FOR CONTRACT NO.: 04-1A5224

DUMBARTON BRIDGE SEISMIC RETROFIT

INFORMATION HANDOUT
Master CD Index

If you have any questions, please contact:

The Toll Bridge Program Duty Senior

District 04 Office

111 Grand AvenueOakland CA 94612

Telephone Number: (510) 286-5209

e-mail address duty_senior_district04@dot.ca.gov

Route: **04-SM/ALA-84-R28.8/R30.2, R0.0/R0.8**

Master CD Index

	File Name	Description
0	Information Handout Index	Index of Information Handout
1	CRWQCB	California Regional Water Quality Control Board (CRWQCB) Water Quality Certification, dated December 3, 2009
2	BCDC 20-73 Amendment 13	San Francisco Bay Conservation and Development (BCDC), Permit No. 20-73, dated Oct 20, 2009
3	Env-Cert	Environmental Certification
4	NMFS_Permit	National Marine Fisheries Service (NMFS) Biological Opinion 151422SWR2009SR00237, dated August 10, 2009
5	Encroachment permits	Encroachment permits # 0497-6UT-0703
6	US Army ACOE_NWP3	United States Army Corps of Engineer (ACOE), Permit No. SPK-2008-00177S, dated Oct 23 , 2009
7	US Army ACOE_NWP14	United States Army Corps of Engineer (ACOE), Permit No. SPK-2009-00253S, dated Oct 7 , 2009
8	USFWS_Permit	United States Fish and Wildlife (USFWS) Biological Opinion File No. 81420-2009-F-0340-1, dated August 14, 2009
9	Foundation report_8-5-09	Foundation Analysis Report, dated Aug 5, 2009 submitted by Earth Mechanics

	File Name	Description

9A	FR_AppendixA	Foundation Analysis Report Appendix A, Idealized Soil Conditions And Foundation Data, dated Aug 5 , 2009 submitted by Earth Mechanics
9B	FR_AppendixB	Foundation Analysis Report Appendix B, T-Z And Q-U Curves, dated Aug 5, 2009 submitted by Earth Mechanics
9C	FR_AppendixC	Foundation Analysis Report Appendix C, Q-δCurves, dated Aug 5, 2009 submitted by Earth Mechanics
9D	FR_AppendixD	Foundation Analysis Report Appendix D, P-Y Curves, dated Aug 5, 2009 submitted by Earth Mechanics
9E	FR_AppendixE	Foundation Analysis Report Appendix E, Lateral Push-Over Curves, dated Aug 5, 2009 submitted by Earth Mechanics
9F	FR_AppendixF	Foundation Analysis Report Appendix F, Q-δCurves At Liquefied State, dated Aug 5, 2009 submitted by Earth Mechanics
9G	FR_AppendixG	Foundation Analysis Report Appendix G, 6x6 Matrices, dated Aug 5, 2009 submitted by Earth Mechanics
9H	FR_AppendixH	Foundation Analysis Report Appendix H, Pushover Analysis And Evaluation Pile Group Stiffness, dated Aug 5, 2009 submitted by Earth Mechanics
9I	FR_AppendixI	Foundation Analysis Report Appendix I, Nonlinear pushover Analysis, dated Aug 5, 2009 submitted by Earth Mechanics
10	Dumbarton_SiteCharRpt	Geotechnical Site Characterization Report, dated October 2, 2008 submitted by Earth Mechanics
10A1	Appendix A previouslotb	Geotechnical Site Characterization Report Appendix A, Logs Of Previous Explorations, dated October 2, 2008 submitted by Earth Mechanics
10A2	Figures	Site location map and photo

	File Name	Description

10B	Appendix B lotbs(3-19-2009)	Geotechnical Site Characterization Report Appendix B, Logs Of Test Borings, dated March 19, 2009 submitted by Earth Mechanics
10C	Appendix C_VaneShear	Geotechnical Site Characterization Report Appendix C, Field Vane Shear Test, dated Feb 28, 2007 submitted by GREGG
10D	Appendix D_suspensionlogging	Geotechnical Site Characterization Report Appendix D, Suspension P&S Velocities, dated April 30, 2007 submitted by Earth Mechanics
10E	Appendix E_cpt	Geotechnical Site Characterization Report Appendix E, Geophysical Survey And Bathymetry Map, dated Dec 6, 2006 submitted by Earth Mechanics
10F1	Appendix F_geophysical_figures. pdf	Geotechnical Site Characterization Report Appendix F, Geophysical Figures, dated Jan 17, 2009 submitted by Earth Mechanics
10F2	Appendix F_geophysical maps	Geotechnical Site Characterization Report Appendix F, Maps, dated Jan 17, 2009 submitted by Earth Mechanics
10F3	Appendix F_geophysical text	Geotechnical Site Characterization Report Appendix F, Text, dated Jan 17, 2009 submitted by Earth Mechanics
10G	Appendix G-labresults	Geotechnical Site Characterization Report Appendix G, Laboratory results, dated March 1, 2007 submitted by Earth Mechanics
10H	Appendix H_UCDavis	Geotechnical Site Characterization Report Appendix H, Laboratory testing, dated July 19, 2007 submitted by UCDavis
10I	Appendix I_photos	Geotechnical Site Characterization Report Appendix I, Photos, dated Jan 7, 2009
11	Pump plant	Pump Station final foundation recommendations, dated Jan 13, 2010 submitted by Division of Engineering Services

	File Name	Description
12	09-06-18 seepage-flow rate estimation for pump plant	Seepage flow rate estimation, dated Jun 18, 2009 submitted by Division of Engineering Services

13	Final Geotech memo Dumbarton Belvedere staircase	Final foundation recommendations for the belvedere staircase, dated Dec 15, 2009 submitted by Earth Mechanics
14	Dumbarton GroundMotion	Ground Motion Study report, dated Mar 27, 2009 submitted by Earth Mechanics
14A1	GM Cover Page	Ground Motion cover page, dated Mar 27, 2009 submitted by Earth Mechanics
14A2	GroundMotion Cover letter	Ground Motion cover letter, dated Mar 27, 2009 submitted by Earth Mechanics
14A3	Appendix A	Probabilistic Seismic Hazard Update Analysis, dated Feb 12, 2009 submitted by Earth Mechanics
14B	Appendix B	Spectrum-compatible time histories, dated Feb 12, 2009 submitted by Earth Mechanics
14C	Appendix C	Pier-Spectrum kinematic motions for see motion set1-FN, dated Feb 12, 2009 submitted by Earth Mechanics
14D	Appendix D	Pier-Spectrum kinematic motions for see motion set1-FN, dated Feb 12, 2009 submitted by Earth Mechanics
15	To-18 ACM_LCP_LSI Report	Asbestos and Lead Containing Paint Survey, and Limited Site Investigation Report, dated Oct, 2009 submitted by GEOCON
16	E8435-06-18 Sediment Report	Sediment Sampling and Analysis Report, dated November, 2009 submitted by GEOCON
17	Upland Report	Upland Site Investigation Report, dated December, 2009 submitted by GEOCON

	File Name	Description
18	Purchase and Price Agreement	Purchase agreement for the supply of friction pendulum bearings, dated Feb 5, 2010 submitted by Earthquake Protection Systems

19	Storm water data report	Storm water data report, dated July 13, 2009 submitted by Caltrans
20	Non Storm Water Info Package	Non Storm Water Information Package
21	BMP for Pile Removal	Best Management practices for pile removal
22	New trestle location	Location map, dated Feb 9, 2010 submitted by Caltrans
23	ConditionTyp	Typical conditions imposed by coast guard

1. CRWQCB

California Regional Water Quality Control Board
San Francisco Bay Region

Linda S. Adams
Secretary for Environmental Protection

1515 Clay Street, Suite 1400, Oakland, California 94612
(510) 622-2300 • Fax (510) 622-2460
http://www.waterboards.ca.gov/sanfranciscobay

Arnold Schwarzenegger
Governor

December 3, 2009
401 Database Site No. 02-41-C0617 (BT)
CIWQS Place No.: 718667

California Department of Transportation
Attn: Mr. Mo Pazooki
Mo_Pazooki@dot.ca.gov
PO Box 23660
Oakland, CA 94623-0660

Subject: Water Quality Certification for the Dumbarton Bridge Structure Rehabilitation Project, San Mateo and Alameda Counties

Department Project No.: EA 04-1A5221

Dear Mr. Pazooki:

We have reviewed and hereby issue water quality certification to the California Department of Transportation (Department) for the project referenced above (hereinafter Project). The U.S. Army Corps of Engineers (Corps) issued Nationwide Permit Nos. 3, *Maintenance*, and 27, *Aquatic Habitat Restoration* (File Number 2008-00177S), pursuant to Section 404 of the Clean Water Act (33 U.S.C. 1344). As such, the Department has applied to the Water Board for a Clean Water Act Section 401 water quality certification that the Project will not violate State water quality standards.

Project: The Department proposes to seismically retrofit an approximately 2.85-mile segment of the Dumbarton Bridge, which connects the cities of Menlo Park and East Palo Alto to the west and the city of Newark to the east. The proposed Project involves strengthening the bridge frames, columns, piles and bent caps. Project activities will be conducted along the entire length of the bridge. All proposed activities shall occur below the superstructure and no new impervious area is proposed. Project construction is expected to begin May 2010 and last approximately three years. The following Project elements are proposed:

Main channel crossing retrofit: From bridge piers 16 to 31, the Department proposes to strengthen the columns, column connections, pile caps, and cross frames. Additional work includes retrofitting hinges, bent caps, and replacing the existing deck joints with "isolation bearings" to accommodate seismic movements.

The bent caps, deck joints, and hinges will be accessed using barges and cranes. Permanent fill to the Bay will occur as a result of adding a reinforced concrete collar around the pile caps.

Retrofit of approach structures: The approach structures are built over San Francisco Bay (Bay) and connect the main channel crossing at both ends to the land-based trestle structures. Work proposed at these locations includes strengthening of the column connections, pile caps, bent caps, and the superstructure.

Permanent fill to the Bay will occur as a result of adding a reinforced concrete collar around the pile caps. Approximately 0.13 acres of temporary fill to the Bay will occur as a result of coffer dam placement and dewatering around each pier. The dewatered areas around the piers will allow for construction of new concrete collars around each column. A vibratory hammer will be used to drive each sheet pile during construction of the coffer dam.

Construction of temporary trestles: Temporary trestles will be built parallel to the bridge and allow access to the bent caps and superstructure. Construction of the trestles will require driving of approximately 1,000 24-inch diameter maximum, steel pipe piles. A total of six to twelve piles will be driven on a daily basis using a vibratory hammer. Each pile will take an average of five minutes to install. The temporary trestles will take approximately six to eight months to construct and be in place for approximately three years. Construction of the temporary trestles will result in approximately 0.20 acres of temporary fill to the Bay.

Fishing Piers: On the western end of the bridge an old fishing pier (Ravenswood Pier) with concrete piles will be removed during construction of the temporary trestle. On the eastern side of the bridge, the existing Dumbarton Pier will remain.

Retrofit of trestle structures: At either end, the trestle structures are land-based and serve as an "anchor for the bridge." They are each 600 feet in length and are composed of twenty 30-foot long spans. The Department will strengthen these structures by installing seismic joint systems in the locations where the existing deck joints connect with the approach structures. Additionally, seven 48-inch diameter steel pipe piles will be driven along each side of the existing structure to provide lateral strengthening.

Direct permanent impacts to jurisdictional wetlands will occur on the northern side of the eastern trestle where all seven piles will be placed into a surface water depression wetland (0.01 acres). Approximately 0.47 acres of this wetland area will be temporarily impacted due to equipment access for pile driving activities.

Construction of Bay wall barrier and pump station: On the northwestern side of the bridge, at the boundary between the Moseley tract and the existing frontage road, an approximately 2,000 linear foot concrete wall is proposed to prevent high tides from inundating the frontage road and the construction site.

A drainage system is also proposed to collect runoff from both the frontage road and State Route 84. Elements of the drainage system include drains, pipes, pump house, pump house outfall, a steel sheet pile barrier driven approximately 20 feet into the ground to prevent Bay water seepage, and an earthen berm on the Bay-side of the wall. All of these elements, with the exception of the pump house and outfall, will be constructed in the footprint of the paved shoulder of the existing access road. The pump house will be approximately 875 square feet and placed underground, supported by four 24 inch diameter steel pipe piles. The outflow pipe from the pump station will be 42 inches in diameter and discharge to a riprap strip placed on the floor of the Bay.

Direct permanent impact to the Bay of approximately 0.01 acres will occur as a result of placement of riprap for the pump station outfall.

Impacts: The Department will permanently fill approximately 0.01 acres of an upland salt marsh due to the placement of seven steel pipe columns and approximately 0.01 acres of intertidal wetland due to placement of rip-rap for the pump station outfall. Additionally, the Department will permanently fill approximately 0.05 acres of the Bay due to installation of concrete collars around existing pile caps.

The Department will temporarily fill approximately 0.13 acres of the Bay as a result of coffer dam placement and dewatering around each pier, approximately 0.47 acres of a surface water depression wetland due to equipment access for pile driving activities, and approximately 0.2 acres of the Bay due to construction of the temporary trestles.

Mitigation: All temporarily impacted areas shall be restored to pre-construction conditions. The Department will remove approximately 0.02 acres of fill from the Bay due to removal of the Ravenswood Pier. At the location where the existing Ravenswood Pier meets the pier, the Department shall create 0.02 acres of tidal wetlands, restore no less than 0.09 acres of intertidal wetlands by removal of rip-rap and grading, and restore an additional 0.04 acres to either intertidal wetland, mudflat, or a transitional area between the two.

Additionally, the Department shall ensure that the installed pump station provides full trash-capture; specifically, the pump station shall trap all particles retained by a 5 mm mesh screen and have a design treatment capacity of not less than the peak flow rate discharge resulting from a one-year, one-hour, storm in the sub-drainage area.

Wetland Tracking System: It has been determined through regional, state, and national studies that tracking of mitigation/restoration projects must be improved to better assess the performance of these projects, following monitoring periods that last several years. In addition, to effectively carry out the State's No Net Loss Policy for wetlands, the State needs to closely track both wetland losses and mitigation/restoration project success. Therefore, we require that the applicant use the Wetland Tracker Standard Form to provide Project information related to impacts and mitigation/restoration measures (see Condition No. 9 of this Certification). An

electronic copy of the form and instructions can be downloaded at: http://www.waterboards.ca.gov/sanfranciscobay/certs.shtml. Project information concerning impacts and mitigation/restoration will be made available at the web link: http://wetlandtracker.org.

CEQA Compliance: On September 2, 2009, the Department prepared a Mitigated Negative Declaration and issued a Notice of Determination that the Project would not have a significant effect on the environment.

Certification: I hereby issue an order certifying that any discharge from the referenced project will comply with the applicable provisions of sections 301 (Effluent Limitations), 302 (Water Quality Related Effluent Limitations), 303 (Water Quality Standards and Implementation Plans), 306 (National Standards of Performance), and 307 (Toxic and Pretreatment Effluent Standards) of the Clean Water Act, and with other applicable requirements of State law. This discharge is also regulated under State Water Resources Control Board Order No. 2003 - 0017 – DWQ, "General Waste Discharge Requirements for Dredge and Fill Discharges That Have Received State Water Quality Certification" which requires compliance with all conditions of this Water Quality Certification. The following conditions are associated with this certification:

1. The Department shall adhere to Corps Nationwide Permit Nos. 3 and 27, issued to the Department on October 23, 2009, and, San Francisco Bay Conservation and Development Commission Permit No. 20-73, as amended October 26, 2009;

2. The Project shall be constructed in conformance with the Project Description described in this certification and July 2009 certification application materials. Any significant change in the Project may require amendment of the certification and shall be reported to the Water Board. Any significant change in Project description must be accepted by the Water Board Executive Officer prior to implementation of said change in the Project;

3. No fueling, cleaning or maintenance of vehicles or equipment shall take place within State waters or within any areas where an accidental discharge to State waters may occur;

4. This certification does not allow for the take, including incidental take, of any State- or Federal-listed threatened or endangered species. The Department is required, as prescribed in the State and/or Federal Endangered Species Acts, to consult with the appropriate agency prior to commencement of the project. Any unauthorized take of such listed species may result in prosecution and would also be considered a violation of this Certification;

5. Immediately following completion of construction activities in any given temporarily impacted area, these areas shall be restored to their pre-construction conditions. A person qualified to assess wetland health and function shall conduct a pre- and post-impact evaluation of wetlands "3, 5, and 7," where approximately 0.47 acres of temporary impacts

are proposed due to construction access. Two reports shall be submitted, subject to the acceptance of Water Board staff:

a. An initial inspection report, including photographs, documenting and describing the pre-construction condition of the wetlands and the installation of the construction access apparatus. This report shall include an assessment of wetland soil compaction. Prior to installation of the construction access apparatus, the Department shall contact Water Board staff to arrange a possible site visit to observe its installation; and,
b. A post-inspection report, including photographs, documenting and describing wetland conditions after the construction access apparatus has been removed. Wetland conditions shall be evaluated using the same metrics detailed in the initial inspection report. This report shall also include an assessment of wetland soil compaction, including areas where heavy equipment had been staged. The report shall include a description of mitigation measures necessary to return the wetlands to their original condition.

6. The Department shall create 0.02 acres of tidal wetlands, restore no less than 0.09 acres of intertidal wetlands by removal of rip-rap and grading, and restore an additional 0.04 acres to either intertidal wetland, mudflat, or a transitional area between the two. All mitigation shall be fully constructed by the end of Project construction;

7. Native wetland vegetation (e.g., pickleweed, cordgrass) shall establish within a contiguous 0.02 acre area of the mitigation limits, at no less than 75% total coverage area;

8. The Department shall monitor and submit annual monitoring reports to the Water Board detailing progress of the on-site wetland mitigation, for not less than five years. After five years, the Department shall continue to monitor the mitigation site and submit biannual reports to the Water Board until the success criteria is met. If the success criteria is not met at year ten, the Department shall contact staff of the Water Board and propose a revised mitigation strategy;

9. The Department is required to use the standard Wetland Tracker form to provide Project information describing impacts and restoration measures within 30 days from the date of this certification. An electronic copy of the form can be downloaded at: http://www.waterboards.ca.gov/sanfranciscobay/certs.shtml. The completed Wetland Tracker form shall be submitted electronically to wetlandtracker@waterboards.ca.gov or shall be submitted as a hard copy to both: (a) the Water Board (see the address on the letterhead), to the attention of Wetland Tracker and, (b) San Francisco Estuary Institute, 7770 Pardee Lane, Oakland, CA 94621-1424, to the attention of Mike May;

10. Not later than January 4, 2010, the Department shall submit plans demonstrating that the proposed pump station shall trap all particles retained by a 5 mm mesh screen and have a

design treatment capacity of not less than the peak flow rate discharge resulting from a one-year, one-hour, storm in the sub-drainage area;

11. Upon completion of construction of the pump station, the Department shall submit as-built and operation and maintenance plans;

12. The Resident Engineer shall hold on-site water quality permit (i.e., this Water Quality Certification and Department's stormwater NPDES permit - Order No. 99-06-DWQ) compliance meetings (similar to tailgate safety meetings) to discuss permit compliance including instructions on how to avoid violations and procedures for reporting violations. The meetings shall be held at least every other week, and particularly before forecasted storm events and when a new contractor or subcontractor arrives to begin work at the site. The contractors, subcontractors and their employees, as well as any inspectors or biological monitors assigned to the project, shall be present at the meetings. Caltrans shall maintain dated sign-in sheets for attendees at these meetings, and shall make them available to the Regional Water Board on request;

13. The Department shall maintain a copy of this water quality certification at the Project site so as to be available at all times to site operating personnel. It is the responsibility of the Department to assure that all personnel (employees, contractors, and subcontractors) are adequately informed and trained regarding the conditions of this certification;

14. Discharge of treated ground or stormwater to waters of the state is prohibited in instances when residual concentrations of the flocculent or coagulant treatment agent used cannot be reliably detected in effluent at or below the lowest established freshwater chronic and acute toxicity thresholds for that agent;

15. Except as expressly allowed in this Certification, the discharge, or creation of the potential for discharge, of any soil materials including fresh concrete, cement, silts, clay, sand and other organic materials to waters of the State is prohibited;

16. This certification action is subject to modification or revocation upon administrative or judicial review, including review and amendment pursuant to Section 13330 of the California Water Code (CWC) and Section 3867 of Title 23 of the California Code of Regulations(23 CCR);

17. This certification action does not apply to any discharge from any activity involving a hydroelectric facility requiring a Federal Energy Regulatory Commission (FERC) license or an amendment to a FERC license, unless the pertinent certification application was filed pursuant to California Code of Regulations (CCR) Title 23, Subsection 3855(b) and that application specifically identified that a FERC license or amendment to a FERC license for a hydroelectric facility was being sought; and,

18. Certification is conditioned upon total payment of the full fee required in State regulations (23 CCR Section 3833). Full payment of $3402.50 was received on June 10, 2009.

We anticipate your cooperation in implementing these conditions. However, please be advised that any violation of water quality certification conditions is a violation of State law and subject to administrative civil liability pursuant to California Water Code (CWC) section 13350. Failure to respond, inadequate response, late response, or failure to meet any condition of this certification may subject you to civil liability imposed by the Water Board to a maximum of $5,000 per day per violation or $10 for each gallon of waste discharged in violation of this certification.

Conditions 5, and 8 - 12 are requirements for information or reports. Any requirement for a report made as a condition to this action is a formal requirement pursuant to CWC section 13267, and failure or refusal to provide, or falsification of such required report is subject to civil liability as described in CWC section 13268.

Should new information come to our attention that indicates a water quality problem with this project, the Water Board may issue Waste Discharge Requirements pursuant to 23 CCR Section 3857.

If you have any question, please contact Brendan Thompson at (510) 622-2506, or via e-mail to BThompson@waterboards.ca.gov.

Sincerely,

Bruce H. Wolfe
Executive Officer

cc (via e-mail): Mr. Bill Orme SWRCB-DWQ
Mr. Hal Durio, USACE
Ms. Jane Hicks, USACE
Mr. Cameron Johnson, USACE
Mr. Rafael Montes, BCDC
Mr. Dale Bowyer, Water Board
Ms. Melissa Escaron, Fish and Game, Yountville
Mr. Hardeep Takhar, Caltrans
Mr. David Smith, USEPA
Ms. Jacqueline Pearson-Meyer, NMFS

2. BCDC 20-73 AMEND 13

Making San Francisco Bay Better

BCDC Original

PERMIT NO. 20-73
(Issued on February 27, 1974, As
Amended Through October 26, 2009)
AMENDMENT NO. THIRTEEN

Department of Transportation
District 4
P. O. Box 23660
Oakland, California 94623-0660

ATTENTION: James Richard, District Deputy Director
Division of Environmental Sciences and Engineering

Ladies and Gentlemen:

On February 21, 1974, the San Francisco Bay Conservation and Development Commissin, by a vote of 19 affirmative, 1 negative, approved the resolution pursuant to which the original permit had been issued. ~~Moreover, on~~ On December 26, 1974, January 19, 1976, February 9, 1977, December 5, 1977, February 28, 1978, September 27, 1979, December 9, 1983, March 26, 1985, July 17, 1986, May 20, 1992, ~~and~~ June 10, 1993, and April 12, 1995, pursuant to Regulation Section 10822, the Executive Director approved Amendment Nos. One, Two, Three, Four, Five, Six, Seven, Eight, Nine, Ten, Eleven, and Twelve, respectively. Moreover, on September 3, 2009, the San Francisco Bay Conservation and Development Commission, by a vote of 17 affirmative, 0 negative, approved the resolution pursuant to which Amendment No. Thirteen to the permit is hereby issued:

1. **Authorization**

A. Subject to the conditions stated below, the permittee, the California Department of Transportation, District 4 (Caltrans), is granted permission to:

1. **Original Bridge Construction and Related Work**

a. Construct and use a four-lane, high-level bridge with approaches, including:

(1) Constructing 31 shallow water piers and 11 deep water piers, including fender system for two piers and filling .89 acres of the Bay to support a 7,400-foot-long by 85-foot-wide bridge providing navigation clearance of 85 vertical feet ~~vertically~~ at the main shipping channel and covering 14.2 acres of Bay surface area;

(2) Filling 50 acres of salt ponds with 650,000 cubic yards of earth and rock to construct a 2-1/2 mile long, 94-foot-wide limited-access east approach to the bridge including a 600-foot-long approach trestle;

(3) Filling 3-1/4 acres of salt ponds, 5-3/4 acres of marsh and 1-3/4 acres of managed wetland with 260,000 cubic yards of fill to construct a 1-1/3 mile long by 94-foot-wide limited-access, west approach to the bridge including a 600-foot-long approach trestle, which shall include no more than six access points solely for ingress and egress to the already filled property known as the "Raychem Property" situated north of the approach;

(4) Constructing a bicycle and pedestrian path on the south side of the bridge no less than eight feet wide; and

(5) Constructing temporary access trestles and work platforms adjacent to the shallow water piers used for the purpose of constructing the shallow water piers and erecting girders for the bridge.

b. Construct and use four limited-access connecting roads to the approaches of the bridge, with adjacent bicycle paths when required under the conditions of this permit, as amended, including:

(1) Filling 15 acres of salt crystallization ponds with 155,000 cubic yards of material to construct a three-mile-long by 225-foot-wide easterly connector road; and

(2) Constructing three westerly connector roads to, and widening portions of, Willow Road, Marsh Road and University Avenue, each approximately 90 feet wide and having a total length of 4-1/2 miles.

c. Improve the existing approaches located on fill in conjunction with the development of the San Francisco Bay National Wildlife Refuge to provide (1) the bicycle path required under Special Conditions II-C-1 and II-C-3; (2) roadways that will provide improved public access to the Bay and shoreline for viewing, walking, fishing, picnicking, sitting, bicycling, and related purposes; and (3) roadways necessary to maintain existing uses within the Commission's jurisdiction.

d. Place 650 cubic yards of material to construct a 5,200-square-foot rock surface public access area and place a total of 4,000 square feet of landscaping on the north and south sides of the area.

e. Dredge 121,000 cubic yards of material from the Bay to construct the bridge and dispose of the spoils at the U. S. Army Corps of Engineers' approved dumping ground off Alcatraz Island.

f. Create and use for marshland, wildlife habitat and open space at least 200 acres of dry land diked-off from the Bay prior to September 17, 1965.

g. Remove nine steel truss spans from the existing bridge to areas outside the Commission's jurisdiction and, as provided for in Special Condition II-C-2, remove up to 4,000 linear feet of trestle-supported approaches to the existing b ridge, including removing all concrete pilings to or below the mud line.

h. Make improvements to the area in and around Pier 44 by: (1) remodeling the interior of Pier 44 to provide offices, restrooms and other facilities for maintenance employees; (2) paving an approximately 3,600-square-foot area with asphalt for use as a storage area for maintenance equipment; (3) installing approximately 153 linear feet of 8-foot-high chain link fence with 1.5-foot-high barbed wire on top of the fence around the perimeter of the asphalt area; (4) paving a 4,400-square-foot area for 10 employee parking spaces; and (5) paving the interior of the "Bent E-20" Pier for use as storage.

i. Facilitate preventive maintenance works of the bridge by installing: (1) a moveable scaffold system, 8 feet 2-1/2 inches long (along the length of the bridge) and 89 feet 6 inches wide (across the cross-section of the bridge); (2) 5,210 feet of a 4 inch-in-diameter airline; and (3) 5,210 feet of a two-inch-in-diameter waterline.

2. **2009 Seismic Retrofit Project (Amendment No. Thirteen)**

a. **In the Bay:**

(1) Construct, use and maintain approximately 5,000 square feet (0.11 acres, 1,700 cubic yards) of submerged concrete collar bolsters on the footing pedestals of Piers 5 to 15 and 32 to 40;

(2) Construct, use and maintain approximately 500 square feet (0.01acres, 100 cubic yards) of rock riprap at a drainage outfall on the north side of the west approach of the bridge;

(3) Construct, use, maintain and, at project completion, remove two temporary pile-supported construction trestles covering an approximately 400,000-square-foot area (9.18 acres, 800 cubic yards);

(4) Construct, use, maintain and, at project completion, remove 20 temporary cofferdams surrounding the shallow-water piers (Piers 5 to 15 and 32 to 40) on the east and west sides of the bridge covering approximately 2,560 square feet (0.06 acres, 1,700 cubic yards); and

(5) Demolish and remove the pile-supported Ravenswood Pier (a segment of the former Dumbarton Drawbridge) on the southwest side of the bridge covering approximately 63,000 square feet (1.45 acres) including all pilings at least two feet below the mudline, the pier abutment, riprap and any debris placed in the mudflat beneath the trestle.

b. **Within the existing bridge footprint:**

(1) Construct, use and maintain 96 isolator bearings between the superstructure and the substructure (intermediate pads between the deck girder and the pier bent cap) at 16 of the main crossing channel piers, piers 16 to 31;

(2) Construct, use and maintain column and bent cap concrete bolsters (reinforced concrete encasements) and footing overlays from Piers 5 to 40;

(3) Replace existing deck joints with a special seismic joint system to accommodate seismic movements at Pier 16 and Pier 31;

(4) Retrofit, use and maintain two bridge hinges (deck section separation openings for seismic displacement) at spans 21 and 25; and

(5) Retrofit, use and maintain 13 sets of steel cross frames (strengthening steel bracings) inside the steel box girders under the bridge deck from Piers 16 to 31.

c. **Within the 100-foot Shoreline Band, Salt Ponds and the Managed Wetland:**

(1) Construct, use and maintain a flood prevention system north of the western approach including: (a) a 2,000-foot-long, 39- to 56-inch-tall concrete high-tide barrier and contiguous underground sheet piling to prevent seepage; (b) a 2,000-foot-long, 36-inch-in-diameter drainage pipe; (c) a 900-square-foot pump station; and (d) an approximately 9,776-square-foot dirt embankment adjacent to the pump station;

(2) Construct, use and maintain an approximately 1,256-square-foot public access lookout on the south side of the western bridge approach (this lookout replaces the overlook currently on the north side of the western bridge approach required in BCDC Permit No. 16-99);

(3) Enhance, use and maintain an existing 5,200-square-foot rock surface public access area immediately south of the Dumbarton Pier on the east approach;

(4) Construct, use and maintain an approximately 96-square-foot overlook (belvedere) on the top of a new outrigger-pile along the southern side of the western bridge approach, with a staircase to a small public plaza with special paving, seating and landscaping, located adjacent to the public access parking lot;

(5) Construct, use and maintain a total of 28 four-foot-in-diameter lateral piles, on both sides (seven piles per side) of the east and west bridge approaches ;

(6) Widen, to at least eight feet, improve, use and maintain the path that transitions between the bridge and frontage road paths;

(7) Use and maintain construction staging areas during the bridge retrofit and, at project completion, repave and restripe all public access parking areas impacted by construction activities;

(8) Temporarily remove 84 parking spaces from the west side and 46 parking lot spaces from the east side of the bridge to accommodate construction activities, and, at project completion, restore and maintain 86 out of a total of 96 parking lot spaces on the west side, and all 80 parking lot spaces on the east side of the bridge. Repave, restripe, use and maintain the existing 25,000-square-foot public access parking lot, the 120,000-square-foot frontage road on the south and north sides of the west approach of the bridge; and the existing 67,000-square-foot public access parking lot at the east approach of the bridge;

(9) Install, use and maintain way finding and interpretive signs in all public access areas within Caltrans right-of-way and, with the approval and direction of local government, install up to 50 way finding signs between the BART station in Union City and Fremont and the Caltrain station in Menlo Park (way finding signs outside of Caltran's right-of-way will be maintained by local government); and

(10) Install, use and monitor for a period of ten years an approximately 6,534-square-foot (0.15 acre) mitigation wetland adjacent to the former Ravenswood Pier.

B. This permit, as amended, is generally pursuant to and limited by the application filed with the Commission on December 7, 1973, and your amendments issued December 26, 1974, January 19, 1976, February 9, 1977, December 5, 1977, February 28, 1978, September 27, 1979, December 8, 1983, March 26, 1985, July 17, 1986, November 25, 1991, March 12, 1993, ~~and~~ May 17, 1993, and February 25, 2009, including all attached and subsequently submitted exhibits and correspondence, but subject to the modifications required by conditions hereto.

C. Work authorized by the original permit was to ~~herein must~~ commence prior to March 31, 1978, or ~~this~~ the permit, as amended, ~~will~~ was to lapse and become null and void. Such work ~~must also~~ was to be diligently pursued to completion and ~~must~~ was to be completed by December 31, 1987, unless an extension of time ~~is~~ was granted by a further amendment of this amended permit. Work authorized by Amendment No. Ten ~~must~~ was to be completed by June 1, 1995.

D. Work authorized by Amendment No. Eleven ~~must~~ was to commence prior to September 30, 1993, or ~~this~~ the permit, as amended, ~~will~~ was to lapse and become null and void. Such work ~~must also~~ was to be diligently prosecuted to completion and ~~must~~ was to be completed by September 30, 1994, unless an extension of time ~~is~~ was granted by a further amendment of this amended permit prior to the date of expiration.

E. Work authorized by Amendment No. Thirteen must commence prior to December 31, 2012 or the permit, as amended, will lapse and become null and void. Such work must also be diligently pursued to completion and must be

completed within five years of commencement or by December 31, 2017, unless an extension of time is granted by a further amendment of this amended permit prior to the date of expiration.

II. Special Conditions

The amended authorization made herein shall be subject to the following special conditions, in addition to the standard conditions in Part IV:

A. **Specific Plans, Plan Review, and Incidental Harassment Authorization Requirements**

1. **Plan Review.** Work authorized herein may be completed under multiple construction contracts. No work shall commence under an individual construction contract until final precise grading, drainage, mobilization, staging, site, engineering, landscaping, public access and shoreline clean-up plans and other relevant criteria, specifications, and plan information for that portion of the work, for each specific contract, have been submitted to, reviewed, and approved in writing by or on behalf of the Commission for work within the Commission's jurisdiction or for required public access either within or outside the Commission's jurisdiction. The specific drawings and information required will be determined by the Commission staff. To save time, preliminary drawings should be submitted and approved prior to final drawings. No changes to the design of the project shall be made without the prior written approval by or on behalf of the Commission.

2. **Grading, Drainage, Mobilization, Staging, Site, Architectural, Landscaping, and Public Access Plans.** Final plans shall include and clearly label the mean high tide line, or, in areas with marsh vegetation, the inland edge of marsh vegetation up to 5.0 feet above mean sea level, the line 100 feet inland of the mean high tide line or the inland edge of marsh vegetation, property lines, the boundaries of all areas to be reserved for public access purposes and open space, and details showing the location, types, dimensions, and materials to be used for all structures, irrigation, landscaping, drainage, erosion control, seating, parking, signs, lighting, fences, paths, trash containers, utilities and other proposed improvements.

   Engineering plans shall include a complete set of contract drawings and specifications and design criteria. The design criteria shall be appropriate to the nature of the project, the use of any structures, soil and foundation conditions at the site, and potential earthquake-induced forces. Final plans shall be signed by the professionals of record and be accompanied by:

   a. Evidence that the project design complies with all applicable Caltrans design standards and all other applicable codes; and

   b. Evidence that an independent or in-house peer review panel has reviewed the project (except that such evidence may be waived by the staff, upon consultation with the Chair of the Engineering Criteria Review Board (ECRB), if peer review is determined not to be necessary).

3. **Plan Requirements.** Plans submitted shall be accompanied by a letter requesting plan approval, identifying the type of plans submitted, the portion of the project involved, and indicating whether the plans are final or preliminary. Approval or disapproval shall be based upon:

   a. Completeness and accuracy of the plans in showing the features required above, particularly the mean high tide line or the line 5.0 feet above mean sea level, property lines, and the line 100 feet inland of the mean high tide line or the inland edge of marsh vegetation up to 5.0 feet above mean sea level, and any other criteria required by this authorization;

   b. Consistency of the plans with the terms and conditions of this authorization;

   c. The provision of the amount and quality of public access to and along the shoreline and in and through the project to the shoreline required by this authorization;

   d. Consistency with legal instruments reserving public access and open space areas;

   e. Assurance that any fill in the Bay does not exceed this authorization and will consist of appropriate shoreline protection materials as determined by or on behalf of the Commission;

   f. Consistency of the plans with the recommendations of the Design Review Board, as applicable;

   g. Consistency of the plans with the recommendations of the Engineering Criteria Review Board; and

   h. Assurance that appropriate provisions have been incorporated for safety in case of a seismic event.

   Plans submitted for review shall be reviewed by or on behalf of the Commission as soon as possible, and shall be completed within 45 days after receipt of the plans to be reviewed.

4. **Conformity with Final Approved Plans.** All work, improvements, and uses shall substantially conform to the final approved plans. Prior to any public use of the facilities authorized herein, the appropriate design professional(s) of record shall certify in writing that, through personal knowledge, the work covered by the authorization has been performed in accordance with the approved design criteria and in substantial conformance with the approved plans. No noticeable changes shall be made thereafter to any final plans or to the exterior of any outside fixture, railing lighting, landscaping, signage, parking area, public access amenities, or shoreline protection work without first obtaining written approval of the change(s) by or on behalf of the Commission.

5. **Discrepancies between Approved Plans and Special Conditions.** In case of any discrepancy between final approved plans and special conditions of this authorization or legal instruments approved pursuant to this authorization, the special conditions or the legal instrument shall prevail. The permittee is

responsible for assuring that all plans accurately and fully reflect the special conditions of this authorization and any legal instruments submitted pursuant to this authorization.

6. **Appeals of Plan Review Decisions**. Any plan approval, conditional plan approval or plan denial may be appealed by the permittee or any other interested party to the Design Review Board or, if necessary, subsequently to the Commission. Such appeals must be submitted to the Executive Director within 30 days of the plan review action and must include the specific reasons for appeal. The Design Review Board shall hold a public hearing and act on the appeal within 60 days of the receipt of the appeal. If subsequently appealed to the Commission, the Commission shall hold a public hearing and act on the appeal within 90 days of the receipt of the subsequent appeal.

7. **Incidental Harassment Authorization Approval.** No work shall commence until the permittee provides the Commission with an approved NOAA Incidental Harassment Authorization for marine mammals and incorporates any required mitigation measures into construction practices for the seismic retrofit project.

~~C.~~ B. **Public Access.** Until this permit, as amended, is revoked, or otherwise modified by or on behalf of the Commission, the permittee shall construct, hold and maintain the following areas of the project open to the public for access to the shoreline of San Francisco Bay and to the Bay itself for viewing, fishing, walking, picnicking, sitting, bicycling, and related purposes, the exact configuration of the areas to be delineated on plans to be submitted to, and approved by or on behalf of the Commission ~~prior to the commencement of any work authorized hereunder~~ pursuant to Special Condition II-A, herein:

1. **Public Access Requirements Associated with Original Bridge Authorization (through Amendment No. 12):**

   a. **Eastern Approach.** A hard surface, all-weather bicycle/pedestrian pathway, no less than 10 feet wide and involving no new fill, extending from the area occupied by the existing toll plaza, along the south side of the frontage road to be constructed on the existing approach road fill, to a connection with the bicycle/pedestrian path described in ~~Subparagraph 3 below~~ Special Condition II-B-1c.

   b. **Eastern Trestle.** A 5,200-square-foot rock surface public access meeting area, involving the placement of 650 cubic yards of material, to be constructed near the ~~fishing~~ Dumbarton Pier described ~~in Special Condition II-C-2~~ herein.

   c. **Bridge.** A hard surface, all-weather bicycle/pedestrian pathway, no less than 8 feet wide, extending from the ~~end of the pathway described in Subparagraph 1~~ eastern approach described above, along the south side of the new high-level bridge, but separated from the roadway by a concrete barrier or similar structure, to ~~a connection with the bicycle/pedestrian path described in Subparagraph 4 below~~ the western approach described below.

d. **Western Approach.** A hard surface, all-weather bicycle/pedestrian pathway, no less than 10 feet wide, extending from the end of the pathway described in ~~Subparagraph 3~~ Special Condition II-B-1c, along either the new approach or the south or north side of the frontage road to be constructed on the existing approach road fill, to a connection with the eastern end of each of the westerly connectors to be constructed as part of the project.

e. **Western~~ly~~ Connectors.** A hard surface, all-weather bicycle/pedestrian pathway, no less than 10 feet wide except where a narrow width (not less than 8 feet) may be necessary along Willow Road due to the proximity of existing buildings, extending from the ends of the ~~pathway, described in Subparagraph 4~~ western approach described above, along each of the westerly connectors to the westerly limits of the project.

f. **Toll Plaza.** An all-weather bicycle/pedestrian path, no less than 10 feet wide, extending through, or over, the proposed new toll plaza and connecting proposed trails extending north and south from the toll plaza.

2. **Public Access Improvements Associated with the 2009 Seismic Retrofit Project (Amendment No. 13)**

a. Prior to the substantial completion of the seismic retrofit work, or by June 30, 2015, whichever is sooner, the permittee shall install the following improvements:

(1) An approximately 96-square-foot overlook (belvedere) on the top of a new outrigger-pile along the southern side of the western bridge approach, with a staircase to a small public plaza with special paving, seating and landscaping, located adjacent to the public access parking lot;

(2) An enhanced public access picnic/viewing area at the eastern bridge approach;

(3) A flood protection wall and pump station to prevent tidal inundation of the public access parking lot;

(4) Approximately 50 way finding signs directing bicyclists to the bicycle route between the Union City and Fremont BART stations and the Caltrans station in Menlo Park with approval and direction of the respective local government; and

(5) Approximately 400 feet of the bicycle/pedestrian path where it transitions from the bridge to the frontage road at both the west and east bridge approaches, including widening the path, relocating the path away from the vehicle travel lanes, if possible, eliminating existing impediments (e.g., utility covers), and installing a concrete barrier between the travel lanes and path.

b. Within one year of the removal of the temporary construction trestles, the permittee shall install a substantial public access overlook with railings, seating, seatwalls, special paving, interpretive elements, landscaping and lighting that is constructed at the site of the removed Ravenswood Pier required by BCDC Permit No. 16-99.

3. **Future Design Review.** Conceptual plans for the public access required herein shall be reviewed by or on behalf of the Commission's Design Review Board (Board) prior to submittal of construction documents to the staff for final approval pursuant to Special Condition II-A.

4. **Public Access Safety During Seismic Retrofit Construction.** During the construction of the seismic retrofit project, the permittee shall inform visitors of the Dumbarton Pier that construction activities could be hazardous to their hearing. To further protect the public, the permittee may close certain portions of the fishing pier during pile driving activities and during construction of the bridge pile caps. These limited area closures shall occur in 10-minute increments, totaling no more than approximately 1.5 hours a day of impeded access while other areas of the fishing pier remain open.

5. **Public Parking During Seismic Retrofit Construction.** Construction operations are anticipated to result in the temporary removal of 84 parking spaces out of a total of 96 spaces at the west approach and 46 spaces out of a total of 80 spaces from the east approach. To maintain public access to the area during construction, the permittee shall provide 12 temporary public shore parking spaces along the frontage road at the western approach and 32 temporary parking spaces along Marshlands Road at the eastern approach.

6. **Bicycle and Pedestrian Shuttle During Seismic Retrofit Construction.** Due to construction activities, public access on the bridge is likely to be closed to all motorized and pedestrian traffic for 2 to 4 weekends over the course of the project. During these closures, the permittee shall provide a shuttle from sunrise to sunset to transport bicyclists and pedestrians to the other side of the bridge.

7. **Minimizing Construction Interruptions.** The permittee shall make every effort to minimize closures and impacts to existing public access areas during project construction. These existing public access areas shall be open to the public after 5:00 p.m. and on weekends whenever possible, unless it is determined by the construction engineer that the path is unsafe for public use due to construction activities. In addition, signs shall be installed at all public access entrances informing the public of why the path is closed, when the path is open, possible detours, and when project construction will be completed.

8. **Maintenance.** The areas and improvements within the total public access areas shall be permanently maintained by and at the expense of the permittee or their assignees. Such maintenance shall include but is not limited to: repairs to all path surfaces; replacement and maintenance of any trees or other plant materials that die or become unkempt; repairs or replacement as needed of any public access amenities such as signs, benches, and trash containers; periodic cleanup of litter

and other materials deposited within the access areas; removal of any encroachments into the access areas; and assuring that public access signs remain in place and visible. Within 30 days after notification by staff, the permittee shall correct any maintenance deficiency noted in a staff inspection of the site.

9. **Reasonable Rules and Restrictions.** The permittee may impose reasonable rules and restrictions for the use of the public access areas to correct particular problems that may arise. Such limitations, rules, and restrictions shall have first been approved in writing by or on behalf of the Commission upon a finding that the proposed rules would not significantly affect the public nature of the area, would not unduly interfere with reasonable public use of the public access areas, and would tend to correct a specific problem that the permittee has both identified and substantiated. Rules may include restricting hours of use and delineating appropriate behavior.

10. **Permanent Guarantee**. Prior to the substantial completion of the seismic retrofit project authorized pursuant to Amendment No. 13, the permittee shall, by instrument or instruments acceptable to counsel for the Commission, dedicate to a public agency or otherwise permanently guarantee such rights for the public as described herein. The instrument(s) shall create rights in favor of the public, which shall commence no later than after completion of construction of any public access improvements required by this amended authorization. Such instrument shall be in a form that meets recordation requirements of either Alameda or San Mateo Counties and shall include a legal description of the property being restricted and a map that clearly shows and labels the shoreline, the property being restricted for public access, the legal description of the property and of the area being restricted for public access, and other appropriate landmarks and topographic features of the site, such as the location and elevation of the top of bank, any levees, any significant elevation changes, and the location of the nearest public street(s) and adjacent public access areas. Approval or disapproval of the instrument shall occur within 30 days after submittal for approval and shall be based on the following:

    a. Sufficiency of the instrument to create legally enforceable rights and duties to provide the public access area required by this authorization;

    b. Inclusion of the exhibit to the instrument that clearly shows the area to be reserved with a legally sufficient description of the boundaries of such area; and

    c. Sufficiency of the instrument to create legal rights in favor of the public for public access that will run with the land and be binding on any subsequent purchasers, licensees, and users.

11 **Recordation of the Instrument.** Within 30 days after approval of the instrument, the permittee shall record the instrument on all parcels affected by the instrument and shall provide evidence of recording to the Commission. No changes shall be made to the instrument after approval without the express written consent by or on behalf of the Commission.

12. **Assignment.** The permittee shall transfer maintenance responsibility to a public agency or another party acceptable to the Commission at such time as the property transfers to a new party in interest but only provided that the transferee agrees in writing, acceptable to counsel for the Commission, to be bound by all terms and conditions of this amended permit.

13. **Accessible to Persons with Disabilities.** All public access facilities authorized or required herein shall be designed and built so that they are accessible to persons with disabilities.

C. **Riprap**

1. **Riprap Material.** Riprap material shall be either quarry rock or specially cast or carefully selected concrete pieces free of reinforcing steel and other extraneous material and conforming to quality requirements for specific gravity, absorption, and durability specified by the California Department of Transportation or the U. S. Army Corps of Engineers. The material shall be generally spheroid-shaped. The overall thickness of the slope protection shall be no more than three feet measured perpendicular to the slope. Use of dirt, small concrete rubble, concrete pieces with exposed rebar, large and odd shaped pieces of concrete, and asphalt concrete as riprap is prohibited.

2. **Riprap Placement.** Riprap material shall be placed so that a permanent shoreline with a minimum amount of fill is established by means of an engineered slope not steeper than one and one-half (horizontal) to one (vertical). The slope shall be created by the placement of a filter layer protected by riprap material of sufficient size to withstand wind and wave generated forces at the site.

3. **Riprap Plans**

   a. **Design.** Professionals knowledgeable of the Commission's concerns, such as civil engineers experienced in coastal processes, should participate in the design of the shoreline protection improvements authorized herein.

   b. **Plan Review**. The placement of riprap authorized herein shall be built generally in conformance with the conceptual plans submitted with the application for Amendment No. 13. No work whatsoever shall be commenced on the shoreline protection improvements authorized herein until final riprap plans have been submitted to, reviewed, and approved in writing by or on behalf of the Commission. The plans shall consist of appropriate diagrams and cross-sections that: (1) show and clearly label the Mean High Tide Line, or the inland edge of marsh vegetation five feet above Mean Sea Level in marshlands, property lines, grading limits, and details showing the location, types, and dimensions of all materials to be used; (2) indicate the source of all materials to be used; and (3) indicate who designed the proposed shoreline protection improvements and their background in coastal engineering and familiarity with the Commission's concerns. Approval or disapproval of the plans shall be based upon: (1) completeness and accuracy of the plans in showing the features required above; (2) consistency of the plans with the terms and conditions of this permit; (3) assurance that the proposed fill material does not exceed this permit; (4) the appropriateness of the types of fill material and their proposed manner of placement; and (5) the preparation of

the plans by professionals knowledgeable of the Commission's concerns, such as civil engineers experienced in coastal processes. All improvements constructed pursuant to this permit shall conform to the final approved plans. No changes shall be made thereafter to any final plans or to the constructed shoreline protection improvements without first obtaining written approval of the change(s) by or on behalf of the Commission.

4. **Maintenance**. The shoreline protection improvements authorized herein shall be regularly maintained by, and at the expense of, the permittee, any assignee, lessee, sublessee, or other successor in interest to the project. Maintenance shall include, but not be limited to, collecting any riprap materials that become dislodged and repositioning them in appropriate locations within the riprap covered areas, replacing in-kind riprap material that is lost, repairing the required filter fabric as needed, and removing debris that collects on top of the riprap. Within 30 days after notification by the staff of the Commission, the permittee or any successor or assignee shall correct any maintenance deficiency noted by the staff.

~~A.~~ D. **Mitigation for Fill Impacts.** The permittee shall fully complete the following mitigation measures to minimize Bay fill and offset the adverse impacts of the project authorized herein on Bay-related resources and endangered species:

1. **Bay Restoration and Mitigation.** Prior to the commencement of any work authorized herein, the permittee shall submit for approval by the Commission, a plan to increase the public benefits of the project and to mitigate the unavoidable adverse environmental impacts of the project. The plans shall meet the following criteria:

   a. **Preparation.** The plan shall be prepared jointly by the permittee and the Commission with maximum feasible public participation.

   b. **Cost.** The cost of preparing and carrying out the plan (including acquisition) shall be $900,000.

   c. **Acquisition**

      (1) **New Bay Surface Area.** An area or areas totaling not less than 200 acres in size consisting of land, preferably in the South Bay (1) not now subject to tidal action; (2) not now used for the solar evaporation of sea water in the course of salt production; and (3) diked-off from the Bay prior to September 17, 1965, shall be acquired and restored to tidal action.

      (2) **Other Areas.** To the extent that the funds available under Paragraph 2 are not exhausted by the acquisitions required under Subparagraph a, they shall be devoted to acquisition that will reduce or eliminate development pressures on wetlands and salt ponds which are in the Commission's jurisdiction and on which the project will have a material growth-inducing impact. Such acquisitions shall encourage retention of such areas in their present uses, and may take the form of (a) purchase of the right to future development of the areas; (b) fee acquisition with a lease back to permit continuation of present uses;

or (c) any combination thereof. The first priority for such acquisitions shall be areas on the western side of the Bay outside the preliminary boundaries of the proposed San Francisco Bay National Wildlife Refuge in the vicinity of the proposed western connectors.

2. **New Tidal Marsh Creation.** Within one year of completion of the seismic retrofit project, or by January 1, 2015, whichever is earlier, the permittee shall create a 6,534-square-foot (0.15 acre) tidal marsh at the land end of the former Ravenswood Pier. Existing fill shall be excavated to promote positive drainage and to create elevations suitable for tidal flat (approximately 70 percent of the restoration site) and marsh establishment (approximately 30 percent of the restoration site). A restoration plan and proposed monitoring program, as described by Special Condition II-D-3 must be approved by or on behalf of the Commission pursuant to Special Condition II-A.

3. **Marsh Restoration Work and Plans.** A restoration plan and program for the 6,534-square-foot new tidal marsh shall be approved by or behalf of the Commission and shall contain the following:

   a. **Site Conditions and Modifications.** A topographic map of the site at one-foot contour intervals and a topographic map showing any proposed site modifications. All elevations shall be relative to National Geodetic Vertical Datum (NGVD). The map shall include typical cross-sections showing the proposed marsh plain elevations, any channels, and any high spots. The map shall show: (1) figures for the ratios of typical horizontal to vertical slopes for existing and proposed marsh surface, channels, and sloughs; (2) proposed plant species along the cross-sections according to their expected zone of growth; (3) the elevation of adjacent surrounding properties; and (4) figures for the estimated tidal range related to Mean Higher High Water, Mean High Water, Mean Lower Low Water, Mean Sea Level, the maximum predicted tide, and the 100-year tide. To promote natural sedimentation and colonization of the site, constructed elevations shall generally be six to twelve inches lower than target elevations. The permittee shall provide the range of elevations where target species are found in neighboring marshes.

   b. **Soil Information.** The program shall include a report identifying the type of soils found at the restoration site, at a nearby reference site, and the soil type of any fill to be imported to the site. Information shall be provided on the quantitative soil measurements of soil texture and dry density for soils at the site, at the reference site, and for all imported soils. All imported soils must be within 10% of the range of values found at the reference marsh for soil qualities such as grain size, organic content, salinity, and pH.

   c. **Planting and Seeding Plan.** The restoration plan shall include a list of the vegetation proposed to be planted (primarily upland and transitional areas. Wetland plants will only be planted where they are slow in establishing or where rare native plants are desired), an irrigation plan for watering upland and transitional plants until they are established, and a maintenance plan. Such plans shall include a program for eliminating

non-native or invasive vegetation and preventing the establishment of non-native or invasive vegetation at the site to no more than five percent of plant coverage during the monitoring period.

d. **Schedule.** The program shall include a schedule indicating when excavation, fill, and grading will occur, the time to be allowed for settlement, and the time when planting will occur, if any.

e. **Identification of a Suitable Reference Site.** The program shall identify a nearby reference site that shall be evaluated as part of the monitoring program and shall provide a reference for evaluating the progress of the restoration site.

f. **Monitoring.** Every other year, starting October 1 of the year following the return of the site to tidal action for a ten-year period, or until those portions of the restoration site subject to tidal action are approximately 95% vegetated as compared with nearby reference marshes, whichever occurs first, the permittee shall report to the Commission on the effects of the project in restoring the target habitat at the restoration site. The report shall include measuring sedimentation rates, percentage of the site revegetated, plant survival, approximate percentage representation of different plant species, and a qualitative assessment of plant growth rates for the tidal restoration area, including adjacent transitional and upland habitats. The report shall also include photo documentation of the restored wetlands using photographs taken from permanent photo locations, management recommendations, a discussion of areas with inadequate performance, and recommendations for remedial measures. Undesirable exotic plant species such as pepperweed (*Lepidium latifolium*), *Spartina alterniflora*, broom, or star thistle shall be reasonably controlled (coverage of less than five percent of their expected zone of growth) during the ten-year monitoring period. Should adverse conditions be identified during the ten-year monitoring period, the permittee shall take corrective action as specified by or on behalf of the Commission.

E. **Minimization of Widlife Impacts During Construction.** The work authorized by this amended permit shall be performed in a manner that will prevent, avoid, or minimize to the extent possible any significant adverse impacts on any tidal marsh, other sensitive wetland resources, and existing native upland vegetation.

1. **San Francisco Bay National Wildlife Refuge.** During the construction of the project and during the planning for the San Francisco Bay National Wildlife Refuge, the permittee shall work closely with the U. S. Department of the Interior, Bureau of Sport Fisheries and Wildlife, to develop a plan, to be approved by or on behalf of the Commission and to be carried out in whole or in part by the permittee, to mitigate to the maximum feasible extent the unavoidable adverse environmental impacts of the construction of the bridge on the proposed Refuge. The plan shall also include provisions for improved public access to the Bay and shoreline in the area, consistent with the primary use of the Refuge as a haven for wildlife.

2. **Pile Driving and Other Physical Disturbances to Habitat.** In consultation with the U.S. Fish and Wildlife Service (USFWS), NOAA Fisheries and/or the California Department of Fish and Game, the permittee shall conduct the following conservation measures:

   a. Limit the physical disturbance of existing habitats and locate all staging and stockpiling areas and other facilities outside of sensitive areas;

   b. Reduce the amount of disturbance within sensitive areas to the minimum necessary to accomplish the project;

   c. Utilize a USFWS-approved biological monitor knowledgeable about sensitive and special-status species and habitats near the construction to conduct surveys before and during construction activities to inspect exclusion fencing and verify absence of listed species;

   d. Conduct weekly focused surveys for each listed bird species during the nesting season within a 300-foot buffer of sensitive habitat areas;

   e. Drive all permanent piles outside of the nesting seasons of listed bird species; and

   f. Apply to the maximum extent practicable similar seasonal avoidance measures for the temporary piles to be used to construct the temporary trestles.

   If seasonal avoidance is not feasible during nesting seasons of listed species, temporary trestle piles and cofferdams' sheet piles shall be driven with a vibratory hammer to reduce noise levels.

F. **Construction and Maintenance Operations**

1. **Certification of Contractor Review.** Prior to commencing any grading, demolition, or construction, the general contractor or contractors in charge of that portion of the work shall submit written certification that s/he has reviewed and understands the requirements of the permit and the final BCDC-approved plans, particularly as they pertain to any public access or open space required herein, or environmentally sensitive areas.

2. **Best Construction Practices.** The work authorized by this permit shall be performed in a manner that minimizes the potential of hazardous spills, prevents the entry of debris into the waters of the Bay, and minimizes sedimentation and erosion into the Bay. Specfically, the permittee shall:

   a. Implement all appropriate and necessary best management practices (BMP's) to minimize the discharge of non-point source pollutants to the Bay during and after construction. The BMP's shall be consistent with applicable local, state and federal laws and any required waste discharge requirements, National Pollutant Discharge Elimination System (NPDES) permits and stormwater pollution prevention plans and shall be shown on the plans required under Special Condition II-A;

b. Perform all construction operations and ongoing repair and maintenance activities in a manner that prevents construction materials from falling, washing, or blowing into the Bay. In the event that such material escapes or is placed in an area subject to tidal action of the Bay, the permittee shall immediately retrieve and remove such material at its expense;

c. Treat water containing residue from construction activities by filtration, retention in a settling pond, or other similar measure and assure that such material not enter San Francisco Bay;

d. Store all hazardous materials offsite in properly designated containers in a storage area with an impermeable membrane between the ground and the hazardous material; and

e. Remove all construction waste material from the site to an authorized disposal area upon completion of the project.

3. **Hazardous Materials Removal and Remediation.** The permittee shall ensure that it performs any removal, remediation, encapsulation or disposal of hazardous or toxic materials, such as lead-based paint, consistent with the requirements of the U. S. Environmental Protection Agency and any applicable local, state and federal laws.

4. **Creosote Treated Wood.** No pilings or other wood structures that have been pressure treated with creosote shall be used in any area subject to tidal action in the Bay or any certain waterway, in any salt pond, or in any managed wetland within the Commission's jurisdiction as part of the project authorized herein.

5. **Mud Waves.** The permittee shall implement reasonable measures to prevent the creation of mud waves as a result of project construction. Should the project result in the formation of a mud wave, the permittee shall remove the mud wave and, after review and approval by or on behalf of the Commission pursuant to Special Condition II-A, implement measures to correct the conditions that led to mud wave formation.

6. **Removal of Excavated Material.** All dredged and excavated material shall be removed from the project site for proper disposal outside of the Commission's jurisdiction.

7. **Debris Removal.** All construction debris shall be removed to a location outside the Commission's jurisdiction. In the event that any such material is placed in any area within the Commission's jurisdiction, the permittee, its assignees, or successors in interest, or the owner of the improvements, shall remove such material, at its expense, within ten days after it has been notified by the Executive Director of such placement.

~~K.~~ 8. **Maintenance Employees and Equipment.** The permittee shall store maintenance equipment only in the exterior or interior storage areas authorized by this amended permit. The permittee shall allow employee parking only in the parking area authorized by this amended permit.

G. **Temporary Construction Trestles.** Unless otherwise approved by or on behalf of the Commission, any fill placed for construction access and work platforms shall be pile-supported or floating only, and shall be approved by or on behalf of the Commission prior to their installation pursuant to Special Condition II-A. The permittee is strictly prohibited from using solid fill in the Bay for construction access and work platform purposes with the exception of minimal amounts of earthen fill necessary to create grade transitions from the land to pile-supported work platforms.

H. **Removal and/or Reuse of Existing Span, Trestles, Approaches, and Temporary Structures**

1. ~~Existing~~ **1927 Span.** The existing overwater steel truss spans and supporting piers shall be removed from the Commission's jurisdiction as part of the project.

2. ~~Existing~~ **1927 Trestles.** The existing east and west trestles extending over the Bay shall be converted into fishing piers as part of a plan that has been approved by or on behalf of the Commission, for the rehabilitation, continuing maintenance, and use (and removal if abandoned at some future date), by the permittee or another public agency, of all or part of either or both trestles for public access to San Francisco Bay for viewing, fishing, walking, picnicking, sitting, bicycling and related purposes. Connections shall be provided from the trestles to the bicycle/pedestrian pathway described in Special Conditions II-B-1 through II-B-4. One bicycle rack shall be installed on or near the fishing pier near the eastern approach to the bridge. The location of the bicycle rack shall be depicted as drawings to be approved in writing by or on behalf of the Commission.

3. **Existing Approaches.** Any improvement of the existing eastern and western approaches on solid fill shall be limited to those necessary to provide (a) the bicycle/pedestrian pathway described in Special Conditions II-B-1 through II-B-4; (b) roadways for public access to San Francisco Bay and its shoreline for viewing, walking, fishing, picnicking, sitting, bicycling, and related purposes; and (c) roadways to provide access necessary to maintain existing uses within the Commission's jurisdiction. Use of the right-of-way on which the existing approaches are located shall be limited to these purposes only once the project is complete and the replacement bridge and approaches are open to full traffic use. The right-of-way and any improvements shall be owned and maintained by the permittee unless a transfer of ownership and maintenance responsibility to another public agency has been approved by or on behalf of the Commission.

4. **Removal of the Ravenswood Pier.** As part of the construction operations associated with the 2009 seismic retrofit of the Dumbarton Bridge, the permittee shall completely remove the existing pile-supported fishing pier known as the Ravenswood Pier (a segment of the former 1927 bridge structure) covering approximately 63,000 square feet (1.45 acres). Removal of the Ravenswood Pier shall include all components of the existing trestle, all pilings and footings to at least 2.0 feet below the mudline, the pier abutment, riprap and any debris placed in the mudflat beneath the trestle. All material

shall be removed and disposed at an authorized location outside of the Commission's jurisdiction. Prior to removal of the existing structure, the permittee shall submit a removal plan to be approved by or on behalf of the Commission to ensure that the removal plan does not adversely impact Bay-related resources, endangered species, navigation and public health and safety and that sufficient safeguards are included to protect human safety and capture all demolition debris and related substances.

5. **Removal of Temporary Structures Associated with the 2009 Seismic Retrofit Project.** Within one year of substantial completion of the seismic retrofit project, the permittee shall completely remove the temporary structures authorized herein, including the construction trestles and cofferdams and all structural components of same, and shall dispose of all material at authorized locations outside the Commission's jurisdiction. Pilings associated with the temporary stuctures shall either be fully removed or, if complete removal is not possible, cut two feet below the mudline.

~~E.~~ I. **Western and Eastern Connectors.** The three westerly connectors (University Avenue, Willow Road, and Marsh Road) and the easterly connector ~~shall~~ were to be constructed as integral parts of the replacement project, and construction ~~shall~~ was to be scheduled, and ~~shall~~ proceed, so that all connectors ~~shall~~ were to be available for traffic use at the same time the new bridge, including the eastern and western approaches, ~~is~~ was opened for full traffic use.

~~H.~~ J. **Median and Shoulders.** The median in the eastern and western approaches, and the shoulders on the replacement span ~~shall~~ were not be used for additional traffic lanes without further permit action by the Commission.

~~F.~~ K. **Financing.** The replacement project, including the approaches and eastern and western connectors, shall be financed according to a plan that provides for the following:

1. **Connecting Roads.** To the maximum feasible extent, the connecting roads in the State highway system are paid for with State highway funds, and the permittee shall use its best efforts to obtain such funds.

2. **Toll Bridge Revenues.** The maximum amount of toll bridge revenue can be made available for other transportation purposes, both in the early years of the project and in the future, if the California Legislature and the Congress of the United States authorize the use of such revenues for such purposes.

~~L. **Plan Review.** The permittee shall submit, for review by or on behalf of the Commission for consistency with this authorization, final plans for each portion of the work prior to that portion of the work being advertised for bids. The permittee shall also submit, for review by or on behalf of the Commission for consistency with the terms and conditions of this permit, as amended, its final plan for financing the bridge prior to that plan being submitted to the Toll Bridge Authority for final approval. Review of construction plans shall be completed within thirty (30) days of receipt of the plans. Review of the financing plan shall be completed within ten (10) days of the receipt of the plan. This plan review condition shall also apply to work authorized under Amendment No. Ten.~~

~~G.~~ L. **Right-of-Way Acquisition**

1. **Public Trust.** Prior to undertaking the acquisition of any parcel for right-of-way for the project authorized herein, the permittee shall submit to the State Lands Commission a description of the required right-of-way for the project. No parcel over which the State Lands Commission asserts, or has asserted, the public trust for navigation, commerce and fisheries shall be acquired by condemnation or any other means without the express written approval of the State Lands Commission.

2. **Connections.** Except as expressly authorized herein, no connections for vehicular access shall be permitted to (a) the eastern and western approaches; (b) the frontage roads to be constructed on the existing approach road fill; or (c) the Bayward side of the westerly connectors; and the permittee shall obtain sufficient right, title, and interest in the property on which the existing approach roads are located, to enable it to fulfill this condition.

~~M. **Temporary Structures.** The temporary trestles and work platforms required for the construction of the shallow water piers, including the erection of girders, shall be removed to an area outside the Commission's jurisdiction including the removal of all piling to or below the mud line before opening the bridge to traffic.~~

~~I.~~ M. **Seismic Safety.** The permittee shall submit such plans, data, or other material as the Commission's Engineering Criteria Review Board may determine are necessary for it to assess the seismic safety of the project, and the permittee shall comply with any recommendations of the Engineering Criteria Review Board that the Board may determine are necessary to ensure the seismic safety of the project.

~~J.~~ N. **Ferry Service.** In any agreement entered into to carry out or finance this project, the permittee shall not obligate itself to opposing other proposals for trans Bay transportation unless the permittee determines that the specific proposal will have a material detrimental effect on the toll bridge revenues to be used to finance this project.

~~N.~~ O. **Limits of Construction for Work Authorized in Amendment No. Eleven.** The work authorized in Amendment No. Eleven herein is confined to the placement of the scaffolding, the airline, and the waterline. The improvements shall be built in conformance with the project description in the permittee's letters dated March 12, 1993, and May 17, 1993, and as shown on the drawing No. 4333-004041, pages 1, 2, and 3, dated February 16, 1993 and February 22, 1993. No changes to the design of the project shall be made without the prior written approval of the BCDC staff.

P. **Recording.** The permittee shall record this document or a notice specifically referring to this document with both San Mateo County and Alameda County within 30 days after execution of the permit issued pursuant to this authorization and shall, within 30 days after recordation, provide evidence of recordation to the Commission.

III. Findings and Declarations

This permit, as amended, is issued on the basis of the Commission's findings and declarations that the authorized work is consistent with the McAteer-Petris Act, the *San Francisco Bay Plan*, the California Environmental Quality Act of 1970, the Commission's amended management program for the San Francisco, and the public trust for commerce, navigation and fisheries, for the following reasons:

A. **Use.** In the original permit, the San Francisco Bay Plan (Map No. 6), as amended November 18, 1971, indicated a bridge crossing between Ravenswood Point and Dumbarton Point and recognized that a replacement high-level bridge would likely be built. The Commission ~~finds~~ found and declared that the ~~proposed~~ authorized bridge ~~is~~ was in accordance with the Bay Plan, because (1) it ~~will~~ would permit motorists and pedestrians maximum views of the Bay; (2) it would provide maximum feasible public access to the shoreline and the Bay consistent with the project; and (3) it would provide adequate clearance for commercial and Navy ships in the main shipping channel and for pleasure boats where such clearance is required for them.

~~C.~~ B. **Fill**

1. **Original Authorization Through Amendment No. 12.** In the original authorization, the Commission ~~finds~~ found and declared that solid fill covering 68.25 acres of salt ponds, 5.75 acres of marsh, 1.75 acres of a managed wetland, and 0.89 acres of the Bay (total 76.64 acres) ~~is~~ was the minimum necessary to achieve the purpose of the fill, there ~~is~~ was no alternative upland location, the extent, nature and location of the fill ~~will~~ would minimize harmful effects to the Bay Area, and ~~will~~ would provide substantial public benefits in the form of improved public access and trans Bay transportation. The proposed fill ~~is~~ was also found to be for a water-oriented use, namely a bridge and fender piling system.

2. **2009 Seismic Retrofit (Amendment No. 13).** Section 66605 of the McAteer-Petris Act, states, in part that: (a) the public benefits from fill must clearly exceed the public detriment from the loss of water areas, and that fill should be limited to water-oriented uses, such as bridges; (b) no alternative upland location exists for the fill; (c) the fill should be the minimum amount necessary; (d) the fill should minimize harmful effects to the Bay including water volume, circulation, and quality, fish and wildlife resources, and marsh fertility; (e) the fill should be constructed in accordance with sound safety standards; and (f) the fill should be authorized only when the applicant has valid title to the affected property.

   a. **Public Benefits Versus Public Detriment.** The bridge opened in 1982, and its design dates to the mid 1970's. Following the 1989 Loma Prieta earthquake, the Governor's Board of Inquiry identified the Dumbarton Bridge as part of the critical transportation system for crossing the Bay. The bridge, part of State Route 84, serves as a major east/west connector route across the Bay between Interstate Highway I-880 in Alameda County and Interstate Highway 101 in San Mateo County.

On the basis of research conducted since the 1989 Loma Prieta earthquake, the U. S. Geological Survey (USGS) and other scientists concluded that there is a 70 percent probability of at least one magnitude 6.7 or greater quake, capable of causing widespread damage, striking the San Francisco Bay region before 2030. It is estimated that a maximum credible earthquake (MCE) with an 8.0 magnitude would generate in excess of 30 times more energy than the Loma Prieta earthquake (magnitude 7.1).

Caltrans has determined that the existing Dumbarton Bridge does not meet current seismic design standards. The proposed project would provide a seismic upgrade in line with all other bridges in the State. The project would strengthen the bridge and upgrade all of the bridge deck's expansion joints making it safer than current conditions for the traveling public. Therefore, the seismic retrofit would provide safety for bridge users during a MCE and facilitate and expedite the reopening of the Bridge to traffic following an MCE.

In addition, Caltrans has stated that the retrofit project would have few negative impacts to the public or the Bay's natural resources. Traffic would be virtually uninterrupted by construction activities except for bridge closures during some weekends of the year. The project has also been designed to minimize construction impacts on fish and wildlife and permanent impacts to natural resources. The surface area of San Francisco Bay would be reduced permanently by approximately 5,500 square feet (fill needed to strengthen the piers) and temporarily by 402,300 square feet (for the temporary construction trestles). Caltrans proposes to mitigate for the impacts of the permanent fill by creating approximately 6,534 square feet of tidal wetlands .

b. **Alternative Location**. Caltrans states that the proposed fill is necessary to retrofit a Bay bridge that is used daily by more than 80,000 vehicles and that does not meet structural requirements for withstanding a maximum credible earthquake event or current vehicle traffic safety design standards. There is no alternative upland location for the project purpose.

c. **Minimum Amount of Fill Necessary**. The Dumbarton Bridge is 1.6 miles long covering 873,000 square feet (20 acres) of the Bay. The project would place 5,500 square feet of permanent fill in the Bay (0.0063 percent of the total area) to strengthen the existing pier footings. This fill is the minimum amount necessary to provide a bridge that meets Caltrans' 1999 Seismic Design Criteria (SDC) intended to provide for improved public safety on bridges.

d. **Valid Title**. Caltrans states that the Bay property on which the proposed project would occur, including the flood barrier and pump station, the temporary pile-supported trestles and cofferdams all fall within Caltrans' existing right-of-way.

C. **Safety of Fills**

1. **Engineering Criteria Review Board.** Policy 1 of the Bay Plan Safety of Fills section states, in part, that: "the Engineering Criteria Review Board should review all except minor projects for the adequacy of their specific safety provisions, and make recommendations concerning these provisions...."

   The Commission's Engineering Criteria Review Board (ECRB) reviewed the proposed project for its seismic and engineering design safety on February 5, 2009. However, the ECRB requested that Caltrans return prior to the Commission's consideration of the project in order to get a complete understanding of the geotechnical and structural criteria, and a detailed seismic instrumentation plan for the proposed project. The ECRB's second review of the project occurred on May 21, 2009. The Board was generally satisfied with the geotechnical and structural criteria, but requested Caltrans to provide additional information on (1) the impacts to the Bay area public, particularly in the South Bay, from a bridge closure as a result of a major earthquake, and any specific steps to communicate and educate the public as to the expected level of bridge safety and bridge performance during an earthquake, based on the chosen engineering criteria; (2) the effects of ground liquefaction on the piers, and (3) the stability of the steeper Bay mud slopes during a seismic event.

   On August 5, 2009, Caltrans responded to the Board's requests for more information indicating that geotechnical analyses demonstrated that the occurrence of soil liquefaction at the bridge site during the target design earthquake (1,000-year return period) should be localized and unlikely to result in significant adverse effects on the bridge. Regarding the potential lateral movement of the softer soil layers (Young Bay Muds) in the slope areas of the channel crossing and its effect on the adjacent pier foundations, the additional analysis indicated that the resulting loads exerted by the Young Bay Muds on the foundations in the slope areas would not adversely affect the bridge foundations. The Board concluded the criteria used for these two analyses were satisfactory.

   On August 19, 2009, Caltrans provided a response to the Board's request that Caltrans inform the Bay area public on the likely performance of the bridge as a result of a major earthquake. As of the date of the preparation of the staff's recommendation (August 28, 2009), the Board has not had the opportunity to comment on CalTrans' response. Caltrans response said that although there was a higher level of bridge performance criteria available for "lifeline" structures such as the San Francisco-Oakland Bay Bridge, the selected bridge performance criteria for the Dumbarton Bridge was in concurrence with its classification as an "important" structure. After a maximum credible earthquake event, an "important" structure could close for as little as one month and as long as twelve months for deck repair, but it would not collapse or be permanently impaired. According to Caltrans, lifeline structures are inherently move expensive to build and maintain, and these are structures selected as part if an emergency route plan developed in conjunction with regional governmental agencies to provide immediate

movement of emergency equipment and supplies into or through the region. State Route 84, which includes the Dumbarton Bridge, is not part of the lifeline emergency route plan. Caltrans chose the seismic retrofit criteria for the Dumbarton partly based on economic realities.

2. **Sea Level Rise.** The Bay Plan policies on the safety of fills state, in part, that: "to prevent damage from flooding, structures on fill or near the shoreline should have adequate flood protection including consideration of future relative sea level rise as determined by competent engineers. Additionally, the policies state that, [to] minimize the potential hazard to Bay fill projects and bayside development from subsidence, all proposed development should be sufficiently high above the highest estimated tide level for the expected life of the project or sufficiently protected by levees." Finally, the policies state that, "[l]ocal governments and special districts with responsibilities for flood protection should assure that their requirements and criteria reflect future relative sea level rise and should assure that new structures and uses attracting people are not approved in flood prone areas or in areas that will become flood prone in the future, and that structures and uses that are approvable will be built at stable elevations to assure long-term protection from flood hazards...."

   Caltrans has not done an assessment of sea level rise impacts on the structure based on the specific geographic and physical features of the area. Currently, proposed projects reviewed by the Commission are reviewed using sea level rise rates projected over a fifty-year period, generally consistent with the California Climate Action Team Reports on Climate Change. These reports project the following sea level rise scenarios: (a) a low rate of 0.08 inches (2 mm) per year; (b) a medium rate of 0.18 inches (4.6mm) per year; and (c) a higher rate of 0.33 inches (8.4 mm) per year. The scenario with the highest projected sea level rise in these reports would result in sea level rise of approximately 16 inches. However, the project is to seismically retrofit an existing bridge, which limits the ability to adjust bridge heights to account for expected sea level rise. To accommodate the isolator bearings installed as part of the seismic retrofit, the bridge deck will be raised five inches. Caltrans also states that the anticipated increase of water levels are not likely to impact the bridge's piers and columns.

   Caltrans will also construct a high-tide barrier on the north side of the west bridge approach to protect an existing public access area, parking lots, and the frontage road from tidal inundation. While not designed specifically for sea level rise, the wall will protect these areas from flooding resulting from sea level rise for a number of years.

   The Commission finds that, as proposed and with adequate notification of local government agencies, the seismic retrofit of the Dumbarton Bridge is consistent with the Bay Plan's Safety of Fills policies.

D. **Fish and Wildlife Resources.** Policy 2 of the Bay Plan Fish, Other Aquatic Organisms, and Wildlife states, in part: "Specific habitats that are needed to conserve, increase, or prevent the extinction of any native species, species threatened or endangered...should be protected...." Policy 4 of the same section states, in part:

"The Commission should: (a) consult with the California Department of Fish and Game and the U. S. Fish and Wildlife Service or the National Marine Fisheries Service whenever a proposed project may adversely affect an endangered or threatened...species...; [and] (c) Give appropriate consideration to the recommendations of the [state and federal resource agencies] in order to avoid possible adverse effects of a proposed project on fish, other aquatic organisms and wildlife habitat." Policy 1 of the Bay Plan policies on Tidal Marshes and Tidal Flats states: "Tidal marshes and tidal flats should be conserved to the fullest possible extent. Filling, diking, and dredging projects that would substantially harm tidal marshes or tidal flats should be allowed only for purposes that provide substantial public benefits and only if there is no feasible alternative." Policy 2 of the same section states that "Any proposed fill, diking, or dredging project should be thoroughly evaluated to determine the effect of the project on tidal and tidal flats, and designed to minimize, and if feasible, avoid any harmful effects." Policy 1 of the Bay Plan policies on Subtidal Areas states: "Any proposed filling or dredging project in a subtidal area should be thoroughly evaluated to determine the local and Bay-wide effects of the project on: (a) the possible introduction or spread of invasive species; (b) tidal hydrology and sediment movement; (c) fish, other aquatic organisms and wildlife; (d) aquatic plants; and (e) the Bay's bathymetry. Projects in subtidal areas should be designed to minimize and, if feasible, avoid any harmful effects."

As an existing bridge spanning the Bay, a number of Bay habitats would or could be affected by constructing the seismic retrofit project. Only a small fringe marsh exists along the western bridge approach, though larger marshlands exist nearby. Some subtidal areas will also likely be affected. Most of the project, including most of the seismic retrofit work, the temporary construction trestles, and the removal of the Ravenswood Pier will occur in intertidal flats. While permanent impacts will be small (only 5,500 square feet of Bay will be permanently lost as result of seismically strengthening the bridge piers), as much as 8,712 square feet of intertidal flats will be directly impacted by the construction of temporary facilities (coffer dams, construction trestles) and the removal of the Ravenswood Pier.

A number of special status species could be affected by project construction, including the green sturgeon, the coast steelhead, the salt marsh harvest mouse, the Pacific harbor seal, the California sea lion, the California clapper rail, the western snowy plover, and the California black rail. In addition, the intertidal flats below and adjacent to the bridge are heavily used by migratory and resident waterfowl and shorebirds.

Caltrans has included a number of construction best management practices to eliminate or minimize construction impacts, and, in consultation with the U.S. Fish and Wildlife Service (USFWS), has proposed several conservation measures, including:

1. Physical disturbance to existing habitats will be limited and all staging and stockpiling areas and other facilities will be located outside of sensitive areas.

2. Caltrans will reduce the amount of disturbance within sensitive areas to the minimum necessary to accomplish the project.

3. A USFWS-approved biological monitor knowledgeable about sensitive and special-status species and habitats near construction areas will conduct surveys before and during construction activities to inspect exclusion fencing and verify the absence of listed species.

4. Weekly focused surveys for each listed bird species will be conducted during the nesting season within a 300 feet buffer of sensitive habitat areas.

5. All permanent piles will be driven outside of the nesting seasons of listed bird species and a vibratory hammer will be used as much as possible.

6. Similar seasonal avoidance will apply to the maximum extent practicable for the temporary piles to be used to construct the temporary trestles.

If seasonal avoidance is not feasible during nesting seasons of listed species, temporary trestle piles and cofferdams' sheet piles will be driven with a vibratory hammer to reduce noise levels.

For these reasons, and because Caltrans will offset the unavoidable, permanent loss of tidal flat habitat with compensatory mitigation (see discussion below), the Commission finds that the seismic retrofit project is consistent with the Bay Plan's policies on Fish, Other Aquatic Organisms, and Wildlife, Tidal Marsh and Tidal Flats, and Subtidal Areas.

~~H.~~ E. **Mitigation and Additional Public Benefits**

1. **Original Authorization Through Amendment No. 12.** The original project's Environmental Impact Report, prepared by the permittee, indicated that the ~~proposed~~ original project ~~will~~ would have several significant unavoidable adverse impacts on the environment including: (1) permanent loss of 76.64 acres of salt pond, marsh and managed wetland and Bay and its associated value as wildlife habitat; (2) degradation of water quality in the South Bay during dredging and in the Bay during dredging disposal; (3) degradation of air quality in the Dumbarton transportation corridor; (4) increased pressure to develop salt ponds for uses other than solar evaporation of salt; and (5) continued reliance on the private automobile as a major transportation mode between the East and West Bay areas. The Commission ~~finds~~ found and declared that the permittee had adequately mitigated this environmental detriment and increased the public benefits of the project by providing the following benefits to man and the environment:

   a. Provision of a bicycle and pedestrian path on the proposed bridge, approaches and portions of the connecting roads;

   b. Acquiring and converting to tidal action at least 200 acres of dry land diked-off from the Bay prior to September 17, 1965;

   c. Acquiring so as to reduce development pressures, wetlands and salt ponds in areas within the Commission's jurisdiction where the growth-inducing impact of the bridge will be the greatest;

   d. Designing the toll plaza to minimize its visual impact and to provide a connection for a north/south pedestrian, equestrian and bicycle path;

e. Cooperating in the planning of the San Francisco Bay National Wildlife Refuge to minimize the impact of the construction of the bridge on the Refuge; and

f. The air quality of the Bay Area basin and particularly in the South Bay Area would be improved by the Dumbarton project.

2. **Seismic Retrofit (Amendment No. 13).** The Bay Plan Mitigation Policy 1 states, in part: "[p]rojects should be designed to avoid adverse environmental impacts to Bay natural resources such as to water surface area, volume, or circulation and to plants, fish, other aquatic organisms and wildlife habitat, subtidal areas, or tidal flats. Whenever adverse impacts cannot be avoided, they should be minimized to the greatest extent practicable. Finally, measures to compensate for unavoidable adverse impacts to the natural resources of the Bay should be required...."

The project will result in the permanent loss of approximately 5,500 square feet (0.13 acres) of Bay intertidal flats and surface area as a result of seismically strengthening the bridge piers. To do the seismic retrofit, Caltrans will also construct temporary trestles (for 3-4 years) to provide construction access that will cover approximately 402,300 square feet (9.23 acres) of tidal flats. To offset the impacts of the permanent and temporary fill, Caltrans will create a 6,534-square-foot (0.15 acre) tidal marsh at the land end of the former Ravenswood Pier by excavating existing fill to promote positive drainage and to create elevations suitable for marsh establishment.

The Commission finds that Caltrans' proposed mitigation will offset the permanent loss of Bay tidelands that will result from project construction and therefore, the project is consistent with the Bay Plan's Mitigation policies.

~~K.~~ F. **Transportation ~~and Financing~~**

1. **Original Authorization Through Amendment 12.** In weighing the public benefits of ~~this~~ the original project against the public detriment from the loss of water surface areas, as it is required to do under the McAteer-Petris Act, the Commission ~~has~~ considered those aspects of the replacement project as a transportation facility that have been brought to its attention by the permittee and the Metropolitan Transportation Commission, together with the related public testimony. ~~These have~~ Those included safety, traffic demand, and financing. The Commission ~~has~~ also ~~given~~ gave careful consideration to the determination by the Legislature that the existing bridge should be replaced. The Commission ~~finds~~ found that the original project, as limited by the terms and conditions herein, ~~will~~ would provide substantial transportation benefits to the public in the Bay Area.

2. **2009 Seismic Retrofit (Amendment 13).** The Bay Plan's Transportation Policy No. 3 states, in part: "[i]f a route must be located across a waterway, the following provisions should apply: (a) [t]he crossing should be placed on a bridge or in a tunnel, not on solid fill...." The Bay Plan Transportation Policy No. 4 states, in part: "bridges over the Bay or certain waterways should

include pedestrian and bicycle paths that will either be a part of the Bay trail or connect the Bay Trail with other regional and community trails....[and]...should be designed to maintain and enhance visual and physical access to the Bay and along the Bay shoreline."

The proposed project is a seismic retrofit of an existing pile-supported bridge to provide increased safety during seismic events. The project will also provide new public access and will enhance the existing access near the bridge, which is part of the Bay Trail. For these reasons, the Commission finds that the proposed project is consistent with the Bay Plan's Transportation Policies.

~~I.~~ G. **Mass Transit.** In the original authorization, the Commission found that the construction of a high-level, four-lane bridge ~~will~~ would facilitate the establishment of adequate bus transportation between the East and West Bay areas. There ~~is~~ was no need to design the structure to include future rail mass transit because the best available evidence is that such facilities ~~will~~ would not be needed in this corridor in the foreseeable future.

H. **Approaches and Existing Causeway.** The Commission ~~finds~~ found and declared in its original authorization that, although there is a possibility that the salt ponds north and south of the bridge may be removed from salt production in the future and the dikes breached and the ponds opened to tidal action, retention of the existing approaches ~~is~~ was desirable to improve public access to the Bay and shoreline in the San Francisco Bay National Wildlife Refuge. Therefore, the Commission concluded it ~~is~~ was not necessary or desirable either to replace the present causeway with a structure on pilings or to build the proposed approaches on pilings. Since the Commission's original authorization on February 27, 1974, the levee encompassing the managed wetlands north of the western bridge approach has breached from natural causes and the salt ponds south of the west approach are being converted to managed wetlands as part of the South Bay Wildlife Refuge.

I. **Toll Plaza.** The toll plaza has been located on dry land outside the Commission's jurisdiction within an area already excavated and therefore it will not require further cutting into Coyote Hills and will not fill the Bay or salt ponds.

J. **Pressures on the Bay.** Without bridge capacity increase, traffic could be expected to shift in part to Route 237 around the south end of the Bay, and as Route 237 is presently operating near its traffic capacity, additional traffic could cause pressures for Route 237 expansion which in turn could involve encroachment on the Bay.

K. **Public Access**

1. **Original Authorization Through Amendment No. 12.** The Commission determined that the original project, subject to conditions stated herein, would provide maximum feasible public access to the Bay shoreline, consistent with the project, and this access would be improved and permanently used by the public.

2. **2009 Seismic Retrofit (Amendment No. 13).** Section 66602 of the McAteer-Petris Act states that "...maximum feasible public access, consistent with a proposed project, should be provided." In assessing whether a project provides maximum feasible public access consistent with the project, the Commission relies on the McAteer-Petris Act, the policies of the San Francisco Bay Plan, and also relevant court decisions. In assessing whether a proposed *public* project, such as Caltrans' proposed bridge retrofit, would provide the maximum feasible public access consistent with the project, the Commission should evaluate whether the proposed public access is reasonable given the scope of the project.

   The Bay Plan Public Access Policy 4 states, in part: "Whenever public access to the Bay is provided as a condition of development, on fill or on the shoreline, the access should be permanently guaranteed." Policy 6 states, in part: "Public access improvements provided as a condition of any approval should be consistent with the project and the physical environment including protection of Bay natural resources, such as aquatic life, wildlife and plant communities, and provide for the public's safety and convenience. The improvements should be designed and built to encourage diverse Bay-related activities and movement to and along the shoreline, should permit barrier free access for the physically handicapped to the maximum feasible extent, should include an ongoing maintenance program, and should be identified with appropriate signs." Policy 9 states, in part: "Roads near the edge of the water should be designed as scenic parkways for slow-moving, principally recreational traffic. The roadway and right-of-way should maintain and enhance visual access for the traveler, discourage traffic, and provide for safe, separated, and improved physical access to and along the shore." Policy 11 states, in part: "The Public Access Design Guidelines should be use as a guide to siting and designing public access consistent with a proposed project. The Design Review Board should advise the commission regarding the adequacy of the public access proposed."

   The existing public access path along the southern edge of the Dumbarton Bridge consists of a Class I (paved and separated from traffic), 8-foot-wide bicycle and pedestrian path. This path transitions to a Class II bike lane along frontage roads at both ends of the bridge. At the eastern approach to the bridge, public access improvements include a fishing pier (the Dumbarton Pier, a remnant of the former Dumbarton Drawbridge), public parking, and a lookout/picnic area. At the western approach to the bridge, public access consists of parking lots both north and south of the approach and a public access lookout (the lookout is to be relocated pursuant to BCDC Permit No. 16-99). The existing Ravenswood fishing pier, abandoned since 1993, will be removed pursuant to the original authorization of 20-73. Caltrans is providing an in-lieu fee to compensate for the 16-year loss of public use of the Ravenswood Pier as part of a settlement agreement of permit noncompliance pursuant to Permit No. 16-99.

   During the estimated three-year construction phase of the proposed retrofit project, the Dumbarton Pier will remain open most (more than 90%) of the time. Construction staff will apprise visitors of conditions that could be

hazardous to their hearing, and will close portions of the fishing pier during pile driving activities and during construction of the new bridge pile caps. These limited area closures would occur in 10-minute increments, totaling approximately 1.5 hours a day of impeded access while other pier sections would remain open.

During project construction, 84 out of a total of 96 parking spaces at the west approach and 48 out of a total of 80 parking spaces at the east approach will be temporarily removed. At project completion, there will be a permanent loss of 10 parking spaces at the west approach, spaces occupied by new permanent piles for seismic support.

To maintain access during construction, Caltrans will provide 12 temporary public shore parking spaces along the frontage road at the western approach and 46 temporary parking spaces along Marshlands Road at the eastern approach.

The construction plan also includes closing the bridge to all motorized and pedestrian traffic for 2 to 4 weekends (two of them being long weekends) as the bridge deck would be raised five inches to install isolation bearings under the deck. On weekends when the deck raising is underway, a shuttle would be provided from sunrise to sunset to transport bicyclists and pedestrians to the other side of the bridge.

To provide new public access, and to offset the impacts to existing public access during construction, Caltrans will provide the following public access improvements:

a. A 96-square-foot overlook (belvedere) on the top of a new outrigger pile driven along the southern side of the western bridge approach, with a staircase to a small, wind-protected access plaza with benches in the public access parking lot;

b. Enhancing the public access overlook to be constructed at the site of the removed Ravenswood pier that is required by the settlement of permit compliance issues with BCDC Permit No. 16-99;

c. Enhancing the public access picnic/viewing area at the eastern bridge approach;

d. Constructing a wall and pump station to prevent tidal inundation of the public access parking lot;

e. Installing approximately 50 way finding signs directing bicyclists to the bicycle route between the BART Union City and Fremont train stations and the Caltrain station in Menlo Park; and

f. Improving approximately 400 feet of the bicycle/pedestrian path where it transitions from the bridge to the frontage road at both the west and east bridge approaches, including widening the path to eight feet to match the width of the bridge path, relocating the path away from the vehicle travel

lanes as much as possible consistent with ADA requirements, eliminating existing impediments (e.g., utility covers), and replacing the existing metal guard rail with a concrete barrier between the travel lanes and path to improve bicycle safety.

The public access improvements will significantly enhance the existing access required in the Commission's original authorization. They have also been required to enhance the experience of visitors to the South Bay Wildlife Refuge which is constructing a major public staging area using the parking lots at the western bridge approach pursuant to CN 10-03 by providing more attractive seating areas, a new overlook of the south Bay, safety improvements to the bridge's bike/pedestrian path, and protecting existing parking lots from flooding.

The Commission finds that the proposed public access improvements provide the maximum feasible public access consistent with the project, and that the access is consistent with Bay Plan policies on public access.

L. **Appearance, Design, and Scenic Views.** The Bay Plan's Appearance, Design, and Scenic Views Policy 1, states, in part: "To enhance the visual quality of development around the Bay and to take maximum advantage of the attractive setting it provides, the shores of the Bay should be developed in accordance with the Public Access Design Guidelines." Policy 6, states, in part: "....New or remodeled bridges across the Bay should be designed to permit maximum viewing of the Bay and its surroundings by both motorists and pedestrians. Guard rails and bridge supports should be designed with views in mind." Policy 9, states, in part: "'Unnatural' debris should be removed from sloughs, marshes, and mudflats that are retained as part of the ecological system...." Policy 12, states, in part: "In order to achieve a high level of design quality, the Commission's Design Review Board...should review, evaluate, and advise the Commission on the proposed design of developments that affect the appearance of the Bay...." Policy 14, states, in part: "Views of the Bay from vista points and from roads should be maintained by appropriate arrangements and heights of all developments and landscaping between the view areas and the water." Policy 15, states, in part: "Vista points should be provided in the general locations indicated in the Plan maps. Access to vista points should be provided by walkways, trails, or other appropriate means and connect to the nearest public thoroughfare where parking or public transportation is available. In some cases, exhibits, museums, or markers would be desirable at vista points to explain the value or importance or the areas being viewed."

The Dumbarton Bridge seismic retrofit project will involve constructing a number of concrete bolsters at the footing pedestals of Piers 5 to 15 and 32 to 40, 14 trestle piles at the approaches, and installing seismic bearings at the superstructure. The bridge will be raised five inches to accommodate the improvements. Upon completion of the project, the appearance of the Dumbarton Bridge will not be significantly altered, nor will the seismic retrofit affect views of the Bay for motorists traveling over the bridge.

Temporary trestles will be required for work at the east and west ends of the bridge. The western trestle will measure approximately 2,200 feet long, and the eastern trestle 2,500 feet. Both trestles will be lower than the existing Ravenswood and Dumbarton fishing piers, and will not exceed 24 feet in width, the minimum required for safe operation of construction equipment. During construction activity, machinery will be present onsite. These visual impacts are temporary, and will not create a permanent adverse impact on views of the Bay.

A flood prevention system consisting of a high-tide concrete barrier will be placed north of the western approach. The height of the barrier will range from 39 to 56 inches above the existing road to accommodate the varied surface level of the roadway. This barrier's height will obstruct foreground views of the Moseley Tract (the former managed wetlands lying immediately to the north of the project) from the parking lot and may affect views of the Bay from cars parked in the public access parking lot. A pump station will be installed at the levee to the north of the west approach to draw water from the parking lot during flood events and return it to San Francisco Bay. The pump station will stand approximately eight feet above the ground, with the majority of the structure buried underground to reduce visual impacts on the shoreline.

The seismic retrofit has been designed so that views of the Bay from the bridge will not be affected and the structure itself will only slightly be altered. The view impacts from temporary construction facilities (the construction trestles and equipment) are necessary in order to construct the project and will be in place for approximately three years. While portions of the flood wall may obstruct views of the bay for motorists parked in the northern parking lot of the west approach, and block views of the bay for some motorists traveling the northern frontage road, it will not block views for motorists on the bridge, the great majority of travelers using the bridge and its associated roadways. The flood wall is also necessary to keep these areas dry at high tides and storm events, and thus an unavoidable impact on views.

For these reasons, the Commission finds that the project is consistent with the Bay Plan's policies on Appearance, Design, and Scenic Views.

~~B.~~ M. **Dredging.** The Commission finds and declares that the dredging authorized by the original permit, as amended, ~~is~~ was to be accomplished and spoils disposed of in accordance with the Bay Plan Policies on Dredging.

N. **Water Quality.** The Bay Plan policies on Water Quality (Policy 1) state: "Bay water pollution should be prevented to the greatest extent feasible..." and policy 2 states that, "...the policies, recommendations, decisions, advice and authority of the State Water Resources Control Board and the Regional Board, should be the basis for carrying out the Commission's water quality responsibilities." Policy 3 states, in part: "[new] projects should be sited, designed, constructed and maintained to prevent or, if prevention is infeasible, to minimize the discharge of pollutants into the Bay by: (a) controlling pollutant sources at the project site; (b) using construction materials that contain non-polluting materials; and (c) applying appropriate, accepted and effective best management practices...."

Because a number of contaminants are known to occur in south Bay sediments, it is possible that the sediment near the bridge contains contaminants. Sediment from the Bay will be excavated during the construction of concrete bolsters on specific piers and to create the wetlands that will offset the loss of Bay tidelands resulting from project construction. Excavated material will be disposed at appropriate upland disposal facilities outside of the Commission's jurisdiction.

Removal of the Ravenswood Pier may also introduce hazardous material, such as lead paint, and asbestos bearings and joint material, into Bay waters.

To prevent the entry of debris into the waters of the Bay, and minimize sedimentation and erosion into the Bay, Caltrans will institute a number of construction best management practices, including:

1. Preparing a stormwater pollution prevention plan to protect the Bay and fish and wildlife species from pollution from fuels, oils, lubricants, and other harmful materials;
2. Treating water containing residue from construction activities by filtration, retention in a settling pond, or other similar measure and assuring that such material not enter San Francisco Bay;
3. Storing all hazardous materials offsite in properly designated containers in a storage area with an impermeable membrane between the ground and the hazardous material; and
4. Removing all construction waste material from the site to an authorized disposal area upon completion of the project.

The Commission finds that the project, as proposed, will protect the Bay's water quality, consistent with the Bay Plan's Water Quality policies.

~~G.~~ O. **Public Trust.** As part of a public transportation facility, and subject to the conditions stated herein, the project's use of the lands and tidelands of the State of California is consistent with the public trust for commerce, navigation and fisheries.

~~L.~~ P. **Coastal Zone Management Act.** The Commission ~~is required to review~~ further finds, declares, and certifies that the activity or activities authorized herein are consistent with the Commission's Amended Management Program for San Francisco Bay, as approved by the Department of Commerce under the Federal Coastal Zone Management Act of 1972, as amended.

Q. **Environmental Review.** The proposed project would involve the seismic retrofit of the existing Dumbarton Bridge. Caltrans certified the Initial Study with Proposed Mitigated Negative Declaration (CEQA) and an Environmental Assessment (NEPA) on June 2, 2009.

R. **Conclusion.** For all of the above reasons, the Commission finds, declares., and certifies that, subject to the special conditions stated herein, the project authorized herein is consistent with the San Francisco Bay Plan, the McAteer-Petris Act, the Commission's regulations, the California Environmental Quality Act, and the Commission's amended Coastal zone management program for San Francisco Bay segment of the California coastal zone.

IV. Standard Conditions

~~A. All required permissions from governmental bodies must be obtained before the commencement of work; these bodies include, but are not limited to, the U. S. Army Corps of Engineers, the State Lands Commission, the Regional Water Quality Control Board, and the city and/or county in which the work is to be performed, whenever any of these may be required. This amended permit does not relieve the permittee of any obligations imposed by State or Federal law, either statutory or otherwise.~~

~~B. The attached Notice of Completion shall be returned to the Commission within 30 days following completion of the work.~~

~~C. Work must be performed in the precise manner and at the precise locations indicated in your application and amendment requests, as such may have been modified by the terms of the amended permit and any plans approved in writing by or on behalf of the Commission.~~

~~D. Work must be performed in a manner so as to minimize muddying of waters, and if diking is involved, dikes shall be waterproof. If any seepage returns to the Bay, the permittee will be subject to the regulations of the Regional Water Quality Control Board in that region.~~

~~E. The rights, duties, and obligations contained in this amended permit are assignable. When the permittee transfers any interest in any property either on which the authorized activity will occur or which is necessary to the full compliance of one or more conditions to this amended permit, the permittee/transferor and the transferee shall execute and submit to the Commission a permit assignment form acceptable to the Executive Director. An assignment shall not be effective until the assignee executes and the Executive Director receives an acknowledgment that the assignee has read and understands the amended permit and agrees to be bound by the terms and conditions of the amended permit, and the assignee is accepted by the Executive Director as being reasonably capable of complying with the terms and conditions of the amended permit.~~

~~F. Unless otherwise provided in this amended permit, all the terms and conditions of this amended permit shall remain effective for so long as the amended permit remains in effect or for so long as any use or construction authorized by this amended permit exists, whichever is longer.~~

~~G. Unless otherwise provided in this amended permit, the terms and conditions of this amended permit shall bind all future owners and future possessors of any legal interest in the land and shall run with the land.~~

~~H. Unless otherwise provided in this amended permit, any work authorized herein shall be completed within the time limits specified in this amended permit, or, if no time limits are specified, within three years. If the work is not completed by the date specified in the amended permit, or, if no date is specified, within three years from the date of the amended permit, the amended permit shall become~~

~~null and void. If this amended permit becomes null and void for a failure to comply with these time limitations, any fill placed in reliance on this amended permit shall be removed by the permittee or its assignee upon receiving written notification by or on behalf of the Commission to remove the fill.~~

~~I. Except as otherwise noted, violation of any of the terms of this amended permit shall be grounds for revocation. The Commission may revoke any amended permit for such violation after a public hearing held on reasonable notice to the permittee or its assignee if the amended permit has been effectively assigned. If the amended permit is revoked, the Commission may determine, if it deems appropriate, that all or part of any fill or structure placed pursuant to this amended permit shall be removed by the permittee or its assignee if the amended permit has been assigned.~~

~~J. This amended permit shall not take effect unless the permittee executes the original of this amended permit and returns it to the Commission within ten days after the date of the issuance of the amended permit. No work shall be done until the acknowledgment is duly executed and returned to the Commission.~~

~~K. Any area subject to the jurisdiction of the San Francisco Bay Conservation and Development Commission under either the McAteer-Petris Act or the Suisun Marsh Preservation Act at the time the amended permit is granted or thereafter shall remain subject to that jurisdiction notwithstanding the placement of any fill or the implementation of any substantial change in use authorized by this amended permit.~~

~~L. Any area not subject to the jurisdiction of the San Francisco Bay Conservation and Development Commission that becomes, as a result of any work or project authorized in this amended permit, subject to tidal action shall become subject to the Commission's "bay" jurisdiction up to the line of highest tidal action.~~

~~M. Unless the Commission directs otherwise, this amended permit shall become null and void, if any term, standard condition, or special condition of this amended permit shall be found illegal or unenforceable through the application of statute, administrative ruling, or court determination. If this amended permit becomes null and void, any fill or structures placed in reliance on this amended permit shall be subject to removal by the permittee or its assignee if the amended permit has been assigned to the extent that the Commission determines that such removal is appropriate. Any uses authorized shall be terminated to the extent that the Commission determines that such uses should be terminated.~~

A. **Permit Execution**. This amended permit shall not take effect unless the permittee executes the original of this amended permit and returns it to the Commission within ten days after the date of the issuance of the amended permit. No work shall be done until the acknowledgment is duly executed and returned to the Commission.

B. **Notice of Completion**. The attached Notice of Completion and Declaration of Compliance form shall be returned to the Commission within 30 days following completion of the work.

C. **Permit Assignment**. The rights, duties, and obligations contained in this amended permit are assignable. When the permittee transfers any interest in any property either on which the activity is authorized to occur or which is necessary to achieve full compliance of one or more conditions to this amended permit, the permittee/transferor and the transferee shall execute and submit to the Commission a permit assignment form acceptable to the Executive Director. An assignment shall not be effective until the assignee executes and the Executive Director receives an acknowledgment that the assignee has read and understands the amended permit and agrees to be bound by the terms and conditions of the amended permit, and the assignee is accepted by the Executive Director as being reasonably capable of complying with the terms and conditions of the amended permit.

D. **Permit Runs With the Land**. Unless otherwise provided in this amended permit, the terms and conditions of this amended permit shall bind all future owners and future possessors of any legal interest in the land and shall run with the land.

E. **Other Government Approvals**. All required permissions from governmental bodies must be obtained before the commencement of work; these bodies include, but are not limited to, the U. S. Army Corps of Engineers, the State Lands Commission, the Regional Water Quality Control Board, and the city or county in which the work is to be performed, whenever any of these may be required. This amended permit does not relieve the permittee of any obligations imposed by State or Federal law, either statutory or otherwise.

F. **Built Project must be Consistent with Application**. Work must be performed in the precise manner and at the precise locations indicated in your application, as such may have been modified by the terms of the amended permit and any plans approved in writing by or on behalf of the Commission.

G. **Life of Authorization**. Unless otherwise provided in this amended permit, all the terms and conditions of this amended permit shall remain effective for so long as the amended permit remains in effect or for so long as any use or construction authorized by this amended permit exists, whichever is longer.

H. **Commission Jurisdiction**. Any area subject to the jurisdiction of the San Francisco Bay Conservation and Development Commission under either the McAteer-Petris Act or the Suisun Marsh Preservation Act at the time the amended permit is granted or thereafter shall remain subject to that jurisdiction notwithstanding the placement of any fill or the implementation of any substantial change in use authorized by this amended permit. Any area not subject to the jurisdiction of the San Francisco Bay Conservation and Development Commission that becomes, as a result of any work or project authorized in this amended permit, subject to tidal action shall become subject to the Commission's "bay" jurisdiction.

I. **Changes to the Commission's Jurisdiction as a Result of Natural Processes**. This amended permit reflects the location of the shoreline of San Francisco Bay when the permit was issued. Over time, erosion, avulsion, accretion, subsidence,

relative sea level change, and other factors may change the location of the shoreline, which may, in turn, change the extent of the Commission's regulatory jurisdiction. Therefore, the issuance of this amended permit does not guarantee that the Commission's jurisdiction will not change in the future.

I. **Violation of Permit May Lead to Permit Revocation**. Except as otherwise noted, violation of any of the terms of this amended permit shall be grounds for revocation. The Commission may revoke any amended permit for such violation after a public hearing held on reasonable notice to the permittee or its assignee if the amended permit has been effectively assigned. If the amended permit is revoked, the Commission may determine, if it deems appropriate, that all or part of any fill or structure placed pursuant to this amended permit shall be removed by the permittee or its assignee if the amended permit has been assigned.

K. **Should Permit Conditions Be Found to be Illegal or Unenforceable**. Unless the Commission directs otherwise, this amended permit shall become null and void if any term, standard condition, or special condition of this amended permit shall be found illegal or unenforceable through the application of statute, administrative ruling, or court determination. If this amended permit becomes null and void, any fill or structures placed in reliance on this amended permit shall be subject to removal by the permittee or its assignee if the amended permit has been assigned to the extent that the Commission determines that such removal is appropriate. Any uses authorized shall be terminated to the extent that the Commission determines that such uses should be terminated.

L. **Permission to Conduct Site Visit**. The permittee shall grant permission to any member of the Commission's staff to conduct a site visit at the subject property during and after construction to verify that the project is being and has been constructed in compliance with the authorization and conditions contained herein. Site visits may occur during business hours without prior notice and after business hours with 24-hour notice.

Executed at San Francisco, California, on behalf of the San Francisco Bay Conservation and Development Commission

WILL TRAVIS
Executive Director
San Francisco Bay Conservation
and Development Commission

WT/RM/mm

cc: U. S. Army Corps of Engineers, Attn: Regulatory Functions Branch
San Francisco Bay Regional Water Quality Control Board,
Attn: Certification Section
Environmental Protection Agency, Attn: Mike Monroe, W-8

State of California)
County of San Francisco)

CALIFORNIA ALL-PURPOSE CERTIFICATE OF ACKNOWLEDGMENT

On October 26, 2009 before me, Myrna Carter-Lee, Notary Public
(here insert name and title of the officer)

personally appeared Bill Graves

,

who proved to me on the basis of satisfactory evidence to be the person~~(s)~~ whose name~~(s)~~ is~~/are~~ subscribed to the within instrument and acknowledged to me that he~~/she/they~~ executed the same in his~~/her/their~~ authorized capacity~~(ies)~~, and that by his~~/her/their~~ signature~~(s)~~ on the instrument the person~~(s),~~ or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

MYRNA CARTER-LEE
COMM. #1859874
Notary Public - California
San Francisco County
My Comm. Expires Jul. 29, 2013
NRO1

WITNESS my hand and official seal.

Signature Myrna Carter-Lee

(Seal)

OPTIONAL INFORMATION

Although the information in this section is not required by law, it could prevent fraudulent removal and reattachment of this acknowledgment to an unauthorized document and may prove useful to persons relying on the attached document.

Description of Attached Document

The preceding Certificate of Acknowledgment is attached to a document

titled/for the purpose of _____

_____ ,

containing _____ pages, and dated _____ .

The signer(s) capacity or authority is/are as:

- ☐ Individual(s)
- ☐ Attorney-in-Fact
- ☐ Corporate Officer(s) _____ Title(s)
- ☐ Guardian/Conservator
- ☐ Partner - Limited/General
- ☐ Trustee(s)
- ☐ Other: _____

representing: _____ Name(s) of Person(s) or Entity(ies) Signer is Representing

_____ .

Additional Information

Method of Signer Identification

Proved to me on the basis of satisfactory evidence:
- ○ form(s) of identification ○ credible witness(es)

Notarial event is detailed in notary journal on:
Page # _____ Entry # _____

Notary contact: _____

Other

- ☐ Additional Signer(s) ☐ Signer(s) Thumbprint(s)
- ☐ _____

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* *

Receipt acknowledged, contents understood and agreed to:

Executed at 111 GRAND AVENUE
OAKLAND, CA

CALTRANS
Applicant

On NOVEMBER 2, 2009 By: James B Richard

DDD, ENVIRONMENTAL
Title PLANNING & ENGINEERING

ACKNOWLEDGMENT

State of California
County of ALAMEDA)

On NOVEMBER 2, 2009 before me, SURESH DHARMANI, NOTARY PUBLIC
(insert name and title of the officer)

personally appeared JAMES BURTON RICHARDS,
who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/~~are~~ subscribed to the within instrument and acknowledged to me that he/~~she/they~~ executed the same in his/~~her/their~~ authorized capacity(~~ies~~), and that by his/~~her/their~~ signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

SURESH DHARMANI
Commission # 1687719
Notary Public - California
San Francisco County
My Comm. Expires Sep 11, 2010

Signature _____ **(Seal)**

3. ENV-CERT

ENVIRONMENTAL CERTIFICATION

DIST-CO-RTE-PM 04-SM 84-28.5/30.15
04-ALA 84-0.0/1.2

EA # 1A5220

A. Environmental Documentation

- NEPA Document type EA/FONSI Date Approved: 9/2/09
- CEQA Document type IS/MND Date Approved: 9/2/09
- NEPA CE ☐ Date Determined:
- CEQA CE ☐ Date Determined:
- NEPA document checked for validity/Re-evaluation Date:
- Supplemental or new document needed (NEPA) Yes ☐ No ☐ Date Approved:
- Addendum, Supplemental or Subsequent (CEQA) Yes ☐ No ☐ Date Approved:

B. All environmental commitments that belong in this PS&E are included.

C. All actions in this PS&E are covered by the approved environmental documentation, which remains valid.

D. All permits are complete. Project permits are listed below:

Agency	Type	Issue Date	Expiration Date
BCDC Permit # 20-73	Amendment # 13	Oct. 26, 2009	Dec. 31, 2017
RWQCB	Water Quality Certification	Dec. 3, 2009	(end of construction)
USACOE 404	Nationwide # 3 and # 27	Oct. 23, 2009	Oct. 23, 2011
USACOE 404	Nationwide # 14	Oct. 7, 2009	Oct. 7, 2011

E. Environmental Construction Window(s) Apply: [X] Yes ☐ No

F. Pursuant to NEPA, noise abatement is included in project: ☐ Yes [X] No

G. If project has environmental commitments [X] Yes ☐ No, an Environmental Commitment Record has been prepared: [X] Yes ☐ No

I certify that, for environmental purposes, this project is ready to list, and, as applicable, Caltrans has fully carried out all environmental responsibilities assumed under 23 U.S.C. 327 for this project in accordance with the Pilot Program Memorandum of Understanding and applicable Federal laws, regulations, and policies.

Ed Davey — 12/15/09

Signature - Environmental Branch Chief — Date

Changes to this PS&E submittal shall be discussed with the signature authority and may require an updated environmental certification.

This project may be advertised for contract award. If the project has not been advertised within twelve months of the date of Environmental Certification, this Environmental Certification expires and a new certification or update is required.

Certification expiration date is Dec.15, 2010.

4. NMFS_PERMIT

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

AUG 10 2009

In response refer to:
2009/02486

James B. Richards
Deputy Director Environmental Planning and Engineering
Office of Natural Sciences and Permits
California Department of Transportation
111 Grand Avenue
Oakland, California 94623-0660

Dear Mr. Richards:

Thank you for your January 12, 2009, letter requesting formal consultation with NOAA's National Marine Fisheries Service (NMFS) regarding the Dumbarton Bridge Seismic Retrofit Project. This response transmits NMFS' biological opinion and conference opinion for this project (Enclosure 1). The enclosed biological and conference opinion describes NMFS' analysis of the effects of the proposed project on 1) threatened Central California Coast steelhead Distinct Population Segment (DPS)(*Oncorhynchus mykiss*) and their critical habitat, and 2) the Southern DPS of North American Green Sturgeon (*Acipenser medirostris*) and their proposed critical habitat in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*).

In the biological opinion and conference opinion, NMFS concludes the proposed action is not likely to jeopardize the continued existence of listed Central California Coast DPS of steelhead or southern DPS green sturgeon, and is not likely to result in the destruction or adverse modification of salmonid designated critical habitat, or proposed critical habitat for green sturgeon. NMFS anticipates that take of listed salmonids and southern DPS green sturgeon as a result of this project will occur. An incidental take statement is included with the enclosed supplemental biological opinion.

Caltrans may ask NMFS to confirm the conference opinion as a biological opinion issued through formal consultation once critical habitat is designated for the southern DPS of green sturgeon. The request must be in writing. If NMFS reviews the proposed action and finds there have been no significant changes in the action as planned or in the information used during the conference, NMFS will confirm the conference opinion as part of the biological opinion for this project.

NMFS has also evaluated the proposed action for potential adverse effects to Essential Fish Habitat (EFH) pursuant to section 305(b)(2) of the Magnuson Stevens Fishery Conservation and Management Act (MSA). Based on our review (Enclosure 2), NMFS concludes that the proposed

action would result in adverse effects to EFH for various life stages of species managed under the Pacific Groundfish Fishery Management Plan (various rockfish, flatfish, roundfish and sharks) and the Coastal Pelagic Fishery Management Plan (Northern anchovy and Pacific sardine) under the MSA. However, the proposed actions contain adequate measures to avoid, minimize, mitigate, or otherwise offset the adverse effects to EFH. Therefore, NMFS has no additional EFH Conservation Recommendations to provide. This response also serves as consultation under the authority of and in accordance with the provisions of the Fish and Wildlife Coordination Act of 1934, as amended.

Please contact Jacqueline Pearson Meyer at (707) 575-6057, or via e-mail at Jacqueline.Pearson-Meyer@noaa.gov if you have any questions concerning this consultation or require additional information.

Sincerely,

for Rodney R. McInnis
Regional Administrator

cc: Russ Strach, NMFS, Sacramento
Korie Schaffer, NMFS, Santa Rosa
Bryant Chesney, NMFS, Long Beach
Margaret Gabil, Caltrans District 4, Oakland
Robert Atanasio, Caltrans District 4, Oakland
Hal Durio, US Army Corps of Engineers, San Francisco
Copy to file: ARN# 151422SWR2009SR00237

Enclosure 1

BIOLOGICAL OPINION AND CONFERENCE OPINION

ACTION AGENCY:	California Department of Transportation
ACTION:	Dumbarton Bridge Seismic Retrofit Project
CONSULTATION CONDUCTED BY:	National Marine Fisheries Service, Southwest Region
TRACKING NUMBER:	2009/02486
DATE ISSUED:	AUG 1 0 2009

I. CONSULTATION HISTORY

The California Department of Transportation (Caltrans) will be acting as the lead agency as per the agreement with the Federal Highway Administration (FHWA) in accordance with Section 6005(a) of the Safe, Accountable, Flexible, Efficient Transportations Equity Act: A Legacy for Users (PL-109-59) to assume the FHWA Secretary's responsibilities under the National Environmental Policy Act of 1969 (42 USC 4351, *et seq.*) This Act gives Caltrans the authority to assume all or part of the FHWA Secretary's responsibilities for environmental review, consultation, or other action required under any environmental law with respect to one or more highway projects with the state.

On January 12, 2009, NOAA's National Marine Fisheries Service (NMFS) received Caltrans' January 7, 2009, letter requesting initiation of formal consultation pursuant to section 7 of the Federal Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531, *et seq.*) regarding the proposed Dumbarton Bridge Seismic Retrofit Project (File Number EA 04-1A522004), located on State Route (SR) 84 in Alameda and San Mateo Counties, California. On February 9, 2009, NMFS received a request for Essential Fish Habitat (EFH) consultation pursuant to section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act.

Caltrans, in the January 2009 biological assessment for the Dumbarton Bridge Seismic Retrofit Project, concluded the project was likely to adversely affect Central California Coast steelhead (*Oncorhynchus mykiss*) and North American southern DPS green sturgeon (*Acipenser medirostris*). Caltrans also determined the project was not likely to result in adverse modification to designated and proposed critical habitat for these species.

Recommendations for the project's pile driving were provided to Caltrans by NMFS during a

pre-consultation meeting on October 1, 2008, and during a tour of the site on October 15, 2008. Once the request for initiation of consultation was received, specific information regarding the construction materials and methods for the project's pile driving, dewatering, fish relocation, hydroacoustic and biological monitoring plans, and a qualitative benthic invertebrate community survey for Essential Fish Habitat was requested by NMFS during telephone conference calls on April 23 and 27, and May 2, 2009. The additional information was provided to NMFS by Caltrans via electronic-mail and telephone correspondence during April, May and June 2009. Consultation was initiated on April 27, 2009.

A complete administrative record of this consultation is on file at the NMFS Santa Rosa Area Office.

II. DESCRIPTION OF THE PROPOSED ACTION

The existing Dumbarton Bridge does not meet Caltrans' operations and safety design standards, therefore the proposed Dumbarton Bridge Seismic Retrofit Project involves construction activities to seismically retrofit the existing Dumbarton Bridge on SR 84 in order to meet current safety requirements. The Dumbarton Bridge serves as an east-west connector between Interstate 880 in Alameda County and U.S. Highway 101 in San Mateo County, providing transportation access for approximately 80,000 trips across the South San Francisco Bay each day. To meet safety design standards, Caltrans will install permanent piles at the bridge trestle structures, temporary piles and additional concrete at the bridge approach sections, and remove an old fishing pier. Construction activities for the project are expected to commence in 2010 and take approximately three years to complete.

A. Proposed Actions

The retrofit and associated construction activities have been divided into five components: 1) Trestle Structures; 2) Approach Sections; 3) Removal of the Ravenswood Pier; 4) Main Channel Crossing; and 5) Temporary Barrier and Drainage System. The project description presented below focuses on the activities for the Dumbarton Bridge Seismic Retrofit Project that may affect listed species, and designated and proposed critical habitat.

1. Trestle Structures

The existing bridge trestle structures are located on land, at both the east and west ends of the bridge. Each trestle section is 600 feet (ft) long and construction on these sections would include installing permanent piles adjacent to the existing structure to provide lateral strengthening. The permanent piles would be 48-inch diameter steel pipe piles driven into the ground with an impact hammer. A total of 14 piles would be installed on the northern and southern sides of each trestle for a total of 28 permanent piles. Caltrans estimates a maximum of four piles would be driven in one day, requiring 30 minutes drive time per pile. All construction at the trestle structures will occur on land, and permanent piles will be located a minimum of 50 ft from the water during high-tide, and over 1000 ft from the water during low-tide periods. Caltrans will install all of the permanent piles between October 1 – November 30, avoiding salmonid migration periods.

2. Approach Sections

The approach sections adjacent to the main channel bridge crossing are supported by a series of piers (bents). The western approach section is 2,580 ft long and extends from Pier 1 to Pier 15. The eastern approach section is 2,600 ft long, extending from Pier 32 to Pier 44. Seismic upgrades on these piers include retrofitting the existing piers through strengthening the connection between the columns, pedestals and pile caps with the installation of a reinforced concrete collar. Caltrans estimates a total of 25,000 square ft (1,700 cubic yards) of concrete will be added as fill for the concrete collar. In order to perform the concrete work, temporary work trestles and cofferdams will be installed for work access and to dewater the areas around the piers. Upon completion of the Dumbarton Bridge Seismic Retrofit Project, temporary piles, cofferdams, barges and other falsework will be removed from the area.

a. Pile Installation for Temporary Falsework

Temporary pile-supported falsework will be constructed adjacent to the existing bridge, and around the approach section piers, extending from Piers 1-16 on the western end, and from Piers 27-44 on the eastern end. Caltrans will install approximately 1000 temporary piles with a vibratory hammer for the construction of the temporary trestles. All temporary pile installation will be conducted within shallow water along the main channel edges, where water depths are estimated to not exceed 10 ft depth at high tide. The temporary piles will be hollow steel pipes, with a maximum diameter of 24-inches. The piles will be inserted in rows of three, with approximately 25 ft between each row. Temporary trestle superstructure (decking) will then be constructed atop the support piles. An additional 16 piles will extend from the temporary work trestle to surround each existing support pier to allow construction around four sides of the pier. All temporary trestles will be less than 25 ft wide. Caltrans will install a maximum of 12 piles per day (six on each side of the Bay). A total of 60 minutes of vibratory pile driving would occur per day. In order to verify load capacity of the temporary piles, approximately one in eight piles (12 percent) will be "tapped" with an impact hammer for proofing. Each pile to be tested would be tapped for a total of 10-15 seconds. No more than two piles per day would need testing. All load capacity proofing with an impact hammer will be conducted during periods of low-tide during salmonid migration periods. The temporary piles are expected to remain in the Bay for a period of three years during the project's construction duration.

To assess the level of impact to fisheries, monitoring will be implemented within the vicinity of pile driving operations for the temporary trestle installation. The fisheries monitoring program will include: 1) observations on predation by gulls and other birds; 2) examination of injured fish collected from the water; and 3) the implementation of a hydroacoustic monitoring program. The biological monitoring program will be designed to document near-term fish mortalities and the likelihood of delayed mortality of differing sizes and species of fish that have swim bladders. In addition to the biological monitoring, measurements of sound pressure and other parameters will be monitored via the hydroacoustic monitoring program.

b. Cofferdam Installation, Dewatering and Sediment Removal

The addition of concrete collars around support piers will require installing cofferdams around the piers and dewatering the work area. Sheet piles will be vibrated into place around shallow water Piers 5-15 and 32-40 (20 piers total) in order to dewater the work area. Caltrans anticipates installing the sheet piles approximately two feet from the edges of the existing piles caps, and 15 ft deep into bay substrate. Approximately .05 acres of aquatic habitat will be dewatered. Dewatering will be done in order to expose the top and several feet of the sides of each pile cap. Caltrans expects to remove up to 50,000 gallons of water from each cofferdam (1,000,000 gallons total). All dewatering activities would occur under the supervision of a NMFS approved biologist.

In addition to dewatering around the piles, accumulated sediment from the pile caps will be removed and placed upon barges to be transported and disposed of off-site at an upland location. Caltrans estimates approximately 1,800 cubic yards of mud could be removed from the pile caps. All of this work will occur within dewatered areas, and no sediment will be discharged into the Bay.

c. Fish Capture and Relocation Activities

Once the sheet piles are installed around the piers for the cofferdams, if necessary, biologists will sweep the area to be dewatered with nets, capturing any aquatic species for removal and release into the Bay. Typically, prior to driving the last sheet pile and completely enclosing the pier, the area is swept with nets towards the open side of the enclosure. Once the enclosure has been swept, the final sheet pile will be placed. However, in intertidal areas and when feasible, Caltrans expects to lower the final sheet pile after the tide has gone out, eliminating the need to sweep the enclosure as fish are anticipated to leave the enclosure during the outgoing tide. All activities that have the potential to trap, capture and relocate fish (*e.g.*, the use of nets to sweep the area) would occur under the supervision of a NMFS approved biologist.

3. Removal of the Ravenswood Pier

The western end of the Dumbarton Bridge is located adjacent to the Ravenswood Pier. The fishing pier has been closed to the public for several years and will be removed as part of the proposed project. Removal of the Ravenswood Pier will facilitate and occur concurrently with the construction of the temporary trestle. Starting at the shoreline, Caltrans will remove short sections of the pier (one span at a time) by either removing the concrete columns or cutting them off three ft below the mudline (depending on the integrity of the old concrete). Approximately 260 concrete support piles will be removed. Temporary piles will then be vibrated in and the temporary trestle superstructure will be constructed. This process will progress east until the entire Ravenswood Pier is removed and the western temporary work trestle is completed.

4. Main Channel Crossing

The main channel crossing of the bridge is approximately 3,000 ft long and extends from Piers 16-31. No in-water construction will occur for retrofitting the main channel crossing. Barges and small marine vessels will be used to transport equipment to the main channel crossing. Structural improvements to the bridge hinges located within the superstructure (roadway bed), and on substructure (such as the pedestals located above the piles caps, and on bent caps located immediately below the superstructure) will occur from the existing roadway or from atop barges.

5. Temporary Barrier and Drainage System

The proposed project would also include construction of a barrier to keep high-tide water from the Moseley Tract from encroaching onto the northern frontage road on the western end of the bridge. The Moseley Tract is located just north of the west approach to the Dumbarton Bridge on the Don Edwards San Francisco Bay National Wildlife Refuge (DENWR). Currently, the highest high-tides can flow unimpeded out of the Moseley Tract to the immediate north of the project area onto the roadway. To address this issue, Caltrans will install a temporary water barrier and pump drainage system to prevent tidal waters from flooding the road, and to remove water that may collect from rain and road run-off behind the barrier. The barrier will be approximately 2,000 ft long and between 39-56 inches above the existing road. Additionally, a sheet pile will be installed up to 20 ft into the ground within the existing shoulder to reduce seepage under the barrier. The main drainage pipe will run underground, parallel with the barrier for the entire 2000-foot distance. A number of drains in the barrier will allow water to collect in the pipe. Once collected in the pipe, the water will flow to a pump house at the eastern end of the barrier. The water will be collected and contained in the pump house until the volume is high enough to pump-out and discharge. This will allow some time for sediment to settle before being discharged into the Bay. Water will be discharged over a 500 square feet (1500 cubic feet) rip-rap strip, adjacent to the western shore of the Bay.

B. Description of the Action Area

The action area is defined as all areas affected directly or indirectly by Federal action and not merely the immediate area involved in the action (50 CFR § 402.02). The Dumbarton Bridge Seismic Retrofit Project site, including the area around the bridge piers and the area necessary to accommodate construction-related equipment such as work barges and cranes, is located in the south San Francisco Bay, between Fremont and Menlo Park in East Palo Alto, California. For the Dumbarton Bridge Seismic Retrofit Project, NMFS defines the action area to be approximately 109 acres, extending across an area of approximately three miles including the portion of the project over and within the south San Francisco Bay and surrounding roadways, tidal mudflats, marshes and salt ponds. This action area has been determined due to the direct and indirect effects of the project's construction activities including areas potentially affected from sound pressure and exposure levels produced by pile driving activities.

III. STATUS OF THE SPECIES AND CRITICAL HABITAT

The following Federally-listed species (Distinct Population Segments [DPS]), critical habitat, and proposed critical habitat occur in the action area and may be affected by bridge retrofitting, pile installation and removal, fish relocation and dewatering:

Central California Coast steelhead DPS
threatened (January 5, 2006, 71 FR 834)
critical habitat (September 2, 2005, 70 FR 52488)
North American green sturgeon southern DPS
threatened (April 7, 2006, 71 FR 17757)
proposed critical habitat (September 8, 2008, 73 FR 52084)

For the above species, only Central California Coast steelhead has designated critical habitat in south San Francisco Bay. A proposed critical habitat designation for North American green sturgeon southern DPS was completed September 8, 2008 (73 FR 52084). As of the signing of this opinion, the proposed take prohibitions under section 4(d) of the ESA (74 FR 23822), as well as the designation of critical habitat, have yet to be finalized for green sturgeon.

A. Species and Critical Habitat Listing Status

1. Salmonids

On June 28, 2005, NMFS completed an updated status review of 16 salmon ESUs, including ten steelhead populations (70 FR 37160). The new listing determination concludes that Central California Coast (CCC) steelhead will remain listed as threatened and all ten steelhead populations will be newly classified as DPS, rather than as ESUs (71 FR 834).

The CCC steelhead DPS were listed as threatened on August 18, 1997 (62 FR 43937), with populations in coastal California streams from the Russian River to Aptos Creek, and several tributaries of San Francisco, San Pablo and Suisun Bays. NMFS evaluated the listing status of CCC steelhead DPS and on June 14, 2004, and proposed maintaining the threatened listing determination (69 FR 33102). On January 5, 2006, NMFS made a final listing determination reconfirming the threatened status of CCC steelhead DPS (71 FR 834). As part of the new listing determination, NMFS included CCC steelhead produced at the Don Clausen Hatchery and Kingfisher Flat Hatchery/Scott Creek (Monterey Bay Salmon and Trout Project) as part of the DPS. Critical habitat has been designated for CCC steelhead, including approximately 1,676 miles of stream habitat in central coastal California and an additional 386 square miles of estuarine habitat in San Francisco and San Pablo bays (70 FR 52488). The action area containing south San Francisco Bay is located within critical habitat for CCC steelhead DPS. Primary constituent elements of critical habitat in the action area include the estuarine water column, foraging habitat, and natural cover including large substrate and aquatic vegetation.

2. Green Sturgeon

Two sub-populations, or DPSs of North American green sturgeon have been identified along the Pacific Coast, and qualify as species under the ESA. These DPSs were identified based on evidence of spawning site fidelity (indicating multiple DPS tendencies), and on genetic analysis that indicates differences at least between the Klamath River and San Pablo Bay samples (Adams *et al.* 2002, Israel *et al.* 2004). The two identified DPS are: (1) a northern DPS consisting of populations in coastal watersheds northward of and including the Eel River; and (2) a southern DPS consisting of coastal and Central Valley populations south of the Eel River, with the only known spawning population occurring in the Sacramento River.

Because of substantial loss of spawning habitat, the concentration of a single spawning population in one section of the Sacramento River, and multiple other risks to the species, the southern DPS green sturgeon was listed as threatened on April 7, 2006 (71 FR 17757). Adult green sturgeon migrate through the action area, and juvenile, subadult and non-spawning adult green sturgeon utilize the action area as rearing and migration habitat. Critical habitat for North American southern DPS green sturgeon was proposed on September 8, 2008 (73 FR 52084). Critical habitat includes approximately 325 miles of freshwater river habitat, 1,058 square miles of estuarine habitat, including 270 square miles in the San Francisco Bay, and 11,927 square miles of marine habitat (73 FR 52084). The action area within the south San Francisco Bay is located within proposed critical habitat for southern DPS green sturgeon. Primary constituent elements of proposed critical habitat in the action area include adequate food resources and foraging habitat, the estuarine water column including suitable water quality and depths, sediment quality, and an unimpeded migratory corridor.

B. Species Life History and Population Dynamics

1. Steelhead

a. General Life History - Steelhead

Steelhead are an anadromous form of *Oncorhynchus mykiss*, spending some time in both freshwater and saltwater. The older juvenile and adult life stages occur in the ocean, until the adults ascend freshwater streams to spawn. Unlike Pacific salmon, steelhead are iteroparous, or capable of spawning more than once before death (Busby *et al.* 1996). Although one-time spawners are the great majority, Shapolov and Taft (1954) reported that repeat spawners are relatively numerous (17.2 percent) in California streams; and may spawn one to four times over their lifetime. Eggs (laid in gravel nests called redds), alevins (gravel dwelling hatchlings), fry (juveniles newly emerged from stream gravels), and young juveniles, remain in freshwater until they become large enough to migrate to the ocean to finish rearing and maturing to adults. General reviews for steelhead in California document much variation in life history (Shapovalov and Taft 1954, Barnhart 1986, Busby *et al.* 1996, McEwan 2001). Although variation occurs, coastal California steelhead usually live in freshwater for two years, then spend one or two years in the ocean before returning to their natal stream to spawn. Steelhead from the tributaries of San Francisco Bay typically migrate to freshwater between November and April, peaking in January and February. They migrate to the ocean as juveniles from March through June, with

peak migration occurring in April and May (Fukushima and Lesh 1998).

Steelhead fry generally rear in freshwater edgewater habitats and move gradually into pools and riffles as they grow larger. Cover is an important habitat component for juvenile steelhead, both as a velocity refuge and as a means of avoiding predation (Shirvell 1990, Meehan and Bjornn 1991). Steelhead, however, tend to use riffles and other habitats not strongly associated with cover during summer rearing more than other salmonids. Young steelhead feed on a wide variety of aquatic and terrestrial insects, and emerging fry are sometimes preyed upon by older juveniles. Rearing steelhead juveniles prefer water temperatures of 7.2-14.4 degrees Celsius (°C) and have an upper lethal limit of 23.9°C (Barnhart 1986, Bjornn and Reiser 1991). However, they can survive in water up to 27°C with saturated dissolved oxygen conditions and a plentiful food supply. Fluctuating diurnal water temperatures also aid in survivability of salmonids (Busby *et al.* 1996).

b. Population Trend - Central California Coast steelhead DPS

Historically, approximately 48 populations[1] of steelhead existed in the CCC steelhead DPS (Bjorkstedt *et al.* 2005). Many of these populations (about 20) were independent, or potentially independent, meaning they had a high likelihood of surviving for 100 years absent anthropogenic impacts. The remaining populations were dependent upon immigration from nearby CCC steelhead DPS populations to ensure their viability (Bjorkstedt *et al.* 2005, McElhaney *et al.* 2000).

While historical and present data on abundance are limited, CCC steelhead numbers are substantially reduced from historical levels. A total of 94,000 adult steelhead were estimated to spawn in the rivers of this DPS in the mid-1960s, including 50,000 fish in the Russian River - the largest population within the DPS (Busby *et al.* 1996). Recent estimates for the Russian River are on the order of 4,000 fish (NMFS 1997). Abundance estimates for smaller coastal streams in the DPS indicate low but stable levels with recent estimates for several streams (Lagunitas, Waddell, Scott, San Vincente, Soquel, and Aptos creeks) of individual run sizes of 500 fish or less (62 FR 43937). Although there were average returns of adult CCC steelhead during 2007/08, preliminary data from the 2008/09 adult CCC steelhead returns indicate a decline in returning adults across their range compared to recent returns (J. Jahn, pers. comm. 2009). For more detailed information on long term trends in CCC steelhead abundance, see: Busby *et al.* 1996, NMFS 1997, and Good *et al.* 2005.

Some loss of genetic diversity has been documented and attributed to previous among-basin transfers of stock and local hatchery production in interior populations in the Russian River (Bjorkstedt *et al.* 2005). Reduced population sizes and fragmentation of habitat in San Francisco streams has likely also led to loss of genetic diversity in these populations.

[1] Population as defined by Bjorkstedt *et al.* 2005 and McElhaney *et al.* 2000 as, in brief summary, a group of fish of the same species that spawns in a particular locality at a particular season and does not interbreed substantially with fish from any other group. Such fish groups may include more than one stream. These authors use this definition as a starting point from which they define four types of populations (not all of which are mentioned here).

CCC steelhead have experienced serious declines in abundance, and long-term population trends suggest a negative growth rate. This indicates the DPS may not be viable in the long term. DPS populations that historically provided enough steelhead strays to support dependent populations may no longer be able to do so, placing dependent populations at increased risk of extirpation. However, because CCC steelhead have maintained a wide distribution throughout the DPS, roughly approximating the known historical distribution, CCC steelhead likely possess a resilience that is apt to slow their decline relative to other salmonid species in worse condition. The most recent status review concludes that steelhead in the CCC DPS remain "likely to become endangered in the foreseeable future" (Good *et al.* 2005).

2. Green Sturgeon

a. General Life History – Green Sturgeon

North American green sturgeon are the most widely distributed, and most marine-oriented of sturgeon species belonging to the family Acipenseridae. Like all sturgeon, North American green sturgeon are anadromous, long-lived, and a slow growing species (Adams *et al.* 2002). Along the Pacific Coast, North American green sturgeon have been documented offshore from Ensenada, Mexico to the Bering Sea, Alaska and found in freshwater rivers from the Sacramento River to British Columbia (Moyle 2002).

As mentioned previously, two DPS of green sturgeon have been identified along the western coast of North America, and are known to occur in nearshore marine waters, and are commonly observed in coastal bays, estuaries, and coastal marine waters from southern California to Alaska. Data from commercial trawl fisheries and tagging studies indicate green sturgeon occupy waters within the 110 m contour on the continental shelf (NMFS 2005, Erickson and Hightower 2007a,b). Of the two DPSs, only the southern DPS is listed as a threatened species under the ESA. Co-occurrence of both northern and southern DPS green sturgeon within the Pacific Coast range is known, thus green sturgeon observed outside of natal rivers may belong to either DPS. Therefore, the geographical area occupied by the southern DPS is defined as the entire west coast range occupied by green sturgeon in North America. Within this range, southern DPS green sturgeon have been confirmed to occur from Graves Harbor, Alaska, to Monterey Bay, California (Lindley *et al.* 2008).

There is limited available data for green sturgeon on habitat usage, distribution and activities while present in nearshore coastal marine waters. New information regarding the migration and habitat use of the southern DPS green sturgeon has emerged. Lindley *et al.* (2008) report large-scale migrations of green sturgeon along the Pacific Coast. It appears that southern DPS green sturgeon are migrating considerable distances up the Pacific Coast into other estuaries, particularly the Columbia River. Recent analysis by Israel (2006a) indicates a substantial population of southern DPS green sturgeon to be present in the Columbia River estuary (50-80 percent). This information also agrees with the results of green sturgeon tagging studies completed by the California Department of Fish and Game (CDFG) where they tagged a total of 233 green sturgeon in the San Pablo Estuary between 1954 and 2001. A total of 17 tagged fish were recovered, 12 from commercial fisheries off of Oregon and Washington, with eight of the

12 recoveries in the Columbia River estuary, three in the Sacramento-San Joaquin River estuary, and two in the Pacific Ocean off of California (CDFG 2002).

Kelley *et al.* (2007) studied the movement of six green sturgeon (one adult and five sub-adults) in the San Francisco Estuary (tagged in San Pablo Bay) and discovered while adults and subadults occupied shallow water depths, there were distinct directional movements. In contrast, when the fish exhibited non-directional movements, they remained close to the bottom. The movements were not found to be related to salinity, current, or temperature and the authors surmised they are related to resource availability. Although Heublein (2006) thought that all adult green sturgeon left the Sacramento River prior to September 1, recent monitoring data reveals that post-spawned green sturgeon can remain in the river for several additional months. Acoustic tagging studies on the Rogue River (Erickson *et al.* 2002) have shown that adult green sturgeon will hold for as much as 6 months in freshwater. They were found to inhabit deep (> 5m), low gradient reaches or off-channel sloughs or coves of the river during summer and autumn months when water temperatures were between 15 and 23 °C. The authors presumed that holding in deep pools was to conserve energy and utilize abundant food resources. When ambient temperatures in the river dropped in autumn and early winter (< 10 °C) and flows increased, the majority of fish emigrated from freshwater into the ocean (Erickson *et al.* 2002). Recent evidence of similar behavior has been noted for post-spawned green sturgeon in the Sacramento River (Vogel 2008). Based on several tagged adult green sturgeon detected in the Sacramento River during their spawning migration in 2007, it appears that they spend several months in holding pools on the Sacramento River above the Glenn-Colusa Irrigation District (GCID) diversion (River Mile 205).

The life cycle of southern DPS green sturgeon can be broken into four distinct phases based on developmental stage and habitat use: (1) larvae and post-larvae less than 10 months of age; (2) juveniles less than or equal to three or four years of age; (3) coastal migrant females between three or four and thirteen, and males between three or four and nine years of age; and (4) adult females greater than or equal to thirteen years of age and males greater than or equal to nine years of age (Nakamoto *et al.* 1995). The largest fish have been aged at 42 years, but this is probably an under estimate and maximum ages of 60-70 years or more are likely (Emmett *et al.* 1991). Adult green sturgeon can reach lengths up to 270 centimeters (cm) and weigh up to 175 kilograms (kg) (Moyle 2002); although adult sturgeon longer than 2 m and over 90 kg in weight are uncommon (Skinner 1962). Males reach maturity at younger ages than females, thus females tend to be larger and older than males (Nakamoto *et al.* 1995).

Confirmed spawning populations of North American green sturgeon currently are found in only three river systems, the Sacramento and Klamath Rivers in California, and the Rogue River in southern Oregon (Erickson *et al.* 2002, Farr and Kern, 2005). During the late summer and early fall, sub-adults and non-spawning adult green sturgeon frequently can be found aggregating in estuaries along the Pacific coast (Emmett *et al.* 1991). Relatively large concentrations occur in the Columbia River estuary, Willapa Bay, and Grays Harbor, with smaller aggregations in San Francisco Estuary (Emmett *et* al 1991, Moyle *et al.* 1992).

Adult green sturgeon are believed to spawn every two to four years and generally exhibit fidelity to their spawning site. Green sturgeon reach sexual maturity only after several years of growth;

first spawning generally occurs at 15 years of age for males, and 17 years for females. Green sturgeon may migrate long distances upstream to reach spawning habitat. Southern DPS green sturgeon adults typically begin their upstream spawning migrations into the San Francisco Bay by late February to early March, reach Knights Landing by April, and spawn between March and July (Heublein 2006). Peak spawning is believed to occur between mid-April to mid-June and thought to occur in deep, fast water (> 3 m), of large rivers (Emmett *et al.* 1991, Adams *et al.* 2002).

Recent data regarding adult southern DPS green sturgeon has been collected from monitors located from the Golden Gate Bridge to the upper Sacramento River. Some fish that entered the estuary continued to the Sacramento River to spawn. Spawning has been documented on the mainstem over 240 miles upstream, both upstream and downstream of the Red Bluff Diversion Dam (RBDD) (Brown 2007 cited in 73 FR 52084, September 8, 2008). Based on the distribution of sturgeon eggs, larvae, and juveniles in the Sacramento River, CDFG (2002) indicated that southern DPS green sturgeon spawn in late spring and early summer above Hamilton City possibly to Keswick Dam.

Adult female green sturgeon produce between 59,000 and 242,000 eggs, depending on body size, with a mean egg diameter of 4.3 millimeters (mm) (Moyle *et al.* 1992, Van Eenennaam *et al.* 2001, 2006). Eggs are broadcast spawned, and either adhere to substrate or settle into crevices between river substrate, which ranges from clean sand to bedrock (Deng 2002, Van Eenennaam *et al.* 2001). Like salmonids, green sturgeon require cool water temperatures for egg and larval development, with optimal temperatures ranging from 11 to 17-18 degrees °C. Laboratory studies have shown 15°C to be optimal for larval growth, whereas temperatures below 11°C and above 19°C may be detrimental. Higher temperatures may cause cellular stress and decreased swimming performance (Cech, Jr. *et al.* 2000, Mayfield and Cech 2004, Allen *et al.* 2006), and temperatures ≥ 23°C have been found lethal for embryos (Van Eenennaam *et al.* 2005). Larvae supplemented with live food in lab conditions exhibited significantly higher survival rates (Van Eenennaam *et al.* 2001). The type of substrate may also affect larval growth and foraging behavior. Nguyen and Crocker (2007) found that larvae reared on flat-surfaced substrates (*e.g.*, glass or slate-rock) had higher specific growth rates than larvae reared on cobble or sand. The authors surmised that this was likely due to lower foraging effectiveness and greater activity level in cobble and sand substrates.

Newly hatched green sturgeon are approximately 12.5 to 14.5 mm in length. Metamorphosis from larvae to juvenile stage (62.5mm – 94.4mm) is completed by 45 days post hatch (dph). Exogenous feeding starts at approximately 10 dph (23-25 mm)(Deng *et al.* 2002), and at this time larvae are believed to initiate downstream migration from spawning areas staying close to the bottom, with downstream migration periodically interrupted by foraging bouts upstream (Kynard *et al.* 2005). Green sturgeon larvae do not exhibit the initial pelagic swim-up behavior characteristic of other members of the Acipenseridae family. As mentioned previously, they are strongly oriented to the bottom and exhibit nocturnal activity patterns. Under laboratory conditions, green sturgeon larvae cling to the bottom during the day, and move into the water column at night (Van Eenennaam *et al.* 2001). After five to six dph, the larvae exhibit nocturnal swim-up activity (Van Eenennaam *et al.* 2001, Deng *et al.* 2002) and nocturnal downstream migrational movements (Kynard *et al.* 2005). Juvenile green sturgeon continue to exhibit

nocturnal behavioral beyond the metamorphosis from larvae to juvenile stages. Green sturgeon larvae grow rapidly, reaching 300 mm in one year, and over 600 mm within 2-3 years. Laboratory studies by Kynard *et al.* (2005) indicated that juvenile fish continued to migrate downstream at night for the first six months of life. When ambient water temperatures reached 8 °C, downstream migrational behavior diminished and holding behavior increased. These data suggests that nine to ten-month-old fish would hold over in their natal rivers during the ensuing winter following hatching, but at a location downstream of their spawning grounds.

Juvenile green sturgeon spend from one to four years in fresh and estuarine waters before they enter the ocean (Nakamoto *et al.* 1995, Adams *et al.* 2002). Juvenile green sturgeon have been salvaged at the Harvey O. Banks Pumping Plant and the John E. Skinner Fish Facility in the south Delta, and captured in trawling studies by the CDFG during all months of the year (CDFG 2002). The majority of these fish were between 200 and 600 mm indicating they were from 2 to 3 years of age based on Klamath River age distribution work by Nakamoto *et al.* (1995). The lack of a significant proportion of juveniles smaller than approximately 200 mm in the Delta indicates juvenile southern DPS green sturgeon likely hold in the mainstem Sacramento River, as suggested by Kyndard *et al.* (2005). Laboratory studies conducted by Allen and Cech, Jr. (2007) also indicated that juveniles spend approximately the first six months in fresh to brackish water and then transition into salt water at about 1.5 years of age (752 ± 7 mm). At approximately 100 to 170 dph, juvenile green sturgeon were able to tolerate prolonged exposure to salt water, however, there was decreased growth and activity levels, and mortality for some individuals at 100 dph. This data is consistent with the study conducted by Nakamoto *et al.* (1995), which indicated juveniles spend one to four years in fresh and estuarine waters, and disperse into salt water when at lengths of 300-750 mm.

Young green sturgeon appear to rear for the first one to two months in the Sacramento River between Keswick Dam and Hamilton City (CDFG 2002). Juvenile green sturgeon first appear in USFWS sampling efforts at RBDD in June and July at lengths ranging from 24 to 31 mm fork length (CDFG 2002, USFWS 2002). The mean yearly total length of post-larval green sturgeon captured in rotary screw traps at the RBDD ranged from 26 mm to 34 mm between 1995 and 2000 indicating they are approximately 2 weeks old. The mean yearly total length of post-larval green sturgeon captured in the GCID rotary screw trap, approximately 30 miles downstream of RBDD ranged from 33 mm to 44 mm between 1997 and 2005 (CDFG, unpublished data), indicating they are approximately three weeks old (Van Eenennaam *et al.* 2001).

Both adult and juvenile green sturgeon are primarily benthic feeders (Moyle 2002). Adult green sturgeon are believed to feed mainly upon benthic invertebrates such as clams, mysid and grass shrimp, and amphipods (Radtke 1966, Adams *et al.* 2002), and to some extent on fish. Adult sturgeon caught in Washington State waters were found to have fed on Pacific sand lance (*Ammodytes hexapterus*) and callianassid shrimp (Moyle *et al.* 1992). Dumbauld *et al.* (in prep) noted that large green sturgeon collected in Willapa Bay, Washington in 2003 fed on thalassinid shrimp and fish. Adults captured in the Sacramento-San Joaquin Delta are known to feed on invertebrates such as shrimp, mollusks, amphipods, and additionally upon small fish (Adams *et al.* 2002).

Juvenile green sturgeon in the San Francisco Estuary have been shown to feed on opossum shrimp (*Neomysis mercedie*) and amphipods (*Corophium spp.*) (Moyle 2002). Radtke (1966) examined 74 juvenile southern DPS green sturgeon caught with gill nets and otter trawl in the Delta. *Corophium spp.* appeared to be the most important food of smaller green sturgeon and was the only item found in the eight smaller green sturgeon (190–390 mm) examined in the fall. All those examined in the spring and summer had eaten *Corophium*, which made up over half the volume of their diet during these seasons. *Neomysis awatschensis* (opossum shrimp) was also utilized heavily during spring and summer. Little is known of the behavioral dynamics of these juveniles, such as habitat preference and water column usage; however, based on diet work reported above and feeding morphology, juveniles are presumed to be benthically oriented.

Migratory corridors are downstream of the spawning areas and include the mainstem Sacramento River, delta, and estuary. These corridors allow the upstream passage of adults and the downstream emigration of juveniles. Migratory habitat condition is strongly affected by the presence of barriers which can include dams, unscreened or poorly screened diversions, and degraded water quality. Both spawning areas and migratory corridors are comprised of rearing habitat for juveniles, which feed and grow before and during their one to four year residence in fresh and estuarine waters. Rearing habitat condition and function may be affected by variation in annual and seasonal flow and temperature characteristics.

b. Population Trend – southern DPS green sturgeon

The precise population size of southern DPS green sturgeon is unknown, but is clearly much smaller than the northern DPS, and is, therefore more vulnerable to catastrophic events. Population abundance information concerning the southern DPS green sturgeon is described in the NMFS status reviews (Adams *et al.* 2002, BRT 2005). Limited population abundance information comes from incidental captures of southern DPS green sturgeon from the white sturgeon monitoring program by the CDFG sturgeon tagging program (CDFG 2002). CDFG utilizes a multiple-census or Peterson mark-recapture method to estimate the legal population of white sturgeon captures in trammel nets. By comparing ratios of white sturgeon to green sturgeon captures, CDFG provides estimates of adult and subadult southern DPS green sturgeon abundance. Estimated abundance between 1954 and 2001 ranged from 175 fish to more than 8,000 per year and averaged 1,509 fish per year. Unfortunately, there are many biases and errors associated with these data, and CDFG does not consider these estimates reliable. Fish monitoring efforts at RBDD and GCID on the upper Sacramento River have captured between 0 and 2,068 juvenile southern DPS green sturgeon per year (Adams *et al.* 2002).

Juvenile entrainment data from the Sacramento-San Joaquin Delta pumping facilities of the Central Valley Project and State Water Project provide an indication of how green sturgeon abundance has changed since 1968. The estimated average number of green sturgeon entrained each year at the State of California's John Skinner Fish Facility prior to 1986 was 732; from 1986 on the average number decreased to 47. At the Federal Tracy Fish Collection Facility, the average prior to 1986 was 889; from 1986 to 2001 the average was 32 (70 FR 17386). Additional analysis of fish entrainment at the these fish facilities indicates that take of both southern DPS green sturgeon and white sturgeon per acre-foot of water exported has decreased substantially since the 1960s. Decreases in numbers of green sturgeon entrained in these

facilities occurred while water export levels at both facilities have increased substantially (*i.e.* more water was pumped, but fewer green sturgeon were entrained).

Catches of subadult and adult southern DPS green sturgeon by the California Department of Water Resources Interagency Ecological Program (IEP) between 1996 and 2004 ranged from 1 to 212 green sturgeon per year (212 occurred in 2001), however, the portion of these captures consisting of southern DPS green sturgeon is unknown as the fish were primarily captured in San Pablo Bay which is known to consist of a mixture of northern and southern DPS green sturgeon. Recent spawning population estimates using sibling based genetics by Israel (2006b) indicates a maximum spawning population of 32 spawners in 2002, 64 in 2003, 44 in 2004, 92 in 2005, and 124 in 2006 above RBDD (with an average of 71). Based on the length and estimated age of post-larvae captured at RBDD (approximately two weeks of age) and GCID (downstream; approximately three weeks of age), it appears the majority of southern DPS green sturgeon are spawning above RBDD. Note, there are many assumptions with this interpretation (*i.e.*, equal sampling efficiency and distribution of post-larvae across channels) and this information should be considered cautiously.

Recent habitat evaluations conducted in the upper Sacramento and Feather rivers suggest that, as for anadromous salmonids, large amounts of potential spawning habitat were made inaccessible or altered by dams (BRT 2005). Current spawning habitat for green sturgeon has been reduced to a limited area of the upper Sacramento River. There are at least two records of confirmed adult sturgeon observation in the Feather River (Beamesderfer *et al.* 2004). However, there are no observations of juvenile or larval sturgeon even prior to the 1960s when Oroville Dam was built (BRT 2005). There are unconfirmed reports that green sturgeon may spawn in the Feather River during high flow years (CDFG 2002).

While there is no direct record of green sturgeon occurrence in the San Joaquin River upstream of the Delta, indirect evidence has been discussed in a variety of sources (Moyle 2002, Lindley *et al.* 2004). Spawning in the San Joaquin River system has not been recorded, but alterations of the San Joaquin River tributaries (Stanislaus, Tuolumne, and Merced Rivers) and its mainstem occurred early in the European settlement of the region. During the later half of the 1800s, impassable barriers were built on these tributaries where the water courses left the foothills and entered the valley floor. Therefore, these low elevation dams have blocked potentially suitable spawning habitats located further upstream for over a century. Additional destruction of riparian and stream channel habitat by industrialized gold dredging further disturbed any valley floor habitat that was still available for sturgeon spawning. It is likely that both white and green sturgeon utilized the San Joaquin River basin for spawning prior to the onset of European influence. This assumption is based on past use of the region by populations of Central Valley spring-run Chinook salmon and Central Valley steelhead which require similar spawning habitat to sturgeon. Although these two populations of salmonids have either been extirpated or greatly diminished in their use of the San Joaquin River basin over the past two centuries, their historical presence indicates that suitable spawning habitat for sturgeon once existed, such as clear, deep, cold and cobble-bottom stream reaches.

The most recent status review update concluded that the southern DPS green sturgeon is likely to become endangered in the foreseeable future due to the substantial loss of spawning habitat, the

concentration of a single spawning population in one section of the Sacramento River, and multiple other risks to the species (BRT 2005). Based on this information, the southern DPS green sturgeon was Federally-listed as threatened on April 7, 2006 (71 FR 17757), and critical habitat was proposed on September 8, 2008 (73 FR 52084). Take prohibitions under section 4(d) of the ESA were proposed May 21, 2009 (74 FR 23822).

IV. ENVIRONMENTAL BASELINE

The environmental baseline is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the species, its habitat, and the ecosystem in the action area. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process (50 CFR § 402.02).

A. Environmental Setting in the Action Area

San Francisco Bay is the largest estuary on the west coast of North America. Located about halfway up the California coast from the Mexican border, it is the natural exit point of 40 percent of California's freshwater outflow. California's two largest rivers, the Sacramento and San Joaquin, merge to form the estuary. The two rivers drain part of the Sierra Nevada and Cascade mountains and form a large and convoluted delta in the Central Valley. The freshwater runoff in the delta flows seaward, mixing with ocean water through Suisun Bay, San Pablo Bay and lastly San Francisco Bay. San Francisco Bay empties into the Pacific Ocean through the channel passing under the Golden Gate Bridge.

The climate is Mediterranean; most precipitation falls in winter and spring as rain throughout the Central Valley and as snow in the Sierra Nevada and Cascades. The freshwater outflow pattern is seasonal; highest outflow occurs in winter and spring. In summer, freshwater inflow to San Francisco Bay is controlled mainly by water released from Central Valley reservoirs. Ocean conditions also greatly influence the estuary. The California Current system dominates California's nearshore ocean environment. Off northern and central California, surface waters are driven south by northwesterly winds in spring and summer and, as a result of Ekman transport of surface water, cold, nutrient-rich water is upwelled to the surface and transported offshore. This creates one of the most productive ocean regions in the world. Ocean temperature is a major factor determining the distribution of fish and invertebrates along the coast and consequently, the marine fauna of the estuary. San Francisco Bay is in a transitional zone containing both cold water species from the north and sub-tropical fauna from the south (Parrish *et al.* 1981). In addition to the longitudinal temperature gradient and seasonal variation due to upwelling, there are large inter-annual temperature differences during El Niño events.

The action area is located in what is commonly termed the south San Francisco Bay or "South Bay". The South Bay refers to the portion of San Francisco Bay south of Coyote Point on the western shore and San Leandro Marina on the eastern shore. The South Bay possesses both

physical and ecological aspects that differ from the Central, North, San Pablo, and Suisun Bays, as well as the Delta portions of San Francisco Bay. The portion of the South Bay is surrounded by developed land, and has a central open water channel (up to 30 ft deep) that narrows southward, and is bordered by broad shoals on either side of the channel with subtidal and intertidal habitats (with water depths 10 ft or less), as well as tidal and non-tidal wetlands, and former salt evaporation ponds. Tidal mudflats are the dominant substrate within the action area, although habitat is present within the water column, benthic substrate and shoreline, providing for a diverse assemblage of aquatic plants and phytoplankton, birds, marine mammals and a high biomass of invertebrates (*e.g.*, gastropods, bivalves, polychaetes, amphipods and crustaceans). These invertebrates provide an important food resource to birds and fish species. There are two public fishing piers south of Dumbarton Bridge. The eastern pier, which is currently open to the public, is the Dumbarton Fishing Pier, located inside the boundaries of the DENWR along the eastern shore. The western pier, as described previously, is the Ravenswood Pier. Artificial surfaces such as the fishing pier piles also provide some hard substrate for invertebrates and vertical relief within the water column.

B. Status of Listed Species and Critical Habitat in the Action Area

1. Salmonids

South San Francisco Bay, including the action area, is within the designated critical habitat for CCC steelhead. Essential features of critical habitat in the action area include the estuarine water column, foraging habitat, and food resources used by these salmonids as part of their juvenile downstream migration or adult upstream migration (58 FR 33212). Primary constituent elements of critical habitat for CCC steelhead in the action area include estuarine areas free of obstruction and excessive predation with: 1) water quality, water quantity and salinity conditions supporting juvenile and adult physiological transitions between freshwater and saltwater; 2) natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels; and 3) juvenile and adult forage, including aquatic invertebrates and fishes, supporting growth and maturation (69 FR 71880).

Historically, the San Francisco Bay provided a highly productive estuarine environment for juvenile anadromous salmonids. During the course of their downstream migration, juvenile salmon and steelhead may still utilize the estuary for seasonal rearing, although recent data suggest that migration to the sea is rapid. Keegan (2007) reports Central Valley steelhead smolts equipped with ultrasonic tags appear to be focused on emigrating through San Francisco Bay as rapidly as possible. Similarly, MacFarlane and Norton (2002) found Central Valley Chinook salmon move quickly through the Bay on their way to the Pacific Ocean. This tendency to rapidly move through the estuary is contrary with salmonid migration in estuaries located at higher latitudes (Quinn 2005; McMichael *et al.* 2006). MacFarlane and Norton (2002) suggest that loss and changes to Bay habitats may have reduced the value of the Bay for juvenile Chinook, resulting in reduced use of the Bay.

Although the Bay residence times of CCC steelhead from South Bay tributary streams have not been studied, NMFS assumes their residence times will be similar to those for Central Valley Chinook salmon and steelhead. Within the South Bay, all adult and juvenile CCC steelhead

migrating from the Guadalupe River, Stevens, San Francisquito, Coyote and Upper Penitencia creeks, migrate under the Dumbarton Bridge. Returning adult salmon and steelhead migrate from the Pacific Ocean, through San Francisco Bay and upstream to spawning areas of their natal streams. Upstream migrations for adult steelhead through the Bay typically begin in early December. Juvenile salmonids migrate downstream and through the Bay, becoming smolts en route to the Pacific Ocean where they rear and become adults. Steelhead smolts migrate downstream through the Bay during the late winter and spring months. Steelhead juveniles likely use brackish waters of the action area during the smoltification process as they move from freshwater to the ocean; and they may forage in both brackish and tidal marshes. However, virtually no information is available to determine the extent of their utilization of these habitats within the action area.

2. Green Sturgeon

Information regarding the spatial and temporal distribution of green sturgeon in the estuary is available from CDFG's San Francisco Bay Study. Between 1980 and 1995, the San Francisco Bay Study sampled several stations each month using midwater and bottom trawls (Baxter *et al.* 1999). The data show that most green sturgeon collected by trawls in the estuary range from about 200 to 1200 mm in length. However, trawls are not designed to adequately sample sturgeon, and therefore cannot be used to accurately estimate abundance of this species.

The South Bay, including the action area, is also within the range of proposed critical habitat for southern DPS green sturgeon. It serves as an important habitat for all lifestages, as it supports rearing and foraging and serves as a migratory/connectivity corridor between the Sacramento River system and nearshore coastal marine waters. Juveniles (1-4 years of age) and subadults (from 4 to 9 years of age for males, and 4 to 13 years of age for females) are believed to be present in the Bay throughout the year (CDFG 2002, Calfish 2008), including the action area. These lifestages utilize the action area primarily for rearing and foraging. Adults likely occur within tidally influenced areas of sloughs surrounding the Bay, and may also be present year-round in the action area depending on reproductive status. Pre-spawning adults could be present from February through May, post-spawned adults could be present October through January, and non-spawning adults may be present June through October (D. Woodbury, pers. comm. 2008). However, although adults may utilize the action area for foraging, spawning adults are more likely to be present within the north San Francisco Bay, several kilometers away from the action area, en route to spawning habitat within the Sacramento River. No current or historic spawning locations for green sturgeon are known in the South Bay drainages. However, during the spring months, sturgeon are regularly caught by sport fishermen from the Dumbarton Public Fishing Pier. CDFG estimates that one-fifth of the sturgeon captured in the estuary are green sturgeon, and the remaining are non-ESA listed white sturgeon (Moyle 2002).

C. Factors Affecting the Species and Critical Habitat in the Action Area

Profound alterations to the environment of the San Francisco Bay estuary began with the discovery of gold in the middle of the 19th century. Dam construction, water diversion, hydraulic mining, and the diking and filling of tidal marshes soon followed, launching the San Francisco Bay area into an era of rapid urban development and coincident habitat degradation. There are

efforts currently underway to restore the habitat in the South Bay area, if not directly within the action area, at least within surrounding tributaries and the estuary itself. There have also been alterations to the biological community as a result of human activities, including hatchery practices and the introduction of non-native species. The following describes, in general, the human activities that have affected these fish and their habitats in the South Bay, including: 1) altered flows from dam construction and water development; 2) land use activities and urban development; 3) industrial and urban pollution; 4) introduction of non-native species; 5) evaporative salt ponds; and 6) ecosystem restoration.

1. Dam Construction and Water Development

Hydropower, flood control, and water supply dams of the Central Valley Project, State Water Project, and other municipal and private entities have affected water quantity, timing, and quality in San Francisco Bay, including in the action area. Altered stream flows and inflow through the Delta and Carquinez Strait have affected the natural cycles by which salmonids and green sturgeon base their migrations. The seasonal distribution of freshwater inflow differs in that the magnitude and duration of peak flows during the winter and spring are significantly reduced by water impoundment in upstream reservoirs. Salmonids and green sturgeon need sufficient freshwater flow within the bays and estuaries adjacent to the Sacramento River (*i.e.*, the Sacramento–San Joaquin Delta, and the Suisun, San Pablo, and San Francisco Bays [including the action area]) to allow adults to successfully orient to the incoming freshwater flow and migrate upstream to natal spawning grounds. Overall, present day water management practices in the Central Valley reduce natural flow variability by creating more uniform flows year-round that diminish migratory cues, natural channel formation, and food web functions.

2. Land Use Activities and Urban Development

Historically, the tidal marshes of San Francisco Bay provided a highly productive estuarine environment for juvenile anadromous fish species. Juvenile salmonids primarily use the bay as a migratory pathway during their outmigration to the Pacific Ocean. Returning adult salmonids and green sturgeon navigate their way through San Francisco Bay as they seek the upstream spawning grounds of their natal streams. Within the action area, adult CCC steelhead migrate to their natal streams within the South Bay to spawn. Non-spawning adults, subadults and juvenile green sturgeon may utilize the estuary and action area year-round for foraging habitat, rearing, and also as a migration corridor to the sea. Land use activities since the 1850's associated with urban, industrial, and agricultural development have altered fish habitat quality in the San Francisco Bay, such as destruction of eelgrass beds or degradation of water quality, and contributed to declines in fish populations.

Urbanization has been a major influence on the land surrounding the estuary. In the past 150 years, the diking and filling of tidal marshes have decreased the surface area of San Francisco Bay by 37 percent. More than 500,000 acres of the estuary's historic tidal wetlands have been converted to farms, salt ponds, and urban uses. Less than 45,000 acres of the estuary's historic tidal marshes remain intact, a reduction of 92 percent (San Francisco Estuary Project 1992). Today, nearly 30 percent of the land in the nine counties surrounding San Francisco Bay is urbanized. The increase in urban land reflects the growth of the human population. There are

now more than 7.5 million individuals living in the Bay Area, making the region the fourth most populous metropolitan area in the United States. These changes have reduced the acreage of valuable farm land, wetlands, and riparian areas, and have increased pollutant loadings to the estuary. Non-point sources of pollution, such as urban and agricultural runoff, continue to degrade water quality in the Bay, including the action area. While the action area encompasses a small area of the entire Bay, the distribution of tidal currents, volume and flow of water throughout the Bay influences the transport of pollutants. Consequently contaminants originating miles away from the Bay are often mixed throughout the estuary. These contaminants may impair the physiological development of salmonid smolts and juvenile green sturgeon, which would reduce their survival potential during later life history phases.

Additionally, installation of docks, shipping wharves, marinas, and miles of rock rip-rap for shoreline protection has also contributed greatly to habitat degradation within the estuary. Correlated with the increase in bay area development, is an increase in marine/ocean vessel traffic transiting through the bay, including the action area. Increased marine traffic is also responsible for more pollutants to enter bay waters (*e.g.* oil spills) as well as disturbance to estuarine species resulting from elevated noise levels within the air and estuarine waters of the Bay. Thus, the majority of factors associated with land use activities and urban development contribute to the continued degradation and loss of habitat for anadromous fish species within the Bay and action area.

3. Industrial and Urban Pollution

Industrial, municipal, and agricultural wastes have been discharged into the waters of San Francisco Bay with major historical point sources including agricultural wastes primarily from the Central Valley, wastes from fish, fruit and vegetable canneries, and municipal sewage. Additionally, mining activities occurring in the 19th century contributed to a substantial increase in sediment deposition and residues leaching from abandoned mines in the lower portion of the estuary, including the action area. Associated with this sediment were high levels of mercury, which was used to help extract gold. Mining, industrial, and environmental uses of mercury have occurred for more than a century, resulting in its large historic and continuing transport to the estuary. Consequently, there is a widespread distribution in the estuary (Conaway *et al.* 2008). Additionally, contaminants in sediment located along the San Francisco Port's waterfront contain elevated levels of polycyclic aromatic hydrocarbons (PAHs), a possible result from the use of creosote-treated wood piles in the construction of the piers that line San Francisco's waterfront.

Many of these contaminants have been found in the tissue of fish inhabiting the estuary, prompting the California Department of Health to issue warnings regarding consumption of fish from within the estuary. Steelhead and green sturgeon both feed on a variety of aquatic invertebrates. Many of these prey species are found within contaminated Bay sediments and the water column, where contaminant uptake may occur. Although salmonids are primarily migratory through the action area, they do forage during this migration and therefore are subjected to the contaminants found in their prey. Additionally, since green sturgeon utilize this area as foraging and rearing habitat year-round, they are likely subjected to higher risks from consuming a greater abundance of prey species containing contaminants. These contaminants

may impair the physiological development of salmonid smolts and juvenile green sturgeon, which would reduce their survival potential during later life history phases. Moreover, since sturgeon are long-lived, and large species, they are likely to bioaccumulate high levels of contaminants during their lifespan.

Although large-scale pollution of the estuary was partially relieved by the passage of the Clean Water Act in 1972, resulting in the construction of sewage treatment plants in all cities surrounding the Bay, non-point sources of pollution, such as urban runoff, continue to degrade water quality in the Bay, including the action area.

4. Introduction of Non-Native Species

As native fishes in the San Francisco Bay-Delta estuary became depleted in the late 19th century, non-native species were brought to the estuary. As their populations boomed, those of native fishes declined further. Introduction of non-native species accelerated in the 20th century through deliberate introductions of fish (*e.g.*, for sport fishing); and unintended introductions of fish and invertebrates from the release of ballast water from ships returning from foreign ports.

Species invasion is a complex process with multiple steps: transport, release, establishment, spread, and integration. The movements of invaders between watersheds in California are primarily related to water transfers (*i.e.*, aqueducts, canals, and diversions) and salinity gradient in the estuary. Invasive and/or exotic species that become widely established are typically spread by humans, as opposed to natural dispersal from a center of origin (Marchetti *et al.* 2004). Invasive species that affect ecosystem processes may indirectly impact populations of native species. Invasive species can replace native species in their trophic level and can alter properties of an ecosystem. In an uninvaded ecosystem, the value of the ecosystem function may vary over time due to shifts in species dominance. As an invasion progresses, the invader makes up an increasing proportion of biomass at its trophic level. The introduction and spread of non-native species throughout the San Francisco Bay-Delta estuary has affected many native species, including listed salmonids (Cohen and Carlton 1995), and presumably green sturgeon, through predation and competition for food and habitat. Introduced fish species (*e.g.* striped bass) tend to be more abundant and thus can out-compete native salmon, green sturgeon, and steelhead by limiting their benthic food source (Moyle 2002). Thus, the decline of listed anadromous fish can be directly attributed to competition with or predation by introduced fish species (Dukes and Mooney 2004).

As currently seen in the San Francisco estuary, non-native invasive species can alter the natural food webs that existed prior to their introduction (Nichols 2007). Perhaps the most significant example is illustrated by the Asiatic freshwater clams *Corbicula fluminea* and *Potamocorbula amurensis*. The arrival of these clams in the estuary disrupted the normal benthic community structure and depressed phytoplankton levels in the estuary due to the highly efficient filter feeding of the introduced clams (Cohen and Moyle 2004). The decline in the levels of phytoplankton reduces the population levels of zooplankton that feed upon them, and hence reduces the forage base available to juvenile salmonids and green sturgeon transiting within the estuary, including those transiting the action area. A reduction in feeding can adversely impact

the health and physiological condition of these fish species as they rear and migrate through the estuary to the Pacific Ocean.

5. Evaporative South Bay Salt Ponds

Solar salt production in the action area began in the mid-1850s and resulted in the conversion of large wetland areas in the South Bay to salt evaporation ponds (Siegel and Bachand 2002). Levees constructed around broad expanses of tidal mudflats and marsh isolated these areas from San Francisco Bay, converting the areas to salt evaporation ponds and altering habitat for animal species present within the South Bay. Early salt production efforts were small operations scattered throughout the Bay, but by 1936, the Leslie Salt Company consolidated several smaller companies into one large operation (EDAW 2005). Cargill acquired the Leslie Salt Company in 1978 and continued producing approximately one million tons of salt annually from ponds around San Francisco Bay (for a detailed history and description of South Bay salt pond operations see Life Science 2004 and SBSP EIS/EIR 2007).

Cargill proposed to consolidate salt pond operations and sell the land and salt production rights on 61 percent of its South Bay operation area in October 2007. Negotiations headed by Senator Dianne Feinstein led to the public acquisition of the South Bay salt ponds. The State of California approved the purchase of the salt ponds from Cargill in 2003. The United States Fish and Wildlife Service (USFWS), and CDFG are now the landowners and land managers of the South Bay salt ponds. Some of these ponds, such as the Ravenswood Pond Complex borders the action area, and is now part of the DENWR managed by the USFWS. This refuge was the first urban National Wildlife Refuge established in the United States dedicated to preserving and enhancing wildlife habitat, protecting migratory birds, protecting threatened and endangered species, and providing opportunities for wildlife-oriented recreation and nature study for the surrounding communities (SBSP EIS/EIR 2007 as cited in NMFS 2009).

6. Ecosystem Restoration

Preliminary, significant steps towards a large scale tidal wetlands restoration project, the South San Francisco Bay Salt Ponds Restoration Project, have occurred. Restoration of wetland areas typically involves flooding lands previously used for agriculture, or in this case salt ponds, thereby creating additional wetland areas and rearing habitat for juvenile salmonids, green sturgeon, other fish species, and birds. Some of the tidal marsh habitat restoration activities planned for the South San Francisco Bay Salt Ponds Restoration Project are expected to benefit CCC steelhead and green sturgeon by increasing productivity in some surrounding marshes and adjacent tidal sloughs and mudflats within the action area. The potential increase in densities of invertebrate species is likely to increase the prey availability for the various animal species, including listed anadromous fish species, that utilize the areas as forage and rearing habitat. We anticipate these restoration activities will improve the habitat conditions for these species within the action area and throughout the San Francisco Bay, and thereby lead to potential increases in species numbers and distribution in the action area.

V. EFFECTS OF THE ACTION

Construction activities (primarily pile driving, dewatering and fish relocation) for the Dumbarton Bridge Seismic Retrofit Project are expected to result in adverse effects to listed CCC steelhead, and southern DPS green sturgeon; and are likely to result in temporary adverse effects to critical habitat for CCC steelhead and proposed critical habitat for southern DPS green sturgeon.

A. Pile Driving

1. Sound Pressure and Accumulated Sound Pressure Exposure

a. Impacts on Fish

NMFS has evaluated the construction activities of the proposed project for potential adverse effects to ESA-listed salmonids, green sturgeon and their designated and proposed critical habitat. These activities, especially the installation of the 48-inch diameter permanent piles and the 24-inch diameter temporary piles, may affect listed salmonids and green sturgeon through exposure to high underwater sound pressure levels and degradation of water quality during pile driving activities. Available information indicates that fish may be injured or killed when exposed to high underwater sound pressure waves generated by steel piles installed with impact hammers.

The underwater sound pressure waves that have the potential to adversely affect listed anadromous fish species originate with the contact of the hammer with the top of the steel pile. The impact of the hammer on the top of the steel pile causes a wave to travel down the pile and causes the pile to resonate radially and longitudinally like a gigantic bell. Most of the acoustic energy is a result of the outward expansion and inward contraction of the walls of the steel pipe pile as the compression wave moves down the pile from the hammer to the end of the pile buried in the bay bottom. Water is virtually incompressible and the outward movement of the pipe pile (by a fraction of an inch) followed by the pile walls pulling back inward to their original shape, sends an underwater pressure wave propagating outward from the pile in all directions. The steel pipe pile resonates sending out a succession of waves even as it is pushed several inches deeper into the bay bottom.

The degree to which an individual fish exposed to underwater sound will be affected (from a startle response to immediate mortality) is dependent on a number of variables such as the species of fish, size of the fish, presence of a swim bladder, sound pressure intensity and frequency, shape of the sound wave (rise time), depth of the water around the pile and the bottom substrate composition and texture.

Pathologies associated with very high sound pressure levels or with exposure to drastic changes in pressure are collectively known as *barotraumas*. These include hemorrhage and rupture of internal organs, including the swim bladder, liver and kidneys in fish (Caltrans 2001; Abbott and Bing-Sawyer 2002; Caltrans 2003). Death can be instantaneous, occur within minutes after exposure, or occur several days later. It has long been known that underwater explosives can cause injury and mortality to fish. The Department of the Navy conducted a series of experiments to determine the effects on fish from underwater explosions (Goertner *et al.* 1994;

Gaspin 1975) which resulted in significant differences in effects to fish depending on whether or not they had swim bladders. Thus it is the swim bladder, inflated with gas, which expands rapidly as the pressure wave passes through the fish that likely causes the observed injuries to internal organs (Keevin and Hempen 1997). An important characteristic of the underwater sound that causes injury is the frequency. During pile installation, most energy is contained within the frequency range (100-1,000 Hertz) which results in reverberation of the swim bladder.

Gisiner (1998) reports swim bladders of fish can perforate and hemorrhage when exposed to blast and high-energy impulse noise underwater. If the swim bladder bursts and the air escapes from the body cavity or is forced out of the pneumatic duct, the fish may sink to the bottom. If the swim bladder bursts but the air stays inside the body cavity, the fish is likely to stay afloat but have some difficulty in maneuvering or maintaining orientation in the water column. With salmonids, the swim bladder routinely expands and contracts as they swim near the surface or swim in deeper water near the bottom. Exposure to high sound pressure levels from pile driving causes the swim bladder to repeatedly expand and contract, hammering the internal organs that cannot move away since they are bound by the vertebral column above and the abdominal muscles and skin that hold the internal organs in place below the swim bladder (Gaspin 1975). This pneumatic pounding may result in the rupture of capillaries in the internal organs as indicated by observed blood in the abdominal cavity, and maceration of the kidney tissues. The pneumatic duct, which connects the swim bladder with the esophagus, may not make a significant difference in the vulnerability of the salmonids since it is so small relative to the volume of the swim bladder (Gaspin 1975). Green sturgeon are likely to suffer similar effects to those of salmonids since they possess similar anatomy and physiology (*e.g.*, physostomous[2] swim bladder).

Fish can also die when exposed to lower sound pressure levels if exposed for longer periods of time (Hastings and Popper 2005). Hastings (1995) found death rates of 50 percent and 56 percent for gouramis (*Trichogaster sp.*) when exposed to continuous sounds at 192 dB re one micropascal squared-second (re: 1 μPa) at 400 Hz and 198 dB (re: 1 μPa) at 150 Hz, respectively, and 25 percent for goldfish (*Carassius auratus*) when exposed to sounds of 204 dB (re: 1 μPa) at 250 Hz for two hours or less. Hastings (1995) also reported that acoustic "stunning," a potentially lethal effect resulting in a physiological shutdown of body functions, immobilized gourami within eight to thirty minutes of exposure to the aforementioned sounds.

High sound pressure levels can also result in hearing damage to fish. Structural damage to the fish inner ear by intense sound has been examined by Enger (1981) and Hastings *et al.* (1995, 1996) with scanning electron microscopy. Hastings *et al.* (1996) found destruction of sensory cells in the inner ears of oscars (*Astronotus ocellatus*) four days after being exposed to continuous sound for one hour at 180 dB (re:1 μPa) at 300 Hz. Hastings (1995) also reported that 13 out of 34 goldfish exposed for two hours to sound pressure levels ranging from 192 to 204 dB (re:1 μPa) at either 250 or 500 Hz experienced equilibrium problems that included swimming backwards and/or upside down and wobbling from side to side. These fish recovered within one day suggesting that the damage was not permanent. This fish behavior could have

[2] Physostomous fish are those species that possess swim bladders connected to the esophagus by a thin tube called the *ductus pneumaticus*. Gas pressure (air) is regulated in these fish by swallowing air to fill the swim bladder or releasing it into the gut through the tube.

been caused by post-traumatic vertigo (lack of balance and dizziness caused by a problem in the inner ear) similar to that experienced by humans after a severe blow to the body or head.

Additional detrimental effects on fish from loud sounds include stress, increasing risk of mortality by reducing predator avoidance capability, and interfering with communication necessary for navigation and reproduction. Scholik and Yan (2001) reported temporary threshold shifts for fathead minnows (*Pimephales promelas*) exposed to 24 hours of white noise with a bandwidth of 300 – 4000 Hz and overall sound pressure level of only 142 dB (re:1 μPa). Their results indicated that the effects could last longer than 14 days. Even if threshold shifts do not occur, loud sounds can mask the ability of aquatic animals to hear their environment.

Pile driving may result in "agitation" of salmonids and green sturgeon indicated by a change in swimming behavior detected by Shin (1995) with salmonids. Salmonids and green sturgeon may exhibit a startle response to the first few strikes of a pile. The startle response is a quick burst of swimming that may be involved in avoidance of predators (Popper 1997). A fish that exhibits a startle response is not considered injured in any way, but it is exhibiting behavior that suggests it perceives a stimulus indicating potential danger in its immediate environment. Fish do not exhibit a startle response every time they experience a strong hydroacoustic stimulus. The startle response is likely to extinguish after a few pile strikes. Although, the degree to which normal behavior patterns are altered from exposure to strong hydroacoustic stimulus is less understood.

Disturbance and noise associated with construction at pile driving sites may also startle fish and result in dispersion from the action area. A study in Puget Sound, Washington suggests that pile driving operations disrupt juvenile salmon behavior (Feist *et al.* 1992). Though no underwater sound measurements are available from that study, comparisons between juvenile salmon schooling behavior in areas subjected to pile driving/construction and other areas where there was no pile driving/construction indicate that there were fewer schools of fish in the pile-driving areas than in the non-pile driving areas. The results are not conclusive but there is a suggestion that pile-driving operations may result in a disruption in the normal migratory behavior of the salmon in that study, though the mechanisms salmon may use for avoiding the area are not well understood at this time. Additionally, since green sturgeon share similar migration patterns to those of Chinook salmon, it is reasonable to assume that similar behavioral patterns would result from pile driving operations for green sturgeon.

In 2004, NMFS, FHWA and Caltrans formed the Fisheries Hydroacoustic Working Group (FHWG) to address the issue of potential impacts to listed species from exposure to underwater sounds produced by pile driving. Caltrans contracted with prominent experts in the field of underwater acoustics to review existing literature on the effects of underwater sound on fish. The result of that effort (Hastings and Popper 2005) indicated the use of the sound exposure level (SEL) metric, which is expressed as decibels (dB) re one micropascal squared-second (re: 1 μPa ^{2}-sec), would be a better metric to use to correlate physical injury to fish from underwater sound pressure produced during the installation of piles than peak sound pressure level (SPL) that was currently being used. The primary rationale for this new metric was the ability to sum the energy over multiple impulses, which cannot be accomplished with peak pressure. Using SEL, the exposure of fish to a total amount of energy (*i.e.* dose) can be used to determine a physical injury response.

A white paper written for the FHWG by Popper *et al.* (2006) proposed a dual metric approach, incorporating both SEL and peak pressure, in assessing potential physical injuries to fish from exposure to high levels of underwater sound produced during pile driving. The authors proposed interim single strike thresholds of and 208 dB peak and 187 dB SEL. In a critique of the white paper, NMFS scientists from the Northwest Fisheries Science Center in Seattle, Washington (Memorandum to Mr. Russ Strach and Mr. Mike Crouse, NMFS from Tracy Collier, NMFS, September 19, 2006) stated that exposure to multiple strikes must be considered in assessing impacts. They further stated that the method described in Hastings and Popper (2005) is appropriate. Specifically, to account for exposure to sound impulses generated by multiple hammer strikes, the single strike SEL at a given distance from the pile is added to 10*log(number of strikes). At a FHWG meeting in Vancouver, Washington in June 2008, an Agreement in Principle between NMFS, Caltrans and others was reached regarding the establishment of interim thresholds to be used to assess physical injury to fish exposed to underwater sound produced during pile driving. Specifically, this included a single strike peak sound pressure level (SPL) of 206 dB (re: 1 µPa) and an accumulated SEL of 187 dB (re: 1 µPa ^{2}sec) for fish greater than 2 grams or 183 dB (re: 1 µPa ^{2}sec) for fish less than 2 grams. If either threshold is exceeded, then physical injury is assumed to occur. There is uncertainty as to the behavioral response of fish to high levels of underwater sound produced when driving piles in or near water. Until new information indicates otherwise, NMFS believes a 150 dB root-mean-square pressure (RMS) threshold for behavioral responses for salmonids is appropriate. Given the typical 15 decibel or so difference between peak SPL and RMS, a value of 150 dB RMS (re: 1 µPa) is approximately equivalent to 165 dB peak SPL (re: 1 µPa).

In *A Compendium of Pile Driving Sound Data* (Illingworth and Rodkin 2007) the most recent pile driving case studies are reviewed in order to provide information regarding the underwater sound pressure levels generated with the installation of different pile types, hammer types, and effectiveness of sound attenuation systems (*e.g.* bubble curtains). Several pile driving case studies conducted within the San Francisco Bay region are included in the compendium. Currently, there are very little data available regarding effects of pile driving directly focused on green sturgeon. However, during the construction of the Benicia-Martinez Bridge in 2002, unattenuated piles driven with a large impact hammer did result in the mortality of an adult green sturgeon. The piles for the bridge piers were 2.5 m diameter steel piles, with each pier consisting of about eight piles each. Piles were driven in water about 12 and 15 m deep in the main channel. Peak underwater sound pressure levels ranged from 227 dB (re 1 µPa) at approximately five meters from the pile to 178 dB at approximately 1,100 m from the pile (Illingworth and Rodkin 2007, D. Woodbury pers. comm. 2008).

b. Assessment of the Project's Pile Driving Effects

The results of the pile driving projects described in the previous section, and information available in the literature are helpful in assessment of the potential effects of pile driving associated with the Dumbarton Bridge Seismic Retrofit Project. As stated above, a dual metric criteria of 206 dB (re 1 µPa) peak SPL for any single strike and an accumulated SEL of 187 dB (re: 1 µPa ^{2}sec) are currently used by NMFS and Caltrans to determine potential injury to fish 2 grams or larger, and an SEL of 183 dB (re: 1 µPa ^{2}sec) for fish under 2 grams. Because all ESA-

listed fish in the action area during pile driving are expected to be larger than 2 grams, the threshold for accumulated SEL used in this analysis is 187 dB (re:1 $\mu Pa^2 sec$). Caltrans proposes to use a vibratory hammer, and a diesel impact hammer to install piles. The use of a vibratory hammer to install piles is not expected to produce sound pressure levels that are injurious to fish, and is a preferred method of pile installation due to the desired sound mitigation and reduction in high sound pressure levels. Sound attenuation is further achieved as distance from the pile increases, reducing harmful SPLs and SELs and in turn decreasing the potential harmful effects to fish. However, the use of impact hammers to drive piles has the potential to produce sound pressure at levels high enough to cause injury and death to fish.

Water depth at the pile driving site will also influence the rate of sound attenuation. In deep water areas high sound pressure waves are likely to travel further out into south San Francisco Bay than they would otherwise travel if attenuated through encapsulation within an air bubble curtain, or within a dewatered cofferdam. In contrast, within shallow water, much of the acoustic energy is expected to be absorbed by the bottom and reflected off the surface back down to the bottom and even backwards towards the pile. Thus, the rate of attenuation is much higher in shallower water (< 5 m) and the expected area of adverse effects is expected to be reduced. Since all of the piles (both permanent and temporary) for the Dumbarton Bridge Seismic Retrofit Project will be installed on land or within water 10 ft or less deep, acoustic energy from pile driving is not expected to travel great distances from the piles; and SPLs and SELs are not expected to travel into deeper channel areas which are the known migration corridors for CCC steelhead to and from South Bay tributaries, and are movement corridors and foraging habitat for both adult and juvenile green sturgeon. It is also possible that fish will exhibit startle responses resulting from disturbance and noise associated with construction at the pile driving site, and disperse from the action area.

Permanent Piles. The permanent 48-inch diameter steel piles will be installed entirely on land at both ends of the Dumbarton Bridge. During low-tide, the piles will be located 1000 ft away from the water. At high-tide, piles will be located within 50 ft of the water. A maximum of four piles will be installed per day, and Caltrans estimates a total of 30 minutes driving time will be required for the installation of each pile. With this information, Caltrans calculates the distance to reach the 187 dB accumulated SEL to be approximately 750 ft within the water column away from the pile during high-tide periods. However, at low-tide, the distance to reach the 187 dB accumulated SEL is not expected to reach into the water column. Furthermore, Caltrans will install all of the permanent piles during October 1 – November 30, avoiding the principal salmonid migration period of December 1 – June 14. Therefore, juvenile and adult CCC steelhead are not to expected to be adversely affected during the installation of the permanent piles. However, since green sturgeon are presumed to be benthically oriented during periods of non-movement and while foraging, they may be present in higher numbers within the waters 10 m or less in depth (*i.e.*, intertidal and sub-tidal areas); and therefore at greater risk of exposure to high SPLs and SELs as a result of the project's pile driving activities with an impact hammer in the nearshore areas, especially within 750 ft of the shoreline at high-tide periods during permanent pile installation.

Temporary Piles. All temporary steel piles used to construct the temporary work trestle will be a maximum of 24 inches in diameter and installed with a vibratory hammer. Therefore, the installation of the temporary piles is not expected to result in SPLs or SELs that would exceed the current dual metric criteria and cause injury to fish. However, as previously described, approximately 12 percent of the temporary piles will have to be re-tapped with an impact hammer to verify load capacity. Each pile to be tested will be tapped for approximately 10-15 seconds, and no more than two piles will be tested per day. NMFS has determined the zone of impact for fish within the vicinity of piles being re-tapped to be a 100 ft diameter (the 50 ft radial distance to reach the 187 db SEL). The use of an impact hammer to re-tap the temporary piles will only occur at low-tide periods during salmonid migration periods (December 1 – June 14). Given the depth of the water in the area is no greater than 10 ft at high tide, the use of an impact hammer during periods of low-tide, and the short duration of the re-tap per day; the potential of adverse effects to salmonids is greatly reduced when they are expected to be present as many of the piles will be re-tapped when water levels are exceedingly low, or within exposed tidal mudflats. However, juvenile, subadult and non-spawning adult green sturgeon could be present year-round within the action area and green sturgeon present within the 100 ft diameter zone of impact of the temporary piles during re-tap could suffer injury from exposure to high SPLs and SELs, especially during high-tide periods.

Additionally, the actual number of impact hammers used simultaneously will influence the extent of area affected by high sound pressure levels. Pile driving may occur simultaneously at either end of the bridge, therefore there may be situations where impact hammers are re-tapping piles concurrently. CCC steelhead and green sturgeon could be exposed to two separate 100 ft diameter areas of potential injury, and therefore it is possible that an individual fish will make multiple passes through the construction area during concurrent pile driving and be vulnerable more than once to harmful sound pressure levels. The potential for multiple exposures depends on how the movements of salmonid smolts and adults, and juvenile, subadult and adult green sturgeon are influenced by disturbance. This scenario is most likely to be a concern for juvenile, subadult and non-spawning adult green sturgeon since they inhabit the Bay year-round, however, since the duration of pile driving during the re-tap period is so short, adverse effects from this construction scenario is expected to have an extremely low probability of occurrence.

Determining the precise number of threatened juvenile and adult CCC steelhead, and juvenile, subadult, and non-spawning adult southern DPS green sturgeon that may be adversely affected through either harassment, injury or mortality by the Dumbarton Bridge Seismic Retrofit Project's pile driving activities is difficult at best, and not possible at this time. The precise size of the steelhead run in south San Francisco Bay tributaries and precise abundance of green sturgeon in the San Francisco Bay and its tributaries is unknown. Although little information is available to determine abundance, and how and where listed anadromous salmonids and green sturgeon migrate through and utilize south San Francisco Bay, general inferences can be made based upon known behavior patterns of steelhead and green sturgeon and their migration corridors within the Bay. Additionally, NMFS will use estimates of the area of potential impact due to pile driving and the potential life stage (juvenile, subadult, and adult) of steelhead and green sturgeon present or passing through the active pile driving area to assess the level of impact. For the purposes of this analysis, the zone of potential impact is defined as the area where there may be injury or mortality to listed anadromous salmonids and green sturgeon.

Based on current pile driving research, the area of injury and mortality of salmonids and juvenile and adult green sturgeon is defined as the area with sound pressure or exposure levels exceeding 206 peak dB (re: 1 μPa), or 187 SEL dB (re:1 $\mu Pa^2 sec$). This zone of impact is within 750 ft of the shoreline during high-tide periods for the installation of the 48-inch permanent piles, and within the 100 ft diameter around the temporary piles during load capacity testing (see descriptions above).

CCC steelhead which spawn in tributaries flowing into the south San Francisco Bay, are likely to be present in greater percentages within the action area during migration since they must pass under the Dumbarton Bridge; and therefore most likely to be exposed to harmful sound levels during pile driving that will occur between December 1 and June 14. NMFS does not expect CCC steelhead to be present within the 750 ft zone of impact associated with the installation of the permanent piles. However, they may be present within the 100 ft diameter area during the re-tap of the temporary piles. Given that Caltrans will only use an impact hammer during low-tide periods during steelhead migration periods, and the re-tap period for the temporary piles is very short duration, CCC steelhead are not expected to be injured or killed during pile driving activities, but may exhibit agitation or startle responses causing temporary changes in behavior. This could potentially disrupt migration, but is not expected to be a long-lasting effect.

Juvenile, subadult and non-spawning adult green sturgeon have the potential to be present year-round, and may be more vulnerable to adverse impacts within the 750 ft zone from the driving of the permanent piles during periods of high-tide, and within the 100 ft diameter zone during the load testing of the temporary piles. Within these zones of impact, green sturgeon could experience a range of barotraumas, including the damage to the inner ear, eyes, blood, nervous system, kidney, and liver. These injuries are expected to result in the delayed mortality of many of these fish. Beyond this range, NMFS estimates fish greater than 2 grams will not sustain permanent harm or injury. These fish may demonstrate temporary abnormal behavior indicative of stress or exhibit a startle response. As described previously, a fish that exhibits a startle response is not injured, but it is exhibiting behavior that suggests it perceives a stimulus indicating potential danger in its immediate environment, and startle responses are likely to extinguish after a few pile strikes.

Juvenile green sturgeon are typically around 600 mm in length by the time they inhabit the estuary, close in size to some adult salmonids. Adult salmonids, due to their large size, can usually tolerate higher pressure levels (40-50 psi) (Hubbs and Rechnitzer 1952) and in general, immediate mortality rates of adults are expected to be less than that experienced by juvenile salmonids. Therefore, for juvenile green sturgeon, it is anticipated that they will also be more resilient and capable of recovering quickly from temporary disturbances associated with pile driving. Similarly, given that adult green sturgeon are on average significantly larger than salmon, they could, presumably, tolerate higher levels of sound pressure and be less affected by pile driving activities. However, they are vulnerable to injury or death from pile driving (especially if within close proximity), as demonstrated by the lethal SPLs resulting in the death of an adult green sturgeon documented during the construction of the Benicia-Martinez Bridge.

In summary, based upon the information above, NMFS assumes: 1) juvenile and adult CCC steelhead could be present between December 1 - June 14; 2) juvenile, subadult and non-spawning adult green sturgeon could be present in the action area year-round; 3) the 100 ft diameter area of impact corresponding to the 206 peak dB (re:1 μPa) and 187 SEL (re:1 μPa ^{2}sec) for load testing the temporary piles, and the 750 ft area of impact for the driving of the permanent piles are the largest areas anticipated to be affected during pile driving with an impact hammer; 4) installation of the 48-inch diameter permanent piles will only occur between October 1 – November 30; 5) during salmonid migration periods of December 1 - June 14, the use of an impact hammer will only occur at low-tide; and 6) a maximum of two temporary piles will be load tested per day with an impact hammer for a duration of 10-15 seconds each. With these assumptions, no injury or mortality will result for juvenile and adult CCC steelhead originating from south San Francisco Bay tributaries, they may be disturbed by pile driving activities and exhibit startle responses or other temporary changes in behavior. For green sturgeon, primarily juvenile and subadult green sturgeon and some non-spawning adults will be harassed, injured or killed by SPLs exceeding 206 dB (re: 1 μPa) and SELs exceeding 187 dB (re: 1 μPa ^{2}sec) if they are located within 750 ft from the shoreline during the installation of the permanent piles, and the 100 ft diameter of a pile being re-tapped for load testing temporary piles. NMFS assumes that the use of a vibratory hammer will effectively minimize sound pressure to levels at or below the dual metric criteria thresholds for the temporary piles. Since Caltrans will install all temporary piles with a vibratory hammer, and will only use an impact hammer to load test approximately 12 percent of the temporary piles, and for driving land-based permanent piles, the project's pile driving activities are anticipated to result in physical injury or mortality to only a very small number green sturgeon located in South Bay, and an even smaller number of the entire San Francisco Bay green sturgeon population.

B. Cofferdam Installation, Dewatering and Fish Relocation

There is potential for listed fish species to be present during the installation of cofferdams, dewatering and fish relocation. Based upon information[3] from similar projects of this nature conducted in the San Francisco Bay, NMFS does not anticipate any permanent physical injury or mortality to individuals to occur from vibrating in sheet piles, dewatering and relocation activities. Approximately .05 acres of aquatic habitat will temporarily be lost during the installation of the 20 cofferdams. All CCC steelhead or southern DPS green sturgeon that are captured in nets from the areas within the cofferdams will likely be temporarily stressed from exposure to air, contact with netting fabric and incidental handling. Once released, NMFS expects individuals to fully recover.

C. Removal of the Ravenswood Pier

Removal of the Ravenswood Pier is expected to have temporary, minor impacts to aquatic habitat primarily due to the removal of the 260 concrete support piles. Temporary localized increases in turbidity, loss of potential invertebrate habitat within the water column (from

[3] Based upon phone conversations and information provided by Caltrans biologist Robert Atanasio. and URS biologist Bill Martin in July 2009, cofferdam installation, dewatering and fish relocation activities conducted in a similar manner during other projects in the San Francisco Bay have not resulted in permanent physical injury or death to Federally-listed species.

support piles), and loss of shade or cover for fish may result from the removal of the pier. The removal of the fishing pier is not expected to result in direct mortality for CCC steelhead or juvenile green sturgeon. However, approximately 1.4 acres of shaded habitat will be lost, which may indirectly lead to slightly higher predation of migrating CCC steelhead if present within the action area. However, as described in the Environmental Baseline, juvenile salmonids are thought to rapidly move through the San Francisco Bay during their outmigration to the Pacific Ocean. Therefore, NMFS expects increased predation resulting from the removal of the Ravenswood Pier to be minimal since salmonids are not anticipated to have a long residence time in this area during migration. Additionally, the Dumbarton Bridge located immediately adjacent to the north, and the Dumbarton Fishing Pier would continue to provide cover habitat for CCC steelhead within the action area. Habitat cover is not considered an important habitat element for green sturgeon, and therefore, are unlikely to suffer deleterious impacts from the loss of shaded habitat.

D. Main Channel Crossing

NMFS does not anticipate any of the work on the Main Channel Crossing to result in adverse impacts to listed species. Construction activities will not require in-water work, and will not directly impact the bay, mudflats, and vegetated areas, nor will large amounts of noise be generated during this portion of the bridge retrofit.

E. Temporary Barrier and Drainage System

NMFS does not anticipate any of the work from the Temporary Barrier and Drainage System to result in adverse impacts to ESA listed species or critical habitat. Currently, rainwater and road run-off water enters the South Bay in a similar manner and volume to what is expected to occur after project completion. No changes to local hydrology are expected. Moreover, the water that is collected in the system will be allowed to settle before being discharged over the 500 square feet (1500 cubic feet) area of rip-rap, allowing a brief attenuation period.

F. Turbidity

For the Dumbarton Bridge Seismic Retrofit Project, turbidity levels that may induce injury or mortality to CCC steelhead or green sturgeon are not expected to occur due to the location and duration of activities. Impacts on fish from installation and removal of piles, vibrating in sheet piles, and removal of the Ravenswood Pier are expected to be temporary. Pile installation and removal activities using both a vibratory and impact hammer are expected to create temporary increases in turbidity in the adjacent water column. These minor and localized elevated levels of turbidity are expected to rapidly disperse and dissipate from the project area through tidal circulation and estuarine currents. Water quality within the action area is expected to return to ambient conditions within hours of the termination of the project's construction activities. However, turbidity may alter the behavior (*e.g.*, feeding and migration) of juvenile and adult CCC steelhead and adult, and juvenile and subadult green sturgeon for a short period of time. These temporary behavioral changes are not expected to result in injury or death of listed salmonids and green sturgeon however, since salmonids and green sturgeon in the San Francisco Bay estuary commonly encounter, and typically avoid, areas of increased turbidity due to storm

flow runoff events, wind and wave action, and benthic foraging activities of other aquatic organisms. Moreover, turbidity and sedimentation events are not expected to affect feeding success of green sturgeon as they are not known to rely heavily on visual cues for feeding (Sillman *et al.* 2005). Green sturgeon can occupy waters containing variable levels of suspended sediment and are not expected to be impacted by the slight increase in the turbidity levels anticipated from the pile driving action as explained above. Therefore, NMFS anticipates the minor and localized areas of turbidity associated with this project's in-water construction to be for a short duration, and are not expected to impair or harm listed CCC steelhead or southern DPS green sturgeon and will not result in long-term impacts to aquatic habitat.

G. Impacts to Critical Habitat

The South Bay has been designated critical habitat for CCC steelhead, and is proposed to be designated as critical habitat for southern DPS green sturgeon. Permanent impacts to critical habitat will result from the addition of concrete collars around the support piers. Approximately 25,000 square feet (.574 acres) of habitat will be lost through the enlargement of the piers' pedestals. Currently, the pedestals on many of the piers are several feet smaller in one direction than the pile caps below them. The added concrete collars would increase the footprint of each pier's pedestal equal to the size of the pile cap. This may result in a reduction of infaunal and bottom-dwelling prey resources. However, tidal action often causes these areas to be quite shallow and exposed, making them marginal fish habitat. Therefore, the reduction in foraging habitat is anticipated to be minor, and will be minimized further by the gain of shallow, soft bottom habitat through removal of approximately 260 support piles from the Ravenswood Pier. Therefore, NMFS does not expect this loss of habitat to appreciably reduce the value of CCC steelhead DPS critical habitat, or proposed designated critical habitat for southern DPS green sturgeon in the action area.

Temporary impacts to critical habitat for CCC steelhead, and proposed critical habitat for southern DPS green sturgeon are also expected during construction of the Dumbarton Bridge Seismic Retrofit Project. Pile driving and removal, cofferdam installation, dewatering, and removal of the Ravenswood Pier will adversely affect the water column and benthic substrate of the South Bay within the action area. However, these temporary impacts are expected to be of short duration, limited to the time of construction, and will not appreciably reduce the value of CCC steelhead DPS critical habitat, or proposed designated critical habitat for southern DPS green sturgeon in the action area. Once the project is complete, habitat conditions within the water column and substrate are expected to return to similar pre-project conditions.

VI. CUMULATIVE EFFECTS

Cumulative effects are defined in 50 CFR 402.02 as "those effects of future State or privately sponsored activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation." For the purposes of this consultation, the action area is located within the south San Francisco Bay in an area encompassing 109 acres surrounding the Dumbarton Bridge. Non-Federal actions that may affect the action area may include State angling regulation changes, voluntary State or privately

sponsored habitat restoration activities, State hatchery practices, discharge of storm water and agricultural runoff, increased population growth, recreational harvest, and urbanization.

VII. INTEGRATION AND SYNTHESIS OF EFFECTS

A. Effects to Species

As previously discussed, pile driving and removal, dewatering and fish relocation activities associated with the Dumbarton Bridge Seismic Retrofit Project are expected to result in adverse effects to a small number Federally-listed anadromous CCC steelhead DPS and green sturgeon during construction. Harmful sound pressure levels from impact hammer driven piles are predicted to extend within a 100 ft diameter from the temporary piles during load capacity testing and up to 750 ft from the shoreline during the installation of the permanent land-based piles at high-tide. Adult spawning green sturgeon will likely be located on the north side of San Francisco Bay during migration, en route between the Golden Gate Bridge and the Sacramento River during construction activities. Since this portion of San Francisco Bay is several kilometers from the area that will be subject to the highest sound pressure levels, no spawning adult green sturgeon are anticipated to be in the action area and exposed to harmful sound pressure levels. However, both adult and juvenile CCC steelhead, along with juvenile, subadult and non-spawning adult green sturgeon may be present in the action area and may encounter these high sound pressure levels.

CCC steelhead were listed as threatened under the ESA because their numbers are dramatically reduced from historical estimates. This DPS does retain resiliency in the face of natural environmental fluctuations, but is at risk because its small numbers and other factors reduce its ability to persist in the face of natural disturbances. Numerically, south San Francisco Bay steelhead represent a very small portion of the entire CCC steelhead DPS, but these south Bay tributaries represent a significant and unique portion of the geographic distribution of this DPS. For CCC steelhead, no individuals of the population originating from south San Francisco Bay tributary streams are expected to be injured or killed during the project's pile driving activities. Incidental take may occur in the form of harassment during load testing of temporary piles, and by capture during dewatering and fish relocation activities. However, these impacts are expected to be temporary such that none of the project's activities are expected to reduce the resiliency of these South Bay populations, (i.e. their likelihood of survival and recovery). Therefore, the abundance, distribution, and reproduction of the South Bay population of CCC steelhead is not likely to be appreciably reduced by the associated effects of the project's actions during construction of the Dumbarton Bridge Seismic Retrofit Project.

For green sturgeon, NMFS estimates that a small percentage of juvenile, subadult and non-spawning adult green sturgeon are likely to be harassed, injured or killed by the project's activities. Although it is not possible to predict the exact number of green sturgeon that may be adversely affected by the project's activities, NMFS assumes juvenile, subadult and non-spawning adult green sturgeon within the South Bay will be located in those areas of the action area with better quality habitat, possessing abundant food resources and within the intertidal areas and benthic substrates with shallow water depths (less than 10 m). These areas are where

all the temporary pile installation and dewatering activities will take place, and also the area impacted from land-based pile driving during high-tide periods. However, of all the project's construction elements, only pile driving with an impact hammer is expected to cause physical injury or mortality to green sturgeon. Since the action area is small compared to green sturgeon habitat in the South Bay and impact hammer pile driving will be limited to October 1 through November 30th for the land-based permanent piles for only 2 hours per day, and will only occur for approximately 12 percent of the temporary piles for a maximum duration of 30 seconds daily, NMFS expects harassment, injury or mortality to affect only a small percentage of the South Bay population of threatened juvenile, subadult and non-spawning adult southern DPS green sturgeon, although the exact amount affected remains uncertain.

Although the population of green sturgeon is low, the possible injury or mortality resulting from exposure to high SPLs and SELs during pile driving activities of a small number of juvenile, subadult, and non-spawning adult green sturgeon is not expected to appreciably decrease the number of returning adults, because of the number of juveniles produced by these populations. Since no spawning or freshwater rearing habitat will be affected by the proposed activities or operations, impacts on spawning survival and survival from egg to juvenile are not expected. In addition, because green sturgeon are long-lived species, it is presumed that adults not harmed or killed by this project will continue to spawn in future years and produce juveniles to replace any lost during construction of the project. For these reasons, the low number of green sturgeon that are adversely affected as a result from the proposed project would represent a very small proportion of the standing population in the San Francisco Bay, and is not expected to considerably reduce the likelihood of survival and recovery of the species. Therefore, the abundance, distribution, and reproduction of the southern DPS green sturgeon is not likely to be appreciably reduced by the associated effects of the project's actions during construction of the Dumbarton Bridge Seismic Retrofit Project.

B. Effects to Critical Habitat and Proposed Critical Habitat

Impacts to CCC steelhead critical habitat are expected during construction as a result of pile driving, dewatering, addition of concrete around bridge pedestals, and removal of the Ravenswood Pier. Pile driving will adversely affect critical habitat (water column and benthic substrate) within the action area through temporary high SPLs, SELs, increased turbidity and loss of benthic substrate. Removal of the Ravenswood Pier is also expected to result in adverse effects to critical habitat through temporary increases in turbidity, temporary increase in amounts of contaminants re-suspended in the water column and temporary disturbance of benthic substrate. Additionally, the permanent loss of 1.4 acres shaded habitat will result from the removal of the Ravenswood Pier, and 25,000 square feet (.574 acres) of benthic substrate will permanently be lost due to reinforcement of the concrete collars located along the Dumbarton Bridge pier pedestals. However, these losses are expected to be offset by the addition of soft-bottom foraging substrate provided through the removal of the 260 concrete piles supporting the Ravenswood Pier. Because no spawning or freshwater rearing habitat will be affected by the proposed actions, nor will the deep water migration channel be affected, impacts from the project's activities are not expected to reduce the value of critical habitat for CCC steelhead for the conservation of the species.

For proposed southern DPS green sturgeon critical habitat, impacts to the water column and bay substrate are expected to occur as a result of pile driving, addition of concrete around bridge pedestals, dewatering, and removal of the Ravenswood Pier. Pile driving will adversely affect proposed critical habitat (water column and benthic substrate) within the action area through temporary high SPLs and SELS, temporary increases in turbidity and temporary loss of benthic substrate. Similarly, removal of the pier is expected to result in adverse effects to proposed critical habitat through temporary increases in turbidity, temporary increase in amounts of contaminants in the water column and temporary disturbance of benthic substrate. Additionally, permanent loss of 25,000 square feet (.574 acres) of benthic substrate will result from the reinforcement of the concrete collars on the Dumbarton Bridge pier pedestals. However, as mentioned above, these losses are expected to be ameliorated by the addition of soft-bottom foraging substrate provided through the removal of the 260 concrete piles supporting the Ravenswood Pier. As with CCC steelhead critical habitat, no spawning or freshwater rearing habitat will be affected by the proposed actions, and only a small portion of green sturgeon estuarine foraging and rearing habitat is affected by the proposed actions. Therefore, impacts from the project's activities are not expected to reduce the value of proposed critical habitat for green sturgeon for the conservation of this species.

VIII. CONLUSION

A. Formal Consultation

After reviewing the best available commercial and scientific information regarding the current status of listed CCC steelhead and southern DPS green sturgeon, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is NMFS' biological opinion that the proposed activities for the Dumbarton Bridge Seismic Retrofit Project are not likely to jeopardize the continued existence of CCC steelhead or southern DPS green sturgeon.

In addition, after reviewing the best available commercial and scientific information regarding the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is NMFS' biological opinion that the proposed activities for the Dumbarton Bridge Seismic Retrofit Project are not likely to adversely modify or destroy the critical habitat of CCC steelhead DPS.

B. Conference

After reviewing the best available commercial and scientific information regarding the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is NMFS' conference opinion that the proposed activities for the Dumbarton Bridge Seismic Retrofit Project are not likely to adversely modify or destroy the proposed critical habitat for southern DPS green sturgeon.

IX. INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by NMFS as an act which actually kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation which actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not the purpose of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this supplemental incidental take statement.

Take prohibitions via section 4(d) of the ESA were proposed for green sturgeon by NMFS on May 21, 2009 (FR 23822), but have not been finalized prior to the date of this biological opinion. NMFS may finalize and issue green sturgeon take prohibitions before work on the Dumbarton Bridge is completed. Once green sturgeon take prohibitions under section 4(d) are issued and become effective, the measures described below will become non-discretionary for green sturgeon. When the measures become non-discretionary, they must be undertaken by Caltrans for the exemption of 7(o)(2) to apply to listed green sturgeon.

A. Amount or Extent of Take Anticipated

It is anticipated that take associated with the Dumbarton Bridge Seismic Retrofit Project will be in the form of mortality, injury, harassment, and disturbance through temporary impacts from construction activities associated with pile driving, dewatering and fish relocation for listed CCC steelhead, and southern DPS green sturgeon.

1. Approach Sections

Underwater sound pressure waves generated by permanent pile driving activities are not expected to expose juvenile or adult CCC steelhead to lethal and injurious conditions. However, because NMFS cannot precisely determine the number of green sturgeon harassed, injured, or killed, we use the area of impact extending into the water column from each land-based pile, and the time period for pile driving as a surrogate for number of fish. For southern DPS green sturgeon, those fish located within 750 ft of the shoreline during high-tide periods at either side of the South Bay during the two hour daily operation of impact hammers between October 1 and November 30 may be injured or killed. Beyond this 750 ft distance, southern DPS green sturgeon may exhibit behavioral responses such as agitation or rapid bursts in swimming speeds. If Caltrans' monitoring indicates that sound pressure levels greater than 206 dB peak (re: 1 μPa), or 187 dB SEL (re: 1 $\mu Pa^2 sec$) extend beyond this distance the amount of incidental take may be exceeded

2. Temporary Trestles

NMFS anticipates juvenile and adult salmonids, and juvenile, subadult and non-spawning adult green sturgeon located within a 100 ft diameter of piles being re-tapped with an impact hammer will be harassed, injured or killed. As described in the biological opinion, the number of CCC steelhead harassed, and the number of green sturgeon harassed, injured or killed is expected to be small. Because NMFS cannot precisely determine the number of salmonids and green sturgeon harassed, injured, or killed, we use the area of impact surrounding each pile (100 ft diameter from temporary piles) and the time period for pile driving as the surrogate for number of fish. As with the permanent piles, if Caltrans' monitoring indicates that sound energy levels greater than 206 dB peak (re: 1 μPa), or 187 dB SEL (re: 1 μPa^2sec) extend beyond this distance the amount of incidental take may be exceeded.

3. Cofferdam Installation, Dewatering and Fish Capture and Relocation

Cofferdam installation and dewatering may result in harassment for CCC steelhead DPS and southern DPS green sturgeon as they are displaced from the work areas. Fish capture and relocation activities associated with project are not expected to result in injury or death to any juvenile or adult CCC steelhead, or any juvenile, subadult, and non-spawning adult southern DPS green sturgeon. However, take in the form of harassment and capture may result from netting fish within the cofferdam enclosure. Approximately .05 acres of aquatic habitat will be temporarily dewatered within the 20 cofferdams. All CCC steelhead or southern DPS green sturgeon that are captured in nets within the dewatered areas would be temporarily stressed from exposure to air, contact with netting fabric and incidental handling. Once released, NMFS expects individuals to fully recover.

4. Removal of the Ravenswood Pier

Removal of the Ravenswood Pier is expected to have temporary, minor impacts to aquatic habitat primarily due to the removal of the piers. No direct mortality is expected to result from the removal of the pier; however, approximately 1.4 acres of shaded habitat will be lost, this may indirectly lead to slightly higher predation of migrating CCC steelhead if present within 1.4 acre area of the action area. However, as described in the Effects of the Action section, NMFS expects increased predation to be minimal since CCC steelhead are not anticipated to have a long residence time in this area during migration, and may find cover elsewhere provided by the Dumbarton Bridge and Dumbarton Fishing Pier. Therefore, very few South Bay CCC steelhead are expected to be lost due to predation. Because the size of the pier is a primary factor in our determination that very few steelhead will be lost, the removal of 1.4 acres of cover is used here as a surrogate for the amount of steelhead taken by increased predation.

B. Effect of the Take

In the accompanying biological opinion, NMFS has determined that the anticipated take is not likely to result in jeopardy to CCC steelhead or southern DPS green sturgeon.

C. Reasonable and Prudent Measures

NMFS believes that the following reasonable and prudent measures are necessary and appropriate to minimize the impacts of incidental take of CCC steelhead and southern DPS green sturgeon.

Caltrans shall:

1. Utilize measures to minimize and avoid the take of CCC steelhead and southern DPS green sturgeon from pile installation.

2. Utilize measures to minimize and avoid the take of salmonids and green sturgeon from dewatering and fish relocation.

3. Ensure that a NMFS approved fisheries and hydroacoustic monitoring program is properly implemented and data is reported.

D. Terms and Conditions

Caltrans must comply with the following terms and conditions, which implement the reasonable and prudent measures described above. Once take prohibitions under section 4(d) become effective, the measures described below will become non-discretionary for green sturgeon.

1. The following Terms and Conditions implement Reasonable and Prudent Measure number 1: Utilize measures to minimize or avoid the take of CCC steelhead DPS and southern DPS green sturgeon from pile installation.

a. To avoid attracting fish with lights during nighttime pile driving operations, no pile driving will occur at night.

2. The following Term and Condition implements Reasonable and Prudent Measure number 2: Utilize measures to reduce the take of listed salmonids and green sturgeon from dewatering and fish relocation.

All captured fish will be allowed to recover before being returned to the Bay. Once recovered, they will be placed in suitable habitat. If any CCC steelhead or southern DPS green sturgeon are found dead or injured, the biologist shall immediately contact Jacqueline Pearson Meyer at (707) 575-6057 or NMFS Santa Rosa Area Office at (707) 575-6050. The purpose of the contact is to review the activities resulting in take and to determine if additional protective measures are required. All salmonid mortalities shall be retained, placed in an appropriately sized whirl-pak or ziplock bag,

labeled with the date and time of collection, fork length, location of capture, and frozen as soon as possible. Frozen samples must be delivered to:

Carlos Garza
Fisheries Ecology Division
Southwest Fisheries Science Center
National Marine Fisheries Service
110 Shaffer Rd.
Santa Cruz, CA 95060

3. The following Terms and Conditions implement Reasonable and Prudent Measure number 3: Ensure the approved fisheries and hydroacoustic monitoring program is properly implemented and data is reported to NMFS.

a. A fisheries and hydroacoustic monitoring plan shall be submitted to NMFS for approval at least 60 days prior to the commencement of the project's activities. The fisheries hydroacoustic monitoring plan shall consist of the following requirements:

i. Caltrans shall monitor underwater sound during all impact hammer pile driving activities on land or in water. Real time monitoring shall be conducted to ensure underwater sound pressure levels to not exceed what has been analyzed in this biological and conference opinion. If sound pressure levels exceed what has been analyzed, NMFS must be contacted within 24 hours.

ii. The reports shall describe the locations of hydroacoustic monitoring stations that were used to document the extent of the underwater sound footprint during pile-driving activities, including the number, location, distances, and depths of hydrophones and associated monitoring equipment.

iii. The Reports shall include the total number of pile strikes per pile, the interval between strikes, the peak/SPL, RMS and SEL per strike, and accumulated SEL per day for each hydroacoustic monitor deployed.

iv. Include a monitoring and reporting program that will include provisions to provide daily summaries of the hydroacoustic monitoring results to NMFS, as well as more comprehensive summary reports on a monthly basis during the pile-driving season.

v. Caltrans shall submit to NMFS a hydroacoustic monitoring summary due 30 days following pile driving that provides a review of the monitoring data and process, as well as any problems that were encountered.

b. All hydroacoustic and biological monitoring reports and other materials to be submitted to NMFS described in the above terms and conditions shall be submitted to:

Jacqueline Pearson Meyer
National Marine Fisheries Service
777 Sonoma Ave., Room 325
Santa Rosa, California 95404
Phone (707) 575-6064
Fax (707) 578-3435

X. REINITATION NOTICE

This concludes formal consultation on the proposed Dumbarton Bridge Seismic Retrofit Project. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the actions has been retained (or is authorized by law) and if: 1) the amount or extent of incidental take is exceeded; 2) new information reveals effects of agency actions that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; 3) the action is subsequently modified in a manner or to an extent not considered in this opinion; or 4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, formal consultation shall be reinitiated immediately.

XI. CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, or to develop information.

1. The use of an impact hammer to install permanent piles and re-tap temporary piles should occur only during periods of low-tide to minimize incidental take of green sturgeon.

2. To avoid adverse impacts to anadromous fish species, pile installation during peak migration periods should be avoided.

3. To minimize the effects of sound pressure waves to anadromous fish species, sound attenuation methods should be developed and incorporated into all pile driving projects. Caltrans and other local, state, and Federal agencies should develop and implement pile driving projects using driving frames or pile installation methods that do not preclude the use of sound attenuation systems.

4. Caltrans and other local, state, and Federal agencies should provide training for Caltrans environmental and engineering staff that will assist in avoiding or minimizing the impacts of transportation projects on salmonids and green sturgeon and their habitats.

5. Caltrans and other local, state, and Federal agencies should include in bid packages to contractors specific requirements for scheduling construction activities that adhere to seasonal work windows in order to avoid principal migration times for anadromous fish species.

In order for NMFS to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, NMFS requests notification of the implementation of any conservation recommendations.

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Enclosure 2

MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT ESSENTIAL FISH HABITAT CONSULTATION

ACTION AGENCY:	California Department of Transportation
ACTION:	Dumbarton Bridge Seismic Retrofit Project
CONSULTATION CONDUCTED BY:	National Marine Fisheries Service, Southwest Region
TRACKING NUMBER:	F/SWR/2009/02486
DATE ISSUED:	AUG 1 0 2009

I. STATUTORY AND REGULATORY INFORMATION

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996, establishes a national program to manage and conserve the fisheries of the United States through the development of federal Fishery Management Plans (FMPs), and federal regulation of domestic fisheries under those FMPs, within the 200-mile U.S. Exclusive Economic Zone ("EEZ"). 16 U.S.C. §1801 *et seq.* To ensure habitat considerations receive increased attention for the conservation and management of fishery resources, the amended MSA required each existing, and any new, FMP to "describe and identify essential fish habitat for the fishery based on the guidelines established by the Secretary under section 1855(b)(1)(A) of this title, minimize to the extent practicable adverse effects on such habitat caused by fishing, and identify other actions to encourage the conservation and enhancement of such habitat." 16 U.S.C. §1853(a)(7). Essential Fish Habitat (EFH) is defined in the MSA as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" 16 U.S.C. §1802(10). The components of this definition are interpreted at 50 C.F.R. §600.10 as follows: "Waters" include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; "substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities; "necessary" means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle.

Pursuant to the MSA, each federal agency is mandated to consult with NMFS (as delegated by the Secretary of Commerce) with respect to any action authorized, funded, or undertaken, or proposed to be, by such agency that may adversely affect any EFH under this Act. 16 U.S.C. §1855(b)(2). The MSA further mandates that where NMFS receives information from a Fishery Management Council or federal or state agency or determines from other sources that an action authorized, funded, or undertaken, or proposed to be, by any federal or state agency would

adversely affect any EFH identified under this Act, NMFS has an obligation to recommend to such agency measures that can be taken by such agency to conserve EFH. 16 U.S.C. §1855(4)(A). The term "adverse effect" is interpreted at 50 C.F.R. §600.810(a) as any impact that reduces quality and/or quantity of EFH and may include direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce quantity and/or quality of EFH. In addition, adverse effects to EFH may result from actions occurring within EFH or outside EFH and may include site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions.

If NMFS determines that an action would adversely affect EFH and subsequently recommends measures to conserve such habitat, the MSA proscribes that the federal action agency that receives the conservation recommendation must provide a detailed response in writing to NMFS within 30 days after receiving EFH conservation recommendations. The response must include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with NMFS EFH conservation recommendations, the federal agency must explain its reasons for not following the recommendations. 16 U.S.C. §1855(b)(4)(B).

II. CONSULTATION HISTORY

February 9, 2009	NMFS received a request for Essential Fish Habitat (EFH) consultation pursuant to section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act.
April and May, 2009	NMFS requested specific project description information, minimization measures, and a benthic invertebrate community survey for EFH through several telephone conference calls and emails in April and May, 2009.
June 2009	NMFS received final clarification from Caltrans on the revised Benthic Invertebrate Survey per Caltrans comments and minimization measures for pile driving.

III. PROPOSED ACTION

The proposed Dumbarton Bridge Seismic Retrofit Project involves construction activities to seismically retrofit the existing Dumbarton Bridge on SR 84 in order to meet current safety requirements. The Dumbarton Bridge serves as an east-west connector between Interstate 880 in Alameda County and U.S. Highway 101 in San Mateo County, providing transportation access for approximately 80,000 trips across the south San Francisco Bay each day. Construction activities for the project are expected to commence in 2010 and take approximately three years to complete. This EFH consultation analyzes the retrofit and other construction activities that have been divided into five components: 1) Trestle Structures; 2) Approach Sections; 3) Removal of the Ravenswood Pier; 4) Main Channel Crossing; and 5) Temporary Barrier and Drainage System.

These construction activities will include installation of permanent and temporary piles, removal of bay sediment from existing bridge pier pile caps, and the removal of the existing Ravenswood fishing pier. More detailed project information regarding the five components of proposed actions is described above in the Description of the Proposal Action in the Biological Opinion for this project (Enclosure 1).

A. Conservation Measures

A complete list of conservation measures are provided in the Biological Opinion (Enclosure 1). Below is a list of the conservation measures aimed at avoiding or minimizing adverse effects to EFH:

- A NMFS approved hydroacoustic and biological monitoring plan will be properly implemented and data will be reported to NMFS.
- Adverse underwater sound impacts to EFH will be minimized by the use of a vibratory hammer for the installation of all temporary piles.
- To avoid attracting fish with lights during nighttime pile driving operations, no pile driving will occur at night.
- Caltrans will limit dewatering to the minimum amount of area necessary to accomplish construction activities.
- During cofferdam, sheet pile driving and dewatering activities a fish stranding and relocation plan will be implemented, under the supervision of a NMFS approved biologist.
- A qualitative survey of the benthic invertebrate community will be conducted by a qualified biologist on 5 representative piles that will be removed from the Ravenswood Pier.
- Pilings removed from Ravenswood Pier will not be washed into San Francisco Bay.

The conservation measures described here and in the consultation initiation package as parts of the proposed action reduce or avoid adverse effects to EFH. NMFS regards these conservation measures as integral components of the proposed action and expects that all proposed activities will be completed consistent with those measures. Any deviation from these conservation measures will be beyond the scope of this consultation and may require supplemental consultation to determine what effect the modified action is likely to have on EFH.

IV. ACTION AREA

The Dumbarton Bridge Seismic Retrofit Project site, including the area around the bridge piers

and the area necessary to accommodate construction-related equipment such as work barges and cranes, is located in the south San Francisco Bay, between Fremont and Menlo Park in East Palo Alto, California. For the Dumbarton Bridge Seismic Retrofit Project, NMFS defines the action area to be approximately 109 acres, extending across an area of approximately three miles including the portion of the project over and within the South San Francisco Bay and surrounding roadways, tidal mudflats, marshes and salt ponds. This action area has been determined due to the direct and indirect effects of the project's construction activities including areas potentially affected from sound pressure and exposure levels produced by pile driving activities.

The proposed project occurs within EFH for various federally managed fish species within the Pacific Groundfish Fishery Management Plan including big skate, California skate, leopard shark, longnose skate, soupfin shark, spiny dogfish, cabezon, kelp greenling, lingcod, brown rockfish, calico rockfish, English sole, rex sole, sand sole, and starry flounder and the Coastal Pelagic Fishery Management Plan, including Northern anchovy and Pacific sardine.

In addition, the project occurs within areas designated as Habitat Areas of Particular Concern (HAPC) for various federally managed fish species within the Pacific Groundfish FMP. HAPC are described in the regulations as subsets of EFH which are rare, particularly susceptible to human-induced degradation, especially ecologically important, or located in an environmentally stressed area. Designated HAPC are not afforded any additional regulatory protection under MSA; however, federal projects with potential adverse impacts to HAPC will be more carefully scrutinized during the consultation process. San Francisco Bay is designated at coastal estuary HAPC. Kelp HAPC, rock substrate HAPC and eelgrass HAPC are present within San Francisco Bay, but not within the proposed action area.

V. EFFECTS OF THE ACTION

1. Elevated Turbidity and Suspended Sediment Concentration

Disturbance activities may result in greatly elevated levels of fine-grained mineral particles or suspended sediment concentration (SSC), usually smaller than silt, and organic particles in the water column. The associated turbidity plumes of suspended particulates may reduce light penetration and lower the rate of photosynthesis for subaquatic vegetation (Dennison 1987) and the primary productivity of an aquatic area if suspended for extended periods of times (Cloern 1987). If suspended sediments loads remain high, fish may suffer reduced feeding ability (Benfield and Minello 1996) and be prone to fish gill injury (Nightingale and Simenstad 2001). The contents of the suspended material may react with the dissolved oxygen in the water and result in short-term oxygen depletion to aquatic resources (Nightingale and Simenstad 2001). In addition, any toxic metals and organics, pathogens, and viruses, absorbed or adsorbed to fine-grained particulates in the material, may become biologically available to organisms either in the water column or through food chain processes.

Activities that may result in elevated turbidity levels include piling installation and removal for the temporary falsework construction activities, the piling removal for the Ravenswood Pier

removal and from water discharge associated with the temporary barrier and drainage system. Effects to EFH from turbidity will be minimized by avoiding the washing of pilings removed from Ravenswood Pier into San Francisco Bay and by allowing settlement of rainwater and runoff water to occur before discharged over a rip-rap strip adjacent to the western shore of the Bay. As described in Enclosure 1, elevated turbidity levels are anticipated to occur over a short duration and to dissipate within several tidal cycles.

2. Reduction of Prey Resources

Many FMP species forage on infaunal and bottom-dwelling organisms, such as polychaete worms, crustaceans, and other FMP prey types (Newell *et al.* 1998, Van der Veer *et al.* 1985). Recolonization studies suggest that recovery may vary based on a variety of site conditions and physical factors including particle size distribution, currents, and compaction/stabilization processes following disturbance. Activities that may result in a reduction of infaunal and bottom-dwelling prey resources include the removal of a maximum of 1,800 cubic yards of San Francisco bay mud from existing pile caps for placement for the installation of concrete collars and the installation of approximately 452,160 sf of temporary steel piles that will remain in place for three years. Additionally, concrete pilings removed from the Ravenswood Pier could remove hard substrata invertebrate communities that may reduce the availability of prey for FMP species. Caltrans will conduct a qualitative benthic community survey on representative piers removed from the Ravenswood Pier to provide NMFS with data to evaluate the habitat value for invertebrate communities provided by pilings, and whether pilings are provided habitat for predominantly native invertebrate species or non-native invertebrate species. Temporary steel piles may provide suitable habitat for invertebrates that attach to hard substrata, therefore, the reduction in hard substrata invertebrate communities from the Ravenswood Pier may be supplemented temporarily. Removal of sediments and the installation of steel piles will likely reduce the infaunal and bottom-dwelling prey species and reduce the value of this area as foraging habitat for EFH species. However, the reduction in foraging habitat is anticipated to be temporary and will be minimized by the gain of shallow, soft bottom habitat through removal of approximately 260 pilings for the Ravenswood Pier that would increase soft bottom habitat by approximately 1.4 acres. Based on available literature for recovery of benthic invertebrates after disturbance, NMFS will assume recovery of prey resources will take between several months to years to recover (Oliver *et al.* 1977, Watling *et al.* 2001).

3. Loss of Habitat

Removal of intertidal or subtidal habitat eliminates habitat that supports important life stages of managed fishes and contributes to overall productivity of SF Bay and sustainability of those species. At a minimum, individuals will be displaced from the areas that are removed. Placement of 500 sf of rip rap near the north-west bridge approach will convert high intertidal, *Spartina* cordgrass wetland habitat to artificial substrate. During cofferdam and dewatering activities, Caltrans estimates 0.05 acre of soft bottom, shallow water habitat in these areas would be temporarily unavailable as EFH. Additionally, the placement of temporary steel piles will convert approximately 452,160 sf of soft bottom habitat to artificial hard substrate for approximately three years. Impacts to FMP species and prey fish species from cofferdam activities would be minimized by implementing a fish stranding and relocation plan. Adverse

effects to EFH from cofferdam and the placement of temporary steel piles are anticipated to be temporary and minimized by the removal of approximately 260 pilings for the Ravenswood Pier.

4. Pile Driving

Pile driving can generate intense underwater sound pressure waves that may adversely affect the ecological functioning of EFH (Hanson *et al.* 2004). Over the long-term, physical injury to fish from pile driving may adversely affect fish populations by adding another source of mortality to their lifecycle. The Biological Opinion (Enclosure 1) describes in detail the potential impacts of pile driving to fish based on available literature. NMFS and Caltrans currently use peak sound, a dual metric criteria, of 206 dB peak sound pressure level (SPL) for any single strike and an accumulated sound exposure level (SEL) of 187 dB to correlate physical injury to fish greater than 2 grams and SEL of 183 dB for fish under 2 grams from underwater sound produced during the installation of piles with impact hammers. SELs of 183 dB are anticipated to reach into the water column within 750 ft of the shoreline at high-tide periods during the permanent pile driving construction on land for the trestle structures. Up to four permanent piles may be driven per day with a maximum of 1,500 strikes and pile driving will not occur during steelhead migration. The installation of temporary piles to construct the temporary work trestle will be driven with a vibratory hammer. Therefore, NMFS does not expect SPLs or SELs that would exceed the current dual metric criteria and cause injury to fish when a vibratory hammer is used. However, approximately 12 percent of the temporary piles will have to be re-tapped with an impact hammer to verify load capacity. Each pile to be tested will be tapped for approximately 10-15 seconds in maximum water depths of 10 ft, and no more than two piles will be tested per day. NMFS has determined that an SEL of 183 db could be reached within 100 ft diameter of piles during re-tapping periods at high tide. During steelhead migration, re-tapping will only occur at periods of low tide, which will reduce sound impacts to below threshold levels for injury during these time periods. However, FMP species and prey inhabit SF Bay year-round and may suffer effects that range from changes in behavior to immediate mortality during some periods of re-tapping and permanent pile driving on land. Fish may respond to the first few strikes with a "startle response" (Hanson et al. 2004), however, some fish particularly those under 2 grams may suffer physical injury before leaving the area. Caltrans has indicated that the use of bubble curtains for periods of re-tapping or conducting all re-tapping and permanent pile driving at low tides is not feasible due to the substantial increase in the amount of time to complete the project and project costs. Caltrans will follow NMFS approved hydroacoustic and biological monitoring plan with sound attenuation plan if underwater sound levels reach threshold levels for fish injury during construction activities. Caltrans will also monitor fish mortality and injury during pile driving. Due to the limited amount of time pile driving will occur each day and the implementation of hydroacoustic and biological monitoring plan, NMFS anticipates that adverse effects to EFH from pile driving activities will be temporary and will not be substantial or result in population-level effects for FMP species.

VI. EFH CONSERVATION RECOMMENDATIONS

Based on information provided in the EFH assessment and developed during consultation, NMFS concludes the proposed action would adversely affect EFH for various federally managed

species within Pacific Groundfish and Coastal Pelagic FMPs. However, as described in the Conservation Measures described above, the proposed actions contain adequate measures to avoid, minimize, mitigate, or otherwise offset the adverse effects to EFH.

VII. SUPPLEMENTAL CONSULTATION

Pursuant to 50 CFR 600.920(l), Caltrans must reinitiate EFH consultation with NMFS if the proposed action is substantially revised in a way that may adversely affect EFH, or if new information becomes available that affects the basis for NMFS' EFH conservation recommendations.

VIII. FISH AND WILDLIFE COORDINATION ACT (FWCA)

The purpose of the Fish and Wildlife Coordination Act (FWCA) is to ensure that wildlife conservation receives equal consideration, and is coordinated with other aspects of water resources development [16 U.S.C. 661]. The FWCA establishes a consultation requirement for federal departments and agencies that undertake any action that proposes to modify any stream or other body of water for any purpose, including navigation and drainage [16 U.S.C 662(a)]. Consistent with this consultation requirement, NMFS provides recommendations and comments to federal action agencies for the purpose of conserving fish and wildlife resources. NMFS has no FWCA recommendations to provide for this project.

IX. LITERATURE CITED

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5. ENCROACHMENT PERMITS

STATE OF CALIFORNIA · DEPARTMENT OF TRANSPORTATION

ENCROACHMENT PERMIT

TR-0120 (NEW 9/91)

Permit No.	0497-6UT-0703
Dist/Co/Rte/PM	04-Ala-84 0.0/3.75 04-SM-84 28.2/30.15
Date	July 14, 1997
Fee Paid	$
Deposit	$
Performance Bond Amount (1)	$
Payment Bond Amount (2)	$
Bond Company	
Bond Number (1)	
Bond Number (2)	

In compliance with (check one):

X Your application of March 31, 1997

____ Utility Notice No. _____ of _____

____ Agreement No. _____ of _____

____ R/W Contract No. _____ of _____

TO:

Pacific Bell
3475 B North First Street
San Jose, CA 95134

ATTN: Alexander Ovalle
PHONE: (408) 493-7068

, PERMITTEE

and subject to the following, PERMISSION IS HEREBY GRANTED to:

install a 6" (15.24 cm) conduit with fiber optic cable on the Dumbarton Bridge and two 4" (10.16 cm) conduits with four innerducts and fiber optic cable within access controlled area approaching the bridge on State Highways 04-Ala-84, Post Miles 0.0/3.8 and 04-SM-84, Post Miles 28.2/30.15 between Fremont and Menlo Park.

Two days before work is started under this permit, notice shall be given to, and approval of construction details, operations, public safety, and traffic control shall be obtained from State Representative M. Movassat, 380 Foster City Blvd., Foster City, 94404, 415-573-8669, weekdays, between 7:30 AM and 4:00 PM .

All utility work shall be performed in accordance with the Department of Transportation Encroachment Permit Utility Provisions dated May 1, 1994.

Immediately following completion of the work permitted herein, the permittee shall fill out and mail the Notice of completion attached to this permit.

The following attachments are also included as part of this permit. (Check applicable):

X Yes	__ No	General Provisions
__ Yes	X No	Utility Maintenance Provisions
__ Yes	X No	Special Provisions
__ Yes	X No	A Cal-OSHA permit required prior to beginning work; # _____

In addition to fee the permittee will be billed actual costs for:

__ Yes	X No	Review
X Yes	__ No	Inspection
X Yes	_____	Field Work

(If any Caltrans effort expended)

__ Yes X No The information in the environmental documentation has been reviewed and considered prior to approval of this permit.

This permit is void unless the work is completed before December 31, 1997

This permit is to be strictly construed and no other work other than specifically mentioned is hereby authorized.

No project work shall be commenced until all other necessary permits and environmental clearances have been obtained.

APPROVED:

Harry Y. Yahata, District Director

BY:

G. J. Battaglini, District Permit Engineer

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY PETE WILSON, *Governor*

DEPARTMENT OF TRANSPORTATION
BOX 23660
[redacted]LAND, CA 94623-0660
(510) 286-4444
TDD (510) 286-4454

March 28, 1997

04-SM-84 26.03
97-0426

Pacific Bell
3475 "B" North First Street, Room 200
San Jose, CA 95135

Attention Mr. Edgar Laigo

Gentlemen:

This is in regard to your February 7, 1997 Encroachment Permit Application, to install galvanized steel conduits by trenching and bore and jack methods along and across State Highway 04-SM-84, Post Mile 27.7, in the City of Menlo Park.

We have the following comments which must be addressed before we can consider your application complete:

- State policy does not allow encroachments on the exterior face of State's structures. The proposed conduits can be placed in a trench crossing the former road as shown in red on the attached plan.

Please revise your plan sheets accordingly, and submit five (5) sets of revised plans along with the red marked plan for our further action. Reference file No. 97-0426 in your submittal.

If you have any questions, please contact Mr. Kazem Rezaei at (510) 286-4419.

Sincerely,

K. Rezaei

for R. B. DANTES
District Branch Chief
Office of Permits

Attachment

STATE OF CALIFORNIA · DEPARTMENT OF TRANSPORTATION

ENCROACHMENT PERMIT

TR-0120 (NEW 9/91)

Permit No.	0497-6UK0426
Dist/Co/Rte/PM	04-SM-84 26.03
Date	June 6, 1997
Fee Paid	$
Deposit	$
Performance Bond Amount (1)	$
Payment Bond Amount (2)	$
Bond Company	
Bond Number (1)	
Bond Number (2)	

In compliance with (check one):

X Your application of February 7, 1997

____ Utility Notice No. _____ of _____

____ Agreement No. _____ of _____

____ R/W Contract No. _____ of _____

TO:

Pacific Bell
3475 "B" North First Street, RM 200
San Jose, CA 95135

ATTN: Edgar Laigo
PHONE: (408) 493 7103

, PERMITTEE

and subject to the following, PERMISSION IS HEREBY GRANTED to:

Install galvanized steel conduits by trenching and bore and jack method along and across State Highway 04-SM-84, Post Mile 26.03, in the City of Menlo Park.

Two days before work is started under this permit, notice shall be given to, and approval of construction details, operations, public safety, and traffic control shall be obtained from State Representative M.Movassat, 380 Foster City Blvd., Foster City, 94404, 415-573-8669, weekdays, between 7:30 AM and 4:00 PM .

Before any work is begun which will interrupt the normal flow of public traffic, approval shall be obtained from State's representative, and closures will be as shown on the attached copy of Standard Plan Sheet T-11.

Immediately following completion of the work permitted herein, the permittee shall fill out and mail the Notice of Completion attached to this permit.

The following attachments are also included as part of this permit. (Check applicable):

X Yes	___ No	General Provisions
___ Yes	X No	Utility Maintenance Provisions
___ Yes	X No	Special Provisions
___ Yes	X No	A Cal-OSHA permit required prior to beginning work; # _____

In addition to fee the permittee will be billed actual costs for:

___ Yes	X No	Review
___ Yes	X No	Inspection
X Yes	_____	Field Work

(If any Caltrans effort expended)

___ Yes X No The information in the environmental documentation has been reviewed and considered prior to approval of this permit.

This permit is void unless the work is completed before December 31, 1997.

This permit is to be strictly construed and no other work other than specifically mentioned is hereby authorized.

No project work shall be commenced until all other necessary permits and environmental clearances have been obtained.

APPROVED:

Harry Y. Yahata, District Director

BY:

G. J. Battaglini, District Permit Engineer

STATE OF CALIFORNIA · DEPARTMENT OF TRANSPORTATION

ENCROACHMENT PERMIT

TR-0120 (NEW 9/91)

Permit No.	0497-6SV1292
Dist/Co/Rte/PM	04-ALA/SM-84 0.0/3.8,28.2/29.2
Date	June 2, 1997
Fee Paid	$
Deposit	$
Performance Bond Amount (1)	$
Payment Bond Amount (2)	$
Bond Company	
Bond Number (1)	
Bond Number (2)	

In compliance with (check one):

x Your application of June 2, 1997

____ Utility Notice No. _____ of _____

____ Agreement No. _____ of _____

____ R/W Contract No. _____ of _____

TO:

Pacific Bell
3475 "B" North First Street
San Jose, CA. 95134

ATTN: Alexander Ovalle
PHONE: (408) 493-7068

, PERMITTEE

and subject to the following, PERMISSION IS HEREBY GRANTED to:

Obtain soil samples for Aerial Lead Soil testing along the shoulder on State Highway 04-ALA/SM-84, Post Mile 0.0/3.8, 28.2/29.2, from Paseo Padre Parkway to University Avenue in the Cities of Fremont and Palo Alto.

Two days before work is started under this permit, notice shall be given to, and approval of construction details, operations, public safety, and traffic control shall be obtained from State Representative, weekdays, between 7:30 AM and 4:00 PM.:

For work in West Alameda County, Norm Freitag, 600 Lewelling Blvd., San Leandro, 94579, 510-614-5951.

For work in Southern San Mateo County, Massoud Movassat, 380 Foster City Blvd., Foster City, 94404, 415-573-8669.

All personnel shall wear hard hats and orange vests, shirts or jackets as appropriate.

The following attachments are also included as part of this permit. (Check applicable):

X Yes	___ No	General Provisions
___ Yes	x No	Utility Maintenance Provisions
___ Yes	x No	Special Provisions
___ Yes	x No	A Cal-OSHA permit required prior to beginning work; # _____

In addition to fee the permittee will be billed actual costs for:

___ Yes	x No	Review
___ Yes	x No	Inspection
X Yes	_____	Field Work

(If any Caltrans effort expended)

___ Yes x No The information in the environmental documentation has been reviewed and considered prior to approval of this permit.

This permit is void unless the work is completed before November 30, 1997.

This permit is to be strictly construed and no other work other than specifically mentioned is hereby authorized.

No project work shall be commenced until all other necessary permits and environmental clearances have been obtained.

APPROVED:

Harry Y. Yahata, District Director

BY:

G. J. Battaglini, District Permit Engineer

6. US ARMY ACOE_NWP3

DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, U.S. ARMY CORPS OF ENGINEERS
1455 MARKET STREET
SAN FRANCISCO, CALIFORNIA 94103-1398

OCT 23 2009

Regulatory Division

SUBJECT: File Number 2008-00177S

Mr. Jeffrey G. Jensen
California Department of Transportation
Office of Biological Sciences & Permit
PO Box 23660

Dear Mr. Jensen:

This letter is written in response to your submittal of May 5, 2009 concerning Department of the Army authorization to implement construction of the Dumbarton Bridge Seismic Retrofit Project located in Alameda County and in San Mateo County on State Route (SR) 84 where the highway crosses over the San Francisco Bay. This letter authorizes permanent fill of 450 square feet (0.01 acre) of wetland, the removal of the Ravenswood Pier, excavation of the Ravenswood Pier approach to restore special aquatic sites, to place approximately 1000 twenty-four inch round steel piles into the bay mud to support temporary construction trestles, to add approximately 1700 cubic yards of new concrete to the top of the footing pedestals of the bridge to strengthen the bridge columns, to use sheet pile coffer dams to dewater the bridge pedestals, and to use barges in the deeper water to support construction activities required to retrofit the Dumbarton Bridge.

Based on a review of the information you submitted and an inspection of the project site conducted by Corps personnel on May 22, 2009 , your project qualifies for authorization under Department of the Army Nationwide Permit 3 – Maintenance and Nationwide Permit 27 – Aquatic Habitat Restoration (72 Fed. Reg. 11092, March 12, 2007), pursuant to Section 404 of the Clean Water Act (33 U.S.C. Section 1344) and Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. Section 403). See Enclosure 1. All bridge retrofit work of the Dumbarton Bridge project is permitted by the United States Coastguard. The Department of the Army is authorizing temporary and permanent fill into wetlands and waters of the United States and work within Section 10 Waters of the United States. Three maps attached within the permit application entitled *Appendix G, Sheet 1 – Sheet 3* show the locations of the temporary work trestles where the temporary support columns will be located, and the footing pedestals of the bridge where the concrete work and dewatering will take place. A separate map entitled *Potential Wetland Restoration Area* shows the location of the mitigation site and the existing Ravenswood Pier.

The project must be in compliance with the General Conditions cited in Enclosure 2 for this Nationwide Permit authorization to remain valid. Non-compliance with any condition could

result in the suspension, modification or revocation of the authorization for your project, thereby requiring you to obtain an Individual Permit from the Corps. This Nationwide Permit authorization does not obviate the need to obtain other State or local approvals required by law.

This authorization will remain valid for two years from the date of this letter unless the Nationwide Permit is modified, suspended or revoked. If you have commenced work or are under contract to commence work prior to the suspension, or revocation of the Nationwide Permit and the project would not comply with the resulting Nationwide Permit authorization, you have 12 months from that date to complete the project under the present terms and conditions of the Nationwide Permit. Upon completion of the project and all associated mitigation requirements, you shall sign and return the Certification of Compliance, Enclosure 3, verifying that you have complied with the terms and conditions of the permit.

This authorization will not be effective until you have obtained a Section 401 water quality certification from the San Francisco Bay Regional Water Quality Control Board (RWQCB). If the RWQCB fails to act on a valid request for certification within two months after receipt of a complete application, the Corps will presume a waiver of water quality certification has been obtained. You shall submit a copy of the certification to the Corps prior to the commencement of work.

This authorization will not be effective until you have obtained a concurrence from the California Coastal Commission or S.F. Bay Conservation and Development Commission that your certification that your project will comply with California's Coastal Zone Management Act. If the Commission fails to act on a valid request for concurrence with your certification within six months after receipt, the Corps will presume a concurrence has been obtained. You shall submit a copy of the concurrence to the Corps prior to the commencement of work.

To ensure compliance with this Nationwide Permit authorization, the following special conditions shall be implemented:

1. This Corps permit does not authorize you to take an endangered species. In order to legally take a listed species, you must have a separate authorization under the Endangered Species Act (ESA) (e.g., an ESA Section 10 permit or a Biological Opinion (BO) under ESA Section 7 with "incidental take" provisions with which you must comply). The enclosed U.S. Fish and Wildlife Service (FWS) and National Marine Fisheries Service (NMFS) BOs dated August 14, 2009 and August 10, 2009 respectively contain mandatory terms and conditions to implement the reasonable and prudent measures that are associated with "incidental take" that is also specified in the BOs. Your authorization under this Corps permit is conditional upon your compliance with all of the mandatory terms and conditions associated with incidental take authorized by the attached BOs, whose terms and conditions are incorporated by reference in this permit. Failure to comply with the terms and conditions associated with incidental take of the BOs, where a

take of the listed species occurs, would constitute an unauthorized take and it would also constitute non-compliance with this Corps permit. The FWS and NMFS are the appropriate authorities to determine compliance with the terms and conditions of their BOs and with the ESA.

2. As mitigation for the 470 square feet (0.01 acre) of permanent fill in wetland due to the placement of seven steel pipe reinforced columns, Caltrans shall create a minimum of 500 square feet (0.01 acre) of intertidal mudflat as described in their Conceptual Design for Wetland Restoration / Creation at the Western Anchorage of the Dumbarton Bridge. At this location, Caltrans will remove earthen fill and the riprap berm that makes up the present approach to the Ravenswood Pier. This area will be graded to match existing contours and would restore approximately 0.02 acre of intertidal pickleweed and or cordgrass marsh and approximately 0.13 acre of intertidal mudflat. This mitigation site is mitigation for the 0.01 acre wetland fill and the 0.01 acre RSP fill in the adjacent project entitled *San Mateo Route 84 Barrier and Drainage System for North Frontage Road Project.*

3. Caltrans shall use Best Management Practices at all times to prevent toxic materials from leaking from machinery or being dumped into San Francisco Bay.

Should you have any questions regarding this matter, please call Hal Durio of our Regulatory Division at 415-503-6785. Please address all correspondence to the Regulatory Division and refer to the File Number at the head of this letter. If you would like to provide comments on our permit review process, please complete the Customer Survey Form available online at http://per2.nwp.usace.army.mil/survey.html.

Sincerely,

Jane M. Hicks
Chief, Regulatory Division

Enclosures

Copy furnished (w/o enclosures):

US CG, Alameda, CA
US FWS, Sacramento, CA
US NMFS, Santa Rosa, CA
CA RWQCB, Oakland, CA

3. *Maintenance*.

(a) The repair, rehabilitation, or replacement of any previously authorized, currently serviceable, structure, or fill, or of any currently serviceable structure or fill authorized by 33 CFR 330.3, provided that the structure or fill is not to be put to uses differing from those uses specified or contemplated for it in the original permit or the most recently authorized modification. Minor deviations in the structure's configuration or filled area, including those due to changes in materials, construction techniques, or current construction codes or safety standards that are necessary to make the repair, rehabilitation, or replacement are authorized. This NWP authorizes the repair, rehabilitation, or replacement of those structures or fills destroyed or damaged by storms, floods, fire or other discrete events, provided the repair, rehabilitation, or replacement is commenced, or is under contract to commence, within two years of the date of their destruction or damage. In cases of catastrophic events, such as hurricanes or tornadoes, this two-year limit may be waived by the district engineer, provided the permittee can demonstrate funding, contract, or other similar delays.

(b) This NWP also authorizes the removal of accumulated sediments and debris in the vicinity of and within existing structures (e.g., bridges, culverted road crossings, water intake structures, etc.) and the placement of new or additional riprap to protect the structure. The removal of sediment is limited to the minimum necessary to restore the waterway in the immediate vicinity of the structure to the approximate dimensions that existed when the structure was built, but cannot extend further than 200 feet in any direction from the structure. This 200 foot limit does not apply to maintenance dredging to remove accumulated sediments blocking or restricting outfall and intake structures or to maintenance dredging to remove accumulated sediments from canals associated with outfall and intake structures. All dredged or excavated materials must be deposited and retained in an upland area unless otherwise specifically approved by the district engineer under separate authorization. The placement of riprap must be the minimum necessary to protect the structure or to ensure the safety of the structure. Any bank stabilization measures not directly associated with the structure will require a separate authorization from the district engineer.

(c) This NWP also authorizes temporary structures, fills, and work necessary to conduct the maintenance activity. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary structures, work, and discharges, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. Temporary fills must be removed in their entirety and the affected areas returned to preconstruction elevations. The areas affected by temporary fills must be revegetated, as appropriate.

(d) This NWP does not authorize maintenance dredging for the primary purpose of navigation or beach restoration. This NWP does not authorize new stream channelization or stream relocation projects.

Notification: For activities authorized by paragraph (b) of this NWP, the permittee must submit a preconstruction notification to the district engineer prior to commencing the activity (see general condition 27). Where maintenance dredging is proposed, the pre-construction notification must

include information regarding the original design capacities and configurations of the outfalls, intakes, small impoundments, and canals. (Sections 10 and 404)

Note: This NWP authorizes the repair, rehabilitation, or replacement of any previously authorized structure or fill that does not qualify for the Clean Water Act Section 404(f) exemption for maintenance.

27. Aquatic Habitat Restoration, Establishment, and Enhancement Activities.

Aquatic Habitat Restoration, Establishment, and Enhancement Activities. Activities in waters of the United States associated with the restoration, enhancement, and establishment of tidal and non-tidal wetlands and riparian areas and the restoration and enhancement of non-tidal streams and other non-tidal open waters, provided those activities result in net increases in aquatic resource functions and services.

To the extent that a Corps permit is required, activities authorized by this NWP include, but are not limited to: the removal of accumulated sediments; the installation, removal, and maintenance of small water control structures, dikes, and berms; the installation of current deflectors; the enhancement, restoration, or establishment of riffle and pool stream structure; the placement of in-stream habitat structures; modifications of the stream bed and/or banks to restore or establish stream meanders; the backfilling of artificial channels and drainage ditches; the removal of existing drainage structures; the construction of small nesting islands; the construction of open water areas; the construction of oyster habitat over unvegetated bottom in tidal waters; shellfish seeding; activities needed to reestablish vegetation, including plowing or discing for seed bed preparation and the planting of appropriate wetland species; mechanized land clearing to remove non-native invasive, exotic, or nuisance vegetation; and other related activities. Only native plant species should be planted at the site.

This NWP authorizes the relocation of non-tidal waters, including non-tidal wetlands and streams, on the project site provided there are net increases in aquatic resource functions and services.

Except for the relocation of non-tidal waters on the project site, this NWP does not authorize the conversion of a stream or natural wetlands to another aquatic habitat type (e.g., stream to wetland or vice versa) or uplands. This NWP does not authorize stream channelization. This NWP does not authorize the relocation of tidal waters or the conversion of tidal waters, including tidal wetlands, to other aquatic uses, such as the conversion of tidal wetlands into open water impoundments.

Reversion. For enhancement, restoration, and establishment activities conducted: (1) In accordance with the terms and conditions of a binding wetland enhancement, restoration, or establishment agreement between the landowner and the U.S. Fish and Wildlife Service (FWS), the Natural Resources Conservation Service (NRCS), the Farm Service Agency (FSA), the National Marine Fisheries Service (NMFS), the National Ocean Service (NOS), or their designated state cooperating agencies; (2) as voluntary wetland restoration, enhancement, and establishment actions documented by the NRCS or USDA Technical Service Provider pursuant to NRCS Field Office Technical Guide standards; or (3) on reclaimed surface coal mine lands, in accordance with a Surface Mining Control and Reclamation Act permit issued by the OSM or the applicable state agency, this NWP also authorizes any future discharge of dredged or fill material associated with the reversion of the area to its documented prior condition and use (i.e., prior to the restoration, enhancement, or establishment activities). The reversion must occur within five years after expiration of a limited term wetland restoration or establishment agreement or permit, and is authorized in these circumstances even if the discharge occurs after this NWP expires. The five-year reversion limit does not apply to agreements without time limits reached between the landowner and the FWS, NRCS, FSA, NMFS, NOS, or an appropriate state cooperating agency. This NWP also authorizes discharges of dredged or fill material in waters of the United States for the reversion of wetlands that were restored, enhanced, or established on prior-converted cropland that has not been abandoned or on uplands, in accordance with a binding agreement between the landowner and NRCS, FSA, FWS, or their designated state cooperating agencies (even though the restoration, enhancement, or establishment activity did not require a section 404 permit). The prior condition will be documented in the original agreement or permit, and the determination of return to prior conditions will be made by the Federal agency or appropriate state agency executing the agreement or permit. Before conducting any

reversion activity the permittee or the appropriate Federal or state agency must notify the district engineer and include the documentation of the prior condition. Once an area has reverted to its prior physical condition, it will be subject to whatever the Corps Regulatory requirements are applicable to that type of land at the time. The requirement that the activity result in a net increase in aquatic resource functions and services does not apply to reversion activities meeting the above conditions. Except for the activities described above, this NWP does not authorize any future discharge of dredged or fill material associated with the reversion of the area to its prior condition. In such cases a separate permit would be required for any reversion.

Reporting: For those activities that do not require pre-construction notification, the permittee must submit to the district engineer a copy of: (1) The binding wetland enhancement, restoration, or establishment agreement, or a project description, including project plans and location map; (2) the NRCS or USDA Technical Service Provider documentation for the voluntary wetland restoration, enhancement, or establishment action; or (3) the SMCRA permit issued by OSM or the applicable state agency. These documents must be submitted to the district engineer at least 30 days prior to commencing activities in waters of the United States authorized by this NWP.

Notification. The permittee must submit a pre-construction notification to the district engineer prior to commencing the activity (see general condition 27), except for the following activities:

(1) Activities conducted on non-Federal public lands and private lands, in accordance with the terms and conditions of a binding wetland enhancement, restoration, or establishment agreement between the landowner and the U.S. FWS, NRCS, FSA, NMFS, NOS, or their designated state cooperating agencies;

(2) Voluntary wetland restoration, enhancement, and establishment actions documented by the NRCS or USDA Technical Service Provider pursuant to NRCS Field Office Technical Guide standards; or

(3) The reclamation of surface coal mine lands, in accordance with an SMCRA permit issued by the OSM or the applicable state agency.

However, the permittee must submit a copy of the appropriate documentation. (Sections 10 and 404)

Note: This NWP can be used to authorize compensatory mitigation projects, including mitigation banks and in-lieu fee programs. However, this NWP does not authorize the reversion of an area used for a compensatory mitigation project to its prior condition, since compensatory mitigation is generally intended to be permanent.

Enclosure 2 - Nationwide Permit General Conditions

(March 12, 2007)

Note: To qualify for NWP authorization, the prospective permittee must comply with the following general conditions, as appropriate, in addition to any regional or case-specific conditions imposed by the division engineer or district engineer. Prospective permittees should contact the appropriate Corps district office to determine if regional conditions have been imposed on an NWP. Prospective permittees should also contact the appropriate Corps district office to determine the status of Clean Water Act Section 401 water quality certification and/ or Coastal Zone Management Act consistency for an NWP.

1. *Navigation.* (a) No activity may cause more than a minimal adverse effect on navigation.
(b) Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States.
(c) The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

2. *Aquatic Life Movements.* No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. Culverts placed in streams must be installed to maintain low flow conditions.

3. *Spawning Areas.* Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.

4. *Migratory Bird Breeding Areas.* Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

5. *Shellfish Beds.* No activity may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWPs 4 and 48.

6. *Suitable Material.* No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the Clean Water Act).

7. *Water Supply Intakes.* No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.

8. *Adverse Effects From Impoundments.* If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.

9. *Management of Water Flows.* To the maximum extent practicable, the preconstruction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization and storm water management activities, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the preconstruction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

10. *Fills Within 100-Year Floodplains.* The activity must comply with applicable FEMA-approved state or local floodplain management requirements.

11. *Equipment.* Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

12. *Soil Erosion and Sediment Controls.* Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow.

13. *Removal of Temporary Fills.* Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

14. *Proper Maintenance.* Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety.

15. *Wild and Scenic Rivers.* No activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a ''study river'' for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency in the area (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service).

16. *Tribal Rights.* No activity or its operation may impair reserved tribal

rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

17. *Endangered Species.* (a) No activity is authorized under any NWP which is likely to jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will destroy or adversely modify the critical habitat of such species. No activity is authorized under any NWP which ''may affect'' a listed species or critical habitat, unless Section 7 consultation addressing the effects of the proposed activity has been completed.
(b) Federal agencies should follow their own procedures for complying with the requirements of the ESA. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements.
(c) Non-federal permittees shall notify the district engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that might affect Federally-listed endangered or threatened species or designated critical habitat, the pre-construction notification must include the name(s) of the endangered or threatened species that may be affected by the proposed work or that utilize the designated critical habitat that may be affected by the proposed work. The district engineer will determine whether the proposed activity ''may affect'' or will have ''no effect'' to listed species and designated critical habitat and will notify the non-Federal applicant of the Corps' determination within 45 days of receipt of a complete pre-construction notification. In cases where the non-Federal applicant has identified listed species or critical habitat that might be affected or is in the vicinity of the project, and has so notified the Corps, the applicant shall not begin work until the Corps has provided notification the proposed activities will have ''no effect'' on listed species or critical habitat, or until Section 7 consultation has been completed.
(d) As a result of formal or informal consultation with the FWS or NMFS the district engineer may add speciesspecific regional endangered species conditions to the NWPs.
(e) Authorization of an activity by a NWP does not authorize the ''take'' of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with ''incidental take'' provisions, etc.) from the U.S. FWS or the NMFS, both lethal and non-lethal ''takes'' of protected species are in violation of the ESA. Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the U.S. FWS and NMFS or their world wide Web pages at *http://www.fws.gov/* and *http://www.noaa.gov/fisheries.html* respectively.

18. *Historic Properties.* (a) In cases where the district engineer determines that the activity may affect properties listed, or eligible for listing, in the National Register of Historic Places, the activity is not authorized, until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied.
(b) Federal permittees should follow their own procedures for complying with the requirements of Section 106 of the National Historic Preservation Act. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements.
(c) Non-federal permittees must submit a pre-construction notification to the district engineer if the authorized activity may have the potential to cause effects to any historic properties listed, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties. For such activities, the preconstruction notification must.state which historic properties may be affected by the proposed work or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of or potential for the presence of historic resources can be sought from the State Historic Preservation Officer or Tribal Historic Preservation Officer, as appropriate, and the National Register of Historic Places (see 33 CFR 330.4(g)). The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigation, and field survey. Based on the information submitted and these efforts, the district engineer shall determine whether the proposed activity has the potential to cause an effect on the historic properties. Where the non-Federal applicant has identified historic properties which the activity may have the potential to cause effects and so notified the Corps, the non-Federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects or that consultation under Section 106 of the NHPA has been completed.
(d) The district engineer will notify the prospective permittee within 45 days of receipt of a complete preconstruction notification whether NHPA Section 106 consultation is required. Section 106 consultation is not required when the Corps determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR 800.3(a)). If NHPA section 106 consultation is required and will occur, the district engineer will notify the non-Federal applicant that he or she cannot begin work until Section 106 consultation is completed.
(e) Prospective permittees should be aware that section 110k of the NHPA (16 U.S.C. 470h–2(k)) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of Section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If

circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, explaining the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

19. *Designated Critical Resource Waters.* Critical resource waters include, NOAA-designated marine sanctuaries, National Estuarine Research Reserves, state natural heritage sites, and outstanding national resource waters or other waters officially designated by a state as having particular environmental or ecological significance and identified by the district engineer after notice and opportunity for public comment. The district engineer may also designate additional critical resource waters after notice and opportunity for comment.
(a) Discharges of dredged or fill material into waters of the United States are not authorized by NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, and 50 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters.
(b) For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, and 38, notification is required in accordance with general condition 27, for any activity proposed in the designated critical resource waters including wetlands adjacent to those waters. The district engineer may authorize activities under these NWPs only after it is determined that the impacts to the critical resource waters will be no more than minimal.

20. *Mitigation.* The district engineer will consider the following factors when determining appropriate and practicable mitigation necessary to ensure that adverse effects on the aquatic environment are minimal:
(a) The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States to the maximum extent practicable at the project site (i.e., on site).
(b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating) will be required to the extent necessary to ensure that the adverse effects to the aquatic environment are minimal.
(c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland losses that exceed 1/10 acre and require preconstruction notification, unless the district engineer determines in writing that some other form of mitigation would be more environmentally appropriate and provides a projectspecific waiver of this requirement. For wetland losses of 1/10 acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in minimal adverse effects on the aquatic environment. Since the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, wetland restoration should be the first compensatory mitigation option considered.
(d) For losses of streams or other open waters that require pre-construction notification, the district engineer may require compensatory mitigation, such as stream restoration, to ensure that the activity results in minimal adverse effects on the aquatic environment.
(e) Compensatory mitigation will not be used to increase the acreage losses allowed by the acreage limits of the NWPs. For example, if an NWP has an acreage limit of 1/2 acre, it cannot be used to authorize any project resulting in the loss of greater than 1/2 acre of waters of the United States, even if compensatory mitigation is provided that replaces or restores some of the lost waters. However, compensatory mitigation can and should be used, as necessary, to ensure that a project already meeting the established acreage limits also satisfies the minimal impact requirement associated with the NWPs.
(f) Compensatory mitigation plans for projects in or near streams or other open waters will normally include a requirement for the establishment, maintenance, and legal protection (e.g., conservation easements) of riparian areas next to open waters. In some cases, riparian areas may be the only compensatory mitigation required. Riparian areas should consist of native species. The width of the required riparian area will address documented water quality or aquatic habitat loss concerns. Normally, the riparian area will be 25 to 50 feet wide on each side of the stream, but the district engineer may require slightly wider riparian areas to address documented water quality or habitat loss concerns. Where both wetlands and open waters exist on the project site, the district engineer will determine the appropriate compensatory mitigation (e.g., riparian areas and/or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where riparian areas are determined to be the most appropriate form of compensatory mitigation, the district engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland losses.
(g) Permittees may propose the use of mitigation banks, in-lieu fee arrangements or separate activityspecific compensatory mitigation. In all cases, the mitigation provisions will specify the party responsible for accomplishing and/or complying with the mitigation plan.
(h) Where certain functions and services of waters of the United States are permanently adversely affected, such as the conversion of a forested or scrub-shrub wetland to a herbaceous wetland in a permanently maintained utility line right-of-way, mitigation may be required to reduce the adverse effects of the project to the minimal level.

21. *Water Quality.* Where States and authorized Tribes, or EPA where applicable, have not previously certified compliance of an NWP with CWA Section 401, individual 401 Water Quality Certification must be obtained or waived (see 33 CFR 330.4(c)). The district engineer or State or Tribe may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.

22. *Coastal Zone Management.* In coastal states where an NWP has not previously received a state coastal zone

management consistency concurrence, an individual state coastal zone management consistency concurrence must be obtained, or a presumption of concurrence must occur (see 33 CFR 330.4(d)). The district engineer or a State may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements.

23. *Regional and Case-By-Case* ***Conditions.*** The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.

24. *Use of Multiple Nationwide Permits.* The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the United States authorized by the NWPs does not exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the United States for the total project cannot exceed ⅓-acre.

25. *Transfer of Nationwide Permit Verifications.* If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature: "When the structures or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this nationwide permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below."

(Transferee)_____
(Date) _____

26. *Compliance Certification.* Each permittee who received an NWP verification from the Corps must submit a signed certification regarding the completed work and any required mitigation. The certification form must be forwarded by the Corps with the NWP verification letter and will include:
(a) A statement that the authorized work was done in accordance with the NWP authorization, including any general or specific conditions;
(b) A statement that any required mitigation was completed in accordance with the permit conditions; and
(c) The signature of the permittee certifying the completion of the work and mitigation.

27. *Pre-Construction Notification.* (a) *Timing.* Where required by the terms of the NWP, the prospective permittee must notify the district engineer by submitting a pre-construction notification (PCN) as early as possible. The district engineer must determine if the PCN is complete within 30 calendar days of the date of receipt and, as a general rule, will request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the district engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the district engineer. The prospective permittee shall not begin the activity:
(1) Until notified in writing by the district engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or
(2) If 45 calendar days have passed from the district engineer's receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer. However, if the permittee was required to notify the Corps pursuant to general condition 17 that listed species or critical habitat might be affected or in the vicinity of the project, or to notify the Corps pursuant to general condition 18 that the activity may have the potential to cause effects to historic properties, the permittee cannot begin the activity until receiving written notification from the Corps that is "no effect" on listed species or "no potential to cause effects" on historic properties, or that any consultation required under Section 7 of the Endangered Species Act (see 33 CFR 330.4(f)) and/or Section 106 of the National Historic Preservation (see 33 CFR 330.4(g)) is completed. Also, work cannot begin under NWPs 21, 49, or 50 until the permittee has received written approval from the Corps. If the proposed activity requires a written waiver to exceed specified limits of an NWP, the permittee cannot begin the activity until the district engineer issues the waiver. If the district or division engineer notifies the permittee in writing that an individual permit is required within 45 calendar days of receipt of a complete PCN, the permittee cannot begin the activity until an individual permit has been obtained. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).
(b) *Contents of Pre-Construction Notification:* The PCN must be in writing and include the following information:
(1) Name, address and telephone numbers of the prospective permittee;
(2) Location of the proposed project;
(3) A description of the proposed project; the project's purpose; direct and indirect adverse environmental effects the project would cause; any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity. The description should be sufficiently detailed to allow the district engineer to determine that the adverse effects of the project will be minimal and to determine the need for compensatory mitigation. Sketches should be provided when necessary to show that the activity complies with the terms of the NWP. (Sketches usually clarify the project and when provided result in a quicker decision.);
(4) The PCN must include a delineation of special aquatic sites and other waters of the United States on the

project site. Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters of the United States, but there may be a delay if the Corps does the delineation, especially if the project site is large or contains many waters of the United States. Furthermore, the 45 day period will not start until the delineation has been submitted to or completed by the Corps, where appropriate;

(5) If the proposed activity will result in the loss of greater than 1/10 acre of wetlands and a PCN is required, the prospective permittee must submit a statement describing how the mitigation requirement will be satisfied. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan.

(6) If any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, for non-Federal applicants the PCN must include the name(s) of those endangered or threatened species that might be affected by the proposed work or utilize the designated critical habitat that may be affected by the proposed work. Federal applicants must provide documentation demonstrating compliance with the Endangered Species Act; and

(7) For an activity that may affect a historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the National Register of Historic Places, for non-Federal applicants the PCN must state which historic property may be affected by the proposed work or include a vicinity map indicating the location of the historic property. Federal applicants must provide documentation demonstrating compliance with Section 106 of the National Historic Preservation Act.

(c) *Form of Pre-Construction Notification:* The standard individual permit application form (Form ENG 4345) may be used, but the completed application form must clearly indicate that it is a PCN and must include all of the information required in paragraphs (b)(1) through (7) of this general condition. A letter containing the required information may also be used.

(d) *Agency Coordination:* (1) The district engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the project's adverse environmental effects to a minimal level.

(2) For all NWP 48 activities requiring pre-construction notification and for other NWP activities requiring preconstruction notification to the district engineer that result in the loss of greater than 1/2-acre of waters of the United States, the district engineer will immediately provide (e.g., via facsimile transmission, overnight mail, or other expeditious manner) a copy of the PCN to the appropriate Federal or state offices (U.S. FWS, state natural resource or water quality agency, EPA, State Historic Preservation Officer (SHPO) or Tribal Historic Preservation Office (THPO), and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will then have 10 calendar days from the date the material is transmitted to telephone or fax the district engineer notice that they intend to provide substantive, site-specific comments. If so contacted by an agency, the district engineer will wait an additional 15 calendar days before making a decision on the preconstruction notification. The district engineer will fully consider agency comments received within the specified time frame, but will provide no response to the resource agency, except as provided below. The district engineer will indicate in the administrative record associated with each preconstruction notification that the resource agencies' concerns were considered. For NWP 37, the emergency watershed protection and rehabilitation activity may proceed immediately in cases where there is an unacceptable hazard to life or a significant loss of property or economic hardship will occur. The district engineer will consider any comments received to decide whether the NWP 37 authorization should be modified, suspended, or revoked in accordance with the procedures at 33 CFR 330.5.

(3) In cases of where the prospective permittee is not a Federal agency, the district engineer will provide a response to NMFS within 30 calendar days of receipt of any Essential Fish Habitat conservation recommendations, as required by Section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act.

(4) Applicants are encouraged to provide the Corps multiple copies of pre-construction notifications to expedite agency coordination.

(5) For NWP 48 activities that require reporting, the district engineer will provide a copy of each report within 10 calendar days of receipt to the appropriate regional office of the NMFS.

(e) *District Engineer's Decision:* In reviewing the PCN for the proposed activity, the district engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. If the proposed activity requires a PCN and will result in a loss of greater than 1/10 acre of wetlands, the prospective permittee should submit a mitigation proposal with the PCN. Applicants may also propose compensatory mitigation for projects with smaller impacts. The district engineer will consider any proposed compensatory mitigation the applicant has included in the proposal in determining whether the net adverse environmental effects to the aquatic environment of the proposed work are minimal. The compensatory mitigation proposal may be either conceptual or detailed. If the district engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse effects on the aquatic environment are minimal, after considering mitigation, the district engineer will notify the permittee and include any conditions the district engineer deems necessary. The district engineer must approve any compensatory mitigation proposal before the permittee commences work. If the prospective permittee elects to submit a compensatory mitigation plan with the PCN, the district engineer will expeditiously review the proposed compensatory mitigation plan. The district engineer must review the plan within 45 calendar days of receiving a complete PCN and determine whether the proposed mitigation would ensure no more than minimal adverse effects on the aquatic environment. If the net adverse effects of the project on the aquatic environment (after

consideration of the compensatory mitigation proposal) are determined by the district engineer to be minimal, the district engineer will provide a timely written response to the applicant. The response will state that the project can proceed under the terms and conditions of the NWP.

If the district engineer determines that the adverse effects of the proposed work are more than minimal, then the district engineer will notify the applicant either: (1) That the project does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit; (2) that the project is authorized under the NWP subject to the applicant's submission of a mitigation plan that would reduce the adverse effects on the aquatic environment to the minimal level; or (3) that the project is authorized under the NWP with specific modifications or conditions. Where the district engineer determines that mitigation is required to ensure no more than minimal adverse effects occur to the aquatic environment, the activity will be authorized within the 45-day PCN period. The authorization will include the necessary conceptual or specific mitigation or a requirement that the applicant submit a mitigation plan that would reduce the adverse effects on the aquatic environment to the minimal level. When mitigation is required, no work in waters of the United States may occur until the district engineer has approved a specific mitigation plan.

28. *Single and Complete Project.* The activity must be a single and complete project. The same NWP cannot be used more than once for the same single and complete project.

Enclosure 3

Permittee: California Department of Transportation

File Number: 2008-00177S

Certification of Compliance
for
Nationwide Permit

"I hereby certify that the work authorized by the above referenced File Number and all required mitigation have been completed in accordance with the terms and conditions of this Nationwide Permit authorization."

_____ _____

(Permittee) (Date)

Return to:

Hal Durio
U.S. Army, Corps of Engineers
San Francisco District
Regulatory Division, CESPN-OR-R
1455 Market Street
San Francisco, CA 94103-1398

7. US ARMY ACOE_NWP14

BJ 10/20/09
MO

DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, U.S. ARMY CORPS OF ENGINEERS
1455 MARKET STREET
SAN FRANCISCO, CALIFORNIA 94103-1398

OCT 07 2009

Regulatory Division

SUBJECT: File Number 2009-00253S

Mr. Jeffrey G. Jensen
California Department of Transportation
Office of Biological Sciences & Permit
PO Box 23660
Oakland, CA 94623-0660

Dear Jensen:

This letter is written in response to your submittal of May 5, 2009 concerning Department of the Army authorization to implement construction of the Barrier and Drainage *System for North Frontage Road to Western Dumbarton Bridge* located in San Mateo County on State Route (SR) 84 on the north side of the Dumbarton Bridge touchdown to the west side of San Francisco Bay on the North Frontage Road. This letter authorizes the placement of approximately 1900 linear feet of sheet pile barrier; an approximate 1900 foot long concrete barrier wall with an underground chamber to house a drainage pipe up to 42 inches in diameter; a 10 foot tall by 25 foot by 35 foot concrete pump house; and an outfall into San Francisco Bay with an approximate 500 square foot RSP (rock slope protection) RED (rock energy dissipater).

Based on a review of the information you submitted and an inspection of the project site conducted by Corps personnel on May 22, 2009 , your project qualifies for authorization under Department of the Army Nationwide Permit 14 – Linear Transportation Project (72 Fed. Reg. 11092, March 12, 2007), pursuant to Section 404 of the Clean Water Act (33 U.S.C. Section 1344) and Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. Section 403). See Enclosure 1. All work shall be completed in accordance with the plans and drawings titled *Drainage Details DD-1, Drainage Plan D-2, Layout L-3 and Potential Impacts to Jurisdictional Wetlands and Waters of the U.S Appendix G, Figure 1.*

The project must be in compliance with the General Conditions cited in Enclosure 2 for this Nationwide Permit authorization to remain valid. Non-compliance with any condition could result in the suspension, modification or revocation of the authorization for your project, thereby requiring you to obtain an Individual Permit from the Corps. This Nationwide Permit authorization does not obviate the need to obtain other State or local approvals required by law.

This authorization will remain valid for two years from the date of this letter unless the Nationwide Permit is modified, suspended or revoked. If you have commenced work or are under contract to commence work prior to the suspension, or revocation of the Nationwide Permit and the project would not comply with the resulting Nationwide Permit authorization, you

have 12 months from that date to complete the project under the present terms and conditions of the Nationwide Permit. Upon completion of the project and all associated mitigation requirements, you shall sign and return the Certification of Compliance, Enclosure 3, verifying that you have complied with the terms and conditions of the permit.

This authorization will not be effective until you have obtained a Section 401 water quality certification from the San Francisco Bay Regional Water Quality Control Board (RWQCB). If the RWQCB fails to act on a valid request for certification within two months after receipt of a complete application, the Corps will presume a waiver of water quality certification has been obtained. You shall submit a copy of the certification to the Corps prior to the commencement of work.

This authorization will not be effective until you have obtained a concurrence from the California Coastal Commission or S.F. Bay Conservation and Development Commission that your certification that your project will comply with California's Coastal Zone Management Act. If the Commission fails to act on a valid request for concurrence with your certification within six months after receipt, the Corps will presume a concurrence has been obtained. You shall submit a copy of the concurrence to the Corps prior to the commencement of work.

To ensure compliance with this Nationwide Permit authorization, the following special conditions shall be implemented:

1. This Corps permit does not authorize you to take an endangered species. In order to legally take a listed species, you must have a separate authorization under the Endangered Species Act (ESA) (e.g., an ESA Section 10 permit or a Biological Opinion (BO) under ESA Section 7 with "incidental take" provisions with which you must comply). The enclosed U.S. Fish and Wildlife Service (FWS) and National Marine Fisheries Service (NMFS) BOs dated August 14, 2009 and August 10, 2009 respectively contain mandatory terms and conditions to implement the reasonable and prudent measures that are associated with "incidental take" that is also specified in the BOs. Your authorization under this Corps permit is conditional upon your compliance with all of the mandatory terms and conditions associated with incidental take authorized by the attached BOs, whose terms and conditions are incorporated by reference in this permit. Failure to comply with the terms and conditions associated with incidental take of the BOs, where a take of the listed species occurs, would constitute an unauthorized take and it would also constitute non-compliance with this Corps permit. The FWS and NMFS are the appropriate authorities to determine compliance with the terms and conditions of their BOs and with the ESA.

2. ESA fencing shall be placed no more than 9 feet from the edge of the paved shoulder of the North Frontage Road along the entire length of the project except where the salt

marsh harvest mouse barrier fence may need to cut through the wetland vegetation to reach the appropriate end point as determined by the U.S. Fish and Wildlife Service.

3. As mitigation for the 500 square feet of RSP fill that will be added to the San Francisco Bay as part of the new outfall structure associated with the barrier wall drainage system, Caltrans shall create a minimum of 500 square feet of intertidal mudflat as described in their Conceptual Design for Wetland Restoration / Creation at the Western Anchorage of the Dumbarton Bridge. At this location, Caltrans will remove earthen fill and the riprap berm that makes up the present approach to the Ravenswood Pier. This area will be graded to match existing contours and would restore approximately 0.02 acre of intertidal pickleweed and or cordgrass marsh and approximately 0.13 acre of intertidal mudflat.

4. Caltrans shall use Best Management Practices and appropriate erosion controls measures throughout the implementation of this project.

Should you have any questions regarding this matter, please call Hal Durio of our Regulatory Division at 415-503-6785. Please address all correspondence to the Regulatory Division and refer to the File Number at the head of this letter. If you would like to provide comments on our permit review process, please complete the Customer Survey Form available online at http://per2.nwp.usace.army.mil/survey.html.

Sincerely,

FW

Jane M. Hicks
Chief, Regulatory Division

Enclosures

Copy furnished (w/o enclosures):

US FWS, Sacramento, CA
US NMFS, Santa Rosa, CA
CA RWQCB, Oakland, CA
SF BCDC, San Francisco, CA

14. Linear Transportation Projects

Activities required for the construction, expansion, modification, or improvement of linear transportation projects (e.g., roads, highways, railways, trails, airport runways, and taxiways) in waters of the United States. For linear transportation projects in non-tidal waters, the discharge cannot cause the loss of greater than 1/2-acre of waters of the United States. For linear transportation projects in tidal waters, the discharge cannot cause the loss of greater than 1/3-acre of waters of the United States. Any stream channel modification, including bank stabilization, is limited to the minimum necessary to construct or protect the linear transportation project; such modifications must be in the immediate vicinity of the project.

This NWP also authorizes temporary structures, fills, and work necessary to construct the linear transportation project. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary structures, work, and discharges, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The areas affected by temporary fills must be revegetated, as appropriate.

This NWP cannot be used to authorize non-linear features commonly associated with transportation projects, such as vehicle maintenance or storage buildings, parking lots, train stations, or aircraft hangars.

Notification: The permittee must submit a pre-construction notification to the district engineer prior to commencing the activity if: (1) the loss of waters of the United States exceeds 1/10 acre; or (2) there is a discharge in a special aquatic site, including wetlands. (See general condition 27.) (Sections 10 and 404)

Note: Some discharges for the construction of farm roads or forest roads, or temporary roads for moving mining equipment, may qualify for an exemption under Section 404(f) of the Clean Water Act (see 33 CFR 323.4).

Enclosure 2 - Nationwide Permit General Conditions

(March 12, 2007)

Note: To qualify for NWP authorization, the prospective permittee must comply with the following general conditions, as appropriate, in addition to any regional or case-specific conditions imposed by the division engineer or district engineer. Prospective permittees should contact the appropriate Corps district office to determine if regional conditions have been imposed on an NWP. Prospective permittees should also contact the appropriate Corps district office to determine the status of Clean Water Act Section 401 water quality certification and/ or Coastal Zone Management Act consistency for an NWP.

1. *Navigation.* (a) No activity may cause more than a minimal adverse effect on navigation.
(b) Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States.
(c) The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

2. *Aquatic Life Movements.* No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. Culverts placed in streams must be installed to maintain low flow conditions.

3. *Spawning Areas.* Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.

4. *Migratory Bird Breeding Areas.* Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

5. *Shellfish Beds.* No activity may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWPs 4 and 48.

6. *Suitable Material.* No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the Clean Water Act).

7. *Water Supply Intakes.* No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.

8. *Adverse Effects From Impoundments.* If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.

9. *Management of Water Flows.* To the maximum extent practicable, the preconstruction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization and storm water management activities, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the preconstruction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

10. *Fills Within 100-Year Floodplains.* The activity must comply with applicable FEMA-approved state or local floodplain management requirements.

11. *Equipment.* Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

12. *Soil Erosion and Sediment Controls.* Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow.

13. *Removal of Temporary Fills.* Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

14. *Proper Maintenance.* Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety.

15. *Wild and Scenic Rivers.* No activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a ''study river'' for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency in the area (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service).

16. *Tribal Rights.* No activity or its operation may impair reserved tribal

rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

17. *Endangered Species.* (a) No activity is authorized under any NWP which is likely to jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will destroy or adversely modify the critical habitat of such species. No activity is authorized under any NWP which ''may affect'' a listed species or critical habitat, unless Section 7 consultation addressing the effects of the proposed activity has been completed.
(b) Federal agencies should follow their own procedures for complying with the requirements of the ESA. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements.
(c) Non-federal permittees shall notify the district engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that might affect Federally-listed endangered or threatened species or designated critical habitat, the pre-construction notification must include the name(s) of the endangered or threatened species that may be affected by the proposed work or that utilize the designated critical habitat that may be affected by the proposed work. The district engineer will determine whether the proposed activity ''may affect'' or will have ''no effect'' to listed species and designated critical habitat and will notify the non-Federal applicant of the Corps' determination within 45 days of receipt of a complete pre-construction notification. In cases where the non-Federal applicant has identified listed species or critical habitat that might be affected or is in the vicinity of the project, and has so notified the Corps, the applicant shall not begin work until the Corps has provided notification the proposed activities will have ''no effect'' on listed species or critical habitat, or until Section 7 consultation has been completed.
(d) As a result of formal or informal consultation with the FWS or NMFS the district engineer may add speciesspecific regional endangered species conditions to the NWPs.
(e) Authorization of an activity by a NWP does not authorize the ''take'' of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with ''incidental take'' provisions, etc.) from the U.S. FWS or the NMFS, both lethal and non-lethal ''takes'' of protected species are in violation of the ESA. Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the U.S. FWS and NMFS or their world wide Web pages at *http://www.fws.gov/* and *http://www.noaa.gov/fisheries.html* respectively.

18. *Historic Properties.* (a) In cases where the district engineer determines that the activity may affect properties listed, or eligible for listing, in the National Register of Historic Places, the activity is not authorized, until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied.
(b) Federal permittees should follow their own procedures for complying with the requirements of Section 106 of the National Historic Preservation Act. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements.
(c) Non-federal permittees must submit a pre-construction notification to the district engineer if the authorized activity may have the potential to cause effects to any historic properties listed, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties. For such activities, the preconstruction notification must state which historic properties may be affected by the proposed work or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of or potential for the presence of historic resources can be sought from the State Historic Preservation Officer or Tribal Historic Preservation Officer, as appropriate, and the National Register of Historic Places (see 33 CFR 330.4(g)). The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigation, and field survey. Based on the information submitted and these efforts, the district engineer shall determine whether the proposed activity has the potential to cause an effect on the historic properties. Where the non-Federal applicant has identified historic properties which the activity may have the potential to cause effects and so notified the Corps, the non-Federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects or that consultation under Section 106 of the NHPA has been completed.
(d) The district engineer will notify the prospective permittee within 45 days of receipt of a complete preconstruction notification whether NHPA Section 106 consultation is required. Section 106 consultation is not required when the Corps determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR 800.3(a)). If NHPA section 106 consultation is required and will occur, the district engineer will notify the non-Federal applicant that he or she cannot begin work until Section 106 consultation is completed.
(e) Prospective permittees should be aware that section 110k of the NHPA (16 U.S.C. 470h–2(k)) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of Section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If

circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, explaining the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

19. *Designated Critical Resource Waters.* Critical resource waters include, NOAA-designated marine sanctuaries, National Estuarine Research Reserves, state natural heritage sites, and outstanding national resource waters or other waters officially designated by a state as having particular environmental or ecological significance and identified by the district engineer after notice and opportunity for public comment. The district engineer may also designate additional critical resource waters after notice and opportunity for comment.
(a) Discharges of dredged or fill material into waters of the United States are not authorized by NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, and 50 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters.
(b) For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, and 38, notification is required in accordance with general condition 27, for any activity proposed in the designated critical resource waters including wetlands adjacent to those waters. The district engineer may authorize activities under these NWPs only after it is determined that the impacts to the critical resource waters will be no more than minimal.

20. *Mitigation.* The district engineer will consider the following factors when determining appropriate and practicable mitigation necessary to ensure that adverse effects on the aquatic environment are minimal:
(a) The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States to the maximum extent practicable at the project site (i.e., on site).
(b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating) will be required to the extent necessary to ensure that the adverse effects to the aquatic environment are minimal.
(c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland losses that exceed 1/10 acre and require preconstruction notification, unless the district engineer determines in writing that some other form of mitigation would be more environmentally appropriate and provides a projectspecific waiver of this requirement. For wetland losses of 1/10 acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in minimal adverse effects on the aquatic environment. Since the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, wetland restoration should be the first compensatory mitigation option considered.
(d) For losses of streams or other open waters that require pre-construction notification, the district engineer may require compensatory mitigation, such as stream restoration, to ensure that the activity results in minimal adverse effects on the aquatic environment.
(e) Compensatory mitigation will not be used to increase the acreage losses allowed by the acreage limits of the NWPs. For example, if an NWP has an acreage limit of 1/2 acre, it cannot be used to authorize any project resulting in the loss of greater than 1/2 acre of waters of the United States, even if compensatory mitigation is provided that replaces or restores some of the lost waters. However, compensatory mitigation can and should be used, as necessary, to ensure that a project already meeting the established acreage limits also satisfies the minimal impact requirement associated with the NWPs.
(f) Compensatory mitigation plans for projects in or near streams or other open waters will normally include a requirement for the establishment, maintenance, and legal protection (e.g., conservation easements) of riparian areas next to open waters. In some cases, riparian areas may be the only compensatory mitigation required. Riparian areas should consist of native species. The width of the required riparian area will address documented water quality or aquatic habitat loss concerns. Normally, the riparian area will be 25 to 50 feet wide on each side of the stream, but the district engineer may require slightly wider riparian areas to address documented water quality or habitat loss concerns. Where both wetlands and open waters exist on the project site, the district engineer will determine the appropriate compensatory mitigation (e.g., riparian areas and/or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where riparian areas are determined to be the most appropriate form of compensatory mitigation, the district engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland losses.
(g) Permittees may propose the use of mitigation banks, in-lieu fee arrangements or separate activityspecific compensatory mitigation. In all cases, the mitigation provisions will specify the party responsible for accomplishing and/or complying with the mitigation plan.
(h) Where certain functions and services of waters of the United States are permanently adversely affected, such as the conversion of a forested or scrub-shrub wetland to a herbaceous wetland in a permanently maintained utility line right-of-way, mitigation may be required to reduce the adverse effects of the project to the minimal level.

21. *Water Quality.* Where States and authorized Tribes, or EPA where applicable, have not previously certified compliance of an NWP with CWA Section 401, individual 401 Water Quality Certification must be obtained or waived (see 33 CFR 330.4(c)). The district engineer or State or Tribe may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.

22. *Coastal Zone Management.* In coastal states where an NWP has not previously received a state coastal zone

management consistency concurrence, an individual state coastal zone management consistency concurrence must be obtained, or a presumption of concurrence must occur (see 33 CFR 330.4(d)). The district engineer or a State may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements.

23. *Regional and Case-By-Case Conditions.* The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.

24. *Use of Multiple Nationwide Permits.* The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the United States authorized by the NWPs does not exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the United States for the total project cannot exceed ⅓-acre.

25. *Transfer of Nationwide Permit Verifications.* If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature: "When the structures or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this nationwide permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below."

(Transferee)_____
(Date) _____

26. *Compliance Certification.* Each permittee who received an NWP verification from the Corps must submit a signed certification regarding the completed work and any required mitigation. The certification form must be forwarded by the Corps with the NWP verification letter and will include:
(a) A statement that the authorized work was done in accordance with the NWP authorization, including any general or specific conditions;
(b) A statement that any required mitigation was completed in accordance with the permit conditions; and
(c) The signature of the permittee certifying the completion of the work and mitigation.

27. *Pre-Construction Notification.* (a) *Timing.* Where required by the terms of the NWP, the prospective permittee must notify the district engineer by submitting a pre-construction notification (PCN) as early as possible. The district engineer must determine if the PCN is complete within 30 calendar days of the date of receipt and, as a general rule, will request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the district engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the district engineer. The prospective permittee shall not begin the activity:
(1) Until notified in writing by the district engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or
(2) If 45 calendar days have passed from the district engineer's receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer. However, if the permittee was required to notify the Corps pursuant to general condition 17 that listed species or critical habitat might be affected or in the vicinity of the project, or to notify the Corps pursuant to general condition 18 that the activity may have the potential to cause effects to historic properties, the permittee cannot begin the activity until receiving written notification from the Corps that is "no effect" on listed species or "no potential to cause effects" on historic properties, or that any consultation required under Section 7 of the Endangered Species Act (see 33 CFR 330.4(f)) and/or Section 106 of the National Historic Preservation (see 33 CFR 330.4(g)) is completed. Also, work cannot begin under NWPs 21, 49, or 50 until the permittee has received written approval from the Corps. If the proposed activity requires a written waiver to exceed specified limits of an NWP, the permittee cannot begin the activity until the district engineer issues the waiver. If the district or division engineer notifies the permittee in writing that an individual permit is required within 45 calendar days of receipt of a complete PCN, the permittee cannot begin the activity until an individual permit has been obtained. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).
(b) *Contents of Pre-Construction Notification:* The PCN must be in writing and include the following information:
(1) Name, address and telephone numbers of the prospective permittee;
(2) Location of the proposed project;
(3) A description of the proposed project; the project's purpose; direct and indirect adverse environmental effects the project would cause; any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity. The description should be sufficiently detailed to allow the district engineer to determine that the adverse effects of the project will be minimal and to determine the need for compensatory mitigation. Sketches should be provided when necessary to show that the activity complies with the terms of the NWP. (Sketches usually clarify the project and when provided result in a quicker decision.);
(4) The PCN must include a delineation of special aquatic sites and other waters of the United States on the

project site. Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters of the United States, but there may be a delay if the Corps does the delineation, especially if the project site is large or contains many waters of the United States. Furthermore, the 45 day period will not start until the delineation has been submitted to or completed by the Corps, where appropriate;

(5) If the proposed activity will result in the loss of greater than 1/10 acre of wetlands and a PCN is required, the prospective permittee must submit a statement describing how the mitigation requirement will be satisfied. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan.

(6) If any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, for non-Federal applicants the PCN must include the name(s) of those endangered or threatened species that might be affected by the proposed work or utilize the designated critical habitat that may be affected by the proposed work. Federal applicants must provide documentation demonstrating compliance with the Endangered Species Act; and

(7) For an activity that may affect a historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the National Register of Historic Places, for non-Federal applicants the PCN must state which historic property may be affected by the proposed work or include a vicinity map indicating the location of the historic property. Federal applicants must provide documentation demonstrating compliance with Section 106 of the National Historic Preservation Act.

(c) *Form of Pre-Construction Notification:* The standard individual permit application form (Form ENG 4345) may be used, but the completed application form must clearly indicate that it is a PCN and must include all of the information required in paragraphs (b)(1) through (7) of this general condition. A letter containing the required information may also be used.

(d) *Agency Coordination:* (1) The district engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the project's adverse environmental effects to a minimal level.

(2) For all NWP 48 activities requiring pre-construction notification and for other NWP activities requiring preconstruction notification to the district engineer that result in the loss of greater than 1/2-acre of waters of the United States, the district engineer will immediately provide (e.g., via facsimile transmission, overnight mail, or other expeditious manner) a copy of the PCN to the appropriate Federal or state offices (U.S. FWS, state natural resource or water quality agency, EPA, State Historic Preservation Officer (SHPO) or Tribal Historic Preservation Office (THPO), and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will then have 10 calendar days from the date the material is transmitted to telephone or fax the district engineer notice that they intend to provide substantive, site-specific comments. If so contacted by an agency, the district engineer will wait an additional 15 calendar days before making a decision on the preconstruction notification. The district engineer will fully consider agency comments received within the specified time frame, but will provide no response to the resource agency, except as provided below. The district engineer will indicate in the administrative record associated with each preconstruction notification that the resource agencies' concerns were considered. For NWP 37, the emergency watershed protection and rehabilitation activity may proceed immediately in cases where there is an unacceptable hazard to life or a significant loss of property or economic hardship will occur. The district engineer will consider any comments received to decide whether the NWP 37 authorization should be modified, suspended, or revoked in accordance with the procedures at 33 CFR 330.5.

(3) In cases of where the prospective permittee is not a Federal agency, the district engineer will provide a response to NMFS within 30 calendar days of receipt of any Essential Fish Habitat conservation recommendations, as required by Section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act.

(4) Applicants are encouraged to provide the Corps multiple copies of pre-construction notifications to expedite agency coordination.

(5) For NWP 48 activities that require reporting, the district engineer will provide a copy of each report within 10 calendar days of receipt to the appropriate regional office of the NMFS.

(e) *District Engineer's Decision:* In reviewing the PCN for the proposed activity, the district engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. If the proposed activity requires a PCN and will result in a loss of greater than 1/10 acre of wetlands, the prospective permittee should submit a mitigation proposal with the PCN. Applicants may also propose compensatory mitigation for projects with smaller impacts. The district engineer will consider any proposed compensatory mitigation the applicant has included in the proposal in determining whether the net adverse environmental effects to the aquatic environment of the proposed work are minimal. The compensatory mitigation proposal may be either conceptual or detailed. If the district engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse effects on the aquatic environment are minimal, after considering mitigation, the district engineer will notify the permittee and include any conditions the district engineer deems necessary. The district engineer must approve any compensatory mitigation proposal before the permittee commences work. If the prospective permittee elects to submit a compensatory mitigation plan with the PCN, the district engineer will expeditiously review the proposed compensatory mitigation plan. The district engineer must review the plan within 45 calendar days of receiving a complete PCN and determine whether the proposed mitigation would ensure no more than minimal adverse effects on the aquatic environment. If the net adverse effects of the project on the aquatic environment (after

consideration of the compensatory mitigation proposal) are determined by the district engineer to be minimal, the district engineer will provide a timely written response to the applicant. The response will state that the project can proceed under the terms and conditions of the NWP.

If the district engineer determines that the adverse effects of the proposed work are more than minimal, then the district engineer will notify the applicant either: (1) That the project does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit; (2) that the project is authorized under the NWP subject to the applicant's submission of a mitigation plan that would reduce the adverse effects on the aquatic environment to the minimal level; or (3) that the project is authorized under the NWP with specific modifications or conditions. Where the district engineer determines that mitigation is required to ensure no more than minimal adverse effects occur to the aquatic environment, the activity will be authorized within the 45-day PCN period. The authorization will include the necessary conceptual or specific mitigation or a requirement that the applicant submit a mitigation plan that would reduce the adverse effects on the aquatic environment to the minimal level. When mitigation is required, no work in waters of the United States may occur until the district engineer has approved a specific mitigation plan.

28. *Single and Complete Project.* The activity must be a single and complete project. The same NWP cannot be used more than once for the same single and complete project.

Enclosure 3

Permittee: California Department of Transportation

File Number: 2009-00253S

Certification of Compliance
for
Nationwide Permit

"I hereby certify that the work authorized by the above referenced File Number and all required mitigation have been completed in accordance with the terms and conditions of this Nationwide Permit authorization."

_____ _____

(Permittee) (Date)

Return to:

Hal Durio
U.S. Army, Corps of Engineers
San Francisco District
Regulatory Division, CESPN-OR-R
1455 Market Street
San Francisco, CA 94103-1398

8. USFWS_PERMIT

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846

AUG 14 2009

In Reply Refer To:
81420-2009-F-0340-1

Mr. Jim Richards
Attn: Robert Atanasio
Office of Biological Sciences and Permits
California Department of Transportation
P.O. Box 23660
Oakland, California 94623-0660

Subject: Biological Opinion on the Effects of the Proposed State Route 84 Dumbarton Bridge Seismic Retrofit Project, Alameda County and San Mateo County, California (Caltrans EA 04-3A5000) on the Threatened Pacific Coast Population of the Western Snowy Plover, Endangered California Least Tern, Endangered California Clapper Rail and Endangered Salt Marsh Harvest Mouse

Dear Mr. Richards:

This letter responds to the letter from the California Department of Transportation (Caltrans), dated January 7, 2009, requesting formal consultation for the proposed State Route 84 Dumbarton Bridge Seismic Retrofit Project, Alameda County and San Mateo County, California. Your request for consultation was received by the U.S. Fish and Wildlife Service (Service) on January 9, 2009. Based on the information provided in the January 2009 biological assessment, the October 15, 2008, November 10, 2008, and January 28, 2009 site visits and project meetings, and informal consultation process, the Service concurs with your determination that the proposed action "is likely to adversely affect" the threatened Pacific coast population of the western snowy plover (*Charadrius alexandrinus nivosus*) and is "not likely to adversely affect" the proposed delisted California brown pelican (*Pelecanus occidentalis californicus*). The Service does not concur with your determination that the proposed action "is not likely to adversely affect" the endangered California least tern (*Sterna antillarum browni*), endangered California clapper rail (*Rallus longirostris obsoletus*) and endangered salt marsh harvest mouse (*Reithrodontomys raviventris*). Therefore, this document represents the Service's biological opinion on the effects of the proposed action on the Pacific coast population of the western snowy plover, California least tern, California clapper rail and salt marsh harvest mouse under the authority of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.) (Act).

The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) legislation (23 U.S.C. 327) allows the Secretary of the U.S. Department of Transportation (USDOT) acting through the Federal Highway Administration (FHWA) to establish a Surface Transportation Project Delivery Pilot Program, whereby a State may assume the FHWA responsibilities under the National Environmental Policy Act (NEPA) for environmental review, agency consultation and other actions pertaining to the review or approval of a specific project. Caltrans assumed these responsibilities for the FHWA on July 1, 2007

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through a Memorandum of Understanding (MOU) within the State of California: http://www.dot.ca.gov/ser/downloads/MOUs/nepa_delegation/sec6005mou.pdf.

The Service has initiated managed pond restoration at Salt Pond SF2 as part of the South Bay Salt Pond Restoration Project (SBSP) located immediately south of State Route 84 west bridge approach and bound to the west by University Avenue, to the south by the Hetch Hetchy Aqueduct, and to the east by the San Francisco Bay. SF2 will be managed as a shallowly flooded pond with unvegetated islands for bird foraging and nesting. Grading and nesting island creation is scheduled to be completed by winter 2010 and revegetation efforts along the northern border of the pond are scheduled to begin in the spring of 2010. Since the timing of the SBSP coincides with the proposed action and there is a potential that early revegetation efforts may be successful leading to the occupation of SF2 by listed species, the Service has addressed potential project effects to listed species in this biological opinion.

This biological opinion is based on: (1) the *Biological Assessment, U.S. Fish and Wildlife Service, Dumbarton Bridge Seismic Retrofit* dated January 2009; (2) letter from Caltrans to the Service dated January 7, 2009; (3) site visits and meetings conducted by Caltrans, the Service, California Department of Fish and Game (CDFG), and National Marine Fisheries Service (NOAA Fisheries) on October 15, 2008, November 10, 2008, and January 28, 2009; (4) miscellaneous correspondence and electronic mail concerning the proposed action between Caltrans and the Service; and (5) other information available to the Service.

Consultation History

April 21, 2008	Peter Johnsen of the Service attended the initial interagency project meeting.
October 1, 2008	Jerry Roe of the Service attended an interagency pre-consultation meeting to discuss the proposed project and discuss the preliminary biological findings, effects determination, project timing and scheduling, and avoidance and minimization measures.
October 15, 2008	Jerry Roe and Winnie Chan of the Service attended an interagency site visit.
October 20, 2008	Caltrans' environmental consultant, URS Corporation, requested historic nesting areas for the western snowy plover from the Don Edwards National Wildlife Refuge (Refuge) staff.
November 10, 2008	Jerry Roe, Melisa Helton, Joy Albertson and Winnie Chan of the Service attended a meeting and site visit with Melissa Escaron of the California Department of Fish and Game, Caltrans staff and their consultants to discuss project effects to listed species and appropriate avoidance and minimization measures. The Service recommended Caltrans change their proposed determination to "likely to adversely affect" for the California clapper rail, California least tern and salt marsh harvest mouse in light of suitable habitat within adjacent salt ponds and the restoration activities within SF2 adjacent to the western bridge trestle. The Service informed Caltrans that a portion of SF2 is located within the action area and if early restoration is successful, listed species could inhabit and utilize restored habitat within the action area during construction of the project.

November 25, 2008	The Service sent Caltrans a map of sensitive habitat along SR 84 and Dumbarton Bridge. The map was revised and sent to Caltrans on December 2, 2008.
January 9, 2009	The Service received a letter from Caltrans dated January 7, 2009 requesting the initiation of formal consultation for the proposed project as the NEPA lead agency under direction of the Memorandum of Understanding between Caltrans and the Federal Highway Administration, Section 6005 of the SAFETEA-LU, 2005. The Service received a copy of the biological assessment.
January 28, 2009	Jerry Roe and Melisa Helton of the Service attended a meeting with Melissa Escaron of California Department of Fish and Game, and Robert Atanasio and Margaret Gabil of Caltrans to discuss the proposed project, biological findings, effects determination, project timing and scheduling, and avoidance and minimization measures. The Service again recommended Caltrans change their proposed determination to "likely to adversely affect" for the California clapper rail, California least tern and salt marsh harvest mouse in light of suitable habitat within adjacent salt ponds and the restoration activities within SF2 adjacent to the western bridge trestle.
May 19, 2009	The Service sent an email to Robert Atanasio of Caltrans requesting Caltrans confirm the initial interagency project meeting date and who from the Service attended; and clarify the extent of the action area incorporating the anticipated area affected by pile driving noise impacts.
May 27, 2009	The Serviced received an email from Robert Atanasio of Caltrans responding to the Service's questions submitted on May 19, 2009 regarding the initial interagency meeting date and attendees, and the extent of the action area.
June 26, 2009	Jerry Roe of the Service conducted a conference call with Rafael Montes, Jamie Michaels and Caitlin Sweeney of the San Francisco Conservation and Development Commission to discuss the status of the biological opinion and avoidance and minimization measures for the western snowy plover.
July 15, 2009	The Service issued a draft biological opinion to Caltrans, National Marine Fisheries Service, California Department of Fish and Game, and San Francisco Conservation and Development Commission for review.
July 22, 2009	The Service received a response letter from Caltrans addressing changes recommended by the Service to the proposed conservation measures and incorporating these changes into their project description.
April 4, 2008 - July 30, 2009	Electronic and phone correspondence between Robert Atanasio and Margaret Gabil of Caltrans; Melissa Escaron of the California Department of Fish and Game; Jacqueline Pearson-Meyer of the National Marine Fisheries Service; Rafael Montes, Jaime Michaels, Caitlin Sweeney and Brad McCrea of the San Francisco Conservation and Development Commission; Bill Martin and Fletcher Halliday of URS Corporation; and Jerry Roe, Melisa Helton, Joy Albertson and Winnie Chan of the Service.

BIOLOGICAL OPINION

Description of the Proposed Action

The following project description, inclusive of the proposed conservation measures, was provided by Caltrans and is an excerpt from the January 2009 Biological Assessment with minor modifications for reasons of clarity and accuracy provided by the Service. A comprehensive description of the project is available in the Biological Assessment (Caltrans 2009).

Project History

The Dumbarton Bridge, part of State Route (SR) 84 (04-ALA-84, PM 0.0/1.2; 04-SM-84, PM 28.5/30.15), serves as a major east/west connector between Interstate 880 in Alameda County and U.S. Highway 101 in San Mateo County. The bridge is the southernmost of the toll bridges that span San Francisco Bay. Its eastern terminus is in Fremont, and its western terminus is at the border of Menlo Park and East Palo Alto. The bridge provides access for approximately 80,000 trips across the bay between Alameda and San Mateo counties each day. The bridge has been identified by the Governor's Board of Inquiry as part of the critical transportation system crossing the bay, and the Board has determined it is important to maintain the redundancy the bridge provides.

The Dumbarton Bridge was designed in the late 1970s, based on design standards Caltrans established in 1971. However, updated standards, particularly Caltrans' Seismic Design Criteria of 1999, prompted further study that identified subsequent improvements necessary to provide adequate seismic resistance. The proposed project would meet the requirements of those updated standards by providing a seismic upgrade of the bridge on SR 84. Although the proposed project would be funded by the Bay Area Toll Authority (BATA), Caltrans is doing the design and project management and is also the point-of-contact for the various environmental planning and permitting requirements.

Project Description

The proposed project is expected to take approximately 3 years to construct and would occur entirely within the Caltrans right-of-way, which is the area that contains the Biological Study Area (BSA) for the environmental studies on this project. Retrofit works would be conducted on each of the 5 sections of the bridge, which are a highly elevated main channel crossing at the center of the bridge, an approach section on each end of the main channel crossing, and a trestle structure landing on each side of the bay.

Construction Activities

Trestle Sections

The trestle sections are located on land and are each 600 feet long. Construction on these sections would include installing permanent piles adjacent to the existing structure to provide lateral strengthening. These would be 4-foot diameter steel pipe piles driven into the ground with an impact hammer. Installation would be restricted to prescribed work windows to avoid disturbing nesting birds with noise from the on-land pile driving.

A total of 14 piles would be installed on the northern and southern sides of each of the two trestle structures, as follows:

1. On the southern side of the western trestle, all 7 piles would be placed into a paved area.

2. On the northern side of the western trestle, all 7 piles would be placed into a paved area.

3. On the southern side of the eastern trestle, all 7 piles would be placed into an area of weedy ruderal vegetation enclosed by parking islands and the trestle itself.

4. On the northern side of the eastern trestle, all 7 piles would be placed into a surface water depression wetland.

The other major activity on the trestle sections would be the installation of a seismic hinge joint to each trestle's connection with its corresponding approach section. These joints extend across the entire roadway bed, therefore requiring weekend bridge closures.

Approach Sections

The approach sections adjacent to the main channel crossing are supported by a series of piers (sometimes referred to as "bents" in design documents). The western approach section is 2,850 feet long and extends from Pier 1 to Pier 15, and the eastern side is 2,600 feet long and extends from Pier 32 to Pier 44. Seismic upgrades on these sections would not include placing permanent piles in the bay, but temporary piles would be driven alongside each approach section. The piles would support a temporary trestle used to provide access and support for project construction activities on the approach sections and part of the main channel crossing. The trestles would extend out to Pier 16 on the western end and to Pier 27 on the eastern end.

The temporary piles supporting the trestles would be 2-foot-maximum-diameter steel pipe piles, placed in rows of three, spaced at intervals (or spans) of approximately 25 feet. Alternate materials (reinforced concrete piles) would possibly be used instead of steel, but the diameter would not exceed 2 feet. Additional piles (up to 16 per pier) would be placed around each of the piers to support temporary trestles around them, allowing construction access along all four sides of the pier. All temporary trestles would be less than 25 feet wide. Collectively, approximately 1,000 temporary piles would be placed into the bay. To reduce noise-related impacts on nesting birds, temporary piles within 800 feet of shore would be installed with vibratory hammers instead of impact hammers during the nesting season. Impact hammers would be necessary for verification of load capacity. Caltrans anticipates that approximately 10 to 20 percent of the piles installed by vibratory method would be "tapped" with an impact hammer to verify the load capacity.

The retrofit activities in the approach sections would involve structural improvements to the substructure and superstructure of the bridge itself and would not directly affect the bay, mudflats, vegetated areas, or other aspects of the surrounding environment.

Main Channel Crossing

The main channel section of the bridge is 3,000 feet long and extends between Piers 16 and 31. Seismic upgrades to this section of the bridge would be done from the existing roadway. Temporary trestles will serve to deliver materials and construction personnel to barges and small marine vessels. The retrofit activities in the approach sections involve structural improvements to the substructure and superstructure of the bridge itself and would not directly impact the bay, mudflats, vegetated areas, or other aspects of the surrounding environment.

Temporary Trestle Construction

There are two public fishing piers south of the Dumbarton Bridge. The eastern pier, which is currently open to the public, is referred to as the Dumbarton Pier and is located inside the boundaries of the Don Edwards San Francisco Bay National Wildlife Refuge (DENWR). The western pier is referred to as the Ravenswood Pier and has been closed to the public for the past several years. The Ravenswood Pier would be removed.

Starting at the shoreline, work crews would remove a short section (one span) of the Ravenswood Pier and then either pull the existing reinforced-concrete piles or if the piles break during removal, cut them off 3 feet below the mud-line. Construction crews would then install temporary piles, construct a section of temporary trestle superstructure, and then repeat the process farther east, toward the main channel. When the work is completed, the temporary trestle would be removed from the easternmost end, working back toward the western shore of the bay. The Ravenswood Pier would not be replaced.

The eastern temporary trestle would be built between the existing Dumbarton Pier and the bridge. Access to the fishing pier would be preserved during construction of the temporary trestle and during bridge construction period. However, during periods of certain construction activities, such as lifting piles, or swinging crane booms, access to the fishing pier would be controlled for public safety reasons. Progression of pile installation and trestle superstructure construction would proceed as described at the western end (Ravenswood Pier), except that the existing fishing pier would not be disturbed. When the retrofit activities are completed, the trestle and piles would be removed starting with the outermost portion and working back toward the shoreline.

Retrofit and Other Construction Activities

While the temporary trestles are in place, retrofit work would be conducted on the superstructure and substructure of the various bridge sections, including retrofit of the bridge hinges located within the superstructure (or roadway bed); strengthening of the columns above the pile caps, bent caps located just below the superstructure, pedestals located on top of the pile caps, and pile caps; and other actions that would not affect habitat or generate large amounts of noise. Reinforcing the connection between the columns, pedestals, and pile caps would involve adding a reinforced concrete collar. The reinforcement would increase the size of the pedestals as they sit atop the pile caps. This work would be performed at most of the piers, including those without adjacent temporary trestles.

Adding the concrete collars would require placing a temporary cofferdam around many of the shallow water piers (Piers 5-15 and 32-40), dewatering the enclosure, and removing any mud deposits from the tops of the pile caps. Caltrans anticipates that the cofferdams would be constructed of sheet piles driven 15 feet into the bay floor with a vibratory hammer and placed up to 2 feet from the edges of the existing pile caps. Dewatering would then lower the water level to expose the top and several feet of the sides of each pile cap. Up to 50,000 gallons of water would be removed from each cofferdam, resulting in a total of 1,000,000 gallons of initial dewatering.

Project design plans and field surveys indicate that a maximum total of 1,800 cubic yards of mud could sit atop the pile caps of the shallow water piers, including Piers 1 and 44, which are on land and would be excavated. The mud would be disposed of offsite in an upland location. The total footprint area of concrete added to the bay as fill from these activities would be 25,000 square feet, and the volume of that concrete would be 1,700 cubic yards.

No construction staging would occur in the project area. Contractors would be required to procure environmentally cleared staging areas away from the immediate project vicinity. Use of currently graded and disturbed areas at each end of the bridge for short-term material laydown and vehicle access would be permitted. The parking areas on both sides would be reconfigured as needed to provide parking for construction workers as well as maintain some public parking for the Dumbarton Pier.

On the western end of the Dumbarton Bridge, all access roads are within Caltrans right-of-way and are included in the BSA. On the eastern end, access into the project area is via Marshlands Road, which is reachable from the Thornton Avenue – South exit from SR 84. Marshlands Road originates more than two miles east of the BSA, enters the wildlife refuge, and provides vehicle access to the Dumbarton Pier parking lot where construction personnel parking and material laydown would occur.

Temporary Barrier and Drainage System

The proposed project would include construction of a barrier to keep high-tide water from Moseley Tract from encroaching onto the northern frontage road on the western end of the bridge and the project work area. At present, the highest tides in the bay flow unchecked out of the Moseley Tract to the immediate north of the project area, and onto the roadway. The barrier would be installed completely within Caltrans right-of-way on the edge of the paved shoulder. The temporary barrier would reduce the flooding due to tides and keep the access road open. It would be left in place post-construction, until such time as Caltrans determines it shall be removed.

The barrier would be approximately 2,000 ft long, between 39 and 56 inches above the existing road. At its eastern end, an earthen berm would be constructed to connect the barrier to the existing levee running north-south along the shore of the San Francisco Bay. In addition, a steel sheet pile system would be sunk up to 20 ft into the ground within the existing shoulder to reduce underseepage that would otherwise occur. It would be driven outside of the nesting season for listed birds if practicable; however, a vibratory hammer would be used to install it if such seasonal avoidance is not feasible. The sheet pile would run the entire length of the barrier and would reach the same above-ground height as the wall.

The proposed barrier would create an enclosed space that would require a water collection system, including drains, pipes, and a pump, that together would collect local rain water and runoff from SR 84 and other roads and return it to San Francisco Bay. The main pipe would run underground parallel to the barrier throughout its length. A number of drains would allow gravity-driven flow of rainwater and runoff from SR 84 and the frontage roads and parking lots to collect in the pipe. Once there, the water would flow to a pumphouse at the eastern end of the barrier, adjacent to the western shore of San Francisco Bay. Currently, rainwater runoff enters the bay in a similar manner and volume to what is expected to occur after project completion. No changes to local hydrology are expected.

The pumphouse would be up to 10 ft tall, having a maximum footprint of 20 ft by 24 ft above grade. The underground storm water vaults would have a footprint of 18 feet by 24 feet. The volume of excavated material could reach 700 cubic yards. It would be supported on piles, no greater than 2-ft in diameter. The pumps would push water through a 42-inch-diameter outflow pipe upwards above the existing levee. At the end of the outflow pipe, a strip of rip-rap would be placed to disperse the outflow and reduce erosion. The strip would have a maximum area of 500

square ft and a maximum volume of 1,900 cubic ft. The riprap would be placed on the floor of the San Francisco Bay. The barrier and the associated drain and pumping system would be the first project activities to take place.

Proposed Conservation Measures

To avoid and minimize effects to federally listed plant and wildlife species and their habitats within the BSA and the action area, Caltrans proposes to implement the following general measures:

5. Standard Caltrans Best Management Practices (BMPs), including Stormwater Pollution Prevention Plans, will be applied to protect individuals of these species and their habitat(s) from pollution due to fuels, oils, lubricants, and other harmful materials. Vehicles and equipment that are used during project activities would be fueled and serviced in a "safe" area (i.e., outside of sensitive habitats) in a manner that would not affect federally protected species in the BSA or their habitats. Spills, leaks, and other problems of a similar nature would be resolved immediately to prevent unnecessary effects. A plan for the emergency cleanup of any spills of fuel or other material would be available onsite and adequate materials for spill cleanup would be maintained on site.

6. Physical disturbance to existing habitats would be limited to the BSA. All staging and stockpiling areas and other facilities would be located outside the BSA in environmentally clear areas (e.g. existing parking lots) as selected by the construction contractor. Existing ingress and egress points, especially existing parking areas, would be used as designated and limited laydown and short-term material storage areas.

7. Project proponents will reduce the amount of disturbance within the BSA to the minimum necessary to accomplish the project. Any removed topsoil would be stockpiled, covered, and encircled with silt fencing separately from other soil to prevent loss or movement of the soil into habitats of federally protected species as well as to maintain and preserve the seed bank. All disturbed soils would undergo erosion control treatment prior to the rainy season and after construction is terminated. Treatment typically includes temporary seeding with native species and sterile straw mulch. All disturbed ground would be graded and restored to its pre-project condition.

8. Project proponents would exercise every reasonable precaution to protect listed species and their habitat(s) from construction by-products and pollutants such as construction chemicals, fresh cement, saw-water, or other deleterious materials. Water containing materials such as mud, silt, or concrete from construction activities would be treated by filtration, retention in a settling pond, or other similar measure. Fresh cement or concrete would not be allowed to enter San Francisco Bay. Construction pollutants would be collected and transported to an authorized upland disposal area, as appropriate, and according to all relevant federal, state, and local laws and regulations.

9. All hazardous materials would be stored offsite in properly designated containers in a storage area with an impermeable membrane between the ground and the hazardous material. The storage area would be encircled by a berm to prevent the discharge of pollutants to ground water or runoff into federally listed species habitats. Short-term laydown of hazardous materials for immediate use will be permitted with the same anti-

spill precautions. A plan for the emergency cleanup of any hazardous material would be available on site and adequate materials for spill cleanup would be maintained onsite.

10. All construction material, including wastes, debris, sediment, rubbish, vegetation, trash, and fencing would be removed from the site when the project was completed and transported to an authorized disposal area, as appropriate, and according to all relevant federal, state, and local laws and regulations.

11. A Service-approved biological monitor knowledgeable about sensitive and special-status species and habitats in the BSA vicinity will conduct surveys before and during construction activities to inspect exclusion fencing and verify absence of listed species. The monitor will be present at all times during the pile-driving phases of construction, as well as during and after cleanup activities.

12. Monthly focused surveys for active nests, broods and calling centers will be conducted during the nesting season from February 1 to September 30 for each listed bird species as described below:

    a. For California clapper rail, within 700 feet of the project footprint;

    b. For the western snowy plover, within 600 feet of the project footprint;

    c. For the California least tern, within 300 feet of the project footprint.

    If active nests – nests with egg(s) or young present – broods, or calling centers are located the action area, all construction activities within the survey areas described above shall cease immediately and the Service shall be notified within 24 hours of the observation.

Disturbances other than physical disruption would be limited to those caused by noise, primarily from pile driving. This disturbance may extend beyond the BSA as discussed in Appendices B and C of the biological assessment (Caltrans 2009). The Project Description contains a discussion of several important project design features that minimize the potential and magnitude of these noise-related impacts on listed species. These are reiterated here to place them in context.

13. All permanent pile driving will be driven outside the western snowy plover, California clapper rail and California least tern breeding season from February 1 to September 30.

14. Seasonal avoidance from February 1 to September 30 will be applied for pile driving using an impact hammer within 800 feet of the shoreline as calculated from the waterline at mean high tide. This pile driving includes the temporary piles used to construct the temporary trestles and the sheet piles associated with both the temporary barrier and the cofferdams.

15. When seasonal avoidance is not possible, piles will be installed using a vibratory hammer; an impact hammer may be used to test pile stability and proper installation when no active listed species nests are located within 800 feet of the pile(s) to be tested.

California Seablite Protective Measures

16. Focused Preconstruction Surveys. Preconstruction focused plant surveys will be conducted in the BSA during the peak blooming period for the California seablite, i.e. July through October, by a qualified botanist. If California seablite is detected during focused preconstruction surveys, avoidance and minimization measures will be determined in consultation with the Service. If California seablite is found, Caltrans will reinitiate consultation.

Salt Marsh Harvest Mouse Protective Measures

17. Temporary Mouse-Proof Barrier (MPB). Prior to construction, a temporary salt marsh harvest mouse-proof barrier (MPB) will be erected to prevent the potential movement of individuals into the construction zone. The MPB fences will consist of corrugated metal, plywood, plastic sheeting or a combination of these materials. Prior to MPB installation, all vegetation within 6 inches of the fence line shall be manually cleared using hand tools excluding motorized hand tools such as string trimmers. Vegetation shall be removed as the fence is being constructed and in such a way that salt marsh harvest mice are allowed to exit the fenced area to the point where the fence is actually sealed off. The bottom of the fencing shall be buried and backfilled or installed flush with the ground and backfilled with soil or sand bags to prevent mice from passing under the fence. The MPB will be installed so that individuals would not become trapped within the MPB area, will not exclude salt marsh harvest mice from upland refuge habitat, and will terminate at permanent passage barriers (e.g. permanent water, high levee) at both ends. The integrity of the fence shall be maintained at all times and vegetation shall be kept clear along the entire length of the fence such that no vegetation is hanging onto or over the fence. The MPB shall remain in place for the duration of the construction phase of the project unless otherwise authorized by the Service and CDFG. The MPB adjacent to the Mosley Tract may be removed upon completion of the temporary barrier wall; however, minor modifications such as plastic sheeting along the top of the wall may necessary to ensure mice cannot climb over the wall and will be determined in cooperation with the Service and CDFG. Due to the tidal influence along the proposed MPB alignment, the fence design may need to be modified during the project. If such adaptive management is necessary, Caltrans will work with the Service and CDFG to modify the design to accommodate the site conditions, while still attaining the goal of preventing mice from entering the work area. Caltrans will provide the fence design and location specifications to the Service and CDFG for review and approval prior to implementation.

18. Construction Monitoring. A Service-approved biologist will be present onsite to monitor for salt marsh harvest mice prior to and during construction activities. The biological monitor will have the authority to stop work if deemed necessary for any reason to protect the species. If a salt marsh harvest mouse is observed in the work area, the biological monitor will stop work in the immediate area until the mouse leaves the work area on its own volition. If the mouse does not leave the work area, work in the immediate area will not be reinitiated until after the Service and CDFG have been contacted and a decision reached on how construction activities could proceed. The biological monitor will direct the project engineer or construction inspector on how to proceed accordingly. The biological monitor will also inspect the MPB along the margins of the project work areas.

19. Revegetation. All temporarily affected areas with suitable habitat for the salt marsh harvest mouse would be replanted within the season of construction activity with native vegetation that is characteristic of pickleweed marsh.

California Clapper Rail Protective Measures

20. Focused Preconstruction Surveys. Within 700 feet of the project footprint, focused preconstruction surveys for active California clapper rail nests, broods and calling centers will be conducted within two weeks prior to the start of construction and monthly thereafter throughout the duration of the nesting season from February 1 to September 30. If active nests – nests with egg(s) or young present – broods, or calling centers are located the action area, all construction activities within the survey buffer shall cease immediately and the Service shall be notified within 24 hours of the observation and a 700 foot no-disturbance buffer will be established until the young have fledged.

21. Biological Monitoring. A qualified biologist approved by the Service will be present onsite to monitor for clapper rails during construction activities on land. The biological monitor will have the authority to stop work if deemed necessary for any reason to protect federally listed species. If a clapper rail of any species is observed in the work area, then work will be stopped immediately by the biological monitor until the rail leaves the work area on its own volition and both Service and CDFG will be notified. If the rail does not leave the work area, work will not be reinitiated until after the Service and CDFG have made a decision on how to proceed with further construction activities. The biological monitor will direct the project engineer or construction inspector on how to proceed accordingly.

22. Vehicle Use. Vehicle use near suitable habitat for the California clapper rail will be minimized to the maximum extent practicable. Vehicles will remain on paved roads and speeds will be limited to 5 miles per hour (mph). No night driving or driving during periods of diminished visibility (e.g. heavy fog, a window of 1 hour before sunset to 1 hour after sunrise) will be permitted. Areas of rack will be avoided.

23. Revegetation. As described in Section 5.3.1.2, all temporarily impacted areas with suitable habitat for the salt marsh harvest mouse would be replanted within the season of construction activity with native vegetation that is characteristic of pickleweed marsh.

California Least Tern Protective Measures

24. Preconstruction Surveys. Within 300 feet of the project footprint, focused preconstruction surveys for active California least tern nests, broods and calling centers will be conducted within two weeks prior to the start of construction and monthly thereafter throughout the duration of the nesting season from February 1 to September 30. If active nests – nests with egg(s) or young present – broods, or calling centers are located the action area, all construction activities within the survey buffer shall cease immediately and the Service shall be notified within 24 hours of the observation and a 300 foot no-disturbance buffer will be established until the young have fledged.

25. Biological Monitoring. A qualified biologist approved by the Service will be present onsite to monitor for California least terns. The biological monitor will have the authority to stop work if deemed necessary for any reason to protect federally listed species. If a

California least tern is observed foraging or roosting in the work area, the biological monitor will monitor for signs of disturbance. If the California least tern(s), exhibits signs of disturbance then work will stop within 300 feet of the individual(s) until the bird leaves of its own volition and both the Service and CDFG have been notified. If the tern does not leave the work area, work will not be reinitiated until after the Service and CDFG have made a decision on how to continue with construction activities. The biological monitor will direct the project engineer or construction inspector on how to proceed accordingly.

26. Seasonal Avoidance. Seasonal avoidance from February 1 to September 30 will be applied for pile driving using an impact hammer within 800 feet of the shoreline as calculated from the waterline at mean high tide. This pile driving includes the temporary piles used to construct the temporary trestles and the sheet piles associated with both the temporary barrier and the cofferdams. When seasonal avoidance is not possible, piles will be installed using a vibratory hammer; an impact hammer may be used to test pile stability and proper installation when no California least tern nests are located within 800 feet of the pile(s) to be tested.

Western Snowy Plovers Protective Measures

27. Preconstruction Surveys. Within 600 feet of the project footprint, focused preconstruction surveys for active western snowy plover nests, broods and calling centers will be conducted within two weeks prior to the start of construction and monthly thereafter throughout the duration of the nesting season from February 1 to September 30. If active nests – nests with egg(s) or young present – broods, or calling centers are located the action area, all construction activities within the survey buffer shall cease immediately and the Service shall be notified within 24 hours of the observation and a 600 foot no-disturbance buffer will be established until the young have fledged.

28. Biological Monitoring. A qualified biologist approved by the Service will be present onsite to monitor for western snowy plover. The biological monitor will have the authority to stop work if deemed necessary for any reason to protect federally listed species. If an individual of the species is observed in the work area, work will be stopped immediately by the biological monitor until the individual leaves of its own volition and both the Service and CDFG have been notified. If it does not leave the work area, work will not be reinitiated until after the Service and CDFG have made a decision on how to continue with construction activities. The biological monitor will direct the project engineer or construction inspector on how to proceed accordingly.

29. Seasonal Avoidance. Seasonal avoidance from February 1 to September 30 will be applied for pile driving using an impact hammer within 800 feet of the shoreline as calculated from the waterline at mean high tide. This pile driving includes the temporary piles used to construct the temporary trestles and the sheet piles associated with both the temporary barrier and the cofferdams. When seasonal avoidance is not possible, piles will be installed using a vibratory hammer; an impact hammer may be used to test pile stability and proper installation when no western snowy plover nests are located within 800 feet of the pile(s) to be tested.

30. Passive Exclusion. To avoid direct impacts to western snowy plover chicks along Marshlands Road, a 2-ft high ESA fence with a silt-fence backing will be placed along

the entire 3-mile length of the access road. The exact location and length of the fence will be determined in cooperation with the Refuge staff. The bottom edge of this fence will be stapled to and entrenched to prevent passage under it. This fence will start and end in full contact with a natural passage barrier so that western snowy plovers cannot pass around it. The biological monitor will ensure the integrity of the fence is maintained by conducting daily inspections, coordinating repairs in an efficient and timely and monitoring of the fence during the nesting period (March 1 – September 30) and prior to initial use of the road.

Analytical Framework for Jeopardy

Jeopardy Determinations

In accordance with policy and regulation, the jeopardy analysis in this Biological Opinion relies on four components: (1) the *Status of the Species* and (2) *Environmental Baseline*, which evaluates the western snowy plover, California least tern, California clapper rail and salt marsh harvest mouse range-wide conditions, the factors responsible for that condition, and their survival and recovery needs; and evaluates the condition of these species in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of this animal; (3) the *Effects of the Action*, which determines the direct and indirect effects of the proposed Federal action and the effects of any interrelated or interdependent activities on these species; and (4) *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on these species.

In accordance with policy and regulation, this jeopardy determination is made by evaluating the effects of the proposed Federal action in the context of the western snowy plover, California least tern, California clapper rail and salt marsh harvest mouse current status, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of both the survival and recovery of any of these species in the wild.

The jeopardy analysis in this Biological Opinion places an emphasis on consideration of the range-wide survival and recovery of the western snowy plover, California least tern, California clapper rail and salt marsh harvest mouse, and the role of the action area in the survival and recovery of these species as the context for evaluating the significance of the effects of the proposed Federal action, taken together with cumulative effects, for purposes of making the jeopardy determination.

Action Area

The action area is defined in 50 CFR § 402.02, as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." For the proposed action, the Service considers the action area to comprise a 2.85-mi segment of SR 84 from Post Mile (PM) 28.5/30.15 in San Mateo County to PM 0.0/1.2 in Alameda County. The action area encompasses 124.0 acres defined as the project footprint, which includes SR 84 (Dumbarton Bridge), several frontage and access roads, parking lots, a partially demolished bridge that is currently used as a fishing pier, tidal mud flats, tidal marsh, salt ponds, freshwater marshes, and 16.3 acres of the San Francisco Bay overlaid by the Dumbarton Bridge and two fishing piers. During installation of 48 inch piles on land, sound could carry at levels above

ambient noise for approximately 1,500 feet from the pile (assuming still conditions). Therefore, the action area encompasses an area totaling 212 total acres in which pile driving noise and other construction activities could directly or indirectly affect the listed species considered in this biological opinion.

Status of the Species and Environmental Baseline

Pacific Coast Population of the Western Snowy Plover

Listing Status: The Pacific coast population of the western snowy plover was listed as threatened on March 5, 1993 (Service 1993). The 1993 listing defined the Pacific coast population as "those individuals that nest adjacent to or near tidal waters, and includes all nesting colonies on the mainland coast, peninsulas, offshore islands, adjacent bays, and estuaries" (Service 1993). In this finding, the Service generally refers to plovers nesting at locations other than on the Pacific coast as "interior" populations, which encompasses populations nesting east or west of the Rocky Mountains, on the Gulf Coast, or in central Mexico. A five-year review was accomplished through the status review conducted for the 12-month petition finding to delist the Pacific coast population of the western snowy plover. The 12-month finding published on April 21, 2006 determined that delisting was not warranted due to continued existence of threats to the distinct population segment (DPS) and its habitat, and recommended the species remain listed as threatened (Service 2006a). Critical Habitat was designated for this species on September 25, 2005 (Service 2005). A final recovery plan was published for the Pacific coast Population of the Western Snowy Plover on September 13, 2007 (Service 2007).

Taxonomy and Distribution: Two subspecies of snowy plover recognized by the American Ornithological Union (AOU 1957), nest in North America: the western snowy plover and the Cuban snowy plover (*Charadrius alexandrinus tenuirostis*). The Cuban snowy plover, nests along the Gulf coast from Louisiana to western Florida and south through the Caribbean (American Ornithological Union (AOU) 1957; Service 1993; Page *et al.* 1995). The subspecific status of populations breeding east of the Rocky Mountains, now considered to belong to the subspecies *C. a. nivosus*, has been questioned. Some consider these populations to belong more appropriately to the subspecies *C. a. tenuirostris* (Warriner *et al.* 1986). Others consider the subspecies *C. a. tenuirostris* to be a paler version of the western snowy plover rather than a separate subspecies (Page *et al.* 1995).

The breeding range of the western snowy plover includes sites in California, Oregon, Washington, Nevada, Utah, Arizona, Colorado, New Mexico, Kansas, Oklahoma, Texas, and Baja California, central and northeastern Mexico, as well as irregularly visited sites in Saskatchewan, Canada, and Wyoming and Montana (Page *et al.* 1995). Some plovers nesting on the Pacific coast migrate north or south to other Pacific coastal wintering sites, while others stay at their breeding sites year round. Birds nesting in the interior, west of the Rocky Mountains (the western interior population) winter in coastal California and Baja California, Mexico, and often commingle with the Pacific coast western snowy plovers. However, some individuals from the southern California interior do not migrate (Page *et al.* 1995). Plovers from the interior east of the Rockies are migratory, probably wintering on the Gulf Coast, except for small numbers of year-round residents in Texas, Arizona, and New Mexico. Plovers nesting on the Gulf coast may sometimes winter at other Gulf coast locations, while those nesting in central Mexico are likely year-round residents (Page *et al.* 1995).

Description and Natural History: Snowy plovers are small shorebirds, about 6 inches long, with pale brown upperparts, buff colored bellies, and darker patches on their shoulders and heads. Their dark gray-to-black legs are a useful distinguishing feature when comparing to other plover species (Page *et al.* 1995). Snowy plovers consume flies, beetles, crabs, polychaete worms, amphipods, sand hoppers, moths, grasshoppers, small crustaceans, mollusks, and plant seeds (Page *et al.* 1995). They forage by pursuing their prey on foot, picking from the surface or probing in sand and loose soils, and will charge dense aggregations of flies, snapping their bill at those flushed (Purdue 1976, Page *et al.* 1995). Within the San Francisco Bay Area, snowy plovers forage on brine flies and brine shrimp (Feeney and Maffei 1991, Page *et al.* 2000). Exposed mudflats, the open water on salt ponds, historic channels, and excavated "borrow ditches" provide foraging areas in the South Bay. Brine flies are usually found in greatest densities at the shallow margins of salt ponds or puddles.

The timing of the nesting season varies with location, but in coastal California it tends to run from March 1 through September 30 (Page *et al.* 1995). Breeding locations tend to be sandy areas close to water, including beaches, salt pans, alkaline playas, and gravel bars on the tidally influenced portion of coastal rivers where prey (usually brine flies and other insects) are abundant. In the South San Francisco Bay, snowy plovers nest on low, barren to sparsely vegetated dry salt ponds as well as on levees and islands, and at pond edges (Page *et al.* 2000). In some areas, snowy plovers nest within dry salt ponds; in other areas where ponds typically hold water through the summer (e.g., the Newark salt ponds), nests are located primarily on levees and pond edges. Plovers preferentially use light-colored substrates such as salt flats and are often located near disruptive objects such as rocks or surface irregularities, and may be constructed in depressions created by footprints and vehicles (Feeney and Maffei 1991, Page *et al.* 1995, Marriott 2003). Clutches, which most commonly consist of three eggs, are laid in shallow scrapes or depressions in the substrate sometimes lined with shell fragments, salt crystals, plant debris, fish bones, exoskeletons, and pebbles or similar local materials (Page *et al.* 2000; Page *et al.* 1995). Snowy plovers generally form monogamous pair bonds and share incubation duties, but western snowy plover females typically desert the brood shortly after hatching, and may renest with a new male if time remains in the breeding season. Males typically care for the young until they fledge, which takes about a month, and may then renest with a new partner if sufficient time remains in the season (Stenzel *et al.* 1994). This results in a serially polygamous breeding system in which males may double clutch and females may triple clutch during a single season (Page *et al.* 1995).

The breeding season of the western snowy plover in California, from nest initiation to fledging of chicks, is considered to be March 1 to September 30. Unlike sandy beach habitat, salt pan habitat used for nesting in the South Bay takes some time to dry after rains. For this reason, nesting habitat within salt ponds may not be available in the early part of the breeding season – March or early April. During years of late rains, nesting habitat may not become available until well into the breeding season, e.g. late April or May (Hannon and Clayton 1995). The snowy plover is opportunistic, capable of moving around among potential breeding areas and breeding where conditions are suitable. The abundance and distribution of snowy plovers in the South Bay shifts annually, and is also dynamic within a given nesting season. Early in each breeding season, many ponds may not be suitable for nesting due to late rains creating muddy substrates, and nesting may be concentrated at a few ponds with suitable conditions. Later in the season, as more ponds dry out and become available for nesting, snowy plovers may be more dispersed among many nesting locations, and nest in lower densities. In 1990 nest density at four Oliver/Eden Landing ponds averaged 1 nest per 6.3 acres, with a range of 1 nest per 3.1 to 14.2 acres (Feeney and Maffei 1991). In 2006, nest density on four ponds in the South Bay averaged 1

nest per 74 acres with a range of 1 nest per 13 to 417 acres (San Francisco Bay Bird Observatory [SFBBO], unpub. data). In 2006, these numbers reflect large areas of ponds not used by snowy plovers probably due to water on the surface of the pond, and to a low number of plovers scattered over a large area.

Some snowy plovers remain in their coastal breeding areas year-round, while other individuals are migratory. In San Francisco Bay, higher numbers in winter indicate that snowy plovers from the Great Basin population probably move into the area for the winter. At the same time, some individuals that nest in the San Francisco Bay Area probably migrate south as far as Mexico (Service 2007). There is overlap between the San Francisco Bay population and the adjacent coastal nesting population. Birds banded at Monterey Bay and Oregon have been seen in the San Francisco Bay (Feeney and Maffei 1991). It is not known whether this species nested inside San Francisco Bay before conversion of salt marsh to salt evaporation ponds. However, these ponds have provided suitable nesting and foraging habitat since the beginning of the 20th century (Grinnell *et al.* 1918). Within San Francisco Bay, snowy plovers were noted to be a common nester in this area by 1918 (Page and Stenzel 1981).

Population Status and Trends: Surveys along the Pacific coast indicate that the numbers of breeding snowy plovers have ranged from a low of 976 in 2000 to a high of 1,904 in 2004; in 2006 1,723 plovers were counted along the Pacific coast (Service 2007). In 1977, nesting snowy plovers in the San Francisco Bay accounted for 22 percent of all snowy plovers counted along the coast; in 2006 only 6 percent of the snowy plovers along the entire Pacific coast were counted in the San Francisco Bay. Nearly all of the San Francisco Bay nesting occurs south of State Route 92 (San Mateo Bridge) in the South Bay (Page and Stenzel 1981, Page *et al.* 1991, Service 2007).

Although snowy plovers in the San Francisco Bay occasionally nest on levees and islands, the majority of nests are currently found on flats within dry or partially dry ponds (Feeney and Maffei 1991, Fischer 1998). A few ponds, particularly in Eden Landing, as well as Ponds A22 in Alviso and SF2 near the Ravenswood Pier, have long been used regularly for nesting by snowy plovers. In the past, such regular use resulted from the type and consistency of management of these ponds for salt production (e.g., the same ponds representing the same stage in the salt-making process provided conditions that were consistently suitable for use by nesting snowy plovers). Other ponds are used more sporadically, and in any given year there may be extensive habitat in the South Bay that is ostensibly suitable for nesting but is unoccupied by the species. The highest numbers of nesting snowy plovers occur at Eden Landing where snowy plovers have recently been focused in Ponds E6A and E6B in 2003 and 2004 (Strong and Dakin 2004; Strong *et al.* 2004a) and in E8A, E12 and E14 in 2007 (SFBBO unpub. data). Numbers of nests in the Eden Landing ponds have ranged from 10 nests in 1999 (Casady 1999) to 84 nests in 2007 (SFBBO unpub. data), although nest finding effort has not been consistent throughout this time period. Low numbers of breeding snowy plovers also occur in the Ravenswood Complex, Warm Springs Complex, and Alviso Complex. At Warm Springs, Pond A22 was used, with more than 10 adults found during the 2003 nesting season, and a high count of 32 snowy plovers at A22 in 2004 (Strong *et al.* 2004a). Low densities of snowy plovers have been recorded during the breeding season, sometimes with nests or chicks, at some other Alviso salt ponds, primarily at A6 and A8 (Ryan and Parkin 1998; Strong *et al.* 2004a). Pond A6 has since been occupied by a colony of approximately 20,000 California Gulls (*Larus californicus*). Snowy plovers also nested in the late 1990s in Alviso Pond A3N and in a small impoundment immediately east of Pond A12 in 2006 (B. Bousman, pers. comm.).

The Oliver Salt Ponds, relatively small ponds adjacent to Eden Landing on either side of the east end of the San Mateo Bridge, have been used regularly for nesting, although not in recent years. In 1989, Feeney and Maffei (1991) found 29 nests here, and 152 individual snowy plovers during the nesting season. To the south, in 1995, Hannon and Clayton (1995) found 90 nests in the Newark Ponds near the Dumbarton Bridge. The Patterson ponds, between Ponds N4A and N1A, have also been used regularly by nesting snowy plovers, at least up until 2001, when eight nests were found here (Marriott and Schelin 2001); no nests have been found here since then probably due to vegetation encroachment on the ponds. Page *et al.* (1979) and Rigney and Rigney (1981) also provide census information for Cargill ponds between Eden Landing and Warm Springs, but current data on the number of snowy plovers breeding in these ponds are not available. Due to limited habitat in these areas it is doubtful that large numbers of plovers use these areas. Marriott and Schelin (2001) surveyed the Newark ponds and found no nests, and they noted that levee over-topping by Cargill in 2000 had diminished the suitability of levees in these ponds for snowy plover nesting.

Threats: Degradation and use of habitat for human activities has been largely responsible for the decline in the snowy plover breeding population (Page *et al.* 1995). Other important threats to the snowy plover are mammalian and avian predators, and human disturbance (Page et al. 1995). Human disturbance, including disturbance from domestic dogs (*Canis lupus familiaris*), can lead to nest abandonment or direct trampling of eggs or chicks. In addition, because young chicks are dependent on adults for protection, human disturbance resulting in the separation of chicks from adults can lead to the death of the chicks. Precocial chicks feed themselves but require the protection of an adult for brooding and evasion of predators (Page *et al.* 1995). Additional pressures include oiling, entanglement in fishing line, striking objects, and shooting; in the South Bay, the use and maintenance of levee roads for access to salt ponds also causes disturbances to nesting snowy plovers.

Non-native predators, such as red fox (*Vulpes vulpes*), have had major negative effects on snowy plover populations in California; for example, in the South Bay, two snowy plover nests were known to have been depredated by red foxes in 1993 and 1994 in the Coyote Hills and Dumbarton areas (Harding *et al.* 1998), and such events have probably occurred much more frequently than is known. Efforts to curtail nest depredation by mammalian predators through a predator management program have greatly enhanced nesting success by snowy plovers on the Central Coast of California (Neuman *et al.* 2004). In the South Bay, no strong increase in nest success was noted between 1991 and 1996, after a predator management plan was implemented, except at a few nests where enclosures were used (Harding *et al.* 1998). Overall nest success in the South Bay has been fairly high in some recent years, with 80 percent nest success in 2001 (n = 78 nests) and 58 percent in 2006 (n = 81 nests, Robinson *et al.* 2006). However, predation levels have dramatically increased over the past four years, from 5 percent in 2004 (n = 59 nests) to 41 percent in 2007 (n = 84 nests) largely due to avian predation (Strong *et al.* 2004b, SFBBO, unpub. data). Fledging success is unknown, and may be far less due to avian predators.

Avian predators, particularly corvids (crows and ravens) and California gulls, are increasingly becoming an issue for snowy plover reproductive success (Strong et al 2004b, SFBBO unpub data). The American crow (*Corvus brachyrhynchos*) and common raven (*Corvus corax*) are adept at finding snowy plover nests and preying on eggs. Corvid numbers are increasing throughout California, at least partially in response to increased availability of food from anthropogenic sources, such as garbage dumps (Boarman and Heinrich 1999, Verbeek and Caffrey 2002). Numbers of California gulls have increased exponentially in the South Bay over the past few decades (Strong *et al.* 2004b). Other avian predators, including loggerhead shrikes

(*Lanius ludovicianus*), American kestrels (*Falco sparverius*), and northern harriers (*Circus cyaneus*) have been documented taking snowy plover chicks, and in some areas, have dramatically reduced fledging success (K. Neuman, pers. comm.). Nest camera studies begun in 2009 in the Bay area also indicate red-tailed hawks (*Buteo jamaicensis*) as a predator of concern (SFBBO, unpub data).

Studies in San Diego County (Hothem and Powell 2000), at Point Reyes (Schwarzbach *et al.* 2005), and in the South Bay (Schwarzbach and Adelsbach 2003) have found elevated mercury levels in snowy plover eggs. At Point Reyes, high levels of mercury in unhatched eggs were thought to be a possible reason for the inviability of these eggs. In the San Diego County and South Bay studies, however, concentrations of mercury in snowy plover eggs were below known embryotoxic thresholds established for other species.

Environmental Baseline

The action area is located within the San Francisco Bay Recovery Unit, which includes locations within Alameda, San Mateo, Santa Clara, and Napa counties (Service 2007). The recovery goal for the Pacific coast western snowy plover population is to ensure the long-term viability of the species such that it can be delisted. The three objectives to achieve this goal are as follows: 1) increase population numbers distributed across the range of the Pacific coast population of the western snowy plover; 2) conduct intensive ongoing management for the species and its habitat and develop mechanisms to ensure management in perpetuity; and 3) monitor western snowy plover populations and threats to determine success of recovery actions and refine management actions (Service 2007).

The northern portion of salt pond SF2 is located within the action area south of the western bridge abutment and is a component of the South Bay Salt Pond Restoration Project (SBSP). The SBSP is a collaborative effort between Federal, State, and local agencies working with scientists and the public to develop a long-term, comprehensive plan to restore and enhance wetlands in the South Bay, while providing flood management and wildlife-oriented public access and recreation within salt ponds formerly-owned by Cargill Corporation Inc. (Cargill). The SFSP project comprises three locations: 1) Eden Landing located in Hayward on lands owned and managed by CDFG; 2) Ravenswood in the West Bay on lands owned and managed by the Service; and 3) Alviso in the South Bay also on lands owned and managed by the Service. The SBSP project is intended to be implemented in several phases over a 50-year timeframe. Implementation of the first phase of restoration, known as Phase 1, began in 2008 and is expected to continue through 2011. Restoration of SF2 will create 81 acres of seasonal wetland habitat with nesting islands and shallow water foraging habitat. The restoration of Pond SF2 is designed to maintain a 300-foot buffer between the nesting islands, the edge of the pond, boardwalk and PG&E towers, and a 600-foot buffer between the islands and the two recreational viewing platforms to limit disturbance to snowy plovers that may nest, roost or forage on the constructed islands by recreational trail users. Grading and nesting island creation within SF2 is scheduled to be completed by winter 2010 and vegetation efforts along the north levee are scheduled to begin in the spring 2010.

The Ravenswood ponds – SF2 (south of SR 84), R1-R5, and S5 (north of SR 84) – are used irregularly for nesting, e.g. 13 nests found during the 2003 breeding season, most of them in SF2 (Strong and Dakin 2004), and 7 nests in 2007, most located in R1 (SFBBO unpub. data). High nesting bird counts during the 2004 included 53 birds at R2, 23 at SF2, and 18 at R1 (Strong *et al.* 2004a). Since salt production was abandoned in the Ravenswood pond system, snowy

plovers have established several nests each year within SF2 for the past few years. Since that time, Pond SF2 and other ponds to the north of the Dumbarton Bridge have been allowed to seasonally dry and snowy plovers have colonized several of these ponds, albeit in relatively low numbers. Numbers of nests have ranged from 6 in 2004, 2 in each of 2005 and 2006, and none in 2007. To date in 2009, 23 nests have been found in SF2, and a few nests each in R4 and R5 (SFBBO, unpub data). Snowy plovers have also nested in Cargill managed ponds near the east end of the Dumbarton Bridge along the levees of Newark Ponds N2, N3, N4, N6 and N9, although rarely in recent years. Snowy plovers have nested along Marshlands Road in recent years resulting in the closure of the road during past nesting seasons. However, snowy plovers have not nested along Marsh Road in the past 2-3 years.

The action area supports snowy plover nesting, roosting and foraging habitat along the entire length of the terrestrial portion of the eastern bridge alignment from the shoreline comprising tidal marsh, salt pond, slough, ruderal and paved areas. Similar habitat is also present along the terrestrial portion of the western bridge alignment to the south including pond SF2, and to the north in salt pond R1 comprising tidal marsh, salt pond, slough, ruderal and paved areas.

California Least Tern

Listing Status: The California least tern was listed as endangered on June 2, 1970 (Service 1970). A recovery plan for the California least tern was originally published on April 2, 1980; a revised recovery plan was published on September 27, 1985 (Service 1985). A five-year review was completed on September 2006, which recommended the species be downlisted to threatened (Service 2006b). Critical Habitat has not been designated for this species.

Natural History and Distribution: The California least tern is the smallest of the North American terns and is found along the Pacific Coast of California, from San Francisco southward to Baja California. California least terns nest in colonies on relatively open beaches kept free of vegetation by natural scouring from tidal action. The typical colony size is 25 pairs. Least terns typically begin breeding in their third year. Their nests consist of simple scrapes in the sand or shell fragments. A typical clutch is two eggs and both adults incubate and care for the young. They can re-nest up to two times if eggs or chicks are lost early in the breeding season. They are very gregarious and forage, roost, nest and migrate in colonies. Fall migration commences between the last week of July and first week of August. Several weeks before fall migration, adults and young wander along marine coastlines, congregating at prime fishing sites (NatureServe 2006). Least terns search for prey by hovering over shallow to deep waters in bays, lagoons, estuaries, river and creek mouths, marshes, lakes, and offshore and diving to the surface. Least terns feed primarily on small surface-swimming, nonspiny fish (2.0–9.0 cm long with body <1.5 cm deep), but also shrimp and other invertebrates; more than 50 fish species have been documented as prey throughout their range (Thompson *et al.* 1997).

The historical breeding range of the California least tern was described in the early literature as extending along the Pacific Coast from Moss Landing, Monterey County, California, to San Jose del Cabo in Baja California Sur, Mexico (A.O.U. 1957, Dawson 1924, Grinnell 1928, Grinnell and Miller 1944). Since 1970, nesting sites have been documented in California from San Francisco Bay area to the Tijuana River at the Mexican border (Marschalek 2006) and in Mexico within the Gulf of California and on the western coast of Baja California from Ensenada to San Jose del Cabo at the tip of the peninsula (Lamb 1927, Grinnell 1928, Patten and Erickson 1996). Although San Francisco Bay may be the northern limit of the least tern range, terns have been

observed at three locations north of the Bay: Humboldt Bay (Yocom and Harris 1975), Fort Stevens, Oregon (Walker 1972), and Ocean Shores, Washington (Hunn and Mattocks 1979).

Along the coast of Southern California, historic records of nesting colonies exist for Santa Barbara, Ventura, Los Angeles, Orange, and San Diego counties. As early as 1908, colonies on the beaches at Venice, Los Angeles County (125 pairs), and Bolsa Chica and Newport, Orange County (collectively thousands of birds) were viable, but the colony at Redondo Beach, Los Angeles County, had already been abandoned (Chambers 1908, Fancher 1994). By 1922, development at Venice had caused the birds to abandon the beach there and retreat in stages to a nesting site a mile inland on a dried-up mudflat (Lamb 1927), presumably along Ballona Creek.

Population Status and Trends: Currently, the breeding colony at Alameda Point is one of the most important breeding colonies in the state. In 2005, this colony had 424 breeding pairs (Marschalek 2006). This total is up considerably from prior decades: 128 pairs were found in 1993, and only 70 pairs nested in 1982 (Collins 1994). Least terns typically arrive at Alameda Point in mid to late April, but have arrived as early as 6 April, and depart in mid to late August each year. Hatchlings are typically fed from June through mid-August. Since 1977, the majority of nesting activities have occurred in the 4-acre, fenced "traditional" colony site on the western end of Alameda Point, but prior to 1987, least tern nesting also occurred in other areas at Alameda Point outside the traditional site area. Furthermore, least terns have moved their young to various locations within the buffer zone surrounding the main colony site during several breeding seasons (and on one occasion as far as about 4,000 feet northwest of the main colony site), apparently to avoid predator pressure at the main colony site. While at the Alameda Point during the breeding season, least terns forage for fish in the open water offshore of the western end of Alameda Point, which contains extensive, generally productive foraging habitat areas. Foraging intensity has varied between different offshore areas, but has occurred in the Oakland Harbor, Seaplane Lagoon at Alameda Point, and areas southeast, south, and west of the traditional least tern colony site. During the breeding season, least terns are central-place foragers, that is, they return regularly to the nest from their foraging trips. Most foraging activity occurs within 2 miles of the nesting site (Atwood and Minsky 1983). Having foraging places near their nests is beneficial to least terns because it reduces the energy cost of flying to the feeding site and reduces the time needed to bring a load of fish back to the nest.

According to Caffrey (1995), the least tern breeding site at the Alameda Point has played a significant role in recent increases in the number of least terns throughout California. The Alameda Point site is consistently one of the most successful sites in California. Between 1987 and 1994, the Alameda Point site supported 5 to 6 percent of the statewide breeding population out of 35 to 40 sites each year, but produced an average of 10.6 percent of the total number of fledglings produced statewide in each of those years. By consistently producing large numbers of fledglings each year, the colony has added large numbers of potential new breeding birds to the statewide population. Therefore, this site is considered to be one of the most important "source" populations in California serving to balance out losses at many "sink" locations throughout the State.

Least terns also nested in 2000 and 2001 at Albany (near Alameda), with up to 12 pairs in 2000. At Pittsburg, on Suisun Bay, 13 pairs nested in 2001 and 8 pairs nested in 2003. Historically, small numbers of birds have nested at the Oakland International Airport (last reported in 1995), Bay Farm Island (last reported 1975), Bair Island (last reported 1984), Port Chicago (last reported in 1988), the Bay Bridge Sand Spit (one-time attempt in 1985), and Tern Island (one-time attempt in 1990, USGS Preliminary data, unpub.).

In addition, salt ponds in the South Bay have been used for sporadic and limited nesting attempts. These include attempts on levees at Ponds E10/E11 at Eden Landing (last reported 1985), Ponds N5/N7 (last reported 1983) and N1A in the Newark salt ponds, and Pond R3 in the Ravenswood Complex (Hurt 2004; Wetlands Research Associates 1994a). In the South Bay, recent breeding has occurred at Hayward Regional Shoreline, where 59 pairs nested in 2008 (45 of the 59 nests produced chicks). Of the 109 eggs laid at the site, 81 chicks have been produced. A total of 68 chicks have been observed on the site (age classes: twelve chicks at 1 to 5 days old, twenty-seven chicks at 5 to 10 days old, and twenty-three chicks at 10 to 17 days) and six fledglings. Currently, 55 to 100 least terns have been observed flying around the colony with the highest numbers observed during high tide events. Wildlife Services Specialists and staff are closely monitoring predators and will continue managing gulls, and prevent California gulls from negatively affecting the reproductive success of the tern colony. A total of two dead chicks have been found, three depredated eggs and two chicks presumed taken by aerial predators (American crow and California gull).

Least terns also nested at Pond E8A within the SBSP restoration project in the Eden Landing Complex, where several pairs nested in 2007; this site was largely abandoned for unknown reasons. These Eden Landing birds were observed foraging both in a borrow ditch within Pond E8A and in Old Alameda Creek (C. Robinson, pers. comm.).

The Alameda Point site currently represents nearly the entire San Francisco Bay Area population, and is the northernmost of least tern breeding colonies by about 178 miles. Because of its northern location, the Alameda Point site is relatively unaffected during El Niño years when many southern California sites experience pronounced breeding failure resulting from limited food availability. During the 1992 El Niño year, the Alameda Point site supported 6 percent of the statewide number of breeding pairs, but produced 16 percent of the total statewide number of fledglings. The 1998 season was another El Niño year, one of the most severe on record, and least tern breeding at NAS Alameda was less successful. Only 90 young fledged, more than a 70 percent reduction from 1997. Observations of delayed breeding, reduced fish catch, and the highest non-predator mortality of young ever observed (about 50 percent, L. Collins, pers. comm.) suggest food limitation and associated problems as a cause.

Threats: Population declines of the least tern are possibly due to the use of organochlorine pesticides, loss of nesting habitat, and disturbance on the nesting grounds by humans. Least terns require large open areas of sand or gravel with little vegetation for nesting and will use filled or graded lands as well as airports if no other habitat is available. Nesting areas must be located near open water to maintain adults and young throughout the nesting season. Conservation efforts for the least tern include protection of nesting sites, predator management, and vegetation control (Feeney 2000).

The major documented cause of breeding failure at many least tern colony sites in California has been predation on eggs, chicks, fledglings, and adults (Caffrey 1995). A wide variety of predators has been documented to prey upon least terns, including most gull species, 22 additional avian species, 14 mammal species, snakes, crabs, ants, and spiders. In addition to direct loss or mortality of eggs and individuals, avian and mammalian predators can cause least tern adults to abandon breeding sites prior to completion of nesting activities. While many least tern breeding colony sites have been plagued by high predation pressure, the Alameda Point generally has been less affected by predation threats than many other sites throughout California (Caffrey 1995).

Environmental Baseline

Ravenswood ponds, particularly pond R1, are occasionally used by California least terns for foraging and roosting, with counts of 96 terns in July 2002 (Hurt 2004), 42 in July 2003, and 110 in July 2004 (USGS Preliminary Data, unpub.). However, the least terns' usage of pond R1 and vicinity are primarily as post-breeding staging areas from-late June through late-August, prior to their southward migration. Here, both adult and juvenile least terns roost on salt pond levees (both outboard levees and interior levees between ponds), posts and boardwalks. Least terns also forage heavily in open San Francisco Bay waters within and adjacent to the action area and to a lesser degree in salt ponds adjacent to the bridge alignment. Least tern foraging habitat is present along the entire open water habitat along the entire bridge approaches and center span.

The SBSP habitat restoration is creating nesting islands in part for least terns and if early revegetation efforts are successful, least terns could colonize SF2 and potentially establish a nesting colony within the action area during the course of proposed action. Based on the biology and ecology of species, the presence of suitable habitat within the Ravenswood complex, restoration efforts within SF2, and recent records, the California least tern is likely to inhabit the action area.

California Clapper Rail

Listing Status: The California clapper rail was listed as endangered on October 13, 1970 (Service 1970). Critical Habitat has not been designated for this species. A detailed account of the taxonomy, ecology, and biology of the clapper rail is presented in the *Salt Marsh Harvest Mouse & California Clapper Rail Recovery Plan* (Service 1984) and the references cited therein. The clapper rail is a fully protected species under California law (See California Fish and Game Code Section 3511).

Natural History and Distribution: This subspecies is one of three subspecies in California listed as endangered under the Endangered Species Act (Act). The other subspecies include the light-footed clapper rail (*R. l. levipes*), which is found in tidal marshes in southern California and northwestern Baja California, and the Yuma clapper rail (*R. l. yumanensis*), which is restricted to the Colorado River basin. The California clapper rail is distinguishable from other clapper rails by its large body size of 13 to 19 in. from bill to tail, and weighs approximately 8.8 to12.3 oz. It has an orange bill, a rufous breast, black and white barred flanks, and white undertail coverts (Albertson and Evens 2000). Clapper rails are sexually dimorphic; the males are slightly larger than females (Garcia 1995). Juveniles have a pale bill and dark plumage. Clapper rails are capable of producing several vocalizations, most common of which are a series of keks or claps (Massey and Zembal 1987).

The clapper rail is endemic to tidally influenced salt and brackish marshes of California. Historically, the clapper rail occurred in tidal marshes along California's coast from Morro Bay, San Luis Obispo County, to Humboldt Bay, Humboldt County. Currently, California clapper rails are known to occur in tidal marshes in the San Francisco Estuary (Estuary) (San Francisco, San Pablo, Grizzly, Suisun and Honker bays). Clapper rails are typically found in the intertidal zone and sloughs of salt and brackish marshes dominated by pickleweed (*Salicornia virginica*), Pacific cordgrass (*Spartina foliosa*), gumplant (*Grindelia stricta* var. *angustifolia*), saltgrass (*Distichlis spicata*), jaumea (*Jaumea carnosa*), and adjacent upland refugia. They may also occupy habitats with other vegetative components, which include, but are not limited to, bulrush *(Scirpus americanus* and *S. maritimus*), cattails (*Typha* spp.), and Baltic rush (*Juncus balticus*).

Evens and Page (1983) concluded from research in a northern San Francisco Bay marsh that the clapper rail breeding season, including pair bonding and nest construction, may begin as early as February. Field observations in South Bay marshes suggest that pair formation also occurs in February in some areas (J. Takekawa, pers. comm.). The end of the breeding season is typically defined as the end of August, which corresponds with the time when eggs laid during re-nesting attempts have hatched and young are mobile. Harvey (1988) and Foerster *et al.* (1990) reported mean clutch sizes of 7.27 and 7.47 eggs for clapper rails, respectively. The clapper rail builds a bowl shaped platform nest of marsh vegetation and detritus (DeGroot 1927, Harvey 1988, Foerster *et al.* 1990). The clapper rail typically feeds on benthic invertebrates, but its diet is wide ranging, and includes seeds, and occasionally small mammals such as the harvest mouse.

Dispersal or movements by clapper rails in California occurs between and outside of marshes (Orr 1939; Zembal *et al.* 1985; San Francisco Bay Bird Observatory [SFBBO] 1986; Page and Evens 1987; Albertson 1995). Eddleman (1989) identified movements by Yuma clapper rails outside of their territories as juvenile dispersal; dispersal by an unmated individual bird; and shifts in home ranges after the breeding, in the winter, and during high water periods; and attributed these movements to a search for more suitable habitat where territories, mates, food, or safe refuge were better available. Juvenile dispersal apparently constitutes the main type of long distance movements by light-footed clapper rails, while adult birds tend to stay within territories once they are established (Zembal and Massey 1988, Zembal *et al.* 1989, Ledig 1990; Zembal 1990, Zembal 1994, Zembal *et al.* 1996, Zembal *et al.* 1997, Zembal *et al.* 1998). Similarly, clapper rails tend to stay within established territories or home ranges year-round (SFBBO 1986; Albertson 1995). Zembal and Massey (1988) noted that 3 of 6 radio-tagged light-footed clapper rails that moved extensively were preyed upon within a relatively short period of time. By comparison, seven other birds that remained sedentary within established territories were not preyed upon during the telemetry period.

Population Status and Trends: An estimated 40,191 acres of tidal marshes remained in 1988 of the 189,931 acres of tidal marsh that historically occurred in the Estuary; this represents a 79 percent reduction from historical conditions (Goals Project 1999). The suitability of many remaining marshes for clapper rails is limited, and in some cases precluded, by their small size, fragmentation, and lack of tidal channel systems and other micro-habitat features. These limitations render much of the remaining tidal marsh acreage unsuitable or of low value for the species. The clapper rail was listed as endangered primarily as a result of habitat loss. The factors described above have contributed to the more recent population reduction, which has occurred since the mid-1980s. Although many factors are at work, predation by native and non-native predators, in conjunction with historic habitat loss and fragmentation are the current known primary threats. With historic populations at Humboldt Bay, Elkhorn Slough, and Morro Bay now extirpated, the Estuary represents the last stronghold and breeding population of this subspecies.

A number of factors influencing remaining tidal marshes limit their habitat values for clapper rails. Much of the east San Francisco Bay shoreline from San Leandro to Dumbarton Bridge is rapidly eroding, and many marshes along this shoreline could lose their clapper rail populations in the future, if they have not already. In addition, an estimated 600 acres of former salt marsh along Coyote Creek, Alviso Slough, and Guadalupe Slough, have been converted to fresh- and brackish-water vegetation due to large-volume freshwater discharge from wastewater facilities in the South Bay and are now of lower quality for clapper rails. This conversion has at least temporarily stabilized as a result of the drought since the early 1990s.

In addition, the introduction of non-native, invasive plant species such as *Spartina* and its hybrids into tidal wetlands within the Estuary is potentially impacting clapper rails by drastically changing the structure and function of tidal marshes in the estuary. Invasive *Spartina* chokes tidal creeks, changing the hydrology of the marsh and reducing the amount of foraging habitat within tidal channels, as well as replacing much of the native diverse tidal marsh vegetation. Other invasive plant species such as perennial pepperweed and glasswort (*Salsola soda*) also have the potential to alter the marsh landscape, making it less suitable as clapper rail habitat.

Throughout the Estuary, the remaining clapper rail population is impacted by a suite of mammalian and avian predators. At least 12 native and 3 non-native predator species are known to prey on various life stages of the clapper rail (Albertson 1995). Artificially high local populations of native predators, especially raccoons, skunks, and ravens occur due to the presence of landfills and other sources of human food waste adjacent to marshes. Feral cats also represent another predation threat on adult and young clapper rails near residential areas and landfills (Albertson 1995). Non-native Norway rats have long been known to be effective predators of clapper rail nests (DeGroot 1927, Harvey 1988, Foerster *et al.* 1990). According to Harvey (1988) and Foerster *et al.* (1990), predators, especially rats, accounted for clapper rail nest losses of 24 to 29 percent in certain South Bay marshes. Placement of shoreline riprap, levees, buildings, and landfills favor rat populations, which results in greater predation pressure on clapper rails in certain marshes. Encroaching development displaces lower order predators from their natural habitat and adversely affects higher order predators, such as coyotes, which will normally limit population levels of lower order native and non-native predators, especially red foxes (Albertson 1995).

Hunting intensity and efficiency by many avian predators is increased by the presence of electric power transmission lines, which cross tidal marshes and provide otherwise-limited hunting perches (J. Takekawa, pers. comm.). In addition, both red-tailed hawks and common ravens nest on transmission towers. Common raven populations have recently increased dramatically within the Estuary and evidence of clapper rail egg predation by this species has been detected (J. Albertson, pers. comm.).

These predation impacts are exacerbated by a lack of high marsh and natural high tide cover in most remaining marshes. DeGroot (1927) noted that clapper rails were extremely vulnerable to predation by raptors during high tide events when they were forced to seek refuge in exposed locations. Similarly, Johnston (1956, 1957) and Fisler (1965) observed heightened predator activity in marshes coinciding with extreme high tides. Evens and Page (1986) also documented the susceptibility of black clapper rails (*Laterallus jamaicensis coturniculus*) to predation during extreme high tides. More recently, clapper rail predation was noted in west Marin during extreme high tides in 2005 (G. Downard, pers. comm.). There is an abundance of falcons, raptors, egrets, and herons during high tides that opportunistically take advantage of prey during this vulnerable period.

The proliferation of non-native red foxes into tidal marshes of South Bay since 1986 has had a profound effect on clapper rail populations. As a result of the rapid decline and almost complete elimination of clapper rail populations in certain marshes, the San Francisco Bay National Wildlife Refuge implemented a predator management plan in 1991 (Foerster and Takekawa 1991) with an ultimate goal of increasing clapper rail population levels and nesting success through management of red fox predation. This program was successful in increasing the South Bay clapper rail populations from an all-time low.

Mercury accumulation in eggs is perhaps the most significant contaminant problem affecting clapper rails in the Estuary, with the South Bay containing the highest mercury levels. Mercury is extremely toxic to embryos and has a long biological half-life. Schwarzbach *et al.* (2006) found high mercury levels and low hatching success (due both to predation and, presumably, mercury) in clapper rail eggs throughout the Estuary.

Clapper rails vary in their sensitivity to human disturbance, both individually and between marshes. Certain types of disturbances have occurred within or adjacent to some marsh areas for a long time and certain clapper rails appear to have habituated or become tolerant of these disturbances, while others appear to habituate over time or are unable to habituate to these disturbances at all. For example, certain clapper rails in the Palo Alto Baylands Nature Preserve appear to be somewhat tolerant of the relatively common pedestrian traffic on the public boardwalk that dissects the marsh. Clapper rail nests have been documented within 10 ft of trails in Elsie Romer and Cogswell marshes in Alameda County, and within 65 ft of a busy street near White Slough (Solano County). In contrast, Albertson (1995) documented a clapper rail abandoning its territory in Laumeister Marsh in the South Bay, shortly after a repair crew worked on a nearby transmission tower. The bird did not establish a stable territory within the duration of the breeding season, but eventually moved closer to its original home range several months after the disturbance. As a result of this territorial abandonment, the opportunity for successful reproduction during the breeding season was eliminated (J. Takekawa, pers. comm.). Clapper rails in Laumeister Marsh have little contact with people, and are apparently quite sensitive to human-related disturbance. Evens and Page (1983) documented 4 clapper rail breeding territories along the Greenbrae boardwalk in the Corte Madera Ecological Preserve. In 1993, no clapper rail breeding territories were discovered along the boardwalk even though clapper rail habitat conditions remained unchanged (J. Garcia, pers. comm.). This territorial abandonment is attributed to an increase in domestic and feral dogs and cats along the boardwalk resulting from new residents moving into nearby residential areas since 1983 (J. Garcia, pers. comm.).

Clapper rail reactions to disturbance may vary with season; however both breeding and non-breeding seasons are critical times. Clapper rail mortality is greatest during the winter, primarily due to predation during extreme winter high tides (Eddleman 1989, Albertson 1995). Human-related disturbance may increase the clapper rails' vulnerability to predators. During high tides, clapper rails and other wildlife hide within any available cover in the transition zone and high marsh. As people approach, the birds may flush and attract predators. The presence of people and their pets in or near the high marsh plain or upland areas during marsh inundation may even prevent clapper rails from leaving the lower marsh plain to seek cover, which also leaves them vulnerable to predation (Evens and Page 1983, Evens and Page 1986). Public trails that run along a narrow marsh transition zone may be particularly hazardous to marsh species that depend on this habitat for refuge during high tides.

On numerous occasions at the Corte Madera Ecological Preserve, clapper rails have been observed seeking refuge from unrestrained dogs entering tidal marshes from adjacent levees with public access (J. Garcia, pers. comm.). These disturbances have occurred despite the presence of signs notifying users that they are entering sensitive wildlife species areas and that pets must be under restraint while in the preserve area. Similarly, along the Redwood Shores Peninsula in San Mateo County, fences and signs installed to prevent access into areas with listed species habitat have been repeatedly vandalized and people continue to enter the prohibited areas beyond the fences and signs (Popper and Bennett 2005).

A population viability analysis under development for clapper rails identified changes in adult survivorship as the factor with the largest influence on population growth rates (M. Johnson, pers. comm.). Another model also indicates that adult survivorship of clapper rails is the primary demographic variable for maintaining a stable population or causing the population to either increase or decline (Foin *et al.* 1997). These models indicate that survival of adult birds has the strongest effect on the perpetuation or extinction of the overall population.

Although Gill (1978) may have overestimated the total clapper rail population in the mid-1970s at 4,200 to 5,900 birds, surveys conducted by CDFG and the Service estimated that the clapper rail population was approximately 1,500 birds in the mid-1980s (Harvey 1988). A conservative estimate of the population in North San Francisco, San Pablo, and Suisun Bays, was 195 to 282 pairs based on a synoptic survey conducted in 1992-93 (Collins *et al.* 1994). In 2004, Avocet Research Associates conducted surveys within San Pablo Bay and estimated about 200 pairs of clapper rails in that area. These surveys did not include some marshes in north Central San Francisco Bay and Suisun Bay that were surveyed in 1992-93. Between the surveys conducted in 1992-93 and 2004, several population centers in San Pablo Bay have declined precipitously. The population in the White Slough tidal marshes on the west side of the Napa River declined from an estimated 16 to 23 pairs as recent as 2000, to an estimated 2 to 5 pairs in 2002, and 3 to 5 pairs in 2004, while the population in the Sonoma Creek marshes declined from 13 pairs in 1992 to no pairs in 2001 and 2004 (Avocet Research Associates 2004).

In 1988, the total clapper rail population was estimated to be 700 individuals, with 400 to 500 clapper rails in South Bay (Foerster 1989). The total clapper rail population reached an estimated all-time historical low of about 500 birds in 1991, with about 300 clapper rails in the South Bay (Service unpubl. data). In response to predator management, the South Bay clapper rail population rebounded from this lowest population estimate to an estimated 650 to 700 individuals in 1997-98 (Service unpubl. data). Subsequently, the South Bay population declined again the following year to about 500 individuals and remained at that level through early 2002 (Service unpubl. data). However, the South Bay population declined further in 2002-2003 and was estimated to be 400 to 500 individuals (Service unpubl. data), which represented the lowest estimated population level in this area since the late 1980's and early 1990's. The South Bay population apparently increased slightly in 2004 with the population estimated at 500 individuals (Service unpubl. data).

Both winter and breeding season surveys suggest that there is substantial annual variability in local distribution and abundance of clapper rails in the South Bay. For example, at one of the sites where clapper rails were found in brackish marshes in Guadalupe Slough (discussed above), no clapper rails were found during protocol-level surveys the year before (H. T. Harvey & Associates 1990a; H. T. Harvey & Associates 1990b; H. T. Harvey & Associates 1991).

Breeding-season surveys of South Bay marshes for clapper rails through the early 1990's, summarized by Foin *et al.* (1997), indicated that the most substantial populations of clapper rails in the South Bay were, predictably, in the largest sections of tidal salt marsh: at Mowry Marsh and Dumbarton Marsh (in the East Bay between the Dumbarton Bridge and Mowry Slough), at the Faber/Laumeister Tracts and other marshes in the Palo Alto/East Palo Alto area, and at Greco Island in Redwood City. Mean counts from these areas include 68 birds at Mowry Marsh, 57 at Faber-Laumeister, and 44 at Dumbarton (Foin et al. 1997). Nest searches by Refuge personnel detected 40 nests in the Faber/Laumeister Tracts, 33 on Greco Island, and 13 in North Mowry Marsh in 1992 (Keldsen 1997). Clapper rails occurred in many other marshes as well, including Ideal Marsh (adjacent to Cargill pond N5), Calaveras Marsh (adjacent to Cargill Ponds M2 and

M3), and Triangle Marsh in Alviso. Other surveys have also documented clapper rails in southern Whale's Tail Marsh, adjacent to the Eden Landing salt ponds (J. Krause, pers. comm.). Clapper rails have been found to occasionally use salt pond dredge locks as high-tide refugia (Wetlands Research Associates 1994b). Although site-specific surveys have not been conducted in all suitable habitat for clapper rails in the South Bay, this species is likely to occur in tidal salt marsh habitats in a number of additional areas as well.

Although clapper rails are typically found in tidal salt marshes, they have also been documented in brackish marshes in the South Bay. Breeding-season surveys conducted in marshes bordering Coyote Creek in 1989 documented breeding clapper rails in a wide variety of plant associations. Surveys conducted during the 1990 breeding season (H. T. Harvey & Associates 1990b) and winter season (H. T. Harvey & Associates 1990a) found a number of clapper rails occupying salt/brackish transitional marshes and several brackish, alkali bulrush-dominated (*Scirpus robustus*) marshes, including Warm Springs Marsh (immediately east of Pond A19) and the marshes along upper Coyote Slough even farther east. In addition, clapper rails were found in nearly pure stands of alkali bulrush along Guadalupe Slough in 1990 and 1991 (H. T. Harvey & Associates 1990a; H. T. Harvey & Associates 1990b; H. T. Harvey & Associates 1991). Although it has been suggested that habitat quality may be lower in brackish marshes than in salt marshes (Shuford 1993), further studies comparing reproductive success in different marsh types are necessary to determine the value of brackish marshes to clapper rails.

On rare occasions, clapper rails have been recorded even further upstream, in brackish/freshwater transition marshes, particularly during the non-breeding season. In the Alviso/Sunnyvale area, such individuals have been recorded along upper Alviso Slough near the Gold Street bridge (on February 14, 1997; S. Terrill, pers. obs.), in nontidal freshwater ponds between Calabazas and San Tomas Aquino Creeks north of Highway 237 in Sunnyvale (on August 16, 1998; S. Rottenborn, pers. obs.), and along Artesian Slough near the Environmental Education Center in January 1999 and January to February 2001 (Santa Clara County Bird Data unpubl.).

Environmental Baseline

Clapper rails are known from tidal marshes south of Pond SF2 in the vicinity of Cooley Landing, and are known to occur in the area north of the Dumbarton Bridge, in Ravenswood Slough. The marsh (approximately 14 acres) adjoining Pond SF2, the slough R2 and R3 ~1,300 feet west of the western project terminus, and the narrow band of pickleweed dominated habitat along the shoreline south of the western bridge abutment is relatively narrow, and could support foraging or dispersing clapper rails, but may be too narrow to support a breeding pair. During an informal site assessment in February 2008 within this area, no clapper rails responded to a playback tape of clapper rail calls (J. Albertson, pers. comm.). Furthermore, if early SBSP revegetation efforts are successful at establishing suitable nesting islands and/or foraging habitat during the course of implementing the proposed action, clapper rails could re-colonize the northern portion of SF2 within the action area. Based on the biology and ecology of species, the presence of suitable habitat, restoration efforts within SF2, occupied habitat in nearby tidal marshes, and recent records, the California clapper rail is likely to inhabit the action area.

Salt Marsh Harvest Mouse

Listing Status: The salt marsh harvest mouse was listed as endangered in 1970 on October 13, 1970 (Service 1970). Critical Habitat has not been designated for this species. A detailed account of the taxonomy, ecology, and biology of the harvest mouse is presented in the Recovery

Plan (Service 1984) and the references cited therein. The harvest mouse is a fully protected species under California law (See California Fish and Game Code Section 4700).

Natural History and Distribution: The harvest mouse is a rodent endemic to the salt and brackish marshes of the Estuary and adjacent tidally influenced areas. The harvest mouse closely resembles the western harvest mouse (*R. megalotis*). The harvest mouse typically weighs about 0.35 oz, has a head and body length ranging from 2.7 to 2.9 in, a tail length ranging from 2.6 to 3.2 in, and a hind foot length of about 0.7 in (Fisler 1965). As stated in the recovery plan, the harvest mouse, when compared to the western harvest mouse, has darker ears, belly and back, and a slightly thicker, less pointed and unicolored tail. The harvest mouse is further distinguished taxonomically into the northern and southern subspecies, *R. raviventris halicoetes* and *R. raviventris raviventris*, respectively. Of the two subspecies, *R. r. halicoetes* more closely resembles *R. megalotis*, and can be difficult to differentiate in the field; body color and color of ventral hairs as well as the thickness and shape of the tail have been used to distinguish the two. As described by Fisler (1965), male harvest mice are reproductively active from April through September, but may appear active throughout the year. Females are reproductively active from March to November, and have a mean litter size of approximately four offspring.

The harvest mouse has evolved to a life in tidal marshes. Specifically, they have evolved to depend mainly on dense pickleweed as their primary cover and food source and may utilize a broader source of food and cover that includes saltgrass and other vegetation typically found in the salt and brackish marshes of this region. In natural systems, harvest mice can be found in the middle tidal marsh and upland transition zones. Upland refugia is an essential habitat component during high tide events. Harvest mice are highly dependent on cover, and open areas as small as 33 ft wide may act as barriers to movement (Shellhammer 1978, as cited in Service 1984). The harvest mouse does not burrow. It has been noted that the northern subspecies may build nests of loose grasses.

Population Status and Trends: The historic range of the species included tidal marshes within the San Francisco and San Pablo Bays, east to the Collinsville-Antioch areas. Agriculture and urbanization has claimed much of the former historic tidal marshes, resulting in a 79 percent reduction in the amount of tidal marshes in these areas (Goals Project 1999). At present, the distribution of the northern subspecies occurs along Suisun and San Pablo Bays north of Point Pinole in Contra Costa County, and Point Pedro in Marin County. The southern subspecies is found in marshes in Corte Madera, Richmond, and South Bay mostly south of the San Mateo Bridge (Highway 92).

Historically, the marshes in San Francisco Bay were a complex mosaic of vegetation zones, generally consisting of low marsh adjacent to mudflats dominated by cordgrass, high marsh plains dominated by pickleweed, and broad transitions of peripheral halophytes (salt-tolerant plants that cannot tolerate as much inundation by the tides) into upland habitats, with narrower transitional zones on natural levees along larger channels within the marshes. Most of the tidal marshes around the Bay and especially in the South Bay were eliminated, and those remaining have lost the upper portion of their pickleweed zones as well as the higher zone of peripheral halophytes (Shellhammer 1982; Shellhammer and Duke 2004). For example, detailed mapping by H.T. Harvey & Associates for the proposed action reveals that pickleweed dominated habitat and peripheral halophyte habitat comprise only 92 and 13 acres respectively, within the 1,600-acre Ravenswood Complex, 638 and 58 acres, respectively, within the 5,500-acre Eden Landing Complex, and 275 and 113 acres, respectively, within the 8,000-acre Alviso Complex; much of the peripheral halophyte acreage in the Alviso Complex, however, is adjacent to little used

brackish vegetation. Most of the tidal salt marshes in the South Bay are small, isolated strip-like marshes along backshores against levees or other hardened structures that promote predation, inhibit further high marsh development, and are threatened by sea level rise (Shellhammer 1989). Similarly, most of the marshes do not have higher order tidal channels within them and hence lack a pattern of natural levees supporting shrubs such as gum plant, and other peripheral halophytes, within them that might act as escape cover for mice within the marshes. Shellhammer and Duke (2004) note that most of the marshes of the South Bay are de facto corridors, likely not wide enough to support viable populations but wide enough to function as dispersal corridors.

Recent mapping is also documenting the fragmentation of the habitat. For example, sections of bare, rip-rapped bayfront levees more than 3,500 feet long separate appropriate pickleweed dominated habitat in the Ravenswood Complex. A similar gap of approximately 3,600 feet occurs in the Eden Landing area, between the Alameda Creek Flood Control Channel and the pickleweed-dominated habitat at the "Whale's Tail" marsh near Old Alameda Creek. Cover-dependent harvest mice are unlikely to move long distances over bare areas, and thus, isolation of suitable habitat may lead to genetic isolation of populations. While they are known to swim well, especially in comparison with western harvest mice, they have not been documented to move more than 13.1 to 16.4 feet across water or more than 16.4 feet over bare ground (Bias 1994; Geissel et al. 1988). The maximum movement through brackish or fresh water vegetation is reported in H.T. Harvey & Associates (Shellhammer 1982), in which two harvest mice moved several hundred feet along a levee side-slope at the upper edge of a brackish marsh. Based on this information, Shellhammer and Duke (2004) have hypothesized that barren areas of land more than 16.4 feet wide, reaches of water more than 42 feet wide, and brackish or freshwater marsh more than 820 feet wide act as barriers to movement of the southern subspecies of the harvest mouse, and hence barriers to gene flow. Areas of bare ground, water, or fresh/brackish marsh less than or equal to these distances may act as filters, reducing the movement of this species (and hence the rate of gene flow) between populations or between portions of a semi-fragmented population. The isolation of populations has contributed to the decline of the species (Shellhammer and Duke 2004) and could lead to local extinctions due to demographic processes or genetic "death." Based on their assessment of potential barriers in the South Bay, Shellhammer and Duke (2004) estimated that there were potentially 25 separate populations of harvest mice in the South Bay as of 2002 (not including mice that might be present in very small patches of pickleweed).

Habitat degradation has also occurred as a result of the conversion of existing tidal salt marsh to brackish or even freshwater marsh over the past four decades. Within the Alviso Complex, the combination of treated effluent discharge, sedimentation that has reduced the tidal prism, and freshwater flows from rivers and streams (especially in high-rainfall years) has created conditions too fresh for pickleweed to compete and survive (H. T. Harvey & Associates 1994; 1997b; 1998; 1999; 2000; 2001; 2002; 2003; Shellhammer 1982; Shellhammer et al. 1988; Shellhammer et al. 1982). Traditionally the brackish species alkali bulrush was considered to have little habitat value in either tidal or diked situations in the South Bay because surveys in the 1960s and 1970s found no harvest mice. However, the habitat value of brackish marsh needs reexamination after recent results in the South Bay and Suisun Marsh. Trapping in harvest mouse preserves in the range of the northern subspecies in the Suisun Bay by Barthman-Thompson of CDFG in 2005 showed that harvest mice do use other species of bulrush and cattail in the area. In the summer of 2006, several harvest mice were captured in stands of pure alkali bulrush in the brackish Warm Springs Marsh of the South Bay. Preliminary results from a number of harvest mouse trapping projects (most of which were done in the Suisun Bay) suggest that monocultures of peppergrass

(*Lepidium virginicum*), which dominate large areas of brackish marsh in the South Bay, are not used by harvest mice.

As a result of habitat loss, degradation, and fragmentation, harvest mouse populations are low. A database for all salt marsh studies carried out in the South Bay, including the entire project area, was compiled by H. Shellhammer at H.T. Harvey and Associates (Shellhammer and Duke 2004). Trapping records from permits issued by the Service and CDFG were reviewed and compiled. The database, which includes 198 trapping projects (estimated 95 percent of all such projects and studies) representing 134,204 trap nights (TN) completed through 2003, shows that 37 percent of all trapping projects (73 of 198, or 49,481 TN of a total of 134,204 TN) captured no harvest mice. The average capture efficiency (C.E., or total effort in TN divided by the number of mice captured) of all trapping projects was 0.013. In terms of unit effort, it took an average of 79 TN to capture one harvest mouse. Approximately 64 percent of the projects in which at least one harvest mouse was captured (153 of 198) had a capture efficiency equal to or less than 0.019, or it took 77 TN to capture a single harvest mouse. There were few projects in which numerous harvest mice were captured (*i.e.*, in 8 projects was there a C.E. of 0.06 or more).

Despite the species' low populations, the harvest mouse is known to rapidly colonize restored areas. This species quickly moves into areas of appropriate habitat from nearby inhabited areas as has been shown in numerous trapping projects' reports. A representative sample of those studies in the South Bay area include H. T. Harvey and Associates (1984; 1985a; 1985b; 1985c; 1987; 1996; 1997a).

Harvest mice may be affected by mercury and polychlorinated biphenyls (PCBs) in the intertidal zone. Clark *et al.* (1992) found that harvest mice were captured only at sites where concentrations of mercury or PCBs were below specific levels in house mice (*Mus musculus*). Their results seem to suggest a southern source of mercury contamination, with mercury an order of magnitude higher in livers of house mice at Calaveras Point than at any other point measured in the San Francisco Bay.

Environmental Baseline

The preservation and expansion of existing populations of the salt marsh harvest mouse is considered important to assuring the survival of this species. The Recovery Plan identifies essential habitat areas to be preserved or restored throughout the Estuary to meet the recovery objectives for this species. The tidal marshes managed by the San Francisco Bay National Wildlife Refuge support many of the major populations of the southern subspecies. Maintaining existing populations and re-establishing populations in formerly occupied habitats and marsh restoration areas are identified in the Recovery Plan as critical to the survivability of the species.

Although no surveys for salt marsh harvest mice were conducted within the action area as part of the proposed action, pickleweed-vegetated tidal wetlands and other potential habitat areas suitable for the salt marsh harvest mouse occur within the action area. Two areas were identified in the biological assessment (Caltrans 2009) that support pickleweed (*Salicornia virginica*) dominated habitat. One is restricted to a small depressional wetland along the northern portion of the eastern bridge trestle within a larger ruderal area adjacent to a dirt access road. Pickleweed within this area is patchy and interspersed among areas of bare ground, ruderal weedy vegetation including non-native barley (*Hordeum murinum*) and slender-leaf iceplant (*Mesembryanthemum nodiflorum*) and is isolated from other areas supporting harvest mouse habitat. The second area comprises a narrow band of pickleweed along the shoreline extending south from the western

bridge abutment. Results of salt marsh harvest mouse trapping studies dating back to the 1980's compiled in support of the South Bay Salt Pond Restoration Project have not reported salt marsh harvest mice within the action area (H.T. Harvey & Associates 2005). However, large areas pickleweed marsh occur approximately 0.75-mile south of the western bridge abutment. Harvest mice have been documented within this marsh and the narrow band of pickleweed within the action area extends southward into this area. Habitat along the shoreline extending north from the western bridge abutment was identified as a barrier to dispersal into the Ravenswood complex by H.T. Harvey & Associates (2005). Furthermore, if early SBSP revegetation efforts are successful at establishing pickleweed habitat during the course of implementing the proposed action, harvest mice could colonize SF2 within the action area from occupied lands to the south. Based on the biology and ecology of this species, the presence of suitable habitat at the repair sites and occupied habitat in nearby tidal marshes, and recent records, the salt marsh harvest mouse is likely to inhabit the action area.

Effects of the Action

Pacific Coast Population of the Western Snowy Plover

The proposed action is likely to result in disturbance to snowy plovers nesting or foraging within the salt ponds, levees, and access roads and has the potential to cause direct mortality or injury individuals, including nests, eggs, and young. These disturbances are most likely to result from work activities associated with pile driving activities associated with the land structure and east/west approach portions of the Dumbarton Bridge, general construction activities associated with the non-pile driving portion of the seismic retrofit activities, installation of a flood wall on the west approach, on-site staging and daily preparation areas, access roads, and vehicle/equipment parking areas. Caltrans proposes to minimize noise disturbance resulting from pile driving by restricting such activities to the snowy plover non-breeding season, which occurs from March 1 to September 30, and using a vibratory hammer within 800 feet of the shoreline for temporary trestle piles and cofferdams. In addition, a Service-approved monitor will be present at all times during the pile-driving phases of construction, as well as during and after cleanup activities.

Despite regular vehicle and human activity along Marshlands Road, Crescent, Newark Slough and Shoreline trails, the Ravenswood and east approach fishing piers, snowy plovers have repeatedly nested within regularly disturbed areas such as on the paved portion of Marshlands Road. Increased human presence, construction activity, vehicular/equipment access and daily staging along Marshlands Road and the access road to Ravenswood Pier, and the use of exclusion fencing will temporarily remove nesting habitat along Marshlands Road and decrease the suitability of nesting and foraging habitat within the action area. Snowy plovers, especially first time nesters without experience selecting nest sites, may attempt to establish nests within the action area, thereby subjecting the breeding pair and their nest, eggs and chicks to disturbance, nest failure, injury or mortality due to displacement, abandonment, altered behaviors, decreased predator vigilance, reduced feeding success and reduced recruitment. However, focused nest surveys and monitoring within the action area, and coordination with the Refuge personnel prior to the use of Marshlands Road will minimize the potential for loss of snowy plovers, including eggs and chicks.

Disturbance such as loud noise, night-lighting, the presence and movement of construction personnel, and operation of heavy equipment in or near snowy plover breeding and foraging habitat may alter normal behaviors in ways that result in injury, mortality, or reduced nesting

success. Such disturbance could result in temporary or permanent habitat loss due to the avoidance of areas that have suitable habitat but intolerable levels of disturbance; abandonment of nests, eggs, or young by nesting pairs; a reduction in foraging efficiency; and increased movement or flushing from cover, or altered activity patterns, that reduce energy reserves and increase predation risk. Disturbance during the non-breeding season, or disturbance in or near foraging habitat during the breeding season, could reduce foraging efficiency or result in increased mortality as birds are displaced to alternative foraging areas. Displaced individuals and their eggs or young could be subjected to injury or mortality from starvation, physiological stress, and increased predation. To minimize effects, work in and adjacent to potential snowy plover nesting habitat would be conducted outside of the nesting season from March 1 to September 30 to the extent practicable. If seasonal avoidance is not possible, pre-construction surveys would be conducted for nesting plovers, Service-approved monitors would be present, and appropriate buffers would be provided between proposed action activities and nesting plovers. Additional conservation measures incorporated into the project description, including the use of barrier fencing, will minimize effects of human disturbance on snowy plovers.

California Least Tern

The proposed action is likely to result in disturbance to California least terns that are staging or foraging within the Ravenswood and SF2 ponds from loud noise, night-lighting, and the presence and movement of people, vehicles and equipment. These disturbances are most likely to result from work activities associated with pile driving/vibratory hammer activities, general construction activities, installation of a flood wall on the west approach, removal of the Ravenswood pier, on-site staging, and vehicle/equipment parking and operation. Since least terns are not currently known to nest within the action area, no effects to nests, eggs, or young are anticipated. However, if early SBSP revegetation efforts are successful at establishing suitable nesting islands during the course of implementing the proposed action, California least terns could establish a nesting colony within the action area. The proposed action may affect subadults and adults roosting within the salt ponds and levees, and foraging within the salt ponds when filled and the open waters of the South Bay. Such disturbance may alter least tern behavior in ways that result in injury, mortality, temporary habitat loss due to avoidance of areas that have suitable staging or foraging habitat but intolerable levels of disturbance, a reduction in foraging efficiency if high quality foraging areas are impacted, and increased movement or flushing from roosts or altered activity patterns that reduce energy reserves and increase predation risk.

Caltrans proposes to minimize noise disturbance resulting from pile driving by restricting such activities to the least tern non-breeding season, which occurs from March 1 to September 30, and using a vibratory hammer within 800 feet of the shoreline for temporary trestle piles and cofferdams. A Service-approved monitor will be present at all times during the pile-driving phases of construction, as well as during and after cleanup activities, and will conduct weekly California least tern surveys.

California Clapper Rail

The proposed action is likely to result in disturbance to California clapper rails nesting or foraging within the pickleweed dominated habitats in the action area. If early SBSP revegetation efforts are successful at establishing suitable nesting islands during the course of implementing the proposed action, clapper rails could begin nesting or foraging within portions of SF2 located within the action area. These disturbances are most likely to result from work activities associated with the western land structure and approach portions of the Dumbarton Bridge project including pile driving/vibratory hammering, general construction activities, installation of

a flood wall on the west approach, removal of the Ravenswood pier, on-site staging, and the presence and movement of people, vehicles and equipment. Such disturbance may alter bird behavior in ways that result in injury, mortality, or reduced nesting success; the temporary loss of habitat due to avoidance of areas that have suitable habitat but intolerable levels of disturbance; abandonment of nests, eggs, or young by nesting pairs; a reduction in foraging efficiency if high quality foraging areas are impacted; and increased movement or flushing from cover, or altered activity patterns, that reduce energy reserves and increase predation risk. Disturbance could cause short-term effects such as failure to breed, nest abandonment, lower numbers of eggs, juvenile abandonment, and overall lower juvenile survivorship.

Even with the implementation of conservation measures to minimize disturbance in the tidal marsh during the breeding season, clapper rails that disperse away from disturbance may not successfully establish new breeding territories and breed. Clapper rails forced to disperse would need to either maintain existing pair bonds or develop new pair bonds and establish new breeding territories in other suitable habitat areas. The ability of these clapper rails to reestablish new breeding territories would be hampered by the fact that clapper rails maintain year-round home ranges and defend established breeding territories from intrusions by other clapper rails. Loss of any female clapper rails would be compounded by the loss of potential future progeny. Reduced survival of adult clapper rails would impact the long-term viability of the population.

Disturbance that occurs during the clapper rail non-breeding season could also result in harassment, harm, or mortality of clapper rails. Clapper rails could be forced to adjust the boundaries of their territories or to disperse to other habitat areas. Displaced individuals and their eggs or young could be subjected to injury or mortality from starvation, physiological stress, and increased predation. Clapper rails disturbed by work activities also could be subjected to predation if they increase their movements within their home range or disperse to other nearby or distant tidal wetlands.

Caltrans proposes to minimize noise disturbance resulting from pile driving by restricting such activities to the least tern non-breeding season, which occurs from March 1 to September 30, and using a vibratory hammer within 800 feet of the shoreline for temporary trestle piles and cofferdams. Caltrans proposes to further minimize disturbance by conducting focused preconstruction surveys within 30 days prior to the start of construction, providing a Service-approved monitor at all times during the pile-driving phases of construction, as well as during and after cleanup activities; and installing a barrier fence between the project boundary and the pickleweed habitat south of the Dumbarton Bridge on the western approach.

Salt Marsh Harvest Mouse

The proposed action is likely to result in disturbance to salt marsh harvest mice inhabiting the pickleweed dominated areas in the action area and potentially within SF2 if early SBSP revegetation establishes or expands upon existing pickleweed habitat during the course of implementing the proposed action resulting in harvest mice colonizing portions of SF2. These disturbances are most likely to result from work activities associated with the western land structure and approach portions of the Dumbarton Bridge project including pile driving/vibratory hammering, general construction activities, installation of a flood wall on the west approach, removal of the Ravenswood pier, on-site staging, and the presence and movement of people, vehicles and equipment. Such disturbance may result in the injury or mortality of individual harvest mice (adults and young); the temporary loss of habitat due to avoidance of areas that have suitable habitat but intolerable levels of disturbance; decreased breeding success or recruitment;

increased movement or flushing from cover; or altered behavioral patterns that reduce energy reserves and increase predation risk.

Caltrans proposes to minimize disturbance to salt marsh harvest mice by installing a mouse-proof barrier on the western approach along the northern access road, the shoreline under the bridge, and between the pickleweed habitat and the southern access road to prevent mice from entering the work area. Caltrans will also provide a Service-approved monitor to be present during the construction activities including preconstruction staging and cleanup activities.

Cumulative Effects

Cumulative effects include the effects of future State, Tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. No other State, Tribal, local or private actions are anticipated in the action area within the foreseeable future.

The global average temperature has risen by approximately 0.6 degrees centigrade during the 20th Century (International Panel on Climate Change 2001, 2007; Adger et al 2007). There is an international scientific consensus that most of the warming observed has been caused by human activities (International Panel on Climate Change 2001, 2007; Adger *et al.* 2007), and that it is "very likely" that it is largely due to increasing concentrations of greenhouse gases (carbon dioxide, methane, nitrous oxide, and others) in the global atmosphere from burning fossil fuels and other human activities (Cayan 2005, EPA Global Warming webpage http://yosemite. epa.gov; Adger *et al.* 2007). Eleven of the twelve years between 1995 and 2006 rank among the twelve warmest years since global temperatures began in 1850 (Adger *et al.* 2007). The warming trend over the last fifty years is nearly twice that for the last 100 years (Adger *et al.* 2007). Looking forward, under a high emissions scenario, the International Panel on Climate Change estimates that global temperatures will rise another four degrees centigrade by the end of this Century; even under a low emissions growth scenario, the International Panel on Climate Change estimates that the global temperature will go up another 1.8 degrees centigrade (International Panel on Climate Change 2001). The increase in global average temperatures affects certain areas more than others. The western United States, in general, is experiencing more warming than the rest of the Nation, with the 11 western states averaging 1.7 degrees Fahrenheit warmer temperatures than this region's average over the 20th Century (Saunders *et al.* 2008). California, in particular, will suffer significant consequences as a result of global warming (California Climate Action Team 2006). In California, reduced snowpack will cause more winter flooding and summer drought, as well as higher temperatures in lakes and coastal areas. The incidence of wildfires in the Golden State also will increase and the amount of increase is highly dependent upon the extent of global warming. No less certain than the fact of global warming itself is the fact that global warming, unchecked, will harm biodiversity generally and cause the extinction of large numbers of species. If the global mean temperatures exceed a warming of two to three degrees centigrade above pre-industrial levels, twenty to thirty percent of plant and animal species will face an increasingly high risk of extinction (International Panel on Climate Change 2001, 2007). The mechanisms by which global warming may push already imperiled species closer or over the edge of extinction are multiple. Global warming increases the frequency of extreme weather events, such as heat waves, droughts, and storms (International Panel on Climate Change 2001, 2007; California Climate Action Team 2006; Lenihan *et al.* 2003). Extreme events, in turn may cause mass mortality of individuals and significantly contribute to

determining which species will remain or occur in natural habitats. Ongoing global climate change (Anonymous 2007; Inkley *et al.* 2004; Adger *et al.* 2007; Kanter 2007) likely imperils the western snowy plover, California least tern, California clapper rail and salt marsh harvest mouse and the resources necessary for their survival. Since climate change threatens to disrupt annual weather patterns, it may result in a loss of their habitats and/or prey, and/or increased numbers of their predators, parasites, and diseases. Where populations are isolated, a changing climate may result in local extinction, with range shifts precluded by lack of habitat.

Conclusion

After reviewing the current status of the Pacific coast population of the western snowy plover, California least tern, California clapper rail and salt marsh harvest mouse; the environmental baseline for the action area; the effects of the proposed State Route 84 Dumbarton Bridge Seismic Retrofit Project and the cumulative effects; it is the Service's biological opinion that the project, as proposed, is not likely to jeopardize the continued existence of these species.

INCIDENTAL TAKE STATEMENT

Section 9(a)(1) of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened fish and wildlife species without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Harm is defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by impairing behavioral patterns including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with this Incidental Take Statement.

The measures described below are non-discretionary, and must be implemented by Caltrans so that they become binding conditions of any grant or permit issued to Caltrans, as appropriate, in order for the exemption in section 7(o)(2) to apply. Caltrans has a continuing duty to regulate the activity covered by this incidental take statement. If Caltrans (1) fails to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

Amount or Extent of Take

Conservation measures proposed by the project proponent and described above in the *Description of the Proposed Action* section of this biological opinion will reduce, but do not eliminate, the potential for incidental taking of western snowy plovers, California least terns, California clapper rails and salt marsh harvest mice. The Service anticipates that incidental take of the western snowy plover may be difficult to detect based on the cryptic coloration of the

nests, eggs, chicks and adults, vagility of the species, and tendency to flush from an area when disturbed inhibiting prolonged observation of individuals. The Service anticipates that incidental take of the California least tern will be difficult to detect based on the vagility of the species and tendency to flush from an area when disturbed inhibiting prolonged observation of individuals. The Service expects that incidental take of the California clapper rail will be difficult to detect based on the cryptic coloration and reclusive nature of this species. The Service anticipates incidental take of the salt marsh harvest mouse will be difficult to detect or quantify based on the variable, unknown size of any resident population over time, and the difficulty of finding injured small mammals. Losses of these species may also be masked by seasonal and annual fluctuations in abundance, density and nest/breeding site selection. The Service considers the number of western snowy plovers, California least terns, California clapper rails and salt marsh harvest mice subject to harassment from noise and vibrations and human activities to be impracticable to estimate. The Service, therefore, anticipates the following levels of take as a result of implementation of the proposed action.

Incidental take of western snowy plovers, California least terns, California clapper rails and salt marsh harvest mice is expected in the form of:

1. Harm, mortality or harassment of a maximum of two (2) pairs of western snowy plovers within the action area due to construction of the proposed action within the 3 year construction timeline;

2. Harm, mortality or harassment of a maximum of two (2) California least terns staging or foraging within the action area, or one (1) nesting pair which may occupy the newly restored habitat within SF2 due to construction of the proposed action within the 3 year construction timeline;

3. Harm, mortality or harassment of a maximum of two (2) California clapper rails foraging within the action area, or one (1) nesting pair which may occupy the newly restored habitat within SF2 due to construction of the proposed action within the 3 year construction timeline; and

4. Harm, mortality or harassment of a maximum of two (2) salt marsh harvest mice within the action area inclusive of the newly restored habitat within SF2 due to construction of the proposed action within the 3 year construction timeline;

5. Harassment associated with pile driving activities (using a vibratory hammer within 800 feet of the shoreline, randomly testing pile installation using an impact hammer within 800 feet of the shoreline, and pile driving using an impact hammer beyond 800 feet of the shoreline) of the proposed action on all western snowy plovers, California least terns, California clapper rails and salt marsh harvest mice due to construction of the proposed action within the 3 year construction timeline.

Effect of the Take

The Service has determined that this level of anticipated take is not likely to result in jeopardy to the Pacific coast population of the western snowy plover, California least tern, California clapper rail and salt marsh harvest mouse, and is not likely to jeopardize the continued existence of these species.

Reasonable and Prudent Measures

The following reasonable and prudent measures are necessary and appropriate to minimize the effect of the proposed action on the Pacific coast population of the western snowy plover, California least tern, California clapper rail and salt marsh harvest mouse:

1. Harassment, harm and mortality to the Pacific coast population of the western snowy plover, California least tern, California clapper rail and salt marsh harvest mouse shall be minimized by fully implementing the Conservation Measures in this biological opinion and adhering to the Service-developed minimization measures described below in the Terms and Conditions.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, Caltrans shall ensure compliance with the following terms and conditions, which implement the reasonable and prudent measures described above.

1. The following Terms and Conditions implement Reasonable and Prudent Measure one (1):

    a. Caltrans shall include Special Provisions that include the Conservation Measures and the Terms and Conditions of this biological opinion in the solicitation for bid information for all contracts for the project that are issued by them to all contractors. In addition, Caltrans shall educate and inform contractors involved in the project as to the requirements of the biological opinion.

    b. Surveys for western snowy plover, California least tern and California clapper rail shall encompass pond SF2 based on the discretion of the Refuge staff and the status of revegetation efforts. At least twenty (20) work days prior to initiating field work, surveying and access to SF2 shall be coordinated with Refuge staff. Encroachment within the buffers may be allowed by incorporating appropriate and site specific measures (e.g. noise restrictions, incorporation of visual screens between the nest the construction activity), through consultation with the Service and CDFG.

    c. The Resident Engineer or their designee shall be responsible for implementing the conservation measures and Terms and Conditions of this biological opinion and shall be the point of contact for the proposed action. The Resident Engineer shall maintain a copy of this biological opinion onsite whenever construction is taking place. Their name and telephone number shall be provided to the Service at least thirty (30) calendar days prior to groundbreaking at the project. Prior to ground breaking, the Resident Engineer must submit a letter to the Service verifying that they posses a copy of this biological opinion and have read the Terms and Conditions.

    d. The Service-approved biologist(s) shall be onsite during all activities that may result in the take of the western snowy plover, California least tern, California clapper rail and salt marsh harvest mouse. The qualifications of the biologist(s)

shall be presented to the Service for review and written approval at least thirty (30) calendar days prior to ground-breaking at the project site. The Service-approved biologist(s) shall keep a copy of this biological opinion in their possession when onsite. The Service-approved biologist(s) shall be given the authority to communicate verbally or by telephone, electronic mail or hardcopy with Caltrans personnel, construction personnel or any other person(s) at the project site or otherwise associated with the project. The Service-approved biologist(s) shall have oversight over implementation of the Terms and Conditions in this biological opinion, and shall, in consultation with the Resident Engineer, have the authority to stop project activities if they determine any of the requirements associated with these Terms and Conditions are not being fulfilled. If the Service-approved biologist(s) exercises this authority, the Service shall be notified by telephone and email within 24 hours. The Service contact is Chris Nagano, Division Chief, Endangered Species Program, Sacramento Fish and Wildlife Office at telephone (916) 414-6600.

e. All on-site personnel shall attend a Worker Environmental Awareness Training Program prior to their involvement in work activities. The program shall include discussion of the western snowy plover, California least tern, California clapper rail, salt marsh harvest mouse, and other listed species including an overview of their life history and take prohibitions outlined in the biological opinion. The program shall focus on the conservation measures that are relevant to employee's personal responsibility. Distributed materials should include wallet-sized cards or brochures with a distinctive photograph of these species, compliance reminders, and relevant contact information. Documentation of the training, including individual signed affidavits, shall be submitted to the Service with the annual compliance report described in the Reporting Requirements outlined in this biological opinion. As needed, training shall be conducted in Spanish for Spanish language speakers or other foreign languages if necessary. Documentation of the training, including individual signed affidavits, shall be kept on file and available on request.

f. To the maximum extent possible, night-time construction and night-lighting should be minimized.

g. If verbally requested, before, during, or upon completion of ground breaking and construction activities, Caltrans shall ensure the Service, CDFG, and/or their designated agents can immediately and without delay, access and inspect the project site for compliance with the proposed project description, conservation measures, and terms and conditions of this biological opinion, and to evaluate project effects to the western snowy plover, California least tern, California clapper rail, salt marsh harvest mouse and their habitat.

h. The following shall be implemented for all staging, storage, lay down, vehicle access, and parking areas associated with the project:

    i. Contractors may independently seek off-site staging locations. Offsite staging locations shall be subject to the requirements of resource agencies and permits will be the responsibility of the contractor.

ii. Caltrans shall require as part of the construction contract that all contractors comply with the Act in the performance of the work as described in the project description of this biological opinion.

i. The Service-approved biologist shall maintain written monitoring records that include: (1) the beginning and ending time of each day's monitoring effort; (2) a statement identifying the species, including general wildlife species, were encountered, including the time and location when such species were found; (3) the time the specimen was identified and by whom and its condition; and (4) a description of any actions taken. The biological monitor shall maintain complete records in their possession while conducting monitoring activities and shall immediately surrender records to the Service or CDFG upon verbal or written request. Originals of all monitoring records shall be provided to the Service immediately upon completion of the monitoring work.

Reporting Requirements

Proof of environmental training shall be provided to the Chris Nagano, Division Chief, Endangered Species Program, Sacramento Fish and Wildlife Office, 2800 Cottage Way, Room W-2605, Sacramento, California 95825-1846. Observations of listed or sensitive animal species should be reported to the California Natural Diversity Database (CNDDB) within thirty (30) calendar days of the observation.

Injured western snowy plovers, California least terns, California clapper rails and salt marsh harvest mice must be cared for by a licensed veterinarian or other qualified person, such as the on-site biologist. Dead individuals shall be placed in a Zip-lock® bag containing a piece of paper with the date, time and location where the specimen was found, the name of the person who found it in permanent ink, and then placed in a freezer in a secure location. The Service and the California Department of Fish and Game must be notified within 24 hours of the discovery of death or injury resulting from project-related activities or is observed at the project site. Notification must include the date, time, and location of the incident or of the finding of a dead or injured animal clearly indicated on a USGS 7.5-minute quadrangle and other maps at a finer scale, as requested by the Service, and any other pertinent information. The Service contacts are Chris Nagano, Division Chief, Endangered Species Program, Sacramento Fish and Wildlife Office at Chris_Nagano@fws.gov and (916) 414-6600, and Dan Crum, Resident Agent-in-Charge Dan Crum of the Service's Law Enforcement Division at (916) 414-6660.

Caltrans shall submit a post-construction compliance report prepared by the on-site biologist to the Sacramento Fish and Wildlife Office within sixty (60) calendar days of the date of the completion of construction activity. This report shall detail: (i) dates that construction occurred; (ii) pertinent information concerning the success of the project in meeting compensation and other conservation measures; (iii) an explanation of failure to meet such measures, if any; (iv) known project effects on the western snowy plover, California least tern, California clapper rail and salt marsh harvest mouse, if any; (v) occurrences of incidental take of these species, if any; (vi) documentation of employee environmental education; and (vii) other pertinent information.

Caltrans shall report to the Service any information about take or suspected take of listed wildlife species not authorized by this biological opinion. Caltrans must notify the Service via electronic mail and telephone within twenty-four (24) hours of receiving such information. Notification

must include the date, time, location of the incident or of the finding of a dead or injured animal, and photographs of the specific animal. The individual animal shall be preserved, as appropriate, and held in a secure location until instructions are received from the Service regarding the disposition of the specimen or the Service takes custody of the specimen. The Service contacts are Chris Nagano, Division Chief, Endangered Species Program, Sacramento Fish and Wildlife Office at Chris_Nagano@fws.gov and (916) 414-6600, and Resident Agent-in-Charge Dan Crum of the Service's Law Enforcement Division at (916) 414-6660.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities that can be implemented to further the purposes of the Act, such as preservation of endangered species habitat, implementation of recovery actions, or development of information and data bases. We have the following conservation recommendations:

1. Caltrans should assist the Service in implementing recovery actions identified in the *Western Snowy Plover (Charadrius alexandrinus nivosus) Pacific Coast Population Recovery Plan* (Service 2007).

2. Caltrans should assist the Service in implementing other recovery actions identified within most current recovery plans for the California least tern, California clapper rail, California brown pelican, and salt marsh harvest mouse.

3. Caltrans should consider participating in the planning for a regional habitat conservation plan for the western snowy plover, California least tern, California clapper rail, California brown pelican, salt marsh harvest mouse, and other listed and sensitive species.

4. Encourage participation of prospective permittees in a program being developed by Federal and State resource agencies to limit and reverse the spread of non-native Spartina within the Estuary.

5. Encourage or require the use of appropriate California native species in re-vegetation and habitat enhancement efforts associated with any projects authorized by the Service.

6. Facilitate additional educational programs geared toward the importance and conservation of tidal marsh and seasonal wetlands.

7. Sightings of any listed or sensitive animal species should be reported to the California Natural Diversity Database of the California Department of Fish and Game. A copy of the reporting form and a topographic map clearly marked with the location the animals were observed also should be provided to the Service.

8. Caltrans should provide roosting habitat for bats, swallows and swifts when designing bridges, overpasses and other suitable structures whenever possible.

9. Roadways can constitute a major barrier to critical wildlife movement; therefore, Caltrans should incorporate culverts, tunnels, or bridges on highways and other roadways that allow

safe passage by giant garter snakes and other listed animals. Photographs, plans, and other information should be included in biological assessments if "wildlife friendly" crossings are incorporated into projects. Efforts should be made to establish upland culverts designed specifically for wildlife movement rather than accommodations for hydrology. Transportation agencies should also acknowledge the value of enhancing human safety by providing safe passage for wildlife in their early project design.

10. Caltrans should continue to develop and implement their Early Statewide Biological Mitigation Planning Project that has been developed by the University of California at Davis, Road Ecology Center through Caltrans funding.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed and/or proposed species or their habitats, the Service requests notification of the implementation of these recommendations.

REINITIATION--CLOSING STATEMENT

This concludes formal consultation on the proposed State Route 84 Dumbarton Bridge Seismic Retrofit Project, Alameda County and San Mateo County, California. As provided in 50 CFR §402.16 and in the terms and conditions of this biological opinion, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

If you have questions concerning this opinion on proposed State Route 84 Dumbarton Bridge Seismic Retrofit Project, Alameda County and San Mateo County, California, you can contact Jerry Roe or Ryan Olah at the letterhead address or at (916) 414-6600.

Sincerely,

Susan K. Moore
Field Supervisor

cc:
Margaret Gabil, California Department of Transportation, Oakland, CA
Melissa Escaron, California Department of Fish and Game, Oakland, CA
Jacqueline Pearson-Meyer, National Marine Fisheries Service, Santa Rosa, CA
Rafael Montes, San Francisco Conservation and Development Commission, San Francisco, CA

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9. FOUNDATION REPORT_8-5-09
&
9A-9I APPENDICES

FOUNDATION ANALYSIS REPORT
DUMBARTON BRIDGE SEISMIC RETROFIT PROJECT

Prepared for:
Bay Area Toll Authority (BATA)
and
CALIFORNIA DEPARTMENT OF TRANSPORTATION

Submitted by:

EARTH MECHANICS, INCORPORATED

August 5, 2009

TABLE OF CONTENTS

1.0 INTRODUCTION 1-1
1.1 Background 1-1
1.2 Scope of Work 1-2
1.3 Organization of the Report 1-2
2.0 SUBSURFACE CONDITIONS 2-1
2.1 Local Geology 2-1
2.2 Idealized Subsurface Conditions 2-1
2.3 Generalized Soil Strata and Property Data for Each Pier 2-2
3.0 GROUND MOTIONS 3-1
3.1 Seismic Hazard Study 3-1
3.2 Spectrum Compatible Time Histories 3-2
3.3 Seismic Response and Kinematic SSI Analysis 3-2
3.4 ARS Design Curves 3-3
4.0 FOUNDATION EVALUATION 4-1
4.1 Foundation Description 4-1
4.2 Axial Loading Conditions 4-2
4.2.1 *t-z* and *q-u* Curves 4-2
4.2.2 Axial Load versus Deformation Analysis 4-4
4.2.3 Pile Capacity Evaluation 4-5
4.3 Lateral Loading Conditions 4-6
4.3.1 *p-y* Curves 4-7
4.3.2 Lateral Push-Over Analysis 4-8
4.4 Nonlinear Soil Springs for Pile Cap 4-9
4.5 New Retrofit Piles for Two Trestles 4-9
4.6 Liquefaction and Lateral Ground Movement 4-10
5.0 SOIL-STRUCTURE INTERACTION 5-1
5.1 Method of Sub-structuring 5-1
5.2 Treatment of Mass and Damping 5-3
5.3 Foundation Stiffness, Mass and Damping 5-4
5.4 Comparison Study of Different Foundation Modeling 5-5
5.5 Nonlinear Pushover Analyses 5-6
6.0 CONCLUSIONS 6-1
7.0 REFERENCES 7-2
8.0 APPENDIX A: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA 8-1
9.0 APPENDIX B: *T-Z* AND *Q-U* CURVES 9-1
10.0 APPENDIX C: *Q-δ* CURVES 10-1
11.0 APPENDIX D: *P-Y* CURVES 11-1
12.0 APPENDIX E: LATERAL PUSH-OVER CURVES 12-1

13.0 APPENDIX F: DRIVEABILITY ANALYSIS PLOTS ON NEW TRESTLE PILES..... 13-1
14.0 APPENDIX G: EFFECTS OF LIQUEFACTION ON FOUNDATION MEMO 14-1
15.0 APPENDIX H: 6×6 MATRICES 15-1
16.0 APPENDIX I: NONLINEAR PUSHOVER ANALYSES 16-1

TABLES

TABLE 2-1: IDEALIZED SOIL PROPERTIES ALONG THE BRIDGE 2-3
TABLE 4-1: SUMMARY OF FOUNDATION INFORMATION FOR BRIDGE PIERS 4-11
TABLE 4-2: SUMMARY OF FOUNDATION INFORMATION FOR TRESTLE BENTS 4-12
TABLE 4-3: END BEARING AND FRICTIONAL FACTORS (K_C, α) USED IN THE LCPC METHOD 4-13
TABLE 4-4: TRI-LINEAR SOIL SPRINGS FOR PILE CAPS 4-14
TABLE 4-5: SUMMARY OF DRIVEABILITY ANALYSIS RESULT FOR NEW EAST TRESTLE PILES 4-15
TABLE 4-6: SUMMARY OF DRIVEABILITY ANALYSIS RESULT FOR NEW WEST TRESTLE PILES 4-16

FIGURES

FIGURE 1-1: LOCATION AND PHOTO OF DUMBARTON TOLL BRIDGE 1-4
FIGURE 1-2: PHOTOS OF DUMBARTON TOLL BRIDGE 1-5
FIGURE 1-3: PHOTOS OF DUMBARTON TOLL BRIDGE 1-6
FIGURE 2-1: GEOLOGICAL FORMATIONS OF SAN FRANCISCO BAY AREA 2-4
FIGURE 2-2: MAJOR FAULT SYATEM IN SAN FRANCISCO BAY AREA 2-5
FIGURE 2-3: IDEALIZED SOIL PROFILE ALONG DUMBARTON BRIDGE 2-6
FIGURE 3-1: UNIFORM HAZARD SPECTRA AND MCE SPECTRA (SPECTRAL ACCELERATION) 3-5
FIGURE 3-2: REFERENCE ROCK SPECTRA FOR THE SAFETY EVALUATION EARTHQUAKE 3-6
FIGURE 3-3: IN-SITU SHEAR WAVE VELOCITY DATA 3-7
FIGURE 3-4: ARS DESIGN CURVES FOR SAFETY EVALUATION EARTHQUAKE (SEE) 3-8
FIGURE 4-1: DUMBARTON BRIDGE PIERS 4-17
FIGURE 4-2: NORMALIZED *t-z*, *q-u* AND *p-y* CURVES FOR SOFT CLAY AND SAND 4-18
FIGURE 4-3: BEARING CAPACITY FACTOR N_q VERSUS INTERNAL FRICTION ANGLE 4-19
FIGURE 4-4: MODELLING OF AXIAL LOAD VERSUS DEFORMATION BEHAVIOR 4-20
FIGURE 4-5: AXIAL PILE CAPACITY VERSUS PIER NUMBER OF DUMBARTON PIERS 4-21
FIGURE 4-6: CALCULATION RESULTS OF PILE BEARING CAPACITY BY CPeT-IT (S27) 4-22
FIGURE 4-7: COEFFICIENTS (C_1, C_2, C_3) AND INITIAL MODULUS (K) AS FUNCTION OF ϕ' 4-23
FIGURE 5-1: FOUNDATION MODELING SCHEMES FOR SOIL-STRUCTURE INTERACTION 5-7
FIGURE 5-2: COMPLETE MODEL FOR SOIL-STRUCTURE INTERACTION 5-8
FIGURE 5-3: SUBSTRUCTURE MODEL 2 FOR SOIL-STRUCTURE INTERACTION 5-9
FIGURE 5-4: MODEL FOR FOUNDATION MASS 5-1
FIGURE 5-5: FOUR MODELS USED FOR DUMBARTON PIER 23 5-2
FIGURE 5-6: COMPARATIVE STUDY RESULTS FOR DUMBARTON PIER 23 5-3

1.0 INTRODUCTION

This project was conducted under a contract (contractually known as Dumbarton and Antioch Toll Bridge Geotechnical Investigation) with the Bay Area Toll Authority (BATA), while the California Department of Transportation (Caltrans) provided technical oversight. The geotechnical investigation was conducted for the Dumbarton Toll Bridge and Antioch Toll Bridge separately, and a number of reports were prepared for each of the two bridges.

This report presents the results of foundation analyses undertaken by Earth Mechanics, Inc. (EMI) as part of larger geotechnical investigation for the seismic evaluation of the Dumbarton Toll Bridge in the San Francisco Bay of California. The materials covered in this report are primarily related to foundation evaluation, pile capacity estimates, and soil-structure interaction. While geology and subsurface conditions, and ground motion study are briefly discussed in this report, two separate reports have been prepared to document these subjects in details.

1.1 Background

The Dumbarton Toll Bridge crosses the southern San Francisco Bay via California State Highway 84, and connects the cities of East Palo Alto, San Mateo County (southwest) and Newark, Alameda County (northeast). This 1.63 mile-long bridge is the southernmost of the highway bridges spanning the San Francisco Bay. The location of the Dumbarton Bridge and photograph of the structure are shown in Figure 1-1.

The existing Dumbarton Toll Bridge was designed in the late 1970's and the construction was completed in 1982, replacing the original 1927-era structure located 90 feet south of the existing bridge; portions of the earlier structure exist today as fishing piers. The bridge consists of the Main Channel crossing, East and West Approaches, and a Trestle structure at the end of each Approach structure. The bridge has three lanes in each direction and a separated bike/pedestrian lane on the eastbound side. A 340 foot center span provides 85 feet of vertical clearance for shipping. The approach spans on both sides of the Bay are of pre-stressed lightweight concrete girders supporting a lightweight concrete deck. The center spans are twin steel trapezoidal girders which also support a lightweight concrete deck.

While the Dumbarton Toll Bridge construction incorporated seismic resistant features as required by the post-1971 San Fernando earthquake codes, recent significant changes in seismic design practice prompted Caltrans to set off vulnerability studies in 2004 (Caltrans, 2005). The studies were unable to conclusively determine the performance of the bridge during a design earthquake normally adopted for this kind of bridge. The studies found that a comprehensive geotechnical study was necessary to determine whether seismic retrofit work is needed for the bridge, thus initiating the onset of this project. The findings from this project provide necessary geotechnical data for the development of seismic retrofit strategy finalized in early 2009.

1.2 Scope of Work

The overall geotechnical investigation program conducted by EMI consists of the following three major elements for the Dumbarton Toll Bridge:

Geotechnical Site Characterization: A number of soil borings (both marine and on-land), CPT soundings (marine and on-land), geophysical measurements, in-situ testing, laboratory testing, subsurface interpretation, and characterization of engineering properties of soils are performed. The operation of the field program, findings from the in-situ and laboratory testing, Logs-of-Test Borings (LOTBs), and the interpreted subsurface conditions are documented in an EMI report entitled "Geotechnical Site Characterization for Dumbarton Bridge Seismic Retrofit Project."

Ground Motion Study: The ground motion study includes probabilistic and deterministic seismic hazard analyses, development of reference rock motion criteria for the Safety Evaluation Earthquake (SEE) and Functional Evaluation Earthquake (FEE) events, generation of spectrum compatible time histories for site response analyses, and kinematic soil-structure interaction analyses to develop ARS (Acceleration Response Spectrum) design curves and pier-specific kinematic time histories. The findings are documented in an EMI report is entitled "Ground Motion Study for Dumbarton Bridge Seismic Retrofit Project."

Foundation Analysis: Detailed analyses of the foundations are conducted. The analyses include characterizations of lateral soil supports (*p-y* curves), and axial soil supports (*t-z* and *q-u* curves) along the pile. Pile capacity evaluations are conducted by performing axial and lateral load-deformation analyses on a single pile. The pile groups are characterized by linearized 6×6 stiffness and mass matrices to be used in a global bridge model for seismic response evaluation. The results are provided in this report entitled "Foundation Analysis for Dumbarton Bridge Seismic Retrofit Project."

1.3 Organization of the Report

In addition to this introductory section, the report has been organized into the following sections:

- Section 2 – Local geology and geotechnical conditions are briefly described including idealized subsurface conditions along the bridge alignment and the soil profile and geotechnical soil parameters at individual pier location;
- Section 3 – Site ground motion study is briefly summarized, which includes development of ARS design curves, site response analyses and kinematic motions analyses for selected piers;
- Section 4 – The foundation system of the existing bridge is described, and its foundation performance is evaluated in terms of axial loading conditions and lateral loading conditions;
- Section 5 – The condensed matrices of stiffness and mass at the bottom of pile-cap for each pier are presented according to soil-structure interaction analysis, and

a verification study of our sub-structuring scheme on a selected pier is included;

- Section 6 – Our main conclusions are summarized.

FIGURE 1-1: LOCATION AND PHOTO OF DUMBARTON TOLL BRIDGE

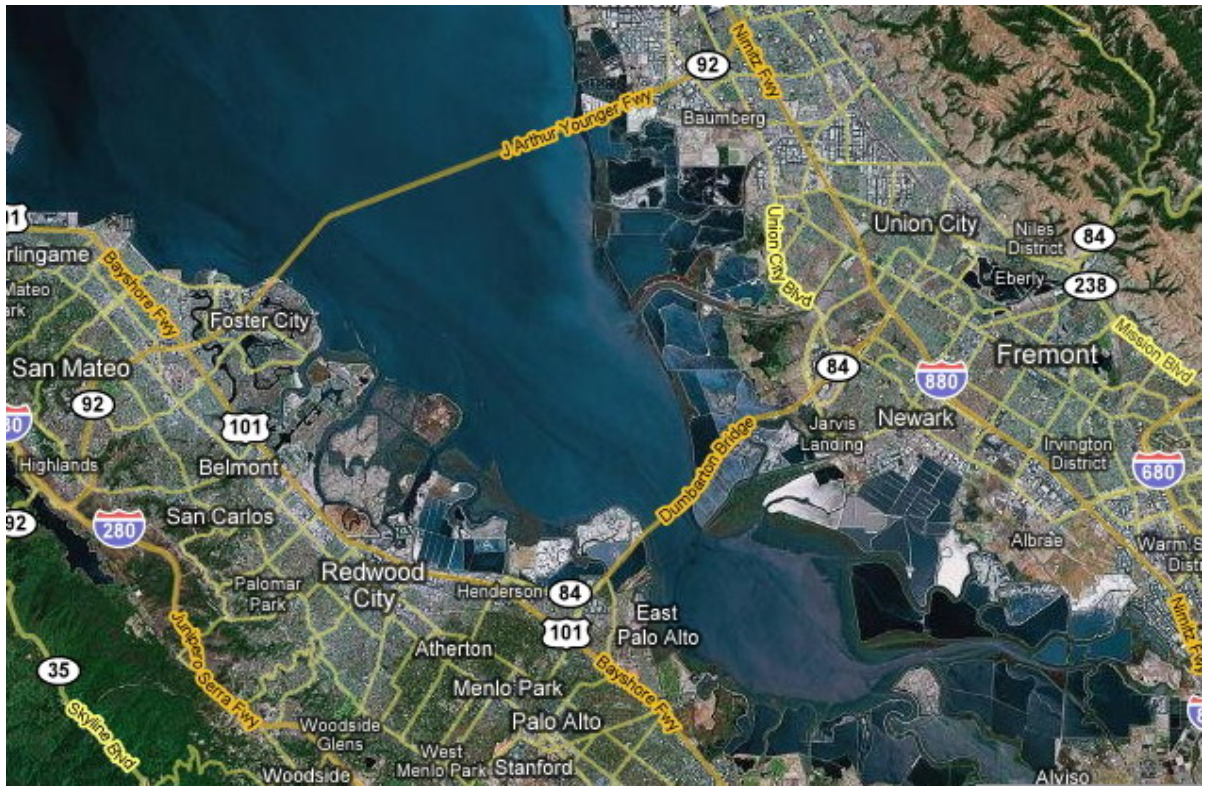


FIGURE 1-2: PHOTOS OF DUMBARTON TOLL BRIDGE

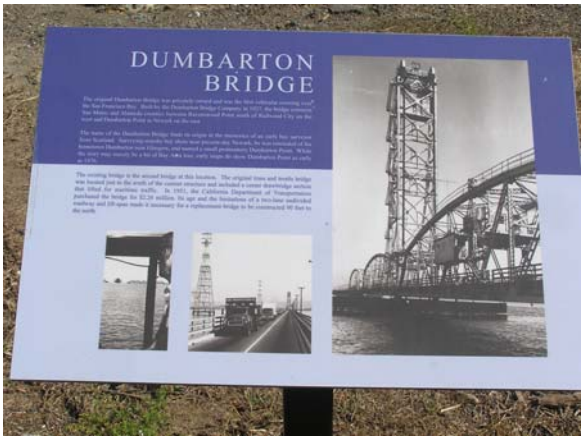


FIGURE 1-3: PHOTOS OF DUMBARTON TOLL BRIDGE

2.0 SUBSURFACE CONDITIONS

This section presents a brief summary of local geology, idealized subsurface conditions, and soil strata for each pier location according to site investigation results along the bridge alignment in order to support the foundation analyses of the Dumbarton Bridge. Detailed descriptions for the field program including soil boring, geophysical testing, laboratory testing, geotechnical interpretation, and logs of test boring, are provided in a dedicated report entitled "Geotechnical Site Characterization for Dumbarton Bridge Seismic Retrofit Project."

2.1 Local Geology

The Dumbarton Bridge spans the southern San Francisco Bay in the central Coast Ranges, a geomorphic sub-province of the California Coast Ranges which consists of several fault-bound blocks. Among these blocks, the Dumbarton Bridge lies in the southern San Francisco Bay-Santa Clara Valley block, which is a relatively shallow structural valley bound by the Santa Cruz Mountains to the west-southwest and the East Bay Hills to the east. The San Francisco Bay is a fairly young topographic unit formed during later stages of uplift of the central Coast Ranges from 4.0 to 0.47 million years ago. Figure 2-1 (source: http://sfgeo.wr.usgs.gov) depicts the geological formations of this region. The underlying formations in sequence from top to bottom are recent (late Pleistocene to present) sedimentation, non-marine Pliocene-Pleistocene sedimentary rock, Tertiary marine sedimentary rock, and Late Jurassic to Cretaceous-aged Franciscan Complex rocks.

The seismicity of the San Francisco Bay area is largely controlled by the northwest trending, right-lateral San Andreas fault system, comprised of several major and minor fault strands as shown in Figure 2-2 (source: http://sfgeo.wr.usgs.gov). A total of 15 earthquakes of moment magnitude (M) $\geq$ 6.0 occurring in this area from 1850 to present are associated with the San Andreas fault system. In the vicinity of the Dumbarton Bridge, the San Francisco Bay-Santa Clara Valley block is bound by two major faults, namely the main trace of the San Andreas fault situated 9 miles west of the Bridge west end and the Hayward fault located approximately 8 miles east of the Bridge east end. Depending upon fault rupture in part or as a whole, USGS Working Group on Earthquake Probabilities in Northern California (WG, 2003) stated that the San Andreas fault might be capable of generating earthquakes with estimated mean magnitude (M) varying from 7.0 to 7.7, and the Hayward fault as the most likely source of the next major earthquake in the Bay area could initiate earthquakes with estimated mean magnitude (M) varying from 6.7 to 7.0.

2.2 Idealized Subsurface Conditions

As part of the geotechnical investigation program, EMI conducted extensive site explorations in the marine and on-land areas for the Dumbarton Bridge, with borings and CPT probing penetrating to depths of about 250 ft below the modern southern San Francisco Bay surface. A few soil borings drilled by Caltrans in 1995 reached over 600 feet in depth, at which Franciscan Rock was

encountered. A separate site characterization report has been prepared for the project documenting geology, site investigation, field and laboratory testing, and interpretation of geotechnical conditions along the bridge. The materials and sediments underlying the bridge, which belong to the late Pleistocene to Holocene deposition, is a typical of the San Francisco Bay geology. According to the current investigation results and previous work, the in-situ lithological units can be interpreted and grouped into the following principal strata:

- Fill – Silty clay and silty sand present from elevation +10 ft to -10 ft, underlying the Trestles at both ends of the bridge;
- Young Bay Mud (YBM) – Marine clay underlies the fills, generally found underneath both Approaches and Trestles from elevation 0 to -40 ft;
- Posey Sand – River sand can be found throughout the bridge alignment from elevation -40 ft to -80 ft;
- San Antonio Formation (SAF) – Stiff to very stiff clay can be found from elevation -70 ft to -140 ft;
- Old Bay Mud (OBM) – Very stiff to hard marine clay, found from elevation -120 ft to -190 ft;
- Alameda Formation – Very dense sand and gravel, and very hard clay can be found below elevation -190 ft;
- Franciscan Formation – Sedimentary bedrock, expected at elevation -600 feet.

Figure 2-3 presents the idealized subsurface soil profile developed along the bridge. Within the limit of bridge alignment, the subsurface conditions underlying the site are rather uniform and flat-lying, with minor variation only near the region between Piers 30 and 34.

2.3 Generalized Soil Strata and Property Data for Each Pier

As described in the following sections, various foundation analyses were conducted along the bridge, which required the soil profile and engineering property data at each pier location. Table 2-1 presents the idealized soil properties adopted for the different lithological units at the site. Because the San Antonio Formation (SAF) has the engineering properties similar to those of Old Bay Mud (OBM), the symbol OBM used in the following represents both of SAF and OBM. Generalized soil strata at all Dumbarton Bridge piers and Trestle bents are presented in Appendix A, in which engineering soil properties used and foundation data are also included.

TABLE 2-1: IDEALIZED SOIL PROPERTIES ALONG THE BRIDGE

Soil Profile I: West Trestle Abut W01 ~ West Approach Pier P02 (Sta. 456+00 ~ 464+00)

Soil Layer	Top Elevation (ft)	γ (pcf)	c (psf)	ε_{50}	ϕ (°)	k (pci)	V_s (fps)
Fill	+2 ~ +6	110	800	0.01	-	-	350~400
YBM	-21 ~ -4	100	300	0.02	-	-	300~350
Sand	-52 ~ -43	120	-	-	35	80	450~600
OBM/SAF	-95 ~ -82	120	4000	0.005	-	-	600~900
UAF	-190	125	-	-	-	-	900~1050

Note: YBM - Young Bay Mud; OBM - Old Bay Mud; SAF - San Antonio Formation; UAF - Upper Alameda Formation.

Soil Profile II: West Approach Pier P03 ~ Pier 16 (Sta. 465+00 ~ 484+00)

Soil Layer	Top Elevation (ft)	γ (pcf)	c (psf)	ε_{50}	ϕ (°)	k (pci)	V_s (fps)
YBM	-10 ~ -1	100	300	0.02	-	-	300~350
Firm Clay[1]	-48 ~ -40	110	800	0.01	-	-	350~400
Sand	-56 ~ -47	120	-	-	35	80	450~600
OBM/SAF	-94 ~ -63	120	4000	0.005	-	-	600~900
UAF	-190	125	-	-	-	-	900~1050

Note: [1] does not appear between Pier 03 and Pier 08.

Soil Profile III: Main Channel Pier P17 ~ Pier 26 (Sta. 486+00 ~ 506+00)

Soil Layer	Top Elevation (ft)	γ (pcf)	c (psf)	ε_{50}	ϕ (°)	k (pci)	V_s (fps)
YBM[1]	-38 ~ -18	100	300	0.02	-	-	300~350
Firm Clay[2]	-47 ~ -39	110	800	0.01	-	-	350~400
Sand	-55 ~ -44	120	-	-	35	80	450~600
OBM/SAF	-80 ~ -66	120	4000	0.005	-	-	600~900
UAF	-190	125	-	-	-	-	900~1050

Note: [1] does not appear between Pier 19 and Pier 24; [2] does not appear between Pier 20 and Pier 23.

Soil Profile IV: Main Channel Pier P27 ~ East Approach Pier 41 (Sta. 507+00 ~ 531+00)

Soil Layer	Top Elevation (ft)	γ (pcf)	c (psf)	ε_{50}	ϕ (°)	k (pci)	V_s (fps)
YBM[1]	-4 ~ +7	100	300	0.02	-	-	300~350
Firm Clay[2]	-39 ~ -27	110	800	0.01	-	-	350~400
Sand	-64 ~ -37	120	-	-	35	80	450~600
OBM/SAF	-103 ~ -70	120	4000	0.005	-	-	600~900
UAF	-190	125	-	-	-	-	900~1050

Note: [1] a sand sub-layer 3'~10' thick appears between Pier 30 and Pier 34; [2] does not appear in Piers 28, 29, 33.

Soil Profile V: East Approach Pier 42 ~ West Trestle Abut E01 (Sta. 532+00 ~ 542+00)

Soil Layer	Top Elevation (ft)	γ (pcf)	c (psf)	ε_{50}	ϕ (°)	k (pci)	V_s (fps)
Fill	+6 ~ +10	110	800	0.01	-	-	350~400
YBM	-5 ~ +5	100	300	0.02	-	-	300~350
Firm Clay	-39 ~ -28	110	800	0.01	-	-	350~400
Sand	-54 ~ -37	120	-	-	35	80	450~600
OBM/SAF	-100 ~ -69	120	4000	0.005	-	-	600~900
UAF	-200	125	-	-	-	-	900~1050

FIGURE 2-1: GEOLOGICAL FORMATIONS OF SAN FRANCISCO BAY AREA

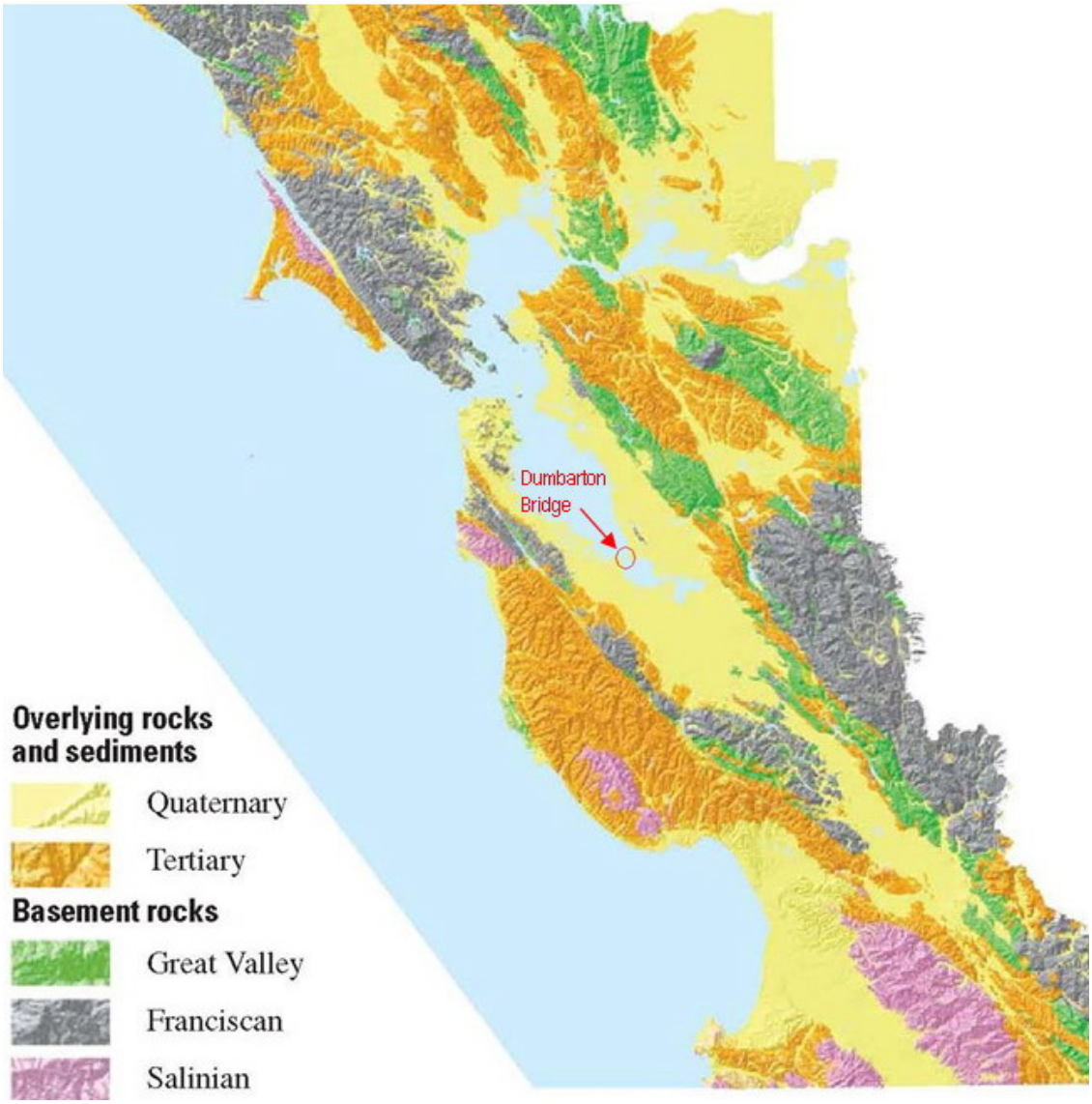


FIGURE 2-2: MAJOR FAULT SYATEM IN SAN FRANCISCO BAY AREA

FIGURE 2-3: IDEALIZED SOIL PROFILE ALONG DUMBARTON BRIDGE

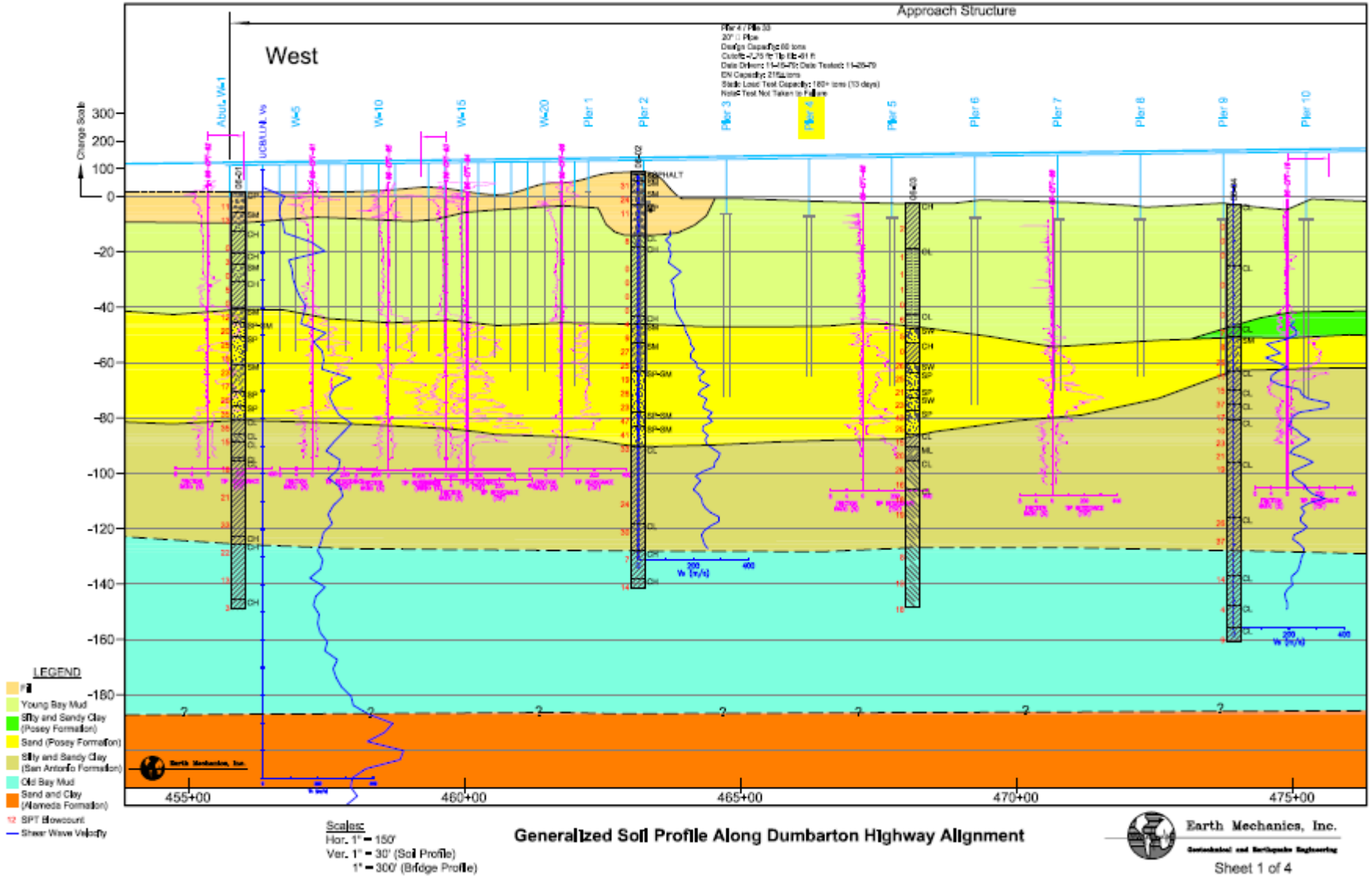


FIGURE 2-3: IDEALIZED SOIL PROFILE ALONG DUMBARTON BRIDGE (Cont.)

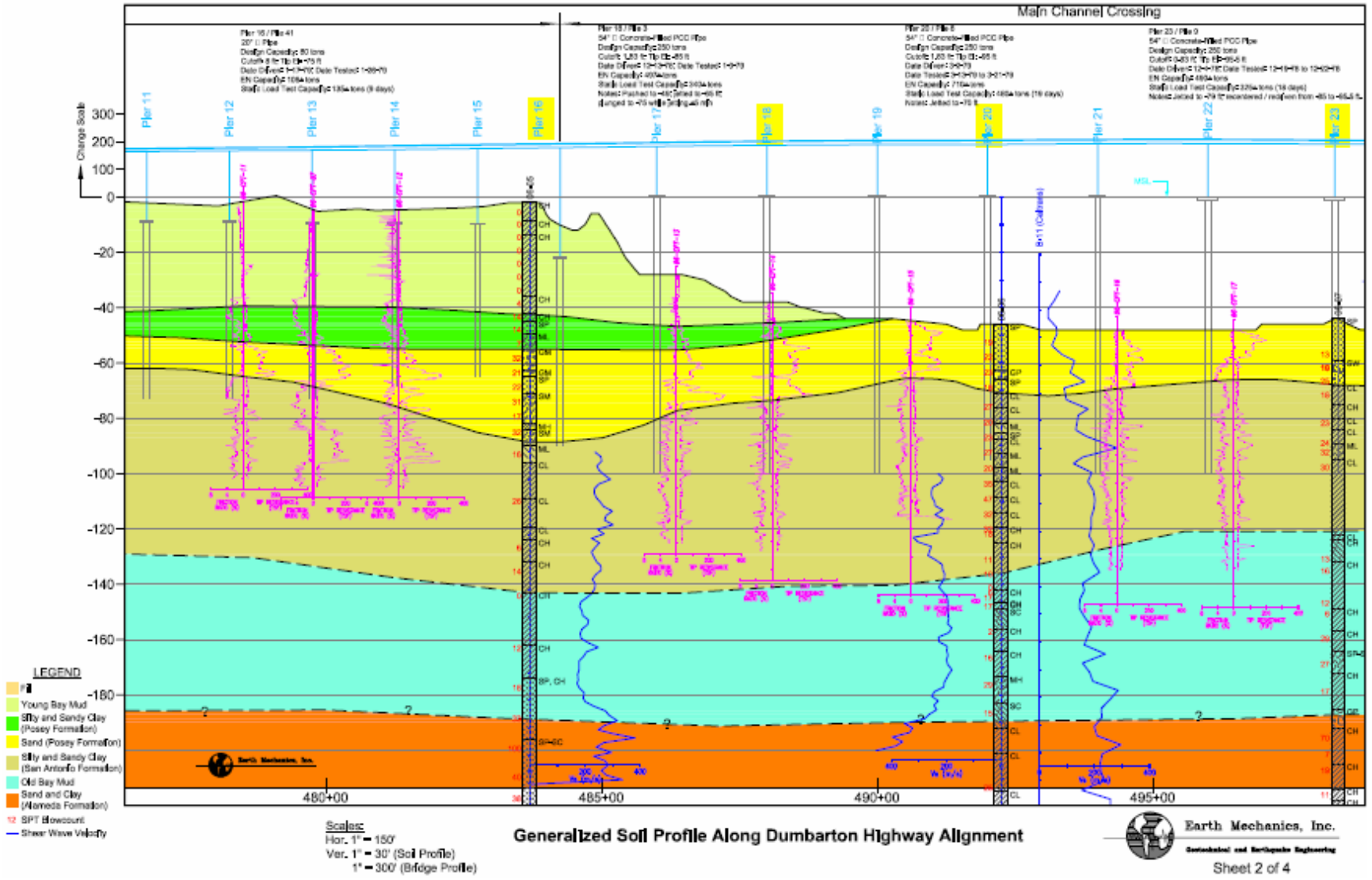


FIGURE 2-3: IDEALIZED SOIL PROFILE ALONG DUMBARTON BRIDGE (Cont.)

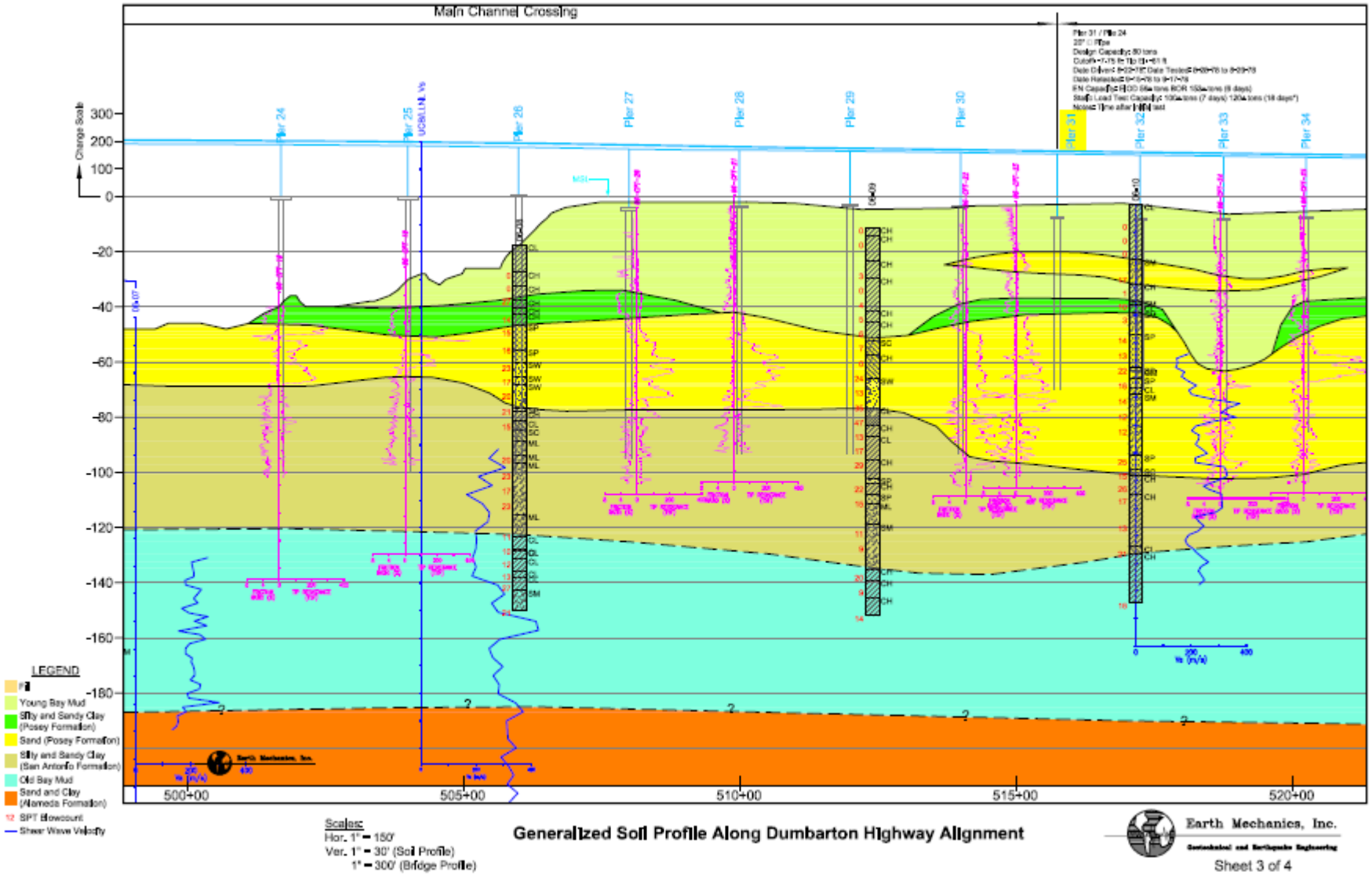
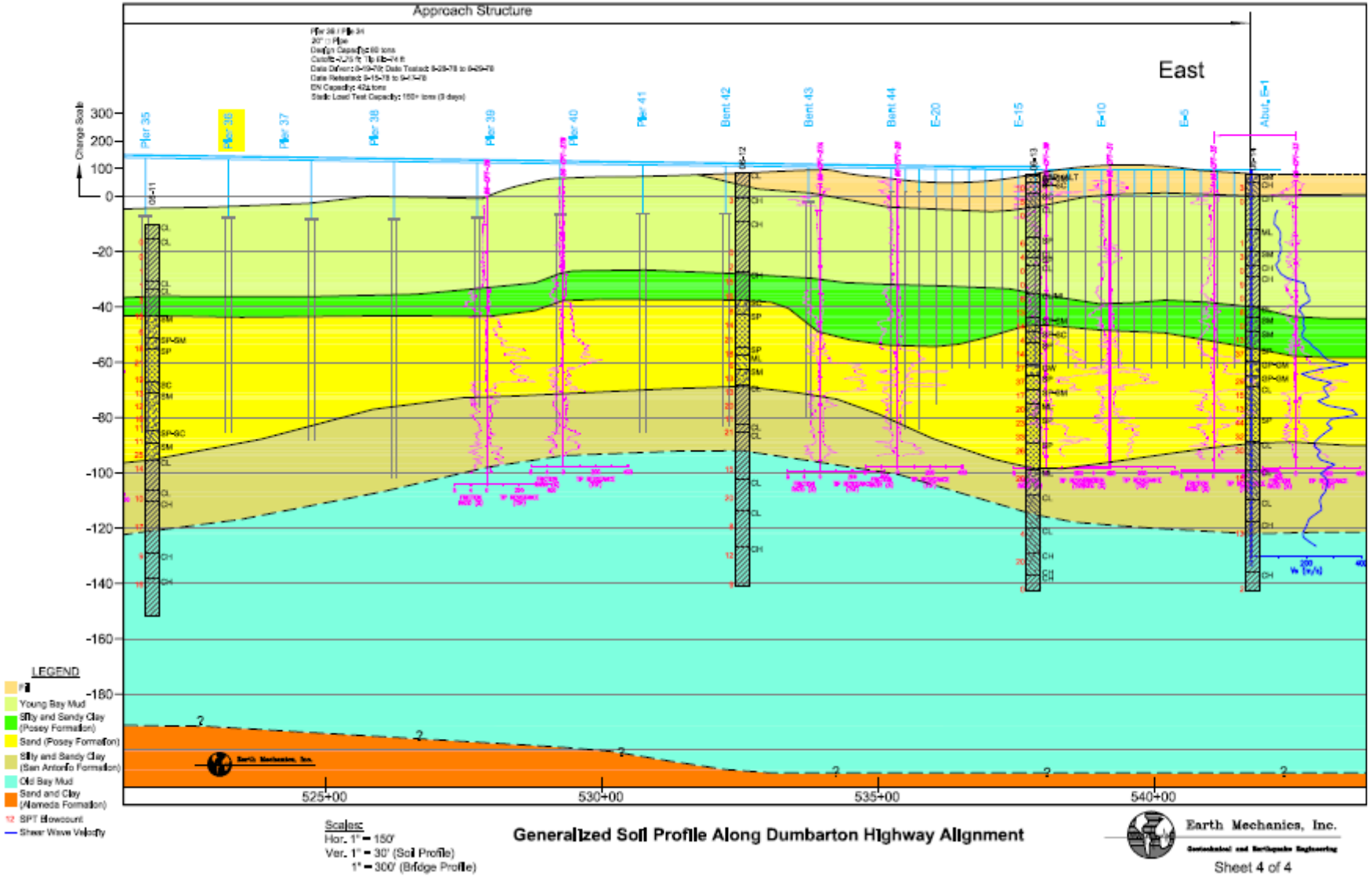


FIGURE 2-3: IDEALIZED SOIL PROFILE ALONG DUMBARTON BRIDGE (Cont.)



3.0 GROUND MOTIONS

This section presents a brief summary of ground motion study work. Details can be found in a separate ground motion report entitled "Ground Motion Study for Dumbarton Bridge Seismic Retrofit Project," which has been prepared for documenting probabilistic and deterministic seismic hazard study, spectrum-compatible earthquake time histories, site response analysis, and soil-structure interaction analysis in depth with supporting tables and illustrations.

3.1 Seismic Hazard Study

The analytical technique adopted for the probabilistic seismic hazard analysis (PSHA) follows the original work developed by Cornell (1968), except with the extension considering both the aleatory variability and the epistemic uncertainty of ground motion prediction. The Hayward and San Andreas Faults contribute much of the seismic hazard at the site, due to their close distances and high activity rates. The seismic source characterization is based on the 2003 USGS Working Group on Earthquake Probabilities in Northern California (WG, 2003), involving Poisson and non-Poisson models of the earthquake recurrence.

Five attenuation relationships developed as part of PEER Next Generation Attenuation (NGA) program were used in the probabilistic seismic hazard analysis. These attenuation relations were made for a spectral damping of 5% and adjusted to account for near-fault directivity effects. The near-fault directivity effects were based on a modified form of the Somerville et al. (1997) fault-rupture directivity model (as described in Abrahamson, 2000), comprising two period-dependent scaling factors: one dealing with the increase in shaking intensity in the average horizontal component and another reflecting the directional nature of the shaking intensity.

Uniform hazard spectra (UHS) at six return periods (100-, 300-, 475-, 1,000-, 1,500- and 2,000-years) were then computed, including the fault normal (FN) and fault parallel (FP). Figure 3-1 shows a series of uniform hazard spectra for the FN component, as well as the result of deterministic analyses conducted for the San Andreas and Hayward faults using 50th percentile (mean) and 84th percentile (mean plus one standard deviation). Vertical spectrum was developed from a V/H ratio applied to the average of the fault normal and fault parallel components.

From discussions with Caltrans and the Seismic Peer Review Panel for the toll bridges, the 1,000-year return period ground motion was considered appropriate and selected as the Safety Evaluation Earthquake (SEE) for seismic retrofit evaluation of the Dumbarton Bridge. Figure 3-2 presents the reference rock spectra for the SEE scenario showing the fault normal (FN), fault parallel (FP), and vertical components. For the Functional Evaluation Earthquake (FEE), a 100-year return period is adopted.

3.2 Spectrum Compatible Time Histories

Seven sets of spectrum compatible time histories were developed by modifying seed motions (usually actual earthquake records) so that their spectra are similar to the SEE reference rock spectra. Various methods have been developed to perform the spectrum matching. A commonly used method adjusts the Fourier amplitude spectrum based on the ratio of the target response spectrum to the time history response spectrum while keeping the Fourier phase of the reference history fixed. An alternative approach adjusts the time history in the time domain by adding wavelets to the reference time history which used in this project.

As part of the spectral matching procedure, a baseline correction was also applied to the ground motions in acceleration, velocity, and displacement. The baseline is computed by fitting the displacement time history to a high order polynomial (order 4 to 7) and excluding the constant and linear terms. The second derivative of this displacement baseline is computed and it is subtracted from the acceleration ground motion.

The project team selected to use the same six sets of seed motions from the East Span San Francisco – Oakland Bay Bridge. Additional seed motion from the 1999 Taiwan Earthquake was added to the pool to create a total of seven sets of time histories for use in the safety evaluation of the Dumbarton Bridge.

3.3 Seismic Response and Kinematic SSI Analysis

For development of ARS design criteria, seven representative piers were selected to conduct site response and kinematic soil-pile interaction analyses. The seven selected piers are: Piers 2, 9, and 15 within West Approach (20-inch diameter steel pipe piles with a buried pile cap); Piers 17 and 23 within Main Span (54-inch diameter concrete hollow piles with a long cantilever pile length above mud-line); Piers 30 and 43 within East Approach (20-inch diameter steel pipe piles with a buried pile cap).

Small-strain shear modulus G_{max} is best estimated from shear wave velocity values that are measured in the field and by using the relationship of $G_{max} = \rho V_s^2$, where ρ is mass density and V_s is shear wave velocity. The measured shear wave velocities from the in-situ boreholes are presented in Figure 3-3. Soil dynamic properties in terms of normalized shear modulus and damping curves have been studied by many researchers. For the site response analyses, we adopted the Seed et al. (1986) relationship for sand and the Vucetic and Dobry (1991) for clays. To deal with potential variations in the determination of in situ soil properties, the following parametric studies were considered: 1) the best-estimate case established from the down-hole shear wave velocity measurements; 2) a lower bound case; and 3) an upper bound case. Scaling factors of 0.75 and 1.25 were used as multiplication factors on the best-estimate shear-wave velocity for lower and upper bound scenarios.

Site response analyses were conducted using the computer program SHAKE91 (Idriss and Sun, 1992), an equivalent linear analysis. The program SHAKE91 has been used for solving one-

dimensional shear wave propagation problems for three decades. Engineers have accumulated knowledge from the performance of SHAKE in predicting ground response during earthquakes. To avoid unrealistic prediction of free-field motion for a long soil column, a relatively short soil column was used for our site response analyses. A transmitting boundary was selected near Elevation (El.) -250 feet where an average shear wave velocity is 400 meters per second, which was a controlling parameter in the NGA attenuation models.

To rigorously develop the design response spectra for the pile-supported structure, soil-pile interaction was considered. The method is based on a linear theory making use of the sub-structuring procedure (see Section 5 for detail). The first step involved linearization of *p-y* curves by performing lateral pushover analysis of a single pile to a representative displacement level expected during the earthquake. A pile foundation model was then created in which each pile was supported on elastic soil springs that were excited by depth-varying, free-field motions computed from the site response analyses. Sub-structuring was performed to compute resultant forces acting at the pile-cap level. The resultant forces were divided by the foundation stiffness to result in so-called kinematic motions. The kinematic motions formed the basis for development of ARS design curves for the bridge structure. The kinematic motion is calculated at the pile cap level and implicitly contains the statically condensed forces transmitted from the ground to the superstructure along the entire embedded pile length. Therefore, the effects of the depth-varying shaking intensity in the soil column, the depth-varying soil stiffnesses, and the pile properties are included in the solution. The following pile properties were used in conducting kinematic soil-pile interaction analyses:

- 54-inch diameter concrete piles (Main Channel Piers 17 ~ 26)
  Effective pile EI = 8.35×10^{11} lb-in^2. (Infilled section)
  Effective pile EI = 5.83×10^{11} lb-in^2. (Hollow section)
- 20-inch diameter steel pipe piles (the remaining piers)
  Effective pile EI = 3.59×10^{10} lb-in^2.
- 20"×20" square concrete piles (Trestle bents)
  Effective pile EI = 2.40×10^{10} lb-in^2.

A fixed pile head condition was assumed in all the cases. The analyses were conducted with the in-house computer program KIPS, which is dedicated to performing kinematic soil-pile interaction analyses (Earth Mechanics, Inc., 1999). Considering seven motion sets and three levels of shear wave velocity, 21 kinematic spectra (spectral accelerations and displacements) for each selected pier were computed, from which their mean and mean plus one standard deviation spectra were then obtained.

3.4 ARS Design Curves

The shape of response spectra as obtained from the kinematic soil-pile interaction analyses sometimes contains multiple peaks and valleys. For practical use and simplicity for the design process, it was decided that the final ARS recommendations should be constrained by a well-behaved ARS curve shape for both spectral acceleration and displacement (i.e., the final ARS curves should be smooth-out). Discussions with the structure designers led to a decision to keep a

minimum number of ARS design curves for the response spectrum analyses. From a review of the kinematic spectra from the seven piers, it appears that two sets of ARS curves would be adequate to cover horizontal seismic loading for the entire bridge:

- ARS Curve 1: This ARS design curve covers Piers 1 through 16, and Piers 27 through 44, representing 20-inch diameter pipe piles with a buried pile-cap
- ARS Curve 2: This ARS design curve cover Piers 17 through 26, representing 54-inch diameter concrete piles with a long cantilever pile extending above mud-line

For the vertical spectrum, we recommend using the reference vertical motion spectrum from PSHA without further site response analysis. The recommended SEE design spectra for 5 percent damping are presented on Figure 3-4. The Trestles at two ends of the Approaches are supported on pile extensions, and two bents (W10 from West Trestle and E15 from East Trestle) were selected to perform site response and kinematic soil-pile interaction analyses. The procedures were the same as those of the Main Span and the Approaches. Based on the kinematic solutions for Trestle Bents W10 and E15, it was determined that ARS Curve 1 can be used for the Trestles.

FIGURE 3-1: UNIFORM HAZARD SPECTRA AND MCE SPECTRA (SPECTRAL ACCELERATION)

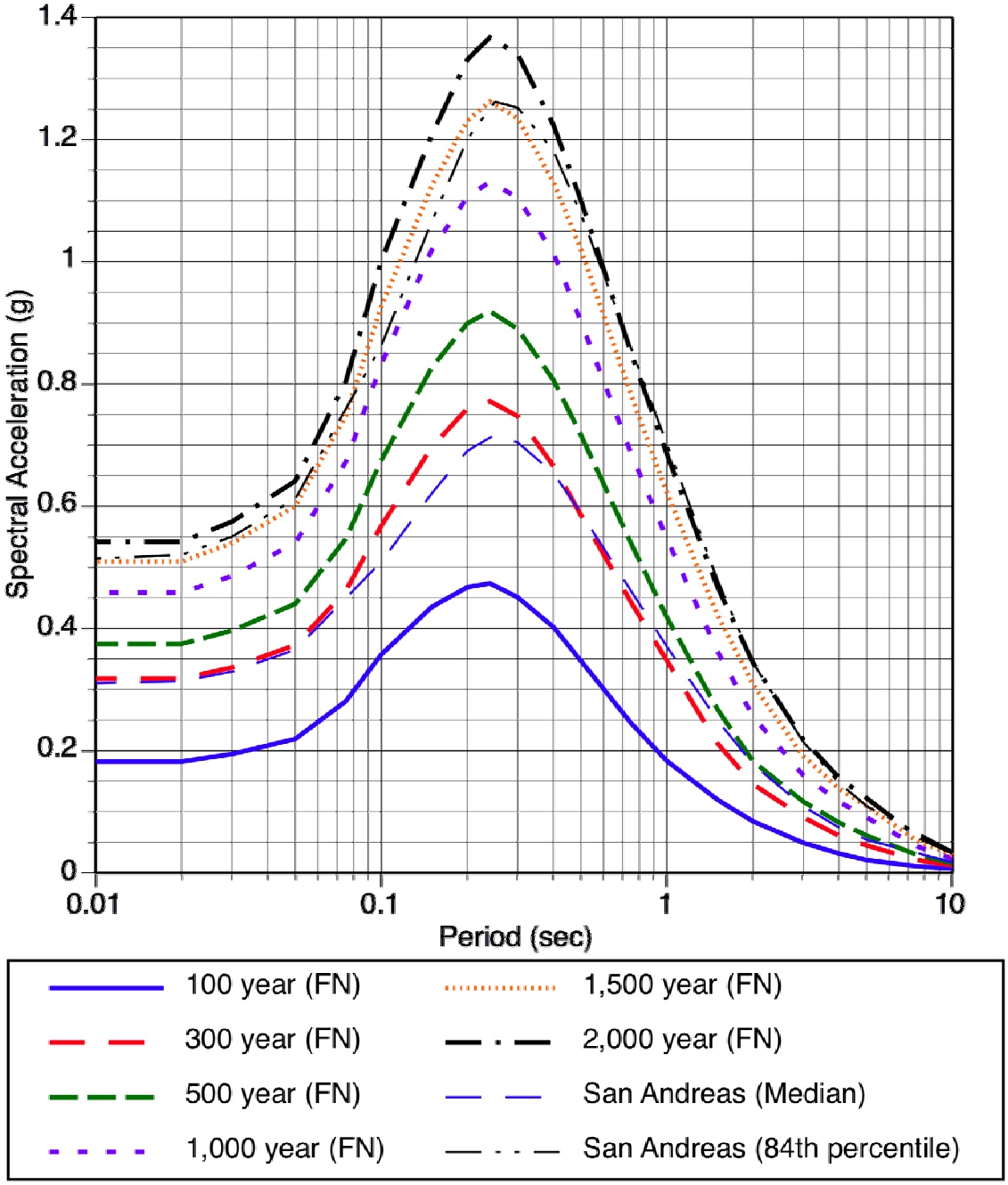


FIGURE 3-2: REFERENCE ROCK SPECTRA FOR THE SAFETY EVALUATION EARTHQUAKE

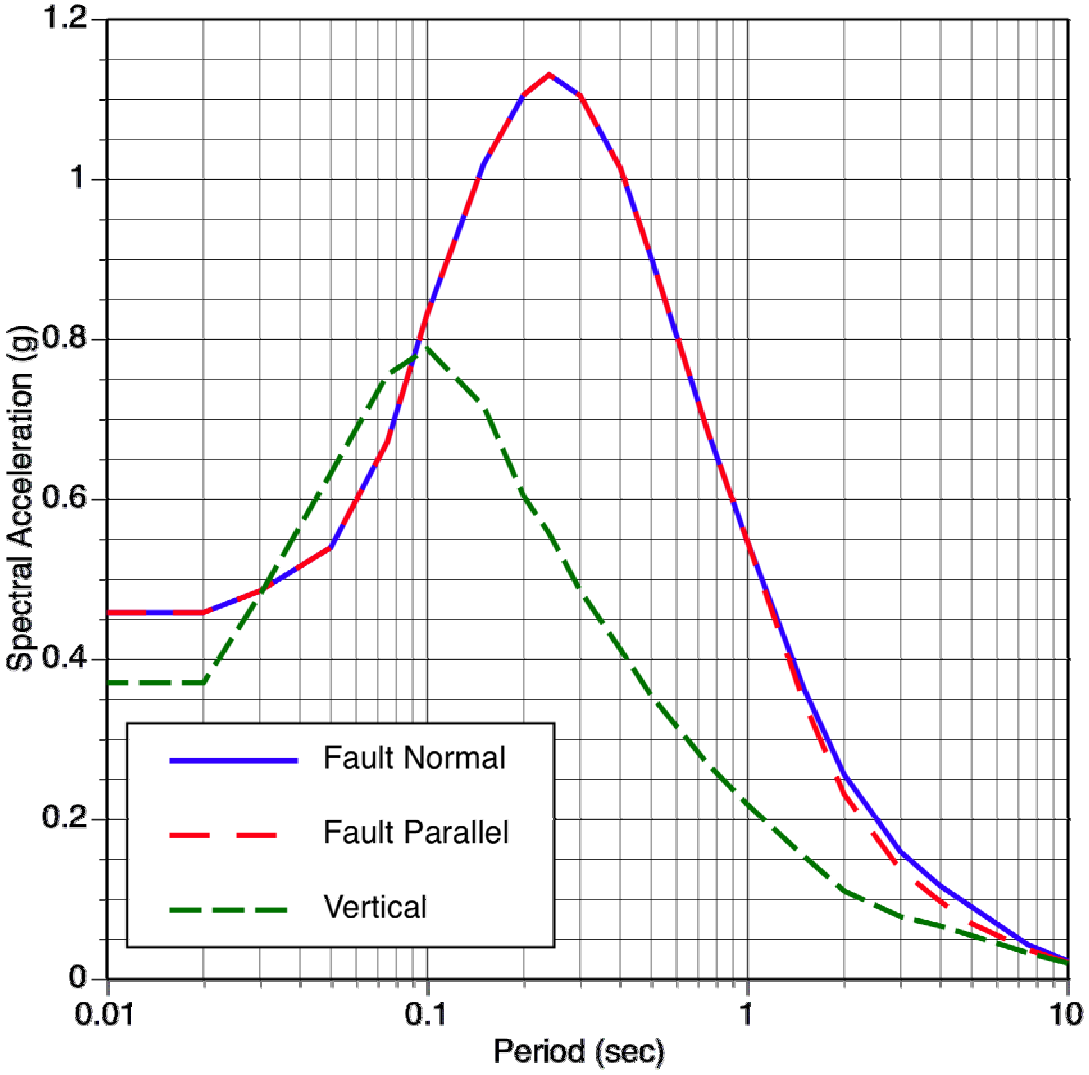


FIGURE 3-3: IN-SITU SHEAR WAVE VELOCITY DATA

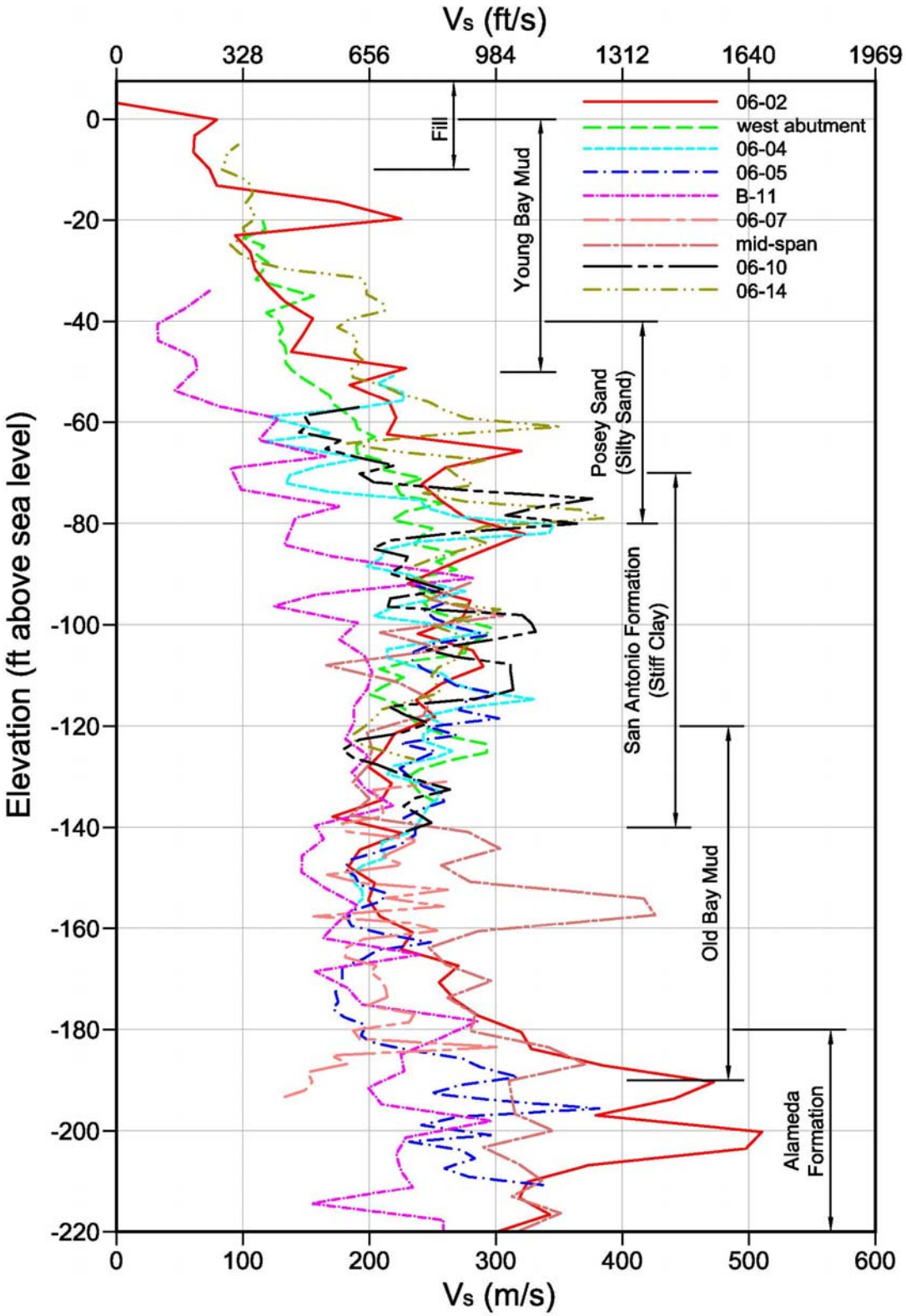
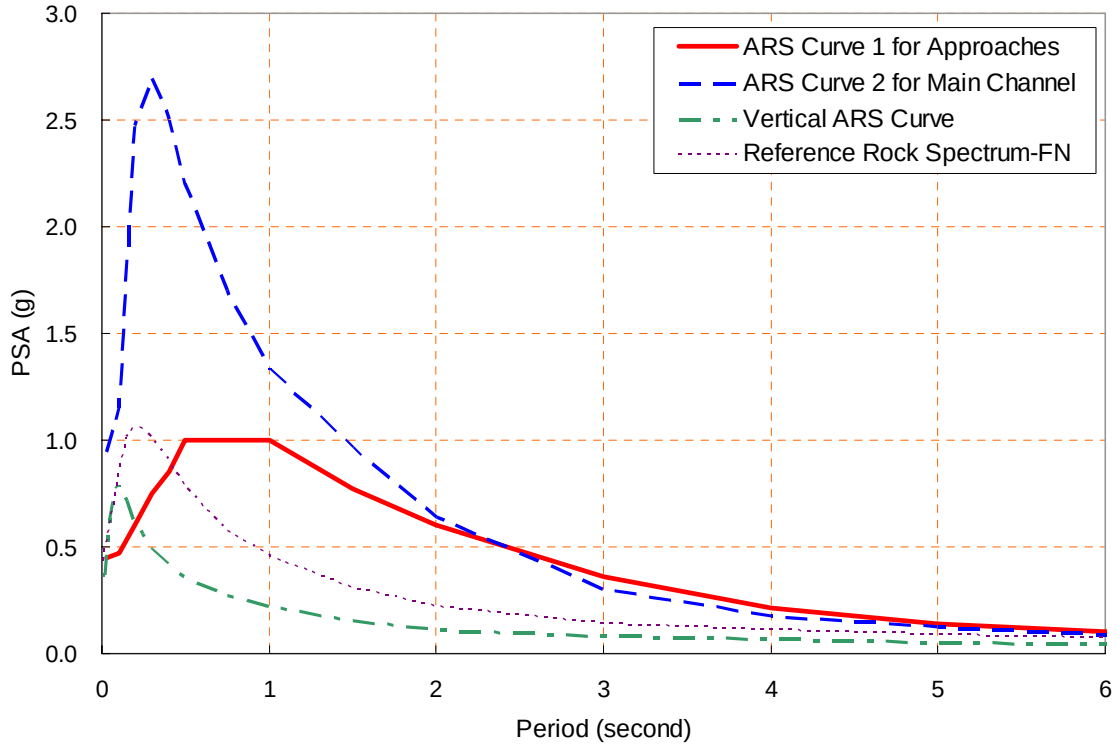
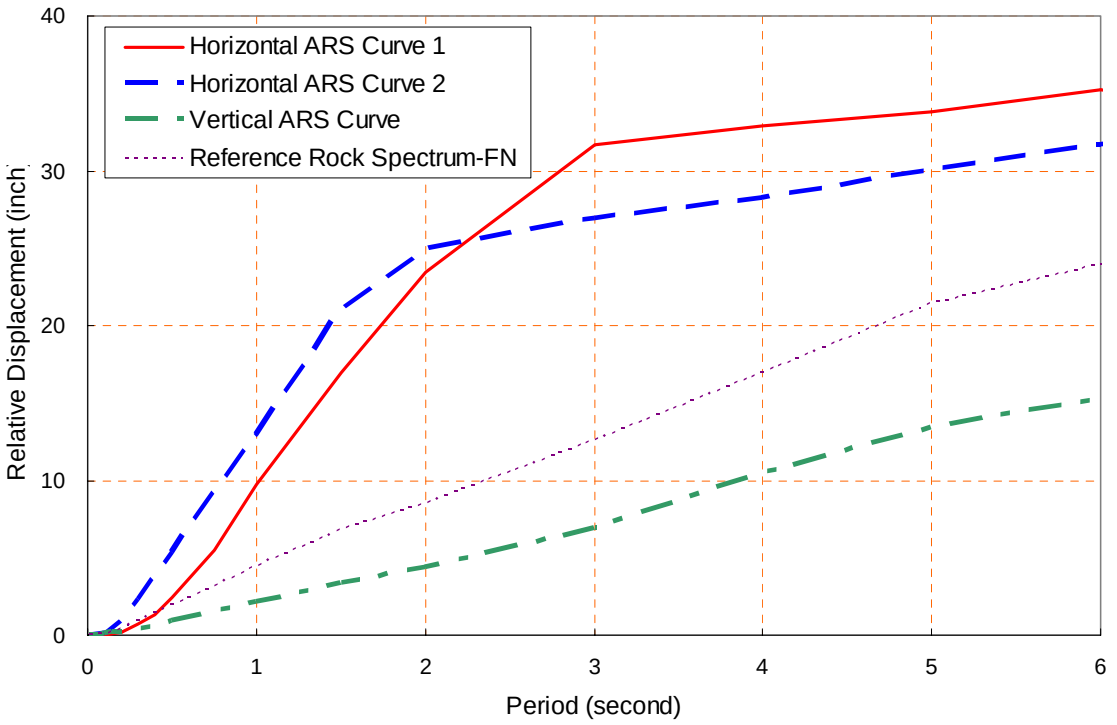


FIGURE 3-4: ARS DESIGN CURVES FOR SAFETY EVALUATION EARTHQUAKE (SEE)





4.0 FOUNDATION EVALUATION

This section presents the description of foundations along the bridge and the important issues in the evaluation of these foundations in terms of axial loading conditions and lateral loading conditions. In addition, soil support characteristics depicting *p-y*, *t-z*, and *q-u* curves for individual pile are tabulated which can be used for pushover analyses and estimating pile capacities. To assist the modeling of the foundations in the global bridge models for seismic response evaluation, foundation stiffness and mass matrices are provided in Section 5.3.

4.1 Foundation Description

The entire existing bridge, consisting of the Main Channel crossing, East and West Approaches, and a Trestle structure at the end of each Approach structure (see Figure 4-1), is supported on pile foundations. Tables 4-1 and 4-2 summarize the number of piles per bent, pile top and pile tip elevations, pile type and size, and design load of the pile for Dumbarton Bridge piers and Trestle bents.

The West Approach is composed of Abutment 1 through Pier 16, each founded on 20-inch diameter steel pipe piles with a buried pile cap. For the Main-Crossing Channel, Piers 17 to 26 are supported on 54-inch diameter concrete hollow piles with a long cantilever pile length (18 ~ 48 feet) above mud-line, while Piers 27 to 30 are founded on 20-inch diameter steel pipe piles with a buried pile cap. The East Approach is composed of Piers 31 to 43 and Abutment 44, each carried by 20-inch diameter steel pipe piles with a buried pile cap. All the 20-inch diameter steel pipe piles had been completely in-filled with concrete from top to tip, while the 54-inch diameter concrete hollow piles had been partially in-filled with concrete from top to a certain elevation below the mudline. The design capacity of a single 20-inch diameter pipe pile is 80 tons, and that of a single 54-inch diameter hollow pile is 250 tons.

All the pile caps are rectangular-shaped in the plan view. The cap width varies from 20 to 39 feet, the cap length varies from 44 to 71 feet, and the cap thickness is between and 2.5 and 8 feet. Piers 23 and 24 in the middle of main crossing channel have the largest cap dimension. The number of piles per pier varies from 21 to 55. The elevation of pile top is between -22 and +1 feet, while that of pile tip is between -100 and -65 feet. The elevation of mudline varies from -48 to +10 feet, with the lowest values near Piers 21 and 22.

The Trestles at two ends of the Approaches are supported on pile extensions of 20"×20" cross-section; each trestle has 20 trestle bents with both the north and south faces supported by pre-cast retaining walls. Among these bents, East Bents 1, 20, and West Bents 1, 20 have narrow pile-caps (cap beam) at the mudline. The design capacity of a single 20"×20" concrete pile is 90 tons. Pile layout for each pier or bent can be also found in Appendix A.

4.2 Axial Loading Conditions

Vertical loads on the foundation are resisted by the underlying piles which are axially loaded. The pile resistance is developed when there is relative movement between the pile and the surrounding soil. The load-displacement relation between the pile shaft and soil is characterized by the so-called *t-z* curve, while that between the pile tip and soil represents the *q-u* curve. For a well-designed pile, the soil adjacent to the pile should provide a sufficient capacity to withstand the applied load without bearing failure so that the pile does not undergo exceeding settlement under the working load condition. In this section, the *t-z* and *q-u* curves of all Dumbarton piers and Trestle bents are presented, their axial load-deformation (Q-δ) curves in terms of pile head load versus pile head displacement relationship are developed, and their ultimate pile bearing capacity values computed using CPT data are compared with the capacity estimated from the conventional pile capacity calculations.

4.2.1 *t-z* and *q-u* Curves

Determination of the ultimate skin friction resistance (t_{max}) and end bearing capacity (q_{max}) as well as development of the *t-z* and *q-u* curves are described in this section. The developed *t-z* and *q-u* curves are used in the following section for generating the Q-δ curves (pile head load vs. pile head deformation), in the soil-structure interaction analysis for forming the 6×6 condensed matrices and kinematic motions (see Section 5-3), and in the finite element analysis of the bridge model for simulating the nonlinear soil springs distributed along the piles.

The ultimate skin friction resistance (t_{max}) in the *t-z* curve can be obtained by multiplying a unit skin friction of soil (f_s) with the pile circumference, and therefore the *t-z* curves are developed per a linear pile length basis. The general formula for soil unit skin friction (f_s) is given in the following equation, depending upon the soil type:

$$sand: \quad f_s = K\sigma_v' \tan\delta$$
$$clay: \quad f_s = \alpha\, c$$

where K is the lateral earth pressure coefficient whose value depends on the pile installation method, σ_v' is the effective overburden pressure, δ is the friction angle between the pile material and the soil as function of soil internal friction angle (ϕ'), c is the undrained shear strength, and α is the adjustment factor depending on (c, σ_v'). In the project, K=1.0 and δ=0.75ϕ' were adopted for sand layers, and α varying from 0.7 to 1.0 was used for clays. The real shape of in-situ *t-z* curves is affected by the pile installation method, the roughness of pile surface, soil type and depth. The *t-z* curve adopted in the project is based on the work developed by Vijayvergiya in 1977, as shown in the following equation in a normalized form:

$$\frac{t}{t_{\max}} = A_0\sqrt{\frac{z}{z_c}} - B_0\frac{z}{z_c}$$

where t is the actual skin resistance, (A_0, B_0) are empirical coefficients, z is the actual relative displacement between the pile surface and soil, and z_c is the ultimate relative displacement between the pile surface and soil. It is noted that the skin friction behavior becomes purely plastic when z exceeds z_c. In the project, we adopted A_0=2 and B_0=1 for both sand and clay, z_c=0.2 inch for sand and z_c=0.01D (where D is pile diameter) for clay. Accordingly, the normalized t-z curves for both sand and clay can be approximated by the following table and plotted in Figure 4-2:

t/t_{max}	z/z_c
0.00	0.00
0.397	0.050
0.532	0.100
0.694	0.200
0.795	0.300
0.865	0.400
0.949	0.600
1.000	1.000
1.000	∞

The ultimate end bearing force (q_{max}) in the q-u curve can be obtained by multiplying a unit end bearing capacity at the pile tip (q_t) with the pile-tip area (A). The general formula for soil end bearing capacity (q_t) is presented in the following equation, also depending upon the soil type:

$$sand: \quad q_t = N_q \sigma_v'$$
$$clay: \quad q_t = N_c \, \bar{c}$$

where (N_q, N_c) are bearing capacity factors depending on ϕ', failure mode and pile geometry, σ_v' is the effective overburden pressure at tip, and $\bar{c}$ is the average undrained shear strength beneath the tip. Figure 4-3 depicts several bearing capacity factor N_q versus internal friction angle relationships (Fang, 1991). It can be seen that there are appreciable variations among different theories in determining the end bearing capacity factors. The uncertainty is compounded by different pile installation methods. In the project, N_q varying from 15 to 50 was adopted for sand layers and N_c=9 was used for clays. The shape of in-situ q-u curves is affected by the pile installation method, the pile tip geometry, soil type and depth. The q-u curve adopted in the project is also based on the work developed by Vijayvergiya in 1977, as shown in the following equation:

$$\frac{q}{q_{\max}} = \begin{cases} \left(\dfrac{u}{u_c}\right)^{C_0} & u < u_c \\ 1 & u \geq u_c \end{cases}$$

where q is the actual end bearing resistance, C_0 is an empirical coefficient, u is the actual end settlement at the tip, and u_c is the ultimate end settlement. It is also observed that the end bearing behavior becomes purely plastic when u exceeds u_c. In the project, we adopted C_0=1/3 and u_c=0.1D for both sand and clay. Note that since the displacement for mobilizing full end bearing is relatively large compared to skin friction, the contribution of end bearing resistance will be

small during load transfer analyses. The normalized *q-u* curves for both sand and clay can be approximated by the following table and also plotted in Figure 4-2:

q/q_{max}	u/u_c
0.00	0.00
0.45	0.10
0.63	0.25
0.79	0.50
1.00	1.00
1.00	∞

In order to compute the *t-z* curves along an in-situ pile and *q-u* curve at its tip, the following parameters are required, namely, pile diameter *D*, pile circumference and tip area, a series of selected depth values from pile top to tip, (γ, c) of soft clay, and (γ, ϕ', N_q) of sand. All these values can be found in Table 2-1 and in the generalized soil profiles provided in Appendix A. The coordinates of *t-z* and *q-u* curves of all Dumbarton piers and Trestle bents developed using these parameters are listed in Appendix B. Also, the presented data are for loading in compression only, whereas a scale factor of 0.75 can be applied on soil skin resistance (t) for tensile loading and there is no end bearing resistance in tension.

4.2.2 Axial Load versus Deformation Analysis

From the complete axial pile-head load versus pile-head deformation (Q-δ) curve of a pile, one can readily find the pile head settlement subjected to an axial load being applied at the pile top, and vice versa. Once the *t-z* and *q-u* curves of a pile are developed and its cross-section area (A) and Young's modulus (E) are given, its corresponding Q-δ curve can be generated. Figure 4-4a shows a schematic of an embedded pile, and the pile top is subjected to a boundary condition of prescribed load or displacement (Q_1 or δ_1). Figure 4-4b depicts this soil-pile system modeled as a series of nodes (from 1 to N) connected by N-1 sets of elastic axial springs of stiffness ($=EA/\Delta l_i$), with N sets of *t-z* soil springs attached at the pile nodes and one *q-u* soil spring at the tip node. Because of the nonlinear nature of *t-z* and *q-u* curves, iterative solution schemes are usually adopted. This kind of boundary value problem can be readily solved using most modern computer codes.

In this project, the BMCOL program developed by Matlock et al. (1981) in the axial mode was used to compute the Q-δ curves of the piles of Dumbarton Bridge piers and Trestle bents. The input data required include the pile geometry and deformability, a series of *t-z* curves along the pile, one *q-u* curves at the tip, and a series of desired prescribed settlements δs at pile top. For all piles investigated, the prescribed δs are -3, -2, -1, -0.5, -0.25, -0.1, 0, 0.1, 0.25, 0.5, 1, 2, 3, 4, and 6 inches. The complete Q-δ curves of all Dumbarton piers and Trestle bents developed using these parameters are presented in Appendix C. The following pile properties were used in conducting the axial load versus deformation analyses:

- 54-inch diameter concrete piles (Main Channel Piers 17 ~ 26)
  Effective pile AE = 9.16×10^9 lb. (Infilled section)

Effective pile AE = 4.14×10^9 lb. (Hollow section)

- 20-inch diameter steel pipe piles (the remaining piers)
  Effective pile AE = 1.49×10^9 lb.
- 20"×20" square concrete piles (Trestle bents)
  Effective pile AE = 1.44×10^9 lb.

4.2.3 Pile Capacity Evaluation

Design Load: As summarized in Tables 4-1 and 4-2, three types of piles are used: 54-inch diameter concrete hollow pile, 20-inch diameter steel pile, and 20-inch square concrete pile. The design loads of these piles as documented on the as-built drawings are 250 tons, 80 tons, and 90 tons, respectively. The prevailing pile design practice in the U.S. requires a minimum static factor of safety of 2.0 and therefore these piles should have ultimate geotechnical capacities of 500 tons, 160 tons, and 180 tons, respectively, as minimum values.

During construction of the bridge, a pile load testing program was undertaken to verify the ultimate pile capacities. The load testing was conducted on production piles at the following locations:

West Approach: 20-inch diameter piles at Piers 4 and 16
Main Channel: 54-inch diameter piles at Piers 18, 20, and 23
East Approach: 20-inch diameter piles at Piers 31 and 36

All 54-inch diameter piles tested in the program yielded ultimate capacities less than two times the design load. A report written by Caltrans staff attributed the deficiency in short term pile capacity to disturbance or remolding of the clayey soil during pile driving since the testing was conducted within a period of 7 to 10 days from pile installation. Over time, the soil is expected to regain its strength to the original value. This phenomenon is widely known as a set-up effect in the off-shore pile design practice. Similar deficiency in the short term pile capacity was also noted for the 20-inch diameter piles tested in the load testing program, particularly those piles driven into a clay member of the San Antonio Formation. However, those 20-inch diameter piles, tipping into sand stratum, proved to have capacities greater than two times the design load. In a summary, it is reasonable to expect that the foundation soils have regained original shear strength, and all piles have attained required geotechnical capacities to fulfill a maximum factor of safety of 2.0 at all locations since completion of the construction.

Ultimate Pile Capacity: To estimate long term ultimate capacities of the piles, conventional pile capacity evaluation was made which generally involves summing of the skin friction resistance and end bearing resistance. While summation of t_{max} (peak value of t-z curves) multiplied by its tributary length along the pile plus q_{max} (peak value of q-u curves) at the tip yields some measures of the static ultimate bearing capacity of a single pile, we elected to use the load resistance at a pile head-displacement of 3 inches from the Q-δ curve as the ultimate pile capacity. This explicitly considered displacement compatibility between skin friction and end bearing. The estimated ultimate pile capacity along with the design load for each pile is presented in Figure 4-5. The ultimate pile capacities estimated from the Q-δ curve have been compared with results from APILE, and the comparison is found to be in agreement. In addition, following the discussions with the Peer

Review Panel members, CPT data were used directly to estimate the pile capacities for comparison with the conventional pile design practice. In the following, a brief description of the CPT-based pile capacity calculation method is provided.

As depicted in Figure 2-3, the Dumbarton Bridge has one CPT probing conducted at every pier for the most cases. The CPT sounding provides soil properties on a continuous basis which has greater advantage over conventional soil boring with SPT samplings with a 5-foot interval. When foundation soils are stratified with thin beds of different soil types, the CPT-based pile capacity method can capture the variations within short distances. For this purpose, the computer program CPeT-IT was used which was recently developed by GeoLogismiki (http://www.geologismiki.gr) in collaboration with Peter Robertson of Gregg Drilling & Testing Inc.

The program CPeT-IT is coded to follow a LCPC method (Bustamante and Gianeselli, 1982), which was based on the analysis of 197 pile load tests with a wide range of foundation and soil types. This partly explains the reportedly good results with the LCPC method. The program also provides simple guidance to account for different pile installations. In this method, the pile unit end bearing, q_p, is calculated from the equivalent average cone resistance, q_{ca}, multiplied by an end bearing coefficient, k_c, whereas the pile unit side friction, f_p, is calculated from measured q_c values divided by a friction coefficient, α, as shown in the following equations:

$$q_p = k_c q_{ca}; f_p = q_c/\alpha$$

Selection of these coefficients (k_c,α) and the limiting value of unit side friction (f_p) depends upon the soil and pile type, and their recommended values are listed in Table 4-3 which was developed on the basis of calibration with the pile load test results with variety of pile types and soil conditions. To evaluate the pile unit end bearing, equivalent average cone resistance (q_{ca}) is taken as the mean value of the cone tip resistance within one pile diameter (D) zone around the pile tip ($0.5D$ above and $0.5D$ below the pile tip). Only the measured q_c is used for the estimation of both side friction and pile end bearing resistance. This is considered an advantage by many due to the difficulties associated in interpreting sleeve friction (f_s) in CPT data. However, both sleeve friction and tip resistance are used for interpretation of soil behavior which proves to be an important parameter for selection of the friction and end bearing coefficients. Figure 4-6 shows the illustration of sample pile capacity calculation at Pier 43 using the CPT data (S27). The ultimate pile capacities estimated using CPT data for all piers are also shown on Figure 4-5 for comparison.

4.3 Lateral Loading Conditions

During an earthquake, lateral loading of a deep foundation is resisted by flexural properties of the pile and lateral soil supports along the pile. The lateral soil supports to the pile is mobilized when there is a relative displacement between the pile and the surrounding soil according to the deflection profile of the pile. This lateral load-deflection relation between the pile and soil is generally known as p-y curve. In this section, the lateral load-deflection (p-y) curves of all Dumbarton piers and Trestle bents are developed, and the response results of the piles subjected to lateral push-over loading are presented.

4.3.1 *p-y* Curves

Determination of the ultimate lateral bearing capacity (p_u) and the load-deflection (p-y) curves of a pile in soils is mainly based on the API Recommended Practice 2A-WSD (1993). The developed p-y curves are used in the soil-structure interaction analysis for forming the 6×6 condensed matrices and kinematic motions (also see Section 5-3), and in the finite element analysis of the bridge for simulating the nonlinear soil springs attached to the piles. The following briefly describes the elements of soil support behaviors for clayey and sandy soils. For the static loads, the ultimate lateral bearing capacity (p_u) for piles in soft clay at a certain depth below soil surface (X), increases from 3c to 9c as X increases from 0 to X_R, according to:

$$p_u = \begin{cases} 3cD + \gamma XD + JcX & \text{for } X < X_R \\ 9cD & \text{for } X \geq X_R \end{cases}$$

where p_u is ultimate lateral bearing capacity (in unit of force per pile length), c is the undrained shear strength, D is the pile diameter, γ is the effective soil unit weight, J is the dimensionless empirical constant varying from 0.25 to 0.5 (usually taken as 0.5), and X_R is the critical depth equal to $6D/(J+\gamma D/c)$. Note that consistent units should be used for the parameters in the above equation. The lateral soil resistance-deflection relationships for piles in soft clay are generally non-linear. The normalized p-y curves of soft clay for the short-term static load case can be represented by the following table:

p/p_u	y/y_u
0.000	0.000
0.250	0.016
0.500	0.125
0.720	0.375
1.000	1.000
1.000	∞

where p is the actual lateral resistance, y is the actual lateral deflection, and y_u is the ultimate lateral deflection when p_u takes place (which equals to 20 times ε_{50}, the strain occurring at 50% the maximum stress on laboratory undrained compression tests of undisturbed soil samples). On the other hand, the ultimate lateral bearing capacity (p_u) for piles in sand may be assigned as the smaller one of the following two equations:

$$p_{us} = (C_1 X + C_2 D)\gamma X; \; p_{ud} = C_3 D\gamma H$$
$$p_u = \min(p_{us}, p_{ud})$$

where (γ, D, X) are defined as above, and (C_1, C_2, C_3) are the empirical coefficients as function of soil internal friction angle (ϕ'), as shown in Figure 4-7. The lateral soil resistance-deflection

relationships for sand are also non-linear and in the absence of more defining information may be approximated by the following expression:

$$p = Ap_u \tanh\left(\frac{kX}{Ap_u} y\right) \text{ or } \frac{p}{(Ap_u)} = f\left(\frac{y}{y_u}\right)$$

where (p, y) are defined as above, and A is the loading factor which is 0.9 for cyclic loading and 3.0-0.8X/D for static loading, k is the initial modulus of subgrade reaction as function of ϕ' (also see Figure 4-6), f represents the corresponding normalized function, and y_u is the ultimate lateral deflection approximated by $3Ap_u/(kX)$. The normalized p-y curves of sand can be represented by the following table:

p/p_u	y/y_u
0.00	0.00
0.10	0.03
0.46	0.17
0.76	0.33
0.91	0.50
1.00	1.00
1.00	∞

Figure 4-2 also depicts the normalized p-y curves of soft clay and sand used in the project. In order to compute the p-y curves along an in-situ pile, the following parameters are required, namely, pile diameter D, a series of selected depth X values from pile top to tip, (γ, J, c, ε_{50}) of soft clay, and (γ, ϕ', k) of sand. All these values can be found in Table 2-1 and in the generalized soil profiles provided in Appendix A. A p-multiplier of 0.5 was applied for p_u to collectively account for potential soil cyclic softening and pile group effect. The coordinates of p-y curves of all Dumbarton piers and Trestle bents developed using these parameters are listed in Appendix D.

4.3.2 Lateral Push-Over Analysis

In this project, the LPILE^{plus} 5.0 program developed by Ensoft, Inc. (2004) was used to perform the lateral push-over analyses of the piles of Dumbarton Bridge piers and Trestle bents. The input data included the pile flexural properties, soil properties, and a series of desired prescribed-boundary conditions at pile top. The pile was modeled as a bi-linear moment-curvature relationship; the limiting moment of the 54-inch diameter pile is taken as 4,000 kips-ft, while that of the smaller piles is taken as 350 kips-ft. The fixed-head condition at the pile top (y=prescribed,θ=0) was used. The following pile properties were used as the elastic branch of the bi-linear moment curvature relationship in the lateral push-over analyses:

- 54-inch diameter concrete piles (Main Channel Piers 17 ~ 26)
  Effective pile EI = 8.35×10^{11} lb-in^2.(Infilled section)
  Effective pile EI = 5.83×10^{11} lb-in^2.(Hollow section)
- 20-inch diameter steel pipe piles (the remaining piers)

Effective pile EI = 3.59×10^{10} lb-in^2.

- 20"×20" square concrete piles (Trestle bents)
  Effective pile EI = 2.40×10^{10} lb-in^2.

The resultant depth-varying deflection, moment, and shear diagrams along the pile as well as pile top moment and shear versus pile top deflection curves are included in Appendix E.

4.4 Nonlinear Soil Springs for Pile Cap

The pile caps for much of the approach foundations are buried in the soils. For these piers, in addition to the piles, the pile caps would also offer additional resistance against lateral movement derived from passive pressure in the soil. The recommendations for pile cap springs are presented in this section. The estimated values of passive soil resistance depend largely on the undrained shear strength of the soil, and to some extent on the pile cap configuration, i.e., the contact dimension for longitudinal and transverse loading directions. The reaction of soil passive resistance can be modeled as two soil springs attached to the pile cap; one in the longitudinal direction, and one in the transverse direction. For this purpose, tri-linear soil springs were developed, and their coordinates are tabulated in Table 4-4.

4.5 New Retrofit Piles for Two Trestles

For seismic retrofit, seven pairs of 48-ich diameter steel pipe piles with wall thickness of 1.5 inch are proposed to be installed at the northern and southern walls of each trestle at Bents 5, 7, 10, 12, 15, 17 and 20 by Caltrans. The average pile tip elevation for the East Trestle is about -58 ft, while that for the West Trestle is about -55 ft. The pile will be directly connected to the deck structure without a pile cap. These retrofit piles are designed to provide lateral resistance only; they are not required to provide axial loads. As a result, the pile acceptable criteria can be based on installing the piles to the pile tip elevations shown on the plan.

To facilitate the pile design and construction, the lateral push-over analysis and drivability analysis of the new piles were performed. The soil profile at Bent E12 was selected to represent that along the East Trestle, while the soil profile at Bent W13 was selected to represent that along the West Trestle. The average deck elevation was assumed to be +20 ft. The pinned-head condition at the pile top (y=prescribed, $moment$=0) was used. The following flexural property was used for the single pile lateral push-over analyses:

- 48-ich diameter steel pipe piles (t=1.5 in)
  Effective pile EI = 1.72×10^{12} lb-in^2.

The resultant depth-varying deflection, moment, and shear diagrams along the pile as well as pile top moment and shear versus pile top deflection curves are also presented in Appendix E.

GRLWEAP program (2005) was used to perform pile drivability analyses for two diesel hammers and two vibration hammers. Tables 4-5 and 4-6 tabulate the relationships between stroke and blow counts and those between vibration frequency and penetration time upon approaching the proposed pile tip elevation. Since these piles are not required to develop certain axial pile capacity, the purpose of pile drivability study is to provide information leading to selection of hammer types. Some of pile drivability analysis results are provided in Appendix F.

4.6 Liquefaction and Lateral Ground Movement

The Posey sand appears throughout the bridge alignment from approximately elevation -40 ft to -80 ft, overlain by the Young Bay Mud (soft clay) and underlain by the San Antonio Formation (stiff clay). Liquefaction potential and possible influence on the bridge foundation were evaluated. Based on the evaluation, widespread liquefaction is not anticipated; however relatively small isolated pockets of soils were identified as potentially liquefiable.

The liquefaction evaluation showed no liquefaction in the Posey sand layer underlying the West Trestle Structures. For the West Approach Piers (Pier 1-16), analysis for the three borings adjacent to Piers 2, 5, and 9 and the CPT sounding adjacent to Pier 5 indicated the upper 5 ft of sand underlying the soft Bay Mud could potentially liquefy in these regions. However, as these are relatively thin and isolated zones, the impact on the overall site and pier response would not be significant.

For the Main Channel Piers (Pier 17-26), relatively thin pockets of sand (1 to 5 ft thick) could liquefy near five piers as shown by nearby CPT soundings. Again, the effect of the potential liquefaction on overall site and pier response is judged to be not of concern, particularly in view of the large pile groups and large pile diameters.

For the East Approach Piers (Piers 27-41), analyses show approximately 5 ft thick layers of sand underlying the soft Bay Mud could potentially liquefy adjacent to several piers. Again, considering the large pile groups and pile size, the impact on pier response is judged to be small. Whereas several inches of free-field relative displacement could occur over the thickness of the liquefaction layers, the effect of kinematic interaction on the large pile groups would not be significant. No liquefaction is indicated for sands underlying the East Trestle Structures.

Appendix G documents details of the liquefaction evaluation, and performance of pile foundation due to soil liquefaction and lateral ground movement from slope stability.

TABLE 4-1: SUMMARY OF FOUNDATION INFORMATION FOR BRIDGE PIERS

Pier Number	Pile Top Elevation (ft)	Pile Tip Elevation (ft)	ML Elevation (ft)	Number of Piles	Pile Type	Pile Dimension	Design Load (ton)
1	1.50	-68.00	4.00	13,11,18	Steel Pipe	20"ϕ	80.00
2	-6.50	-65.00	2.00	28	Steel Pipe	20"ϕ	80.00
3	-7.50	-72.00	-1.00	33	Steel Pipe	20"ϕ	80.00
4	-8.00	-65.00	-2.00	34	Steel Pipe	20"ϕ	80.00
5	-8.00	-68.00	-3.00	34	Steel Pipe	20"ϕ	80.00
6	-8.50	-75.00	-2.00	35	Steel Pipe	20"ϕ	80.00
7	-8.50	-70.00	-2.00	35	Steel Pipe	20"ϕ	80.00
8	-8.50	-65.00	-4.00	35	Steel Pipe	20"ϕ	80.00
9	-8.50	-65.00	-3.00	36	Steel Pipe	20"ϕ	80.00
10	-8.50	-73.00	-2.00	37	Steel Pipe	20"ϕ	80.00
11	-9.00	-73.00	-2.00	37	Steel Pipe	20"ϕ	80.00
12	-9.00	-73.00	-3.00	37	Steel Pipe	20"ϕ	80.00
13	-9.50	-73.00	-5.00	38	Steel Pipe	20"ϕ	80.00
14	-9.50	-68.00	-4.50	39	Steel Pipe	20"ϕ	80.00
15	-10.00	-65.00	-4.00	39	Steel Pipe	20"ϕ	80.00
16	-22.00	-90.00	-10.00	43	Steel Pipe	20"ϕ	80.00
17	0.00	-100.00	-29.00	21	Prestr. concrete hollow	54"ϕOD,40"ϕID	250.00
18	0.00	-100.00	-38.00	21	Prestr. concrete hollow	54"ϕOD,40"ϕID	250.00
19	0.00	-100.00	-44.00	21	Prestr. concrete hollow	54"ϕOD,40"ϕID	250.00
20	0.00	-95.00	-46.00	21	Prestr. concrete hollow	54"ϕOD,40"ϕID	250.00
21	0.00	-100.00	-48.00	21	Prestr. concrete hollow	54"ϕOD,40"ϕID	250.00
22	-1.00	-100.00	-48.00	28	Prestr. concrete hollow	54"ϕOD,40"ϕID	250.00
23	1.00	-100.00	-44.00	32	Prestr. concrete hollow	54"ϕOD,40"ϕID	250.00
24	1.00	-100.00	-39.00	32	Prestr. concrete hollow	54"ϕOD,40"ϕID	250.00
25	-1.00	-100.00	-30.00	28	Prestr. concrete hollow	54"ϕOD,40"ϕID	250.00
26	0.00	-100.00	-18.00	21	Prestr. concrete hollow	54"ϕOD,40"ϕID	250.00
27	-5.00	-95.00	-2.00	52	Steel Pipe	20"ϕ	80.00
28	-4.00	-93.00	-2.00	52	Steel Pipe	20"ϕ	80.00
29	-3.50	-93.00	-4.00	52	Steel Pipe	20"ϕ	80.00
30	-4.00	-93.00	-4.00	52	Steel Pipe	20"ϕ	80.00
31	-8.00	-70.00	-3.00	37	Steel Pipe	20"ϕ	80.00
32	-8.50	-70.00	-4.00	38	Steel Pipe	20"ϕ	80.00
33	-8.50	-78.00	-6.00	38	Steel Pipe	20"ϕ	80.00
34	-8.00	-85.00	-5.00	37	Steel Pipe	20"ϕ	80.00
35	-7.50	-85.00	-5.00	37	Steel Pipe	20"ϕ	80.00
36	-8.00	-85.00	-4.00	37	Steel Pipe	20"ϕ	80.00
37	-8.50	-88.00	-2.00	37	Steel Pipe	20"ϕ	80.00
38	-8.50	-102.00	0.00	36	Steel Pipe	20"ϕ	80.00
39	-8.00	-76.00	-1.00	35	Steel Pipe	20"ϕ	80.00
40	-7.00	-85.00	6.00	34	Steel Pipe	20"ϕ	80.00
41	-6.50	-85.00	7.00	33	Steel Pipe	20"ϕ	80.00
42	-6.50	-83.00	8.00	33	Steel Pipe	20"ϕ	80.00
43	-2.50	-80.00	10.00	33	Steel Pipe	20"ϕ	80.00
44	1.50	-84.00	8.00	18,11,13	Steel Pipe	20"ϕ	80.00

TABLE 4-2: SUMMARY OF FOUNDATION INFORMATION FOR TRESTLE BENTS

Bent Number	Pile Top Elevation (ft)	Pile Tip Elevation (ft)	ML Elevation (ft)	Number of Piles	Pile Type	Pile Dimension	Design Load (ton)
W01	6.00	-56.00	6.00	11	Square concrete	20"×20"	90.00
W02	6.00	-56.00	6.00	7	Square concrete	20"×20"	90.00
W03	6.00	-56.00	6.00	7	Square concrete	20"×20"	90.00
W04	6.00	-56.00	6.00	7	Square concrete	20"×20"	90.00
W05	6.00	-56.00	6.00	7	Square concrete	20"×20"	90.00
W06	6.00	-56.00	6.00	7	Square concrete	20"×20"	90.00
W07	6.00	-56.00	6.00	7	Square concrete	20"×20"	90.00
W08	6.00	-56.00	6.00	7	Square concrete	20"×20"	90.00
W09	6.00	-56.00	6.00	7	Square concrete	20"×20"	90.00
W10	4.00	-56.00	4.00	7	Square concrete	20"×20"	90.00
W11	6.00	-56.00	6.00	7	Square concrete	20"×20"	90.00
W12	6.00	-56.00	6.00	7	Square concrete	20"×20"	90.00
W13	6.00	-56.00	6.00	7	Square concrete	20"×20"	90.00
W14	6.00	-56.00	6.00	7	Square concrete	20"×20"	90.00
W15	6.00	-58.00	6.00	7	Square concrete	20"×20"	90.00
W16	6.00	-58.00	6.00	7	Square concrete	20"×20"	90.00
W17	6.00	-58.00	6.00	7	Square concrete	20"×20"	90.00
W18	6.00	-63.00	6.00	7	Square concrete	20"×20"	90.00
W19	6.00	-70.00	6.00	7	Square concrete	20"×20"	90.00
W20	6.00	-63.00	6.00	11	Square concrete	20"×20"	90.00
E01	6.00	-62.00	6.00	11	Square concrete	20"×20"	90.00
E02	6.00	-62.00	6.00	7	Square concrete	20"×20"	90.00
E03	6.00	-62.00	6.00	7	Square concrete	20"×20"	90.00
E04	6.00	-62.00	6.00	7	Square concrete	20"×20"	90.00
E05	6.00	-62.00	6.00	7	Square concrete	20"×20"	90.00
E06	6.00	-62.00	6.00	7	Square concrete	20"×20"	90.00
E07	6.00	-62.00	6.00	7	Square concrete	20"×20"	90.00
E08	6.00	-62.00	6.00	7	Square concrete	20"×20"	90.00
E09	6.00	-62.00	6.00	7	Square concrete	20"×20"	90.00
E10	6.00	-62.00	6.00	7	Square concrete	20"×20"	90.00
E11	6.00	-62.00	6.00	7	Square concrete	20"×20"	90.00
E12	6.00	-62.00	6.00	7	Square concrete	20"×20"	90.00
E13	6.00	-62.00	6.00	7	Square concrete	20"×20"	90.00
E14	6.00	-62.00	6.00	7	Square concrete	20"×20"	90.00
E15	4.00	-62.00	4.00	7	Square concrete	20"×20"	90.00
E16	6.00	-62.00	6.00	7	Square concrete	20"×20"	90.00
E17	6.00	-62.00	6.00	7	Square concrete	20"×20"	90.00
E18	6.00	-62.00	6.00	7	Square concrete	20"×20"	90.00
E19	6.00	-62.00	6.00	7	Square concrete	20"×20"	90.00
E20	6.00	-75.00	6.00	11	Square concrete	20"×20"	90.00

TABLE 4-3: END BEARING AND FRICTIONAL FACTORS (K_C,α) USED IN THE LCPC METHOD

Nature of soil	q_c (MPa)	Factors k_c Group I	Group II
Soft clay and mud	< 1	0.4	0.5
Moderately compact clay	1 to 5	0.35	0.45
Silt and loose sand	≤ 5	0.4	0.5
Compact to stiff clay and compact silt	> 5	0.45	0.55
Soft chalk	≤ 5	0.2	0.3
Moderately compact sand and gravel	5 to 12	0.4	0.5
Weathered to fragmented chalk	> 5	0.2	0.4
Compact to very compact sand and gravel	> 12	0.3	0.4

Group I: plain bored piles; mud bored piles; micro piles (grouted under low pressure); cased bored piles; hollow auger bored piles; piers; barrettes.
Group II: cast screwed piles; driven precast piles; prestressed tubular piles; driven cast piles; jacked metal piles; micropiles (small diameter piles grouted under high pressure with diameter < 250 mm); driven grouted piles (low pressure grouting); driven metal piles; driven rammed piles; jacket concrete piles; high pressure grouted piles of large diameter.

Nature of soil	q_c (MPa)	Category: Coefficients, α I A	I B	II A	II B	Maximum limit of f_p (MPa) I A	I B	II A	II B	III A	III B
Soft clay and mud	< 1	30	90	90	30	0.015	0.015	0.015	0.015	0.035	
Moderately compact clay	1 to 5	40	80	40	80	0.035 (0.08)	0.035 (0.08)	0.035 (0.08)	0.035	0.08	≥ 0.12
Silt and loose sand	≤ 5	60	150	60	120	0.035	0.035	0.035	0.035	0.08	–
Compact to stiff clay and compact silt	> 5	60	120	60	120	0.035 (0.08)	0.035 (0.08)	0.035 (0.08)	0.035	0.08	≥ 0.20
Soft chalk	≤ 5	100	120	100	120	0.035	0.035	0.035	0.035	0.08	–
Moderately compact sand and gravel	5 to 12	100	200	100	200	0.08 (0.12)	0.035 (0.08)	0.08 (0.12)	0.08	0.12	≥ 0.20
Weathered to fragmented chalk	> 5	60	80	60	80	0.12 (0.15)	0.08 (0.12)	0.12 (0.15)	0.12	0.15	≥ 0.20
Compact to very compact sand and gravel	> 12	150	300	150	200	0.12 (0.15)	0.08 (0.12)	0.12 (0.15)	0.12	0.15	≥ 0.20

Category – IA: plain bored piles; mud bored piles; hollow auger bored piles; micropiles (grouted under low pressure); cast screwed piles; piers; barrettes. IB: cased bored piles; driven cast piles. IIA: driven precast piles; prestressed tubular piles; jacket concrete piles. IIB: driven metal piles; jacked metal piles. IIIA: driven grouted piles; driven rammed piles. IIIB: high pressure grouted piles of large diameter > 250 mm; micropiles (grouted under high pressure).
Note: Maximum limit unit skin friction, f_p: bracket values apply to careful execution and minimum disturbance of soil due to construction.

TABLE 4-4: TRI-LINEAR SOIL SPRINGS FOR PILE CAPS

Pier Number	Soil Spring Elevation (ft)	Longitudinal Direction						Transverse Direction					
		Point 1		Point 2		Point 3		Point 1		Point 2		Point 3	
		Δ_1 (in)	P_1 (kips)	Δ_2 (in)	P_2 (kips)	Δ_3 (in)	P_3 (kips)	Δ_1 (in)	P_1 (kips)	Δ_2 (in)	P_2 (kips)	Δ_3 (in)	P_3 (kips)
1A	2.75	0.00	0.0	0.36	407.2	4.57	814.4	0.00	0.0	0.36	20.1	4.57	40.2
1B	2.75	0.00	0.0	0.36	267.4	4.57	534.8	0.00	0.0	0.36	11.7	4.57	23.5
1C	2.75	0.00	0.0	0.36	407.2	4.57	814.4	0.00	0.0	0.36	24.6	4.57	49.1
2	-4.25	0.00	0.0	0.35	419.5	8.56	839.1	0.00	0.0	0.35	152.1	8.56	304.3
3	-5.25	0.00	0.0	0.50	118.8	6.70	237.5	0.00	0.0	0.50	47.6	6.70	95.2
4	-5.75	0.00	0.0	0.54	109.1	6.32	218.2	0.00	0.0	0.54	45.2	6.32	90.4
5	-5.75	0.00	0.0	0.60	89.8	5.75	179.6	0.00	0.0	0.60	39.9	5.75	79.8
6	-6.25	0.00	0.0	0.50	118.8	6.70	237.5	0.00	0.0	0.50	47.6	6.70	95.2
7	-6.25	0.00	0.0	0.50	118.8	6.70	237.5	0.00	0.0	0.50	47.6	6.70	95.2
8	-6.25	0.00	0.0	0.60	80.0	5.40	160.0	0.00	0.0	0.60	36.4	5.40	72.7
9	-6.25	0.00	0.0	0.58	99.5	6.01	198.9	0.00	0.0	0.58	42.7	6.01	85.3
10	-6.25	0.00	0.0	0.50	118.8	6.70	237.5	0.00	0.0	0.50	55.8	6.70	111.5
11	-6.75	0.00	0.0	0.46	128.4	7.12	256.8	0.00	0.0	0.46	58.2	7.12	116.4
12	-6.75	0.00	0.0	0.54	109.1	6.32	218.2	0.00	0.0	0.54	53.3	6.32	106.5
13	-7.25	0.00	0.0	0.60	80.0	5.40	160.0	0.00	0.0	0.60	43.6	5.40	87.3
14	-7.25	0.00	0.0	0.60	89.8	5.75	179.6	0.00	0.0	0.60	47.7	5.75	95.4
15	-7.75	0.00	0.0	0.54	109.1	6.32	218.2	0.00	0.0	0.54	53.3	6.32	106.5
16	-20.00	0.00	0.0	0.18	266.6	12.51	533.1	0.00	0.0	0.18	119.3	12.51	238.7
17	0.00	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0
18	0.00	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0
19	0.00	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0
20	0.00	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0
21	0.00	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0
22	-1.00	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0
23	1.00	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0
24	1.00	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0
25	-1.00	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0
26	0.00	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0
27	-3.50	0.00	0.0	0.54	60.5	3.60	120.9	0.00	0.0	0.54	33.1	3.60	66.2
28	-3.00	0.00	0.0	0.47	37.0	2.40	74.1	0.00	0.0	0.47	20.3	2.40	40.5
29	-3.50	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0
30	-4.00	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0
31	-6.00	0.00	0.0	0.56	105.8	5.42	211.6	0.00	0.0	0.56	48.5	5.42	97.1
32	-6.25	0.00	0.0	0.60	80.0	5.40	160.0	0.00	0.0	0.60	43.6	5.40	87.3
33	-7.25	0.00	0.0	0.51	40.4	3.00	80.8	0.00	0.0	0.51	22.0	3.00	44.1
34	-6.50	0.00	0.0	0.54	50.2	3.60	100.4	0.00	0.0	0.54	27.4	3.60	54.8
35	-6.25	0.00	0.0	0.51	40.4	3.00	80.8	0.00	0.0	0.51	22.0	3.00	44.1
36	-6.00	0.00	0.0	0.58	70.0	4.80	140.0	0.00	0.0	0.58	38.2	4.80	76.4
37	-6.25	0.00	0.0	0.50	118.8	6.70	237.5	0.00	0.0	0.50	55.8	6.70	111.5
38	-6.25	0.00	0.0	0.35	157.3	8.56	314.7	0.00	0.0	0.35	57.0	8.56	114.1
39	-5.75	0.00	0.0	0.46	128.4	7.12	256.8	0.00	0.0	0.46	50.0	7.12	100.0
40	-4.75	0.00	0.0	0.19	214.9	13.50	429.9	0.00	0.0	0.19	70.9	13.50	141.8
41	-4.25	0.00	0.0	0.18	206.1	14.07	412.1	0.00	0.0	0.18	68.8	14.07	137.6
42	-4.25	0.00	0.0	0.17	206.5	15.22	413.0	0.00	0.0	0.17	68.9	15.22	137.8
43	-0.25	0.00	0.0	0.20	129.5	12.93	259.1	0.00	0.0	0.20	50.6	12.93	101.1
44A	2.75	0.00	0.0	0.36	407.2	4.57	814.4	0.00	0.0	0.36	24.6	4.57	49.1
44B	2.75	0.00	0.0	0.36	267.4	4.57	534.8	0.00	0.0	0.36	11.7	4.57	23.5
44C	2.75	0.00	0.0	0.36	407.2	4.57	814.4	0.00	0.0	0.36	20.1	4.57	40.2

TABLE 4-5: SUMMARY OF DRIVEABILITY ANALYSIS RESULT FOR NEW EAST TRESTLE PILES

Hammer	Type	Energy/Power (kips-ft)/kW	Stroke (ft)	Blow counts when approaching the proposed tip elevation (#/ft)	
				Shaft Gain Factor 0.33	Shaft Gain Factor 0.25
Delmag D36-32	Diesel OED	90.56	8	16.9	13.0
			9	14.9	11.6
			10	13.1	10.5
			11	11.9	9.5
			12	11.0	8.8
APE D50-32	Diesel OED	115.76	8	10.3	7.9
			9	9.0	7.3
			10	8.3	6.6
			11	7.6	5.7
			12	6.9	5.3

Hammer	Type	Energy/Power (kips-ft)/kW	Vibration Frequency (Hz)	Penetration time when approaching the proposed tip elevation (sec/ft)	
				Shaft Gain Factor 0.33	Shaft Gain Factor 0.25
PTC 100HDS	VIB	564.00	12	5.5	3.5
			20	2.9	2.7
			30	2.3	2.2
APE 400B	VIB	738.00	12	3.3	2.5
			20	2.1	1.9
			30	1.5	1.3

Note: Shaft gain factor varies from 0.25 to 0.33 according to pile driving experience at Oakland Mole, and toe gain factor is assumed to be 0.50. Hammer efficiency is assumed to be 0.8.

TABLE 4-6: SUMMARY OF DRIVEABILITY ANALYSIS RESULT FOR NEW WEST TRESTLE PILES

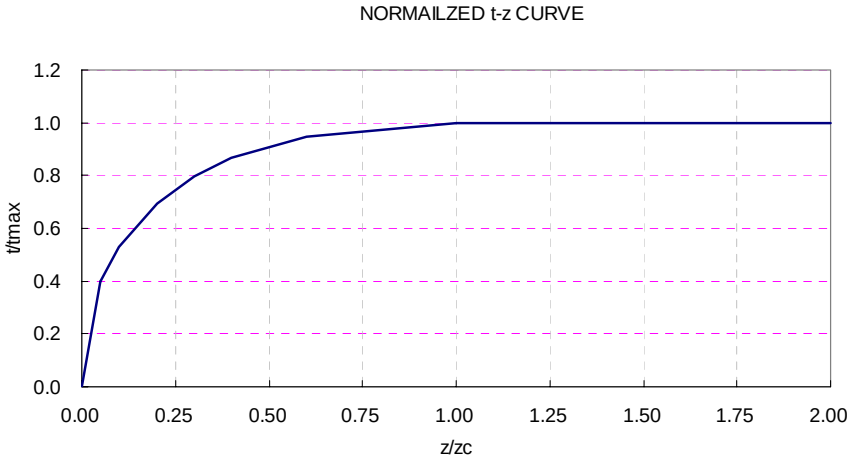
Hammer	Type	Energy/Power (kips-ft)/kW	Stroke (ft)	Blow counts when approaching the proposed tip elevation (#/ft)	
				Shaft Gain Factor 0.33	Shaft Gain Factor 0.25
Delmag D36-32	Diesel OED	90.56	8	20.3	15.8
			9	17.4	13.8
			10	15.5	12.4
			11	14.1	11.3
			12	13.0	10.4
APE D50-32	Diesel OED	115.76	8	12.4	9.6
			9	10.9	8.4
			10	9.7	7.9
			11	8.9	7.3
			12	8.1	6.5

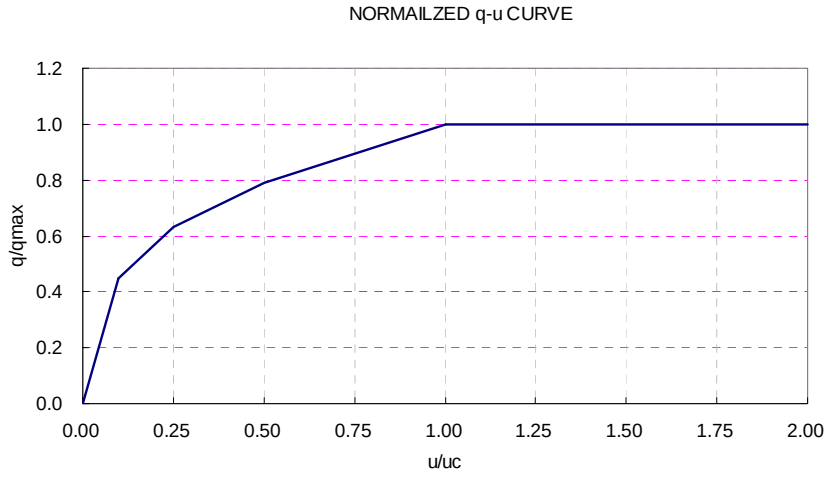
Hammer	Type	Energy/Power (kips-ft)/kW	Vibration Frequency (Hz)	Penetration time when approaching the proposed tip elevation (sec/ft)	
				Shaft Gain Factor 0.33	Shaft Gain Factor 0.25
PTC 100HDS	VIB	564.00	12	17.0	4.4
			20	2.9	2.7
			30	2.6	2.5
APE 400B	VIB	738.00	12	4.3	3.0
			20	2.3	2.0
			30	1.8	1.5

Note: Shaft gain factor varies from 0.25 to 0.33 according to pile driving experience at Oakland Mole, and toe gain factor is assumed to be 0.50. Hammer efficiency is assumed to be 0.8.

FIGURE 4-1: DUMBARTON BRIDGE PIERS

FIGURE 4-2: NORMALIZED *t-z*, *q-u* AND *p-y* CURVES FOR SOFT CLAY AND SAND





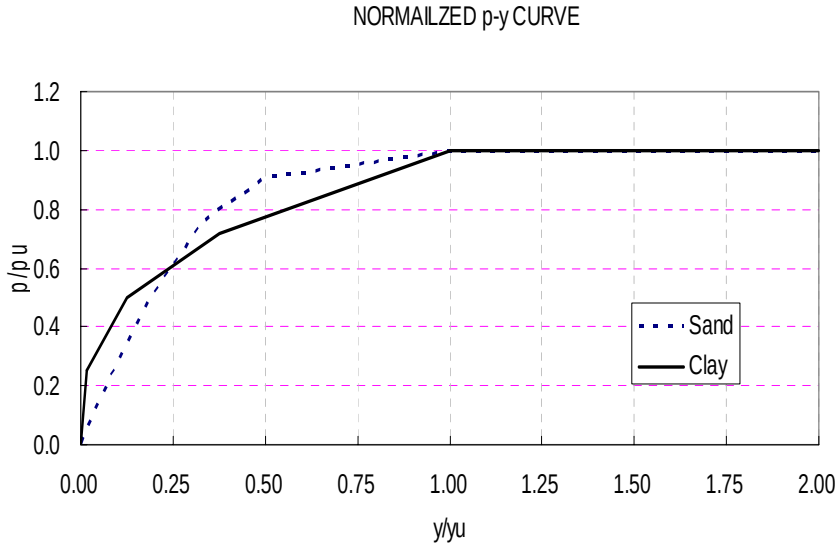


FIGURE 4-3: BEARING CAPACITY FACTOR N_q VERSUS INTERNAL FRICTION ANGLE

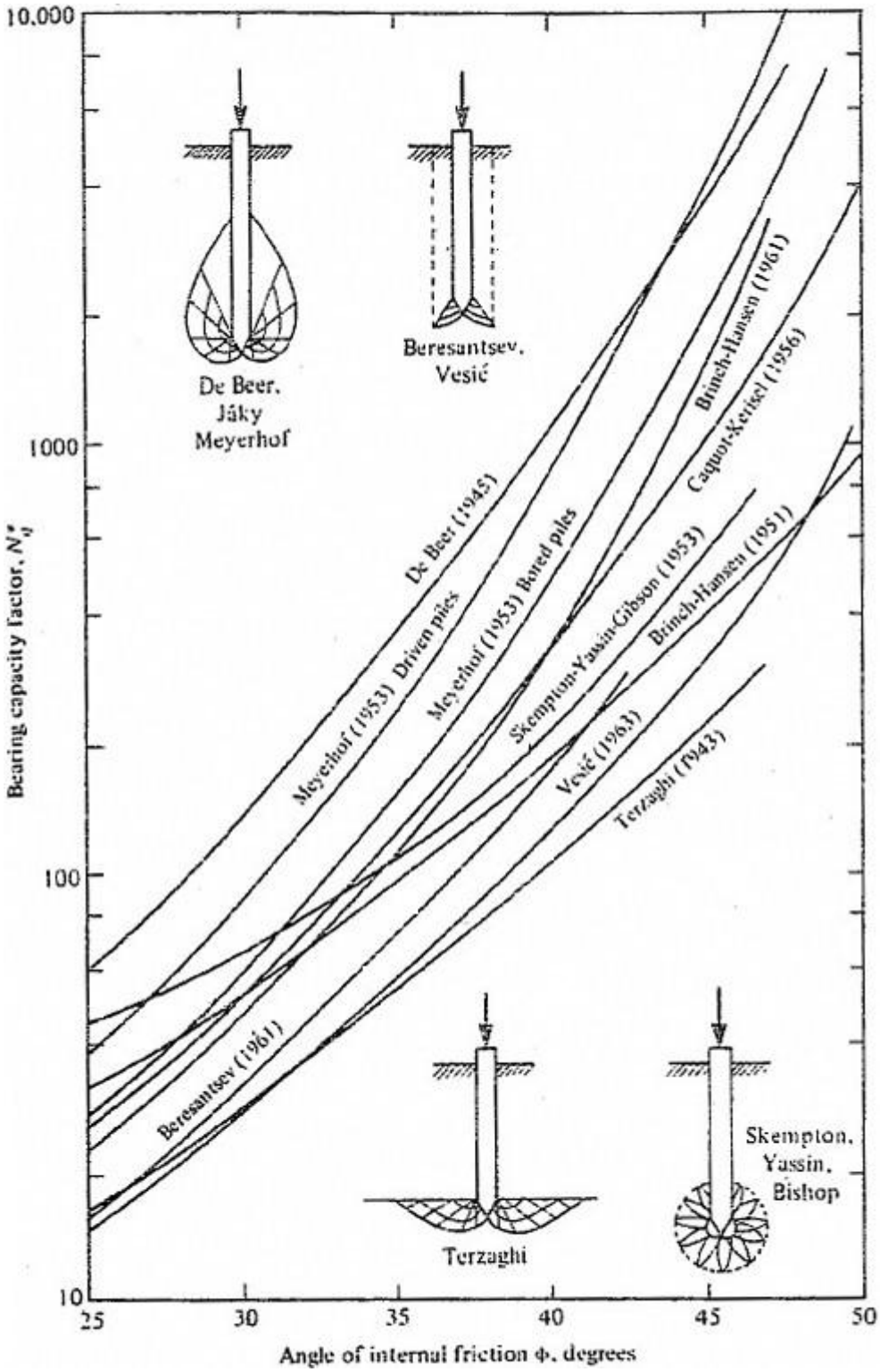


FIGURE 4-4: MODELLING OF AXIAL LOAD VERSUS DEFORMATION BEHAVIOR

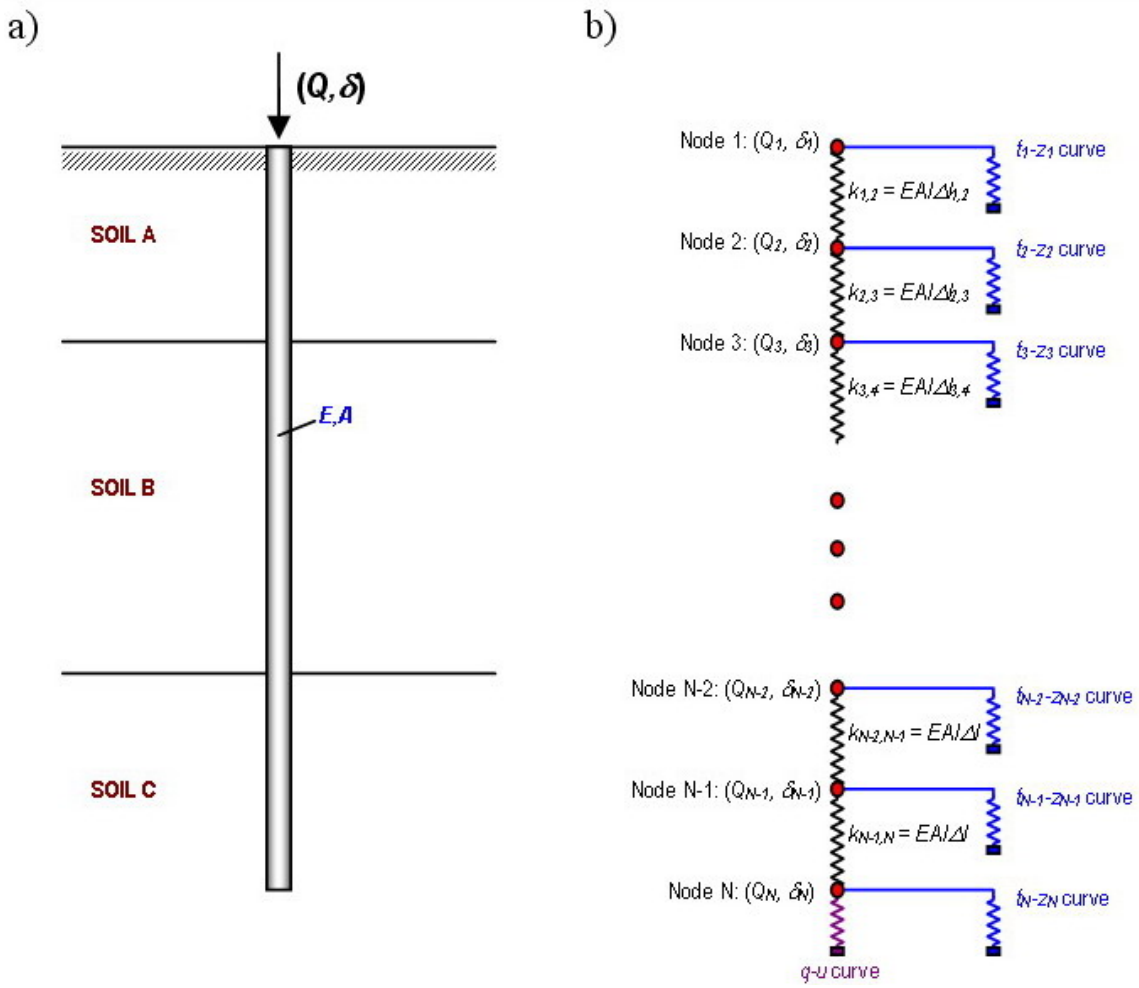


FIGURE 4-5: AXIAL PILE CAPACITY VERSUS PIER NUMBER OF DUMBARTON PIERS

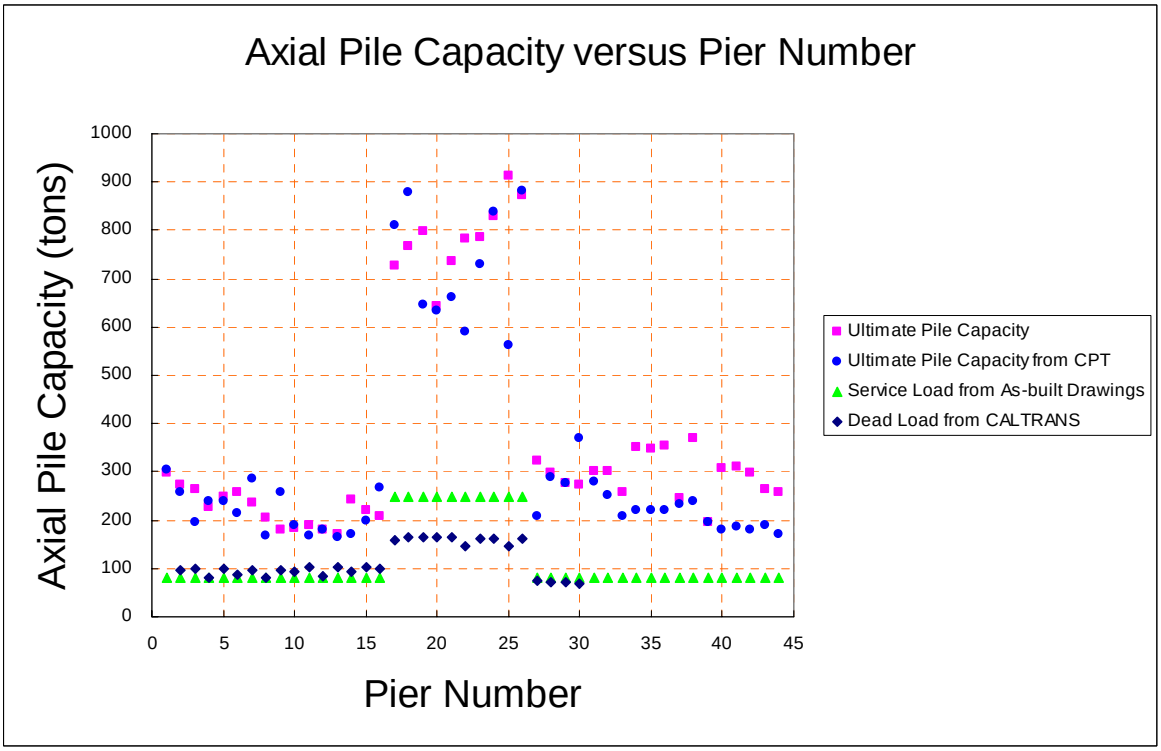


FIGURE 4-6: CALCULATION RESULTS OF PILE BEARING CAPACITY BY CPeT-IT (S27)

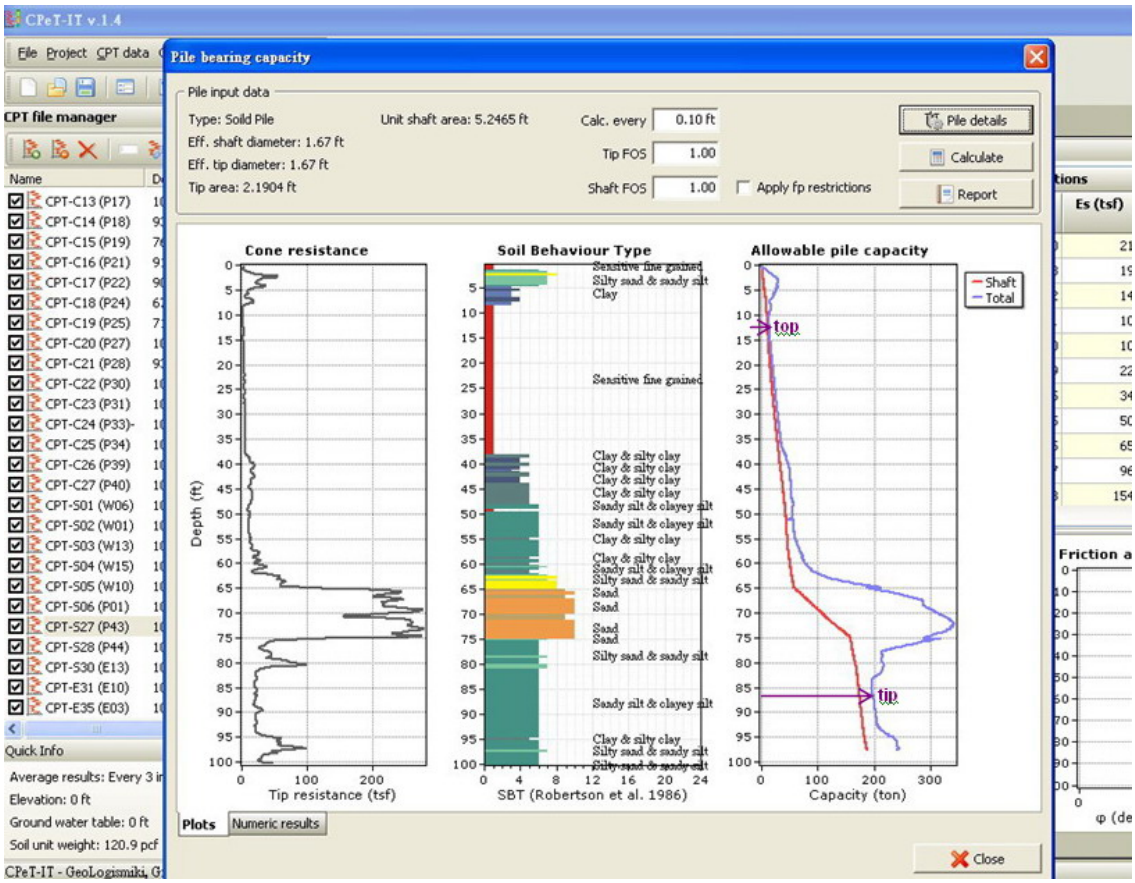
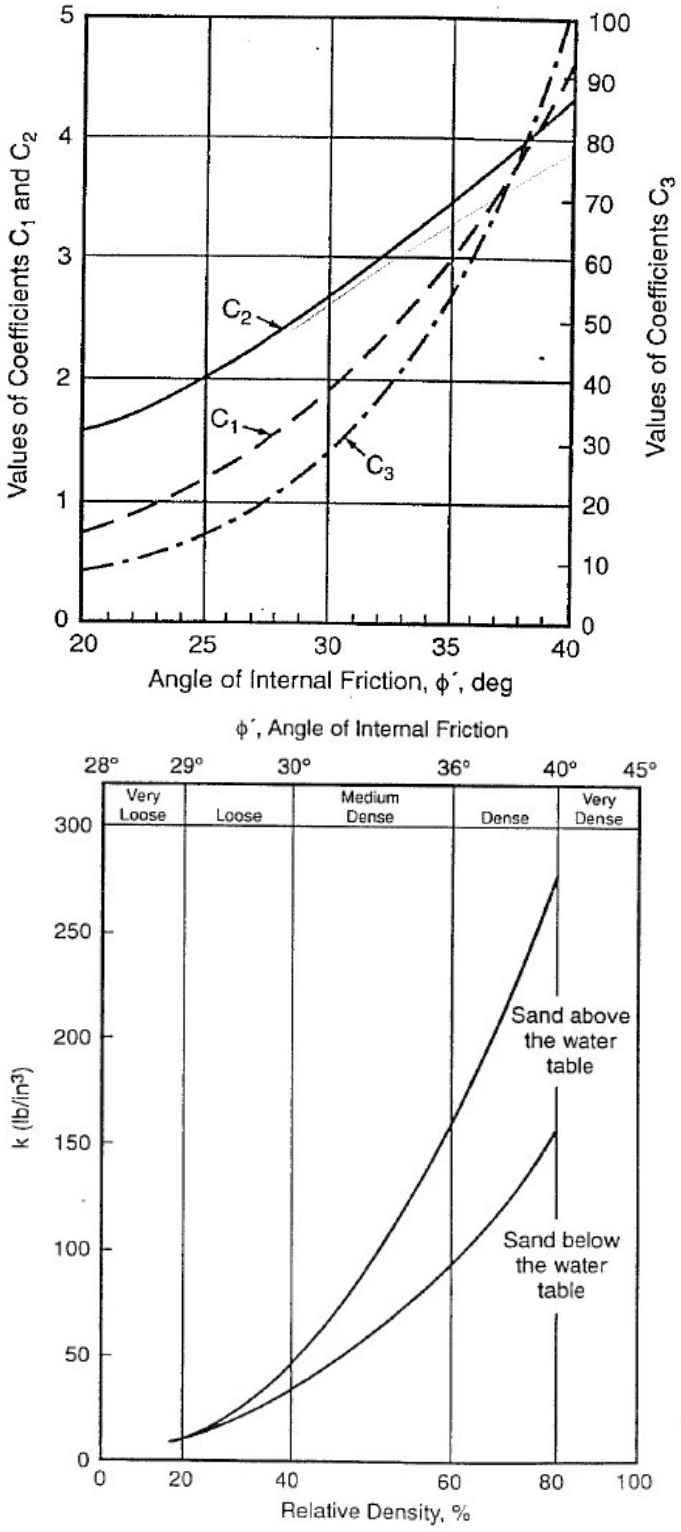


FIGURE 4-7: COEFFICIENTS (C_1, C_2, C_3) AND INITIAL MODULUS (K) AS FUNCTION OF ϕ'



5.0 SOIL-STRUCTURE INTERACTION

Pile foundations supporting a bridge can be modeled in several ways for seismic response evaluation. Figure 5-1 illustrates some of the modeling approaches adopted in the Toll Bridge Seismic Retrofit Program; namely, Complete Model, Sub-structure Model 1 and Sub-structure Model 2. They all offered satisfactory results depending on the objectives of the global bridge model. The Complete Model includes all foundation members in the global bridge model, in which the piles are explicitly modeled with beam elements and *t-z* and *p-y* soil springs distributed along each pile. Then depth-varying free field motions are used to excite the foundation. On the other hand, Sub-structure Model 1 and Sub-structure Model 2 involve a cut-off line at convenient interface, and the structure immediately above the interface line is subjected to some kind of equivalent stiffness matrix and kinematic motion to represent the contribution of the sub-structure (foundation) below. In this project, the Sub-structure Model 2 with the cut-off line at pile cap was adopted for primary design. As such, the entire pile-foundation below the pile-cap was represented by 6×6 stiffness and mass matrices, and kinematic motion to excite the global bridge structure. A special study was also conducted on a stand-alone pier to check validity of all models shown in Figure 5-1.

The sections that follow describe the formulation of foundation stiffness matrix using the sub-structuring approach. A more detailed formulation of kinematic motion and its discussion can be found in an MCEER report (Lam and Law, 2000). A set of stiffness matrices were developed at the pile-cap level to represent the entire pile group of each Dumbarton Bridge pier. Other than foundation stiffness matrices, we also provided mass matrices, damping matrices and kinematic motions (forcing functions) for seismic response analyses.

5.1 Method of Sub-structuring

To develop a foundation stiffness matrix and kinematic motion (forcing function) for a substructure system, we consider a global structural model (total system) consisting of superstructure, pile-cap, and pile-foundation, as shown in Figure 5-2. For the purpose of discussion, we neglect the damping term and assume a lumped mass system. The global bridge structure is excited by depth-varying input ground motions $\{x_g(t)\}$ along the pile length, and the equations of motion can be written as,

$$\begin{bmatrix} [m_s] & & \\ & [m_c] & \\ & & [m_p] \end{bmatrix} \begin{Bmatrix} \{\ddot{x}_s\} \\ \{\ddot{x}_c\} \\ \{\ddot{x}_p\} \end{Bmatrix} + \begin{bmatrix} [K_{ss}] & [K_{sc}] & \\ [K_{cs}] & [K_s]+[K_{cc}] & [K_{cp}] \\ & [K_{pc}] & [K_{pp}] \end{bmatrix} \begin{Bmatrix} \{x_s\} \\ \{x_c\} \\ \{x_p\} \end{Bmatrix} = \begin{Bmatrix} 0 \\ 0 \\ [K_g]\{x_g\} \end{Bmatrix}$$

where $\{x_s\}$, $\{x_c\}$ and $\{x_p\}$ are displacement vectors of the superstructure, pile-cap, and pile degrees of freedom, respectively, relative to the earth inertia reference frame (i.e, total displacements). The pile-cap would have 6 degrees of freedom (three translations, and three rotations). We assume that mass of the pile is small, and can be ignored, i.e, $[m_p]=0$. Typically, this is the case because inertial forces of the piles are relatively small in relation to the more massive

superstructure and therefore, neglecting the foundation inertial effect does not normally cause significant error. Then the system of equations becomes

$$\begin{bmatrix} [m_s] & & \\ & [m_c] & \\ & & [0] \end{bmatrix} \begin{Bmatrix} \{\ddot{x}_s\} \\ \{\ddot{x}_c\} \\ \{\ddot{x}_p\} \end{Bmatrix} + \begin{bmatrix} [K_{ss}] & [K_{sc}] & \\ [K_{cs}] & [K_s]+[K_{cc}] & [K_{cp}] \\ & [K_{pc}] & [K_{pp}] \end{bmatrix} \begin{Bmatrix} \{x_s\} \\ \{x_c\} \\ \{x_p\} \end{Bmatrix} = \begin{Bmatrix} 0 \\ 0 \\ [K_g]\{x_g\} \end{Bmatrix}$$

With the pile mass assumed to be zero, static condensation can be conducted to eliminate the pile degrees of freedom. Dynamic response analysis in the time domain can be conducted via the following equation derived from the first two sets of the above equation:

$$\begin{bmatrix} [m_s] & \\ & [m_c] \end{bmatrix} \begin{Bmatrix} \{\ddot{x}_s\} \\ \{\ddot{x}_c\} \end{Bmatrix} + \begin{bmatrix} [K_{ss}] & [K_{sc}] \\ [K_{cs}] & [K_s]+[K] \end{bmatrix} \begin{Bmatrix} \{x_s\} \\ \{x_c\} \end{Bmatrix} = \begin{Bmatrix} 0 \\ \{f\} \end{Bmatrix}$$

which only involves the superstructure $\{x_s\}$ and the pile cap variables $\{x_c\}$, and where [K] and $\{f\}$ in the above equation are defined as:

$$[K] = [K_{cc}] - [K_{cp}][K_{pp}]^{-1}[K_{pc}]$$
$$[f] = -[K_{cp}][K_{pp}]^{-1}[K_g]\{x_g\}$$

It is noted that the resultant dynamic equations of motion contain only pile-cap and superstructure degrees of freedom, and in fact the solutions to these equations are what the structure engineers are seeking, which represent demands for the superstructure and the pile-cap. The original global structural model is now reduced to a system of the superstructure and pile-cap which is connected with the ground by an equivalent stiffness matrix of [K] and is subjected to an equivalent force of $\{f\}$, as shown Figure 5-3a. This transformation of the original problem into the substructure system consisting only of superstructure and pile-cap is entirely based on classical static condensation. The stiffness and loading of pile foundation appear in the form of 6×6 condensed stiffness matrix [K] and a 6×1 time-series forcing function $\{f\}$ applied at the pile-cap level. Both the stiffness matrix [K] (which is constant with time) and the forcing $\{f\}$ (which is time dependent related to the time histories of the depth-varying free-field input ground motion $\{x_g(t)\}$) can be pre-calculated without knowledge of the response of the superstructure or the pile cap. Instead of using the forcing function $\{f\}$ explicitly on the right hand side of the equations, we introduce a 6×1 vector {X}, such that

$$\{f\} = [K]\{X\}$$

From the above equation, it can be noted that loading from ground excitation is introduced into the overall structure as a right hand vector in a form of a displacement vector {X} times the foundation stiffness [K]

$$\begin{bmatrix} [m_s] & \\ & [m_c] \end{bmatrix} \begin{Bmatrix} \{\ddot{x}_s\} \\ \{\ddot{x}_c\} \end{Bmatrix} + \begin{bmatrix} [K_{ss}] & [K_{sc}] \\ [K_{cs}] & [K_s]+[K] \end{bmatrix} \begin{Bmatrix} \{x_s\} \\ \{x_c\} \end{Bmatrix} = \begin{Bmatrix} 0 \\ [K]\{X\} \end{Bmatrix}$$

Upon inspection of the above reduced equations of motion, {X} represents some form of rigid-base motion. The system becomes the superstructure and pile cap, connected with the ground by the stiffness matrix [K], and the ground is subjected to the rigid-base motion of {X}, as shown Figure 5-3b. This six-component motion {X} is termed "kinematic motion", and is a major element in defining ARS design criteria.

5.2 Treatment of Mass and Damping

The substructuring approach using static condensation, as mentioned above, provides rigorous solutions for massless piles. However, for piles with some limited mass, the method is only approximate and the error depends on the relative magnitude of the pile mass to the superstructure mass. The solution can be greatly improved by implementing a condensed mass in the foundation substructure, which can be derived from a free vibration system of pile-cap and piles as shown in Figure 5-4. This is to maintain the fundamental mode of vibration of the entire foundation system in the condensed substructure that consists of 6 degrees of freedom (3 translation and 3 rotational modes) at the pile cap. One approach would be based on computation of Eigen values for the soil-pile system representing the entire foundation. The condensed mass, [M], can be approximated by:

$$[M] = \frac{1}{\omega^2}[K]$$

Where, [K] is the condensed stiffness matrix (6×6) obtained from static condensation and ω is an angular frequency. The value for ω is often chosen as the fundamental frequency (1st mode) for each of the six axes (3 translation and 3 rotation) of the entire foundation. By doing so, the condensed model consisting of 6×6 mass matrix [M] and 6×6 stiffness matrix [K] would reproduce the same 6 fundamental modes of vibration as the original foundation prior to adding the superstructure. In fact, matching of six modes of vibration is the best one can achieve for a condensed system that has only six degrees of freedom. It is not feasible to have more than six vibration modes for a six-d.o.f system.

In many cases, however, computation of natural frequencies and mode shapes for a large pile group can be difficult. A method similar to static condensation can be employed to reduce the number of degrees of freedom for a dynamic system that reduces the expense of computing Eigen value and Eigen vector. This condensation algorithm is known in the literature as Guyan reduction, mass condensation, dynamic condensation, or Eigen value economization. In the context of pile foundation, free vibration characteristics of the pile-cap/pile system can be expressed as,

$$\left(\begin{bmatrix} [K_{cc}] & [K_{cp}] \\ [K_{pc}] & [K_{pp}] \end{bmatrix} - \omega^2 \begin{bmatrix} [m_c] & \\ & [m_p] \end{bmatrix} \right) \begin{Bmatrix} \{x_c\} \\ \{x_p\} \end{Bmatrix} = \begin{Bmatrix} 0 \\ 0 \end{Bmatrix}$$

where the subscript 'c' denotes the pile-cap d.o.f and the subscript 'p' denotes the pile d.o.f. In order to obtain a relation between $\{x_c\}$ and $\{x_p\}$ we temporarily ignore all the mass and the above equation reduces to

$$\begin{Bmatrix} \{x_c\} \\ \{x_p\} \end{Bmatrix} = [T]\{x_c\}$$

where

$$[T] = \begin{Bmatrix} I \\ -[K_{pp}]^{-1}[K_{pc}]^T \end{Bmatrix}$$

Substituting the above equation into the free-vibration Eigen value equation and pre-multiplying by $[T]^T$ yields the condensed Eigen-value problem as follows

$$([K] - \omega^2[M])\{x_c\} = 0$$

where the reduced stiffness and mass matrices are symmetric and are given by

$$[K] = [T]^T \begin{bmatrix} [K_{cc}] & [K_{cp}] \\ [K_{pc}] & [K_{pp}] \end{bmatrix} [T]$$

and

$$[M] = [T]^T \begin{bmatrix} [m_c] & \\ & [m_p] \end{bmatrix} [T]$$

It can be seen that [T] plays a similar role as Ritz vectors in the Raleigh-Ritz method. Furthermore, it is noted that the condensed mass [M] is banded and is a combination of both mass and stiffness coefficients. If the piles carry no mass, then [K] is the same matrix as produced by static condensation. If damping matrix appears in the equation of motion, the same principle can be employed to obtain a condensed damping matrix [C] as

$$[C] = [T]^T \begin{bmatrix} [C_{cc}] & [C_{cp}] \\ [C_{pc}] & [C_{pp}] \end{bmatrix} [T]$$

However, in a typical seismic response analysis of global bridge foundation, damping is not used explicitly. Global damping parameters such as those based on Raleigh damping coefficients are generally used.

5.3 Foundation Stiffness, Mass and Damping

The method of sub-structuring is an approach based on a linear theory, and it provides approximate solutions to the problems with non-linear foundation behavior. Though *p-y* and *t-z* curves are highly non-linear, the overall behavior of foundation system, which consists of pile and soil supports, is mildly non-linear within the range of seismic loading.

The first step towards developing the foundation stiffness matrix involved linearization of the *p-y* curves by performing lateral pushover analysis of the single pile to a representative displacement level expected during the earthquake. The structural engineers provided their initial estimates on peak foundation displacements, while we used 65% of the peak displacement values as representative displacement levels. Once the *p-y* curves were linearized on the basis of lateral pushover analysis, the problem became beams on elastic springs, and the method of sub-structuring was applied to obtain the condensed stiffness matrix. These stiffness matrices were then used in the next round of the global analysis to compute displacement demands. Iteration was adopted to ensure that the displacements used to linearize the soil stiffness were compatible with the seismic demands.

Two sets of stiffness matrices were developed for each Dumbarton Bridge pier; one presuming a fixed head condition, and the other presuming a pinned-head condition. The fixed head condition is believed to be the prevailing case, and thus only matrices for the fixed head condition are provided in Appendix H. The coordinate system adopted for the stiffness calculation is such that the X-direction is along the bridge axis, Y-direction is transverse to the bridge axis, and Z-direction is vertical. The mass matrices and damping matrices are also provided in the same tables. Formulation of the mass matrix follows the procedure based on Guyan reduction discussed above, and therefore the condensed mass matrix is fully populated; however for simplicity, the off-diagonal terms have been neglected. Using the stiffness matrix and the mass matrix, a damping matrix was developed assuming a 5% damping ratio for all six modes of vibration (3 translation and 3 rotation). Computation of the above condensed matrices were also conducted with the in-house computer program KIPS.

The stiffness, mass and damping matrices were developed at the bottom of the pile cap for all piers at the Main Span and Approach Structures (equivalent to Sub-structure Model 2 depicted in Figure 5-1). However, for the Trestle piers, which are supported on pile extensions, a stiffness matrix was developed at the ground line at each pile (equivalent to Sub-structure Model 1 depicted in Figure 5-1).

5.4 Comparison Study of Different Foundation Modeling

At the onset of seismic retrofit strategy phase of the project, the structural designers evaluated the most appropriate foundation model to be used for the primary design of the bridge. To assist the decision making, all the models shown in Figure 5-1 were studied using Pier 23 as a stand alone bent without adjacent piers.

Four different models, as shown in Figure 5-5, were examined. The first model was a full SSI model considering all piles as structure members with non-linear soil springs attached to the piles. Free-field motions provided depth-varying ground excitation.

The second model adopted a cut-off line at the mudline. Each pile segment at this elevation was connected with a 4×4 stiffness matrix representing lateral and associated rotational degrees of

freedom, and a nonlinear axial load-deformation spring. Seismic excitation was given in a form of kinematic motion.

The third and fourth models adopted a cut-off line at the pile-cap; the former used a 4×4 stiffness matrix and a nonlinear axial load-deformation spring for each pile similar to that of second model, and the latter adopted a 6×6 stiffness matrix to represent the entire pile group.

The stiffness matrix for each of the foundation model was developed separately since the cut-off boundary varied. The Office of Earthquake Engineering conducted the time history analyses of the Pier 23 stand alone models with the four foundation representations. The superstructure response of the bridge from each of the model is shown in Figure 5-6. The solutions are shown to be very comparable; the minor variations are attributed to non-linear springs used in some of the foundation models. The studies verified that all foundation models yield satisfactory solutions.

5.5 Nonlinear Pushover Analyses

Static nonlinear pushover analyses were conducted at three piers to assist Caltrans structural designers for the independent check of displacement capacities Piers 18, 20 and 23 were selected; all supported on 54" diameter hollow concrete piles. The pushover analyses involved modeling the pile/footing connection with a non-linear moment-rotation spring, characterizing the pre-stressed pile section with a moment-curvature relationship, and representing the soil supports with non-linear p-y curves. Findings from the single pile push-over analyses are provided in Appendix I.

Dr. Nigel Priestley provided the characterizations of the pile/footing connection (moment-rotation spring) and pre-stressed pile section (moment-curvature relationship) for a typical 54 inch diameter prestressed concrete pile. Three different axial loads were examined. Priestley's report describing limit states and the level of strains used is also included in Appendix I.

FIGURE 5-1: FOUNDATION MODELING SCHEMES FOR SOIL-STRUCTURE INTERACTION

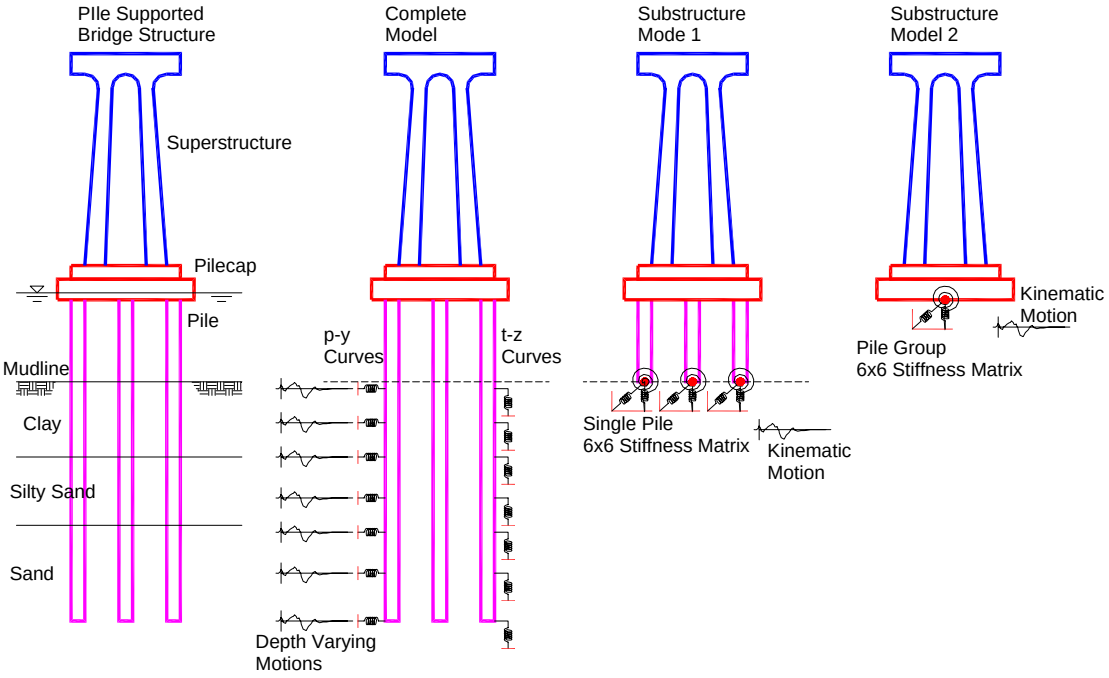


FIGURE 5-2: COMPLETE MODEL FOR SOIL-STRUCTURE INTERACTION

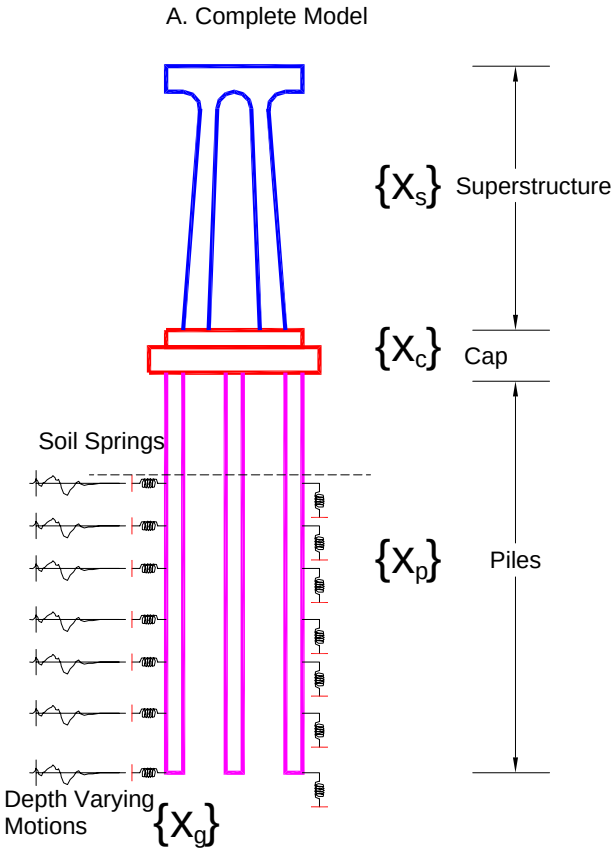


FIGURE 5-3: SUBSTRUCTURE MODEL 2 FOR SOIL-STRUCTURE INTERACTION

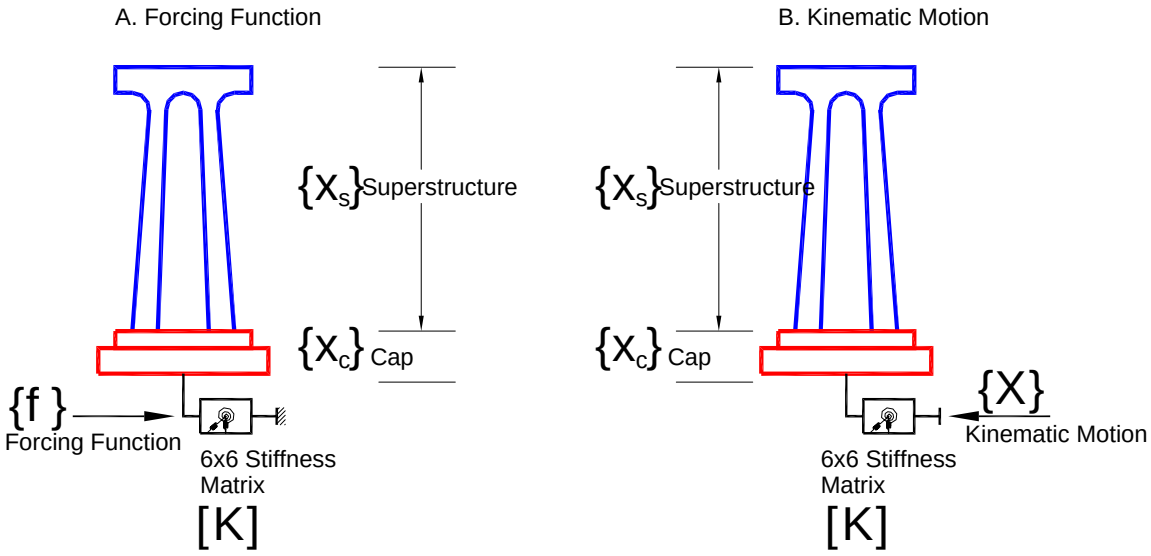


FIGURE 5-4: MODEL FOR FOUNDATION MASS

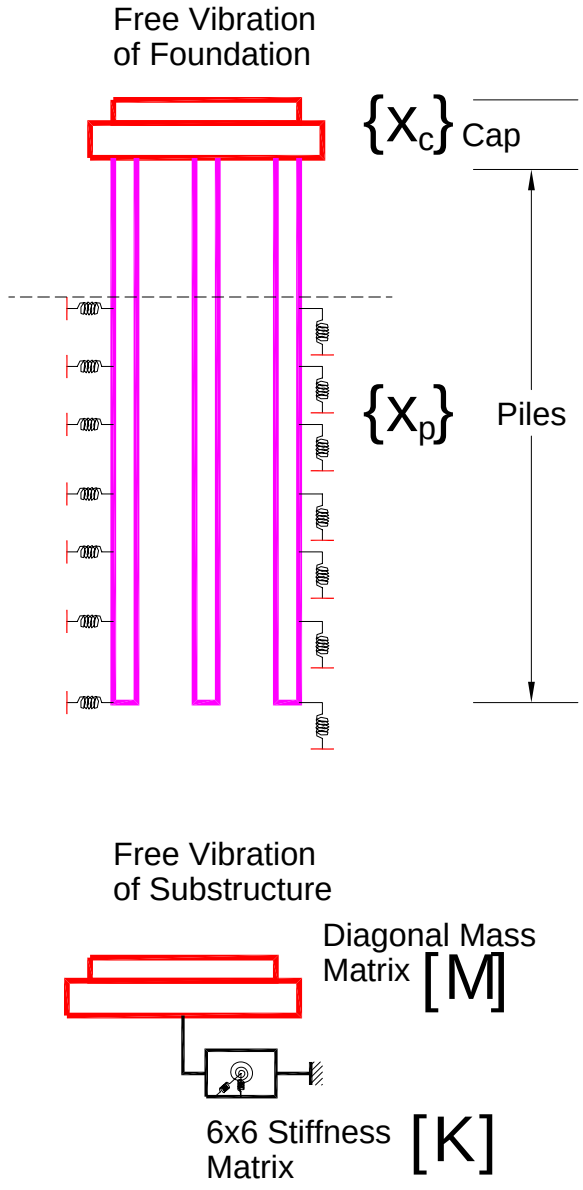


FIGURE 5-5: FOUR MODELS USED FOR DUMBARTON PIER 23

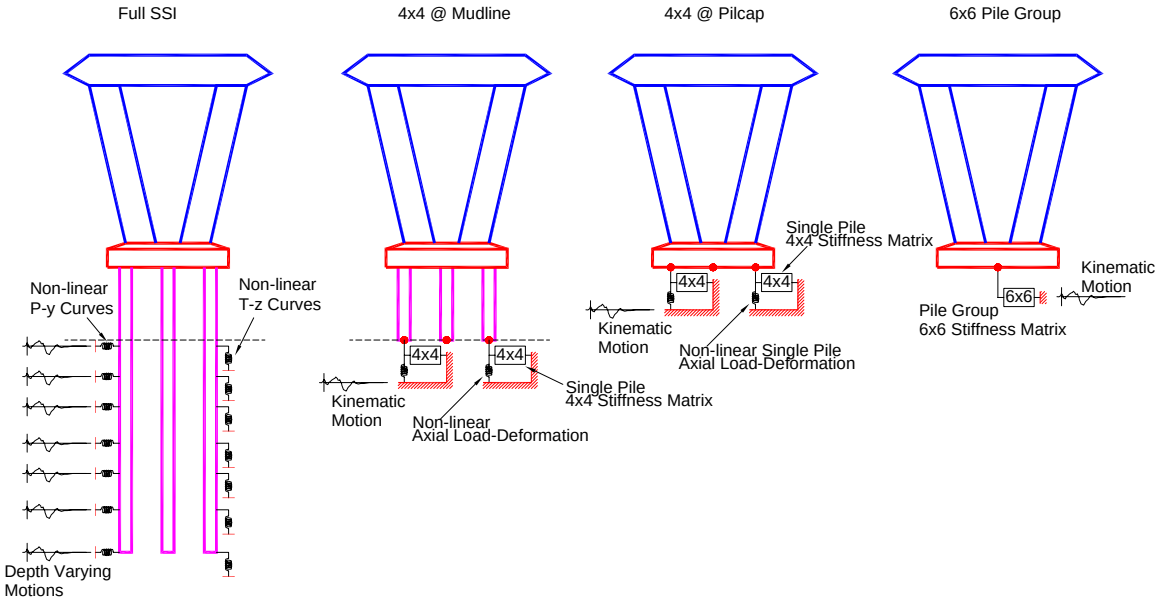
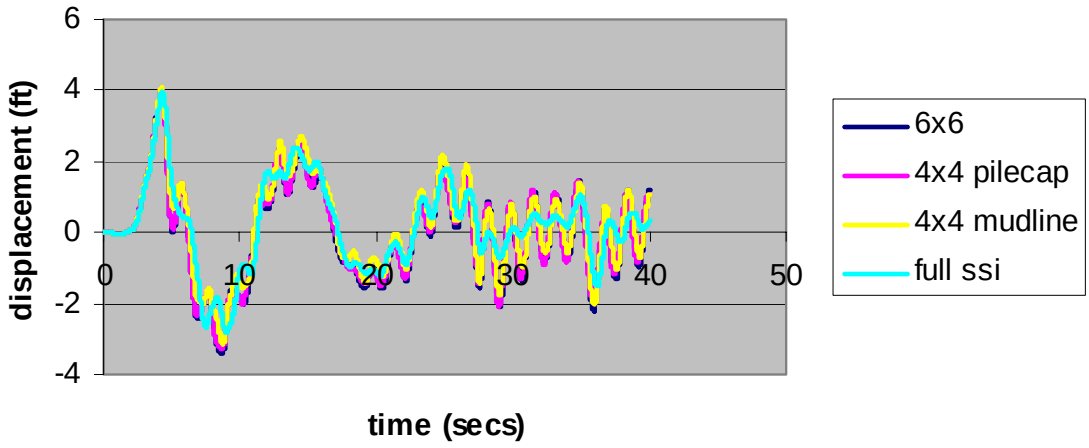
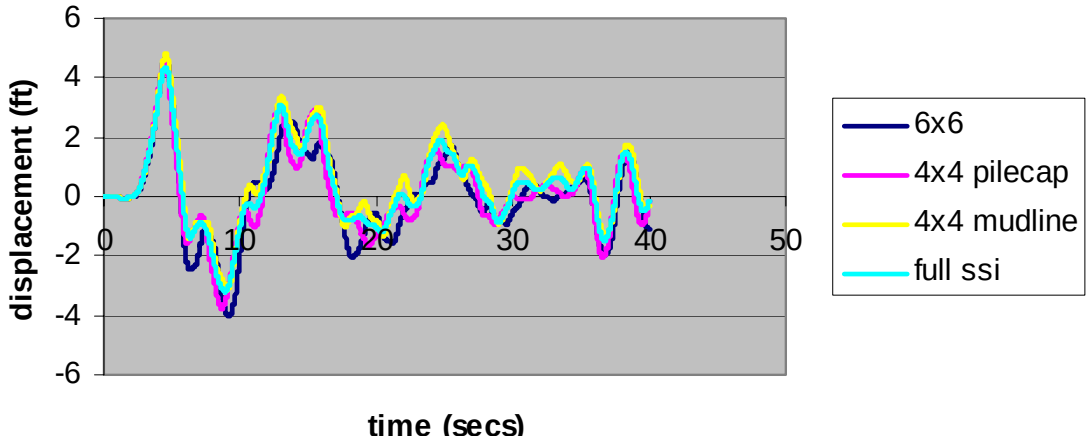


FIGURE 5-6: COMPARATIVE STUDY RESULTS FOR DUMBARTON PIER 23

a) Transverse Direction



b) Longitudinal direction



6.0 CONCLUSIONS

This report presents foundation analysis works conducted for the existing Dumbarton Toll Bridge, with emphasis on the foundation design and modeling issues. The following are a summary of materials discussed in the report:

(1) The subsurface conditions underlying the site are relatively uniform, mainly composed of Young Bay Mud, Posey Sand, San Antonio Formation and Old Bay Mud in sequence. Engineering properties of these soil units are provided at all piers along the bridge.

(2) The local seismicity is mainly controlled by the Hayward and San Andreas faults due to their close distances to the project site and high activity rates. Reference rock spectra corresponding to the 1,000-year return period ground motions were selected as the Safety Evaluation Earthquake (SEE) for seismic retrofit evaluation, based on a probabilistic approach.

(3) Two sets of ARS curves for the SEE event are developed for two groups of piers along the bridge alignment, based on the results of seismic response and SSI analyses conducted at seven representative piers with seven spectrum-compatible motions.

(4) Soil supports in terms of *t-z* curves along the pile and the end bearing *q-u* curves at pile tip for all bridge piers and trestle bents are provided. They were used in pile capacity analyses, development of foundation stiffness matrix, and direct modeling of soil springs in the complete foundation model.

(5) The axial pile-head load versus pile-head deformation (Q-δ) curves are evaluated. Design loads and ultimate pile capacities are discussed including pile load test results, findings from conventional pile capacity calculations, and findings from a CPT-based pile capacity method.

(6) The lateral soil supports (*p-y* curves) along the pile and the results of the lateral push-over analyses on a single pile are presented. The development of *p-y* curves is based on API code; however a *p*-multiplier of 0.5 was adopted for seismic design which is intended to collectively account for cyclic degradation and pile group effects.

(7) Modeling approaches used in the Toll Bridge Program is discussed, and mathematical derivation of 6×6 foundation stiffness, mass and damping matrices is presented. The foundation stiffness matrices, mass matrices, and damping matrices are provided for all bridge piers and trestle bents in the seismic response analyses of the global bridge model.

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8.0 APPENDIX A: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA

FIGURE A-1: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT ABUTMENT 1

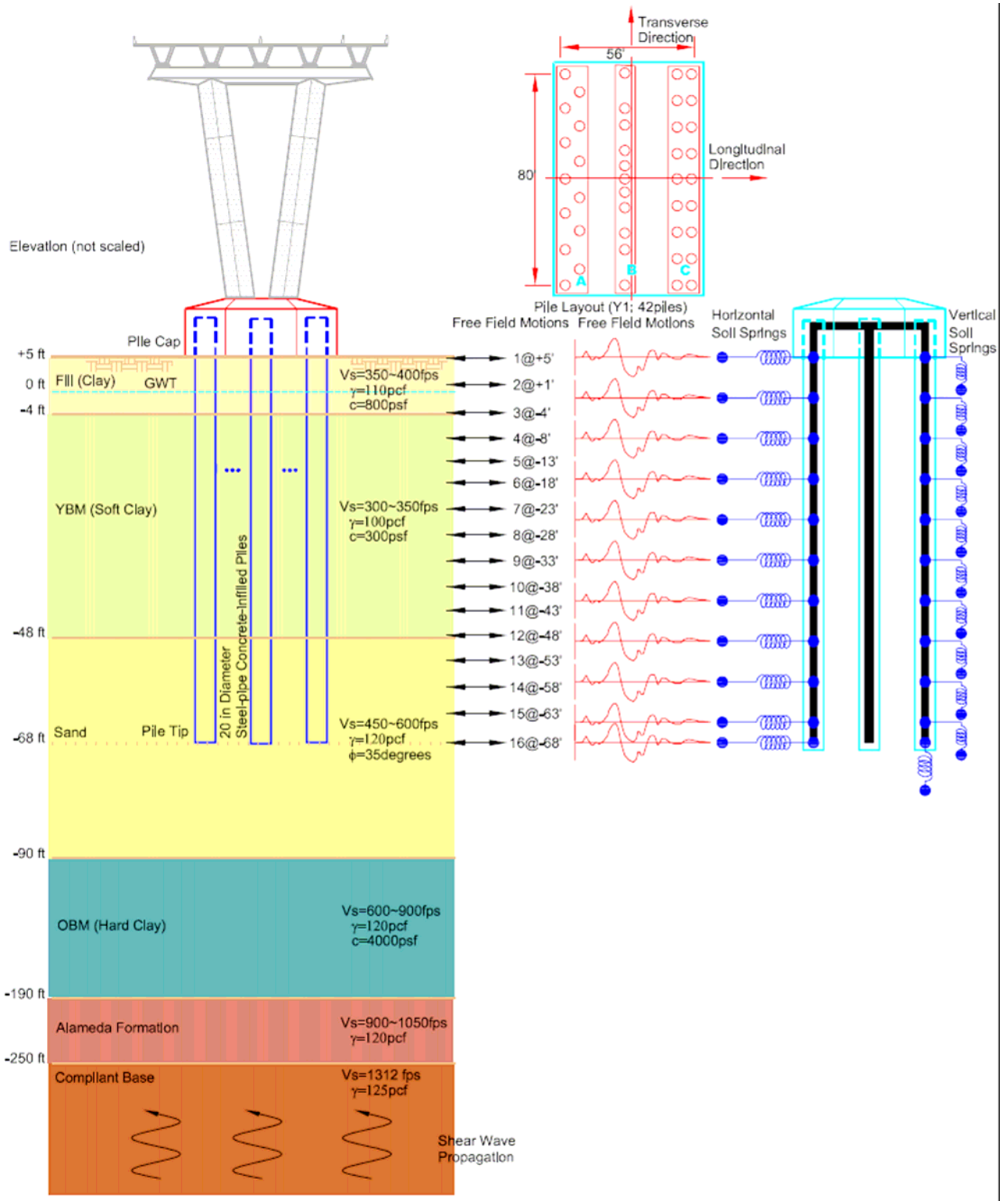


FIGURE A-2: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT PIER 2

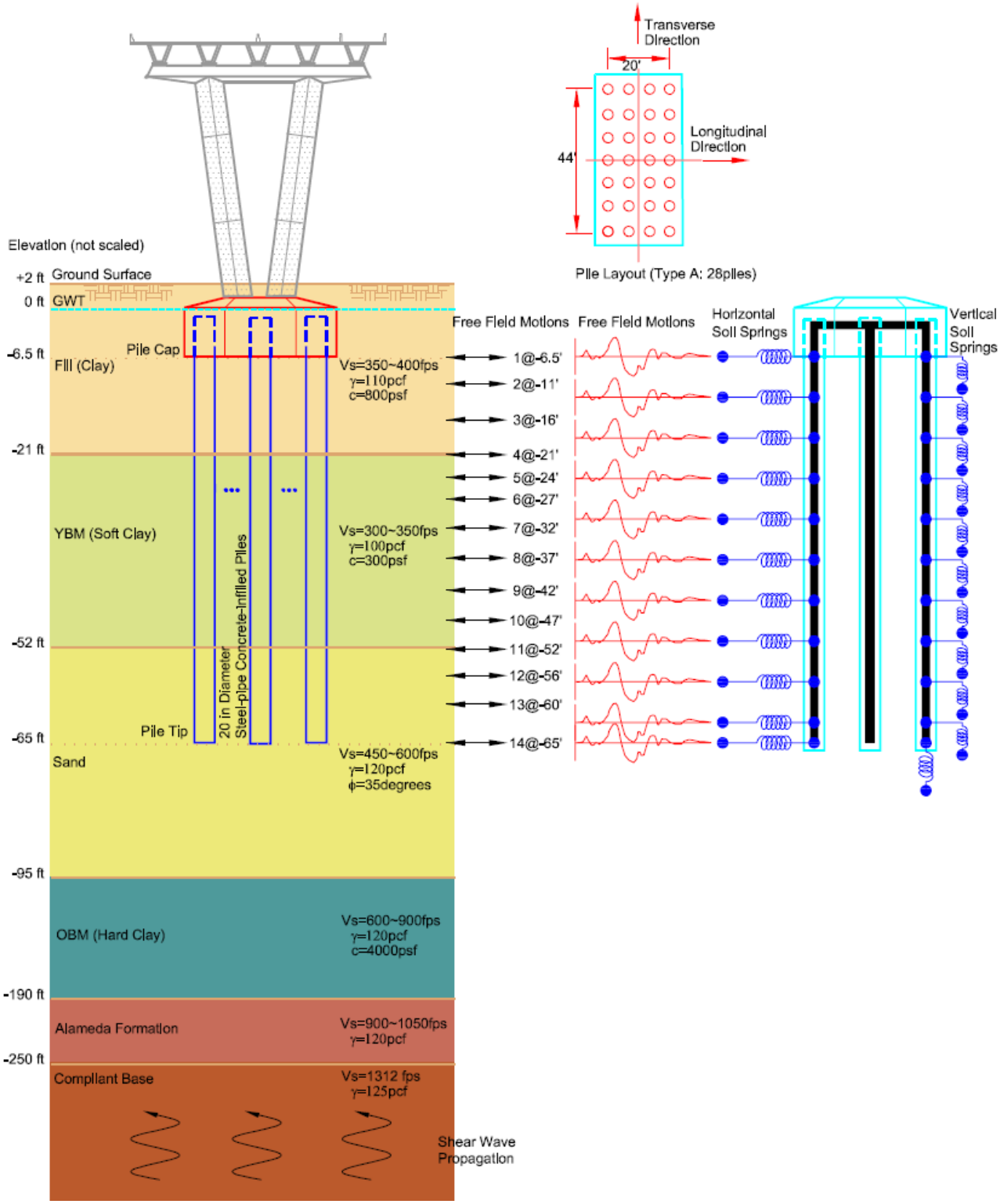


FIGURE A-3: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT PIER 3

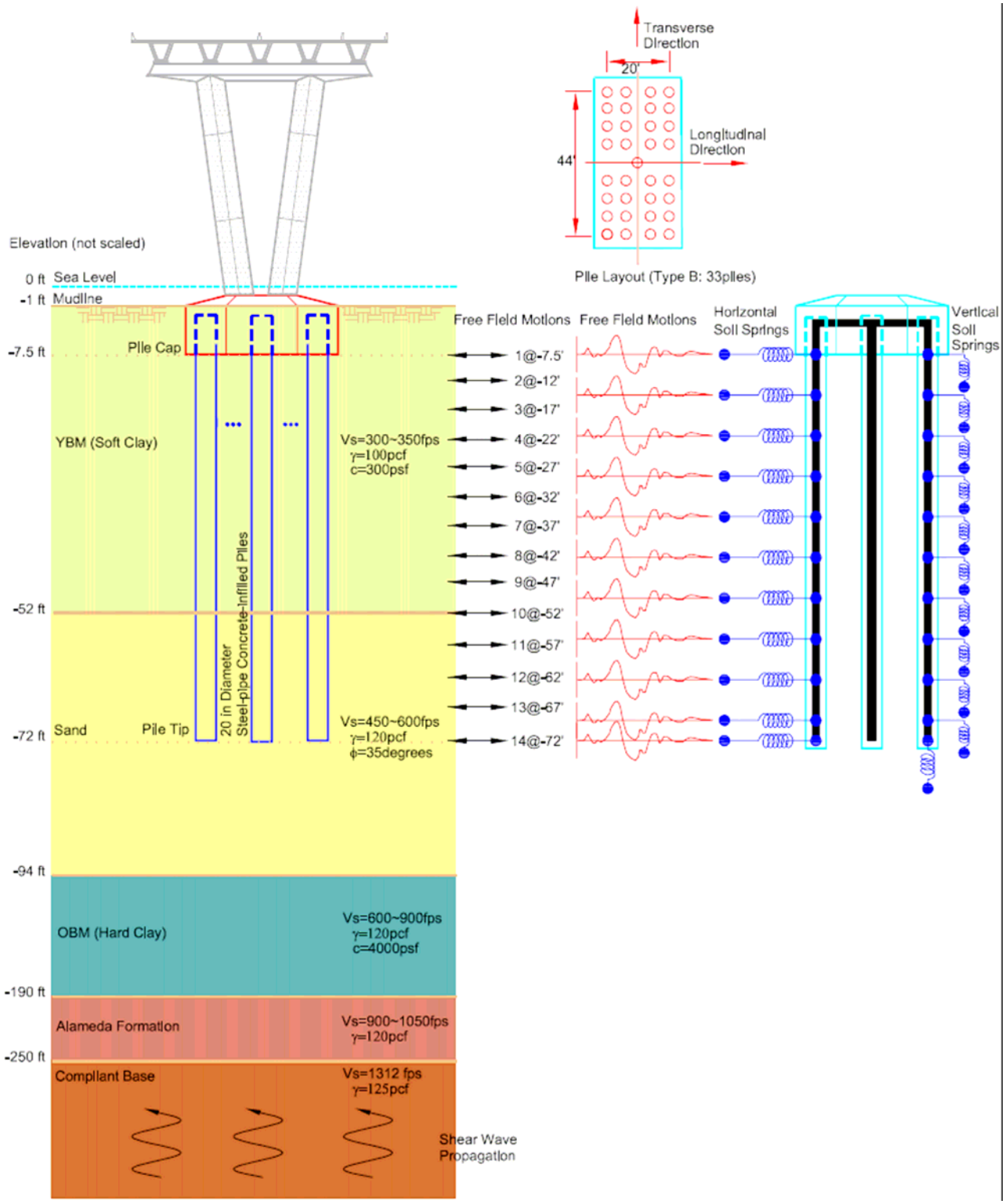


FIGURE A-4: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT PIER 4

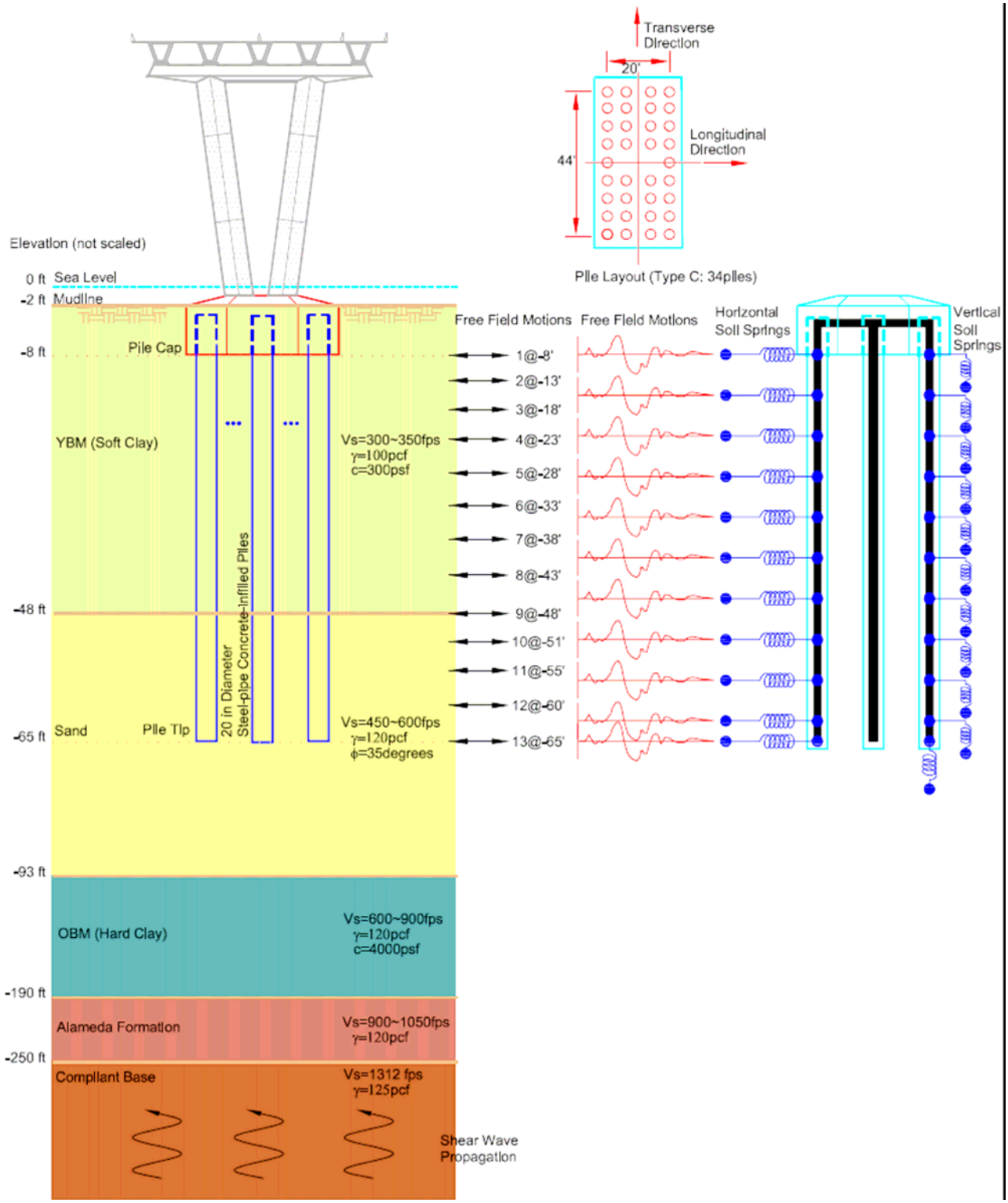


FIGURE A-5: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT PIER 5

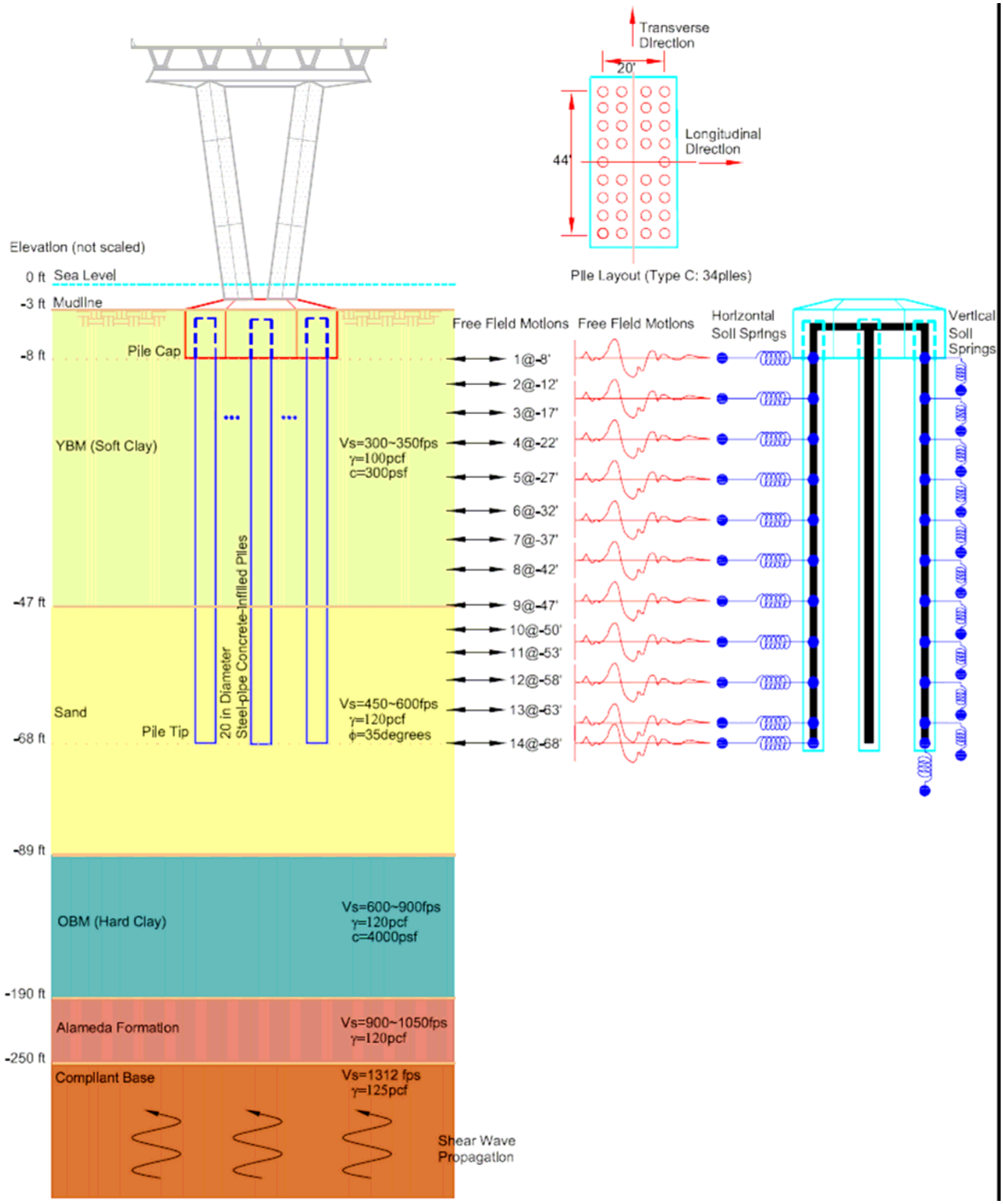


FIGURE A-6: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT PIER 6

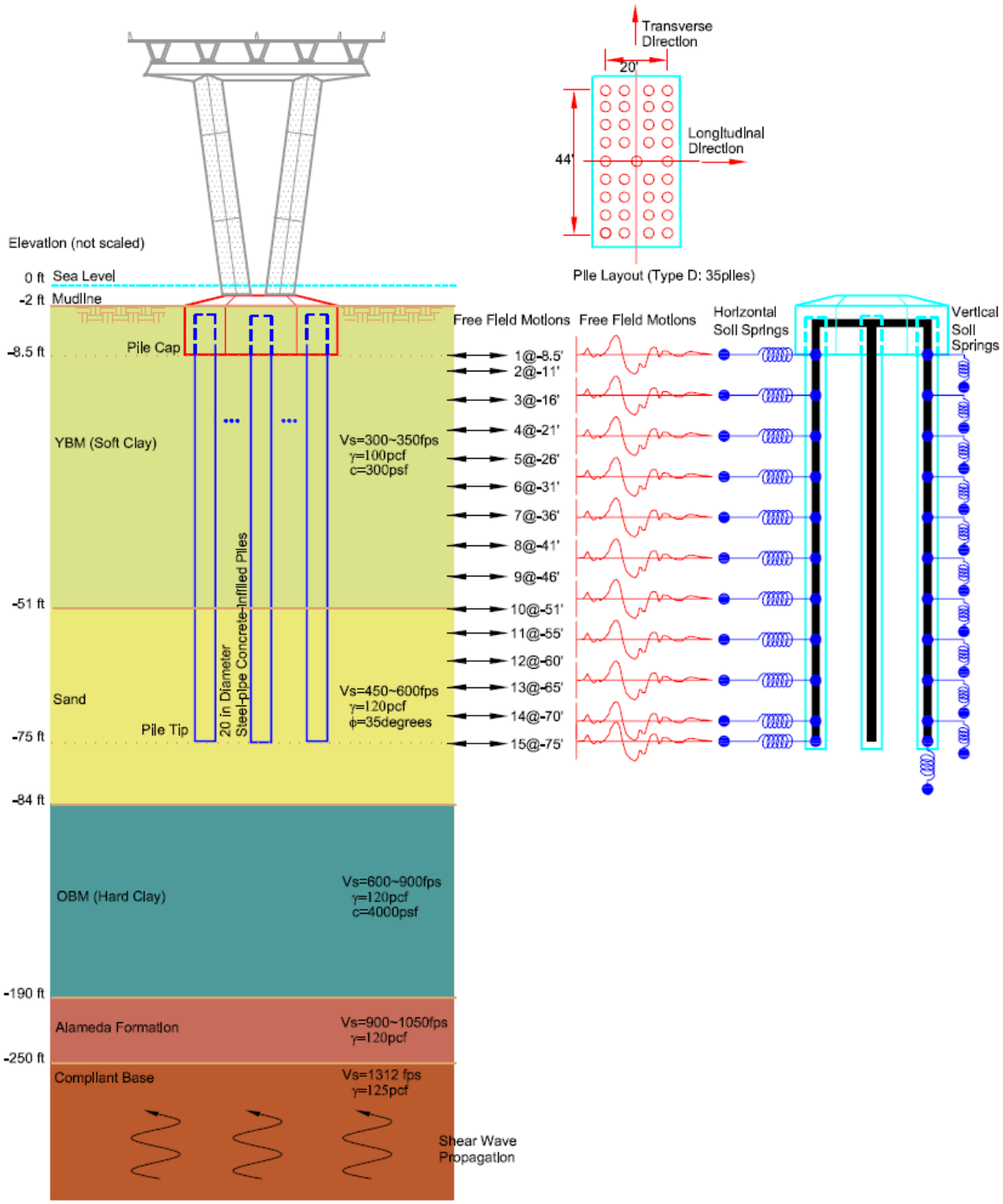


FIGURE A-7: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT PIER 7

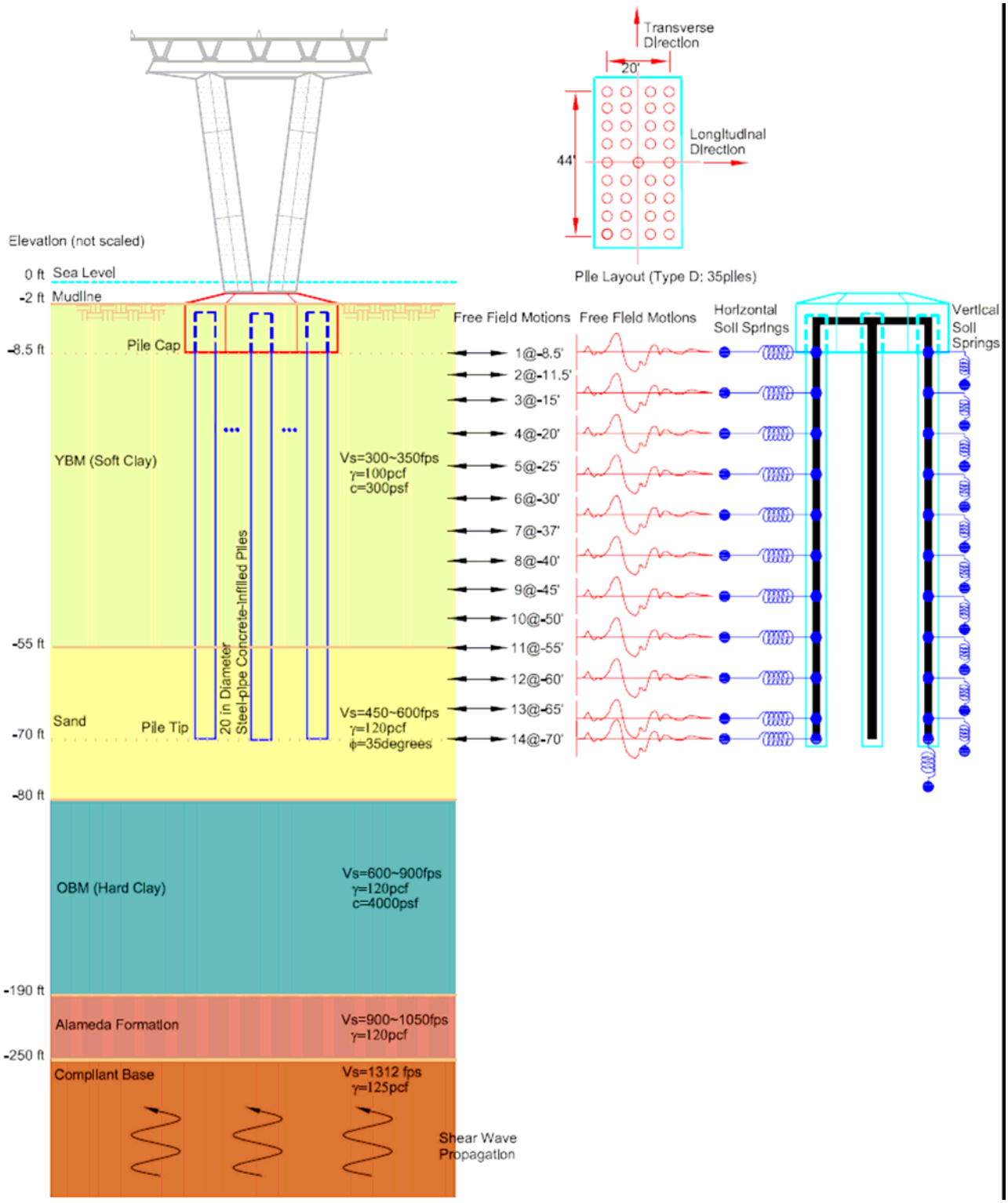


FIGURE A-8: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT PIER 8

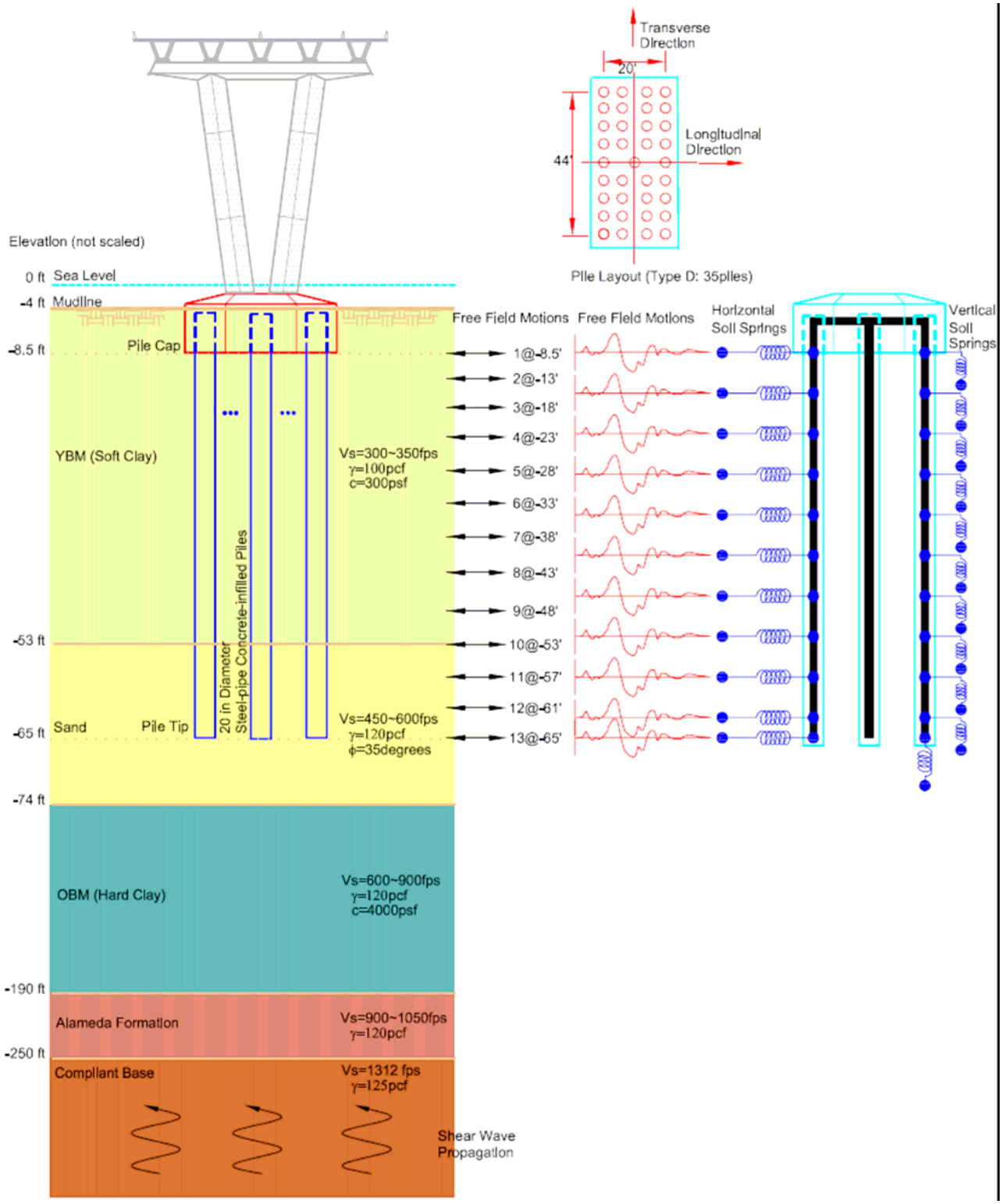


FIGURE A-9: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT PIER 9

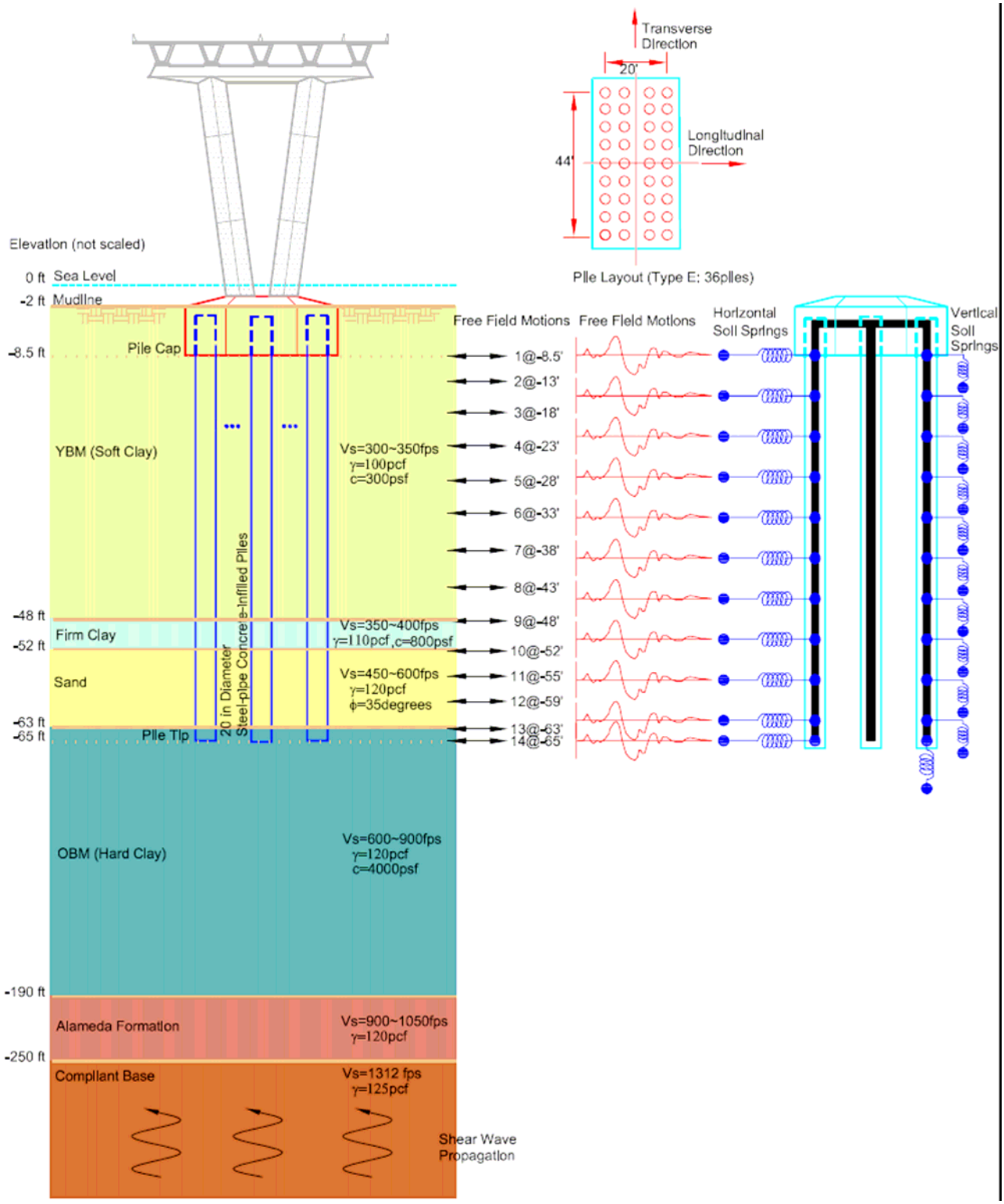


FIGURE A-10: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT PIER 10

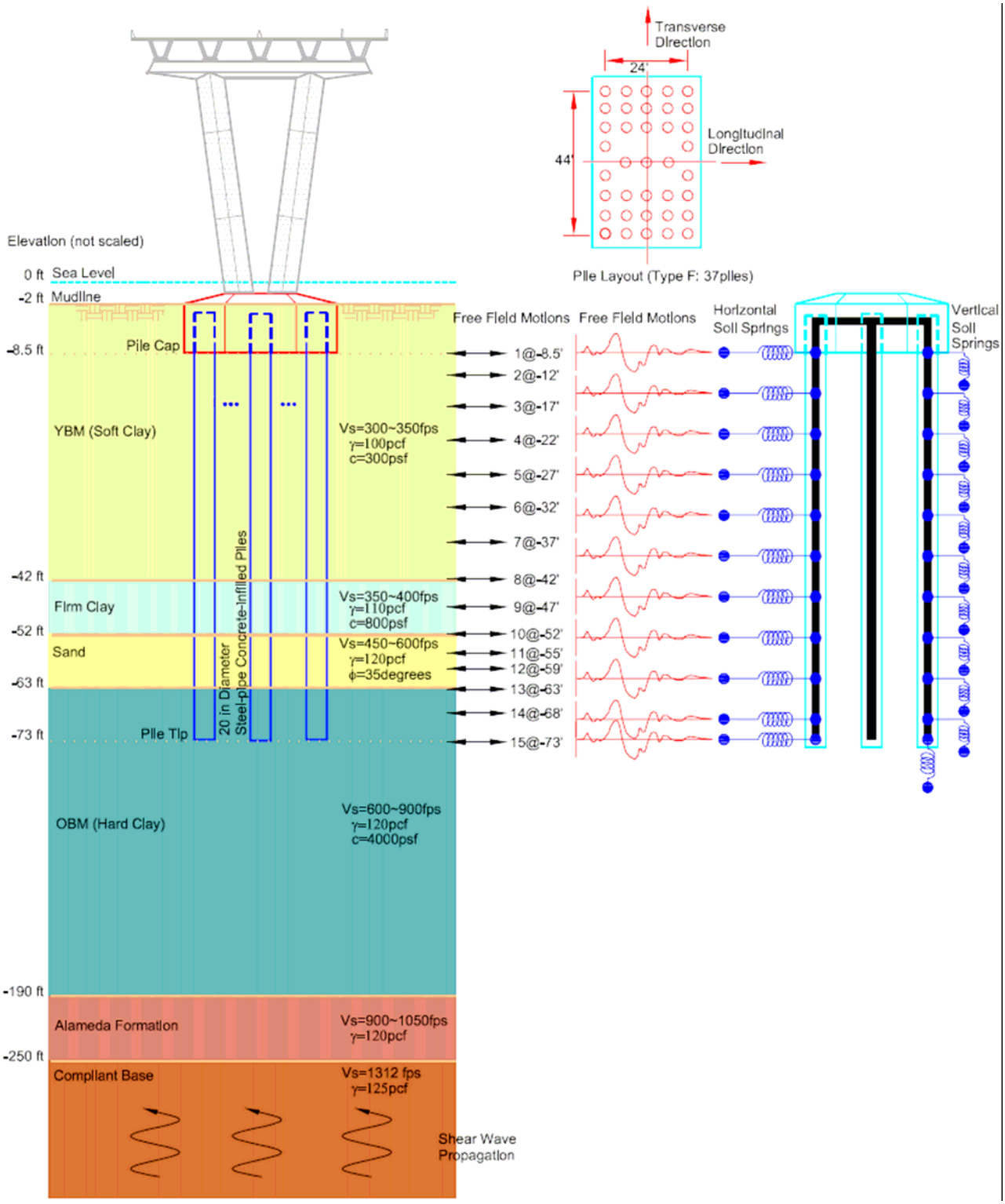


FIGURE A-11: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT PIER 11

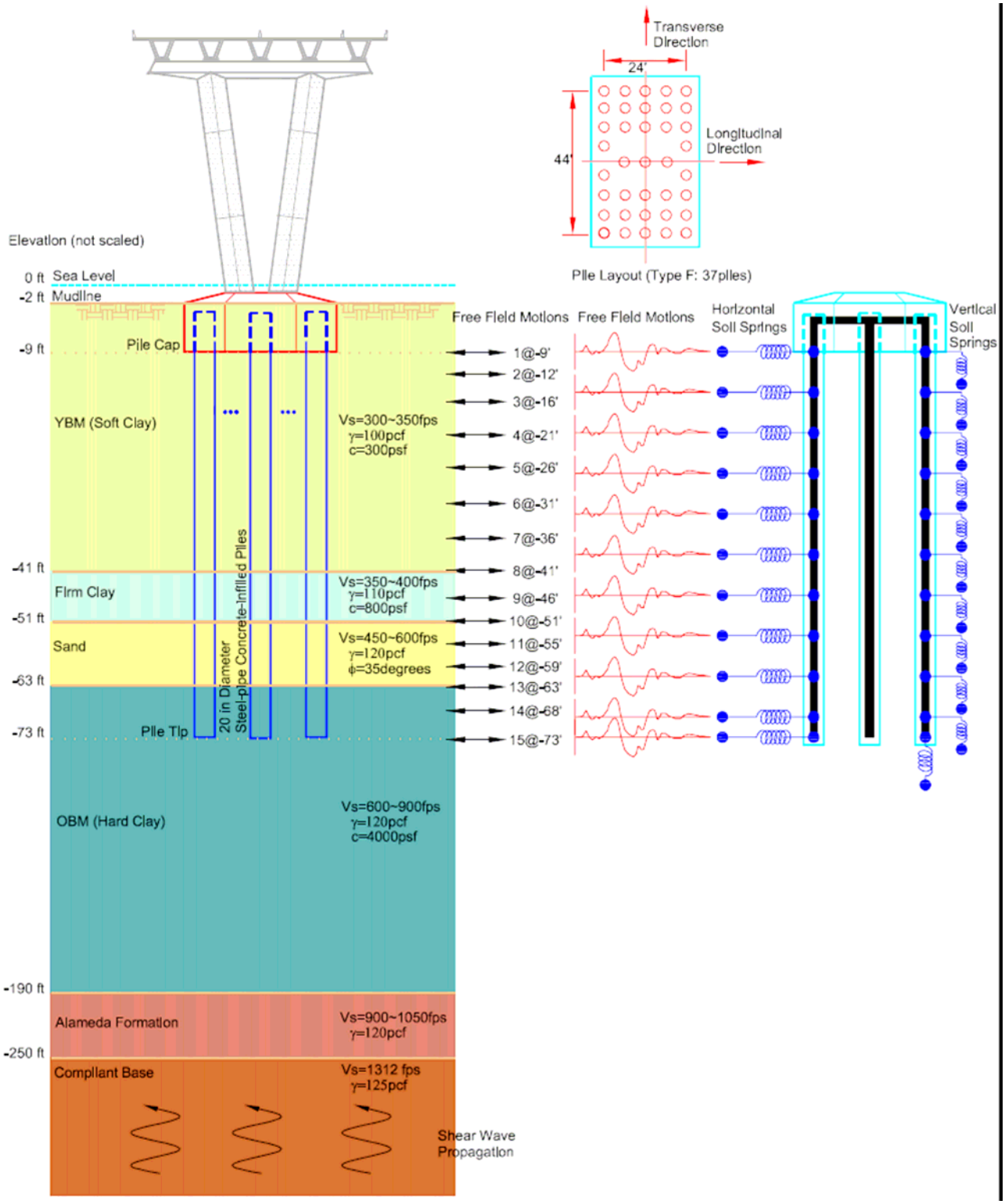


FIGURE A-12: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT PIER 12

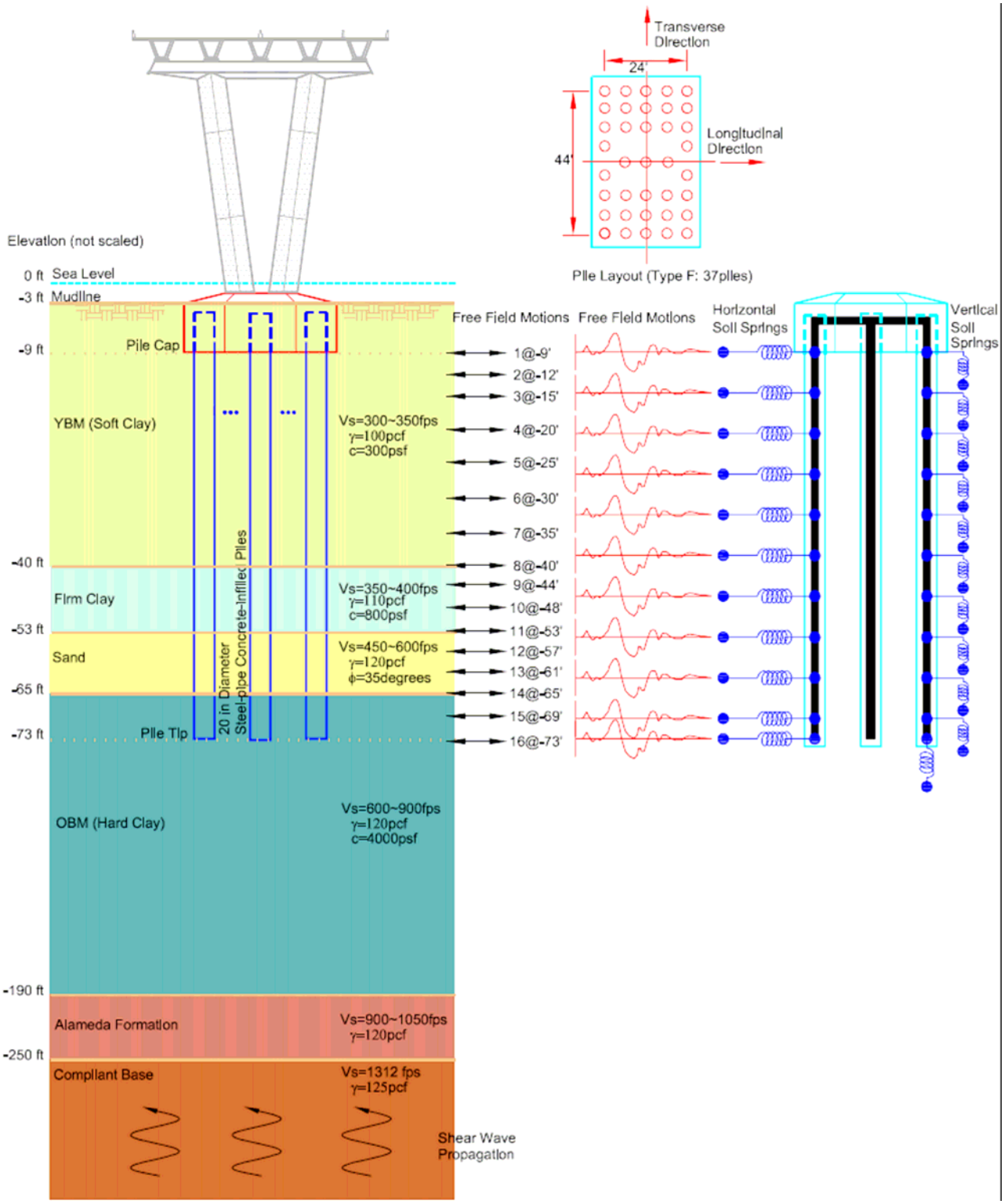


FIGURE A-13: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT PIER 13

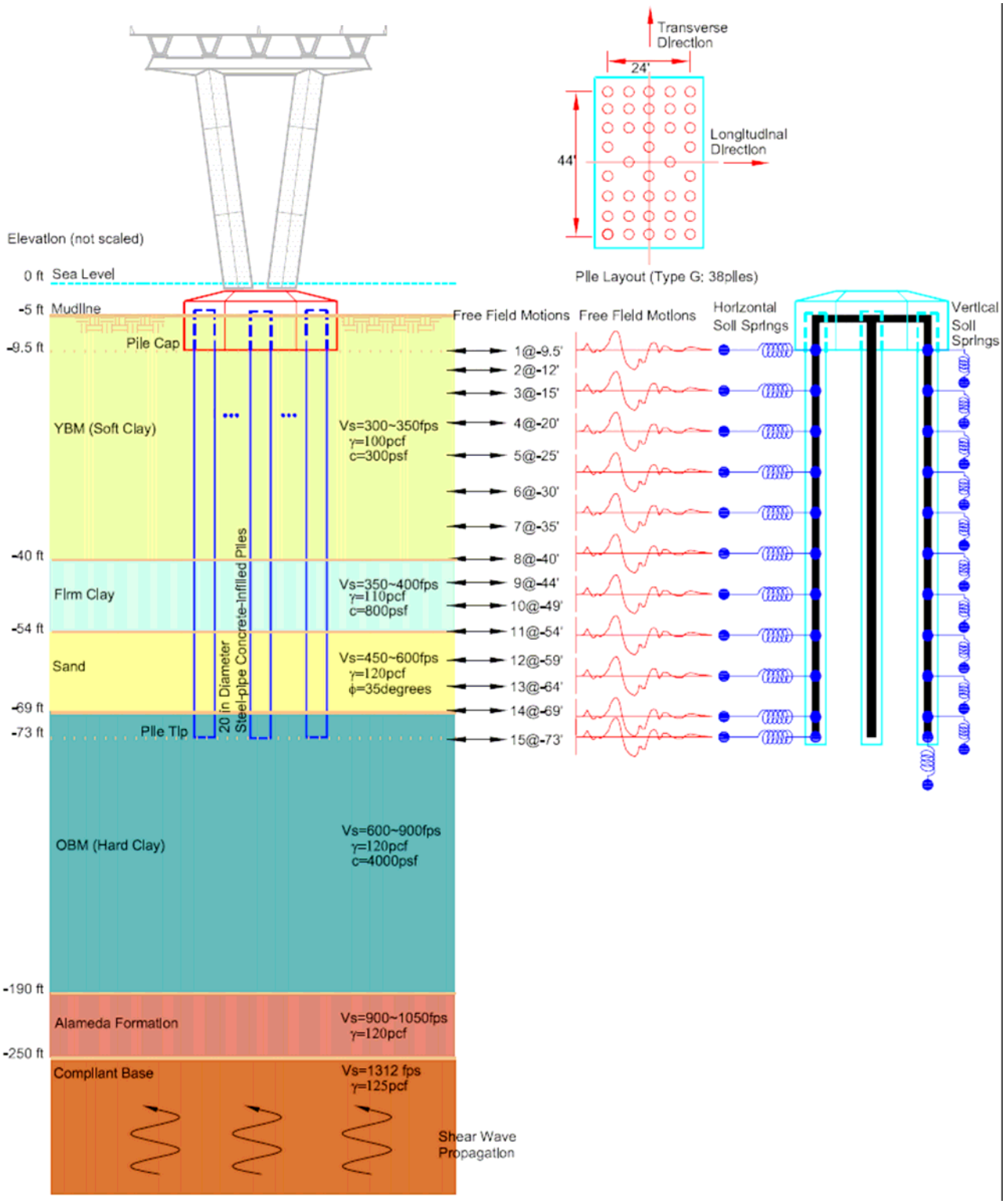
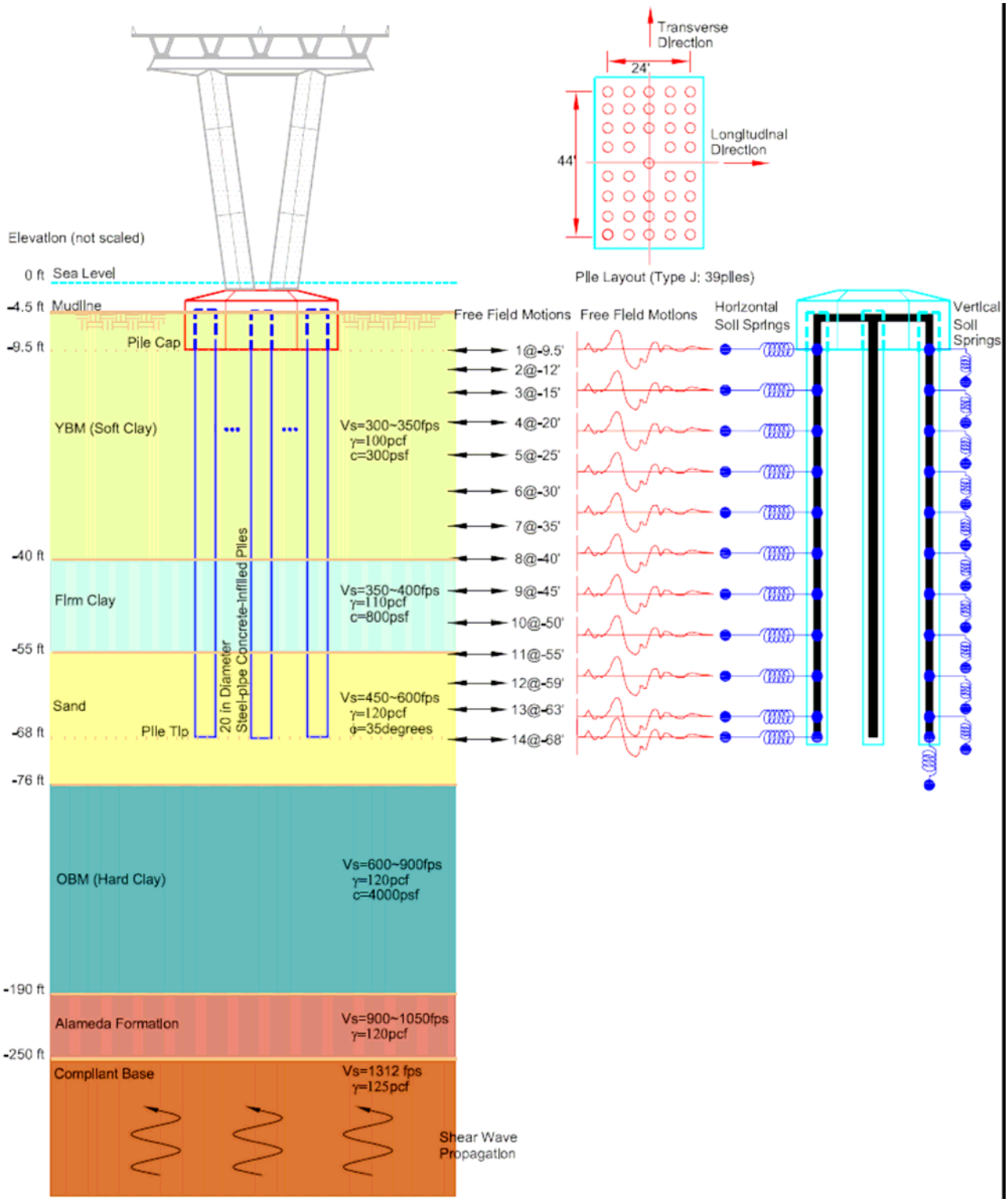


FIGURE A-14: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT PIER 14



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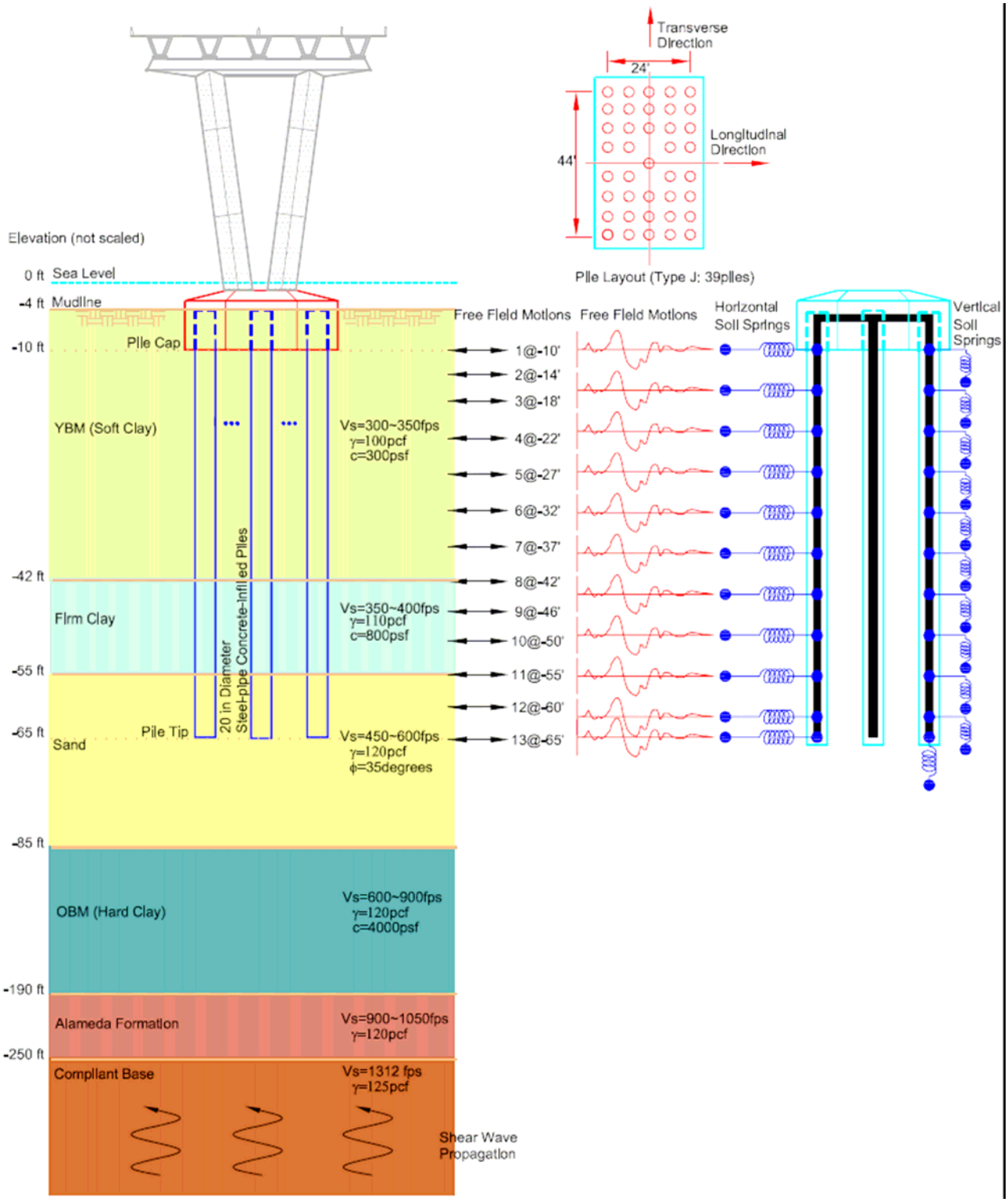
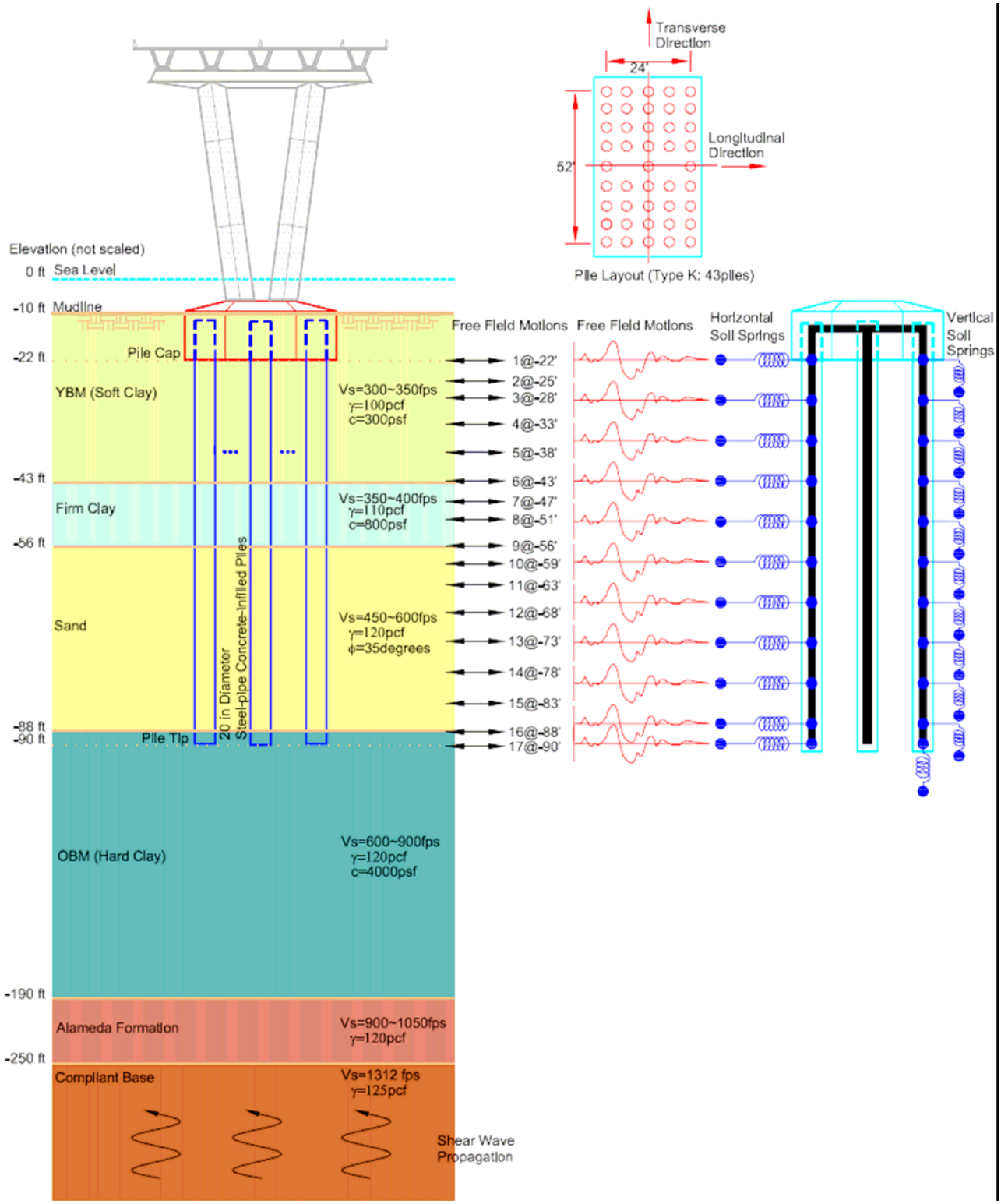


FIGURE A-16: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT PIER 16



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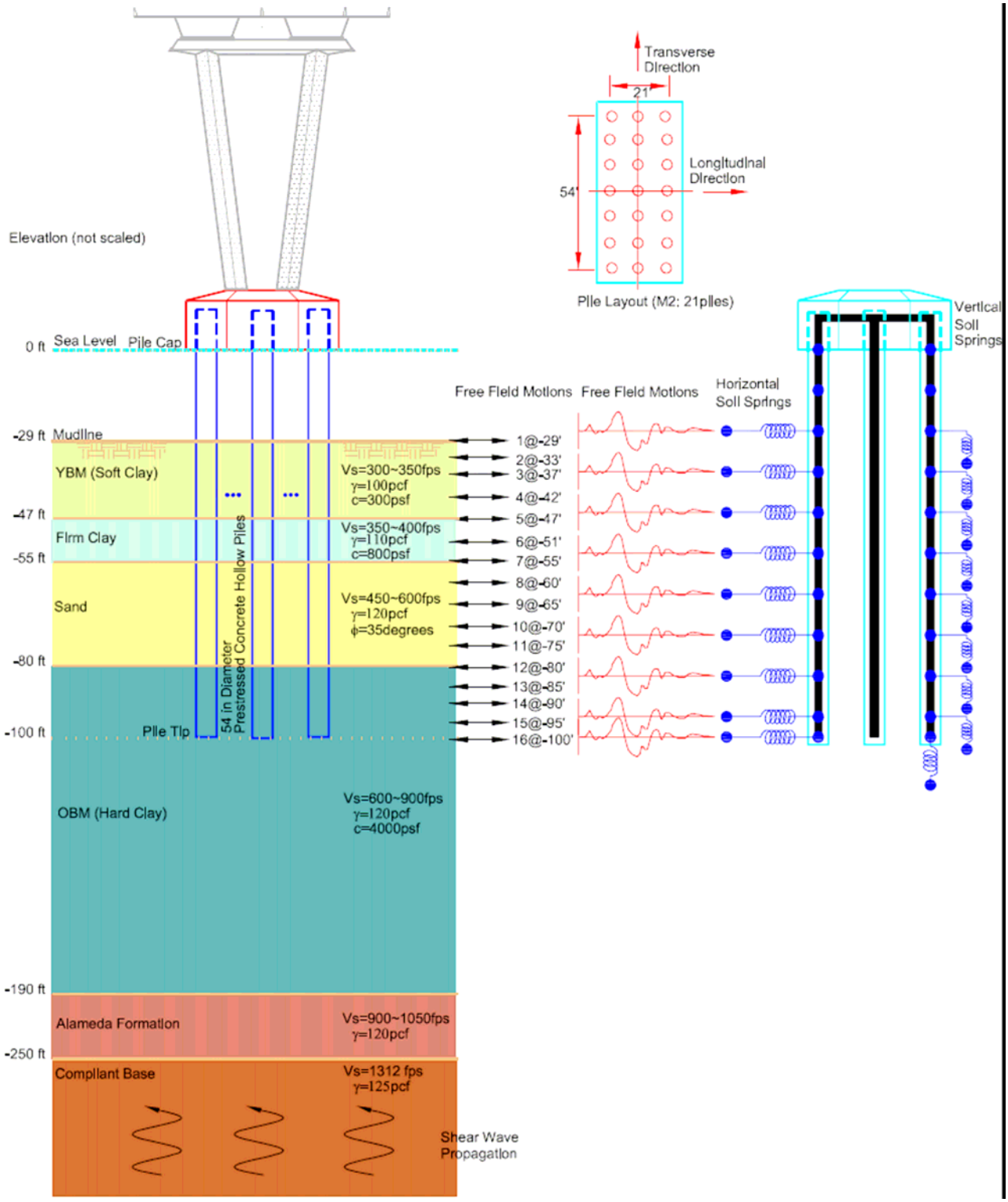

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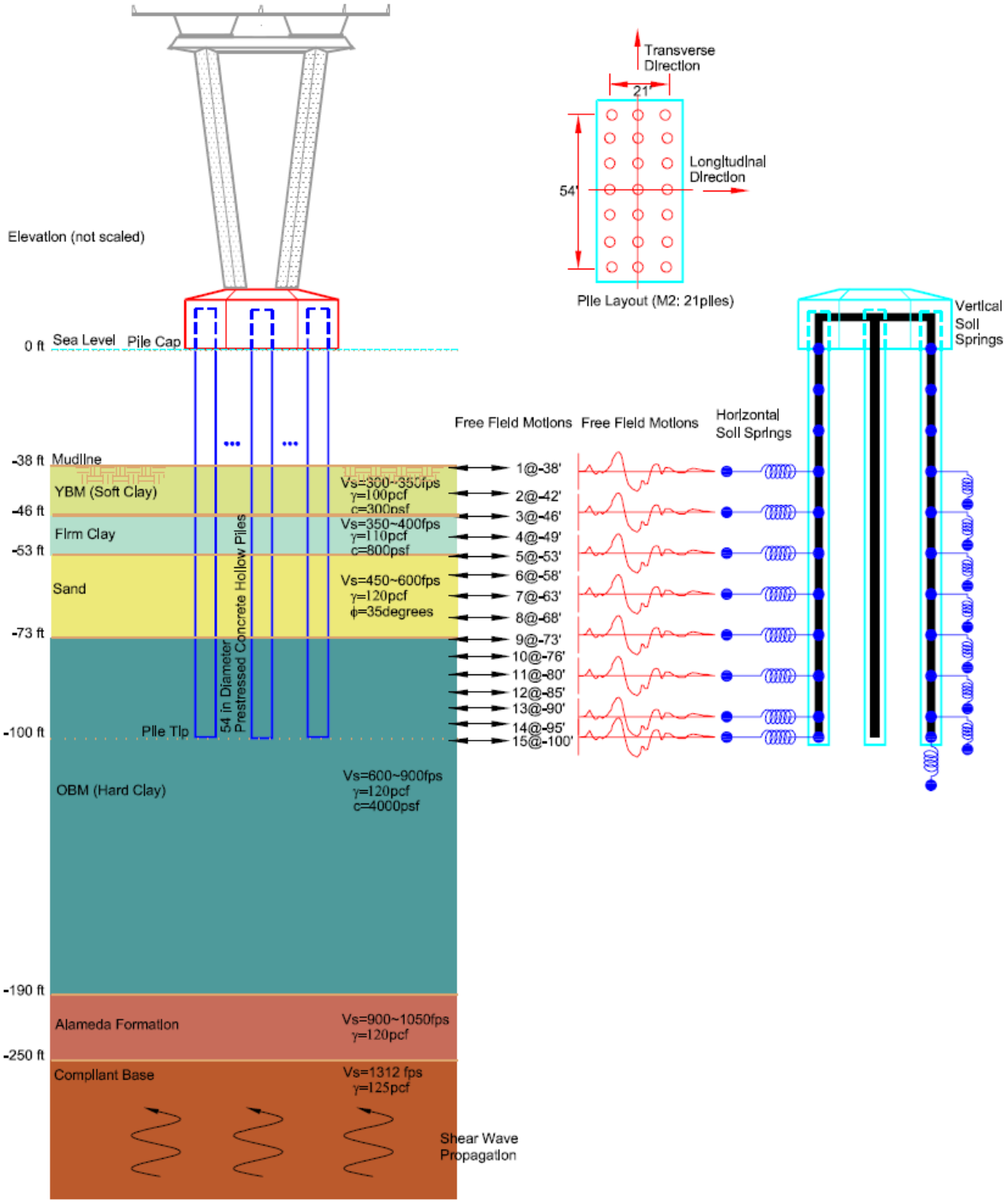

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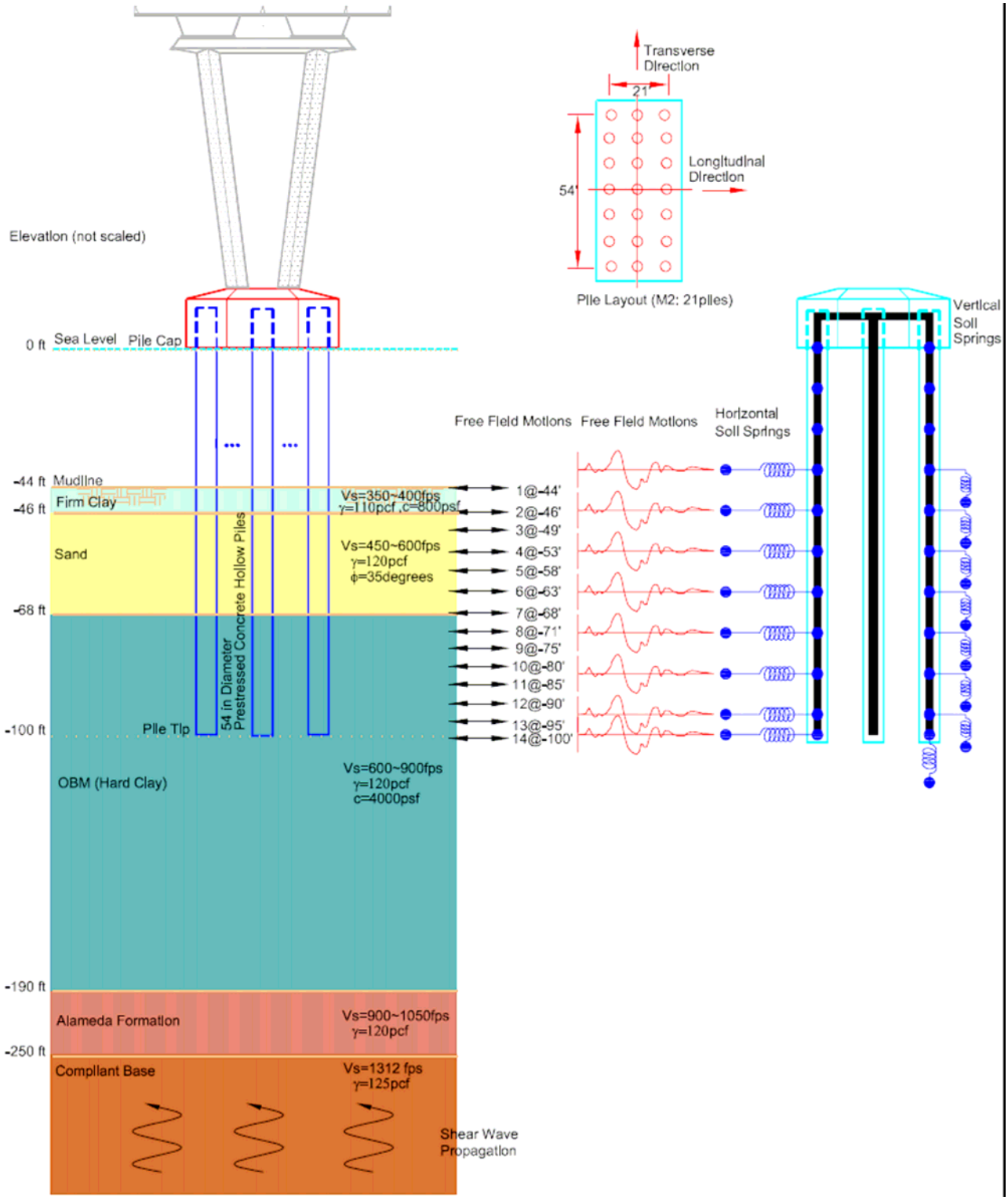

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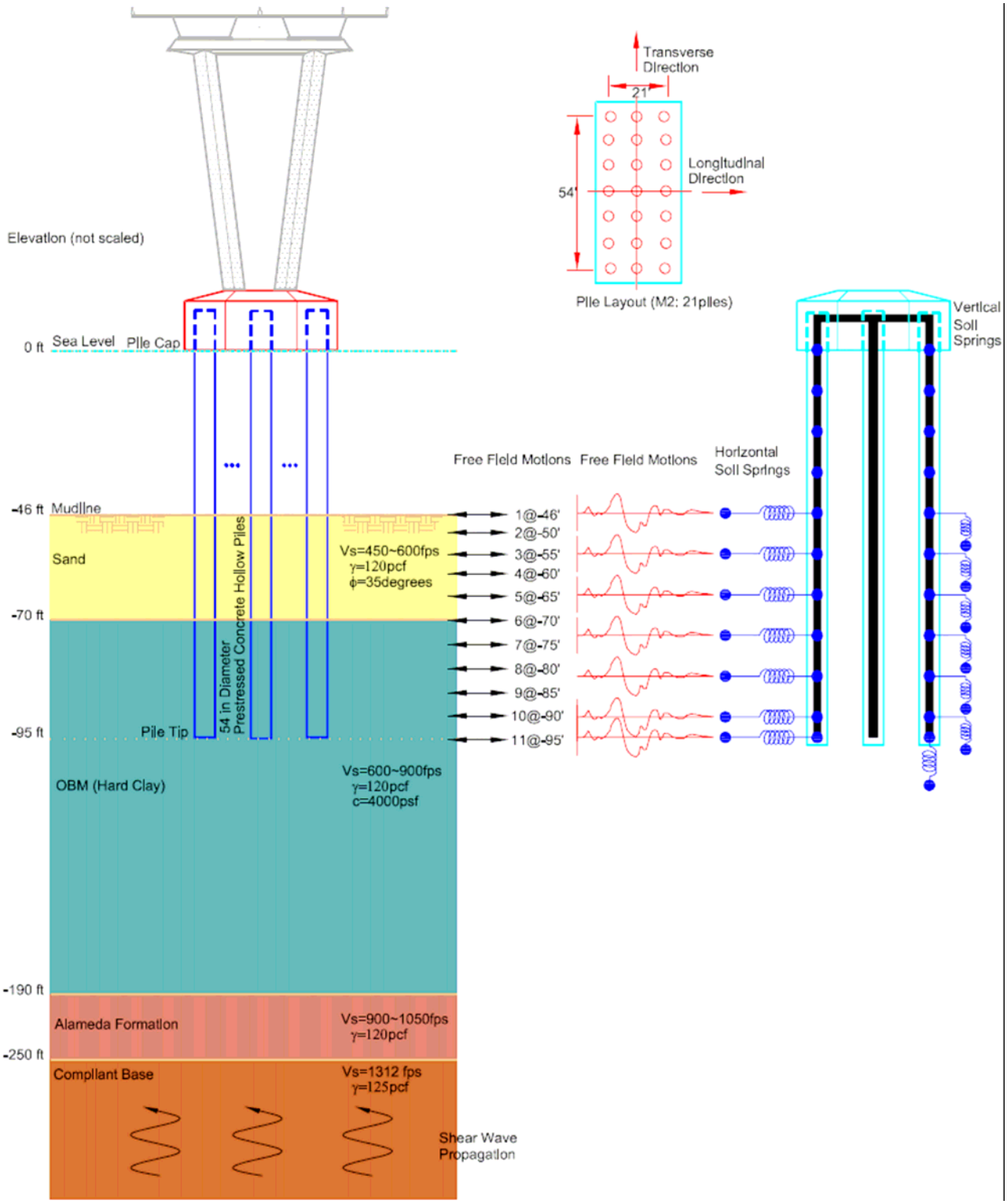

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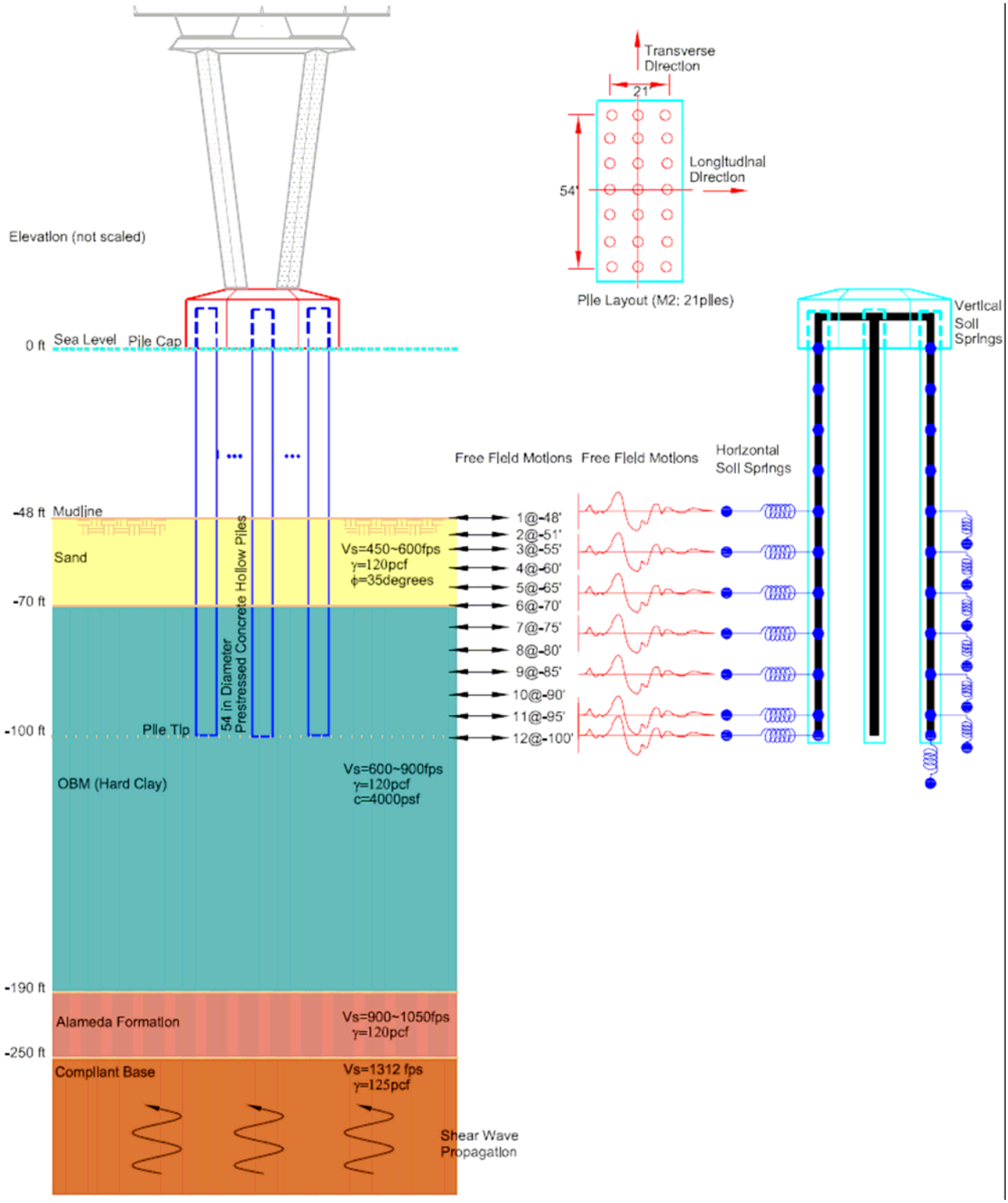

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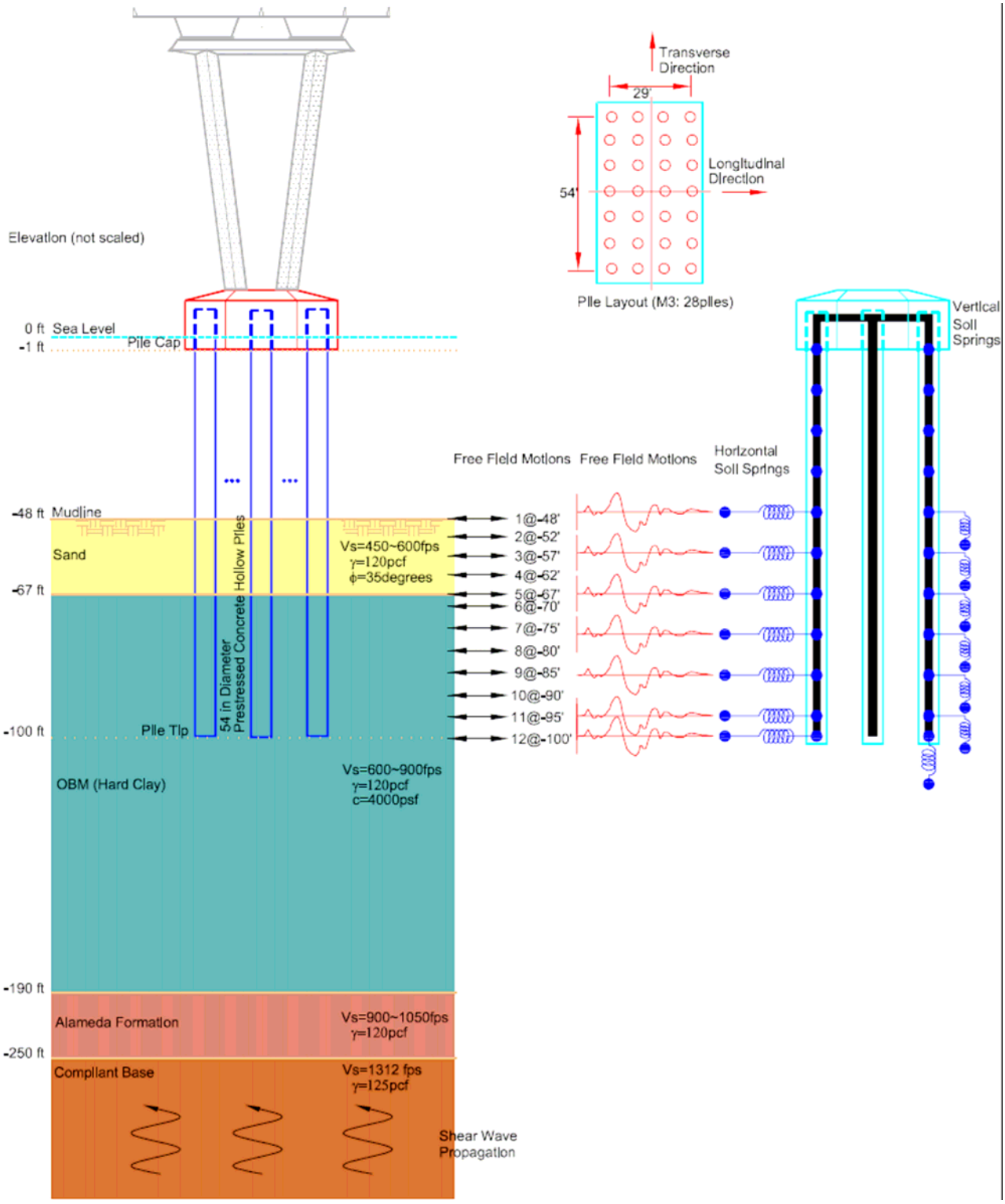


FIGURE A-23: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT PIER 23

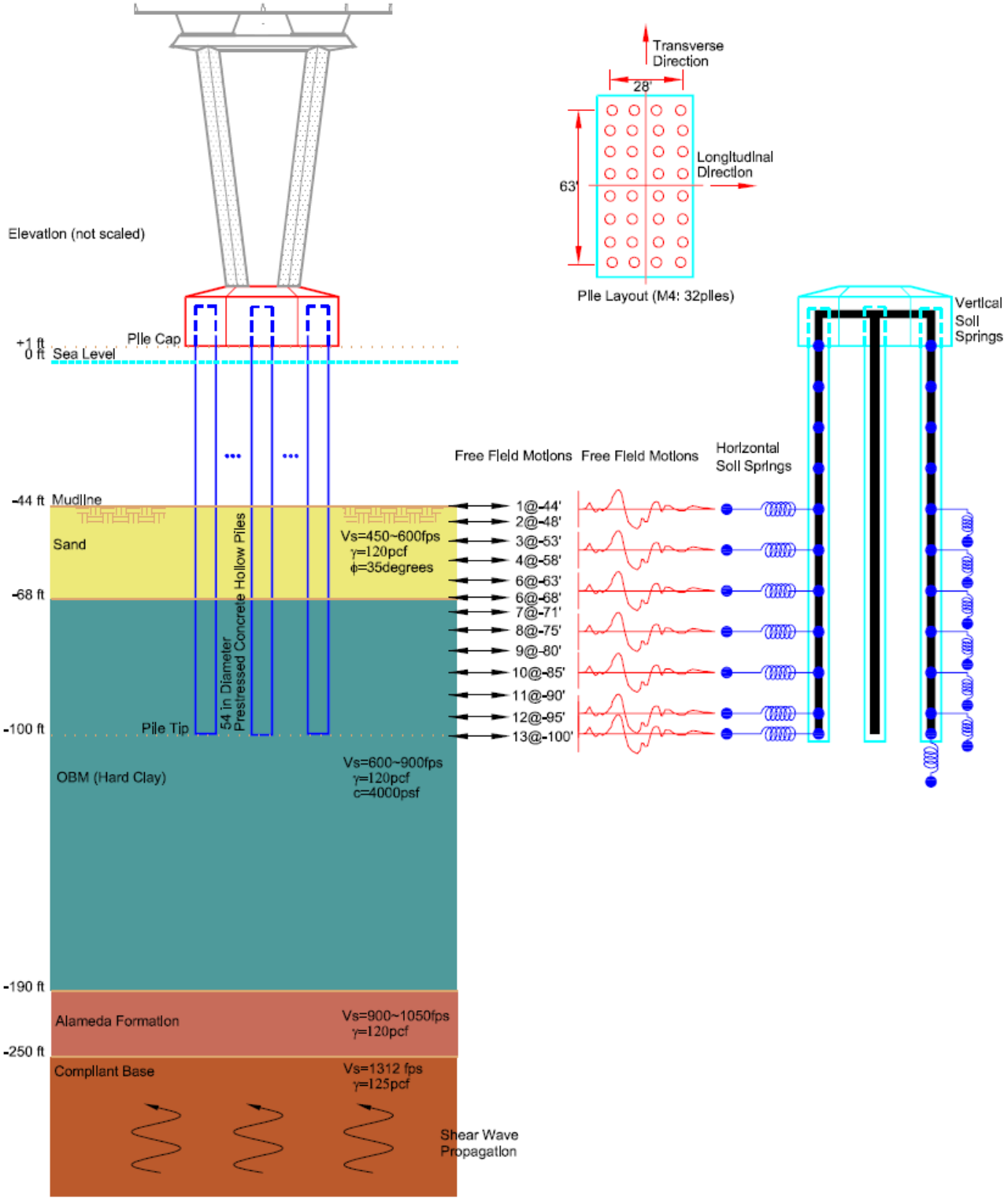
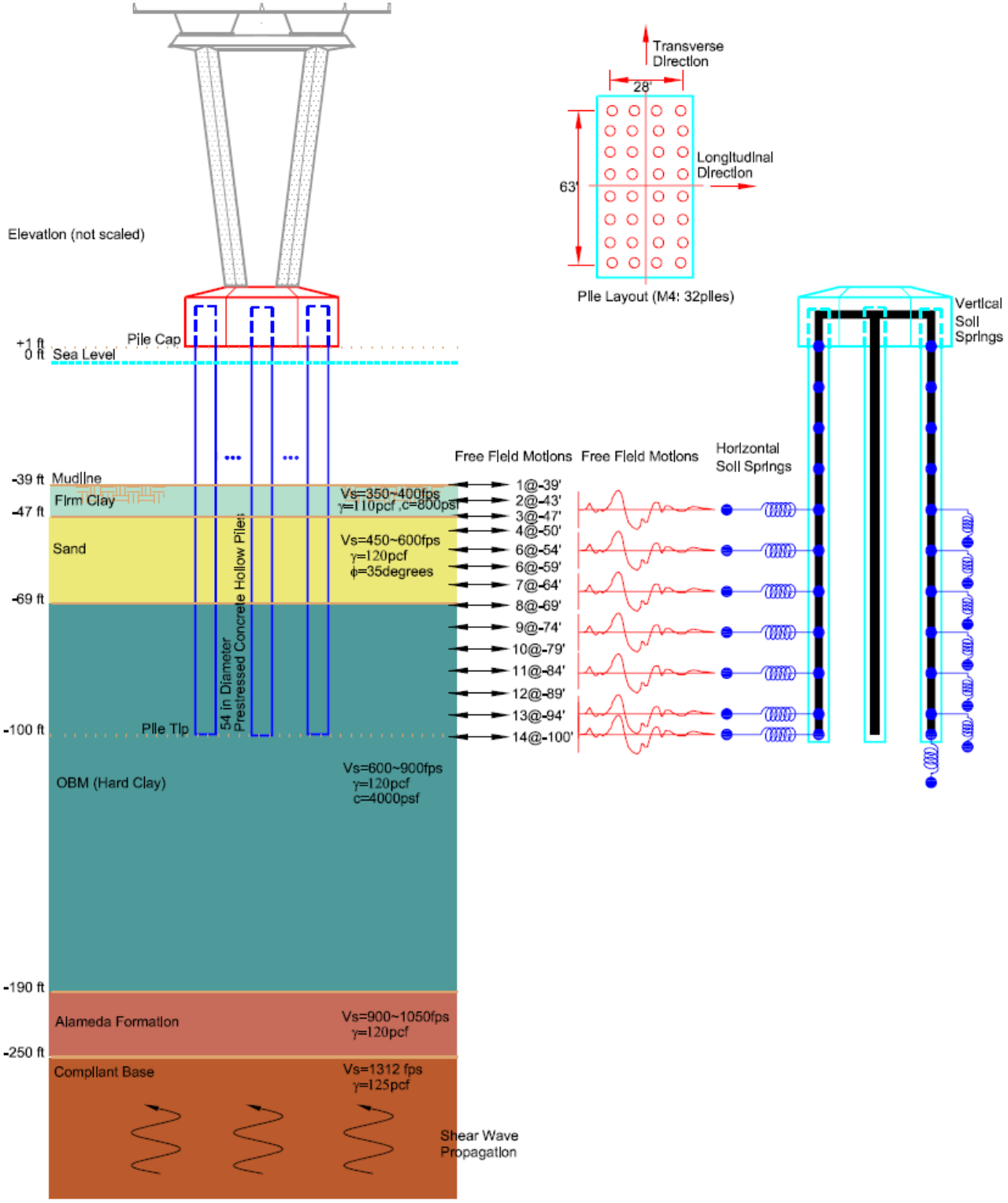


FIGURE A-24: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT PIER 24



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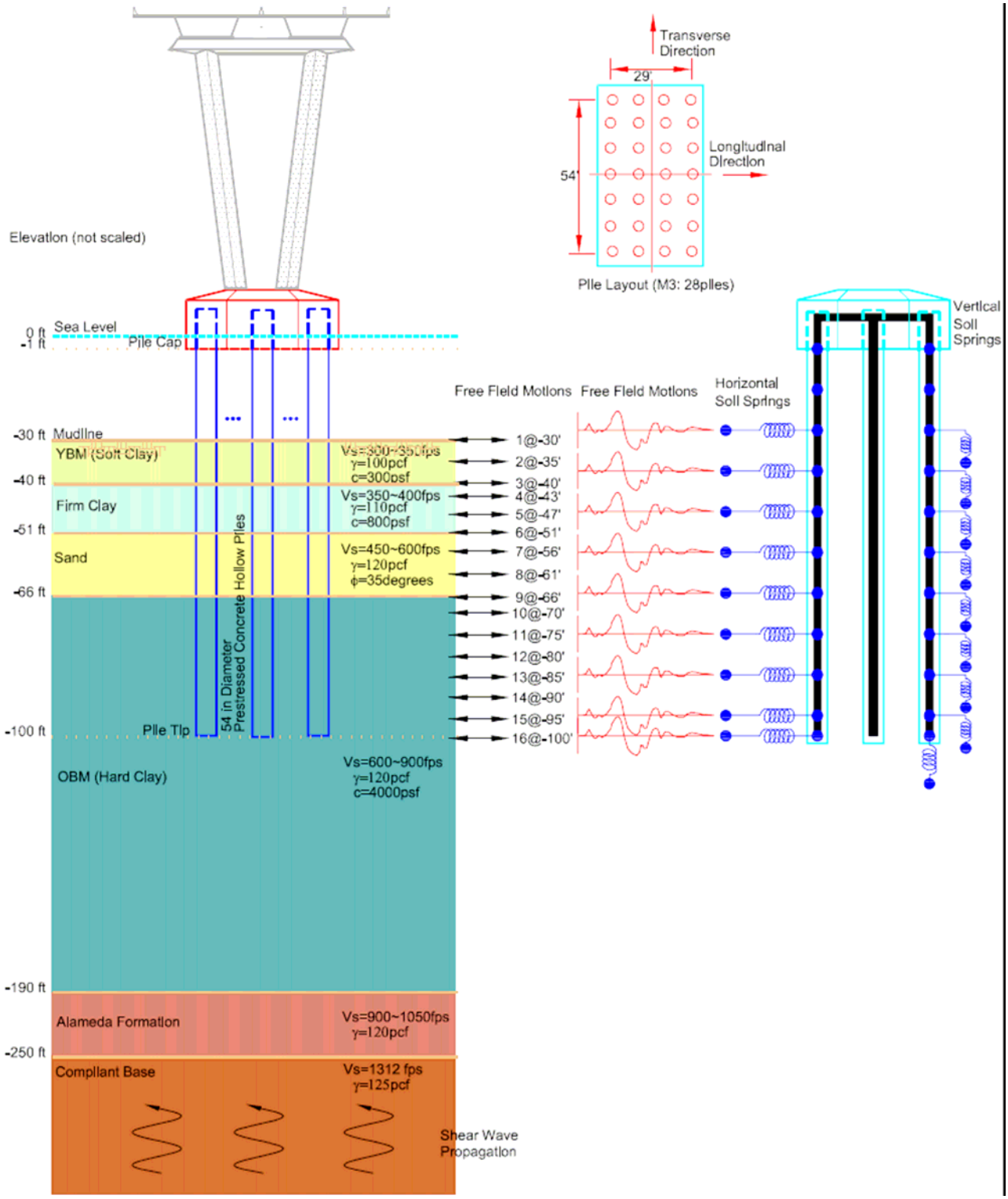


FIGURE A-26: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT PIER 26

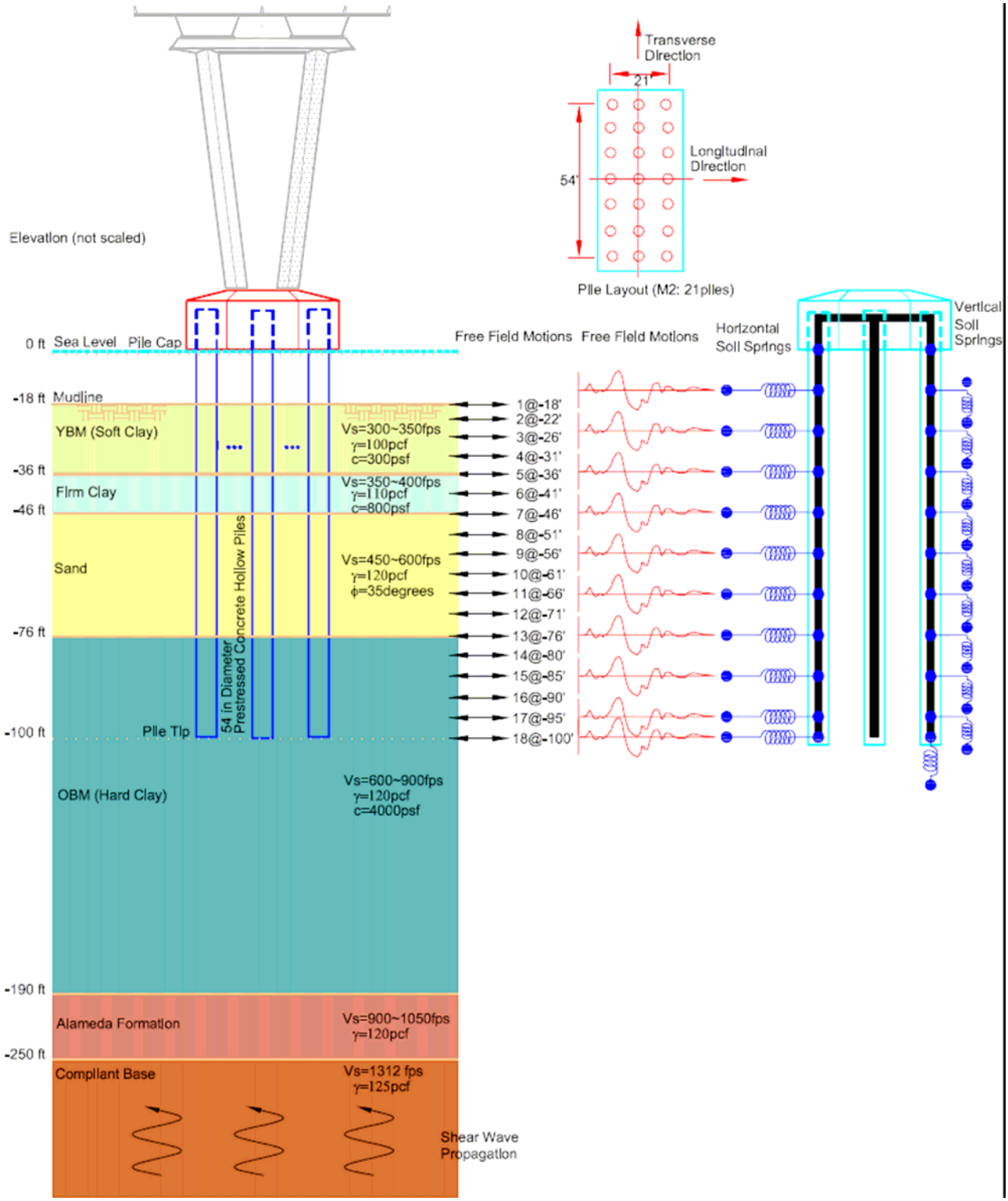


FIGURE A-27: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT PIER 27

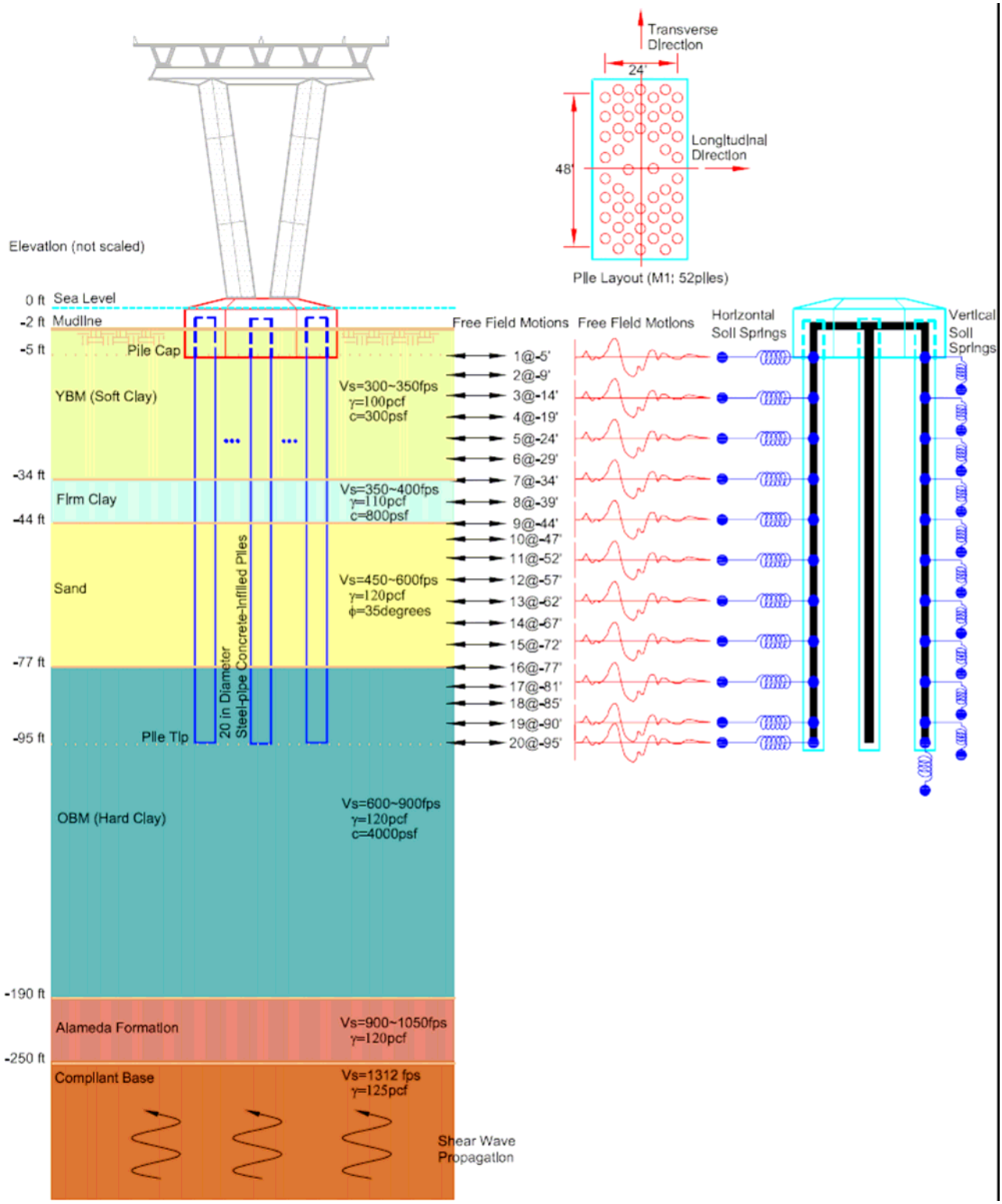


FIGURE A-28: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT PIER 28

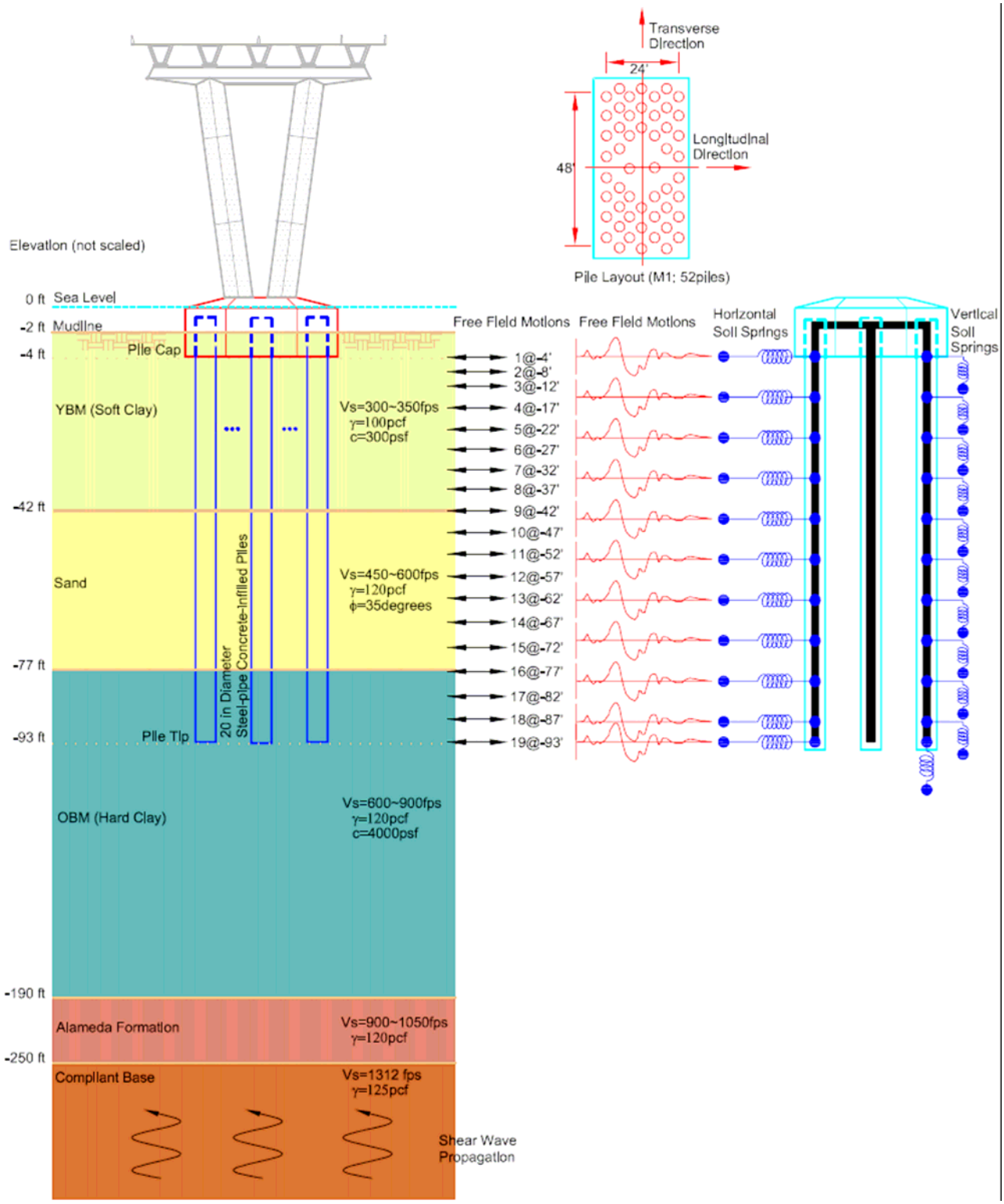


FIGURE A-29: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT PIER 29

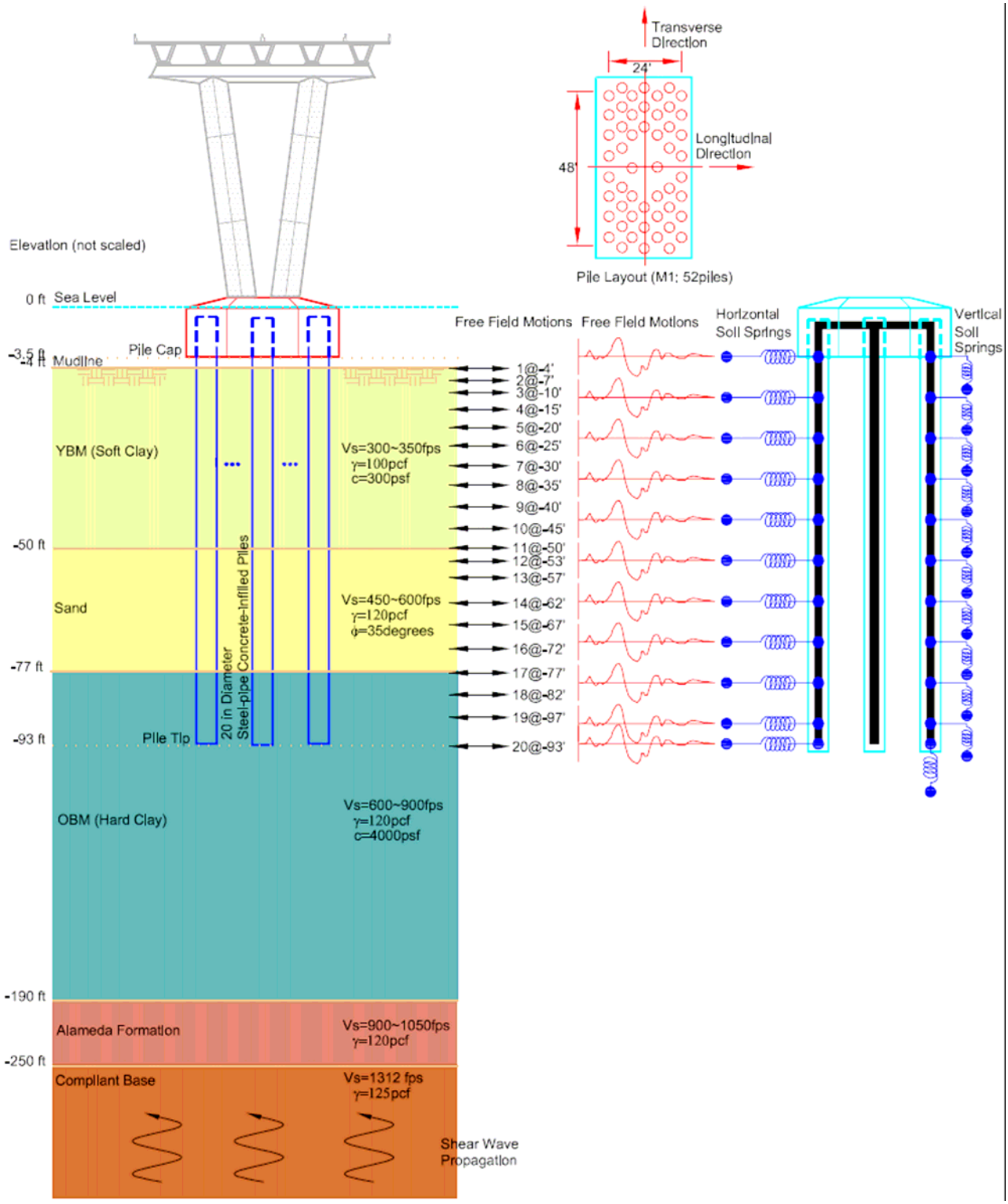


FIGURE A-30: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT PIER 30

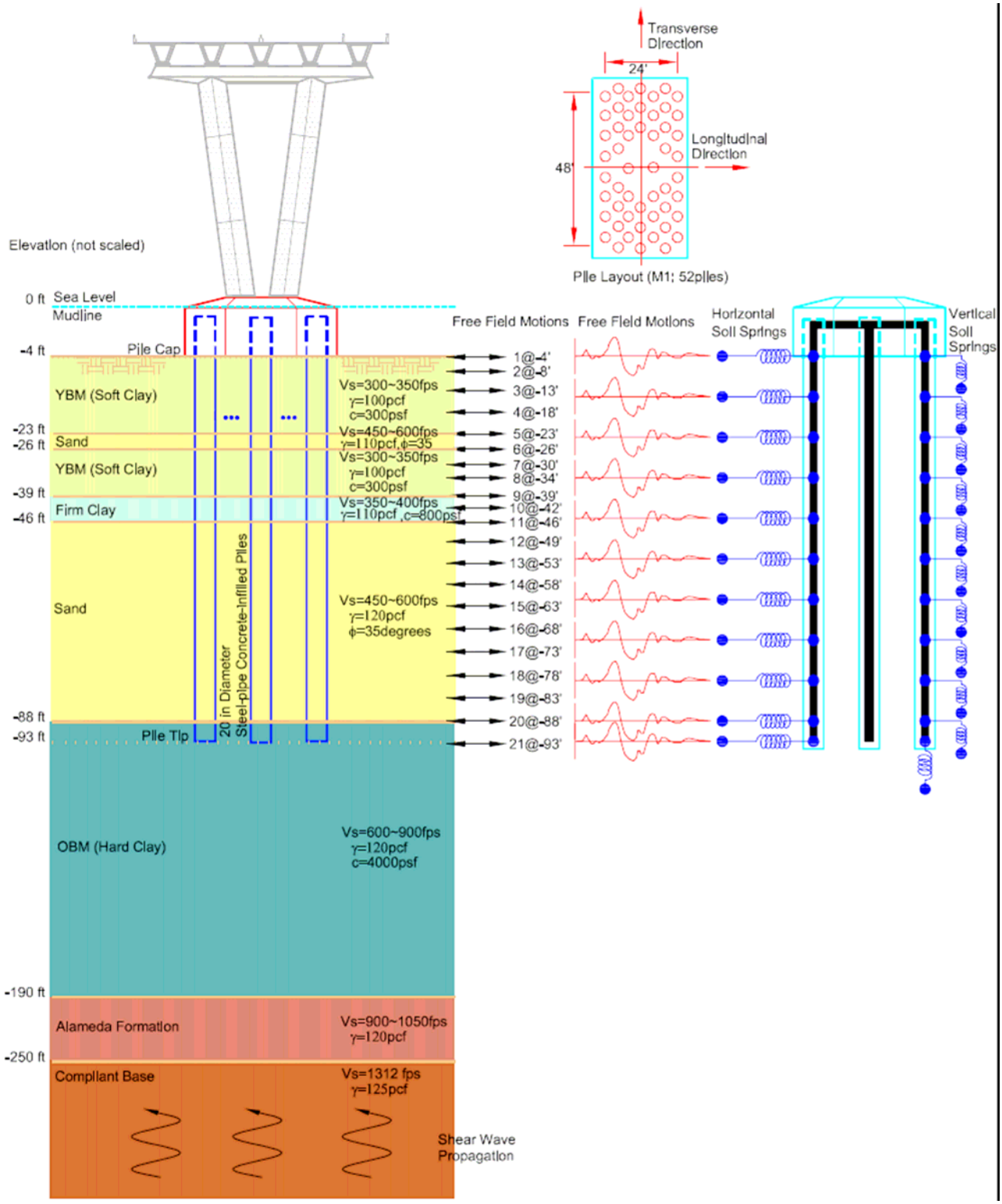


FIGURE A-31: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT PIER 31

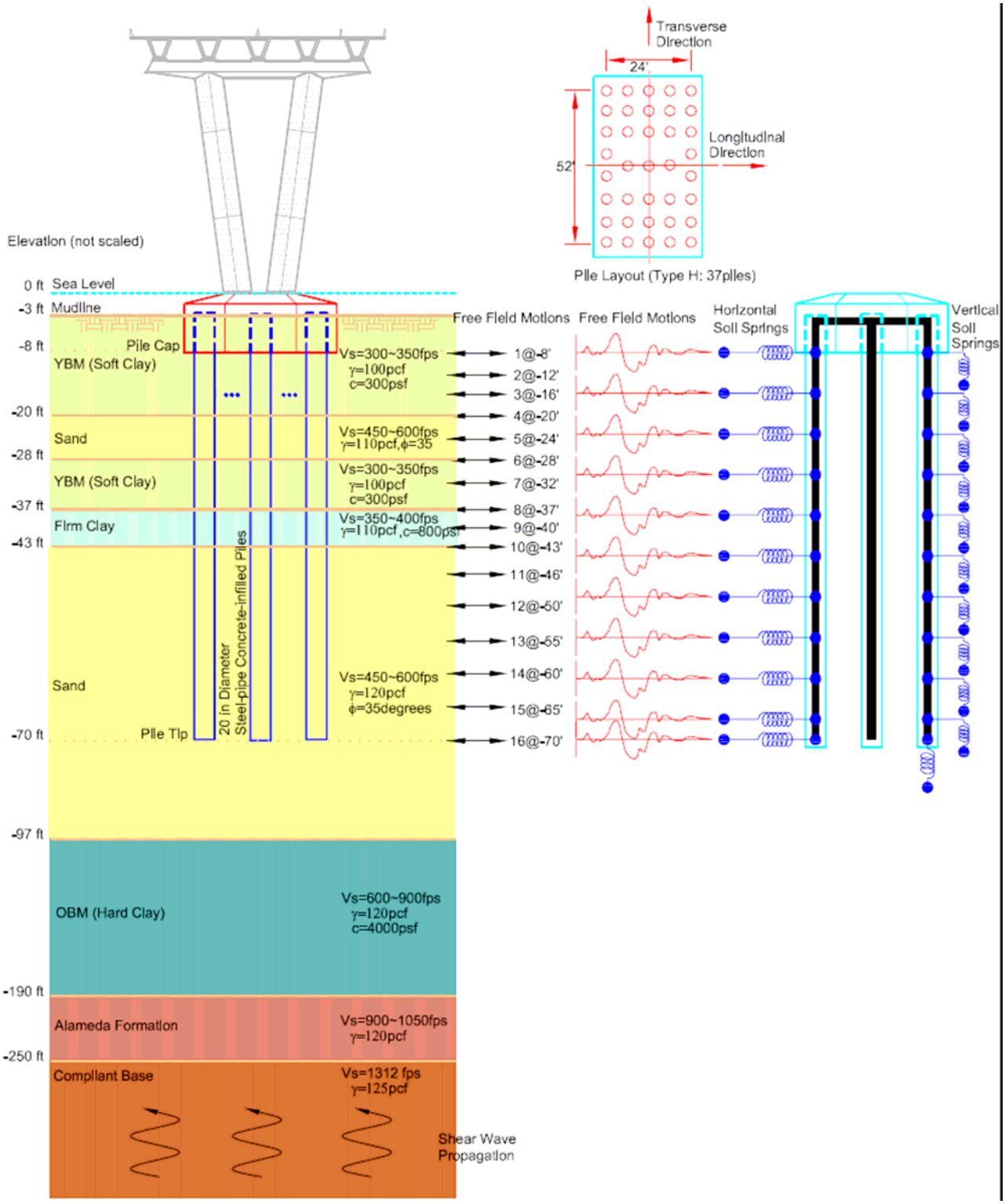


FIGURE A-32: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT PIER 32

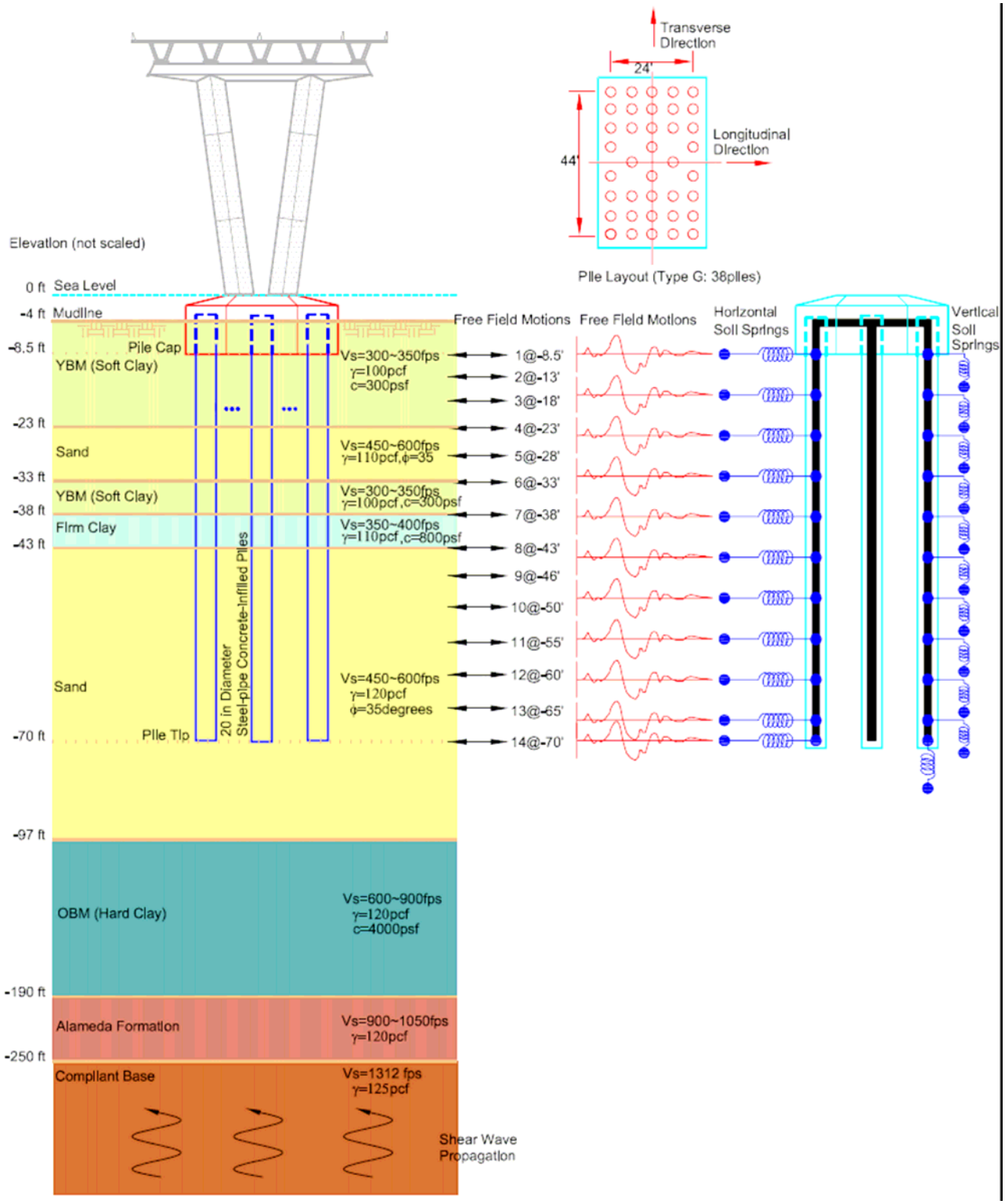


FIGURE A-33: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT PIER 33

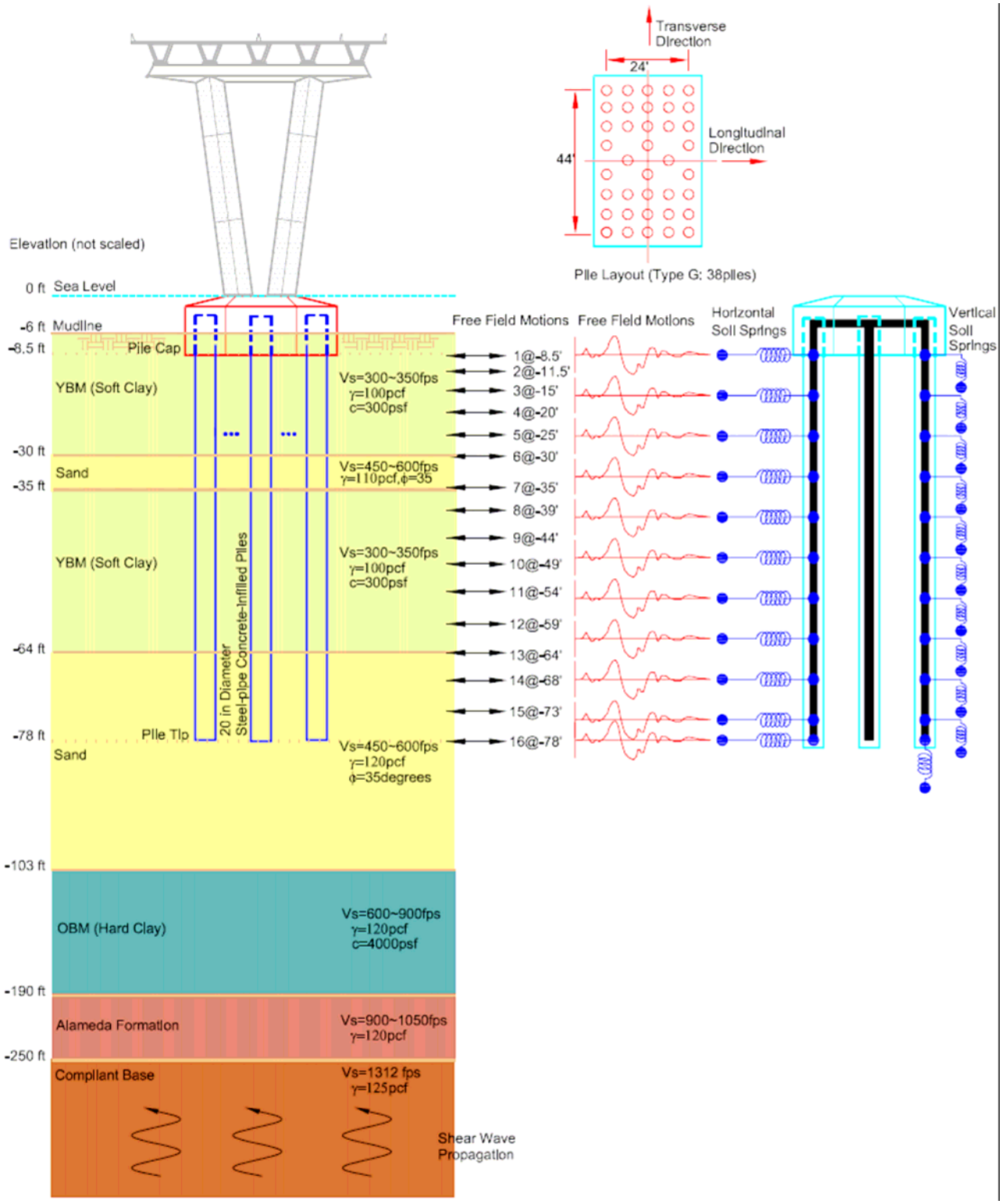


FIGURE A-34: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT PIER 34

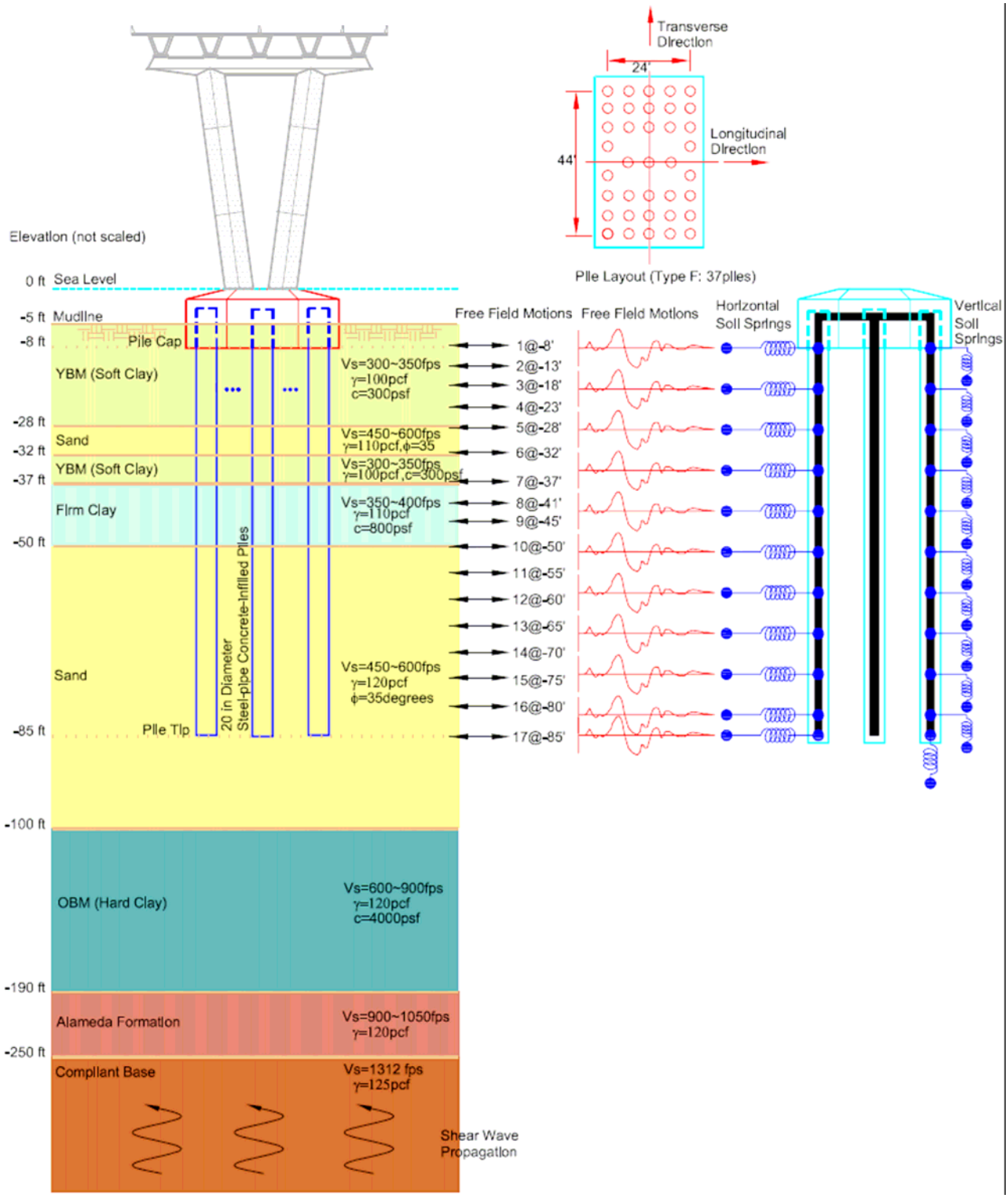


FIGURE A-35: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT PIER 35

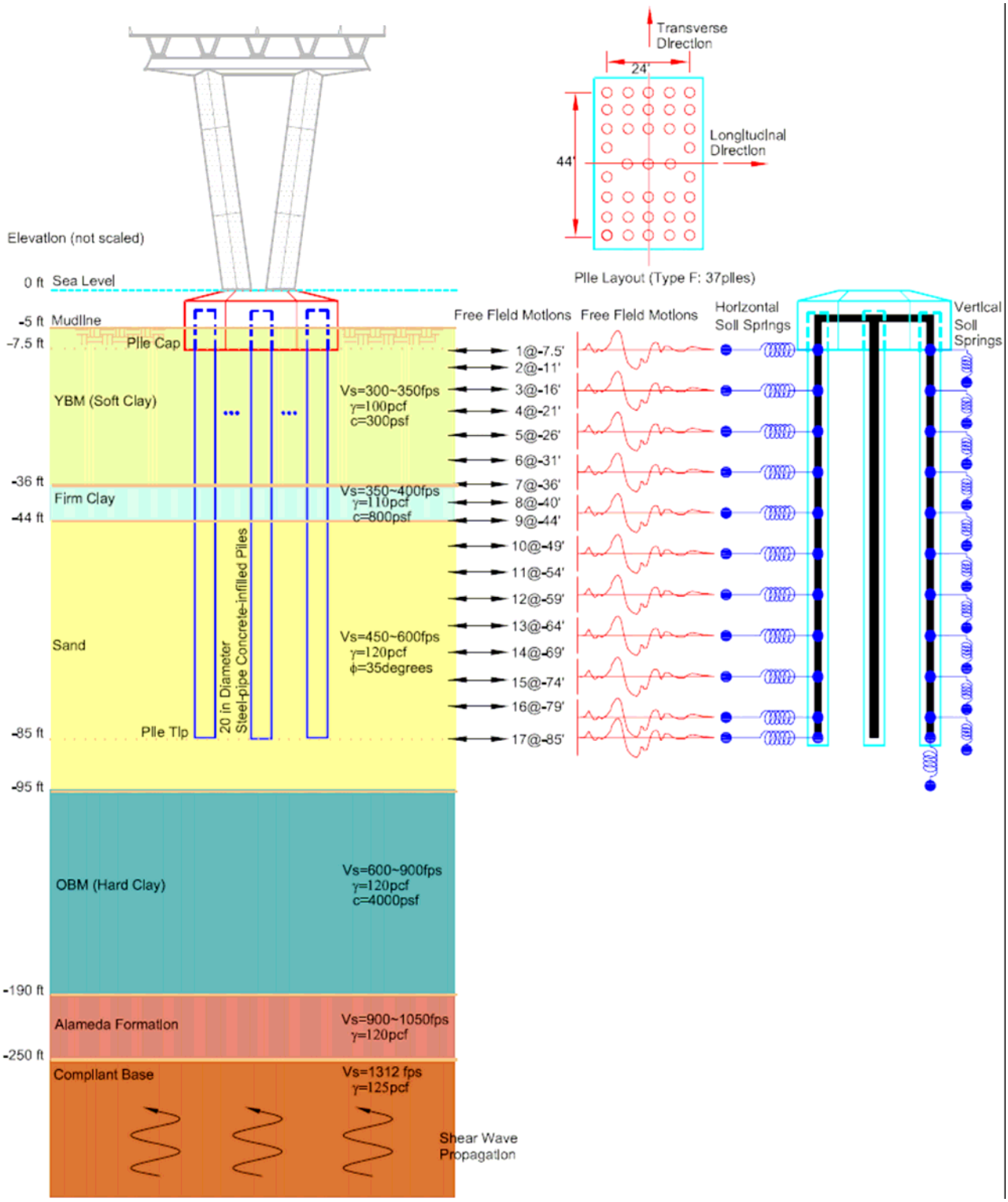


FIGURE A-36: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT PIER 36

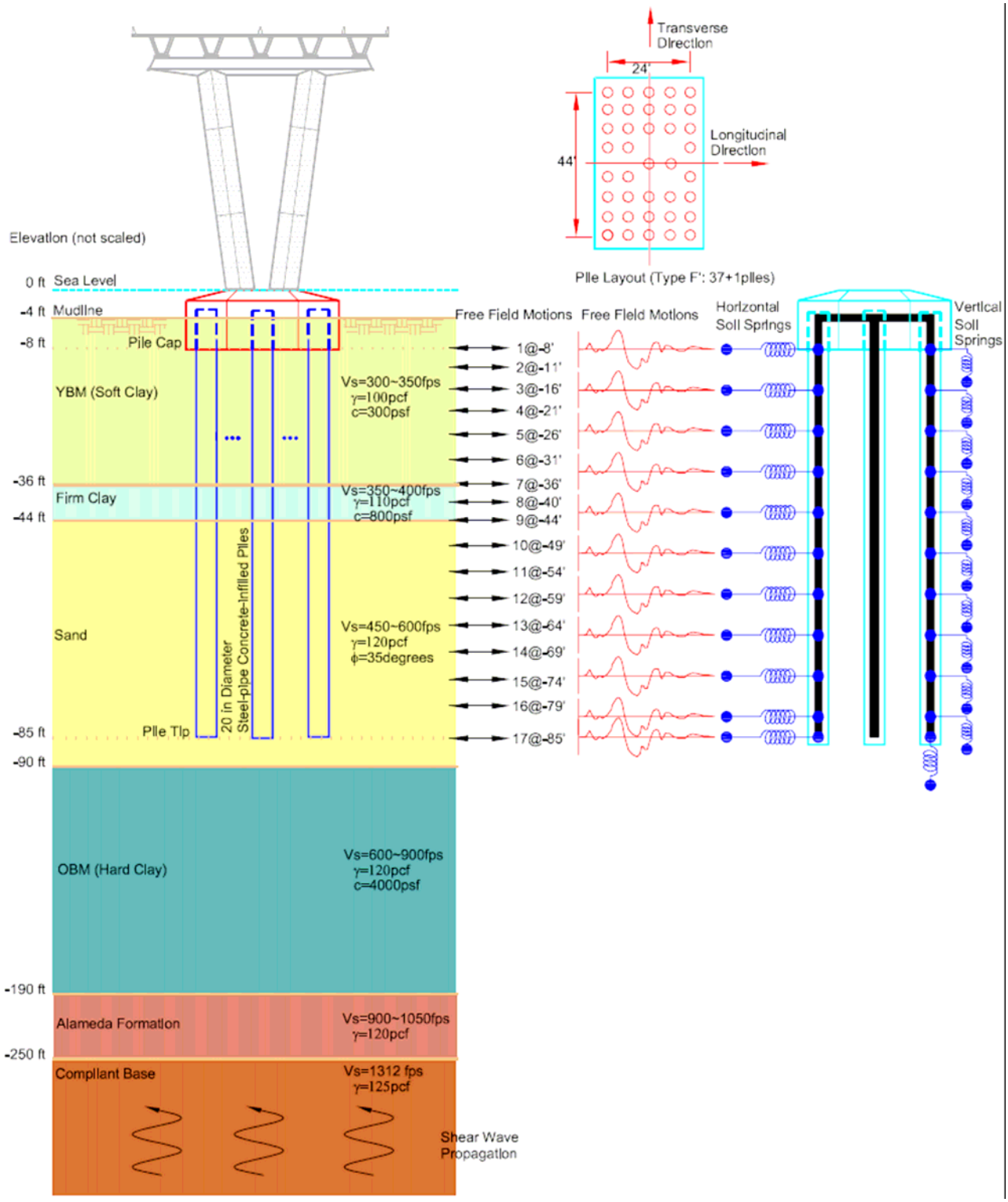


FIGURE A-37: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT PIER 37

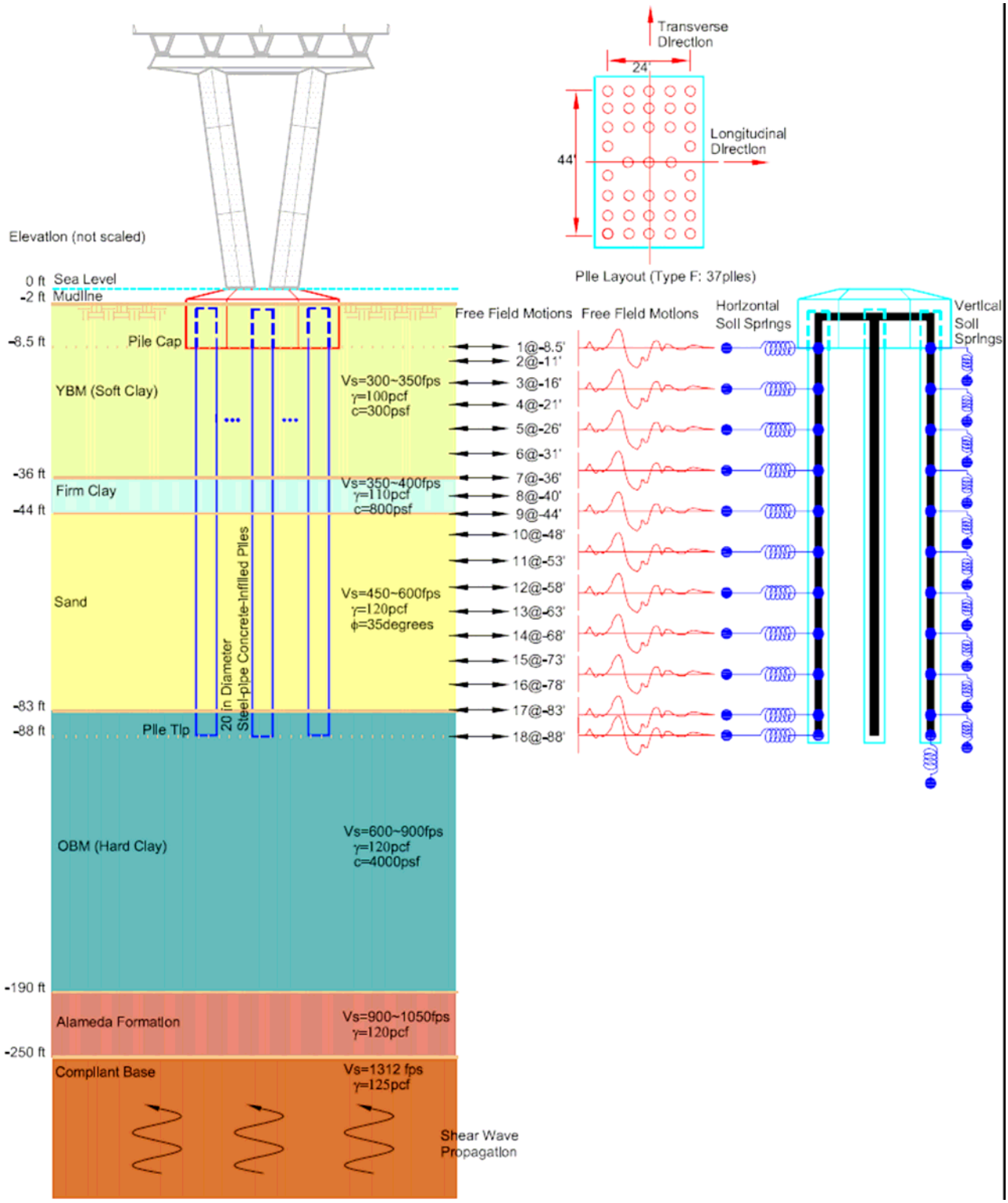


FIGURE A-38: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT PIER 38

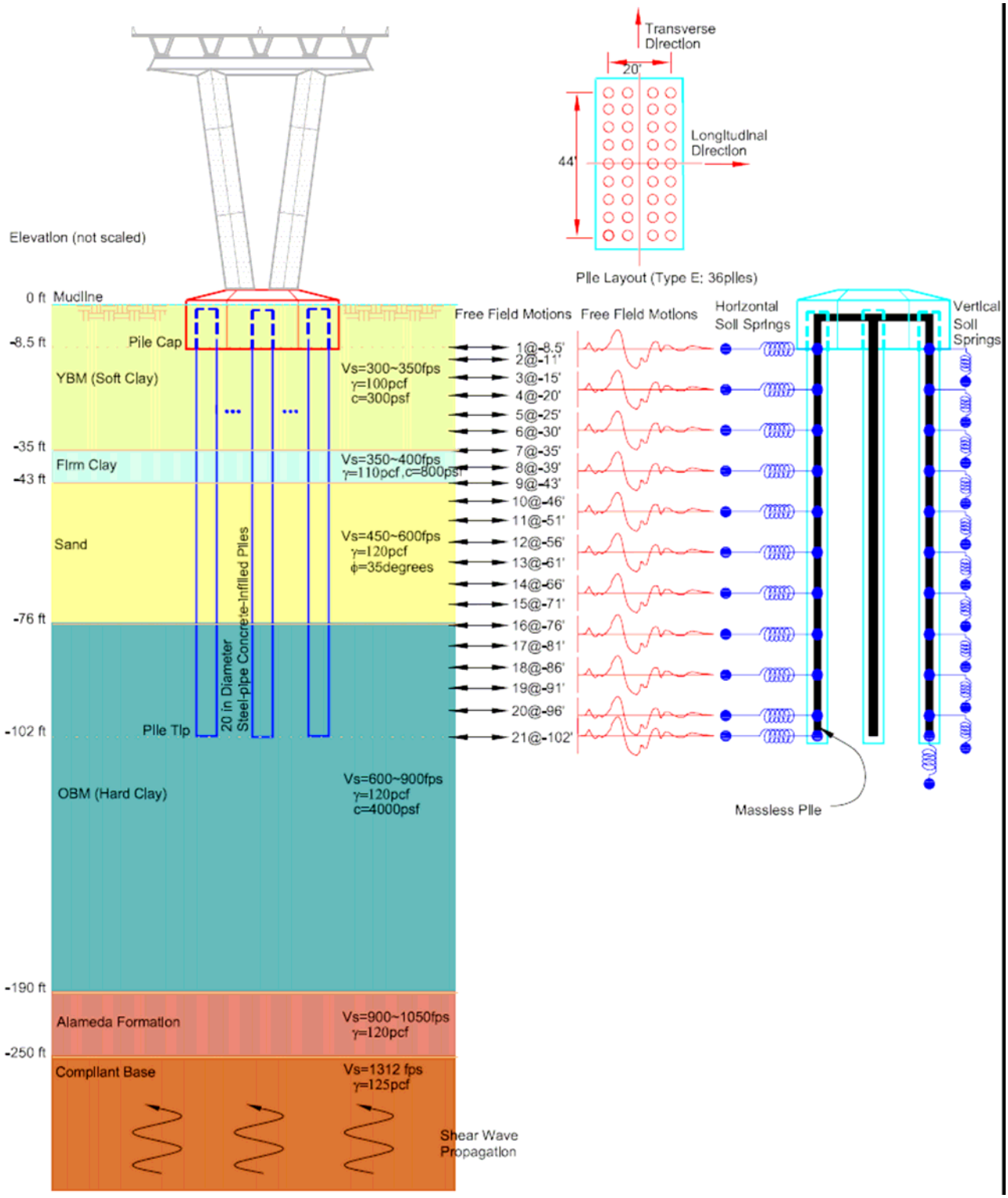


FIGURE A-39: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT PIER 39

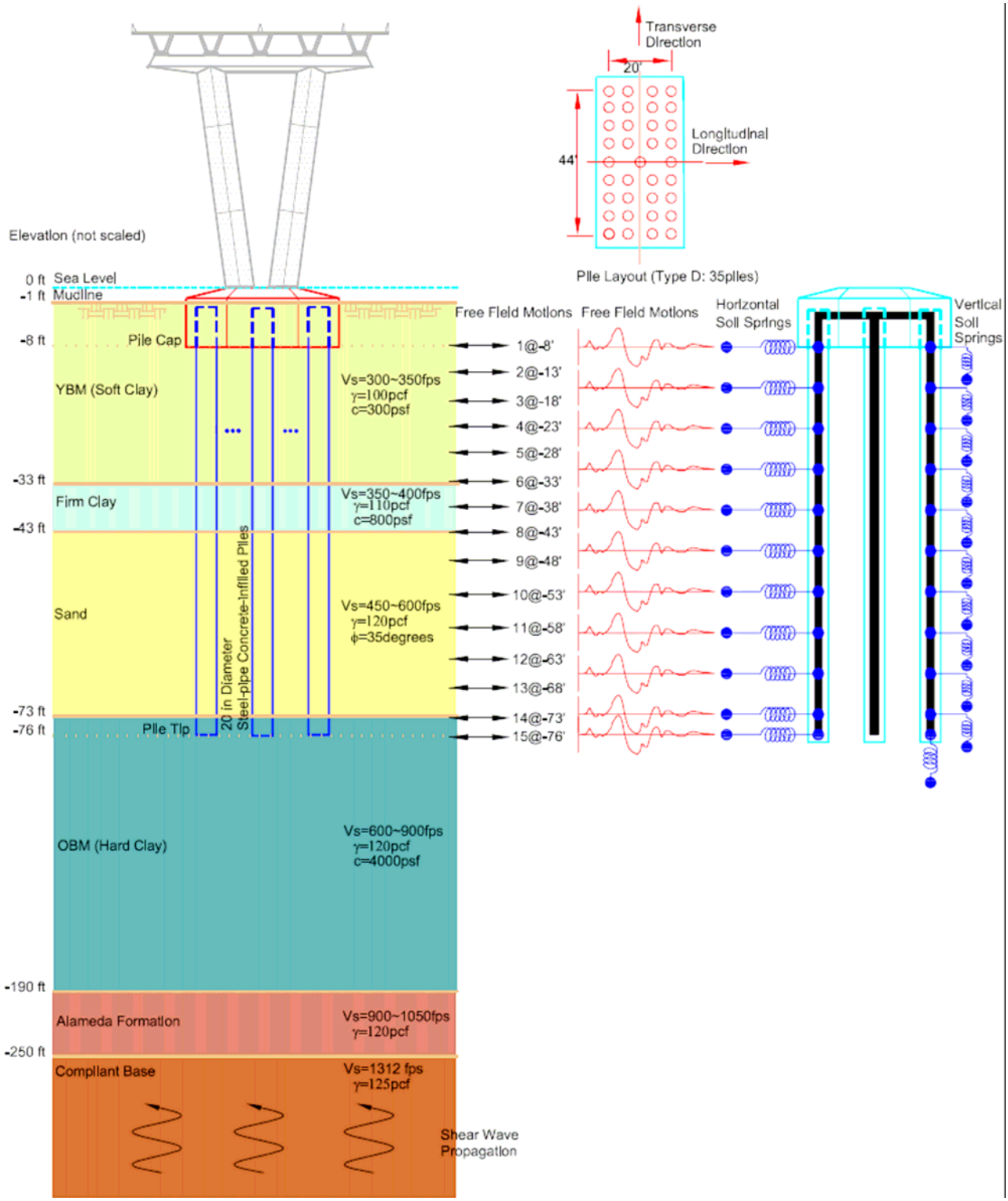


FIGURE A-40: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT PIER 40

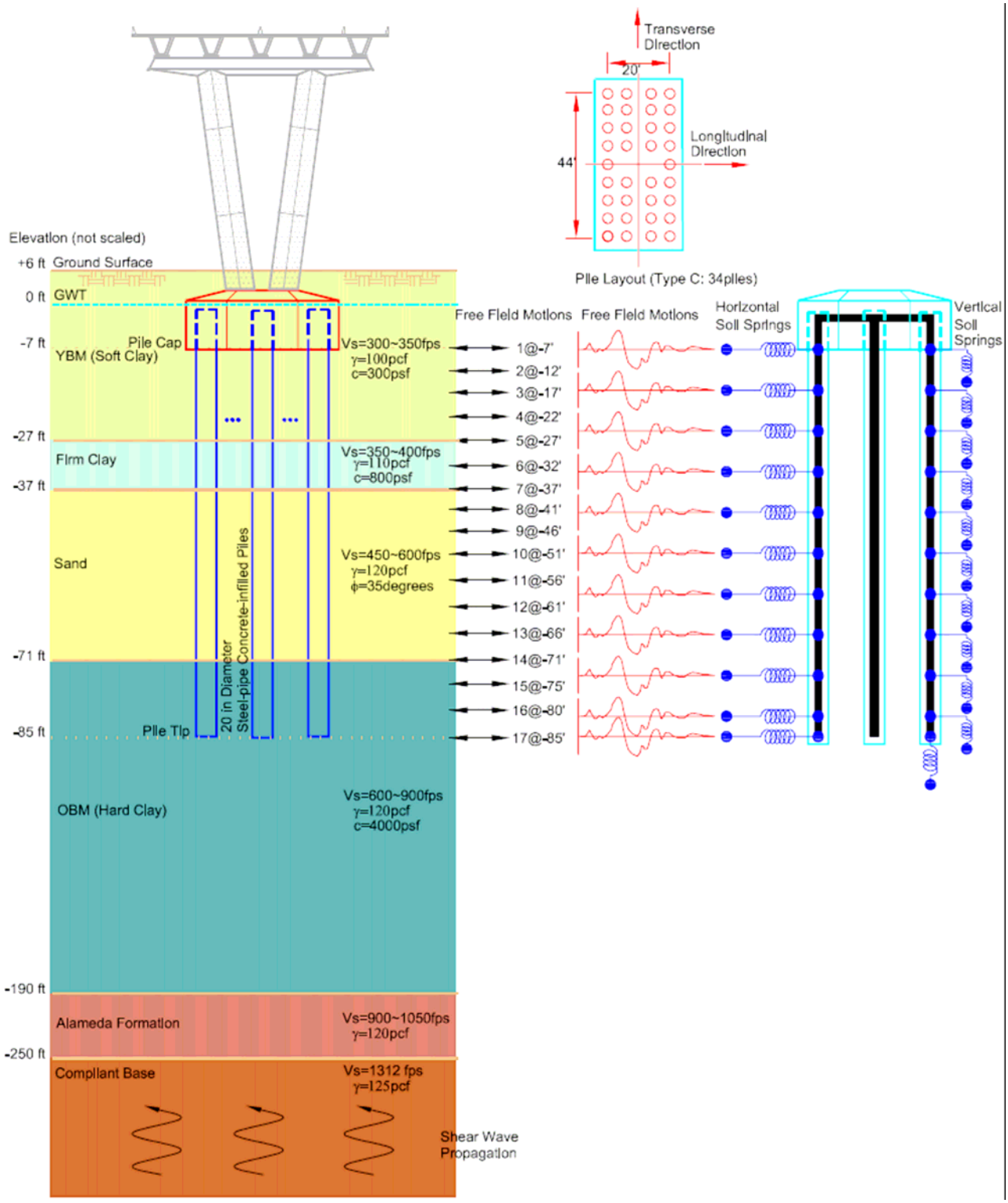


FIGURE A-41: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT PIER 41

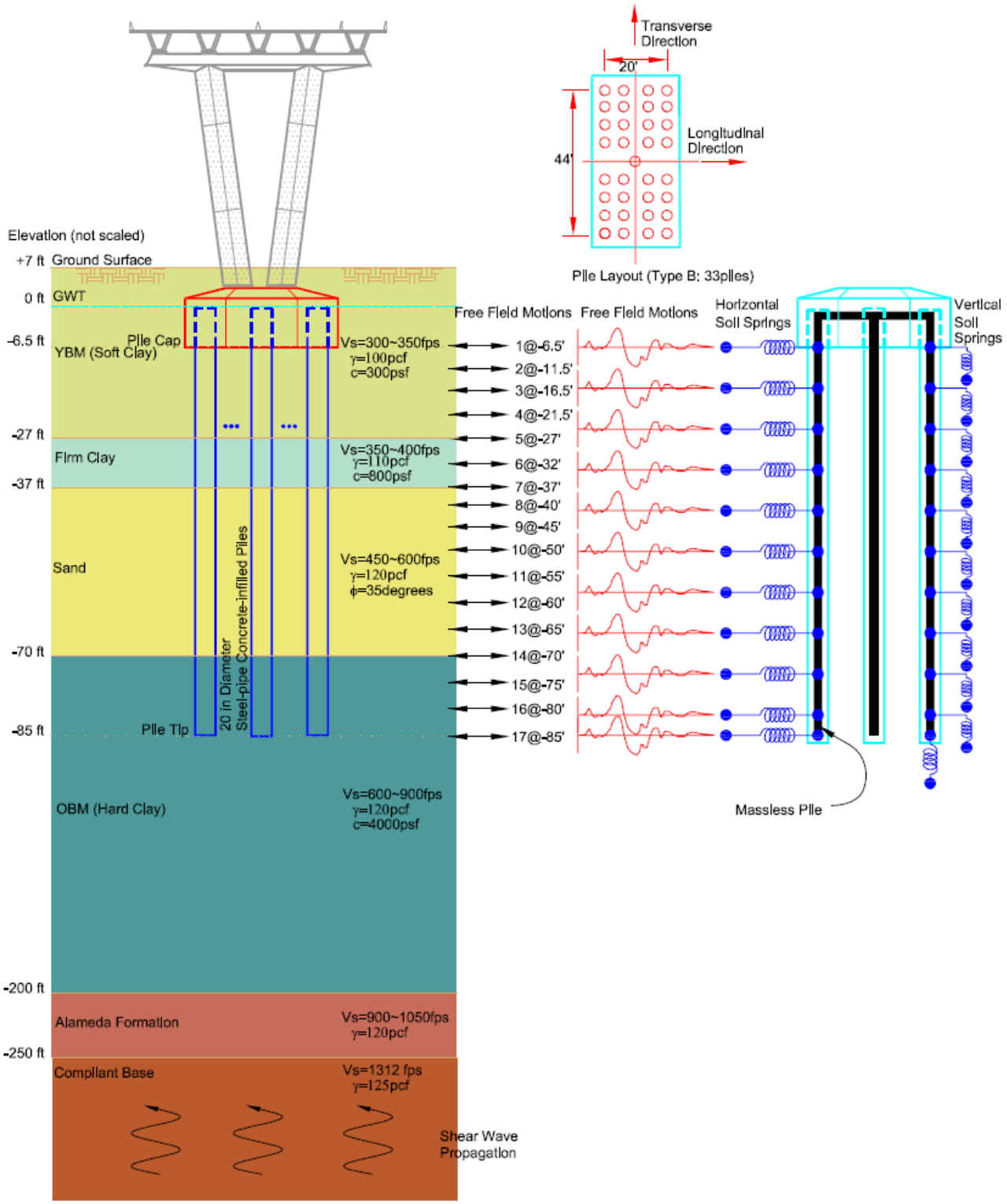


FIGURE A-42: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT PIER 42

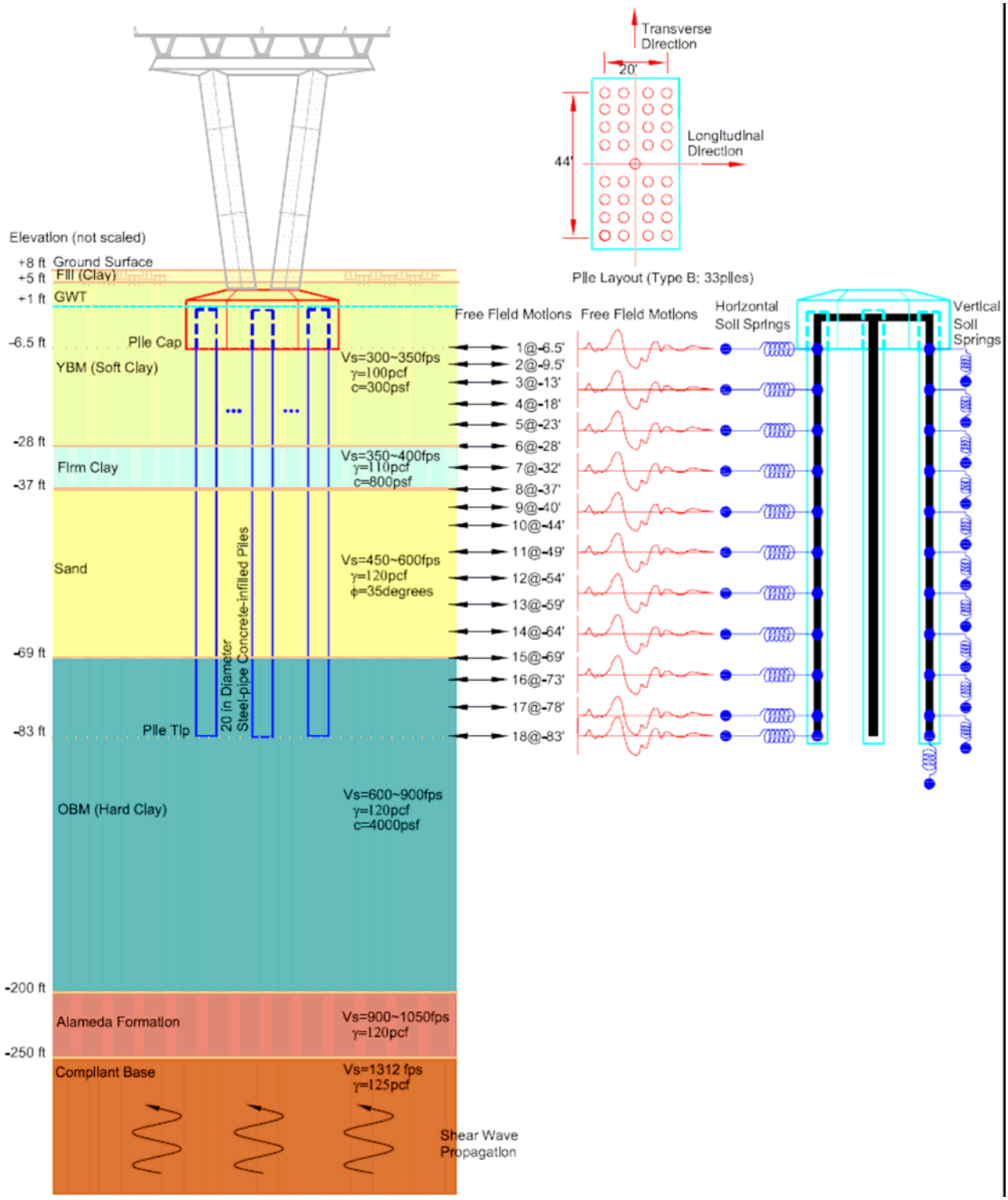


FIGURE A-43: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT PIER 43

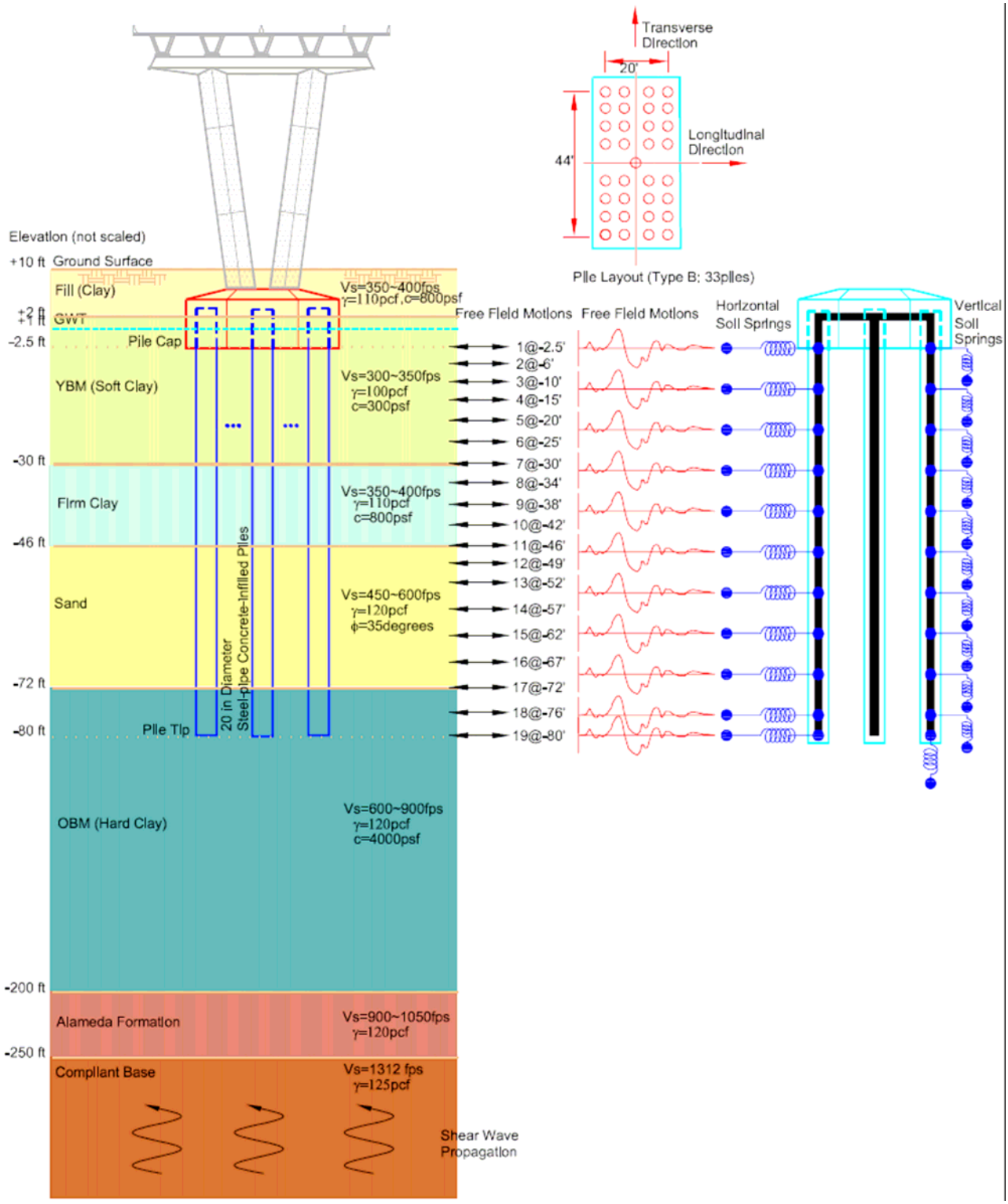


FIGURE A-44: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT PIER 44

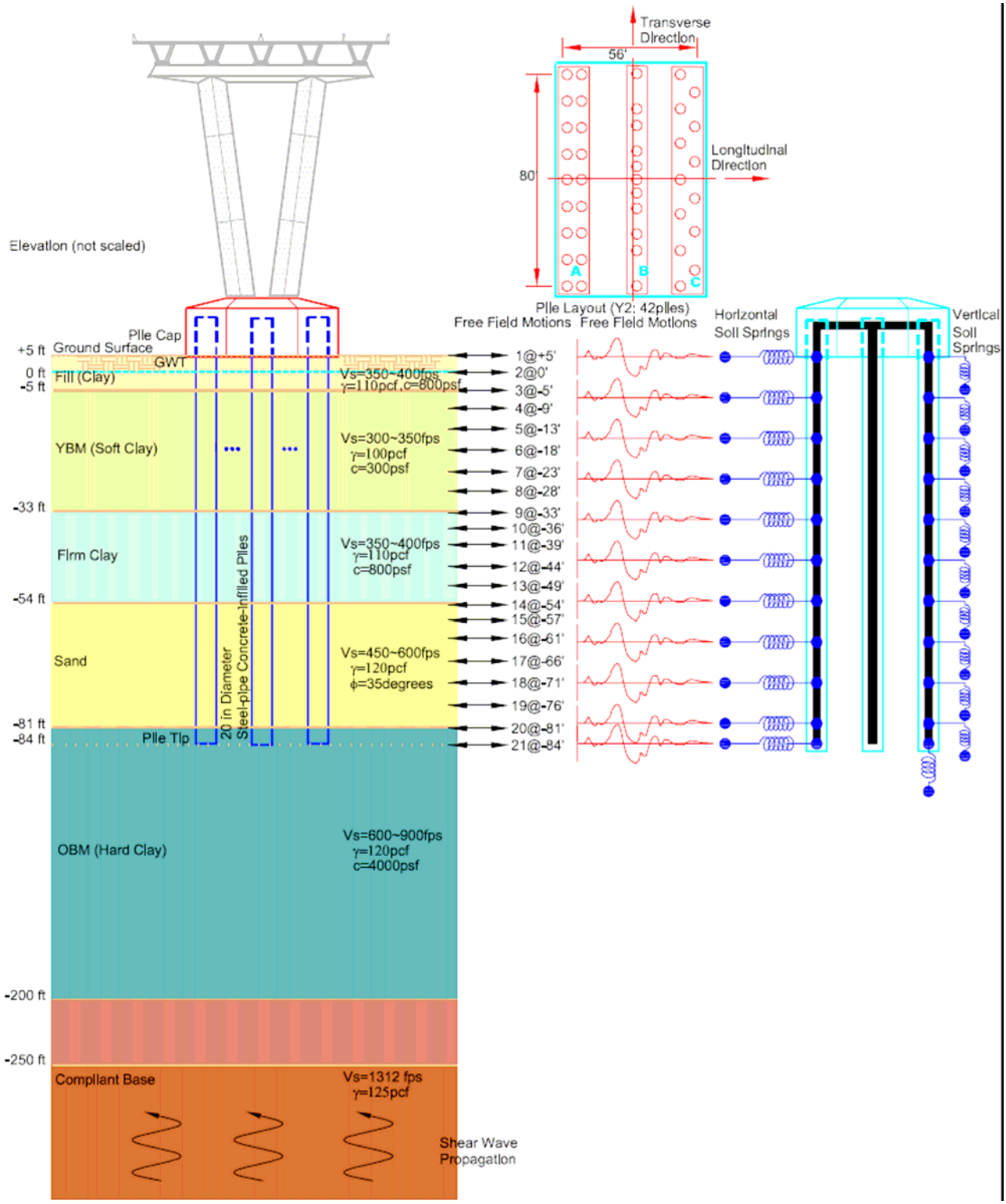


FIGURE A-45: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT TRESTLE BENT E01

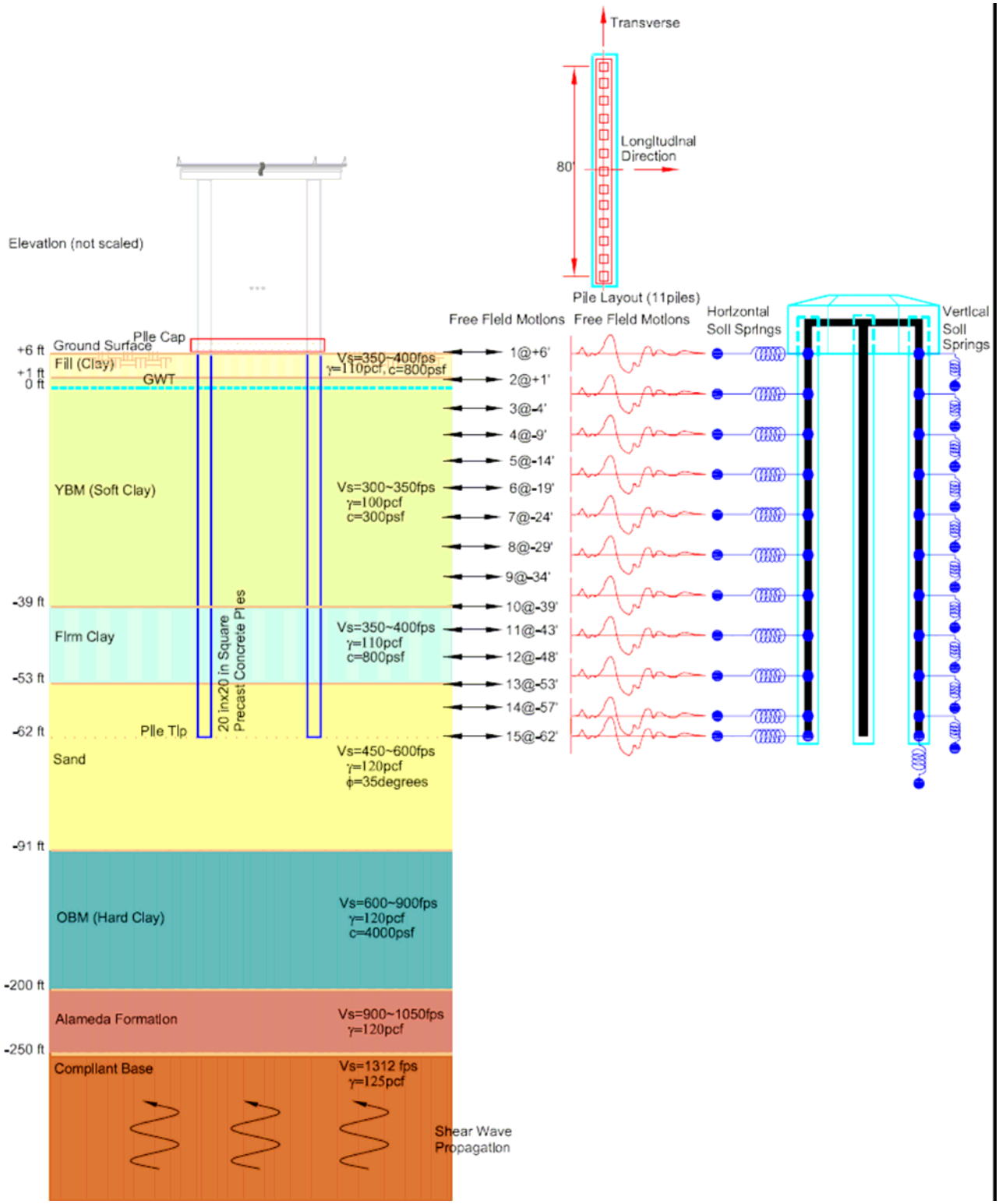


FIGURE A-46: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT TRESTLE BENTS E02-05

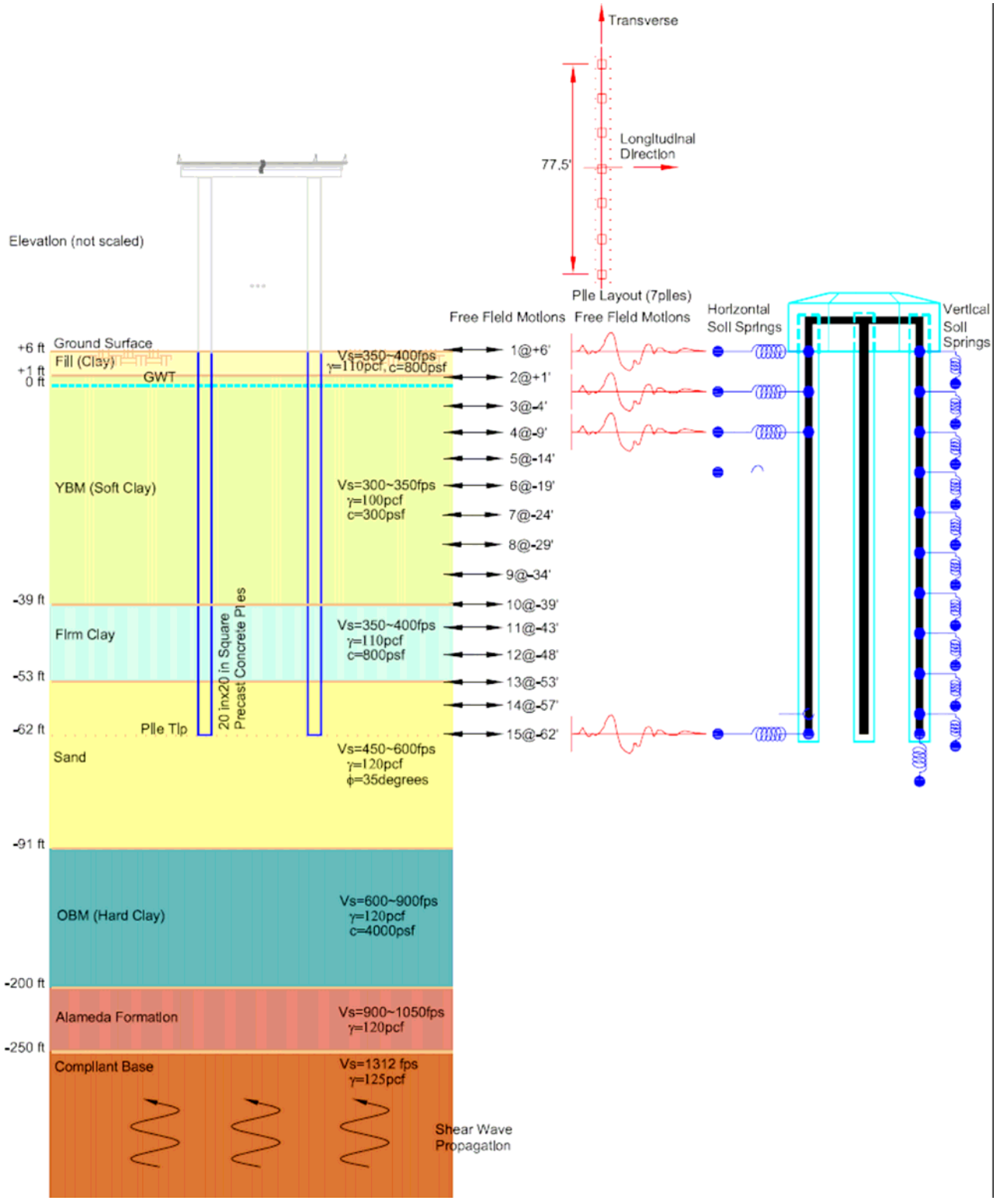


FIGURE A-47: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT TRESTLE BENTS E06-10

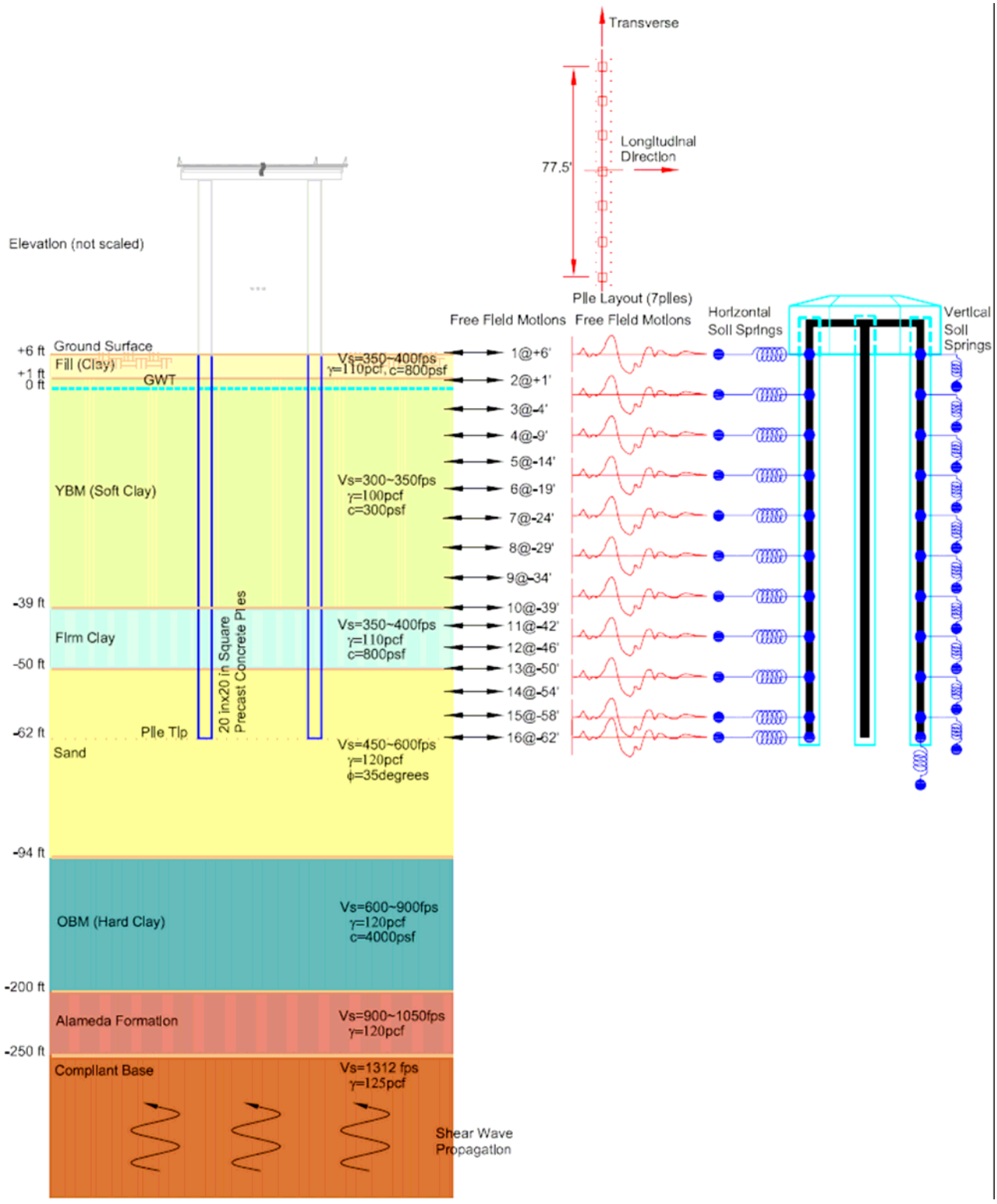


FIGURE A-48: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT TRESTLE BENTS E11-15

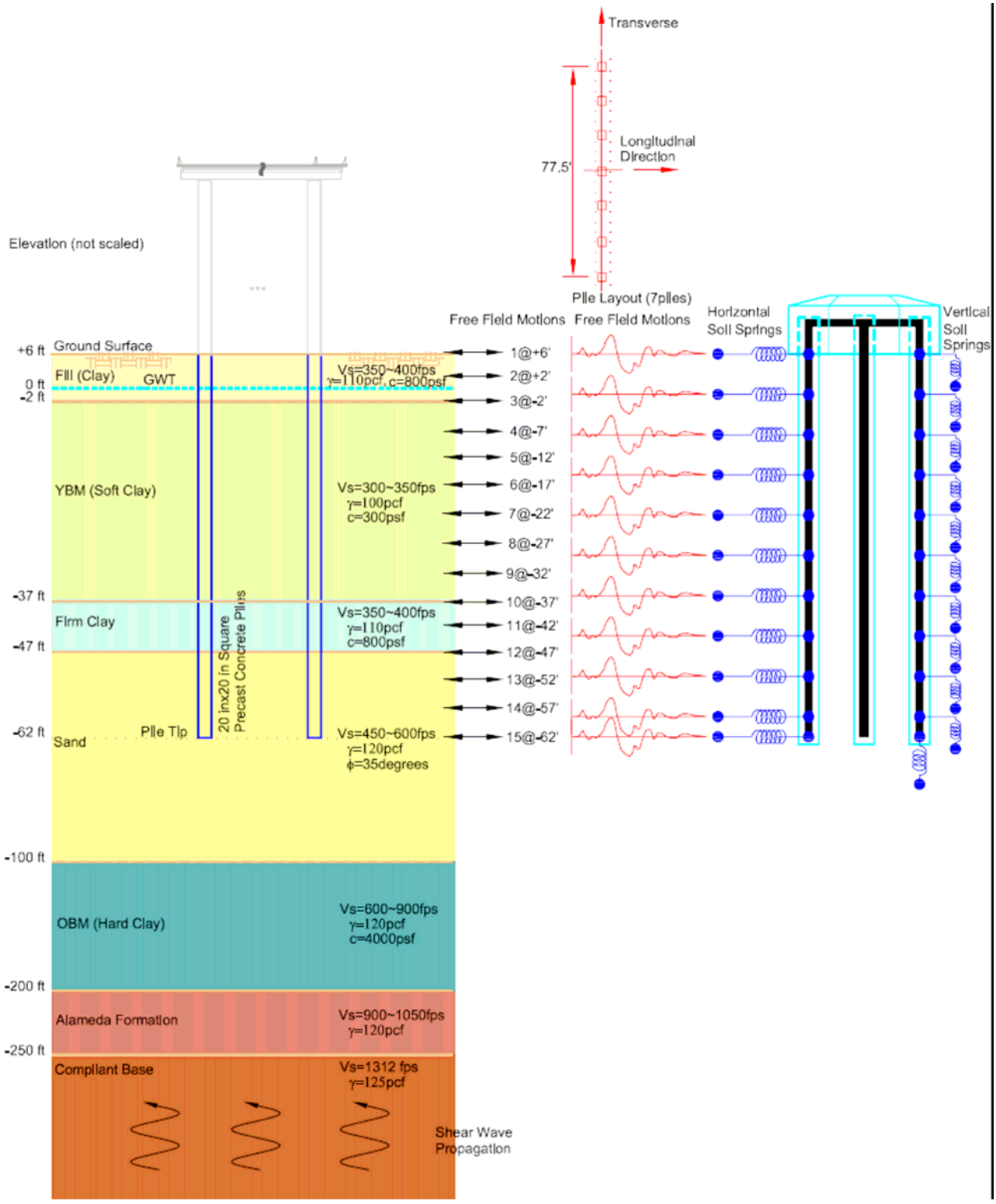


FIGURE A-49: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT TRESTLE BENTS E16-19

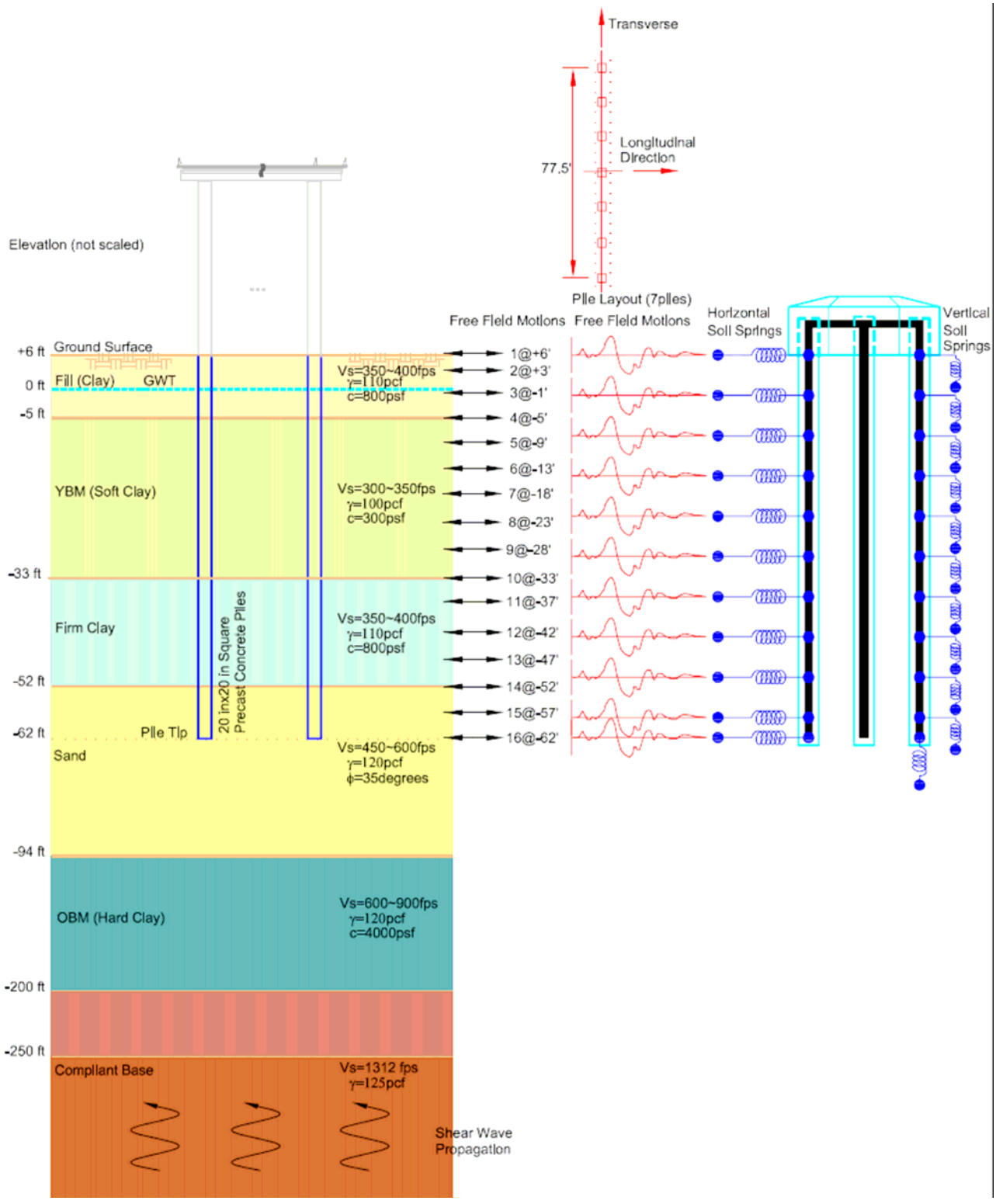


FIGURE A-50: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT TRESTLE BENT E20

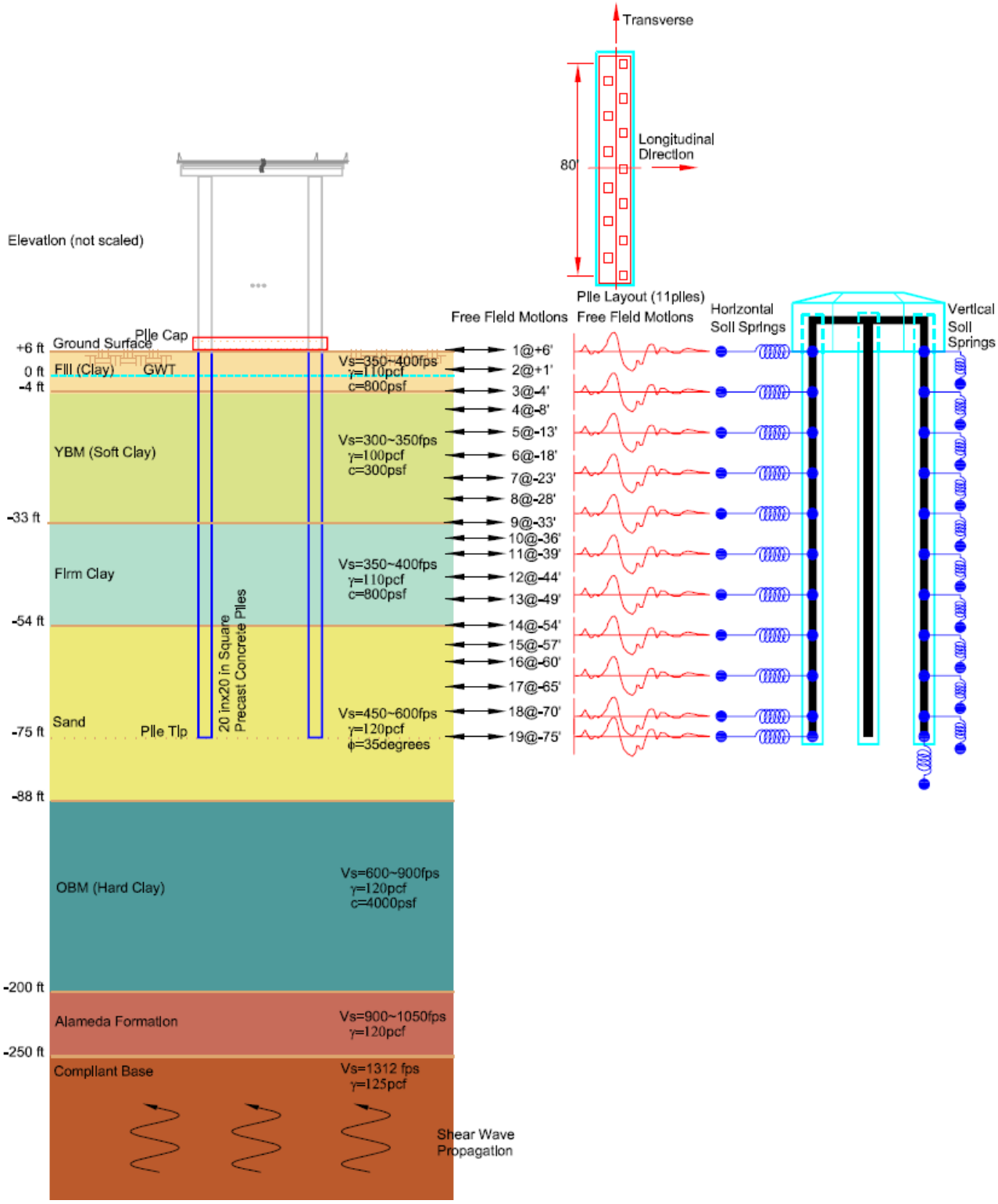


FIGURE A-51: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT TRESTLE BENT W01

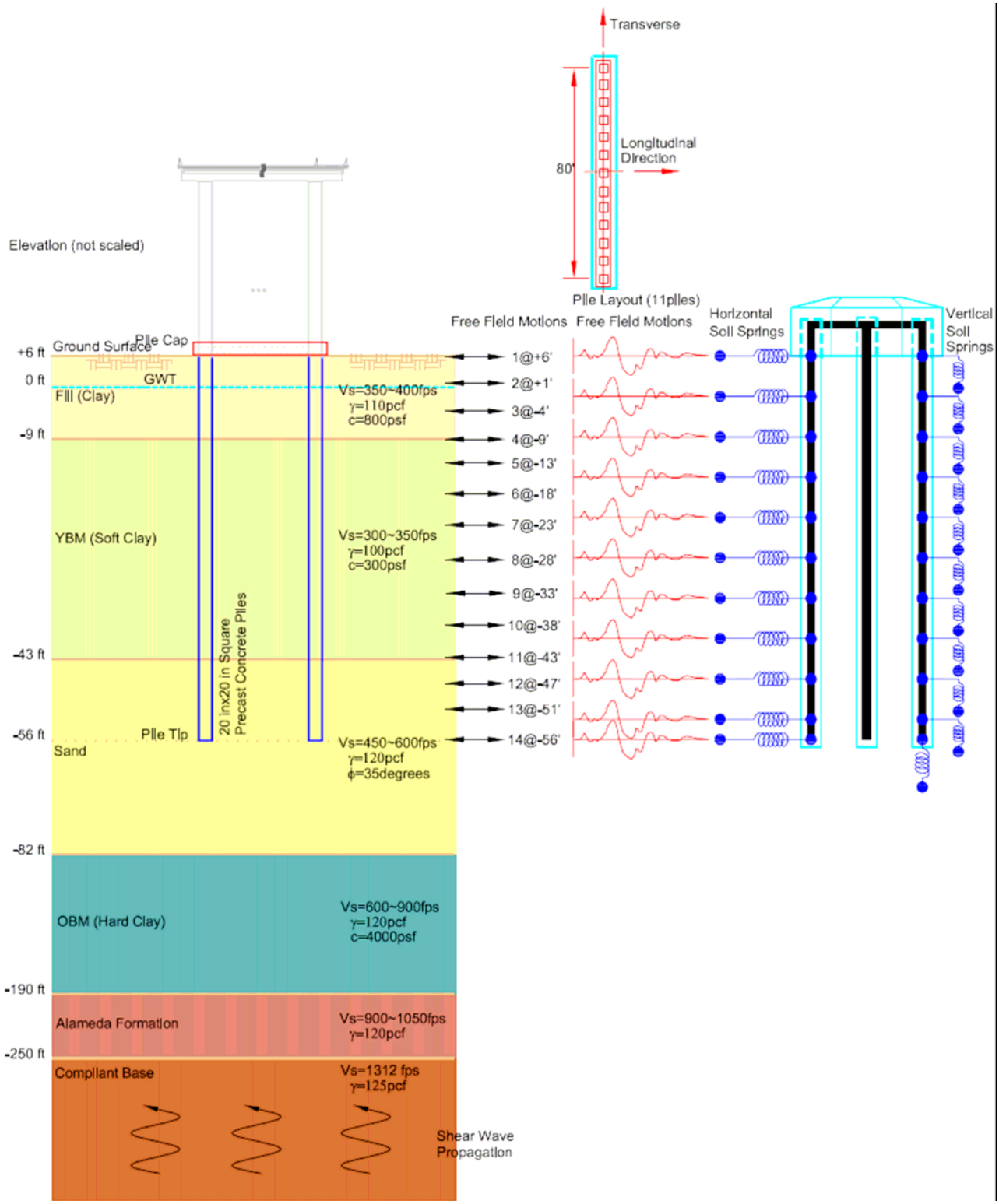


FIGURE A-52:GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT TRESTLE BENTS W02-09

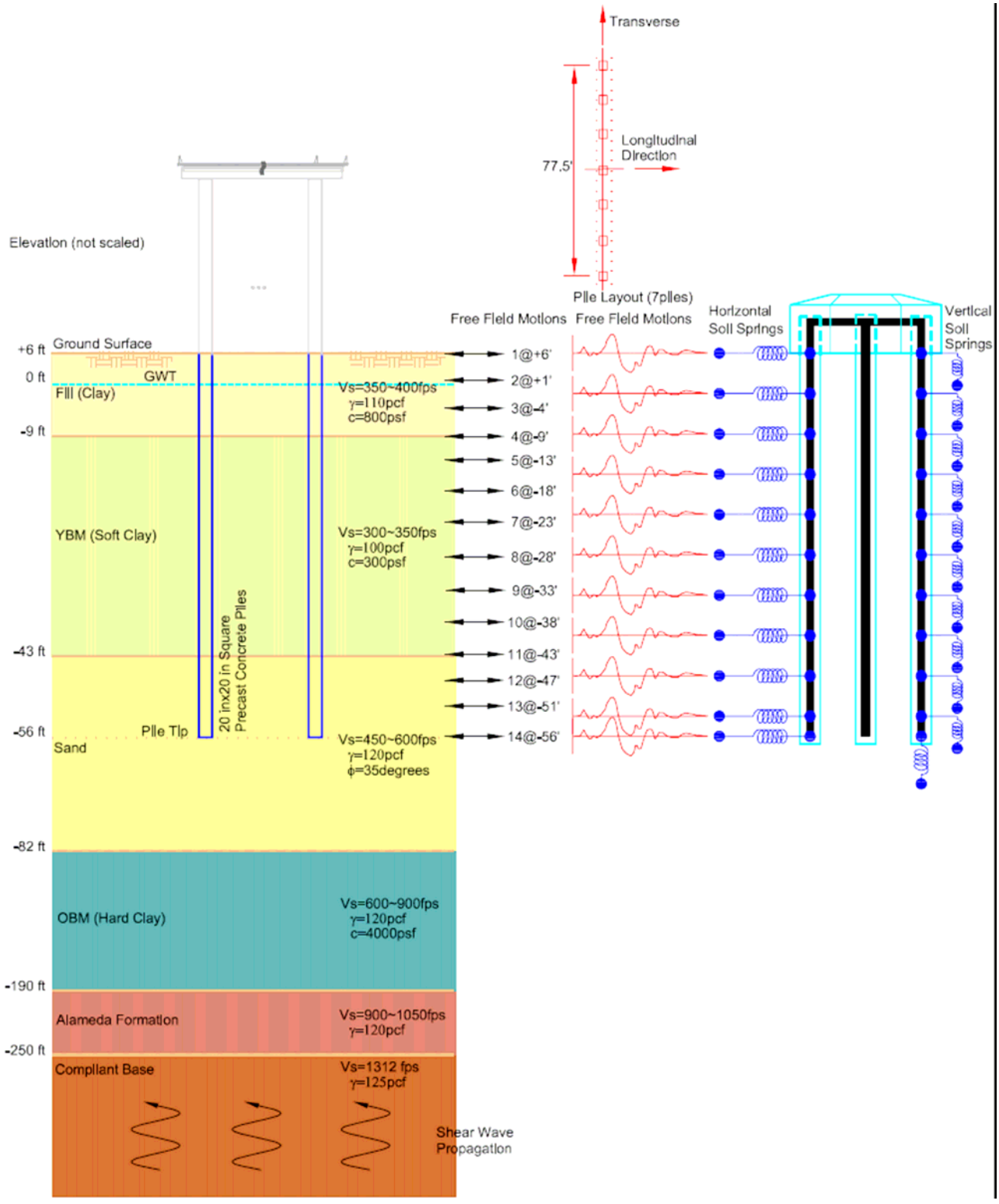


FIGURE A-53:GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT TRESTLE BENTS W10-14

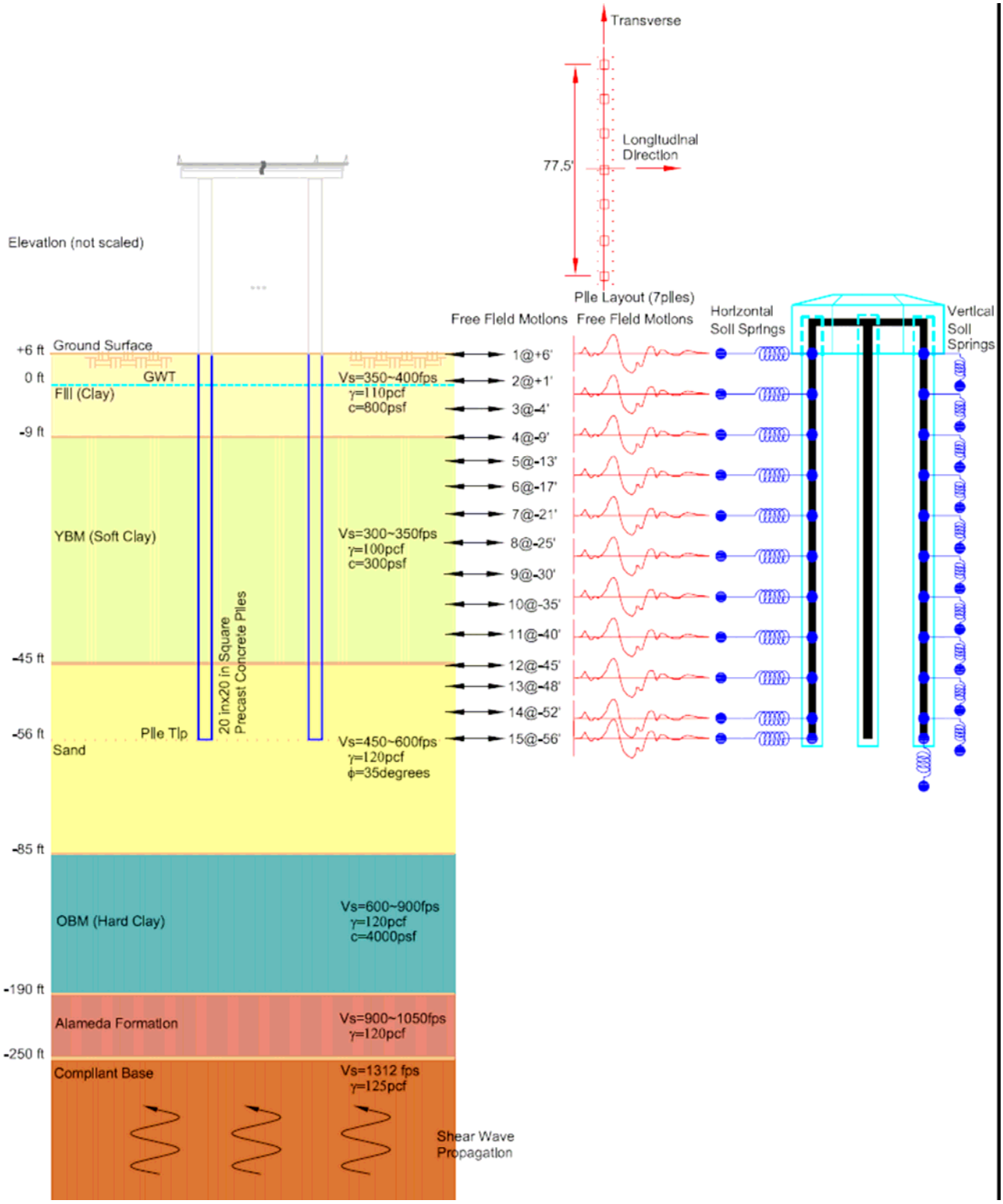


FIGURE A-54:GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT TRESTLE BENTS W15-17

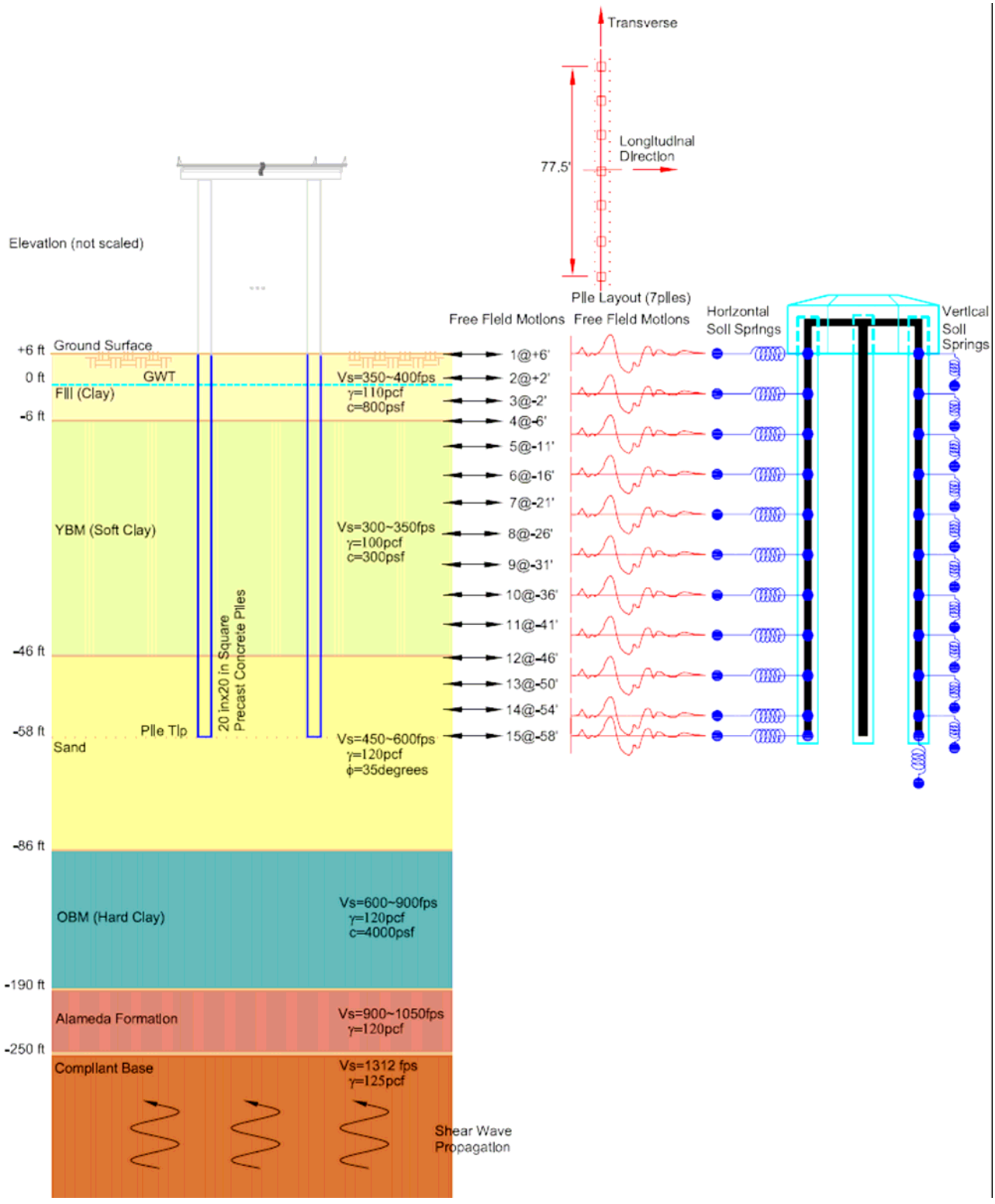


FIGURE A-55: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT TRESTLE BENT W18

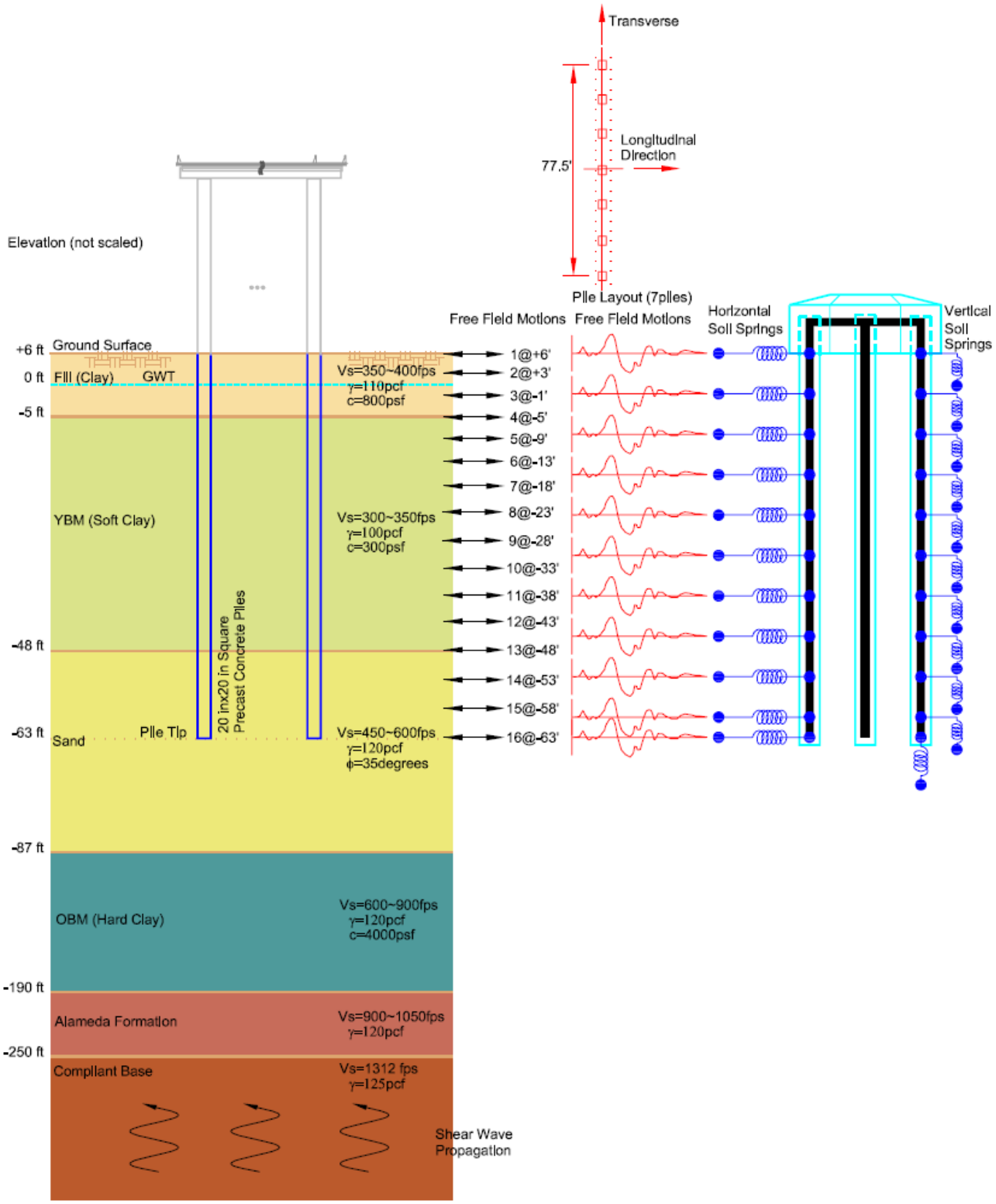


FIGURE A-56: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT TRESTLE BENT W19

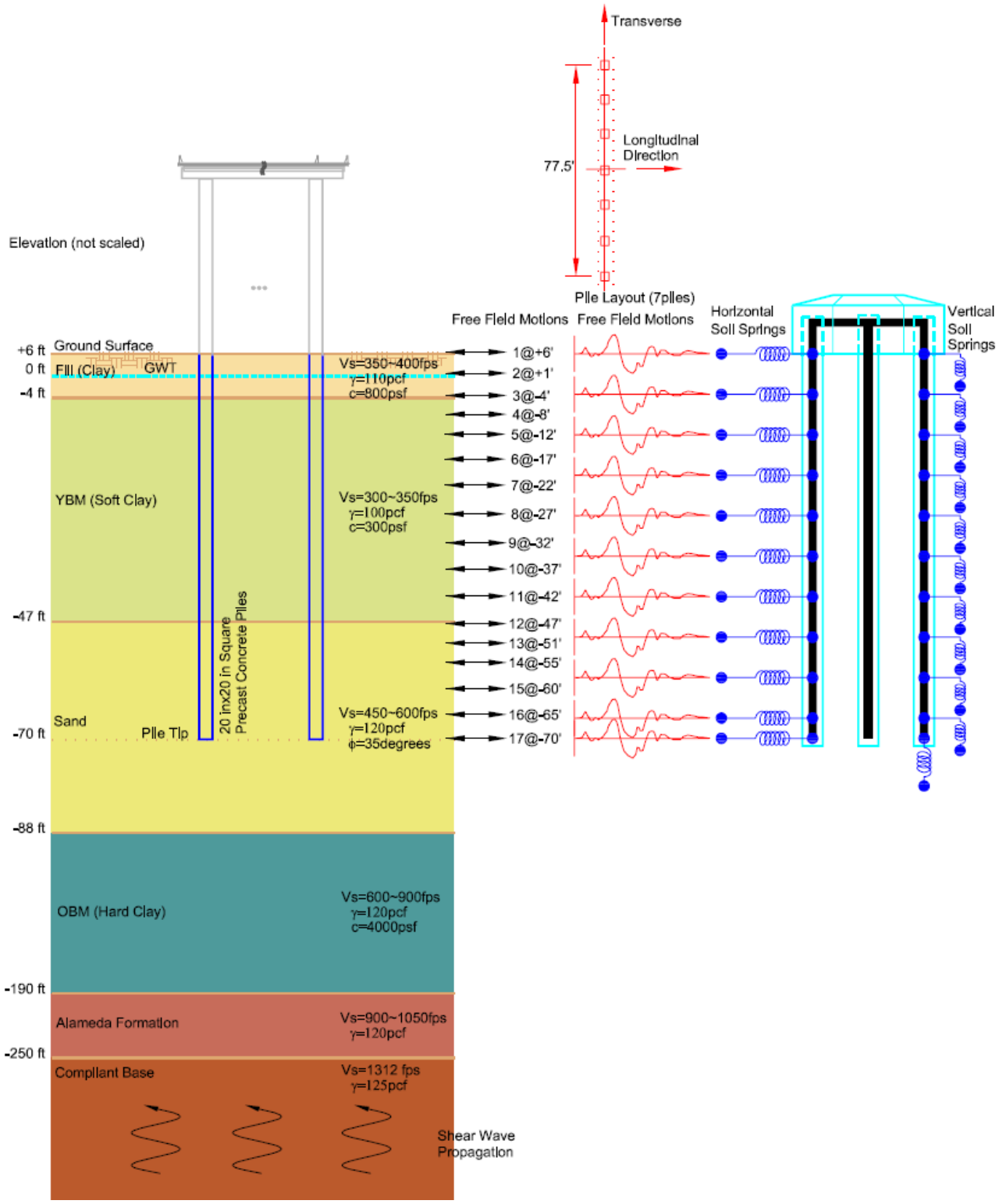
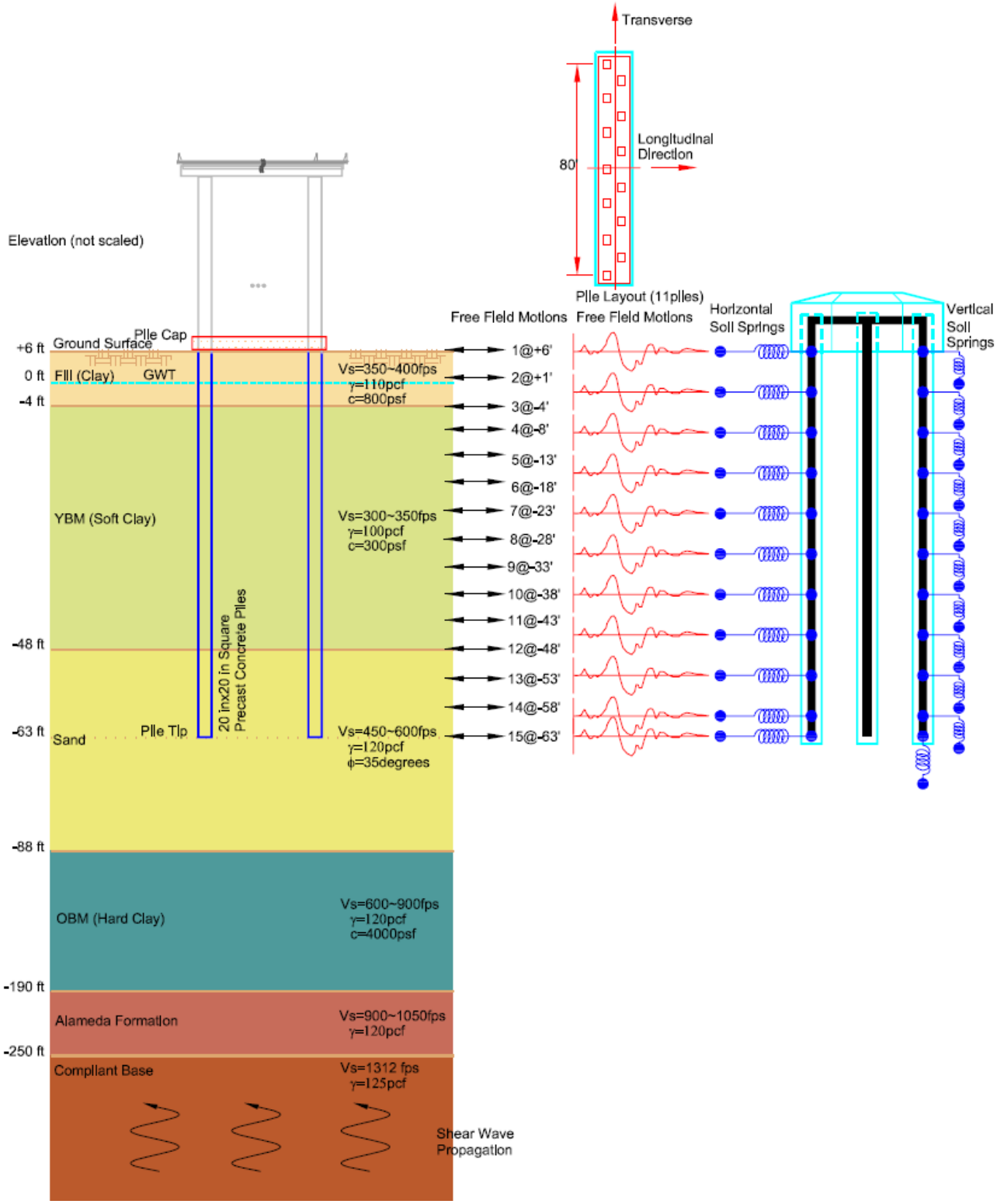


FIGURE A-57: GENERALIZED SOIL CONDITIONS AND FOUNDATION DATA AT TRESTLE BENT W20



9.0 APPENDIX B: *T-Z* AND *Q-U* CURVES

TABLE B-1: ABUTMENT 1 - *t-z* AND *q-u* CURVES

Node #	Elevation (ft)	Soil Type	t_{max} (lb/in)	z_c (in)	t_1 (lb/in)	z_1 (in)	t_2 (lb/in)	z_2 (in)	t_3 (lb/in)	z_3 (in)	t_4 (lb/in)	z_4 (in)	t_5 (lb/in)	z_5 (in)	t_6 (lb/in)	z_6 (in)	t_7 (lb/in)	z_7 (in)
1	1.5	Clay	314.2	0.20	124.7	0.01	167.1	0.02	218.0	0.04	249.8	0.06	271.7	0.08	298.1	0.12	314.2	0.20
2	-1.0	Clay	314.2	0.20	124.7	0.01	167.1	0.02	218.0	0.04	249.8	0.06	271.7	0.08	298.1	0.12	314.2	0.20
3	-4.0	Clay	222.5	0.20	88.3	0.01	118.4	0.02	154.4	0.04	176.9	0.06	192.5	0.08	211.2	0.12	222.5	0.20
4	-8.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
5	-13.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
6	-18.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
7	-23.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
8	-28.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
9	-33.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
10	-38.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
11	-43.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
12	-48.0	Clay	350.4	0.20	139.1	0.01	186.4	0.02	243.2	0.04	278.6	0.06	303.1	0.08	332.6	0.12	350.4	0.20
13	-53.0	Sand	600.9	0.20	238.6	0.01	319.7	0.02	417.1	0.04	477.7	0.06	519.8	0.08	570.3	0.12	600.9	0.20
14	-58.0	Sand	662.9	0.20	263.2	0.01	352.7	0.02	460.1	0.04	527.0	0.06	573.4	0.08	629.1	0.12	662.9	0.20
15	-63.0	Sand	724.9	0.20	287.8	0.01	385.6	0.02	503.1	0.04	576.3	0.06	627.0	0.08	687.9	0.12	724.9	0.20
16	-68.0	Sand	786.9	0.20	312.4	0.01	418.6	0.02	546.1	0.04	625.5	0.06	680.6	0.08	746.7	0.12	786.9	0.20

q_{max} (kips)	u_c (in)	$_{q1}$ (kips)	u_1 (in)	q_2 (kips)	u_2 (in)	q_3 (kips)	u_3 (in)	q_4 (kips)	u_4 (in)
359.0	2.00	161.6	0.20	226.2	0.50	283.6	1.00	359.0	2.00

TABLE B-2: PIER 2 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-6.5	Clay	392.7	0.20	155.9	0.01	208.9	0.02	272.5	0.04	312.2	0.06	339.7	0.08	372.7	0.12	392.7	0.20
2	-11.0	Clay	392.7	0.20	155.9	0.01	208.9	0.02	272.5	0.04	312.2	0.06	339.7	0.08	372.7	0.12	392.7	0.20
3	-16.0	Clay	392.7	0.20	155.9	0.01	208.9	0.02	272.5	0.04	312.2	0.06	339.7	0.08	372.7	0.12	392.7	0.20
4	-21.0	Clay	392.7	0.20	155.9	0.01	208.9	0.02	272.5	0.04	312.2	0.06	339.7	0.08	372.7	0.12	392.7	0.20
5	-24.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
6	-27.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
7	-32.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
8	-37.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
9	-42.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
10	-47.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
11	-52.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
12	-56.0	Sand	537.9	0.20	213.5	0.01	286.2	0.02	373.3	0.04	427.6	0.06	465.3	0.08	510.5	0.12	537.9	0.20
13	-60.0	Sand	587.5	0.20	233.2	0.01	312.5	0.02	407.7	0.04	467.0	0.06	508.2	0.08	557.5	0.12	587.5	0.20
14	-65.0	Sand	643.2	0.20	255.4	0.01	342.2	0.02	446.4	0.04	511.4	0.06	556.4	0.08	610.4	0.12	643.2	0.20

q_{max}	u_c	q_{1}	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
341.9	2.00	153.8	0.20	215.4	0.50	270.1	1.00	341.9	2.00

TABLE B-3: PIER 3 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-7.5	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
2	-12.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
3	-17.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
4	-22.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
5	-27.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
6	-32.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
7	-37.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
8	-42.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
9	-47.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
10	-52.0	Clay	287.3	0.20	114.0	0.01	152.8	0.02	199.4	0.04	228.4	0.06	248.5	0.08	272.6	0.12	287.3	0.20
11	-57.0	Sand	474.6	0.20	188.4	0.01	252.5	0.02	329.4	0.04	377.3	0.06	410.5	0.08	450.4	0.12	474.6	0.20
12	-62.0	Sand	536.6	0.20	213.0	0.01	285.5	0.02	372.4	0.04	426.6	0.06	464.1	0.08	509.2	0.12	536.6	0.20
13	-67.0	Sand	598.5	0.20	237.6	0.01	318.4	0.02	415.4	0.04	475.8	0.06	517.7	0.08	568.0	0.12	598.5	0.20
14	-72.0	Sand	660.5	0.20	262.2	0.01	351.4	0.02	458.4	0.04	525.1	0.06	571.3	0.08	626.8	0.12	660.5	0.20

q_{max}	u_c	$_{q1}$	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
334.8	2.00	150.7	0.20	211.0	0.50	264.5	1.00	334.8	2.00

TABLE B-4: PIER 4 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-8.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
2	-13.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
3	-18.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
4	-23.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
5	-28.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
6	-33.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
7	-38.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
8	-43.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
9	-48.0	Clay	260.8	0.20	103.5	0.01	138.8	0.02	181.0	0.04	207.4	0.06	225.6	0.08	247.5	0.12	260.8	0.20
10	-51.0	Sand	412.4	0.20	163.7	0.01	219.4	0.02	286.2	0.04	327.9	0.06	356.8	0.08	391.4	0.12	412.4	0.20
11	-55.0	Sand	462.0	0.20	183.4	0.01	245.8	0.02	320.6	0.04	367.3	0.06	399.7	0.08	438.5	0.12	462.0	0.20
12	-60.0	Sand	520.9	0.20	206.8	0.01	277.1	0.02	361.5	0.04	414.1	0.06	450.6	0.08	494.3	0.12	520.9	0.20
13	-65.0	Sand	582.9	0.20	231.4	0.01	310.1	0.02	404.5	0.04	463.4	0.06	504.2	0.08	553.1	0.12	582.9	0.20

q_{max}	u_c	q_1	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
295.5	2.00	133.0	0.20	186.2	0.50	233.4	1.00	295.5	2.00

TABLE B-5: PIER 5 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-8.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
2	-12.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
3	-17.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
4	-22.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
5	-27.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
6	-32.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
7	-37.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
8	-42.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
9	-47.0	Clay	252.7	0.20	100.3	0.01	134.5	0.02	175.4	0.04	200.9	0.06	218.6	0.08	239.8	0.12	252.7	0.20
10	-50.0	Sand	393.2	0.20	156.1	0.01	209.2	0.02	272.9	0.04	312.6	0.06	340.1	0.08	373.1	0.12	393.2	0.20
11	-53.0	Sand	436.5	0.20	173.3	0.01	232.2	0.02	303.0	0.04	347.1	0.06	377.6	0.08	414.3	0.12	436.5	0.20
12	-58.0	Sand	492.3	0.20	195.5	0.01	261.9	0.02	341.7	0.04	391.4	0.06	425.9	0.08	467.2	0.12	492.3	0.20
13	-63.0	Sand	554.3	0.20	220.1	0.01	294.9	0.02	384.7	0.04	440.7	0.06	479.5	0.08	526.0	0.12	554.3	0.20
14	-68.0	Sand	616.3	0.20	244.7	0.01	327.9	0.02	427.7	0.04	489.9	0.06	533.1	0.08	584.8	0.12	616.3	0.20

q_{max}	u_c	$_{q1}$	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
312.4	2.00	140.6	0.20	196.8	0.50	246.8	1.00	312.4	2.00

TABLE B-6: PIER 6 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-8.5	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
2	-11.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
3	-16.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
4	-21.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
5	-26.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
6	-31.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
7	-36.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
8	-41.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
9	-46.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
10	-51.0	Clay	276.1	0.20	109.6	0.01	146.9	0.02	191.6	0.04	219.5	0.06	238.8	0.08	262.0	0.12	276.1	0.20
11	-55.0	Sand	449.1	0.20	178.3	0.01	238.9	0.02	311.7	0.04	357.0	0.06	388.5	0.08	426.2	0.12	449.1	0.20
12	-60.0	Sand	508.0	0.20	201.7	0.01	270.2	0.02	352.5	0.04	403.8	0.06	439.4	0.08	482.1	0.12	508.0	0.20
13	-65.0	Sand	570.0	0.20	226.3	0.01	303.2	0.02	395.5	0.04	453.1	0.06	493.0	0.08	540.9	0.12	570.0	0.20
14	-70.0	Sand	631.9	0.20	250.9	0.01	336.2	0.02	438.6	0.04	502.4	0.06	546.6	0.08	599.7	0.12	631.9	0.20
15	-75.0	Sand	693.9	0.20	275.5	0.01	369.2	0.02	481.6	0.04	551.6	0.06	600.2	0.08	658.5	0.12	693.9	0.20

q_{max}	u_c	$_{q1}$	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
316.6	2.00	142.5	0.20	199.5	0.50	250.1	1.00	316.6	2.00

TABLE B-7: PIER 7 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-8.5	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
2	-11.5	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
3	-15.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
4	-20.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
5	-25.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
6	-30.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
7	-35.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
8	-40.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
9	-45.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
10	-50.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
11	-55.0	Clay	295.3	0.20	117.3	0.01	157.1	0.02	205.0	0.04	234.8	0.06	255.5	0.08	280.3	0.12	295.3	0.20
12	-60.0	Sand	490.8	0.20	194.8	0.01	261.1	0.02	340.6	0.04	390.2	0.06	424.5	0.08	465.7	0.12	490.8	0.20
13	-65.0	Sand	552.7	0.20	219.4	0.01	294.1	0.02	383.6	0.04	439.4	0.06	478.1	0.08	524.6	0.12	552.7	0.20
14	-70.0	Sand	614.7	0.20	244.0	0.01	327.0	0.02	426.6	0.04	488.7	0.06	531.7	0.08	583.4	0.12	614.7	0.20

q_{max}	u_c	$_{q1}$	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
311.6	2.00	140.2	0.20	196.3	0.50	246.2	1.00	311.6	2.00

TABLE B-8: PIER 8 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-8.5	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
2	-13.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
3	-18.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
4	-23.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
5	-28.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
6	-33.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
7	-38.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
8	-43.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
9	-48.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
10	-53.0	Clay	276.1	0.20	109.6	0.01	146.9	0.02	191.6	0.04	219.5	0.06	238.8	0.08	262.0	0.12	276.1	0.20
11	-57.0	Sand	446.0	0.20	177.1	0.01	237.3	0.02	309.5	0.04	354.6	0.06	385.8	0.08	423.3	0.12	446.0	0.20
12	-61.0	Sand	495.6	0.20	196.7	0.01	263.7	0.02	343.9	0.04	394.0	0.06	428.7	0.08	470.3	0.12	495.6	0.20
13	-65.0	Sand	545.2	0.20	216.4	0.01	290.0	0.02	378.3	0.04	433.4	0.06	471.6	0.08	517.4	0.12	545.2	0.20

q_{max}	u_c	q_1	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
276.4	2.00	124.4	0.20	174.1	0.50	218.3	1.00	276.4	2.00

TABLE B-9: PIER 9 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-8.5	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
2	-13.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
3	-18.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
4	-23.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
5	-28.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
6	-33.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
7	-38.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
8	-43.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
9	-48.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
10	-52.0	Clay	314.2	0.20	124.7	0.01	167.1	0.02	218.0	0.04	249.8	0.06	271.7	0.08	298.1	0.12	314.2	0.20
11	-55.0	Sand	671.0	0.20	266.4	0.01	357.0	0.02	465.7	0.04	533.4	0.06	580.4	0.08	636.8	0.12	671.0	0.20
12	-59.0	Sand	739.7	0.20	293.7	0.01	393.5	0.02	513.4	0.04	588.1	0.06	639.8	0.08	702.0	0.12	739.7	0.20
13	-63.0	Sand	818.2	0.20	324.8	0.01	435.3	0.02	567.8	0.04	650.5	0.06	707.8	0.08	776.5	0.12	818.2	0.20
14	-65.0	Clay	1527.2	0.20	606.3	0.01	812.5	0.02	1059.9	0.04	1214.1	0.06	1321.0	0.08	1449.3	0.12	1527.2	0.20

q_{max}	u_c	$_{q1}$	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
130.9	2.00	58.9	0.20	82.5	0.50	103.4	1.00	130.9	2.00

TABLE B-10: PIER 10 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-8.5	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
2	-12.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
3	-17.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
4	-22.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
5	-27.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
6	-32.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
7	-37.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
8	-42.0	Clay	222.5	0.20	88.3	0.01	118.4	0.02	154.4	0.04	176.9	0.06	192.5	0.08	211.2	0.12	222.5	0.20
9	-47.0	Clay	314.2	0.20	124.7	0.01	167.1	0.02	218.0	0.04	249.8	0.06	271.7	0.08	298.1	0.12	314.2	0.20
10	-52.0	Clay	379.4	0.20	150.6	0.01	201.8	0.02	263.3	0.04	301.6	0.06	328.2	0.08	360.0	0.12	379.4	0.20
11	-55.0	Sand	466.3	0.20	185.1	0.01	248.1	0.02	323.6	0.04	370.7	0.06	403.4	0.08	442.5	0.12	466.3	0.20
12	-59.0	Sand	512.8	0.20	203.6	0.01	272.8	0.02	355.9	0.04	407.7	0.06	443.6	0.08	486.7	0.12	512.8	0.20
13	-63.0	Sand	879.7	0.20	349.2	0.01	468.0	0.02	610.5	0.04	699.3	0.06	760.9	0.08	834.8	0.12	879.7	0.20
14	-68.0	Clay	1221.7	0.20	485.0	0.01	650.0	0.02	847.9	0.04	971.3	0.06	1056.8	0.08	1159.4	0.12	1221.7	0.20
15	-73.0	Clay	1221.7	0.20	485.0	0.01	650.0	0.02	847.9	0.04	971.3	0.06	1056.8	0.08	1159.4	0.12	1221.7	0.20

q_{max}	u_c	$_{q1}$	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
78.5	2.00	35.3	0.20	49.5	0.50	62.0	1.00	78.5	2.00

TABLE B-11: PIER 11 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-9.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
2	-12.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
3	-16.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
4	-21.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
5	-26.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
6	-31.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
7	-36.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
8	-41.0	Clay	222.5	0.20	88.3	0.01	118.4	0.02	154.4	0.04	176.9	0.06	192.5	0.08	211.2	0.12	222.5	0.20
9	-46.0	Clay	314.2	0.20	124.7	0.01	167.1	0.02	218.0	0.04	249.8	0.06	271.7	0.08	298.1	0.12	314.2	0.20
10	-51.0	Clay	378.5	0.20	150.2	0.01	201.3	0.02	262.6	0.04	300.9	0.06	327.4	0.08	359.2	0.12	378.5	0.20
11	-55.0	Sand	467.5	0.20	185.6	0.01	248.7	0.02	324.5	0.04	371.7	0.06	404.4	0.08	443.7	0.12	467.5	0.20
12	-59.0	Sand	517.1	0.20	205.3	0.01	275.1	0.02	358.9	0.04	411.1	0.06	447.3	0.08	490.7	0.12	517.1	0.20
13	-63.0	Sand	881.8	0.20	350.1	0.01	469.1	0.02	612.0	0.04	701.0	0.06	762.8	0.08	836.8	0.12	881.8	0.20
14	-68.0	Clay	1221.7	0.20	485.0	0.01	650.0	0.02	847.9	0.04	971.3	0.06	1056.8	0.08	1159.4	0.12	1221.7	0.20
15	-73.0	Clay	1221.7	0.20	485.0	0.01	650.0	0.02	847.9	0.04	971.3	0.06	1056.8	0.08	1159.4	0.12	1221.7	0.20

q_{max}	u_c	$_{q1}$	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
78.5	2.00	35.3	0.20	49.5	0.50	62.0	1.00	78.5	2.00

TABLE B-12: PIER 12 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-9.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
2	-12.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
3	-15.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
4	-20.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
5	-25.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
6	-30.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
7	-35.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
8	-40.0	Clay	222.5	0.20	88.3	0.01	118.4	0.02	154.4	0.04	176.9	0.06	192.5	0.08	211.2	0.12	222.5	0.20
9	-44.0	Clay	314.2	0.20	124.7	0.01	167.1	0.02	218.0	0.04	249.8	0.06	271.7	0.08	298.1	0.12	314.2	0.20
10	-48.0	Clay	314.2	0.20	124.7	0.01	167.1	0.02	218.0	0.04	249.8	0.06	271.7	0.08	298.1	0.12	314.2	0.20
11	-53.0	Clay	385.7	0.20	153.1	0.01	205.2	0.02	267.7	0.04	306.7	0.06	333.7	0.08	366.1	0.12	385.7	0.20
12	-57.0	Sand	482.1	0.20	191.4	0.01	256.5	0.02	334.6	0.04	383.3	0.06	417.0	0.08	457.5	0.12	482.1	0.20
13	-61.0	Sand	531.7	0.20	211.1	0.01	282.8	0.02	369.0	0.04	422.7	0.06	459.9	0.08	504.5	0.12	531.7	0.20
14	-65.0	Sand	889.1	0.20	353.0	0.01	473.0	0.02	617.0	0.04	706.8	0.06	769.1	0.08	843.7	0.12	889.1	0.20
15	-69.0	Clay	1221.7	0.20	485.0	0.01	650.0	0.02	847.9	0.04	971.3	0.06	1056.8	0.08	1159.4	0.12	1221.7	0.20
16	-73.0	Clay	1221.7	0.20	485.0	0.01	650.0	0.02	847.9	0.04	971.3	0.06	1056.8	0.08	1159.4	0.12	1221.7	0.20

q_{max}	u_c	q_1	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
78.5	2.00	35.3	0.20	49.5	0.50	62.0	1.00	78.5	2.00

TABLE B-13: PIER 13 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-9.5	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
2	-12.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
3	-15.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
4	-20.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
5	-25.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
6	-30.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
7	-35.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
8	-40.0	Clay	222.5	0.20	88.3	0.01	118.4	0.02	154.4	0.04	176.9	0.06	192.5	0.08	211.2	0.12	222.5	0.20
9	-44.0	Clay	314.2	0.20	124.7	0.01	167.1	0.02	218.0	0.04	249.8	0.06	271.7	0.08	298.1	0.12	314.2	0.20
10	-49.0	Clay	314.2	0.20	124.7	0.01	167.1	0.02	218.0	0.04	249.8	0.06	271.7	0.08	298.1	0.12	314.2	0.20
11	-54.0	Clay	436.0	0.20	173.1	0.01	232.0	0.02	302.6	0.04	346.6	0.06	377.2	0.08	413.8	0.12	436.0	0.20
12	-59.0	Sand	596.4	0.20	236.8	0.01	317.3	0.02	413.9	0.04	474.1	0.06	515.9	0.08	566.0	0.12	596.4	0.20
13	-64.0	Sand	673.4	0.20	267.3	0.01	358.2	0.02	467.3	0.04	535.3	0.06	582.5	0.08	639.0	0.12	673.4	0.20
14	-69.0	Sand	966.8	0.20	383.8	0.01	514.3	0.02	671.0	0.04	768.6	0.06	836.3	0.08	917.5	0.12	966.8	0.20
15	-73.0	Clay	1221.7	0.20	485.0	0.01	650.0	0.02	847.9	0.04	971.3	0.06	1056.8	0.08	1159.4	0.12	1221.7	0.20

q_{max}	u_c	$_{q1}$	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
78.5	2.00	35.3	0.20	49.5	0.50	62.0	1.00	78.5	2.00

TABLE B-14: PIER 14 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-9.5	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
2	-12.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
3	-15.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
4	-20.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
5	-25.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
6	-30.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
7	-35.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
8	-40.0	Clay	222.5	0.20	88.3	0.01	118.4	0.02	154.4	0.04	176.9	0.06	192.5	0.08	211.2	0.12	222.5	0.20
9	-45.0	Clay	314.2	0.20	124.7	0.01	167.1	0.02	218.0	0.04	249.8	0.06	271.7	0.08	298.1	0.12	314.2	0.20
10	-50.0	Clay	314.2	0.20	124.7	0.01	167.1	0.02	218.0	0.04	249.8	0.06	271.7	0.08	298.1	0.12	314.2	0.20
11	-55.0	Clay	389.9	0.20	154.8	0.01	207.4	0.02	270.6	0.04	310.0	0.06	337.3	0.08	370.0	0.12	389.9	0.20
12	-59.0	Sand	490.4	0.20	194.7	0.01	260.9	0.02	340.4	0.04	389.9	0.06	424.2	0.08	465.4	0.12	490.4	0.20
13	-63.0	Sand	543.1	0.20	215.6	0.01	288.9	0.02	376.9	0.04	431.8	0.06	469.8	0.08	515.4	0.12	543.1	0.20
14	-68.0	Sand	602.0	0.20	239.0	0.01	320.3	0.02	417.8	0.04	478.6	0.06	520.7	0.08	571.3	0.12	602.0	0.20

q_{max}	u_c	$_{q1}$	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
305.2	2.00	137.3	0.20	192.3	0.50	241.1	1.00	305.2	2.00

TABLE B-15: PIER 15 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-10.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
2	-15.5	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
3	-21.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
4	-26.5	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
5	-32.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
6	-37.5	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
7	-43.0	Clay	471.2	0.20	187.1	0.01	250.7	0.02	327.0	0.04	374.6	0.06	407.6	0.08	447.2	0.12	471.2	0.20
8	-48.5	Clay	471.2	0.20	187.1	0.01	250.7	0.02	327.0	0.04	374.6	0.06	407.6	0.08	447.2	0.12	471.2	0.20
9	-54.0	Clay	471.2	0.20	187.1	0.01	250.7	0.02	327.0	0.04	374.6	0.06	407.6	0.08	447.2	0.12	471.2	0.20
10	-59.5	Sand	422.9	0.20	167.9	0.01	225.0	0.02	293.5	0.04	336.2	0.06	365.8	0.08	401.4	0.12	422.9	0.20
11	-65.0	Sand	484.9	0.20	192.5	0.01	258.0	0.02	336.5	0.04	385.5	0.06	419.4	0.08	460.2	0.12	484.9	0.20

q_{max}	u_c	q_1	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
261.6	2.00	117.7	0.20	164.8	0.50	206.6	1.00	261.6	2.00

TABLE B-16: PIER 16 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-22.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
2	-25.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
3	-28.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
4	-33.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
5	-38.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
6	-43.0	Clay	222.5	0.20	88.3	0.01	118.4	0.02	154.4	0.04	176.9	0.06	192.5	0.08	211.2	0.12	222.5	0.20
7	-47.0	Clay	314.2	0.20	124.7	0.01	167.1	0.02	218.0	0.04	249.8	0.06	271.7	0.08	298.1	0.12	314.2	0.20
8	-51.0	Clay	314.2	0.20	124.7	0.01	167.1	0.02	218.0	0.04	249.8	0.06	271.7	0.08	298.1	0.12	314.2	0.20
9	-56.0	Clay	366.4	0.20	145.5	0.01	194.9	0.02	254.3	0.04	291.3	0.06	317.0	0.08	347.8	0.12	366.4	0.20
10	-59.0	Sand	440.4	0.20	174.8	0.01	234.3	0.02	305.7	0.04	350.1	0.06	381.0	0.08	418.0	0.12	440.4	0.20
11	-63.0	Sand	490.0	0.20	194.5	0.01	260.7	0.02	340.1	0.04	389.5	0.06	423.8	0.08	465.0	0.12	490.0	0.20
12	-68.0	Sand	548.9	0.20	217.9	0.01	292.0	0.02	380.9	0.04	436.4	0.06	474.8	0.08	520.9	0.12	548.9	0.20
13	-73.0	Sand	610.8	0.20	242.5	0.01	325.0	0.02	423.9	0.04	485.6	0.06	528.4	0.08	579.7	0.12	610.8	0.20
14	-78.0	Sand	672.8	0.20	267.1	0.01	357.9	0.02	466.9	0.04	534.9	0.06	582.0	0.08	638.5	0.12	672.8	0.20
15	-83.0	Sand	734.8	0.20	291.7	0.01	390.9	0.02	509.9	0.04	584.2	0.06	635.6	0.08	697.3	0.12	734.8	0.20
16	-88.0	Sand	993.7	0.20	394.5	0.01	528.7	0.02	689.7	0.04	790.0	0.06	859.6	0.08	943.1	0.12	993.7	0.20
17	-90.0	Clay	1221.7	0.20	485.0	0.01	650.0	0.02	847.9	0.04	971.3	0.06	1056.8	0.08	1159.4	0.12	1221.7	0.20

q_{max}	u_c	q_{q1}	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
78.5	2.00	35.3	0.20	49.5	0.50	62.0	1.00	78.5	2.00

TABLE B-17: PIER 17 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-29.0	Clay	353.4	0.54	140.3	0.03	188.0	0.054	245.3	0.108	281.0	0.162	305.7	0.216	335.4	0.324	353.4	0.54
2	-33.0	Clay	353.4	0.54	140.3	0.03	188.0	0.054	245.3	0.108	281.0	0.162	305.7	0.216	335.4	0.324	353.4	0.54
3	-37.0	Clay	353.4	0.54	140.3	0.03	188.0	0.054	245.3	0.108	281.0	0.162	305.7	0.216	335.4	0.324	353.4	0.54
4	-42.0	Clay	353.4	0.54	140.3	0.03	188.0	0.054	245.3	0.108	281.0	0.162	305.7	0.216	335.4	0.324	353.4	0.54
5	-47.0	Clay	353.4	0.54	140.3	0.03	188.0	0.054	245.3	0.108	281.0	0.162	305.7	0.216	335.4	0.324	353.4	0.54
6	-51.0	Clay	848.2	0.54	336.7	0.03	451.3	0.054	588.7	0.108	674.3	0.162	733.7	0.216	805.0	0.324	848.2	0.54
7	-55.0	Clay	848.2	0.54	336.7	0.03	451.3	0.054	588.7	0.108	674.3	0.162	733.7	0.216	805.0	0.324	848.2	0.54
8	-60.0	Sand	697.9	0.20	277.1	0.01	371.3	0.02	484.4	0.04	554.9	0.06	603.7	0.08	662.4	0.12	697.9	0.20
9	-65.0	Sand	865.2	0.20	343.5	0.01	460.3	0.02	600.5	0.04	687.9	0.06	748.4	0.08	821.1	0.12	865.2	0.20
10	-70.0	Sand	1032.5	0.20	409.9	0.01	549.3	0.02	716.6	0.04	820.8	0.06	893.1	0.08	979.9	0.12	1032.5	0.20
11	-75.0	Sand	1199.8	0.20	476.3	0.01	638.3	0.02	832.7	0.04	953.8	0.06	1037.8	0.08	1138.6	0.12	1199.8	0.20
12	-80.0	Sand	1367.1	0.20	542.7	0.01	727.3	0.02	948.8	0.04	1086.8	0.06	1182.5	0.08	1297.4	0.12	1367.1	0.20
13	-85.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
14	-90.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
15	-95.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
16	-100.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54

q_{max}	u_c	$_{q1}$	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
258.4	5.40	116.3	0.54	162.8	1.35	204.1	2.70	258.4	5.40

TABLE B-18: PIER 18 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-38.0	Clay	353.4	0.54	140.3	0.03	188.0	0.054	245.3	0.108	281.0	0.162	305.7	0.216	335.4	0.324	353.4	0.54
2	-42.0	Clay	353.4	0.54	140.3	0.03	188.0	0.054	245.3	0.108	281.0	0.162	305.7	0.216	335.4	0.324	353.4	0.54
3	-46.0	Clay	600.8	0.54	238.5	0.03	319.6	0.054	417.0	0.108	477.7	0.162	519.7	0.216	570.2	0.324	600.8	0.54
4	-49.0	Clay	848.2	0.54	336.7	0.03	451.3	0.054	588.7	0.108	674.3	0.162	733.7	0.216	805.0	0.324	848.2	0.54
5	-53.0	Clay	650.1	0.37	258.1	0.02	345.9	0.037	451.2	0.074	516.8	0.111	562.3	0.148	617.0	0.222	650.1	0.37
6	-58.0	Sand	535.7	0.20	212.7	0.01	285.0	0.02	371.7	0.04	425.8	0.06	463.3	0.08	508.3	0.12	535.7	0.20
7	-63.0	Sand	703.0	0.20	279.1	0.01	374.0	0.02	487.9	0.04	558.9	0.06	608.1	0.08	667.1	0.12	703.0	0.20
8	-68.0	Sand	870.3	0.20	345.5	0.01	463.0	0.02	604.0	0.04	691.9	0.06	752.8	0.08	825.9	0.12	870.3	0.20
9	-73.0	Sand	2126.3	0.37	844.1	0.02	1131.2	0.037	1475.7	0.074	1690.4	0.111	1839.3	0.148	2017.9	0.222	2126.3	0.37
10	-76.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
11	-80.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
12	-85.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
13	-90.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
14	-95.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
15	-100.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54

q_{max}	u_c	$_{q1}$	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
258.4	5.40	116.3	0.54	162.8	1.35	204.1	2.70	258.4	5.40

TABLE B-19: PIER 19 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-44.0	Clay	848.2	0.54	336.7	0.03	451.3	0.054	588.7	0.108	674.3	0.162	733.7	0.216	805.0	0.324	848.2	0.54
2	-46.0	Clay	848.2	0.37	336.7	0.02	451.3	0.037	588.7	0.074	674.3	0.111	733.7	0.148	805.0	0.222	848.2	0.37
3	-49.0	Sand	164.1	0.20	65.1	0.01	87.3	0.02	113.9	0.04	130.4	0.06	141.9	0.08	155.7	0.12	164.1	0.20
4	-53.0	Sand	297.9	0.20	118.3	0.01	158.5	0.02	206.8	0.04	236.8	0.06	257.7	0.08	282.7	0.12	297.9	0.20
5	-58.0	Sand	456.9	0.20	181.4	0.01	243.1	0.02	317.1	0.04	363.2	0.06	395.2	0.08	433.6	0.12	456.9	0.20
6	-63.0	Sand	624.2	0.20	247.8	0.01	332.1	0.02	433.2	0.04	496.2	0.06	539.9	0.08	592.4	0.12	624.2	0.20
7	-68.0	Sand	2003.3	0.37	795.3	0.02	1065.7	0.037	1390.3	0.074	1592.6	0.111	1732.8	0.148	1901.1	0.222	2003.3	0.37
8	-71.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
9	-75.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
10	-80.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
11	-85.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
12	-90.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
13	-95.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
14	-100.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54

q_{max}	u_c	q_1	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
258.4	5.40	116.3	0.54	162.8	1.35	204.1	2.70	258.4	5.40

TABLE B-20: PIER 20 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-46.0	Sand	0.0	0.00	0.0	0.00	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.00
2	-50.0	Sand	66.9	0.20	26.6	0.01	35.6	0.02	46.4	0.04	53.2	0.06	57.9	0.08	63.5	0.12	66.9	0.20
3	-55.0	Sand	301.2	0.20	119.6	0.01	160.2	0.02	209.0	0.04	239.4	0.06	260.5	0.08	285.8	0.12	301.2	0.20
4	-60.0	Sand	468.5	0.20	186.0	0.01	249.2	0.02	325.1	0.04	372.5	0.06	405.2	0.08	444.6	0.12	468.5	0.20
5	-65.0	Sand	635.8	0.20	252.4	0.01	338.3	0.02	441.3	0.04	505.5	0.06	550.0	0.08	603.4	0.12	635.8	0.20
6	-70.0	Sand	2009.1	0.37	797.6	0.02	1068.8	0.037	1394.3	0.074	1597.2	0.111	1737.8	0.148	1906.6	0.222	2009.1	0.37
7	-75.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
8	-80.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
9	-85.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
10	-90.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
11	-95.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54

q_{max}	u_c	q_1	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
258.4	5.40	116.3	0.54	162.8	1.35	204.1	2.70	258.4	5.40

TABLE B-21: PIER 21 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-48.0	Sand	0.0	0.00	0.0	0.00	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.00
2	-51.0	Sand	50.2	0.20	19.9	0.01	26.7	0.02	34.8	0.04	39.9	0.06	43.4	0.08	47.6	0.12	50.2	0.20
3	-55.0	Sand	242.6	0.20	96.3	0.01	129.1	0.02	168.4	0.04	192.9	0.06	209.9	0.08	230.2	0.12	242.6	0.20
4	-60.0	Sand	401.6	0.20	159.4	0.01	213.6	0.02	278.7	0.04	319.2	0.06	347.4	0.08	381.1	0.12	401.6	0.20
5	-65.0	Sand	568.9	0.20	225.8	0.01	302.6	0.02	394.8	0.04	452.3	0.06	492.1	0.08	539.9	0.12	568.9	0.20
6	-70.0	Sand	1975.6	0.37	784.3	0.02	1051.0	0.037	1371.1	0.074	1570.6	0.111	1708.9	0.148	1874.9	0.222	1975.6	0.37
7	-75.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
8	-80.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
9	-85.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
10	-90.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
11	-95.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
12	-100.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54

q_{max}	u_c	$_{q1}$	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
258.4	5.40	116.3	0.54	162.8	1.35	204.1	2.70	258.4	5.40

TABLE B-22: PIER 22 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-48.0	Sand	0.0	0.00	0.0	0.00	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.00
2	-52.0	Sand	66.9	0.20	26.6	0.01	35.6	0.02	46.4	0.04	53.2	0.06	57.9	0.08	63.5	0.12	66.9	0.20
3	-57.0	Sand	301.2	0.20	119.6	0.01	160.2	0.02	209.0	0.04	239.4	0.06	260.5	0.08	285.8	0.12	301.2	0.20
4	-62.0	Sand	468.5	0.20	186.0	0.01	249.2	0.02	325.1	0.04	372.5	0.06	405.2	0.08	444.6	0.12	468.5	0.20
5	-67.0	Sand	1925.4	0.37	764.4	0.02	1024.3	0.037	1336.2	0.074	1530.7	0.111	1665.5	0.148	1827.2	0.222	1925.4	0.37
6	-70.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
7	-75.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
8	-80.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
9	-85.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
10	-90.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
11	-95.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
12	-100.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54

q_{max}	u_c	$_{q1}$	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
258.4	5.40	116.3	0.54	162.8	1.35	204.1	2.70	258.4	5.40

TABLE B-23: PIER 23 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-46.0	Sand	66.9	0.20	26.6	0.01	35.6	0.02	46.4	0.04	53.2	0.06	57.9	0.08	63.5	0.12	66.9	0.20
2	-52.5	Sand	217.5	0.20	86.3	0.01	115.7	0.02	150.9	0.04	172.9	0.06	188.1	0.08	206.4	0.12	217.5	0.20
3	-56.0	Sand	384.8	0.20	152.7	0.01	204.7	0.02	267.0	0.04	305.9	0.06	332.8	0.08	365.1	0.12	384.8	0.20
4	-60.5	Sand	552.0	0.20	219.2	0.01	293.7	0.02	383.1	0.04	438.9	0.06	477.5	0.08	523.9	0.12	552.0	0.20
5	-65.5	Sand	719.3	0.20	285.6	0.01	382.7	0.02	499.2	0.04	571.9	0.06	622.2	0.08	682.6	0.12	719.3	0.20
6	-70.5	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
7	-75.5	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
8	-80.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
9	-84.5	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
10	-89.5	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
11	-96.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
12	-100.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54

q_{max}	u_c	$_{q1}$	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
258.4	5.40	116.3	0.54	162.8	1.35	204.1	2.70	258.4	5.40

TABLE B-24: PIER 24 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-39.0	Clay	848.2	0.54	336.7	0.03	451.3	0.054	588.7	0.108	674.3	0.162	733.7	0.216	805.0	0.324	848.2	0.54
2	-43.0	Clay	848.2	0.54	336.7	0.03	451.3	0.054	588.7	0.108	674.3	0.162	733.7	0.216	805.0	0.324	848.2	0.54
3	-47.0	Clay	559.8	0.37	222.3	0.02	297.8	0.037	388.5	0.074	445.1	0.111	484.3	0.148	531.3	0.222	559.8	0.37
4	-50.0	Sand	330.0	0.20	131.0	0.01	175.6	0.02	229.0	0.04	262.3	0.06	285.4	0.08	313.2	0.12	330.0	0.20
5	-54.0	Sand	463.8	0.20	184.1	0.01	246.8	0.02	321.9	0.04	368.8	0.06	401.2	0.08	440.2	0.12	463.8	0.20
6	-59.0	Sand	622.8	0.20	247.3	0.01	331.3	0.02	432.2	0.04	495.1	0.06	538.7	0.08	591.0	0.12	622.8	0.20
7	-64.0	Sand	790.1	0.20	313.7	0.01	420.3	0.02	548.3	0.04	628.1	0.06	683.5	0.08	749.8	0.12	790.1	0.20
8	-69.0	Sand	2086.2	0.37	828.2	0.02	1109.9	0.037	1447.8	0.074	1658.6	0.111	1804.6	0.148	1979.8	0.222	2086.2	0.37
9	-74.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
10	-79.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
11	-84.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
12	-89.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
13	-94.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
14	-100.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54

q_{max}	u_c	q_{q1}	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
245.5	5.40	110.5	0.54	154.7	1.35	193.9	2.70	245.5	5.40

TABLE B-25: PIER 25 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-30.0	Clay	353.4	0.54	140.3	0.03	188.0	0.054	245.3	0.108	281.0	0.162	305.7	0.216	335.4	0.324	353.4	0.54
2	-35.0	Clay	353.4	0.54	140.3	0.03	188.0	0.054	245.3	0.108	281.0	0.162	305.7	0.216	335.4	0.324	353.4	0.54
3	-40.0	Clay	600.8	0.54	238.5	0.03	319.6	0.054	417.0	0.108	477.7	0.162	519.7	0.216	570.2	0.324	600.8	0.54
4	-43.0	Clay	848.2	0.54	336.7	0.03	451.3	0.054	588.7	0.108	674.3	0.162	733.7	0.216	805.0	0.324	848.2	0.54
5	-47.0	Clay	848.2	0.54	336.7	0.03	451.3	0.054	588.7	0.108	674.3	0.162	733.7	0.216	805.0	0.324	848.2	0.54
6	-51.0	Clay	727.3	0.37	288.7	0.02	386.9	0.037	504.7	0.074	578.2	0.111	629.1	0.148	690.2	0.222	727.3	0.37
7	-56.0	Sand	690.0	0.20	273.9	0.01	367.1	0.02	478.8	0.04	548.5	0.06	596.8	0.08	654.8	0.12	690.0	0.20
8	-61.0	Sand	857.3	0.20	340.3	0.01	456.1	0.02	595.0	0.04	681.5	0.06	741.6	0.08	813.6	0.12	857.3	0.20
9	-66.0	Sand	2119.8	0.37	841.6	0.02	1127.7	0.037	1471.1	0.074	1685.2	0.111	1833.6	0.148	2011.7	0.222	2119.8	0.37
10	-70.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
11	-75.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
12	-80.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
13	-85.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
14	-90.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
15	-95.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
16	-100.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54

q_{max}	u_c	q_1	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
232.6	5.40	104.7	0.54	146.5	1.35	183.7	2.70	232.6	5.40

TABLE B-26: PIER 26 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-18.0	Clay	353.4	0.54	140.3	0.03	188.0	0.054	245.3	0.108	281.0	0.162	305.7	0.216	335.4	0.324	353.4	0.54
2	-22.0	Clay	353.4	0.54	140.3	0.03	188.0	0.054	245.3	0.108	281.0	0.162	305.7	0.216	335.4	0.324	353.4	0.54
3	-26.0	Clay	353.4	0.54	140.3	0.03	188.0	0.054	245.3	0.108	281.0	0.162	305.7	0.216	335.4	0.324	353.4	0.54
4	-31.0	Clay	353.4	0.54	140.3	0.03	188.0	0.054	245.3	0.108	281.0	0.162	305.7	0.216	335.4	0.324	353.4	0.54
5	-36.0	Clay	600.8	0.54	238.5	0.03	319.6	0.054	417.0	0.108	477.7	0.162	519.7	0.216	570.2	0.324	600.8	0.54
6	-41.0	Clay	848.2	0.54	336.7	0.03	451.3	0.054	588.7	0.108	674.3	0.162	733.7	0.216	805.0	0.324	848.2	0.54
7	-46.0	Clay	800.8	0.37	317.9	0.02	426.0	0.037	555.8	0.074	636.7	0.111	692.7	0.148	760.0	0.222	800.8	0.37
8	-51.0	Sand	837.1	0.20	332.3	0.01	445.3	0.02	580.9	0.04	665.5	0.06	724.1	0.08	794.4	0.12	837.1	0.20
9	-56.0	Sand	1004.4	0.20	398.7	0.01	534.3	0.02	697.0	0.04	798.5	0.06	868.8	0.08	953.2	0.12	1004.4	0.20
10	-61.0	Sand	1171.7	0.20	465.2	0.01	623.3	0.02	813.2	0.04	931.5	0.06	1013.5	0.08	1111.9	0.12	1171.7	0.20
11	-66.0	Sand	1339.0	0.20	531.6	0.01	712.4	0.02	929.3	0.04	1064.5	0.06	1158.3	0.08	1270.7	0.12	1339.0	0.20
12	-71.0	Sand	1506.3	0.20	598.0	0.01	801.4	0.02	1045.4	0.04	1197.5	0.06	1303.0	0.08	1429.5	0.12	1506.3	0.20
13	-76.0	Sand	2444.3	0.37	970.4	0.02	1300.4	0.037	1696.4	0.074	1943.3	0.111	2114.4	0.148	2319.7	0.222	2444.3	0.37
14	-80.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
15	-85.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
16	-90.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
17	-95.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54
18	-100.0	Clay	3298.7	0.54	1309.6	0.03	1754.9	0.054	2289.3	0.108	2622.4	0.162	2853.4	0.216	3130.4	0.324	3298.7	0.54

q_{max}	u_c	$_{q1}$	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
239.0	5.40	107.6	0.54	150.6	1.35	188.8	2.70	239.0	5.40

TABLE B-27: PIER 27 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-5.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
2	-9.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
3	-14.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
4	-19.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
5	-24.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
6	-29.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
7	-34.0	Clay	222.5	0.20	88.3	0.01	118.4	0.02	154.4	0.04	176.9	0.06	192.5	0.08	211.2	0.12	222.5	0.20
8	-39.0	Clay	314.2	0.20	124.7	0.01	167.1	0.02	218.0	0.04	249.8	0.06	271.7	0.08	298.1	0.12	314.2	0.20
9	-44.0	Clay	347.0	0.20	137.8	0.01	184.6	0.02	240.8	0.04	275.9	0.06	300.2	0.08	329.3	0.12	347.0	0.20
10	-47.0	Sand	404.7	0.20	160.7	0.01	215.3	0.02	280.9	0.04	321.7	0.06	350.1	0.08	384.1	0.12	404.7	0.20
11	-52.0	Sand	460.5	0.20	182.8	0.01	245.0	0.02	319.6	0.04	366.1	0.06	398.3	0.08	437.0	0.12	460.5	0.20
12	-57.0	Sand	522.4	0.20	207.4	0.01	277.9	0.02	362.6	0.04	415.3	0.06	451.9	0.08	495.8	0.12	522.4	0.20
13	-62.0	Sand	584.4	0.20	232.0	0.01	310.9	0.02	405.6	0.04	464.6	0.06	505.5	0.08	554.6	0.12	584.4	0.20
14	-67.0	Sand	646.4	0.20	256.6	0.01	343.9	0.02	448.6	0.04	513.9	0.06	559.1	0.08	613.4	0.12	646.4	0.20
15	-72.0	Sand	708.4	0.20	281.2	0.01	376.8	0.02	491.6	0.04	563.1	0.06	612.7	0.08	672.2	0.12	708.4	0.20
16	-77.0	Sand	980.5	0.20	389.3	0.01	521.6	0.02	680.5	0.04	779.5	0.06	848.2	0.08	930.5	0.12	980.5	0.20
17	-81.0	Clay	1221.7	0.20	485.0	0.01	650.0	0.02	847.9	0.04	971.3	0.06	1056.8	0.08	1159.4	0.12	1221.7	0.20
18	-85.0	Clay	1221.7	0.20	485.0	0.01	650.0	0.02	847.9	0.04	971.3	0.06	1056.8	0.08	1159.4	0.12	1221.7	0.20
19	-90.0	Clay	1221.7	0.20	485.0	0.01	650.0	0.02	847.9	0.04	971.3	0.06	1056.8	0.08	1159.4	0.12	1221.7	0.20
20	-95.0	Clay	1221.7	0.20	485.0	0.01	650.0	0.02	847.9	0.04	971.3	0.06	1056.8	0.08	1159.4	0.12	1221.7	0.20

q_{max}	u_c	$_{q1}$	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
78.5	2.00	35.3	0.20	49.5	0.50	62.0	1.00	78.5	2.00

TABLE B-28: PIER 28 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-4.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
2	-8.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
3	-12.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
4	-17.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
5	-22.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
6	-27.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
7	-32.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
8	-37.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
9	-42.0	Clay	242.8	0.20	96.4	0.01	129.1	0.02	168.5	0.04	193.0	0.06	210.0	0.08	230.4	0.12	242.8	0.20
10	-47.0	Sand	385.6	0.20	153.1	0.01	205.1	0.02	267.6	0.04	306.5	0.06	333.5	0.08	365.9	0.12	385.6	0.20
11	-52.0	Sand	447.6	0.20	177.7	0.01	238.1	0.02	310.6	0.04	355.8	0.06	387.1	0.08	424.7	0.12	447.6	0.20
12	-57.0	Sand	509.5	0.20	202.3	0.01	271.1	0.02	353.6	0.04	405.1	0.06	440.7	0.08	483.5	0.12	509.5	0.20
13	-62.0	Sand	571.5	0.20	226.9	0.01	304.0	0.02	396.6	0.04	454.3	0.06	494.4	0.08	542.4	0.12	571.5	0.20
14	-67.0	Sand	633.5	0.20	251.5	0.01	337.0	0.02	439.6	0.04	503.6	0.06	548.0	0.08	601.2	0.12	633.5	0.20
15	-72.0	Sand	695.4	0.20	276.1	0.01	370.0	0.02	482.6	0.04	552.9	0.06	601.6	0.08	660.0	0.12	695.4	0.20
16	-77.0	Sand	974.1	0.20	386.7	0.01	518.2	0.02	676.0	0.04	774.4	0.06	842.6	0.08	924.4	0.12	974.1	0.20
17	-82.0	Clay	1221.7	0.20	485.0	0.01	650.0	0.02	847.9	0.04	971.3	0.06	1056.8	0.08	1159.4	0.12	1221.7	0.20
18	-87.0	Clay	1221.7	0.20	485.0	0.01	650.0	0.02	847.9	0.04	971.3	0.06	1056.8	0.08	1159.4	0.12	1221.7	0.20
19	-93.0	Clay	1221.7	0.20	485.0	0.01	650.0	0.02	847.9	0.04	971.3	0.06	1056.8	0.08	1159.4	0.12	1221.7	0.20

q_{max}	u_c	$_{q1}$	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
78.5	2.00	35.3	0.20	49.5	0.50	62.0	1.00	78.5	2.00

TABLE B-29: PIER 29 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-4.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
2	-7.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
3	-10.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
4	-15.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
5	-20.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
6	-25.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
7	-30.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
8	-35.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
9	-40.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
10	-45.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
11	-50.0	Clay	260.8	0.20	103.5	0.01	138.8	0.02	181.0	0.04	207.4	0.06	225.6	0.08	247.5	0.12	260.8	0.20
12	-53.0	Sand	412.4	0.20	163.7	0.01	219.4	0.02	286.2	0.04	327.9	0.06	356.8	0.08	391.4	0.12	412.4	0.20
13	-57.0	Sand	462.0	0.20	183.4	0.01	245.8	0.02	320.6	0.04	367.3	0.06	399.7	0.08	438.5	0.12	462.0	0.20
14	-62.0	Sand	520.9	0.20	206.8	0.01	277.1	0.02	361.5	0.04	414.1	0.06	450.6	0.08	494.3	0.12	520.9	0.20
15	-67.0	Sand	582.9	0.20	231.4	0.01	310.1	0.02	404.5	0.04	463.4	0.06	504.2	0.08	553.1	0.12	582.9	0.20
16	-72.0	Sand	644.8	0.20	256.0	0.01	343.1	0.02	447.5	0.04	512.6	0.06	557.8	0.08	612.0	0.12	644.8	0.20
17	-77.0	Sand	948.8	0.20	376.7	0.01	504.7	0.02	658.5	0.04	754.3	0.06	820.7	0.08	900.4	0.12	948.8	0.20
18	-82.0	Clay	1221.7	0.20	485.0	0.01	650.0	0.02	847.9	0.04	971.3	0.06	1056.8	0.08	1159.4	0.12	1221.7	0.20
19	-87.0	Clay	1221.7	0.20	485.0	0.01	650.0	0.02	847.9	0.04	971.3	0.06	1056.8	0.08	1159.4	0.12	1221.7	0.20
20	-93.0	Clay	1221.7	0.20	485.0	0.01	650.0	0.02	847.9	0.04	971.3	0.06	1056.8	0.08	1159.4	0.12	1221.7	0.20

q_{max}	u_c	$_{q1}$	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
78.5	2.00	35.3	0.20	49.5	0.50	62.0	1.00	78.5	2.00

TABLE B-30: PIER 30 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-4.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
2	-8.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
3	-13.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
4	-18.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
5	-23.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
6	-26.0	Sand	170.7	0.20	67.8	0.01	90.8	0.02	118.4	0.04	135.7	0.06	147.6	0.08	162.0	0.12	170.7	0.20
7	-30.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
8	-34.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
9	-39.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
10	-42.0	Clay	314.2	0.20	124.7	0.01	167.1	0.02	218.0	0.04	249.8	0.06	271.7	0.08	298.1	0.12	314.2	0.20
11	-46.0	Clay	314.2	0.20	124.7	0.01	167.1	0.02	218.0	0.04	249.8	0.06	271.7	0.08	298.1	0.12	314.2	0.20
12	-49.0	Sand	383.1	0.20	152.1	0.01	203.8	0.02	265.8	0.04	304.5	0.06	331.3	0.08	363.5	0.12	383.1	0.20
13	-53.0	Sand	426.4	0.20	169.3	0.01	226.9	0.02	295.9	0.04	339.0	0.06	368.9	0.08	404.7	0.12	426.4	0.20
14	-58.0	Sand	482.2	0.20	191.4	0.01	256.5	0.02	334.6	0.04	383.3	0.06	417.1	0.08	457.6	0.12	482.2	0.20
15	-63.0	Sand	544.1	0.20	216.0	0.01	289.5	0.02	377.6	0.04	432.6	0.06	470.7	0.08	516.4	0.12	544.1	0.20
16	-68.0	Sand	606.1	0.20	240.6	0.01	322.4	0.02	420.6	0.04	481.9	0.06	524.3	0.08	575.2	0.12	606.1	0.20
17	-73.0	Sand	668.1	0.20	265.2	0.01	355.4	0.02	463.6	0.04	531.1	0.06	577.9	0.08	634.0	0.12	668.1	0.20
18	-78.0	Sand	730.0	0.20	289.8	0.01	388.4	0.02	506.6	0.04	580.4	0.06	631.5	0.08	692.8	0.12	730.0	0.20
19	-83.0	Sand	792.0	0.20	314.4	0.01	421.3	0.02	549.6	0.04	629.6	0.06	685.1	0.08	751.6	0.12	792.0	0.20
20	-88.0	Sand	853.9	0.20	339.0	0.01	454.3	0.02	592.6	0.04	678.9	0.06	738.7	0.08	810.4	0.12	853.9	0.20
21	-93.0	Clay	1221.7	0.20	485.0	0.01	650.0	0.02	847.9	0.04	971.3	0.06	1056.8	0.08	1159.4	0.12	1221.7	0.20

q_{max}	u_c	q_1	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
78.5	2.00	35.3	0.20	49.5	0.50	62.0	1.00	78.5	2.00

TABLE B-31: PIER 31 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-8.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
2	-12.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
3	-16.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
4	-20.0	Clay	146.6	0.20	58.2	0.01	78.0	0.02	101.8	0.04	116.6	0.06	126.8	0.08	139.1	0.12	146.6	0.20
5	-24.0	Sand	187.1	0.20	74.3	0.01	99.5	0.02	129.9	0.04	148.8	0.06	161.9	0.08	177.6	0.12	187.1	0.20
6	-28.0	Sand	171.4	0.20	68.0	0.01	91.2	0.02	119.0	0.04	136.3	0.06	148.3	0.08	162.7	0.12	171.4	0.20
7	-32.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
8	-37.0	Clay	222.5	0.20	88.3	0.01	118.4	0.02	154.4	0.04	176.9	0.06	192.5	0.08	211.2	0.12	222.5	0.20
9	-40.0	Clay	314.2	0.20	124.7	0.01	167.1	0.02	218.0	0.04	249.8	0.06	271.7	0.08	298.1	0.12	314.2	0.20
10	-43.0	Clay	351.9	0.20	139.7	0.01	187.2	0.02	244.2	0.04	279.7	0.06	304.4	0.08	333.9	0.12	351.9	0.20
11	-46.0	Sand	411.2	0.20	163.3	0.01	218.8	0.02	285.4	0.04	326.9	0.06	355.7	0.08	390.3	0.12	411.2	0.20
12	-50.0	Sand	460.8	0.20	182.9	0.01	245.2	0.02	319.8	0.04	366.4	0.06	398.6	0.08	437.3	0.12	460.8	0.20
13	-55.0	Sand	519.7	0.20	206.3	0.01	276.5	0.02	360.7	0.04	413.2	0.06	449.5	0.08	493.2	0.12	519.7	0.20
14	-60.0	Sand	581.7	0.20	230.9	0.01	309.4	0.02	403.7	0.04	462.4	0.06	503.1	0.08	552.0	0.12	581.7	0.20
15	-65.0	Sand	643.6	0.20	255.5	0.01	342.4	0.02	446.7	0.04	511.7	0.06	556.7	0.08	610.8	0.12	643.6	0.20
16	-70.0	Sand	705.6	0.20	280.1	0.01	375.4	0.02	489.7	0.04	561.0	0.06	610.3	0.08	669.6	0.12	705.6	0.20

q_{max}	u_c	q_1	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
357.7	2.00	161.0	0.20	225.4	0.50	282.6	1.00	357.7	2.00

TABLE B-32: PIER 32 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-8.5	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
2	-13.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
3	-18.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
4	-23.0	Clay	157.8	0.20	62.6	0.01	84.0	0.02	109.5	0.04	125.5	0.06	136.5	0.08	149.8	0.12	157.8	0.20
5	-28.0	Sand	215.7	0.20	85.6	0.01	114.7	0.02	149.7	0.04	171.5	0.06	186.6	0.08	204.7	0.12	215.7	0.20
6	-33.0	Sand	188.8	0.20	74.9	0.01	100.4	0.02	131.0	0.04	150.1	0.06	163.3	0.08	179.2	0.12	188.8	0.20
7	-38.0	Clay	222.5	0.20	88.3	0.01	118.4	0.02	154.4	0.04	176.9	0.06	192.5	0.08	211.2	0.12	222.5	0.20
8	-43.0	Clay	351.0	0.20	139.4	0.01	186.8	0.02	243.6	0.04	279.1	0.06	303.6	0.08	333.1	0.12	351.0	0.20
9	-46.0	Sand	409.6	0.20	162.6	0.01	217.9	0.02	284.3	0.04	325.6	0.06	354.3	0.08	388.7	0.12	409.6	0.20
10	-50.0	Sand	459.2	0.20	182.3	0.01	244.3	0.02	318.7	0.04	365.1	0.06	397.2	0.08	435.8	0.12	459.2	0.20
11	-55.0	Sand	518.1	0.20	205.7	0.01	275.6	0.02	359.5	0.04	411.9	0.06	448.1	0.08	491.6	0.12	518.1	0.20
12	-60.0	Sand	580.0	0.20	230.3	0.01	308.6	0.02	402.5	0.04	461.1	0.06	501.7	0.08	550.4	0.12	580.0	0.20
13	-65.0	Sand	642.0	0.20	254.9	0.01	341.5	0.02	445.5	0.04	510.4	0.06	555.3	0.08	609.3	0.12	642.0	0.20
14	-70.0	Sand	704.0	0.20	279.5	0.01	374.5	0.02	488.6	0.04	559.7	0.06	608.9	0.08	668.1	0.12	704.0	0.20

q_{max}	u_c	q_1	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
377.6	2.00	169.9	0.20	237.9	0.50	298.3	1.00	377.6	2.00

TABLE B-33: PIER 33 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-8.5	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
2	-11.5	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
3	-15.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
4	-20.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
5	-25.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
6	-30.0	Clay	178.0	0.20	70.7	0.01	94.7	0.02	123.6	0.04	141.5	0.06	154.0	0.08	169.0	0.12	178.0	0.20
7	-35.0	Sand	178.0	0.20	70.7	0.01	94.7	0.02	123.6	0.04	141.5	0.06	154.0	0.08	169.0	0.12	178.0	0.20
8	-39.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
9	-44.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
10	-49.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
11	-54.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
12	-59.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
13	-64.0	Clay	323.2	0.20	128.3	0.01	172.0	0.02	224.3	0.04	257.0	0.06	279.6	0.08	306.7	0.12	323.2	0.20
14	-68.0	Sand	543.4	0.20	215.7	0.01	289.1	0.02	377.2	0.04	432.0	0.06	470.1	0.08	515.7	0.12	543.4	0.20
15	-73.0	Sand	602.3	0.20	239.1	0.01	320.4	0.02	418.0	0.04	478.8	0.06	521.0	0.08	571.6	0.12	602.3	0.20
16	-78.0	Sand	664.3	0.20	263.7	0.01	353.4	0.02	461.0	0.04	528.1	0.06	574.6	0.08	630.4	0.12	664.3	0.20

q_{max}	u_c	$_{q1}$	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
336.8	2.00	151.5	0.20	212.2	0.50	266.0	1.00	336.8	2.00

TABLE B-34: PIER 34 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-8.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
2	-13.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
3	-18.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
4	-23.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
5	-28.0	Clay	170.9	0.20	67.8	0.01	90.9	0.02	118.6	0.04	135.9	0.06	147.8	0.08	162.2	0.12	170.9	0.20
6	-32.0	Sand	170.9	0.20	67.8	0.01	90.9	0.02	118.6	0.04	135.9	0.06	147.8	0.08	162.2	0.12	170.9	0.20
7	-37.0	Clay	222.5	0.20	88.3	0.01	118.4	0.02	154.4	0.04	176.9	0.06	192.5	0.08	211.2	0.12	222.5	0.20
8	-41.0	Clay	314.2	0.20	124.7	0.01	167.1	0.02	218.0	0.04	249.8	0.06	271.7	0.08	298.1	0.12	314.2	0.20
9	-45.0	Clay	314.2	0.20	124.7	0.01	167.1	0.02	218.0	0.04	249.8	0.06	271.7	0.08	298.1	0.12	314.2	0.20
10	-50.0	Clay	377.2	0.20	149.7	0.01	200.7	0.02	261.8	0.04	299.9	0.06	326.3	0.08	358.0	0.12	377.2	0.20
11	-55.0	Sand	471.2	0.20	187.1	0.01	250.7	0.02	327.0	0.04	374.6	0.06	407.6	0.08	447.2	0.12	471.2	0.20
12	-60.0	Sand	533.2	0.20	211.7	0.01	283.7	0.02	370.0	0.04	423.9	0.06	461.2	0.08	506.0	0.12	533.2	0.20
13	-65.0	Sand	595.2	0.20	236.3	0.01	316.6	0.02	413.1	0.04	473.2	0.06	514.8	0.08	564.8	0.12	595.2	0.20
14	-70.0	Sand	657.1	0.20	260.9	0.01	349.6	0.02	456.1	0.04	522.4	0.06	568.4	0.08	623.6	0.12	657.1	0.20
15	-75.0	Sand	719.1	0.20	285.5	0.01	382.6	0.02	499.1	0.04	571.7	0.06	622.0	0.08	682.4	0.12	719.1	0.20
16	-80.0	Sand	781.1	0.20	310.1	0.01	415.5	0.02	542.1	0.04	621.0	0.06	675.6	0.08	741.3	0.12	781.1	0.20
17	-85.0	Sand	843.1	0.20	334.7	0.01	448.5	0.02	585.1	0.04	670.2	0.06	729.2	0.08	800.1	0.12	843.1	0.20

q_{max}	u_c	q_1	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
341.9	2.00	153.9	0.20	215.4	0.50	270.1	1.00	341.9	2.00

TABLE B-35: PIER 35 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-7.5	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
2	-11.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
3	-16.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
4	-21.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
5	-26.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
6	-31.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
7	-36.0	Clay	222.5	0.20	88.3	0.01	118.4	0.02	154.4	0.04	176.9	0.06	192.5	0.08	211.2	0.12	222.5	0.20
8	-40.0	Clay	314.2	0.20	124.7	0.01	167.1	0.02	218.0	0.04	249.8	0.06	271.7	0.08	298.1	0.12	314.2	0.20
9	-44.0	Clay	338.9	0.20	134.6	0.01	180.3	0.02	235.2	0.04	269.5	0.06	293.2	0.08	321.7	0.12	338.9	0.20
10	-49.0	Sand	394.7	0.20	156.7	0.01	210.0	0.02	273.9	0.04	313.8	0.06	341.4	0.08	374.6	0.12	394.7	0.20
11	-54.0	Sand	456.7	0.20	181.3	0.01	243.0	0.02	316.9	0.04	363.1	0.06	395.0	0.08	433.4	0.12	456.7	0.20
12	-59.0	Sand	518.7	0.20	205.9	0.01	275.9	0.02	359.9	0.04	412.3	0.06	448.6	0.08	492.2	0.12	518.7	0.20
13	-64.0	Sand	580.6	0.20	230.5	0.01	308.9	0.02	403.0	0.04	461.6	0.06	502.2	0.08	551.0	0.12	580.6	0.20
14	-69.0	Sand	642.6	0.20	255.1	0.01	341.9	0.02	446.0	0.04	510.9	0.06	555.8	0.08	609.8	0.12	642.6	0.20
15	-74.0	Sand	704.6	0.20	279.7	0.01	374.8	0.02	489.0	0.04	560.1	0.06	609.5	0.08	668.6	0.12	704.6	0.20
16	-79.0	Sand	769.6	0.20	305.5	0.01	409.4	0.02	534.1	0.04	611.9	0.06	665.7	0.08	730.4	0.12	769.6	0.20
17	-85.0	Sand	840.9	0.20	333.8	0.01	447.4	0.02	583.6	0.04	668.5	0.06	727.4	0.08	798.0	0.12	840.9	0.20

q_{max}	u_c	q_1	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
341.0	2.00	153.5	0.20	214.9	0.50	269.4	1.00	341.0	2.00

TABLE B-36: PIER 36 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-8.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
2	-11.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
3	-16.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
4	-21.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
5	-26.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
6	-31.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
7	-36.0	Clay	222.5	0.20	88.3	0.01	118.4	0.02	154.4	0.04	176.9	0.06	192.5	0.08	211.2	0.12	222.5	0.20
8	-40.0	Clay	314.2	0.20	124.7	0.01	167.1	0.02	218.0	0.04	249.8	0.06	271.7	0.08	298.1	0.12	314.2	0.20
9	-44.0	Clay	343.0	0.20	136.2	0.01	182.5	0.02	238.0	0.04	272.7	0.06	296.7	0.08	325.5	0.12	343.0	0.20
10	-49.0	Sand	402.8	0.20	159.9	0.01	214.3	0.02	279.5	0.04	320.2	0.06	348.4	0.08	382.3	0.12	402.8	0.20
11	-54.0	Sand	464.8	0.20	184.5	0.01	247.3	0.02	322.6	0.04	369.5	0.06	402.0	0.08	441.1	0.12	464.8	0.20
12	-59.0	Sand	526.7	0.20	209.1	0.01	280.2	0.02	365.6	0.04	418.8	0.06	455.6	0.08	499.9	0.12	526.7	0.20
13	-64.0	Sand	588.7	0.20	233.7	0.01	313.2	0.02	408.6	0.04	468.0	0.06	509.2	0.08	558.7	0.12	588.7	0.20
14	-69.0	Sand	650.7	0.20	258.3	0.01	346.2	0.02	451.6	0.04	517.3	0.06	562.8	0.08	617.5	0.12	650.7	0.20
15	-74.0	Sand	712.7	0.20	282.9	0.01	379.1	0.02	494.6	0.04	566.6	0.06	616.5	0.08	676.3	0.12	712.7	0.20
16	-79.0	Sand	777.7	0.20	308.8	0.01	413.8	0.02	539.7	0.04	618.3	0.06	672.7	0.08	738.1	0.12	777.7	0.20
17	-85.0	Sand	849.0	0.20	337.1	0.01	451.7	0.02	589.2	0.04	675.0	0.06	734.4	0.08	805.7	0.12	849.0	0.20

q_{max}	u_c	q_1	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
344.3	2.00	154.9	0.20	216.9	0.50	272.0	1.00	344.3	2.00

TABLE B-37: PIER 37 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-8.5	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
2	-11.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
3	-16.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
4	-21.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
5	-26.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
6	-31.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
7	-36.0	Clay	222.5	0.20	88.3	0.01	118.4	0.02	154.4	0.04	176.9	0.06	192.5	0.08	211.2	0.12	222.5	0.20
8	-40.0	Clay	314.2	0.20	124.7	0.01	167.1	0.02	218.0	0.04	249.8	0.06	271.7	0.08	298.1	0.12	314.2	0.20
9	-44.0	Clay	348.0	0.20	138.1	0.01	185.1	0.02	241.5	0.04	276.6	0.06	301.0	0.08	330.2	0.12	348.0	0.20
10	-48.0	Sand	409.7	0.20	162.6	0.01	218.0	0.02	284.3	0.04	325.7	0.06	354.4	0.08	388.8	0.12	409.7	0.20
11	-53.0	Sand	468.6	0.20	186.0	0.01	249.3	0.02	325.2	0.04	372.5	0.06	405.3	0.08	444.7	0.12	468.6	0.20
12	-58.0	Sand	530.5	0.20	210.6	0.01	282.2	0.02	368.2	0.04	421.8	0.06	458.9	0.08	503.5	0.12	530.5	0.20
13	-63.0	Sand	592.5	0.20	235.2	0.01	315.2	0.02	411.2	0.04	471.0	0.06	512.5	0.08	562.3	0.12	592.5	0.20
14	-68.0	Sand	654.5	0.20	259.8	0.01	348.2	0.02	454.2	0.04	520.3	0.06	566.1	0.08	621.1	0.12	654.5	0.20
15	-73.0	Sand	716.4	0.20	284.4	0.01	381.2	0.02	497.2	0.04	569.6	0.06	619.7	0.08	679.9	0.12	716.4	0.20
16	-78.0	Sand	778.4	0.20	309.0	0.01	414.1	0.02	540.2	0.04	618.8	0.06	673.3	0.08	738.7	0.12	778.4	0.20
17	-83.0	Sand	1015.6	0.20	403.2	0.01	540.3	0.02	704.8	0.04	807.4	0.06	878.5	0.08	963.8	0.12	1015.6	0.20
18	-88.0	Clay	1221.7	0.20	485.0	0.01	650.0	0.02	847.9	0.04	971.3	0.06	1056.8	0.08	1159.4	0.12	1221.7	0.20

q_{max}	u_c	q_1	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
78.5	2.00	35.3	0.20	49.5	0.50	62.0	1.00	78.5	2.00

TABLE B-38: PIER 38 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-8.5	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
2	-11.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
3	-15.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
4	-20.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
5	-25.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
6	-30.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
7	-35.0	Clay	222.5	0.20	88.3	0.01	118.4	0.02	154.4	0.04	176.9	0.06	192.5	0.08	211.2	0.12	222.5	0.20
8	-39.0	Clay	314.2	0.20	124.7	0.01	167.1	0.02	218.0	0.04	249.8	0.06	271.7	0.08	298.1	0.12	314.2	0.20
9	-43.0	Clay	348.9	0.20	138.5	0.01	185.6	0.02	242.2	0.04	277.4	0.06	301.8	0.08	331.1	0.12	348.9	0.20
10	-46.0	Sand	408.5	0.20	162.2	0.01	217.3	0.02	283.5	0.04	324.7	0.06	353.3	0.08	387.7	0.12	408.5	0.20
11	-51.0	Sand	464.3	0.20	184.3	0.01	247.0	0.02	322.2	0.04	369.1	0.06	401.6	0.08	440.6	0.12	464.3	0.20
12	-56.0	Sand	526.2	0.20	208.9	0.01	280.0	0.02	365.2	0.04	418.4	0.06	455.2	0.08	499.4	0.12	526.2	0.20
13	-61.0	Sand	588.2	0.20	233.5	0.01	312.9	0.02	408.2	0.04	467.6	0.06	508.8	0.08	558.2	0.12	588.2	0.20
14	-66.0	Sand	650.2	0.20	258.1	0.01	345.9	0.02	451.2	0.04	516.9	0.06	562.4	0.08	617.0	0.12	650.2	0.20
15	-71.0	Sand	712.1	0.20	282.7	0.01	378.9	0.02	494.2	0.04	566.2	0.06	616.0	0.08	675.8	0.12	712.1	0.20
16	-76.0	Sand	982.4	0.20	390.0	0.01	522.7	0.02	681.8	0.04	781.0	0.06	849.8	0.08	932.3	0.12	982.4	0.20
17	-81.0	Clay	1221.7	0.20	485.0	0.01	650.0	0.02	847.9	0.04	971.3	0.06	1056.8	0.08	1159.4	0.12	1221.7	0.20
18	-86.0	Clay	1221.7	0.20	485.0	0.01	650.0	0.02	847.9	0.04	971.3	0.06	1056.8	0.08	1159.4	0.12	1221.7	0.20
19	-91.0	Clay	1221.7	0.20	485.0	0.01	650.0	0.02	847.9	0.04	971.3	0.06	1056.8	0.08	1159.4	0.12	1221.7	0.20
20	-96.0	Clay	1221.7	0.20	485.0	0.01	650.0	0.02	847.9	0.04	971.3	0.06	1056.8	0.08	1159.4	0.12	1221.7	0.20
21	-102.0	Clay	1221.7	0.20	485.0	0.01	650.0	0.02	847.9	0.04	971.3	0.06	1056.8	0.08	1159.4	0.12	1221.7	0.20

q_{max}	u_c	$_{q1}$	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
70.7	2.00	31.8	0.20	44.5	0.50	55.8	1.00	70.7	2.00

TABLE B-39: PIER 39 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-8.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
2	-13.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
3	-18.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
4	-23.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
5	-28.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
6	-33.0	Clay	222.5	0.20	88.3	0.01	118.4	0.02	154.4	0.04	176.9	0.06	192.5	0.08	211.2	0.12	222.5	0.20
7	-38.0	Clay	314.2	0.20	124.7	0.01	167.1	0.02	218.0	0.04	249.8	0.06	271.7	0.08	298.1	0.12	314.2	0.20
8	-43.0	Clay	353.2	0.20	140.2	0.01	187.9	0.02	245.1	0.04	280.8	0.06	305.5	0.08	335.2	0.12	353.2	0.20
9	-48.0	Sand	423.3	0.20	168.0	0.01	225.2	0.02	293.8	0.04	336.5	0.06	366.1	0.08	401.7	0.12	423.3	0.20
10	-53.0	Sand	485.3	0.20	192.6	0.01	258.2	0.02	336.8	0.04	385.8	0.06	419.8	0.08	460.5	0.12	485.3	0.20
11	-58.0	Sand	547.2	0.20	217.3	0.01	291.1	0.02	379.8	0.04	435.1	0.06	473.4	0.08	519.3	0.12	547.2	0.20
12	-63.0	Sand	609.2	0.20	241.9	0.01	324.1	0.02	422.8	0.04	484.3	0.06	527.0	0.08	578.1	0.12	609.2	0.20
13	-68.0	Sand	671.2	0.20	266.5	0.01	357.1	0.02	465.8	0.04	533.6	0.06	580.6	0.08	636.9	0.12	671.2	0.20
14	-73.0	Sand	961.9	0.20	381.9	0.01	511.8	0.02	667.6	0.04	764.7	0.06	832.1	0.08	912.9	0.12	961.9	0.20
15	-76.0	Clay	1221.7	0.20	485.0	0.01	650.0	0.02	847.9	0.04	971.3	0.06	1056.8	0.08	1159.4	0.12	1221.7	0.20

q_{max}	u_c	$_{q1}$	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
78.5	2.00	35.3	0.20	49.5	0.50	62.0	1.00	78.5	2.00

TABLE B-40: PIER 40 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-7.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
2	-12.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
3	-17.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
4	-22.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
5	-27.0	Clay	222.5	0.20	88.3	0.01	118.4	0.02	154.4	0.04	176.9	0.06	192.5	0.08	211.2	0.12	222.5	0.20
6	-32.0	Clay	314.2	0.20	124.7	0.01	167.1	0.02	218.0	0.04	249.8	0.06	271.7	0.08	298.1	0.12	314.2	0.20
7	-37.0	Clay	394.5	0.20	156.6	0.01	209.9	0.02	273.8	0.04	313.6	0.06	341.2	0.08	374.3	0.12	394.5	0.20
8	-41.0	Sand	502.6	0.20	199.6	0.01	267.4	0.02	348.8	0.04	399.6	0.06	434.8	0.08	477.0	0.12	502.6	0.20
9	-46.0	Sand	561.5	0.20	222.9	0.01	298.7	0.02	389.7	0.04	446.4	0.06	485.7	0.08	532.9	0.12	561.5	0.20
10	-51.0	Sand	623.5	0.20	247.5	0.01	331.7	0.02	432.7	0.04	495.7	0.06	539.3	0.08	591.7	0.12	623.5	0.20
11	-56.0	Sand	685.5	0.20	272.1	0.01	364.7	0.02	475.7	0.04	544.9	0.06	592.9	0.08	650.5	0.12	685.5	0.20
12	-61.0	Sand	747.4	0.20	296.7	0.01	397.6	0.02	518.7	0.04	594.2	0.06	646.5	0.08	709.3	0.12	747.4	0.20
13	-66.0	Sand	809.4	0.20	321.3	0.01	430.6	0.02	561.7	0.04	643.5	0.06	700.1	0.08	768.1	0.12	809.4	0.20
14	-71.0	Sand	1031.1	0.20	409.3	0.01	548.5	0.02	715.6	0.04	819.7	0.06	891.9	0.08	978.5	0.12	1031.1	0.20
15	-75.0	Clay	1221.7	0.20	485.0	0.01	650.0	0.02	847.9	0.04	971.3	0.06	1056.8	0.08	1159.4	0.12	1221.7	0.20
16	-80.0	Clay	1221.7	0.20	485.0	0.01	650.0	0.02	847.9	0.04	971.3	0.06	1056.8	0.08	1159.4	0.12	1221.7	0.20
17	-85.0	Clay	1221.7	0.20	485.0	0.01	650.0	0.02	847.9	0.04	971.3	0.06	1056.8	0.08	1159.4	0.12	1221.7	0.20

q_{max}	u_c	q_{q1}	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
78.5	2.00	35.3	0.20	49.5	0.50	62.0	1.00	78.5	2.00

TABLE B-41: PIER 41 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-6.5	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
2	-11.5	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
3	-16.5	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
4	-21.5	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
5	-27.0	Clay	222.5	0.20	88.3	0.01	118.4	0.02	154.4	0.04	176.9	0.06	192.5	0.08	211.2	0.12	222.5	0.20
6	-32.0	Clay	314.2	0.20	124.7	0.01	167.1	0.02	218.0	0.04	249.8	0.06	271.7	0.08	298.1	0.12	314.2	0.20
7	-37.0	Clay	402.1	0.20	159.6	0.01	213.9	0.02	279.1	0.04	319.7	0.06	347.8	0.08	381.6	0.12	402.1	0.20
8	-40.0	Sand	514.9	0.20	204.4	0.01	273.9	0.02	357.3	0.04	409.3	0.06	445.4	0.08	488.6	0.12	514.9	0.20
9	-45.0	Sand	570.6	0.20	226.5	0.01	303.6	0.02	396.0	0.04	453.7	0.06	493.6	0.08	541.5	0.12	570.6	0.20
10	-50.0	Sand	632.6	0.20	251.1	0.01	336.6	0.02	439.0	0.04	502.9	0.06	547.2	0.08	600.4	0.12	632.6	0.20
11	-55.0	Sand	694.6	0.20	275.8	0.01	369.5	0.02	482.0	0.04	552.2	0.06	600.8	0.08	659.2	0.12	694.6	0.20
12	-60.0	Sand	756.6	0.20	300.4	0.01	402.5	0.02	525.1	0.04	601.5	0.06	654.4	0.08	718.0	0.12	756.6	0.20
13	-65.0	Sand	818.5	0.20	325.0	0.01	435.5	0.02	568.1	0.04	650.7	0.06	708.0	0.08	776.8	0.12	818.5	0.20
14	-70.0	Sand	1035.6	0.20	411.1	0.01	551.0	0.02	718.7	0.04	823.3	0.06	895.8	0.08	982.8	0.12	1035.6	0.20
15	-75.0	Clay	1221.7	0.20	485.0	0.01	650.0	0.02	847.9	0.04	971.3	0.06	1056.8	0.08	1159.4	0.12	1221.7	0.20
16	-80.0	Clay	1221.7	0.20	485.0	0.01	650.0	0.02	847.9	0.04	971.3	0.06	1056.8	0.08	1159.4	0.12	1221.7	0.20
17	-85.0	Clay	1221.7	0.20	485.0	0.01	650.0	0.02	847.9	0.04	971.3	0.06	1056.8	0.08	1159.4	0.12	1221.7	0.20

q_{max}	u_c	q_1	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
78.5	2.00	35.3	0.20	49.5	0.50	62.0	1.00	78.5	2.00

TABLE B-42: PIER 42 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-6.5	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
2	-9.5	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
3	-13.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
4	-18.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
5	-23.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
6	-28.0	Clay	222.5	0.20	88.3	0.01	118.4	0.02	154.4	0.04	176.9	0.06	192.5	0.08	211.2	0.12	222.5	0.20
7	-32.0	Clay	314.2	0.20	124.7	0.01	167.1	0.02	218.0	0.04	249.8	0.06	271.7	0.08	298.1	0.12	314.2	0.20
8	-37.0	Clay	408.3	0.20	162.1	0.01	217.2	0.02	283.4	0.04	324.6	0.06	353.2	0.08	387.5	0.12	408.3	0.20
9	-40.0	Sand	524.2	0.20	208.1	0.01	278.9	0.02	363.8	0.04	416.7	0.06	453.4	0.08	497.4	0.12	524.2	0.20
10	-44.0	Sand	573.7	0.20	227.8	0.01	305.2	0.02	398.2	0.04	456.1	0.06	496.3	0.08	544.5	0.12	573.7	0.20
11	-49.0	Sand	632.6	0.20	251.1	0.01	336.6	0.02	439.0	0.04	502.9	0.06	547.2	0.08	600.4	0.12	632.6	0.20
12	-54.0	Sand	694.6	0.20	275.8	0.01	369.5	0.02	482.0	0.04	552.2	0.06	600.8	0.08	659.2	0.12	694.6	0.20
13	-59.0	Sand	756.6	0.20	300.4	0.01	402.5	0.02	525.1	0.04	601.5	0.06	654.4	0.08	718.0	0.12	756.6	0.20
14	-64.0	Sand	818.5	0.20	325.0	0.01	435.5	0.02	568.1	0.04	650.7	0.06	708.0	0.08	776.8	0.12	818.5	0.20
15	-69.0	Sand	1035.6	0.20	411.1	0.01	551.0	0.02	718.7	0.04	823.3	0.06	895.8	0.08	982.8	0.12	1035.6	0.20
16	-73.0	Clay	1221.7	0.20	485.0	0.01	650.0	0.02	847.9	0.04	971.3	0.06	1056.8	0.08	1159.4	0.12	1221.7	0.20
17	-78.0	Clay	1221.7	0.20	485.0	0.01	650.0	0.02	847.9	0.04	971.3	0.06	1056.8	0.08	1159.4	0.12	1221.7	0.20
18	-83.0	Clay	1221.7	0.20	485.0	0.01	650.0	0.02	847.9	0.04	971.3	0.06	1056.8	0.08	1159.4	0.12	1221.7	0.20

q_{max}	u_c	q_1	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
78.5	2.00	35.3	0.20	49.5	0.50	62.0	1.00	78.5	2.00

TABLE B-43: PIER 43 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-2.5	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
2	-6.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
3	-10.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
4	-15.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
5	-20.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
6	-25.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
7	-30.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
8	-34.0	Clay	314.2	0.20	124.7	0.01	167.1	0.02	218.0	0.04	249.8	0.06	271.7	0.08	298.1	0.12	314.2	0.20
9	-38.0	Clay	314.2	0.20	124.7	0.01	167.1	0.02	218.0	0.04	249.8	0.06	271.7	0.08	298.1	0.12	314.2	0.20
10	-42.0	Clay	314.2	0.20	124.7	0.01	167.1	0.02	218.0	0.04	249.8	0.06	271.7	0.08	298.1	0.12	314.2	0.20
11	-46.0	Clay	314.2	0.20	124.7	0.01	167.1	0.02	218.0	0.04	249.8	0.06	271.7	0.08	298.1	0.12	314.2	0.20
12	-49.0	Sand	644.0	0.20	255.7	0.01	342.6	0.02	446.9	0.04	512.0	0.06	557.1	0.08	611.2	0.12	644.0	0.20
13	-52.0	Sand	681.2	0.20	270.4	0.01	362.4	0.02	472.7	0.04	541.5	0.06	589.2	0.08	646.4	0.12	681.2	0.20
14	-57.0	Sand	730.7	0.20	290.1	0.01	388.8	0.02	507.1	0.04	580.9	0.06	632.1	0.08	693.5	0.12	730.7	0.20
15	-62.0	Sand	792.7	0.20	314.7	0.01	421.7	0.02	550.1	0.04	630.2	0.06	685.7	0.08	752.3	0.12	792.7	0.20
16	-67.0	Sand	854.7	0.20	339.3	0.01	454.7	0.02	593.1	0.04	679.5	0.06	739.3	0.08	811.1	0.12	854.7	0.20
17	-72.0	Sand	916.6	0.20	363.9	0.01	487.6	0.02	636.1	0.04	728.7	0.06	792.9	0.08	869.9	0.12	916.6	0.20
18	-76.0	Clay	1221.7	0.20	485.0	0.01	650.0	0.02	847.9	0.04	971.3	0.06	1056.8	0.08	1159.4	0.12	1221.7	0.20
19	-80.0	Clay	1221.7	0.20	485.0	0.01	650.0	0.02	847.9	0.04	971.3	0.06	1056.8	0.08	1159.4	0.12	1221.7	0.20

q_{max}	u_c	$_{q1}$	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
78.5	2.00	35.3	0.20	49.5	0.50	62.0	1.00	78.5	2.00

TABLE B-44: PIER 44 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	1.5	Clay	314.2	0.20	124.7	0.01	167.1	0.02	218.0	0.04	249.8	0.06	271.7	0.08	298.1	0.12	314.2	0.20
2	-1.5	Clay	314.2	0.20	124.7	0.01	167.1	0.02	218.0	0.04	249.8	0.06	271.7	0.08	298.1	0.12	314.2	0.20
3	-5.0	Clay	222.5	0.20	88.3	0.01	118.4	0.02	154.4	0.04	176.9	0.06	192.5	0.08	211.2	0.12	222.5	0.20
4	-9.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
5	-13.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
6	-18.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
7	-23.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
8	-28.0	Clay	130.9	0.20	52.0	0.01	69.6	0.02	90.8	0.04	104.1	0.06	113.2	0.08	124.2	0.12	130.9	0.20
9	-33.0	Clay	222.5	0.20	88.3	0.01	118.4	0.02	154.4	0.04	176.9	0.06	192.5	0.08	211.2	0.12	222.5	0.20
10	-36.0	Clay	314.2	0.20	124.7	0.01	167.1	0.02	218.0	0.04	249.8	0.06	271.7	0.08	298.1	0.12	314.2	0.20
11	-39.0	Clay	314.2	0.20	124.7	0.01	167.1	0.02	218.0	0.04	249.8	0.06	271.7	0.08	298.1	0.12	314.2	0.20
12	-44.0	Clay	314.2	0.20	124.7	0.01	167.1	0.02	218.0	0.04	249.8	0.06	271.7	0.08	298.1	0.12	314.2	0.20
13	-49.0	Clay	314.2	0.20	124.7	0.01	167.1	0.02	218.0	0.04	249.8	0.06	271.7	0.08	298.1	0.12	314.2	0.20
14	-54.0	Clay	483.8	0.20	192.1	0.01	257.4	0.02	335.8	0.04	384.6	0.06	418.5	0.08	459.1	0.12	483.8	0.20
15	-57.0	Sand	675.1	0.20	268.0	0.01	359.2	0.02	468.5	0.04	536.7	0.06	584.0	0.08	640.7	0.12	675.1	0.20
16	-61.0	Sand	724.7	0.20	287.7	0.01	385.5	0.02	502.9	0.04	576.1	0.06	626.9	0.08	687.8	0.12	724.7	0.20
17	-66.0	Sand	783.6	0.20	311.1	0.01	416.9	0.02	543.8	0.04	622.9	0.06	677.8	0.08	743.6	0.12	783.6	0.20
18	-71.0	Sand	845.6	0.20	335.7	0.01	449.8	0.02	586.8	0.04	672.2	0.06	731.4	0.08	802.4	0.12	845.6	0.20
19	-76.0	Sand	907.5	0.20	360.3	0.01	482.8	0.02	629.8	0.04	721.5	0.06	785.0	0.08	861.2	0.12	907.5	0.20
20	-81.0	Sand	1080.1	0.20	428.8	0.01	574.6	0.02	749.6	0.04	858.7	0.06	934.3	0.08	1025.0	0.12	1080.1	0.20
21	-84.0	Clay	1221.7	0.20	485.0	0.01	650.0	0.02	847.9	0.04	971.3	0.06	1056.8	0.08	1159.4	0.12	1221.7	0.20

q_{max}	u_c	q_1	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)

TABLE B-45: TRESTLE BENTS E01~05 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	6.0	Clay	400.0	0.20	158.8	0.01	212.8	0.02	277.6	0.04	318.0	0.06	346.0	0.08	379.6	0.12	400.0	0.20
2	1.0	Clay	283.3	0.20	112.5	0.01	150.7	0.02	196.6	0.04	225.3	0.06	245.1	0.08	268.9	0.12	283.3	0.20
3	-4.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
4	-9.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
5	-14.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
6	-19.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
7	-24.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
8	-29.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
9	-34.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
10	-39.0	Clay	283.3	0.20	112.5	0.01	150.7	0.02	196.6	0.04	225.3	0.06	245.1	0.08	268.9	0.12	283.3	0.20
11	-43.0	Clay	400.0	0.20	158.8	0.01	212.8	0.02	277.6	0.04	318.0	0.06	346.0	0.08	379.6	0.12	400.0	0.20
12	-48.0	Clay	400.0	0.20	158.8	0.01	212.8	0.02	277.6	0.04	318.0	0.06	346.0	0.08	379.6	0.12	400.0	0.20
13	-53.0	Clay	597.0	0.20	237.0	0.01	317.6	0.02	414.3	0.04	474.6	0.06	516.4	0.08	566.5	0.12	597.0	0.20
14	-57.0	Sand	829.5	0.20	329.3	0.01	441.3	0.02	575.7	0.04	659.4	0.06	717.5	0.08	787.2	0.12	829.5	0.20
15	-62.0	Sand	904.4	0.20	359.1	0.01	481.2	0.02	627.7	0.04	719.0	0.06	782.3	0.08	858.3	0.12	904.4	0.20

q_{max}	u_c	$_{q1}$	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
366.8	2.00	165.1	0.20	231.1	0.50	289.8	1.00	366.8	2.00

TABLE B-46: TRESTLE BENTS E06~10 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	6.0	Clay	400.0	0.20	158.8	0.01	212.8	0.02	277.6	0.04	318.0	0.06	346.0	0.08	379.6	0.12	400.0	0.20
2	1.0	Clay	283.3	0.20	112.5	0.01	150.7	0.02	196.6	0.04	225.3	0.06	245.1	0.08	268.9	0.12	283.3	0.20
3	-4.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
4	-9.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
5	-14.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
6	-19.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
7	-24.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
8	-29.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
9	-34.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
10	-39.0	Clay	283.3	0.20	112.5	0.01	150.7	0.02	196.6	0.04	225.3	0.06	245.1	0.08	268.9	0.12	283.3	0.20
11	-42.0	Clay	400.0	0.20	158.8	0.01	212.8	0.02	277.6	0.04	318.0	0.06	346.0	0.08	379.6	0.12	400.0	0.20
12	-46.0	Clay	400.0	0.20	158.8	0.01	212.8	0.02	277.6	0.04	318.0	0.06	346.0	0.08	379.6	0.12	400.0	0.20
13	-50.0	Clay	577.4	0.20	229.2	0.01	307.2	0.02	400.7	0.04	459.0	0.06	499.5	0.08	548.0	0.12	577.4	0.20
14	-54.0	Sand	786.4	0.20	312.2	0.01	418.4	0.02	545.8	0.04	625.2	0.06	680.2	0.08	746.3	0.12	786.4	0.20
15	-58.0	Sand	849.5	0.20	337.3	0.01	451.9	0.02	589.6	0.04	675.4	0.06	734.8	0.08	806.2	0.12	849.5	0.20
16	-62.0	Sand	912.6	0.20	362.3	0.01	485.5	0.02	633.4	0.04	725.6	0.06	789.4	0.08	866.1	0.12	912.6	0.20

q_{max}	u_c	$_{q1}$	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
370.1	2.00	166.6	0.20	233.2	0.50	292.4	1.00	370.1	2.00

TABLE B-48: TRESTLE BENTS E11~15 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	6.0	Clay	400.0	0.20	158.8	0.01	212.8	0.02	277.6	0.04	318.0	0.06	346.0	0.08	379.6	0.12	400.0	0.20
2	2.0	Clay	400.0	0.20	158.8	0.01	212.8	0.02	277.6	0.04	318.0	0.06	346.0	0.08	379.6	0.12	400.0	0.20
3	-2.0	Clay	283.3	0.20	112.5	0.01	150.7	0.02	196.6	0.04	225.3	0.06	245.1	0.08	268.9	0.12	283.3	0.20
4	-7.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
5	-12.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
6	-17.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
7	-22.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
8	-27.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
9	-32.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
10	-37.0	Clay	283.3	0.20	112.5	0.01	150.7	0.02	196.6	0.04	225.3	0.06	245.1	0.08	268.9	0.12	283.3	0.20
11	-42.0	Clay	400.0	0.20	158.8	0.01	212.8	0.02	277.6	0.04	318.0	0.06	346.0	0.08	379.6	0.12	400.0	0.20
12	-47.0	Clay	568.7	0.20	225.8	0.01	302.5	0.02	394.6	0.04	452.1	0.06	491.9	0.08	539.7	0.12	568.7	0.20
13	-52.0	Sand	776.8	0.20	308.4	0.01	413.2	0.02	539.1	0.04	617.5	0.06	671.9	0.08	737.1	0.12	776.8	0.20
14	-57.0	Sand	855.7	0.20	339.7	0.01	455.2	0.02	593.8	0.04	680.3	0.06	740.1	0.08	812.0	0.12	855.7	0.20
15	-62.0	Sand	934.6	0.20	371.0	0.01	497.2	0.02	648.6	0.04	743.0	0.06	808.4	0.08	886.9	0.12	934.6	0.20

q_{max}	u_c	$_{q1}$	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
379.0	2.00	170.6	0.20	238.8	0.50	299.4	1.00	379.0	2.00

TABLE B-48: TRESTLE BENTS E16~19 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	6.0	Clay	400.0	0.20	158.8	0.01	212.8	0.02	277.6	0.04	318.0	0.06	346.0	0.08	379.6	0.12	400.0	0.20
2	3.0	Clay	400.0	0.20	158.8	0.01	212.8	0.02	277.6	0.04	318.0	0.06	346.0	0.08	379.6	0.12	400.0	0.20
3	-1.0	Clay	400.0	0.20	158.8	0.01	212.8	0.02	277.6	0.04	318.0	0.06	346.0	0.08	379.6	0.12	400.0	0.20
4	-5.0	Clay	283.3	0.20	112.5	0.01	150.7	0.02	196.6	0.04	225.3	0.06	245.1	0.08	268.9	0.12	283.3	0.20
5	-9.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
6	-13.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
7	-18.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
8	-23.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
9	-28.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
10	-33.0	Clay	283.3	0.20	112.5	0.01	150.7	0.02	196.6	0.04	225.3	0.06	245.1	0.08	268.9	0.12	283.3	0.20
11	-37.0	Clay	400.0	0.20	158.8	0.01	212.8	0.02	277.6	0.04	318.0	0.06	346.0	0.08	379.6	0.12	400.0	0.20
12	-42.0	Clay	400.0	0.20	158.8	0.01	212.8	0.02	277.6	0.04	318.0	0.06	346.0	0.08	379.6	0.12	400.0	0.20
13	-47.0	Clay	400.0	0.20	158.8	0.01	212.8	0.02	277.6	0.04	318.0	0.06	346.0	0.08	379.6	0.12	400.0	0.20
14	-52.0	Clay	610.8	0.20	242.5	0.01	325.0	0.02	423.9	0.04	485.6	0.06	528.4	0.08	579.7	0.12	610.8	0.20
15	-57.0	Sand	861.1	0.20	341.9	0.01	458.1	0.02	597.6	0.04	684.6	0.06	744.9	0.08	817.2	0.12	861.1	0.20
16	-62.0	Sand	940.0	0.20	373.2	0.01	500.1	0.02	652.4	0.04	747.3	0.06	813.1	0.08	892.1	0.12	940.0	0.20

q_{max}	u_c	q_1	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
381.2	2.00	171.6	0.20	240.2	0.50	301.2	1.00	381.2	2.00

TABLE B-49: TRESTLE BENT E20 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	6.0	Clay	400.0	0.20	158.8	0.01	212.8	0.02	277.6	0.04	318.0	0.06	346.0	0.08	379.6	0.12	400.0	0.20
2	1.0	Clay	400.0	0.20	158.8	0.01	212.8	0.02	277.6	0.04	318.0	0.06	346.0	0.08	379.6	0.12	400.0	0.20
3	-4.0	Clay	283.3	0.20	112.5	0.01	150.7	0.02	196.6	0.04	225.3	0.06	245.1	0.08	268.9	0.12	283.3	0.20
4	-8.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
5	-13.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
6	-18.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
7	-23.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
8	-28.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
9	-33.0	Clay	283.3	0.20	112.5	0.01	150.7	0.02	196.6	0.04	225.3	0.06	245.1	0.08	268.9	0.12	283.3	0.20
10	-36.0	Clay	400.0	0.20	158.8	0.01	212.8	0.02	277.6	0.04	318.0	0.06	346.0	0.08	379.6	0.12	400.0	0.20
11	-39.0	Clay	400.0	0.20	158.8	0.01	212.8	0.02	277.6	0.04	318.0	0.06	346.0	0.08	379.6	0.12	400.0	0.20
12	-44.0	Clay	400.0	0.20	158.8	0.01	212.8	0.02	277.6	0.04	318.0	0.06	346.0	0.08	379.6	0.12	400.0	0.20
13	-49.0	Clay	400.0	0.20	158.8	0.01	212.8	0.02	277.6	0.04	318.0	0.06	346.0	0.08	379.6	0.12	400.0	0.20
14	-54.0	Clay	614.6	0.20	244.0	0.01	327.0	0.02	426.6	0.04	488.6	0.06	531.7	0.08	583.3	0.12	614.6	0.20
15	-57.0	Sand	852.9	0.20	338.6	0.01	453.8	0.02	591.9	0.04	678.1	0.06	737.8	0.08	809.4	0.12	852.9	0.20
16	-60.0	Sand	908.2	0.20	360.5	0.01	483.1	0.02	630.3	0.04	722.0	0.06	785.6	0.08	861.8	0.12	908.2	0.20
17	-65.0	Sand	979.2	0.20	388.7	0.01	520.9	0.02	679.5	0.04	778.4	0.06	847.0	0.08	929.2	0.12	979.2	0.20
18	-70.0	Sand	1058.1	0.20	420.1	0.01	562.9	0.02	734.3	0.04	841.2	0.06	915.2	0.08	1004.1	0.12	1058.1	0.20
19	-75.0	Sand	1137.0	0.20	451.4	0.01	604.9	0.02	789.1	0.04	903.9	0.06	983.5	0.08	1079.0	0.12	1137.0	0.20

q_{max}	u_c	$_{q1}$	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
345.8	2.00	155.6	0.20	217.9	0.50	273.2	1.00	345.8	2.00

TABLE B-50: TRESTLE BENTS W01~09 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	6.0	Clay	400.0	0.20	158.8	0.01	212.8	0.02	277.6	0.04	318.0	0.06	346.0	0.08	379.6	0.12	400.0	0.20
2	1.0	Clay	400.0	0.20	158.8	0.01	212.8	0.02	277.6	0.04	318.0	0.06	346.0	0.08	379.6	0.12	400.0	0.20
3	-4.0	Clay	400.0	0.20	158.8	0.01	212.8	0.02	277.6	0.04	318.0	0.06	346.0	0.08	379.6	0.12	400.0	0.20
4	-9.0	Clay	283.3	0.20	112.5	0.01	150.7	0.02	196.6	0.04	225.3	0.06	245.1	0.08	268.9	0.12	283.3	0.20
5	-13.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
6	-18.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
7	-23.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
8	-28.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
9	-33.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
10	-38.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
11	-43.0	Clay	423.3	0.20	168.1	0.01	225.2	0.02	293.8	0.04	336.5	0.06	366.2	0.08	401.7	0.12	423.3	0.20
12	-47.0	Sand	711.6	0.20	282.5	0.01	378.5	0.02	493.8	0.04	565.7	0.06	615.5	0.08	675.3	0.12	711.6	0.20
13	-51.0	Sand	778.6	0.20	309.1	0.01	414.2	0.02	540.4	0.04	619.0	0.06	673.5	0.08	738.9	0.12	778.6	0.20
14	-56.0	Sand	853.6	0.20	338.9	0.01	454.1	0.02	592.4	0.04	678.6	0.06	738.3	0.08	810.0	0.12	853.6	0.20

q_{max}	u_c	q_{q1}	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
346.2	2.00	155.8	0.20	218.1	0.50	273.5	1.00	346.2	2.00

TABLE B-51: TRESTLE BENTS W10~14 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	6.0	Clay	400.0	0.20	158.8	0.01	212.8	0.02	277.6	0.04	318.0	0.06	346.0	0.08	379.6	0.12	400.0	0.20
2	1.0	Clay	400.0	0.20	158.8	0.01	212.8	0.02	277.6	0.04	318.0	0.06	346.0	0.08	379.6	0.12	400.0	0.20
3	-4.0	Clay	400.0	0.20	158.8	0.01	212.8	0.02	277.6	0.04	318.0	0.06	346.0	0.08	379.6	0.12	400.0	0.20
4	-9.0	Clay	283.3	0.20	112.5	0.01	150.7	0.02	196.6	0.04	225.3	0.06	245.1	0.08	268.9	0.12	283.3	0.20
5	-13.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
6	-17.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
7	-21.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
8	-25.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
9	-30.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
10	-35.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
11	-40.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
12	-45.0	Clay	429.7	0.20	170.6	0.01	228.6	0.02	298.2	0.04	341.6	0.06	371.7	0.08	407.8	0.12	429.7	0.20
13	-48.0	Sand	720.3	0.20	286.0	0.01	383.2	0.02	499.9	0.04	572.7	0.06	623.1	0.08	683.6	0.12	720.3	0.20
14	-52.0	Sand	779.5	0.20	309.5	0.01	414.7	0.02	541.0	0.04	619.7	0.06	674.3	0.08	739.7	0.12	779.5	0.20
15	-56.0	Sand	842.6	0.20	334.5	0.01	448.3	0.02	584.8	0.04	669.9	0.06	728.9	0.08	799.6	0.12	842.6	0.20

q_{max}	u_c	$_{q1}$	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
341.7	2.00	153.8	0.20	215.3	0.50	270.0	1.00	341.7	2.00

TABLE B-52: TRESTLE BENTS W15~17 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	6.0	Clay	400.0	0.20	158.8	0.01	212.8	0.02	277.6	0.04	318.0	0.06	346.0	0.08	379.6	0.12	400.0	0.20
2	2.0	Clay	400.0	0.20	158.8	0.01	212.8	0.02	277.6	0.04	318.0	0.06	346.0	0.08	379.6	0.12	400.0	0.20
3	-2.0	Clay	400.0	0.20	158.8	0.01	212.8	0.02	277.6	0.04	318.0	0.06	346.0	0.08	379.6	0.12	400.0	0.20
4	-6.0	Clay	283.3	0.20	112.5	0.01	150.7	0.02	196.6	0.04	225.3	0.06	245.1	0.08	268.9	0.12	283.3	0.20
5	-11.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
6	-16.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
7	-21.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
8	-26.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
9	-31.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
10	-36.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
11	-41.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
12	-46.0	Clay	434.7	0.20	172.6	0.01	231.2	0.02	301.7	0.04	345.6	0.06	376.0	0.08	412.5	0.12	434.7	0.20
13	-50.0	Sand	734.2	0.20	291.5	0.01	390.6	0.02	509.6	0.04	583.7	0.06	635.1	0.08	696.8	0.12	734.2	0.20
14	-54.0	Sand	797.4	0.20	316.6	0.01	424.2	0.02	553.4	0.04	633.9	0.06	689.7	0.08	756.7	0.12	797.4	0.20
15	-58.0	Sand	860.5	0.20	341.6	0.01	457.8	0.02	597.2	0.04	684.1	0.06	744.3	0.08	816.6	0.12	860.5	0.20

q_{max}	u_c	$_{q1}$	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
349.0	2.00	157.0	0.20	219.9	0.50	275.7	1.00	349.0	2.00

TABLE B-53: TRESTLE BENT W18 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	6.0	Clay	400.0	0.20	158.8	0.01	212.8	0.02	277.6	0.04	318.0	0.06	346.0	0.08	379.6	0.12	400.0	0.20
2	3.0	Clay	400.0	0.20	158.8	0.01	212.8	0.02	277.6	0.04	318.0	0.06	346.0	0.08	379.6	0.12	400.0	0.20
3	-1.0	Clay	400.0	0.20	158.8	0.01	212.8	0.02	277.6	0.04	318.0	0.06	346.0	0.08	379.6	0.12	400.0	0.20
4	-5.0	Clay	283.3	0.20	112.5	0.01	150.7	0.02	196.6	0.04	225.3	0.06	245.1	0.08	268.9	0.12	283.3	0.20
5	-9.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
6	-13.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
7	-18.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
8	-23.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
9	-28.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
10	-33.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
11	-38.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
12	-43.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
13	-48.0	Clay	447.5	0.20	177.7	0.01	238.1	0.02	310.6	0.04	355.8	0.06	387.1	0.08	424.7	0.12	447.5	0.20
14	-53.0	Sand	767.9	0.20	304.8	0.01	408.5	0.02	532.9	0.04	610.5	0.06	664.2	0.08	728.7	0.12	767.9	0.20
15	-58.0	Sand	846.8	0.20	336.2	0.01	450.5	0.02	587.7	0.04	673.2	0.06	732.5	0.08	803.6	0.12	846.8	0.20
16	-63.0	Sand	925.7	0.20	367.5	0.01	492.5	0.02	642.4	0.04	735.9	0.06	800.7	0.08	878.5	0.12	925.7	0.20

q_{max}	u_c	$_{q1}$	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
375.4	2.00	168.9	0.20	236.5	0.50	296.6	1.00	375.4	2.00

TABLE B-54: TRESTLE BENT W19 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	6.0	Clay	400.0	0.20	158.8	0.01	212.8	0.02	277.6	0.04	318.0	0.06	346.0	0.08	379.6	0.12	400.0	0.20
2	1.0	Clay	400.0	0.20	158.8	0.01	212.8	0.02	277.6	0.04	318.0	0.06	346.0	0.08	379.6	0.12	400.0	0.20
3	-4.0	Clay	283.3	0.20	112.5	0.01	150.7	0.02	196.6	0.04	225.3	0.06	245.1	0.08	268.9	0.12	283.3	0.20
4	-8.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
5	-12.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
6	-17.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
7	-22.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
8	-27.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
9	-32.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
10	-37.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
11	-42.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
12	-47.0	Clay	437.1	0.20	173.5	0.01	232.5	0.02	303.3	0.04	347.5	0.06	378.1	0.08	414.8	0.12	437.1	0.20
13	-51.0	Sand	739.1	0.20	293.4	0.01	393.2	0.02	512.9	0.04	587.6	0.06	639.3	0.08	701.4	0.12	739.1	0.20
14	-55.0	Sand	806.1	0.20	320.0	0.01	428.9	0.02	559.5	0.04	640.9	0.06	697.3	0.08	765.0	0.12	806.1	0.20
15	-60.0	Sand	881.1	0.20	349.8	0.01	468.7	0.02	611.5	0.04	700.5	0.06	762.1	0.08	836.2	0.12	881.1	0.20
16	-65.0	Sand	960.0	0.20	381.1	0.01	510.7	0.02	666.2	0.04	763.2	0.06	830.4	0.08	911.0	0.12	960.0	0.20
17	-70.0	Sand	1038.9	0.20	412.4	0.01	552.7	0.02	721.0	0.04	825.9	0.06	898.6	0.08	985.9	0.12	1038.9	0.20

q_{max}	u_c	q_{1}	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
421.3	2.00	189.6	0.20	265.4	0.50	332.9	1.00	421.3	2.00

TABLE B-55: TRESTLE BENT W20 - *t-z* AND *q-u* CURVES

Node #	Elevation	Soil	t_{max}	z_c	t_1	z_1	t_2	z_2	t_3	z_3	t_4	z_4	t_5	z_5	t_6	z_6	t_7	z_7
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	6.0	Clay	400.0	0.20	158.8	0.01	212.8	0.02	277.6	0.04	318.0	0.06	346.0	0.08	379.6	0.12	400.0	0.20
2	1.0	Clay	400.0	0.20	158.8	0.01	212.8	0.02	277.6	0.04	318.0	0.06	346.0	0.08	379.6	0.12	400.0	0.20
3	-4.0	Clay	283.3	0.20	112.5	0.01	150.7	0.02	196.6	0.04	225.3	0.06	245.1	0.08	268.9	0.12	283.3	0.20
4	-8.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
5	-13.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
6	-18.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
7	-23.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
8	-28.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
9	-33.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
10	-38.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
11	-43.0	Clay	166.7	0.20	66.2	0.01	88.7	0.02	115.7	0.04	132.5	0.06	144.2	0.08	158.2	0.12	166.7	0.20
12	-48.0	Clay	446.2	0.20	177.1	0.01	237.4	0.02	309.6	0.04	354.7	0.06	385.9	0.08	423.4	0.12	446.2	0.20
13	-53.0	Sand	765.1	0.20	303.8	0.01	407.1	0.02	531.0	0.04	608.3	0.06	661.8	0.08	726.1	0.12	765.1	0.20
14	-58.0	Sand	844.0	0.20	335.1	0.01	449.0	0.02	585.8	0.04	671.0	0.06	730.1	0.08	801.0	0.12	844.0	0.20
15	-63.0	Sand	922.9	0.20	366.4	0.01	491.0	0.02	640.5	0.04	733.7	0.06	798.4	0.08	875.9	0.12	922.9	0.20

q_{max}	u_c	$_{q1}$	u_1	q_2	u_2	q_3	u_3	q_4	u_4
(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)	(kips)	(in)
374.3	2.00	168.4	0.20	235.8	0.50	295.7	1.00	374.3	2.00

10.0 APPENDIX C: Q-δ CURVES

FIGURE C-1: ABUTMENT 1 - Q-δ CURVES

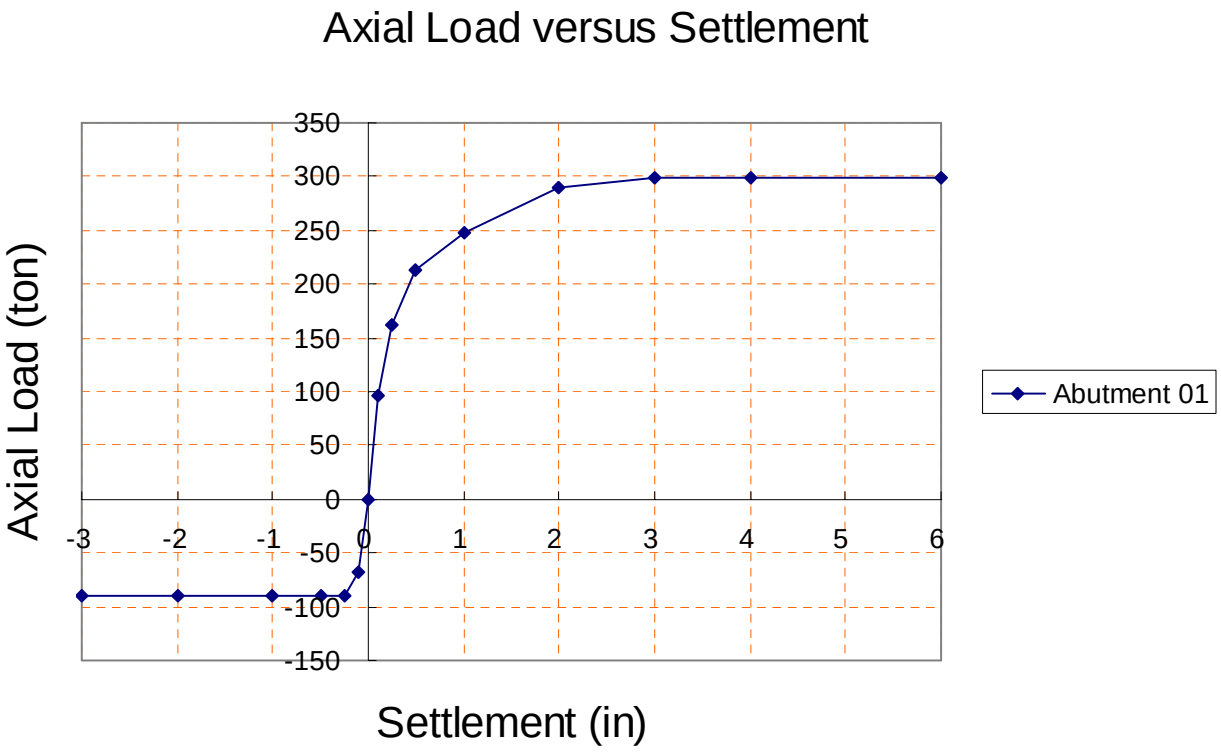


FIGURE C-2: PIER 2 - Q-δ CURVES

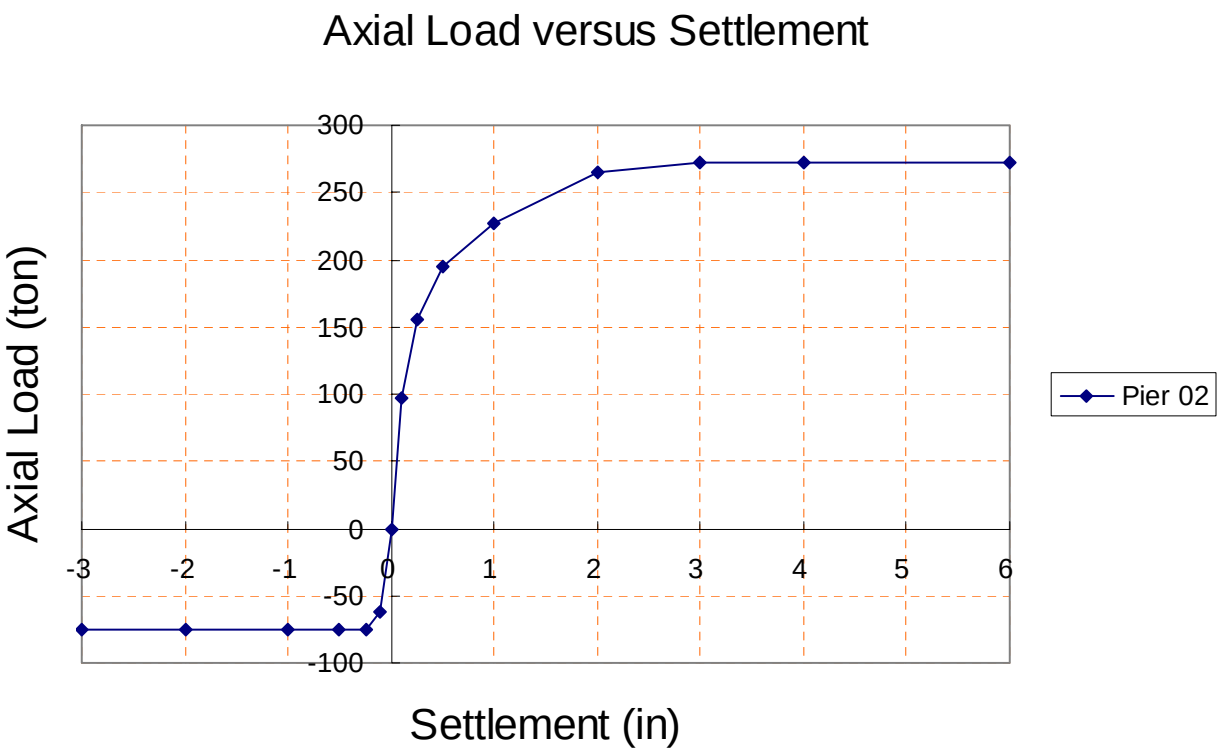


FIGURE C-3: PIER 3 - Q-δ CURVES

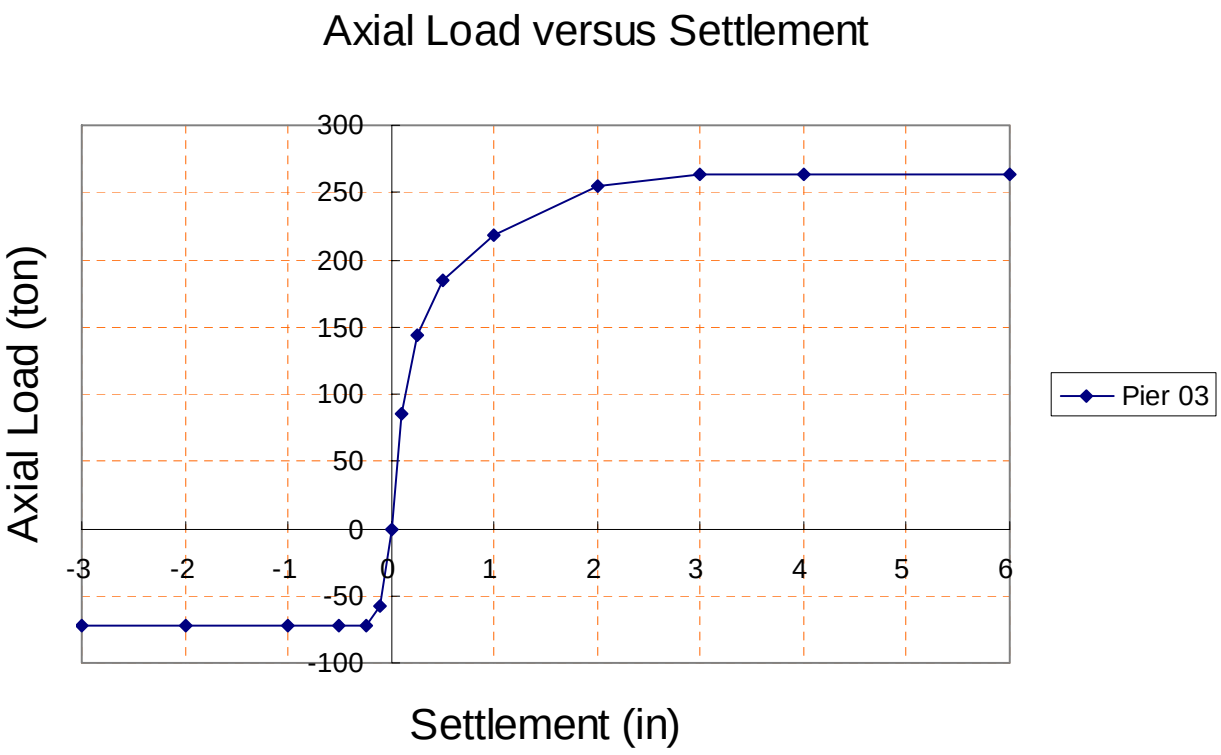


FIGURE C-4: PIER 4 - Q-δ CURVES

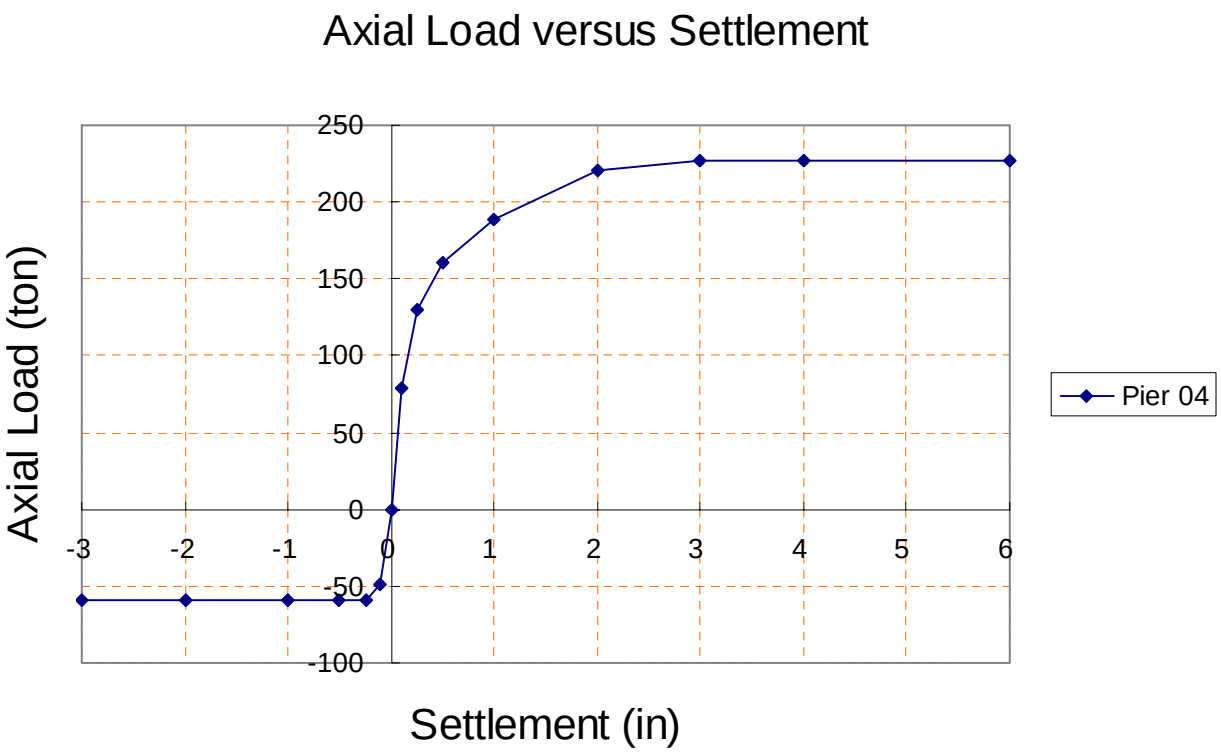


FIGURE C-5: PIER 5 - Q-δ CURVES

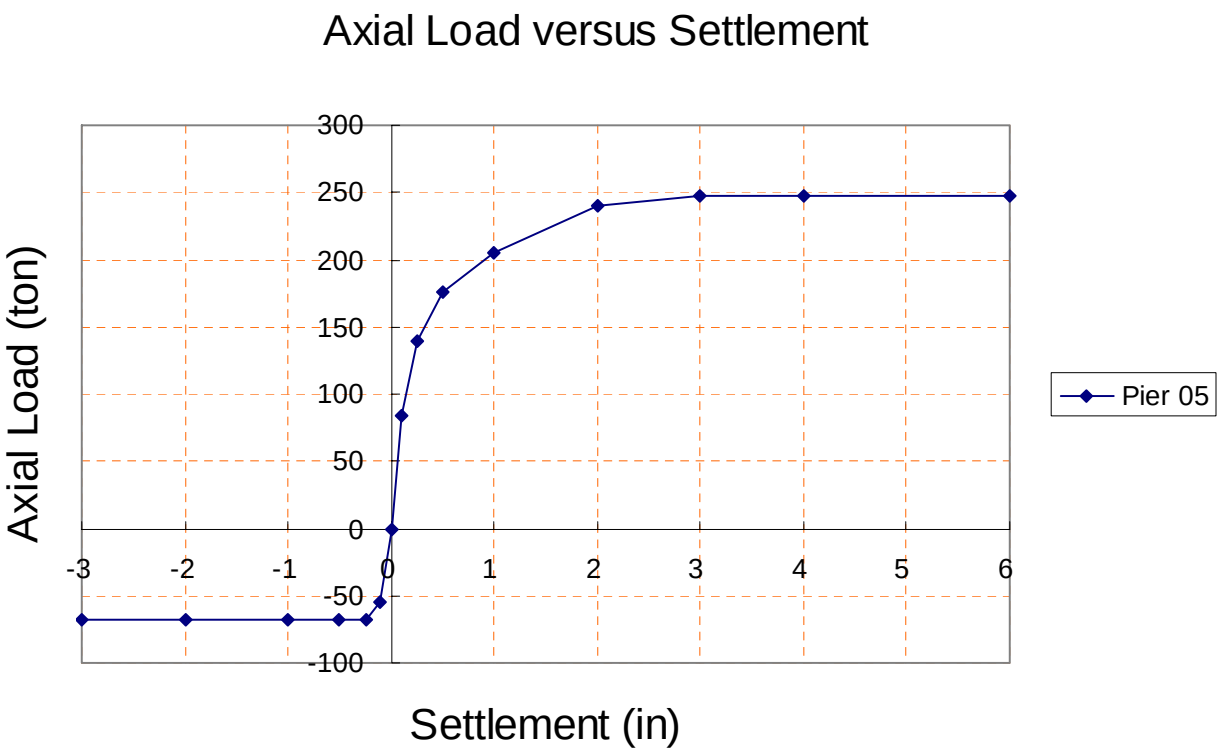


FIGURE C-6: PIER 6 - Q-δ CURVES

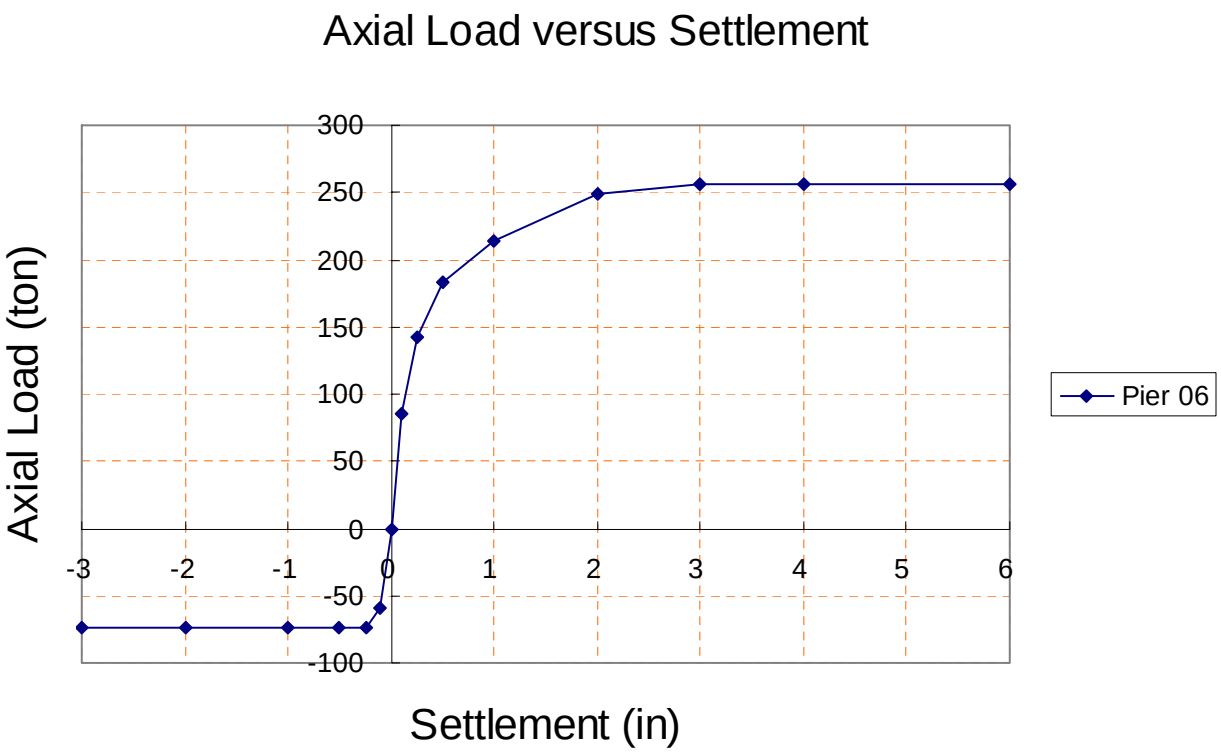


FIGURE C-7: PIER 7 - Q-δ CURVES

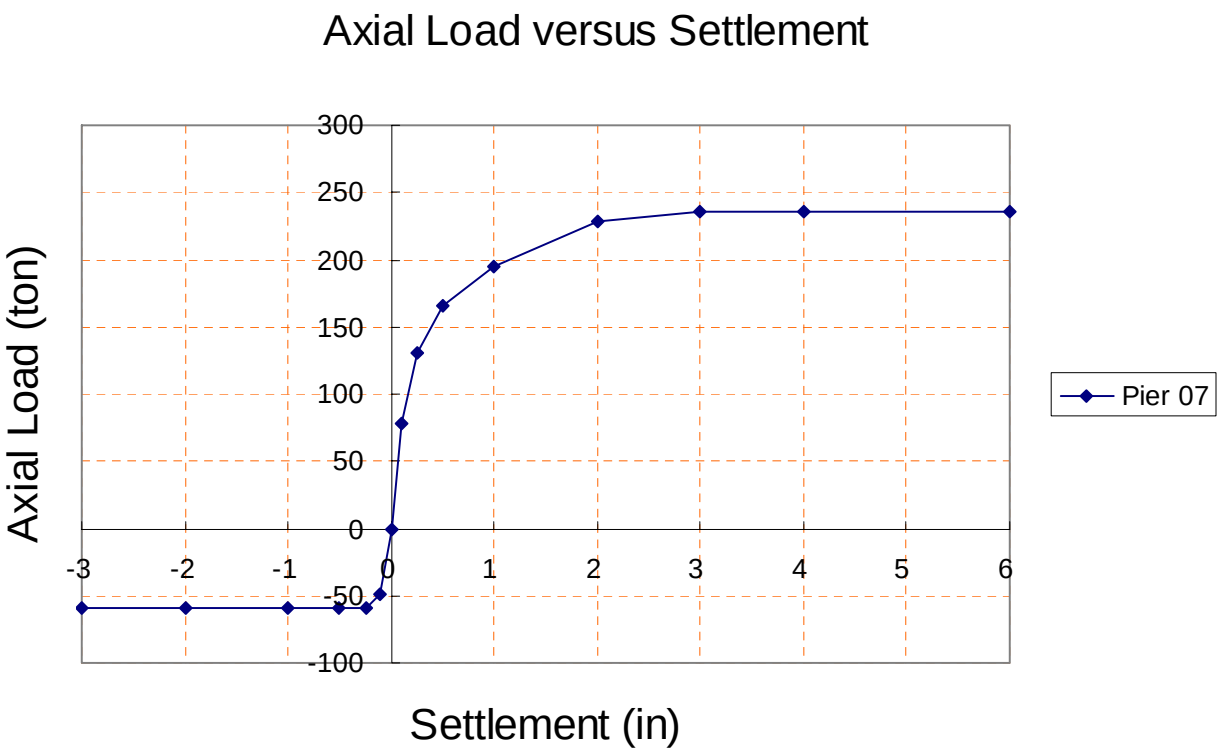


FIGURE C-8: PIER 8 - Q-δ CURVES

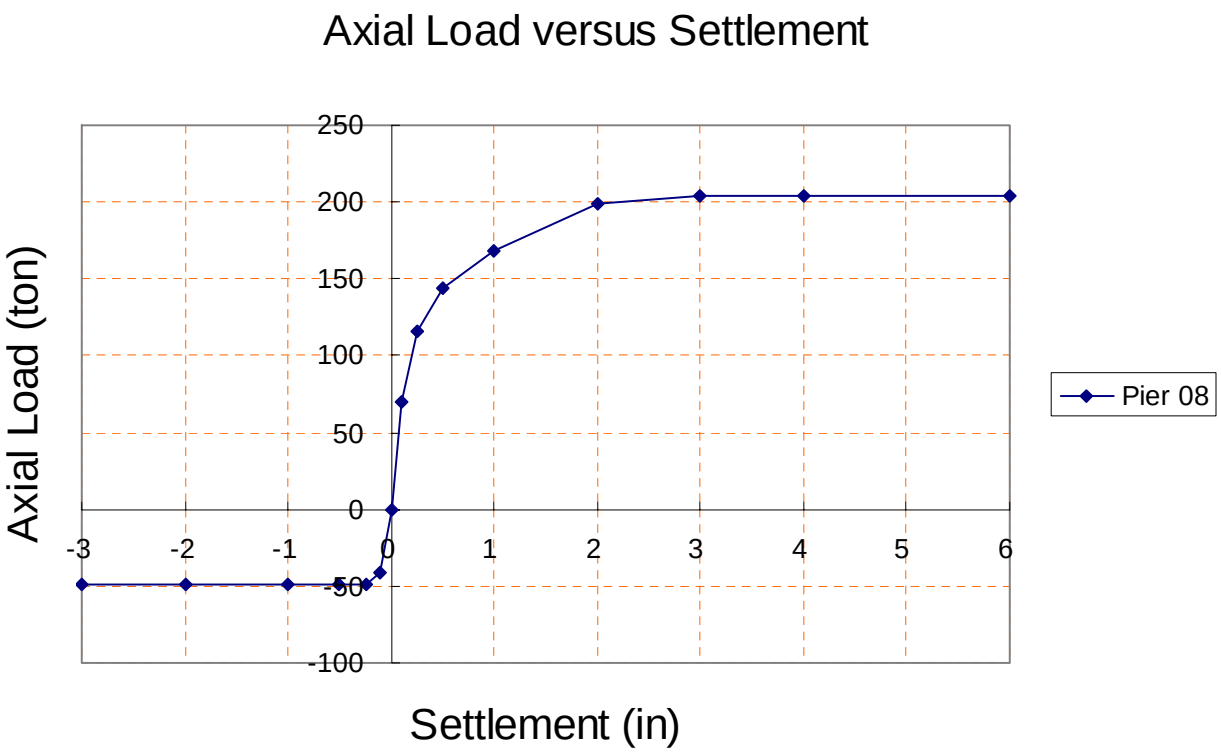


FIGURE C-9: PIER 9 - Q-δ CURVES

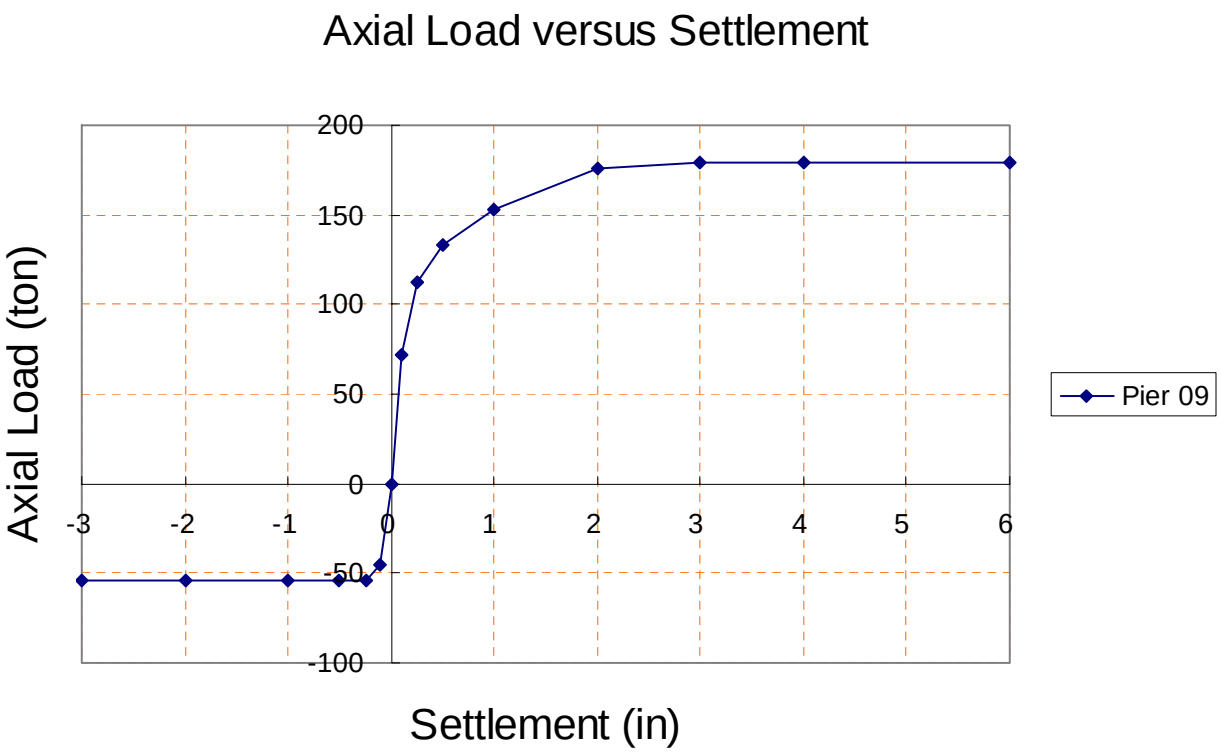


FIGURE C-10: PIER 10 - Q-δ CURVES

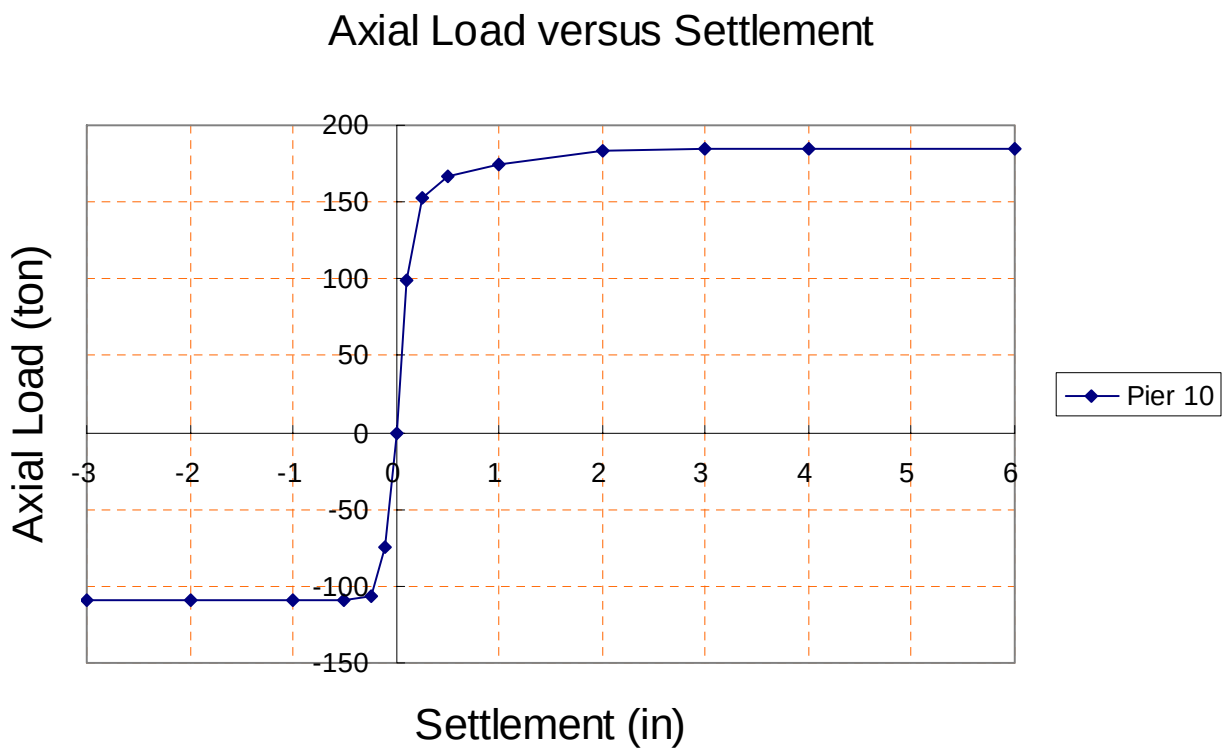


FIGURE C-11: PIER 11 - Q-δ CURVES

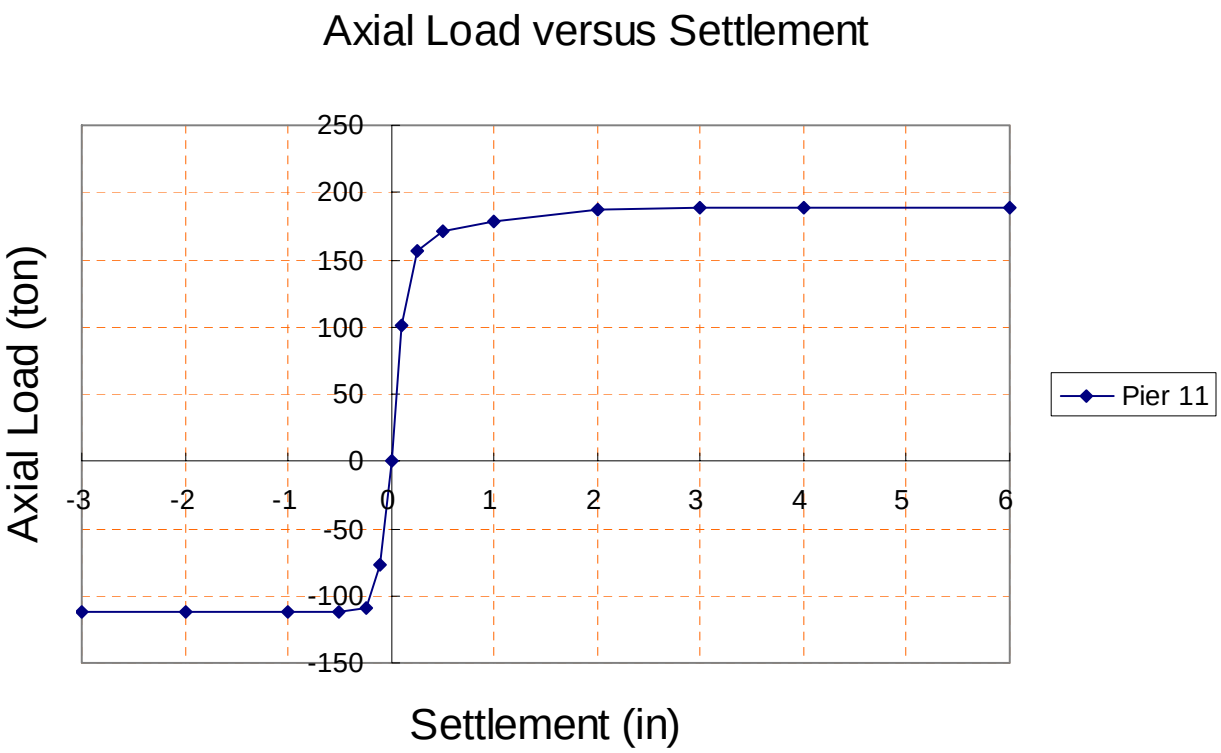


FIGURE C-12: PIER 12 - Q-δ CURVES

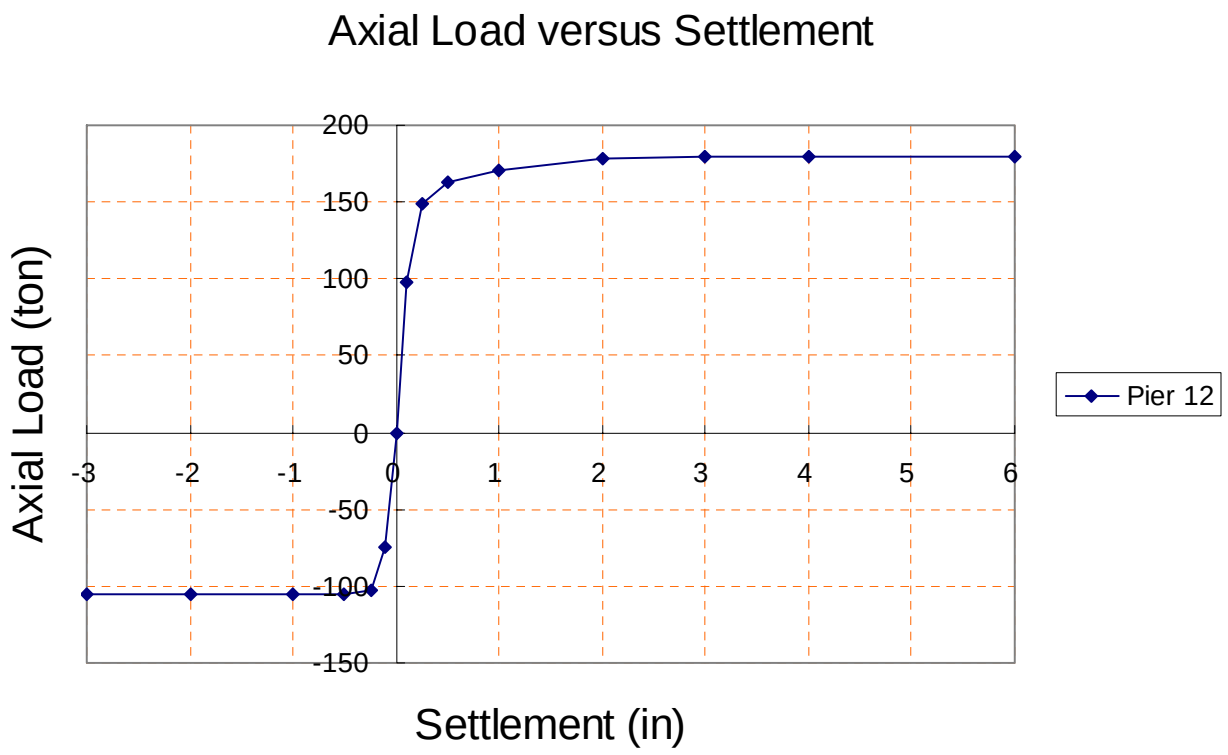


FIGURE C-13: PIER 13 - Q-δ CURVES

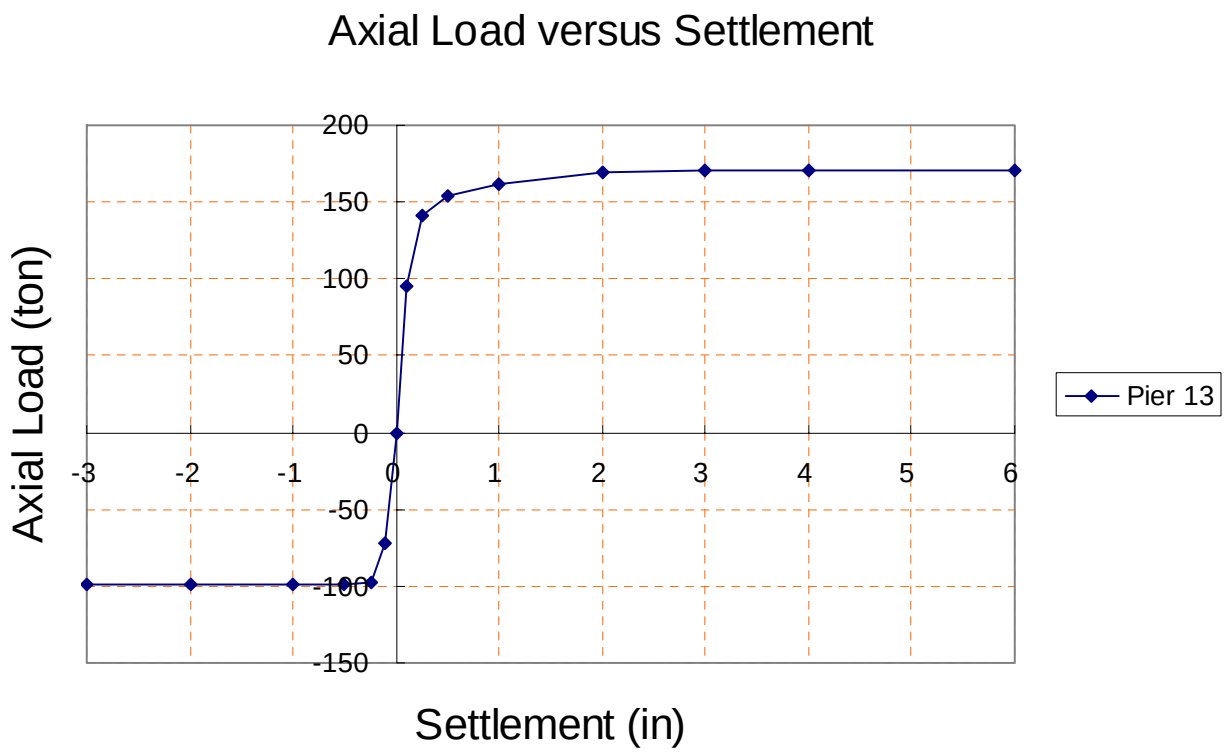


FIGURE C-14: PIER 14 - Q-δ CURVES

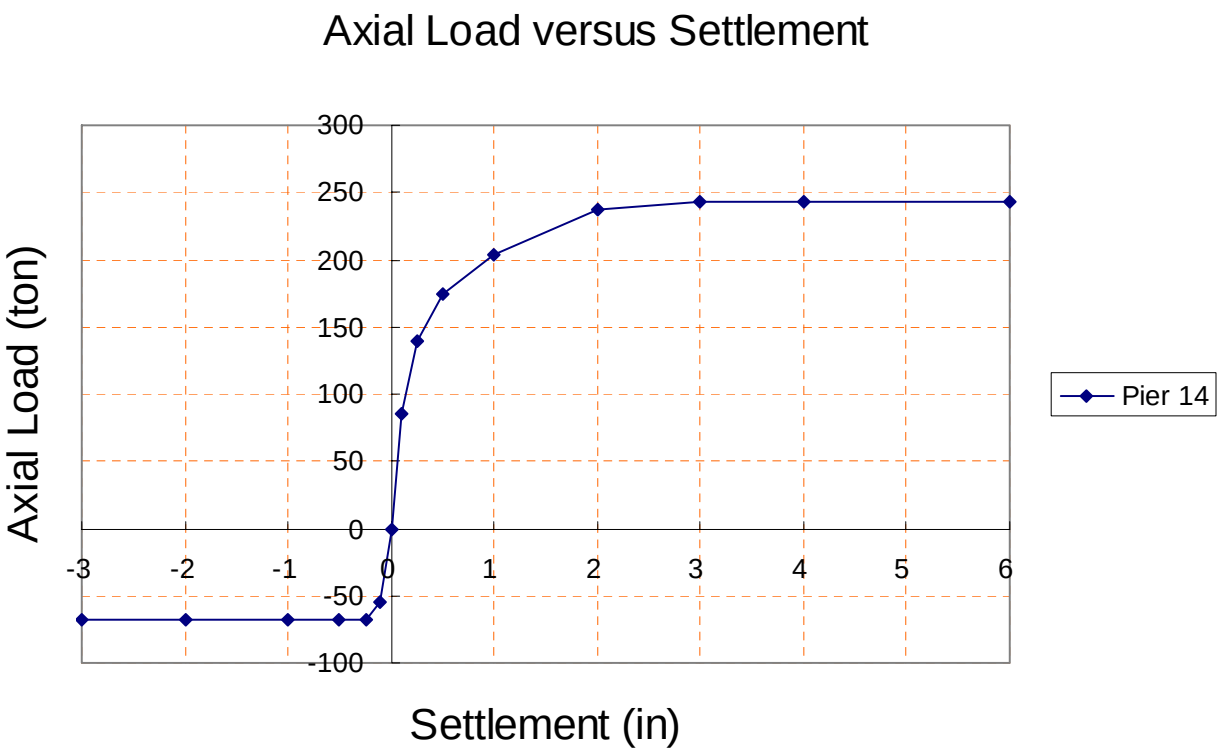


FIGURE C-15: PIER 15 - Q-δ CURVES

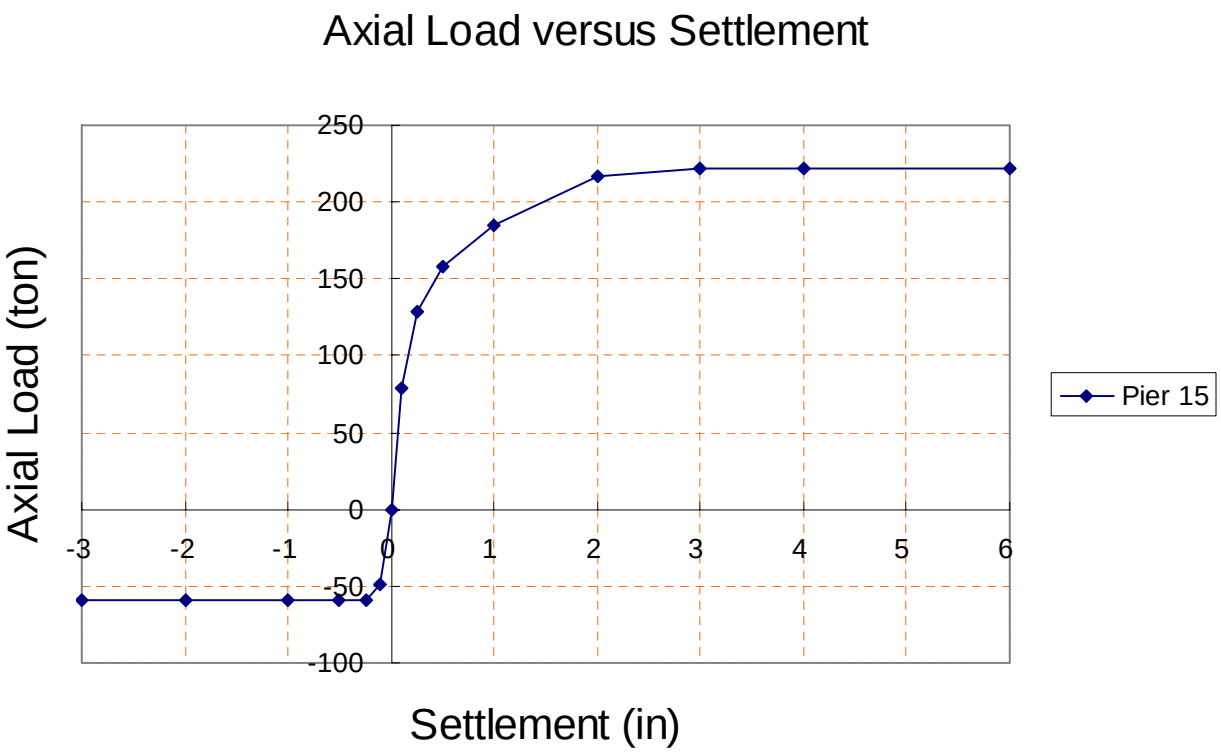


FIGURE C-16: PIER 16 - Q-δ CURVES

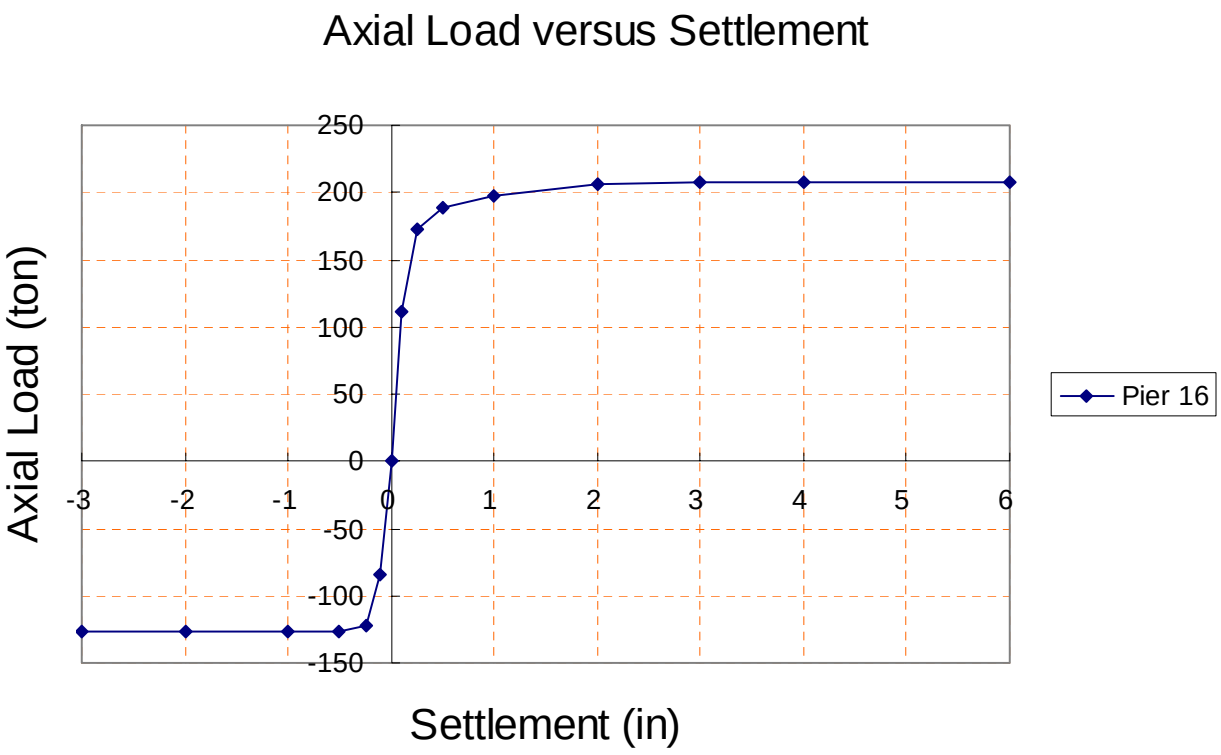


FIGURE C-17: PIER 17 - Q-δ CURVES

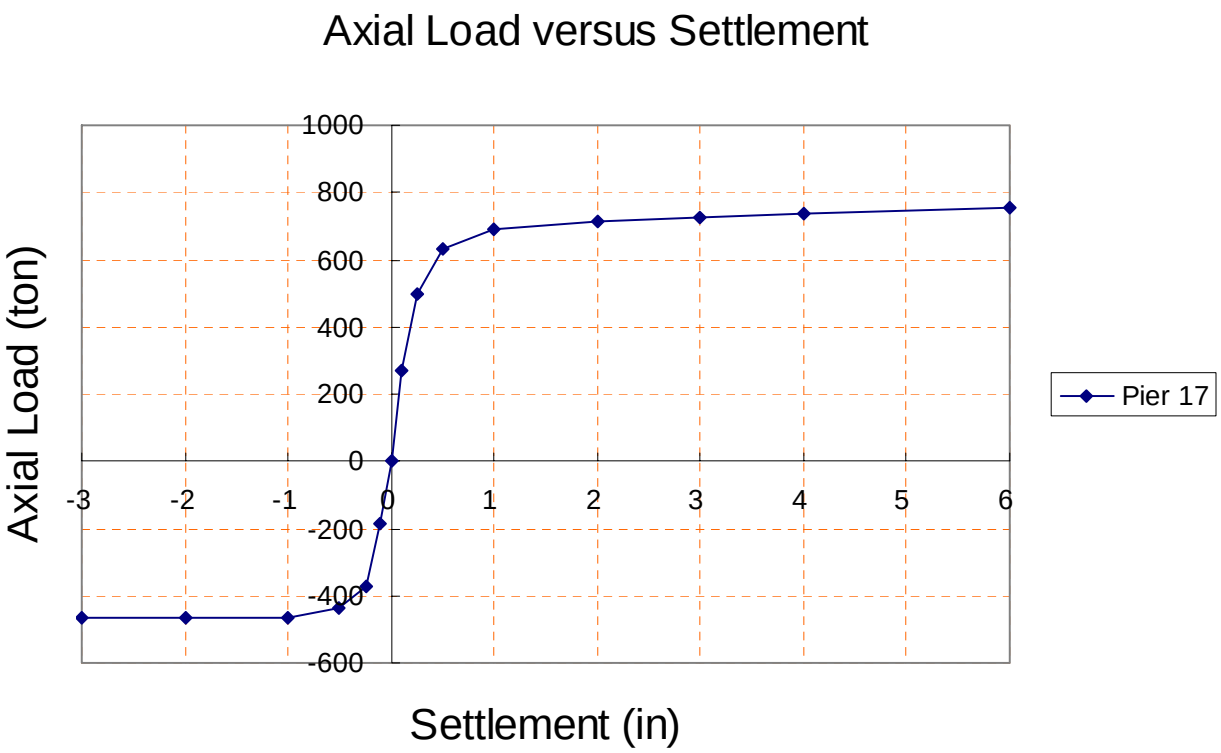


FIGURE C-18: PIER 18 - Q-δ CURVES

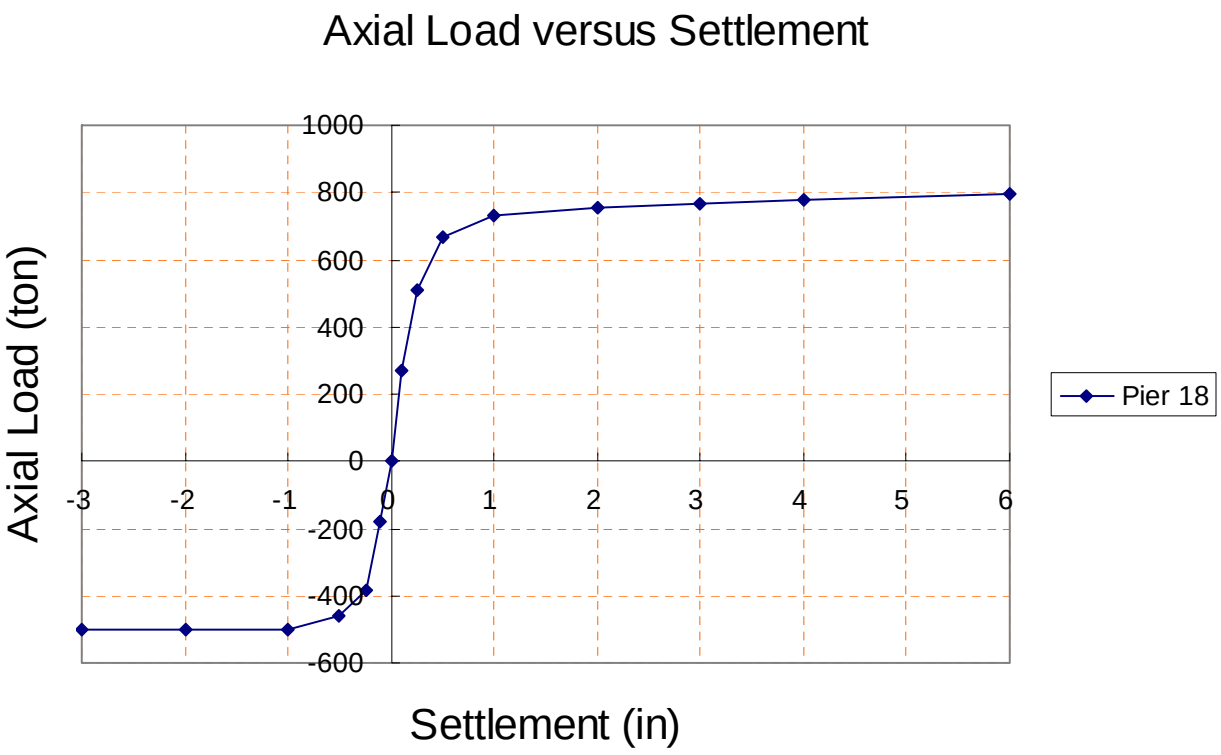


FIGURE C-19: PIER 19 - Q-δ CURVES

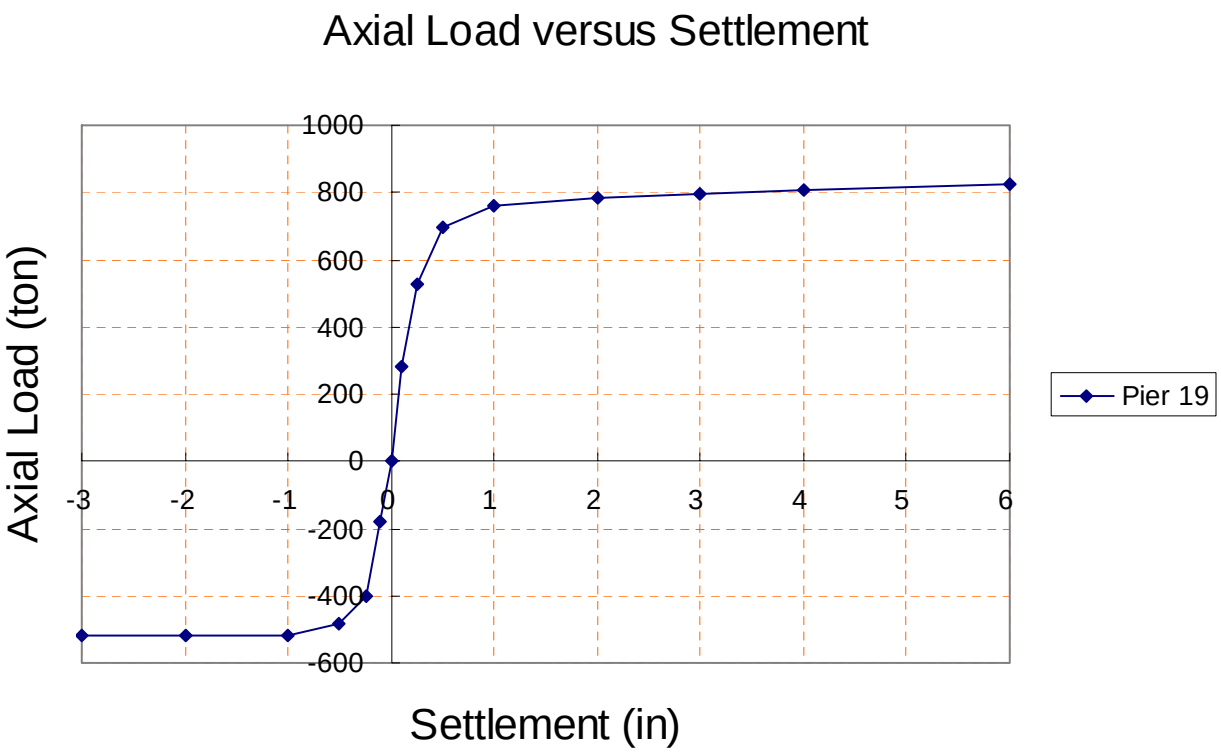


FIGURE C-20: PIER 20 - Q-δ CURVES

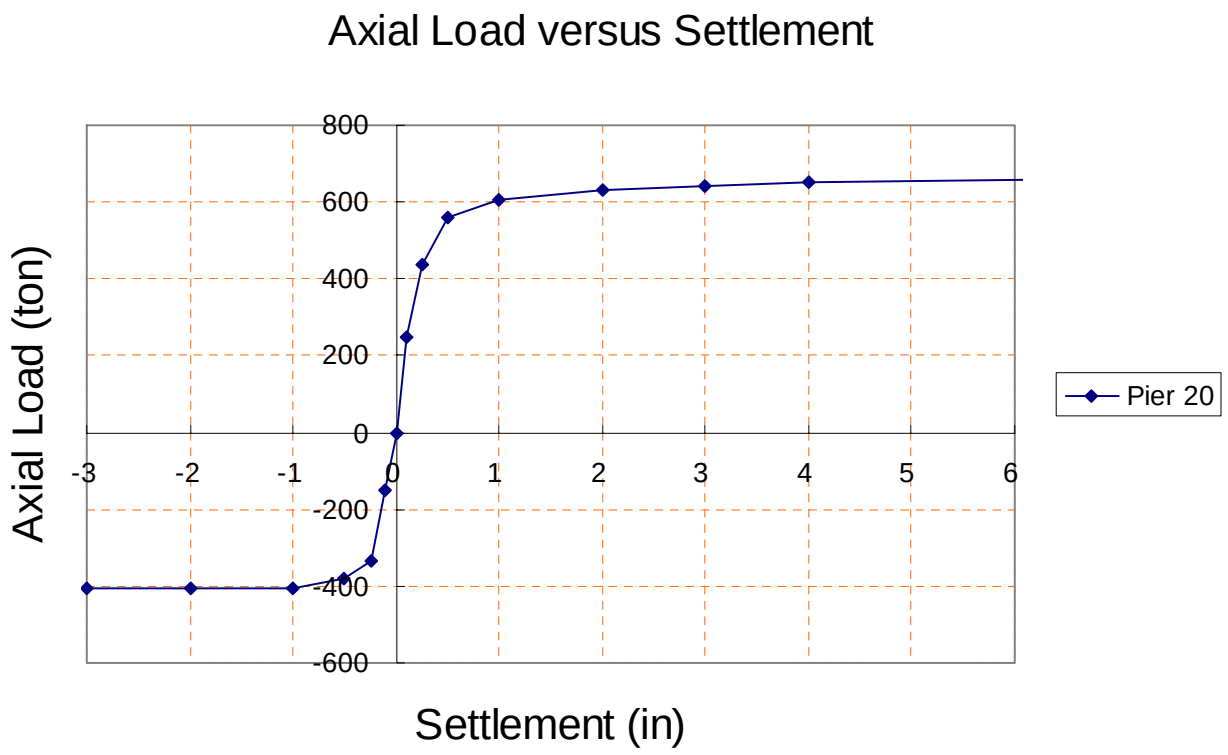


FIGURE C-21: PIER 21 - Q-δ CURVES

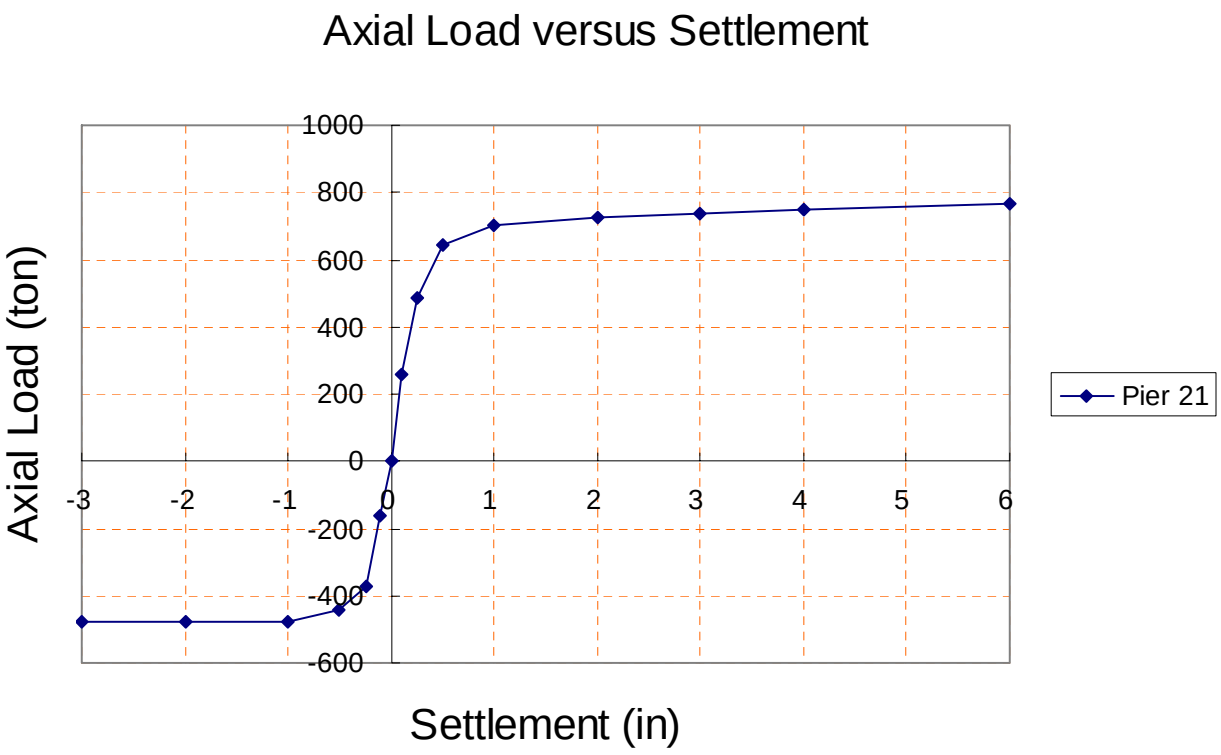


FIGURE C-22: PIER 22 - Q-δ CURVES

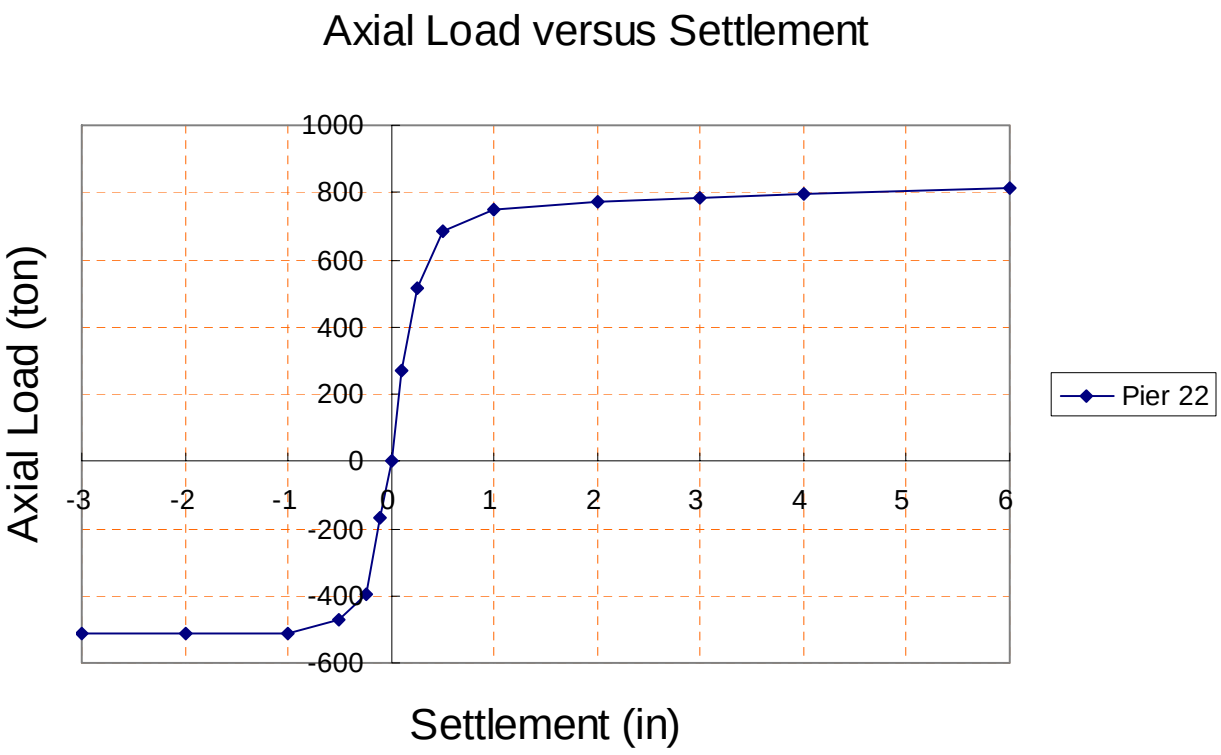


FIGURE C-23: PIER 23 - Q-δ CURVES

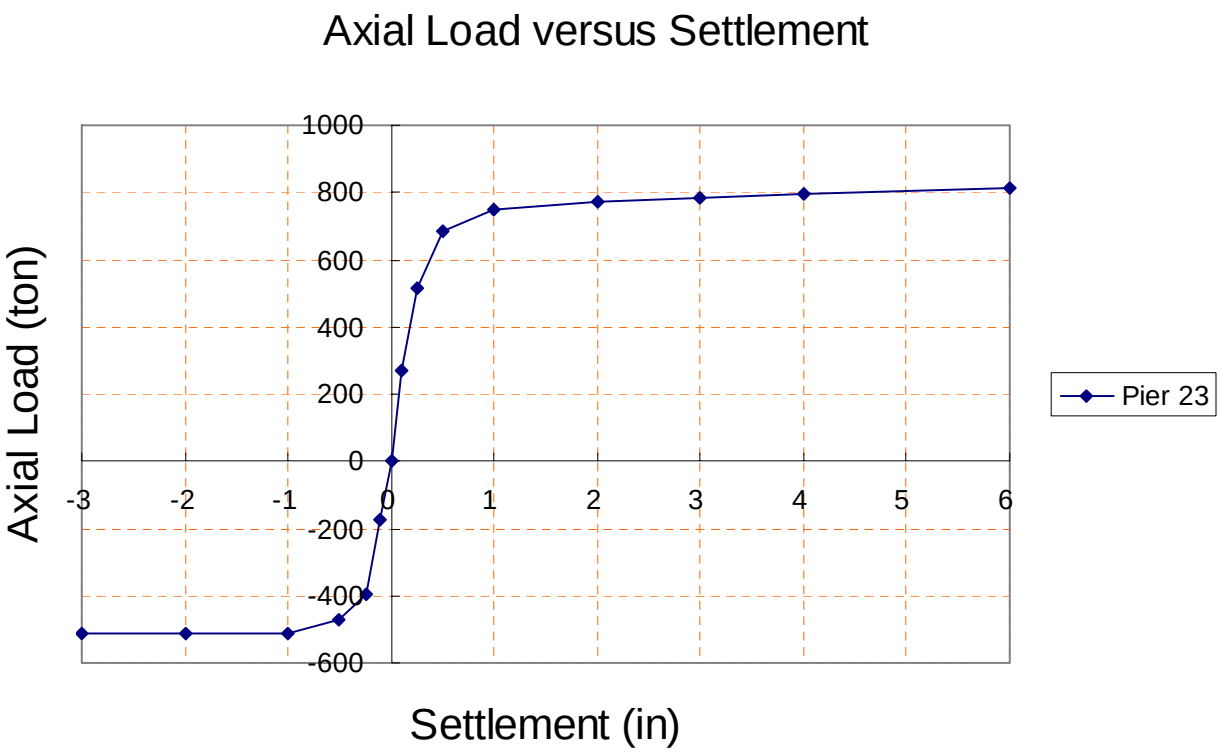


FIGURE C-24: PIER 24 - Q-δ CURVES

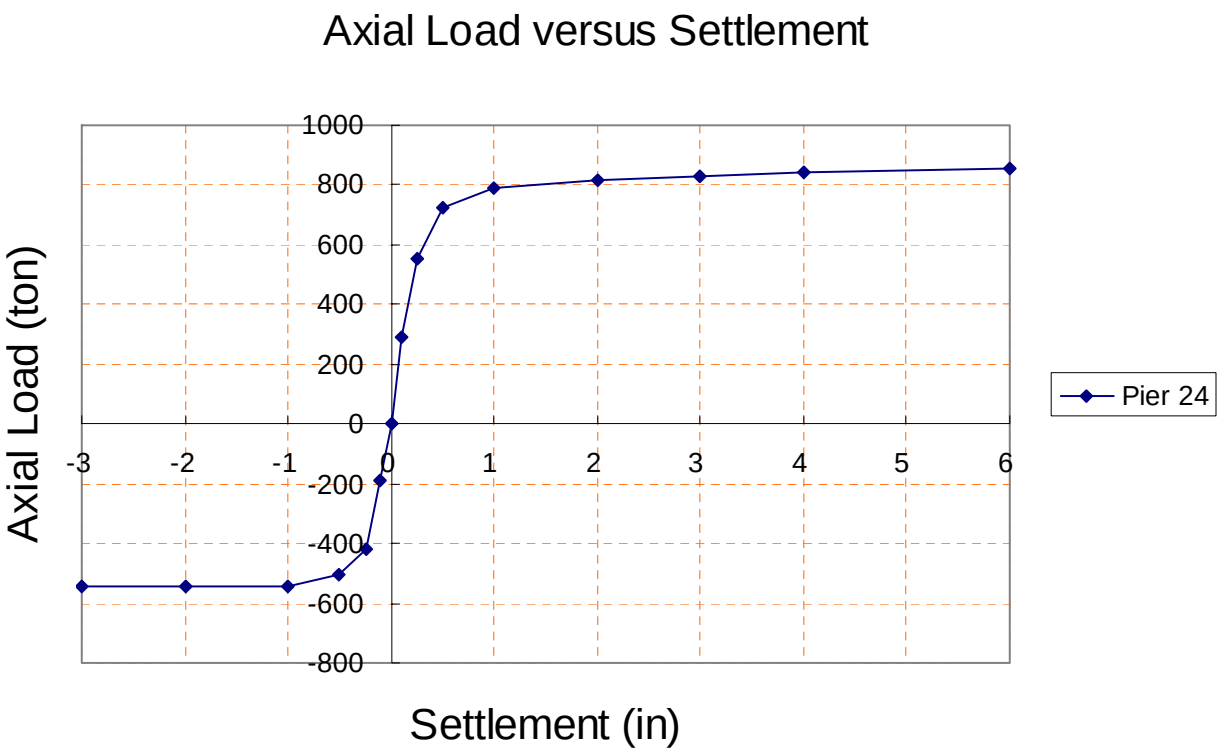


FIGURE C-25: PIER 25 - Q-δ CURVES

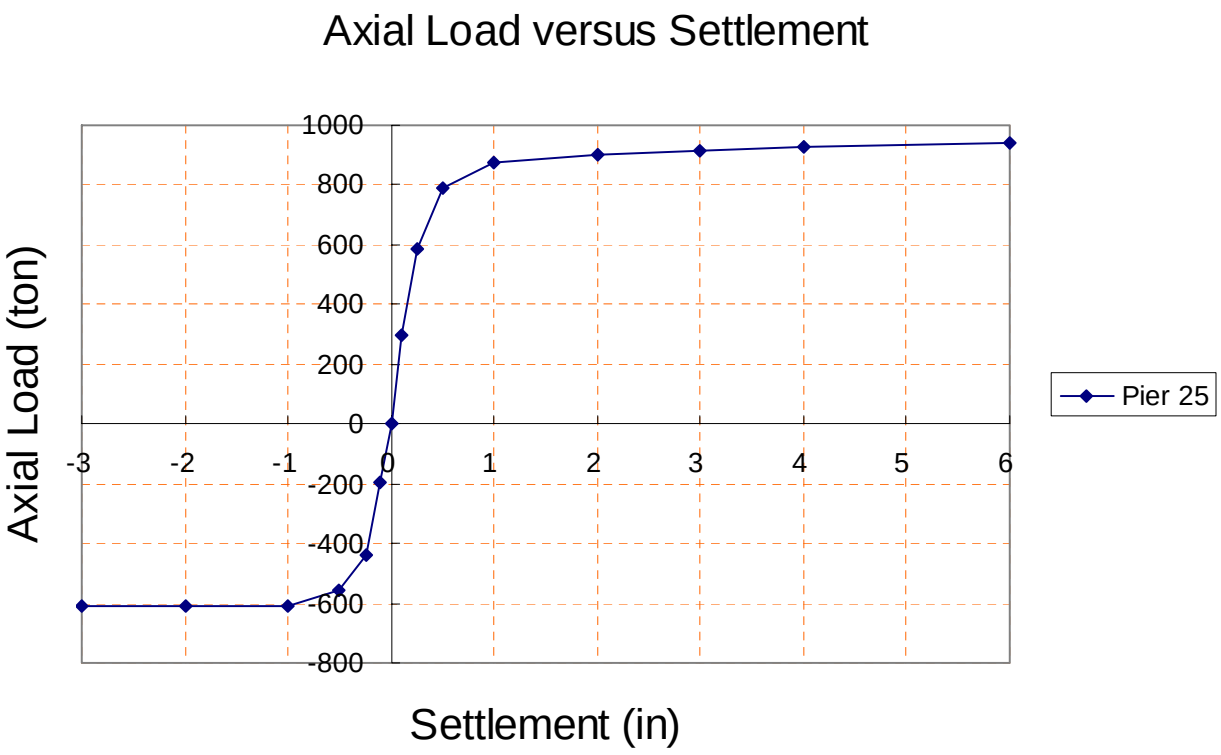


FIGURE C-26: PIER 26 - Q-δ CURVES

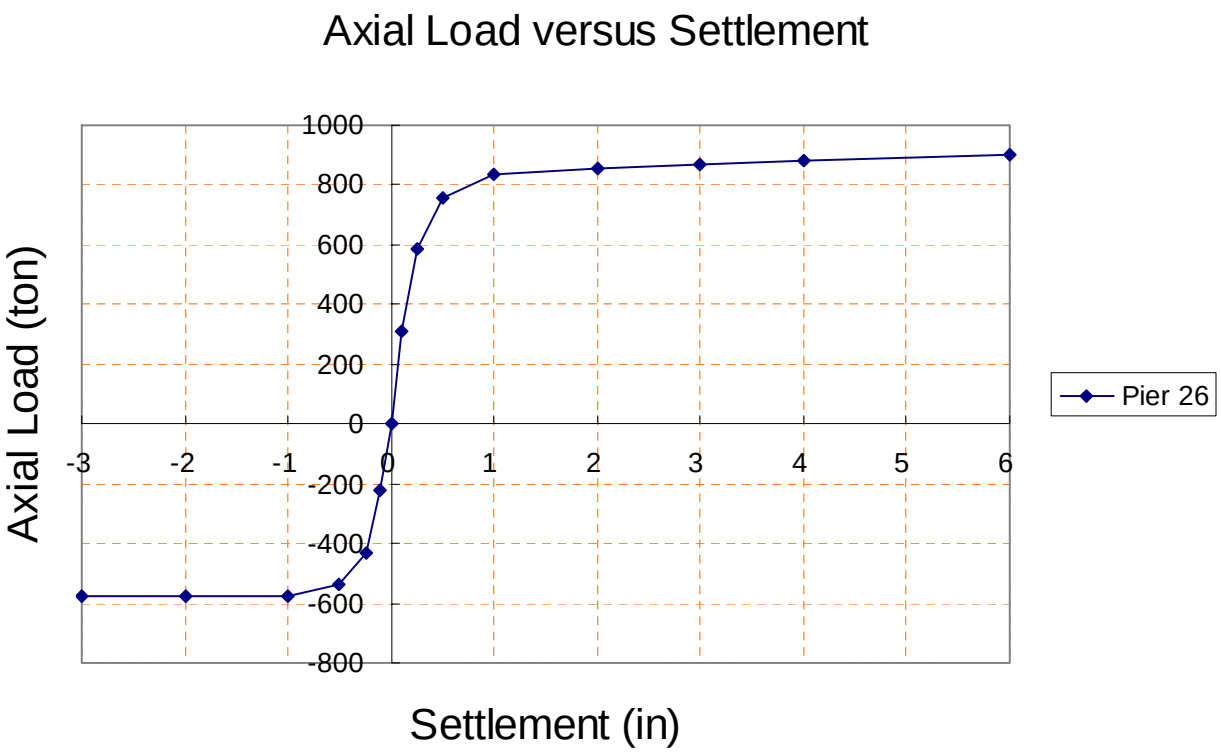


FIGURE C-27: PIER 27 - Q-δ CURVES

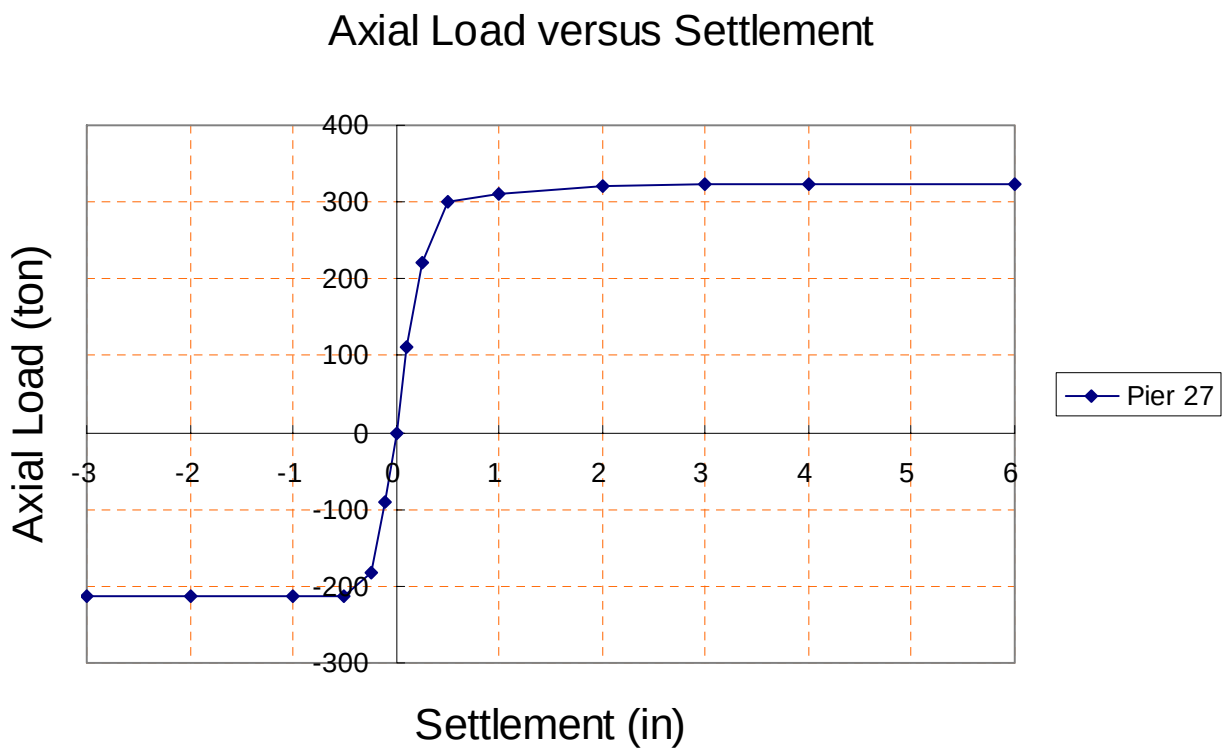


FIGURE C-28: PIER 28 - Q-δ CURVES

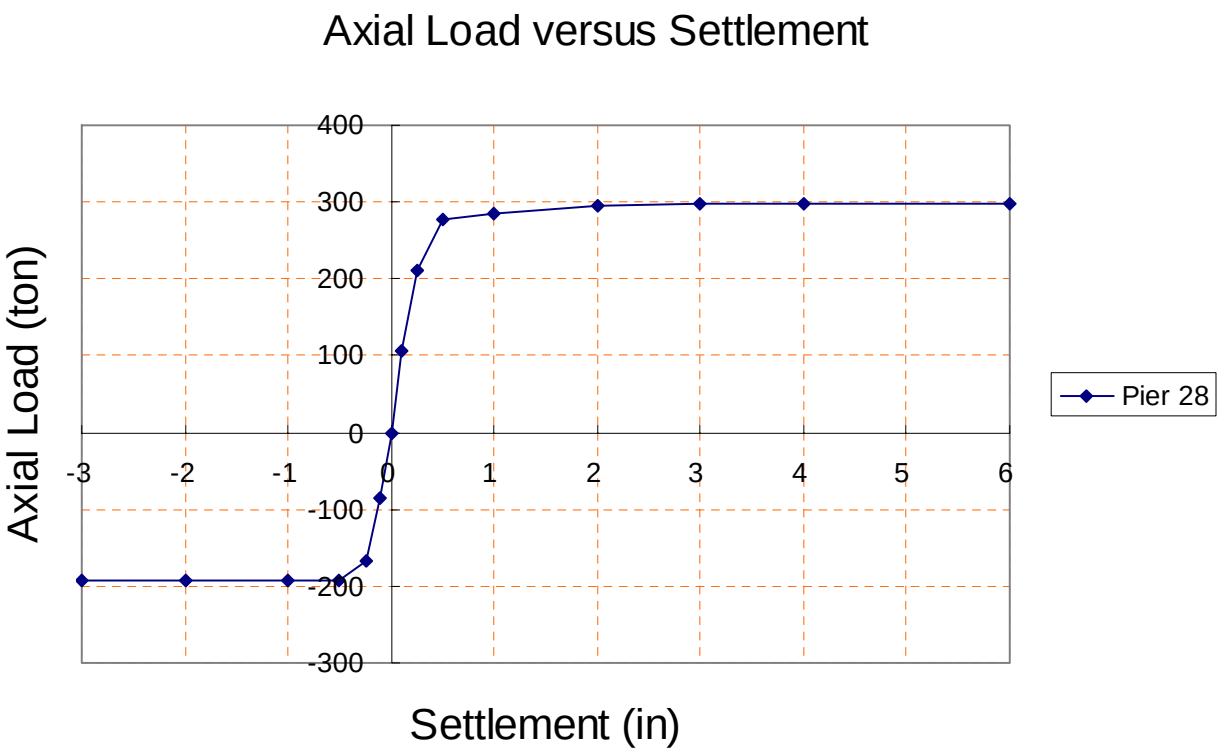


FIGURE C-29: PIER 29 - Q-δ CURVES

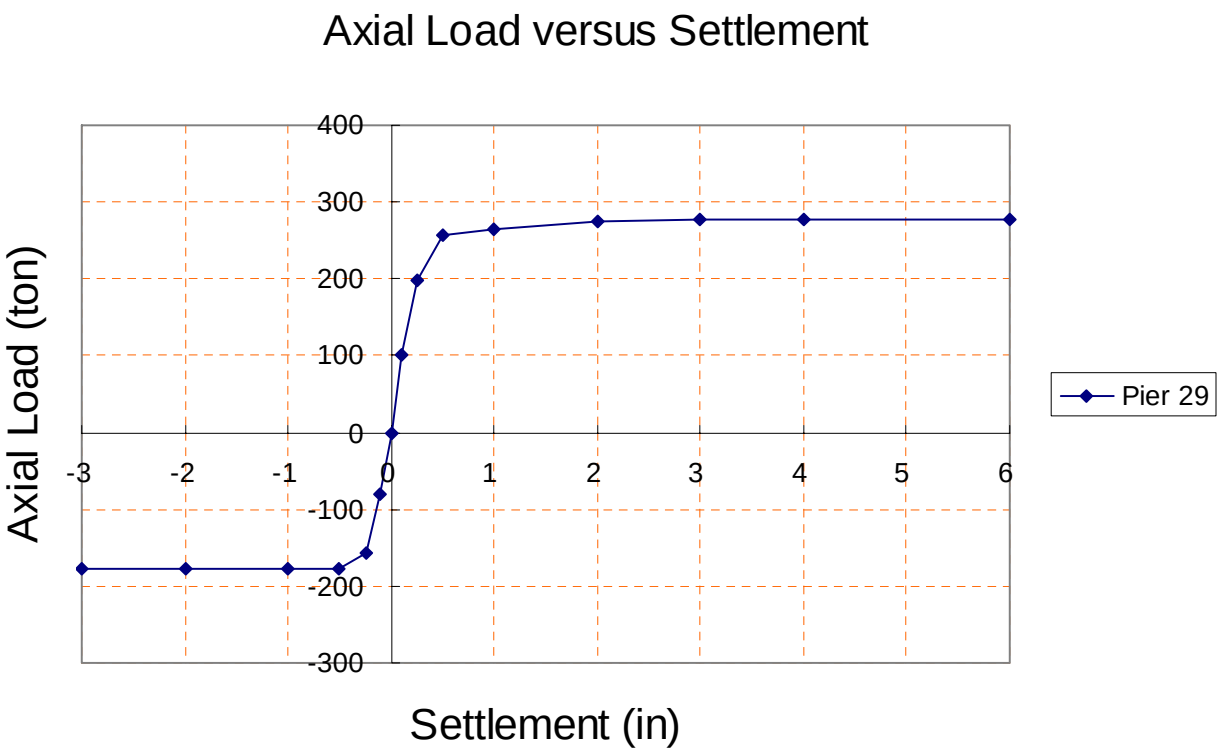


FIGURE C-30: PIER 30 - Q-δ CURVES

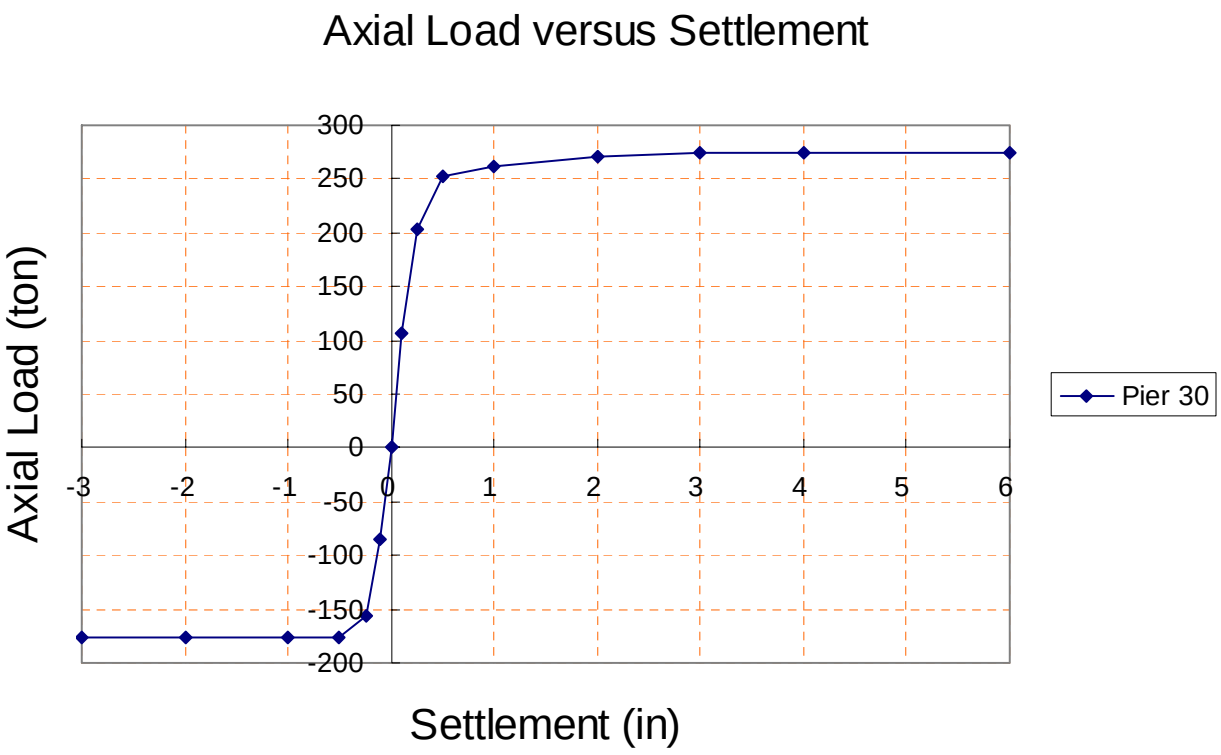


FIGURE C-31: PIER 31 - Q-δ CURVES

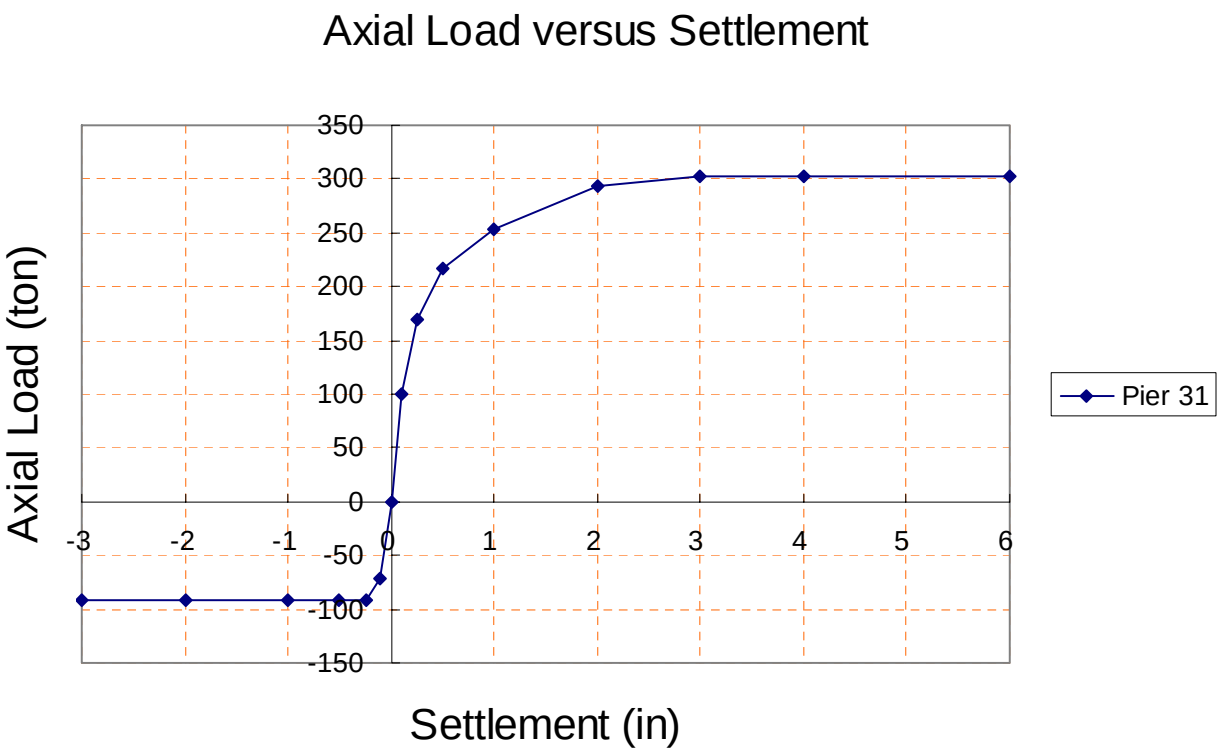


FIGURE C-32: PIER 32 - Q-δ CURVES

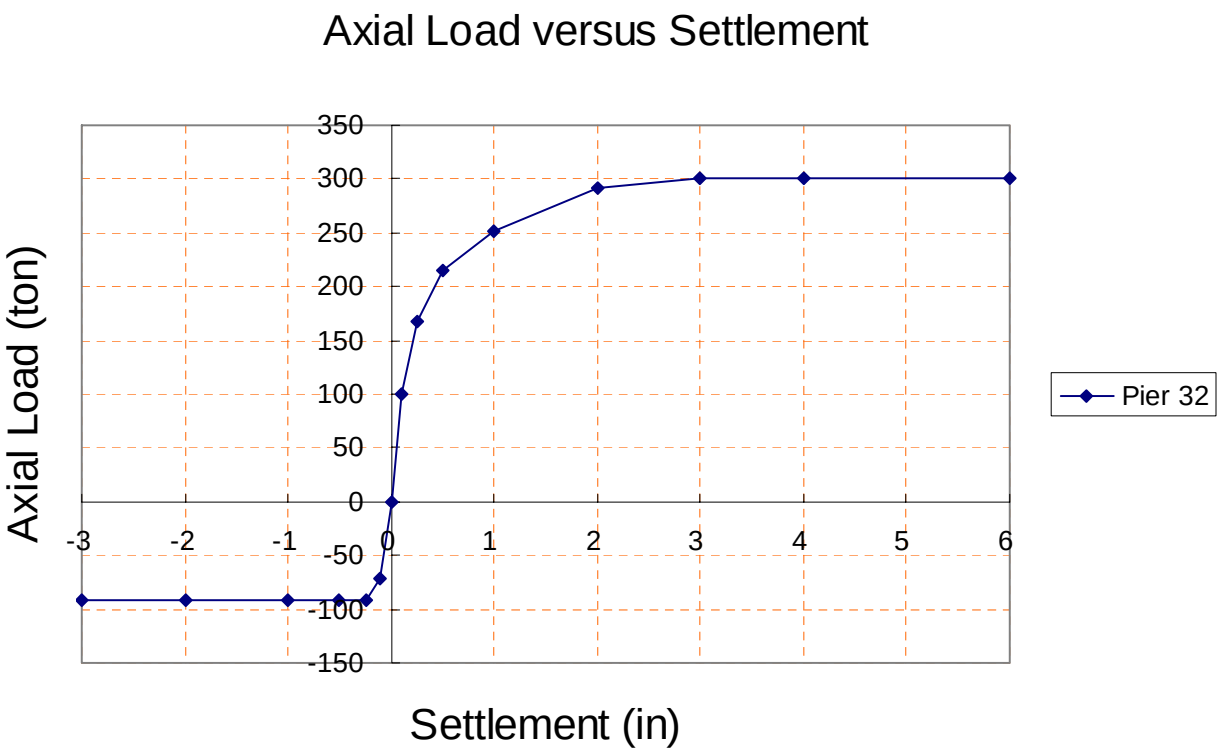


FIGURE C-33: PIER 33 - Q-δ CURVES

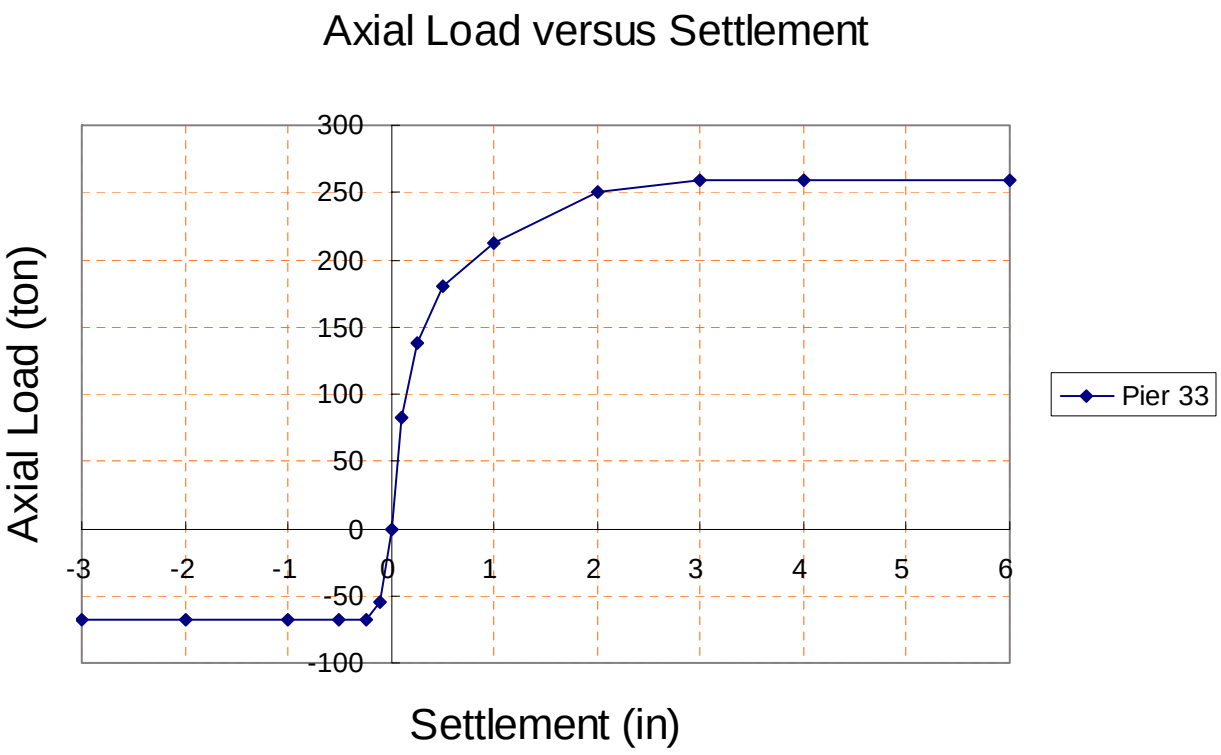


FIGURE C-34: PIER 34 - Q-δ CURVES

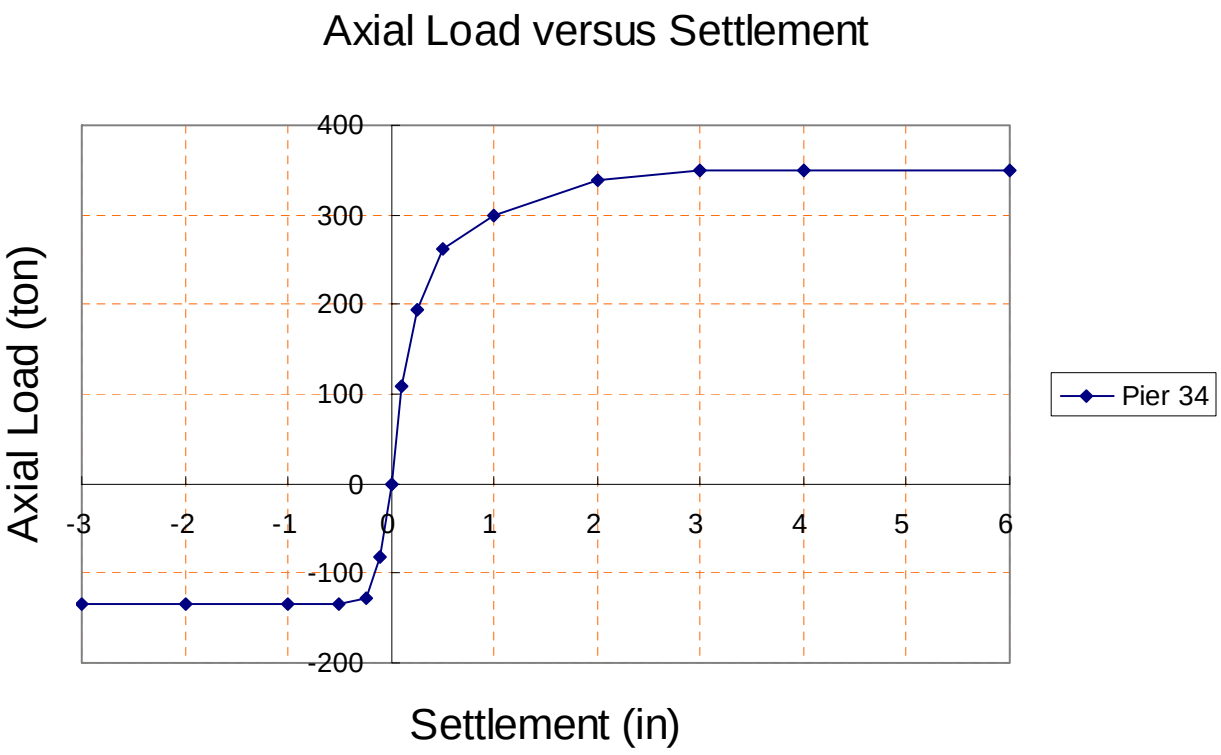


FIGURE C-35: PIER 35 - Q-δ CURVES

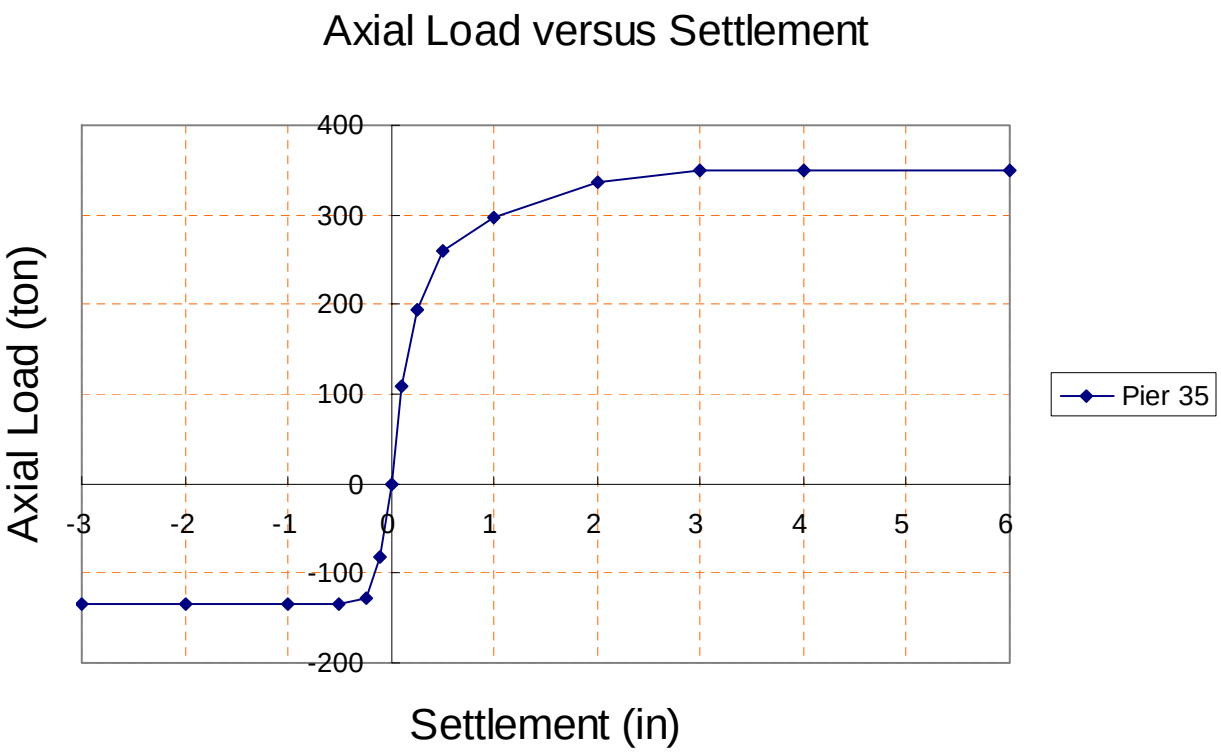


FIGURE C-36: PIER 36 - Q-δ CURVES

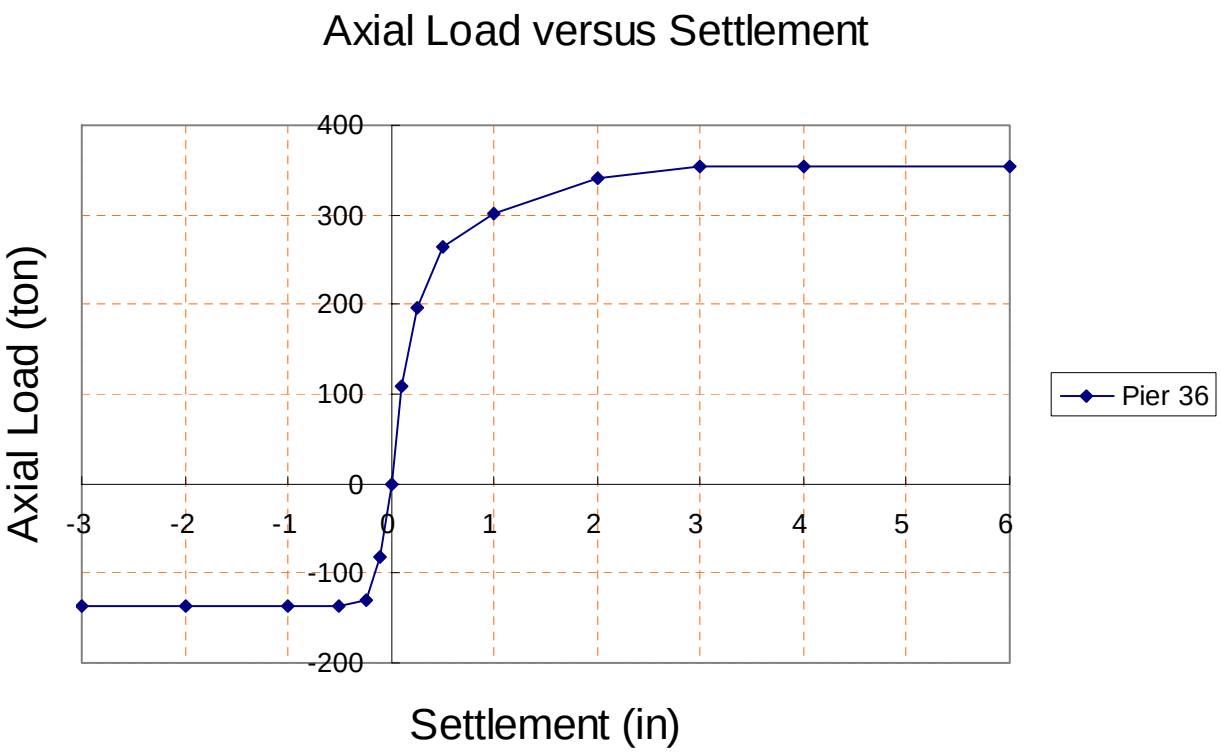


FIGURE C-37: PIER 37 - Q-δ CURVES

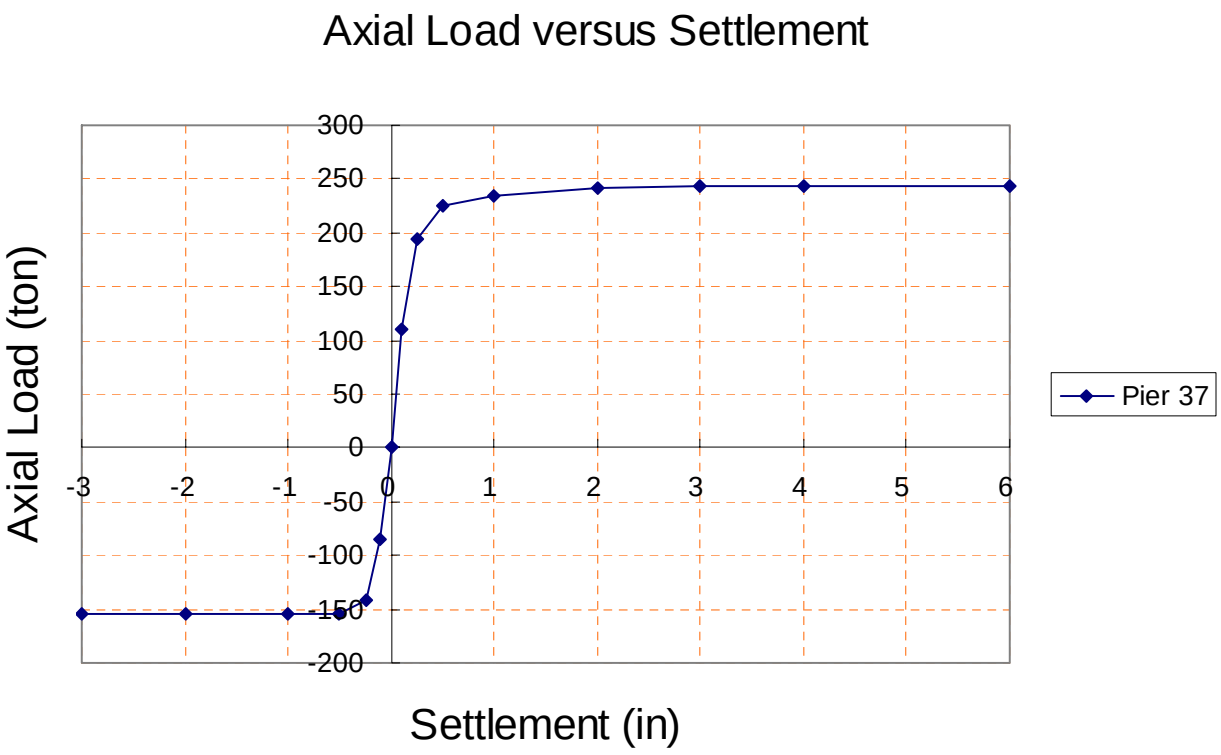


FIGURE C-38: PIER 38 - Q-δ CURVES

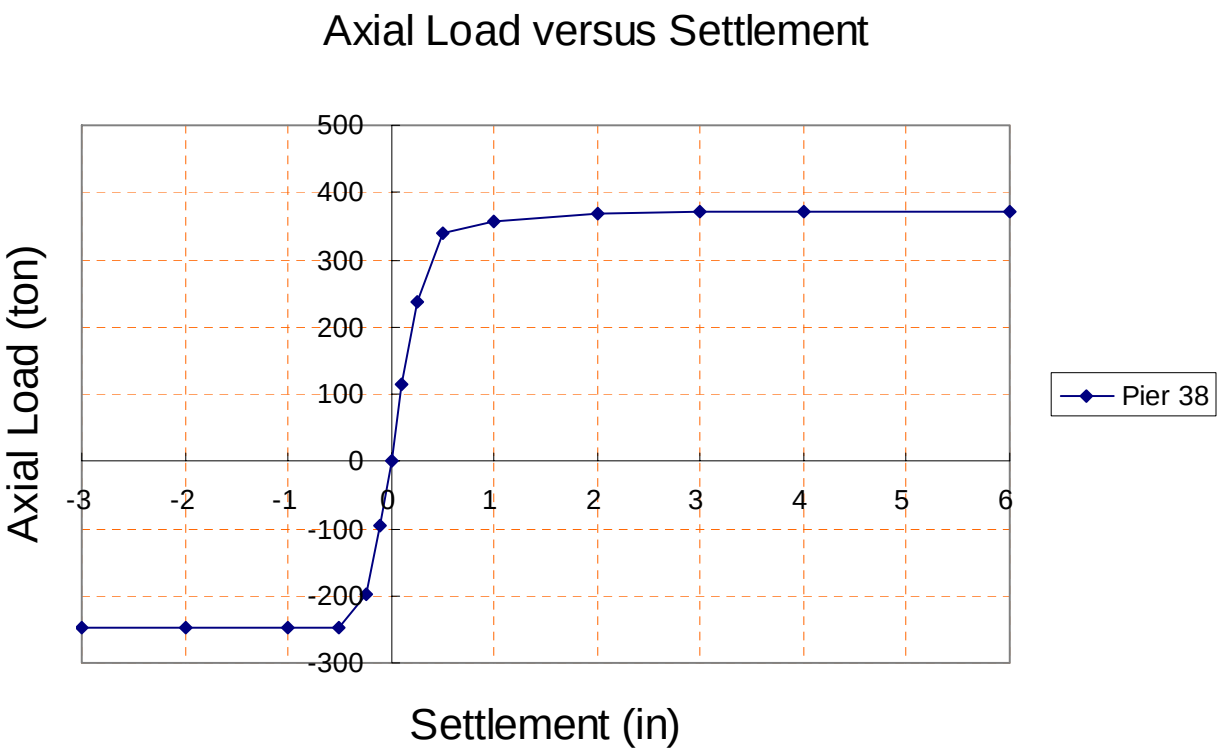


FIGURE C-39: PIER 39 - Q-δ CURVES

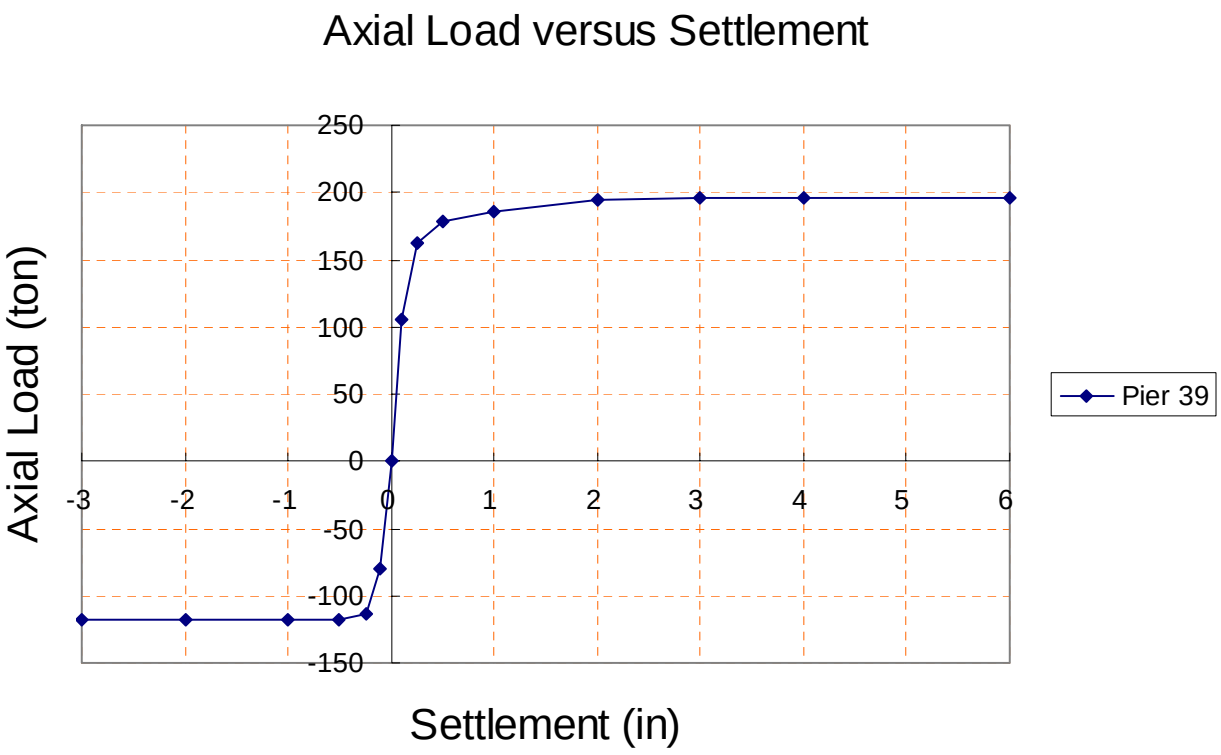


FIGURE C-40: PIER 40 - Q-δ CURVES

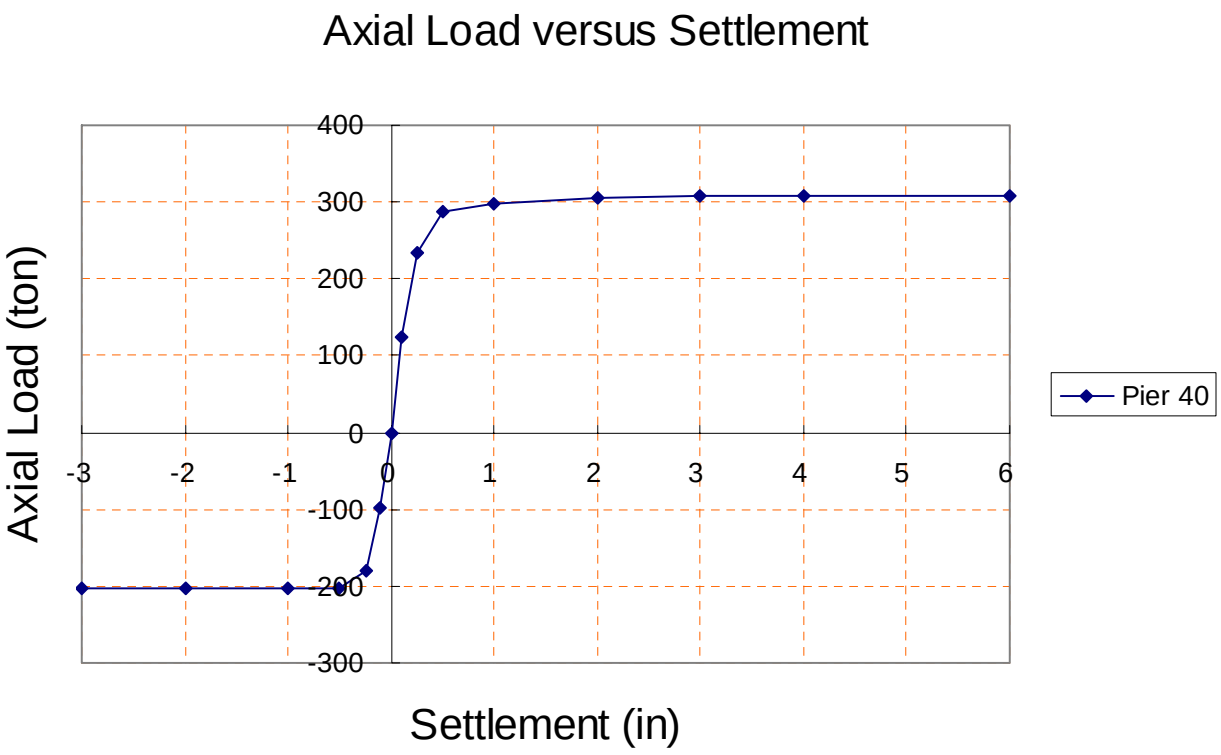


FIGURE C-41: PIER 41 - Q-δ CURVES

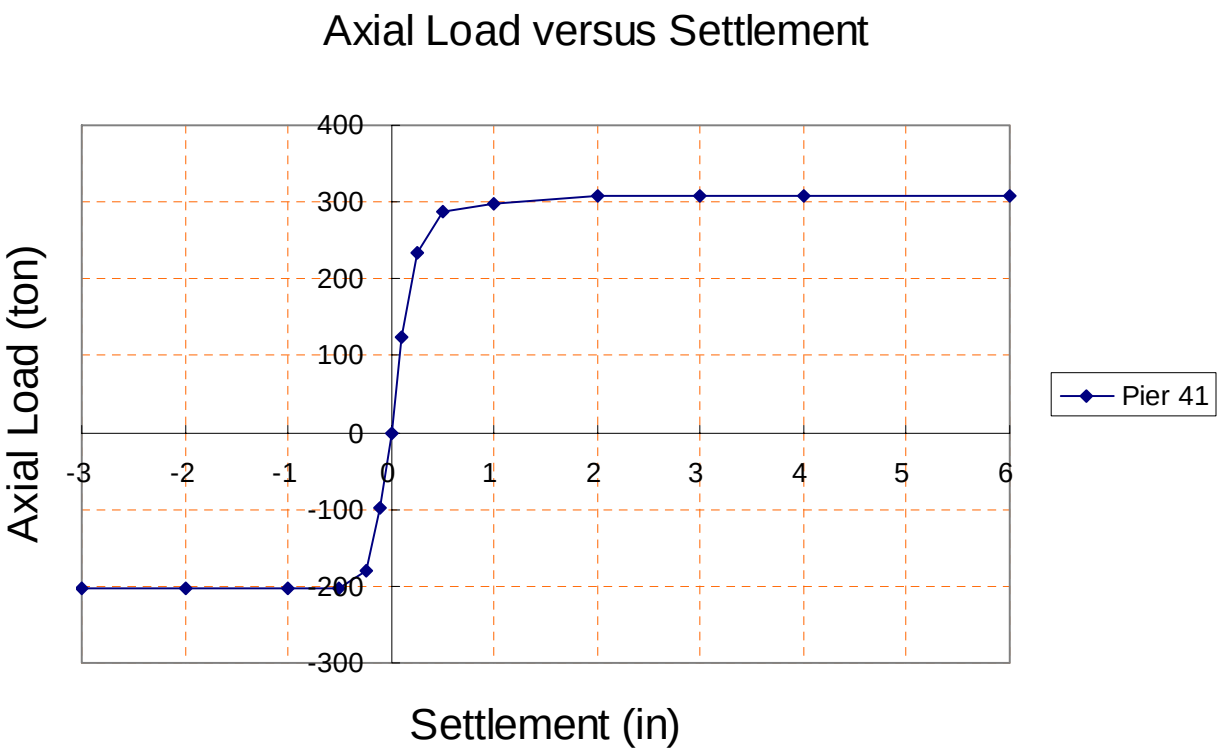


FIGURE C-42: PIER 42 - Q-δ CURVES

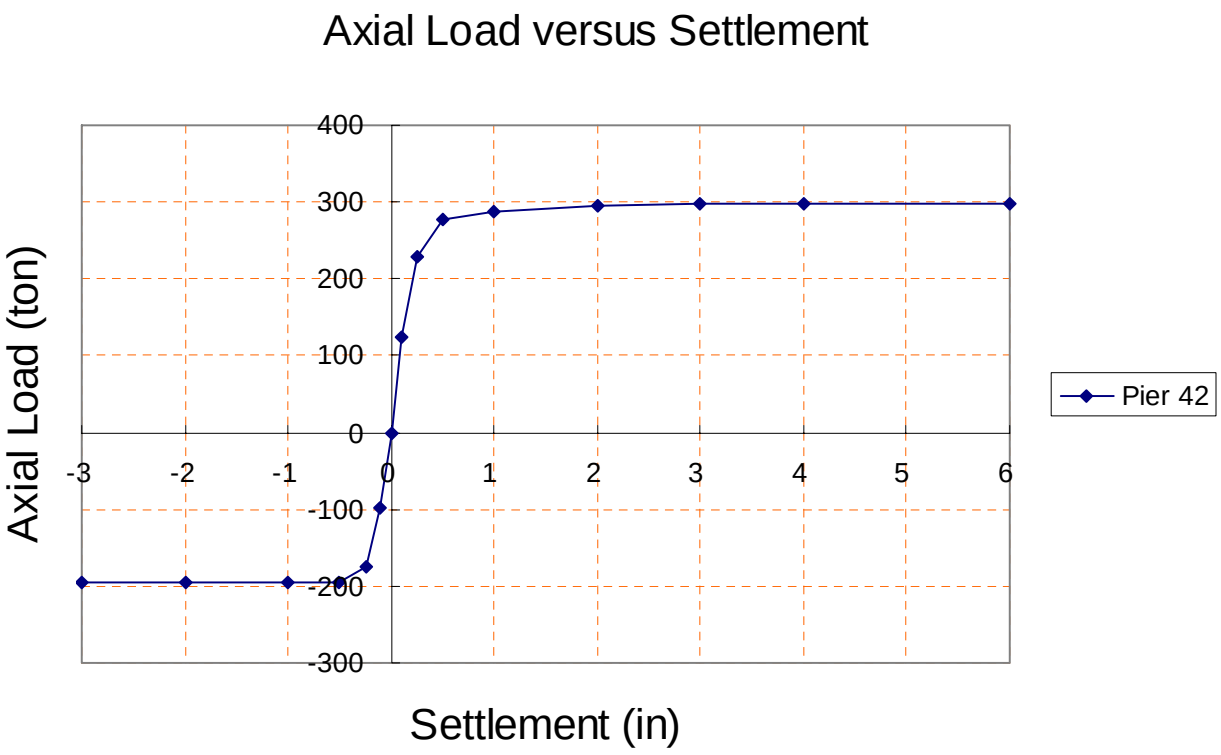


FIGURE C-43: PIER 43 - Q-δ CURVES

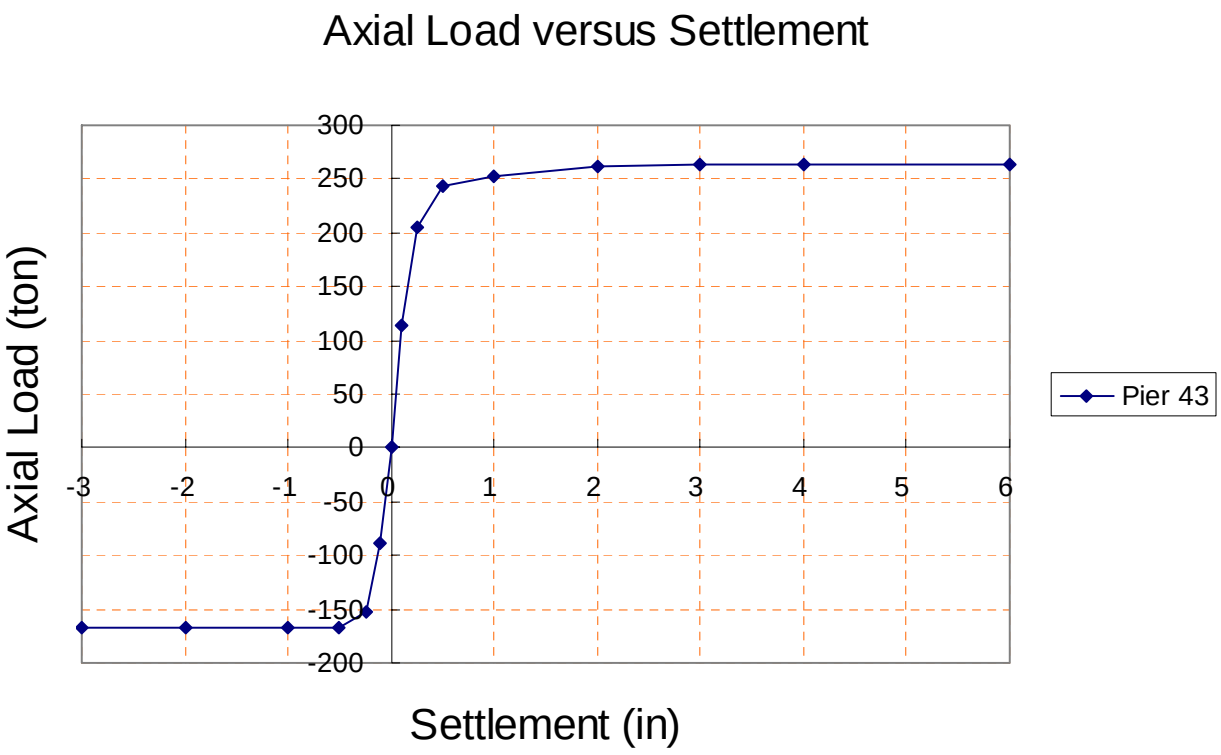


FIGURE C-44: PIER 44 - Q-δ CURVES

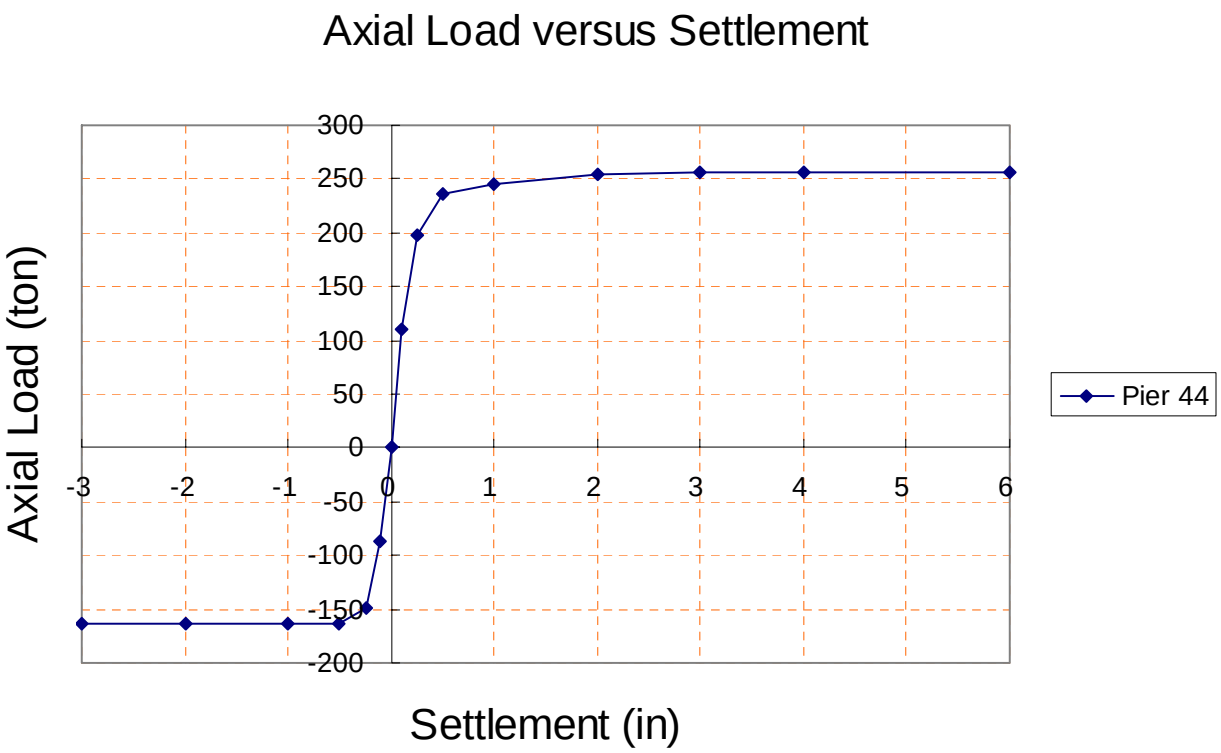


FIGURE C-45: TRESTLE BENTS E01~05 - Q-δ CURVES

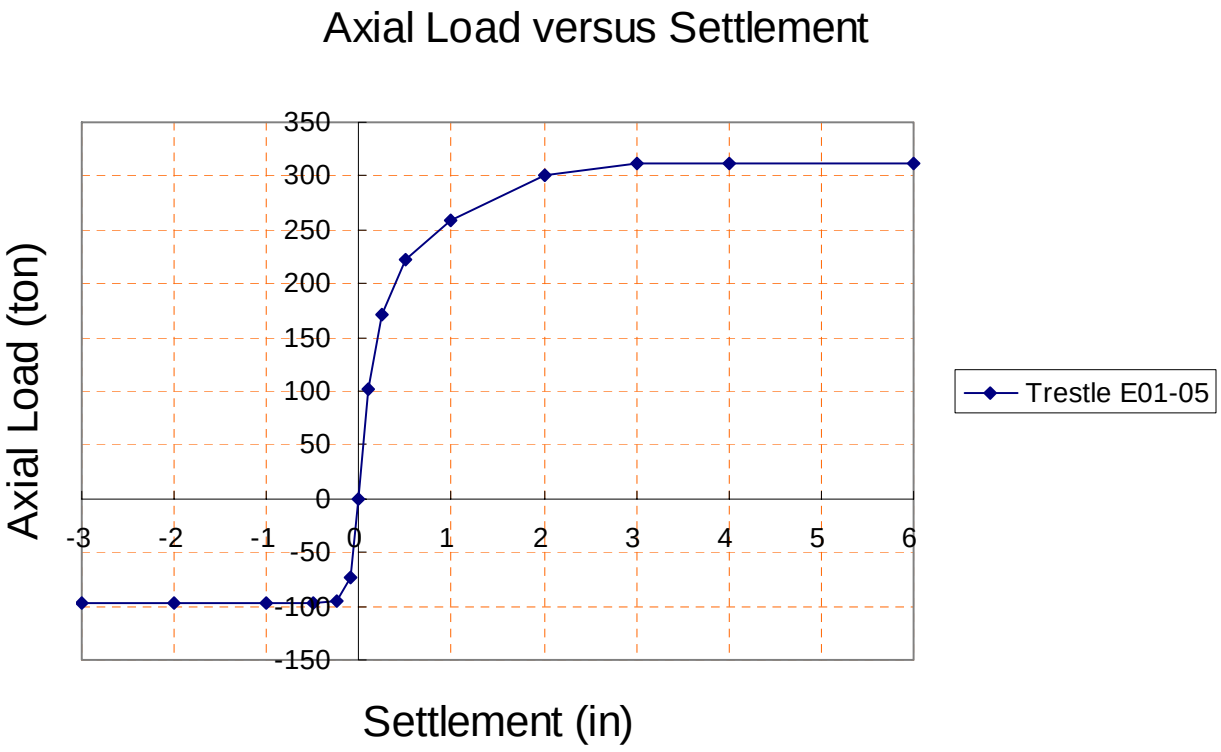


FIGURE C-46: TRESTLE BENTS E06~10 - Q-δ CURVES

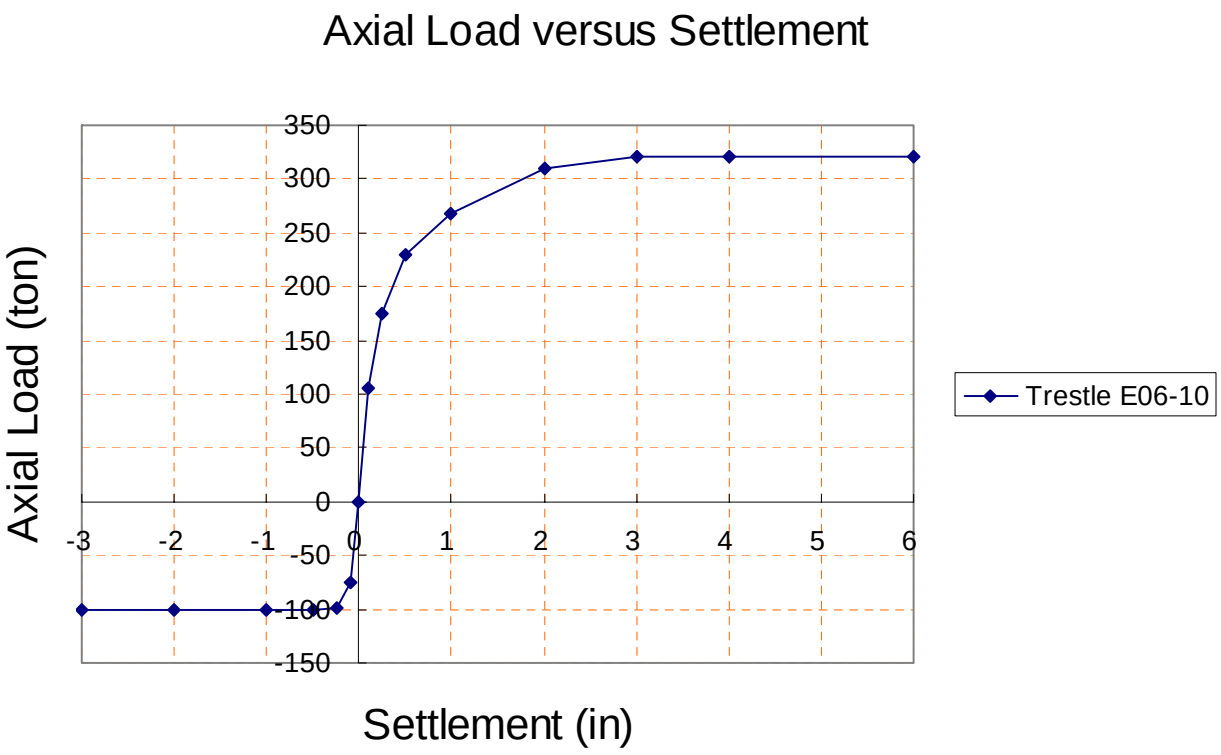


FIGURE C-47: TRESTLE BENTS E11~15 - Q-δ CURVES

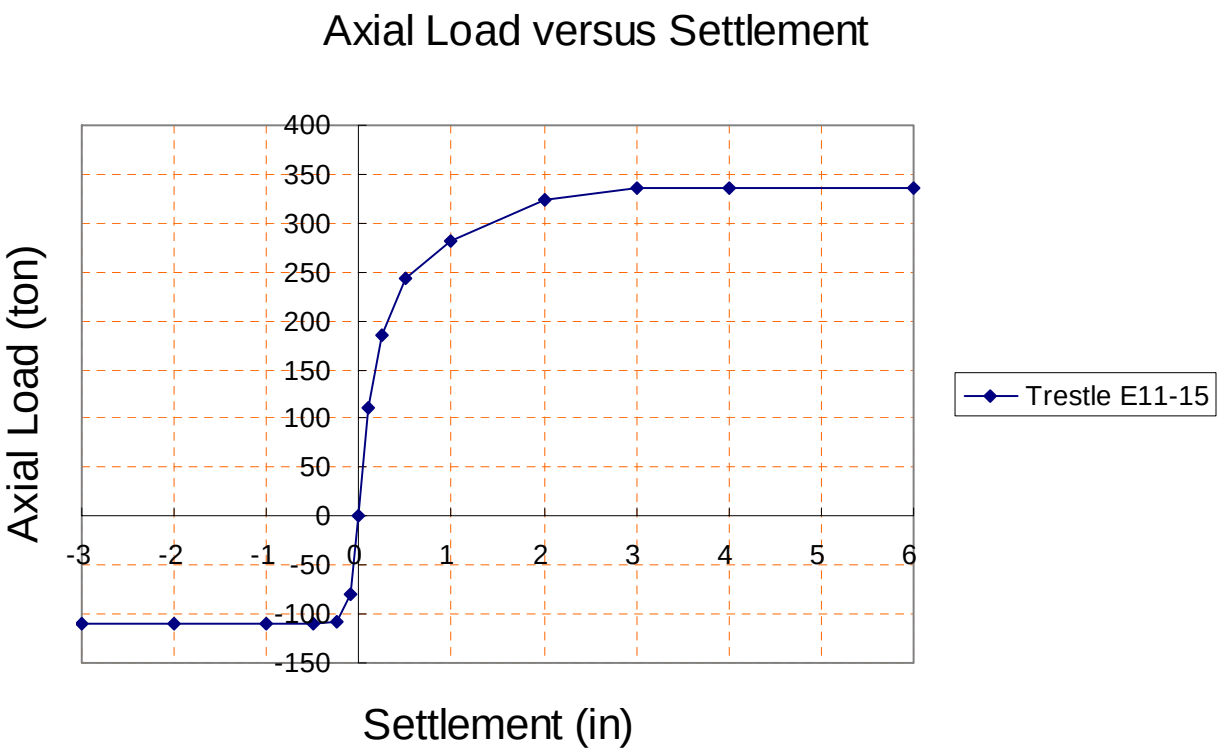


FIGURE C-48: TRESTLE BENTS E16~19 - Q-δ CURVES

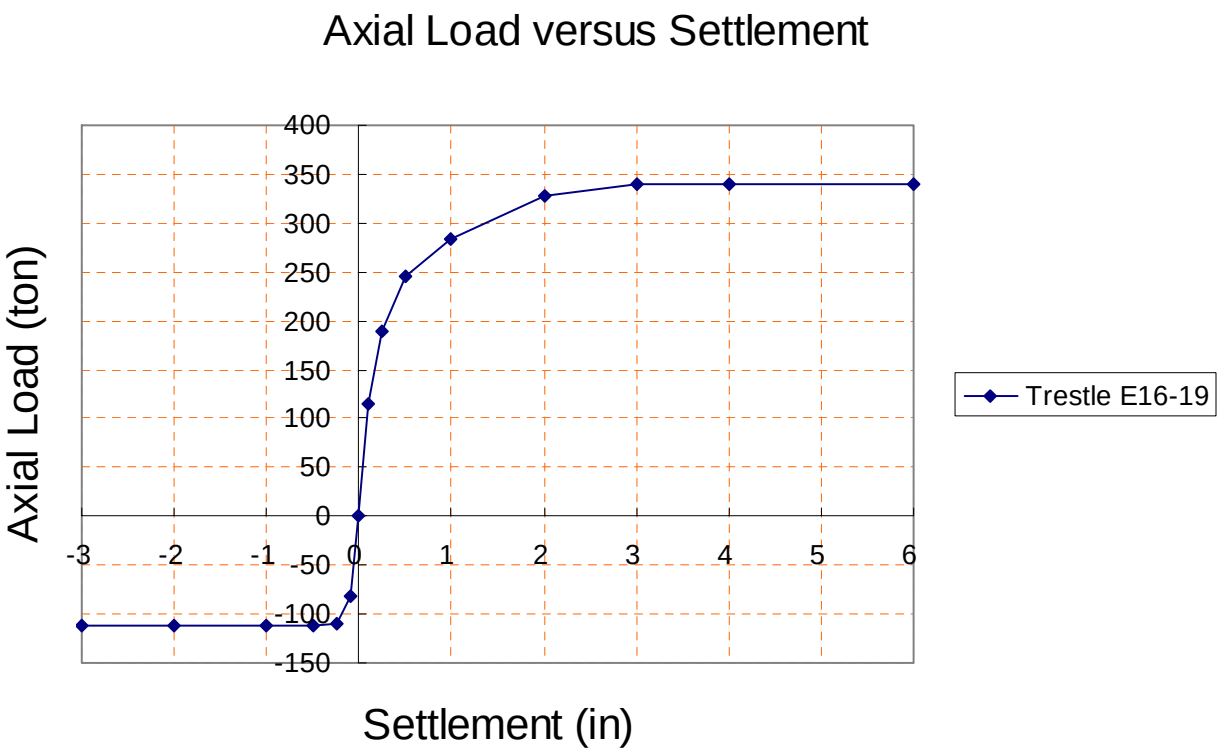


FIGURE C-49: TRESTLE BENT E20 - Q-δ CURVES

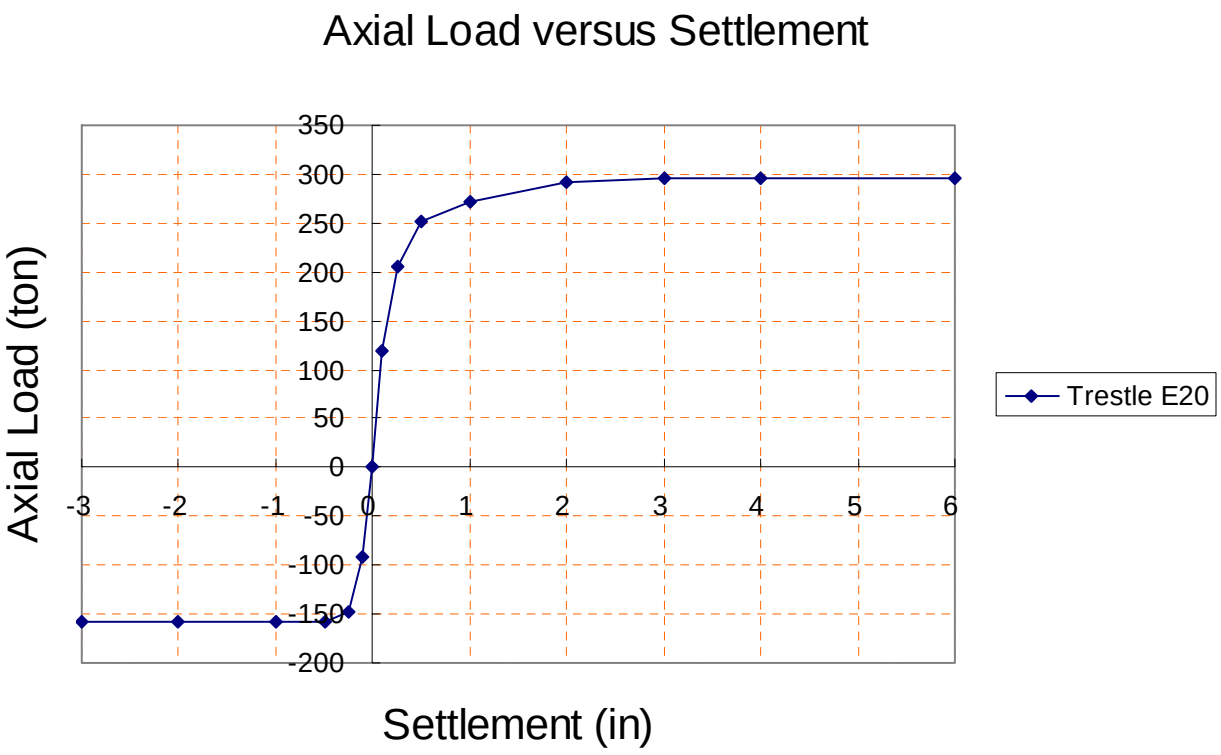


FIGURE C-50: TRESTLE BENTS W01~09 - *Q*-δ CURVES

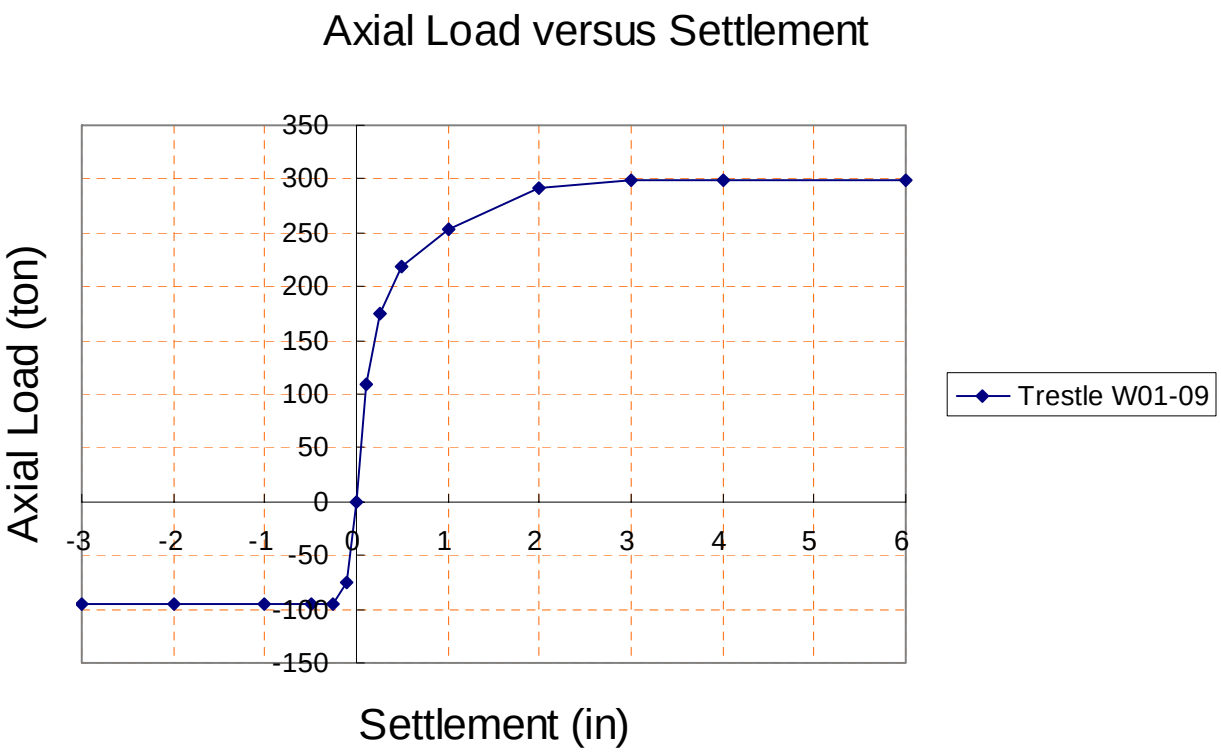


FIGURE C-51: TRESTLE BENTS W10~14 - *Q*-δ CURVES

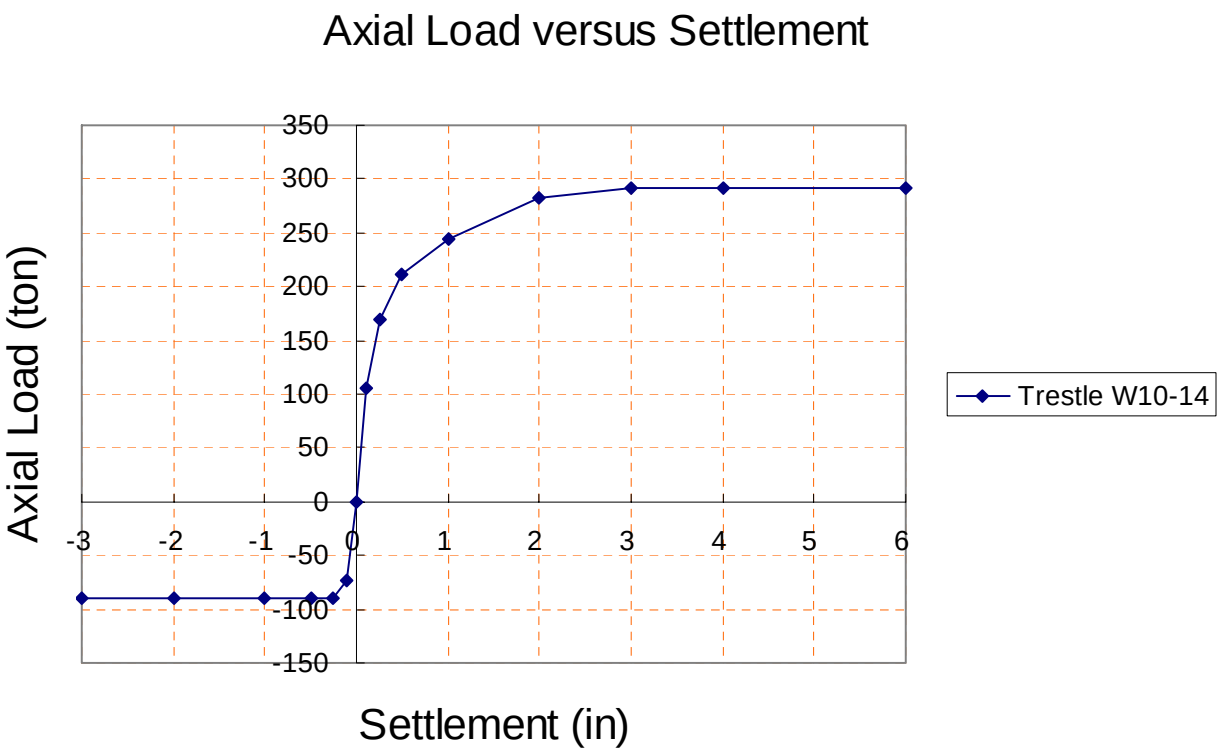


FIGURE C-52: TRESTLE BENTS W15~17 - *Q*-δ CURVES

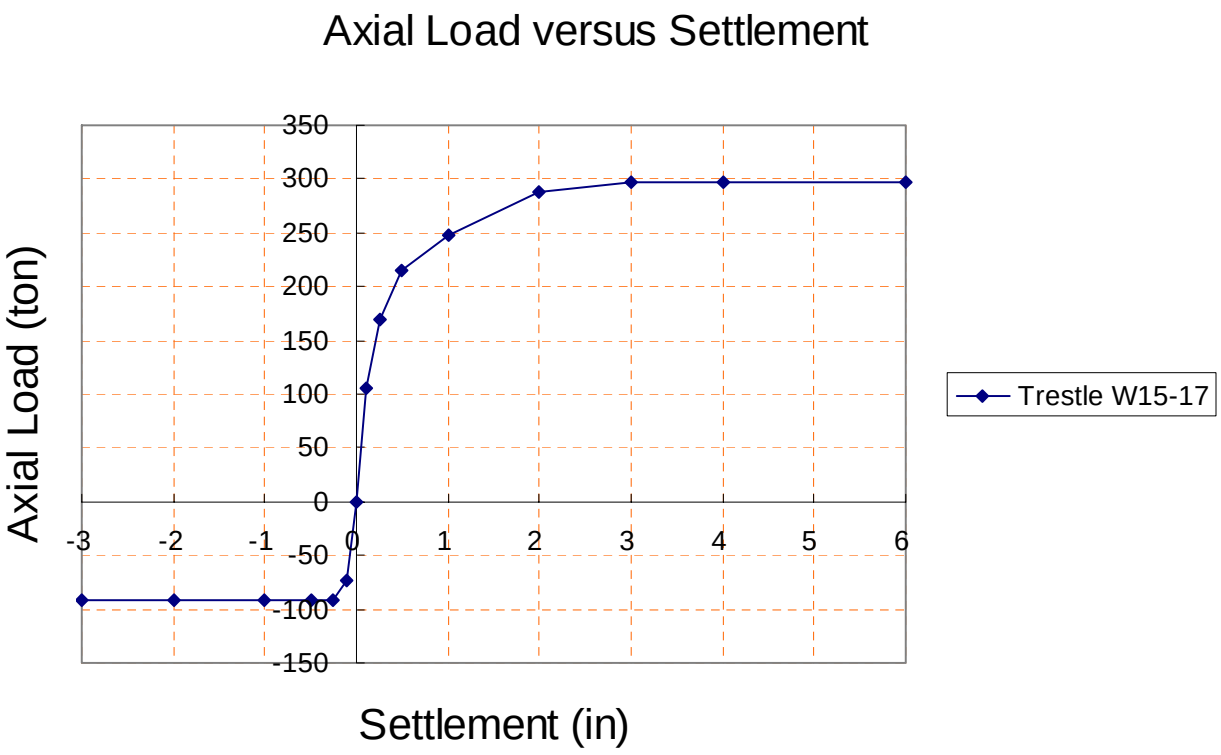


FIGURE C-53: TRESTLE BENT W18 - Q-δ CURVES

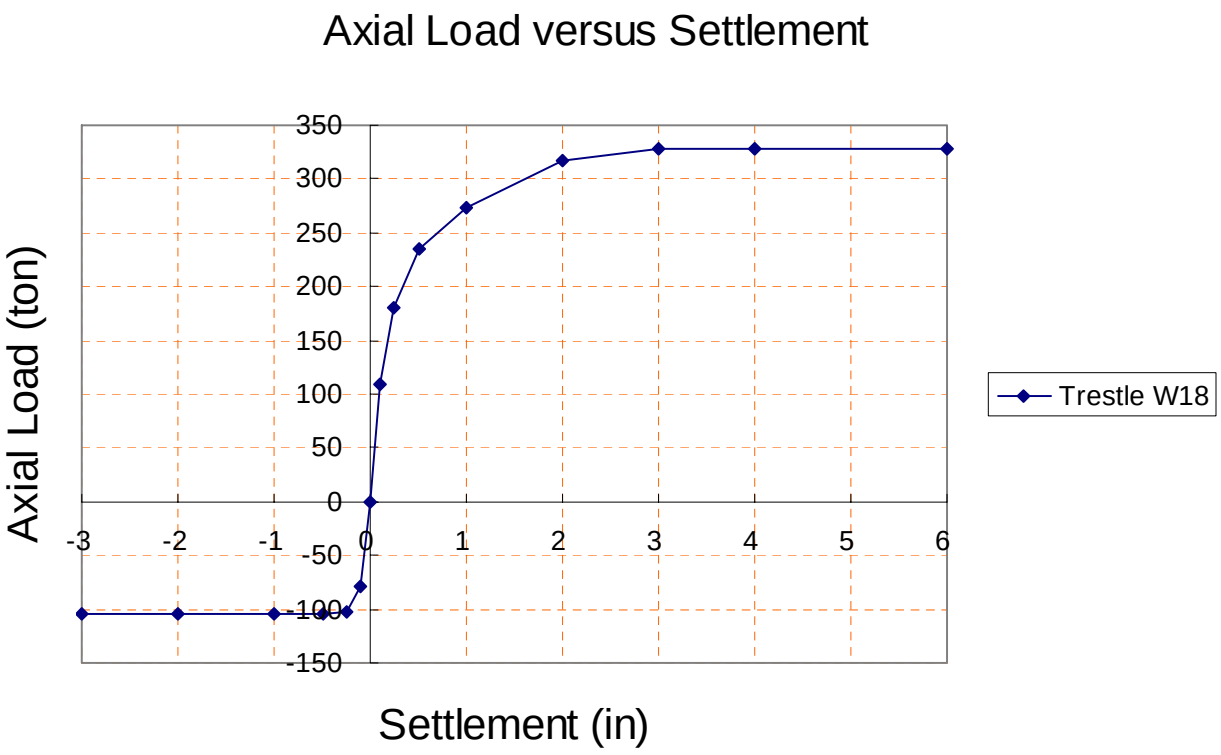


FIGURE C-54: TRESTLE BENT W19 - Q-δ CURVES

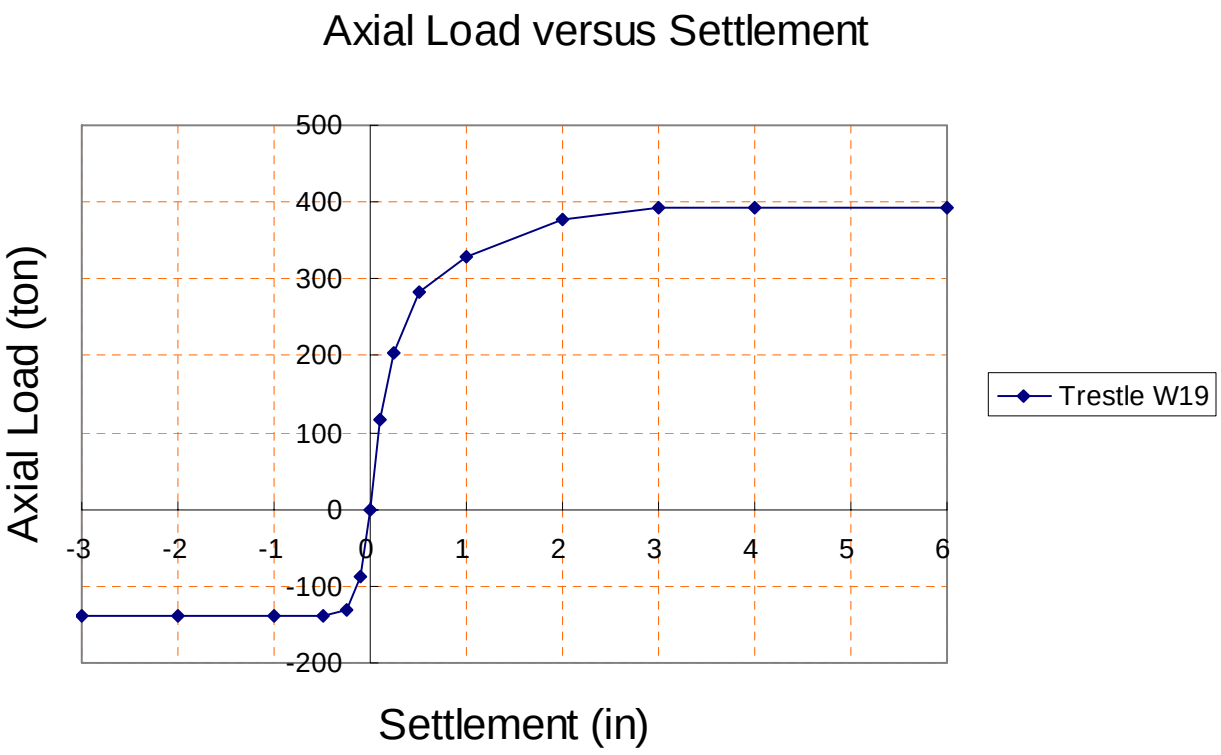
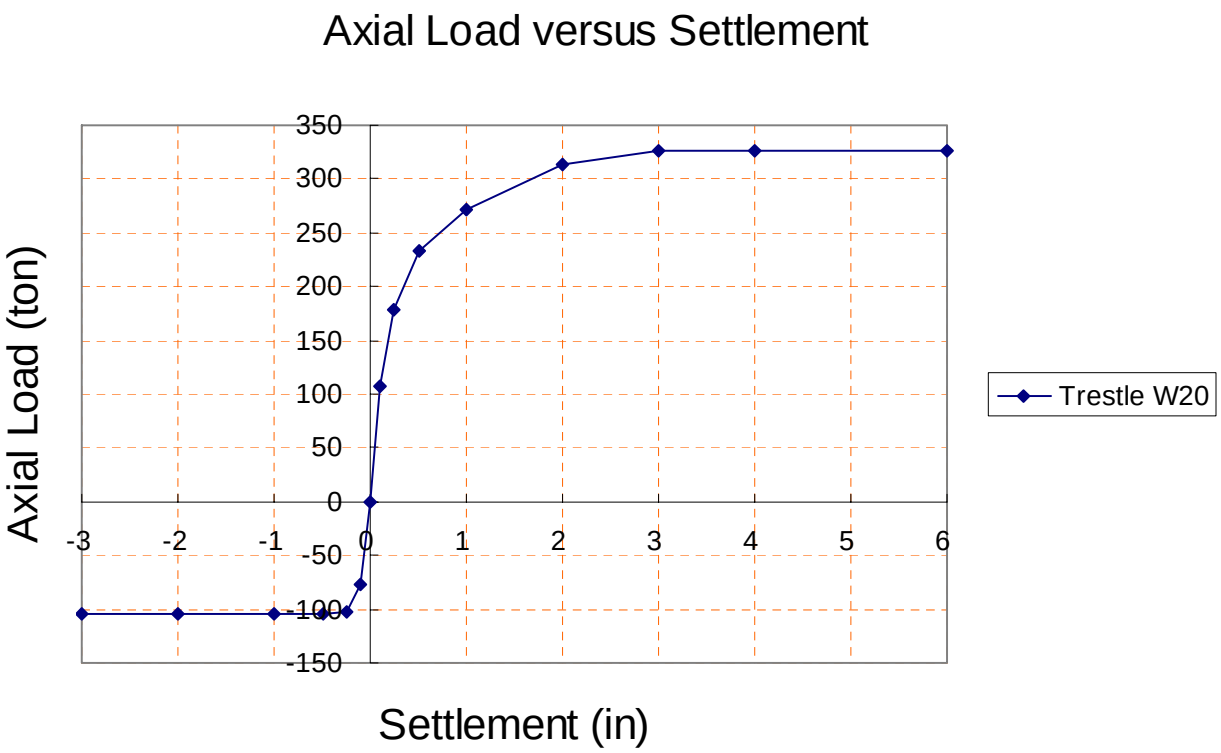


FIGURE C-55: TRESTLE BENT W20 - Q-δ CURVES



11.0 APPENDIX D: *P-Y* CURVES

TABLE D-1: ABUTMENT 1 – *p-y* CURVES

Node #	Elevation (ft)	Soil Type	p_u (lb/in)	y_u (in)	p_1 (lb/in)	y_1 (in)	p_2 (lb/in)	y_2 (in)	p_3 (lb/in)	y_3 (in)	p_4 (lb/in)	y_4 (in)	p_5 (lb/in)	y_5 (in)
1	1.5	Clay	276.0	4.00	69.0	0.06	138.0	0.50	198.7	1.50	276.0	4.00	276.0	8.00
2	-1.0	Clay	332.5	4.00	83.1	0.06	166.3	0.50	239.4	1.50	332.5	4.00	332.5	8.00
3	-4.0	Clay	288.3	6.00	72.1	0.10	144.2	0.75	207.6	2.25	288.3	6.00	288.3	12.00
4	-8.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
5	-13.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
6	-18.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
7	-23.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
8	-28.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
9	-33.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
10	-38.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
11	-43.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
12	-48.0	Clay	4336.4	4.49	1084.1	0.07	2168.2	0.56	3122.2	1.68	4336.4	4.49	4336.4	8.98
13	-53.0	Sand	9460.3	1.00	946.0	0.03	4351.7	0.17	7189.8	0.33	8608.9	0.50	9460.3	1.00
14	-58.0	Sand	10435.3	1.02	1043.5	0.03	4800.2	0.17	7930.8	0.34	9496.1	0.51	10435.3	1.02
15	-63.0	Sand	11410.2	1.03	1141.0	0.03	5248.7	0.18	8671.8	0.34	10383.3	0.52	11410.2	1.03
16	-68.0	Sand	12385.2	1.05	1238.5	0.03	5697.2	0.18	9412.7	0.35	11270.5	0.52	12385.2	1.05

TABLE D-2: PIER 2 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-6.5	Clay	413.0	4.00	103.3	0.06	206.5	0.50	297.4	1.50	413.0	4.00	413.0	8.00
2	-11.0	Clay	522.0	4.00	130.5	0.06	261.0	0.50	375.8	1.50	522.0	4.00	522.0	8.00
3	-16.0	Clay	625.0	4.00	156.3	0.06	312.5	0.50	450.0	1.50	625.0	4.00	625.0	8.00
4	-21.0	Clay	625.0	4.00	156.3	0.06	312.5	0.50	450.0	1.50	625.0	4.00	625.0	8.00
5	-24.0	Clay	187.0	8.00	46.8	0.13	93.5	1.00	134.6	3.00	187.0	8.00	187.0	16.00
6	-27.0	Clay	187.0	8.00	46.8	0.13	93.5	1.00	134.6	3.00	187.0	8.00	187.0	16.00
7	-32.0	Clay	187.0	8.00	46.8	0.13	93.5	1.00	134.6	3.00	187.0	8.00	187.0	16.00
8	-37.0	Clay	187.0	8.00	46.8	0.13	93.5	1.00	134.6	3.00	187.0	8.00	187.0	16.00
9	-42.0	Clay	187.0	8.00	46.8	0.13	93.5	1.00	134.6	3.00	187.0	8.00	187.0	16.00
10	-47.0	Clay	187.0	8.00	46.8	0.13	93.5	1.00	134.6	3.00	187.0	8.00	187.0	16.00
11	-52.0	Clay	187.0	8.00	46.8	0.13	93.5	1.00	134.6	3.00	187.0	8.00	187.0	16.00
12	-56.0	Sand	8451.0	0.91	845.1	0.03	3887.5	0.15	6422.8	0.30	7690.4	0.46	8451.0	0.91
13	-60.0	Sand	9231.0	0.93	923.1	0.03	4246.3	0.16	7015.6	0.31	8400.2	0.47	9231.0	0.93
14	-65.0	Sand	10200.0	0.95	1020.0	0.03	4692.0	0.16	7752.0	0.31	9282.0	0.48	10200.0	0.95

TABLE D-3: PIER 3 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-7.5	Clay	120.3	8.00	30.1	0.13	60.1	1.00	86.6	3.00	120.3	8.00	120.3	16.00
2	-12.0	Clay	160.3	8.00	40.1	0.13	80.1	1.00	115.4	3.00	160.3	8.00	160.3	16.00
3	-17.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
4	-22.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
5	-27.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
6	-32.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
7	-37.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
8	-42.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
9	-47.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
10	-52.0	Clay	3351.4	4.40	837.9	0.07	1675.7	0.55	2413.0	1.65	3351.4	4.40	3351.4	8.80
11	-57.0	Sand	7490.3	0.84	749.0	0.03	3445.5	0.14	5692.6	0.28	6816.1	0.42	7490.3	0.84
12	-62.0	Sand	8465.2	0.87	846.5	0.03	3894.0	0.15	6433.6	0.29	7703.3	0.43	8465.2	0.87
13	-67.0	Sand	9440.2	0.89	944.0	0.03	4342.5	0.15	7174.5	0.30	8590.5	0.45	9440.2	0.89
14	-72.0	Sand	10415.1	0.92	1041.5	0.03	4790.9	0.16	7915.5	0.30	9477.7	0.46	10415.1	0.92

TABLE D-4: PIER 4 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-8.0	Clay	115.8	8.00	29.0	0.13	57.9	1.00	83.4	3.00	115.8	8.00	115.8	16.00
2	-13.0	Clay	160.3	8.00	40.1	0.13	80.1	1.00	115.4	3.00	160.3	8.00	160.3	16.00
3	-18.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
4	-23.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
5	-28.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
6	-33.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
7	-38.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
8	-43.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
9	-48.0	Clay	3032.0	4.40	758.0	0.07	1516.0	0.55	2183.1	1.65	3032.0	4.40	3032.0	8.80
10	-51.0	Sand	6461.5	0.82	646.2	0.02	2972.3	0.14	4910.8	0.27	5880.0	0.41	6461.5	0.82
11	-55.0	Sand	7241.5	0.85	724.1	0.03	3331.1	0.15	5503.5	0.28	6589.7	0.43	7241.5	0.85
12	-60.0	Sand	8216.4	0.89	821.6	0.03	3779.6	0.15	6244.5	0.29	7476.9	0.44	8216.4	0.89
13	-65.0	Sand	9191.4	0.91	919.1	0.03	4228.0	0.16	6985.4	0.30	8364.1	0.46	9191.4	0.91

TABLE D-5: PIER 5 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-8.0	Clay	106.9	8.00	26.7	0.13	53.5	1.00	77.0	3.00	106.9	8.00	106.9	16.00
2	-12.0	Clay	142.5	8.00	35.6	0.13	71.3	1.00	102.6	3.00	142.5	8.00	142.5	16.00
3	-17.0	Clay	186.9	8.00	46.7	0.13	93.5	1.00	134.6	3.00	186.9	8.00	186.9	16.00
4	-22.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
5	-27.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
6	-32.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
7	-37.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
8	-42.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
9	-47.0	Clay	2904.3	4.40	726.1	0.07	1452.1	0.55	2091.1	1.65	2904.3	4.40	2904.3	8.80
10	-50.0	Sand	6206.0	0.83	620.6	0.02	2854.8	0.14	4716.6	0.27	5647.5	0.41	6206.0	0.83
11	-53.0	Sand	6791.0	0.85	679.1	0.03	3123.9	0.14	5161.2	0.28	6179.8	0.42	6791.0	0.85
12	-58.0	Sand	7765.9	0.88	776.6	0.03	3572.3	0.15	5902.1	0.29	7067.0	0.44	7765.9	0.88
13	-63.0	Sand	8740.9	0.91	874.1	0.03	4020.8	0.15	6643.1	0.30	7954.2	0.46	8740.9	0.91
14	-68.0	Sand	9715.8	0.93	971.6	0.03	4469.3	0.16	7384.0	0.31	8841.4	0.47	9715.8	0.93

TABLE D-6: PIER 6 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-8.5	Clay	120.3	8.00	30.1	0.13	60.1	1.00	86.6	3.00	120.3	8.00	120.3	16.00
2	-11.0	Clay	142.5	8.00	35.6	0.13	71.3	1.00	102.6	3.00	142.5	8.00	142.5	16.00
3	-16.0	Clay	186.9	8.00	46.7	0.13	93.5	1.00	134.6	3.00	186.9	8.00	186.9	16.00
4	-21.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
5	-26.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
6	-31.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
7	-36.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
8	-41.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
9	-46.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
10	-51.0	Clay	3223.7	4.40	805.9	0.07	1611.8	0.55	2321.0	1.65	3223.7	4.40	3223.7	8.80
11	-55.0	Sand	7039.8	0.83	704.0	0.02	3238.3	0.14	5350.2	0.27	6406.2	0.42	7039.8	0.83
12	-60.0	Sand	8014.7	0.86	801.5	0.03	3686.8	0.15	6091.2	0.29	7293.4	0.43	8014.7	0.86
13	-65.0	Sand	8989.7	0.89	899.0	0.03	4135.2	0.15	6832.1	0.29	8180.6	0.45	8989.7	0.89
14	-70.0	Sand	9964.6	0.92	996.5	0.03	4583.7	0.16	7573.1	0.30	9067.8	0.46	9964.6	0.92
15	-75.0	Sand	10939.5	0.94	1094.0	0.03	5032.2	0.16	8314.1	0.31	9955.0	0.47	10939.5	0.94

TABLE D-7: PIER 7 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-8.5	Clay	120.3	8.00	30.1	0.13	60.1	1.00	86.6	3.00	120.3	8.00	120.3	16.00
2	-11.5	Clay	146.9	8.00	36.7	0.13	73.5	1.00	105.8	3.00	146.9	8.00	146.9	16.00
3	-15.0	Clay	178.1	8.00	44.5	0.13	89.0	1.00	128.2	3.00	178.1	8.00	178.1	16.00
4	-20.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
5	-25.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
6	-30.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
7	-35.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
8	-40.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
9	-45.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
10	-50.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
11	-55.0	Clay	3479.2	4.40	869.8	0.07	1739.6	0.55	2505.0	1.65	3479.2	4.40	3479.2	8.80
12	-60.0	Sand	7745.8	0.83	774.6	0.03	3563.0	0.14	5886.8	0.28	7048.6	0.42	7745.8	0.83
13	-65.0	Sand	8720.7	0.87	872.1	0.03	4011.5	0.15	6627.7	0.29	7935.8	0.43	8720.7	0.87
14	-70.0	Sand	9695.7	0.89	969.6	0.03	4460.0	0.15	7368.7	0.29	8823.0	0.45	9695.7	0.89

TABLE D-8: PIER 8 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-8.5	Clay	102.5	8.00	25.6	0.13	51.3	1.00	73.8	3.00	102.5	8.00	102.5	16.00
2	-13.0	Clay	142.5	8.00	35.6	0.13	71.3	1.00	102.6	3.00	142.5	8.00	142.5	16.00
3	-18.0	Clay	186.9	8.00	46.7	0.13	93.5	1.00	134.6	3.00	186.9	8.00	186.9	16.00
4	-23.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
5	-28.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
6	-33.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
7	-38.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
8	-43.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
9	-48.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
10	-53.0	Clay	3223.7	4.40	805.9	0.07	1611.8	0.55	2321.0	1.65	3223.7	4.40	3223.7	8.80
11	-57.0	Sand	7039.8	0.83	704.0	0.02	3238.3	0.14	5350.2	0.27	6406.2	0.42	7039.8	0.83
12	-61.0	Sand	7819.7	0.86	782.0	0.03	3597.1	0.15	5943.0	0.28	7115.9	0.43	7819.7	0.86
13	-65.0	Sand	8599.7	0.88	860.0	0.03	3955.9	0.15	6535.8	0.29	7825.7	0.44	8599.7	0.88

TABLE D-9: PIER 9 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-8.5	Clay	111.0	8.00	27.8	0.13	55.5	1.00	79.9	3.00	111.0	8.00	111.0	16.00
2	-13.0	Clay	151.0	8.00	37.8	0.13	75.5	1.00	108.7	3.00	151.0	8.00	151.0	16.00
3	-18.0	Clay	187.0	8.00	46.8	0.13	93.5	1.00	134.6	3.00	187.0	8.00	187.0	16.00
4	-23.0	Clay	187.0	8.00	46.8	0.13	93.5	1.00	134.6	3.00	187.0	8.00	187.0	16.00
5	-28.0	Clay	187.0	8.00	46.8	0.13	93.5	1.00	134.6	3.00	187.0	8.00	187.0	16.00
6	-33.0	Clay	187.0	8.00	46.8	0.13	93.5	1.00	134.6	3.00	187.0	8.00	187.0	16.00
7	-38.0	Clay	187.0	8.00	46.8	0.13	93.5	1.00	134.6	3.00	187.0	8.00	187.0	16.00
8	-43.0	Clay	187.0	8.00	46.8	0.13	93.5	1.00	134.6	3.00	187.0	8.00	187.0	16.00
9	-48.0	Clay	187.0	8.00	46.8	0.13	93.5	1.00	134.6	3.00	187.0	8.00	187.0	16.00
10	-52.0	Clay	499.0	4.00	124.8	0.06	249.5	0.50	359.3	1.50	499.0	4.00	499.0	8.00
11	-55.0	Sand	6912.0	0.83	691.2	0.02	3179.5	0.14	5253.1	0.27	6289.9	0.42	6912.0	0.83
12	-59.0	Sand	7691.0	0.86	769.1	0.03	3537.9	0.15	5845.2	0.28	6998.8	0.43	7691.0	0.86
13	-63.0	Sand	8471.0	0.88	847.1	0.03	3896.7	0.15	6438.0	0.29	7708.6	0.44	8471.0	0.88
14	-65.0	Clay	2500.0	2.00	625.0	0.03	1250.0	0.25	1800.0	0.75	2500.0	2.00	2500.0	4.00

TABLE D-10: PIER 10 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-8.5	Clay	120.3	8.00	30.1	0.13	60.1	1.00	86.6	3.00	120.3	8.00	120.3	16.00
2	-12.0	Clay	151.4	8.00	37.8	0.13	75.7	1.00	109.0	3.00	151.4	8.00	151.4	16.00
3	-17.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
4	-22.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
5	-27.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
6	-32.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
7	-37.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
8	-42.0	Clay	343.8	6.00	85.9	0.10	171.9	0.75	247.5	2.25	343.8	6.00	343.8	12.00
9	-47.0	Clay	500.0	4.00	125.0	0.06	250.0	0.50	360.0	1.50	500.0	4.00	500.0	8.00
10	-52.0	Clay	3611.9	2.42	903.0	0.04	1805.9	0.30	2600.6	0.91	3611.9	2.42	3611.9	4.84
11	-55.0	Sand	7308.7	0.86	730.9	0.03	3362.0	0.15	5554.6	0.28	6650.9	0.43	7308.7	0.86
12	-59.0	Sand	8088.7	0.89	808.9	0.03	3720.8	0.15	6147.4	0.29	7360.7	0.44	8088.7	0.89
13	-63.0	Sand	5684.3	1.45	568.4	0.04	2614.8	0.25	4320.1	0.48	5172.7	0.73	5684.3	1.45
14	-68.0	Clay	2500.0	2.00	625.0	0.03	1250.0	0.25	1800.0	0.75	2500.0	2.00	2500.0	4.00
15	-73.0	Clay	2500.0	2.00	625.0	0.03	1250.0	0.25	1800.0	0.75	2500.0	2.00	2500.0	4.00

TABLE D-11: PIER 11 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-9.0	Clay	124.7	8.00	31.2	0.13	62.4	1.00	89.8	3.00	124.7	8.00	124.7	16.00
2	-12.0	Clay	151.4	8.00	37.8	0.13	75.7	1.00	109.0	3.00	151.4	8.00	151.4	16.00
3	-16.0	Clay	186.9	8.00	46.7	0.13	93.5	1.00	134.6	3.00	186.9	8.00	186.9	16.00
4	-21.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
5	-26.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
6	-31.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
7	-36.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
8	-41.0	Clay	343.8	6.00	85.9	0.10	171.9	0.75	247.5	2.25	343.8	6.00	343.8	12.00
9	-46.0	Clay	500.0	4.00	125.0	0.06	250.0	0.50	360.0	1.50	500.0	4.00	500.0	8.00
10	-51.0	Clay	3548.0	2.42	887.0	0.04	1774.0	0.30	2554.6	0.91	3548.0	2.42	3548.0	4.84
11	-55.0	Sand	7376.0	0.87	737.6	0.03	3392.9	0.15	5605.7	0.29	6712.1	0.43	7376.0	0.87
12	-59.0	Sand	8155.9	0.89	815.6	0.03	3751.7	0.15	6198.5	0.30	7421.9	0.45	8155.9	0.89
13	-63.0	Sand	5717.9	1.46	571.8	0.04	2630.2	0.25	4345.6	0.48	5203.3	0.73	5717.9	1.46
14	-68.0	Clay	2500.0	2.00	625.0	0.03	1250.0	0.25	1800.0	0.75	2500.0	2.00	2500.0	4.00
15	-73.0	Clay	2500.0	2.00	625.0	0.03	1250.0	0.25	1800.0	0.75	2500.0	2.00	2500.0	4.00

TABLE D-12: PIER 12 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-9.0	Clay	115.8	8.00	29.0	0.13	57.9	1.00	83.4	3.00	115.8	8.00	115.8	16.00
2	-12.0	Clay	142.5	8.00	35.6	0.13	71.3	1.00	102.6	3.00	142.5	8.00	142.5	16.00
3	-15.0	Clay	169.2	8.00	42.3	0.13	84.6	1.00	121.8	3.00	169.2	8.00	169.2	16.00
4	-20.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
5	-25.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
6	-30.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
7	-35.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
8	-40.0	Clay	343.8	6.00	85.9	0.10	171.9	0.75	247.5	2.25	343.8	6.00	343.8	12.00
9	-44.0	Clay	500.0	4.00	125.0	0.06	250.0	0.50	360.0	1.50	500.0	4.00	500.0	8.00
10	-48.0	Clay	500.0	4.00	125.0	0.06	250.0	0.50	360.0	1.50	500.0	4.00	500.0	8.00
11	-53.0	Clay	3662.3	2.43	915.6	0.04	1831.2	0.30	2636.9	0.91	3662.3	2.43	3662.3	4.85
12	-57.0	Sand	7604.6	0.88	760.5	0.03	3498.1	0.15	5779.5	0.29	6920.1	0.44	7604.6	0.88
13	-61.0	Sand	8384.5	0.90	838.5	0.03	3856.9	0.15	6372.2	0.30	7629.9	0.45	8384.5	0.90
14	-65.0	Sand	5832.2	1.46	583.2	0.04	2682.8	0.25	4432.5	0.48	5307.3	0.73	5832.2	1.46
15	-69.0	Clay	2500.0	2.00	625.0	0.03	1250.0	0.25	1800.0	0.75	2500.0	2.00	2500.0	4.00
16	-73.0	Clay	2500.0	2.00	625.0	0.03	1250.0	0.25	1800.0	0.75	2500.0	2.00	2500.0	4.00

TABLE D-13: PIER 13 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-9.5	Clay	102.5	8.00	25.6	0.13	51.3	1.00	73.8	3.00	102.5	8.00	102.5	16.00
2	-12.0	Clay	124.7	8.00	31.2	0.13	62.4	1.00	89.8	3.00	124.7	8.00	124.7	16.00
3	-15.0	Clay	151.4	8.00	37.8	0.13	75.7	1.00	109.0	3.00	151.4	8.00	151.4	16.00
4	-20.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
5	-25.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
6	-30.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
7	-35.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
8	-40.0	Clay	343.8	6.00	85.9	0.10	171.9	0.75	247.5	2.25	343.8	6.00	343.8	12.00
9	-44.0	Clay	500.0	4.00	125.0	0.06	250.0	0.50	360.0	1.50	500.0	4.00	500.0	8.00
10	-49.0	Clay	500.0	4.00	125.0	0.06	250.0	0.50	360.0	1.50	500.0	4.00	500.0	8.00
11	-54.0	Clay	3615.2	2.43	903.8	0.04	1807.6	0.30	2603.0	0.91	3615.2	2.43	3615.2	4.86
12	-59.0	Sand	7705.4	0.89	770.5	0.03	3544.5	0.15	5856.1	0.29	7011.9	0.45	7705.4	0.89
13	-64.0	Sand	8680.4	0.92	868.0	0.03	3993.0	0.16	6597.1	0.30	7899.1	0.46	8680.4	0.92
14	-69.0	Sand	6077.7	1.47	607.8	0.04	2795.7	0.25	4619.0	0.49	5530.7	0.74	6077.7	1.47
15	-73.0	Clay	2500.0	2.00	625.0	0.03	1250.0	0.25	1800.0	0.75	2500.0	2.00	2500.0	4.00

TABLE D-14: PIER 14 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-9.5	Clay	106.9	8.00	26.7	0.13	53.5	1.00	77.0	3.00	106.9	8.00	106.9	16.00
2	-12.0	Clay	129.2	8.00	32.3	0.13	64.6	1.00	93.0	3.00	129.2	8.00	129.2	16.00
3	-15.0	Clay	155.8	8.00	39.0	0.13	77.9	1.00	112.2	3.00	155.8	8.00	155.8	16.00
4	-20.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
5	-25.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
6	-30.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
7	-35.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
8	-40.0	Clay	343.8	6.00	85.9	0.10	171.9	0.75	247.5	2.25	343.8	6.00	343.8	12.00
9	-45.0	Clay	500.0	4.00	125.0	0.06	250.0	0.50	360.0	1.50	500.0	4.00	500.0	8.00
10	-50.0	Clay	500.0	4.00	125.0	0.06	250.0	0.50	360.0	1.50	500.0	4.00	500.0	8.00
11	-55.0	Clay	3727.9	2.43	932.0	0.04	1863.9	0.30	2684.1	0.91	3727.9	2.43	3727.9	4.86
12	-59.0	Sand	7735.7	0.89	773.6	0.03	3558.4	0.15	5879.1	0.29	7039.5	0.44	7735.7	0.89
13	-63.0	Sand	8515.6	0.91	851.6	0.03	3917.2	0.15	6471.9	0.30	7749.2	0.45	8515.6	0.91
14	-68.0	Sand	9490.6	0.93	949.1	0.03	4365.7	0.16	7212.8	0.31	8636.4	0.47	9490.6	0.93

TABLE D-15: PIER 15 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-10.0	Clay	115.0	8.00	28.8	0.13	57.5	1.00	82.8	3.00	115.0	8.00	115.0	16.00
2	-15.5	Clay	164.0	8.00	41.0	0.13	82.0	1.00	118.1	3.00	164.0	8.00	164.0	16.00
3	-21.0	Clay	187.0	8.00	46.8	0.13	93.5	1.00	134.6	3.00	187.0	8.00	187.0	16.00
4	-26.5	Clay	187.0	8.00	46.8	0.13	93.5	1.00	134.6	3.00	187.0	8.00	187.0	16.00
5	-32.0	Clay	187.0	8.00	46.8	0.13	93.5	1.00	134.6	3.00	187.0	8.00	187.0	16.00
6	-37.5	Clay	187.0	8.00	46.8	0.13	93.5	1.00	134.6	3.00	187.0	8.00	187.0	16.00
7	-43.0	Clay	499.0	4.00	124.8	0.06	249.5	0.50	359.3	1.50	499.0	4.00	499.0	8.00
8	-48.5	Clay	499.0	4.00	124.8	0.06	249.5	0.50	359.3	1.50	499.0	4.00	499.0	8.00
9	-54.0	Clay	499.0	4.00	124.8	0.06	249.5	0.50	359.3	1.50	499.0	4.00	499.0	8.00
10	-59.5	Sand	7611.0	0.86	761.1	0.03	3501.1	0.15	5784.4	0.28	6926.0	0.43	7611.0	0.86
11	-65.0	Sand	8683.0	0.89	868.3	0.03	3994.2	0.15	6599.1	0.29	7901.5	0.45	8683.0	0.89

TABLE D-16: PIER 16 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-22.0	Clay	169.2	8.00	42.3	0.13	84.6	1.00	121.8	3.00	169.2	8.00	169.2	16.00
2	-25.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
3	-28.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
4	-33.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
5	-38.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
6	-43.0	Clay	343.8	6.00	85.9	0.10	171.9	0.75	247.5	2.25	343.8	6.00	343.8	12.00
7	-47.0	Clay	500.0	4.00	125.0	0.06	250.0	0.50	360.0	1.50	500.0	4.00	500.0	8.00
8	-51.0	Clay	500.0	4.00	125.0	0.06	250.0	0.50	360.0	1.50	500.0	4.00	500.0	8.00
9	-56.0	Clay	3406.8	2.43	851.7	0.04	1703.4	0.30	2452.9	0.91	3406.8	2.43	3406.8	4.86
10	-59.0	Sand	6898.6	0.88	689.9	0.03	3173.3	0.15	5242.9	0.29	6277.7	0.44	6898.6	0.88
11	-63.0	Sand	7678.5	0.91	767.9	0.03	3532.1	0.15	5835.7	0.30	6987.5	0.45	7678.5	0.91
12	-68.0	Sand	8653.5	0.93	865.3	0.03	3980.6	0.16	6576.6	0.31	7874.7	0.47	8653.5	0.93
13	-73.0	Sand	9628.4	0.96	962.8	0.03	4429.1	0.16	7317.6	0.32	8761.9	0.48	9628.4	0.96
14	-78.0	Sand	10603.4	0.97	1060.3	0.03	4877.5	0.17	8058.5	0.32	9649.0	0.49	10603.4	0.97
15	-83.0	Sand	11578.3	0.99	1157.8	0.03	5326.0	0.17	8799.5	0.33	10536.3	0.50	11578.3	0.99
16	-88.0	Sand	7526.6	1.50	752.7	0.05	3462.2	0.26	5720.2	0.50	6849.2	0.75	7526.6	1.50
17	-90.0	Clay	2500.0	2.00	625.0	0.03	1250.0	0.25	1800.0	0.75	2500.0	2.00	2500.0	4.00

TABLE D-17: PIER 17 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-29.0	Clay	168.8	21.60	42.2	0.35	84.4	2.70	121.5	8.10	168.8	21.60	168.8	43.20
2	-33.0	Clay	222.3	21.60	55.6	0.35	111.1	2.70	160.0	8.10	222.3	21.60	222.3	43.20
3	-37.0	Clay	275.8	21.60	68.9	0.35	137.9	2.70	198.5	8.10	275.8	21.60	275.8	43.20
4	-42.0	Clay	342.6	21.60	85.7	0.35	171.3	2.70	246.7	8.10	342.6	21.60	342.6	43.20
5	-47.0	Clay	409.5	21.60	102.4	0.35	204.8	2.70	294.8	8.10	409.5	21.60	409.5	43.20
6	-51.0	Clay	980.9	10.80	245.2	0.17	490.5	1.35	706.3	4.05	980.9	10.80	980.9	21.60
7	-55.0	Clay	1083.6	10.80	270.9	0.17	541.8	1.35	780.2	4.05	1083.6	10.80	1083.6	21.60
8	-60.0	Sand	5472.4	1.10	547.2	0.03	2517.3	0.19	4159.0	0.36	4979.9	0.55	5472.4	1.10
9	-65.0	Sand	7558.8	1.31	755.9	0.04	3477.0	0.22	5744.7	0.43	6878.5	0.66	7558.8	1.31
10	-70.0	Sand	9968.1	1.52	996.8	0.05	4585.3	0.26	7575.8	0.50	9071.0	0.76	9968.1	1.52
11	-75.0	Sand	12700.4	1.73	1270.0	0.05	5842.2	0.29	9652.3	0.57	11557.4	0.86	12700.4	1.73
12	-80.0	Sand	15755.8	1.93	1575.6	0.06	7247.6	0.33	11974.4	0.64	14337.7	0.97	15755.8	1.93
13	-85.0	Clay	6750.0	5.40	1687.5	0.09	3375.0	0.68	4860.0	2.03	6750.0	5.40	6750.0	10.80
14	-90.0	Clay	6750.0	5.40	1687.5	0.09	3375.0	0.68	4860.0	2.03	6750.0	5.40	6750.0	10.80
15	-95.0	Clay	6750.0	5.40	1687.5	0.09	3375.0	0.68	4860.0	2.03	6750.0	5.40	6750.0	10.80
16	-100.0	Clay	6750.0	5.40	1687.5	0.09	3375.0	0.68	4860.0	2.03	6750.0	5.40	6750.0	10.80

TABLE D-18: PIER 18 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-38.0	Clay	168.8	21.60	42.2	0.35	84.4	2.70	121.5	8.10	168.8	21.60	168.8	43.20
2	-42.0	Clay	222.3	21.60	55.6	0.35	111.1	2.70	160.0	8.10	222.3	21.60	222.3	43.20
3	-46.0	Clay	458.0	16.20	114.5	0.26	229.0	2.03	329.8	6.08	458.0	16.20	458.0	32.40
4	-49.0	Clay	717.3	10.80	179.3	0.17	358.7	1.35	516.5	4.05	717.3	10.80	717.3	21.60
5	-53.0	Clay	1129.3	5.70	282.3	0.09	564.6	0.71	813.1	2.14	1129.3	5.70	1129.3	11.40
6	-58.0	Sand	2608.3	0.82	260.8	0.02	1199.8	0.14	1982.3	0.27	2373.6	0.41	2608.3	0.82
7	-63.0	Sand	4101.0	1.03	410.1	0.03	1886.5	0.17	3116.8	0.34	3731.9	0.51	4101.0	1.03
8	-68.0	Sand	5916.8	1.23	591.7	0.04	2721.7	0.21	4496.7	0.41	5384.2	0.62	5916.8	1.23
9	-73.0	Sand	6779.8	3.42	678.0	0.10	3118.7	0.58	5152.7	1.13	6169.6	1.71	6779.8	3.42
10	-76.0	Clay	5786.8	5.40	1446.7	0.09	2893.4	0.68	4166.5	2.03	5786.8	5.40	5786.8	10.80
11	-80.0	Clay	6163.6	5.40	1540.9	0.09	3081.8	0.68	4437.8	2.03	6163.6	5.40	6163.6	10.80
12	-85.0	Clay	6634.7	5.40	1658.7	0.09	3317.3	0.68	4777.0	2.03	6634.7	5.40	6634.7	10.80
13	-90.0	Clay	6750.0	5.40	1687.5	0.09	3375.0	0.68	4860.0	2.03	6750.0	5.40	6750.0	10.80
14	-95.0	Clay	6750.0	5.40	1687.5	0.09	3375.0	0.68	4860.0	2.03	6750.0	5.40	6750.0	10.80
15	-100.0	Clay	6750.0	5.40	1687.5	0.09	3375.0	0.68	4860.0	2.03	6750.0	5.40	6750.0	10.80

TABLE D-19: PIER 19 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-44.0	Clay	450.0	10.80	112.5	0.17	225.0	1.35	324.0	4.05	450.0	10.80	450.0	21.60
2	-46.0	Clay	363.5	5.75	90.9	0.09	181.7	0.72	261.7	2.16	363.5	5.75	363.5	11.51
3	-49.0	Sand	718.2	0.90	71.8	0.03	330.4	0.15	545.8	0.30	653.6	0.45	718.2	0.90
4	-53.0	Sand	1233.4	0.86	123.3	0.03	567.4	0.15	937.4	0.28	1122.4	0.43	1233.4	0.86
5	-58.0	Sand	1692.0	0.76	169.2	0.02	778.3	0.13	1285.9	0.25	1539.7	0.38	1692.0	0.76
6	-63.0	Sand	2914.1	0.96	291.4	0.03	1340.5	0.16	2214.7	0.32	2651.8	0.48	2914.1	0.96
7	-68.0	Sand	4483.2	3.28	448.3	0.10	2062.3	0.56	3407.2	1.08	4079.7	1.64	4483.2	3.28
8	-71.0	Clay	4789.9	5.40	1197.5	0.09	2394.9	0.68	3448.7	2.03	4789.9	5.40	4789.9	10.80
9	-75.0	Clay	5166.7	5.40	1291.7	0.09	2583.4	0.68	3720.0	2.03	5166.7	5.40	5166.7	10.80
10	-80.0	Clay	5637.8	5.40	1409.4	0.09	2818.9	0.68	4059.2	2.03	5637.8	5.40	5637.8	10.80
11	-85.0	Clay	6108.8	5.40	1527.2	0.09	3054.4	0.68	4398.3	2.03	6108.8	5.40	6108.8	10.80
12	-90.0	Clay	6579.8	5.40	1645.0	0.09	3289.9	0.68	4737.5	2.03	6579.8	5.40	6579.8	10.80
13	-95.0	Clay	6750.0	5.40	1687.5	0.09	3375.0	0.68	4860.0	2.03	6750.0	5.40	6750.0	10.80
14	-100.0	Clay	6750.0	5.40	1687.5	0.09	3375.0	0.68	4860.0	2.03	6750.0	5.40	6750.0	10.80

TABLE D-20: PIER 20 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-46.0	Sand	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00
2	-50.0	Sand	603.4	0.94	60.3	0.03	277.6	0.16	458.6	0.31	549.1	0.47	603.4	0.94
3	-55.0	Sand	1282.6	0.89	128.3	0.03	590.0	0.15	974.7	0.29	1167.1	0.45	1282.6	0.89
4	-60.0	Sand	1734.7	0.77	173.5	0.02	798.0	0.13	1318.4	0.26	1578.6	0.39	1734.7	0.77
5	-65.0	Sand	2968.0	0.98	296.8	0.03	1365.3	0.17	2255.6	0.32	2700.8	0.49	2968.0	0.98
6	-70.0	Sand	4517.6	3.29	451.8	0.10	2078.1	0.56	3433.4	1.09	4111.0	1.64	4517.6	3.29
7	-75.0	Clay	4982.0	5.40	1245.5	0.09	2491.0	0.68	3587.1	2.03	4982.0	5.40	4982.0	10.80
8	-80.0	Clay	5453.1	5.40	1363.3	0.09	2726.5	0.68	3926.2	2.03	5453.1	5.40	5453.1	10.80
9	-85.0	Clay	5924.1	5.40	1481.0	0.09	2962.1	0.68	4265.4	2.03	5924.1	5.40	5924.1	10.80
10	-90.0	Clay	6395.2	5.40	1598.8	0.09	3197.6	0.68	4604.5	2.03	6395.2	5.40	6395.2	10.80
11	-95.0	Clay	6750.0	5.40	1687.5	0.09	3375.0	0.68	4860.0	2.03	6750.0	5.40	6750.0	10.80

TABLE D-21: PIER 21 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-48.0	Sand	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00
2	-51.0	Sand	434.6	0.91	43.5	0.03	199.9	0.15	330.3	0.30	395.5	0.45	434.6	0.91
3	-55.0	Sand	1074.5	0.96	107.4	0.03	494.3	0.16	816.6	0.32	977.8	0.48	1074.5	0.96
4	-60.0	Sand	1331.9	0.69	133.2	0.02	612.7	0.12	1012.2	0.23	1212.0	0.35	1331.9	0.69
5	-65.0	Sand	2435.9	0.90	243.6	0.03	1120.5	0.15	1851.3	0.30	2216.7	0.45	2435.9	0.90
6	-70.0	Sand	4092.8	3.25	409.3	0.10	1882.7	0.55	3110.5	1.07	3724.4	1.62	4092.8	3.25
7	-75.0	Clay	4793.6	5.40	1198.4	0.09	2396.8	0.68	3451.4	2.03	4793.6	5.40	4793.6	10.80
8	-80.0	Clay	5264.7	5.40	1316.2	0.09	2632.3	0.68	3790.6	2.03	5264.7	5.40	5264.7	10.80
9	-85.0	Clay	5735.7	5.40	1433.9	0.09	2867.9	0.68	4129.7	2.03	5735.7	5.40	5735.7	10.80
10	-90.0	Clay	6206.8	5.40	1551.7	0.09	3103.4	0.68	4468.9	2.03	6206.8	5.40	6206.8	10.80
11	-95.0	Clay	6677.8	5.40	1669.4	0.09	3338.9	0.68	4808.0	2.03	6677.8	5.40	6677.8	10.80
12	-100.0	Clay	6750.0	5.40	1687.5	0.09	3375.0	0.68	4860.0	2.03	6750.0	5.40	6750.0	10.80

TABLE D-22: PIER 22 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-48.0	Sand	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00
2	-52.0	Sand	603.4	0.94	60.3	0.03	277.6	0.16	458.6	0.31	549.1	0.47	603.4	0.94
3	-57.0	Sand	1282.6	0.89	128.3	0.03	590.0	0.15	974.7	0.29	1167.1	0.45	1282.6	0.89
4	-62.0	Sand	1734.7	0.77	173.5	0.02	798.0	0.13	1318.4	0.26	1578.6	0.39	1734.7	0.77
5	-67.0	Sand	3504.0	3.19	350.4	0.10	1611.8	0.54	2663.0	1.05	3188.6	1.59	3504.0	3.19
6	-70.0	Clay	4322.6	5.40	1080.6	0.09	2161.3	0.68	3112.3	2.03	4322.6	5.40	4322.6	10.80
7	-75.0	Clay	4793.6	5.40	1198.4	0.09	2396.8	0.68	3451.4	2.03	4793.6	5.40	4793.6	10.80
8	-80.0	Clay	5264.7	5.40	1316.2	0.09	2632.3	0.68	3790.6	2.03	5264.7	5.40	5264.7	10.80
9	-85.0	Clay	5735.7	5.40	1433.9	0.09	2867.9	0.68	4129.7	2.03	5735.7	5.40	5735.7	10.80
10	-90.0	Clay	6206.8	5.40	1551.7	0.09	3103.4	0.68	4468.9	2.03	6206.8	5.40	6206.8	10.80
11	-95.0	Clay	6677.8	5.40	1669.4	0.09	3338.9	0.68	4808.0	2.03	6677.8	5.40	6677.8	10.80
12	-100.0	Clay	6750.0	5.40	1687.5	0.09	3375.0	0.68	4860.0	2.03	6750.0	5.40	6750.0	10.80

TABLE D-23: PIER 23 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-46.0	Sand	272.0	0.85	27.2	0.03	125.1	0.14	206.7	0.28	247.5	0.43	272.0	0.85
2	-52.5	Sand	1242.0	0.91	124.2	0.03	571.3	0.16	943.9	0.30	1130.2	0.46	1242.0	0.91
3	-56.0	Sand	1331.0	0.69	133.1	0.02	612.3	0.12	1011.6	0.23	1211.2	0.35	1331.0	0.69
4	-60.5	Sand	2310.0	0.88	231.0	0.03	1062.6	0.15	1755.6	0.29	2102.1	0.44	2310.0	0.88
5	-65.5	Sand	3705.0	1.08	370.5	0.03	1704.3	0.18	2815.8	0.36	3371.6	0.54	3705.0	1.08
6	-70.5	Clay	4746.0	5.40	1186.5	0.09	2373.0	0.68	3417.1	2.03	4746.0	5.40	4746.0	10.80
7	-75.5	Clay	5217.0	5.40	1304.3	0.09	2608.5	0.68	3756.2	2.03	5217.0	5.40	5217.0	10.80
8	-80.0	Clay	5641.0	5.40	1410.3	0.09	2820.5	0.68	4061.5	2.03	5641.0	5.40	5641.0	10.80
9	-84.5	Clay	6065.0	5.40	1516.3	0.09	3032.5	0.68	4366.8	2.03	6065.0	5.40	6065.0	10.80
10	-89.5	Clay	6536.0	5.40	1634.0	0.09	3268.0	0.68	4705.9	2.03	6536.0	5.40	6536.0	10.80
11	-96.0	Clay	6750.0	5.40	1687.5	0.09	3375.0	0.68	4860.0	2.03	6750.0	5.40	6750.0	10.80
12	-100.0	Clay	6750.0	5.40	1687.5	0.09	3375.0	0.68	4860.0	2.03	6750.0	5.40	6750.0	10.80

TABLE D-24: PIER 24 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-39.0	Clay	450.0	10.80	112.5	0.17	225.0	1.35	324.0	4.05	450.0	10.80	450.0	21.60
2	-43.0	Clay	552.7	10.80	138.2	0.17	276.3	1.35	397.9	4.05	552.7	10.80	552.7	21.60
3	-47.0	Clay	821.8	5.79	205.5	0.09	410.9	0.72	591.7	2.17	821.8	5.79	821.8	11.57
4	-50.0	Sand	1167.1	0.66	116.7	0.02	536.8	0.11	887.0	0.22	1062.0	0.33	1167.1	0.66
5	-54.0	Sand	1775.7	0.74	177.6	0.02	816.8	0.13	1349.5	0.24	1615.9	0.37	1775.7	0.74
6	-59.0	Sand	3029.0	0.95	302.9	0.03	1393.3	0.16	2302.0	0.31	2756.4	0.47	3029.0	0.95
7	-64.0	Sand	4605.3	1.15	460.5	0.03	2118.4	0.20	3500.0	0.38	4190.8	0.58	4605.3	1.15
8	-69.0	Sand	5782.9	3.38	578.3	0.10	2660.1	0.57	4395.0	1.11	5262.4	1.69	5782.9	3.38
9	-74.0	Clay	5532.3	5.40	1383.1	0.09	2766.1	0.68	3983.2	2.03	5532.3	5.40	5532.3	10.80
10	-79.0	Clay	6003.3	5.40	1500.8	0.09	3001.7	0.68	4322.4	2.03	6003.3	5.40	6003.3	10.80
11	-84.0	Clay	6474.4	5.40	1618.6	0.09	3237.2	0.68	4661.6	2.03	6474.4	5.40	6474.4	10.80
12	-89.0	Clay	6750.0	5.40	1687.5	0.09	3375.0	0.68	4860.0	2.03	6750.0	5.40	6750.0	10.80
13	-94.0	Clay	6750.0	5.40	1687.5	0.09	3375.0	0.68	4860.0	2.03	6750.0	5.40	6750.0	10.80
14	-100.0	Clay	6750.0	5.40	1687.5	0.09	3375.0	0.68	4860.0	2.03	6750.0	5.40	6750.0	10.80

TABLE D-25: PIER 25 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-30.0	Clay	168.8	21.60	42.2	0.35	84.4	2.70	121.5	8.10	168.8	21.60	168.8	43.20
2	-35.0	Clay	235.6	21.60	58.9	0.35	117.8	2.70	169.7	8.10	235.6	21.60	235.6	43.20
3	-40.0	Clay	495.2	16.20	123.8	0.26	247.6	2.03	356.6	6.08	495.2	16.20	495.2	32.40
4	-43.0	Clay	764.9	10.80	191.2	0.17	382.5	1.35	550.7	4.05	764.9	10.80	764.9	21.60
5	-47.0	Clay	867.6	10.80	216.9	0.17	433.8	1.35	624.7	4.05	867.6	10.80	867.6	21.60
6	-51.0	Clay	1809.0	5.79	452.2	0.09	904.5	0.72	1302.5	2.17	1809.0	5.79	1809.0	11.59
7	-56.0	Sand	4160.5	1.00	416.1	0.03	1913.8	0.17	3162.0	0.33	3786.1	0.50	4160.5	1.00
8	-61.0	Sand	5996.3	1.21	599.6	0.04	2758.3	0.21	4557.2	0.40	5456.6	0.60	5996.3	1.21
9	-66.0	Sand	6869.2	3.41	686.9	0.10	3159.8	0.58	5220.6	1.12	6251.0	1.70	6869.2	3.41
10	-70.0	Clay	5960.2	5.40	1490.1	0.09	2980.1	0.68	4291.4	2.03	5960.2	5.40	5960.2	10.80
11	-75.0	Clay	6431.3	5.40	1607.8	0.09	3215.6	0.68	4630.5	2.03	6431.3	5.40	6431.3	10.80
12	-80.0	Clay	6750.0	5.40	1687.5	0.09	3375.0	0.68	4860.0	2.03	6750.0	5.40	6750.0	10.80
13	-85.0	Clay	6750.0	5.40	1687.5	0.09	3375.0	0.68	4860.0	2.03	6750.0	5.40	6750.0	10.80
14	-90.0	Clay	6750.0	5.40	1687.5	0.09	3375.0	0.68	4860.0	2.03	6750.0	5.40	6750.0	10.80
15	-95.0	Clay	6750.0	5.40	1687.5	0.09	3375.0	0.68	4860.0	2.03	6750.0	5.40	6750.0	10.80
16	-100.0	Clay	6750.0	5.40	1687.5	0.09	3375.0	0.68	4860.0	2.03	6750.0	5.40	6750.0	10.80

TABLE D-26: PIER 26 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-18.0	Clay	168.8	21.60	42.2	0.35	84.4	2.70	121.5	8.10	168.8	21.60	168.8	43.20
2	-22.0	Clay	222.3	21.60	55.6	0.35	111.1	2.70	160.0	8.10	222.3	21.60	222.3	43.20
3	-26.0	Clay	275.8	21.60	68.9	0.35	137.9	2.70	198.5	8.10	275.8	21.60	275.8	43.20
4	-31.0	Clay	342.6	21.60	85.7	0.35	171.3	2.70	246.7	8.10	342.6	21.60	342.6	43.20
5	-36.0	Clay	643.9	16.20	161.0	0.26	321.9	2.03	463.6	6.08	643.9	16.20	643.9	32.40
6	-41.0	Clay	1006.6	10.80	251.6	0.17	503.3	1.35	724.7	4.05	1006.6	10.80	1006.6	21.60
7	-46.0	Clay	2718.3	5.88	679.6	0.09	1359.2	0.74	1957.2	2.21	2718.3	5.88	2718.3	11.76
8	-51.0	Sand	6183.1	1.17	618.3	0.04	2844.2	0.20	4699.2	0.39	5626.7	0.59	6183.1	1.17
9	-56.0	Sand	8387.6	1.38	838.8	0.04	3858.3	0.23	6374.5	0.46	7632.7	0.69	8387.6	1.38
10	-61.0	Sand	10915.0	1.59	1091.5	0.05	5020.9	0.27	8295.4	0.52	9932.6	0.79	10915.0	1.59
11	-66.0	Sand	13765.3	1.79	1376.5	0.05	6332.1	0.30	10461.7	0.59	12526.5	0.90	13765.3	1.79
12	-71.0	Sand	16938.7	2.00	1693.9	0.06	7791.8	0.34	12873.4	0.66	15414.2	1.00	16938.7	2.00
13	-76.0	Sand	13592.5	3.80	1359.3	0.11	6252.6	0.65	10330.3	1.25	12369.2	1.90	13592.5	3.80
14	-80.0	Clay	6750.0	5.40	1687.5	0.09	3375.0	0.68	4860.0	2.03	6750.0	5.40	6750.0	10.80
15	-85.0	Clay	6750.0	5.40	1687.5	0.09	3375.0	0.68	4860.0	2.03	6750.0	5.40	6750.0	10.80
16	-90.0	Clay	6750.0	5.40	1687.5	0.09	3375.0	0.68	4860.0	2.03	6750.0	5.40	6750.0	10.80
17	-95.0	Clay	6750.0	5.40	1687.5	0.09	3375.0	0.68	4860.0	2.03	6750.0	5.40	6750.0	10.80
18	-100.0	Clay	6750.0	5.40	1687.5	0.09	3375.0	0.68	4860.0	2.03	6750.0	5.40	6750.0	10.80

TABLE D-27: PIER 27 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-5.0	Clay	89.2	8.00	22.3	0.13	44.6	1.00	64.2	3.00	89.2	8.00	89.2	16.00
2	-9.0	Clay	124.7	8.00	31.2	0.13	62.4	1.00	89.8	3.00	124.7	8.00	124.7	16.00
3	-14.0	Clay	169.2	8.00	42.3	0.13	84.6	1.00	121.8	3.00	169.2	8.00	169.2	16.00
4	-19.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
5	-24.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
6	-29.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
7	-34.0	Clay	343.8	6.00	85.9	0.10	171.9	0.75	247.5	2.25	343.8	6.00	343.8	12.00
8	-39.0	Clay	500.0	4.00	125.0	0.06	250.0	0.50	360.0	1.50	500.0	4.00	500.0	8.00
9	-44.0	Clay	3100.9	2.42	775.2	0.04	1550.4	0.30	2232.6	0.91	3100.9	2.42	3100.9	4.85
10	-47.0	Sand	6286.7	0.87	628.7	0.03	2891.9	0.15	4777.9	0.29	5720.9	0.44	6286.7	0.87
11	-52.0	Sand	7261.7	0.91	726.2	0.03	3340.4	0.15	5518.9	0.30	6608.1	0.45	7261.7	0.91
12	-57.0	Sand	8236.6	0.94	823.7	0.03	3788.8	0.16	6259.8	0.31	7495.3	0.47	8236.6	0.94
13	-62.0	Sand	9211.5	0.96	921.2	0.03	4237.3	0.16	7000.8	0.32	8382.5	0.48	9211.5	0.96
14	-67.0	Sand	10186.5	0.98	1018.6	0.03	4685.8	0.17	7741.7	0.32	9269.7	0.49	10186.5	0.98
15	-72.0	Sand	11161.4	1.00	1116.1	0.03	5134.3	0.17	8482.7	0.33	10156.9	0.50	11161.4	1.00
16	-77.0	Sand	7318.2	1.51	731.8	0.05	3366.4	0.26	5561.8	0.50	6659.5	0.75	7318.2	1.51
17	-81.0	Clay	2500.0	2.00	625.0	0.03	1250.0	0.25	1800.0	0.75	2500.0	2.00	2500.0	4.00
18	-85.0	Clay	2500.0	2.00	625.0	0.03	1250.0	0.25	1800.0	0.75	2500.0	2.00	2500.0	4.00
19	-90.0	Clay	2500.0	2.00	625.0	0.03	1250.0	0.25	1800.0	0.75	2500.0	2.00	2500.0	4.00
20	-95.0	Clay	2500.0	2.00	625.0	0.03	1250.0	0.25	1800.0	0.75	2500.0	2.00	2500.0	4.00

TABLE D-28: PIER 28 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-4.0	Clay	80.3	8.00	20.1	0.13	40.1	1.00	57.8	3.00	80.3	8.00	80.3	16.00
2	-8.0	Clay	115.8	8.00	29.0	0.13	57.9	1.00	83.4	3.00	115.8	8.00	115.8	16.00
3	-12.0	Clay	151.4	8.00	37.8	0.13	75.7	1.00	109.0	3.00	151.4	8.00	151.4	16.00
4	-17.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
5	-22.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
6	-27.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
7	-32.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
8	-37.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
9	-42.0	Clay	2648.8	4.40	662.2	0.07	1324.4	0.55	1907.1	1.65	2648.8	4.40	2648.8	8.80
10	-47.0	Sand	6085.0	0.85	608.5	0.03	2799.1	0.14	4624.6	0.28	5537.3	0.42	6085.0	0.85
11	-52.0	Sand	7059.9	0.88	706.0	0.03	3247.6	0.15	5365.6	0.29	6424.5	0.44	7059.9	0.88
12	-57.0	Sand	8034.9	0.91	803.5	0.03	3696.0	0.16	6106.5	0.30	7311.7	0.46	8034.9	0.91
13	-62.0	Sand	9009.8	0.94	901.0	0.03	4144.5	0.16	6847.5	0.31	8198.9	0.47	9009.8	0.94
14	-67.0	Sand	9984.8	0.96	998.5	0.03	4593.0	0.16	7588.4	0.32	9086.1	0.48	9984.8	0.96
15	-72.0	Sand	10959.7	0.98	1096.0	0.03	5041.5	0.17	8329.4	0.32	9973.3	0.49	10959.7	0.98
16	-77.0	Sand	7217.3	1.50	721.7	0.04	3320.0	0.25	5485.2	0.49	6567.8	0.75	7217.3	1.50
17	-82.0	Clay	2500.0	2.00	625.0	0.03	1250.0	0.25	1800.0	0.75	2500.0	2.00	2500.0	4.00
18	-87.0	Clay	2500.0	2.00	625.0	0.03	1250.0	0.25	1800.0	0.75	2500.0	2.00	2500.0	4.00
19	-93.0	Clay	2500.0	2.00	625.0	0.03	1250.0	0.25	1800.0	0.75	2500.0	2.00	2500.0	4.00

TABLE D-29: PIER 29 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-4.0	Clay	62.5	8.00	15.6	0.13	31.3	1.00	45.0	3.00	62.5	8.00	62.5	16.00
2	-7.0	Clay	89.2	8.00	22.3	0.13	44.6	1.00	64.2	3.00	89.2	8.00	89.2	16.00
3	-10.0	Clay	115.8	8.00	29.0	0.13	57.9	1.00	83.4	3.00	115.8	8.00	115.8	16.00
4	-15.0	Clay	160.3	8.00	40.1	0.13	80.1	1.00	115.4	3.00	160.3	8.00	160.3	16.00
5	-20.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
6	-25.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
7	-30.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
8	-35.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
9	-40.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
10	-45.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
11	-50.0	Clay	3032.0	4.40	758.0	0.07	1516.0	0.55	2183.1	1.65	3032.0	4.40	3032.0	8.80
12	-53.0	Sand	6461.5	0.82	646.2	0.02	2972.3	0.14	4910.8	0.27	5880.0	0.41	6461.5	0.82
13	-57.0	Sand	7241.5	0.85	724.1	0.03	3331.1	0.15	5503.5	0.28	6589.7	0.43	7241.5	0.85
14	-62.0	Sand	8216.4	0.89	821.6	0.03	3779.6	0.15	6244.5	0.29	7476.9	0.44	8216.4	0.89
15	-67.0	Sand	9191.4	0.91	919.1	0.03	4228.0	0.16	6985.4	0.30	8364.1	0.46	9191.4	0.91
16	-72.0	Sand	10166.3	0.93	1016.6	0.03	4676.5	0.16	7726.4	0.31	9251.3	0.47	10166.3	0.93
17	-77.0	Sand	6820.6	1.48	682.1	0.04	3137.5	0.25	5183.7	0.49	6206.8	0.74	6820.6	1.48
18	-82.0	Clay	2500.0	2.00	625.0	0.03	1250.0	0.25	1800.0	0.75	2500.0	2.00	2500.0	4.00
19	-87.0	Clay	2500.0	2.00	625.0	0.03	1250.0	0.25	1800.0	0.75	2500.0	2.00	2500.0	4.00
20	-93.0	Clay	2500.0	2.00	625.0	0.03	1250.0	0.25	1800.0	0.75	2500.0	2.00	2500.0	4.00

TABLE D-30: PIER 30 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-4.0	Clay	62.5	8.00	15.6	0.13	31.3	1.00	45.0	3.00	62.5	8.00	62.5	16.00
2	-8.0	Clay	98.1	8.00	24.5	0.13	49.0	1.00	70.6	3.00	98.1	8.00	98.1	16.00
3	-13.0	Clay	142.5	8.00	35.6	0.13	71.3	1.00	102.6	3.00	142.5	8.00	142.5	16.00
4	-18.0	Clay	186.9	8.00	46.7	0.13	93.5	1.00	134.6	3.00	186.9	8.00	186.9	16.00
5	-23.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
6	-26.0	Sand	2347.0	0.67	234.7	0.02	1079.6	0.11	1783.7	0.22	2135.8	0.33	2347.0	0.67
7	-30.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
8	-34.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
9	-39.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
10	-42.0	Clay	500.0	4.00	125.0	0.06	250.0	0.50	360.0	1.50	500.0	4.00	500.0	8.00
11	-46.0	Clay	500.0	4.00	125.0	0.06	250.0	0.50	360.0	1.50	500.0	4.00	500.0	8.00
12	-49.0	Sand	6337.1	0.88	633.7	0.03	2915.1	0.15	4816.2	0.29	5766.8	0.44	6337.1	0.88
13	-53.0	Sand	7117.1	0.91	711.7	0.03	3273.9	0.15	5409.0	0.30	6476.6	0.45	7117.1	0.91
14	-58.0	Sand	8092.0	0.94	809.2	0.03	3722.3	0.16	6149.9	0.31	7363.8	0.47	8092.0	0.94
15	-63.0	Sand	9067.0	0.96	906.7	0.03	4170.8	0.16	6890.9	0.32	8250.9	0.48	9067.0	0.96
16	-68.0	Sand	10041.9	0.98	1004.2	0.03	4619.3	0.17	7631.9	0.32	9138.1	0.49	10041.9	0.98
17	-73.0	Sand	11016.9	1.00	1101.7	0.03	5067.8	0.17	8372.8	0.33	10025.3	0.50	11016.9	1.00
18	-78.0	Sand	11991.8	1.01	1199.2	0.03	5516.2	0.17	9113.8	0.33	10912.5	0.51	11991.8	1.01
19	-83.0	Sand	12966.8	1.03	1296.7	0.03	5964.7	0.17	9854.7	0.34	11799.7	0.51	12966.8	1.03
20	-88.0	Sand	13941.7	1.04	1394.2	0.03	6413.2	0.18	10595.7	0.34	12686.9	0.52	13941.7	1.04
21	-93.0	Clay	2500.0	2.00	625.0	0.03	1250.0	0.25	1800.0	0.75	2500.0	2.00	2500.0	4.00

TABLE D-31: PIER 31 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-8.0	Clay	106.9	8.00	26.7	0.13	53.5	1.00	77.0	3.00	106.9	8.00	106.9	16.00
2	-12.0	Clay	142.5	8.00	35.6	0.13	71.3	1.00	102.6	3.00	142.5	8.00	142.5	16.00
3	-16.0	Clay	178.1	8.00	44.5	0.13	89.0	1.00	128.2	3.00	178.1	8.00	178.1	16.00
4	-20.0	Clay	774.4	4.25	193.6	0.07	387.2	0.53	557.5	1.59	774.4	4.25	774.4	8.50
5	-24.0	Sand	2241.2	0.67	224.1	0.02	1031.0	0.11	1703.3	0.22	2039.5	0.33	2241.2	0.67
6	-28.0	Sand	1757.7	4.42	175.8	0.13	808.5	0.75	1335.9	1.46	1599.5	2.21	1757.7	4.42
7	-32.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
8	-37.0	Clay	343.8	6.00	85.9	0.10	171.9	0.75	247.5	2.25	343.8	6.00	343.8	12.00
9	-40.0	Clay	500.0	4.00	125.0	0.06	250.0	0.50	360.0	1.50	500.0	4.00	500.0	8.00
10	-43.0	Clay	3174.8	2.46	793.7	0.04	1587.4	0.31	2285.9	0.92	3174.8	2.46	3174.8	4.91
11	-46.0	Sand	6434.6	0.94	643.5	0.03	2959.9	0.16	4890.3	0.31	5855.5	0.47	6434.6	0.94
12	-50.0	Sand	7214.6	0.96	721.5	0.03	3318.7	0.16	5483.1	0.32	6565.3	0.48	7214.6	0.96
13	-55.0	Sand	8189.5	0.98	819.0	0.03	3767.2	0.17	6224.0	0.32	7452.5	0.49	8189.5	0.98
14	-60.0	Sand	9164.5	1.00	916.4	0.03	4215.7	0.17	6965.0	0.33	8339.7	0.50	9164.5	1.00
15	-65.0	Sand	10139.4	1.02	1013.9	0.03	4664.1	0.17	7706.0	0.34	9226.9	0.51	10139.4	1.02
16	-70.0	Sand	11114.4	1.04	1111.4	0.03	5112.6	0.18	8446.9	0.34	10114.1	0.52	11114.4	1.04

TABLE D-32: PIER 32 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-8.5	Clay	102.5	8.00	25.6	0.13	51.3	1.00	73.8	3.00	102.5	8.00	102.5	16.00
2	-13.0	Clay	142.5	8.00	35.6	0.13	71.3	1.00	102.6	3.00	142.5	8.00	142.5	16.00
3	-18.0	Clay	186.9	8.00	46.7	0.13	93.5	1.00	134.6	3.00	186.9	8.00	186.9	16.00
4	-23.0	Clay	934.8	4.28	233.7	0.07	467.4	0.53	673.1	1.60	934.8	4.28	934.8	8.55
5	-28.0	Sand	2921.4	0.76	292.1	0.02	1343.8	0.13	2220.3	0.25	2658.5	0.38	2921.4	0.76
6	-33.0	Sand	2282.3	4.47	228.2	0.13	1049.9	0.76	1734.6	1.48	2076.9	2.24	2282.3	4.47
7	-38.0	Clay	343.8	6.00	85.9	0.10	171.9	0.75	247.5	2.25	343.8	6.00	343.8	12.00
8	-43.0	Clay	3161.4	2.47	790.3	0.04	1580.7	0.31	2276.2	0.92	3161.4	2.47	3161.4	4.93
9	-46.0	Sand	6407.7	0.95	640.8	0.03	2947.6	0.16	4869.9	0.31	5831.0	0.48	6407.7	0.95
10	-50.0	Sand	7187.7	0.98	718.8	0.03	3306.3	0.17	5462.6	0.32	6540.8	0.49	7187.7	0.98
11	-55.0	Sand	8162.6	1.00	816.3	0.03	3754.8	0.17	6203.6	0.33	7428.0	0.50	8162.6	1.00
12	-60.0	Sand	9137.6	1.02	913.8	0.03	4203.3	0.17	6944.6	0.34	8315.2	0.51	9137.6	1.02
13	-65.0	Sand	10112.5	1.04	1011.3	0.03	4651.8	0.18	7685.5	0.34	9202.4	0.52	10112.5	1.04
14	-70.0	Sand	11087.5	1.05	1108.7	0.03	5100.2	0.18	8426.5	0.35	10089.6	0.52	11087.5	1.05

TABLE D-33: PIER 33 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-8.5	Clay	84.7	8.00	21.2	0.13	42.4	1.00	61.0	3.00	84.7	8.00	84.7	16.00
2	-11.5	Clay	111.4	8.00	27.8	0.13	55.7	1.00	80.2	3.00	111.4	8.00	111.4	16.00
3	-15.0	Clay	142.5	8.00	35.6	0.13	71.3	1.00	102.6	3.00	142.5	8.00	142.5	16.00
4	-20.0	Clay	186.9	8.00	46.7	0.13	93.5	1.00	134.6	3.00	186.9	8.00	186.9	16.00
5	-25.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
6	-30.0	Clay	1410.1	4.34	352.5	0.07	705.1	0.54	1015.3	1.63	1410.1	4.34	1410.1	8.69
7	-35.0	Sand	2114.2	4.44	211.4	0.13	972.6	0.75	1606.8	1.46	1924.0	2.22	2114.2	4.44
8	-39.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
9	-44.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
10	-49.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
11	-54.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
12	-59.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
13	-64.0	Clay	3966.6	4.42	991.7	0.07	1983.3	0.55	2856.0	1.66	3966.6	4.42	3966.6	8.83
14	-68.0	Sand	8525.7	0.86	852.6	0.03	3921.8	0.15	6479.5	0.28	7758.4	0.43	8525.7	0.86
15	-73.0	Sand	9500.7	0.89	950.1	0.03	4370.3	0.15	7220.5	0.29	8645.6	0.44	9500.7	0.89
16	-78.0	Sand	10475.6	0.91	1047.6	0.03	4818.8	0.15	7961.5	0.30	9532.8	0.45	10475.6	0.91

TABLE D-34: PIER 34 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-8.0	Clay	89.2	8.00	22.3	0.13	44.6	1.00	64.2	3.00	89.2	8.00	89.2	16.00
2	-13.0	Clay	133.6	8.00	33.4	0.13	66.8	1.00	96.2	3.00	133.6	8.00	133.6	16.00
3	-18.0	Clay	178.1	8.00	44.5	0.13	89.0	1.00	128.2	3.00	178.1	8.00	178.1	16.00
4	-23.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
5	-28.0	Clay	1306.6	4.33	326.6	0.07	653.3	0.54	940.7	1.62	1306.6	4.33	1306.6	8.66
6	-32.0	Sand	1874.9	4.41	187.5	0.13	862.4	0.75	1424.9	1.46	1706.1	2.21	1874.9	4.41
7	-37.0	Clay	343.8	6.00	85.9	0.10	171.9	0.75	247.5	2.25	343.8	6.00	343.8	12.00
8	-41.0	Clay	500.0	4.00	125.0	0.06	250.0	0.50	360.0	1.50	500.0	4.00	500.0	8.00
9	-45.0	Clay	500.0	4.00	125.0	0.06	250.0	0.50	360.0	1.50	500.0	4.00	500.0	8.00
10	-50.0	Clay	3477.4	2.45	869.4	0.04	1738.7	0.31	2503.7	0.92	3477.4	2.45	3477.4	4.90
11	-55.0	Sand	7429.7	0.93	743.0	0.03	3417.7	0.16	5646.6	0.31	6761.1	0.46	7429.7	0.93
12	-60.0	Sand	8404.7	0.96	840.5	0.03	3866.2	0.16	6387.6	0.32	7648.3	0.48	8404.7	0.96
13	-65.0	Sand	9379.6	0.98	938.0	0.03	4314.6	0.17	7128.5	0.32	8535.5	0.49	9379.6	0.98
14	-70.0	Sand	10354.6	1.00	1035.5	0.03	4763.1	0.17	7869.5	0.33	9422.7	0.50	10354.6	1.00
15	-75.0	Sand	11329.5	1.01	1133.0	0.03	5211.6	0.17	8610.4	0.33	10309.9	0.51	11329.5	1.01
16	-80.0	Sand	12304.5	1.03	1230.4	0.03	5660.1	0.17	9351.4	0.34	11197.1	0.51	12304.5	1.03
17	-85.0	Sand	13279.4	1.04	1327.9	0.03	6108.5	0.18	10092.4	0.34	12084.3	0.52	13279.4	1.04

TABLE D-35: PIER 35 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-7.5	Clay	84.7	8.00	21.2	0.13	42.4	1.00	61.0	3.00	84.7	8.00	84.7	16.00
2	-11.0	Clay	115.8	8.00	29.0	0.13	57.9	1.00	83.4	3.00	115.8	8.00	115.8	16.00
3	-16.0	Clay	160.3	8.00	40.1	0.13	80.1	1.00	115.4	3.00	160.3	8.00	160.3	16.00
4	-21.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
5	-26.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
6	-31.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
7	-36.0	Clay	343.8	6.00	85.9	0.10	171.9	0.75	247.5	2.25	343.8	6.00	343.8	12.00
8	-40.0	Clay	500.0	4.00	125.0	0.06	250.0	0.50	360.0	1.50	500.0	4.00	500.0	8.00
9	-44.0	Clay	2875.6	2.42	718.9	0.04	1437.8	0.30	2070.4	0.91	2875.6	2.42	2875.6	4.84
10	-49.0	Sand	6226.2	0.88	622.6	0.03	2864.0	0.15	4731.9	0.29	5665.8	0.44	6226.2	0.88
11	-54.0	Sand	7201.1	0.92	720.1	0.03	3312.5	0.16	5472.9	0.30	6553.0	0.46	7201.1	0.92
12	-59.0	Sand	8176.1	0.95	817.6	0.03	3761.0	0.16	6213.8	0.31	7440.2	0.47	8176.1	0.95
13	-64.0	Sand	9151.0	0.97	915.1	0.03	4209.5	0.16	6954.8	0.32	8327.4	0.48	9151.0	0.97
14	-69.0	Sand	10126.0	0.99	1012.6	0.03	4657.9	0.17	7695.7	0.33	9214.6	0.49	10126.0	0.99
15	-74.0	Sand	11100.9	1.01	1110.1	0.03	5106.4	0.17	8436.7	0.33	10101.8	0.50	11100.9	1.01
16	-79.0	Sand	12075.9	1.02	1207.6	0.03	5554.9	0.17	9177.7	0.34	10989.0	0.51	12075.9	1.02
17	-85.0	Sand	13245.8	1.03	1324.6	0.03	6093.1	0.18	10066.8	0.34	12053.7	0.52	13245.8	1.03

TABLE D-36: PIER 36 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-8.0	Clay	98.1	8.00	24.5	0.13	49.0	1.00	70.6	3.00	98.1	8.00	98.1	16.00
2	-11.0	Clay	124.7	8.00	31.2	0.13	62.4	1.00	89.8	3.00	124.7	8.00	124.7	16.00
3	-16.0	Clay	169.2	8.00	42.3	0.13	84.6	1.00	121.8	3.00	169.2	8.00	169.2	16.00
4	-21.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
5	-26.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
6	-31.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
7	-36.0	Clay	343.8	6.00	85.9	0.10	171.9	0.75	247.5	2.25	343.8	6.00	343.8	12.00
8	-40.0	Clay	500.0	4.00	125.0	0.06	250.0	0.50	360.0	1.50	500.0	4.00	500.0	8.00
9	-44.0	Clay	2939.5	2.42	734.9	0.04	1469.8	0.30	2116.4	0.91	2939.5	2.42	2939.5	4.84
10	-49.0	Sand	6353.9	0.88	635.4	0.03	2922.8	0.15	4829.0	0.29	5782.1	0.44	6353.9	0.88
11	-54.0	Sand	7328.9	0.92	732.9	0.03	3371.3	0.16	5570.0	0.30	6669.3	0.46	7328.9	0.92
12	-59.0	Sand	8303.8	0.94	830.4	0.03	3819.8	0.16	6310.9	0.31	7556.5	0.47	8303.8	0.94
13	-64.0	Sand	9278.8	0.97	927.9	0.03	4268.2	0.16	7051.9	0.32	8443.7	0.48	9278.8	0.97
14	-69.0	Sand	10253.7	0.99	1025.4	0.03	4716.7	0.17	7792.8	0.33	9330.9	0.49	10253.7	0.99
15	-74.0	Sand	11228.7	1.00	1122.9	0.03	5165.2	0.17	8533.8	0.33	10218.1	0.50	11228.7	1.00
16	-79.0	Sand	12203.6	1.02	1220.4	0.03	5613.7	0.17	9274.7	0.34	11105.3	0.51	12203.6	1.02
17	-85.0	Sand	13373.5	1.03	1337.4	0.03	6151.8	0.18	10163.9	0.34	12169.9	0.52	13373.5	1.03

TABLE D-37: PIER 37 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-8.5	Clay	120.3	8.00	30.1	0.13	60.1	1.00	86.6	3.00	120.3	8.00	120.3	16.00
2	-11.0	Clay	142.5	8.00	35.6	0.13	71.3	1.00	102.6	3.00	142.5	8.00	142.5	16.00
3	-16.0	Clay	186.9	8.00	46.7	0.13	93.5	1.00	134.6	3.00	186.9	8.00	186.9	16.00
4	-21.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
5	-26.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
6	-31.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
7	-36.0	Clay	343.8	6.00	85.9	0.10	171.9	0.75	247.5	2.25	343.8	6.00	343.8	12.00
8	-40.0	Clay	500.0	4.00	125.0	0.06	250.0	0.50	360.0	1.50	500.0	4.00	500.0	8.00
9	-44.0	Clay	3067.3	2.42	766.8	0.04	1533.6	0.30	2208.4	0.91	3067.3	2.42	3067.3	4.84
10	-48.0	Sand	6414.5	0.87	641.4	0.03	2950.7	0.15	4875.0	0.29	5837.2	0.44	6414.5	0.87
11	-53.0	Sand	7389.4	0.91	738.9	0.03	3399.1	0.15	5615.9	0.30	6724.4	0.45	7389.4	0.91
12	-58.0	Sand	8364.4	0.93	836.4	0.03	3847.6	0.16	6356.9	0.31	7611.6	0.47	8364.4	0.93
13	-63.0	Sand	9339.3	0.96	933.9	0.03	4296.1	0.16	7097.9	0.32	8498.8	0.48	9339.3	0.96
14	-68.0	Sand	10314.2	0.98	1031.4	0.03	4744.5	0.17	7838.8	0.32	9385.9	0.49	10314.2	0.98
15	-73.0	Sand	11289.2	0.99	1128.9	0.03	5193.0	0.17	8579.8	0.33	10273.2	0.50	11289.2	0.99
16	-78.0	Sand	12264.1	1.01	1226.4	0.03	5641.5	0.17	9320.7	0.33	11160.3	0.50	12264.1	1.01
17	-83.0	Sand	7869.5	1.51	787.0	0.05	3620.0	0.26	5980.8	0.50	7161.3	0.76	7869.5	1.51
18	-88.0	Clay	2500.0	2.00	625.0	0.03	1250.0	0.25	1800.0	0.75	2500.0	2.00	2500.0	4.00

TABLE D-38: PIER 38 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-8.5	Clay	138.1	8.00	34.5	0.13	69.0	1.00	99.4	3.00	138.1	8.00	138.1	16.00
2	-11.0	Clay	160.3	8.00	40.1	0.13	80.1	1.00	115.4	3.00	160.3	8.00	160.3	16.00
3	-15.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
4	-20.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
5	-25.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
6	-30.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
7	-35.0	Clay	343.8	6.00	85.9	0.10	171.9	0.75	247.5	2.25	343.8	6.00	343.8	12.00
8	-39.0	Clay	500.0	4.00	125.0	0.06	250.0	0.50	360.0	1.50	500.0	4.00	500.0	8.00
9	-43.0	Clay	3131.1	2.42	782.8	0.04	1565.6	0.30	2254.4	0.91	3131.1	2.42	3131.1	4.84
10	-46.0	Sand	6347.2	0.86	634.7	0.03	2919.7	0.15	4823.9	0.28	5776.0	0.43	6347.2	0.86
11	-51.0	Sand	7322.2	0.90	732.2	0.03	3368.2	0.15	5564.8	0.30	6663.2	0.45	7322.2	0.90
12	-56.0	Sand	8297.1	0.93	829.7	0.03	3816.7	0.16	6305.8	0.31	7550.4	0.46	8297.1	0.93
13	-61.0	Sand	9272.1	0.95	927.2	0.03	4265.1	0.16	7046.8	0.31	8437.6	0.48	9272.1	0.95
14	-66.0	Sand	10247.0	0.97	1024.7	0.03	4713.6	0.16	7787.7	0.32	9324.8	0.49	10247.0	0.97
15	-71.0	Sand	11221.9	0.99	1122.2	0.03	5162.1	0.17	8528.7	0.33	10212.0	0.49	11221.9	0.99
16	-76.0	Sand	7348.4	1.50	734.8	0.05	3380.3	0.26	5584.8	0.50	6687.1	0.75	7348.4	1.50
17	-81.0	Clay	2500.0	2.00	625.0	0.03	1250.0	0.25	1800.0	0.75	2500.0	2.00	2500.0	4.00
18	-86.0	Clay	2500.0	2.00	625.0	0.03	1250.0	0.25	1800.0	0.75	2500.0	2.00	2500.0	4.00
19	-91.0	Clay	2500.0	2.00	625.0	0.03	1250.0	0.25	1800.0	0.75	2500.0	2.00	2500.0	4.00
20	-96.0	Clay	2500.0	2.00	625.0	0.03	1250.0	0.25	1800.0	0.75	2500.0	2.00	2500.0	4.00
21	-102.0	Clay	2500.0	2.00	625.0	0.03	1250.0	0.25	1800.0	0.75	2500.0	2.00	2500.0	4.00

TABLE D-39: PIER 39 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-8.0	Clay	124.7	8.00	31.2	0.13	62.4	1.00	89.8	3.00	124.7	8.00	124.7	16.00
2	-13.0	Clay	169.2	8.00	42.3	0.13	84.6	1.00	121.8	3.00	169.2	8.00	169.2	16.00
3	-18.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
4	-23.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
5	-28.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
6	-33.0	Clay	343.8	6.00	85.9	0.10	171.9	0.75	247.5	2.25	343.8	6.00	343.8	12.00
7	-38.0	Clay	500.0	4.00	125.0	0.06	250.0	0.50	360.0	1.50	500.0	4.00	500.0	8.00
8	-43.0	Clay	3100.9	2.42	775.2	0.04	1550.4	0.30	2232.6	0.91	3100.9	2.42	3100.9	4.85
9	-48.0	Sand	6676.7	0.89	667.7	0.03	3071.3	0.15	5074.3	0.29	6075.8	0.44	6676.7	0.89
10	-53.0	Sand	7651.6	0.92	765.2	0.03	3519.7	0.16	5815.2	0.30	6963.0	0.46	7651.6	0.92
11	-58.0	Sand	8626.6	0.95	862.7	0.03	3968.2	0.16	6556.2	0.31	7850.2	0.47	8626.6	0.95
12	-63.0	Sand	9601.5	0.97	960.2	0.03	4416.7	0.16	7297.2	0.32	8737.4	0.48	9601.5	0.97
13	-68.0	Sand	10576.5	0.99	1057.6	0.03	4865.2	0.17	8038.1	0.33	9624.6	0.49	10576.5	0.99
14	-73.0	Sand	7025.7	1.50	702.6	0.05	3231.8	0.26	5339.5	0.50	6393.4	0.75	7025.7	1.50
15	-76.0	Clay	2500.0	2.00	625.0	0.03	1250.0	0.25	1800.0	0.75	2500.0	2.00	2500.0	4.00

TABLE D-40: PIER 40 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-7.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
2	-12.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
3	-17.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
4	-22.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
5	-27.0	Clay	343.8	6.00	85.9	0.10	171.9	0.75	247.5	2.25	343.8	6.00	343.8	12.00
6	-32.0	Clay	500.0	4.00	125.0	0.06	250.0	0.50	360.0	1.50	500.0	4.00	500.0	8.00
7	-37.0	Clay	3790.1	2.51	947.5	0.04	1895.0	0.31	2728.8	0.94	3790.1	2.51	3790.1	5.03
8	-41.0	Sand	7860.1	1.05	786.0	0.03	3615.6	0.18	5973.6	0.34	7152.7	0.52	7860.1	1.05
9	-46.0	Sand	8835.0	1.06	883.5	0.03	4064.1	0.18	6714.6	0.35	8039.9	0.53	8835.0	1.06
10	-51.0	Sand	9810.0	1.08	981.0	0.03	4512.6	0.18	7455.6	0.35	8927.1	0.54	9810.0	1.08
11	-56.0	Sand	10784.9	1.09	1078.5	0.03	4961.1	0.18	8196.5	0.36	9814.3	0.54	10784.9	1.09
12	-61.0	Sand	11759.8	1.10	1176.0	0.03	5409.5	0.19	8937.5	0.36	10701.5	0.55	11759.8	1.10
13	-66.0	Sand	12734.8	1.11	1273.5	0.03	5858.0	0.19	9678.4	0.36	11588.6	0.55	12734.8	1.11
14	-71.0	Sand	8104.9	1.56	810.5	0.05	3728.2	0.26	6159.7	0.51	7375.4	0.78	8104.9	1.56
15	-75.0	Clay	2500.0	2.00	625.0	0.03	1250.0	0.25	1800.0	0.75	2500.0	2.00	2500.0	4.00
16	-80.0	Clay	2500.0	2.00	625.0	0.03	1250.0	0.25	1800.0	0.75	2500.0	2.00	2500.0	4.00
17	-85.0	Clay	2500.0	2.00	625.0	0.03	1250.0	0.25	1800.0	0.75	2500.0	2.00	2500.0	4.00

TABLE D-41: PIER 41 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-6.5	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
2	-11.5	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
3	-16.5	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
4	-21.5	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
5	-27.0	Clay	343.8	6.00	85.9	0.10	171.9	0.75	247.5	2.25	343.8	6.00	343.8	12.00
6	-32.0	Clay	500.0	4.00	125.0	0.06	250.0	0.50	360.0	1.50	500.0	4.00	500.0	8.00
7	-37.0	Clay	3958.2	2.53	989.5	0.04	1979.1	0.32	2849.9	0.95	3958.2	2.53	3958.2	5.05
8	-40.0	Sand	8001.3	1.06	800.1	0.03	3680.6	0.18	6081.0	0.35	7281.1	0.53	8001.3	1.06
9	-45.0	Sand	8976.2	1.08	897.6	0.03	4129.1	0.18	6821.9	0.36	8168.4	0.54	8976.2	1.08
10	-50.0	Sand	9951.2	1.09	995.1	0.03	4577.5	0.19	7562.9	0.36	9055.5	0.55	9951.2	1.09
11	-55.0	Sand	10926.1	1.10	1092.6	0.03	5026.0	0.19	8303.8	0.36	9942.7	0.55	10926.1	1.10
12	-60.0	Sand	11901.0	1.11	1190.1	0.03	5474.5	0.19	9044.8	0.37	10829.9	0.56	11901.0	1.11
13	-65.0	Sand	12876.0	1.12	1287.6	0.03	5923.0	0.19	9785.7	0.37	11717.1	0.56	12876.0	1.12
14	-70.0	Sand	8175.5	1.56	817.5	0.05	3760.7	0.27	6213.3	0.52	7439.7	0.78	8175.5	1.56
15	-75.0	Clay	2500.0	2.00	625.0	0.03	1250.0	0.25	1800.0	0.75	2500.0	2.00	2500.0	4.00
16	-80.0	Clay	2500.0	2.00	625.0	0.03	1250.0	0.25	1800.0	0.75	2500.0	2.00	2500.0	4.00
17	-85.0	Clay	2500.0	2.00	625.0	0.03	1250.0	0.25	1800.0	0.75	2500.0	2.00	2500.0	4.00

TABLE D-42: PIER 42 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-6.5	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
2	-9.5	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
3	-13.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
4	-18.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
5	-23.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
6	-28.0	Clay	343.8	6.00	85.9	0.10	171.9	0.75	247.5	2.25	343.8	6.00	343.8	12.00
7	-32.0	Clay	500.0	4.00	125.0	0.06	250.0	0.50	360.0	1.50	500.0	4.00	500.0	8.00
8	-37.0	Clay	4055.6	2.53	1013.9	0.04	2027.8	0.32	2920.1	0.95	4055.6	2.53	4055.6	5.06
9	-40.0	Sand	8196.3	1.07	819.6	0.03	3770.3	0.18	6229.2	0.35	7458.6	0.53	8196.3	1.07
10	-44.0	Sand	8976.2	1.08	897.6	0.03	4129.1	0.18	6821.9	0.36	8168.4	0.54	8976.2	1.08
11	-49.0	Sand	9951.2	1.09	995.1	0.03	4577.5	0.19	7562.9	0.36	9055.5	0.55	9951.2	1.09
12	-54.0	Sand	10926.1	1.10	1092.6	0.03	5026.0	0.19	8303.8	0.36	9942.7	0.55	10926.1	1.10
13	-59.0	Sand	11901.0	1.11	1190.1	0.03	5474.5	0.19	9044.8	0.37	10829.9	0.56	11901.0	1.11
14	-64.0	Sand	12876.0	1.12	1287.6	0.03	5923.0	0.19	9785.7	0.37	11717.1	0.56	12876.0	1.12
15	-69.0	Sand	8175.5	1.56	817.5	0.05	3760.7	0.27	6213.3	0.52	7439.7	0.78	8175.5	1.56
16	-73.0	Clay	2500.0	2.00	625.0	0.03	1250.0	0.25	1800.0	0.75	2500.0	2.00	2500.0	4.00
17	-78.0	Clay	2500.0	2.00	625.0	0.03	1250.0	0.25	1800.0	0.75	2500.0	2.00	2500.0	4.00
18	-83.0	Clay	2500.0	2.00	625.0	0.03	1250.0	0.25	1800.0	0.75	2500.0	2.00	2500.0	4.00

TABLE D-43: PIER 43 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	-2.5	Clay	179.2	8.00	44.8	0.13	89.6	1.00	129.0	3.00	179.2	8.00	179.2	16.00
2	-6.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
3	-10.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
4	-15.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
5	-20.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
6	-25.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
7	-30.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
8	-34.0	Clay	500.0	4.00	125.0	0.06	250.0	0.50	360.0	1.50	500.0	4.00	500.0	8.00
9	-38.0	Clay	500.0	4.00	125.0	0.06	250.0	0.50	360.0	1.50	500.0	4.00	500.0	8.00
10	-42.0	Clay	500.0	4.00	125.0	0.06	250.0	0.50	360.0	1.50	500.0	4.00	500.0	8.00
11	-46.0	Clay	500.0	4.00	125.0	0.06	250.0	0.50	360.0	1.50	500.0	4.00	500.0	8.00
12	-49.0	Sand	8545.9	0.91	854.6	0.03	3931.1	0.15	6494.9	0.30	7776.8	0.45	8545.9	0.91
13	-52.0	Sand	9130.9	0.92	913.1	0.03	4200.2	0.16	6939.4	0.30	8309.1	0.46	9130.9	0.92
14	-57.0	Sand	10105.8	0.94	1010.6	0.03	4648.7	0.16	7680.4	0.31	9196.3	0.47	10105.8	0.94
15	-62.0	Sand	11080.7	0.96	1108.1	0.03	5097.1	0.16	8421.4	0.32	10083.5	0.48	11080.7	0.96
16	-67.0	Sand	12055.7	0.98	1205.6	0.03	5545.6	0.17	9162.3	0.32	10970.7	0.49	12055.7	0.98
17	-72.0	Sand	13030.6	0.99	1303.1	0.03	5994.1	0.17	9903.3	0.33	11857.9	0.50	13030.6	0.99
18	-76.0	Clay	2500.0	2.00	625.0	0.03	1250.0	0.25	1800.0	0.75	2500.0	2.00	2500.0	4.00
19	-80.0	Clay	2500.0	2.00	625.0	0.03	1250.0	0.25	1800.0	0.75	2500.0	2.00	2500.0	4.00

TABLE D-44: PIER 44 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	1.5	Clay	276.0	4.00	69.0	0.06	138.0	0.50	198.7	1.50	276.0	4.00	276.0	8.00
2	-1.5	Clay	342.5	4.00	85.6	0.06	171.3	0.50	246.6	1.50	342.5	4.00	342.5	8.00
3	-5.0	Clay	300.0	6.00	75.0	0.10	150.0	0.75	216.0	2.25	300.0	6.00	300.0	12.00
4	-9.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
5	-13.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
6	-18.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
7	-23.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
8	-28.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
9	-33.0	Clay	343.8	6.00	85.9	0.10	171.9	0.75	247.5	2.25	343.8	6.00	343.8	12.00
10	-36.0	Clay	500.0	4.00	125.0	0.06	250.0	0.50	360.0	1.50	500.0	4.00	500.0	8.00
11	-39.0	Clay	500.0	4.00	125.0	0.06	250.0	0.50	360.0	1.50	500.0	4.00	500.0	8.00
12	-44.0	Clay	500.0	4.00	125.0	0.06	250.0	0.50	360.0	1.50	500.0	4.00	500.0	8.00
13	-49.0	Clay	500.0	4.00	125.0	0.06	250.0	0.50	360.0	1.50	500.0	4.00	500.0	8.00
14	-54.0	Clay	5245.8	2.52	1311.4	0.04	2622.9	0.32	3776.9	0.95	5245.8	2.52	5245.8	5.04
15	-57.0	Sand	10576.5	1.05	1057.6	0.03	4865.2	0.18	8038.1	0.35	9624.6	0.52	10576.5	1.05
16	-61.0	Sand	11356.4	1.06	1135.6	0.03	5223.9	0.18	8630.9	0.35	10334.3	0.53	11356.4	1.06
17	-66.0	Sand	12331.4	1.07	1233.1	0.03	5672.4	0.18	9371.8	0.35	11221.5	0.54	12331.4	1.07
18	-71.0	Sand	13306.3	1.08	1330.6	0.03	6120.9	0.18	10112.8	0.36	12108.7	0.54	13306.3	1.08
19	-76.0	Sand	14281.2	1.09	1428.1	0.03	6569.4	0.19	10853.7	0.36	12995.9	0.54	14281.2	1.09
20	-81.0	Sand	8878.1	1.55	887.8	0.05	4083.9	0.26	6747.3	0.51	8079.1	0.77	8878.1	1.55
21	-84.0	Clay	2500.0	2.00	625.0	0.03	1250.0	0.25	1800.0	0.75	2500.0	2.00	2500.0	4.00

TABLE D-45: TRESTLE BENTS E01~05 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	6.0	Clay	166.7	4.00	41.7	0.06	83.3	0.50	120.0	1.50	166.7	4.00	166.7	8.00
2	1.0	Clay	210.1	6.00	52.5	0.10	105.0	0.75	151.3	2.25	210.1	6.00	210.1	12.00
3	-4.0	Clay	180.7	8.00	45.2	0.13	90.3	1.00	130.1	3.00	180.7	8.00	180.7	16.00
4	-9.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
5	-14.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
6	-19.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
7	-24.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
8	-29.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
9	-34.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
10	-39.0	Clay	343.8	6.00	85.9	0.10	171.9	0.75	247.5	2.25	343.8	6.00	343.8	12.00
11	-43.0	Clay	500.0	4.00	125.0	0.06	250.0	0.50	360.0	1.50	500.0	4.00	500.0	8.00
12	-48.0	Clay	500.0	4.00	125.0	0.06	250.0	0.50	360.0	1.50	500.0	4.00	500.0	8.00
13	-53.0	Clay	4963.4	2.50	1240.8	0.04	2481.7	0.31	3573.6	0.94	4963.4	2.50	4963.4	5.00
14	-57.0	Sand	10206.7	1.01	1020.7	0.03	4695.1	0.17	7757.1	0.33	9288.1	0.51	10206.7	1.01
15	-62.0	Sand	11181.6	1.03	1118.2	0.03	5143.5	0.17	8498.0	0.34	10175.3	0.51	11181.6	1.03

TABLE D-46: TRESTLE BENTS E06~10 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	6.0	Clay	166.7	4.00	41.7	0.06	83.3	0.50	120.0	1.50	166.7	4.00	166.7	8.00
2	1.0	Clay	210.1	6.00	52.5	0.10	105.0	0.75	151.3	2.25	210.1	6.00	210.1	12.00
3	-4.0	Clay	180.7	8.00	45.2	0.13	90.3	1.00	130.1	3.00	180.7	8.00	180.7	16.00
4	-9.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
5	-14.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
6	-19.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
7	-24.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
8	-29.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
9	-34.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
10	-39.0	Clay	343.8	6.00	85.9	0.10	171.9	0.75	247.5	2.25	343.8	6.00	343.8	12.00
11	-42.0	Clay	500.0	4.00	125.0	0.06	250.0	0.50	360.0	1.50	500.0	4.00	500.0	8.00
12	-46.0	Clay	500.0	4.00	125.0	0.06	250.0	0.50	360.0	1.50	500.0	4.00	500.0	8.00
13	-50.0	Clay	4721.3	2.50	1180.3	0.04	2360.6	0.31	3399.3	0.94	4721.3	2.50	4721.3	5.00
14	-54.0	Sand	9722.5	1.01	972.3	0.03	4472.4	0.17	7389.1	0.33	8847.5	0.51	9722.5	1.01
15	-58.0	Sand	10502.5	1.03	1050.3	0.03	4831.2	0.17	7981.9	0.34	9557.3	0.51	10502.5	1.03
16	-62.0	Sand	11282.5	1.04	1128.2	0.03	5189.9	0.18	8574.7	0.34	10267.0	0.52	11282.5	1.04

TABLE D-47: TRESTLE BENTS E11~15 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	6.0	Clay	166.7	4.00	41.7	0.06	83.3	0.50	120.0	1.50	166.7	4.00	166.7	8.00
2	2.0	Clay	263.9	4.00	66.0	0.06	131.9	0.50	190.0	1.50	263.9	4.00	263.9	8.00
3	-2.0	Clay	258.8	6.00	64.7	0.10	129.4	0.75	186.3	2.25	258.8	6.00	258.8	12.00
4	-7.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
5	-12.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
6	-17.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
7	-22.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
8	-27.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
9	-32.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
10	-37.0	Clay	343.8	6.00	85.9	0.10	171.9	0.75	247.5	2.25	343.8	6.00	343.8	12.00
11	-42.0	Clay	500.0	4.00	125.0	0.06	250.0	0.50	360.0	1.50	500.0	4.00	500.0	8.00
12	-47.0	Clay	4563.3	2.51	1140.8	0.04	2281.6	0.31	3285.6	0.94	4563.3	2.51	4563.3	5.02
13	-52.0	Sand	9601.5	1.03	960.2	0.03	4416.7	0.18	7297.1	0.34	8737.4	0.52	9601.5	1.03
14	-57.0	Sand	10576.5	1.05	1057.6	0.03	4865.2	0.18	8038.1	0.35	9624.6	0.52	10576.5	1.05
15	-62.0	Sand	11551.4	1.06	1155.1	0.03	5313.6	0.18	8779.1	0.35	10511.8	0.53	11551.4	1.06

TABLE D-48: TRESTLE BENTS E16~19 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	6.0	Clay	166.7	4.00	41.7	0.06	83.3	0.50	120.0	1.50	166.7	4.00	166.7	8.00
2	3.0	Clay	239.6	4.00	59.9	0.06	119.8	0.50	172.5	1.50	239.6	4.00	239.6	8.00
3	-1.0	Clay	332.5	4.00	83.1	0.06	166.3	0.50	239.4	1.50	332.5	4.00	332.5	8.00
4	-5.0	Clay	300.0	6.00	75.0	0.10	150.0	0.75	216.0	2.25	300.0	6.00	300.0	12.00
5	-9.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
6	-13.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
7	-18.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
8	-23.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
9	-28.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
10	-33.0	Clay	343.8	6.00	85.9	0.10	171.9	0.75	247.5	2.25	343.8	6.00	343.8	12.00
11	-37.0	Clay	500.0	4.00	125.0	0.06	250.0	0.50	360.0	1.50	500.0	4.00	500.0	8.00
12	-42.0	Clay	500.0	4.00	125.0	0.06	250.0	0.50	360.0	1.50	500.0	4.00	500.0	8.00
13	-47.0	Clay	500.0	4.00	125.0	0.06	250.0	0.50	360.0	1.50	500.0	4.00	500.0	8.00
14	-52.0	Clay	5084.4	2.52	1271.1	0.04	2542.2	0.32	3660.8	0.95	5084.4	2.52	5084.4	5.04
15	-57.0	Sand	10643.7	1.06	1064.4	0.03	4896.1	0.18	8089.2	0.35	9685.8	0.53	10643.7	1.06
16	-62.0	Sand	11618.6	1.07	1161.9	0.03	5344.6	0.18	8830.2	0.35	10573.0	0.53	11618.6	1.07

TABLE D-49: TRESTLE BENT E20 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	6.0	Clay	166.7	4.00	41.7	0.06	83.3	0.50	120.0	1.50	166.7	4.00	166.7	8.00
2	1.0	Clay	288.2	4.00	72.0	0.06	144.1	0.50	207.5	1.50	288.2	4.00	288.2	8.00
3	-4.0	Clay	288.3	6.00	72.1	0.10	144.2	0.75	207.6	2.25	288.3	6.00	288.3	12.00
4	-8.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
5	-13.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
6	-18.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
7	-23.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
8	-28.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
9	-33.0	Clay	343.8	6.00	85.9	0.10	171.9	0.75	247.5	2.25	343.8	6.00	343.8	12.00
10	-36.0	Clay	500.0	4.00	125.0	0.06	250.0	0.50	360.0	1.50	500.0	4.00	500.0	8.00
11	-39.0	Clay	500.0	4.00	125.0	0.06	250.0	0.50	360.0	1.50	500.0	4.00	500.0	8.00
12	-44.0	Clay	500.0	4.00	125.0	0.06	250.0	0.50	360.0	1.50	500.0	4.00	500.0	8.00
13	-49.0	Clay	500.0	4.00	125.0	0.06	250.0	0.50	360.0	1.50	500.0	4.00	500.0	8.00
14	-54.0	Clay	5228.9	2.52	1307.2	0.04	2614.5	0.31	3764.8	0.94	5228.9	2.52	5228.9	5.04
15	-57.0	Sand	10542.8	1.05	1054.3	0.03	4849.7	0.18	8012.6	0.35	9594.0	0.52	10542.8	1.05
16	-60.0	Sand	11127.8	1.05	1112.8	0.03	5118.8	0.18	8457.1	0.35	10126.3	0.53	11127.8	1.05
17	-65.0	Sand	12102.8	1.07	1210.3	0.03	5567.3	0.18	9198.1	0.35	11013.5	0.53	12102.8	1.07
18	-70.0	Sand	13077.7	1.08	1307.8	0.03	6015.7	0.18	9939.0	0.35	11900.7	0.54	13077.7	1.08
19	-75.0	Sand	14052.6	1.08	1405.3	0.03	6464.2	0.18	10680.0	0.36	12787.9	0.54	14052.6	1.08

TABLE D-50: TRESTLE BENTS W01~09 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	6.0	Clay	166.7	4.00	41.7	0.06	83.3	0.50	120.0	1.50	166.7	4.00	166.7	8.00
2	1.0	Clay	288.2	4.00	72.0	0.06	144.1	0.50	207.5	1.50	288.2	4.00	288.2	8.00
3	-4.0	Clay	392.5	4.00	98.1	0.06	196.3	0.50	282.6	1.50	392.5	4.00	392.5	8.00
4	-9.0	Clay	340.0	6.00	85.0	0.10	170.0	0.75	244.8	2.25	340.0	6.00	340.0	12.00
5	-13.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
6	-18.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
7	-23.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
8	-28.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
9	-33.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
10	-38.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
11	-43.0	Clay	4101.1	4.51	1025.3	0.07	2050.6	0.56	2952.8	1.69	4101.1	4.51	4101.1	9.02
12	-47.0	Sand	8794.7	1.04	879.5	0.03	4045.5	0.18	6683.9	0.34	8003.1	0.52	8794.7	1.04
13	-51.0	Sand	9574.6	1.05	957.5	0.03	4404.3	0.18	7276.7	0.35	8712.9	0.52	9574.6	1.05
14	-56.0	Sand	10549.6	1.06	1055.0	0.03	4852.8	0.18	8017.7	0.35	9600.1	0.53	10549.6	1.06

TABLE D-51: TRESTLE BENTS W10~14 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	6.0	Clay	166.7	4.00	41.7	0.06	83.3	0.50	120.0	1.50	166.7	4.00	166.7	8.00
2	1.0	Clay	288.2	4.00	72.0	0.06	144.1	0.50	207.5	1.50	288.2	4.00	288.2	8.00
3	-4.0	Clay	392.5	4.00	98.1	0.06	196.3	0.50	282.6	1.50	392.5	4.00	392.5	8.00
4	-9.0	Clay	340.0	6.00	85.0	0.10	170.0	0.75	244.8	2.25	340.0	6.00	340.0	12.00
5	-13.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
6	-17.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
7	-21.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
8	-25.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
9	-30.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
10	-35.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
11	-40.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
12	-45.0	Clay	4228.9	4.51	1057.2	0.07	2114.4	0.56	3044.8	1.69	4228.9	4.51	4228.9	9.01
13	-48.0	Sand	8855.2	1.02	885.5	0.03	4073.4	0.17	6729.9	0.34	8058.2	0.51	8855.2	1.02
14	-52.0	Sand	9635.1	1.04	963.5	0.03	4432.2	0.18	7322.7	0.34	8768.0	0.52	9635.1	1.04
15	-56.0	Sand	10415.1	1.05	1041.5	0.03	4790.9	0.18	7915.5	0.35	9477.7	0.52	10415.1	1.05

TABLE D-52: TRESTLE BENTS W15~17 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	6.0	Clay	166.7	4.00	41.7	0.06	83.3	0.50	120.0	1.50	166.7	4.00	166.7	8.00
2	2.0	Clay	263.9	4.00	66.0	0.06	131.9	0.50	190.0	1.50	263.9	4.00	263.9	8.00
3	-2.0	Clay	352.5	4.00	88.1	0.06	176.3	0.50	253.8	1.50	352.5	4.00	352.5	8.00
4	-6.0	Clay	310.0	6.00	77.5	0.10	155.0	0.75	223.2	2.25	310.0	6.00	310.0	12.00
5	-11.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
6	-16.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
7	-21.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
8	-26.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
9	-31.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
10	-36.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
11	-41.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
12	-46.0	Clay	4242.3	4.50	1060.6	0.07	2121.2	0.56	3054.5	1.69	4242.3	4.50	4242.3	9.00
13	-50.0	Sand	9077.1	1.01	907.7	0.03	4175.4	0.17	6898.6	0.33	8260.1	0.51	9077.1	1.01
14	-54.0	Sand	9857.0	1.03	985.7	0.03	4534.2	0.17	7491.3	0.34	8969.9	0.51	9857.0	1.03
15	-58.0	Sand	10637.0	1.04	1063.7	0.03	4893.0	0.18	8084.1	0.34	9679.6	0.52	10637.0	1.04

TABLE D-53: TRESTLE BENT W18 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	6.0	Clay	166.7	4.00	41.7	0.06	83.3	0.50	120.0	1.50	166.7	4.00	166.7	8.00
2	3.0	Clay	239.6	4.00	59.9	0.06	119.8	0.50	172.5	1.50	239.6	4.00	239.6	8.00
3	-1.0	Clay	332.5	4.00	83.1	0.06	166.3	0.50	239.4	1.50	332.5	4.00	332.5	8.00
4	-5.0	Clay	300.0	6.00	75.0	0.10	150.0	0.75	216.0	2.25	300.0	6.00	300.0	12.00
5	-9.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
6	-13.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
7	-18.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
8	-23.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
9	-28.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
10	-33.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
11	-38.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
12	-43.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
13	-48.0	Clay	4353.3	4.49	1088.3	0.07	2176.6	0.56	3134.3	1.68	4353.3	4.49	4353.3	8.99
14	-53.0	Sand	9493.9	1.01	949.4	0.03	4367.2	0.17	7215.4	0.33	8639.5	0.50	9493.9	1.01
15	-58.0	Sand	10468.9	1.02	1046.9	0.03	4815.7	0.17	7956.3	0.34	9526.7	0.51	10468.9	1.02
16	-63.0	Sand	11443.8	1.04	1144.4	0.03	5264.2	0.18	8697.3	0.34	10413.9	0.52	11443.8	1.04

TABLE D-54: TRESTLE BENT W19 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	6.0	Clay	166.7	4.00	41.7	0.06	83.3	0.50	120.0	1.50	166.7	4.00	166.7	8.00
2	1.0	Clay	288.2	4.00	72.0	0.06	144.1	0.50	207.5	1.50	288.2	4.00	288.2	8.00
3	-4.0	Clay	288.3	6.00	72.1	0.10	144.2	0.75	207.6	2.25	288.3	6.00	288.3	12.00
4	-8.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
5	-12.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
6	-17.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
7	-22.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
8	-27.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
9	-32.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
10	-37.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
11	-42.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
12	-47.0	Clay	4272.6	4.49	1068.1	0.07	2136.3	0.56	3076.2	1.68	4272.6	4.49	4272.6	8.99
13	-51.0	Sand	9137.6	1.00	913.8	0.03	4203.3	0.17	6944.6	0.33	8315.2	0.50	9137.6	1.00
14	-55.0	Sand	9917.5	1.02	991.8	0.03	4562.1	0.17	7537.3	0.34	9025.0	0.51	9917.5	1.02
15	-60.0	Sand	10892.5	1.03	1089.2	0.03	5010.5	0.18	8278.3	0.34	9912.2	0.52	10892.5	1.03
16	-65.0	Sand	11867.4	1.04	1186.7	0.03	5459.0	0.18	9019.2	0.34	10799.4	0.52	11867.4	1.04
17	-70.0	Sand	12842.4	1.06	1284.2	0.03	5907.5	0.18	9760.2	0.35	11686.5	0.53	12842.4	1.06

TABLE D-55: TRESTLE BENT W20 – *p-y* CURVES

Node #	Elevation	Soil	p_u	y_u	p_1	y_1	p_2	y_2	p_3	y_3	p_4	y_4	p_5	y_5
	(ft)	Type	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)	(lb/in)	(in)
1	6.0	Clay	166.7	4.00	41.7	0.06	83.3	0.50	120.0	1.50	166.7	4.00	166.7	8.00
2	1.0	Clay	288.2	4.00	72.0	0.06	144.1	0.50	207.5	1.50	288.2	4.00	288.2	8.00
3	-4.0	Clay	288.3	6.00	72.1	0.10	144.2	0.75	207.6	2.25	288.3	6.00	288.3	12.00
4	-8.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
5	-13.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
6	-18.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
7	-23.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
8	-28.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
9	-33.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
10	-38.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
11	-43.0	Clay	187.5	8.00	46.9	0.13	93.8	1.00	135.0	3.00	187.5	8.00	187.5	16.00
12	-48.0	Clay	4336.4	4.49	1084.1	0.07	2168.2	0.56	3122.2	1.68	4336.4	4.49	4336.4	8.98
13	-53.0	Sand	9460.3	1.00	946.0	0.03	4351.7	0.17	7189.8	0.33	8608.9	0.50	9460.3	1.00
14	-58.0	Sand	10435.3	1.02	1043.5	0.03	4800.2	0.17	7930.8	0.34	9496.1	0.51	10435.3	1.02
15	-63.0	Sand	11410.2	1.03	1141.0	0.03	5248.7	0.18	8671.8	0.34	10383.3	0.52	11410.2	1.03

12.0 APPENDIX E: LATERAL PUSH-OVER CURVES

FIGURE E-1: ABUTMENT 1 – LATERAL PUSH-OVER CURVES

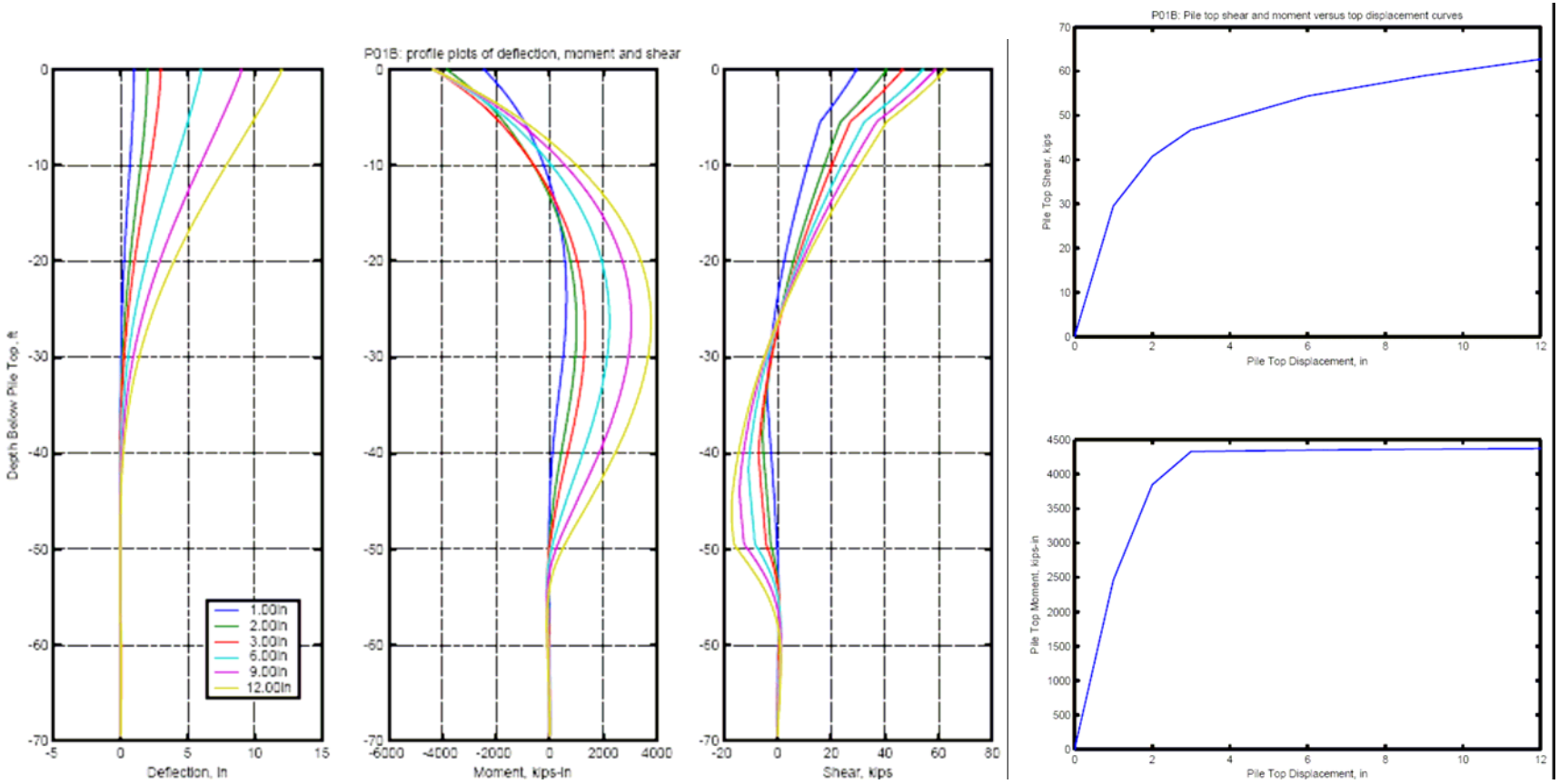


FIGURE E-2: PIER 2 – LATERAL PUSH-OVER CURVES

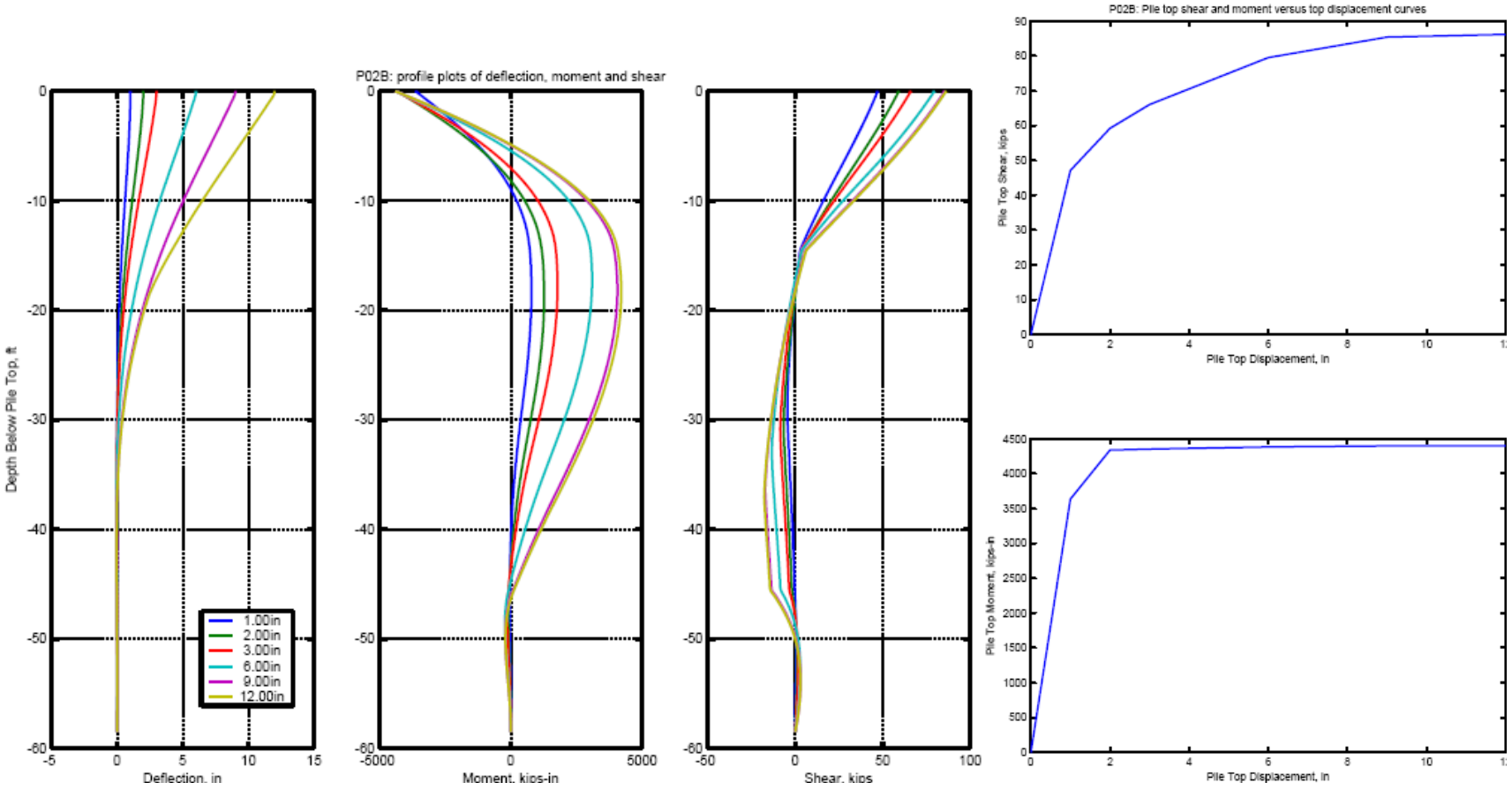


FIGURE E-3: PIER 3 – LATERAL PUSH-OVER CURVES

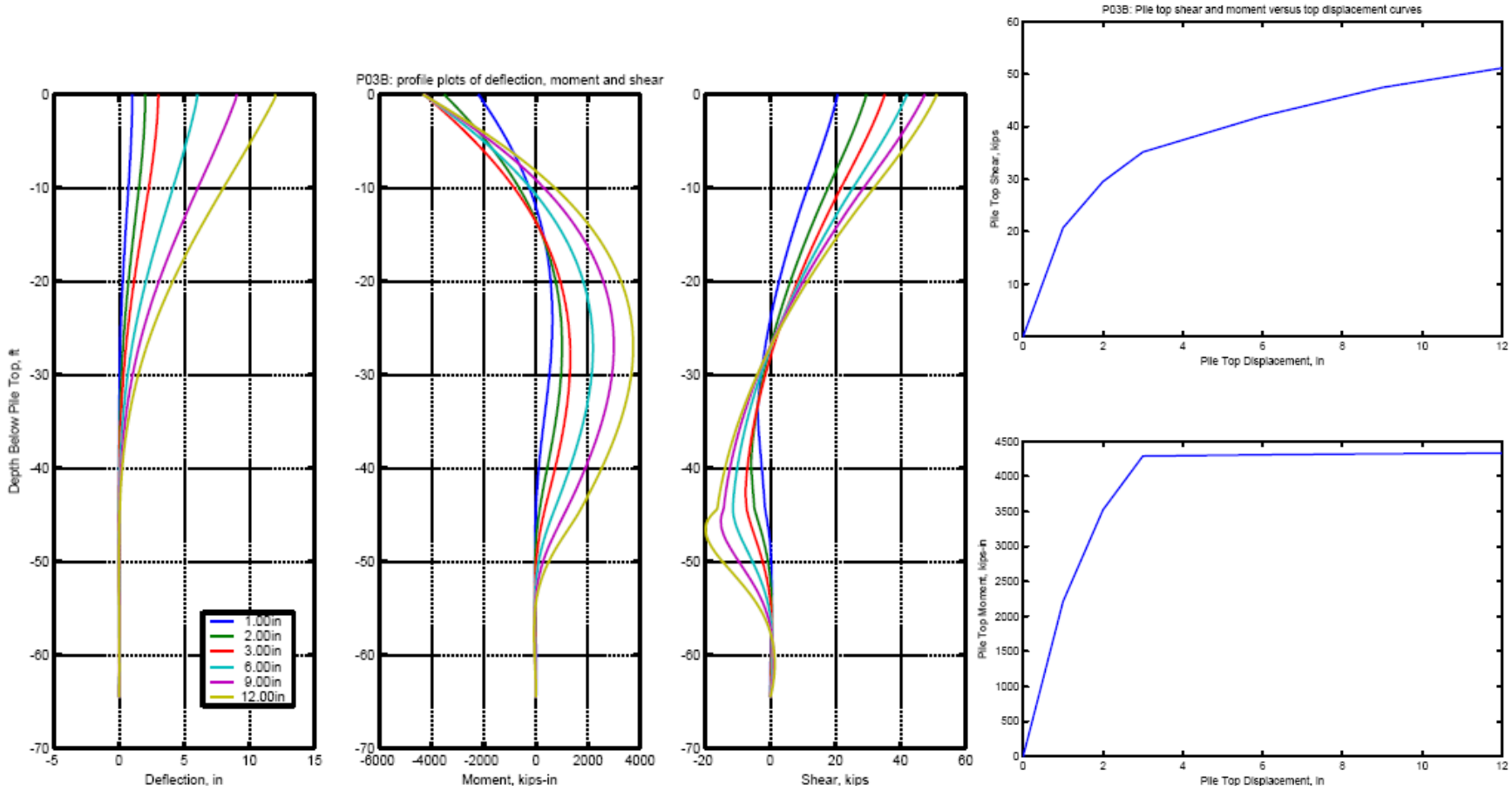


FIGURE E-4: PIER 4 – LATERAL PUSH-OVER CURVES

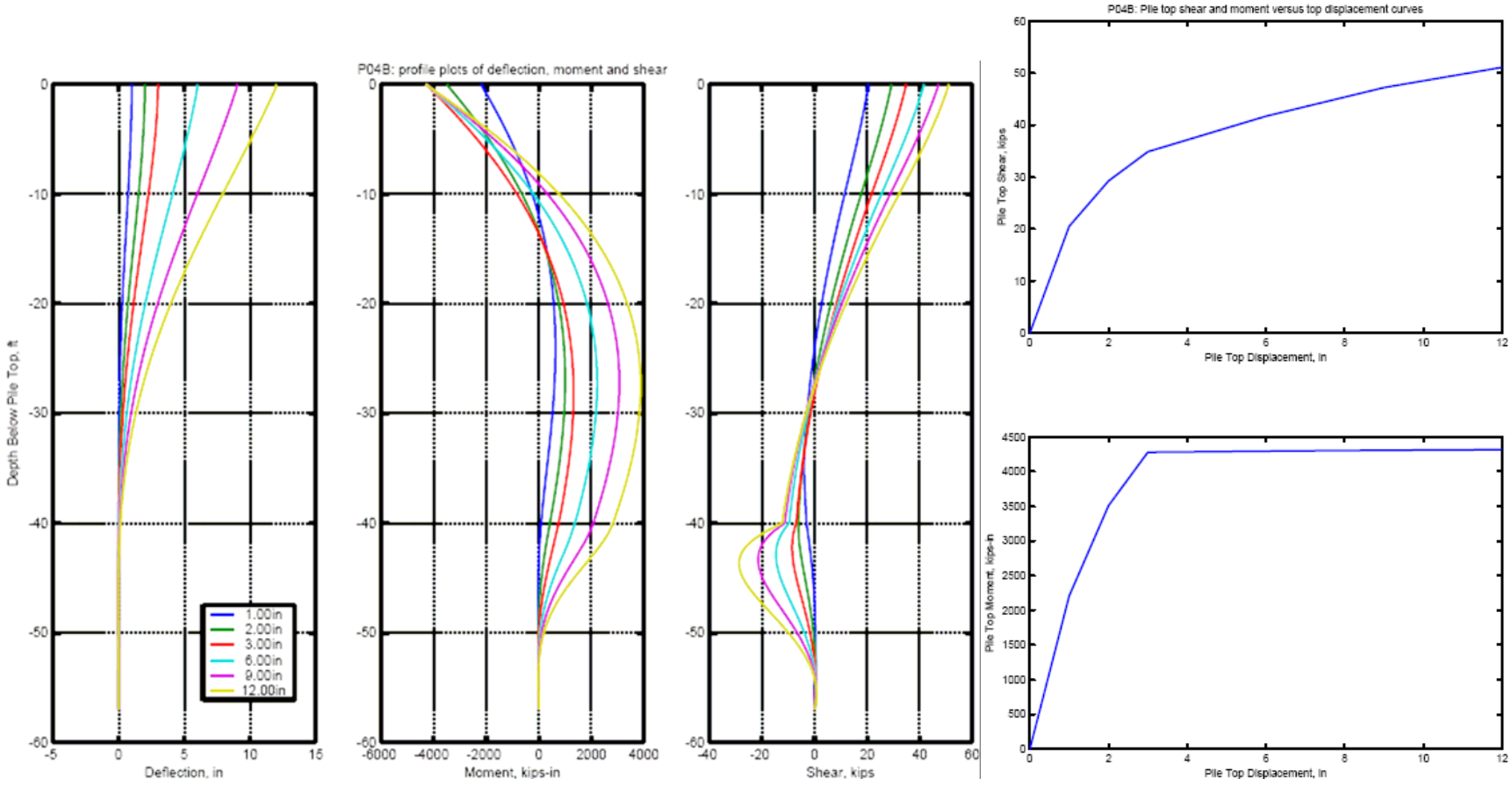


FIGURE E-5: PIER 5 – LATERAL PUSH-OVER CURVES

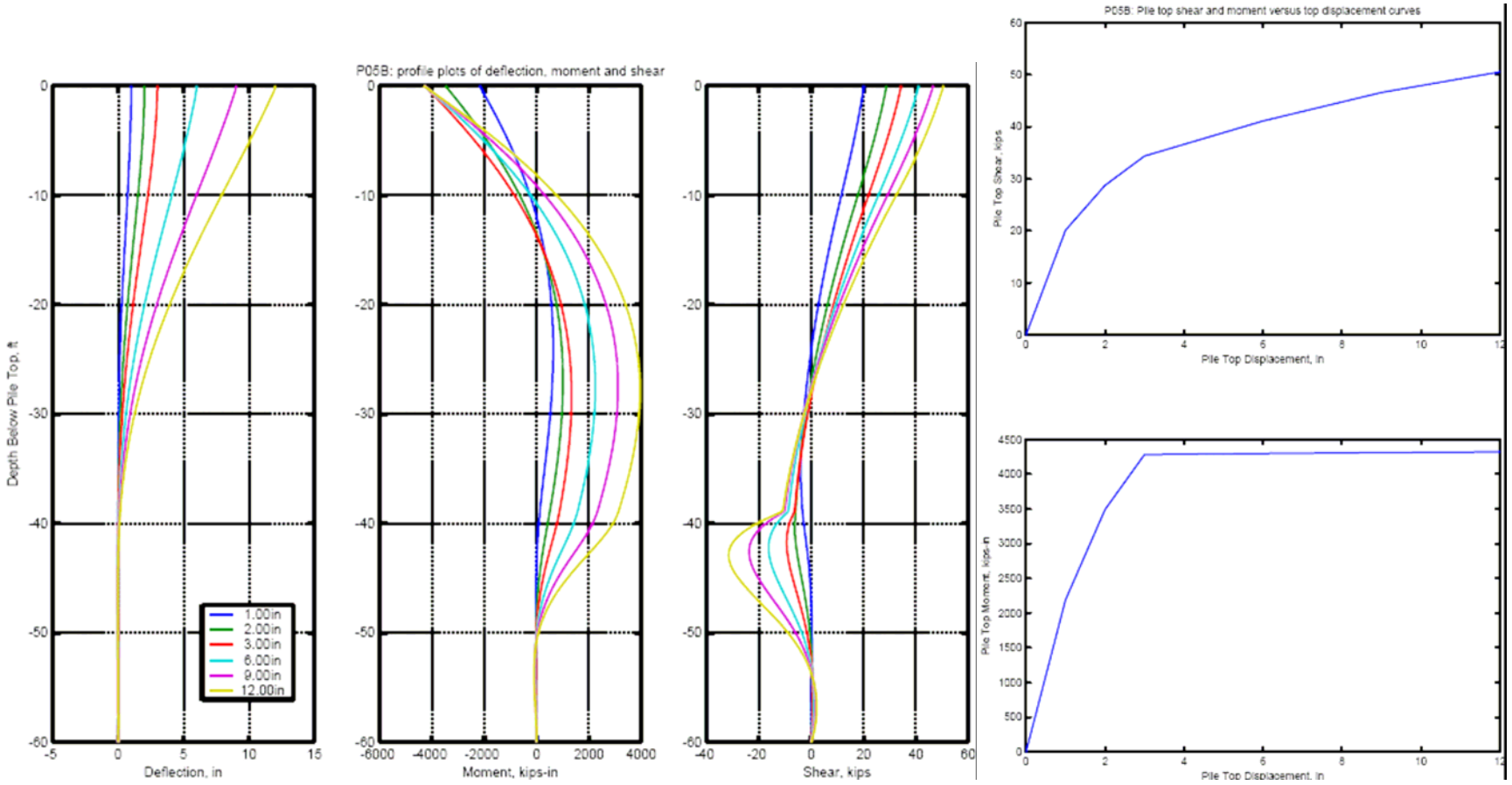


FIGURE E-6: PIER 6 – LATERAL PUSH-OVER CURVES

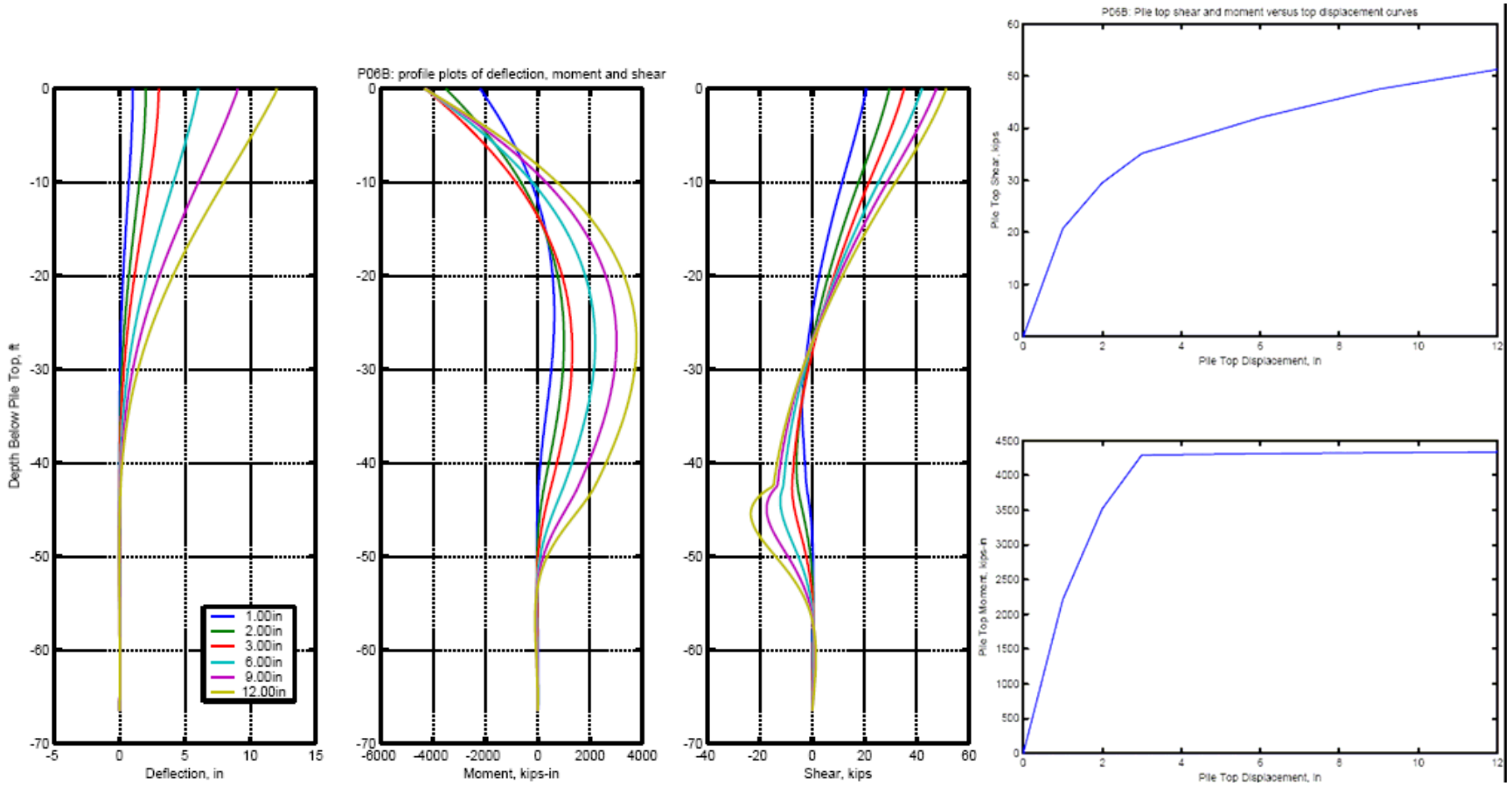


FIGURE E-7: PIER 7 – LATERAL PUSH-OVER CURVES

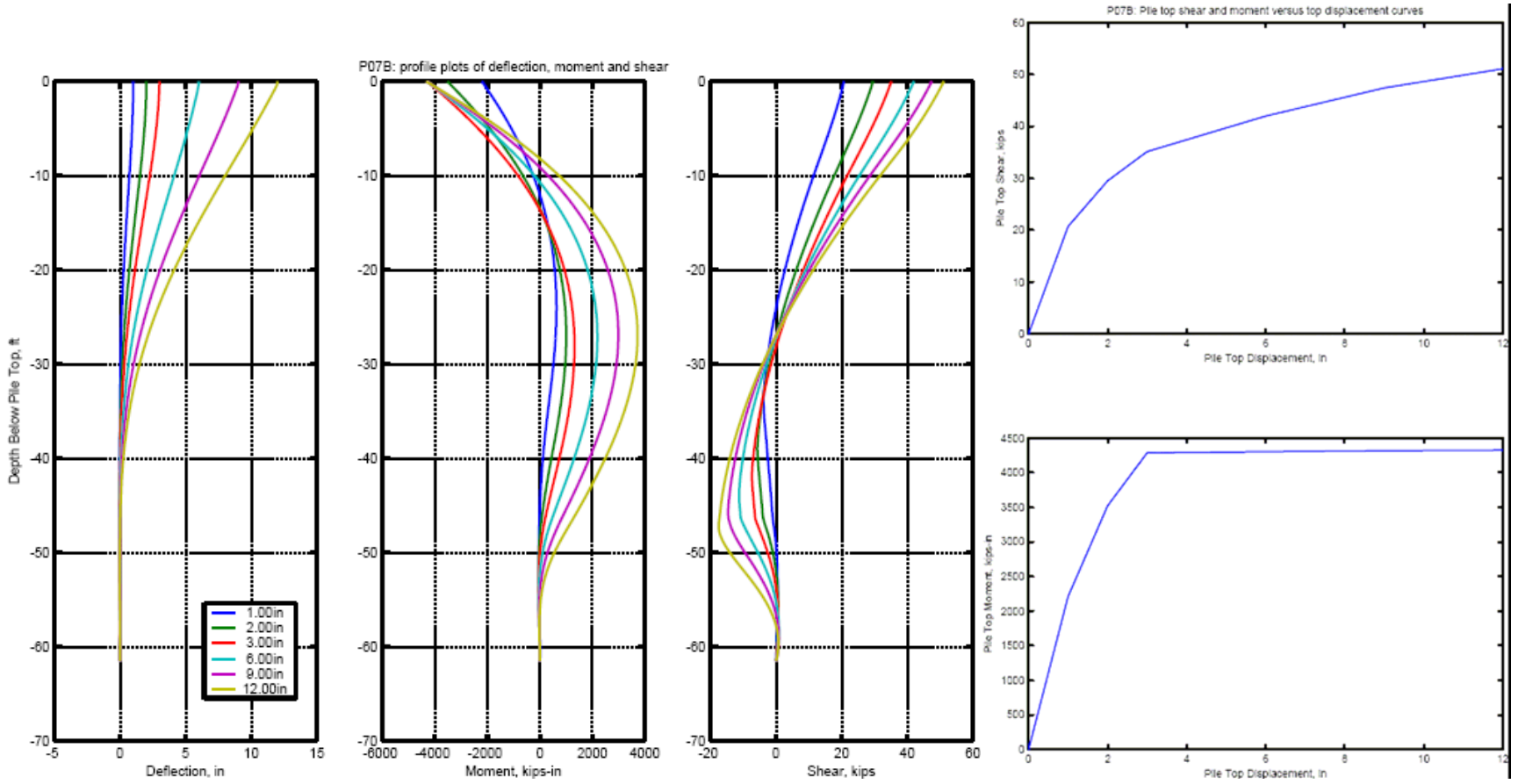


FIGURE E-8: PIER 8 – LATERAL PUSH-OVER CURVES

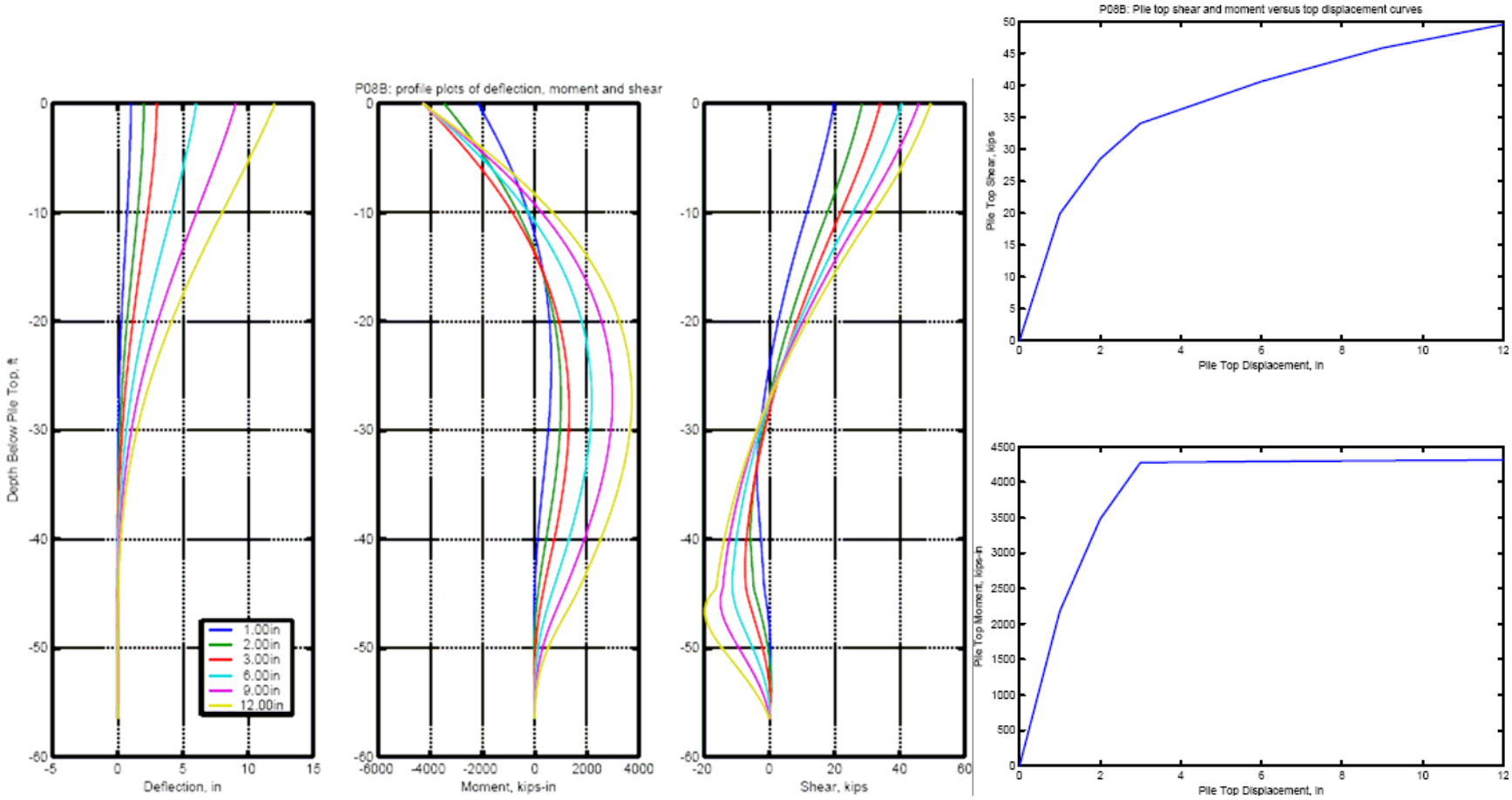


FIGURE E-9: PIER 9 – LATERAL PUSH-OVER CURVES

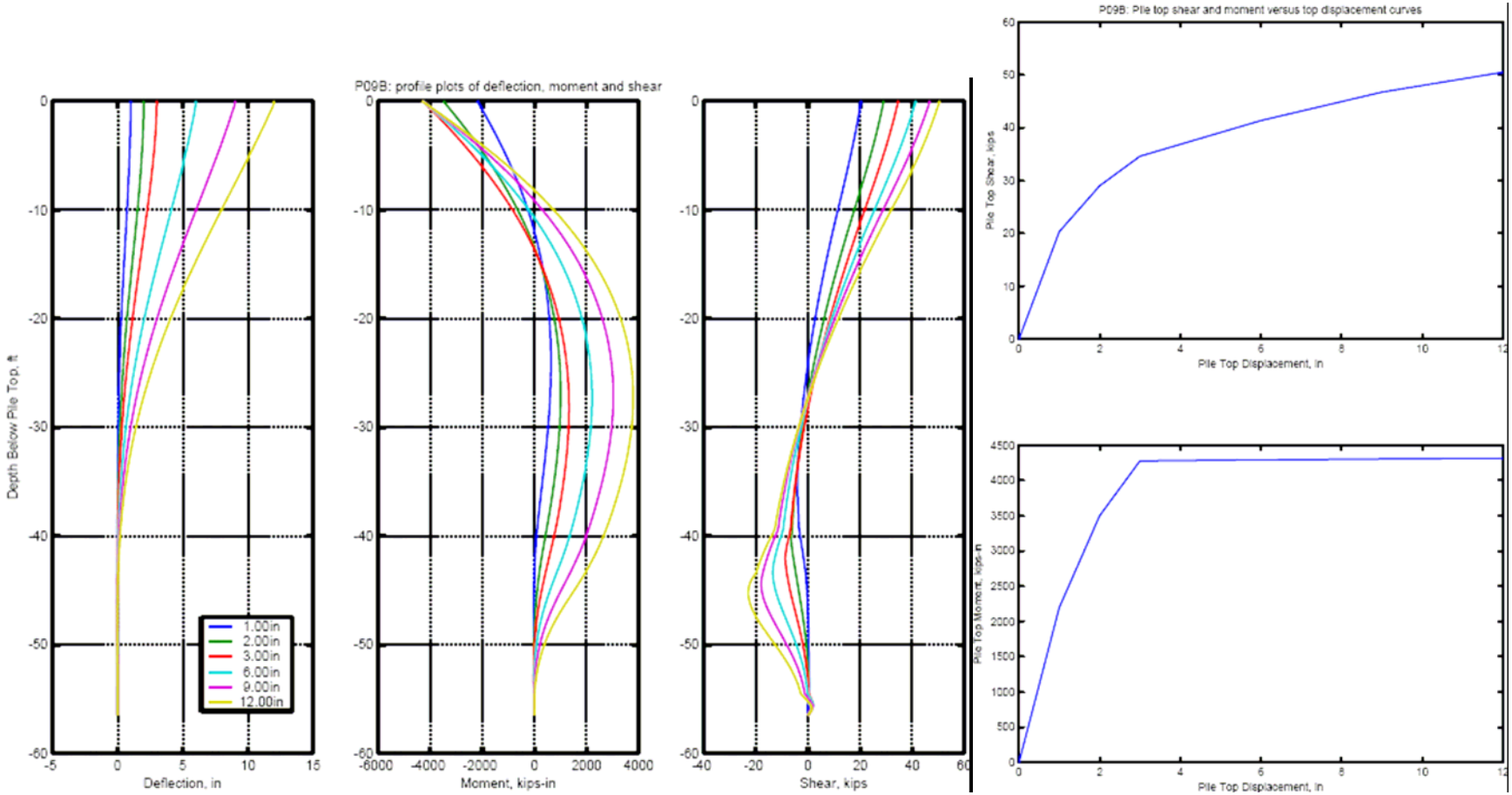


FIGURE E-10: PIER 10 – LATERAL PUSH-OVER CURVES

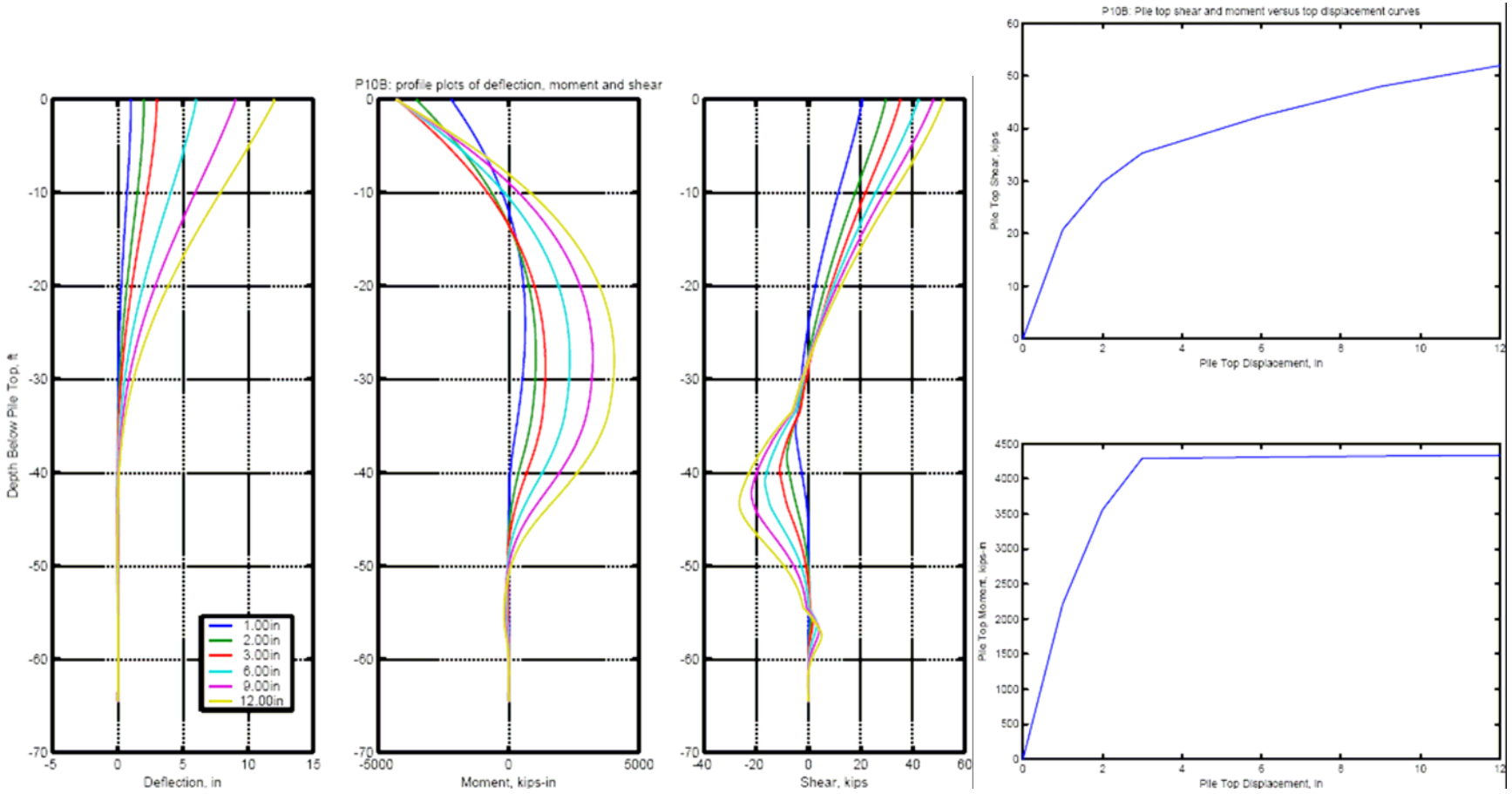


FIGURE E-11: PIER 11 – LATERAL PUSH-OVER CURVES

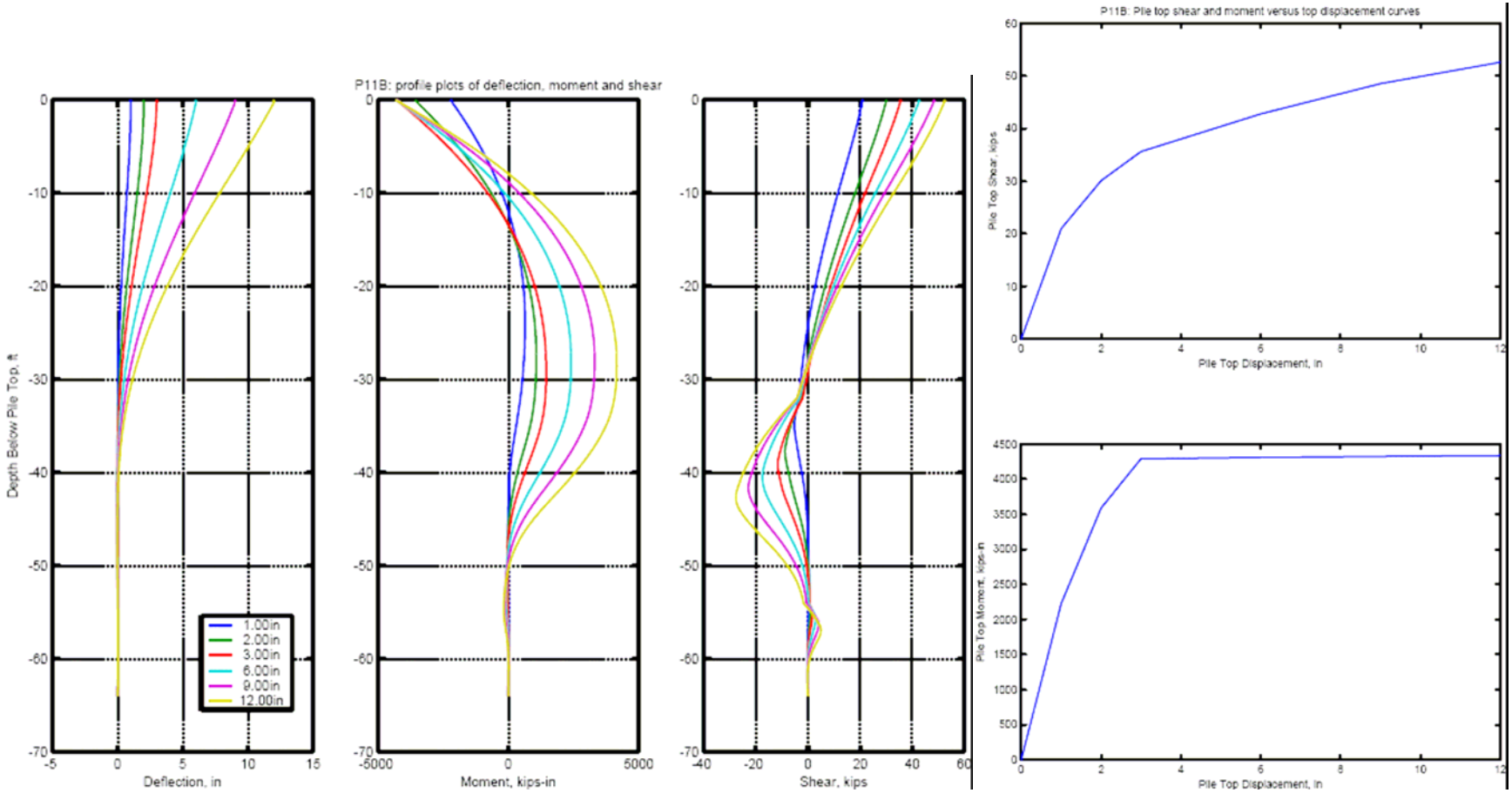


FIGURE E-12: PIER 12 – LATERAL PUSH-OVER CURVES

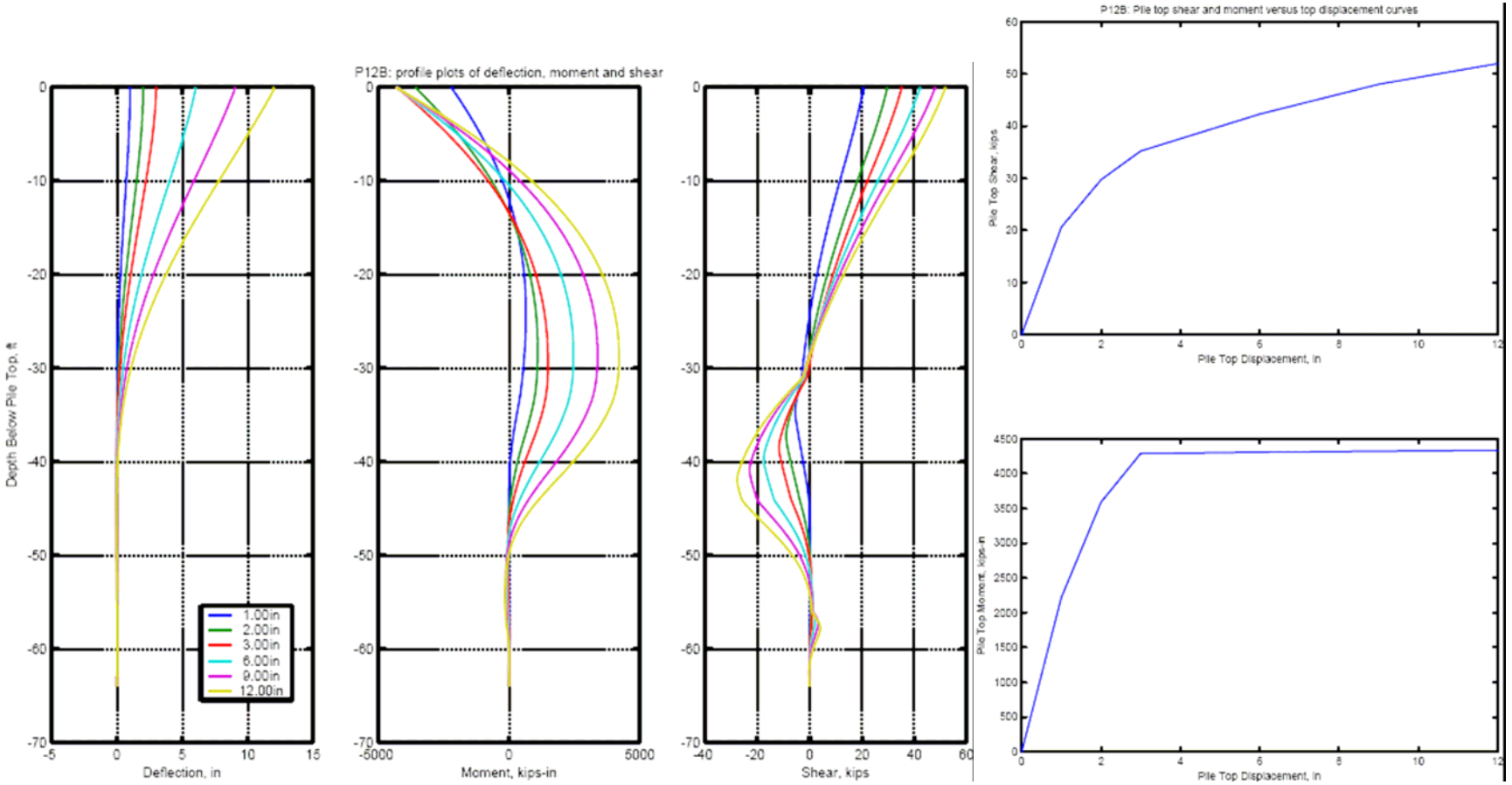


FIGURE E-13: PIER 13 – LATERAL PUSH-OVER CURVES

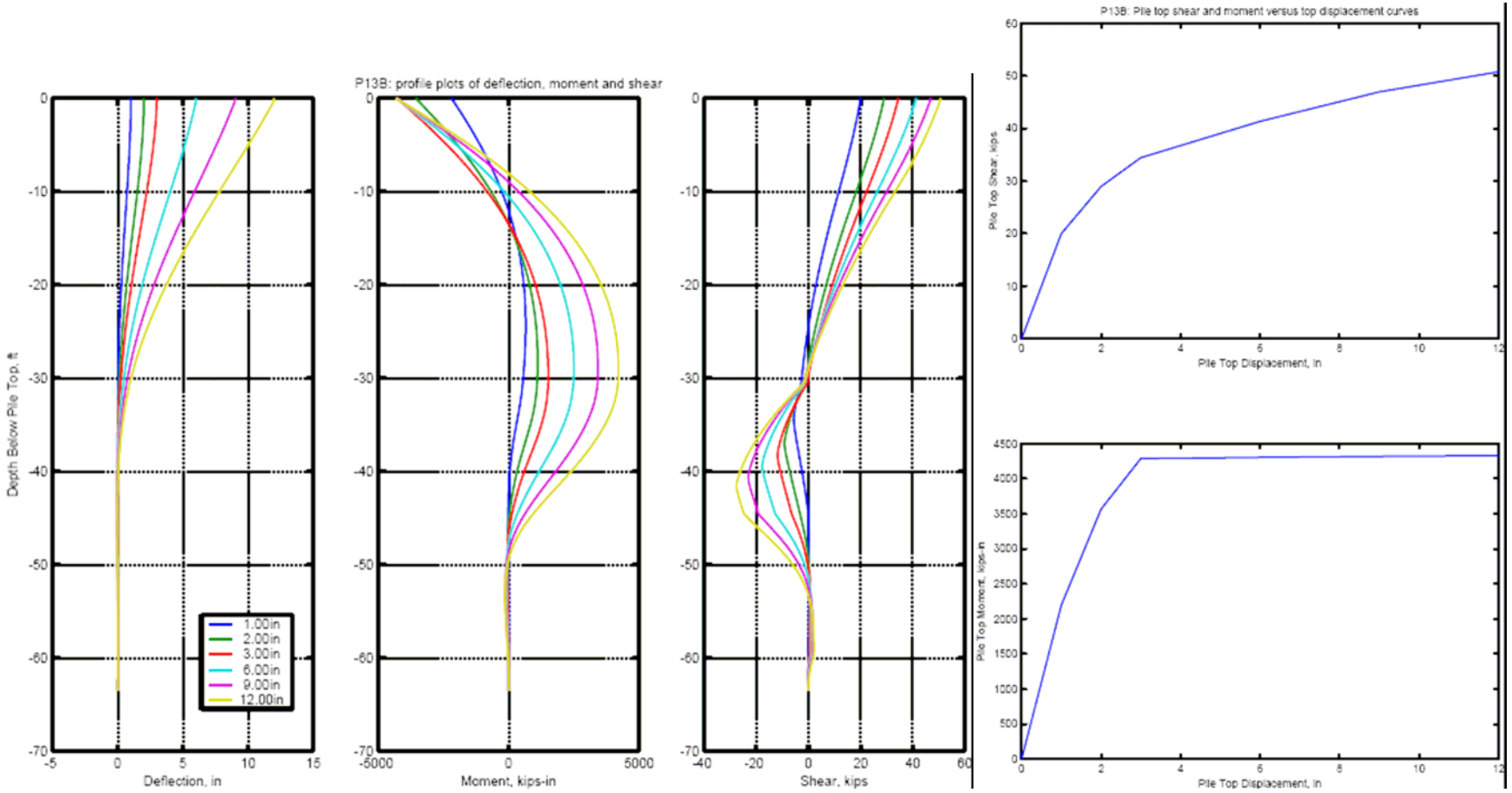


FIGURE E-14: PIER 14 – LATERAL PUSH-OVER CURVES

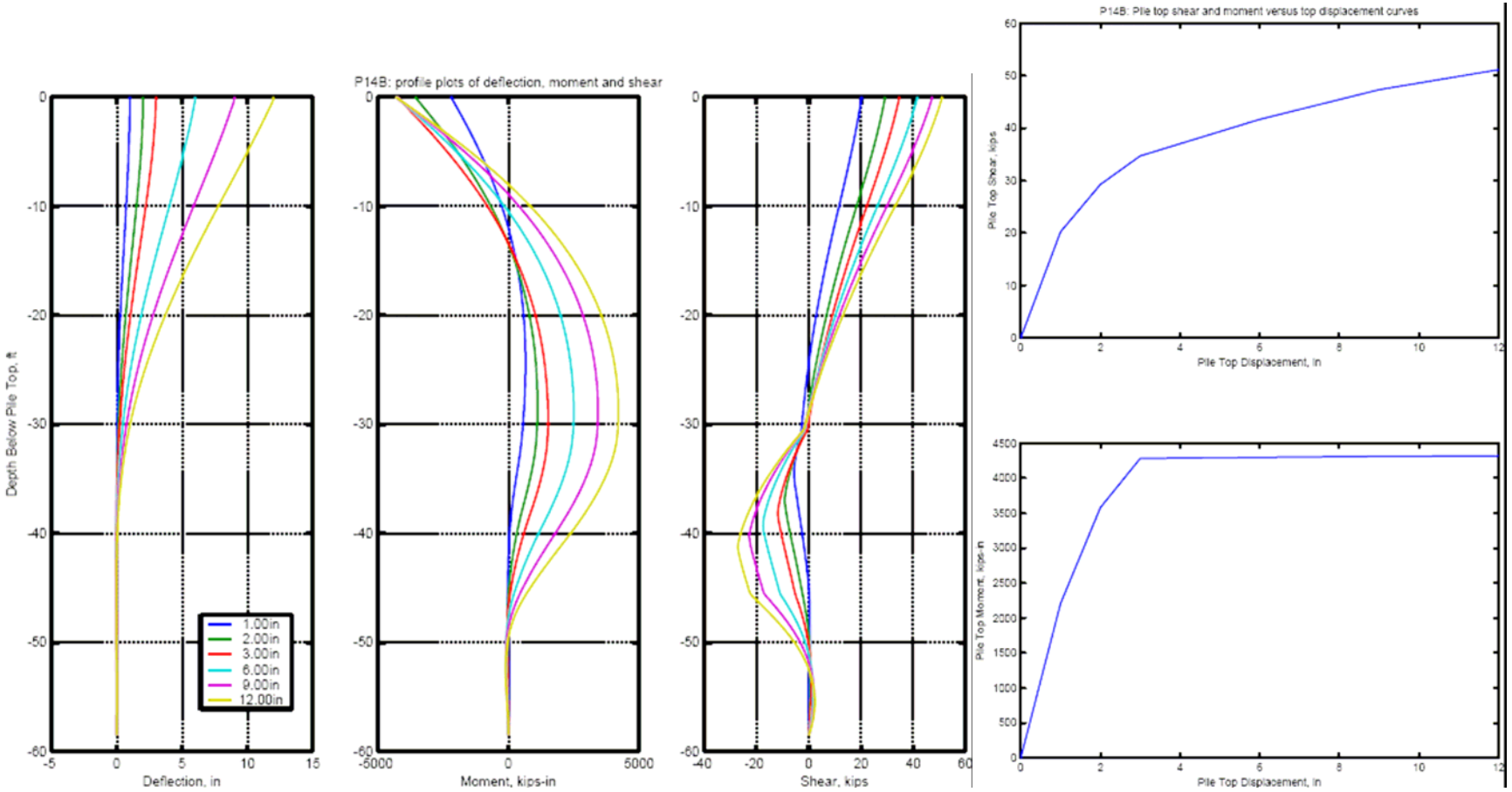


FIGURE E-15: PIER 15 – LATERAL PUSH-OVER CURVES

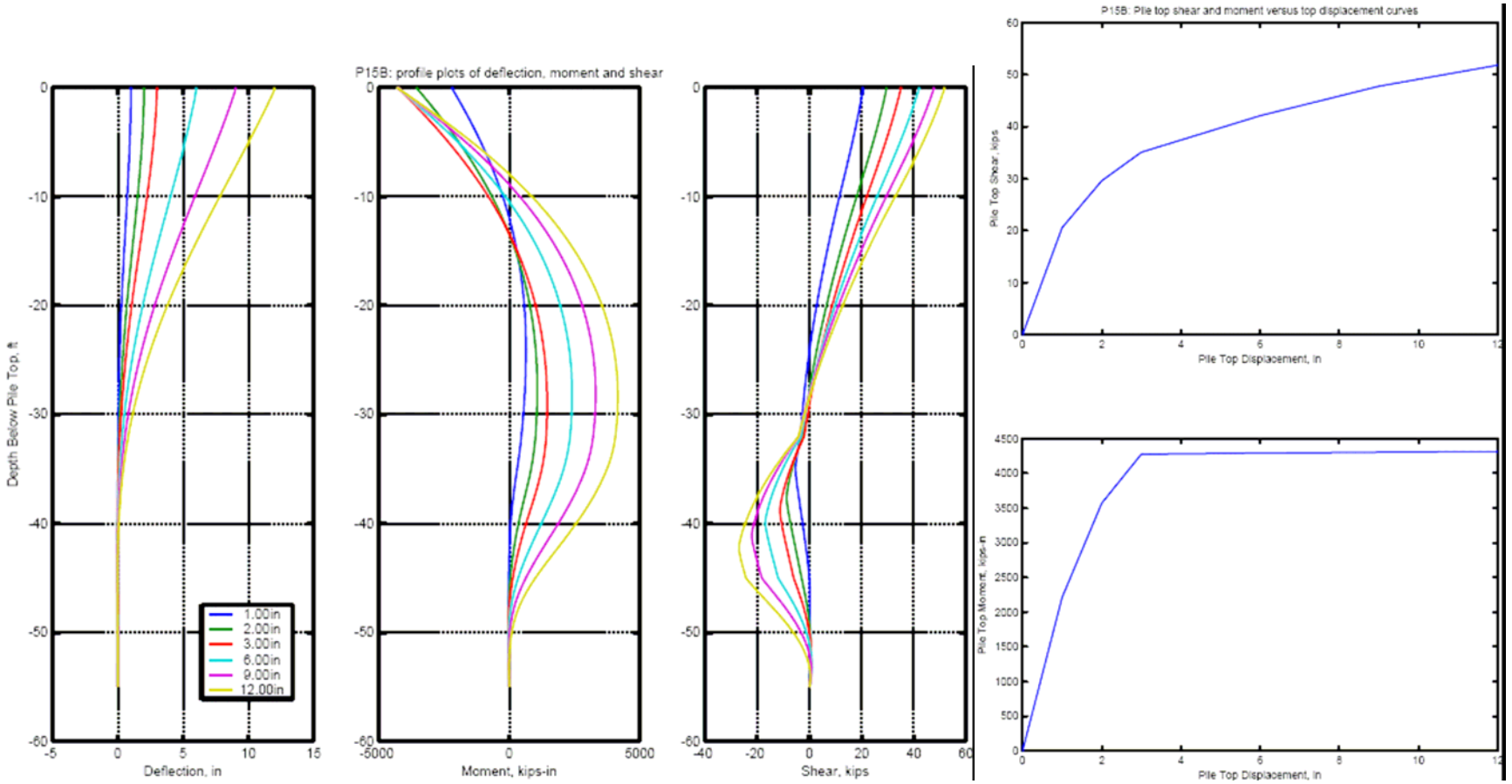


FIGURE E-16: PIER 16 – LATERAL PUSH-OVER CURVES

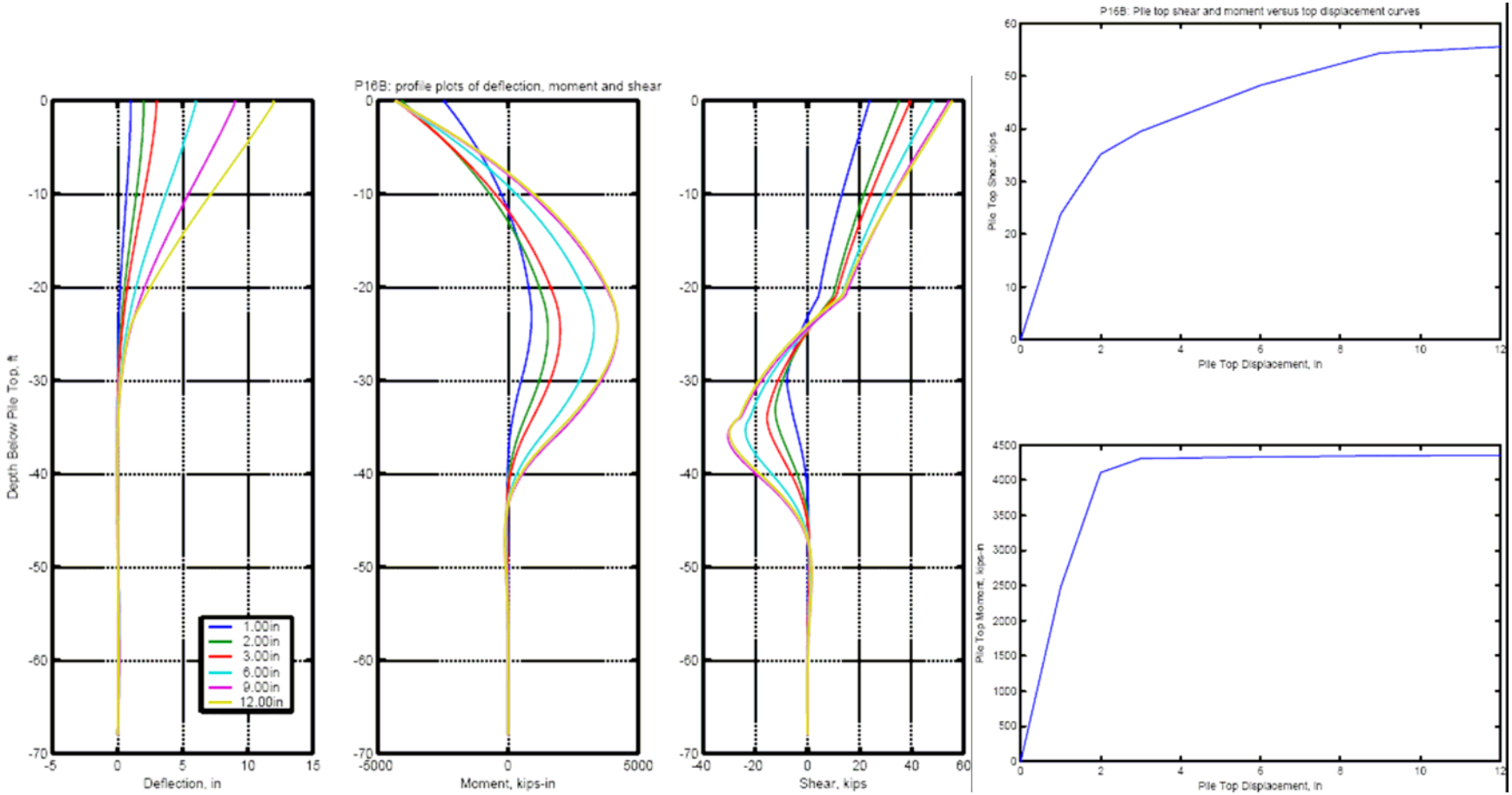


FIGURE E-17: PIER 17 – LATERAL PUSH-OVER CURVES

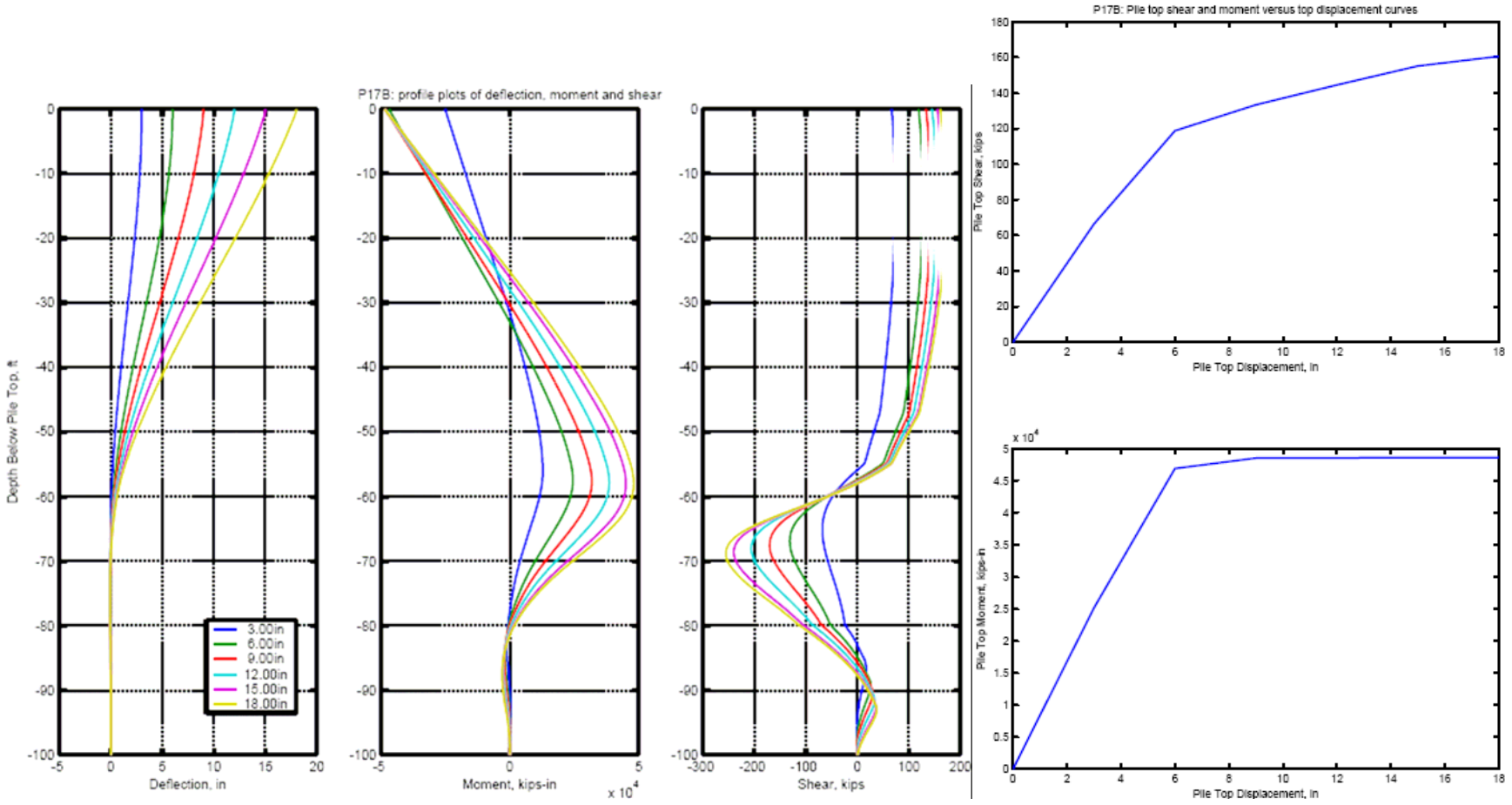


FIGURE E-18: PIER 18 – LATERAL PUSH-OVER CURVES

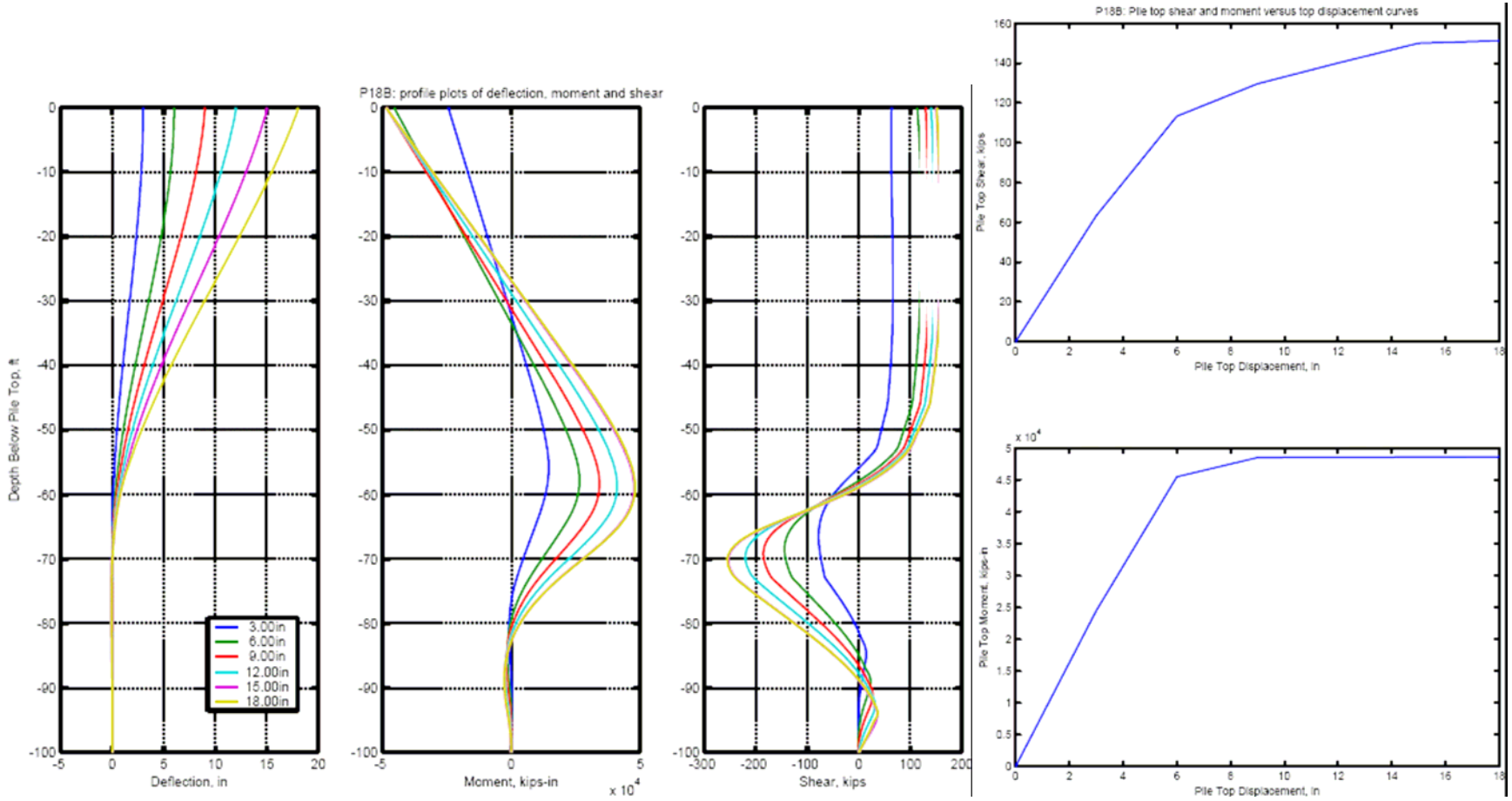


FIGURE E-19: PIER 19 – LATERAL PUSH-OVER CURVES

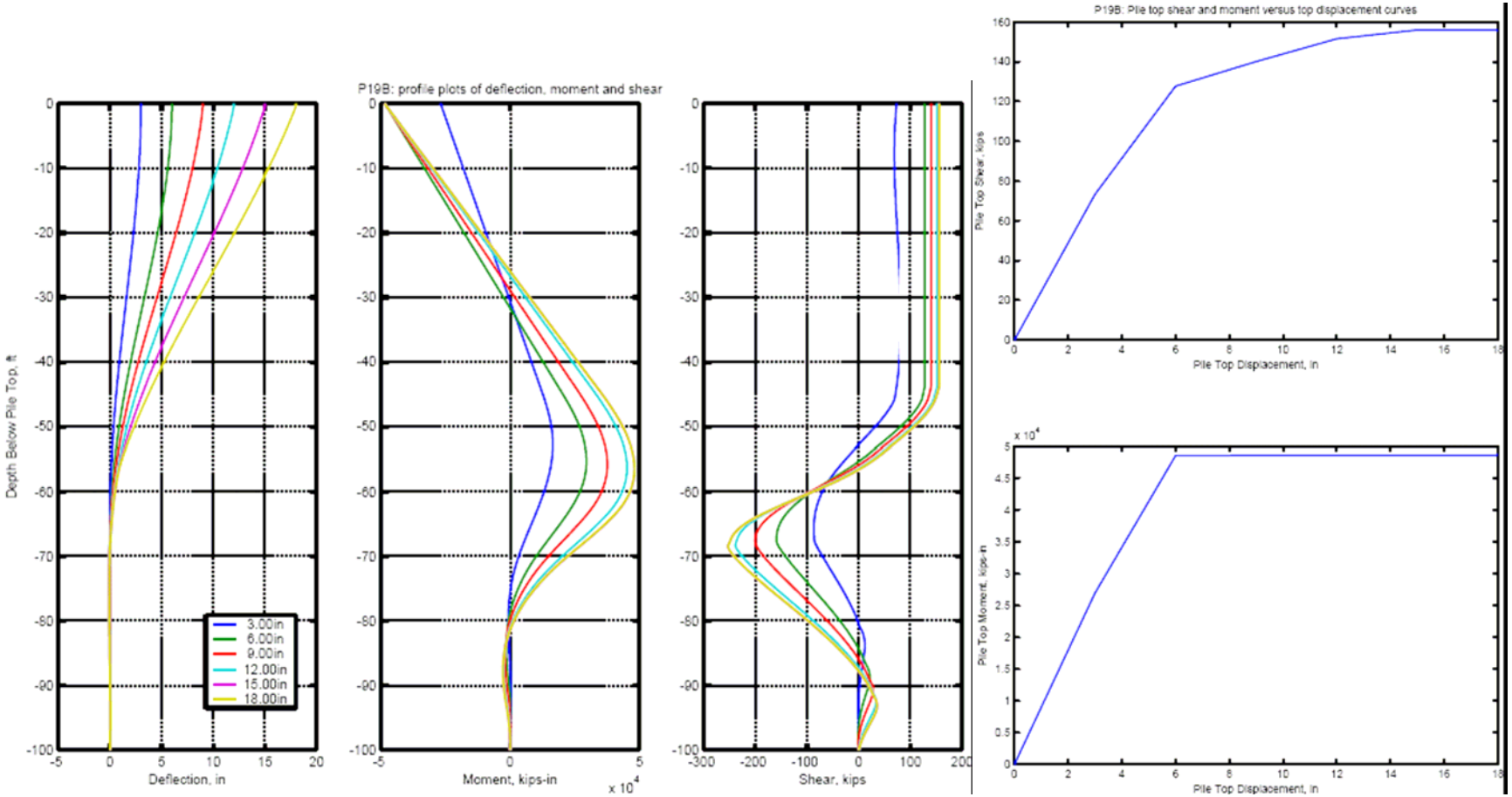


FIGURE E-20: PIER 20 – LATERAL PUSH-OVER CURVES

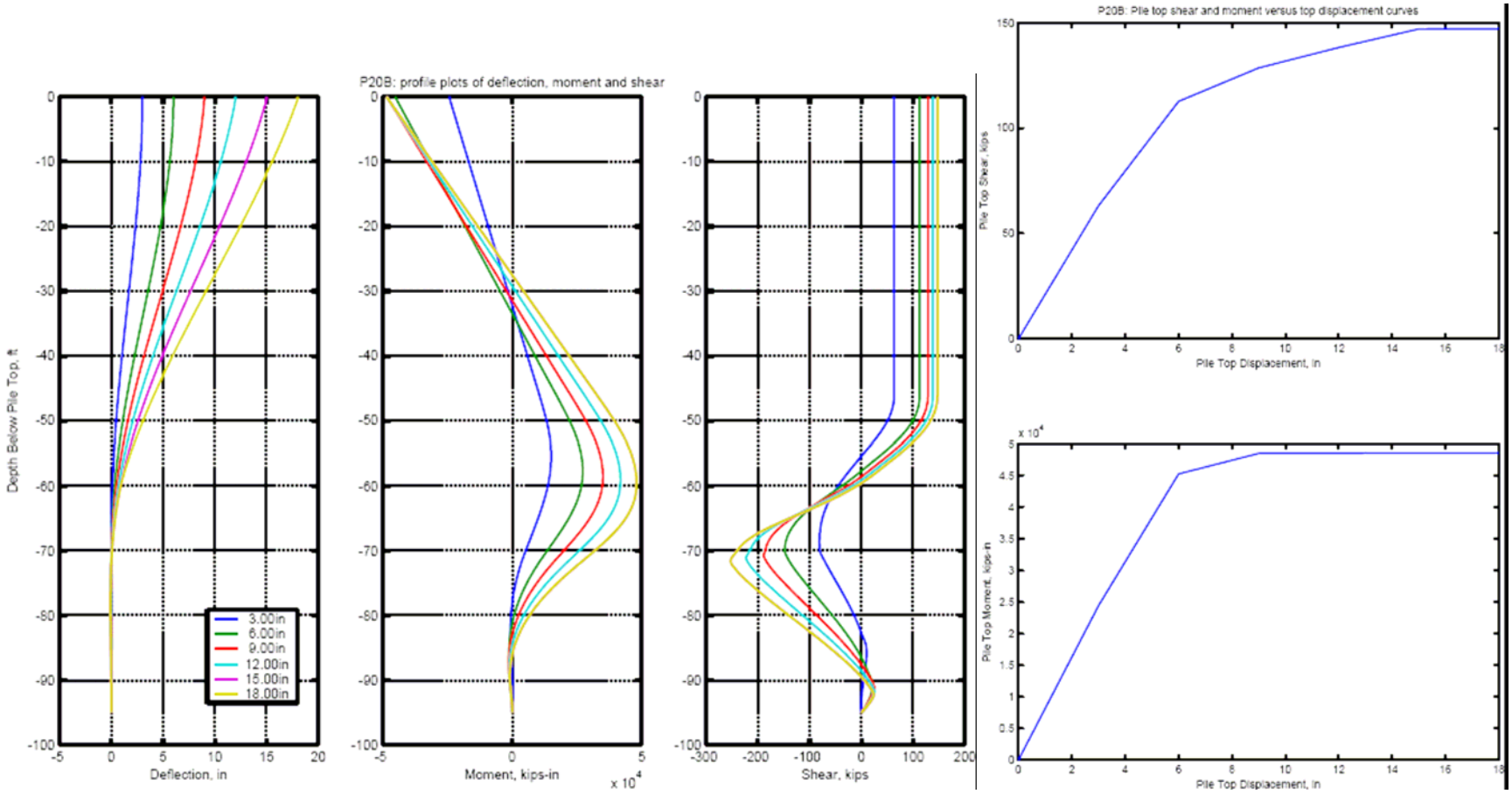


FIGURE E-21: PIER 21 – LATERAL PUSH-OVER CURVES

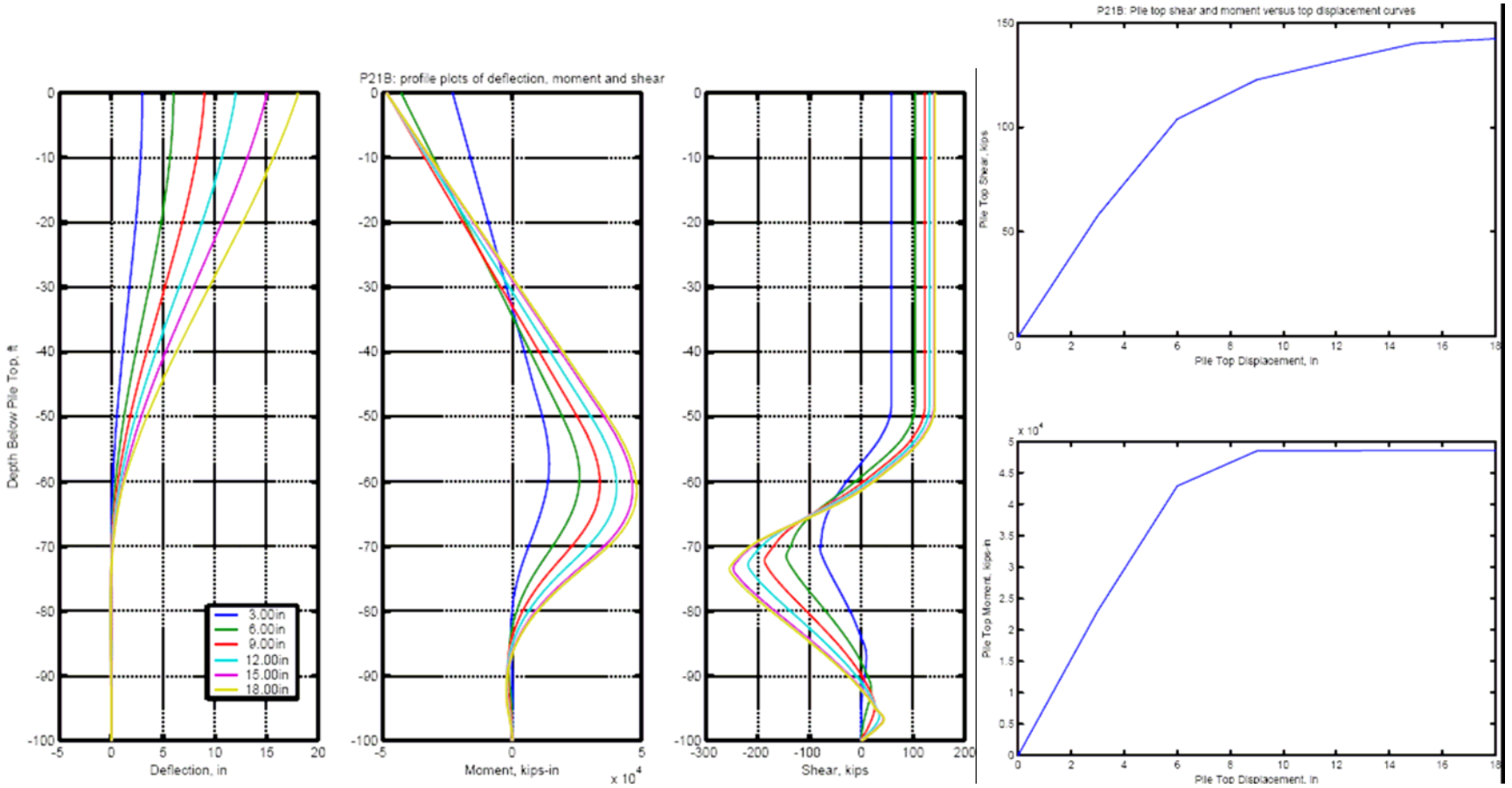


FIGURE E-22: PIER 22 – LATERAL PUSH-OVER CURVES

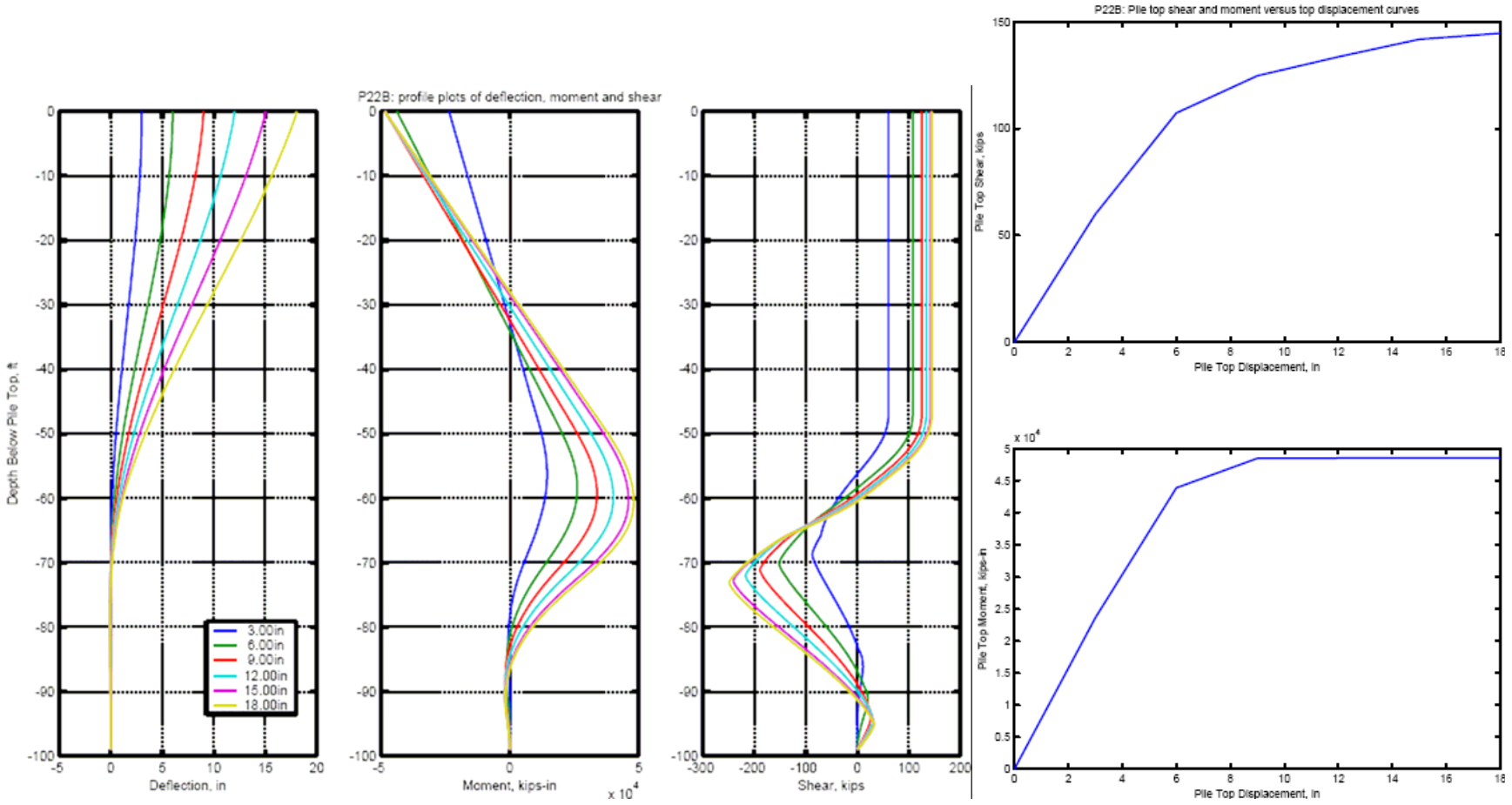


FIGURE E-23: PIER 23 – LATERAL PUSH-OVER CURVES

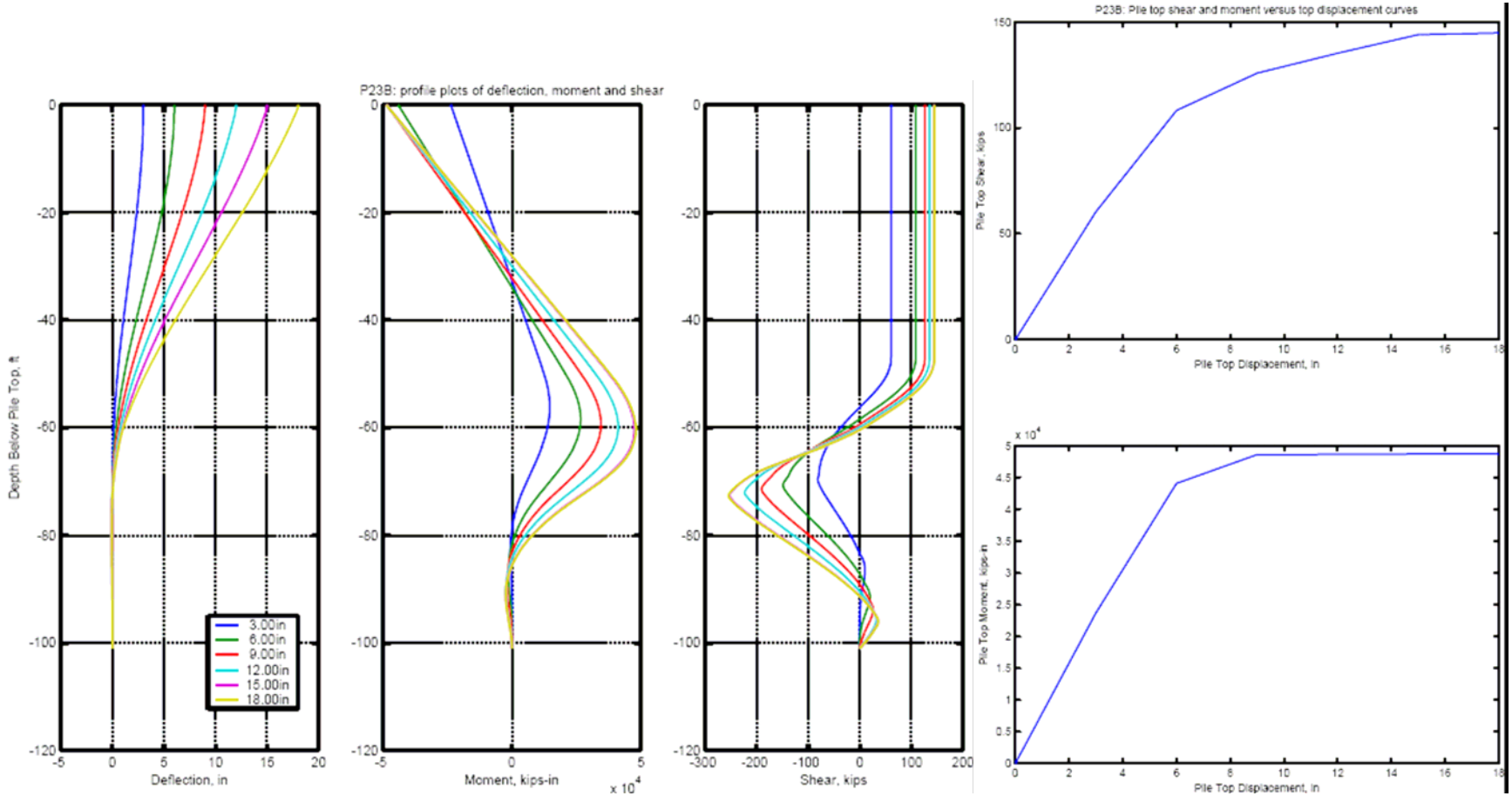


FIGURE E-24: PIER 24 – LATERAL PUSH-OVER CURVES

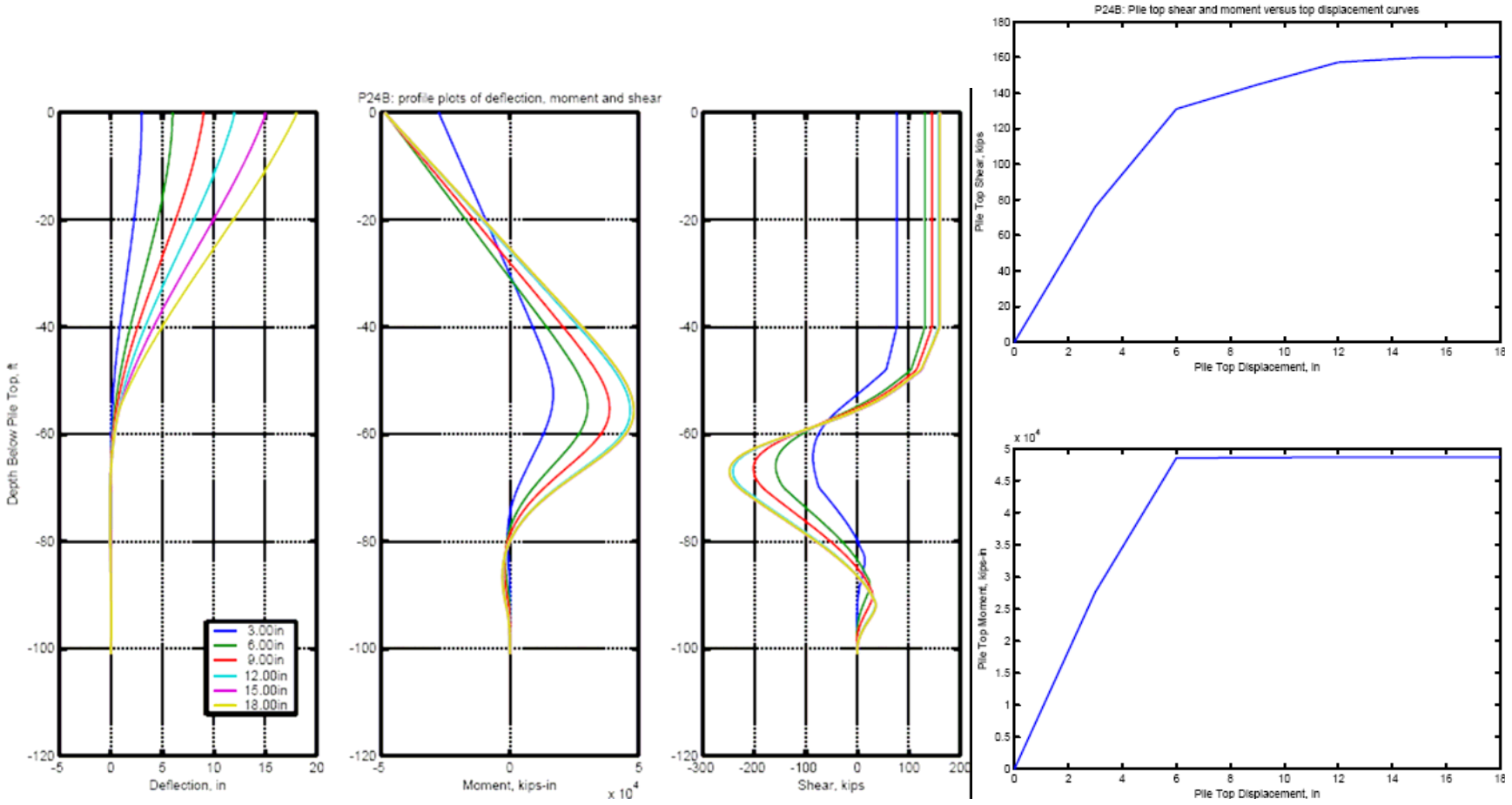


FIGURE E-25: PIER 25 – LATERAL PUSH-OVER CURVES

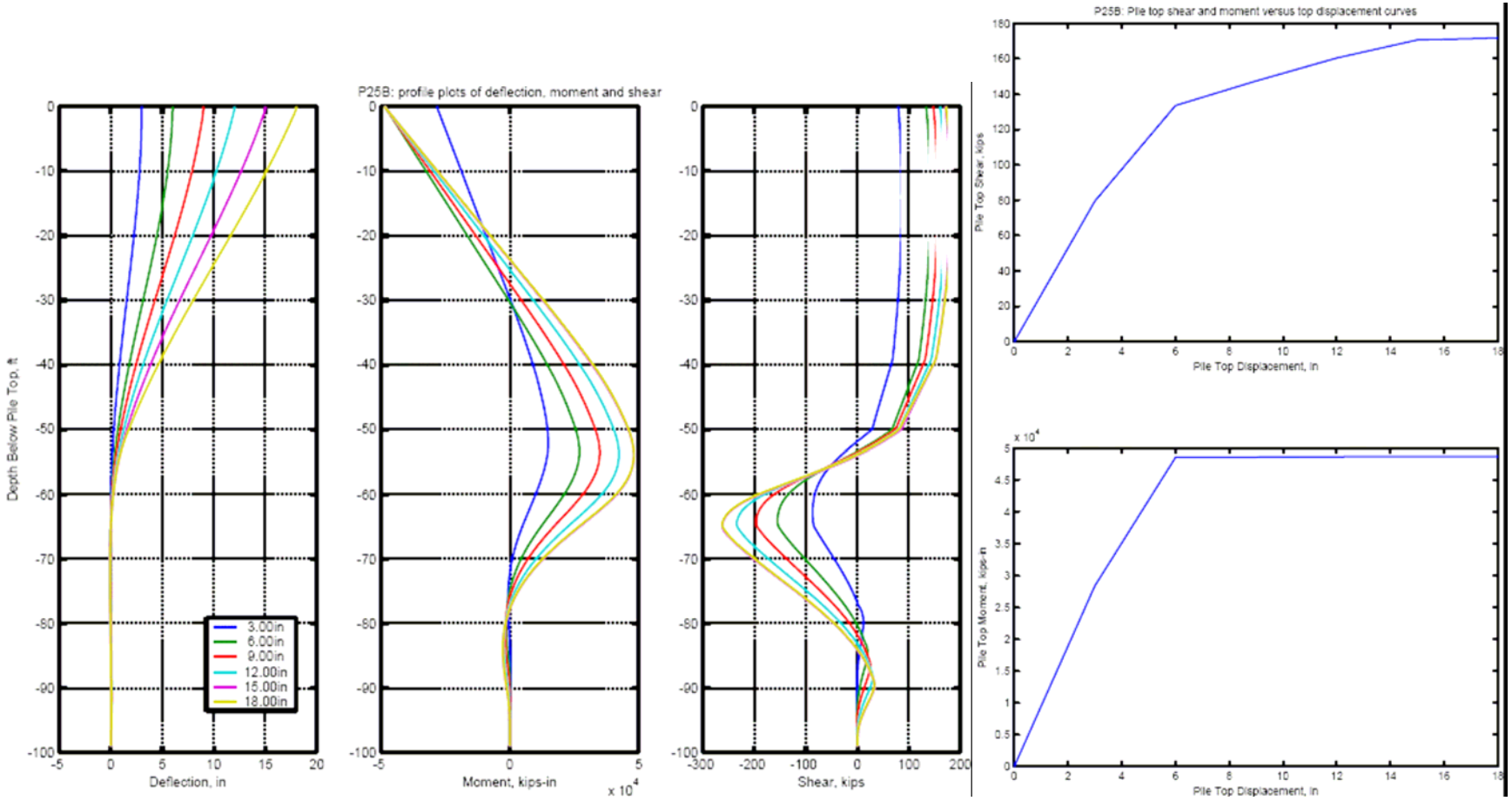


FIGURE E-26: PIER 26 – LATERAL PUSH-OVER CURVES

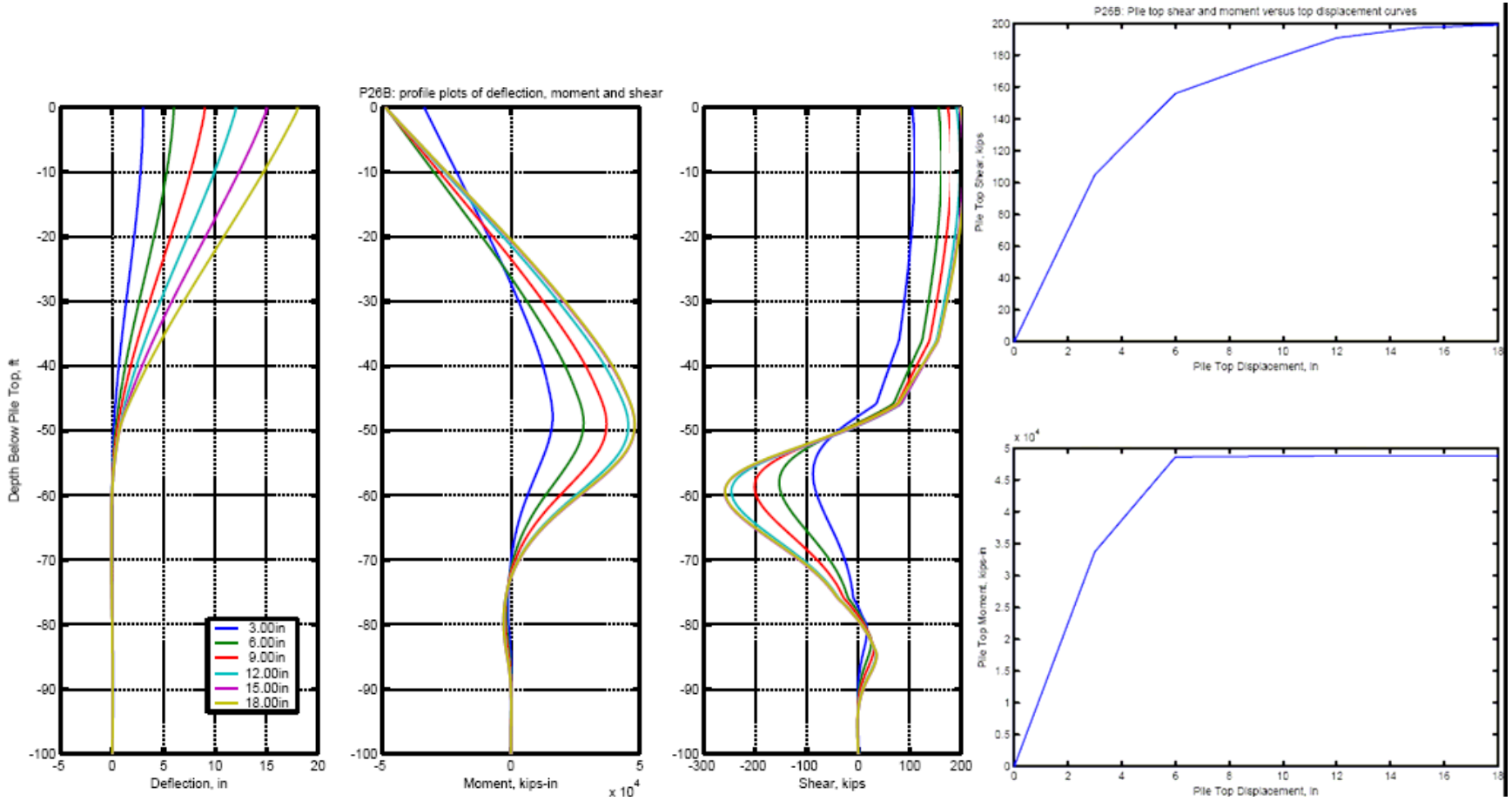


FIGURE E-27: PIER 27 – LATERAL PUSH-OVER CURVES

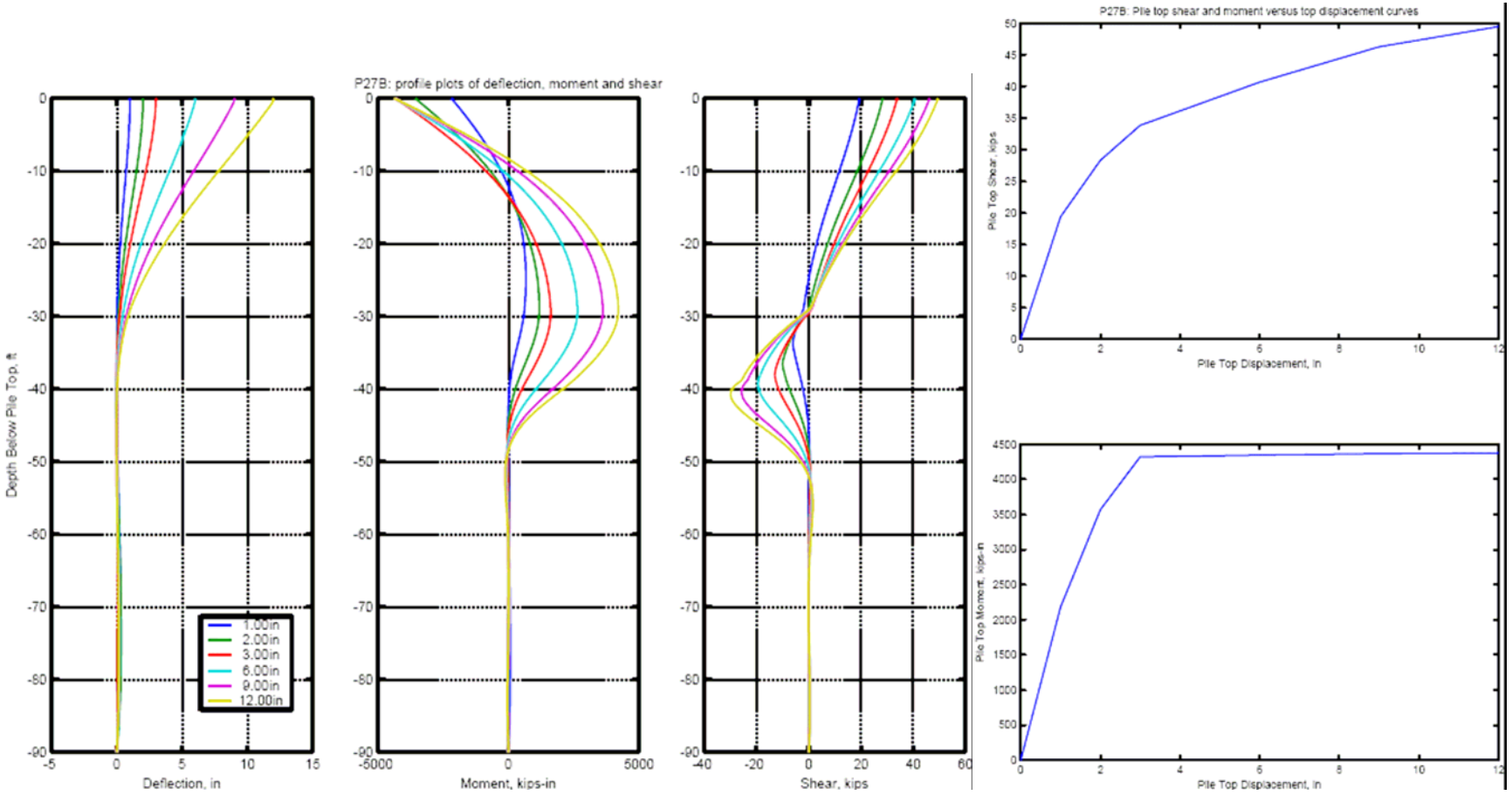


FIGURE E-28: PIER 28 – LATERAL PUSH-OVER CURVES

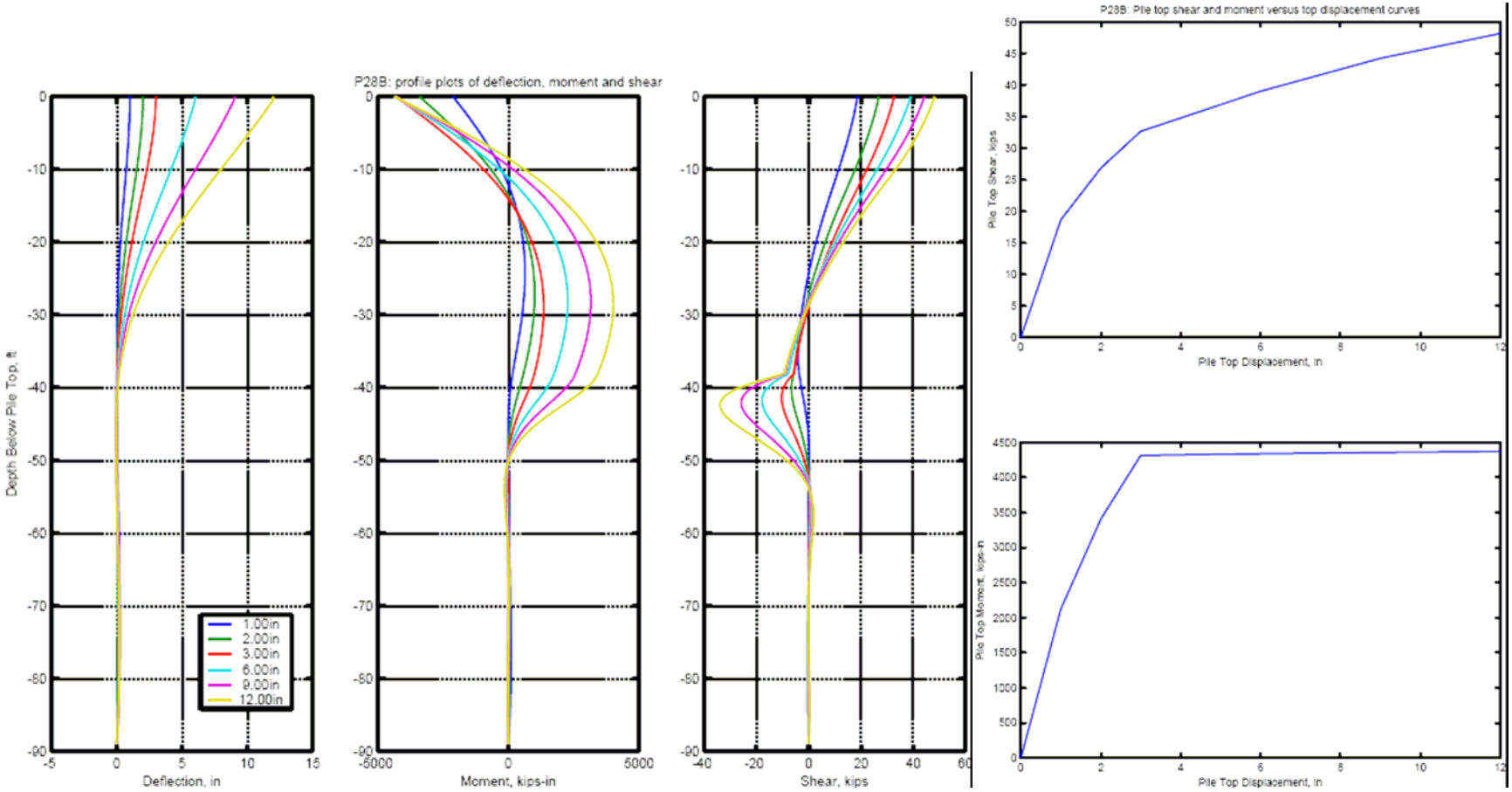


FIGURE E-29: PIER 29 – LATERAL PUSH-OVER CURVES

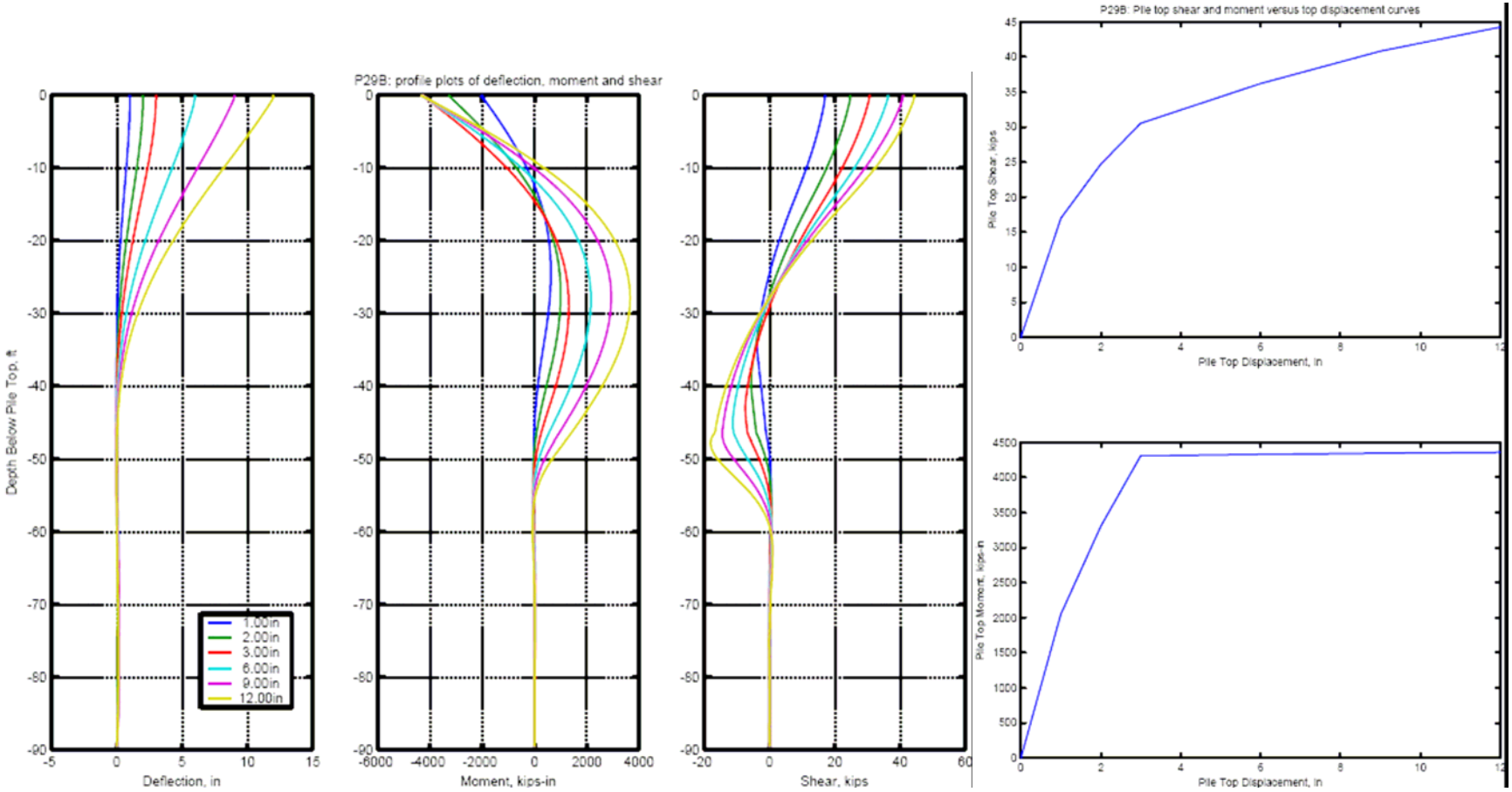


FIGURE E-30: PIER 30 – LATERAL PUSH-OVER CURVES

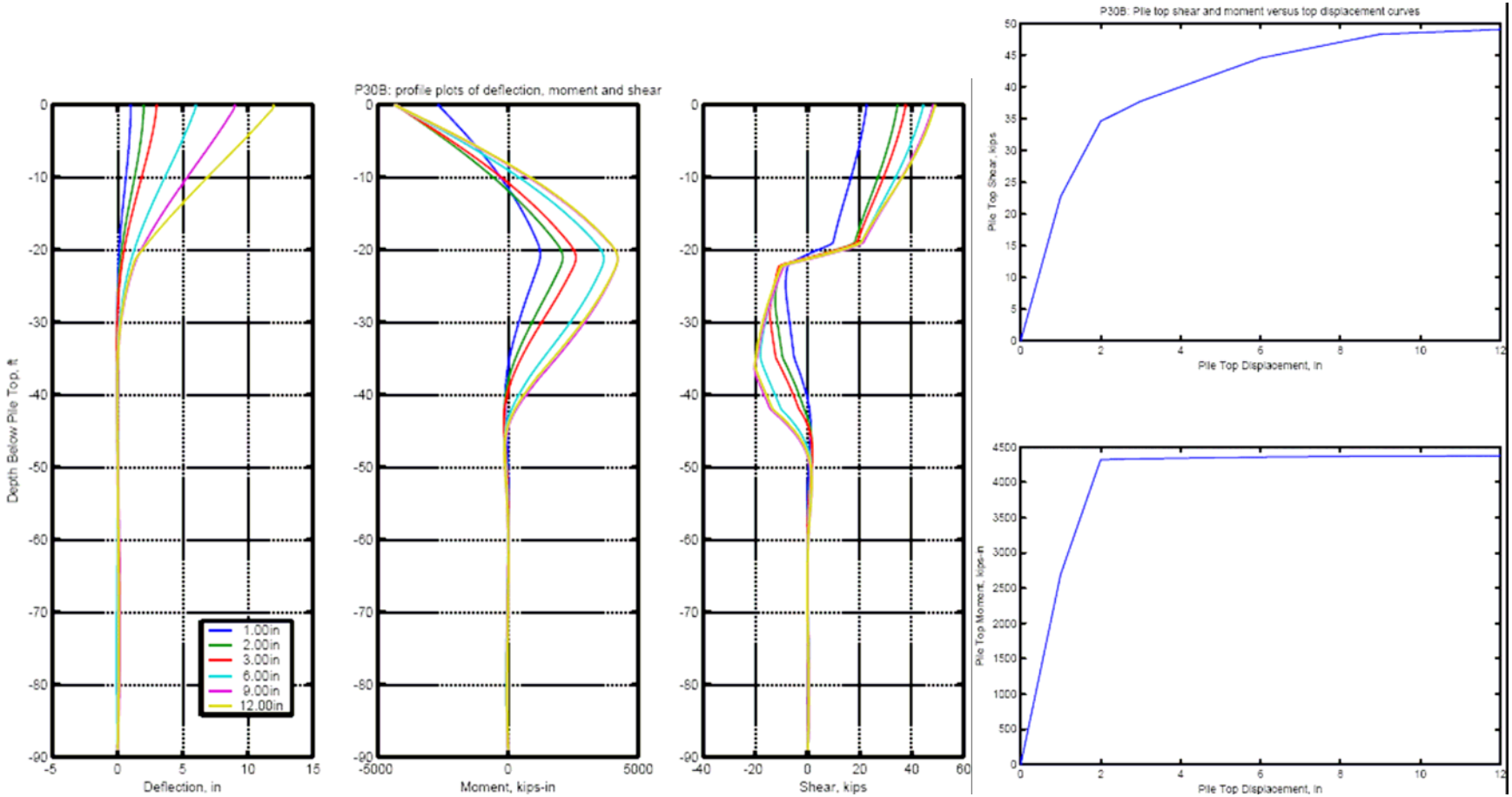


FIGURE E-31: PIER 31 – LATERAL PUSH-OVER CURVES

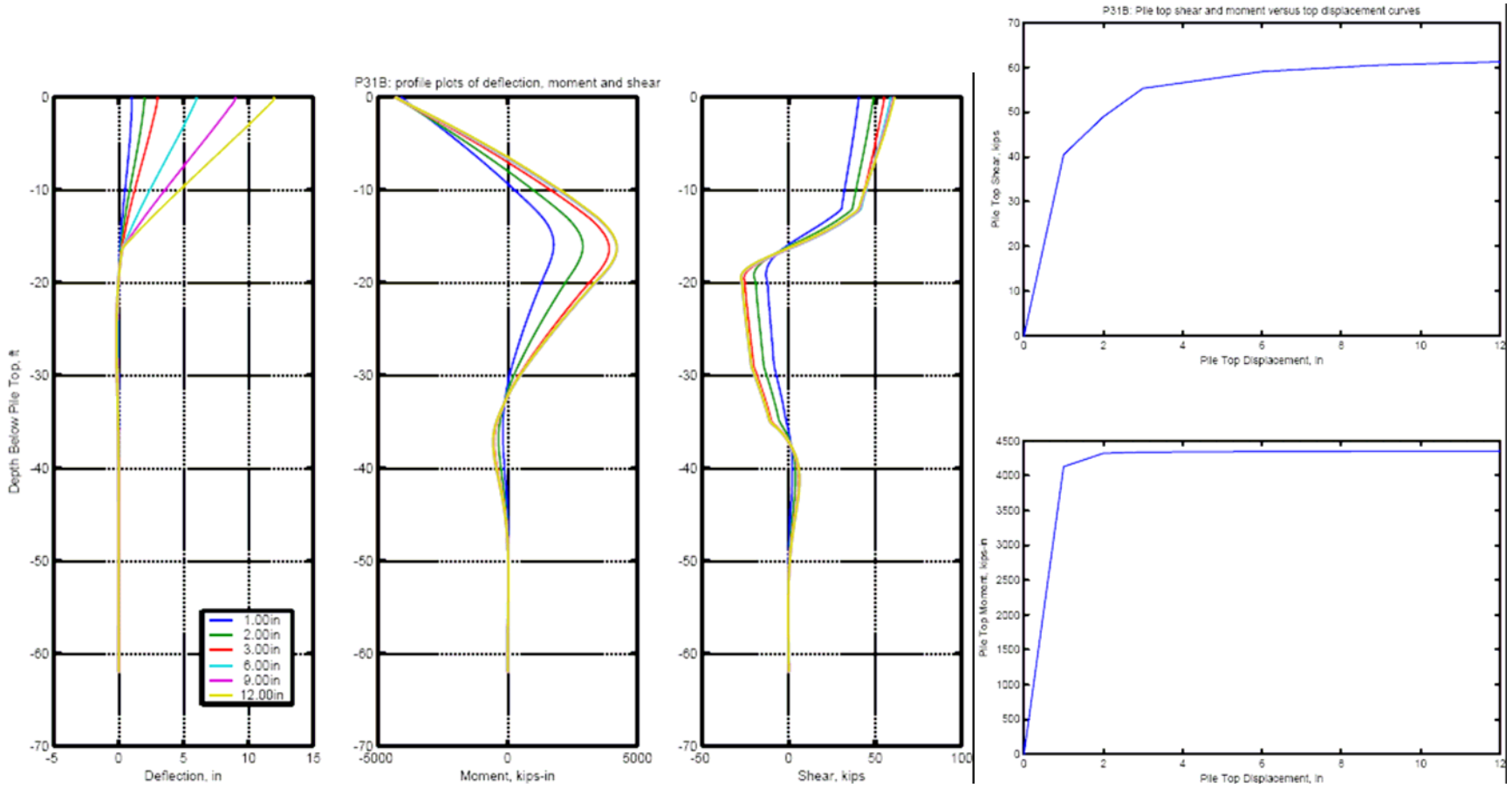


FIGURE E-32: PIER 32 – LATERAL PUSH-OVER CURVES

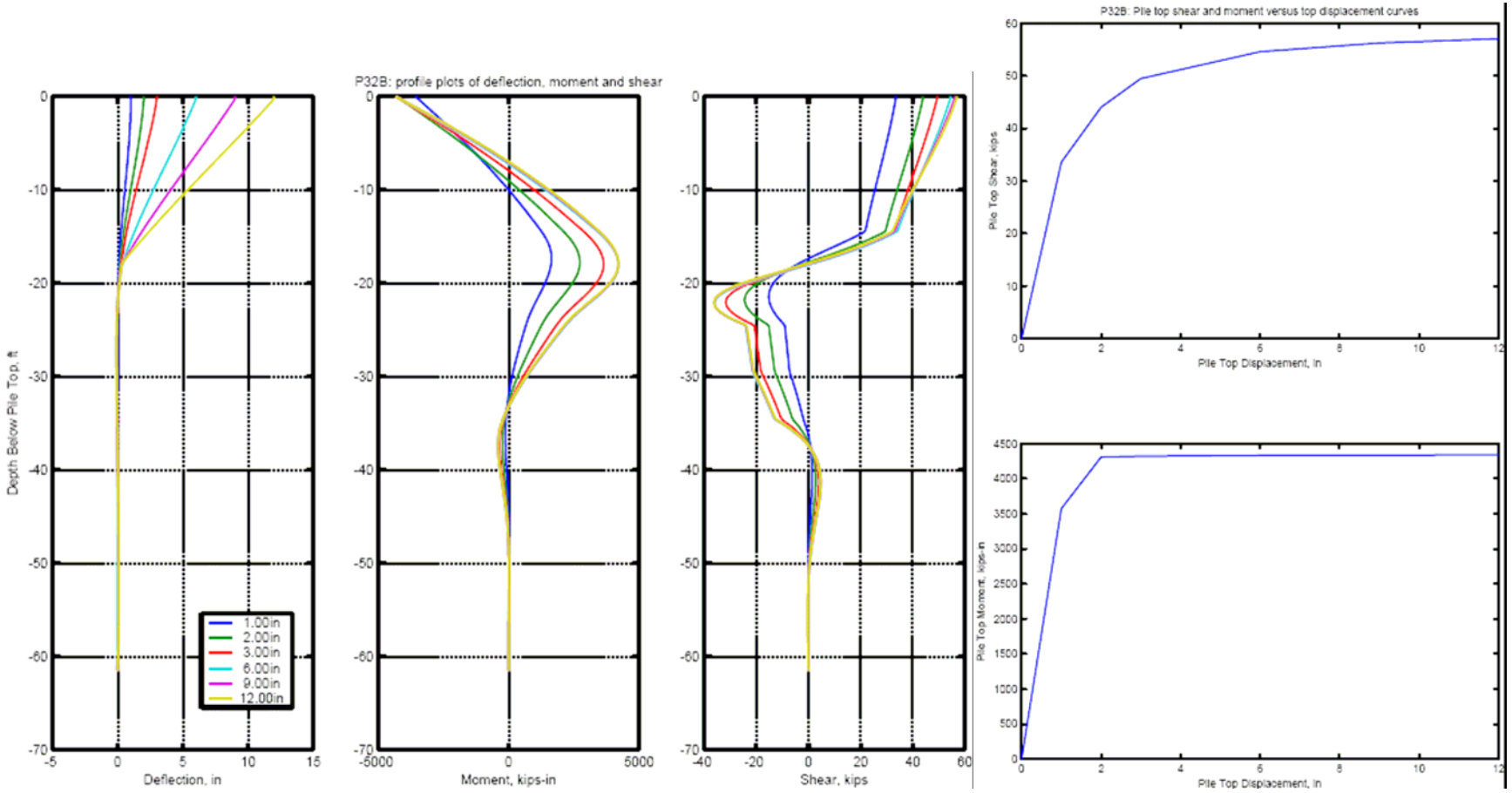


FIGURE E-33: PIER 33 – LATERAL PUSH-OVER CURVES

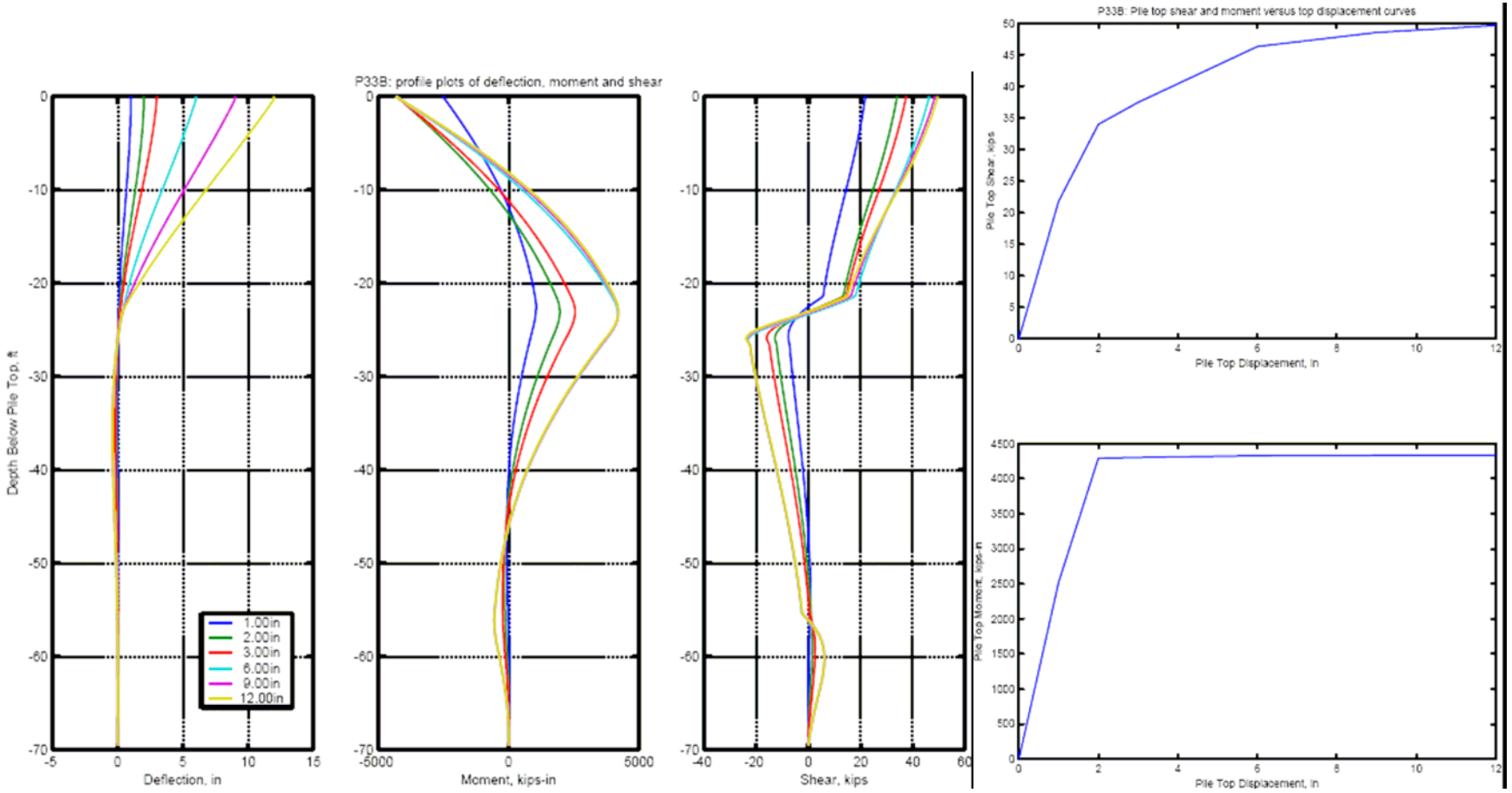


FIGURE E-34: PIER 34 – LATERAL PUSH-OVER CURVES

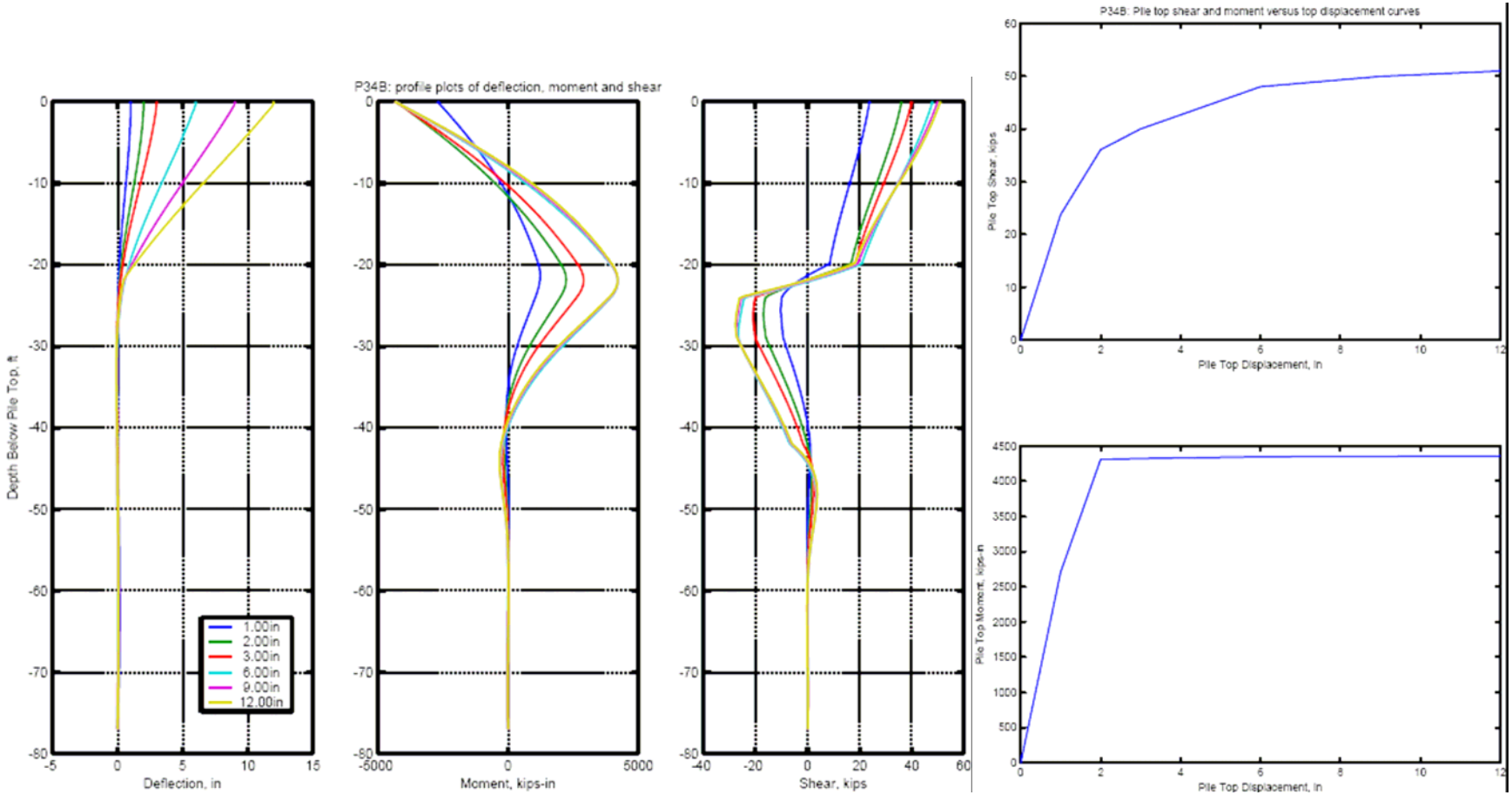


FIGURE E-35: PIER 35 – LATERAL PUSH-OVER CURVES

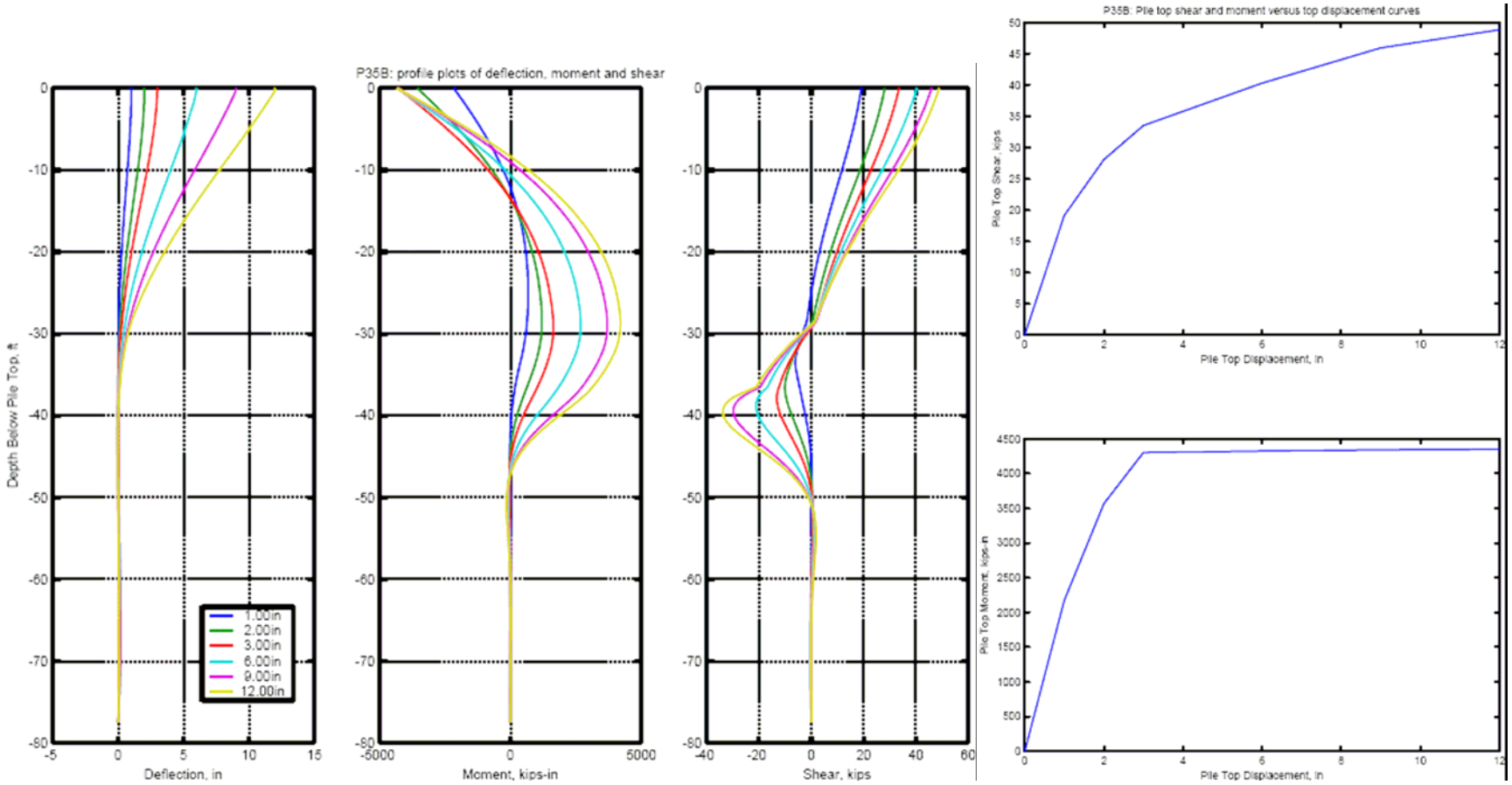


FIGURE E-36: PIER 36 – LATERAL PUSH-OVER CURVES

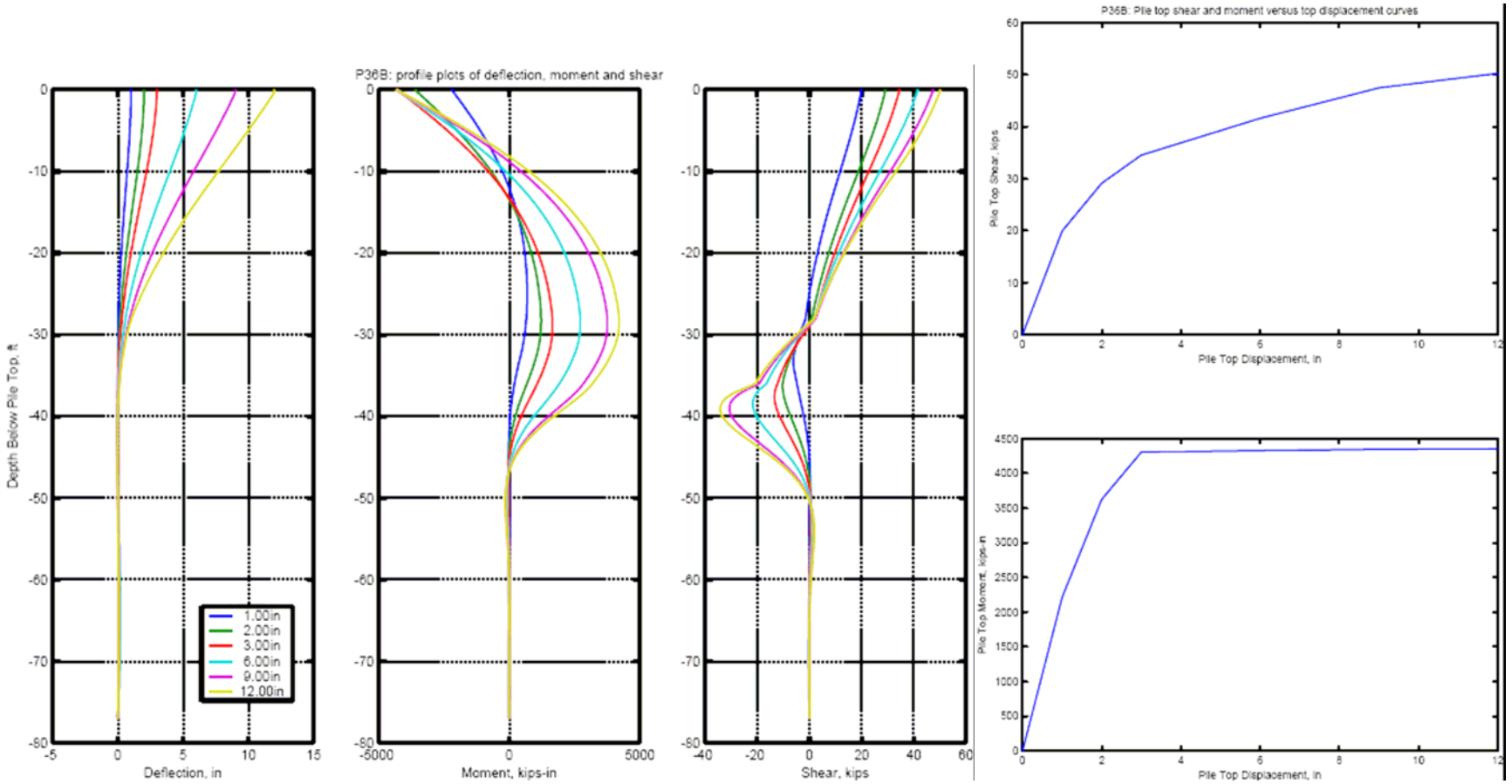


FIGURE E-37: PIER 37 – LATERAL PUSH-OVER CURVES

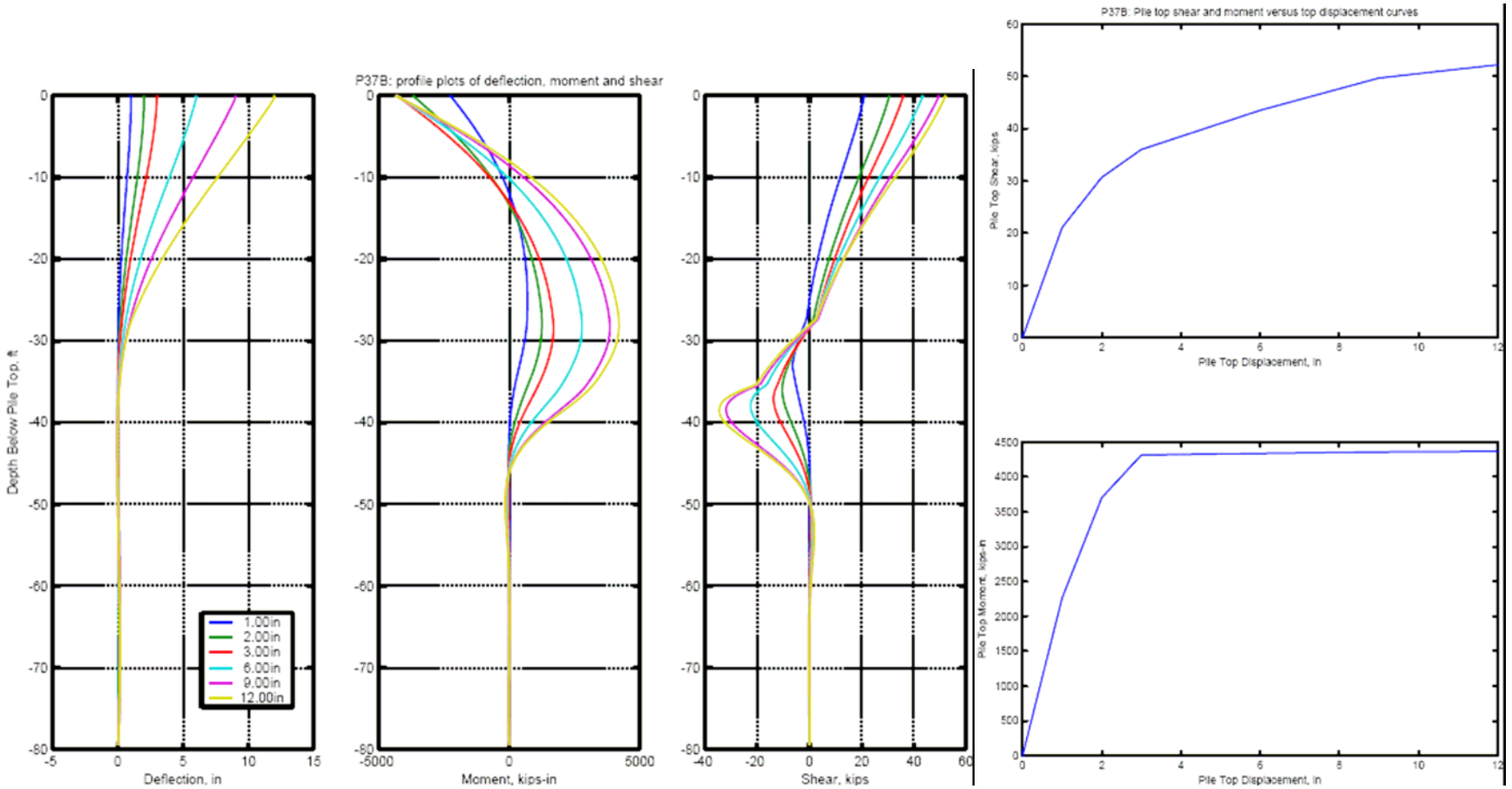


FIGURE E-38: PIER 38 – LATERAL PUSH-OVER CURVES

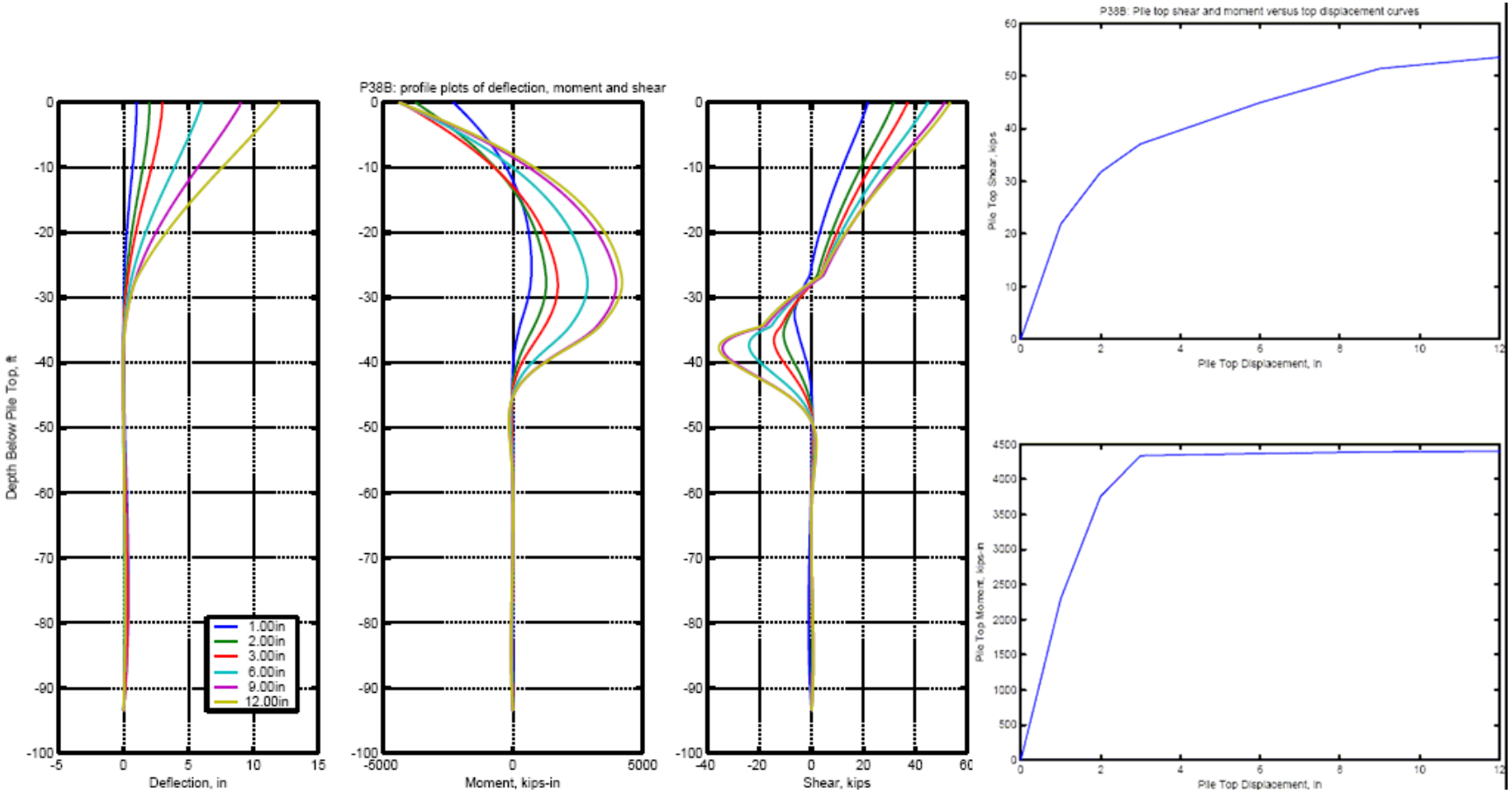


FIGURE E-39: PIER 39 – LATERAL PUSH-OVER CURVES

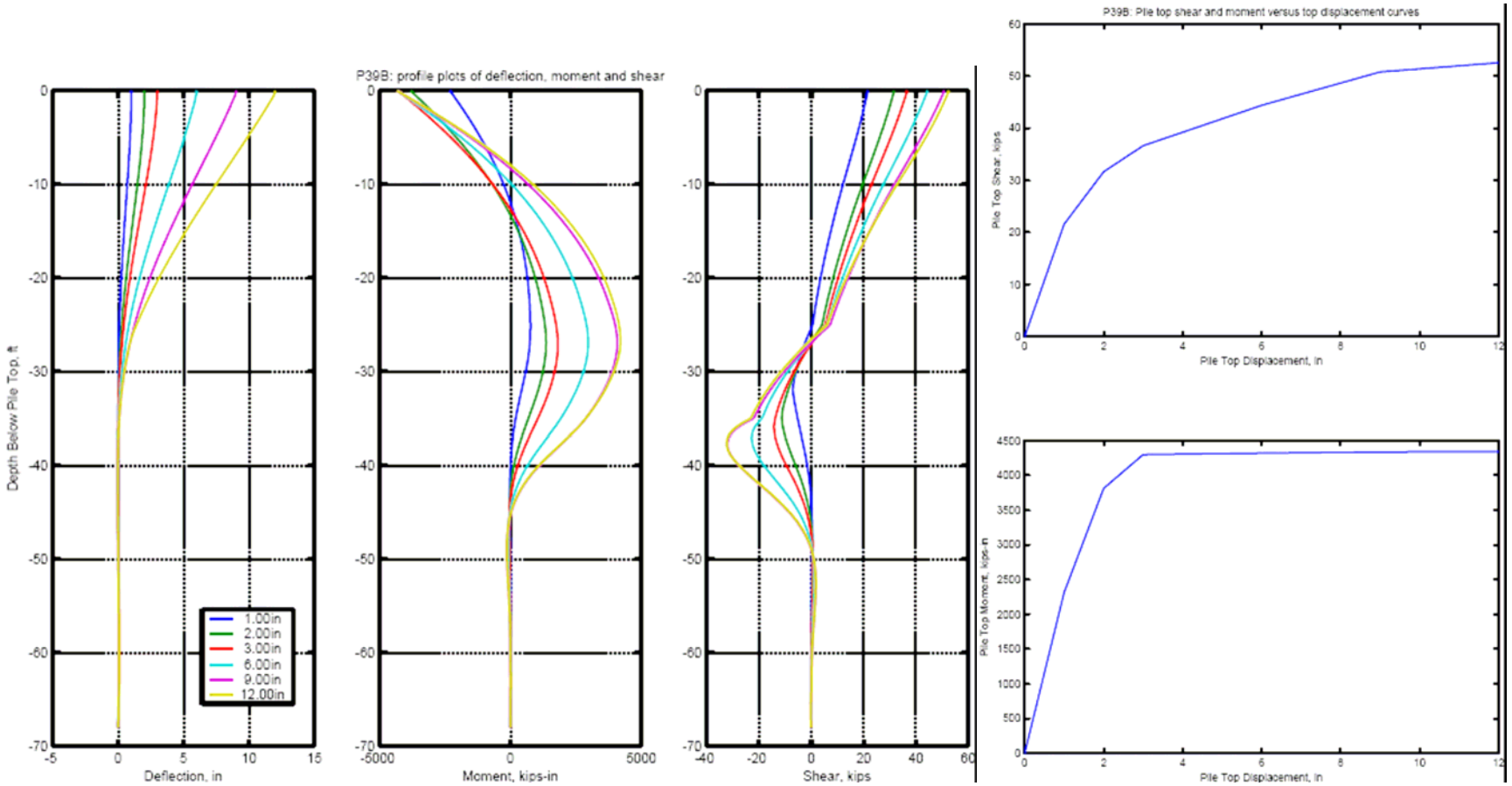


FIGURE E-40: PIER 40 – LATERAL PUSH-OVER CURVES

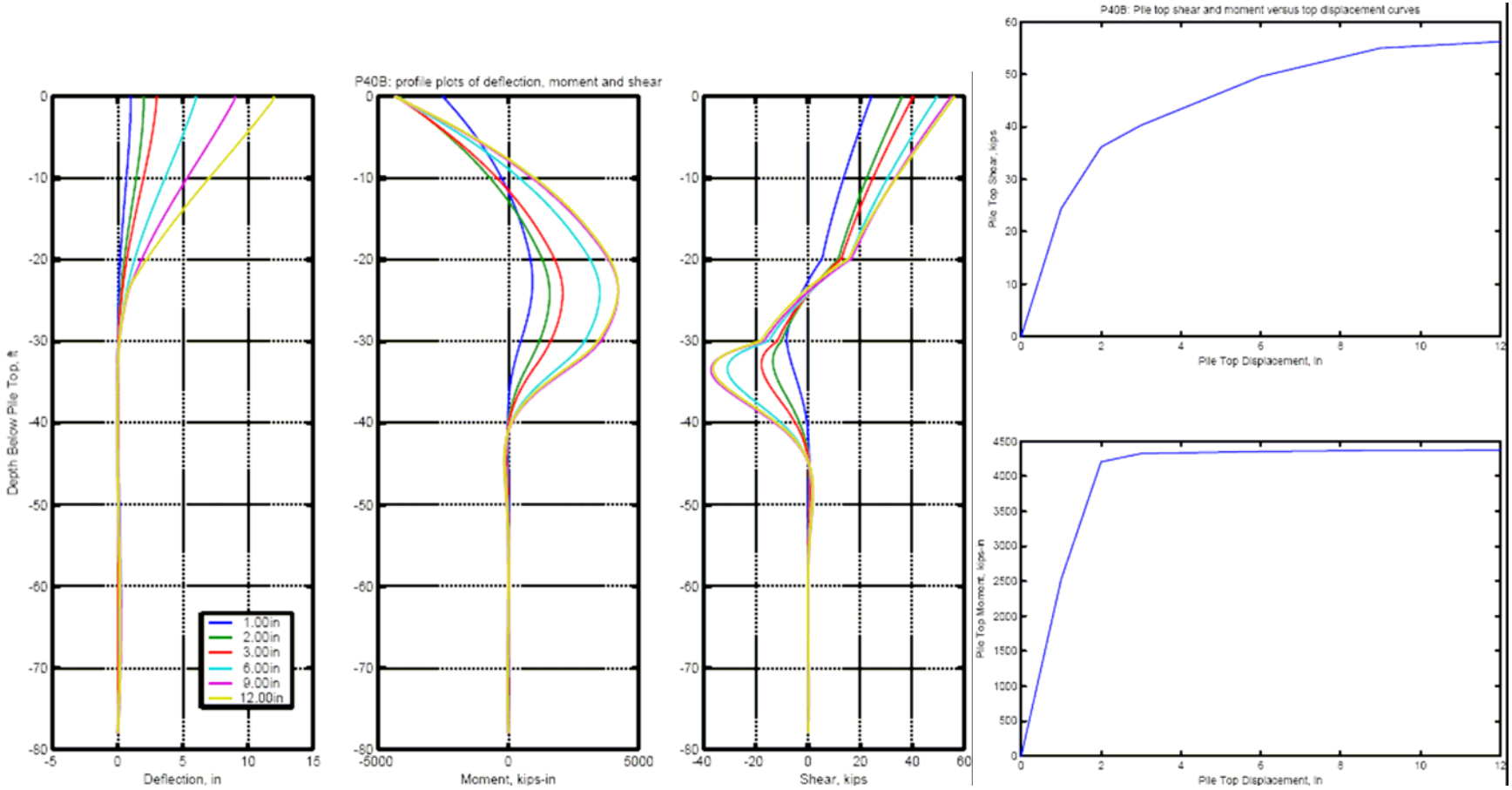


FIGURE E-41: PIER 41 – LATERAL PUSH-OVER CURVES

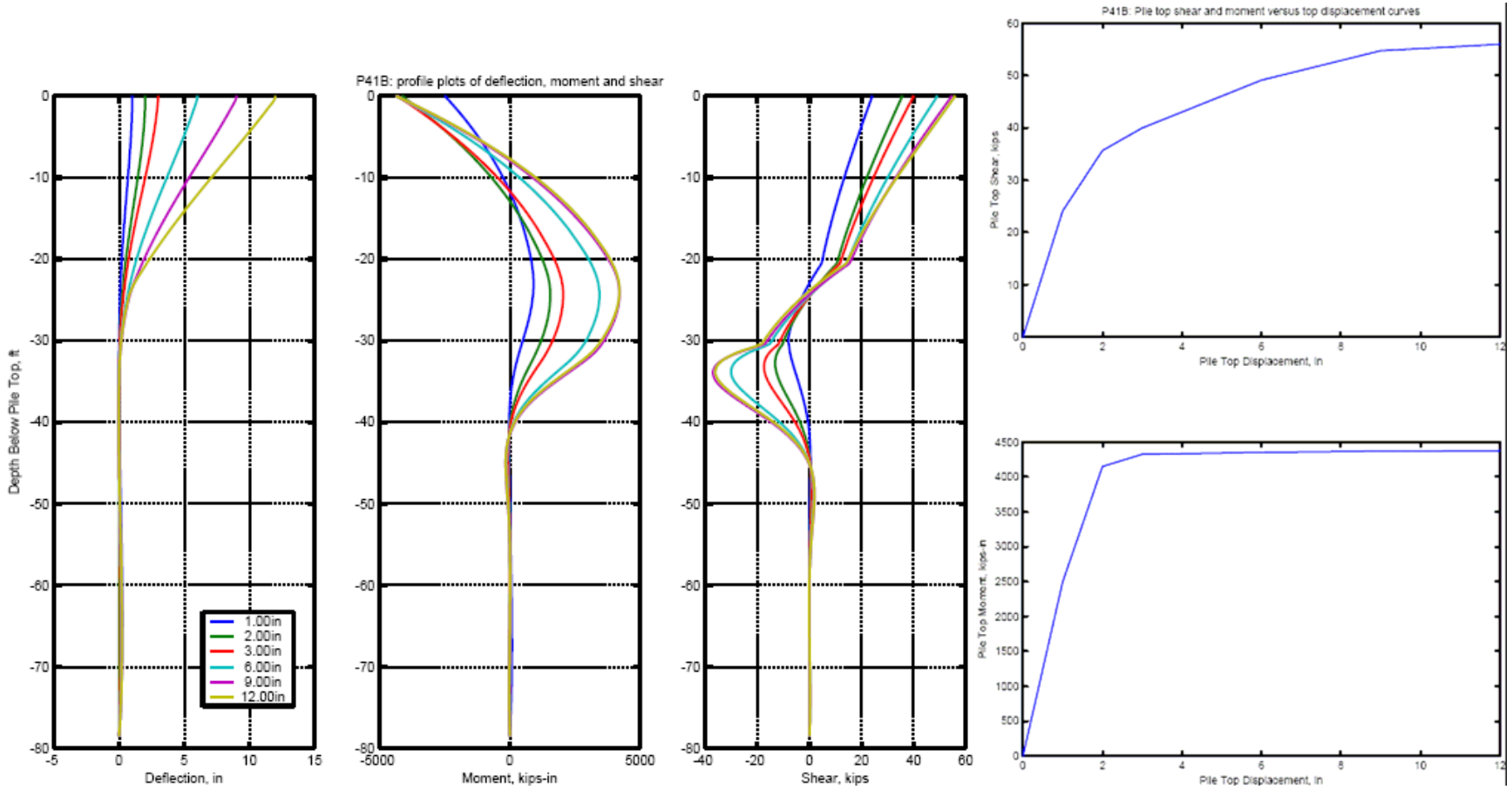


FIGURE E-42: PIER 42 – LATERAL PUSH-OVER CURVES

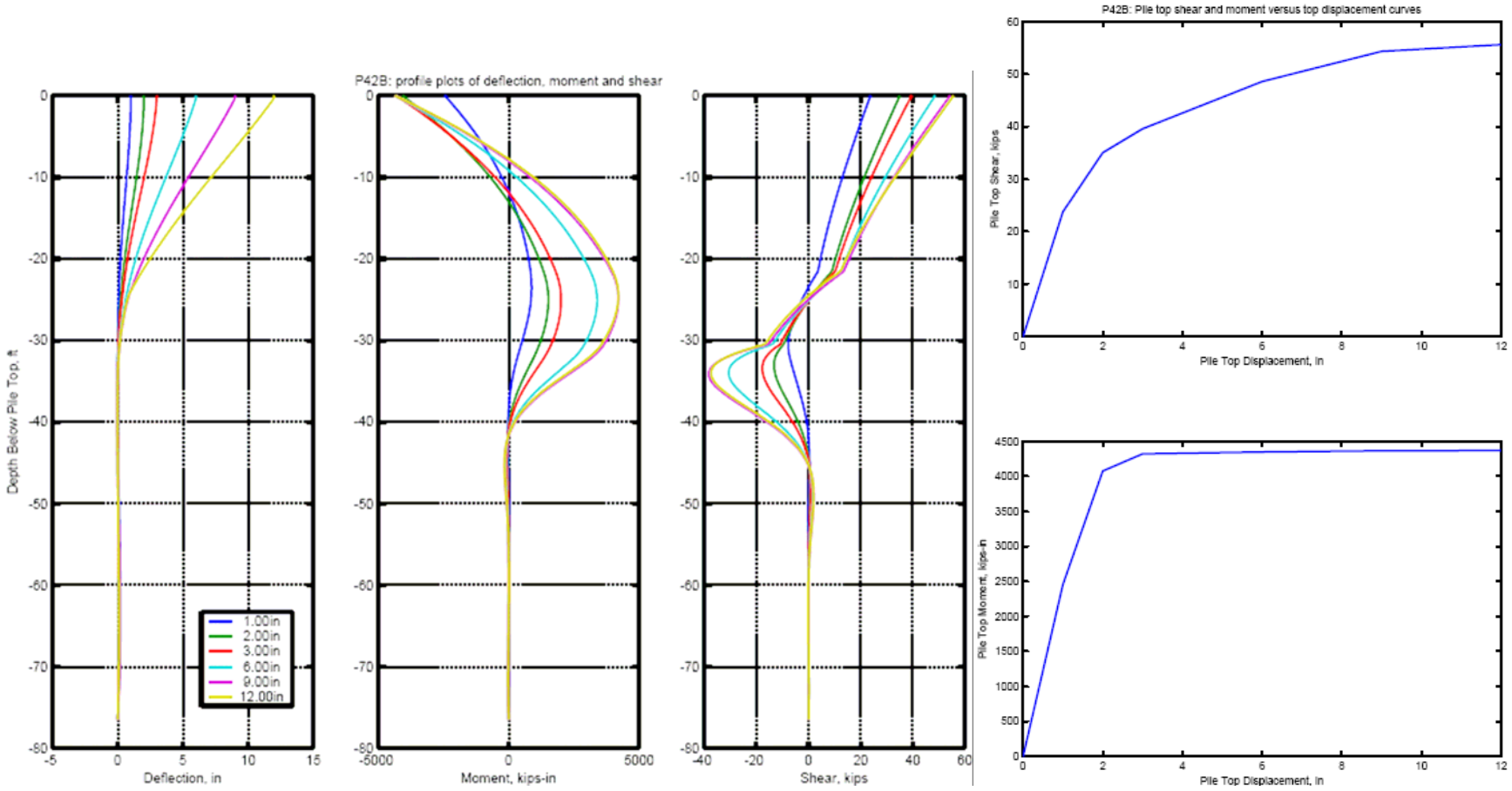


FIGURE E-43: PIER 43 – LATERAL PUSH-OVER CURVES

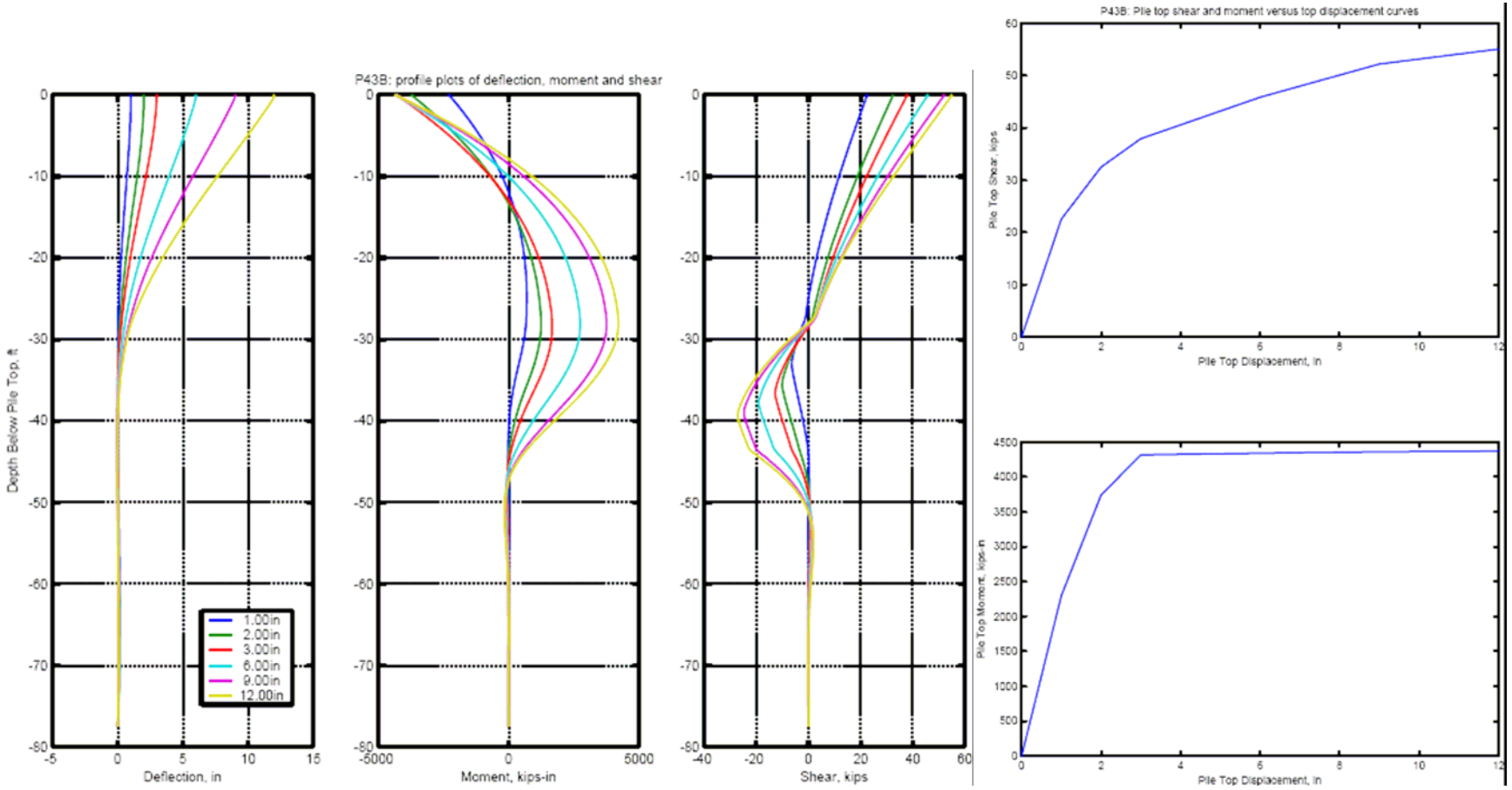


FIGURE E-44: PIER 44 – LATERAL PUSH-OVER CURVES

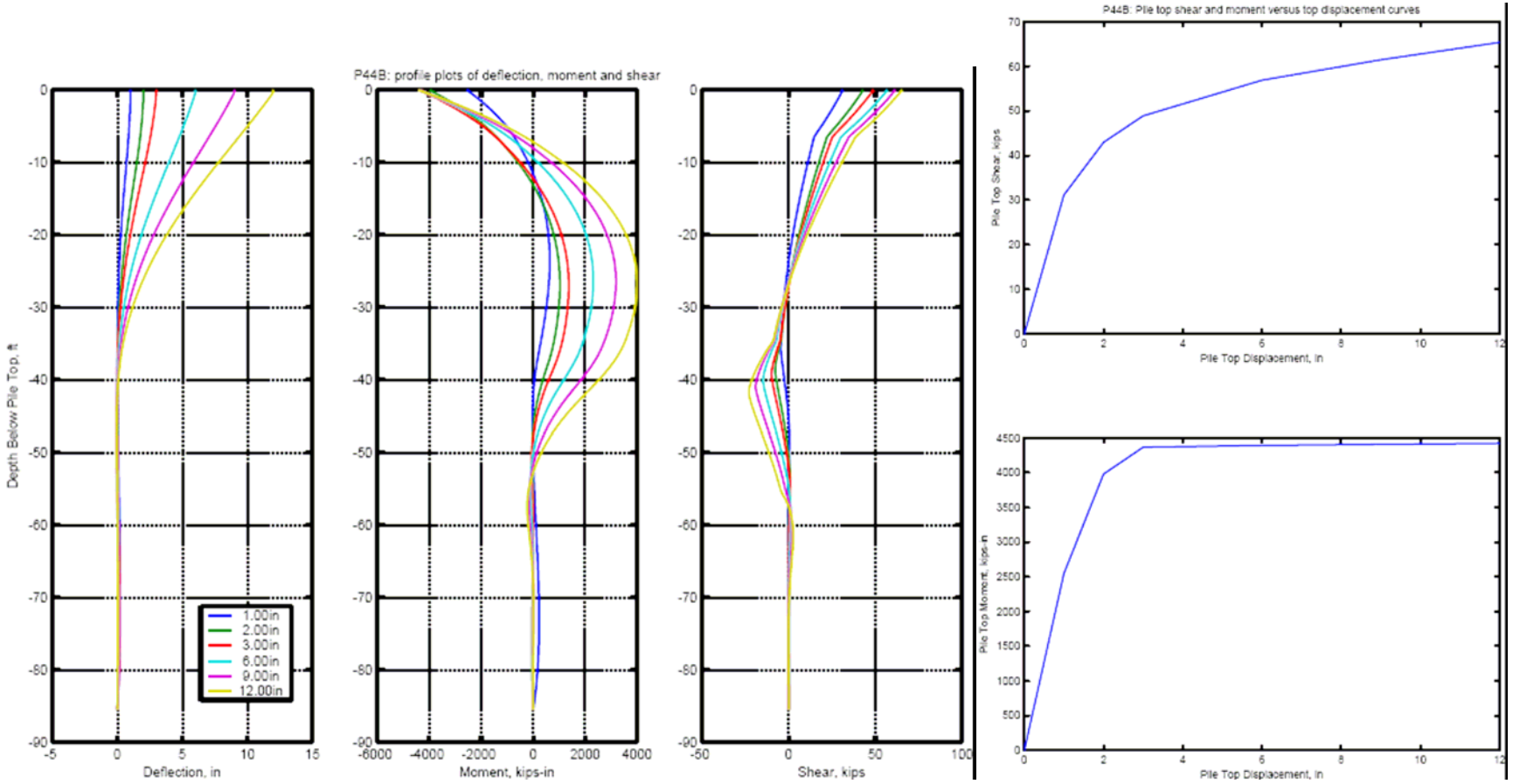


FIGURE E-45: TRESTLE BENTS E01~05 – LATERAL PUSH-OVER CURVES

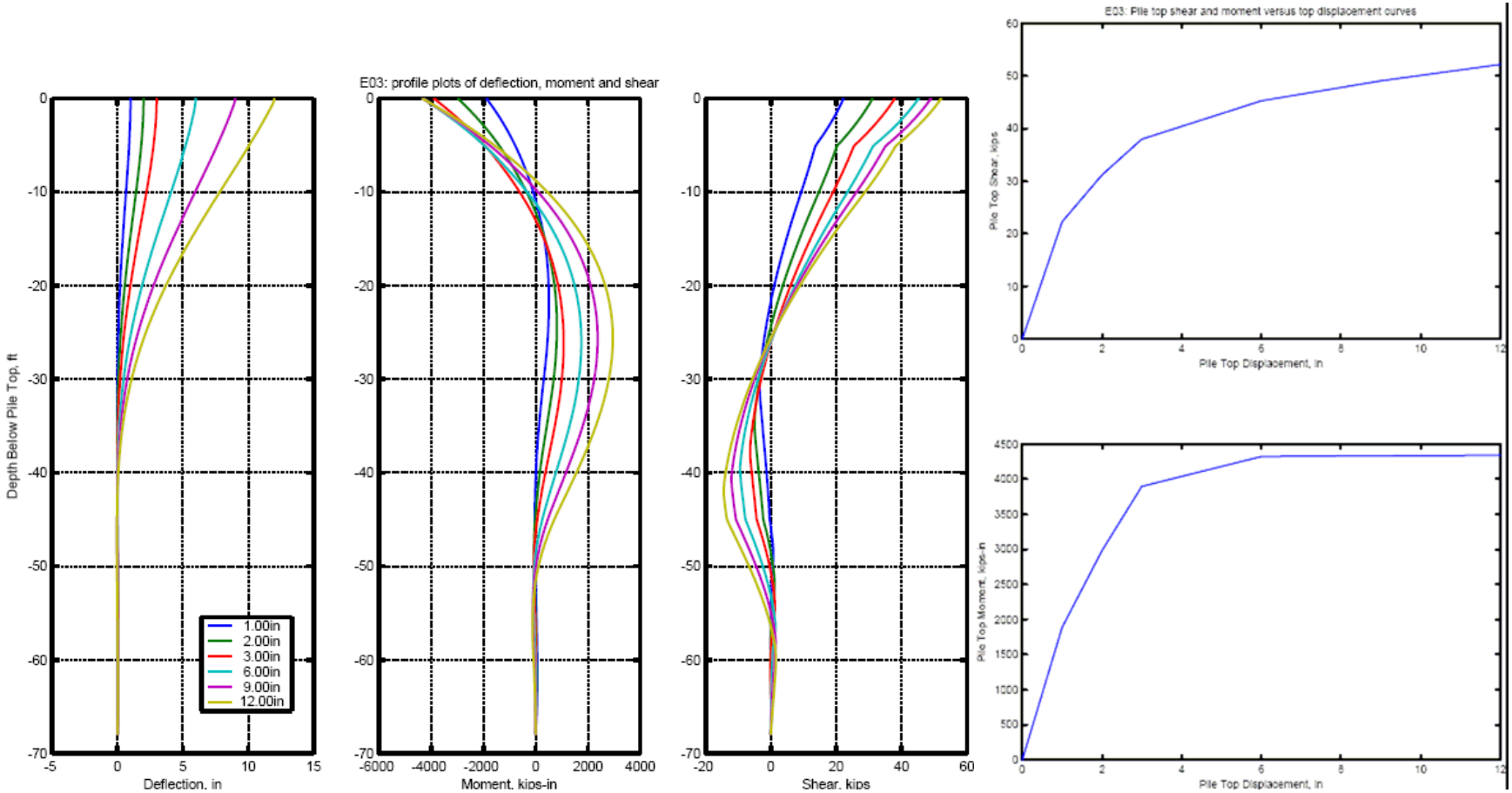


FIGURE E-46: TRESTLE BENTS E06~10 – LATERAL PUSH-OVER CURVES

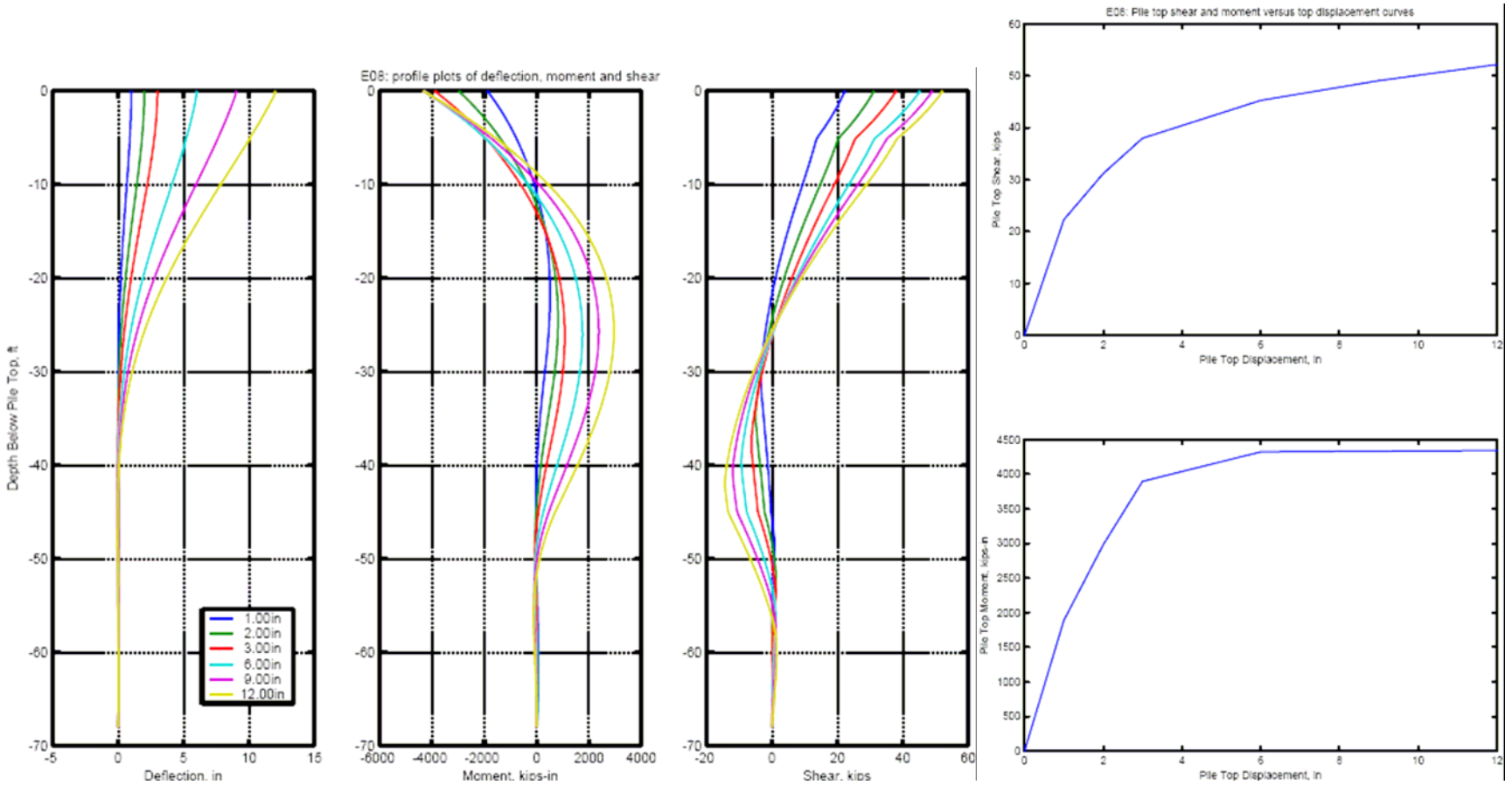


FIGURE E-47: TRESTLE BENTS E11~15 – LATERAL PUSH-OVER CURVES

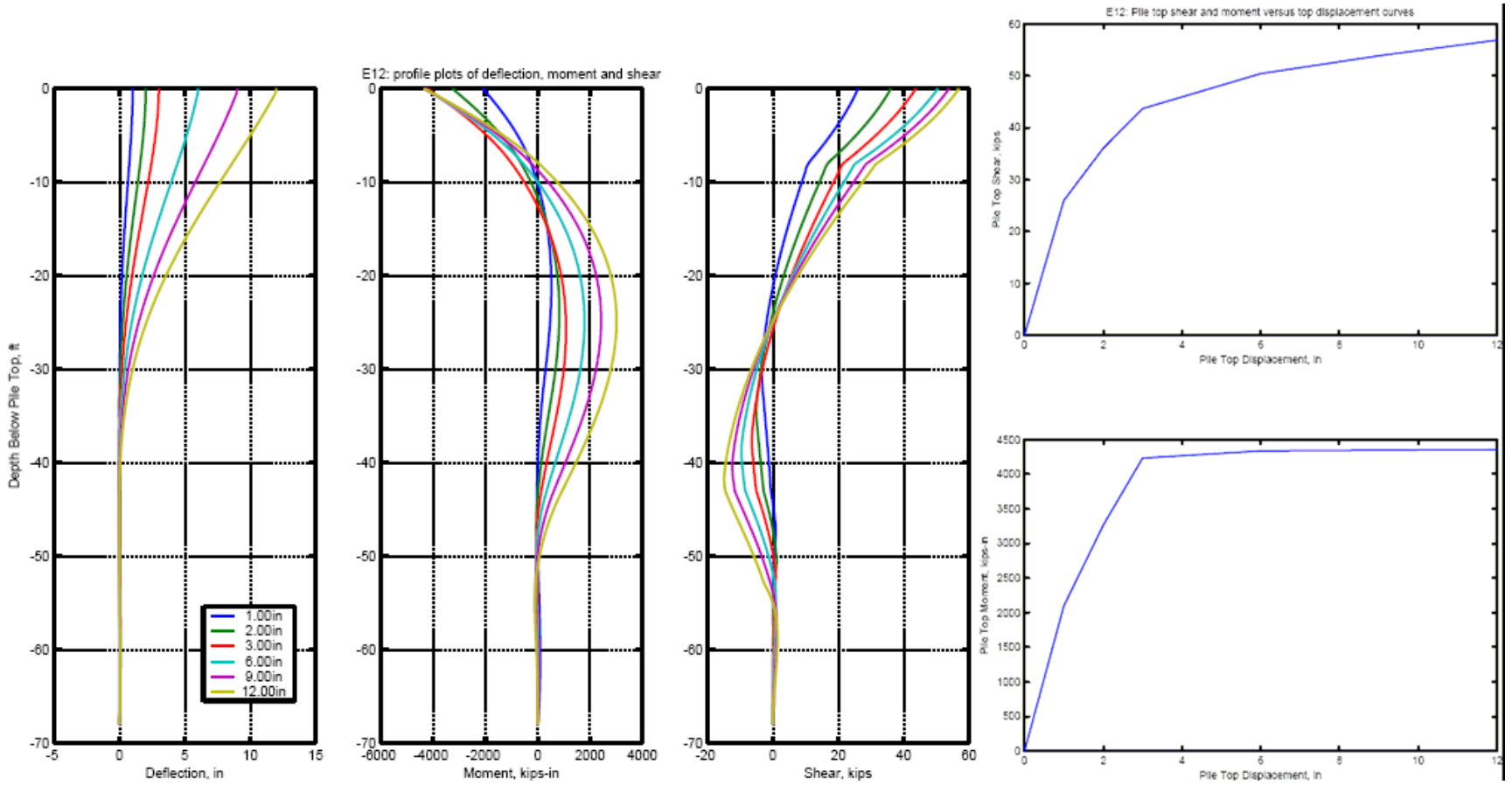


FIGURE E-48: TRESTLE BENTS E16~19 – LATERAL PUSH-OVER CURVES

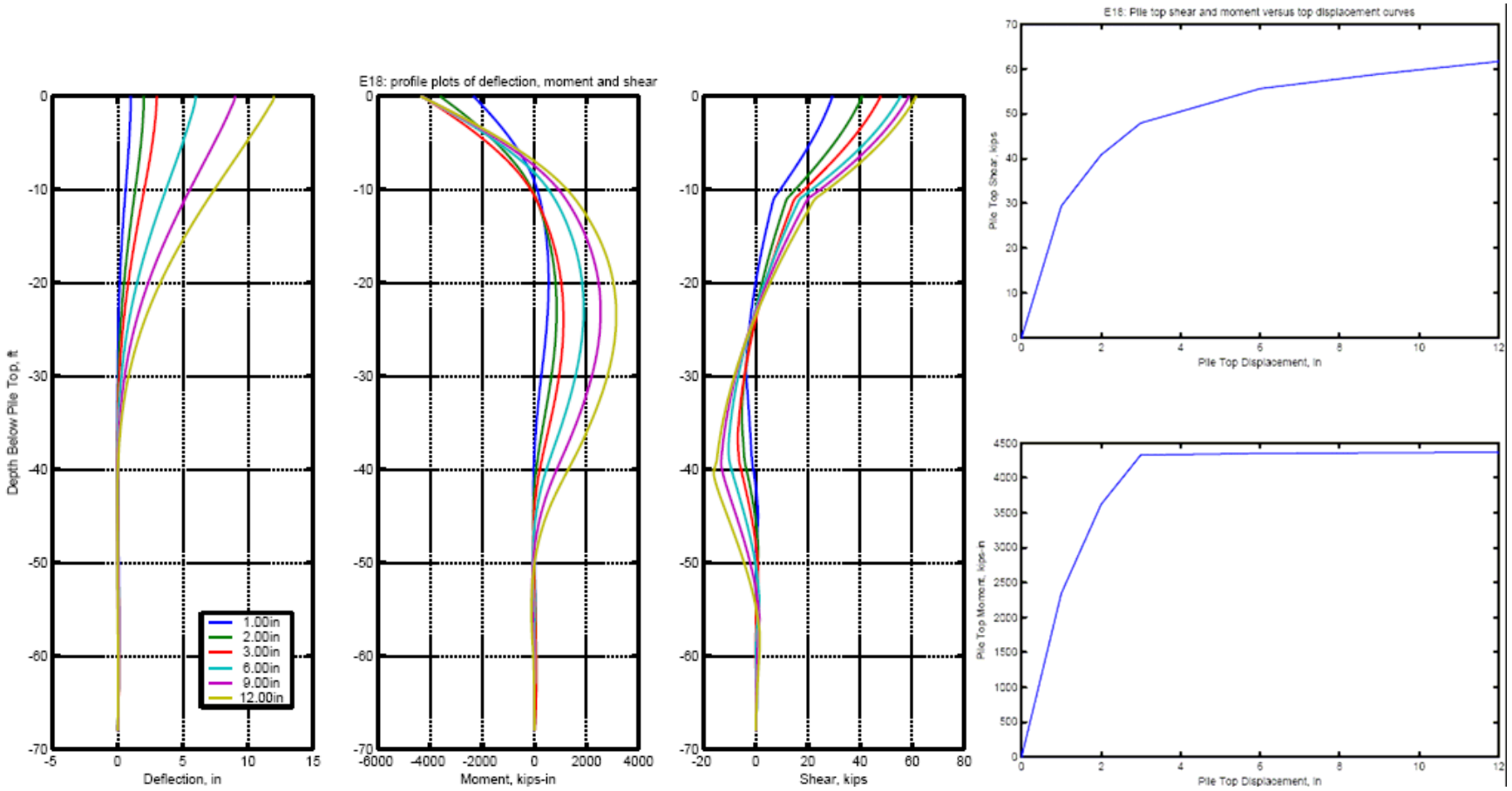


FIGURE E-49: TRESTLE BENT E20 – LATERAL PUSH-OVER CURVES

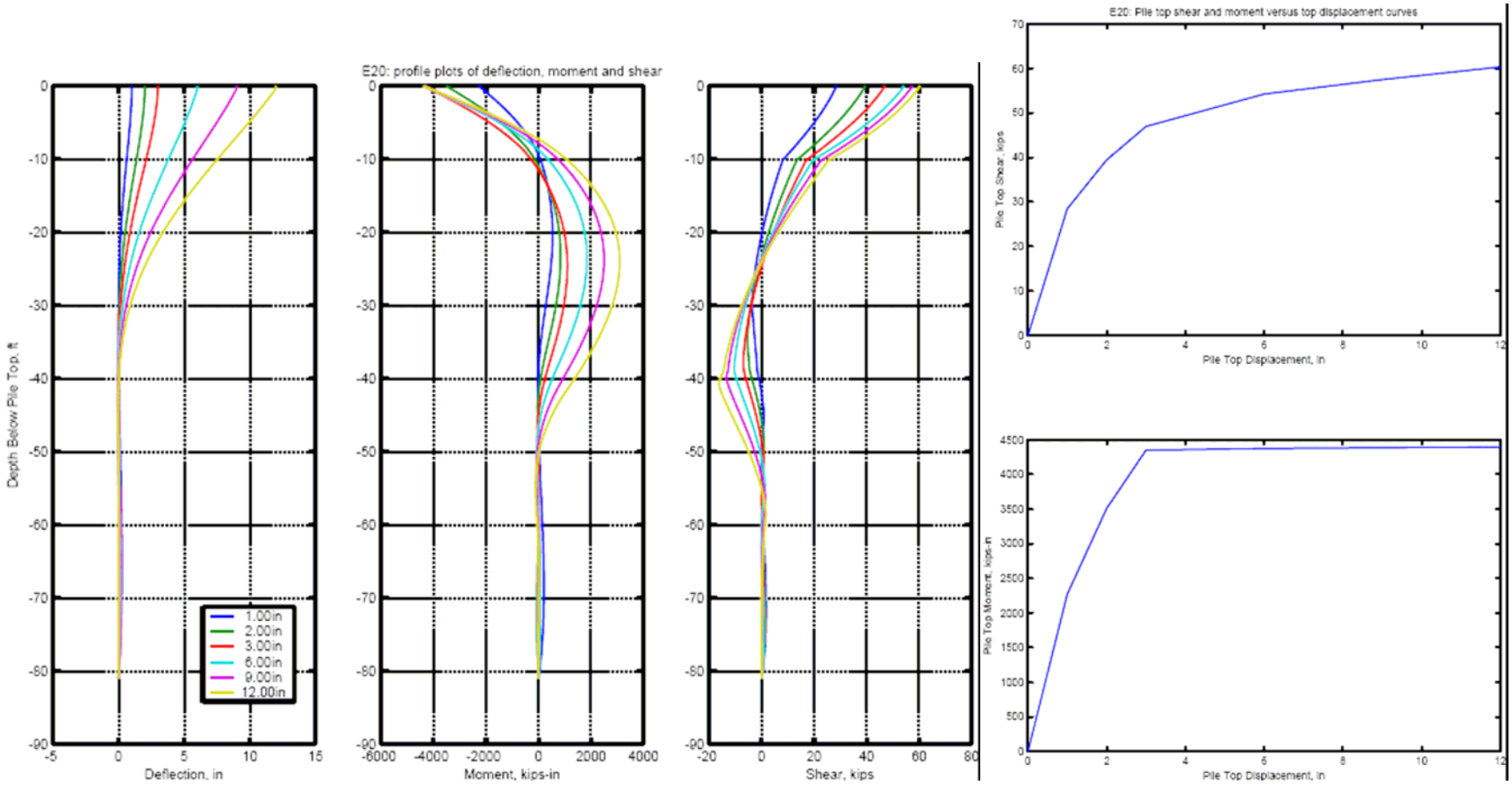


FIGURE E-50: TRESTLE BENTS W01~09 – LATERAL PUSH-OVER CURVES

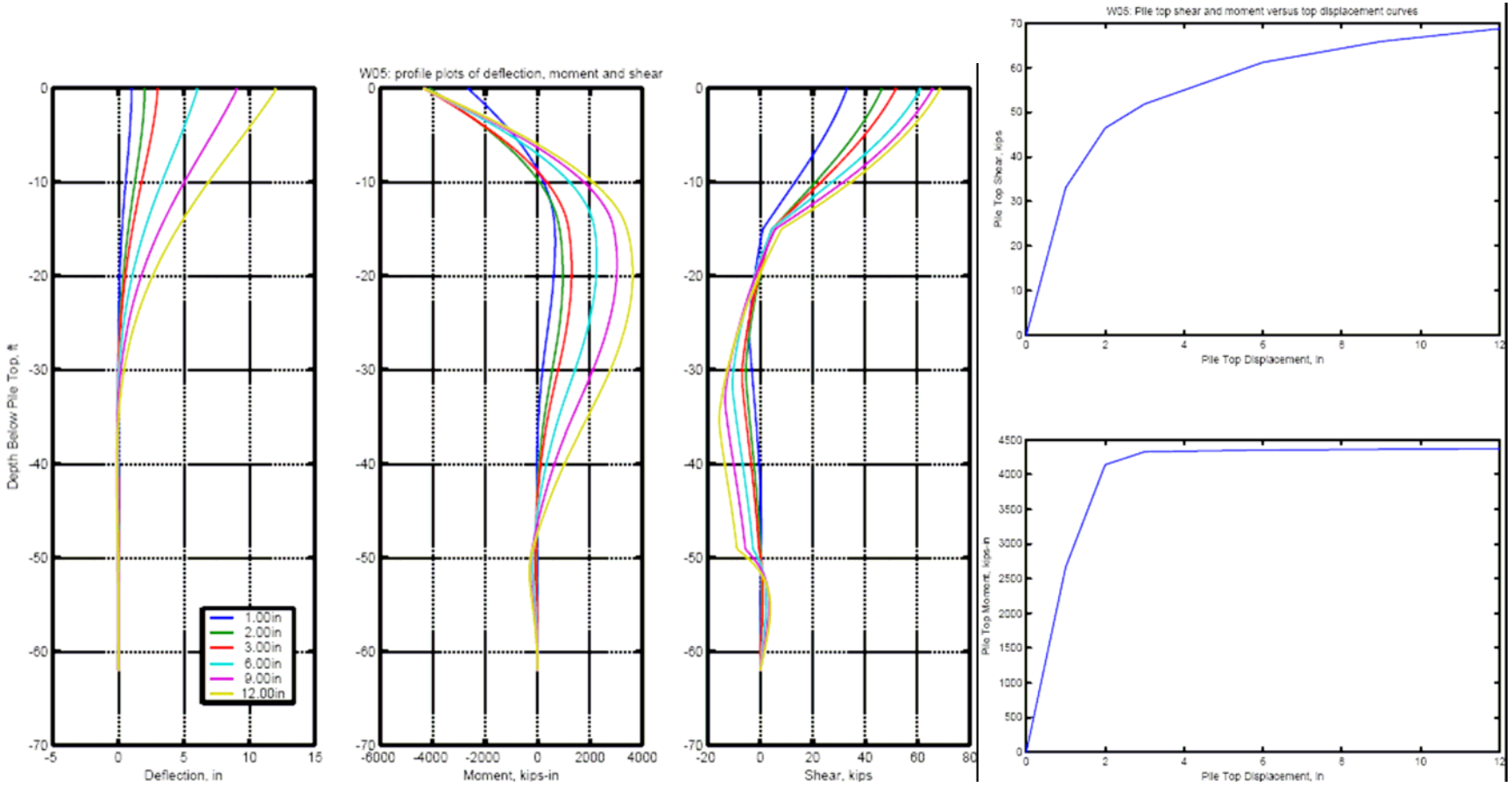


FIGURE E-51: TRESTLE BENTS W10~14 – LATERAL PUSH-OVER CURVES

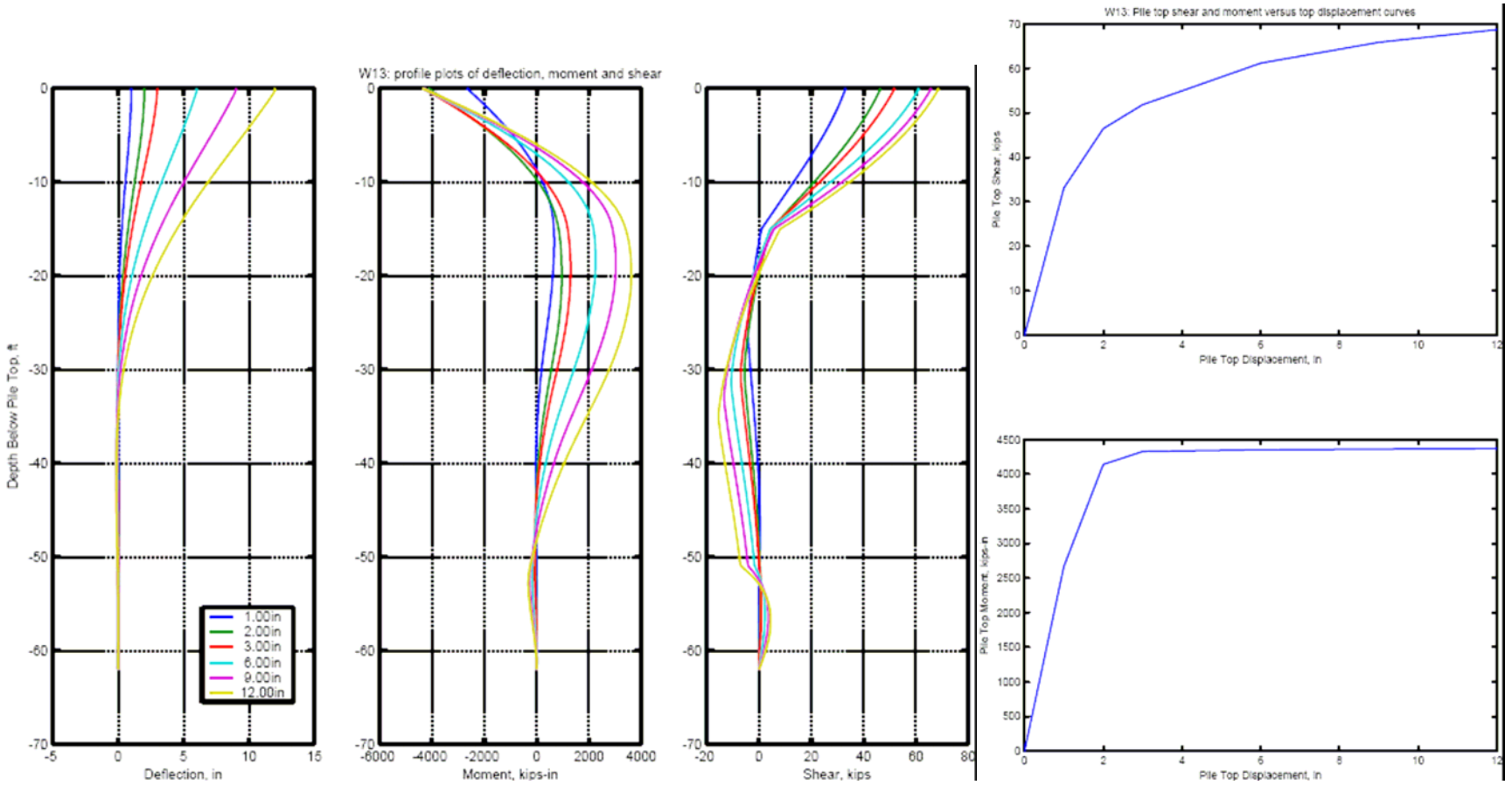


FIGURE E-52: TRESTLE BENTS W15~17 – LATERAL PUSH-OVER CURVES

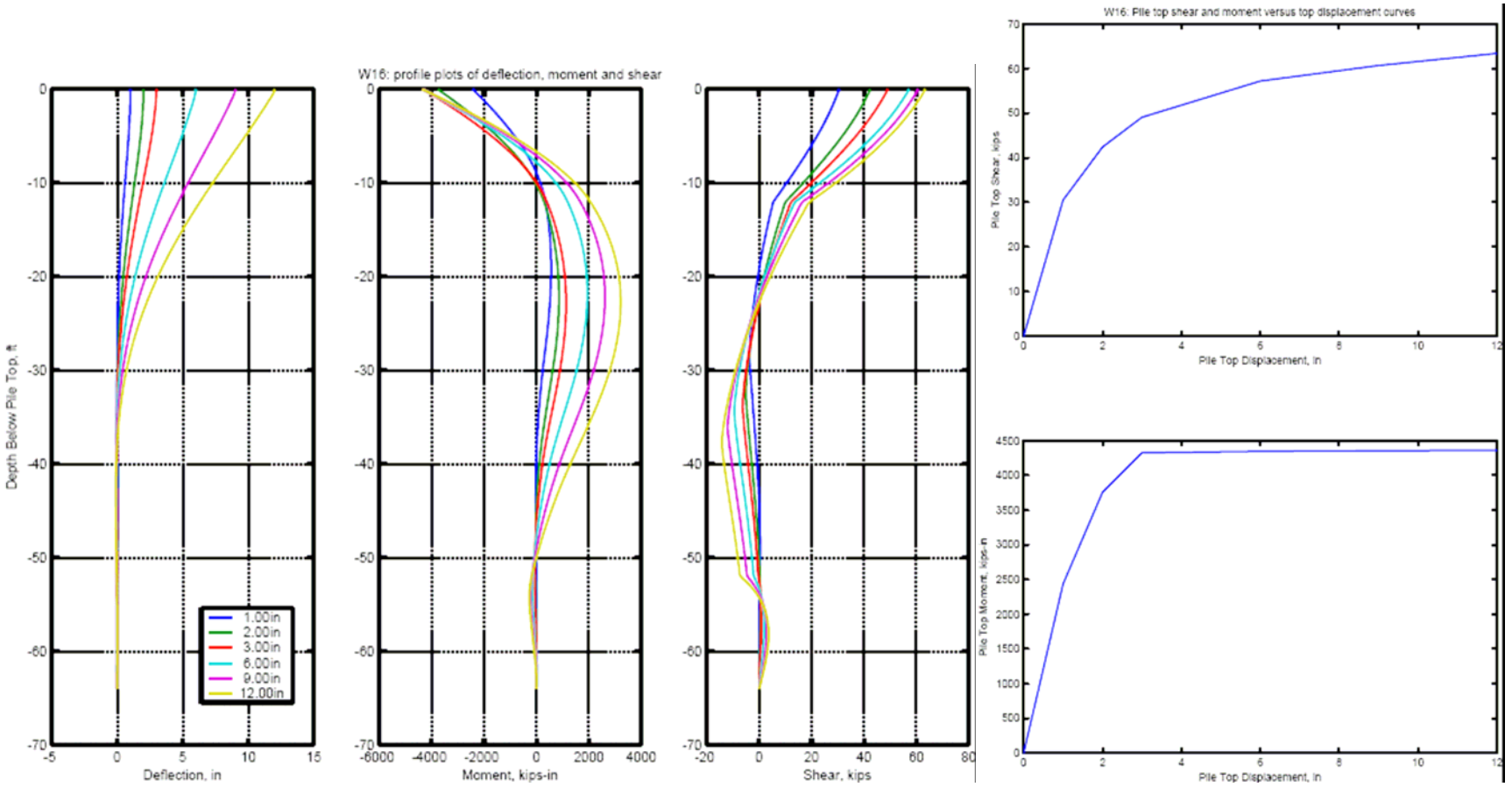


FIGURE E-53: TRESTLE BENT W18 – LATERAL PUSH-OVER CURVES

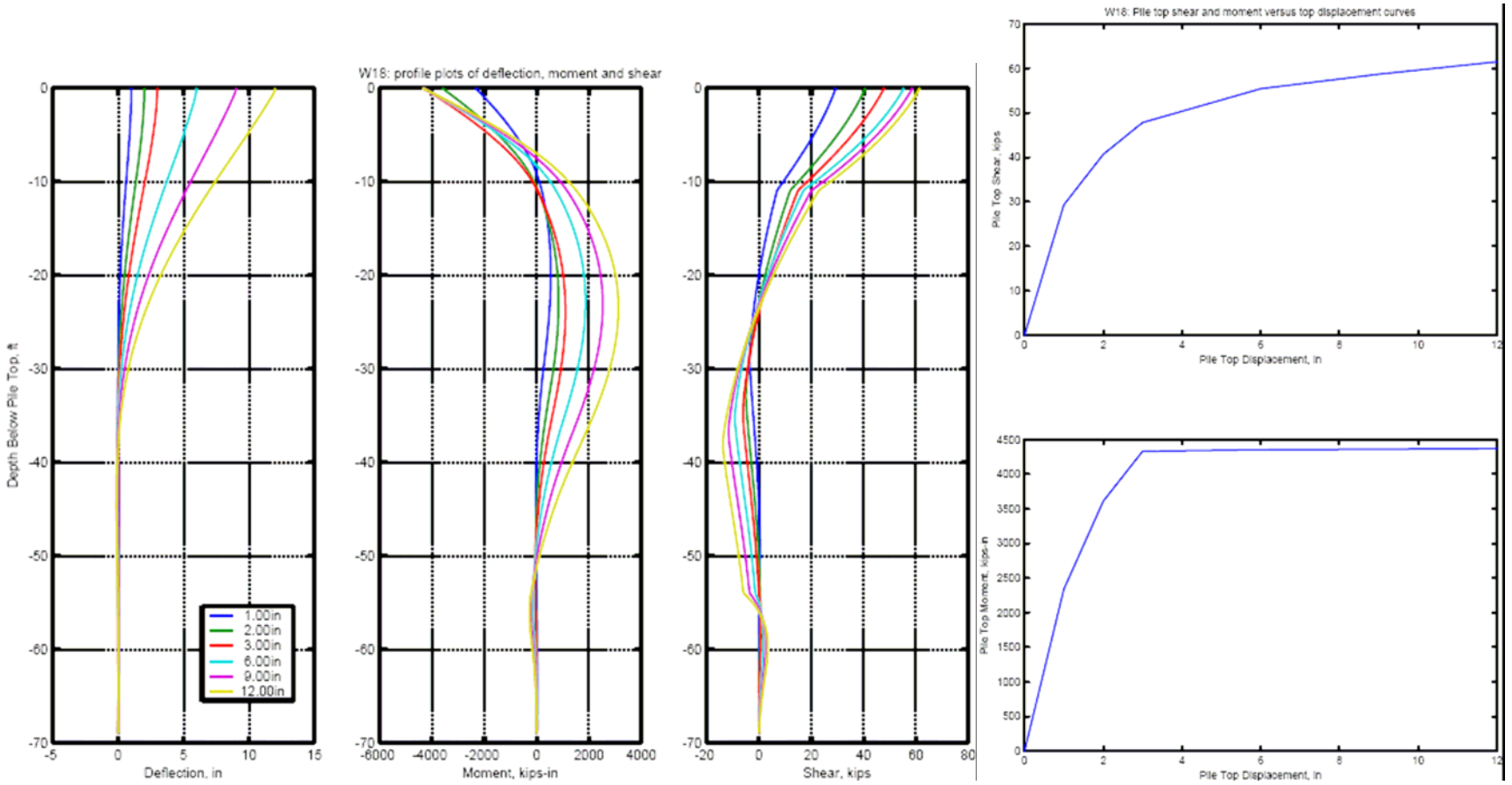


FIGURE E-54: TRESTLE BENT W19 – LATERAL PUSH-OVER CURVES

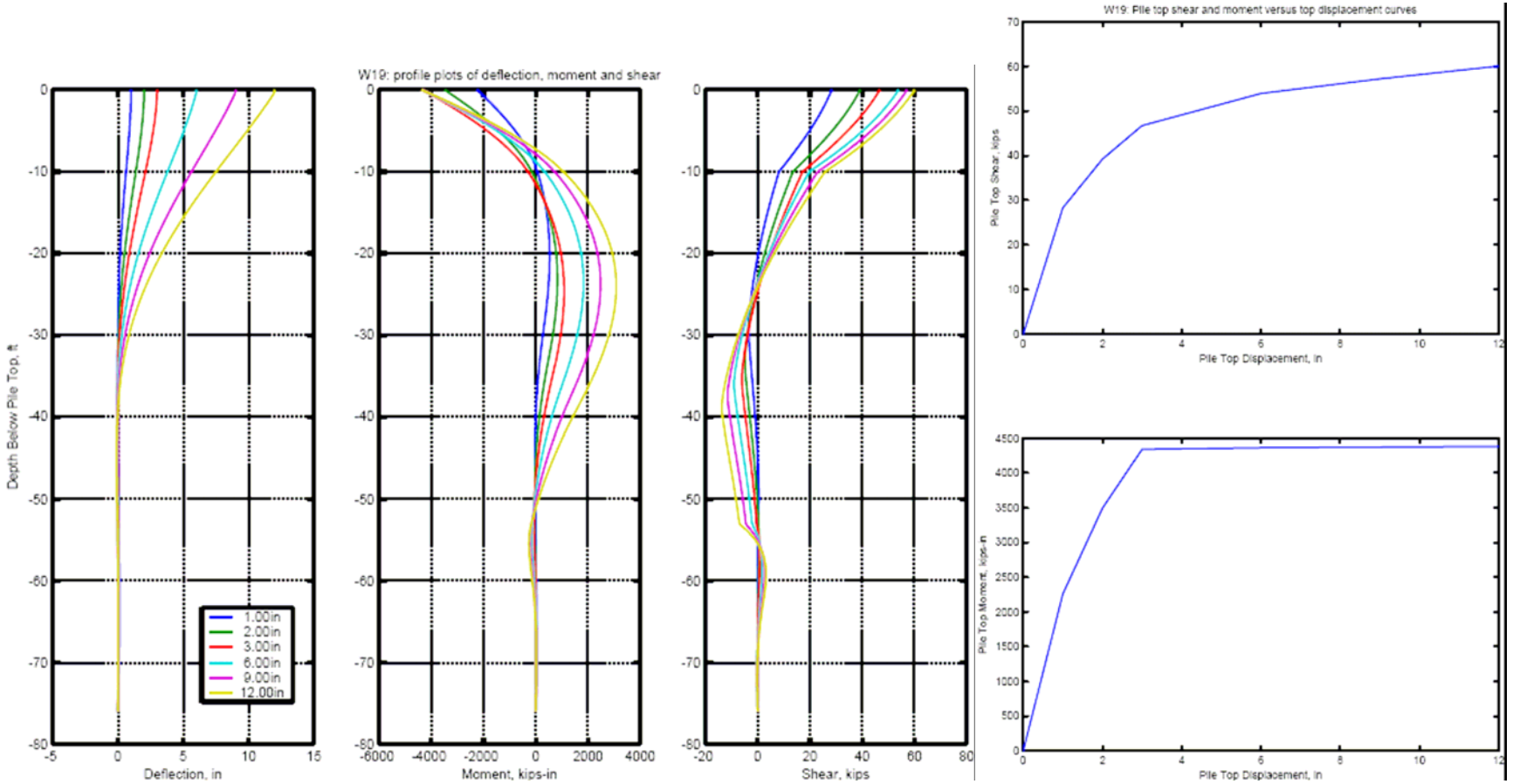


FIGURE E-55: TRESTLE BENT W20 – LATERAL PUSH-OVER CURVES

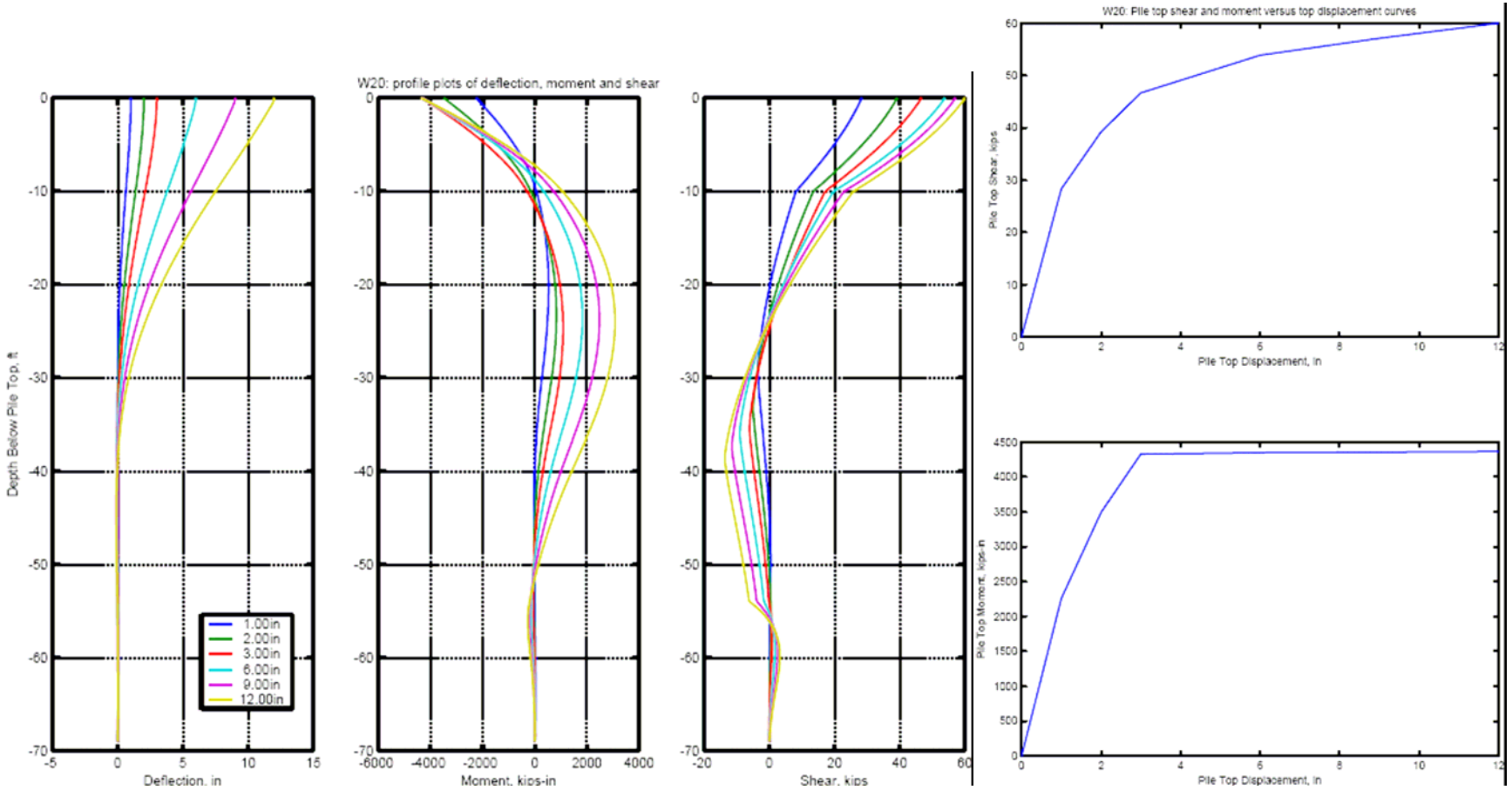


FIGURE E-56: LATERAL PUSH-OVER CURVES OF NEW EAST TRESTLE PILES

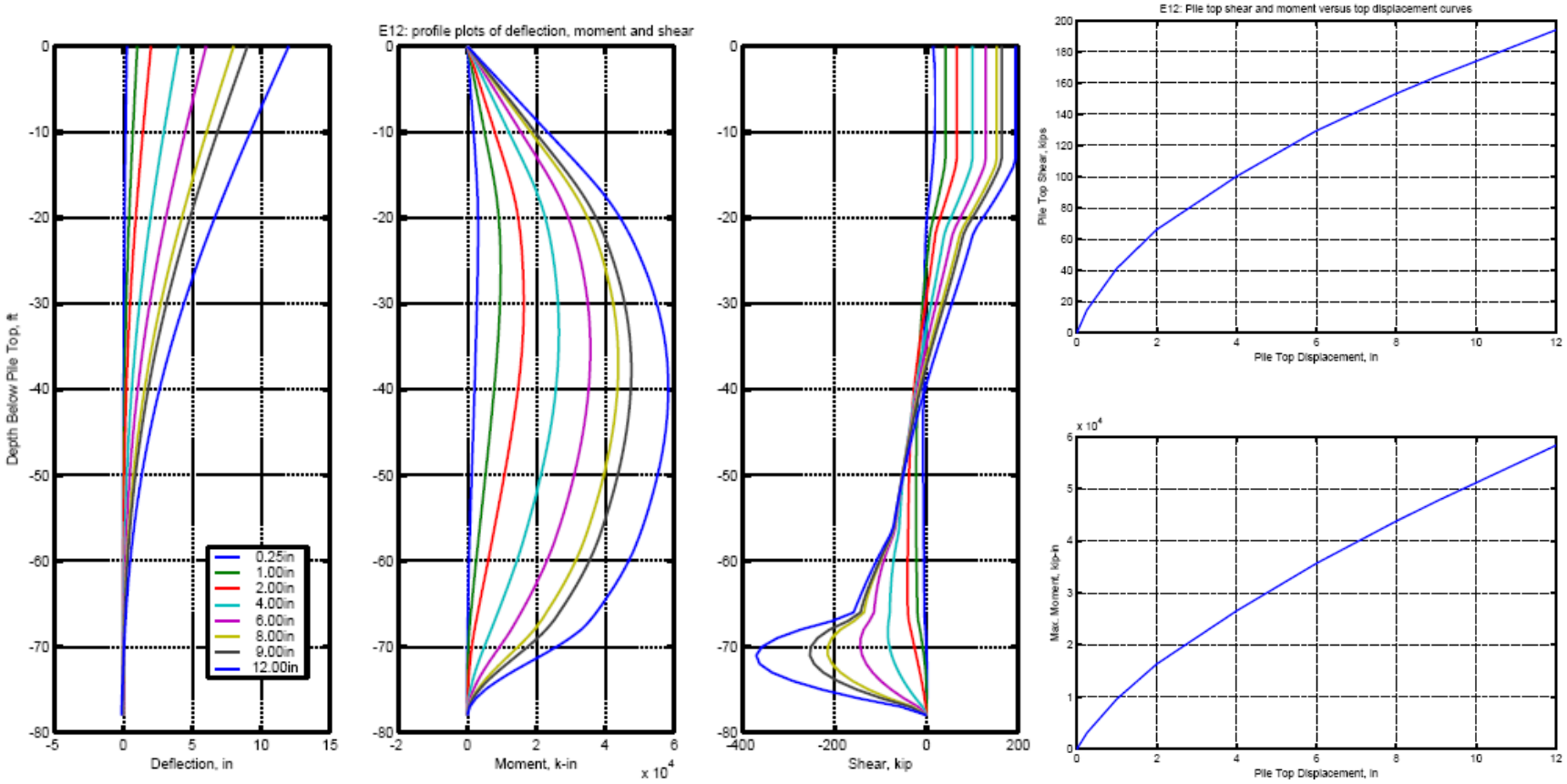
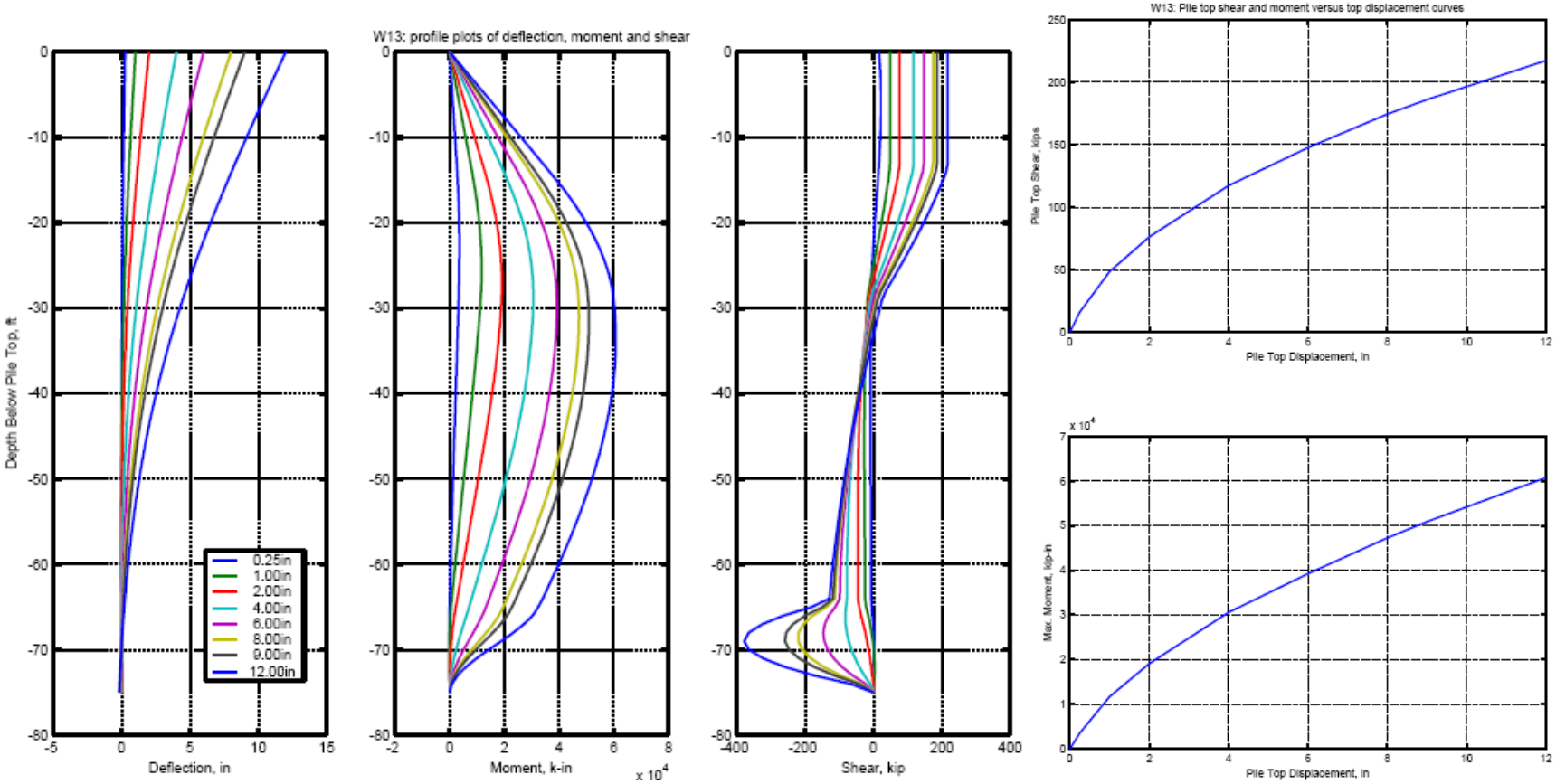


FIGURE E-57: LATERAL PUSH-OVER CURVES OF NEW WEST TRESTLE PILES



13.0 APPENDIX F: DRIVEABILITY ANALYSIS PLOTS ON NEW TRESTLE PILES

FIGURE F-1A: DRIVEABILITY ANALYSIS PLOTS OF NEW EAST TRESTLE PILE (HAMMER: DELMAG D36-32, STOKE: 12FT)

Earth Mechanics, Inc. Jul 02 2009

Gain/Loss 1 at Shaft and Toe 0.330 / 0.500

Dumbarton Trestle E12 (new 4' steelpile) Gain/Loss 2 at Shaft and Toe 0.250 / 0.500 GRLWEAP(TM) Version 2005

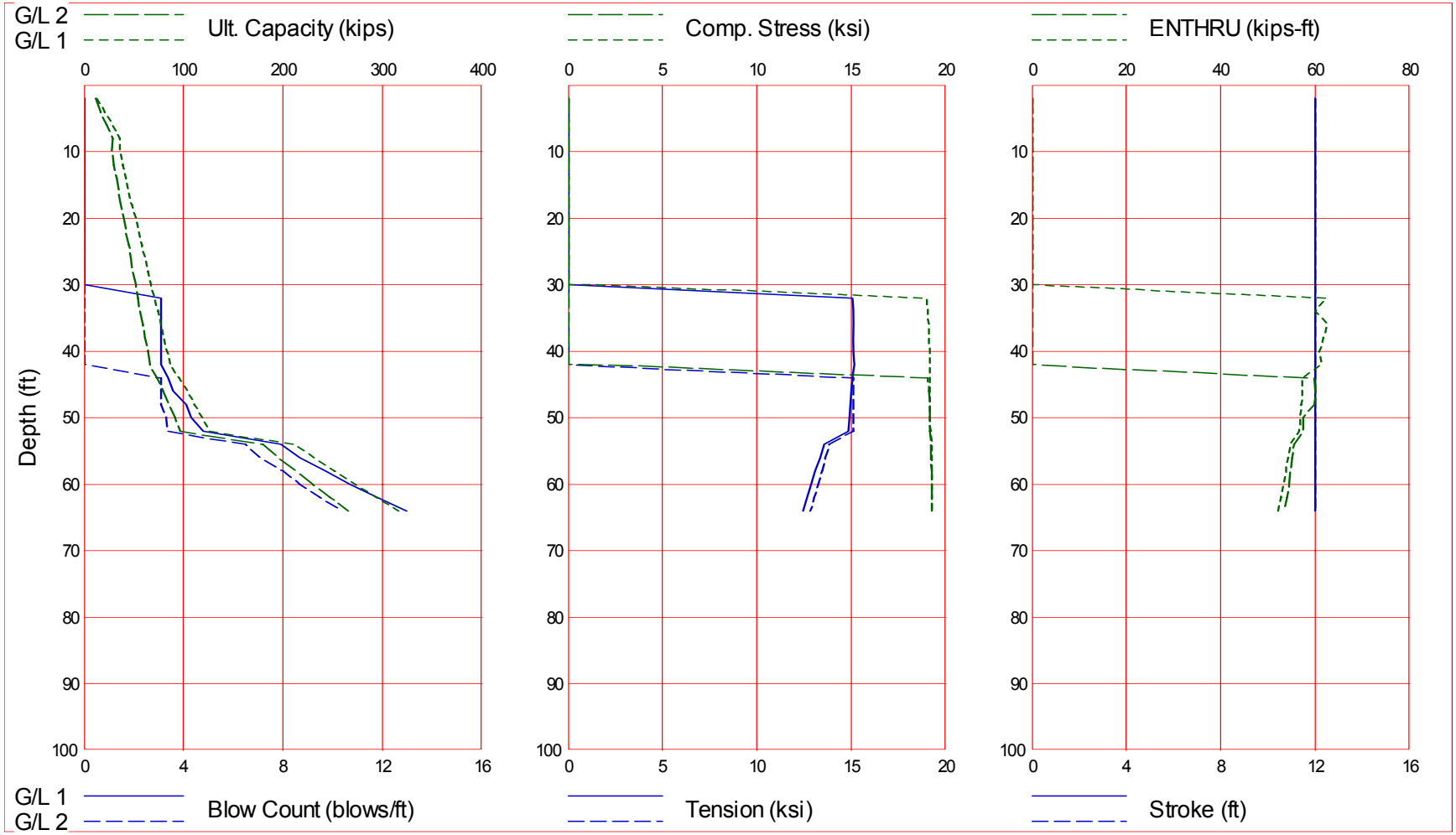


FIGURE F-1B: DRIVEABILITY ANALYSIS PLOTS OF NEW EAST TRESTLE PILE (HAMMER: APE D50-32, STOKE: 12FT)

Earth Mechanics, Inc. Jul 02 2009

Gain/Loss 1 at Shaft and Toe 0.330 / 0.500

Dumbarton Trestle E12 (new 4' steelpile) Gain/Loss 2 at Shaft and Toe 0.250 / 0.500 GRLWEAP(TM) Version 2005

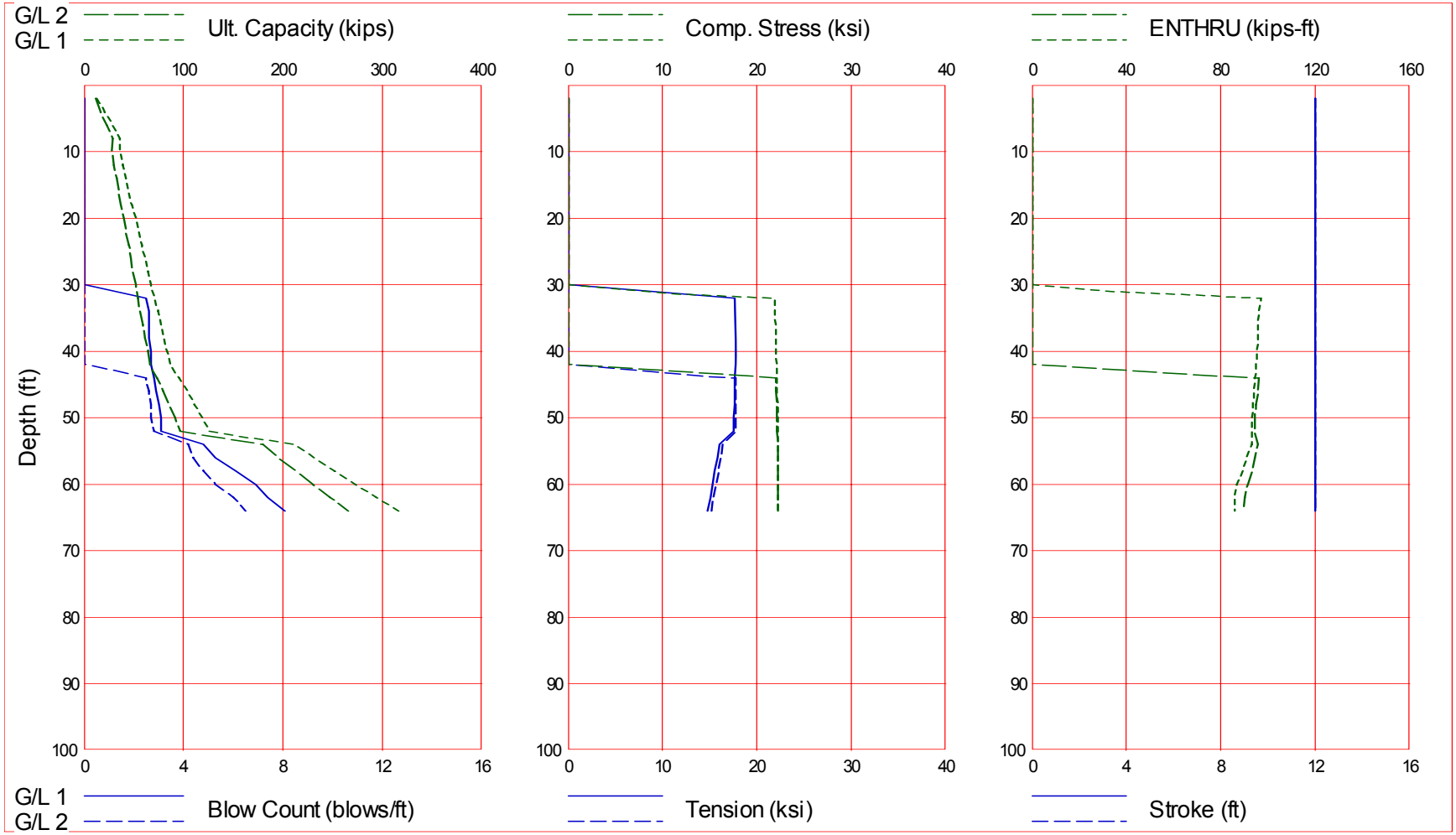


FIGURE F-1C: DRIVEABILITY ANALYSIS PLOTS OF NEW EAST TRESTLE PILE (HAMMER: PTC 100HDS, HZ: 30)

Earth Mechanics, Inc. Jul 02 2009

Gain/Loss 1 at Shaft and Toe 0.330 / 0.500

Dumbarton Trestle E12 (new 4' steelpile) Gain/Loss 2 at Shaft and Toe 0.250 / 0.500 GRLWEAP(TM) Version 2005

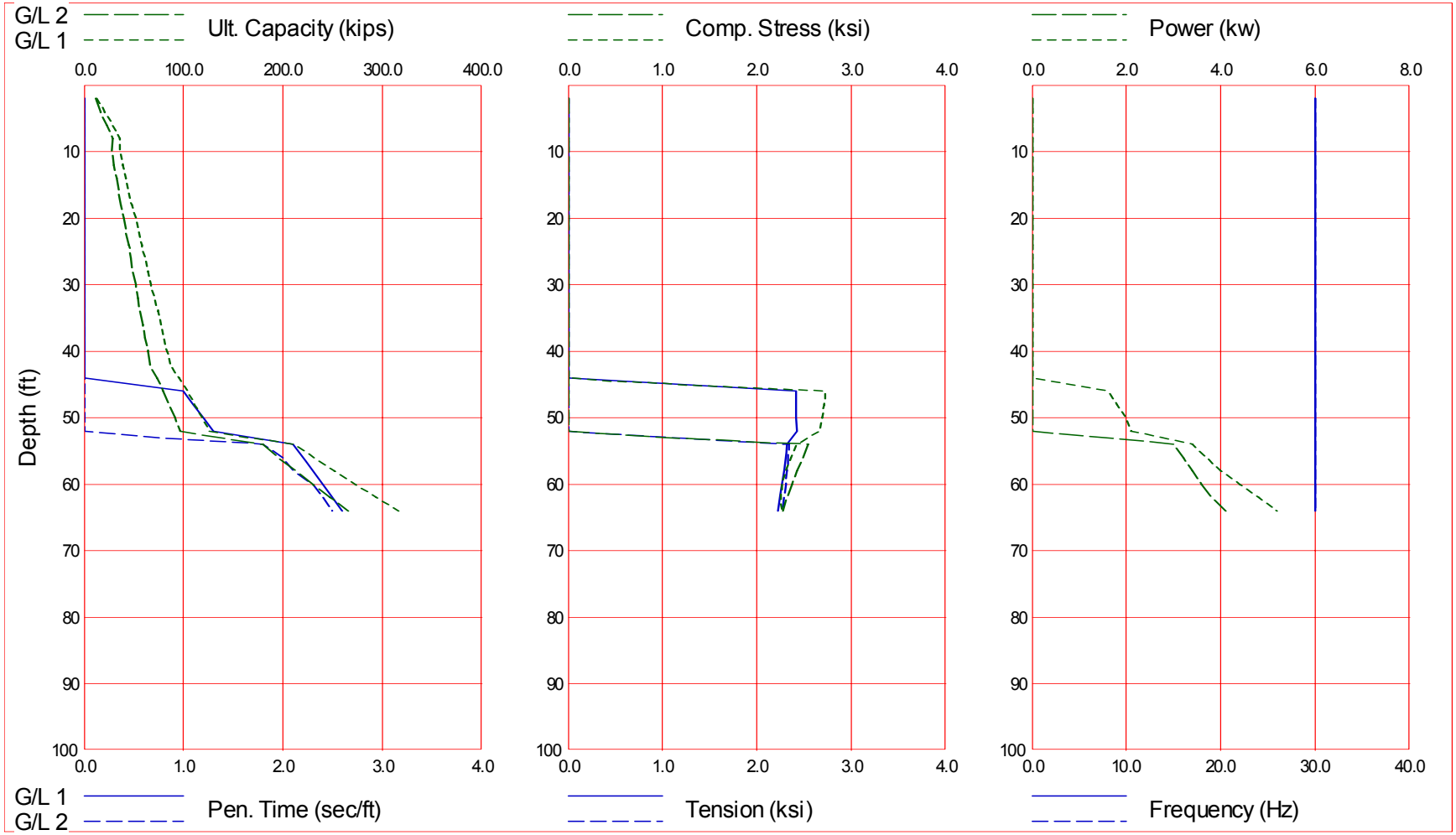


FIGURE F-1D: DRIVEABILITY ANALYSIS PLOTS OF NEW EAST TRESTLE PILE (HAMMER: APE 400B, HZ:30)

Earth Mechanics, Inc. Jul 02 2009

Gain/Loss 1 at Shaft and Toe 0.330 / 0.500

Dumbarton Trestle E12 (new 4' steelpile) Gain/Loss 2 at Shaft and Toe 0.250 / 0.500 GRLWEAP(TM) Version 2005

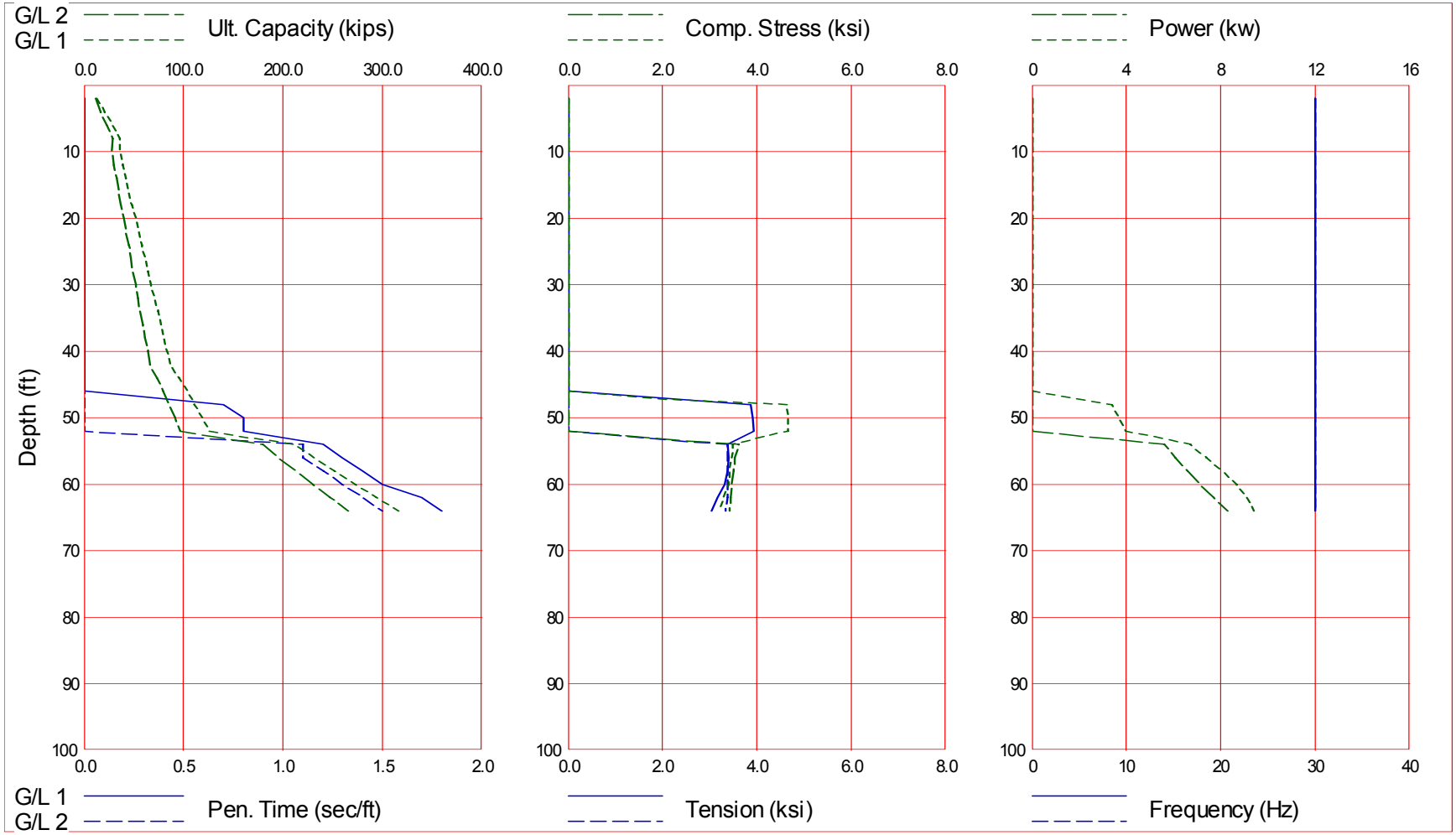


FIGURE F-2A: DRIVEABILITY ANALYSIS PLOTS OF NEW WEST TRESTLE PILE (HAMMER: DELMAG D36-32, STOKE: 12FT)

Earth Mechanics, Inc. Jul 02 2009

Gain/Loss 1 at Shaft and Toe 0.330 / 0.500

Dumbarton Trestle W13 (new 4' steelpile) Gain/Loss 2 at Shaft and Toe 0.250 / 0.500 GRLWEAP(TM) Version 2005

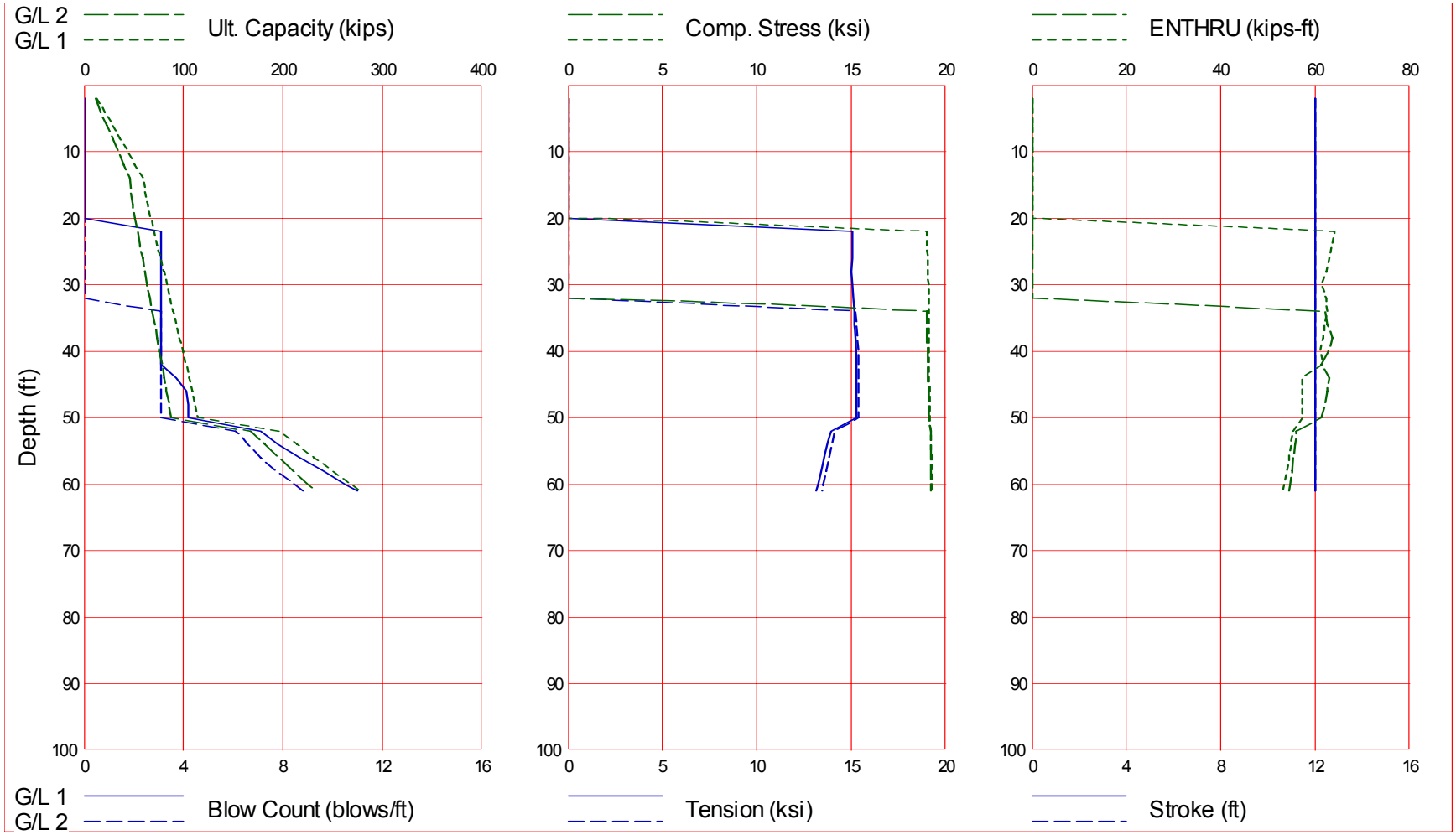


FIGURE F-2B: DRIVEABILITY ANALYSIS PLOTS OF NEW WEST TRESTLE PILE (HAMMER: APE D50-32, STOKE: 12FT)

Earth Mechanics, Inc. Jul 02 2009

Gain/Loss 1 at Shaft and Toe 0.330 / 0.500

Dumbarton Trestle W13 (new 4' steelpile) Gain/Loss 2 at Shaft and Toe 0.250 / 0.500 GRLWEAP(TM) Version 2005

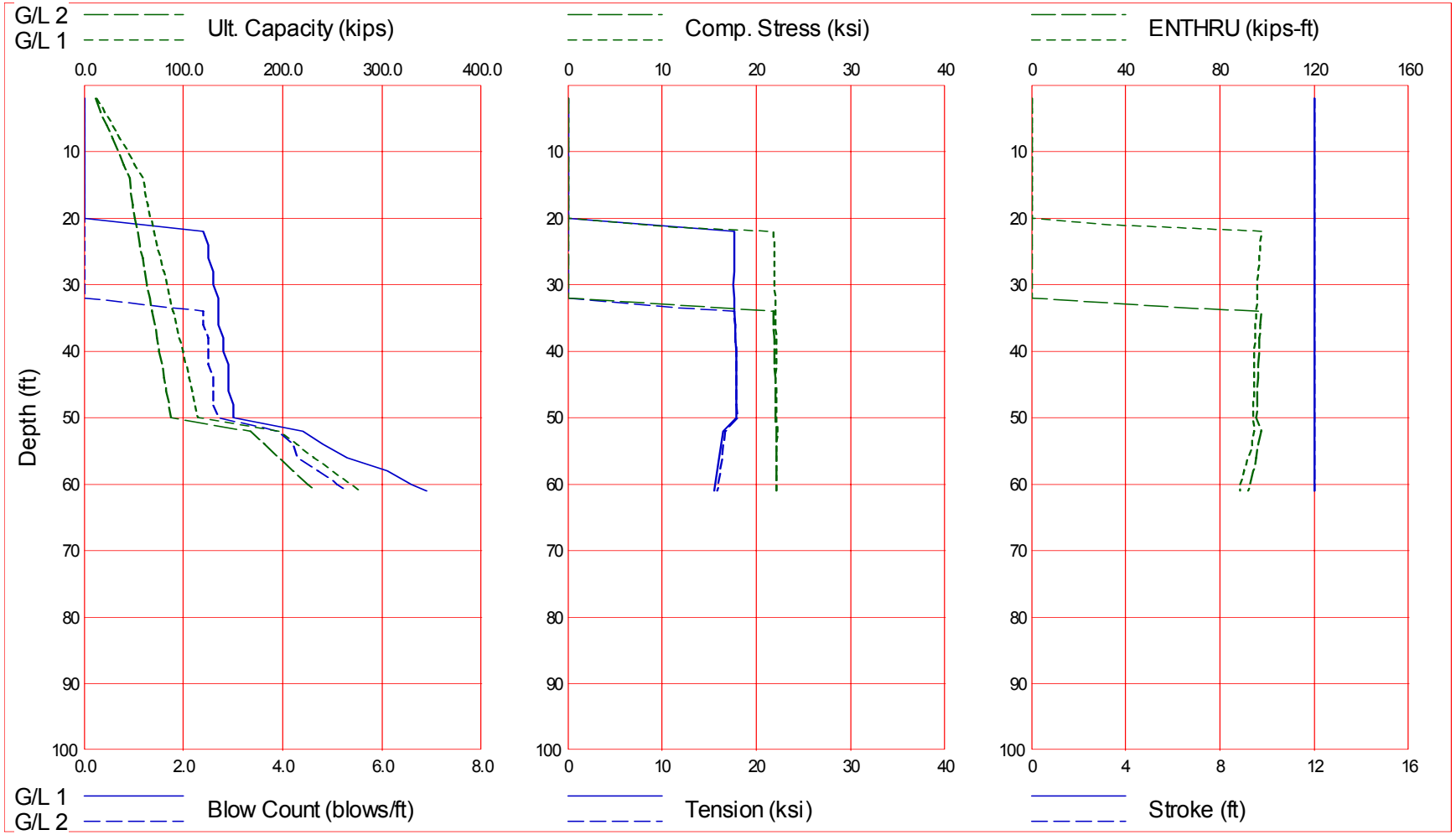


FIGURE F-2C: DRIVEABILITY ANALYSIS PLOTS OF NEW WEST TRESTLE PILE (HAMMER: PTC 100HDS, HZ: 30)

Earth Mechanics, Inc. Jul 02 2009

Gain/Loss 1 at Shaft and Toe 0.330 / 0.500

Dumbarton Trestle W13 (new 4' steelpile) Gain/Loss 2 at Shaft and Toe 0.250 / 0.500 GRLWEAP(TM) Version 2005

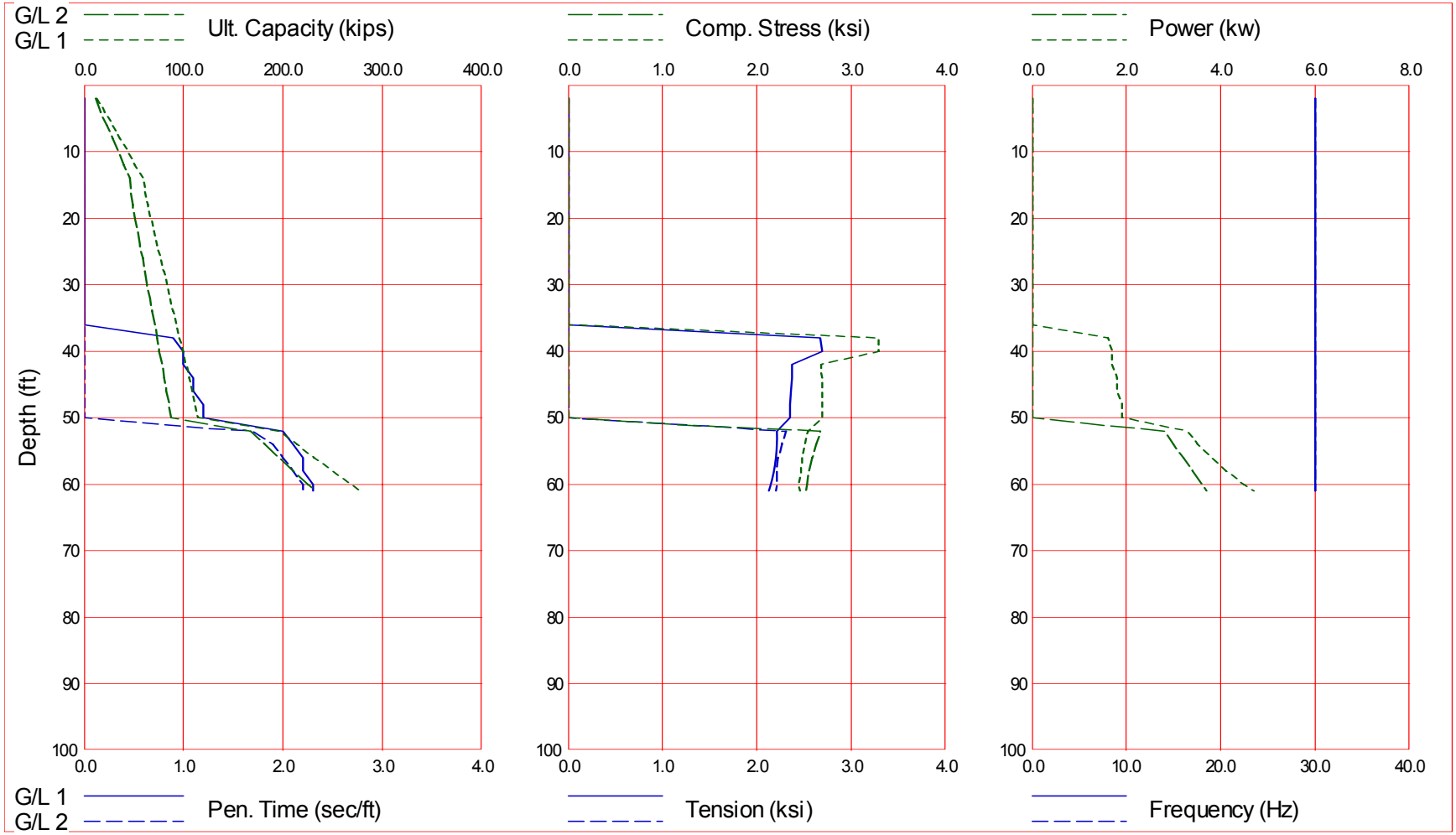
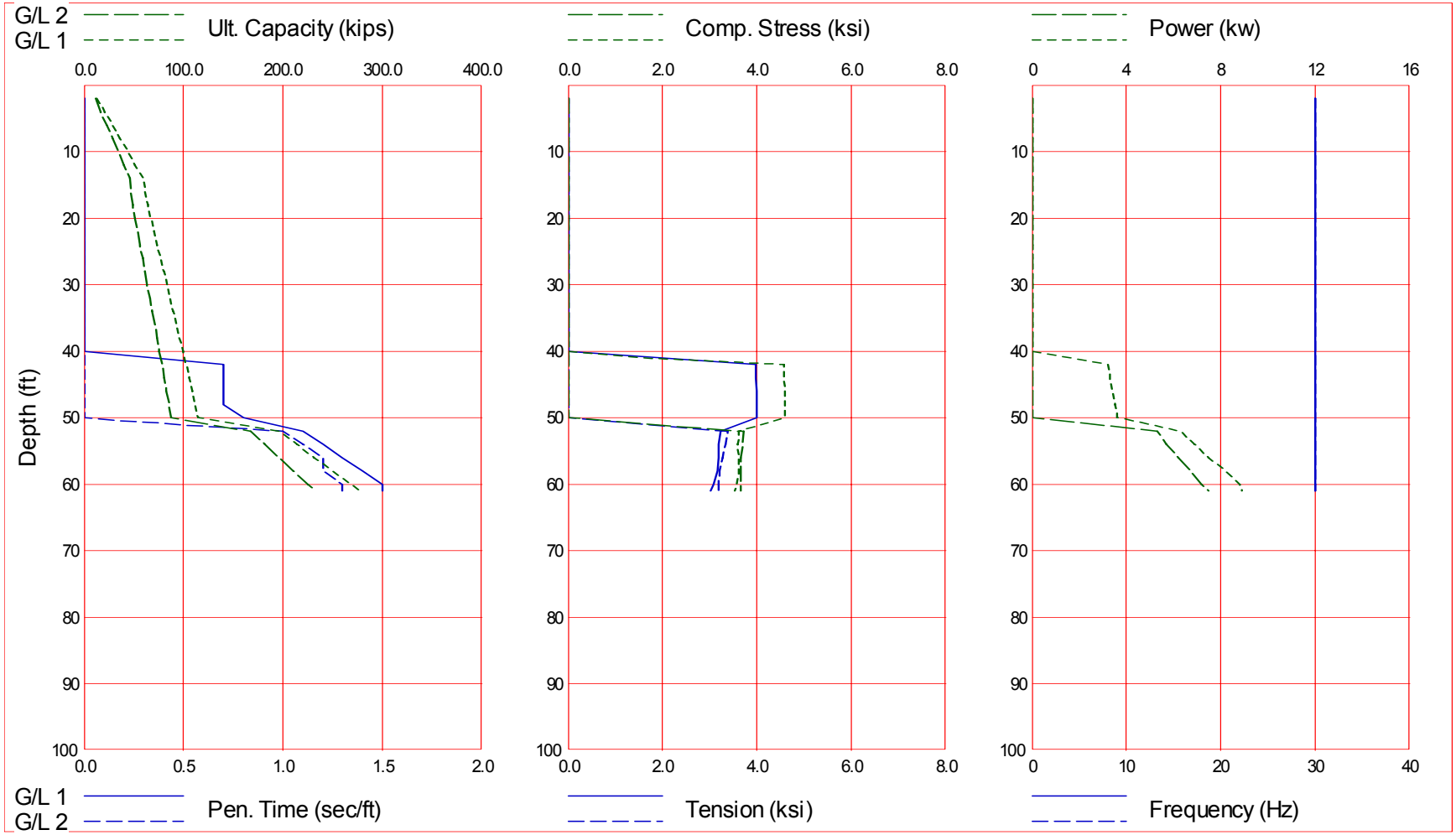


FIGURE F-2D: DRIVEABILITY ANALYSIS PLOTS OF NEW WEST TRESTLE PILE (HAMMER: APE 400B, HZ:30)

Earth Mechanics, Inc. Jul 02 2009

Gain/Loss 1 at Shaft and Toe 0.330 / 0.500

Dumbarton Trestle W13 (new 4' steelpile) Gain/Loss 2 at Shaft and Toe 0.250 / 0.500 GRLWEAP(TM) Version 2005



14.0 APPENDIX G: EFFECTS OF LIQUEFACTION ON FOUNDATION MEMO

Earth Mechanics, Inc.
Geotechnical & Earthquake Engineering

TECHNICAL MEMORANDUM

DATE: July 15, 2009 **EMI PROJECT NO:** 06-160

PREPARED FOR: Brian Maroney

PREPARED BY: Hubert Law, Joe Cheng / Earth Mechanics, Inc.

REVIEWED BY: Po Lam/ Earth Mechanics, Inc.

SUBJECT: **Effects of Liquefaction on Foundation**
Dumbarton Bridge Seismic Retrofit Project

Background

In the BCDC meeting of May 21, 2009, the panel asked the design team to evaluate axial pile behavior and it effects on the bridge performance if liquefaction is to occur in several isolated sand zones. Another panel concern in the meeting related to the stability of the Young Bay Mud slope in the central channel and the potential impact of slope deformation on the pile foundations. We conducted analyses to address the two concerns raised by the BCDC panel.

A previous liquefaction memo (dated March 18, 2009) has been provided to the BCDC panel discussing the liquefaction potential of the onsite soils. As discussed in the liquefaction memo, widespread liquefaction is not anticipated; however relatively small isolated pockets of soils were identified as potentially liquefiable. The zones of liquefiable soil are depicted as red bars in Figure 1 (A to D). Factors of safety (FOS) against liquefaction for each liquefiable zone are provided next to the red bars. The average value for the factors of safety calculated over the zone of liquefied zone is plotted on the figure where CPT data is used for the liquefaction assessment.

From a review of distribution of the liquefiable soils, the condition near Pier 32 appears to be most severe due to potential occurrence of thicker liquefied soil layers at deeper depths. As a result, we selected the soil conditions near Pier 32 to provide further details on the liquefaction evaluation. Figure 2 shows a maximum stress profile (blue line) from the site response analysis conducted at the Pier 32, and corrected blowcounts $(N1)_{60}$ (red square) from the soil boring data. The blowcounts from the modified California samplers have been converted to equivalent SPT blowcounts. A conversion factor of 0.62 was adopted, based on our prior experience comparing field measurements using the standard SPT sampler and the modified California sampler. The resultant earthquake-induced cyclic shear stress ratio $(CSR)_{7.5}$ and cyclic resistance ratio $(CRR)_{7.5}$ are shown in the middle plot of Figure 2. The factor of safety (FOS) against liquefaction is provided in the last plot of Figure 2 (sample calculations are provided as attachments).

To provide an example for liquefaction evaluation using CPT data, we selected the cone data collected near Pier 33 for presentation in this memo. Figure 3 presents the evaluation results in cohesionless soils using the CPT data. The CPT procedure described in the 2001 ASCE paper (Youd, et. al., 2001) was used to evaluate the liquefaction potential. After several reviews of this memo by Dr. Idriss, a slightly different CPT procedure as described in the 2008 EERI monograph (Idriss and Boulanger, 2008) was used to check the results per Dr. Idriss's suggestion. Both results are provided on the figure showing comparable solutions. The principal difference is the treatment of fines contents (I_c) in the evaluations.

To address the effects of liquefaction on axial pile behavior, we elected to use Pier 32 as the example (The BCDC panel also expressed their concern at Pier 32 for potential influence from soil liquefaction). To evaluate the slope stability and lateral spreading effects on the pile foundations, we selected the conditions near Pier 26 (refer to Figure 1-C for location of these piers).

Axial Foundation Performance under Static Design Load (Pier 32)

Pier 32 is supported on 38 20-inch diameter steel piles with a design load of 80 tons per pile. The ultimate geotechnical capacity of a single pile is estimated to be approximately 300 tons considering both skin friction resistance (t-z curves) and end bearing resistance (q-u curve). The design soil profile and properties at Pier 32 are provided in Figure 4. Figure 5 shows design loads versus ultimate geotechnical capacities of all piers along the bridge. Note that Figures 4 and 5 are extracted from the Foundation Analysis Report.

The axial load-deformation behavior of a single pile for Pier 32 is depicted as a blue line in Figure 6, based on the t-z and q-u soil support behavior. To estimate the pile capacity under liquefaction, shear strengths within the liquefied layers were assigned residual shear strengths using the correlation compiled by Idriss and Boulanger (2008) relating residual shear strengths to SPT blowcounts; no change in shear strength was made for non-liquefied soils. We conducted axial load-deformation analysis of a single pile using the liquefied soil strengths for the t-z curves in liquefied sand zones (from Elev. –43 to –60 ft, and Elev. –66 to –69 ft). The resultant axial load-deformation behavior of a pile is shown as a red line in Figure 6, comparing with the non-liquefied case.

While the factor of safety for the liquefiable layer that exists between elevations -66 to -69 ft is closer to 1.0, one might argue that excess pore pressure could have been generated in this layer could migrate to the pile tip affecting the end bearing resistance. Although the scenario is very unlikely, we reduced the end bearing resistance by 20% in addition to using liquefied soil strengths for the t-z curves in liquefied sand zones. The adopted soil parameters are considered conservative considering that we have ignored that the pile driving operation will compacted the soils, especially for sands around the pile shaft and beneath the pile tip. The solution for this extreme case is shown as a purple line in Figure 4. The soil parameters for these three cases in Figure 6 are tabulated in Table 1; note that residual shear strengths were assigned in the potentially liquefiable layers. Representative t-z and q-u curve shapes are schematically shown at the bottom on of Table 1.

Under a design load of 80 tons (160 kips), the pile will sustain a sufficient static capacity, even if soil liquefaction is to occur.

Axial Foundation Performance under Seismic Load (Pier 32)

To evaluate the axial pile performance under seismic loading from the bridge superstructure, pushover analyses of the pile group were conducted using the foundation displacement demands estimated from the structural analyses. The pile group consisting of a row of piles in the transverse direction was modeled by 8 piles supported on non-linear p-y, t-z, and q-u curves, representing soil support behavior using the program ADINA. The push-over analyses in the transverse direction will result in the largest pile loads. The pile group was prescribed a maximum lateral translation of 6.8 inches in conjunction with the associated rotation of 0.0109 radians after applying the vertical dead load. This foundation displacement represents the largest seismic demand from the dynamic structural analyses employing seven sets of earthquake time histories.

Figure 7 shows the distribution of axial pile loads, negative moments, and axial displacements within the pile group subjected to the peak seismic demand for the non-liquefied condition. Figure 8 shows the solutions for the liquefied conditions where the t-z curves within the liquefiable sand zones were based on residual shear strengths. Figure 9 shows the solutions for liquefied t-z curves (residual shear strength) plus reduced end bearing.

Due to the rocking behavior of the footing, some piles undergo tension, momentarily. The magnitude of peak seismic load (axial) for each of the 8 piles is indicated on the load-vs.-deformation curve as circular dots in Figure 6 to enable comparison of the peak seismic loads with the ultimate geotechnical capacity. Some piles reach the ultimate pile capacity under the extreme seismic event which will lead to a factor of safety of 1.0 in the context of a force based design. In force based pile design, factors of safety of 1.0 and 2.0 are required for seismic and static loads, respectively.

However, the current seismic design of the Dumbarton Bridge is based on a displacement approach; therefore we concentrate the design effort on the evaluation of displacement behavior.

Liquefaction tends to increase the foundation displacement. While the extreme piles could move up to 3 inches (either upward or downward during cyclic loading), the center of the pile group will not settle appreciably. The overall foundation behavior will remain stable even if the localized zones of soil are to liquefy. Judging from the peak foundation movement, the permanent foundation axial displacement is expected to be relatively small (probably less than ¼ of the peak value). We consider this is acceptable foundation behavior for the 1000-year return period ground motion criteria.

Potential Post Liquefaction Foundation Settlement (Pier 32)

We also evaluated potential post liquefaction induced settlement and it effects on the foundation. The total thickness of potentially liquefiable layers is estimated to be 20 feet. Based on the Seed and Tokimastu procedure, the free-field liquefaction induced settlement is estimated to be approximately 5.6 inches. This free-field settlement can induce downdrag loads on the piles resulting in the pile group settlement. A soil-pile interaction analysis was conducted to estimate

the downdrag settlement of the foundation using a series of t-z curves along the pile, end-bearing q-u curve at the pile tip, and a series of prescribed downward displacements imposed on the t-z curves in conjunction with loadings applied at the pile top from the bridge structure.

The free-field settlement profile as shown in Figure 10 was prescribed on the ground node of the t-z springs, in addition to the pile head load to solve for the combined effect of settlement induced by both structural loading and ground settlement associated with liquefaction induced ground subsidence. Figure 11 presents the axial load-deformation curves for with and without downdrag considerations.

The difference in pile-head displacement at the design load between the cases for with and without downdrag considerations can be considered as additional foundation settlement. It is estimated to be approximately 0.56 – 0.72 inches.

To appreciate the above estimated settlement value, we have reviewed the FHWA study on "Tolerable Movement Criteria for Highway Bridges (FHWA-TS-85-228, 1985 and FHWA/RD-85/107, 1986)". The report has been adopted by AASHTO which indicates that a maximum differential settlement of 0.004 radians can be accommodated for simply supported and continuous bridge structures (both steel and concrete bridges) to maintain functionality of the bridge. This kind of rotation would translate to a maximum tolerable differential settlement of 9 inches for a 200-ft span for the Dumbarton Bridge. As an alternate reference, AASHTO recommends that a differential settlement that can be estimated using L/760 for maintaining functionality of the bridge under service load condition, which translates to the allowable settlement of 3 inches for a 200-ft span. The second differential settlement criterion of L/760 ~~is~~ differs from the AASHTO tolerable foundation movement criteria as it was related to comfortableness of the traveling public as oppose to the AASHTO criterion which relates to potential structural distress.

Based on the presented analyses, the foundations are expected to have acceptable performance during liquefaction of identified sand zones under the 1,000- year return period ground motion.

Lateral Spreading at the YBM Slope (Pier 26)

Pier 26 (Figure 12) was chosen for evaluation of foundation performance if the Young Bay Mud (YBM) slope is to move laterally, imposing loads on the piles. This foundation is supported on 21 54" diameter pre-stressed concrete piles. We treat this kind of lateral spreading as a separate load case from the inertia load from the bridge superstructure. A pseudo static slope stability analysis was conducted using the shear strength of YBM. A yield acceleration of 0.11g was calculated for the slope (Figure 13).

Newmark sliding analyses were conducted using the free-field motions determined at the mid point of the YBM slope from the site response analyses to estimate permanent slope deformations. Figure 14 presents the results of Newmark deformations from the seven sets of free-field earthquake time histories. The maximum lateral slope displacement is estimated to be 19. 4 inches from the seven sets of earthquake time histories; the average is 13.9 inches.

Figure 15 shows a schematic of lateral spread loading analysis where p-y curves along the pile were laterally loaded with free-field ground displacements simulating the lateral slope movement.

Based on the API, Matlock's soft clay p-y curve criterion, which is appropriate for the upper layer of soft Bay mud undergoing lateral spread displacement, the y_c was estimated at about 1.35 inches ($y_c = 2.5 \cdot \varepsilon_c \cdot D = 1.35$ inches) which implies that the ultimate passive pressure be mobilized at $8 \cdot y_c = 10.8$ inches). At the maximum slope deformation of 19.4 inches, the bay mud has mobilized the full passive soil pressure on the pile. The pile solutions in terms of pile deflection, moment and curvature diagrams are presented in Figure 16 for the lateral spread loading. The maximum moment induced by the lateral spreading is much less than the plastic moment of the pile. Dr. Nigel Priestley estimated the plastic moment of the pre-stressed pile section to be approximately 5.9 x 104 kips-in (6,650 kN-m). His report on the pile capacity is provided with this memo.

To compare with the inertia loading from the bridge superstructure, Figure 17 is presented to show the deflection, moment and curvature diagrams resulting from the maximum foundation displacement of 6.4 inches along with associated rotation of 0.00011 radians in the bridge longitudinal direction. This foundation displacement was obtained from the seismic response analyses of the global bridge using the seven sets of earthquake time histories. The bending moment (as well as curvature) induced by the lateral spreading is relatively small compared to the pile stresses due to the inertia loading.

Impact of Liquefaction on Ground Motion Criteria

Sensitivity site response and kinematic soil pile interaction analyses were conducted to evaluate potential changes in ground motion due to soil liquefaction at Pier 32. The shear wave velocities within the liquefiable sand zones were reduced to 80% or 50% from the un-liquefied case to make comparisons. The free-field site response analysis results were fed into our pile group model to calculate 'effective' kinematic motion for the structural analyses. Figure 18 shows the resultant kinematic spectra for un-liquefied case and liquefied cases where shear wave velocities were reduced to reflect degradation of soil stiffness during liquefaction. Soil liquefaction generally shows somewhat lower ground shaking than the un-liquefied case, which is consistent with the observations made by Youd and Carter (Report No. UT 03.07, 2003).

In the 2003 Youd and Carter Report to Utah DOT, they examined available strong motion recordings worldwide and then conducted site response hindcast analyses to appreciate the influence of soil softening and liquefaction on response spectra for bridge design. The Port Island record from the 1995 Kobe earthquake is probably the most relevant case history to demonstrate the effect of liquefaction on ground shaking. The January 17, 1995 Kyogoken-Nanbu, Kobe earthquake is a magnitude 6.9 (reported as 6.9 on NGA, but originally reported as 7.2 by Youd and Caster, 2003) event which shook the Port Island area with peak horizontal acceleration in excess of 0.5g measured at PIDA site. Many areas at Port Island suffered liquefaction damage. Figure 19 has been extracted from the Youd and Carter report showing the acceleration time histories from the Port Island downhole array. It can be observed that at the 16-m depth where no liquefaction was noted, peak ground acceleration exceeded 0.5g. The upper 15-m of loose fill liquefied at about 7 second. The surface motion and the 16 m recordings are nearly congruent up to about 7 second. After 7 second, surface motion record began to lengthen with smaller acceleration amplitude.

Figure 20 presents the ground surface spectrum of the liquefied site with the ground surface spectrum if the site did not liquefy. The curve labeled as 'Predicted' is the response spectrum based on site response analysis from conventional total stress site response analysis method using the 16-m depth input record. The figure showed that liquefaction will reduce ground shaking at short to intermediate period range (i.e. T<1 second), while the liquefaction effect has little influence on longer period motion (T>1.0 second).

Youd and Carter in their conclusion section also compared liquefied response spectra from the actual measurements to conventionally adopted design response spectra developed for nonliquefied ground conditions in Figure 21. The conventional spectrum with a peak ground acceleration of 0.3g would envelope all known ground surface spectrum recorded at liquefied soil sites (the Port Island records are some of the strongest shaking in liquefied sites). They concluded that seismic designs using a ground shaking criteria based on rationally conducted total stress site response analyses without accounting for additional softening due to liquefaction effect is sufficiently conservative for design against the inertial loading condition.

The Dumbarton Bridge site has a ground shaking level corresponding to a 0.5 g design spectrum. We judge that the basic ground motion criteria adopted for the Dumbarton Bridge is sufficiently conservative that additional change to allow for liquefaction effect would be unnecessarily complex and can be avoided.

References:

FHWA/RD-85/107 (1985). Tolerable Movement Criteria for Highway Bridges, report by Lyle K. Moulton, Hota V.s. GangaRao and Grant T. Halvorsen from Department of Civil Engineering, West Virginia University, Morgantown, West Virginia 26506-6101.

FHWA-TS-85-228 (1986). Tolerable Movement Criteria for Highway Bridges, report by Lyle K. Moulton from Department of Civil Engineering, West Virginia University, Morgantown, West Virginia 26506-6101.

Idriss, I. M. and Boulanger, R. W. (2008), Soil Liquefaction during Earthquakes, Earthquake Engineering Research Institute, MONO-12.

Youd, T.L., Idriss, I.M., Andrus, R.D., Arango, I., Castro, G., Christian, J.T., Dobry, R., Finn, W.D.L., Harder, L.F., Hynes, M.E., Ishihara, K., Koester, J.P., Liao, S.S.C., Marcuson, W.F., Martin, G.R., Mitchell, J.K., Moriwaki, Y., Power, M.S., Robertson, P.K., Seed, R.B., and Stokoe, K.H., 2001. Liquefaction resistance of soils: summary report from the 1996 NCEER and 1998 NCEER/NSF Workshops on evaluation of liquefaction resistance of soils. Journal of Geotechnical and Geoenvironmental Engineering, ASCE 127(10): 817-833.

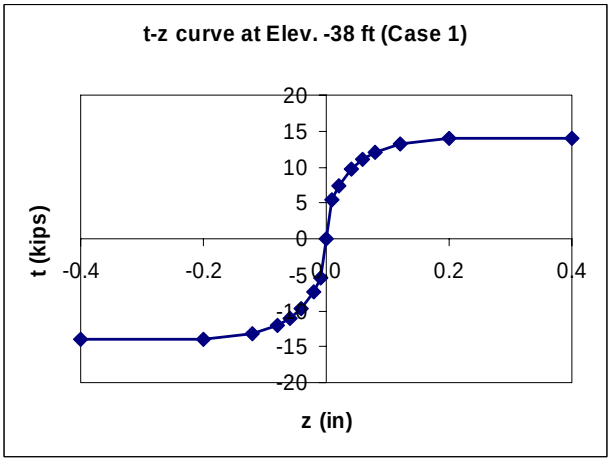
Youd, Leslie, T., and Carter, Ben, (2003), Influence of Soil Softening and Liquefaction on Response Spectra for Bridge Design, Prepared for Utah Department of Transportation, Research and Development Division, Submitted by Brigham Young University, Department of Civil Environmental Engineering, March 2003.

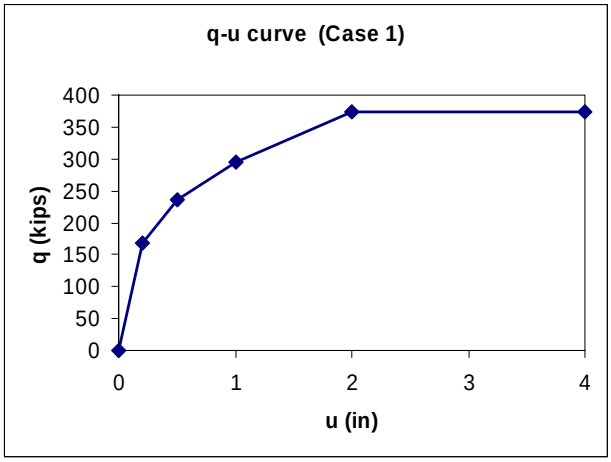
Table 1: Soil parameters used for Figure 4

Elevation (ft)	Case 1	Case 2 (residual strengths)	Case 3 (residual strengths with reduced tip bearing)
-4 to -23	γ = 110 pcf c = 300 psf f = 300 psf	γ = 110 pcf c = 300 psf f = 300 psf	γ = 110 pcf c = 300 psf f = 300 psf
-23 to -33	γ = 110 pcf ϕ = 35º f = 423-565 psf	γ = 110 pcf ϕ = 35º f = 423-565 psf	γ = 110 pcf ϕ = 35º f = 423-565 psf
-33 to -38	γ = 110 pcf c = 300 psf f = 300 psf	γ = 110 pcf c = 300 psf f = 300 psf	γ = 110 pcf c = 300 psf f = 300 psf
-38 to -43	γ = 110 pcf c = 800 psf f = 720 psf	γ = 110 pcf c = 800 psf f = 720 psf	γ = 110 pcf c = 800 psf f = 720 psf
-43 to -60 (Potential Liquefaction Zone)	γ = 120 pcf ϕ = 35º f = 889-1258 psf	γ = 120 pcf c = 330 psf f = 300 psf	γ = 120 pcf c = 330 psf f = 300 psf
-60 to -66	γ = 120 pcf ϕ = 35º f = 1400 psf	γ = 120 pcf ϕ = 35º f = 1400 psf	γ = 120 pcf ϕ = 35º f = 1400 psf
-66 to -69 (Potential Liquefaction Zone)	γ = 120 pcf ϕ = 35º f = 1542 psf	γ = 120 pcf c = 1200 psf f = 1080 psf	γ = 120 pcf c = 1200 psf f = 1080 psf
-69 to -79	γ = 120 pcf ϕ = 35º f = 1542 psf Nq = 52	γ = 120 pcf ϕ = 35º f = 1542 psf Nq = 52	γ = 120 pcf ϕ = 35º f = 1542 psf Nq = 42

Note: γ: total unit weight; c: cohesion; ϕ: friction angle; f: unit skin friction; Nq: bearing capacity factor.

Representative t-z and q-u curves:





Approach Structure

West

Pier 4 / Pile 33
20" Ø Pipe
Design Capacity: 80 tons
Cutoff: -7.75 ft; Tip El: -61 ft
Date Driven: 11-15-79; Date Tested: 11-28-79
EN Capacity: 215± tons
Static Load Test Capacity: 180+ tons (13 days)
Note: Test Not Taken to Failure

Abut. W-1 | W-5 | W-10 | W-15 | W-20 | Pier 1 | Pier 2 | Pier 3 | Pier 4 | Pier 5 | Pier 6 | Pier 7 | Pier 8 | Pier 9 | Pier 10

06-CPT-02 | 06-CPT-01 | 06-CPT-05 | 06-CPT-03 | 06-CPT-04 | 06-CPT-06 | 06-CPT-08 | 06-CPT-09 | 06-CPT-10

06-01 | 06-02 | 06-03 | 06-04

FOS=0.59
FOS=0.45
FOS=0.66
FOS=0.41
FOS=0.36
FOS=0.47

0
-20
-40
-60
-80
-100
-120
-140
-160
-180

455+00 | 460+00 | 465+00 | 470+00 | 475+00

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LEGEND

- Soft Young Bay Mud
- Silty and Sandy Clay (San Antonio Formation)
- Sand
- Stiff Silty to Sandy Clay
- Sand and Clay (Alameda Formation)
- Fill
- Old Bay Mud
- Liquefaction Potential Zone

FOS: Factor of Safety to Liquefaction

Scales:
Hor. 1" = 150'
Ver. 1" = 30' (Soil Profile)
1" = 300' (Bridge Profile)

Figure 1-A: Soil profile and potential liquefaction zones

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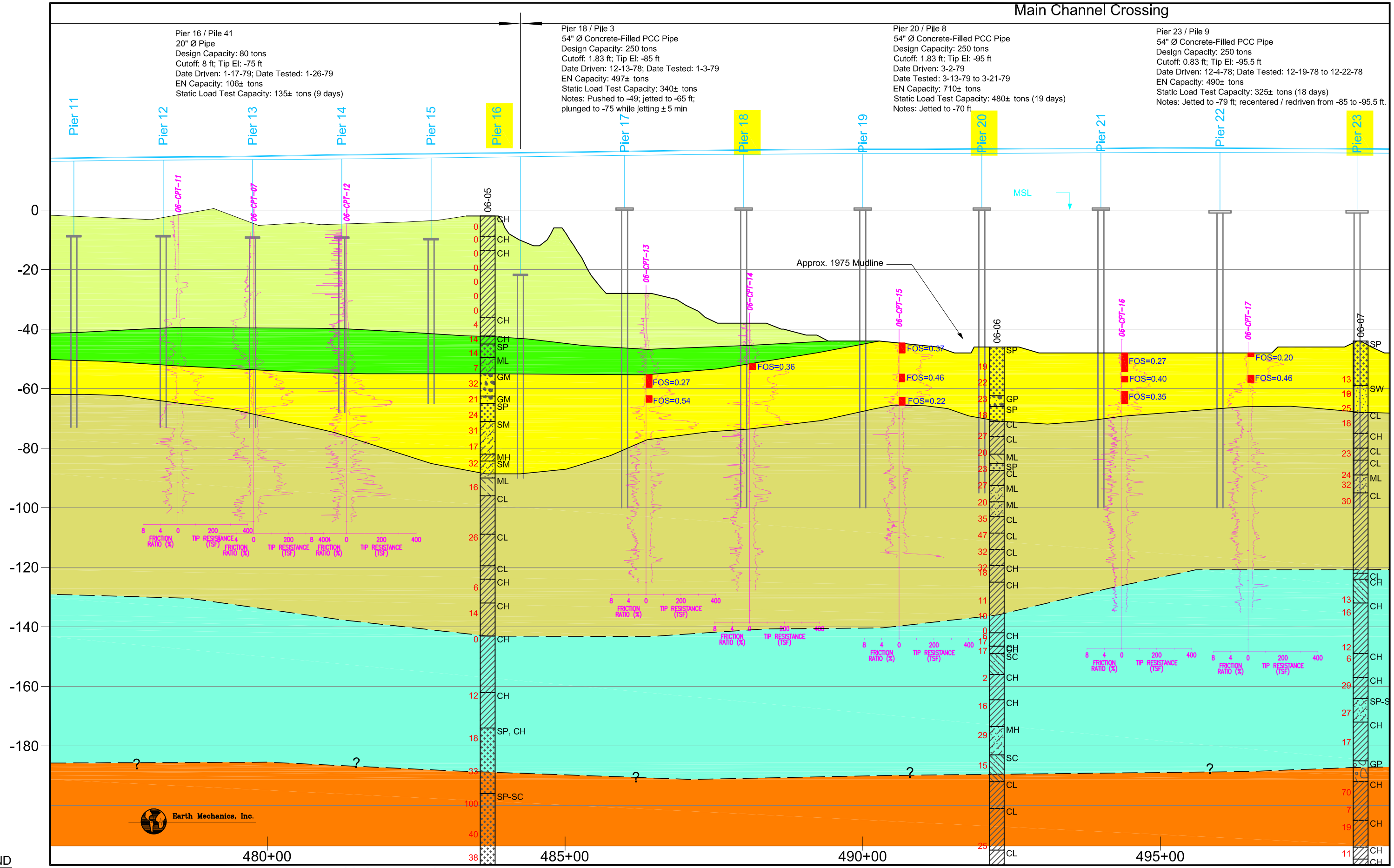
Main Channel Crossing

Pier 16 / Pile 41
20" Ø Pipe
Design Capacity: 80 tons
Cutoff: 8 ft; Tip El: -75 ft
Date Driven: 1-17-79; Date Tested: 1-26-79
EN Capacity: 106± tons
Static Load Test Capacity: 135± tons (9 days)

Pier 18 / Pile 3
54" Ø Concrete-Filled PCC Pipe
Design Capacity: 250 tons
Cutoff: 1.83 ft; Tip El: -85 ft
Date Driven: 12-13-78; Date Tested: 1-3-79
EN Capacity: 497± tons
Static Load Test Capacity: 340± tons
Notes: Pushed to -49; jetted to -65 ft; plunged to -75 while jetting ± 5 min

Pier 20 / Pile 8
54" Ø Concrete-Filled PCC Pipe
Design Capacity: 250 tons
Cutoff: 1.83 ft; Tip El: -95 ft
Date Driven: 3-2-79
Date Tested: 3-13-79 to 3-21-79
EN Capacity: 710± tons
Static Load Test Capacity: 480± tons (19 days)
Notes: Jetted to -70 ft

Pier 23 / Pile 9
54" Ø Concrete-Filled PCC Pipe
Design Capacity: 250 tons
Cutoff: 0.83 ft; Tip El: -95.5 ft
Date Driven: 12-4-78; Date Tested: 12-19-78 to 12-22-78
EN Capacity: 490± tons
Static Load Test Capacity: 325± tons (18 days)
Notes: Jetted to -79 ft; recentered / redriven from -85 to -95.5 ft.



LEGEND

- Soft Young Bay Mud
- Silty and Sandy Clay (San Antonio Formation)
- Sand
- Stiff Silty to Sandy Clay
- Sand and Clay (Alameda Formation)
- Fill
- Old Bay Mud
- Liquefaction Potential Zone

FOS: Factor of Safety to Liquefaction

Scales:
Hor. 1" = 150'
Ver. 1" = 30' (Soil Profile)
1" = 300' (Bridge Profile)

Figure 1-B: Soil profile and potential liquefaction zones

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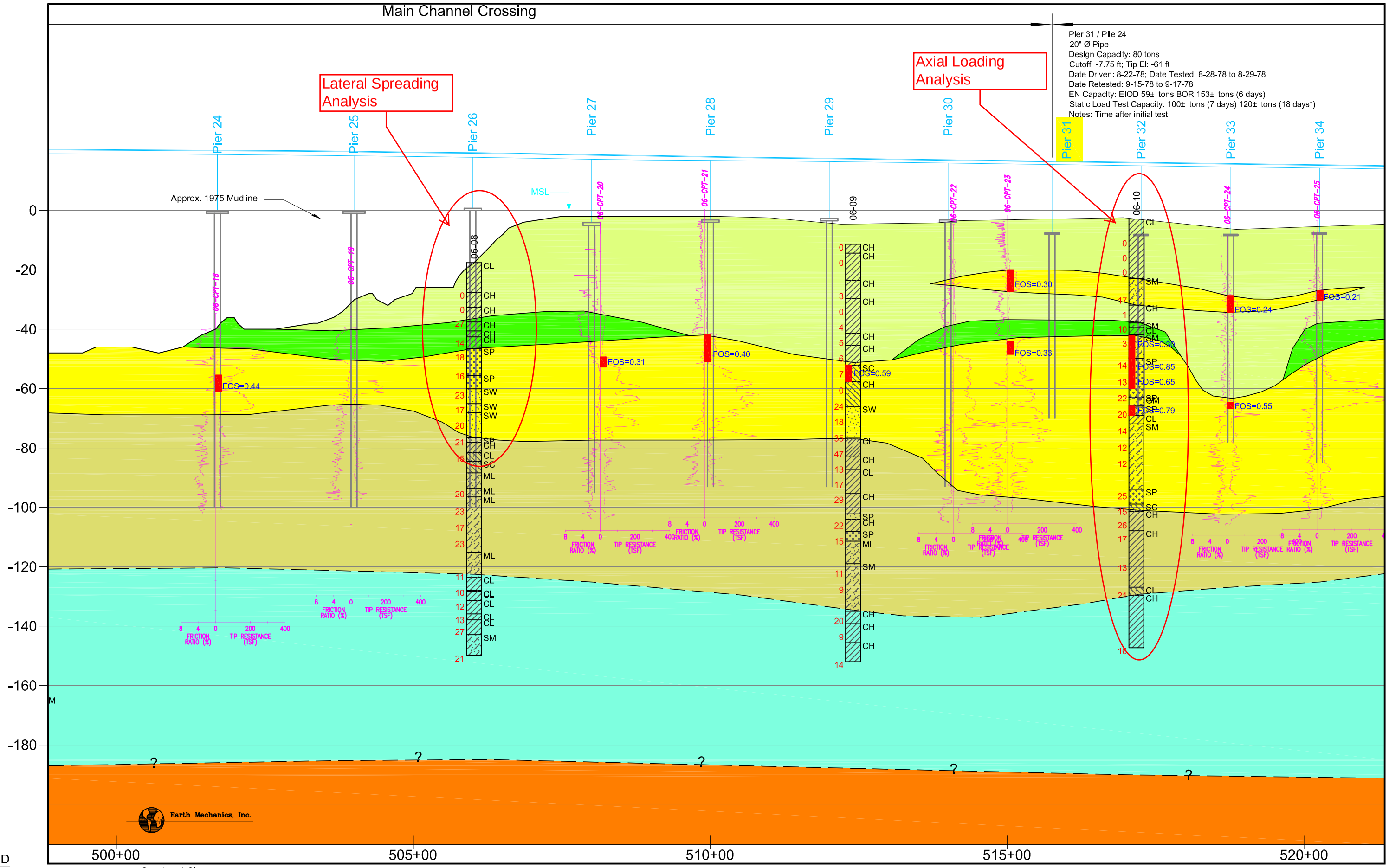

LEGEND

- Soft Young Bay Mud
- Silty and Sandy Clay (San Antonio Formation)
- Sand
- Stiff Silty to Sandy Clay
- Sand and Clay (Alameda Formation)
- Fill
- Old Bay Mud
- Liquefaction Potential Zone

FOS: Factor of Safety to Liquefaction

Scales:
Hor. 1" = 150'
Ver. 1" = 30' (Soil Profile)
1" = 300' (Bridge Profile)

Figure 1-C: Soil profile and potential liquefaction zones

Approach Structure

East

Pier 36 / Pile 34
20" Ø Pipe
Design Capacity: 80 tons
Cutoff: -7.75 ft; Tip El: -74 ft
Date Driven: 8-19-78; Date Tested: 8-28-78 to 8-29-78
Date Retested: 9-15-78 to 9-17-78
EN Capacity: 42± tons
Static Load Test Capacity: 150+ tons (9 days)

Pier 35 | Pier 36 | Pier 37 | Pier 38 | Pier 39 | Pier 40 | Pier 41 | Bent 42 | Bent 43 | Bent 44 | E-20 | E-15 | E-10 | E-5 | Abut. E-1

06-11 | 06-CPT-26 | 06-CPT-27B | 06-12 | 06-CPT-27A | 06-CPT-28 | 06-13 | 06-CPT-30 | 06-CPT-31 | 06-CPT-35 | 06-14 | 06-CPT-33

0 | -20 | -40 | -60 | -80 | -100 | -120 | -140 | -160 | -180

FOS=0.55 | FOS=0.28 | FOS=0.55 | FOS=0.67 | FOS=0.38 | FOS=0.39

FRICTION RATIO (%) | TIP RESISTANCE (TSF)

525+00 | 530+00 | 535+00 | 540+00

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LEGEND

- Soft Young Bay Mud
- Silty and Sandy Clay (San Antonio Formation)
- Sand
- Stiff Silty to Sandy Clay
- Sand and Clay (Alameda Formation)
- Fill
- Old Bay Mud
- Liquefaction Potential Zone

FOS: Factor of Safety to Liquefaction

Scales:
Hor. 1" = 150'
Ver. 1" = 30' (Soil Profile)
1" = 300' (Bridge Profile)

Figure 1-D: Soil profile and potential liquefaction zones

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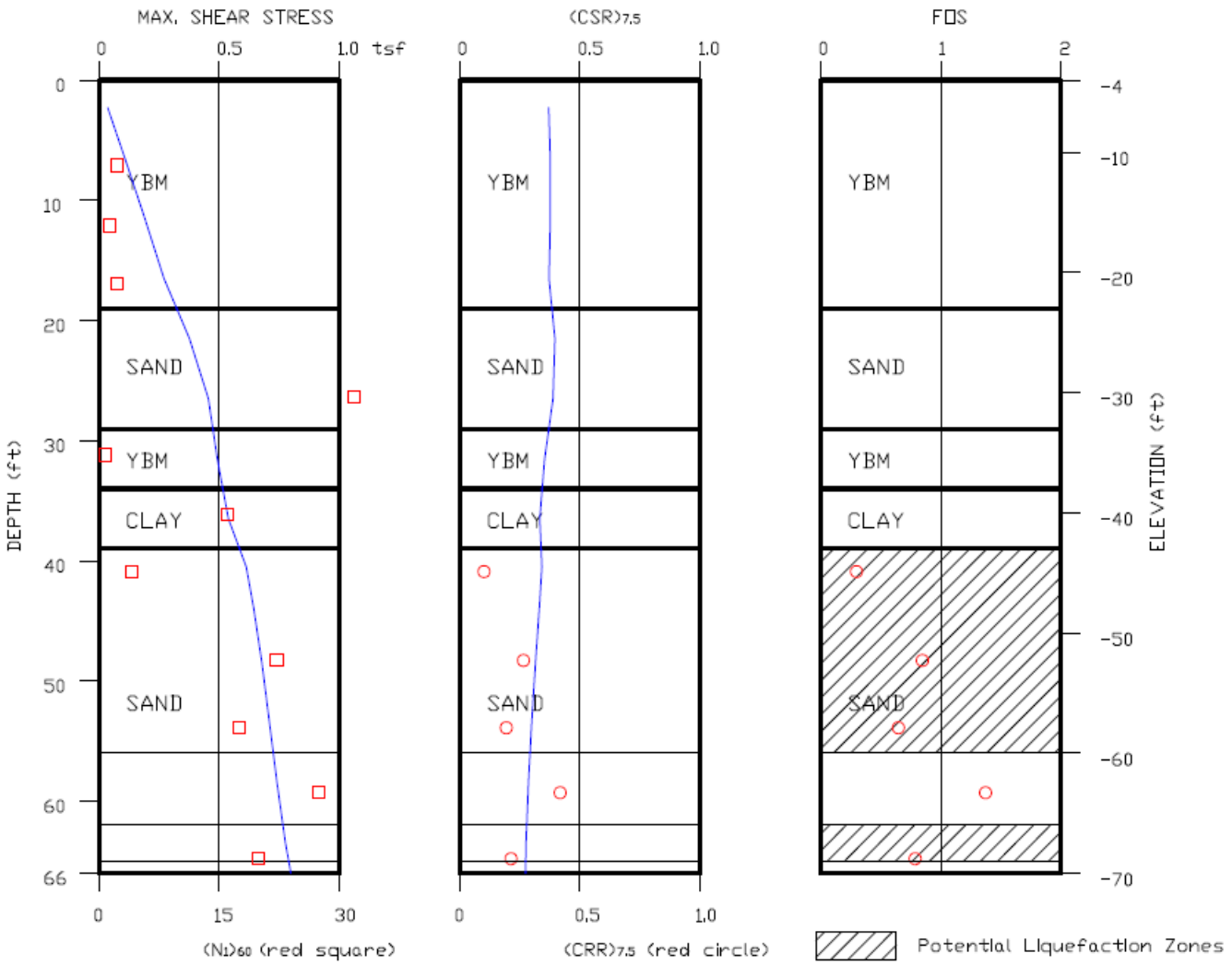


Figure 2: Liquefaction Analysis based on boring data (Pier 32)

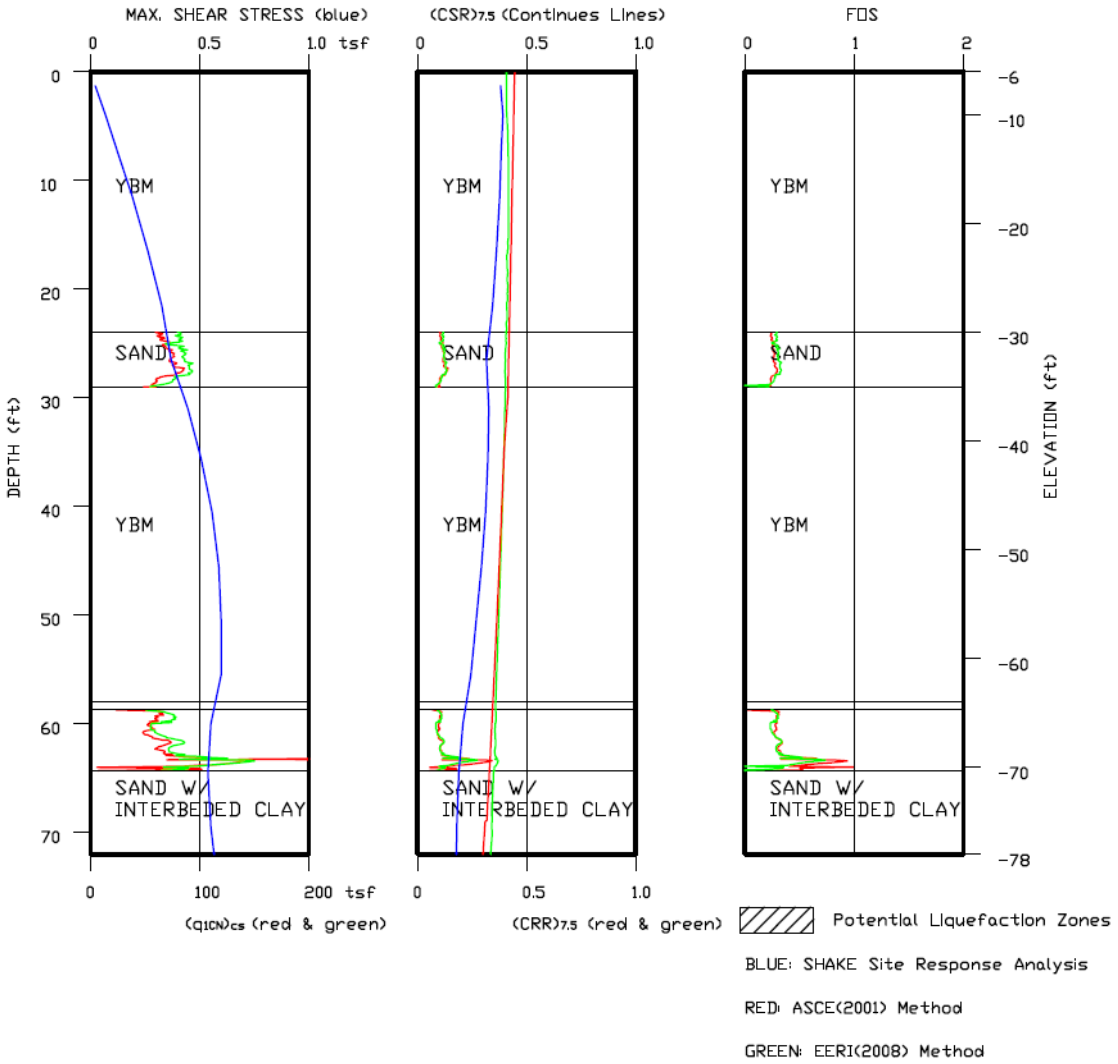


Figure 3: Liquefaction Analysis based on CPT data (Pier 33)

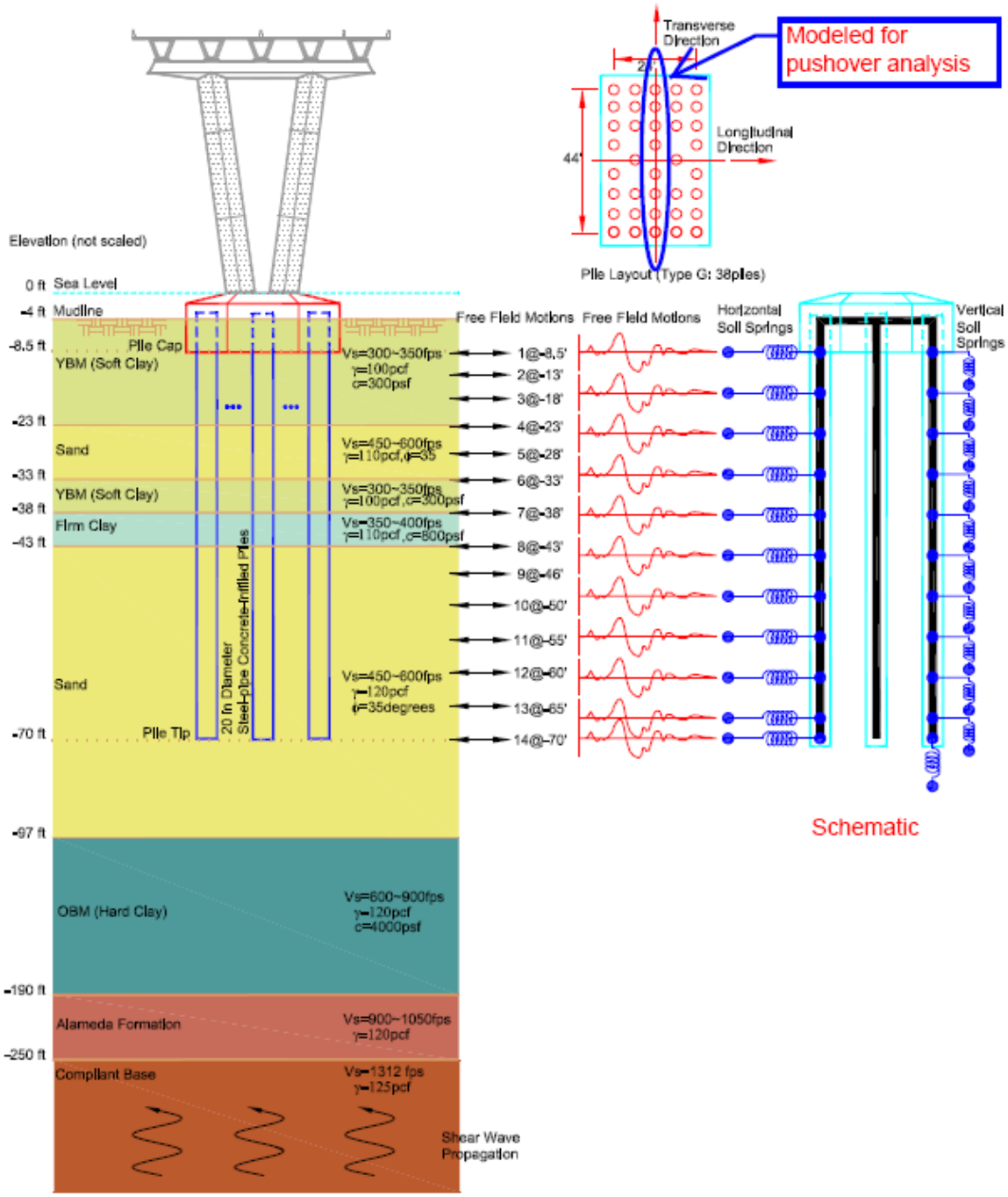


Figure 4: Schematic design soil profile and properties at Pier 32

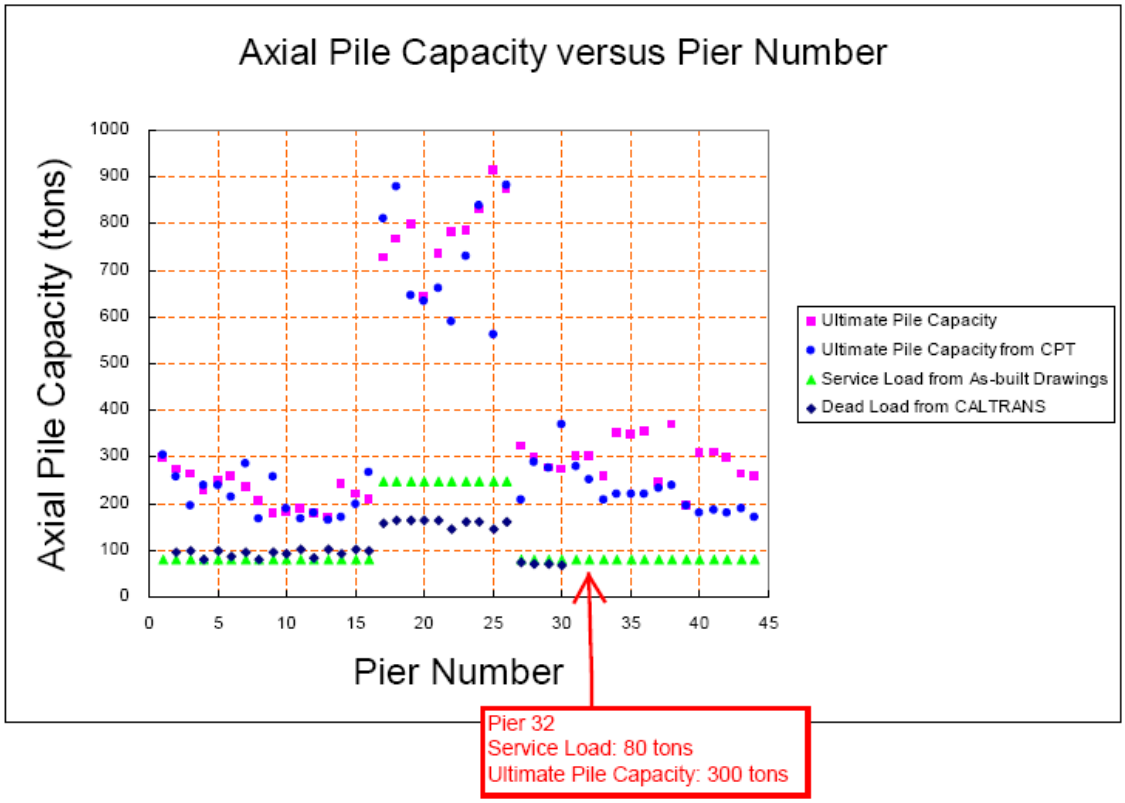


Figure 5: Design load versus ultimate capacities for all piers along the bridge

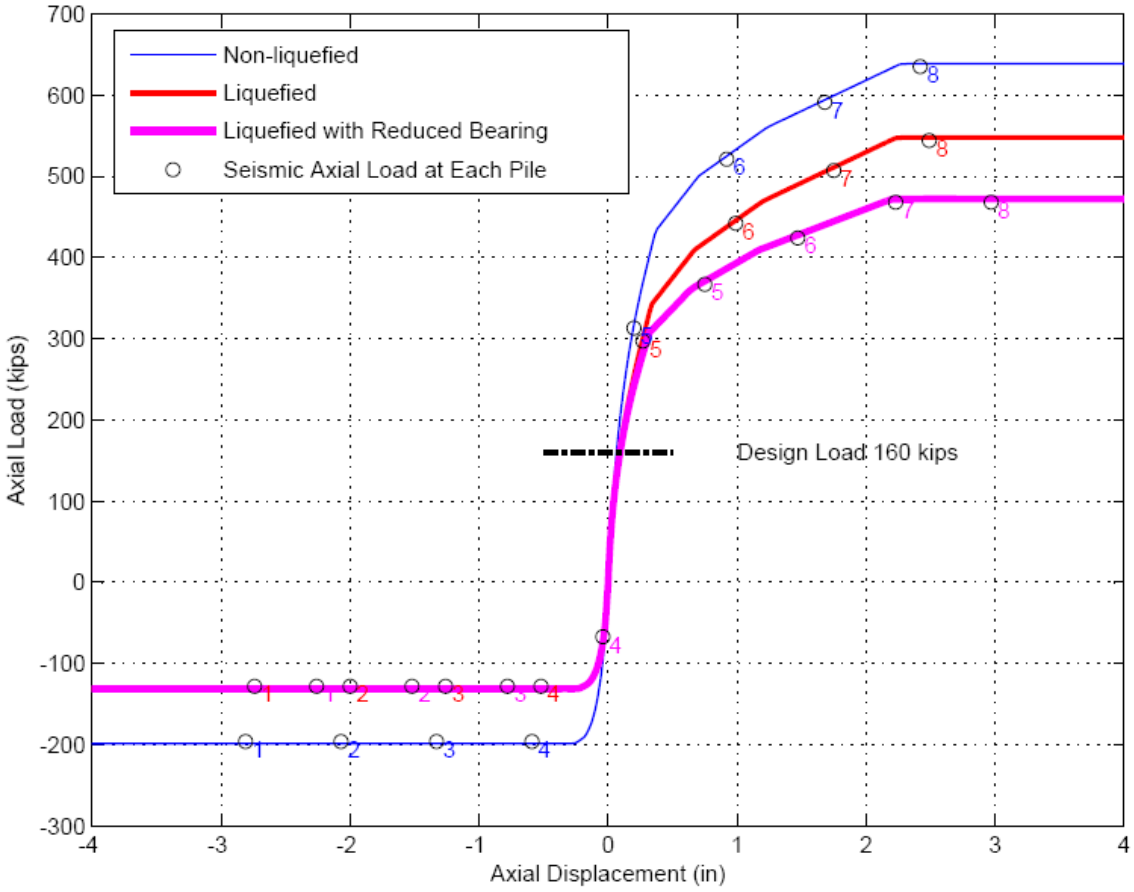


Figure 6: Axial load-deformation behavior of the piles in the liquefied and non-liquefied soil at Pier 32

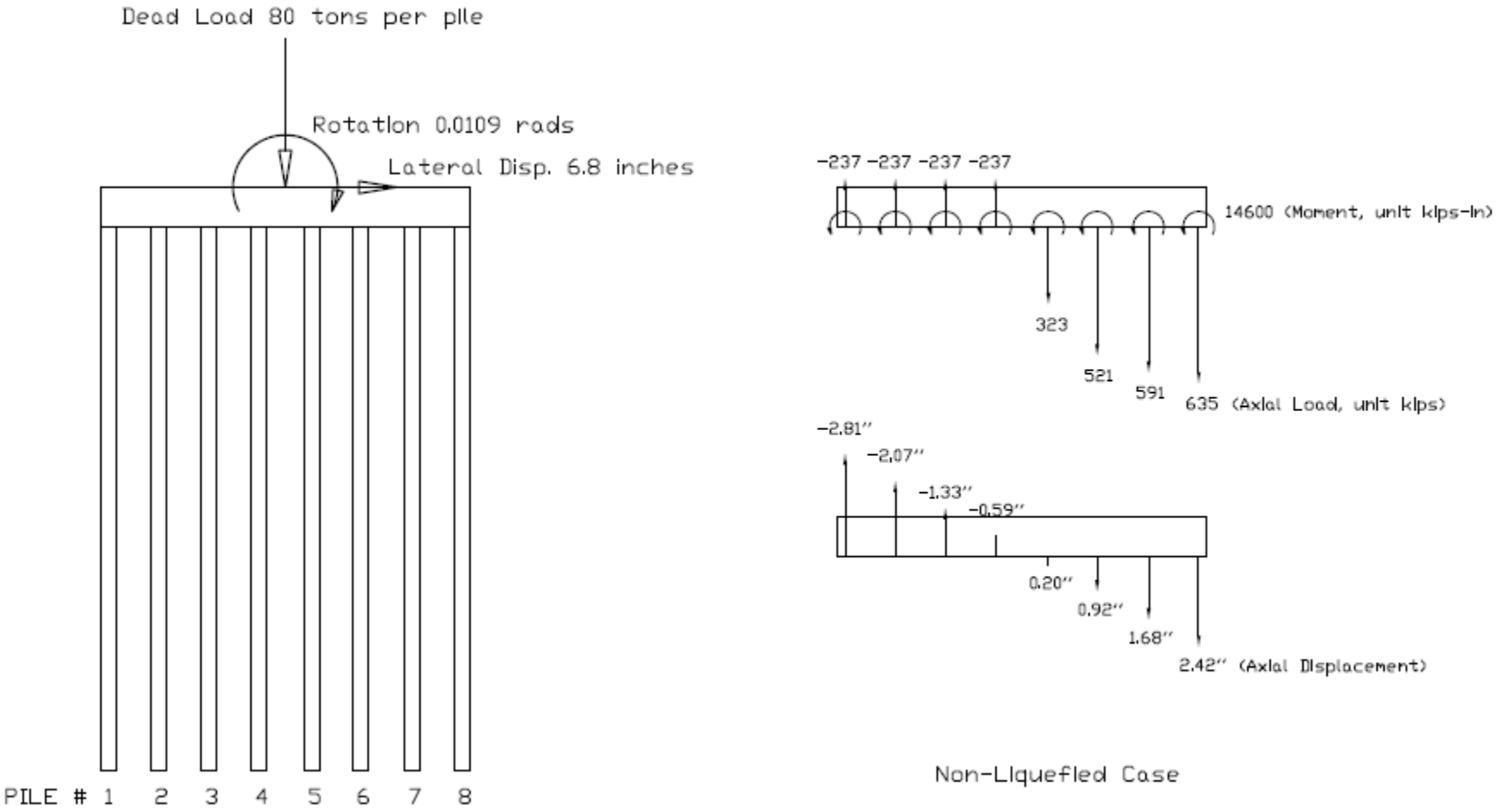


Figure 7: Distribution of axial pile loads, moments, and axial displacements in non-liquefied soil at Pier 32

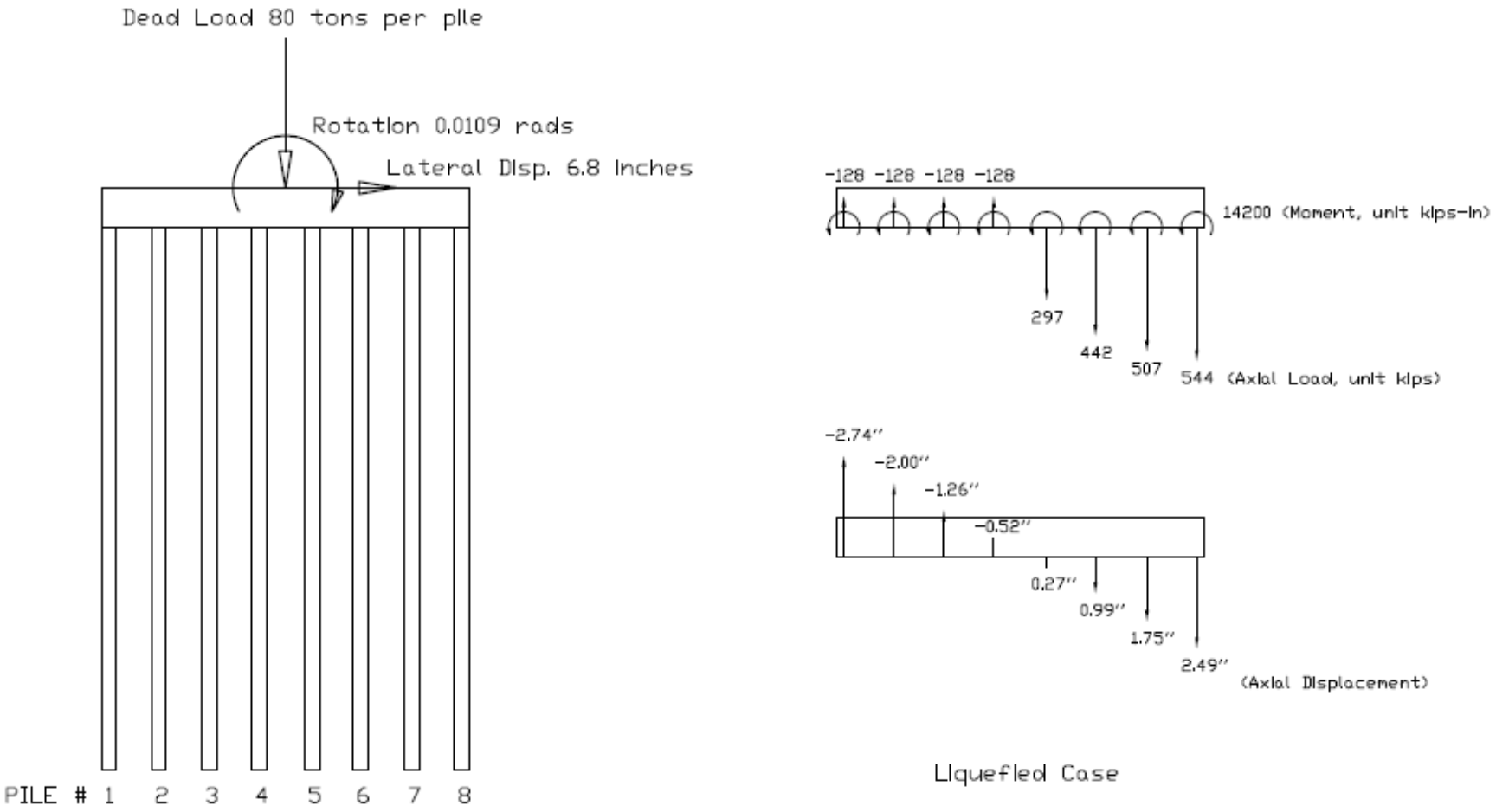


Figure 8: Distribution of axial pile loads, moments, and axial displacements in liquefied soil at Pier 32

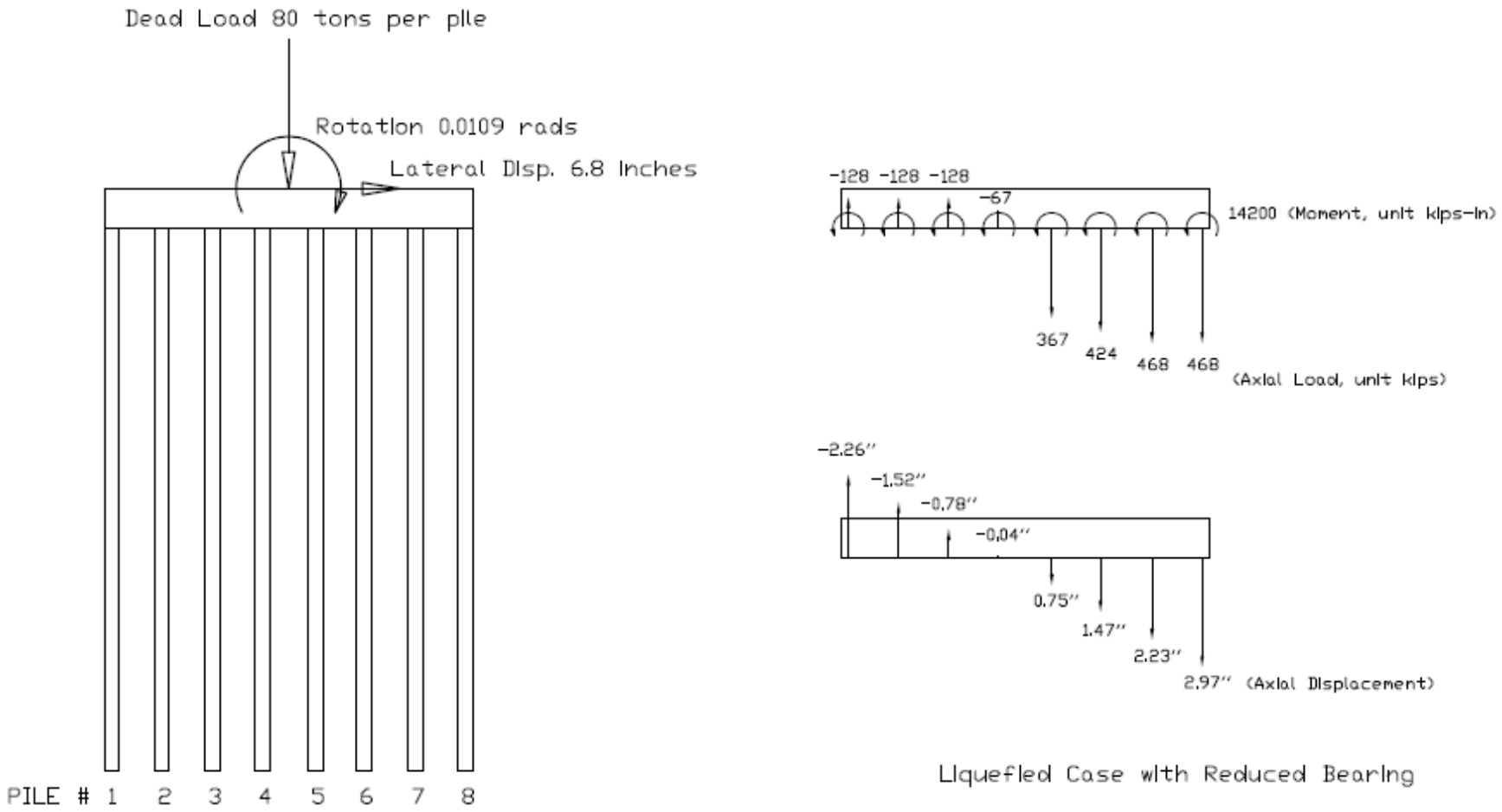


Figure 9: Distribution of axial pile loads, moments, and axial displacements in liquefied soil with reduced bearing at Pier 32

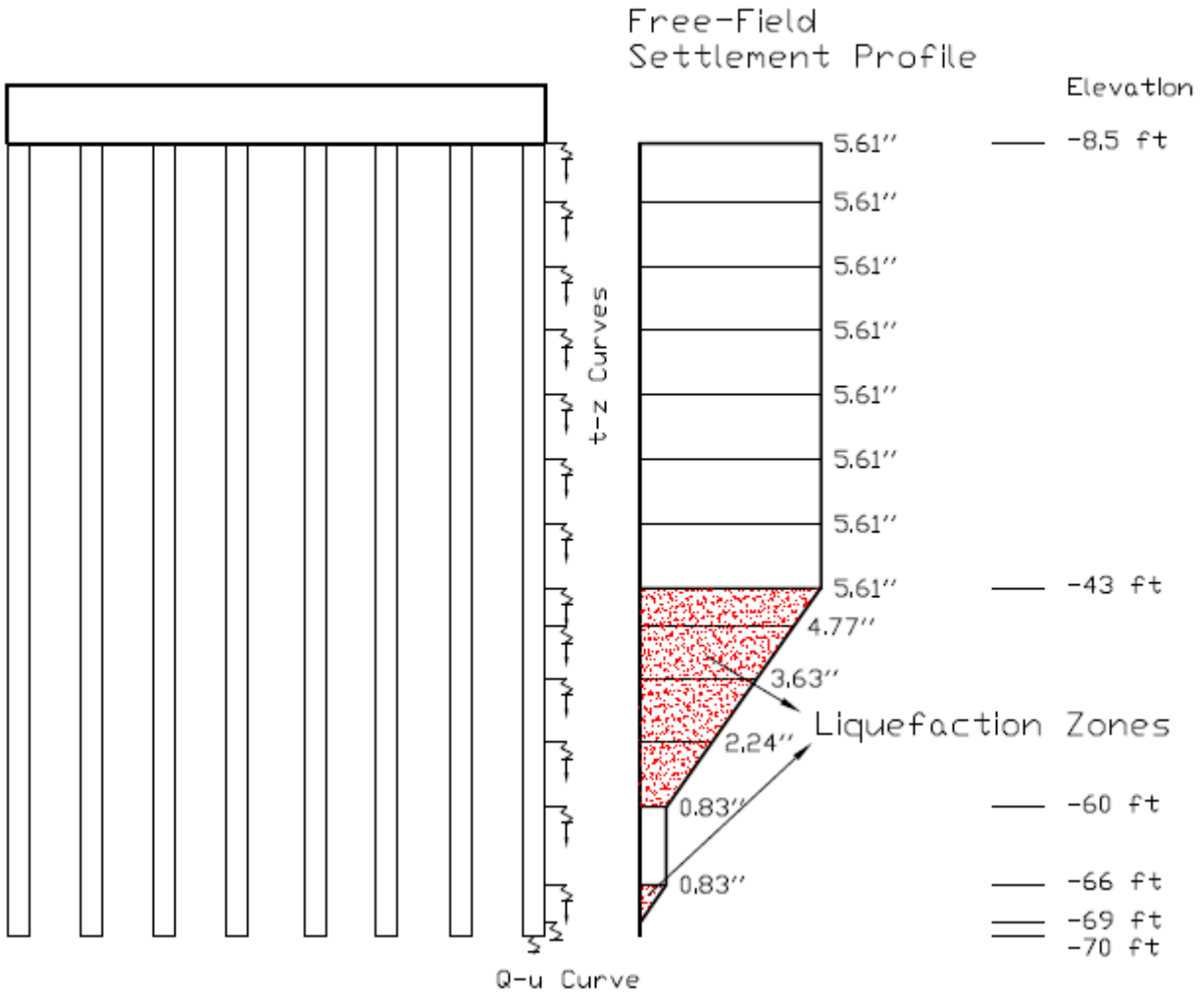


Figure 10: Downdrag settlement analysis with free-field settlement profile

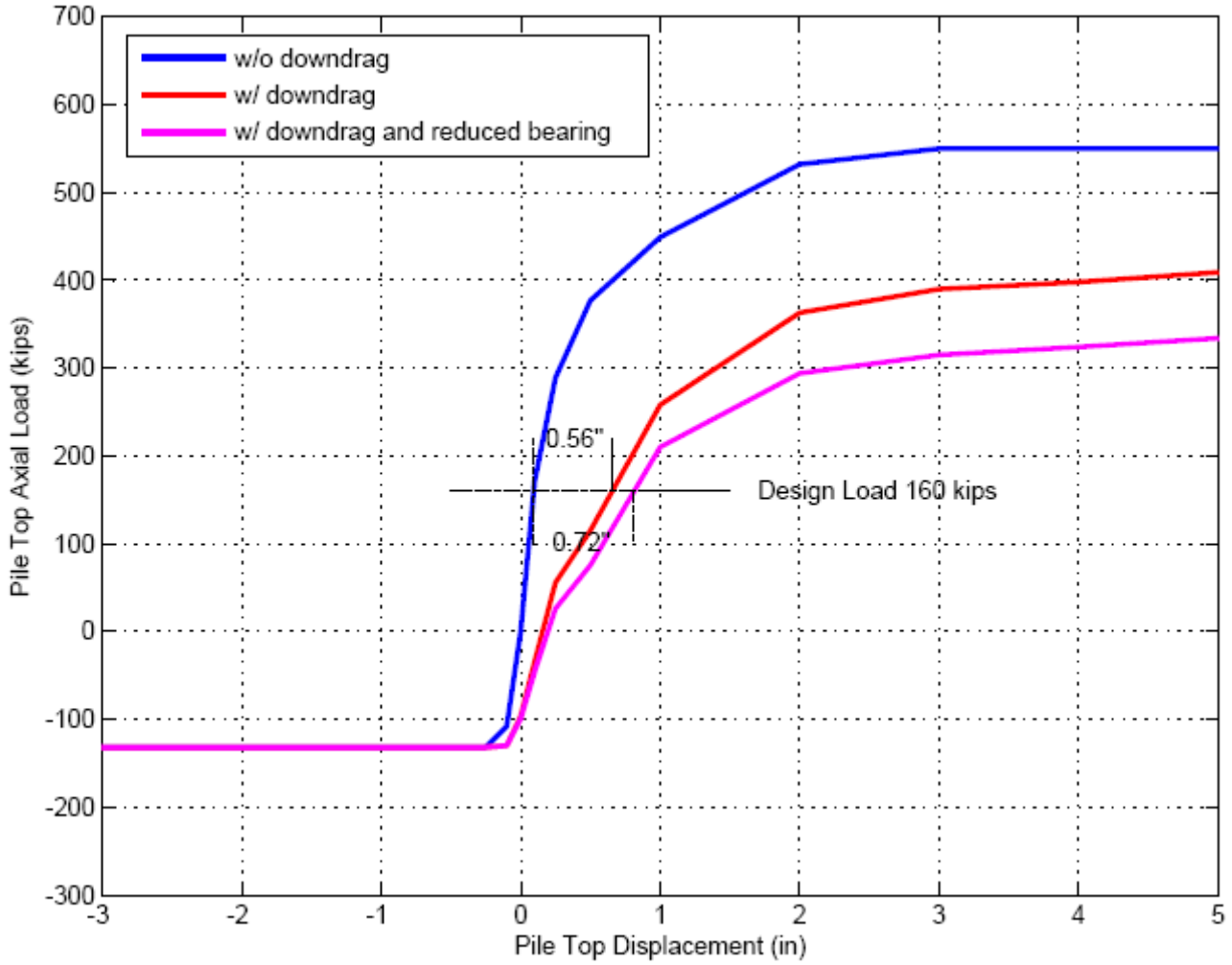


Figure 11: Axial load-deformation curves with and without downdrag considerations (Pier 32, single pile)

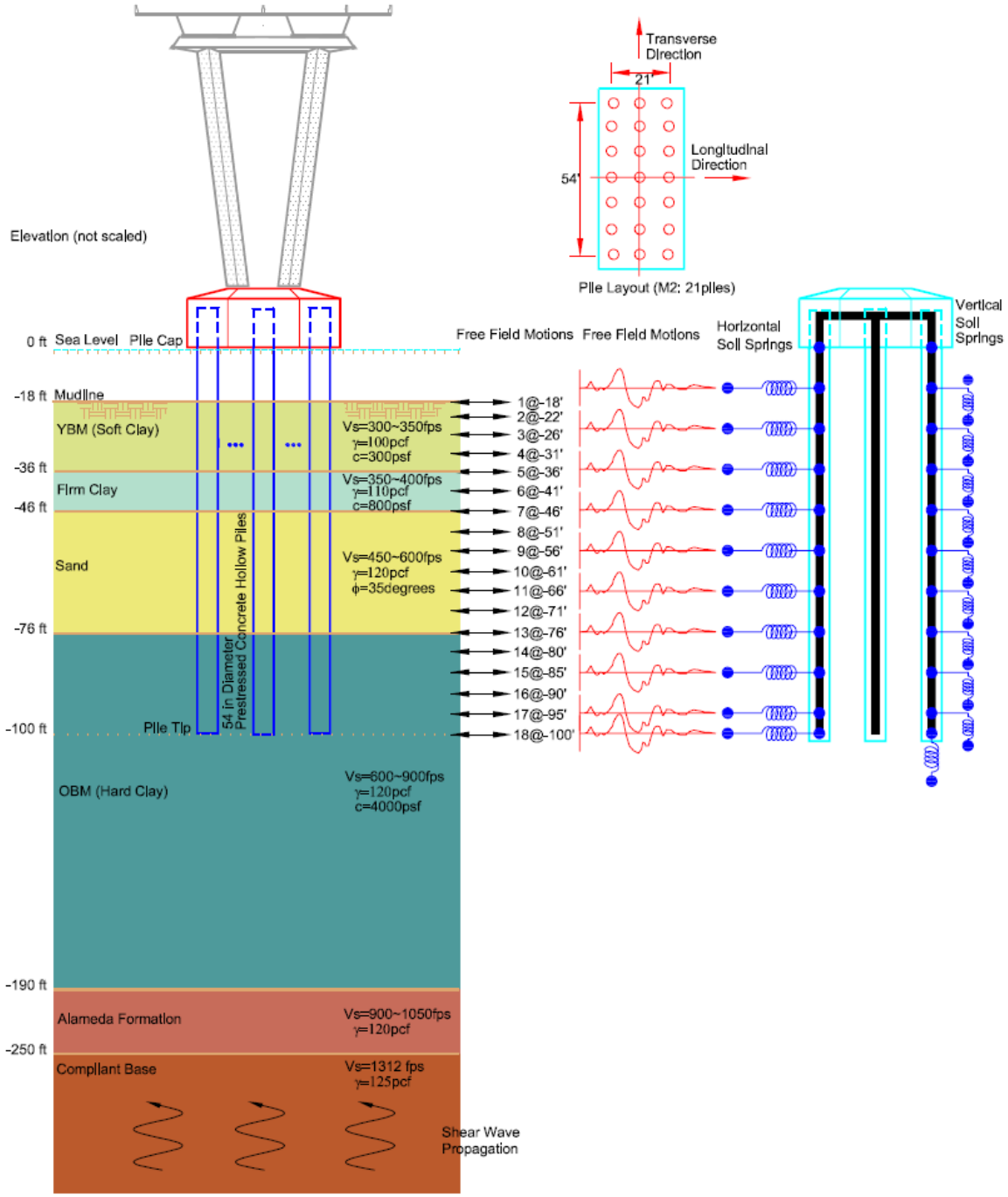


Figure 12: design soil profile and properties at Pier 26

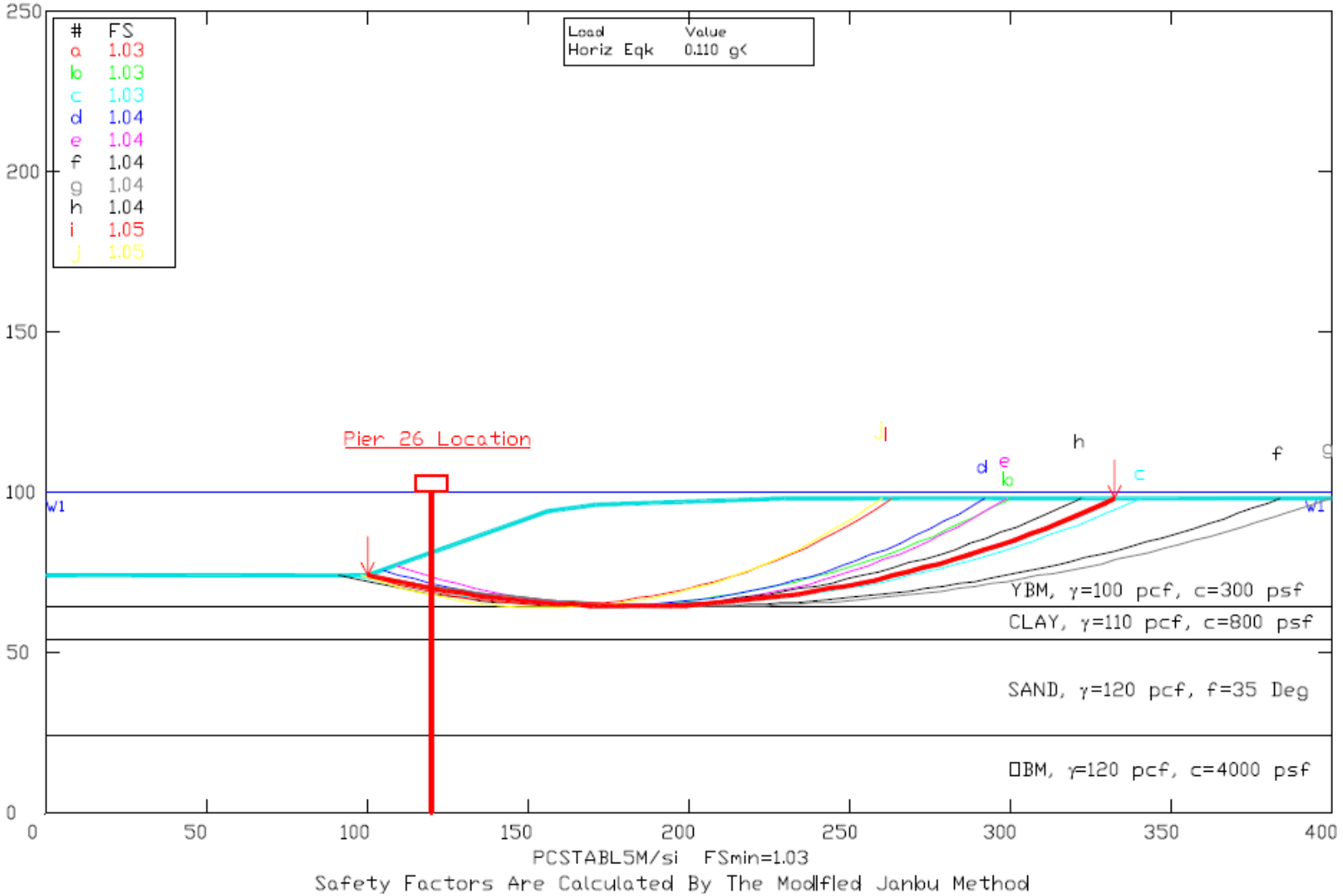


Figure 13: Schematic of slope stability analysis near Pier 26

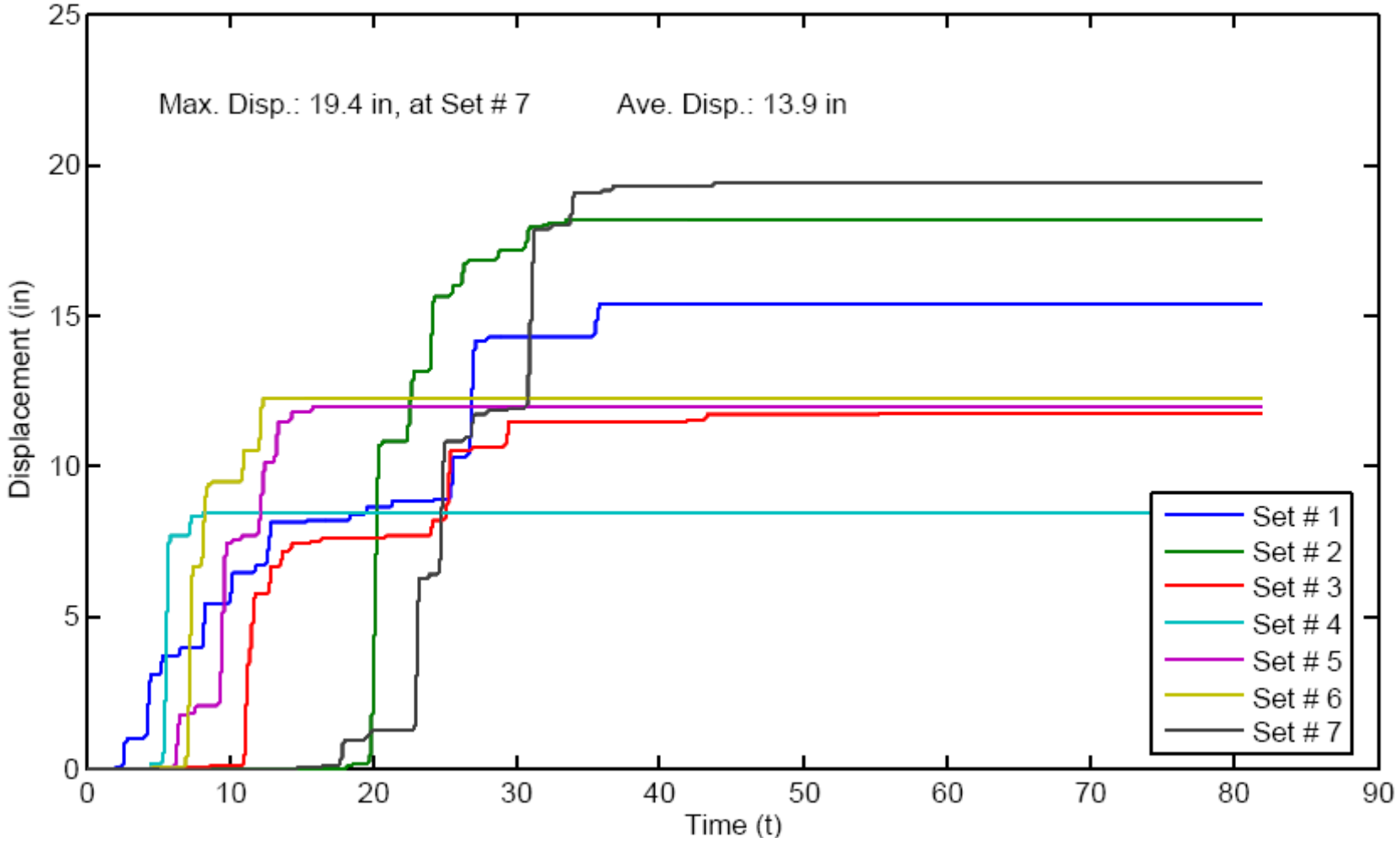


Figure 14: Newmark deformation from the seven sets of free-field earthquake time histories (near Pier 26)

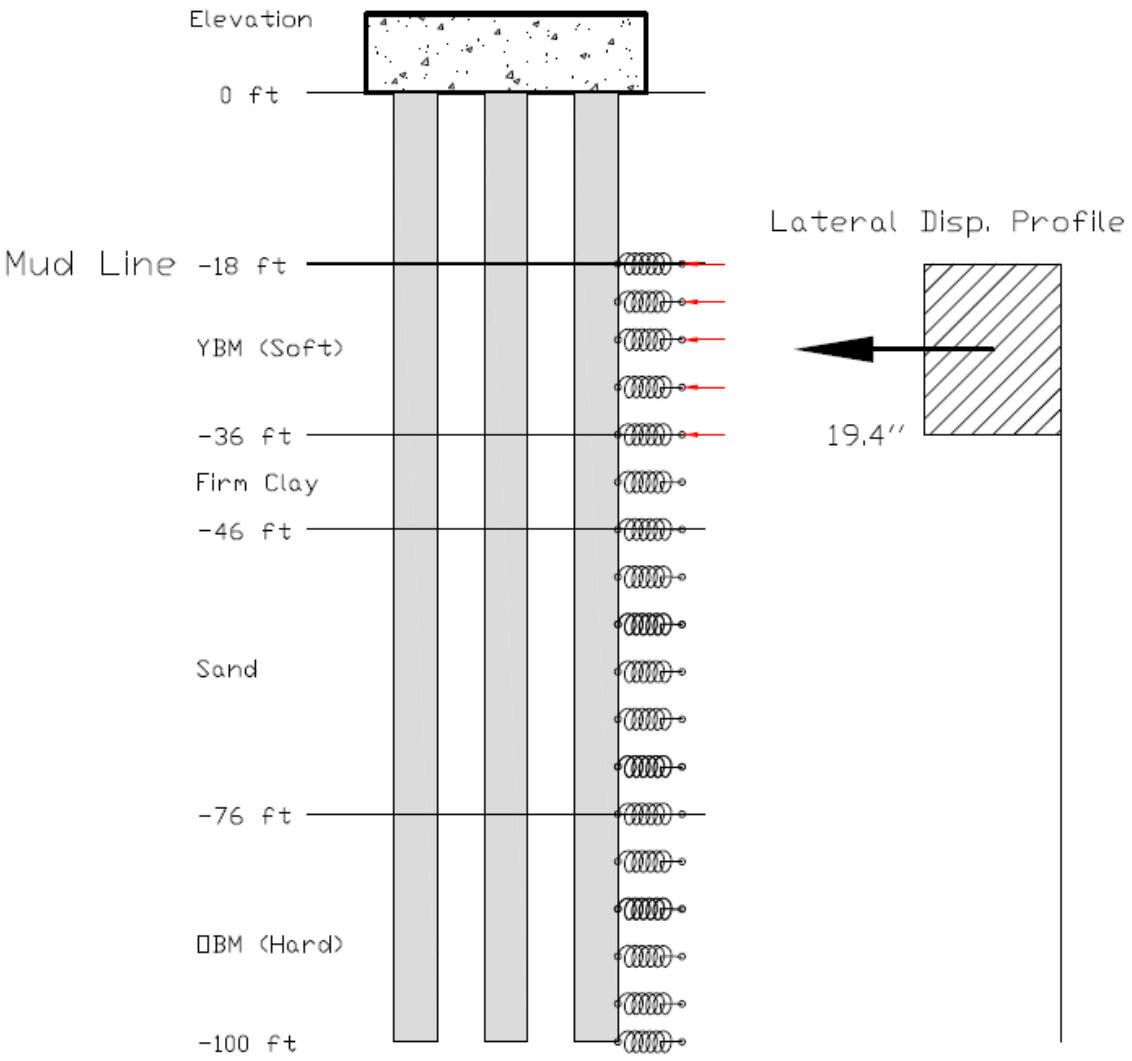


Figure 15: Schematic of lateral spread analysis with lateral soil movement profile (Pier 26)

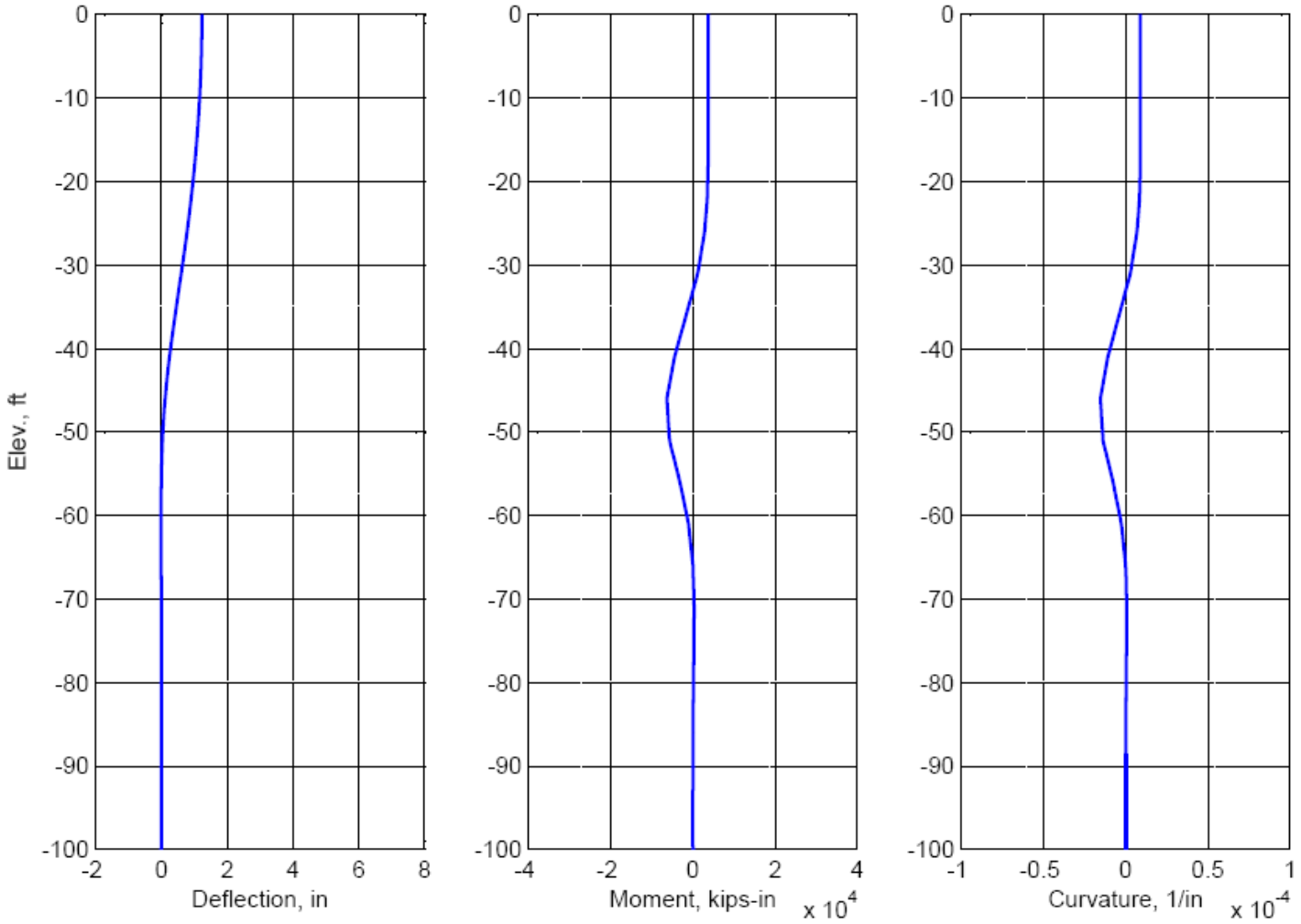


Figure 16: Pile deflection, moment and curvature based on lateral spreading analysis (Pier 26)

(Plastic Moment of Pile = 5.9×10^4 kips-in per Nigel Priestley Report)

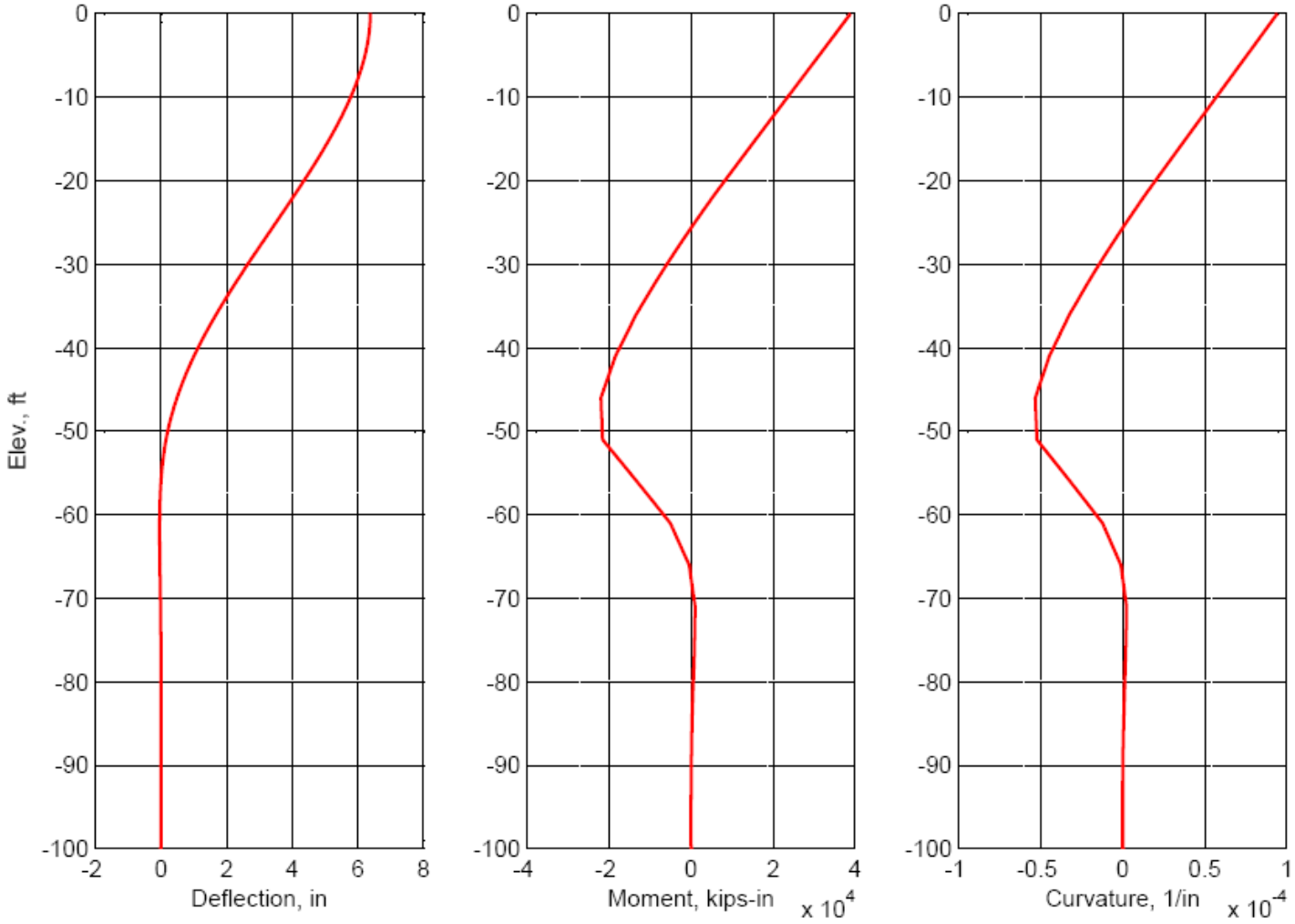


Figure 17: Inertia loading of the superstructure using peak displacement of 6.38 in and rotation of 0.00011 rad (Pier 26)

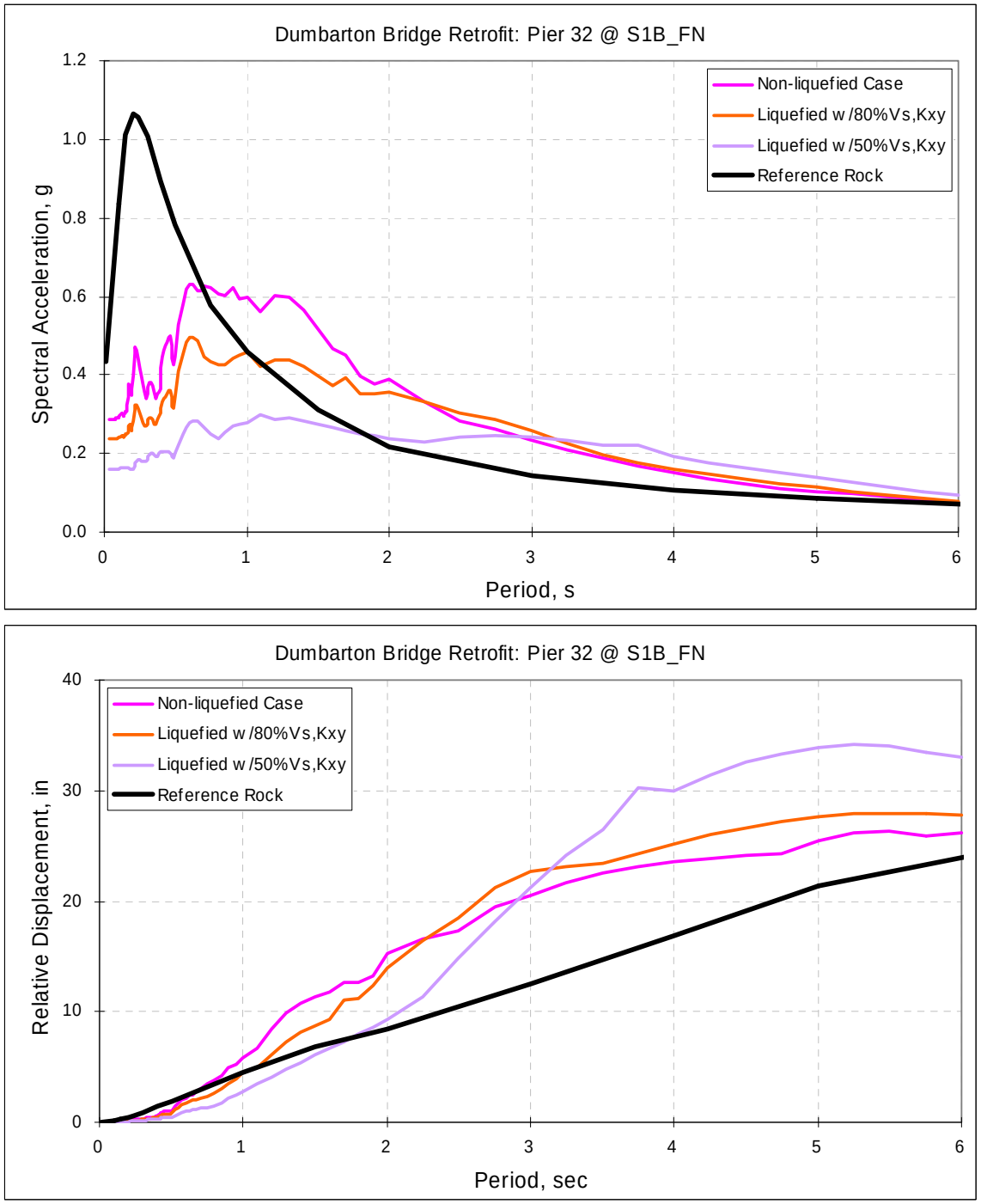


Figure 18: Sensitivity of kinematic motions at Pier 32 due to liquefaction

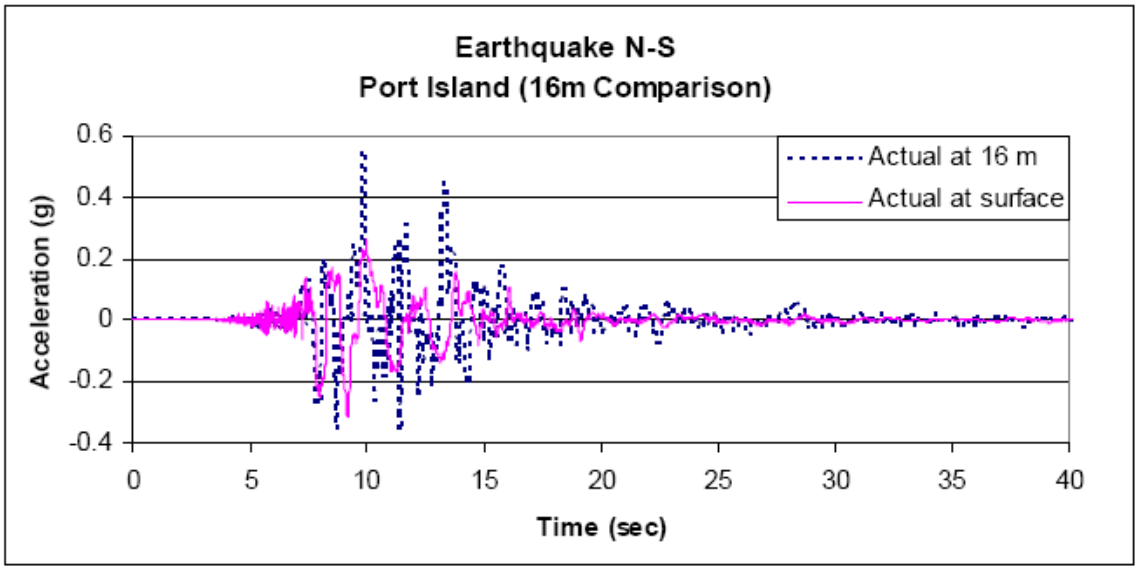
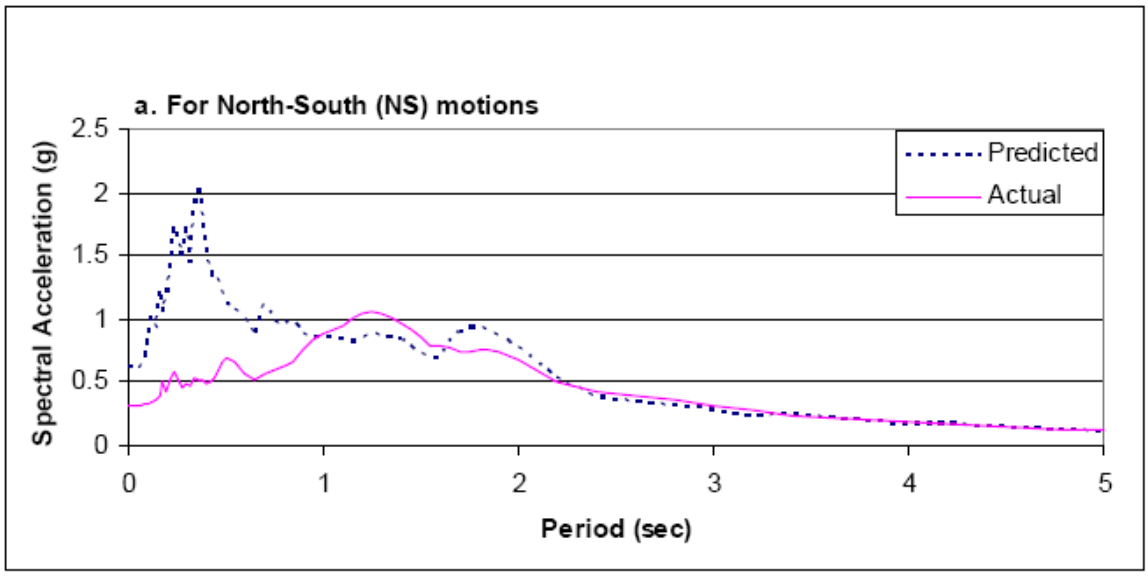


Figure 19: Acceleration time histories from downhole array at Port Island. (After Youd and Carter, 2003)



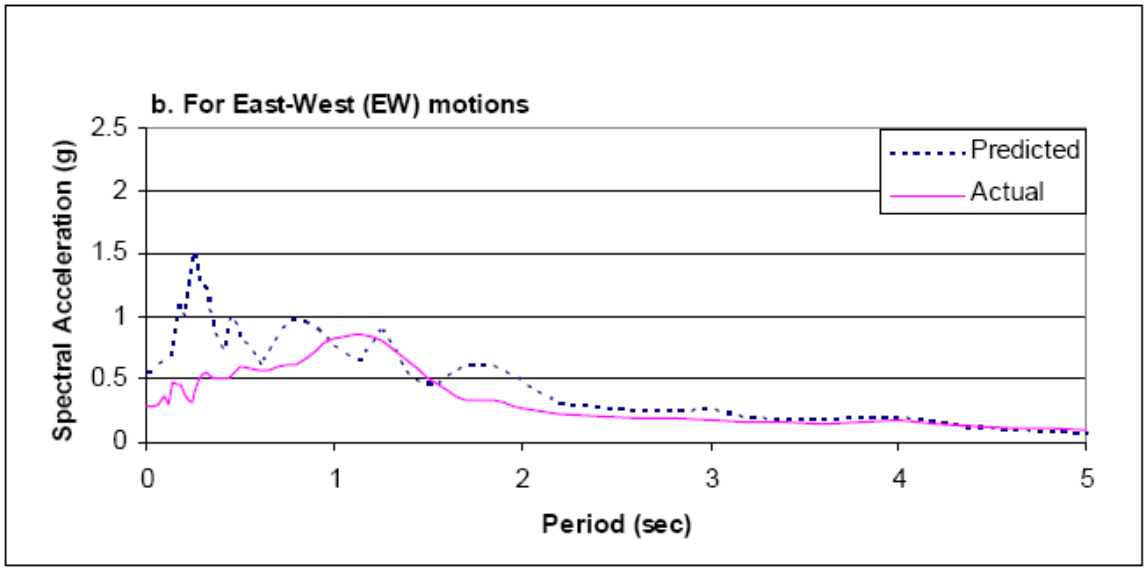


Figure 20 Comparison of Response Spectra with and without liquefaction (the dashed line is without liquefaction predicted using total stress site response analyses; the solid line is the actual measurement in the liquefied site).

(After Youd and Carter, 2003)

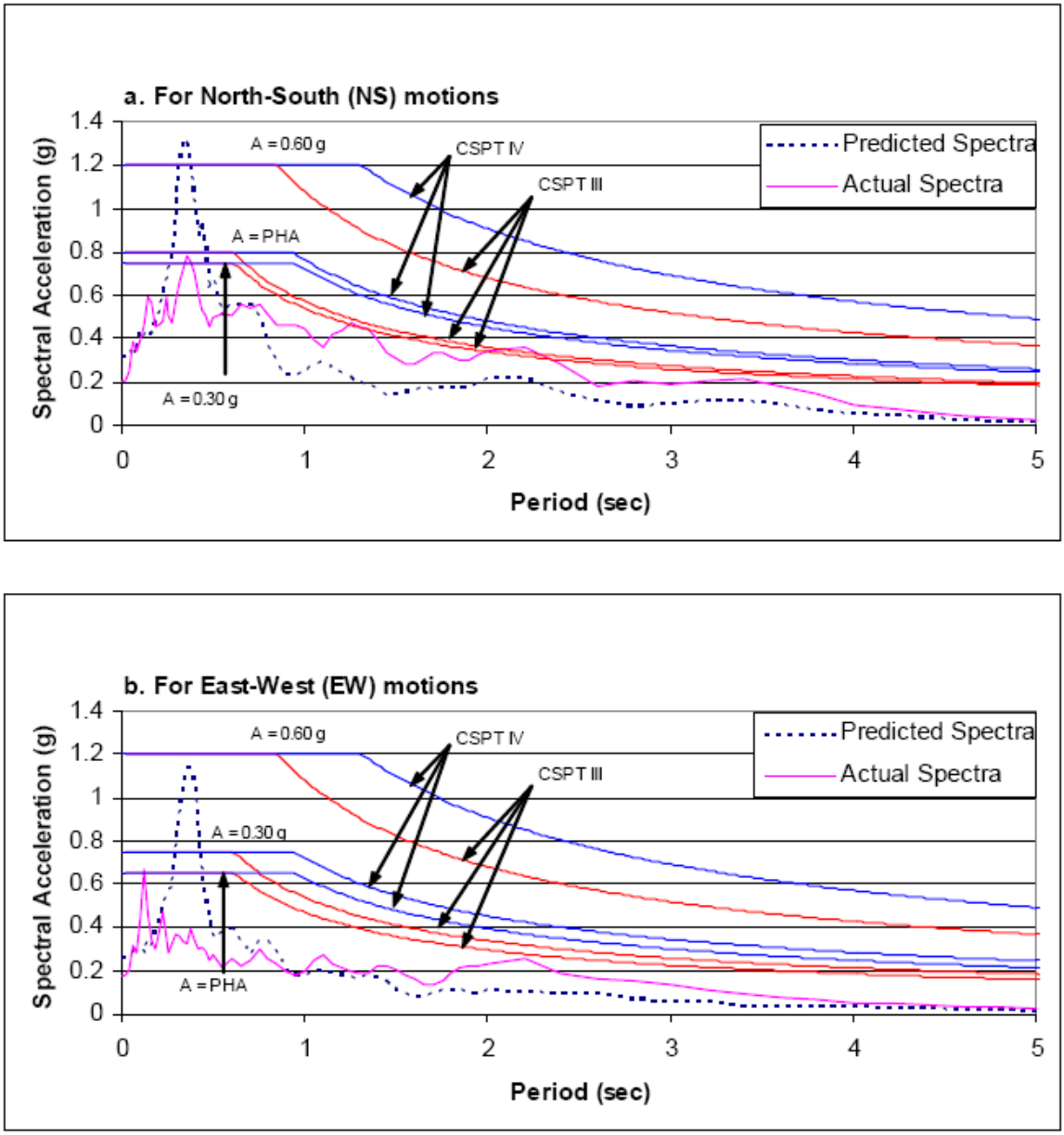


Figure 21: Comparison of conventional design response spectra with the actual response spectrum from the liquefied site.

(After Youd and Carter, 2003)

Appendix

Sample Calculations of Liquefaction

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Liquefaction Potential Calculation (Pier 32)

#1: @ Pier 32, Boring ob-10, Depth 53.9 ft:

- Earthquake Magnitude $M = 7.5$;
- Peak $a_{max} = 0.325\,g$, based on site response of motion 4

Motion	1	2	3	4	5	6	7
a_{max}	0.282	0.318	0.301	0.325	0.265	0.324	0.324 (g)

$a_{max}^{av} = 0.306$ for all 7 motions.

- Field Blow-count is $N = 24$, California Method, which is equivalent to SPT $N_m = 0.66N = 16$
- $\sigma_{vo} = 120\ pcf \times 53.9\ ft = 6468\ psf = 3.23\ tsf$

  $\sigma'_{vo} = (120 - 62.4)\ pcf \times 53.9\ ft = 3105\ psf = 1.55\ tsf$
- $C_N = \min\left(1.7, \sqrt{Pa / \sigma'_{vo}}\right) = \min\left(1.7, \sqrt{1.044/1.55}\right) = 0.82$,

  $C_E = \frac{ER}{60\%} = \frac{90\%}{60\%} = 1.33$, ER is assumed 90% for safety hammer

  $C_B = 1.00$ for Borehole Diameter 4 1/8 inches

  $C_R = 1.00$ for rod length 10 ~ 30 m

  $C_S = 1.00$ for standard sampler

$$(N_1)_{60} = N_m C_N C_E C_B C_R C_S$$
$$= (16)(0.82)(1.33)(1.00)(1.00)(1.00)$$
$$= 17.4$$

- $FC = 12\%$ (SP)

$$\alpha = \exp\left[1.76 - \frac{190}{FC^2}\right] = 1.554$$

$$\beta = 0.99 + \frac{FC^{1.5}}{1000} = 1.032$$

$$(N_1)_{60cs} = \alpha + \beta (N_1)_{60} = 1.554 + 17.4 \times 1.032 = 19.5$$

- $$(CRR)_{7.5} = \frac{1}{34 - (N_1)_{60cs}} + \frac{(N_1)_{60cs}}{135} + \frac{50}{[10(N_1)_{60cs} + 45]^2} - \frac{1}{200}$$
$$= \frac{1}{34 - 19.5} + \frac{19.5}{135} + \frac{50}{(10 \times 19.5 + 45)^2} - \frac{1}{200}$$
$$= 0.210$$

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- CSR based on r_d:

$z = 53.9\ ft = 53.9 \times 0.3048\ m = 16.42m$

$r_d = 1.174 - 0.0267 z = 1.174 - 0.0267 \times 16.42 = 0.735$

$CSR = 0.65 \frac{a_{max}}{g} \cdot \frac{\sigma_{vo}}{\sigma'_{vo}} r_d$

$= (0.65)(0.306)\left(\frac{3.23}{1.55}\right)(0.735)$

$= 0.305$

$K_\sigma = 0.92$, refs Fig 13, Youd et al 2001.

$MSF = 1.00$ for $M = 7.5$

$FS = \frac{(CRR)_{7.5}}{CSR} \cdot MSF \cdot K_\sigma = \frac{0.210}{0.305}(1.0)(0.92) = 0.63$

- CSR based on SHAKE

Since a_{max} is based on motion 4, site response of motion 4 is used:

τ_{max} was calculated by SHAKE at this position is

$\tau_{max} = 1420\ psf = 0.71\ tsf$

$CSR = \frac{\tau_{av}}{\sigma'_{vo}} = \frac{(0.65)(0.71)}{1.55} = 0.298$,

$FS = \frac{(CRR)_{7.5}}{CSR} \cdot MSF \cdot K_\sigma = \frac{0.210}{0.298}(1.0)(0.92) = 0.65$ (reported in Fig 2)

$(CSR)_{7.5} = CSR/(MSF \cdot K_\sigma) = 0.298/0.92 = 0.32$

#2 @ Pier 32, Boring 06-10, Depth = 64.8 ft

- Earthquake Magnitude $M = 7.5$
- $a_{max} = 0.325\ g$, $a^{av}_{max} = 0.306$
- Field $N = 30$, California Method

$N_m = 0.66\ N = 20$

- $\sigma_{vo} = 120\ pcf \times 64.8\ ft = 7776\ psf = 3.89\ tsf$

$\sigma'_{vo} = (120 - 62.4) \times 64.8\ ft = 3732\ psf = 1.87\ tsf$

- $C_N = \min(1.7, \sqrt{Pa/\sigma'_{vo}}) = \min(1.7, \sqrt{1.044/1.87}) = 0.75$

$C_E = \frac{ER}{60\%} = \frac{80\%}{60\%} = 1.33$, ER is assumed 80% for safety hamm

$C_B = 1.00$ for Borehole Diameter 4 1/8 inches

$C_R = 1.00$ for rod length 10 ~ 30 m

$C_S = 1.00$ for standard sampler

$$(N_1)_{60} = N_m C_N C_E C_B C_R C_S$$
$$= (20)(0.75)(1.33)(1.00)(1.00)(1.00)$$
$$= 20$$

- FC = 12% (SP)

$$\alpha = \exp\left[1.76 - \frac{190}{FC^2}\right] = 1.554$$

$$\beta = 0.99 + \frac{FC^{1.5}}{1000} = 1.032$$

$$(N_1)_{60CS} = \alpha + \beta (N_1)_{60} = 1.554 + 1.032(20) = 22.2$$

- $$(CRR)_{7.5} = \frac{1}{34 - (N_1)_{60CS}} + \frac{(N_1)_{60CS}}{135} + \frac{50}{[10(N_1)_{60CS} + 45]^2} - \frac{1}{200}$$

$$= \frac{1}{34 - 22.2} + \frac{22.2}{135} + \frac{50}{(10 \times 22.2 + 45)^2} - \frac{1}{200}$$

$$= 0.245$$

- CSR based on r_d

$z = 64.8$ ft $= 19.75$ m

$$r_d = 1.174 - 0.0265 z = 1.174 - 0.0265 \times 19.75 = 0.647$$

$$CSR = 0.65 \frac{a_{max}}{g} \cdot \frac{\sigma_{vo}}{\sigma'_{vo}} \cdot r_d$$

$$= (0.65)(0.306) \frac{3.89}{1.87} (0.647)$$

$$= \underline{0.267}$$

$K_\sigma = 0.88$, refs Fig 13, Youd et al 2001

$MSF = 1.00$, for $M = 7.5$

$$FS = \frac{(CRR)_{7.5}}{CSR} \cdot MSF \cdot K_\sigma$$

$$= \frac{0.245}{0.267} (1.00)(0.88) = \underline{0.81}$$

$$(CSR)_{7.5} = \frac{CSR}{MSF \cdot K_\sigma} = \frac{0.267}{0.88} = 0.30$$

- CSR based on SHAKE

Since a_{max} is based on motion 4, site response of motion 4 is used:

T_{max} was calculated by SHAKE at this position is

$$T_{max} = 1598 \text{ psf} = 0.80 \text{ tsf}$$

$$CSR = \frac{\tau_{av}}{\sigma'_{vo}} = \frac{(0.65)(0.80)}{1.87} = \underline{0.278}$$

$$FS = \frac{(CRR)_{7.5}}{CSR} \cdot MSF \cdot K_\sigma$$

$$= \frac{0.265}{0.278} \cdot (1.00)(0.88) = \underline{0.79} \text{ (reported in Fig. 2)}$$

Summary:

It can be found that both methods have close results of CSR & FS.

Liquefaction potential calculation (pier 33)

@ Pier 33, CPT-24, Depth 60.2 ft

- Earthquake Magnitude $M = 7.5$;
- Peak $a_{max} = 0.352\,g$, based on site response of Motion 6

Motion	1	2	3	4	5	6	7
a_{max}	0.308	0.331	0.324	0.342	0.310	0.352	0.345 (g)

$a_{max}^{av} = 0.330\,g$ for all 7 motions

- Measured $q_c = 30.94$ tsf, $f_s = 0.19$ tsf
- $\sigma_{vo} = 120\ pcf \times 60.2\ ft = 7224\ psf = 3.61\ tsf$

$\sigma'_{vo} = (120 - 62.4)\ pcf \times 60.2\ ft = 3468\ psf = 1.74\ tsf$

- $Q = \dfrac{q_c - \sigma_{vo}}{P_a} \cdot \left(\dfrac{P_a}{\sigma'_{vo}}\right)^n$

$= \dfrac{q_c - \sigma_{vo}}{\sigma'_{vo}}$ (assuming $n = 1$)

$= \dfrac{30.94 - 3.61}{1.74} = 15.7$

$F = \dfrac{f_s}{q_c - \sigma_{vo}} \times 100\% = \dfrac{0.19}{30.94 - 3.61} \times 100\% = 0.70\%$

$I_c = [(3.47 - \log Q)^2 + (1.22 + \log F)^2]^{0.5}$

$= [(3.47 - \log 15.7)^2 + (1.22 + \log 0.70)^2]^{0.5}$

$= 2.51 < 2.6$, the soil is sand, n is modified to 0.5.

$C_Q = \min\left[1.7, \left(\dfrac{P_a}{\sigma'_{vo}}\right)^n\right]$

$= \min\left(1.7, \left(\dfrac{1.04}{1.74}\right)^{0.5}\right) = 0.77$

$Q = \dfrac{q_c - \sigma_{vo}}{P_a}\left(\dfrac{P_a}{\sigma'_{vo}}\right)^n$

$= \dfrac{30.94 - 3.61}{1.04}\left(\dfrac{1.04}{1.74}\right)^{0.5} = 20.28$

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$I_c = [(3.47 - \log Q)^2 + (1.22 + \log F)^2]^{0.5}$

$= [(3.47 - \log 2028)^2 + (1.22 + \log 0.70)^2]^{0.5}$

$= 2.41 < 2.6$, the soil is sand, $n = 0.5$ OK,

- $q_{c1N} = C_Q \frac{q_c}{P_a}$

$= 0.77 \times \left(\frac{30.94}{1.04}\right) = 23.0$ tsf

- Since $I_c = 2.41 > 1.64$

$K_c = -0.403 I_c^4 + 5.581 I_c^3 - 21.63 I_c^2 + 33.75 I_c - 17.88$

$= 2.35$

- $(q_{c1N})_{cs} = K_c q_{c1N} = (2.35) \times 23.0 = 54.05$ tsf

- since $(q_{c1N})_{cs} \geq 50$,

$(CRR)_{7.5} = 93\left(\frac{q_{c1N}}{1000}\right)^3 + 0.08$

$= 93\left(\frac{54.05}{1000}\right)^3 + 0.08 = 0.09$

- CSR based on r_d:

$z = 60.2$ ft $= 18.35$ m

$r_d = 1.174 - 0.0267 z = 1.174 - 0.0267 z = 0.684$

$MSF = 1.0$ for $M = 7.5$

$K_\sigma = 0.9$ ref> Fig. 13, Youd et al 2001.

$CSR = 0.65 \frac{a_{max}}{g} \cdot \frac{\sigma_{vo}}{\sigma'_{vo}} r_d$ (av)

$= (0.65)(0.33)\frac{3.47}{1.60}(0.684) = \underline{0.30}$

$FS = \frac{(CRR)_{7.5}}{CSR} \cdot MSF \cdot K_\sigma$

$= \frac{0.09}{0.30} \times 1.0 \times 0.9$

$= \underline{0.27}$

$(CSR)_{7.5} = \frac{CSR}{MSF \cdot K_\sigma} = \frac{0.30}{0.9} = 0.33$

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o CSR based on SHAKE

τ_{max} was calculated by SHAKE at this position is

$\tau_{max} = 1100$ psf $= 0.55$ tsf

$$CSR = \frac{\tau_{av}}{\sigma'_{vo}} = \frac{(0.65)(0.55)}{1.74} = 0.205$$

$$FS = \frac{(CRR)_{7.5}}{CSR} \cdot MSF \cdot K_\sigma$$

$$= \frac{0.095}{0.205}(1.0)(0.9)$$

$$= 0.42$$

CPT Liquefaction potential calculation (pier 33)

by CGER1 (2008) Method

@ Pier 33, CPT-24, Depth 60.2 ft

- $M = 7.5$, $a_{max}^{av} = 0.330\,g$

  Measured $q_c = 30.94$ tsf, $f_s = 0.19$ tsf

- $\sigma_{vo} = 120$ pcf $\times$ 60.2 ft $= 3.61$ tsf

  $\sigma'_{vo} = (120 - 62.4)$ pcf $\times$ 60.2 $= 1.73$ tsf

- $$Q = \frac{q_c - \sigma_{vo}}{p_a} \cdot \left(\frac{p_a}{\sigma'_{vo}}\right)^n$$

  $$= \frac{30.94 - 3.61}{1.058} \left(\frac{1.058}{1.73}\right)^{0.5}$$ (n is assumed 0.5 for sand)

  $$= 20.2$$

$$F = \frac{f_s}{q_c - \sigma_{vo}} \times 100\%$$

$$= \frac{0.19}{30.94 - 3.61} \times 100\%$$

$$= 0.695\%$$

$$I_c = \left[(3.47 - \log Q)^2 + (1.22 + \log F)^2\right]^{0.5}$$

$$= \left[(3.47 - \log 20.2)^2 + (1.22 + \log 0.695)^2\right]^{0.5}$$

$$= 2.41 < 2.6, \quad n = 0.5 \text{ OK}$$

According to Roberson (1990), the soil at this depth is between Type 6 (clean sand to silty sand) and Type 5 (silty sand to sandy silt). We judge it <u>silty sand</u>.

$$FC = 28\, I_c^{2.6}$$ (Idriss & Boulanger 2008)

$$= 28\%$$

- In CGER1 (2008) Method

  C_N is dependent on q_{1cN}, and q_{1cN} is dependent on C_N. We use iteration calculation here.

$C_N^{(0)} = \left(\frac{Pa}{\sigma'_{v0}}\right)^{0.5} = \left(\frac{1.058}{1.73}\right)^{0.5} = 0.782 \quad (\leq 1.7)$

$q_{1cN}^{(0)} = C_N^{(0)} \cdot \left(\frac{q_c}{Pa}\right) = 0.782\left(\frac{30.94}{1.058}\right) = 22.84$

$C_N^{(1)} = \left(\frac{Pa}{\sigma'_{v0}}\right)^{1.338 - 0.249 (q_{1cN}^{(0)})^{0.264}}$

$= \left(\frac{1.058}{1.73}\right)^{1.338 - 0.249 (22.84)^{0.264}}$

$= 0.684$

$q_{1cN}^{(1)} = C_N^{(1)} \left(\frac{q_c}{Pa}\right) = 0.684 \left(\frac{30.94}{1.058}\right) = 20.00$

$C_N^{(2)} = \left(\frac{Pa}{\sigma'_{v0}}\right)^{1.338 - 0.249 (q_{1cN}^{(1)})^{0.264}}$

$= \left(\frac{1.058}{1.73}\right)^{1.338 - 0.249 (20.00)^{0.264}}$

$= 0.679$

$q_{1cN}^{(2)} = C_N^{(2)} \left(\frac{q_c}{Pa}\right) = 0.679 \left(\frac{30.94}{1.058}\right) = 19.86$

$C_N^{(2)} \approx C_N^{(1)}, \quad q_{1cN}^{(2)} \approx q_{1cN}^{(1)}$

$C_N \longrightarrow 0.68, \quad q_{1cN} \longrightarrow 19.9$

- $\Delta q_{1cN} = \left(5.4 + \frac{q_{c1N}}{16}\right) \cdot \exp\left(1.63 + \frac{9.7}{FC + 0.01} - \left(\frac{15.7}{FC + 0.01}\right)^2\right)$

$= \left(5.4 + \frac{19.9}{16}\right) \cdot \exp\left[1.63 + \frac{9.7}{28 + 0.01} - \left(\frac{15.7}{28 + 0.01}\right)^2\right]$

$= 35.0$

$q_{1cN-cs} = q_{1cN} + \Delta q_{1cN}$

$= 19.9 + 35.0 = 54.9$

- $(CRR)_{7.5} = \exp\left(\frac{q_{c1N-cs}}{540} + \left(\frac{q_{c1N-cs}}{67}\right)^2 - \left(\frac{q_{1cN-cs}}{80}\right)^3 + \left(\frac{q_{1cN-cs}}{114}\right)^4 - 3\right]$

$= \exp\left[\frac{54.9}{540} + \left(\frac{54.9}{67}\right)^2 - \left(\frac{54.9}{80}\right)^3 + \left(\frac{54.9}{114}\right)^4 - 3\right]$

$= 0.08$

- $r_d = \exp(\alpha + \beta M)$

$\alpha = -1.012 - 1.126 \sin\left(\frac{z}{11.73} + 5.133\right)$ (z in meters)

$= -1.012 - 1.126 \sin\left(\frac{6002 \times 0.3048}{11.73} + 5.133\right)$

$= -1.46$

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$\beta = 0.106 + 0.118 \sin\left(\frac{3}{11.28} + 5.142\right)$ (3 in meters)

$= 0.106 + 0.118 \sin\left(\frac{60.02 \times 0.3048}{11.28} + 5.142\right)$

$= 0.161$

$r_d = \exp(\alpha + \beta M)$

$= \exp(-1.46 + 0.161 \times 7.5)$

$= 0.77$

- $C_6 = \frac{1}{37.3 - 8.27 (q_{1cN})^{0.264}}$

$= \frac{1}{37.3 - 8.27 (19.9)^{0.264}} = 0.0524 \leq 0.3$

$K_6 = 1 - C_6 \ln\left(\frac{\sigma'_{vo}}{p_a}\right)$

$= 1 - 0.0524 \ln\left(\frac{1.73}{1.058}\right) = 0.974$

- CSR based on r_d

MSF = 1.0 for M = 7.5

$(CSR)_{7.5} = 0.65 \frac{a_{max}}{g} \cdot \frac{\sigma_{vo}}{\sigma'_{vo}} \cdot r_d \cdot \frac{1}{MSF} \cdot \frac{1}{K_6}$

$= (0.65)(0.330)\left(\frac{3.61}{1.73}\right)(0.77) \cdot \frac{1}{1.0} \cdot \frac{1}{0.974}$

$= \underline{0.35}$

$FS = \frac{(CRR)_{7.5}}{(CSR)_{7.5}} = \frac{0.08}{0.35} = \underline{0.23}$.

-

	$(CSR)_{7.5}$	$(CRR)_{7.5}$	FS
EERI (2008)	0.35	0.08	0.23
ASCE (2001)	0.33	0.09	0.27

Appendix

Dr. Nigel Priestley Report

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DUNBARTON BRIDGE PILE ANALYSES

FINAL REPORT

Nigel Priestley

In accordance with an email request from Dr. Po Lam (EMI), I have carried out an investigation of the moment-curvature, moment-rotation, and displacement capacity of the 54in dia. prestressed piles of pier 23. This report supersedes earlier preliminary reports, dated January 5, 2008 and February 1, 2008.
The following data were applicable (or assumed) for the analyses:

Connection:

Dowels: 20#11 grade 60 rebar: yield assumed: f_y = 455MPa (66ksi)
ultimate assumed : f_u = 683MPa (99ksi)
P.C.D. of dowels: 857mm (33.7in)
Concrete: f'_c = 1.3x6000psi i.e. f'_c = 53.8MPa (7.8ksi)
Cover to confinement: 76mm (3in)
Confinement: #5 spiral (15.9mm dia., pitch=2.75in)
: f_{yh} =420MPa (60ksi)
(note: This yield strength may be conservative, but has little influence)
Axial Loads: Three levels considered: 250tons, 750tons, -100tons
(2225kN, 6670kN, -896kN)

Prestressed Section:

Prestressing: 46x0.6in strands (Total area = 6450mm^2 =10.0in^2)
Cover to prestressing: 89mm (3.5in)
Initial stress: 690MPa (100ksi)
Yield stress: 1500MPa (217.5ksi)
Ultimate stress 1863MPa (270ksi)
Confinement: #5 spiral – as for footing connection)
Axial Loads: Three levels considered: 250tons, 750tons, 11tons
(2250kN, 6670kN, 100kN)

Data for Deflection Calculations:

Pile free length to mudline: 13.7m (45ft)
Depth below mudline to max. moment 3.05m (10ft) (assumed)
Depth to effective fixity for elastic deflections: 6.86m (22.5ft) (assumed)
Plastic hinge length at footing connection:

$$L_P = 0.03 f_y d_{bd} = 0.03 \times 455 \times 44.5 = 607mm$$

Plastic hinge length in-ground (conservative estimate)

$$L_P = 1.5 D_P = 1.5x1.372 = 2.06m$$

Limit States Considered:

Yield: For footing connection, ε_s = 0.002275, or ε_c = 0.002 (whichever first)
Prestressed**:** ε_p = 0.0075 or ε_c = 0.002 (whichever first)

Serviceability: Footing Connection: ε_s = 0.015 or ε_c = 0.004 (whichever first)
Prestressed: (same as footing connection)

Damage Control: Footing Conn: $\varepsilon_s = 0.07$, or $\varepsilon_c = 0.0147$ (energy balance)
Prestressed: $\varepsilon_p = 0.04$ or $\varepsilon_c = 0.008$

Ultimate: Footing Connection: $\varepsilon_s = 0.07$
Prestressed: Same as Damage control.

Notes on Above:

1. For the prestressed section, it is assumed that the hollow has been filled with concrete. It is not clear from the plans whether this is the case for the full length of the pile.

2. The depths to maximum moment and effective fixity for elastic displacements are "guesses" based on EMI values for Dumbarton Bridge. Small adjustments are to be expected.

3. The plastic hinge length for the in-ground hinge, at $1.5D_p$ is small compared with the normally assumed value of $2D_p$. However, the latter value is based on smaller diameter piles, and with higher shear force. I feel that the value of $1.5D_p$ is more appropriate.

4. The ultimate condition for the pile/footing connection is based on an "ultimate" dowel strain of 70% of a uniaxial value of 0.10, and hence takes account of reduction of ultimate strain as a consequence of cyclic response under EQ loading.

5. The damage control and ultimate conditions for the in-ground hinge are based on an extreme fibre compression strain of 0.008, based on theoretical and experimental results. At higher strains the cover deteriorates, and the plastic hinge length reduces rapidly. Although larger plastic rotations may occur, they should not be relied on.

6. The analysis program including prestressing is unstable for low or negative axial compression. As a consequence, the minimum axial compression for the prestressed section is 11 tons, while the footing connection is analyzed for a tension force of 100 tons. Note, however, that the critical in-ground section will be subjected to higher compressive loading than the top of the pile, due to the pile weight (approx. 37.5kN/m, or about 500kN (56 tons) total)

2. Pile/Footing Connection Characteristics

2.1 Moment-Curvature Response:

Moment Curvature analyses:

Moment-curvature characteristics are based on analyses considering strain-hardening of the reinforcement and confinement of the core concrete, using the Mander et al model. A bilinear prestressing stress-strain curve is adopted. Results of the analyses are plotted in Fig. 1, and listed in Table 1. In Fig.1 a bilinear approximation to the moment-curvature curves is included, and the various limit states are identified by solid circles.

It will be noted that limit state curvatures reduce as axial load increases for LS1 to LS3, but increase with increasing axial load for LS4. This latter increase is a consequence of LS4 being

controlled by the maximum permitted dowel strain of 0.07. At higher axial loads the neutral axis depth is increased, resulting in increased curvature for a given dowel tension strain.

2.2 Moment-Rotation Response:

The moment-rotation response of the pile/footing connection is shown in Fig.2 in quadri-linear and bilinear forms, with the quadrilinear curve defined by the four limit states. It will be seen than the ultimate plastic rotation capacity of the section is close to 0.05 for all three axial loads considered. Serviceability and Damage Control rotations decrease as the axial load increases. The rotation at the yield limit state (LS1) corresponds to elastic strain penetration of the dowel bars into the footing, and is typically about 0.001. Rotational values at the four limit states are included in Table 1.

3. Prestressed Section Characteristics

3.1 Moment-Curvature Response:

Moment-curvature response of the prestressed section at three different axial load levels, together with bilinear approximations, are shown in Fig.3, with the limit states identified by solid circles. Note that only LS1, LS2 and LS3 are shown, since the ultimate limit state (LS4) is the same as the damage-control (LS3) limit state. Values for moment and curvature for the limit states are listed in Table 2.

It will be noted that the moment capacities of the prestressed section for a given limit state and axial load level are similar to, or higher than the corresponding moment capacity for the dowel connection. As a consequence, there is essentially no possibility that plastic hinging could develop at the lower end of the dowels, some 1.7m below the pile/footing connection.

Curvatures for the prestressed section, for a given limit state, are typically about 50% of the dowel connection curvatures for the same limit state and axial load. However, since the plastic hinge length for the prestressed section is much larger than for the dowel connection, plastic rotation capacities are significantly higher for the in-ground plastic hinge (compare values for limit state rotations in Tables 1 and 2). An exception occurs only for LS4, as a consequence of applying strain limits for the Damage Control limit state for the prestressed section ultimate limit.

3.2 Moment-Rotation Response:

Key values of the rotational capacity of the in-ground hinge at the serviceability and ultimate limit states are also listed in Table 2. Note that there is no yield rotation, as strain penetration does not occur at the critical in-ground location. Since there are only two data points for each limit state, plots of rotational capacity are not provided.

4. Displacement Capacity

Approximate Displacement Capacity:

Approximate displacement capacities have been estimated based on the stiffness of the prestressed section at 75% of nominal capacity, and the rotational capacities of the top plastic

hinge, as listed in Table 1. It has further been assumed that at the nominal yield of the connection, the in-ground moment is 80% of nominal. At the serviceability and damage control limit states it has been assumed that the in-ground moment is equal to the nominal capacity. These values, and the corresponding predicted displacement capacities, should be expected to contain errors up to about 10-20%. More accurate values can only be obtained based on pushover analyses using the moment-rotation characteristics defined in Table 1.

Table 3 summarizes the predicted displacement capacities for the different limit states and axial loads. For nominal axial compression and for reduced compression or tension, displacements corresponding to LS2 (serviceability) exceed 0.6m (24in). At the LS3 (Damage Control), displacement capacity exceeds 1.0m (40in). and at LS4 (ultimate), displacement capacity exceeds 1.3m (50in). These values are each reduced (by between 1% (LS4) and 20% (LS3) for the case of maximum feasible axial compression.

No attempt has been made to estimate the displacement capacity based on the rotation capacity of the in-ground hinge. There are too reasons for this. 1) The displacement at which the in-ground hinge yields cannot be estimated with any accuracy based on the simple modes used for this analysis. An inelastic pushover analysis would be required. 2) If the assessment criterion is “No collapse” it is hard to see how a failure of the in-ground hinge would lead to structural failure of the bridge. The in-ground hinge is confined by ground that has to be competent to cause a plastic hinge to form, and confinement of the pile by the soil will ensure that catastrophic failure does not occur. At LS 2 and LS3, rotation capacity of the in-ground hinge exceeds that of the connection (as noted above), and hence the in-ground hinge cannot control the pile deflection capacity. Nevertheless, I recommend that displacement capacity based on rotation capacity of the in-ground hinge be assessed by a push-over analysis. Such an analysis will also allow a refinement of the displacement capacities predicted in Table 3.

TABLE 1: PILE/FOOTING LIMIT-STATE DEFORMATIONS

LIMIT-STATE VALUES	**P=2224kN**	**P=6670kN**	**P=-896kN**
First-Yield Moment (kNm)	4249	6198	2928
First-Yield Curvature (m^{-1})	0.00293	0.00330	0.00267
First-Yield Rotation (rad)	0.00089	0.00100	0.00081
Serviceability Moment (kNm)	5942	7617	4611
Serviceability Curvature (m^{-1})	0.0152	0.01249	0.0162
Serviceability Rotation (rad)	0.00834	0.00658	0.00905
Damage-Control Moment (kNm)	6703	8173	5470
Damage-Control Curvature (m^{-1})	0.0508	0.0403	0.0577
Damage-Control Rotation (rad)	0.0300	0.0235	0.0342
Ultimate Moment (kNm)	6800	8100	5500
Ultimate Curvature (m^{-1})	0.0803	0.0880	0.0774
Ultimate Rotation (rad)	0.0479	0.0524	0.0462
Bilinear Yield Moment (kNm)	5942	7617	4611
Bilinear Yield Curvature (m^{-1})	0.00410	0.00405	0.00420
Bilinear Ultimate Moment (kNm)	6800	8100	5500
Bilinear Ultimate Curvature (m^{-1})	0.0803	0.0880	0.0774

TABLE 2: PRESTRESSED SECTION LIMIT-STATE DEFORMATIONS

LIMIT-STATE VALUES	P=2224kN	P=6670kN	P=100kN
First-Yield Moment (kNm)	5261	6956	4406
First-Yield Curvature (m^{-1})	0.00444	0.00435	0.00434
First-Yield Rotation (rad)	0	0	0
Serviceability Moment (kNm)	6650	8209	5818
Serviceability Curvature (m^{-1})	0.0136	0.0111	0.0156
Serviceability Rotation (rad)	0.0189	0.0139	0.0232
Ultimate Moment (kNm) (also LS3)	6990	8566	6159
Ultimate Curvature (m^{-1}) (also LS3)	0.0280	0.0232	0.0317
Ultimate Rotation (rad) (also LS3)	0.0485	0.0388	0.0563
Bilinear Yield Moment (kNm)	6650	8209	5818
Bilinear Yield Curvature (m^{-1})	0.00561	0.0513	0.00573
Bilinear Ultimate Moment (kNm)	6990	8566	6159
Bilinear Ultimate Curvature (m^{-1})	0.0280	0.0232	0.0317

TABLE 3: DISPLACEMENT CAPACITIES BASED ON PILE/FOOTING ROTATION CAPACITY (m)

LIMIT STATE VALUES	P=2225kN	P=6670kN	P=-896kN
EI pile (kNm^2)	$1.28x10^6$	$2.07x10^6$	$0.89x10^6$
First yield displacement (m)	0.43	0.34	0.49
Serviceability Displacement (m)	0.61	0.48	0.69
Damage Control Displacement (m)	1.00	0.79	1.16
Ultimate Displacement (m)	1.30	1.28	1.36

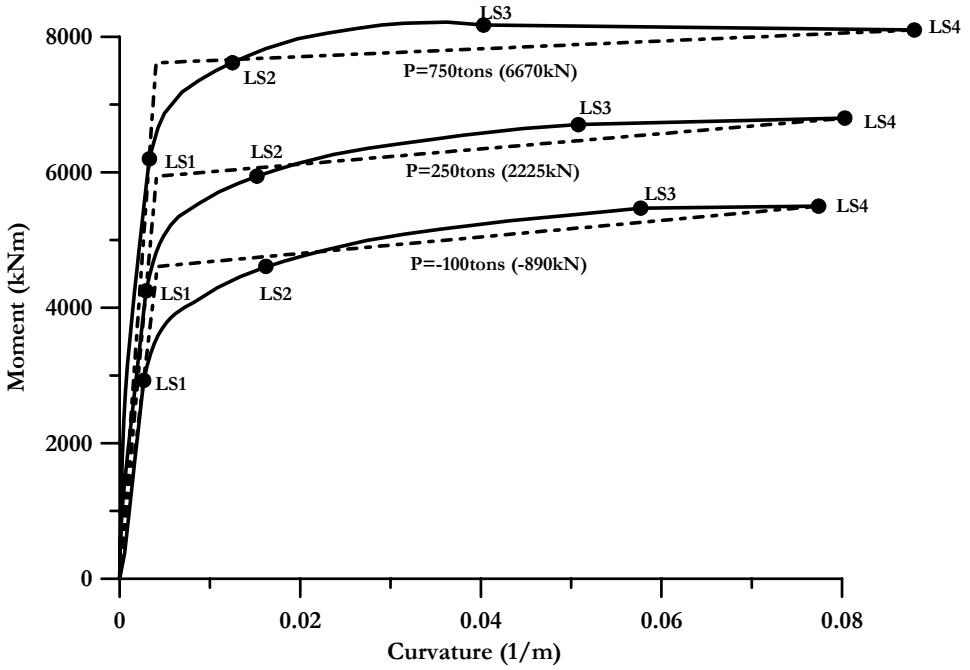

Fig.1 MOMENT-CURVATURE RESULTS FOR 54in. PILE/FOOTING CONNECTION (LS1=Yield, LS2=Serviceability, LS3=Damage Control, LS4=Ultimate)

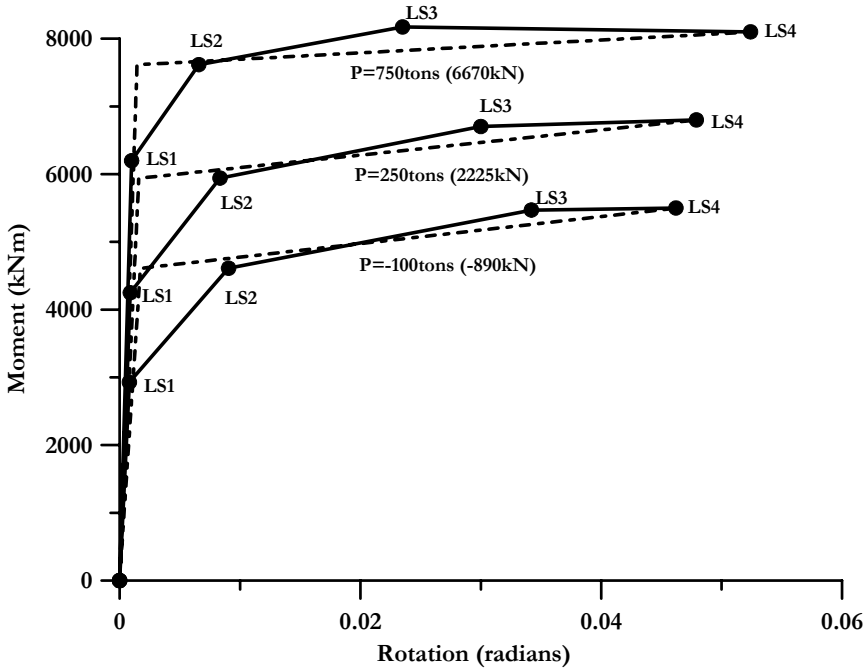

Fig.2 MOMENT-ROTATION RESULTS FOR 54in. PILE-FOOTING CONNECTION (LS1=Yield, LS2=Serviceability, LS3=Damage Control, LS4=Ultimate)

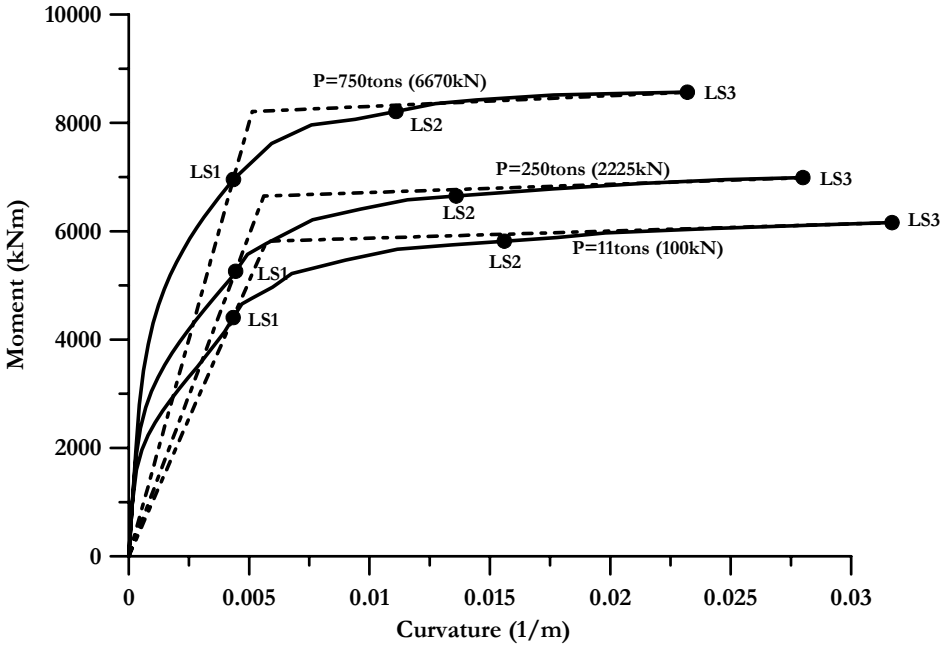

Fig.3 MOMENT-CURVATURE RESULTS FOR 54in. PRESTRESSED PILE SECTION (LS1=Yield, LS2=Serviceability, LS3=Damage Control/Ultimate)

15.0 APPENDIX H: 6×6 MATRICES

TABLE H-1A: ABUTMENT 1A - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 13 Pile Diameter = 20 inch Footing Bottom El = +1.5'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
1.4110E+05	0.0000E+00	0.0000E+00	0.0000E+00	-1.6750E+07	0.0000E+00
0.0000E+00	1.4110E+05	0.0000E+00	1.6750E+07	0.0000E+00	-1.9540E+05
0.0000E+00	0.0000E+00	5.1920E+06	0.0000E+00	7.1890E+06	0.0000E+00
0.0000E+00	1.6750E+07	0.0000E+00	4.6930E+11	0.0000E+00	-2.3190E+07
-1.6750E+07	0.0000E+00	7.1890E+06	0.0000E+00	5.7860E+09	0.0000E+00
0.0000E+00	-1.9540E+05	0.0000E+00	-2.3190E+07	0.0000E+00	1.2690E+10

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
1.8870E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.8870E+02	0.0000E+00	0.0000E+00	0.0000E+00	-2.6130E+02
0.0000E+00	0.0000E+00	7.3890E+02	0.0000E+00	1.0230E+03	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	6.6200E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.0230E+03	0.0000E+00	2.3940E+05	0.0000E+00
0.0000E+00	-2.6130E+02	0.0000E+00	0.0000E+00	0.0000E+00	1.6970E+07

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
1.0244E+03	0.0000E+00	0.0000E+00	0.0000E+00	-1.1848E+05	0.0000E+00
0.0000E+00	1.0244E+03	0.0000E+00	1.1848E+05	0.0000E+00	-1.4187E+03
0.0000E+00	0.0000E+00	3.6829E+04	0.0000E+00	5.0995E+04	0.0000E+00
0.0000E+00	1.1848E+05	0.0000E+00	3.3289E+09	0.0000E+00	-1.6404E+05
-1.1848E+05	0.0000E+00	5.0995E+04	0.0000E+00	4.0961E+07	0.0000E+00
0.0000E+00	-1.4187E+03	0.0000E+00	-1.6404E+05	0.0000E+00	9.2134E+07

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-1B: ABUTMENT 1B - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 11 Pile Diameter = 20 inch Footing Bottom El = +1.5'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
1.1940E+05	0.0000E+00	0.0000E+00	0.0000E+00	-1.4170E+07	0.0000E+00
0.0000E+00	1.1940E+05	0.0000E+00	1.4170E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	4.3930E+06	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.4170E+07	0.0000E+00	3.4520E+11	0.0000E+00	0.0000E+00
-1.4170E+07	0.0000E+00	0.0000E+00	0.0000E+00	3.4720E+09	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.2890E+09

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
1.5970E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.5970E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	6.2520E+02	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	4.8630E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2420E+07

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
8.6689E+02	0.0000E+00	0.0000E+00	0.0000E+00	-1.0023E+05	0.0000E+00
0.0000E+00	8.6689E+02	0.0000E+00	1.0023E+05	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	3.1162E+04	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.0023E+05	0.0000E+00	2.4486E+09	0.0000E+00	0.0000E+00
-1.0023E+05	0.0000E+00	0.0000E+00	0.0000E+00	2.4560E+07	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.7441E+07

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-1C: ABUTMENT 1C - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 18 Pile Diameter = 20 inch Footing Bottom El = +1.5'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
1.9540E+05	0.0000E+00	0.0000E+00	0.0000E+00	-2.3190E+07	0.0000E+00
0.0000E+00	1.9540E+05	0.0000E+00	2.3190E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	7.1890E+06	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	2.3190E+07	0.0000E+00	6.9580E+11	0.0000E+00	0.0000E+00
-2.3190E+07	0.0000E+00	0.0000E+00	0.0000E+00	1.0920E+10	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.8900E+10

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
2.6130E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	2.6130E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.0230E+03	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	9.8210E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	7.4580E+05	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	2.5270E+07

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
1.4187E+03	0.0000E+00	0.0000E+00	0.0000E+00	-1.6404E+05	0.0000E+00
0.0000E+00	1.4187E+03	0.0000E+00	1.6404E+05	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	5.0995E+04	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.6404E+05	0.0000E+00	4.9355E+09	0.0000E+00	0.0000E+00
-1.6404E+05	0.0000E+00	0.0000E+00	0.0000E+00	7.7348E+07	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3722E+08

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-2: PIER 2 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 28 Pile Diameter = 20 inch Footing Bottom El = -6.5'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
4.6580E+05	0.0000E+00	0.0000E+00	0.0000E+00	-4.8010E+07	0.0000E+00
0.0000E+00	4.6580E+05	0.0000E+00	4.8010E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.0270E+07	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	4.8010E+07	0.0000E+00	2.7280E+11	0.0000E+00	0.0000E+00
-4.8010E+07	0.0000E+00	0.0000E+00	0.0000E+00	6.3900E+10	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.4370E+10

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
3.6170E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	3.6170E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.4080E+03	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	3.6040E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	7.3980E+06	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1160E+07

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
3.3454E+03	0.0000E+00	0.0000E+00	0.0000E+00	-3.3960E+05	0.0000E+00
0.0000E+00	3.3454E+03	0.0000E+00	3.3960E+05	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	7.2842E+04	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	3.3960E+05	0.0000E+00	1.9347E+09	0.0000E+00	0.0000E+00
-3.3960E+05	0.0000E+00	0.0000E+00	0.0000E+00	4.5304E+08	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0321E+08

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-3: PIER 3 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 33 Pile Diameter = 20 inch Footing Bottom El = -7.5'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
2.8630E+05	0.0000E+00	0.0000E+00	0.0000E+00	-4.0630E+07	0.0000E+00
0.0000E+00	2.8630E+05	0.0000E+00	4.0630E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.1760E+07	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	4.0630E+07	0.0000E+00	3.1840E+11	0.0000E+00	0.0000E+00
-4.0630E+07	0.0000E+00	0.0000E+00	0.0000E+00	7.0370E+10	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.9560E+09

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
4.7640E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	4.7640E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.7960E+03	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	4.7020E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.1540E+06	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.4900E+07

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
2.0917E+03	0.0000E+00	0.0000E+00	0.0000E+00	-2.8740E+05	0.0000E+00
0.0000E+00	2.0917E+03	0.0000E+00	2.8740E+05	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	8.3436E+04	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	2.8740E+05	0.0000E+00	2.2588E+09	0.0000E+00	0.0000E+00
-2.8740E+05	0.0000E+00	0.0000E+00	0.0000E+00	4.9905E+08	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.5432E+07

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-4: PIER 4 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 34 Pile Diameter = 20 inch Footing Bottom El = -8.0'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
2.9760E+05	0.0000E+00	0.0000E+00	0.0000E+00	-4.2720E+07	0.0000E+00
0.0000E+00	2.9760E+05	0.0000E+00	4.2720E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.0750E+07	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	4.2720E+07	0.0000E+00	2.8410E+11	0.0000E+00	0.0000E+00
-4.2720E+07	0.0000E+00	0.0000E+00	0.0000E+00	6.9950E+10	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.1950E+09

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
4.8100E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	4.8100E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.7010E+03	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	4.3220E+07	2.3280E-10	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.3350E+06	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.4860E+07

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
2.1723E+03	0.0000E+00	0.0000E+00	0.0000E+00	-3.0218E+05	0.0000E+00
0.0000E+00	2.1723E+03	0.0000E+00	3.0218E+05	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	7.6279E+04	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	3.0218E+05	0.0000E+00	2.0156E+09	3.2506E-11	0.0000E+00
-3.0218E+05	0.0000E+00	0.0000E+00	0.0000E+00	4.9610E+08	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.7117E+07

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-5: PIER 5 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 34 Pile Diameter = 20 inch Footing Bottom El = -8.0'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
2.9630E+05	0.0000E+00	0.0000E+00	0.0000E+00	-4.3120E+07	0.0000E+00
0.0000E+00	2.9630E+05	0.0000E+00	4.3120E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.1480E+07	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	4.3120E+07	0.0000E+00	3.0260E+11	0.0000E+00	0.0000E+00
-4.3120E+07	0.0000E+00	0.0000E+00	0.0000E+00	7.4020E+10	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.1550E+09

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
4.7750E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	4.7750E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.7590E+03	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	4.4690E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.6530E+06	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.4750E+07

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
2.1626E+03	0.0000E+00	0.0000E+00	0.0000E+00	-3.0501E+05	0.0000E+00
0.0000E+00	2.1626E+03	0.0000E+00	3.0501E+05	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	8.1451E+04	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	3.0501E+05	0.0000E+00	2.1467E+09	0.0000E+00	0.0000E+00
-3.0501E+05	0.0000E+00	0.0000E+00	0.0000E+00	5.2494E+08	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.6818E+07

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-6: PIER 6 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 35 Pile Diameter = 20 inch Footing Bottom El = -8.5'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
3.0570E+05	0.0000E+00	0.0000E+00	0.0000E+00	-4.3470E+07	0.0000E+00
0.0000E+00	3.0570E+05	0.0000E+00	4.3470E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.2550E+07	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	4.3470E+07	0.0000E+00	3.2080E+11	0.0000E+00	0.0000E+00
-4.3470E+07	0.0000E+00	0.0000E+00	0.0000E+00	7.8030E+10	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.1750E+09

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
5.0240E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	5.0240E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.9520E+03	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	4.8200E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0410E+07	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.5080E+07

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
2.2325E+03	0.0000E+00	0.0000E+00	0.0000E+00	-3.0749E+05	0.0000E+00
0.0000E+00	2.2325E+03	0.0000E+00	3.0749E+05	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	8.9046E+04	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	3.0749E+05	0.0000E+00	2.2759E+09	0.0000E+00	0.0000E+00
-3.0749E+05	0.0000E+00	0.0000E+00	0.0000E+00	5.5341E+08	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.7006E+07

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-7: PIER 7 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 35 Pile Diameter = 20 inch Footing Bottom El = -8.5'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
3.0300E+05	0.0000E+00	0.0000E+00	0.0000E+00	-4.2900E+07	0.0000E+00
0.0000E+00	3.0300E+05	0.0000E+00	4.2900E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.1460E+07	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	4.2900E+07	0.0000E+00	2.9380E+11	0.0000E+00	0.0000E+00
-4.2900E+07	0.0000E+00	0.0000E+00	0.0000E+00	7.2080E+10	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.0970E+09

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
5.0980E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	5.0980E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.8580E+03	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	4.5870E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.9070E+06	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.5300E+07

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
2.2145E+03	0.0000E+00	0.0000E+00	0.0000E+00	-3.0346E+05	0.0000E+00
0.0000E+00	2.2145E+03	0.0000E+00	3.0346E+05	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	8.1323E+04	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	3.0346E+05	0.0000E+00	2.0846E+09	0.0000E+00	0.0000E+00
-3.0346E+05	0.0000E+00	0.0000E+00	0.0000E+00	5.1125E+08	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.6485E+07

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-8: PIER 8 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 35 Pile Diameter = 20 inch Footing Bottom El = -8.5'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
2.9430E+05	0.0000E+00	0.0000E+00	0.0000E+00	-4.2690E+07	0.0000E+00
0.0000E+00	2.9430E+05	0.0000E+00	4.2690E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.0150E+07	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	4.2690E+07	0.0000E+00	2.6150E+11	0.0000E+00	0.0000E+00
-4.2690E+07	0.0000E+00	0.0000E+00	0.0000E+00	6.5120E+10	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.8350E+09

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
5.0680E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	5.0680E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.7580E+03	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	4.3390E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.3720E+06	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.5210E+07

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
2.1525E+03	0.0000E+00	0.0000E+00	0.0000E+00	-3.0197E+05	0.0000E+00
0.0000E+00	2.1525E+03	0.0000E+00	3.0197E+05	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	7.2043E+04	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	3.0197E+05	0.0000E+00	1.8558E+09	0.0000E+00	0.0000E+00
-3.0197E+05	0.0000E+00	0.0000E+00	0.0000E+00	4.6194E+08	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.4619E+07

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-9: PIER 9 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 36 Pile Diameter = 20 inch Footing Bottom El = -8.5'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
3.1020E+05	0.0000E+00	0.0000E+00	0.0000E+00	-4.4620E+07	0.0000E+00
0.0000E+00	3.1020E+05	0.0000E+00	4.4620E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	7.3560E+06	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	4.4620E+07	0.0000E+00	1.8800E+11	0.0000E+00	0.0000E+00
-4.4620E+07	0.0000E+00	0.0000E+00	0.0000E+00	5.0120E+10	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.0760E+09

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
5.1550E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	5.1550E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.8840E+03	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	4.5210E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.9020E+06	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.5080E+07

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
2.2662E+03	0.0000E+00	0.0000E+00	0.0000E+00	-3.1562E+05	0.0000E+00
0.0000E+00	2.2662E+03	0.0000E+00	3.1562E+05	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	5.2296E+04	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	3.1562E+05	0.0000E+00	1.3361E+09	0.0000E+00	0.0000E+00
-3.1562E+05	0.0000E+00	0.0000E+00	0.0000E+00	3.5591E+08	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.6306E+07

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-10: PIER 10 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 37 Pile Diameter = 20 inch Footing Bottom El = -8.5'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
3.3280E+05	0.0000E+00	0.0000E+00	0.0000E+00	-4.7690E+07	0.0000E+00
0.0000E+00	3.3280E+05	0.0000E+00	4.7690E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	8.7010E+06	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	4.7690E+07	0.0000E+00	2.4380E+11	0.0000E+00	0.0000E+00
-4.7690E+07	0.0000E+00	0.0000E+00	0.0000E+00	7.8120E+10	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1390E+10

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
5.1590E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	5.1590E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	2.1560E+03	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	5.7400E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.6360E+07	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.7650E+07

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
2.4261E+03	0.0000E+00	0.0000E+00	0.0000E+00	-3.3734E+05	0.0000E+00
0.0000E+00	2.4261E+03	0.0000E+00	3.3734E+05	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	6.1848E+04	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	3.3734E+05	0.0000E+00	1.7326E+09	0.0000E+00	0.0000E+00
-3.3734E+05	0.0000E+00	0.0000E+00	0.0000E+00	5.5487E+08	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.3033E+07

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-11: PIER 11 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 37 Pile Diameter = 20 inch Footing Bottom El = -9.0'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
3.3840E+05	0.0000E+00	0.0000E+00	0.0000E+00	-4.8350E+07	0.0000E+00
0.0000E+00	3.3840E+05	0.0000E+00	4.8350E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	8.8050E+06	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	4.8350E+07	0.0000E+00	2.4670E+11	0.0000E+00	0.0000E+00
-4.8350E+07	0.0000E+00	0.0000E+00	0.0000E+00	7.9020E+10	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1580E+10

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
5.1230E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	5.1230E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	2.1380E+03	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	5.6940E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.6230E+07	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.7530E+07

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
2.4652E+03	0.0000E+00	0.0000E+00	0.0000E+00	-3.4201E+05	0.0000E+00
0.0000E+00	2.4652E+03	0.0000E+00	3.4201E+05	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	6.2582E+04	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	3.4201E+05	0.0000E+00	1.7530E+09	0.0000E+00	0.0000E+00
-3.4201E+05	0.0000E+00	0.0000E+00	0.0000E+00	5.6122E+08	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.4360E+07

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-12: PIER 12 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 37 Pile Diameter = 20 inch Footing Bottom El = -9.0'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
3.3630E+05	0.0000E+00	0.0000E+00	0.0000E+00	-4.8560E+07	0.0000E+00
0.0000E+00	3.3630E+05	0.0000E+00	4.8560E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	8.5270E+06	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	4.8560E+07	0.0000E+00	2.3930E+11	0.0000E+00	0.0000E+00
-4.8560E+07	0.0000E+00	0.0000E+00	0.0000E+00	7.6960E+10	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1510E+10

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
5.1000E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	5.1000E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	2.1460E+03	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	5.7140E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.6290E+07	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.7450E+07

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
2.4501E+03	0.0000E+00	0.0000E+00	0.0000E+00	-3.4349E+05	0.0000E+00
0.0000E+00	2.4501E+03	0.0000E+00	3.4349E+05	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	6.0616E+04	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	3.4349E+05	0.0000E+00	1.7007E+09	0.0000E+00	0.0000E+00
-3.4349E+05	0.0000E+00	0.0000E+00	0.0000E+00	5.4666E+08	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.3854E+07

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-13: PIER 13 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 38 Pile Diameter = 20 inch Footing Bottom El = -9.5'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
3.3890E+05	0.0000E+00	0.0000E+00	0.0000E+00	-4.9770E+07	0.0000E+00
0.0000E+00	3.3890E+05	0.0000E+00	4.9770E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	8.2280E+06	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	4.9770E+07	0.0000E+00	2.2650E+11	0.0000E+00	0.0000E+00
-4.9770E+07	0.0000E+00	0.0000E+00	0.0000E+00	7.3390E+10	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1310E+10

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
5.2300E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	5.2300E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	2.2040E+03	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	5.7280E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.6280E+07	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.7460E+07

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
2.4703E+03	0.0000E+00	0.0000E+00	0.0000E+00	-3.5205E+05	0.0000E+00
0.0000E+00	2.4703E+03	0.0000E+00	3.5205E+05	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	5.8509E+04	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	3.5205E+05	0.0000E+00	1.6102E+09	0.0000E+00	0.0000E+00
-3.5205E+05	0.0000E+00	0.0000E+00	0.0000E+00	5.2140E+08	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.2440E+07

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-14: PIER 14 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 39 Pile Diameter = 20 inch Footing Bottom El = -9.5'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
3.5170E+05	0.0000E+00	0.0000E+00	0.0000E+00	-5.1440E+07	0.0000E+00
0.0000E+00	3.5170E+05	0.0000E+00	5.1440E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.3080E+07	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	5.1440E+07	0.0000E+00	3.4520E+11	0.0000E+00	0.0000E+00
-5.1440E+07	0.0000E+00	0.0000E+00	0.0000E+00	1.0960E+11	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1530E+10

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
5.3440E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	5.3440E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.9780E+03	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	5.0230E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.4610E+07	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.7520E+07

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
2.5624E+03	0.0000E+00	0.0000E+00	0.0000E+00	-3.6387E+05	0.0000E+00
0.0000E+00	2.5624E+03	0.0000E+00	3.6387E+05	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	9.2799E+04	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	3.6387E+05	0.0000E+00	2.4488E+09	0.0000E+00	0.0000E+00
-3.6387E+05	0.0000E+00	0.0000E+00	0.0000E+00	7.7731E+08	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.4005E+07

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-15: PIER 15 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 39 Pile Diameter = 20 inch Footing Bottom El = -10'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
3.5090E+05	0.0000E+00	0.0000E+00	0.0000E+00	-5.0640E+07	0.0000E+00
0.0000E+00	3.5090E+05	0.0000E+00	5.0640E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.2750E+07	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	5.0640E+07	0.0000E+00	3.3650E+11	0.0000E+00	0.0000E+00
-5.0640E+07	0.0000E+00	0.0000E+00	0.0000E+00	1.0690E+11	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1500E+10

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
5.4090E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	5.4090E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.8830E+03	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	4.7820E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3910E+07	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.7730E+07

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
2.5577E+03	0.0000E+00	0.0000E+00	0.0000E+00	-3.5821E+05	0.0000E+00
0.0000E+00	2.5577E+03	0.0000E+00	3.5821E+05	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	9.0451E+04	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	3.5821E+05	0.0000E+00	2.3869E+09	0.0000E+00	0.0000E+00
-3.5821E+05	0.0000E+00	0.0000E+00	0.0000E+00	7.5811E+08	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.3822E+07

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-16: PIER 16 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 43 Pile Diameter = 20 inch Footing Bottom El = -22.0'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
4.8440E+05	0.0000E+00	0.0000E+00	0.0000E+00	-6.7410E+07	0.0000E+00
0.0000E+00	4.8440E+05	0.0000E+00	6.7410E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.2340E+07	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	6.7410E+07	0.0000E+00	4.6220E+11	0.0000E+00	0.0000E+00
-6.7410E+07	0.0000E+00	0.0000E+00	0.0000E+00	1.0670E+11	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	2.1090E+10

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
5.3160E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	5.3160E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	2.5690E+03	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	9.2930E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.8930E+07	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	2.3140E+07

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
3.5007E+03	0.0000E+00	0.0000E+00	0.0000E+00	-4.7683E+05	0.0000E+00
0.0000E+00	3.5007E+03	0.0000E+00	4.7683E+05	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	8.7647E+04	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	4.7683E+05	0.0000E+00	3.2824E+09	0.0000E+00	0.0000E+00
-4.7683E+05	0.0000E+00	0.0000E+00	0.0000E+00	7.5740E+08	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.5241E+08

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-17: PIER 17 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 21 Pile Diameter = 54 inch Footing Bottom El = 0'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
3.6670E+05	0.0000E+00	0.0000E+00	0.0000E+00	-1.5170E+08	0.0000E+00
0.0000E+00	3.6670E+05	0.0000E+00	1.5170E+08	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.7040E+07	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.5170E+08	0.0000E+00	8.7900E+11	0.0000E+00	0.0000E+00
-1.5170E+08	0.0000E+00	0.0000E+00	0.0000E+00	2.5490E+11	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	2.0790E+10

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
3.5120E+03	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	3.5120E+03	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	9.1850E+03	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	4.2850E+08	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.2170E+07	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.9910E+08

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
3.0843E+03	0.0000E+00	0.0000E+00	0.0000E+00	-1.0731E+06	0.0000E+00
0.0000E+00	3.0843E+03	0.0000E+00	1.0731E+06	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.2182E+05	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.0731E+06	0.0000E+00	6.2775E+09	0.0000E+00	0.0000E+00
-1.0731E+06	0.0000E+00	0.0000E+00	0.0000E+00	1.8159E+09	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.7486E+08

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-18: PIER 18 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 21 Pile Diameter = 54 inch Footing Bottom El = +0.0'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
3.2610E+05	0.0000E+00	0.0000E+00	0.0000E+00	-1.4040E+08	0.0000E+00
0.0000E+00	3.2610E+05	0.0000E+00	1.4040E+08	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.6740E+07	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.4040E+08	0.0000E+00	8.6160E+11	0.0000E+00	0.0000E+00
-1.4040E+08	0.0000E+00	0.0000E+00	0.0000E+00	2.4870E+11	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.8490E+10

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
3.6640E+03	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	3.6640E+03	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	9.7660E+03	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	4.5560E+08	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.8000E+07	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	2.0770E+08

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
2.8183E+03	0.0000E+00	0.0000E+00	0.0000E+00	-9.9313E+05	0.0000E+00
0.0000E+00	2.8183E+03	0.0000E+00	9.9313E+05	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.1978E+05	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	9.9313E+05	0.0000E+00	6.1582E+09	0.0000E+00	0.0000E+00
-9.9313E+05	0.0000E+00	0.0000E+00	0.0000E+00	1.7729E+09	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.5979E+08

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-19: PIER 19 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 21 Pile Diameter = 54 inch Footing Bottom El = +0.0'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
3.6430E+05	0.0000E+00	0.0000E+00	0.0000E+00	-1.5000E+08	0.0000E+00
0.0000E+00	3.6430E+05	0.0000E+00	1.5000E+08	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.6870E+07	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.5000E+08	0.0000E+00	8.7020E+11	0.0000E+00	0.0000E+00
-1.5000E+08	0.0000E+00	0.0000E+00	0.0000E+00	2.5250E+11	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	2.0660E+10

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
3.5650E+03	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	3.5650E+03	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.0190E+04	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	4.7560E+08	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0230E+08	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	2.0210E+08

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
3.0747E+03	0.0000E+00	0.0000E+00	0.0000E+00	-1.0610E+06	0.0000E+00
0.0000E+00	3.0747E+03	0.0000E+00	1.0610E+06	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.2075E+05	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.0610E+06	0.0000E+00	6.2219E+09	0.0000E+00	0.0000E+00
-1.0610E+06	0.0000E+00	0.0000E+00	0.0000E+00	1.8004E+09	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.7436E+08

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-20: PIER 20 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 21 Pile Diameter = 54 inch Footing Bottom El = +0.0'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
3.1420E+05	0.0000E+00	0.0000E+00	0.0000E+00	-1.3640E+08	0.0000E+00
0.0000E+00	3.1420E+05	0.0000E+00	1.3640E+08	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.3990E+07	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.3640E+08	0.0000E+00	7.3200E+11	0.0000E+00	0.0000E+00
-1.3640E+08	0.0000E+00	0.0000E+00	0.0000E+00	2.1990E+11	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.7810E+10

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
3.7340E+03	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	3.7340E+03	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.0060E+04	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	4.6940E+08	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0100E+08	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	2.1170E+08

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
2.7439E+03	0.0000E+00	0.0000E+00	0.0000E+00	-9.6484E+05	0.0000E+00
0.0000E+00	2.7439E+03	0.0000E+00	9.6484E+05	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.0036E+05	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	9.6484E+05	0.0000E+00	5.2434E+09	0.0000E+00	0.0000E+00
-9.6484E+05	0.0000E+00	0.0000E+00	0.0000E+00	1.5696E+09	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.5554E+08

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-21: PIER 21 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 21 Pile Diameter = 54 inch Footing Bottom El = +0.0'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
2.8990E+05	0.0000E+00	0.0000E+00	0.0000E+00	-1.2950E+08	0.0000E+00
0.0000E+00	2.8990E+05	0.0000E+00	1.2950E+08	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.5400E+07	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.2950E+08	0.0000E+00	7.9600E+11	0.0000E+00	0.0000E+00
-1.2950E+08	0.0000E+00	0.0000E+00	0.0000E+00	2.3210E+11	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.6430E+10

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
3.8300E+03	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	3.8300E+03	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.0260E+04	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	4.7850E+08	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0290E+08	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	2.1710E+08

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
2.5854E+03	0.0000E+00	0.0000E+00	0.0000E+00	-9.1603E+05	0.0000E+00
0.0000E+00	2.5854E+03	0.0000E+00	9.1603E+05	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.1037E+05	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	9.1603E+05	0.0000E+00	5.6974E+09	0.0000E+00	0.0000E+00
-9.1603E+05	0.0000E+00	0.0000E+00	0.0000E+00	1.6562E+09	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.4653E+08

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-22: PIER 22 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 28 Pile Diameter = 54 inch Footing Bottom El = -1.0'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
4.2550E+05	0.0000E+00	0.0000E+00	0.0000E+00	-1.8360E+08	0.0000E+00
0.0000E+00	4.2550E+05	0.0000E+00	1.8360E+08	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	2.1310E+07	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.8360E+08	0.0000E+00	1.1010E+12	0.0000E+00	0.0000E+00
-1.8360E+08	0.0000E+00	0.0000E+00	0.0000E+00	4.5890E+11	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	2.6890E+10

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
4.9580E+03	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	4.9580E+03	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.3390E+04	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	6.2470E+08	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	2.2140E+08	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	3.1330E+08

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
3.7021E+03	0.0000E+00	0.0000E+00	0.0000E+00	-1.2987E+06	0.0000E+00
0.0000E+00	3.7021E+03	0.0000E+00	1.2987E+06	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.5261E+05	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.2987E+06	0.0000E+00	7.8753E+09	0.0000E+00	0.0000E+00
-1.2987E+06	0.0000E+00	0.0000E+00	0.0000E+00	3.2770E+09	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	2.3396E+08

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-23: PIER 23 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 32 Pile Diameter = 54 inch Footing Bottom El = +1'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
5.2660E+05	0.0000E+00	0.0000E+00	0.0000E+00	-2.2120E+08	0.0000E+00
0.0000E+00	5.2660E+05	0.0000E+00	2.2120E+08	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	2.5300E+07	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	2.2120E+08	0.0000E+00	1.6750E+12	0.0000E+00	0.0000E+00
-2.2120E+08	0.0000E+00	0.0000E+00	0.0000E+00	5.3400E+11	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	4.0760E+10

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
5.5160E+03	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	5.5160E+03	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.5560E+04	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	9.5280E+08	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	2.5150E+08	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	4.2690E+08

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
4.4952E+03	0.0000E+00	0.0000E+00	0.0000E+00	-1.5647E+06	0.0000E+00
0.0000E+00	4.4952E+03	0.0000E+00	1.5647E+06	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.8113E+05	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.5647E+06	0.0000E+00	1.1981E+10	0.0000E+00	0.0000E+00
-1.5647E+06	0.0000E+00	0.0000E+00	0.0000E+00	3.8124E+09	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	3.4793E+08

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-24: PIER 24 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 32 Pile Diameter = 54 inch Footing Bottom El = +1.0'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
6.2020E+05	0.0000E+00	0.0000E+00	0.0000E+00	-2.4600E+08	0.0000E+00
0.0000E+00	6.2020E+05	0.0000E+00	2.4600E+08	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	2.6460E+07	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	2.4600E+08	0.0000E+00	1.7520E+12	0.0000E+00	0.0000E+00
-2.4600E+08	0.0000E+00	0.0000E+00	0.0000E+00	5.5920E+11	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	4.8000E+10

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
5.2390E+03	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	5.2390E+03	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.5520E+04	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	9.5050E+08	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	2.5090E+08	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	4.0550E+08

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
5.1186E+03	0.0000E+00	0.0000E+00	0.0000E+00	-1.7401E+06	0.0000E+00
0.0000E+00	5.1186E+03	0.0000E+00	1.7401E+06	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.8933E+05	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.7401E+06	0.0000E+00	1.2526E+10	0.0000E+00	0.0000E+00
-1.7401E+06	0.0000E+00	0.0000E+00	0.0000E+00	3.9906E+09	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	3.9615E+08

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-25: PIER 25 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 28 Pile Diameter = 54 inch Footing Bottom El = -1.0'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
5.7340E+05	0.0000E+00	0.0000E+00	0.0000E+00	-2.2480E+08	0.0000E+00
0.0000E+00	5.7340E+05	0.0000E+00	2.2480E+08	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	2.4520E+07	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	2.2480E+08	0.0000E+00	1.2620E+12	0.0000E+00	0.0000E+00
-2.2480E+08	0.0000E+00	0.0000E+00	0.0000E+00	5.2340E+11	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	3.6230E+10

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
4.4470E+03	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	4.4470E+03	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.2010E+04	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	5.6020E+08	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.9850E+08	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	2.8100E+08

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
4.6769E+03	0.0000E+00	0.0000E+00	0.0000E+00	-1.5901E+06	0.0000E+00
0.0000E+00	4.6769E+03	0.0000E+00	1.5901E+06	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.7512E+05	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.5901E+06	0.0000E+00	9.0051E+09	0.0000E+00	0.0000E+00
-1.5901E+06	0.0000E+00	0.0000E+00	0.0000E+00	3.7300E+09	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	2.9551E+08

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-26: PIER 26 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 21 Pile Diameter = 54 inch Footing Bottom El = +0.0'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
5.5110E+05	0.0000E+00	0.0000E+00	0.0000E+00	-1.9680E+08	0.0000E+00
0.0000E+00	5.5110E+05	0.0000E+00	1.9680E+08	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	2.0350E+07	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.9680E+08	0.0000E+00	1.0440E+12	0.0000E+00	0.0000E+00
-1.9680E+08	0.0000E+00	0.0000E+00	0.0000E+00	2.9930E+11	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	3.1240E+10

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
3.0940E+03	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	3.0940E+03	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	8.5450E+03	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	3.9870E+08	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.5760E+07	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.7540E+08

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
4.3303E+03	0.0000E+00	0.0000E+00	0.0000E+00	-1.3921E+06	0.0000E+00
0.0000E+00	4.3303E+03	0.0000E+00	1.3921E+06	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.4514E+05	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.3921E+06	0.0000E+00	7.4405E+09	0.0000E+00	0.0000E+00
-1.3921E+06	0.0000E+00	0.0000E+00	0.0000E+00	2.1291E+09	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	2.4547E+08

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-27: PIER 27 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 52 Pile Diameter = 20 inch Footing Bottom El = -5.0'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
4.6200E+05	0.0000E+00	0.0000E+00	0.0000E+00	-6.9220E+07	0.0000E+00
0.0000E+00	4.6200E+05	0.0000E+00	6.9220E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.9720E+07	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	6.9220E+07	0.0000E+00	6.9570E+11	0.0000E+00	0.0000E+00
-6.9220E+07	0.0000E+00	0.0000E+00	0.0000E+00	2.1140E+11	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	2.0440E+10

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
7.0270E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	7.0270E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	3.6790E+03	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	1.2650E+08	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	3.6190E+07	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	3.1080E+07

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
3.3661E+03	0.0000E+00	0.0000E+00	0.0000E+00	-4.8963E+05	0.0000E+00
0.0000E+00	3.3661E+03	0.0000E+00	4.8963E+05	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.4001E+05	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	4.8963E+05	0.0000E+00	4.9388E+09	0.0000E+00	0.0000E+00
-4.8963E+05	0.0000E+00	0.0000E+00	0.0000E+00	1.5004E+09	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.4892E+08

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-28: PIER 28 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 52 Pile Diameter = 20 inch Footing Bottom El = -4.0'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
4.3390E+05	0.0000E+00	0.0000E+00	0.0000E+00	-6.5840E+07	0.0000E+00
0.0000E+00	4.3390E+05	0.0000E+00	6.5840E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.8250E+07	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	6.5840E+07	0.0000E+00	6.4460E+11	0.0000E+00	0.0000E+00
-6.5840E+07	0.0000E+00	0.0000E+00	0.0000E+00	1.9650E+11	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.9190E+10

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
7.2510E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	7.2510E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	3.7070E+03	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	1.2750E+08	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	3.6460E+07	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	3.2070E+07

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
3.1705E+03	0.0000E+00	0.0000E+00	0.0000E+00	-4.6573E+05	0.0000E+00
0.0000E+00	3.1705E+03	0.0000E+00	4.6573E+05	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.2961E+05	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	4.6573E+05	0.0000E+00	4.5774E+09	0.0000E+00	0.0000E+00
-4.6573E+05	0.0000E+00	0.0000E+00	0.0000E+00	1.3951E+09	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.4022E+08

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-29: PIER 29 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 52 Pile Diameter = 20 inch Footing Bottom El = -3.5'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
3.9900E+05	0.0000E+00	0.0000E+00	0.0000E+00	-6.1670E+07	0.0000E+00
0.0000E+00	3.9900E+05	0.0000E+00	6.1670E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.6910E+07	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	6.1670E+07	0.0000E+00	5.9780E+11	0.0000E+00	0.0000E+00
-6.1670E+07	0.0000E+00	0.0000E+00	0.0000E+00	1.8260E+11	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.7650E+10

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
7.6100E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	7.6100E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	3.7700E+03	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	1.2960E+08	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	3.7080E+07	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	3.3660E+07

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
2.9286E+03	0.0000E+00	0.0000E+00	0.0000E+00	-4.3623E+05	0.0000E+00
0.0000E+00	2.9286E+03	0.0000E+00	4.3623E+05	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.2014E+05	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	4.3623E+05	0.0000E+00	4.2467E+09	0.0000E+00	0.0000E+00
-4.3623E+05	0.0000E+00	0.0000E+00	0.0000E+00	1.2968E+09	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2955E+08

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-30: PIER 30 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 52 Pile Diameter = 20 inch Footing Bottom El = -4'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
5.2580E+05	0.0000E+00	0.0000E+00	0.0000E+00	-7.8840E+07	0.0000E+00
0.0000E+00	5.2580E+05	0.0000E+00	7.8840E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.8220E+07	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	7.8840E+07	0.0000E+00	6.4530E+11	0.0000E+00	0.0000E+00
-7.8840E+07	0.0000E+00	0.0000E+00	0.0000E+00	1.9790E+11	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	2.3260E+10

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
6.5410E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	6.5410E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	3.7200E+03	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	1.2800E+08	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	3.6600E+07	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	2.8930E+07

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
3.8106E+03	0.0000E+00	0.0000E+00	0.0000E+00	-5.5768E+05	0.0000E+00
0.0000E+00	3.8106E+03	0.0000E+00	5.5768E+05	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.2940E+05	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	5.5768E+05	0.0000E+00	4.5825E+09	0.0000E+00	0.0000E+00
-5.5768E+05	0.0000E+00	0.0000E+00	0.0000E+00	1.4050E+09	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.6857E+08

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-31: PIER 31 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 37 Pile Diameter = 20 inch Footing Bottom El = -8.0'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
6.8270E+05	0.0000E+00	0.0000E+00	0.0000E+00	-8.6810E+07	0.0000E+00
0.0000E+00	6.8270E+05	0.0000E+00	8.6810E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.5010E+07	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	8.6810E+07	0.0000E+00	5.8250E+11	0.0000E+00	0.0000E+00
-8.6810E+07	0.0000E+00	0.0000E+00	0.0000E+00	1.3060E+11	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	3.0920E+10

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
3.7010E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	3.7010E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.9070E+03	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	7.1900E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.4480E+07	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.6760E+07

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
4.8808E+03	0.0000E+00	0.0000E+00	0.0000E+00	-6.1406E+05	0.0000E+00
0.0000E+00	4.8808E+03	0.0000E+00	6.1406E+05	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.0644E+05	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	6.1406E+05	0.0000E+00	4.1304E+09	0.0000E+00	0.0000E+00
-6.1406E+05	0.0000E+00	0.0000E+00	0.0000E+00	9.2583E+08	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	2.2106E+08

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-32: PIER 32 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 38 Pile Diameter = 20 inch Footing Bottom El = -8.5'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
7.3570E+05	0.0000E+00	0.0000E+00	0.0000E+00	-9.5960E+07	0.0000E+00
0.0000E+00	7.3570E+05	0.0000E+00	9.5960E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.5410E+07	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	9.5960E+07	0.0000E+00	4.1880E+11	0.0000E+00	0.0000E+00
-9.5960E+07	0.0000E+00	0.0000E+00	0.0000E+00	1.3210E+11	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	2.4560E+10

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
3.5700E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	3.5700E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.9460E+03	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	5.0590E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.4380E+07	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1920E+07

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
5.2539E+03	0.0000E+00	0.0000E+00	0.0000E+00	-6.7878E+05	0.0000E+00
0.0000E+00	5.2539E+03	0.0000E+00	6.7878E+05	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.0928E+05	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	6.7878E+05	0.0000E+00	2.9695E+09	0.0000E+00	0.0000E+00
-6.7878E+05	0.0000E+00	0.0000E+00	0.0000E+00	9.3643E+08	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.7539E+08

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-33: PIER 33 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 38 Pile Diameter = 20 inch Footing Bottom El = -8.5'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
4.6390E+05	0.0000E+00	0.0000E+00	0.0000E+00	-6.8450E+07	0.0000E+00
0.0000E+00	4.6390E+05	0.0000E+00	6.8450E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.3370E+07	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	6.8450E+07	0.0000E+00	3.6270E+11	0.0000E+00	0.0000E+00
-6.8450E+07	0.0000E+00	0.0000E+00	0.0000E+00	1.1400E+11	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.5490E+10

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
4.2870E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	4.2870E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	2.2070E+03	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	5.7370E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.6310E+07	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.4310E+07

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
3.3413E+03	0.0000E+00	0.0000E+00	0.0000E+00	-4.8419E+05	0.0000E+00
0.0000E+00	3.3413E+03	0.0000E+00	4.8419E+05	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	9.4882E+04	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	4.8419E+05	0.0000E+00	2.5736E+09	0.0000E+00	0.0000E+00
-4.8419E+05	0.0000E+00	0.0000E+00	0.0000E+00	8.0867E+08	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1157E+08

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-34: PIER 34 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 37 Pile Diameter = 20 inch Footing Bottom El = -8.0'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
4.3510E+05	0.0000E+00	0.0000E+00	0.0000E+00	-6.3020E+07	0.0000E+00
0.0000E+00	4.3510E+05	0.0000E+00	6.3020E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.6200E+07	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	6.3020E+07	0.0000E+00	4.4550E+11	0.0000E+00	0.0000E+00
-6.3020E+07	0.0000E+00	0.0000E+00	0.0000E+00	1.3720E+11	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.4890E+10

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
4.3200E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	4.3200E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	2.2180E+03	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	5.9070E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.6840E+07	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.4780E+07

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
3.1380E+03	0.0000E+00	0.0000E+00	0.0000E+00	-4.4578E+05	0.0000E+00
0.0000E+00	3.1380E+03	0.0000E+00	4.4578E+05	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.1490E+05	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	4.4578E+05	0.0000E+00	3.1595E+09	0.0000E+00	0.0000E+00
-4.4578E+05	0.0000E+00	0.0000E+00	0.0000E+00	9.7285E+08	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0739E+08

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-35: PIER 35 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 37 Pile Diameter = 20 inch Footing Bottom El = -7.5'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
3.3140E+05	0.0000E+00	0.0000E+00	0.0000E+00	-5.0120E+07	0.0000E+00
0.0000E+00	3.3140E+05	0.0000E+00	5.0120E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.6180E+07	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	5.0120E+07	0.0000E+00	4.4330E+11	0.0000E+00	0.0000E+00
-5.0120E+07	0.0000E+00	0.0000E+00	0.0000E+00	1.3540E+11	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1340E+10

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
4.9280E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	4.9280E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	2.2280E+03	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	5.9320E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.6910E+07	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.6860E+07

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
2.4130E+03	0.0000E+00	0.0000E+00	0.0000E+00	-3.5453E+05	0.0000E+00
0.0000E+00	2.4130E+03	0.0000E+00	3.5453E+05	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.1476E+05	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	3.5453E+05	0.0000E+00	3.1440E+09	0.0000E+00	0.0000E+00
-3.5453E+05	0.0000E+00	0.0000E+00	0.0000E+00	9.6013E+08	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.2569E+07

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-36: PIER 36 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 37+1 (nonsymm.) Pile Diameter = 20 inch Footing Bottom El = -8.0'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
3.5300E+05	0.0000E+00	0.0000E+00	0.0000E+00	-5.2440E+07	0.0000E+00
0.0000E+00	3.5300E+05	0.0000E+00	5.2440E+07	0.0000E+00	-5.5730E+05
0.0000E+00	0.0000E+00	1.6820E+07	0.0000E+00	2.6550E+07	0.0000E+00
0.0000E+00	5.2440E+07	0.0000E+00	4.5020E+11	0.0000E+00	-8.2800E+07
-5.2440E+07	0.0000E+00	2.6550E+07	0.0000E+00	1.3890E+11	0.0000E+00
0.0000E+00	-5.5730E+05	0.0000E+00	-8.2800E+07	0.0000E+00	1.1820E+10

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
5.0180E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	5.0180E+02	0.0000E+00	0.0000E+00	0.0000E+00	-7.9230E+02
0.0000E+00	0.0000E+00	2.2710E+03	0.0000E+00	3.5860E+03	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	5.9040E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	3.5860E+03	0.0000E+00	1.7000E+07	0.0000E+00
0.0000E+00	-7.9230E+02	0.0000E+00	0.0000E+00	0.0000E+00	1.6800E+07

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
2.5670E+03	0.0000E+00	0.0000E+00	0.0000E+00	-3.7094E+05	0.0000E+00
0.0000E+00	2.5670E+03	0.0000E+00	3.7094E+05	0.0000E+00	-4.0527E+03
0.0000E+00	0.0000E+00	1.1930E+05	0.0000E+00	1.8830E+05	0.0000E+00
0.0000E+00	3.7094E+05	0.0000E+00	3.1928E+09	0.0000E+00	-5.8569E+05
-3.7094E+05	0.0000E+00	1.8830E+05	0.0000E+00	9.8490E+08	0.0000E+00
0.0000E+00	-4.0527E+03	0.0000E+00	-5.8569E+05	0.0000E+00	8.5956E+07

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-37: PIER 37 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 37 Pile Diameter = 20 inch Footing Bottom El = -8.5'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
3.5760E+05	0.0000E+00	0.0000E+00	0.0000E+00	-5.1770E+07	0.0000E+00
0.0000E+00	3.5760E+05	0.0000E+00	5.1770E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.2130E+07	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	5.1770E+07	0.0000E+00	3.3590E+11	0.0000E+00	0.0000E+00
-5.1770E+07	0.0000E+00	0.0000E+00	0.0000E+00	1.0490E+11	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2240E+10

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
4.8640E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	4.8640E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	2.4600E+03	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	6.5490E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.8670E+07	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.6640E+07

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
2.5974E+03	0.0000E+00	0.0000E+00	0.0000E+00	-3.6620E+05	0.0000E+00
0.0000E+00	2.5974E+03	0.0000E+00	3.6620E+05	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	8.6146E+04	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	3.6620E+05	0.0000E+00	2.3852E+09	0.0000E+00	0.0000E+00
-3.6620E+05	0.0000E+00	0.0000E+00	0.0000E+00	7.4463E+08	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.8904E+07

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-38: PIER 38 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 36 Pile Diameter = 20 inch Footing Bottom El = -8.5'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
3.6310E+05	0.0000E+00	0.0000E+00	0.0000E+00	-5.1760E+07	0.0000E+00
0.0000E+00	3.6310E+05	0.0000E+00	5.1760E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.5190E+07	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	5.1760E+07	0.0000E+00	3.7710E+11	0.0000E+00	0.0000E+00
-5.1760E+07	0.0000E+00	0.0000E+00	0.0000E+00	9.2460E+10	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0620E+10

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
4.6680E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	4.6680E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	2.5570E+03	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	6.1370E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3440E+07	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3660E+07

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
2.6336E+03	0.0000E+00	0.0000E+00	0.0000E+00	-3.6613E+05	0.0000E+00
0.0000E+00	2.6336E+03	0.0000E+00	3.6613E+05	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.0781E+05	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	3.6613E+05	0.0000E+00	2.6760E+09	0.0000E+00	0.0000E+00
-3.6613E+05	0.0000E+00	0.0000E+00	0.0000E+00	6.5590E+08	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	7.7029E+07

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-39: PIER 39 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 35 Pile Diameter = 20 inch Footing Bottom El = -8.0'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
3.5450E+05	0.0000E+00	0.0000E+00	0.0000E+00	-5.1070E+07	0.0000E+00
0.0000E+00	3.5450E+05	0.0000E+00	5.1070E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	9.3060E+06	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	5.1070E+07	0.0000E+00	2.4220E+11	0.0000E+00	0.0000E+00
-5.1070E+07	0.0000E+00	0.0000E+00	0.0000E+00	6.2040E+10	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0640E+10

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
4.4690E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	4.4690E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	2.1100E+03	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	5.2080E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1250E+07	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3420E+07

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
2.5700E+03	0.0000E+00	0.0000E+00	0.0000E+00	-3.6125E+05	0.0000E+00
0.0000E+00	2.5700E+03	0.0000E+00	3.6125E+05	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	6.6122E+04	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	3.6125E+05	0.0000E+00	1.7205E+09	0.0000E+00	0.0000E+00
-3.6125E+05	0.0000E+00	0.0000E+00	0.0000E+00	4.4042E+08	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	7.7137E+07

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-40: PIER 40 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 34 Pile Diameter = 20 inch Footing Bottom El = -7.0'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
4.1030E+05	0.0000E+00	0.0000E+00	0.0000E+00	-5.6920E+07	0.0000E+00
0.0000E+00	4.1030E+05	0.0000E+00	5.6920E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.3410E+07	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	5.6920E+07	0.0000E+00	3.5370E+11	0.0000E+00	0.0000E+00
-5.6920E+07	0.0000E+00	0.0000E+00	0.0000E+00	8.6640E+10	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2680E+10

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
4.0020E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	4.0020E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	2.1530E+03	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	5.4700E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1820E+07	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2370E+07

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
2.9582E+03	0.0000E+00	0.0000E+00	0.0000E+00	-4.0263E+05	0.0000E+00
0.0000E+00	2.9582E+03	0.0000E+00	4.0263E+05	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	9.5158E+04	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	4.0263E+05	0.0000E+00	2.5096E+09	0.0000E+00	0.0000E+00
-4.0263E+05	0.0000E+00	0.0000E+00	0.0000E+00	6.1451E+08	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.1420E+07

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-41: PIER 41 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 33 Pile Diameter = 20 inch Footing Bottom El = -6.5'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
3.8970E+05	0.0000E+00	0.0000E+00	0.0000E+00	-5.4120E+07	0.0000E+00
0.0000E+00	3.8970E+05	0.0000E+00	5.4120E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.3260E+07	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	5.4120E+07	0.0000E+00	3.5960E+11	0.0000E+00	0.0000E+00
-5.4120E+07	0.0000E+00	0.0000E+00	0.0000E+00	8.0080E+10	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2190E+10

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
3.9360E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	3.9360E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	2.0900E+03	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	5.4730E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0650E+07	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2310E+07

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
2.8115E+03	0.0000E+00	0.0000E+00	0.0000E+00	-3.8282E+05	0.0000E+00
0.0000E+00	2.8115E+03	0.0000E+00	3.8282E+05	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	9.4088E+04	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	3.8282E+05	0.0000E+00	2.5513E+09	0.0000E+00	0.0000E+00
-3.8282E+05	0.0000E+00	0.0000E+00	0.0000E+00	5.6794E+08	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.7946E+07

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-42: PIER 42 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 33 Pile Diameter = 20 inch Footing Bottom El = -6.5'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
3.8310E+05	0.0000E+00	0.0000E+00	0.0000E+00	-5.3420E+07	0.0000E+00
0.0000E+00	3.8310E+05	0.0000E+00	5.3420E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.2910E+07	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	5.3420E+07	0.0000E+00	3.5040E+11	0.0000E+00	0.0000E+00
-5.3420E+07	0.0000E+00	0.0000E+00	0.0000E+00	7.8220E+10	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1980E+10

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
3.9850E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	3.9850E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	2.0600E+03	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	5.3940E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0500E+07	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2460E+07

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
2.7655E+03	0.0000E+00	0.0000E+00	0.0000E+00	-3.7787E+05	0.0000E+00
0.0000E+00	2.7655E+03	0.0000E+00	3.7787E+05	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	9.1608E+04	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	3.7787E+05	0.0000E+00	2.4861E+09	0.0000E+00	0.0000E+00
-3.7787E+05	0.0000E+00	0.0000E+00	0.0000E+00	5.5476E+08	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.6482E+07

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-43: PIER 43 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 33 Pile Diameter = 20 inch Footing Bottom El = -2.5'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
3.2940E+05	0.0000E+00	0.0000E+00	0.0000E+00	-4.5690E+07	0.0000E+00
0.0000E+00	3.2940E+05	0.0000E+00	4.5690E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.1760E+07	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	4.5690E+07	0.0000E+00	3.1920E+11	0.0000E+00	0.0000E+00
-4.5690E+07	0.0000E+00	0.0000E+00	0.0000E+00	7.1220E+10	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0300E+10

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
4.4010E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	4.4010E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	2.1120E+03	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	5.5310E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0770E+07	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3770E+07

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
2.3915E+03	0.0000E+00	0.0000E+00	0.0000E+00	-3.2319E+05	0.0000E+00
0.0000E+00	2.3915E+03	0.0000E+00	3.2319E+05	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	8.3480E+04	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	3.2319E+05	0.0000E+00	2.2656E+09	0.0000E+00	0.0000E+00
-3.2319E+05	0.0000E+00	0.0000E+00	0.0000E+00	5.0529E+08	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	7.4781E+07

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-44A: PIER 44A - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 18 Pile Diameter = 20 inch Footing Bottom El = +1.5'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
2.0990E+05	0.0000E+00	0.0000E+00	0.0000E+00	-2.4680E+07	0.0000E+00
0.0000E+00	2.0990E+05	0.0000E+00	2.4680E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	6.3190E+06	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	2.4680E+07	0.0000E+00	6.1260E+11	0.0000E+00	0.0000E+00
-2.4680E+07	0.0000E+00	0.0000E+00	0.0000E+00	1.0530E+10	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	2.0310E+10

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
2.5050E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	2.5050E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.2560E+03	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	1.2060E+08	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.1580E+05	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	2.4230E+07

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
1.5197E+03	0.0000E+00	0.0000E+00	0.0000E+00	-1.7458E+05	0.0000E+00
0.0000E+00	1.5197E+03	0.0000E+00	1.7458E+05	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	4.4873E+04	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.7458E+05	0.0000E+00	4.3501E+09	0.0000E+00	0.0000E+00
-1.7458E+05	0.0000E+00	0.0000E+00	0.0000E+00	7.4613E+07	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.4705E+08

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-44B: PIER 44B - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 11 Pile Diameter = 20 inch Footing Bottom El = +1.5'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
1.2830E+05	0.0000E+00	0.0000E+00	0.0000E+00	-1.5080E+07	0.0000E+00
0.0000E+00	1.2830E+05	0.0000E+00	1.5080E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	3.8620E+06	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.5080E+07	0.0000E+00	3.0400E+11	0.0000E+00	0.0000E+00
-1.5080E+07	0.0000E+00	0.0000E+00	0.0000E+00	3.6210E+09	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.9790E+09

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
1.5310E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.5310E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	7.6770E+02	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	5.9710E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1910E+07

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
9.2892E+02	0.0000E+00	0.0000E+00	0.0000E+00	-1.0667E+05	0.0000E+00
0.0000E+00	9.2892E+02	0.0000E+00	1.0667E+05	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	2.7425E+04	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.0667E+05	0.0000E+00	2.1587E+09	0.0000E+00	0.0000E+00
-1.0667E+05	0.0000E+00	0.0000E+00	0.0000E+00	2.5614E+07	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	7.2250E+07

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-44C: PIER 44C - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 13 Pile Diameter = 20 inch Footing Bottom El = +1.5'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
1.5160E+05	0.0000E+00	0.0000E+00	0.0000E+00	-1.7830E+07	0.0000E+00
0.0000E+00	1.5160E+05	0.0000E+00	1.7830E+07	0.0000E+00	2.0990E+05
0.0000E+00	0.0000E+00	4.5640E+06	0.0000E+00	-6.3190E+06	0.0000E+00
0.0000E+00	1.7830E+07	0.0000E+00	4.1320E+11	0.0000E+00	2.4680E+07
-1.7830E+07	0.0000E+00	-6.3190E+06	0.0000E+00	5.7580E+09	0.0000E+00
0.0000E+00	2.0990E+05	0.0000E+00	2.4680E+07	0.0000E+00	1.3630E+10

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
1.8090E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.8090E+02	0.0000E+00	0.0000E+00	0.0000E+00	2.5050E+02
0.0000E+00	0.0000E+00	9.0730E+02	0.0000E+00	-1.2560E+03	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	8.1290E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	-1.2560E+03	0.0000E+00	2.9390E+05	0.0000E+00
0.0000E+00	2.5050E+02	0.0000E+00	0.0000E+00	0.0000E+00	1.6270E+07

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
1.0976E+03	0.0000E+00	0.0000E+00	0.0000E+00	-1.2612E+05	0.0000E+00
0.0000E+00	1.0976E+03	0.0000E+00	1.2612E+05	0.0000E+00	1.5197E+03
0.0000E+00	0.0000E+00	3.2411E+04	0.0000E+00	-4.4873E+04	0.0000E+00
0.0000E+00	1.2612E+05	0.0000E+00	2.9342E+09	0.0000E+00	1.7458E+05
-1.2612E+05	0.0000E+00	-4.4873E+04	0.0000E+00	4.0771E+07	0.0000E+00
0.0000E+00	1.5197E+03	0.0000E+00	1.7458E+05	0.0000E+00	9.8685E+07

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-45: TRESTLE BENT E01 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 11 Pile Cross-Section = 20x20 inch Footing Bottom El = +6'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
1.0510E+05	0.0000E+00	0.0000E+00	0.0000E+00	-1.1910E+07	0.0000E+00
0.0000E+00	1.0510E+05	0.0000E+00	1.1910E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	4.3750E+06	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.1910E+07	0.0000E+00	4.0580E+11	0.0000E+00	0.0000E+00
-1.1910E+07	0.0000E+00	0.0000E+00	0.0000E+00	2.6430E+09	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.6870E+09

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
1.6130E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.6130E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	7.0600E+02	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	6.5060E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.4870E+07

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
7.6596E+02	0.0000E+00	0.0000E+00	0.0000E+00	-8.4247E+04	0.0000E+00
0.0000E+00	7.6596E+02	0.0000E+00	8.4247E+04	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	3.1046E+04	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	8.4247E+04	0.0000E+00	2.8796E+09	0.0000E+00	0.0000E+00
-8.4247E+04	0.0000E+00	0.0000E+00	0.0000E+00	1.8696E+07	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	7.0598E+07

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-46: TRESTLE BENT E02~05 – SINGLE PILE CONDENSED MATRICES AT MUDLINE

Number of Piles = 1 Pile Cross-Section = 20x20 inch Footing Bottom El = +6'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
9.5560E+03	0.0000E+00	0.0000E+00	0.0000E+00	-1.0830E+06	0.0000E+00
0.0000E+00	9.5560E+03	0.0000E+00	1.0830E+06	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	3.9770E+05	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.0830E+06	0.0000E+00	2.4030E+08	0.0000E+00	0.0000E+00
-1.0830E+06	0.0000E+00	0.0000E+00	0.0000E+00	2.4030E+08	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
1.4660E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.4660E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	6.4180E+01	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
6.9642E+01	0.0000E+00	0.0000E+00	0.0000E+00	-7.6607E+03	0.0000E+00
0.0000E+00	6.9642E+01	0.0000E+00	7.6607E+03	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	2.8221E+03	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	7.6607E+03	0.0000E+00	1.6998E+06	0.0000E+00	0.0000E+00
-7.6607E+03	0.0000E+00	0.0000E+00	0.0000E+00	1.6998E+06	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-47: TRESTLE BENT E06~10 – SINGLE PILE CONDENSED MATRICES AT MUDLINE

Number of Piles = 1 Pile Cross-Section = 20x20 inch Footing Bottom El = +6'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
9.5550E+03	0.0000E+00	0.0000E+00	0.0000E+00	-1.0820E+06	0.0000E+00
0.0000E+00	9.5550E+03	0.0000E+00	1.0820E+06	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	4.0550E+05	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.0820E+06	0.0000E+00	2.4030E+08	0.0000E+00	0.0000E+00
-1.0820E+06	0.0000E+00	0.0000E+00	0.0000E+00	2.4030E+08	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
1.4660E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.4660E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	6.3880E+01	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
6.9635E+01	0.0000E+00	0.0000E+00	0.0000E+00	-7.6536E+03	0.0000E+00
0.0000E+00	6.9635E+01	0.0000E+00	7.6536E+03	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	2.8773E+03	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	7.6536E+03	0.0000E+00	1.6998E+06	0.0000E+00	0.0000E+00
-7.6536E+03	0.0000E+00	0.0000E+00	0.0000E+00	1.6998E+06	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-48: TRESTLE BENT E11~15 – SINGLE PILE CONDENSED MATRICES AT MUDLINE

Number of Piles = 1 Pile Cross-Section = 20x20 inch Footing Bottom El = +6'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
1.0880E+04	0.0000E+00	0.0000E+00	0.0000E+00	-1.1600E+06	0.0000E+00
0.0000E+00	1.0880E+04	0.0000E+00	1.1600E+06	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	4.2650E+05	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.1600E+06	0.0000E+00	2.4440E+08	0.0000E+00	0.0000E+00
-1.1600E+06	0.0000E+00	0.0000E+00	0.0000E+00	2.4440E+08	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
1.4500E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.4500E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	6.3280E+01	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
7.8985E+01	0.0000E+00	0.0000E+00	0.0000E+00	-8.2054E+03	0.0000E+00
0.0000E+00	7.8985E+01	0.0000E+00	8.2054E+03	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	3.0257E+03	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	8.2054E+03	0.0000E+00	1.7288E+06	0.0000E+00	0.0000E+00
-8.2054E+03	0.0000E+00	0.0000E+00	0.0000E+00	1.7288E+06	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-49: TRESTLE BENT E16~19 – SINGLE PILE CONDENSED MATRICES AT MUDLINE

Number of Piles = 1 Pile Cross-Section = 20x20 inch Footing Bottom El = +6'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
1.2320E+04	0.0000E+00	0.0000E+00	0.0000E+00	-1.2750E+06	0.0000E+00
0.0000E+00	1.2320E+04	0.0000E+00	1.2750E+06	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	4.2730E+05	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.2750E+06	0.0000E+00	2.5450E+08	0.0000E+00	0.0000E+00
-1.2750E+06	0.0000E+00	0.0000E+00	0.0000E+00	2.5450E+08	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
1.3960E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.3960E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	6.3340E+01	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
8.9096E+01	0.0000E+00	0.0000E+00	0.0000E+00	-9.0188E+03	0.0000E+00
0.0000E+00	8.9096E+01	0.0000E+00	9.0188E+03	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	3.0314E+03	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	9.0188E+03	0.0000E+00	1.8002E+06	0.0000E+00	0.0000E+00
-9.0188E+03	0.0000E+00	0.0000E+00	0.0000E+00	1.8002E+06	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-50: TRESTLE BENT E20 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 11 Pile Cross-Section = 20x20 inch Footing Bottom El = +6'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
1.3030E+05	0.0000E+00	0.0000E+00	0.0000E+00	-1.3550E+07	0.0000E+00
0.0000E+00	1.3030E+05	0.0000E+00	1.3550E+07	0.0000E+00	2.1330E+05
0.0000E+00	0.0000E+00	5.2030E+06	0.0000E+00	-8.5150E+06	0.0000E+00
0.0000E+00	1.3550E+07	0.0000E+00	4.8230E+11	0.0000E+00	2.2180E+07
-1.3550E+07	0.0000E+00	-8.5150E+06	0.0000E+00	4.4490E+09	0.0000E+00
0.0000E+00	2.1330E+05	0.0000E+00	2.2180E+07	0.0000E+00	1.2050E+10

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
1.5480E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.5480E+02	0.0000E+00	0.0000E+00	0.0000E+00	2.5340E+02
0.0000E+00	0.0000E+00	7.7300E+02	0.0000E+00	-1.2650E+03	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	7.1240E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	-1.2650E+03	0.0000E+00	2.5040E+05	0.0000E+00
0.0000E+00	2.5340E+02	0.0000E+00	0.0000E+00	0.0000E+00	1.4320E+07

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
9.4330E+02	0.0000E+00	0.0000E+00	0.0000E+00	-9.5847E+04	0.0000E+00
0.0000E+00	9.4330E+02	0.0000E+00	9.5847E+04	0.0000E+00	1.5442E+03
0.0000E+00	0.0000E+00	3.6912E+04	0.0000E+00	-6.0408E+04	0.0000E+00
0.0000E+00	9.5847E+04	0.0000E+00	3.4215E+09	0.0000E+00	1.5689E+05
-9.5847E+04	0.0000E+00	-6.0408E+04	0.0000E+00	3.1505E+07	0.0000E+00
0.0000E+00	1.5442E+03	0.0000E+00	1.5689E+05	0.0000E+00	8.7236E+07

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-51: TRESTLE BENT W01 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 11 Pile Cross-Section = 20x20 inch Footing Bottom El = +6'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
1.5590E+05	0.0000E+00	0.0000E+00	0.0000E+00	-1.5900E+07	0.0000E+00
0.0000E+00	1.5590E+05	0.0000E+00	1.5900E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	4.2130E+06	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.5900E+07	0.0000E+00	3.9120E+11	0.0000E+00	0.0000E+00
-1.5900E+07	0.0000E+00	0.0000E+00	0.0000E+00	2.9940E+09	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.4370E+10

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
1.4240E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.4240E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	6.6350E+02	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	6.1150E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3120E+07

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
1.1227E+03	0.0000E+00	0.0000E+00	0.0000E+00	-1.1247E+05	0.0000E+00
0.0000E+00	1.1227E+03	0.0000E+00	1.1247E+05	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	2.9894E+04	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.1247E+05	0.0000E+00	2.7757E+09	0.0000E+00	0.0000E+00
-1.1247E+05	0.0000E+00	0.0000E+00	0.0000E+00	2.1178E+07	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0348E+08

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-52: TRESTLE BENT W02~09 – SINGLE PILE CONDENSED MATRICES AT MUDLINE

Number of Piles = 1 Pile Cross-Section = 20x20 inch Footing Bottom El = +6'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
1.4170E+04	0.0000E+00	0.0000E+00	0.0000E+00	-1.4460E+06	0.0000E+00
0.0000E+00	1.4170E+04	0.0000E+00	1.4460E+06	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	3.8300E+05	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.4460E+06	0.0000E+00	2.7210E+08	0.0000E+00	0.0000E+00
-1.4460E+06	0.0000E+00	0.0000E+00	0.0000E+00	2.7210E+08	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
1.2940E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.2940E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	6.0320E+01	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
1.0204E+02	0.0000E+00	0.0000E+00	0.0000E+00	-1.0228E+04	0.0000E+00
0.0000E+00	1.0204E+02	0.0000E+00	1.0228E+04	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	2.7176E+03	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.0228E+04	0.0000E+00	1.9247E+06	0.0000E+00	0.0000E+00
-1.0228E+04	0.0000E+00	0.0000E+00	0.0000E+00	1.9247E+06	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-53: TRESTLE BENT W10~14 – SINGLE PILE CONDENSED MATRICES AT MUDLINE

Number of Piles = 1 Pile Cross-Section = 20x20 inch Footing Bottom El = +6'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
1.4150E+04	0.0000E+00	0.0000E+00	0.0000E+00	-1.4450E+06	0.0000E+00
0.0000E+00	1.4150E+04	0.0000E+00	1.4450E+06	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	3.7390E+05	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.4450E+06	0.0000E+00	2.7300E+08	0.0000E+00	0.0000E+00
-1.4450E+06	0.0000E+00	0.0000E+00	0.0000E+00	2.7300E+08	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
1.2910E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.2910E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	6.0610E+01	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
1.0189E+02	0.0000E+00	0.0000E+00	0.0000E+00	-1.0221E+04	0.0000E+00
0.0000E+00	1.0189E+02	0.0000E+00	1.0221E+04	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	2.6533E+03	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.0221E+04	0.0000E+00	1.9311E+06	0.0000E+00	0.0000E+00
-1.0221E+04	0.0000E+00	0.0000E+00	0.0000E+00	1.9311E+06	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-54: TRESTLE BENT W15~17 – SINGLE PILE CONDENSED MATRICES AT MUDLINE

Number of Piles = 1 Pile Cross-Section = 20x20 inch Footing Bottom El = +6'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
1.2820E+04	0.0000E+00	0.0000E+00	0.0000E+00	-1.3190E+06	0.0000E+00
0.0000E+00	1.2820E+04	0.0000E+00	1.3190E+06	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	3.7980E+05	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.3190E+06	0.0000E+00	2.5880E+08	0.0000E+00	0.0000E+00
-1.3190E+06	0.0000E+00	0.0000E+00	0.0000E+00	2.5880E+08	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
1.3710E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.3710E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	6.1970E+01	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
9.2598E+01	0.0000E+00	0.0000E+00	0.0000E+00	-9.3301E+03	0.0000E+00
0.0000E+00	9.2598E+01	0.0000E+00	9.3301E+03	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	2.6952E+03	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	9.3301E+03	0.0000E+00	1.8306E+06	0.0000E+00	0.0000E+00
-9.3301E+03	0.0000E+00	0.0000E+00	0.0000E+00	1.8306E+06	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-55: TRESTLE BENT W18 – SINGLE PILE CONDENSED MATRICES AT MUDLINE

Number of Piles = 1 Pile Cross-Section = 20x20 inch Footing Bottom El = +6'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
1.2270E+04	0.0000E+00	0.0000E+00	0.0000E+00	-1.2700E+06	0.0000E+00
0.0000E+00	1.2270E+04	0.0000E+00	1.2700E+06	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	4.0860E+05	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.2700E+06	0.0000E+00	2.5370E+08	0.0000E+00	0.0000E+00
-1.2700E+06	0.0000E+00	0.0000E+00	0.0000E+00	2.5370E+08	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
1.3990E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.3990E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	6.4760E+01	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
8.8746E+01	0.0000E+00	0.0000E+00	0.0000E+00	-8.9835E+03	0.0000E+00
0.0000E+00	8.8746E+01	0.0000E+00	8.9835E+03	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	2.8993E+03	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	8.9835E+03	0.0000E+00	1.7946E+06	0.0000E+00	0.0000E+00
-8.9835E+03	0.0000E+00	0.0000E+00	0.0000E+00	1.7946E+06	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-56: TRESTLE BENT W19 – SINGLE PILE CONDENSED MATRICES AT MUDLINE

Number of Piles = 1 Pile Cross-Section = 20x20 inch Footing Bottom El = +6'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
1.1780E+04	0.0000E+00	0.0000E+00	0.0000E+00	-1.2280E+06	0.0000E+00
0.0000E+00	1.1780E+04	0.0000E+00	1.2280E+06	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	4.6470E+05	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.2280E+06	0.0000E+00	2.5100E+08	0.0000E+00	0.0000E+00
-1.2280E+06	0.0000E+00	0.0000E+00	0.0000E+00	2.5100E+08	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
1.4060E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.4060E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	6.7260E+01	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
8.5290E+01	0.0000E+00	0.0000E+00	0.0000E+00	-8.6864E+03	0.0000E+00
0.0000E+00	8.5290E+01	0.0000E+00	8.6864E+03	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	3.2965E+03	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	8.6864E+03	0.0000E+00	1.7755E+06	0.0000E+00	0.0000E+00
-8.6864E+03	0.0000E+00	0.0000E+00	0.0000E+00	1.7755E+06	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

TABLE H-57: TRESTLE BENT W20 - PILE GROUP CONDENSED MATRICES AT PILE-CAP

Number of Piles = 11 Pile Cross-Section = 20x20 inch Footing Bottom El = +6'

6x6 Stiffness Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
1.2950E+05	0.0000E+00	0.0000E+00	0.0000E+00	-1.3500E+07	0.0000E+00
0.0000E+00	1.2950E+05	0.0000E+00	1.3500E+07	0.0000E+00	-2.1200E+05
0.0000E+00	0.0000E+00	4.4740E+06	0.0000E+00	7.3210E+06	0.0000E+00
0.0000E+00	1.3500E+07	0.0000E+00	4.1510E+11	0.0000E+00	-2.2080E+07
-1.3500E+07	0.0000E+00	7.3210E+06	0.0000E+00	4.2100E+09	0.0000E+00
0.0000E+00	-2.1200E+05	0.0000E+00	-2.2080E+07	0.0000E+00	1.1980E+10

6x6 Mass Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
1.5490E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.0000E+00	1.5490E+02	0.0000E+00	0.0000E+00	0.0000E+00	-2.5350E+02
0.0000E+00	0.0000E+00	7.1280E+02	0.0000E+00	1.1660E+03	0.0000E+00
0.0000E+00	0.0000E+00	0.0000E+00	6.5690E+07	0.0000E+00	0.0000E+00
0.0000E+00	0.0000E+00	1.1660E+03	0.0000E+00	2.3090E+05	0.0000E+00
0.0000E+00	-2.5350E+02	0.0000E+00	0.0000E+00	0.0000E+00	1.4330E+07

6x6 Damping Matrix

DIS-X	DIS-Y	DIS-Z	ROT-X	ROT-Y	ROT-Z
9.3766E+02	0.0000E+00	0.0000E+00	0.0000E+00	-9.5494E+04	0.0000E+00
0.0000E+00	9.3766E+02	0.0000E+00	9.5494E+04	0.0000E+00	-1.5350E+03
0.0000E+00	0.0000E+00	3.1747E+04	0.0000E+00	5.1949E+04	0.0000E+00
0.0000E+00	9.5494E+04	0.0000E+00	2.9454E+09	0.0000E+00	-1.5619E+05
-9.5494E+04	0.0000E+00	5.1949E+04	0.0000E+00	2.9812E+07	0.0000E+00
0.0000E+00	-1.5350E+03	0.0000E+00	-1.5619E+05	0.0000E+00	8.6743E+07

Note: units = lb,in,sec; stiffness (translation=lb/in, rotation=lb-in/rad); mass (translation=lb-sec^2/in, rotation=lb-in-sec^2/rad); damping (translation=lb-sec/in, rotation=lb-in-sec/rad).

16.0 APPENDIX I: NONLINEAR PUSHOVER ANALYSES

Dumbarton Bridge Pile Pushover Analyses Report

(Piers 18, 20 & 23)

Dated: August 04, 2008

1. Introduction

This report by Earth Mechanics, Inc (EMI) presents results of the pile pushover analyses of Piers 18, 20 and 23 of the Dumbarton Bridge.

The report analyzes a typical 54 inch diameter prestressed concrete pile at Piers 18, 20 and 23. A nominal axial load of 250 tons (2225 kN) and a maximum axial load of 750 tons (6670 kN) are considered.

In the final report of Dumbarton Bridge pile analyses by Priestley (2008), moment-curvature and moment-rotation response curves were estimated at nominal (250 tons) and maximum (750 tons) loads for a typical 54 inch diameter prestressed concrete pile of Pier 23. Both Pier 18 and Pier 20 are also 54 inch diameter prestressed concrete pile, the same moment-curvature and moment-rotation response curves as Pier 23 were therefore referred for Piers18 and 20.

The idealized soil profile, p-y and t-z curves for the pile-foundation of Piers 18, 20 and 23 are based on the Foundation Analysis Report of Dumbarton Bridge Seismic Retrofit Project (EMI 2007).

2. Pushover Analysis Model

The finite element program ADINA (Version 8.4) is used for the pushover analyses.

At the pile top, a rotational spring with the characteristics of pile/footing connection moment-rotation curves provided in Priestley's report was used. Priestley's report presents four limit states: first-yield limit state (LS1), serviceability limit state (LS2), damage-control limit state (LS3), and ultimate limit state (LS4). These limit states are summarized in Table 1.

Priestley report points out that plastic hinging could not develop with the dowel section which extends some 1.7 m below the pile/footing connection. For this, top 6 feet (1.7 meters) of the pile is modeled with linear moment-curvature and the other part of the prestressed pile is modeled with the nonlinear moment-curvature relationship. Following Priestley's recommendation, the limit states on prestressed section moment-curvature curves are summarized in Table 2.

Table 1: Pile/Footing Connection Limit States (Moment-Rotation)

	2250 kN (250 tons)		6670 kN (750 tons)	
	Rotation (rad)	**Moment (kN-m)**	**Rotation (rad)**	**Moment (kN-m)**
LS1	0.00089	4249	0.00100	6198
LS2	0.00834	5942	0.00658	7617
LS3	0.0300	6703	0.0235	8173
LS4	0.0479	6800	0.0524	8100

Table 2: Prestressed Section Limit States (Moment-Curvature)

	2250 kN (250 tons)		6670 kN (750 tons)	
	Curvature (m^{-1})	**Moment (kN-m)**	**Curvature (m^{-1})**	**Moment (kN-m)**
LS1	0.00444	5261	0.00435	6956
LS2	0.0136	6650	0.0111	8209
LS3	0.0280	6990	0.0232	8566

For the pushover analyses, all nodes below the mud line are linked with horizontal springs characterized by the nonlinear p-y relationships. All these nonlinear curves are tabulated in the Foundation Analysis Report of Dumbarton Bridge Seismic Retrofit Project (EMI 2007).

3. Pushover Analysis Results

To be convenient, the pile section part above the contraflexure point is called ‘section top’, while the pile section part below the contraflexure point is called ‘section bottom’. The limit states at pile/footing connection, pile top and bottom will be labeled.

The pushover analysis results in terms of the pile-head shear versus pile head deflection, and the distributions of deflection, moment and curvature along the pile length are provided in attached figures:

Figures 1, 6 and 11 plot the idealized soil profile at Piers 18, 20 and 23 respectively. The schematics of pile/soil springs are also shown in the figures.

Figure 2 shows pushover analysis results of deflection, moment and curvature distributions along the pile length for Pier 18 at axial load of 250 tons. The plots are at the pile head displacements of 0.152, 0.305, 0.610, 0.914, 1.219 1.524 meters (6, 12, 24, 36, 48, 60 inches).

Figure 3 gives the pile-head shear versus pile head deflection for Pier 18 at axial load of 250 tons.

Figure 4 shows pushover analysis results of deflection, moment and curvature distributions along the pile length for Pier 18 at axial load of 750 tons. The plots are at the pile head displacements of 0.152, 0.305, 0.610, 0.914, 1.219 1.524 meters (6, 12, 24, 36, 48, 60 inches).

Figure 5 gives the pile-head shear versus pile head deflection for Pier 18 at axial load of 750 tons.

Figure 7 shows pushover analysis results of the distributions of deflection, moment and curvature distributions along the pile length for Pier 20 at axial load of 250 tons. The plots are at the pile head displacements of 0.152, 0.305, 0.610, 0.914, 1.219 1.524 meters (6, 12, 24, 36, 48, 60 inches).

Figure 8 gives the pile-head shear versus pile head deflection for Pier 20 at axial load of 250 tons.

Figure 9 shows pushover analysis results of the distributions of deflection, moment and curvature distributions along the pile length for Pier 20 at axial load of 750 tons. The plots are at the pile head displacements of 0.152, 0.305, 0.610, 0.914, 1.219 1.524 meters (6, 12, 24, 36, 48, 60 inches).

Figure 10 gives the pile-head shear versus pile head deflection for Pier 20 at axial load of 750 tons.

Figure 12 shows pushover analysis results of the distributions of deflection, moment and curvature distributions along the pile length for Pier 23 at axial load of 250 tons. The plots are at the pile head displacements of 0.152, 0.305, 0.610, 0.914, 1.219 1.524 meters (6, 12, 24, 36, 48, 60 inches).

Figure 13 gives the pile-head shear versus pile head deflection for Pier 23 at axial load of 250 tons.

Figure 14 shows pushover analysis results of the distributions of deflection, moment and curvature distributions along the pile length for Pier 23 at axial load of 750 tons. The plots are at the pile head displacements of 0.152, 0.305, 0.610, 0.914, 1.219 1.524 meters (6, 12, 24, 36, 48, 60 inches).

Figure 15 gives the pile-head shear versus pile head deflection for Pier 23 at axial load of 750 tons.

The pile head displacement capacities at LS2, LS3 and LS4 based on pile/footing rotation are summarized in Table 3.

Table 3: Displacement Capacities Based on Pile/Footing Rotation Capacity

Axial Load	Pier No.	LS2	LS3	LS4
2224 kN (250 tons)	**18**	0.46 m (18 inch)	0.84 m (33 inch)	1.14 m (45 inch)
	20	0.49 m (19 inch)	0.90 m (35 inch)	1.23 m (48 inch)
	23	0.47 m (19 inch)	0.87 m (34 inch)	1.19 m (47 inch)
6670 kN (750 tons)	**18**	0.43 m (17 inch)	0.72 m (28 inch)	1.20 m (47 inch)
	20	0.46 m (18 inch)	0.78 m (31 inch)	1.30 m (51 inch)
	23	0.44 m (17 inch)	0.75 m (30 inch)	1.25 m (49 inch)

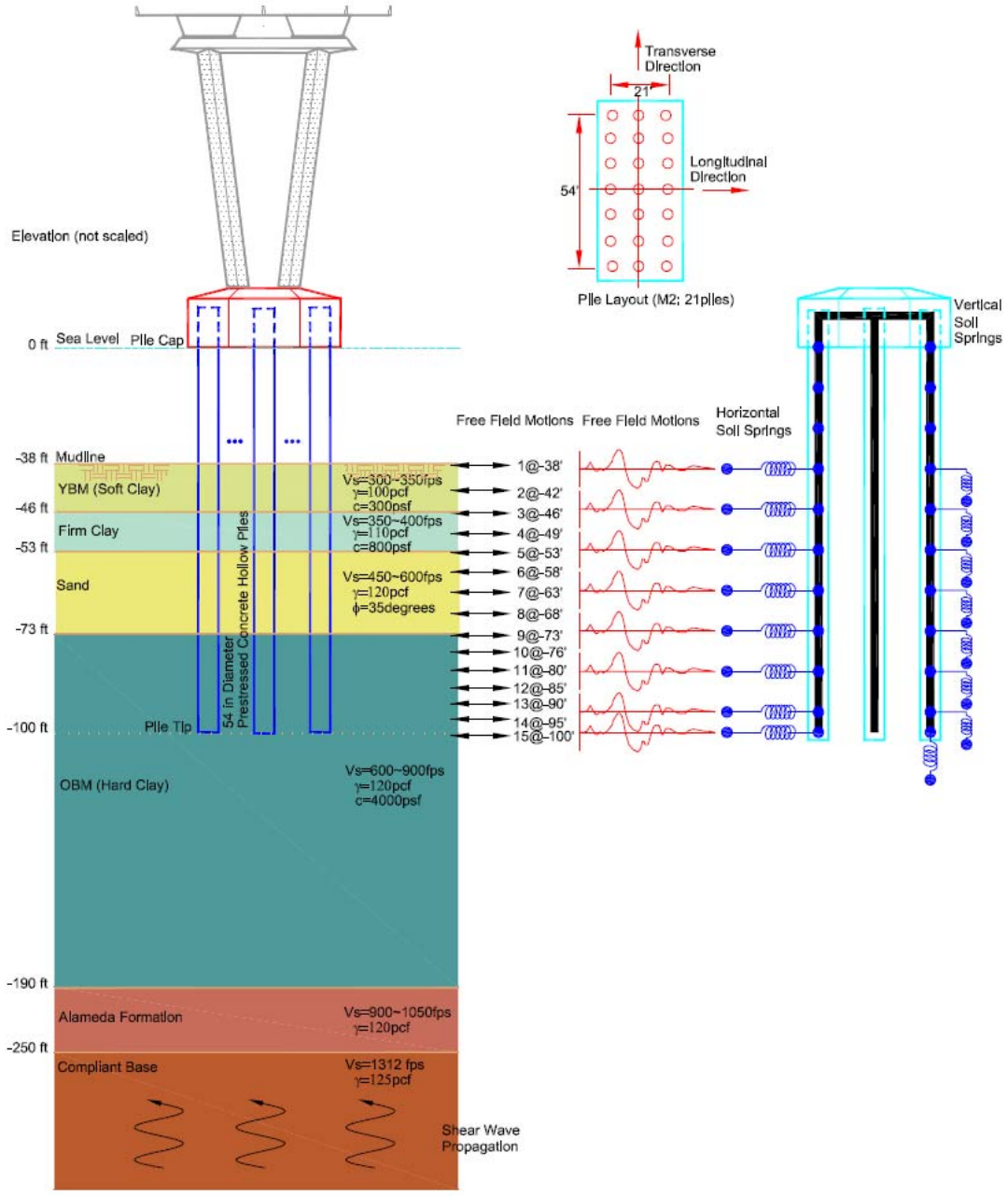

Figure 1: Profile of Pier 18

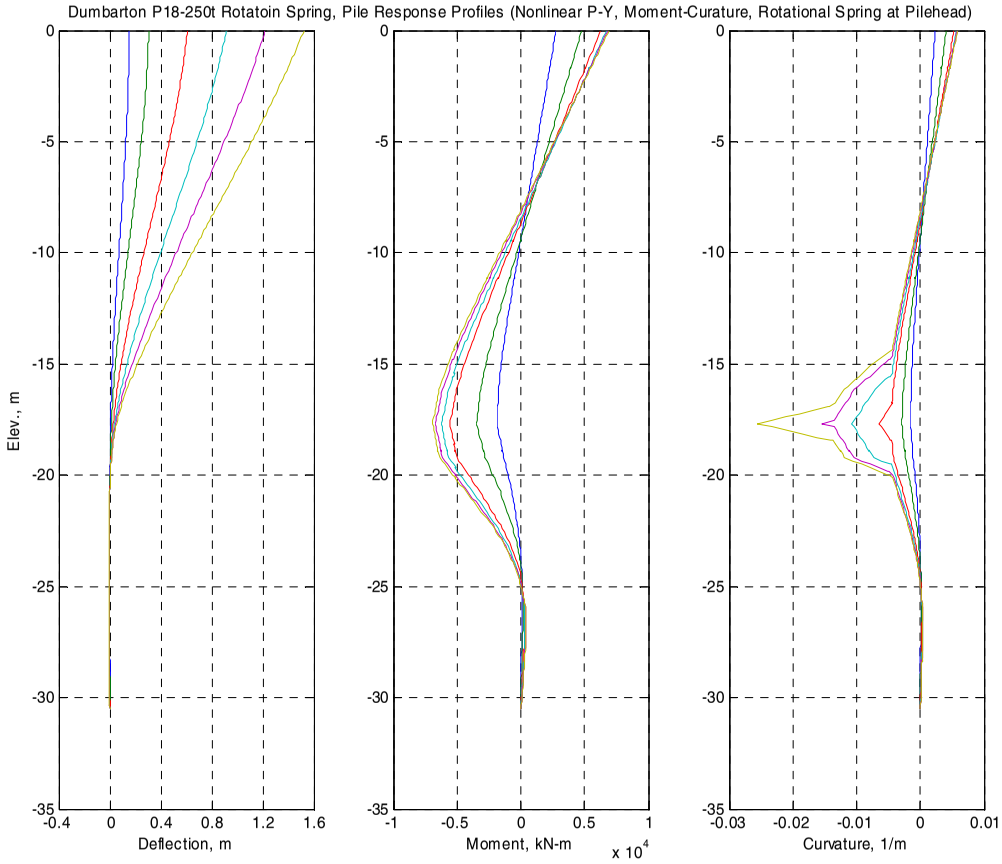

Figure 2: Pile pushover deflection, moment and curvature profiles for Pier 18 at axial load 250 tons

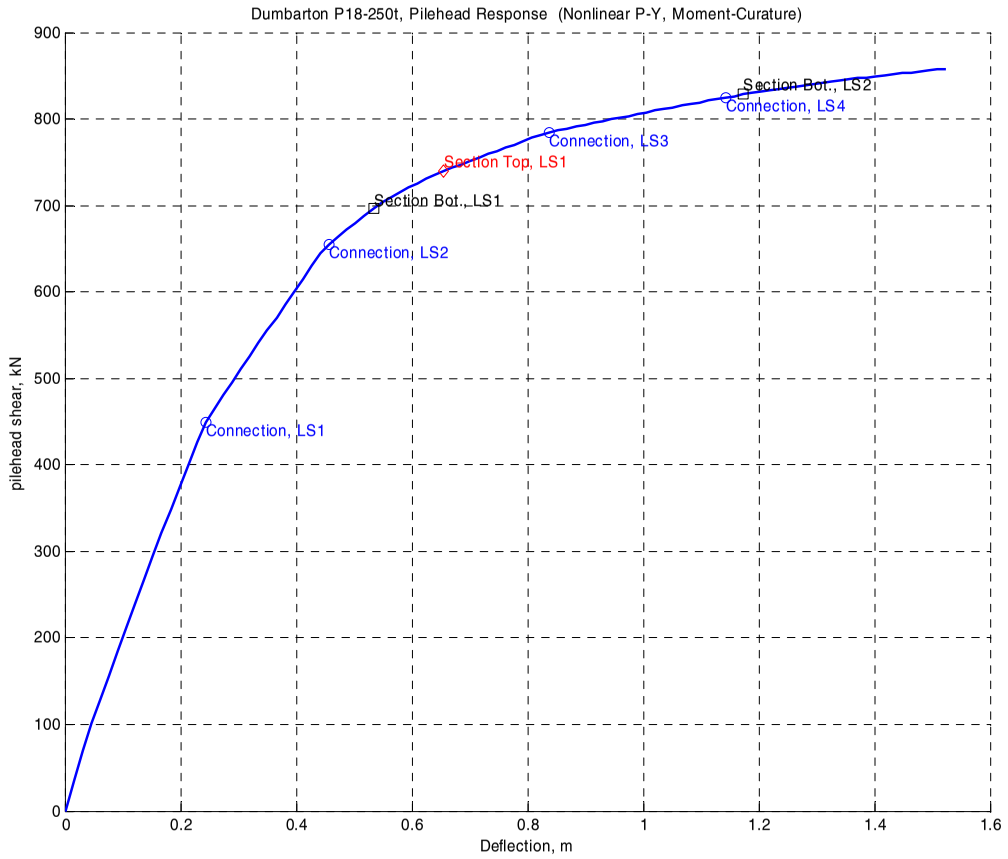

Figure 3: Pile pushover result for Pier 18 at axial load 250 tons

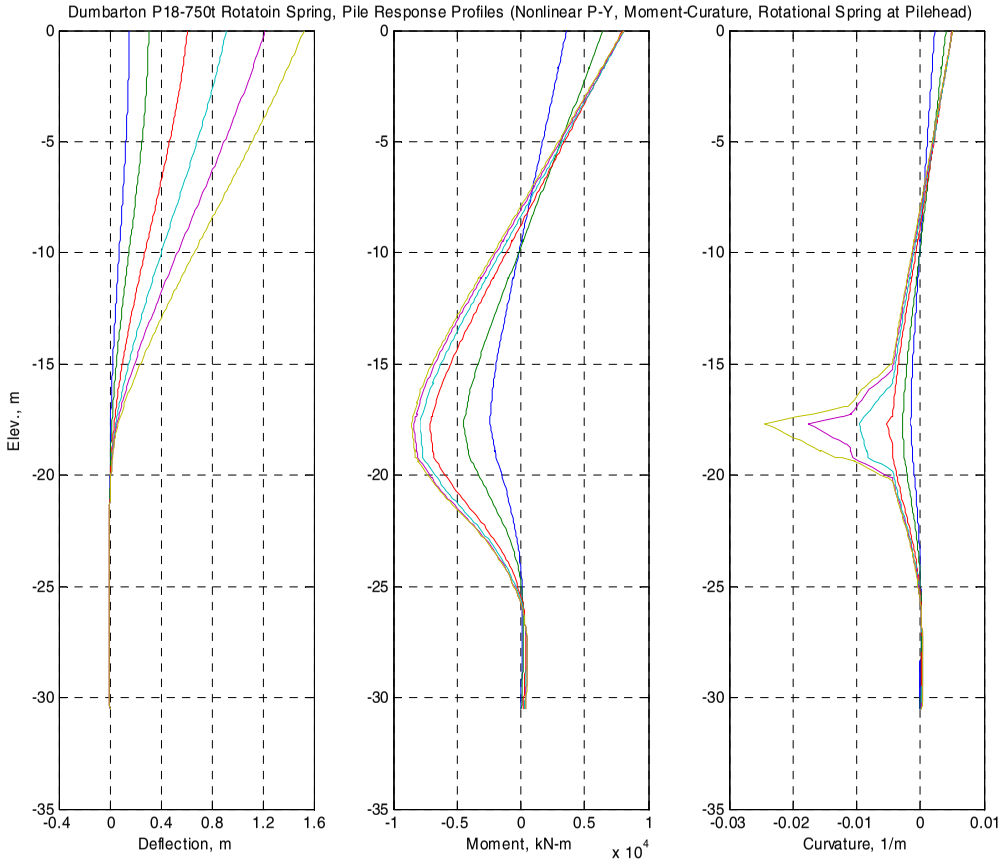

Figure 4: Pile pushover deflection, moment and curvature profiles for Pier 18 at axial load 750 tons

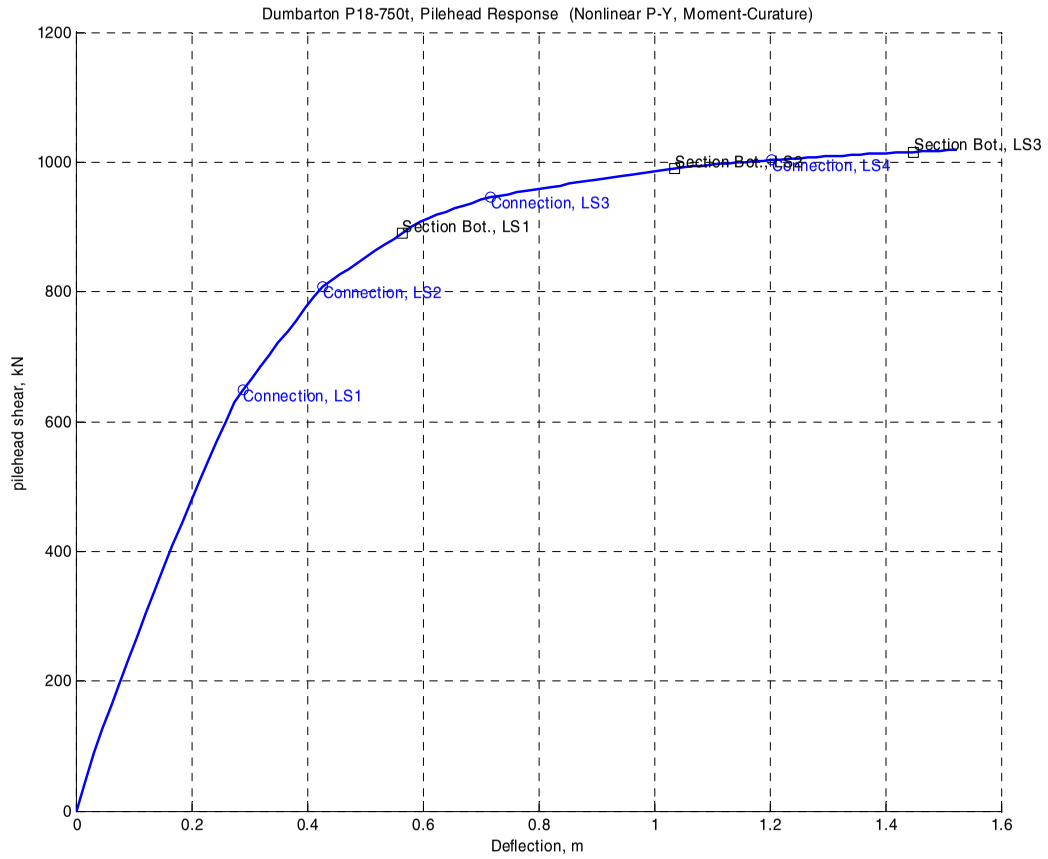

Figure 5: Pile pushover result for Pier 18 at axial load 750 tons

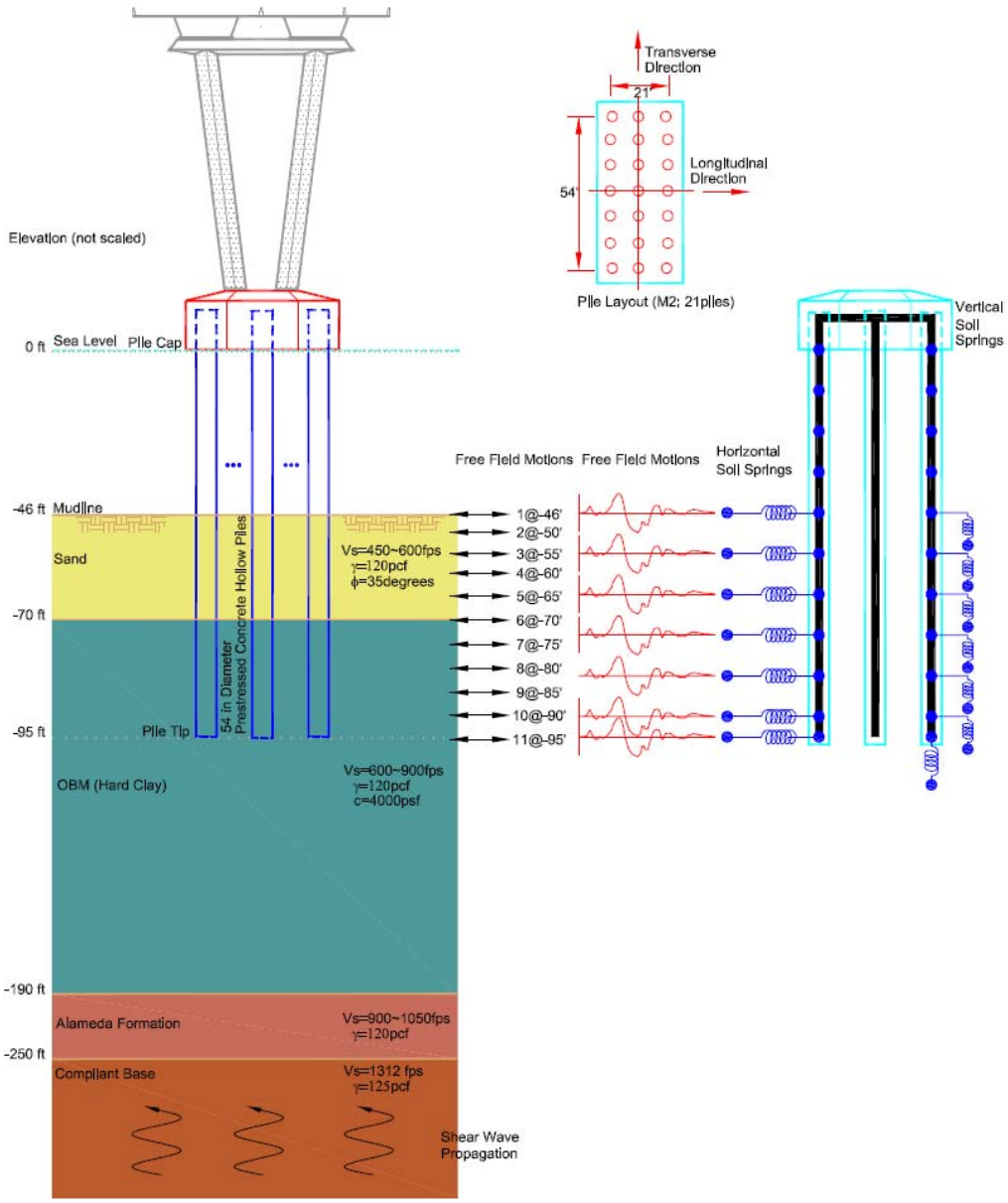

Figure 6: Profile of Pier 20

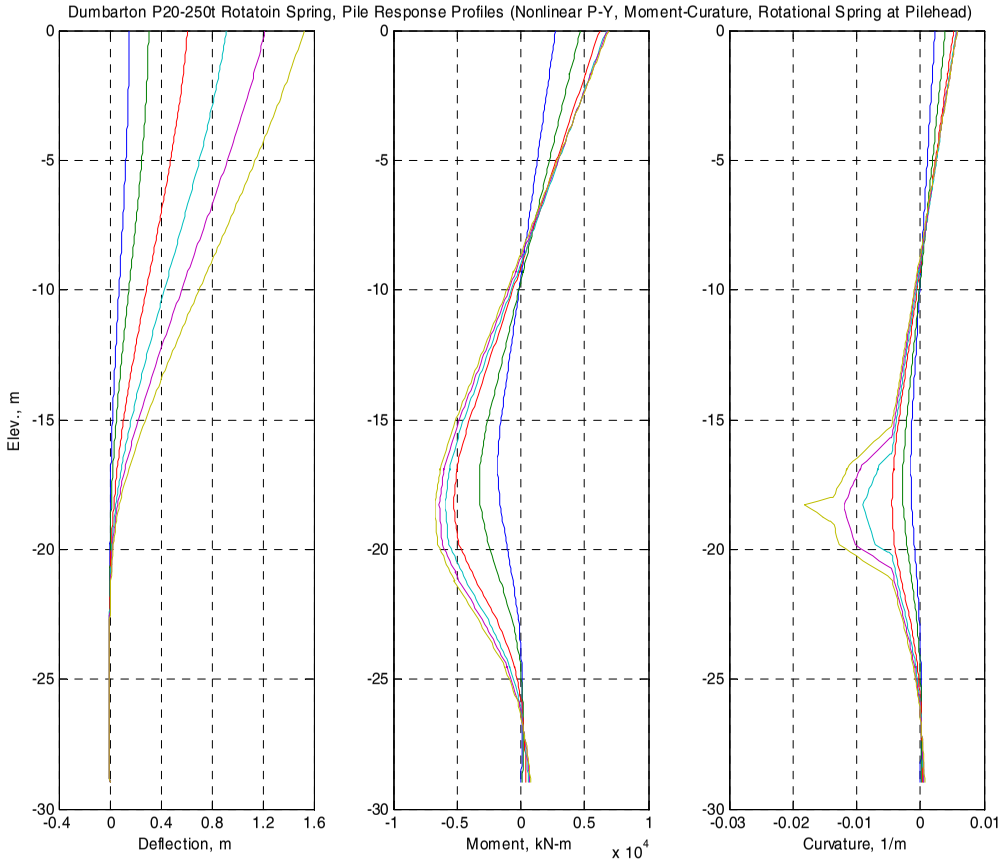

Figure 7: Pile pushover deflection, moment and curvature profiles for Pier 20 at axial load 250 tons

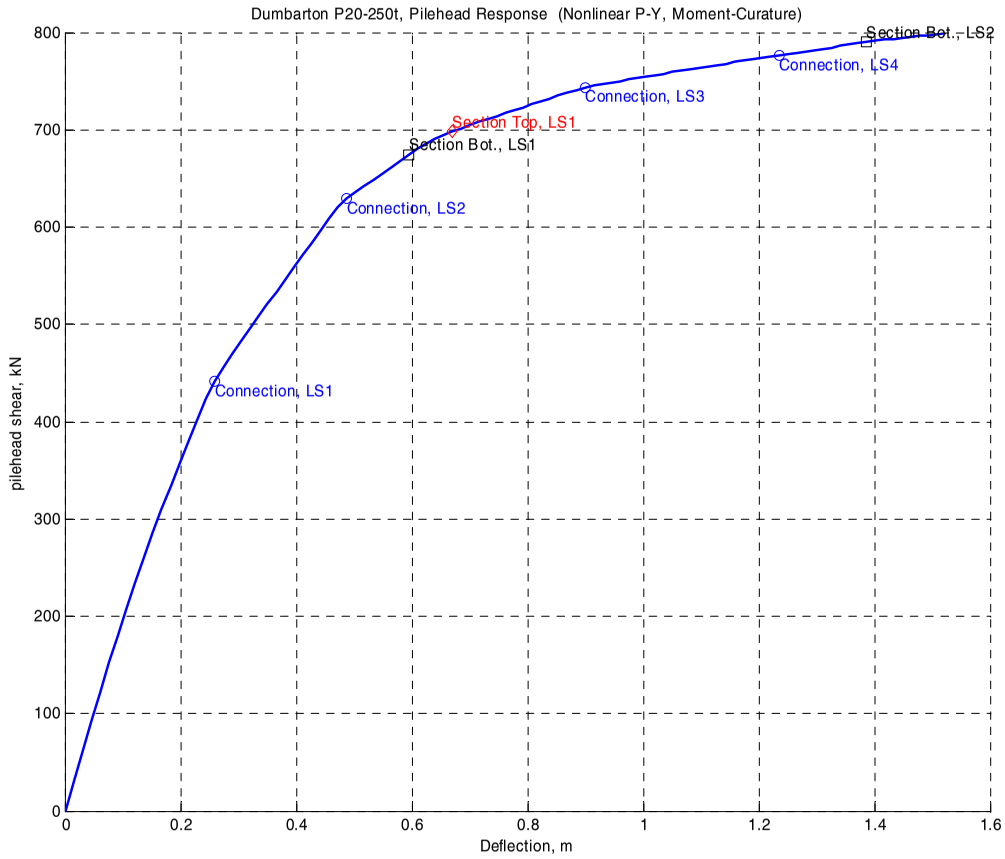

Figure 8: Pile pushover result for Pier 20 at axial load 250 tons

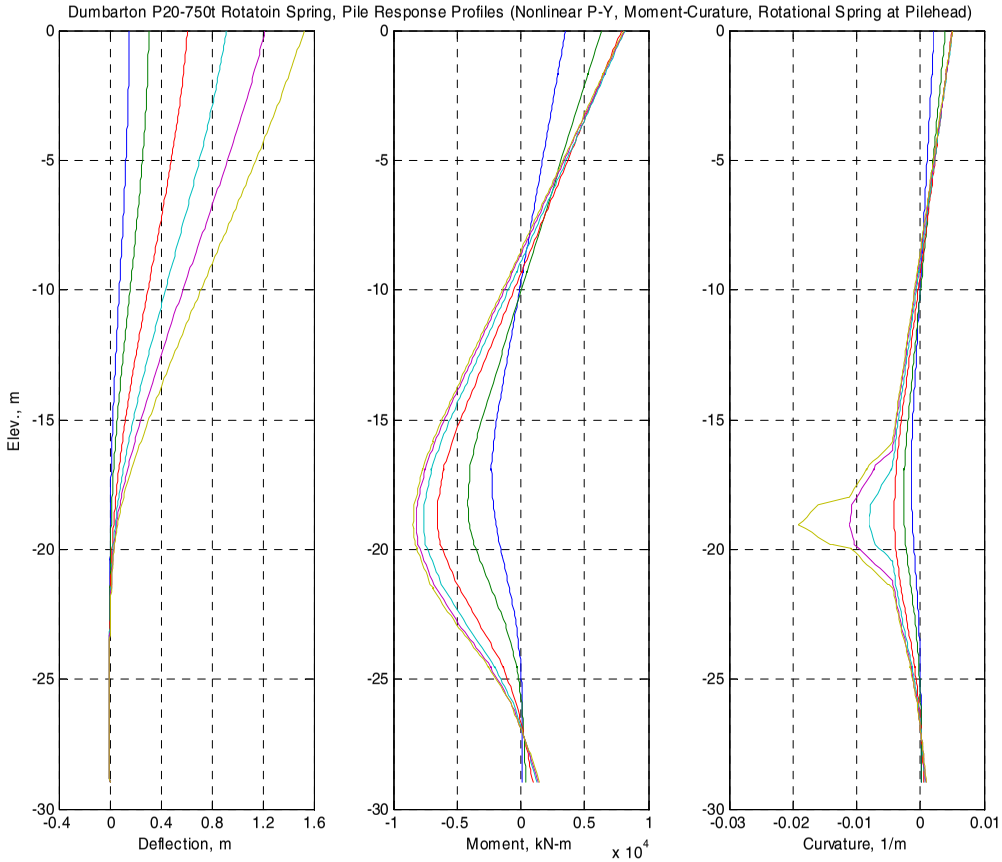

Figure 9: Pile pushover deflection, moment and curvature profiles for Pier 20 at axial load 750 tons

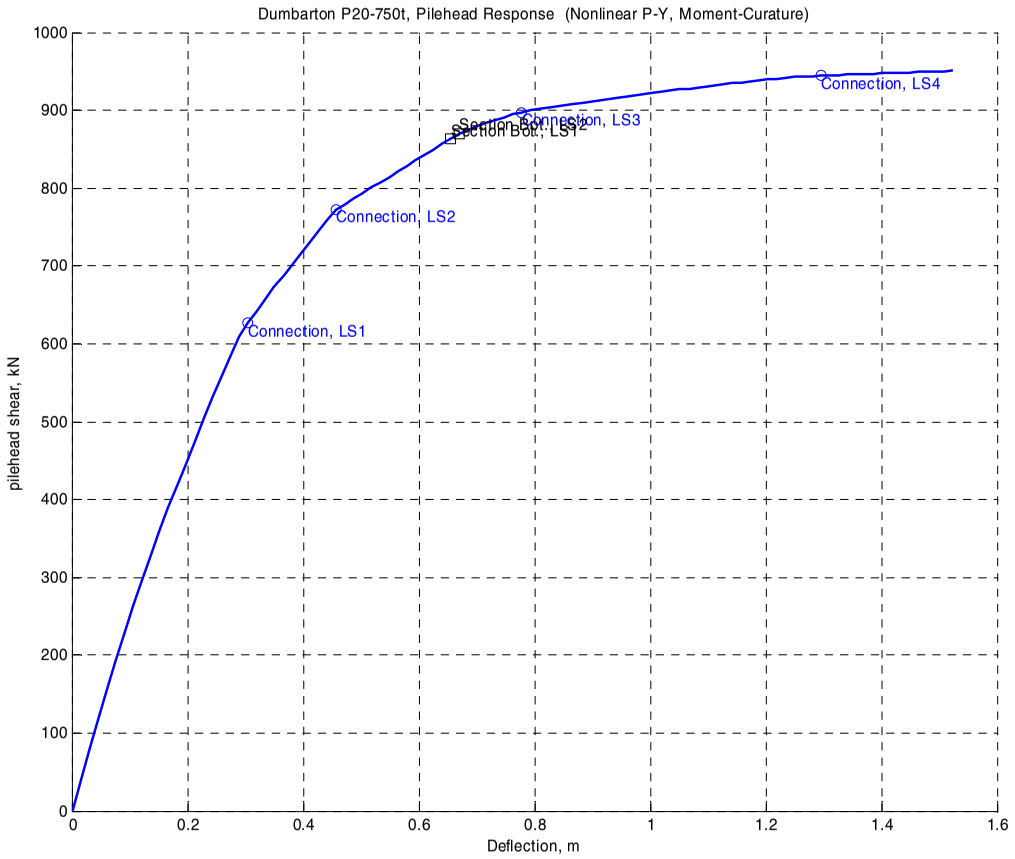

Figure 10: Pile pushover result for Pier 20 at axial load 750 tons

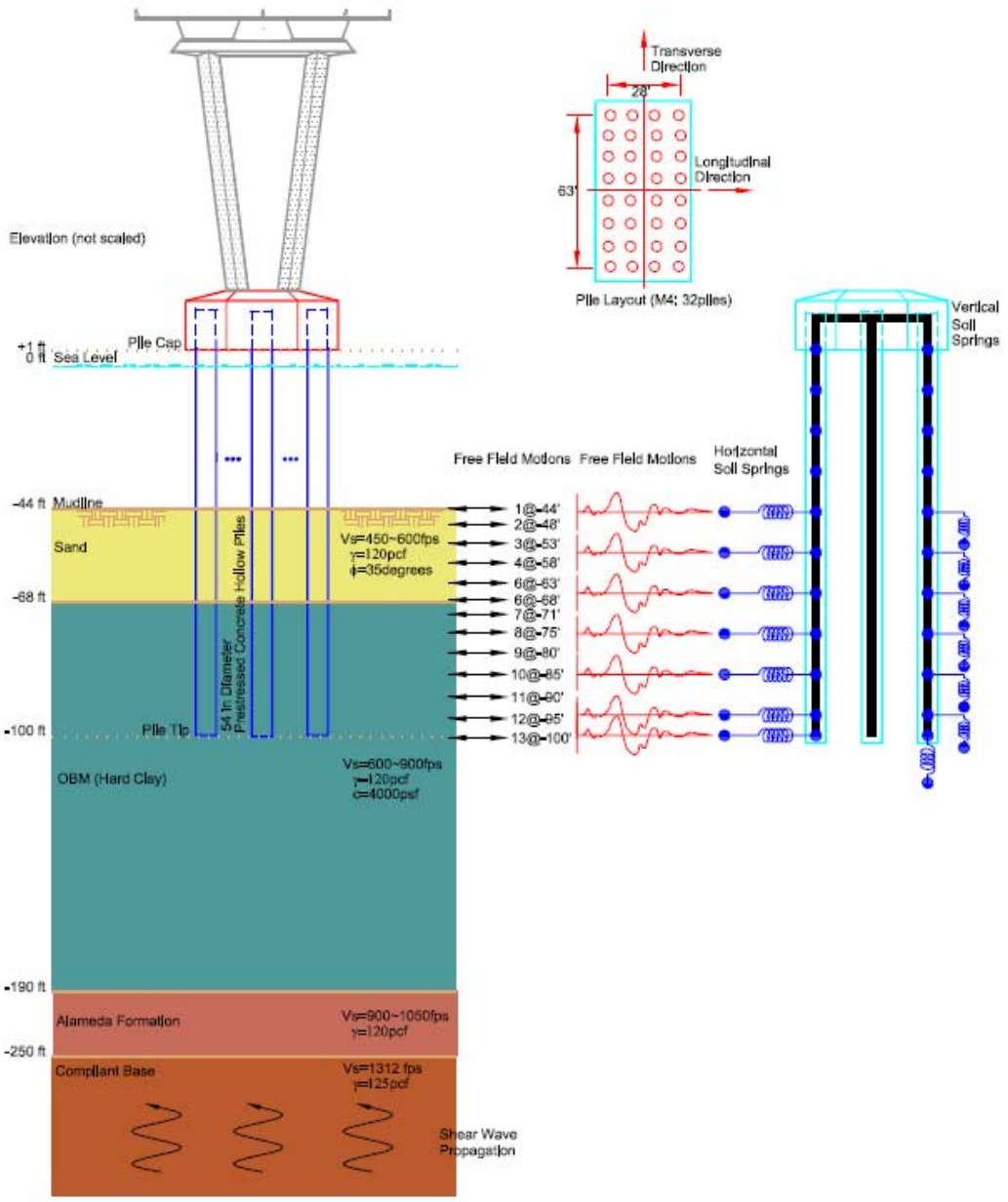

Figure 11: Profile of Pier 23

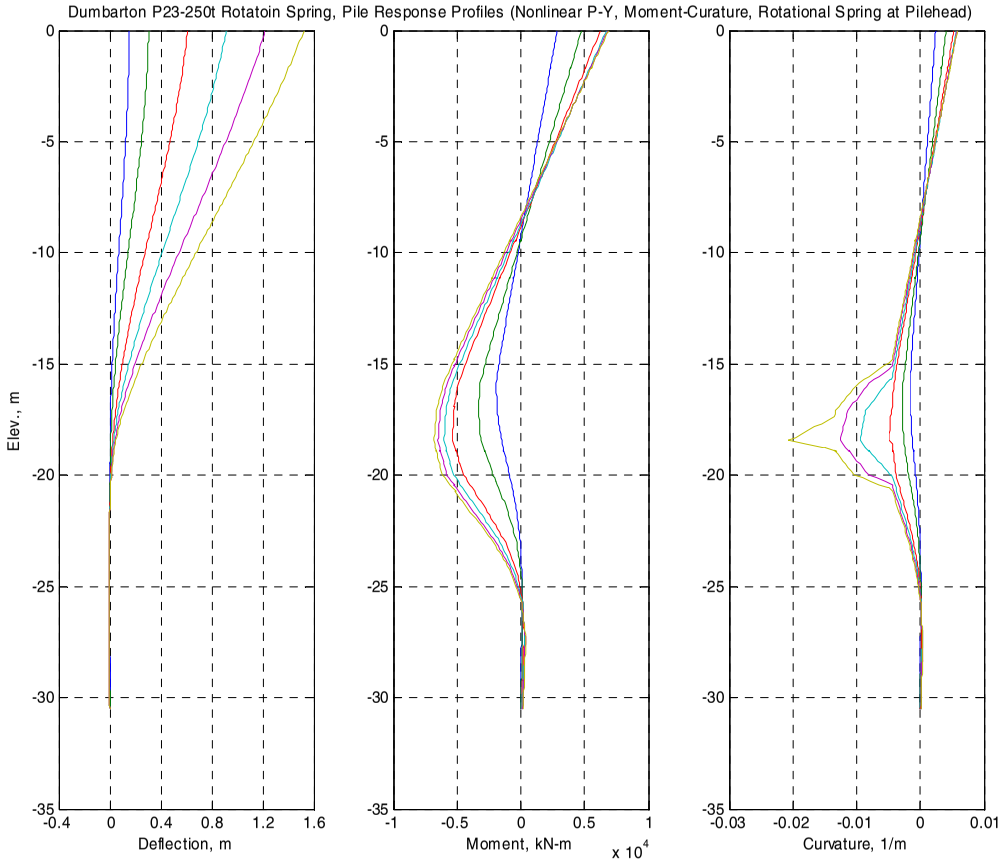

Figure 12: Pile pushover deflection, moment and curvature profiles for Pier 23 at axial load 250 tons

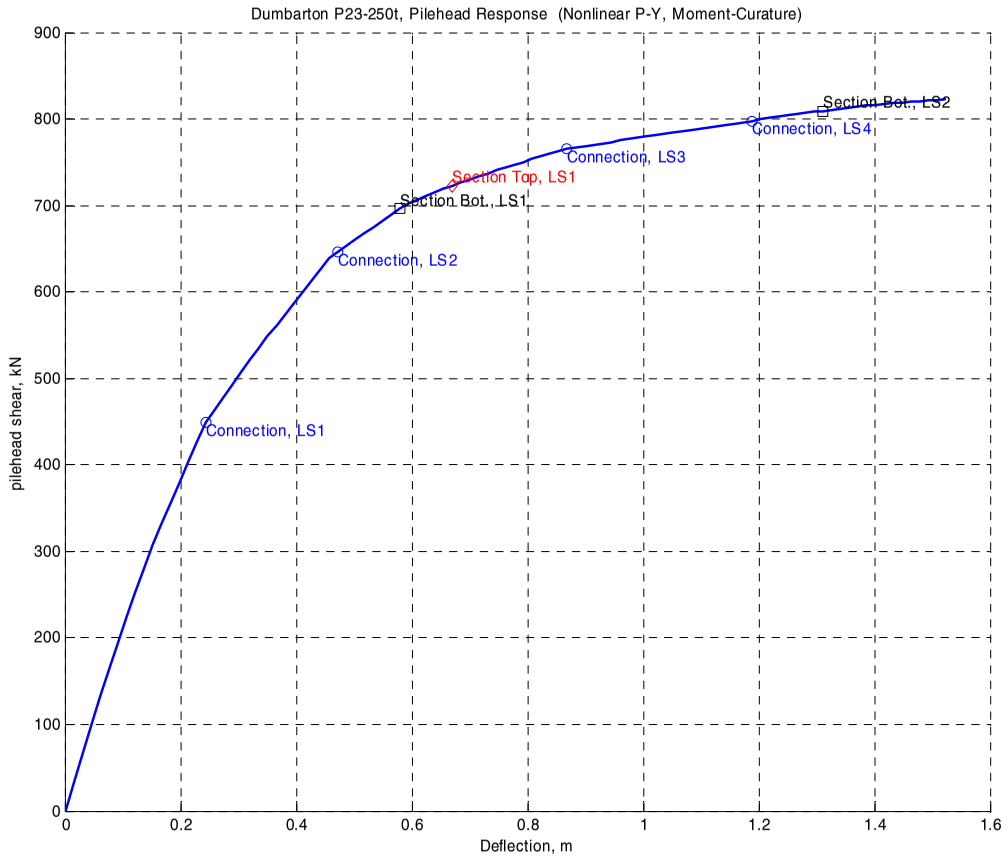

Figure 13: Pile pushover result for Pier 23 at axial load 250 tons

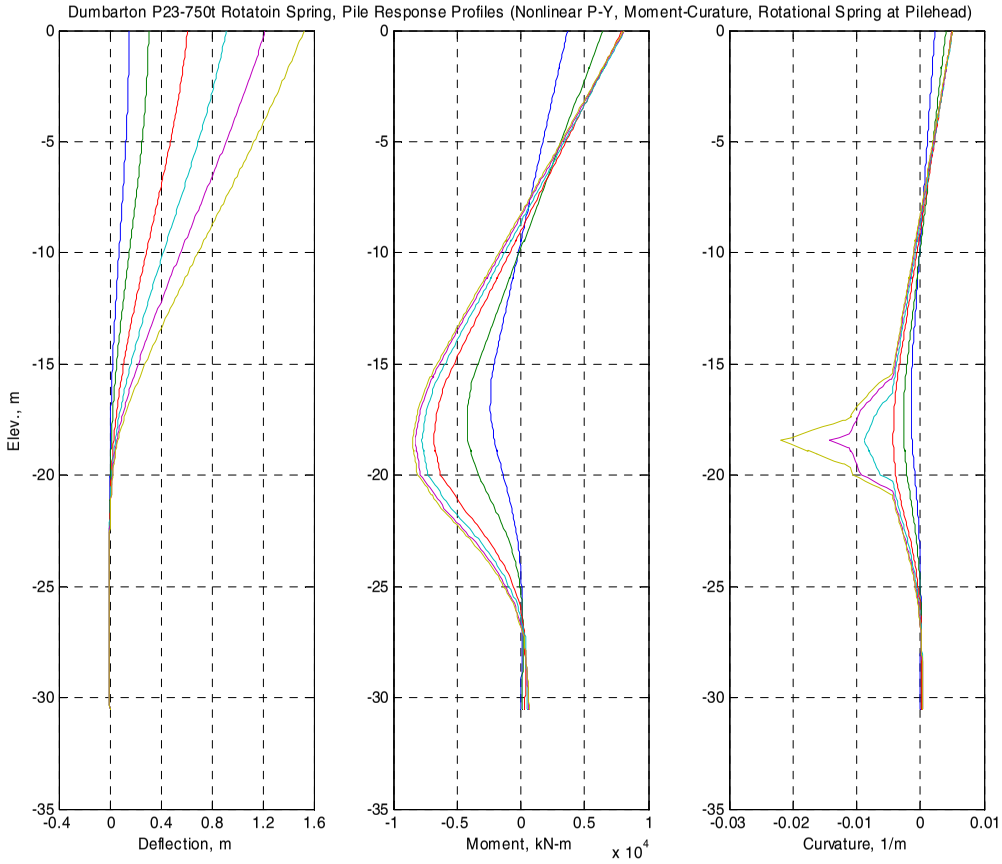

Figure 14: Pile pushover deflection, moment and curvature profiles for Pier 23 at axial load 750 tons

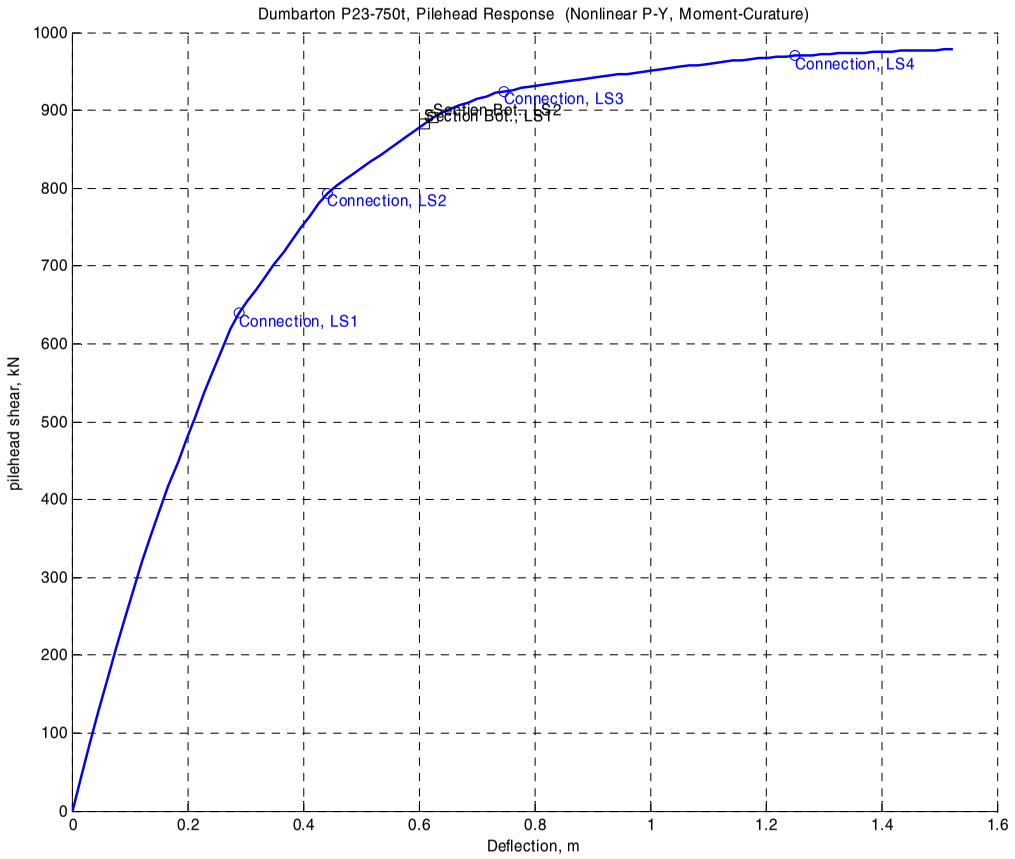

Figure 15: Pile pushover result for Pier 23 at axial load 750 tons

4. References

EMI. (2007). "Foundation Analysis Report, Dumbarton Bridge Seismic Retrofit Project, Prepared for: Bay Area Toll Authority (BATA) and California Department of Transportation (Caltrans)." Earth Mechanics Inc.

Priestley, N. (2008). "Dumbarton Bridge Pile Analysis, Final Report, July 27, 2008."

DUNBARTON BRIDGE PILE ANALYSES

FINAL REPORT

Nigel Priestley

In accordance with an email request from Dr. Po Lam (EMI), I have carried out an investigation of the moment-curvature, moment-rotation, and displacement capacity of the 54in dia. prestressed piles of pier 23. This report supersedes earlier preliminary reports, dated January 5, 2008 and February 1, 2008.
The following data were applicable (or assumed) for the analyses:

Connection:

Dowels: 20#11 grade 60 rebar: yield assumed: f_y = 455MPa (66ksi)
ultimate assumed : f_u = 683MPa (99ksi)
P.C.D. of dowels: 857mm (33.7in)
Concrete: f'_c = 1.3x6000psi i.e. f'_c = 53.8MPa (7.8ksi)
Cover to confinement: 76mm (3in)
Confinement: #5 spiral (15.9mm dia., pitch=2.75in)
: f_{yh} =420MPa (60ksi)
(note: This yield strength may be conservative, but has little influence)
Axial Loads: Three levels considered: 250tons, 750tons, -100tons
(2225kN, 6670kN, -896kN)

Prestressed Section:

Prestressing: 46x0.6in strands (Total area = 6450mm^2 =10.0in^2)
Cover to prestressing: 89mm (3.5in)
Initial stress: 690MPa (100ksi)
Yield stress: 1500MPa (217.5ksi)
Ultimate stress 1863MPa (270ksi)
Confinement: #5 spiral – as for footing connection)
Axial Loads: Three levels considered: 250tons, 750tons, 11tons
(2250kN, 6670kN, 100kN)

Data for Deflection Calculations:

Pile free length to mudline: 13.7m (45ft)
Depth below mudline to max. moment 3.05m (10ft) (assumed)
Depth to effective fixity for elastic deflections: 6.86m (22.5ft) (assumed)
Plastic hinge length at footing connection:

$$L_P = 0.03 f_y d_{bd} = 0.03 \times 455 \times 44.5 = 607mm$$

Plastic hinge length in-ground (conservative estimate)

$$L_P = 1.5 D_P = 1.5x1.372 = 2.06m$$

Limit States Considered:

Yield: For footing connection, ε_s = 0.002275, or ε_c = 0.002 (whichever first)
Prestressed**:** ε_p = 0.0075 or ε_c = 0.002 (whichever first)

Serviceability: Footing Connection: ε_s = 0.015 or ε_c = 0.004 (whichever first)
Prestressed: (same as footing connection)

Damage Control: Footing Conn: $\varepsilon_s = 0.07$, or $\varepsilon_c = 0.0147$ (energy balance)
Prestressed: $\varepsilon_p = 0.04$ or $\varepsilon_c = 0.008$

Ultimate: Footing Connection: $\varepsilon_s = 0.07$
Prestressed: Same as Damage control.

Notes on Above:

1. For the prestressed section, it is assumed that the hollow has been filled with concrete. It is not clear from the plans whether this is the case for the full length of the pile.

2. The depths to maximum moment and effective fixity for elastic displacements are "guesses" based on EMI values for Dumbarton Bridge. Small adjustments are to be expected.

3. The plastic hinge length for the in-ground hinge, at $1.5D_p$ is small compared with the normally assumed value of $2D_p$. However, the latter value is based on smaller diameter piles, and with higher shear force. I feel that the value of $1.5D_p$ is more appropriate.

4. The ultimate condition for the pile/footing connection is based on an "ultimate" dowel strain of 70% of a uniaxial value of 0.10, and hence takes account of reduction of ultimate strain as a consequence of cyclic response under EQ loading.

5. The damage control and ultimate conditions for the in-ground hinge are based on an extreme fibre compression strain of 0.008, based on theoretical and experimental results. At higher strains the cover deteriorates, and the plastic hinge length reduces rapidly. Although larger plastic rotations may occur, they should not be relied on.

6. The analysis program including prestressing is unstable for low or negative axial compression. As a consequence, the minimum axial compression for the prestressed section is 11 tons, while the footing connection is analyzed for a tension force of 100 tons. Note, however, that the critical in-ground section will be subjected to higher compressive loading than the top of the pile, due to the pile weight (approx. 37.5kN/m, or about 500kN (56 tons) total)

2. Pile/Footing Connection Characteristics

2.1 Moment-Curvature Response:

Moment Curvature analyses:

Moment-curvature characteristics are based on analyses considering strain-hardening of the reinforcement and confinement of the core concrete, using the Mander et al model. A bilinear prestressing stress-strain curve is adopted. Results of the analyses are plotted in Fig. 1, and listed in Table 1. In Fig.1 a bilinear approximation to the moment-curvature curves is included, and the various limit states are identified by solid circles.

It will be noted that limit state curvatures reduce as axial load increases for LS1 to LS3, but increase with increasing axial load for LS4. This latter increase is a consequence of LS4 being

controlled by the maximum permitted dowel strain of 0.07. At higher axial loads the neutral axis depth is increased, resulting in increased curvature for a given dowel tension strain.

2.2 Moment-Rotation Response:

The moment-rotation response of the pile/footing connection is shown in Fig.2 in quadri-linear and bilinear forms, with the quadrilinear curve defined by the four limit states. It will be seen than the ultimate plastic rotation capacity of the section is close to 0.05 for all three axial loads considered. Serviceability and Damage Control rotations decrease as the axial load increases. The rotation at the yield limit state (LS1) corresponds to elastic strain penetration of the dowel bars into the footing, and is typically about 0.001. Rotational values at the four limit states are included in Table 1.

3. Prestressed Section Characteristics

3.1 Moment-Curvature Response:

Moment-curvature response of the prestressed section at three different axial load levels, together with bilinear approximations, are shown in Fig.3, with the limit states identified by solid circles. Note that only LS1, LS2 and LS3 are shown, since the ultimate limit state (LS4) is the same as the damage-control (LS3) limit state. Values for moment and curvature for the limit states are listed in Table 2.

It will be noted that the moment capacities of the prestressed section for a given limit state and axial load level are similar to, or higher than the corresponding moment capacity for the dowel connection. As a consequence, there is essentially no possibility that plastic hinging could develop at the lower end of the dowels, some 1.7m below the pile/footing connection.

Curvatures for the prestressed section, for a given limit state, are typically about 50% of the dowel connection curvatures for the same limit state and axial load. However, since the plastic hinge length for the prestressed section is much larger than for the dowel connection, plastic rotation capacities are significantly higher for the in-ground plastic hinge (compare values for limit state rotations in Tables 1 and 2). An exception occurs only for LS4, as a consequence of applying strain limits for the Damage Control limit state for the prestressed section ultimate limit.

3.2 Moment-Rotation Response:

Key values of the rotational capacity of the in-ground hinge at the serviceability and ultimate limit states are also listed in Table 2. Note that there is no yield rotation, as strain penetration does not occur at the critical in-ground location. Since there are only two data points for each limit state, plots of rotational capacity are not provided.

4. Displacement Capacity

Approximate Displacement Capacity:

Approximate displacement capacities have been estimated based on the stiffness of the prestressed section at 75% of nominal capacity, and the rotational capacities of the top plastic

hinge, as listed in Table 1. It has further been assumed that at the nominal yield of the connection, the in-ground moment is 80% of nominal. At the serviceability and damage control limit states it has been assumed that the in-ground moment is equal to the nominal capacity. These values, and the corresponding predicted displacement capacities, should be expected to contain errors up to about 10-20%. More accurate values can only be obtained based on pushover analyses using the moment-rotation characteristics defined in Table 1.

Table 3 summarizes the predicted displacement capacities for the different limit states and axial loads. For nominal axial compression and for reduced compression or tension, displacements corresponding to LS2 (serviceability) exceed 0.6m (24in). At the LS3 (Damage Control), displacement capacity exceeds 1.0m (40in). and at LS4 (ultimate), displacement capacity exceeds 1.3m (50in). These values are each reduced (by between 1% (LS4) and 20% (LS3) for the case of maximum feasible axial compression.

No attempt has been made to estimate the displacement capacity based on the rotation capacity of the in-ground hinge. There are too reasons for this. 1) The displacement at which the in-ground hinge yields cannot be estimated with any accuracy based on the simple modes used for this analysis. An inelastic pushover analysis would be required. 2) If the assessment criterion is “No collapse” it is hard to see how a failure of the in-ground hinge would lead to structural failure of the bridge. The in-ground hinge is confined by ground that has to be competent to cause a plastic hinge to form, and confinement of the pile by the soil will ensure that catastrophic failure does not occur. At LS 2 and LS3, rotation capacity of the in-ground hinge exceeds that of the connection (as noted above), and hence the in-ground hinge cannot control the pile deflection capacity. Nevertheless, I recommend that displacement capacity based on rotation capacity of the in-ground hinge be assessed by a push-over analysis. Such an analysis will also allow a refinement of the displacement capacities predicted in Table 3.

TABLE 1: PILE/FOOTING LIMIT-STATE DEFORMATIONS

LIMIT-STATE VALUES	**P=2224kN**	**P=6670kN**	**P=-896kN**
First-Yield Moment (kNm)	4249	6198	2928
First-Yield Curvature (m^{-1})	0.00293	0.00330	0.00267
First-Yield Rotation (rad)	0.00089	0.00100	0.00081
Serviceability Moment (kNm)	5942	7617	4611
Serviceability Curvature (m^{-1})	0.0152	0.01249	0.0162
Serviceability Rotation (rad)	0.00834	0.00658	0.00905
Damage-Control Moment (kNm)	6703	8173	5470
Damage-Control Curvature (m^{-1})	0.0508	0.0403	0.0577
Damage-Control Rotation (rad)	0.0300	0.0235	0.0342
Ultimate Moment (kNm)	6800	8100	5500
Ultimate Curvature (m^{-1})	0.0803	0.0880	0.0774
Ultimate Rotation (rad)	0.0479	0.0524	0.0462
Bilinear Yield Moment (kNm)	5942	7617	4611
Bilinear Yield Curvature (m^{-1})	0.00410	0.00405	0.00420
Bilinear Ultimate Moment (kNm)	6800	8100	5500
Bilinear Ultimate Curvature (m^{-1})	0.0803	0.0880	0.0774

TABLE 2: PRESTRESSED SECTION LIMIT-STATE DEFORMATIONS

LIMIT-STATE VALUES	P=2224kN	P=6670kN	P=100kN
First-Yield Moment (kNm)	5261	6956	4406
First-Yield Curvature (m^{-1})	0.00444	0.00435	0.00434
First-Yield Rotation (rad)	0	0	0
Serviceability Moment (kNm)	6650	8209	5818
Serviceability Curvature (m^{-1})	0.0136	0.0111	0.0156
Serviceability Rotation (rad)	0.0189	0.0139	0.0232
Ultimate Moment (kNm) (also LS3)	6990	8566	6159
Ultimate Curvature (m^{-1}) (also LS3)	0.0280	0.0232	0.0317
Ultimate Rotation (rad) (also LS3)	0.0485	0.0388	0.0563
Bilinear Yield Moment (kNm)	6650	8209	5818
Bilinear Yield Curvature (m^{-1})	0.00561	0.0513	0.00573
Bilinear Ultimate Moment (kNm)	6990	8566	6159
Bilinear Ultimate Curvature (m^{-1})	0.0280	0.0232	0.0317

TABLE 3: DISPLACEMENT CAPACITIES BASED ON PILE/FOOTING ROTATION CAPACITY (m)

LIMIT STATE VALUES	P=2225kN	P=6670kN	P=-896kN
EI pile (kNm^2)	$1.28x10^6$	$2.07x10^6$	$0.89x10^6$
First yield displacement (m)	0.43	0.34	0.49
Serviceability Displacement (m)	0.61	0.48	0.69
Damage Control Displacement (m)	1.00	0.79	1.16
Ultimate Displacement (m)	1.30	1.28	1.36

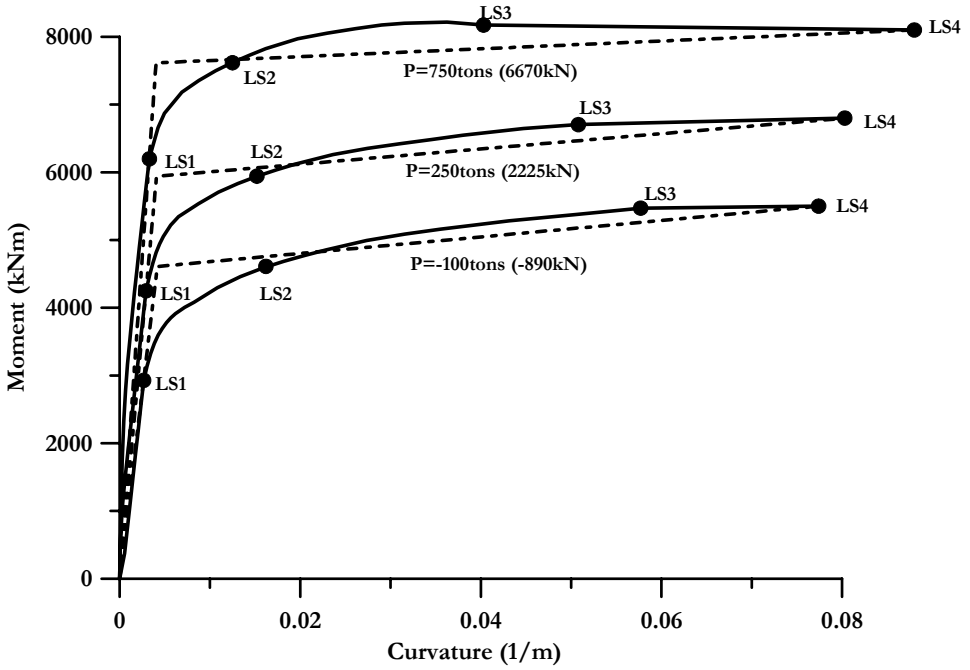

Fig.1 MOMENT-CURVATURE RESULTS FOR 54in. PILE/FOOTING CONNECTION (LS1=Yield, LS2=Serviceability, LS3=Damage Control, LS4=Ultimate)

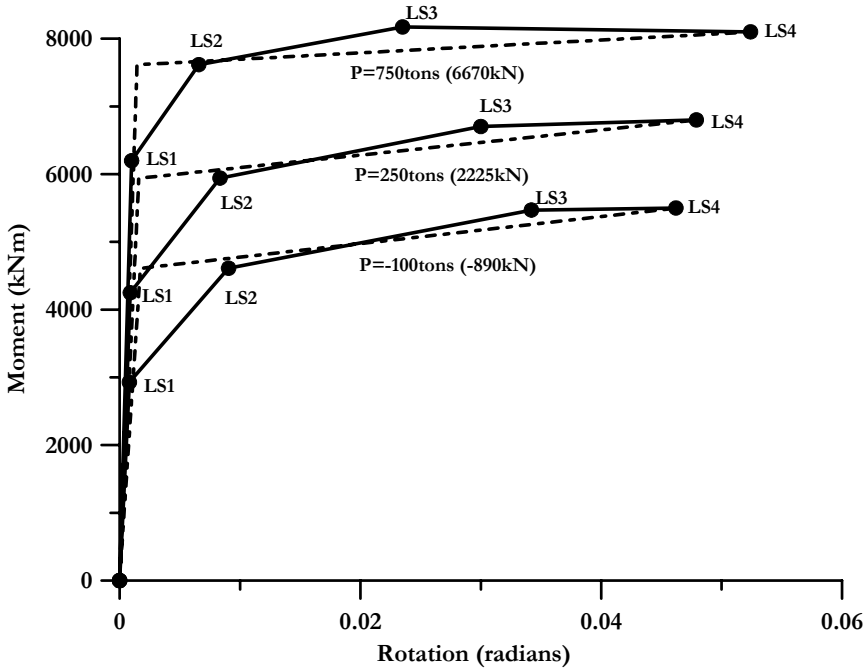

Fig.2 MOMENT-ROTATION RESULTS FOR 54in. PILE-FOOTING CONNECTION (LS1=Yield, LS2=Serviceability, LS3=Damage Control, LS4=Ultimate)

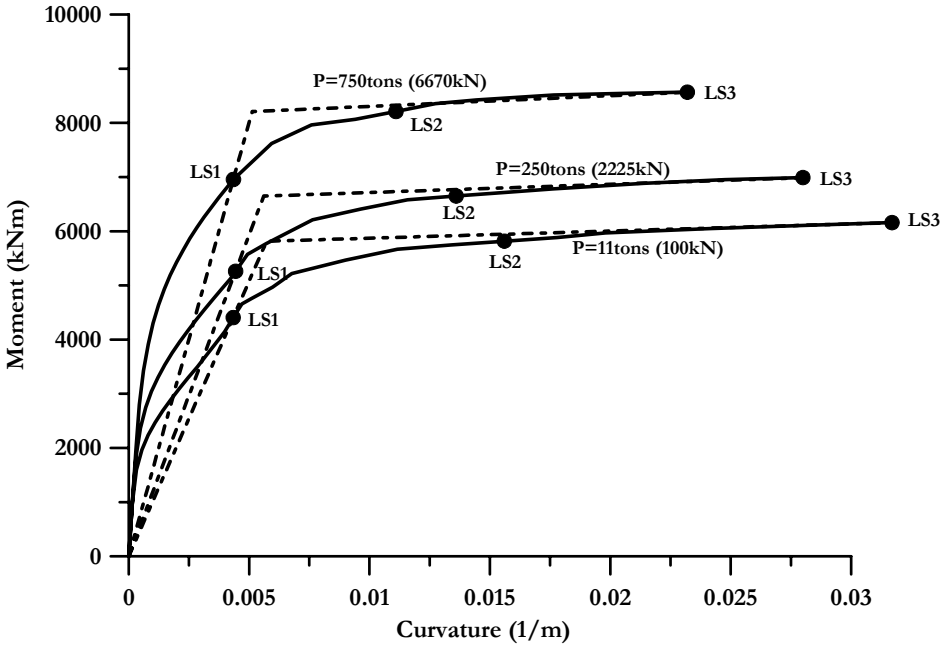

Fig.3 MOMENT-CURVATURE RESULTS FOR 54in. PRESTRESSED PILE SECTION (LS1=Yield, LS2=Serviceability, LS3=Damage Control/Ultimate)

10. DUMBARTON_SITECHARRPT
&
10A-10I APPENDICES

GEOTECHNICAL SITE CHARACTERIZATION REPORT
DUMBARTON BRIDGE SEISMIC RETROFIT PROJECT

Task Order No. 2A

Prepared for:

Bay Area Toll Authority (BATA)
And
California Department of Transportation (Caltrans)

Submitted by:

EARTH MECHANICS, INC.

October 2, 2008

TABLE OF CONTENTS

1.0 INTRODUCTION 1-1
1.1 Purpose and Scope of Work 1-1
1.2 Project Description and Background 1-2
1.3 Datum 1-3
1.4 Report Organization 1-3
1.5 Previous Reports 1-4

2.0 FIELD INVESTIGATIONS 2-1
2.1 Review of Existing Data 2-1
2.2 Present Field Investigation 2-1
2.2.1 General 2-1
2.2.2 Drilling and Soil Sampling Operations 2-5
2.2.3 Logs of Test Borings 2-7
2.2.4 Field Vane Shear Testing 2-7
2.2.5 Down-hole Seismic Suspension Logging 2-7
2.2.6 Cone Penetration Tests 2-7
2.2.7 Pore Pressure Dissipation Tests 2-8
2.2.8 Offshore Geophysical Survey 2-8
2.3 Comparison of Existing Data to Field Exploration Findings 2-8

3.0 LABORATORY TESTING PROGRAM 3-1
3.1 Descriptions of Laboratory Tests 3-1
3.1.1 Moisture-Unit Weight Tests (ASTM D-2216 & D-2937) 3-1
3.1.2 Grain Size Analyses (ASTM D-422) and Wash on #200 (D-1140) 3-1
3.1.3 Atterberg Limits (ASTM D-4318) 3-1
3.1.4 Direct Shear (ASTM D-3080) 3-1
3.1.5 Consolidated-Undrained Triaxial (ASTM D-2850) 3-2
3.1.6 Consolidation (ASTM D-2435) 3-2
3.1.7 Soil Corrosivity (CA Tests 417/422/532/643) 3-2
3.1.8 Organic Test (ASTM D-2974) 3-2
3.1.9 Special Strain Rate Test 3-2
3.2 Laboratory Tests Results 3-3

4.0 GEOLOGY AND SUBSURFACE CONDITIONS 4-1
4.1 Regional Geology and Geomorphology 4-1
4.2 Regional Tectonics and Seismicity 4-2
4.3 Stratigraphy of the Southern San Francisco Bay, Dumbarton Bridge section 4-3
4.3.1 Young Bay Mud (ybm) 4-3
4.3.2 Quaternary alluvium (Qa) 4-4
4.3.3 Posey Formation (upper, clay) 4-4
4.3.4 Posey Formation (middle, silty sand) 4-4
4.3.5 Posey Formation (lower, sandy gravel) 4-4
4.3.6 San Antonio Formation (silty sand and silty clay) 4-5
4.3.7 Old Bay Mud 4-5

5.0 ENGINEERING PROPERTIES OF SOILS 5-1
5.1 Blowcounts 5-1

5.2 Unit Weight 5-2
5.3 Water Content 5-2
5.4 Undrained Shear Strength 5-2
5.5 Shear Wave Velocity 5-2
5.6 Recommended Pile Design Parameters 5-3
6.0 REFERENCES 6-1
7.0 FIGURES 7-1
8.0 APPENDIX A, LOGS OF PREVIOUS EXPLORATIONS 8-1
9.0 APPENDIX B, LOGS OF TEST BORINGS 9-1
10.0 APPENDIX C, VANE SHEAR TEST RESULTS 10-1
11.0 APPENDIX D, SUSPENSION LOGGING RESULTS 11-1
12.0 APPENDIX E, CONE PENETRATION TEST RESULTS 12-1
13.0 APPENDIX F, GEOPHYSICAL SURVEY AND BATHYMETRY MAP 13-1
14.0 APPENDIX G, LABORATORY TEST RESULTS 14-1
15.0 APPENDIX H, U.C. DAVIS TEST RESULTS 15-1
16.0 APPENDIX I, SITE EXPLORATION PHOTOS 16-1

TABLE OF TABLES

Table 2-1.Summary of Soil Borings and CPTs 2-3
Table 3-1: Summary of Laboratory Testing 3-4
Table 5-1: Geotechnical Design Parameters along the Bridge 5-1

TABLE OF FIGURES

Figure 1-1. Site Location Map and Photo 7-2
Figure 1-2. Dumbarton Bridge Pier Numbers 7-3
Figure 2-1a. Boring Locations 7-4
Figure 2-1b. Boring Locations, continued 7-5
Figure 2-1c. Boring Locations, continued 7-6
Figure 2-2a. Geologic Cross Section 7-7
Figure 2-2b. Geologic Cross Section, continued 7-8
Figure 2-2c. Geologic Cross Section, continued 7-9
Figure 2-2d. Geologic Cross Section, continued 7-10
Figure 4-1. Bay Area Fault Map 7-11
Figure 5-1. Blowcount vs. Elevation 7-11
Figure 5-1. Blowcount vs. Elevation 7-12
Figure 5-2. Unit Weight vs. Elevation 7-13

Figure 5-3. Water Content vs. Elevation 7-14
Figure 5-4. Shear Strength vs. Elevation 7-15
Figure 5-5. Shear Wave Velocity, from Suspension Logging vs. Elevation 7-16
Figure 5-6. Shear Wave Velocity, from CPT Measurements vs. Elevation 7-17

1.0 INTRODUCTION

This Geotechnical Site Characterization Report presents the results of the geotechnical investigation and data analyses conducted by Earth Mechanics, Inc. (EMI) for the Dumbarton Toll Bridge Geotechnical Investigation project. This work was conducted under contract with the Bay Area Toll Authority (BATA). The California Department of Transportation (Caltrans) provided technical oversight for the project. The project is located in the southern portion of the San Francisco Bay, as indicated on the Site Location Map, Figure 1-1.

1.1 Purpose and Scope of Work

The overall geotechnical program conducted by EMI consists of the following three major elements:

Geotechnical Site Characterization: A number of soil borings (both marine and on-land), CPT soundings (marine and on-land), geophysical measurements, in-situ testing, laboratory testing, subsurface interpretation, and characterization of engineering properties of soils are performed. The operation of the field program, findings from the in-situ and laboratory testing, Logs-of-Test Borings (LOTBs), and the interpreted subsurface conditions are documented in this report entitled "Geotechnical Site Characterization for Dumbarton Bridge Seismic Retrofit Project."

Ground Motion Study: The ground motion study includes probabilistic and deterministic seismic hazard analyses, development of reference rock motion criteria for the Safety Evaluation Earthquake (SEE) and Functional Evaluation Earthquake (FEE) events, generation of spectrum compatible time histories for site response analyses, and kinematic soil-structure interaction analyses to develop ARS (Acceleration Response Spectrum) design curves and pier-specific kinematic time histories. The findings are documented in an EMI report is entitled "Ground Motion Study for Dumbarton Bridge Seismic Retrofit Project."

Foundation Analysis: Detailed analyses of the foundations are conducted. The analyses include characterizations of lateral soil supports (p-y curves), and axial soil supports (t-z and q-u curves) along the pile. Pile capacity evaluations are conducted by performing axial and lateral load-deformation analyses on a single pile. The pile groups are characterized by linearized 6x6 stiffness and mass matrices to be used in a global bridge model for seismic response evaluation. The results are provided in an EMI report entitled "Foundation Analysis for Dumbarton Bridge Seismic Retrofit Project."

The purpose of the geotechnical site investigation was to collect subsurface data in order to characterize geologic deposits and define subsurface properties along the Dumbarton Toll Bridge in the southern San Francisco Bay. The geotechnical site investigation services provided for this project included the following tasks:

- On-land and over-water field explorations including drilling and logging soil borings, in-situ seismic wave velocity measurements, in-situ shear strength measurements, and an offshore geophysical survey.

- Laboratory testing to characterize materials properties for selected soil samples.
- Interpretation of subsurface information and preparation of this report presenting the geotechnical data obtained.

The geotechnical data collected and presented in this report were used in the determination of the performance of the bridge during a design earthquake and in the evaluation of seismic retrofit work needed for the bridge.

1.2 Project Description and Background

The project is located along the Dumbarton Toll Bridge, which crosses the southern San Francisco Bay via California State Highway 84, and connects the cities of East Palo Alto, San Mateo County (southwest) and Fremont, Alameda County (northeast) (Figure 1-1). The 1.63 mile-long Dumbarton Bridge is the southernmost of the highway bridges spanning the San Francisco Bay.

The existing Dumbarton Toll Bridge was completed in 1982, replacing the original 1927-era structure located 90 feet south of the existing bridge; portions of the earlier structure remain today as fishing piers. The existing bridge has three lanes in each direction and a separated bike/pedestrian lane on the eastbound side. A 340 foot center span provides 85 feet of vertical clearance for shipping. The approach spans on both sides of the Bay are of prestressed lightweight concrete girders supporting a lightweight concrete deck. The center spans are twin steel trapezoidal girders which also support a lightweight concrete deck.

The entire bridge is consisted of the Main Channel crossing, East and West Approaches, and a Trestle structure at the end of each Approach structure. Referring to Figure 1.2, the West Approach is composed of Abutment 1 through Pier 16, each founded on 20-inch diameter steel pipe piles with a buried pile cap. For the Main Channel Crossing, Piers 17 to 26 are supported on 54-inch diameter concrete hollow piles with a long cantilever pile length (18 ~ 48 feet) above mud-line, while Piers 27 to 30 are founded on 20-inch diameter steel pipe piles with a buried pile cap. The East Approach is composed of Piers 31 to 43 and Abutment 44, each carried by 20-inch diameter steel pipe piles with a buried pile cap.

The Trestles at two ends of the Approaches are supported on pile extensions of 20"x20" cross-section; each trestle has 20 trestle bents with both the north and south faces supported by pre-cast retaining walls.

While the Dumbarton Toll Bridge construction incorporated seismic resistant features as required by the post-1971 San Fernando earthquake codes, recent significant changes in seismic design practice prompted Caltrans to initiate vulnerability studies in 2004 (Caltrans, 2005). The studies were unable to conclusively determine the performance of the bridge during a maximum credible earthquake. The studies found that a comprehensive geotechnical study was necessary to determine whether seismic retrofit work is needed for the bridge.

In addition to this investigation, other current major projects in the southern San Francisco Bay include the Bay Tunnel and the Dumbarton Rail Bridge. The Bay Tunnel, a water tunnel currently under design, will be located approximately 0.6 miles south of the highway bridge. The Dumbarton Rail Bridge is located 0.7 miles south of the highway bridge and planning is underway for the rehabilition of that bridge as a rail commuter

corridor.

1.3 Datum

Coordinates and elevations referenced in this report were determined through field surveying using a Thales ProMark3 differential global positioning system (DGPS) with GNSS processing software accurate to approximately 8 horizontal feet and 2-3 vertical feet. Locations are reported in feet using the California Coordinate System of 1983 (CCS83), California Zone 3, referenced to the (horizontal) North American Datum of 1983 (NAD83). Elevations are reported in feet and are referenced to the (vertical) National Geodetic Vertical Datum of 1929 (NGVD29). NGVD 29 was used rather than the North American Vertical Datum of 1988 (NAVD88) to maintain contiguity with existing plans. Elevations for the marine survey sites were referenced to the tidal datum, Mean Low Lower Water (MLLW) in the field and subsequently converted to NGVD29 using the National Oceanic and Atmospheric Administration/National Geodetic Survey (NOAA/NGS) software program Vdatum Transformation Tool, version 1.06.

1.4 Report Organization

This report summarizes results of the geotechnical investigation in the following sections:

- Section 1.0 provides an introduction to the subject;
- Section 2.0 describes the site exploration program;
- Section 3.0 summarizes the laboratory testing program;
- Section 4.0 provides geology and subsurface conditions;
- Section 5.0 presents engineering properties of soil and design parameters; and
- Section 6.0 provides the references.

These text sections are followed by:

- Figures consisting of maps, soil profiles and data plots;
- Appendix A: Logs of Previous Explorations;
- Appendix B: Logs of Test Borings (LOTB);
- Appendix C: Vane Shear Test Results;
- Appendix D: Suspension Logging Results;
- Appendix E: Cone Penetration Test Results;
- Appendix F: Geophysical Survey and Bathymetry Data;
- Appendix G: Laboratory Tests and Data;
- Appendix H: University of California, Davis Testing Program, and
- Appendix I: Site Exploration Photos.

1.5 Previous Reports

The following existing reports document previous studies of interest to this project:

- "Dumbarton Toll Bridge: Seismic Vulnerability Study" prepared by Caltrans-DES/OEE, 2005.
- "Bay Division Pipelines Reliability Upgrade (CUW36801) Bay Tunnel Project, Technical Memorandum No. 6, Draft Seismicity" by Jacobs Associates with URS, 2007.
- 'Draft Geotechnical Data Report, Bay Division Pipeline Reliability Upgrades, Bay Tunnel Engineering Services, Agreement No. CS-781" by Jacobs Associates with URS, 2006.
- "Log of Test Borings, Dumbarton Bridge Replacement Approach Structure, Drawing No. 04-397454-47 through 50" By Caltrans, 1975.
- "Log of Test Borings, Dumbarton Bridge Replacement Main Channel Crossing, Drawing No. 04-397484-46 through 48" by Caltrans, 1977.
- "Log of Test Borings, Logs of Test Borings, Dumbarton Bridge Replacement, West Approach Structure, Main Channel Crossing, and East Approach Structure, Bridge No. 36-38 and 35-38" by Caltrans, 1978.
- "Log of Test Borings, Dumbarton Bridge Replacement, Main Channel Crossing" by Caltrans, 1978.
- "Log of Test Borings, Dumbarton Bridge Paint M.S." by Caltrans, 1989.
- "Log of Test Borings, Dumbarton Bridge Seismic Analysis" by Caltrans, 1995.

2.0 FIELD INVESTIGATIONS

2.1 Review of Existing Data

We reviewed a variety of references related the geotechnical, geologic, and seismic conditions near the Dumbarton Toll Bridge and the southern San Francisco Bay. Selected references are listed at the end of this report in Section 6.0.

Along the bridge alignment, explorations prior to the current project consist of series of soil borings and penetration test borings performed by Caltrans in 1975, 1977, 1978, 1989, and 1995.

The 1975 boring program produced 4 sheets of boring logs showing 22 soil borings with a deepest penetrated elevation of -220 feet. The 1977 boring program produced 3 sheets of boring logs showing 10 soil borings with a deepest penetrated elevation of -210 feet. In 1978, a total of 48 soil borings and 7 penetration test borings were drilled, and the findings were documented on 9 sheets of boring logs which show a maximum penetrated elevation of -110 feet.

We judged that the boring programs conducted in 1975, 1977, and 1978 were in preparation for the design and construction of the Dumbarton Toll Bridge which was completed in 1982. Three shallow borings were drilled in 1989, and a deep drilling program was carried in 1995 for seismic analysis of the bridge. The 1995 boring program consisted of 6 soil borings and 5 cone penetration test (CPT); some borings penetrated to elevation -750 ft.

The Lawrence Livermore National Laboratory made measurements of shear wave and compression wave velocities at two locations along the bridge in 1992 and 1993; one near mid span and near the west end of the bridge. These borings were 220 and 230 feet deep, respectively. Also, the 1995 Caltrans boring program included shear and compression wave velocity logging. These shear wave velocity measurements were reviewed and the data are included on the idealized soil profile.

Logs of these borings from the earlier works are presented in Appendix A. A comparison of the findings from those previous investigations to the present field investigation is presented in Section 2.3.

2.2 Present Field Investigation

2.2.1 General

During the period of November 27, 2006 to January 26, 2007, Earth Mechanics Inc. (EMI) conducted a geotechnical investigation along existing piers and abutment structures of the Dumbarton Bridge. The field investigation was carried out both on-land and over-water, and consisted of 14 soil borings, six down-hole seismic suspension loggings, seven vane shear tests, and 34 cone penetrometer tests (CPT). On-land sites were located on both the north and south sides of the southwest (Menlo Park) and northeast (Fremont) termini of the bridge, and over-water sites were located north of the pier supports in the San Francisco Bay. Boring locations were selected based on consideration of locations of previous borings, gaps in existing data and site accessibility. Boreholes and CPT soundings ranged in depth from 67 to

270 feet and have designated numbers based on borehole type (e.g., CPT) and relative position (e.g., 06-03). Summaries of the soil and CPT borings are presented in Table 2-1. Soil and CPT boring locations are shown in Figure 2-1.

Of the 14 soil borings, four were positioned on-land (06-01 and 06-02, and 06-13 and 06-14) and ten were positioned over-water (06-03 through 06-12). On-land drilling was conducted from 11/27/2006 through 12/5/2006 and over-water drilling was conducted from 1/8/2007 to 1/25/2007. On-land drilling took place over one or two 10 hour day shifts per site; over-water drilling was conducted around-the-clock and lasted between ~15 and 33 hours per location depending on site conditions and borehole depth. Logs of test borings (LOTBs) are presented in Appendix B.

In addition to drilling and sampling, vane shear tests were performed at five borehole locations (06-05, 06-06, 06-07, 06-09, 06-12) and down-hole seismic suspension logging was performed at six borehole locations (06-02, 06-04, 06-05, 06-06, 06-07, 06-14). Results of vane shear tests and suspension logging are presented in Appendices C and D respectively.

To supplement the physical soil data and to aid in stratigraphic correlation, 13 on-land and 21 over-water sites were selected for CPT testing. The on-land CPT were performed as seismic soundings. CPT durations ranged from ~ 1 to 4 hours depending on site conditions. Results of the CPT borings are presented in Appendix E. Geologic cross-sections are presented in Figure 2-2.

Table 2-1.Summary of Soil Borings and CPTs

	Boring	Coordinates (CCS83; CA-Zone 3, NAD83)		Dates Drilled		Total Depth (ft)
		Northing	Easting	Start Date	End Date	
On-land soil borings	06-01	2,007,960.14	6,088,779.73	11/30/2006	12/1/2006	150.5
	06-02	2,008,349.36	6,089,395.52	11/27/2006	11/28/2006	150.5
	06-13	2,013,294.63	6,095,004.13	12/4/2006	12/5/2006	150.5
	06-14	2,013,610.76	6,095,221.48	11/28/2006	11/29/2006	150.5
Over-water Soil Borings	06-03	2,008,791.75	6,089,675.20	1/10/2007	1/11/2007	151.5
	06-04	2,009,180.00	6,090,108.00	1/19/2007	1/20/2007	170
	06-05	2,009,778.70	6,090,878.76	1/22/2007	1/23/2007	251.5
	06-06	2,010,316.82	6,091,542.60	1/15/2007	1/16/2007	270
	06-07	2,010,725.06	6,091,997.42	1/16/2007	1/17/2007	210
	06-08	2,011,209.29	6,092,590.53	1/8/2007	1/9/2007	151.5
	06-09	2,011,585.80	6,093,108.42	1/9/2007	1/10/2007	151.5
	06-10	2,011,910.72	6,093,452.32	1/25/2007	1/25/2007	151.5
	06-11	2,012,186.80	6,093,829.65	1/12/2007	1/13/2007	152
	06-12	2,012,844.18	6,094,434.56	1/11/2007	1/11/2007	151.5
On-land CPT	06-CPT-01	2,008,041.02	6,088,878.19	12/6/2006	12/6/2006	100.06
	06-CPT-02	2,007,872.67	6,088,870.10	11/29/2006	11/29/2006	100.06
	06-CPT-03	2,008,103.50	6,089,091.98	11/29/2006	11/29/2006	100.06
	06-CPT-04	2,008,193.13	6,089,188.77	12/1/2006	12/1/2006	100.06
	06-CPT-05	2,008,137.94	6,088,979.08	12/1/2006	12/1/2006	100.06
	06-CPT-06	2,008,359.15	6,089,200.33	12/1/2006	12/1/2006	100.06
	06-CPT-27a	2,012,970.50	6,094,760.64	12/5/2006	12/5/2006	100.23
	06-CPT-28	2,013,159.50	6,094,749.76	12/2/2006	12/2/2006	100.23
	06-CPT-30	2,013,301.88	6,095,004.07	12/5/2006	12/5/2006	100.06
	06-CPT-31	2,013,392.00	6,095,078.59	12/2/2006	12/2/2006	100.23
	06-CPT-33	2,013,548.46	6,095,187.10	12/2/2006	12/2/2006	100.23
	06-CPT-34	2,013,611.94	6,095,093.27	12/5/2006	12/5/2006	100.06
	06-CPT-35	2,013,590.56	6,095,074.38	12/5/2006	12/5/2006	100.06

Table 2-1 (continued). Summary of Soil Borings and CPTs

	Boring	Coordinates (CCS83; CA-Zone 3, NAD83)		Dates Drilled		Total Depth (ft)
		Northing	Easting	Start Date	End Date	
Over-water CPT borings	06-CPT-07	2,009,534.00	6,090,566.00	1/24/2007	1/24/2007	100.15
	06-CPT-08	2,008,750.83	6,089,591.30	12/20/2006	12/20/2006	92.03
	06-CPT-09	2,008,985.49	6,089,904.90	12/19/2006	12/19/2006	100.23
	06-CPT-10	2,009,240.38	6,090,278.83	12/12/2006	12/12/2006	88.34
	06-CPT-11	2,009,432.78	6,090,489.29	12/13/2006	12/13/2006	100.39
	06-CPT-12	2,009,618.53	6,090,703.18	12/14/2006	12/14/2006	100.31
	06-CPT-13	2,009,950.56	6,091,080.84	12/14/2006	12/14/2006	100.06
	06-CPT-14	2,010,078.11	6,091,201.92	12/15/2006	12/15/2006	93.5
	06-CPT-15	2,010,263.43	6,091,373.99	12/18/2006	12/18/2006	76.69
	06-CPT-16	2,010,487.33	6,091,674.03	12/19/2006	12/19/2006	91.62
	06-CPT-17	2,010,635.02	6,091,826.36	12/20/2006	12/20/2006	90.88
	06-CPT-18	2,011,045.00	6,092,458.00	1/24/2007	1/24/2007	67.26
	06-CPT-19	2,010,901.00	6,092,280.00	1/24/2007	1/24/2007	71.6
	06-CPT-20	2,011,257.10	6,092,648.04	12/18/2006	12/18/2006	100.15
	06-CPT-21	2,011,450.44	6,092,893.17	12/21/2006	12/21/2006	93.09
	06-CPT-22	2,011,694.55	6,093,245.31	12/22/2006	12/22/2006	100.47
	06-CPT-23	2,011,716.17	6,093,336.94	12/21/2006	12/21/2006	100.06
	06-CPT-24	2,011,988.00	6,093,590.00	1/26/2007	1/26/2007	100.64
	06-CPT-25	2,012,084.00	6,093,702.00	1/26/2007	1/26/2007	100.39
	06-CPT-26	2,012,634.66	6,094,235.29	1/3/2007	1/3/2007	100.06
	06-CPT-27b	2,012,743.98	6,094,313.97	1/2/2007	1/2/2007	100.15

2.2.2 Drilling and Soil Sampling Operations

General Drilling and Sampling Procedures.

All soil borings were drilled by Gregg Drilling, located in Martinez, CA and East Palo Alto, CA using mud-rotary-wash drilling methods. Soils were generally sampled at ~5 ft intervals for ~100 ft; below the uppermost ~100 ft, sample intervals were altered to every ~10 ft. Sampling alternated between Standard Penetration Test (SPT) and California Modified (MC) samplers. Shelby tube and Pitcher tube samplers were used at depths where soils were expected to be predominantly fine-grained. The precise depth interval for sampling with Shelby/Pitcher tubes was determined in the field when drilling conditions (i.e., blow counts and soil cuttings) suggested soils were the appropriate density/consistency for lab tests. SPT sampling was conducted to analyze grain size distributions, moisture content and soil corrosivity; Cal-Mod, Shelby and Pitcher tube sampling were conducted for consolidation tests and shear tests that require soil samples that are relatively undisturbed.

Standard Penetration Tests (SPT) and California Modified (MC) samplers were driven using a 140-lb hammer free falling from a height of 30 inches. The number of blows required to advance the sampler 18 inches was recorded to determine penetration resistance. Blow counts were recorded for each 6" interval; counts from the last 12" were used to calculate consistency and density values. Where the count exceeded 50 blows in the first 6", the blow count was recorded as '0' or, 'refusal' and hammer driving for that depth increment was terminated. Where the count exceeded 50 blows in the second or third 6" interval, driving for that depth increment was terminated and blow counts were recorded as the number of blows driven below the first 6", per number of inches penetrated before meeting resistance (i.e., > 50 blows per <12").

SPT split-tube samplers, 18" in length, with inner and outer diameters of 1.4" and 2.0" respectively, were used in the drilling. SPT samples were placed in plastic sampling bags and tightly sealed with twist ties and electric tape. MC split-spoon samplers, 18" in length, with inner and outer diameters of 2.5" and 3.0" respectively, were lined with one-inch brass rings. Generally, the lowest 6 rings (6" of sample) that were relatively undisturbed by the drilling and extraction processes were encased in 6" plastic-lined sampling tubes, capped, and sealed with electrical tape. Shelby and Pitcher tubes were pushed with a continuous motion using the drill rig's hydraulic system. After the push was completed, the drill rod string was rotated to shear off the sample at the cutting edge. The sample tubes were then capped, sealed with electric tape, and kept in an upright position. All samples were logged in the field and moved to storage in a refrigerated trailer.

On-land Drilling and Sampling Procedures

On-land drilling procedures involved the use of a truck-mounted Failing 1500 drill rig equipped with a 3.87" diameter tri-cone drill bit operated by Gregg Drilling out of their East Palo Alto, CA office. In addition to alternating SPT and MC sampling, hand–augured bulk samples were collected from the first four ft of each borehole. Soil sampling was conducted with alternating SPT, MC and Shelby/Pitcher tube samplers to a depth of 150.5 ft at each of the four on-land sites (06-01, 06-02, 06-12 and 06-13).

Over-water Drilling and Sampling Procedures

Over-water drilling was conducted using Gregg Drilling's *Quin Delta*, equipped with a Mobile B-80/22 mud-rotary drill rig, mounted ~ 30 ft from the bow. The 110' long ship was navigated into position next to the pier structures so boreholes could be drilled as closely as possible to the pier footings. The ship's design, with a shallow (3 ft) draft and long (80 ft) spuds, allowed for stable anchoring in the fluctuating tidal conditions of the southern San Francisco Bay.

An on-board, real-time DGPS system was used for navigation and calculating tide elevations. At each site, prior to drilling, initial water depth (depth to mudline) was measured using a weighted tape. Water depths ranged from 0 to 50+ feet depending on channel bathymetry and tidal fluctuations (up to 8 ft). Elevations were calculated based on measured sample depth below deck, deck height, and tide elevation(s). Mean Low Lower Water (MLLW) was used as a reference datum for mudline and sample elevations, and was obtained from a local National Ocean Service (NOAA-NOS) Tide Watch Monitoring Station (Dumbarton Highway Bridge-Station Reference ID #9414509). In order to maintain relatively consistent sampling intervals (±1 ft) and to conduct tests at target elevations, depths were monitored and readjusted for tidal fluctuations based on charts provided by the NOAA's Electronic Navigational Charts database.

Soil Logging

Soil logging was conducted in accordance with procedures defined in Caltrans Soil and Rock Logging Classification Manual (Caltrans, 2006). Logs include borehole location, time and date of drilling, sample depths, blow counts, percent recovery, in-situ test depths, and soil classification with soil descriptions. Soil samples were classified using the Unified Soil Classification System (USCS); bedrock was not encountered in any of the boreholes. Field-based estimates of soil properties (i.e., color, soil moisture, grain size, etc.) were used for initial soil description and classification; classifications were subsequently modified based on quantitative values from laboratory tests.

SPT Energy Calibration

SPT energy calibrations were conducted to correct for the energy loss transferred to the drilling rod with each hammer blow. To conduct SPT energy calibrations, instrumented sections are attached to rods that measure strain and elevation with each hammer blow. SPT energy calibrations were conducted with Gregg Drilling's Pile Driving Analyzer® (PDA). The N values calculated by the PDA were adjusted to the normalized (60% energy ration) standard for energy transferred to the rods. All equipment and analyses conform to ASTM D6066.

Borehole Abandonment and Waste Disposal

At the completion of drilling, boreholes were backfilled with grout, and soil and drilling-mud waste was placed into labeled 55-gallon steel drums that were removed from site by Waste Management, Kettleman City, CA. The contents of the drums were tested for Title 22 metals (EPA 6010B/7471A), volatile organics/BTEX (EPA 5030B/8260B), and total recoverable petroleum hydrocarbons (EPA 418.1). Based on the testing, the contents were classified as non-hazardous and suitable for disposal at approved waste repositories.

2.2.3 Logs of Test Borings

Fourteen Logs of Test Borings are provided in Appendix B. The soil logs generally follow the Caltrans' standard format and give borehole locations and depths, condensed descriptions of boring operations, blowcounts, descriptions and classifications of soils, and annotated references to soil laboratory tests.

2.2.4 Field Vane Shear Testing

In-situ vane shear tests were performed at five selected over-water locations to determine undrained shear strength in cohesive soils. Field vane shear tests are accomplished by introducing a vane system into the borehole and applying torque to the vane at a specified rate. The torsional force required to cause shearing can be used to measure the soil shear strength of both undisturbed and remolded soils. Results of vane shear testing are presented in Appendix C.

Field vane shear testing was carried out by Gregg Drilling aboard the *Quin Delta* drill ship from 1/9/07 to 1/22/07. Data was collected from Borings 06-05, 06-06, 06-07, 06-09 and 06-12 at depths where soil logging confirmed the presence of cohesive soils. All tests were carried out using a 55mm x 110 mm Geonor vane equipped with a recording/measuring module. For Borings 06-09 and 06-12, vane shear tests were conducted with an Envi MemoVane system that utilized a down-hole measuring/recording device; tests for the remaining borings were completed with Gregg's up-hole measuring/recording torque cell. The vane system used included an outer rod casing, so that as the system was advanced, surrounding soils were prevented from adhering to the inner rod and potentially adding soil/rod friction error to torque measurements. At targeted depths, the inner vane rod was pushed into the soil beyond the outer rod and torque was applied to the vane using an electric motor attached to the drill rig which rotated the vane approximately 4-6 degrees per minute. Remolded soil strengths were tested after the measuring/recording unit showed peak values for torque were exceeded in undisturbed soils. Tests for remolded soil strength were conducted by continuing rotation of the vane for an additional 20 revolutions past peak torque values for undisturbed soils and performing the test again.

2.2.5 Down-hole Seismic Suspension Logging

Down-hole seismic suspension logging (P-S logging) was conducted to supplement stratigraphic information and establish shear wave velocity profiles of the subsurface.

P-S logging was performed at six locations, both on-land and over-water, by GEOVision of Corona, CA between the dates of 11/28/2006 and 1/26/07 using the OYO Model 170 Suspension Logging system. Detailed descriptions of the instrumentation, procedures, results, and analysis of the seismic suspension logging are presented in Appendix D.

2.2.6 Cone Penetration Tests

Cone penetration tests (CPT) were performed over-water and on-land, respectively, at 34 locations.

CPT Procedures

Over-water CPT were carried out aboard the Gregg Drilling's *Quin Delta* drill ship from 11/29/06 and 12/12/06. One to three cone penetration tests were positioned between adjacent soil borings. Soundings were conducted using a 20-ton capacity cone with an equal end area friction sleeve of 225 cm^2, a tip area of 15 cm^2 (60° apex), and a tip end area ratio of 0.85. Appendix E provides data for corrected tip stress (q_t), sleeve friction (f_s,), friction ratios (R_f), correlations to normalized SPT blow counts (SPT N/60), pore water pressure (u_2) and model soil behavior type (SBT). All measurements of q_c, f_s, and u_2 were taken at 5 cm intervals and values were plotted as a function of depth, providing a virtually continuous, real-time log of soils properties.

Seismic CPT Procedures

On-land seismic CPTs were carried out by Gregg Drilling from 12/6/06 to 1/26/07. Seismic CPTs were conducted every five feet using the same cone, sleeve, tip, etc. as described above. The geophone offset distance was 0.66 feet and the source offset distance was 1.67 feet. Corrections for offset distances between the seismic beam and both geophone sets were applied in velocity calculations. To check waveform consistency and maintain desired signal resolution with depth, a minimum of two waves were recorded for each test and the input sensitivity was increased with depth. Shear wave data were sampled at a frequency of 20 kHz and compression wave data were sampled at 50 kHz. Wave form plots and data for shear wave velocity calculations are presented in Appendix E.

2.2.7 Pore Pressure Dissipation Tests

Three pore pressure dissipation tests (PPT) and were performed at sites CPT-04 and CPT-28 on 11/28/06 and 12/02/06, respectively, at depths of approximately 80 and 95 feet. In a dissipation test, the pore water pressure change is obtained by recording the values of the pore water pressure with time during a pause in pushing while the cone penetrometer is held stationary. Results of these tests are presented in Appendix E.

2.2.8 Offshore Geophysical Survey

An offshore geophysical program was conducted by Golder Associates Inc. in December of 2006. The program consisted of multibeam bathymetry, sidescan sonar and subbottom/seismic reflection profiling. The report by Golder Associates, presented as Appendix F, provides information on testing equipment and procedures, analyses, and information on surficial data from the Bay floor, including a bathymetry map. The Microstation contour files and raw data for the bathymetry map is presented on a CD included with this report. This data has been electronically submitted to Caltrans. The bathymetry data on the CD includes: the "original" points gathered in the MLLW vertical control system; the original points "translated" into the NGVD29 vertical control system; and files showing both the NGVD29 elevation and the MLLW elevations.

2.3 Comparison of Existing Data to Field Exploration Findings

Explorations prior to the current project consist of series of soil borings and cone penetrometer tests performed by Caltrans in 1975, 1977, 1978, 1989, and 1995 for the Dumbarton Bridge Replacement and Seismic Analysis projects. In general, this field

investigation strongly corroborated findings from earlier investigations. At the Dumbarton Bridge, soft to medium stiff clays (Young Bay Mud) are present at the east and west approaches. Beneath the Young Bay Mud, the soils include alternating layers of sands, sandy silts, and minor gravels (Posey Formation), silty sands and silty clays (San Antonio Formation), and stiff clays (Old Bay Mud).

Some minor differences in stratigraphic findings can be attributed to discrete alluvial channel deposits associated with Young Bay Mud, variations in Bay bottom elevation due to dredging, and seasonal depositional changes.

Engineering properties of the lithologies were, generally, in good agreement with anticipated values from the previous San Francisco-Oakland Bay Bridge investigation.

3.0 LABORATORY TESTING PROGRAM

Laboratory tests were conducted between the dates of 2/14/2007 and 6/14/2007 by Earth Mechanics, Inc. in Fountain Valley, CA, and by Cooper Testing Laboratory in Palo Alto, CA. Tests were conducted on soil samples that were considered representative of subsurface conditions in general accordance with applicable American Society for Testing and Materials (ASTM) standards. All Shelby/Pitcher tubes were x-rayed prior to extraction and analysis to identify possible voids, sedimentary discontinuities, coarse-grained intervals, etc.

Soils were classified in general accordance with ASTM D2488, which is based on the Unified Soil Classification System. Tests conducted for this project included moisture content, unit weight, grain size distribution, No. 200 sieve wash, Atterberg limits, unconsolidated-undrained triaxial compression tests, unconfined compression tests, direct shear, and corrosivity.

3.1 Descriptions of Laboratory Tests

3.1.1 Moisture-Unit Weight Tests (ASTM D-2216 & D-2937)

The in-situ moisture content in percent of dry weight and total unit weight were determined on selected drive samples taken in the field exploration. The information is useful for soil classification and the state of in-situ compaction and water content. Test results, in terms of moisture content in percent and unit weight in pound per cubic foot are given on the boring logs.

3.1.2 Grain Size Analyses (ASTM D-422) and Wash on #200 (D-1140)

Sieve and hydrometer tests as well as wash on #200 sieve were performed on representative samples of the various soils to assist in the soils classification. Liquefaction analysis and scour evaluation also rely on the grain size data. Particle sizes finer than No. 200 are determined using hydrometer tests. Results of these analyses are presented on gradation curves describing relative percentages of different particle sizes.

3.1.3 Atterberg Limits (ASTM D-4318)

Atterberg Limits Tests were performed to evaluate their plasticity and aid in their classification. The Atterberg Limits include Plastic Limit (PL), Liquid Limit (LL), and Plastic Index (PI). PL is defined as moisture content at the point of transition from semisolid to plastic state; LL from plastic to liquid state. PI is difference between the Plastic Limit and Liquid Limit; this is an important parameter in distinguishing clayey soils from sandy soils.

3.1.4 Direct Shear (ASTM D-3080)

Direct shear tests were run on selected drive samples using a constant strain-rate shear machine. Samples were placed in the shear machine, a normal load applied and the samples soaked prior to shear. The samples were sheared to the end of the shear box

using an appropriate shearing rate. The test was repeated on two other samples using different normal loads. The ultimate shearing resistance for each sample was determined and a plot prepared indicating the strength parameters, the angle of internal friction (φ) and the cohesion (C).

3.1.5 Consolidated-Undrained Triaxial (ASTM D-2850)

Consolidated-Undrained Triaxial tests were run on clayey soil samples to determine the compressive strength of the soils. Samples with a length to diameter ratio of 2 were loaded in a triaxial cell with appropriate confining pressure. However, the sample wrapped in rubber membrane is not allowed to consolidate; i.e., drainage is closed. The compressive load and axial deformation were recorded.

3.1.6 Consolidation (ASTM D-2435)

Consolidation tests were performed on drive samples to determine the moisture sensitivity and compressibility of the typical soils. This test involved loading samples into a consolidometer, which contained porous stones on both top and bottom. Vertical loads were applied and the resulting deflections were recorded at various times. Normal loads were applied at a constant load-increment ratio, successive loads being generally twice the preceding load. Moisture infiltration was allowed during the tests to determine whether the samples would swell or collapse. Coefficient of consolidation, compression index, and swell index can be obtained from the consolidation testing.

3.1.7 Soil Corrosivity (CA Tests 417/422/532/643)

Resistivity, pH, soluble sulfate and chloride concentrations were determined to evaluate the corrosion potential of common construction materials in contact with site soils. The resistivity is measured in ohm-cm, and sulfate and chloride contents in parts per million (ppm). According to Caltrans Corrosion Guidelines (Caltrans, 2003), a site is considered to be corrosive if the pH is less than 5.5, the chloride content is higher than 500 ppm or soluble sulfate content is more than 2,000 ppm.

3.1.8 Organic Test (ASTM D-2974)

The percent of organic matter in the soil is determined. It involves determination of ash content of an organic soil sample by igniting the oven-dried soil sample. The substance remaining after ignition is the ash, and the ash content is expressed as a percentage of the mass of the oven-dried sample. Organic matter is determined by subtracting percent aimed content from one hundred.

3.1.9 Special Strain Rate Test

Advanced laboratory testing was conducted at the University of California Davis to evaluate the effects of strain rate on the shear strength properties of clay. The testing program consisted of direct simple shear (DSS), and direct interface shear (IDST, MS-IDST) tests conducted with different loading (strain) rates. The results can be used for consideration of strength increase for pile design under seismic loading conditions.

3.2 Laboratory Tests Results

A summary of types and distribution of laboratory tests performed are presented in Table 3-1. Detailed test results are presented in Appendix G and on the Logs of Test Borings (Appendix B).

Additionally, specialized shear strength and consolidation tests were performed on Shelby/Pitcher tube samples by Soil Interactions Laboratory at the University of California, Davis, CA. Tests were conducted on samples from varying depths from Boring 06-07 to measure the effects of rates of loading on shear strengths. A description of the UC Davis testing program, including procedures, results and proposed future tests are presented in Appendix H. The Shelby/Pitcher tube samples were x-rayed by Testing Engineers, Inc. of San Leandro prior to testing.

Discussions of engineering properties, including N-value, unit weight, water content and index properties, undrained shear strength, and shear wave velocity taken from suspension logging and seismic CPT are presented in Section 5.0.

Table 3-1: Summary of Laboratory Testing

Boring#	Grain size distribution		Plasticity of cohesive soils	Compression	Organic material	Shear strength		Soil corrosivity
	ASTM D-1140	ASTM D422-63/CT 203	ASTM D 4318-84/CT 204	ASTM D 2435/CT 219	ASTM D 2974	ASTM D-2850	ASTM 3080-90	ASTM G 57-78/CT 643; ASTM G 51-77/CT 643; CT 417; CT 422
	W	SA	AL	CN	OC	UU	DS	CA
06-01	S-1 (+2) D-7 (-28) D-9 (-38) S-16 (-73)	D-2 (-3) D-11 (-48) D-13 (-58)	S-25 (-143)	D-20 (-93)		D-22 (-113) S-25 (-143)	D-7 (-28) D-15 (-68)	S-4 (-8)
06-02	S-1 (+5) D-4 (-10) D-13 (-55) S-14 (-60) S-18 (-75)	D-2 (+5) S-12 (-50) S-16 (-68)			D-7 (-25)	D-22 (-105)	D-4 (-10) D-11 (-45) D-19 (-80)	S-6 (-20) S-8 (-30)
06-03	D-15 (-82)	S-12 (-69) S-14 (-73)	D-9 (-54) S-16 (-87)	D-5 (-26) D-21 (-112)	S-4 (-26)	D-19 (-102)	D-11 (-59) D-15 (-82)	
06-04				D-21 (-124)			D-9 (-54)	S-1 (-10) D-5 (-31)
06-05			D-4 (-20)				D-10 (-49) D-14 (-70)	S-3 (-16) S-7 (-35)
06-06	S-7 (-94) S-13 (-127)			D-8 (-45) D-12 (-122) D-23 (-174)		D-6 (-89) D-14 (-129) D-17(-144)	S-16 (-138)	S-5 (-283) S-11 (-116)
06-07							D-21 (-176)	S-5 (-78)
06-08	S-7 (-54) S-11 (-76)	S-8 (-60) S-9 (-65) S-10 (-70)	D-14 (-94)	D-5 (-43) D-19 (-122')		D-2 (-31) D-16 (-105)	D-7 (-54) D-11 (-76)	S-3 (-36) S-12 (-82)
06-09	S-6 (-37) D-9 (-53) D-13 (-74) D-20 (-109) S-22 (-120)	S-12 (-69)	D-20 (-109)		D-26 (-141)		D-5 (-32) D-17 (-95)	S-1 (-10) S-4 (-26)
06-10				D-6 (-34) D-19 (-105)			D-17 (-95)	S-1 (-10) S-3 (-20)

Notes:
1) W: % < 200 Sieve ; SA: Particle Size Analysis; AL: Atterberg Limits: CN: One Dimensional Consolidation of Soil; UU: Unconsolidated Undrained Triaxial Test; DS: Direct Shear Test; CA: Measurement of Soil Corrosivity
2) ASTM = American Society for Testing and Materials; CT = California Test Methods
3) 'S'-SPT sample; 'D'-California Modified sample (elevation)

Table 3-1: Summary of Laboratory Testing, continued

Boring#	Grain size distribution		Plasticity of cohesive soils	Compression	Organic material	Shear strength		Soil corrosivity
	ASTM D-1140	ASTM D422-63/CT 203	ASTM D 4318-84/CT 204	ASTM D 2435/CT 219	ASTM D 2974	ASTM D-2850	ASTM 3080-90	ASTM G 57-78/CT 643; ASTM G 51-77/CT 643; CT 417; CT 422
	W	SA	AL	CN	OC	UU	DS	CA
06-11	S-6 (-38) D-9 (-55) D-11 (-66) S-14 (-78) S-16 (-88)	S-8 (-50) S-12 (-71) S-15 (-83)	D-9 (-55)	D-3 (-22)		D-5 (-32) D-22 (-125)	D-7 (-44) D-13 (-75)	S-1 (-11)
06-12	D-9 (-60) S-16 (-93)	S-8 (-55) S-12 (-74)	S-4 (-34) S-14 (-84)	D-15 (-89)		D-5 (-39) D-18 (-107)	D-9 (-60)	S-3 (-28) D-7 (-50)
06-13	S-2 (-3) S-5 (-18) D-13 (-58) S-16 (-73) S-20 (-93)	S-1 (+2) S-12 (-53)	S-10 (-43) S-25 (-143)	D-9 (-38)		D-7 (-28) D-24 (-133)	D-11 (-48) D-19 (-88)	D-3 (-8) S-8 (-33)
06-14	D-6 (-23) D-12 (-53) S-13 (-58) S-19 (-88)	S-11 (-48)	D-2 (-3) S-21 (-103)	D-16 (-73)		D-10 (-43)	D-18 (-83)	D-2 (-3) D-8 (-33)

Notes:
1) W: % < 200 Sieve ; SA: Particle Size Analysis; AL: Atterberg Limits: CN: One Dimensional Consolidation of Soil; UU: Unconsolidated Undrained Triaxial Test; DS: Direct Shear Test; CA: Measurement of Soil Corrosivity
2) ASTM = American Society for Testing and Materials; CT = California Test Methods
3) 'S'-SPT sample; 'D'-California Modified sample (elevation)

4.0 GEOLOGY AND SUBSURFACE CONDITIONS

4.1 Regional Geology and Geomorphology

The Dumbarton Bridge spans the southern San Francisco Bay in the central Coast Ranges, a geomorphic subprovince of the California Coast Ranges characterized by parallel to subparallel, elongated, northwest-southeast trending ranges and valleys that formed as a result of ongoing motion along the Pacific-North American plate boundary Page et al, 1998). The region is commonly further subdivided into fault-bound blocks based on characteristics such as rock type, structure style and magnetic anomalies. The Dumbarton Bridge lies in the southern San Francisco Bay-Santa Clara Valley block, which is a relatively shallow structural valley bound by the Santa Cruz Mountains to the west-southwest and the East Bay Hills to the east. The structural nature of the valley is supported by evidence that includes rapid uplift of the bounding ranges both along fault-block margins and through intra-block warping, basin-flanking piedmont fans, and agraded, rather than eroded, valley floors (Page et. al., 1998).

The San Francisco Bay is a relatively young topographic feature formed during later stages of uplift of the central Coast Ranges from 4-0.47 Ma (Page et. al., 1998). Underlying bedrock includes the Late Jurassic to Cretaceous-aged (~161-65 Ma) Franciscan Complex rocks, comprised of locally sheared, clastic sedimentary rock, altered basalt, chert, and metamorphic rock, overlain in places by strongly folded and faulted, Tertiary-aged (~55-5 Ma) marine sedimentary rock (Spangle and Blair, 1979). The locally folded and faulted, weakly consolidated, generally non-marine Pliocene-Pleistocene (4-0.45 Ma) sedimentary rock that overlies the Tertiary marine sedimentary rock represents late-stage emergence of the central Coast Ranges and the inception of the San Francisco Bay (Lajoie and Helley, 1975; Atwater et. al, 1977). Although the San Francisco Bay-Santa Clara block forms a topographic depression, the region is not strictly considered a sedimentary basin; even in the southern San Francisco Bay where depth to bedrock is greatest, Franciscan Complex rock is commonly encountered at relatively shallow depths of 300 to 800 feet (Goldman, 1969; Atwater et. al, 1977) and is identified in outcrop along the low-lying Coyote Hills east of the Dumbarton Bridge.

Recent (late Pleistocene to present) sedimentation in the San Francisco Bay has been strongly affected by sea level fluctuations in the past half million years, although coring evidence suggests, that during this period, the southern San Francisco Bay has been only infrequently connected to the Pacific Ocean. Evidence for sea level fluctuation is more commonly represented by changes in local base level inferred from overlapping, interfingering, and unconformable units of channel gravel, shallow marsh deposits, and subaerially exposed soils. In the southern San Francisco Bay, including the area beneath the Dumbarton Bridge, there have also been two significant periods of high sea level, represented by estuarine to shallow marine deposits, that occur during the time periods of approximately 123-125 ka and 8 ka to present, each corresponding to the onset of post-glacial conditions (Atwater et. al, 1977; Sloan, 1992), As in most of coastal California, there is no apparent evidence for high sea level in the San Francisco Bay during the penultimate (Wisconsin) post-glacial period between 30-40 ka (Atwater et. al., 1977); either the estuarine sediments were eroded away or the local sea level did not rise to its

present level.

4.2 Regional Tectonics and Seismicity

Figure 4-1 shows major faults in the Bay area. The geology of the San Francisco Bay is controlled by the northwest trending, right-lateral San Andreas fault system that is comprised of several major and minor fault strands with generally similar trends, deformation styles, and seismic histories. The fault system accommodates ~1.5 inches/year of relative dextral shear within the broad boundary (60-120 miles) between the Pacific and North American plates. In the vicinity of the Dumbarton Bridge, the San Francisco Bay-Santa Clara Valley block is bound by two major faults; the main trace of the San Andreas fault occurs approximately 10 miles to the west and the Hayward fault lies ~8 miles to the east. The sub-parallel San Andreas and Hayward faults strike ~N35°W to N37°W and cut through the crust at variably high angles. The San Andreas fault on the San Francisco Peninsula is relatively young strand that has undergone ~15 miles of right-lateral offset in the past 3.3-1.3 Ma (Parsons, et. al., 2002). The Hayward fault system, including the Hayward, Calaveras, Rodgers Creek, and Healdsburg faults, has undergone ~ 65 miles of cumulative offset in the past 12 Ma (Graymer, 2003).

In the southern San Francisco Bay block, the San Andreas fault is considered "locked" at the surface; strike-slip (lateral) motion along the fault occurs as (earthquake-generated) discrete seismic slip events. Slip rate estimates for the Bay area segments of the San Andreas fault are very uncertain, with credible values ranging from 15 to 25 mm/yr (Working Group on California Earthquake Probabilities, 2003).

The model for the Hayward fault suggests it is locked at variable depths from the surface to ~ 7.5 miles below the surface (Bürgmann et. al., 2000). Where the Hayward fault is locked at depth, movement occurs both as seismic and aseismic slip (distributed fault 'creep'). Aseismic slip is an important component of the Hayward fault; in some creeping sections, greater than 50% of the long-term fault displacement is accommodated by aseismic slip and recent studies suggest that aseismic slip releases up to 25% of the seismic moment accumulating on the fault (Furlong et. al., 2003).

There is also a considerable amount of vertical displacement along fault zones in the southern San Francisco Bay. In the west, much of the vertical displacement occurs along folds and discrete thrust faults (e.g., the Monte Vista and Berrocal faults) located within a restraining bend in the San Andreas fault near the foothills of the Santa Cruz Mountains southeast of Palo Alto (Hitchcock and Kelson, 1999). In the east, vertical displacement is especially notable in the Mission Hills region where there is left step-over between the Hayward and Calaveras faults. Vertical offset on the Hayward fault system appears to be partitioned rather than discrete, occurring as oblique right-lateral slip. Relative to other areas in the San Francisco Bay-Santa Clara Valley block, the active uplift rates in both these regions are considered rapid and capable of producing large earthquakes such as the 1989 Loma Prieta earthquake (M_w 6.9) (Bürgmann et. al., 2006) which had an epicenter in the southern Santa Cruz Mountains ~20 miles southeast of the Dumbarton Bridge.

Most historical seismicity in the San Francisco Bay region is associated with the major faults of the San Andreas fault system. A total of 15 earthquakes of moment magnitude (M) ≥ 6.0 have occurred in the San Francisco Bay region in historical times (1850 to

present), including the 1868 M 6.9 Hayward, the 1906 M 7.9 San Francisco and the 1989 M 6.9 Loma Prieta earthquakes. Additionally, between 1808 and 1850, 4 large intensity earthquakes with moment magnitudes estimated between 6.0 and 6.8 occurred in the southern San Francisco Bay region.

Paleoseismicity data from the Fremont area estimates a mean recurrence interval for earthquakes with M ≥ 6.0 between ~ 130-195 years on the Hayward fault. Recurrence intervals for a 1906 San Andreas fault event are estimated between ~250 and 375 years, however given the long recurrence interval relative to available data, the estimates are considered very uncertain (Lienkaemper, 2003).

Based in part on fault segment lengths, the Working Group on California Earthquake Probabilities, 2003 considers the Santa Cruz Mountains and the Peninsula sections of the San Andreas fault capable of generating earthquakes with estimated mean magnitudes of M7.0 and M7.15 respectively; in the event of multiple section ruptures, the magnitude estimates are as great as M7.7. The Hayward fault is considered the most likely source of the next major earthquake in the Bay area and estimated mean magnitude for the southern Hayward fault is M6.7, with rupture of the entire fault zone capable of generating a M7.0 earthquake.

4.3 Stratigraphy of the Southern San Francisco Bay, Dumbarton Bridge section

Nearly continuous late Pleistocene to Holocene deposition in the San Francisco Bay permits the identification and correlation of several contiguous, relatively flat-lying units based on sedimentary characteristics, fossils and physical properties (i.e., blow counts, seismic velocities, SBT models, etc.) up to depths of greater than 300 ft.

Borings and CPT data investigated for this report go to depths of ~250 ft below the modern southern San Francisco Bay surface. The following units have been identified and interpreted based on current and existing borehole data, geophysical information and previous work by Trask and Ralston (1951), Goldman (1969), Atwater et. al., (1977), Helley et. al., (1979), Sloan, (1992) and others.

4.3.1 Young Bay Mud (ybm)

Laterally continuous, very soft, plastic, organic-rich mud found from the modern Bay surface to approximately –40-ft. to –60-ft. elevation. Dredging in the center of the shipping channel has removed much of the upper 40 feet of mud. The wet, loose sediment is gray to dark gray, very fine-grained (clay, silt and fine-grained sand), and generally homogeneous. Bedding is usually absent although occasional parting surfaces and thin laminations of fine-grained sand occur locally. Thin, shell-rich (>90% oyster) layers are common. The shells' reduced, gray to black color, occasional H_2S odor, and trace plant material illustrate the organic nature of the deposit.

An apparently discrete, thick bed of "shell hash" was found within the Young Bay Mud from approximately –15-ft to -38.5-ft. in boring 06-03. The proximity to the modern shoreline, the absence of shells in living position, and the common occurrence of shell middens in and around the SF Bay suggest an isolated, submerged shell midden deposit.

4.3.2 Quaternary alluvium (Qa)

Discontinuous, well-graded sand and gravel found beginning at the approximate lower boundary of the Young Bay Mud (ybm), generally between about –40-ft. to –45-ft. elevation. The loose, wet, deposit has an overall gray to very dark gray color. Gravels are fine to coarse in size with a maximum diameter of approximately 0.75-in., subrounded to well-rounded, and are predominantly hard sandstone, siltstone and mudstone of probable Franciscan Formation origin. The gravel is mixed with coarse-grained to fine-grained gray sand, silt, and trace shell fragments. The discontinuous bedding and the well-rounded, heterogeneous, coarse-grained sediment suggest that the bed is channel-derived. Similar alluvial channel deposits have been described at the same approximate depth in other logs and are likely associated with the Young Bay Mud.

4.3.3 Posey Formation (upper, clay)

Discontinuous, very stiff, plastic clay found at the approximate upper boundary of the Posey Formation, generally between about -30-ft. to –60-ft. elevation. The unit varies in thickness from about 5 to 15 feet and has an olive-gray to grayish brown mottled appearance. Bedding is massive with occasional small, hard carbonate nodules. The mottling and carbonate nodules are suggestive of a subaerial (soil) deposit.

4.3.4 Posey Formation (middle, silty sand)

Generally continuous, medium density, interbedded sand and silty sand found between approximately -45-ft. to -60-ft. elevation. Where encountered, the unit thickness appears relatively constant (about 10 to 15 feet thick) with a gradational lower boundary of sand and gravel. Beds are generally thin (up to 2") and tend to fine upward. The unit has an overall grayish brown color with rare small, hard, carbonate nodules in the silt-rich beds. Poorly graded sand is fine- to very fine-grained. The silty sand member of the Posey Formation is very similar to the underlying San Antonio Formation, but it can be distinguished by its lower coarse-grained contact and differences in overall color and grain size, stiffness, and thickness.

4.3.5 Posey Formation (lower, sandy gravel)

Generally continuous, medium dense, sand and sandy gravel found between approximately –60-ft. to –85-ft. elevation. The unit indiscriminately varies in thickness, from about 5 to 35 feet, and has a sharp lower contact with the underlying, fine-grained San Antonio Formation. In general, the beds coarsen downward grading from poorly-graded, medium-grained sand to well-graded, coarse sand and gravel. Sands and gravel are dark gray to black, subangular to subrounded and comprised of Franciscan Formation-sourced sandstone, siltstone, quartz and chert. Gravels range in size from 0.25-in. to 1.5-in. diameter; shell fragments are common. In the eastern portion of the project alignment, (Piers 26-32) woody (redwood) debris up to 3-in. occurs in the lower gravels. The distinct, coarse-grained member of the Posey Formation was likely deposited in an energetic, braided channel environment.

4.3.6 San Antonio Formation (silty sand and silty clay)

Continuous, medium dense to dense, silty sand found between about –65-ft. and –125-ft. elevation. The unit varies in thickness, from 0 to 45 feet. The lower contact with the Old Bay Mud is gradational over about 20 feet. Overall color changes from mottled olive and gray to dark bluish gray, sediment becomes finer and more plastic, and shelly layers begin to occur. Silty sands are brown to olive brown, medium- to very fine-grained and are either massive or thinly interbedded with silty clay. Occasional beds contain highly oxidized, angular, coarse sand and fine gravel comprised primarily of sandstone and siltstone (Franciscan Formation). The silt and silty clay beds are yellowish brown, olive brown and olive gray, and often strongly mottled. Carbonate nodules up to 0.75-in., reddish brown oxidation and very fine sand lenses are common. Sand-filled burrows, reedy plant material and possible desiccation cracks occur rarely. Both the clayey and sandy units of the San Antonio Formation have characteristics common to an intermittently exposed, low energy, intertidal zone. The sandy and clayey units of the San Antonio Formation have characteristics common to an intermittently exposed, low energy, intertidal zone.

4.3.7 Old Bay Mud

Laterally continuous, very stiff, highly plastic, clay found from approximately -125-ft to -180'-ft elevation. In this part of the San Francisco Bay, the unit ranges in thickness from 40-70 feet. The bluish gray to dark gray sediment is very fine-grained (predominantly clay and silt), and generally homogeneous. Olive gray to light gray mottles and thin, sandy shell layers occur frequently in the top 20 feet of the unit. Bedforms are common but faint, and distinguished by thin, horizontal laminations of fine-grained sand and silt. The Old Bay Mud differs from the Young Bay Mud in its stiffness, and can be distinguished from fine-grained sections of the overlying San Antonio Formation by its darker color, high plasticity and finer sand.

5.0 ENGINEERING PROPERTIES OF SOILS

Subsurface conditions along the Dumbarton Toll Bridge alignment are relatively uniform. The sediments underlying the bridge belong to the late Pleistocene to Holocene deposition. The materials represent a typical of the San Francisco Bay geology. Based on the current investigation results and previous work, the in-situ lithological units can be interpreted and grouped into the following principal strata:

- Fill – Silty clay and silty sand present from elevation +10 ft to -10 ft, underlying the Trestles at both ends of the bridge;
- Young Bay Mud (YBM) – Marine clay underlies the fills, generally found underneath both Approaches and Trestles from elevation 0 to -40 ft;
- Posey Sand – River sand can be found throughout the bridge alignment from elevation -40 ft to -80 ft;
- San Antonio Formation (SAF) – Stiff to very stiff clay with interbeded silt layers can be found from elevation -70 ft to -140 ft;
- Old Bay Mud (OBM) – Very stiff to hard marine clay, found from elevation -120 ft to -190 ft;
- Alameda Formation – Very dense sand and gravel, and very hard clay can be found below elevation -190 ft;
- Franciscan Formation – Sedimentary bedrock, expected at elevation -600 feet.

Figure 2-2 shows the idealized subsurface soil profile developed along the bridge. Within the limit of bridge alignment, the subsurface conditions underlying the site are rather uniform and flat-lying, with minor variation only near the region between Piers 30 and 34.

5.1 Blowcounts

The subsurface profiles include SPT blowcounts measured in the field and SPT-equivalent blowcounts correlated from the modified California Drive sampler blowcounts. Figure 5-1 shows the variation of these blowcounts measured in all borings with elevations.

The blowcounts in artificial fill and YBM are relative low, generally less than 10 blows per foot. The average blowcounts in sandy sediments generally increase with depth from about 10 to 25 blows per foot within Posey Sand. Because of interbedded silts and sand layers, the blowcounts of San Antonio Formation show higher number than Old Bay Mud. The blowcounts in Alameda Formation also increase with depth from about 20 to 30 blows per foot.

5.2 Unit Weight

Figure 5-2 summarizes the dry and total (wet) unit weights determined from ring-lined California Drive samples plotted with elevations where the samples were retrieved. The total unit weights of Young Bay Mud are from 90 to 100 pcf. Posey Sand and San Antonio Formation show the total unit weights ranging from 115 to 130 pcf. Old Bay Mud is from 110 to 120 pcf and Alameda Formation is from 120 to 130 pcf.

5.3 Water Content

Moisture (water) contents of soil specimens were determined from both SPT and ring-lined California Drive samples. The water content, Liquid Limit (LL), and Plastic Limit (PL) measured in all borings are summarized in Figure 5-3. The water contents for Young Bay Mud are very high, some approaching Liquid Limit; this suggests that Young Bay Mud may behave like fluid. The water contents for Posey Sand and San Antonio Formation range from 10 to 30%. Old Bay Mud has a water content of 20 to 50%, while Alameda Formation has a water content of 15 to 30%. In general, the measured water contents and Plastic Indices (PI=LL-PL) are consistent with the soil types and ages of the formations.

5.4 Undrained Shear Strength

Figure 5-4 summarizes undrained shear strengths determined from all CPT measurements for this project. For Young Bay Mud underlying the project alignment, the undrained shear strengths range from 250 to 500 psf. Significant scattering of undrained shear strength data (1,500 psf to more than 5,000 psf) can be observed within San Antonio Formation because thinly bedded silt and fine sand layers are founded in the soils. Most of the piles supporting the Dumbarton Bridge tip into San Antonio Formation, and pile capacity calculations can benefit by realizing that stiffer silty and silt sand layers will carry substantially loads.

Soil specimens from San Antonio Formation were tested at the University of California, Davis for a potential increase in shear strengths when loaded quickly. These tests, while limited in number, suggest that higher strain rates can increase undrained shear strengths as much as 40% depending of velocity.

5.5 Shear Wave Velocity

Seismic shear wave velocities in the soils were logged using the suspension logging method in some of the borings drilled for the project. The data was supplemented by the suspension logging data collected by others in the area. These shear wave velocities are graphically presented on the idealized soil profiles and are summarized in Figure 5-5 compiling all the data from the suspension logging. Shear wave velocities obtained from seismic CPT cones are provided in Figure 5-6. The comparison of shear wave velocity data between the suspension logging and seismic CPT is favorable.

Shear wave velocities show moderate increase with depth, ranging from 250 to 400 ft/sec in Young Bay Mud. The shear wave velocities in Posey Sand increase with depth from

400 to 700 ft/sec. Within San Antonio Formation and Old Bay Mud, shear wave velocities range from 600 m/sec to 900 ft/sec. Upper Alameda Formation has shear wave velocities typically ranging from 900 to 1,100 ft/sec.

5.6 Recommended Pile Design Parameters

Using the field and laboratory test data from the present investigation and the prior studies by others, a set of geotechnical design parameters were adopted for seismic evaluations. A summary of the design soil parameters developed along the bridge are presented in Table 5-1. These design soil properties were utilized during foundation analyses and ground motion studies.

Table 5-1: Geotechnical Design Parameters along the Bridge

Soil Profile I: West Trestle Abut W01 ~ West Approach Pier P02 (Sta. 456+00 ~ 464+00)

Soil Layer	Top Elevation (ft)	γ (pcf)	c (psf)	ε_{50}	ϕ (°)	k (pci)	V_s (fps)
Fill	+2 ~ +6	110	800	0.01	-	-	350~400
YBM	-21 ~ -4	100	300	0.02	-	-	300~350
Sand	-52 ~ -43	120	-	-	35	80	450~600
OBM/SAF	-95 ~ -82	120	4000	0.005	-	-	600~900
UAF	-190	125	-	-	-	-	900~1050

Note: YBM - Young Bay Mud; OBM - Old Bay Mud; SAF - San Antonio Formation; UAF - Upper Alameda Formation.

Soil Profile II: West Approach Pier P03 ~ Pier 16 (Sta. 465+00 ~ 484+00)

Soil Layer	Top Elevation (ft)	γ (pcf)	c (psf)	ε_{50}	ϕ (°)	k (pci)	V_s (fps)
YBM	-10 ~ -1	100	300	0.02	-	-	300~350
Firm Clay[1]	-48 ~ -40	110	800	0.01	-	-	350~400
Sand	-56 ~ -47	120	-	-	35	80	450~600
OBM/SAF	-94 ~ -63	120	4000	0.005	-	-	600~900
UAF	-190	125	-	-	-	-	900~1050

Note: [1] does not appear between Pier 03 and Pier 08.

Soil Profile III: Main Channel Pier P17 ~ Pier 26 (Sta. 486+00 ~ 506+00)

Soil Layer	Top Elevation (ft)	γ (pcf)	c (psf)	ε_{50}	ϕ (°)	k (pci)	V_s (fps)
YBM[1]	-38 ~ -18	100	300	0.02	-	-	300~350
Firm Clay[2]	-47 ~ -39	110	800	0.01	-	-	350~400
Sand	-55 ~ -44	120	-	-	35	80	450~600
OBM/SAF	-80 ~ -66	120	4000	0.005	-	-	600~900
UAF	-190	125	-	-	-	-	900~1050

Note: [1] does not appear between Pier 19 and Pier 24; [2] does not appear between Pier 20 and Pier 23.

Soil Profile IV: Main Channel Pier P27 ~ East Approach Pier 41 (Sta. 507+00 ~ 531+00)

Soil Layer	Top Elevation (ft)	γ (pcf)	c (psf)	ε_{50}	ϕ (°)	k (pci)	V_s (fps)
YBM[1]	-4 ~ +7	100	300	0.02	-	-	300~350
Firm Clay[2]	-39 ~ -27	110	800	0.01	-	-	350~400
Sand	-64 ~ -37	120	-	-	35	80	450~600
OBM/SAF	-103 ~ -70	120	4000	0.005	-	-	600~900
UAF	-190	125	-	-	-	-	900~1050

Note: [1] a sand sub-layer 3'~10' thick appears between Pier 30 and Pier 34; [2] does not appear in Piers 28, 29, 33.

Soil Profile V: East Approach Pier 42 ~ West Trestle Abut E01 (Sta. 532+00 ~ 542+00)

Soil Layer	Top Elevation (ft)	γ (pcf)	c (psf)	ε_{50}	ϕ (°)	k (pci)	V_s (fps)
Fill	+6 ~ +10	110	800	0.01	-	-	350~400
YBM	-5 ~ +5	100	300	0.02	-	-	300~350
Firm Clay	-39 ~ -28	110	800	0.01	-	-	350~400
Sand	-54 ~ -37	120	-	-	35	80	450~600
OBM/SAF	-100 ~ -69	120	4000	0.005	-	-	600~900
UAF	-200	125	-	-	-	-	900~1050

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7.0 FIGURES

8.0 APPENDIX A, LOGS OF PREVIOUS EXPLORATIONS

9.0 APPENDIX B, LOGS OF TEST BORINGS

10.0 APPENDIX C, VANE SHEAR TEST RESULTS

11.0 APPENDIX D, SUSPENSION LOGGING RESULTS

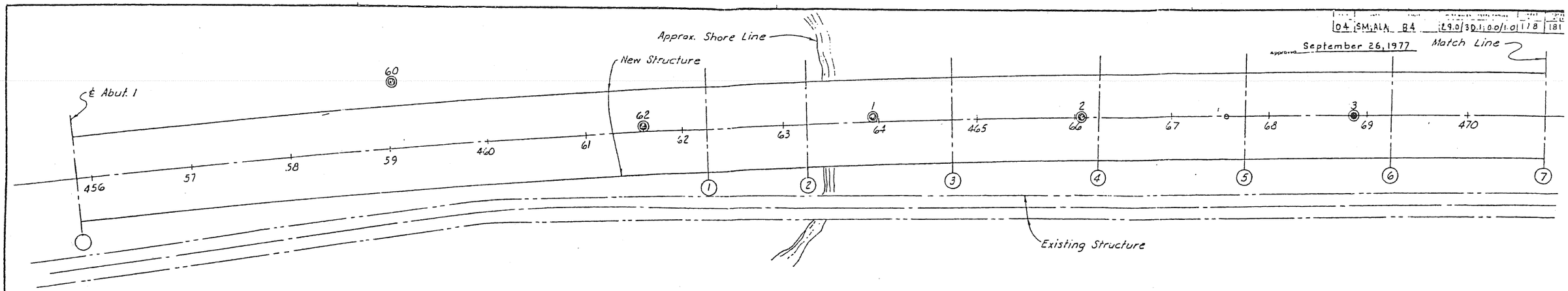
12.0 APPENDIX E, CONE PENETRATION TEST RESULTS

13.0 APPENDIX F, GEOPHYSICAL SURVEY AND BATHYMETRY MAP

14.0 APPENDIX G, LABORATORY TEST RESULTS

15.0 APPENDIX H, U.C. DAVIS TEST RESULTS

16.0 APPENDIX I, SITE EXPLORATION PHOTOS



LEGEND

- BAY MUD
- SHELLS WITH BAY MUD
- SAND
- SAND WITH GRAVEL
- SILTY SAND ○ SANDY SILT
- CLAYEY SAND
- SILTY CLAY – CLAY
- SANDY SILTY CLAY
- CLAYEY SILT
- PEATY CLAY
- FILL

Top hole El.
Blows per 1/2 foot (using a 140 lb. hammer with a 30" drop)
% Moisture
Shear strength (Kips/sq. ft.)
Sample values from
Trip end
Middle
Bottom
Boring No.
Description of material.
Unit weight (#1 cu. ft.)
Bottom
Middle
Tip end
Boring location

NOTES

1. Typical sampling interval – 5 feet.
2. Type of samples recovered: 2.8 in. dia. Shelby Tube (undisturbed), 1 3/8 in dia. standard Penetration Test, 2 in. dia. drive (driven w/slip jars).
3. Types of laboratory tests performed on undisturbed samples. Moisture content, wet and dry unit weight, Atterberg limits, mechanical analysis, consolidation, unconfined compression, triaxial compression.

REDUCED PLAN
USE SCALE BELOW
0 1 2 3
3 INCHES ON ORIGINAL PLAN

8 THS 0 1 2 3 4 10 THS
SCALE IN INCHES ON ORIGINAL

STRUCTURAL STEEL ALTERNATIVE

MARK	DATE	REVISION	BY	CHK.

STATE OF CALIFORNIA — BUSINESS AND TRANSPORTATION AGENCY — DEPARTMENT OF TRANSPORTATION

DESIGN	BY F. Cisneros	CHK. N.Rudolph	
DRAWN	BY F. Estes	CHK. M.Hilliard	
ENGINEERING	C. Lindberg	ESTIMATE	

IN CHARGE OF DESIGN: W. B. Schott

APPROVED July 1, 1975

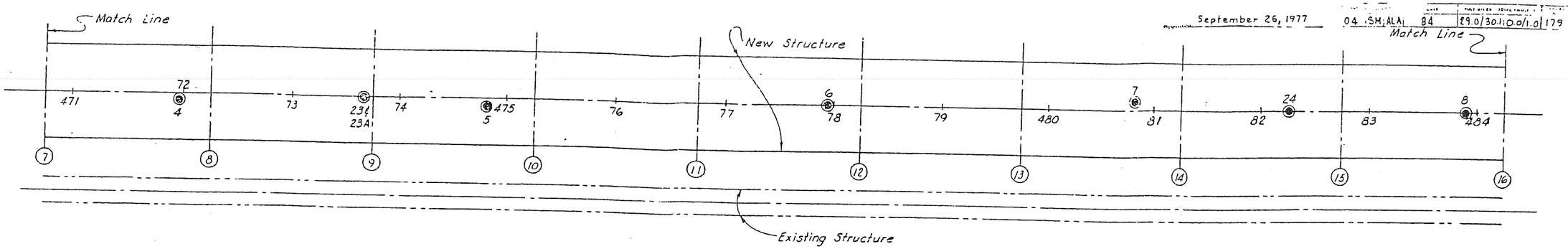
S. Larson
DESIGN ENGINEER – REG. ENG. C12737

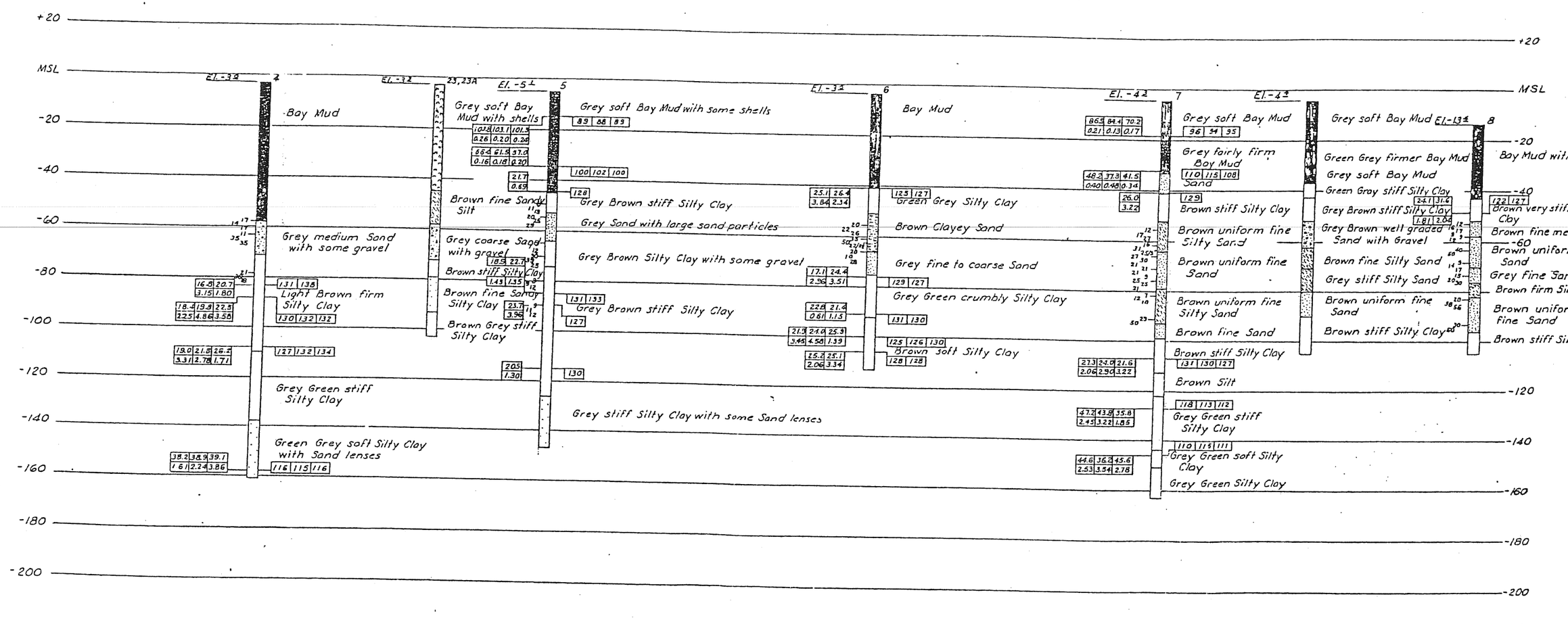
DUMBARTON BRIDGE REPLACEMENT
APPROACH STRUCTURE

LOGS OF TEST BORINGS SHEET 1

SCALE	SHEET NO.	DRAWING NO.
NO SCALE	77	04-397454-77

118





8 THS 0 1 2 3 10 THS 4
SCALE IN INCHES ON ORIGINAL

STRUCTURAL STEEL ALTERNATIVE

REDUCED PLAN
USE SCALE BELOW
0 1 2 3
3 INCHES ON ORIGINAL PLAN

MARK	DATE	REVISION	BY	CHK.

STATE OF CALIFORNIA — BUSINESS AND TRANSPORTATION AGENCY — DEPARTMENT OF TRANSPORTATION

DESIGN BY P. Carrero CHK. W.R. Schott
DRAWN BY F. Eakes CHK.
SPECIFICATION Mark Berg ESTIMATE
IN CHARGE OF DESIGN W.R. Schott

APPROVED July 1, 1975
S. Larsen
DESIGN ENGINEER - BRR ENG. 47213

DUMBARTON BRIDGE REPLACEMENT
APPROACH STRUCTURE
LOGS OF TEST BORINGS SHEET 2

SCALE NO SCALE | SHEET NO. 78 | DRAWING NO. 04-397454-78

179

04	SM;NA	84	29.0 30.1 ; 0.0 1.0		180	181

September 25, 1

Match Line

Match Line

New Structure

Existing Structure

516 519 17 18 19 520 20 21 22 23 24 525 26 27 28 529

21 22 63

31 32 33 34 35 36 37 38 39 40

+20

MSL

-20

-40

-60

-80

-100

-120

-140

-160

-180

-200

El. -2²

El. -3²

El. -2³

El. -0²

El. +8²

19 20 21 22 63

Grey soft Bay Mud with shells

Grey firm Bay Mud, Silty Sand @ top

Grey Black uniform fine Silty Sand

Clean Sand

Grey Black fine Silty Sand

Green Grey Firm Silty Clay

Brown uniform fine Clayey Sand

Brown uniform fine Silty Sand

Brown uniform fine Sand

Clean Sand well graded fine to course

Brown, Large gravels, Silty Clay

Brown fairly clean fine Sand

Brown stiff Silty Clay

Brown Silty Sand

Grey Brown hard crumbly Silty Clay

Grey material with shells

Grey Green very stiff Silty Clay

Sand with pieces of wood

Green Grey smooth textured Silty Clay

Brown very stiff Silty Clay

Brown Sandy Clay

Grey Green stiff to firm Silty Clay

Grey Green fairly soft Sandy Clay

Brown Sandy Clay

Grey soft Bay Mud with shells

Grey clean Sand

Grey fairly firm Bay Mud with shells

Brown firm grading to very stiff Silty Clay

Well graded Sand

Brown stiff Silty Clay

Sandy Silty Clay

Brown uniform fine Sand

Brown stiff Silty Clay

Grey soft Bay Mud with shells

Dark Grey uniform Fine fairly clean Sand

Bay Mud

Brown stiff Silty Clay

Brown very fine Silty Sand

Brown coarse Sand

Brown fine to coarse clean Sand, some gravel to ¾"

Brown stiff Silty Clay

Brown uniform fine Silty Sand

Brown stiff Clayey Silt

Brown firm Silty Sand

Brown loose clean Sand

Brown Silty Clay

Brown Silt

Grey Green fairly stiff Silty Clay

Brown Silty Clay

Brown Clayey Sand

Brown Sandy Silt

Grey Green fairly soft Silty Clay

Grey Fine Silty Sand

Grey soft Bay Mud with shells

Grey Green firm Silty Clay

Brown loose clean fine to Medium Sand

Grey medium Sand with gravel

Brown stiff Sandy Silt

Brown very stiff Silty Clay with some cemented particles

Fill

Black soft to very so Bay Mud

Grey to Tan firm Silty Clay

Brown to Grey fine to coarse fairly clean Sand

Coarse Sand & Pea Gravel

Brown firm to stiff Silty Clay

Brown Silty Sand

Brown Silty Clay to Clayey Silt

Grey to Blue Grey stiff Silty Clay

Grey to Blue Grey soft to firm Silty Clay

8 THS 10 THS

0 1 2 3 4

SCALE IN INCHES ON ORIGINAL

STRUCTURAL STEEL ALTERNATIVE

REDUCED PLAN

USE SCALE BELOW

0 1 2 3

3 INCHES ON ORIGINAL PLAN

MARK	DATE	REVISION	BY	CHK.

STATE OF CALIFORNIA — BUSINESS AND TRANSPORTATION AGENCY — DEPARTMENT OF TRANSPORTATION

DESIGN	BY F. Carson	CHK. W.R. Schott	
QUANTITIES	BY F. Eakes	CHK. W.R. Schott	
SPECIFICATIONS	C. Lindberg	ESTIMATE	
IN CHARGE OF DESIGN	W.R. Schott		

APPROVED July 1, 1975

S. Larsen

DESIGN ENGINEER - REG. ENG. CIVIL

DUMBARTON BRIDGE REPLACEMENT

APPROACH STRUCTURE

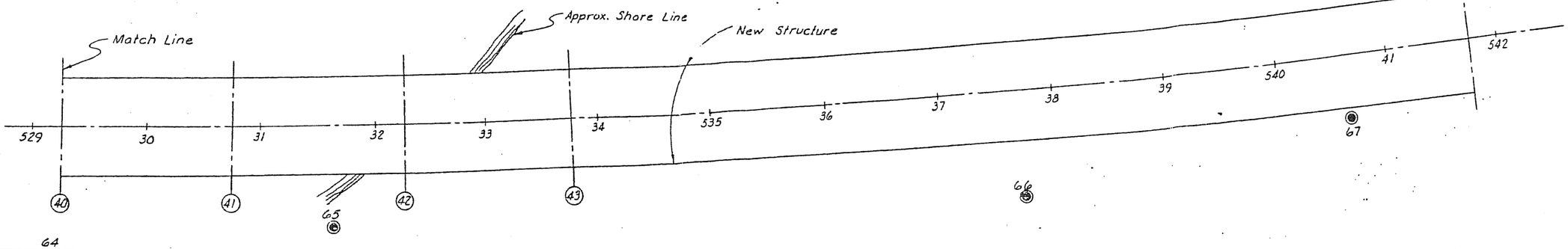
LOGS OF TEST BORINGS SHEET

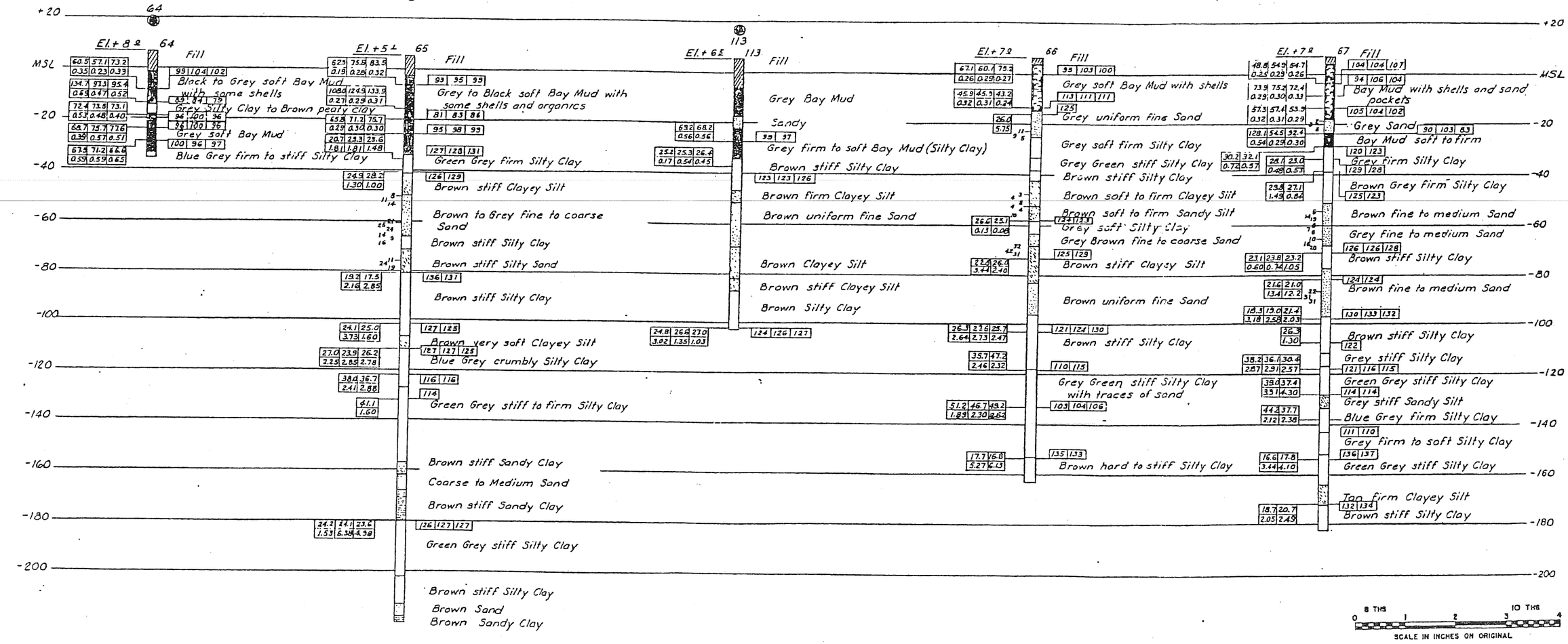
SCALE	SHEET NO.	DRAWING NO.
NO SCALE	79	04-397454-79

180

04	SH; ALA	84	29.0/30.1 ; 0.0/1.0	181

Approved September 26,





8 THS 10 THS
0 1 2 3 4
SCALE IN INCHES ON ORIGINAL

STRUCTURAL STEEL ALTERNATIVE

REDUCED PLAN
USE SCALE BELOW
0 1 2 3
3 INCHES ON ORIGINAL PLAN

MARK	DATE	REVISION	BY	CHK.

STATE OF CALIFORNIA — BUSINESS AND TRANSPORTATION AGENCY — DEPARTMENT OF TRANSPORTATION

RECOM.	BY F. Lumas	CHK.	
DRAWN	BY F. Fakes	CHK.	
SPECIFICATION	A. Lindsay	SETTLE'S	
IN CHARGE OF DESIGN			

APPROVED July 1, 1975

S. Larsen
DESIGN ENGINEER — REG. ENG. C17737

DUMBARTON BRIDGE REPLACEMENT
APPROACH STRUCTURE

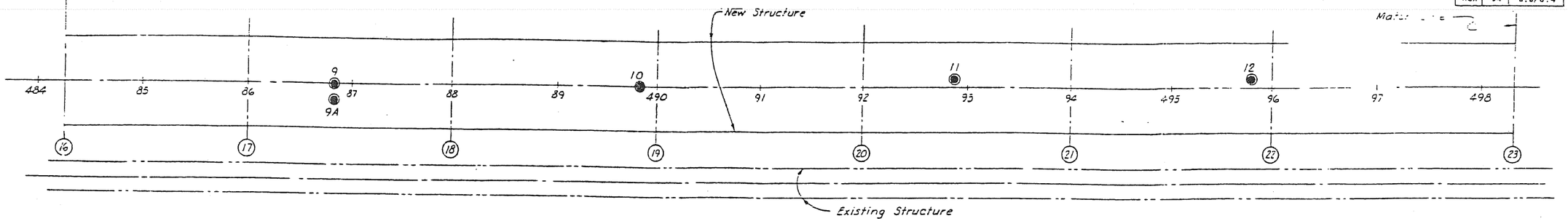
LOGS OF TEST BORINGS SHEET

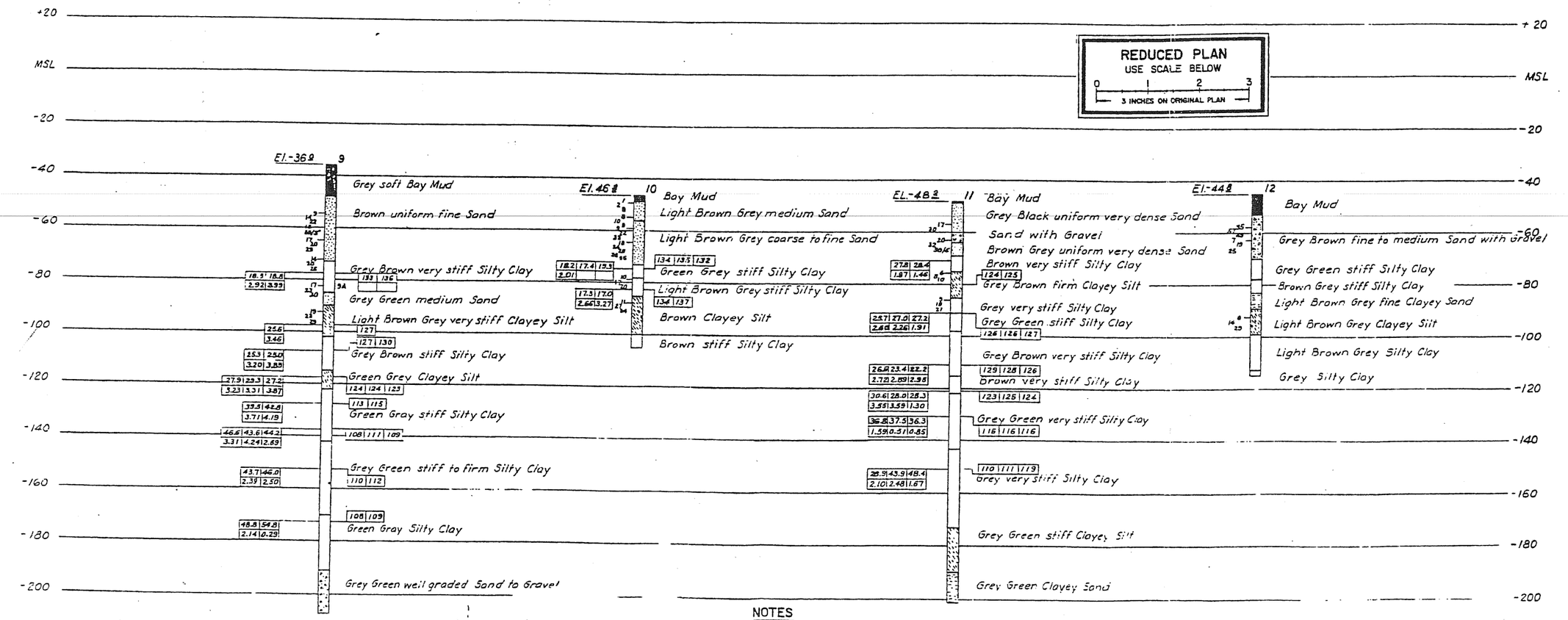
SCALE	SHEET NO.	DRAWING NO.
NO SCALE	80	04-397454-80

181

January 30, 1978

DIST	CO	ROUTE	POST MILE	SHEET NO	TOTAL SHEETS
04	SM	84	29.6/30.1	45	50
	ALA	84	0.0/0.4		





REDUCED PLAN
USE SCALE BELOW
0 2 3
3 INCHES ON ORIGINAL PLAN

LEGEND

BAY MUD
SHELLS WITH BAY MUD
SAND
SAND WITH GRAVEL
SILTY SAND - SANDY SILT
CLAYEY SAND
SILTY CLAY - CLAY
SANDY SILTY CLAY
CLAYEY SILT
PEATY CLAY
FILL

Top hole El.
Boring No.
Blows per ½ ft. (using a 140 lb. hammer with a 30" drop.)
Description of material.
% Moisture
Unit weight (#/cu.ft.)
Shear strength (kips/sq.ft.)
Tip end
Middle
Bottom
Sample values from
Bottom
Middle
Tip end

NOTES

1. Typical sampling interval -5 feet.
2. Type of samples recovered: 2.8 in. dia. Shelby Tube (undisturbed). 1⅜ in. dia. standard Penetration Test. 2 in. dia drive (driven w/sliding jars)
3. Types of laboratory tests performed on undisturbed samples Moisture content, wet and dry unit weight, Atterberg limits, mechanical analysis, consolidation, unconfined compression, triaxial compression.

8 THS 10 THS
0 1 2 3 4
SCALE IN INCHES ON ORIGINAL

STATE OF CALIFORNIA — BUSINESS AND TRANSPORTATION AGENCY — DEPARTMENT OF TRANSPORTATION

DESIGN BY — CHK'D
DRAWN BY — CHK'D
IN CHARGE OF DESIGN

APPROVED NOV 1977

DUMBARTON BRIDGE REPLACEMENT
MAIN CHANNEL CROSSING
LOGS OF TEST BORINGS - I

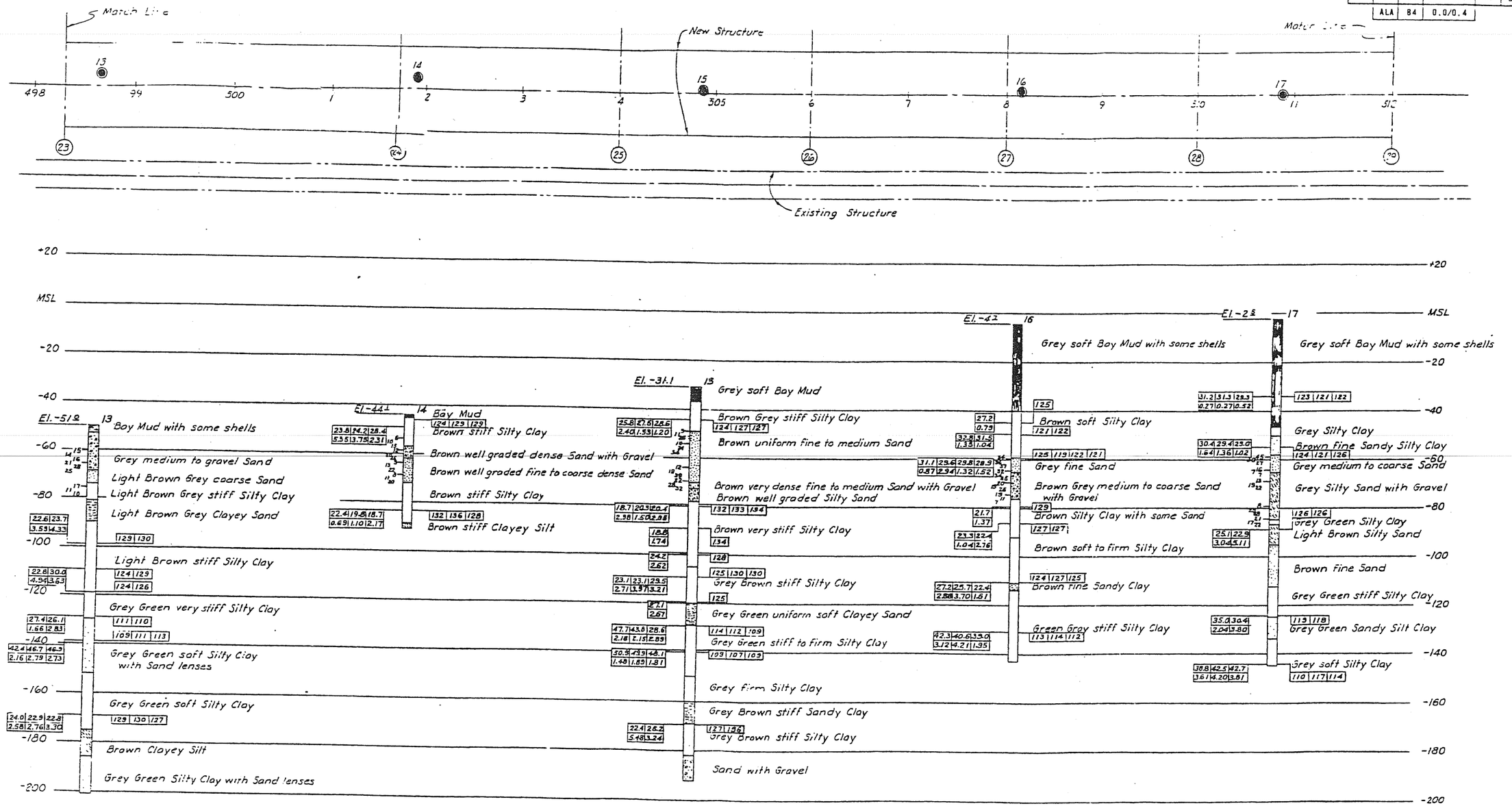
SCALE: No Scale
SHEET NO. 46
DRAWING NO. 04-397484-4E

MARK | DATE | REVISION | BY | CHK'D

46

DIST	CO	ROUTE	POST MILE	SHT NO	TOTAL SHTS
04	SM	84	29.6/30.1	47	50
	ALA	84	0.0/0.4		

Approved January 30 1978



REDUCED PLAN
USE SCALE BELOW
0 1 2 3
3 INCHES ON ORIGINAL PLAN

8 THS
0 1 2 3 4 10 THS
SCALE IN INCHES ON ORIGINAL

STATE OF CALIFORNIA — BUSINESS AND TRANSPORTATION AGENCY — DEPARTMENT OF TRANSPORTATION

DESIGN BY F. CURTIS DRAWN BY W. KAUFMAN
DRAWN BY E. DAVIS CHECKED BY W. KAUFMAN
IN CHARGE OF DESIGN: W. Kaufman
APPROVED NOV 1 1977
DESIGN ENGINEER REGISTERED ENGINEER

DUMBARTON BRIDGE REPLACEMENT
MAIN CHANNEL CROSSING
LOGS OF TEST BORINGS-2

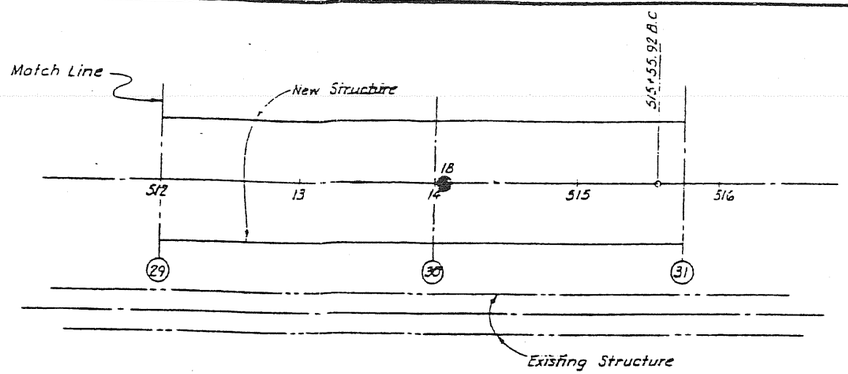
MARK	DATE	REVISION	BY

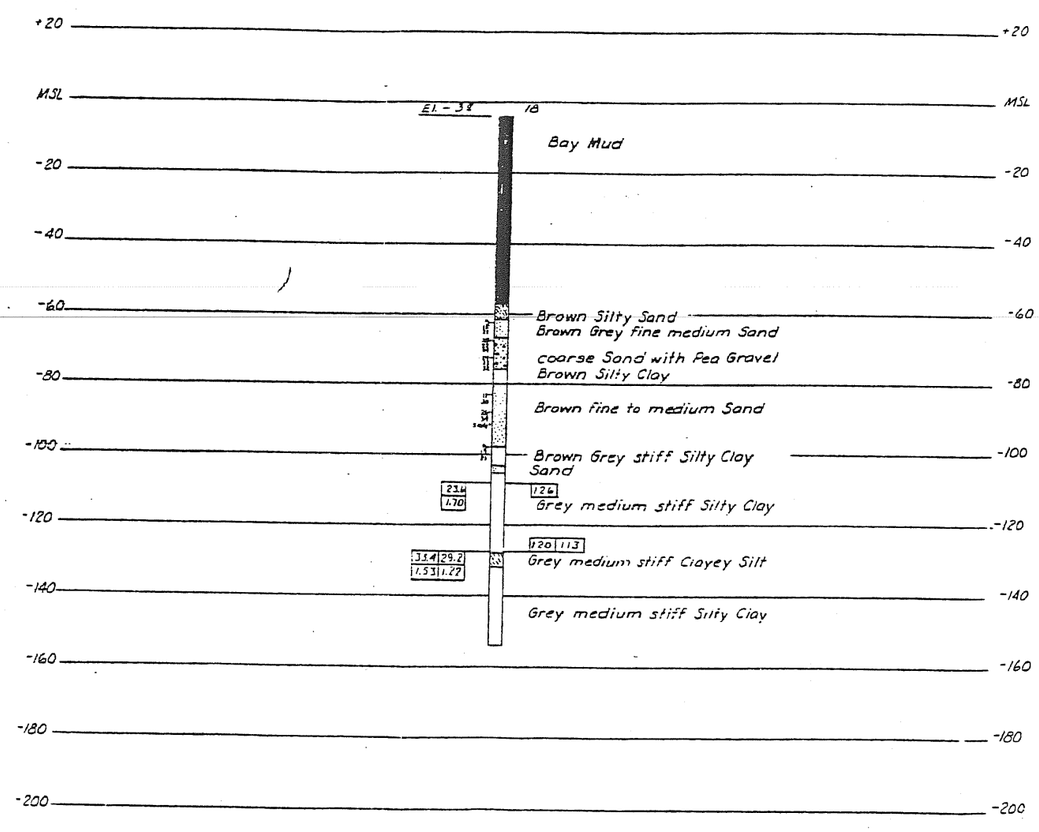
SCALE	SHEET NO.	DRAWING NO.
NO SCALE	47	02 7484-47

47

DIST	CO	ROUTE	POST MILE	SHT NO	TOTAL SHEETS
04	SM	84	29.6/30.1	48	50
	ALA	84	0.0/0.4		

January 30, 1978





REDUCED PLAN
USE SCALE BELOW
0 1 2 3
3 INCHES ON ORIGINAL PLAN

8 THS 10 THS
0 1 2 3 4
SCALE IN INCHES ON ORIGINAL

STATE OF CALIFORNIA — BUSINESS AND TRANSPORTATION AGENCY — DEPARTMENT OF TRANSPORTATION

DESIGN BY F. Lanier CHK. W. Schott
DRAWN BY F. Eskes CHK. W. Schott
IN CHARGE OF DESIGN W. R. Schott
APPROVED Nov. 1 1977
DESIGN ENGINEER - REGISTERED ENGINEER

DUMBARTON BRIDGE REPLACEMENT
MAIN CHANNEL CROSSING

LOGS OF TEST BORINGS - 3

SCALE No Scale | SHEET NO. 48 | DRAWING NO. 04-397484-48

MARK	DATE	REVISION	BY	CHK.

48

DIST.	COUNTY	ROUTE	POST MILES—TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SM, ALA	84			

Gilbert L. Reynolds #165

BENCH MARK

TBM - Elev. 6' ± Existing roadway at spot elevation as shown on site map.

BM V-150 Elev. (?' south side of west end of Dumbarton Br. approx. 30' N/E sta. 163+08 'D' Line

PLAN

1" = 50'

D LINE

A-1W, B-1W, B-7W, B-4W, B-2W, B-5W, B-10W, B-6W, B-15W, B-3W, B-20W, P-1W, B-40W, B-38W, P-2W, B-19W, P-3W, E-14W, P-4W, P-5W, B-13W

456- 457- 458- 459- 460- 461- 462- 463- 464- 465- 466- 467- 468-

Approx. ground line along 'D' Line

SEA LEVEL

Brown, SAND and GRAVEL (up to BOULDER size)

Very loose to loose, brown SILTY SAND and GRAVEL

Very soft, gray ORGANIC CLAY

Dense, brown, SILTY GRAVEL (fill)

Very soft, gray ORGANIC CLAY with peat

Loose, gray, medium SAND with thin interbedded layers of silt

Very soft, gray, organic clay with peat

Compact, gray, fine to medium SAND. Dense, gray, medium SAND with scattered GRAVEL. Dense to compact gray, medium to coarse SAND and GRAVEL

Compact, gray, fine to medium SAND

Compact, gray, medium to coarse SAND with scattered GRAVEL

Compact, brown, CLAYEY SILT

Very stiff, brown SILTY CLAY

Compact, mottled red brown and yellow, admixture of GRAVEL, SAND, SILT and CLAY (fill material)

Very soft to soft, blue gray to gray green, SILTY CLAY and CLAYEY SILT with abundant organic material and scattered shells

Loose to dense, gray, fine to medium SAND and GRAVELLY poorly sorted SAND with occasional thin CLAYEY very fine SAND layers

Very stiff, brown to gray green, SILTY CLAY and CLAYEY SILT

Brown, admixture of SILT, CLAY, SAND and GRAVEL (fill material)

Very soft, gray, SILTY CLAY and CLAYEY SILT with ORGANICS

Slightly compact to dense, gray, fine to medium SAND and GRAVELLY poorly sorted SAND

Slightly compact, gray, SILTY very fine SAND

Very stiff, gray green, SILTY CLAY

Very soft, gray ORGANIC CLAY

Compact, gray, slightly CLAYEY rounded coarse SAND and GRAVEL

Dense, gray, medium to coarse SAND with scattered rounded GRAVEL

Dense, gray, fine to medium SAND with scattered GRAVEL

Compact, gray, fine to coarse SAND with scattered GRAVEL and thin CLAYEY SAND layers

Very soft, gray, ORGANIC CLAY

Slightly compact to compact, gray, CLAYEY fine SAND to fine SAN

Very stiff, tan SILTY CLAY

Very soft, gray ORGANIC CLAY with numerous shells

Soft, gray, SANDY SILTY ORGANIC CLAY

Slightly compact, gray, fine SAND

Dense, gray, medium to coarse SAND and pea GRAVEL

Slightly compact, fine SAND with some pea GRAVEL

Slightly compact, gray, fine SAND

Slightly compact, slightly SANDY SILT with ORGANIC matter - grading to

Slightly compact, gray fine to medium SAND with ORGANIC matter

Compact to slightly compact, gray, fine to medium SAND with pea GRAVEL

Very stiff to stiff, brown slightly SILTY SAND CLAY - grading to

Dense, brown, slightly CLAYEY SILT - grading to

Very stiff, brown, CLAY

Very soft, gray ORGANIC CLAY with numerous shells

Dense to compact, gray, SAND and GRAVEL with scattered SHELLS

Very soft, gray, ORGANIC CLAY

Compact, gray, medium SAND

Compact, greenish gray, medium SAND

grading to

Compact, gray CLAYEY GRAVEL

grading to

Dense, greenish gray coarse SAND and GRAVEL

Compact, brown, coarse SAND and GRAVEL

Very stiff, brown CLAY

12-1-77 12-15-77 12-11-77 12-6-77 12-15-77 12-20-77 12-9-77 11-13-76 2-9-78 1-26-78 1-25-78

300/0.2

PROFILE

Hor: 1" = 50'
Ver: 1" = 10'

0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110

LEGEND OF BORING OPERATIONS

PENETRATION BORING — CORE BORING — JET BORING — ROTARY BORING (WET) — ROTARY BORING (DRY) — 4" AUGER BORING (DRY) — 2½" I.D. CONE PENETROMETER — SAMPLER BORING (DRY) — SOIL TUBE

EARTH MATERIALS

GRAVEL — SAND — SILT — CLAY — SANDY CLAY or CLAYEY SAND — SANDY SILT or SILTY SAND — IGNEOUS ROCK — SEDIMENTARY ROCK — METAMORPHIC ROCK — FILL MATERIAL — BOUNDARY

CONSISTENCY CLASSIFICATION FOR SOILS

According to the Standard Penetration Test

Penetration Index (Blows / Ft.)	Granular	Cohesive
0 - 5	Very loose	Very soft
5 - 10	Loose	Soft
10 - 20	Slightly compact	Stiff
20 - 35	Compact	Very stiff
35 - 70	Dense	Hard
70	Very dense	Very hard

NOTE: Classification of earth material as shown on this sheet is based upon visual field inspection and is not to be construed to imply mechanical analysis.

UNIFIED SOIL CLASSIFICATION SYSTEM

ENGINEERING GEOLOGY BRANCH		
FIELD STUDY	by R. Cox	1/78
DRAWN	by ED FONG	2/78
CHECKED	by R. Cox	2/78

State of CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF STRUCTURES
DESIGN SECTION

PROJECT ENGINEER

BRIDGE NO. 36-33

POST MILE

DUMBARTON BRIDGE REPLACEMENT
APPROACH STRUCTURE (WEST)

LOG OF TEST BORINGS 10F9

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

CU 04220
WO 39745

REVISION DATES (PRELIMINARY STAGE ONLY)

DIST.	COUNTY	ROUTE	POST MILES—TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	ALA,SM	84			

ENGINEERING GEOLOGIST _____ CERTIFIED ENGINEERING GEOLOGIST NUMBER _____

DATE APPROVED _____

P-1W P-4W P-5W P-6W P-7W P-8W P-9W P-10W

B-39W B-30W B-31W B-32W

462 463 466 467 468 469 470 471 472 473 474 475 476

D LINE

BENCH MARK
See "Log of Test Borings 1 of 9"

PLAN
1"=30'

℄ Sta. 462+25.0' Line — B-39W — 5° — 3"
℄ Sta. 466+25.0' Line — B-30W — 7° — 3"
℄ Sta. 469+25.0' Line — B-31W — 6° — 3"
℄ Sta. 475+25.0' Line — B-32W — 6° — 3"

0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120

B-39W:
Brown, SAND and GRAVEL (Fill)
Very soft, gray, ORGANIC CLAY with scattered shell layers
Compact, gray, medium to coarse SAND and GRAVEL
Slightly compact, gray, CLAYEY SAND and SILTY SANDY CLAY
Dense, gray, medium to coarse SAND and GRAVEL
Compact, gray, poorly sorted, medium to coarse, slightly SILTY SAND and GRAVEL
Dense, gray, coarse SAND and GRAVEL
Dense, brown, fine to medium SAND
Stiff, gray SILTY CLAY
Compact, brown, medium SAND
Very stiff, brown, slightly SILTY CLAY grading to
Compact, brown SILT grading to
Very stiff, brown, slightly SILTY CLAY grading to
Slightly compact, brown, CLAYEY SILT grading to
Very stiff, brown, SLIGHTLY SILTY CLAY
11-16-76

B-30W:
Very soft, gray, ORGANIC CLAY with shell layers
Compact, gray, medium to coarse SAND and GRAVEL
Compact, gray, medium to coarse SAND with scattered GRAVEL
Dense, gray, medium to coarse SAND with scattered GRAVEL
Dense, brown, slightly SANDY SILT
Dense, brown, slightly SILTY fine to medium SAND
Dense, brown medium SAND
10-23-76

B-31W:
Very soft, gray, ORGANIC CLAY with shell layers
Very loose, gray, CLAYEY fine to medium SAND
Very soft, gray, ORGANIC CLAY with thin fine to medium SAND lenses
Very soft, gray, ORGANIC CLAY with shell layers
Compact, gray, medium to coarse SAND and GRAVEL
Slightly compact, gray, fine to medium SAND
Compact, gray, medium to coarse SAND and GRAVEL
Very stiff, brown, slightly SILTY CLAY
Slightly compact, brown, interbedded SILTY fine SAND and fine SANDY SILT
Stiff, brown, slightly SILTY CLAY
Stiff, brown, interbedded SILTY SANDY CLAY and SANDY CLAYEY SILT
Very stiff, brown and gray, mottled slightly SILTY CLAY
Very stiff, brown, interbedded fine SANDY SILT and SILTY CLAY grading to
Very stiff, brown, slightly SILTY CLAY
Very stiff, brown and gray, mottled slightly SILTY CLAY grading to
Compact, brown, slightly SILTY fine SAND
Compact, brown, interbedded slightly SILTY CLAY and SILTY fine SAND
10-22-76

B-32W:
Very soft, gray, ORGANIC CLAY with shell layers
Slightly compact, brown and gray, mottled interbedded SANDY SILT and SILTY SAND
Slightly compact, brown, fine SANDY SILT
Compact, brown, medium to coarse SAND with some GRAVEL
Compact to slightly compact, brown, fine to coarse SAND with some GRAVEL
Slightly compact, gray, CLAYEY fine to medium SAND to coarse SAND and GRAVEL
Very stiff, brown CLAY
Very stiff, brown and gray, mottled CLAY
Compact, brown coarse SAND
Compact, brown, interbedded SILTY SAND and SANDY SILT grading to
Very stiff, brown, slightly SILTY CLAY
Slightly compact, brown, SILTY fine SAND
Very stiff, brown and gray mottled slightly SILTY CLAY
Compact, brown and gray, mottled SILT grading to
Very stiff, brown CLAY
Very stiff, brown and gray mottled slightly SILTY CLAY
Compact, brown, interbedded SILTY fine SAND and SILT
10-21-76

462 463 466 467 468 469 470 471 472 473 474 475 476

PROFILE
Hor: 1"=30'
Ver: 1"=10'

LEGEND OF BORING OPERATIONS

TEST PIT
PENETRATION BORING
JET BORING
CORE BORING
ROTARY BORING
SOIL TUBE
SAMPLER BORING (DRY)
ROTARY BORING (WET)
AUGER BORING (DRY)
2½" CONE PENETROMETER

LEGEND OF EARTH MATERIALS

GRAVEL
SAND
SILT
CLAY
SANDY CLAY or CLAYEY SAND
SANDY SILT or SILTY SAND
ORGANIC SILT, CLAY or PEAT
FILL MATERIAL
IGNEOUS ROCK
SEDIMENTARY ROCK
METAMORPHIC ROCK

CONSISTENCY CLASSIFICATION FOR SOILS
According to the Standard Penetration Test

Penetration Index (Blows/Ft)	Granular	Cohesive
0-5	Very loose	Very soft
5-10	Loose	Soft
10-20	Slightly compact	Stiff
20-35	Compact	Very stiff
35-70	Dense	Hard
70	Very dense	Very hard

NOTE: Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

UNIFIED SOIL CLASSIFICATION SYSTEM

ENGINEERING GEOLOGY BRANCH

FIELD STUDY	By	Approved, Recommended By
DRAWN	By LU FONG 11/78	ENGINEERING GEOLOGIST
CHECKED	By	REGISTERED ENGINEERING GEOLOGIST NUMBER

State of CALIFORNIA
DEPARTMENT OF TRANSPORTATION

STRUCTURES - DESIGN
PROJECT ENGINEER

BRIDGE NO. 30-75
POST MILE

DUMBARTON BRIDGE REPLACEMENT
APPROACH STRUCTURE (WEST)

LOG OF TEST BORINGS 2 OF 9

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

CU 04850
WO 39745

Disregard prints bearing earlier revision dates

REVISION DATES (PRELIMINARY STAGE ONLY)

SHEET

DIST	COUNTY	ROUTE	POST MILES — TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SF-A.A.	24			

Robert W. Reynolds #165

BENCH MARK

See Log of Test Borings 1 of 9

PLAN

1"=30'

PROFILE

Hor. 1"=30'
Ver. 1"=10'

LEGEND OF BORING OPERATIONS

TEST PIT

PENETRATION BORING

JET BORING

CORE BORING

ROTARY BORING

ROTARY BORING (DRY)

WATER BORING (WET)

SOIL CORE

2½" CONE PENETROMETER

SAMPLER BORING (DRY)

EARTH MATERIALS

GRAVEL

SAND

SILT

CLAY

SANDY CLAY or CLAYEY SAND

SANDY SILT or SILTY SAND

PEAT and/or ORGANIC MATTER

FILL MATERIAL

IGNEOUS ROCK

SEDIMENTARY ROCK

METAMORPHIC ROCK

Key is based upon Modified Unified.

CONSISTENCY CLASSIFICATION FOR SOILS According to the Standard Penetration Test

Cohesive	Penetration (Blows/Ft)	Granular
Very soft	0-5	Very loose
Soft	5-10	Loose
Stiff	10-20	Slightly compact
Very stiff	20-35	Compact
Hard	35-70	Dense
Very hard		Very dense

NOTE: Classification of earth material as shown on this chart is based upon visual inspection and is not to be construed to imply mechanical analysis.

UNIFIED SOIL CLASSIFICATION SYSTEM

Group Symbols	Typical Names	Information Required for Describing Soils	Laboratory Classification Criteria
GW	Well-graded gravels, gravel-sand mixtures, little or no fines	Give typical name; indicate approximate percentages of sand and gravel; maximum size; angularity, surface condition, and hardness of the coarse grains; local or geologic name and other pertinent descriptive information; and symbol in parentheses	For undisturbed soils add information on stratification, degree of compactness, cementation, moisture conditions and drainage characteristics
GP	Poorly graded gravels, gravel-sand mixtures, little or no fines		
GM	Silty gravels, gravel-sand-silt mixtures		
GC	Clayey gravels, gravel-sand-clay mixtures		
SW	Well-graded sands, gravelly sands, little or no fines		
SP	Poorly graded sands, gravelly sands, little or no fines		
SM	Silty sands, sand-silt mixtures		
SC	Clayey sands, sand-clay mixtures		
ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity	Give typical name; indicate degree and character of plasticity, amount and maximum size of coarse grains; color in wet condition, odor if any, local or geologic name and other pertinent descriptive information; and symbol in parentheses	For undisturbed soils add information on structure, stratification, consistency in undisturbed and remolded states, moisture and drainage conditions
CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays		
OL	Organic silts and organic silty clays of low plasticity		
MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts		
CH	Inorganic clays of high plasticity, fat clays		
OH	Organic clays of medium to high plasticity, organic silts		
Pt	Peat and other highly organic soils		

Boundary Classifications	Soils possessing characteristics of two groups are designated by combinations of group symbols. For example GW-GC, well-graded gravel-sand mixture with clay binder.
Borderline Cases	Borderline cases requiring use of dual symbols.

Coarse-grained soils: More than half of material is larger than No. 200 sieve size.

Fine-grained soils: More than half of material is smaller than No. 200 sieve size.

Organic soils

Boundary Classifications	Soils possessing characteristics of two groups are designated by combinations of group symbols. For example CL-ML, silty clay.
Borderline Cases	Borderline cases requiring use of dual symbols.

Coarse-grained soils: More than half of material is larger than No. 200 sieve size.

Fine-grained soils: More than half of material is smaller than No. 200 sieve size.

Organic soils

B-11W — 3" — Top of barge — 6' Rt. Sta. 470+65 "O" Line — 1-20-78

B-12W — 3" — Top of barge — 8' Sta. 472+25 "O" Line

B-10W — 3" — Top of barge — 10' Lt. Sta. 473+15 "O" Line — 1-19-78

B-9W — 3" — Top of barge — 8' Sta. 476+15 "O" Line — 1-16-78

B-15W — 3" — 0' — 8' Sta. 473+00 "O" Line — 1-26-78

B-8W — 3" — 0' — 8' Sta. 473+15 "O" Line — 1-12-78

B-16W — 3" — 0' — 8' Sta. 480+80 "O" Line — 1-30-78

Apparent ground line along "O" Line

SEA LEVEL

Very soft, dark gray ORGANIC SILTY CLAY with shells

Slightly compact, gray SILTY fine to medium SAND with abundant shells

Slightly compact, gray SILTY fine to medium GRAVELLY SAND with shell and wood fragments

Very stiff, olive brown to gray CLAY with scattered PEBBLE GRAVEL

Compact, brown SANDY GRAVEL

Slightly compact, gray fine SAND with wood fragments

Very stiff, olive brown SANDY to SILTY CLAY

Very stiff, tan and light gray, iron stained, SILT, fine SANDY SILT with fine SAND lenses

Very soft, dark gray ORGANIC CLAY with traces of fine SAND and shells

Slightly compact, gray SILTY fine to medium SAND with shells

Very soft, gray, SILTY CLAY with shells

Slightly compact, gray SILTY fine to coarse SAND with abundant shells

Compact, gray and brown GRAVELLY fine to coarse SAND, mostly coarse

Compact to dense, brown SANDY, fine GRAVEL, mostly fine pea GRAVEL

Very stiff, tan and gray CLAY

Stiff, tan iron stained, fine SANDY CLAY to CLAYEY SILT with scattered LIMY concretions

Stiff, tan and gray, SILTY CLAY with SILT and FINE SAND lenses

Compact, tan SILT, fine SANDY SILT with thin CLAY lenses

Compact, tan, iron stained, combinations of fine SAND, SILT, and SILTY fine SAND

Very soft, gray ORGANIC CLAY with a few shells

Very loose, dark gray, SILT fine to medium SAND with shells

Very soft, dark gray, CLAY with shells

Very loose, gray and tan fine SANDY SILT

Slightly compact, tan, fine SANDY SILT

Dense, brown, clean fine to medium SAND

Dense, brown and gray, SILTY SANDY GRAVEL (1" max. size)

Dense, brown and gray SANDY GRAVEL

Very stiff, gray SANDY CLAY

Loose, gray and tan fine SANDY SILT

Compact, brown fine SAND

Compact, brown, GRAVELLY fine to coarse SAND

Compact, brown, SANDY PEBBLE GRAVEL

Very stiff, tan CLAY

Hard, tan and gray CLAY

Stiff, tan CLAY

Compact, tan, CLAYEY SILT to CLAYEY fine SANDY SILT

Compact, brown, SANDY SILT

Very soft, gray ORGANIC CLAY with a few shells

Very stiff to stiff, brown slightly SILTY CLAY

Stiff, brown and gray mottled CLAY

Dense, brownish gray medium SAND

Compact, gray, slightly CLAYEY coarse SAND and GRAVEL

Very stiff, brown CLAY

Stiff, brown, slightly SILTY CLAY

Very stiff, brown CLAY

Very soft, gray ORGANIC CLAY with a few shell layers

Stiff, gray, slightly SILTY CLAY

Very stiff, brown, SILTY CLAY

Soft, brown, slightly CLAYEY CLAY

Stiff, gray and brown, mottled CLAY

Very soft, gray, slightly SILTY CLAY

Slightly compact, gray, medium to coarse SAND with scattered FINE GRAVEL

Compact, brown medium SAND

Very stiff, brown CLAY

Stiff, brown CLAY

Very soft, gray ORGANIC CLAY.

Very stiff, gray and brown mottled CLAY

Stiff, brown, slightly SILTY CLAY

Slightly compact, brown, fine to medium SAND

Compact, brown medium SAND

Dense, gray, medium to coarse SAND and semi rounded GRAVEL

Very stiff, brown, slightly SILTY CLAY

Very stiff, brown, SILTY SANDY CLAY

Stiff to very stiff, brown SILTY CLAY

D LINE

ENGINEERING GEOLOGY BRANCH			
FIELD STUDY	By R. Fox	1/78	Engineering Responsible By
DRAWN	By ED FONG	2/78	R. Fox
CHECKED	By R. Fox	2/78	Registered Engineering Geologist or Civil Engineer 78

State of CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF STRUCTURES
DESIGN SECTION

PROJECT ENGINEER

DISTRICT 04 — POST

CONCRETE BOX GIRDER REPLACEMENT APPROACH STRUCTURE (WEST)

LOG OF TEST BORINGS 3 OF 9

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2

CU 08650
WO 30745

Unsigned prints bear no or incorrect revision dates

POSITIVE DATED ITEM (JANUARY 1966 ONLY)

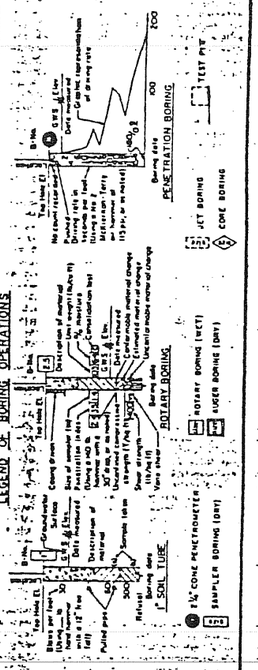
DF 8111

DIST.	COUNTY	ROUTE	POST MILES — TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SM, ALA	84			

ENGINEER IN RESPONSIBLE CHARGE — CERTIFIED ENGINEERING GEOLOGIST NUMBER

DATE APPROVED

LEGEND OF BORING OPERATIONS



LEGEND OF EARTH MATERIALS

- SILTY CLAY w/ GRAVEL
- PEAT and/or ORGANIC MATTER
- FILL MATERIAL
- IGNEOUS ROCK
- SEDIMENTARY ROCK
- METAMORPHIC ROCK
- GRAVEL
- SAND
- SILT
- CLAY
- SANDY CLAY w/ GRAVEL
- SILTY SAND w/ GRAVEL

CONSISTENCY CLASSIFICATION

FOR SOILS

According to the Standard Penetration Test		Cohesive
Penetration (blows/ft)	Granular	
0-5	Very loose	Very soft
5-10	Loose	Soft
10-20	Slightly compact	Stiff
20-35	Compact	Very stiff
35-70	Dense	Hard
70	Very dense	Very hard

NOTE: Classification of earth material as shown on this sheet is based upon visual inspection and is not to be construed to imply mechanical analysis.

UNIFIED SOIL CLASSIFICATION SYSTEM

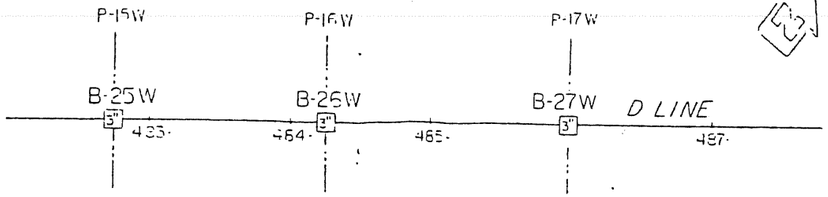
Major Divisions		Typical Names	Laboratory Classification Criteria			Field Identification Procedures (Excluding particles larger than 3 in. and basing fractions on estimated weights)			
Coarse-grained soils (more than half of material is larger than No. 200 sieve size)	Gravels (more than half of coarse fraction is larger than No. 4 sieve size)	Clean gravels (little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines	$C_u = \frac{D_{60}}{D_{10}}$ Greater than 4; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3				
			GP	Poorly graded gravels, gravel-sand mixtures, little or no fines	Not meeting all gradation requirements for GW				
		Gravels with fines (appreciable amount of fines)	GM	Silty gravels, gravel-sand-silt mixtures	Atterberg limits below "A" line or P.I. less than 4	Plastic fines (for identification procedures see CL below)			
			GC	Clayey gravels, gravel-sand-clay mixtures	Atterberg limits above "A" line with P.I. greater than 7				
	Sands (more than half of coarse fraction is smaller than No. 4 sieve size)	Clean sands (little or no fines)	SW	Well-graded sands, gravelly sands, little or no fines	$C_u = \frac{D_{60}}{D_{10}}$ Greater than 6; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3				
			SP	Poorly graded sands, gravelly sands, little or no fines	Not meeting all gradation requirements for SW				
		Sands with fines (appreciable amount of fines)	SM	Silty sands, sand-silt mixtures	Atterberg limits below "A" line or P.I. less than 4	Plastic fines (for identification procedures see CL below)			
			SC	Clayey sands, sand-clay mixtures	Atterberg limits above "A" line with P.I. greater than 7				
Fine-grained soils (more than half of material is smaller than No. 200 sieve size)	Silts and Clays (liquid limit less than 50)		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity		Dry strength (crushing characteristics)	Dilatancy (reaction to shaking)	Toughness (consistency near plastic limit)	
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays		Medium to high	None to slow	Medium	
			OL	Organic silts and organic silty clays of low plasticity		Slight to medium	Slow	Slight	
	Silts and Clays (liquid limit greater than 50)		MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts		Slight to medium	Slow to none	Slight to medium	
			CH	Inorganic clays of high plasticity, fat clays		High to very high	None	High	
			OH	Organic clays of medium to high plasticity, organic silts		Medium to high	None to very slow	Slight to medium	
Highly Organic Soils			Pt	Peat and other highly organic soils					

ENGINEERING GEOLOGY BRANCH

FIELD STUDY	By	Approval Recommended By	
DRAWN	By ED FUNG 10/76		
CHECKED	By	ENGINEERING GEOLOGIST	
		CERTIFIED ENGINEERING GEOLOGIST NUMBER	

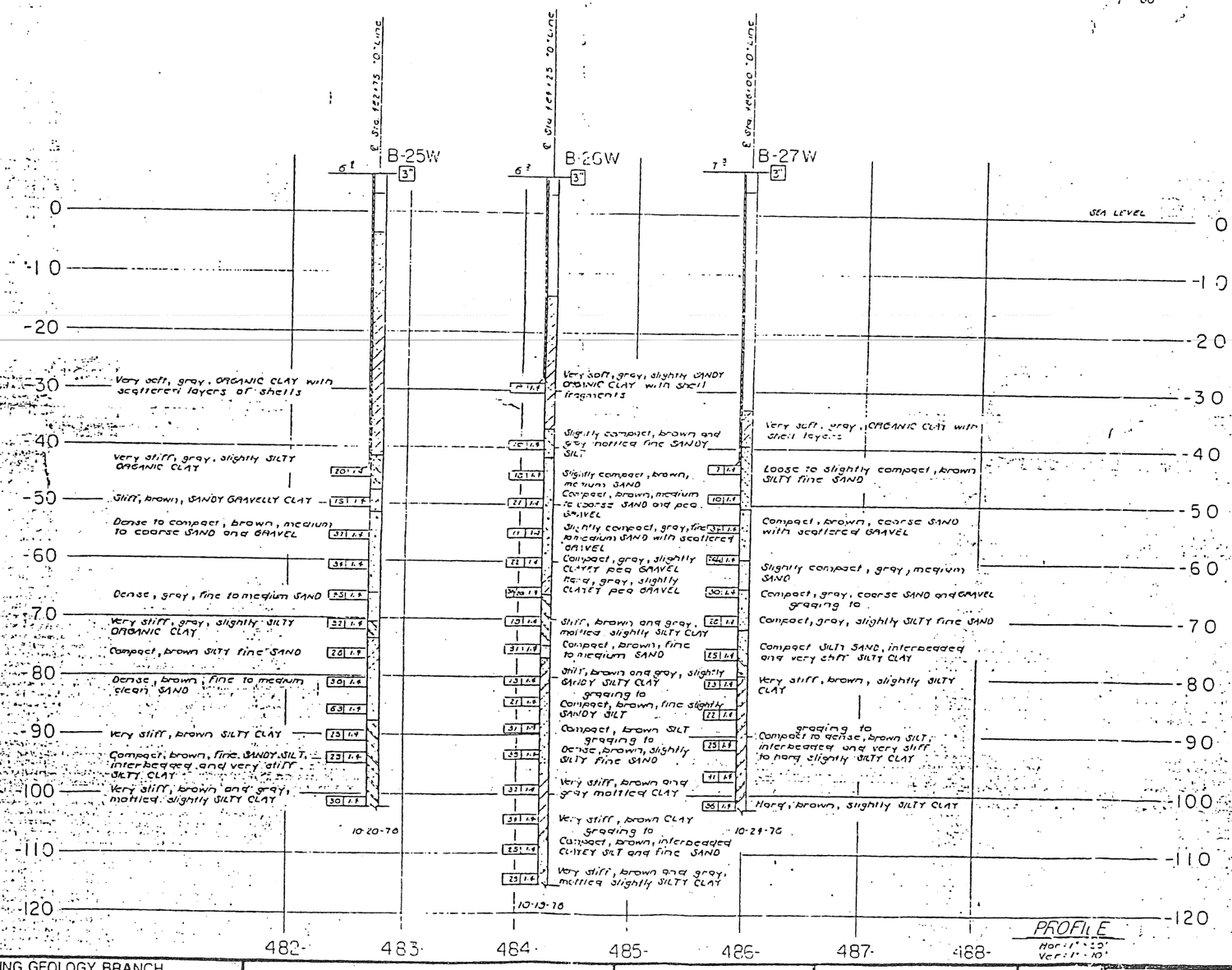
BENCH MARK

See "Log of Test Borings 1 of 3"



PLAN

1" = 50'



PROFILE

Hor. 1" = 50'
Ver. 1" = 10'

State of CALIFORNIA DEPARTMENT OF TRANSPORTATION	STRUCTURES - DESIGN	PROJECT ENGINEER	BRIDGE NO. 36-35
			POST MILE

DUMBARTON BRIDGE REPLACEMENT
APPROACH STRUCTURE (WEST)

LOG OF TEST BORINGS 4 OF 9

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

CU 04650
WO 337251

Disregard prints bearing earlier revision dates

REVISION DATES (PRELIMINARY STAGE ONLY) — SHEET — OF

DIST.	COUNTY	ROUTE	POST MILES—TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SM, ALA	84			

ENGINEERING GEOLOGIST _____ CERTIFIED ENGINEERING GEOLOGIST NUMBER _____

DATE APPROVED _____

BENCH MARK

See "Log of Test Borings 1 of 3"

P-19 P-20 P-21 P-22 P-23 P-24

℄ D LINE

B-33 491- B-34 493- B-35 495- B-36 497- 498- 499- 500- 501- B-37 502

PLAN
1" = 50'

℄ Sta. 130+90.00 "D" Line

℄ Sta. 132+00.00 "D" Line

℄ Sta. 134+00.00 "D" Line

℄ Sta. 136+00.00 "D" Line

℄ Sta. 501+10.00 "D" Line

B-33 B-34 B-35 B-36 B-37

11½ 11½ 7½ 8½ 8½

3" 3" 3" 3" 3"

10-31-76 11-1-76 11-2-76 11-3-76 11-6-76

Very soft, gray, ORGANIC CLAY with shell layers

Loose, brown, medium SAND

Compact, brown, medium to coarse SAND with scattered GRAVEL

Compact, brown, medium to coarse SAND and GRAVEL

Very stiff to hard, brown and gray, mottled CLAY

Very stiff, brown and gray, mottled CLAY

Compact, brown SILT grading to

Very stiff, brown slightly SILTY CLAY

Hard, brown and gray mottled CLAY

Loose, gray, medium SAND

Very soft, gray, ORGANIC CLAY

Compact to slightly compact, gray, medium to coarse SAND with scattered GRAVEL layers

Compact, gray, medium to coarse SAND and GRAVEL with thin interbedded CLAYEY GRAVEL layers

Stiff, brown and gray, mottled CLAY

Stiff, gray and brown, CLAY interbedded with slightly compact CLAYEY SAND

Very stiff, brown and gray, mottled CLAY

Very stiff, gray, slightly SILTY CLAY grading to

Compact, brown, CLAYEY SILT

Very stiff, brown and gray mottled CLAY

Dense, brown, SILTY fine SAND grading to

Very stiff, brown and gray, mottled CLAY

Very soft, gray, ORGANIC CLAY

Very loose to compact, brown, fine to medium SAND grading to

Compact, gray, medium to coarse SAND and GRAVEL

Stiff, brown, slightly SILTY CLAY

Very stiff, brown and gray, mottled CLAY grading to

Slightly compact to compact, brown, slightly SILTY CLAY

Compact, brown, SILTY fine SAND

Slightly compact, brown, slightly SANDY CLAYEY SILT

Dense, brown, interbedded SANDY SILT and fine SAND

Compact, brown and gray, mottled slightly SANDY SILT and very stiff SILTY CLAY

Very stiff, brown and gray, mottled CLAY

Very soft, gray, ORGANIC CLAY

Compact, brown, medium to coarse SAND and GRAVEL

Slightly compact, gray, fine to medium SAND and GRAVEL

Very stiff, brown CLAY

Very stiff, brown, slightly SILTY CLAY

Slightly compact, brown and gray, mottled slightly CLAYEY SILT and stiff SILTY CLAY

Compact, brown CLAYEY SILT

Dense, brown, slightly SILTY fine SAND

Compact, brown, slightly CLAYEY SILT grading to

Very stiff, brown and gray, mottled slightly SILTY CLAY

Compact, brown and gray, mottled CLAYEY SILT and very stiff SILTY CLAY

Very soft, gray, ORGANIC CLAY

Very stiff, brown and gray, mottled CLAY

Compact, gray, medium to coarse SAND and GRAVEL

Very stiff, gray, SANDY CLAY

Dense, brown, fine to medium SAND

Slightly compact, brown SILT, interbedded and stiff SILTY CLAY

Very stiff, brown, slightly SILTY CLAY grading to

Compact, brown, CLAYEY SILT

Compact, brown, slightly CLAYEY SILT

Compact, brown, SILT grading to

Very stiff, brown SILTY CLAY grading to

Slightly compact, brown, CLAYEY SILT

PROFILE
Hor 1" = 30'
Vert 1" = 10

490- 491- 492- 493- 494- 495- 496- 497- 498- 499- 500- 501-

LEGEND OF BORING OPERATIONS

TEST PIT · CORE BORING · JET BORING · PENETRATION BORING · ROTARY BORING (WET) · AUGER BORING (DRY) · ROTARY BORING · 2½" CONE PENETROMETER · SAMPLER BORING (DRY) · 1" SOIL TUBE

LEGEND OF EARTH MATERIALS

SILTY CLAY or CLAYEY SILT · PEAT and/or HIGHLY ORGANIC SOIL · FILL MATERIAL · IGNEOUS ROCK · SEDIMENTARY ROCK · METAMORPHIC ROCK · GRAVEL · SAND · SILT · CLAY · SANDY CLAY or CLAYEY SAND · SANDY SILT or SILTY SAND

CONSISTENCY CLASSIFICATION FOR SOILS

According to the Standard Penetration Test

Cohesive	Penetration Index (Blows/Ft)	Granular
Very soft	0-5	Very loose
Soft	5-10	Loose
Stiff	10-20	Slightly Compact
Very stiff	20-35	Compact
Hard	35-70	Dense
Very hard	70	Very dense

NOTE: Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed as imply mechanical analysis.

UNIFIED SOIL CLASSIFICATION SYSTEM

ENGINEERING GEOLOGY BRANCH

FIELD STUDY By _____ Approved Recommended By _____

DRAWN By ED FONG 11/78 ENGINEERING GEOLOGIST _____

CHECKED By _____ CERTIFIED ENGINEERING GEOLOGIST NUMBER _____

State of CALIFORNIA
DEPARTMENT OF TRANSPORTATION.

STRUCTURES - DESIGN

PROJECT ENGINEER _____

BRIDGE NO. 36-3

POST MIL _____

DUMBARTON BRIDGE REPLACEMENT
APPROACH STRUCTURE (WEST)

LOG OF TEST BORINGS 5 OF 9

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

CU 04850
WO 397451

Disregard prints bearing earlier revision dates

REVISION DATES (PRELIMINARY STAGE ONLY)

SHEET OF

DIST.	COUNTY	ROUTE	POST MILES—TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SM,ALA	84			

ENGINEERING GEOLOGIST — CERTIFIED ENGINEERING GEOLOGIST NUMBER

DATE APPROVED

LEGEND OF BORING OPERATIONS

TEST PIT — PENETRATION BORING — JET BORING — CORE BORING — ROTARY BORING — ROTARY BORING (WET) — AUGER BORING (DRY) — SAMPLER BORING (DRY) — 2½" Ø CONE PENETROMETER — SOIL TUBE

LEGEND OF EARTH MATERIALS

GRAVEL — SAND — SILT — CLAY — SANDY CLAY or CLAYEY SAND — SANDY SILT or SILTY SAND — PEAT and/or ORGANIC MATTER — FILL MATERIAL — IGNEOUS ROCK — SEDIMENTARY ROCK — METAMORPHIC ROCK

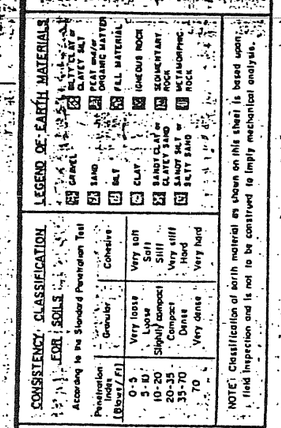
CONSISTENCY CLASSIFICATION FOR SOILS

According to the Standard Penetration Test

	Penetration (Blows/ft)	Granular	Cohesive
	0-5	Very loose	Very soft
	5-10	Loose	Soft
	10-20	Slightly compact	Stiff
	20-35	Compact	Very stiff
	35-70	Dense	Hard
	70 +	Very dense	Very hard

NOTE: Classification of earth material as shown on this sheet is based upon visual inspection and laboratory tests. Field inspection and is not to be construed to imply mechanical and

UNIFIED SOIL CLASSIFICATION SYSTEM



BENCH MAR:
See "Log of Test Borings 1 of 3"

PLAN
1" = 50'

D LINE

B-41 — B-42 — B-29 — B-21 — B-20 — B-19

P-25 — P-26 — P-27 — P-28 — P-29 — P-30

℄ Sta. 504+00 "D" Line

13' Lt. Sta. 510+13 "D" Line

45' Lt. Sta. 511+10 "D" Line

3' Rt. Sta. 513+72 "D" Line

B-41: Very soft, gray ORGANIC CLAY; Very stiff, brown and gray, SILTY CLAY; Compact to very dense, brown, medium to coarse SAND and GRAVEL; Compact, brown, fine to coarse SAND and GRAVEL; Compact to dense, brown, medium to coarse SAND and GRAVEL; Very stiff, brown, slightly SILTY CLAY; Compact, brown, slightly CLAYEY SILT

B-42: Very soft, gray ORGANIC CLAY with scattered shells; Very stiff to stiff, brown CLAY; Compact, brown, SILTY fine SAND; Compact, brown and gray, interbedded fine to medium SAND and SILT; Slightly compact, gray, slightly SILTY SAND; Compact, brown, medium to coarse SAND and GRAVEL; Very stiff, gray SANDY CLAY; Slightly compact, brown CLAYEY SILT grading to Stiff, brown, slightly SANDY SILTY CLAY grading to Compact, brown, interbedded fine SILTY SAND and SILT; Compact, brown, slightly CLAYEY SILTY, fine SAND; Compact, brown, interbedded fine SAND and very stiff SILTY CLAY

B-29: Very soft, gray ORGANIC CLAY with scattered shells; Stiff, brown and gray, mottled fine SANDY CLAY, Slightly compact, brown, CLAYEY SAND and GRAVEL; Soft, brown CLAY; Stiff, brown and gray, mottled Slightly SILTY CLAY; Soft, gray to brown, SILTY CLAY with thin interbedded fine SAND layers; Dense, brown, medium SAND with scattered GRAVEL; Slightly compact to dense, brown coarse SAND and GRAVEL; Compact, gray, coarse SAND and GRAVEL with thin interbedded CLAYEY GRAVEL layers; Dense, gray, coarse SAND and GRAVEL; Stiff, brown, slightly SILTY CLAY with a few pieces of scattered GRAVEL; Hard to very stiff, brown, slightly SANDY, SILTY, CLAY with thin interbedded SAND layers; Compact, brown, SAND and GRAVEL; Compact, brown and gray, interbedded fine SAND and SILT grading to Very stiff, brown, SILTY CLAY grading to Dense, brown, interbedded fine SAND and SILT

B-21: with scattered shells; Soft, gray, CLAYEY SILT to SILTY CLAY with SAND SILT lenses; Very loose, brown, SILTY fine SAND to fine SANDY SILT; Slightly compact, brown, SILTY fine to coarse SAND with scattered PEBBLE GRAVEL; Stiff, gray, SILTY CLAY; Compact, gray, fine to coarse SAND with thin PEBBLE GRAVEL layers; Stiff, gray, SILTY CLAY; Compact, gray, SILTY, fine to coarse SAND with scattered PEBBLE GRAVEL; Stiff, tan, SILTY, CLAY with fine SAND lenses; Compact, tan, SILT with fine SAND lenses; Stiff, tan, SILTY CLAY

B-20: with scattered shells; Very soft, gray ORGANIC CLAY with scattered shells; Stiff, light gray CLAY; Loose, brown, fine SAND to fine SANDY SILT; Soft, tan to gray SILTY CLAY; Slightly compact, gray, SILTY fine to coarse SAND; Compact to dense, brown, interbedded layers of fine SAND, fine to coarse SAND with scattered PEBBLE GRAVEL and fine to medium SAND; Stiff, tan SILTY CLAY; Slightly compact, brown SILTY fine SAND

B-19: Very soft, gray ORGANIC CLAY with scattered shells; Very loose, olive brown, SILT with fine SAND; Slightly compact, brown, fine SAND to fine SANDY SILT to fine SAND; Slightly compact, brown and gray, fine SAND grading to SILTY SAND and fine to medium SAND; Slightly compact, light brown, fine SAND grading to GRAVELLY fine to coarse SAND at Elev. 64'; Very soft, gray SILTY CLAY; Slightly compact to compact, gray to brown, interbedded layers of GRAVELLY fine to coarse SAND, fine to medium SAND; Compact to slightly compact, brown, iron stained, interbedded SILTY fine SAND, fine SANDY SILT and SILT with scattered GRAVEL and LIME and iron cemented NODULES and with thin CLAY lenses below Elev. 103'

10-16-70 — 11-15-70 — 5-28-70 — 5-27-70 — 5-26-70

PROFILE
Hor: 1" = 50'
Ver: 1" = 10'

ENGINEERING GEOLOGY BRANCH

FIELD STUDY	By	Approved, Recommended By
DRAWN	By ED FONG 10/78	ENGINEERING GEOLOGIST
CHECKED	By	CERTIFIED ENGINEERING GEOLOGIST NUMBER

State of CALIFORNIA
DEPARTMENT OF TRANSPORTATION

STRUCTURES - DESIGN

PROJECT ENGINEER

BRIDGE NO. 35-38

POST MILE

DUMBARTON BRIDGE REPLACEMENT
MAIN CHANNEL CROSSING

LOG OF TEST BORINGS 6 OF 9

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

CU 04890
WO 397451

Disregard prints bearing earlier revision dates

REVISION DATES (PRELIMINARY STAGE ONLY) — SHEET — OF

DIST.	COUNTY	ROUTE	POST MILES—TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SM	ALA	9.4		

Robert L. Reynolds #1165

P-31E P-32E P-33E P-34E P-35E P-36E P-37E P-38E P-39E B-40E

B-12E B-11E B-10E B-36 B-9E B-7E

516- 517- 518- 519- 520- 521- 522- 523- 524- 525- 526- 527- 528- 529-

D LINE

N

BENCH MARK

BM1- Spot elev. 66'Rt. Sta. 533+91 "D" Line Elev. 7'
BM2- Spot elev. 168'Rt Sta. 533+63 "D" Line Elev. 12
BM "NGS V533 - carriage bolt 30 to 100ft. west of the east abutment on the south curb existing bridge Elev. 19.98
TBM No. 1 - point spot on Rt. east end of bridge Elev. 7.9

PLAN
1" = 50'

B-12E Sta. 515+75 "D" Line
B-11E Sta. 518+75 "D" Line
B-10E Sta. 521+75 "D" Line
B-36 Sta. 524+06 "D" Line
B-9E Sta. 527+75 "D" Line
B-7E Sta. 529+75 "D" Line

Approx. ground line along "D" Line

B-12E — SEA LEVEL

Very soft, gray, ORGANIC CLAY with interbedded SAND and shell layers
Compact, gray, fine to medium SAND
Very loose, gray, SILTY peat
Compact, gray, medium SAND
Soft, gray, ORGANIC CLAY
Loose, gray, slightly CLAYEY fine SAND
Slightly compact to loose, brown, fine tan slightly SILTY SAND
Slightly compact, brown medium SAND
Compact, brown, medium to coarse SAND and peg GRAVEL
Compact to dense, brown coarse, SAND and GRAVEL
Dense, brown, medium to coarse SAND
Compact, brown, fine to medium SAND
Dense, brown medium SAND

1-11-78

B-11E

Very soft, gray, ORGANIC CLAY with interbedded CLAYEY silty SAND shell fragments
Slightly compact, gray, medium SAND with scattered shells
Soft, gray slightly SILTY CLAY grading to Very loose, gray CLAYEY SAND
Stiff, brown, slightly SILTY CLAY
Stiff, brown, SILTY slightly SANDY CLAY
Dense, brown, coarse SAND and peg GRAVEL
Very stiff, brown, SILTY CLAY
Stiff, brown, SILTY CLAY
Compact, brown, CLAYEY fine to medium SAND
Dense, brown, Slightly SILTY SAND

1-10-78

B-10E

Very soft, gray, ORGANIC CLAY
Very soft, gray, CLAYEY SAND with shells
Very soft, gray, slightly SILTY ORGANIC CLAY
Stiff, gray, ORGANIC CLAY
Very stiff, brown, slightly SILTY CLAY
Stiff, brown and gray mottled Slightly SILTY CLAY
Slightly compact, brown, CLAYEY SAND grading to Slightly compact, gray, fine to medium SAND with some ORGANIC matter
Slightly compact, gray, medium to coarse SAND
Very stiff, brown CLAY
Very stiff, brown SILTY, with scattered pieces of round GRAVEL
Compact, brown SILTY SAND grading to Slightly compact, brown SILT
Loose to compact, fine to medium SAND

1-7-78

B-36

Approx. ground line along "D" Line

Air

Very soft, gray, ORGANIC CLAY
Very soft, gray ORGANIC CLAY with scattered SHELLS
Stiff to very soft, brown CLAY
Slightly compact, brown, Slightly SILTY coarse SAND and small GRAVEL
Compact, brown, clean medium to coarse SAND
Compact, brown, coarse SAND and GRAVEL
Stiff, brown and gray mottled CLAY
Compact, brown, fine SAND
Very dense, brown fine SAND
Compact, brown, fine SAND
Compact, brown, CLAYEY SILT and SILTY CLAY

9-25-78

Stiff, brown CLAY
Soft, brown, fine SANDY CLAY
Slightly compact, brown, Slightly SILTY fine SAND
Compact, brown medium SAND
Compact, brown, medium to coarse SAND with scattered GRAVEL
Stiff, brown, slightly SILTY CLAY
Very stiff, brown and gray, SILTY CLAY
Compact, brown fine SAND
Slightly compact, brown, CLAYEY SILT
Slightly compact, brown medium SAND
Compact, brown to gray, silty, peaty SILT, SAND and trace of SILTY CLAY

12-5-77

B-9E

Air

Very soft, gray, ORGANIC CLAY
Very soft, gray ORGANIC CLAY
Stiff, brown CLAY
Loose, brown, medium SAND
Compact, brown, medium SAND
Compact, gray, coarse SAND and peg GRAVEL
Compact, very coarse SAND and GRAVEL
Hard, brown slightly SILTY CLAY
Compact, brown, slightly SILTY fine to medium SAND
Very stiff, brown, slightly SILTY CLAY
Slightly compact, brown fine to medium SAND
Dense to compact, gray to brown CLAYEY SILT

12-22-77

B-7E

Air

Very soft, gray ORGANIC CLAY with some peat
Stiff, gray, ORGANIC CLAY
Stiff, brown CLAY
Soft, brown SILTY CLAY
Slightly compact, brown SILTY fine SAND
Compact, brown, medium to coarse SAND
Compact, brown coarse SAND with scattered GRAVEL
Very stiff, brown, slightly SILTY CLAY
Stiff, brown CLAY
Stiff, brown, slightly SILTY CLAY grading to Slightly compact, brown CLAYEY SILT

12-20-77

PROFILE
Hor 1" = 50'
Ver 1" = 10'

0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100

LEGEND OF BORING OPERATIONS

PENETRATION BORING — TEST PIT — CPT BORING — CORE BORING — ROTARY BORING — SOIL TUBE — SAMPLER BORING (WET) — AUGER BORING (DRY)

LEGEND OF EARTH MATERIALS

GRAVEL — SAND — SILT — CLAY — SANDY CLAY or CLAYEY SAND — SANDY SILT or SILTY SAND — FILL MATERIAL — ORGANIC MATTER — PEAT — HARD OR SOUND ROCK — SEDIMENTARY ROCK — METAMORPHIC ROCK

Identification is based upon visual examination and is not to be construed as implying laboratory analysis.

CONSISTENCY CLASSIFICATION FOR SOILS

According to the Standard Penetration Test

Penetration (blows per foot)	Granular	Cohesive
0-4	Very loose	Very soft
5-9	Loose	Soft
10-29	Slightly compact	Stiff
30-49	Compact	Very stiff
50-70	Dense	Hard
70	Very dense	

NOTE: Classification of earth materials as shown on this sheet is based upon Field Inspection and is not to be construed as implying laboratory analysis.

UNIFIED SOIL CLASSIFICATION SYSTEM

Group Symbols	GW	GP	GM	GC	SW	SP	SM	SC
Typical Names	Well graded gravels, gravel-sand mixtures, little or no fines	Poorly graded gravels, gravel-sand mixtures, little or no fines	Silty gravels, poorly graded gravel-sand-silt mixtures	Clayey gravels, poorly graded gravel-sand-clay mixtures	Well graded sands, gravelly sands, little or no fines	Poorly graded sands, gravelly sands, little or no fines	Silty sands, poorly graded sand-silt mixtures	Clayey sands, poorly graded sand-clay mixtures
Laboratory Classification	Less than 5% passing No. 200		More than 12% passing No. 200		Less than 5% passing No. 200		More than 12% passing No. 200	
Group Symbols	ML	CL	OL	MH	CH	OH	Pt	
Typical Names	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	Organic silts and organic silty clays of low plasticity	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts	Inorganic clays of high plasticity, fat clays	Organic clays of medium to high plasticity	Peat and other highly organic soils	
Laboratory Classification	Atterberg limits below "A" line or P.I. less than 4	Atterberg limits above "A" line with P.I. greater than 7		Atterberg limits below "A" line with P.I. greater than 4	Atterberg limits above "A" line with P.I. greater than 7			

ENGINEERING GEOLOGY BRANCH

FIELD STUDY by R.Fox 1-78
DRAWN by ED Flynn 1/79
CHECKED by R. Fox 2/79

State of CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF STRUCTURES
DESIGN SECTION
PROJECT ENGINEER

BRIDGE NO. 35-33
POST MILE

DUMBARTON BRIDGE REPLACEMENT
APPROACH STRUCTURE (EAST)

LOG OF TEST BORINGS 7 OF 9

DIST.	COUNTY	ROUTE	POST MILES—TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SM ALA	84			

ENGINEERING GEOLOGIST — CERTIFIED ENGINEERING GEOLOGIST NUMBER

DATE APPROVED

P-36E P-37E P-38E P-39E P-40E P-41E P-42

D LINE

523- 524- 525- 526- 527- 528- 529- 530- 531- 532-

B-22E B-23E B-24E B-25E

BENCH MARK

See 'Log of Test Borings 1 of 3'

PLAN

1" = 50'

B-22E B-23E B-24E B-25E

12"ø 11"Alt. Dia. 521+61 "D" Line 12"ø 11"Alt. Dia. 526+10 "D" Line 12"ø 11"Alt. Dia. 530+76 "D" Line 12"ø 11"Alt. Dia. 531+20 "D" Line

SEA LEVEL

Approx. ground line along "D" Line

Very soft, gray, ORGANIC CLAY

Very soft, gray, ORGANIC CLAY

Very soft, gray, ORGANIC CLAY

Very soft, gray, ORGANIC CLAY

Stiff, blue gray, CLAY

Loose, brown, fine SANDY SILT to SILTY fine SAND

Loose, brown, fine to coarse SAND with scattered fine GRAVEL

Slightly compact, brown, fine to coarse SAND with scattered fine GRAVEL

Compact, brown, GRAVELLY fine to coarse SAND

Slightly compact, gray to tan, SANDY SILT to fine SANDY CLAY

Compact, brown, fine to coarse SAND

Very stiff to stiff, tan, SILTY CLAY to fine SANDY CLAY

Slightly compact, tan, fine SANDY SILT with fine SAND lenses

Very stiff, tan, SILTY CLAY

10-3-76

Stiff, blue gray, slightly ORGANIC CLAY

Very loose, brown, fine to medium SAND

Loose, brown, fine to coarse SAND with scattered fine GRAVEL

Slightly compact, brown, fine to coarse SAND with scattered fine GRAVEL

Slightly compact to compact, brown, fine to coarse SAND with PEBBLE GRAVEL lenses

Stiff, tan, SILTY CLAY to CLAYEY SILT

Slightly compact, tan, fine SANDY SILT

Slightly compact, tan, very fine SAND to fine SANDY SILT

Slightly compact, tan, fine SANDY SILT with occasional tan SILTY CLAY lenses

Slightly compact, tan, fine SANDY SILT with lenses of fine SAND

Very stiff, tan; SILTY CLAY

Compact, tan, SILT

Soft, gray to tan, SILTY CLAY with fine SANDY SILT lenses

Stiff, tan, SILTY CLAY

Very loose, tan, fine SAND of SILT with interbedded SILTY CLAY

Very loose, tan, SANDY SILT with fine SAND layers

Loose, dark gray, interbedded SILT, fine SAND, fine SANDY SILT and SILTY CLAY

Compact, grayish brown, fine to coarse SAND

Compact, brown, SANDY GRAVEL

Very stiff, tan, SILTY CLAY

Compact, tan, fine SAND SILT with interbeds of fine SAND and SILT with LIME cemented NODULES

Slightly compact, tan, CLAYEY SANDY SILT to fine SANDY CLAY with SILT lenses

Compact, tan, fine SAND with interbedded SILT layers

10-5-76

1-3-78

Stiff, gray CLAY

Soft, brown, SILTY CLAY, grading to CLAYEY SILT

Soft, tan, fine SANDY SILTY CLAY

Soft, tan, SILTY CLAY with CLAYEY SILT and SILT lenses and small LIMY NODULES

Compact, gray, fine to medium SAND with scattered fine GRAVEL

Compact, brown gray, slightly SILTY, fine to coarse SAND with scattered fine GRAVEL

Hard, gray CLAY

PROFILE

Hor. 1" = 50'
Vert. 1" = 10'

10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110

524- 525- 526- 527- 528- 529- 530- 531- 532- 533-

LEGEND OF BORING OPERATIONS

PENETRATION BORING — TEST PIT — ROTARY BORING — JET BORING — CORE BORING — SOIL TUBE — S.P.T. CONE PENETROMETER — SAMPLER BOUNCE (DROP) — ROTARY BORING (WET) — ROTARY BORING (DRY) — AUGER BORING (WET) — AUGER BORING (DRY)

LEGEND OF EARTH MATERIALS

GRAVEL — SAND — SILT — CLAY — PEAT and/or ORGANIC SILT — FILL MATERIAL — IGNEOUS ROCK — SEDIMENTARY ROCK — METAMORPHIC ROCK — SILTY CLAY — CLAYEY SILT — SILTY SAND — CLAYEY SAND — SANDY SILT — SILTY SAND

CONSISTENCY CLASSIFICATION

According to the Standard Penetration Test

Penetration Index (Blows/Ft.)	Granular	Cohesive
0 - 4	Very loose	Very soft
5 - 10	Loose	Soft
10 - 20	Slightly compact	Still
20 - 35	Compact	Very stiff
35 - 70	Dense	Hard
70 +	Very dense	Very hard

NOTE: Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed, to imply mechanical analysis.

UNIFIED SOIL CLASSIFICATION SYSTEM

ENGINEERING GEOLOGY BRANCH

FIELD STUDY	By	Approved Recommended By	
DRAWN	By ED TONG 10/78		
CHECKED	By		

State of CALIFORNIA
DEPARTMENT OF TRANSPORTATION

STRUCTURES - DESIGN

PROJECT ENGINEER

BRIDGE NO. 35-38

POST MILE

DUMBARTON BRIDGE REPLACEMENT
APPROACH STRUCTURE (EAST)

LOG OF TEST BORINGS 3 OF 3

ENGINEERING GEOLOGY BRANCH – TRANSPORTATION LABORATORY

CERTIFIED ENGINEERING GEOLOGIST

DUMBARTON BRIDGE PAINT M.S.

LOG OF TEST BORINGS 2 OF 2

CU: 04 EA: 003371 BRIDGE No.

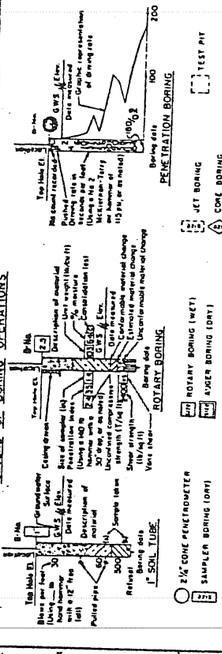
REGISTERED GEOLOGIST G.G. MILLER No. 632 CERTIFIED ENGINEERING GEOLOGIST STATE OF CALIFORNIA

NOTE: THIS LOG OF TEST BORINGS IS AVAILABLE ON MICROFILM AT OFFICE OF STRUCTURES DESIGN SACRAMENTO, CALIFORNIA

DIST.	COUNTY	ROUTE	POST MILES—TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SM,ALA	84			

Robert C. Reynolds #165
CIVIL ENGINEERING GEOLOGIST
DATE APPROVED

LEGEND OF BORING OPERATIONS



LEGEND OF EARTH MATERIALS

GRAVEL; SAND; SILT; CLAY; SANDY CLAY or CLAYEY SAND; SANDY SILT or SILTY SAND; SILTY CLAY or CLAY; PEAT and/or ORGANIC MATTER; FILL MATERIAL; IGNEOUS ROCK; SEDIMENTARY ROCK; METAMORPHIC ROCK

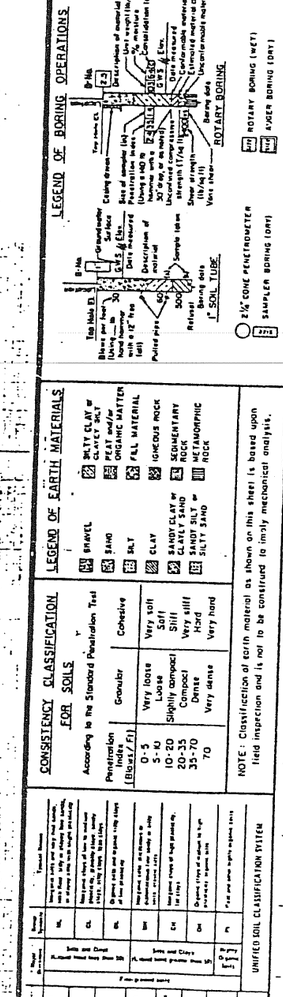
NOTE: Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

CONSISTENCY CLASSIFICATION FOR SOILS

According to the Standard Penetration Test

Penetration Index (Blows / ft)	Granular	Cohesive
0-5	Very loose	Very soft
5-10	Loose	Soft
10-20	Slightly compact	Stiff
20-35	Compact	Very stiff
35-70	Dense	Hard
70	Very dense	Very hard

UNIFIED SOIL CLASSIFICATION SYSTEM



P-40E P-41E B-20E B-15E B-10E B-5E A-1E

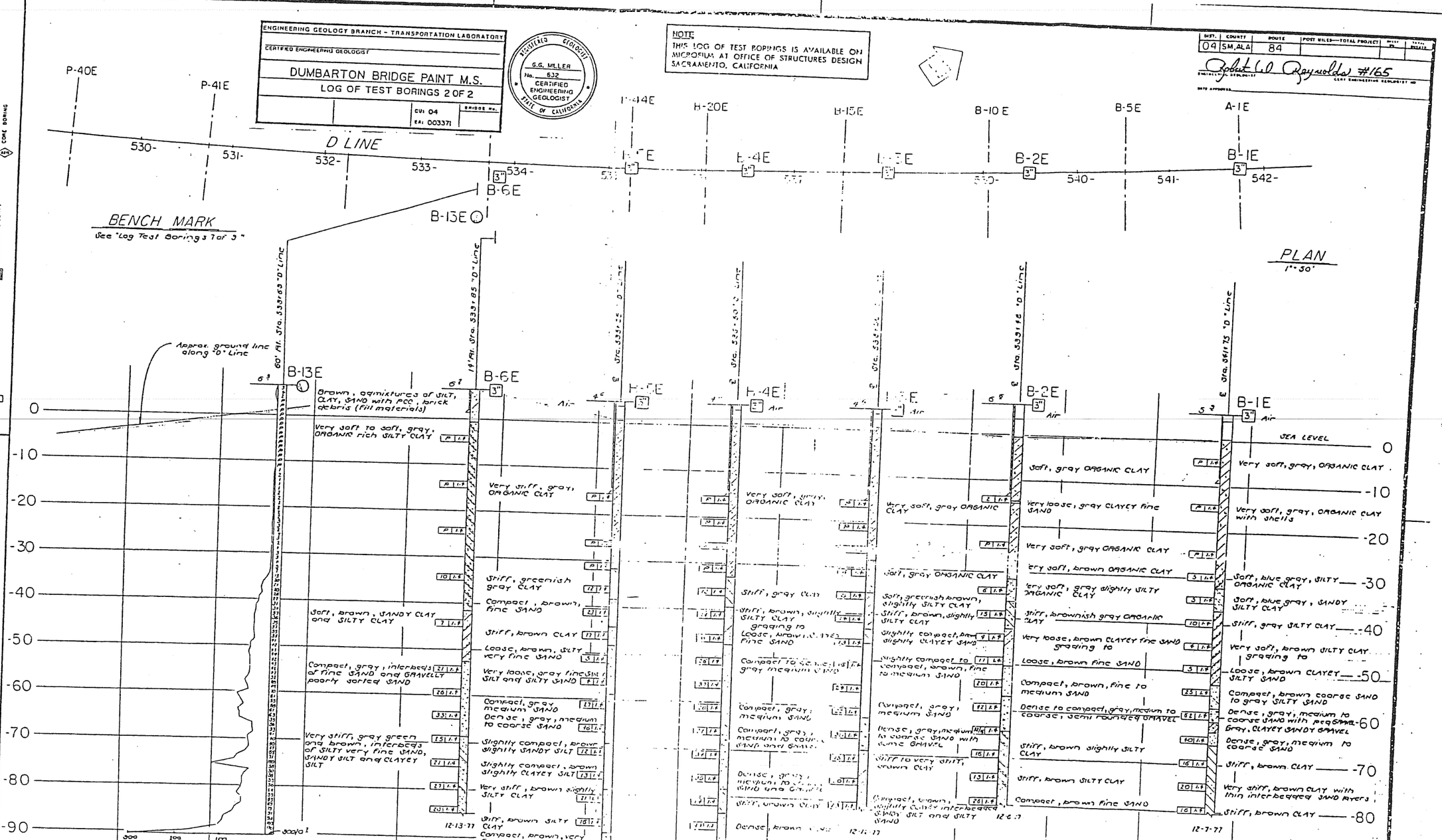
D LINE

530- 531- 532- 533- 534- 535- 536- 537- 538- 539- 540- 541- 542-

BENCH MARK
See "Log Test Borings 1 of 3"

B-13E B-6E B-4E B-2E B-1E

PLAN
1" = 30'



PROFILE
Hor: 1" = 30'
Ver: 1" = 10'

ENGINEERING GEOLOGY BRANCH

FIELD STUDY	By R. Fox 1/78	Approved for release by:
DRAWN	By ED MING 1/78	ENGINEERING GEOLOGIST
CHECKED	By R. Fox 2/78	CERTIFICATE OF REGISTERED GEOLOGIST NUMBER 78

ORIGINAL SCALE IN INCHES

State of CALIFORNIA
DEPARTMENT OF TRANSPORTATION

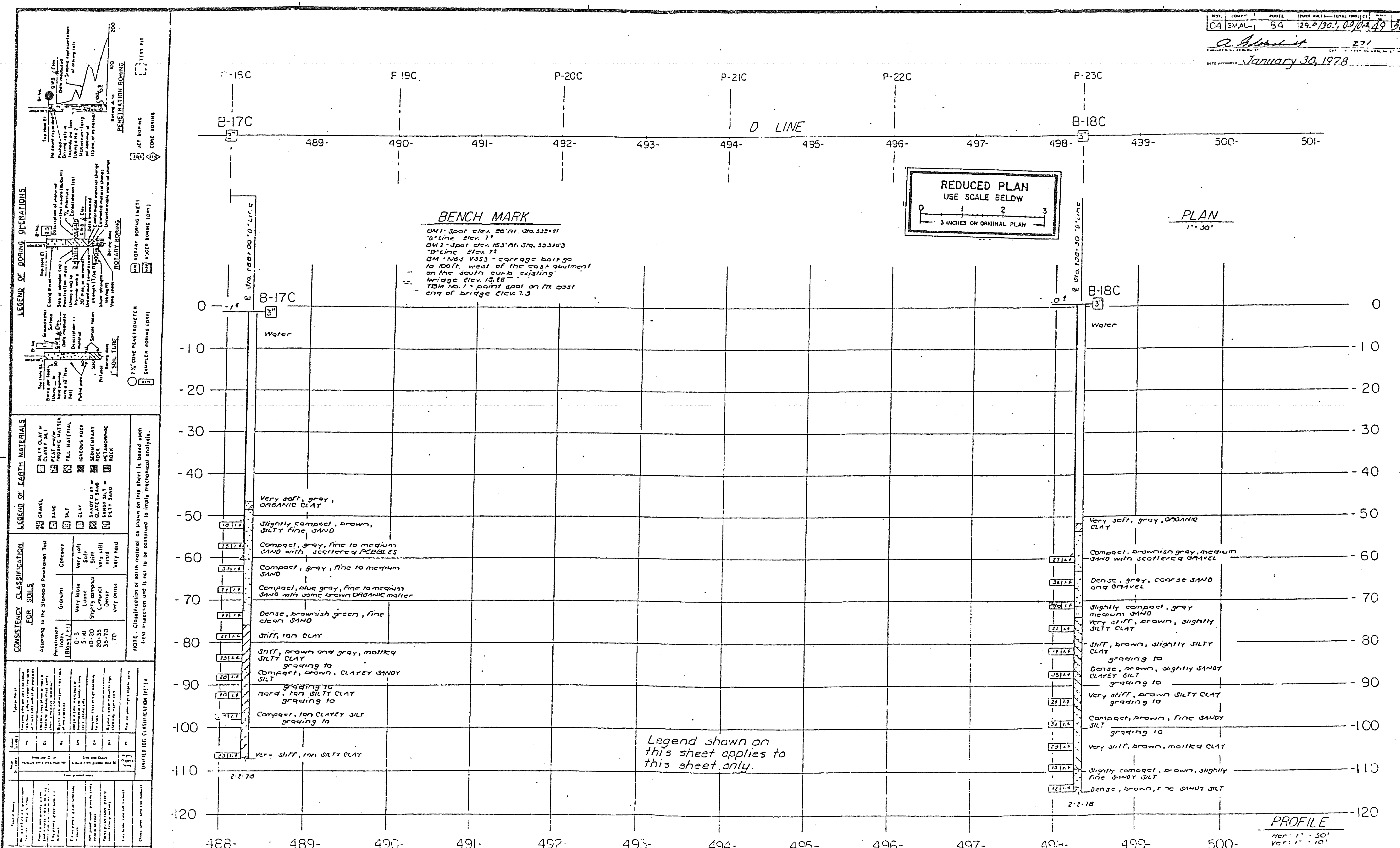
DIVISION OF STRUCTURES
DESIGN SECTION

PROJECT ENGINEER

BRIDGE NO. 35-38
POST MILE

DUMBARTON BRIDGE REPLACEMENT
APPROACH STRUCTURE (EAST)

LOG OF TEST BORINGS 90F9



Dist.	County	Route	Post Miles	Sheet	Total
04	SM-AL	84	29.8/30.1, 0.0/0.4	49	50

January 30, 1978

ENGINEERING GEOLOGY BRANCH

State of CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF STRUCTURES
DESIGN SECTION 3

DUMBARTON BRIDGE REPLACEMENT
MAIN CHANNEL CROSSING
LOG OF TEST BORINGS-4

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

CU 04850
WC 397451

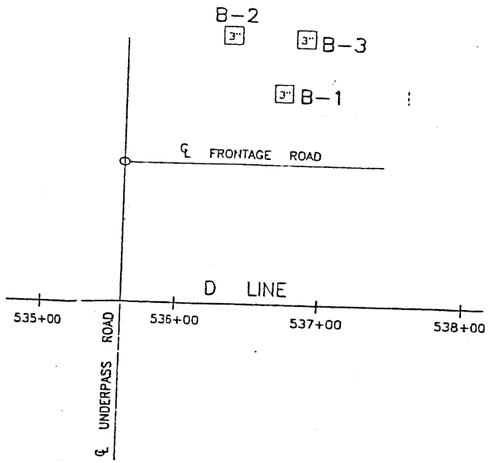
49

DIST.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	Ala	84			

CERTIFIED ENGINEERING GEOLOGIST

REGISTERED GEOLOGIST
G. G. MILLER
No. 632
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

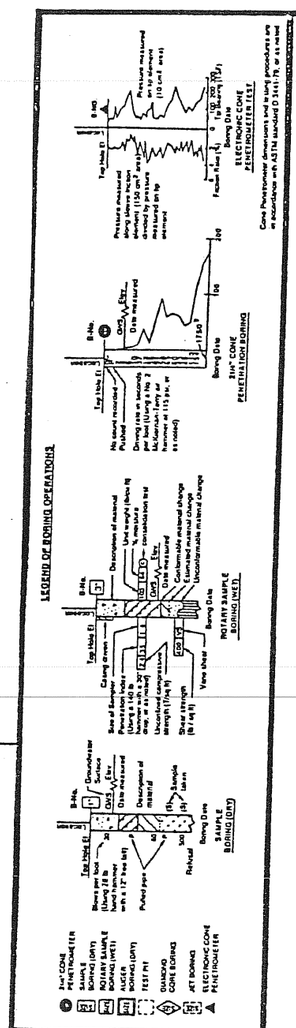
PLANS APPROVAL DATE



BENCH MARK

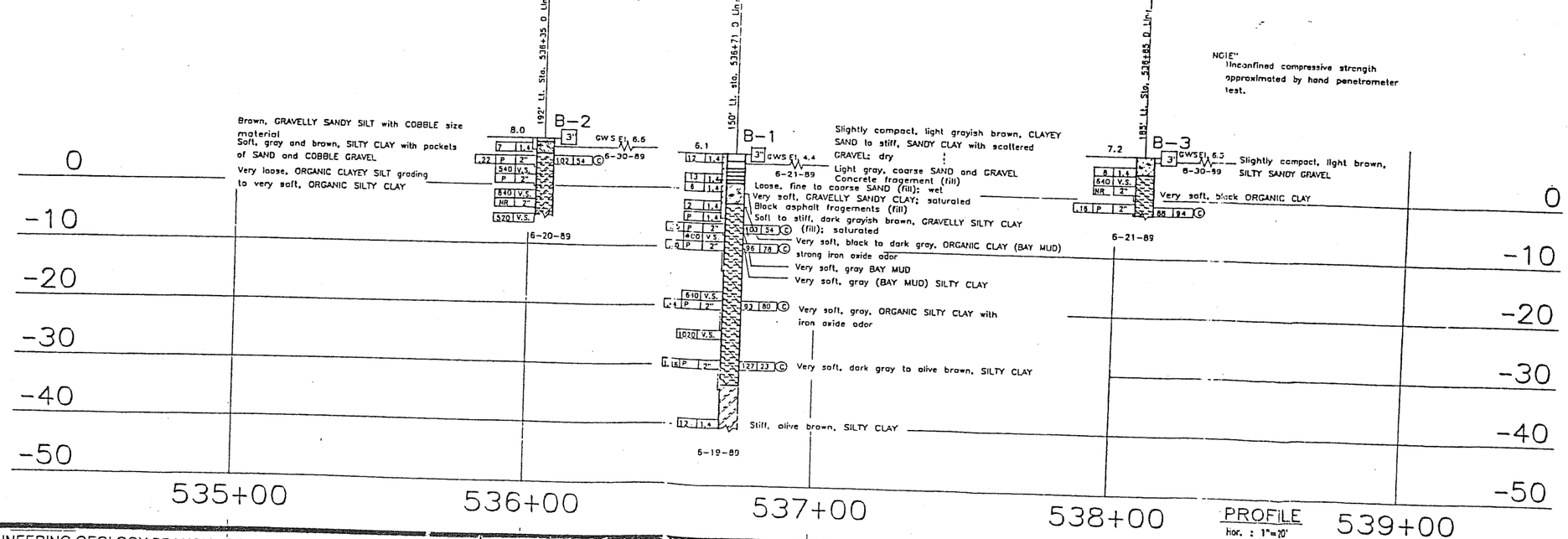
TBM: Outlet Culvert Grade Elev. 4.4
18" Dia. culvert located 120' Lt
Sta. 537+15

PLAN
1"=50'



CONSISTENCY CLASSIFICATION FOR SOILS According to the Standard Penetration Test		
Penetration Index (Blows / Ft)	Granular	Cohesive
0-4	Very loose	Very soft
5-9	Loose	Soft
10-19	Slightly compact	Slight
20-34	Compact	Very stiff
35-69	Dense	Hard
>70	Very dense	Very hard

NOTE: Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.



PROFILE
Hor. : 1"=20'
Ver. : 1"=10'

ENGINEERING GEOLOGY BRANCH - TRANSPORTATION LABORATORY					
DRAWN BY	ED FONG 7/89	, PROJECT ENGINEER	State of CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF STRUCTURES STRUCTURE DESIGN	BRIDGE NO.
CHECKED BY					POST MILE

DUMBARTON BRIDGE PAINT M.S.

LOG OF TEST BORINGS 1 OF 2

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

CU 04
EA 003771

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES (PRELIMINARY STAGE ONLY)

SHEET 01

TL 8051 REV. 4/89 IN LIVG

DIST.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SM	84			

REGISTERED ENGINEERING GEOLOGIST

REGISTERED GEOLOGIST — J. BOWMAN — No. 1677 — Exp. 8-31-96 — CERTIFIED ENGINEERING GEOLOGIST — STATE OF CALIFORNIA

PLANS APPROVAL DATE

BENCH MARK

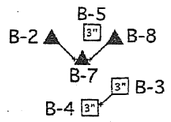
BM Elev. 19.89
FD. US COAST AND GEODETIC SURVEY BRASS DISK US53-1956 AT W. END OF EAST FISHING PIER ON S. CURB.

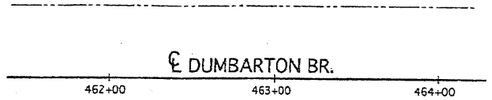
BM Elev. 17.27
FD. US COAST AND GEODETIC SURVEY BRASS DISK V150-1933 NEAR W. END OF PIER IN SOUTH CURB.

BM Elev. 6.53
FD. BRASS DISK CALIF. DEPT. OF TRANSPORTATION V635 IN CURB S. OF BRIDGE W. SIDE OF ACCESS RD. IN PARKING LOT.

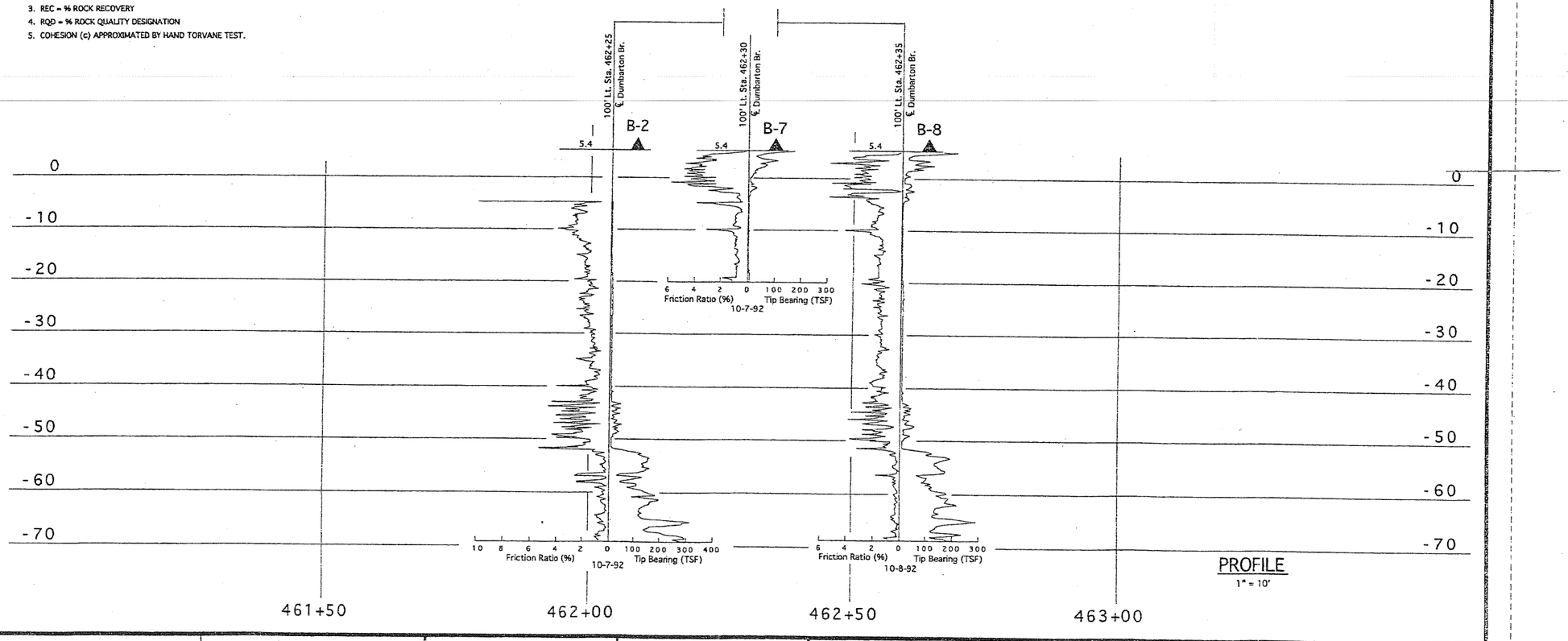
NOTES:

1. UNCONFINED COMPRESSIVE STRENGTH (qu) APPROXIMATED BY HAND PENETROMETER TEST
2. N = BLOW COUNT FOR ONE FOOT PENETRATION EXTRAPOLATED FROM BLOW COUNT FOR LESS THAN ONE FOOT (DUE TO CHANGE IN MATERIAL OR HARD DRIVING)
3. REC = % ROCK RECOVERY
4. RQD = % ROCK QUALITY DESIGNATION
5. COHESION (c) APPROXIMATED BY HAND TORVANE TEST.

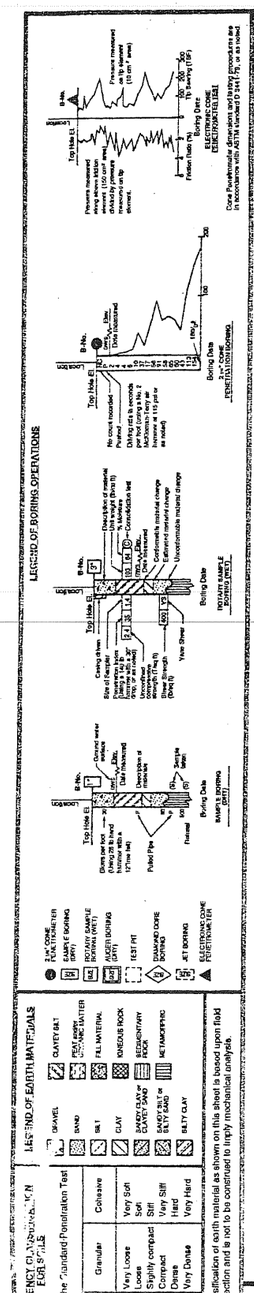




PLAN
1" = 40'



PROFILE
1" = 10'



ENGINEERING SERVICE CENTER	STRUCTURE FOUNDATIONS
DRAWN BY	Irma Garnets 5/95
CHECKED BY	

FIELD INVESTIGATION BY:
J. BOWMAN / M. PALMER

State of CALIFORNIA
DEPARTMENT OF TRANSPORTATION
DIVISION OF STRUCTURES
STRUCTURE DESIGN

BRIDGE NO. 35-38
POST MILE 29.2

DUMBARTON BRIDGE SEISMIC ANALYSIS
LOG OF TEST BORINGS 1 OF 18

CU: 04
EA: 04371K

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS → 0 1 2 3

DISREGARD PRINTS BEARING EARLIER REVISION DATES →

REVISION DATES (PRELIMINARY STAGE ONLY) 11/1/95

SHEET OF

TS 5061 REV. 5/95

CONSISTENCY CLASSIFICATION FOR SOILS

According to the Standard Penetration Test

Penetration Index (Blows / Ft)	Granular	Cohesive
0-4	Very Loose	Very Soft
5-9	Loose	Soft
10-19	Slightly compact	Stiff
20-34	Compact	Very Stiff
35-69	Dense	Hard
>70	Very Dense	Very Hard

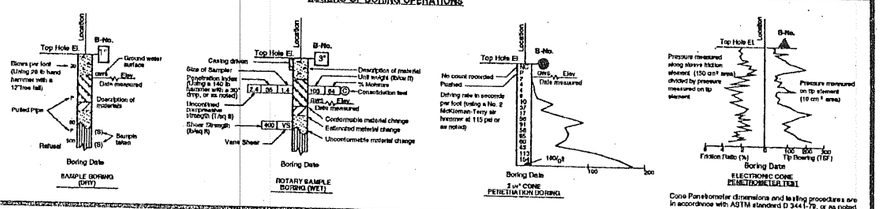
LEGEND OF EARTH MATERIALS

GRAVEL; SAND; SILT; CLAY; SANDY CLAY or CLAYEY SAND; SANDY SILT or SILTY SAND; SILTY CLAY; CLAYEY SILT; PEAT HIGHLY ORGANIC MATTER; FILL MATERIAL; CALCAREOUS ROCK; SEDIMENTARY ROCK; METAMORPHIC

NOTE: Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

2 1/4" CONE PENETROMETER; SAMPLE BORING (SPT); ROTARY SAMPLE BORING (WET); AUGER BORING (DRY); TEST PIT; DIAMOND CORE BORING; JET BORING; ELECTRONIC CONE PENETROMETER

LEGEND OF BORING OPERATIONS



Cone Penetrometer dimensions and testing procedures are in accordance with ASTM standard D 344 T-72, or as noted.

FOR PLAN VIEW,
SEE "LOG OF TEST BORINGS 1 OF 18"

70' Lt. Sta. 462+35 ± ℄ Dumbarton Br.

B-4

5.6

Material not logged, see B-3

0 / -10 / -20 / -30 / -40 / -50 / -60 / -70 / -80 / -90 / -100 / -110 / -120 / -130 / -140 / -150 / -160 / -170 / -180 / -190 / -200 / -210 / -220 / -230 / -240 / -250

0.5 B3 11.4 — Very stiff, gray, SILTY CLAY; moist.

70 11.4 — Very dense, green-gray SILT to fine SAND; slightly moist.

84 11.4 — Very dense, gray-green, interbedded SILT, CLAYEY SILT and fine SAND; slightly moist.

E100 11.4 — Very dense, gray-green, fine SAND interbedded with SILT & medium SAND; slightly moist.

2" 2" 2" — Green-gray, SILTY fine to medium SAND with interbeds of fine to coarse GRAVEL.

Gray, medium to coarse SAND & fine to coarse GRAVEL.

2" 2" — Green-brown, CLAYEY SILT; moist.

Light brown SILT; moist, locally cemented with calcium carbonate.

2" — -230

MATCH LINE — -250

-250 / -260 / -270 / -280 / -290 / -300 / -310 / -320 / -330 / -340 / -350 / -360 / -370 / -380 / -390 / -400 / -410 / -420 / -430 / -440 / -450 / -460 / -470 / -480 / -490 / -500

MATCH LINE

2" — Green-brown, SILTY CLAY variably cemented with carbon carbonate; moist. qu = 3 TSF

Green-gray, SILTY CLAY; moist. qu = 4 TSF — 2" at -290

Olive green, SILTY CLAY; moist. qu = 4 TSF — 2" at -300

Olive green, SILTY fine SAND; dry to slightly moist. — 2" at -310

Interbedded SILT, CLAYEY SILT & fine SAND.

Brown, SILTY CLAY to CLAYEY SILT.

Medium to coarse SAND.

SILTY CLAY to SILT, grading to

Olive green CLAY to SILTY CLAY; moist. qu > 4 TSF — 2" at -340

CLAYEY SAND to SANDY CLAY grading to fine to medium SAND and SILT.

Fine SANDY SILT grading to CLAYEY SILT, grading to

Gray-green, SILTY to fine SANDY CLAY. — 2" at -360

Fine SANDY CLAYEY SILT.

2" 2" — Brown mottled with black, calcareous CLAYEY SILT grading to green-brown, slightly CLAYEY SILTY fine SAND; moist.

Green-brown, SILTY fine SAND to fine SANDY SILT.

Blue-green, weakly cemented, fine to medium SAND.

2" — Olive green, fine, SANDY SILTY CLAY with laminations of fine SAND; variably cemented with calcium carbonate; moist.

Interbedded brown-gray, SILTY CLAY and slightly fine SANDY CLAYEY SILT.

Blue gray, CLAYEY SILT grading to blue gray CLAY to SILTY CLAY.

2" — Olive gray, SILTY CLAY with trace of fine SAND; slightly calcareous, slightly moist.

2" 2" — Olive-gray, CLAYEY SILT; moist.

2" — Olive green, slightly SILTY CLAY; moist.

MATCH LINE

MATCH LINE — -500

Olive green, slightly SILTY CLAY; moist. — -510

Medium to coarse SAND.

Fine SANDY SILT. — -520

Medium to coarse SAND with SILT interbeds.

Gray, fine to coarse SAND and GRAVEL. — -530

2" — SILT, locally fine SANDY or CLAYEY grading to olive green, slightly SILTY CLAY; slightly moist. — -540

-550

Medium to coarse SAND and fine GRAVEL.

Brown, CLAYEY SILT grading to — -560

2" — Brown-green, slightly SILTY CLAY, trace of calcium carbonate; slightly moist. qu = 4.5 TSF — -570

-580

Coarse SAND and fine CHERT GRAVEL fragments. — -590

Green-gray, CLAYEY SILT.

Medium to coarse SAND.

2" — Sheared blue-gray CLAY grading to weakly cemented blue-green, slightly CLAYEY fine SANDY SILT to SILTY fine SAND; moist, trace of roots. — -600

Medium to coarse SAND.

Light brown, CLAYEY SILT.

Coarse SAND and fine GRAVEL. — -610

Light brown, CLAYEY SILT with interbeds of hard black CLAY

Gold-brown SILT. — -620

2" — Gold-brown, SILTY CLAY with trace of SAND & fine GRAVEL; slightly moist. — -630

- grading to -

SANDY CLAY to CLAYEY SAND with sporadic fine GRAVEL. — -640

-650

3 1/2 — Black SILTSTONE with scattered lenses of green-gray GRAYWACKE and white and brown CHERT all with calcium carbonate healed fractures. — -660

SILTSTONE and SHALE.

REC=39% RQD=0% — 3 1/2 — Soft, slightly weathered, very intensely fractured and sheared gray-black SHALEY SILTSTONE and SILTSTONE, trace carbon carbonate veining — -670

-680

-690

Dark gray SHALE or CLAYSTONE.

Dark gray SILTSTONE with calcite veins. — -700

REC=42% RQD=0% — 3 1/2 — Gray SILTSTONE; soft, fresh, intensely fractured & dark gray SHALEY SILTSTONE; soft, fresh, very intensely fractured all with calcite veining. — -710

-720

-730

-740

REC=40% RQD=0% — 3 1/2 — Gray SILTSTONE; soft, fresh, intensely fractured & dark gray SHALEY SILTSTONE; soft, fresh, very intensely fractured all with calcite veining. — -750

11-21-92 — -760

NOTE: BORING REAMED TO 4 7/8" & ACCELEROMETER GROUTED IN BOTTOM.

PLANS APPROVAL DATE

REGISTERED ENGINEERING GEOLOGIST

J. BOWMAN — No. 1677 — Exp. 8-31-96 — REGISTERED ENGINEERING GEOLOGIST — STATE OF CALIFORNIA

DIST.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO	TOTAL SHEETS
04	SM	84			

ENGINEERING SERVICE CENTER

STRUCTURE FOUNDATIONS

DRAWN BY: J. Tree Simons 5/95

CHECKED BY:

FIELD INVESTIGATION BY: J. BOWMAN / M. PALMER

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS → 0 1 2 3

State of CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF STRUCTURES
STRUCTURE DESIGN

CU: 04
EA: 04371K

BRIDGE NO. 35-38
POST MILE 23.2

DESIGNED PRIOR TO BEARING EARLIER REVISION DATES →

REVISION DATES (PRELIMINARY STAGE ONLY)

11/22/95

DUMBARTON BRIDGE SEISMIC ANALYSIS

LOG OF TEST BORINGS 2 OF 18

SHEET OF

CONSISTENCY CLASSIFICATION FOR SOILS

According to the Standard Penetration Test

Penetration Index (Blows / Ft)	Granular	Cohesive
0-4	Very Loose	Very Soft
5-9	Loose	Soft
10-19	Slightly compact	Silt
20-34	Compact	Very Stiff
35-59	Dense	Hard
>70	Very Dense	Very Hard

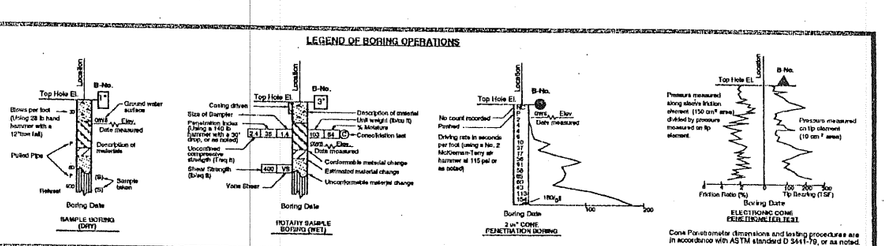
LEGEND OF EARTH MATERIALS

GRAVEL; SAND; SILT; CLAY; SANDY CLAY or CLAYEY SAND; SANDY SILT or SILTY SAND; SILTY CLAY; CLAYEY SILT; PEAT and/or ORGANIC MATTER; FILL MATERIAL; IGNEOUS ROCK; SEDIMENTARY ROCK; METAMORPHIC

NOTE: Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

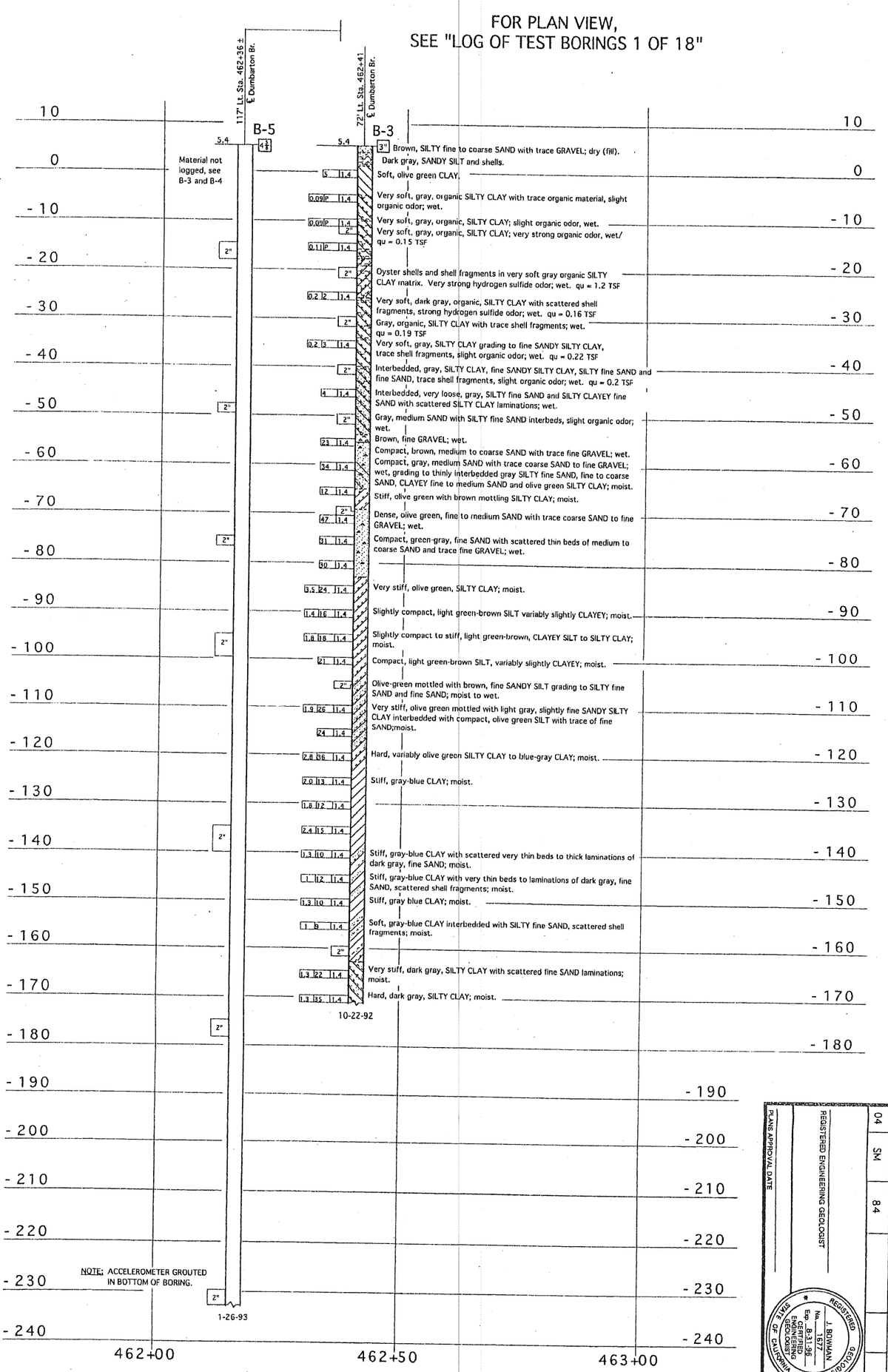
2 in² CONE PENETROMETER; SAMPLE BORING (DRY); ROTARY SAMPLE BORING (WET); AUGER BORING (DRY); TEST PIT; DIAMOND CORE BORING; JET BORING; ELECTRONIC CONE PENETROMETER

LEGEND OF BORING OPERATIONS



Cone Penetrometer dimensions and testing procedures are in accordance with ASTM standard D 3441-79, or as noted.

FOR PLAN VIEW, SEE "LOG OF TEST BORINGS 1 OF 18"



ENGINEERING SERVICE CENTER
STRUCTURE FOUNDATIONS
DRAWN BY: Jime Samuels 5/95
CHECKED BY:
FIELD INVESTIGATION BY: J. BOWMAN / M. PALMER

State of CALIFORNIA
DEPARTMENT OF TRANSPORTATION
DIVISION OF STRUCTURES
STRUCTURE DESIGN

CU: 04
EA: 04371K

BRIDGE NO. 35-38
POST MILE 29.2

DISREGARD PRINTS BEARING EARLIER REVISION DATES

DUMBARTON BRIDGE SEISMIC ANALYSIS

LOG OF TEST BORINGS 3 OF 18

REVISION DATES (PRELIMINARY STAGE ONLY)

PLANS APPROVAL DATE

REGISTERED ENGINEERING GEOLOGIST

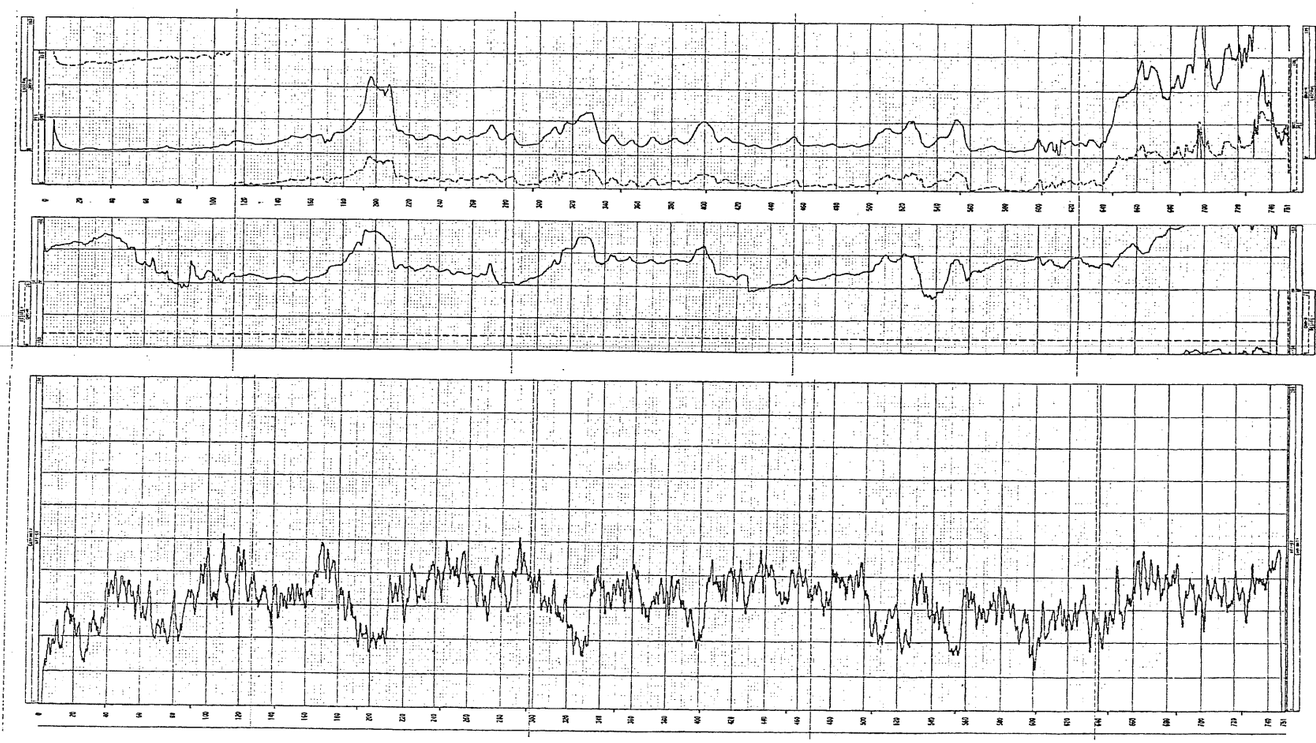
REGISTERED GEOLOGIST — J. BOWMAN — No. 1677 — Exp. 8-31-95 — REGISTERED ENGINEERING GEOLOGIST — STATE OF CALIFORNIA

DIST.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SM	84			

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS → 0 1 2 3

FOR PLAN VIEW, SEE
"LOG OF TEST BORINGS 1 OF 18"

B-4



DIST.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SM	84			

CERTIFIED ENGINEERING GEOLOGIST

REGISTERED GEOLOGIST
J. BOWMAN
No. 1577
Exp. 8-31-96
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

PLANS APPROVAL DATE

GEO-HYDRO-DATA
INCORPORATED
ELECTRIC WELL LOG

GEO-HYDRO-DATA
INCORPORATED
NATURAL GAMMA LOG

LEGEND OF BORING OPERATIONS

LEGEND OF EARTH MATERIALS
GRAVEL · SAND · SILT · CLAY · SANDY CLAY or CLAYEY SAND · SANDY SILT or SILTY SAND · SILTY CLAY · CLAYEY SILT · PEAT and/or ORGANIC MATTER · FILL MATERIAL · IGNEOUS ROCK · SEDIMENTARY ROCK · METAMORPHIC ROCK

CONSISTENCY CLASSIFICATION FOR SOILS
According to the Standard Penetration Test

Penetration Resistance (Blows / Ft)	Granular	Cohesive
0-4	Very loose	Very soft
5-9	Loose	Soft
10-19	Slightly compact	Stiff
20-34	Compact	Very stiff
35-69	Dense	Hard
>70	Very dense	Very hard

NOTE: Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

DIVISION OF	OFFICE OF ENGINEERING GEOLOGY
NEW TECHNOLOGY, MATERIALS AND RESEARCH	
DRAWN BY	5/95
CHECKED BY	

FIELD INVESTIGATION BY:
J. BOWMAN / M. PALMER

State of CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF STRUCTURES
STRUCTURE DESIGN

BRIDGE NO.	35-38
POST MILE	29.2

DUMBARTON BRIDGE SEISMIC ANALYSIS
LOG OF TEST BORINGS 4 OF 18

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

CU 04
EA 04371K

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES (PRELIMINARY STAGE ONLY)

SHEET 01

TL 6051 REV 2/92

CONSISTENCY CLASSIFICATION FOR SOILS

According to the Standard Penetration Test

Penetration Index (Blows / Ft)	Granular	Cohesive
0-4	Very Loose	Very Soft
5-9	Loose	Soft
10-19	Slightly compact	Stiff
20-34	Compact	Very Stiff
35-69	Dense	Hard
>70	Very Dense	Very Hard

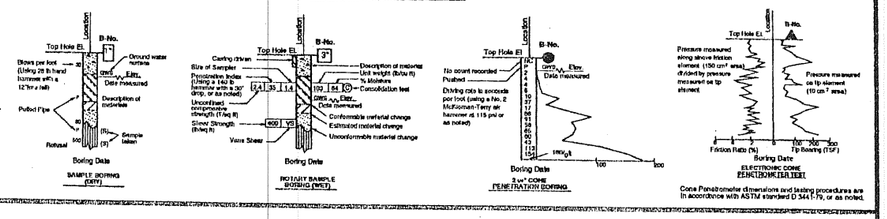
NOTE: Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

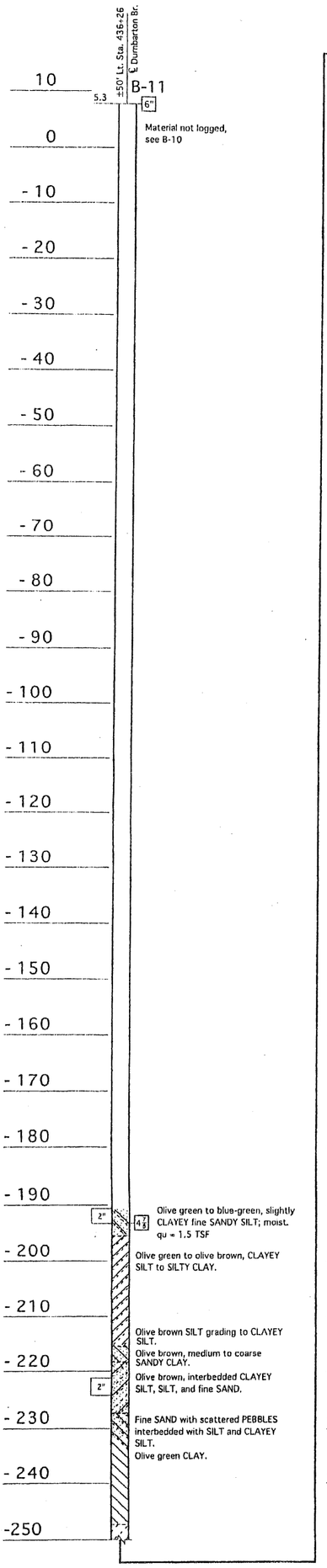
LEGEND OF EARTH MATERIALS

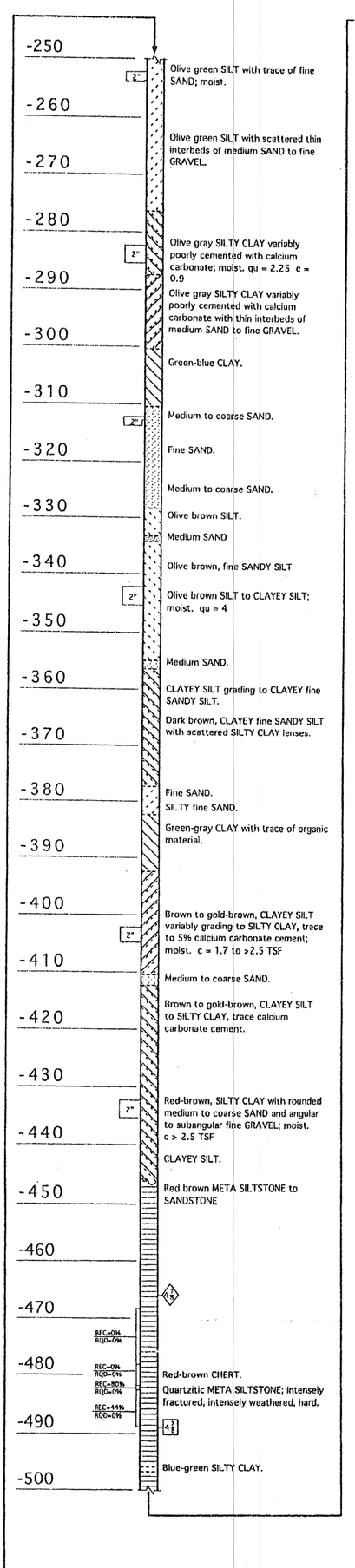
GRAVEL; SAND; SILT; CLAY; SANDY CLAY or CLAYEY SAND; SANDY SILT or SILTY SAND; SILTY CLAY; CLAYEY SILT; PEAT and/or ORGANIC MATTER; FILL MATERIAL; KINEOUS ROCK; SEDIMENTARY ROCK; METAMORPHIC

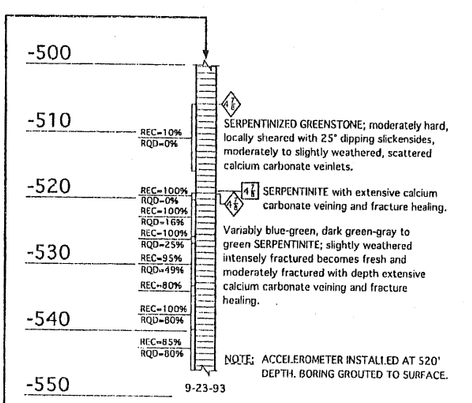
2 1/4" CONE PENETROMETER; SAMPLE BORING (DRIVE); ROTARY SAMPLE BORING (WET); AUGER BORING (DRY); TEST PIT; DIAMOND CORE BORING; JET BORING; ELECTRONIC CONE PENETROMETER

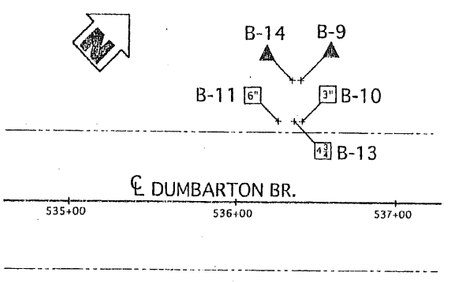
LEGEND OF BORING OPERATIONS











PLAN
1" = 40'

NOTES:
1. UNCONFINED COMPRESSIVE STRENGTH (qu) APPROXIMATED BY HAND PENETROMETER TEST
2. REC = % ROCK RECOVERY
3. RQD = % ROCK QUALITY DESIGNATION
4. COHESION (c) APPROXIMATED BY HAND TORVANE TEST.

PROFILE
1" = 10'

ENGINEERING SERVICE CENTER
STRUCTURE FOUNDATIONS
DRAWN BY
CHECKED BY
Jimmie Kamarra
5/95
FIELD INVESTIGATION BY:
J. BOWMAN / M. PALMER

State of CALIFORNIA
DEPARTMENT OF TRANSPORTATION
DIVISION OF STRUCTURES
STRUCTURE DESIGN

DUMBARTON BRIDGE SEISMIC ANALYSIS

LOG OF TEST BORINGS

SHEET 5 OF 18

BRIDGE NO. 35-38
POST MILE 29.2

REGISTERED ENGINEERING GEOLOGIST
J. BOWMAN
No. EG 1097
CERTIFIED ENGINEERING GEOLOGIST
8-31-96
STATE OF CALIFORNIA

PLANS APPROVAL DATE

DIST.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SM	84			

CU: 04
EA: 043714K

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS → 0 1 2 3

DISREGARD PRINTS BEARING EARLIER REVISION DATES →

REVISION DATES (PRELIMINARY STAGE ONLY)

11/22/93

TL 0.64 REV. 5/95

CONSISTENCY CLASSIFICATION FOR SOILS

According to the Standard Penetration Test

Penetration Index (Blows / Ft)	Granular	Cohesive
0-4	Very Loose	Very Soft
5-9	Loose	Soft
10-19	Slightly compact	Stiff
20-34	Compact	Very Stiff
35-69	Dense	Hard
>70	Very Dense	Very Hard

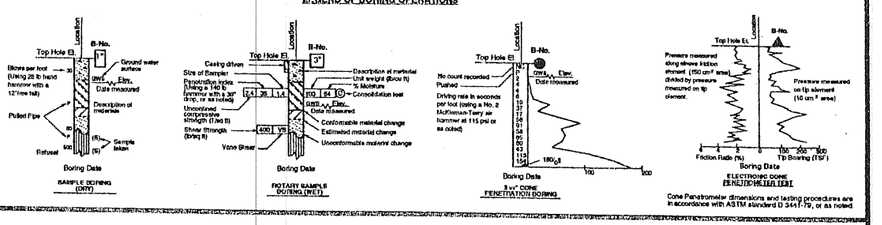
NOTE: Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

LEGEND OF EARTH MATERIALS

GRAVEL; SAND; SILT; CLAY; SANDY CLAY or CLAYEY SAND; SANDY SILT or SILTY SAND; SILTY CLAY; CLAYEY SILT; PEAT and/or ORGANIC MATTER; FILL MATERIAL; IGNEOUS ROCK; SEDIMENTARY ROCK; METAMORPHIC

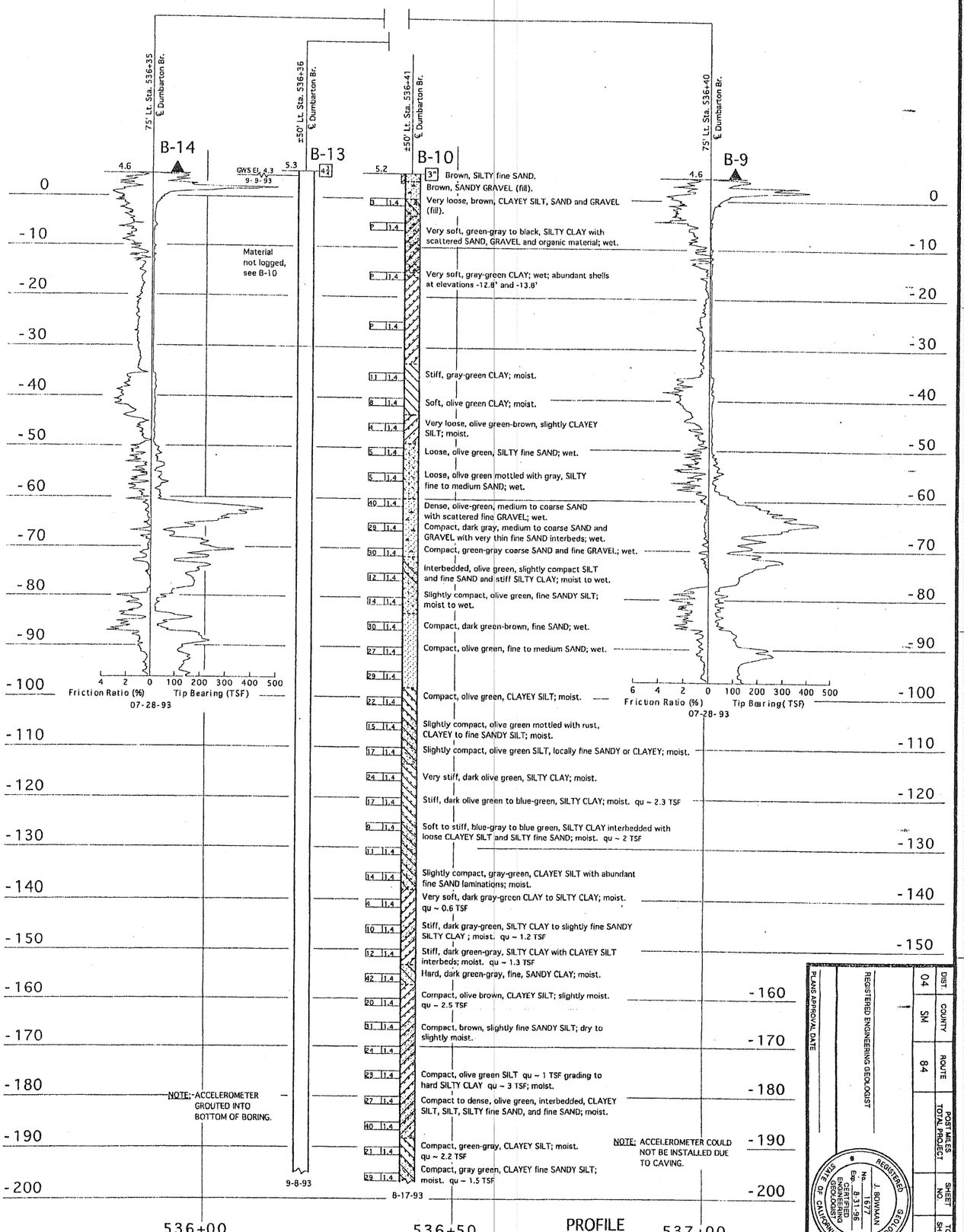
2 1/4" CONE PENETROMETER; SAMPLE BORING (DRY); ROTARY SAMPLE BORING (WET); AUGER BORING (DRY); TEST PIT; DIAMOND CORE BORING; JET BORING; ELECTRONIC CONE PENETROMETER

LEGEND OF BORING OPERATIONS



Cone Penetrometer dimensions and testing procedures are in accordance with ASTM standard D 3441-79, or as noted

FOR PLAN VIEW, SEE
"LOG OF TEST BORINGS 5 OF 18"



536+00 536+50 PROFILE 537+00
1" = 10'

ENGINEERING SERVICE CENTER
STRUCTURE FOUNDATIONS
DRAWN BY: Irma Serrano 5/95
CHECKED BY:
FIELD INVESTIGATION BY: J. BOWMAN / M. PALMER
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS → 0 1 2 3

State of CALIFORNIA
DEPARTMENT OF TRANSPORTATION
DIVISION OF STRUCTURES
STRUCTURE DESIGN

CU: 04
EA: 04371K

DESIGNATION PRIOR TO EARLIER REVISION DATES →

BRIDGE NO. 35-38
POST MILE 29.2

DUMBARTON BRIDGE SEISMIC ANALYSIS
LOG OF TEST BORINGS 6 OF 18

REVISION DATES (PRELIMINARY STAGE ONLY)
11/29/95

SHEET OF

PLANS APPROVAL DATE

REGISTERED ENGINEERING GEOLOGIST

REGISTERED ENGINEERING GEOLOGIST
No. 1877
Exp. 8-31-95
CERTIFIED ENGINEERING GEOLOGIST
J. BOWMAN
STATE OF CALIFORNIA

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SM	84			

DIST.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SM	84			

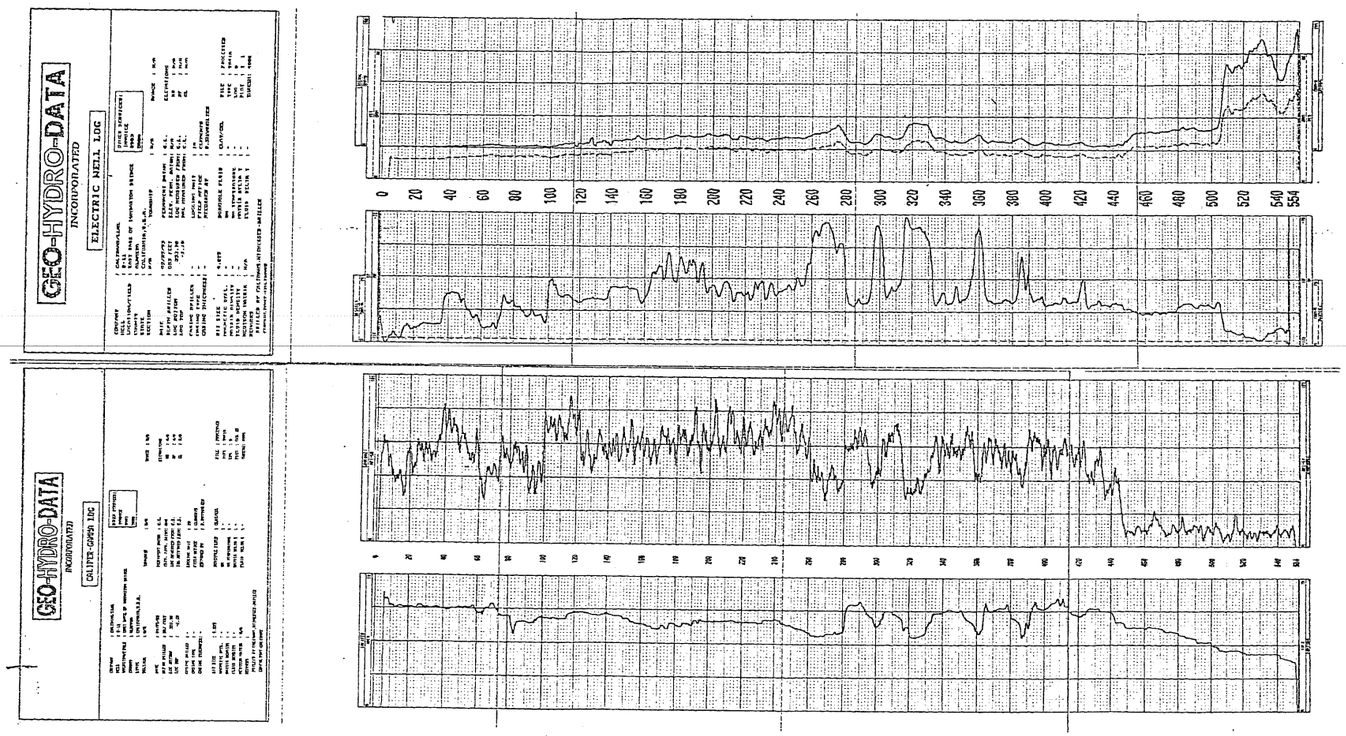
CERTIFIED ENGINEERING GEOLOGIST

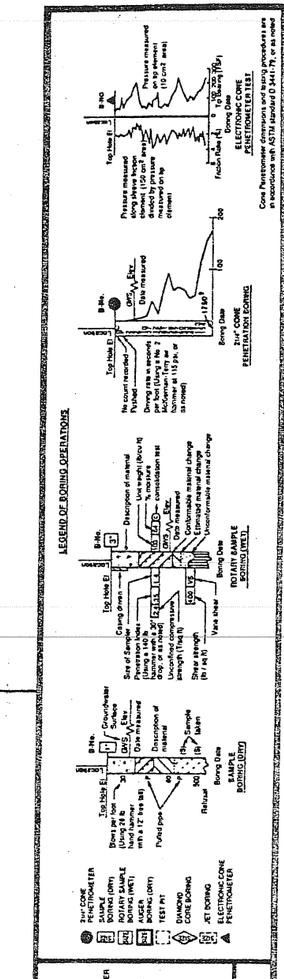
REGISTERED GEOLOGIST
J. BOWMAN
No. 1677
Exp. 8-31-96
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

PLANS APPROVAL DATE

FOR PLAN VIEW, SEE
"LOG OF TEST BORINGS 1 OF 18"

B-11





DIVISION OF NEW TECHNOLOGY, MATERIALS AND RESEARCH	OFFICE OF ENGINEERING GEOLOGY	FIELD INVESTIGATION BY:	State of CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF STRUCTURES STRUCTURE DESIGN	BRIDGE NO. 35-38	DUMBARTON BRIDGE SEISMIC ANALYSIS
DRAWN BY 5/95		J. BOWMAN / M. PALMER			POST MILE 29.2	LOG OF TEST BORINGS 7 OF 18
CHECKED BY						

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

CU 04
EA 04371K

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES (PRELIMINARY STAGE ONLY)

SHEET 01

TL 6051 REV 2/92

CONSISTENCY CLASSIFICATION FOR SOILS

According to the Standard Penetration Test

Penetration Index (Blows / Ft)	Granular	Cohesive
0-4	Very Loose	Very Soft
5-9	Loose	Soft
10-19	Slightly compact	Stiff
20-34	Compact	Very Stiff
35-69	Dense	Hard
>70	Very Dense	Very Hard

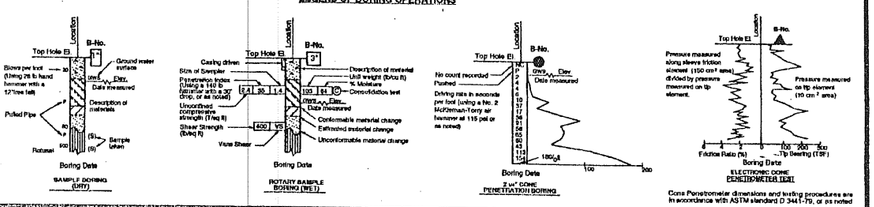
LEGEND OF EARTH MATERIALS

GRAVEL; SAND; SILT; CLAY; SANDY CLAY or CLAYEY SAND; SANDY SILT or SILTY SAND; SILTY CLAY; CLAYEY SILT; PEAT and/or ORGANIC MATTER; FILL MATERIAL; IGNEOUS ROCK; SEDIMENTARY ROCK; METAMORPHIC

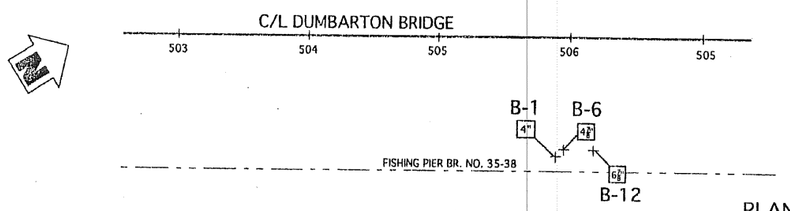
NOTE: Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

2 1/4" CONE PENETROMETER; SAMPLE BORING (DRY); ROTARY SAMPLE BORING (WET); AUGER BORING (DRY); TEST PIT; DIAMOND CORE BORING; JET BORING; ELECTRONIC CONE PENETROMETER

LEGEND OF BORING OPERATIONS

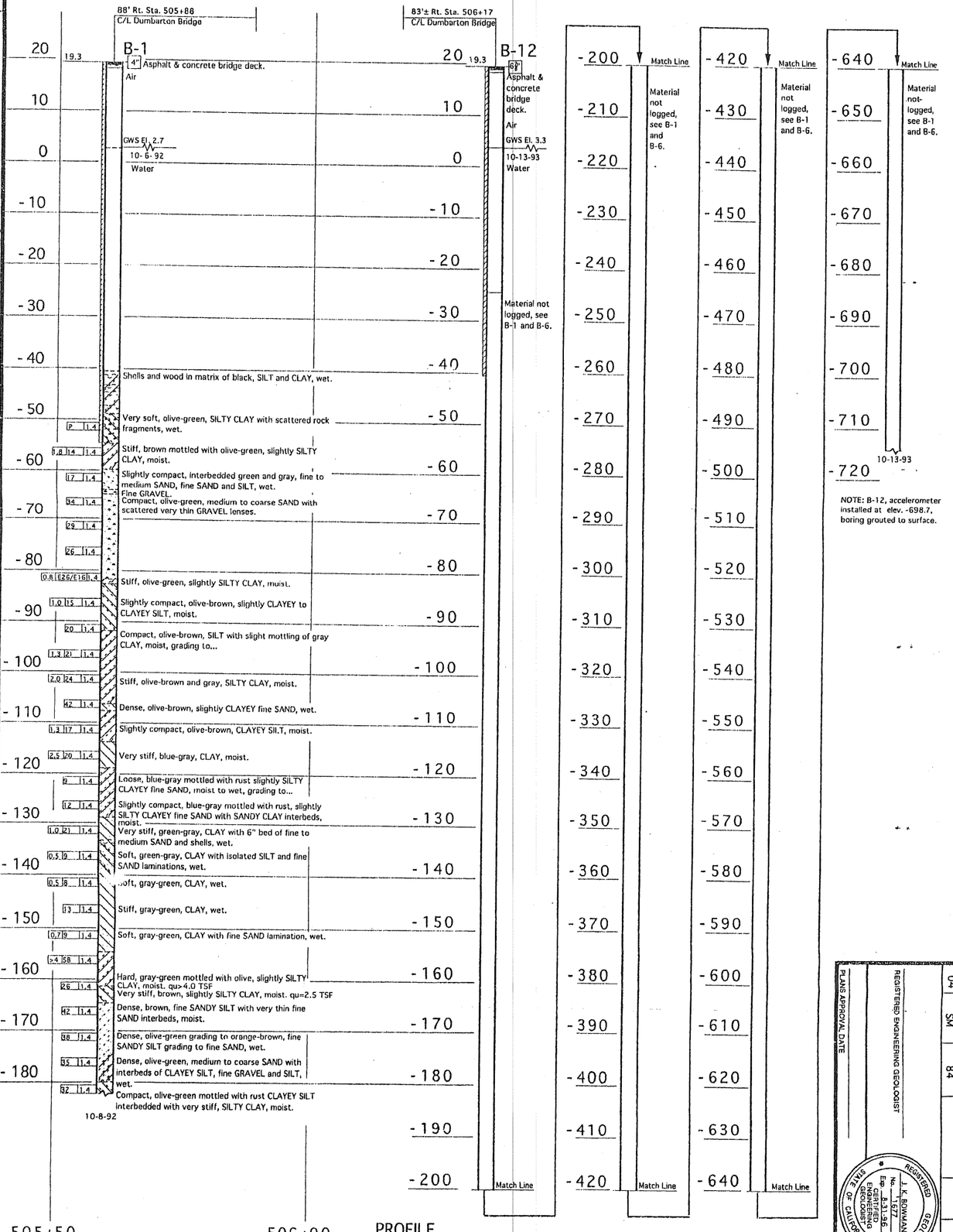


Cone Penetrometer dimensions and testing procedures are in accordance with ASTM standard D 344 T-79, or as noted



PLAN
1" = 50'

NOTES:
1. E = BLOW COUNT FOR ONE FOOT PENETRATION EXTRAPOLATED FROM BLOW COUNT FOR LESS THAN ONE FOOT (DUE TO CHANGE IN MATERIAL OR HARD DRIVING).
2. UNCONFINED COMPRESSIVE STRENGTH DETERMINED BY "POCKET PENETROMETER".



PROFILE
1" = 10'

ENGINEERING SERVICE CENTER
STRUCTURE FOUNDATIONS
DRAWN BY
CHECKED BY
FIELD INVESTIGATION BY: J. BOWMAN, J. THORNE
State of CALIFORNIA
DEPARTMENT OF TRANSPORTATION
DIVISION OF STRUCTURES
STRUCTURE DESIGN
CU: 04
EA: 0437K
BRIDGE NO. 35-38
POST MILE 23.2
DUMBARTON BRIDGE SEISMIC ANALYSIS
LOG OF TEST BORINGS
SHEET 8 OF 18
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS
DISTRICT | COUNTY | ROUTE | POST MILES TOTAL PROJECT | SHEET NO. | TOTAL SHEETS
04 | SM | 84

PLANS APPROVAL DATE

REGISTERED ENGINEERING GEOLOGIST

REGISTERED GEOLOGIST — STATE OF CALIFORNIA — J. K. BOWMAN — No. 1627 — Exp. 8-31-96 — CERTIFIED ENGINEERING GEOLOGIST

CONSISTENCY CLASSIFICATION FOR SOILS

According to the Standard Penetration Test

Penetration Index (Blows / Ft)	Granular	Cohesive
0-4	Very Loose	Very Soft
5-9	Loose	Soft
10-19	Slightly compact	Stiff
20-34	Compact	Very Stiff
35-69	Dense	Hard
>70	Very Dense	Very Hard

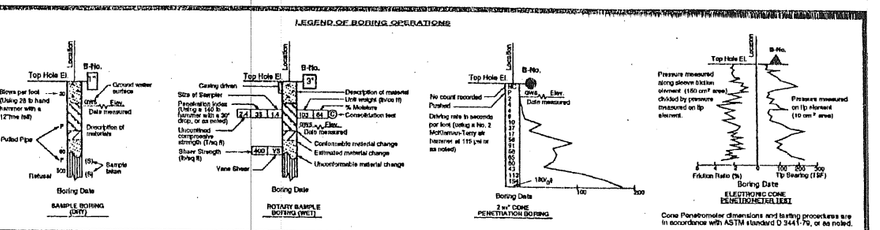
NOTE: Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

LEGEND OF EARTH MATERIALS

GRAVEL; SAND; SILT; CLAY; SANDY CLAY or CLAYEY SAND; SANDY SILT or SILTY SAND; SILTY CLAY; CLAYEY SILT; PEAT and/or ORGANIC MATTER; FILL MATERIAL; IGNEOUS ROCK; SEDIMENTARY ROCK; METAMORPHIC

2 1/2" CONE PENETROMETER; SAMPLE BORING (DRT); ROTARY SAMPLE BORING (WET); AUGER BORING (DRT); TEST PIT; DIAMOND CORE BORING; JET BORING; ELECTRONIC CONE PENETROMETER

LEGEND OF BORING OPERATIONS



Cone Penetrometer dimensions and testing procedures are in accordance with ASTM standard D 3441-79, or as noted.

FOR PLAN VIEW, SEE LOG OF TEST BORINGS, SHEET 8 OF 18.

83'± Rt. Sta. 505+94
C/L Dumbarton Bridge
B-6

20 — 19.3 — 4½" Asphalt & concrete bridge deck.
10 — Air
0 — GWS El. 2.8 2-1-95 Water
-10
-20
-30
-40 — Material not logged, see B-1.
-50
-60
-70
-80
-90
-100
-110 — 2" Olive-brown, slightly fine SANDY CLAYEY SILT, moist.
Material not logged, see B-1.
-120
-130
-140 — 2" Gray, CLAY, moist.
Material not logged, see B-1.
-150
-160
-170 — 2" Brown, slightly SILTY fine to medium SAND, wet.
Fine to medium SAND with trace of fine GRAVEL interbedded with gray, CLAYEY SILT, grading to...
Olive-green, CLAYEY SILT with SANDY interbeds.
-180
-190
-200 — 2" Olive-green, variably SILTY CLAY to CLAYEY SILT, moist, qu=2.8
-210
-220 — Olive-green, SILTY CLAY.
Fine SANDY SILT to SILTY fine SAND.
-230
-240 — 2" Olive-green, CLAYEY SILT grading to fine SANDY CLAY grading to fine SANDY CLAYEY SILT, moist, qu=2.8

506+00

-240 — Gray, CLAY.
-250 — Gray, CLAY with interbeds of fine SANDY CLAYEY SILT, grading to...
-260 — 2" Olive-green, CLAYEY fine SAND,qu=1.5, grading to SILTY fine SAND, moist.
-270 — Interbedded fine SANDY SILT and fine SAND.
Medium to coarse SAND with scattered fine GRAVEL.
-280 — Fine SANDY SILT grading to...
Fine SANDY CLAYEY SILT grading to...
-290
-300 — 2" Slightly CLAYEY fine SANDY SILT.
Olive-green, SILTY fine SAND.
Brown, slightly CLAYEY SILT interbedded with brown CLAY, qu>4.0
CLAY to SILTY CLAY with CLAYEY SILT interbeds.
-310
-320
-330 — Fine SAND and SILT.
Green-gray, CLAY.
-340 — 2" Coarse SAND and fine GRAVEL.
Brown, CLAY.
-350
-360
-370 — 2" Olive-brown, CLAY, moist.
-380
-390
-400 — 2" Olive-brown, slightly CLAYEY SILT with scattered thin interbeds of CLAY all variably cemented with calcium carbonate, moist.
-410
-420 — Gray, CLAY interbedded with fine SAND, trace of woody fragments, grading to...
Green-gray with trace of black mottling, fine SAND, trace of carbonized woody fragments.
-430
-440 — 2" Olive-brown, CLAYEY SILT.
Fine, angular CHERT, SANDSTONE and SHALE GRAVEL.
CLAYEY fine SAND with CLAY interbeds, grading to...
-450 — Olive-brown CLAY with interbeds of olive-gray with scattered iron oxide staining, CLAYEY fine SAND, moist, grading to...
-460 — CLAYEY fine SAND with CLAY interbeds.
-470
-480 — 2" Light brown, slightly SILTY fine SAND, moist.
-490
-500

506+50

-500 — Medium to coarse SAND and fine CHERT and SHALE GRAVEL.
-510 — 2" Olive-green with white mottling CLAY variably cemented with calcium carbonate.
-520
-530 — Interbedded fine SAND and SILT, becoming CLAYEY with depth.
-540 — Gray, SILTY CLAY to CLAYEY SILT, slightly fissile grading to gray CLAY with calcium carbonate nodules.
-550 — 2"
-560
-570 — Brown, SILTY CLAY.
Olive-green, fine SANDY CLAYEY SILT grading to CLAY with calcium carbonate concretions.
-580 — 2" Brown, SANDY SILT poorly cemented.
-590 — JASPER rock fragments and dark brown CLAY.
-600 — Red-brown, JASPER, soft to very soft, intensely weathered to decomposed, intensely fractured to very intensely fractured, variably sheared with some fractures filled with CLAY.
REC. 100%
RQD. 0%
REC. 17%
RQD. 0%
-610 — 4½" Red-brown, JASPER, very soft, intensely weathered, very intensely fractured, variably decomposed to CLAY.
-620 — Light gray, SILTSTONE with iron oxide stained fracture surfaces.
Brown, SILTSTONE, locally decomposed to SILTY CLAY.
-630
-640
-650 — 4½" Brown to tan grading to pale tan SILTSTONE, very soft, intensely weathered, was intensely fractured but fractures healed with iron oxide.
REC. 88%
RQD.89%
4½"
-660 — Light brown mottled with rust SILTSTONE, decomposed to SILT and CLAY.
-670 — 4½" Light brown with black and rust staining, SILTSTONE and SANDSTONE, very soft to soft, intensely to moderately weathered, sheared but healed to moderately fractured with iron oxide and SILT. SANDSTONE contains SHALE chips to 3/4".
-680 — 4½"
Black, SHALE, soft, fresh, grading to...
-690 — Dark gray, SILTSTONE, moderately soft, fresh, grading to...
-700
-710 — 4½" Dark gray, GRAYWACKE, moderately soft, fresh, fine grained with calcium carbonate veins and SHALE interbeds. Becomes harder with depth.
4½"
-720 — Dark gray, GRAYWACKE, moderately hard, fresh, intensely to moderately fractured, trace calcium carbonate veins and SHALE laminations to thin beds.

2-5-93

PROFILE
1" = 10'

ENGINEERING SERVICE CENTER
STRUCTURE FOUNDATIONS
DRAWN BY
CHECKED BY
FIELD INVESTIGATION BY: J. BOWMAN
5/93

State of CALIFORNIA
DEPARTMENT OF TRANSPORTATION
DIVISION OF STRUCTURES
STRUCTURE DESIGN

DUMBARTON BRIDGE SEISMIC ANALYSIS
LOG OF TEST BORINGS 9 OF 18

DISREGARD PRINTS BEARING EARLIER REVISION DATES
BRIDGE NO. 35-38
POST MILE 29.2
REVISION DATES (PRELIMINARY STAGE ONLY)
SHEET OF

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS → 0 1 2 3

CU: 04
EA: 04371K

REGISTERED ENGINEERING GEOLOGIST
PLANS APPROVAL DATE
J. K. BOWMAN
No. 1577
CERTIFIED ENGINEERING GEOLOGIST
8-31-96
REGISTERED GEOLOGIST
STATE OF CALIFORNIA

DIST.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SM	84			

DIST.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SM	84			

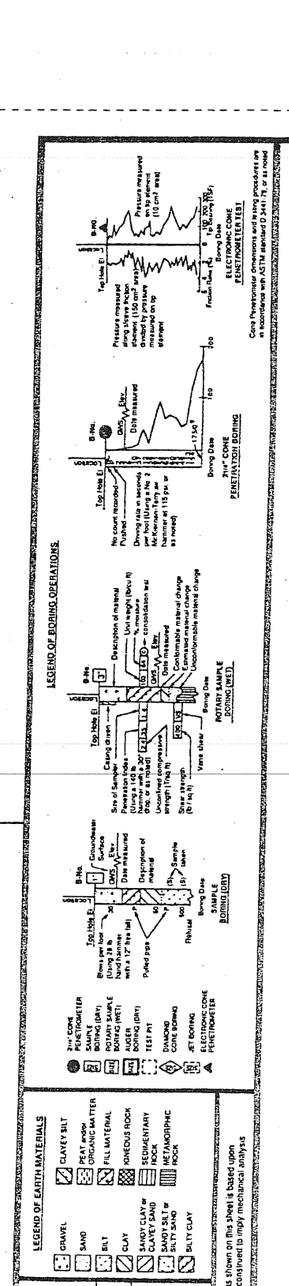
CERTIFIED ENGINEERING GEOLOGIST

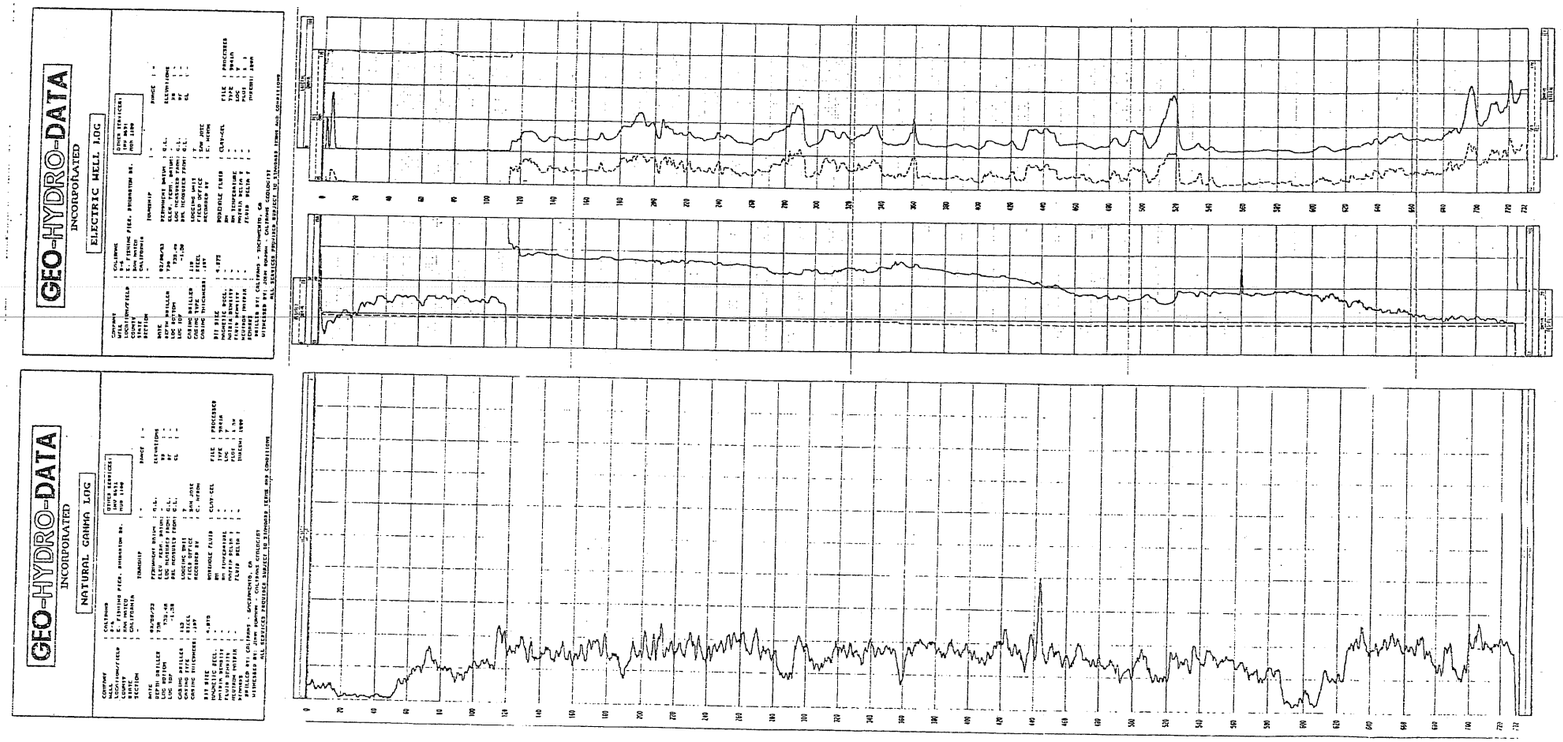
REGISTERED GEOLOGIST — J. K. BOWMAN — No. 1677 — Exp. 8-31-96 — CERTIFIED ENGINEERING GEOLOGIST — STATE OF CALIFORNIA

PLANS APPROVAL DATE

FOR PLAN VIEW, SEE LOG OF TEST BORINGS, SHEET 8 OF 18.

B-6





DIVISION OF	OFFICE OF ENGINEERING GEOLOGY	FIELD INVESTIGATION BY:	State of CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF STRUCTURES STRUCTURE DESIGN	BRIDGE NO. 35-38	DUMBARTON BRIDGE SEISMIC ANALYSIS
NEW TECHNOLOGY, MATERIALS AND RESEARCH		J. BOWMAN			POST MILE 29.2	LOG OF TEST BORINGS 10 OF 18
DRAWN BY Jon Wald 5/95				CU 04 EA 04371K	DISREGARD PRINTS BEARING EARLIER REVISION DATES	REVISION DATES (PRELIMINARY STAGE ONLY) SHEET 01
CHECKED BY						

TL 6051 REV 2/92 — ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

Figure 1-1. Site Location Map and Photo

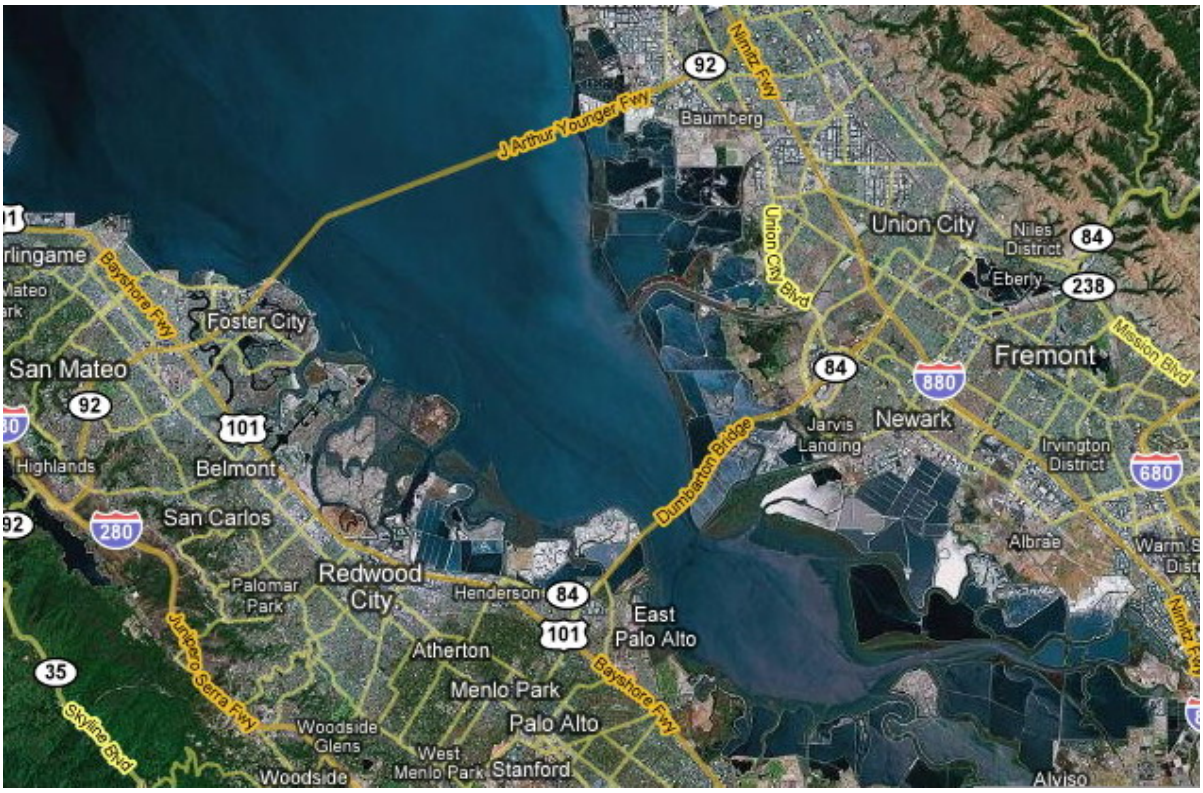


Figure 1-2. Dumbarton Bridge Pier Numbers

Figure 2-1a. Boring Locations

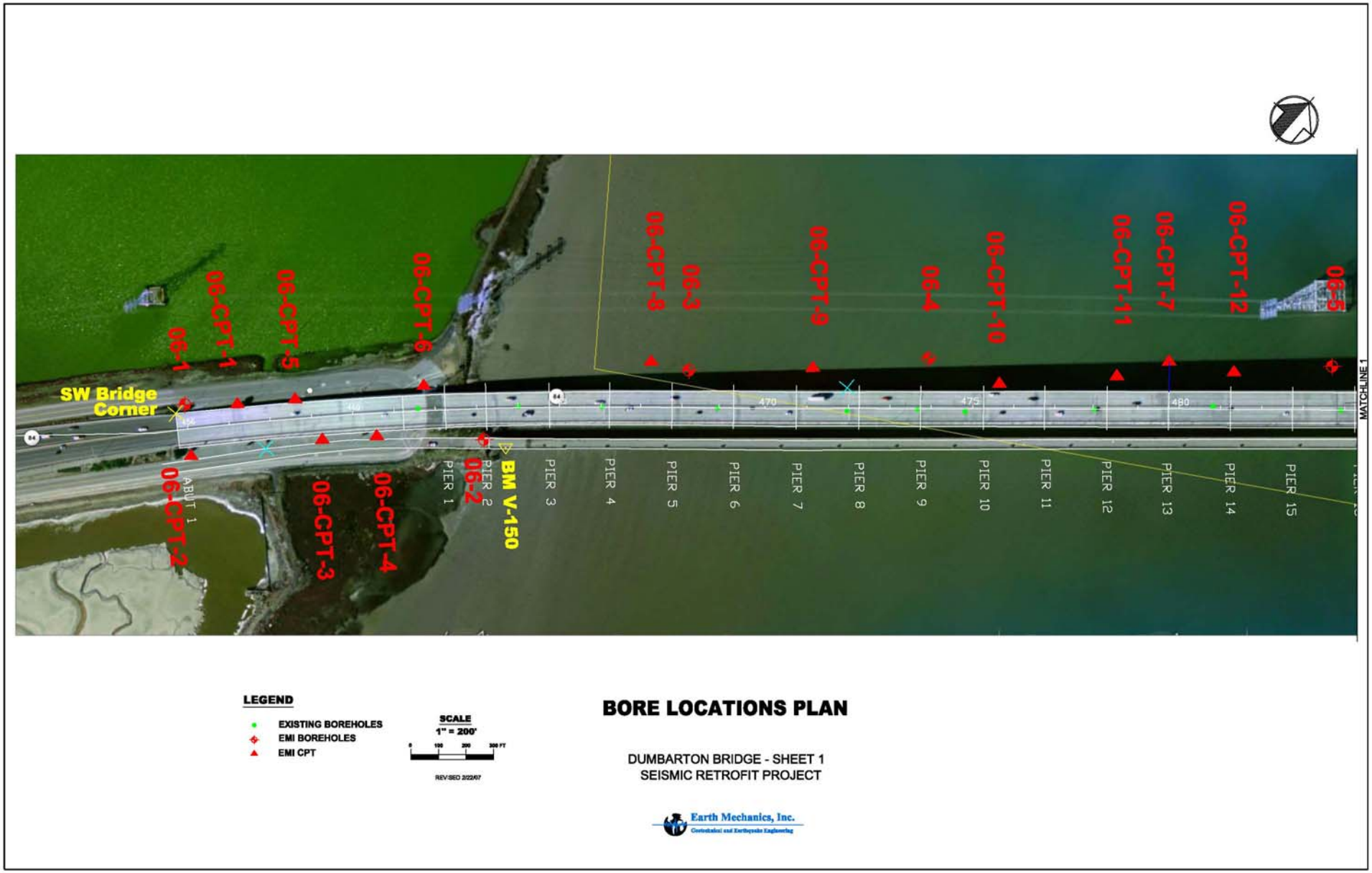


Figure 2-1b. Boring Locations, continued

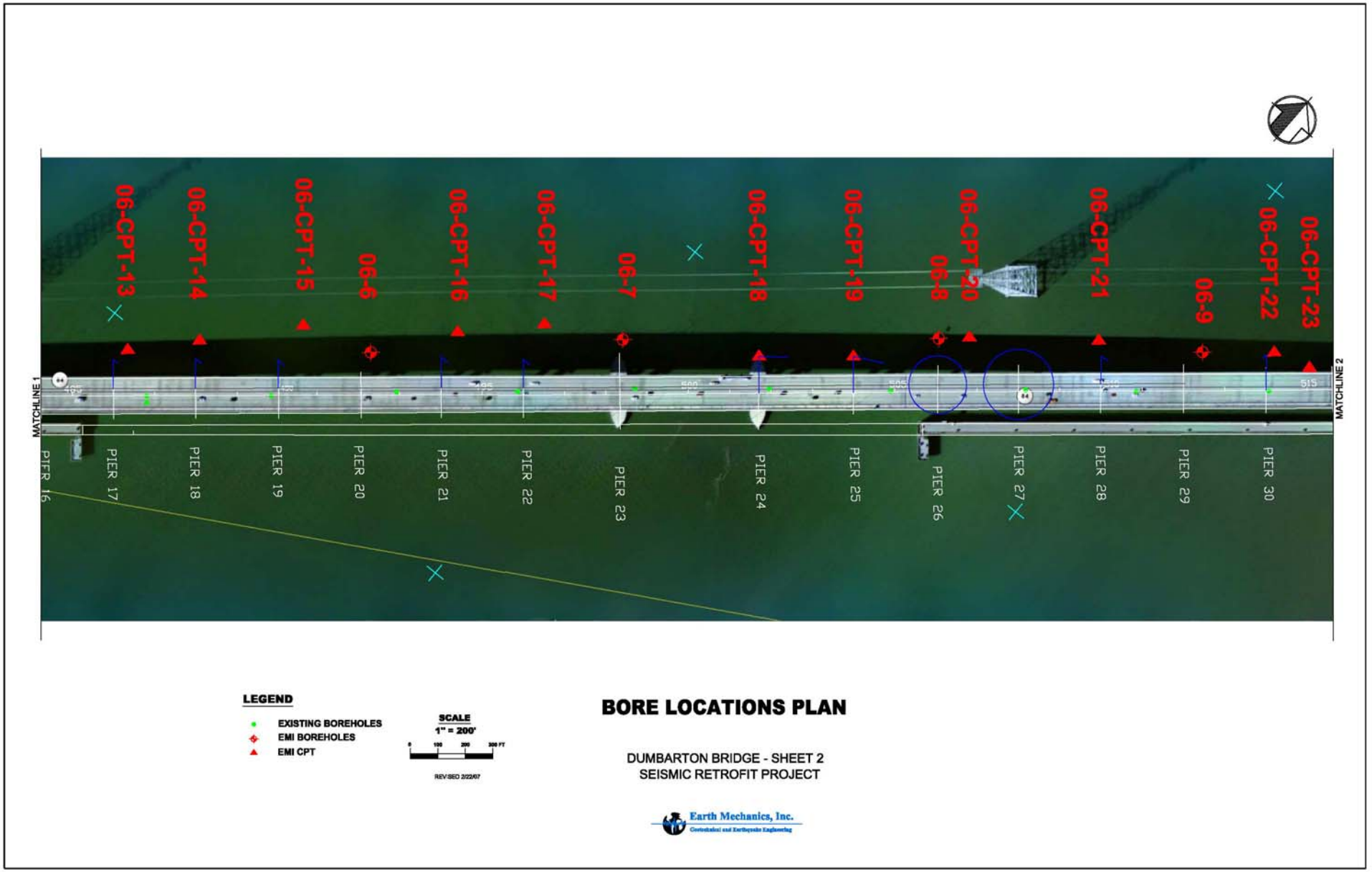
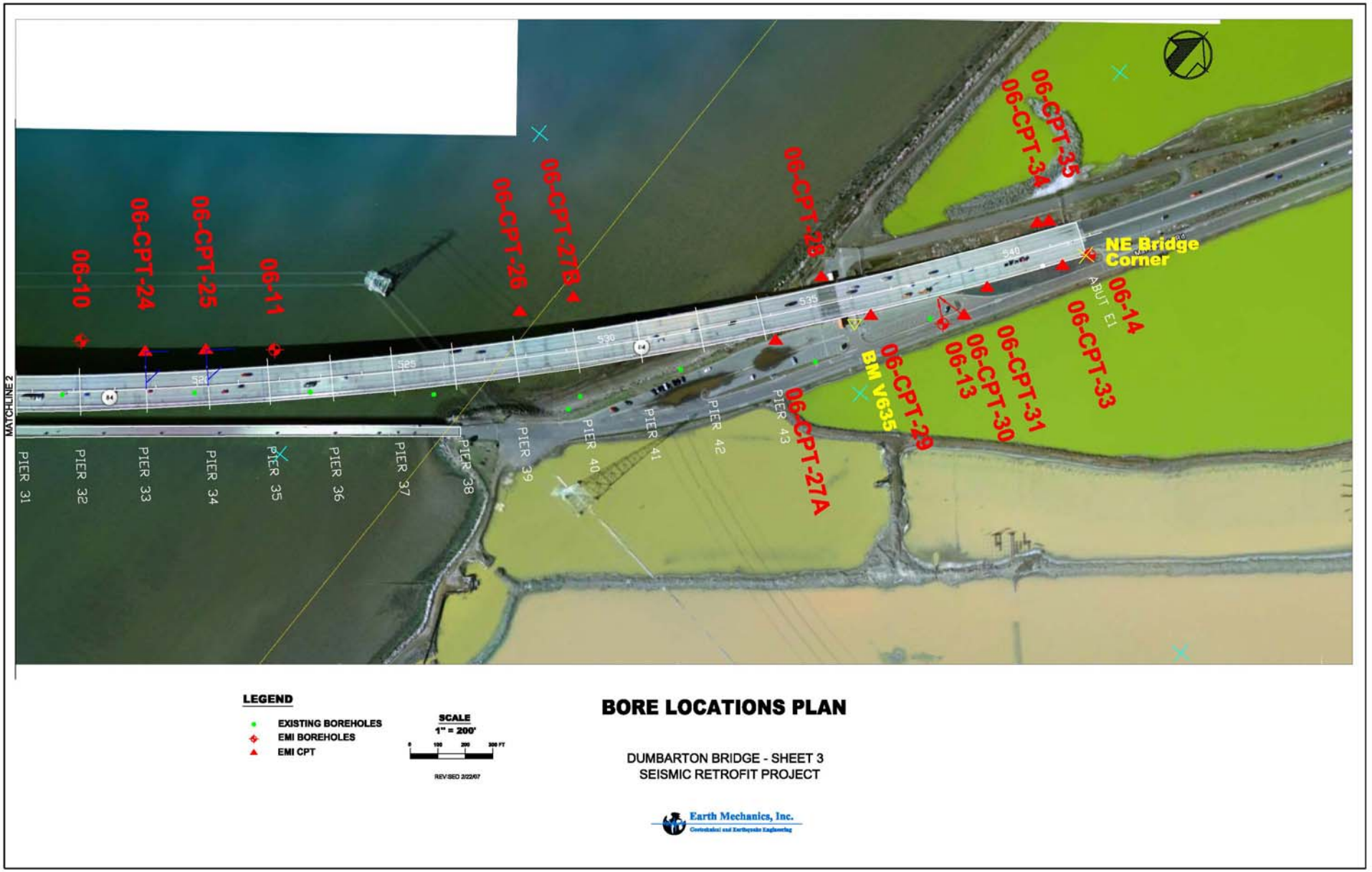


Figure 2-1c. Boring Locations, continued



Approach Structure

West

Pier 4 / Pile 33
20" Ø Pipe
Design Capacity: 80 tons
Cutoff: -7.75 ft; Tip El: -61 ft
Date Driven: 11-15-79; Date Tested: 11-28-79
EN Capacity: 215± tons
Static Load Test Capacity: 180+ tons (13 days)
Note: Test Not Taken to Failure

Abut. W-1 | UCB/LLNL Vs | W-5 | W-10 | W-15 | W-20 | Pier 1 | Pier 2 | Pier 3 | Pier 4 | Pier 5 | Pier 6 | Pier 7 | Pier 8 | Pier 9 | Pier 10

Change Scale: 300 200 100 0 -20 -40 -60 -80 -100 -120 -140 -160 -180

06-CPT-02 | 06-01 | 06-CPT-01 | 06-CPT-05 | 06-CPT-03 | 06-CPT-04 | 06-CPT-06 | 06-02 | 06-CPT-08 | 06-03 | 06-CPT-09 | 06-04 | 06-CPT-10

06-01: GP 11 SM 13 CH 0 CH 3 SM 0 CH 5 0 SM 12 SP-SM 20 SP 25 SM 19 SP 23 SM 17 SP 26 SP 35 CL 35 CL 15 CL CL 18 CH 21 CH 33 CH 22 CH 13 CH 3

06-02: ASPHALT SM 31 SM 24 SP 11 CL 8 CH 0 0 0 CH 4 SM 9 SM 27 SP-SM 25 SP-SM 19 SP-SM 26 SP-SM 23 SP-SM 47 SP-SM 41 CL 33 CL 24 CL 30 CH 7 CH 14 CH

06-03: CH 2 OL 1 1 1 0 OL 6 SW 5 CH 0 SW 26 SP 25 SP 21 SW 23 SP 43 CL 25 CL 15 ML 20 CL 26 CL 16 CL 18 CL 19 8 13 18

06-04: CL 0 0 0 CL 0 CL 7 SM 8 CL 25 CL 11 CL 15 CL 37 CL 17 CL 10 CL 23 CL 21 CL 19 CL 26 CL 37 CL 14 CL 4 CL 9 CL

FRICTION RATIO (%) | TIP RESISTANCE (TSF) | Vs (m/s)

LEGEND
- Fill
- Young Bay Mud
- Silty and Sandy Clay (Posey Formation)
- Sand (Posey Formation)
- Silty and Sandy Clay (San Antonio Formation)
- Old Bay Mud
- Sand and Clay (Alameda Formation)
- 12 SPT Blowcount
- Shear Wave Velocity

Earth Mechanics, Inc.

455+00 | 460+00 | 465+00 | 470+00 | 475+00

Scales:
Hor. 1" = 150'
Ver. 1" = 30' (Soil Profile)
1" = 300' (Bridge Profile)

Generalized Soil Profile Along Dumbarton Highway Alignment

Figure 2-2a

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

Main Channel Crossing

Pier 16 / Pile 41
20" Ø Pipe
Design Capacity: 80 tons
Cutoff: 8 ft; Tip El: -75 ft
Date Driven: 1-17-79; Date Tested: 1-26-79
EN Capacity: 106± tons
Static Load Test Capacity: 135± tons (9 days)

Pier 18 / Pile 3
54" Ø Concrete-Filled PCC Pipe
Design Capacity: 250 tons
Cutoff: 1.83 ft; Tip El: -85 ft
Date Driven: 12-13-78; Date Tested: 1-3-79
EN Capacity: 497± tons
Static Load Test Capacity: 340± tons
Notes: Pushed to -49; jetted to -65 ft; plunged to -75 while jetting ±5 min

Pier 20 / Pile 8
54" Ø Concrete-Filled PCC Pipe
Design Capacity: 250 tons
Cutoff: 1.83 ft; Tip El: -95 ft
Date Driven: 3-2-79
Date Tested: 3-13-79 to 3-21-79
EN Capacity: 710± tons
Static Load Test Capacity: 480± tons (19 days)
Notes: Jetted to -70 ft

Pier 23 / Pile 9
54" Ø Concrete-Filled PCC Pipe
Design Capacity: 250 tons
Cutoff: 0.83 ft; Tip El: -95.5 ft
Date Driven: 12-4-78; Date Tested: 12-19-78 to 12-22-78
EN Capacity: 490± tons
Static Load Test Capacity: 325± tons (18 days)
Notes: Jetted to -79 ft; recentered / redriven from -85 to -95.5 ft.

Change Scale

Pier 11 | Pier 12 | Pier 13 | Pier 14 | Pier 15 | Pier 16 | Pier 17 | Pier 18 | Pier 19 | Pier 20 | Pier 21 | Pier 22 | Pier 23

MSL

B-11 (Caltrans)

06-CPT-11 | 06-CPT-07 | 06-CPT-12 | 06-CPT-13 | 06-CPT-14 | 06-CPT-15 | 06-CPT-16 | 06-CPT-17

06-05 | 06-06 | 06-07

LEGEND
- Fill
- Young Bay Mud
- Silty and Sandy Clay (Posey Formation)
- Sand (Posey Formation)
- Silty and Sandy Clay (San Antonio Formation)
- Old Bay Mud
- Sand and Clay (Alameda Formation)
- 12 SPT Blowcount
- Shear Wave Velocity

Earth Mechanics, Inc.

480+00 | 485+00 | 490+00 | 495+00

Scales:
Hor. 1" = 150'
Ver. 1" = 30' (Soil Profile)
1" = 300' (Bridge Profile)

Generalized Soil Profile Along Dumbarton Highway Alignment

Figure 2-2b

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

Main Channel Crossing

Pier 31 / Pile 24
20" Ø Pipe
Design Capacity: 80 tons
Cutoff: -7.75 ft; Tip El: -61 ft
Date Driven: 8-22-78; Date Tested: 8-28-78 to 8-29-78
Date Retested: 9-15-78 to 9-17-78
EN Capacity: EIOD 59± tons BOR 153± tons (6 days)
Static Load Test Capacity: 100± tons (7 days) 120± tons (18 days*)
Notes: Time after initial test

Change Scale

Pier 24 | Pier 25 | UCB/LLNL Vs | Pier 26 | Pier 27 | Pier 28 | Pier 29 | Pier 30 | Pier 31 | Pier 32 | Pier 33 | Pier 34

MSL

06-CPT-18 | 06-CPT-19 | 06-CPT-20 | 06-CPT-21 | 06-CPT-22 | 06-CPT-23 | 06-CPT-24 | 06-CPT-25

06-07 | 06-08 | 06-09 | 06-10

FRICTION RATIO (%) 8 4 0 | TIP RESISTANCE (TSF) 200 400

Vs (m/s) 0 200 400

300 200 100 0 -20 -40 -60 -80 -100 -120 -140 -160 -180

500+00 505+00 510+00 515+00 520+00

LEGEND

- Fill
- Young Bay Mud
- Silty and Sandy Clay (Posey Formation)
- Sand (Posey Formation)
- Silty and Sandy Clay (San Antonio Formation)
- Old Bay Mud
- Sand and Clay (Alameda Formation)
- 12 SPT Blowcount
- Shear Wave Velocity

Earth Mechanics, Inc.

Scales:
Hor. 1" = 150'
Ver. 1" = 30' (Soil Profile)
1" = 300' (Bridge Profile)

Generalized Soil Profile Along Dumbarton Highway Alignment

Figure 2-2c

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

Approach Structure

Pier 36 / Pile 34
20" Ø Pipe
Design Capacity: 80 tons
Cutoff: -7.75 ft; Tip El: -74 ft
Date Driven: 8-19-78; Date Tested: 8-28-78 to 8-29-78
Date Retested: 9-15-78 to 9-17-78
EN Capacity: 42± tons
Static Load Test Capacity: 150+ tons (9 days)

East

Change Scale

300 200 100 0 -20 -40 -60 -80 -100 -120 -140 -160 -180

Pier 35 | Pier 36 | Pier 37 | Pier 38 | Pier 39 | Pier 40 | Pier 41 | Bent 42 | Bent 43 | Bent 44 | E-20 | E-15 | E-10 | E-5 | Abut. E-1

06-11 | 06-12 | 06-13 | 06-14

06-CPT-26 | 06-CPT-27B | 06-CPT-27A | 06-CPT-28 | 06-CPT-30 | 06-CPT-31 | 06-CPT-35 | 06-CPT-33

FRICTION RATIO (%) | TIP RESISTANCE (TSF) | Vs (m/s)

525+00 | 530+00 | 535+00 | 540+00

LEGEND

- Fill
- Young Bay Mud
- Silty and Sandy Clay (Posey Formation)
- Sand (Posey Formation)
- Silty and Sandy Clay (San Antonio Formation)
- Old Bay Mud
- Sand and Clay (Alameda Formation)
- 12 SPT Blowcount
- Shear Wave Velocity

Earth Mechanics, Inc.

Scales:
Hor. 1" = 150'
Ver. 1" = 30' (Soil Profile)
1" = 300' (Bridge Profile)

Generalized Soil Profile Along Dumbarton Highway Alignment

Figure 2-2d

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

Figure 4-1. Bay Area Fault Map

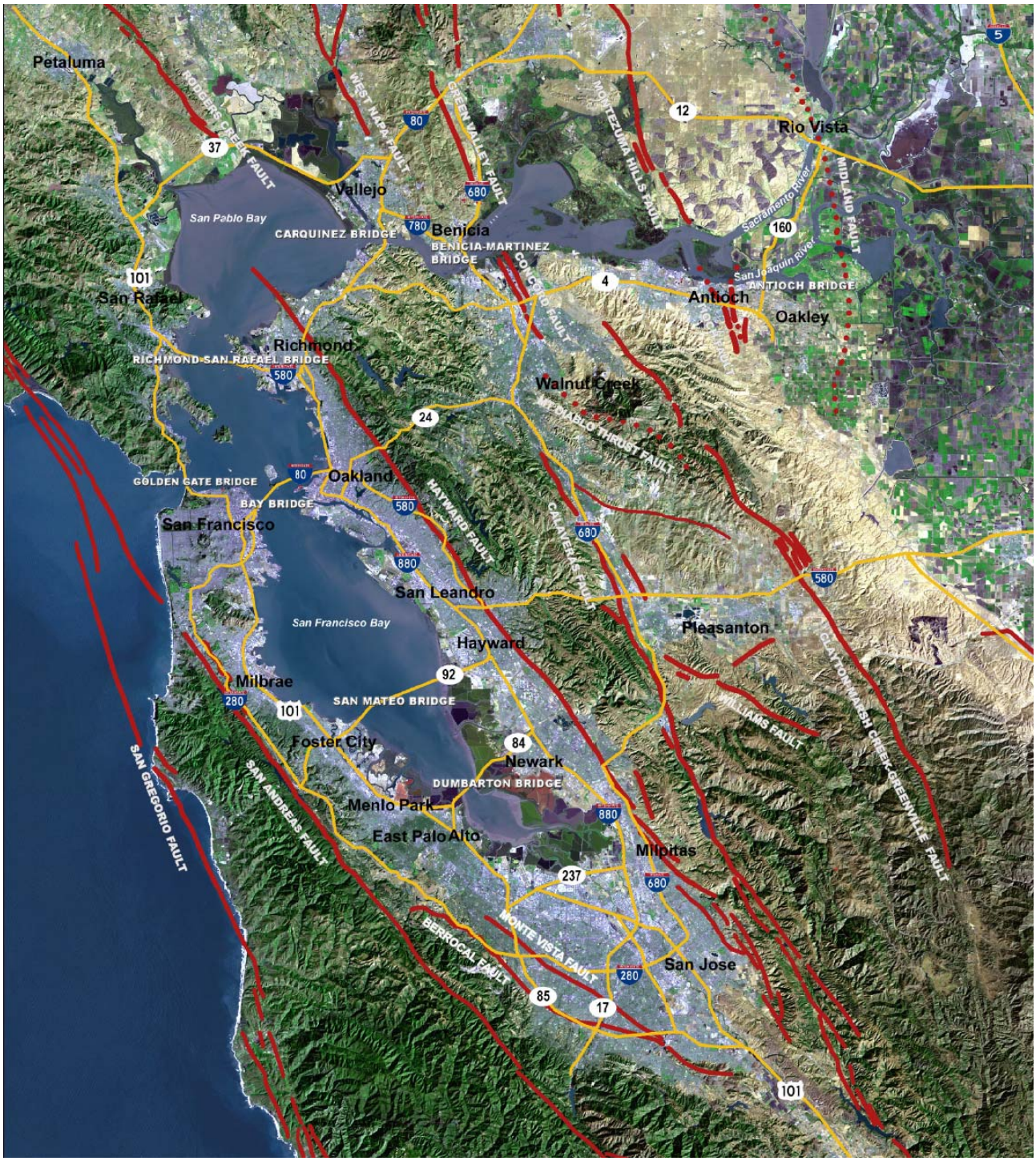


Figure 5-1

Earth Mechanics, Inc.

Geotechnical and Earthquake Engineering

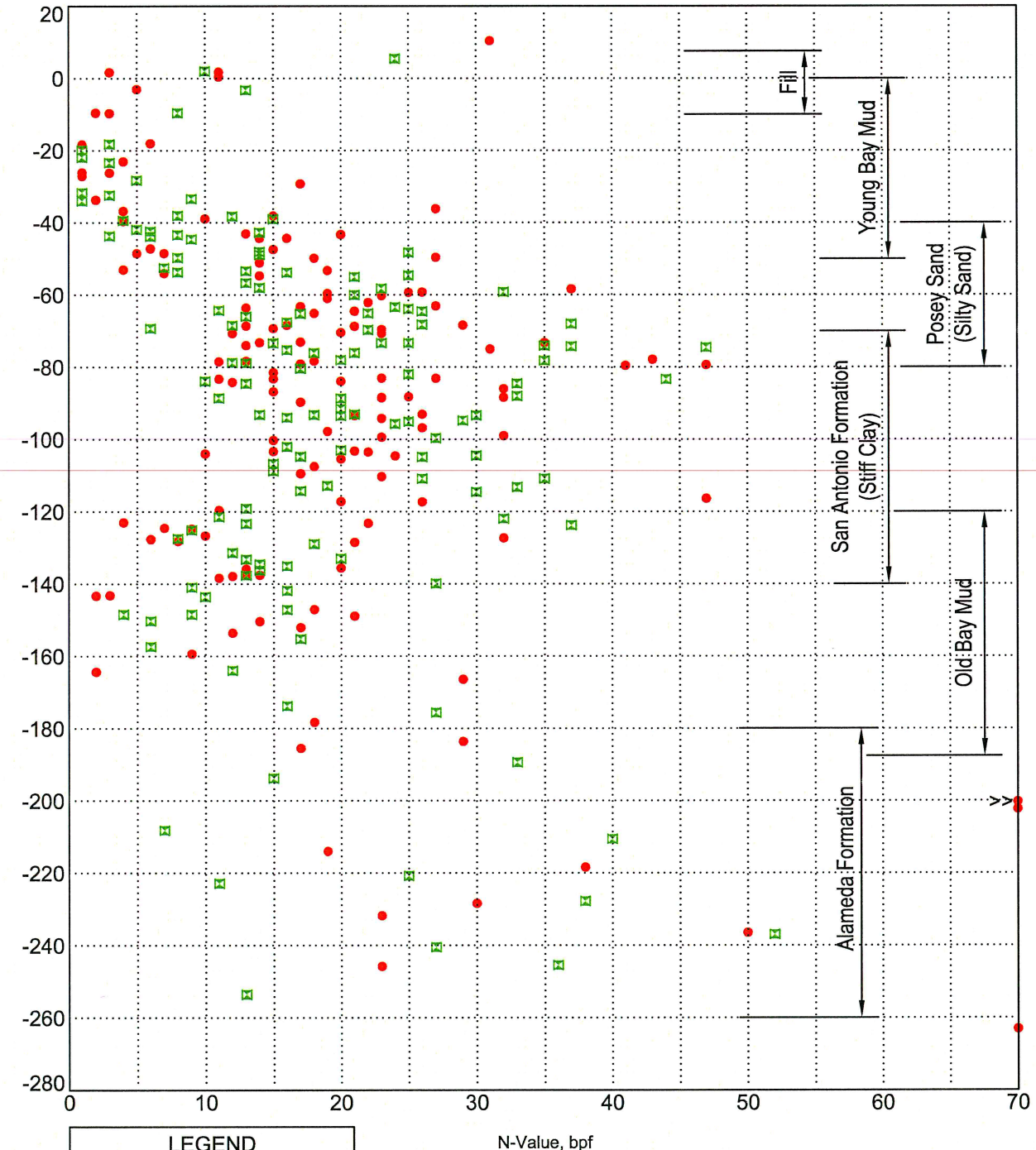
N-VALUE (EQUIV. SPT) VS. ELEVATION

CLIENT BATA - Caltrans

PROJECT NAME Dumbarton Toll Bridge

PROJECT NUMBER 06-159

PROJECT LOCATION Fremont



LEGEND	
●	SPT N-Value
⊠	Equiv. SPT N-Value*
▲	Refusal
>>	N-Value > 70

* Blowcount obtained by Modified California Sampler and converted to equivalent SPT blowcount using a Conversion Factor of 0.63.

SPT N-VALUE GRAPH DUMBARTON_BOREHOLES-8_16_2007.GPJ DAMBARTON.GDT 9/10/07

Figure 5-2

Earth Mechanics, Inc.

Geotechnical and Earthquake Engineering

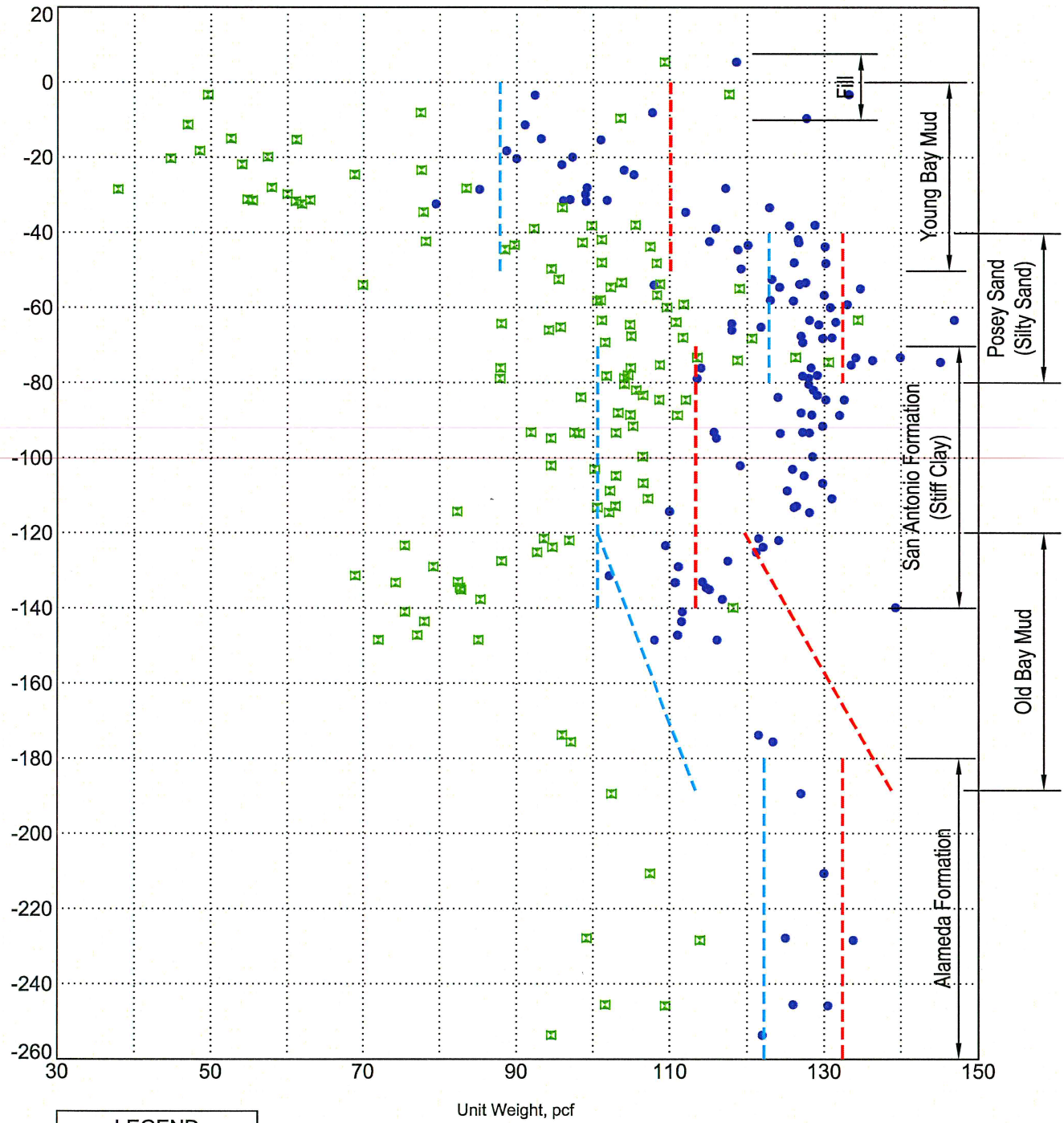
UNIT WEIGHT VERSUS ELEVATION

CLIENT BATA - Caltrans

PROJECT NAME Dumbarton Toll Bridge

PROJECT NUMBER 06-159

PROJECT LOCATION Fremont



LEGEND
Total Unit Weight
Dry Unit Weight

Lower Bound of Typical Total Unit Weight Values *

Upper Bound of Typical Total Unit Weight Values *

* Reference: Final Marine Geotechnical Site Characterization, San Francisco-Oakland Bay Bridge East Span Seismic Safety Project, Earth Mechanics & Fugro, 2001.

UNIT WEIGHT GRAPH DUMBARTON_BOREHOLES-8_16_2007.GPJ DAMBARTON.GDT 9/5/07

Figure 5-3

Earth Mechanics, Inc.

Geotechnical and Earthquake Engineering

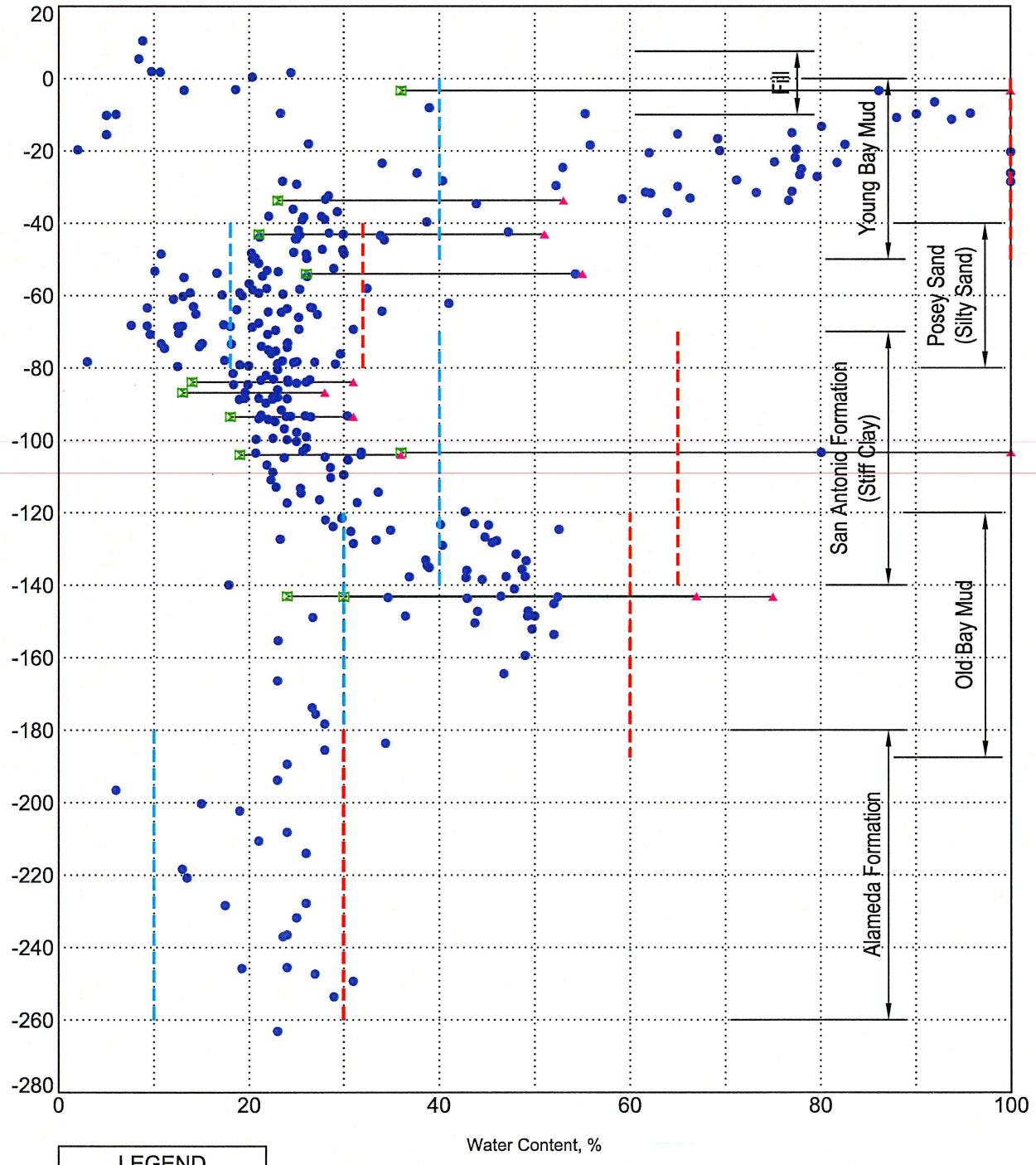
INDEX PROPERTIES VERSUS ELEVATION

CLIENT BATA - Caltrans

PROJECT NAME Dumbarton Toll Bridge

PROJECT NUMBER 06-159

PROJECT LOCATION Fremont



LEGEND
Water Content
Plastic Limit
Liquid Limit

Lower Bound of Typical Water Content Values *

Upper Bound of Typical Water Content Values *

* Reference: Final Marine Geotechnical Site Characterization, San Francisco-Oakland Bay Bridge East Span Seismic Safety Project, Earth Mechanics & Fugro, 2001.

PLASTICITY & WATER CONTENT GRAPH DUMBARTON_BOREHOLES-8_16_2007.GPJ DAMBARTON.GDT 9/10/07

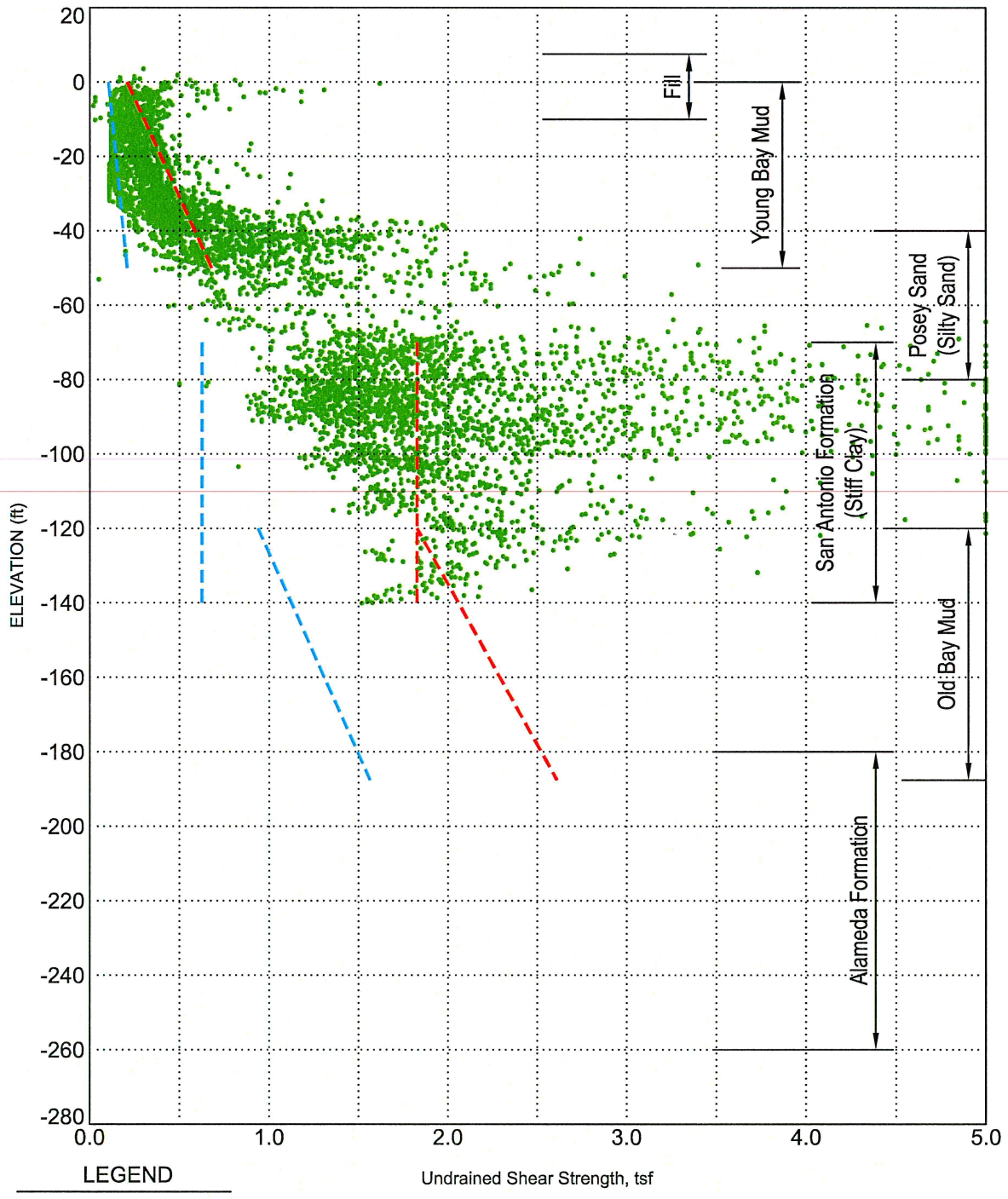
Figure 5-4

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

SHEAR STRENGTH VS. ELEVATION

CLIENT BATA - Caltrans PROJECT NAME Dumbarton CPT Data 2006

PROJECT NUMBER PROJECT LOCATION



LEGEND

- Undrained Shear Strength estimated from CPT test using
- Lower Bound of Typical Values *
- Upper Bound of Typical Values *

* Reference: Final Marine Geotechnical Site Characterization, San Francisco-Oakland Bay Bridge East Span Seismic Safety Project, Earth Mechanics & Fugro, 2001.

Figure 5-5

Earth Mechanics, Inc.

Geotechnical and Earthquake Engineering

SHEAR WAVE VELOCITY VS. ELEVATION

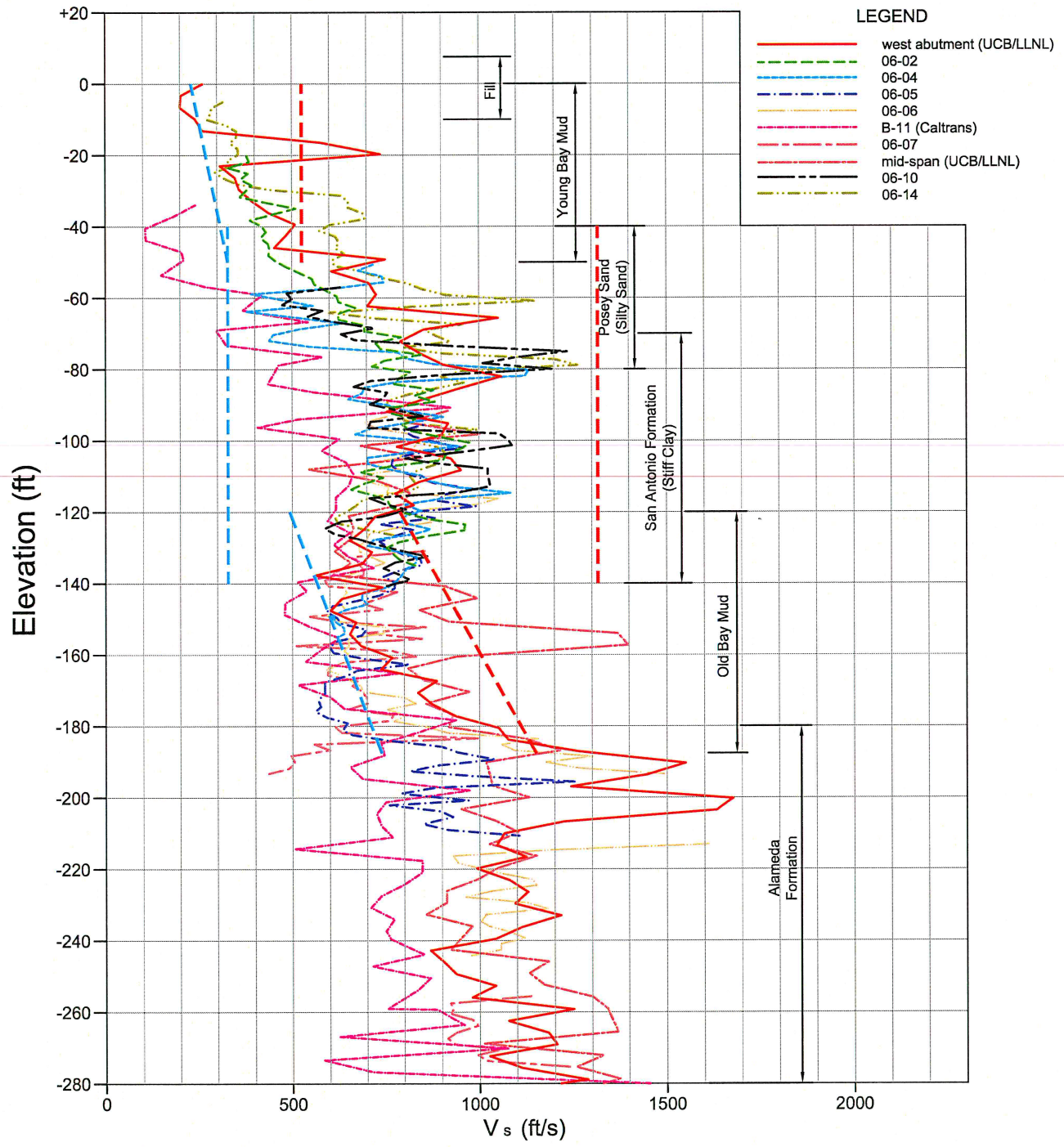
BATA - Caltrans

CLIENT

PROJECT NAME Dumbarton Toll Bridge

PROJECT NUMBER 06-159

PROJECT LOCATION Fremont



Lower Bound of Typical Values *

Upper Bound of Typical Values *

* Reference: Final Marine Geotechnical Site Characterization, San Francisco-Oakland Bay Bridge East Span Seismic Safety Project, Earth Mechanics & Fugro, 2001.

Figure 5-6

Earth Mechanics, Inc.

Geotechnical and Earthquake Engineering

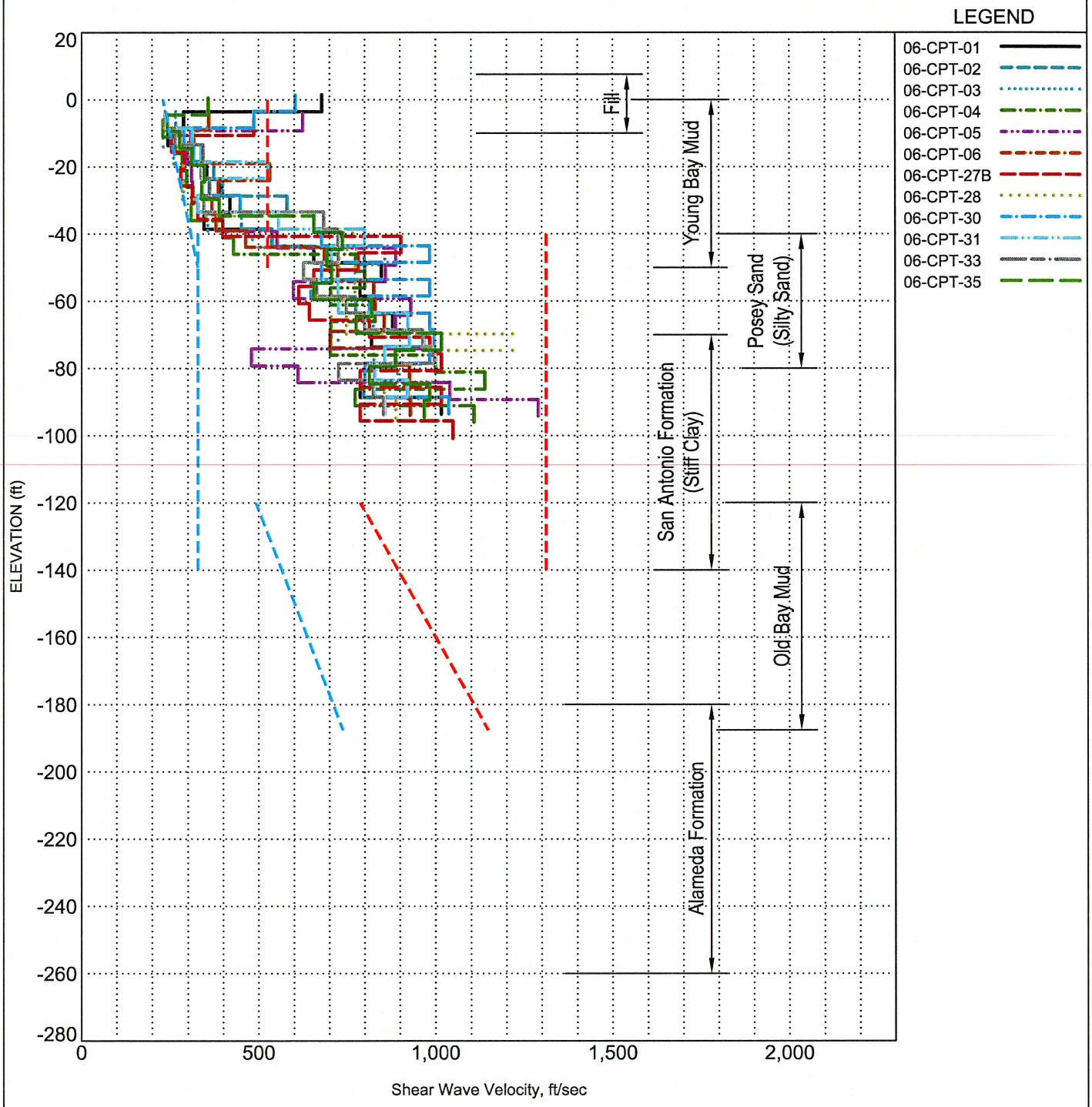
SHEAR WAVE VELOCITY* VS. ELEVATION

CLIENT BATA - Caltrans

PROJECT NAME Dumbarton CPT Data 2006

PROJECT NUMBER

PROJECT LOCATION



Lower Bound of Typical Values **

Upper Bound of Typical Values **

* Shear Wave Velocity from Seismic CPT test

** Reference: Final Marine Geotechnical Site Characterization, San Francisco-Oakland Bay Bridge East Span Seismic Safety Project, Earth Mechanics & Fugro, 2001.

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SM Alg	84	29.6/13.1 0.0/0.4		

Jody A. Castle 3/20/09
PROFESSIONAL GEOLOGIST DATE

PROFESSIONAL GEOLOGIST
J. CASTLE
No. PG 8162
Exp. 12-31-10
STATE OF CALIFORNIA

PLANS APPROVAL DATE

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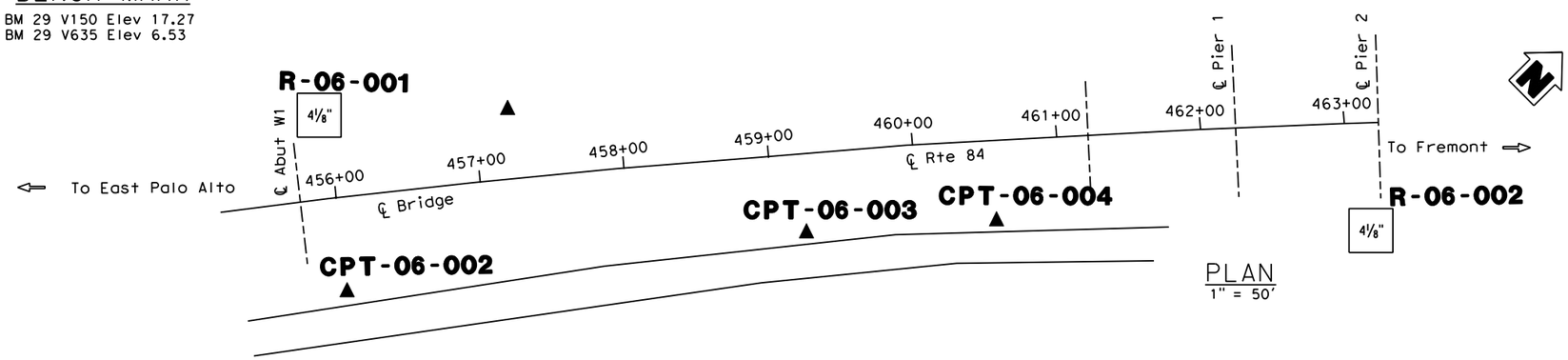
Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering
7750 Pardee Lane, Suite 120
Oakland, California 94621

BENCH MARK

BM 29 V150 Elev 17.27
BM 29 V635 Elev 6.53



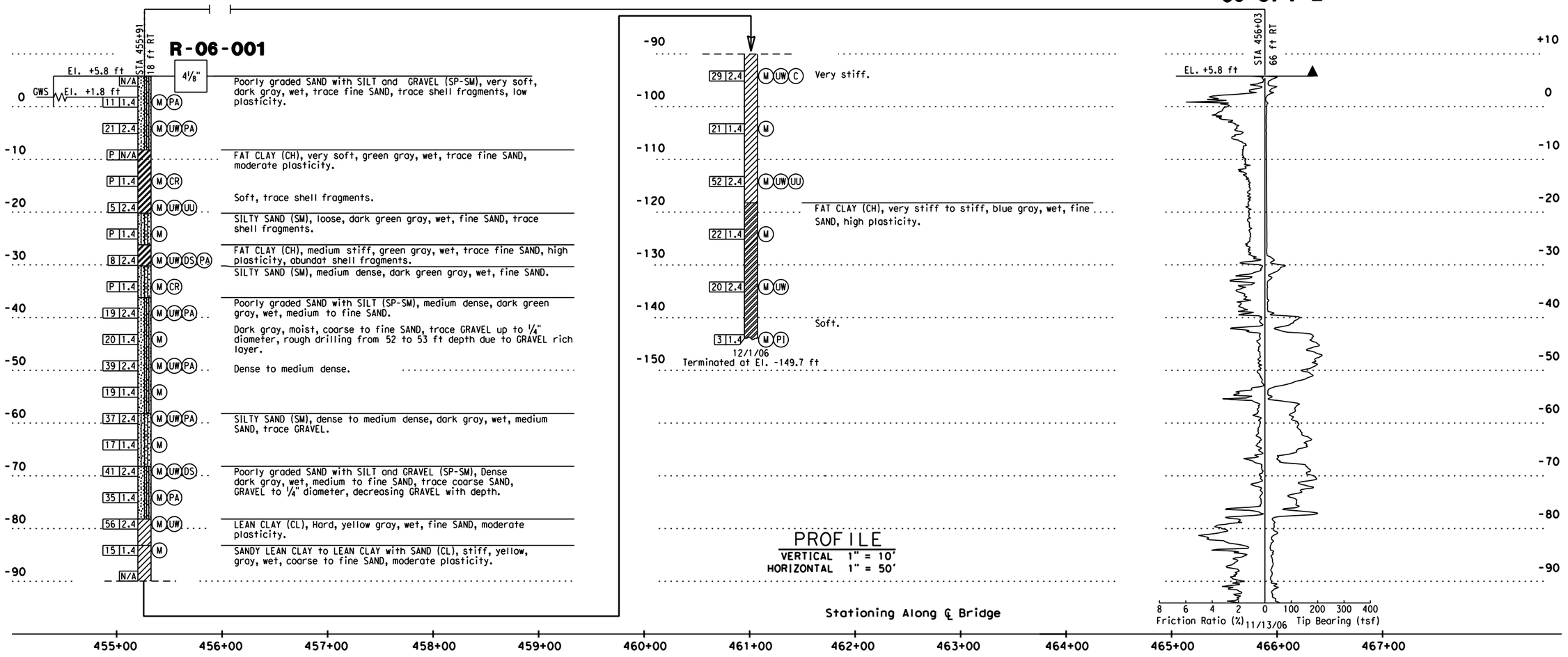
PLAN
1" = 50'

NOTES:

1.4" samples were taken using a SPT sampler with an inside diameter (I.D.) of 1.4" and an outside diameter (O.D.) of 2.0".

2.4" samples were taken using a California split-barrel sampler with an I.D. of 2.4" and an O.D. of 3.1".

An automatic trip hammer system consisting of a hammer weight of 140 lbs falling a distance of 30" was used to advance both samplers.



PROFILE
VERTICAL 1" = 10'
HORIZONTAL 1" = 50'

ENGINEERING SERVICES		GEOTECHNICAL SERVICES		STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION		BRIDGE NO.	DUMBARTON BRIDGE
FUNCTIONAL SUPERVISOR SABA MOHAN	DRAWN BY: A. ZAND, K. THANT	FIELD INVESTIGATION BY: J. CASTLE			H. LAW PROJECT ENGINEER	35-0038	
NAME	CHECKED BY: E. BROWN, J. CASTLE					POST MILE 29.25	LOG OF TEST BORING NO. 1

OSF GEOTECHNICAL LOG OF TEST BORINGS SHEET

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS P 1 2 3

CU
EA

FILE => $REQUEST

DISREGARD PRINTS BEARING EARLIER REVISION DATES →

REVISION DATES (PRELIMINARY STAGE ONLY) 7/6/07 3/20/09

SHEET OF

USERNAME => $USER DATE PLOTTED => $DATE TIME PLOTTED => $TIME

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SM Alg	84	29.6/13.1 0.0/0.4		

Jody A. Castle 3/20/09
PROFESSIONAL GEOLOGIST DATE

PLANS APPROVAL DATE

PROFESSIONAL GEOLOGIST J. CASTLE No. PG 8162 Exp. 12-31-10 STATE OF CALIFORNIA

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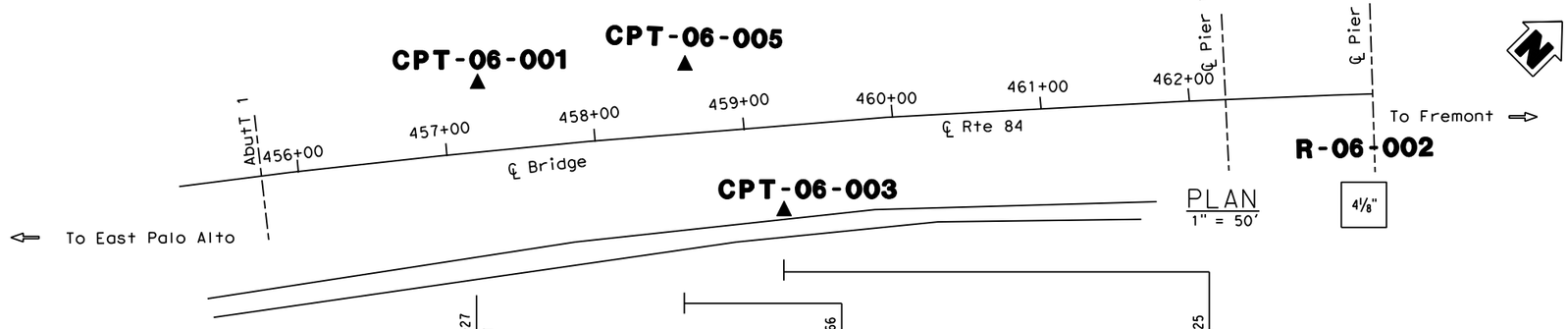
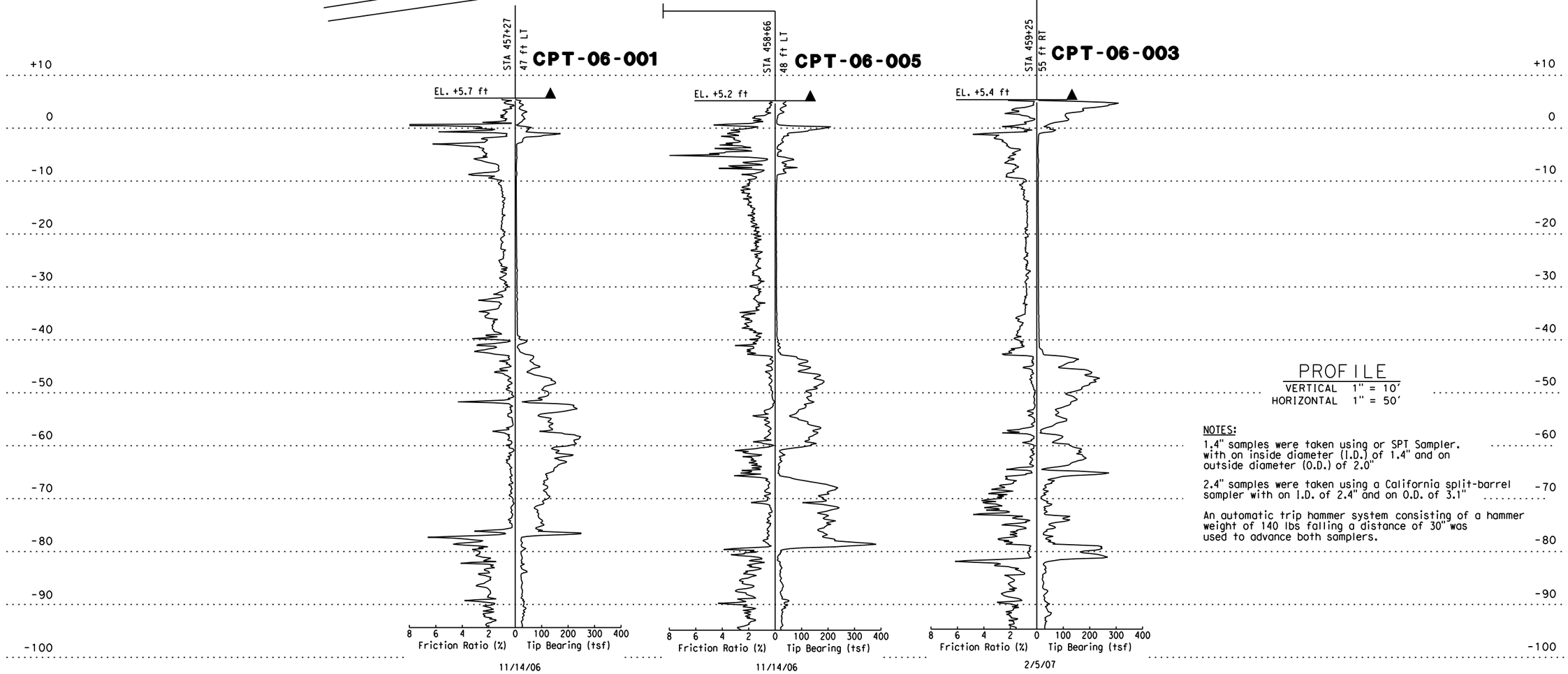
Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering
7750 Pardee Lane, Suite 120
Oakland, California 94621

BENCH MARK

BM 29 V150 Elev 17.27
BM 29 V635 Elev 6.53





PROFILE

VERTICAL 1" = 10'
HORIZONTAL 1" = 50'

NOTES:

1.4" samples were taken using or SPT Sampler. with on inside diameter (I.D.) of 1.4" and on outside diameter (O.D.) of 2.0"

2.4" samples were taken using a California split-barrel sampler with on I.D. of 2.4" and on O.D. of 3.1"

An automatic trip hammer system consisting of a hammer weight of 140 lbs falling a distance of 30" was used to advance both samplers.

ENGINEERING SERVICES		GEOTECHNICAL SERVICES	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION		BRIDGE NO.	DUMBARTON BRIDGE
FUNCTIONAL SUPERVISOR SABA MOHAN NAME	DRAWN BY: A. ZAND, K. THANT	FIELD INVESTIGATION BY: J. CASTLE		H. LAW PROJECT ENGINEER	35-0038	
	CHECKED BY: E. BROWN, J. CASTLE				POST MILE 29.25	LOG OF TEST BORING NO. 2
OSF GEOTECHNICAL LOG OF TEST BORINGS SHEET	ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3		CU EA	DISREGARD PRINTS BEARING EARLIER REVISION DATES →	REVISION DATES (PRELIMINARY STAGE ONLY) 7/6/07 3/20/09	SHEET OF

FILE => $REQUEST

USERNAME => $USER DATE PLOTTED => $DATE TIME PLOTTED => $TIME

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SM Ala	84	29.6/13.1 0.0/0.4		

Jody A. Castle 3/28/07
PROFESSIONAL GEOLOGIST DATE

PLANS APPROVAL DATE

PROFESSIONAL GEOLOGIST J. CASTLE No. PG 8162 Exp. 12-31-07 STATE OF CALIFORNIA

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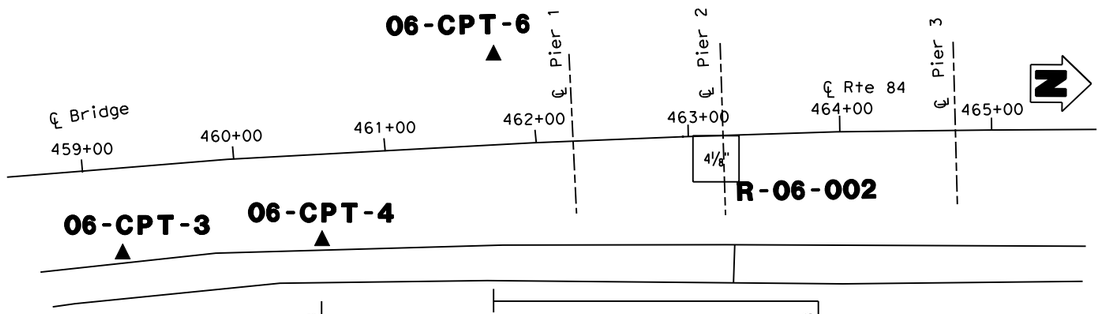
Geotechnical and Earthquake Engineering
7750 Pardee Lane, Suite 120
Oakland, California 94621

BENCH MARK

BM 29 V150 Elev 17.27
BM 29 V635 Elev 6.53



PLAN
1" = 50'

NOTES:

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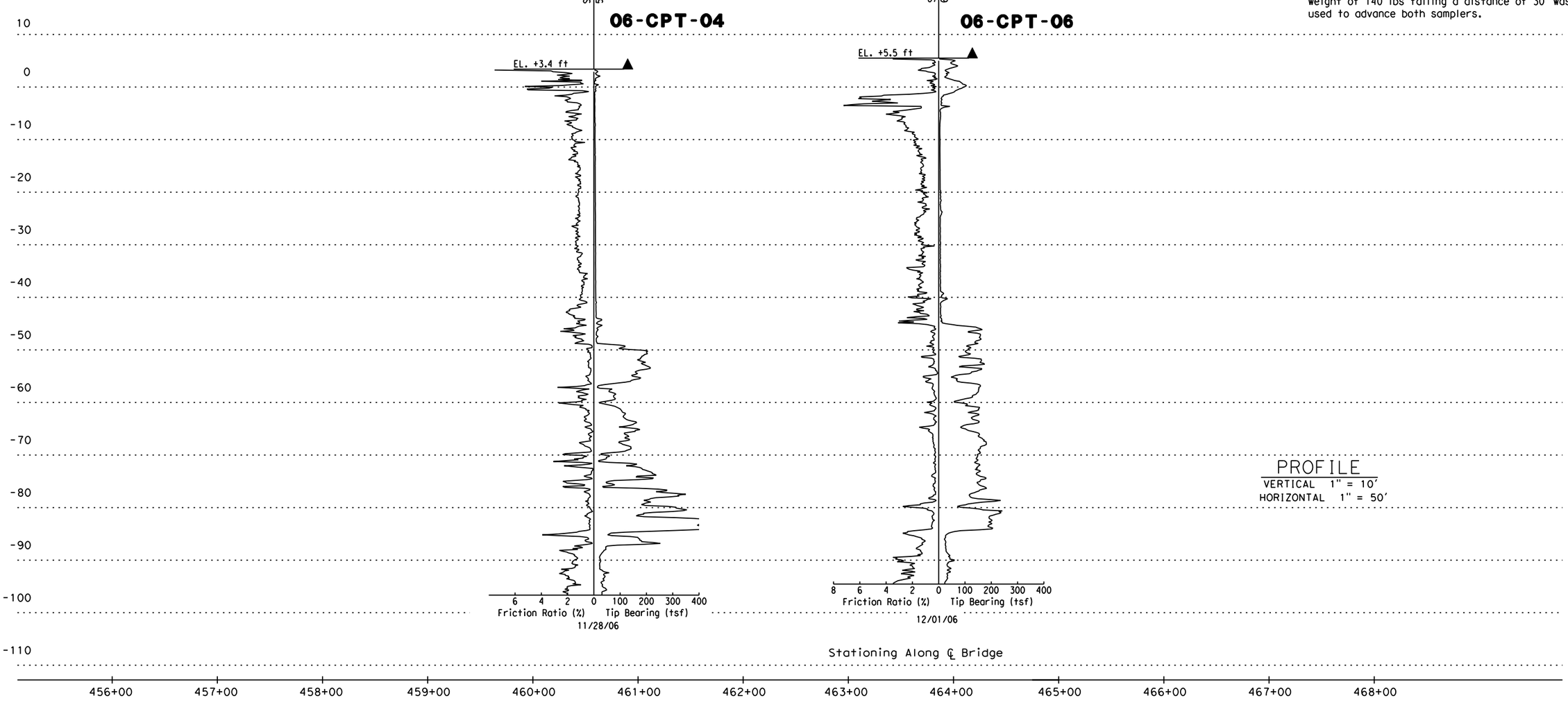

PROFILE
VERTICAL 1" = 10'
HORIZONTAL 1" = 50'

ENGINEERING SERVICES		GEOTECHNICAL SERVICES	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION		BRIDGE NO.	DUMBARTON BRIDGE
FUNCTIONAL SUPERVISOR SABA MOHAN	DRAWN BY: A. ZAND, K. THANT	FIELD INVESTIGATION BY: J. CASTLE		H. LAW PROJECT ENGINEER	35-0038	
NAME	CHECKED BY: E. BROWN, J. CASTLE				POST MILE 29.25	LOG OF TEST BORING NO. 3

OSF GEOTECHNICAL LOG OF TEST BORINGS SHEET

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS P 1 2 3

CU
EA

DISREGARD PRINTS BEARING EARLIER REVISION DATES →

REVISION DATES (PRELIMINARY STAGE ONLY) 7/6/07 5/20/09

SHEET OF

FILE => $REQUEST

USERNAME => $USER DATE PLOTTED => $DATE TIME PLOTTED => $TIME

▲ 06-CPT-008

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SM Alg	84	29.6/13.1 0.0/0.4		

Jody A. Castle 3/20/09
PROFESSIONAL GEOLOGIST DATE

PROFESSIONAL GEOLOGIST J. CASTLE No. PG 8162 Exp. 12-31-10 STATE OF CALIFORNIA

PLANS APPROVAL DATE

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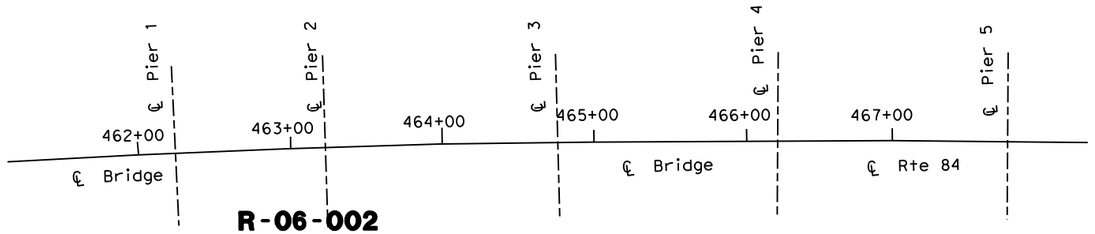
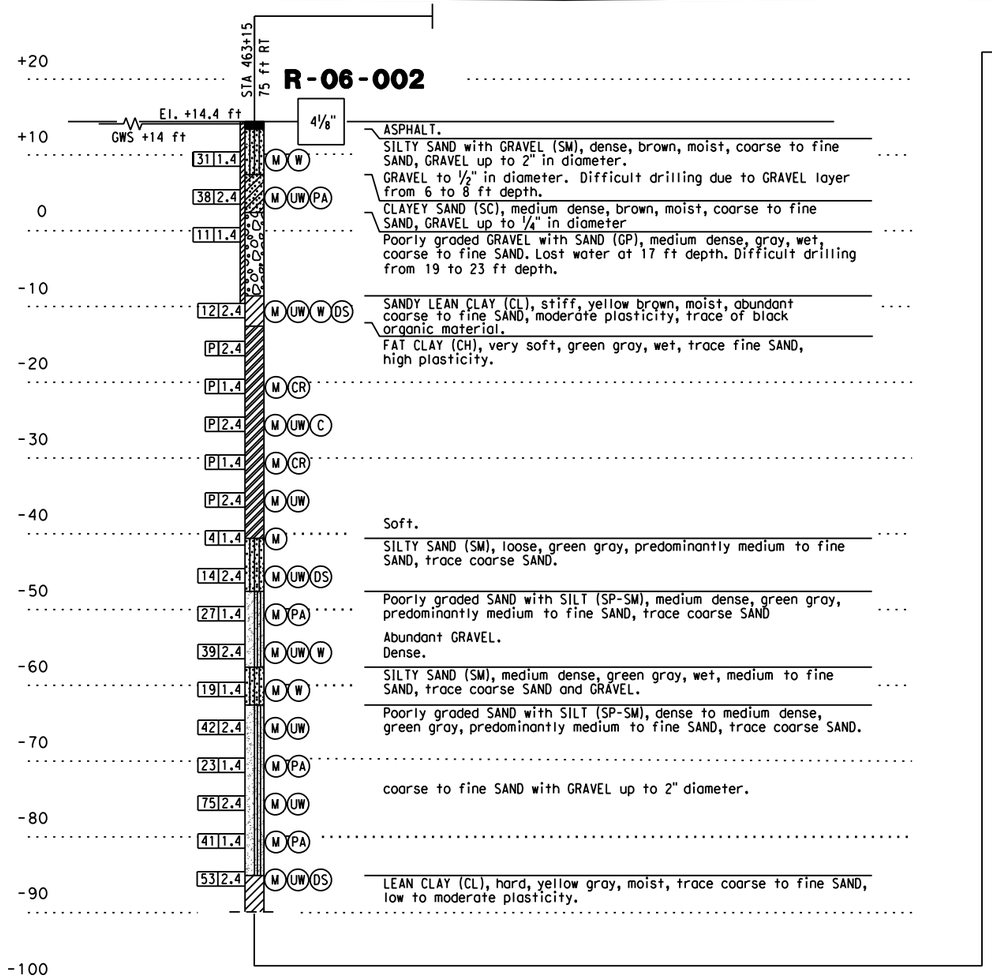
Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering
7750 Pardee Lane, Suite 120
Oakland, California 94621

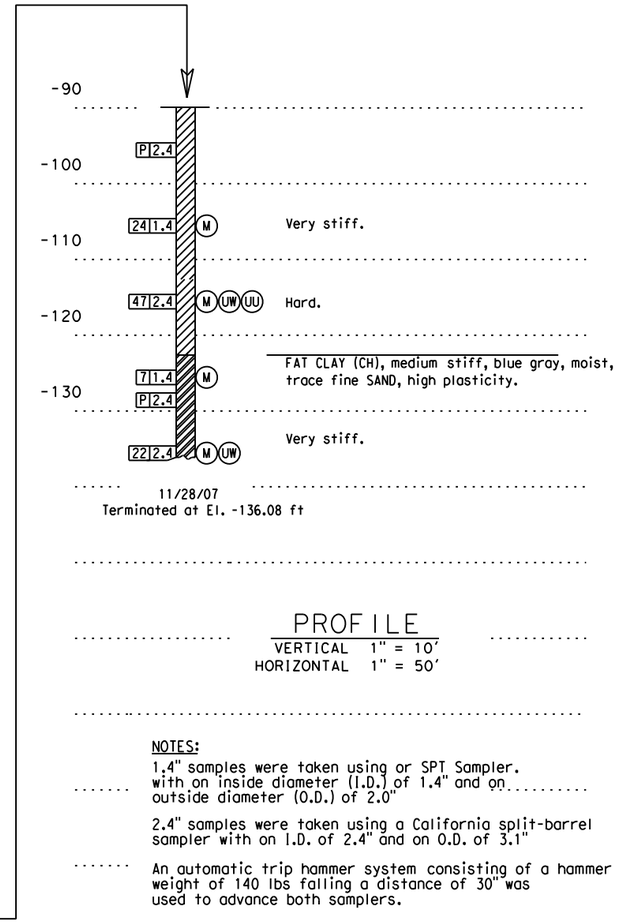
BENCH MARK

BM 29 V150 Elev 17.27
BM 29 V635 Elev 6.53



PLAN
1" = 50'





11/28/07
Terminated at El. -136.08 ft

PROFILE

VERTICAL 1" = 10'
HORIZONTAL 1" = 50'

NOTES:

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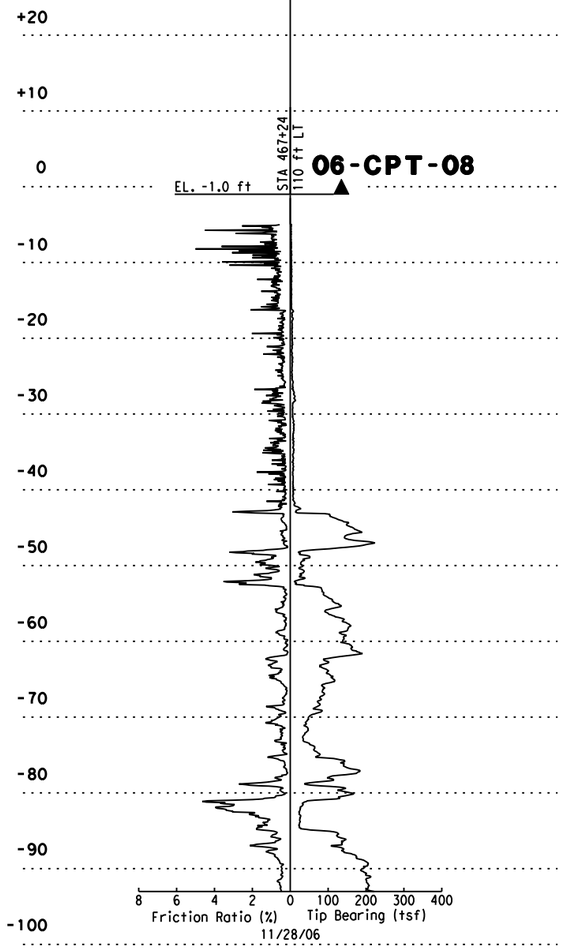
2.4" samples were taken using a California split-barrel sampler with on I.D. of 2.4" and on O.D. of 3.1"

An automatic trip hammer system consisting of a hammer weight of 140 lbs falling a distance of 30" was used to advance both samplers.



11/28/06

Stationing Along C/L Bridge

461+00 462+00 463+00 464+00 465+00 466+00 467+00 468+00 469+00 470+00 471+00 472+00 473+00

ENGINEERING SERVICES		GEOTECHNICAL SERVICES	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION		BRIDGE NO.	DUMBARTON BRIDGE
FUNCTIONAL SUPERVISOR SABA MOHAN NAME	DRAWN BY: A. ZAND, K. THANT	FIELD INVESTIGATION BY: J. CASTLE		H. LAW PROJECT ENGINEER	28-0035	
	CHECKED BY: E. BROWN, J. CASTLE				POST MILE 29.25	LOG OF TEST BORING NO. 4
OSF GEOTECHNICAL LOG OF TEST BORINGS SHEET	ORIGINAL SCALE IN INCHES FOR REDUCED PLANS P 1 2 3		CU EA	DISREGARD PRINTS BEARING EARLIER REVISION DATES →	REVISION DATES (PRELIMINARY STAGE ONLY) 7/6/07 3/20/09	SHEET OF

FILE => $REQUEST

USERNAME => $USER DATE PLOTTED => $DATE TIME PLOTTED => $TIME

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SM Alg	84	29.6/13.1 0.0/0.4		

Jody A. Castle 3/1/2007
PROFESSIONAL GEOLOGIST DATE

PROFESSIONAL GEOLOGIST — J. CASTLE — No. PG 8162 — Exp. 12-31-08 — STATE OF CALIFORNIA

PLANS APPROVAL DATE

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Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering
7750 Pardee Lane, Suite 120
Oakland, California 94621

CPT-06-008

CPT-06-009

R-06-003 4⅛"

℄ Pier 5 | 467+00 | 468+00 | 469+00 | ℄ Pier 6 | 470+00 | ℄ Pier 7 | 471+00 | ℄ Pier 8 | 472+00

℄ Bridge ℄ Rte 84

⇦ To East Palo Alto

To Fremont ⇨

N

BENCH MARK

BM 29 V150 Elev 17.27
BM 29 V635 Elev 6.53

PLAN

1" = 50'

R-06-003

STA 468+13, 75 ft LT

EL. -1.6 ft

4⅛"

FAT CLAY (CH), soft, very dark gray, wet, high plasticity.

ORGANIC CLAY (OL), soft, dark gray, wet, H2S odor, predominantly shells and shell fragments in soft clay matrix. Shells are predominantly oysters up to 1½" size.

Stiff, abundant shells.

Poorly graded SAND with SILT and GRAVEL (SP-SM), loose, dark gray, wet, fine to coarse SAND, fine to coarse well rounded to subrounded GRAVEL ¾" diameter.

FAT CLAY (CH), very soft, dark gray to very dark gray, moist, moist, fine, horizontal parting, faint laminations, trace organic fragments.

Poorly graded SAND with SILT (SW-SM), medium dense to dense, very dark gray, moist, fine to coarse SAND, trace subrounded GRAVEL.

2" thick bed with abundant oyster shell fragments.

Poorly graded SAND with SILT and GRAVEL (SP-SM), dense, very dark gray, moist, fine to coarse SAND, GRAVEL up to ¾" diameter.

Poorly graded SAND with SILT (SP-SM) interbedded with FAT CLAY (CH), dense, very dark gray, moist, subangular to well rounded fine SAND with trace GRAVEL to 1.5" in diameter at top of sample. 1" thick CLAY interbeds, stiff, moist, gray brown, high plasticity.

SILTY SAND (SM), medium dense, dark gray, moist, fine to medium SAND, trace shell fragments.

LEAN CLAY (CL), hard, dark yellow brown, moist, oxidation and mottling throughout.

SILT and CLAYEY SILT interbedded (ML), very stiff, dark yellow brown, moist, slight to no plasticity.

LEAN CLAY (CL), very stiff, yellow brown, moist, low to moderate plasticity, fine horizontal laminations.

Olive brown with brown to brown orangemottling.

Medium stiff to very stiff.

1/10/07
Terminated at El. -148.6 ft

PROFILE

VERTICAL 1" = 10'
HORIZONTAL 1" = 50'

NOTES:

1.4" samples were taken using or SPT Sampler. with on inside diameter (I.D.) of 1.4" and on outside diameter (O.D.) of 2.0"

2.4" samples were taken using a California split-barrel sampler with on I.D. of 2.4" and on O.D. of 3.1"

An automatic trip hammer system consisting of a hammer weight of 140 lbs falling a distance of 30" was used to advance both samplers.

06-CPT-09

STA 471+18, 99 ft LT

EL. -1.5 ft

8 6 4 2 0 — Friction Ratio (%)
100 200 300 400 — Tip Bearing (tsf)

12/19/06

Stationing Along ℄ Bridge

467+00 | 468+00 | 469+00 | 470+00 | 471+00 | 472+00 | 473+00 | 474+00 | 475+00 | 476+00 | 477+00 | 478+00

ENGINEERING SERVICES		GEOTECHNICAL SERVICES			BRIDGE NO.	DUMBARTON BRIDGE
FUNCTIONAL SUPERVISOR: SABA MOHAN (NAME)	DRAWN BY: A. ZAND, K. THANT	FIELD INVESTIGATION BY: K. THANT, C. DOMROSE	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	H. LAW PROJECT ENGINEER	35-0038	
	CHECKED BY: E. BROWN, J. CASTLE				POST MILE 29.25	LOG OF TEST BORING NO. 5

OSF GEOTECHNICAL LOG OF TEST BORINGS SHEET

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS: P 1 2 3

CU
EA

FILE => $REQUEST

DISREGARD PRINTS BEARING EARLIER REVISION DATES →

REVISION DATES (PRELIMINARY STAGE ONLY): 7/6/07 3/20/09

SHEET OF

USERNAME => $USER DATE PLOTTED => $DATE TIME PLOTTED => $TIME

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SM Alg	84	29.6/13.1 0.0/0.4		

Jody A. Castle 3/20/09
PROFESSIONAL GEOLOGIST DATE

J. CASTLE
No. PG 8162
Exp. 12-31-10

PLANS APPROVAL DATE

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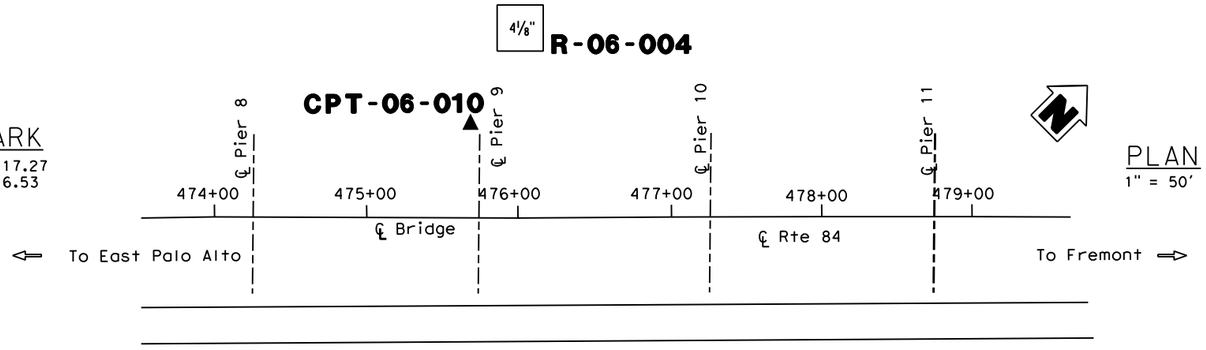
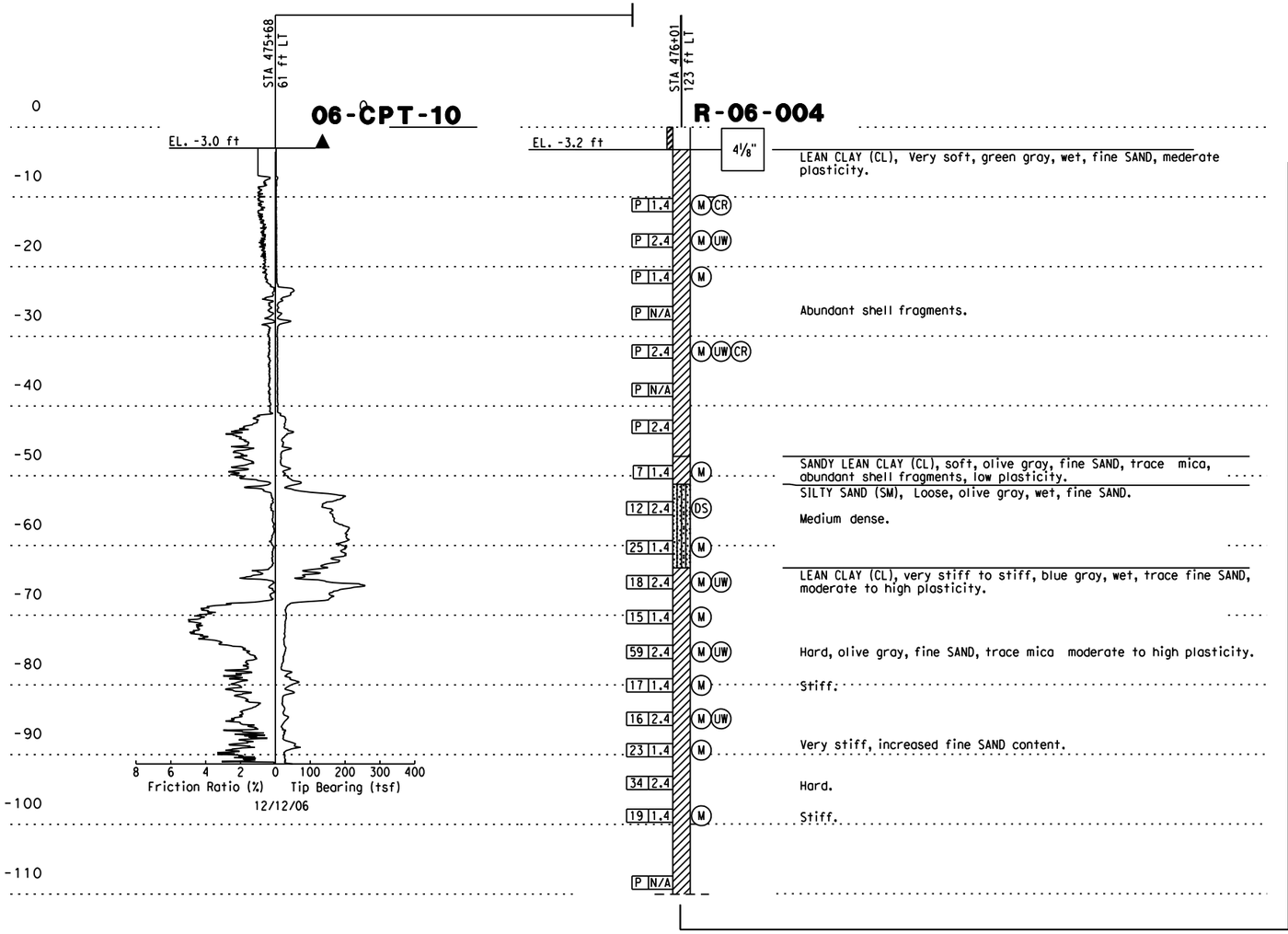
Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering
7750 Pardee Lane, Suite 120
Oakland, California 94621

BENCH MARK

BM 29 V150 Elev 17.27
BM 29 V635 Elev 6.53



PLAN
1" = 50'



PROFILE
VERTICAL 1" = 10'
HORIZONTAL 1" = 50'

NOTES:

1.4" samples were taken using or SPT Sampler. with on inside diameter (I.D.) of 1.4" and on outside diameter (O.D.) of 2.0"

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ENGINEERING SERVICES		GEOTECHNICAL SERVICES	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION		BRIDGE NO.	DUMBARTON BRIDGE
FUNCTIONAL SUPERVISOR SABA MOHAN	DRAWN BY: A. ZAND, K. THANT	FIELD INVESTIGATION BY: M. THAN, C. DOMROSE		H. LAW PROJECT ENGINEER	35-0038	
NAME	CHECKED BY: E. BROWN, J. CASTLE				POST MILE 29.25	LOG OF TEST BORING NO. 6
OSF GEOTECHNICAL LOG OF TEST BORINGS SHEET	ORIGINAL SCALE IN INCHES FOR REDUCED PLANS P 1 2 3		CU EA	FILE => $REQUEST	DISREGARD PRINTS BEARING EARLIER REVISION DATES →	REVISION DATES (PRELIMIN/ARY STAGE ONLY) 7/6/07 3/20/09 SHEET OF

DATE PLOTTED => $DATE TIME PLOTTED => $TIME
USERNAME => $USER

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SM Ala	84	29.6/13.1 0.0/0.4		

Jody A. Castle 3/20/09
PROFESSIONAL GEOLOGIST DATE

PLANS APPROVAL DATE

PROFESSIONAL GEOLOGIST J. CASTLE No. PG 8162 Exp. 12-31-10 STATE OF CALIFORNIA

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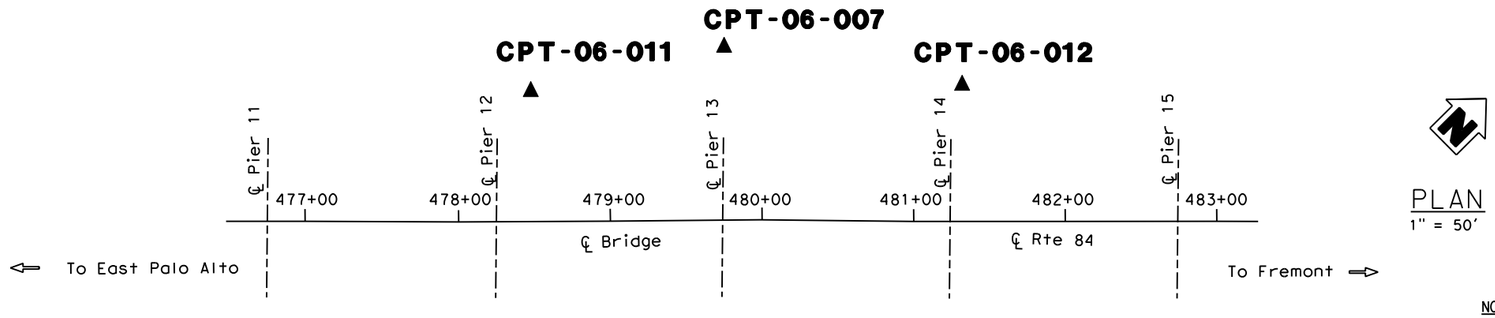
Geotechnical and Earthquake Engineering
7750 Pardee Lane, Suite 120
Oakland, California 94621

BENCH MARK

BM 29 V150 Elev 17.27
BM 29 V635 Elev 6.53



PLAN
1" = 50'

NOTES:

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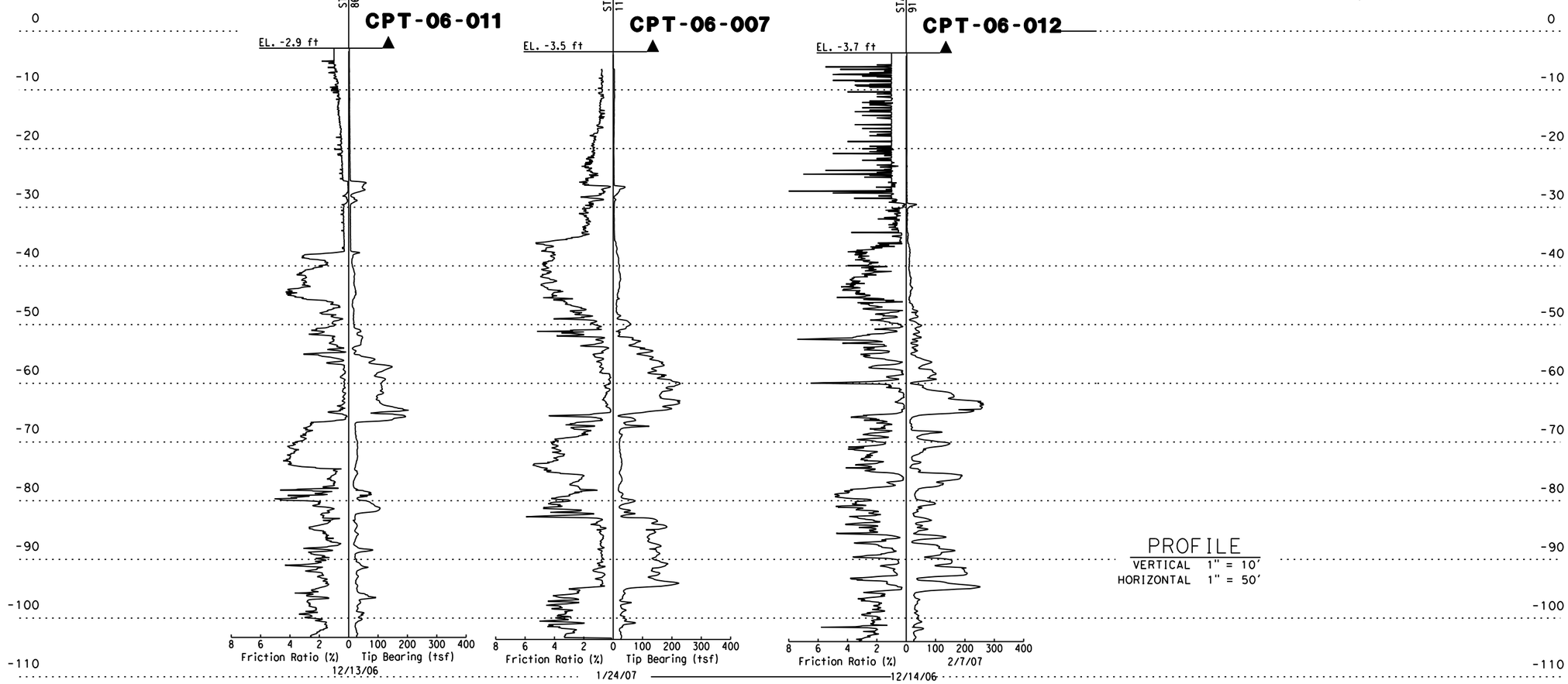

PROFILE
VERTICAL 1" = 10'
HORIZONTAL 1" = 50'

Stationing Along ℄ Bridge
475+00 476+00 477+00 478+00 479+00 480+00 481+00 482+00 483+00

ENGINEERING SERVICES		GEOTECHNICAL SERVICES				
FUNCTIONAL SUPERVISOR SABA MOHAN (NAME)	DRAWN BY: A. ZAND, K. THANT	FIELD INVESTIGATION BY: K. THANT, C. DOMROSE	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	H. LAW PROJECT ENGINEER	BRIDGE NO. 35-0038	DUMBARTON BRIDGE
	CHECKED BY: E. BROWN, J. CASTLE				POST MILE 29.25	LOG OF TEST BORING NO. 7

OSF GEOTECHNICAL LOG OF TEST BORINGS SHEET

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS P 1 2 3

CU
EA

FILE => $REQUEST

DISREGARD PRINTS BEARING EARLIER REVISION DATES →

REVISION DATES (PRELIMINARY STAGE ONLY): 7/6/07 3/20/09 | SHEET | OF

USERNAME => $USER DATE PLOTTED => $DATE TIME PLOTTED => $TIME

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SM Alg	84	29.6/13.1 0.0/0.4		

Jody A. Castle 3/20/09
PROFESSIONAL GEOLOGIST DATE

PLANS APPROVAL DATE

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PROFESSIONAL GEOLOGIST J. CASTLE No. PG 8162 Exp. 12-31-10 STATE OF CALIFORNIA

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering
7750 Pardee Lane, Suite 120
Oakland, California 94621

CPT-06-012 ▲ **4⅛"** **R-06-005** **CPT-06-013** ▲

Pier 14 ℄ 482+00 Pier 15 ℄ 483+00 Pier 16 ℄ 484+00 485+00 Pier 17 ℄ 486+00 487+00

℄ Bridge To East Palo Alto ⇦ ℄ Rte 84 To Fremont ⇨

BENCH MARK

BM 29 SJ337 Elev 14.0
BM 29 STA 4-HK Elev 15.9

PLAN

1" = 50'

NOTES:

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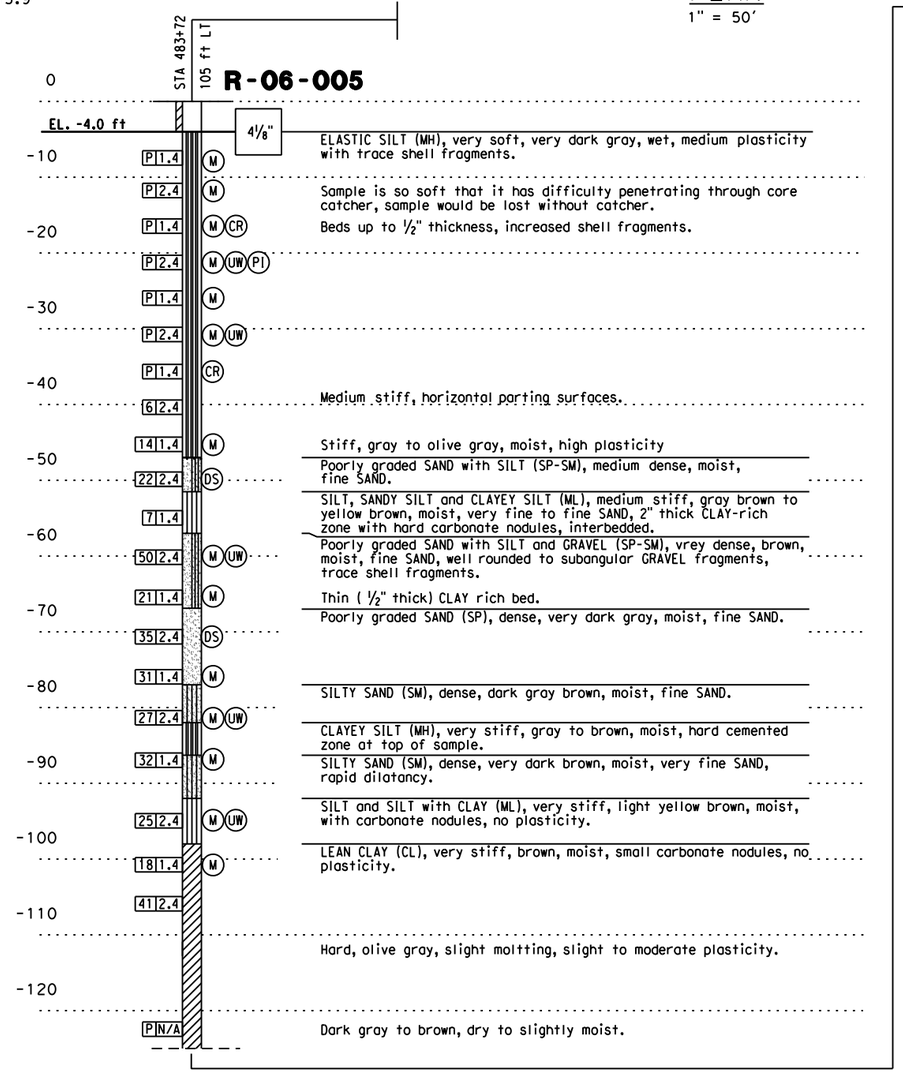
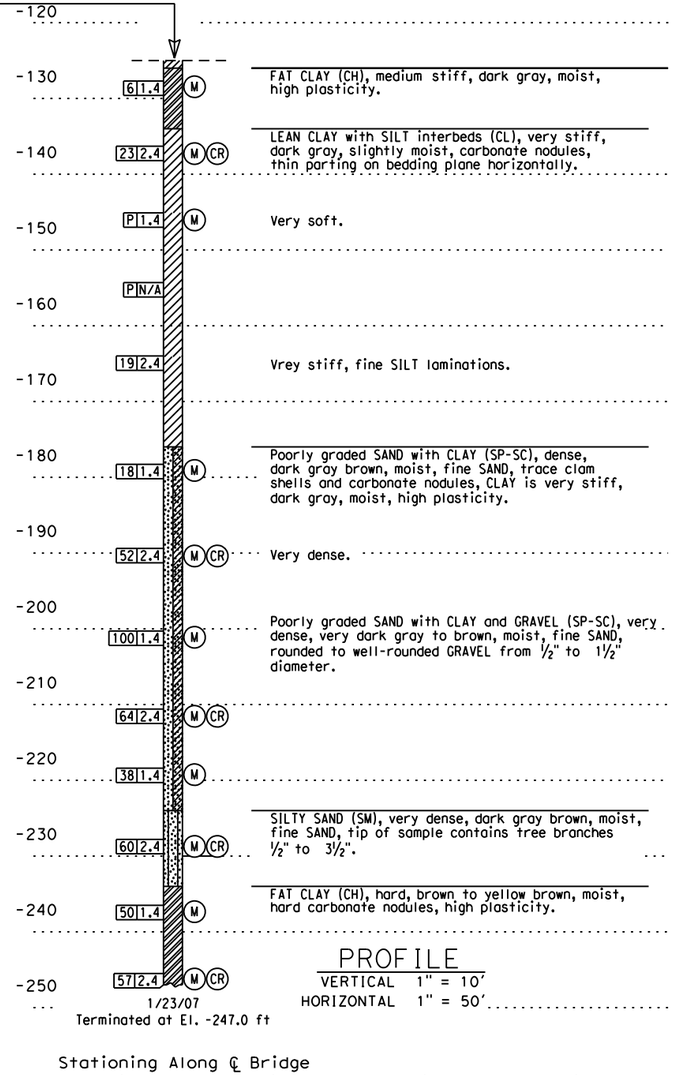
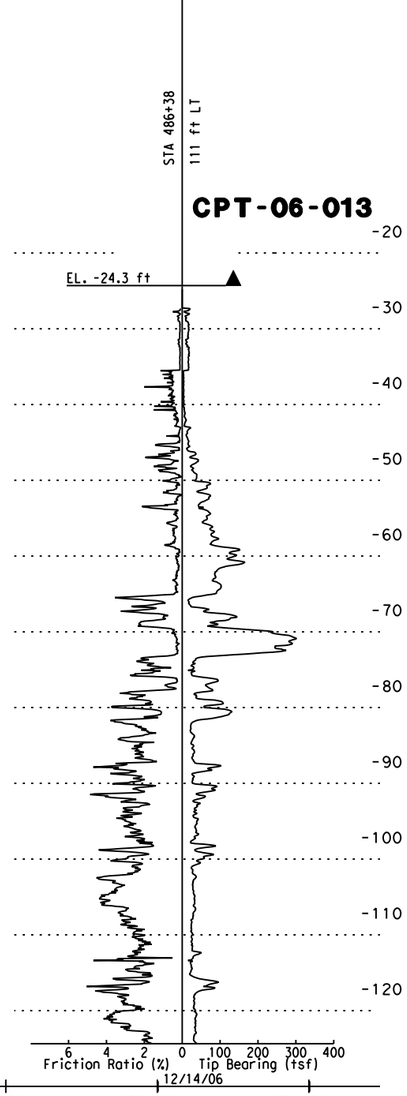




PROFILE

VERTICAL 1" = 10'
HORIZONTAL 1" = 50'



Stationing Along ℄ Bridge

482+00 483+00 484+00 485+00 486+00 487+00 488+00 489+00 490+00 491+00 492+00 493+00 494+00

ENGINEERING SERVICES		GEOTECHNICAL SERVICES		STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION		BRIDGE NO.	DUMBARTON BRIDGE
FUNCTIONAL SUPERVISOR SABA MOHAN	DRAWN BY. A. ZAND, K. THANT	FIELD INVESTIGATION BY.	B. SCHELL, C. DOMROSE K. THANT		H. LAW PROJECT ENGINEER	35-0038	
NAME	CHECKED BY. E. BROWN, J. CASTLE					POST MILE 29.25	LOG OF TEST BORING NO. 8

OSF GEOTECHNICAL LOG OF TEST BORINGS SHEET

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS P 1 2 3

CU EA

FILE => $REQUEST

DISREGARD PRINTS BEARING EARLIER REVISION DATES →

REVISION DATES (PRELIMINARY STAGE ONLY) 7/6/07 3/20/09 — SHEET — OF

USERNAME => $USER DATE PLOTTED => $DATE TIME PLOTTED => $TIME

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SM Ala	84	29.6/13.1 0.0/0.4		

Jody A. Castle 3/1/2007
PROFESSIONAL GEOLOGIST DATE

PLANS APPROVAL DATE

PROFESSIONAL GEOLOGIST J. CASTLE No. PG 8162 Exp. 12-31-00 STATE OF CALIFORNIA

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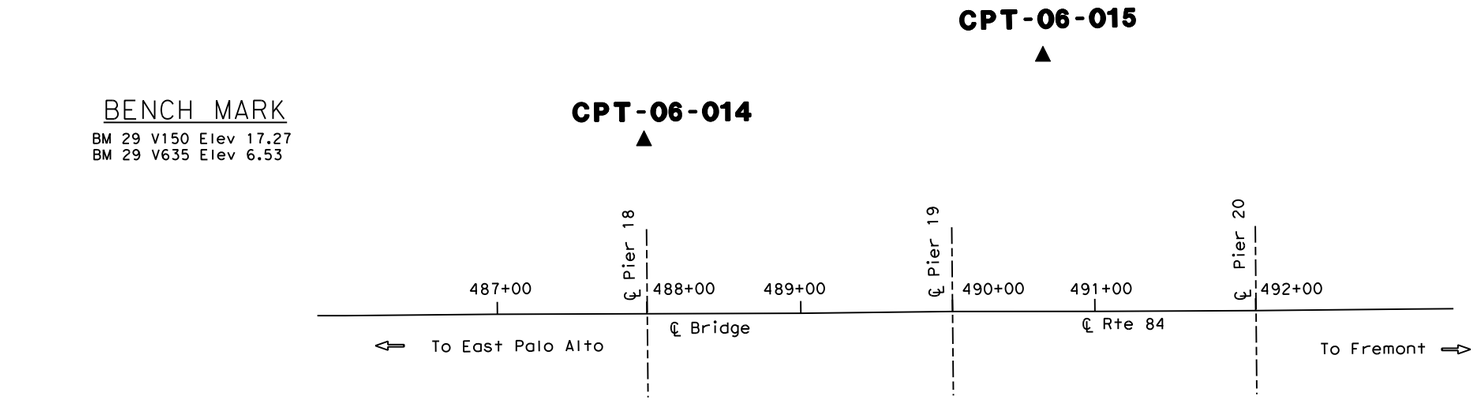
Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering
7750 Pardee Lane, Suite 120
Oakland, California 94621

BENCH MARK

BM 29 V150 Elev 17.27
BM 29 V635 Elev 6.53



PLAN

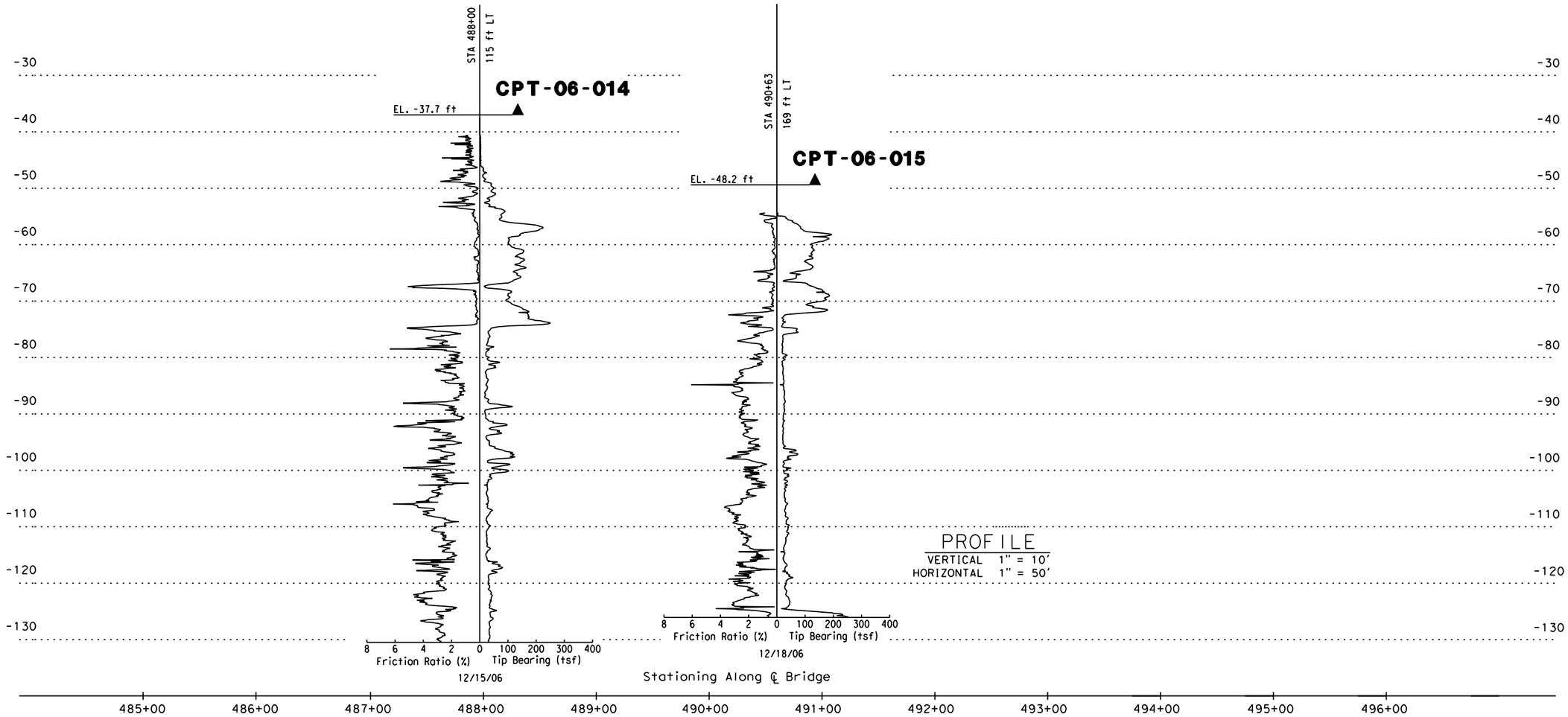
1" = 50'

NOTES:

1.4" samples were taken using or SPT Sampler. with on inside diameter (I.D.) of 1.4" and on outside diameter (O.D.) of 2.0"

2.4" samples were taken using a California split-barrel sampler with on I.D. of 2.4" and on O.D. of 3.1"

An automatic trip hammer system consisting of a hammer weight of 140 lbs falling a distance of 30" was used to advance both samplers.



PROFILE

VERTICAL 1" = 10'
HORIZONTAL 1" = 50'

ENGINEERING SERVICES		GEOTECHNICAL SERVICES				
FUNCTIONAL SUPERVISOR SABA MOHAN	DRAWN BY: A. ZAND, K. THANT	FIELD INVESTIGATION BY: J. CASTLE, E. BROWN	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	H. LAW PROJECT ENGINEER	BRIDGE NO. 35-0038	DUMBARTON BRIDGE
NAME	CHECKED BY: E. BROWN, J. CASTLE				POST MILE 29.25	LOG OF TEST BORING NO. 9

OSF GEOTECHNICAL LOG OF TEST BORINGS SHEET

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS P 1 2 3

CU
EA

FILE => $REQUEST

DISREGARD PRINTS BEARING EARLIER REVISION DATES →

REVISION DATES (PRELIMINARY STAGE ONLY) 7/6/07 3/20/09

SHEET OF

USERNAME => $USER DATE PLOTTED => $DATE TIME PLOTTED => $TIME

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	CC Sac	160			

Jody A. Castle 3/20/09
PROFESSIONAL GEOLOGIST DATE

PROFESSIONAL GEOLOGIST
J. CASTLE
No. PG 8162
Exp. 12-31-10
STATE OF CALIFORNIA

PLANS APPROVAL DATE

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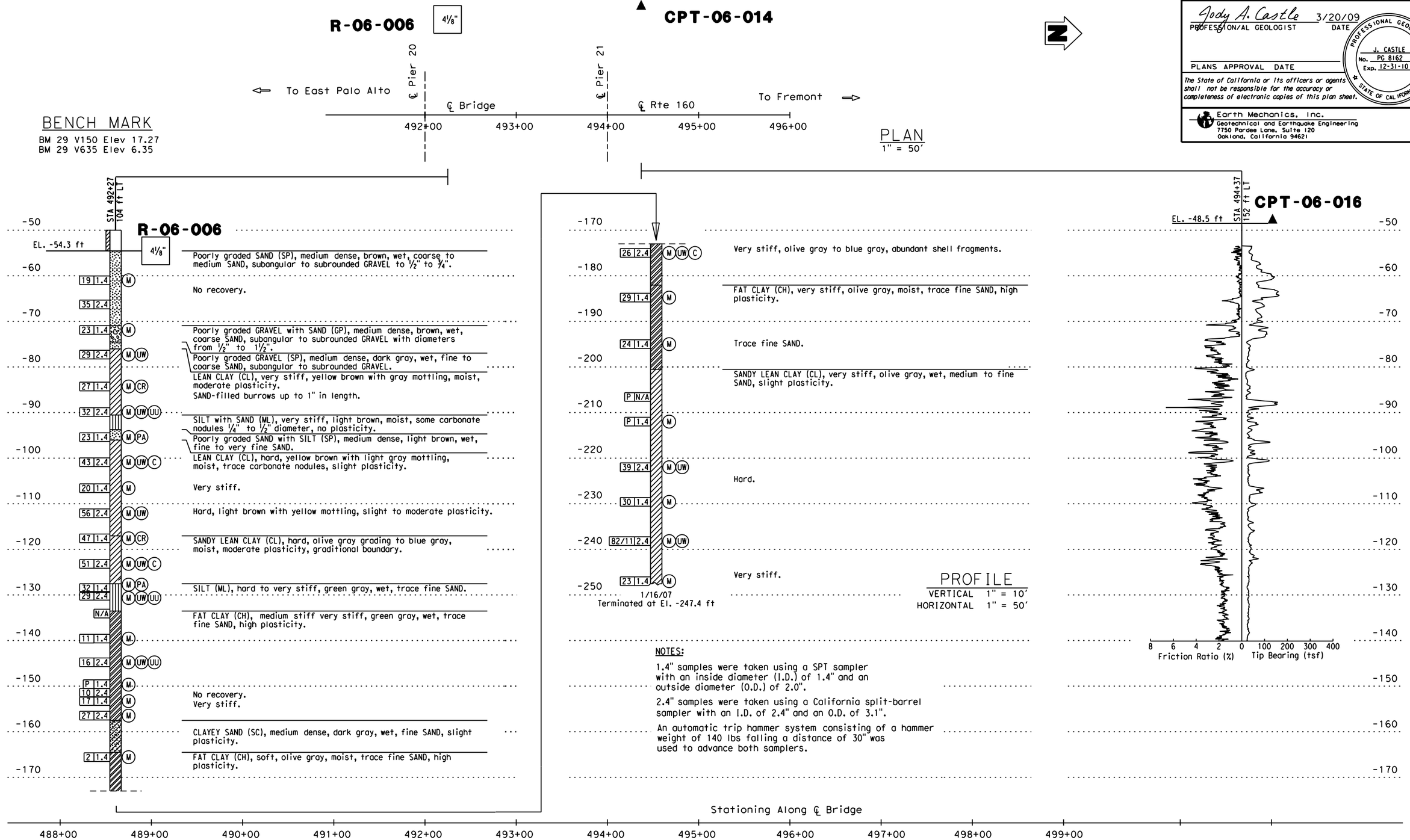
Oakland, California 94621



ENGINEERING SERVICES		GEOTECHNICAL SERVICES		STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION		BRIDGE NO.	DUMBARTON BRIDGE
FUNCTIONAL SUPERVISOR SABA MOHAN	DRAWN BY: A. ZAND, K. THANT	FIELD INVESTIGATION BY:	M. THAN, C. DOMROSE		H. LAW PROJECT ENGINEER	28-0009	LOG OF TEST BORING NO. 10
NAME	CHECKED BY: E. BROWN, J. CASTLE					POST MILE 0.82	

OSF GEOTECHNICAL LOG OF TEST BORINGS SHEET

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

CU
EA

FILE => $REQUEST

DISREGARD PRINTS BEARING EARLIER REVISION DATES →

REVISION DATES (PRELIMINARY STAGE ONLY)										SHEET	OF
7/6/07	3/20/09										

DATE PLOTTED => $DATE TIME PLOTTED => $TIME
USERNAME => %USER

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SM Ala	84	29.6/13.1 0.0/0.4		

Jody A. Castle 3/20/09
PROFESSIONAL GEOLOGIST DATE

J. CASTLE
No. PG 8162
Exp. 12-31-10
PROFESSIONAL GEOLOGIST
STATE OF CALIFORNIA

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Oakland, California 94621

CPT-06-017

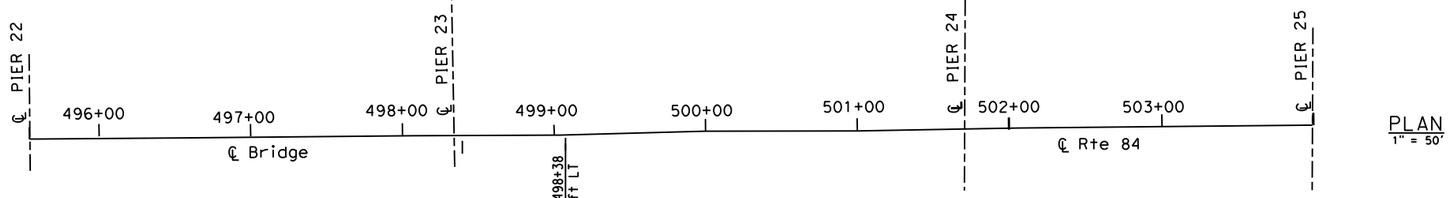
⇐ To East Palo Alto

4⅛" **R-06-007**

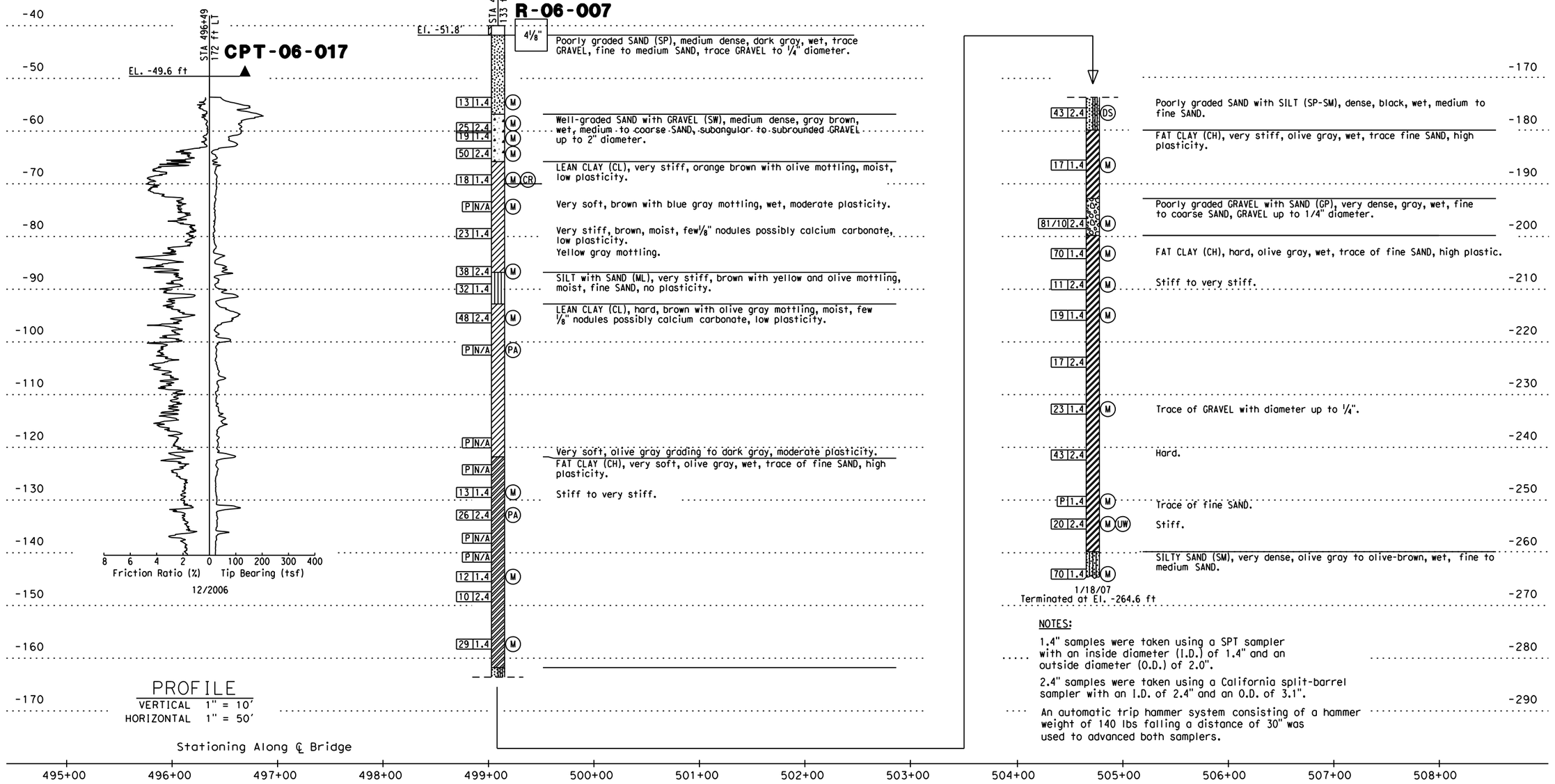
To Fremont ⇒

BENCH MARK

BM 29 V150 Elev 17.27
BM 29 V635 Elev 6.35



PLAN
1" = 50'



PROFILE
VERTICAL 1" = 10'
HORIZONTAL 1" = 50'

Stationing Along ℄ Bridge

495+00 496+00 497+00 498+00 499+00 500+00 501+00 502+00 503+00 504+00 505+00 506+00 507+00 508+00

NOTES:

1.4" samples were taken using a SPT sampler with an inside diameter (I.D.) of 1.4" and an outside diameter (O.D.) of 2.0".

2.4" samples were taken using a California split-barrel sampler with an I.D. of 2.4" and an O.D. of 3.1".

An automatic trip hammer system consisting of a hammer weight of 140 lbs falling a distance of 30" was used to advanced both samplers.

ENGINEERING SERVICES		GEOTECHNICAL SERVICES	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION		BRIDGE NO.	DUMBARTON BRIDGE
FUNCTIONAL SUPERVISOR SABA MOHAN NAME	DRAWN BY: A. ZAND, K. THANT CHECKED BY: E. BROWN, J. CASTLE	FIELD INVESTIGATION BY: C. DOMROSE, G. GUNAARANJAN		H. LAW PROJECT ENGINEER	35-0038 POST MILE	LOG OF TEST BORING NO. 11
OSF GEOTECHNICAL LOG OF TEST BORINGS SHEET	ORIGINAL SCALE IN INCHES FOR REDUCED PLANS P 1 2 3		CU EA	FILE => $REQUEST	DISREGARD PRINTS BEARING EARLIER REVISION DATES →	REVISION DATES (PRELIMIN/ARY STAGE ONLY): 7/6/07, 3/20/09 — SHEET OF

USERN/AME => $USER DATE PLOTTED => $DATE TIME PLOTTED => $TIME

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SM Alg	84	29.6/13.1 0.0/0.4		

Jody A. Castle 3/20/09
PROFESSIONAL GEOLOGIST DATE

PLANS APPROVAL DATE

PROFESSIONAL GEOLOGIST — J. CASTLE — No. PG 8162 — Exp. 12-31-10 — STATE OF CALIFORNIA

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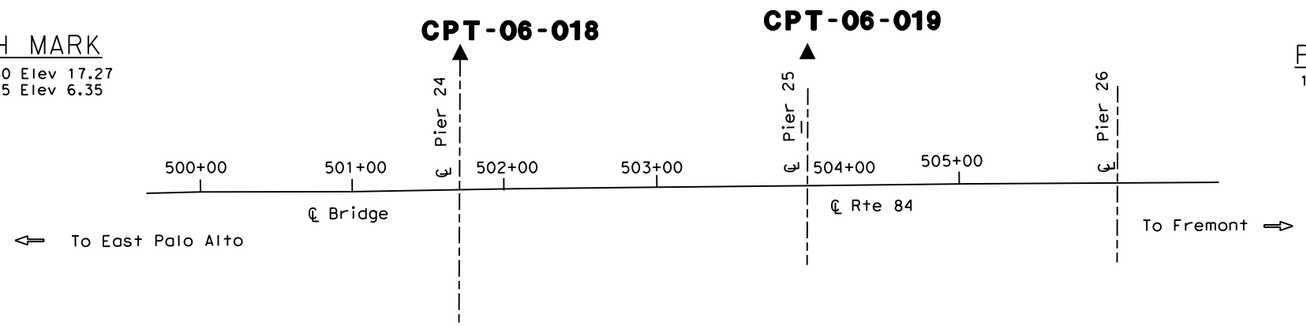
Geotechnical and Earthquake Engineering
7750 Pardee Lane, Suite 120
Oakland, California 94621

BENCH MARK

BM 29 V150 Elev 17.27
BM 29 V635 Elev 6.35



PLAN

1" = 50'

NOTES:

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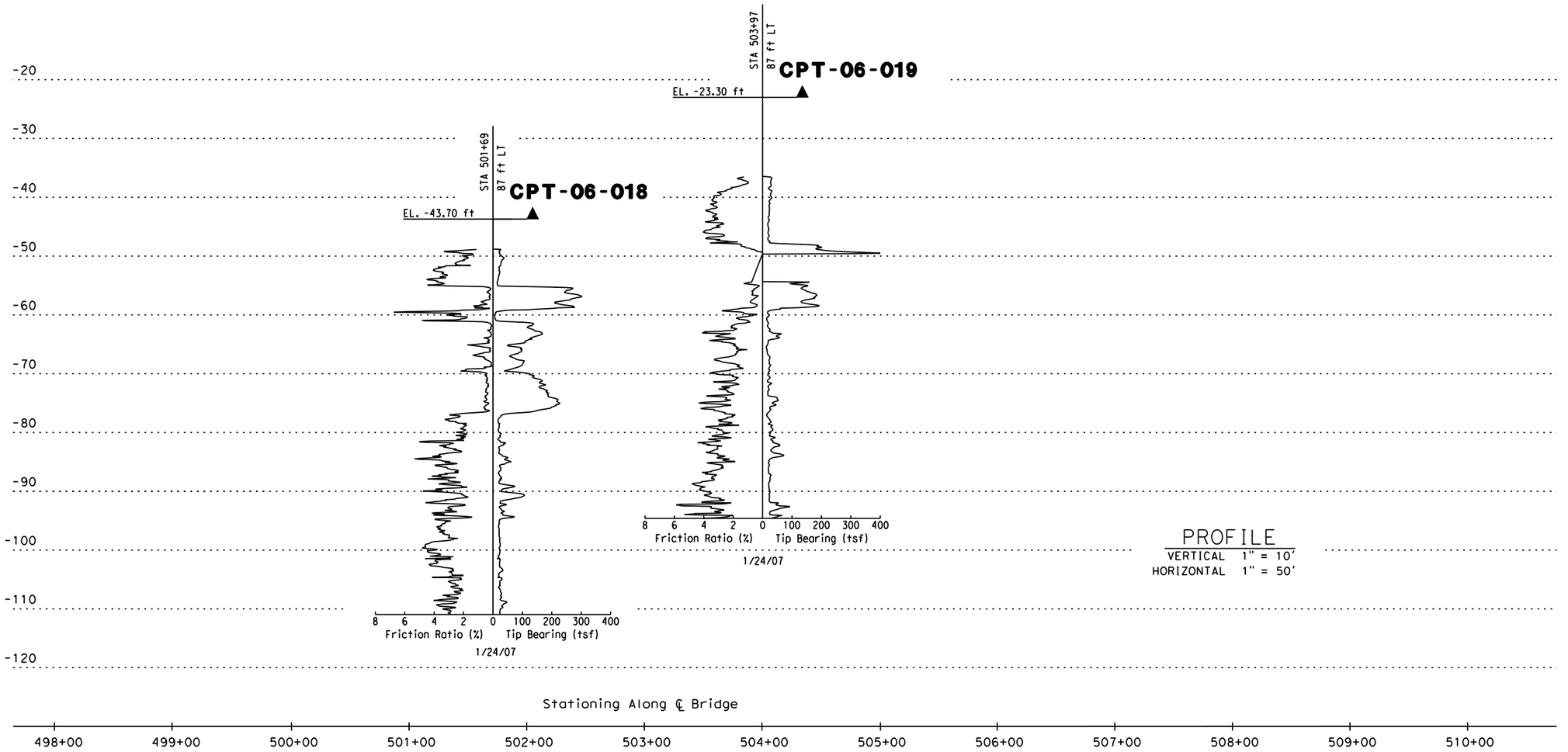

PROFILE

VERTICAL 1" = 10'
HORIZONTAL 1" = 50'

ENGINEERING SERVICES		GEOTECHNICAL SERVICES			BRIDGE NO.	DUMBARTON BRIDGE
FUNCTIONAL SUPERVISOR SABA MOHAN	DRAWN BY: A. ZAND, K. THANT	FIELD INVESTIGATION BY: C. DOMROSE	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	H. LAW PROJECT ENGINEER	35-0038	
NAME	CHECKED BY: E. BROWN, J. CASTLE				POST MILE 29.25	LOG OF TEST BORING NO. 12
OSF GEOTECHNICAL LOG OF TEST BORINGS SHEET	ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3			CU EA	DISREGARD PRINTS BEARING EARLIER REVISION DATES →	REVISION DATES (PRELIMINARY STAGE ONLY) 7/6/07 3/20/09 — SHEET — OF

FILE => $REQUEST

USERNAME => $USER DATE PLOTTED => $DATE TIME PLOTTED => $TIME

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SM Ala	84	29.6/13.1 0.0/0.4		

Jody A. Castle 3/20/09
PROFESSIONAL GEOLOGIST DATE

PROFESSIONAL GEOLOGIST
J. CASTLE
No. PG 8162
Exp. 12-31-10
STATE OF CALIFORNIA

PLANS APPROVAL DATE

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Geotechnical and Earthquake Engineering
7750 Pardee Lane, Suite 120
Oakland, California 94621

▲06-CPT-20

R-06-008

4⅛"

NOTES:

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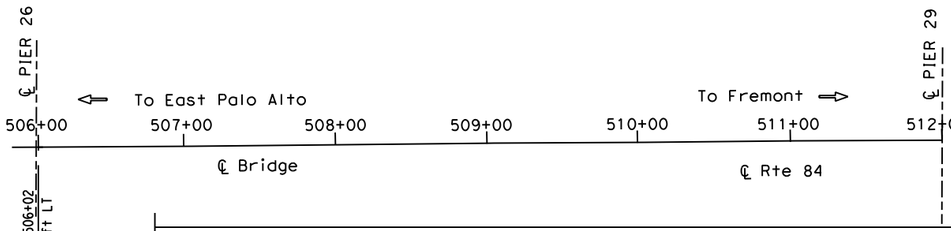
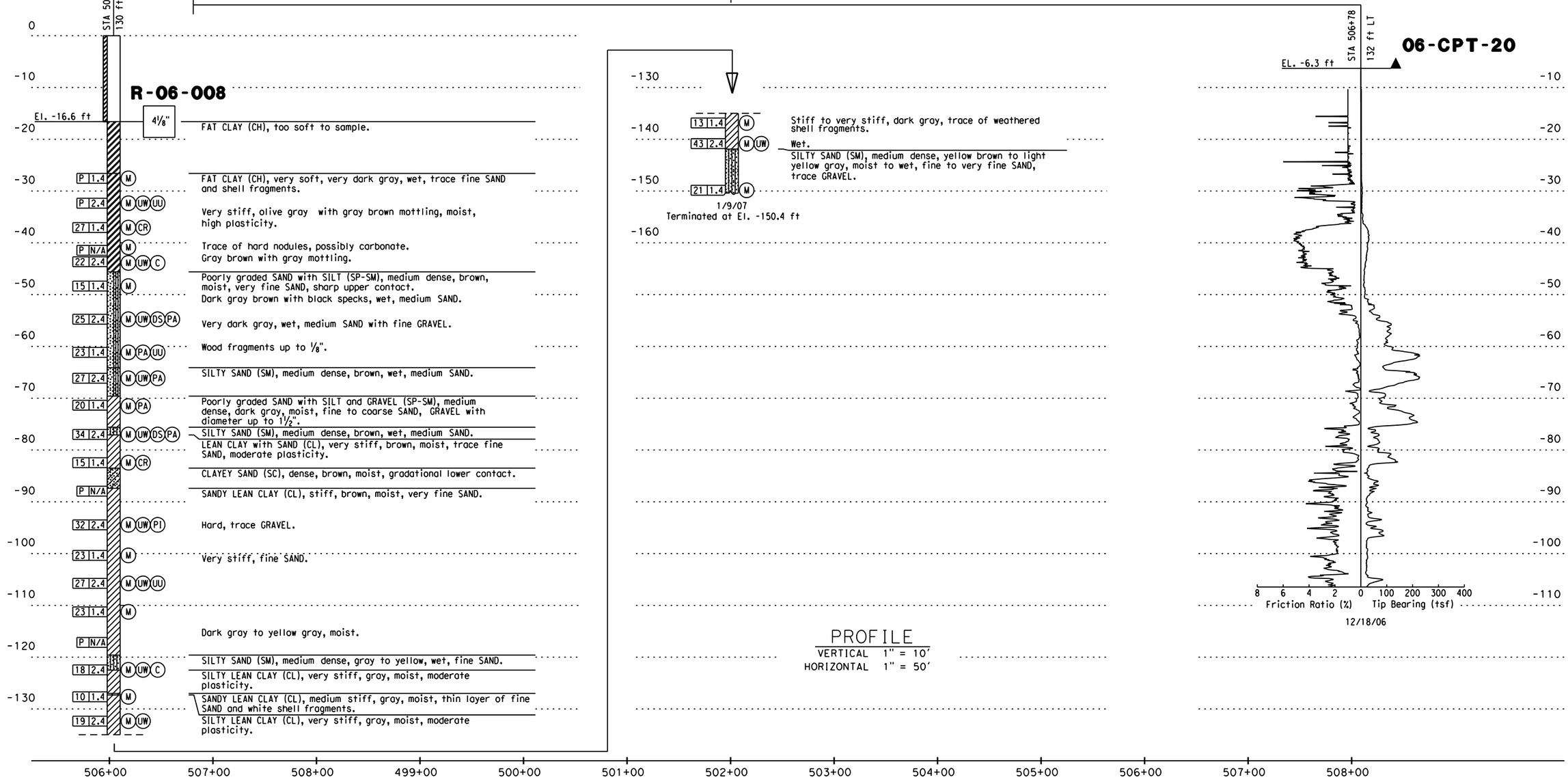


PLAN
1" = 50'

BENCH MARK
BM 29 V150 Elev 17.27
BM 29 V635 Elev 6.35



PROFILE
VERTICAL 1" = 10'
HORIZONTAL 1" = 50'

ENGINEERING SERVICES		GEOTECHNICAL SERVICES					
FUNCTIONAL SUPERVISOR SABA MOHAN NAME	DRAWN BY: A. ZAND, K. THANT CHECKED BY: E. BROWN, J. CASTLE	FIELD INVESTIGATION BY: B. SCHELL K. THANT	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	H. LAW PROJECT ENGINEER	BRIDGE NO. 35-0038 POST MILE 29.25	DUMBARTON BRIDGE LOG OF TEST BORING NO. 13	
OSF GEOTECHNICAL LOG OF TEST BORINGS SHEET	ORIGINAL SCALE IN INCHES FOR REDUCED PLANS P 1 2 3	CU EA	DISREGARD PRINTS BEARING EARLIER REVISION DATES →	REVISION DATES (PRELIMINARY STAGE ONLY) 7/6/07 3/20/09	SHEET	OF	

USERNAME => $USER DATE PLOTTED => $DATE TIME PLOTTED => $TIME

FILE => $REQUEST

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SM Alg	84	29.6/13.1 0.0/0.4		

Jody A. Castle 3/20/09
PROFESSIONAL/AL GEOLOGIST DATE

PLANS APPROVAL DATE

PROFESSIONAL GEOLOGIST — J. CASTLE No. PG 8162 Exp. 12-31-10 — STATE OF CALIFORNIA

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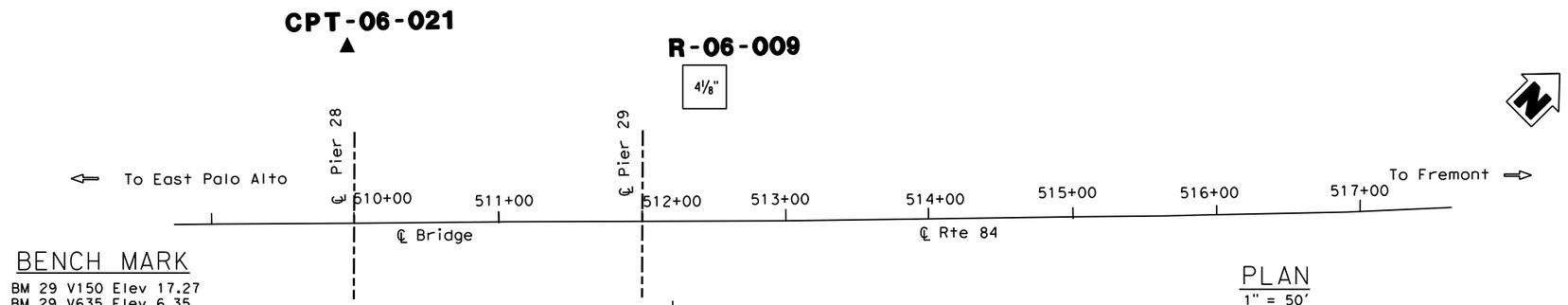
Oakland, California 94621



PLAN
1" = 50'

BENCH MARK

BM 29 V150 Elev 17.27
BM 29 V635 Elev 6.35

NOTES:

1.4" samples were taken using a SPT sampler with an inside diameter (I.D.) of 1.4" and an outside diameter (O.D.) of 2.0".

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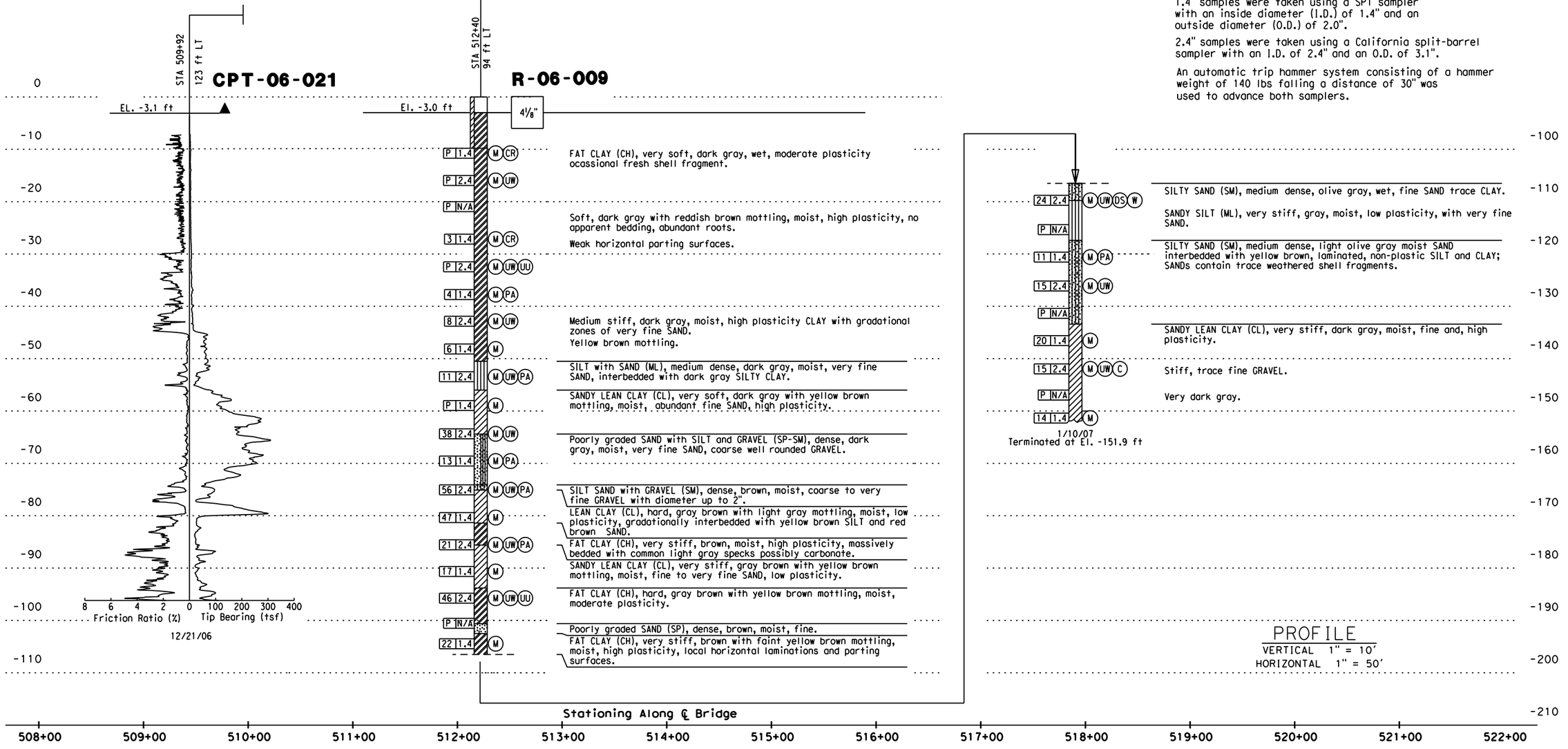

PROFILE
VERTICAL 1" = 10'
HORIZONTAL 1" = 50'

ENGINEERING SERVICES		GEOTECHNICAL SERVICES		STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION		BRIDGE NO.	DUMBARTON BRIDGE
FUNCTIONAL SUPERVISOR SABA MOHAN	DRAWN BY: A. ZAND, K. THANT	FIELD INVESTIGATION BY:	B. SCHELL, K. THANT		H. LAW PROJECT ENGINEER	35-0038	
NAME	CHECKED BY: E. BROWN, J. CASTLE					POST MILE 29.25	LOG OF TEST BORING NO. 14

OSF GEOTECHNICAL LOG OF TEST BORINGS SHEET

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS: P 1 2 3

CU
EA

FILE => $REQUEST

DISREGARD PRINTS BEARING EARLIER REVISION DATES →

REVISION DATES (PRELIMINARY STAGE ONLY)								SHEET	OF
1	2	3/20/09							

USERN/AME => $USER DATE PLOTTED => $DATE TIME PLOTTED => $TIME

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SM Alg	84	29.6/13.1 0.0/0.4		

Jody A. Castle 3/20/09
PROFESSIONAL GEOLOGIST DATE

PROFESSIONAL GEOLOGIST J. CASTLE No. PG 8162 Exp. 12-31-10 STATE OF CALIFORNIA

PLANS APPROVAL DATE

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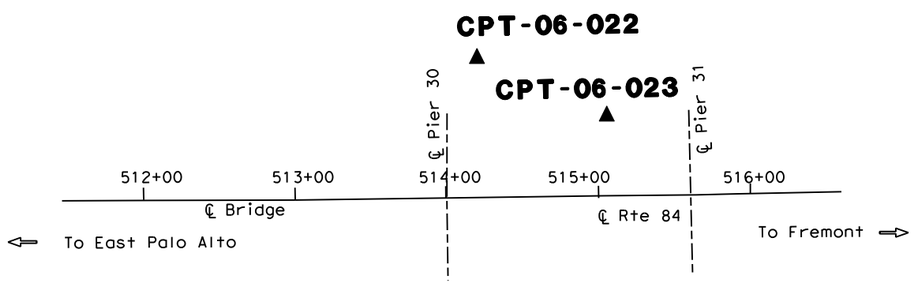
Oakland, California 94621

BENCH MARK

BM 29 V150 Elev 17.27
BM 29 V635 Elev 6.35



PLAN
1" = 50'

NOTES:

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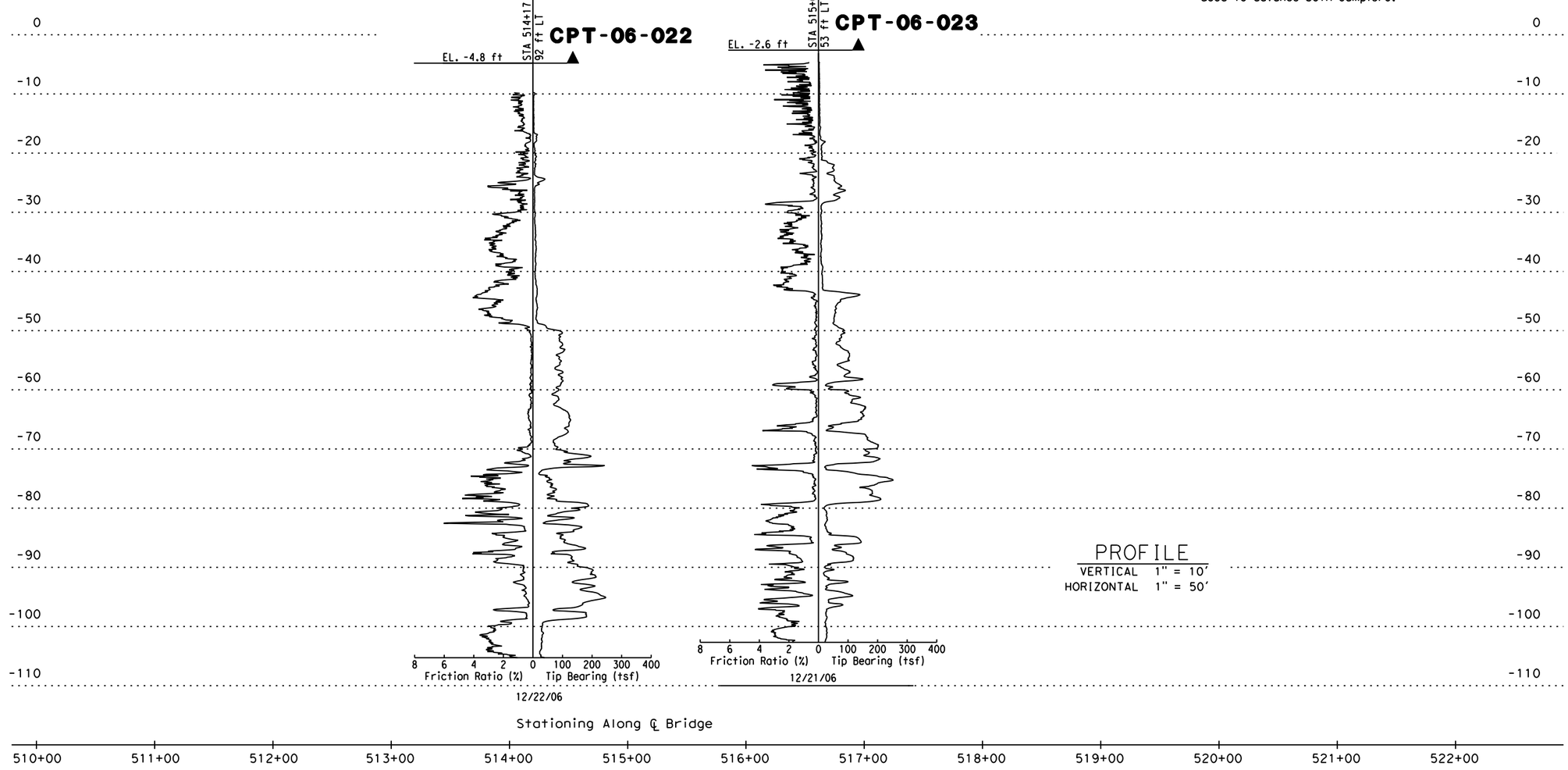

PROFILE
VERTICAL 1" = 10'
HORIZONTAL 1" = 50'

ENGINEERING SERVICES		GEOTECHNICAL SERVICES				
FUNCTIONAL SUPERVISOR SABA MOHAN (NAME)	DRAWN BY: A. ZAND, K. THANT	FIELD INVESTIGATION BY: J. CASTLE	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	H. LAW PROJECT ENGINEER	BRIDGE NO. 35-0038	DUMBARTON BRIDGE
	CHECKED BY: E. BROWN, J. CASTLE				POST MILE 29.25	LOG OF TEST BORING NO. 15

OSF GEOTECHNICAL LOG OF TEST BORINGS SHEET

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

CU
EA

FILE => $REQUEST

DISREGARD PRINTS BEARING EARLIER REVISION DATES →

REVISION DATES (PRELIMINARY STAGE ONLY): 7/6/07 3/20/09

SHEET OF

USERNAME => $USER DATE PLOTTED => $DATE TIME PLOTTED => $TIME

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SM Alg	84	29.6/13.1 0.0/0.4		

Jody A. Castle 3/20/09
PROFESSIONAL GEOLOGIST DATE

PROFESSIONAL GEOLOGIST J. CASTLE No. PG 8162 Exp. 12-31-10 STATE OF CALIFORNIA

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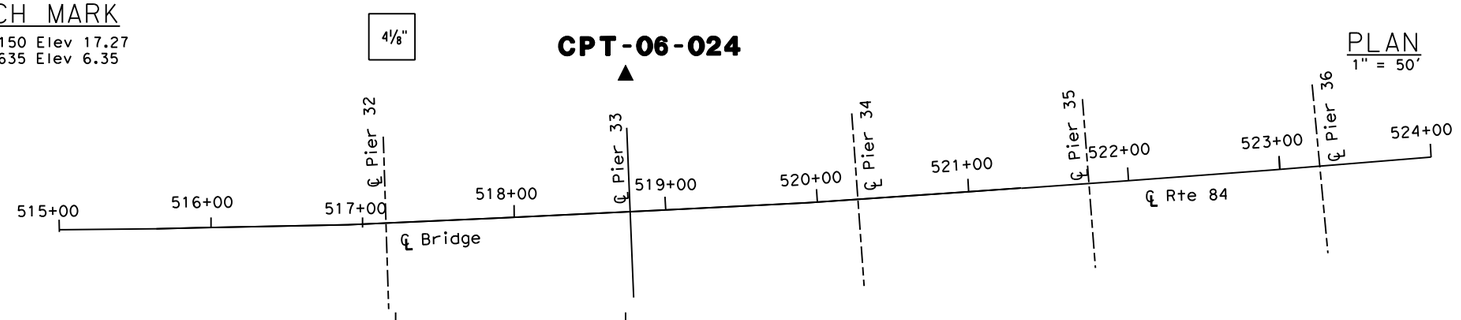
Oakland, California 94621

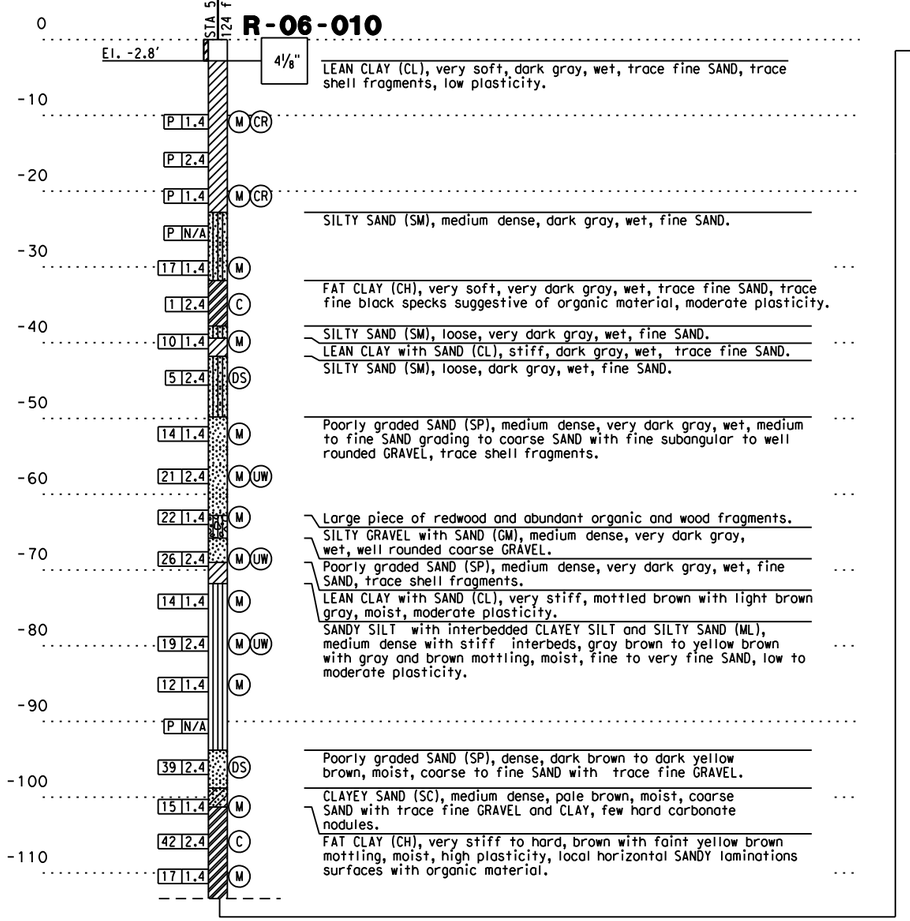
R-06-010

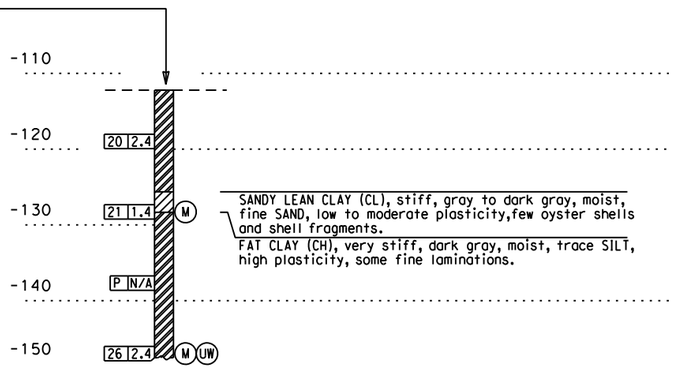
BENCH MARK

BM 29 V150 Elev 17.27
BM 29 V635 Elev 6.35

PLAN
1" = 50'







PROFILE
VERTICAL 1" = 10'
HORIZONTAL 1" = 50'

NOTES:

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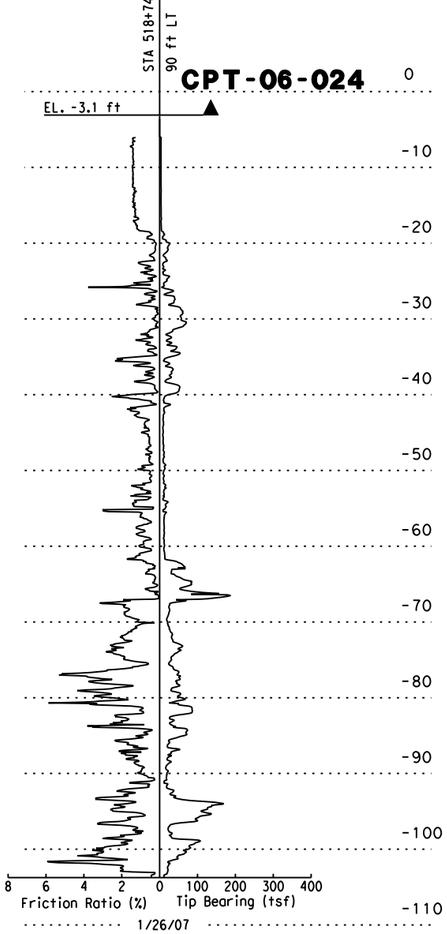

Stationing Along ℄ Bridge
515+00 516+00 517+00 518+00 519+00 520+00 521+00 522+00 523+00 524+00 525+00 526+00 527+00 528+00

ENGINEERING SERVICES		GEOTECHNICAL SERVICES		STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION		BRIDGE NO.	DUMBARTON BRIDGE
FUNCTIONAL SUPERVISOR SABA MOHAN	DRAWN BY: A. ZAND, K. THANT	FIELD INVESTIGATION BY:	J. CASTLE, G. GUNARANJAN		H. LAW PROJECT ENGINEER	35-0038	
NAME	CHECKED BY: E. BROWN, J. CASTLE					POST MILE 29.25	LOG OF TEST BORING NO. 16

OSF GEOTECHNICAL LOG OF TEST BORINGS SHEET

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS P 1 2 3

CU
EA

DISREGARD PRINTS BEARING EARLIER REVISION DATES →

REVISION DATES (PRELIMINARY STAGE ONLY)									SHEET	OF
7/6/07	3/20/09									

FILE => $REQUEST

DATE PLOTTED => $DATE TIME PLOTTED => $TIME USERNAME => $USER

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SM Alg	84	29.6/13.1 0.0/0.4		

Jody A. Castle 3/20/09
PROFESSIONAL GEOLOGIST DATE

PROFESSIONAL GEOLOGIST J. CASTLE No. PG 8162 Exp. 12-31-10 STATE OF CALIFORNIA

PLANS APPROVAL DATE

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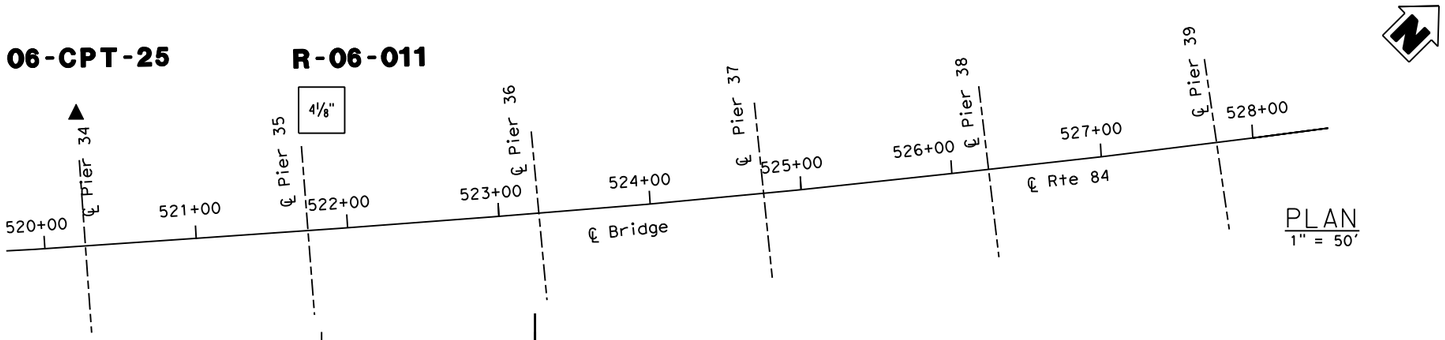
Geotechnical and Earthquake Engineering
7750 Pardee Lane, Suite 120
Oakland, California 94621

BENCH MARK

BM 29 V150 Elev 17.27
BM 29 V635 Elev 6.35



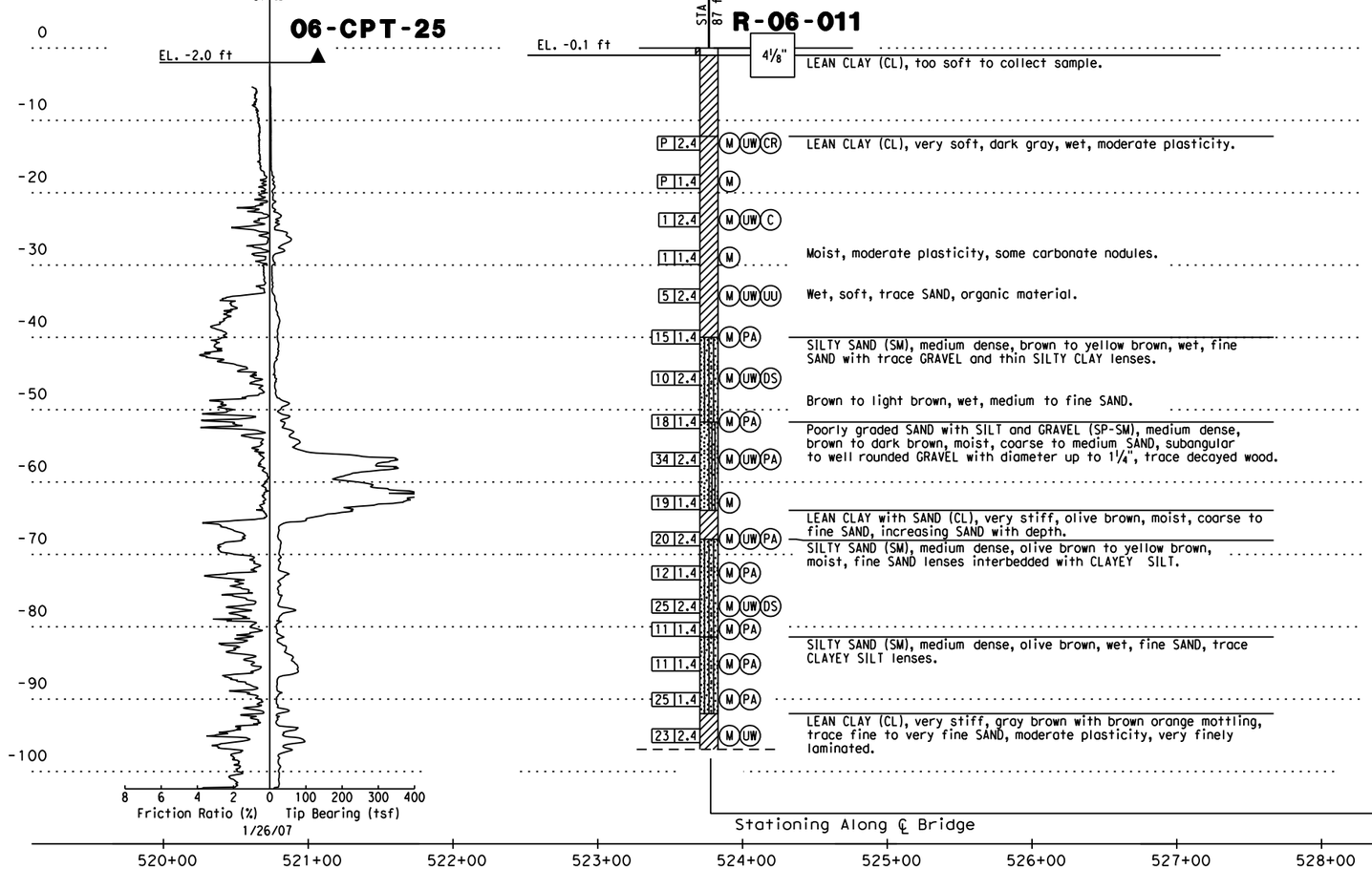
PLAN
1" = 50'

NOTES:

1.4" samples were taken using a SPT sampler with an inside diameter (I.D.) of 1.4" and an outside diameter (O.D.) of 2.0".

2.4" samples were taken using a California split-barrel sampler with an I.D. of 2.4" and an O.D. of 3.1".

An automatic trip hammer system consisting of a hammer weight of 140 lbs falling a distance of 30" was used to advance both samplers.



PROFILE
VERTICAL 1" = 10'
HORIZONTAL 1" = 50'

ENGINEERING SERVICES		GEOTECHNICAL SERVICES		STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION		BRIDGE NO.	DUMBARTON BRIDGE
FUNCTIONAL SUPERVISOR SABA MOHAN	DRAWN BY: A. ZAND, K. THANT	FIELD INVESTIGATION BY:	J. CASTLE, K. THANT		H. LAW PROJECT ENGINEER	35-0038	
NAME	CHECKED BY: E. BROWN, J. CASTLE					POST MILE 29.25	LOG OF TEST BORING NO. 17

OSF GEOTECHNICAL LOG OF TEST BORINGS SHEET

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

CU
EA

FILE => $REQUEST

DISREGARD PRINTS BEARING EARLIER REVISION DATES →

REVISION DATES (PRELIMINARY STAGE ONLY): 7/6/07 3/20/09

SHEET OF

USERNAME => %USER DATE PLOTTED => $DATE TIME PLOTTED => $TIME

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SM Alg	84	29.6/13.1 0.0/0.4		

Jody A. Castle 3/20/09
PROFESSIONAL GEOLOGIST DATE

PLANS APPROVAL DATE

PROFESSIONAL GEOLOGIST
J. CASTLE
No. PG 8162
Exp. 12-31-10
STATE OF CALIFORNIA

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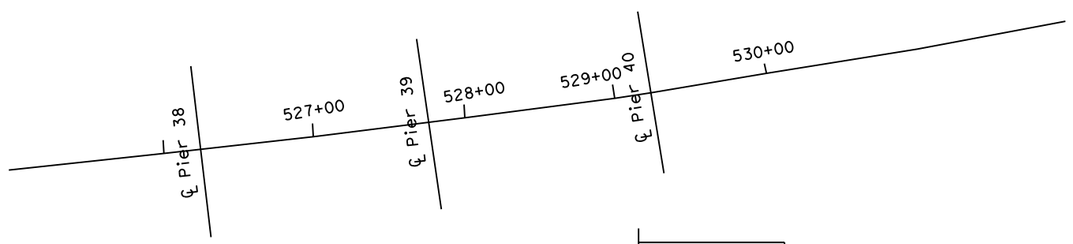
Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering
7750 Pardee Lane, Suite 120
Oakland, California 94621

BENCH MARK

BM 29 V150 Elev 17.27
BM 29 V635 Elev 6.35



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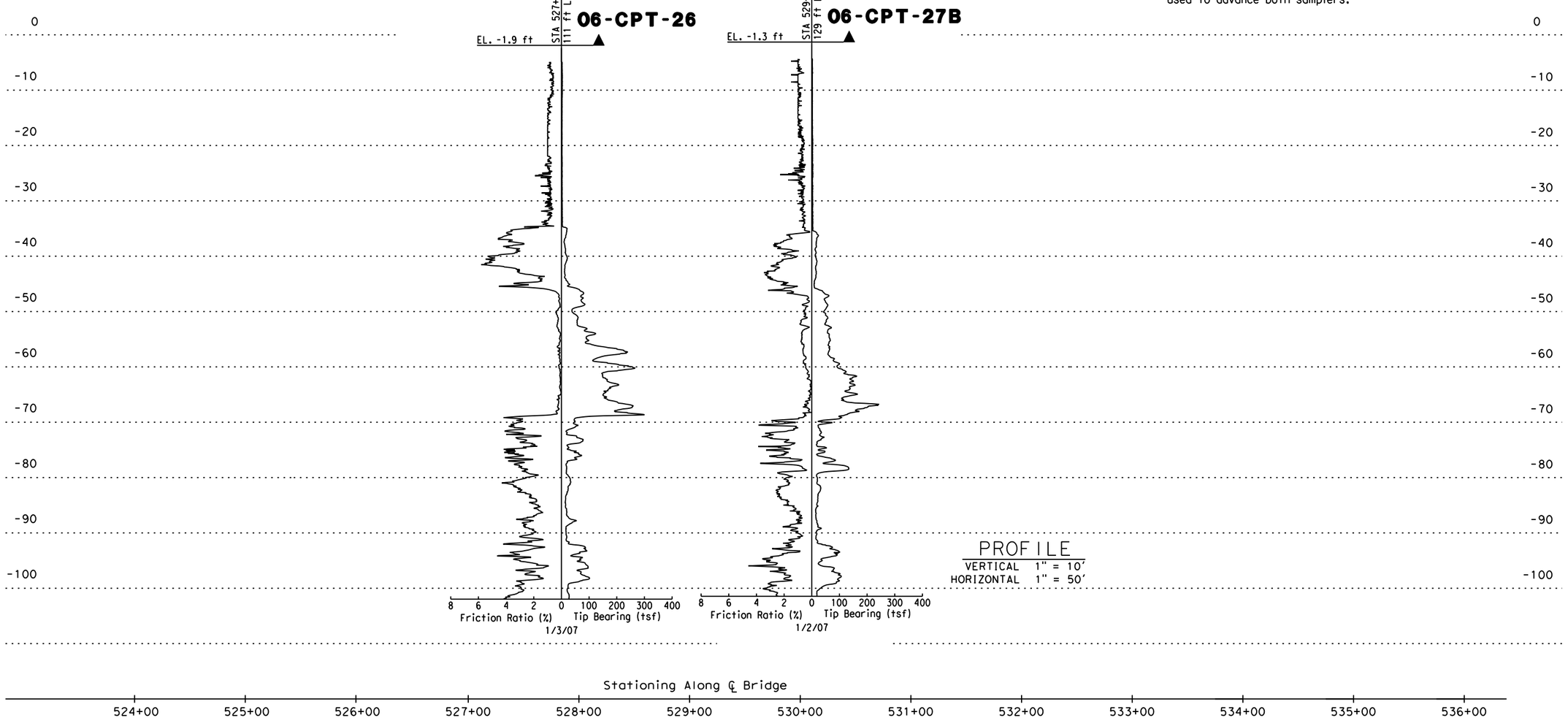

ENGINEERING SERVICES		GEOTECHNICAL SERVICES		STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION		BRIDGE NO.	DUMBARTON BRIDGE
FUNCTIONAL SUPERVISOR SABA MOHAN NAME	DRAWN BY: A. ZAND, K. THANT CHECKED BY: E. BROWN, J. CASTLE	FIELD INVESTIGATION BY:	J. CASTLE C. DOMROSE		H. LAW PROJECT ENGINEER	35-0038 POST MILE 29.25	LOG OF TEST BORING NO. 18

OSF GEOTECHNICAL LOG OF TEST BORINGS SHEET

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS P 1 2 3

CU
EA

DISREGARD PRINTS BEARING EARLIER REVISION DATES →

REVISION DATES (PRELIMINARY STAGE ONLY)										SHEET	OF
7/6/07	3/20/09										

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USERNAME => $USER DATE PLOTTED => $DATE TIME PLOTTED => $TIME

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SM Ala	84	29.6/13.1 0.0/0.4		

Jody A. Castle 7/6/07
PROFESSIONAL GEOLOGIST DATE

PROFESSIONAL GEOLOGIST
J. CASTLE
No. PG 8162
Exp. 12-31-07
STATE OF CALIFORNIA

PLANS APPROVAL DATE

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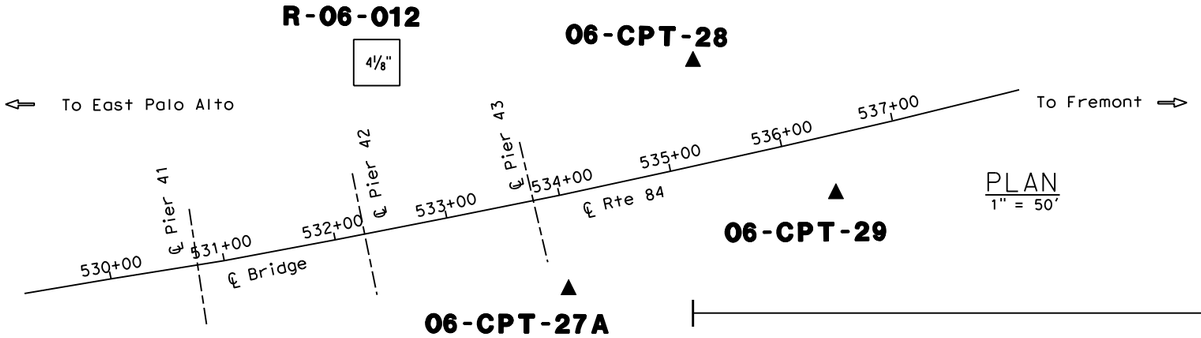
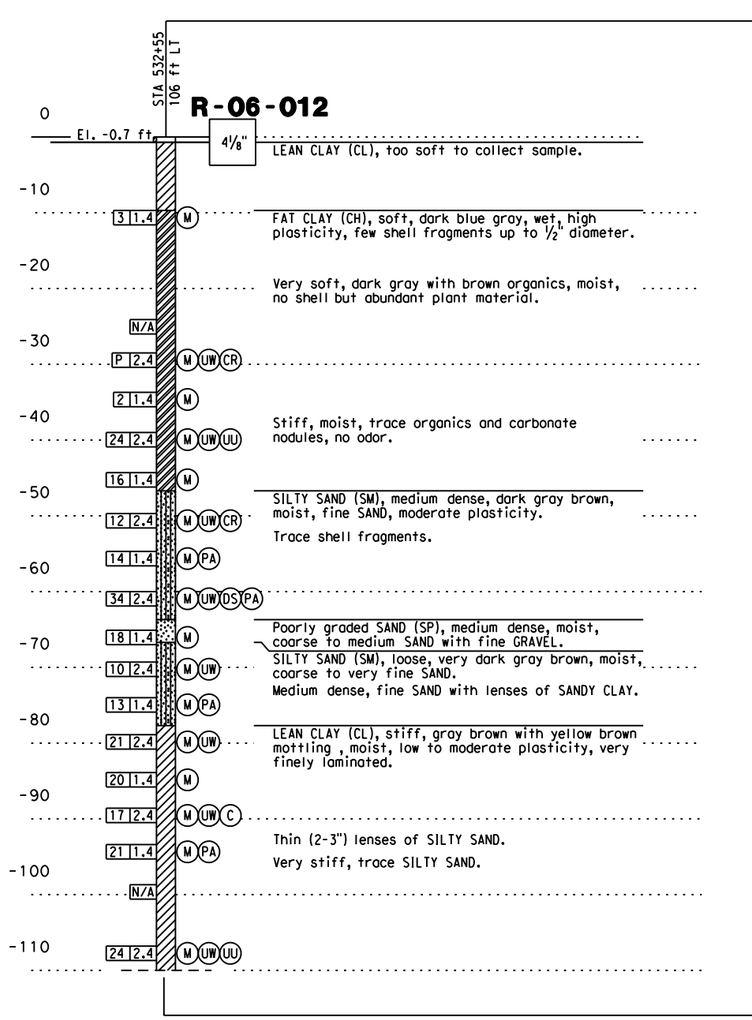
Geotechnical and Earthquake Engineering
7750 Pardee Lane, Suite 120
Oakland, California 94621

BENCH MARK

BM 29 V150 Elev 17.27
BM 29 V635 Elev 6.35



PLAN
1" = 50'



NOTES:

1.4" samples were taken using or SPT Sampler. with on inside diameter (I.D.) of 1.4" and on outside diameter (O.D.) of 2.0"

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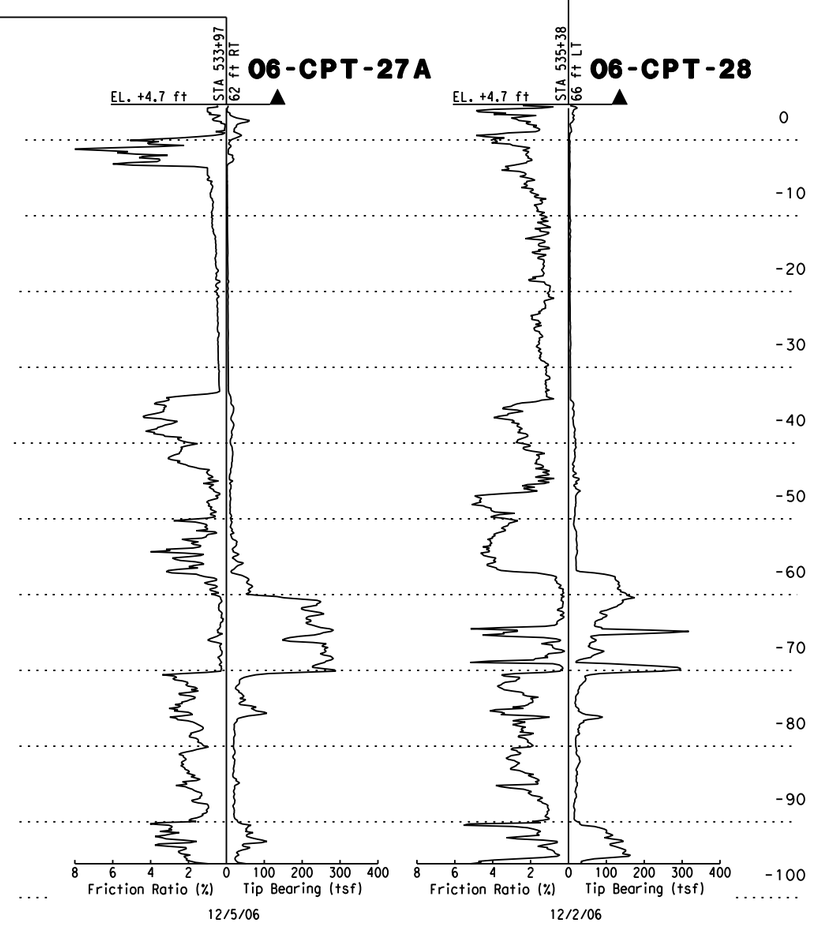

PROFILE
VERTICAL 1" = 10'
HORIZONTAL 1" = 50'

Stationing Along ℄ Bridge

527+00 528+00 529+00 530+00 531+00 532+00 533+00 534+00 535+00 536+00 537+00 538+00 539+00 540+00 541+00

ENGINEERING SERVICES		GEOTECHNICAL SERVICES				
FUNCTIONAL SUPERVISOR	DRAWN BY: A. ZAND, K. THANT	FIELD INVESTIGATION BY:	J. CASTLE, B. SCHELL C. DOMROSE	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	H. LAW PROJECT ENGINEER	BRIDGE NO. 35-0038 POST MILE 29.25
NAME	CHECKED BY: E. BROWN, J. CASTLE					

DUMBARTON BRIDGE

LOG OF TEST BORING NO. 19

OSF GEOTECHNICAL LOG OF TEST BORINGS SHEET

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

CU
EA

DISREGARD PRINTS BEARING EARLIER REVISION DATES →

REVISION DATES (PRELIMINARY STAGE ONLY) | SHEET | OF

FILE => $REQUEST

DATE PLOTTED => $DATE TIME PLOTTED => $TIME USERNAME => %USER

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SM Ala	84	29.6/13.1 0.0/0.4		

Jody A. Castle 3/20/09
PROFESSIONAL GEOLOGIST DATE

PROFESSIONAL GEOLOGIST
J. CASTLE
No. PG 8162
Exp. 12-31-10
STATE OF CALIFORNIA

PLANS APPROVAL DATE

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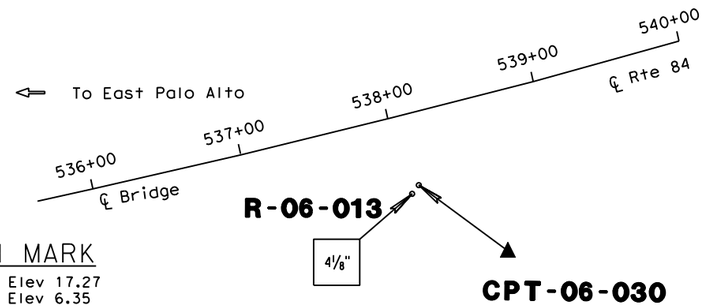
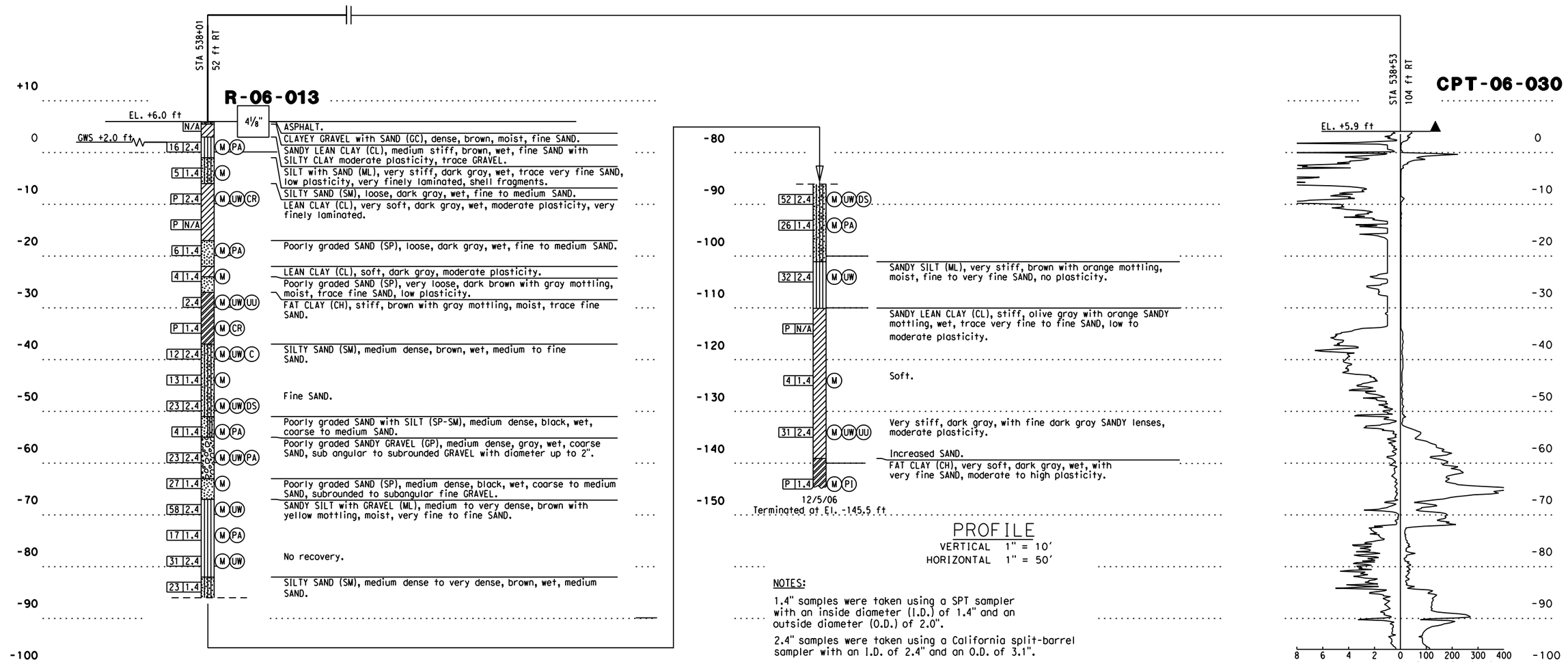
Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering
7750 Pardee Lane, Suite 120
Oakland, California 94621



BENCH MARK

BM 29 V150 Elev 17.27
BM 29 V635 Elev 6.35

PLAN
1" = 50'



PROFILE
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HORIZONTAL 1" = 50'

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Stationing Along ℄ Bridge
536+00 537+00 538+00 539+00 540+00 541+00 542+00 543+00 544+00 545+00 546+00 547+00 548+00 549+00

ENGINEERING SERVICES		GEOTECHNICAL SERVICES					
FUNCTIONAL SUPERVISOR SABA MOHAN NAME	DRAWN BY: A. ZAND, K. THANT CHECKED BY: E. BROWN, J. CASTLE	FIELD INVESTIGATION BY: C. DOMROSE	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	H. LAW PROJECT ENGINEER	BRIDGE NO. 35-0038 POST MILE 29.25	DUMBARTON BRIDGE LOG OF TEST BORING NO. 20	
OSF GEOTECHNICAL LOG OF TEST BORINGS SHEET	ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3			CU EA	DISREGARD PRINTS BEARING EARLIER REVISION DATES →	REVISION DATES (PRELIMINARY STAGE ONLY) 7/6/07 3/20/09	SHEET OF

FILE => $REQUEST

USERNAME => $USER DATE PLOTTED => $DATE TIME PLOTTED => $TIME

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SM Ala	84	29.6/13.1 0.0/0.4		

Jody A. Castle 3/20/09
PROFESSIONAL GEOLOGIST DATE

PROFESSIONAL GEOLOGIST
J. CASTLE
No. PG 8162
Exp. 12-31-10
STATE OF CALIFORNIA

PLANS APPROVAL DATE

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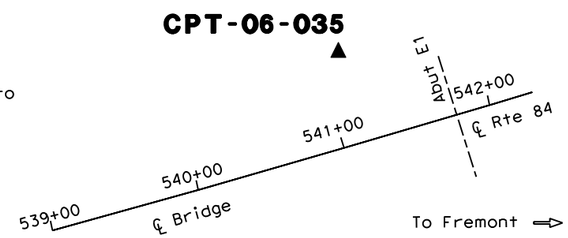
Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering
7750 Pardee Lane, Suite 120
Oakland, California 94621

BENCH MARK

BM 29 V150 Elev 17.27
BM 29 V635 Elev 6.35

PLAN

1" = 50'



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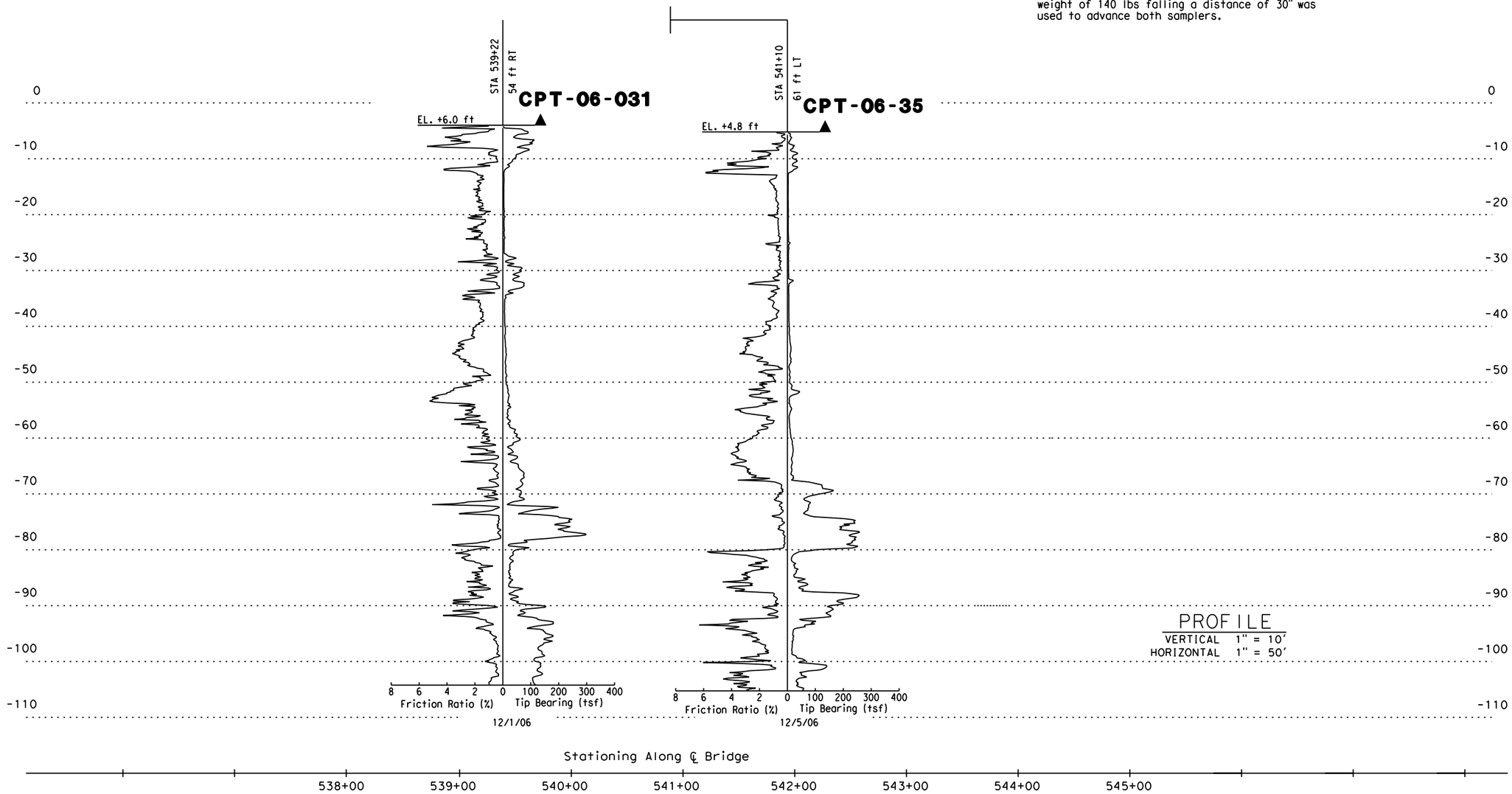

ENGINEERING SERVICES		GEOTECHNICAL SERVICES	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION		BRIDGE NO.	DUMBARTON BRIDGE
FUNCTIONAL SUPERVISOR SABA MOHAN NAME	DRAWN BY: A. ZAND, K. THANT CHECKED BY: E. BROWN, J. CASTLE	FIELD INVESTIGATION BY: J. CASTLE, G. GUNARANJAN		H. LAW PROJECT ENGINEER	35-0038 POST MILE 29.25	LOG OF TEST BORING NO. 21

OSF GEOTECHNICAL LOG OF TEST BORINGS SHEET

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

CU
EA

FILE => $REQUEST

DISREGARD PRINTS BEARING EARLIER REVISION DATES →

REVISION DATES (PRELIMINARY STAGE ONLY)										SHEET	OF
7/6/07	3/20/09										

USERNAME => $USER DATE PLOTTED => $DATE TIME PLOTTED => $TIME

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SM Alg	84	29.6/13.1 0.0/0.4		

Jody A. Castle 3/20/09
PROFESSIONAL GEOLOGIST DATE

J. CASTLE
No. PG 8162
Exp. 12-31-10
PROFESSIONAL GEOLOGIST
STATE OF CALIFORNIA

PLANS APPROVAL DATE

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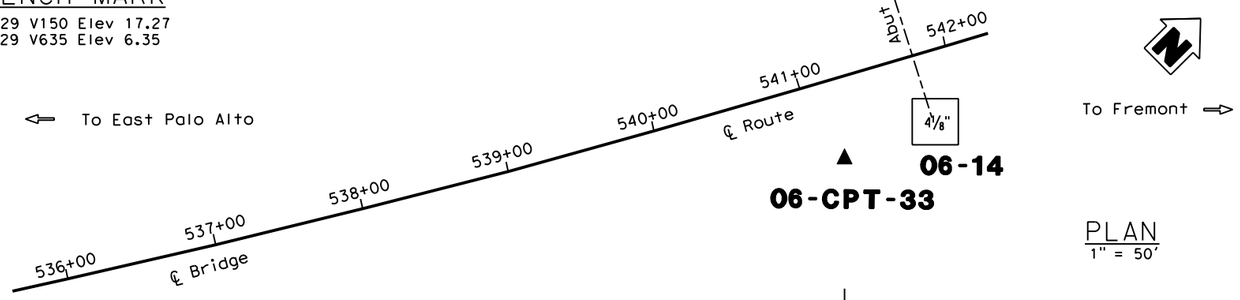
Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering
7750 Pardee Lane, Suite 120
Oakland, California 94621

BENCH MARK

BM 29 V150 Elev 17.27
BM 29 V635 Elev 6.35



PLAN
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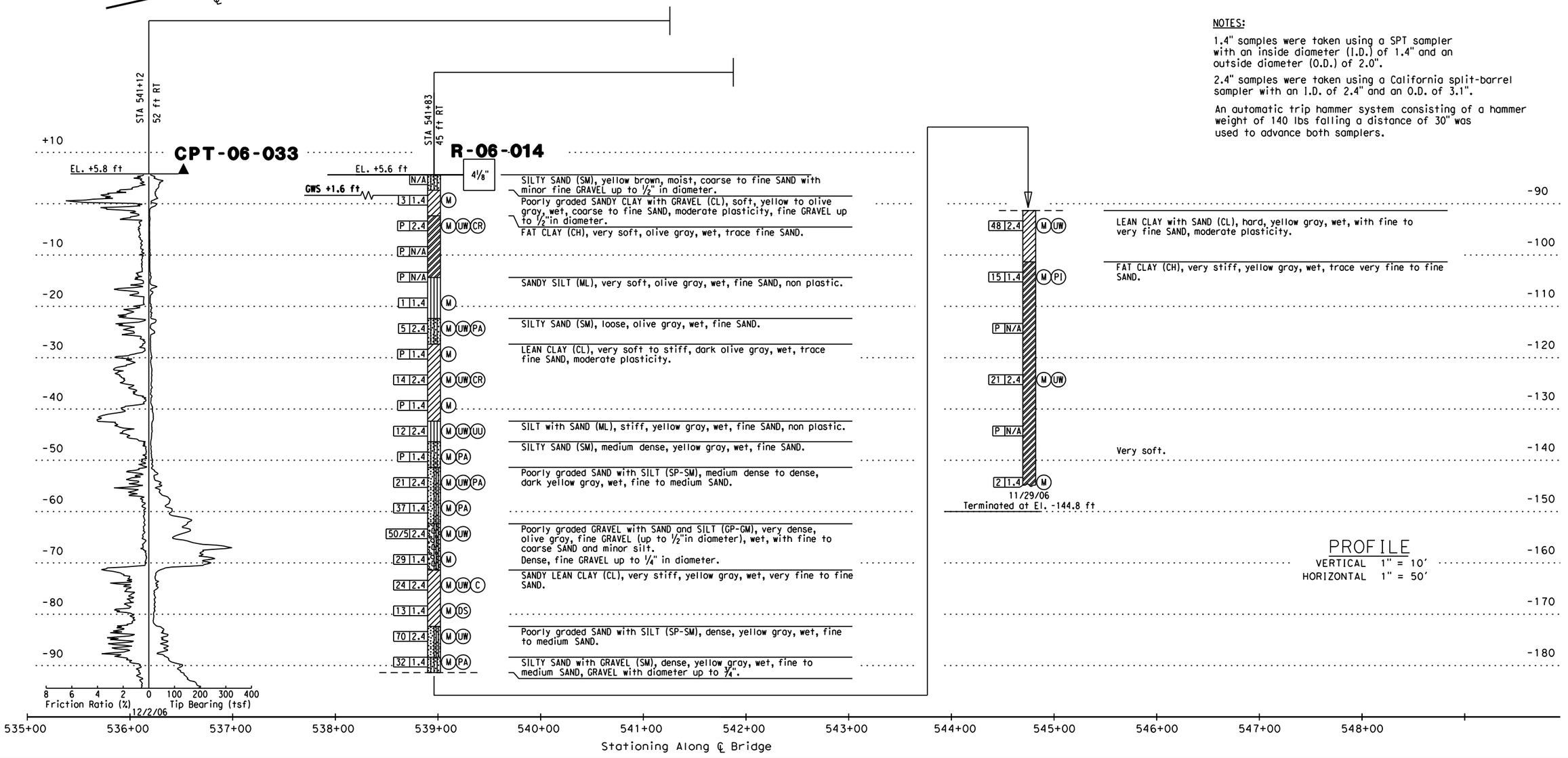


PROFILE
VERTICAL 1" = 10'
HORIZONTAL 1" = 50'

ENGINEERING SERVICES		GEOTECHNICAL SERVICES	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION		BRIDGE NO.	DUMBARTON BRIDGE
FUNCTIONAL SUPERVISOR SABA MOHAN	DRAWN BY: A. ZAND, K. THANT	FIELD INVESTIGATION BY: M. THAN		H. LAW PROJECT ENGINEER	35-0038	LOG OF TEST BORING NO. 22
NAME	CHECKED BY: E. BROWN, J. CASTLE				POST MILE 29.25	

OSF GEOTECHNICAL LOG OF TEST BORINGS SHEET

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

CU
EA

DISREGARD PRINTS BEARING EARLIER REVISION DATES →

REVISION DATES (PRELIMINARY STAGE ONLY)										SHEET	OF
7/6/07	3/20/09										

FILE => $REQUEST

USERNAME => $USER DATE PLOTTED => $DATE TIME PLOTTED => $TIME

GREGG DRILLING AND TESTING, INC.
GREGG IN SITU, INC.
ENVIRONMENTAL AND GEOTECHNICAL INVESTIGATION SERVICES

February 28, 2007

Attn:
Ms. Jody Castle
Earth Mechanics, Inc.
7700 Edgewater Drive, Ste. 846
Oakland, CA 94621

Subject: Field Vane Shear Test Results
Dumbarton Bridge Project
San Mateo County, California
GREGG Project Number:

Dear Ms. Castle:

The following report presents the results of GREGG IN SITU's Field Vane Shear Testing Program for the above referenced site. The following testing services were performed:

1	Cone Penetration Tests	(CPTU)	☐
2	Pore Pressure Dissipation Tests	(PPD)	☐
3	Seismic Cone Penetration Tests	(SCPTU)	☐
4	Resistivity Cone Penetration Tests	(RCPTU)	☐
5	Pressuremeter Tests	(PMT)	☐
6	Groundwater Sampling	(GWS)	☐
7	Soil Sampling	(SS)	☐
8	Vapor Sampling	(VS)	☐
9	Vane Shear Testing	(VST)	X
10	SPT Energy Calibration	(SPTE)	☐

Field vane shear testing was part of a drilling program conducted at various locations adjacent to the existing Dumbarton Bridge in San Mateo & Alameda Counties, California. Gregg drilling's drill ship the "Quinn Delta" was used for this drilling program. The tests were accomplished using a vane borer incorporating a 55 mm x 110 mm vane. Vane tests were conducted in 5 boring locations, Borings 06-05, 06-06, 06-07, 06-09 and 06-12. The vane tests in Borings 06-09 and 06-12 were carried out using an Envi MemoVane. The MemoVane is a shear strength testing device which incorporates a Geonor vane, down-hole measuring and down-hole recording. The down-hole recording/measuring module failed after completing Borings 06-09 and 06-12. A Geonor vane with up-hole measuring and recording was used for the remainder of the testing.

All vane tests were accomplished by applying torque to an inner rod of a two concentric rod system. The outer rod prevented the surrounding soils from adhering to the inner rods and

thus prevented error due to soil/rod friction from being included in the vane torque measurements. An electric motor which applied torque to the inner rods was attached to the drill rig above the borings. The electric motor rotation was approximately 4 to 6 degrees per minute. The test at 06-09 could not be carried out to completion because the tide was moving faster than the vane equipment in it's configuration, at the time, could compensate for. The equipment was modified after this attempt so that the rate of tidal change was not again an issue. Torque/time histories for each of the completed tests are presented in the data sets that follow Table 1, the test summary.

A list of reference papers providing additional background on the specific tests conducted is provided in the bibliography following the text of the report. If you would like a copy of any of these publications or should you have any questions or comments regarding the contents of this report, please do not hesitate to contact our office at (925) 313-5800.

Sincerely,
GREGG IN SITU, Inc.

Virgil A. Baker
Geotechnical Manager

Field Vane Shear Testing Summary

-Table 1-

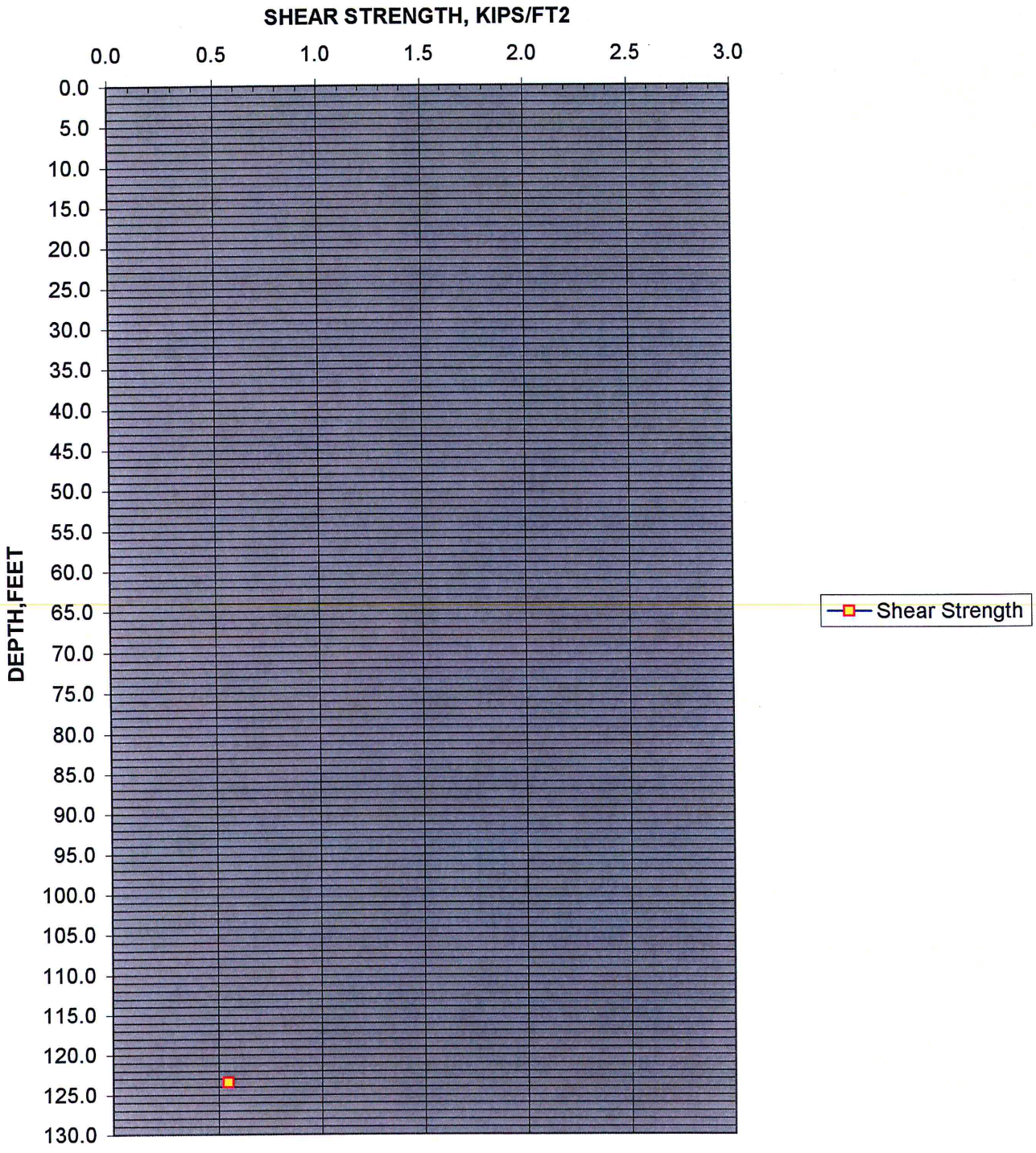
FVST Identification	Date	Test Depths, Below Deck (Feet)	Comments
06-05	01/22/07	123.5	Gregg Up-Hole Torque Cell (Not Clay), Sandy Clayey Silt
06-06	01/15/07	132.5	Gregg Up-Hole Torque Cell
06-07	01/17/07	121.5	Gregg Up-Hole Torque Cell
06-09	01/09/07	108.0	Incomplete Test, Envi Down-HoleTorque Cell
06-12	01/11/07	24.5, 27.8, 101.5	Envi Down-HoleTorque Cell

Notes:

1. Average Rate of Testing 4 to 6 degrees/min.
2. Torque applied up-hole to 21mm OD x 12mm ID inner rods
3. 55mm x 110mm vane used for all tests

GREGG IN SITU

FIELD VANE SHEAR TEST RESULTS
DUNBARTON BRIDGE
LOCATION: 06-05



CLIENT JOB NO.:
GREGG JOB NO:
LOCATION: Boring # 06-05
DATE: 22-Jan-07
VANE TYPE: Envi, MemoVane
VANE DIAMETER, d (mm): 55
VANE Length, l (mm): 110

D= 0.055 Meter

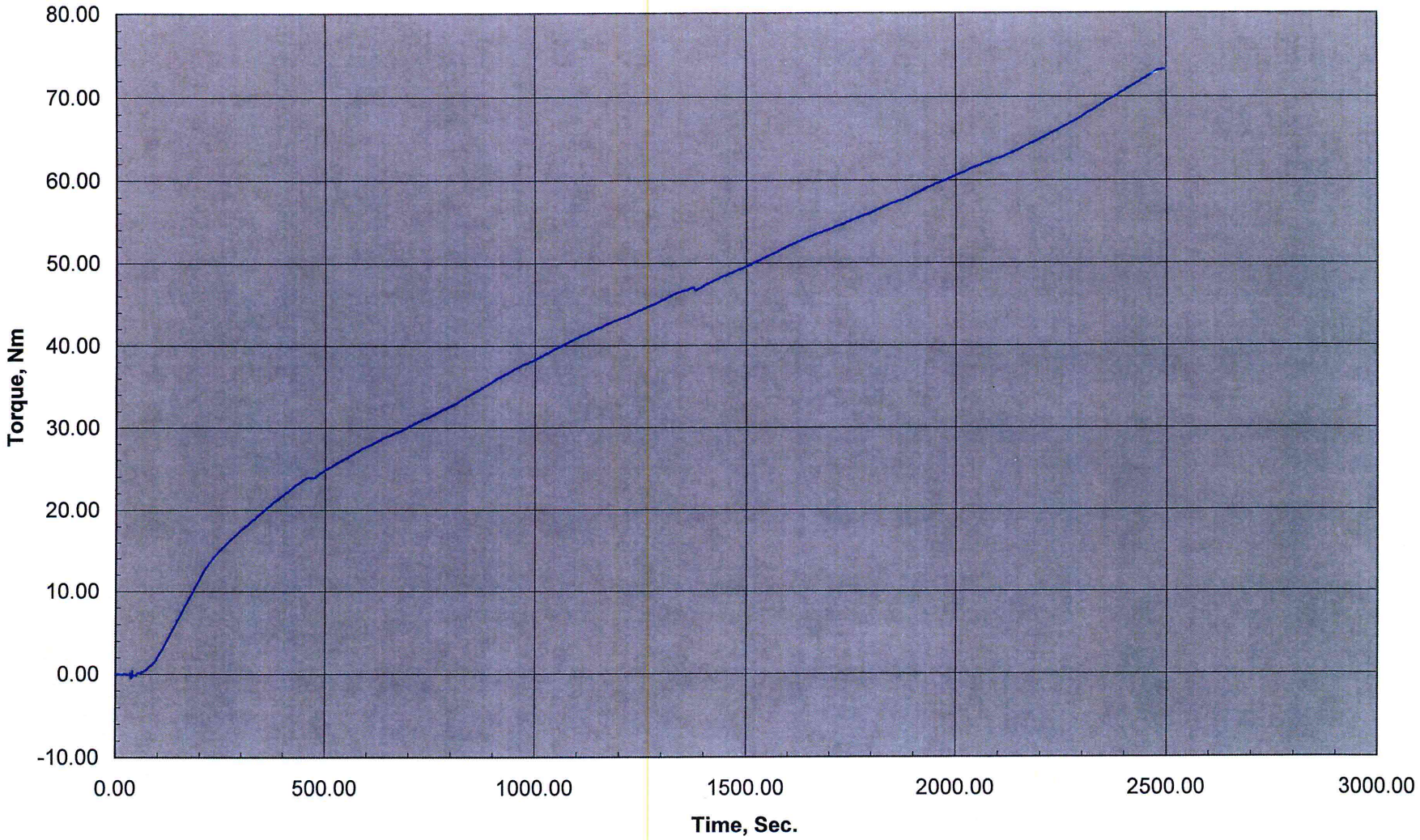
$1N/M^2$=1Pascal

UNDRAINED SHEAR STRENGTH, $c_u = 6M/7\pi D^3$

Where: M=Max. Recorded Torque, D= Vane Diiameter

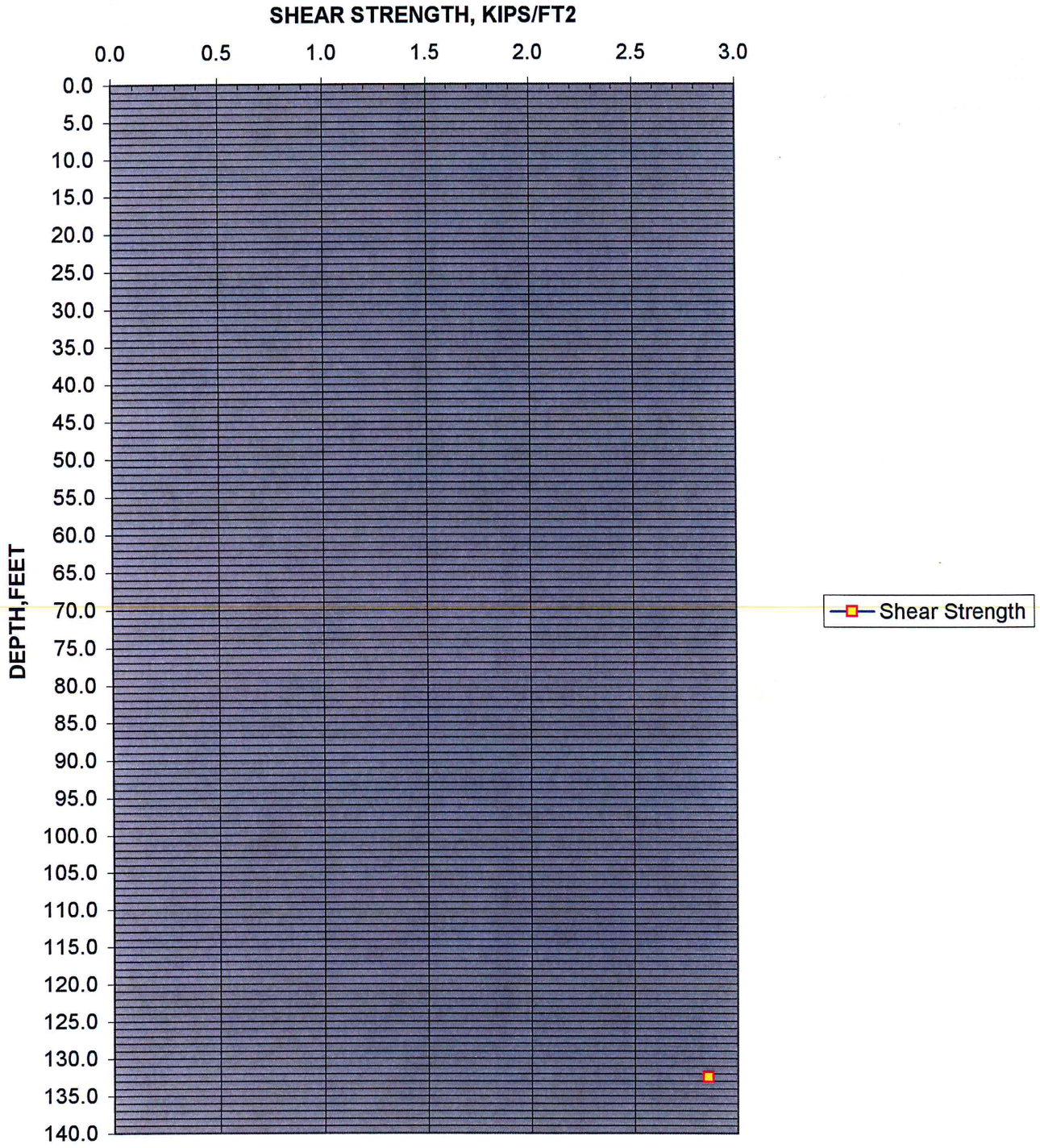
DEPTH (M)	DEPTH (FT)	PEAK TORQUE READING (Nm)	SHEAR STRENGTH (N/m^2)	SHEAR STRENGTH (KIPS/FT^2)	REMOLDED PEAK IAL READIN (Nm)	REMOLDED SHEAR STRENGTH (kN/m^2)	REMOLDED SHEAR STRENGTH (KIPS/FT^2)	SENSITIVITY
37.64	123.5	15.981	26207.14	0.547				

Torque vs Time
Boring 06-05 @ 123.5



GREGG IN SITU

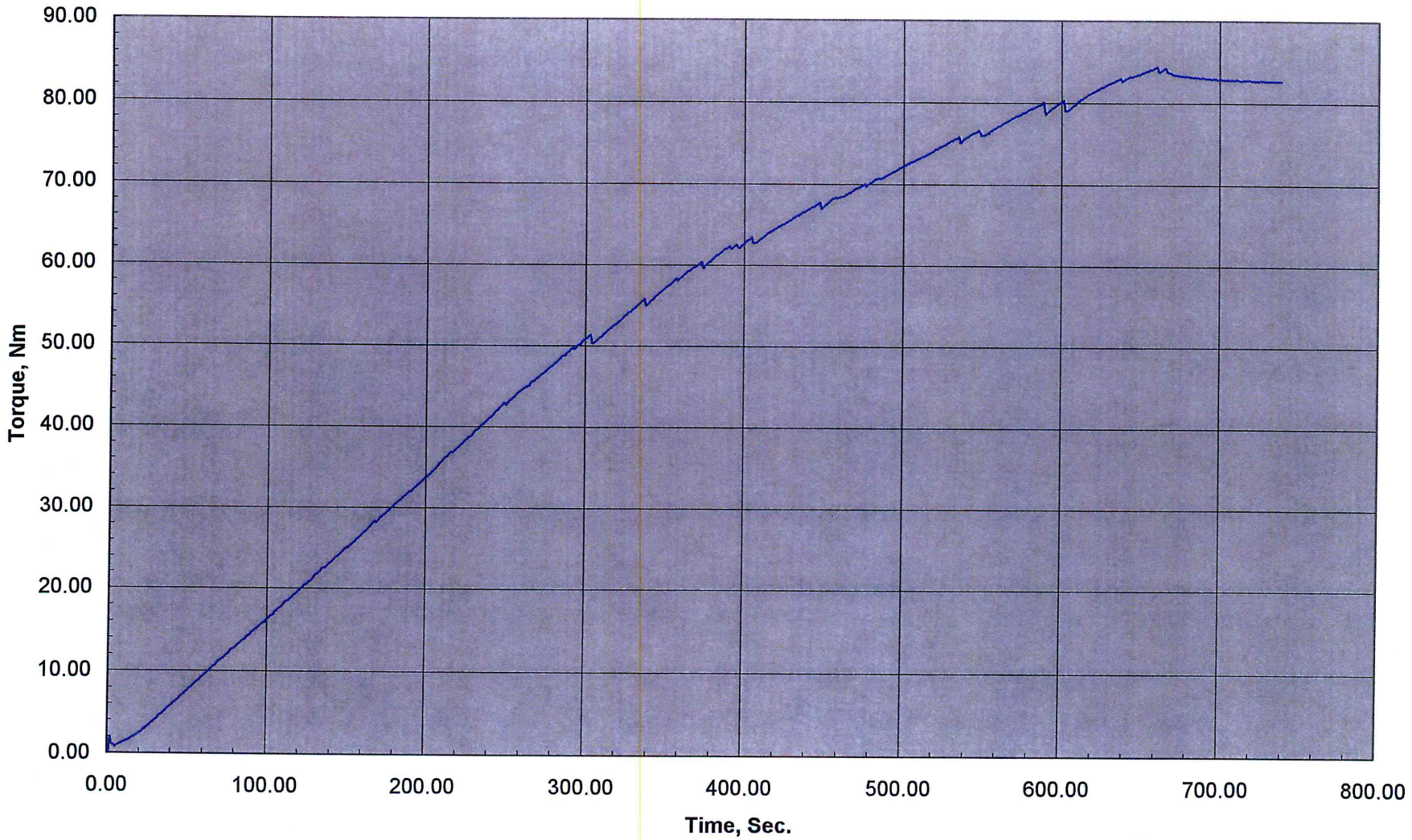
FIELD VANE SHEAR TEST RESULTS
DUNBARTON BRIDGE
LOCATION: 06-06



CLIENT JOB NO.:
GREGG JOB NO:
LOCATION: Boring # 06-06 DRAFT
DATE: 22-Jan-07
VANE TYPE: Envi, MemoVane
VANE DIAMETER, d (mm): 55 D= 0.055 Meter
VANE Length, l (mm): 110 $1N/M^2=1Pascal$
UNDRAINED SHEAR STRENGTH, $c_u = 6M/7\pi D^3$ Where: M=Max. Recorded Torque, D= Vane Diiameter

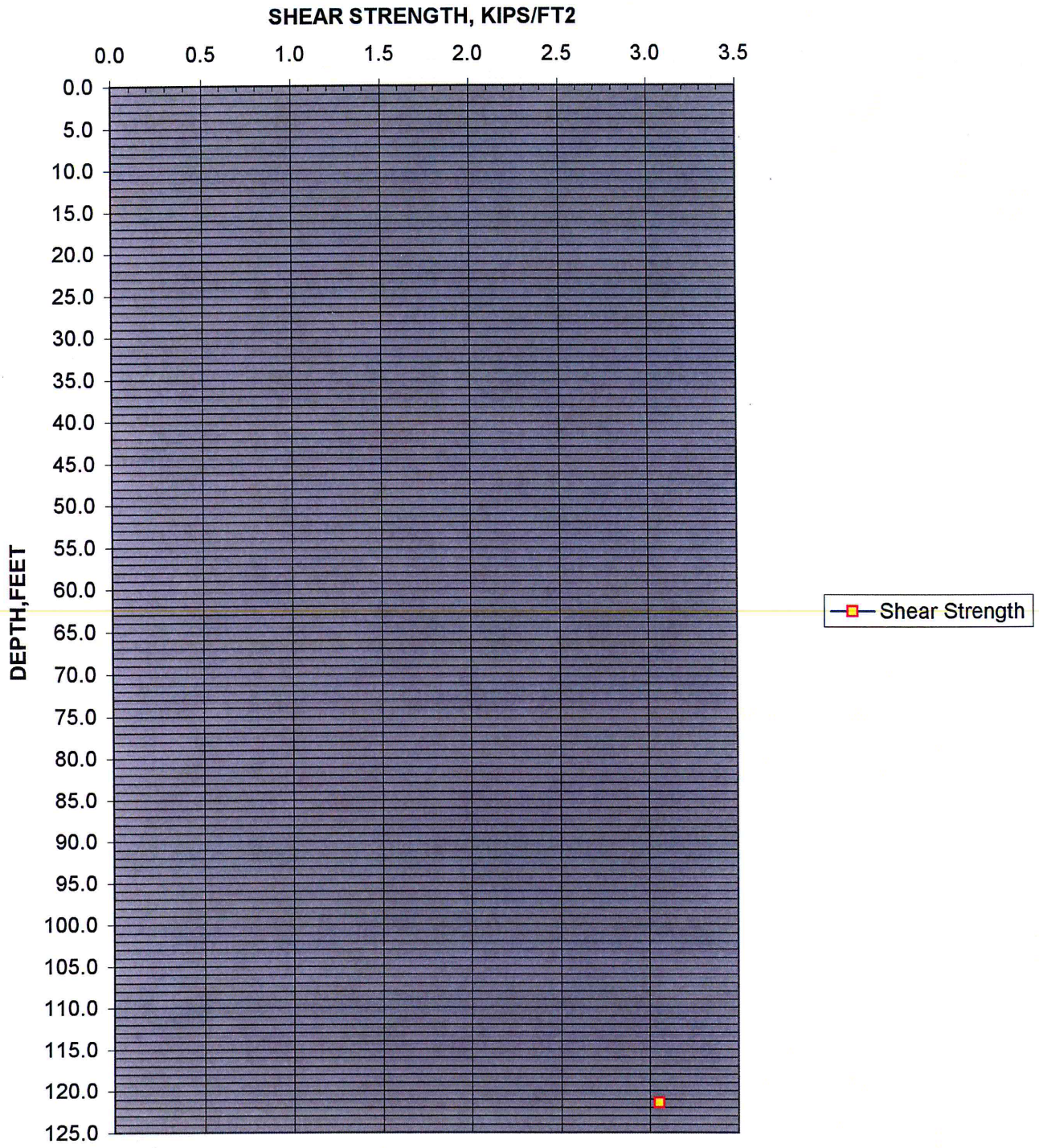
DEPTH (M)	DEPTH (FT)	PEAK TORQUE READING (Nm)	SHEAR STRENGTH (N/m^2)	SHEAR STRENGTH (KIPS/FT^2)	REMOLDED PEAK IAL READIN (Nm)	REMOLDED SHEAR STRENGTH (kN/m^2)	REMOLDED SHEAR STRENGTH (KIPS/FT^2)	SENSITIVITY
40.39	132.5	83.485	136906.51	2.859				

Torque vs Time
Boring 06-06 @ 132.5'



GREGG IN SITU

FIELD VANE SHEAR TEST RESULTS
DUNBARTON BRIDGE
LOCATION: 06-07



CLIENT JOB NO.:
GREGG JOB NO:
LOCATION: Boring # 06-07
DATE: 22-Jan-07
VANE TYPE: Envi, MemoVane
VANE DIAMETER, d (mm): 55
VANE Length, l (mm): 110

D= 0.055 Meter

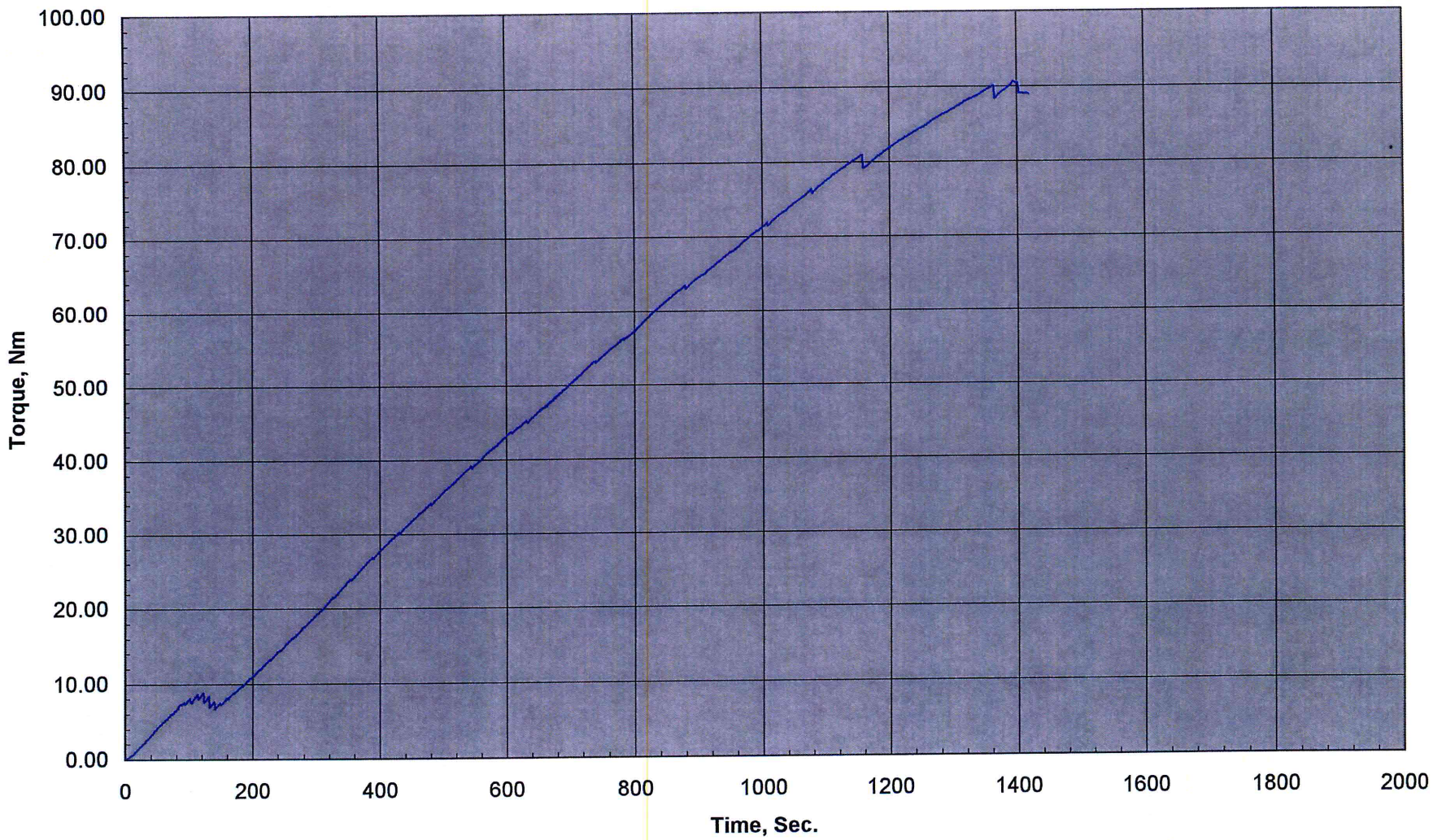
$1N/M^2$=1Pascal

UNDRAINED SHEAR STRENGTH, $c_u = 6M/7\pi D^3$

Where: M=Max. Recorded Torque, D= Vane Diiameter

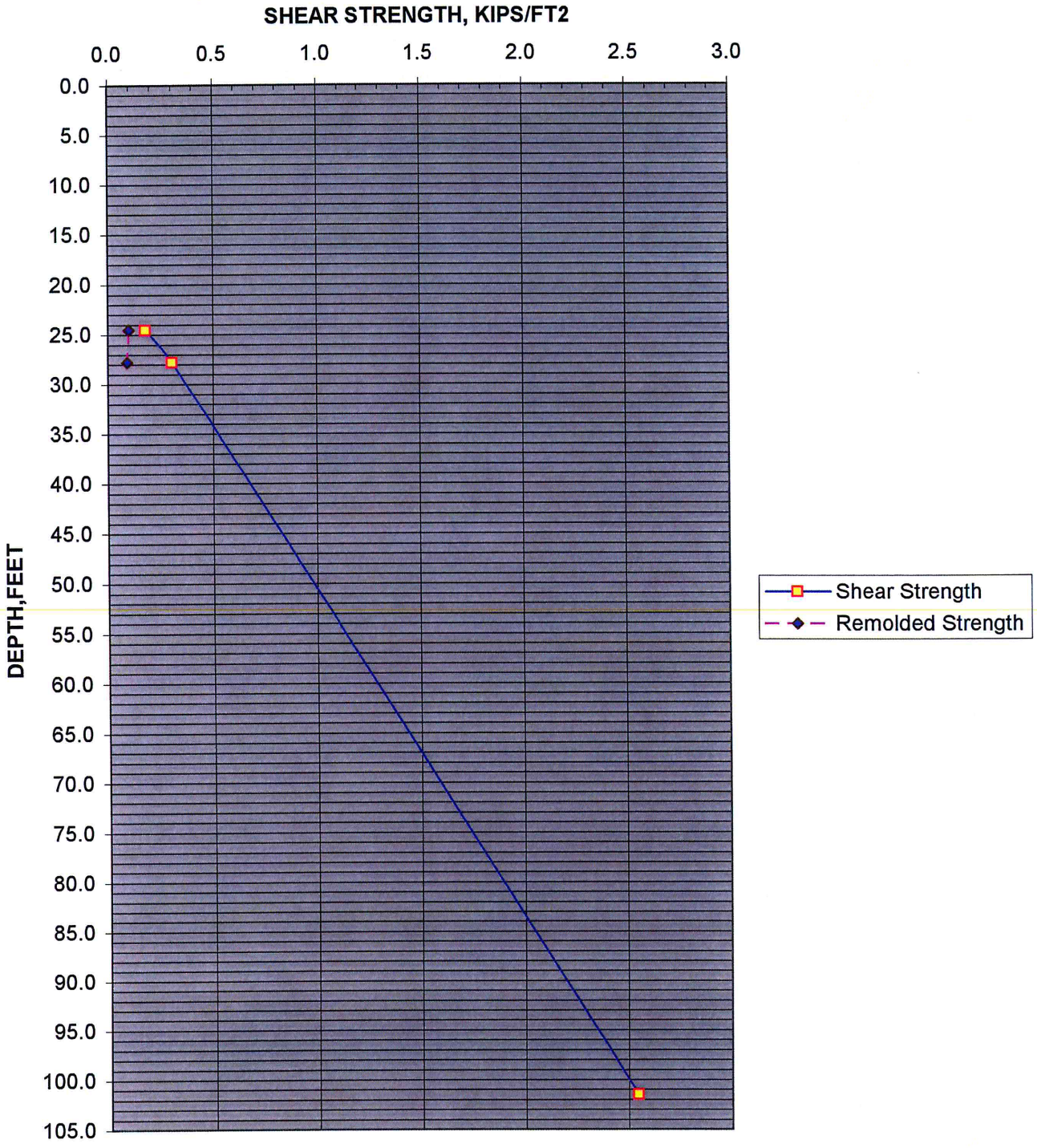
DEPTH (M)	DEPTH (FT)	PEAK TORQUE READING (Nm)	SHEAR STRENGTH (N/m^2)	SHEAR STRENGTH (KIPS/FT^2)	REMOLDED PEAK IAL READIN (Nm)	REMOLDED SHEAR STRENGTH (kN/m^2)	REMOLDED SHEAR STRENGTH (KIPS/FT^2)	SENSITIVITY
37.03	121.5	89.126	146157.15	3.053				

Torque vs Time
Boring 06-07 @ 121.5'



GREGG IN SITU

FIELD VANE SHEAR TEST RESULTS
DUNBARTON BRIDGE
LOCATION: 06-12



CLIENT JOB NO.:
GREGG JOB NO:
LOCATION: Boring # 06-12
DATE: 22-Jan-07
VANE TYPE: Envi, MemoVane
VANE DIAMETER, d (mm): 55
VANE Length, l (mm): 110

D= 0.055 Meter

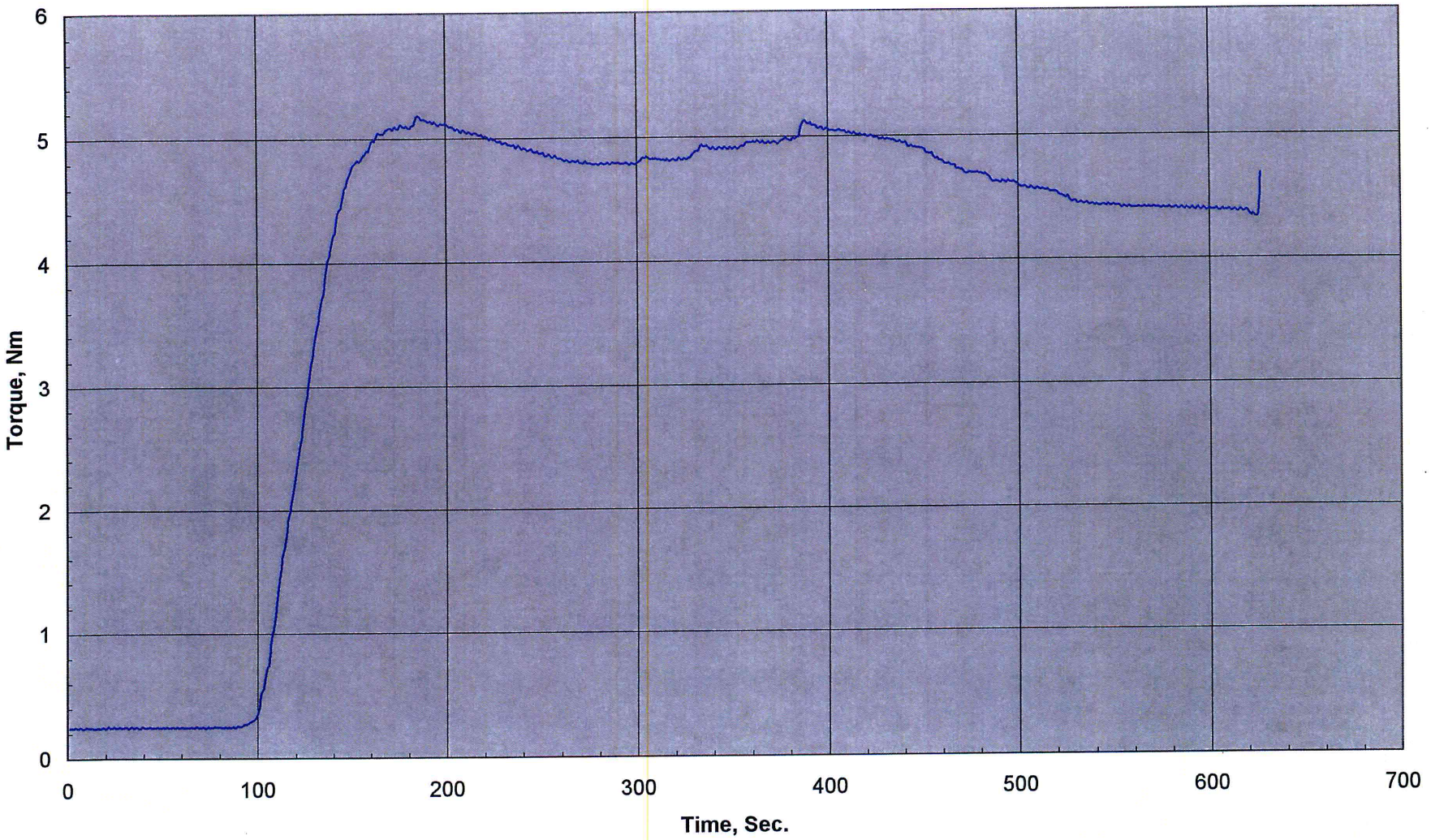
1N/M^2=1Pascal

UNDRAINED SHEAR STRENGTH, $c_u = 6M/7\pi D^3$

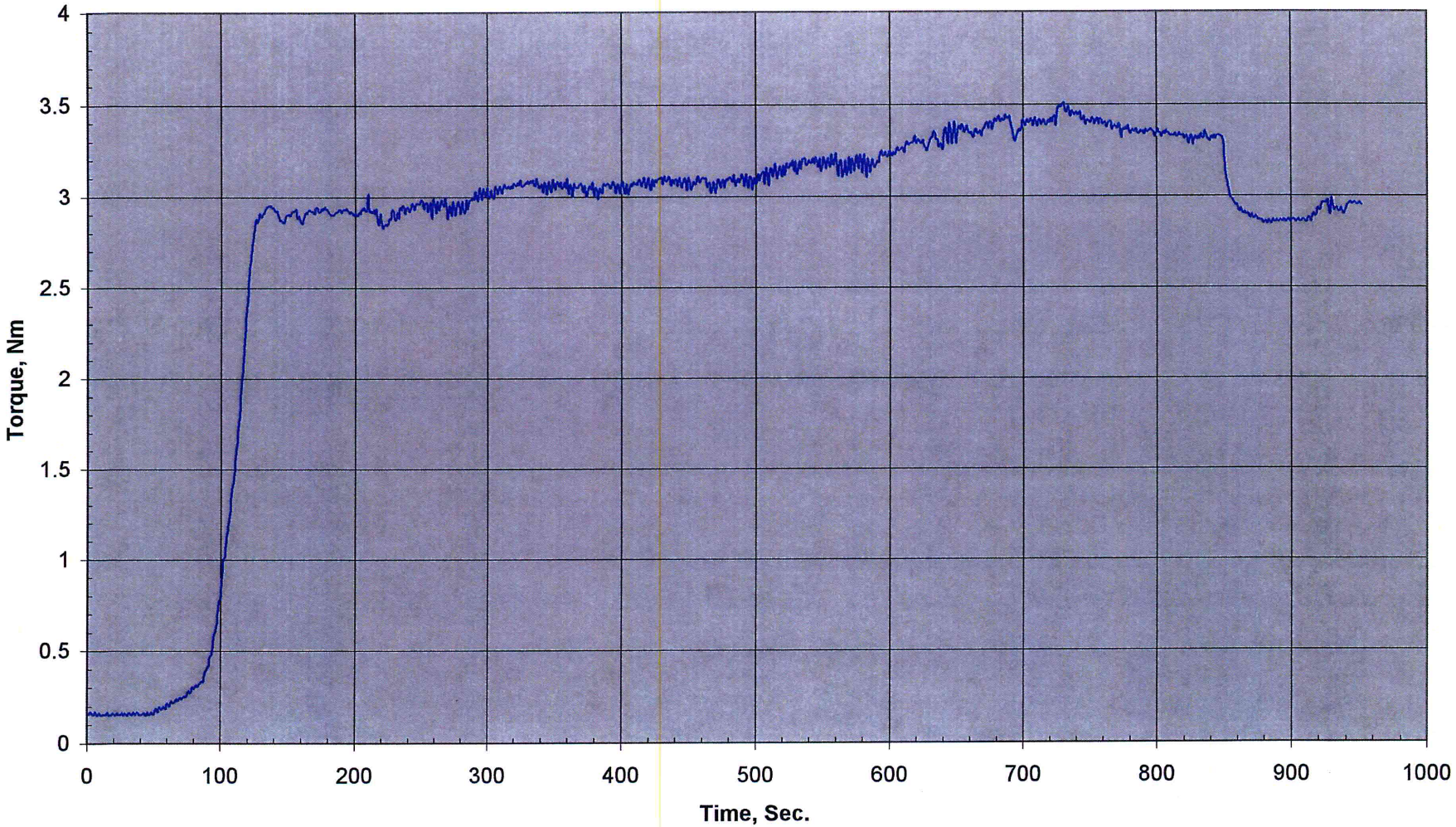
Where: M=Max. Recorded Torque, D= Vane Diiameter

DEPTH (M)	DEPTH (FT)	PEAK TORQUE READING (Nm)	SHEAR STRENGTH (N/m^2)	SHEAR STRENGTH (KIPS/FT^2)	REMOLDED PEAK IAL READIN (Nm)	REMOLDED SHEAR STRENGTH (kN/m^2)	REMOLDED SHEAR STRENGTH (KIPS/FT^2)	SENSITIVITY
7.47	24.5	5.16	8461.85	0.177	2.872	4709.77	0.098	1.8
8.47	27.8	8.824	14470.42	0.302	2.65	4345.72	0.091	3.3
30.94	101.5	74.304	121850.64	2.545				

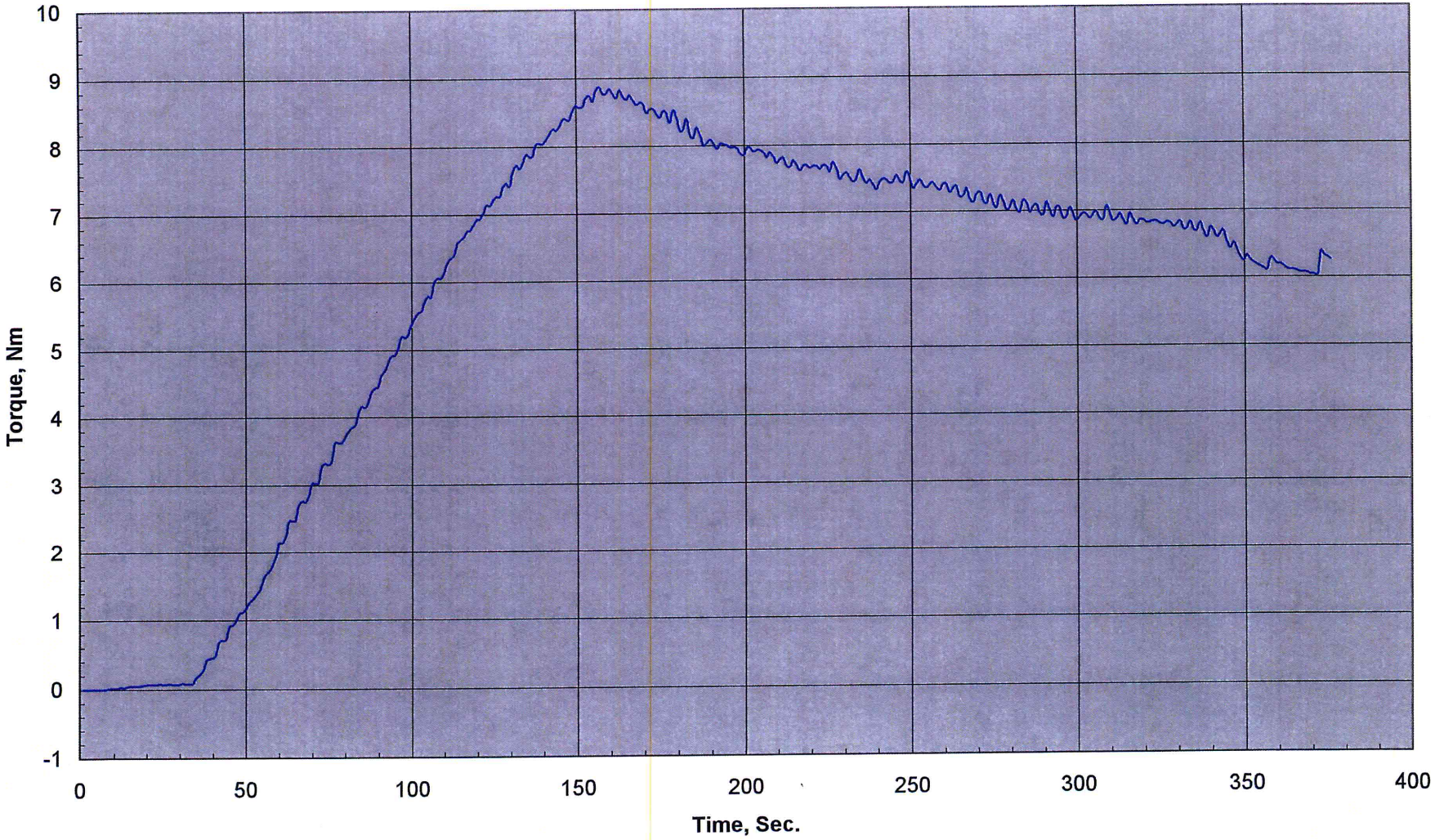
Torque vs Time
Boring 06-12 @ 24.5'



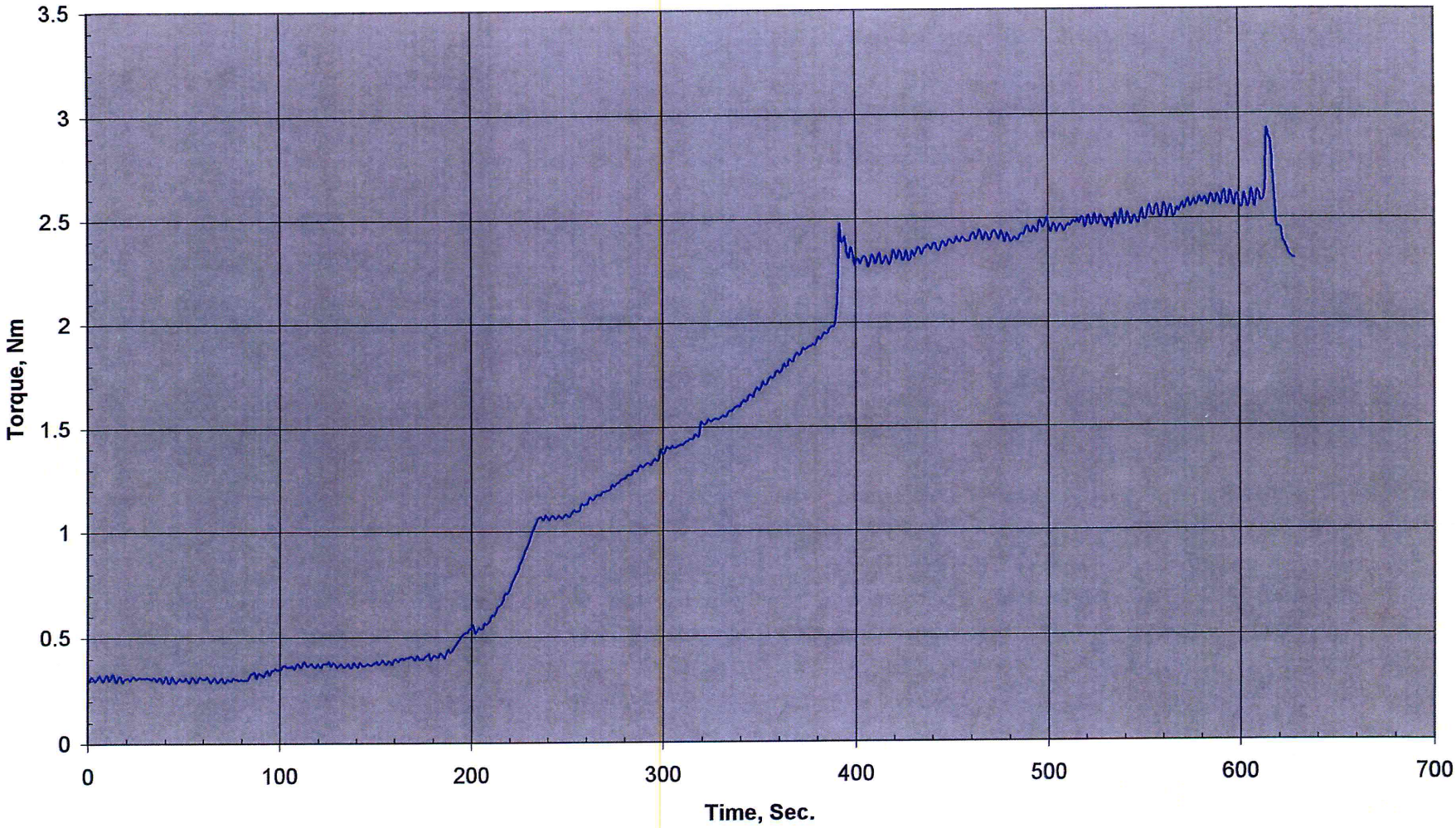
Torque vs Time
Boring 06-12 @ 24.5' Remolded



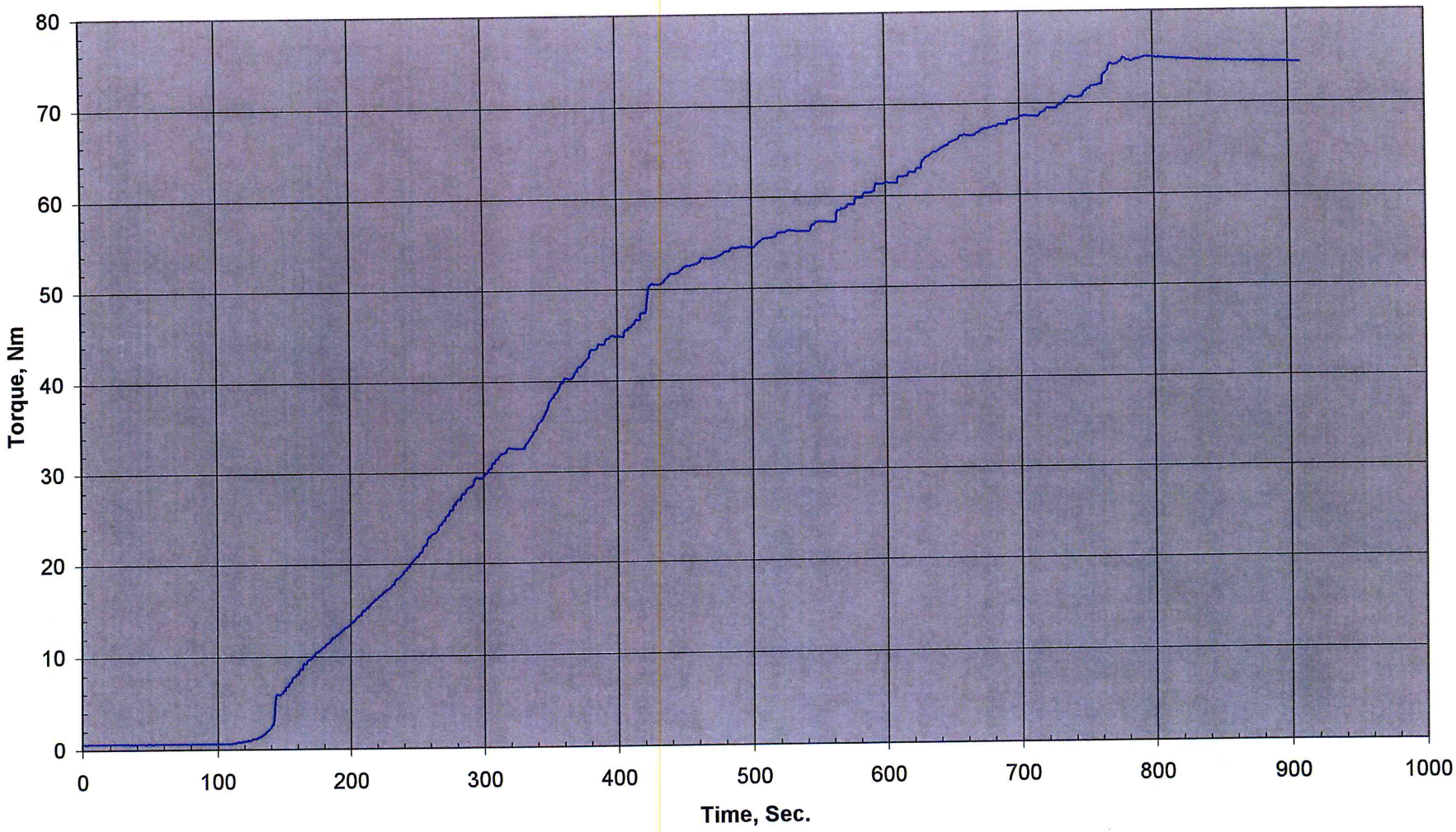
Torque vs Time
Boring 06-12 @ 27.8'



Torque vs Time
Boring 06-12 @ 27.8' Remolded



Torque vs Time
Boring 06-12 @ 101.5'



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DUMBARTON BRIDGE INVESTIGATION

BORINGS 06-02, 06-04, 06-05,

06-06, 06-07, 06-10 AND 06-14

SUSPENSION P & S VELOCITIES

April 30, 2007
Report 6554-01 Rev 01

DUMBARTON BRIDGE INVESTIGATION

BORINGS 06-02, 06-04, 06-05,

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SUSPENSION P & S VELOCITIES

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April 30, 2007
Report 6554-01 Rev 01

TABLE OF CONTENTS

INTRODUCTION 1

SCOPE OF WORK 2

SUSPENSION INSTRUMENTATION 3

SUSPENSION MEASUREMENT PROCEDURES 6

SUSPENSION DATA ANALYSIS 7

SUSPENSION RESULTS 9

SUMMARY

Discussion of Suspension Results 9

Quality Assurance 10

Data Reliability 10

FIGURES

Figure 1. Concept illustration of P-S logging system 11

Figure 2. Example of filtered (1400 Hz lowpass) record 12

Figure 3. Example of unfiltered record 13

Figure 4. Boring 06-02, Suspension P- and S_H-wave velocities 14

Figure 5. Boring 06-04, Suspension P- and S_H-wave velocities 17

Figure 6. Boring 06-05, Suspension P- and S_H-wave velocities 20

Figure 7. Boring 06-06, Suspension P- and S_H-wave velocities 23

Figure 8. Boring 06-07, Suspension P- and S_H-wave velocities 26

Figure 9. Boring 06-10, Suspension P- and S_H-wave velocities 29

Figure 10. Boring 06-14, Suspension P- and S_H-wave velocities 32

TABLES

Table 1. Boring locations and logging dates 2

Table 2. Logging dates and depth ranges 6

Table 3. Boring 06-02, Suspension R1-R2 depth, pick times, and velocities 15

Table 4. Boring 06-04, Suspension R1-R2 depth, pick times, and velocities 18

Table 5. Boring 06-05, Suspension R1-R2 depth, pick times, and velocities 21

Table 6. Boring 06-06, Suspension R1-R2 depth, pick times, and velocities 24

Table 7. Boring 06-07, Suspension R1-R2 depth, pick times, and velocities 27

Table 8. Boring 06-10, Suspension R1-R2 depth, pick times, and velocities 30

Table 9. Boring 06-14, Suspension R1-R2 depth, pick times, and velocities 33

APPENDICES

APPENDIX A: Suspension velocity measurement quality assurance suspension source to receiver analysis results

APPENDIX A FIGURES

Figure A-1. Boring 06-02, R1 - R2 high resolution analysis and S-R1 quality assurance analysis P- and S_H-wave data A-2

Figure A-2. Boring 06-04, R1 - R2 high resolution analysis and S-R1 quality assurance analysis P- and S_H-wave data A-4

Figure A-3. Boring 06-05, R1 - R2 high resolution analysis and S-R1 quality assurance analysis P- and S_H-wave data A-6

Figure A-4. Boring 06-06, R1 - R2 high resolution analysis and S-R1 quality assurance analysis P- and S_H-wave data A-8

Figure A-5. Boring 06-07, R1 - R2 high resolution analysis and S-R1 quality assurance analysis P- and S_H-wave data A-10

Figure A-6. Boring 06-10, R1 - R2 high resolution analysis and S-R1 quality assurance analysis P- and S_H-wave data A-12

Figure A-7. Boring 06-14, R1 - R2 high resolution analysis and S-R1 quality assurance analysis P- and S_H-wave data A-14

APPENDIX A TABLES

Table A-1. Boring 06-02, R1 - R2 high resolution analysis and S-R1 quality assurance analysis P- and S_H-wave data A-3

Table A-2. Boring 06-04, R1 - R2 high resolution analysis and S-R1 quality assurance analysis P- and S_H-wave data A-5

Table A-3. Boring 06-05, R1 - R2 high resolution analysis and S-R1 quality assurance analysis P- and S_H-wave data A-7

Table A-4. Boring 06-06, R1 - R2 high resolution analysis and S-R1 quality assurance analysis P- and S_H-wave data A-9

Table A-5. Boring 06-07, R1 - R2 high resolution analysis and S-R1 quality assurance analysis P- and S_H-wave data A-11

Table A-6. Boring 06-10, R1 - R2 high resolution analysis and S-R1 quality assurance analysis P- and S_H-wave data A-13

Table A-7. Boring 06-14, R1 - R2 high resolution analysis and S-R1 quality assurance analysis P- and S_H-wave data A-15

APPENDIX B: OYO Model 170 suspension velocity logging system NIST traceable calibration procedure

INTRODUCTION

OYO suspension velocity measurements were performed in two land and five marine borings beneath the Dumbarton Bridge, as a component of the bridge investigation. Suspension logging data acquisition was performed between November 28, 2006 and January 26, 2007 by Rob Steller of GEOVision. The work was performed under subcontract with Earth Mechanics, Inc. (EMI), with Jody Castle as the point of contact for EMI.

This report describes the field measurements, data analysis, and results of this work.

SCOPE OF WORK

This report presents the results of suspension velocity measurements collected between November 28, 2006 and January 26, 2007, in the uncased borings designated 06-02 through 06-14, as detailed below. The purpose of these studies was to supplement stratigraphic information obtained during EMI's soil sampling program and to acquire shear wave velocities and compressional wave velocities as a function of depth, which, in turn, can be used to characterize soil condition and calculate site response.

BORING DESIGNATION	LOCATION	DATE LOGGED	APPROX ELEV. (NGVD) (FEET)	COORDINATES (NAD83)	
				EASTING (FT)	NORTHING (FT)
06-02	LAND	11/28/06	+14.4	6,089,395.5	2,008,349.4
06-04	MARINE	1/19/07	-3.2	6,090,108.0	2,009,180.0
06-05	MARINE	1/24/07	-4.0	6,090,878.8	2,009,778.70
06-06	MARINE	1/17/07	-54.3	6,091,542.6	2,010,316.8
06-07	MARINE	1/18/07	-51.8	6,091,997.4	2,010,725.1
06-10	MARINE	1/25-26/07	-2.8	6,093,452.3	2,011,910.7
06-14	LAND	11/29/06	+5.6	6,095,221.5	2,013,610.8

(Survey data provided by EMI 4/26/07 cjd)

Table 1. Boring locations and logging dates

The OYO Model 170 Suspension Logging Recorder and Suspension Logging Probe were used to obtain in-situ horizontal shear and compressional wave velocity measurements at 1.64 ft intervals. The acquired data was analyzed and a profile of velocity versus depth was produced for both compressional and horizontally polarized shear waves.

A detailed reference for the velocity measurement techniques used in this study is:

> Guidelines for Determining Design Basis Ground Motions, Report TR-102293, Electric Power Research Institute, Palo Alto, California, November 1993, Sections 7 and 8.

SUSPENSION INSTRUMENTATION

Suspension soil velocity measurements were performed using the Model 170 Suspension Logging system, manufactured by OYO Corporation. This system directly determines the average velocity of a 3.28 ft high segment of the soil column surrounding the boring of interest by measuring the elapsed time between arrivals of a wave propagating upward through the soil column. The receivers that detect the wave, and the source that generates the wave, are moved as a unit in the boring producing relatively constant amplitude signals at all depths.

The suspension system probe consists of a combined reversible polarity solenoid horizontal shear-wave source (S_H) and compressional-wave source (P), joined to two biaxial receivers by a flexible isolation cylinder, as shown in Figure 1. The separation of the two receivers is 3.28 ft, allowing average wave velocity in the region between the receivers to be determined by inversion of the wave travel time between the two receivers. The total length of the probe as used in this survey is 19 ft, with the center point of the receiver pair 12.1 ft above the bottom end of the probe. The probe receives control signals from, and sends the amplified receiver signals to, instrumentation on the surface via an armored 7 conductor cable. The cable is wound onto the drum of a winch and is used to support the probe. Cable travel is measured to provide probe depth data.

The entire probe is suspended by the cable and centered in the boring by nylon "whiskers", therefore, source motion is not coupled directly to the boring walls; rather, the source motion creates a horizontally propagating impulsive pressure wave in the fluid filling the boring and surrounding the source. This pressure wave is converted to P and S_H-waves in the surrounding soil and rock as it impinges upon the boring wall. These waves propagate through the soil and rock surrounding the boring, in turn causing a pressure wave to be generated in the fluid surrounding the receivers as the soil waves pass their location. Separation of the P and S_H-waves at the receivers is performed using the following steps:

1. Orientation of the horizontal receivers is maintained parallel to the axis of the source, maximizing the amplitude of the recorded S_H -wave signals.
2. At each depth, S_H-wave signals are recorded with the source actuated in opposite directions, producing S_H-wave signals of opposite polarity, providing a characteristic S_H-wave signature distinct from the P-wave signal.
3. The 7.0 ft separation of source and receiver 1 permits the P-wave signal to pass and damp significantly before the slower S_H-wave signal arrives at the receiver. In faster soils or rock, the isolation cylinder is extended to allow greater separation of the P- and S_H-wave signals.
4. In saturated soils, the received P-wave signal is typically of much higher frequency than the received S_H-wave signal, permitting additional separation of the two signals by low pass filtering.
5. Direct arrival of the original pressure pulse in the fluid is not detected at the receivers because the wavelength of the pressure pulse in fluid is significantly greater than the dimension of the fluid annulus surrounding the probe (foot versus inch scale), preventing significant energy transmission through the fluid medium.

In operation, a distinct, repeatable pattern of impulses is generated at each depth as follows:

1. The source is fired in one direction producing dominantly horizontal shear with some vertical compression, and the signals from the horizontal receivers situated parallel to the axis of motion of the source are recorded.
2. The source is fired again in the opposite direction and the horizontal receiver signals are recorded.
3. The source is fired again and the vertical receiver signals are recorded. The repeated source pattern facilitates the picking of the P and S_H-wave arrivals; reversal of the source changes the polarity of the S_H-wave pattern but not the P-wave pattern.

The data from each receiver during each source activation is recorded as a different channel on the recording system. The Model 170 has six channels (two simultaneous recording channels), each with a 12 bit 1024 sample record. The recorded data is displayed on a CRT display and on paper tape output as six channels with a common time scale. Data is stored on 3.5 inch floppy diskettes for further processing. Up to 8 sampling sequences can be summed to improve the signal to noise ratio of the signals.

Review of the displayed data on the CRT or paper tape allows the operator to set the gains, filters, delay time, pulse length (energy), sample rate, and summing number to optimize the quality of the data before recording. Verification of the calibration of the Model 170 digital recorder is performed every twelve months using a NIST traceable frequency source and counter, as outlined in Appendix B.

SUSPENSION MEASUREMENT PROCEDURES

The borings were logged uncased, filled with bentonite or polymer based drilling fluid. The boring probe was positioned with the mid-point of the receiver spacing at grade or deck level, and the mechanical and electronic depth counters were set to zero. The probe was lowered to the bottom of the boring, stopping at 1.64 ft intervals to collect data, as summarized below.

At each measurement depth the measurement sequence of two opposite horizontal records and one vertical record was performed, and the gains were adjusted as required. The data from each depth was printed on paper tape, checked, and recorded on diskette before moving to the next depth.

Upon completion of the measurements, the probe zero depth indication at grade or deck level was verified prior to removal from the boring.

BORING NUMBER	RUN NUMBER	DEPTH RANGE (FEET)	DEPTH AS DRILLED (FEET)	LOST TO SLOUGH/COLLAPSE (FEET)	SAMPLE INTERVAL (FEET)	DATE LOGGED
06-02	1	21.3 – 136.2	150.0	1.7	1.64	11/28/06
06-04	1	101.7 – 153.2	167.0	1.7	1.64	1/19/07
06-04	2	45.9 – 103.4		0	1.64	1/19/07
06-05	1	90.2 – 211.6	250.0	26.3	1.64	1/24/07
06-06	1	219.8 – 251.0	268.0	4.9	1.64	1/17/07
06-06	2	95.1 – 200.0		19.8	1.64	1/17/07
06-07	1	210.0 – 231.3	270.0	26.6	1.64	1/18/07
06-07	2	86.9 - 149.3		60.7	1.64	1/18/07
06-10	1	109.9 – 152.6	164.0	0	1.64	1/25-26/07
06-10	2	49.2 – 54.1		0	1.64	1/25-26/07
06-10	3	50.9 – 106.6		3.3	1.64	1/25-26/07
06-14	1	14.8 n- 136.2	150.0	1.7	1.64	11/29/06

Table 2. Logging dates and depth ranges

SUSPENSION DATA ANALYSIS

The recorded digital waveforms were analyzed to locate the first minima on the vertical axis records, indicating the arrival of P-wave energy. The difference in travel time between receiver 1 and receiver 2 (R1-R2) arrivals was used to calculate the P-wave velocity for that 3.28 ft segment of the soil column. When observable, P-wave arrivals on the horizontal axis records were used to verify the velocities determined from the vertical axis data.

The P-wave velocity calculated from the travel time over the 7.0 ft interval from source to receiver 1 (S-R1) was calculated and plotted for quality assurance of the velocity derived from the travel time between receivers. In this analysis, the depth values as recorded were increased by 5.15 ft to correspond to the mid-point of the 7.0 ft S-R1 interval, as illustrated in Figure 1. Travel times were obtained by picking the first break of the P-wave signal at receiver 1 and subtracting 3.85 milliseconds, the calculated and experimentally verified delay from source trigger pulse (beginning of record) to source impact. This delay corresponds to the duration of acceleration of the solenoid before impact.

The recorded digital records were studied to establish the presence of clear S_H-wave pulses, as indicated by the presence of opposite polarity pulses on each pair of horizontal records. Ideally, the S_H-wave signals from the 'normal' and 'reverse' source pulses are very nearly inverted images of each other. Digital FFT - IFFT lowpass filtering was used to remove the higher frequency P-wave signal from the S_H-wave signal. Different filter cutoffs were used to separate P- and S_H-waves at different depths, ranging from 500 Hz in the slowest zones to 4000 Hz in the regions of highest velocity. At each depth, the filter frequency was selected to be at least twice the fundamental frequency of the S_H-wave signal being filtered.

Generally, the first maxima was picked for the 'normal' signals and the first minima for the 'reverse' signals, although other points on the waveform were used if the first pulse was distorted. The absolute arrival time of the 'normal' and 'reverse' signals may vary by +/- 0.2 milliseconds, due to differences in the actuation time of the solenoid source caused by constant mechanical bias in the source or by boring inclination. This variation does not affect the R1-R2 velocity determinations, as the differential time is measured between arrivals of waves created by the same source actuation. The final velocity value is the average of the values obtained from the 'normal' and 'reverse' source actuations.

As with the P-wave data, S_H-wave velocity calculated from the travel time over the 7.0 ft interval from source to receiver 1 was calculated and plotted for verification of the velocity derived from the travel time between receivers. In this analysis, the depth values were increased by 5.15 ft to correspond to the mid-point of the 7.0 ft S-R1 interval. Travel times were obtained by picking the first break of the S_H-wave signal at the near receiver and subtracting 3.85 milliseconds, the calculated and experimentally verified delay from the beginning of the record at the source trigger pulse to source impact.

Figure 2 shows an example of R1 - R2 measurements on a sample filtered suspension record. In Figure 2, the time difference over the 3.28 ft interval of 1.88 milliseconds for the horizontal signals is equivalent to an S_H-wave velocity of 1745 ft/sec. Whenever possible, time differences were determined from several phase points on the S_H-waveform records to verify the data obtained from the first arrival of the S_H-wave pulse. Figure 3 displays the same record before filtering of the S_H-waveform record with an 1400 Hz FFT - IFFT digital lowpass filter, illustrating the presence of higher frequency P-wave energy at the beginning of the record, and distortion of the lower frequency S_H-wave by residual P-wave signal.

SUSPENSION RESULTS

Suspension R1-R2 P- and S_H-wave velocities are plotted in Figures 4 through 10. The suspension velocity data shown in these figures are presented in Tables 3 through 9. P- and S_H-wave velocity data from R1-R2 analysis and quality assurance analysis of S-R1 data are plotted together in Figures A1 through A7 to aid in visual comparison. It must be noted that R1-R2 data is an average velocity over a 3.28 ft segment of the soil column; S-R1 data is an average over 7.0 ft, creating a significant smoothing relative to the R1-R2 plots. S-R1 data are presented in Tables A1 through A7. Good correspondence between the shapes of the P- and S_H-wave velocity curves is observed for both all these data sets. The velocities derived from S-R1 and R1-R2 data are in excellent agreement, providing verification of the higher resolution R1-R2 data.

Calibration procedures and records for the suspension measurement system are presented in Appendix B.

SUMMARY

Discussion of Suspension Results

Both P- and S_H-wave velocities were measured using the OYO Suspension Method in two uncased land borings and five uncased marine borings to depths up to 251.0 ft beneath the Dumbarton Bridge. All borings were located adjacent to a heavily traveled highway bridge, but no significant signal contamination from ambient vibration was observed.

Quality Assurance

These velocity measurements were performed using industry-standard or better methods for both measurements and analyses. All work was performed under GEOVision quality assurance procedures, which include:

- Use of NIST-traceable calibrations, where applicable, for field and laboratory instrumentation
- Use of standard field data logs
- Use of independent verification of data by comparison of receiver-to-receiver and source-to-receiver velocities
- Independent review of calculations and results by a registered professional engineer, geologist, or geophysicist.

Data Reliability

P- and S_H-wave velocity measurement using the Suspension Method gives average velocities over a 3.28 ft interval of depth. This high resolution results in the scatter of values shown in the graphs. Individual measurements are very reliable with estimated precision of +/- 5%. Standardized field procedures and quality assurance checks add to the reliability of these data.

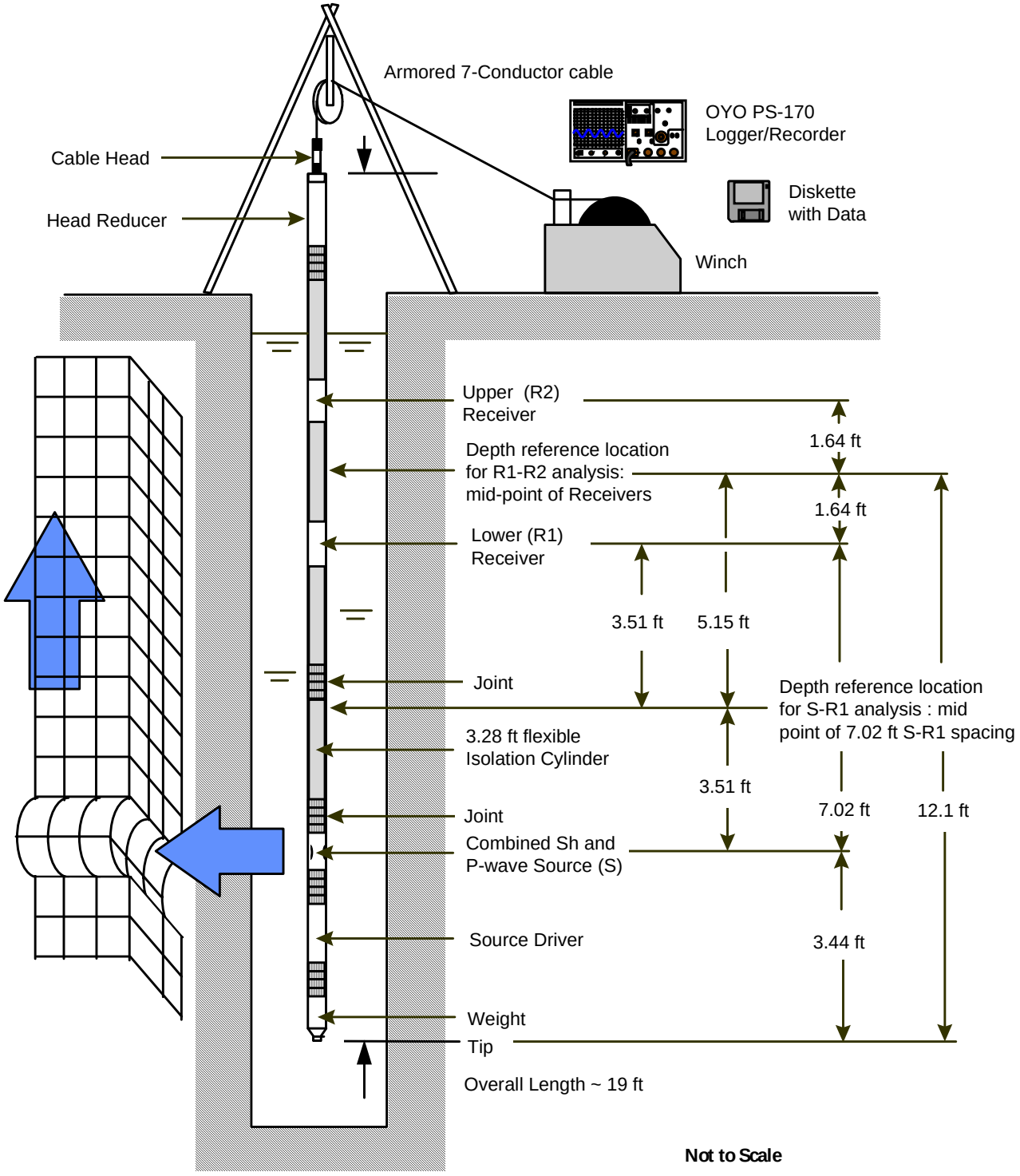


Figure 1. Concept illustration of P-S logging system

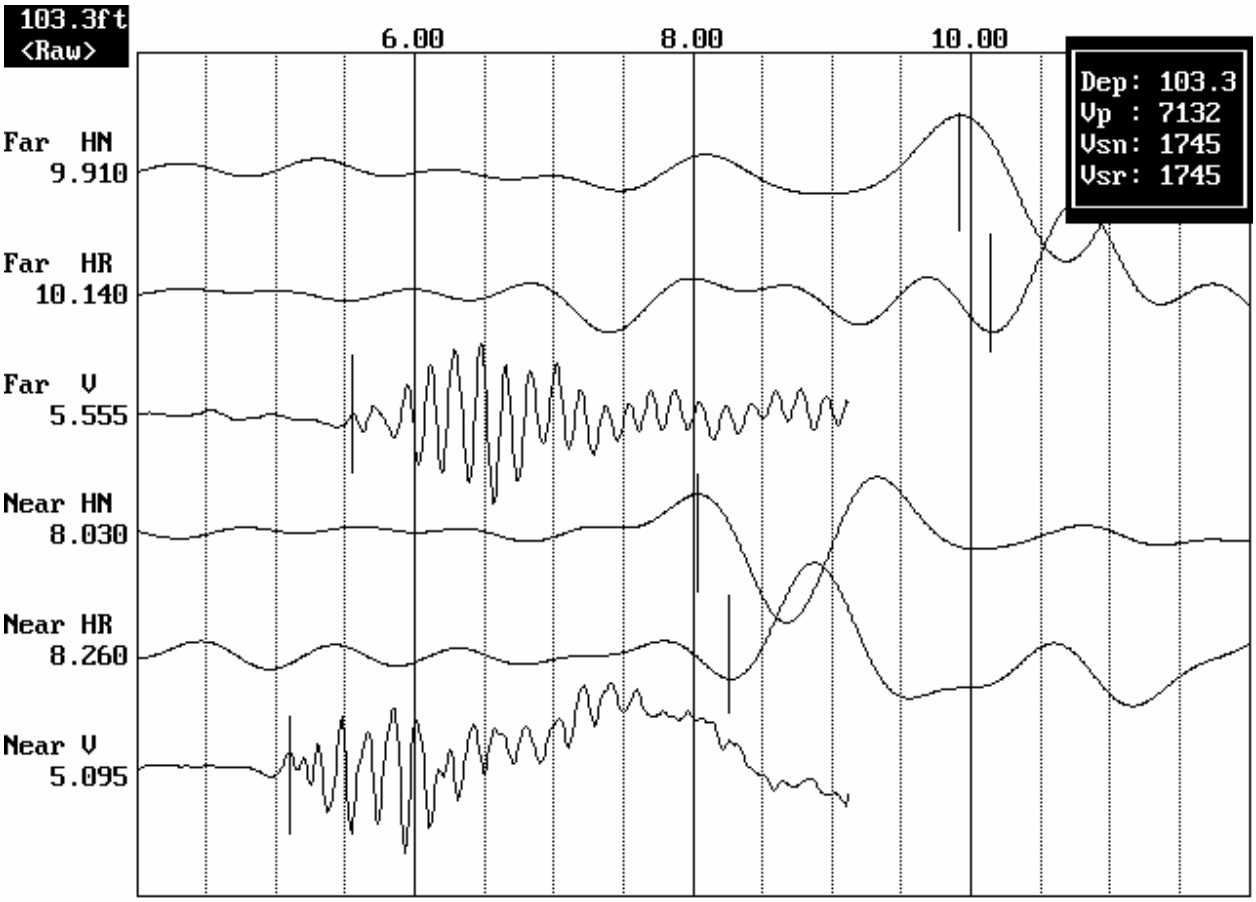


Figure 2. Example of filtered (1400 Hz lowpass) record

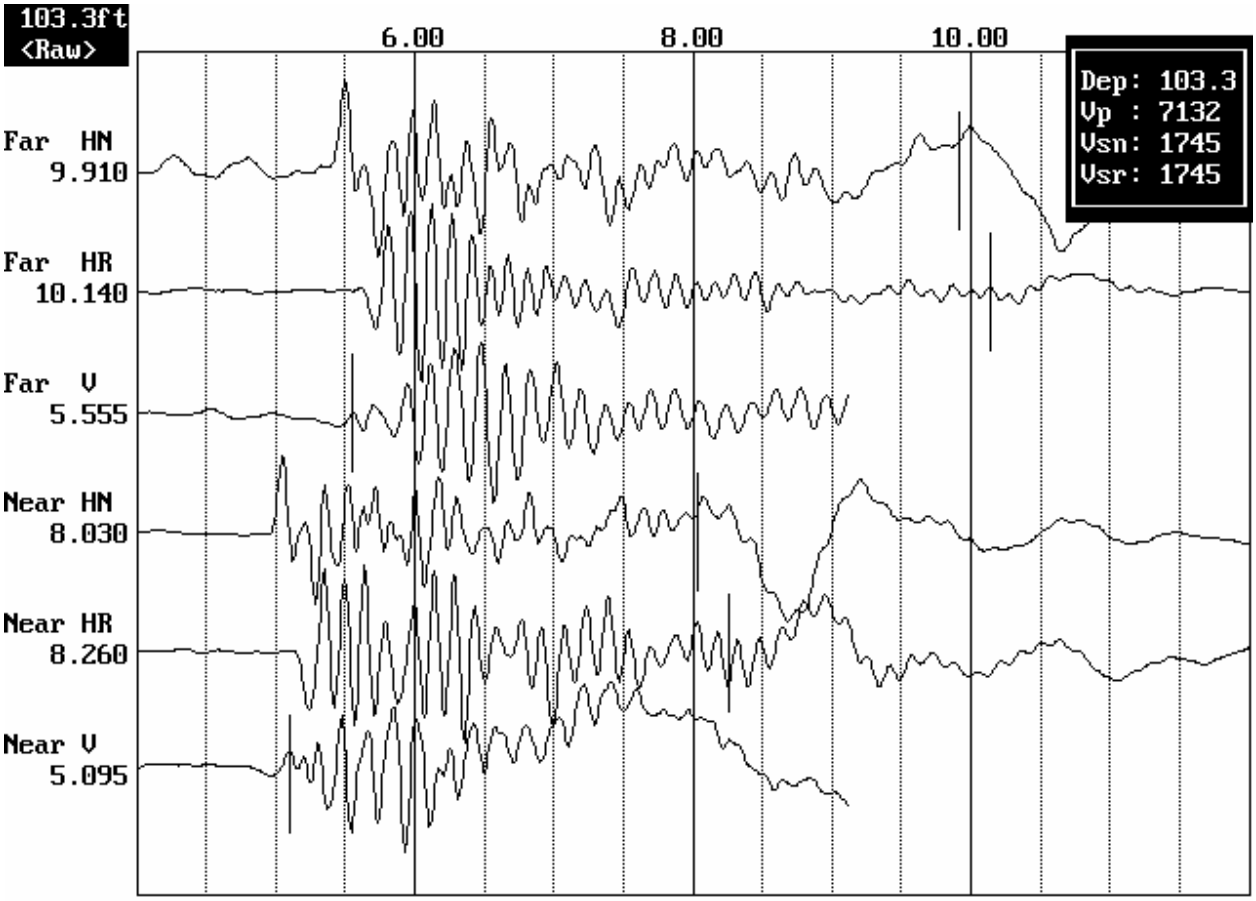


Figure 3. Example of unfiltered record

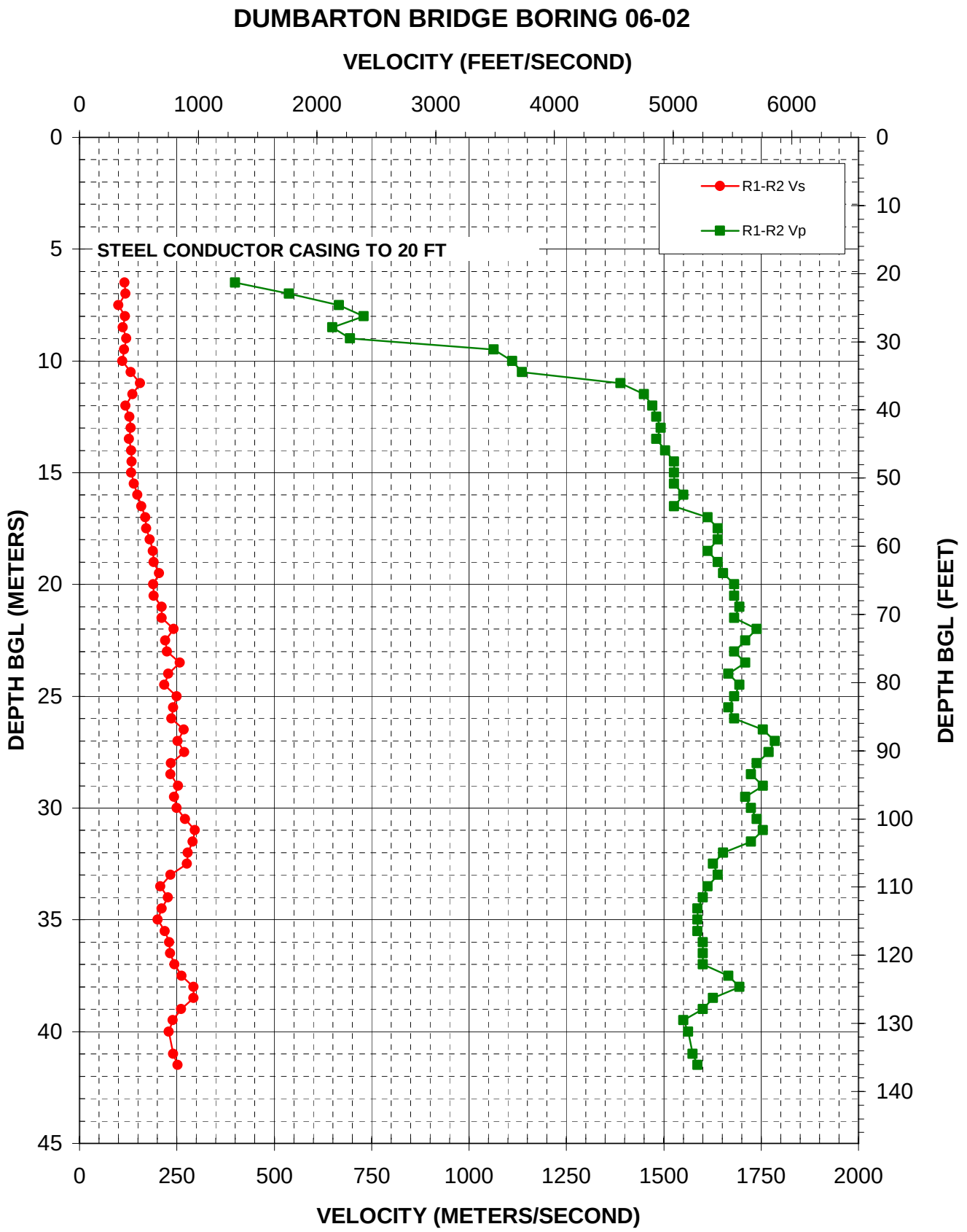


Figure 4. Boring 06-02, Suspension P- and S_H-wave velocities

Depth		Pick Times						Velocity			
(m)	(feet)	Far-Hn (millisec)	Far-Hr (millisec)	Far-V (millisec)	Near-Hn (millisec)	Near-Hr (millisec)	Near-V (millisec)	$V\text{-}S_H$ (m/sec)	V-P (m/sec)	$V\text{-}S_H$ (ft/sec)	V-P (ft/sec)
6.5	21.3	35.80	35.70	9.55	27.00	27.20	7.05	116	400	379	1312
7.0	23.0	31.65	34.10	8.72	23.30	25.45	6.86	118	538	386	1764
7.5	24.6	32.85	32.80	8.70	22.80	22.90	7.20	100	667	329	2187
8.0	26.2	30.45	30.45	8.05	21.80	21.95	6.68	117	730	383	2395
8.5	27.9	29.75	29.60	8.00	20.60	20.70	6.46	111	649	364	2130
9.0	29.5	28.20	28.30	7.26	19.90	19.90	5.82	120	694	393	2278
9.5	31.2	28.40	28.55	6.64	19.70	19.85	5.70	115	1064	377	3490
10.0	32.8	28.35	28.40	6.30	19.20	19.40	5.40	110	1111	362	3645
10.5	34.4	27.40	27.50	6.31	19.80	19.95	5.43	132	1136	433	3728
11.0	36.1	27.65	27.70	6.16	21.20	21.30	5.44	156	1389	511	4557
11.5	37.7	27.55	27.65	6.18	20.20	20.35	5.49	137	1449	448	4755
12.0	39.4	28.05	28.20	6.14	19.60	19.75	5.46	118	1471	388	4825
12.5	41.0	27.85	27.90	6.14	20.00	20.10	5.47	128	1481	419	4861
13.0	42.7	26.90	27.00	6.12	19.25	19.40	5.45	131	1493	430	4897
13.5	44.3	26.80	26.90	6.11	18.90	19.05	5.43	127	1481	417	4861
14.0	45.9	26.25	26.25	6.05	18.70	18.75	5.39	133	1504	436	4934
14.5	47.6	25.50	25.55	6.07	18.00	18.15	5.41	134	1527	440	5009
15.0	49.2	24.95	25.05	6.04	17.45	17.55	5.39	133	1527	437	5009
15.5	50.9	24.35	24.35	6.03	17.15	17.20	5.37	139	1527	457	5009
16.0	52.5	23.80	23.85	6.00	17.05	17.10	5.36	148	1550	486	5087
16.5	54.1	23.20	23.25	6.01	16.85	17.00	5.35	159	1527	521	5009
17.0	55.8	22.40	22.45	5.98	16.45	16.55	5.36	169	1613	554	5292
17.5	57.4	21.70	21.80	5.94	15.85	15.95	5.33	171	1639	561	5378
18.0	59.1	20.70	20.85	5.94	15.15	15.30	5.33	180	1639	591	5378
18.5	60.7	20.20	20.25	5.92	14.90	14.95	5.30	189	1613	619	5292
19.0	62.3	19.65	19.75	5.83	14.40	14.50	5.22	190	1639	625	5378
19.5	64.0	19.05	19.10	5.82	14.10	14.25	5.22	204	1653	670	5423
20.0	65.6	18.75	18.90	5.88	13.50	13.60	5.29	190	1681	622	5514
20.5	67.3	18.75	18.90	5.87	13.50	13.65	5.28	190	1681	625	5514
21.0	68.9	17.65	17.85	5.87	12.95	13.10	5.28	212	1695	694	5561
21.5	70.5	17.70	17.85	5.85	13.00	13.10	5.26	212	1681	694	5514
22.0	72.2	17.42	17.58	5.81	13.30	13.42	5.23	242	1739	792	5706
22.5	73.8	17.14	17.32	5.87	12.64	12.76	5.29	221	1709	724	5608
23.0	75.5	17.32	17.44	5.87	12.86	13.00	5.28	225	1681	737	5514
23.5	77.1	17.10	17.22	5.86	13.22	13.34	5.28	258	1709	846	5608
24.0	78.7	17.38	17.52	5.86	13.00	13.14	5.26	228	1667	749	5468
24.5	80.4	17.70	17.84	5.88	13.10	13.26	5.29	218	1695	715	5561
25.0	82.0	17.12	17.20	5.83	13.12	13.18	5.23	249	1681	818	5514
25.5	83.7	17.10	17.20	5.83	12.92	13.06	5.23	240	1667	789	5468
26.0	85.3	17.36	17.46	5.83	13.14	13.20	5.23	236	1681	774	5514
26.5	86.9	16.82	16.94	5.81	13.12	13.18	5.24	268	1754	880	5756
27.0	88.6	17.12	17.20	5.84	13.12	13.28	5.28	253	1786	828	5859
27.5	90.2	17.08	17.10	5.87	13.32	13.42	5.31	269	1770	882	5807
28.0	91.9	16.48	16.62	5.82	12.26	12.34	5.25	235	1739	772	5706
28.5	93.5	16.10	16.26	5.80	11.86	11.94	5.22	234	1724	767	5657
29.0	95.1	15.56	15.66	5.79	11.60	11.72	5.22	253	1754	831	5756
29.5	96.8	15.64	15.76	5.79	11.62	11.54	5.21	243	1709	796	5608
30.0	98.4	15.82	15.94	5.82	11.82	11.94	5.24	250	1724	820	5657
30.5	100.1	16.20	16.30	5.83	12.48	12.66	5.26	272	1739	892	5706
31.0	101.7	17.00	17.10	5.84	13.62	13.74	5.27	297	1754	974	5756

Table 3. Boring 06-02, Suspension R1-R2 depth, pick times, and velocities

Depth		Pick Times						Velocity			
(m)	(feet)	Far-Hn (millisec)	Far-Hr (millisec)	Far-V (millisec)	Near-Hn (millisec)	Near-Hr (millisec)	Near-V (millisec)	$V\text{-}S_H$ (m/sec)	V-P (m/sec)	$V\text{-}S_H$ (ft/sec)	V-P (ft/sec)
31.5	103.3	17.74	17.90	5.73	14.30	14.46	5.15	291	1724	954	5657
32.0	105.0	18.12	18.26	5.88	14.56	14.62	5.27	278	1653	911	5423
32.5	106.6	18.30	18.44	5.90	14.70	14.78	5.28	275	1626	904	5335
33.0	108.3	18.50	18.58	5.89	14.24	14.30	5.28	234	1639	768	5378
33.5	109.9	18.56	18.62	5.90	13.70	13.86	5.28	208	1613	682	5292
34.0	111.5	18.18	18.24	5.91	13.78	13.82	5.28	227	1600	744	5249
34.5	113.2	18.04	18.12	5.91	13.30	13.40	5.28	211	1587	694	5208
35.0	114.8	17.90	17.98	5.91	12.90	13.00	5.28	200	1587	657	5208
35.5	116.5	17.00	17.12	5.89	12.46	12.54	5.26	219	1587	719	5208
36.0	118.1	16.44	16.56	5.88	12.10	12.22	5.25	230	1600	756	5249
36.5	119.8	16.30	16.38	5.89	12.00	12.10	5.26	233	1600	765	5249
37.0	121.4	16.30	16.38	5.86	12.20	12.28	5.24	244	1600	800	5249
37.5	123.0	16.08	16.14	5.87	12.24	12.34	5.27	262	1667	859	5468
38.0	124.7	15.84	16.00	5.88	12.44	12.58	5.29	293	1695	962	5561
38.5	126.3	16.04	16.14	5.90	12.62	12.72	5.29	292	1626	959	5335
39.0	128.0	16.44	16.56	5.91	12.62	12.72	5.29	261	1600	857	5249
39.5	129.6	16.74	16.86	5.94	12.58	12.68	5.30	240	1550	787	5087
40.0	131.2	17.04	17.16	5.96	12.68	12.80	5.32	229	1563	752	5126
41.0	134.5	17.40	17.56	5.98	13.24	13.40	5.35	240	1575	789	5167
41.5	136.2	17.18	17.34	5.94	13.22	13.38	5.31	253	1587	828	5208

Table 3, continued. Boring 06-02, Suspension R1-R2 depth, pick times, and velocities

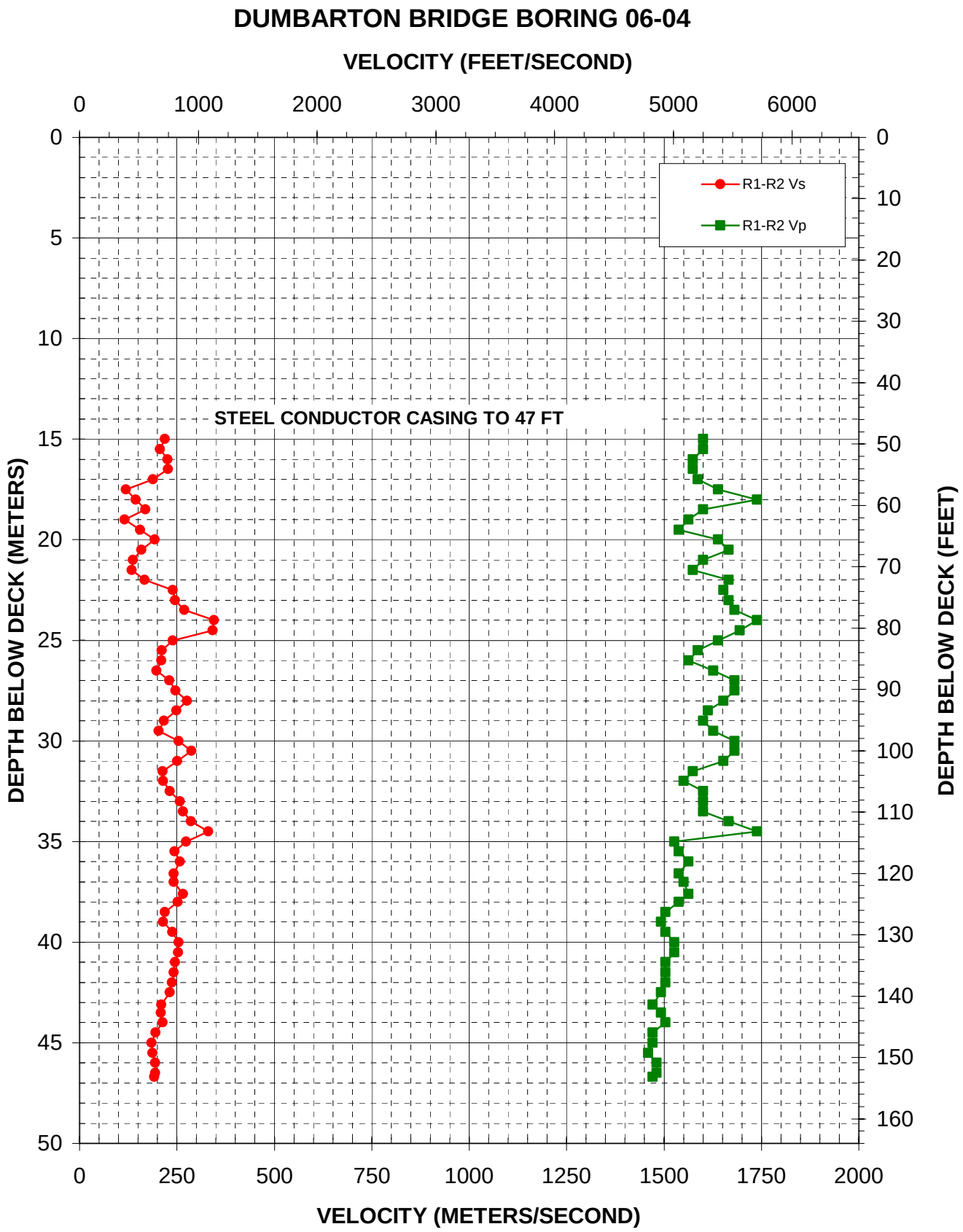


Figure 5. Boring 06-04, Suspension P- and S_H-wave velocities

Depth		Pick Times						Velocity			
(m)	(feet)	Far-Hn (millisec)	Far-Hr (millisec)	Far-V (millisec)	Near-Hn (millisec)	Near-Hr (millisec)	Near-V (millisec)	$V\text{-}S_H$ (m/sec)	V-P (m/sec)	$V\text{-}S_H$ (ft/sec)	V-P (ft/sec)
14.0	45.9										
14.5	47.6										
15.0	49.2	23.65	23.80	5.86	19.05	19.25	5.24	219	1600	717	5249
15.5	50.9	22.35	22.60	5.87	17.55	17.70	5.25	206	1600	676	5249
16.0	52.5	22.65	22.80	5.90	18.25	18.35	5.27	226	1575	741	5167
16.5	54.1		23.05	6.02		18.65	5.39	227	1575	746	5167
17.0	55.8	25.15	25.30	6.01	19.70	20.13	5.38	188	1587	618	5208
17.5	57.4		26.10	5.98		17.70	5.37	119	1639	391	5378
18.0	59.1	24.80	24.65	5.95	17.80	17.80	5.38	144	1739	474	5706
18.5	60.7	23.60	23.45	5.84	17.45	17.80	5.22	169	1600	556	5249
19.0	62.3	25.90	26.00	5.94	17.20	17.35	5.30	115	1563	378	5126
19.5	64.0	24.10	24.20	5.92	17.60	17.80	5.27	155	1538	509	5047
20.0	65.6	21.50	21.50	5.87	16.30	16.35	5.26	193	1639	634	5378
20.5	67.3	22.25	22.70	5.83	16.10	16.25	5.23	159	1667	521	5468
21.0	68.9	19.85	19.80	5.88	12.50	12.55	5.25	137	1600	449	5249
21.5	70.5	19.30	19.20	5.81	11.75	11.80	5.18	134	1575	439	5167
22.0	72.2	17.55	17.80	5.81	11.65	11.75	5.21	167	1667	549	5468
22.5	73.8	16.35	16.50	5.78	12.20	12.30	5.17	240	1653	786	5423
23.0	75.5	16.50	16.85	5.82	12.45	12.75	5.22	245	1667	805	5468
23.5	77.1	16.95	17.05	5.75	13.20	13.35	5.16	268	1681	881	5514
24.0	78.7	17.20	17.30	5.80	14.30	14.40	5.23	345	1739	1131	5706
24.5	80.4	17.45	17.60	5.82	14.55	14.65	5.23	342	1695	1122	5561
25.0	82.0	17.75	17.80	5.86	13.55	13.65	5.25	240	1639	786	5378
25.5	83.7	18.10	18.20	5.79	13.40	13.45	5.16	212	1587	694	5208
26.0	85.3	17.90	18.00	5.86	13.10	13.25	5.22	209	1562	687	5126
26.5	86.9	17.90	18.00	5.85	12.85	12.95	5.23	198	1626	650	5335
27.0	88.6	17.54	17.74	5.94	13.22	13.40	5.34	231	1681	758	5514
27.5	90.2	17.26	17.44	5.92	13.20	13.38	5.32	246	1681	808	5514
28.0	91.9	17.06	17.28	5.93	13.46	13.62	5.33	275	1653	904	5423
28.5	93.5	17.34	17.52	5.87	13.34	13.46	5.25	248	1613	814	5292
29.0	95.1	17.88	17.94	5.94	13.24	13.36	5.32	217	1600	712	5249
29.5	96.8	17.62	17.78	5.92	12.72	12.86	5.30	204	1626	668	5335
30.0	98.4	17.36	17.52	5.95	13.42	13.58	5.36	254	1681	833	5514
30.5	100.1	16.88	17.06	5.80	13.42	13.56	5.21	287	1681	943	5514
31.0	101.7	16.74	16.88	5.96	12.76	12.90	5.36	251	1653	824	5423
31.5	103.3	16.88	17.10	5.98	12.20	12.42	5.35	214	1575	701	5167
32.0	105.0	16.48	16.62	5.98	11.80	11.96	5.34	214	1550	703	5087
32.5	106.6	15.98	16.16	5.94	11.66	11.86	5.32	232	1600	761	5249
33.0	108.3	15.98	16.16	6.01	12.08	12.30	5.39	258	1600	846	5249
33.5	109.9	15.60	15.82	5.98	11.86	12.02	5.36	265	1600	870	5249
34.0	111.5	15.66	15.86	5.99	12.14	12.38	5.39	286	1667	937	5468
34.5	113.2	15.34	15.54	5.96	12.34	12.48	5.39	330	1739	1083	5706
35.0	114.8	15.50	15.70	5.98	11.84	12.04	5.32	273	1527	896	5009
35.5	116.5	16.08	16.28	6.01	12.00	12.16	5.36	244	1538	800	5047
36.0	118.1	16.08	16.30	5.98	12.22	12.40	5.34	258	1563	846	5126
36.6	120.1	16.40	16.56	6.01	12.26	12.44	5.36	242	1538	794	5047
37.0	121.4	16.44	16.56	6.01	12.26	12.48	5.36	242	1550	794	5087
37.6	123.4	16.18	16.34	6.00	12.46	12.52	5.36	265	1563	870	5126
38.0	124.7	16.12	16.30	6.02	12.16	12.34	5.37	253	1538	828	5047
38.5	126.3	16.26	16.40	5.97	11.68	11.86	5.30	219	1504	719	4934

Table 4. Boring 06-04, Suspension R1-R2 depth, pick times, and velocities

Depth		Pick Times						Velocity			
(m)	(feet)	Far-Hn (millisec)	Far-Hr (millisec)	Far-V (millisec)	Near-Hn (millisec)	Near-Hr (millisec)	Near-V (millisec)	$V\text{-}S_H$ (m/sec)	V-P (m/sec)	$V\text{-}S_H$ (ft/sec)	V-P (ft/sec)
39.0	128.0	16.24	16.38	6.00	11.56	11.72	5.33	214	1493	703	4897
39.5	129.6	15.82	16.02	6.04	11.62	11.82	5.37	238	1504	781	4934
40.0	131.2	15.76	15.94	6.03	11.84	12.00	5.38	254	1527	835	5009
40.5	132.9	16.14	16.28	6.02	12.18	12.34	5.37	253	1527	831	5009
41.0	134.5	16.58	16.78	6.05	12.50	12.72	5.39	246	1504	806	4934
41.5	136.2	16.84	17.02	6.04	12.70	12.90	5.38	242	1504	794	4934
42.0	137.8	17.20	17.36	6.06	12.98	13.16	5.39	238	1504	779	4934
42.5	139.4	17.78	17.98	6.08	13.46	13.66	5.41	231	1493	759	4897
43.1	141.4	18.64	18.84	6.09	13.88	14.06	5.41	210	1471	688	4825
43.5	142.7	19.02	19.18	6.08	14.24	14.40	5.41	209	1493	686	4897
44.0	144.4	19.14	19.26	6.07	14.44	14.60	5.41	214	1504	701	4934
44.5	146.0	19.44	19.62	6.10	14.30	14.50	5.42	195	1471	640	4825
45.0	147.6	19.66	19.80	6.09	14.24	14.42	5.41	185	1471	608	4825
45.5	149.3	19.74	19.88	6.08	14.40	14.56	5.39	188	1460	616	4790
46.0	150.9	19.72	19.88	6.10	14.56	14.74	5.42	194	1481	637	4861
46.5	152.6	19.78	19.88	6.07	14.62	14.76	5.40	195	1481	638	4861
46.7	153.2	19.84	20.00	6.08	14.62	14.78	5.40	192	1471	629	4825

Table 4, continued. Boring 06-04, Suspension R1-R2 depth, pick times, and velocities

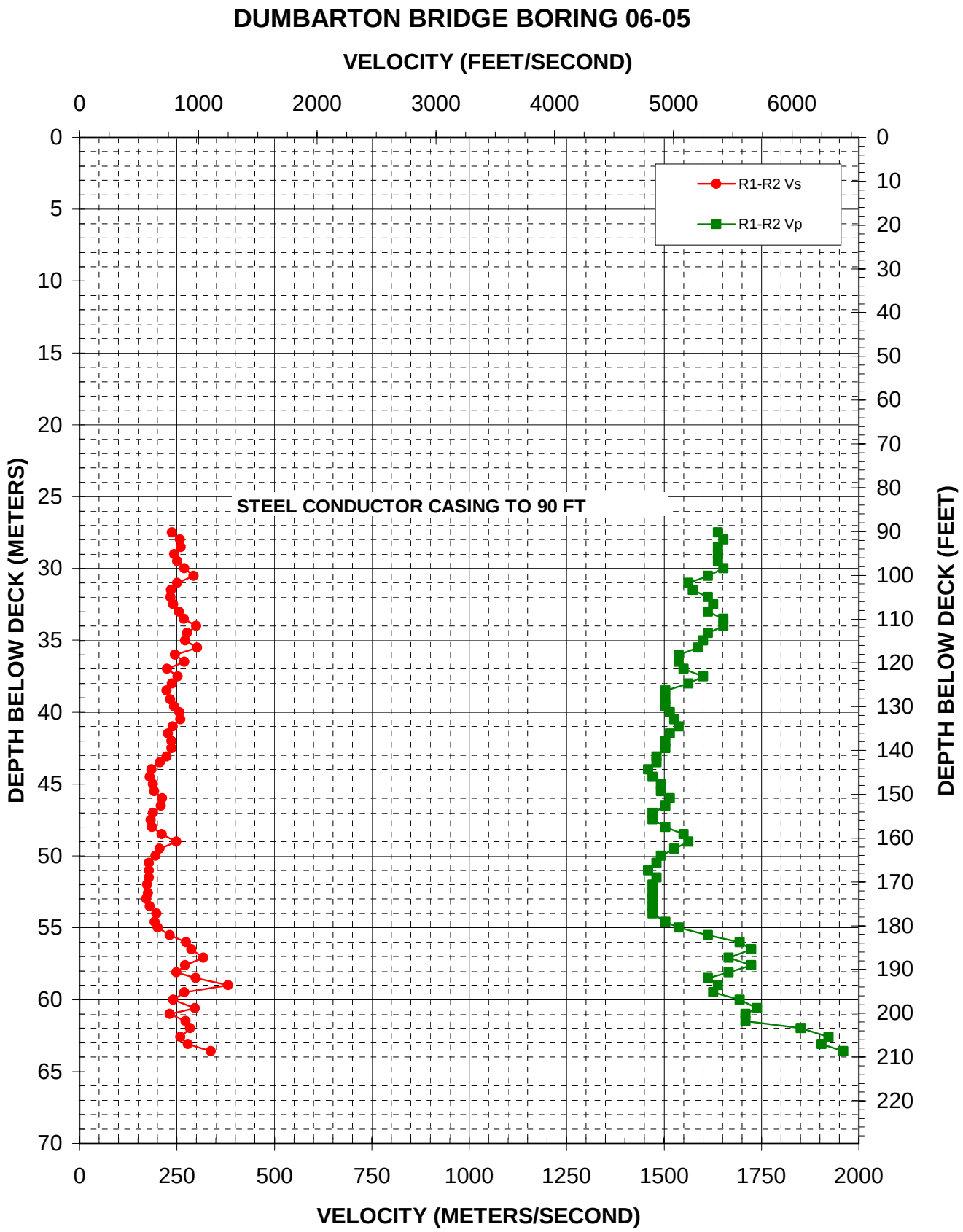


Figure 6. Boring 06-05, Suspension P- and S_H-wave velocities

Depth		Pick Times						Velocity			
(m)	(feet)	Far-Hn (millisec)	Far-Hr (millisec)	Far-V (millisec)	Near-Hn (millisec)	Near-Hr (millisec)	Near-V (millisec)	$V\text{-}S_H$ (m/sec)	V-P (m/sec)	$V\text{-}S_H$ (ft/sec)	V-P (ft/sec)
27.5	90.2	16.60	16.60	6.02	12.30	12.46	5.41	237	1639	777	5378
28.0	91.9	16.60	16.48	5.97	12.54	12.78	5.37	258	1653	846	5423
28.5	93.5	16.58	16.76	5.96	12.74	12.92	5.35	260	1639	854	5378
29.0	95.1	16.88	16.98	5.97	12.70	12.94	5.36	243	1639	798	5378
29.5	96.8	16.88	17.10	5.97	12.92	13.10	5.36	251	1639	824	5378
30.0	98.4	16.64	16.82	5.98	12.94	13.10	5.37	270	1653	884	5423
30.5	100.1	16.62	16.74	5.97	13.20	13.32	5.35	292	1613	959	5292
31.0	101.7	16.92	17.08	5.98	12.96	13.06	5.34	251	1563	822	5126
31.5	103.3	16.88	17.10	5.98	12.66	12.80	5.35	235	1575	770	5167
32.0	105.0	16.72	16.86	5.95	12.44	12.58	5.33	234	1613	767	5292
32.5	106.6	16.48	16.62	5.94	12.38	12.42	5.33	241	1626	791	5335
33.0	108.3	16.44	16.58	5.92	12.50	12.68	5.30	255	1613	837	5292
33.5	109.9	20.24	20.52	5.96	16.56	16.74	5.36	268	1653	880	5423
34.0	111.5	17.24	17.40	5.94	13.96	14.00	5.33	299	1653	982	5423
34.5	113.2	16.96	17.12	5.94	13.32	13.52	5.32	276	1613	906	5292
35.0	114.8	17.16	17.34	5.97	13.48	13.64	5.34	271	1600	889	5249
35.5	116.5	19.26	19.56	5.93	16.02	16.18	5.30	302	1587	991	5208
36.0	118.1	16.26	16.40	5.95	12.22	12.30	5.30	246	1538	806	5047
36.5	119.8	17.66	17.70	5.92	13.88	14.04	5.27	269	1538	882	5047
37.0	121.4	16.16	16.32	5.98	11.72	11.84	5.33	224	1550	736	5087
37.5	123.0	15.68	15.94	6.00	11.78	11.90	5.38	252	1600	826	5249
38.0	124.7	15.76	15.88	5.99	11.54	11.66	5.35	237	1562	777	5126
38.5	126.3	15.94	16.06	5.98	11.46	11.60	5.31	224	1504	734	4934
39.1	128.3	15.74	15.84	5.99	11.44	11.56	5.33	233	1504	765	4934
39.6	129.9	15.60	15.70	6.02	11.46	11.60	5.36	243	1504	796	4934
40.0	131.2	15.56	15.68	5.99	11.68	11.78	5.33	257	1515	843	4971
40.5	132.9	15.80	15.90	6.01	11.92	12.04	5.36	258	1527	848	5009
41.0	134.5	16.22	16.36	6.00	12.08	12.14	5.35	239	1538	785	5047
41.5	136.2	17.14	17.16	6.03	12.72	12.76	5.37	227	1515	744	4971
42.0	137.8	17.72	17.74	6.05	13.46	13.54	5.38	236	1504	776	4934
42.5	139.4	18.22	18.30	6.01	13.98	14.06	5.35	236	1504	774	4934
43.1	141.4	18.58	18.66	6.07	14.12	14.18	5.39	224	1481	734	4861
43.5	142.7	18.76	18.92	6.08	13.98	14.04	5.40	207	1481	679	4861
44.0	144.4	18.78	18.94	6.04	13.44	13.48	5.36	185	1460	608	4790
44.5	146.0	20.04	20.18	6.05	14.48	14.64	5.37	180	1471	591	4825
45.0	147.6	20.00	20.16	6.03	14.72	14.84	5.36	189	1493	619	4897
45.5	149.3	20.32	20.48	6.03	15.10	15.28	5.36	192	1493	630	4897
46.0	150.9	20.08	20.28	6.01	15.40	15.56	5.35	213	1515	698	4971
46.5	152.6	19.88	20.06	6.01	15.10	15.28	5.34	209	1504	686	4934
47.0	154.2	19.94	20.16	6.02	14.68	14.82	5.34	189	1471	619	4825
47.5	155.8	20.14	20.22	6.01	14.62	14.78	5.33	182	1471	599	4825
48.0	157.5	19.76	20.02	5.93	14.42	14.60	5.27	186	1504	610	4934
48.5	159.1	19.82	19.96	6.02	15.04	15.28	5.38	211	1550	694	5087
49.0	160.8	20.04	20.10	5.99	16.06	16.02	5.35	248	1563	814	5126
49.5	162.4	20.86	20.86	6.04	15.90	16.08	5.39	205	1527	674	5009
50.0	164.0	21.20	21.30	5.89	16.10	16.15	5.22	195	1493	640	4897
50.5	165.7	21.60	21.70	5.86	16.00	16.10	5.19	179	1481	586	4861
51.0	167.3	21.45	21.50	5.91	15.85	15.90	5.23	179	1460	586	4790
51.5	169.0	21.35	21.35	5.88	15.75	15.75	5.20	179	1481	586	4861
52.0	170.6	21.15	21.25	5.89	15.40	15.45	5.21	173	1471	568	4825

Table 5. Boring 06-05, Suspension R1-R2 depth, pick times, and velocities

Depth		Pick Times						Velocity			
(m)	(feet)	Far-Hn (millisec)	Far-Hr (millisec)	Far-V (millisec)	Near-Hn (millisec)	Near-Hr (millisec)	Near-V (millisec)	$V\text{-}S_H$ (m/sec)	V-P (m/sec)	$V\text{-}S_H$ (ft/sec)	V-P (ft/sec)
52.6	172.6	20.95	21.00	5.87	15.25	15.30	5.19	175	1471	576	4825
53.0	173.9	20.50	20.60	5.86	14.70	14.70	5.18	171	1471	561	4825
53.5	175.5	19.60	19.60	5.87	14.05	14.05	5.19	180	1471	591	4825
54.0	177.2	18.45	18.55	5.83	13.40	13.45	5.15	197	1471	646	4825
54.6	179.1	17.60	17.65	5.88	12.40	12.50	5.22	193	1504	634	4934
55.0	180.4	16.95	16.95	5.77	11.95	12.00	5.12	201	1538	659	5047
55.5	182.1	16.44	16.56	5.90	12.14	12.24	5.28	232	1613	761	5292
56.0	183.7	15.26	15.40	5.89	11.62	11.74	5.30	274	1695	899	5561
56.5	185.4	15.16	15.28	5.86	11.68	11.80	5.28	287	1724	943	5657
57.1	187.3	14.96	15.06	5.83	11.82	11.90	5.23	317	1667	1042	5468
57.6	189.0	15.52	15.72	5.86	11.86	12.00	5.28	271	1724	889	5657
58.1	190.6	18.14	18.00	5.89	13.88	14.20	5.29	248	1667	814	5468
58.5	191.9	17.78	17.68	5.86	14.34	14.42	5.24	299	1613	979	5292
59.0	193.6	18.18	18.26	5.83	15.54	15.66	5.22	382	1639	1252	5378
59.5	195.2	18.24	18.36	5.91	14.48	14.68	5.29	269	1626	882	5335
60.0	196.9	16.56	16.72	5.86	12.40	12.58	5.27	241	1695	791	5561
60.6	198.8	16.50	16.28	5.75	13.12	12.90	5.17	296	1739	971	5706
61.0	200.1	16.36	16.64	5.68	12.18	12.18	5.09	231	1709	759	5608
61.5	201.8	15.78	15.86	5.84	12.12	12.18	5.25	272	1709	894	5608
62.0	203.4	15.76	15.80	5.67	12.20	12.30	5.13	283	1852	929	6076
62.6	205.4	15.88	16.28	5.62	12.04	12.40	5.10	259	1923	850	6309
63.1	207.0	14.20	14.26	5.72	10.64	10.64	5.20	279	1905	914	6249
63.6	208.7	17.84	17.94	5.71	14.80	15.04	5.20	337	1961	1105	6433
64.1	210.3										

Table 5, continued. Boring 06-05, Suspension R1-R2 depth, pick times, and velocities

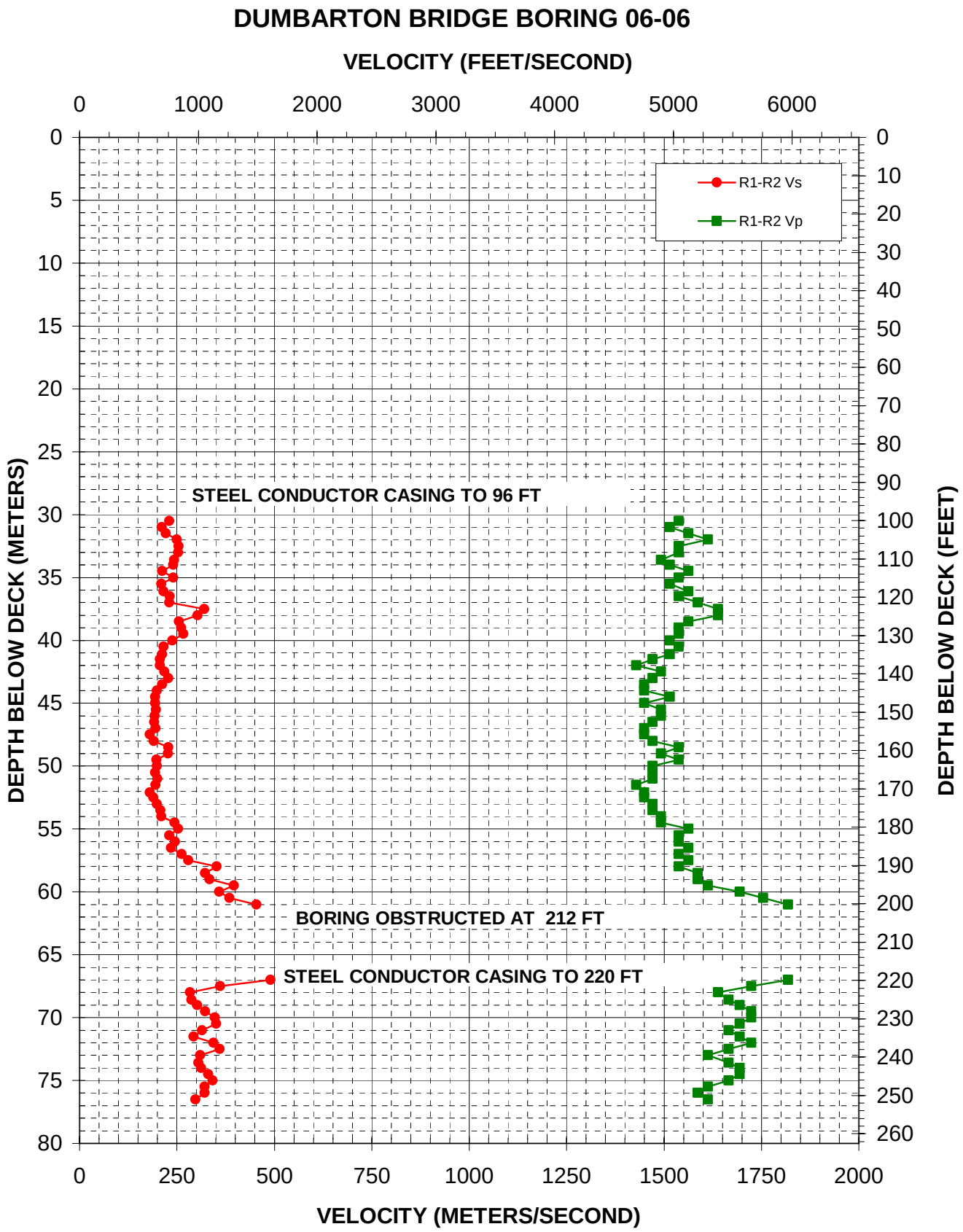


Figure 7. Boring 06-06, Suspension P- and S_H-wave velocities

Depth		Pick Times						Velocity			
(m)	(feet)	Far-Hn (millisec)	Far-Hr (millisec)	Far-V (millisec)	Near-Hn (millisec)	Near-Hr (millisec)	Near-V (millisec)	$V\text{-}S_H$ (m/sec)	V-P (m/sec)	$V\text{-}S_H$ (ft/sec)	V-P (ft/sec)
29.0	95.1										
29.6	97.1										
30.1	98.8										
30.5	100.1	18.10	18.15	5.94	13.75	13.80	5.29	230	1538	754	5047
31.0	101.7	20.00	18.60	5.93	15.55	13.60	5.27	212	1515	694	4971
31.5	103.3	20.15	19.75	5.91	15.60	15.25	5.27	221	1563	725	5126
32.0	105.0	18.75	18.65	5.95	14.65	14.75	5.33	250	1613	820	5292
32.5	106.6	17.90	18.05	5.93	14.00	14.10	5.28	255	1538	836	5047
33.0	108.3	19.50	20.55	5.97	15.10	17.05	5.32	253	1538	831	5047
33.6	110.2	21.95	21.85	5.95	17.70	17.85	5.28	242	1493	795	4897
34.0	111.5	17.65	17.65	5.94	13.45	13.55	5.28	241	1515	791	4971
34.5	113.2	17.85	17.75	5.93	13.15	13.05	5.29	213	1563	698	5126
35.0	114.8	17.10	17.10	5.93	12.85	13.05	5.28	241	1538	791	5047
35.5	116.5	20.75	16.15	5.93	15.75	11.65	5.27	211	1515	691	4971
36.1	118.4	16.65	16.80	5.89	12.05	12.15	5.25	216	1563	709	5126
36.5	119.8	15.45	15.65	5.82	11.20	11.25	5.17	231	1538	759	5047
37.0	121.4	15.40	15.60	5.86	11.10	11.20	5.23	230	1587	754	5208
37.5	123.0	14.75	14.90	5.86	11.65	11.75	5.25	320	1639	1050	5378
38.0	124.7	15.00	15.10	5.87	11.70	11.80	5.26	303	1639	994	5378
38.5	126.3	15.70	15.84	5.91	11.76	11.94	5.27	255	1563	837	5126
39.0	128.0	15.98	16.12	5.94	12.12	12.32	5.29	261	1538	857	5047
39.5	129.6	16.44	16.58	5.97	12.64	12.88	5.32	267	1538	875	5047
40.0	131.2	16.88	17.04	5.98	12.68	12.84	5.32	238	1515	781	4971
40.5	132.9	17.62	17.76	5.99	12.98	13.12	5.34	216	1538	707	5047
41.1	134.8	17.52	17.70	5.98	12.84	12.98	5.32	213	1515	698	4971
41.5	136.2	17.80	17.98	5.99	12.98	13.12	5.31	207	1471	678	4825
42.0	137.8	18.12	18.30	6.01	13.30	13.46	5.31	207	1429	679	4687
42.5	139.4	18.26	18.46	5.99	13.68	13.84	5.32	217	1493	713	4897
43.0	141.1	18.18	18.48	6.01	13.80	14.08	5.33	228	1471	747	4825
43.5	142.7	18.62	18.72	6.01	13.90	14.04	5.32	213	1449	698	4755
44.0	144.4	19.16	19.30	6.01	14.14	14.26	5.32	199	1449	652	4755
44.5	146.0	19.36	19.52	5.99	14.24	14.36	5.33	195	1515	638	4971
45.0	147.6	19.64	19.82	6.01	14.52	14.66	5.32	195	1449	638	4755
45.5	149.3	19.88	20.00	6.00	14.78	14.92	5.33	196	1493	645	4897
46.0	150.9	19.70	19.82	6.00	14.52	14.64	5.33	193	1493	633	4897
46.5	152.6	19.38	19.50	5.99	14.16	14.28	5.31	192	1471	629	4825
47.0	154.2	18.78	18.90	5.99	13.68	13.78	5.30	196	1449	642	4755
47.5	155.8	18.76	18.88	5.98	13.22	13.34	5.29	181	1449	592	4755
48.0	157.5	18.66	18.74	5.98	13.40	13.54	5.30	191	1471	627	4825
48.5	159.1	18.36	18.46	5.97	13.96	14.10	5.32	228	1538	749	5047
49.0	160.8	18.50	18.62	5.99	14.08	14.22	5.32	227	1493	744	4897
49.5	162.4	19.48	19.58	5.98	14.40	14.52	5.33	197	1538	647	5047
50.0	164.0	19.72	19.86	6.01	14.70	14.80	5.33	198	1471	651	4825
50.5	165.7	19.82	20.12	6.00	14.74	14.90	5.32	194	1471	637	4825
51.0	167.3	19.80	19.94	6.00	14.80	14.94	5.32	200	1471	656	4825
51.5	169.0	19.80	19.96	6.00	14.72	14.80	5.30	195	1429	641	4687
52.1	170.9	19.56	19.60	5.99	14.02	14.04	5.30	180	1449	591	4755
52.5	172.2	18.56	18.46	5.98	13.22	13.26	5.29	190	1449	623	4755
53.0	173.9	18.10	18.16	5.94	13.06	13.14	5.26	199	1471	652	4825
53.5	175.5	17.60	17.60	5.94	12.74	12.84	5.26	208	1471	682	4825

Table 6. Boring 06-06, Suspension R1-R2 depth, pick times, and velocities

Depth		Pick Times						Velocity			
(m)	(feet)	Far-Hn (millisec)	Far-Hr (millisec)	Far-V (millisec)	Near-Hn (millisec)	Near-Hr (millisec)	Near-V (millisec)	$V\text{-}S_H$ (m/sec)	V-P (m/sec)	$V\text{-}S_H$ (ft/sec)	V-P (ft/sec)
54.0	177.2	16.94	17.28	5.93	12.40	12.30	5.26	210	1493	689	4897
54.5	178.8	16.90	17.06	5.93	12.82	12.94	5.26	244	1493	800	4897
55.0	180.4	16.68	16.88	5.90	12.76	12.90	5.26	253	1562	831	5126
55.5	182.1	16.76	16.80	5.91	12.44	12.42	5.26	230	1538	754	5047
56.0	183.7	16.50	16.66	5.91	12.36	12.64	5.26	245	1538	804	5047
56.5	185.4	16.42	16.62	5.95	12.22	12.32	5.31	235	1563	772	5126
57.0	187.0	16.22	15.92	5.92	12.24	12.28	5.27	262	1538	861	5047
57.5	188.6	16.00	16.00	5.92	12.46	12.38	5.28	279	1563	916	5126
58.0	190.3		17.88	5.88		15.04	5.23	352	1538	1155	5047
58.5	191.9		21.10	5.88		18.00	5.25	323	1587	1058	5208
59.0	193.6	23.30	23.15	5.87	20.25	20.20	5.24	333	1587	1094	5208
59.5	195.2	23.15	23.35	5.89	20.70	20.75	5.27	396	1613	1299	5292
60.0	196.9	22.90	22.90	5.86	19.87	20.35	5.27	358	1695	1176	5561
60.5	198.5		24.65	5.83		22.05	5.26	385	1754	1262	5756
61.0	200.1	19.80	19.80	5.80	17.65	17.55	5.25	455	1818	1491	5965
67.0	219.8	12.68	12.98	5.74	10.76	10.82	5.19	490	1818	1608	5965
67.5	221.5	13.32	13.42	5.75	10.54	10.66	5.17	361	1724	1184	5657
68.0	223.1	13.76	13.82	5.77	10.18	10.34	5.16	283	1639	929	5378
68.6	225.1	13.66	13.76	5.74	10.20	10.26	5.14	287	1667	943	5468
69.0	226.4	13.74	13.88	5.76	10.46	10.54	5.17	302	1695	991	5561
69.5	228.0	13.62	13.74	5.75	10.52	10.64	5.17	323	1724	1058	5657
70.0	229.7	13.38	13.50	5.76	10.50	10.62	5.18	347	1724	1139	5657
70.5	231.3	13.76	13.90	5.78	10.96	11.00	5.19	351	1695	1151	5561
71.0	232.9	13.78	13.94	5.78	10.62	10.74	5.18	314	1667	1032	5468
71.5	234.6	14.10	14.20	5.78	10.70	10.78	5.19	293	1695	962	5561
72.0	236.2	13.72	13.76	5.77	10.78	10.88	5.19	344	1724	1127	5657
72.5	237.9	13.40	13.52	5.77	10.62	10.74	5.17	360	1667	1180	5468
73.0	239.5	13.80	13.96	5.81	10.62	10.68	5.19	310	1613	1016	5292
73.6	241.5	13.84	13.98	5.78	10.56	10.72	5.18	306	1667	1003	5468
74.0	242.8	13.78	13.92	5.79	10.58	10.72	5.20	313	1695	1025	5561
74.5	244.4	13.88	13.96	5.80	10.86	10.92	5.21	330	1695	1083	5561
75.0	246.1	13.62	13.74	5.81	10.70	10.80	5.21	341	1667	1120	5468
75.5	247.7	13.86	13.96	5.84	10.76	10.84	5.22	322	1613	1055	5292
76.0	249.3	13.78	13.90	5.84	10.68	10.78	5.21	322	1587	1055	5208
76.5	251.0	13.66	13.76	5.81	10.28	10.42	5.19	298	1613	976	5292

Table 6, continued. Boring 06-06, Suspension R1-R2 depth, pick times, and velocities

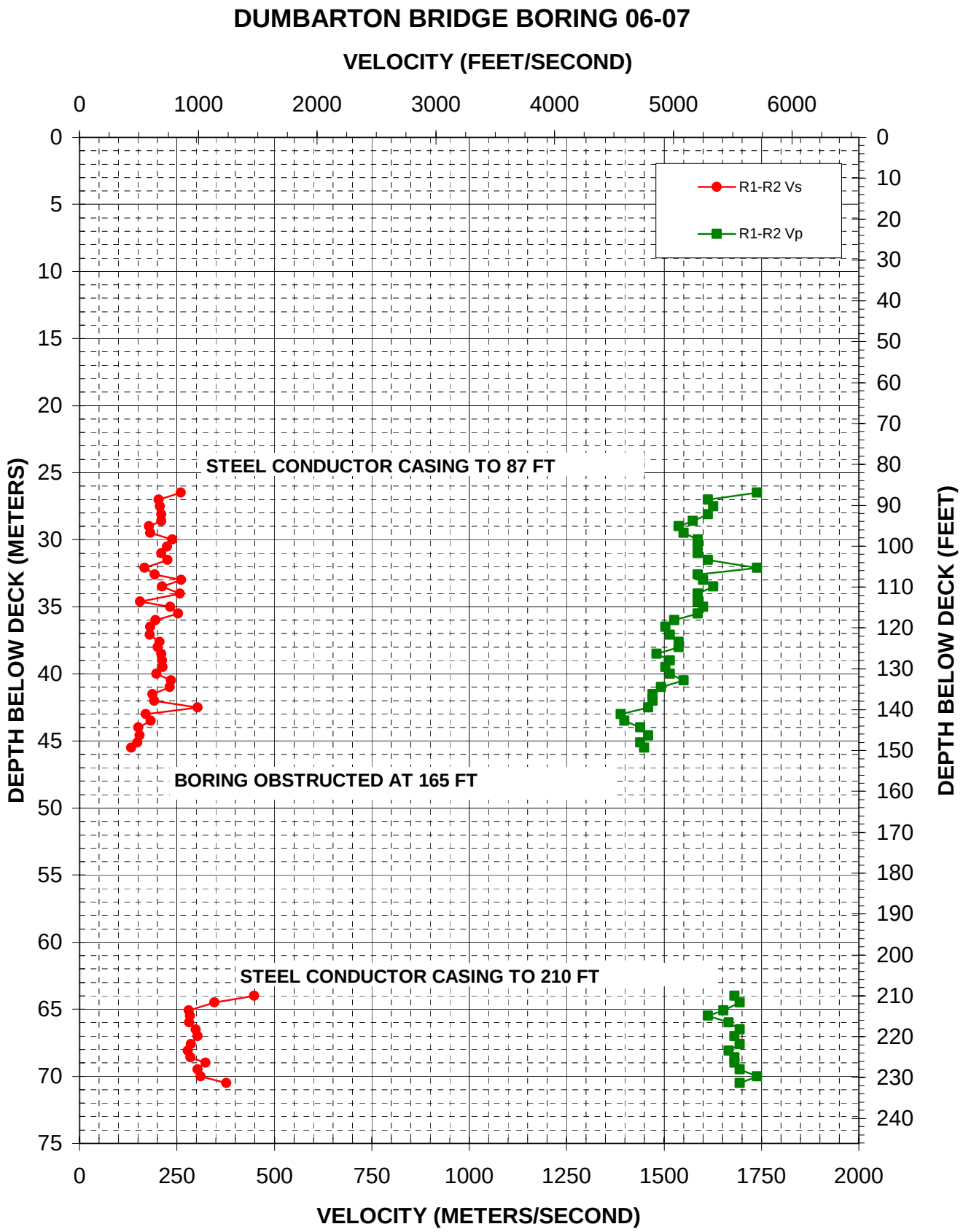


Figure 8. Boring 06-07, Suspension P- and S_H-wave velocities

Depth		Pick Times						Velocity			
(m)	(feet)	Far-Hn (millisec)	Far-Hr (millisec)	Far-V (millisec)	Near-Hn (millisec)	Near-Hr (millisec)	Near-V (millisec)	$V\text{-}S_H$ (m/sec)	V-P (m/sec)	$V\text{-}S_H$ (ft/sec)	V-P (ft/sec)
26.5	86.9	18.52	18.52	5.84	14.60	14.76	5.27	260	1739	854	5706
27.0	88.6	19.12	19.40	5.86	14.30	14.36	5.24	203	1613	665	5292
27.5	90.2	19.64	19.78	5.87	14.78	14.94	5.26	206	1626	676	5335
28.1	92.2	19.55	19.70	5.87	14.80	14.95	5.25	211	1613	691	5292
28.6	93.8	19.25	19.75	5.87	14.70	14.80	5.24	211	1575	691	5167
29.0	95.1	19.00	19.25	5.87	13.45	13.60	5.22	179	1538	586	5047
29.5	96.8	19.10	19.30	5.83	13.60	13.80	5.19	182	1550	597	5087
30.0	98.4	17.05	17.40	5.85	12.95	13.10	5.22	238	1587	781	5208
30.5	100.1	17.55	17.75	5.84	13.10	13.30	5.21	225	1587	737	5208
31.0	101.7	19.65	19.90	5.90	14.95	15.10	5.27	211	1587	691	5208
31.5	103.3	18.90	19.15	5.81	14.50	14.70	5.19	226	1613	741	5292
32.1	105.3	19.85	20.25	5.97	13.85	14.25	5.39	167	1739	547	5706
32.6	107.0	19.40	19.45	5.86	14.10	14.40	5.23	193	1587	634	5208
33.0	108.3	18.95	19.15	6.01	15.05	15.40	5.38	261	1600	858	5249
33.5	109.9	19.10	19.35	6.00	14.45	14.60	5.38	213	1626	698	5335
34.0	111.5	19.45	19.90	5.88	15.55	16.05	5.25	258	1587	847	5208
34.6	113.5	19.85	20.00	5.90	13.40	13.60	5.27	156	1587	511	5208
35.0	114.8	18.25	18.10	5.90	13.80	13.95	5.27	233	1600	763	5249
35.5	116.5	17.85	17.85	5.91	13.80	14.00	5.28	253	1587	831	5208
36.0	118.1	18.15	18.30	5.93	13.10	13.10	5.28	195	1527	640	5009
36.5	119.8	18.35	18.45	5.95	12.80	13.00	5.29	182	1504	597	4934
37.1	121.7	18.20	18.20	5.96	12.60	12.75	5.30	181	1515	594	4971
37.6	123.4	17.80	17.70	5.96	12.85	12.90	5.31	205	1538	673	5047
38.0	124.7	17.50	17.70	5.96	12.50	12.75	5.31	201	1538	659	5047
38.5	126.3	16.75	16.90	5.99	11.95	12.15	5.31	209	1481	687	4861
39.0	128.0	17.55	17.60	5.97	12.80	12.95	5.31	213	1515	698	4971
39.5	129.6	18.20	18.40	5.99	13.50	13.75	5.32	214	1504	702	4934
40.0	131.2	20.45	20.65	5.97	15.40	15.60	5.31	198	1515	650	4971
40.5	132.9	21.05	21.10	5.96	16.85	16.80	5.31	235	1550	772	5087
41.0	134.5	21.45	21.55	5.98	17.15	17.20	5.31	231	1493	759	4897
41.5	136.2	23.15	23.20	5.98	17.80	17.85	5.30	187	1471	613	4825
42.0	137.8	23.85	23.75	5.97	18.60	18.60	5.29	192	1471	631	4825
42.5	139.4	21.10	21.25	6.02	17.80	17.95	5.33	303	1460	994	4790
43.0	141.1	24.20	24.25	6.05	18.35	18.35	5.33	170	1389	558	4557
43.5	142.7	24.15	23.85	6.03	18.90	18.15	5.31	183	1399	599	4589
44.0	144.4	24.60	24.65	5.98	17.90	18.10	5.29	151	1439	495	4721
44.6	146.3	24.55	24.35	5.99	17.75	18.20	5.31	154	1460	507	4790
45.1	148.0	24.10	24.20	6.01	17.30	17.55	5.32	149	1439	488	4721
45.5	149.3	24.55	24.65	5.97	16.95	17.20	5.28	133	1449	436	4755
64.0	210.0	13.80	13.82	5.84	11.58	11.58	5.25	448	1681	1471	5514
64.5	211.6	14.10	14.18	5.88	11.18	11.32	5.29	346	1695	1135	5561
65.1	213.6	14.80	14.98	5.85	11.28	11.38	5.24	281	1653	922	5423
65.5	214.9	14.82	15.04	5.79	11.36	11.44	5.17	283	1613	929	5292
66.0	216.5	14.60	14.80	5.76	11.08	11.22	5.16	282	1667	924	5468
66.5	218.2	14.36	14.50	5.76	11.00	11.16	5.17	299	1695	979	5561
67.0	219.8	14.20	14.38	5.75	10.90	11.08	5.15	303	1681	994	5514
67.6	221.8	14.32	14.48	5.76	10.82	10.98	5.17	286	1695	937	5561
68.1	223.4	14.04	14.18	5.83	10.46	10.58	5.23	279	1667	914	5468
68.6	225.1	14.02	14.30	5.95	10.56	10.74	5.36	285	1681	935	5514

Table 7. Boring 06-07, Suspension R1-R2 depth, pick times, and velocities

Depth		Pick Times						Velocity			
(m)	(feet)	Far-Hn (millisec)	Far-Hr (millisec)	Far-V (millisec)	Near-Hn (millisec)	Near-Hr (millisec)	Near-V (millisec)	$V\text{-}S_H$ (m/sec)	V-P (m/sec)	$V\text{-}S_H$ (ft/sec)	V-P (ft/sec)
69.0	226.4	15.84	16.00	5.84	12.80	12.86	5.25	324	1681	1062	5514
69.5	228.0	14.24	14.36	5.94	10.92	11.08	5.35	303	1695	994	5561
70.0	229.7	14.22	14.30	5.85	10.96	11.12	5.28	311	1739	1019	5706
70.5	231.3	14.44	14.46	5.87	11.76	11.84	5.28	377	1695	1238	5561

Table 7, continued. Boring 06-07, Suspension R1-R2 depth, pick times, and velocities

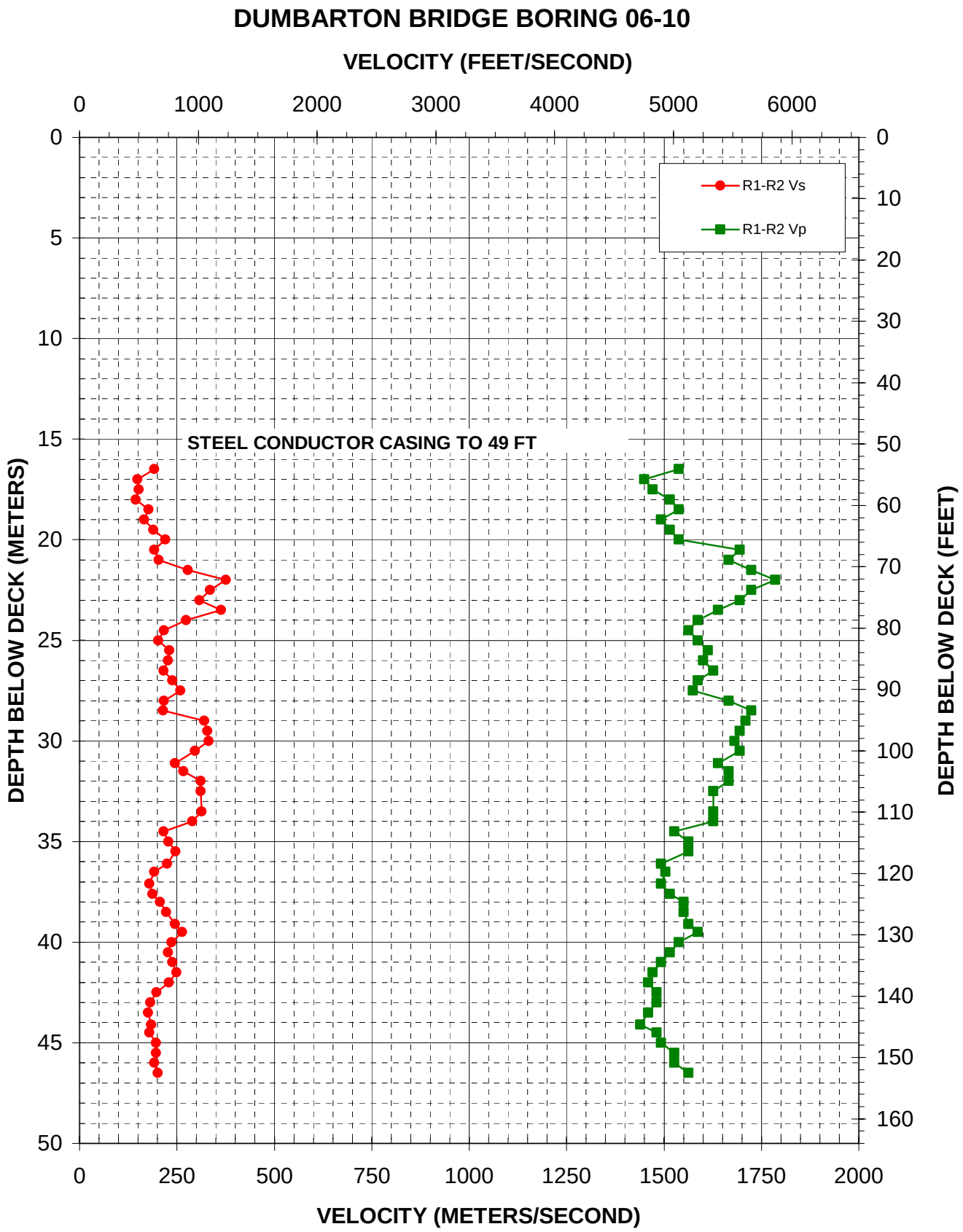


Figure 9. Boring 06-10, Suspension P- and S_H-wave velocities

Depth		Pick Times						Velocity			
(m)	(feet)	Far-Hn (millisec)	Far-Hr (millisec)	Far-V (millisec)	Near-Hn (millisec)	Near-Hr (millisec)	Near-V (millisec)	$V\text{-}S_H$ (m/sec)	V-P (m/sec)	$V\text{-}S_H$ (ft/sec)	V-P (ft/sec)
15.5	50.9				26.05	27.95	5.33				
16.0	52.5				24.95	25.05	5.72				
16.5	54.1	29.40	28.55	6.83	24.10	23.40	6.18	191	1538	628	5047
17.0	55.8	27.70	27.50	6.60	20.90	20.80	5.91	148	1449	486	4755
17.5	57.4	28.40	28.50	6.16	21.80	21.95	5.48	152	1471	499	4825
18.0	59.1	24.25	23.95	5.81	17.15	17.20	5.15	144	1515	474	4971
18.5	60.7	21.40	21.15	5.82	15.65	15.60	5.17	177	1538	581	5047
19.0	62.3	20.80	20.80	5.83	14.75	14.75	5.16	165	1493	542	4897
19.5	64.0	19.10	19.05	5.77	13.80	13.80	5.11	190	1515	622	4971
20.0	65.6	17.90	17.75	5.73	13.25	13.30	5.08	220	1538	721	5047
20.5	67.3	16.20	16.25	5.63	11.05	11.00	5.04	192	1695	631	5561
21.0	68.9	15.55	15.55	5.64	10.65	10.60	5.04	203	1667	666	5468
21.5	70.5	15.12	15.20	5.64	11.52	11.60	5.06	278	1724	911	5657
22.0	72.2	15.74	15.72	5.64	13.08	13.06	5.08	376	1786	1233	5859
22.5	73.8	16.48	16.44	5.67	13.48	13.46	5.09	334	1724	1097	5657
23.0	75.5	17.04	17.04	5.69	13.80	13.78	5.10	308	1695	1009	5561
23.5	77.1	17.46	17.42	5.70	14.70	14.68	5.09	364	1639	1193	5378
24.0	78.7	18.28	18.22	5.71	14.62	14.58	5.08	274	1587	899	5208
24.5	80.4	19.02	18.98	5.72	14.40	14.36	5.08	216	1562	710	5126
25.0	82.0	19.12	19.06	5.80	14.18	14.12	5.17	202	1587	664	5208
25.5	83.7	20.04	19.94	5.78	15.62	15.66	5.16	230	1613	754	5292
26.0	85.3	18.38	18.36	5.77	13.98	13.94	5.14	227	1600	744	5249
26.5	86.9	17.58	17.54	5.88	12.94	12.92	5.27	216	1626	709	5335
27.0	88.6	16.64	16.64	5.75	12.44	12.44	5.12	238	1587	781	5208
27.5	90.2	15.74	15.74	5.79	11.92	11.84	5.16	259	1575	850	5167
28.0	91.9	15.24	15.38	5.63	10.72	10.66	5.03	216	1667	710	5468
28.5	93.5	15.68	15.70	5.62	11.04	11.02	5.04	215	1724	704	5657
29.0	95.1	14.78	14.74	5.68	11.66	11.62	5.10	321	1709	1052	5608
29.5	96.8	14.64	14.58	5.62	11.58	11.54	5.03	328	1695	1076	5561
30.0	98.4	15.46	15.50	5.63	12.48	12.44	5.03	331	1681	1086	5514
30.5	100.1	15.96	15.90	5.62	12.56	12.54	5.03	296	1695	971	5561
31.1	102.0	16.50	16.48	5.67	12.42	12.40	5.06	245	1639	804	5378
31.5	103.3	16.46	16.48	5.76	12.70	12.74	5.16	267	1667	875	5468
32.0	105.0	16.08	16.10	5.69	12.92	12.84	5.09	312	1667	1022	5468
32.5	106.6	16.76	16.74	5.72	13.58	13.50	5.11	312	1626	1022	5335
33.5	109.9	15.74	15.92	5.86	12.58	12.70	5.24	313	1626	1028	5335
34.0	111.5	16.50	16.62	5.85	13.04	13.16	5.23	289	1626	948	5335
34.5	113.2	18.00	18.10	5.87	13.36	13.46	5.21	216	1527	707	5009
35.0	114.8	18.74	18.80	5.91	14.34	14.42	5.27	228	1563	747	5126
35.5	116.5	18.84	18.94	6.00	14.76	14.90	5.36	246	1563	808	5126
36.1	118.4	19.10	19.22	6.02	14.66	14.76	5.35	225	1493	737	4897
36.5	119.8	19.08	19.18	5.99	13.88	13.96	5.32	192	1504	630	4934
37.1	121.7	18.32	18.48	5.91	12.74	12.88	5.24	179	1493	587	4897
37.6	123.4	17.54	17.66	5.94	12.22	12.30	5.28	187	1515	614	4971
38.0	124.7	17.04	17.14	5.87	12.18	12.30	5.23	206	1550	676	5087
38.5	126.3	16.32	16.42	5.83	11.84	11.90	5.18	222	1550	729	5087
39.1	128.3	15.98	16.08	5.83	11.92	11.98	5.19	245	1563	804	5126
39.5	129.6	15.98	16.08	5.85	12.20	12.26	5.22	263	1587	863	5208
40.0	131.2	16.72	16.76	5.86	12.48	12.54	5.21	236	1538	776	5047
40.5	132.9	17.96	18.02	5.90	13.56	13.60	5.24	227	1515	744	4971

Table 8. Boring 06-10, Suspension R1-R2 depth, pick times, and velocities

Depth		Pick Times						Velocity			
(m)	(feet)	Far-Hn (millisec)	Far-Hr (millisec)	Far-V (millisec)	Near-Hn (millisec)	Near-Hr (millisec)	Near-V (millisec)	$V\text{-}S_H$ (m/sec)	V-P (m/sec)	$V\text{-}S_H$ (ft/sec)	V-P (ft/sec)
41.0	134.5	18.12	18.24	5.93	13.92	14.06	5.26	239	1493	783	4897
41.5	136.2	18.54	18.62	5.91	14.50	14.62	5.23	249	1471	816	4825
42.0	137.8	19.36	19.40	5.91	15.02	15.02	5.22	229	1460	752	4790
42.5	139.4	20.06	20.10	5.88	15.00	15.04	5.21	198	1481	648	4861
43.0	141.1	20.30	20.36	5.89	14.80	14.86	5.21	182	1481	597	4861
43.5	142.7	20.68	20.80	5.94	14.98	15.10	5.26	175	1460	576	4790
44.1	144.7	19.84	19.82	5.87	14.40	14.36	5.17	183	1439	602	4721
44.5	146.0	19.62	19.60	5.83	14.04	14.04	5.15	180	1481	589	4861
45.0	147.6	18.54	18.54	5.74	13.46	13.44	5.07	196	1493	645	4897
45.5	149.3	17.34	17.40	5.91	12.22	12.32	5.26	196	1527	643	5009
46.0	150.9	16.48	16.48	5.71	11.26	11.26	5.05	192	1527	629	5009
46.5	152.6	15.32	15.18	5.64	10.36	10.18	5.00	201	1563	659	5126

Table 8, continued. Boring 06-10, Suspension R1-R2 depth, pick times, and velocities

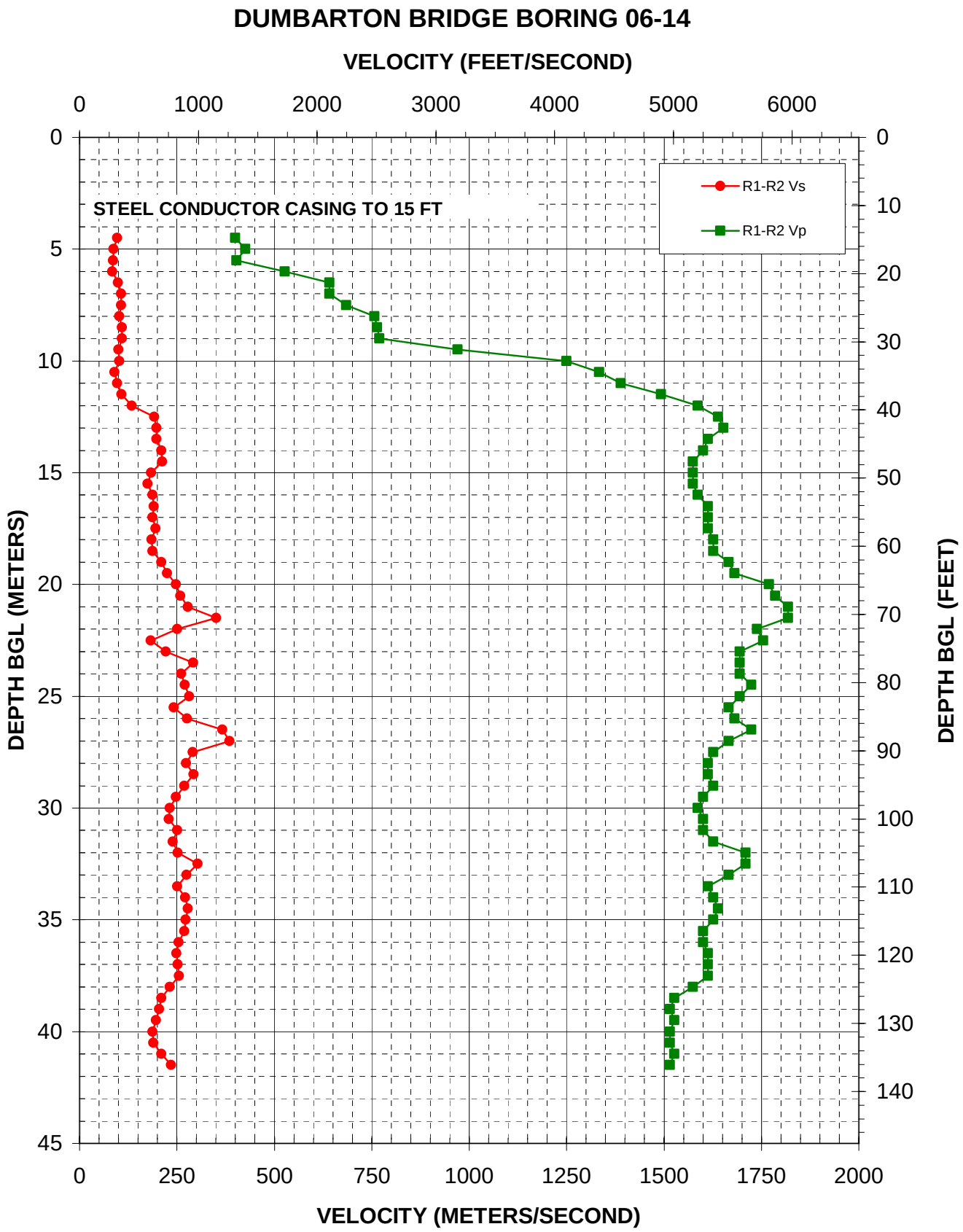


Figure 10. Boring 06-14, Suspension P- and S_H-wave velocities

Depth		Pick Times						Velocity			
(m)	(feet)	Far-Hn (millisec)	Far-Hr (millisec)	Far-V (millisec)	Near-Hn (millisec)	Near-Hr (millisec)	Near-V (millisec)	$V\text{-}S_H$ (m/sec)	V-P (m/sec)	$V\text{-}S_H$ (ft/sec)	V-P (ft/sec)
4.5	14.8	36.80	38.00	11.00	26.80	27.20	8.50	96	400	315	1312
5.0	16.4	37.20	37.40	10.05	25.70	26.00	7.70	87	426	287	1396
5.5	18.0	36.00	36.05	9.70	24.35	24.40	7.22	86	403	282	1323
6.0	19.7	36.00	36.00	8.94	24.20	23.90	7.04	84	526	275	1727
6.5	21.3	33.90	34.20	8.50	23.95	24.00	6.94	99	641	326	2103
7.0	23.0	33.55	33.60	8.26	24.15	24.35	6.70	107	641	352	2103
7.5	24.6	33.70	33.85	7.82	24.40	24.50	6.36	107	685	352	2247
8.0	26.2	35.00	34.85	7.42	25.10	25.15	6.10	102	758	335	2485
8.5	27.9	35.80	35.80	7.18	26.45	26.70	5.87	108	763	356	2504
9.0	29.5	36.05	36.00	6.94	26.80	26.85	5.64	109	769	357	2524
9.5	31.2	35.80	35.80	6.58	25.80	25.80	5.55	100	971	328	3185
10.0	32.8	32.30	32.40	6.30	22.55	22.60	5.50	102	1250	336	4101
10.5	34.4	29.85	29.90	6.19	18.75	18.75	5.44	90	1333	295	4374
11.0	36.1	27.40	27.35	6.12	17.00	17.10	5.40	97	1389	318	4557
11.5	37.7	24.10	24.10	6.06	14.80	14.85	5.39	108	1493	354	4897
12.0	39.4	21.75	21.70	6.02	14.25	14.30	5.39	134	1587	440	5208
12.5	41.0	20.35	20.35	6.02	15.15	15.15	5.41	192	1639	631	5378
13.0	42.7	20.05	20.15	6.00	15.00	15.10	5.39	198	1653	650	5423
13.5	44.3	20.36	20.46	6.01	15.28	15.42	5.39	198	1613	648	5292
14.0	45.9	20.78	20.88	6.00	16.00	16.14	5.38	210	1600	689	5249
14.5	47.6	20.50	20.84	6.04	15.80	16.10	5.40	212	1575	695	5167
15.0	49.2	21.28	21.42	6.04	15.86	15.96	5.41	184	1575	603	5167
15.5	50.9	21.70	21.85	6.01	16.00	16.10	5.37	175	1575	573	5167
16.0	52.5	21.50	21.65	5.98	16.20	16.30	5.35	188	1587	616	5208
16.5	54.1	21.50	21.60	5.97	16.25	16.35	5.35	190	1613	625	5292
17.0	55.8	21.20	21.25	5.99	15.85	15.95	5.37	188	1613	616	5292
17.5	57.4	20.10	20.05	5.96	14.95	14.95	5.34	195	1613	640	5292
18.0	59.1	19.30	19.35	5.97	13.85	14.00	5.35	185	1626	608	5335
18.5	60.7	18.65	18.65	5.89	13.25	13.35	5.27	187	1626	613	5335
19.0	62.3	17.35	17.45	5.86	12.60	12.70	5.26	211	1667	691	5468
19.5	64.0	17.36	17.48	5.82	12.88	13.04	5.22	224	1681	736	5514
20.0	65.6	17.88	17.90	5.82	13.82	13.86	5.26	247	1770	810	5807
20.5	67.3	17.02	17.08	5.71	13.16	13.22	5.15	259	1786	850	5859
21.0	68.9	16.46	16.60	5.71	12.86	13.00	5.16	278	1818	911	5965
21.5	70.5	16.48	16.62	5.81	13.62	13.78	5.26	351	1818	1151	5965
22.0	72.2	16.60	16.62	5.83	12.58	12.66	5.26	251	1739	822	5706
22.5	73.8	16.68	16.78	5.83	11.20	11.30	5.26	182	1754	599	5756
23.0	75.5	16.28	16.40	5.84	11.76	11.88	5.25	221	1695	726	5561
23.5	77.1	15.42	15.46	5.86	11.98	12.04	5.27	292	1695	957	5561
24.0	78.7	15.20	15.28	5.87	11.36	11.46	5.28	261	1695	857	5561
24.5	80.4	15.42	15.46	5.84	11.70	11.78	5.26	270	1724	887	5657
25.0	82.0	15.56	15.62	5.85	12.00	12.08	5.26	282	1695	924	5561
25.5	83.7	15.94	16.06	5.86	11.82	11.92	5.26	242	1667	794	5468
26.0	85.3	15.86	15.92	5.87	12.22	12.32	5.27	276	1681	906	5514
26.5	86.9	15.76	15.84	5.87	13.02	13.12	5.29	366	1724	1202	5657
27.0	88.6	16.06	16.12	5.88	13.46	13.52	5.28	385	1667	1262	5468
27.5	90.2	16.86	16.90	5.97	13.40	13.48	5.35	291	1626	954	5335
28.0	91.9	16.50	16.60	5.90	12.84	12.96	5.28	274	1613	899	5292
28.5	93.5	16.28	16.36	5.90	12.86	12.94	5.28	292	1613	959	5292
29.0	95.1	16.50	16.54	5.91	12.74	12.86	5.29	269	1626	882	5335

Table 9. Boring 06-14, Suspension R1-R2 depth, pick times, and velocities

Depth		Pick Times						Velocity			
(m)	(feet)	Far-Hn (millisec)	Far-Hr (millisec)	Far-V (millisec)	Near-Hn (millisec)	Near-Hr (millisec)	Near-V (millisec)	$V\text{-}S_H$ (m/sec)	V-P (m/sec)	$V\text{-}S_H$ (ft/sec)	V-P (ft/sec)
29.5	96.8	16.80	16.88	5.91	12.76	12.84	5.28	248	1600	812	5249
30.0	98.4	16.40	16.50	5.91	12.08	12.18	5.28	231	1587	759	5208
30.5	100.1	16.40	16.52	5.90	12.04	12.14	5.27	229	1600	751	5249
31.0	101.7	16.08	16.16	5.87	12.10	12.18	5.24	251	1600	824	5249
31.5	103.3	15.84	15.94	5.87	11.66	11.76	5.26	239	1626	785	5335
32.0	105.0	15.56	15.68	5.84	11.60	11.72	5.26	253	1709	828	5608
32.5	106.6	15.28	15.40	5.84	11.98	12.10	5.26	303	1709	994	5608
33.0	108.3	15.44	15.56	5.86	11.82	11.90	5.26	275	1667	901	5468
33.5	109.9	15.96	16.06	5.87	11.98	12.08	5.25	251	1613	824	5292
34.0	111.5	16.00	16.06	5.90	12.30	12.38	5.28	271	1626	889	5335
34.5	113.2	15.92	16.02	5.90	12.32	12.42	5.29	278	1639	911	5378
35.0	114.8	16.06	16.16	5.91	12.40	12.48	5.29	272	1626	894	5335
35.5	116.5	16.30	16.42	5.91	12.58	12.70	5.28	269	1600	882	5249
36.0	118.1	16.82	16.92	5.90	12.88	13.00	5.28	254	1600	835	5249
36.5	119.8	17.26	17.38	5.91	13.26	13.34	5.29	249	1613	816	5292
37.0	121.4	17.76	17.86	5.93	13.80	13.90	5.31	253	1613	828	5292
37.5	123.0	18.50	18.62	5.95	14.58	14.70	5.33	255	1613	837	5292
38.0	124.7	18.78	18.86	5.97	14.48	14.54	5.33	232	1575	761	5167
38.5	126.3	19.14	19.20	5.99	14.34	14.48	5.33	210	1527	689	5009
39.0	128.0	18.80	18.92	5.99	13.90	14.02	5.33	204	1515	670	4971
39.5	129.6	18.46	18.64	5.99	13.40	13.54	5.33	197	1527	646	5009
40.0	131.2	17.88	17.92	5.98	12.54	12.58	5.32	187	1515	614	4971
40.5	132.9	17.28	17.38	5.98	11.98	12.12	5.32	189	1515	621	4971
41.0	134.5	16.88	17.04	5.99	12.14	12.28	5.34	211	1527	691	5009
41.5	136.2	17.04	17.18	5.99	12.78	12.92	5.33	235	1515	770	4971

Table 9, continued. Boring 06-14, Suspension R1-R2 depth, pick times, and velocities

APPENDIX A

SUSPENSION VELOCITY MEASUREMENT QUALITY ASSURANCE SUSPENSION SOURCE TO RECEIVER ANALYSIS RESULTS

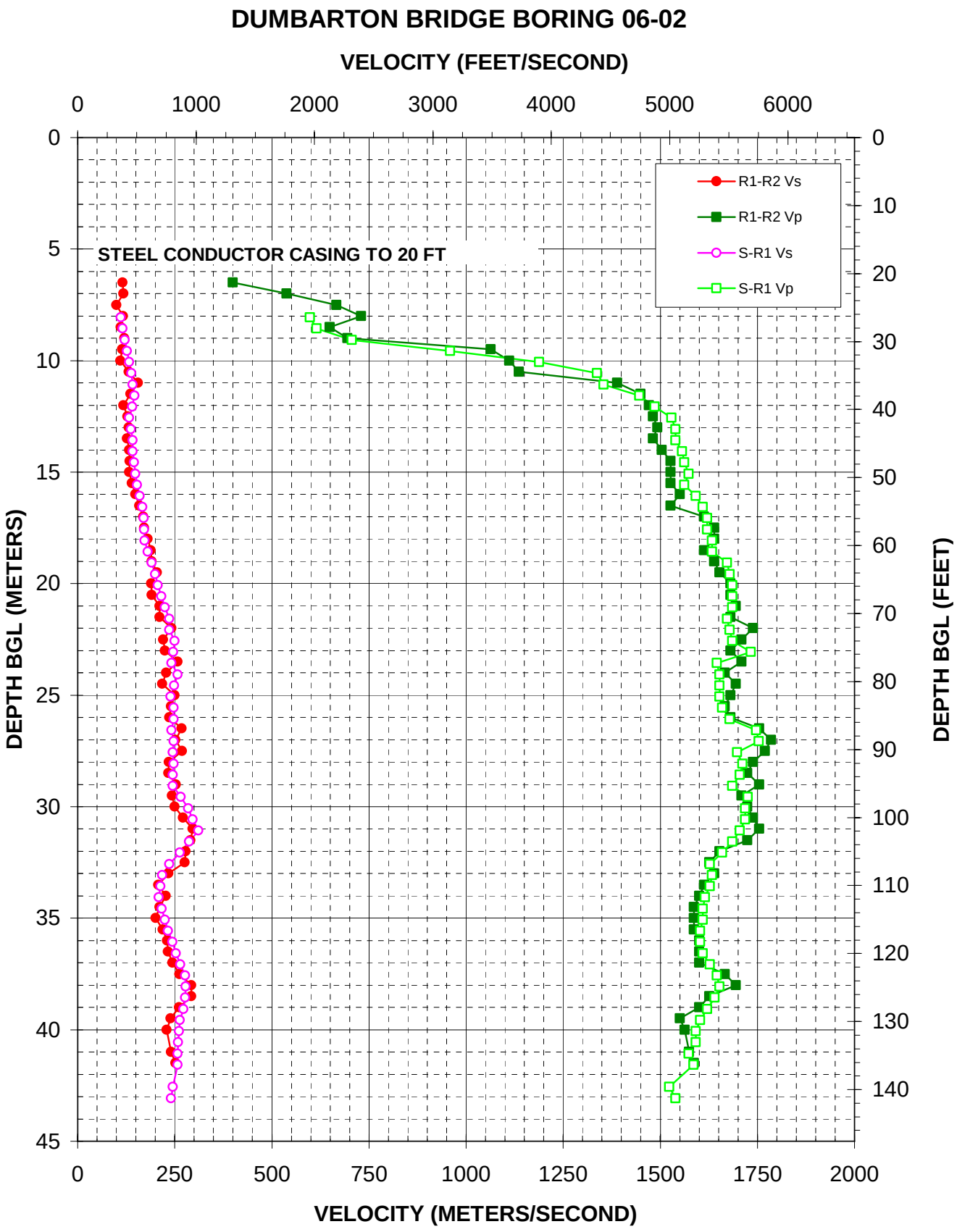


Figure A-1. Boring 06-02, R1 - R2 high resolution analysis and S-R1 quality assurance analysis P- and S_H-wave data

Depth (meters)	Velocity		Depth (feet)	Velocity	
	$V\text{-}S_H$ (m/sec)	V-p (m/sec)		$V\text{-}S_H$ (ft/sec)	V-p (ft/sec)
8.1	111	598	26.5	364	1961
8.6	116	615	28.1	381	2018
9.1	121	706	29.8	398	2317
9.6	128	960	31.4	418	3148
10.1	133	1189	33.0	435	3901
10.6	138	1338	34.7	454	4388
11.1	142	1354	36.3	466	4444
11.6	147	1446	38.0	482	4744
12.1	141	1486	39.6	461	4876
12.6	132	1529	41.2	434	5015
13.1	137	1540	42.9	449	5051
13.6	142	1540	44.5	467	5051
14.1	141	1556	46.2	464	5106
14.6	145	1562	47.8	475	5125
15.1	149	1574	49.4	488	5162
15.6	153	1562	51.1	502	5125
16.1	160	1591	52.7	525	5220
16.6	167	1609	54.4	547	5279
17.1	170	1621	56.0	558	5319
17.6	171	1621	57.6	563	5319
18.1	172	1634	59.3	565	5360
18.6	181	1634	60.9	593	5360
19.1	191	1672	62.6	625	5485
19.6	199	1678	64.2	654	5507
20.1	206	1685	65.8	676	5528
20.6	216	1685	67.5	707	5528
21.1	225	1685	69.1	737	5528
21.6	236	1672	70.8	773	5485
22.1	236	1678	72.4	773	5507
22.6	249	1685	74.0	818	5528
23.1	247	1733	75.7	809	5685
23.6	242	1646	77.3	794	5401
24.1	257	1653	79.0	844	5422
24.6	249	1653	80.6	816	5422
25.1	239	1653	82.3	785	5422
25.6	247	1659	83.9	811	5443
26.1	247	1678	85.5	811	5507
26.6	242	1747	87.2	794	5731
27.1	247	1754	88.8	811	5755
27.6	245	1698	90.5	805	5572
28.1	247	1712	92.1	811	5617
28.6	245	1705	93.7	805	5594
29.1	245	1685	95.4	805	5528
29.6	266	1726	97.0	873	5662
30.1	285	1719	98.7	934	5639
30.6	296	1719	100.3	972	5639
31.1	311	1705	101.9	1020	5594
31.6	287	1685	103.6	941	5528
32.1	263	1659	105.2	863	5443
32.6	236	1627	106.9	775	5339
33.1	218	1634	108.5	716	5360
33.6	213	1627	110.1	699	5339
34.1	209	1615	111.8	684	5299
34.6	217	1609	113.4	712	5279
35.1	225	1609	115.1	737	5279
35.6	233	1603	116.7	765	5259
36.1	244	1603	118.3	800	5259
36.6	254	1609	120.0	832	5279
37.1	265	1627	121.6	869	5339
37.6	276	1646	123.3	907	5401
38.1	279	1653	124.9	914	5422
38.6	276	1640	126.5	907	5380
39.1	272	1621	128.2	893	5319
39.6	263	1603	129.8	863	5259
40.1	261	1591	131.5	856	5220
40.6	259	1591	133.1	850	5220
41.1	257	1574	134.7	844	5162
41.6	257	1585	136.4	844	5201
42.6	245	1523	139.7	805	4997
43.1	240	1540	141.3	789	5051

Table A-1. Boring 06-02, S - R1 quality assurance analysis P- and S_H-wave data

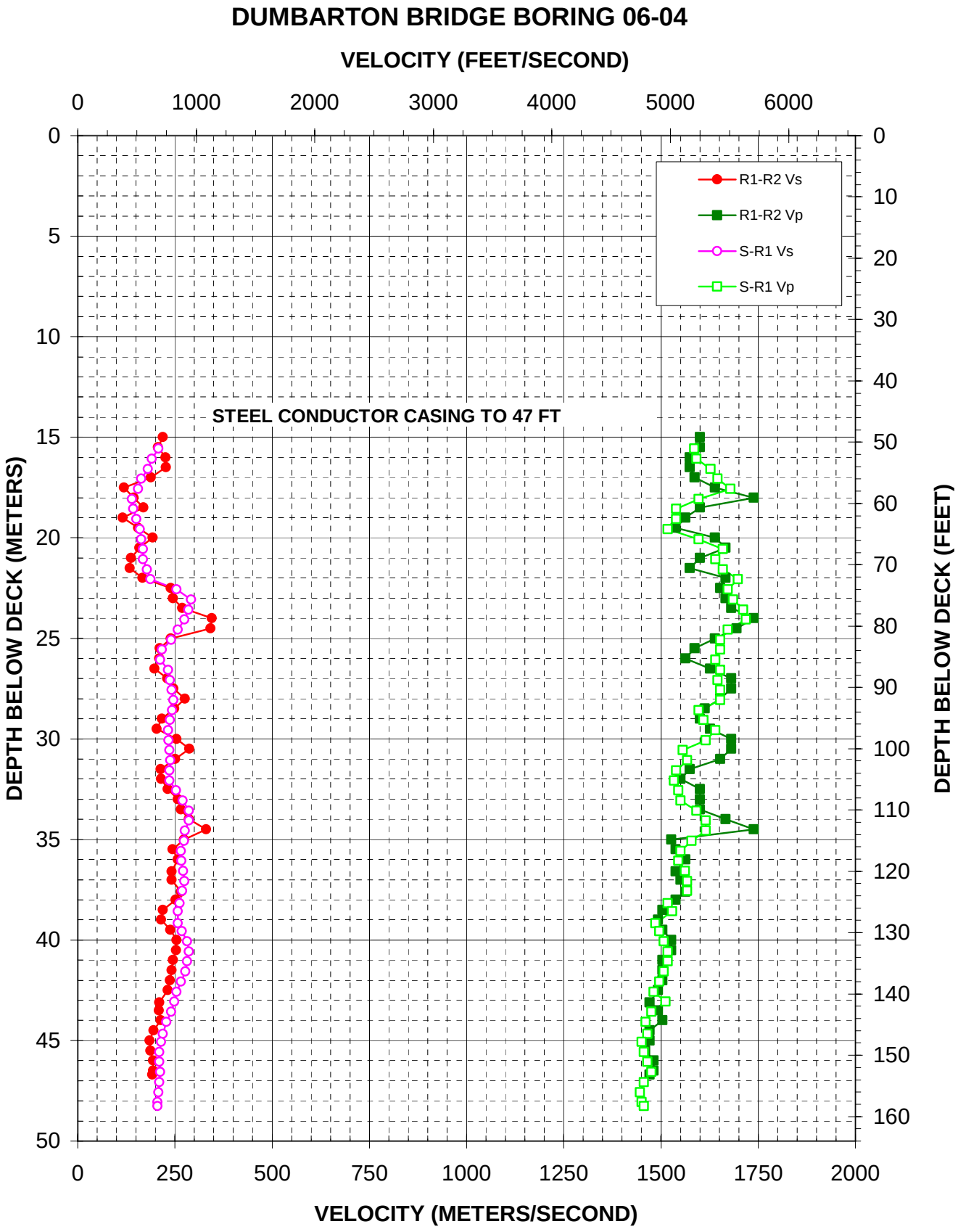


Figure A-2. Boring 06-04, R1 - R2 high resolution analysis and S-R1 quality assurance analysis

Depth (meters)	Velocity		Depth (feet)	Velocity	
	$V\text{-}S_H$ (m/sec)	V-p (m/sec)		$V\text{-}S_H$ (ft/sec)	V-p (ft/sec)
15.6	207	1585	51.1	680	5201
16.1	191	1591	52.7	627	5220
16.6	180	1627	54.4	591	5339
17.1	163	1646	56.0	536	5401
17.6	155	1678	57.6	509	5507
18.1	139	1597	59.3	457	5240
18.6	143	1540	60.9	468	5051
19.1	151	1540	62.6	496	5051
19.6	160	1518	64.2	526	4979
20.1	164	1597	65.8	538	5240
20.6	168	1659	67.5	551	5443
21.1	168	1640	69.1	551	5380
21.6	178	1659	70.8	585	5443
22.1	188	1698	72.4	616	5572
22.6	255	1672	74.0	836	5485
23.1	291	1685	75.7	955	5528
23.6	285	1712	77.3	936	5617
24.1	274	1719	79.0	900	5639
24.6	258	1672	80.6	846	5485
25.1	240	1653	82.3	789	5422
25.6	217	1653	83.9	713	5422
26.1	212	1640	85.5	695	5380
26.6	233	1653	87.2	763	5422
27.1	238	1646	88.8	780	5401
27.6	242	1653	90.5	793	5422
28.1	246	1653	92.1	807	5422
28.6	243	1597	93.7	799	5240
29.1	237	1609	95.4	778	5279
29.6	233	1640	97.0	764	5380
30.1	234	1615	98.7	768	5299
30.6	236	1556	100.3	774	5106
31.1	239	1568	101.9	783	5144
31.6	236	1540	103.6	774	5051
32.1	236	1534	105.2	774	5033
32.6	253	1545	106.9	831	5069
33.1	270	1551	108.5	885	5088
33.6	286	1591	110.1	937	5220
34.1	286	1615	111.8	937	5299
34.6	276	1615	113.4	906	5299
35.1	273	1579	115.1	897	5182
35.6	266	1551	116.7	872	5088
36.1	267	1545	118.3	877	5069
36.6	271	1562	120.0	890	5125
37.1	275	1568	121.6	901	5144
37.6	269	1568	123.3	881	5144
38.2	263	1518	125.2	862	4979
38.6	258	1529	126.5	847	5015
39.2	258	1486	128.5	847	4876
39.6	267	1497	129.8	877	4910
40.1	281	1507	131.5	923	4944
40.6	286	1518	133.1	940	4979
41.1	281	1518	134.7	923	4979
41.6	277	1507	136.4	908	4944
42.1	266	1497	138.0	872	4910
42.6	254	1481	139.7	833	4859
43.1	249	1512	141.3	815	4962
43.6	241	1476	142.9	790	4842
44.1	228	1461	144.6	748	4792
44.7	219	1466	146.6	720	4809
45.1	214	1451	147.9	703	4760
45.6	210	1456	149.5	688	4776
46.1	210	1466	151.1	690	4809
46.6	213	1476	152.8	697	4842
47.1	210	1456	154.4	688	4776
47.6	208	1446	156.1	681	4744
48.1	206	1451	157.7	676	4760
48.3	206	1456	158.4	676	4776

Table A-2. Boring 06-04, S - R1 quality assurance analysis P- and S_H-wave data

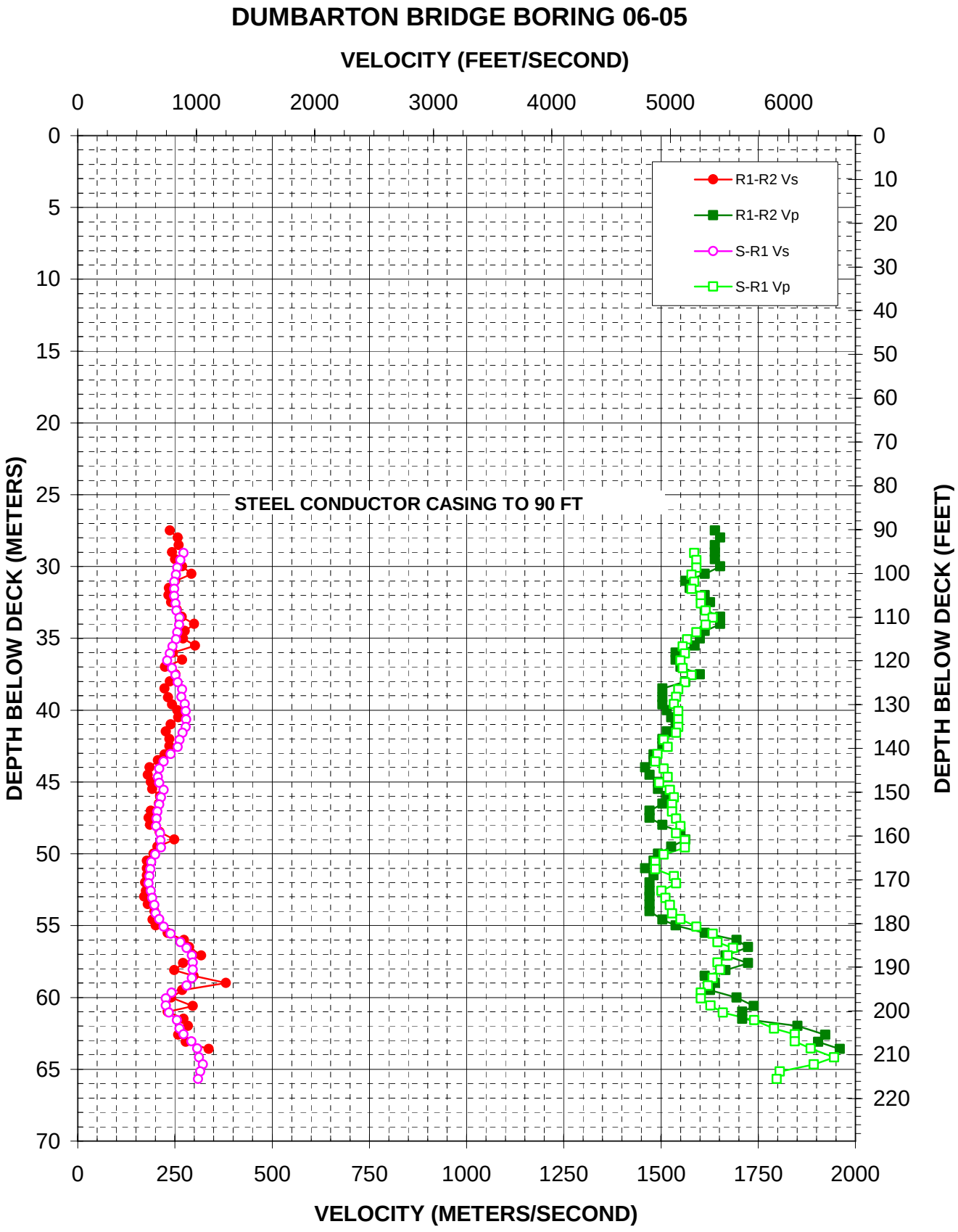


Figure A-3. Boring 06-05, R1 - R2 high resolution analysis and S-R1 quality assurance analysis

Depth (meters)	Velocity		Depth (feet)	Velocity	
	$V\text{-}S_H$ (m/sec)	V-p (m/sec)		$V\text{-}S_H$ (ft/sec)	V-p (ft/sec)
29.1	273	1585	95.4	894	5201
29.6	265	1591	97.0	868	5220
30.1	256	1591	98.7	841	5220
30.6	253	1579	100.3	831	5182
31.1	249	1585	101.9	817	5201
31.6	249	1579	103.6	817	5182
32.1	249	1603	105.2	817	5259
32.6	251	1603	106.9	825	5259
33.1	254	1615	108.5	835	5299
33.6	262	1634	110.1	859	5360
34.1	261	1615	111.8	857	5299
34.6	256	1591	113.4	841	5220
35.1	253	1568	115.1	831	5144
35.6	244	1556	116.7	801	5106
36.1	238	1562	118.3	779	5125
36.6	231	1551	120.0	757	5088
37.1	242	1556	121.6	795	5106
37.6	251	1579	123.3	825	5182
38.1	258	1562	124.9	845	5125
38.6	269	1545	126.5	883	5069
39.1	267	1540	128.2	877	5051
39.6	275	1534	129.8	904	5033
40.1	278	1545	131.5	913	5069
40.7	279	1545	133.4	915	5069
41.2	278	1545	135.1	913	5069
41.6	271	1540	136.4	888	5051
42.1	263	1507	138.0	861	4944
42.6	258	1518	139.7	845	4979
43.1	239	1491	141.3	784	4893
43.6	221	1486	142.9	725	4876
44.1	210	1507	144.6	688	4944
44.7	207	1518	146.6	678	4979
45.1	210	1497	147.9	688	4910
45.6	221	1523	149.5	726	4997
46.1	215	1534	151.1	704	5033
46.6	210	1529	152.8	689	5015
47.1	205	1529	154.4	673	5015
47.6	203	1540	156.1	665	5051
48.1	202	1551	157.7	663	5088
48.6	212	1540	159.4	696	5051
49.1	213	1562	161.0	699	5125
49.6	215	1562	162.6	706	5125
50.1	200	1507	164.3	657	4944
50.6	190	1486	165.9	622	4876
51.1	187	1486	167.6	614	4876
51.6	185	1534	169.2	606	5033
52.1	183	1540	170.8	601	5051
52.6	189	1502	172.5	620	4927
53.1	192	1512	174.1	630	4962
53.6	198	1523	175.8	648	4997
54.2	200	1529	177.7	657	5015
54.6	210	1551	179.0	689	5088
55.1	221	1591	180.7	725	5220
55.6	240	1634	182.3	786	5360
56.2	265	1646	184.3	869	5401
56.6	280	1685	185.6	920	5528
57.1	294	1672	187.2	966	5485
57.6	297	1646	188.9	974	5401
58.1	296	1653	190.5	971	5422
58.7	294	1634	192.5	966	5360
59.2	280	1621	194.1	920	5319
59.7	241	1603	195.8	792	5259
60.1	227	1603	197.1	746	5259
60.6	227	1627	198.7	746	5339
61.1	235	1659	200.4	772	5443
61.6	256	1740	202.0	839	5708
62.2	262	1791	204.0	859	5875
62.6	272	1845	205.3	892	6053
63.1	293	1845	206.9	960	6053
63.6	308	1885	208.6	1010	6186
64.2	312	1945	210.5	1025	6383
64.7	323	1894	212.2	1059	6213
65.2	316	1806	213.8	1037	5925
65.7	310	1798	215.5	1016	5900

Table A-3. Boring 06-05, S - R1 quality assurance analysis P- and S_H-wave data

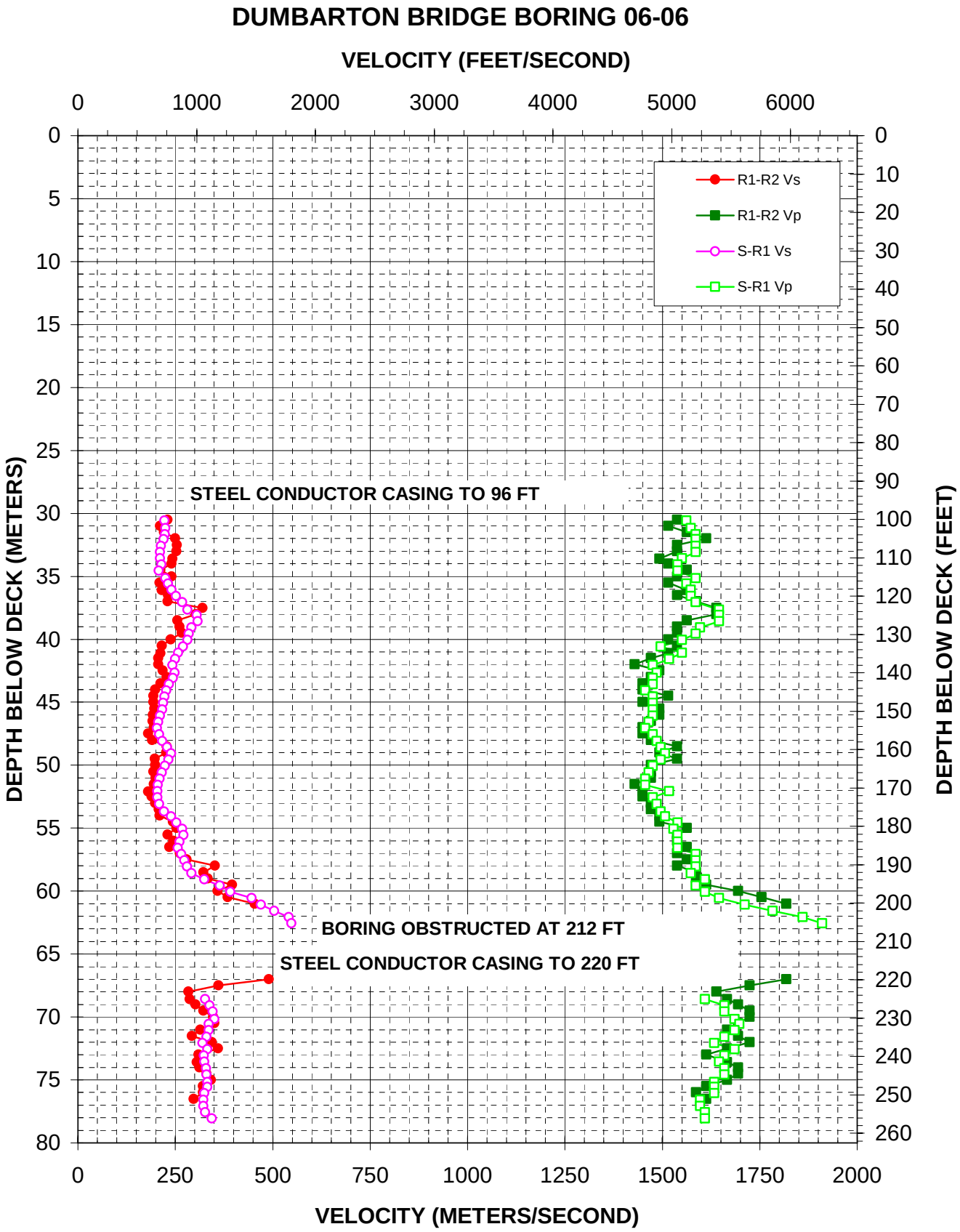


Figure A-4. Boring 06-06, R1 - R2 high resolution analysis and S-R1 quality assurance analysis

Depth (meters)	Velocity V-S_H (m/sec)	Velocity V-p (m/sec)	Depth (feet)	Velocity V- S_H (ft/sec)	Velocity V-p (ft/sec)
30.6	223	1562	100.3	731	5125
31.2	225	1574	102.3	739	5162
31.7	224	1585	103.9	735	5201
32.1	221	1585	105.2	724	5201
32.6	213	1585	106.9	699	5201
33.1	211	1585	108.5	692	5201
33.6	211	1551	110.1	692	5088
34.1	214	1540	111.8	702	5051
34.6	208	1540	113.4	682	5051
35.2	225	1585	115.4	739	5201
35.6	231	1562	116.7	759	5125
36.1	240	1574	118.3	789	5162
36.6	252	1574	120.0	826	5162
37.1	268	1585	121.6	878	5201
37.7	282	1646	123.6	924	5401
38.1	306	1646	124.9	1003	5401
38.6	308	1646	126.5	1010	5401
39.1	291	1597	128.2	955	5240
39.6	285	1585	129.8	936	5201
40.1	281	1551	131.5	923	5088
40.6	270	1497	133.1	885	4910
41.1	258	1551	134.7	847	5088
41.6	250	1518	136.4	819	4979
42.1	243	1476	138.0	799	4842
42.7	249	1486	140.0	815	4876
43.1	245	1476	141.3	802	4842
43.6	233	1476	142.9	766	4842
44.1	227	1456	144.6	745	4776
44.6	223	1476	146.2	731	4842
45.1	219	1476	147.9	720	4842
45.6	217	1476	149.5	713	4842
46.1	211	1476	151.1	693	4842
46.6	207	1466	152.8	678	4809
47.1	203	1456	154.4	667	4776
47.6	209	1476	156.1	685	4842
48.1	216	1486	157.7	710	4876
48.6	229	1497	159.4	751	4910
49.1	240	1507	161.0	786	4944
49.6	232	1497	162.6	762	4910
50.1	224	1476	164.3	734	4842
50.6	216	1466	165.9	707	4809
51.1	210	1456	167.6	690	4776
51.6	206	1456	169.2	676	4776
52.1	204	1518	170.8	669	4979
52.6	205	1476	172.5	672	4842
53.1	209	1486	174.1	685	4876
53.7	222	1497	176.1	727	4910
54.1	239	1507	177.4	784	4944
54.6	253	1540	179.0	831	5051
55.1	268	1529	180.7	879	5015
55.6	271	1540	182.3	890	5051
56.1	261	1540	184.0	857	5051
56.6	257	1540	185.6	843	5051
57.1	266	1585	187.2	872	5201
57.6	274	1585	188.9	899	5201
58.1	280	1585	190.5	920	5201
58.6	292	1574	192.2	958	5162
59.1	325	1609	193.8	1065	5279
59.6	365	1585	195.4	1196	5201
60.1	391	1609	197.1	1284	5279
60.6	446	1646	198.7	1463	5401
61.1	470	1712	200.4	1543	5617
61.6	504	1783	202.0	1652	5851
62.1	542	1861	203.6	1777	6105
62.6	549	1911	205.3	1800	6269
68.6	327	1609	225.0	1072	5279
69.1	338	1659	226.6	1109	5443
69.6	346	1659	228.2	1134	5443
70.2	350	1685	230.2	1149	5528
70.6	336	1698	231.5	1102	5572
71.1	336	1685	233.2	1102	5528
71.6	331	1659	234.8	1085	5443
72.1	320	1634	236.5	1049	5360
72.6	333	1685	238.1	1092	5528
73.1	324	1659	239.7	1062	5443
73.6	325	1646	241.4	1065	5401
74.1	329	1659	243.0	1078	5443
74.6	331	1659	244.7	1085	5443
75.2	333	1634	246.6	1092	5360
75.6	333	1634	247.9	1092	5360
76.1	325	1634	249.6	1065	5360
76.6	322	1597	251.2	1056	5240
77.1	322	1597	252.9	1056	5240
77.6	327	1609	254.5	1072	5279
78.1	343	1609	256.1	1127	5279

Table A-4. Boring 06-06, S - R1 quality assurance analysis P- and S_H-wave data

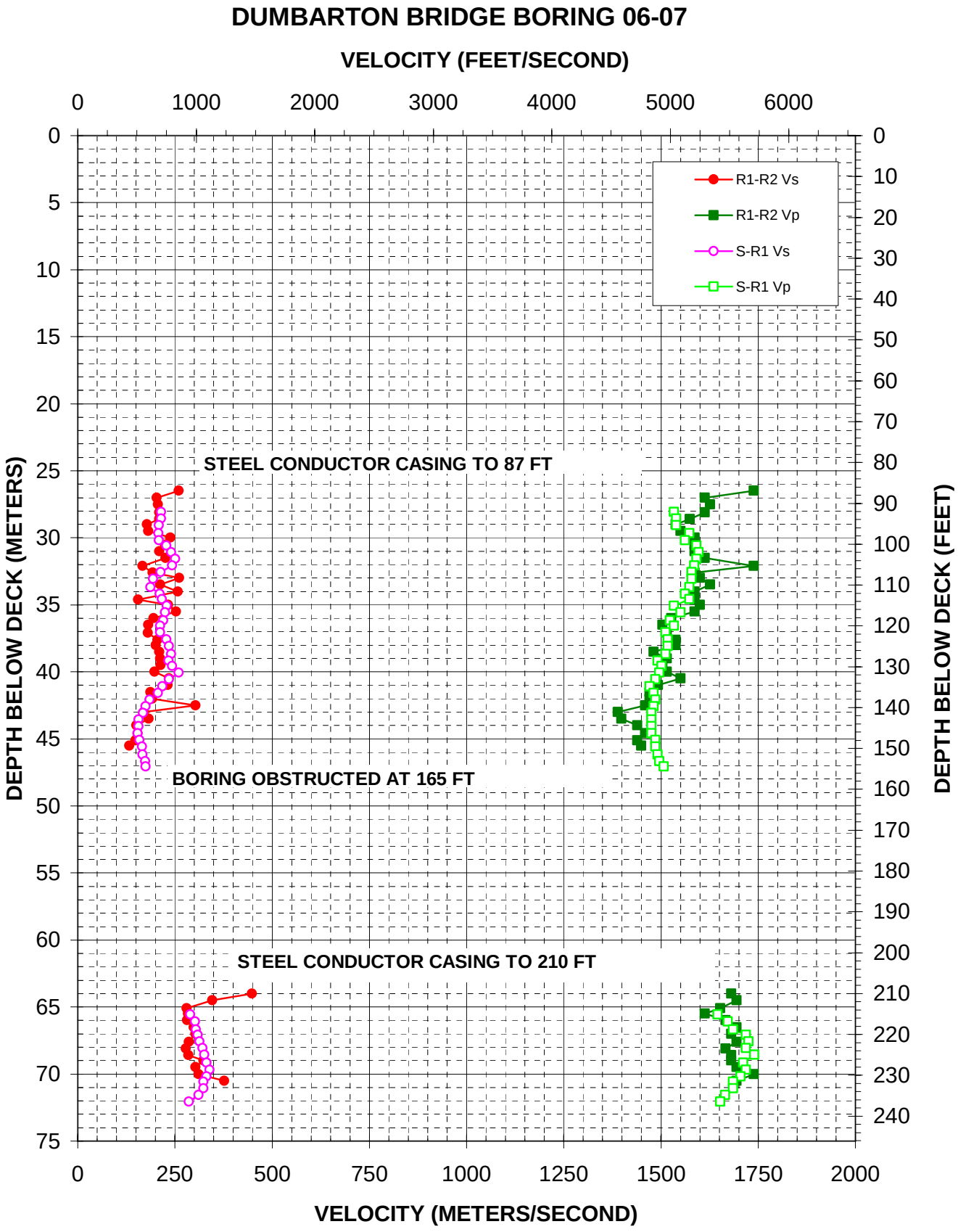


Figure A-5. Boring 06-07, R1 - R2 high resolution analysis and S-R1 quality assurance analysis

Depth (meters)	Velocity V-S_H (m/sec)	Velocity V-p (m/sec)	Depth (feet)	Velocity V- S_H (ft/sec)	Velocity V-p (ft/sec)
28.1	215	1534	92.1	705	5033
28.6	215	1540	93.7	705	5051
29.1	209	1540	95.4	685	5051
29.7	207	1574	97.3	680	5162
30.2	209	1562	99.0	685	5125
30.6	228	1591	100.3	747	5220
31.1	240	1597	101.9	789	5240
31.6	250	1591	103.6	821	5220
32.1	243	1585	105.2	798	5201
32.6	213	1579	106.9	699	5182
33.1	195	1579	108.5	638	5182
33.7	188	1574	110.5	616	5162
34.2	211	1562	112.1	692	5125
34.6	217	1574	113.4	713	5162
35.1	229	1534	115.1	751	5033
35.6	225	1551	116.7	739	5088
36.2	221	1523	118.7	724	4997
36.6	212	1534	120.0	695	5033
37.1	212	1512	121.6	695	4962
37.6	228	1518	123.3	747	4979
38.1	235	1518	124.9	772	4979
38.7	240	1512	126.9	789	4962
39.2	234	1491	128.5	767	4893
39.6	243	1502	129.8	798	4927
40.1	259	1497	131.5	851	4910
40.6	235	1486	133.1	772	4876
41.1	218	1471	134.7	716	4825
41.6	207	1481	136.4	678	4859
42.1	185	1486	138.0	606	4876
42.6	175	1481	139.7	573	4859
43.1	169	1476	141.3	553	4842
43.6	156	1476	142.9	512	4842
44.1	156	1476	144.6	512	4842
44.6	155	1476	146.2	507	4842
45.1	159	1486	147.9	520	4876
45.6	165	1486	149.5	542	4876
46.2	167	1491	151.5	549	4893
46.7	173	1497	153.1	569	4910
47.1	175	1507	154.4	573	4944
65.6	289	1646	215.1	949	5401
66.1	302	1672	216.8	992	5485
66.7	304	1685	218.7	997	5528
67.1	309	1719	220.0	1015	5639
67.6	313	1726	221.7	1026	5662
68.1	321	1719	223.3	1054	5639
68.6	325	1740	225.0	1067	5708
69.2	331	1712	226.9	1087	5617
69.7	340	1719	228.6	1114	5639
70.2	331	1705	230.2	1087	5594
70.6	323	1685	231.5	1061	5528
71.1	323	1685	233.2	1061	5528
71.6	311	1665	234.8	1020	5464
72.1	286	1653	236.5	939	5422

Table A-5. Boring 06-07, S - R1 quality assurance analysis P- and S_H-wave data

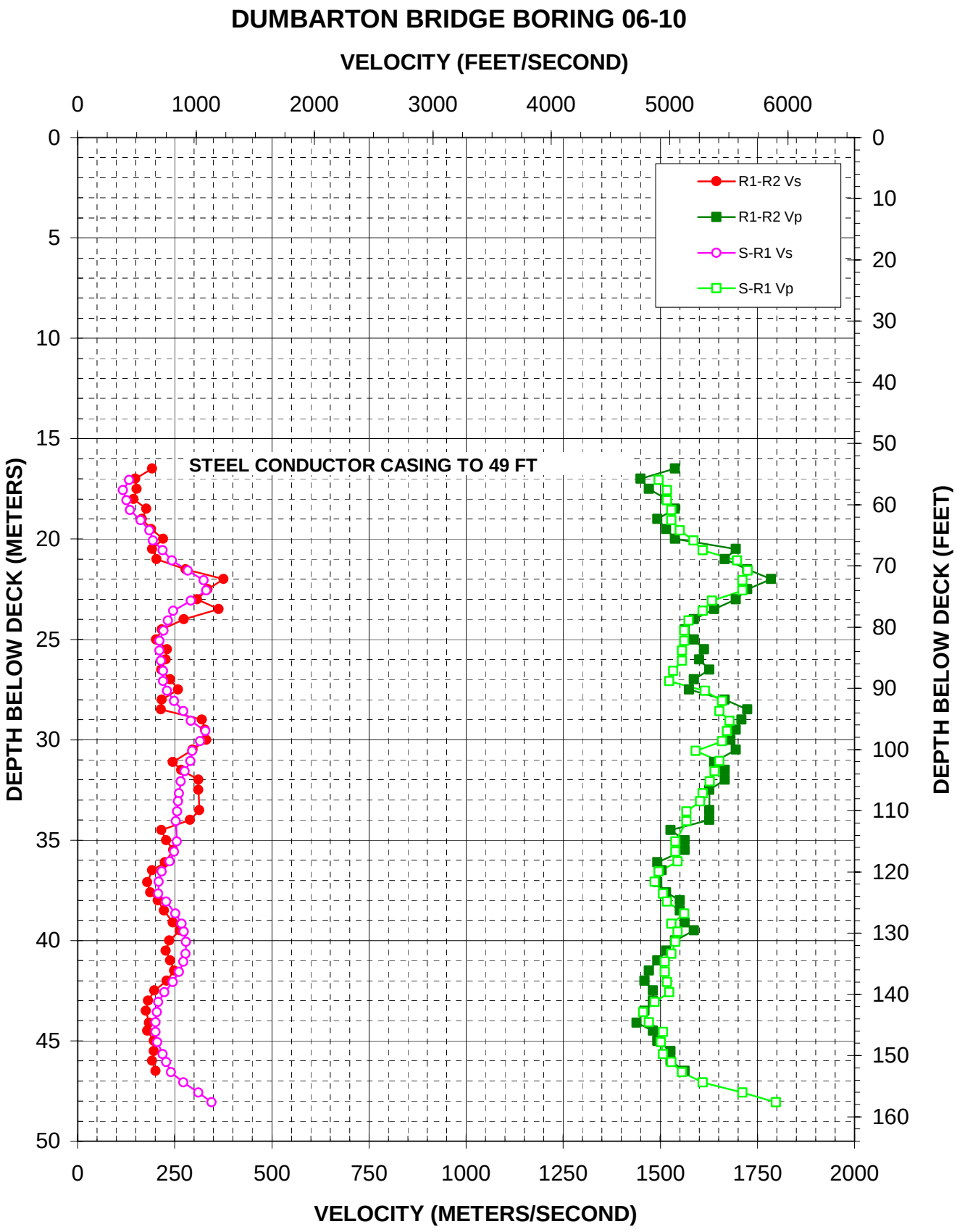


Figure A-6. Boring 06-10, R1 - R2 high resolution analysis and S-R1 quality assurance analysis

Depth (meters)	Velocity V-S_H (m/sec)	Velocity V-p (m/sec)	Depth (feet)	Velocity V- S_H (ft/sec)	Velocity V-p (ft/sec)
17.1	133	1497	56.0	435	4910
17.6	117	1518	57.6	385	4979
18.1	126	1518	59.3	412	4979
18.6	135	1529	60.9	443	5015
19.1	163	1529	62.6	534	5015
19.6	185	1551	64.2	608	5088
20.1	195	1585	65.8	638	5201
20.6	219	1609	67.5	720	5279
21.1	243	1698	69.1	798	5572
21.6	283	1726	70.8	930	5662
22.1	324	1712	72.4	1064	5617
22.6	332	1712	74.0	1089	5617
23.1	291	1634	75.7	955	5360
23.6	247	1609	77.3	810	5279
24.1	233	1574	79.0	764	5162
24.6	222	1562	80.6	728	5125
25.1	212	1562	82.3	694	5125
25.6	212	1556	83.9	694	5106
26.1	214	1556	85.5	703	5106
26.6	220	1534	87.2	723	5033
27.1	220	1523	88.8	723	4997
27.6	230	1615	90.5	754	5299
28.1	249	1659	92.1	815	5443
28.6	272	1653	93.7	892	5422
29.1	291	1678	95.4	955	5507
29.6	329	1672	97.0	1081	5485
30.1	315	1659	98.7	1034	5443
30.6	295	1591	100.3	968	5220
31.1	291	1653	101.9	955	5422
31.6	276	1640	103.6	906	5380
32.1	266	1627	105.2	872	5339
32.7	261	1609	107.2	855	5279
33.1	259	1603	108.5	849	5259
33.6	257	1568	110.1	843	5144
34.1	253	1568	111.8	829	5144
35.1	255	1540	115.1	837	5051
35.6	249	1540	116.7	815	5051
36.1	238	1545	118.3	779	5069
36.6	217	1497	120.0	711	4910
37.1	208	1486	121.6	684	4876
37.7	207	1507	123.6	680	4944
38.1	228	1518	124.9	749	4979
38.7	251	1562	126.9	825	5125
39.2	268	1529	128.5	879	5015
39.6	274	1545	129.8	899	5069
40.1	280	1540	131.5	918	5051
40.7	278	1529	133.4	911	5015
41.1	272	1512	134.7	892	4962
41.6	261	1512	136.4	855	4962
42.1	245	1518	138.0	804	4979
42.6	223	1523	139.7	732	4997
43.1	207	1486	141.3	680	4876
43.6	205	1456	142.9	672	4776
44.1	201	1471	144.6	660	4825
44.6	201	1507	146.2	660	4944
45.1	206	1502	147.9	676	4927
45.7	219	1507	149.8	719	4944
46.1	228	1529	151.1	749	5015
46.6	240	1556	152.8	788	5106
47.1	272	1609	154.4	892	5279
47.6	311	1712	156.1	1019	5617
48.1	345	1798	157.7	1131	5900

Table A-6. Boring 06-10, S - R1 quality assurance analysis P- and S_H-wave data

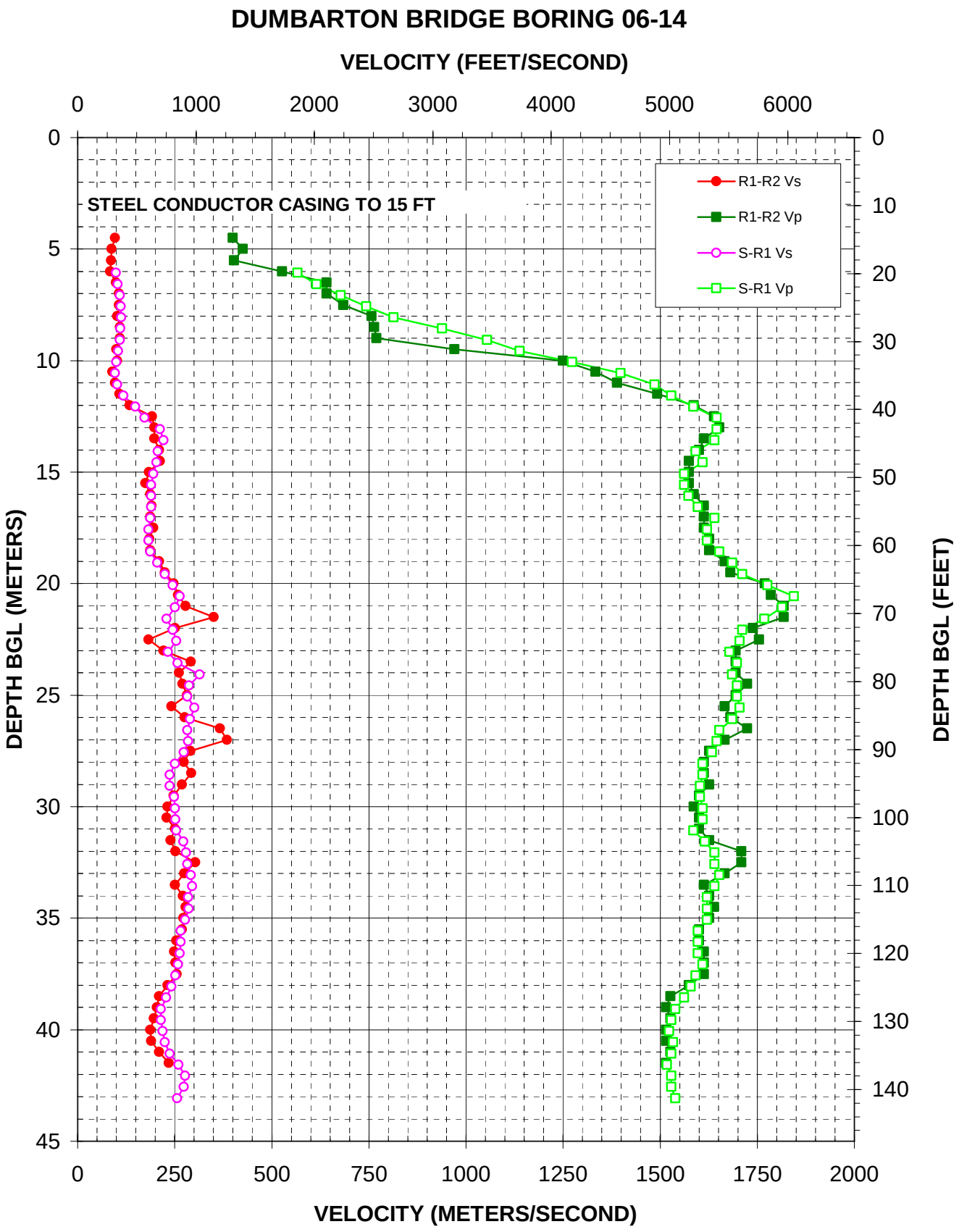


Figure A-7. Boring 06-14, R1 - R2 high resolution analysis and S-R1 quality assurance analysis

Depth (meters)	Velocity V-S_H (m/sec)	Velocity V-p (m/sec)	Depth (feet)	Velocity V- S_H (ft/sec)	Velocity V-p (ft/sec)
6.1	98	566	19.9	322	1857
6.6	103	615	21.6	338	2018
7.1	109	677	23.2	356	2222
7.6	112	743	24.8	366	2438
8.1	112	814	26.5	368	2670
8.6	110	939	28.1	361	3079
9.1	109	1054	29.8	358	3459
9.6	105	1138	31.4	344	3735
10.1	99	1274	33.0	326	4179
10.6	97	1399	34.7	318	4589
11.1	102	1486	36.3	335	4876
11.6	118	1529	38.0	386	5015
12.1	148	1585	39.6	487	5201
12.6	172	1646	41.2	565	5401
13.1	212	1646	42.9	697	5401
13.6	221	1640	44.5	725	5380
14.1	206	1591	46.2	676	5220
14.6	203	1609	47.8	667	5279
15.1	196	1562	49.4	642	5125
15.6	189	1562	51.1	620	5125
16.1	189	1574	52.7	620	5162
16.6	189	1597	54.4	620	5240
17.1	187	1640	56.0	614	5380
17.6	182	1621	57.6	599	5319
18.1	182	1621	59.3	599	5319
18.6	187	1653	60.9	614	5422
19.1	205	1685	62.6	673	5528
19.6	225	1712	64.2	737	5617
20.1	245	1776	65.8	805	5827
20.6	263	1845	67.5	864	6053
21.1	251	1814	69.1	822	5950
21.6	230	1769	70.8	753	5802
22.1	245	1712	72.4	805	5617
22.6	255	1705	74.0	836	5594
23.1	233	1678	75.7	765	5507
23.6	257	1698	77.3	844	5572
24.1	315	1685	79.0	1032	5528
24.6	288	1698	80.6	944	5572
25.1	282	1698	82.3	926	5572
25.6	301	1705	83.9	986	5594
26.1	289	1685	85.5	949	5528
26.6	282	1653	87.2	926	5422
27.1	285	1646	88.8	936	5401
27.6	274	1634	90.5	898	5360
28.1	251	1609	92.1	822	5279
28.6	237	1609	93.7	777	5279
29.1	237	1603	95.4	777	5259
29.6	248	1603	97.0	815	5259
30.1	251	1609	98.7	822	5279
30.6	252	1609	100.3	826	5279
31.1	255	1585	101.9	836	5201
31.6	272	1615	103.6	893	5299
32.1	279	1640	105.2	917	5380
32.6	282	1640	106.9	926	5380
33.1	292	1653	108.5	957	5422
33.6	295	1640	110.1	967	5380
34.1	285	1621	111.8	936	5319
34.6	286	1621	113.4	939	5319
35.1	277	1621	115.1	909	5319
35.6	266	1597	116.7	873	5240
36.1	266	1597	118.3	873	5240
36.6	264	1597	120.0	865	5240
37.1	259	1609	121.6	850	5279
37.6	252	1591	123.3	826	5220
38.1	242	1579	124.9	792	5182
38.6	229	1562	126.5	750	5125
39.1	214	1540	128.2	702	5051
39.6	215	1529	129.8	705	5015
40.1	219	1523	131.5	718	4997
40.6	225	1534	133.1	739	5033
41.1	238	1529	134.7	780	5015
41.6	260	1518	136.4	854	4979
42.1	277	1529	138.0	909	5015
42.6	274	1529	139.7	898	5015
43.1	256	1540	141.3	840	5051

Table A-7. Boring 06-14, S - R1 quality assurance analysis P- and S_H-wave data

APPENDIX B

OYO 170 VELOCITY LOGGING SYSTEM

NIST TRACEABLE

CALIBRATION PROCEDURE

CALIBRATION PROCEDURE FOR

GEOVision SEISMIC RECORDER/LOGGER

Reviewed 4/6/06

Objective

The timing/sampling accuracy of seismic recorders or data loggers is required for several GEOVision field procedures including Seismic Refraction, Downhole Seismic Velocity Logging, and P-S Suspension Logging. This procedure describes the method for measuring the timing accuracy of a seismic data logger, such as the OYO Model 170, OYO/Robertson Model 3403, Geometrics Strataview or Geometrics Geode. The objective of this procedure is to verify that the timing accuracy of the recorder is accurate to within 1%.

Frequency of Calibration

The calibration of each GEOVision seismic data logger is twelve (12) months. In the case of rented seismic data loggers, calibration must be performed prior to use.

Test Equipment Required

The following equipment is required. Item #2 must have current NIST traceable calibration.

1. Function generator, Krohn Hite 5400B or equivalent
2. Frequency counter, HP 5315A or equivalent
3. Test cables, from item 1 to item 2, and from item 1 to subject data logger.

Procedure

This procedure is designed to be performed using the accompanying Seismograph Calibration Data Sheet with the same revision number. All data must be entered and the procedure signed by the technician performing the test.

1. Record all identification data on the form provided.
2. Connect function generator to data logger (such as OYO Model 170) using test cable
3. Connect the function generator to the frequency counter using test cable.

4. Set up generator to produce a 100.0 Hz, 0.25 volt (amplitude is approximate, modify as necessary to yield less than full scale waveforms on logger display) peak square wave or sine wave. Verify frequency using the counter and initial space on the data sheet.

5. Initialize data logger and record a data record of at least 0.1 second using a 100 microsecond or less sample period.

6. Measure the recorded square wave frequency by measuring the duration of 9 cycles of data. This measurement can be made using the data logger display device, or by printing out a paper tape. If a paper tape can be printed, the resulting printout must be attached to this procedure. Record the data in the space provided.

7. Repeat steps 5 and 6 three more times using separate files.

Criteria

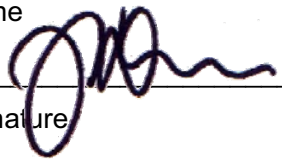
The duration for 9 cycles in any file must be 90.0 milliseconds plus or minus 0.9 milliseconds, corresponding to an average frequency for the nine cycles of 100.0 Hz plus or minus 1 Hz (obtained by dividing 9 cycles by the duration in milliseconds).

If the results are outside this range, the data logger must be marked with a GEOVision REJECT tag until it can be repaired and retested.

If results are acceptable affix label indicating the initials of the person performing the calibration, the date of calibration, and the due date for the next calibration (12 months).

Procedure Approval

Approved by:

John G. Diehl	President
Name	Title
	April 6, 2006
Signature	Date

Client Approval (if required):

_____	_____
Name	Title
_____	_____
Signature	Date

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

Certificate of Accreditation to ISO/IEC 17025:1999

NVLAP LAB CODE: 105014-0

Southern California Edison Company
Westminster, CA

is recognized by the National Voluntary Laboratory Accreditation Program for conformance with criteria set forth in NIST Handbook 150:2001 and all requirements of ISO/IEC 17025:1999.
Accreditation is granted for specific services, listed on the Scope of Accreditation, for:

CALIBRATION LABORATORIES

2006-04-01 through 2007-03-31
Effective dates

DEPARTMENT OF COMMERCE * UNITED STATES OF AMERICA *

For the National Institute of Standards and Technology

NVLAP-01C (REV. 2005-05-19)

National Voluntary Laboratory Accreditation Program

SCOPE OF ACCREDITATION TO ISO/IEC 17025:1999

Southern California Edison Company
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CALIBRATION LABORATORIES **NVLAP LAB CODE 105014-0**

NVLAP Code: 20/A01 ANSI/NCSL Z540-1-1994; Part 1 Compliant

DIMENSIONAL

NVLAP Code: 20/D03
Gage Blocks

Nominal Length in in	*Best Uncertainty (±) in µin* [note 1]
0.01 to < 0.05	1.9
0.05 to < 0.1	1.7
0.1 to < 1.0	1.2
1.0	1.4
2.0	1.8
3.0	2.2
4.0	2.9
5.0	5.4
6.0	5.6
7.0	5.8
8.0	6.0
10.0	6.8
12.0	7.2
16.0	8.1
20.0	9.4

2006-04-01 through 2007-03-31

Effective dates

For the National Institute of Standards and Technology

CALIBRATION LABORATORIES **NVLAP LAB CODE 105014-0**

Nominal Length in mm	*Best Uncertainty (±) in nm* note 1
0.5 to < 1.0	52
1.0 to < 2.5	44
2.5 to < 25.0	39
25.0	44
50.0	47
75.0	60
100.0	80

NVLAP Code: 20/D11
Spherical Diameter; Ring Gages

Range in inches	*Best Uncertainty (±) in µin* note 1	*Remarks*
0.040 to 0.825	6	Comparison to gage blocks
> 0.825 to 1.510	7	Comparison to gage blocks
> 1.510 to 2.510	8	Comparison to gage blocks
> 2.510 to 4.510	12	Comparison to gage blocks
> 4.510 to 6.510	14	Comparison to gage blocks
> 6.510 to 9.010	16	Comparison to gage blocks
> 9.010 to 12.010	19	Comparison to gage blocks
> 12.010 to 13.25	31	Comparison to gage blocks

ELECTROMAGNETICS - DC/LOW FREQUENCY

NVLAP Code: 20/E02
AC Current

Range	*Best Uncertainty (±) in ppm* note 1 *Frequency in Hz*			
	10	*20*	*40*	*400 to 10 k*
10 mA	270	199	127	116
20 mA	270	199	127	116
30 mA	270	199	127	116
50 mA	286	208	141	130
100 mA	270	199	127	116

2006-04-01 through 2007-03-31

Effective dates

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CALIBRATION LABORATORIES **NVLAP LAB CODE 105014-0**

200 mA		270		199	127		116
300 mA		270		199	127		116
500 mA		270		208	141		130
	10	***20***	***40***	***400 to 5 k***	***10 k***		
1A	270	199	127	116	130		
	10	***20***	***40***	***400 to 10 k***			
2A	271	200	129	118			
3A	271	200	129	118			
	10	***20***	***40***	***400 to 5 k***	***10 k***		
5A	286	209	142	132	148		
	10	***20***	***40***	***400***	***1 k***	***5 k***	***10 k***
10A	273	233	132	121	121	143	143
							400 to 10 k
20A							144

NVLAP Code: 20/E05
DC Current

Range	***Best Uncertainty (±) in ppm*** [note 1]
10 nA	2.9
100 nA	2.3
1 µA	2.0
10 µA	2.0
100 µA	2.0
1 mA	1.9
10 mA	1.9
100 mA	1.9
1 A	10.4
10 A	10.4
30 A	20.6

2006-04-01 through 2007-03-31

Effective dates

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CALIBRATION LABORATORIES **NVLAP LAB CODE 105014-0**

DC Resistance

Nominal Value in Ω	*Best Uncertainty (±) in ppm* [note 1]	*Remarks*
100 μ	8.20	Automated DC Resistance Calibration System
1 m	5.50	Automated DC Resistance Calibration System
10 m	3.70	Automated DC Resistance Calibration System
100 m	2.10	Automated DC Resistance Calibration System
1	0.40	Automated DC Resistance Calibration System
10	0.40	Automated DC Resistance Calibration System
25	0.50	Automated DC Resistance Calibration System
100	0.50	Automated DC Resistance Calibration System
1 k	0.50	Automated DC Resistance Calibration System
10 k	0.50	Automated DC Resistance Calibration System
100 k	1.50	Automated DC Resistance Calibration System
1 M	2.30	Automated DC Resistance Calibration System
10 M	3.30	Automated DC Resistance Calibration System
100 M	4.00	Automated DC Resistance Calibration System

NVLAP Code: 20/E06
DC Voltage

Range	*Best Uncertainty (±) in ppm* [notes 1,2]	*Remarks*
1.018 V	0.80	Automated DC Calibration System
10.00 V	0.20	Automated DC Calibration System
1.000 V	0.80	Automated DC Calibration System
1 mV to 100 mV	1.3 [note 6]	Ratiometric Measurement Techniques performed by voltage transfer utilizing a high precision voltage
100 mV	0.7	Ratiometric Measurement Techniques performed by voltage transfer utilizing a high precision voltage
1.0 V	0.3	Ratiometric Measurement Techniques performed by voltage transfer utilizing a high precision voltage

2006-04-01 through 2007-03-31

Effective dates

For the National Institute of Standards and Technology

CALIBRATION LABORATORIES **NVLAP LAB CODE 105014-0**

10.0 V	0.3	Ratiometric Measurement Techniques performed by voltage transfer utilizing a high precision voltage
20.0 V	0.5	Ratiometric Measurement Techniques performed by voltage transfer utilizing a high precision voltage
100.0 V	0.3	Ratiometric Measurement Techniques performed by voltage transfer utilizing a high precision voltage
1000.0 V	0.7	Ratiometric Measurement Techniques performed by voltage transfer utilizing a high precision voltage

NVLAP Code: 20/E09
LF AC Voltage

Best Uncertainty (±) in ppm [notes 1,3,4]
Frequency in Hz

Range	*10*	*20*	*40*	*100*	*1k*	*10k*	*20k*	*50k*	*100k*	*300k*	*500k*	*800k*	*1M*
2 mV	448	912	889	969	379	865	1073	405	1131	1265	2116	2595	2938
10 mV	119	230	102	177	245	169	180	220	343	243	676	425	488
20 mV	83	70	67	67	66	76	76	165	261	361	521	372	442
30 mV	134	111	80	78	62	63	71	133	219	345	535	688	791
100 mV	36	72	23	42	34	35	34	43	77	169	220	287	225
190 mV	36	31	22	20	21	26	21	42	80	136	124	264	215
300 mV	46	61	30	32	34	19	28	36	59	116	143	189	205
1 V	120	36	18	10	13	12	11	25	14	87	102	104	98
1.9 V	36	22	22	9	9	9	8	18	11	94	101	85	89
3 V	26	34	25	17	14	14	13	27	14	100	108	95	97
10 V	20	42	19	10	10	9	10	11	16	80	100	111	100
19 V	26	23	20	11	9	9	10	11	16	98	109	82	82
30 V	30	37	26	19	15	16	19	37	44	118			
100 V	140	46	20	16	15	19	11	40	22				
190 V	47	27	20	20	13	13	13	41	26				
300 V			37	29	18	27	22	29	46				
500 V			33	25	17	20	19	38	52				

2006-04-01 through 2007-03-31

Effective dates

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700 V	29	23	18	17	19	44	54
1000 V	22	23	21	19	22		

TIME AND FREQUENCY

NVLAP Code: 20/F01
Frequency Dissemination

Range	*Best Uncertainty (±)* [note 1]	*Remarks*
10 MHz	1.2×10^{-12}	GPS Receiver

MECHANICAL

NVLAP Code: 20/M05
Flow Rate

Nominal Flow Rate	*Best Uncertainty (±) in percent* [notes 1, 5]
(0.8 to 30) L/s	0.3
(0.1 to 800) mL/s	0.4
(0.006 to 0.1) mL/s	0.7

NVLAP Code: 20/M06
Force

Nominal Force in lb	*Best Uncertainty (±)* [note 1]	*Remarks*
2 to 200	0.025 %	Dead Weight
> 200 to 300	0.086 lb	Proving Ring
> 300 to 500	0.14 lb	Proving Ring
> 500 to 1000	0.28 lb	Proving Ring
> 1000 to 2000	0.55 lb	Proving Ring
> 2000 to 5000	0.84 lb	Proving Ring
> 5000 to 10 000	1.7 lb	Proving Ring
> 10 000 to 20 000	5.5 lb	Proving Ring
> 20 000 to 35 000	5.8 lb	Proving Ring
> 35 000 to 50 000	13 lb	Proving Ring

2006-04-01 through 2007-03-31

Effective dates

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CALIBRATION LABORATORIES **NVLAP LAB CODE 105014-0**

> 50 000 to 60 000	16 lb	Proving Ring
> 60 000 to 100 000	26 lb	Proving Ring
> 100 000 to 300 000	113 lb	Proving Ring

NVLAP Code: 20/M08
Mass

Range	*Best Uncertainty (±) in mg* [notes 1,2]	*Remarks*
10 kg	2.3	Echelon I
5 kg	0.93	Echelon I
3 kg	0.65	Echelon I
2 kg	0.43	Echelon I
1 kg	0.052	Echelon I
500 g	0.043	Echelon I
300 g	0.041	Echelon I
200 g	0.034	Echelon I
100 g	0.020	Echelon I
50 g	0.013	Echelon I
30 g	0.013	Echelon I
20 g	0.0095	Echelon I
10 g	0.0073	Echelon I
5 g	0.0048	Echelon I
3 g	0.0038	Echelon I
2 g	0.0029	Echelon I
1 g	0.0030	Echelon I
500 mg	0.0017	Echelon I
300 mg	0.0013	Echelon I
200 mg	0.0010	Echelon I
100 mg	0.0009	Echelon I
50 mg	0.0007	Echelon I
30 mg	0.0007	Echelon I
20 mg	0.0005	Echelon I
10 mg	0.0005	Echelon I
5 mg	0.0006	Echelon I
3 mg	0.0006	Echelon I

2006-04-01 through 2007-03-31

Effective dates

For the National Institute of Standards and Technology

CALIBRATION LABORATORIES **NVLAP LAB CODE 105014-0**

2 mg	0.0005	Echelon I
1 mg	0.0005	Echelon I
30 kg	56	Echelon II
20 kg	22	Echelon II

THERMODYNAMIC

NVLAP Code: 20/T05
Pressure

Range	*Best Uncertainty (±) in ppm* [note 1]	*Remarks*
> 1.5 to 50	20	Gas
> 50 to 1450	45	Gas
> 1450 to 16 000	90	Gas
> 1000 to 10 000	60	Oil
> 10 000 to 30 000	110	Oil
> 30 000 to 50 000	210	Oil

1. Represents an expanded uncertainty using a coverage factor, k = 2, at an approximate level of confidence of 95 %.
2. Approximate value. Actual value determined by the test statistics.
3. All ACV measurements performed via AC/DC transfer system.
4. Uncertainties listed are representative of the laboratory's accredited capabilities within the stated ranges. Accreditation is not limited to only those fixed values shown.
5. Dependent upon principle of operation of device being calibrated and its performance relative to standards at the time of the test.
6. The equation: uncert. = $(A + B/mVDC^2)^{0.5}$ (where A = 0.16 and B = 0.013333) is provided in order for potential customers to calculate approximate uncertainties for values down to 1 mV. Example: uncertainty at 1 mVDC would calculate to approximately ±115.47 ppm.
7. The laboratory maintains Echelon II capability for ranges 20 kg to 1 mg and separate Echelon III for all ranges.
8. Avoirdupois mass calibration services are available by comparison to equivalent metric standards. Uncertainties may be appropriately larger.

2006-04-01 through 2007-03-31

Effective dates

For the National Institute of Standards and Technology

GEOVision Borehole Geophysics depth wheel verification

Performed by Robert Steller on September 23, 2006

	Depth reading in #1	Depth reading out	Depth reading in #2
Depth wheel S/N 101 500 pulse/revolution Circumference = 983mm (3225.07 millifeet)	100.1 feet (30.51 m)	99.95 feet (30.46 m)	100.05 feet (30.50 m)
Depth wheel S/N 102 500 pulse/revolution Circumference = 994mm (3261.15 millifeet)	100.00 feet (30.48) m	100.05 feet (30.50 m)	100.00 feet (30.48) m
Aries winch 200 pulse/revolution Circumference = 305.9mm (1003.51 millifeet)	100.05 feet (30.50) m	100.05 feet (30.50 m)	100.00 feet (30.48) m
Depth wheel S/N 103 500 pulse/revolution Circumference = 1000mm (3.281 feet)			
Comprobe winch 500 pulse/revolution Circumference = 1000mm (3.281 feet)			

All measurements taken with a Stanley 100ft flexible stainless steel tape model number 34-130, and a Keeson 300 foot fiberglass tape, both marked in feet, inches and 1/8ths of inches. Enough cable was spooled off of the winch to allow the cable and tape measures to be laid flat on the parking lot surface side-by-side. A permanent marker was used to mark a 100.0 foot interval on the cable, and the marks were also tagged with electrical tape for visibility. The cable was then spooled back onto the winch. When the first mark was at the top of the measuring wheel, a matching permanent mark was placed, and the recording system (Robertson Micrologger) was set to 0.0 feet depth. The cable was spooled in to the second mark, and the distance was recorded. The recording system was set to 0.0 feet again, and the cable spooled out to the first mark again, and the distance was recorded. The process was repeated one more time to spool the cable back onto the winch, and the distance was recorded.

Estimated accuracy is of these measurements is +/- 0.1 foot or +/- 0.03m.

GEOVision Suspension PS probe Receiver 1–Receiver 2 (R1-R2) spacing verification

Performed by Robert Steller on September 23, 2006

	R2 center to R1 center hanging dry	R2 center to R1 center hanging submerged	R1 bottom to source center hanging submerged with 1m isolation tube S/N 280068
Receiver S/N 30086	40.2in 1.02m	40.0in 1.02m	76.0in 1.93m
Receiver S/N 20042	39.8in 1.01m	39.6in 1.01m	75.7in 1.92m
Receiver S/N 12008	40.2in 1.02m	40.0in 1.02m	76.0in 1.93m

All measurements taken with a Lufkin 3.7m flexible steel tape model number HV1034DM, marked in mm and 100th of feet. Probe suspended in 3-inch diameter clear PVC pipe, using chain clamp placed between bottom and center of Receiver 2 hard section (See Figure). Probe "bounced" to establish unrestricted hanging length before measurement. Probe allowed to relax for 5 minutes prior to each measurement. Water level set to submerge bottom of Receiver 2 hard section.. Estimated accuracy due to hysterisis in rubber section approximately +/- 0.01' or +/- 0.003m.

TEST NUMBER
506737

EDISON ESI®
A SOUTHERN CALIFORNIA EDISON® Company

Calibration Report

METROLOGY
7300 Fenwick Lane
Westminster, CA 92683
866-723-2257
edisonmetrology.com

GEOVision Geophysical Services
1151 Pomona Road, Unit P
Corona, CA 92882
P.O. No.: 6303-060815-01

Manufacturer:	Oyo
Model Number:	03331-0000
Description:	Seismograph,
Asset Number:	15014
Serial Number:	15014

Calibration Date:	08/16/2006
Calibration Due Date:	08/16/2007
Calibration Interval:	12 Months
Condition As Found:	In Tolerance
Condition As Left:	In Tolerance

Remarks:
The UUT (unit under test) was calibrated using the customer's procedure. The UUT was operated by the customer's personnel and data collection was observed by SCE personnel. The UUT was found to be in tolerance to customer supplied specifications. The reference standards used are in compliance with ISO/IEC 17025:1999 and laboratory accreditation criteria established by NIST/NVLAP under the specific scope of accreditation for lab code 105014-0. Frequency is accredited.
Please see attached data.

Standards Utilized

I.D. No.	Mfg.	Model No.	Description	Cal. Date	Due Date
S1-01252	Hewlett Packard	5335A OPT 010,203040	Counter, Universal,	06/16/2006	12/16/2006
S1-03079	Hewlett Packard	3325B	Generator, Function,	04/04/2006	04/04/2007
S1-03686	Fluke	910	Standard, Frequency, Controlled, Gps	01/16/2006	01/16/2007

Procedure:	Customer
Temperature:	23° C
Humidity:	47% RH
Test No.:	506737

Calibration Performed By:			Quality Reviewer:	
Cordero, Denise M	Metrologist	714-895-0714		8/16/2006
Name	Title	Phone	Name	Date

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GEOVision
geophysical services

SEISMOGRAPH CALIBRATION DATA SHEET REV 4/6/06

INSTRUMENT DATA

SYSTEM MFR:	OYO	MODEL NO.:	3331
SERIAL NO.:	15014	CALIBRATION DATE:	8/16/2006
BY:	ROBERT STELLER	DUE DATE: 8/16/2007	8/16/2007
COUNTER MFR	HEWLETT PACKARD	MODEL NO.:	5335A
SERIAL NO.:	2626A09881	CALIBRATION DATE:	6/16/2006
BY:	SCE #S1-01252	DUE DATE:	12/16/2006
FCTN GEN MFR	HEWLETT PACKARD	MODEL NO.:	3325B
SERIAL NO.:	2847A11880	CALIBRATION DATE:	4/4/2006
BY:	SCE #S1-03073	DUE DATE:	4/4/2007

SYSTEM SETTINGS:

GAIN:	10
FILTER:	20 KHZ
RANGE:	100 MILLISEC
DELAY:	0
STACK: 1 (STD)	1
PULSE:	1.6
DISPLAY:	NA
SYSTEM: DATE = CORRECT DATE & TIME	8/16/2006, 10:38 AM

PROCEDURE:

SET FREQUENCY TO 100.0HZ SQUAREWAVE WITH AMPLITUDE APPROXIMATELY 0.25 VOLT PEAK. RECORD BOTH ON DISK AND PAPER TAPE, IF AVAILABLE. ANALYZE AND PRINT WAVEFORMS FROM ANALYSIS UTILITY. ATTACH PAPER COPIES OF PRINTOUT AND PAPER TAPES, IF AVAILABLE, TO THIS FORM. AVERAGE FREQUENCY MUST BE BETWEEN 99.0 AND 101.0 HZ.

AS FOUND 100.0 AS LEFT 100.0

WAVEFORM	FILE NO	FREQUENCY	TIME FOR 9 CYCLES Hn	TIME FOR 9 CYCLES Hr	TIME FOR 9 CYCLES V	AVERAGE FREQ.
SQUARE	501	100.0	90.0	90.0	90.0	100.0
SQUARE	502	100.0	90.0	90.0	90.0	100.0
SINE	503	100.0	90.0	90.0	90.0	100.0
SINE	504	100.0	90.0	90.0	90.0	100.0

CALIBRATED BY: ROBERT STELLER 8/16/2006 Robt Steller

NAME DATE SIGNATURE

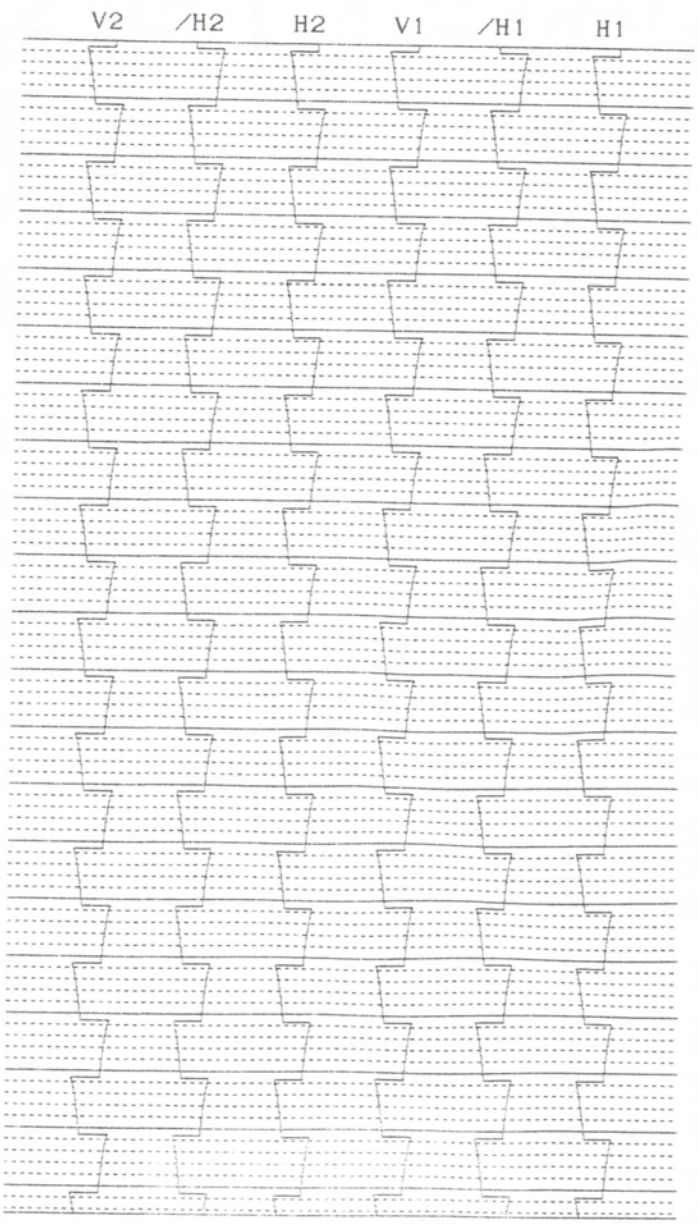
OYO S/N 15014

Suspension 170 1.42

ID_NO. : 501
HOLE NO. : 0
DEPTH : 0.0 [m]
DATE : 16/08/06 10:44:56 AM
H-SAMPLE RATE: 100 [μSEC]
V-SAMPLE RATE: 100 [μSEC]
PULSE WIDTH : 1.6 [mSEC]
DELAY TIME : 0 [mSEC]

	H1	/H1	V1	H2	/H2	V2
GAIN	X 10	X 10	X 10	X 10	X 10	X 10
LCF[Hz]	5	5	5	5	5	5
HCF[Hz]	20K	20K	20K	20K	20K	20K
STACK	1	1	1	1	1	1

TRACE SIZE : 1
H-TIME SCALE: 1.00 [mSEC/LINE]
V-TIME SCALE: 1.00 [mSEC/LINE]



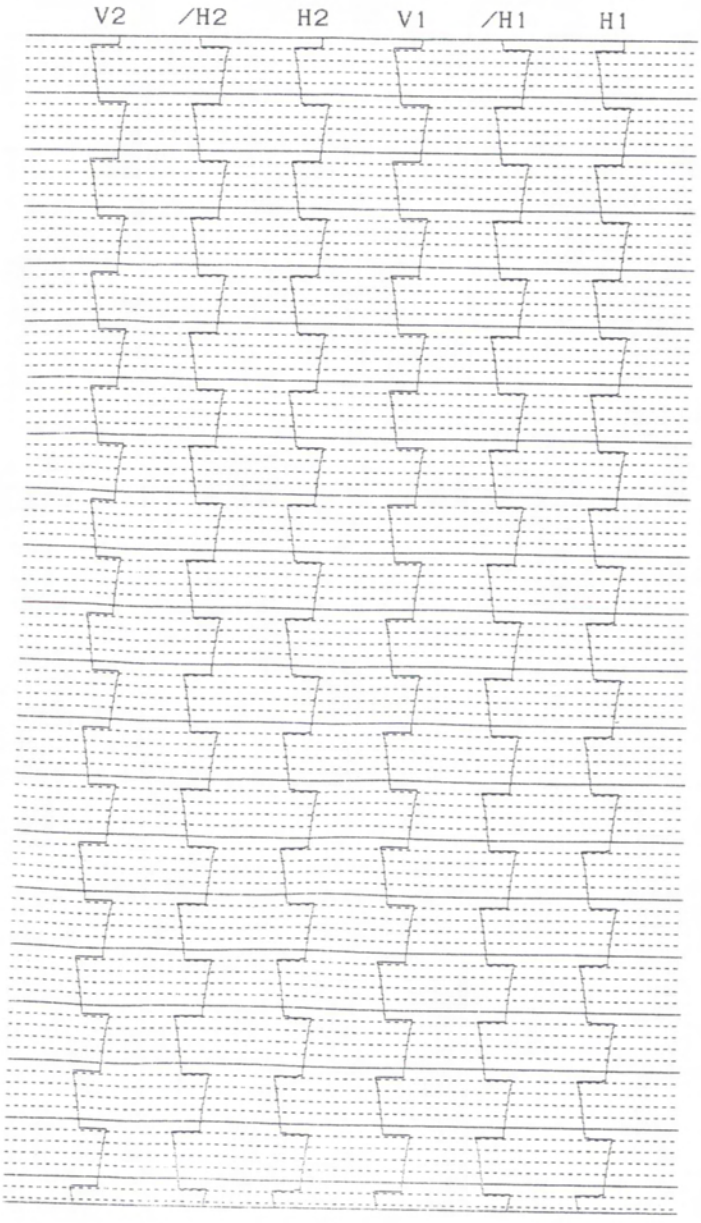
OYO S/N 15014

Suspension 170 1.42

ID_NO. : 502
HOLE NO. : 0
DEPTH : 0.0 [m]
DATE : 16/08/06 10:45:55 AM
H-SAMPLE RATE: 100 [μSEC]
V-SAMPLE RATE: 100 [μSEC]
PULSE WIDTH : 1.6 [mSEC]
DELAY TIME : 0 [mSEC]

	H1	/H1	V1	H2	/H2	V2
GAIN	X 10	X 10	X 10	X 10	X 10	X 10
LCF[Hz]	5	5	5	5	5	5
HCF[Hz]	20K	20K	20K	20K	20K	20K
STACK	1	1	1	1	1	1

TRACE SIZE : 1
H-TIME SCALE: 1.00 [mSEC/LINE]
V-TIME SCALE: 1.00 [mSEC/LINE]



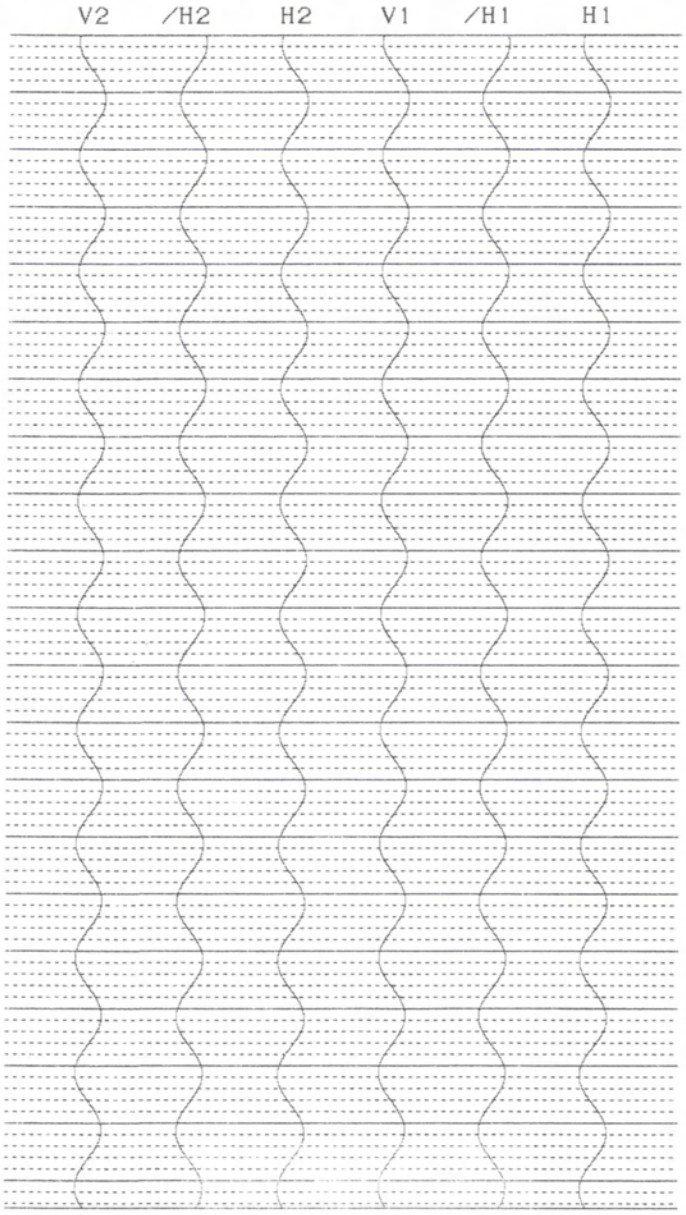
OYO

Suspension 170 1.42 S/N 15014

ID_NO. : 503
HOLE NO. : 0
DEPTH : 0.0 [m]
DATE : 16/08/06 10:46:52 AM
H-SAMPLE RATE: 100 [μSEC]
V-SAMPLE RATE: 100 [μSEC]
PULSE WIDTH : 1.6 [mSEC]
DELAY TIME : 0 [mSEC]

	H1	/H1	V1	H2	/H2	V2
GAIN	X 10	X 10	X 10	X 10	X 10	X 10
LCF[Hz]	5	5	5	5	5	5
HCF[Hz]	20K	20K	20K	20K	20K	20K
STACK	1	1	1	1	1	1

TRACE SIZE : 1
H-TIME SCALE: 1.00 [mSEC/LINE]
V-TIME SCALE: 1.00 [mSEC/LINE]



P243 # 504

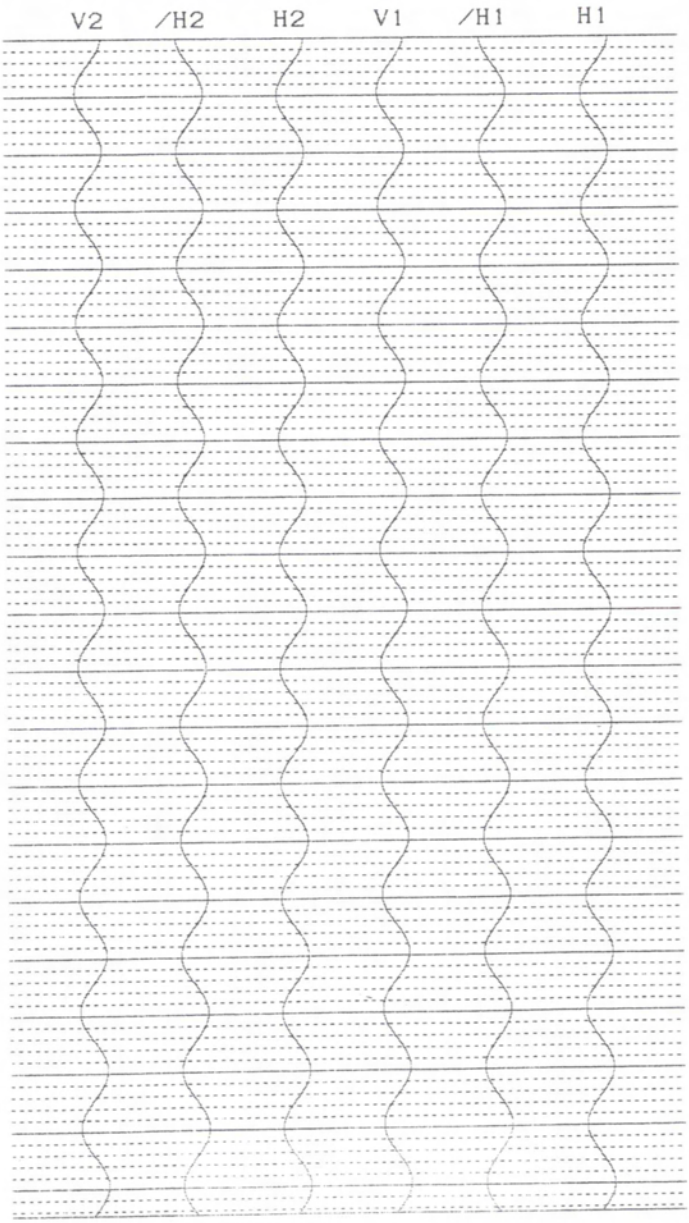
OYO S/N 15014

Suspension 170 1.42

ID_NO. : 504
HOLE NO. : 0
DEPTH : 0.0 [m]
DATE : 16/08/06 10:47:45 AM
H-SAMPLE RATE: 100 [μSEC]
V-SAMPLE RATE: 100 [μSEC]
PULSE WIDTH : 1.6 [mSEC]
DELAY TIME : 0 [mSEC]

	H1	/H1	V1	H2	/H2	V2
GAIN	X 10	X 10	X 10	X 10	X 10	X 10
LCF[Hz]	5	5	5	5	5	5
HCF[Hz]	20K	20K	20K	20K	20K	20K
STACK	1	1	1	1	1	1

TRACE SIZE : 1
H-TIME SCALE: 1.00 [mSEC/LINE]
V-TIME SCALE: 1.00 [mSEC/LINE]



EDISON ESI®

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TEST NUMBER 501206

Calibration Report

METROLOGY
7300 Fenwick Lane
Westminster, CA 92683
866-723-2257
edisonmetrology.com

GEOVision Geophysical Services
1151 Pomona Road, Unit P
Corona, CA 92882
P.O. No.: 6162-060414-01

Manufacturer:	Oyo Corporation
Model Number:	3331-A
Description:	Logger, Suspension,
Asset Number:	19029
Serial Number:	19029

Calibration Date:	04/21/2006
Calibration Due Date:	04/21/2007
Calibration Interval:	12 Months
Condition As Found:	In Tolerance
Condition As Left:	In Tolerance

Remarks:
The UUT (unit under test) was calibrated using the customer's procedure. The UUT was operated by the customer's personnel and data collection was observed by SCE personnel. The UUT was found to be in tolerance to customer supplied specifications. The reference standards used are in compliance with ISO/IEC 17025:1999 and laboratory accreditation criteria established by NIST/NVLAP under the specific scope of accreditation for lab code 105014-0. Frequency is accredited.
Please see attached data.

Standards Utilized

I.D. No.	Mfg.	Model No.	Description	Cal. Date	Due Date
S1-01252	Hewlett Packard	5335A OPT 010,203040	Counter, Universal	12/09/2005	06/09/2006
S1-03355	Hewlett Packard	3325B OPT 001, 002	Generator, Function, Synthesizer	11/03/2005	11/03/2006
S1-03686	Fluke	910	Standard, Frequency, Controlled, Gps	01/16/2006	01/16/2007

Procedure: Customer
Temperature: 23° C
Humidity: 40% RH
Test No.: 501206

Calibration Performed By:			Quality Reviewer:	
Branson, Craig A CAB	Metrologist	714-895-0714	Marty J	04-21-06
Name	Title	Phone	Name	Date

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GEOVision
geophysical services

SEISMOGRAPH CALIBRATION DATA SHEET REV 4/6/06

INSTRUMENT DATA

SYSTEM MFR:	OYO	MODEL NO.:	3331A
SERIAL NO.:	19029	CALIBRATION DATE:	4/21/2006
BY:	ROBERT STELLER	DUE DATE:	4/21/2007
COUNTER MFR:	HEWLETT PACKARD	MODEL NO.:	5335A
SERIAL NO.:	2626A09881	CALIBRATION DATE:	12/9/2005
BY:	SCE #S1-01252	DUE DATE:	6/9/2006
FCTN GEN MFR:	HEWLETT PACKARD	MODEL NO.:	3325B
SERIAL NO.:	2847A14447	CALIBRATION DATE:	11/3/2005
BY:	SCE #S1-03355	DUE DATE:	11/3/2006

SYSTEM SETTINGS:

GAIN:	10
FILTER:	20 KHZ
RANGE:	100 MILLISEC
DELAY:	0
STACK: 1 (STD)	1
PULSE:	1.6
DISPLAY:	NA
SYSTEM: DATE = CORRECT DATE & TIME	4/21/2006, 10:30AM

PROCEDURE:

SET FREQUENCY TO 100.0HZ SQUAREWAVE WITH AMPLITUDE APPROXIMATELY 0.25 VOLT PEAK. RECORD BOTH ON DISK AND PAPER TAPE, IF AVAILABLE. ANALYZE AND PRINT WAVEFORMS FROM ANALYSIS UTILITY. ATTACH PAPER COPIES OF PRINTOUT AND PAPER TAPES, IF AVAILABLE, TO THIS FORM. AVERAGE FREQUENCY MUST BE BETWEEN 99.0 AND 101.0 HZ.

AS FOUND 100.0 AS LEFT 100.0

WAVEFORM	FILE NO	FREQUENCY	TIME FOR 9 CYCLES Hn	TIME FOR 9 CYCLES Hr	TIME FOR 9 CYCLES V	AVERAGE FREQ.
SQUARE	201	100.0	90.0	90.0	90.0	100.0
SQUARE	202	100.0	90.0	90.0	90.0	100.0
SINE	203	100.0	89.9	89.9	89.9	100.1
SINE	204	100.0	90.0	90.0	89.9	100.0

CALIBRATED BY: ROBERT STELLER 4/21/2006 Robt Steller

NAME DATE SIGNATURE

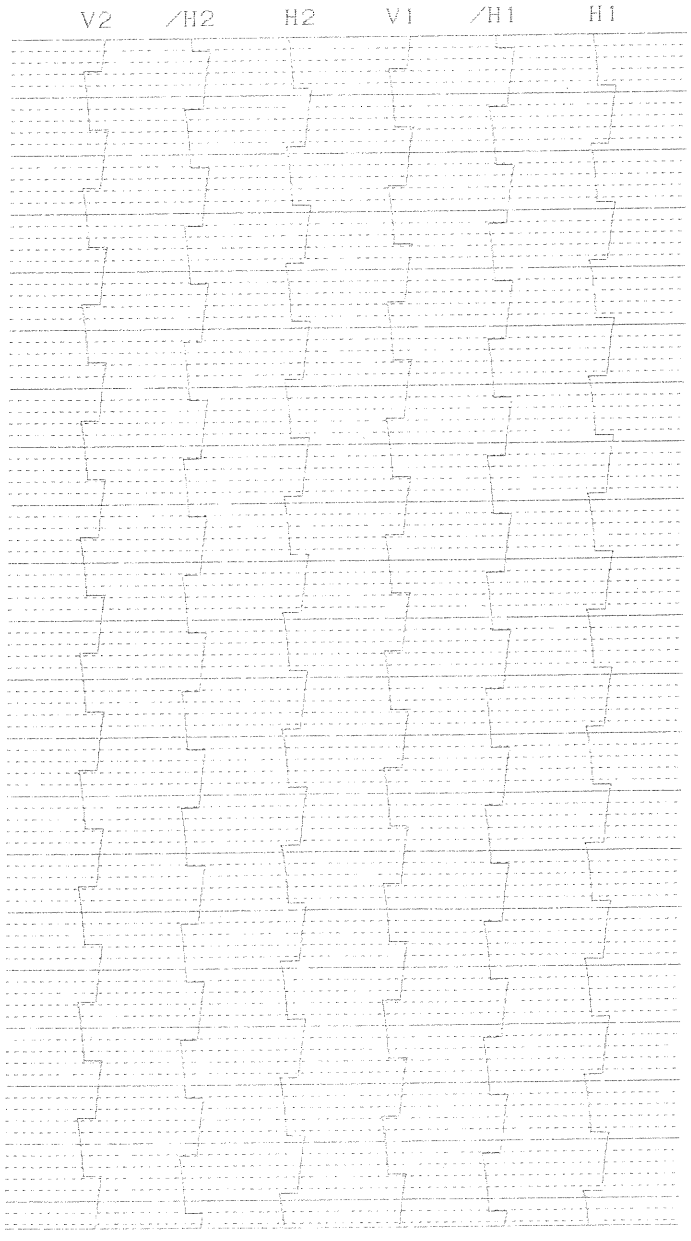
OYO S/N 19029

Suspension 170 4.25

ID_NO. : 201
HOLE NO. : 0
DEPTH : 0.0 [m]
DATE : 21/04/06 10:41:08 AM
H-SAMPLE RATE: 100 [μSEC]
V-SAMPLE RATE: 100 [μSEC]
PULSE WIDTH : 1.6 [mSEC]
DELAY TIME : 3 [mSEC]

	H1	/H1	V1	H2	/H2	V2
GAIN	X 10	X 10	X 10	X 10	X 10	X 10
LCF[Hz]	5	5	5	5	5	5
HCF[Hz]	20K	20K	20K	20K	20K	20K
STACK	1	1	1	1	1	1

TRACE SIZE : 1
H-TIME SCALE: 1.00 [mSEC/LINE]
V-TIME SCALE: 1.00 [mSEC/LINE]



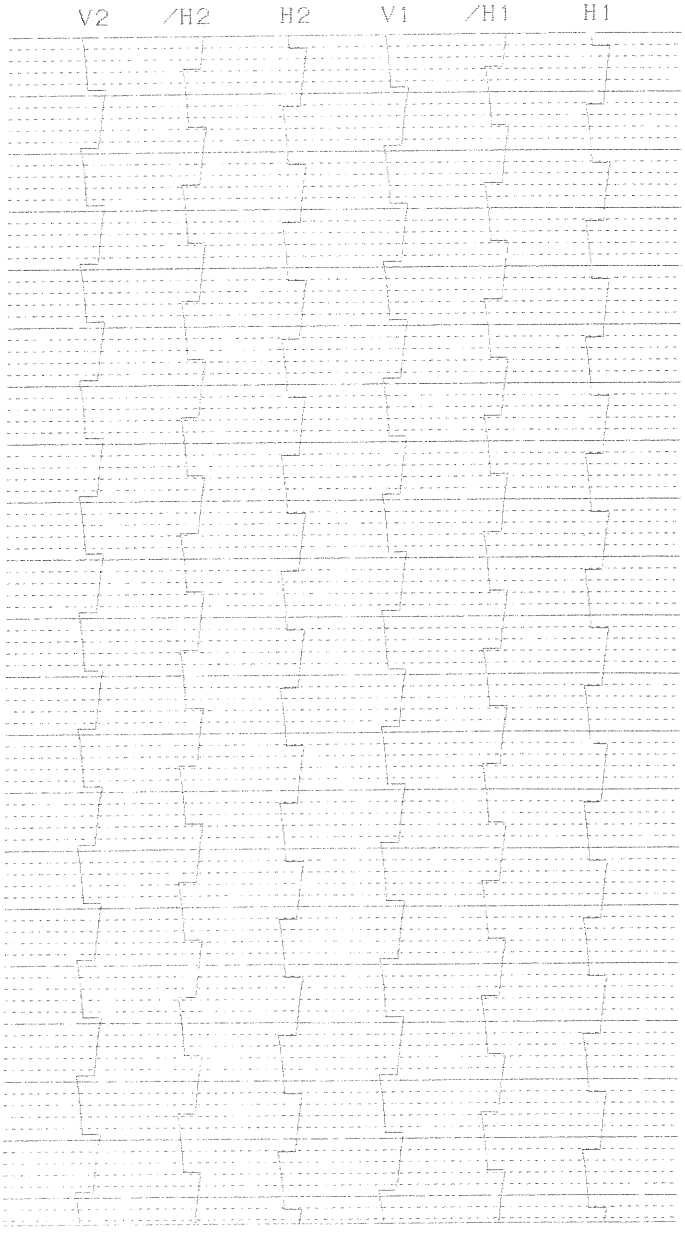
OYO S/N 19029

Suspension 170 4.25

ID_NO. : 202
HOLE NO. : 0
DEPTH : 0.0 [m]
DATE : 21/04/06 10:45:05 AM
H-SAMPLE RATE: 100 [μSEC]
V-SAMPLE RATE: 100 [μSEC]
PULSE WIDTH : 1.6 [mSEC]
DELAY TIME : 3 [mSEC]

	H1	/H1	V1	H2	/H2	V2
GAIN	X 10	X 10	X 10	X 10	X 10	X 10
LCF[Hz]	5	5	5	5	5	5
HCF[Hz]	20K	20K	20K	20K	20K	20K
STACK	1	1	1	1	1	1

TRACE SIZE : 1
H-TIME SCALE: 1.00 [mSEC/LINE]
V-TIME SCALE: 1.00 [mSEC/LINE]



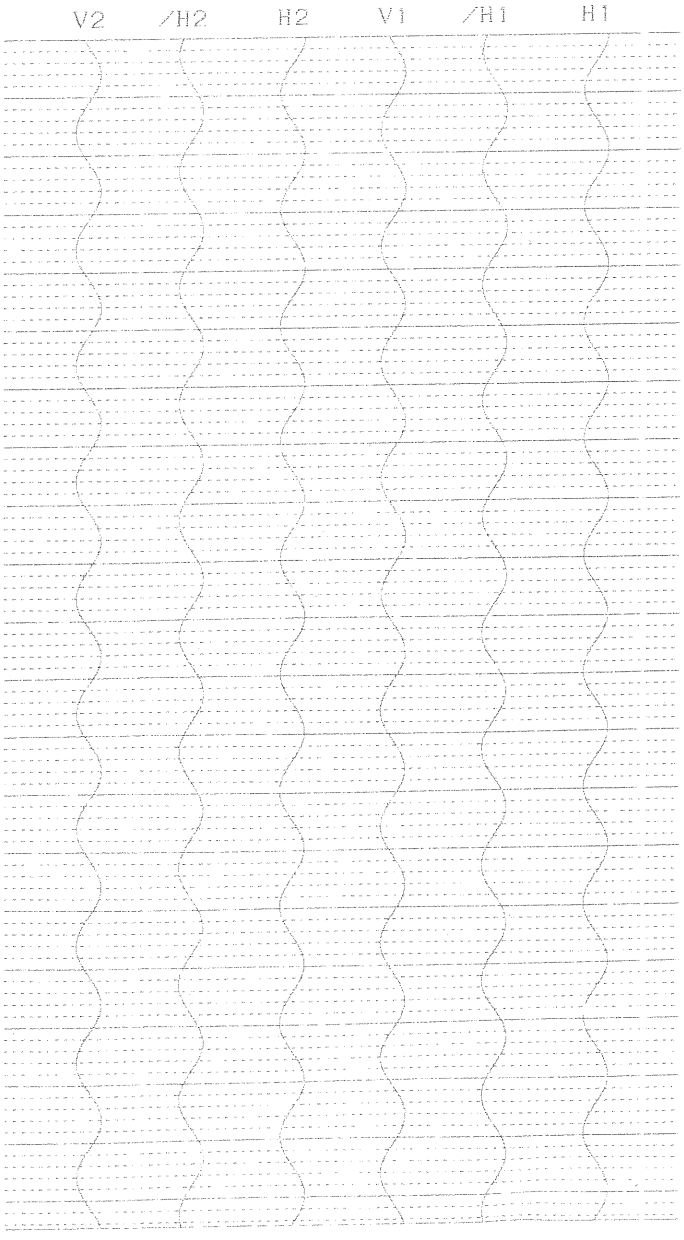
OYO S/N 19029

Suspension 170 4.25

ID_NO. : 203
HOLE NO. : 0
DEPTH : 0.0 [m]
DATE : 21/04/06 10:46:15 AM
H-SAMPLE RATE: 100 [μSEC]
V-SAMPLE RATE: 100 [μSEC]
PULSE WIDTH : 1.6 [mSEC]
DELAY TIME : 3 [mSEC]

	H1	/H1	V1	H2	/H2	V2
GAIN	X 10	X 10	X 10	X 10	X 10	X 10
LCF[Hz]	5	5	5	5	5	5
HCF[Hz]	20K	20K	20K	20K	20K	20K
STACK	1	1	1	1	1	1

TRACE SIZE : 1
H-TIME SCALE: 1.00 [mSEC/LINE]
V-TIME SCALE: 1.00 [mSEC/LINE]



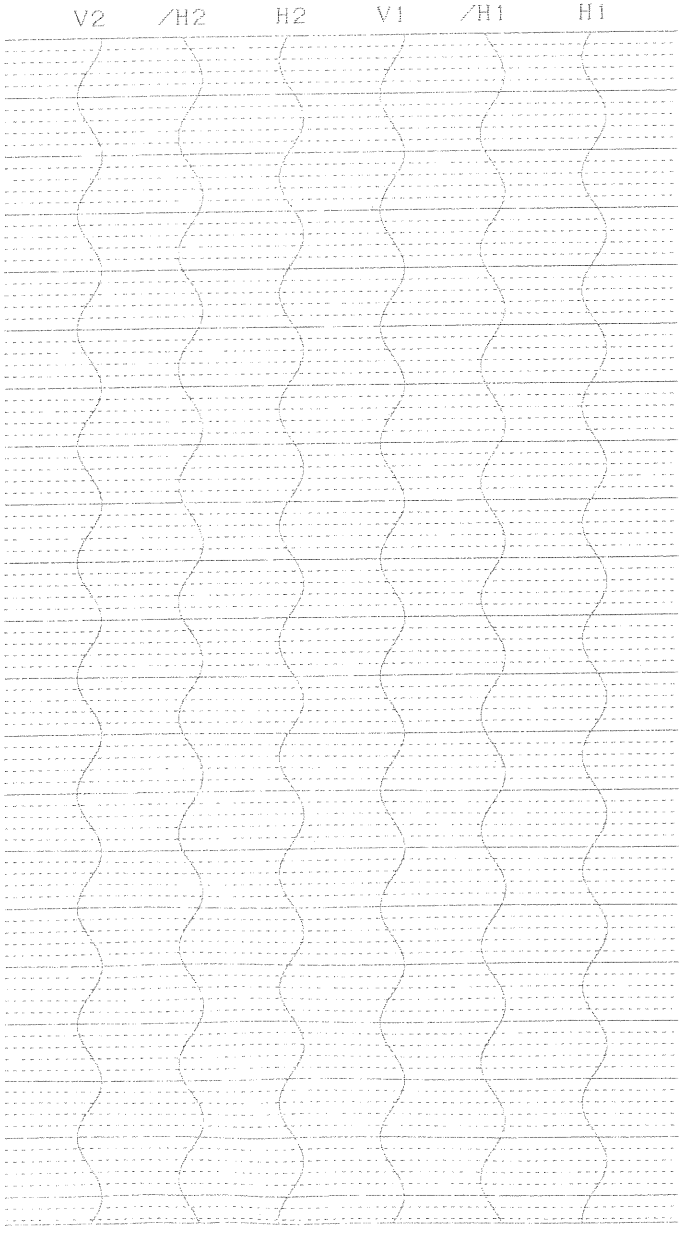
OYO S/N 19024

Suspension 170 4.25

ID_NO. : 204
HOLE NO. : 0
DEPTH : 0.0 [m]
DATE : 21/04/06 10:47:47 AM
H-SAMPLE RATE: 100 [μSEC]
V-SAMPLE RATE: 100 [μSEC]
PULSE WIDTH : 1.6 [mSEC]
DELAY TIME : 3 [mSEC]

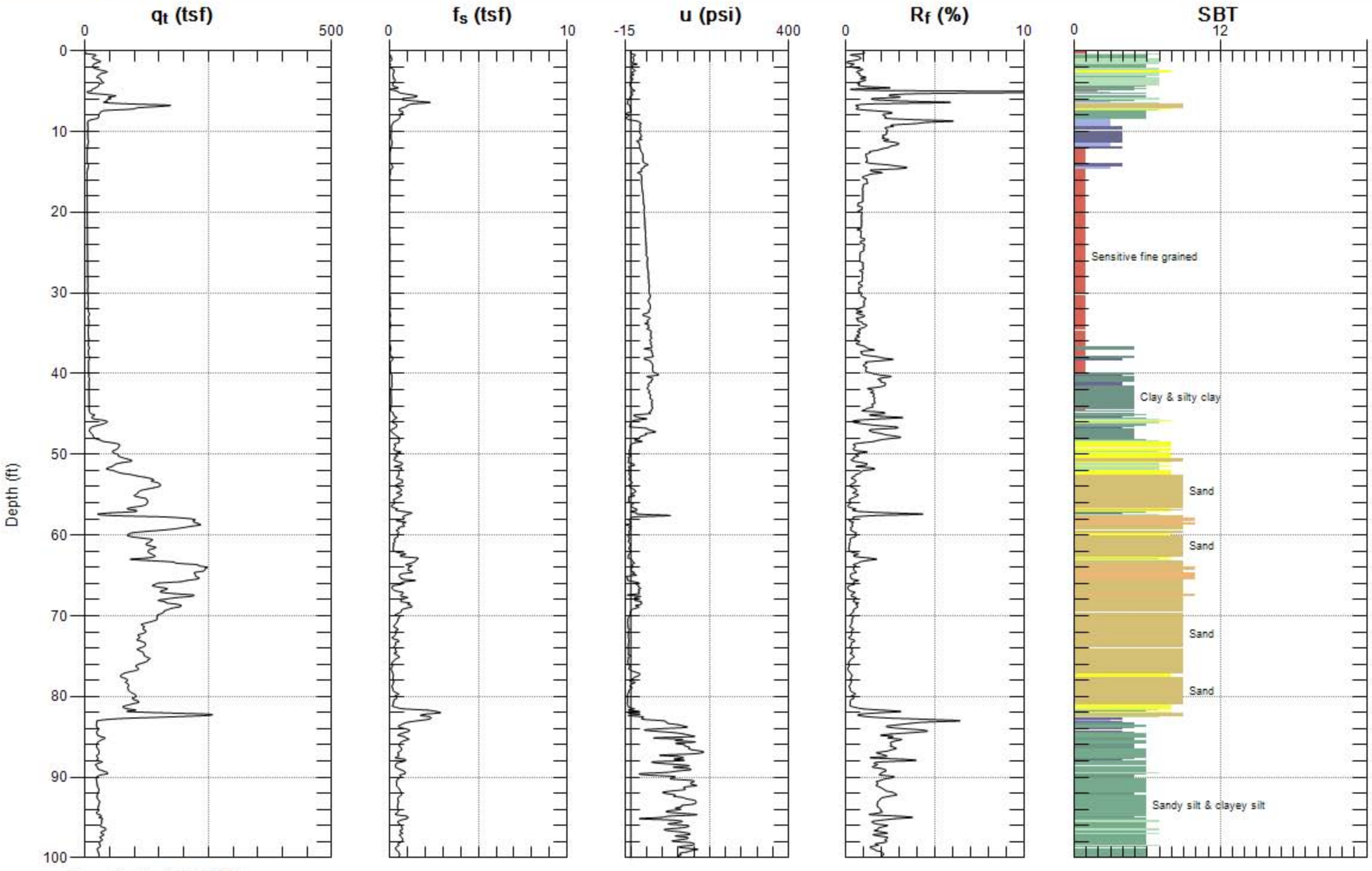
	H1	/H1	V1	H2	/H2	V2
GAIN	X 10	X 10	X 10	X 10	X 10	X 10
LCF[Hz]	5	5	5	5	5	5
HCF[Hz]	20K	20K	20K	20K	20K	20K
STACK	1	1	1	1	1	1

TRACE SIZE : 1
H-TIME SCALE: 1.00 [mSEC/LINE]
V-TIME SCALE: 1.00 [mSEC/LINE]



EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: CPT-01
Engineer: J.CASTLE
Date: 12/6/2006 07:45

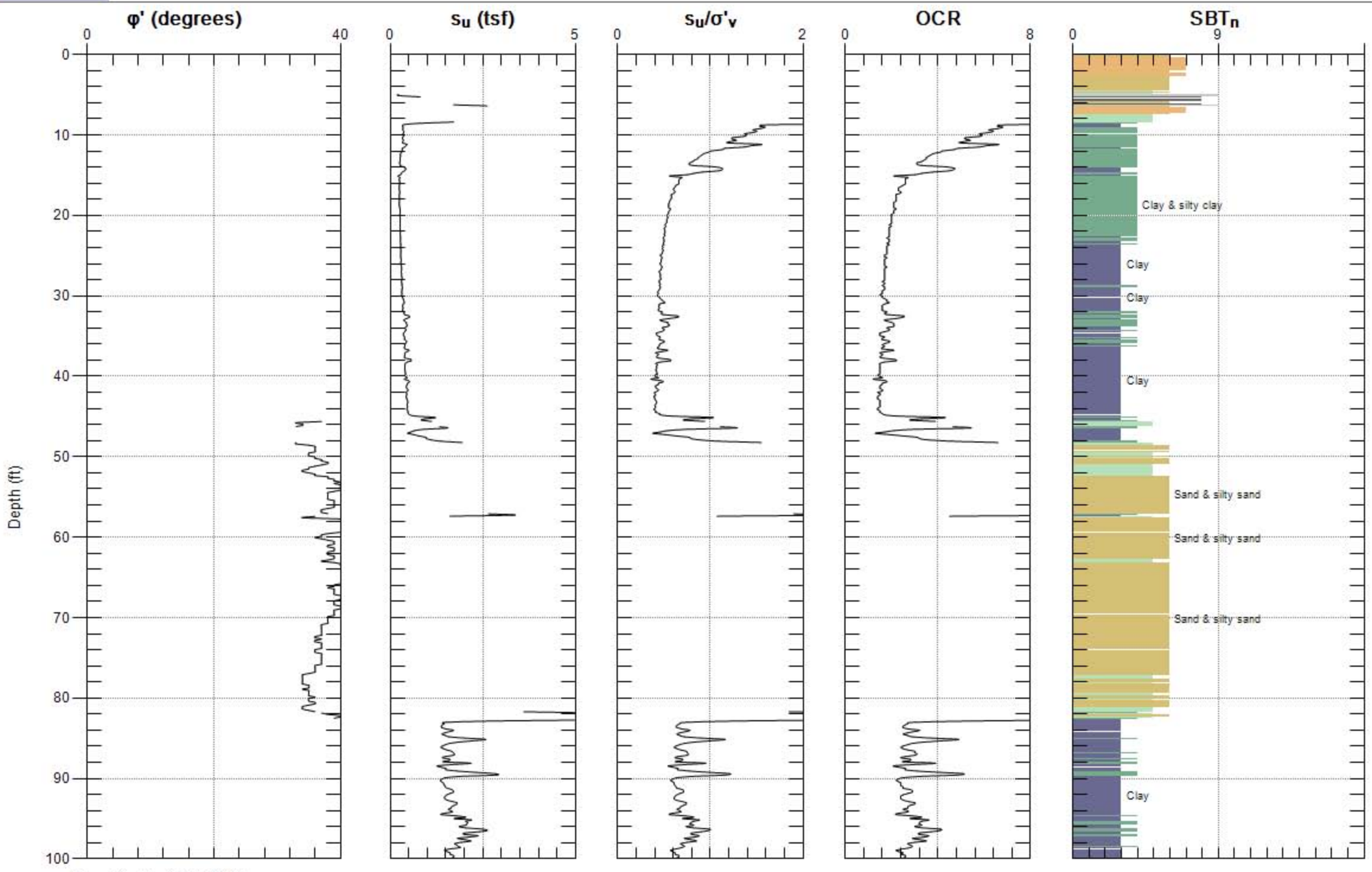


Max. Depth: 100.070 (ft)
Avg. Interval: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: CPT-01
Engineer: J.CASTLE
Date: 12/6/2006 07:45

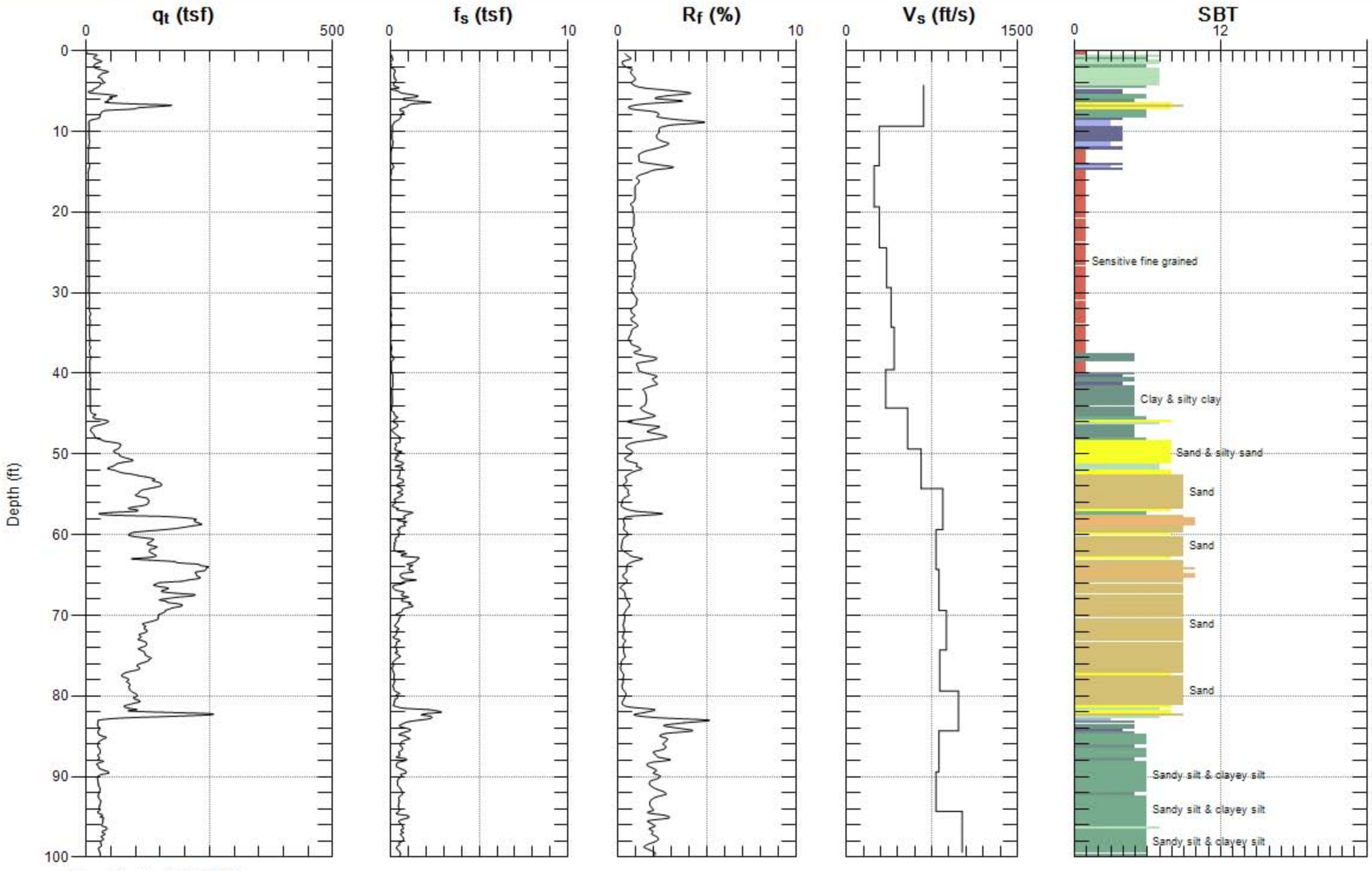


Max. Depth: 100.070 (ft)
Avg. Interval: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: CPT-01
Engineer: J.CASTLE
Date: 12/6/2006 07:45

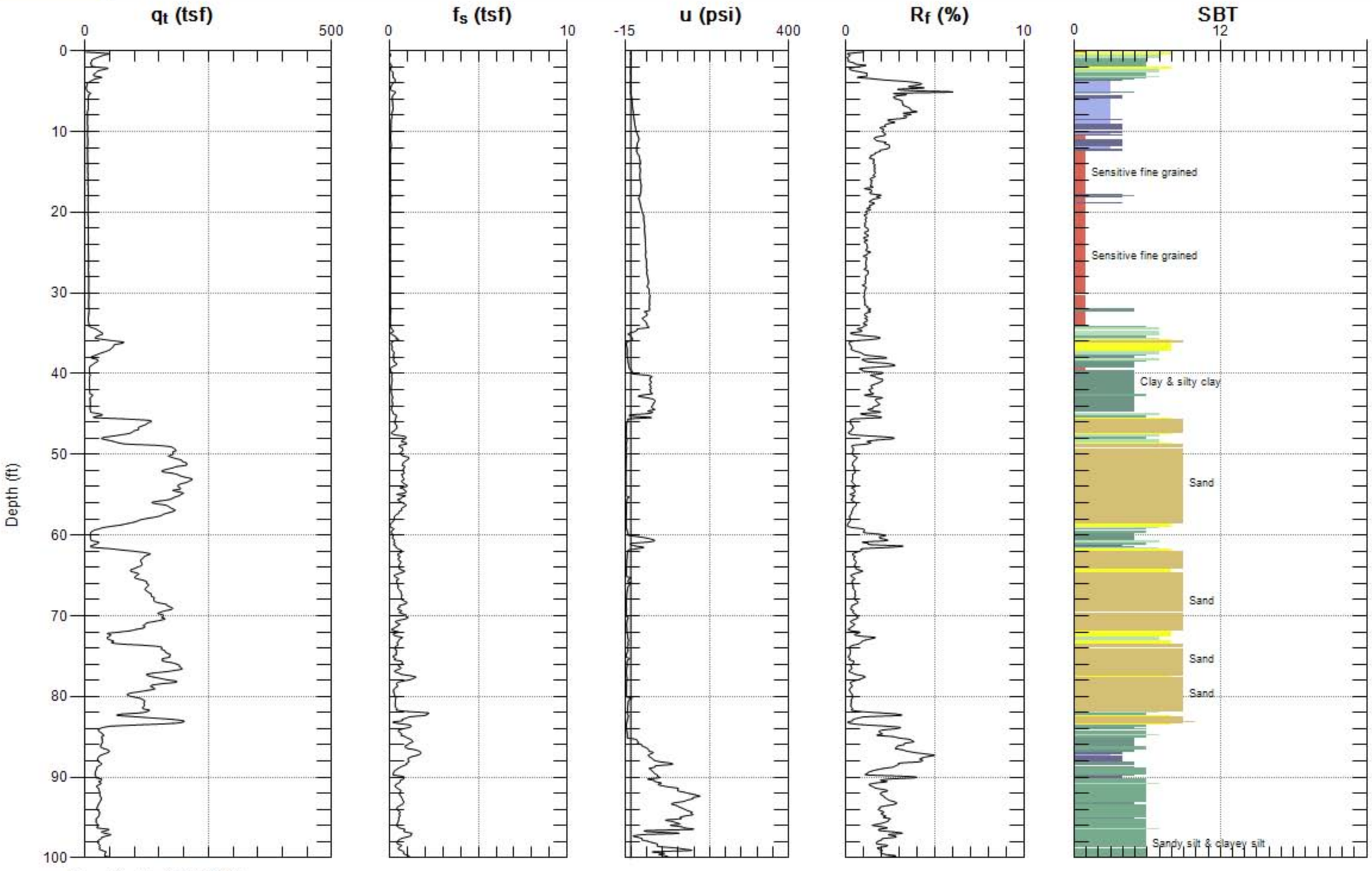


Max. Depth: 100.070 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: CPT-02
Engineer: J.CASTLE
Date: 11/29/2006 03:14

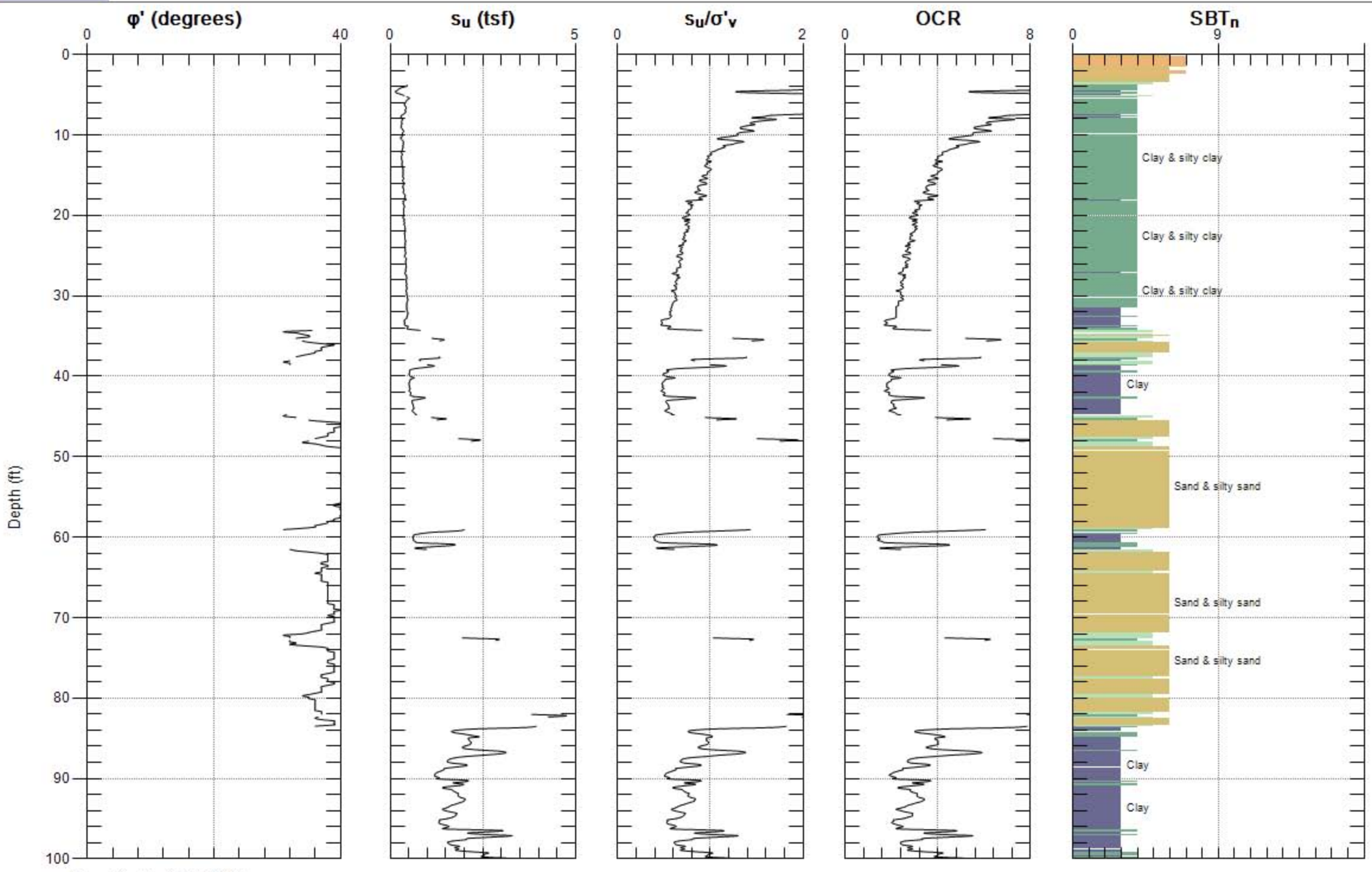


Max. Depth: 100.070 (ft)
Avg. Interval: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: CPT-02
Engineer: J.CASTLE
Date: 11/29/2006 03:14

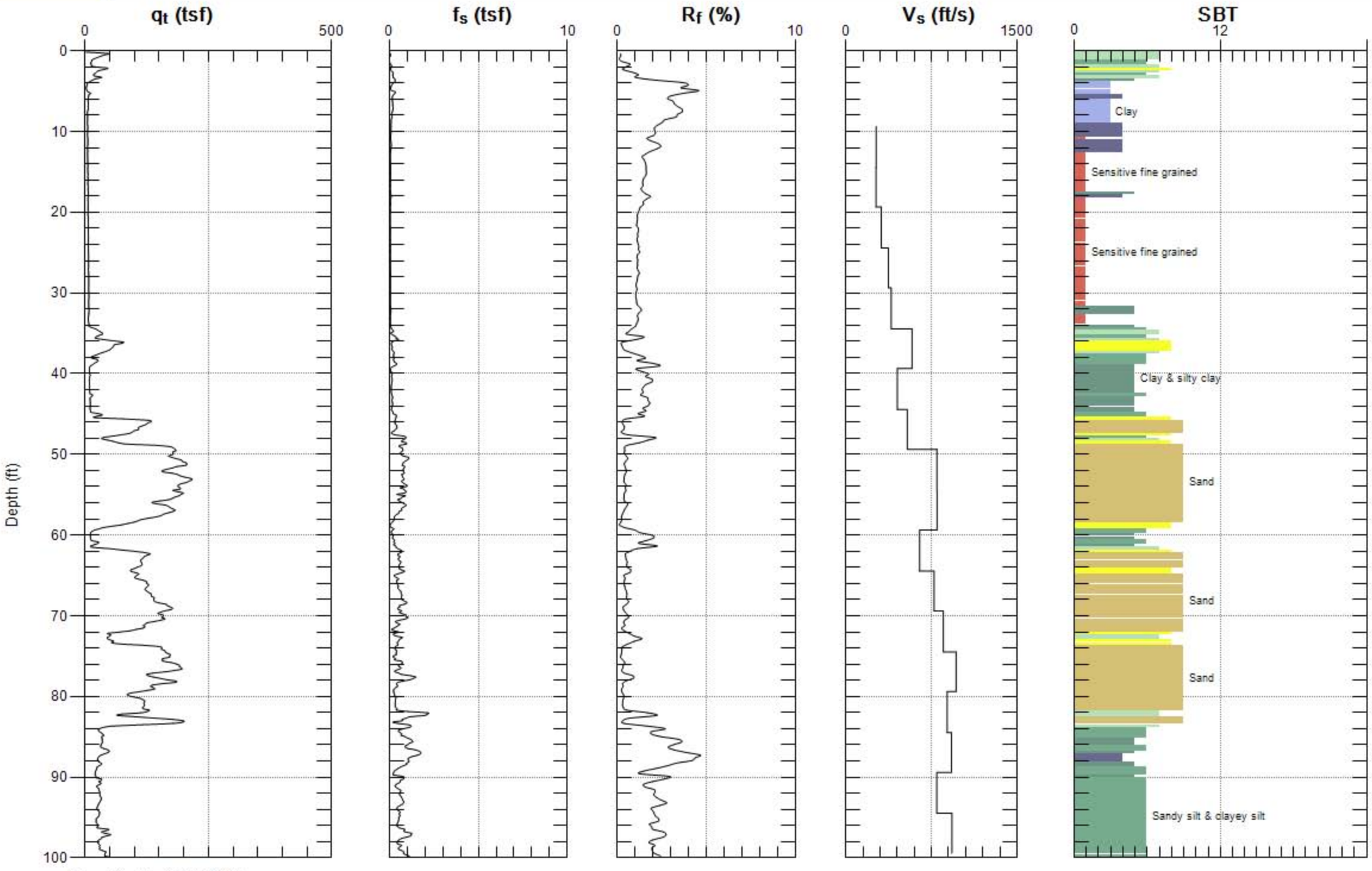


Max. Depth: 100.070 (ft)
Avg. Interval: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: CPT-02
Engineer: J.CASTLE
Date: 11/29/2006 03:14

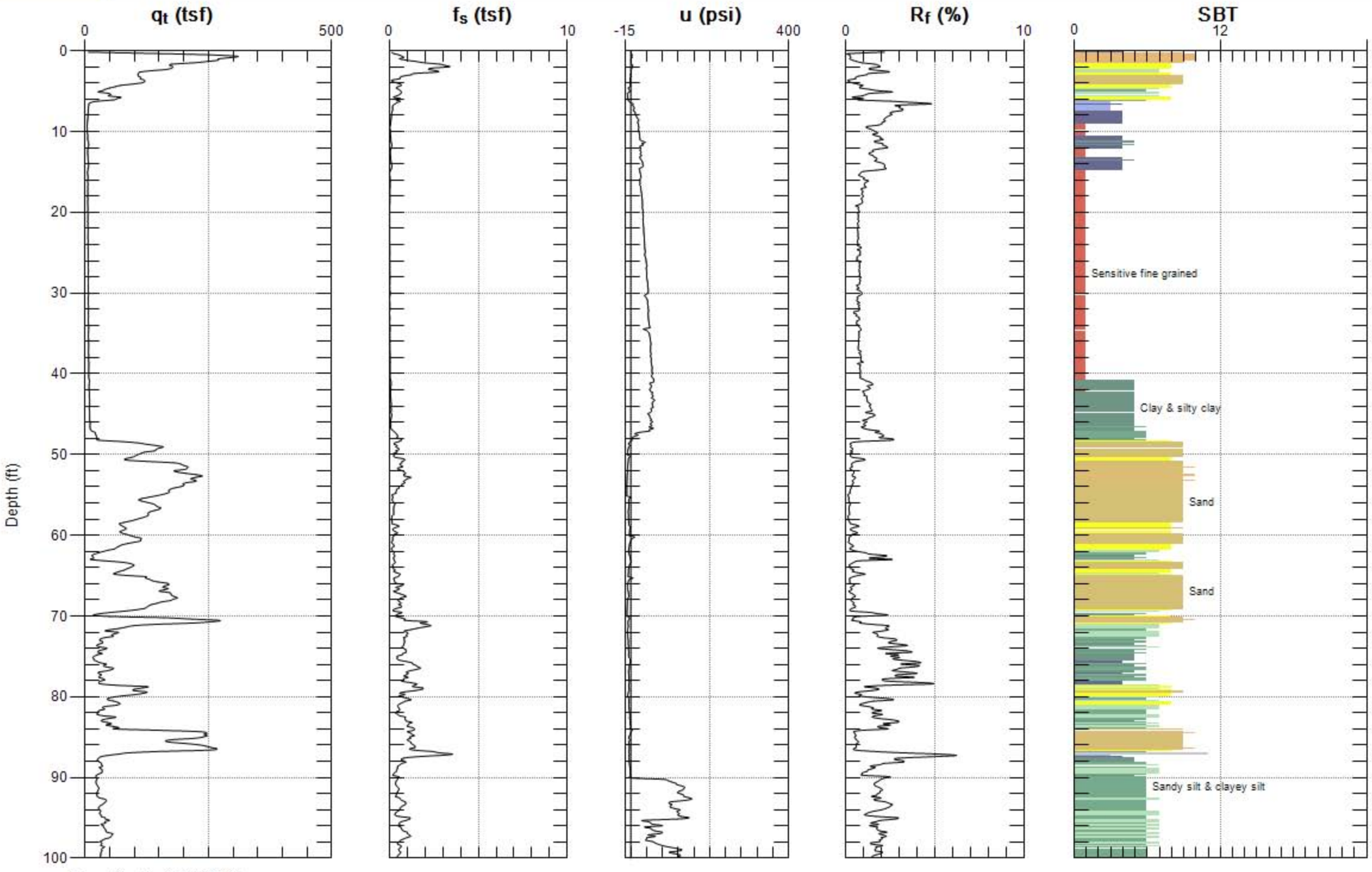


Max. Depth: 100.070 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: CPT-03
Engineer: J.CASTLE
Date: 11/29/2006 11:34

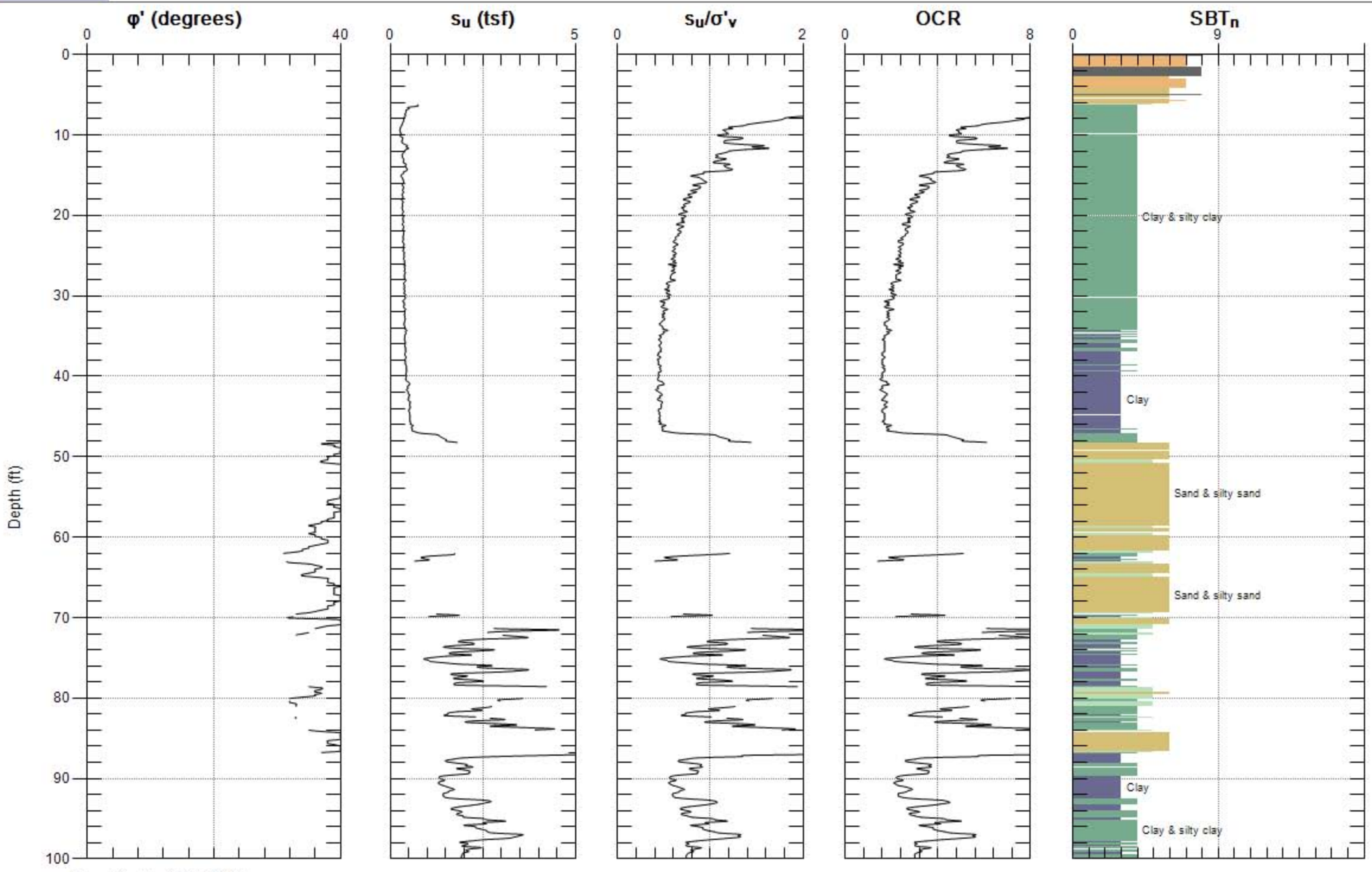


Max. Depth: 100.070 (ft)
Avg. Interval: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: CPT-03
Engineer: J.CASTLE
Date: 11/29/2006 11:34

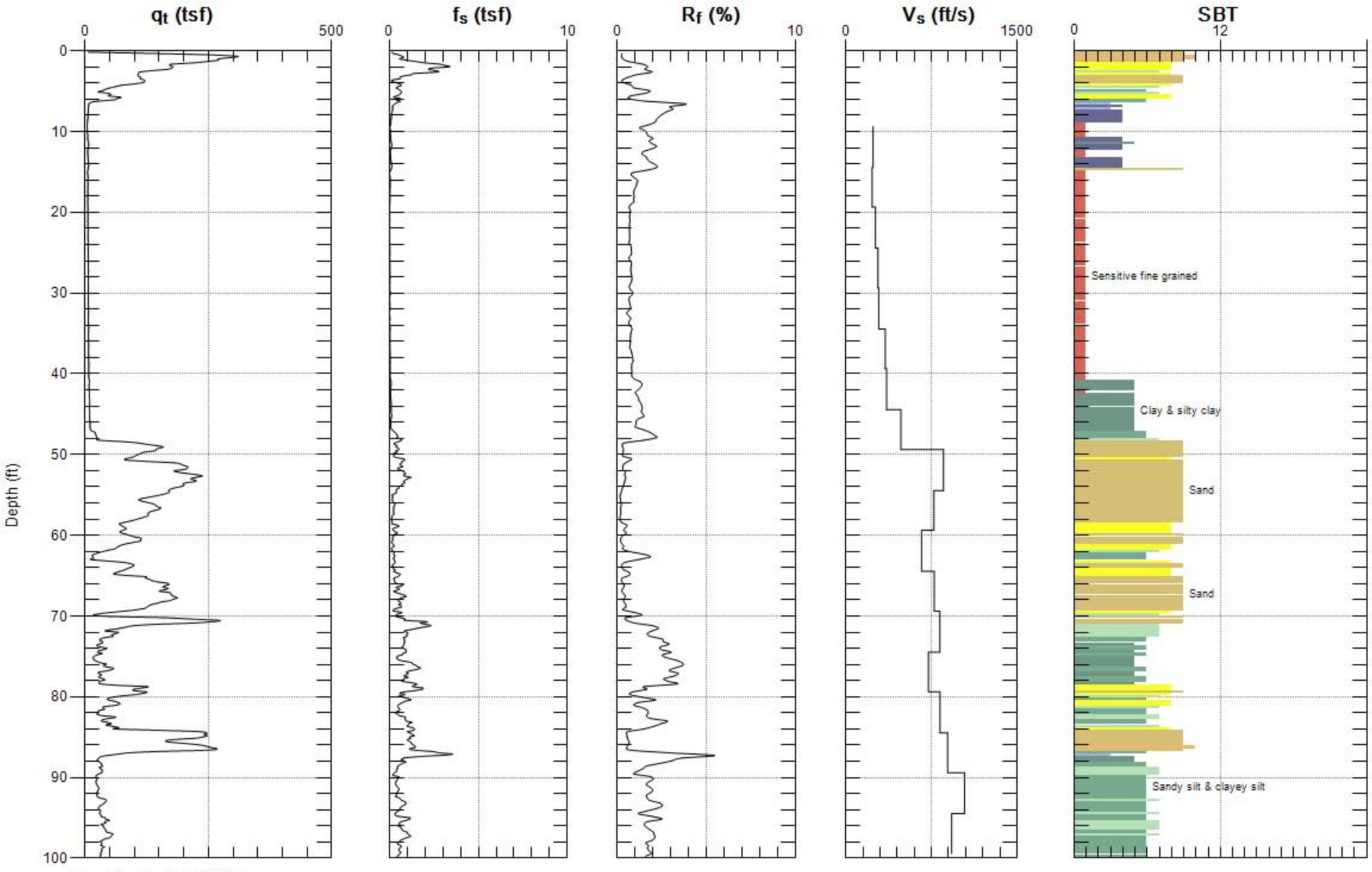


Max. Depth: 100.070 (ft)
Avg. Interval: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: CPT-03
Engineer: J.CASTLE
Date: 11/29/2006 11:34

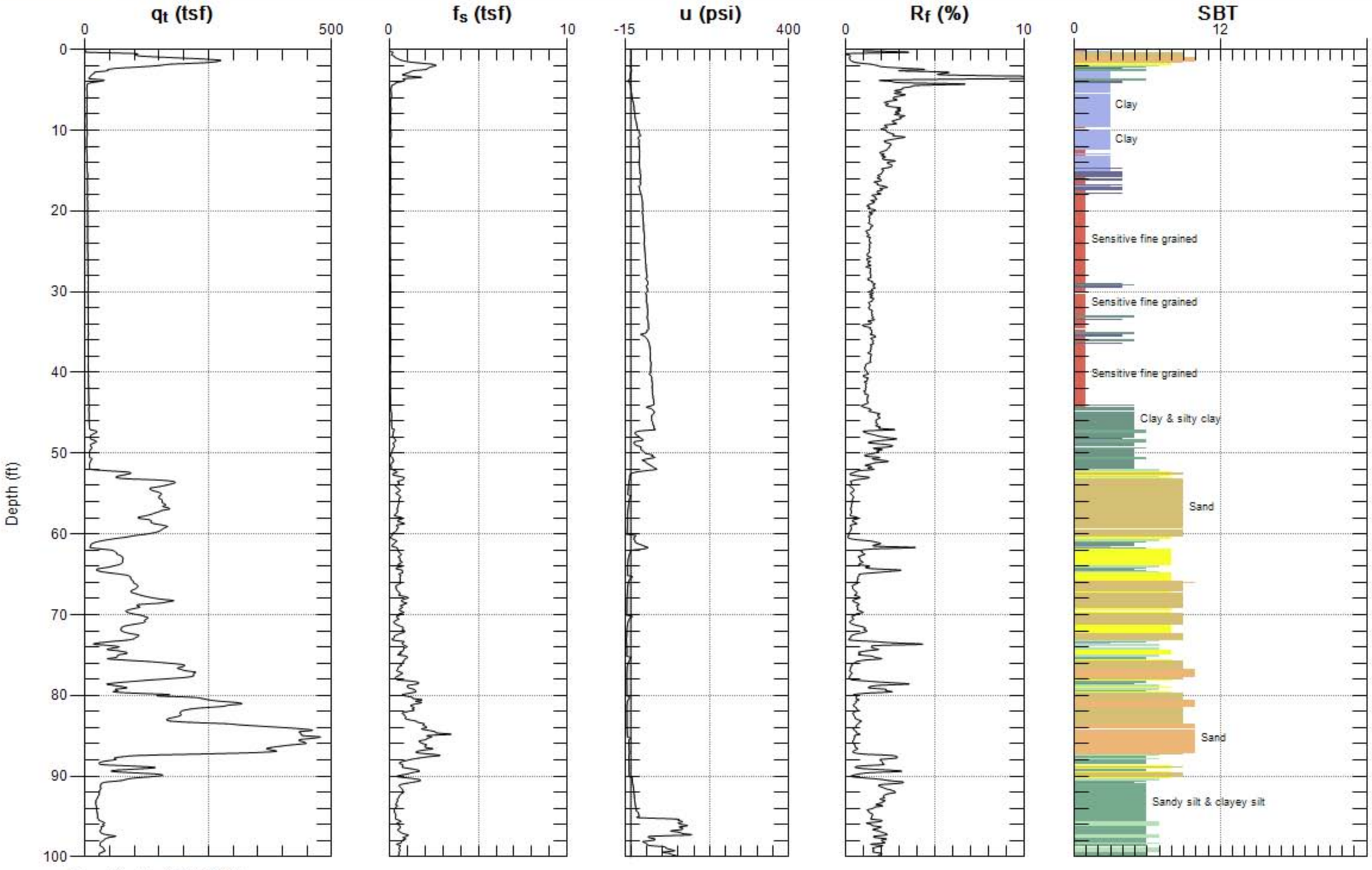


Max. Depth: 100.070 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: CPT-04a
Engineer: J.CASTLE
Date: 12/1/2006 08:07

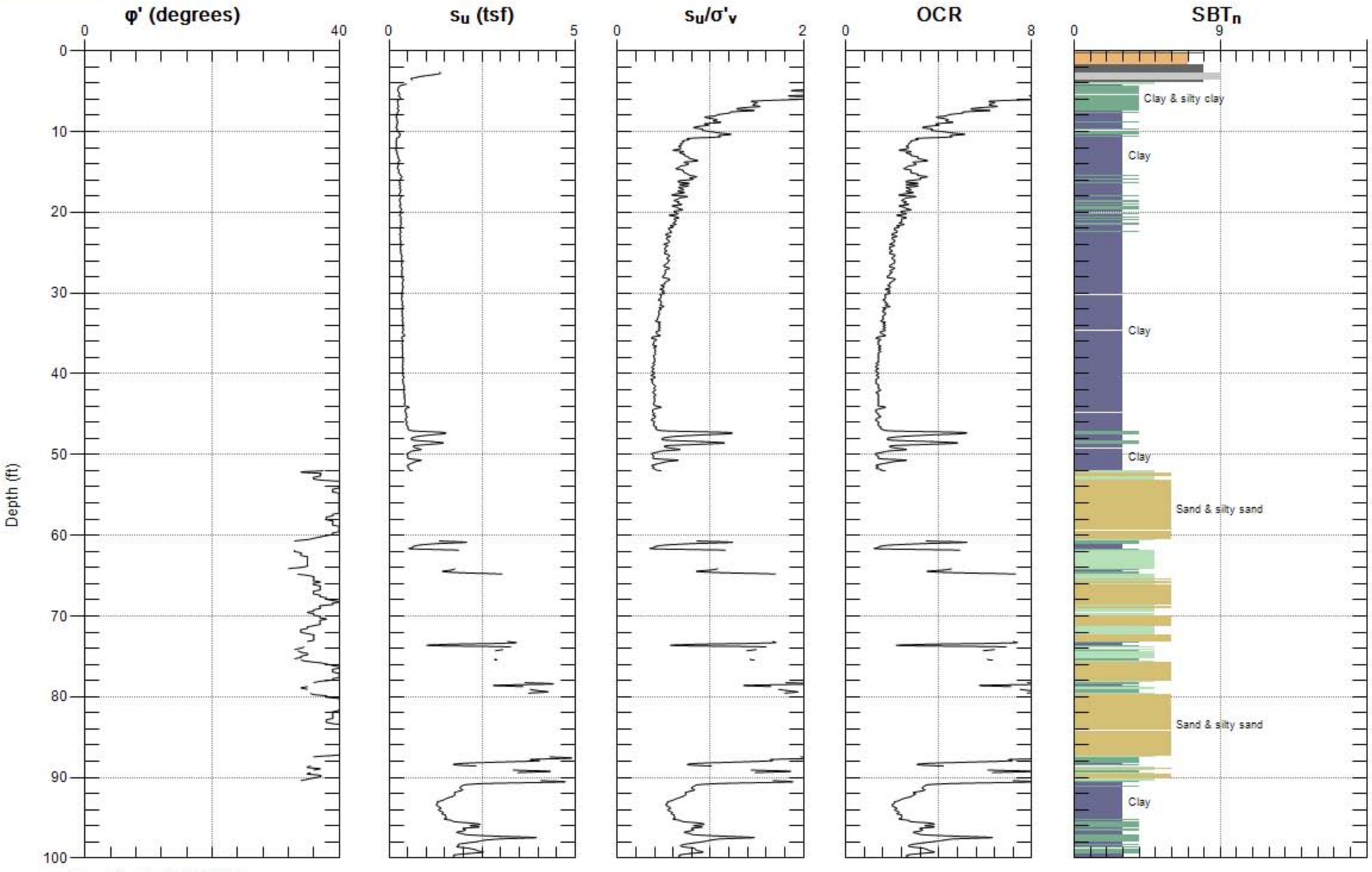


Max. Depth: 100.070 (ft)
Avg. Interval: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: CPT-04a
Engineer: J.CASTLE
Date: 12/1/2006 08:07

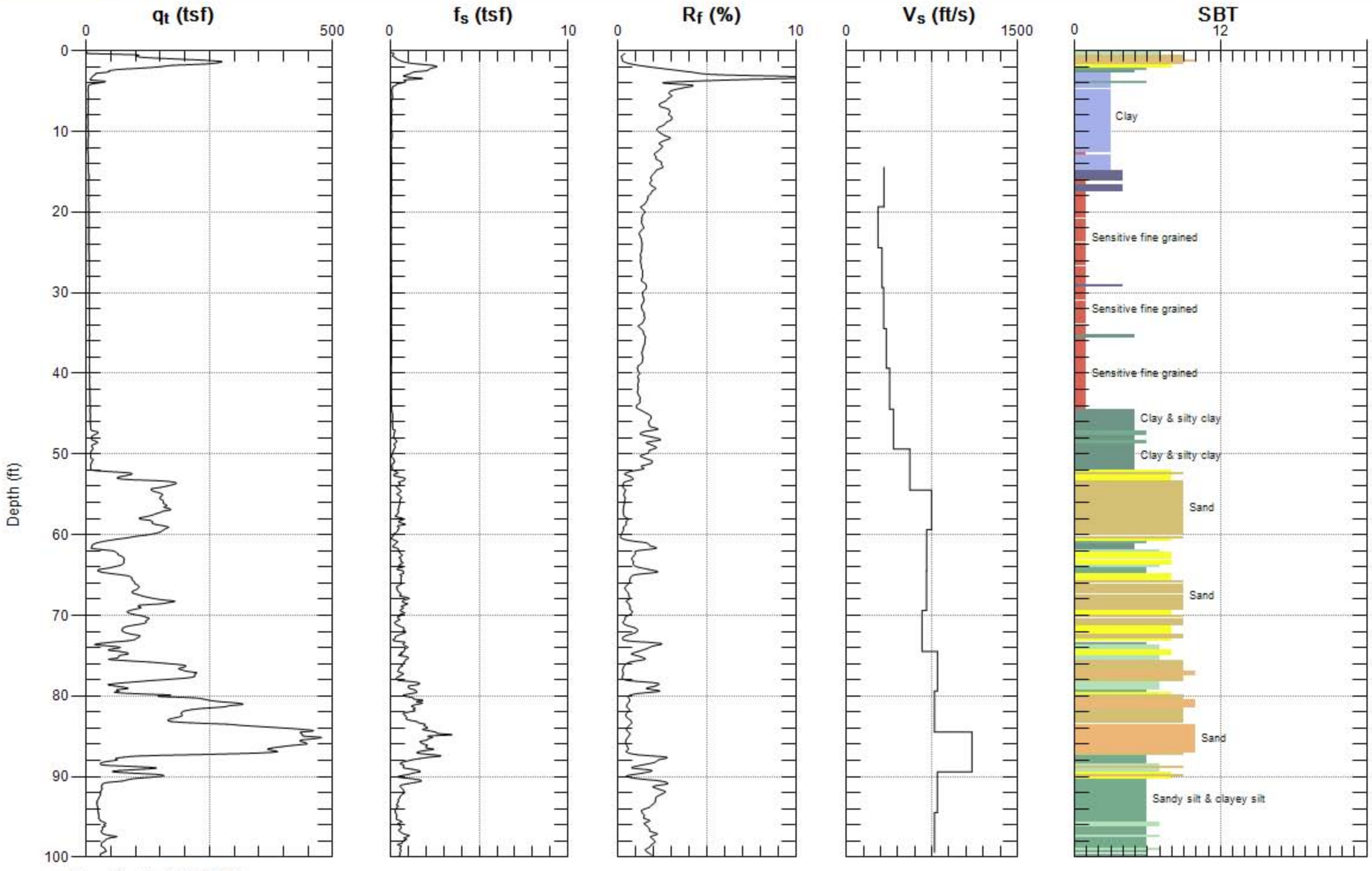


Max. Depth: 100.070 (ft)
Avg. Interval: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: CPT-04a
Engineer: J.CASTLE
Date: 12/1/2006 08:07

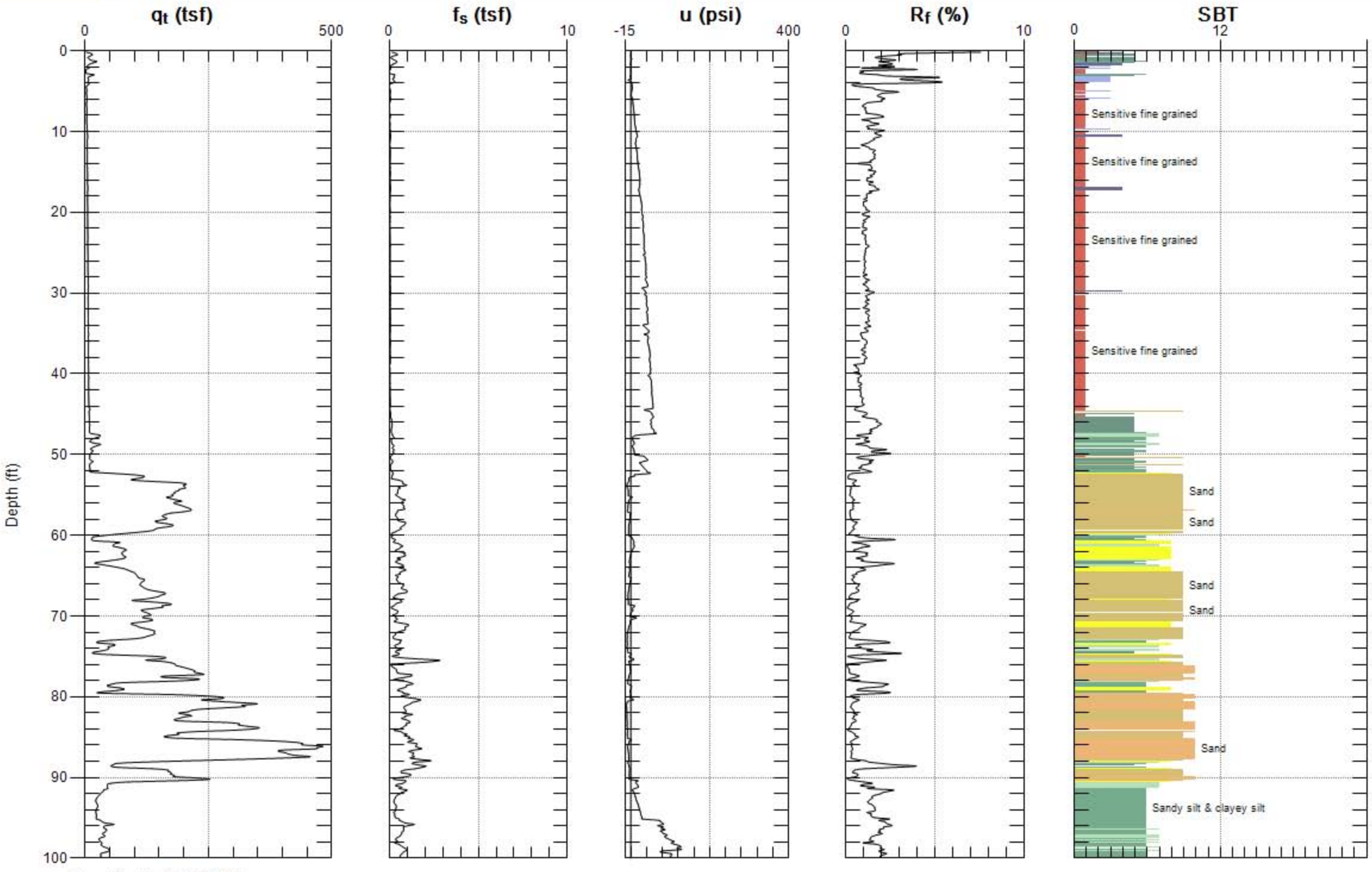


Max. Depth: 100.070 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: CPT-04
Engineer: J.CASTLE
Date: 11/28/2006 09:08

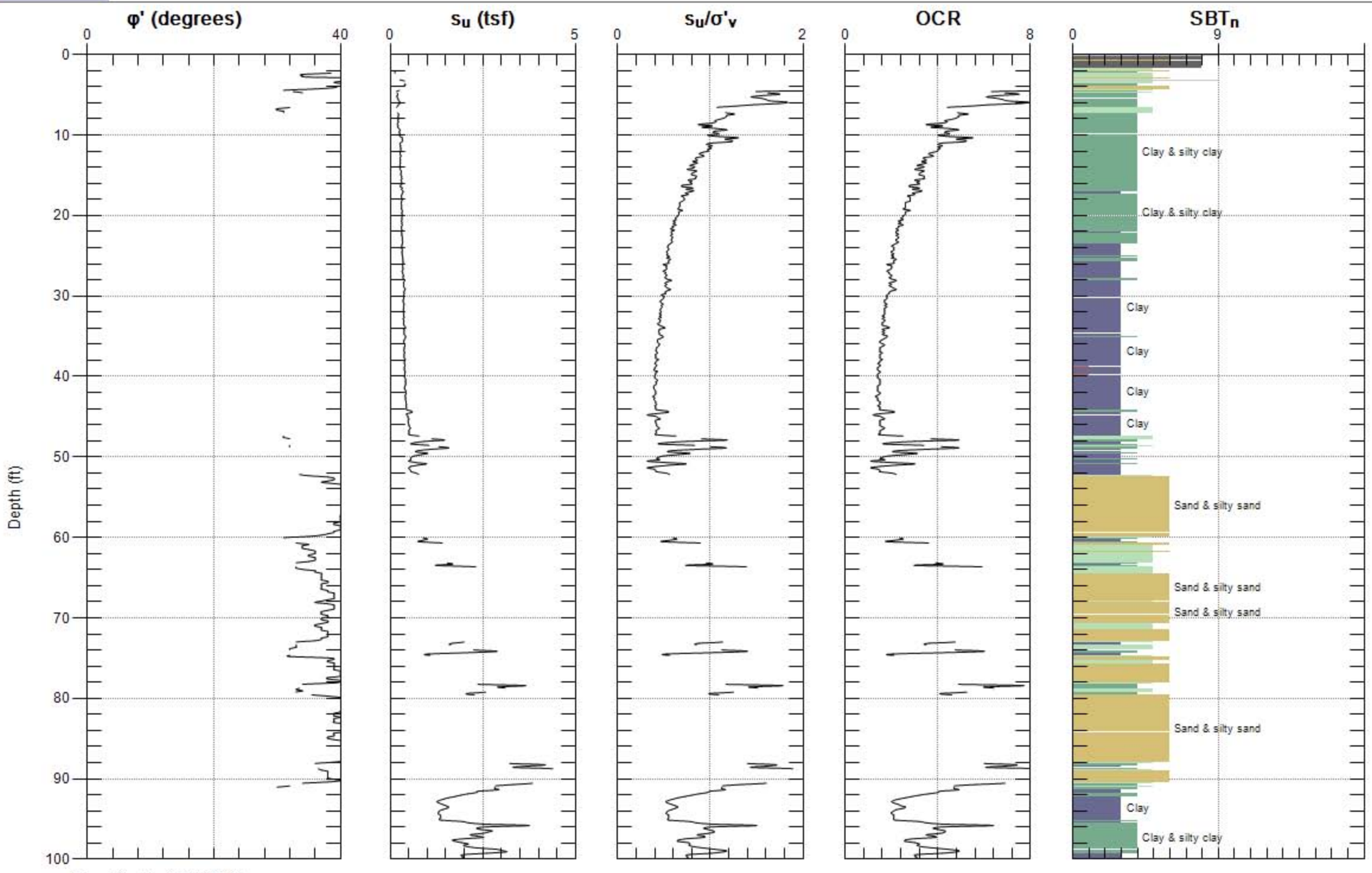


Max. Depth: 100.070 (ft)
Avg. Interval: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: CPT-04
Engineer: J.CASTLE
Date: 11/28/2006 09:08



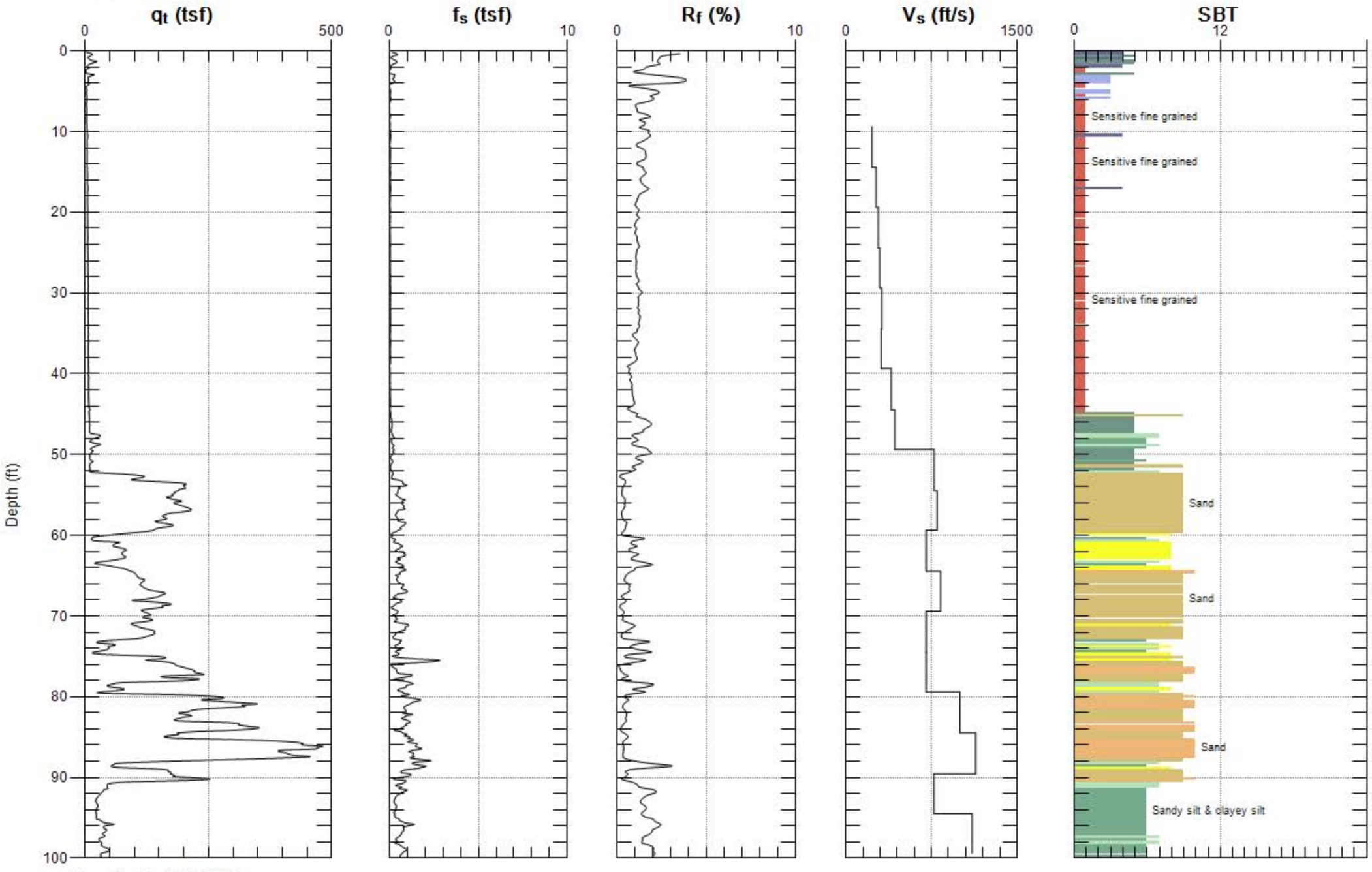
Max. Depth: 100.070 (ft)
Avg. Interval: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: CPT-04

Engineer: J.CASTLE
Date: 11/28/2006 09:08

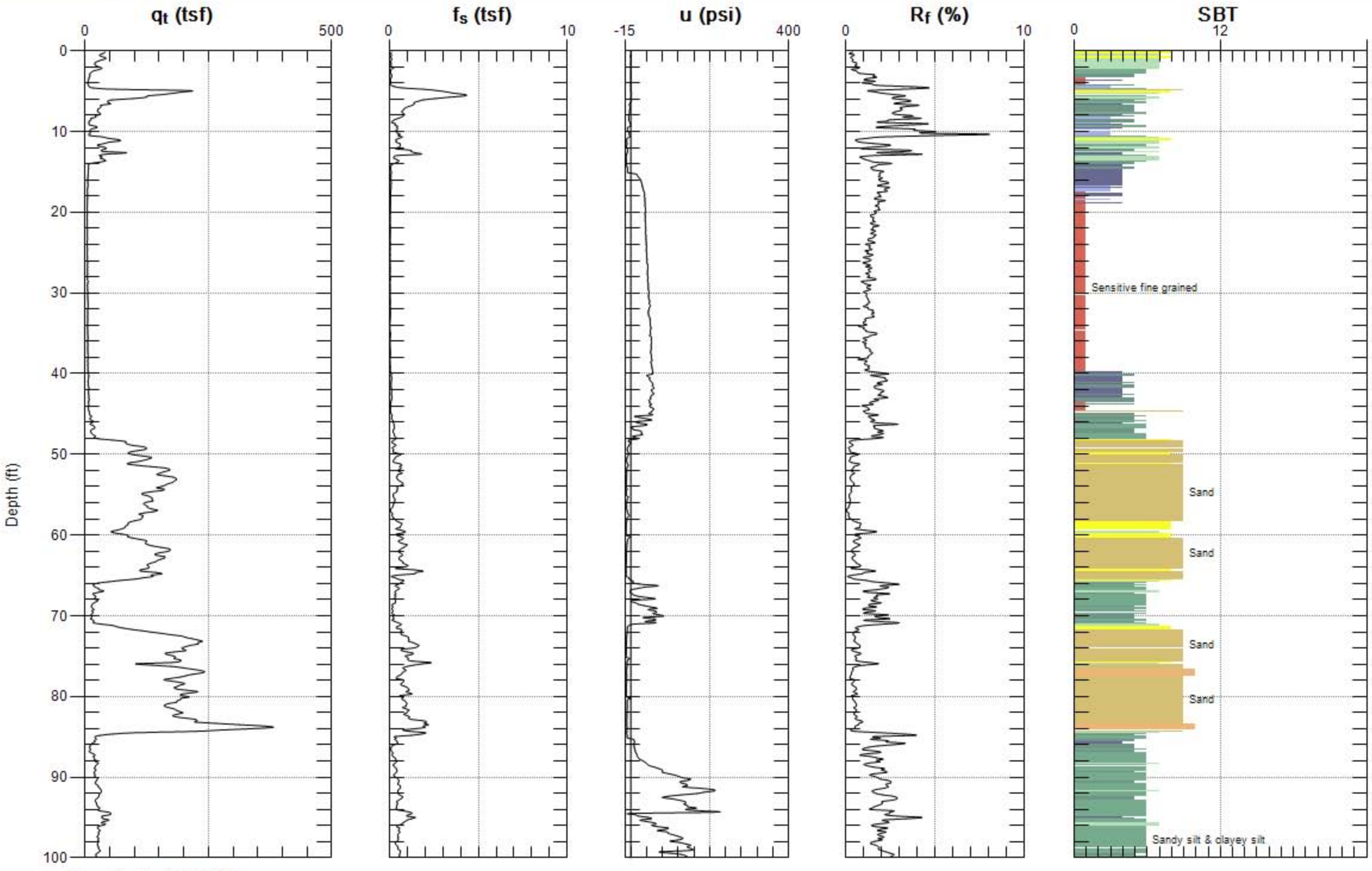


Max. Depth: 100.070 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: CPT-05
Engineer: J.CASTLE
Date: 12/1/2006 03:01

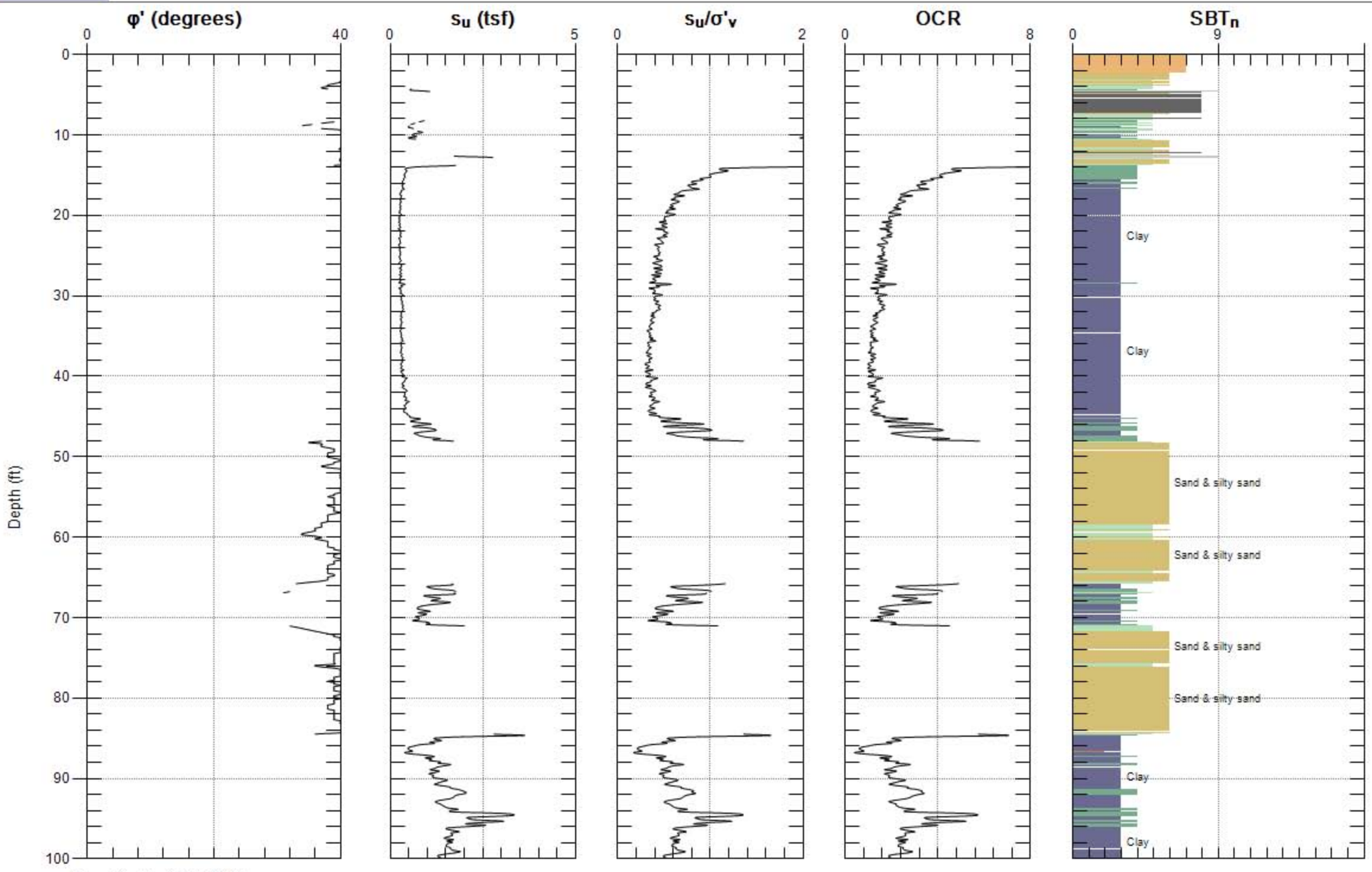


Max. Depth: 100.070 (ft)
Avg. Interval: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: CPT-05
Engineer: J.CASTLE
Date: 12/1/2006 03:01

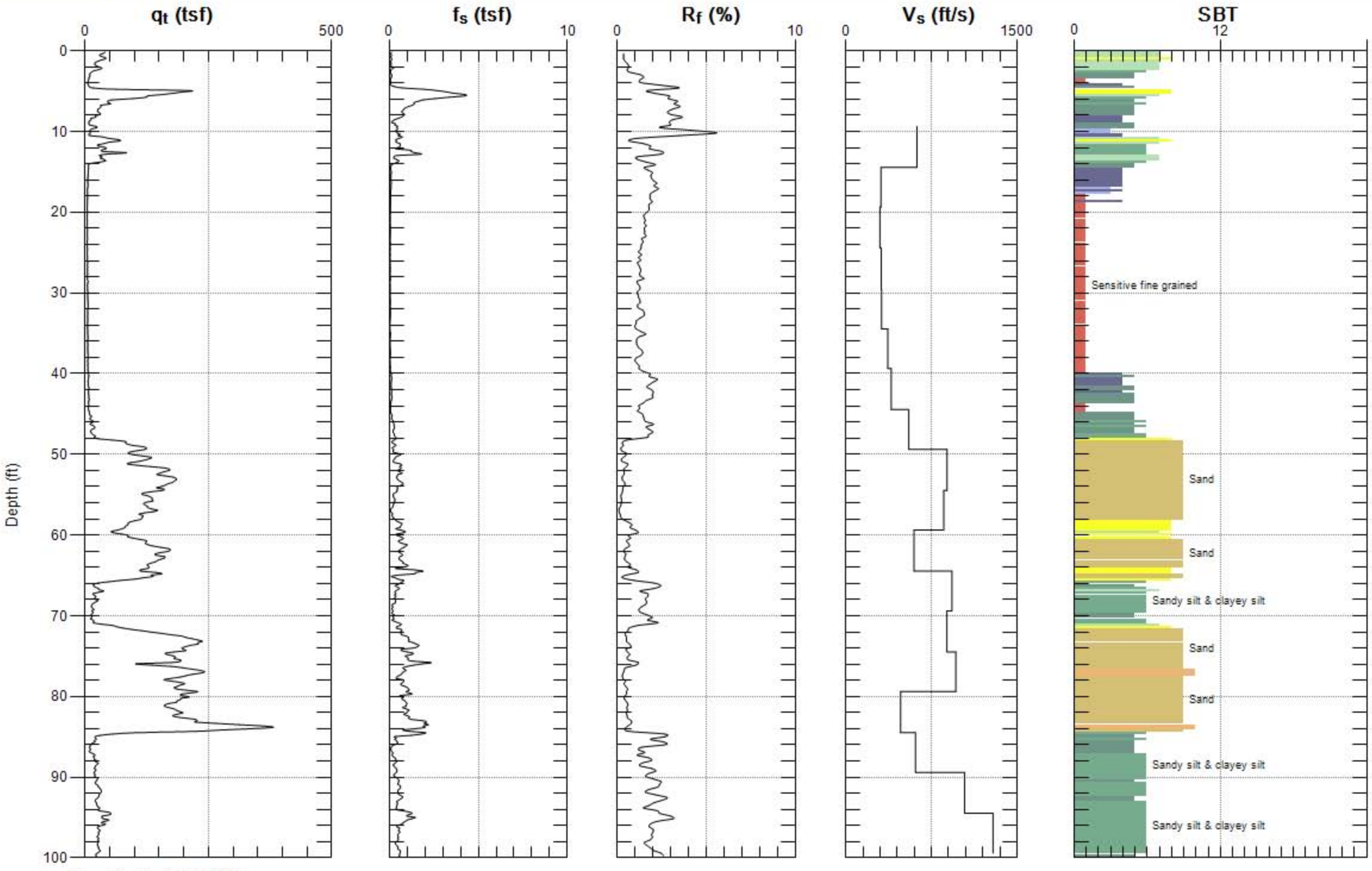


Max. Depth: 100.070 (ft)
Avg. Interval: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: CPT-05
Engineer: J.CASTLE
Date: 12/1/2006 03:01

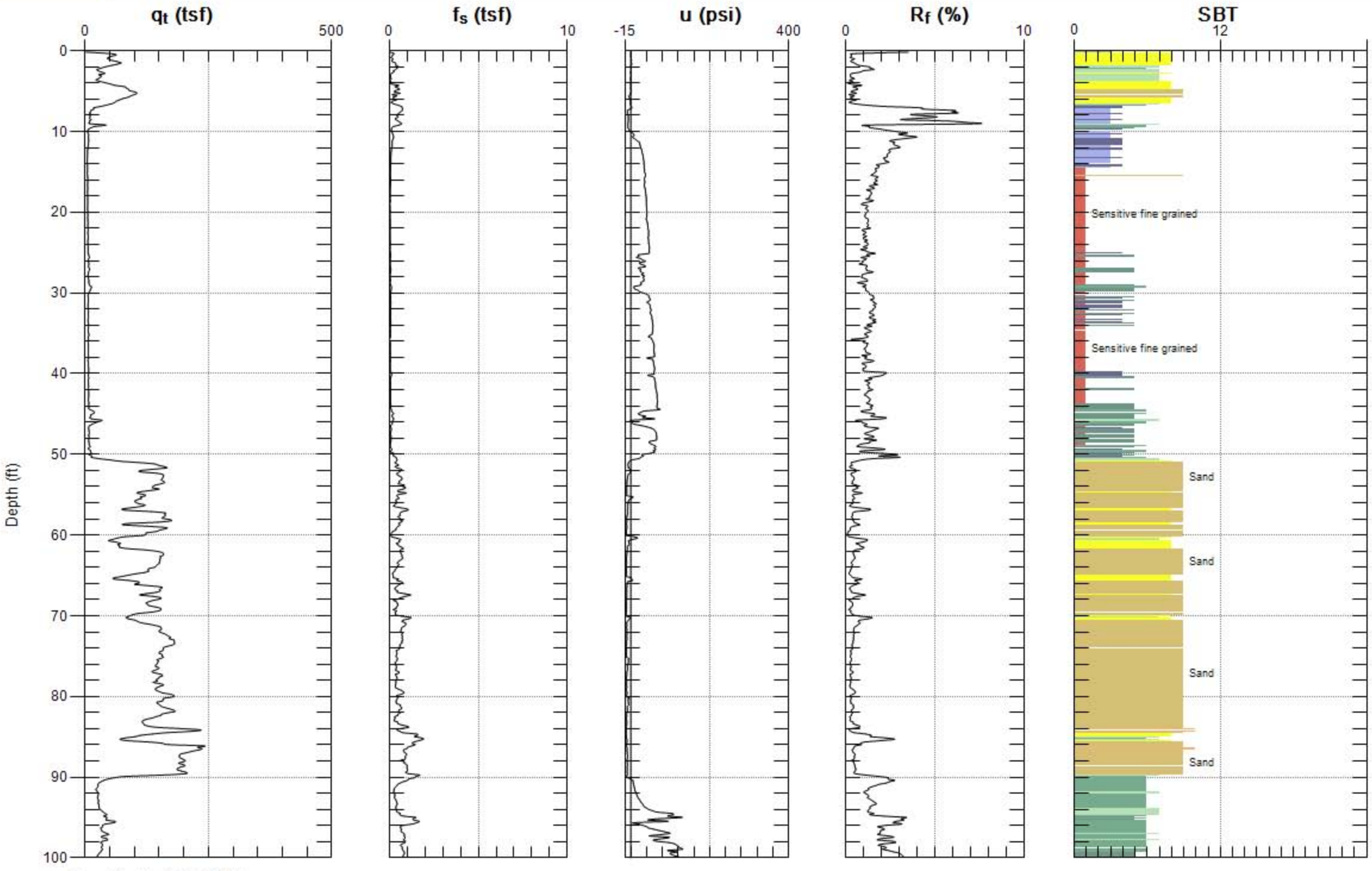


Max. Depth: 100.070 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: CPT-06
Engineer: J.CASTLE
Date: 12/1/2006 10:55

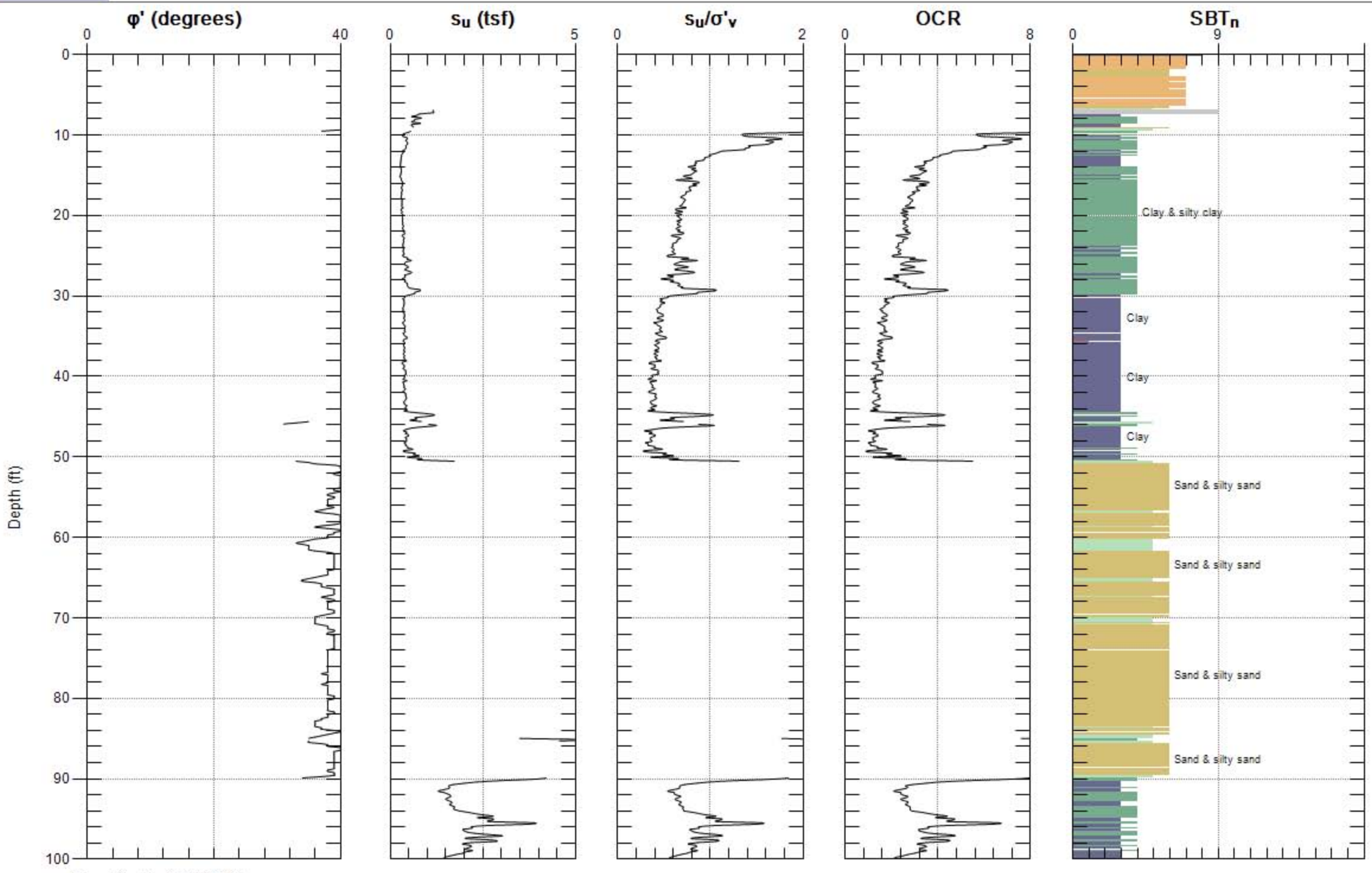


Max. Depth: 100.070 (ft)
Avg. Interval: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: CPT-06
Engineer: J.CASTLE
Date: 12/1/2006 10:55

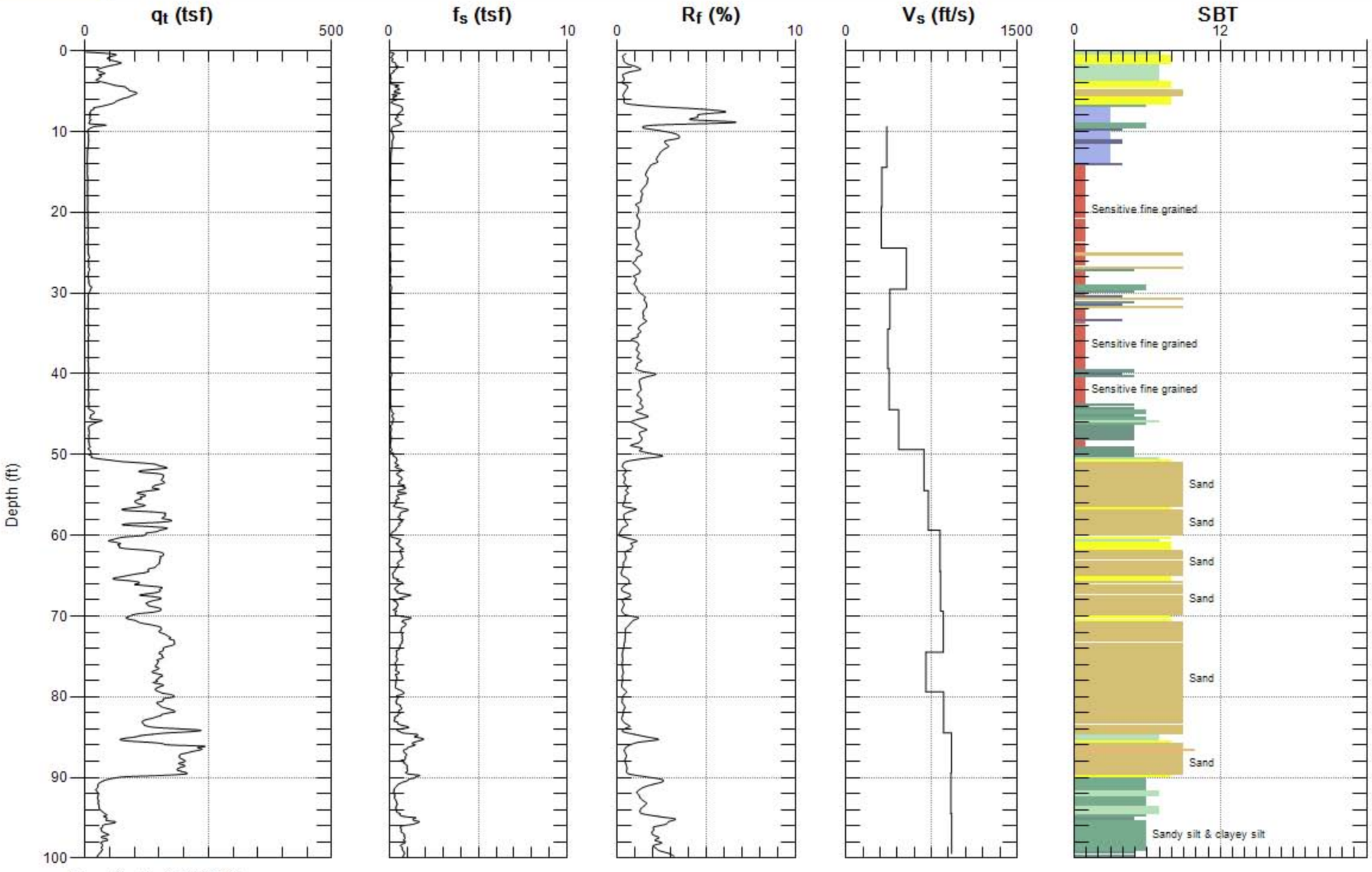


Max. Depth: 100.070 (ft)
Avg. Interval: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: CPT-06
Engineer: J.CASTLE
Date: 12/1/2006 10:55

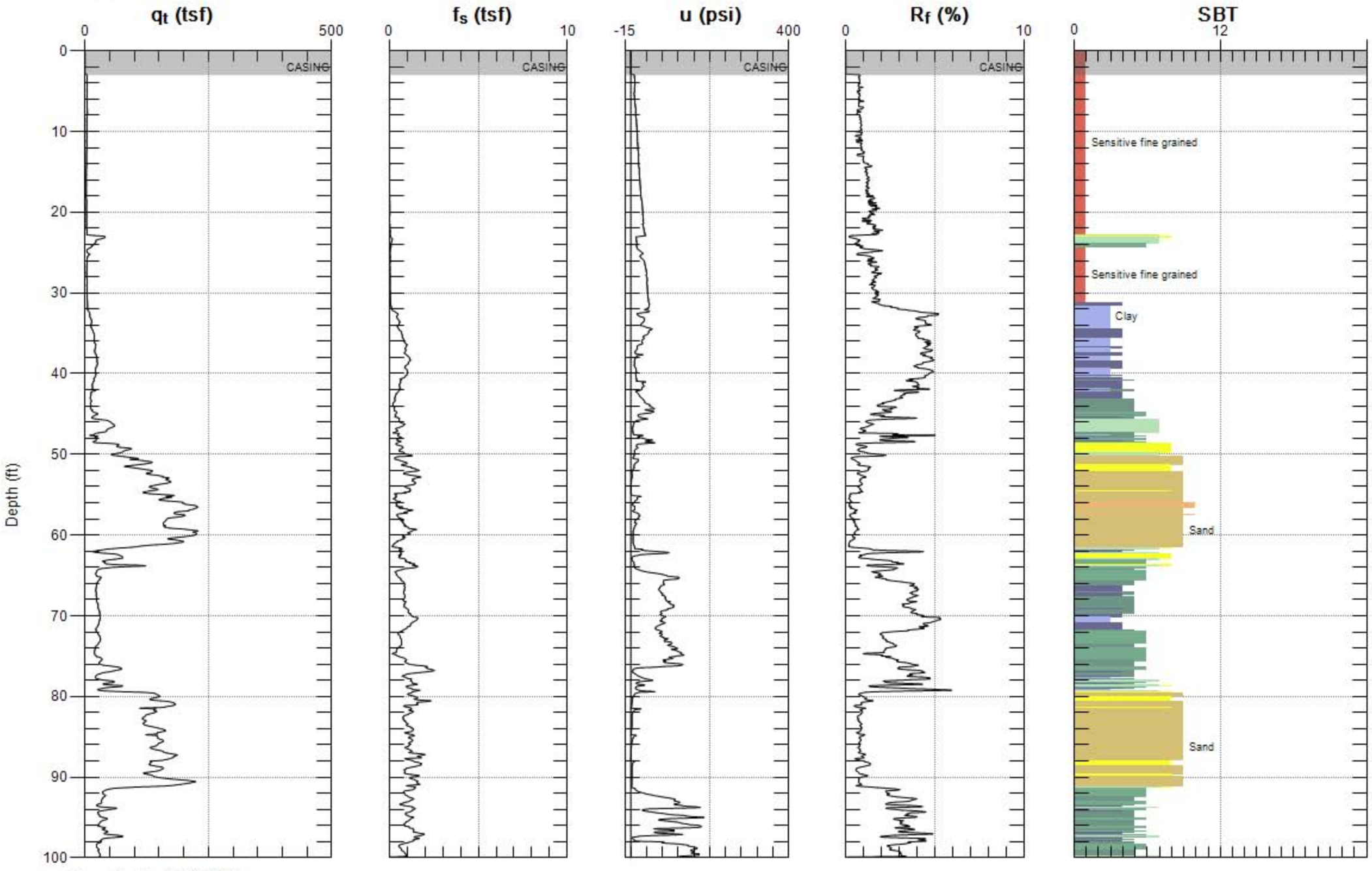


Max. Depth: 100.070 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: 06-CPT-07
Engineer: J.CASTLE
Date: 1/24/2007 06:24

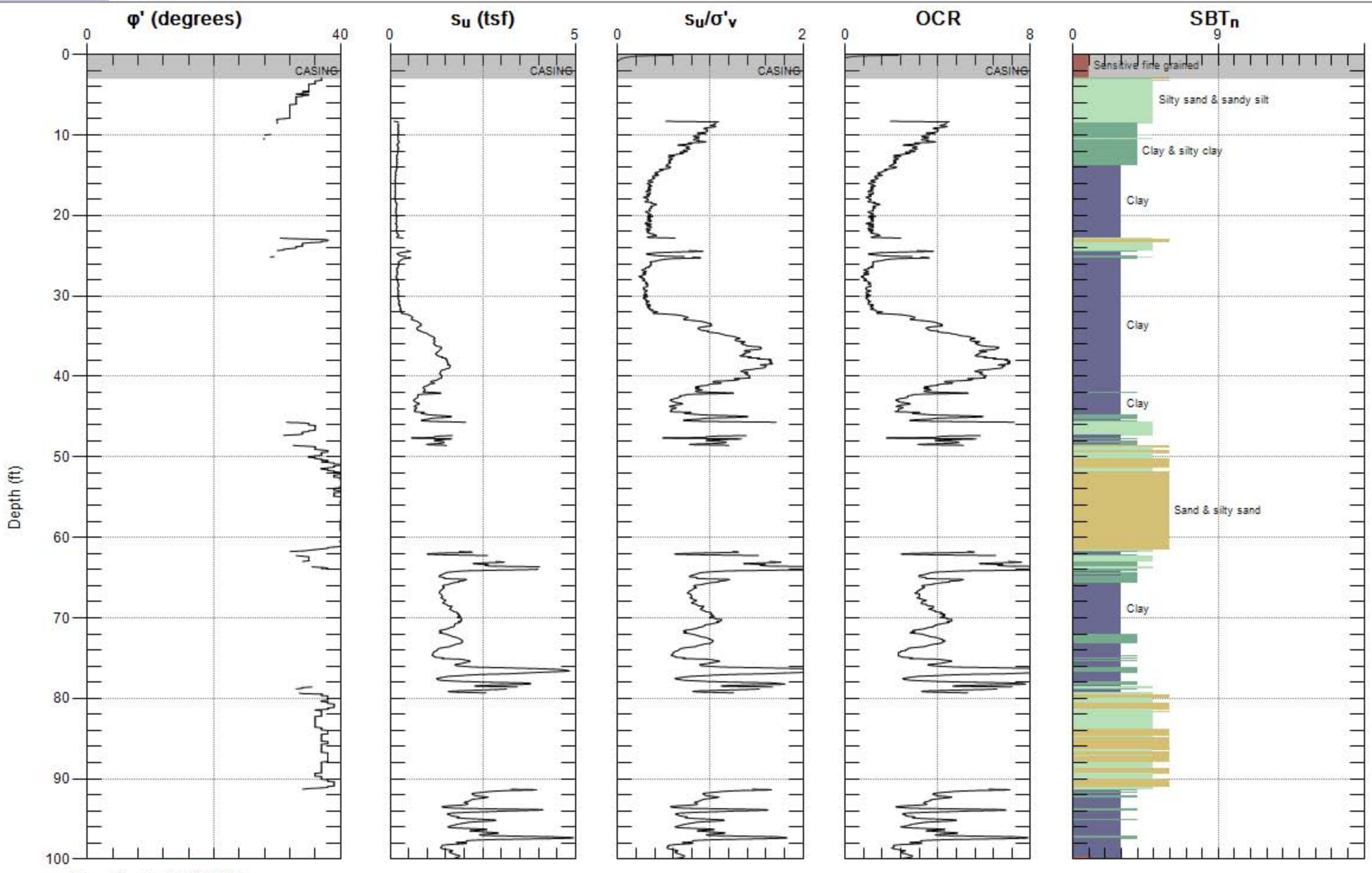


Max. Depth: 100.150 (ft)
Avg. Interval: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: 06-CPT-07
Engineer: J.CASTLE
Date: 1/24/2007 06:24

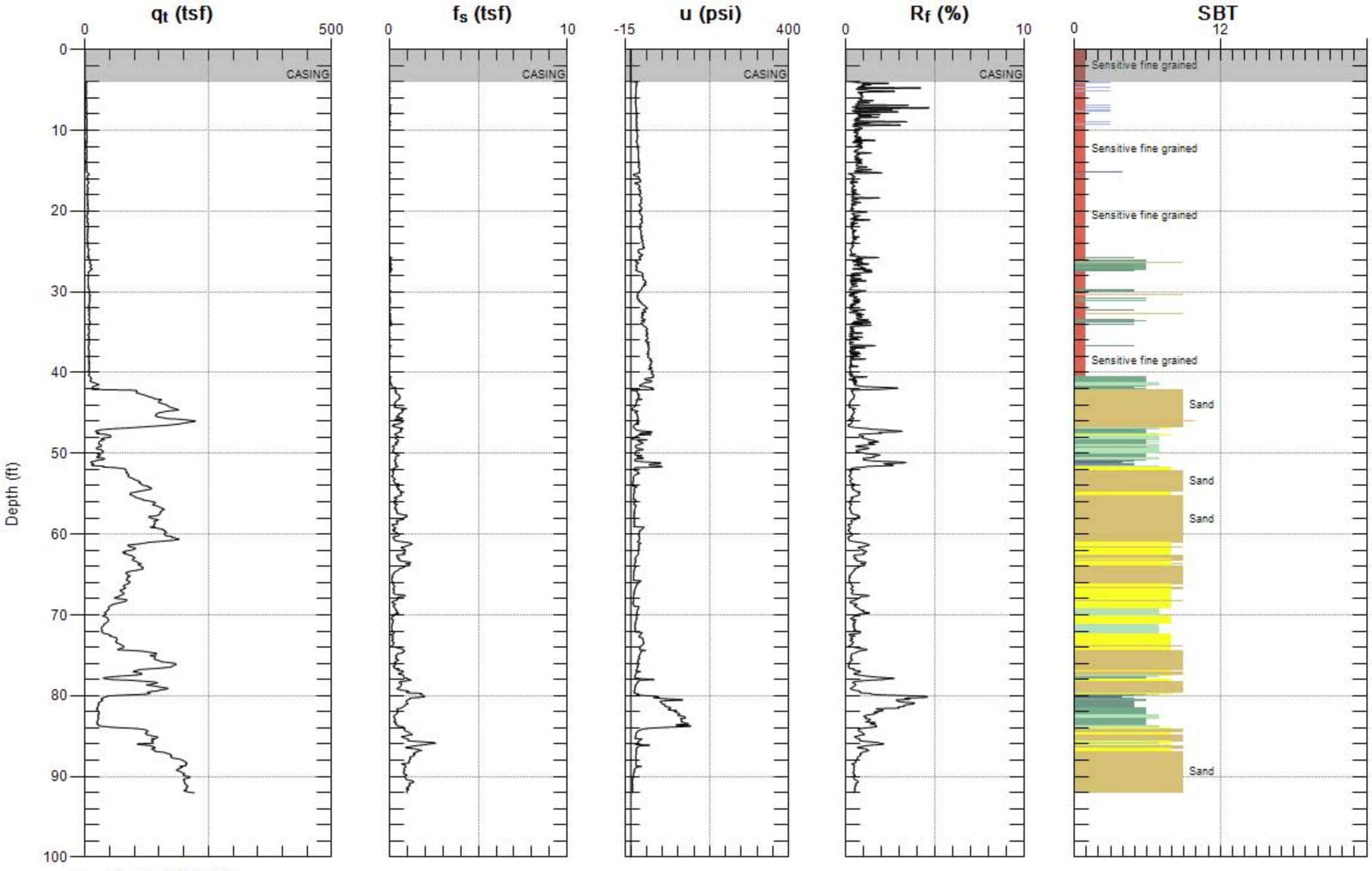


Max. Depth: 100.150 (ft)
Avg. Interval: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: 06-CPT-08
Engineer: J.CASTLE
Date: 12/20/2006 09:27

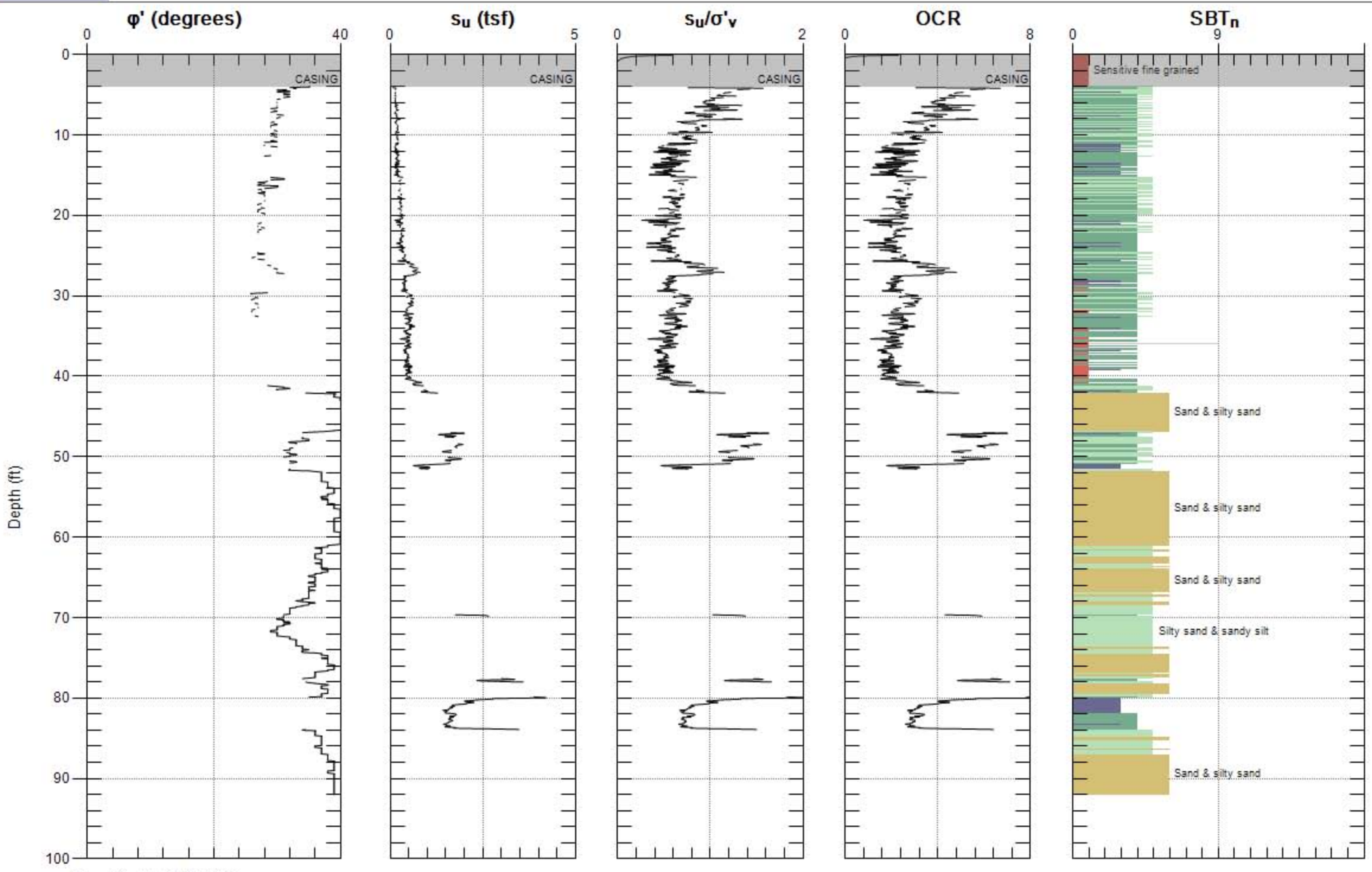


Max. Depth: 92.030 (ft)
Avg. Interval: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: 06-CPT-08
Engineer: J.CASTLE
Date: 12/20/2006 09:27

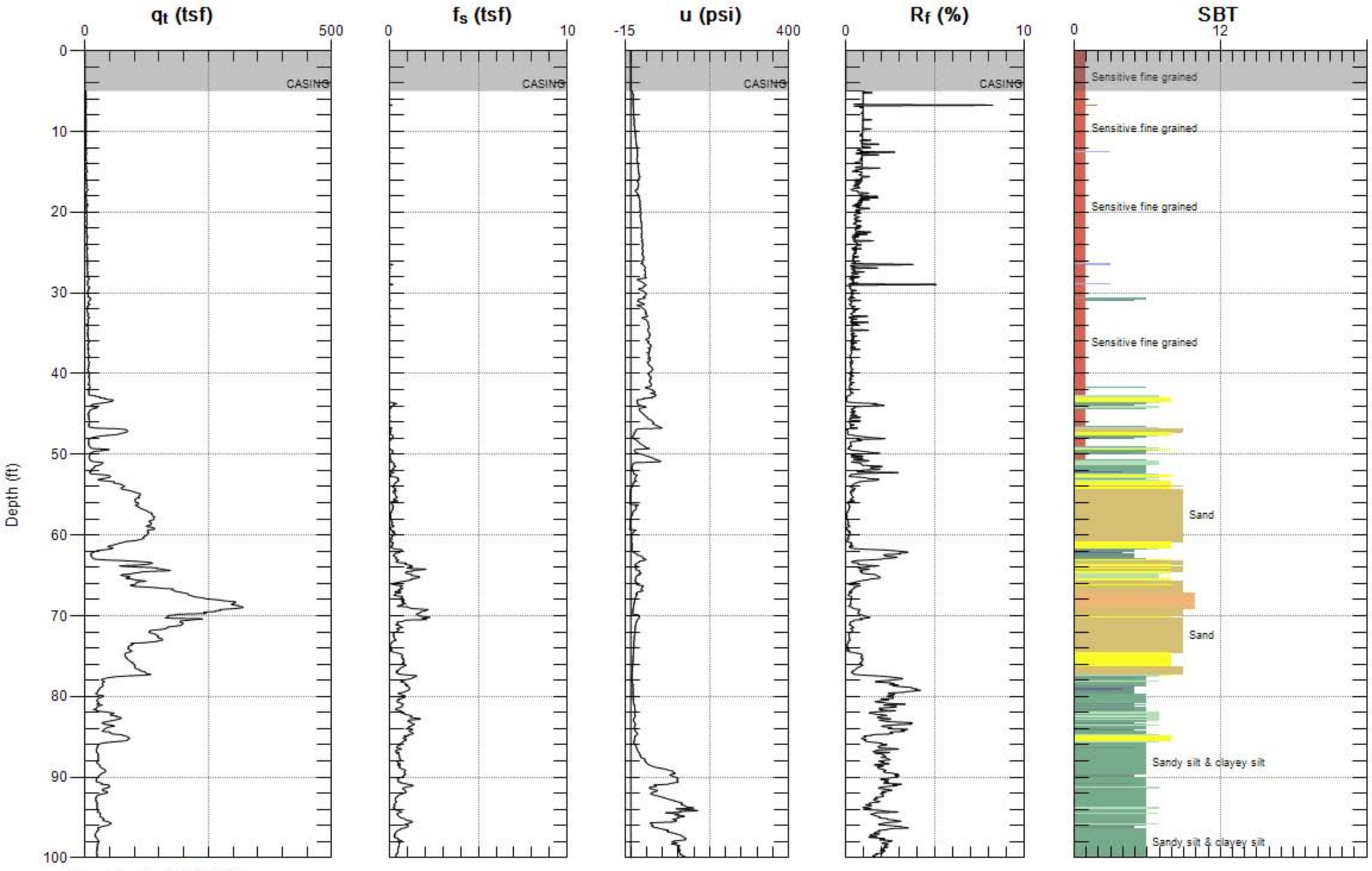


Max. Depth: 92.030 (ft)
Avg. Interval: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: 06-CPT-09
Engineer: J.CASTLE
Date: 12/19/2006 08:21

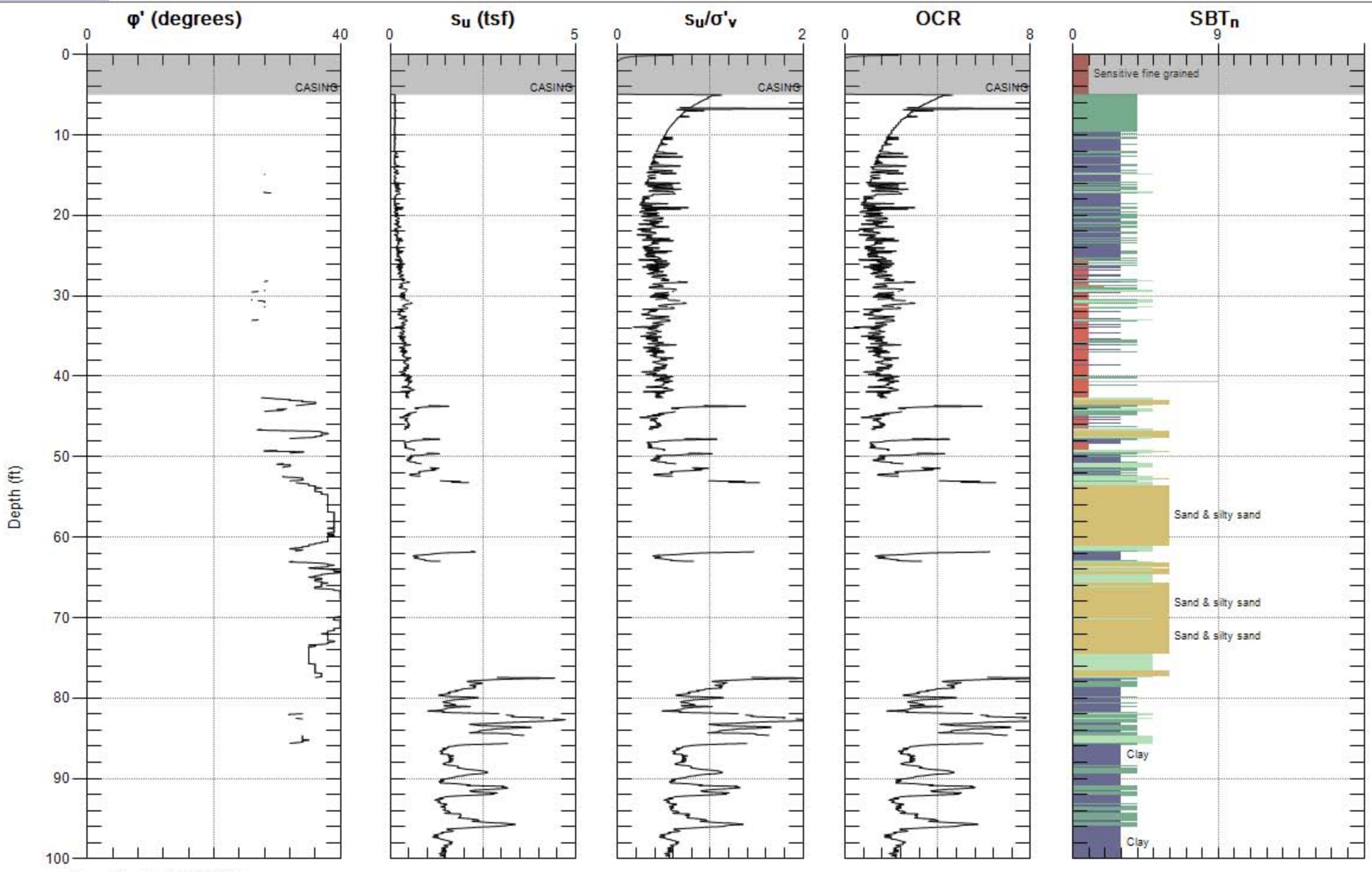


Max. Depth: 100.230 (ft)
Avg. Interval: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: 06-CPT-09
Engineer: J.CASTLE
Date: 12/19/2006 08:21

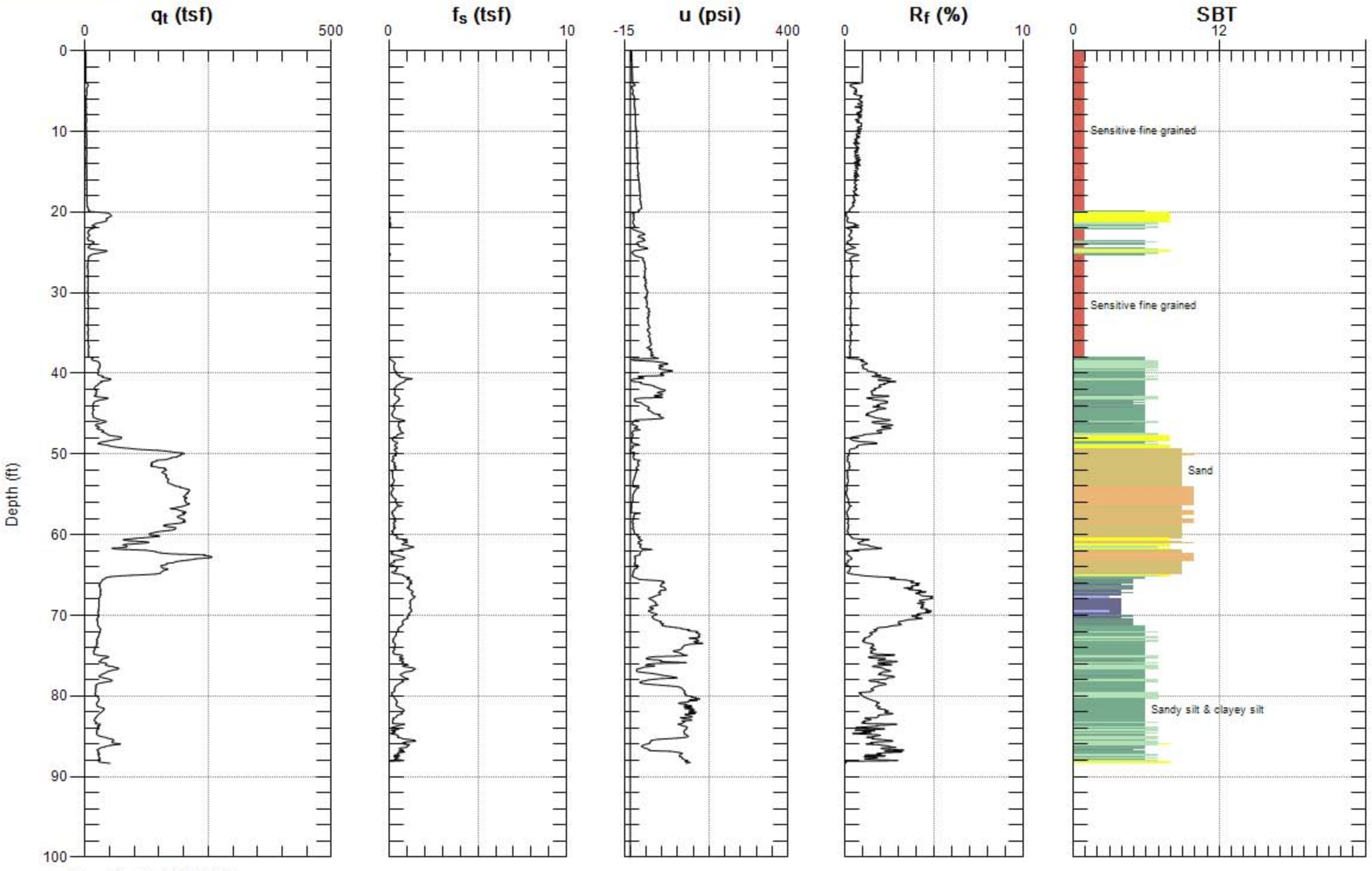


Max. Depth: 100.230 (ft)
Avg. Interval: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: 06-CPT-10
Engineer: J.CASTLE
Date: 12/12/2006 09:42

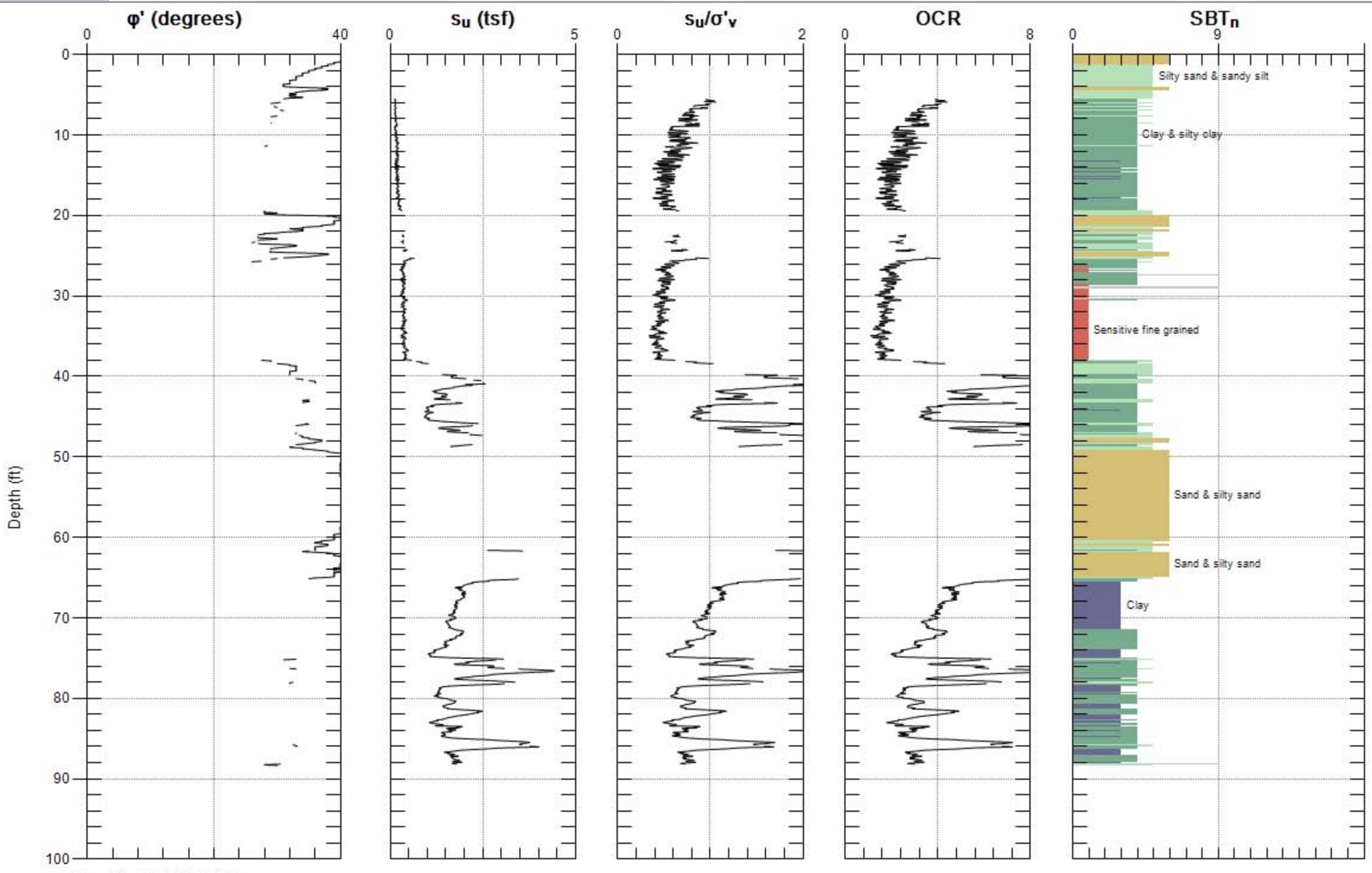


Max. Depth: 88.340 (ft)
Avg. Interval: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: 06-CPT-10
Engineer: J.CASTLE
Date: 12/12/2006 09:42

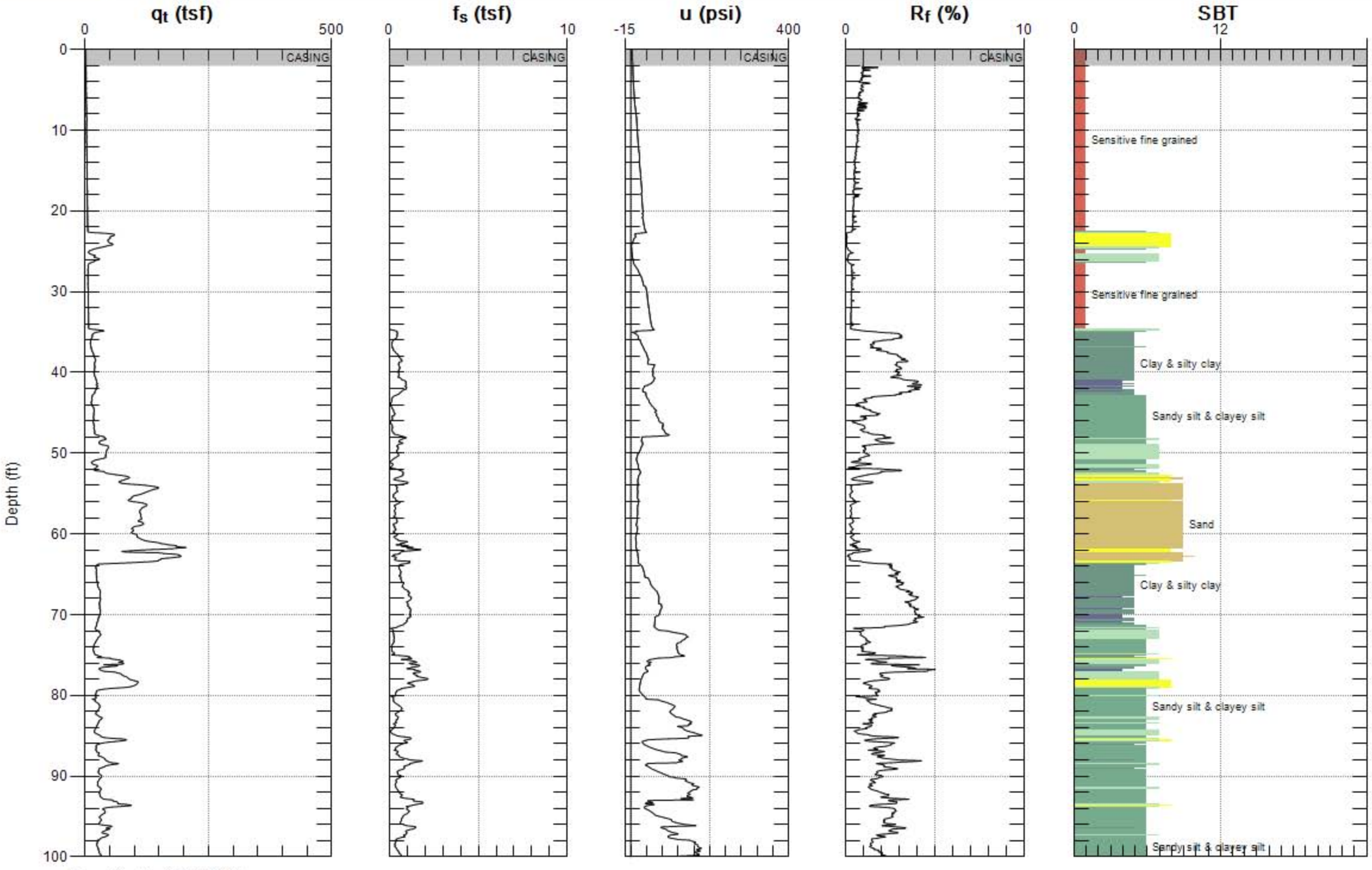


Max. Depth: 88.340 (ft)
Avg. Interval: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: 06-CPT-11
Engineer: J.CASTLE
Date: 12/13/2006 08:05

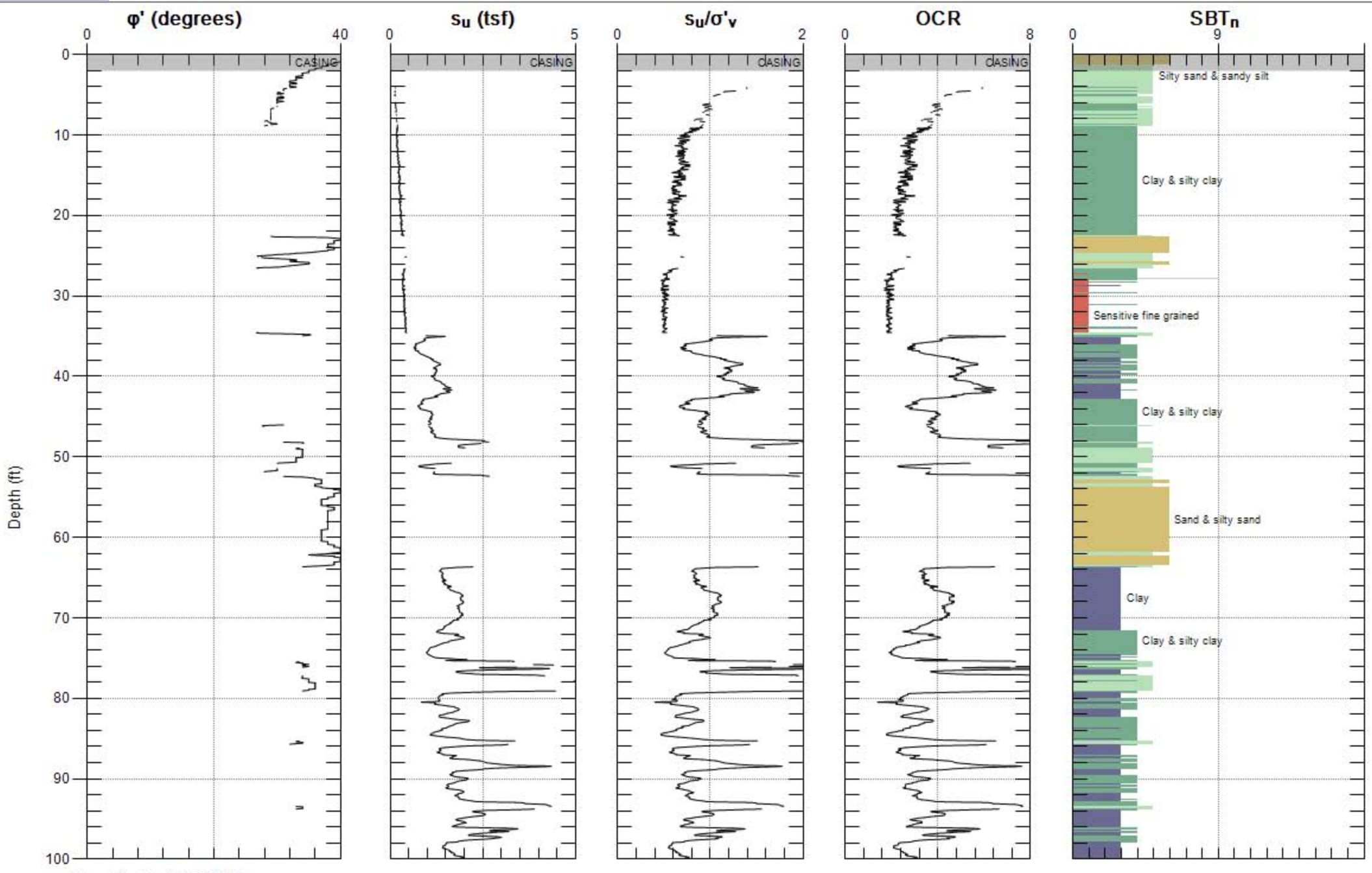


Max. Depth: 100.390 (ft)
Avg. Interval: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: 06-CPT-11
Engineer: J.CASTLE
Date: 12/13/2006 08:05

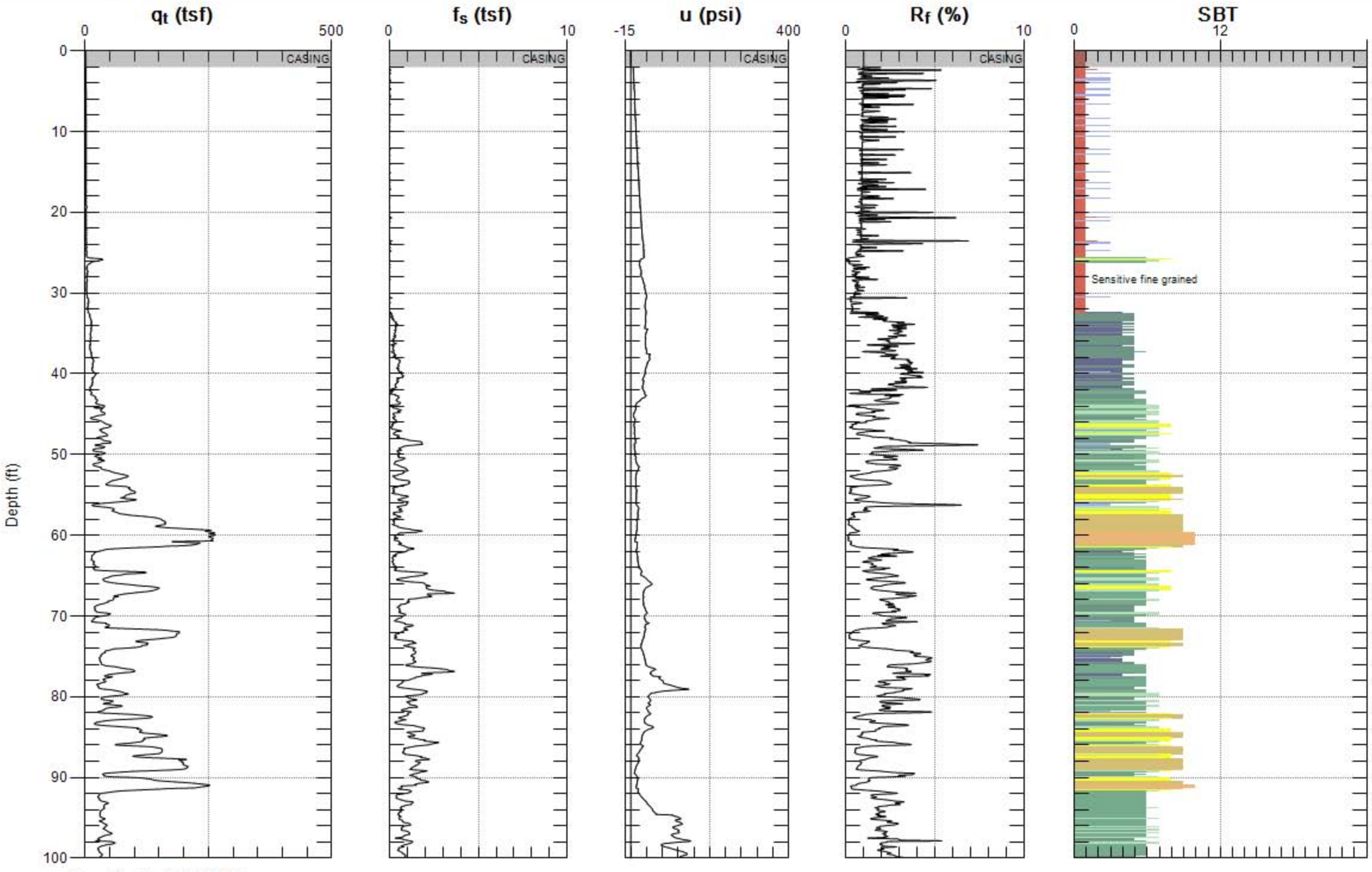


Max. Depth: 100.390 (ft)
Avg. Interval: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: 06-CPT-12
Engineer: J.CASTLE
Date: 12/14/2006 07:10

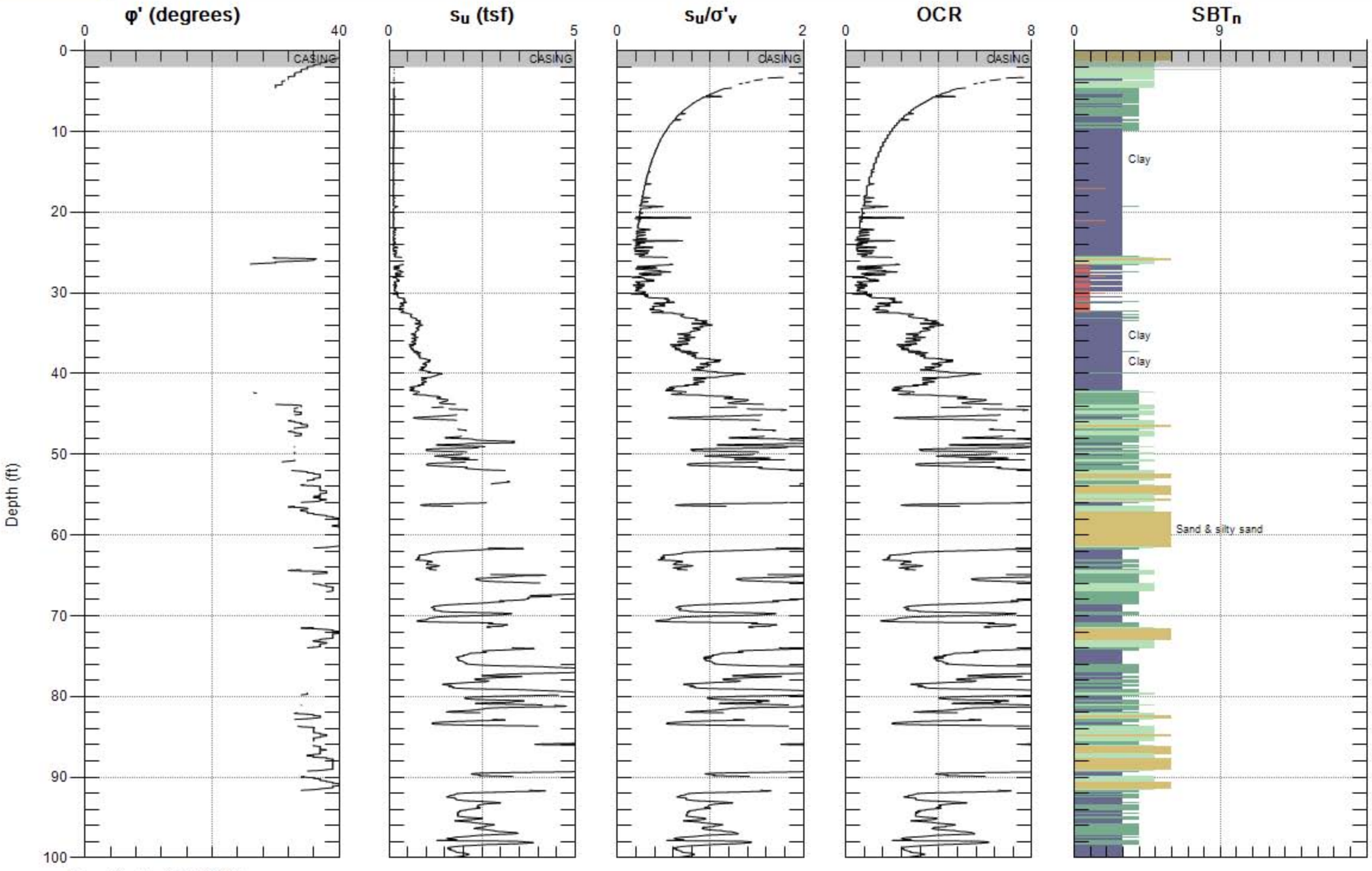


Max. Depth: 100.310 (ft)
Avg. Interval: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: 06-CPT-12
Engineer: J.CASTLE
Date: 12/14/2006 07:10

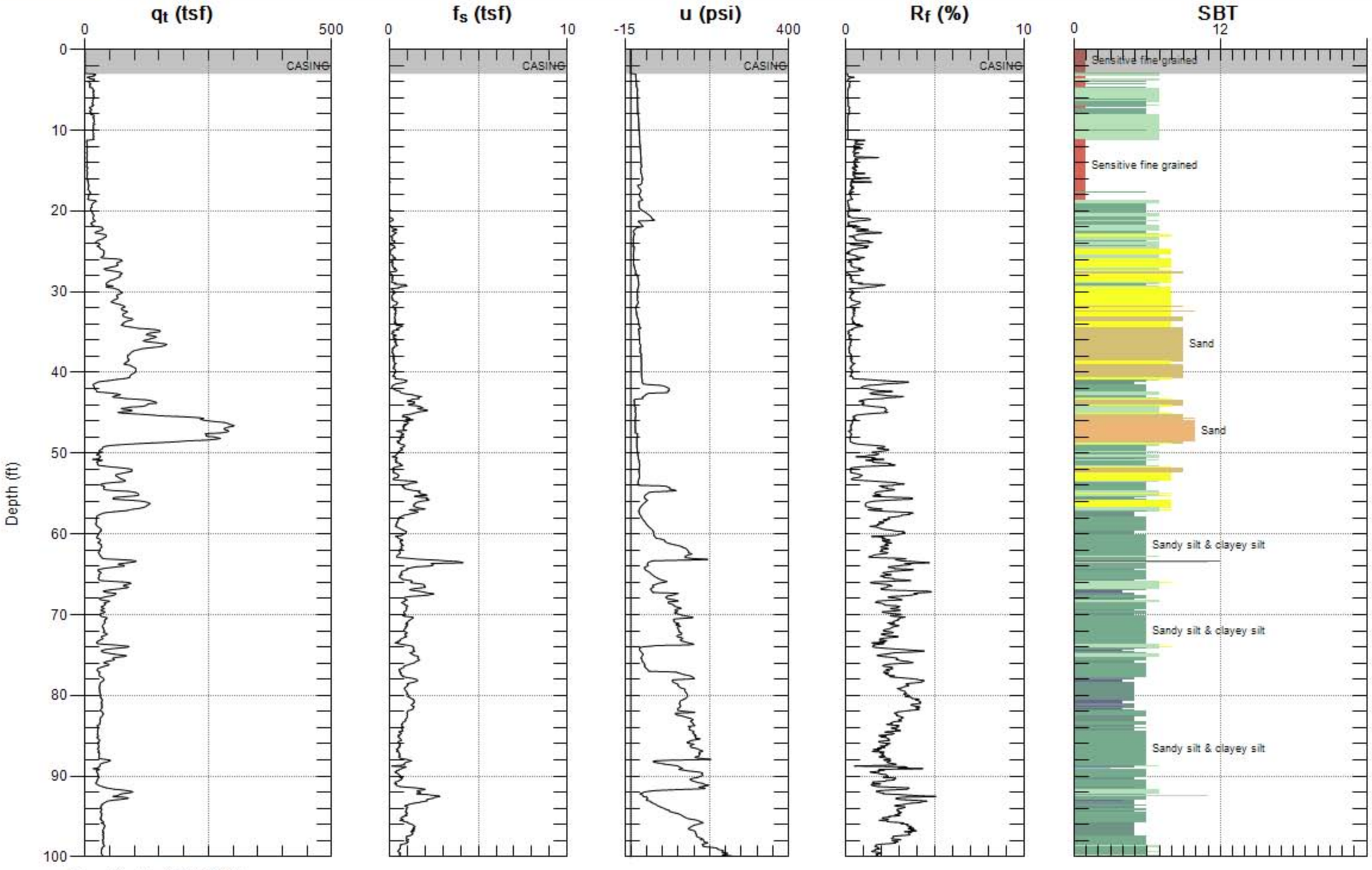


Max. Depth: 100.310 (ft)
Avg. Interval: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: 06-CPT-13
Engineer: J.CASTLE
Date: 12/14/2006 10:51

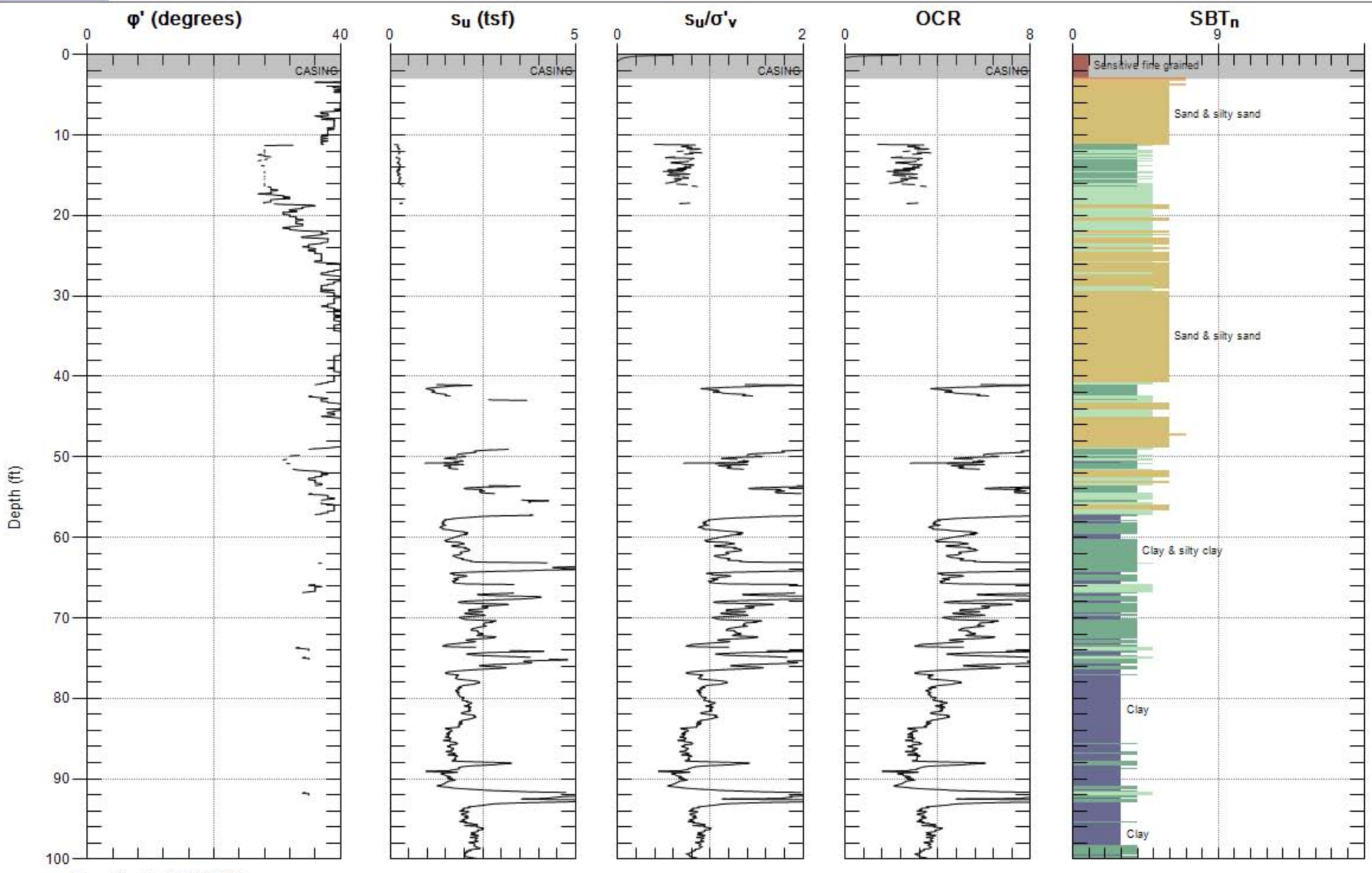


Max. Depth: 100.070 (ft)
Avg. Interval: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: 06-CPT-13
Engineer: J.CASTLE
Date: 12/14/2006 10:51

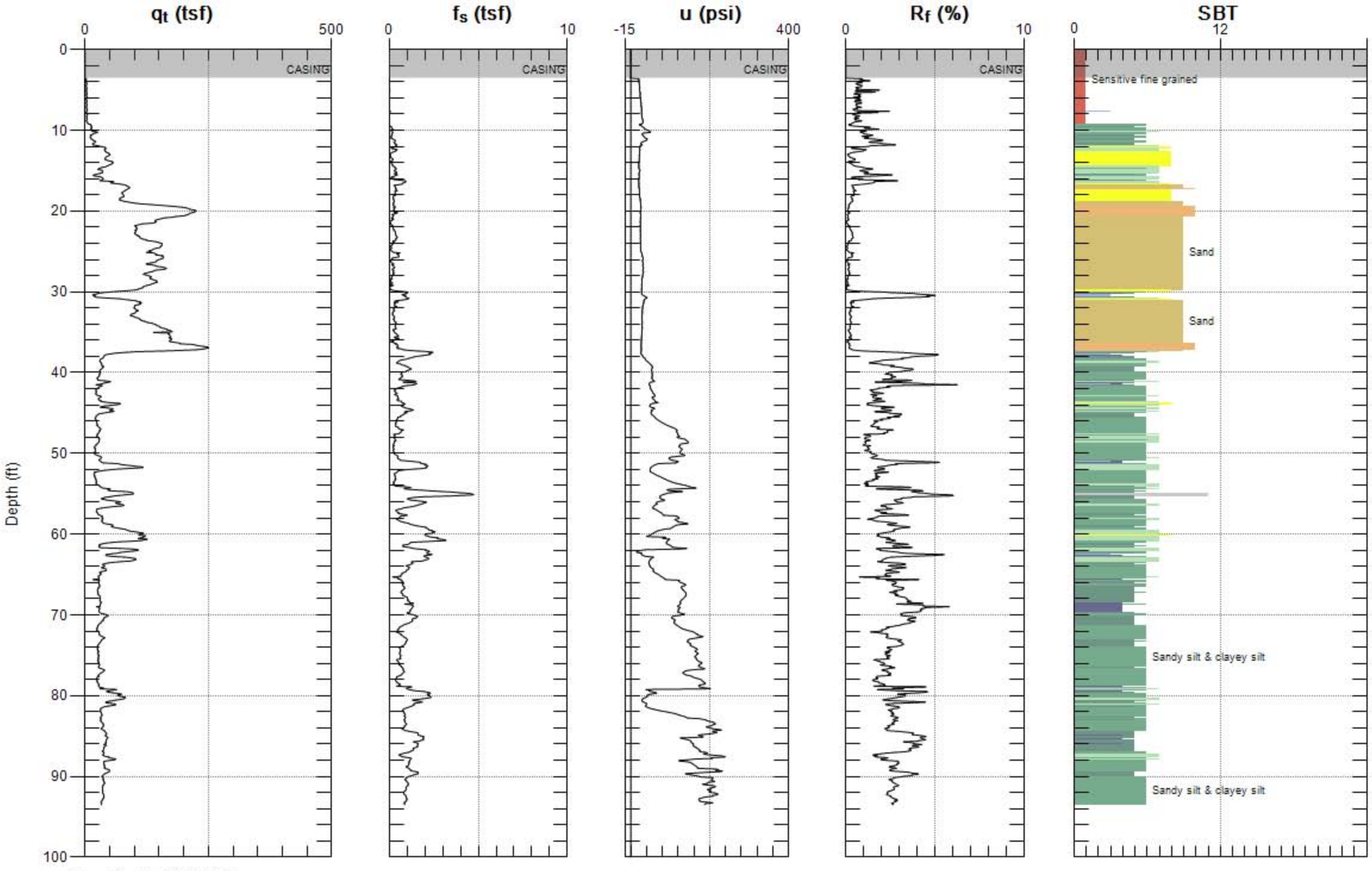


Max. Depth: 100.070 (ft)
Avg. Interval: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: 06-CPT-14
Engineer: J.CASTLE
Date: 12/15/2006 08:28

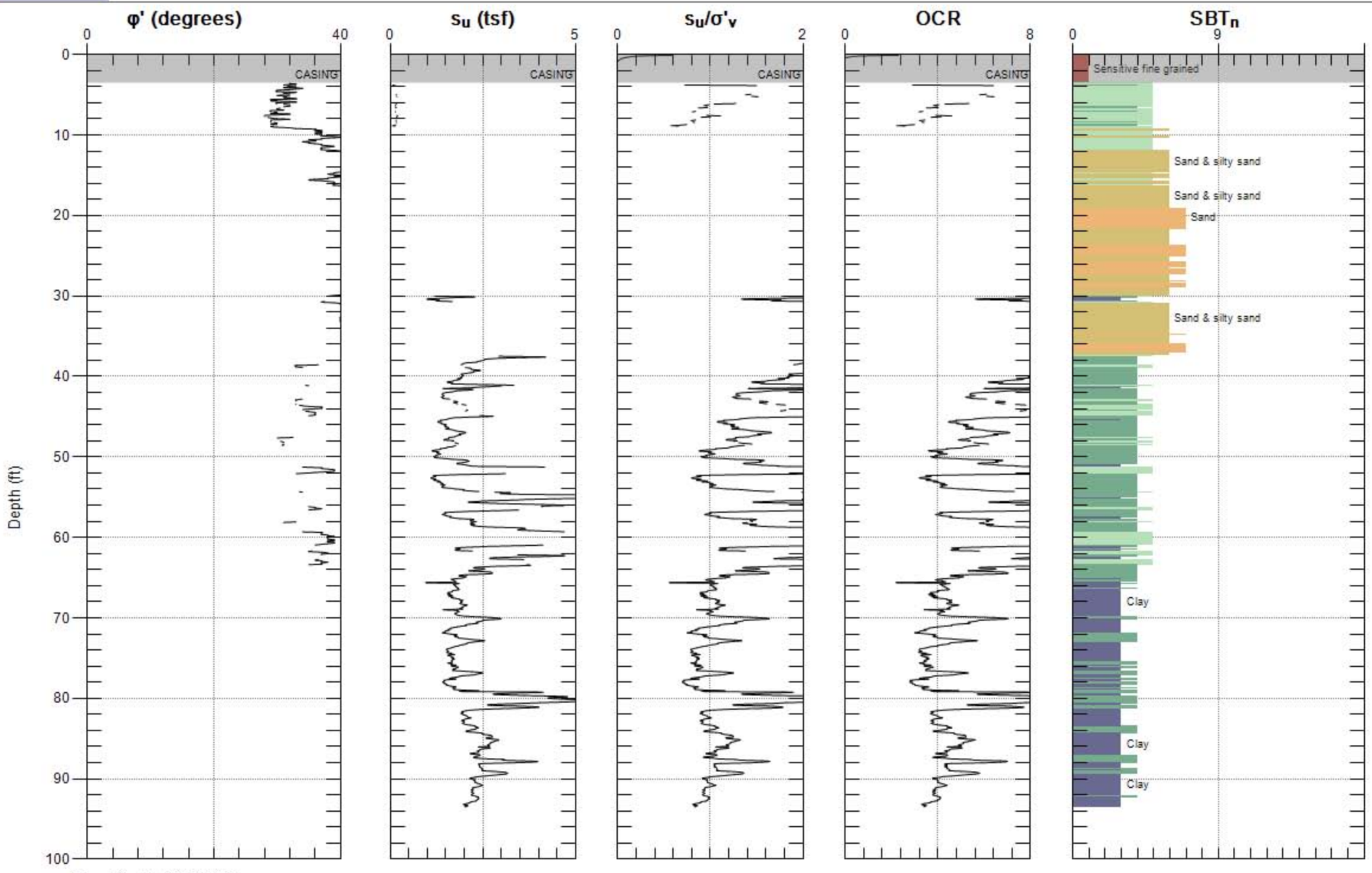


Max. Depth: 93.500 (ft)
Avg. Interval: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: 06-CPT-14
Engineer: J.CASTLE
Date: 12/15/2006 08:28

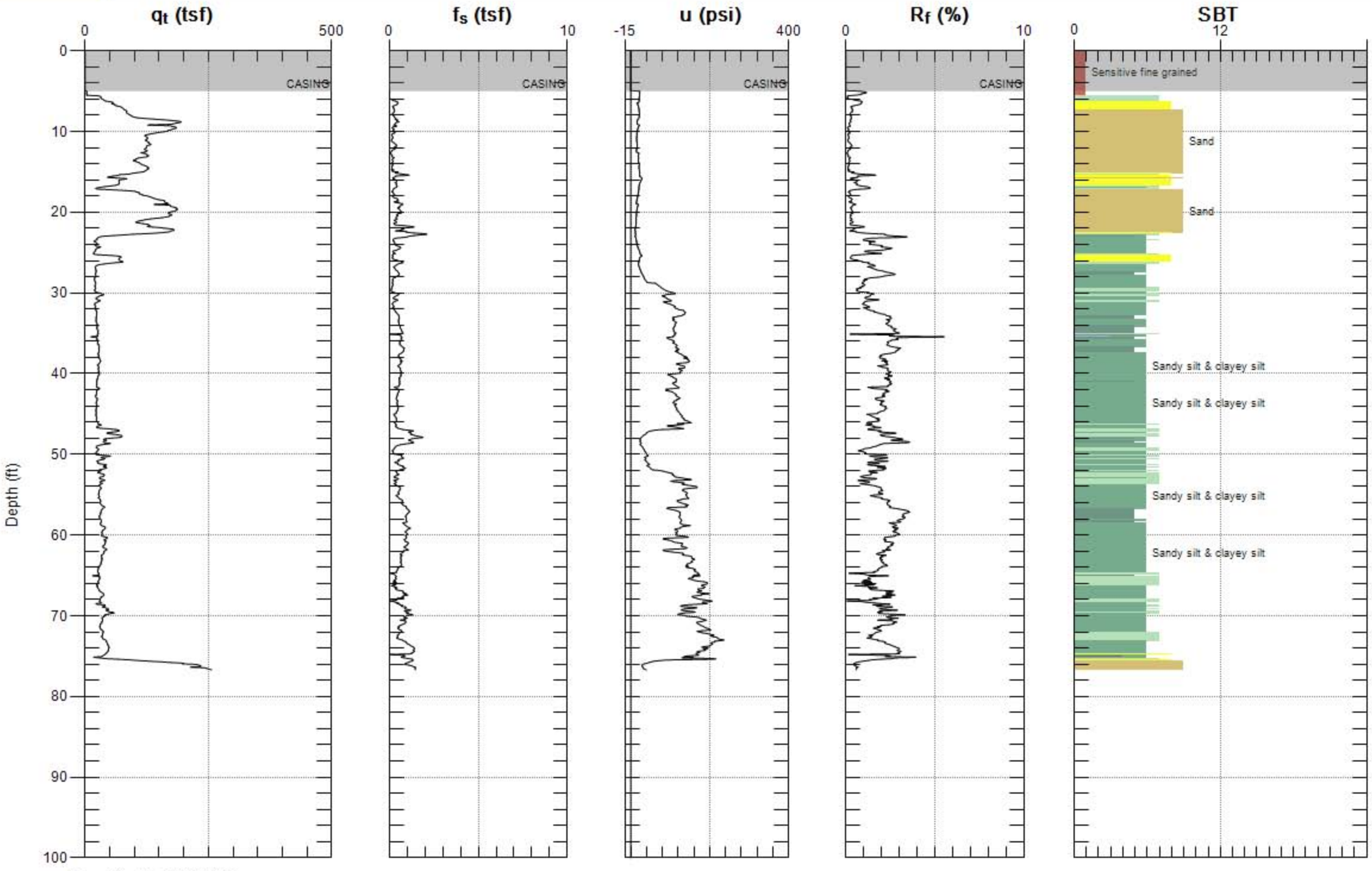


Max. Depth: 93.500 (ft)
Avg. Interval: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: 06-CPT-15
Engineer: J.CASTLE
Date: 12/18/2006 04:29

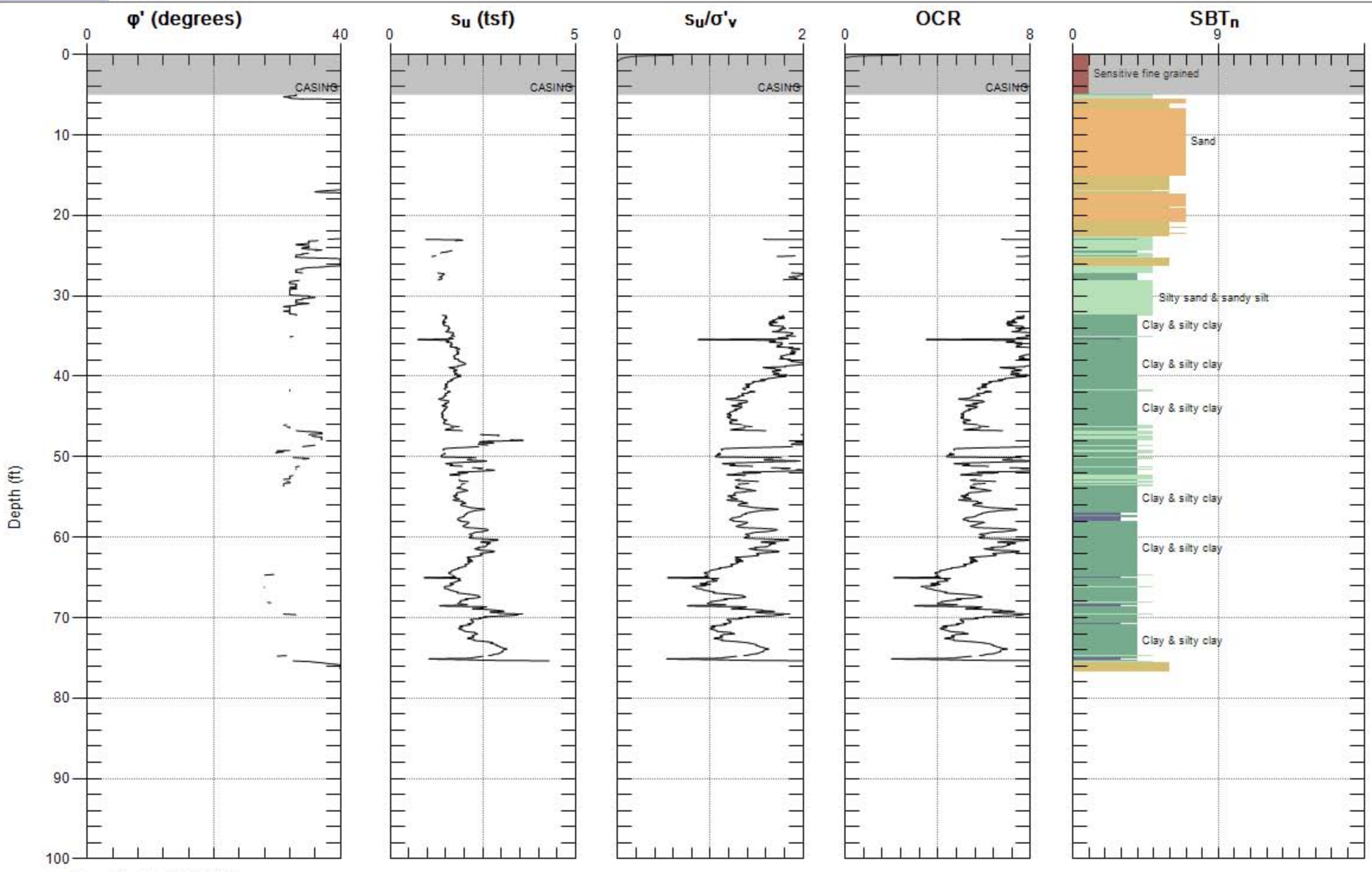


Max. Depth: 76.690 (ft)
Avg. Interval: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: 06-CPT-15
Engineer: J.CASTLE
Date: 12/18/2006 04:29

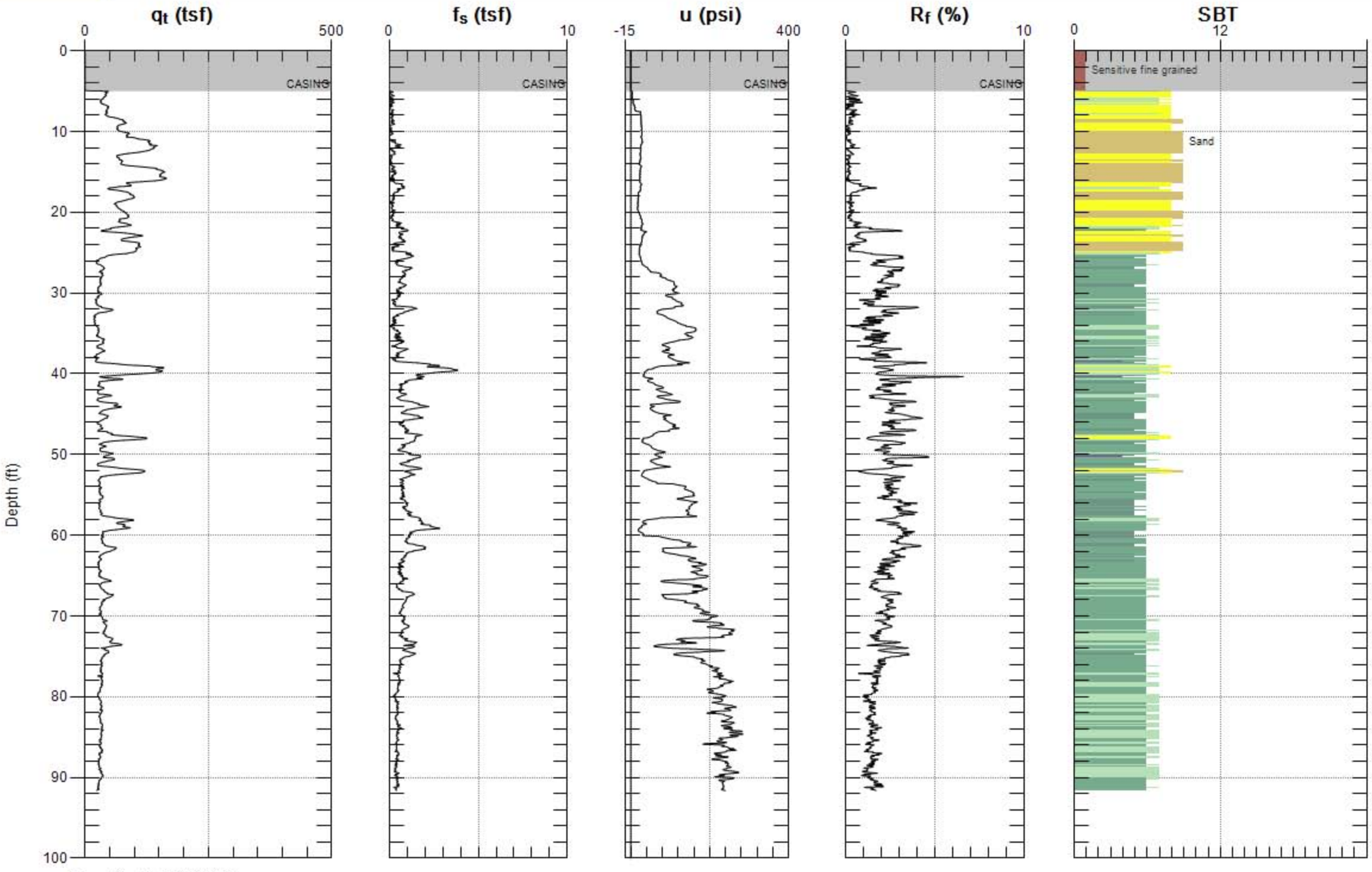


Max. Depth: 76.690 (ft)
Avg. Interval: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: 06-CPT-16
Engineer: J.CASTLE
Date: 12/19/2006 11:42

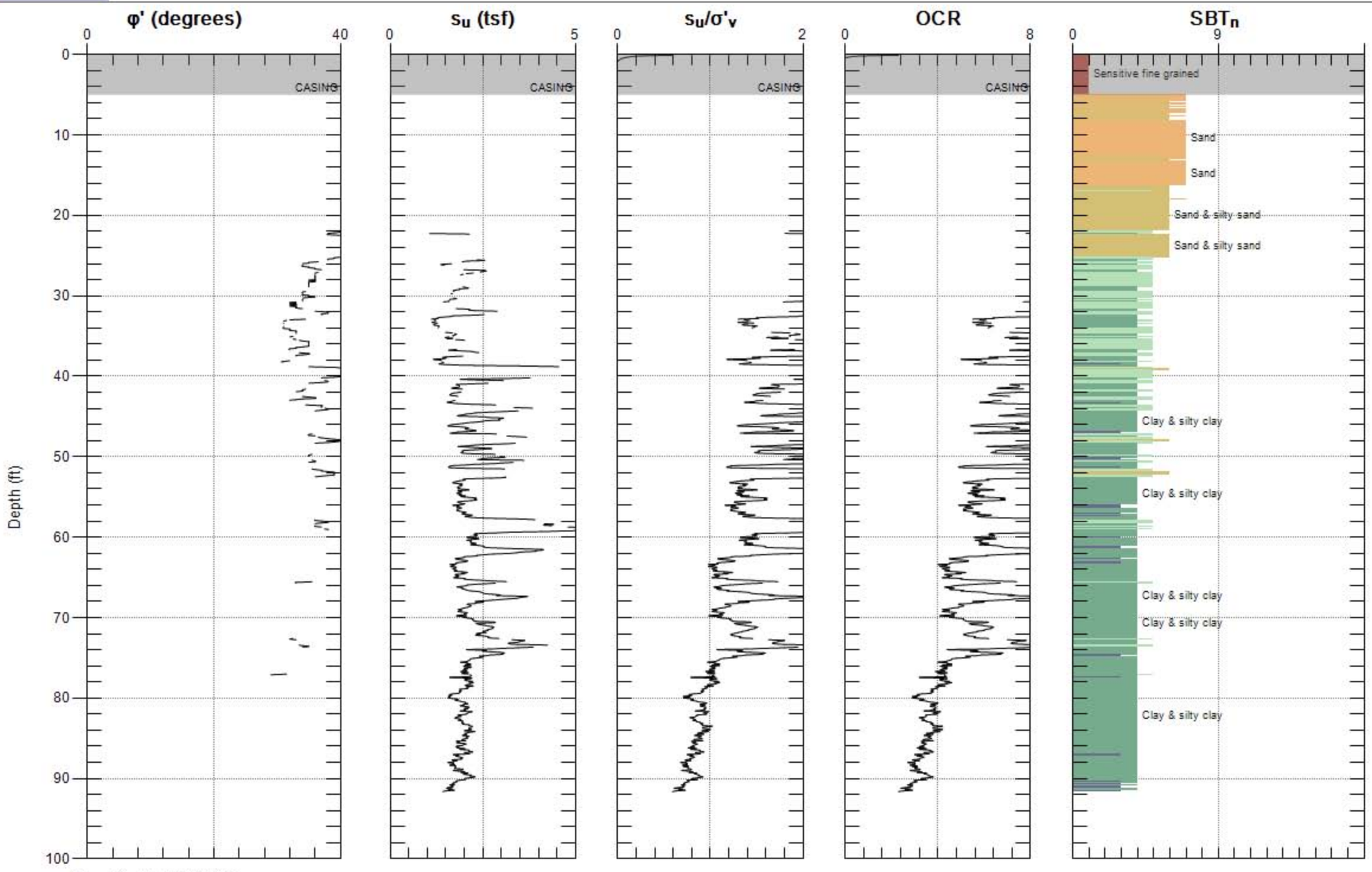


Max. Depth: 91.620 (ft)
Avg. Interval: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: 06-CPT-16
Engineer: J.CASTLE
Date: 12/19/2006 11:42

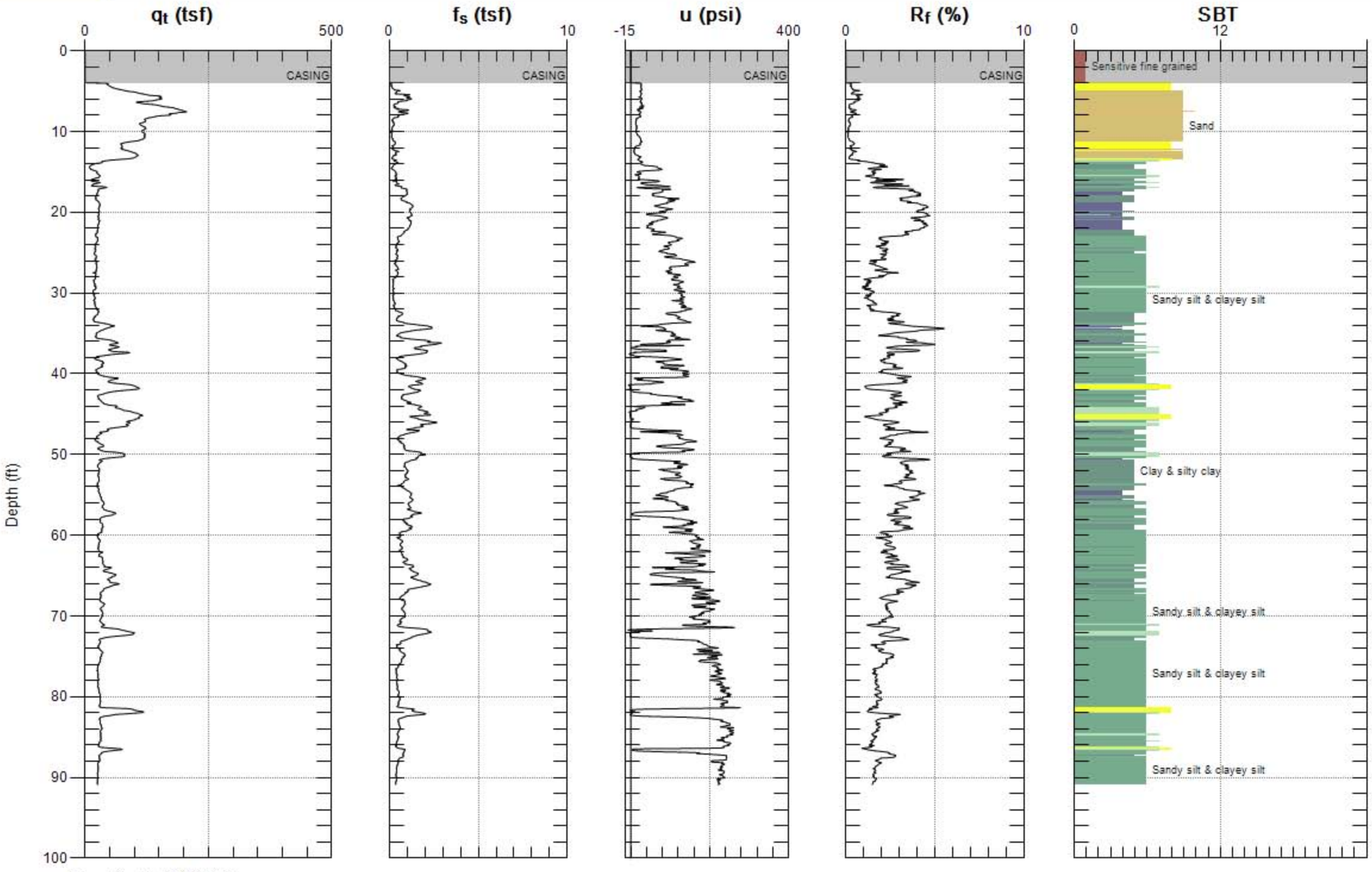


Max. Depth: 91.620 (ft)
Avg. Interval: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: 06-CPT-17
Engineer: J.CASTLE
Date: 12/20/2006 12:07

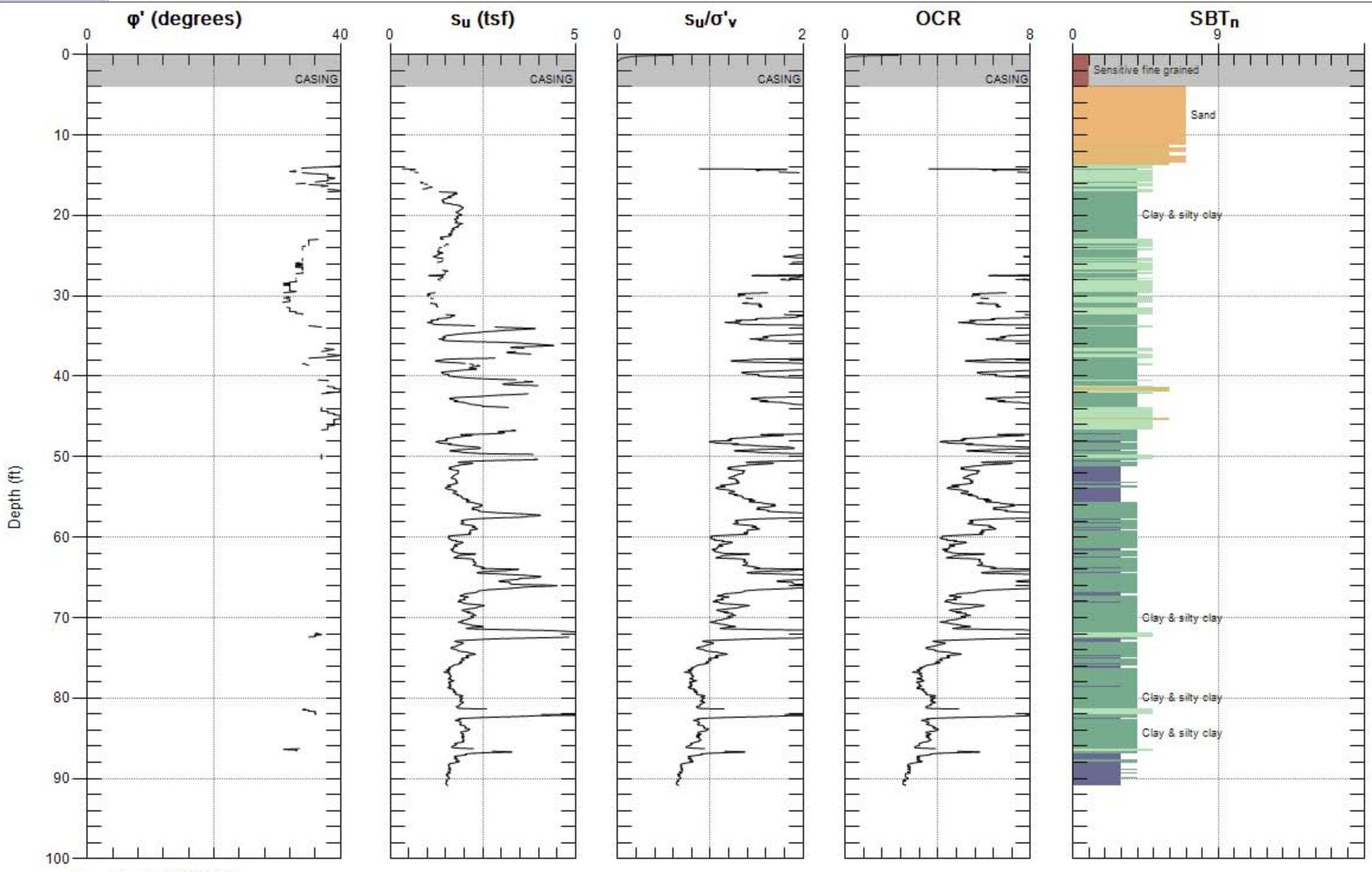


Max. Depth: 90.880 (ft)
Avg. Interval: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: 06-CPT-17
Engineer: J.CASTLE
Date: 12/20/2006 12:07

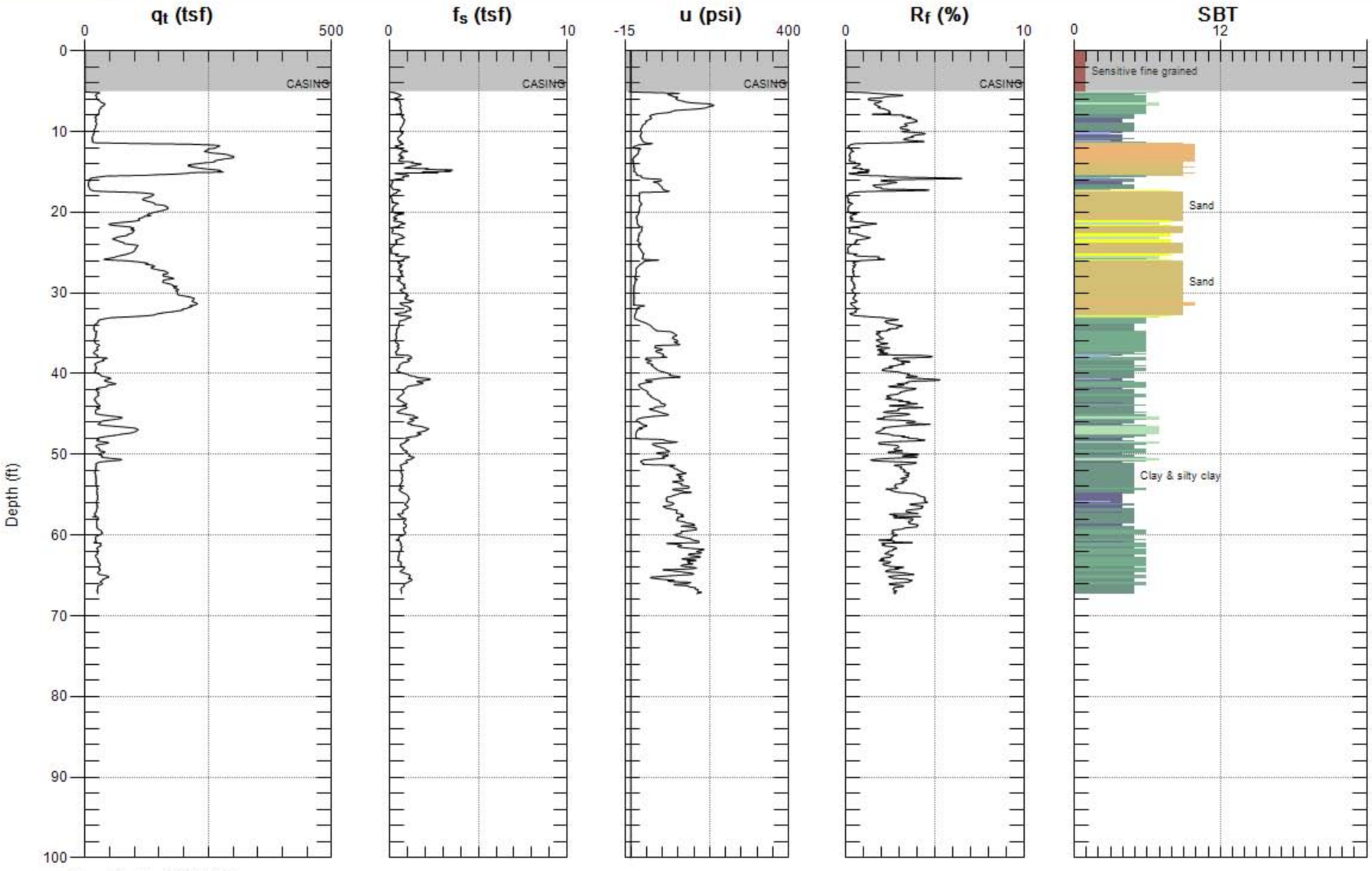


Max. Depth: 90.880 (ft)
Avg. Interval: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: 06-CPT-18
Engineer: J.CASTLE
Date: 1/24/2007 06:17

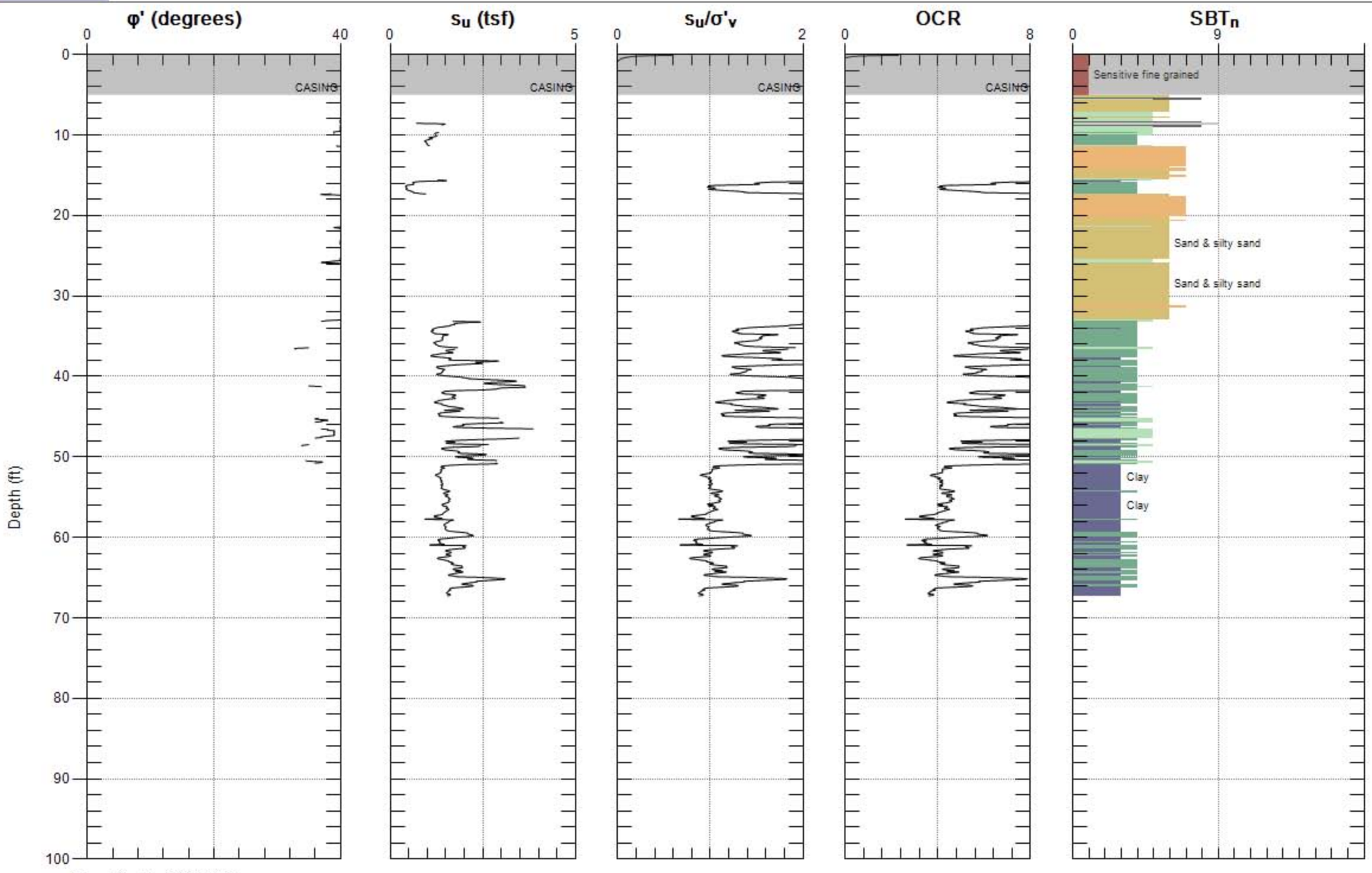


Max. Depth: 67.260 (ft)
Avg. Interval: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: 06-CPT-18
Engineer: J.CASTLE
Date: 1/24/2007 06:17

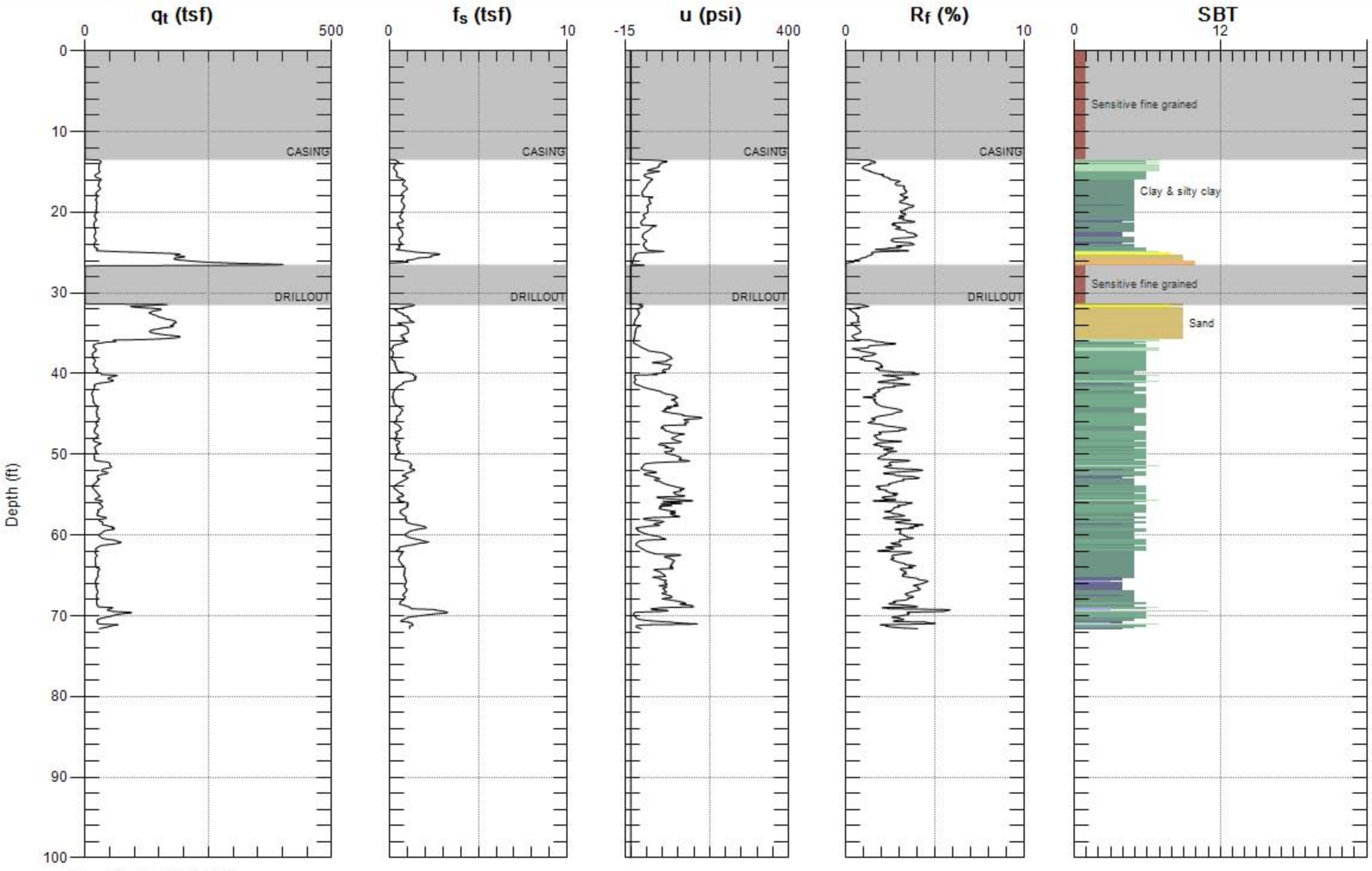


Max. Depth: 67.260 (ft)
Avg. Interval: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: 06-CPT-19
Engineer: J.CASTLE
Date: 1/24/2007 01:02

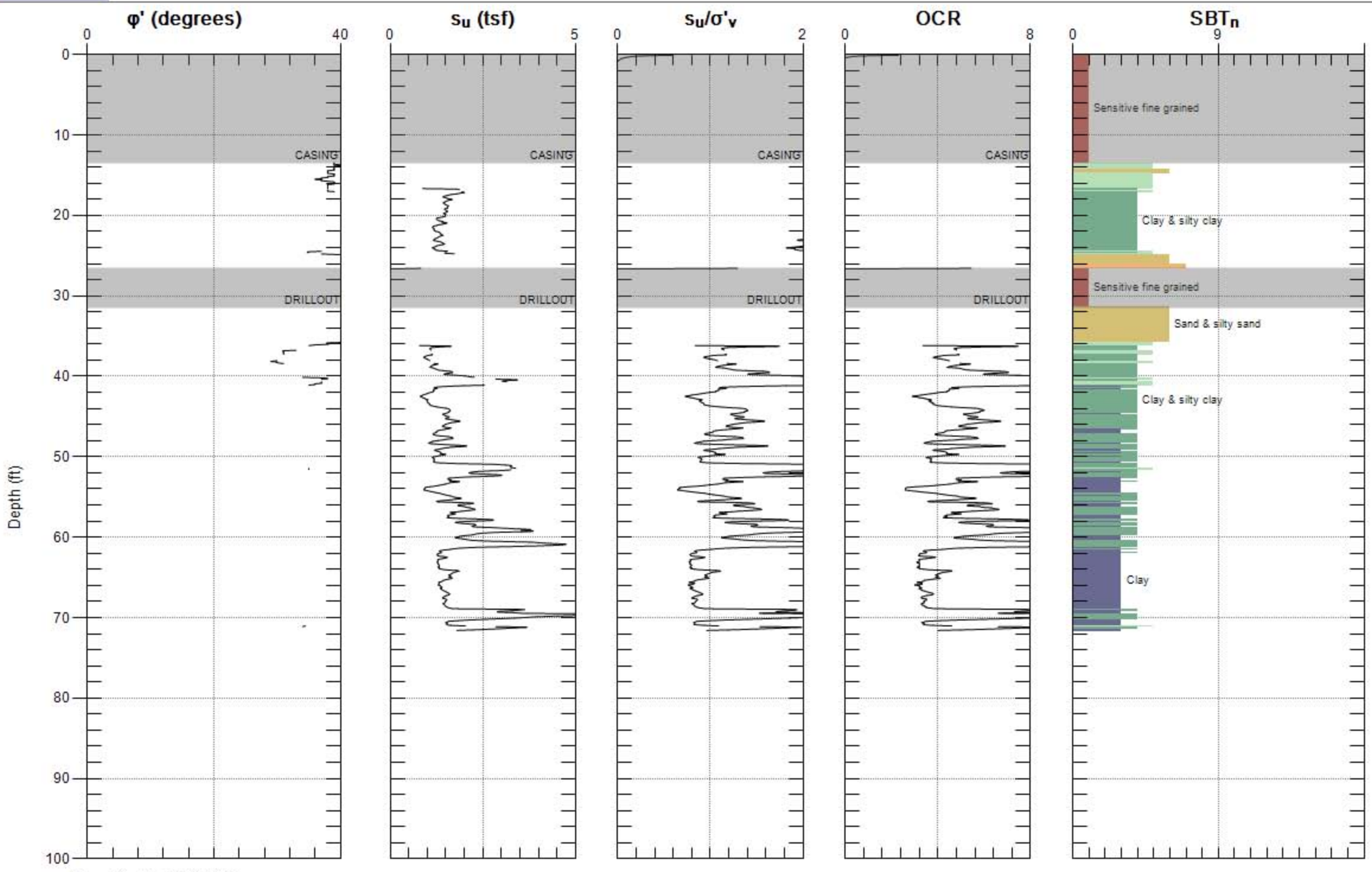


Max. Depth: 71.600 (ft)
Avg. Interval: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: 06-CPT-19
Engineer: J.CASTLE
Date: 1/24/2007 01:02

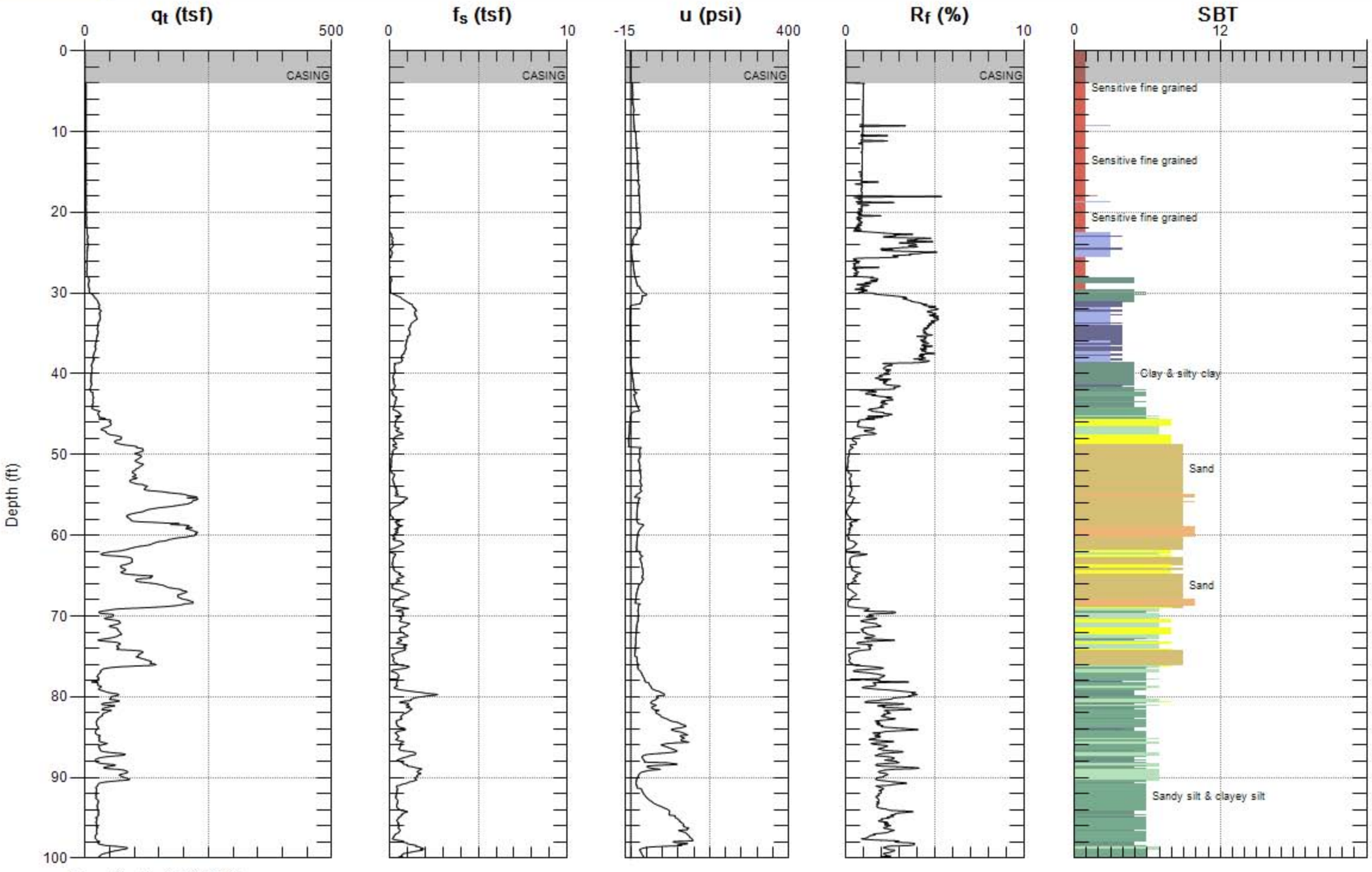


Max. Depth: 71.600 (ft)
Avg. Interval: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: 06-CPT-20
Engineer: J.CASTLE
Date: 12/18/2006 08:58

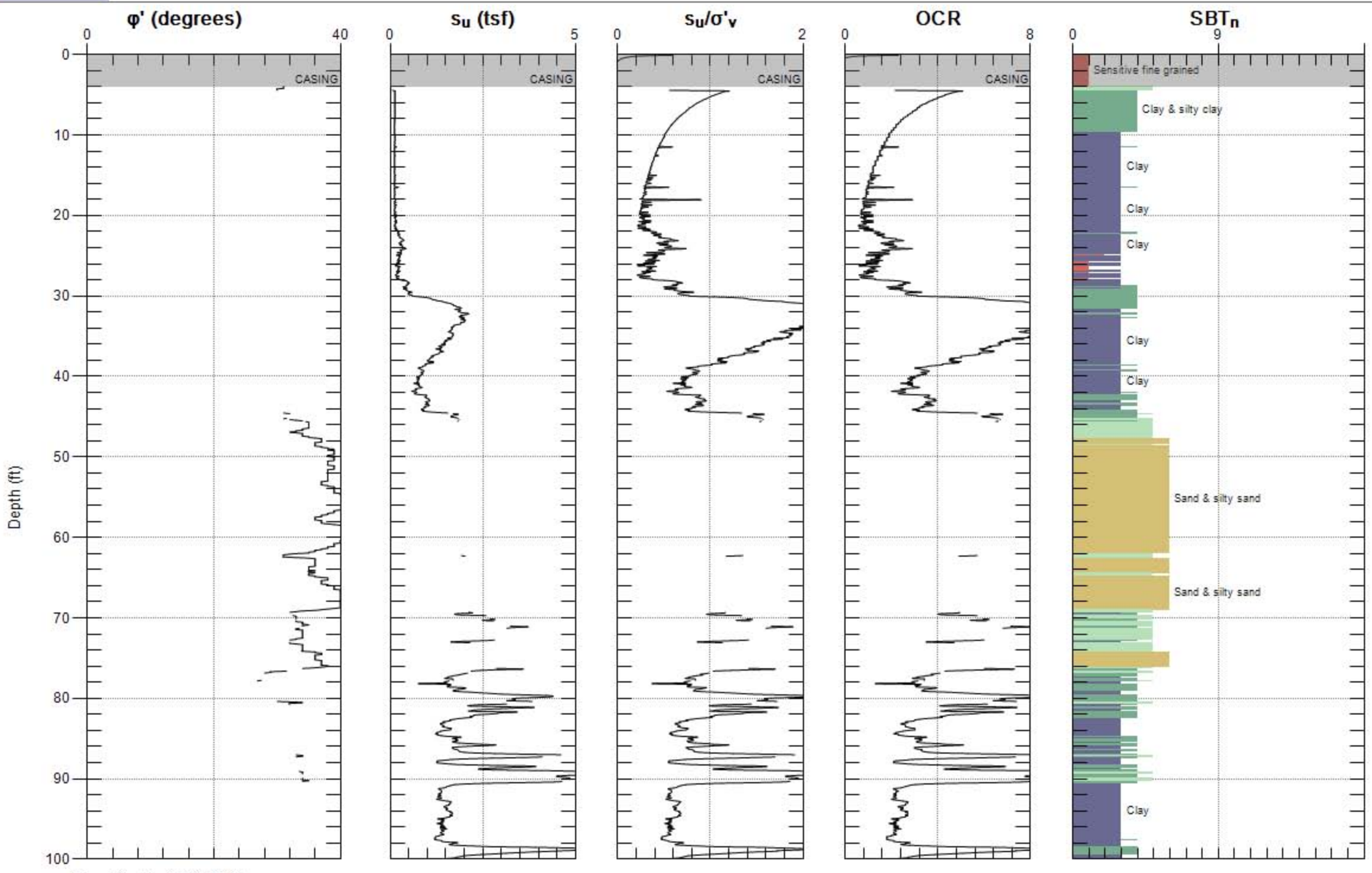


Max. Depth: 100.150 (ft)
Avg. Interval: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: 06-CPT-20
Engineer: J.CASTLE
Date: 12/18/2006 08:58

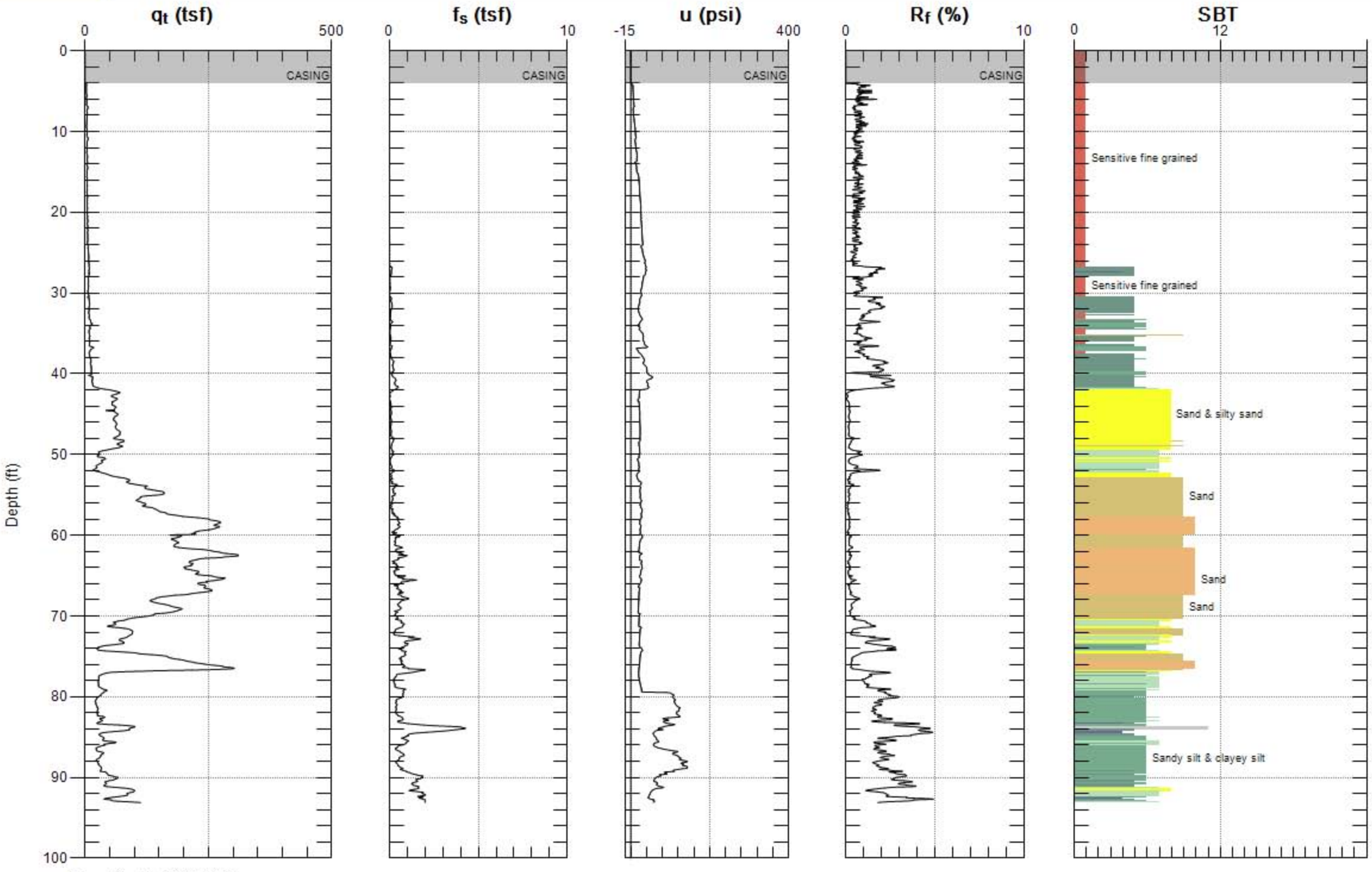


Max. Depth: 100.150 (ft)
Avg. Interval: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: 06-CPT-21
Engineer: J.CASTLE
Date: 12/21/2006 09:24

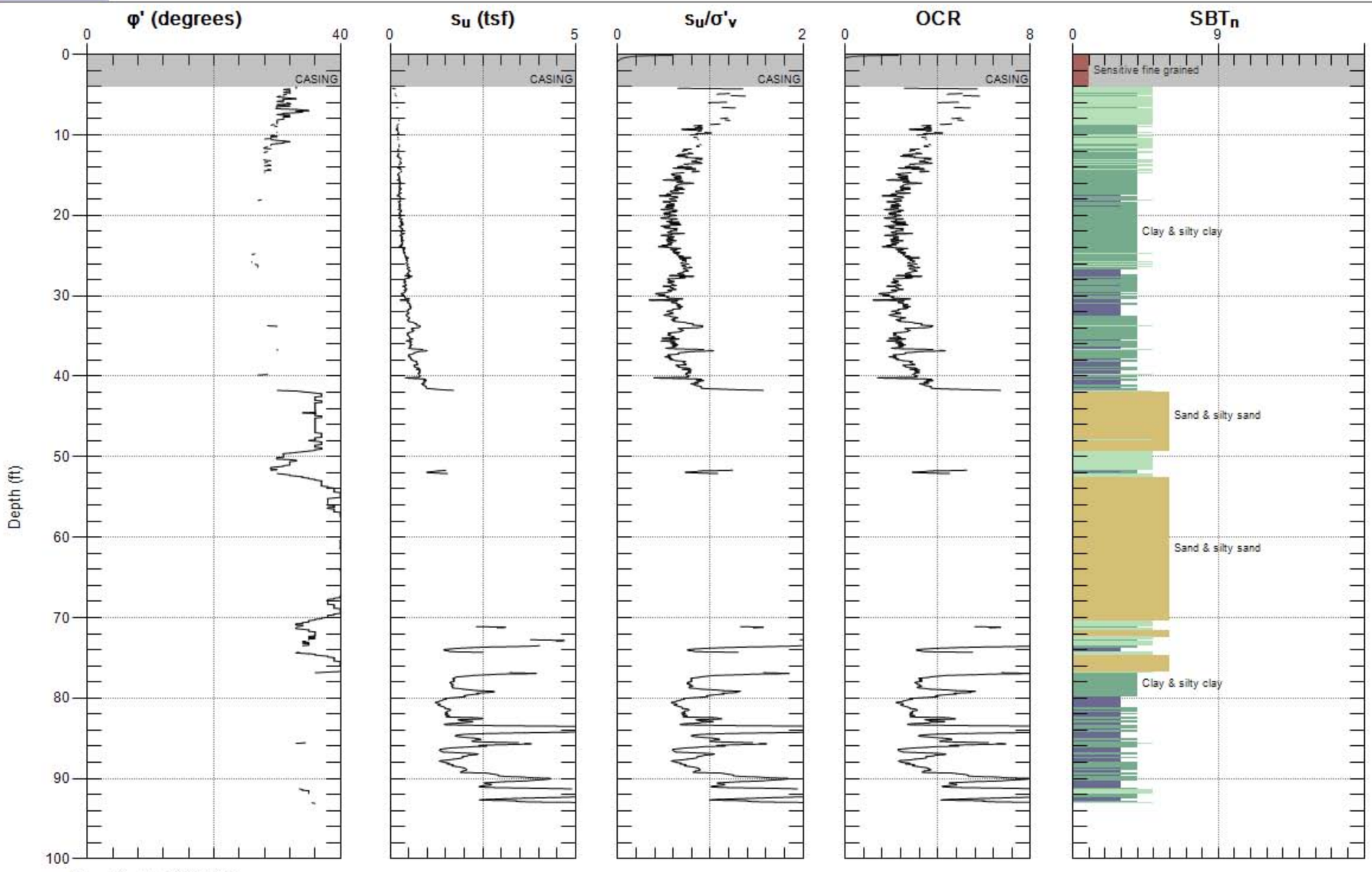


Max. Depth: 93.090 (ft)
Avg. Interval: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: 06-CPT-21
Engineer: J.CASTLE
Date: 12/21/2006 09:24

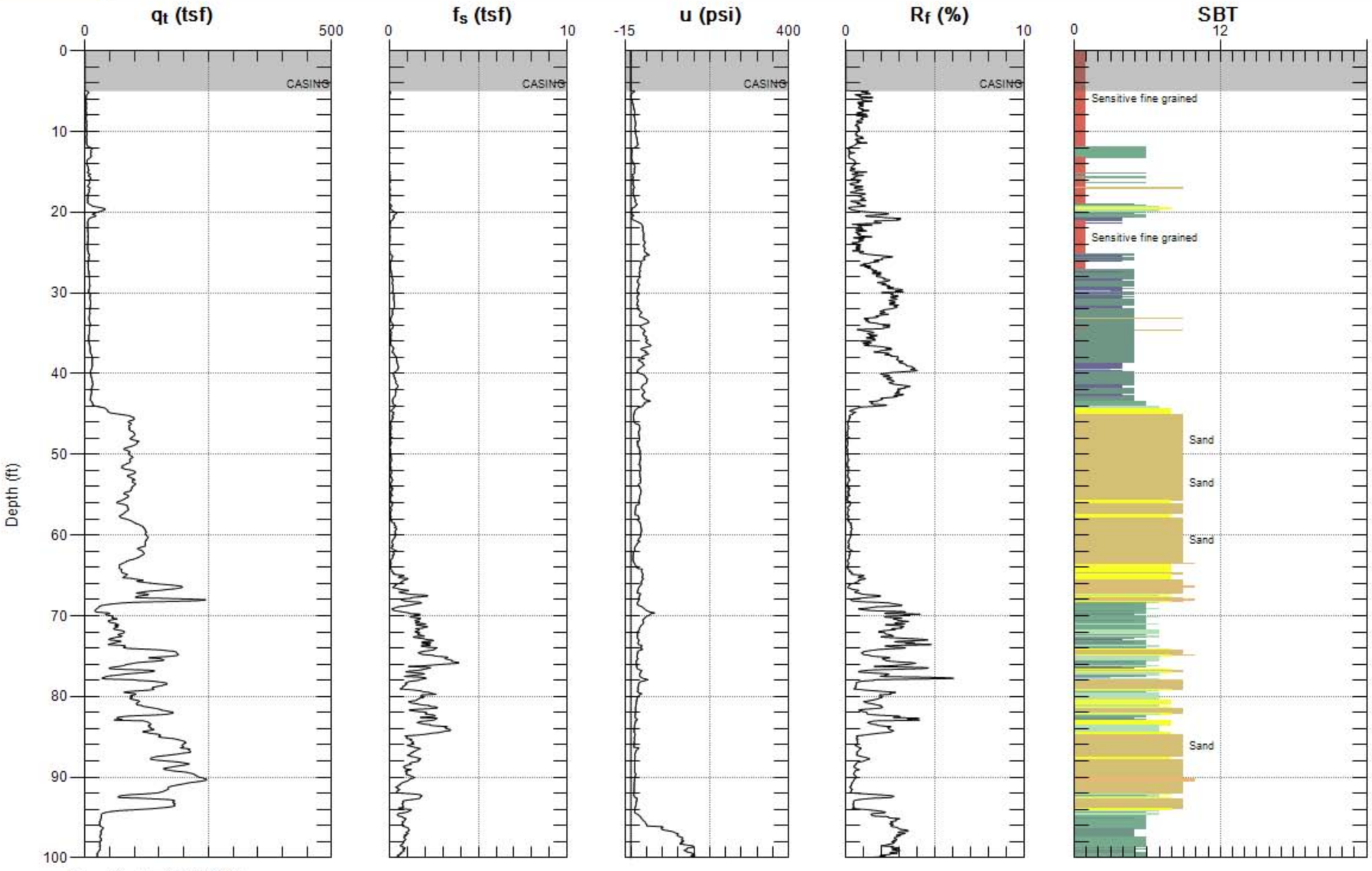


Max. Depth: 93.090 (ft)
Avg. Interval: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: 06-CPT-22
Engineer: J.CASTLE
Date: 12/22/2006 07:49

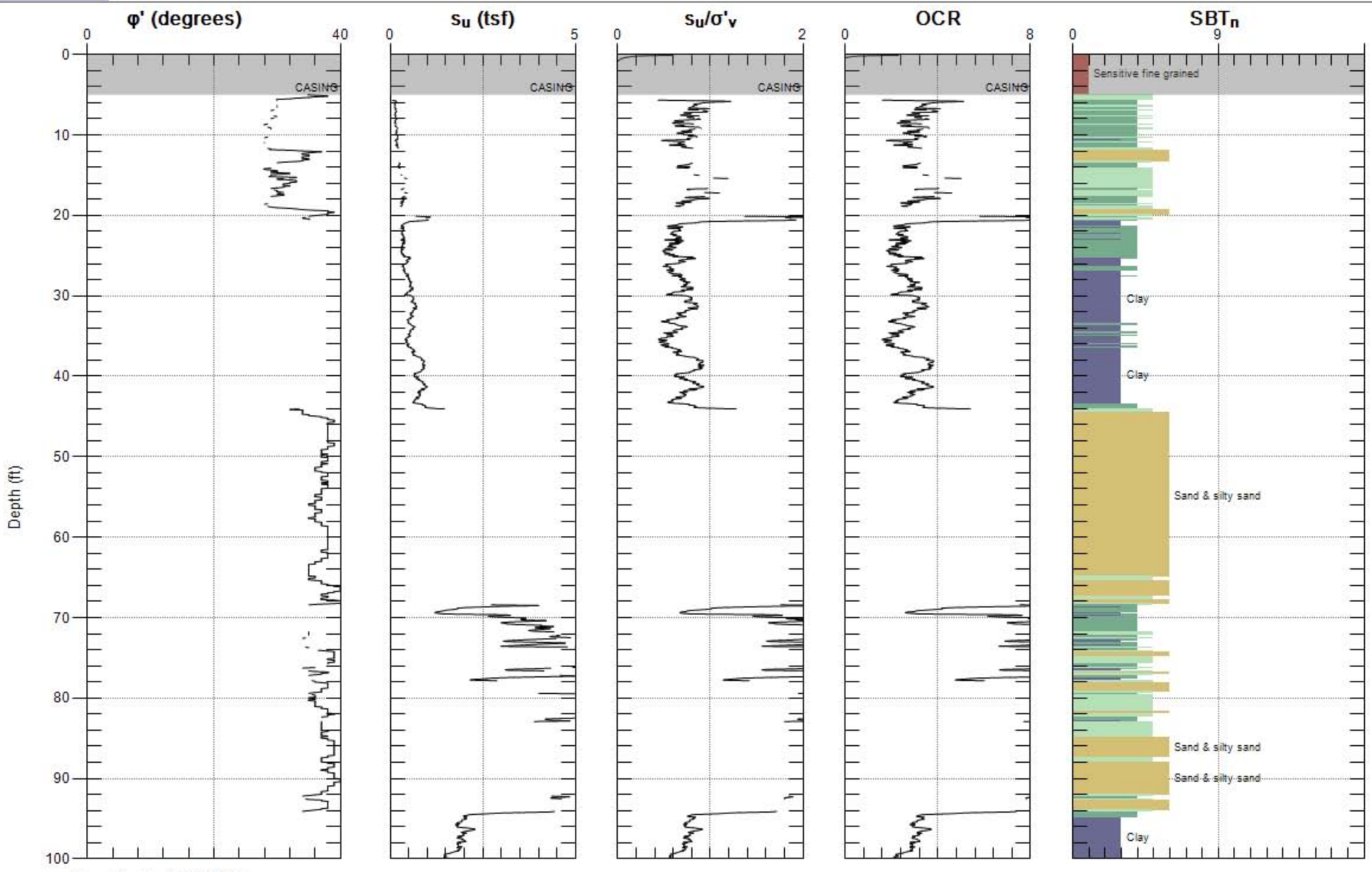


Max. Depth: 100.480 (ft)
Avg. Interval: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Engineer: J.CASTLE
Sounding: 06-CPT-22
Date: 12/22/2006 07:49

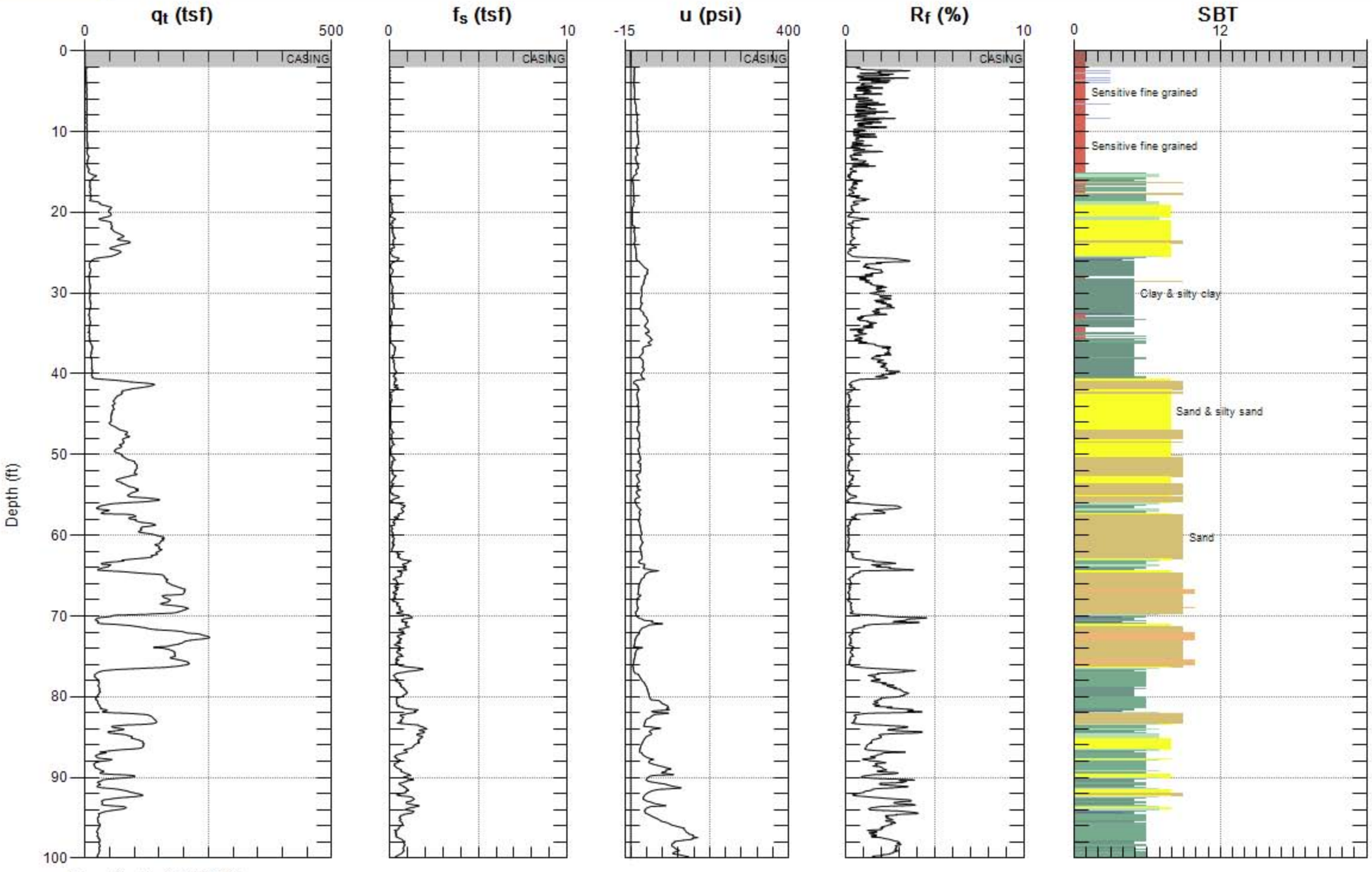


Max. Depth: 100.480 (ft)
Avg. Interval: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: 06-CPT-23
Engineer: J.CASTLE
Date: 12/21/2006 11:25

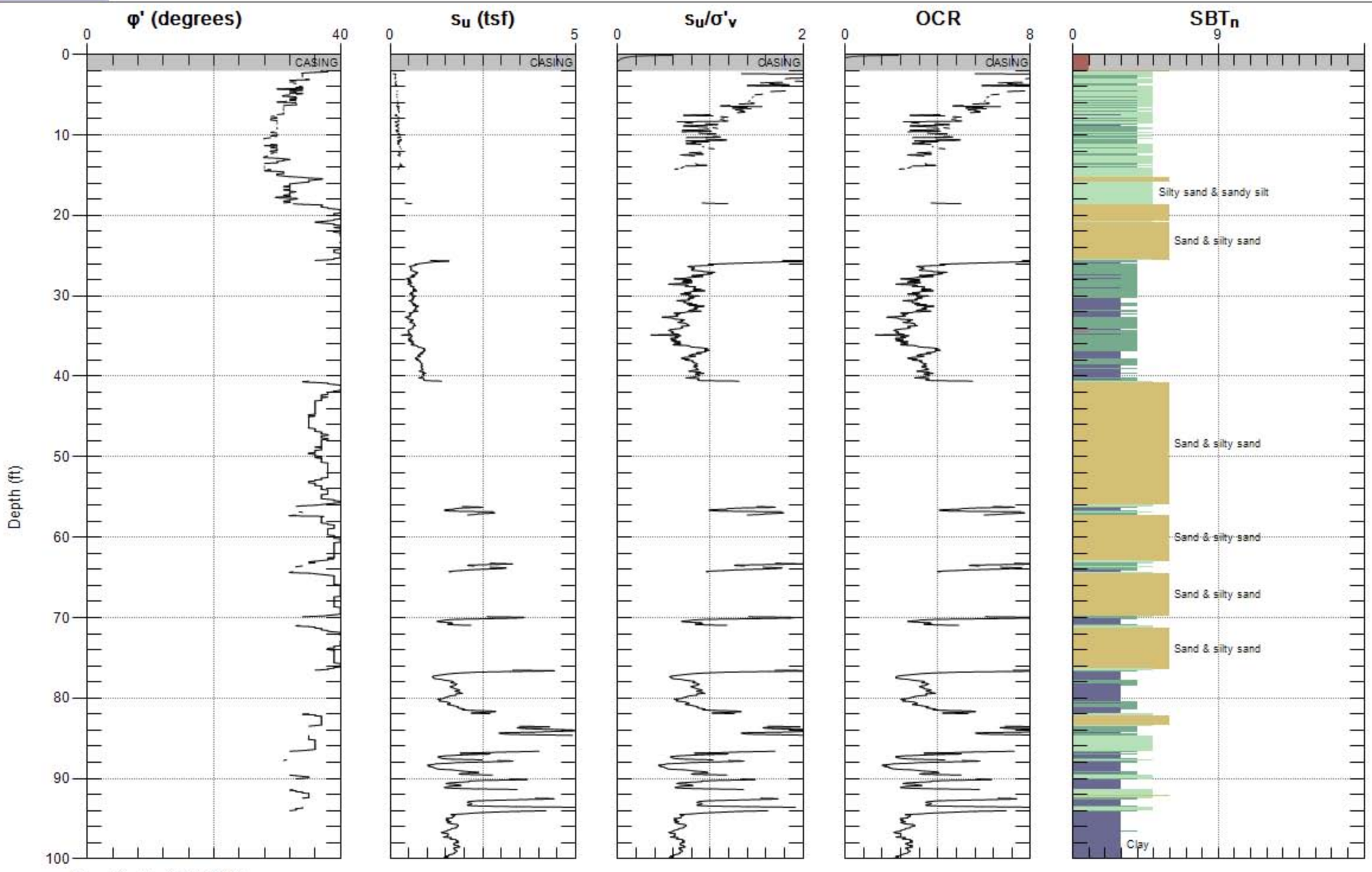


Max. Depth: 100.070 (ft)
Avg. Interval: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Engineer: J.CASTLE
Sounding: 06-CPT-23
Date: 12/21/2006 11:25

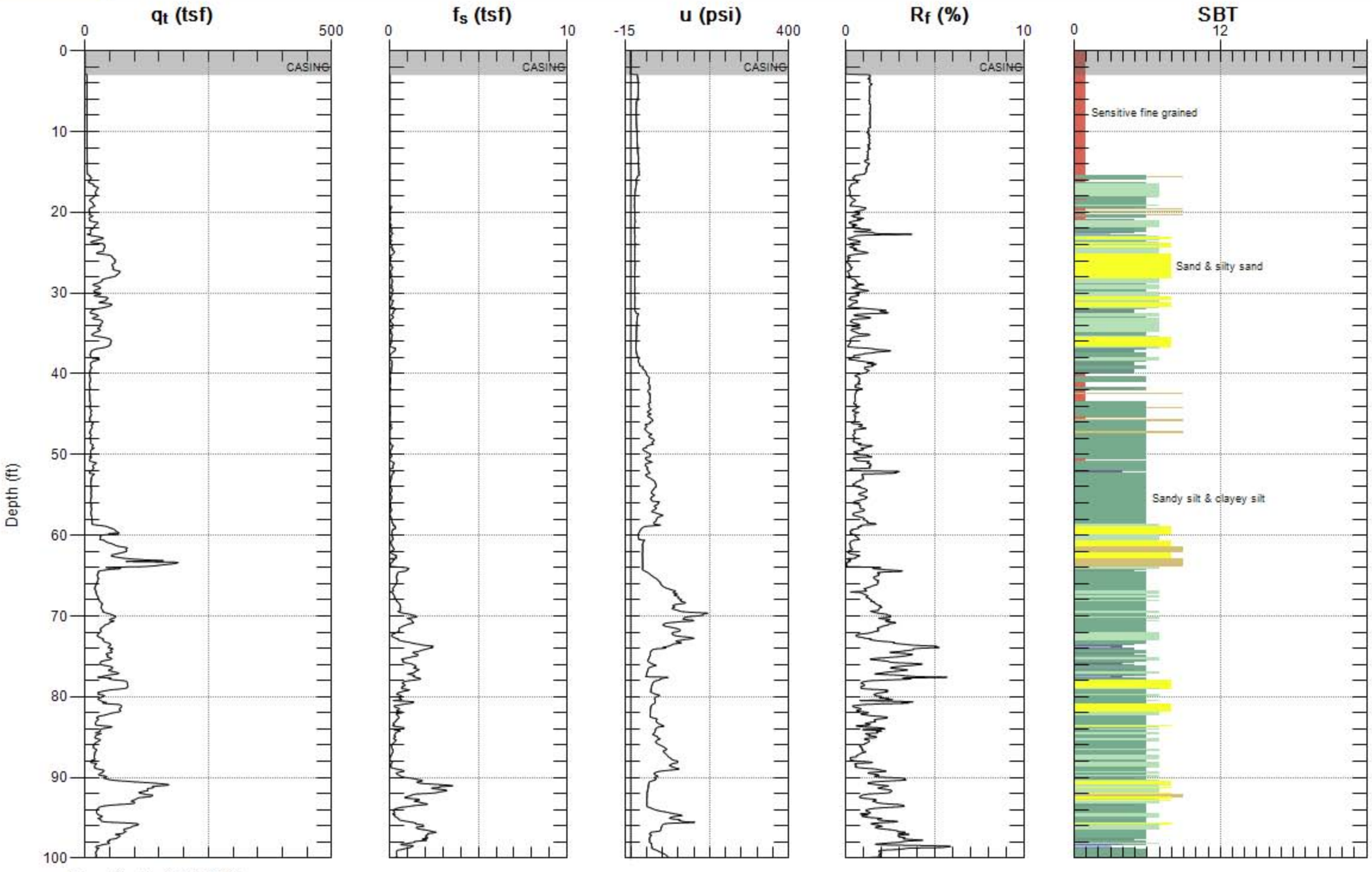


Max. Depth: 100.070 (ft)
Avg. Interval: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: 06-CPT-24
Engineer: J.CASTLE
Date: 1/26/2007 07:03

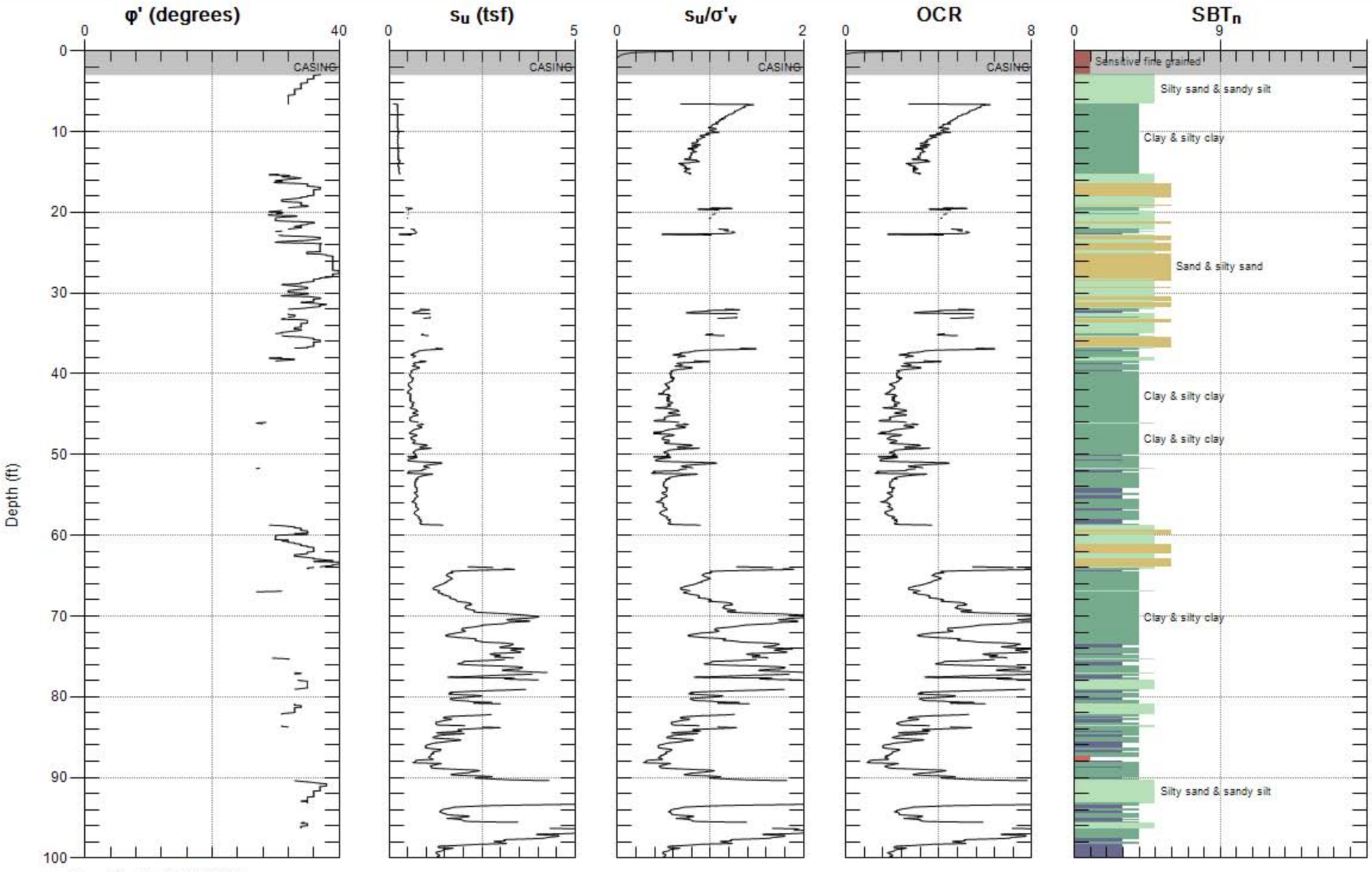


Max. Depth: 100.640 (ft)
Avg. Interval: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: 06-CPT-24
Engineer: J.CASTLE
Date: 1/26/2007 07:03

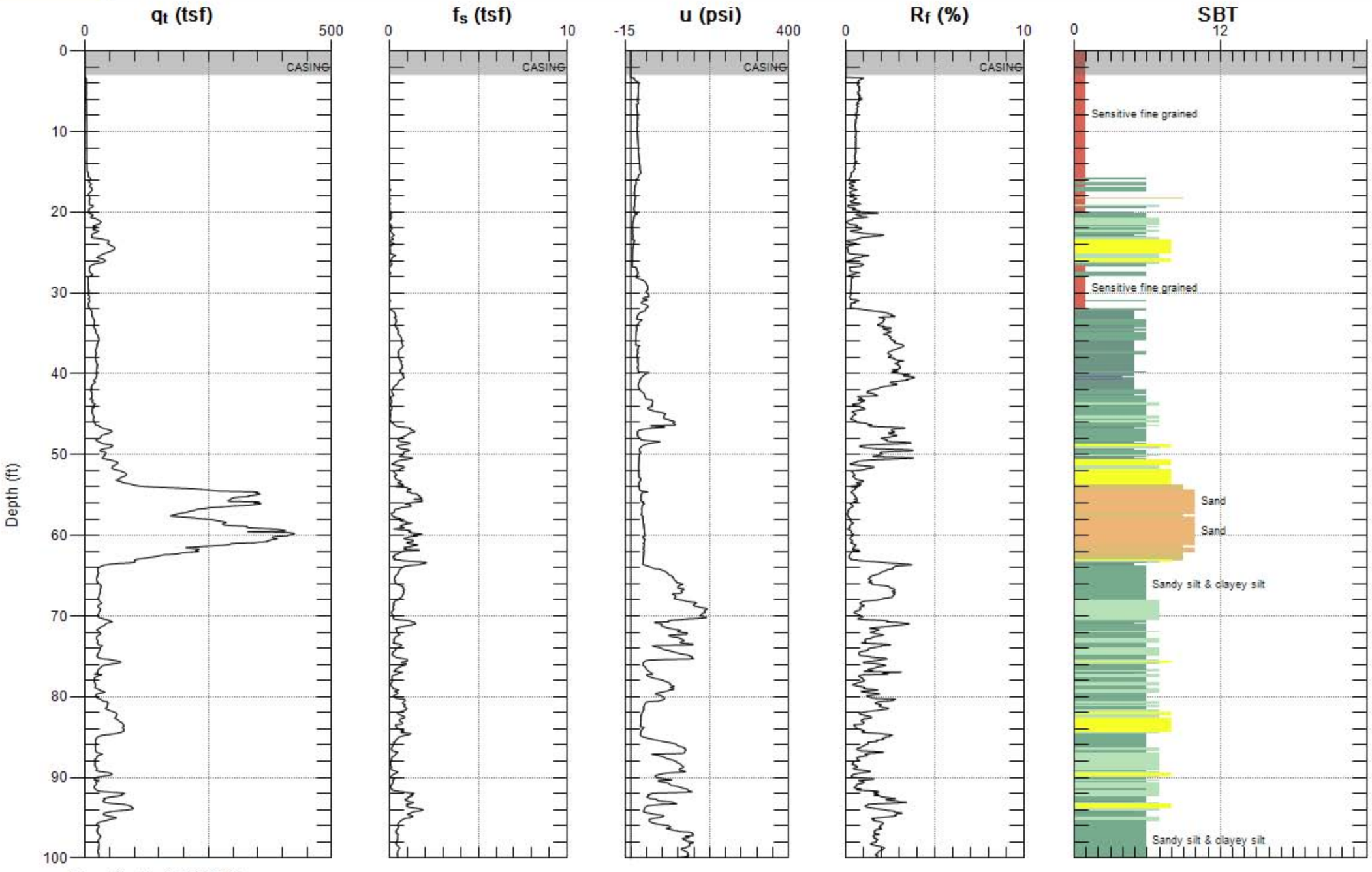


Max. Depth: 100.640 (ft)
Avg. Interval: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: 06-CPT-25
Engineer: J.CASTLE
Date: 1/26/2007 08:46

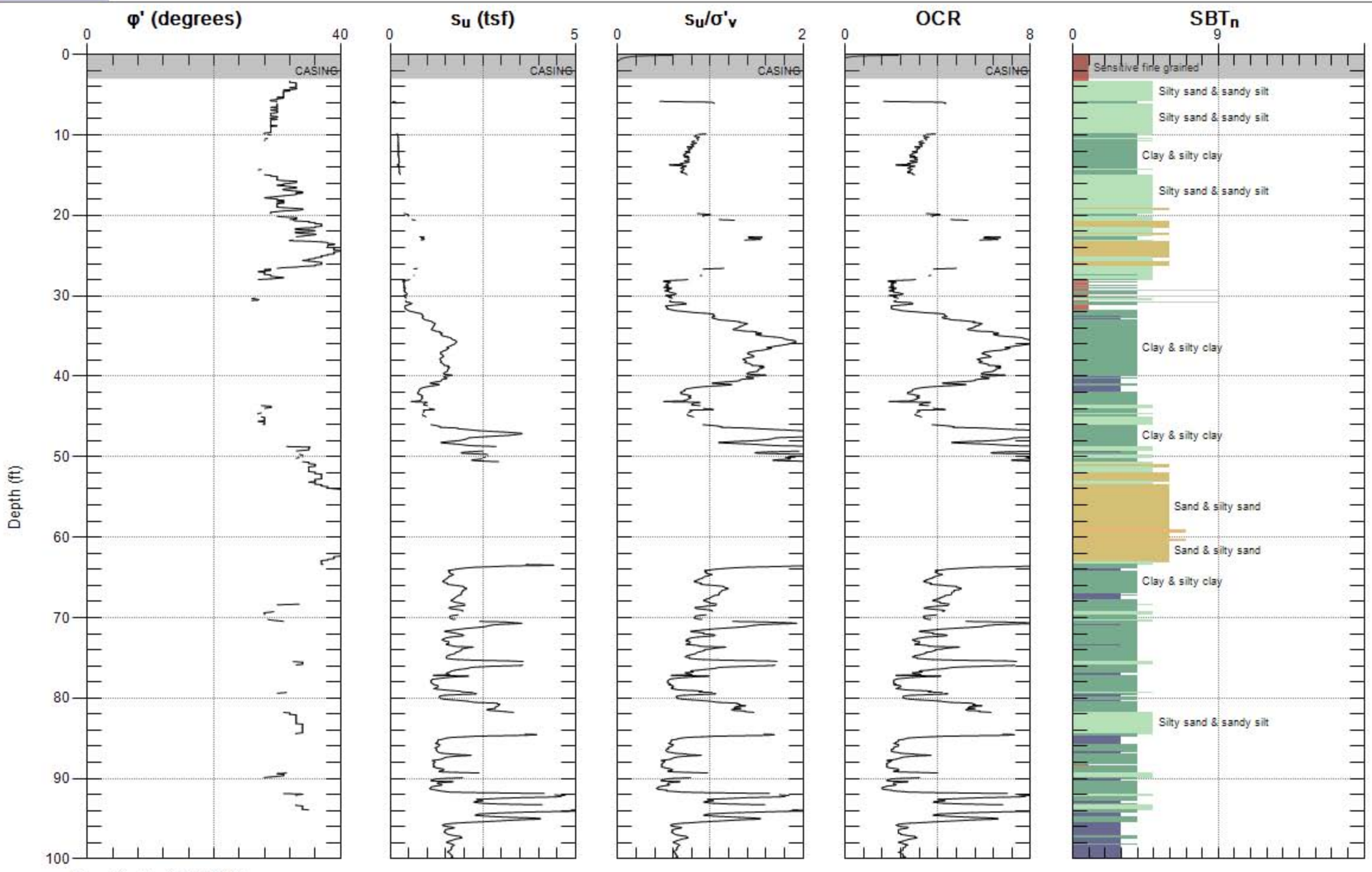


Max. Depth: 100.390 (ft)
Avg. Interval: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: 06-CPT-25
Engineer: J.CASTLE
Date: 1/26/2007 08:46

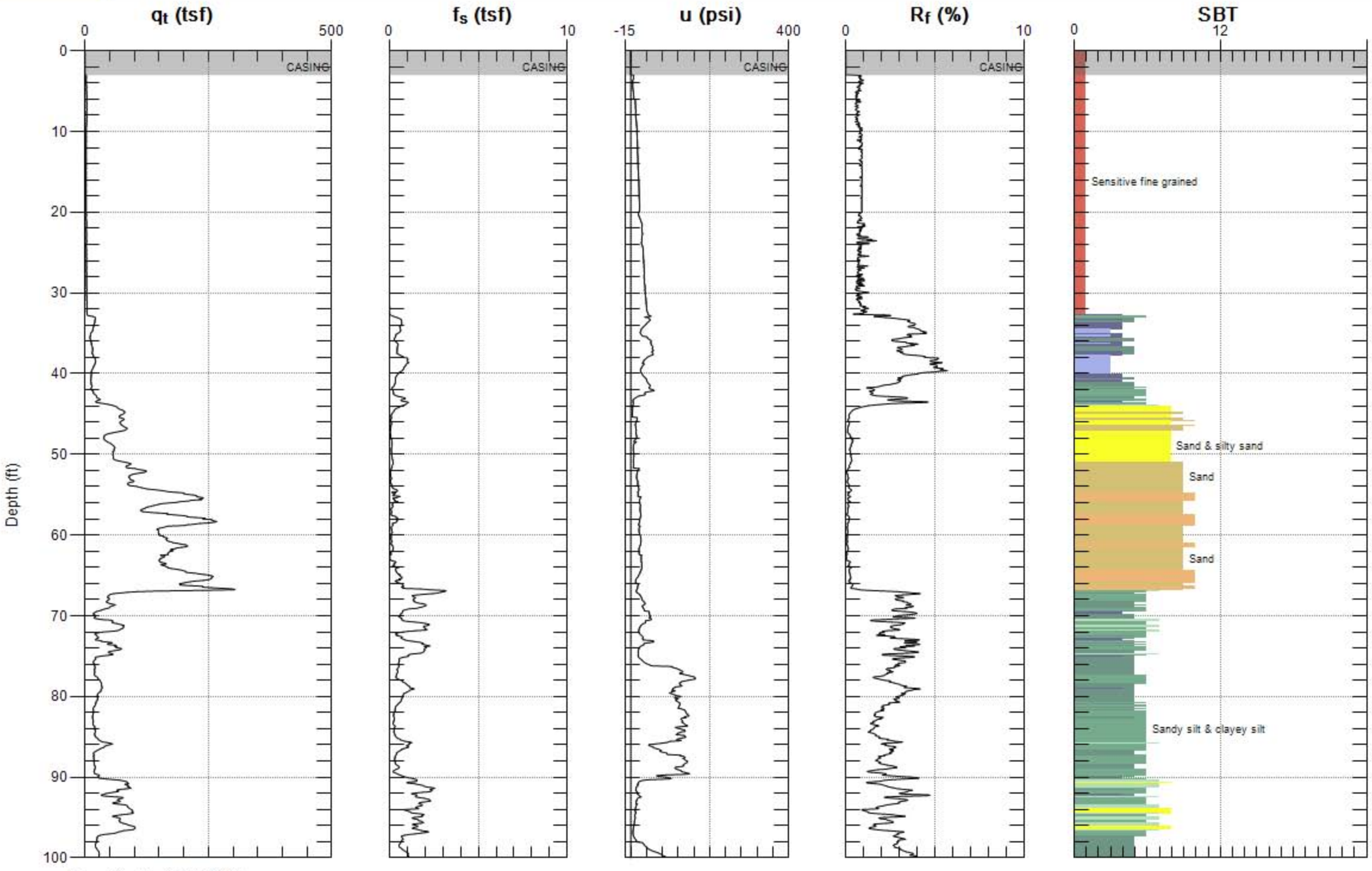


Max. Depth: 100.390 (ft)
Avg. Interval: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: 06-CPT-26
Engineer: J.CASTLE
Date: 1/3/2007 10:28

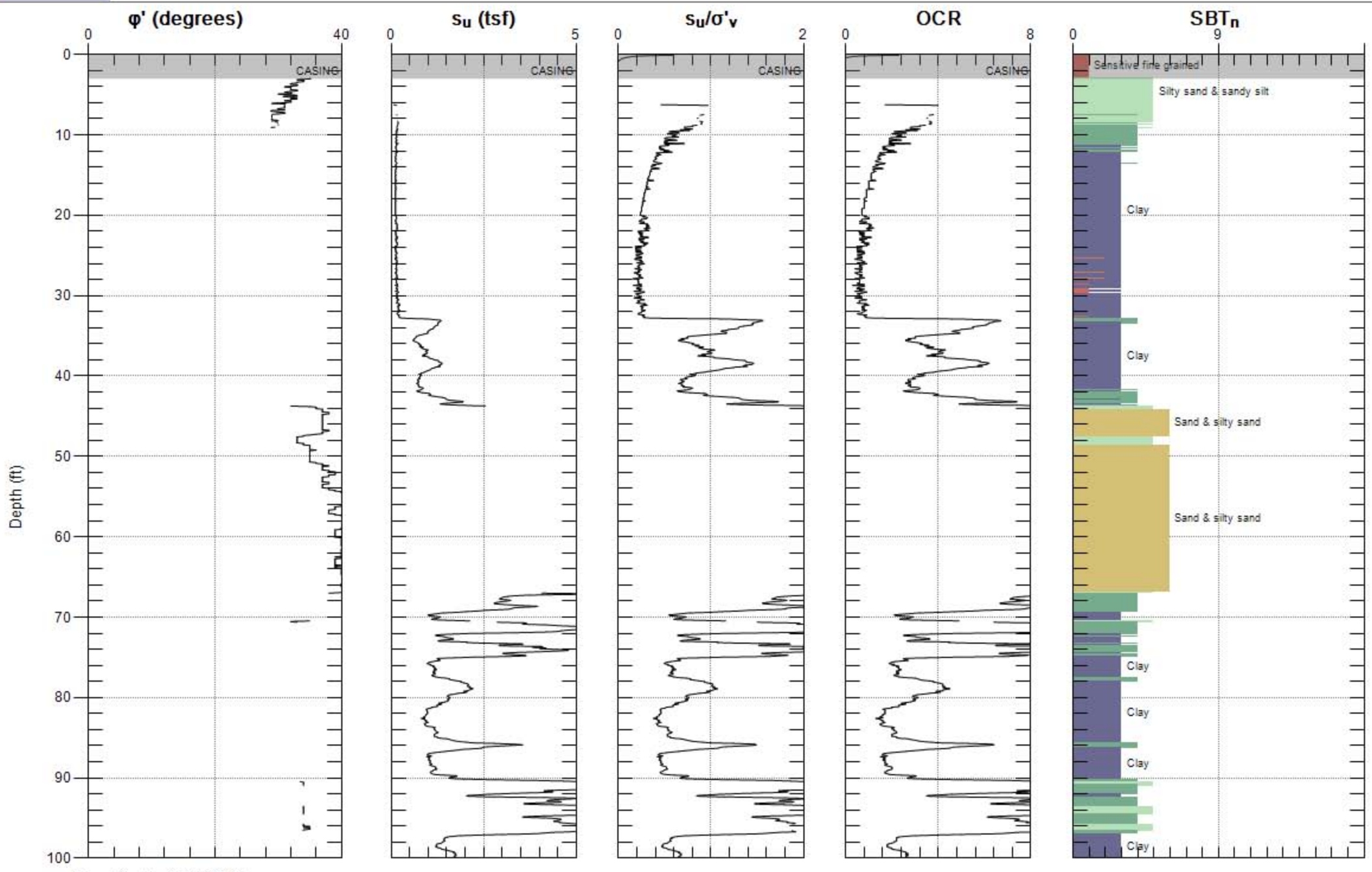


Max. Depth: 100.070 (ft)
Avg. Interval: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: 06-CPT-26
Engineer: J.CASTLE
Date: 1/3/2007 10:28

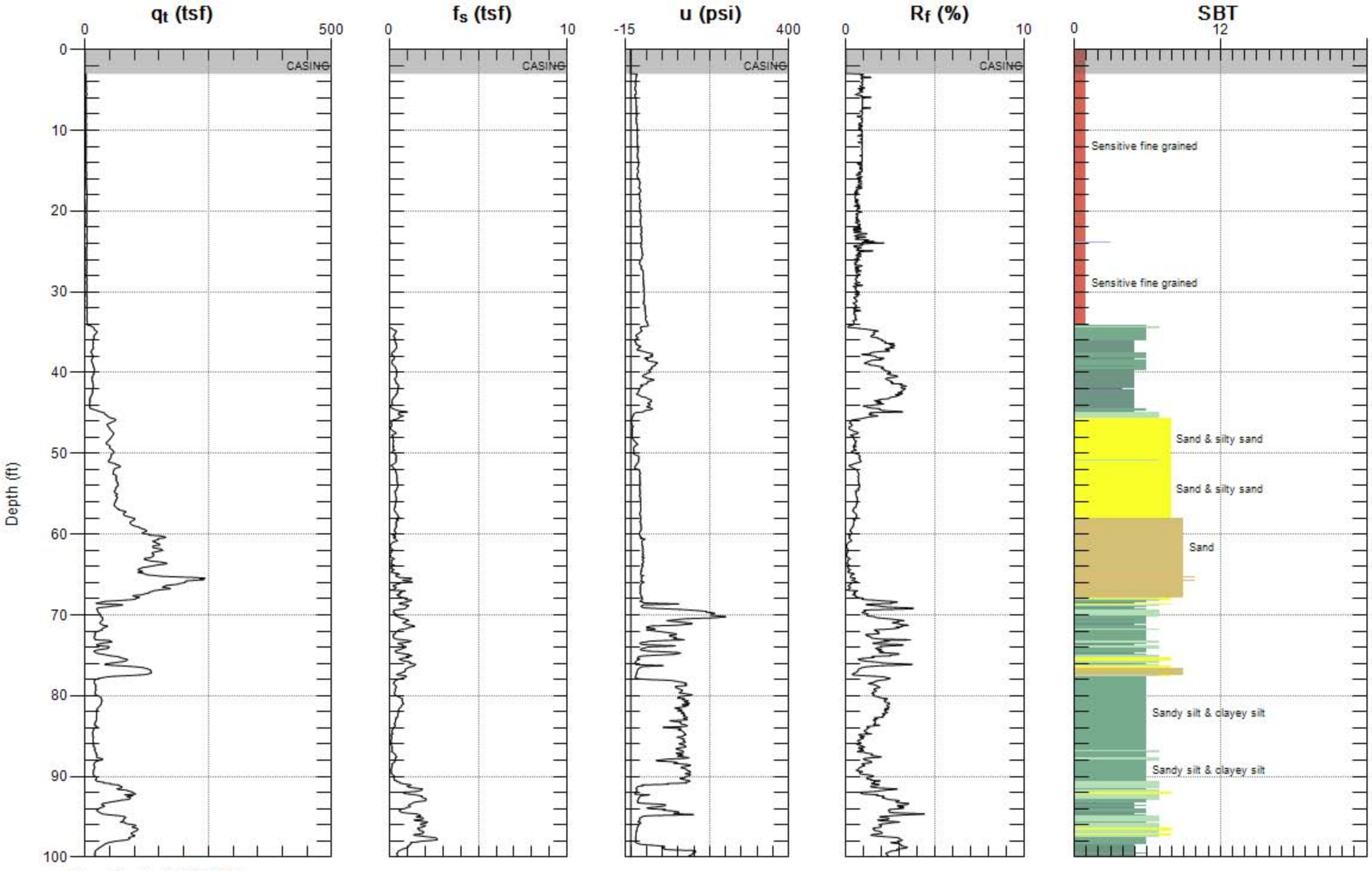


Max. Depth: 100.070 (ft)
Avg. Interval: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: 06-CPT-27
Engineer: J.CASTLE
Date: 1/2/2007 11:36

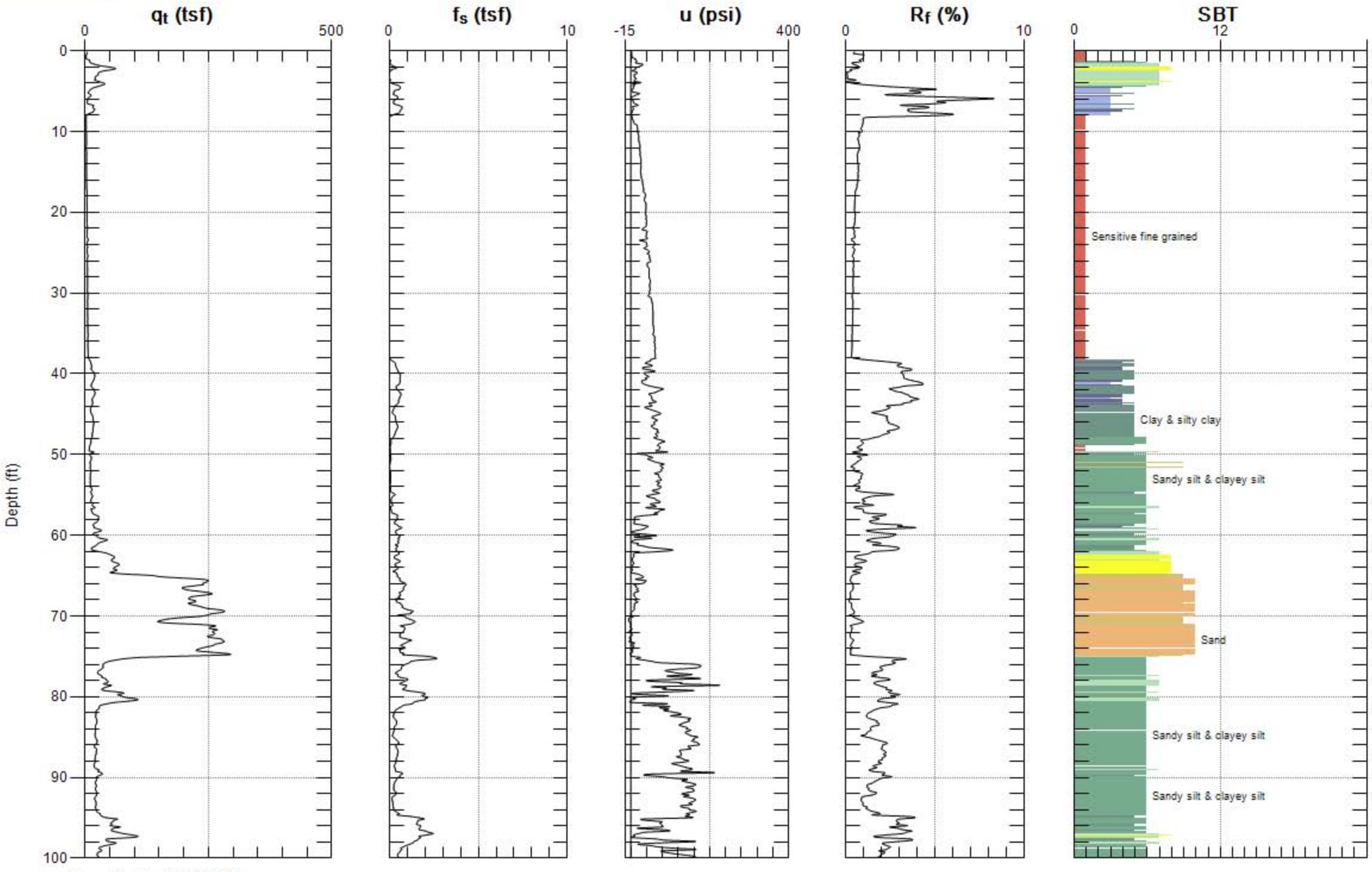


Max. Depth: 100.150 (ft)
Avg. Interval: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: CPT-27
Engineer: J.CASTLE
Date: 12/5/2006 07:55

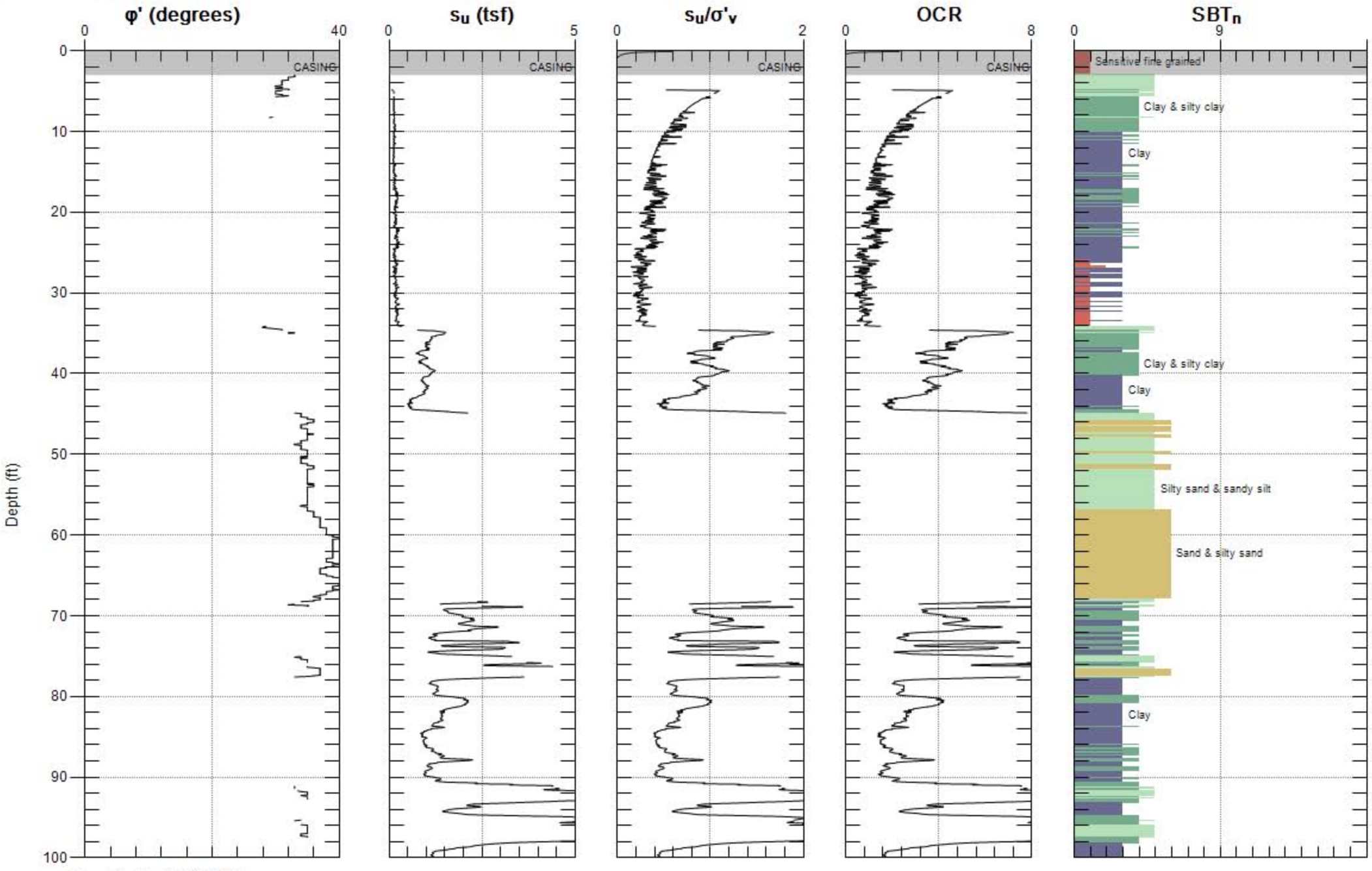


Max. Depth: 100.230 (ft)
Avg. Interval: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: 06-CPT-27
Engineer: J.CASTLE
Date: 1/2/2007 11:36

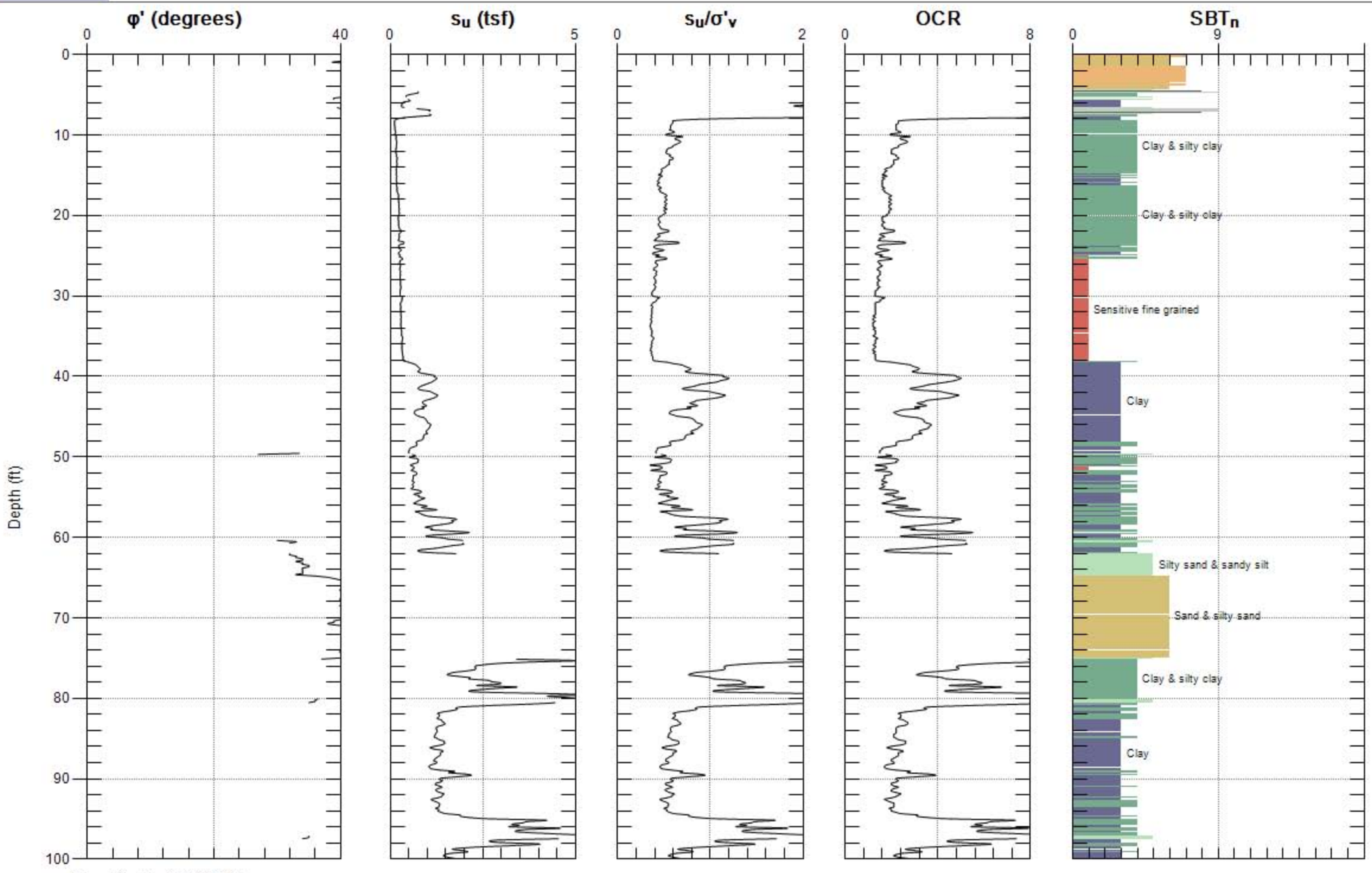


Max. Depth: 100.150 (ft)
Avg. Interval: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: CPT-27
Engineer: J.CASTLE
Date: 12/5/2006 07:55

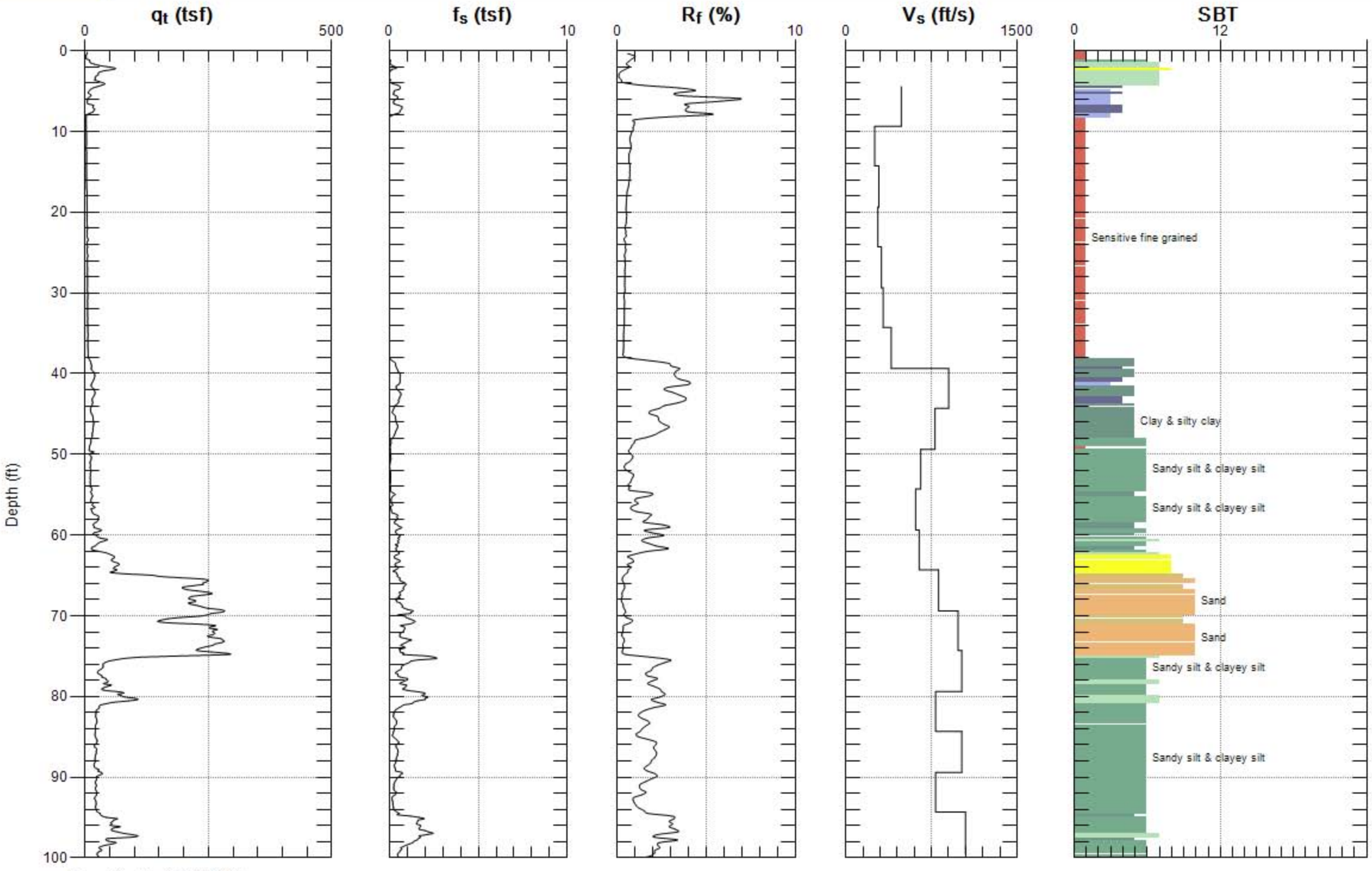


Max. Depth: 100.230 (ft)
Avg. Interval: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: CPT-27
Engineer: J.CASTLE
Date: 12/5/2006 07:55

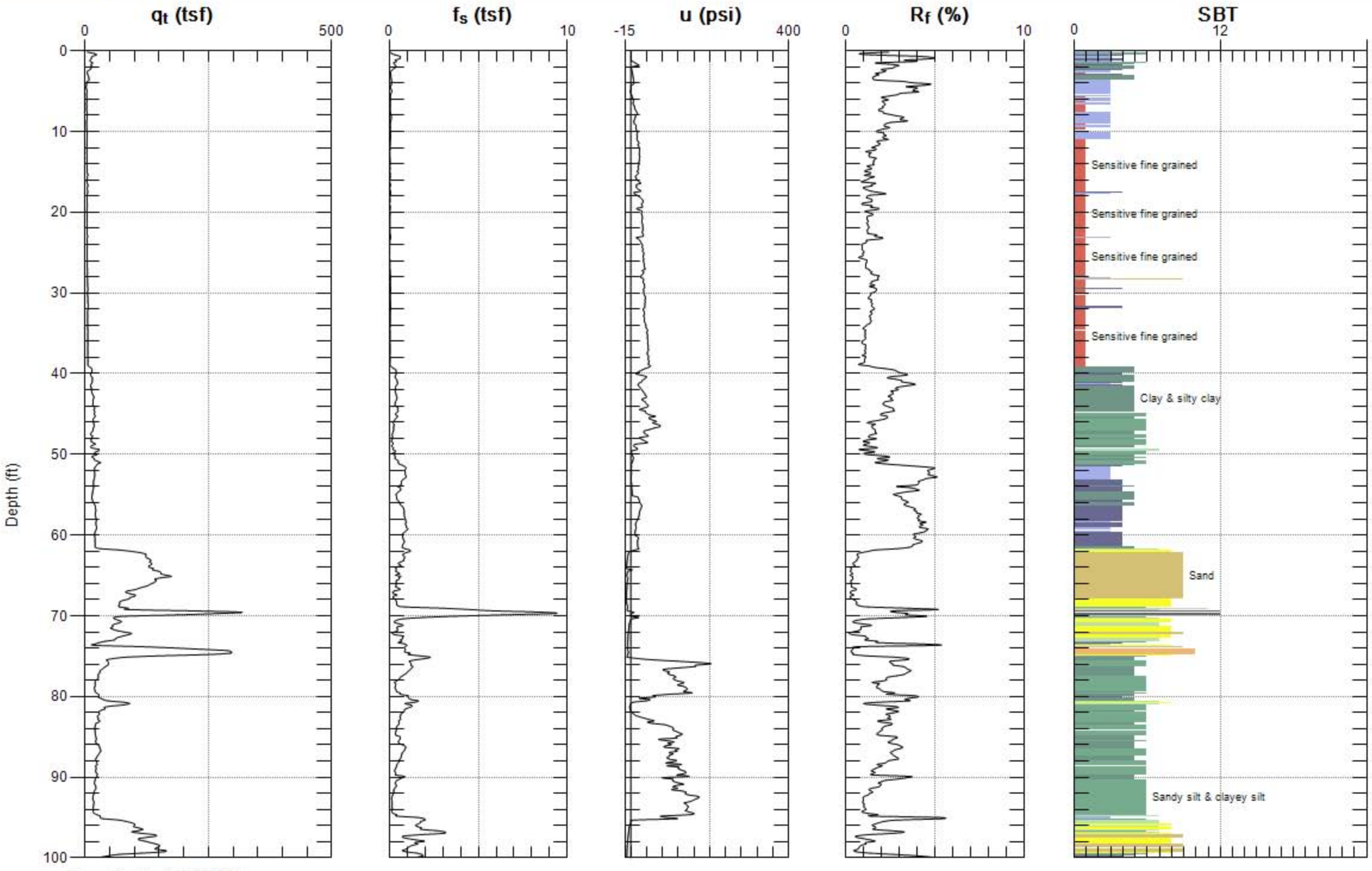


Max. Depth: 100.230 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: CPT-28
Engineer: J.CASTLE
Date: 12/2/2006 02:06

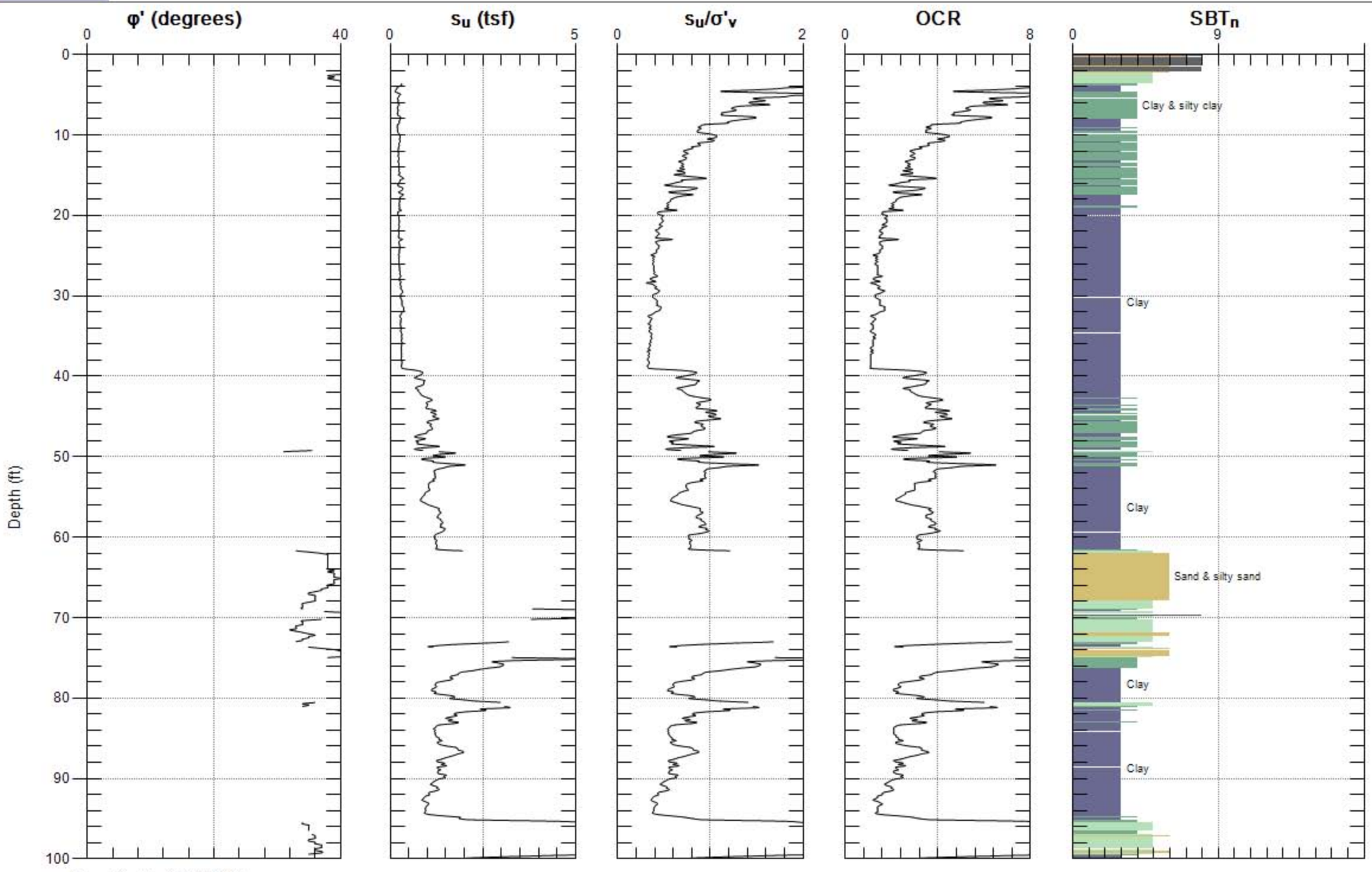


Max. Depth: 100.230 (ft)
Avg. Interval: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: CPT-28
Engineer: J.CASTLE
Date: 12/2/2006 02:06

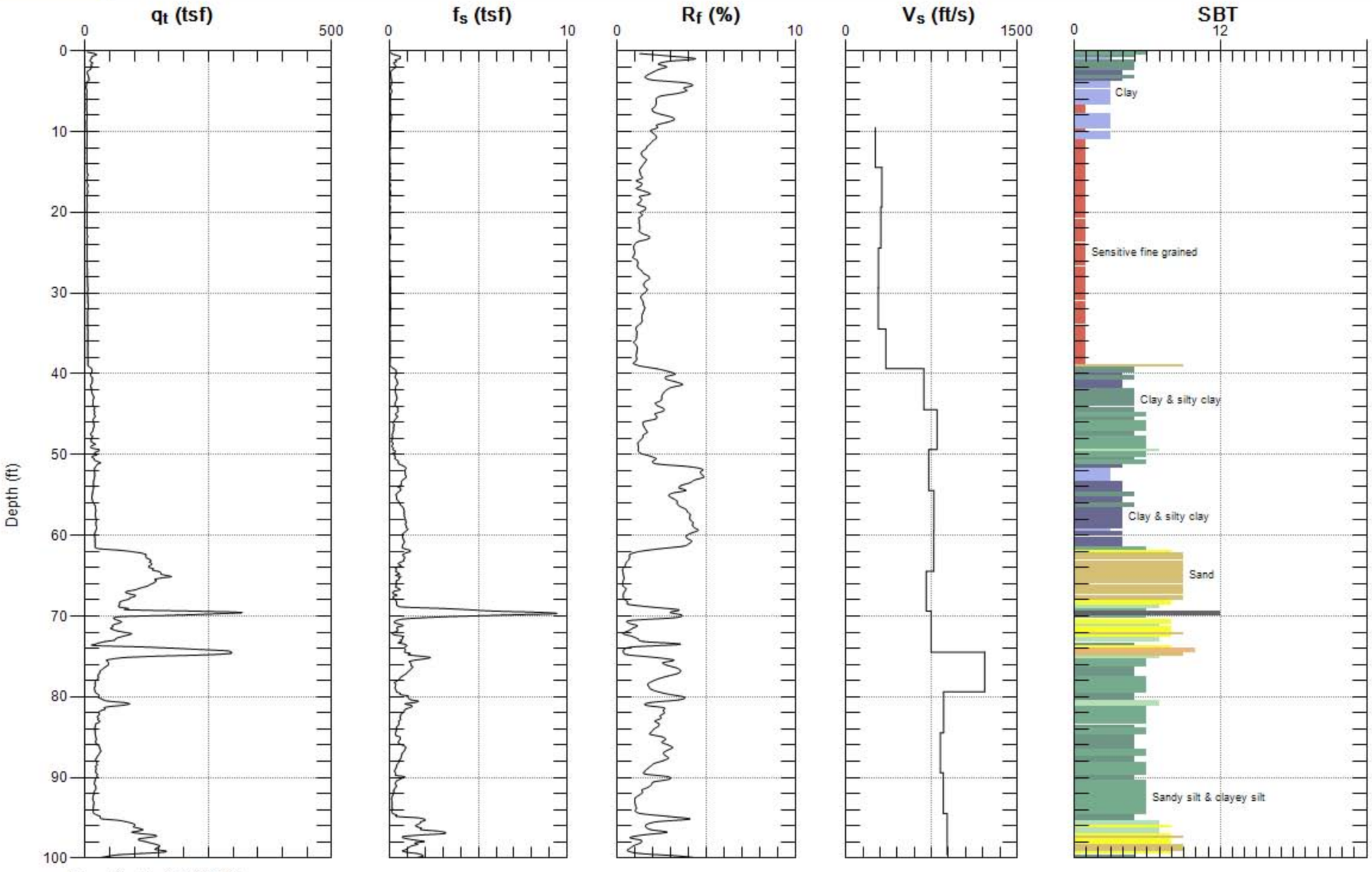


Max. Depth: 100.230 (ft)
Avg. Interval: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: CPT-28
Engineer: J.CASTLE
Date: 12/2/2006 02:06

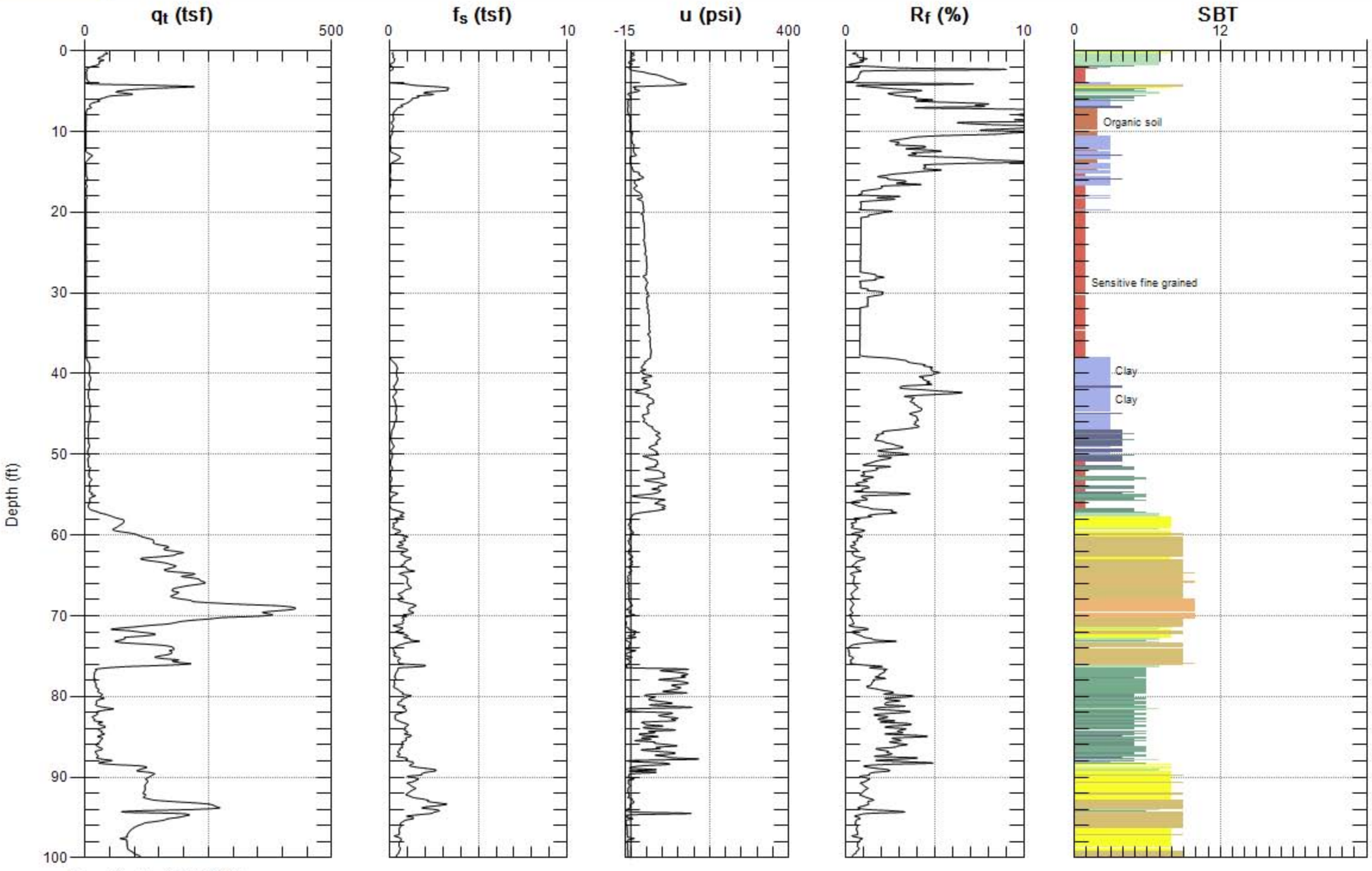


Max. Depth: 100.230 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: CPT-30
Engineer: J.CASTLE
Date: 12/5/2006 10:15

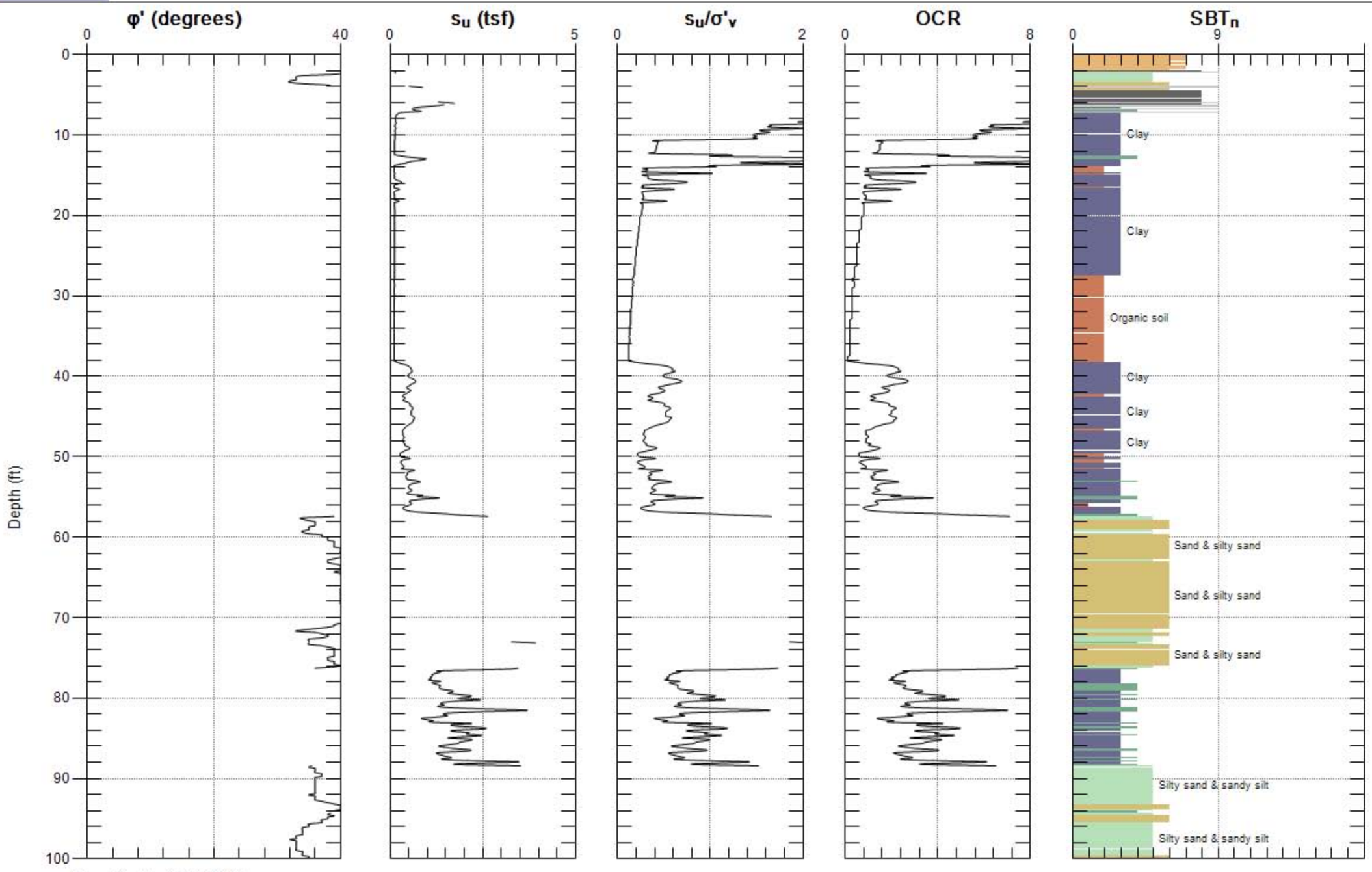


Max. Depth: 100.070 (ft)
Avg. Interval: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: CPT-30
Engineer: J.CASTLE
Date: 12/5/2006 10:15

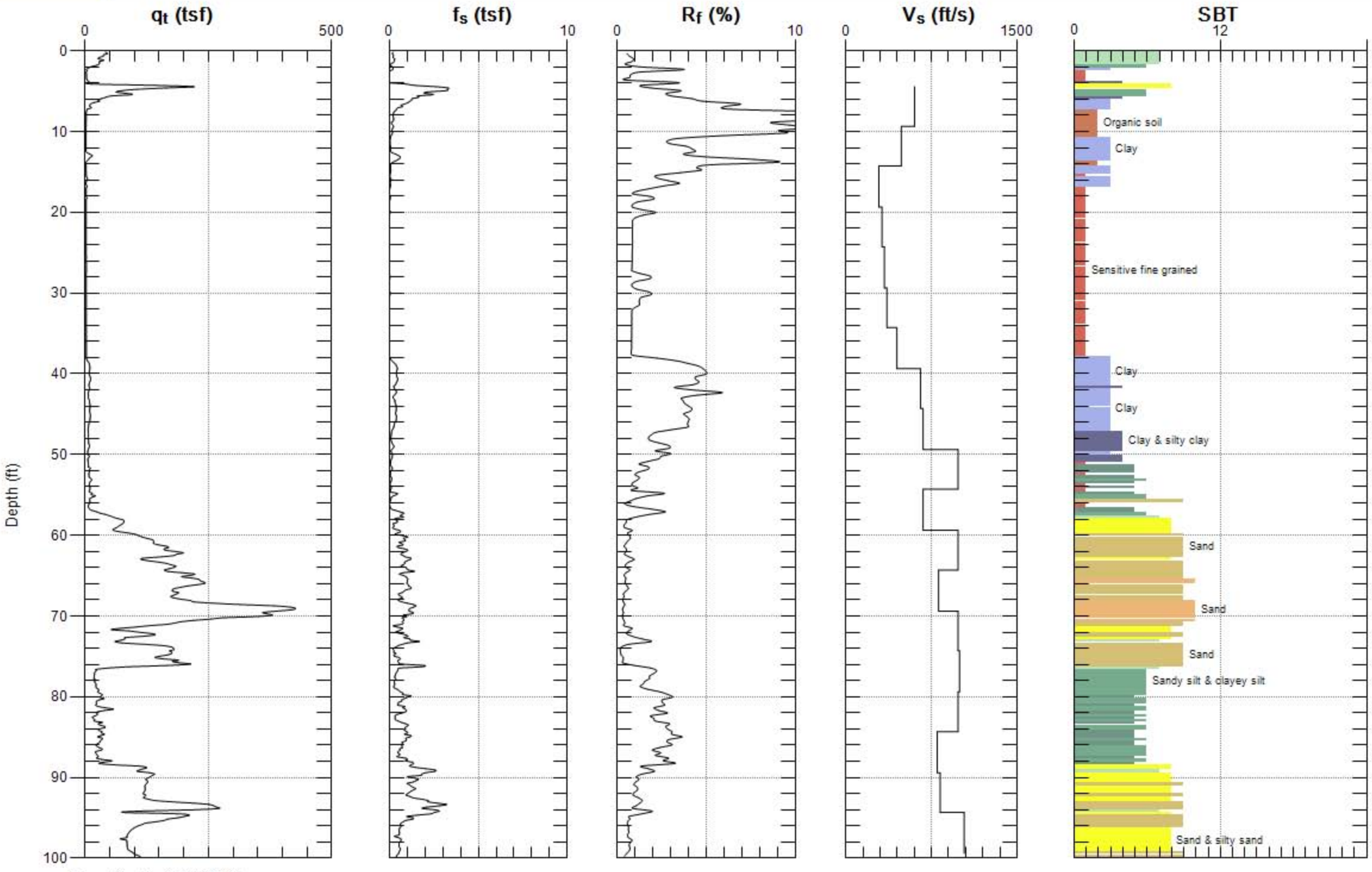


Max. Depth: 100.070 (ft)
Avg. Interval: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: CPT-30
Engineer: J.CASTLE
Date: 12/5/2006 10:15

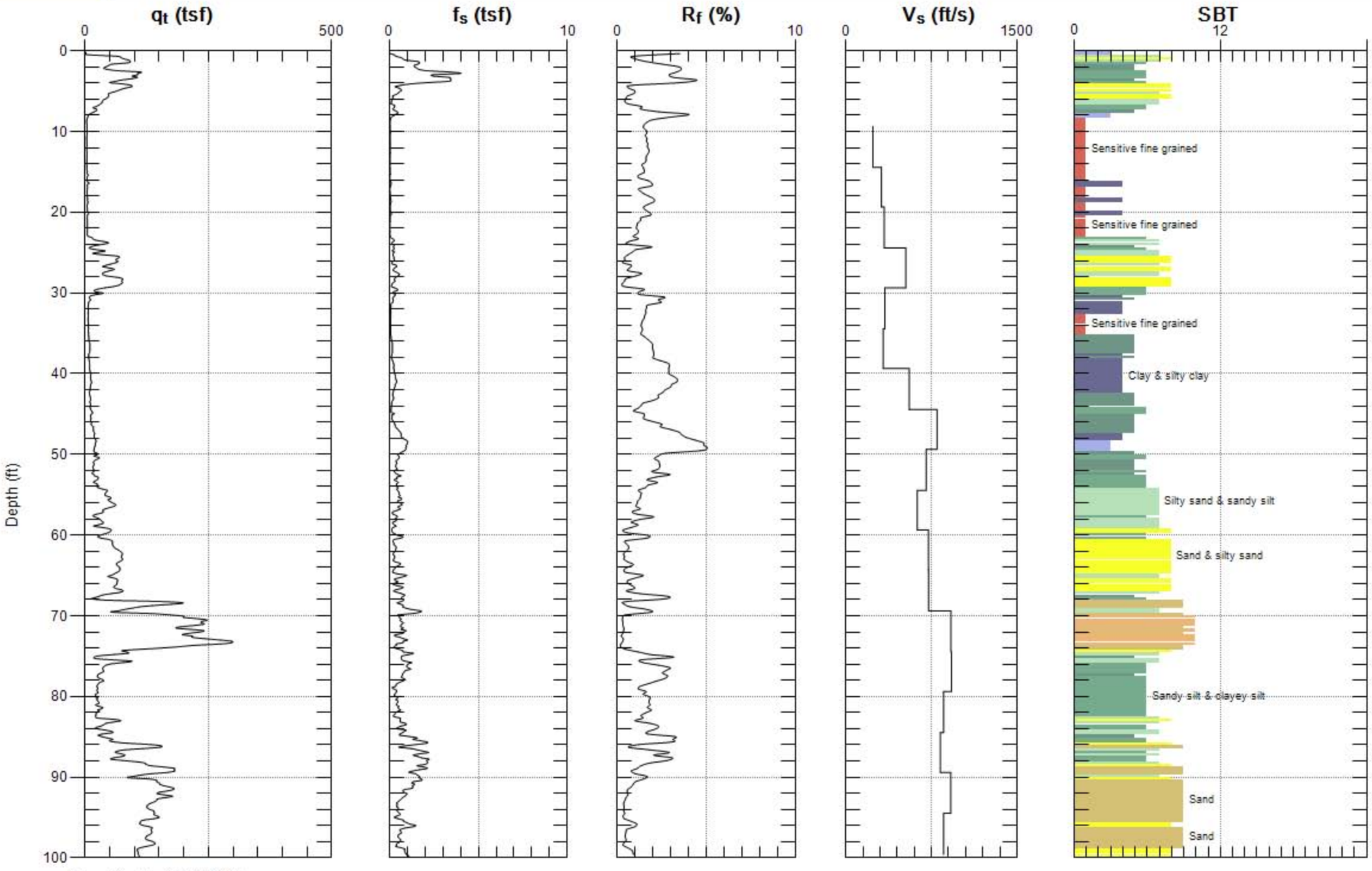


Max. Depth: 100.070 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: CPT-31
Engineer: J.CASTLE
Date: 12/2/2006 11:04

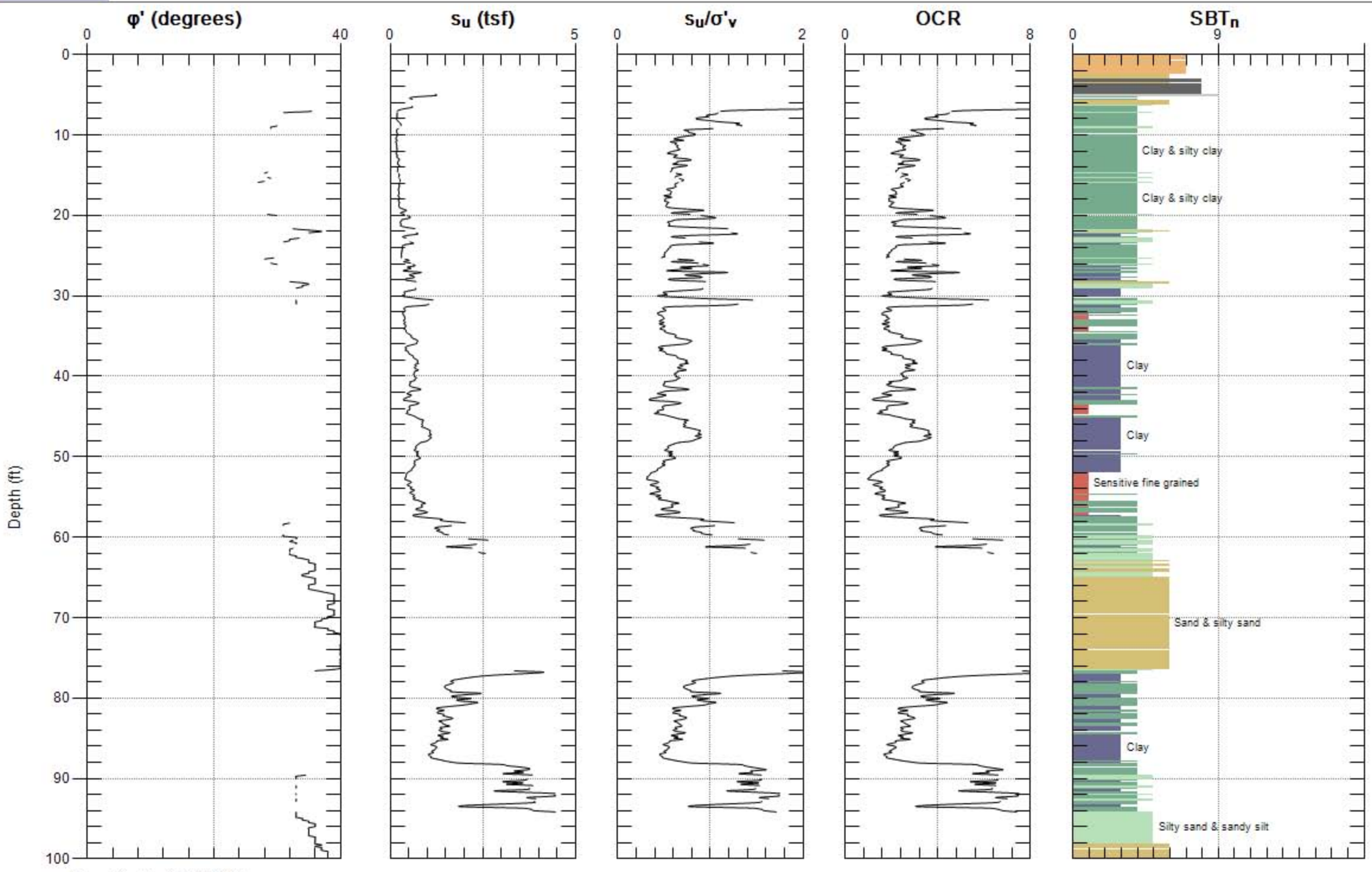


Max. Depth: 100.230 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: CPT-33
Engineer: J.CASTLE
Date: 12/2/2006 08:35

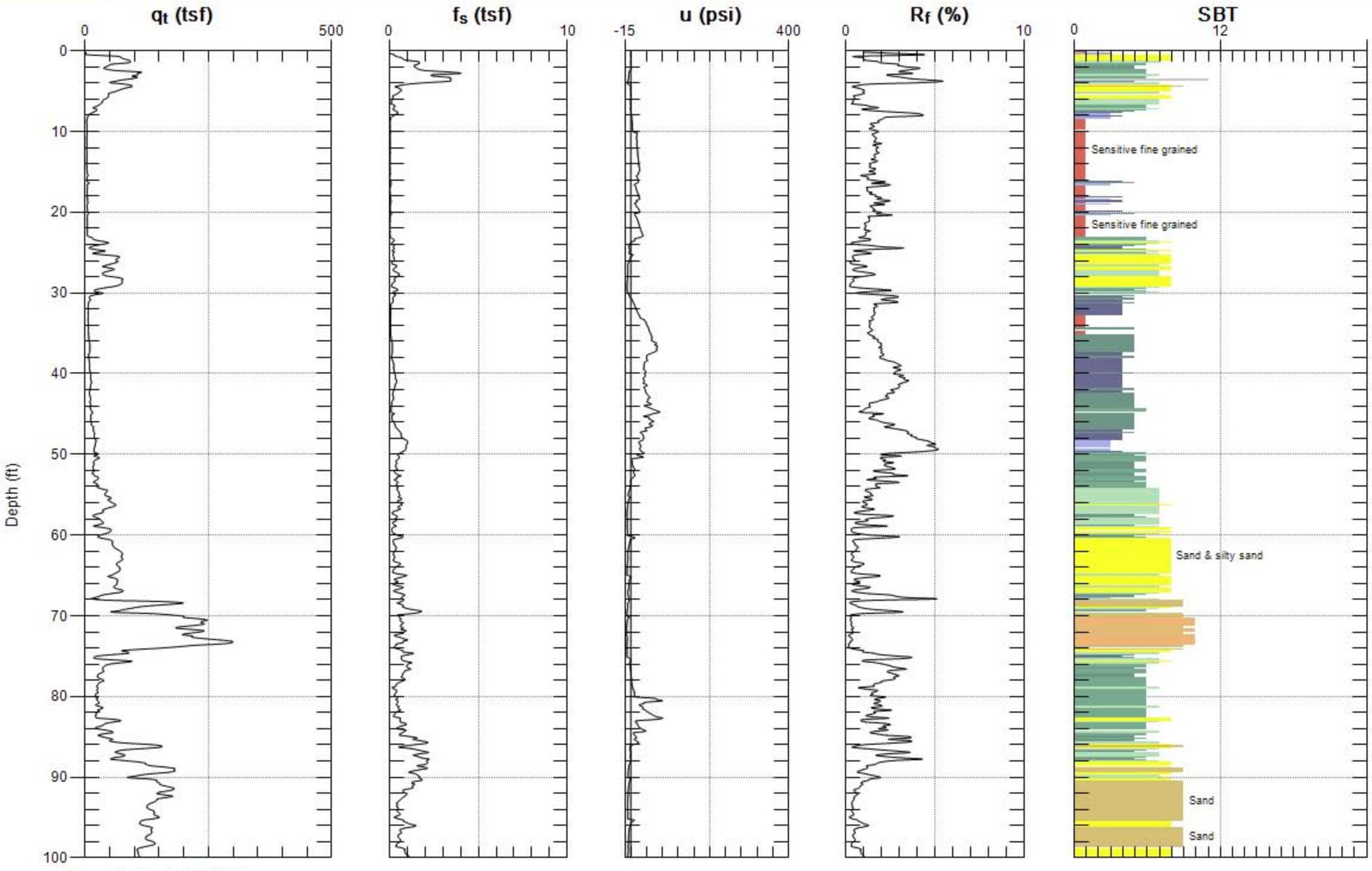


Max. Depth: 100.230 (ft)
Avg. Interval: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: CPT-31
Engineer: J.CASTLE
Date: 12/2/2006 11:04

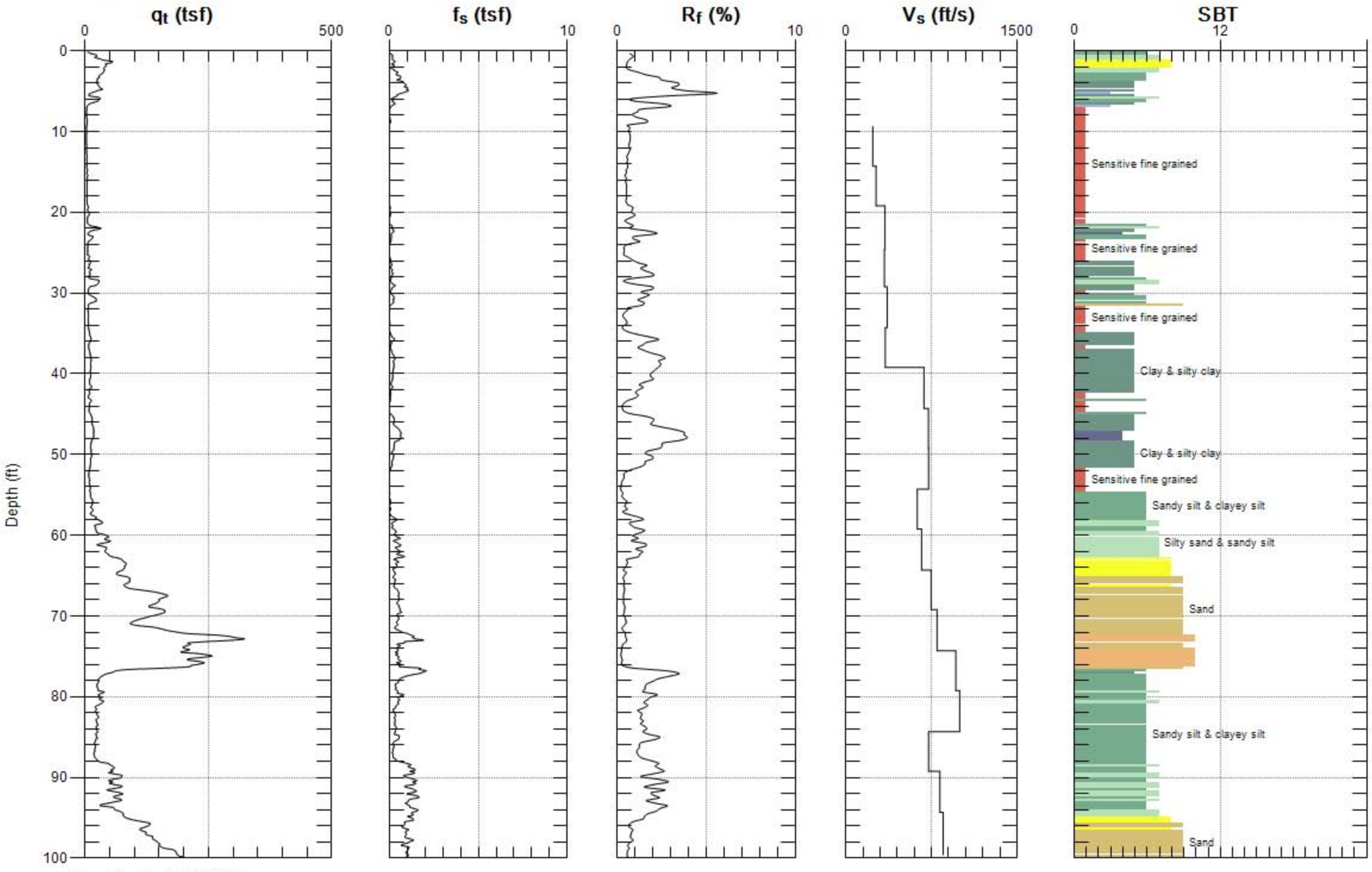


Max. Depth: 100.230 (ft)
Avg. Interval: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: CPT-33
Engineer: J.CASTLE
Date: 12/2/2006 08:35

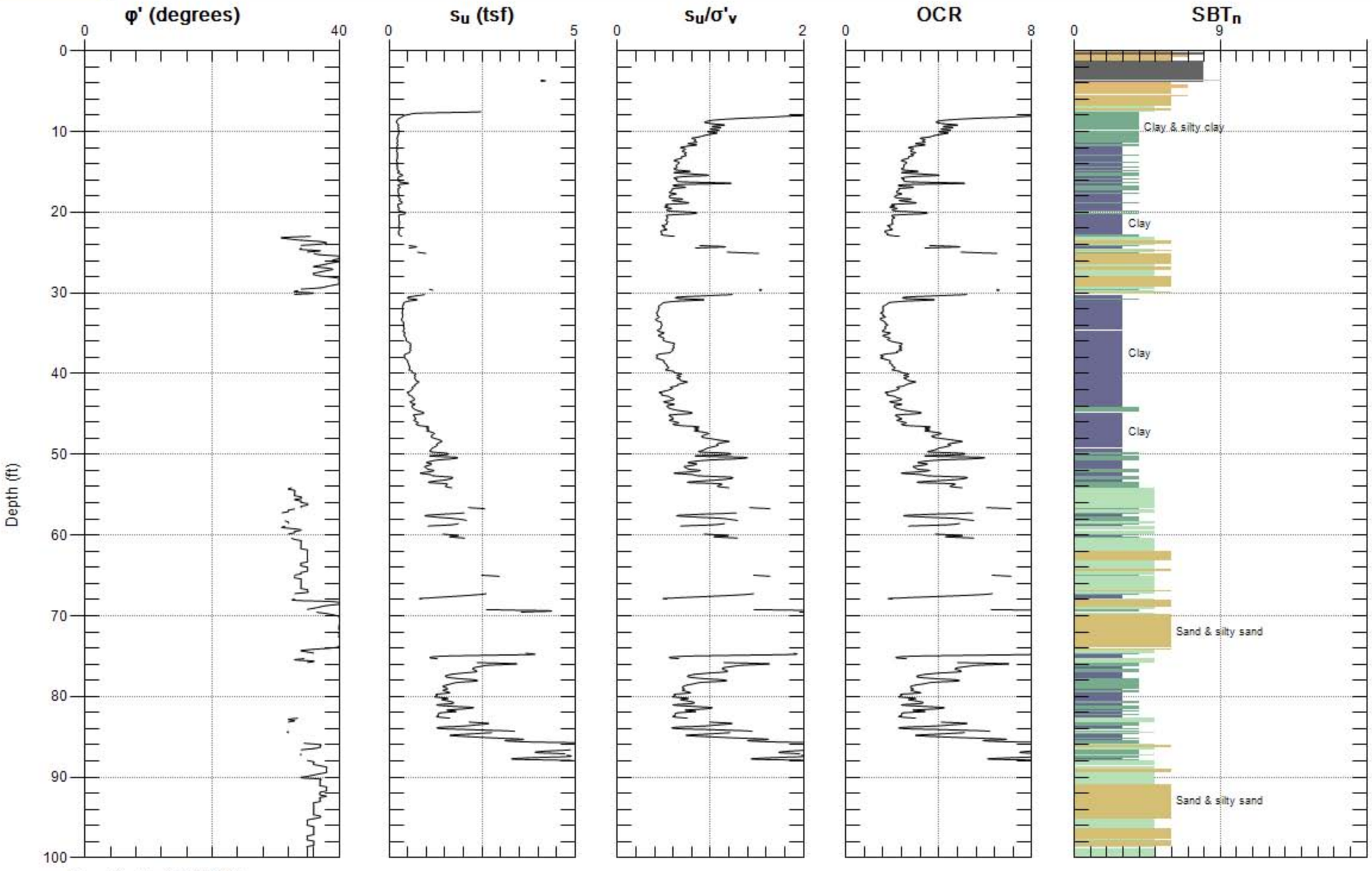


Max. Depth: 100.230 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: CPT-31
Engineer: J.CASTLE
Date: 12/2/2006 11:04

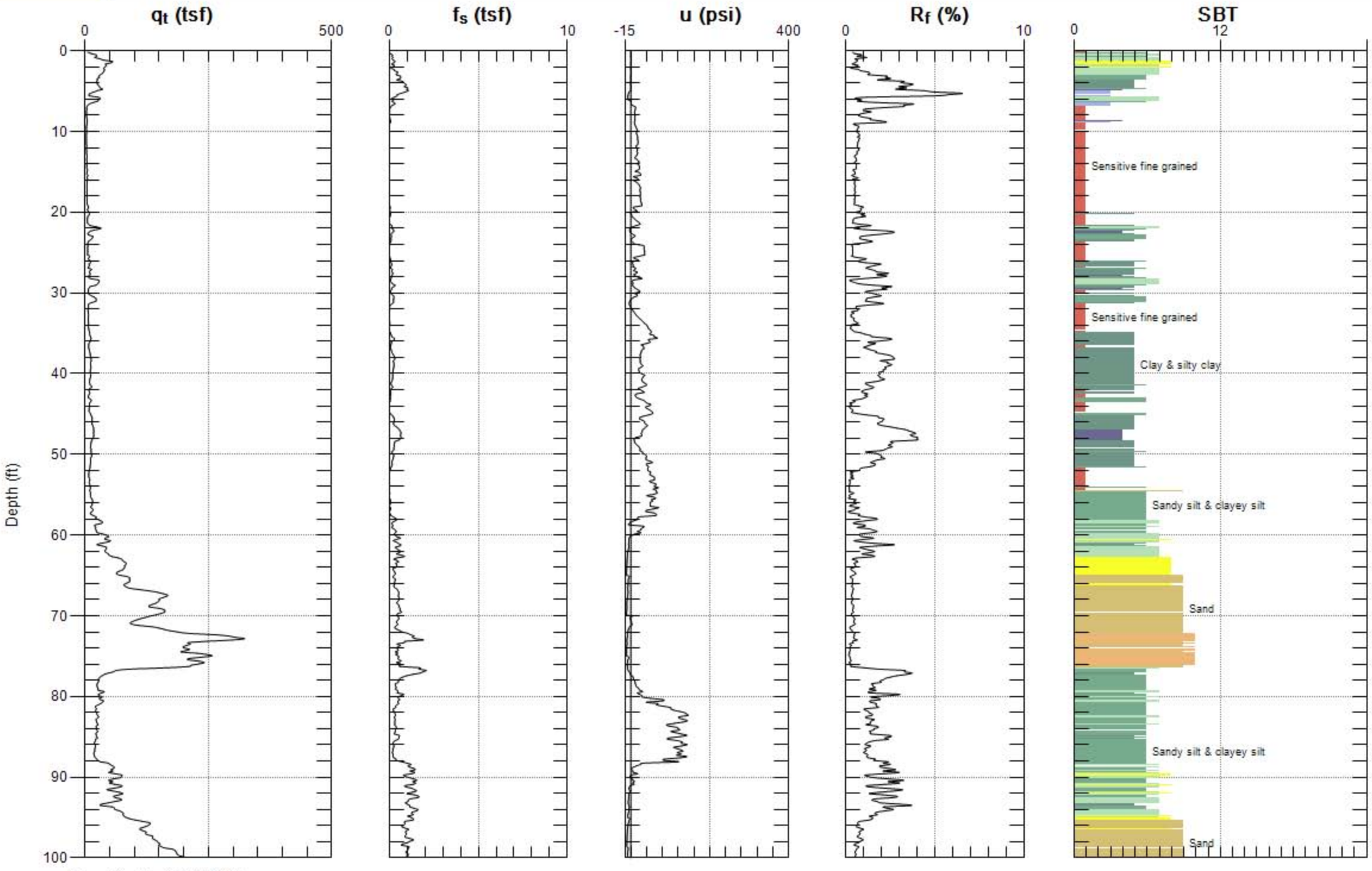


Max. Depth: 100.230 (ft)
Avg. Interval: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: CPT-33
Engineer: J.CASTLE
Date: 12/2/2006 08:35

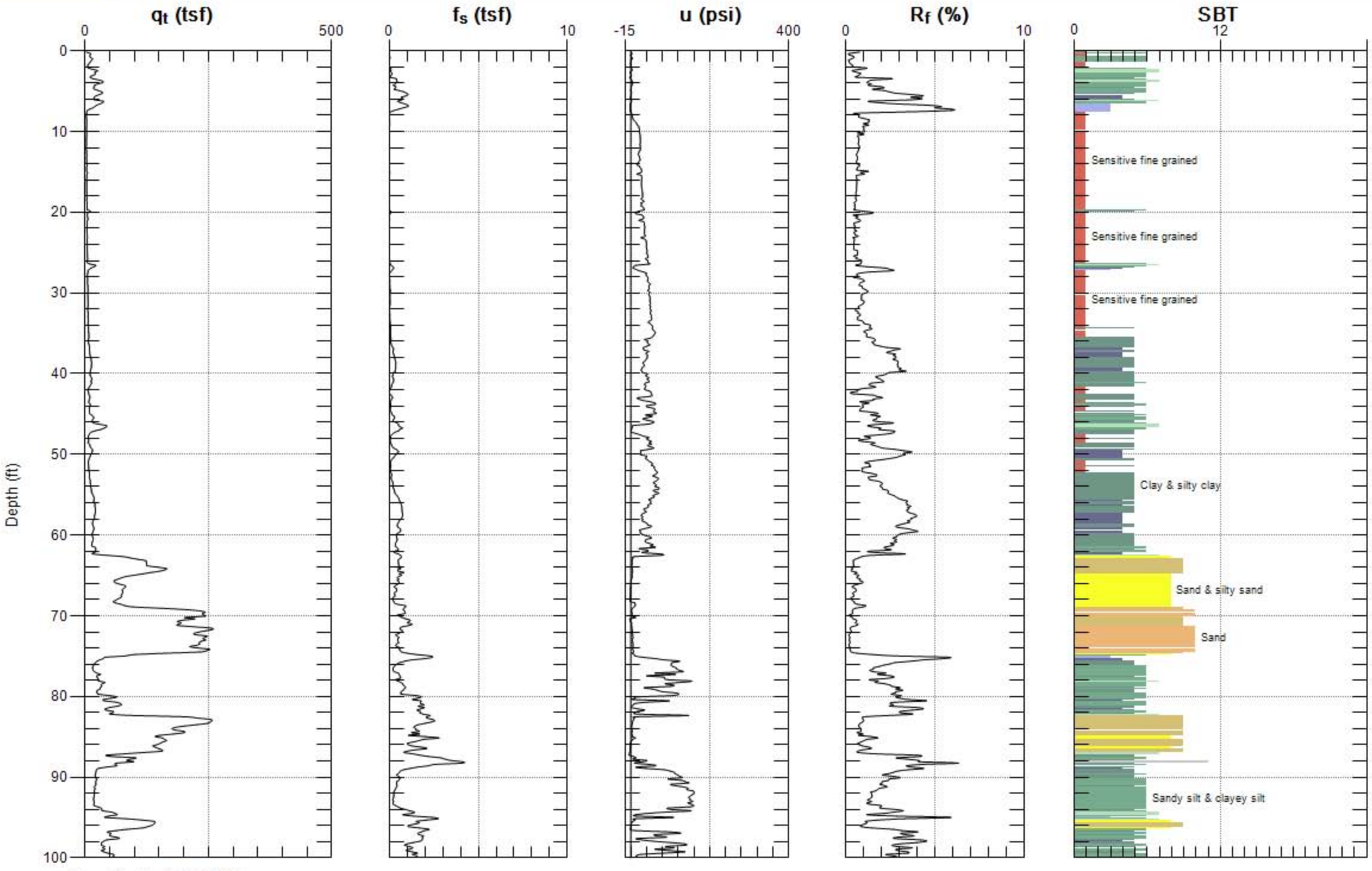


Max. Depth: 100.230 (ft)
Avg. Interval: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: CPT-35
Engineer: J.CASTLE
Date: 12/5/2006 02:26

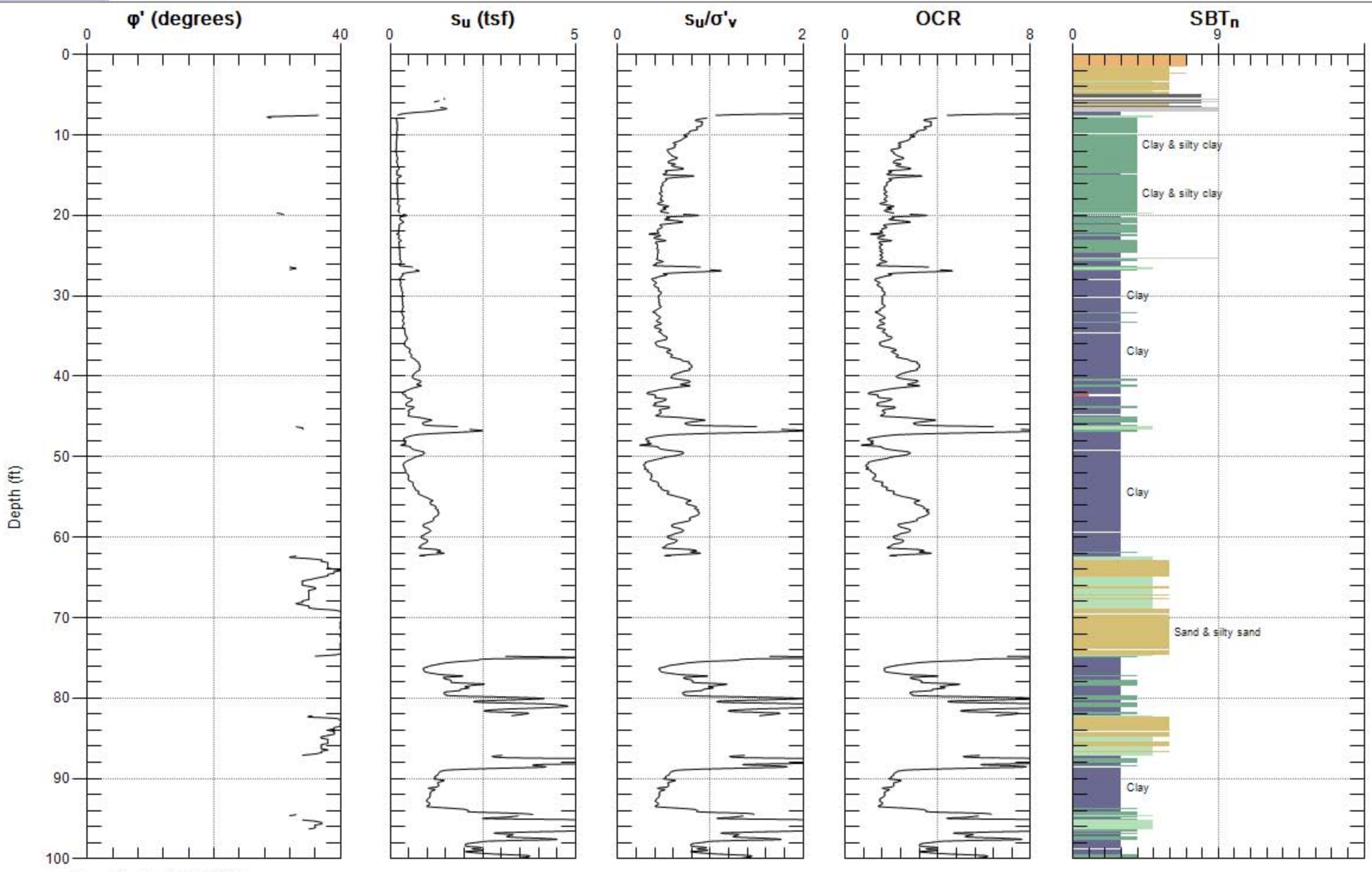


Max. Depth: 100.070 (ft)
Avg. Interval: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: CPT-35
Engineer: J.CASTLE
Date: 12/5/2006 02:26

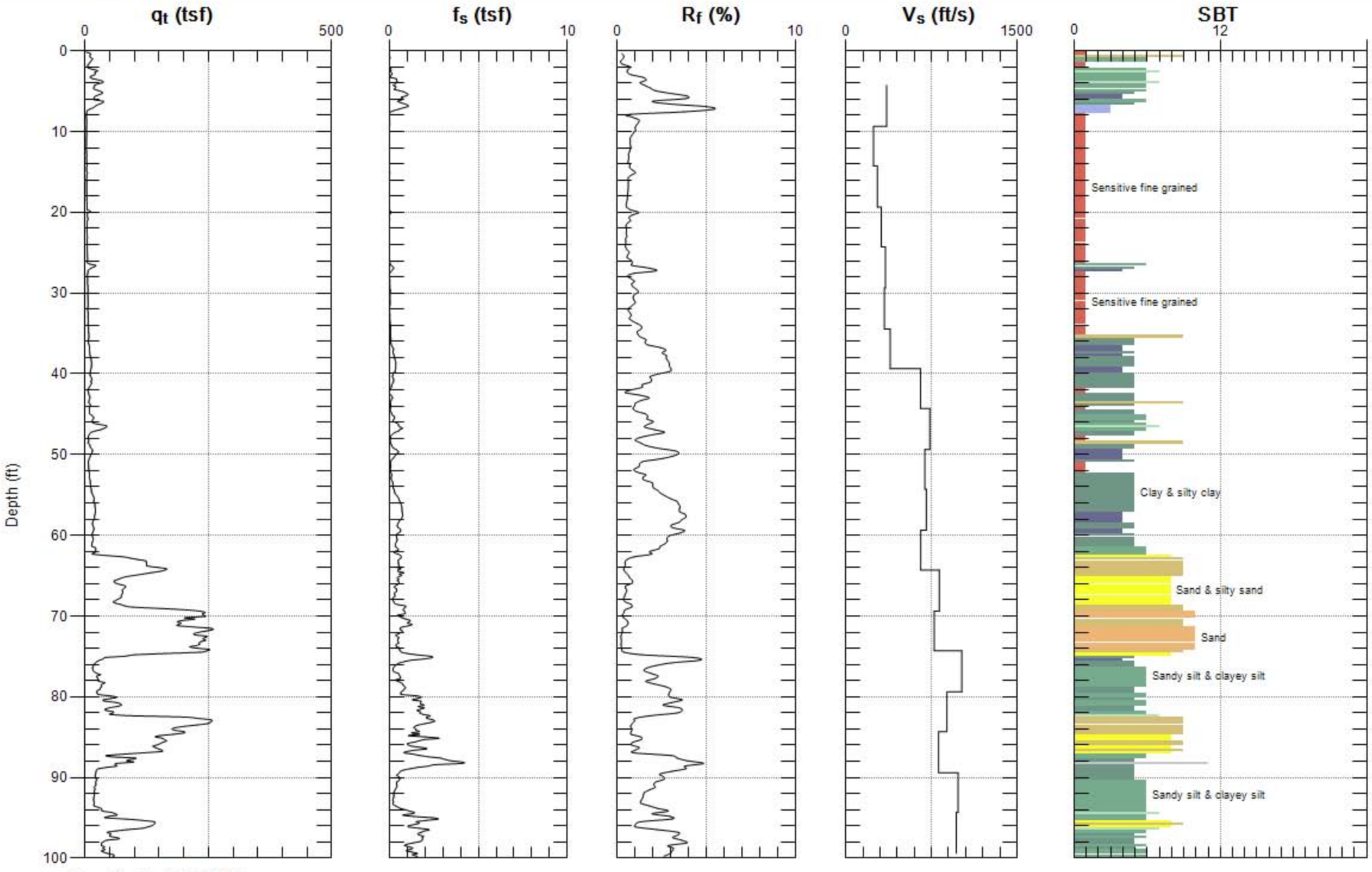


Max. Depth: 100.070 (ft)
Avg. Interval: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EARTH MECHANICS

Site: DUMBARTON BRIDGE
Sounding: CPT-35
Engineer: J.CASTLE
Date: 12/5/2006 02:26



Max. Depth: 100.070 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

FIGURE 1
SITE MAP
ANTIOCH AND
DUMBARTON BRIDGE
EMI/ANTIOCH & DUMBARTON GEOPHYS/CA

Source: USGS 250,000 Topographic Quadrangle Map, San Francisco, CA, 1956
Sacramento, CA, 1970, Santa Rosa, CA, San Jose, CA, 1962

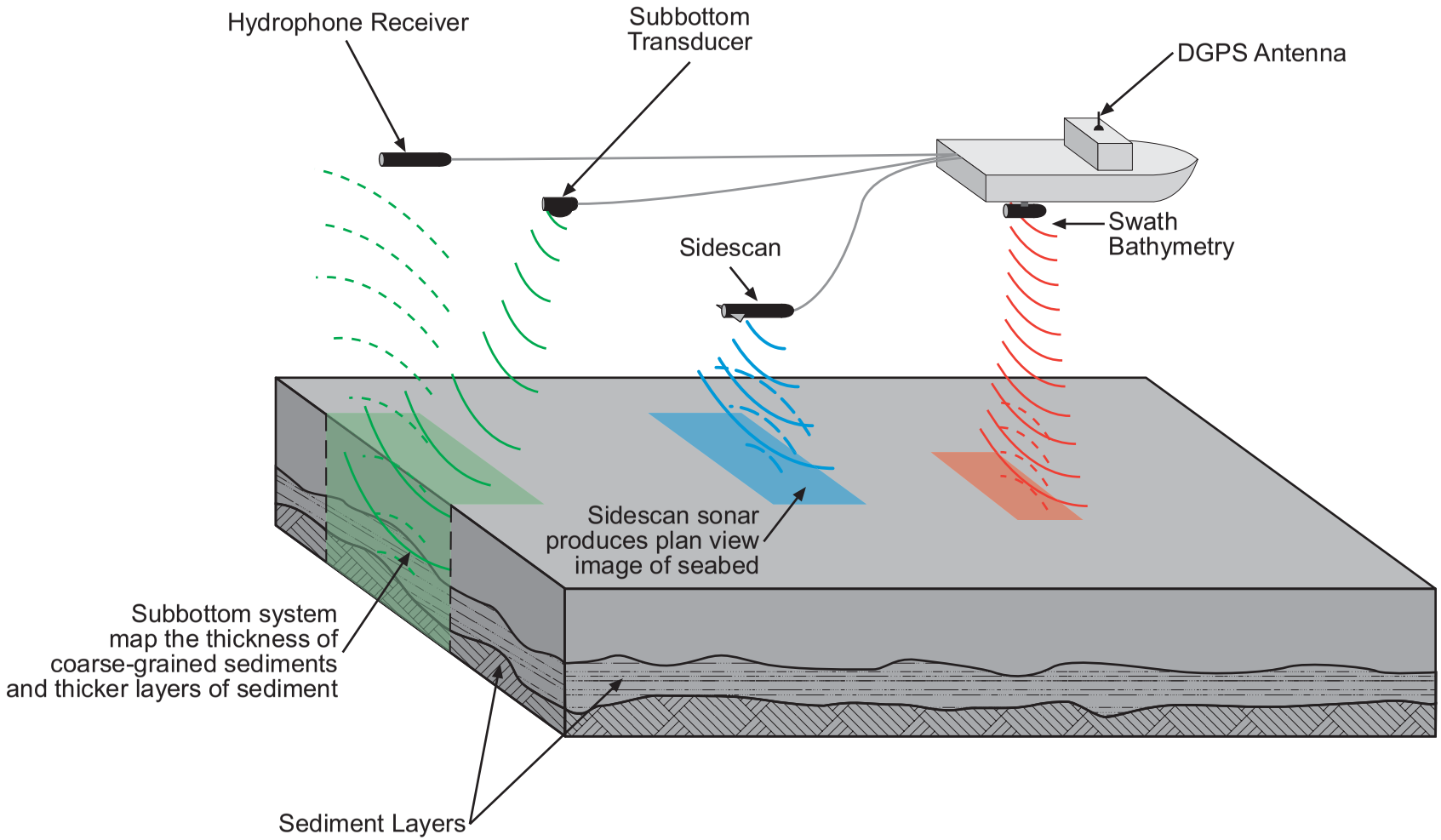
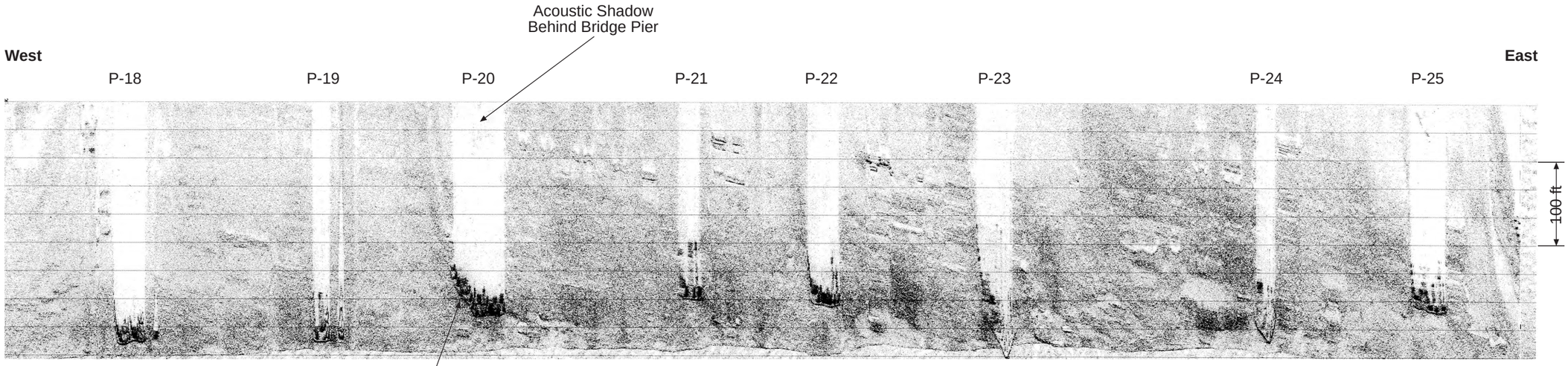


FIGURE **2**

SWATH BATHYMETRY, SIDESCAN SONAR, AND SUBBOTTOM PROFILING METHODS

EMI/ANTIOCH & DUMBARTON GEOPHYS/CA



Plan View Image
Made From South Side
of Bridge Looking North

FIGURE **3**
EXAMPLE OF SIDESCAN SONAR DATA FROM DUMBARTON BRIDGE
EMI/ANTIOCH & DUMBARTON GEOPHYS/CA

Plan View Image
Made Along West Side
of Bridge Looking East

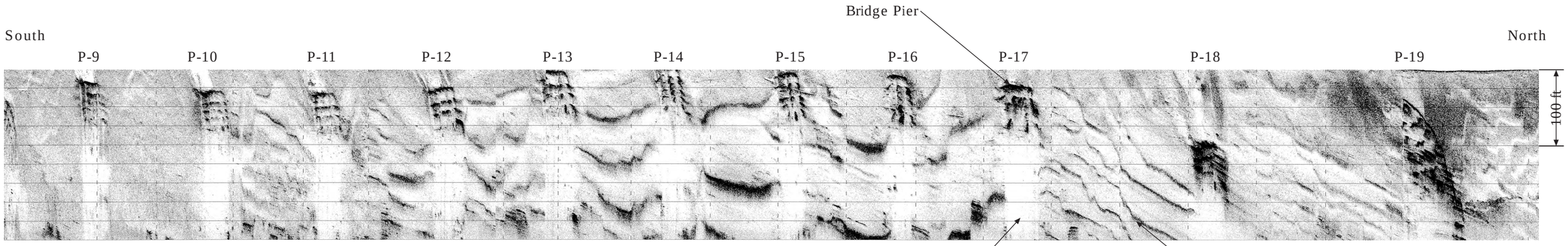
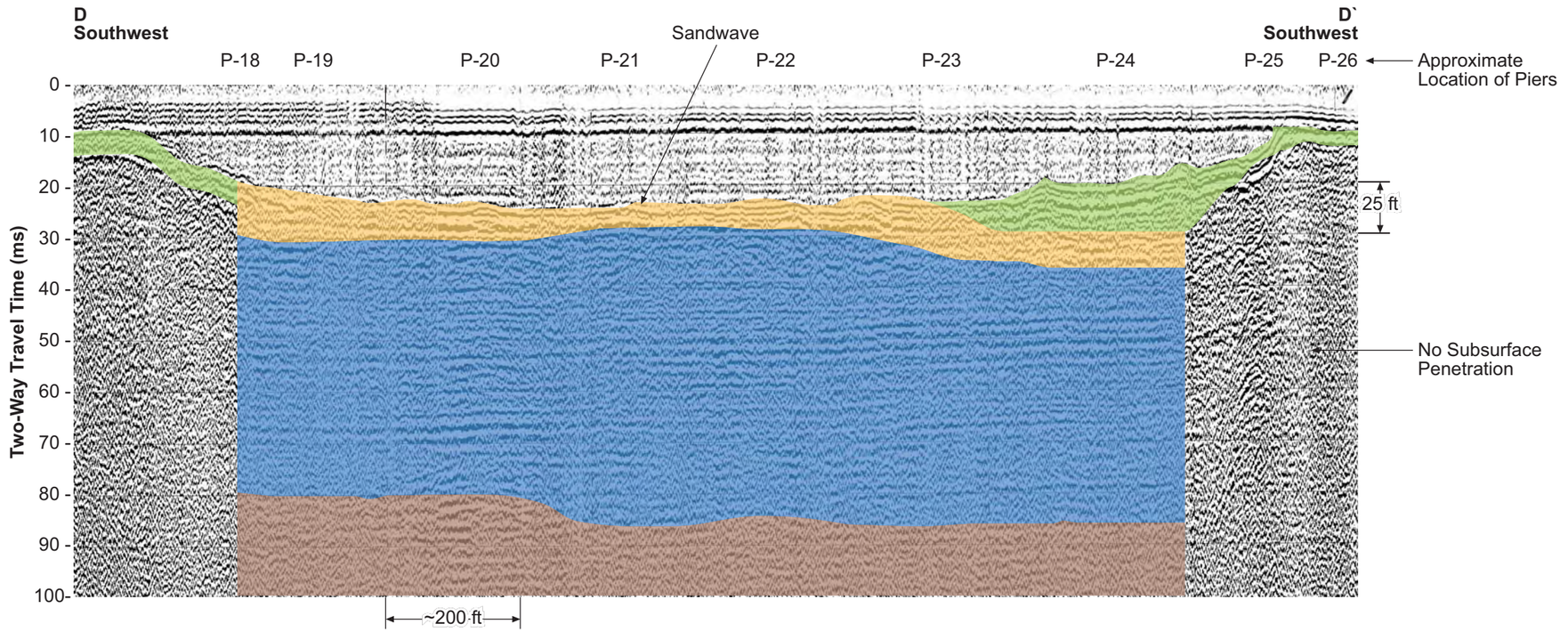
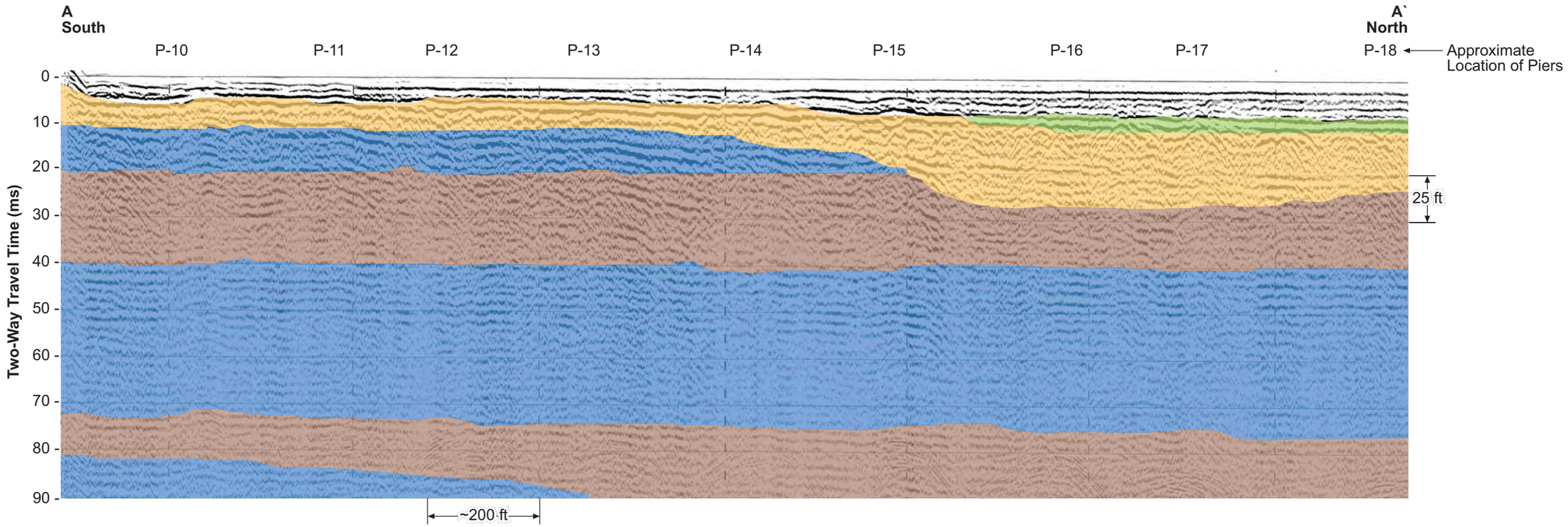


FIGURE 4
EXAMPLE OF SIDESCAN SONAR DATA
FROM ANTIOCH BRIDGE
EMI/ANTIOCH & DUMBARTON GEOPHYS/CA



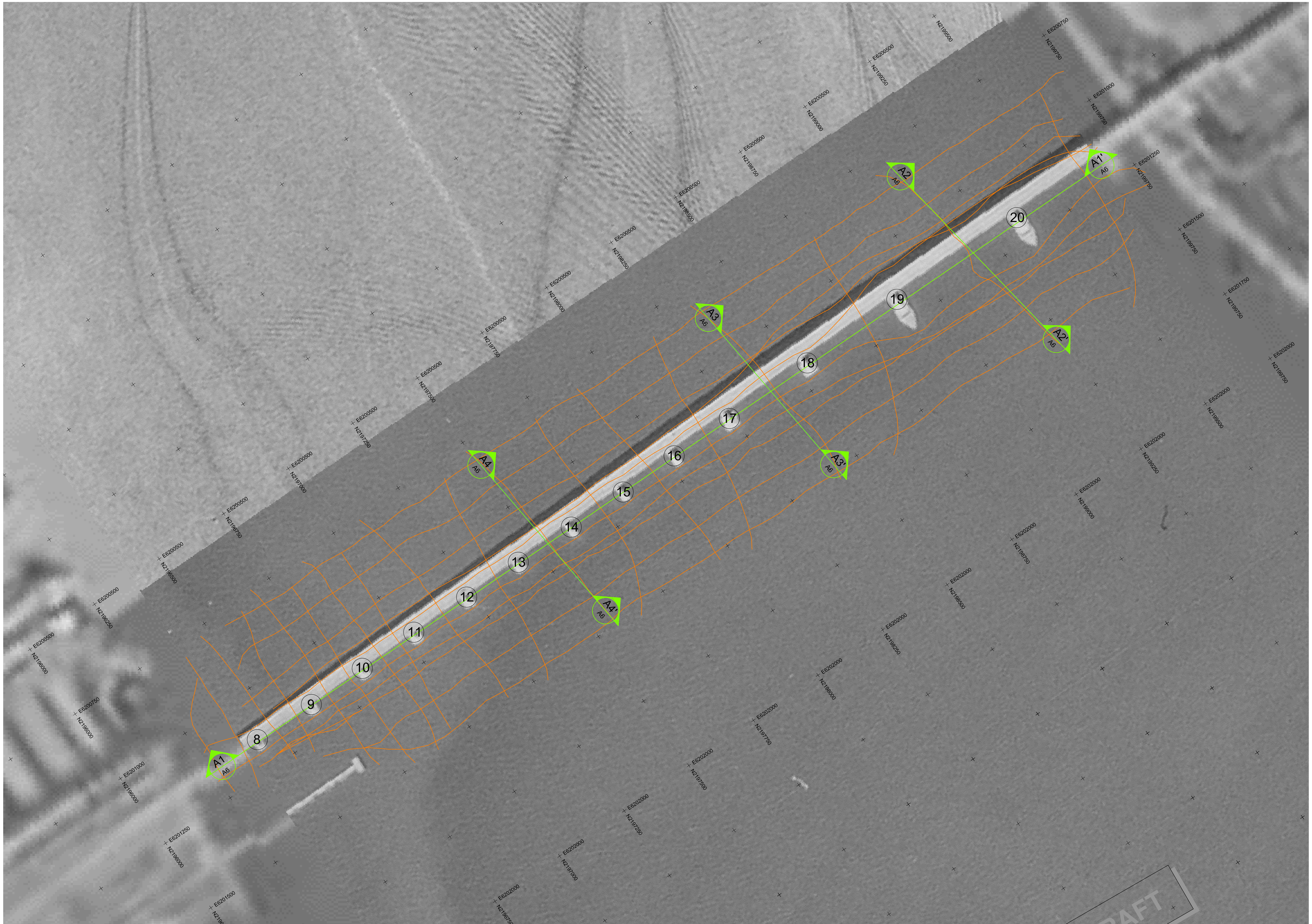
Note: Scale and location of piers for general reference only - not to exact scale.
See map D1 for location.

FIGURE **5**
EXAMPLE OF SUBBOTTOM DATA FROM DUMBARTON BRIDGE
EMI/ANTIOCH & DUMBARTON GEOPHYS/CA



Note: Scale and location of piers for general reference only - not to exact scale.
See map D1 for location.

FIGURE **6**
EXAMPLE OF SUBBOTTOM DATA FROM ANTIOCH BRIDGE
EMI/ANTIOCH & DUMBARTON GEOPHYS/CA



KEY MAP

ANTIOCH BRIDGE

SEE FIGURE 1 FOR LOCATION

LEGEND

GEOPHYSICAL SURVEY TRACKLINE

8 PIER NUMBER

A1 A1 CROSS SECTION LOCATION

SEE DRAWING A6 FOR PROFILES

0 150 300

SCALE IN FEET

INSTRUMENTATION

Navigation	- Trimble DGPS/HYPACK Software
Bathymetry	- Reson Model 2124
Subbottom	- Datasonic Bubble Pulser
Sidescan	- GeoAcoustic 100 KHz
Digital Acq.	- Chesapeake SonarWIZ
	- Sony 208 DAT

GEODETIC PARAMETERS

VERT. DATUM: - NGVD 1929
HORIZ. DATUM: - CA STATE PLANE ZONE III
PROJECTION: - NAD 83

Golder Associates

GOLDER ASSOCIATES INC.
18300 NE UNION HILL ROAD, SUITE 200
REDMOND, WA USA 98052-3333
TEL: (425) 883-0777
FAX: (425) 882-5498

SUBMITTED TO:

Earth Mechanics Inc.
Geotechnical and Earthquake Engineering

PROJECT:
EMI/ANTIOCH AND DUMBARTON GEOPHYS/CA

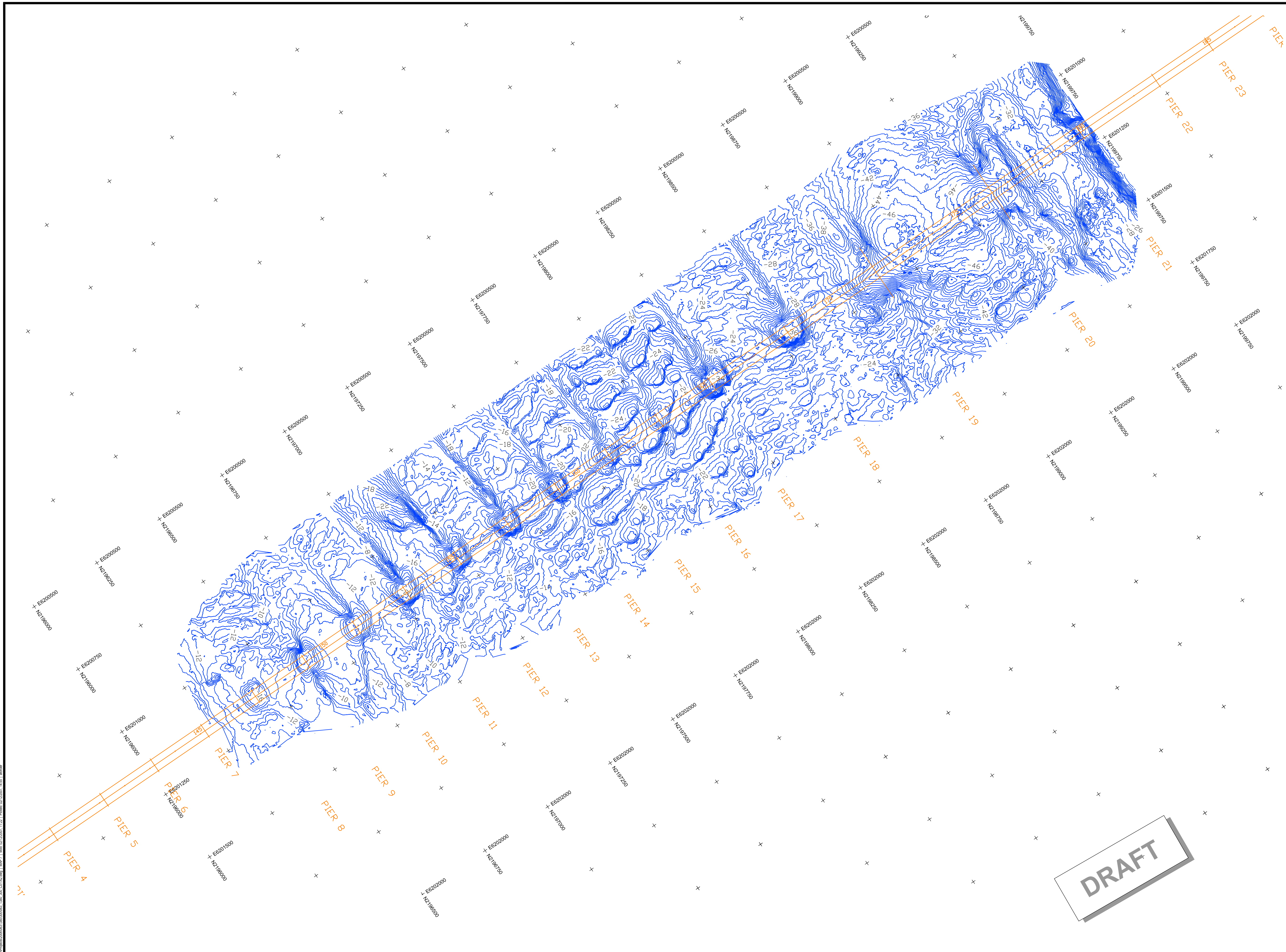
TITLE:

ANTIOCH TRACKLINE MAP

REV	DATE	REVISION DESCRIPTION	SIGNED
–	–	–	–

PROJECT No.	063–1380.300	
FILE No.	0631380300C01–A1.dwg	
REV. 0	SCALE	AS SHOWN
DESIGN	DS	12/18/06
CADD	ACF	1/12/07
CHECK	DS	1/12/07
REVIEW	–	–

A-1



KEY MAP

ANTIOCH BRIDGE

SEE FIGURE 1 FOR LOCATION

LEGEND

CONTOUR LINE
C.I. = 1 FT

0 150 300
SCALE IN FEET

INSTRUMENTATION

Navigation	- Trimble DGPS/HYPACK Software
Bathymetry	- Reson Model 2124
Subbottom	- Datasonic Bubble Pulser
Sidescan	- GeoAcoustic 100 KHz
Digital Acq.	- Chesapeake SonarWIZ
	- Sony 208 DAT

GEODETIC PARAMETERS

VERT. DATUM:	- NGVD 1929
HORIZ. DATUM:	- CA STATE PLANE ZONE III
PROJECTION:	- NAD 83

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Earth Mechanics Inc.
Geotechnical and Earthquake Engineering

PROJECT:
EMI/ANTIOCH AND DUMBARTON GEOPHYS/CA

TITLE:

BATHYMETRIC CONTOUR MAP ANTIOCH BRIDGE

REV	DATE	REVISION DESCRIPTION	SIGNED
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PROJECT No.		063–1380.300
FILE No.		0631380300C01–A2.dwg
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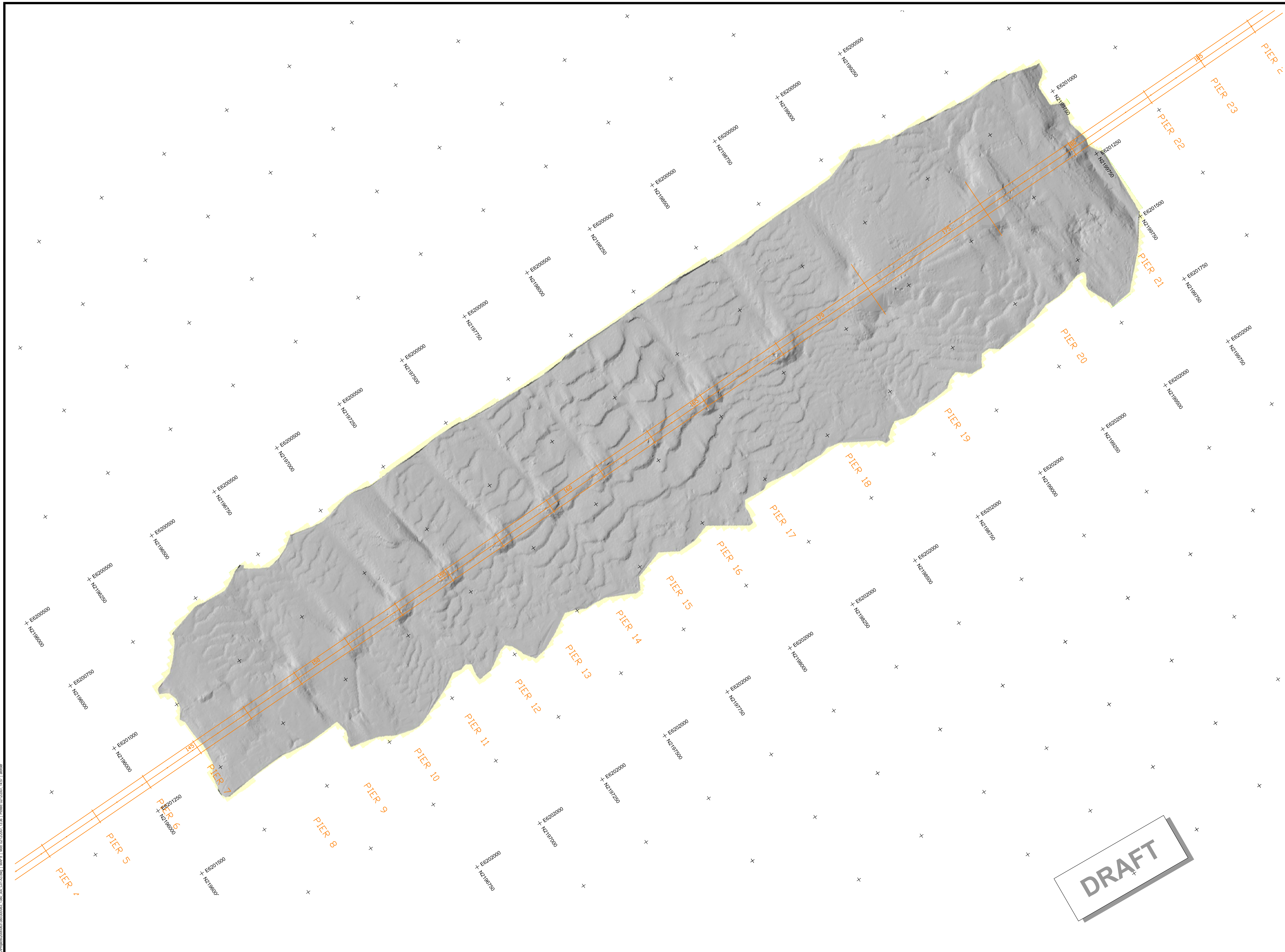
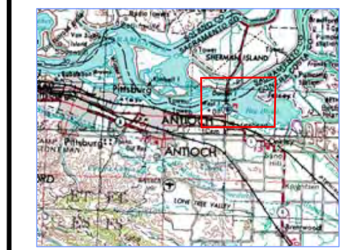
CADD	ACF	1/12/07
CHECK	DS	1/12/07
REVIEW	–	–

A-2



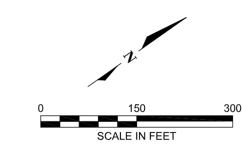
KEY MAP



ANTIOCH BRIDGE

SEE FIGURE 1 FOR LOCATION

LEGEND



INSTRUMENTATION

Navigation	- Trimble DGPS/HYPACK Software
Bathymetry	- Reson Model 2124
Subbottom	- Datasonic Bubble Pulser
Sidescan	- GeoAcoustic 100 KHz
Digital Acq.	- Chesapeake SonarWIZ
	- Sony 208 DAT

GEODETIC PARAMETERS

VERT. DATUM: - NGVD 1929
HORIZ. DATUM: - CA STATE PLANE ZONE III
PROJECTION: - NAD 83

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Earth Mechanics Inc.
Geotechnical and Earthquake Engineering

PROJECT:
EMI/ANTIOCH AND DUMBARTON
GEOPHYS/CA

TITLE:

BATHYMETRIC SHADED RELIEF IMAGE ANTIOCH BRIDGE

REV	DATE	REVISION DESCRIPTION	SIGNED
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PROJECT No.	063–1380.300	
FILE No.	0631380300C01–A3.dwg	
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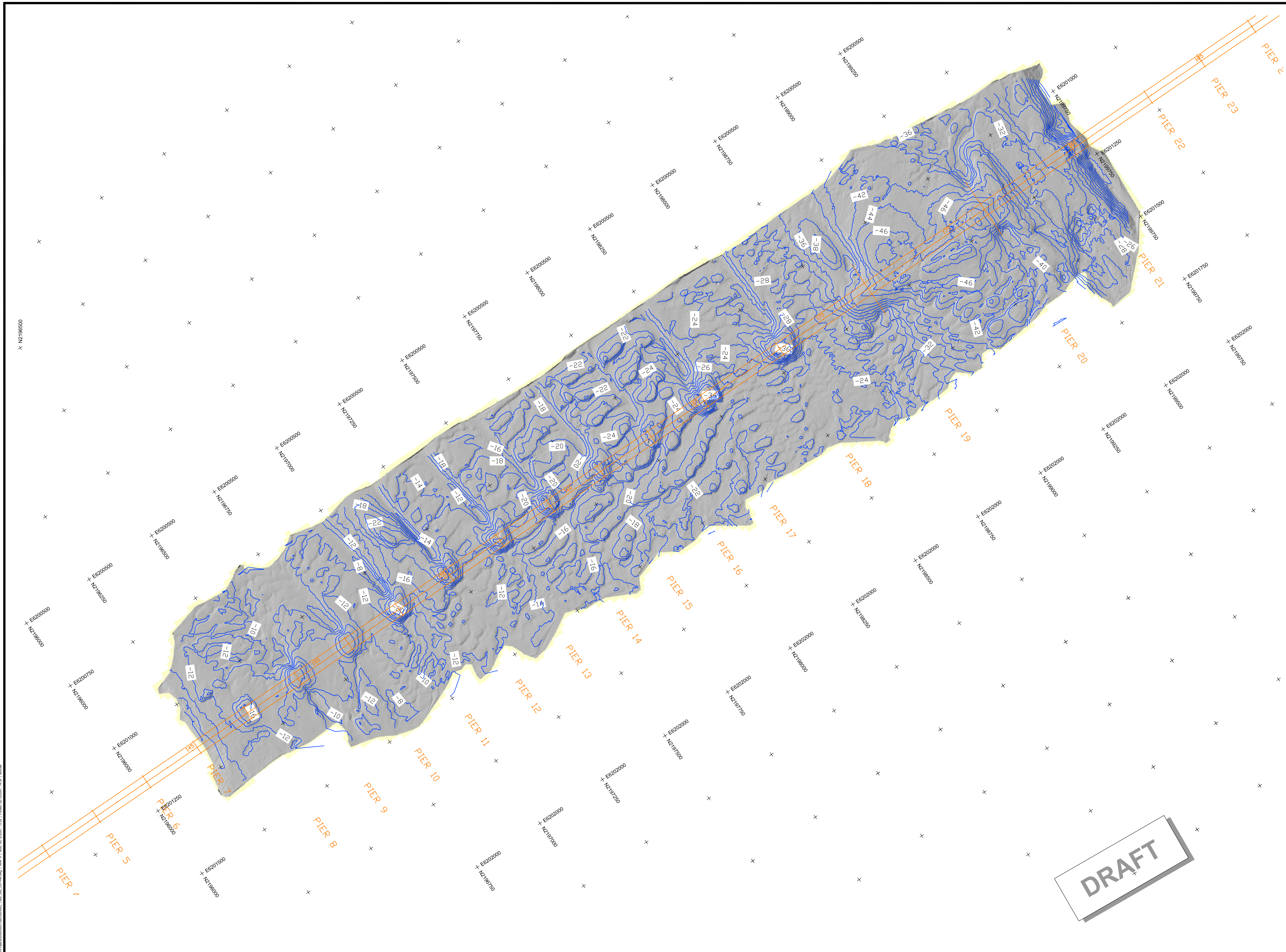

KEY MAP

ANTIOCH BRIDGE

SEE FIGURE 1 FOR LOCATION

LEGEND

CONTOUR LINE
C.I. = 1 FT

N

0 150 300
SCALE IN FEET

INSTRUMENTATION

Navigation - Trimble DGPS/HYPACK Software
Bathymetry - Reson Model 2124
Subbottom - Datasonic Bubble Pulser
Sidescan - GeoAcoustic 100 KHz
Digital Acq. - Chesapeake SonarWIZ
- Sony 208 DAT

GEODETIC PARAMETERS

VERT. DATUM: - NGVD 1929
HORIZ. DATUM: - CA STATE PLANE ZONE III
PROJECTION: - NAD 83

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Geotechnical and Earthquake Engineering

PROJECT:
EMI/ANTIOCH AND DUMBARTON GEOPHYS/CA

TITLE:
CONTOURS OVERLAIN ON BATHYMETRIC SHADED RELIEF IMAGE ANTIOCH BRIDGE

REV	DATE	REVISION DESCRIPTION	SIGNED
–	–	–	–

PROJECT No.	063–1380.300	
FILE No.	0631380300C01–A4.dwg	
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CADD	ACF	1/12/07
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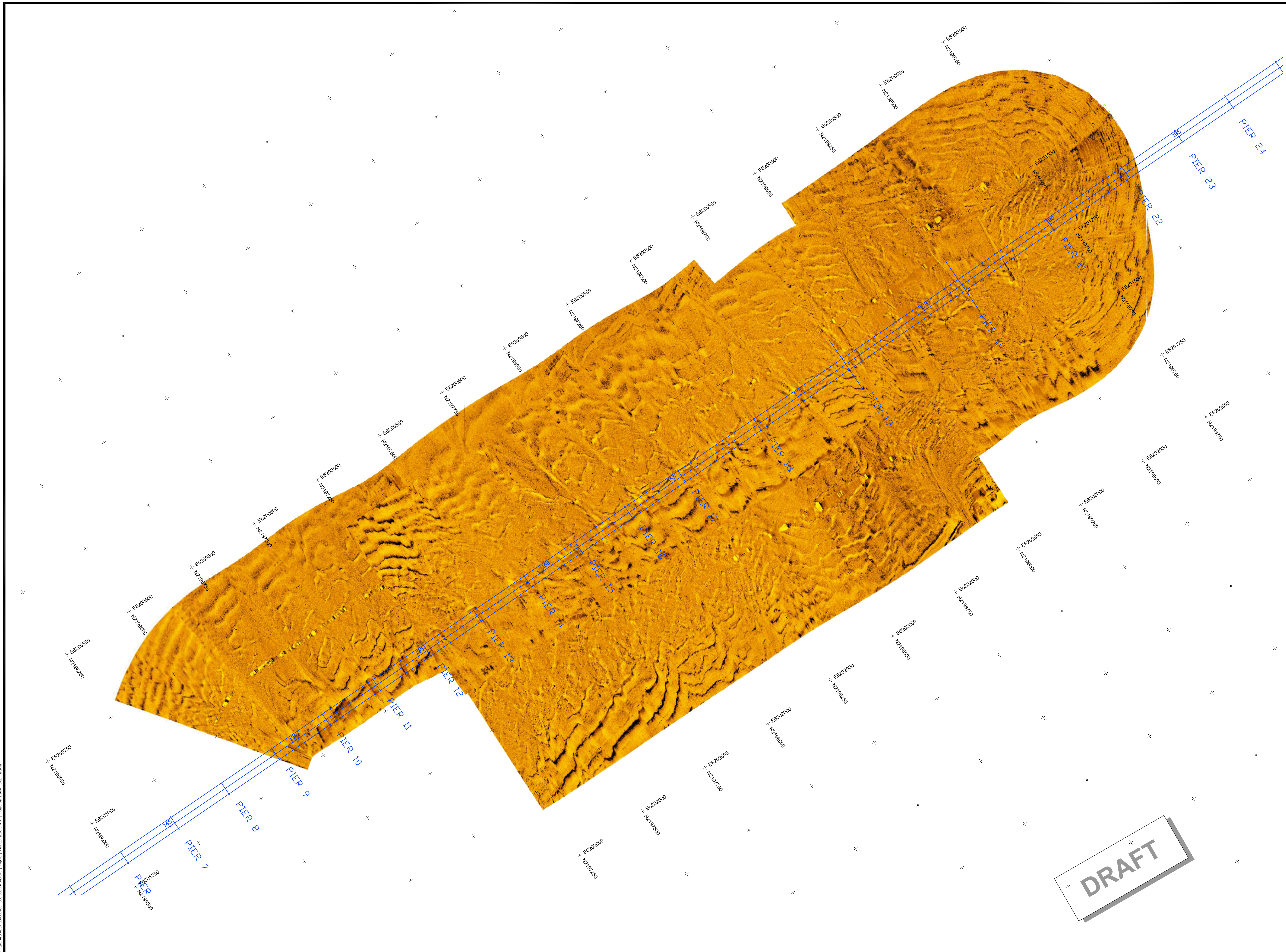
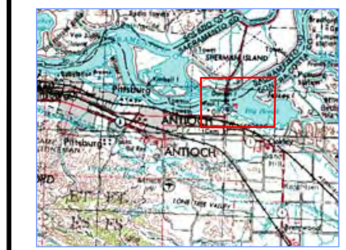
REVIEW	–	–

A-4



KEY MAP



ANTIOCH BRIDGE

SEE FIGURE 1 FOR LOCATION

LEGEND

N

0 150 300

SCALE IN FEET

INSTRUMENTATION

Navigation	- Trimble DGPS/HYPACK Software
Bathymetry	- Reson Model 2124
Subbottom	- Datasonic Bubble Pulser
Sidescan	- GeoAcoustic 100 KHz
Digital Acq.	- Chesapeake SonarWIZ
	- Sony 208 DAT

GEODETIC PARAMETERS

VERT. DATUM:	- NGVD 1929
HORIZ. DATUM:	- CA STATE PLANE ZONE III
PROJECTION:	- NAD 83

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Geotechnical and Earthquake Engineering

PROJECT:
EMI/ANTIOCH AND DUMBARTON GEOPHYS/CA

TITLE:

ANTIOCH SIDESCAN MOSAIC

REV	DATE	REVISION DESCRIPTION	SIGNED
–	–	–	–

PROJECT No.		063–1380.300
FILE No.		0631380300C01–A5.dwg
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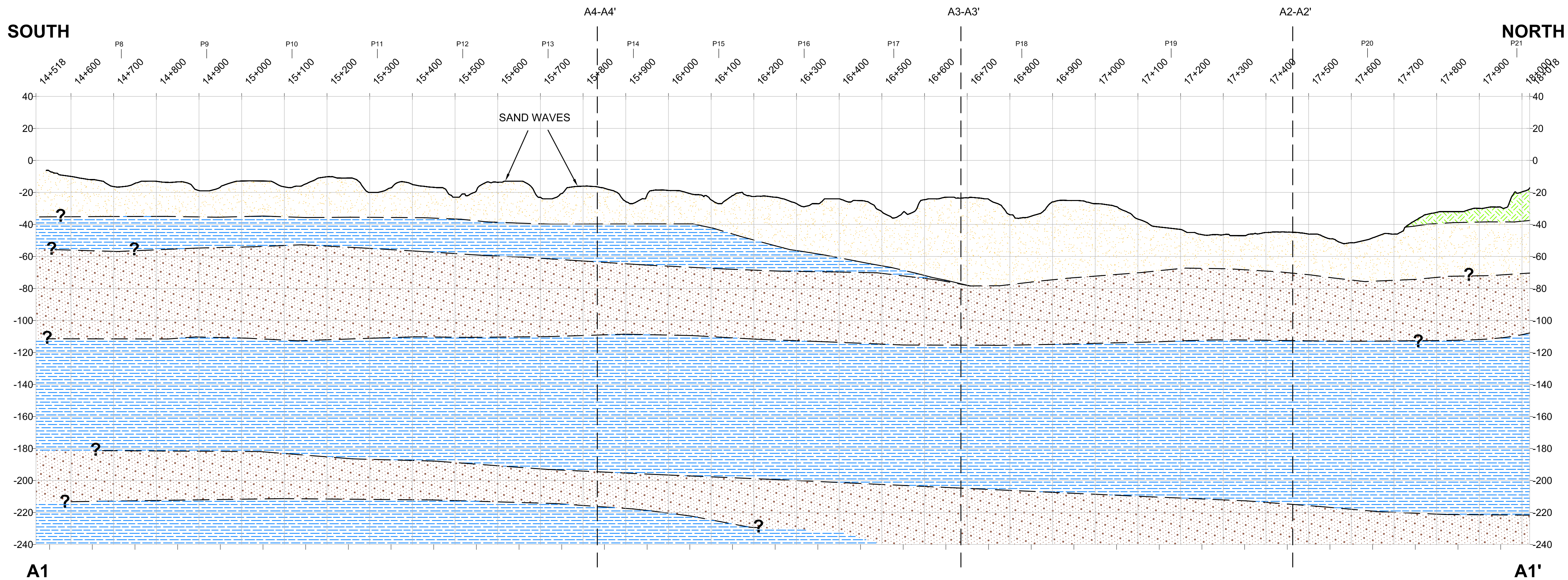
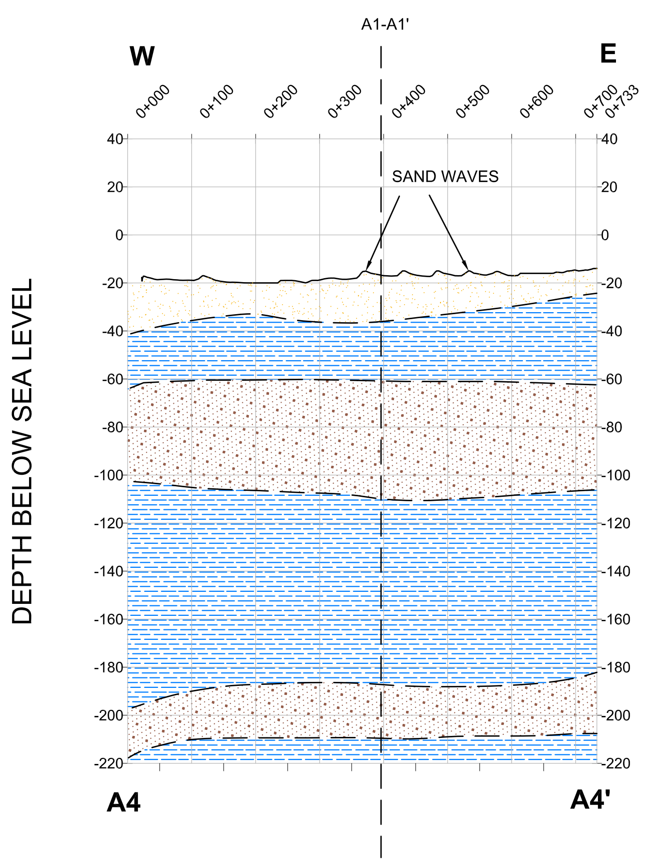
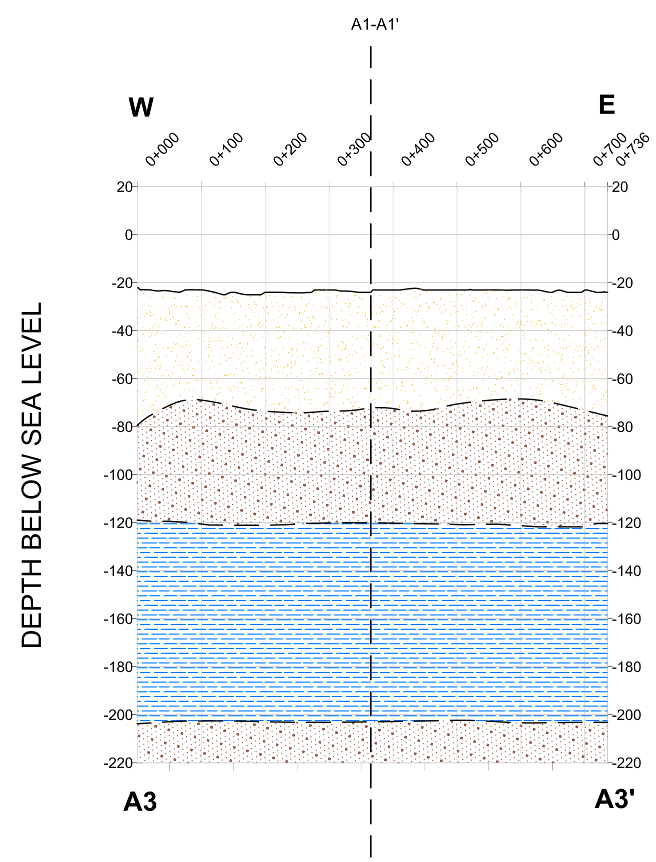
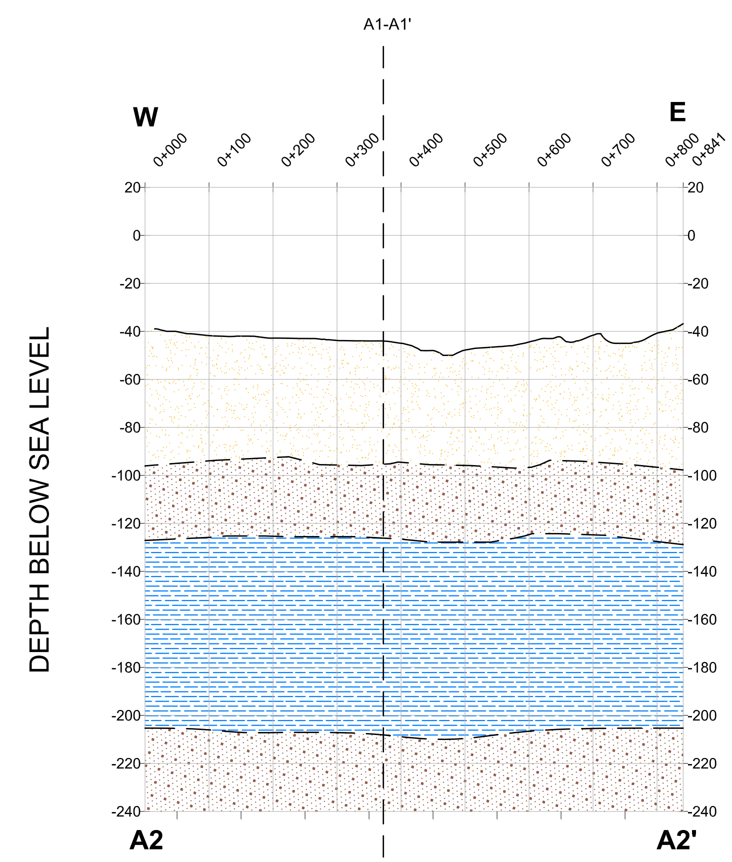
CADD	ACF	1/12/07
CHECK	DS	1/12/07
REVIEW	–	–

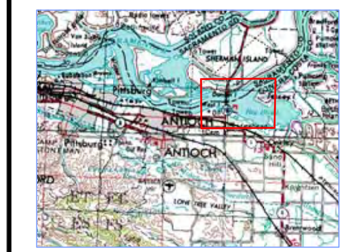
A-5











ANTIOCH BRIDGE

SEE FIGURE 1 FOR LOCATION

LEGEND

- YOUNG BAY MUD
- SAND
- HARD CLAY
- SAND AND GRAVEL

LITHOLOGY BASED ON GENERALIZED SOIL PROFILE FROM EMI

SEE DRAWING A1 FOR LOCATIONS

0 150 300
SCALE IN FEET
VERTICAL SCALE 1:40

INSTRUMENTATION

Navigation	- Trimble DGPS/HYPACK Software
Bathymetry	- Reson Model 2124
Subbottom	- Datasonic Bubble Pulser
Sidescan	- GeoAcoustic 100 KHz
Digital Acq.	- Chesapeake SonarWIZ
	- SONY 208 DAT

GEODETIC PARAMETERS

VERT. DATUM:	- NGVD 1929
HORIZ. DATUM:	- CA STATE PLANE ZONE III
PROJECTION:	- NAD 83

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Earth Mechanics Inc.
Geotechnical and Earthquake Engineering

PROJECT:
EMI/ANTIOCH AND DUMBARTON GEOPHYS/CA

TITLE:

INTERPRETED PROFILES, ANTIOCH BRIDGE

REV	DATE	REVISION DESCRIPTION	SIGNED
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PROJECT No.		063–1380.300
FILE No.		0631380300C01–M10.dwg
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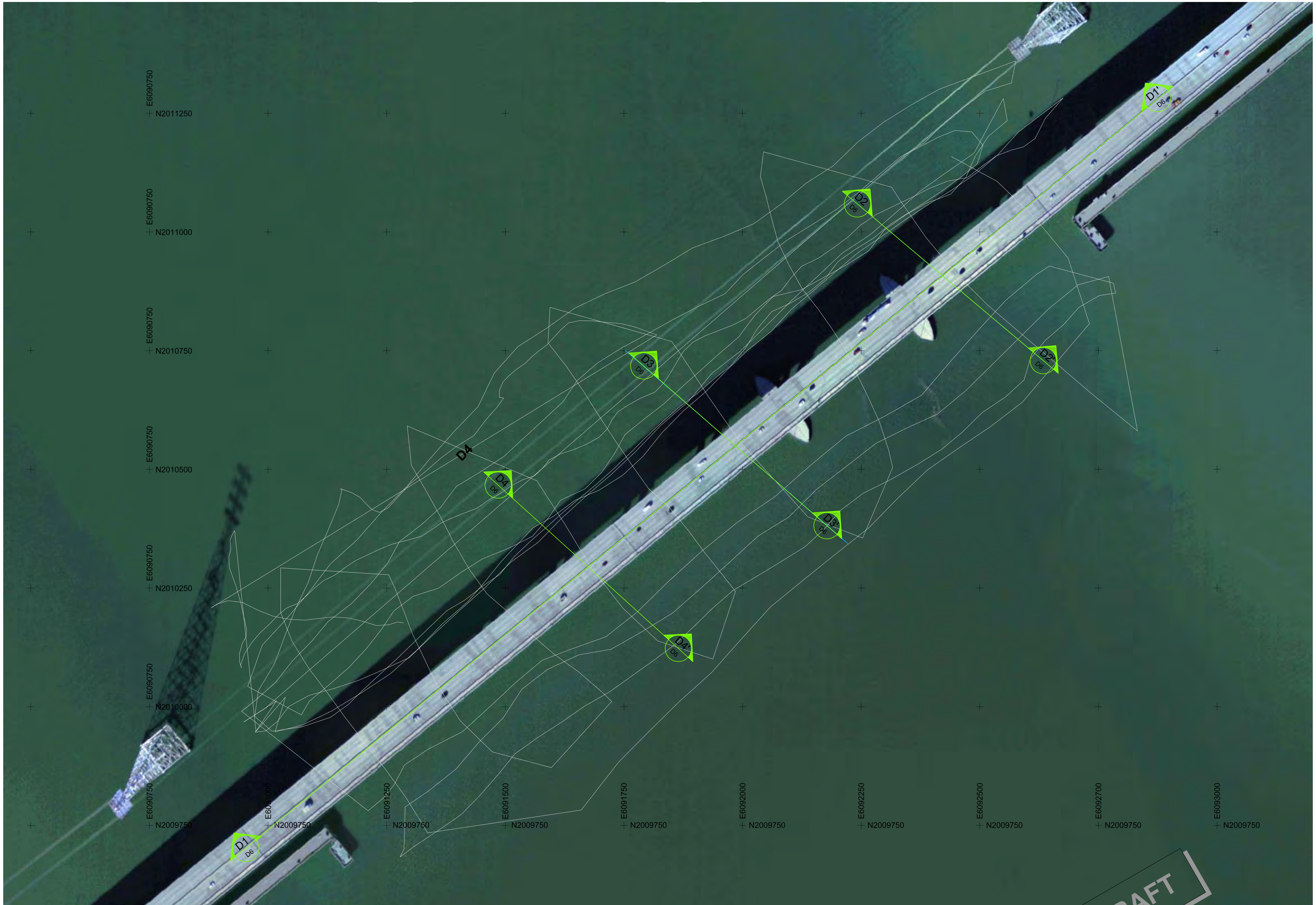
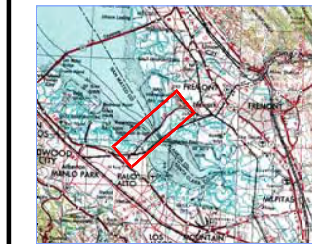
REVIEW	–	–

A-6



KEY MAP



DUMBARTON BRIDGE

SEE FIGURE 1 FOR LOCATION

LEGEND

GEOPHYSICAL SURVEY TRACKLINE

CROSS SECTION LOCATION

SEE DRAWING D6 FOR PROFILES

N

0 100 200
SCALE IN FEET

INSTRUMENTATION

Navigation	- Trimble DGPS/HYPACK Software
Bathymetry	- Reson Model 2124
Subbottom	- Datasonic Bubble Pulser
Sidescan	- GeoAcoustic 100 KHz
Digital Acq.	- Chesapeake SonarWIZ
	- Sony 208 DAT

GEODETIC PARAMETERS

VERT. DATUM:	- NAVD 88
HORIZ. DATUM:	- CA STATE PLANE ZONE III
PROJECTION:	- NAD 83

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FAX: (425) 882-5498

SUBMITTED TO:

Earth Mechanics Inc.
Geotechnical and Earthquake Engineering

PROJECT:
EMI/ANTIOCH AND DUMBARTON GEOPHYS/CA

TITLE:

DUMBARTON TRACKLINE MAP

REV	DATE	REVISION DESCRIPTION	SIGNED
–	–	–	–

PROJECT No.		063–1380.300
FILE No.		0631380300C01–D1.dwg
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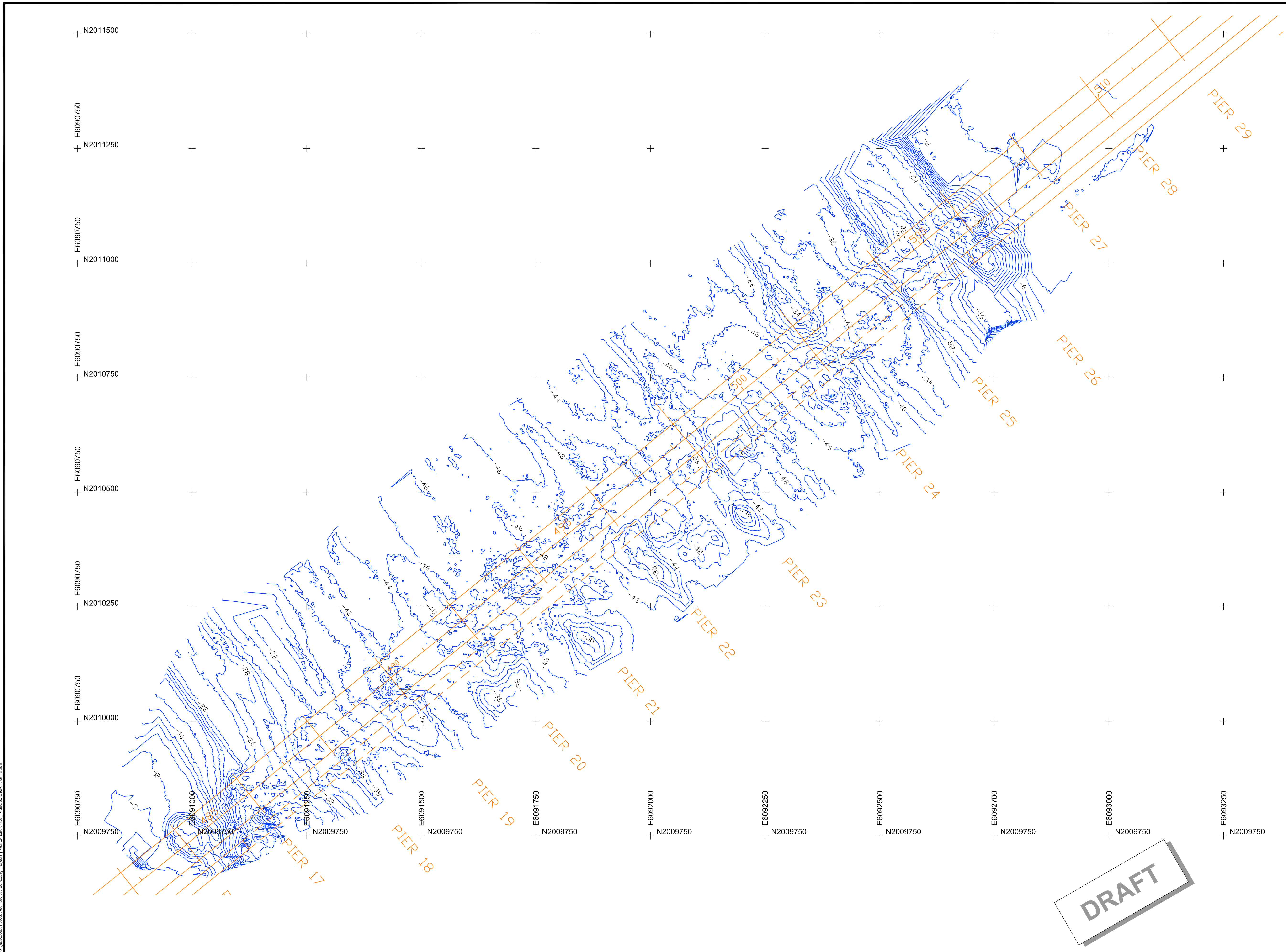
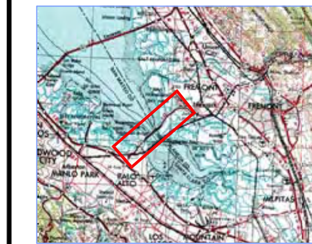
CADD	ACF	1/12/07
CHECK	DS	1/12/07
REVIEW	–	–

D-1

DRAFT



KEY MAP



DUMBARTON BRIDGE

SEE FIGURE 1 FOR LOCATION

LEGEND

CONTOUR LINES
C.I.= 1 FT

N

0 100 200
SCALE IN FEET

INSTRUMENTATION

Navigation	- Trimble DGPS/HYPACK Software
Bathymetry	- Reson Model 2124
Subbottom	- Datasonic Bubble Pulser
Sidescan	- GeoAcoustic 100 KHz
Digital Acq.	- Chesapeake SonarWIZ
	- Sony 208 DAT

GEODETIC PARAMETERS

VERT. DATUM:	- NAVD 88
HORIZ. DATUM:	- CA STATE PLANE ZONE III
PROJECTION:	- NAD 83

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SUBMITTED TO:

Earth Mechanics Inc.
Geotechnical and Earthquake Engineering

PROJECT:
EM/ANTIOCH AND DUMBARTON GEOPHYS/CA

TITLE:

BATHYMETRIC CONTOURS DUMBARTON BRIDGE

REV	DATE	REVISION DESCRIPTION	SIGNED
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PROJECT No.		063–1380.300
FILE No.		0631380300C01–D2.dwg
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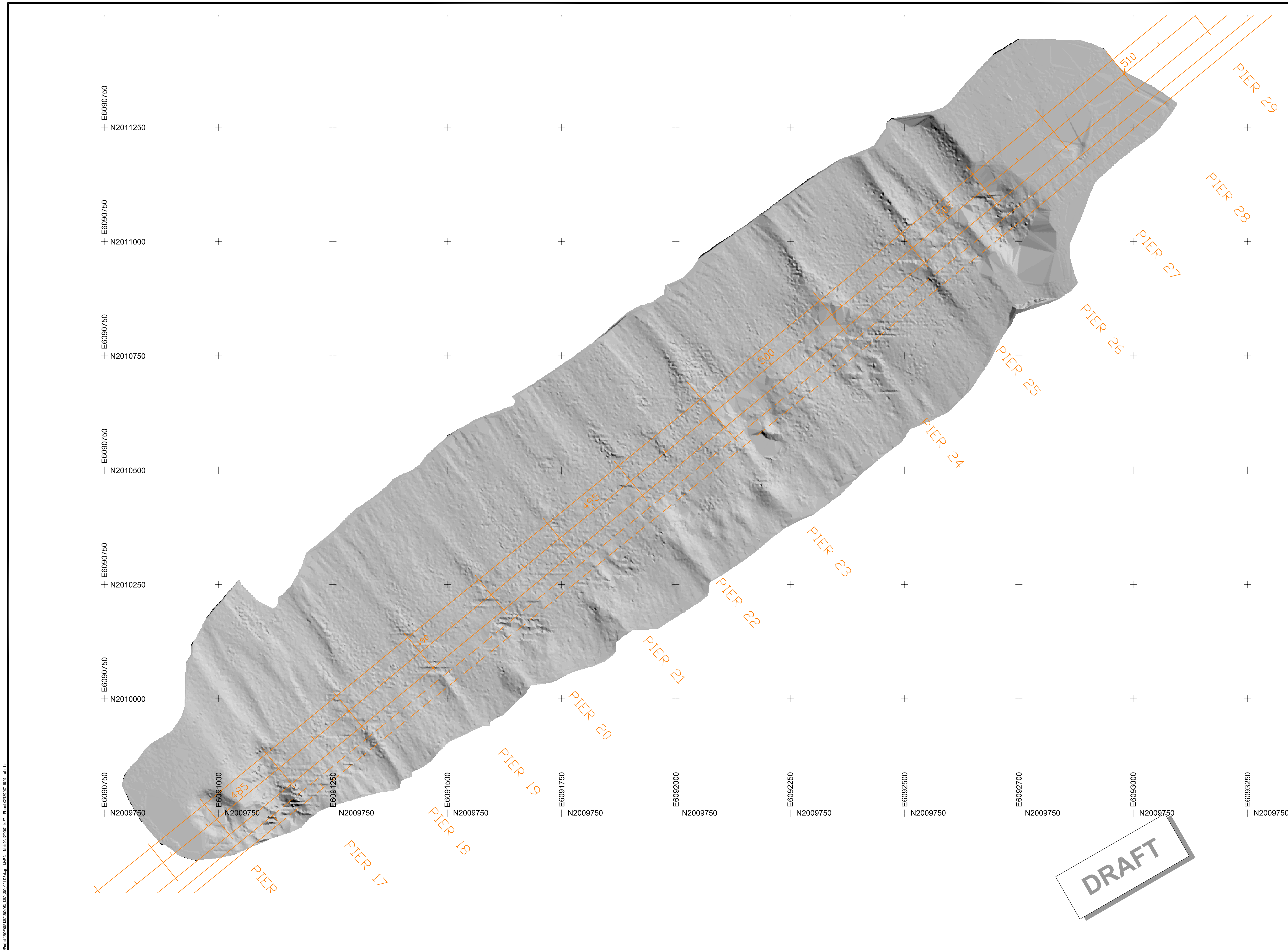
DESIGN	DS	12/18/06
CADD	ACF	1/12/07
CHECK	DS	1/12/07
REVIEW	–	–

D-2



KEY MAP

DUMBARTON BRIDGE

SEE FIGURE 1 FOR LOCATION

LEGEND

0 100 200

SCALE IN FEET

INSTRUCTIONS

INSTRUMENTATION

Navigation	- Trimble DGPS/HYPACK Software
Bathymetry	- Reson Model 2124
Subbottom	- Datasonic Bubble Pulser
Sidescan	- GeoAcoustic 100 KHz
Digital Acq.	- Chesapeake SonarWIZ
	- Sony 208 DAT

GEODETIC PARAMETERS

VERT. DATUM:	- NSVD 88
HORIZ. DATUM:	- CA STATE PLANE ZONE III
PROJECTION:	- NAD 83

Golder Associates

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REDMOND, WA USA 98052-3333
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FAX: (425) 882-5498

SUBMITTED TO:

Earth Mechanics Inc.
Geotechnical and Earthquake Engineering

PROJECT:
EMI/ANTIOCH AND DUMBARTON GEOPHYS/CA

TITLE:

BATHYMETRIC SHADED RELIEF IMAGE DUMBARTON BRIDGE

REV	DATE	REVISION DESCRIPTION	SIGNED
–	–	–	–

PROJECT No.	063–1380.300	
FILE No.	0631380300C01–D3.dwg	
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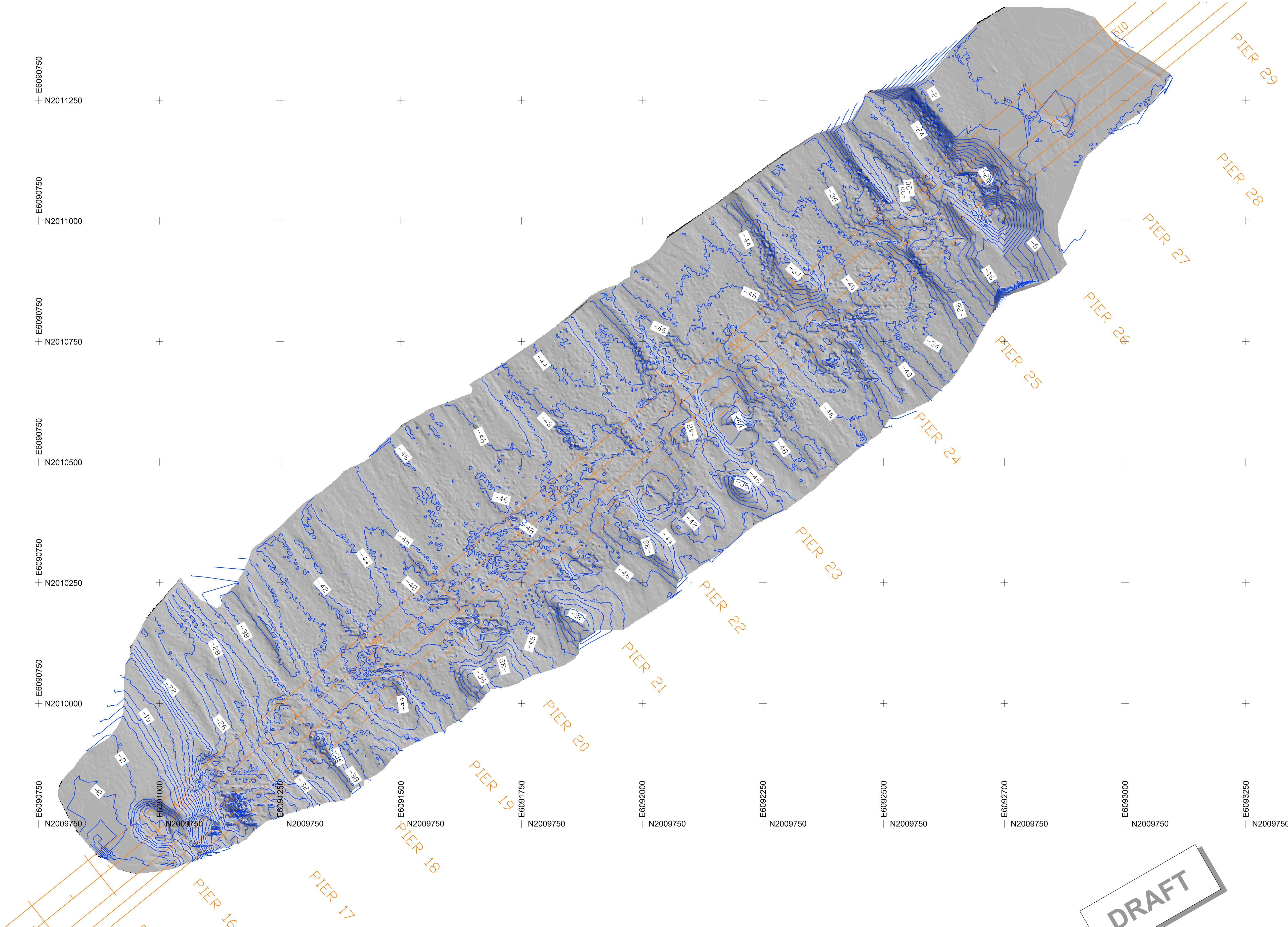
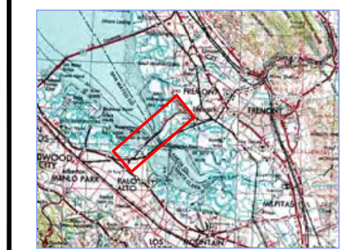
REVIEW	–	–

D-3



KEY MAP



DUMBARTON BRIDGE

SEE FIGURE 1 FOR LOCATION

LEGEND

CONTOURS
C.I. = 1 FT

0 100 200
SCALE IN FEET

INSTRUMENTATION

Navigation	- Trimble DGPS/HYPACK Software
Bathymetry	- Reson Model 2124
Subbottom	- Datasonic Bubble Pulser
Sidescan	- GeoAcoustic 100 KHz
Digital Acq.	- Chesapeake SonarWIZ
	- Sony 208 DAT

GEODETIC PARAMETERS

VERT. DATUM: - NAVD 88
HORIZ. DATUM: - CA STATE PLANE ZONE III
PROJECTION: - NAD 83

Golder Associates

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REDMOND, WA USA 98052-3333
TEL: (425) 883-0777
FAX: (425) 882-5498

SUBMITTED TO:

Earth Mechanics Inc.
Geotechnical and Earthquake Engineering

PROJECT:
EMI/ANTIOCH AND DUMBARTON
GEOPHYS/CA

TITLE:
CONTOURS OVERLAIN ON BATHYMETRIC SHADED RELIEF IMAGE DUMBARTON BRIDGE

REV	DATE	REVISION DESCRIPTION	SIGNED
–	–	–	–

PROJECT No.		063–1380.300
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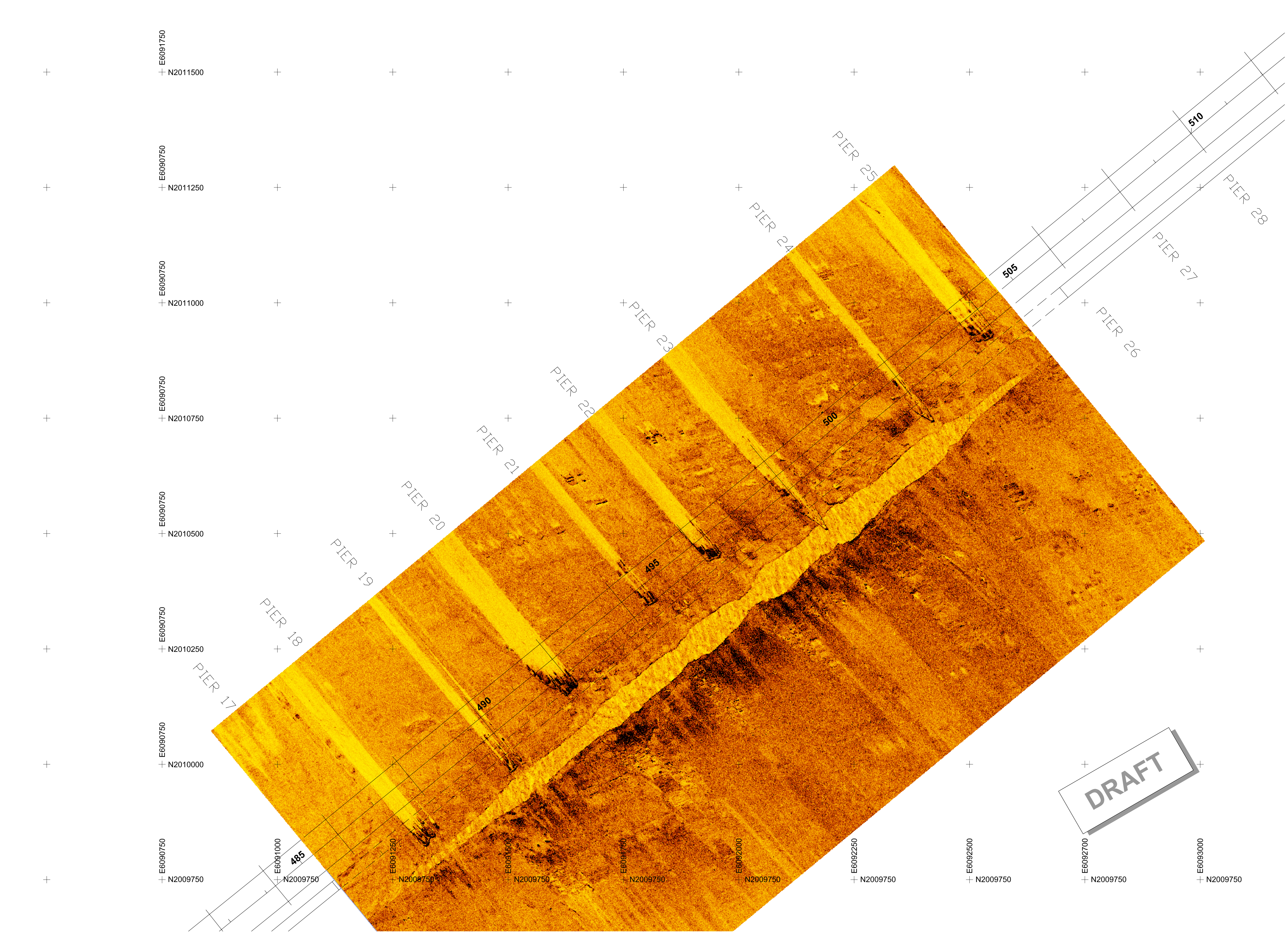
CHECK	DS	1/12/07
REVIEW	–	–

D-4



KEY MAP

DUMBARTON BRIDGE

SEE FIGURE 1 FOR LOCATION

LEGEND

N

0 100 200

SCALE IN FEET

INSTRUMENTATION

Navigation	- Trimble DGPS/HYPACK Software
Bathymetry	- Reson Model 2124
Subbottom	- Datasonic Bubble Pulser
Sidescan	- GeoAcoustic 100 KHz
Digital Acq.	- Chesapeake SonarWIZ
	- Sony 208 DAT

GEODETIC PARAMETERS

VERT. DATUM:	- NAVD 88
HORIZ. DATUM:	- CA STATE PLANE ZONE III
PROJECTION:	- NAD 83

Golder Associates

GOLDER ASSOCIATES INC.
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SUBMITTED TO:

Earth Mechanics Inc.
Geotechnical and Earthquake Engineering

PROJECT:
EMI/ANTIOCH AND DUMBARTON GEOPHYS/CA

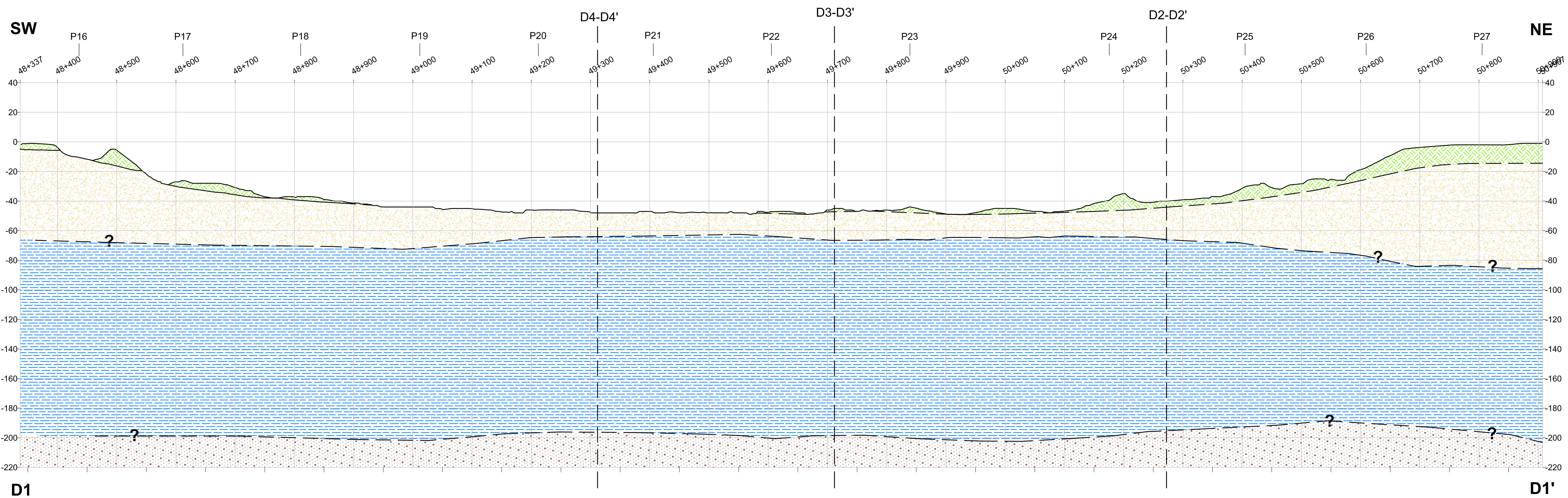
TITLE:

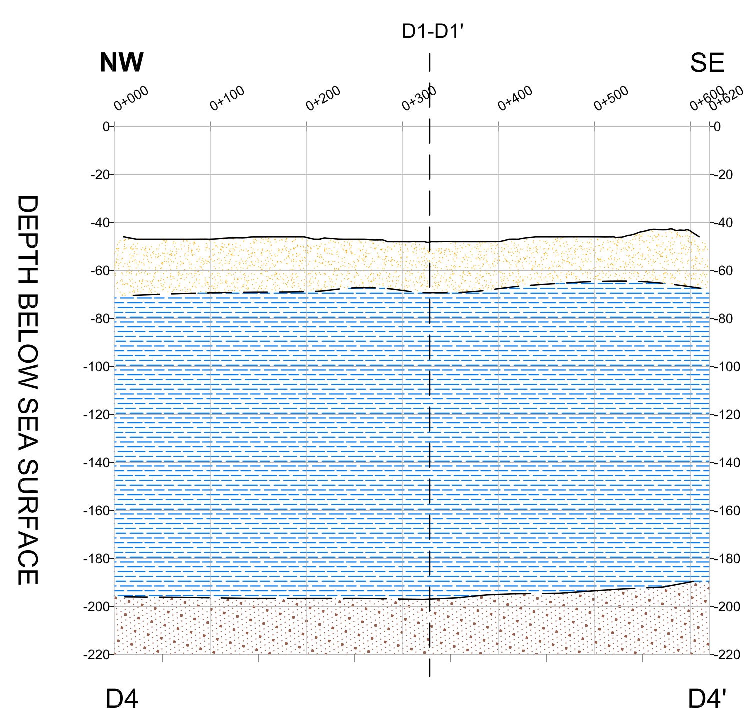
DUMBARTON SIDESCAN MOSAIC

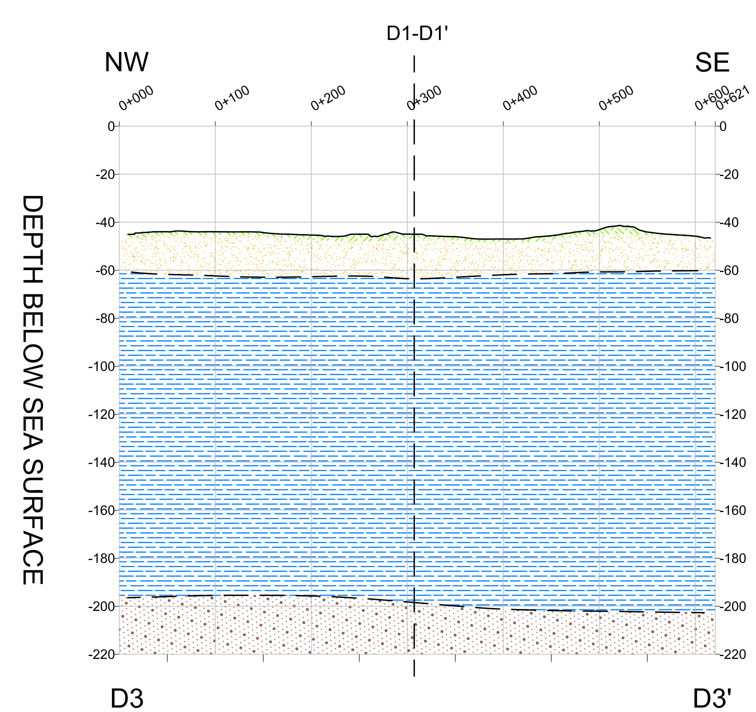
REV	DATE	REVISION DESCRIPTION	SIGNED
–	–	–	–

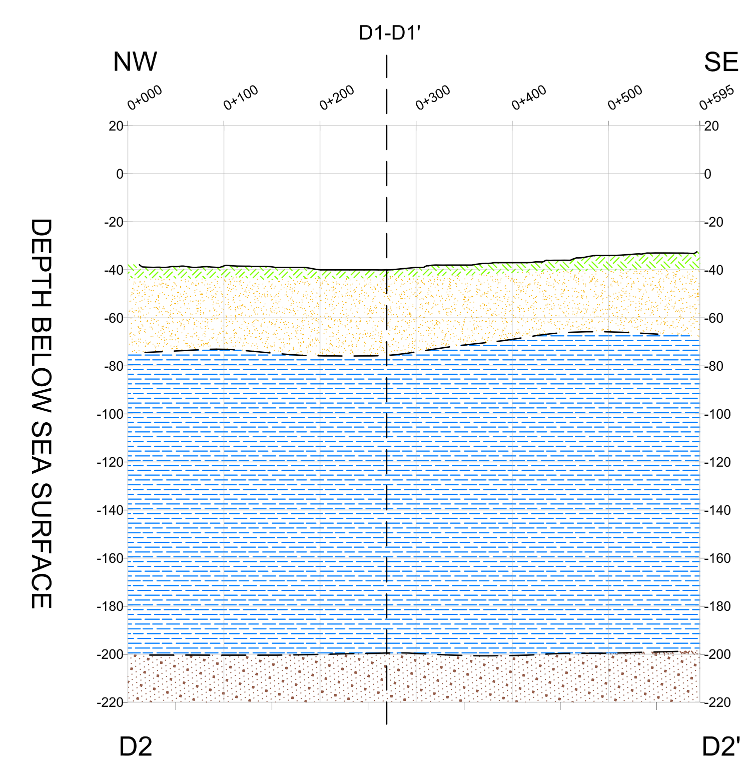
PROJECT No.		063–1380.300
FILE No.		0631380300C01–D5.dwg
REV. 0	SCALE	AS SHOWN
DESIGN	DS	12/18/06
CADD	ACF	1/12/07
CHECK	DS	1/12/07
REVIEW	–	–

D5

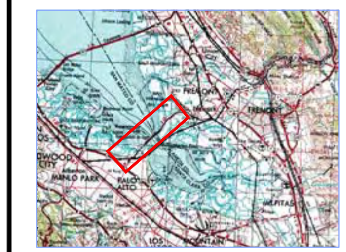








KEY MAP



DUMBARTON BRIDGE

SEE FIGURE 1 FOR LOCATION

LEGEND

YOUNG BAY MUD

SAND

HARD CLAY

SAND AND GRAVEL

LITHOLOGY BASED ON GENERALIZED SOIL PROFILE FROM EMI

SEE DRAWING D1 FOR LOCATIONS

0 100 200
SCALE IN FEET
VERICAL SCALE 1:40

INSTRUMENTATION

Navigation	- Trimble DGPS/HYPACK Software
Bathymetry	- Reson Model 2124
Subbottom	- Datasonic Bubble Pulser
Sidescan	- GeoAcoustic 100 KHz
Digital Acq.	- Chesapeake SonarWIZ
	- Sony 208 DAT

GEODETIC PARAMETERS

VERT. DATUM: - NAVD 88
HORIZ. DATUM: - CA STATE PLANE ZONE III
PROJECTION: - NAD 83

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SUBMITTED TO:

Earth Mechanics Inc.
Geotechnical and Earthquake Engineering

PROJECT:
EMI/ANTIOCH AND DUMBARTON GEOPHYS/CA

TITLE:

INTERPRETED PROFILES, DUMBARTON BRIDGE

REV	DATE	REVISION DESCRIPTION	SIGNED
–	–	–	–

PROJECT No.		063–1380.300
FILE No.		0631380300C01–D6.dwg
REV. 0	SCALE	AS SHOWN
DESIGN	DS	12/18/06
CADD	ACF	1/12/07
CHECK	DS	1/12/07
REVIEW	–	–

D-6

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February 13, 2007 Our Ref: 063-1380

Earth Mechanics, Inc.
17660 Newhope Street, Suite E
Fountain Valley, CA 92708

Attention: Hubert Law

RE: DRAFT REPORT OF THE RESULTS OF OFFSHORE SURVEY AT THE ANTIOCH AND DUMBARTON BRIDGES, SAN FRANCISCO BAY, CALIFORNIA

Dear Mr. Law:

Enclosed is a draft copy of the report from the results of the marine survey performed by Golder Associates at the Antioch and Dumbarton Bridges. The investigation was conducted with multibeam bathymetry, sidescan sonar and subbottom/seismic reflection profiling. The interpreted results of the geophysical investigation are presented on a series of figures, drawings and maps included with the written document. We have also placed this information on an ftp site in PDF and DWG format.

After we receive your review comments we will make requested or recommended changes to the report and issue a final report.

If you have any questions regarding the draft report please contact me.

Sincerely,

GOLDER ASSOCIATES INC.

DRAFT DRAFT

Richard E. Sylwester L.G, L.E.G.
Principal Marine Geophysicist

Richard Graham
Senior Marine Geophysicist

RES/se

Enclosure

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DRAFT REPORT

RESULTS OF THE OFFSHORE GEOPHYSICAL INVESTIGATION DUMBARTON AND ANTIOCH BRIDGES

Submitted to:

Earth Mechanics Inc.
17660 Newhope Street, Suite Ec
Fountain Valley, California 92708

Submitted by:

Golder Associates Inc.
18300 NE Union Hill Road, Suite 200
Redmond, Washington 98052

February 13, 2007 063-1380.300

TABLE OF CONTENTS

1.0 PROJECT OBJECTIVES 1

2.0 FIELD PROGRAM 2
2.1 Offshore Survey Instrumentation 2
2.1.1 Survey Vessel 2
2.1.2 Survey Area 2
2.1.3 Navigation 2
2.1.4 Bathymetry 2
2.1.5 Sidescan Sonar 3
2.1.6 Subbottom Profiling System 3

3.0 OFFSHORE SURVEY PROCEDURES 4
3.1 Operations 4
3.2 Survey Coverage 4

4.0 DATA PROCESSING AND ANALYSIS 5
4.1 Navigation 5
4.2 Bathymetry Data 5
4.3 Side Scan Sonar Data 5
4.4 Subbottom Reflection Data 6

5.0 DATA RESULTS 8
5.1 Dumbarton Bridge (Maps D1-D6) 8
5.1.1 Bathymetry Results 8
5.1.2 Sidescan Sonar Results 8
5.1.3 Subbottom Results 9
5.2 Antioch Bridge (Maps A1-A6) 9
5.2.1 Bathymetry Results 9
5.2.2 Sidescan Sonar Results 10
5.2.3 Subbottom Reflection Results 10

LIST OF TABLE

Table 1 Instrumentation and Specifications

LIST OF FIGURES

Figure 1 Site Map-Antioch and Dumbarton Bridges
Figure 2 Swath Bathymetry, Sidescan Sonar and Subbottom Profiling Methods
Figure 3 Example of Sidescan Sonar Data from Dumbarton Bridge
Figure 4 Example of Sidescan Sonar Data from Antioch Bridge
Figure 5 Example of Subbottom Data from Dumbarton Bridge
Figure 6 Example of Subbottom Data from Antioch Bridge

LIST OF MAPS

D1 Trackline Map Dumbarton Bridge
D2 Bathymetric Contours, Dumbarton Bridge
D3 Bathymetric Shaded Relief Image, Dumbarton Bridge
D4 Contours Overlain on Shaded Relief Image, Dumbarton Bridge
D5 Dumbarton Sidescan Mosaic
D6 Interpreted Profiles, Dumbarton Bridge

A1 Trackline Map Antioch Bridge
A2 Bathymetric Contours, Antioch Bridge
A3 Bathymetric Shaded Relief Image, Antioch Bridge
A4 Contours Overlain on Shaded Relief Image, Antioch Bridge
A5 Dumbarton Sidescan Mosaic
A6 Interpreted Profiles, Antioch Bridge

1.0 PROJECT OBJECTIVES

The California Department of Transportation (Caltrans) and the Bay Area Toll Authority (BATA), plan to undertake seismic evaluations of the Dumbarton and Antioch Bridges to withstand potential future earthquakes (Figure 1). Under this contract EMI are providing geotechnical engineering services necessary to support the retrofit designs and collaborate with Caltrans design engineers on the retrofit project.

To assist in the retrofit design program an offshore geophysical program was conducted at the two bridges by Golder Associates Inc. The specific objectives of geophysical program and the methods used to achieve these objectives included:

- Detailed Bathymetric Map — Multibeam Bathymetric Survey
- Surficial Features on Seabed — Sidescan Sonar
- Subsurface Stratigraphy — Subbottom Profiling

This report discusses the field program, describes the methods of analysis and presents the interpreted results on a number of figures and maps located in the appendix (Figures 1-6, Maps D1-D6 and A1-A6)

2.0 FIELD PROGRAM

The offshore geophysical investigation was a multiple component study that includes precision navigation, precision bathymetry, sidescan sonar, and seismic reflection or subbottom profiling (Figure 2). The following is a brief discussion of these methods.

2.1 Offshore Survey Instrumentation

2.1.1 Survey Vessel

The geophysical instruments were installed on the survey vessel R/V SeaCAT a 22 foot catamaran a specially designed vessel that allowed for the installation of acquisition electronics and processing systems and for simultaneous operations of all systems. The equipment installation took place at a local marina followed by calibration and dock side operational checks. A final operational check was made of all systems prior to initiation of the surveys.

2.1.2 Survey Area

The survey areas are located in the immediate vicinity of the Dumbarton and Antioch Bridges. Geophysical data were acquired along the full alignment and around the piers of each bridge. A number of transects were run on either side of the bridges in addition to cross line transects that ran between the piers (A1, D1)

2.1.3 Navigation

A differential global positioning system (DGPS) was used to determine the vessel's location in real-time, and to plot the vessel's position along the pre-selected survey lines**.** The pre-plotted survey lines, and the actual survey lines traversed, were displayed in real time on a video monitor located on the bridge for use by the vessel operator. The navigation computer transmitted event marks to the geophysical recording instruments every 10 seconds in order to correlate the geophysical data with the survey vessel position during data analysis and mapping. These event marks were also logged with the geophysical digital data.

A Trimble Ag132 with Omnistar differential correctors was used for real time positioning of the vessel. All data were collected in NAD-83 California State Plane North zone #0402 with coordinates in US survey feet.

2.1.4 Bathymetry

Bathymetric data were collected using a state-of-the-art multibeam automated hydrographic system that collected data in a swath configuration. Output of the multibeam transducer was coupled with a motion sensor, heading sensor, DGPS positioning system, and velocimeter. The complete system produced accurate depth measurements (IHO standards) over a 120 degree swath. The motion sensor tracked the sonar beam and corrected for movement of the DGPS antenna. The DGPS antenna was mounted directly over the swath transducer thereby reducing offset induced errors. The velocity of sound in the water column was measured at selected depths using an acoustic velocimeter. This information was logged in the computer and used to correct the depths during processing of the bathymetric multibeam data.

2.1.5 Sidescan Sonar

Acoustic images of the seafloor were acquired using a 100 KHz sidescan sonar system. The sidescan data were printed in real-time on a thermal graphic recorder and archived on a digital recorder and on a digital acquisition system. The graphic recorder and the digital acquisition system were interfaced with the navigation system that generated sequentially numbered event marks at 10-second intervals.

The sidescan sonar transducer was towed from the bow of the survey vessel which provided extremely quiet acoustic conditions and a stable tow configuration. The sidescan display was set for a full scale range of 600 feet (140 ms) which provided approximately 200% overlap coverage of data on adjacent transects.

2.1.6 Subbottom Profiling System

Subbottom data were acquired with a low frequency seismic reflection profiling system. The system achieved subsurface penetration of up to 260 feet below the seafloor in the medium to coarse-grained sediment and stiff clay. The subbottom reflection data, acquired three times each second, or for every two foot of travel along the transect, were displayed in real-time on a thermal graphic recorder and archived on a digital recorder and on a digital acquisition system. The digital acquisition systems and the graphic recorder were interfaced with the navigation computer which annotated event mark at 10 second intervals.

TABLE 1

Instrumentation and Specifications

System	Manufacturer	Parameters
Differential GPS	Trimble 4000 SSE	L1 C/A code, 12 Channel, Omnistar différential corrections.
Seismic Energy Source	Datasonic Bubble Pulser	350/700 Hz, 24 joules
Seismic Array	NWGS Hydrophone	15 element, high-resolution array
Seismic Processor	GeoAcoustic 5210A	100 db gain, TVG, BP filter
Multibeam Echosounder	Reson Model 8124	250 KHz, 1.5 degree
Multibeam Acquisition	HySweep	
Sidescan Sonar	GeoAcoustic Model	100/400 KHz
Seismic Digital Acquisition	Sony Model 208 DAT	8 Channel, 12 bit DAS
Digital Acquisition	Chesapeake SonarWiz	12 bit, mosaic
Digital Acquisition	Chesapeake SonarWiz	TVG, 12 bit logging for sidescan sonar
Seismic Digital Acquisition	Sony Model 208 DAT	8 Channel, 12 bit DAS
Graphic Display Recorders	EPC Model 1086-500	2-Channel, 12 bit display

3.0 OFFSHORE SURVEY PROCEDURES

3.1 Operations

The navigation, hydrographic and seismic reflection systems (transducers, power supply, digital acquisition systems, graphic recorders,) were installed on the survey vessel at the marina located in close proximity to the Dumbarton Bridge. The subbottom acoustic source was mounted on the starboard side of the vessel and the hydrophone streamer was towed from the port side of the vessel. The multibeam transducer was mounted in a well located in the center of the vessel and the sidescan sonar was towed from the bow. The power supplies, processing amplifier, digital acquisition systems, graphic recorders and navigation equipment were installed in the instrumentation lab located adjacent to the hydrographic/navigation system and the bridge.

A dock side operational test was performed on the systems followed by a brief sea trial to calibrate systems that could not be tested dockside (acoustic sources array, hydrophones). The navigation system and hydrographic system were tested and calibrated at this time.

Upon completion of successful operations test and calibration the survey began at the Dumbarton Bridge and then was followed by the Antioch Bridge survey.

3.2 Survey Coverage

A series of transects were run parallel to each bridge followed by transects that passed perpendicular to the bridges and between the piers (Maps A1, D1). For the Dumbarton bridge a total of twelve (12) transects were run parallel to the bridge and ten (10) transects were run perpendicular, between the piers. At the Antioch bridge nine (9) transects were run parallel to the bridge and ten (10) transects were run between the piers.

4.0 DATA PROCESSING AND ANALYSIS

Preliminary analysis and archiving of geophysical data was done at the end of each survey day. This consisted of reviewing the trackline locations to verify the data coverage, QA/QC of the swath bathymetric, sidescan and subsurface reflection data, archiving field records, and downloading the digital data to digital media.

4.1 Navigation

A table of event numbers (10 second intervals), with their x, y coordinates was generated from the navigation data for each bridge. The event numbers, which correspond with the events printed on the paper copies of the geophysical data and the digital data, were then plotted on a trackline map (A1, D1). These maps were used for interpreting the geophysical data and correlating the geophysical data with the boring logs that had been obtained during previous studies for the bridge.

4.2 Bathymetry Data

The multibeam bathymetric data were edited and corrected for, ship roll, heave and pitch, and removal of anomalous depth values due to water column noise. The depth data at the Dumbarton Bridge were corrected to MLLW using NOAA predicted tides. The tide data were cubic splined (a curved interpolation technique) on even one minute increments. The depths were then converted from MLLW to NAVD 88 (corrections for MLLW to NGVD 29 were not available at this time). For the final report these data will be referenced to NGVD 29 which is approximately 5 feet greater. The depth data at the Antioch Bridge were corrected directly to NGVD 29 using the readings from the San Joaquin River gage (ANH).

The edited data were then imported into Questar Tangent and gridded using inverse distance weighted and contoured (Maps D2, A2). In addition, the software program was used to generate a shaded view image of the bathymetry data and to over lay this image on the contour map (Maps D3, D4, A3, and A4). The shaded view images highlight subtle changes in the seafloor that are often difficult to identify on the contour map.

4.3 Side Scan Sonar Data

Sidescan sonar produces an acoustic image of the seafloor that is analogous to an aerial photograph on land (Figures 2, 3 and 4). The plan view image can be used for characterizing surficial sediment (silt, sand, gravel) and detecting the presence of rock or other features such as cultural artifacts, that project above the seabed. Additionally, side scan sonar data often depicts scour zones and potential geohazards such as faults, submarine slides, or zones of subsidence.

Changes in the energy or strength of the acoustic backscatter from the seabed produces variations in the intensity of the data (darker or lighter) displayed on the graphic recorder or color monitor. Fine-grained sediments are represented by a lighter shading and coarse-grained sediment by darker shading on the image (Figures 3 and 4). Bedrock, large boulders or other features, such as sand waves or debris,, resting on the seafloor, that project upwards into the water column, produce a dark image (strong acoustic return or reflection) with a shadow (no acoustic return) which appears as a white area on the image. The bridge piers completely block the acoustic signal producing a dark reflection from the pier and a long shadow (white zone) immediately behind the pier (Figures 3 and 4).

The sidescan sonar data were processed with Chesapeake SonarWiz software to generate a digital sidescan mosaic (integration of data from multiple, parallel transects, Map 11)) or a corrected image from a single transect (Map 6).

4.4 Subbottom Reflection Data

Interpreting subsurface stratigraphy, or geology, from subbottom data, uses the principal of seismic facies analysis. This method, although somewhat subjective, attempts to identify and group various reflection patterns (reflection free, uniform horizontal reflectors, discontinuous, chaotic reflectors, etc.) on the subbottom records. It is assumed that each pattern is characteristic of a particular type of sediment, geology or depositional environment. For example, a reflector pattern (geophysical facies) on the record comprised of continuous, thin layers suggests fine-grained sediment, such as clay, deposited in a low energy environment. The same pattern, but with a strong reflections (high amplitude) suggests a more compact, consolidated or stiff material. Sediments deposited in a high-energy environment usually produce very strong reflections (dark layers on the records) and the reflectors are often discontinuous. Areas of no subsurface penetration, with a dark reflection pattern, represent hard or dense material such as cobble or boulder layers or bedrock. There is often no distinct boundary between the interpreted seismic facies since stratigraphic are generally transitional in nature.

The next step is to relate the seismic facies (no internal reflections or thin layers, low reflection) to sediment type (fine-grained sediment, stiff clay, sand/gravel etc) or depositional environment (deep-water, shallow water, near shore high energy environment etc.). Information from borehole is of considerable importance for providing a final and less objective interpretation.

After identifying the seismic facies the next interpretation step is determining the depth to various reflectors or the thickness of geologic units. All reflection data (bathymetry, sidescan, subbottom seismic reflection) represents the two-way travel time, or time of flight, of an acoustic signal from the acoustic source to the point of reflection and back to the receiver. For instance, the bathymetric record displays the time for an acoustic signal to travel from the transducer to the seafloor and back to the transducer. If the velocity of sound in water is known the depth of water is found by multiplying the travel time by the velocity. On an echosounder, this is done electronically within the console and the paper record or the numerical display shows depths in feet or meters instead of milliseconds of time. The digitally acquired two-way travel time data stored on the navigation computer are converted using a simple computer program. Travel time is an absolute measurement and depth or thickness is a calculation whose accuracy depends on how well the velocity of sound is known within the medium in which it traveled.

The sediment thicknesses were determined by measuring the travel time on the seismic records for an acoustic pulse to travel from the seafloor to an underlying contact and back to the seafloor (two-way travel time in milliseconds). The two-wave travel time was multiplied by the velocity of a compressional wave in sediment to determine the thickness of a geologic unit, or depth to a reflector, in feet. A compressional velocity of 5,100 feet/second was used for this calculation.

Interpreted cross sections were then developed from the bathymetric and geophysical data for each bridge (Maps 7 and 11). The seafloor profile is generated from a section cut along the centerline of the bridges. The subsurface data are extrapolated from the geophysical subbottom data obtained on transects collected on either side of the bridge and the cross transects. In areas of insufficient data or poor data information from the borehole logs were used to fill in the information. The borehole logs were also used to provide geologic or lithologic classification.

An example of a subbottom reflection record is presented on Figures 5 and 6. On these image colors are used to highlight the general zones of various interpreted seismic facies units. The geologic classification of the seismic facies is based on information from the soil profile provided by EMI.

The general acoustic characteristics of the seismic facies and their geologic interpretation, based on the Geology Profiles, are as follows:

- Young Bay Mud — Low reflectivity, no internal bedding. Very difficult to detect on the subbottom data; low reflectivity areas often could be identified on the swath bathymetry and sidescan sonar images.
- Sand. — Less continuous and lower amplitude reflectors; some diffractions and scattering of acoustic energy.
- Stiff Clay — Horizontal reflectors, high amplitude reflections.
- Sand/Gravel — Irregular, discontinuous, high-amplitude reflection, some diffractions.

5.0 DATA RESULTS

5.1 Dumbarton Bridge (Maps D1-D6)

5.1.1 Bathymetry Results

The multibeam bathymetric data are presented on a contour map (Map D2), a shaded relief image (Map D3) and a map that overlays these two (Map D3).

The water depth varies from approximately + 2 feet along either end of the survey alignment to approximately -44 to -46 feet in the main channel (Map 2). The transition from shallow to deep-water is relatively rapid occurring over a horizontal distance of approximately 200 to 300 feet.

The most apparent geomorphic features on the contour map are small mounds that appear northeast of Piers 24 and 25 and southwest of Piers 20 to 23. These mounds have approximately 3 to 4 feet of relief and tend to be elongated in the NW-SE direction. The dimension of the long axis is approximately 150 feet and the short axis approximately 50 to 75 feet. On the shaded image map, which displays very subtle changes in relief, similar but smaller mounds can be observed northwest and southeast of all of the Piers. These mounds are assumed to be depositional features resulting from the hydrodynamics of current flow around the piers.

There are two semi-circular areas, that appear to be depressions (northeast corner of Pier 23, and adjacent to Pier 24) and several southwest-northeast oriented linear features (Piers 19, 20 and 21). These are acoustic artifacts resulting from the lack of data possibly due to turbidity or entrapment of air in the water column around the piers, or turbidity immediately adjacent to the face of the transducer. It is difficult to see the affect of this data loss on the bathymetric contour map except in the two areas adjacent to the piers. The sidescan sonar data shows no evidence of depressions in this region therefore a fill-in program will be used to correct the contours in these two areas for the final report

5.1.2 Sidescan Sonar Results

An example of a sidescan sonar image from a transect located between the bridge and the small mounds south of the bridge clearly images the piers and the acoustic shadows produced by the piers (Figure 3, Map D6). Also shown on this acoustic image, between Piers 20-21, 21-22 and 22-23 are small, dark, linear features. These are interpreted to be miscellaneous debris, possibly pipes or cables lying on the seabed.

Because of errors in the navigation data that were archived with the digital sidescan data it was not possible to produce a complete mosaic for this bridge (the field records are clear images although uncorrected were unaffected). However, the corrected sidescan sonar image clearly shows details of the seafloor adjacent to the bridge and the entire area between all of the piers. Efforts are being made, using a new processing program to incorporate several of the other sidescan sonar record in order to produce a larger mosaic.

5.1.3

Subbottom Results

The seismic/geologic profiles (Map D6) are a composite of information interpreted from seismic reflection data obtained on transects located adjacent to the bridge and subbottom data from several cross lines. The interpreted subsurface information is plotted on a seafloor profile generated from the bathymetric contours located along the centerline of the bridge. The soil and geologic classification is based on information presented on the EMI soil profile.

The Young Bay Mud is found predominantly on the shallow water shelf on either end of the transects. This soil over lays a sand deposit interpreted to vary in thickness from approximately 20 to 60 feet with the thicker material located near the NE and SW end of the profile.

The sand deposit overlays a thick sequence of horizontally stratified material that in the boreholes is identified as stiff clay. The relatively high amplitude signals (dark reflection patterns) suggest that these are relatively rigid or stiff material.

The deepest reflector corresponds with a dense sand and gravel material identified in three of the boreholes (Pier 17, 20 and 23 boreholes). The contact between the top of this unit and the overlying clay is more pronounced on the southwest end of the profile (Figure 5). In this area (see between P-19 and P-20, at 80ms depth) the horizontal reflectors transition to discontinuous, arcuate patterns suggesting an irregular surface.

5.2 Antioch Bridge (Maps A1-A6)

5.2.1 Bathymetry Results

The multibeam bathymetric data are presented on a contour map (Map A2), a shaded relief image (Map A3) and a map composed of these latter two (Map A4).

The water depth varies from approximately -12 feet at the northern end of the survey alignment to approximately -44 to -46 feet in the main channel. The dredged shipping channel is located between Piers 19 and 20, toward the northern end of the alignment

The most apparent geomorphic features on the contour map are the ridges that extend towards the west from each of the piers. These are interpreted to be small depositional ridges that develop as a result of the hydrodynamic of the current flow around the piers.

A second noticeable bathymetric pattern are the narrow linear features, oriented north-south, that parallel the bridge. These geomorphic features, which are very evident on the shaded relief maps, are interpreted to be sand waves (A3 and A4). The dark ridges are the crest of the sand wave and the reflection free areas (very light return) are the troughs

In addition, a zone indicative of potentially limited bathymetric data can be seen to the right of Pier 19 (north sides) and to the left of Pier 20 (south side). The contour map shows a small depression in these two areas. The sidescan sonar data, obtained on a transect that runs between these two piers, suggests that small depressions are present in these two areas.

5.2.2

Sidescan Sonar Results

An example of sidescan sonar data obtained along the west side of the Antioch Bridge clearly images the piers and the acoustic shadows behind the piers (Figure 4). Also shown on this plan view image are the linear features that are evidence of sand waves

On the sidescan sonar mosaic the linear sand wave are the most pronounced feature. However, the piers and east-west ridges are very subtle. The shadows produced by the Piers, that are very evident when imaging from only one side (Figure 4), are filled-in by the mosaic process which looks at the piers from both sides and merges the two images. The east-west trending ridges are difficult to detect because they are imaged down their long axis (a small target) whereas the sand waves are imaged across their long axis.

5.2.3 Subbottom Reflection Results

The seismic/geologic profile (Map A6) is a composite of information interpreted from several seismic reflection profiles located adjacent to the bridge and several of the cross line transects. The subsurface interpretations were extrapolated to a profile of the seafloor made along the centerline of the bridge. The soil and geologic classification is based on information presented on the EMI soil profile

There was little evidence of Young Bay Mud in this area. The seafloor is predominantly mantled with a relatively thick sand deposit which, on the surface, has been formed into a series of sand waves. The shallow reflection horizons between the upper sand unit and underlying clay unit, located on the southern half of the profile (A-A') were not as well defined in this area. In the lower clay unit (54 ms travel time) the horizontal bedding is well defined.

The strongest and most continuous reflection is from the top of the lower dense sand/gravel unit. This reflector becomes increasingly deeper to the north. The gravel unit rests on a stiff clay unit that can be seen on the southern end of the profile at a depth of 80ms

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Hydrographic Surveys in San Francisco Bay, CA.

Introduction:
CRA-NW was selected to perform a bathymetric survey on two bridges located in San Francisco, California. This survey was to determine the current bottom conditions at that time.

Methodology:
The bathymetry data was collected using a state-of-the-art multi beam automated hydrographic system. The Reson SeaBat 8124, also called a multi beam system, collects data in a swath configuration. This gives a higher resolution and larger data set compared to a single transducer echo sounder. This system consists of a single transducer multi beam array. Coupled with a motion sensor, heading sensor, DGPS positioning system, and velocimeter. The complete system produces accurate depth measurements (IHO standards) over a 120 degree swath. The motion sensor accurately tracks the sonar beam in addition it will also correct for the DGPS antenna movement that is mounted directly over the swath transducer thereby reducing offset induced errors. This data set was then reduced for heave, pitch, and roll along with a sound velocity and a tide table corrections. This data is then contoured and sunlit (3D) for further validity.

Project Limitations:
This survey was a straight forward hydrographic survey. There were no obstructions in the survey area other than the two bridges themselves (Dumbarton & Antioch). Weather was cool, some winds (5-20 mph), and no local boat wake noise. Data was collected along bridge azimuth for the swath data and then again normal to the first data set for the sub-bottom data acquisition.

Deliverables:
A contour chart of the depth data along with the x,y,z data set was sent to Golder Associates.

Field Activity:
1st Survey (Dumbarton Bridge)-
Dec. 06 - 07, 2006- Mobilization to the project site.
Dec. 08 - 09, 2006- Began data acquisition.
Jan. 02 - 03, 2007- Begin data editing and processing.
Jan. 03, 2007- Sent XYZ ASCII data file via email.
Jan. 31, 2007- Report sent to client via mail/email.

2ne Survey (Antioch Bridge)-
Dec. 06 - 07, 2006- Mobilization to the project site.
Dec. 10, 2006- Began data acquisition.
Jan. 02, 2007- Begin data editing and processing.
Jan. 03, 2007- Sent XYZ ASCII data file via email.
Jan. 31, 2007- Report sent to client via mail/email.

Personnel:
Senior Hydrographer- K. Craig Keener AK. RLS / ACSM of **CRA-NW.**
Junior Hydrographer- Alex Howden of **CRA-CAN**.

Equipment:
The following equipment or equivalent will be provided:

1. Reson 8124 swath sounding system with 1.5 degree, extended range, and side scan options.
2. HySweep acquisition software.
3. AML SV*Plus* velocimeter.
4. SeaTex MRU-5 motion sensor (heave, pitch, roll)
5. SG Brown Meridian Surveyor Gyro Compass or KVH 1000AC digital compass.

CHRIS RANSOME & ASSOCIATES, INC.

CRA-NW

BATHYMETRY SURVEY

in

San Francisco Bay Area

for

Golder Associates Inc.

Condition Survey Report

CRA-NW

20126 Ballinger Way NE #117

Seattle, Wa. 98155

425.673.2518 ph.
425.609.0031 fx.

Date: January 31, 2007

Job# 06060

File: R06060a_gai

6. Coastal Oceanographics HySweep logging system (‘windows’ based).
7. **CRA-NW** CatNav Navigation system (‘windows’ based).
8. **CRA-NW** CatBox binning/editing software (‘windows’ based).
9. Trimble Ag132 12 channel GPS receiver w/USCG or Omnistar correctors.
10. Optional: Endeco 1029 automated tide gauge.
11. 25' R/V Data Cat survey vessel with truck.

Horizontal Datum:
A Trimble Ag132 with OmniStar differential correctors was used for real time positioning of the vessel. All data was collected in NAD-83 California State Plane North zone #0402 with coordinates in US survey feet.

Vertical Datum:
The vertical datum was MLLW for Dumbarton and NGVD for Antioch.

Velocity Profile:
Available upon request.

Tide Data:
Available upon request.

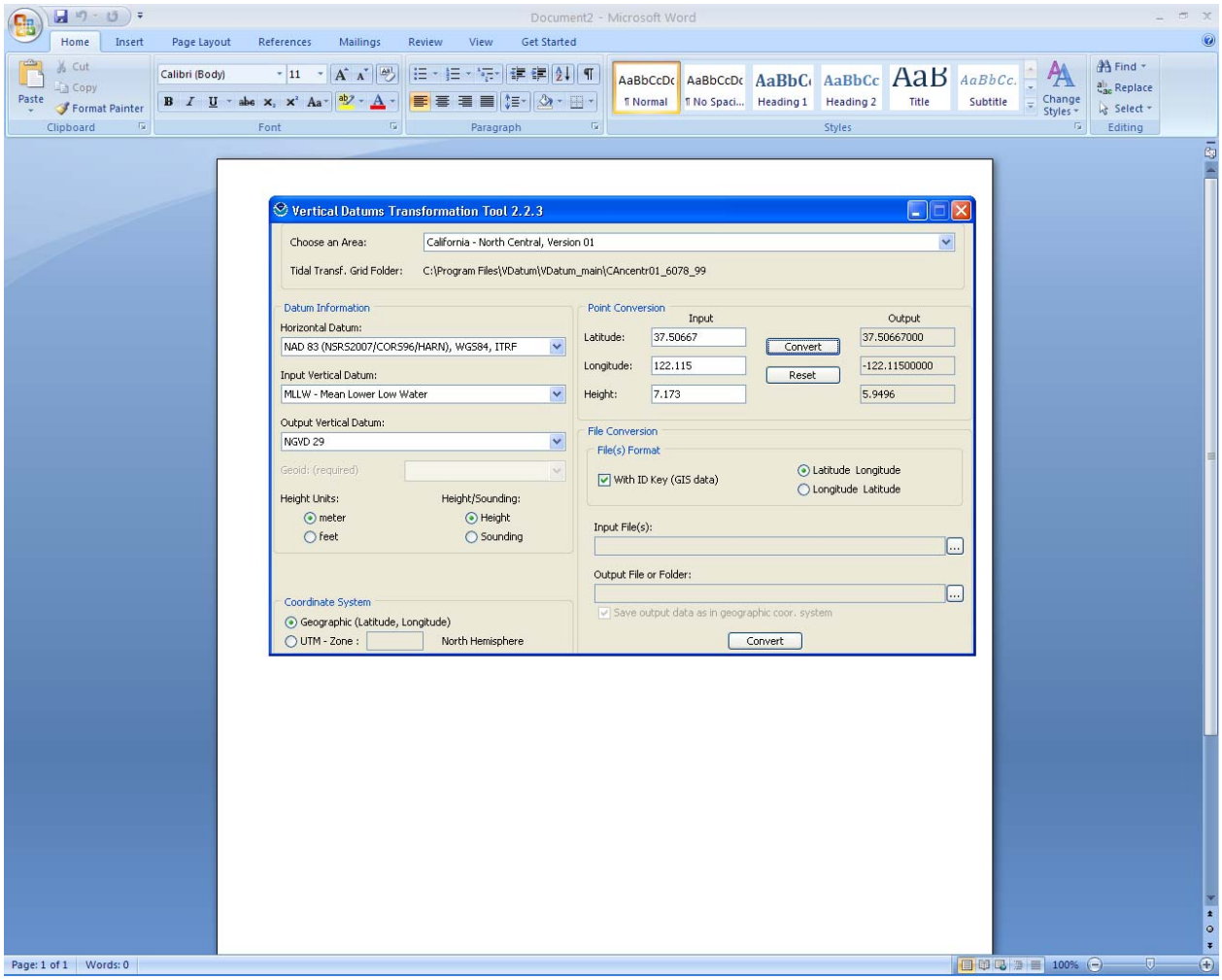


Figure 1. Vdatum conversion

7.173 – 5.9496 = 1.2234 difference in meters between MLLW and NGVD vertical control

Therefore 1.2234 = 4.0138 feet of difference between the MLLW surface points and the new surface points translated into NGVD.

FIGURES

MAPS

Amount of Material in Soil Finer Than No. 200 Sieve
(ASTM D-1140-97)

V

Project No. : 06-159 **Project Name :** BATA / Dumbarton Toll Bridge

Boring No.	: 06- 1		Prepared By : MT	Date : 02/19/07	Percentage of			Maximum Size
Sample No.	: S-1		Washed By : MT	Date : 02/22/07	Gravel	Sand	Fine	
Depth (ft)	:	40	Tested By : MT	Date : 02/23/07	33	57	10	3/4"
Depth (m)	:		Checked By : R.Y	Date : 2-25-07				
Description	:	DK Br, P/G Gravel w/ SILT and SAND			Sample		Retained On	
Method (A) - Soaked by Water		P/G SAND w/SILT & gvl (~~SP-SM~~)					No. 200	No. 4
Method (B) - Soaked by Deflocculating Agent (Minimum 2 Hours)		(SP-SM)			Tested	Moisture	Sieve	
Container Number					S-4 →	S-	S-	S-
Wet Weight of Soil + Container (gm)					510.26 →			
Dry Weight of Soil + Container (gm)						472.42	437.60	
Weight of Container (gm)					118.07 →	→		
Weight of Dry Soil (gm)						354.35	319.53	117.52
Moisture Content (%)								
(%) of Soil Passing No. 200 Sieve and Retained on No. 4 Sieve							9.83	33.2

Remark : 1

Boring No.	: 06- 1		Prepared By : ~~MT~~ R.Y	Date : 2/25/07	Percentage of			Maximum Size
Sample No.	: D-7		Washed By : MT	Date : 2/27/07	Gravel	Sand	Fine	
Depth (ft)	:	34.0	Tested By : MT	Date : 3/1/07	1	55	44	3/4"
Depth (m)	:		Checked By : R.Y	Date : 3-2-07				
Description	:	DK Gray, SILTY SAND (SM)			Sample		Retained On	
Method (A) - Soaked by Water							No. 200	No. 4
Method (B) - Soaked by Deflocculating Agent (Minimum 2 Hours)					Tested	Moisture	Sieve	
Container Number					S-24	S-24	S-24	S-24
Wet Weight of Soil + Container (gm)					360.32 →			
Dry Weight of Soil + Container (gm)						289.25	212.64	
Weight of Container (gm)					113.11 →	→		
Weight of Dry Soil (gm)								1.49
Moisture Content (%)								
(%) of Soil Passing No. 200 Sieve and Retained on No. 4 Sieve							43.5	0.85

Remark : > #4, shell frag., some organic 2

Boring No.	: 06- 1		Prepared By : MT	Date : 02/19/07	Percentage of			Maximum Size
Sample No.	: D-9		Washed By : MT	Date : 02/22/07	Gravel	Sand	Fine	
Depth (ft)	:	44.0	Tested By : MT	Date : 02/23/07	0	85	15	#100
Depth (m)	:		Checked By : R.Y	Date : 2-25-07				
Description	:	DK Bluish Gray, SILTY SAND (SM)			Sample		Retained On	
Method (A) - Soaked by Water							No. 200	No. 4
Method (B) - Soaked by Deflocculating Agent (Minimum 2 Hours)					Tested	Moisture	Sieve	
Container Number					S-9 →	S-	→S-	S-
Wet Weight of Soil + Container (gm)					417.55 →			
Dry Weight of Soil + Container (gm)						355.80	318.75	
Weight of Container (gm)					115.79 →	→	→	
Weight of Dry Soil (gm)						240.01	202.96	0
Moisture Content (%)								
(%) of Soil Passing No. 200 Sieve and Retained on No. 4 Sieve							15.4	D

Remark : 3

Amount of Material in Soil Finer Than No. 200 Sieve
(ASTM D-1140-97)

Project No. : 06-159 **Project Name** : BATA / Dumbarton Toll Bridge

Boring No.	: 06- 1		**Prepared By** : MT	**Date** : 02/20/07	**Percentage of**			**Maximum Size**
Sample No.	: S-16		**Washed By** : MT	**Date** 02/22/07	**Gravel**	**Sand**	**Fine**	
Depth (ft)	:	79.0	**Tested By** : MT	**Date** 02/23/07	28	64	8	1"
Depth (m)	:		**Checked By** : R. T	**Date** : 2-25-07				
Description	:	Olive Br, ~~P/G SAND w/ SILT (SP)~~			**Sample**		**Retained On**	
	Method (A) - Soaked by Water	P/G SAND w/ SILT & gvl					**No. 200**	**No. 4**
	Method (B) - Soaked by Deflocculating Agent (Minimum 2 Hours)	(SP-SM)			**Tested**	**Moisture**	**Sieve**	
Container Number					S-12 →	S- →	S-	S-
Wet Weight of Soil + Container (gm)					488.17 →			
Dry Weight of Soil + Container (gm)						439.24	413.66	
Weight of Container (gm)					114.29 →	→	→	
Weight of Dry Soil (gm)						324.95	299.37	89.84
Moisture Content (%)								
(%) of Soil Passing No. 200 Sieve and Retained on No. 4 Sieve							7.87	27.65

Remark : 1

Boring No.	: 06- 2		**Prepared By** : MT	**Date** : 02/20/07	**Percentage of**			**Maximum Size**
Sample No.	: S-1		**Washed By** : MT	**Date** 02/22/07	**Gravel**	**Sand**	**Fine**	
Depth (ft)	:	4.0	**Tested By** : MT	**Date** 02/23/07	25	61	14	1/2"
Depth (m)	:		**Checked By** : R. T	**Date** : 2-25-07				
Description	:	Yellowish Brown, ~~SILTY SAND (SM)~~			**Sample**		**Retained On**	
	Method (A) - Soaked by Water	SILTY SAND w/ gvl (SM)					**No. 200**	**No. 4**
	Method (B) - Soaked by Deflocculating Agent (Minimum 2 Hours)				**Tested**	**Moisture**	**Sieve**	
Container Number					S-13 →	S- →	S-	S-
Wet Weight of Soil + Container (gm)					450.31 →			
Dry Weight of Soil + Container (gm)						423.02	379.94	
Weight of Container (gm)					113.63 →	→	→	
Weight of Dry Soil (gm)						309.39	266.31	77.28
Moisture Content (%)								
(%) of Soil Passing No. 200 Sieve and Retained on No. 4 Sieve							13.9	24.98

Remark : 1/2" pieces are rock fragments 2

Boring No.	: 06- 2		**Prepared By** : MT	**Date** : 02/20/07	**Percentage of**			**Maximum Size**
Sample No.	: S-14		**Washed By** : MT	**Date** 02/22/07	**Gravel**	**Sand**	**Fine**	
Depth (ft)	:	74.0	**Tested By** : MT	**Date** 02/23/07	6	80	14	1/2"
Depth (m)	:		**Checked By** : R. T	**Date** : 2-25-07				
Description	:	DK Greenish Gray, SILTY SAND (SM)			**Sample**		**Retained On**	
	Method (A) - Soaked by Water						**No. 200**	**No. 4**
	Method (B) - Soaked by Deflocculating Agent (Minimum 2 Hours)				**Tested**	**Moisture**	**Sieve**	
Container Number					S-16 →	S-	S-	S-
Wet Weight of Soil + Container (gm)					535.97 →			
Dry Weight of Soil + Container (gm)						455.58	408.32	
Weight of Container (gm)					114.20 →	→	→	
Weight of Dry Soil (gm)						341.38	294.12	18.81
Moisture Content (%)								
(%) of Soil Passing No. 200 Sieve and Retained on No. 4 Sieve							13.84	5.51

Remark : 3

Amount of Material in Soil Finer Than No. 200 Sieve
(ASTM D-1140-97)

Project No. : 06-159 **Project Name** : BATA / Dumbarton Toll Bridge

Boring No.	: 06- 2		Prepared By : MT	Date : 02/21/07	Percentage of			Maximum Size		
Sample No.	: S-18		Washed By : MT	Date : 02/22/07	Gravel	Sand	Fine			
Depth (ft)	:	940	Tested By : MT	Date : 02/23/07	36	53	11	1"		
Depth (m)	:		Checked By : R.Y	Date : 2-25-07						
Description	:	DK Greenish Gray, ~~SILTY SAND w/ gvl (SM)~~ P/G SAND w/ SILT & gvl (SP-SM)			Sample			Retained On		
Method (A) - Soaked by Water								No. 200	No. 4	
Method (B) - Soaked by Deflocculating Agent (Minimum 2 Hours)					Tested	Moisture		Sieve		
Container Number					S-1 →	S- →		S-	S-	
Wet Weight of Soil + Container (gm)					523.57 →					
Dry Weight of Soil + Container (gm)						478.63		440.52		
Weight of Container (gm)					118.80 →	→		→		
Weight of Dry Soil (gm)						359.83		321.72	128.22	
Moisture Content (%)										
(%) of Soil Passing No. 200 Sieve and Retained on No. 4 Sieve								10.59	35.63	
Remark :										1

Boring No.	: 06- 3		Prepared By : MT	Date : 02/21/07	Percentage of			Maximum Size		
Sample No.	: S-10		Washed By : MT	Date : 02/22/07	Gravel	Sand	Fine			
Depth (ft)	:	520	Tested By : MT	Date : 02/23/07	19	74	7	1/2"		
Depth (m)	:		Checked By : R.Y	Date : 2-25-07						
Description	:	DK Gray, ~~P/G SAND w/ gvl (SP)~~ P/G SAND w/ SILT & gvl (SP-SM)			Sample			Retained On		
Method (A) - Soaked by Water								No. 200	No. 4	
Method (B) - Soaked by Deflocculating Agent (Minimum 2 Hours)					Tested	Moisture		Sieve		
Container Number					S-19 →	S- →		S-	S-	
Wet Weight of Soil + Container (gm)					554.71 →					
Dry Weight of Soil + Container (gm)						501.56		476.32		
Weight of Container (gm)					116.63 →	→		→		
Weight of Dry Soil (gm)						384.93		359.69	73.34	
Moisture Content (%)										
(%) of Soil Passing No. 200 Sieve and Retained on No. 4 Sieve								6.56	19.05	
Remark :										2

Boring No.	: 06- 3		Prepared By : MT	Date : 02/21/07	Percentage of			Maximum Size		
Sample No.	: D-13		Washed By : MT	Date : 02/22/07	Gravel	Sand	Fine			
Depth (ft)	:	67.0	Tested By : MT	Date : 02/23/07	19	69	12	1/2"		
Depth (m)	:		Checked By : R.Y	Date : 2-25-07						
Description	:	DK Bluish Gray, ~~P/G Gravel w/ SILT & SAND (GP-GM)~~ P/G SAND w/ SILT & gvl (SP-SM)			Sample			Retained On		
Method (A) - Soaked by Water								No. 200	No. 4	
Method (B) - Soaked by Deflocculating Agent (Minimum 2 Hours)					Tested	Moisture		Sieve		
Container Number					S-3 →	S- →		S-	S-	
Wet Weight of Soil + Container (gm)					527.86 →					
Dry Weight of Soil + Container (gm)						487.98		444.45		
Weight of Container (gm)					118.17 →	→		→		
Weight of Dry Soil (gm)						369.81		326.28	68.81	
Moisture Content (%)										
(%) of Soil Passing No. 200 Sieve and Retained on No. 4 Sieve								11.77	18.61	
Remark :										3

Amount of Material in Soil Finer Than No. 200 Sieve
(ASTM D-1140-97)

Project No. : 06-159 **Project Name** : BATA / Dumbarton Toll Bridge

Boring No.	: 06- 6		Prepared By : MT	Date : 02/13/07	Percentage of			Maximum
Sample No.	: S-7B		Washed By : MT	Date : 02/15/07	Gravel	Sand	Fine	Size
Depth (ft)	:	36.0	Tested By : MT	Date : 02/19/07	0	66	34	#50
Depth (m)	:		Checked By : K.Y	Date : 2-20-07				
Description	:	Olive Gray, SILTY SAND (SM)			Sample		Retained On	
Method (A) - Soaked by Water							No. 200	No. 4
Method (B) - Soaked by Deflocculating Agent (Minimum 2 Hours)					Tested	Moisture	Sieve	
Container Number					S-2 →	S-	S-	S-
Wet Weight of Soil + Container (gm)					257.52 →			
Dry Weight of Soil + Container (gm)						236.00	196.02	
Weight of Container (gm)					116.87 →	→	→	
Weight of Dry Soil (gm)						119.13	79.15	0
Moisture Content (%)								
(%) of Soil Passing No. 200 Sieve and Retained on No. 4 Sieve							33.56	0

Remark : 1

Boring No.	: 06- 6		Prepared By : MT	Date : 02/13/07	Percentage of			Maximum
Sample No.	: S-13		Washed By : MT	Date : 02/15/07	Gravel	Sand	Fine	Size
Depth (ft)	:	65.0	Tested By : MT	Date : 02/19/07	0	39	61	#100
Depth (m)	:		Checked By : K.Y	Date : 2-20-07				
Description	:	DK Greenish Gray, SILTY SAND (SM) SANDY SILT (ML)			Sample		Retained On	
Method (A) - Soaked by Water							No. 200	No. 4
Method (B) - Soaked by Deflocculating Agent (Minimum 2 Hours)					Tested	Moisture	Sieve	
Container Number					S-3 →	S-	S-	S-
Wet Weight of Soil + Container (gm)					503.33 →			
Dry Weight of Soil + Container (gm)						430.63	239.28	
Weight of Container (gm)					118.18 →	→	→	
Weight of Dry Soil (gm)						312.45	121.10	0
Moisture Content (%)								
(%) of Soil Passing No. 200 Sieve and Retained on No. 4 Sieve							61.24	0

Remark : 2

Boring No.	: 06- 8		Prepared By : MT	Date : 02/18/07	Percentage of			Maximum
Sample No.	: D-7		Washed By : MT	Date : 02/19/07	Gravel	Sand	Fine	Size
Depth (ft)	:	40.0	Tested By : MT	Date : 02/20/07	4	88	8	1/2"
Depth (m)	:		Checked By : K.Y	Date : 2-20-07				
Description	:	DK. OLIVE Brn. P/G SAND (SP) P/G SAND w/ SILT (SP-SM)			Sample		Retained On	
Method (A) - Soaked by Water							No. 200	No. 4
Method (B) - Soaked by Deflocculating Agent (Minimum 2 Hours)					Tested	Moisture	Sieve	
Container Number					S-6	S-6	S-6	S-6
Wet Weight of Soil + Container (gm)					—	—		
Dry Weight of Soil + Container (gm)						503.59	473.25	
Weight of Container (gm)					116.79 →	→	→	
Weight of Dry Soil (gm)						386.8	356.46	17.19
Moisture Content (%)								
(%) of Soil Passing No. 200 Sieve and Retained on No. 4 Sieve							7.84	4.44

Remark : 3

Amount of Material in Soil Finer Than No. 200 Sieve
(ASTM D-1140-97)

Project No. : 06-159 **Project Name :** BATA / Dumbarton Toll Bridge

Boring No.	: 06- 8		**Prepared By :** MT	**Date :** 02 / 13 /07	**Percentage of**			**Maximum**
Sample No.	: D – 11		**Washed By :** MT	**Date :** 02 /19 /07	**Gravel**	**Sand**	**Fine**	**Size**
Depth (ft)	:	58.0	**Tested By :** MT	**Date :** 02 /20 /07	0	84	16	# 30
Depth (m)	:		**Checked By :** R. G	**Date :** 2-20-07				
Description	:	DK olive Brown SILTY SAND (SM)			**Sample**		**Retained On**	
	Method (A) - Soaked by Water						**No. 200**	**No. 4**
	Method (B) - Soaked by Deflocculating Agent (Minimum 2 Hours)				**Tested**	**Moisture**	**Sieve**	
Container Number					S-8	S-8	S-8	S-8
Wet Weight of Soil + Container (gm)					—	—		
Dry Weight of Soil + Container (gm)						490.00	429.58	
Weight of Container (gm)					118.27	→	→	
Weight of Dry Soil (gm)						371.73	311.31	0
Moisture Content (%)								
(%) of Soil Passing No. 200 Sieve and Retained on No. 4 Sieve							16.25	0

Remark : 1

Boring No.	: 06-		**Prepared By :** MT	**Date :** / /07	**Percentage of**			**Maximum**
Sample No.	:		**Washed By :** MT	**Date :** / /07	**Gravel**	**Sand**	**Fine**	**Size**
Depth (ft)	:		**Tested By :** MT	**Date :** / /07				
Depth (m)	:		**Checked By :**	**Date :**				
Description	:				**Sample**		**Retained On**	
	Method (A) - Soaked by Water						**No. 200**	**No. 4**
	Method (B) - Soaked by Deflocculating Agent (Minimum 2 Hours)				**Tested**	**Moisture**	**Sieve**	
Container Number					S-	S-	S-	S-
Wet Weight of Soil + Container (gm)								
Dry Weight of Soil + Container (gm)								
Weight of Container (gm)								
Weight of Dry Soil (gm)								
Moisture Content (%)								
(%) of Soil Passing No. 200 Sieve and Retained on No. 4 Sieve								

Remark : 2

Boring No.	: 06-		**Prepared By :** MT	**Date :** / /07	**Percentage of**			**Maximum**
Sample No.	:		**Washed By :** MT	**Date :** / /07	**Gravel**	**Sand**	**Fine**	**Size**
Depth (ft)	:		**Tested By :** MT	**Date :** / /07				
Depth (m)	:		**Checked By :**	**Date :**				
Description	:				**Sample**		**Retained On**	
	Method (A) - Soaked by Water						**No. 200**	**No. 4**
	Method (B) - Soaked by Deflocculating Agent (Minimum 2 Hours)				**Tested**	**Moisture**	**Sieve**	
Container Number					S-	S-	S-	S-
Wet Weight of Soil + Container (gm)								
Dry Weight of Soil + Container (gm)								
Weight of Container (gm)								
Weight of Dry Soil (gm)								
Moisture Content (%)								
(%) of Soil Passing No. 200 Sieve and Retained on No. 4 Sieve								

Remark : 3

Amount of Material in Soil Finer Than No. 200 Sieve
(ASTM D-1140-97)

Project No. : 06-159 **Project Name** : BATA / Dumbarton Toll Bridge

Boring No.	: 06- 3		Prepared By : MT RY	Date : 3/1/07	Percentage of			Maximum Size
Sample No.	: D-15		Washed By : MT RY	Date : 3/1/07	Gravel	Sand	Fine	
Depth (ft)	:	77.0	Tested By : MT	Date : 3/2/07	0	67	33	#100
Depth (m)	:		Checked By : R.Y	Date : 3-2-07				
Description	:	DK Yellow with Brown, SILTY SAND (SM)			Sample		Retained On	
Method (A) - Soaked by Water							No. 200	No. 4
Method (B) - Soaked by Deflocculating Agent (Minimum 2 Hours)					Tested	Moisture	Sieve	
Container Number					S-26	S-26	S-26	S-26
Wet Weight of Soil + Container (gm)					—	—		
Dry Weight of Soil + Container (gm)						476.13	358.99	
Weight of Container (gm)					115B3 →	→	→	
Weight of Dry Soil (gm)						360.30	241.16	0
Moisture Content (%)								
(%) of Soil Passing No. 200 Sieve and Retained on No. 4 Sieve							33.07	0

Remark : 1

Boring No.	: 06- 9		Prepared By : MT	Date : 02/22/07	Percentage of			Maximum Size
Sample No.	: S-6		Washed By : MT R.Y	Date : 2/27/07	Gravel	Sand	Fine	
Depth (ft)	:	30.0	Tested By : MT R.Y	Date : 3/1/07	0	6	94	#50
Depth (m)	:		Checked By : R.Y	Date : 3-2-07				
Description	:	DK Greenish Grey, LEAN CLAY (CL)			Sample		Retained On	
Method (A) - Soaked by Water							No. 200	No. 4
Method (B) - Soaked by Deflocculating Agent (Minimum 2 Hours)					Tested	Moisture	Sieve	
Container Number					S- 6 →	S- →	S- →	S-
Wet Weight of Soil + Container (gm)					494.50 →			
Dry Weight of Soil + Container (gm)						402.22	135.47	
Weight of Container (gm)					116.79 →	→	→	
Weight of Dry Soil (gm)						292.03	18.68	0
Moisture Content (%)								
(%) of Soil Passing No. 200 Sieve and Retained on No. 4 Sieve							93.60	0

Remark : tr. organic 2

Boring No.	: 06- 9		Prepared By : MT	Date : 02/22/07	Percentage of			Maximum Size
Sample No.	: D-9		Washed By : MT R.Y	Date : 2/27/07	Gravel	Sand	Fine	
Depth (ft)	:	45.0	Tested By : MT R.Y	Date : 3/1/07	2	19	79	3/8"
Depth (m)	:		Checked By :	Date : 3-2-07				
Description	:	Olive Brown, SILT w/ SAND (ML)			Sample		Retained On	
Method (A) - Soaked by Water							No. 200	No. 4
Method (B) - Soaked by Deflocculating Agent (Minimum 2 Hours)					Tested	Moisture	Sieve	
Container Number					S- 8 →	S- →	S-	S-
Wet Weight of Soil + Container (gm)					410.92 →			
Dry Weight of Soil + Container (gm)						345.20	167.13	
Weight of Container (gm)					118.27 →	→	→	
Weight of Dry Soil (gm)						226.93	48.86	3.78
Moisture Content (%)								
(%) of Soil Passing No. 200 Sieve and Retained on No. 4 Sieve							78.47	1.67

Remark : > #4, Cemented Sandstone Flakes 3

Amount of Material in Soil Finer Than No. 200 Sieve
(ASTM D-1140-97)

Project No. : 06-159 **Project Name :** BATA / Dumbarton Toll Bridge

Boring No.	: 06- 9	Prepared By : MT	Date : 02/22/07	Percentage of			Maximum Size		
Sample No.	: B-13	Washed By : MT RQ	Date : 2/26/07	Gravel	Sand	Fine			
Depth (ft)	: 65.0	Tested By : MT R.Q	Date : 3/1/07	12	39	49	3/4"		
Depth (m)	:	Checked By :	Date : 3-2-07						
Description	: Gray, ~~Dk Sandy Silt of high~~ SILTY SAND (SM) ~~(SP-SM)~~			Sample		Retained On			
Method (A) - Soaked by Water						No. 200	No. 4		
Method (B) - Soaked by Deflocculating Agent (Minimum 2 Hours)				Tested	Moisture	Sieve			
Container Number				S-21	S- →	S-	S-		
Wet Weight of Soil + Container (gm)				453.27 →					
Dry Weight of Soil + Container (gm)					409.69	265.09			
Weight of Container (gm)				114.63 →	→	→			
Weight of Dry Soil (gm)					295.06	150.46	33.85		
Moisture Content (%)									
(%) of Soil Passing No. 200 Sieve and Retained on No. 4 Sieve						49.01	11.47		
Remark :									1

Boring No.	: 06- 9	Prepared By : MT	Date : 02/22/07	Percentage of			Maximum Size		
Sample No.	: D-15	Washed By : MT RQ	Date : 2/26/07	Gravel	Sand	Fine			
Depth (ft)	: 75.0	Tested By : MT RQ	Date : 3/1/07	0	0	100	#50		
Depth (m)	:	Checked By :	Date : 3-2-07						
Description	: Olive, ~~Sandy Silty Clay~~ LEAN CLAY (CL)			Sample		Retained On			
Method (A) - Soaked by Water						No. 200	No. 4		
Method (B) - Soaked by Deflocculating Agent (Minimum 2 Hours)				Tested	Moisture	Sieve			
Container Number				S-22 →	S-22	S-	S-		
Wet Weight of Soil + Container (gm)				427.73 →					
Dry Weight of Soil + Container (gm)					379.27	115.65			
Weight of Container (gm)				115.18 →	→	→			
Weight of Dry Soil (gm)					264.09	0.49	0		
Moisture Content (%)									
(%) of Soil Passing No. 200 Sieve and Retained on No. 4 Sieve						99.81	0		
Remark : Tr. coal, shell frag									2

Boring No.	: 06- 9	Prepared By : MT RQ	Date : 3/1/07	Percentage of			Maximum Size		
Sample No.	: D-20	Washed By : MT RQ	Date : 3/1/07	Gravel	Sand	Fine			
Depth (ft)	: 100.0	Tested By : MT	Date : 3/2/07	0	87	13	#100		
Depth (m)	:	Checked By : RQ	Date : 3-2-07						
Description	: Dk Gray, SILTY SAND, (SM)			Sample		Retained On			
Method (A) - Soaked by Water						No. 200	No. 4		
Method (B) - Soaked by Deflocculating Agent (Minimum 2 Hours)				Tested	Moisture	Sieve			
Container Number				S-27	S-27	S-27	S-27		
Wet Weight of Soil + Container (gm)									
Dry Weight of Soil + Container (gm)					462.79	417.85			
Weight of Container (gm)				112.59 →	→	→			
Weight of Dry Soil (gm)					350.20	305.26	0		
Moisture Content (%)									
(%) of Soil Passing No. 200 Sieve and Retained on No. 4 Sieve						12.83	0		
Remark : many shell fragments									3

Amount of Material in Soil Finer Than No. 200 Sieve
(ASTM D-1140-97)

Project No. : 06-159 **Project Name** : BATA / Dumbarton Toll Bridge

Boring No.	: 06- 2	Prepared By : ~~MT~~ R.Y	Date : 2/15/07	Percentage of			Maximum
Sample No.	: D-4	Washed By : ~~MT~~ R.Y	Date : 2/26/07	Gravel	Sand	Fine	Size
Depth (ft)	: 24.0	Tested By : MT R.Y	Date : 3/1/07	2	47	51	1/2"
Depth (m)	:	Checked By :	Date : 3-7-07				
Description	: olive brn, ~~LEAN CLAY with SAND (CL)~~ SANDY CLAY (CL)			Sample		Retained On	
Method (A) - Soaked by Water						No. 200	No. 4
Method (B) - Soaked by Deflocculating Agent (Minimum 2 Hours)				Tested	Moisture	Sieve	
Container Number				S-25	S-25	S-25	S-25
Wet Weight of Soil + Container (gm)							
Dry Weight of Soil + Container (gm)					426.14	267.67	
Weight of Container (gm)				112.90 →			
Weight of Dry Soil (gm)					313.24	154.77	6.16
Moisture Content (%)							
(%) of Soil Passing No. 200 Sieve and Retained on No. 4 Sieve						50.59	1.96

Remark : 1/2 metl > #4 were Cemt. mods. 1

Boring No.	: 06- 9	Prepared By : MT	Date : 2/22/07	Percentage of			Maximum
Sample No.	: S-22	Washed By : MT R.Y	Date : 2/26/07	Gravel	Sand	Fine	Size
Depth (ft)	: 11.00	Tested By : MT R.Y	Date : 3/1/07	0	10	90	#16
Depth (m)	:	Checked By :	Date : 3-7-07				
Description	: ~~LEAN CLAY w/sand (CL)~~ Lt. Bluish gray w/rust brn- LEAN CLAY (CL)			Sample		Retained On	
Method (A) - Soaked by Water						No. 200	No. 4
Method (B) - Soaked by Deflocculating Agent (Minimum 2 Hours)				Tested	Moisture	Sieve	
Container Number				S-23	S-23	S-23	S-23
Wet Weight of Soil + Container (gm)				483.43 →			
Dry Weight of Soil + Container (gm)					372.84	140.91	
Weight of Container (gm)				113.83 →			
Weight of Dry Soil (gm)					259.01	27.08	0
Moisture Content (%)							
(%) of Soil Passing No. 200 Sieve and Retained on No. 4 Sieve						89.54	0

Remark : > #50. Some Cemt. mods 2

Boring No.	: 06-	Prepared By : MT	Date : / /07	Percentage of			Maximum
Sample No.	:	Washed By : MT	Date : / /07	Gravel	Sand	Fine	Size
Depth (ft)	:	Tested By : MT	Date : / /07				
Depth (m)	:	Checked By :	Date :				
Description	:			Sample		Retained On	
Method (A) - Soaked by Water						No. 200	No. 4
Method (B) - Soaked by Deflocculating Agent (Minimum 2 Hours)				Tested	Moisture	Sieve	
Container Number				S-	S-	S-	S-
Wet Weight of Soil + Container (gm)							
Dry Weight of Soil + Container (gm)							
Weight of Container (gm)							
Weight of Dry Soil (gm)							
Moisture Content (%)							
(%) of Soil Passing No. 200 Sieve and Retained on No. 4 Sieve							

Remark : 3

Amount of Material in Soil Finer Than No. 200 Sieve
(ASTM D-1140-97)

Project No. : 06-159 **Project Name** : BATA/ Dumbarton Bridge

Boring No.	: 06-11		Prepared By : M.T.	Date : 04/03/07	Percentage of			Maximum Size		
Sample No.	: S-6		Washed By : M.T.	Date : 4-12-07	Gravel	Sand	Fine			
Depth (ft)	:	350	Tested By : M.T.	Date : 4-13-07	1	8	91	#4		
Depth (m)	:		Checked By : R.J.	Date : 4-17-07						
Description	: Olive Brown, LEAN CLAY (CL)				Sample			Retained On		
Method (A) - Soaked by Water								No. 200	No. 4	
Method (B) - Soaked by Deflocculating Agent (Minimum 2 Hours)					Tested	Moisture		Sieve		
Container Number					S-20					
Wet Weight of Soil + Container (gm)					349.40					
Dry Weight of Soil + Container (gm)						298.69	131.43			
Weight of Container (gm)					115.17					
Weight of Dry Soil (gm)									151	
Moisture Content (%)										
(%) of Soil Passing No. 200 Sieve and Retained on No. 4 Sieve							91.1		0.82	
Remark : > #4 Cemented nods. (Carbonate)										

Boring No.	: 06-11		Prepared By : M.T.	Date : 04/03/07	Percentage of			Maximum Size		
Sample No.	: D-9		Washed By : M.T.	Date : 4-12-07	Gravel	Sand	Fine			
Depth (ft)	: 1	500	Tested By : M.T.	Date : 4-13-07	10	85	5	1/2"		
Depth (m)	:		Checked By : R.J.	Date : 4-17-07						
Description	: DK Grey, P/G SAND (SP→SW)				Sample			Retained On		
Method (A) - Soaked by Water								No. 200	No. 4	
Method (B) - Soaked by Deflocculating Agent (Minimum 2 Hours)					Tested	Moisture		Sieve		
Container Number					S-22					
Wet Weight of Soil + Container (gm)					433.38					
Dry Weight of Soil + Container (gm)						396.34	382.22			
Weight of Container (gm)					115.19					
Weight of Dry Soil (gm)									26.88	
Moisture Content (%)										
(%) of Soil Passing No. 200 Sieve and Retained on No. 4 Sieve							502		9.56	
Remark : > #20. Matl were coated. nods.										

Boring No.	: 06-11		Prepared By : M.T.	Date : 04/03/07	Percentage of			Maximum Size		
Sample No.	: D-11		Washed By : M.T.	Date : 4-16-07	Gravel	Sand	Fine			
Depth (ft)	:	600	Tested By : M.T.	Date : 4-13-07	0	6	94	#10		
Depth (m)	:		Checked By : R.J.	Date : 4-17-07						
Description	: Olive Brown, LEAN CLAY ~~w/ SAND~~ (CL)				Sample			Retained On		
Method (A) - Soaked by Water								No. 200	No. 4	
Method (B) - Soaked by Deflocculating Agent (Minimum 2 Hours)					Tested	Moisture		Sieve		
Container Number					S-23					
Wet Weight of Soil + Container (gm)					395.10					
Dry Weight of Soil + Container (gm)						338.49	128.21			
Weight of Container (gm)					113.83					
Weight of Dry Soil (gm)									0	
Moisture Content (%)										
(%) of Soil Passing No. 200 Sieve and Retained on No. 4 Sieve							93.60			
Remark :										

Amount of Material in Soil Finer Than No. 200 Sieve
(ASTM D-1140-97)

Project No. : 06-159 **Project Name** : BATA/ Dumbarton Bridge

Boring No. : 06-11		**Prepared By** : M.T.	**Date** : 04/03/07	**Percentage of**			**Maximum Size**
Sample No. : S-14		**Washed By** : M.T.	**Date** : 4/12/07	**Gravel**	**Sand**	**Fine**	
Depth (ft) :	75.0	**Tested By** : M.T.	**Date** : 4-13-07				#40
Depth (m) :		**Checked By** : R.J.	**Date** : 4-17-07	0	79	21	
Description : DK olive Brown, SILTY SAND (SM)				**Sample**		**Retained On**	
Method (A) - Soaked by Water						**No. 200**	**No. 4**
Method (B) - Soaked by Deflocculating Agent (Minimum 2 Hours)				**Tested**	**Moisture**	**Sieve**	
Container Number				S-25 →	→		
Wet Weight of Soil + Container (gm)				480.99 →			
Dry Weight of Soil + Container (gm)					408.16	346.43	
Weight of Container (gm)				112.90 →	→		
Weight of Dry Soil (gm)							0
Moisture Content (%)							
(%) of Soil Passing No. 200 Sieve and Retained on No. 4 Sieve						20.91	
Remark :							

Boring No. : 06-11		**Prepared By** : M.T.	**Date** : 04/03/07	**Percentage of**			**Maximum Size**
Sample No. : S-16		**Washed By** : M.T.	**Date** : 4/12/07	**Gravel**	**Sand**	**Fine**	
Depth (ft) :	85.0	**Tested By** : M.T.	**Date** : 4-13-07				3/8"
Depth (m) :		**Checked By** : R.J.	**Date** : 4-17-07	1	79	20	
Description : olive, SILTY SAND (SM)				**Sample**		**Retained On**	
Method (A) - Soaked by Water						**No. 200**	**No. 4**
Method (B) - Soaked by Deflocculating Agent (Minimum 2 Hours)				**Tested**	**Moisture**	**Sieve**	
Container Number				S-1 →	→		
Wet Weight of Soil + Container (gm)				425.06 →			
Dry Weight of Soil + Container (gm)					368.91	318.97	
Weight of Container (gm)				118.80 →	→		
Weight of Dry Soil (gm)							2.69
Moisture Content (%)							
(%) of Soil Passing No. 200 Sieve and Retained on No. 4 Sieve						19.96	1.08
Remark :							

Boring No. :		**Prepared By** : M.T.	**Date** :	**Percentage of**			**Maximum Size**
Sample No. :		**Washed By** : M.T.	**Date** :	**Gravel**	**Sand**	**Fine**	
Depth (ft) :		**Tested By** : M.T.	**Date** :				
Depth (m) :		**Checked By** : R.J.	**Date** :				
Description :				**Sample**		**Retained On**	
Method (A) - Soaked by Water						**No. 200**	**No. 4**
Method (B) - Soaked by Deflocculating Agent (Minimum 2 Hours)				**Tested**	**Moisture**	**Sieve**	
Container Number							
Wet Weight of Soil + Container (gm)							
Dry Weight of Soil + Container (gm)							
Weight of Container (gm)							
Weight of Dry Soil (gm)							
Moisture Content (%)							
(%) of Soil Passing No. 200 Sieve and Retained on No. 4 Sieve							
Remark :							

Amount of Material in Soil Finer Than No. 200 Sieve
(ASTM D-1140-97)

Project No. : 06-159 **Project Name** : BATA/ Dumbarton Bridge

Boring No.	: 06-12		**Prepared By** : ~~M.T.~~ R.Y	**Date** : 5-14-07	**Percentage of**			**Maximum Size**
Sample No.	: D-9		**Washed By** : ~~M.T.~~ R.Y	**Date** : 5-14-07	**Gravel**	**Sand**	**Fine**	
Depth (ft)	:	54.0	**Tested By** : ~~M.T.~~ R.Y	**Date** : 5-15-07	0	84	16	#4
Depth (m)	:		**Checked By** : R.J.	**Date** :				
Description	: Gray, SILTY SAND (SM)				**Sample**		**Retained On**	
	Method (A) - Soaked by Water						**No. 200**	**No. 4**
	Method (B) - Soaked by Deflocculating Agent (Minimum 2 Hours)				**Tested**	**Moisture**	**Sieve**	
Container Number					S-6 →	→	→	
Wet Weight of Soil + Container (gm)					—			
Dry Weight of Soil + Container (gm)						499.84	440.36	
Weight of Container (gm)					116.69 →	→		
Weight of Dry Soil (gm)								0.00
Moisture Content (%)								
(%) of Soil Passing No. 200 Sieve and Retained on No. 4 Sieve							15.52	0
Remark : After direct shear test. Matl on #4, Were shell frag.								

Boring No.	: 06-12		**Prepared By** : M.T.	**Date** : 05/17/07	**Percentage of**			**Maximum Size**
Sample No.	: S-16		**Washed By** : M.T.	**Date** :	**Gravel**	**Sand**	**Fine**	
Depth (ft)	:	89.0	**Tested By** : ~~M.T.~~ R.Y	**Date** : 5-22-07	1	36	63	#4
Depth (m)	:		**Checked By** : R.J.	**Date** :				
Description	: Lt olive Brown, SANDY SILT (ML)				**Sample**		**Retained On**	
	Method (A) - Soaked by Water						**No. 200**	**No. 4**
	Method (B) - Soaked by Deflocculating Agent (Minimum 2 Hours)				**Tested**	**Moisture**	**Sieve**	
Container Number					S-4 →	→		
Wet Weight of Soil + Container (gm)					529.73 →			
Dry Weight of Soil + Container (gm)						450.34	239.78	
Weight of Container (gm)					118.03 →	→		
Weight of Dry Soil (gm)								2.48
Moisture Content (%)								
(%) of Soil Passing No. 200 Sieve and Retained on No. 4 Sieve							63.36	0.74
Remark : Matl > #50 were cemented sand/silt stone (± 5%)								

Boring No.	: S-13		**Prepared By** : M.T.	**Date** : 05/17/07	**Percentage of**			**Maximum Size**
Sample No.	: S-2		**Washed By** : M.T.	**Date** :	**Gravel**	**Sand**	**Fine**	
Depth (ft)	:	9.0	**Tested By** : ~~M.T.~~ R.Y	**Date** : 5-23-07	7	30	63	1/2"
Depth (m)	:		**Checked By** : R.J.	**Date** :				
Description	: Dk olive Brown, SANDY CLAY ~~light~~ (CL)				**Sample**		**Retained On**	
	Method (A) - Soaked by Water						**No. 200**	**No. 4**
	Method (B) - Soaked by Deflocculating Agent (Minimum 2 Hours)				**Tested**	**Moisture**	**Sieve**	
Container Number					S-5 →	→		
Wet Weight of Soil + Container (gm)					452.23 →			
Dry Weight of Soil + Container (gm)						399.83	322.02	
Weight of Container (gm)					117.70 →	→		
Weight of Dry Soil (gm)								20.53
Moisture Content (%)								
(%) of Soil Passing No. 200 Sieve and Retained on No. 4 Sieve							63.02	7.28
Remark :								

Amount of Material in Soil Finer Than No. 200 Sieve
(ASTM D-1140-97)

Project No. : 06-159 **Project Name** : BATA/ Dumbarton Bridge

Boring No.	: 06-13	Prepared By : M.T.	Date : 5/17/07	Percentage of			Maximum Size		
Sample No.	: S-5	Washed By : M.T.	Date :	Gravel	Sand	Fine			
Depth (ft)	: 24.0	Tested By : ~~M.T.~~ R.J.	Date : 5-24-07	0	76	24	1/4" shell frag		
Depth (m)	:	Checked By : R.J.	Date :						
Description	: DK Bluish Gray, SILTY SAND(SM)			Sample		Retained On			
Method (A) - Soaked by Water						No. 200	No. 4		
Method (B) - Soaked by Deflocculating Agent (Minimum 2 Hours)				Tested	Moisture	Sieve			
Container Number				S-6 →	→	→			
Wet Weight of Soil + Container (gm)				496.09 →					
Dry Weight of Soil + Container (gm)					417.23	346.13			
Weight of Container (gm)				116.70 →	→	→			
Weight of Dry Soil (gm)							0.20		
Moisture Content (%)									
(%) of Soil Passing No. 200 Sieve and Retained on No. 4 Sieve						23.66	0.07		
Remark : tr. organic & shell frag. w/sl. F. Sand.									

Boring No.	: 06-13	Prepared By : M.T.	Date : 5/18/07	Percentage of			Maximum Size		
Sample No.	: D-13	Washed By : M.T.	Date :	Gravel	Sand	Fine			
Depth (ft)	: 64.0	Tested By : ~~M.T.~~ R.J.	Date : 5-24-07	0	89	11	#8		
Depth (m)	:	Checked By : R.J.	Date :						
Description	: DK Bluish Gray, P/G SAND w/silt (SP-SM)			Sample		Retained On			
Method (A) - Soaked by Water						No. 200	No. 4		
Method (B) - Soaked by Deflocculating Agent (Minimum 2 Hours)				Tested	Moisture	Sieve			
Container Number				S-16 →	→	→			
Wet Weight of Soil + Container (gm)				431.82 →	→				
Dry Weight of Soil + Container (gm)					374.89	346.60			
Weight of Container (gm)				114.14 →	→	→			
Weight of Dry Soil (gm)							0		
Moisture Content (%)									
(%) of Soil Passing No. 200 Sieve and Retained on No. 4 Sieve						10.85			
Remark :									

Boring No.	: 06-13	Prepared By : M.T.	Date : 5/18/07	Percentage of			Maximum Size		
Sample No.	: S-16	Washed By : M.T.	Date :	Gravel	Sand	Fine			
Depth (ft)	: 79.0	Tested By : ~~M.T.~~ R.J.	Date : 5-24-07	1	40	59	1/2"		
Depth (m)	:	Checked By : R.J.	Date :						
Description	: Lt Olive Brown, SAND & SILT (ML)			Sample		Retained On			
Method (A) - Soaked by Water						No. 200	No. 4		
Method (B) - Soaked by Deflocculating Agent (Minimum 2 Hours)				Tested	Moisture	Sieve			
Container Number				S-9 →	→	→			
Wet Weight of Soil + Container (gm)				481.45 →					
Dry Weight of Soil + Container (gm)					410.52	336.12			
Weight of Container (gm)				115.70 →	→	→			
Weight of Dry Soil (gm)							4.06		
Moisture Content (%)									
(%) of Soil Passing No. 200 Sieve and Retained on No. 4 Sieve						59.15	1.38		
Remark : 1/2 matrix > #50, wave cont. nods									

Amount of Material in Soil Finer Than No. 200 Sieve
(ASTM D-1140-97)

Project No. : 06-159 **Project Name** : BATA/ Dumbarton Bridge

Boring No.	: 06-13		Prepared By : M.T.	Date : 05/18/07	Percentage of			Maximum Size
Sample No.	: S-20		Washed By : M.T.	Date :	Gravel	Sand	Fine	
Depth (ft)	:	99.0	Tested By : ~~M.T.~~ R.J.	Date : 5-24-07	1	78	21	5/8"
Depth (m)	:		Checked By : R.J.	Date :				
Description	: Olive Gray, SILTY SAND (SM)				Sample		Retained On	
Method (A) - Soaked by Water							No. 200	No. 4
Method (B) - Soaked by Deflocculating Agent (Minimum 2 Hours)					Tested	Moisture	Sieve	
Container Number					S-10 →	→	→	
Wet Weight of Soil + Container (gm)					438.32 →			
Dry Weight of Soil + Container (gm)						382.37	326.65	
Weight of Container (gm)					119.05 →	→	→	
Weight of Dry Soil (gm)								3.33
Moisture Content (%)								
(%) of Soil Passing No. 200 Sieve and Retained on No. 4 Sieve							21.16	1.16
Remark :								

Boring No.	: 06-14		Prepared By : M.T. R.J.	Date : 5/14/07	Percentage of			Maximum Size
Sample No.	: D-6		Washed By : M.T. R.J.	Date : 5-15-07	Gravel	Sand	Fine	
Depth (ft)	:	29.0	Tested By : M.T. R.J.	Date : 5-16-07	0	66	34	#4
Depth (m)	:		Checked By : R.J.	Date :				
Description	: Black, SILTY SAND (SM)				Sample		Retained On	
Method (A) - Soaked by Water							No. 200	No. 4
Method (B) - Soaked by Deflocculating Agent (Minimum 2 Hours)					Tested	Moisture	Sieve	
Container Number					S-12 →	→	→	→
Wet Weight of Soil + Container (gm)					379.49 →			
Dry Weight of Soil + Container (gm)						312.15	245.13	
Weight of Container (gm)					114.22 →	→	→	
Weight of Dry Soil (gm)								0.21
Moisture Content (%)								
(%) of Soil Passing No. 200 Sieve and Retained on No. 4 Sieve							33.86	0.11
Remark : On upper portion of the sample, mottle on #4 were organic & shell frag. Some in the sample also.								

Boring No.	: 06-14		Prepared By : M.T.	Date : 05/18/07	Percentage of			Maximum Size
Sample No.	: D-12		Washed By : M.T.	Date :	Gravel	Sand	Fine	
Depth (ft)	:	59.0	Tested By : ~~M.T.~~ R.J.	Date : 5-24-07	0	57	43	#50
Depth (m)	:		Checked By : R.J.	Date :				
Description	: Olive Brown, SILTY SAND (SM)				Sample		Retained On	
Method (A) - Soaked by Water							No. 200	No. 4
Method (B) - Soaked by Deflocculating Agent (Minimum 2 Hours)					Tested	Moisture	Sieve	
Container Number					S-12 →	→	→	
Wet Weight of Soil + Container (gm)					420.85 →			
Dry Weight of Soil + Container (gm)						363.38	256.65	
Weight of Container (gm)					114.21 →	→	→	
Weight of Dry Soil (gm)								0
Moisture Content (%)								
(%) of Soil Passing No. 200 Sieve and Retained on No. 4 Sieve							42.03	
Remark :								

Amount of Material in Soil Finer Than No. 200 Sieve
(ASTM D-1140-97)

Project No. : 06-159 **Project Name** : BATA/ Dumbarton Bridge

Boring No.	: 06-14		Prepared By : M.T.	Date : 5/18/07	Percentage of			Maximum Size
Sample No.	: S-13		Washed By : M.T.	Date :	Gravel	Sand	Fine	
Depth (ft)	:	64.0	Tested By : ~~M.T.~~ RJ	Date : 5-24-07	0	92	8	#16
Depth (m)	:		Checked By : R.J.	Date :				
Description	: DK Gray, P/G SAND (SP-SM)				Sample		Retained On	
Method (A) - Soaked by Water							No. 200	No. 4
Method (B) - Soaked by Deflocculating Agent (Minimum 2 Hours)					Tested	Moisture	Sieve	
Container Number					S-13			
Wet Weight of Soil + Container (gm)					432.32			
Dry Weight of Soil + Container (gm)						378.38	357.32	
Weight of Container (gm)					113.59			
Weight of Dry Soil (gm)								0
Moisture Content (%)								
(%) of Soil Passing No. 200 Sieve and Retained on No. 4 Sieve							7.95	
Remark :								

Boring No.	: 06-14		Prepared By : M.T.	Date : 5/18/07	Percentage of			Maximum Size
Sample No.	: S-19		Washed By : M.T.	Date :	Gravel	Sand	Fine	
Depth (ft)	:	94.0	Tested By : M.T. RJ	Date : 5-24-07	10	75	15	3/4"
Depth (m)	:		Checked By : R.J.	Date :				
Description	: DK Grayish Brown, SILTY SAND (SM)				Sample		Retained On	
Method (A) - Soaked by Water							No. 200	No. 4
Method (B) - Soaked by Deflocculating Agent (Minimum 2 Hours)					Tested	Moisture	Sieve	
Container Number					S-18			
Wet Weight of Soil + Container (gm)					333.14			
Dry Weight of Soil + Container (gm)						297.57	270.96	
Weight of Container (gm)					115.54			
Weight of Dry Soil (gm)								17.37
Moisture Content (%)								
(%) of Soil Passing No. 200 Sieve and Retained on No. 4 Sieve							14.62	9.54
Remark :								

Boring No.	:		Prepared By : M.T.	Date :	Percentage of			Maximum Size
Sample No.	:		Washed By : M.T.	Date :	Gravel	Sand	Fine	
Depth (ft)	:		Tested By : M.T.	Date :				
Depth (m)	:		Checked By : R.J.	Date :				
Description	:				Sample		Retained On	
Method (A) - Soaked by Water							No. 200	No. 4
Method (B) - Soaked by Deflocculating Agent (Minimum 2 Hours)					Tested	Moisture	Sieve	
Container Number								
Wet Weight of Soil + Container (gm)								
Dry Weight of Soil + Container (gm)								
Weight of Container (gm)								
Weight of Dry Soil (gm)								
Moisture Content (%)								
(%) of Soil Passing No. 200 Sieve and Retained on No. 4 Sieve								
Remark :								

PARTICLE SIZE ANALYSIS OF SOIL

ASTM D-422-63 (Rev. 1990) / CT - 202, 203

Project No : 06-155	Project Name : BATA / Dumbarton Toll Bridge
Standard : ☑ CAL. TRAN. ☐ ASTM ☐ OTHER	

Prepared By : M.T.	Date : 02/19/07	Tested By : R.J.	Date : 03/01/07
Washed By : M.T.	Date : 02/22/07	Computed By : CY	Date : 04/12/07

Checked By : R.J. Date : 04/12/07

Boring No. : 06-1	Depth : (ft) : 9.0	10.5	
Sample No. : D-2	(m) : 2.75	3.20	

Description : Gray, Well Graded Sand with Silt and Gravel (SW-SM)

	Before Washing Sample		After Wet Sieve
	Tested	Moisture	
Container Number	S-5	S-5	S-5
Wet Wt. of Soil + Cont. (gm)	494.22	494.22	
Dry Wt. of Soil + Cont. (gm)		450.35	432.99
Weight of Container (gm)	117.76	117.76	117.76
Weight of Dry Soil (gm)	332.59	332.59	315.23
Moisture Content (%)		13.19	

Sieve	Cimulative Weight	(%)
5"		
4"		
3"		
2.5"		
2.0"		
1.5"		
1.0"		
3/4"	0.00	100.00
1/2"	18.67	94.39
3/8"	56.93	82.88
No. 4	146.22	56.04
Cu :	19.4	
Cc :	2.3	

Sieve	Cimulative Weight	(%)
No. 8	215.55	35.19
No. 10		
No. 16	259.42	22.00
No. 20		
No. 30	282.50	15.06
No. 40		
No. 50	298.01	10.40
No. 60		
No. 100	308.51	7.24
No. 200	315.07	5.27
Pan	315.46	
Gravel	Sand	Fine
44	51	5

Remark : 1

Prepared By : M.T.	Date : 02/19/07	Tested By : R.J.	Date : 03/01/07
Washed By : M.T.	Date : 02/22/07	Computed By : CY	Date : 04/12/07

Checked By : R.J. Date : 04/12/07

Boring No. : 06-1	Depth : (ft) : 54.0	55.5	
Sample No. : D-11	(m) : 16.47	16.93	

Description : Dark Gray, Poorly Graded Sand with Silt SP-SM)

	Before Washing Sample		After Wet Sieve
	Tested	Moisture	
Container Number	S-10	S-10	S-10
Wet Wt. of Soil + Cont. (gm)	443.47	443.47	
Dry Wt. of Soil + Cont. (gm)		388.90	365.32
Weight of Container (gm)	119.14	119.14	119.14
Weight of Dry Soil (gm)	269.76	269.76	246.18
Moisture Content (%)		20.23	

Sieve	Cimulative Weight	(%)
5"		
4"		
3"		
2.5"		
2.0"		
1.5"		
1.0"		
3/4"		
1/2"	0.00	100.00
3/8"	1.62	99.40
No. 4	4.09	98.48
Cu :	2.1	
Cc :	0.5	

Sieve	Cimulative Weight	(%)
No. 8	23.88	91.15
No. 10		
No. 16	66.87	75.21
No. 20		
No. 30	153.97	42.92
No. 40		
No. 50	216.23	19.84
No. 60		
No. 100	237.16	12.08
No. 200	245.85	8.86
Pan	246.24	
Gravel	Sand	Fine
2	89	9

Remark : 2

Prepared By : M.T.	Date : 02/19/07	Tested By : R.J.	Date : 03/01/07
Washed By : M.T.	Date : 02/22/07	Computed By : CY	Date : 04/12/07

Checked By : R.J. Date : 04/12/07

Boring No. : 06-1	Depth : (ft) : 64.0	65.5	
Sample No. : D-13	(m) : 19.52	19.98	

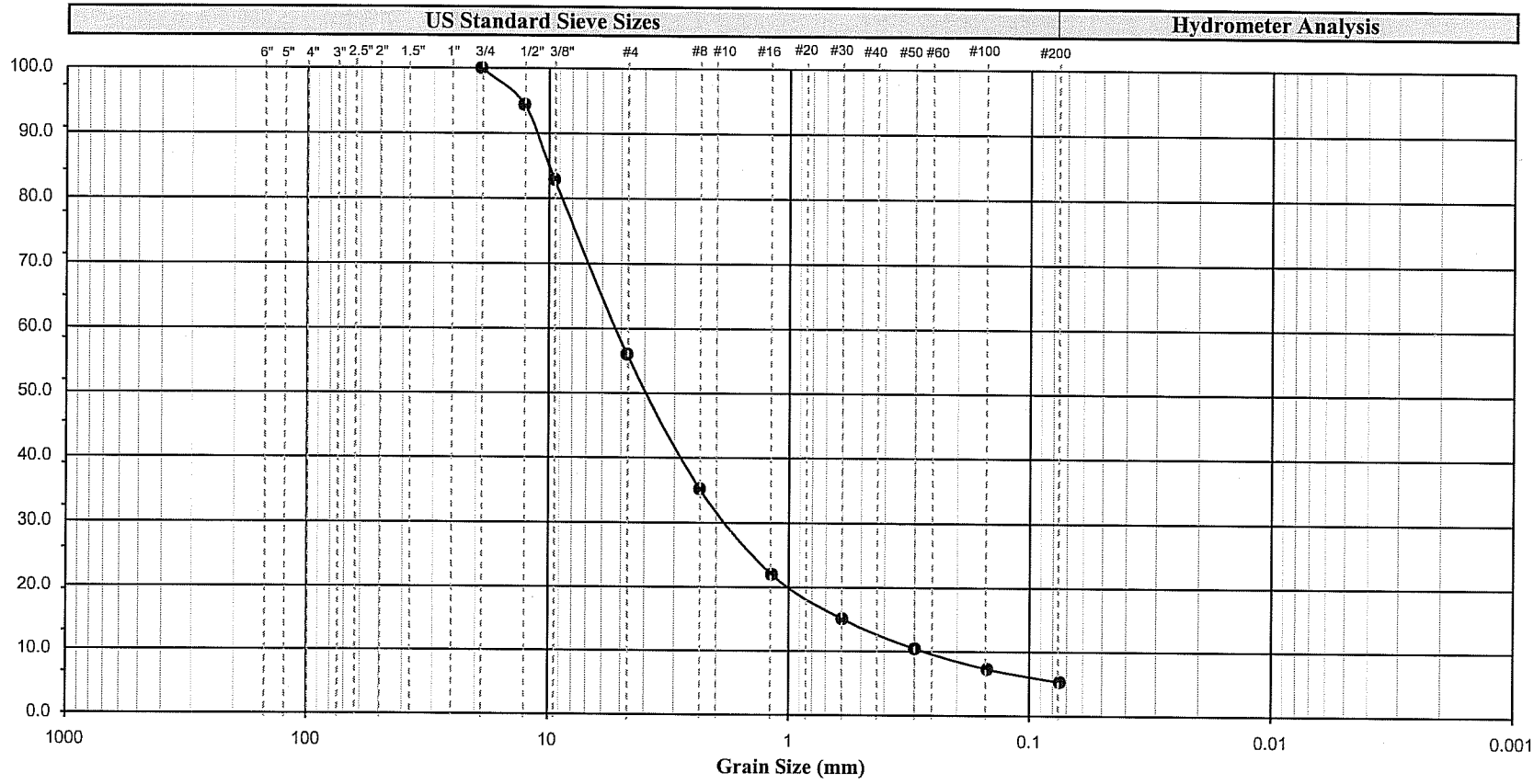
Description : Dark Gray, Silty Sand (SM)

	Before Washing Sample		After Wet Sieve
	Tested	Moisture	
Container Number	S-11	S-11	S-11
Wet Wt. of Soil + Cont. (gm)	443.49	443.49	
Dry Wt. of Soil + Cont. (gm)		378.12	344.13
Weight of Container (gm)	119.92	119.92	119.92
Weight of Dry Soil (gm)	258.20	258.2	224.21
Moisture Content (%)		25.32	

Sieve	Cimulative Weight	(%)
5"		
4"		
3"		
2.5"		
2.0"		
1.5"		
1.0"		
3/4"		
1/2"		
3/8"		
No. 4	0.00	100.00
Cu :		
Cc :		

Sieve	Cimulative Weight	(%)
No. 8	0.00	100.00
No. 10		
No. 16	0.05	99.98
No. 20		
No. 30	0.15	99.94
No. 40		
No. 50	4.34	98.32
No. 60		
No. 100	164.05	36.46
No. 200	223.71	13.36
Pan	224.24	
Gravel	Sand	Fine
0	87	13

Remark : 3



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

Symbol	Boring Number	Sample Number	Depth (ft)		Depth (m)		Soil Color	Soil Description	U.S.C.S.
●	06-1	D-2	9.0	10.5	2.75	3.20	Gray	Well graded sand with silt with gravel	SW-SM
Remark									

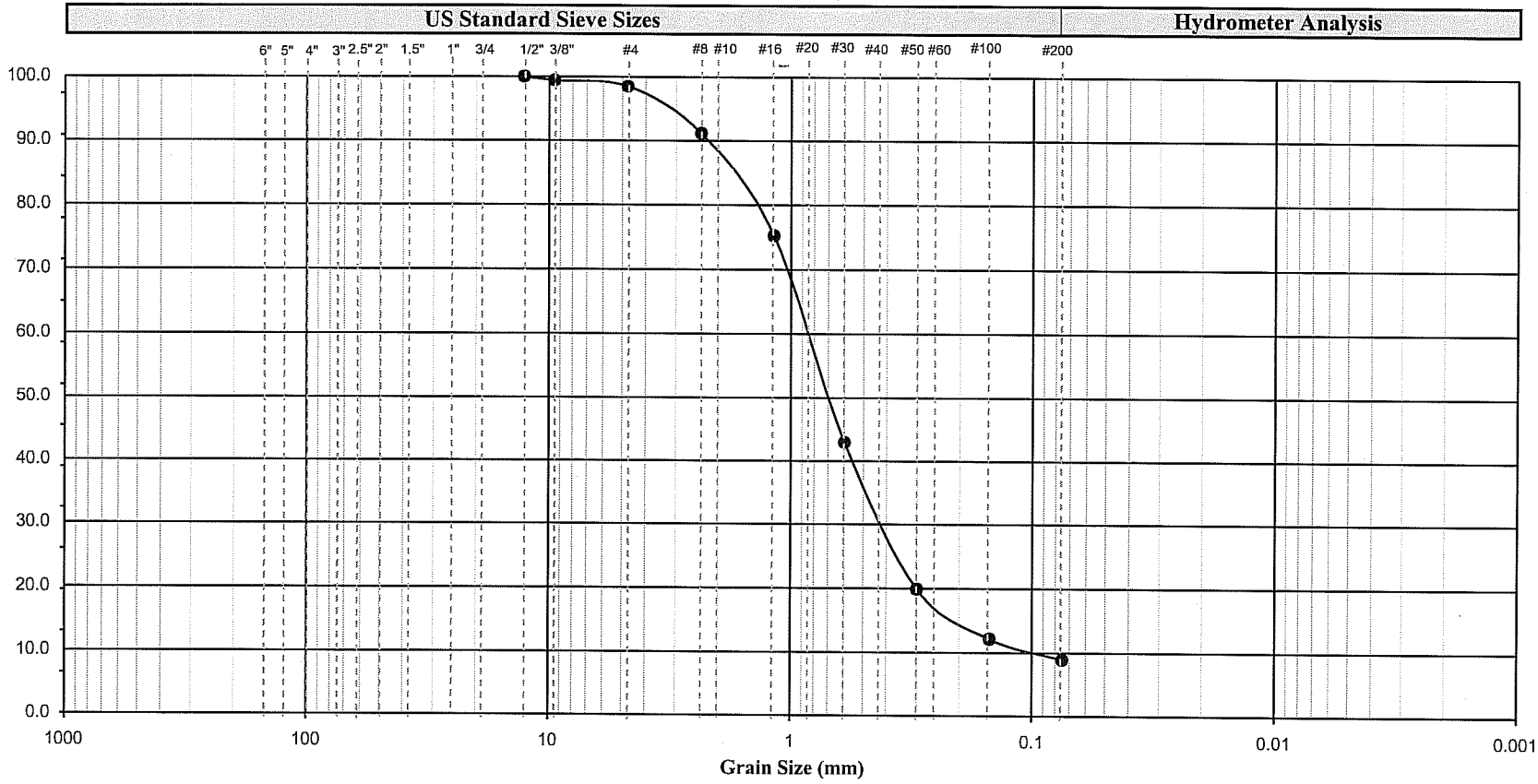
Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

BATA / Dumbarton Toll Bridge

Project No. : *06-155* **Date :** *03/01/07*

GRAIN SIZE ANALYSIS
(ASTM D-422-63)

Figure No. :



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

Symbol	Boring Number	Sample Number	Depth (ft)		Depth (m)		Soil Color	Soil Description	U.S.C.S.
●	06-1	D-11	54.0	55.5	16.47	16.93	Dark Gray	Poorly graded sand with silt	SP-SM
Remark									

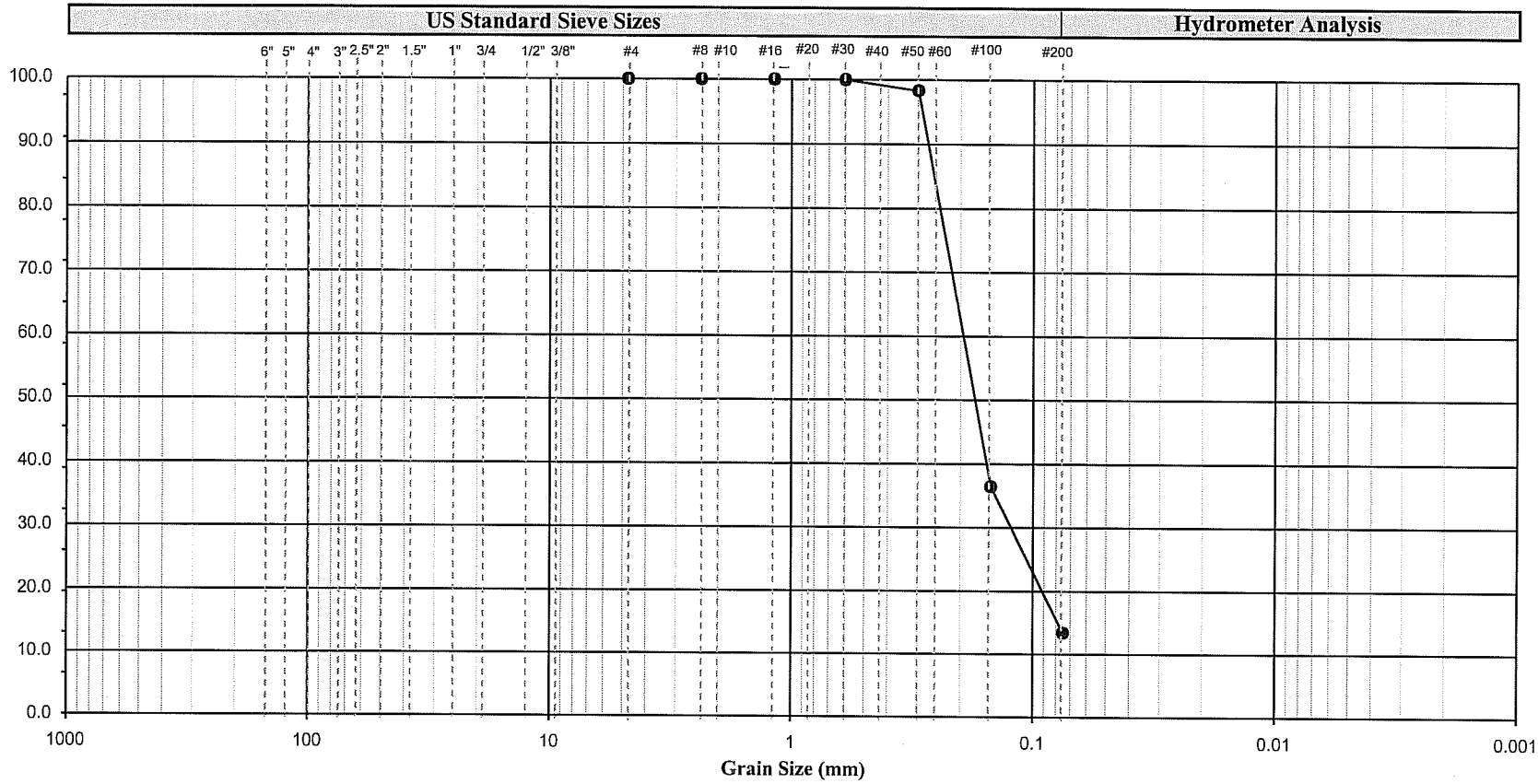
Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

BATA / Dumbarton Toll Bridge

Project No. : *06-155* **Date :** *03/01/07*

GRAIN SIZE ANALYSIS
(ASTM D-422-63)

Figure No. :



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

Symbol	Boring Number	Sample Number	Depth (ft)		Depth (m)		Soil Color	Soil Description	U.S.C.S.
●	06-1	D-13	64.0	65.5	19.52	19.98	Dark Gray	Silty sand	SM
Remark									

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

BATA / Dumbarton Toll Bridge

Project No. : 06-155

Date : 03/01/07

GRAIN SIZE ANALYSIS
(ASTM D-422-63)

Figure No. :

PARTICLE SIZE ANALYSIS OF SOIL

ASTM D-422-63 (Rev. 1990) / CT - 202, 203

Project No : 06-155	Project Name : BATA / Dumbarton Toll Bridge
Standard : ☑ CAL. TRAN. ☐ ASTM ☐ OTHER	

Prepared By : M.T.	Date : 02/19/07	Tested By : R.J.	Date : 03/01/07	Checked By : R.J.							
Washed By : M.T.	Date : 02/22/07	Computed By : CY	Date : 04/12/07	Date : 04/12/07							
Boring No. : 06-2	Depth : (ft) : 9.0	10.5									
Sample No. : D-2	(m) : 2.75	3.20									
Description : Dark Red, Clayey Sand with Gravel (SC)											

	Before Washing Sample		After Wet Sieve
	Tested	Moisture	
Container Number	S-8	S-8	S-8
Wet Wt. of Soil + Cont. (gm)	447.81	447.81	
Dry Wt. of Soil + Cont. (gm)		422.02	374.38
Weight of Container (gm)	115.86	115.86	115.86
Weight of Dry Soil (gm)	306.16	306.16	258.52
Moisture Content (%)		8.42	

Remark : 4

Sieve	Cimulative Weight	(%)
5"		
4"		
3"		
2.5"		
2.0"		
1.5"		
1.0"		
3/4"		
1/2"	0.00	100.00
3/8"	24.55	91.98
No. 4	102.43	66.54
Cu :		
Cc :		

Sieve	Cimulative Weight	(%)
No. 8	154.54	49.52
No. 10		
No. 16	190.13	37.90
No. 20		
No. 30	212.00	30.76
No. 40		
No. 50	229.23	25.13
No. 60		
No. 100	245.49	19.82
No. 200	257.98	15.74
Pan	315.46	
Gravel	Sand	Fine
33	51	16

Prepared By : M.T.	Date : 02/19/07	Tested By : R.J.	Date : 03/01/07	Checked By : R.J.							
Washed By : M.T.	Date : 02/22/07	Computed By : CY	Date : 04/12/07	Date : 04/12/07							
Boring No. : 06-2	Depth : (ft) : 64.0	65.5									
Sample No. : S-12	(m) : 19.52	19.98									
Description : Dark Greenish Gray, Poorly Graded Sand with Silt (SP-SM)											

	Before Washing Sample		After Wet Sieve
	Tested	Moisture	
Container Number	S-15	S-15	S-15
Wet Wt. of Soil + Cont. (gm)	532.10	532.10	
Dry Wt. of Soil + Cont. (gm)		460.75	418.07
Weight of Container (gm)	114.77	114.77	114.77
Weight of Dry Soil (gm)	345.98	345.98	303.3
Moisture Content (%)		20.62	

Remark : 5

Sieve	Cimulative Weight	(%)
5"		
4"		
3"		
2.5"		
2.0"		
1.5"		
1.0"		
3/4"		
1/2"		
3/8"	0.00	100.00
No. 4	1.98	99.43
Cu :		
Cc :		

Sieve	Cimulative Weight	(%)
No. 8	12.52	96.38
No. 10		
No. 16	41.64	87.96
No. 20		
No. 30	99.86	71.14
No. 40		
No. 50	218.53	36.84
No. 60		
No. 100	288.72	16.55
No. 200	302.88	12.46
Pan	303.23	
Gravel	Sand	Fine
1	87	12

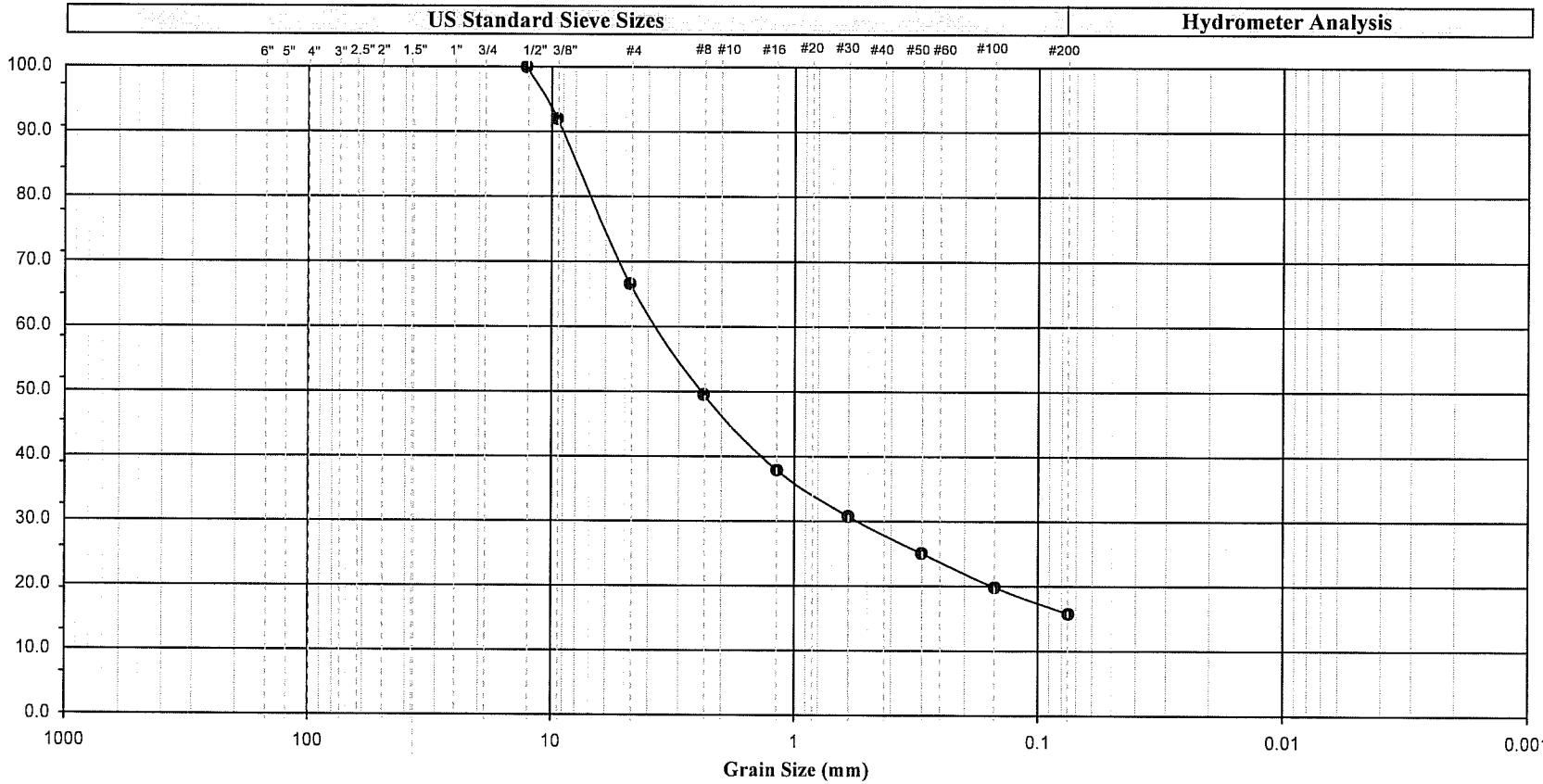
Prepared By : M.T.	Date : 02/21/07	Tested By : R.J.	Date : 03/01/07	Checked By : R.J.							
Washed By : M.T.	Date : 02/22/07	Computed By : CY	Date : 04/12/07	Date : 04/12/07							
Boring No. : 06-2	Depth : (ft) : 84.0	85.5									
Sample No. : S-16	(m) : 25.62	26.08									
Description : Dark Greenish Gray, Poorly Graded Sand with Silt (SP-SM)											

	Before Washing Sample		After Wet Sieve
	Tested	Moisture	
Container Number	S-17	S-17	S-17
Wet Wt. of Soil + Cont. (gm)	461.11	461.11	
Dry Wt. of Soil + Cont. (gm)		396.86	373.45
Weight of Container (gm)	114.81	114.81	114.81
Weight of Dry Soil (gm)	282.05	282.05	258.64
Moisture Content (%)		22.78	

Remark : 6

Sieve	Cimulative Weight	(%)
5"		
4"		
3"		
2.5"		
2.0"		
1.5"		
1.0"		
3/4"		
1/2"		
3/8"	0.00	100.00
No. 4	0.99	99.65
Cu :	3.8	
Cc :	1.3	

Sieve	Cimulative Weight	(%)
No. 8	3.50	98.76
No. 10		
No. 16	8.52	96.98
No. 20		
No. 30	27.81	90.14
No. 40		
No. 50	148.56	47.33
No. 60		
No. 100	244.86	13.19
No. 200	258.69	8.28
Pan	258.89	
Gravel	Sand	Fine
0	92	8



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

Symbol	Boring Number	Sample Number	Depth (ft)		Depth (m)		Soil Color	Soil Description	U.S.C.S.
●	06-2	D-2	9.0	10.5	2.75	3.20	Dark Red	Clayey sand with gravel	SC
Remark									

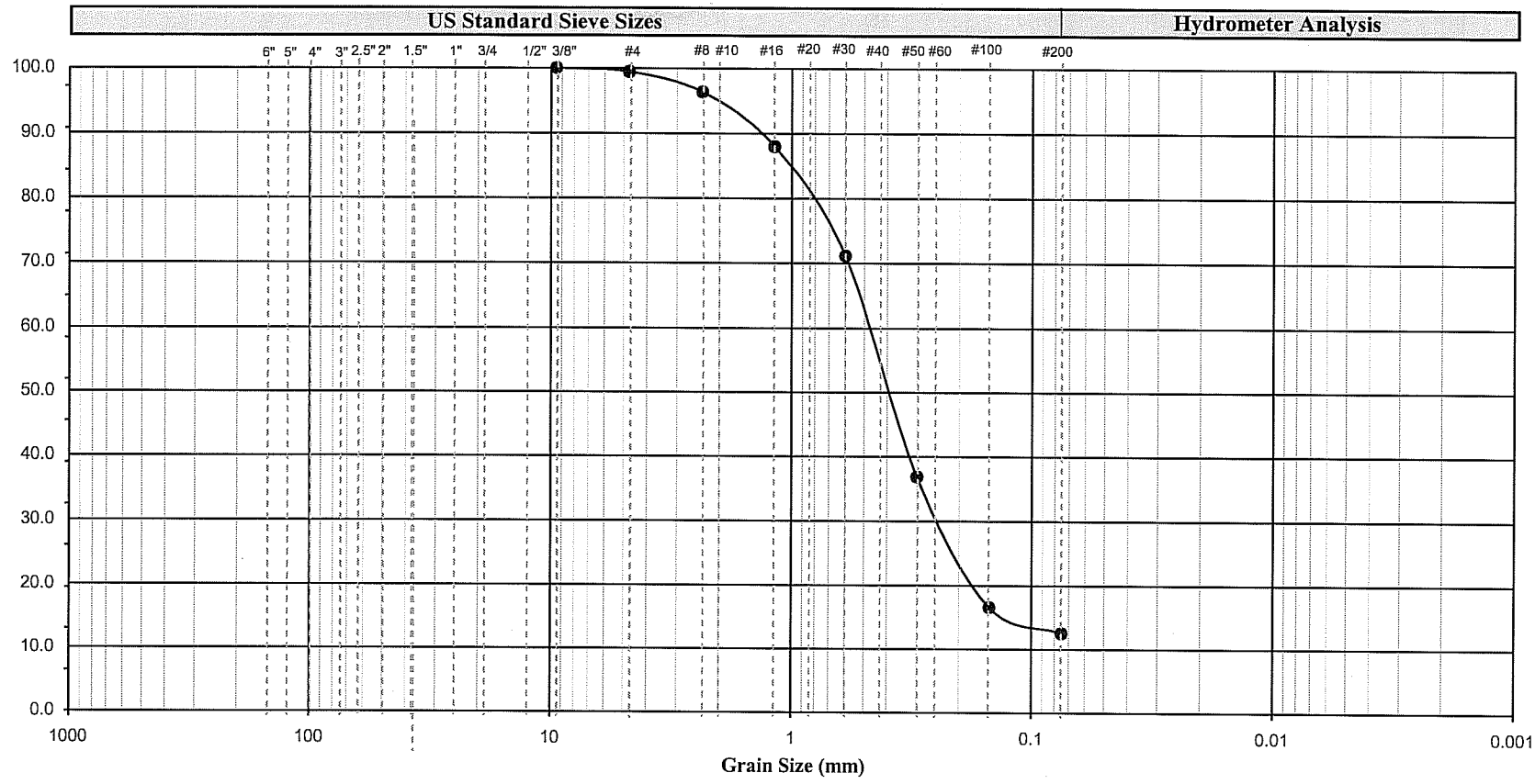
Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

BATA / Dumbarton Toll Bridge

Project No. : 06-155 Date : 03/01/07

GRAIN SIZE ANALYSIS
(ASTM D-422-63)

Figure No. :



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

Symbol	Boring Number	Sample Number	Depth (ft)		Depth (m)		Soil Color	Soil Description	U.S.C.S.
●	06-2	S-12	64.0	65.5	19.52	19.98	Dark Greenish Gray	Poorly graded sand with silt	SP-SM
Remark									

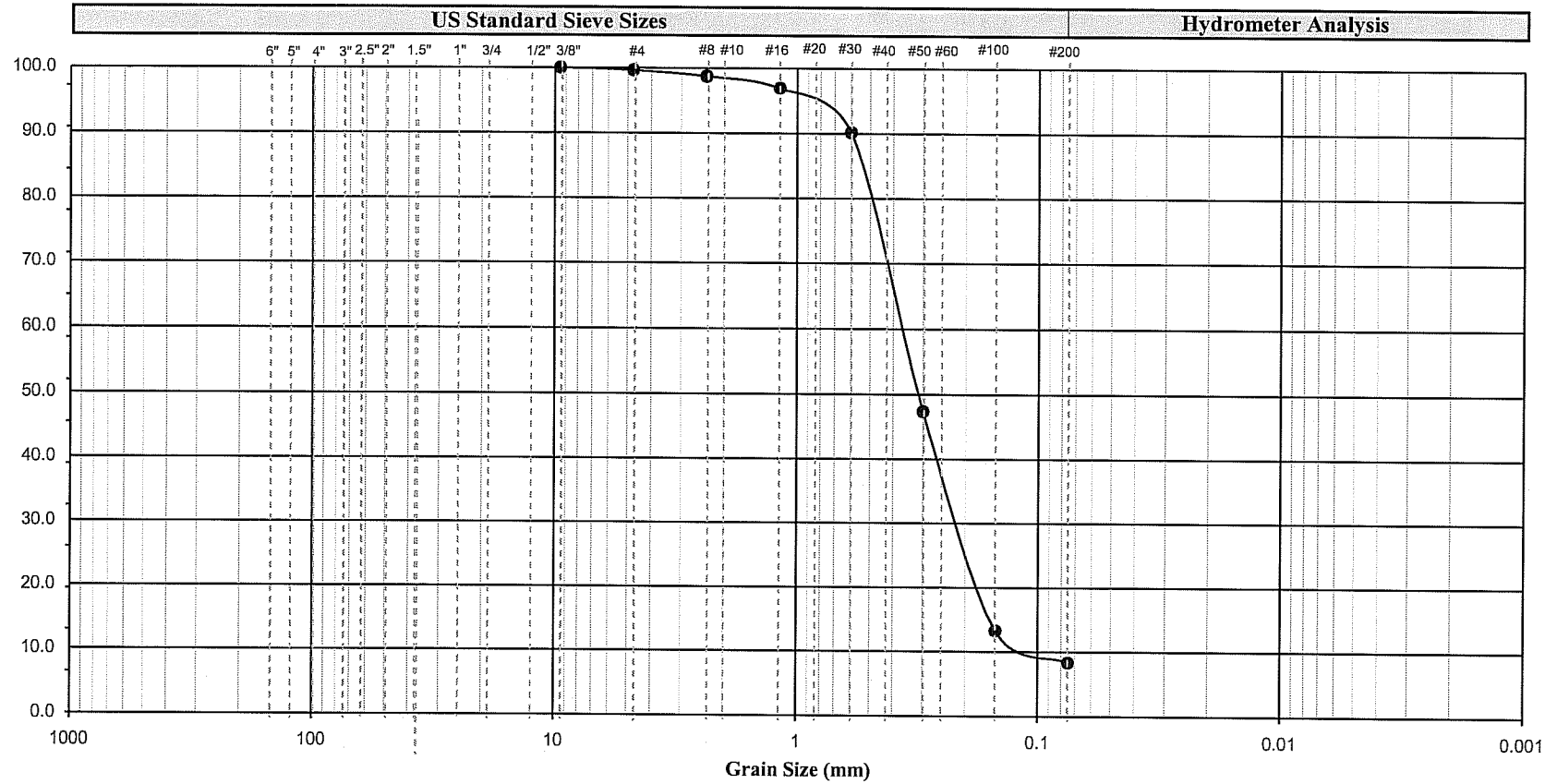
Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

BATA / Dumbarton Toll Bridge

Project No. : *06-155* **Date :** *03/01/07*

GRAIN SIZE ANALYSIS
(ASTM D-422-63)

Figure No. :



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

Symbol	Boring Number	Sample Number	Depth (ft)		Depth (m)		Soil Color	Soil Description	U.S.C.S.
●	06-2	S-16	84.0	85.5	25.62	26.08	Dark Greenish Gray	Poorly graded sand with silt	SP-SM
Remark									

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

BATA / Dumbarton Toll Bridge

Project No. : *06-155*

Date : *03/01/07*

GRAIN SIZE ANALYSIS
(ASTM D-422-63)

Figure No. :

PARTICLE SIZE ANALYSIS OF SOIL

ASTM D-422-63 (Rev. 1990) / CT - 202, 203

Project No : 06-155	Project Name : BATA / Dumbarton Toll Bridge
Standard : ☑ CAL. TRAN. ☐ ASTM ☐ OTHER	

Prepared By : M.T.	Date : 02/21/07	Tested By : R.J.	Date : 03/01/07	Checked By : R.J.							
Washed By : M.T.	Date : 02/22/07	Computed By : CY	Date : 04/12/07	Date : 04/12/07							
Boring No. : 06-3	Depth : (ft) : 62.0	63.5									
Sample No. : S-12	(m) : 18.91	19.37									
Description : Dark Gray, Poorly Grade Sand with Silt (SP-SM)											

	Before Washing Sample		After Wet Sieve
	Tested	Moisture	
Container Number	S-2	S-2	S-2
Wet Wt. of Soil + Cont. (gm)	537.05	537.05	
Dry Wt. of Soil + Cont. (gm)		466.11	423.81
Weight of Container (gm)	116.84	116.84	116.84
Weight of Dry Soil (gm)	349.27	349.27	306.97
Moisture Content (%)		20.31	

Sieve	Cimulative Weight	(%)	Sieve	Cimulative Weight	(%)
5"			No. 8	1.06	99.70
4"			No. 10		
3"			No. 16	4.61	98.68
2.5"			No. 20		
2.0"			No. 30	27.36	92.17
1.5"			No. 40		
1.0"			No. 50	174.97	49.90
3/4"			No. 60		
1/2"			No. 100	279.66	19.93
3/8"			No. 200	306.10	12.36
No. 4	0.00	100.00	Pan	306.93	
Cu :			Gravel	Sand	Fine
Cc :			0	88	12

Remark :

7

Prepared By : M.T.	Date : 02/21/07	Tested By : R.J.	Date : 03/01/07	Checked By : R.J.							
Washed By : M.T.	Date : 02/22/07	Computed By : CY	Date : 04/12/07	Date : 04/12/07							
Boring No. : 06-3	Depth : (ft) : 72.0	73.5									
Sample No. : S-14	(m) : 21.96	22.42									
Description : Dark Gray, Poorly Grade Sand with Silt and Gravel (SP-SM)											

	Before Washing Sample		After Wet Sieve
	Tested	Moisture	
Container Number	S-18	S-18	S-18
Wet Wt. of Soil + Cont. (gm)	427.63	427.63	
Dry Wt. of Soil + Cont. (gm)		381.38	555.89
Weight of Container (gm)	115.63	115.63	115.63
Weight of Dry Soil (gm)	265.75	265.75	440.26
Moisture Content (%)		17.40	

Sieve	Cimulative Weight	(%)	Sieve	Cimulative Weight	(%)
5"			No. 8	64.57	75.70
4"			No. 10		
3"			No. 16	83.92	68.42
2.5"			No. 20		
2.0"			No. 30	104.41	60.71
1.5"			No. 40		
1.0"			No. 50	195.03	26.61
362.26	0.00	100.00	No. 60		
1/2"	15.42	94.20	No. 100	238.63	10.21
3/8"	25.77	90.30	No. 200	246.25	7.34
No. 4	42.46	84.02	Pan	246.45	
Cu :	4.1		Gravel	Sand	Fine
Cc :	1.3		16	77	7

Remark :

8

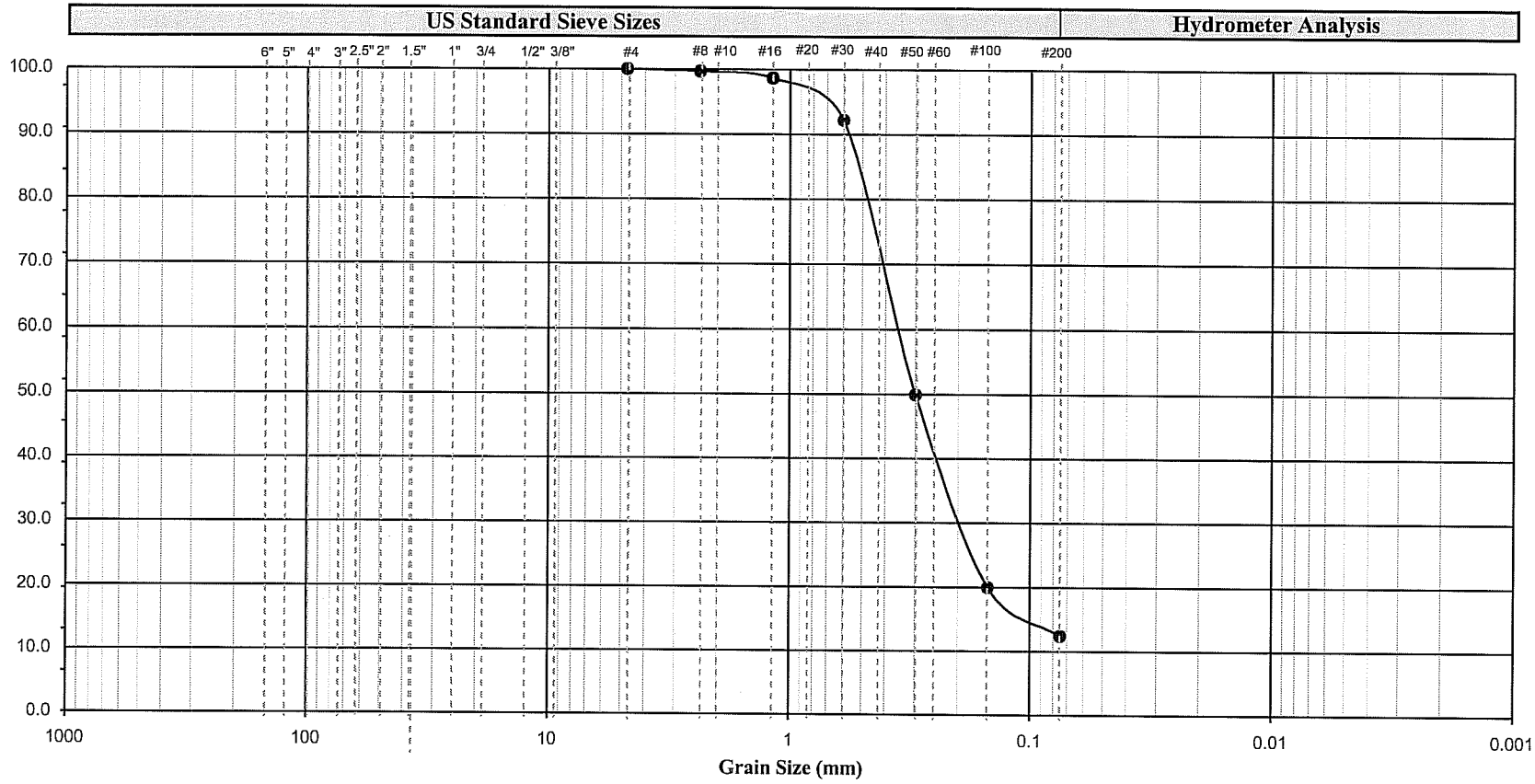
Prepared By : M.T.	Date : 02/21/07	Tested By : R.J.	Date : 03/01/07	Checked By : R.J.							
Washed By : M.T.	Date : 02/22/07	Computed By : CY	Date : 04/12/07	Date : 04/12/07							
Boring No. : 06-9	Depth : (ft) : 60.0	61.5									
Sample No. : S-12	(m) : 18.30	18.76									
Description : Gray, Poorly Grade Sand with Silt and Gravel (SP-SM)											

	Before Washing Sample		After Wet Sieve
	Tested	Moisture	
Container Number	S-20	S-20	S-20
Wet Wt. of Soil + Cont. (gm)	434.30	434.30	
Dry Wt. of Soil + Cont. (gm)		398.78	383.57
Weight of Container (gm)	115.16	115.16	115.16
Weight of Dry Soil (gm)	283.62	283.62	268.41
Moisture Content (%)		12.52	

Sieve	Cimulative Weight	(%)	(%)	Cimulative Weight	(%)
5"			No. 8	181.38	36.05
4"			No. 10		
3"			No. 16	229.03	19.25
2.5"			No. 20		
2.0"			No. 30	241.86	14.72
1.5"			No. 40		
1.0"			No. 50	247.38	12.78
3/4"	0.00	100.00	No. 60		
1/2"	17.92	93.68	No. 100	260.98	7.98
3/8"	35.60	87.45	No. 200	268.05	5.49
No. 4	94.80	66.57	Pan	268.37	
Cu :	19.9		Gravel	Sand	Fine
Cc :	4.1		33	62	5

Remark :

9



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

Symbol	Boring Number	Sample Number	Depth (ft)		Depth (m)		Soil Color	Soil Description	U.S.C.S.
●	06-3	S-12	62.0	63.5	18.91	19.37	Dark Gray	Poorly graded sand with silt	SP-SM
Remark									

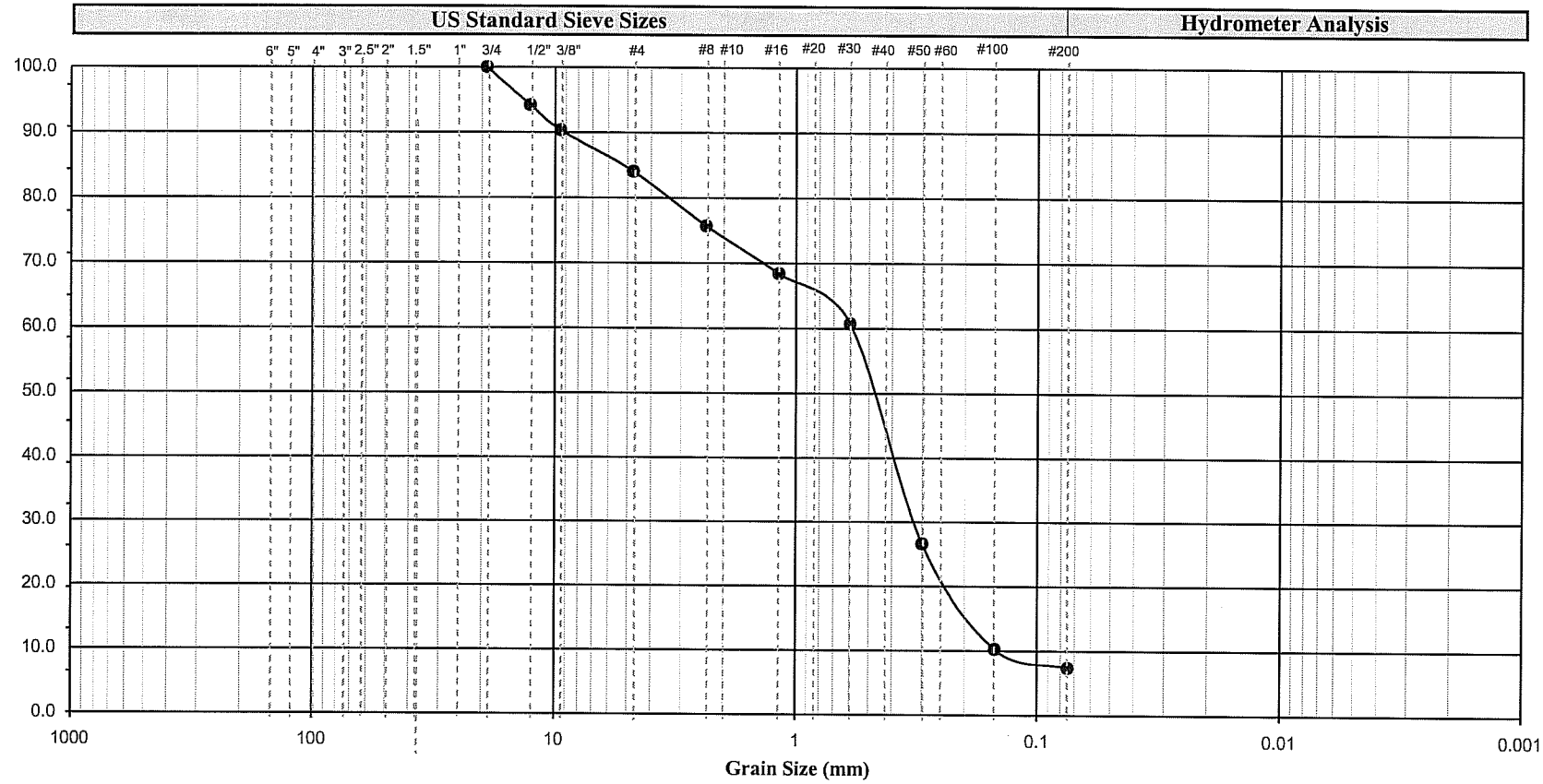
Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

BATA / Dumbarton Toll Bridge

Project No. : 06-155 **Date :** 03/01/07

GRAIN SIZE ANALYSIS
(ASTM D-422-63)

Figure No. :



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

Symbol	Boring Number	Sample Number	Depth (ft)		Depth (m)		Soil Color	Soil Description	U.S.C.S.
●	06-3	S-14	72.0	73.5	21.96	22.42	Dark Gray	Poorly graded sand with silt with gravel	SP-SM
Remark									

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

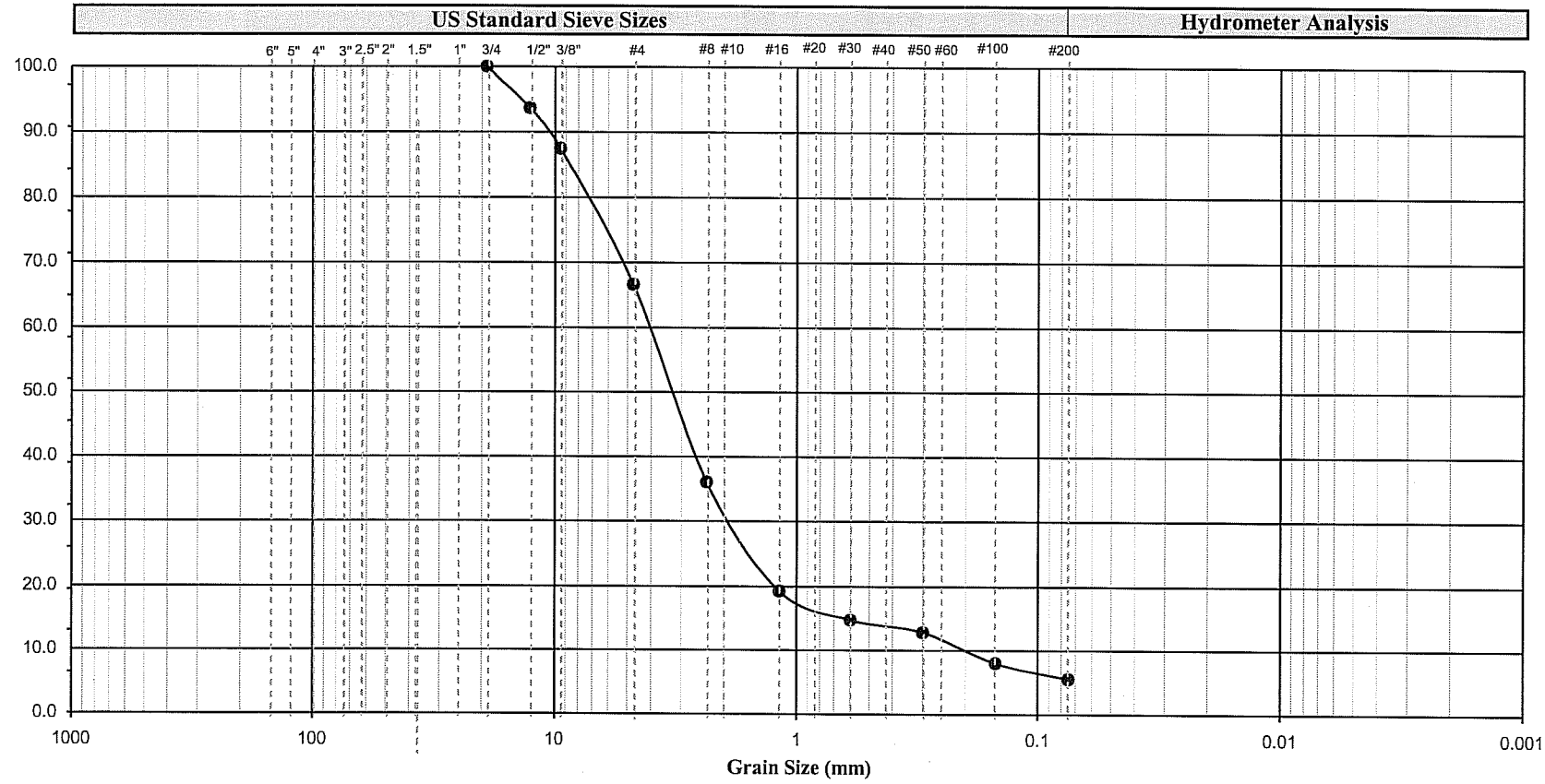
BATA / Dumbarton Toll Bridge

Project No. : *06-155*

Date : *03/01/07*

GRAIN SIZE ANALYSIS
(ASTM D-422-63)

Figure No. :



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

Symbol	Boring Number	Sample Number	Depth (ft)		Depth (m)		Soil Color	Soil Description	U.S.C.S.
●	06-9	S-12	60.0	61.5	18.30	18.76	Gray	Poorly graded sand with silt with gravel	SP-SM
Remark									

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

BATA / Dumbarton Toll Bridge

Project No. : *06-155*

Date : *03/01/07*

GRAIN SIZE ANALYSIS
(ASTM D-422-63)

Figure No. :

PARTICLE SIZE ANALYSIS OF SOIL

ASTM D-422-63 (Rev. 1990) / CT - 202, 203

Project No : 06-159	Project Name : BATA / Dumbarton Toll Bridge
Standard : ☐ CAL. TRAN. ☑ ASTM ☐ OTHER	

Prepared By : M.T. Date : 02/14/07 | Tested By : M.T. Date : 02/19/07 | Checked By : R.J.
Washed By : M.T. Date : 02/15/07 | Computed By : CY Date : 02/21/07 | Date : 02/21/07

Boring No. : 06-8 | Depth : (ft) : 43.0 | 44.5
Sample No. : S-8 | (m) : 13.12 | 13.57

Description : Dark Grey, Poorly Graded Sand with Gravel (SP)

	Before Washing Sample		After Wet Sieve
	Tested	Moisture	
Container Number	S-4	S-4	S-4
Wet Wt. of Soil + Cont. (gm)	529.14	529.14	
Dry Wt. of Soil + Cont. (gm)		481.63	466.77
Weight of Container (gm)	118.07	118.07	118.07
Weight of Dry Soil (gm)	363.56	363.56	348.7
Moisture Content (%)		13.07	

Sieve	Cimulative Weight	(%)
5"		
4"		
3"		
2.5"		
2.0"		
1.5"		
1.0"		
3/4"	0.00	100.00
1/2"	13.86	96.19
3/8"	24.62	93.23
No. 4	70.57	80.59
Cu :	10.2	
Cc :	0.6	

Sieve	Cimulative Weight	(%)
No. 8	125.76	65.41
No. 10		
No. 16	180.27	50.42
No. 20		
No. 30	227.22	37.50
No. 40		
No. 50	292.71	19.49
No. 60		
No. 100	339.96	6.49
No. 200	349.20	3.95
Pan	349.30	
Gravel	Sand	Fine
19	77	4

Remark :
1

Prepared By : M.T. Date : 02/14/07 | Tested By : M.T. Date : 02/19/07 | Checked By : R.J.
Washed By : M.T. Date : 02/15/07 | Computed By : CY Date : 02/21/07 | Date : 02/21/07

Boring No. : 06-8 | Depth : (ft) : 48.0 | 49.5
Sample No. : D-9 | (m) : 14.64 | 15.10

Description : Dark Bluish Grey, Silty Sand (SM)

	Before Washing Sample		After Wet Sieve
	Tested	Moisture	
Container Number	S-10	S-10	S-10
Wet Wt. of Soil + Cont. (gm)	416.02	416.02	
Dry Wt. of Soil + Cont. (gm)		352.56	300.03
Weight of Container (gm)	119.14	119.14	119.14
Weight of Dry Soil (gm)	233.42	233.42	180.89
Moisture Content (%)		27.19	

Sieve	Cimulative Weight	(%)
5"		
4"		
3"		
2.5"		
2.0"		
1.5"		
1.0"		
3/4"		
1/2"	0.00	100.00
3/8"	2.80	98.80
No. 4	11.36	95.13
Cu :		
Cc :		

Sieve	Cimulative Weight	(%)
No. 8	20.76	91.11
No. 10		
No. 16	31.19	86.64
No. 20		
No. 30	44.55	80.91
No. 40		
No. 50	80.68	65.44
No. 60		
No. 100	145.00	37.88
No. 200	180.32	22.75
Pan	181.20	
Gravel	Sand	Fine
5	72	23

Remark :
2

Prepared By : M.T. Date : 02/14/07 | Tested By : M.T. Date : 02/19/07 | Checked By : R.J.
Washed By : M.T. Date : 02/15/07 | Computed By : CY Date : 02/21/07 | Date : 02/21/07

Boring No. : 06-8 | Depth : (ft) : 53.0 | 54.5
Sample No. : S-10 | (m) : 16.17 | 16.62

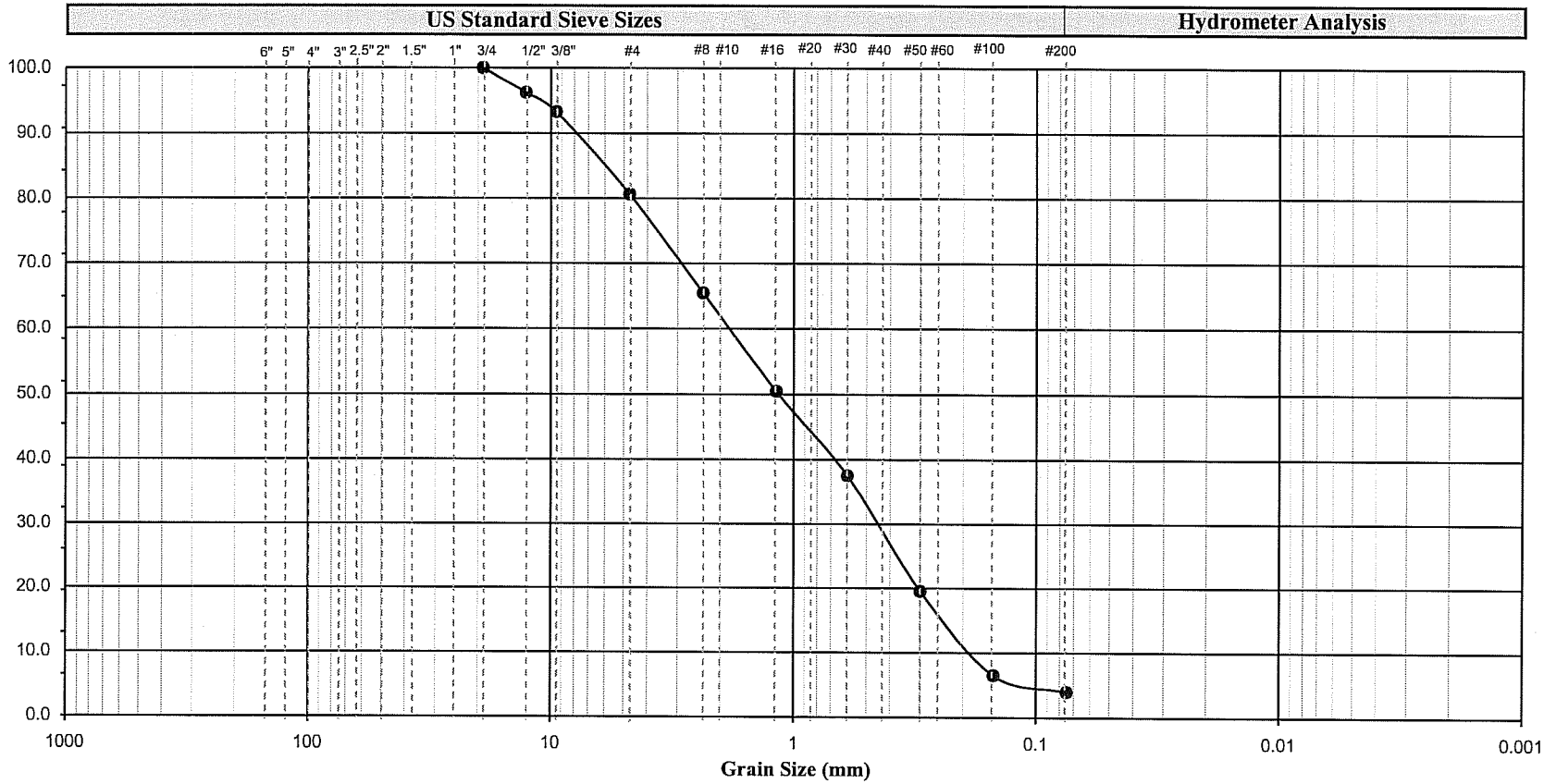
Description : Dark Gray, Poorly Graded Sand with Silty and Gravel (SP-SM)

	Before Washing Sample		After Wet Sieve
	Tested	Moisture	
Container Number	S-5	S-5	S-5
Wet Wt. of Soil + Cont. (gm)	438.05	438.05	
Dry Wt. of Soil + Cont. (gm)		402.20	389.17
Weight of Container (gm)	117.75	117.75	117.75
Weight of Dry Soil (gm)	284.45	284.45	271.42
Moisture Content (%)		12.60	

Sieve	Cimulative Weight	(%)
5"		
4"		
3"		
2.5"		
2.0"		
1.5"		
1.0"		
3/4"	0.00	100.00
1/2"	12.46	95.62
3/8"	25.25	91.12
No. 4	52.65	81.49
Cu :	7.0	
Cc :	0.8	

Sieve	Cimulative Weight	(%)
No. 8	88.18	69.00
No. 10		
No. 16	121.60	57.25
No. 20		
No. 30	170.57	40.04
No. 40		
No. 50	240.92	15.30
No. 60		
No. 100	265.16	6.78
No. 200	271.51	4.55
Pan	271.62	
Gravel	Sand	Fine
19	76	5

Remark :
3



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

Symbol	Boring Number	Sample Number	Depth (ft)		Depth (m)		Soil Color	Soil Description	U.S.C.S.
●	06-8	S-8	43.0	44.5	13.12	13.57	Dark Grey	Poorly graded sand with gravel	SP
Remark									

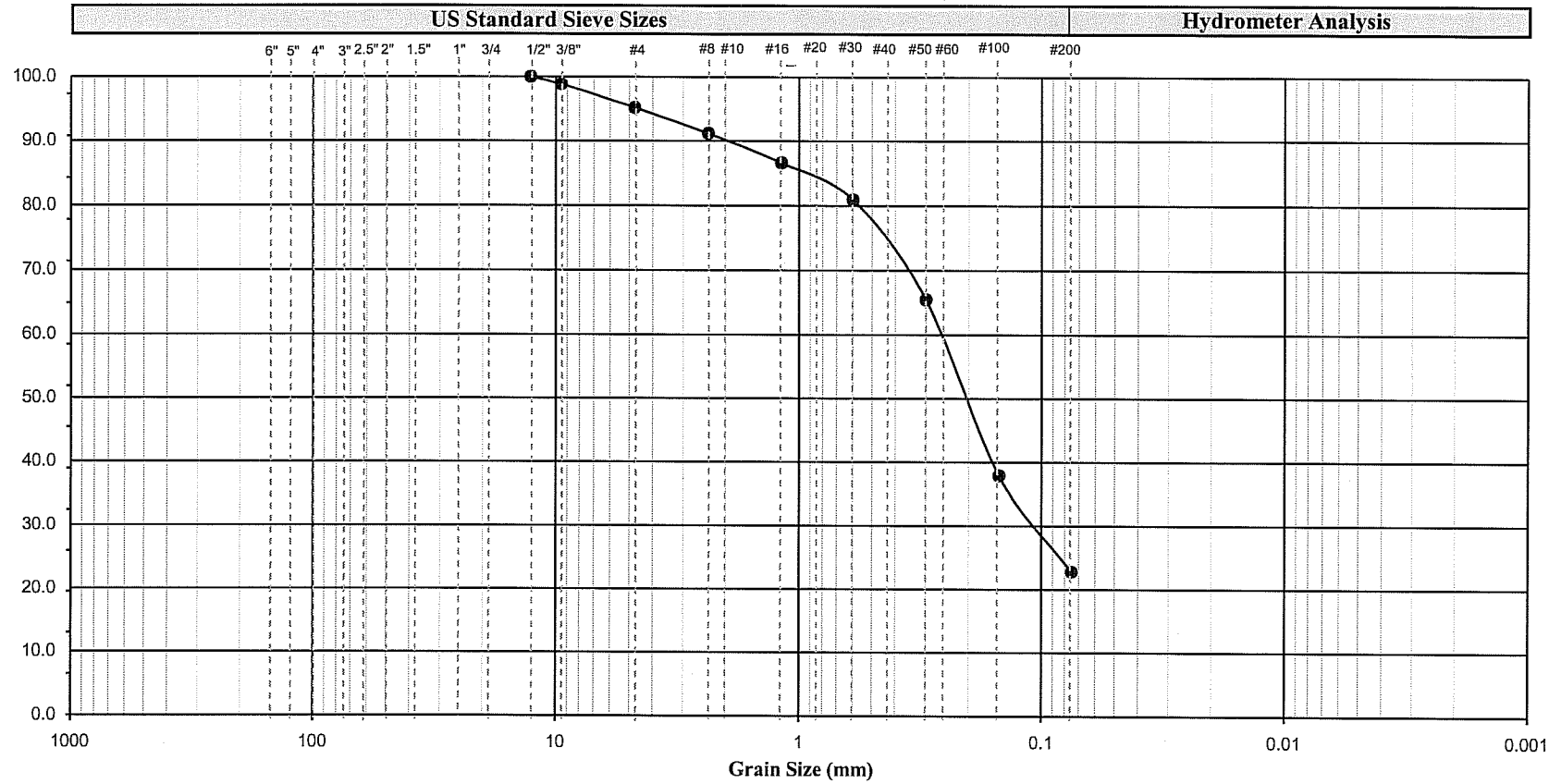
Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

BATA / Dumbarton Toll Bridge

Project No. : 06-159 Date : 02/19/07

GRAIN SIZE ANALYSIS
(ASTM D-422-63)

Figure No. :



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

Symbol	Boring Number	Sample Number	Depth (ft)		Depth (m)		Soil Color	Soil Description	U.S.C.S.
●	06-8	D-9	48.0	49.5	14.64	15.10	Dark Bluish Grey	Silty sand	SM
Remark									

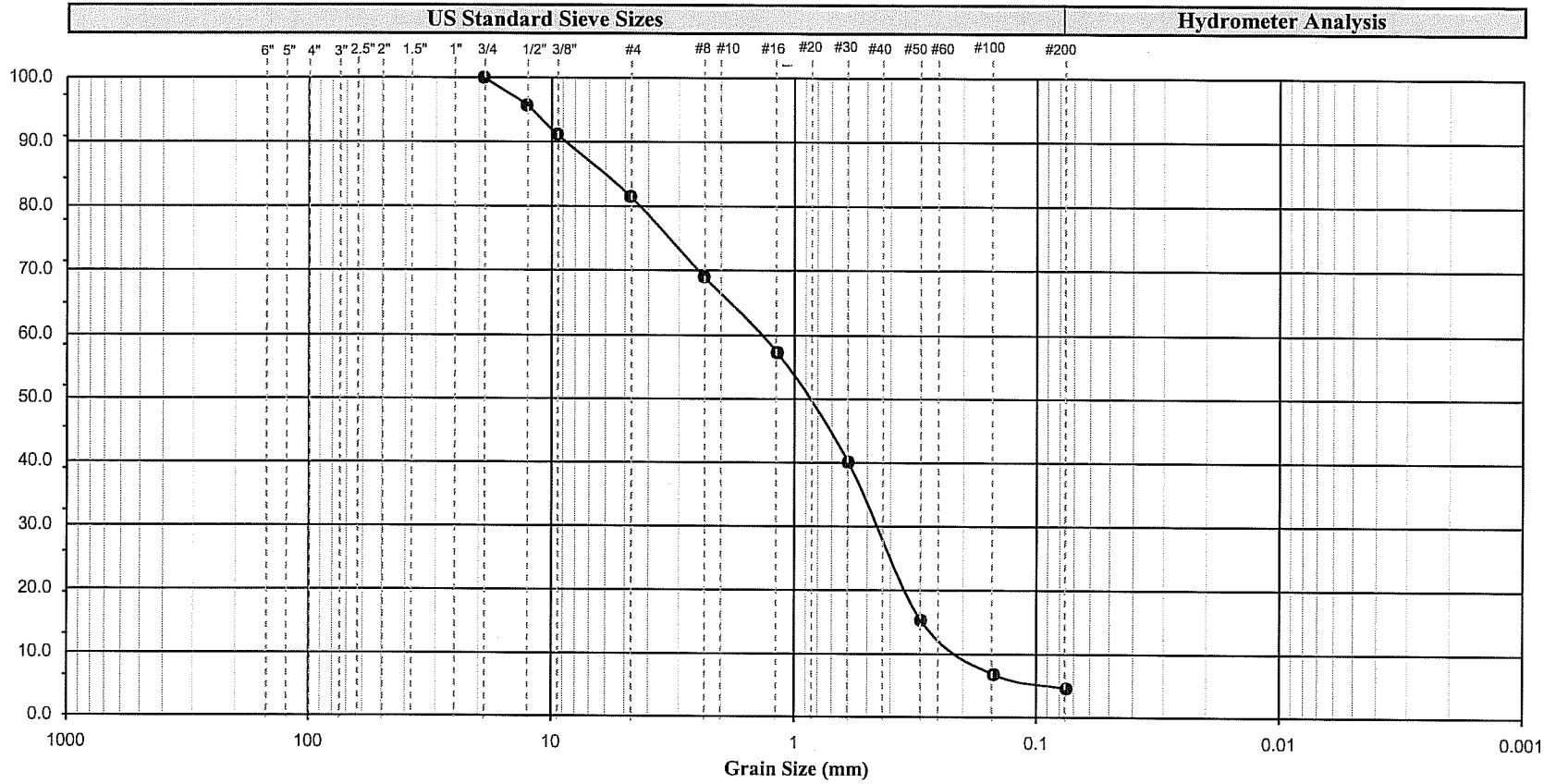
Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

BATA / Dumbarton Toll Bridge

Project No. : *06-159* **Date :** *02/19/07*

GRAIN SIZE ANALYSIS
(ASTM D-422-63)

Figure No. :



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

Symbol	Boring Number	Sample Number	Depth (ft)		Depth (m)		Soil Color	Soil Description	U.S.C.S.
●	06-8	S-10	53.0	54.5	16.17	16.62	Dark Grey	Poorly graded sand with silt with gravel	SP-SM
Remark									

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

BATA / Dumbarton Toll Bridge

Project No. : *06-159*

Date : *02/19/07*

GRAIN SIZE ANALYSIS
(ASTM D-422-63)

Figure No. :

PARTICLE SIZE ANALYSIS OF SOIL

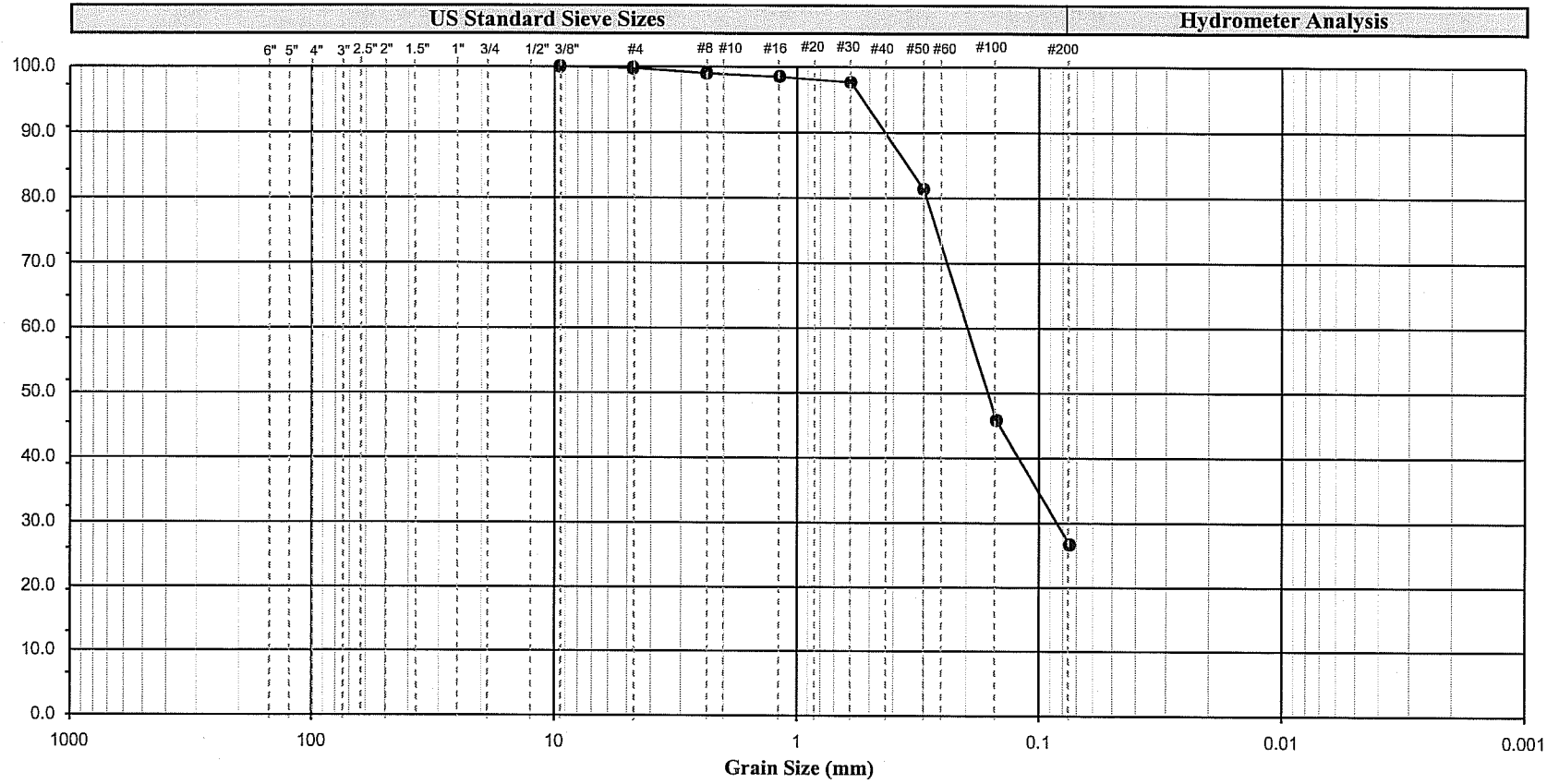
ASTM D-422-63 (Rev. 1990) / CT - 202, 203

Project No : 06-155	Project Name : BATA / Dumbarton Toll Bridge
Standard : ☑ CAL. TRAN. ☐ ASTM ☐ OTHER	

Prepared By : M.T.	Date : 04/03/07	Tested By : M.T.	Date : 04/13/07	Checked By : R.J.							
Washed By : M.T.	Date : 04/12/07	Computed By : CY	Date : 05/31/07	Date : 05/31/07							
Boring No. : 06-11	Depth : (ft) : 45.0	46.5	Sieve	Cimulative Weight	(%)	Sieve	Cimulative Weight	(%)			
Sample No. : S-8	(m) : 13.73	14.18									
Description : Olive Brown, Silty Sand (SM)			5"			No. 8	0.88	99.04			
			4"			No. 10					
	Before Washing Sample	After Wet Sieve	3"			No. 16	1.33	98.55			
	Tested	Moisture	2.5"			No. 20					
Container Number	S-21	S-21	S-21	2.0"			No. 30	2.15	97.66		
Wet Wt. of Soil + Cont. (gm)	225.34	225.34		1.5"			No. 40				
Dry Wt. of Soil + Cont. (gm)		206.63	183.03	1.0"			No. 50	17.12	81.39		
Weight of Container (gm)	114.65	114.65	114.65	3/4"			No. 60				
Weight of Dry Soil (gm)	91.98	91.98	68.38	1/2"			No. 100	49.83	45.83		
Moisture Content (%)		20.34		3/8"	0.00	100.00	No. 200	67.48	26.64		
Remark :				No. 4	0.22	99.76	Pan	68.43			
1				Cu :			Gravel	Sand	Fine		
				Cc :			0	73	27		

Prepared By : M.T.	Date : 04/03/07	Tested By : M.T.	Date : 04/13/07	Checked By : R.J.							
Washed By : M.T.	Date : 04/12/07	Computed By : CY	Date : 05/31/07	Date : 05/31/07							
Boring No. : 06-11	Depth : (ft) : 65.0	66.5	Sieve	Cimulative Weight	(%)	Sieve	Cimulative Weight	(%)			
Sample No. : S-12	(m) : 19.83	20.28									
Description : Olive Brown, Silty Sand (SM)			5"			No. 8	0.00	100.00			
			4"			No. 10					
	Before Washing Sample	After Wet Sieve	3"			No. 16	0.20	99.91			
	Tested	Moisture	2.5"			No. 20					
Container Number	S-24	S-24	S-24	2.0"			No. 30	1.01	99.55		
Wet Wt. of Soil + Cont. (gm)	388.42	388.42		1.5"			No. 40				
Dry Wt. of Soil + Cont. (gm)		338.88	237.51	1.0"			No. 50	2.26	99.00		
Weight of Container (gm)	113.11	113.11	113.11	3/4"			No. 60				
Weight of Dry Soil (gm)	225.77	225.77	124.4	1/2"			No. 100	22.75	89.92		
Moisture Content (%)		21.94		3/8"			No. 200	118.92	47.33		
Remark :				No. 4	0.00	100.00	Pan	124.49			
2				Cu :			Gravel	Sand	Fine		
				Cc :			0	53	47		

Prepared By : M.T.	Date : 04/03/07	Tested By : M.T.	Date : 04/13/07	Checked By : R.J.							
Washed By : M.T.	Date : 04/12/07	Computed By : CY	Date : 05/31/07	Date : 05/31/07							
Boring No. : 06-11	Depth : (ft) : 80.0	81.5	Sieve	Cimulative Weight	(%)	Sieve	Cimulative Weight	(%)			
Sample No. : D-15	(m) : 24.40	24.86									
Description : Olive, Lean Clay with Sand (CL)			5"			No. 8	0.12	99.96			
			4"			No. 10					
	Before Washing Sample	After Wet Sieve	3"			No. 16	0.68	99.78			
	Tested	Moisture	2.5"			No. 20					
Container Number	S-3	S-3	S-3	2.0"			No. 30	1.24	99.60		
Wet Wt. of Soil + Cont. (gm)	505.86	505.86		1.5"			No. 40				
Dry Wt. of Soil + Cont. (gm)		430.67	207.11	1.0"			No. 50	1.30	99.58		
Weight of Container (gm)	118.18	118.18	118.18	3/4"			No. 60				
Weight of Dry Soil (gm)	312.49	312.49	88.93	1/2"			No. 100	14.71	95.29		
Moisture Content (%)		24.06		3/8"			No. 200	73.18	76.58		
Remark :				No. 4	0.00	100.00	Pan	89.06			
3				Cu :			Gravel	Sand	Fine		
				Cc :			0	23	77		



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

Symbol	Boring Number	Sample Number	Depth (ft)		Depth (m)		Soil Color	Soil Description	U.S.C.S.
●	06-11	S-8	45.0	46.5	13.73	14.18	Olive Brown	Silty sand	SM
Remark									

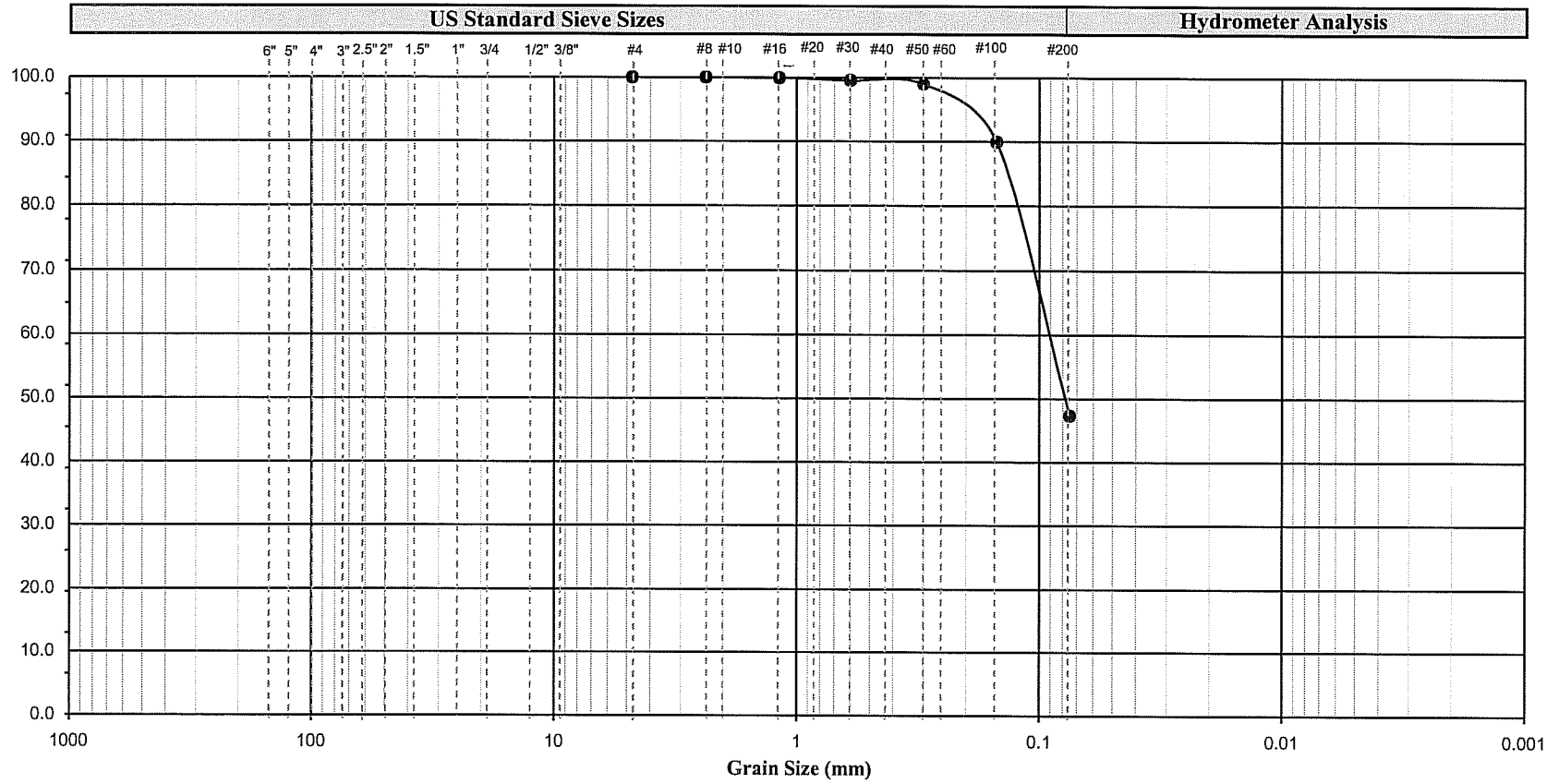
Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

BATA / Dumbarton Toll Bridge

Project No. : *06-155* **Date :** *04/13/07*

GRAIN SIZE ANALYSIS
(ASTM D-422-63)

Figure No. :



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

Symbol	Boring Number	Sample Number	Depth (ft)		Depth (m)		Soil Color	Soil Description	U.S.C.S.
●	06-11	S-12	65.0	66.5	19.83	20.28	Olive Brown	Silty sand	SM
Remark									

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

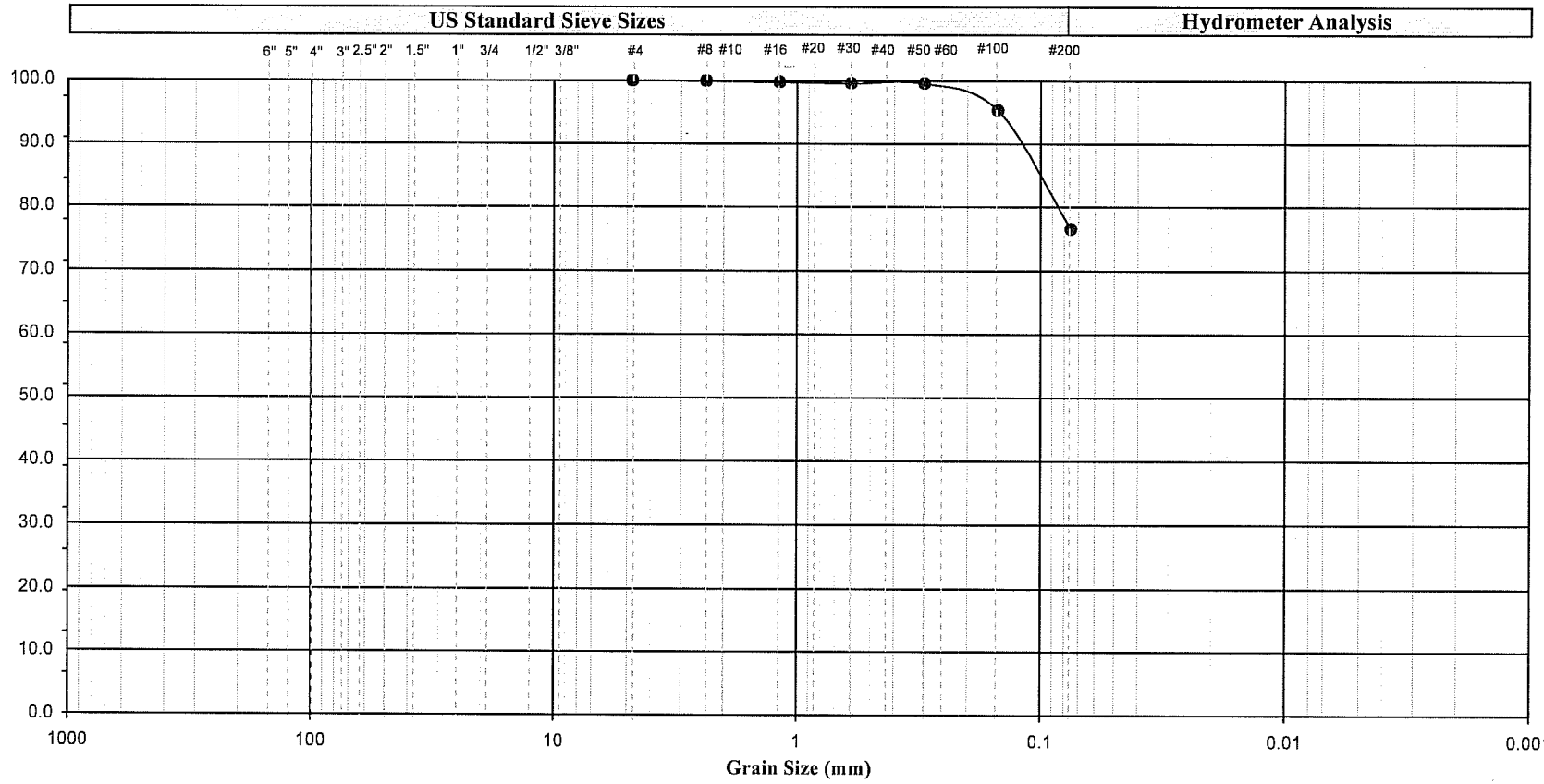
BATA / Dumbarton Toll Bridge

Project No. : 06-155

Date : 04/13/07

GRAIN SIZE ANALYSIS
(ASTM D-422-63)

Figure No. :



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

Symbol	Boring Number	Sample Number	Depth (ft)		Depth (m)		Soil Color	Soil Description	U.S.C.S.
●	06-11	D-15	80.0	81.5	24.40	24.86	Olive	Lean clay with sand	CL
Remark									

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

BATA / Dumbarton Toll Bridge

Project No. : 06-155

Date : 04/13/07

GRAIN SIZE ANALYSIS
(ASTM D-422-63)

Figure No. :

PARTICLE SIZE ANALYSIS OF SOIL

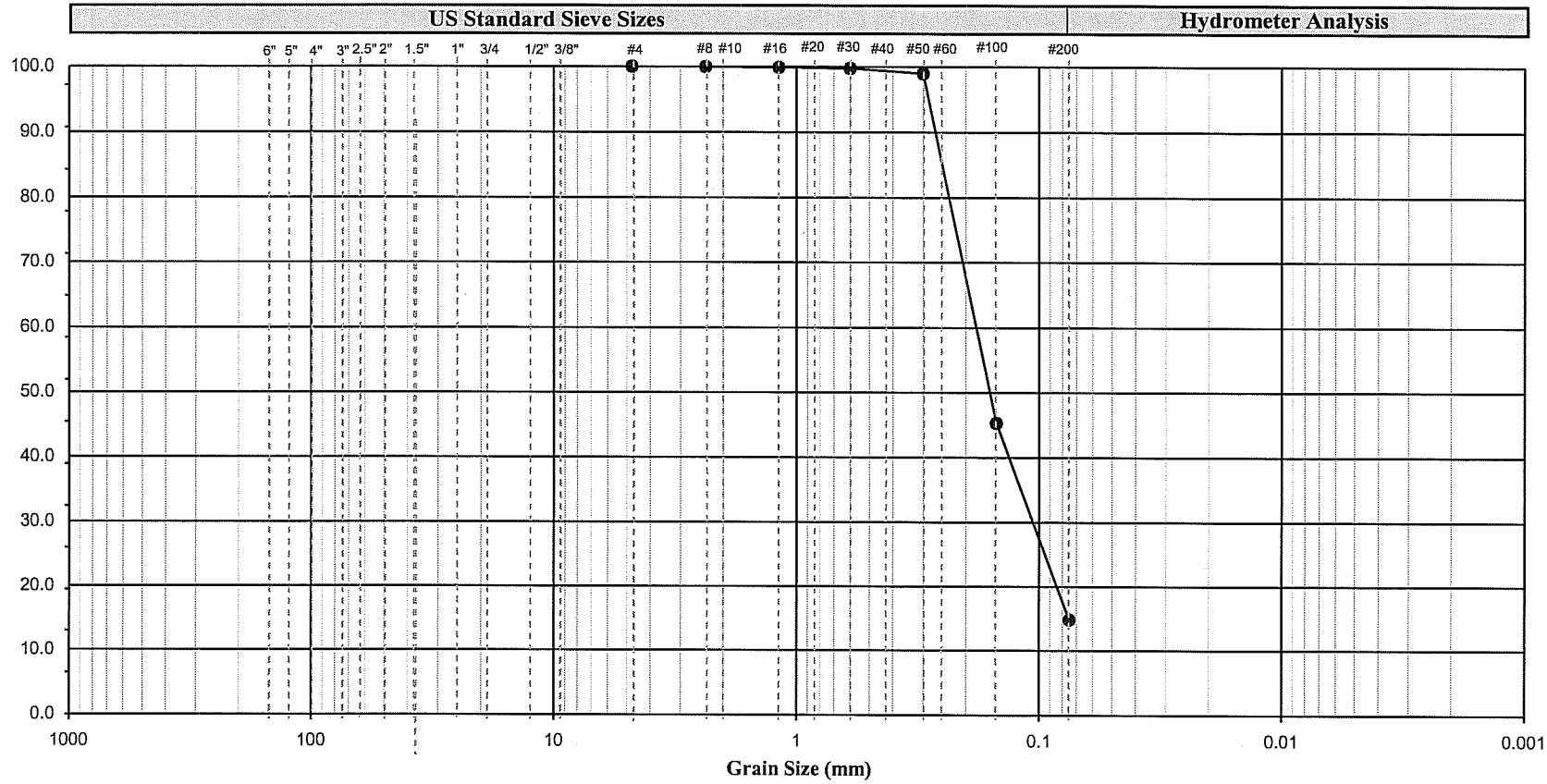
ASTM D-422-63 (Rev. 1990) / CT - 202, 203

Project No : 06-155	Project Name : BATA / Dumbarton Toll Bridge
Standard : ☑ CAL. TRAN. ☐ ASTM ☐ OTHER	

Prepared By : M.T.	Date : 05/17/07	Tested By : R.J.	Date : 05/24/07	Checked By : R.J.							
Washed By : M.T.	Date : 05/17/07	Computed By : CY	Date : 05/31/07	Date : 05/31/07							
Boring No. : 06-12	Depth : (ft) : 49.0	50.5		Sieve	Cimulative Weight	(%)		Sieve	Cimulative Weight	(%)	
Sample No. : S-8	(m) : 14.95	15.40		5"				No. 8	0.13	99.96	
Description : Dark Yellowish Gray, Silty Sand (SM)				4"				No. 10			
	Before Washing Sample		After Wet Sieve	3"				No. 16	0.38	99.87	
	Tested	Moisture		2.5"				No. 20			
Container Number	S-1	S-1	S-1	2.0"				No. 30	0.82	99.72	
Wet Wt. of Soil + Cont. (gm)	485.49	485.49		1.5"				No. 40			
Dry Wt. of Soil + Cont. (gm)		409.59	368.50	1.0"				No. 50	2.95	98.99	
Weight of Container (gm)	118.73	118.73	118.73	3/4"				No. 60			
Weight of Dry Soil (gm)	290.86	290.86	249.77	1/2"				No. 100	159.28	45.24	
Moisture Content (%)		26.10		3/8"				No. 200	247.86	14.78	
Remark :				No. 4	0.00	100.00		Pan	249.86		
4				Cu :				Gravel	Sand	Fine	
				Cc :				0	85	15	

Prepared By : M.T.	Date : 05/17/07	Tested By : R.J.	Date : 05/24/07	Checked By : R.J.							
Washed By : M.T.	Date : 05/17/07	Computed By : CY	Date : 05/31/07	Date : 05/31/07							
Boring No. : 06-12	Depth : (ft) : 69.0	70.5		Sieve	Cimulative Weight	(%)		Sieve	Cimulative Weight	(%)	
Sample No. : S-12	(m) : 21.05	21.50		5"				No. 8	1.44	99.52	
Description : Light Olive Brown, Silty Sand (SM)				4"				No. 10			
	Before Washing Sample		After Wet Sieve	3"				No. 16	3.47	98.84	
	Tested	Moisture		2.5"				No. 20			
Container Number	S-3	S-3	S-3	2.0"				No. 30	5.09	98.29	
Wet Wt. of Soil + Cont. (gm)	479.99	479.99		1.5"				No. 40			
Dry Wt. of Soil + Cont. (gm)		416.50	290.39	1.0"				No. 50	11.61	96.11	
Weight of Container (gm)	118.14	118.14	118.14	3/4"				No. 60			
Weight of Dry Soil (gm)	298.36	298.36	172.25	1/2"				No. 100	87.24	70.76	
Moisture Content (%)		21.28		3/8"				No. 200	169.32	43.25	
Remark : Material > #30 were cemented silt/sandstone nods.				No. 4	0.00	100.00		Pan	172.28		
5				Cu :				Gravel	Sand	Fine	
				Cc :				0	57	43	

Prepared By : M.T.	Date : 05/18/07	Tested By : R.J.	Date : 05/24/07	Checked By : R.J.							
Washed By : M.T.	Date : 05/18/07	Computed By : CY	Date : 05/31/07	Date : 05/31/07							
Boring No. : 06-13	Depth : (ft) : 4.0	5.5		Sieve	Cimulative Weight	(%)		Sieve	Cimulative Weight	(%)	
Sample No. : D-1	(m) : 1.22	1.68		5"				No. 8	156.25	51.54	
Description : Dark Reddish Brown, Clayey Gravel with Sand (GC)				4"				No. 10			
	Before Washing Sample		After Wet Sieve	3"				No. 16	178.36	44.68	
	Tested	Moisture		2.5"				No. 20			
Container Number	S-15	S-15	S-15	2.0"				No. 30	192.70	40.23	
Wet Wt. of Soil + Cont. (gm)	468.54	468.54		1.5"				No. 40			
Dry Wt. of Soil + Cont. (gm)		437.09	351.84	1.0"	0.00	100.00		No. 50	205.25	36.34	
Weight of Container (gm)	114.69	114.69	114.69	3/4"	32.97	89.77		No. 60			
Weight of Dry Soil (gm)	322.40	322.4	237.15	1/2"	66.19	79.47		No. 100	219.01	32.07	
Moisture Content (%)		9.75		3/8"	84.80	73.70		No. 200	236.56	26.63	
Remark :				No. 4	120.21	62.71		Pan	237.26		
6				Cu :				Gravel	Sand	Fine	
				Cc :				37	36	27	



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

Symbol	Boring Number	Sample Number	Depth (ft)		Depth (m)		Soil Color	Soil Description	U.S.C.S.
●	06-12	S-8	49.0	50.5	14.95	15.40	Dark Yellowish Gray	Silty sand	SM
Remark									

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

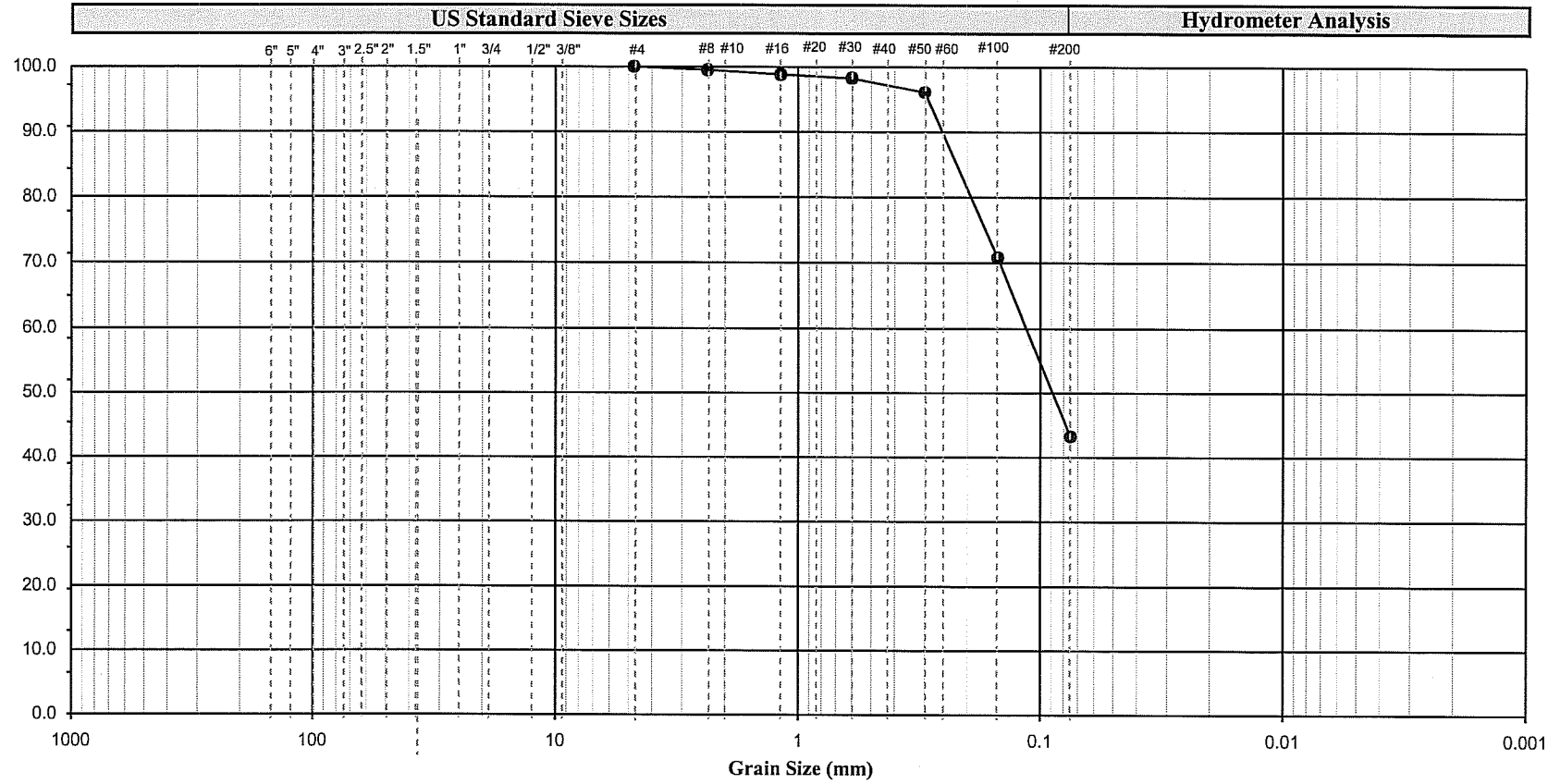
BATA / Dumbarton Toll Bridge

Project No. : *06-155*

Date : *04/13/07*

GRAIN SIZE ANALYSIS
(ASTM D-422-63)

Figure No. :



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

Symbol	Boring Number	Sample Number	Depth (ft)		Depth (m)		Soil Color	Soil Description	U.S.C.S.
●	06-12	S-12	69.0	70.5	21.05	21.50	Light Olive Brown	Silty sand	SM
Remark	Material > #30 were cemented silt/sandstone nods.								

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

BATA / Dumbarton Toll Bridge

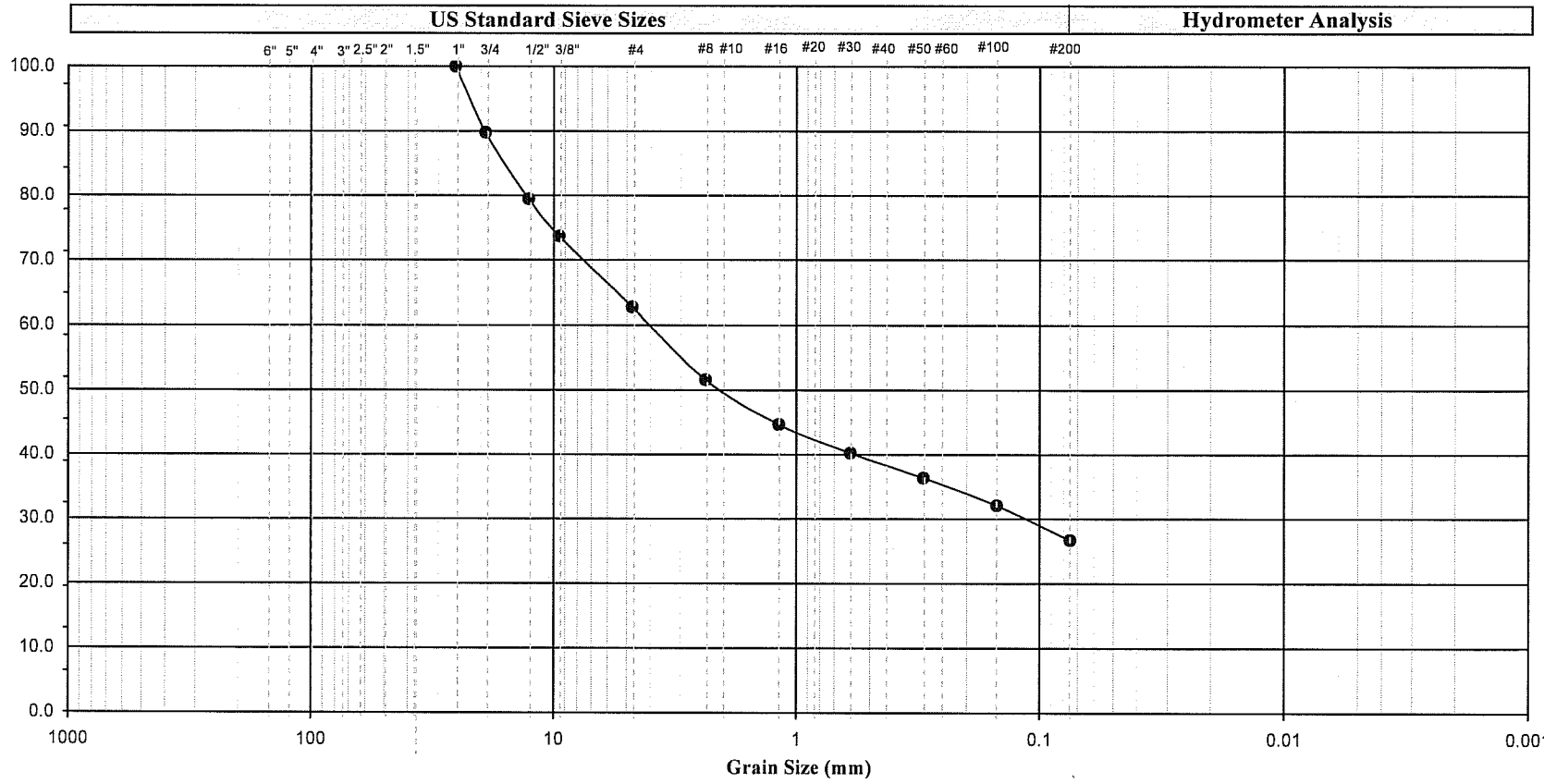
Project No. : 06-155

Date : 04/13/07

GRAIN SIZE ANALYSIS

(ASTM D-422-63)

Figure No. :



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

Symbol	Boring Number	Sample Number	Depth (ft)		Depth (m)		Soil Color	Soil Description	U.S.C.S.
●	06-13	D-1	4.0	5.5	1.22	1.68	Dark Reddish Brown	Clayey gravel with sand	GC
Remark									

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

BATA / Dumbarton Toll Bridge

Project No. : *06-155*

Date : *04/13/07*

GRAIN SIZE ANALYSIS

(ASTM D-422-63)

Figure No. :

PARTICLE SIZE ANALYSIS OF SOIL

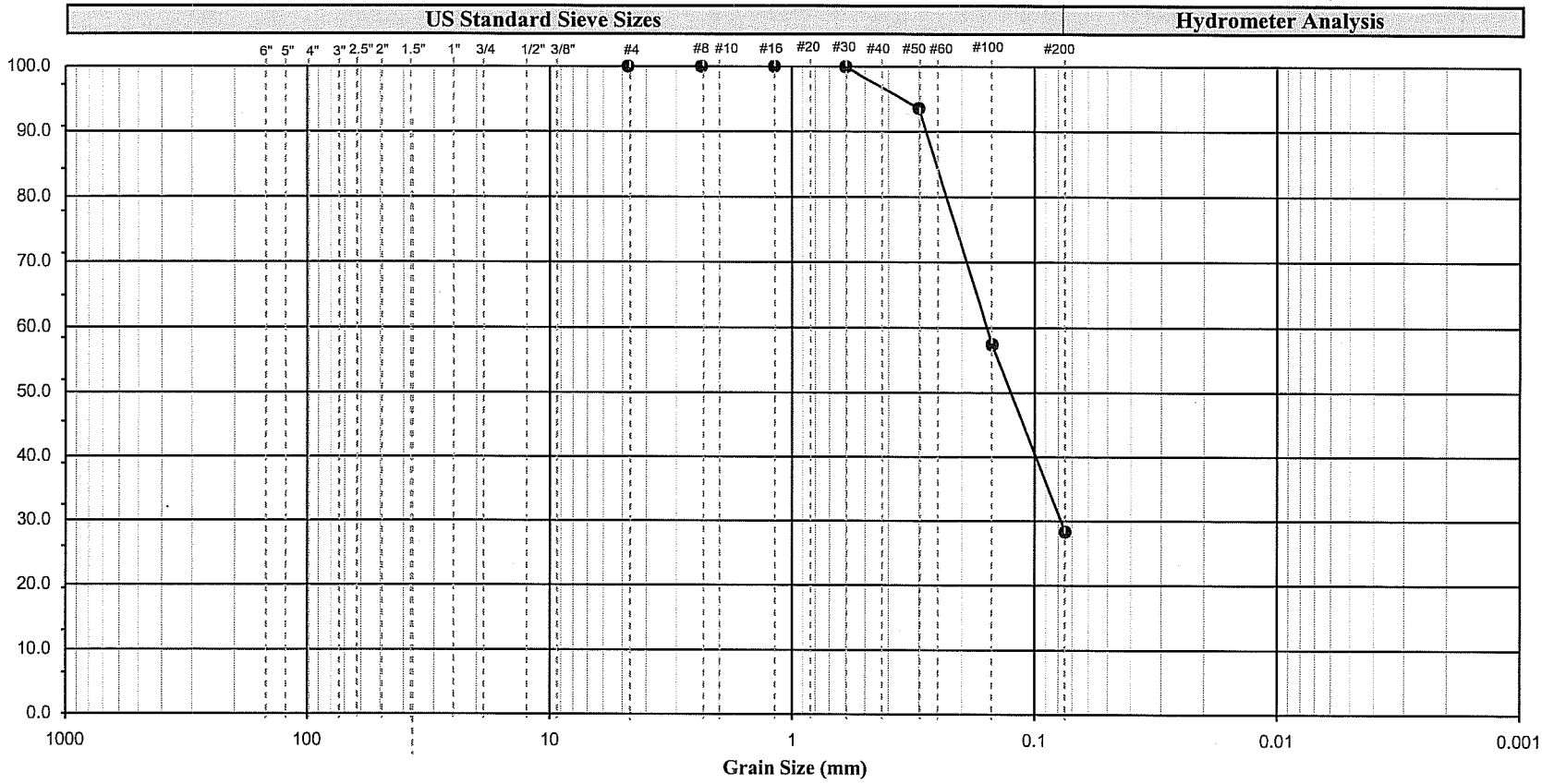
ASTM D-422-63 (Rev. 1990) / CT - 202, 203

Project No : 06-155	Project Name : BATA / Dumbarton Toll Bridge
Standard : ☑ CAL. TRAN. ☐ ASTM ☐ OTHER	

Prepared By : M.T.	Date : 05/17/07		Tested By : R.J.		Date : 05/24/07		Checked By : R.J.				
Washed By : M.T.	Date : 05/17/07		Computed By : CY		Date : 05/31/07		Date : 04/12/07				
Boring No. : 06-13	Depth :	(ft) : 59.0	60.5	Sieve	Cimulative Weight	(%)	Sieve	Cimulative Weight	(%)		
Sample No. : S-12		(m) : 18.00	18.45	5"			No. 8	0.00	100.00		
Description : Dark Olive Gray, Silty Sand (SM)				4"			No. 10				
	Before Washing Sample		After Wet Sieve	3"			No. 16	0.00	100.00		
	Tested	Moisture		2.5"			No. 20				
Container Number	S-8	S-8	S-8	2.0"			No. 30	0.15	99.95		
Wet Wt. of Soil + Cont.(gm)	488.90	488.90		1.5"			No. 40				
Dry Wt. of Soil + Cont.(gm)		422.35	343.36	1.0"			No. 50	19.70	93.52		
Weight of Container(gm)	118.21	118.21	118.21	3/4"			No. 60				
Weight of Dry Soil(gm)	304.14	304.14	225.15	1/2"			No. 100	129.48	57.43		
Moisture Content(%)		21.88		3/8"			No. 200	218.10	28.29		
Remark :				No. 4	0.00	100.00	Pan	225.17			
7				Cu :			Gravel	Sand	Fine		
				Cc :			0	72	28		

Prepared By : M.T.	Date : 05/18/07		Tested By : R.J.		Date : 05/24/07		Checked By : R.J.				
Washed By : M.T.	Date : 05/18/07		Computed By : CY		Date : 05/31/07		Date : 04/12/07				
Boring No. : 06-14	Depth :	(ft) : 54.0	55.5	Sieve	Cimulative Weight	(%)	Sieve	Cimulative Weight	(%)		
Sample No. : S-11		(m) : 16.47	16.93	5"			No. 8	1.20	99.63		
Description : Olive Brown, Silt with Sand (ML)				4"			No. 10				
	Before Washing Sample		After Wet Sieve	3"			No. 16	1.61	99.50		
	Tested	Moisture		2.5"			No. 20				
Container Number	S-11	S-11	S-11	2.0"			No. 30	1.89	99.41		
Wet Wt. of Soil + Cont.(gm)	539.43	539.43		1.5"			No. 40				
Dry Wt. of Soil + Cont.(gm)		442.53	214.50	1.0"			No. 50	2.10	99.35		
Weight of Container(gm)	119.85	119.85	119.85	362.26			No. 60				
Weight of Dry Soil(gm)	322.68	322.68	94.65	1/2"			No. 100	8.70	97.30		
Moisture Content(%)		30.03		3/8"	0.00	100.00	No. 200	80.47	75.06		
Remark : Material > #30 were cemented silt/sandstone nods.				No. 4	0.92	99.71	Pan	94.66			
8				Cu :			Gravel	Sand	Fine		
				Cc :			0	25	75		

Prepared By :	Date :		Tested By :		Date :		Checked By :				
Washed By :	Date :		Computed By :		Date :		Date :				
Boring No. :	Depth :	(ft) :		Sieve	Cimulative Weight	(%)	(%)	Cimulative Weight	(%)		
Sample No. :		(m) :		5"			No. 8				
Description :				4"			No. 10				
	Before Washing Sample		After Wet Sieve	3"			No. 16				
	Tested	Moisture		2.5"			No. 20				
Container Number				2.0"			No. 30				
Wet Wt. of Soil + Cont.(gm)				1.5"			No. 40				
Dry Wt. of Soil + Cont.(gm)				1.0"			No. 50				
Weight of Container(gm)				3/4"			No. 60				
Weight of Dry Soil(gm)				1/2"			No. 100				
Moisture Content(%)				3/8"			No. 200				
Remark :				No. 4			Pan				
9				Cu :			Gravel	Sand	Fine		
				Cc :							



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

Symbol	Boring Number	Sample Number	Depth (ft)		Depth (m)		Soil Color	Soil Description	U.S.C.S.
●	06-13	S-12	59.0	60.5	18.00	18.45	Dark Olive Gray	Silty sand	SM
Remark									

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

BATA / Dumbarton Toll Bridge

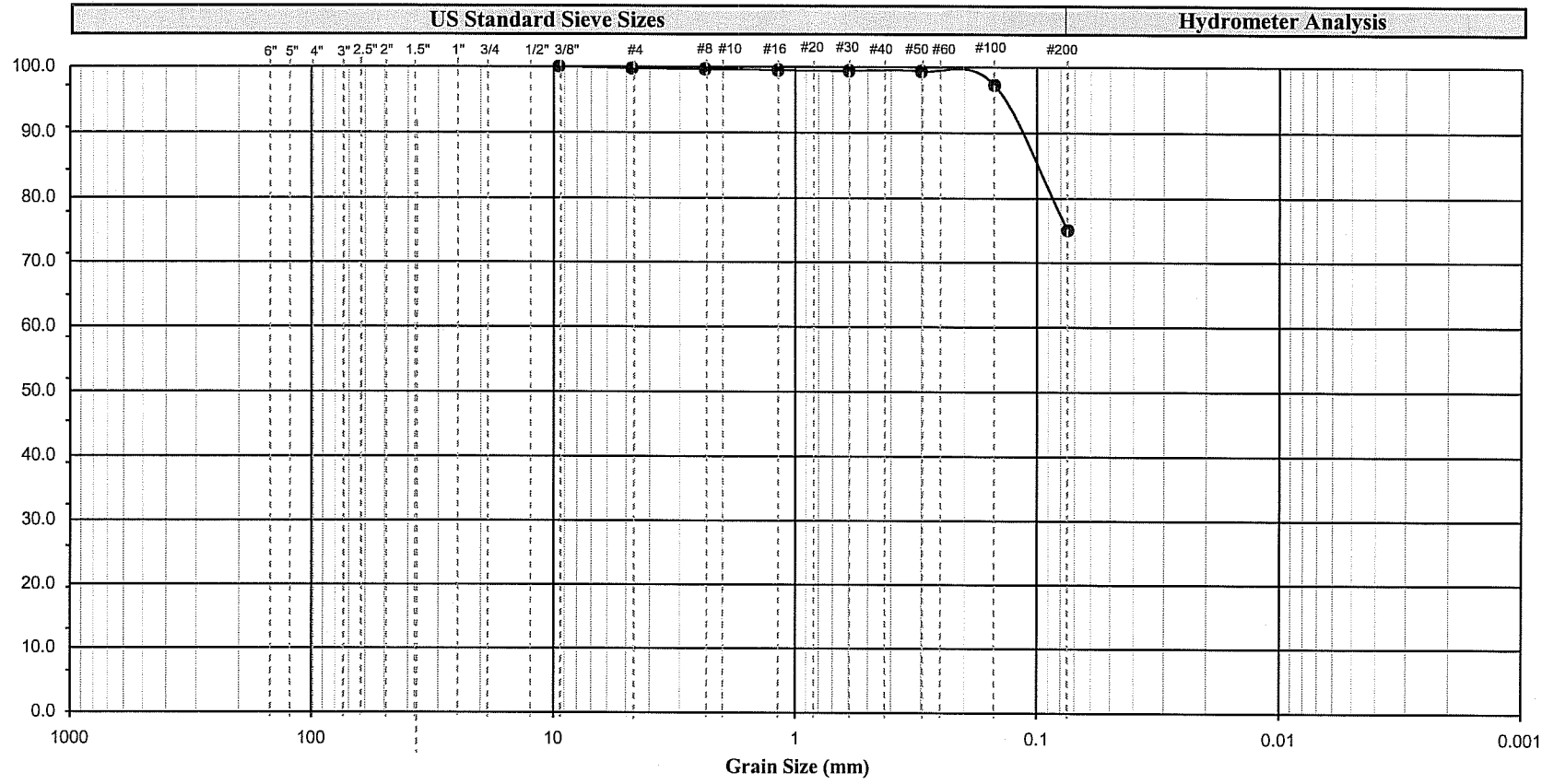
Project No. : *06-155*

Date : *04/13/07*

GRAIN SIZE ANALYSIS

(ASTM D-422-63)

Figure No. :



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

Symbol	Boring Number	Sample Number	Depth (ft)		Depth (m)		Soil Color	Soil Description	U.S.C.S.
●	06-14	S-11	54.0	55.5	16.47	16.93	Olive Brown	Silt with sand	ML
Remark	Material > #30 were cemented silt/sandstone nods.								

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

BATA / Dumbarton Toll Bridge

Project No. : *06-155* **Date :** *04/13/07*

GRAIN SIZE ANALYSIS
(ASTM D-422-63)

Figure No. :

ATTERBERG LIMITS

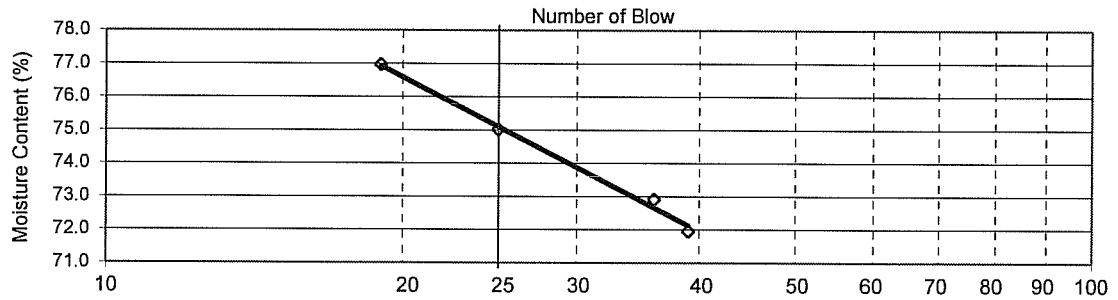
ASTM D-4318-84 / CT-204

Project No: 06-159 Project Name: BATA/ Dumbarton Toll Bridge

Boring Number:	06-1	Depth (ft/m):	149.0 ft		1
Sample Number:	S-25	Description:	CH		
Prepared By:	M.T.	Date:	02/22/07	Checked By:	
Pulverized By:		Date:			Container Number
Tested By:	M.T.	Date:	02/28/07		Air: G-8
Computed By:	M.T.	Date:	03/02/07		Field:

Trial Number	Field Moisture	1	2	3	4	Plastic Limit 1	Plastic Limit 2
Number of Blow		39	36	25	19		
Can Number		31	32	33	34	35	36
Wt. Wet Soil +Can (gm)		51.33	44.47	45.39	47.67	31.91	33.04
Wt. Dry Soil +Can (gm)		39.17	35.13	35.09	36.71	29.39	30.72
Weight of Can (gm)		22.27	22.32	21.36	22.47	21.14	22.93
Water Content (%)		72.0	72.9	75.0	77.0	30.5	29.8

Liquid Limit (LL, %):	75	Plastic Limit (PL, %):	30	Plastic Index (PI, %):	45

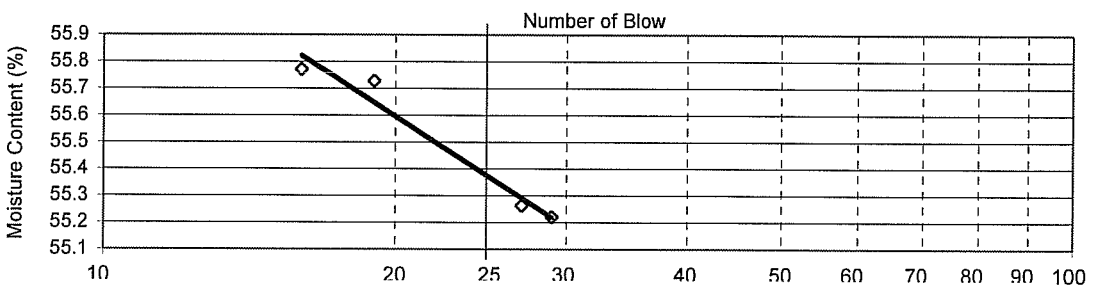


Remark:

Boring Number:	06-3	Depth (ft/m):	47.0 ft		2
Sample Number:	D-9	Description:	CH		
Prepared By:	M.T.	Date:	02/22/07	Checked By:	Date:
Pulverized By:		Date:			Container Number
Tested By:	M.T.	Date:	03/01/07		Air: G-9
Computed By:	M.T.	Date:	03/02/07		Field:

Trial Number	Field Moisture	1	2	3	4	Plastic Limit 1	Plastic Limit 2
Number of Blow		29	27	19	16		
Can Number		1	2	3	4	5	6
Wt. Wet Soil +Can (gm)		52.83	48.12	49.77	52.72	34.79	39.29
Wt. Dry Soil +Can (gm)		43.47	39.51	40.77	42.62	32.55	36.91
Weight of Can (gm)		26.52	23.93	24.62	24.51	24.27	27.61
Water Content (%)		55.2	55.3	55.7	55.8	27.1	25.6

Liquid Limit (LL,%)	55	Plastic Limit PL,%)	26	Plastic Index (PI,%)	29



Remark:

ATTERBERG LIMITS

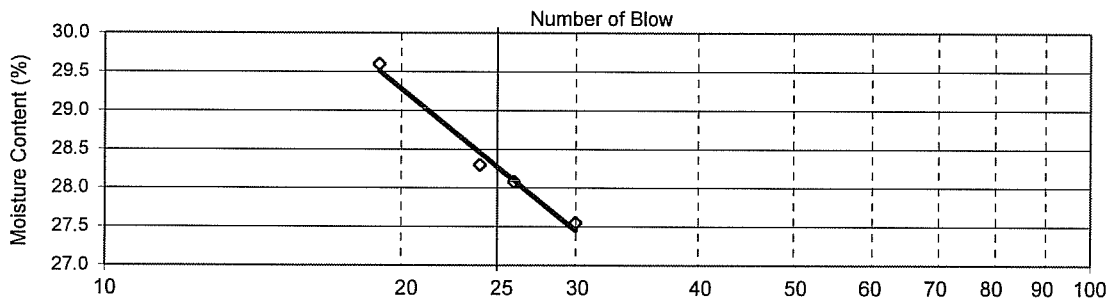
ASTM D-4318-84 / CT-204

Project No: 06-159 Project Name: BATA/ Dumbarton Toll Bridge

Boring Number:	06-3	Depth (ft/m):	82.0 ft	1.5 m	1
Sample Number:	S-16	Description:	CL		
Prepared By:	M.T.	Date:	02/22/07	Checked By:	
Pulverized By:		Date:			Container Number
Tested By:	M.T.	Date:	03/01/07		Air: G-11
Computed By:	M.T.	Date:	03/02/07		Field:

Trial Number	Field Moisture	1	2	3	4	Plastic Limit 1	Plastic Limit 2
Number of Blow		30	26	24	19		
Can Number		37	38	39	40	41	42
Wt. Wet Soil +Can (gm)		48.29	51.53	56.01	49.15	33.67	33.09
Wt. Dry Soil +Can (gm)		42.48	44.85	49.30	42.73	32.36	31.79
Weight of Can (gm)		21.39	21.06	25.59	21.04	22.62	21.62
Water Content (%)		27.5	28.1	28.3	29.6	13.4	12.8

Liquid Limit (LL, %): 28 **Plastic Limit (PL, %): 13** **Plastic Index (PI, %): 15**

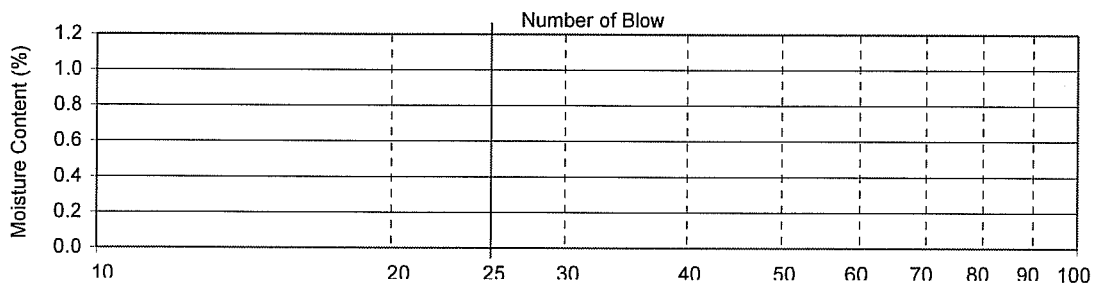


Remark:

Boring Number:	Depth (ft/m):			2
Sample Number:	Description:			
Prepared By:	Date:	Checked By:		Date:
Pulverized By:	Date:			Container Number
Tested By:	Date:			Air:
Computed By:	Date:			Field:

Trial Number	Field Moisture	1	2	3	4	Plastic Limit 1	Plastic Limit 2
Number of Blow							
Can Number							
Wt. Wet Soil +Can (gm)							
Wt. Dry Soil +Can (gm)							
Weight of Can (gm)							
Water Content (%)							

Liquid Limit (LL,%) **Plastic Limit PL,%)** **Plastic Index (PI,%)**



Remark:

ATTERBERG LIMITS

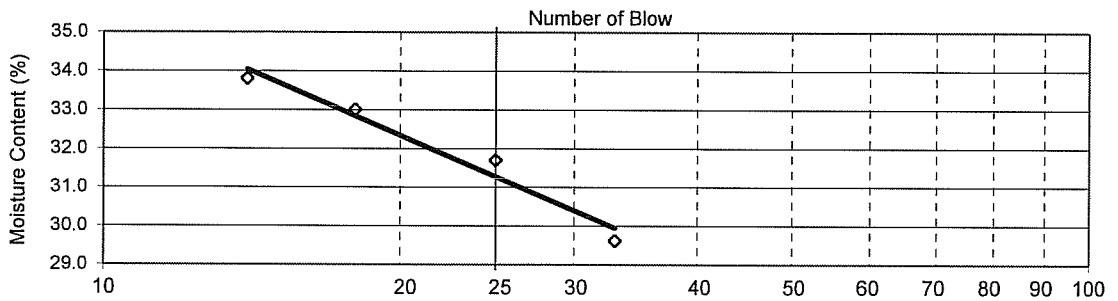
ASTM D-4318-84 / CT-204

Project No: 06-159 Project Name: BATA/ Dumbarton Toll Bridge

Boring Number:	06-8	Depth (ft/m):	73.0 ft	1.5 m	1
Sample Number:	D-14	Description:	CL		
Prepared By:	M.T.	Date:	02/15/07	Checked By:	
Pulverized By:		Date:			Container Number
Tested By:	M.T.	Date:	02/19/07		Air: G-3
Computed By:	M.T.	Date:	02/20/07		Field:

Trial Number	Field Moisture					Plastic Limit	
		1	2	3	4	1	2
Number of Blow		33	25	18	14		
Can Number		31	32	33	34	35	36
Wt. Wet Soil +Can (gm)		57.19	51.27	55.22	55.61	32.69	33.99
Wt. Dry Soil +Can (gm)		49.21	44.30	46.82	47.24	30.96	32.25
Weight of Can (gm)		22.27	22.31	21.37	22.48	21.14	22.94
Water Content (%)		29.6	31.7	33.0	33.8	17.6	18.7

Liquid Limit (LL, %): 31 **Plastic Limit (PL, %): 18** **Plastic Index (PI, %): 13**

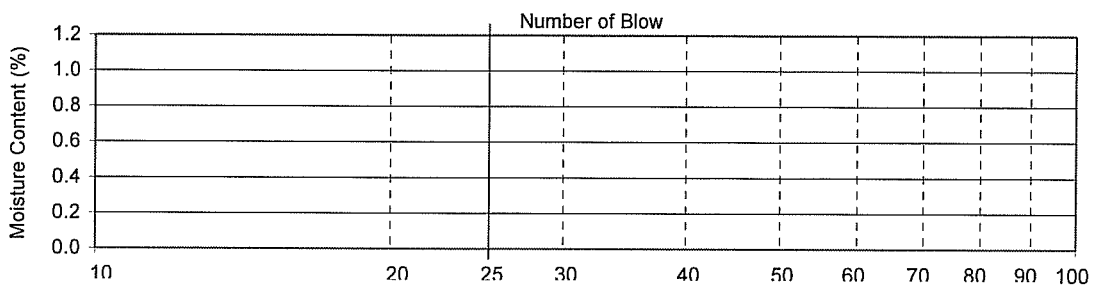


Remark:

Boring Number:	Depth (ft/m):			2
Sample Number:	Description:			
Prepared By:	Date:	Checked By:		Date:
Pulverized By:	Date:			Container Number
Tested By:	Date:			Air:
Computed By:	Date:			Field:

Trial Number	Field Moisture					Plastic Limit	
		1	2	3	4	1	2
Number of Blow							
Can Number							
Wt. Wet Soil +Can (gm)							
Wt. Dry Soil +Can (gm)							
Weight of Can (gm)							
Water Content (%)							

Liquid Limit (LL,%) **Plastic Limit PL,%)** **Plastic Index (PI,%)**



Remark:

ATTERBERG LIMITS

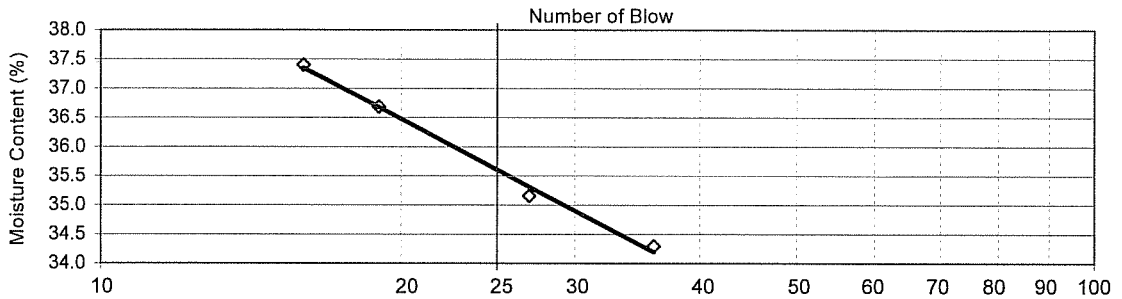
ASTM D-4318-84 / CT-204

Project No: 06-159 Project Name: BATA/ Dumbarton Toll Bridge

Boring Number: 06-11	Depth (ft/m): 100.0 ft				1
Sample Number: S-19	Description: CL				
Prepared By: M.T.	Date: 05/17/07	Checked By:			
Pulverized By:	Date:				Container Number
Tested By: M.T.	Date: 05/18/07				Air: G-2
Computed By: M.T.	Date: 05/23/07				Field:

Trial Number	Field Moisture	1	2	3	4	Plastic Limit 1	Plastic Limit 2
Number of Blow		36	27	19	16		
Can Number		25	26	27	28	29	30
Wt. Wet Soil +Can (gm)		52.16	51.67	55.85	50.45	37.69	36.23
Wt. Dry Soil +Can (gm)		46.56	46.33	48.77	44.75	36.03	34.57
Weight of Can (gm)		30.23	31.14	29.47	29.51	27.47	25.95
Water Content (%)		34.3	35.2	36.7	37.4	19.4	19.3

Liquid Limit (LL, %): 36 **Plastic Limit (PL, %): 19** **Plastic Index (PI, %): 17**

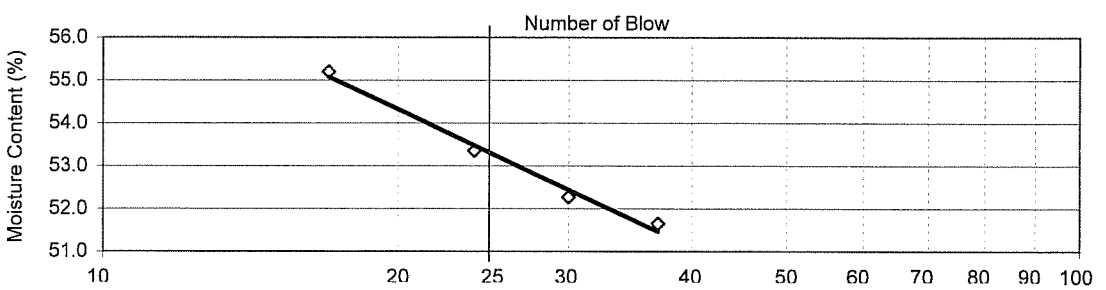


Remark:

Boring Number: 06-12	Depth (ft/m): 29.0 ft				2
Sample Number: S-4	Description: CH				
Prepared By: M.T.	Date: 05/17/07	Checked By:			Date:
Pulverized By:	Date:				Container Number
Tested By: M.T.	Date: 05/21/07				Air: G-4
Computed By: M.T.	Date: 05/23/07				Field:

Trial Number	Field Moisture	1	2	3	4	Plastic Limit 1	Plastic Limit 2
Number of Blow		37	30	24	17		
Can Number		13	14	15	16	17	18
Wt. Wet Soil +Can (gm)		53.81	49.63	50.63	46.54	35.59	34.63
Wt. Dry Soil +Can (gm)		45.03	40.63	41.32	38.36	33.69	32.69
Weight of Can (gm)		28.03	23.41	23.87	23.54	25.45	24.54
Water Content (%)		51.6	52.3	53.4	55.2	23.1	23.8

Liquid Limit (LL,%) 53 **Plastic Limit PL,%) 23** **Plastic Index (PI,%) 30**



Remark:

ATTERBERG LIMITS

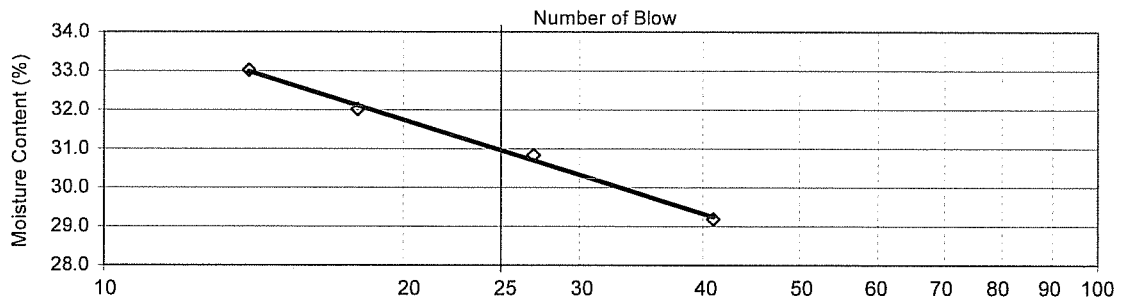
ASTM D-4318-84 / CT-204

Project No: 06-159 Project Name: BATA/ Dumbarton Toll Bridge

Boring Number:	06-12	Depth (ft/m):	79.0 ft		1
Sample Number:	S-14	Description:	CL		
Prepared By:	M.T.	Date:	05/17/07	Checked By:	
Pulverized By:		Date:			Container Number
Tested By:	M.T.	Date:	05/21/07		Air: G-7
Computed By:	M.T.	Date:	05/23/07		Field:

Trial Number	Field Moisture	1	2	3	4	Plastic Limit 1	Plastic Limit 2
Number of Blow		41	27	18	14		
Can Number		31	32	33	34	35	36
Wt. Wet Soil +Can (gm)		48.50	49.45	47.01	47.43	31.18	33.09
Wt. Dry Soil +Can (gm)		42.57	43.05	40.79	41.23	29.95	31.85
Weight of Can (gm)		22.25	22.29	21.36	22.45	21.12	22.93
Water Content (%)		29.2	30.8	32.0	33.0	13.9	13.9

Liquid Limit (LL, %):	31	Plastic Limit (PL, %):	14	Plastic Index (PI, %):	17

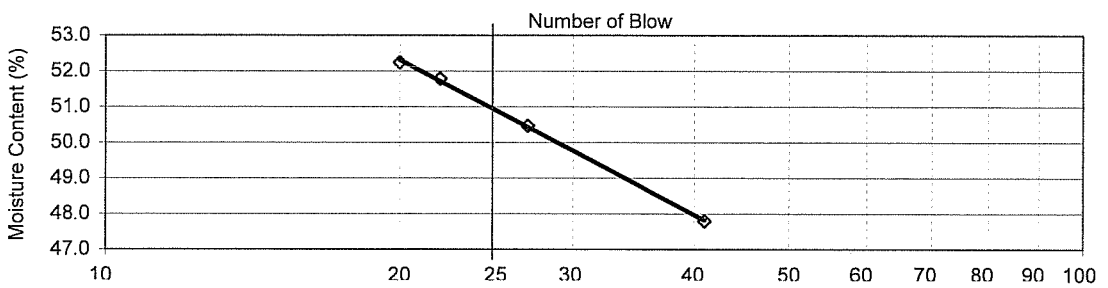


Remark:

Boring Number:	06-13	Depth (ft/m):	49.0 ft		2
Sample Number:	S-10	Description:	CH		
Prepared By:	M.T.	Date:	05/17/07	Checked By:	Date:
Pulverized By:		Date:			Container Number
Tested By:	M.T.	Date:	05/21/07		Air: G-8
Computed By:	M.T.	Date:	05/23/07		Field:

Trial Number	Field Moisture	1	2	3	4	Plastic Limit 1	Plastic Limit 2
Number of Blow		41	27	22	20		
Can Number		7	8	9	10	11	12
Wt. Wet Soil +Can (gm)		47.79	48.59	50.12	47.52	39.29	41.87
Wt. Dry Soil +Can (gm)		40.76	40.95	41.99	39.70	37.54	40.09
Weight of Can (gm)		26.05	25.81	26.29	24.73	29.17	31.75
Water Content (%)		47.8	50.5	51.8	52.2	20.9	21.3

Liquid Limit (LL,%)	51	Plastic Limit PL,%)	21	Plastic Index (PI,%)	30



Remark:

ATTERBERG LIMITS

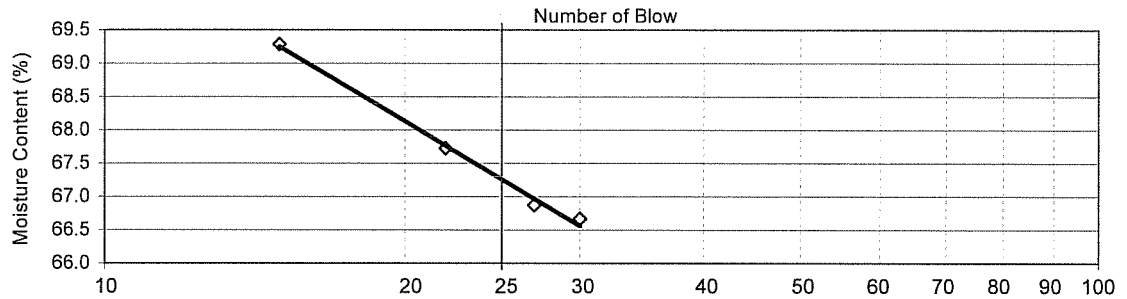
ASTM D-4318-84 / CT-204

Project No: 06-159 Project Name: BATA/ Dumbarton Toll Bridge

Boring Number:	06-13	Depth (ft/m):	149.0 ft				1
Sample Number:	S-25	Description:	CH				
Prepared By:	M.T.	Date:	05/17/07	Checked By:			
Pulverized By:		Date:				Container Number	
Tested By:	M.T.	Date:	05/21/07			Air:	G-6
Computed By:	M.T.	Date:	05/23/07			Field:	

Trial Number	Field Moisture	1	2	3	4	Plastic Limit 1	Plastic Limit 2
Number of Blow		30	27	22	15		
Can Number		1	2	3	4	5	6
Wt. Wet Soil +Can (gm)		49.01	45.83	46.79	46.05	34.39	37.67
Wt. Dry Soil +Can (gm)		40.01	37.05	37.83	37.23	32.41	35.67
Weight of Can (gm)		26.51	23.92	24.60	24.50	24.23	27.57
Water Content (%)		66.7	66.9	67.7	69.3	24.2	24.7

Liquid Limit (LL, %):	67	Plastic Limit (PL, %):	24	Plastic Index (PI, %):	43

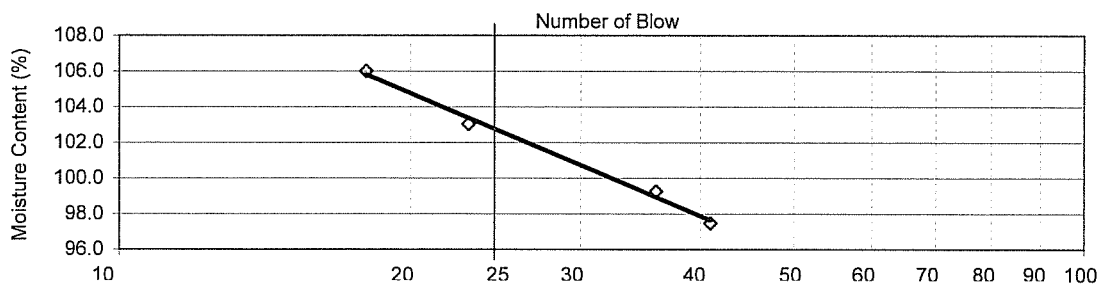


Remark:

Boring Number:	06-14	Depth (ft/m):	9.0 ft				2
Sample Number:	D-2	Description:	CH				
Prepared By:	M.T.	Date:	05/17/07	Checked By:		Date:	
Pulverized By:		Date:				Container Number	
Tested By:	M.T.	Date:	05/21/07			Air:	G-3
Computed By:	M.T.	Date:	05/23/07			Field:	

Trial Number	Field Moisture	1	2	3	4	Plastic Limit 1	Plastic Limit 2
Number of Blow		41	36	23	18		
Can Number		37	38	39	40	41	42
Wt. Wet Soil +Can (gm)		44.71	42.43	48.30	41.59	32.91	31.63
Wt. Dry Soil +Can (gm)		33.18	31.77	36.75	30.99	30.17	29.01
Weight of Can (gm)		21.35	21.03	25.54	20.99	22.59	21.59
Water Content (%)		97.5	99.3	103.0	106.0	36.1	35.3

Liquid Limit (LL,%)	103	Plastic Limit PL,%)	36	Plastic Index (PI,%)	67



Remark:

ATTERBERG LIMITS

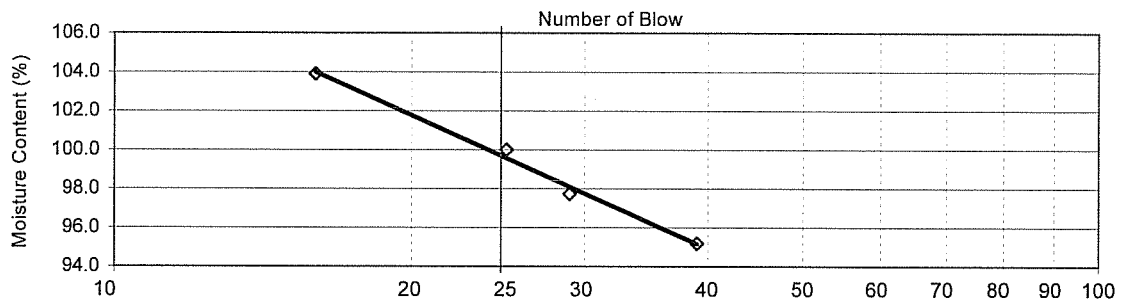
ASTM D-4318-84 / CT-204

Project No: 06-159 Project Name: BATA/ Dumbarton Toll Bridge

Boring Number:	06-14	Depth (ft/m):	109.0 ft				1
Sample Number:	S-21	Description:	CH				
Prepared By:	M.T.	Date:	05/17/07	Checked By:			
Pulverized By:		Date:				Container Number	
Tested By:	M.T.	Date:	05/21/07			Air:	G-9
Computed By:	M.T.	Date:	05/23/07			Field:	

Trial Number	Field Moisture					Plastic Limit	
		1	2	3	4	1	2
Number of Blow		39	29	25	16		
Can Number		19	20	21	22	23	24
Wt. Wet Soil +Can (gm)		51.53	47.67	47.49	49.36	34.93	35.99
Wt. Dry Soil +Can (gm)		40.07	37.32	37.05	38.43	32.23	33.32
Weight of Can (gm)		28.03	26.73	26.61	27.91	24.83	25.99
Water Content (%)		95.2	97.7	100.0	103.9	36.5	36.4

Liquid Limit (LL, %):	100	Plastic Limit (PL, %):	36	Plastic Index (PI, %):	64

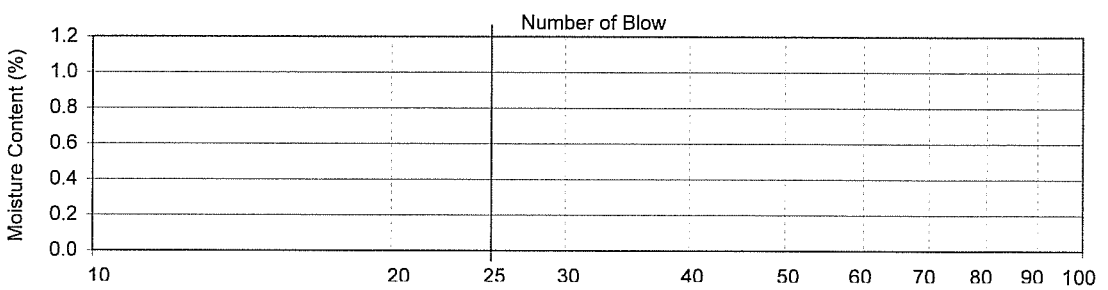


Remark:

Boring Number:		Depth (ft/m):					2
Sample Number:		Description:					
Prepared By:		Date:		Checked By:		Date:	
Pulverized By:		Date:				Container Number	
Tested By:		Date:				Air:	
Computed By:		Date:				Field:	

Trial Number	Field Moisture					Plastic Limit	
		1	2	3	4	1	2
Number of Blow							
Can Number							
Wt. Wet Soil +Can (gm)							
Wt. Dry Soil +Can (gm)							
Weight of Can (gm)							
Water Content (%)							

Liquid Limit (LL,%)	Plastic Limit PL,%)	Plastic Index (PI,%)



Remark:

ONE-DIMENSIONAL CONSOLIDATION OF SOIL

ASTM D-2435 / CT-219

Device No. : 5

Project Name : *BATA / Dumbarton Bridge*
Project No. : *06-159*
Boring No. : *06-1*
Sample No. : *D-20*
Depth (ft / m) : *99.0* | *30.20*
File No. :
Soil Description : *Olive Gray, Lean Clay (CL)*

Set up By :	*R.J*	**Date :**	*2/25/2007*
Tested By :	*R.J*	**Date :**	*2/25-3/9/2007*
Time Rate Took By :	*R.J*	**Date :**	*3/3/2007*
Computer By :	*CY*	**Date :**	*3/16/2007*
Checked By :	*R.J*	**Date :**	*3/16/2007*

Method (A) : ☑ Constant load increment duration of 24 hours or multiples there for. Minium of two Time -deformation reading are required.

Method (B) : ☐ Time-deformation reading are required on all load increments. Successive load increments are applied after 100 % primary consolidation is reached, or at constant time increments are described in Test Method (A)

1

Sample	(inch)	(mm)	Vertical Load	(ksf)	(kPa)	Vertical Load	(ksf)	(kPa)
Internal Diameter	2.42	61.47	Add Water at	4.00	191.52	Reload to	-	-
Height (Intial)	1.00	25.40	Load to	32.00	1532.16	Rebound to	-	-
Height (Final)	0.9351	23.75	Rebound to	0.25	11.97	Time rate taking at	8.00	381.62

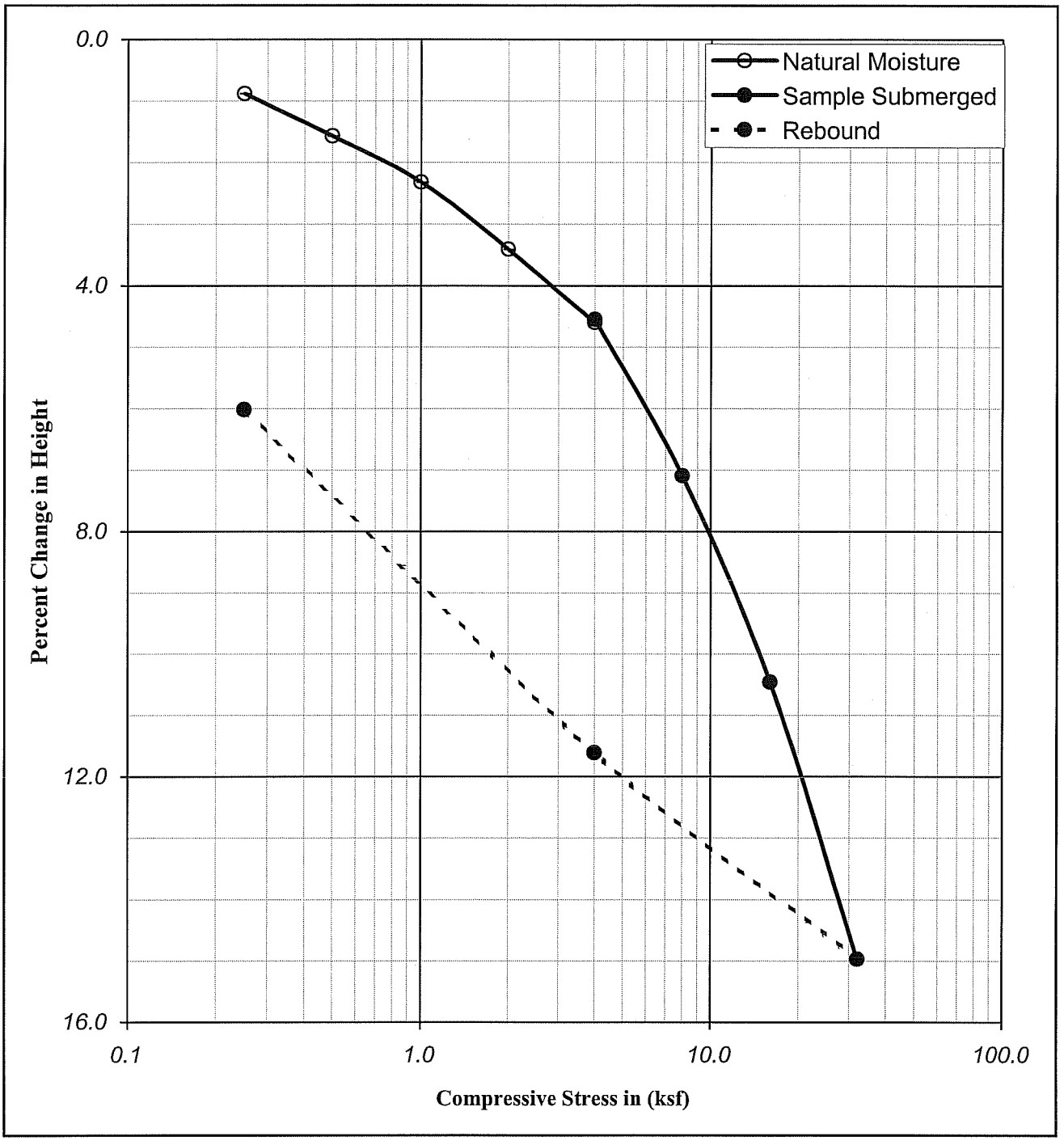
Date	Time	Elapsed Time (min.)	Load (ksf)	Load (kPa)	Dial Reading (in)	Dial Reading (mm)	Consol. (%)
2/25/2007	11:05	0:00:00	Seating Load		0.04520	1.15	
	11:15		2.0	95.8	0.05000	1.27	0.00
2/26/2007	9:05	0:00:00	0.25	12.0	0.05880	1.49	0.88
2/27/2007	8:09	0:00:00	0.50	23.9	0.06570	1.67	1.57
2/28/2007	7:59	0:00:00	1.00	47.9	0.07320	1.86	2.32
3/1/2007	7:57	0:00:00	2.00	95.8	0.08410	2.14	3.41
3/2/2007	8:45	0:00:00	4.00	191.5	0.09600	2.44	4.60
			Add Water				
3/3/2007	8:25	0:00:00	4.00	191.5	0.09550	2.43	4.55
3/3/2007	8:30	0.00	8.0	383.0			
		0.10	8.0	383.0	0.09770	2.48	4.77
		0.25	8.0	383.0	0.09900	2.51	4.90
		0.50	8.0	383.0	0.10020	2.55	5.02
		1	8.0	383.0	0.10120	2.57	5.12
		2	8.0	383.0	0.10265	2.61	5.27
		4	8.0	383.0	0.10455	2.66	5.46
		8	8.0	383.0	0.10700	2.72	5.70
		16	8.0	383.0	0.11030	2.80	6.03
		30	8.0	383.0	0.11300	2.87	6.30
		60	8.0	383.0	0.11520	2.93	6.52
		120	8.0	383.0	0.11680	2.97	6.68
		240	8.0	383.0	0.11830	3.00	6.83
		500	8.0	383.0	0.11960	3.04	6.96
		1440	8.0	383.0	0.12090	3.07	7.09
3/5/2007	7:29	0:00:00	16.00	766.1	0.1546	3.93	10.46
3/6/2007	7:59	0:00:00	32.00	1532.2	0.1997	5.07	14.97
3/7/2007	8:03	0:00:00	4.00	191.5	0.1661	4.22	11.61
3/8/2007	8:03	0:00:00	0.25	12.0	0.1102	2.80	6.01

	Before	After
Weight of wet soil + ring (gm)	195.75	
Weight of ring (gm)	43.50	
Weight of wet soil + ring + container (gm)		251.02
Weight of dry soil + ring + container (gm)		219.20
No. 2 — Weight of container (gm)		58.63
Weight of ring + container (gm)		102.13
Moisture Content (%)	30.05	27.18
Dial Reading (inch)	0.05	0.04
Sample Volume (ft^3)	0.0027	0.0025
Wet Density (pcf)	126.1	131.9
Dry Density (pcf)	96.96	103.70

SQRT Time
0.00
0.32
0.50
0.71
1.00
1.41
2.00
2.83
4.00
5.48
7.75
10.95
15.49
22.36
37.95

Date	Time	Elapsed Time (min.)	Load (ksf)	Load (kPa)	Dial Reading (in)	Dial Reading (mm)	Consol. (%)

Remark *Final Dial Reading 0.1102*



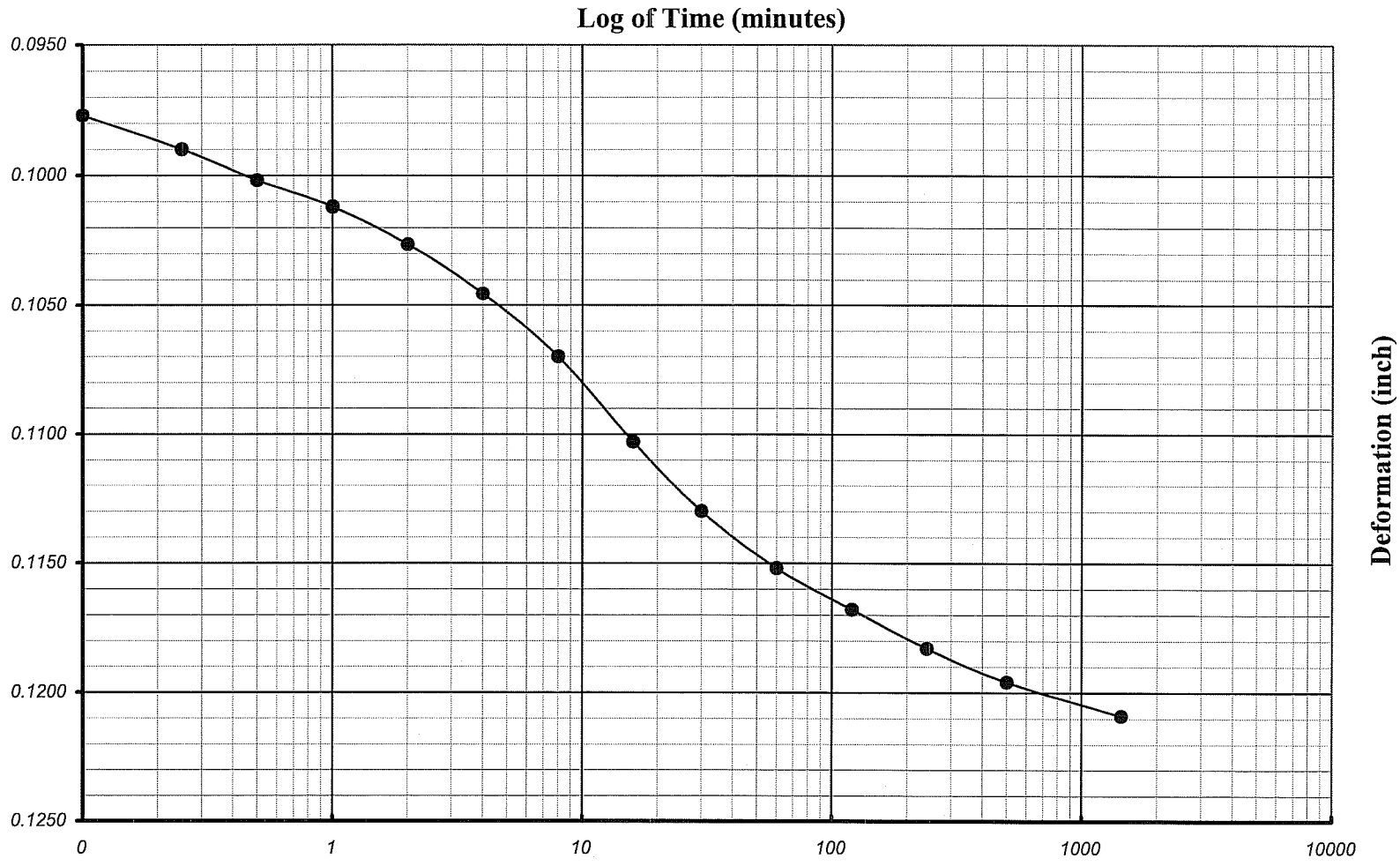
Boring No.		:	06-1		Liquid Limit :	-		Moisture Content (%)	Dry Density		Percent Saturation	Void Ratio
Sample No.		:	D-20		Plastic Limit :	-			(pcf)	(kN/m³)		
Depth	(ft)	:	99.0	100.5	Plastic Index :	-	Initial	30.05	96.96	15.26	109.87	0.74
	(m)	:	30.20	30.65	Specific Gravity :	2.70	Final	27.18	103.70	16.32	117.32	0.63
Description		:	Olive Gray, Lean Clay (CL)									

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

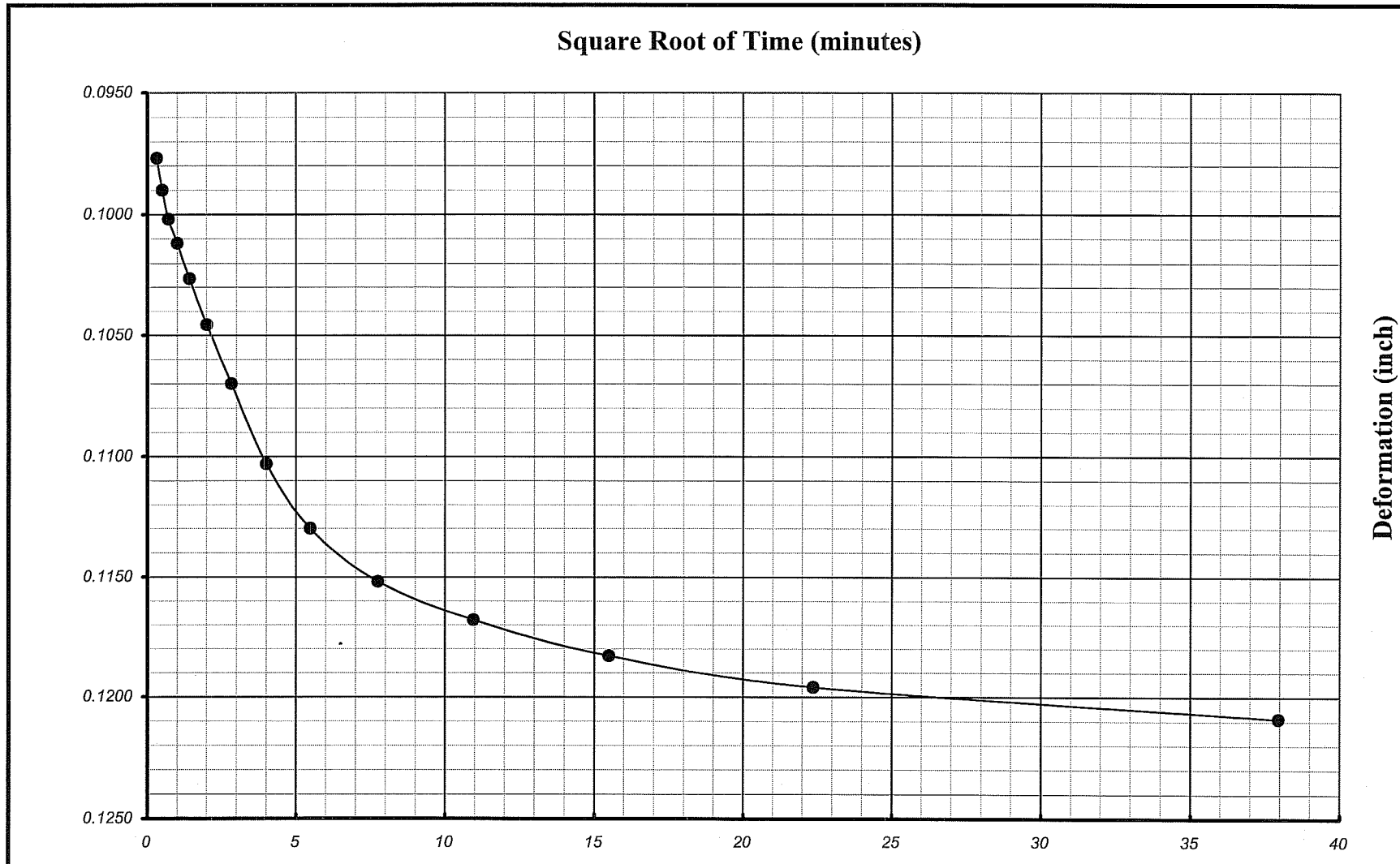
BATA / Dumbarton Bridge

Project No. : 06-159 03/16/07

CONSOLIDATION TEST
(ASTM D-2435 / CT-219)



Earth Mechanics, Inc. Geotechnical and Earthquake Engineering	***BATA / Dumbarton Bridge***	**Boring No. :** *06-1*	**One-Dimensional Consolidation of Soil** **Time-Deformation Curve (Log of Time Method)**
		Sample No. : *D-20*	
EMI Project No. : *06-159*		**Depth (ft/m) :** *99.0* *30.2*	**Veritcal Load (ksf/kpa) :** *8.00* *383.0*



Earth Mechanics, Inc. Geotechnical and Earthquake Engineering	***BATA / Dumbarton Bridge***	**Boring No. :** *06-1*	**One-Dimensional Consolidation of Soil** **Time-Deformation Curve (Square Root of Time Method)**
		Sample No. : *D-20*	
EMI Project No. : *06-159*		**Depth (ft/m) :** *99.0* *30.2*	**Veritcal Load (ksf/kpa) :** *8.0* *383.0*

ONE-DIMENSIONAL CONSOLIDATION OF SOIL

ASTM D-2435 / CT-219

Device No. : 2

Project Name : *BATA / Dumbarton Bridge*
Project No. : *06-159*
Boring No. : *06-2*
Sample No. : *D-7*
Depth (ft / m) : *39.0* | *11.90*
File No. :

Set up By :	*R.J.*	**Date :**	*2/25/2007*
Tested By :	*R.J.*	**Date :**	*2/25-3/8/2007*
Time Rate Took By :	*R.J.*	**Date :**	*3/1/2007*
Computer By :	*CY*	**Date :**	*3/22/2007*
Checked By :	*R.J.*	**Date :**	*3/22/2007*

Soil Description : *Dark Greenish Gray, Elastic Silt (MH)*

Method (A) : ☑ Constant load increment duration of 24 hours or multiples there for. Minium of two Time -deformation reading are required.

Method (B) : ☐ Time-deformation reading are required on all load increments. Successive load increments are applied after 100 % primary consolidation is reached, or at constant time increments are described in Test Method (A)

1

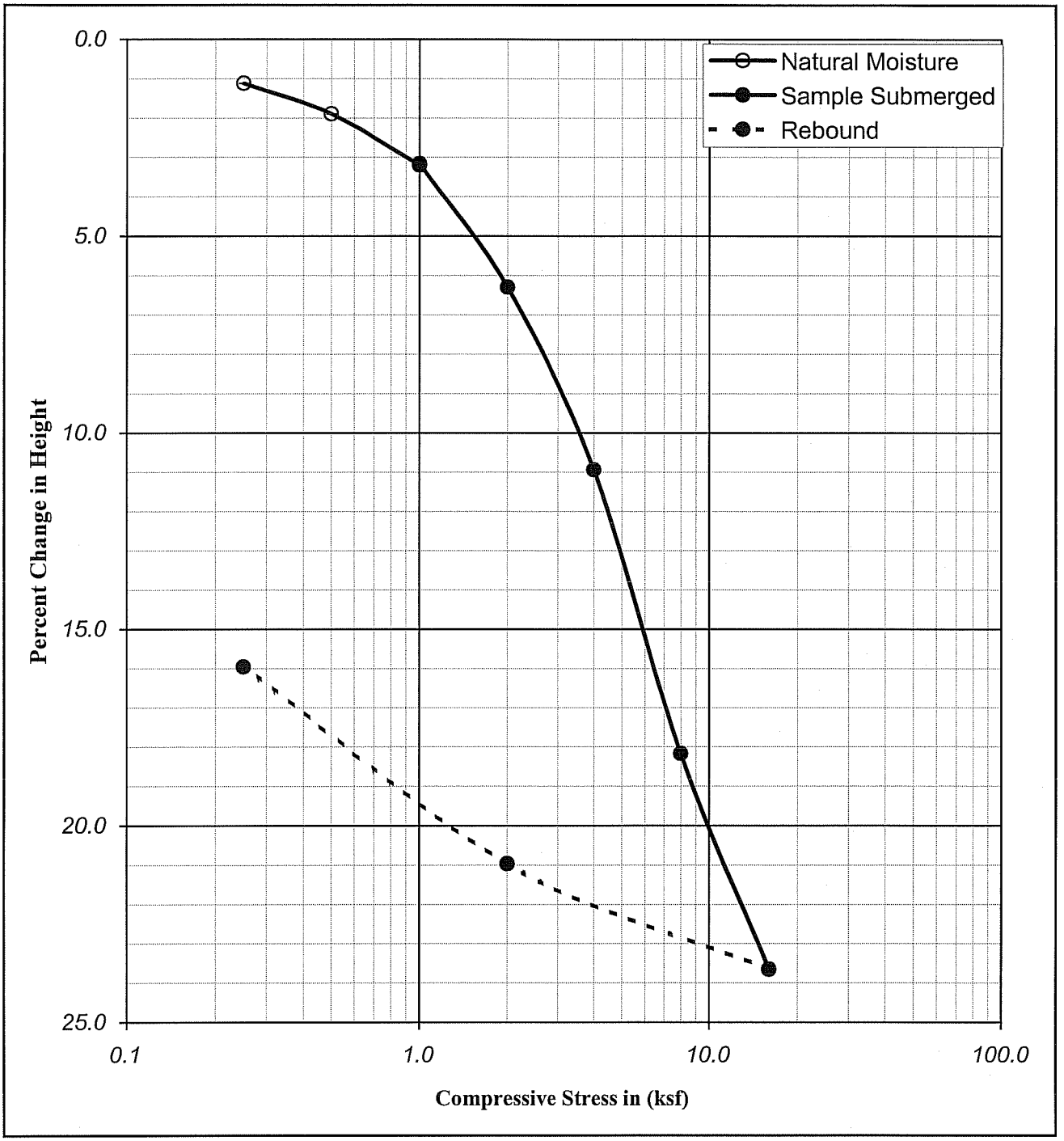
Sample	(inch)	(mm)	Vertical Load	(ksf)	(kPa)	Vertical Load	(ksf)	(kPa)
Internal Diameter	2.42	61.47	Add Water at	1.00	47.88	Reload to	-	-
Height (Intial)	1.00	25.40	Load to	16.00	766.08	Rebound to	-	-
Height (Final)	0.8375	21.27	Rebound to	-	-	Time rate taking at	2.00	95.41

Date	Time	Elapsed Time (min.)	Load (ksf)	Load (kPa)	Dial Reading (in)	Dial Reading (mm)	Consol. (%)
2/25/2007	11:14	0:00:00	Seating		0.04710	1.20	
			Load				
	11:24		0.1	4.8	0.05000	1.27	0.00
2/26/2007	7:55	0:00:00	0.25	12.0	0.06120	1.55	1.12
2/27/2007	9:04	0:00:00	0.50	23.9	0.06900	1.75	1.90
2/28/2007	8:08	0:00:00	1.00	47.9	0.08200	2.08	3.20
			Add Water				
3/1/2007	7:58	0:00:00	1.00	47.9	0.08160	2.07	3.16
3/1/2007	8:01	0.00	2.0	95.8			
		0.10	2.0	95.8	0.08730	2.22	3.73
		0.25	2.0	95.8	0.08790	2.23	3.79
		0.50	2.0	95.8	0.08860	2.25	3.86
		1	2.0	95.8	0.08970	2.28	3.97
		2	2.0	95.8	0.09090	2.31	4.09
		4	2.0	95.8	0.09280	2.36	4.28
		8	2.0	95.8	0.09540	2.42	4.54
		16	2.0	95.8	0.09850	2.50	4.85
		30	2.0	95.8	0.10155	2.58	5.16
		60	2.0	95.8	0.10440	2.65	5.44
		120	2.0	95.8	0.10710	2.72	5.71
		240	2.0	95.8	0.10940	2.78	5.94
		480	2.0	95.8	0.11165	2.84	6.16
		1440	2.0	95.8	0.11300	2.87	6.30
3/3/2007	8:06	0:00:00	4.00	191.5	0.1595	4.05	10.95
3/4/2007	8:06	0:00:00	8.00	383.0	0.2317	5.89	18.17
3/5/2007	8:02	0:00:00	16.00	766.1	0.2865	7.28	23.65
3/6/2007	8:11	0:00:00	2.00	95.8	0.2597	6.60	20.97
3/7/2007	9:00	0:00:00	0.25	12.0	0.2096	5.32	15.96

	Before	After
Weight of wet soil + ring (gm)	169.72	
Weight of ring (gm)	43.10	
Weight of wet soil + ring + container (gm)		215.81
Weight of dry soil + ring + container (gm)		180.73
No. 1 — Weight of container (gm)		57.24
Weight of ring + container (gm)		100.34
Moisture Content (%)	57.51	43.64
Dial Reading (inch)	0.05	0.04
Sample Volume (ft³)	0.0027	0.0022
Wet Density (pcf)	104.9	114.2
Dry Density (pcf)	66.58	79.50

SQRT Time	Date	Time	Elapsed Time (min.)	Load (ksf)	Load (kPa)	Dial Reading (in)	Dial Reading (mm)	Consol. (%)
0.00								
0.32								
0.50								
0.71								
1.00								
1.41								
2.00								
2.83								
4.00								
5.48								
7.75								
10.95								
15.49								
21.91								
37.95								

Remark *Final Dial Reading 0.2096*



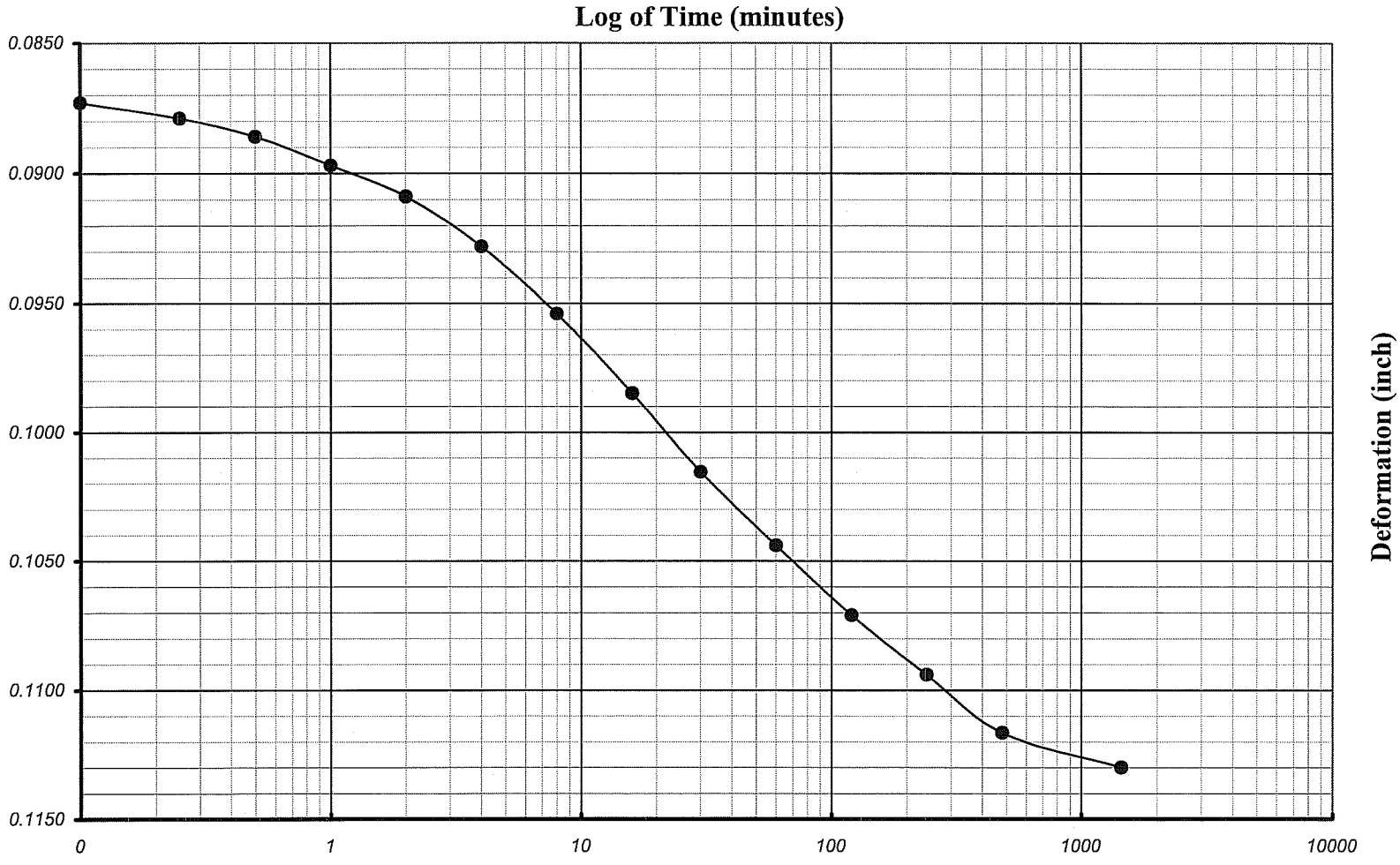
Boring No. : 06-2			Liquid Limit :	-		Moisture Content (%)	Dry Density (pcf)	Dry Density (kN/m³)	Percent Saturation	Void Ratio
Sample No. : D-7			Plastic Limit :	-						
Depth	(ft) : 39.0	40.5	Plastic Index :	-	Initial	57.51	66.58	10.48	101.37	1.53
	(m) : 11.90	12.35	Specific Gravity :	2.70	Final	43.64	79.50	12.51	105.17	1.12
Description : Dark Greenish Gray, Elastic Silt (MH)										

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

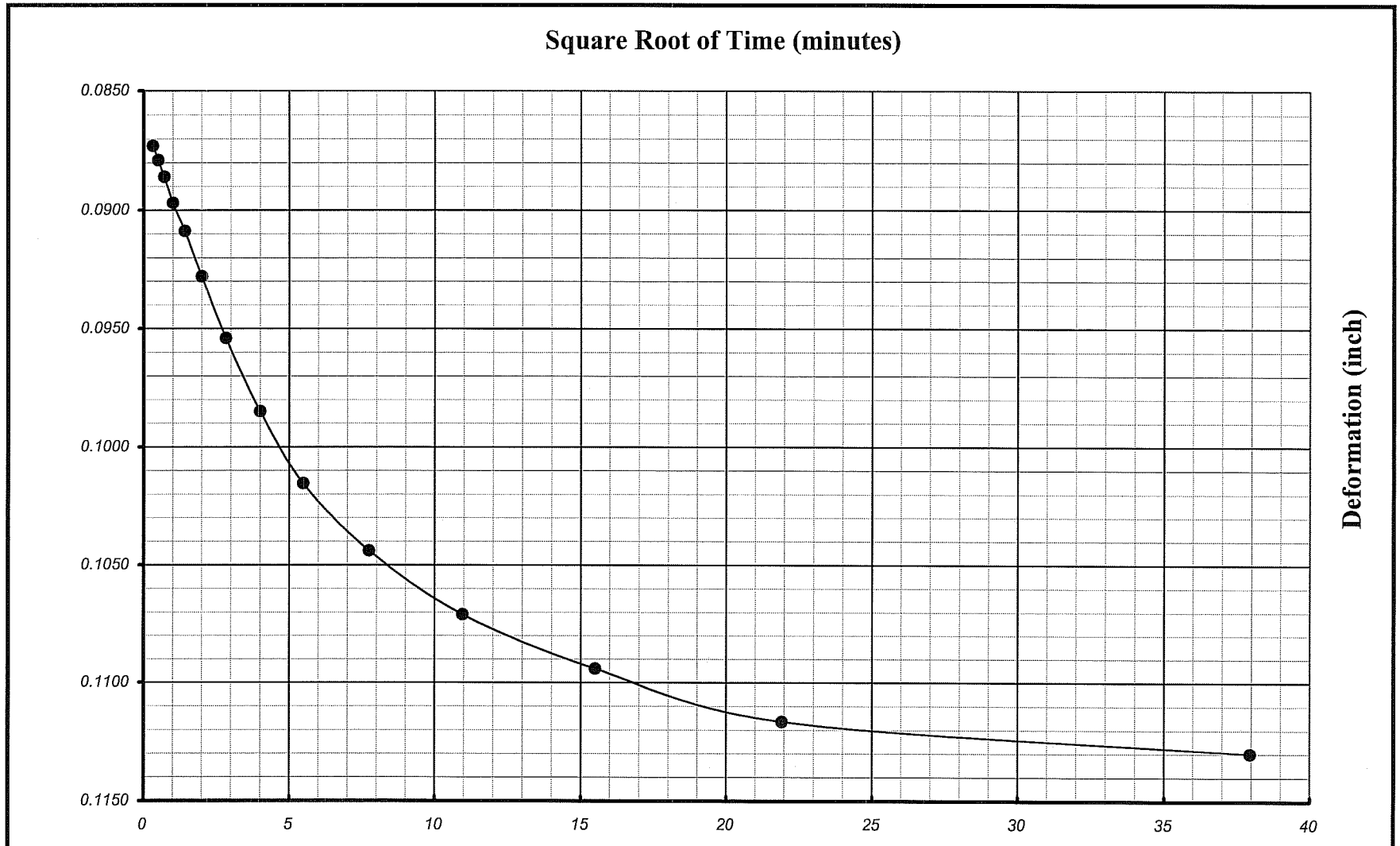
BATA / Dumbarton Bridge

Project No. : 06-159 03/22/07

CONSOLIDATION TEST
(ASTM D-2435 / CT-219)



Earth Mechanics, Inc. Geotechnical and Earthquake Engineering	***BATA / Dumbarton Bridge***	**Boring No. :** *06-2*	**One-Dimensional Consolidation of Soil** **Time-Deformation Curve (Log of Time Method)**
		Sample No. : *D-7*	
EMI Project No. : *06-159*		**Depth (ft/m) :** *39.0* *11.9*	**Veritcal Load (ksf/kpa) :** *2.00* *95.8*



Earth Mechanics, Inc. Geotechnical and Earthquake Engineering	***BATA / Dumbarton Bridge***	**Boring No. :** *06-2*	**One-Dimensional Consolidation of Soil** **Time-Deformation Curve (Square Root of Time Method)**
		Sample No. : *D-7*	
EMI Project No. : *06-159*		**Depth (ft/m) :** *39.0* *11.9*	**Veritcal Load (ksf/kpa) :** *2.0* *95.8*

ONE-DIMENSIONAL CONSOLIDATION OF SOIL

ASTM D-2435 / CT-219

Device No. : 3

Project Name : *BATA / Dumbarton Bridge*
Project No. : *06-159*
Boring No. : *06-3*
Sample No. : *D-5*
Depth (ft / m) : *27.0* *8.24*
File No. :
Soil Description : *Dark Grey, Elastic Silt with abundant shell fragment (MH)*

Set up By : *R.J.* **Date :** *2/25/2007*
Tested By : *R.J.* **Date :** *2/25-3/8/2007*
Time Rate Took By : *R.J.* **Date :** *3/1/2007*
Computer By : *CY* **Date :** *3/22/2007*
Checked By : *R.J.* **Date :** *3/22/2007*

Method (A) : ☑ Constant load increment duration of 24 hours or multiples there for. Minium of two Time -deformation reading are required.

Method (B) : ☐ Time-deformation reading are required on all load increments. Successive load increments are applied after 100 % primary consolidation is reached, or at constant time increments are described in Test Method (A)

1

Sample	(inch)	(mm)
Internal Diameter	2.42	61.47
Height (Intial)	1.00	25.40
Height (Final)	0.6968	17.70

Vertical Load	(ksf)	(kPa)
Add Water at	0.25	11.97
Load to	16.00	766.08
Rebound to	0.25	11.97

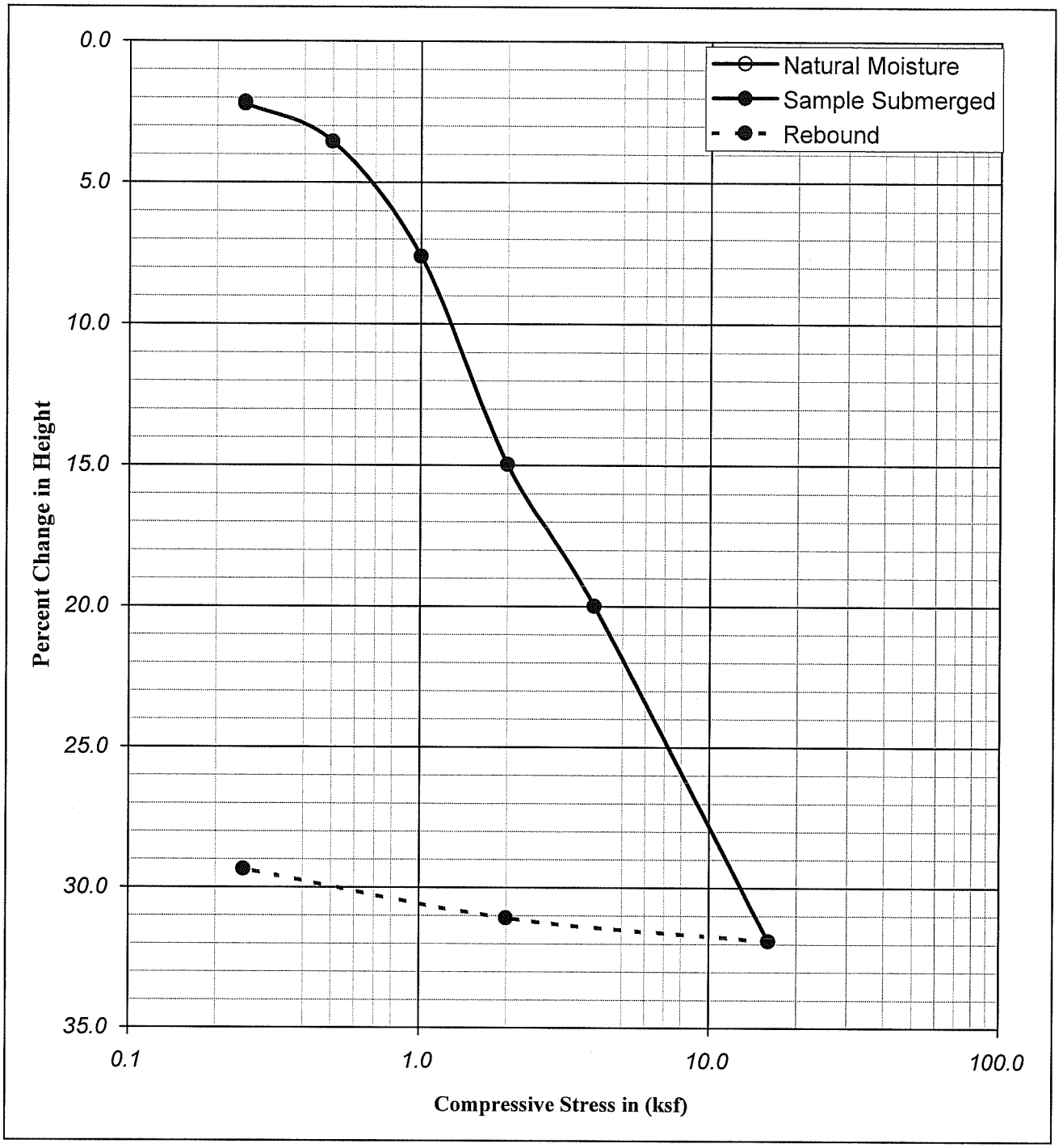
Vertical Load	(ksf)	(kPa)
Reload to	-	-
Rebound to	-	-
Time rate taking at	2.00	95.41

	Before	After
Weight of wet soil + ring (gm)	168.60	
Weight of ring (gm)	45.30	
Weight of wet soil + ring + container (gm)		202.53
Weight of dry soil + ring + container (gm)		177.17
No. 1 Weight of container (gm)		58.69
Weight of ring + container (gm)		103.99
Moisture Content (%)	68.49	34.65
Dial Reading (inch)	0.05	0.04
Sample Volume (ft^3)	0.0027	0.0019
Wet Density (pcf)	102.1	117.1
Dry Density (pcf)	60.61	86.98

Date	Time	Elapsed Time (min.)	Load (ksf)	Load (kPa)	Dial Reading (in)	Dial Reading (mm)	Consol. (%)	SQRT Time
2/25/2007	11:14	0:00:00	Seating		0.04030	1.02		
			Load					
	11:24		0.1	4.8	0.05000	1.27	0.00	
2/26/2007	7:55	0:00:00	0.25	12.0	0.07150	1.82	2.15	
			Add Water					
2/27/2007	9:04	0:00:00	0.25	12.0	0.07210	1.83	2.21	
2/28/2007	8:08	0:00:00	0.50	23.9	0.08550	2.17	3.55	
3/1/2007	7:58	0:00:00	1.00	47.9	0.12610	3.20	7.61	
3/1/2007	8:01	0.00	2.0	95.8				0.00
		0.10	2.0	95.8	0.13740	3.49	8.74	0.32
		0.25	2.0	95.8	0.14050	3.57	9.05	0.50
		0.50	2.0	95.8	0.14360	3.65	9.36	0.71
		1	2.0	95.8	0.14810	3.76	9.81	1.00
		2	2.0	95.8	0.15370	3.90	10.37	1.41
		4	2.0	95.8	0.16160	4.10	11.16	2.00
		8	2.0	95.8	0.17080	4.34	12.08	2.83
		16	2.0	95.8	0.17750	4.51	12.75	4.00
		30	2.0	95.8	0.18250	4.64	13.25	5.48
		60	2.0	95.8	0.18680	4.74	13.68	7.75
		146	2.0	95.8	0.19050	4.84	14.05	12.08
		300	2.0	95.8	0.19515	4.96	14.52	17.32
		600	2.0	95.8	0.19825	5.04	14.83	24.49
		1440	2.0	95.8	0.19960	5.07	14.96	37.95
3/3/2007	8:06	0:00:00	4.00	191.5	0.2499	6.35	19.99	
3/4/2007	8:06	0:00:00	8.00	383.0	0.3115	7.91	26.15	
3/5/2007	8:02	0:00:00	16.00	766.1	0.3689	9.37	31.89	
3/6/2007	8:11	0:00:00	2.00	95.8	0.3608	9.16	31.08	
3/7/2007	9:00	0:00:00	0.25	12.0	0.3435	8.72	29.35	

Date	Time	Elapsed Time (min.)	Load (ksf)	Load (kPa)	Dial Reading (in)	Dial Reading (mm)	Consol. (%)

Remark *Final Dial Reading 0.3435*



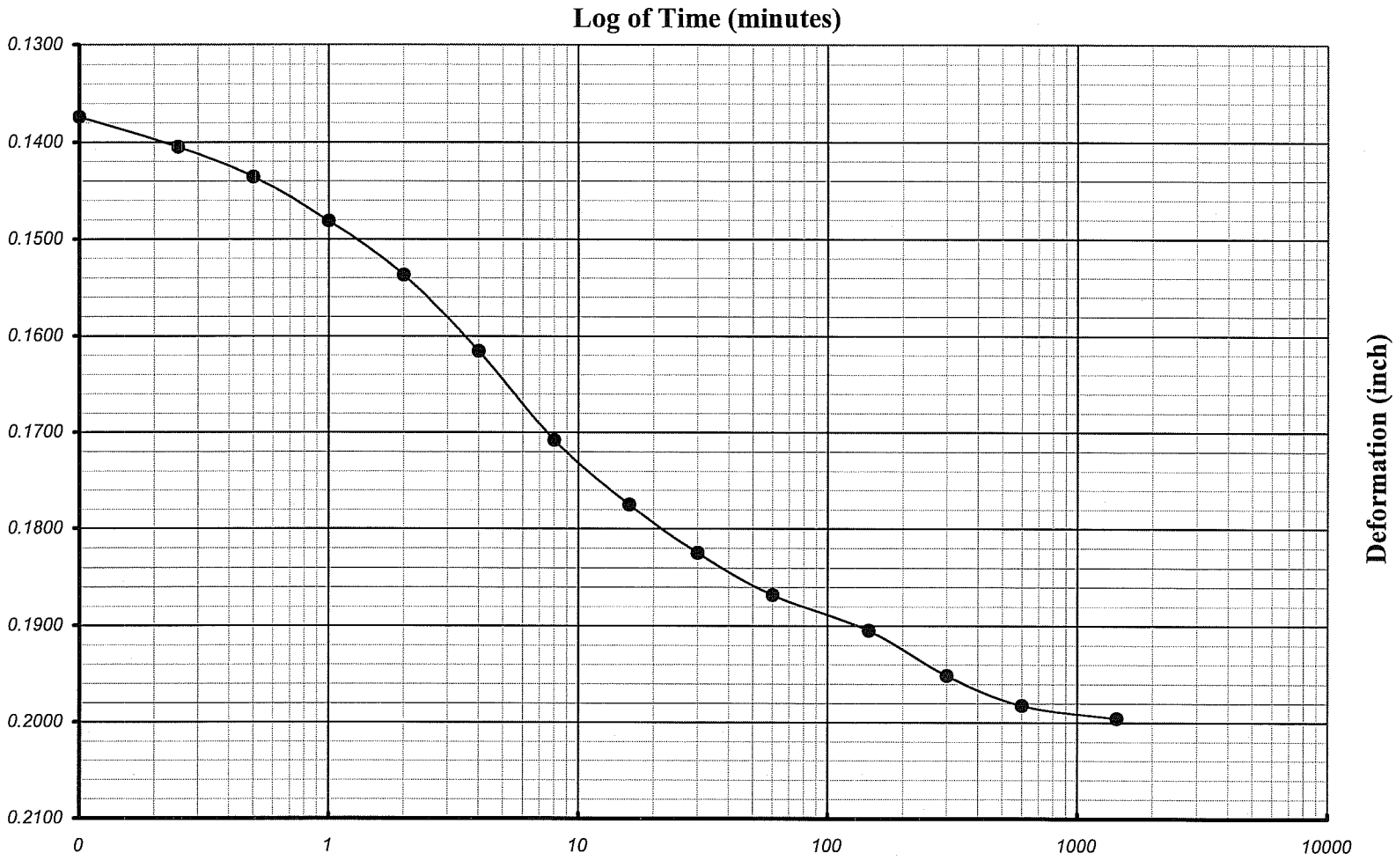
Boring No. : 06-3			Liquid Limit :	-		Moisture Content (%)	Dry Density		Percent Saturation	Void Ratio
Sample No. : D-5			Plastic Limit :	-			(pcf)	(kN/m³)		
Depth	(ft) : 27.0	28.5	Plastic Index :	-	Initial	68.49	60.61	9.54	103.82	1.78
	(m) : 8.24	8.69	Specific Gravity :	2.70	Final	34.65	86.98	13.69	99.77	0.94
Description : Dark Grey, Elastic Silt with abundant shell fragment (MH)										

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

BATA / Dumbarton Bridge

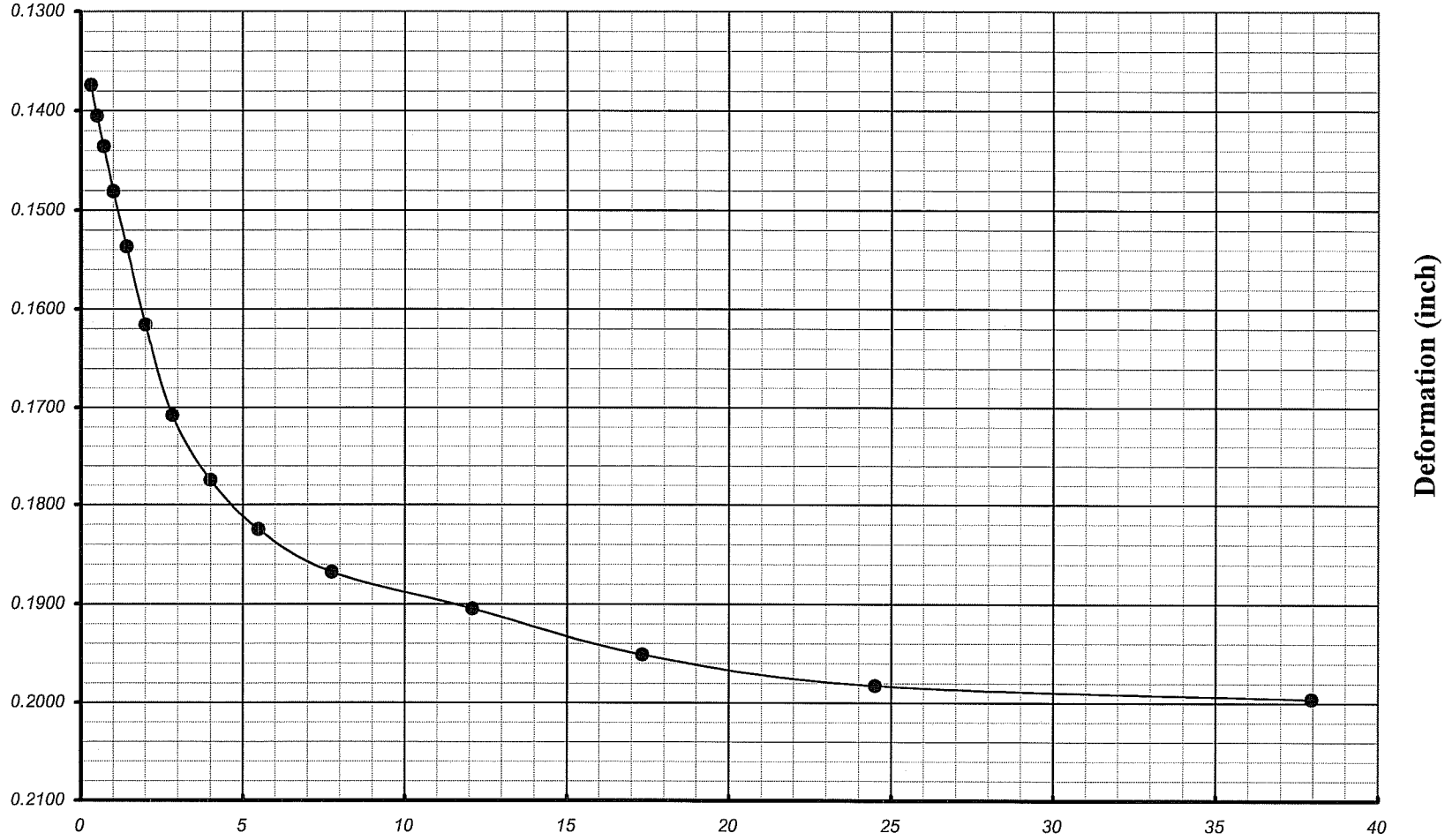
Project No. : 06-159 03/22/07

CONSOLIDATION TEST
(ASTM D-2435 / CT-219)



Earth Mechanics, Inc. Geotechnical and Earthquake Engineering	***BATA / Dumbarton Bridge***	**Boring No. :** *06-3*	**One-Dimensional Consolidation of Soil** **Time-Deformation Curve (Log of Time Method)**
		Sample No. : *D-5*	
EMI Project No. : *06-159*		**Depth (ft/m) :** *27.0* *8.2*	**Veritcal Load (ksf/kpa) :** *2.00* *95.8*

Square Root of Time (minutes)



Earth Mechanics, Inc. Geotechnical and Earthquake Engineering	***BATA / Dumbarton Bridge***	**Boring No. :** *06-3*	**One-Dimensional Consolidation of Soil** **Time-Deformation Curve (Square Root of Time Method)**
		Sample No. : *D-5*	
EMI Project No. : *06-159*		**Depth (ft/m) :** *27.0* *8.2*	**Veritcal Load (ksf/kpa) :** *2.0* *95.8*

ONE-DIMENSIONAL CONSOLIDATION OF SOIL

ASTM D-2435 / CT-219

Device No. : 5

Project Name : *BATA / Dumbarton Bridge*
Project No. : *06-159*
Boring No. : *06-3*
Sample No. : *D-21*
Depth (ft / m) : *107.0* *32.64*
File No. :
Soil Description : *Olive Brown, Lean Clay (CL)*

Set up By :	*R.J*	**Date :**	*2/26/2007*
Tested By :	*R.J*	**Date :**	*2/26-3/10/2007*
Time Rate Took By :	*R.J*	**Date :**	*3/4/2007*
Computer By :	*CY*	**Date :**	*3/16/2007*
Checked By :	*R.J*	**Date :**	*3/16/2007*

Method (A) : ☑ Constant load increment duration of 24 hours or multiples there for. Minium of two Time -deformation reading are required.

Method (B) : ☐ Time-deformation reading are required on all load increments. Successive load increments are applied after 100 % primary consolidation is reached, or at constant time increments are described in Test Method (A)

1

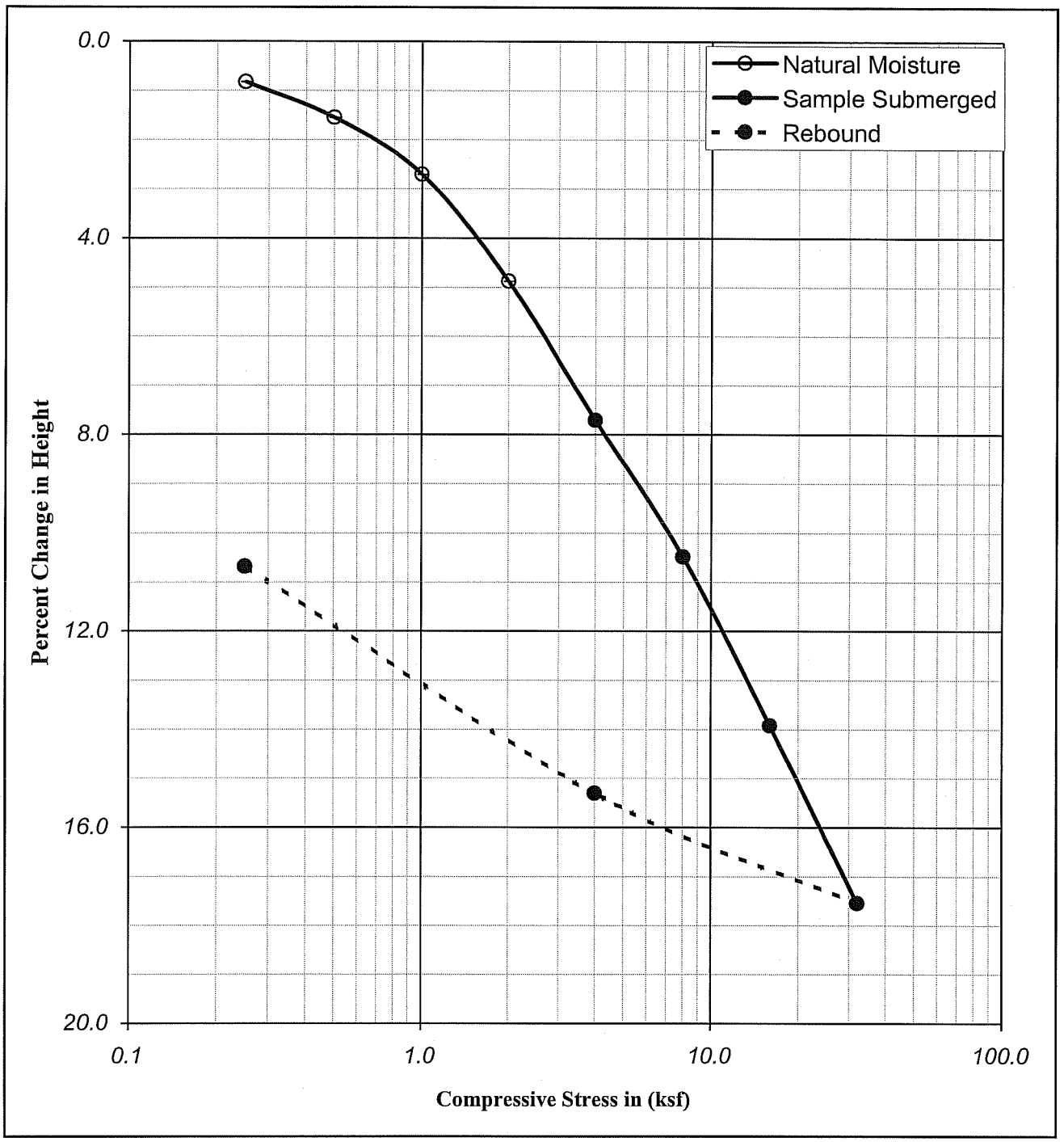
Sample	(inch)	(mm)	Vertical Load	(ksf)	(kPa)	Vertical Load	(ksf)	(kPa)
Internal Diameter	2.42	61.47	Add Water at	4.00	191.52	Reload to	-	-
Height (Intial)	1.00	25.40	Load to	32.00	1532.16	Rebound to	-	-
Height (Final)	0.8912	22.64	Rebound to	0.25	11.97	Time rate taking at	8.00	381.62

Date	Time	Elapsed Time (min.)	Load (ksf)	Load (kPa)	Dial Reading (in)	Dial Reading (mm)	Consol. (%)
2/26/2007	13:59	0:00:00	Seating Load		0.04800	1.22	
	14:09		2.0	95.8	0.05000	1.27	0.00
2/27/2007	9:05	0:00:00	0.25	12.0	0.05830	1.48	0.83
2/28/2007	8:09	0:00:00	0.50	23.9	0.06550	1.66	1.55
3/1/2007	7:59	0:00:00	1.00	47.9	0.07710	1.96	2.71
3/2/2007	7:57	0:00:00	2.00	95.8	0.09875	2.51	4.88
3/3/2007	8:45	0:00:00	4.00	191.5	0.12710	3.23	7.71
			Add Water				
3/4/2007	8:25	0:00:00	4.00	191.5	0.12710	3.23	7.71
3/4/2007	8:30	0.00	8.0	383.0			
		0.10	8.0	383.0	0.13360	3.39	8.36
		0.25	8.0	383.0	0.13470	3.42	8.47
		0.50	8.0	383.0	0.13580	3.45	8.58
		1	8.0	383.0	0.13735	3.49	8.74
		2	8.0	383.0	0.13950	3.54	8.95
		4	8.0	383.0	0.14220	3.61	9.22
		8	8.0	383.0	0.14505	3.68	9.51
		16	8.0	383.0	0.14740	3.74	9.74
		30	8.0	383.0	0.14900	3.78	9.90
		60	8.0	383.0	0.15025	3.82	10.03
		120	8.0	383.0	0.15170	3.85	10.17
		240	8.0	383.0	0.15280	3.88	10.28
		500	8.0	383.0	0.15410	3.91	10.41
		1440	8.0	383.0	0.15480	3.93	10.48
3/6/2007	7:29	0:00:00	16.00	766.1	0.1893	4.81	13.93
3/7/2007	7:59	0:00:00	32.00	1532.2	0.2255	5.73	17.55
3/8/2007	8:03	0:00:00	4.00	191.5	0.2031	5.16	15.31
3/9/2007	8:03	0:00:00	0.25	12.0	0.1568	3.98	10.68

	Before	After
Weight of wet soil + ring (gm)	192.12	
Weight of ring (gm)	45.73	
Weight of wet soil + ring + container (gm)		245.94
Weight of dry soil + ring + container (gm)		218.90
No. 2 Weight of container (gm)		58.65
Weight of ring + container (gm)		104.38
Moisture Content (%)	27.83	23.61
Dial Reading (inch)	0.05	0.04
Sample Volume (ft³)	0.0027	0.0024
Wet Density (pcf)	121.2	131.6
Dry Density (pcf)	94.85	106.43

SQRT Time	Date	Time	Elapsed Time (min.)	Load (ksf)	Load (kPa)	Dial Reading (in)	Dial Reading (mm)	Consol. (%)
0.00								
0.32								
0.50								
0.71								
1.00								
1.41								
2.00								
2.83								
4.00								
5.48								
7.75								
10.95								
15.49								
22.36								
37.95								

Remark *Sand Catcher's been used* *Final Dial Reading* *0.1568*



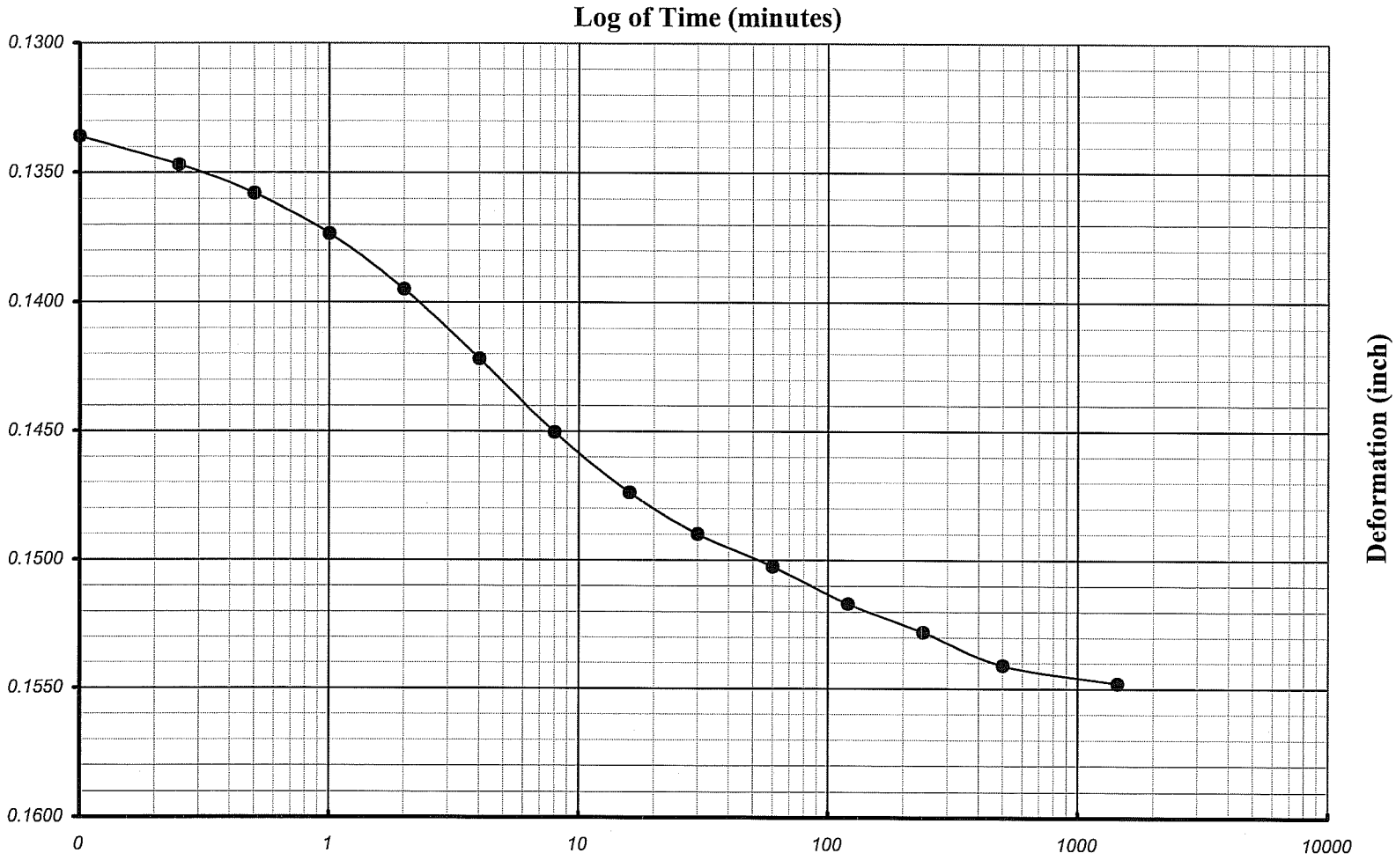
Boring No.		:	06-3		Liquid Limit :	-		Moisture Content (%)	Dry Density		Percent Saturation	Void Ratio
Sample No.		:	D-21		Plastic Limit :	-			(pcf)	(kN/m³)		
Depth	(ft)	:	107.0	108.5	Plastic Index :	-	Initial	27.83	94.85	14.93	96.68	0.78
	(m)	:	32.64	33.09	Specific Gravity :	2.70	Final	23.61	106.43	16.75	109.20	0.58
Description		:	Olive Brown, Lean Clay (CL)									

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

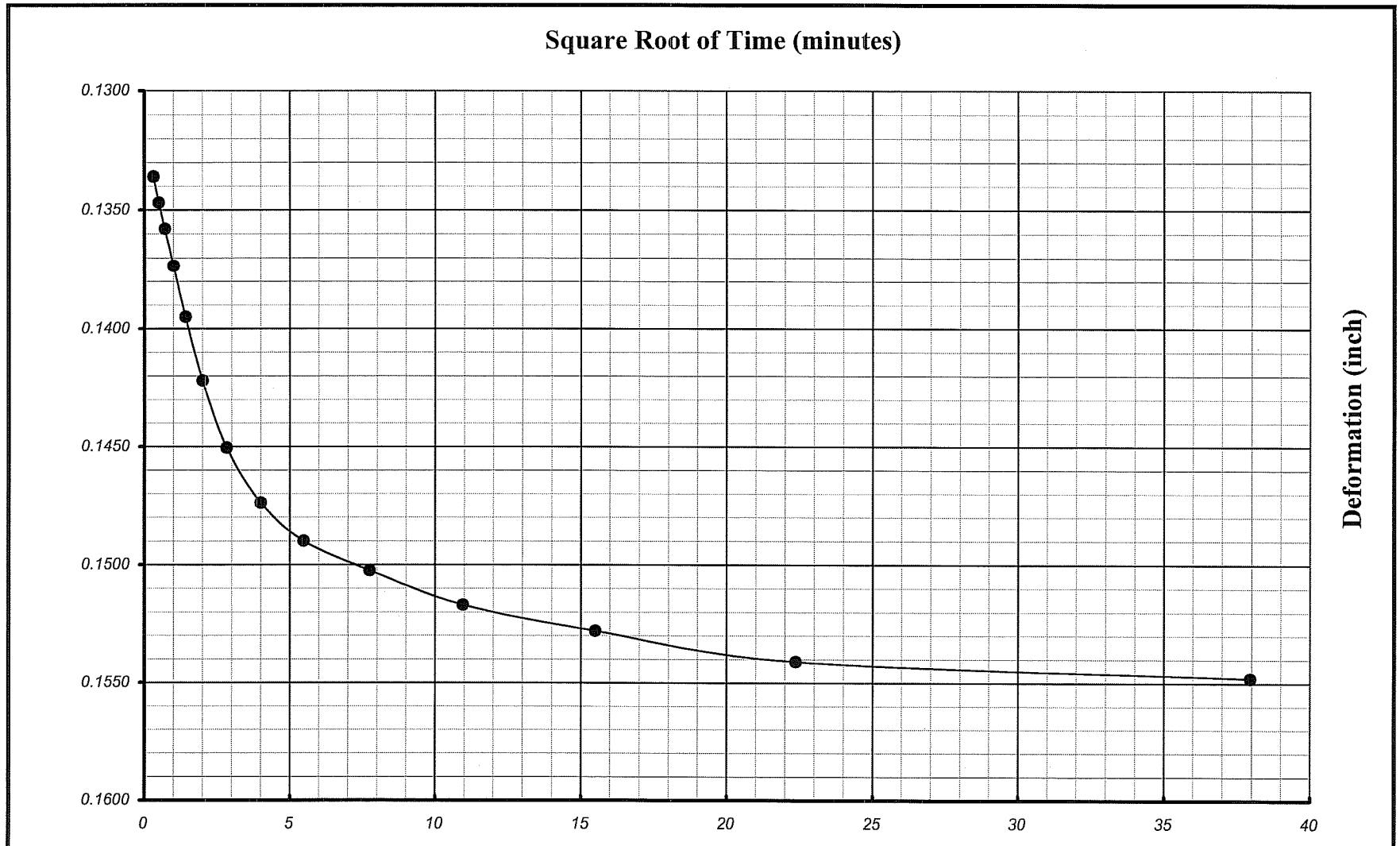
BATA / Dumbarton Bridge

Project No. : 06-159 03/16/07

CONSOLIDATION TEST
(ASTM D-2435 / CT-219)



Earth Mechanics, Inc. Geotechnical and Earthquake Engineering	***BATA / Dumbarton Bridge***	**Boring No. :** *06-3*	**One-Dimensional Consolidation of Soil** **Time-Deformation Curve (Log of Time Method)**
		Sample No. : *D-21*	
EMI Project No. : *06-159*		**Depth (ft/m) :** *107.0* *32.6*	**Veritcal Load (ksf/kpa) :** *8.00* *383.0*



Earth Mechanics, Inc. Geotechnical and Earthquake Engineering	***BATA / Dumbarton Bridge***	**Boring No. :** *06-3*	**One-Dimensional Consolidation of Soil** **Time-Deformation Curve (Square Root of Time Method)**
		Sample No. : *D-21*	
EMI Project No. : *06-159*		**Depth (ft/m) :** *107.0* *32.6*	**Veritcal Load (ksf/kpa) :** *8.0* *383.0*

ONE-DIMENSIONAL CONSOLIDATION OF SOIL

ASTM D-2435 / CT-219

Device No. : 2

Project Name : BATA / Dumbarton Bridge
Project No. : 06-159
Boring No. : 06-6
Sample No. : D-8
Depth (ft / m) : 40.0 | 12.20
File No. :
Soil Description : Olive Brown, Silt (ML)

Set up By :	R.J	**Date :**	2/9/2007
Tested By :	R.J	**Date :**	2/9-2/20/2007
Time Rate Took By :	R.J	**Date :**	2/14/2007
Computer By :	CY	**Date :**	2.22/2007
Checked By :	R.J	**Date :**	2/22/2007

Method (A) : ☑ Constant load increment duration of 24 hours or multiples there for. Minium of two Time -deformation reading are required.

Method (B) : ☐ Time-deformation reading are required on all load increments. Successive load increments are applied after 100 % primary consolidation is reached, or at constant time increments are described in Test Method (A)

1

Sample	(inch)	(mm)	Vertical Load	(ksf)	(kPa)
Internal Diameter	2.42	61.47	Add Water at	2.00	95.76
Height (Intial)	1.00	25.40	Load to	16.00	766.08
Height (Final)	0.9445	23.99	Rebound to	-	-

Vertical Load	(ksf)	(kPa)
Reload to	-	-
Rebound to	-	-
Time rate taking at	4.00	190.81

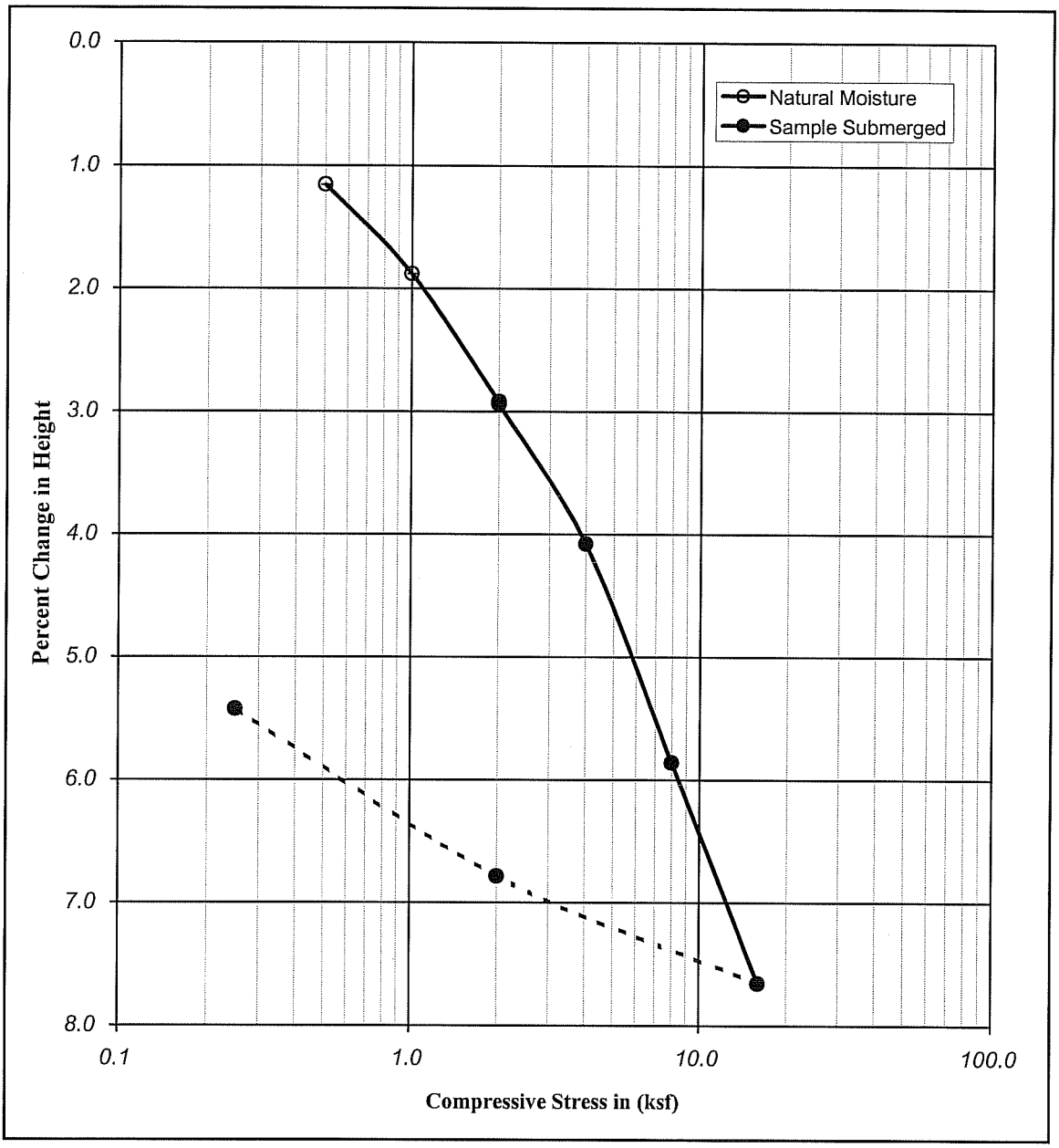
		Before	After
Weight of wet soil + ring (gm)		199.56	
Weight of ring (gm)		45.10	
Weight of wet soil + ring + container (gm)			256.73
Weight of dry soil + ring + container (gm)			228.94
No. 1	Weight of container (gm)		59.38
	Weight of ring + container (gm)		104.48
	Moisture Content (%)	24.10	22.33
	Dial Reading (inch)	0.05	0.04
	Sample Volume (ft^3)	0.0027	0.0025
	Wet Density (pcf)	127.9	133.5
	Dry Density (pcf)	103.08	109.14

Date	Time	Elapsed Time (min.)	Load (ksf)	Load (kPa)	Dial Reading (in)	Dial Reading (mm)	Consol. (%)	SQRT Time
2/9/2007	12:10	0:00:00	Seating Load		0.04870	1.24		
	12:20		0.1	4.8	0.05000	1.27	0.00	
2/10/2007	8:02	0:00:00	0.25	12.0	0.05665	1.44	0.66	
2/11/2007	8:04	0:00:00	0.50	23.9	0.06155	1.56	1.16	
2/12/2007	8:12	0:00:00	1.00	47.9	0.06880	1.75	1.88	
2/13/2007	8:05	0:00:00	2.00	95.8	0.07920	2.01	2.92	
			Add Water					
2/14/2007	9:05	0:00:00	2.00	95.8	0.07940	2.02	2.94	
2/14/2007	9:07	0.00	4.0	191.5				0.00
		0.10	4.0	191.5	0.08480	2.15	3.48	0.32
		0.25	4.0	191.5	0.08590	2.18	3.59	0.50
		0.50	4.0	191.5	0.08650	2.20	3.65	0.71
		1	4.0	191.5	0.08700	2.21	3.70	1.00
		2	4.0	191.5	0.08740	2.22	3.74	1.41
		4	4.0	191.5	0.08775	2.23	3.77	2.00
		8	4.0	191.5	0.08805	2.24	3.80	2.83
		16	4.0	191.5	0.08840	2.25	3.84	4.00
		30	4.0	191.5	0.08870	2.25	3.87	5.48
		60	4.0	191.5	0.08905	2.26	3.90	7.75
		120	4.0	191.5	0.08945	2.27	3.94	10.95
		240	4.0	191.5	0.09000	2.29	4.00	15.49
		480	4.0	191.5	0.09045	2.30	4.05	21.91
		1440	4.0	191.5	0.09080	2.31	4.08	37.95
2/16/2007	8:06	0:00:00	8.00	383.0	0.1086	2.76	5.86	
2/17/2007	8:02	0:00:00	16.00	766.1	0.1266	3.21	7.65	
2/18/2007	8:11	0:00:00	2.00	95.8	0.1179	2.99	6.79	
2/19/2007	9:00	0:00:00	0.25	12.0	0.1043	2.65	5.43	

Date	Time	Elapsed Time (min.)	Load (ksf)	Load (kPa)	Dial Reading (in)	Dial Reading (mm)	Consol. (%)

Remark :

Final Dial Reading 0.1043



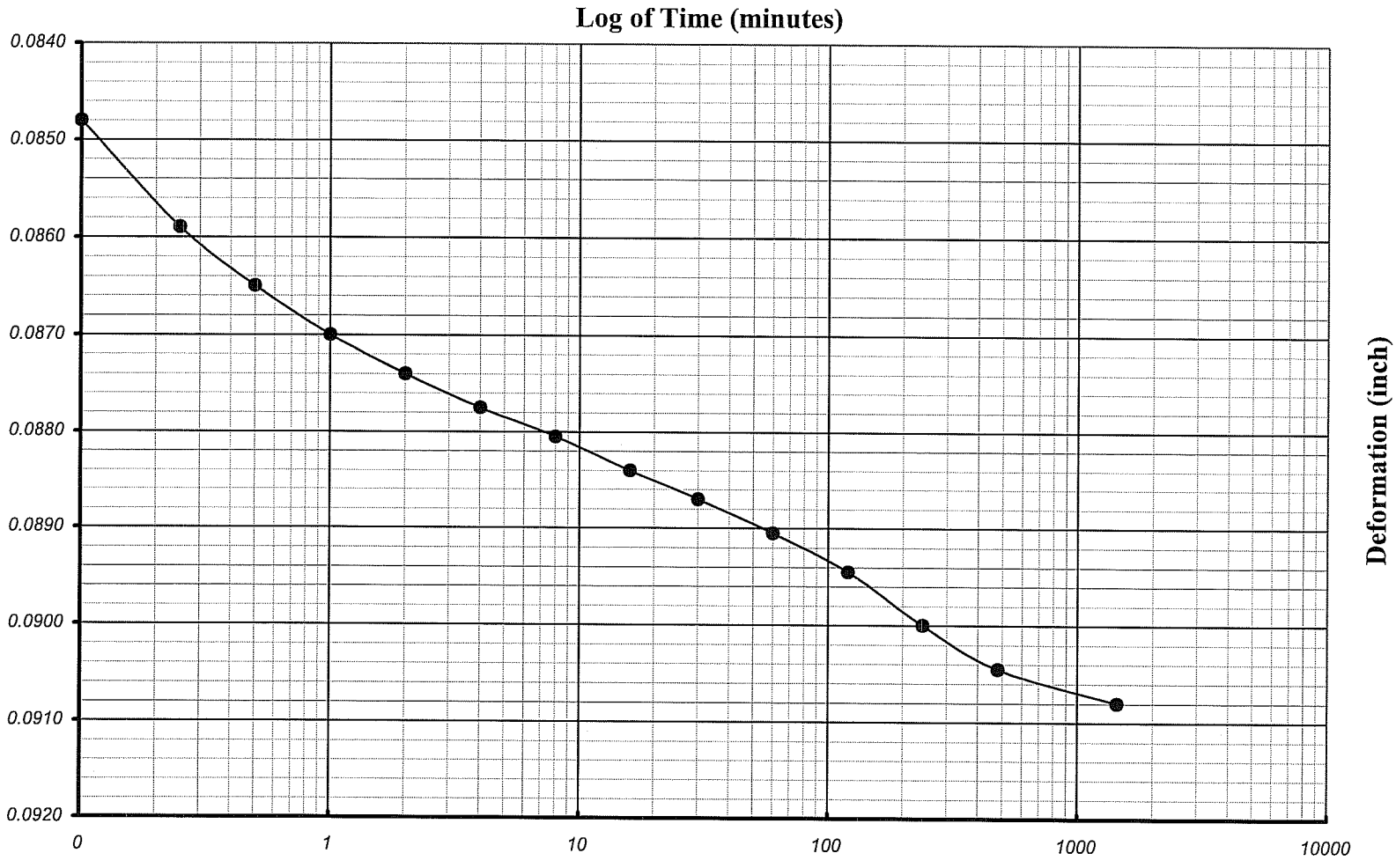
Boring No. : 06-6			Liquid Limit :	-		Moisture Content (%)	Dry Density		Percent Saturation	Void Ratio
Sample No. : D-8			Plastic Limit :	-			(pcf)	(kN/m³)		
Depth	(ft) : 40.0	41.5	Plastic Index :	-	Initial	24.10	103.08	16.22	102.45	0.64
	(m) : 12.20	12.66	Specific Gravity :	2.70	Final	22.33	109.14	17.18	110.74	0.54
Description : Olive Brown, Silt (ML)										

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

BATA / Dumbarton Bridge

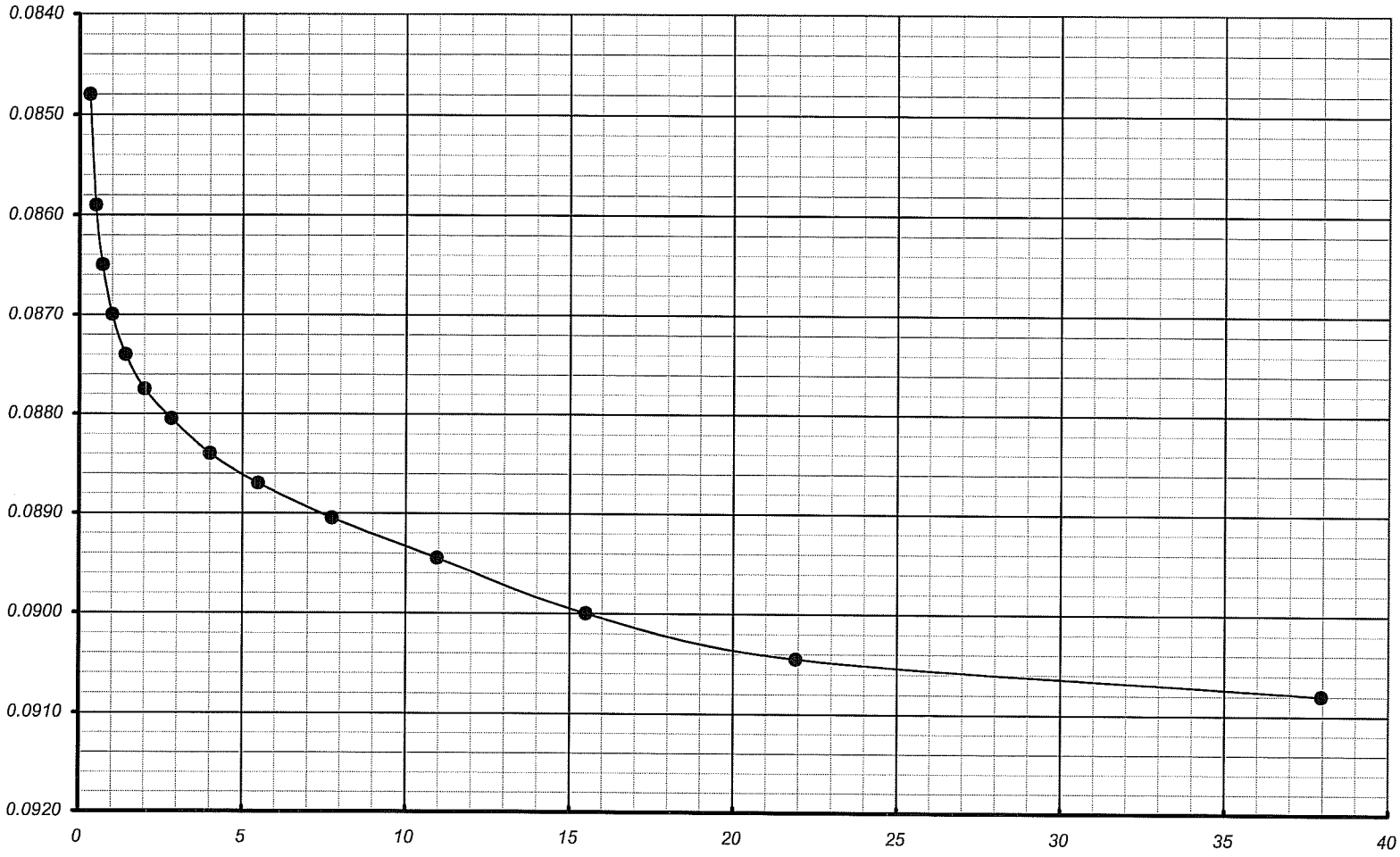
Project No. : 06-159 2.22/2007

CONSOLIDATION TEST
(ASTM D-2435 / CT-219)



Earth Mechanics, Inc. Geotechnical and Earthquake Engineering	***BATA / Dumbarton Bridge***	**Boring No. :** *06-6*	**One-Dimensional Consolidation of Soil** **Time-Deformation Curve (Log of Time Method)**
		Sample No. : *D-8*	
EMI Project No. : *06-159*		**Depth (ft/m) :** *40.0* *12.2*	**Veritcal Load (ksf/kpa) :** *4.00* *191.5*

Square Root of Time (minutes)



Earth Mechanics, Inc. Geotechnical and Earthquake Engineering	*BATA / Dumbarton Bridge*	Boring No. : *06-6*	One-Dimensional Consolidation of Soil Time-Deformation Curve (Square Root of Time Method)
		Sample No. : *D-8*	
EMI Project No. : *06-159*		Depth (ft/m) : *40.0* *12.2*	Veritcal Load (ksf/kpa) : *4.0* *191.5*

ONE-DIMENSIONAL CONSOLIDATION OF SOIL

ASTM D-2435 / CT-219

Device No. : 4

Project Name : *BATA / Dumbarton Bridge*
Project No. : *06-159*
Boring No. : *06-6*
Sample No. : *D-12*
Depth (ft / m) : *60.0* | *18.30*
File No. :
Soil Description : *Dark Greenish Gray, Lean Clay (CL)*

Set up By : *R.J* **Date :** *5/14/2007*
Tested By : *R.J* **Date :** *5/14-5/25/2007*
Time Rate Taken By : **Date :**
Computer By : *CY* **Date :** *5/31/2007*
Checked By : *R.J* **Date :** *5/31/2007*

Method (A) : ☑ Constant load increment duration of 24 hours or multiples there for. Minium of two Time -deformation reading are required.
Method (B) : ☐ Time-deformation reading are required on all load increments. Successive load increments are applied after 100 % primary consolidation is reached, or at constant time increments are described in Test Method (A)

1

Sample	(inch)	(mm)
Internal Diameter	2.42	61.47
Height (Intial)	1.00	25.40
Height (Final)	0.9806	24.91

Vertical Load	(ksf)	(kPa)
Add Water at	2.00	95.76
Load to	16.00	766.08
Rebound to	0.25	11.97

Vertical Load	(ksf)	(kPa)
Reload to	-	-
Rebound to	-	-
Time rate taken at	-	-

Date	Time	Elapsed Time (min.)	Load (ksf)	Load (kPa)	Dial Reading (in)	Dial Reading (mm)	Consol. (%)
5/14/2007	13:37	0:00:00	Seating		0.04860	1.23	
			Load				
	14:47		2.0	95.8	0.05000	1.27	0.00
5/15/2007	8:30	0:00:00	0.25	12.0	0.05700	1.45	0.70
5/16/2007	8:00	0:00:00	0.50	23.9	0.06250	1.59	1.25
5/17/2007	8:00	0:00:00	1.00	47.9	0.06900	1.75	1.90
5/18/2007	8:00	0:00:00	2.00	95.8	0.07700	1.96	2.70
			Add Water				
5/19/2007	8:20	0:00:00	2.00	95.8	0.07290	1.85	2.29
5/20/2007	9:01	0:00:00	4.00	191.5	0.07940	2.02	2.94
5/21/2007	8:07	0:00:00	8.00	383.0	0.09230	2.34	4.23
5/22/2007	8:09	0:00:00	16.00	766.1	0.11660	2.96	6.66
5/23/2007	8:13	0:00:00	2.00	95.8	0.09440	2.40	4.44
5/24/2007	8:35	0:00:00	0.25	12.0	0.06800	1.73	1.80

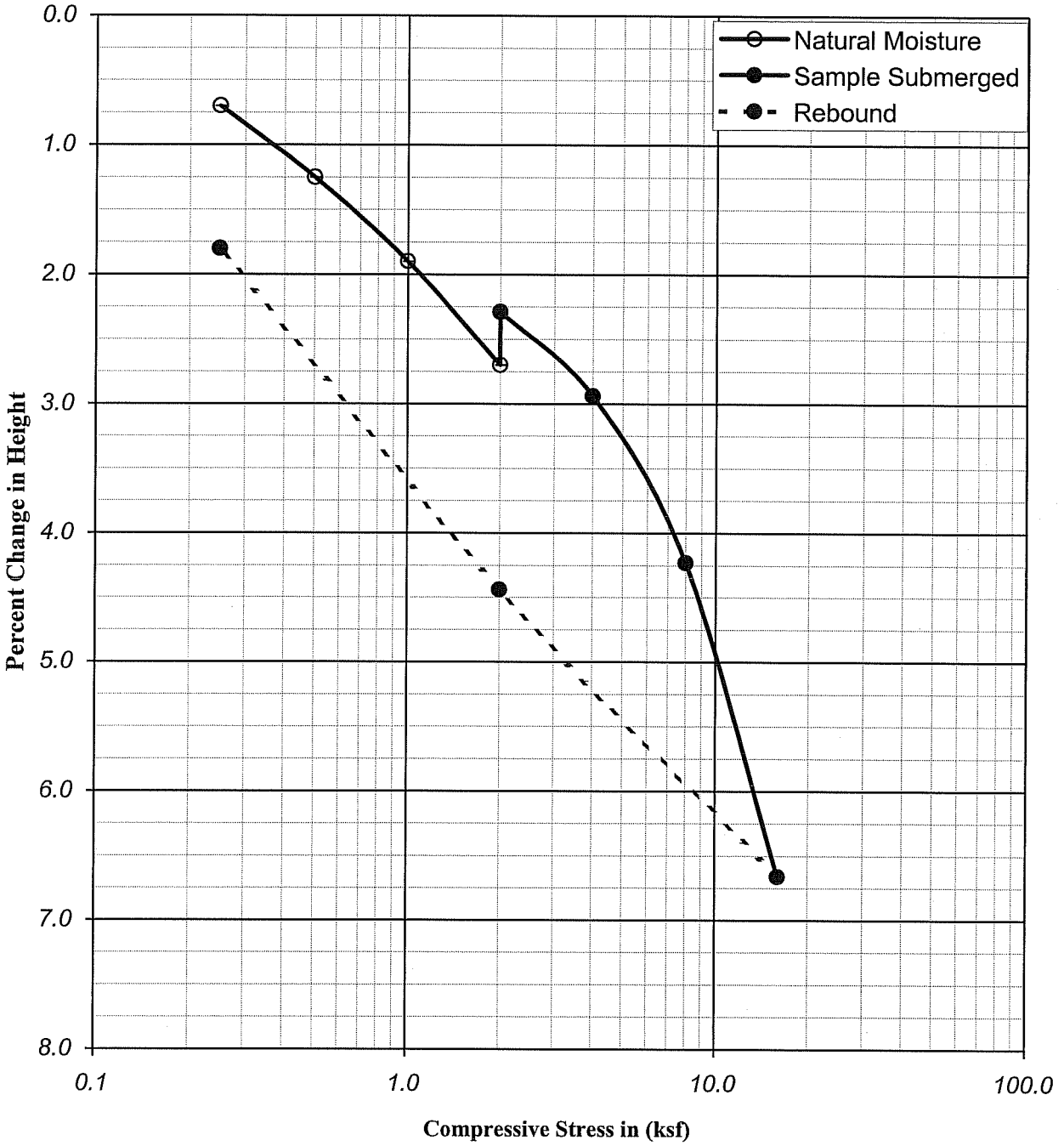
	Before	After
Weight of wet soil + ring (gm)	193.73	
Weight of ring (gm)	45.08	
Weight of wet soil + ring + container (gm)		251.86
Weight of dry soil + ring + container (gm)		218.33
No. 4 — Weight of container (gm)		58.04
Weight of ring + container (gm)		103.12
Moisture Content (%)	29.03	29.10
Dial Reading (inch)	0.05	0.04
Sample Volume (ft^3)	0.0027	0.0026
Wet Density (pcf)	123.1	125.6
Dry Density (pcf)	95.42	97.31

SQRT Time

Date	Time	Elapsed Time (min.)	Load (ksf)	Load (kPa)	Dial Reading (in)	Dial Reading (mm)	Consol. (%)

Remark

Final Dial Reading *0.0680*



Boring No. : 06-6				Liquid Limit :	-		Moisture Content (%)	Dry Density		Percent Saturation	Void Ratio
Sample No. : D-12				Plastic Limit :	-			(pcf)	(kN/m³)		
Depth	(ft) :	60.0	61.5	Plastic Index :	-	Initial	29.03	95.42	15.02	102.24	0.77
	(m) :	18.30	18.76	Specific Gravity :	2.70	Final	29.10	97.31	15.32	107.31	0.73
Description : Dark Greenish Gray, Lean Clay (CL)											

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

BATA / Dumbarton Bridge

Project No. : 06-159 05/31/07

CONSOLIDATION TEST
(ASTM D-2435 / CT-219)

ONE-DIMENSIONAL CONSOLIDATION OF SOIL

ASTM D-2435 / CT-219

Device No. : 3

Project Name : *BATA / Dumbarton Bridge*
Project No. : *06-159*
Boring No. : *06-6*
Sample No. : *D-23*
Depth (ft / m) : *120.0* | *36.60*
File No. :
Soil Description : *Dark Gray, Fat Clay (CH)*

Set up By :	*R.J.*	**Date :**	*2/9/2007*
Tested By :	*R.J.*	**Date :**	*2/9-2/21/2007*
Time Rate Took By :	*R.J.*	**Date :**	*2/16/2007*
Computer By :	*CY*	**Date :**	*3/22/2007*
Checked By :	*R.J.*	**Date :**	*3/22/2007*

Method (A) : ☑ Constant load increment duration of 24 hours or multiples there for. Minium of two Time -deformation reading are required.

Method (B) : ☐ Time-deformation reading are required on all load increments. Successive load increments are applied after 100 % primary consolidation is reached, or at constant time increments are described in Test Method (A)

1

Sample	(inch)	(mm)	Vertical Load	(ksf)	(kPa)	Vertical Load	(ksf)	(kPa)
Internal Diameter	2.42	61.47	Add Water at	4.00	191.52	Reload to	-	-
Height (Intial)	1.00	25.40	Load to	32.00	1532.16	Rebound to	-	-
Height (Final)	0.9258	23.51	Rebound to	0.25	11.97	Time rate taking at	16.00	763.25

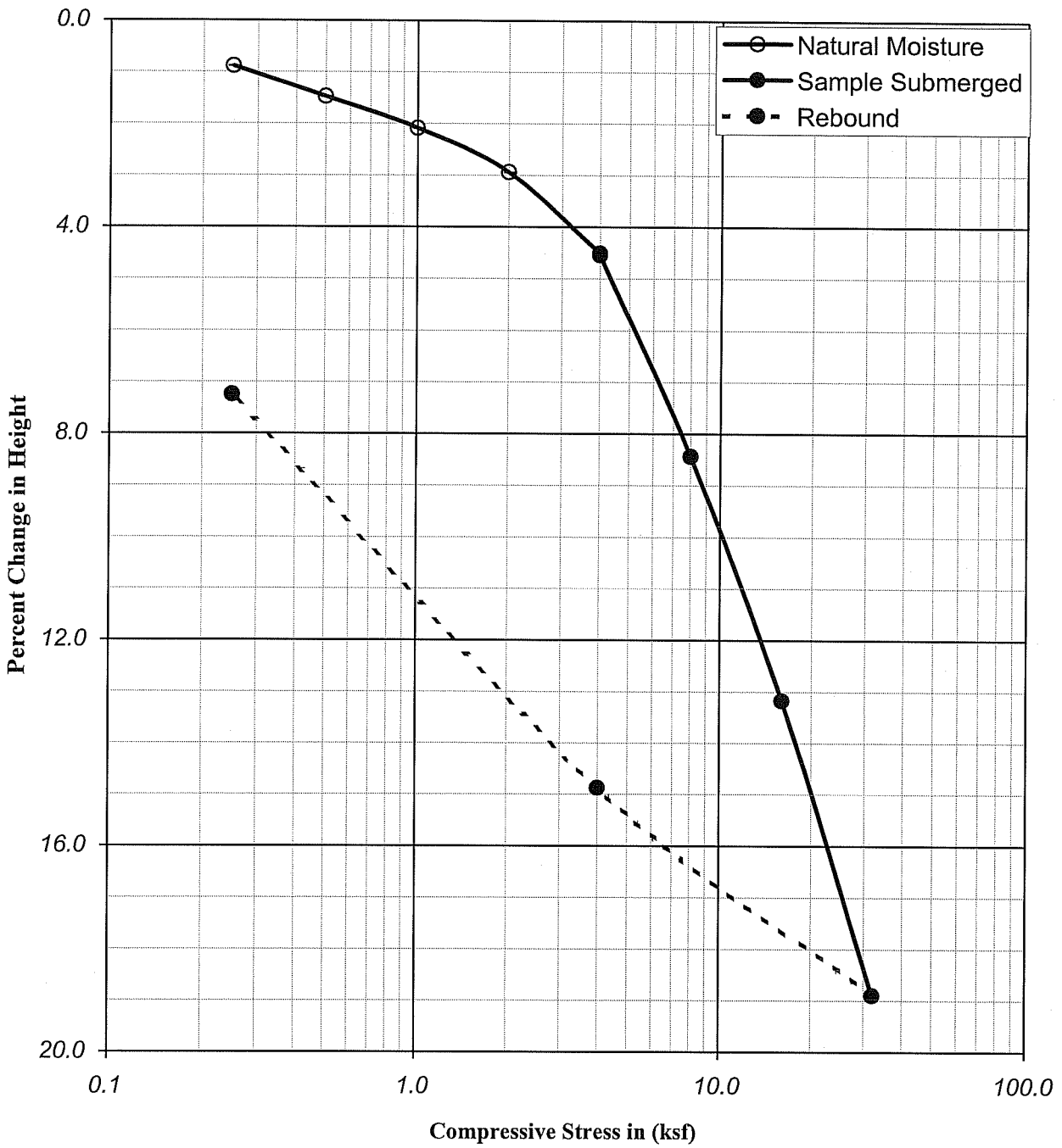
Date	Time	Elapsed Time (min.)	Load (ksf)	Load (kPa)	Dial Reading (in)	Dial Reading (mm)	Consol. (%)
2/9/2007	12:10	0:00:00	Seating Load		0.04820	1.22	
	12:20		0.1	4.8	0.05000	1.27	0.00
2/10/2007	8:04	0:00:00	0.25	12.0	0.05890	1.50	0.89
2/11/2007	8:05	0:00:00	0.50	23.9	0.06480	1.65	1.48
2/12/2007	8:14	0:00:00	1.00	47.9	0.07090	1.80	2.09
2/13/2007	8:05	0:00:00	2.00	95.8	0.07940	2.02	2.94
2/14/2007	8:35	0:00:00	4.00	191.5	0.09510	2.42	4.51
			Add Water				
2/15/2007	8:37	0:00:00	4.00	191.5	0.0955	2.43	4.55
2/16/2007	8:06	0:00:00	8.00	383.0	0.1344	3.41	8.44
2/16/2007	8:30	0.00	16.0	766.1			0.00
		0.10	16.0	766.1	0.13730	3.49	8.73
		0.25	16.0	766.1	0.13820	3.51	8.82
		0.50	16.0	766.1	0.13930	3.54	8.93
		1	16.0	766.1	0.14090	3.58	9.09
		2	16.0	766.1	0.14305	3.63	9.30
		4	16.0	766.1	0.14605	3.71	9.60
		8	16.0	766.1	0.15030	3.82	10.03
		16	16.0	766.1	0.15595	3.96	10.60
		30	16.0	766.1	0.16220	4.12	11.22
		60	16.0	766.1	0.16840	4.28	11.84
		190	16.0	766.1	0.17520	4.45	12.52
		263	16.0	766.1	0.17685	4.49	12.69
		530	16.0	766.1	0.18020	4.58	13.02
		1440	16.0	766.1	0.18175	4.62	13.18
2/18/2007	8:12	0:00:00	32.00	1532.2	0.2390	6.07	18.90
2/19/2007	8:16	0:00:00	4.00	191.5	0.1988	5.05	14.88
2/20/2007	9:59	0:00:00	0.25	12.0	0.1225	3.11	7.24

	Before	After
Weight of wet soil + ring (gm)	184.89	
Weight of ring (gm)	42.70	
Weight of wet soil + ring + container (gm)		238.26
Weight of dry soil + ring + container (gm)		204.57
No. 1 — Weight of container (gm)		57.92
Weight of ring + container (gm)		100.62
Moisture Content (%)	36.79	32.41
Dial Reading (inch)	0.05	0.04
Sample Volume (ft^3)	0.0027	0.0025
Wet Density (pcf)	117.8	123.1
Dry Density (pcf)	86.09	93.00

SQRT Time

Date	Time	Elapsed Time (min.)	Load (ksf)	Load (kPa)	Dial Reading (in)	Dial Reading (mm)	Consol. (%)

Remark *Final Dial Reading 0.1225*



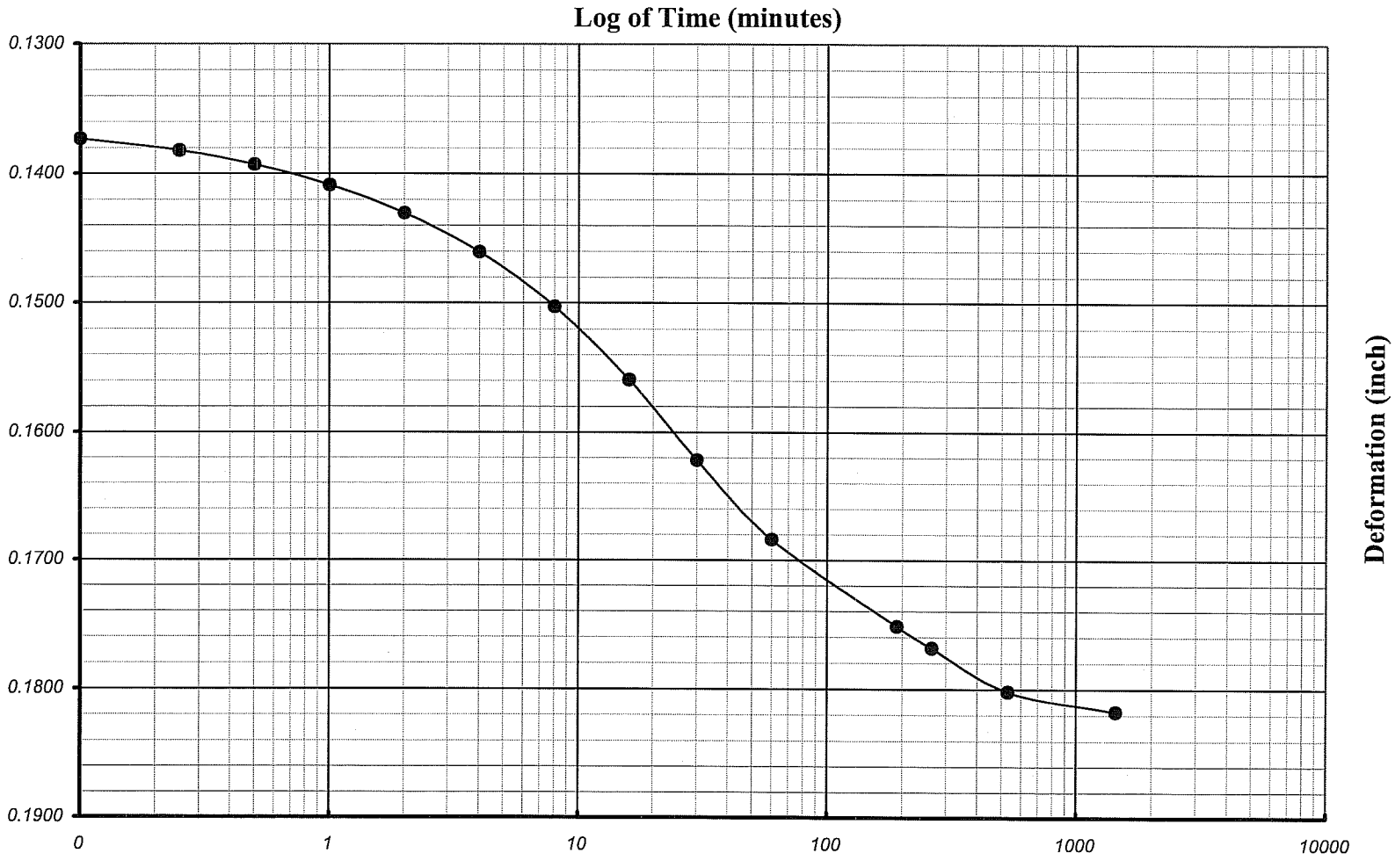
Boring No. : 06-6			Liquid Limit :	-		Moisture Content (%)	Dry Density		Percent Saturation	Void Ratio
Sample No. : D-23			Plastic Limit :	-			(pcf)	(kN/m³)		
Depth	(ft) : 120.0	121.5	Plastic Index :	-	Initial	36.79	86.09	13.55	103.69	0.96
	(m) : 36.60	37.06	Specific Gravity :	2.70	Final	32.41	93.00	14.64	107.70	0.81
Description : Dark Gray, Fat Clay (CH)										

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

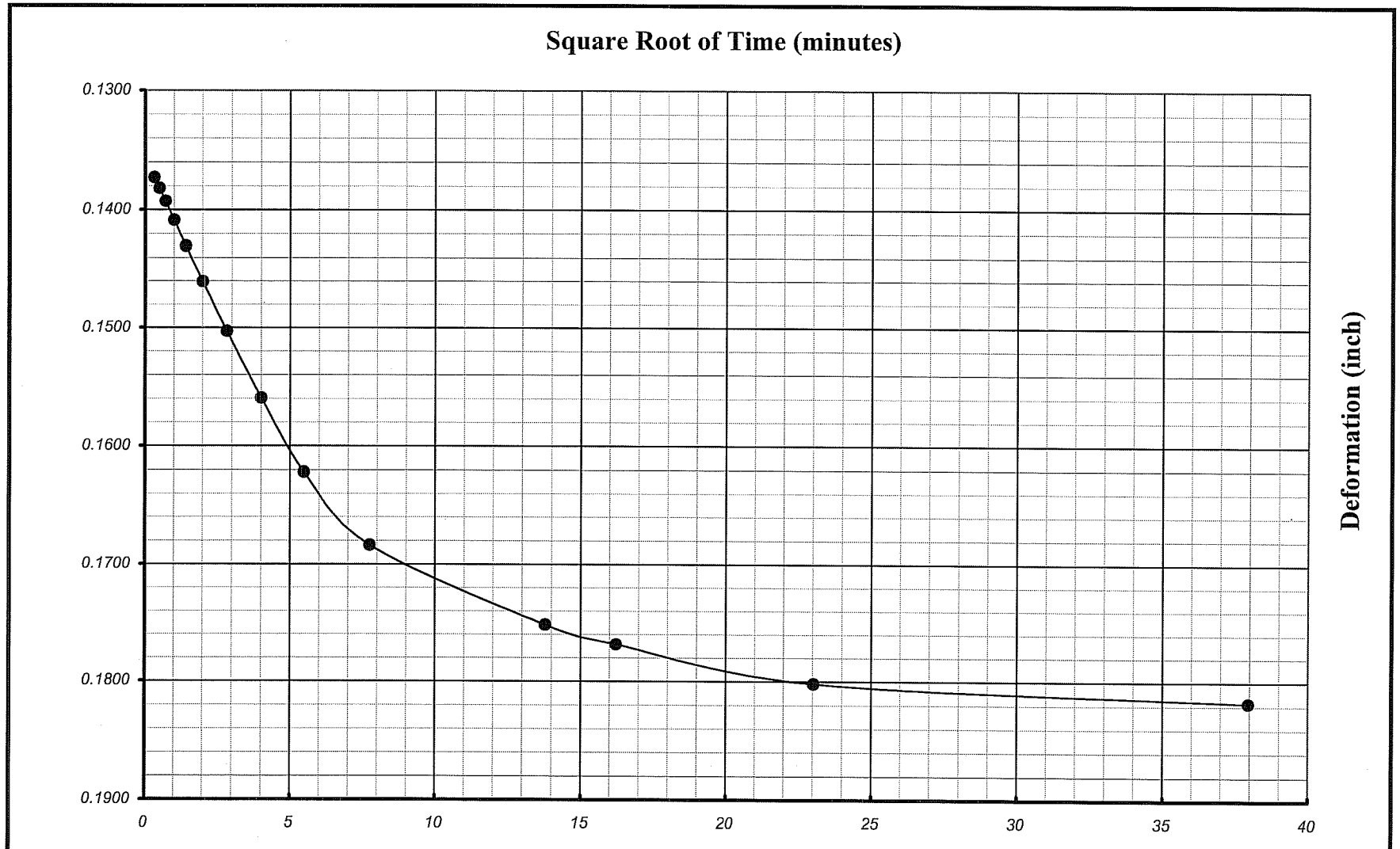
BATA / Dumbarton Bridge

Project No. : 06-159 03/22/07

CONSOLIDATION TEST
(ASTM D-2435 / CT-219)



Earth Mechanics, Inc. Geotechnical and Earthquake Engineering	***BATA / Dumbarton Bridge***	**Boring No. :** *06-6*	**One-Dimensional Consolidation of Soil** **Time-Deformation Curve (Log of Time Method)**
		Sample No. : *D-23*	
EMI Project No. : *06-159*		**Depth (ft/m) :** *120.0* *36.6*	**Veritcal Load (ksf/kpa) :** *16.00* *766.1*



Earth Mechanics, Inc. Geotechnical and Earthquake Engineering	***BATA / Dumbarton Bridge***	**Boring No. :** *06-6*	**One-Dimensional Consolidation of Soil** **Time-Deformation Curve (Square Root of Time Method)**
		Sample No. : *D-23*	
EMI Project No. : *06-159*		**Depth (ft/m) :** *120.0* *36.6*	**Veritcal Load (ksf/kpa) :** *16.0* *766.1*

ONE-DIMENSIONAL CONSOLIDATION OF SOIL

ASTM D-2435 / CT-219

Device No. : 5

Project Name : *BATA / Dumbarton Bridge*
Project No. : *06-159*
Boring No. : *06-8*
Sample No. : *D-5*
Depth (ft / m) : *30.0* | *9.15*
File No. :
Soil Description : *Olive Brown with Yellowish Brown, Lean Clay (CL)*

Set up By :	*R.J.*	**Date :**	*2/16/2007*
Tested By :	*R.J.*	**Date :**	*2/16-2/26/2007*
Time Rate Took By :	*R.J.*	**Date :**	*2/20/2007*
Computer By :	*CY*	**Date :**	*3/22/2007*
Checked By :	*R.J.*	**Date :**	*3/22/2007*

Method (A) : ☑ Constant load increment duration of 24 hours or multiples there for. Minium of two Time -deformation reading are required.

Method (B) : ☐ Time-deformation reading are required on all load increments. Successive load increments are applied after 100 % primary consolidation is reached, or at constant time increments are described in Test Method (A)

1

Sample	(inch)	(mm)
Internal Diameter	2.42	61.47
Height (Intial)	1.00	25.40
Height (Final)	0.9632	24.47

	(ksf)	(kPa)
Vertical Load		
Add Water at	0.25	11.97
Load to	16.00	766.08
Rebound to	0.25	11.97

	(ksf)	(kPa)
Vertical Load		
Reload to	-	-
Rebound to	-	-
Time rate taking at	2.00	95.41

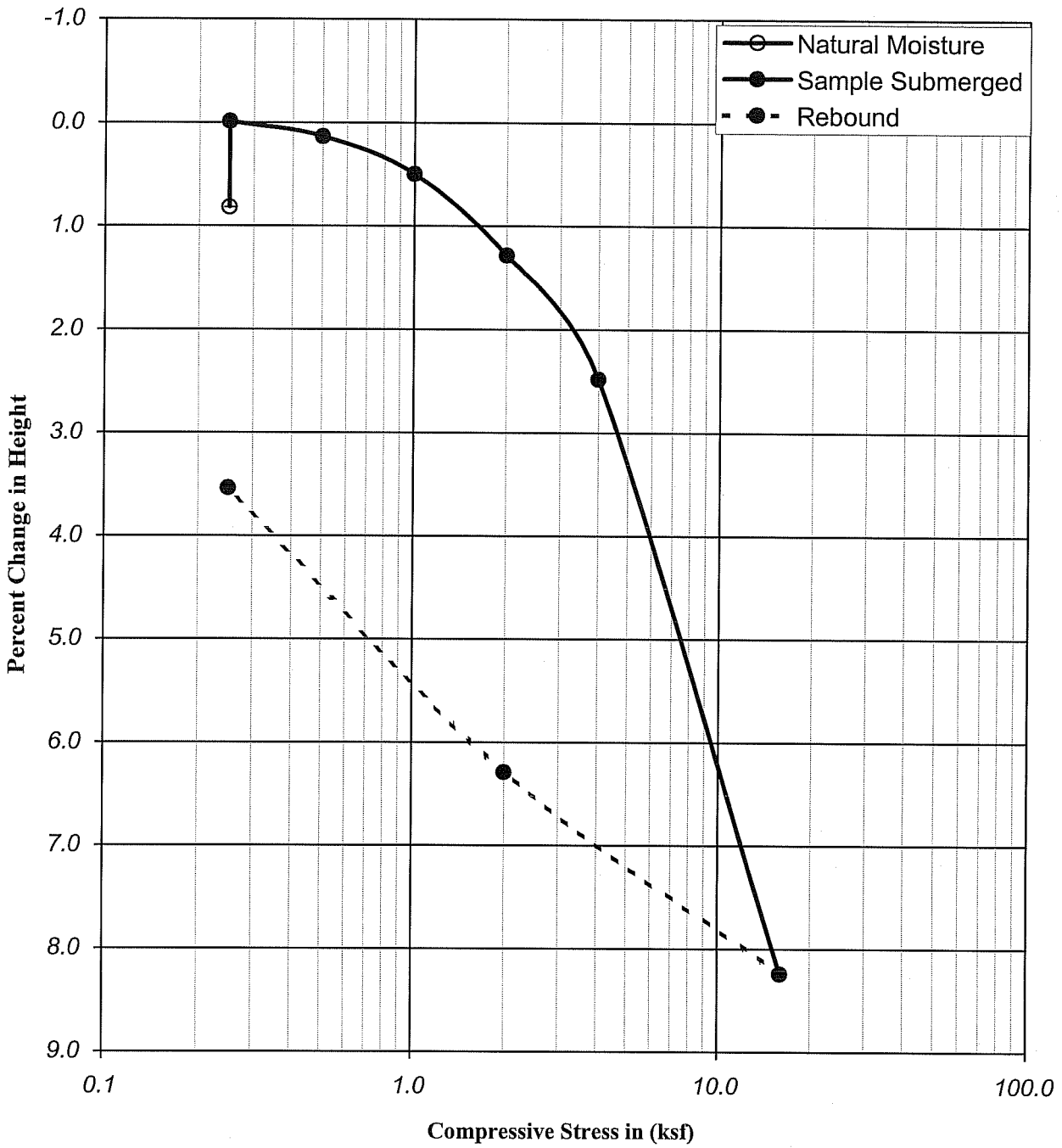
	Before	After
Weight of wet soil + ring (gm)	195.48	
Weight of ring (gm)	45.71	
Weight of wet soil + ring + container (gm)		251.37
Weight of dry soil + ring + container (gm)		219.97
No. 1 Weight of container (gm)		57.91
Weight of ring + container (gm)		103.62
Moisture Content (%)	28.72	26.99
Dial Reading (inch)	0.05	0.04
Sample Volume (ft³)	0.0027	0.0026
Wet Density (pcf)	124.0	127.0
Dry Density (pcf)	96.36	100.05

Date	Time	Elapsed Time (min.)	Load (ksf)	Load (kPa)	Dial Reading (in)	Dial Reading (mm)	Consol. (%)	SQRT Time
2/16/2007	11:25	0:00:00	Seating Load		0.04860	1.23		
	11:35		0.1	4.8	0.05000	1.27	0.00	
2/17/2007	8:06	0:00:00	0.25	12.0	0.05820	1.48	0.82	
			Add Water					
2/18/2007	8:16	0:00:00	0.25	12.0	0.04990	1.27	-0.01	
2/19/2007	8:20	0:00:00	0.50	23.9	0.05135	1.30	0.13	
2/20/2007	8:13	0:00:00	1.00	47.9	0.05500	1.40	0.50	
2/20/2007	8:51	0.00	2.0	95.8				0.00
		0.10	2.0	95.8	0.05570	1.41	0.57	0.32
		0.25	2.0	95.8	0.05655	1.44	0.66	0.50
		0.50	2.0	95.8	0.05740	1.46	0.74	0.71
		1	2.0	95.8	0.05790	1.47	0.79	1.00
		2	2.0	95.8	0.05850	1.49	0.85	1.41
		4	2.0	95.8	0.05935	1.51	0.94	2.00
		8	2.0	95.8	0.06030	1.53	1.03	2.83
		16	2.0	95.8	0.06105	1.55	1.11	4.00
		30	2.0	95.8	0.06140	1.56	1.14	5.48
		60	2.0	95.8	0.06180	1.57	1.18	7.75
		120	2.0	95.8	0.06210	1.58	1.21	10.95
		240	2.0	95.8	0.06230	1.58	1.23	15.49
		480	2.0	95.8	0.06260	1.59	1.26	21.91
		1440	2.0	95.8	0.06285	1.60	1.29	37.95
2/22/2007	8:06	0:00:00	4.00	191.5	0.0748	1.90	2.48	
2/23/2007	8:37	0:00:00	8.00	383.0	0.0925	2.35	4.25	
2/24/2007	8:13	0:00:00	16.00	766.1	0.1325	3.36	8.24	
2/25/2007	8:28	0:00:00	2.00	95.8	0.1129	2.87	6.29	
2/26/2007	10:23	0:00:00	0.25	12.0	0.0854	2.17	3.54	

Date	Time	Elapsed Time (min.)	Load (ksf)	Load (kPa)	Dial Reading (in)	Dial Reading (mm)	Consol. (%)

Remark

Final Dial Reading 0.0854



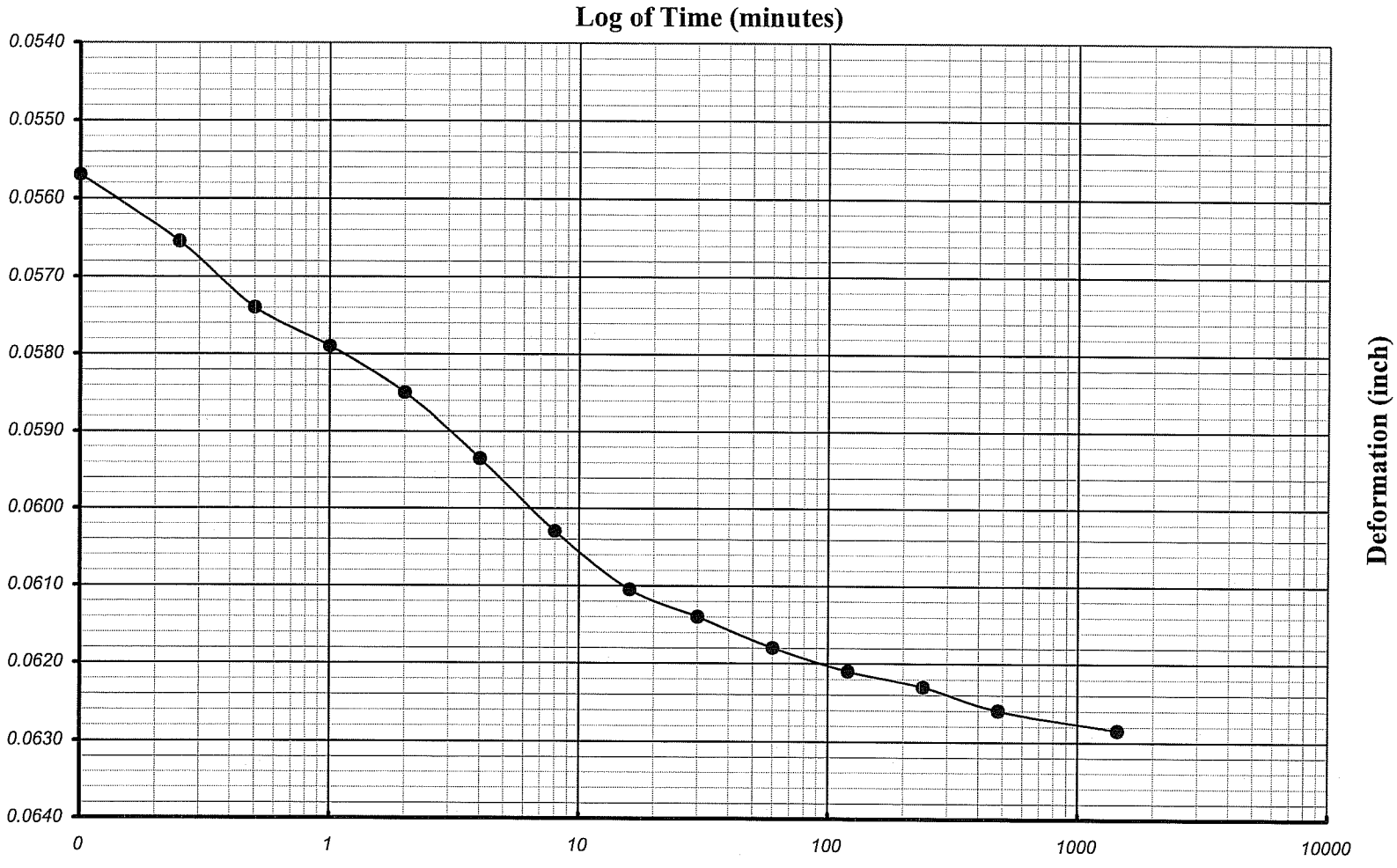
Boring No. : 06-8				Liquid Limit :	-		Moisture Content (%)	Dry Density (pcf)	Dry Density (kN/m³)	Percent Saturation	Void Ratio
Sample No. : D-5				Plastic Limit :	-						
Depth	(ft) :	30.0	31.5	Plastic Index :	-	Initial	28.72	96.36	15.17	103.51	0.75
	(m) :	9.15	9.61	Specific Gravity :	2.70	Final	26.99	100.05	15.75	106.40	0.68
Description : Olive Brown with Yellowish Brown, Lean Clay (CL)											

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

BATA / Dumbarton Bridge

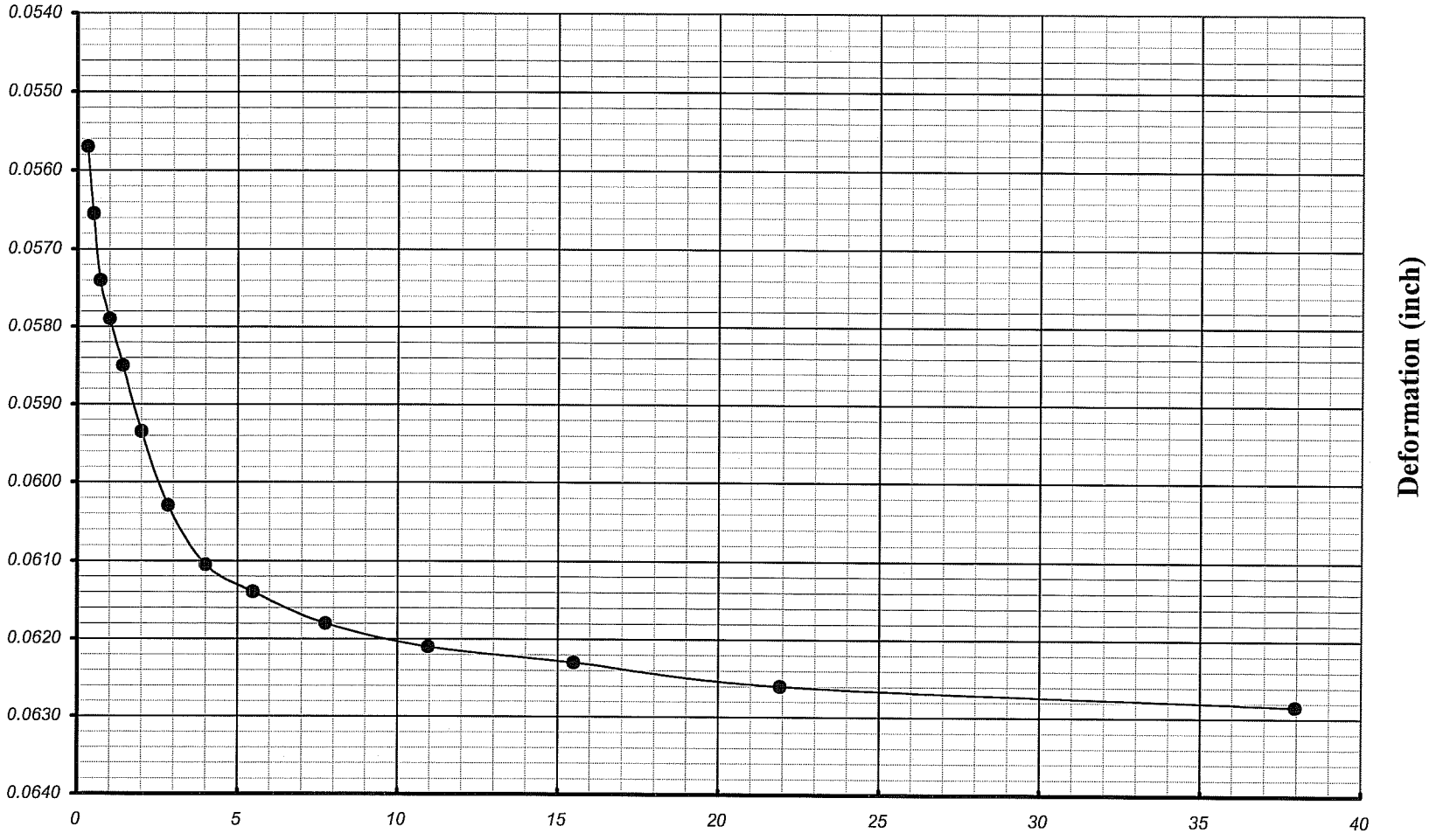
Project No. : 06-159 03/22/07

CONSOLIDATION TEST
(ASTM D-2435 / CT-219)



Earth Mechanics, Inc. Geotechnical and Earthquake Engineering	***BATA / Dumbarton Bridge***	**Boring No. :** *06-8*	**One-Dimensional Consolidation of Soil** **Time-Deformation Curve (Log of Time Method)**
		Sample No. : *D-5*	
EMI Project No. : *06-159*		**Depth (ft/m) :** *30.0* *9.2*	**Veritcal Load (ksf/kpa) :** *2.00* *95.8*

Square Root of Time (minutes)



Earth Mechanics, Inc. Geotechnical and Earthquake Engineering	***BATA / Dumbarton Bridge***	**Boring No. :** *06-8*	**One-Dimensional Consolidation of Soil** **Time-Deformation Curve (Square Root of Time Method)**
		Sample No. : *D-5*	
EMI Project No. : *06-159*		**Depth (ft/m) :** *30.0* *9.2*	**Veritcal Load (ksf/kpa) :** *2.0* *95.8*

ONE-DIMENSIONAL CONSOLIDATION OF SOIL

ASTM D-2435 / CT-219

Device No. : 4

Project Name : *BATA / Dumbarton Bridge*
Project No. : *06-159*
Boring No. : *06-8*
Sample No. : *D-19B*
Depth (ft / m) : *103.5* | *31.57*
File No. :
Soil Description : *Olive Gray, Silty Sand with Fat Clay (SM/CH)*

Set up By : *R.J.* **Date :** *2/16/2007*
Tested By : *R.J.* **Date :** *2/16-2/26/2007*
Time Rate Took By : **Date :**
Computer By : *CY* **Date :** *3/22/2007*
Checked By : *R.J.* **Date :** *3/22/2007*

Method (A) : ☑ Constant load increment duration of 24 hours or multiples there for. Minium of two Time -deformation reading are required.
Method (B) : ☐ Time-deformation reading are required on all load increments. Successive load increments are applied after 100 % primary consolidation is reached, or at constant time increments are described in Test Method (A)

1

Sample	(inch)	(mm)
Internal Diameter	2.42	61.47
Height (Intial)	1.00	25.40
Height (Final)	0.9082	23.07

Vertical Load	(ksf)	(kPa)
Add Water at	4.00	191.52
Load to	16.00	766.08
Rebound to	0.25	11.97

Vertical Load	(ksf)	(kPa)
Reload to	-	-
Rebound to	-	-
Time rate taking at	-	-

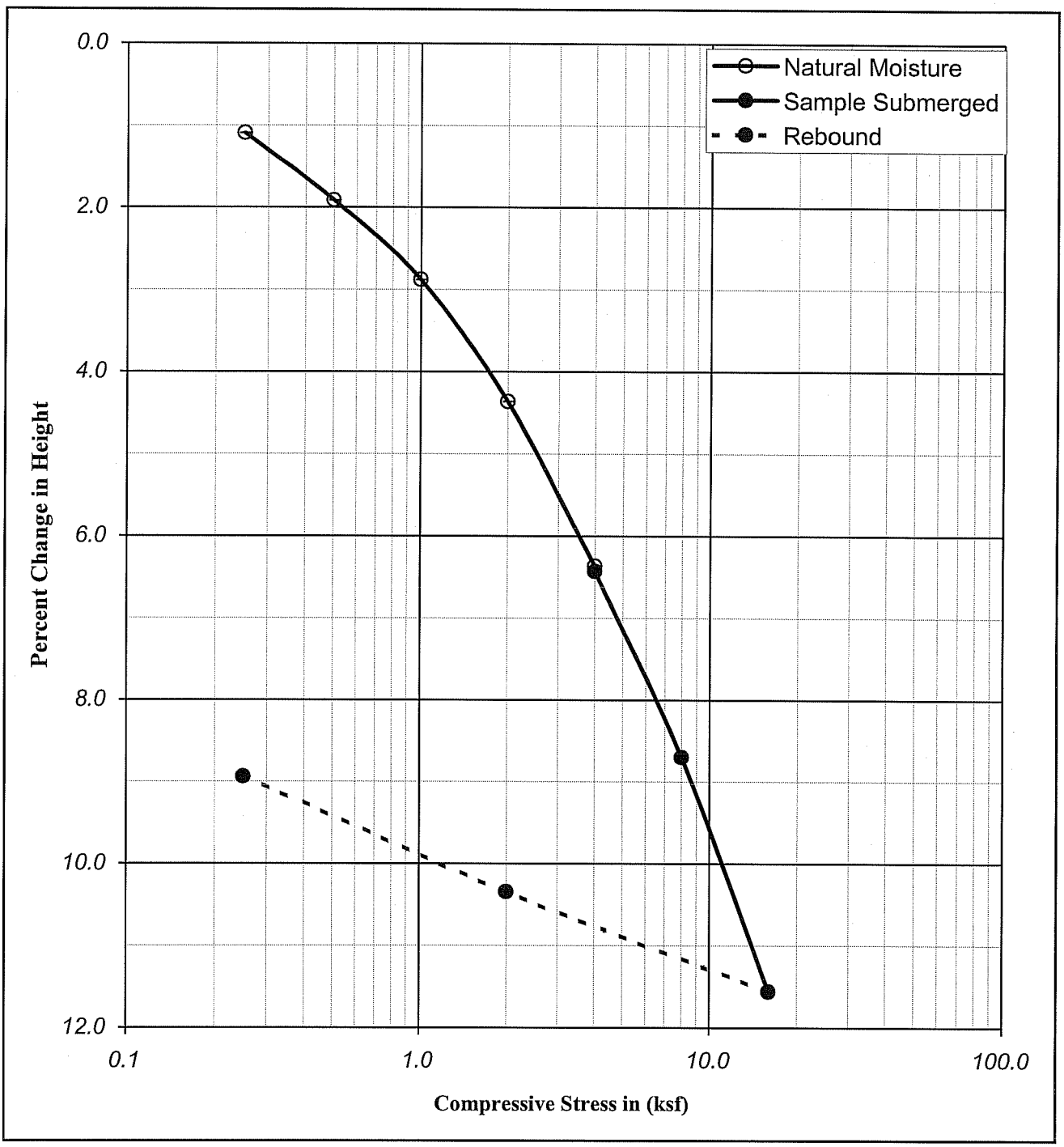
Date	Time	Elapsed Time (min.)	Load (ksf)	Load (kPa)	Dial Reading (in)	Dial Reading (mm)	Consol. (%)
2/16/2007	11:25	0:00:00	Seating Load		0.04760	1.21	
	11:35		0.1	4.8	0.05000	1.27	0.00
2/17/2007	8:06	0:00:00	0.25	12.0	0.06090	1.55	1.09
2/18/2007	8:16	0:00:00	0.50	23.9	0.06915	1.76	1.92
2/19/2007	8:20	0:00:00	1.00	47.9	0.07880	2.00	2.88
2/20/2007	8:13	0:00:00	2.00	95.8	0.09365	2.38	4.36
2/21/2007	8:13	0:00:00	4.00	191.5	0.11365	2.89	6.36
			Add Water				
2/22/2007	8:37	0:00:00	4.00	191.5	0.1143	2.90	6.43
2/23/2007	8:13	0:00:00	8.00	383.0	0.1370	3.48	8.70
2/24/2007	8:28	0:00:00	16.00	766.1	0.1656	4.21	11.56
2/25/2007	8:28	0:00:00	2.00	95.8	0.1535	3.90	10.35
2/26/2007	10:23	0:00:00	0.25	12.0	0.1394	3.54	8.94

	Before	After
Weight of wet soil + ring (gm)	191.52	
Weight of ring (gm)	45.24	
Weight of wet soil + ring + container (gm)		245.54
Weight of dry soil + ring + container (gm)		217.81
No. 1 Weight of container (gm)		58.95
Weight of ring + container (gm)		104.19
Moisture Content (%)	28.74	24.41
Dial Reading (inch)	0.05	0.04
Sample Volume (ft^3)	0.0027	0.0024
Wet Density (pcf)	121.2	128.9
Dry Density (pcf)	94.10	103.61

SQRT Time

Date	Time	Elapsed Time (min.)	Load (ksf)	Load (kPa)	Dial Reading (in)	Dial Reading (mm)	Consol. (%)

Remark *Final Dial Reading 0.1394*



Boring No. : 06-8				Liquid Limit :	-		Moisture Content (%)	Dry Density (pcf)	Dry Density (kN/m³)	Percent Saturation	Void Ratio
Sample No. : D-19B				Plastic Limit :	-						
Depth	(ft) :	103.5	105.0	Plastic Index :	-	Initial	28.74	94.10	14.81	98.09	0.79
	(m) :	31.57	32.03	Specific Gravity :	2.70	Final	24.41	103.61	16.31	105.13	0.63
Description : Olive Gray, Silty Sand with Fat Clay (SM/CH)											

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

BATA / Dumbarton Bridge

Project No. : 06-159 03/22/07

CONSOLIDATION TEST
(ASTM D-2435 / CT-219)

ONE-DIMENSIONAL CONSOLIDATION OF SOIL

ASTM D-2435 / CT-219

Device No. : 5

Project Name : BATA / Dumbarton Bridge
Project No. : 06-159
Boring No. : 06-9
Sample No. : D-26
Depth (ft / m) : 130.0 | 39.65
File No. :
Soil Description : Bluish Gray, Lean Clay (CL)

Set up By :	R.J	**Date :**	2/26/2007
Tested By :	R.J	**Date :**	2/26-3/10/2007
Time Rate Took By :	R.J	**Date :**	3/4/2007
Computer By :	CY	**Date :**	3/16/2007
Checked By :	R.J	**Date :**	3/16/2007

Method (A) : ☑ Constant load increment duration of 24 hours or multiples there for. Minium of two Time -deformation reading are required.

Method (B) : ☐ Time-deformation reading are required on all load increments. Successive load increments are applied after 100 % primary consolidation is reached, or at constant time increments are described in Test Method (A)

1

Sample	(inch)	(mm)
Internal Diameter	2.42	61.47
Height (Intial)	1.00	25.40
Height (Final)	0.8854	22.49

	(ksf)	(kPa)
Vertical Load		
Add Water at	4.00	191.52
Load to	32.00	1532.16
Rebound to	0.25	11.97

	(ksf)	(kPa)
Vertical Load		
Reload to	-	-
Rebound to	-	-
Time rate taking at	8.00	381.62

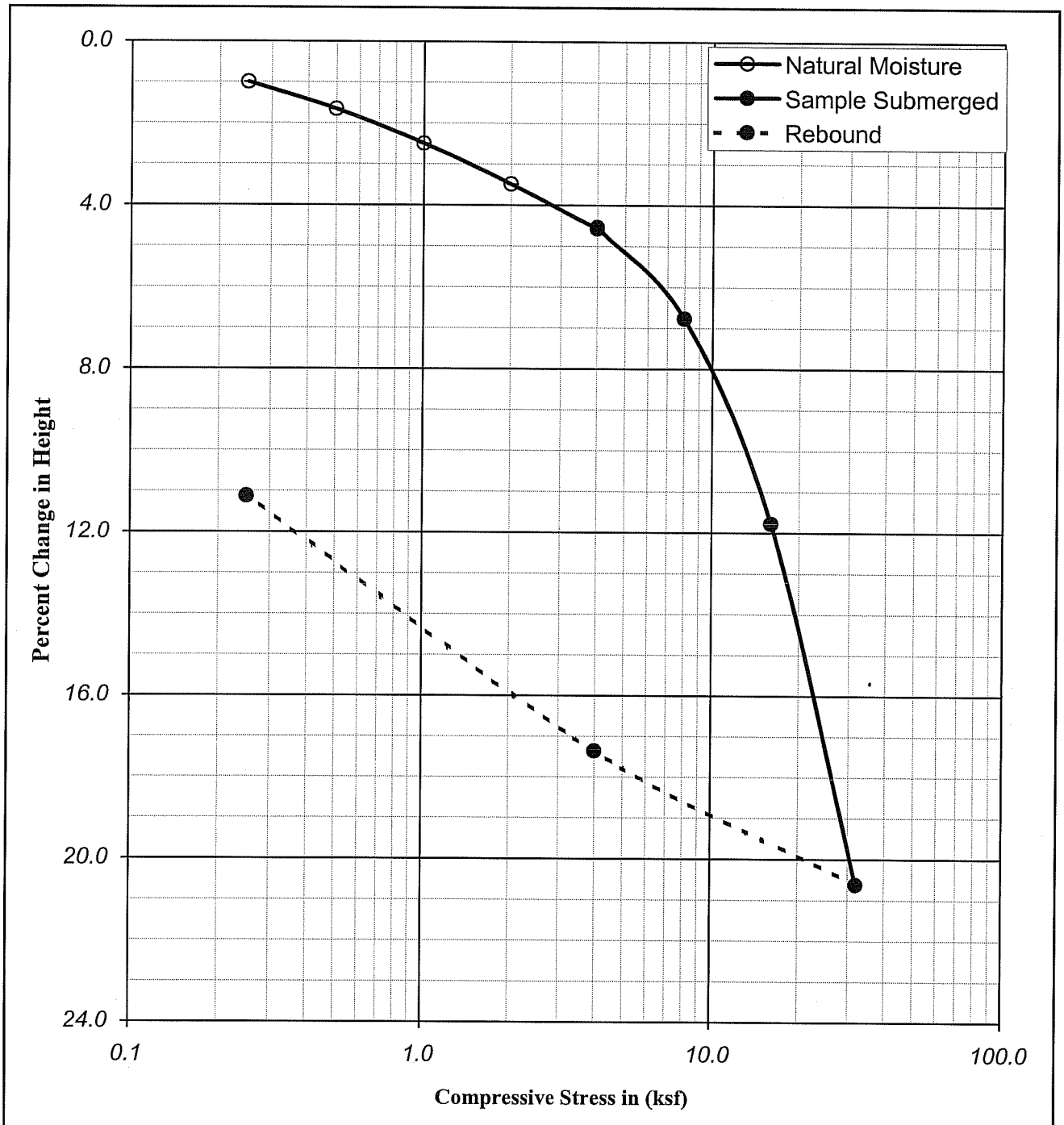
	Before	After
Weight of wet soil + ring (gm)	179.06	
Weight of ring (gm)	45.21	
Weight of wet soil + ring + container (gm)		229.44
Weight of dry soil + ring + container (gm)		194.41
No. 6 Weight of container (gm)		57.20
Weight of ring + container (gm)		102.41
Moisture Content (%)	45.49	38.08
Dial Reading (inch)	0.05	0.04
Sample Volume (ft³)	0.0027	0.0024
Wet Density (pcf)	110.9	118.8
Dry Density (pcf)	76.20	86.06

Date	Time	Elapsed Time (min.)	Load (ksf)	Load (kPa)	Dial Reading (in)	Dial Reading (mm)	Consol. (%)	SQRT Time
2/26/2007	13:59	0:00:00	Seating Load		0.04660	1.18		
	14:09		2.0	95.8	0.05000	1.27	0.00	
2/27/2007	9:05	0:00:00	0.25	12.0	0.06000	1.52	1.00	
2/28/2007	8:09	0:00:00	0.50	23.9	0.06660	1.69	1.66	
3/1/2007	7:59	0:00:00	1.00	47.9	0.07500	1.91	2.50	
3/2/2007	7:57	0:00:00	2.00	95.8	0.08490	2.16	3.49	
3/3/2007	8:45	0:00:00	4.00	191.5	0.09580	2.43	4.58	
			Add Water					
3/4/2007	8:25	0:00:00	4.00	191.5	0.09540	2.42	4.54	
3/4/2007	8:30	0.00	8.0	383.0				0.00
		0.10	8.0	383.0	0.09730	2.47	4.73	0.32
		0.25	8.0	383.0	0.09800	2.49	4.80	0.50
		0.50	8.0	383.0	0.09860	2.50	4.86	0.71
		1	8.0	383.0	0.09940	2.52	4.94	1.00
		2	8.0	383.0	0.10070	2.56	5.07	1.41
		4	8.0	383.0	0.10220	2.60	5.22	2.00
		8	8.0	383.0	0.10425	2.65	5.43	2.83
		16	8.0	383.0	0.10655	2.71	5.66	4.00
		30	8.0	383.0	0.10845	2.75	5.85	5.48
		60	8.0	383.0	0.11045	2.81	6.05	7.75
		120	8.0	383.0	0.11225	2.85	6.22	10.95
		240	8.0	383.0	0.11425	2.90	6.43	15.49
		500	8.0	383.0	0.11655	2.96	6.66	22.36
		1440	8.0	383.0	0.11770	2.99	6.77	37.95
3/6/2007	7:29	0:00:00	16.00	766.1	0.1678	4.26	11.78	
3/7/2007	7:59	0:00:00	32.00	1532.2	0.2562	6.51	20.62	
3/8/2007	8:03	0:00:00	4.00	191.5	0.2236	5.68	17.36	
3/9/2007	8:03	0:00:00	0.25	12.0	0.1613	4.10	11.13	

Date	Time	Elapsed Time (min.)	Load (ksf)	Load (kPa)	Dial Reading (in)	Dial Reading (mm)	Consol. (%)

Remark

Final Dial Reading 0.1613



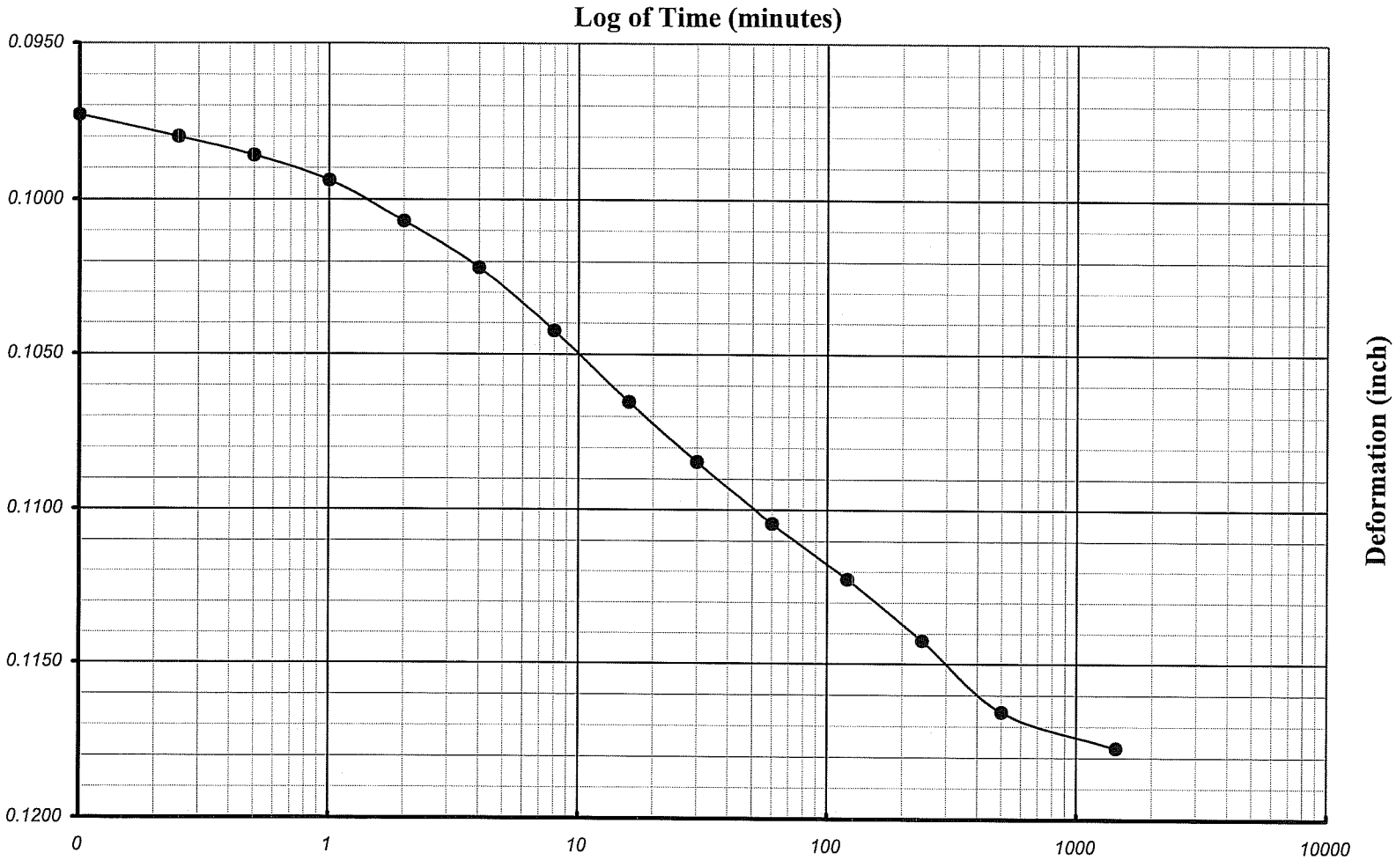
Boring No. : 06-9				Liquid Limit :	-		Moisture Content (%)	Dry Density		Percent Saturation	Void Ratio
Sample No. : D-26				Plastic Limit :	-			(pcf)	(kN/m³)		
Depth	(ft) :	130.0	131.5	Plastic Index :	-	Initial	45.49	76.20	11.99	101.32	1.21
	(m) :	39.65	40.11	Specific Gravity :	2.70	Final	38.08	86.06	13.55	107.25	0.96
Description : Bluish Gray, Lean Clay (CL)											

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

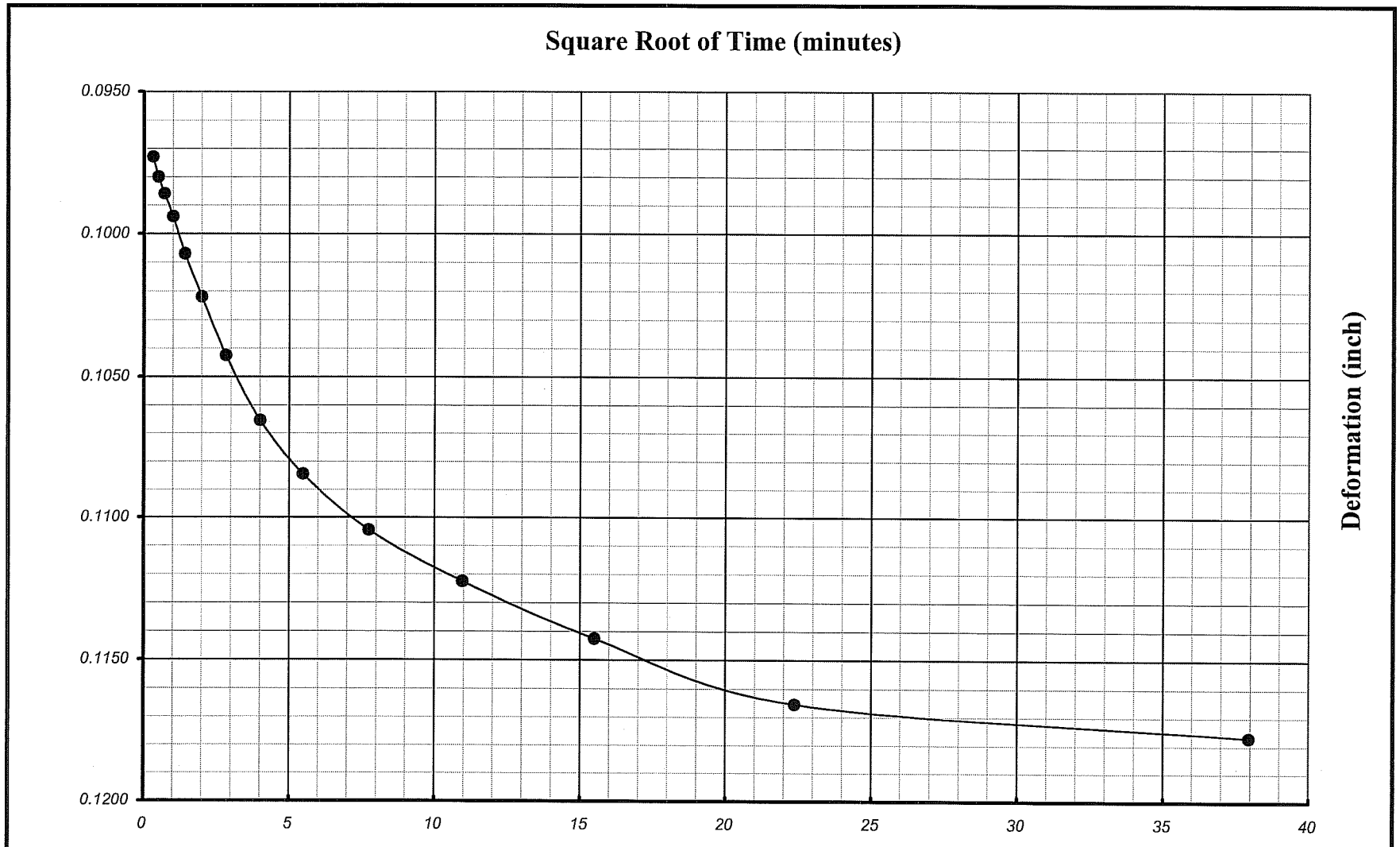
BATA / Dumbarton Bridge

Project No. : 06-159 03/16/07

CONSOLIDATION TEST
(ASTM D-2435 / CT-219)



Earth Mechanics, Inc. Geotechnical and Earthquake Engineering	***BATA / Dumbarton Bridge***	**Boring No. :** *06-9*	**One-Dimensional Consolidation of Soil** **Time-Deformation Curve (Log of Time Method)**
		Sample No. : *D-26*	
EMI Project No. : *06-159*		**Depth (ft/m) :** *130.0* *39.7*	**Veritcal Load (ksf/kpa) :** *8.00* *383.0*



Earth Mechanics, Inc. Geotechnical and Earthquake Engineering	***BATA / Dumbarton Bridge***	**Boring No. :** *06-9*	**One-Dimensional Consolidation of Soil** **Time-Deformation Curve(Square Root of Time Method)**
		Sample No. : *D-26*	
EMI Project No. : *06-159*		**Depth (ft/m) :** *130.0* *39.7*	**Veritcal Load (ksf/kpa) :** *8.0* *383.0*

ONE-DIMENSIONAL CONSOLIDATION OF SOIL

ASTM D-2435 / CT-219

Device No. : 5

Project Name : BATA / Dumbarton Bridge
Project No. : 06-159
Boring No. : 06-11
Sample No. : D-3
Depth (ft / m) : 20.0 | 6.10
File No. :
Soil Description : Dark Gray, Lean Clay (CL)

Set up By :	R.J	**Date :**	4/4/2007
Tested By :	R.J	**Date :**	4/4-4/14/2007
Time Rate Taken By :	R.J	**Date :**	4/10/2007
Computer By :	CY	**Date :**	5/31/2007
Checked By :	R.J	**Date :**	5/31/2007

Method (A) : ☑ Constant load increment duration of 24 hours or multiples there for. Minium of two Time -deformation reading are required.

Method (B) : ☐ Time-deformation reading are required on all load increments. Successive load increments are applied after 100 % primary consolidation is reached, or at constant time increments are described in Test Method (A)

1

Sample	(inch)	(mm)	Vertical Load	(ksf)	(kPa)	Vertical Load	(ksf)	(kPa)
Internal Diameter	2.42	61.47	Add Water at	0.25	11.97	Reload to	-	-
Height (Intial)	1.00	25.40	Load to	8.00	383.04	Rebound to	-	-
Height (Final)	0.7667	19.47	Rebound to	0.25	11.97	Time rate taken at	-	-

Date	Time	Elapsed Time (min.)	Load (ksf)	Load (kPa)	Dial Reading (in)	Dial Reading (mm)	Consol. (%)
4/4/2007	10:50	0:00:00	Seating		0.04880	1.24	
			Load				
	11:00		2.0	95.8	0.05000	1.27	0.00
4/5/2007	9:00	0:00:00	0.25	12.0	0.06720	1.71	1.72
			Add Water				
4/6/2007	7:40	0:00:00	0.25	12.0	0.06720	1.71	1.72
4/7/2007	7:48	0:00:00	0.50	23.9	0.07510	1.91	2.51
4/8/2007	7:36	0:00:00	1.00	47.9	0.09910	2.52	4.91
4/9/2007	6:12	0:00:00	2.00	95.8	0.18690	4.75	13.69
4/10/2007	7:59	0:00:00	4.00	191.5	0.26460	6.72	21.46
4/11/2007	8:00	0:00:00	8.00	383.0	0.32810	8.33	27.81
4/12/2007	7:55	0:00:00	2.00	95.8	0.31680	8.05	26.68
4/13/2007	7:52	0:00:00	0.25	12.0	0.28210	7.17	23.21

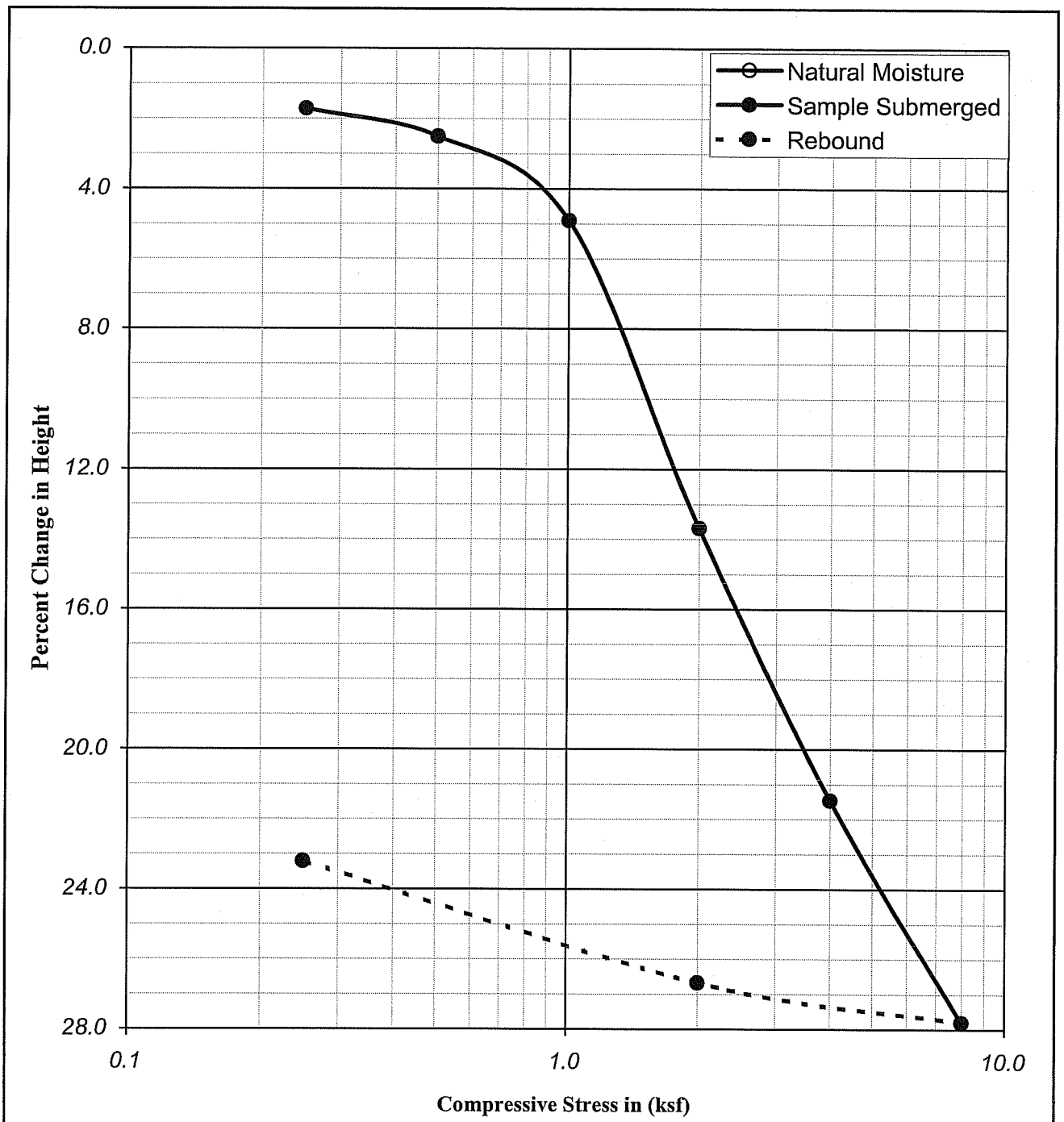
	Before	After
Weight of wet soil + ring (gm)	160.54	
Weight of ring (gm)	45.29	
Weight of wet soil + ring + container (gm)		200.34
Weight of dry soil + ring + container (gm)		166.27
No. 39 — Weight of container (gm)		57.00
Weight of ring + container (gm)		102.29
Moisture Content (%)	80.13	53.25
Dial Reading (inch)	0.05	0.04
Sample Volume (ft^3)	0.0027	0.0020
Wet Density (pcf)	95.5	105.9
Dry Density (pcf)	52.99	69.11

SQRT Time

Date	Time	Elapsed Time (min.)	Load (ksf)	Load (kPa)	Dial Reading (in)	Dial Reading (mm)	Consol. (%)

Remark

Final Dial Reading 0.2821



Boring No.	:	06-11		Liquid Limit :	-		Moisture Content (%)	Dry Density (pcf)	Dry Density (kN/m³)	Percent Saturation	Void Ratio
Sample No.	:	D-3		Plastic Limit :	-						
Depth (ft)	:	20.0	21.5	Plastic Index :	-	Initial	80.13	52.99	8.34	99.20	2.18
Depth (m)	:	6.10	6.56	Specific Gravity :	2.70	Final	53.25	69.11	10.88	99.92	1.44
Description	: Dark Gray, Lean Clay (CL)										

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

BATA / Dumbarton Bridge

Project No. : 06-159 05/31/07

CONSOLIDATION TEST
(ASTM D-2435 / CT-219)

ONE-DIMENSIONAL CONSOLIDATION OF SOIL

ASTM D-2435 / CT-219

Device No. : 3

Project Name : *BATA / Dumbarton Bridge*
Project No. : *06-159*
Boring No. : *06-12*
Sample No. : *D-15*
Depth (ft / m) : *84.0* | *25.62*
File No. :
Soil Description : *Light Olive Brown, Lean Clay (CL)*

Set up By : *R.J* **Date :** *4/13/2007*
Tested By : *R.J* **Date :** *4/13-4/24/2007*
Time Rate Took By : **Date :**
Computer By : *CY* **Date :** *5/31/2007*
Checked By : *R.J* **Date :** *5/31/2007*

Method (A) : ☑ Constant load increment duration of 24 hours or multiples there for. Minium of two Time -deformation reading are required.
Method (B) : ☐ Time-deformation reading are required on all load increments. Successive load increments are applied after 100 % primary consolidation is reached, or at constant time increments are described in Test Method (A)

1

Sample	(inch)	(mm)
Internal Diameter	2.42	61.47
Height (Intial)	1.00	25.40
Height (Final)	0.9242	23.47

	(ksf)	(kPa)
Vertical Load		
Add Water at	4.00	191.52
Load to	16.00	766.08
Rebound to	0.25	11.97

Vertical Load	(ksf)	(kPa)
Reload to	-	-
Rebound to	-	-
Time rate taking at	-	-

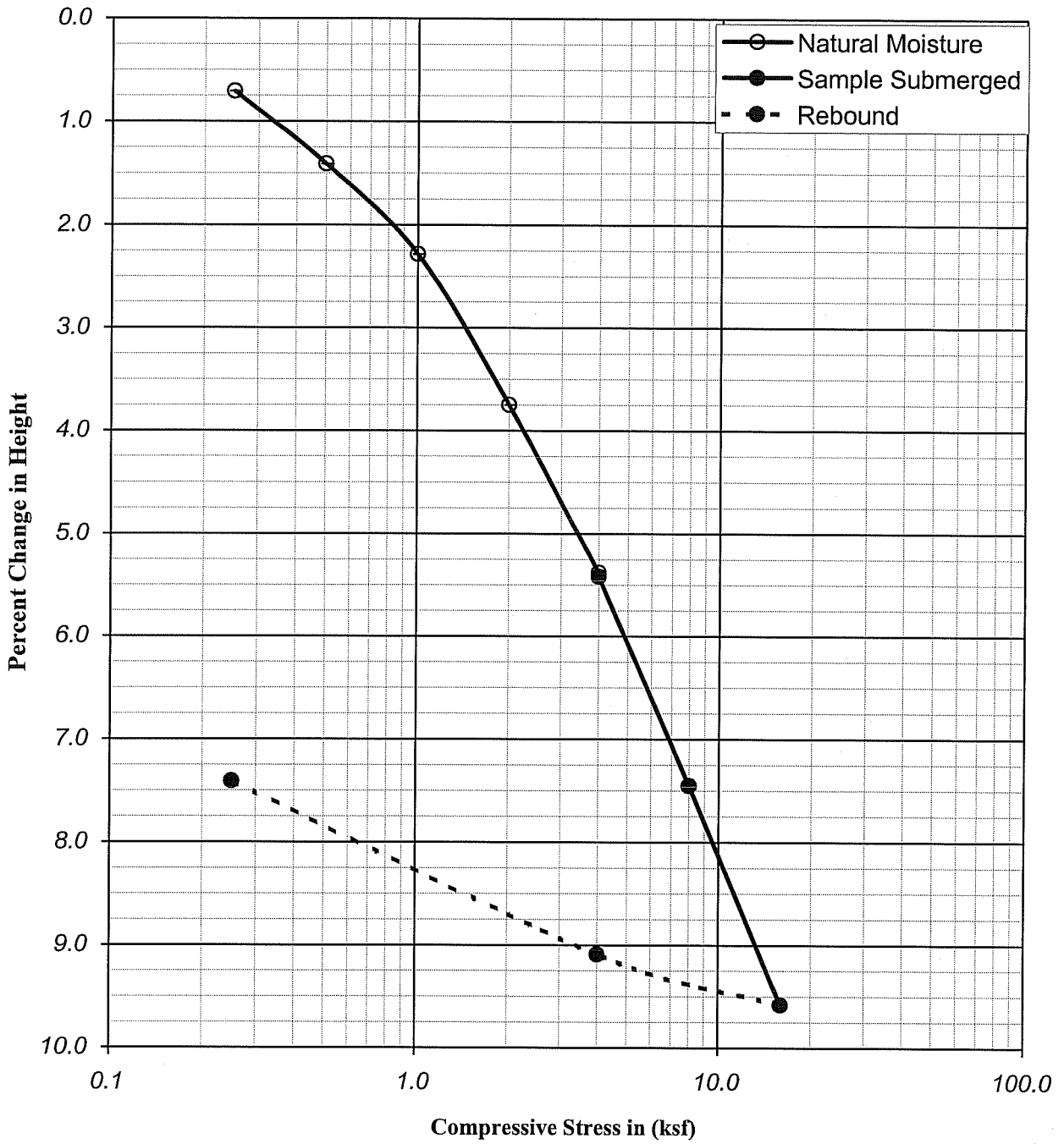
Date	Time	Elapsed Time (min.)	Load (ksf)	Load (kPa)	Dial Reading (in)	Dial Reading (mm)	Consol. (%)
4/13/2007	9:15	0:00:00	Seating Load		0.04830	1.23	
	9:25		2.0	95.8	0.05000	1.27	0.00
4/14/2007	8:14	0:00:00	0.25	12.0	0.05710	1.45	0.71
4/15/2007	8:17	0:00:00	0.50	23.9	0.06410	1.63	1.41
4/16/2007	7:29	0:00:00	1.00	47.9	0.07285	1.85	2.29
4/17/2007	7:48	0:00:00	2.00	95.8	0.08750	2.22	3.75
4/18/2007	8:48	0:00:00	4.00	191.5	0.10380	2.64	5.38
			Add Water				
4/19/2007	8:07	0:00:00	4.00	191.5	0.10420	2.65	5.42
4/20/2007	8:10	0:00:00	8.00	383.0	0.12450	3.16	7.45
4/21/2007	8:03	0:00:00	16.00	766.1	0.14580	3.70	9.58
4/22/2007	9:52	0:00:00	4.00	191.5	0.14090	3.58	9.09
4/23/2007	9:15	0:00:00	0.25	12.0	0.12410	3.15	7.41

	Before	After
Weight of wet soil + ring (gm)	195.03	
Weight of ring (gm)	45.03	
Weight of wet soil + ring + container (gm)		247.75
Weight of dry soil + ring + container (gm)		220.17
No. 39 — Weight of container (gm)		57.88
Weight of ring + container (gm)		102.91
Moisture Content (%)	27.92	23.52
Dial Reading (inch)	0.05	0.04
Sample Volume (ft^3)	0.0027	0.0025
Wet Density (pcf)	124.2	129.8
Dry Density (pcf)	97.12	105.08

SQRT Time

Date	Time	Elapsed Time (min.)	Load (ksf)	Load (kPa)	Dial Reading (in)	Dial Reading (mm)	Consol. (%)

Remark *Final Dial Reading 0.1241*



Boring No. : 06-12				Liquid Limit :	-		Moisture Content (%)	Dry Density (pcf)	Dry Density (kN/m³)	Percent Saturation	Void Ratio
Sample No. : D-15				Plastic Limit :	-						
Depth	(ft) :	84.0	85.5	Plastic Index :	-	Initial	27.92	97.12	15.29	102.48	0.74
	(m) :	25.62	26.08	Specific Gravity :	2.70	Final	23.52	105.08	16.54	105.13	0.60
Description : Light Olive Brown, Lean Clay (CL)											

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

BATA / Dumbarton Bridge

Project No. : 06-159 05/31/07

CONSOLIDATION TEST
(ASTM D-2435 / CT-219)

ONE-DIMENSIONAL CONSOLIDATION OF SOIL

ASTM D-2435 / CT-219

Device No. : 4

Project Name : BATA / Dumbarton Bridge
Project No. : 06-159
Boring No. : 06-13
Sample No. : D-9
Depth (ft / m) : 44.0 | 13.42
File No. :
Soil Description : Dark Greenish Gray, Sandy Silt (ML)

Set up By : R.J **Date :** 4/13/2007
Tested By : R.J **Date :** 4/13-4/24/2007
Time Rate Took By : **Date :**
Computer By : CY **Date :** 5/31/2007
Checked By : R.J **Date :** 5/31/2007

Method (A) : ☑ Constant load increment duration of 24 hours or multiples there for. Minium of two Time -deformation reading are required.
Method (B) : ☐ Time-deformation reading are required on all load increments. Successive load increments are applied after 100 % primary consolidation is reached, or at constant time increments are described in Test Method (A)

1

Sample	(inch)	(mm)
Internal Diameter	2.42	61.47
Height (Intial)	1.00	25.40
Height (Final)	0.8995	22.85

	(ksf)	(kPa)
Vertical Load		
Add Water at	1.00	47.88
Load to	16.00	766.08
Rebound to	0.25	11.97

	(ksf)	(kPa)
Vertical Load		
Reload to	-	-
Rebound to	-	-
Time rate taking at	-	-

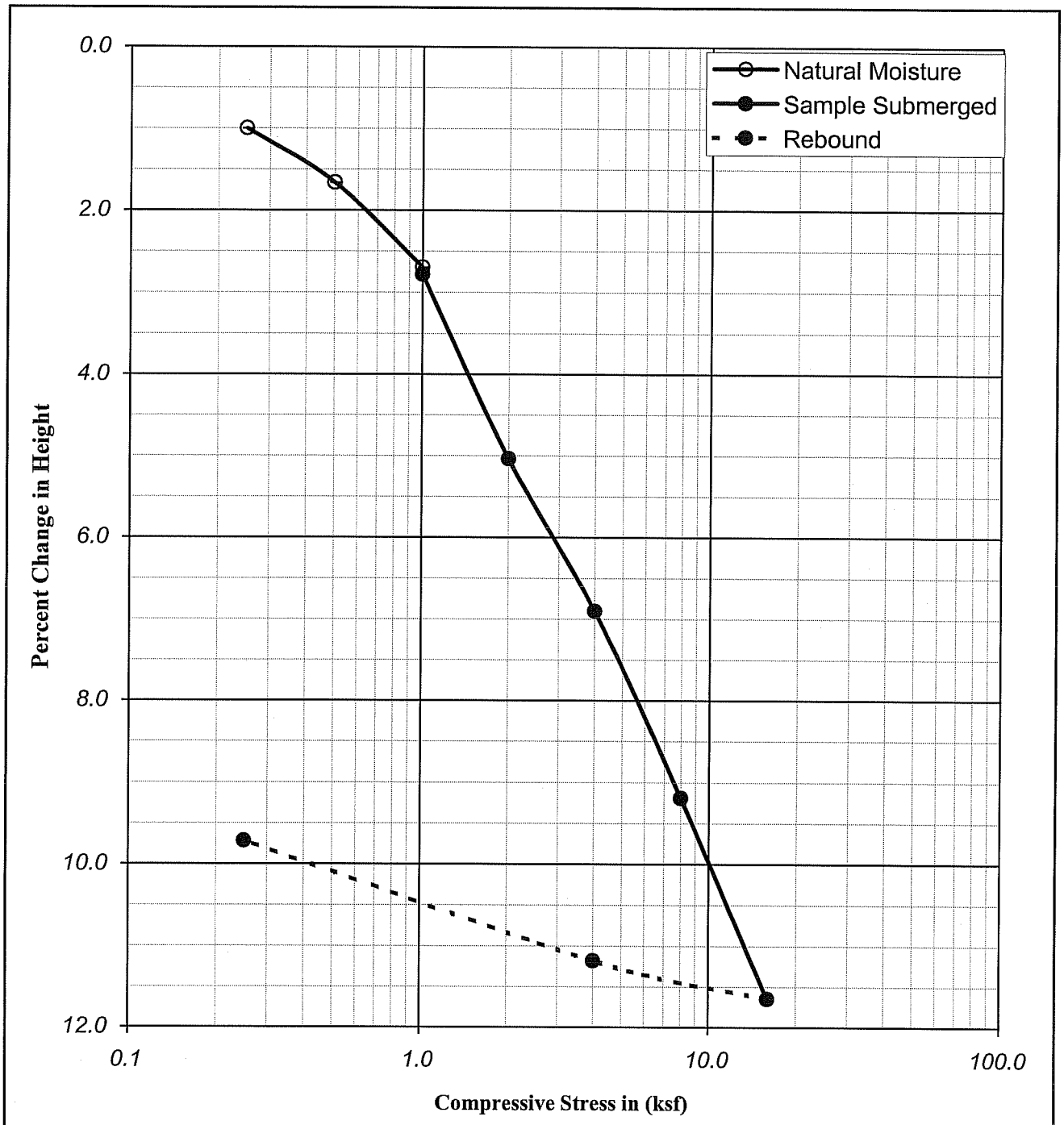
Date	Time	Elapsed Time (min.)	Load (ksf)	Load (kPa)	Dial Reading (in)	Dial Reading (mm)	Consol. (%)
4/13/2007	9:15	0:00:00	Seating Load		0.04670	1.19	
	9:25		2.0	95.8	0.05000	1.27	0.00
4/14/2007	8:14	0:00:00	0.25	12.0	0.06000	1.52	1.00
4/15/2007	8:17	0:00:00	0.50	23.9	0.06660	1.69	1.66
4/16/2007	7:29	0:00:00	1.00	47.9	0.07695	1.95	2.69
			Add Water				
4/17/2007	7:48	0:00:00	1.00	47.9	0.07780	1.98	2.78
4/18/2007	8:48	0:00:00	2.00	95.8	0.10040	2.55	5.04
4/19/2007	8:07	0:00:00	4.00	191.5	0.11900	3.02	6.90
4/20/2007	8:10	0:00:00	8.00	383.0	0.14190	3.60	9.19
4/21/2007	8:03	0:00:00	16.00	766.1	0.16650	4.23	11.65
4/22/2007	9:52	0:00:00	4.00	191.5	0.16180	4.11	11.18
4/23/2007	9:15	0:00:00	0.25	12.0	0.14720	3.74	9.72

	Before	After
Weight of wet soil + ring (gm)	199.58	
Weight of ring (gm)	43.48	
Weight of wet soil + ring + container (gm)		251.91
Weight of dry soil + ring + container (gm)		228.74
No. 4 Weight of container (gm)		58.92
Weight of ring + container (gm)		102.40
Moisture Content (%)	23.56	18.34
Dial Reading (inch)	0.05	0.04
Sample Volume (ft³)	0.0027	0.0024
Wet Density (pcf)	129.3	137.7
Dry Density (pcf)	104.64	116.33

SQRT Time

Date	Time	Elapsed Time (min.)	Load (ksf)	Load (kPa)	Dial Reading (in)	Dial Reading (mm)	Consol. (%)

Remark Final Dial Reading 0.1472



Boring No. : 06-13				Liquid Limit :	-		Moisture Content (%)	Dry Density		Percent Saturation	Void Ratio
Sample No. : D-9				Plastic Limit :	-			(pcf)	(kN/m³)		
Depth	(ft) :	44.0	45.5	Plastic Index :	-	Initial	23.56	104.64	16.47	104.11	0.61
	(m) :	13.42	13.88	Specific Gravity :	2.70	Final	18.34	116.33	18.31	110.28	0.45
Description : Dark Greenish Gray, Sandy Silt (ML)											

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

BATA / Dumbarton Bridge

Project No. : 06-159 05/31/07

CONSOLIDATION TEST
(ASTM D-2435 / CT-219)

ONE-DIMENSIONAL CONSOLIDATION OF SOIL

ASTM D-2435 / CT-219

Device No. : 5

Project Name : *BATA / Dumbarton Bridge*
Project No. : *06-159*
Boring No. : *06-14*
Sample No. : *D-16*
Depth (ft / m) : *79.0* | *24.10*
File No. :
Soil Description : *Dark Yellowish Brown, Lean Clay with Sand (CL)*

Set up By : *R.J* **Date :** *5/14/2007*
Tested By : *R.J* **Date :** *5/14-5/25/2007*
Time Rate Taken By : **Date :**
Computer By : *CY* **Date :** *5/31/2007*
Checked By : *R.J* **Date :** *5/31/2007*

Method (A) : ☑ Constant load increment duration of 24 hours or multiples there for. Minium of two Time -deformation reading are required.

Method (B) : ☐ Time-deformation reading are required on all load increments. Successive load increments are applied after 100 % primary consolidation is reached, or at constant time increments are described in Test Method (A)

1

Sample	(inch)	(mm)
Internal Diameter	2.42	61.47
Height (Intial)	1.00	25.40
Height (Final)	0.9351	23.75

Vertical Load	(ksf)	(kPa)
Add Water at	2.00	95.76
Load to	16.00	766.08
Rebound to	0.25	11.97

Vertical Load	(ksf)	(kPa)
Reload to	-	-
Rebound to	-	-
Time rate taken at	-	-

Date	Time	Elapsed Time (min.)	Load (ksf)	Load (kPa)	Dial Reading (in)	Dial Reading (mm)	Consol. (%)
5/14/2007	13:37	0:00:00	Seating Load		0.04900	1.24	
	14:47		2.0	95.8	0.05000	1.27	0.00
5/15/2007	8:30	0:00:00	0.25	12.0	0.05820	1.48	0.82
5/16/2007	8:00	0:00:00	0.50	23.9	0.06450	1.64	1.45
5/17/2007	8:00	0:00:00	1.00	47.9	0.07250	1.84	2.25
5/18/2007	8:00	0:00:00	2.00	95.8	0.08480	2.15	3.48
			Add Water				
5/19/2007	8:20	0:00:00	2.00	95.8	0.08510	2.16	3.51
5/20/2007	9:01	0:00:00	4.00	191.5	0.09430	2.40	4.43
5/21/2007	8:07	0:00:00	8.00	383.0	0.11470	2.91	6.47
5/22/2007	8:09	0:00:00	16.00	766.1	0.13890	3.53	8.89
5/23/2007	8:13	0:00:00	2.00	95.8	0.12900	3.28	7.90
5/24/2007	8:35	0:00:00	0.25	12.0	0.11390	2.89	6.39

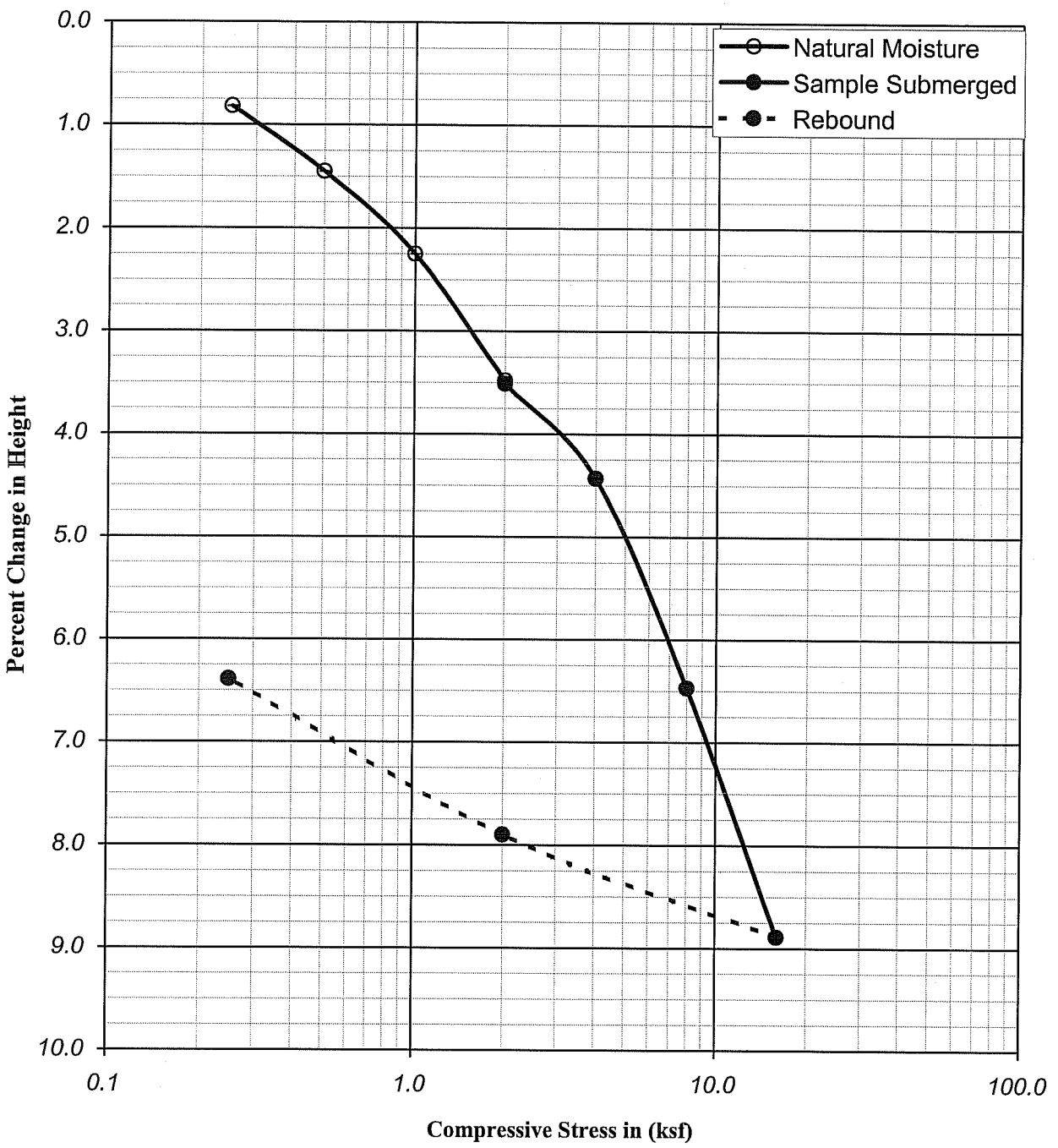
	Before	After
Weight of wet soil + ring (gm)	205.28	
Weight of ring (gm)	45.06	
Weight of wet soil + ring + container (gm)		260.62
Weight of dry soil + ring + container (gm)		238.84
No. 4 — Weight of container (gm)		59.02
Weight of ring + container (gm)		104.08
Moisture Content (%)	18.89	16.16
Dial Reading (inch)	0.05	0.04
Sample Volume (ft³)	0.0027	0.0025
Wet Density (pcf)	132.7	138.6
Dry Density (pcf)	111.61	119.36

SQRT Time

Date	Time	Elapsed Time (min.)	Load (ksf)	Load (kPa)	Dial Reading (in)	Dial Reading (mm)	Consol. (%)

Remark

Final Dial Reading 0.1139



Boring No. : 06-14				Liquid Limit :	-		Moisture Content (%)	Dry Density		Percent Saturation	Void Ratio
Sample No. : D-16				Plastic Limit :	-			(pcf)	(kN/m³)		
Depth	(ft) :	79.0	80.5	Plastic Index :	-	Initial	18.89	111.61	17.57	99.97	0.51
	(m) :	24.10	24.55	Specific Gravity :	2.70	Final	16.16	119.36	18.79	105.86	0.41
Description : Dark Yellowish Brown, Lean Clay with Sand (CL)											

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

BATA / Dumbarton Bridge

Project No. : 06-159 05/31/07

CONSOLIDATION TEST
(ASTM D-2435 / CT-219)

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

ASTM D2850

Project Name:	Dumbarton Toll Bridge			**Project No:**	06-159
Boring No.:	06-1	**Tested by:**	R.J.	**Date:**	02/27/07
Depth (ft):	24	**Checked by:**		**Date:**	
Sample No.	D-5	**Sample Type:**	R		

Sample Description: Dark Bluish Gray, FAT CLAY (CH)

	1	2	3		
Diameter (in.):	2.392	2.375	2.367	Average:	2.378
Height (in.):	4.988	5.033	5.042	Average:	5.021

Moisture Content Calculation		
Wt. Wet Sample + Container (gms):		213.29
Wt. Dry Sample + Container (gms):		142.89
Container (gms)	No. 9	57.66
Moisture Content (%)		**82.6**

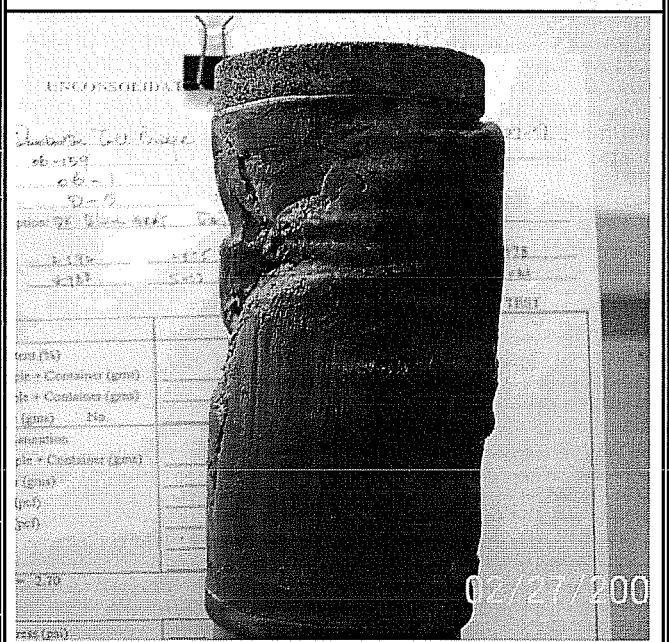
Density and Saturation	
Wt. Wet Sample + Container (gms)	757.89
Container (gms)	228.92
Wet Density (pcf)	**90.3**
Dry Density (pcf)	**49.4**
Void Ratio	**2.407**
% Saturation	**92.6**

Assume Gs=2.70

Test Data Filename:	

SKETCH / PHOTO AFTER TEST:

PHOTO FILE NAME: D:\06-159 Dumbarton\lab\100_3465.JPG



Shear	
Rate of Deformation (% strain / min) =	**1**
Confining Stress (ksf):	**1.87**

Failure Criterion: **criterion 1 is used**

1. the maximum deviator stress within 15% strain
2. the stress at 10% strain for no peak stress.

At Failure	
Deviator Stress (ksf)	**0.27**
Eff. Minor Principal Stress (ksf)=	**1.87**
Eff. Major Principal Stress (ksf)=	**2.14**
Axial Strain (%)=	**15.01**

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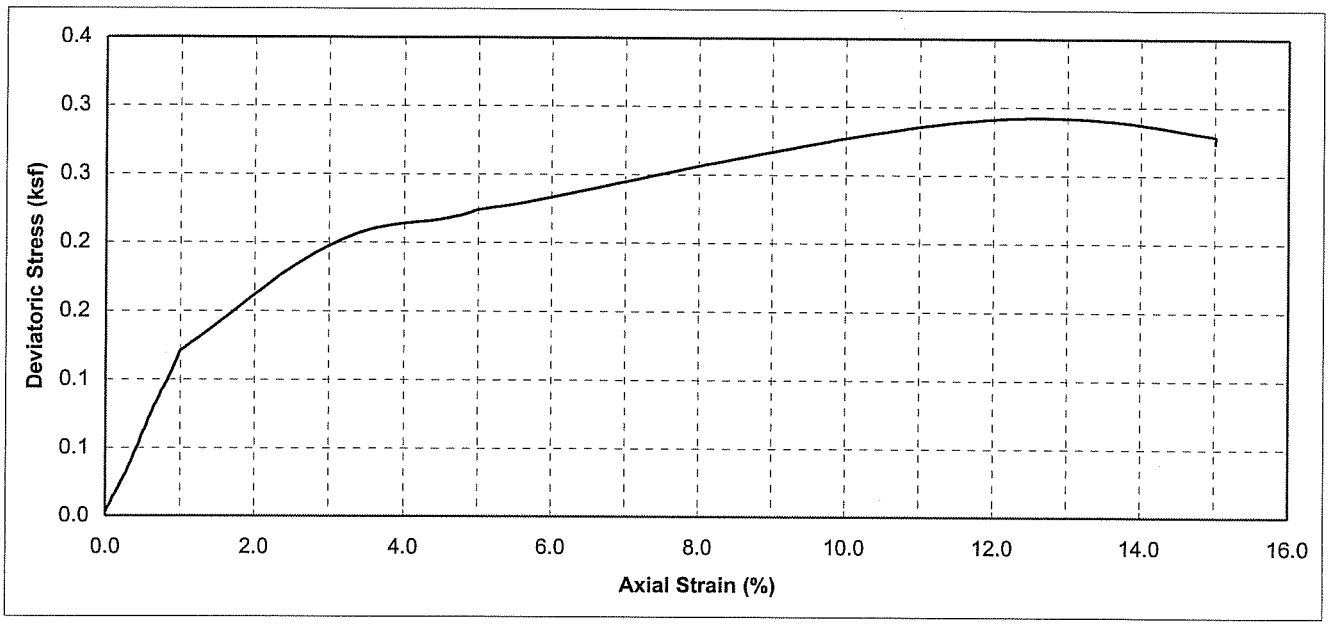

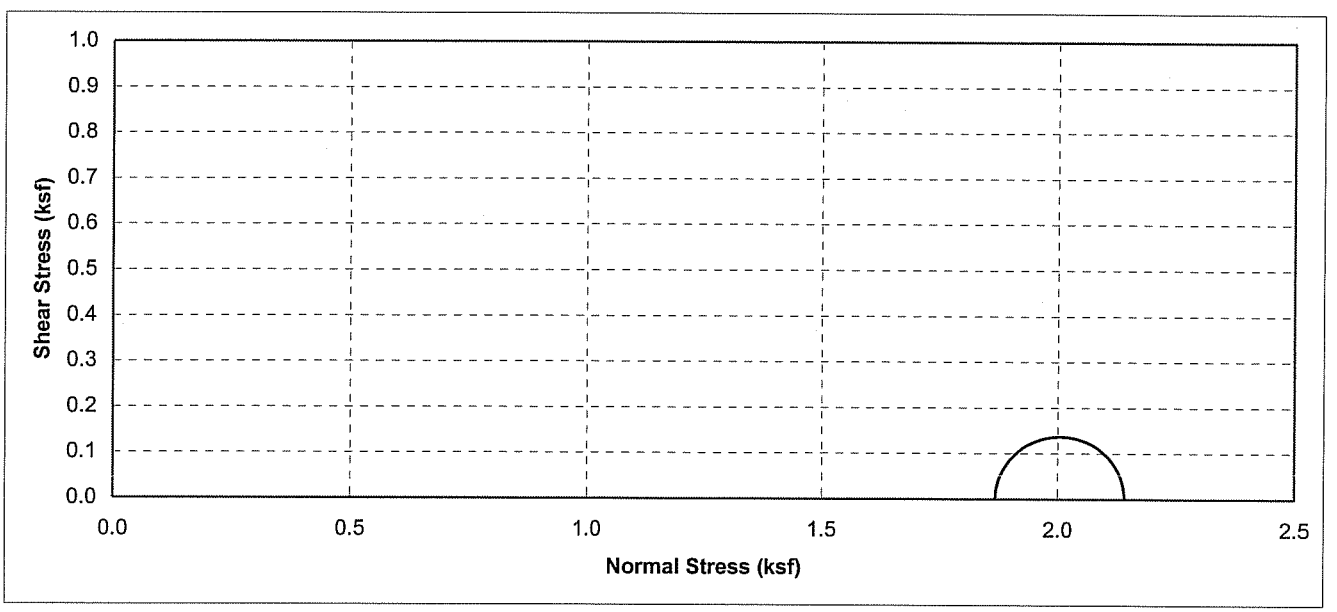

Boring No.	Sample No.	Depth (ft)	Soil Type	Dry Density (pcf)	Moisture Content (%)	Conf. Stress (ksf)	Max. Dev. Stress (ksf)	Initial Saturation (%)
06-1	D-5	24	Dark Bluish Gray, FAT CLAY (CH)	49.4	82.60	1.87	0.27	92.6

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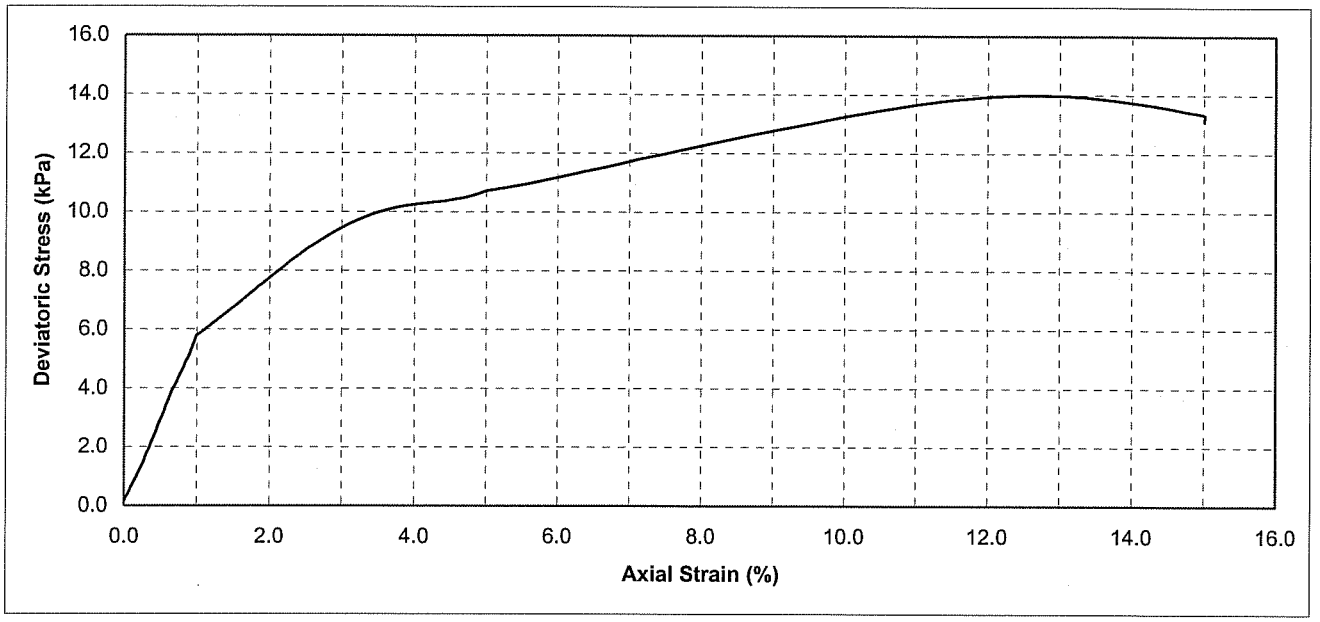
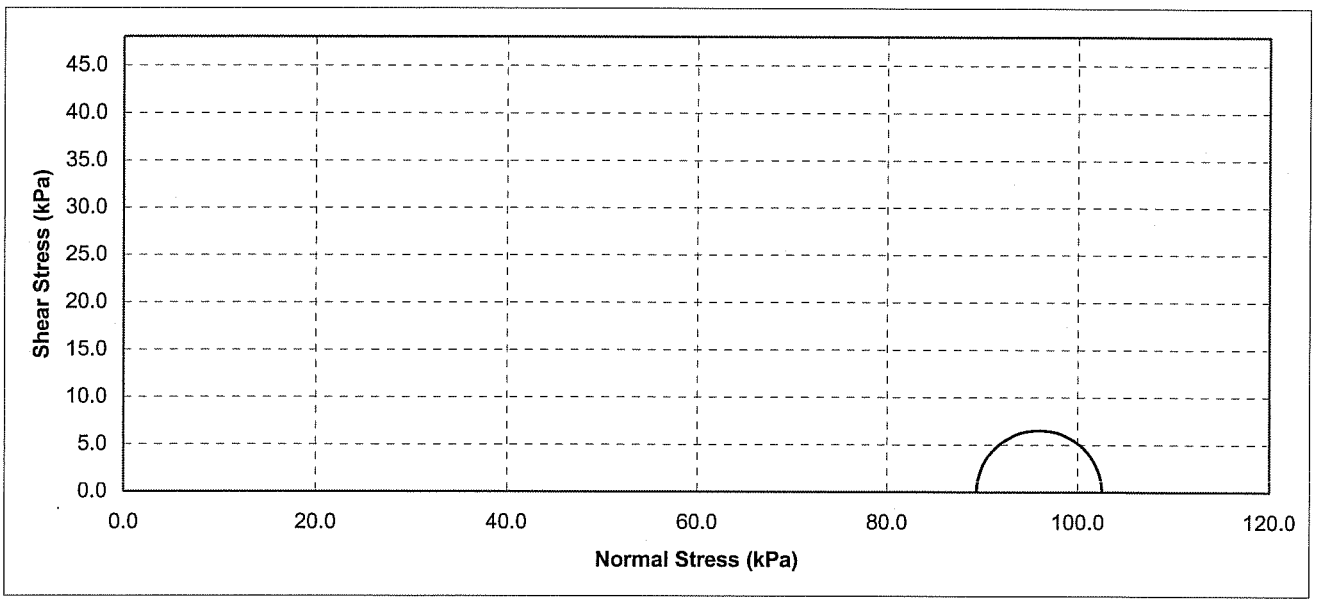
Dumbarton Toll Bridge

UNCONSOLIDATED UNDRAINED TEST
(ASTM D2850)

Project No. : 06-159 **Date :** 02/27/07

Figure No. :





Boring No.	Sample No.	Depth (m)	Soil Type	Dry Density (kN/m^3)	Moisture Content (%)	Conf. Stress (kPa)	Max. Dev. Stress (kPa)	Initial Saturation (%)
06-1	D-5	7.32	Dark Bluish Gray, FAT CLAY (CH)	7.8	82.6	89.5	13.1	92.6

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Dumbarton Toll Bridge

UNCONSOLIDATED UNDRAINED TEST
(ASTM D2850)

Project No. : 06-159 **Date :** 02/27/07

Figure No. :

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

ASTM D2850

Project Name:	Dumbarton Toll Bridge			**Project No:**	06-159
Boring No.:	06-1	**Tested by:**	R.J.	**Date:**	02/27/07
Depth (ft):	119	**Checked by:**		**Date:**	
Sample No.	D-22	**Sample Type:**	R		

Sample Description: Olive Gray, SILT With Sand (ML)

	1	2	3		
Diameter (in.):	2.418	2.418	2.417	Average:	2.418
Height (in.):	5.022	5.014	5.014	Average:	5.017

Moisture Content Calculation		
Wt. Wet Sample + Container (gms):		211.09
Wt. Dry Sample + Container (gms):		180.37
Container (gms)	No. 10	59.37
Moisture Content (%)		**25.4**

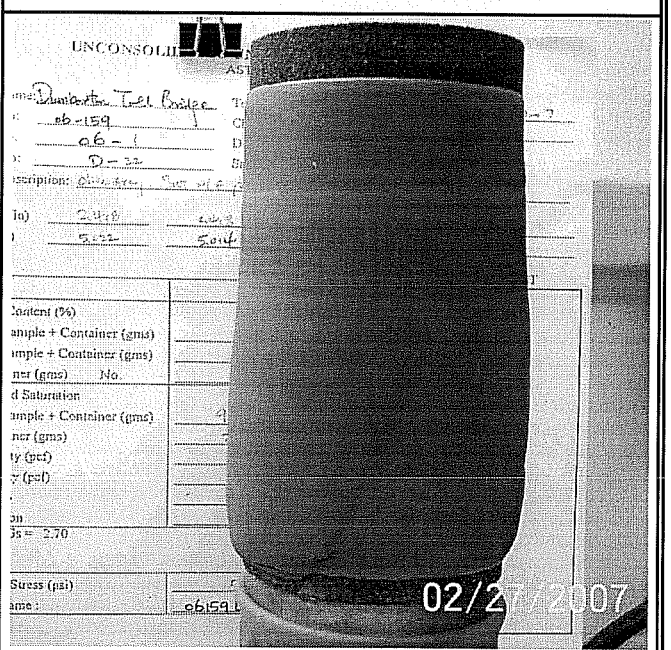
Density and Saturation	
Wt. Wet Sample + Container (gms)	986.17
Container (gms)	228.92
Wet Density (pcf)	**125.1**
Dry Density (pcf)	**99.8**
Void Ratio	**0.689**
% Saturation	**99.5**

Assume Gs=2.70

Test Data Filename:	06159B1D22.trx

SKETCH / PHOTO AFTER TEST:

PHOTO FILE NAME: D:\06-159 Dumbarton\lab\100_3466.JPG



Shear	
Rate of Deformation (% strain / min) =	**1**
Confining Stress (ksf):	**7.20**

Failure Criterion: **criterion 1 is used**

1. the maximum deviator stress within 15% strain
2. the stress at 10% strain for no peak stress.

At Failure	
Deviator Stress (ksf)	**13.69**
Eff. Minor Principal Stress (ksf)=	**7.20**
Eff. Major Principal Stress (ksf)=	**20.89**
Axial Strain (%)=	**11.24**

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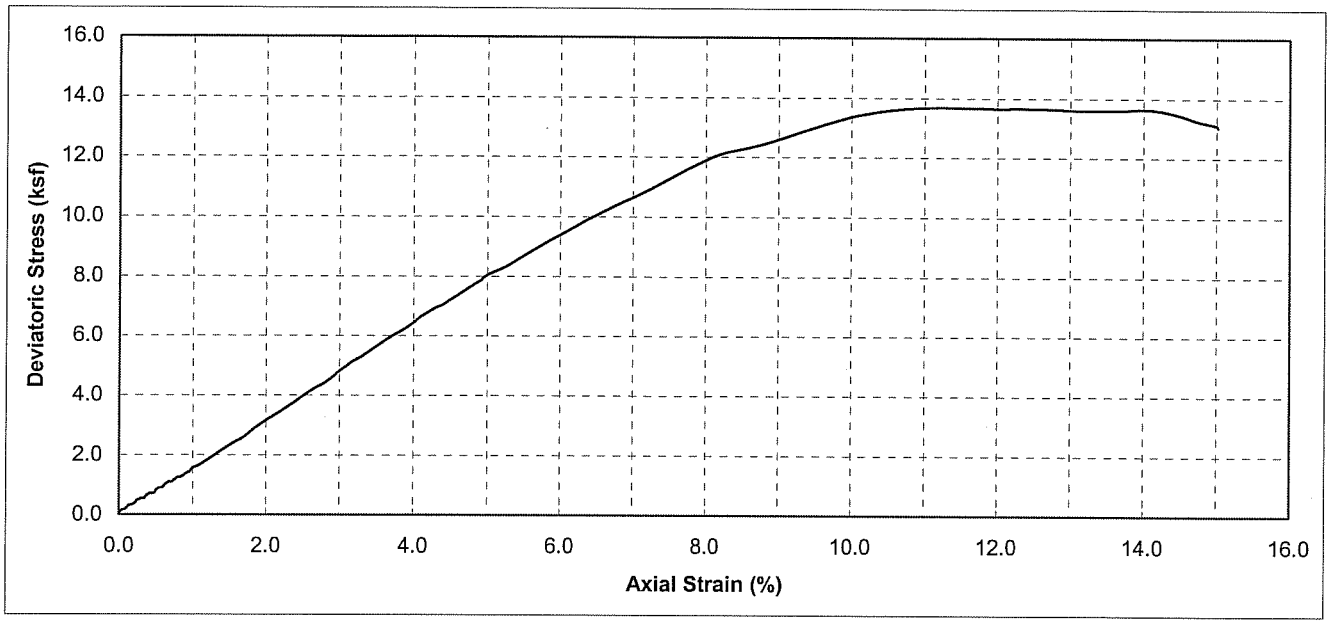
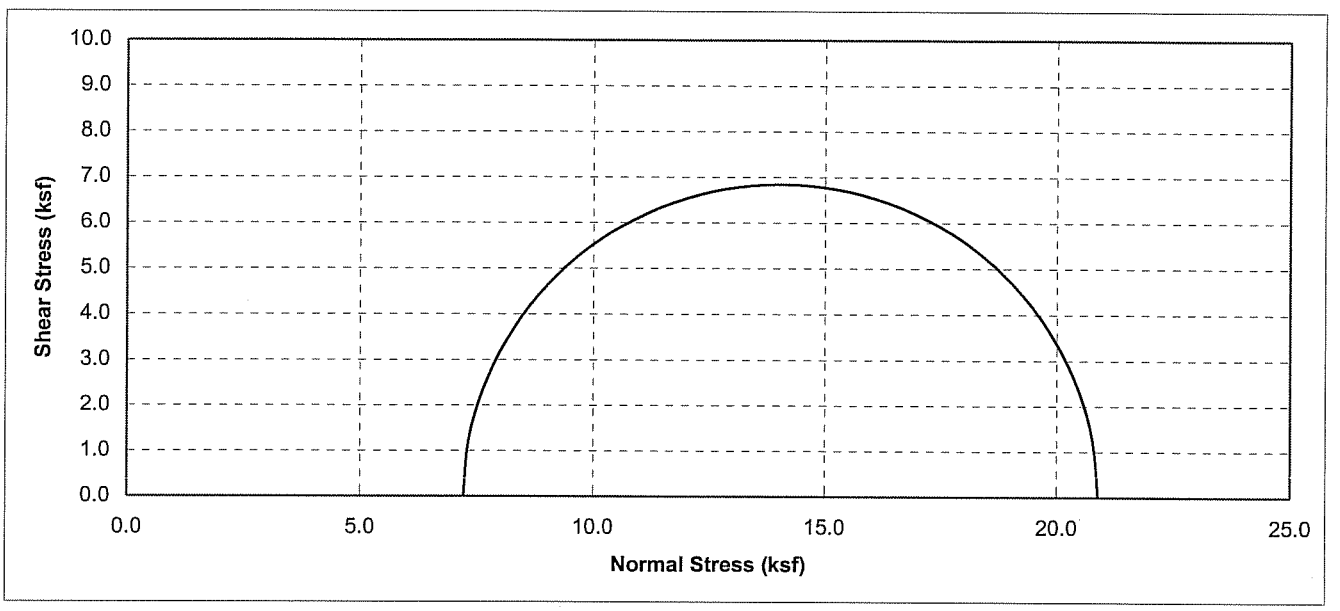
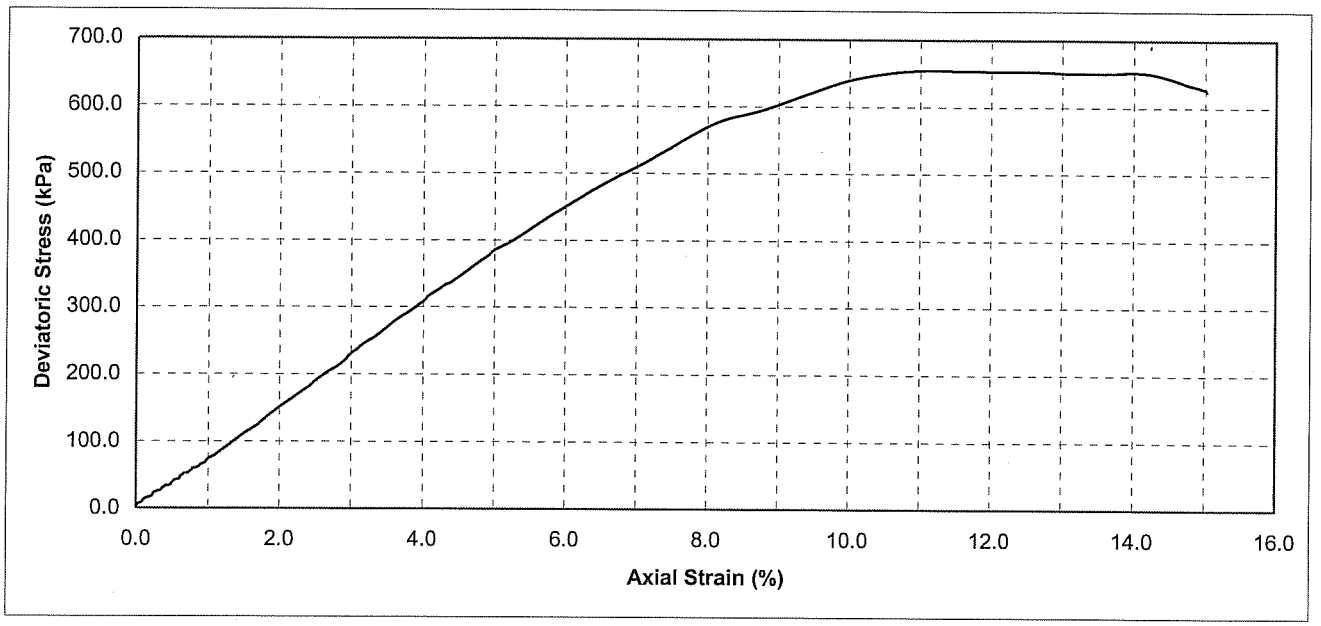
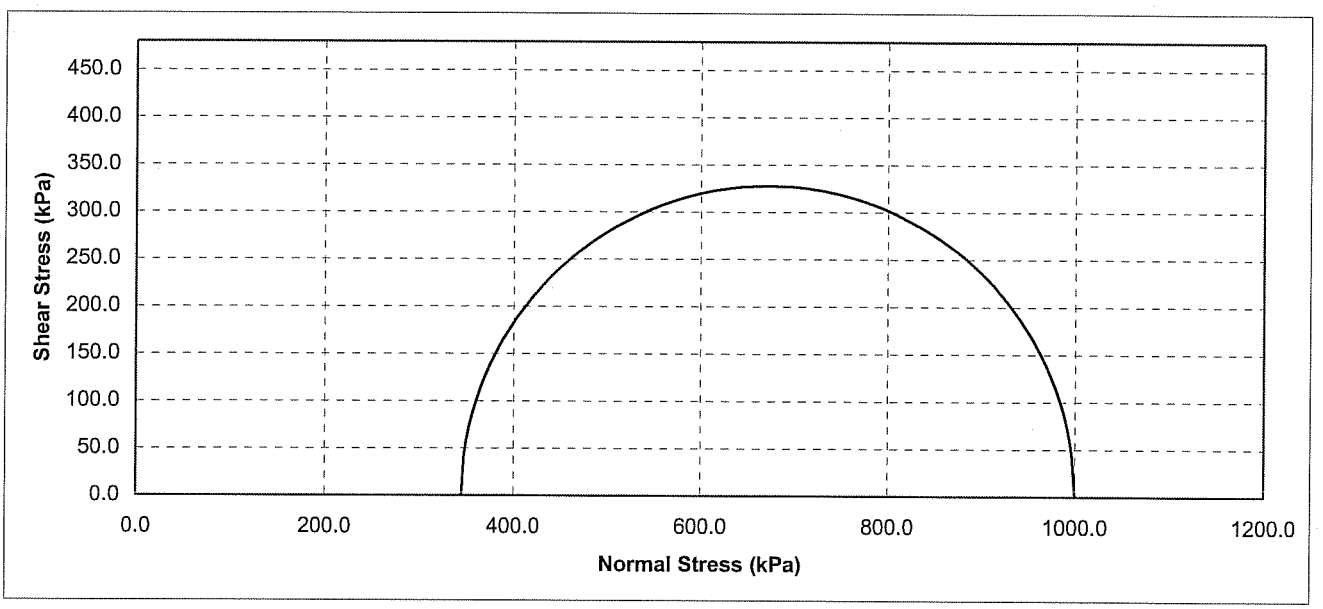




Boring No.	Sample No.	Depth (ft)	Soil Type	Dry Density (pcf)	Moisture Content (%)	Conf. Stress (ksf)	Max. Dev. Stress (ksf)	Initial Saturation (%)
06-1	D-22	119	Olive Gray, SILT With Sand (ML)	99.8	25.39	7.20	13.69	99.5

Earth Mechanics, Inc. Geotechnical and Earthquake Engineering	**Dumbarton Toll Bridge**
Project No. : 06-159 **Date :** 02/27/07	**UNCONSOLIDATED UNDRAINED TEST** **(ASTM D2850)** Figure No. :





Boring No.	Sample No.	Depth (m)	Soil Type	Dry Density (kN/m^3)	Moisture Content (%)	Conf. Stress (kPa)	Max. Dev. Stress (kPa)	Initial Saturation (%)
06-1	D-22	36.27	Olive Gray, SILT With Sand (ML)	15.7	25.4	344.7	655.3	99.5

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Dumbarton Toll Bridge

UNCONSOLIDATED UNDRAINED TEST
(ASTM D2850)

Project No. : 06-159 **Date :** 02/27/07

Figure No. :

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

ASTM D2850

Project Name:	Dumbarton Toll Bridge			**Project No:**	06-159
Boring No.:	06-2	**Tested by:**	R.J.	**Date:**	02/27/07
Depth (ft):	129	**Checked by:**		**Date:**	
Sample No.	D-22	**Sample Type:**	R		

Sample Description: Olive Gray, LEAN CLAY (CL)

	1	2	3		
Diameter (in.):	2.415	2.415	2.416	Average:	2.415
Height (in.):	5.055	5.022	5.022	Average:	5.033

Moisture Content Calculation	
Wt. Wet Sample + Container (gms):	207.05
Wt. Dry Sample + Container (gms):	176.93
Container (gms) No. 11	58.65
Moisture Content (%)	**25.5**

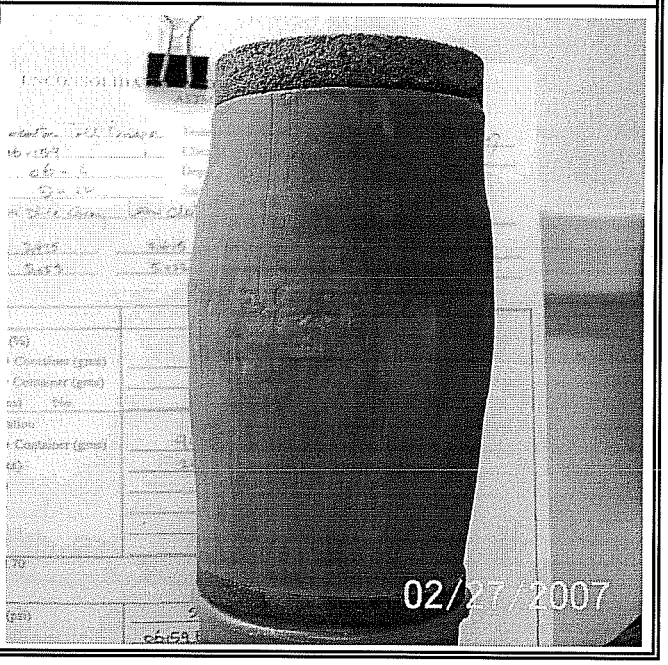
Density and Saturation	
Wt. Wet Sample + Container (gms)	992.97
Container (gms)	228.92
Wet Density (pcf)	**126.1**
Dry Density (pcf)	**100.5**
Void Ratio	**0.676**
% Saturation	**101.7**

Assume Gs=2.70

Test Data Filename:	06159B2D22.xls

SKETCH / PHOTO AFTER TEST:

PHOTO FILE NAME: D:\06-159 Dumbarton\lab\100_3467.JPG



Shear	
Rate of Deformation (% strain / min) =	**1**
Confining Stress (ksf):	**7.20**

Failure Criterion: **criterion 2 is used**

1. the maximum deviator stress within 15% strain
2. the stress at 10% strain for no peak stress.

At Failure	
Deviator Stress (ksf)	**5.69**
Eff. Minor Principal Stress (ksf)=	**7.20**
Eff. Major Principal Stress (ksf)=	**12.89**
Axial Strain (%)=	**9.90**

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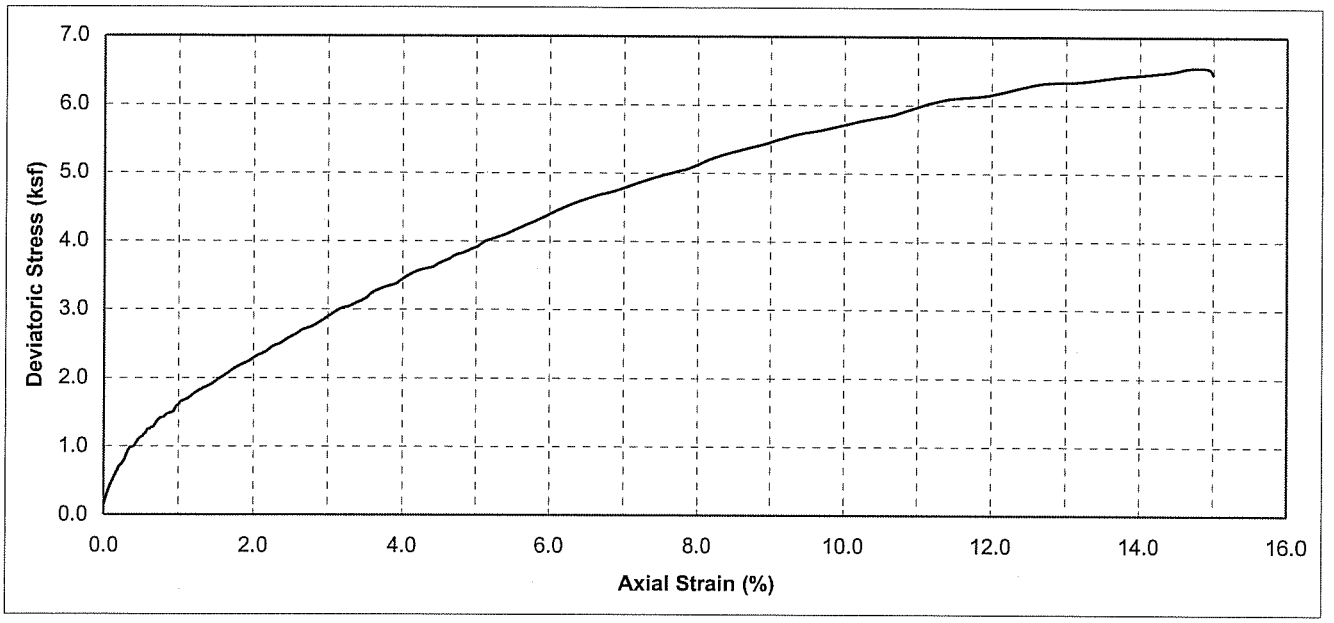

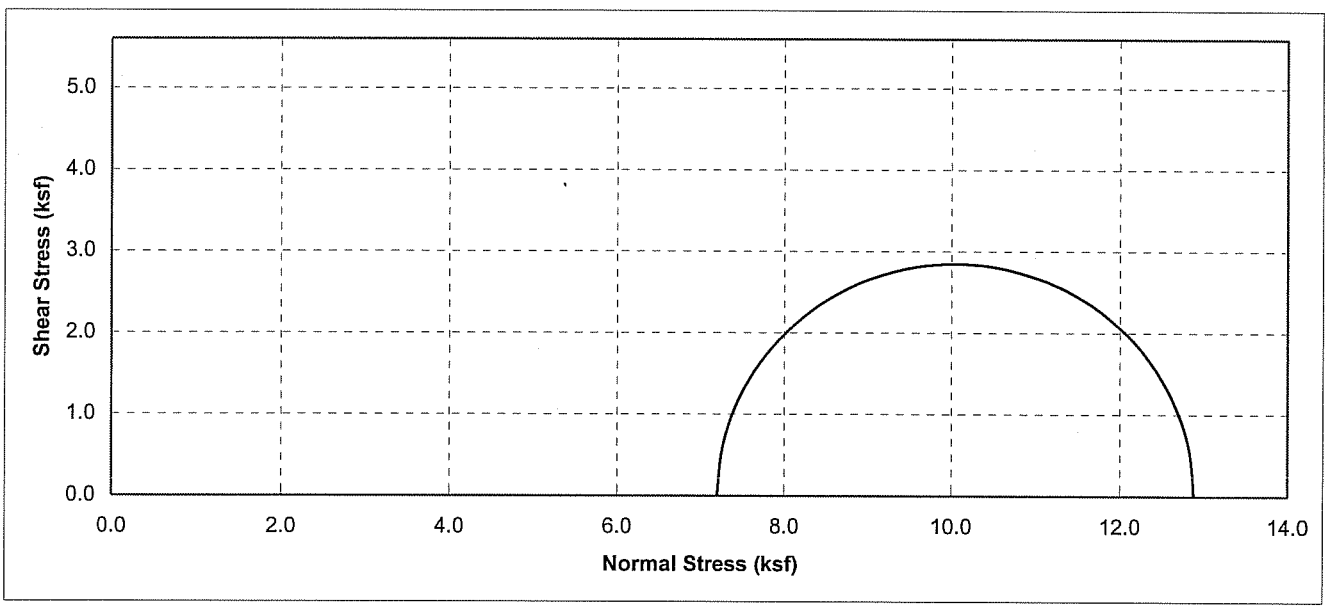

Boring No.	Sample No.	Depth (ft)	Soil Type	Dry Density (pcf)	Moisture Content (%)	Conf. Stress (ksf)	Max. Dev. Stress (ksf)	Initial Saturation (%)
06-2	D-22	129	Olive Gray, LEAN CLAY (CL)	100.5	25.46	7.20	5.69	101.7

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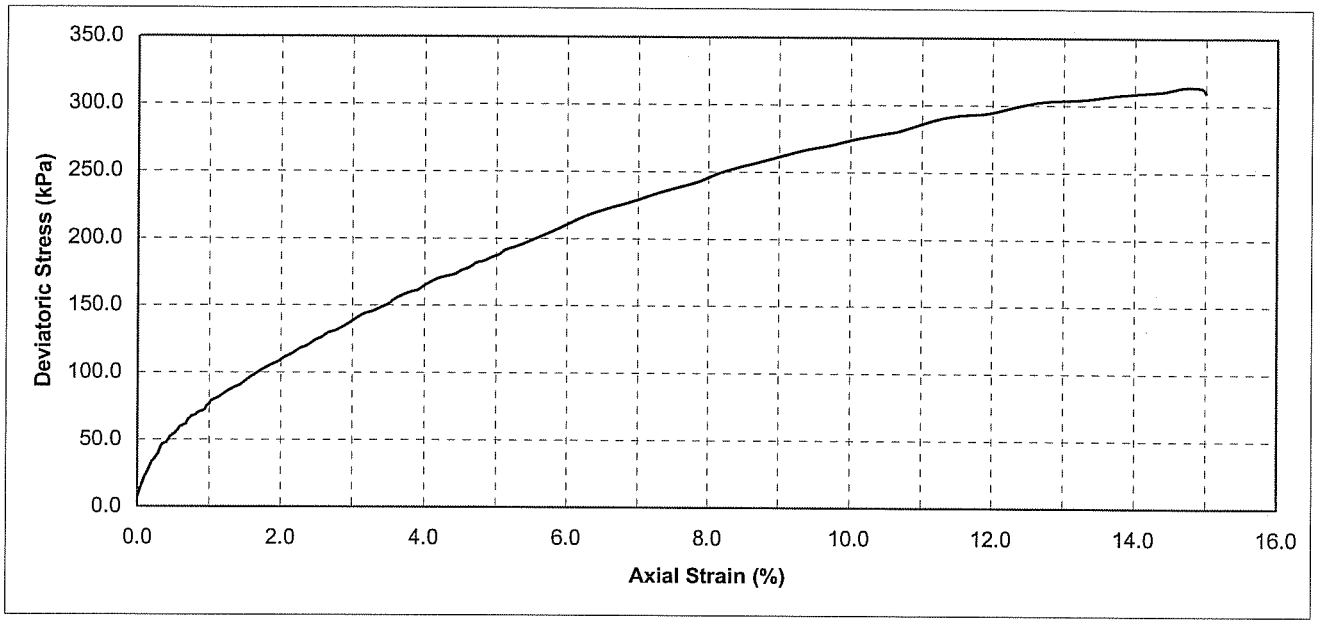
Dumbarton Toll Bridge

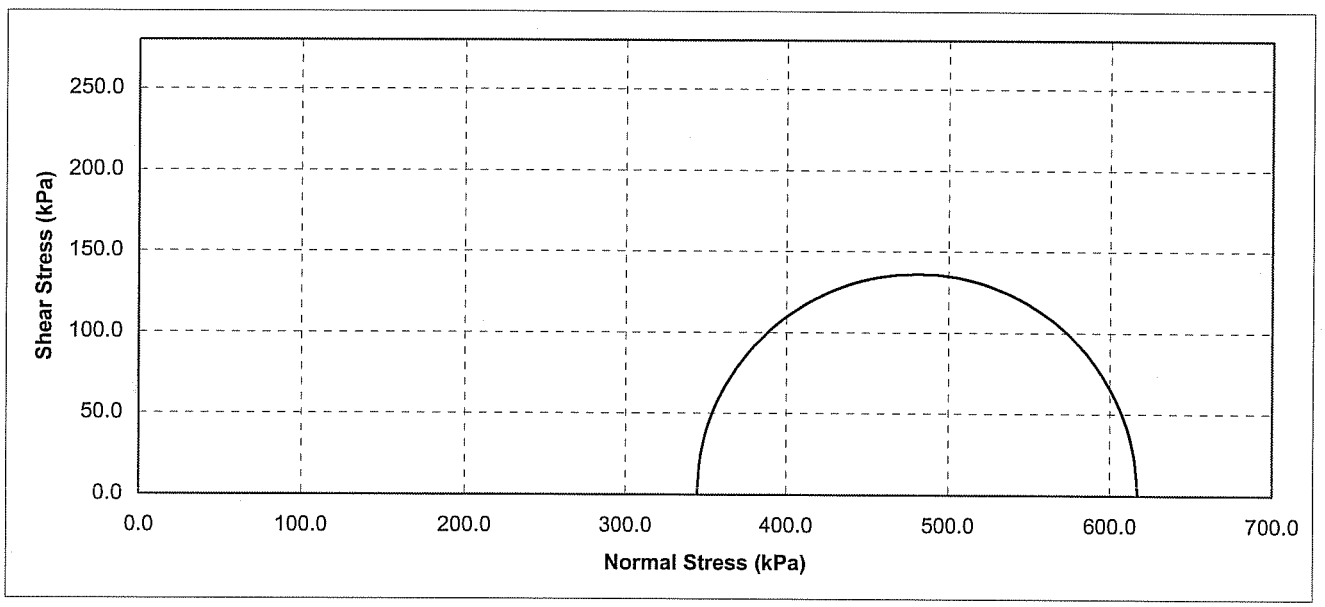
UNCONSOLIDATED UNDRAINED TEST
(ASTM D2850)

Project No. : 06-159

Date : 02/27/07

Figure No. :





Boring No.	Sample No.	Depth (m)	Soil Type	Dry Density (kN/m^3)	Moisture Content (%)	Conf. Stress (kPa)	Max. Dev. Stress (kPa)	Initial Saturation (%)
06-2	D-22	39.32	Olive Gray, LEAN CLAY (CL)	15.8	25.5	344.7	272.3	101.7

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Dumbarton Toll Bridge

UNCONSOLIDATED UNDRAINED TEST
(ASTM D2850)

Project No. : 06-159 **Date :** 02/27/07

Figure No. :

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

ASTM D2850

Project Name:	Dumbarton Toll Bridge			**Project No:**	06-159
Boring No.:	06-3	**Tested by:**	R.J.	**Date:**	02/27/07
Depth (ft):	97	**Checked by:**		**Date:**	
Sample No.	D-19	**Sample Type:**	R		

Sample Description: Olive Gray, LEAN CLAY (CL)

	1	2	3		
Diameter (in.):	2.352	2.352	2.362	Average:	2.355
Height (in.):	5.011	4.998	5.016	Average:	5.008

Moisture Content Calculation		
Wt. Wet Sample + Container (gms):		192.19
Wt. Dry Sample + Container (gms):		164.48
Container (gms)	No. 13	57.88
Moisture Content (%)		**26.0**

Density and Saturation	
Wt. Wet Sample + Container (gms)	938.84
Container (gms)	228.92
Wet Density (pcf)	**123.9**
Dry Density (pcf)	**98.3**
Void Ratio	**0.714**
% Saturation	**98.3**

Assume Gs=2.70

Test Data Filename:	06159B3D19.xls

SKETCH / PHOTO AFTER TEST:

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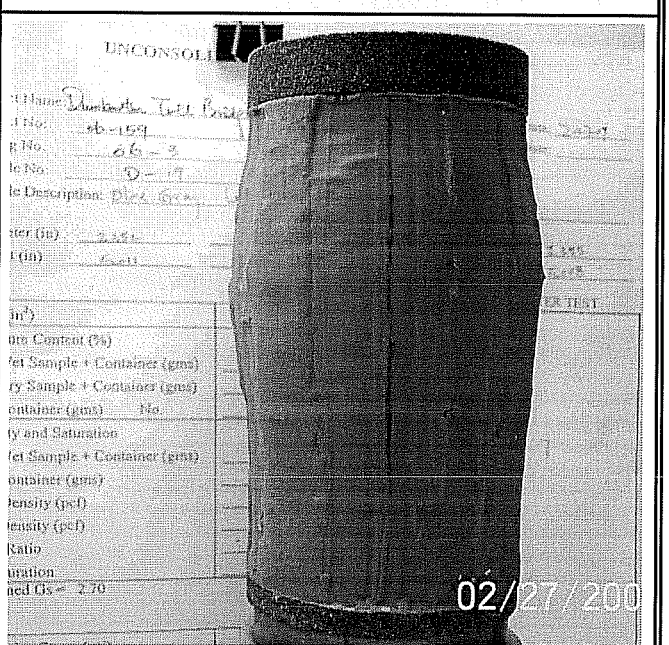

Shear	
Rate of Deformation (% strain / min) =	**1**
Confining Stress (ksf):	**7.20**

Failure Criterion: **criterion 2 is used**

1. the maximum deviator stress within 15% strain
2. the stress at 10% strain for no peak stress.

At Failure	
Deviator Stress (ksf)	**3.16**
Eff. Minor Principal Stress (ksf)=	**7.20**
Eff. Major Principal Stress (ksf)=	**10.37**
Axial Strain (%)=	**9.91**

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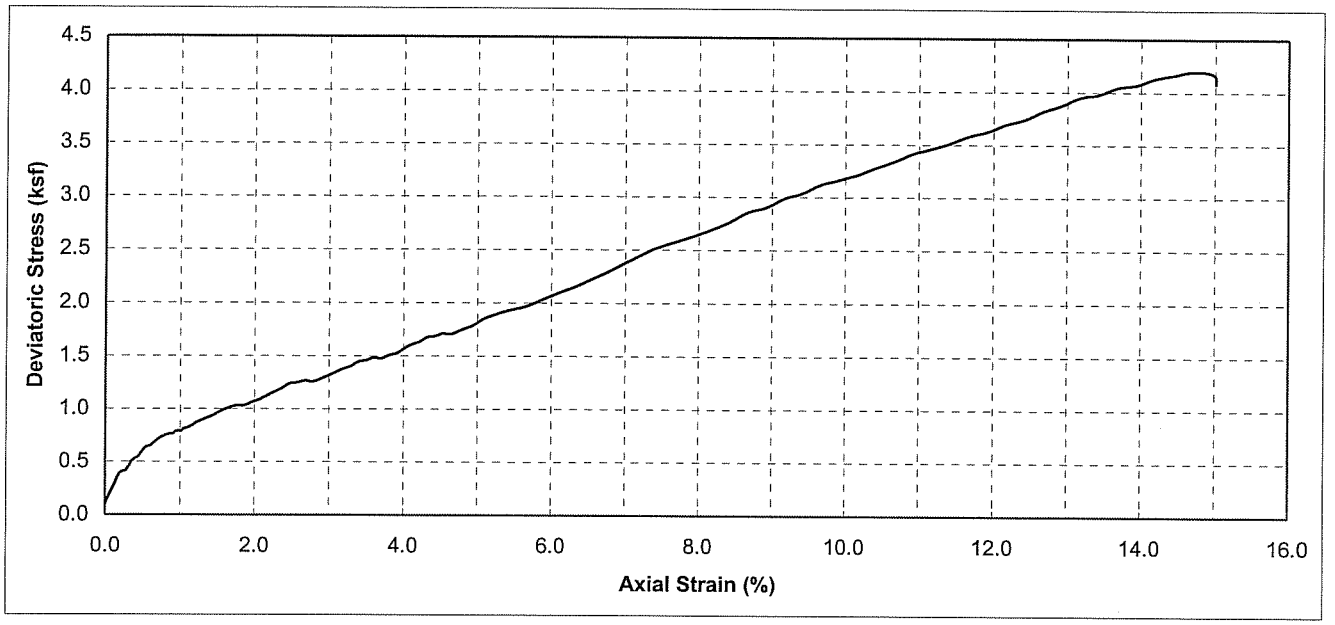
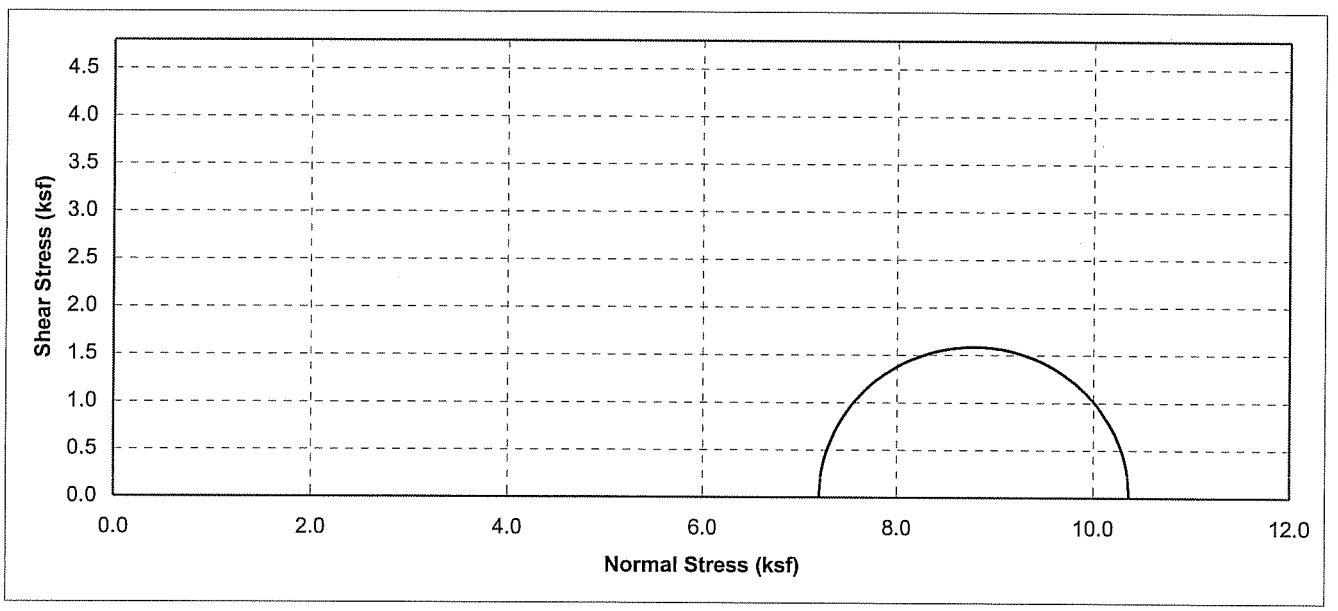
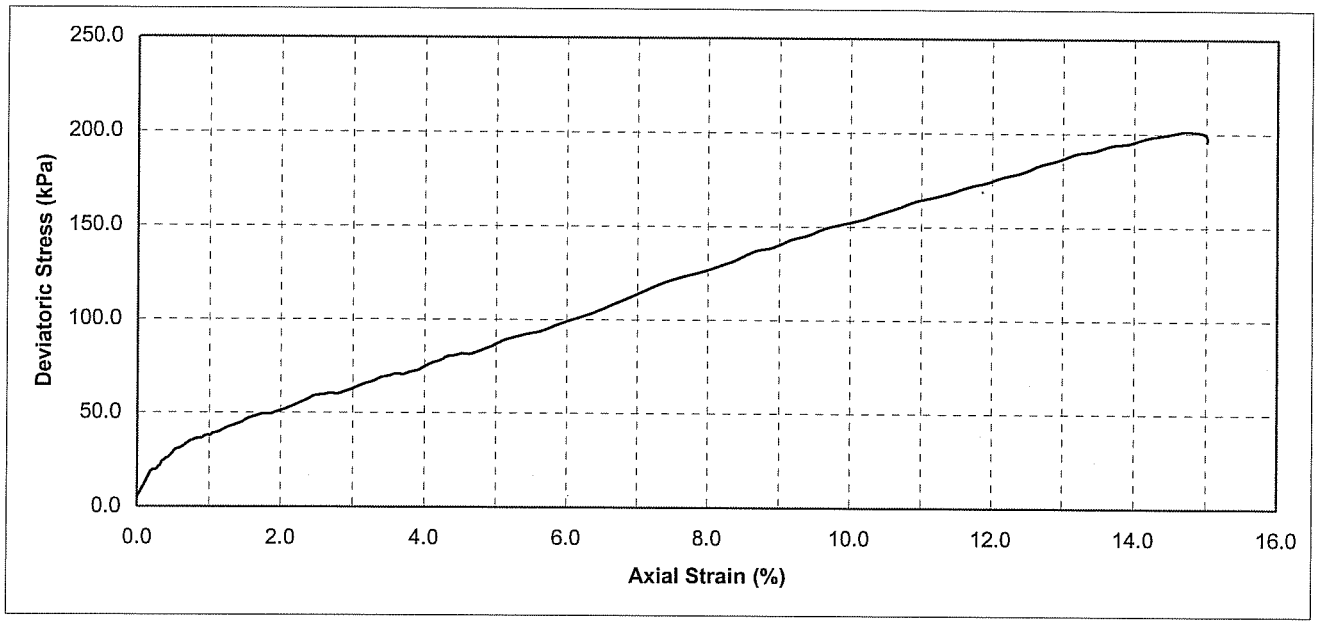
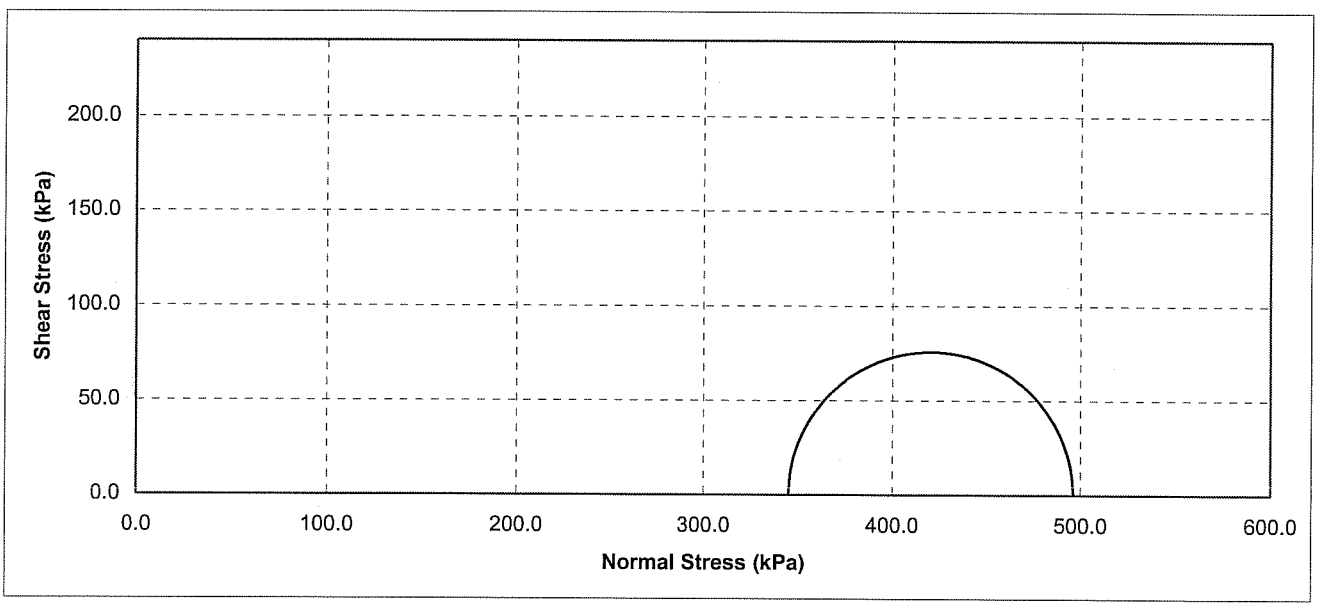




Boring No.	Sample No.	Depth (ft)	Soil Type	Dry Density (pcf)	Moisture Content (%)	Conf. Stress (ksf)	Max. Dev. Stress (ksf)	Initial Saturation (%)
06-3	D-19	97	Olive Gray, LEAN CLAY (CL)	98.3	25.99	7.20	3.16	98.3

Earth Mechanics, Inc. Geotechnical and Earthquake Engineering	**Dumbarton Toll Bridge**
Project No. : 06-159 **Date :** 02/27/07	**UNCONSOLIDATED UNDRAINED TEST** **(ASTM D2850)** Figure No. :





Boring No.	Sample No.	Depth (m)	Soil Type	Dry Density (kN/m^3)	Moisture Content (%)	Conf. Stress (kPa)	Max. Dev. Stress (kPa)	Initial Saturation (%)
06-3	D-19	29.57	Olive Gray, LEAN CLAY (CL)	15.5	26.0	344.9	151.5	98.3

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Dumbarton Toll Bridge

UNCONSOLIDATED UNDRAINED TEST
(ASTM D2850)

Project No. : 06-159 **Date :** 02/27/07

Figure No. :

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

ASTM D2850

Project Name:	Dumbarton Toll Bridge			**Project No:**	06-159
Boring No.:	06-6	**Tested by:**	R.J.	**Date:**	02/18/07
Depth (ft):	30	**Checked by:**		**Date:**	
Sample No.	D-6	**Sample Type:**	R		

Sample Description: Olive Brown With Olive Gray, LEAN CLAY To SANDY CLAY (CL)

	1	2	3		
Diameter (in.):	2.41	2.412	2.411	Average:	2.411
Height (in.):	5.031	4.989	4.996	Average:	5.005

Moisture Content Calculation		
Wt. Wet Sample + Container (gms):		219.77
Wt. Dry Sample + Container (gms):		193.98
Container (gms)	No. 5	57.92
Moisture Content (%)		**19.0**

Density and Saturation	
Wt. Wet Sample + Container (gms)	1022.14
Container (gms)	228.92
Wet Density (pcf)	**132.1**
Dry Density (pcf)	**111.1**
Void Ratio	**0.517**
% Saturation	**99.0**

Assume Gs=2.70

Test Data Filename:	06159B6D6.trx

SKETCH / PHOTO AFTER TEST:

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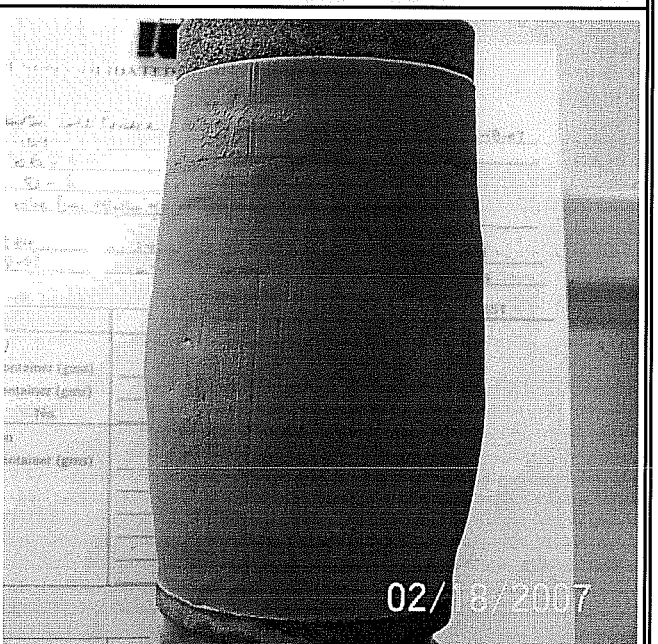

Shear	
Rate of Deformation (% strain / min) =	**1**
Confining Stress (ksf):	**2.45**

Failure Criterion: **criterion 1 is used**

1. the maximum deviator stress within 15% strain
2. the stress at 10% strain for no peak stress.

At Failure	
Deviator Stress (ksf)	**2.99**
Eff. Minor Principal Stress (ksf)=	**2.45**
Eff. Major Principal Stress (ksf)=	**5.44**
Axial Strain (%)=	**14.01**

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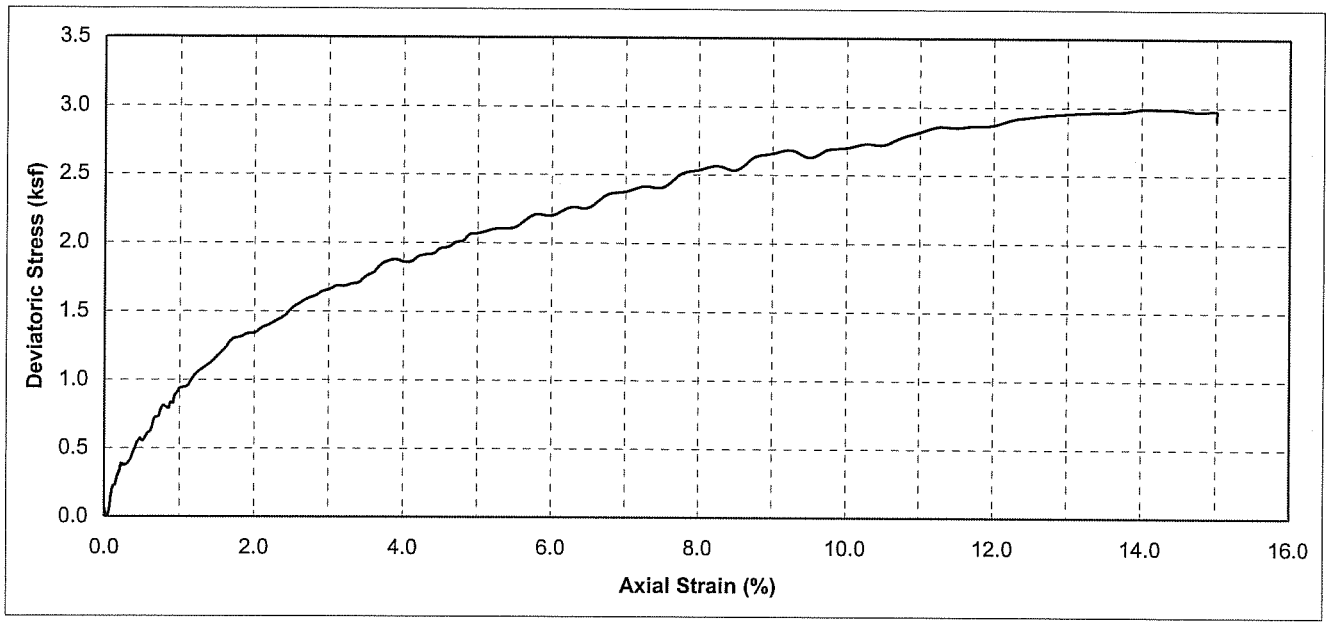

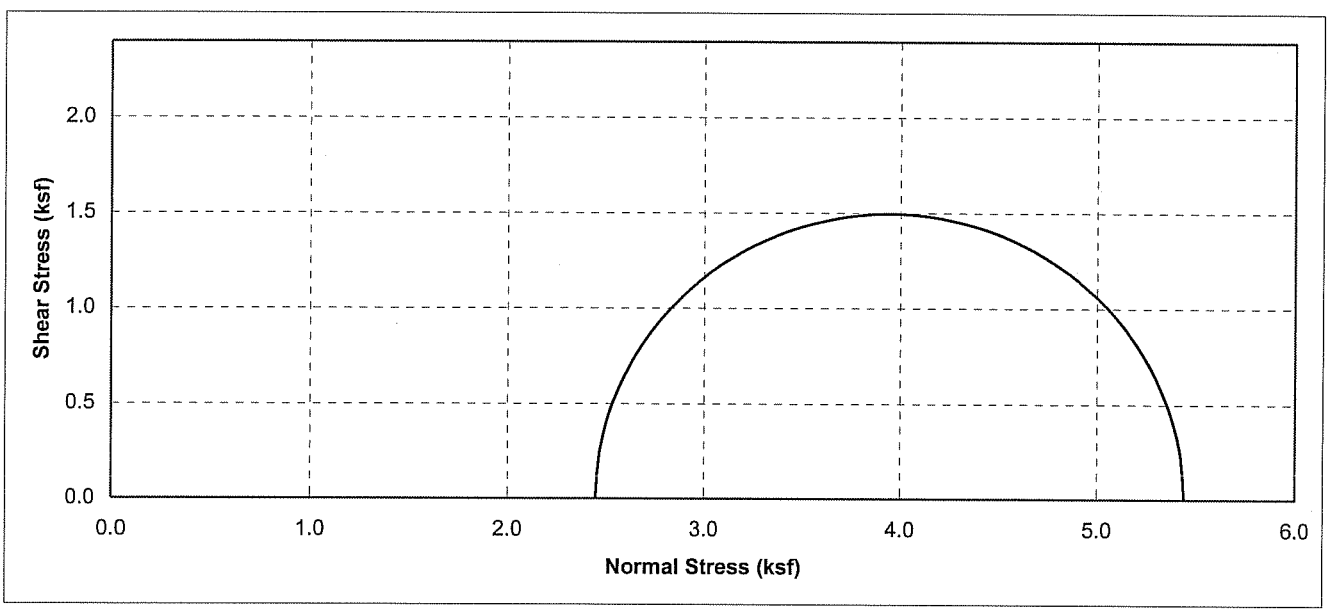

Boring No.	Sample No.	Depth (ft)	Soil Type	Dry Density (pcf)	Moisture Content (%)	Conf. Stress (ksf)	Max. Dev. Stress (ksf)	Initial Saturation (%)
06-6	D-6	30	Olive Brown With Olive Gray, LEAN CLAY To SANDY CLAY (CL)	111.1	18.95	2.45	2.99	99.0

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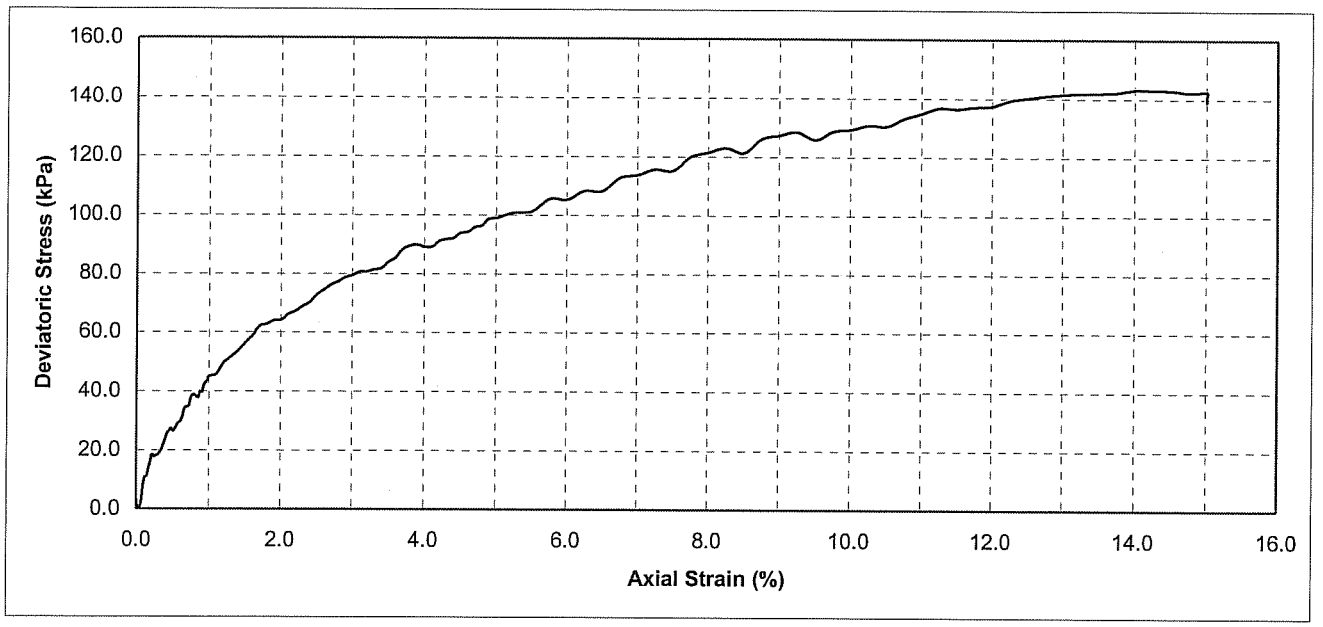
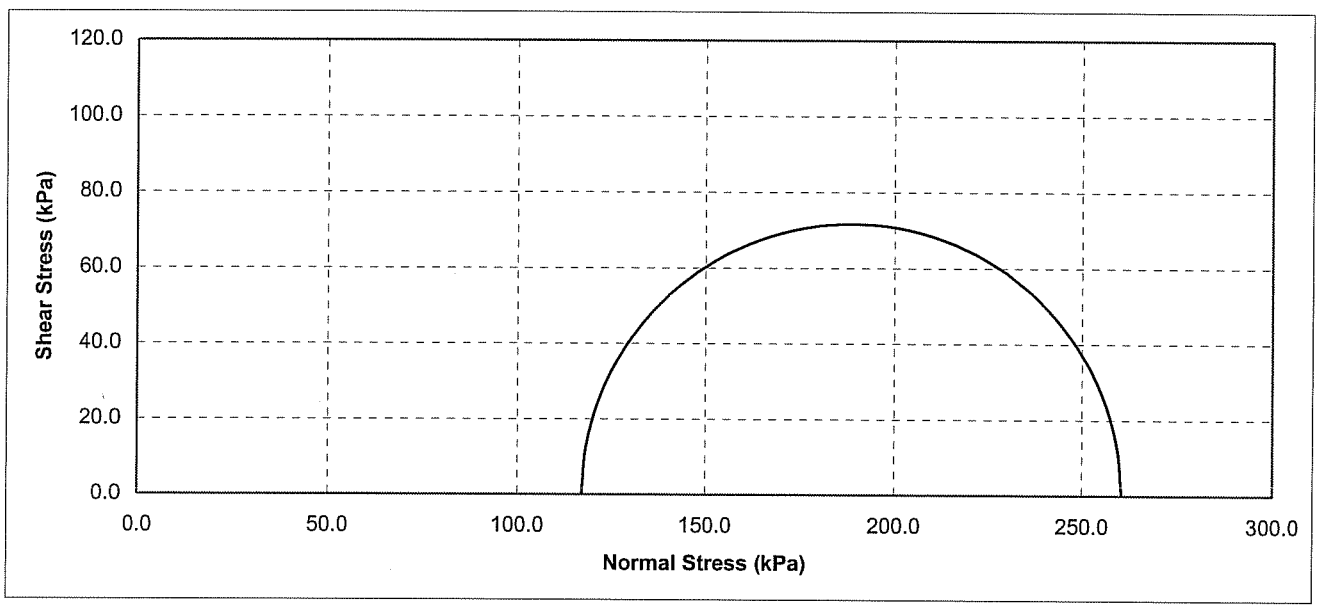
Dumbarton Toll Bridge

UNCONSOLIDATED UNDRAINED TEST
(ASTM D2850)

Project No. : 06-159 **Date :** 02/18/07

Figure No. :





Boring No.	Sample No.	Depth (m)	Soil Type	Dry Density (kN/m^3)	Moisture Content (%)	Conf. Stress (kPa)	Max. Dev. Stress (kPa)	Initial Saturation (%)
06-6	D-6	9.14	Olive Brown With Olive Gray, LEAN CLAY To SANDY CLAY (CL)	17.5	19.0	117.3	143.2	99.0

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Dumbarton Toll Bridge

UNCONSOLIDATED UNDRAINED TEST
(ASTM D2850)

Project No. : 06-159 **Date :** 02/18/07 **Figure No. :**

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

ASTM D2850

Project Name:	Dumbarton Toll Bridge			**Project No:**	06-159
Boring No.:	06-6	**Tested by:**	R.J.	**Date:**	02/18/07
Depth (ft):	70	**Checked by:**		**Date:**	
Sample No.	D-14	**Sample Type:**	R		

Sample Description: Bluish Gray, Fat CLAY (CH/MH)

	1	2	3		
Diameter (in.):	2.365	2.367	2.37	Average:	2.367
Height (in.):	5.047	5.055	5.028	Average:	5.043

Moisture Content Calculation		
Wt. Wet Sample + Container (gms):		198.67
Wt. Dry Sample + Container (gms):		158.01
Container (gms)	No. 6	57.2
Moisture Content (%)		**40.3**

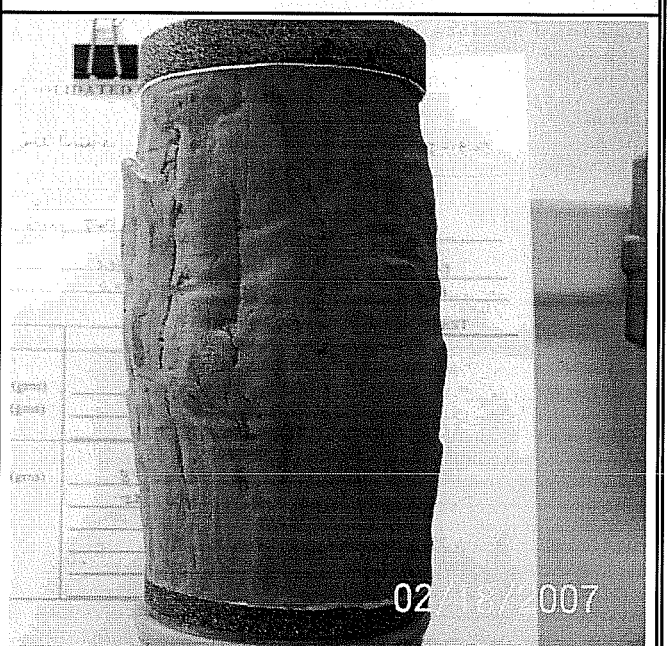
Density and Saturation	
Wt. Wet Sample + Container (gms)	890.91
Container (gms)	228.92
Wet Density (pcf)	**114.4**
Dry Density (pcf)	**81.5**
Void Ratio	**1.067**
% Saturation	**102.1**

Assume Gs=2.70

Test Data Filename:	06159B6D14.trx

SKETCH / PHOTO AFTER TEST:

PHOTO FILE NAME: D:\06-159 Dumbarton\lab\100_3413.JPG



Shear	
Rate of Deformation (% strain / min) =	**1**
Confining Stress (ksf):	**5.62**

Failure Criterion: **criterion 1 is used**

1. the maximum deviator stress within 15% strain
2. the stress at 10% strain for no peak stress.

At Failure	
Deviator Stress (ksf)	**2.58**
Eff. Minor Principal Stress (ksf)=	**5.62**
Eff. Major Principal Stress (ksf)=	**8.20**
Axial Strain (%)=	**14.75**

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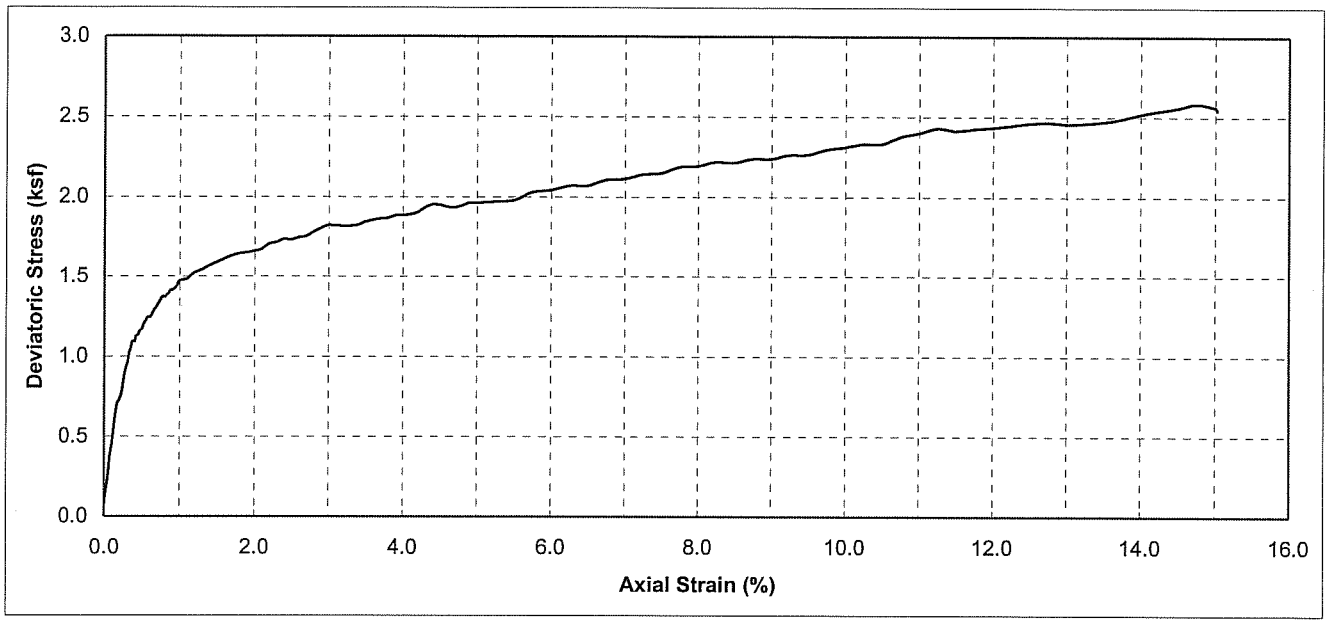
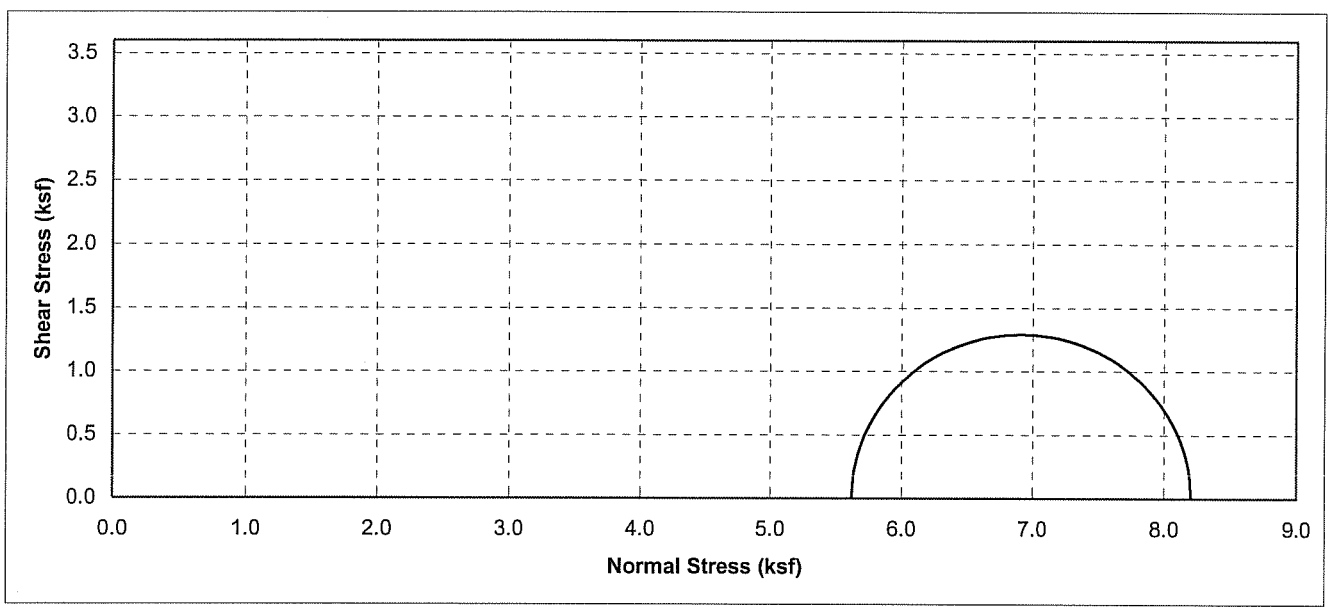
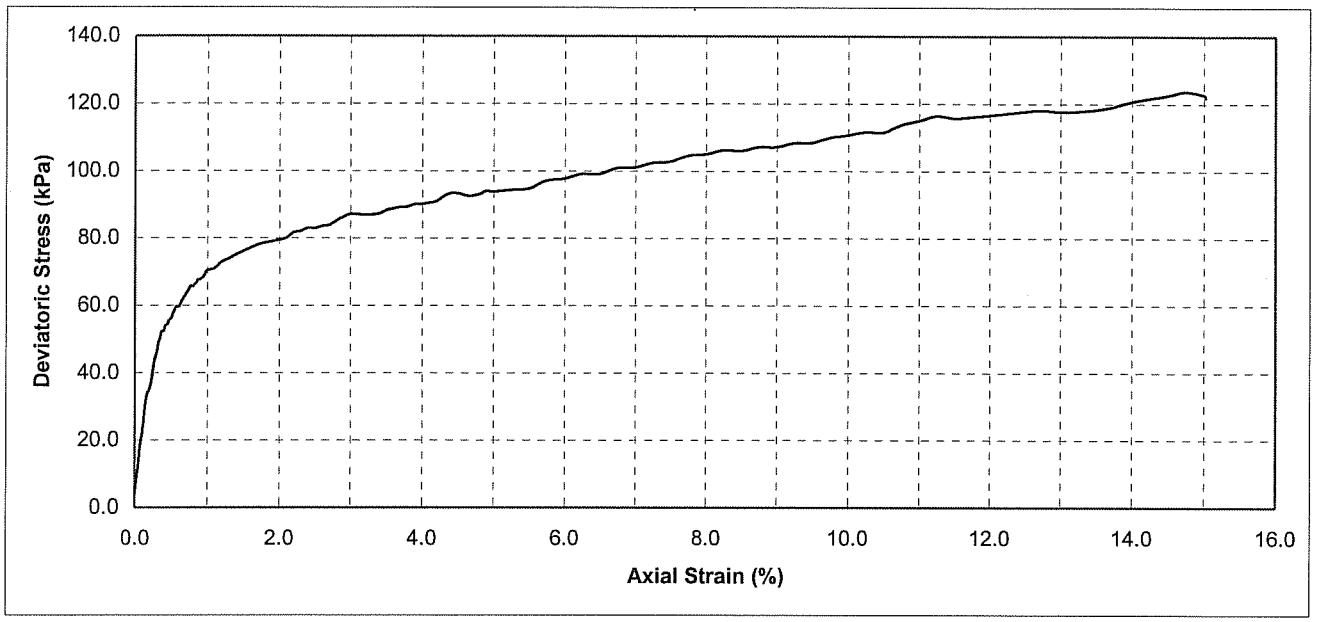
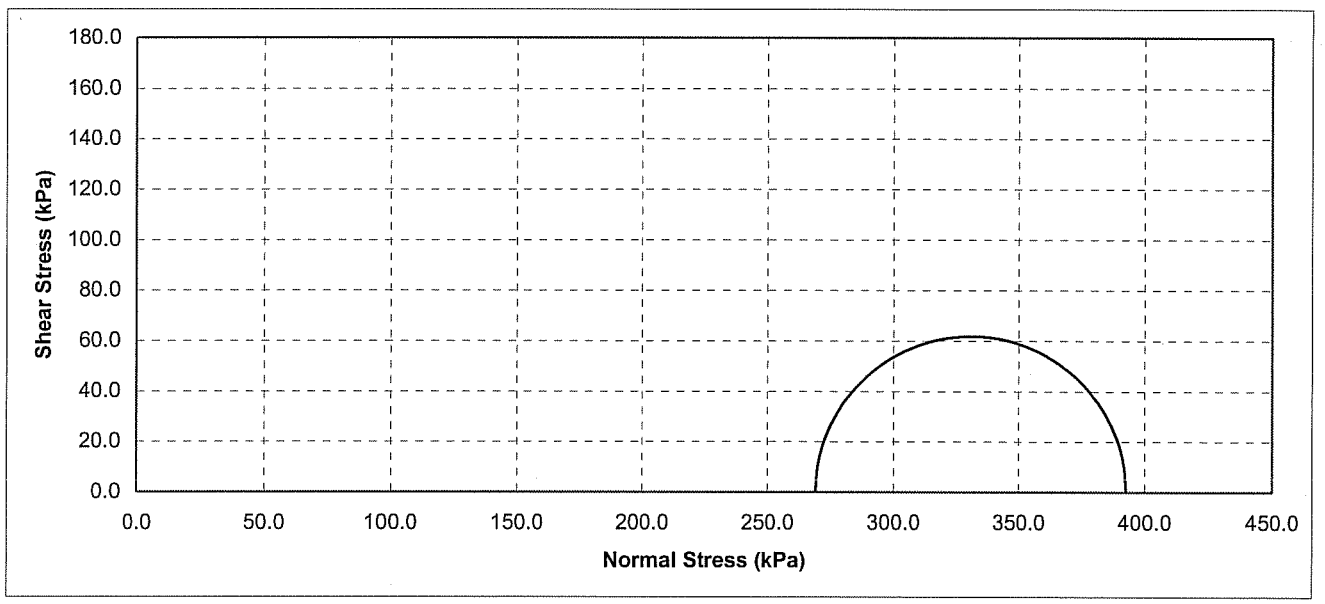




Boring No.	Sample No.	Depth (ft)	Soil Type	Dry Density (pcf)	Moisture Content (%)	Conf. Stress (ksf)	Max. Dev. Stress (ksf)	Initial Saturation (%)
06-6	D-14	70	Bluish Gray, Fat CLAY (CH/MH)	81.5	40.33	5.62	2.58	102.1

Earth Mechanics, Inc. Geotechnical and Earthquake Engineering	**Dumbarton Toll Bridge**
Project No. : 06-159 **Date :** 02/18/07	**UNCONSOLIDATED UNDRAINED TEST** **(ASTM D2850)** Figure No. :





Boring No.	Sample No.	Depth (m)	Soil Type	Dry Density (kN/m^3)	Moisture Content (%)	Conf. Stress (kPa)	Max. Dev. Stress (kPa)	Initial Saturation (%)
06-6	D-14	21.34	Bluish Gray, Fat CLAY (CH/MH)	12.8	40.3	269.1	123.7	102.1

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Geotechnical and Earthquake Engineering

Dumbarton Toll Bridge

UNCONSOLIDATED UNDRAINED TEST
(ASTM D2850)

Project No. : 06-159 **Date :** 02/18/07

Figure No. :

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

ASTM D2850

Project Name:	Dumbarton Toll Bridge			**Project No:**	06-159
Boring No.:	06-6	**Tested by:**	R.J.	**Date:**	02/18/07
Depth (ft):	85	**Checked by:**		**Date:**	
Sample No.	D-17	**Sample Type:**	R		

Sample Description: Bluish Gray, FAT CLAY (CH) With Shell Fragment

	1	2	3		
Diameter (in.):	2.417	2.418	2.42	Average:	2.418
Height (in.):	5.015	5.013	4.990	Average:	5.006

Moisture Content Calculation	
Wt. Wet Sample + Container (gms):	197.65
Wt. Dry Sample + Container (gms):	155.99
Container (gms) No. 7	58.9
Moisture Content (%)	**42.9**

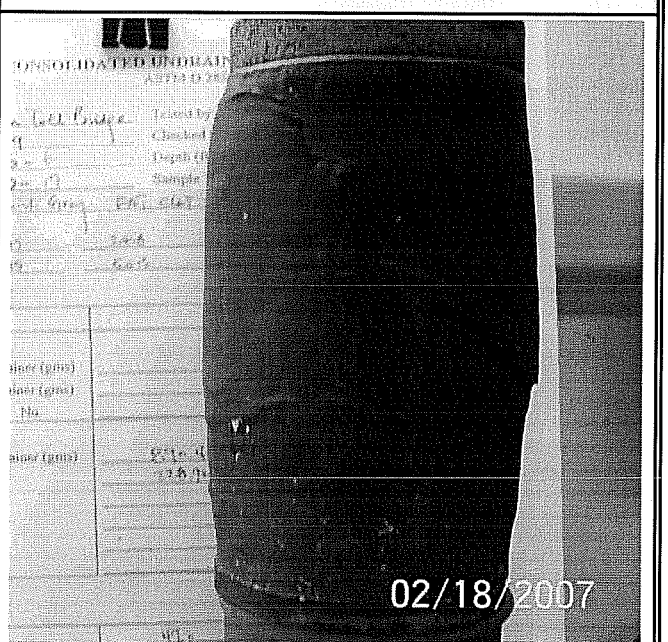
Density and Saturation	
Wt. Wet Sample + Container (gms)	890.4
Container (gms)	228.92
Wet Density (pcf)	**109.5**
Dry Density (pcf)	**76.6**
Void Ratio	**1.198**
% Saturation	**96.7**

Assume Gs=2.70

Test Data Filename:	06159B6D17.trx

SKETCH / PHOTO AFTER TEST:

PHOTO FILE NAME: D:\06-159 Dumbarton\lab\100_3414.JPG



Shear	
Rate of Deformation (% strain / min) =	**1**
Confining Stress (ksf):	**6.77**

Failure Criterion: **criterion 2 is used**

1. the maximum deviator stress within 15% strain
2. the stress at 10% strain for no peak stress.

At Failure	
Deviator Stress (ksf)	**3.11**
Eff. Minor Principal Stress (ksf)=	**6.77**
Eff. Major Principal Stress (ksf)=	**9.88**
Axial Strain (%)=	**9.99**

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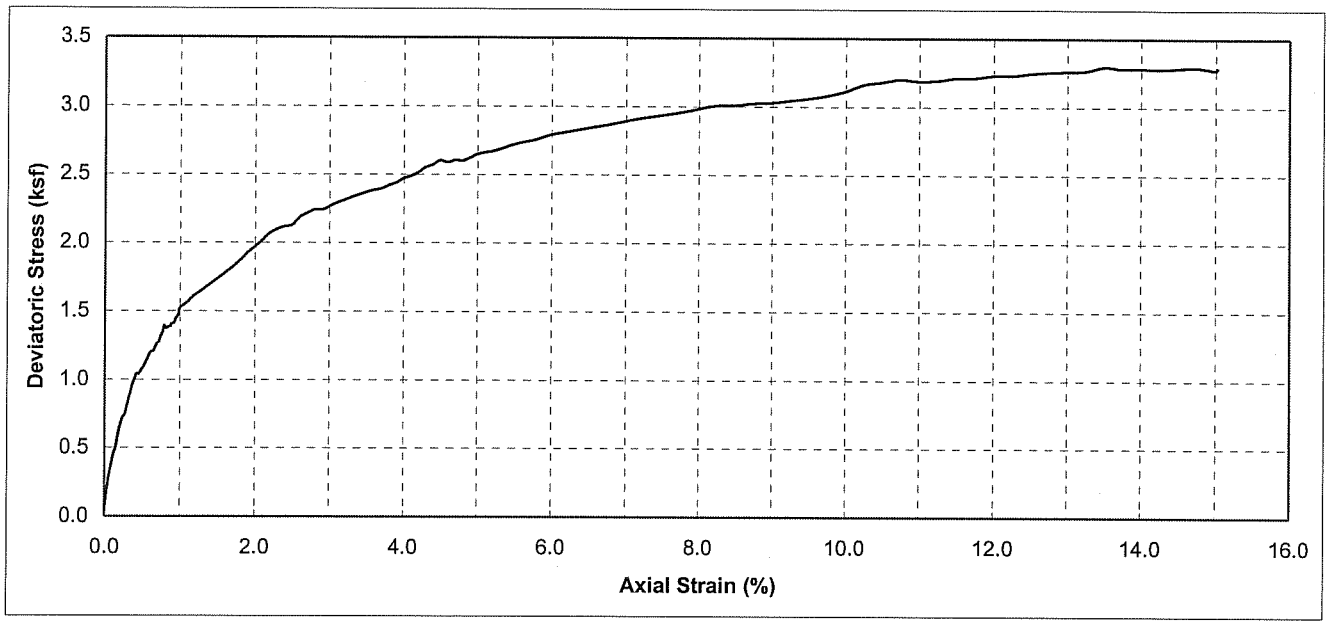
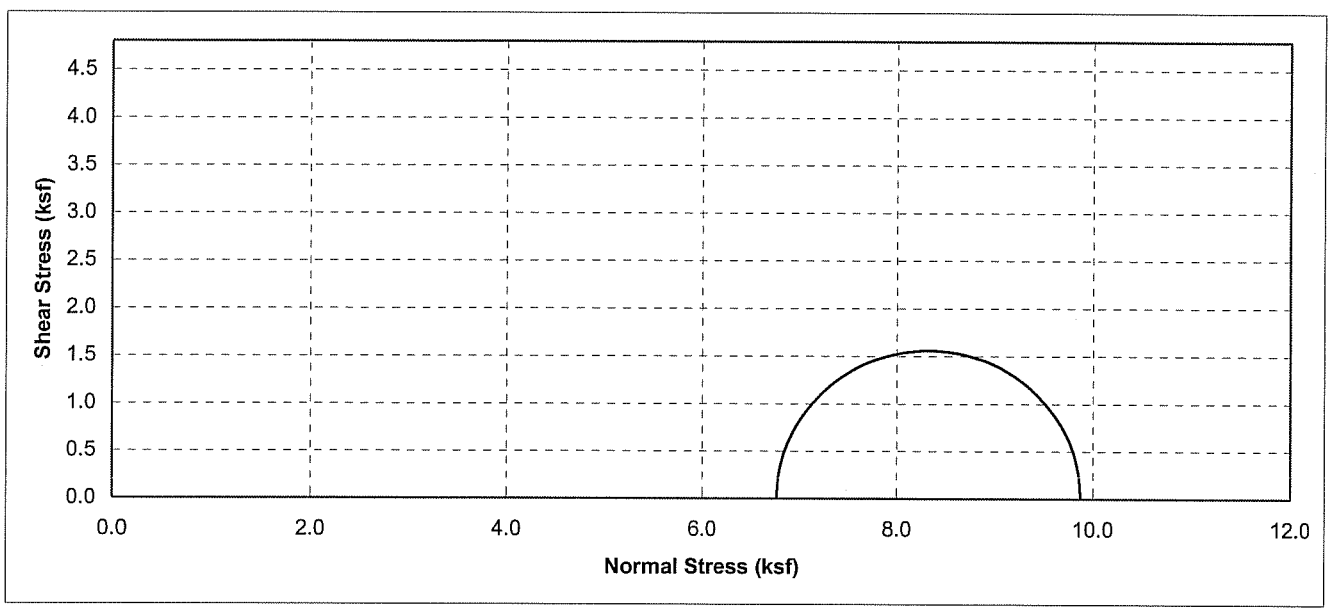
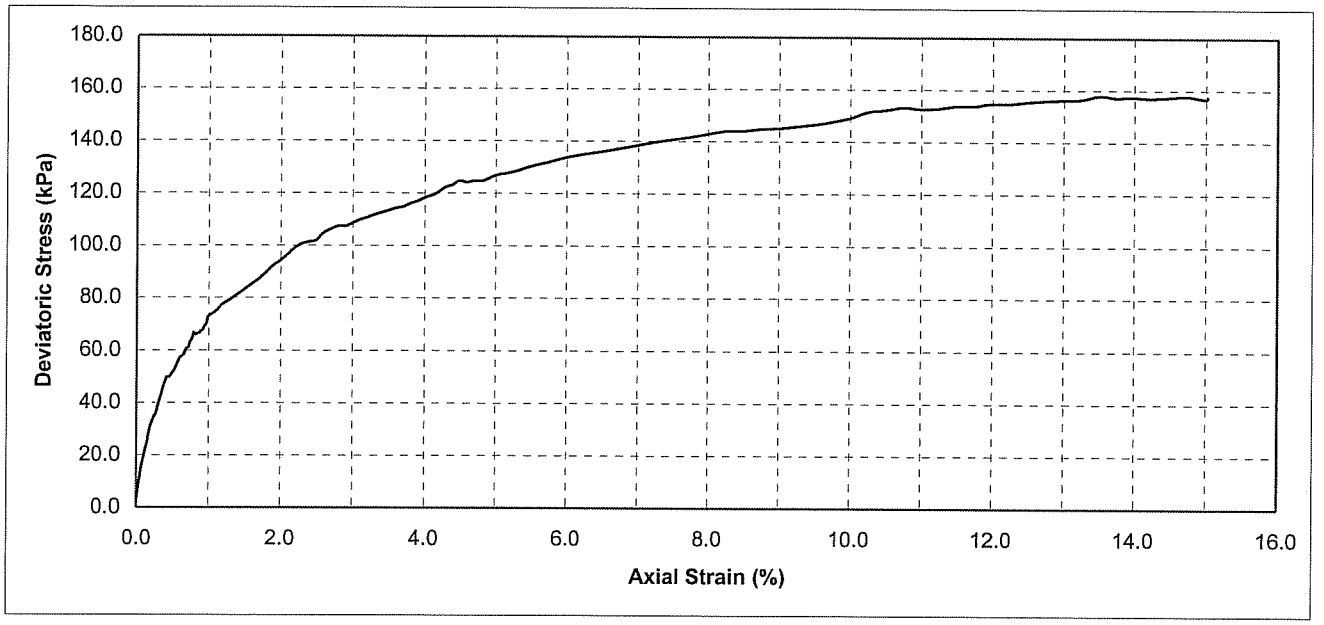
Geotechnical and Earthquake Engineering

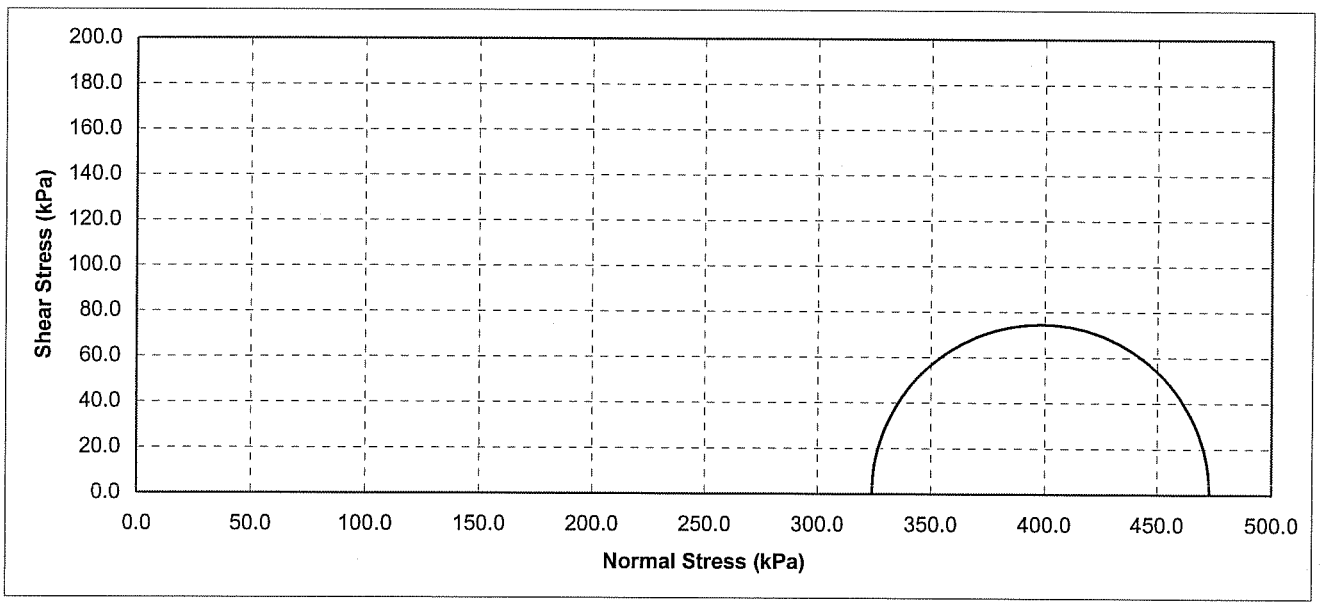




Boring No.	Sample No.	Depth (ft)	Soil Type	Dry Density (pcf)	Moisture Content (%)	Conf. Stress (ksf)	Max. Dev. Stress (ksf)	Initial Saturation (%)
06-6	D-17	85	Bluish Gray, FAT CLAY (CH) With Shell Fragment	76.6	42.91	6.77	3.11	96.7

Earth Mechanics, Inc. Geotechnical and Earthquake Engineering	**Dumbarton Toll Bridge**
Project No. : 06-159 **Date :** 02/18/07	**UNCONSOLIDATED UNDRAINED TEST** **(ASTM D2850)** Figure No. :





Boring No.	Sample No.	Depth (m)	Soil Type	Dry Density (kN/m^3)	Moisture Content (%)	Conf. Stress (kPa)	Max. Dev. Stress (kPa)	Initial Saturation (%)
06-6	D-17	25.91	Bluish Gray, FAT CLAY (CH) With Shell Fragment	12.0	42.9	324.0	148.9	96.7

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

Dumbarton Toll Bridge

UNCONSOLIDATED UNDRAINED TEST
(ASTM D2850)

Project No. : 06-159 **Date :** 02/18/07 **Figure No. :**

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

ASTM D2850

Project Name:	Dumbarton Toll Bridge			**Project No:**	06-159
Boring No.:	06-8	**Tested by:**	R.J.	**Date:**	02/18/07
Depth (ft):	15	**Checked by:**		**Date:**	
Sample No.	D-2	**Sample Type:**	R		

Sample Description: Dark Gray, Elastic SILT (MH)

	1	2	3		
Diameter (in.):	2.445	2.432	2.419	Average:	2.432
Height (in.):	4.943	4.872	4.423	Average:	4.746

Moisture Content Calculation	
Wt. Wet Sample + Container (gms):	176.83
Wt. Dry Sample + Container (gms):	131.32
Container (gms) No.	57.46
Moisture Content (%)	**61.6**

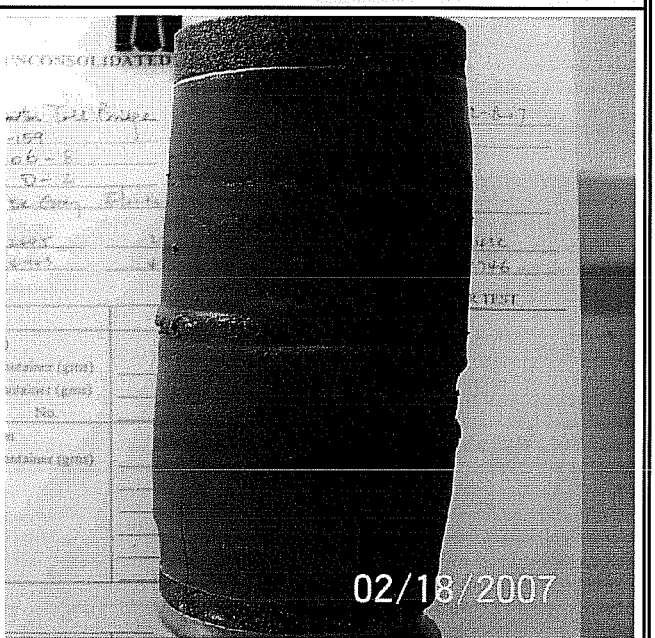
Density and Saturation	
Wt. Wet Sample + Container (gms)	825.28
Container (gms)	228.92
Wet Density (pcf)	**103.0**
Dry Density (pcf)	**63.7**
Void Ratio	**1.645**
% Saturation	**101.1**

Assume Gs=2.70

Test Data Filename:	06159B8D2.trx

SKETCH / PHOTO AFTER TEST:

PHOTO FILE NAME: D:\06-159 Dumbarton\lab\100_3415.JPG



Shear	
Rate of Deformation (% strain / min) =	**1**
Confining Stress (ksf):	**1.15**

Failure Criterion: **criterion 2 is used**

1. the maximum deviator stress within 15% strain
2. the stress at 10% strain for no peak stress.

At Failure	
Deviator Stress (ksf)	**0.41**
Eff. Minor Principal Stress (ksf)=	**1.15**
Eff. Major Principal Stress (ksf)=	**1.56**
Axial Strain (%)=	**10.00**

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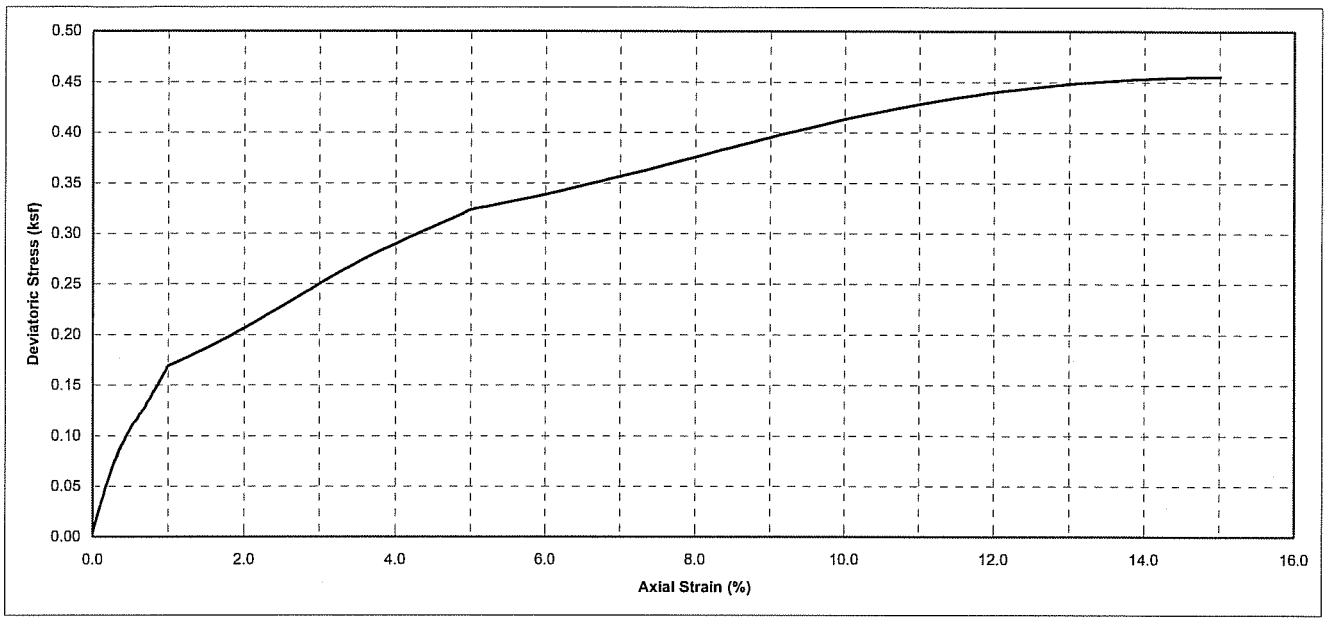
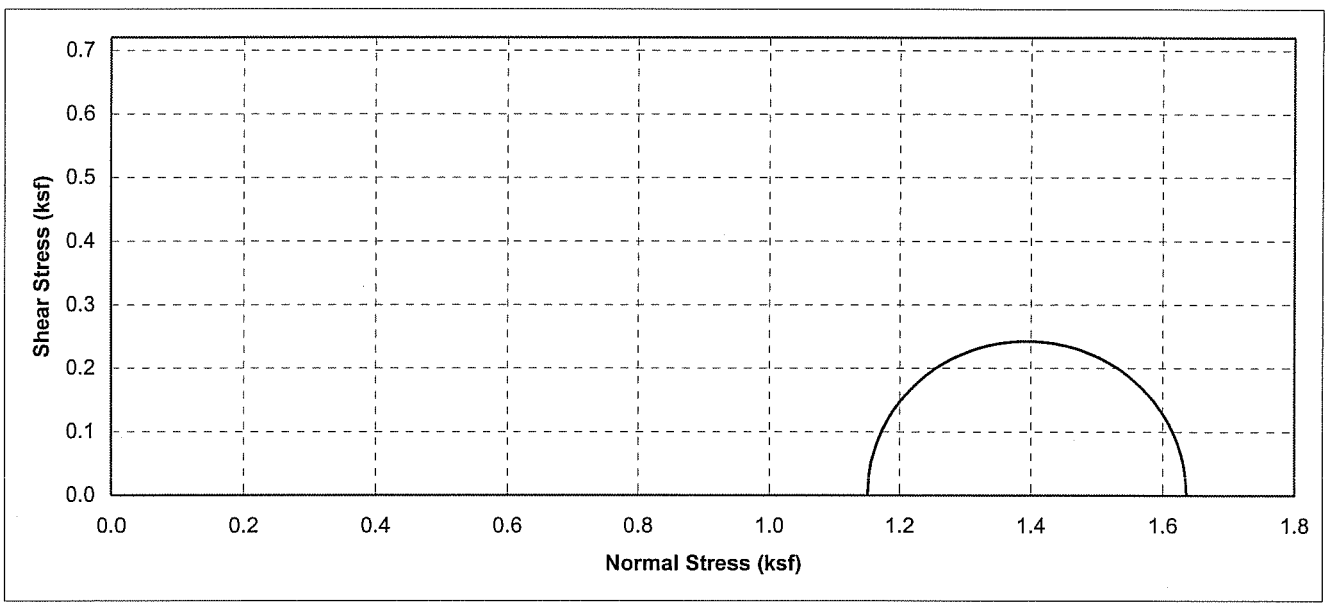




Boring No.	Sample No.	Depth (ft)	Soil Type	Dry Density (pcf)	Moisture Content (%)	Conf. Stress (ksf)	Max. Dev. Stress (ksf)	Initial Saturation (%)
06-8	D-2	15	Dark Gray, Elastic SILT (MH)	63.7	61.62	1.15	0.41	101.1

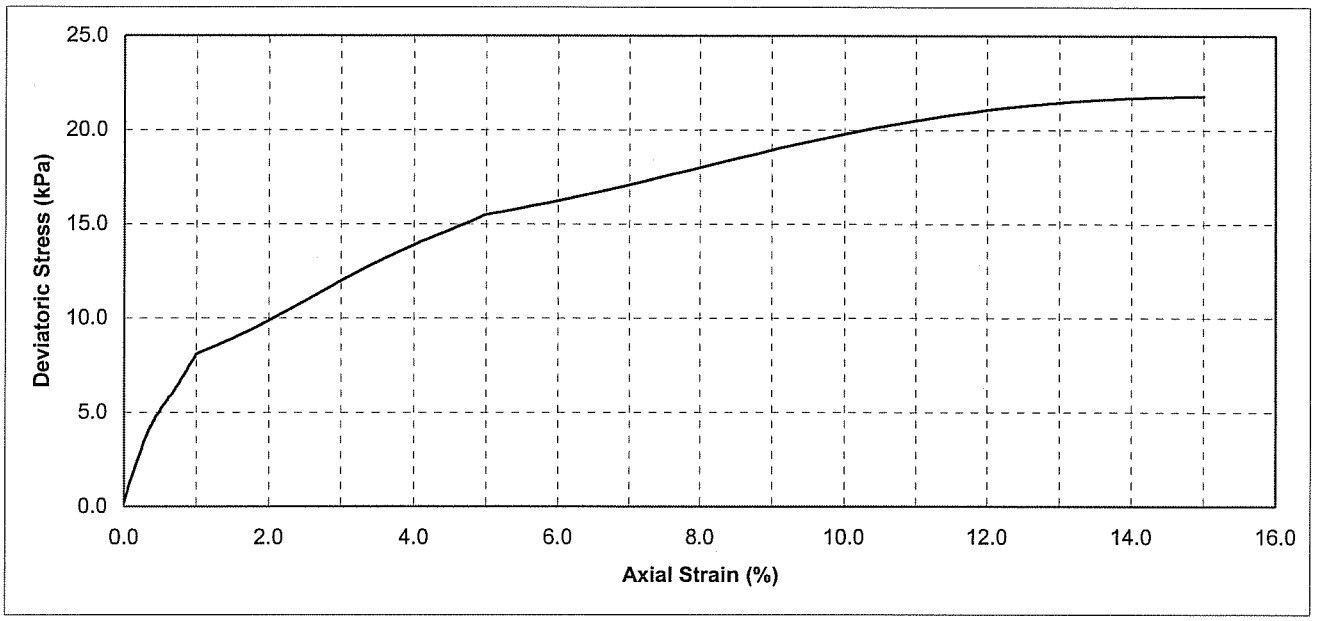
Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

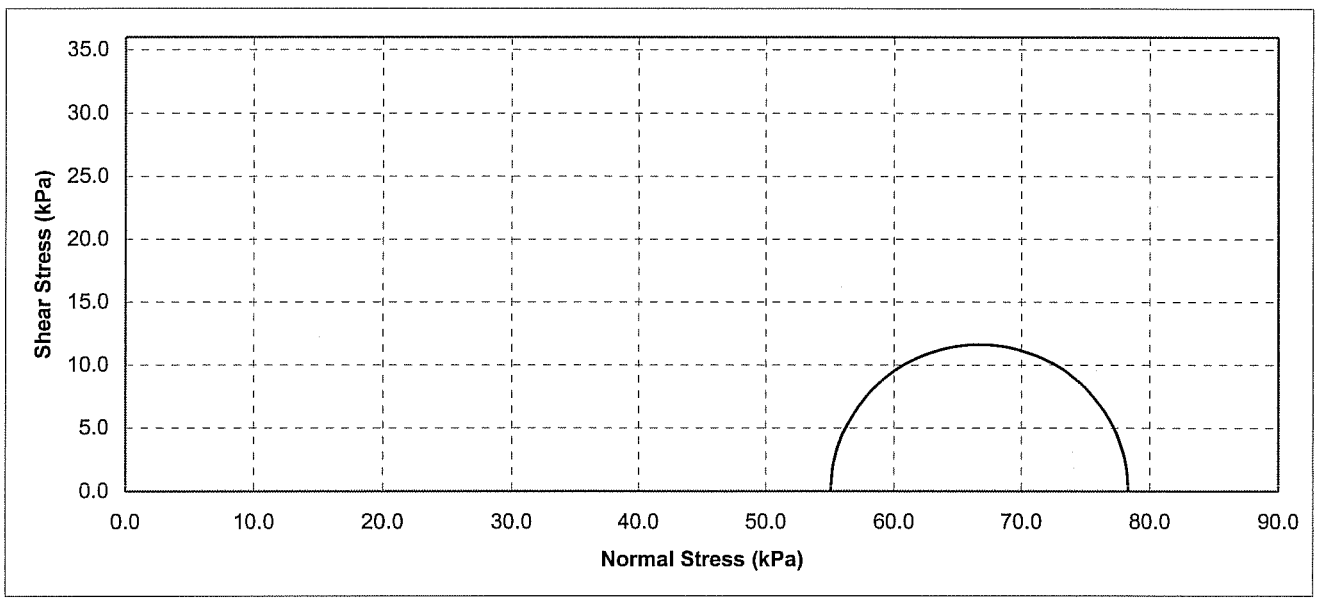
Dumbarton Toll Bridge

UNCONSOLIDATED UNDRAINED TEST
(ASTM D2850)

Project No. : 06-159 **Date :** 02/18/07

Figure No. :





Boring No.	Sample No.	Depth (m)	Soil Type	Dry Density (kN/m^3)	Moisture Content (%)	Conf. Stress (kPa)	Max. Dev. Stress (kPa)	Initial Saturation (%)
06-8	D-2	4.57	Dark Gray, Elastic SILT (MH)	10.0	61.6	55.1	19.8	101.1

Earth Mechanics, Inc. Geotechnical and Earthquake Engineering	**Dumbarton Toll Bridge**
	UNCONSOLIDATED UNDRAINED TEST
Project No. : 06-159 **Date :** 02/18/07	**(ASTM D2850)** Figure No. :

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

ASTM D2850

Project Name:	Dumbarton Toll Bridge			**Project No:**	06-159
Boring No.:	06-8	**Tested by:**	R.J.	**Date:**	02/18/07
Depth (ft):	88	**Checked by:**		**Date:**	
Sample No.	D-16	**Sample Type:**	R		

Sample Description: Olive Brown, SANDY SILT to SILT (ML)

	1	2	3		
Diameter (in.):	2.405	2.413	2.42	Average:	2.413
Height (in.):	4.941	4.938	4.933	Average:	4.937

Moisture Content Calculation	
Wt. Wet Sample + Container (gms):	161.57
Wt. Dry Sample + Container (gms):	141.66
Container (gms) No. 9	57.65
Moisture Content (%)	**23.7**

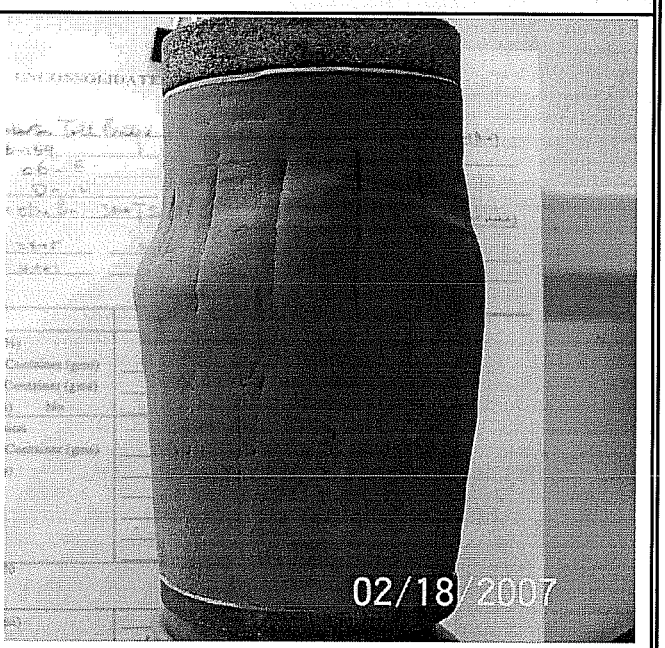
Density and Saturation	
Wt. Wet Sample + Container (gms)	991.26
Container (gms)	228.92
Wet Density (pcf)	**128.5**
Dry Density (pcf)	**103.9**
Void Ratio	**0.622**
% Saturation	**102.9**

Assume Gs=2.70

Test Data Filename:	06159B8D16.trx

SKETCH / PHOTO AFTER TEST:

PHOTO FILE NAME: D:\06-159 Dumbarton\lab\100_3416.JPG



Shear	
Rate of Deformation (% strain / min) =	**1**
Confining Stress (ksf):	**7.06**

Failure Criterion: **criterion 2 is used**

1. the maximum deviator stress within 15% strain
2. the stress at 10% strain for no peak stress.

At Failure	
Deviator Stress (ksf)	**3.65**
Eff. Minor Principal Stress (ksf)=	**7.06**
Eff. Major Principal Stress (ksf)=	**10.71**
Axial Strain (%)=	**10.01**

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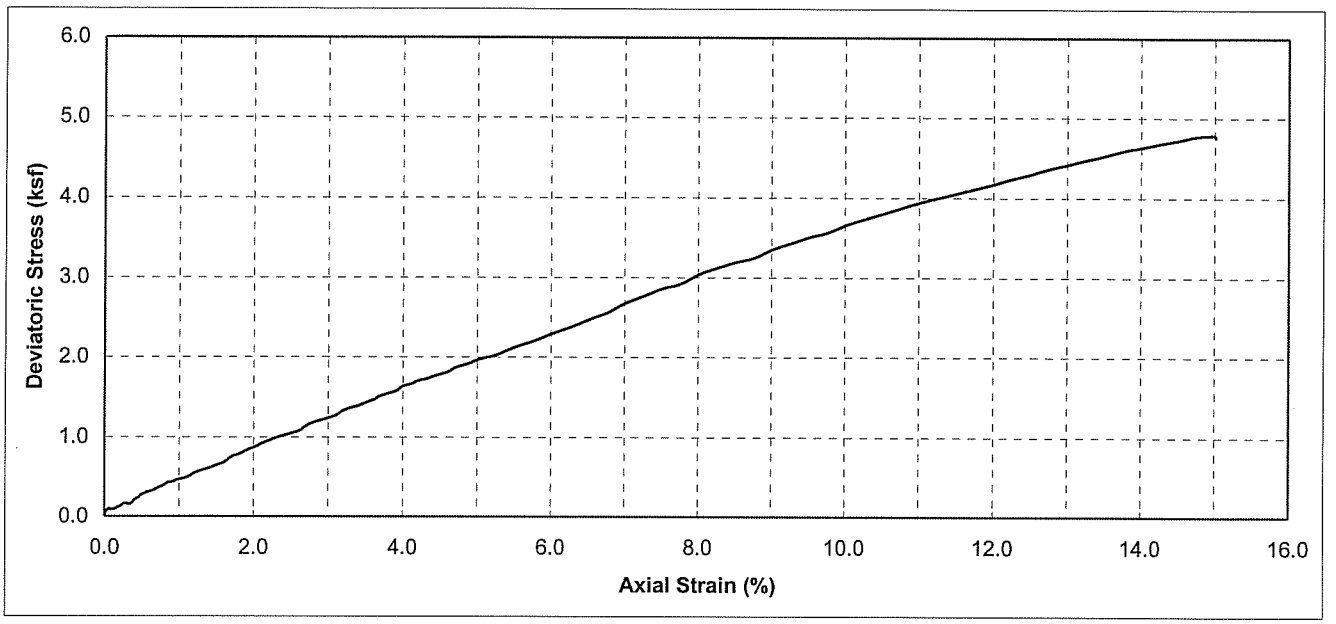
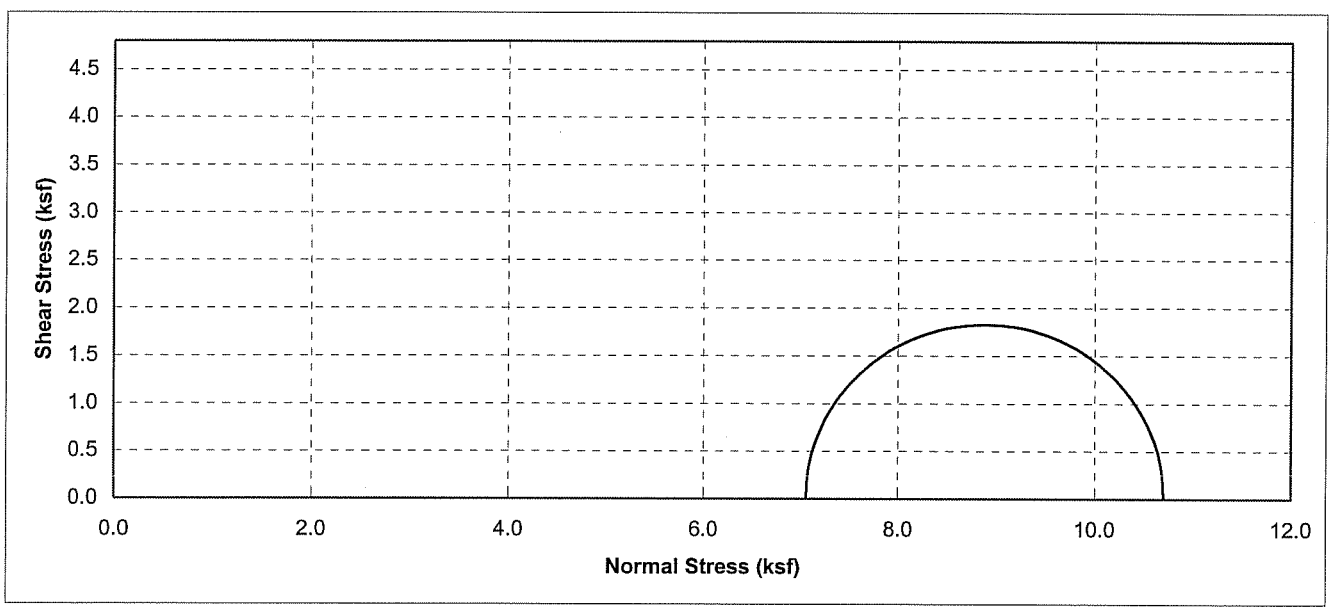
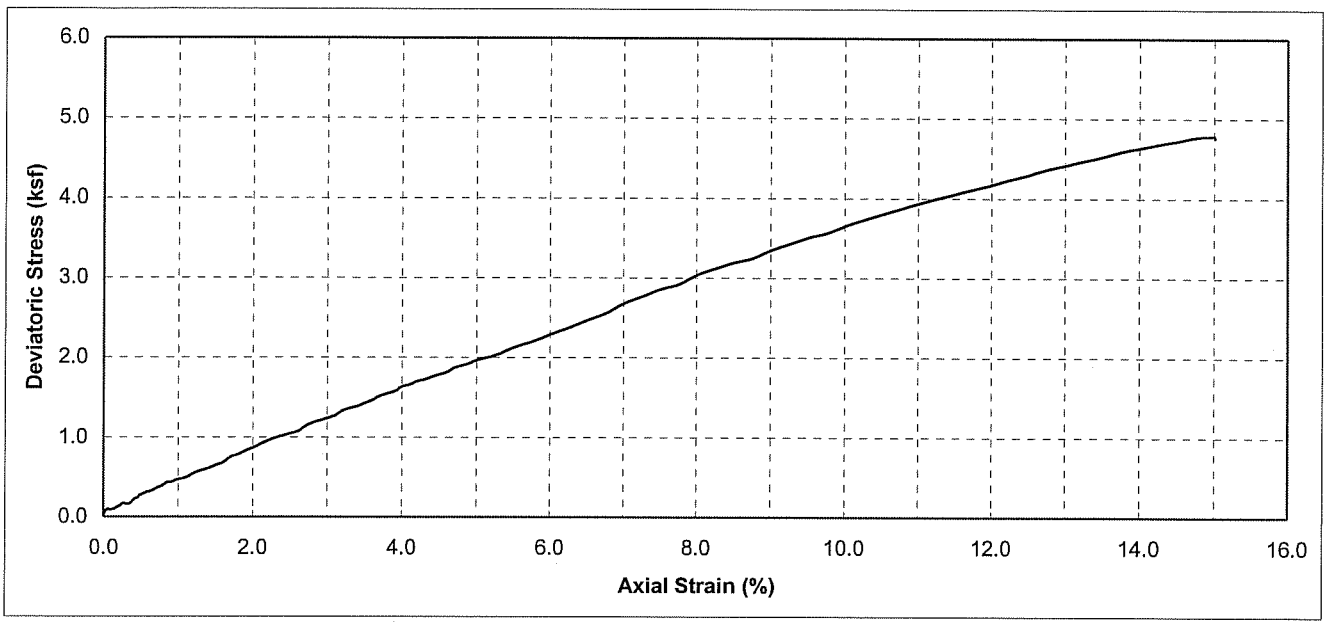
Geotechnical and Earthquake Engineering

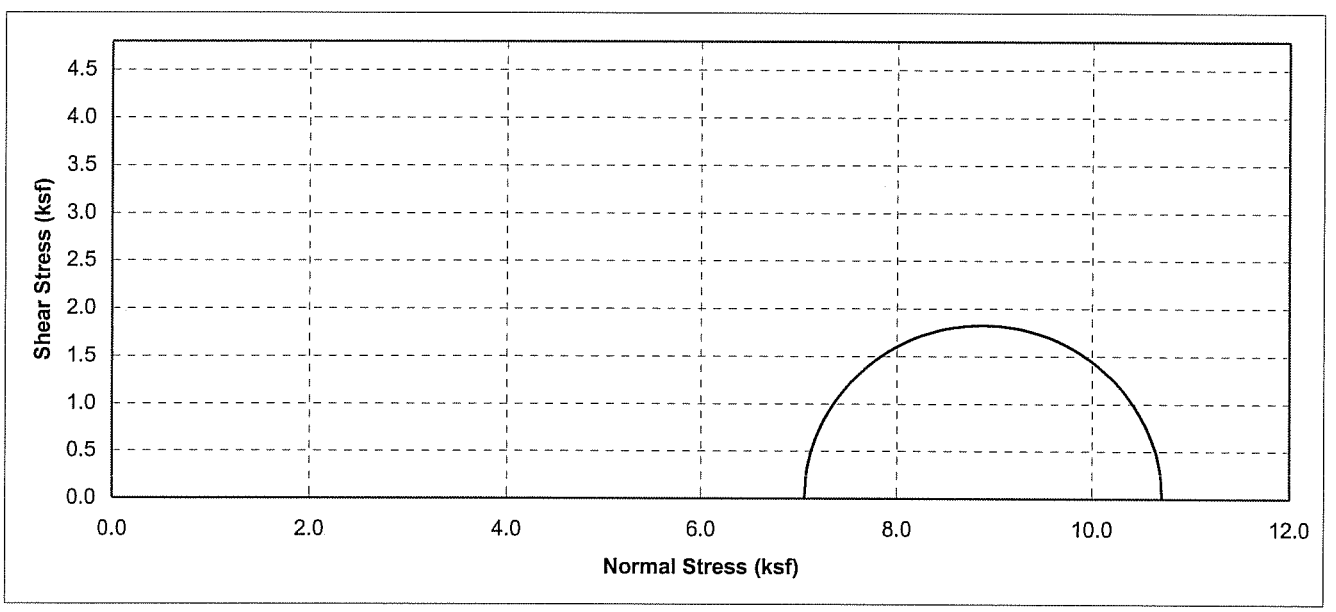




Boring No.	Sample No.	Depth (ft)	Soil Type	Dry Density (pcf)	Moisture Content (%)	Conf. Stress (ksf)	Max. Dev. Stress (ksf)	Initial Saturation (%)
06-8	D-16	88	Olive Brown, SANDY SILT to SILT (ML)	103.9	23.70	7.06	3.65	102.9

Earth Mechanics, Inc. Geotechnical and Earthquake Engineering	**Dumbarton Toll Bridge**
Project No. : 06-159 **Date :** 02/18/07	**UNCONSOLIDATED UNDRAINED TEST** **(ASTM D2850)** Figure No. :





Boring No.	Sample No.	Depth (ft)	Soil Type	Dry Density (pcf)	Moisture Content (%)	Conf. Stress (ksf)	Max. Dev. Stress (ksf)	Initial Saturation (%)
06-8	D-16	88	Olive Brown, SANDY SILT to SILT (ML)	103.9	23.70	7.06	3.65	102.9

Earth Mechanics, Inc. Geotechnical and Earthquake Engineering	**Dumbarton Toll Bridge**
Project No. : 06-159 **Date :** 02/18/07	**UNCONSOLIDATED UNDRAINED TEST** **(ASTM D2850)** Figure No. :

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

ASTM D2850

Project Name:	Dumbarton Toll Bridge			**Project No:**	06-159
Boring No.:	06-9	**Tested by:**	R.J.	**Date:**	02/28/07
Depth (ft):	25	**Checked by:**		**Date:**	
Sample No.	D-5	**Sample Type:**	R		

Sample Description: Dark Gray, FAT CLAY (CH)

	1	2	3		
Diameter (in.):	2.41	2.409	2.407	Average:	2.409
Height (in.):	4.955	4.991	4.956	Average:	4.967

Moisture Content Calculation		
Wt. Wet Sample + Container (gms):		164.17
Wt. Dry Sample + Container (gms):		118.81
Container (gms)	No. 14	56.89
Moisture Content (%)		**73.3**

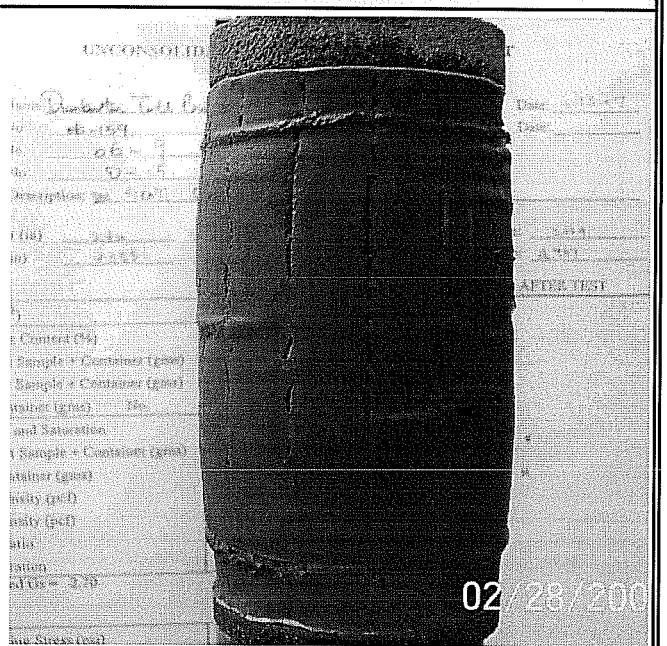
Density and Saturation	
Wt. Wet Sample + Container (gms)	799.5
Container (gms)	228.92
Wet Density (pcf)	**95.9**
Dry Density (pcf)	**55.4**
Void Ratio	**2.043**
% Saturation	**96.8**

Assume Gs=2.70

Test Data Filename:	

SKETCH / PHOTO AFTER TEST:

PHOTO FILE NAME: D:\06-159 Dumbarton\lab\100_3470.JPG



Shear	
Rate of Deformation (% strain / min) =	**1**
Confining Stress (ksf):	**7.20**

Failure Criterion: **criterion 1 is used**

1. the maximum deviator stress within 15% strain
2. the stress at 10% strain for no peak stress.

At Failure	
Deviator Stress (ksf)	**0.00**
Eff. Minor Principal Stress (ksf)=	**7.20**
Eff. Major Principal Stress (ksf)=	**7.20**
Axial Strain (%)=	**0.00**

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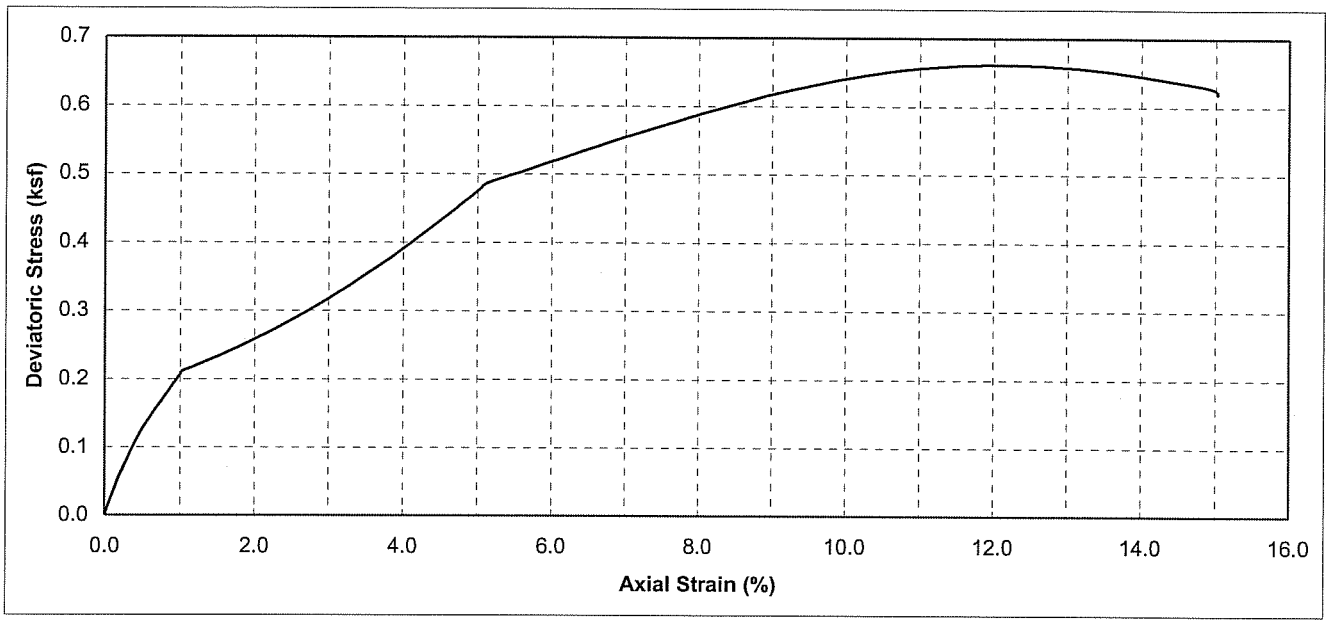
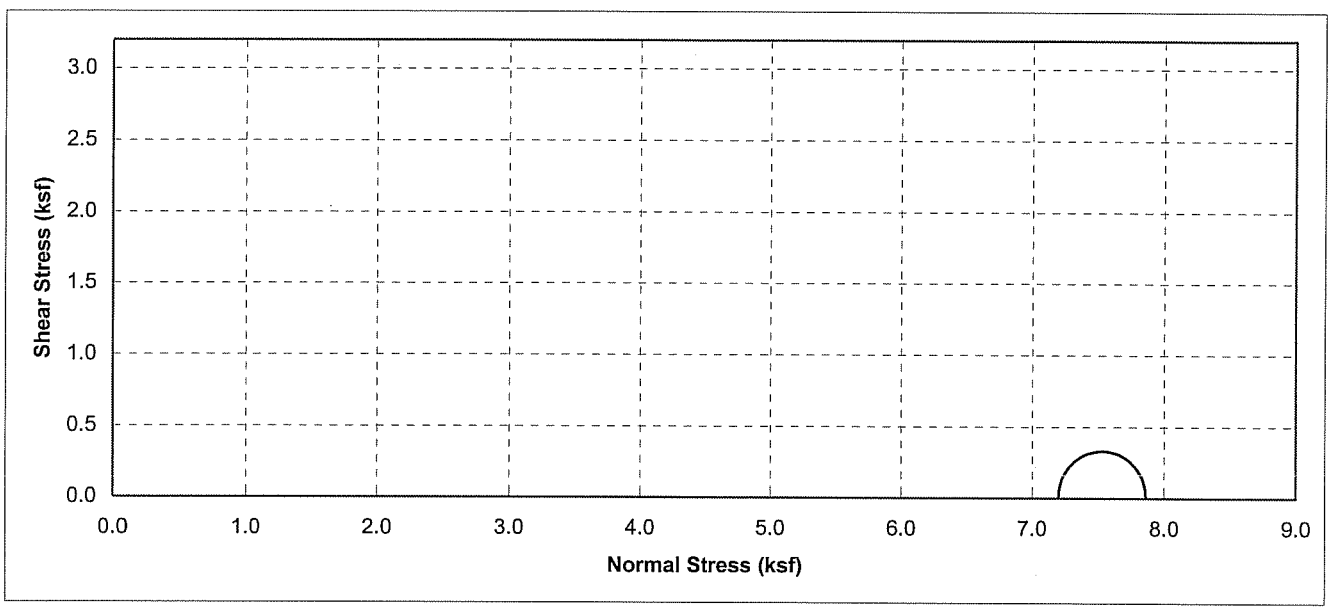
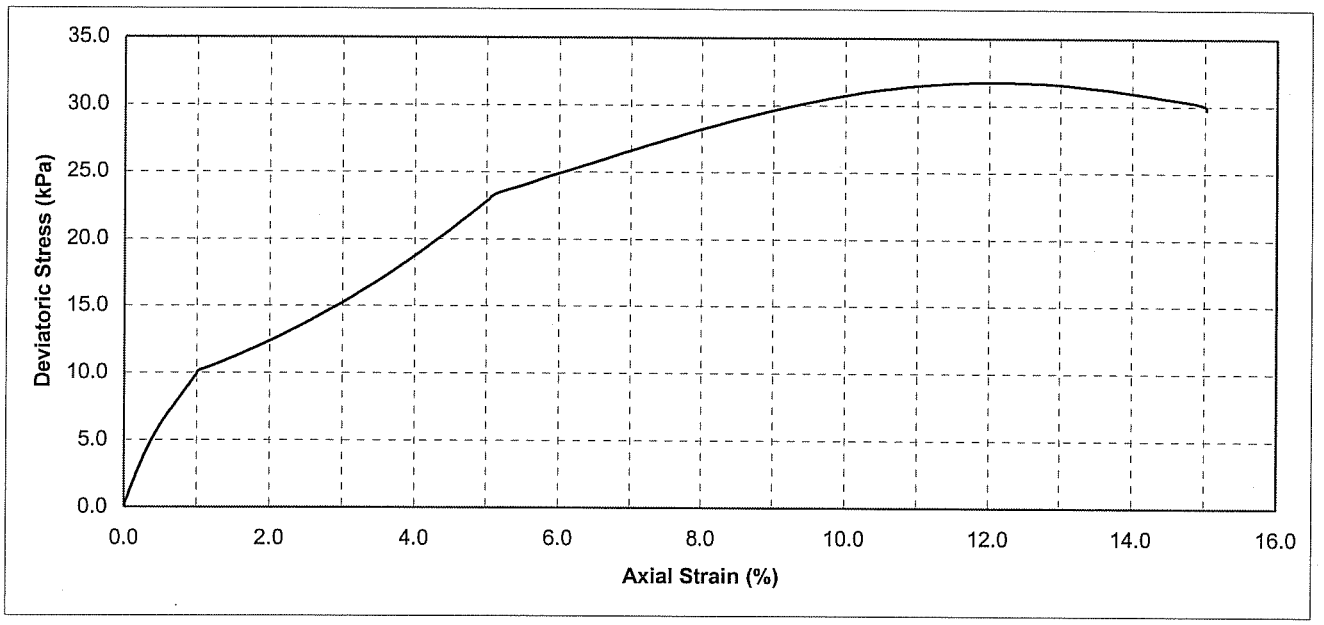
Geotechnical and Earthquake Engineering

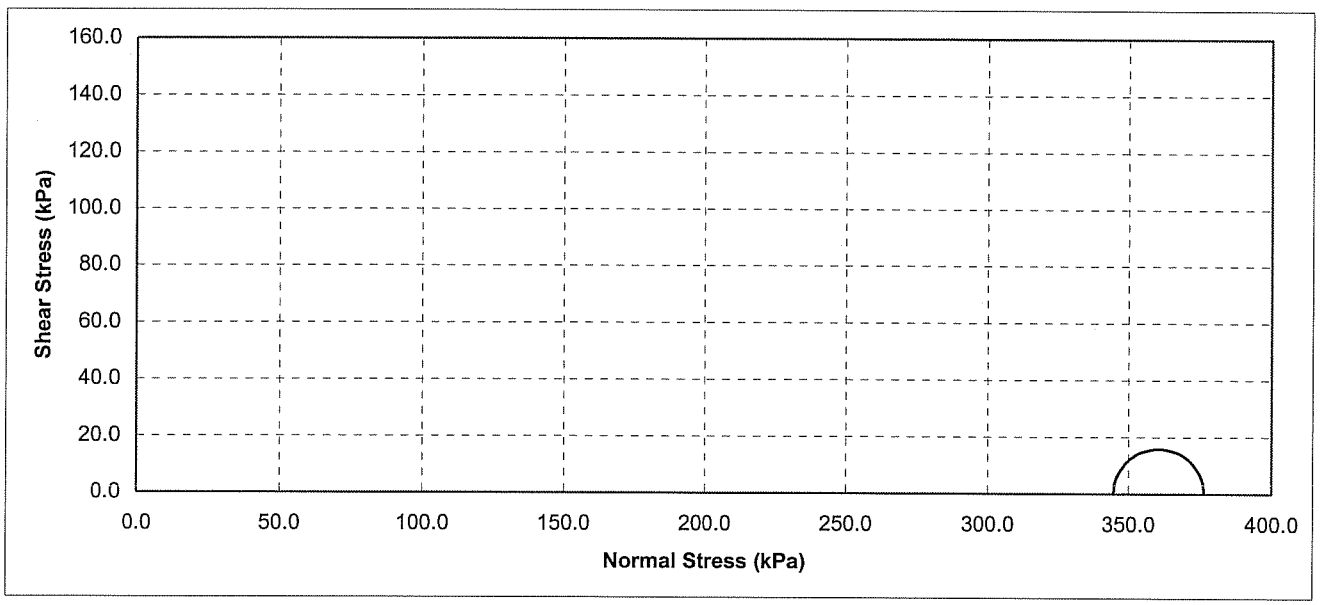




Boring No.	Sample No.	Depth (ft)	Soil Type	Dry Density (pcf)	Moisture Content (%)	Conf. Stress (ksf)	Max. Dev. Stress (ksf)	Initial Saturation (%)
06-9	D-5	25	Dark Gray, FAT CLAY (CH)	55.4	73.26	7.20	0.00	96.8

Earth Mechanics, Inc. Geotechnical and Earthquake Engineering	**Dumbarton Toll Bridge**
Project No. : 06-159 **Date :** 02/28/07	**UNCONSOLIDATED UNDRAINED TEST** **(ASTM D2850)** Figure No. :





Boring No.	Sample No.	Depth (m)	Soil Type	Dry Density (kN/m^3)	Moisture Content (%)	Conf. Stress (kPa)	Max. Dev. Stress (kPa)	Initial Saturation (%)
06-9	D-5	7.62	Dark Gray, FAT CLAY (CH)	8.7	73.3	344.8	0.0	96.8

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

Dumbarton Toll Bridge

UNCONSOLIDATED UNDRAINED TEST
(ASTM D2850)

Project No. : 06-159 **Date :** 02/28/07

Figure No. :

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

ASTM D2850

Project Name:	Dumbarton Toll Bridge			**Project No:**	06-159
Boring No.:	06-9	**Tested by:**	R.J.	**Date:**	02/28/07
Depth (ft):	85	**Checked by:**		**Date:**	
Sample No.	D-17	**Sample Type:**	R		

Sample Description: Olive Brown, LEAN CLAY (CL)

	1	2	3		
Diameter (in.):	2.316	2.313	2.312	Average:	2.314
Height (in.):	5.053	5.043	5.065	Average:	5.054

Moisture Content Calculation		
Wt. Wet Sample + Container (gms):		210.69
Wt. Dry Sample + Container (gms):		182.24
Container (gms)	No. 15	57.15
Moisture Content (%)		**22.7**

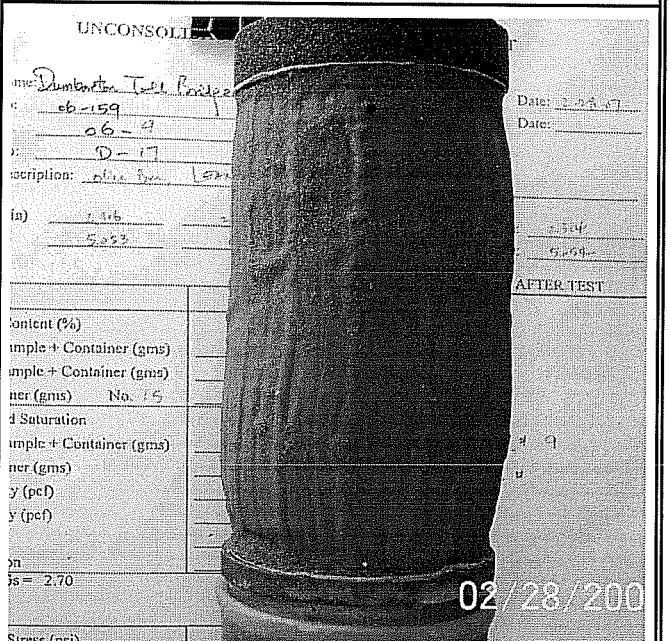
Density and Saturation	
Wt. Wet Sample + Container (gms)	923.85
Container (gms)	228.92
Wet Density (pcf)	**124.4**
Dry Density (pcf)	**101.4**
Void Ratio	**0.662**
% Saturation	**92.8**

Assume Gs=2.70

Test Data Filename:	06159B9D17.xls

SKETCH / PHOTO AFTER TEST:

PHOTO FILE NAME: D:\06-159 Dumbarton\lab\100_3471.JPG



Shear	
Rate of Deformation (% strain / min) =	**1**
Confining Stress (ksf):	**7.20**

Failure Criterion: **criterion 2 is used**

1. the maximum deviator stress within 15% strain
2. the stress at 10% strain for no peak stress.

At Failure	
Deviator Stress (ksf)	**3.29**
Eff. Minor Principal Stress (ksf)=	**7.20**
Eff. Major Principal Stress (ksf)=	**10.49**
Axial Strain (%)=	**9.90**

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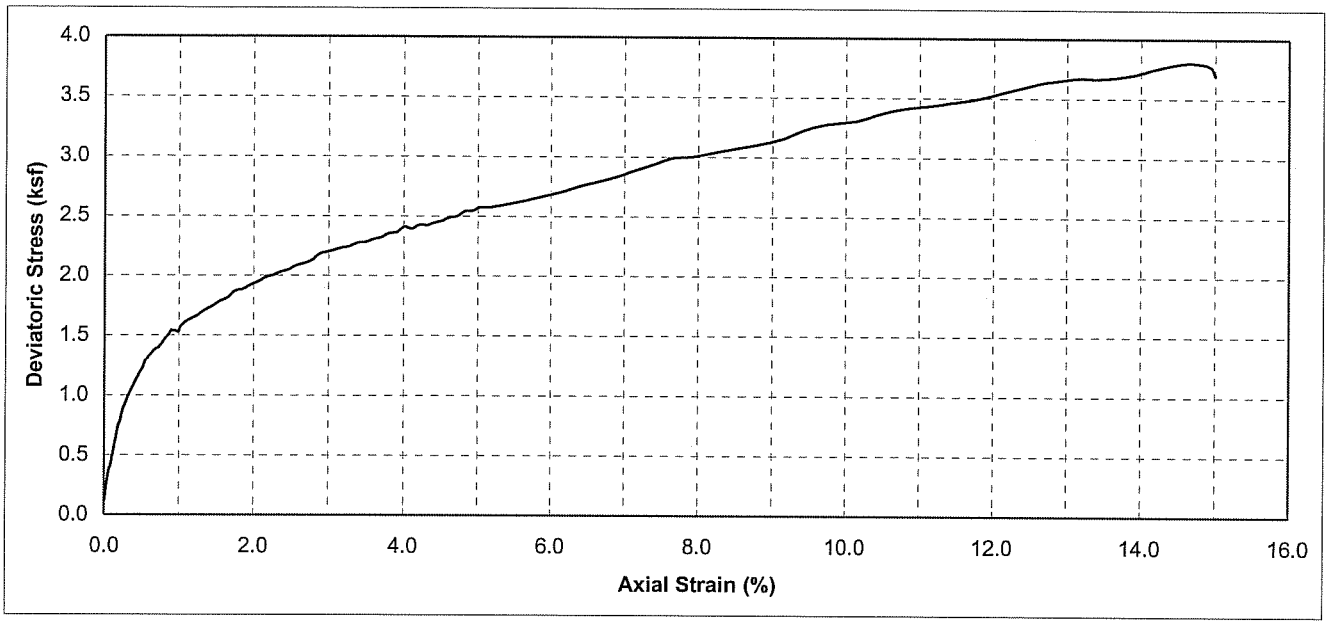

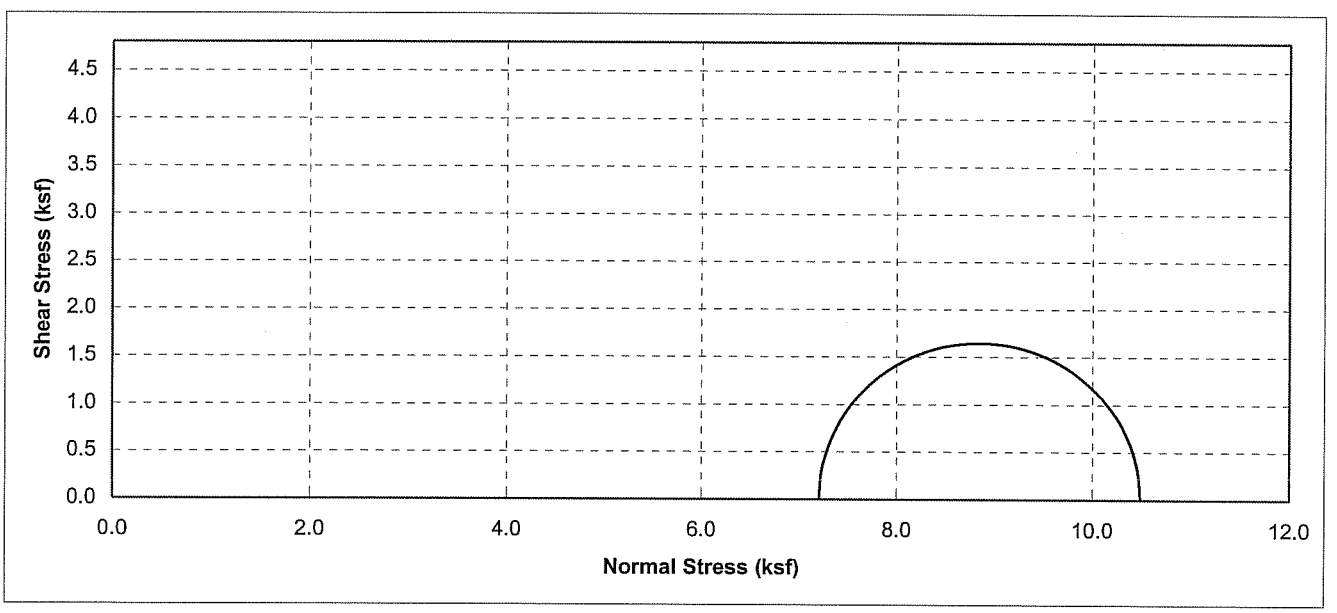

Boring No.	Sample No.	Depth (ft)	Soil Type	Dry Density (pcf)	Moisture Content (%)	Conf. Stress (ksf)	Max. Dev. Stress (ksf)	Initial Saturation (%)
06-9	D-17	85	Olive Brown, LEAN CLAY (CL)	101.4	22.74	7.20	3.29	92.8

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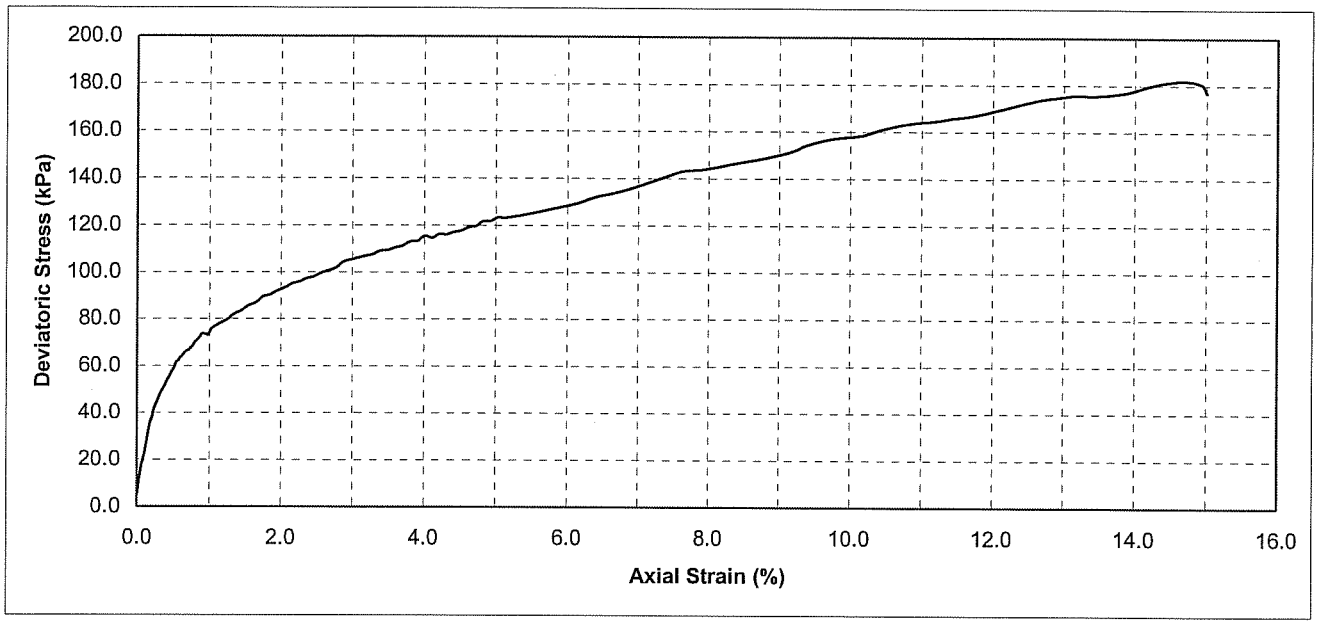
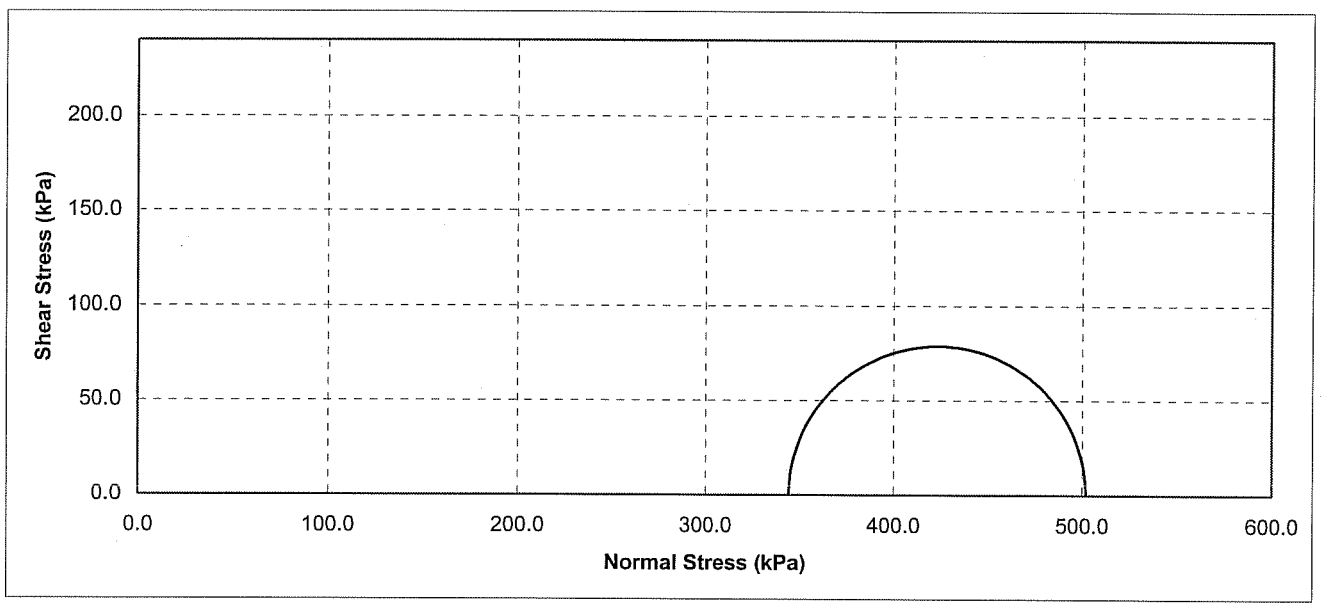
Dumbarton Toll Bridge

UNCONSOLIDATED UNDRAINED TEST
(ASTM D2850)

Project No. : 06-159 **Date :** 02/28/07

Figure No. :





Boring No.	Sample No.	Depth (m)	Soil Type	Dry Density (kN/m^3)	Moisture Content (%)	Conf. Stress (kPa)	Max. Dev. Stress (kPa)	Initial Saturation (%)
06-9	D-17	25.91	Olive Brown, LEAN CLAY (CL)	15.9	22.7	344.7	157.5	92.8

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Dumbarton Toll Bridge

UNCONSOLIDATED UNDRAINED TEST
(ASTM D2850)

Project No. : 06-159 **Date :** 02/28/07

Figure No. :

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

ASTM D2850

Project Name:	Dumbarton Toll Bridge			**Project No:**	06-159
Boring No.:	06-11	**Tested by:**	R.J.	**Date:**	04/16/07
Depth (ft):	30	**Checked by:**		**Date:**	
Sample No.	D-5	**Sample Type:**	R		

Sample Description: Bluish Gray , LEAN CLAY (CL)

	1	2	3		
Diameter (in.):	2.302	2.3	2.3	Average:	2.301
Height (in.):	5.020	5.026	5.016	Average:	5.021

Moisture Content Calculation		
Wt. Wet Sample + Container (gms):		208.84
Wt. Dry Sample + Container (gms):		175.9
Container (gms)	No. 69	59.91
Moisture Content (%)		**28.4**

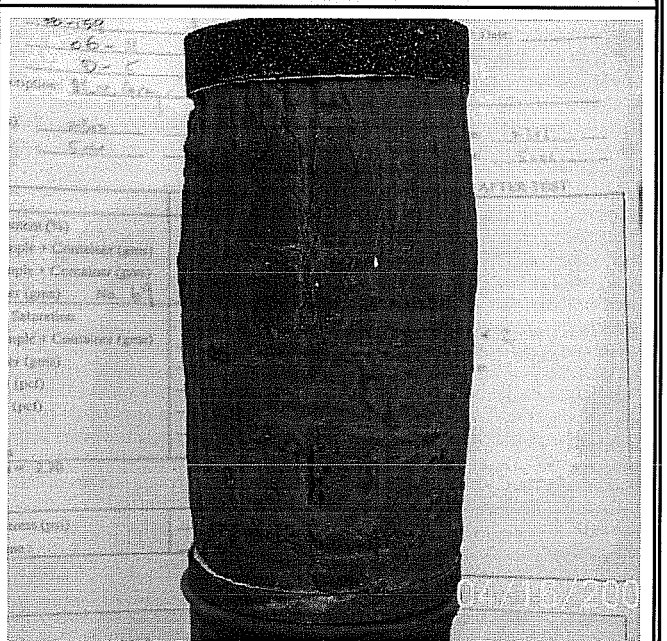
Density and Saturation	
Wt. Wet Sample + Container (gms)	895.76
Container (gms)	228.92
Wet Density (pcf)	**121.6**
Dry Density (pcf)	**94.7**
Void Ratio	**0.779**
% Saturation	**98.4**

Assume Gs=2.70

Test Data Filename:	06159B11d5.trx

SKETCH / PHOTO AFTER TEST:

PHOTO FILE NAME: D:\06-159 Dumbarton\lab\100_3586.JPG



Shear	
Rate of Deformation (% strain / min) =	**1**
Confining Stress (ksf):	**2.74**

Failure Criterion: **criterion 1 is used**

1. the maximum deviator stress within 15% strain
2. the stress at 10% strain for no peak stress.

At Failure	
Deviator Stress (ksf)	**2.47**
Eff. Minor Principal Stress (ksf)=	**2.74**
Eff. Major Principal Stress (ksf)=	**5.21**
Axial Strain (%)=	**14.68**

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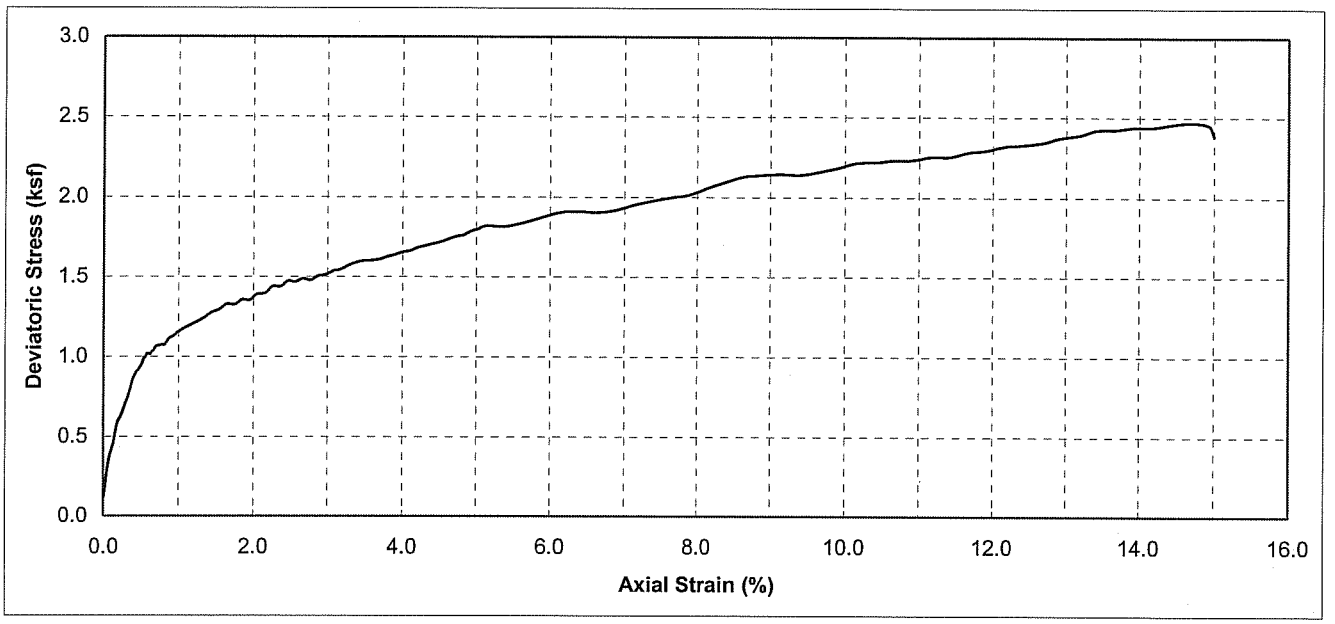
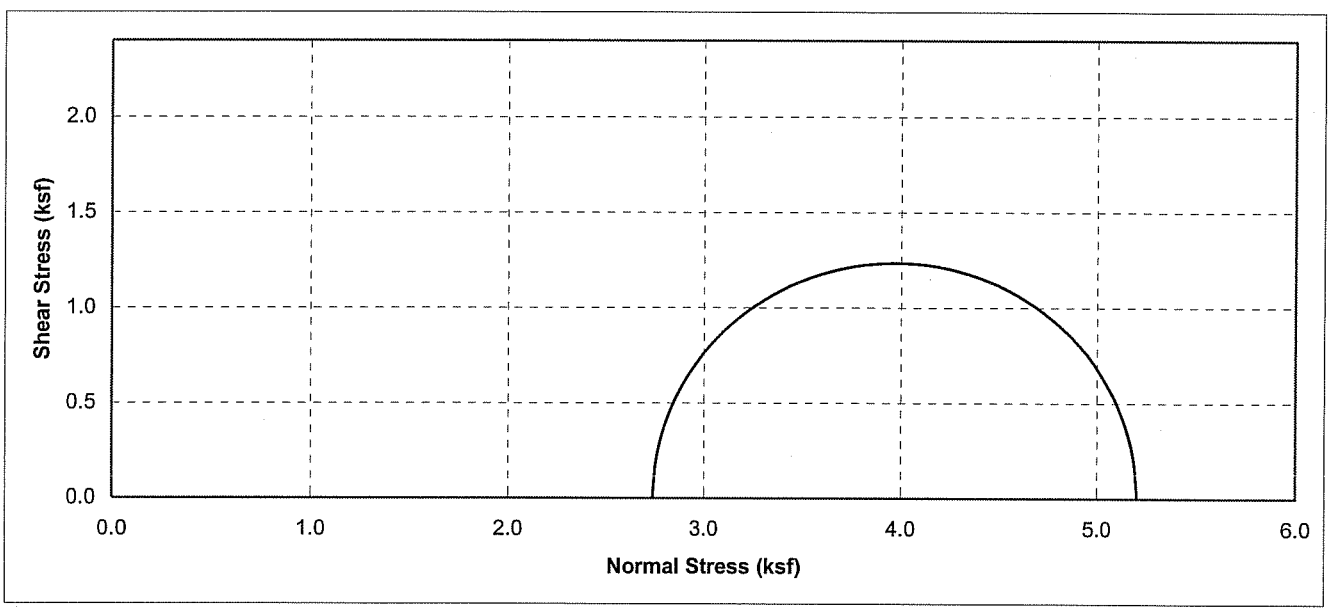
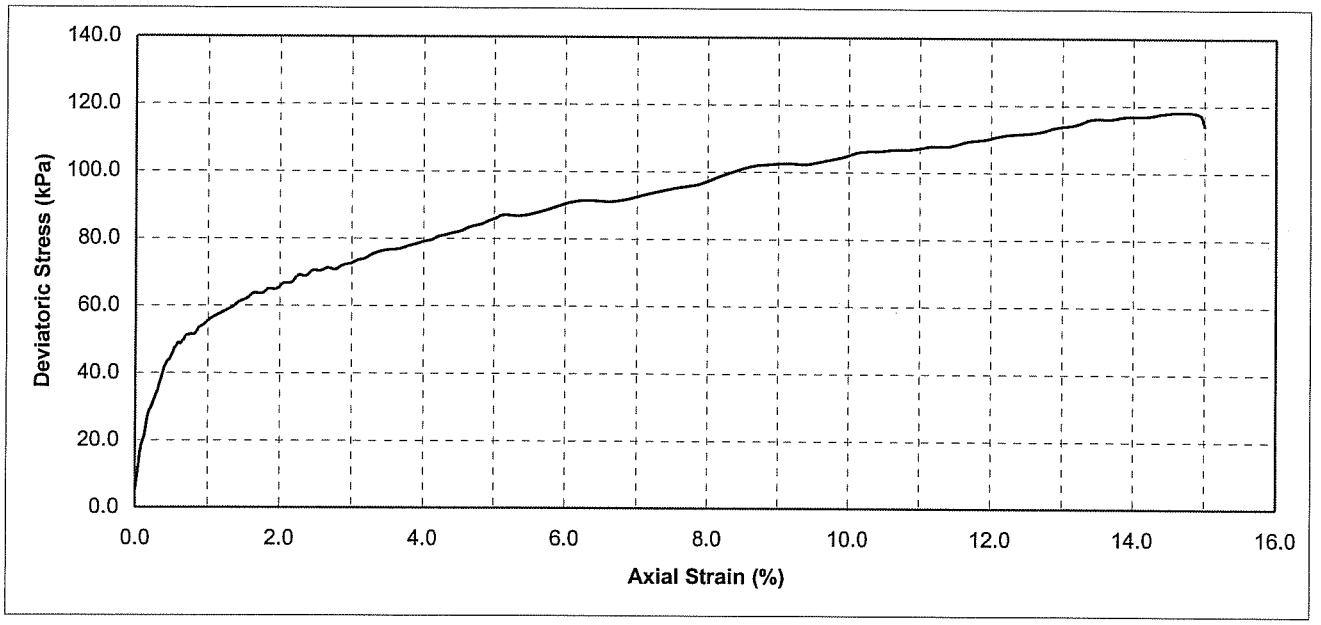
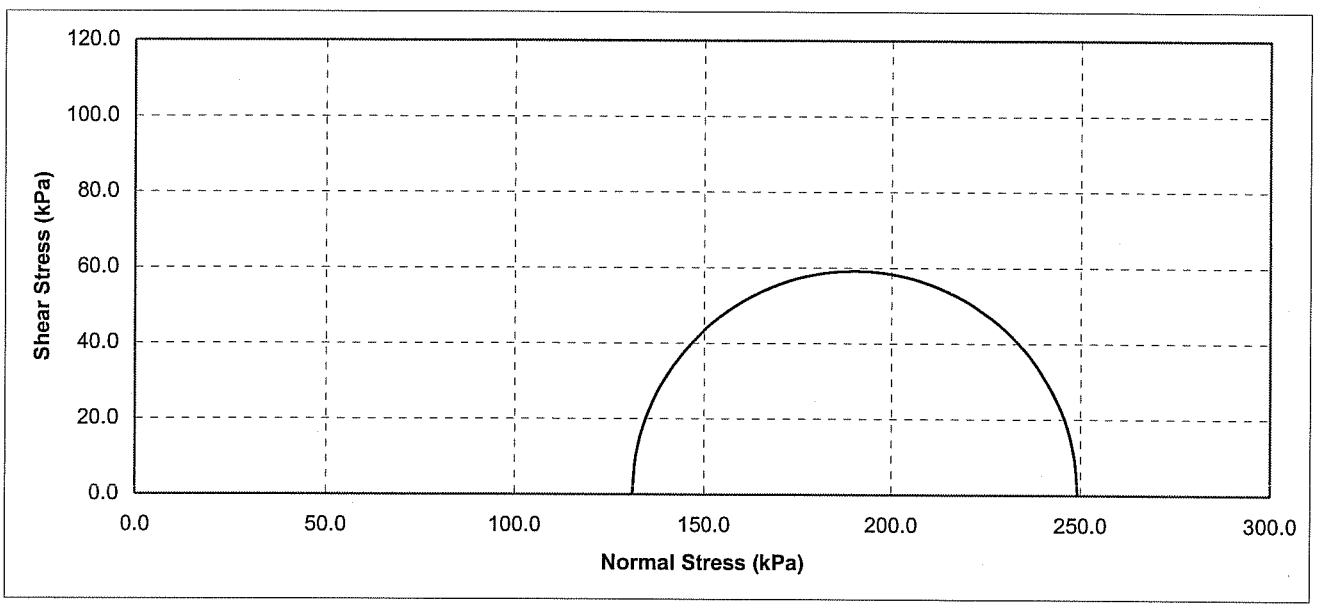




Boring No.	Sample No.	Depth (ft)	Soil Type	Dry Density (pcf)	Moisture Content (%)	Conf. Stress (ksf)	Max. Dev. Stress (ksf)	Initial Saturation (%)
06-11	D-5	30	Bluish Gray , LEAN CLAY (CL)	94.7	28.40	2.74	2.47	98.4

Earth Mechanics, Inc. Geotechnical and Earthquake Engineering	**Dumbarton Toll Bridge**
Project No. : 06-159 **Date :** 04/16/07	**UNCONSOLIDATED UNDRAINED TEST** **(ASTM D2850)** Figure No. :





Boring No.	Sample No.	Depth (m)	Soil Type	Dry Density (kN/m^3)	Moisture Content (%)	Conf. Stress (kPa)	Max. Dev. Stress (kPa)	Initial Saturation (%)
06-11	D-5	9.10	Bluish Gray , LEAN CLAY (CL)	14.9	28.4	131.1	118.2	98.4

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Dumbarton Toll Bridge

UNCONSOLIDATED UNDRAINED TEST
(ASTM D2850)

Project No. : 06-159 **Date :** 04/16/07

Figure No. :

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

ASTM D2850

Project Name:	Dumbarton Toll Bridge			**Project No:**	06-159
Boring No.:	06-11	**Tested by:**	R.J.	**Date:**	04/16/07
Depth (ft):	130	**Checked by:**		**Date:**	
Sample No.	D-22	**Sample Type:**	R		

Sample Description: Bluish Gray , LEAN CLAY (CL)

	1	2	3		
Diameter (in.):	2.402	2.398	2.408	Average:	2.403
Height (in.):	5.042	5.062	5.016	Average:	5.040

Moisture Content Calculation		
Wt. Wet Sample + Container (gms):		193.95
Wt. Dry Sample + Container (gms):		156.11
Container (gms)	No. 68	58.93
Moisture Content (%)		**38.9**

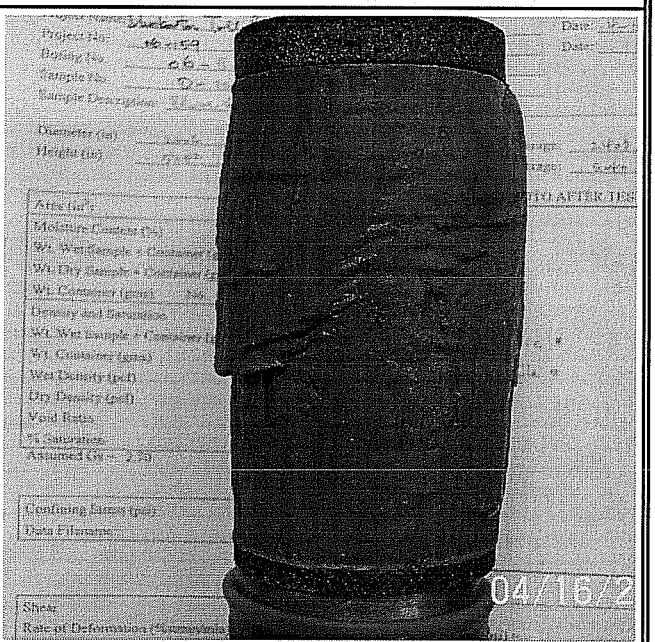
Density and Saturation	
Wt. Wet Sample + Container (gms)	913.37
Container (gms)	228.92
Wet Density (pcf)	**114.0**
Dry Density (pcf)	**82.0**
Void Ratio	**1.054**
% Saturation	**99.8**

Assume Gs=2.70

Test Data Filename:	06159B11D22.trx

SKETCH / PHOTO AFTER TEST:

PHOTO FILE NAME: D:\06-159 Dumbarton\lab\100_3585.JPG



Shear	
Rate of Deformation (% strain / min) =	**1**
Confining Stress (ksf):	**7.20**

Failure Criterion: **criterion 1 is used**

1. the maximum deviator stress within 15% strain
2. the stress at 10% strain for no peak stress.

At Failure	
Deviator Stress (ksf)	**3.06**
Eff. Minor Principal Stress (ksf)=	**7.20**
Eff. Major Principal Stress (ksf)=	**10.26**
Axial Strain (%)=	**8.89**

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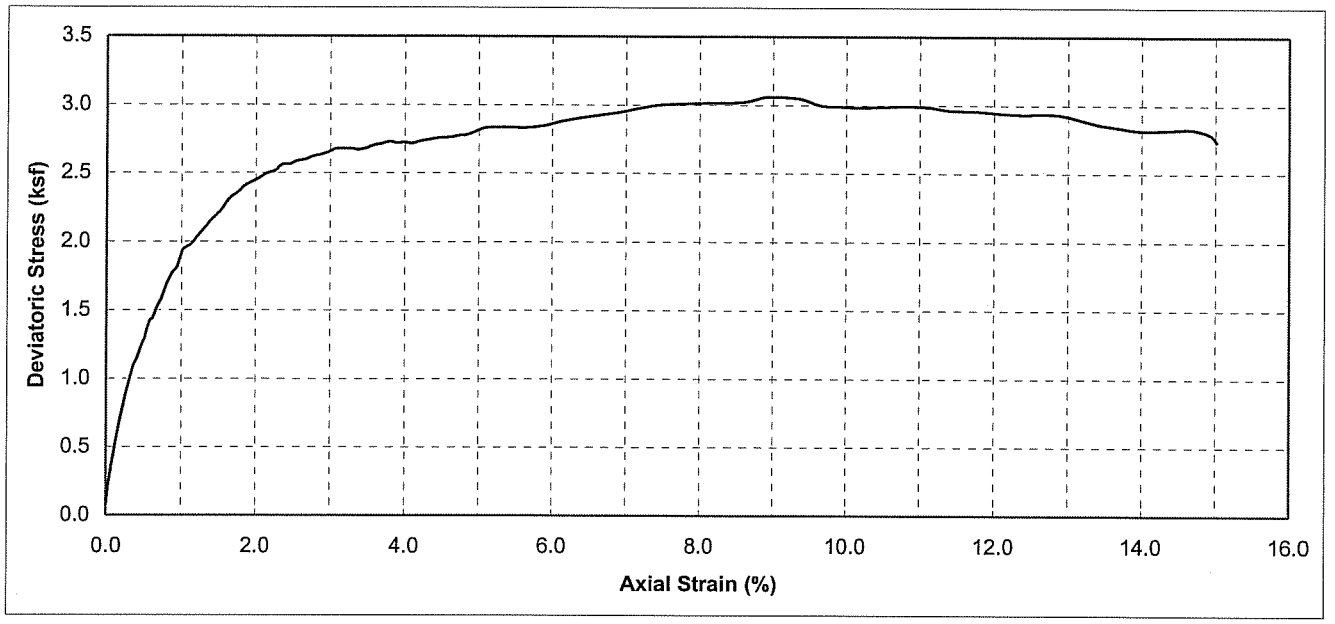

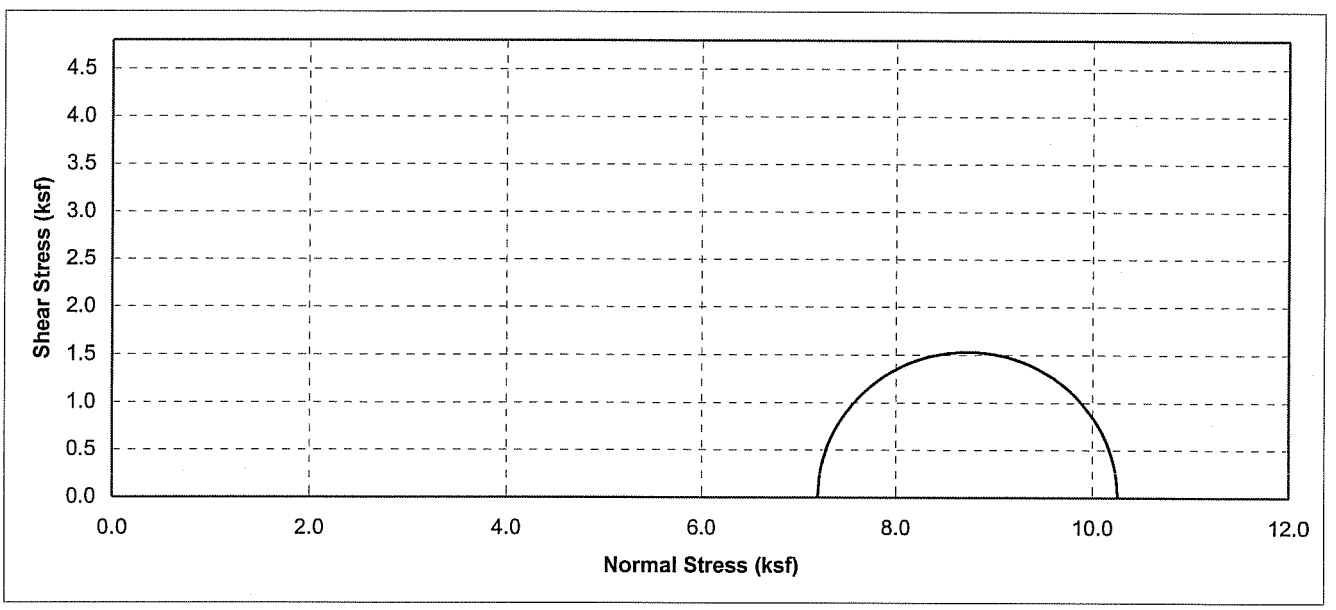

Boring No.	Sample No.	Depth (ft)	Soil Type	Dry Density (pcf)	Moisture Content (%)	Conf. Stress (ksf)	Max. Dev. Stress (ksf)	Initial Saturation (%)
06-11	D-22	130	Bluish Gray , LEAN CLAY (CL)	82.0	38.94	7.20	3.06	99.8

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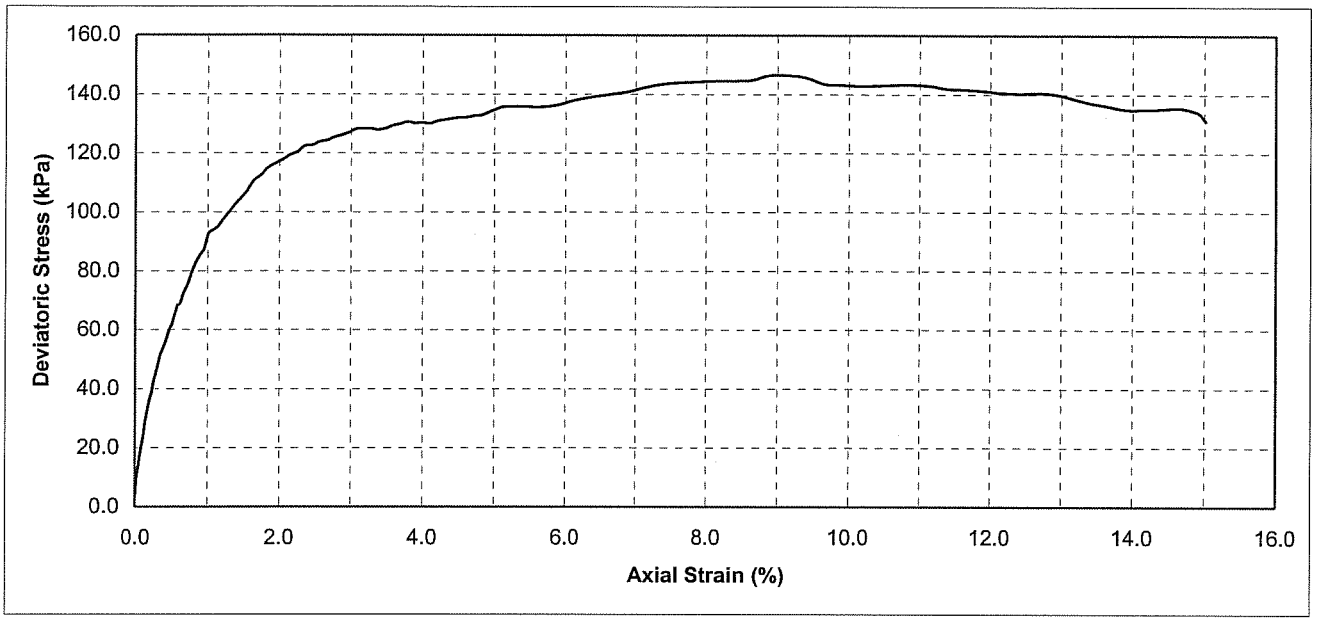
Geotechnical and Earthquake Engineering

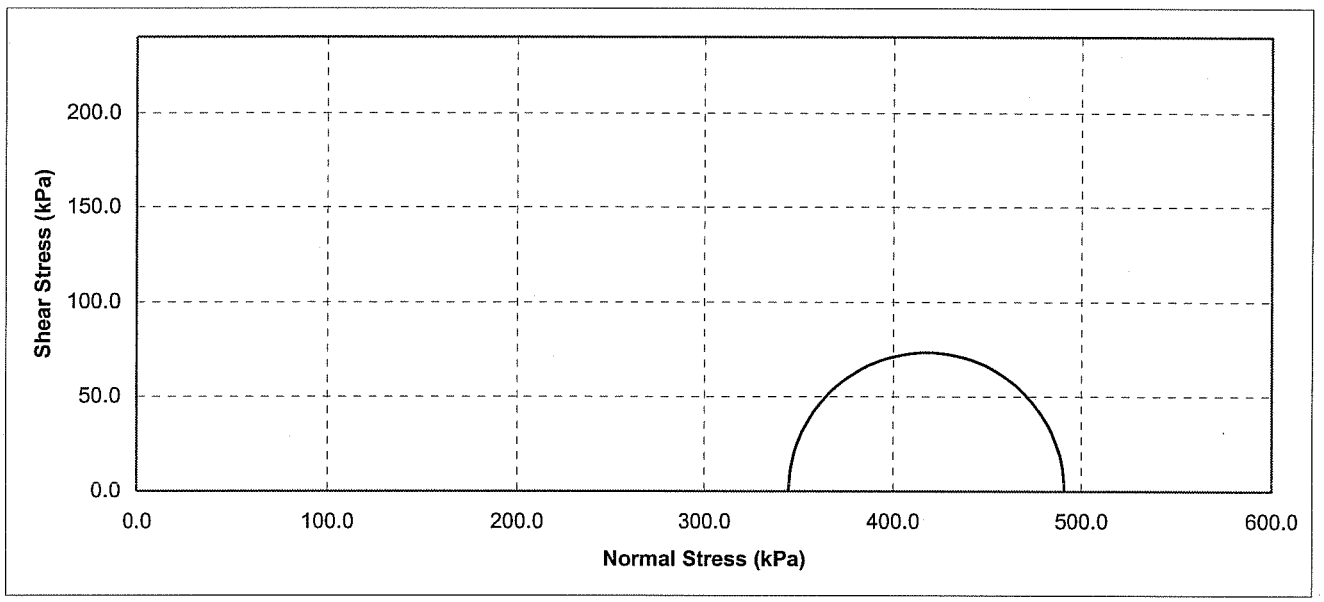
Dumbarton Toll Bridge

UNCONSOLIDATED UNDRAINED TEST
(ASTM D2850)

Project No. : 06-159 **Date :** 04/16/07

Figure No. :





Boring No.	Sample No.	Depth (m)	Soil Type	Dry Density (kN/m^3)	Moisture Content (%)	Conf. Stress (kPa)	Max. Dev. Stress (kPa)	Initial Saturation (%)
06-11	D-22	39.62	Bluish Gray , LEAN CLAY (CL)	12.9	38.9	344.7	146.4	99.8

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Geotechnical and Earthquake Engineering

Dumbarton Toll Bridge

UNCONSOLIDATED UNDRAINED TEST
(ASTM D2850)

Project No. : 06-159 **Date :** 04/16/07

Figure No. :

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

ASTM D2850

Project Name:	Dumbarton Toll Bridge			**Project No:**	06-159
Boring No.:	06-12	**Tested by:**	R.J.	**Date:**	05/15/07
Depth (ft):	34	**Checked by:**		**Date:**	
Sample No.	D-5	**Sample Type:**	R		

Sample Description: Bluish Gray, FAT CLAY (CH)

	1	2	3		
Diameter (in.):	2.34	2.34	2.327	Average:	2.336
Height (in.):	5.025	5.025	5.009	Average:	5.020

Moisture Content Calculation		
Wt. Wet Sample + Container (gms):		213.95
Wt. Dry Sample + Container (gms):		182.25
Container (gms)	No. 26	58.37
Moisture Content (%)		**25.6**

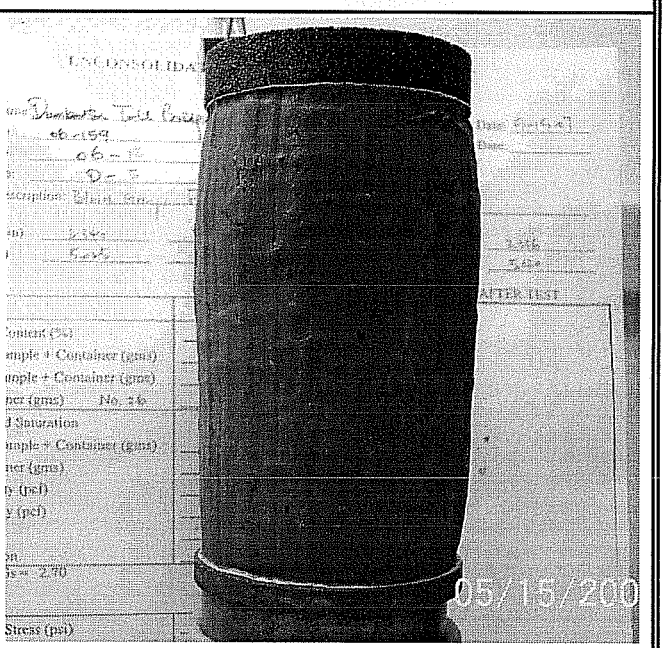
Density and Saturation	
Wt. Wet Sample + Container (gms)	924.72
Container (gms)	228.92
Wet Density (pcf)	**123.1**
Dry Density (pcf)	**98.0**
Void Ratio	**0.719**
% Saturation	**96.1**

Assume Gs=2.70

Test Data Filename:	06159B12D5.trx

SKETCH / PHOTO AFTER TEST:

PHOTO FILE NAME: D:\06-159 Dumbarton\lab\100_3599.JPG



Shear	
Rate of Deformation (% strain / min) =	**1**
Confining Stress (ksf):	**3.17**

Failure Criterion: **criterion 2 is used**

1. the maximum deviator stress within 15% strain
2. the stress at 10% strain for no peak stress.

At Failure	
Deviator Stress (ksf)	**2.70**
Eff. Minor Principal Stress (ksf)=	**3.17**
Eff. Major Principal Stress (ksf)=	**5.87**
Axial Strain (%)=	**9.90**

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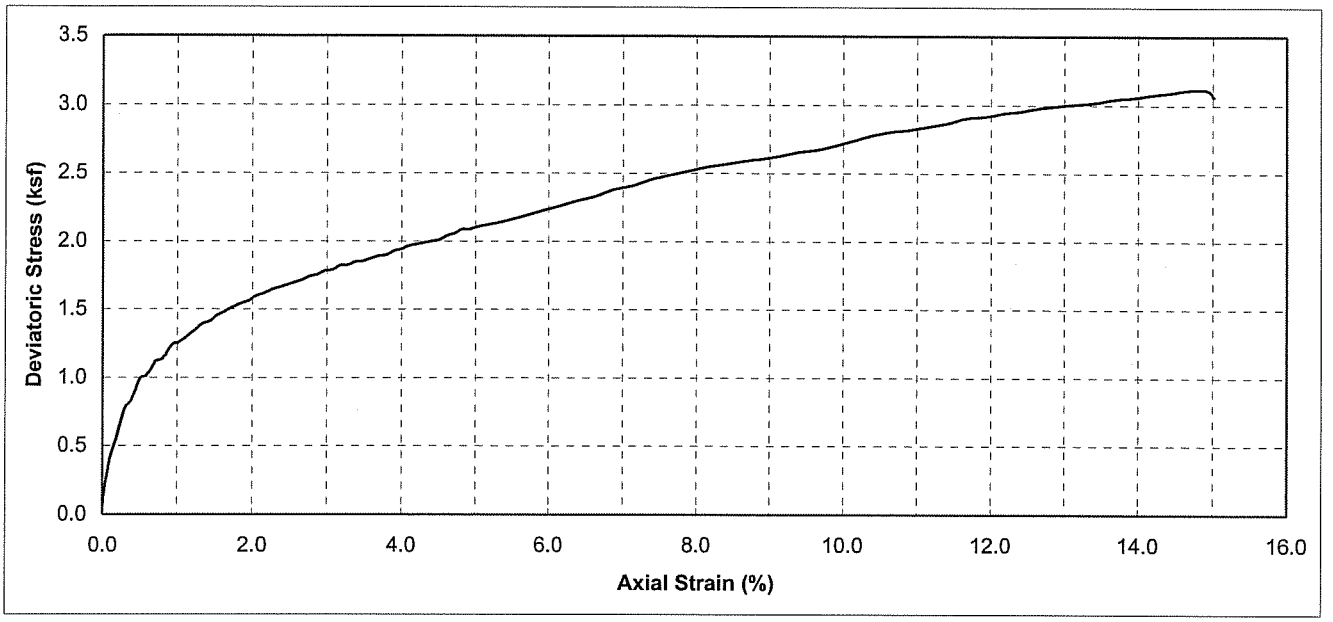

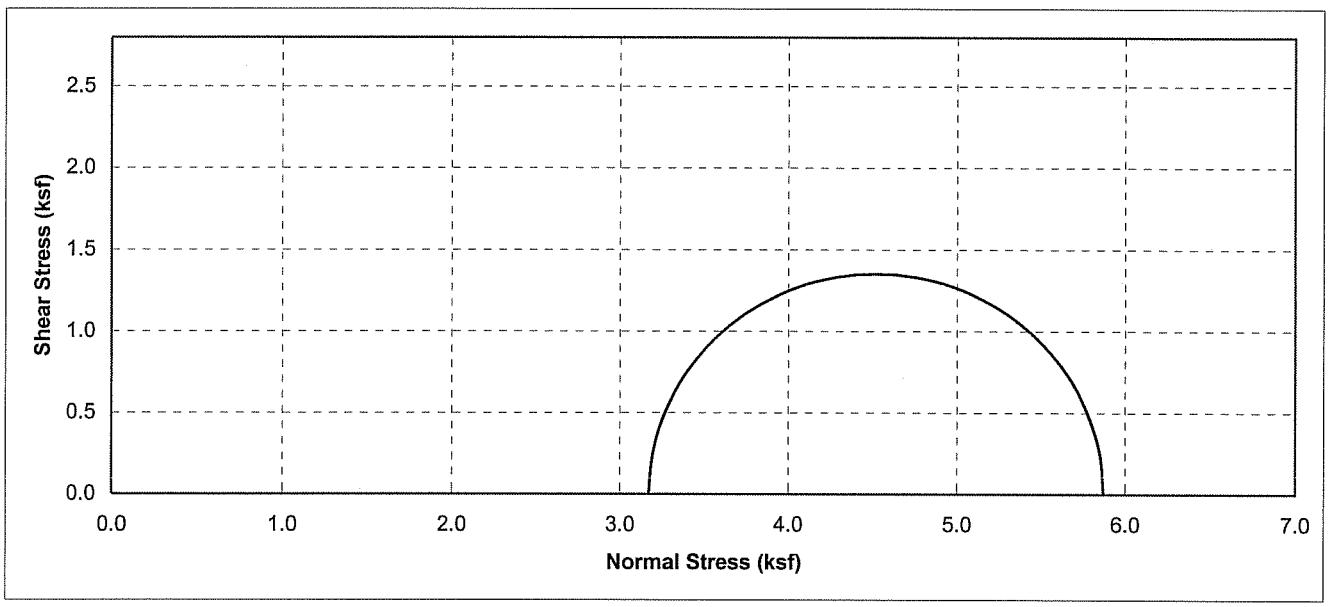

Boring No.	Sample No.	Depth (ft)	Soil Type	Dry Density (pcf)	Moisture Content (%)	Conf. Stress (ksf)	Max. Dev. Stress (ksf)	Initial Saturation (%)
06-12	D-5	34	Bluish Gray, FAT CLAY (CH)	98.0	25.59	3.17	2.70	96.1

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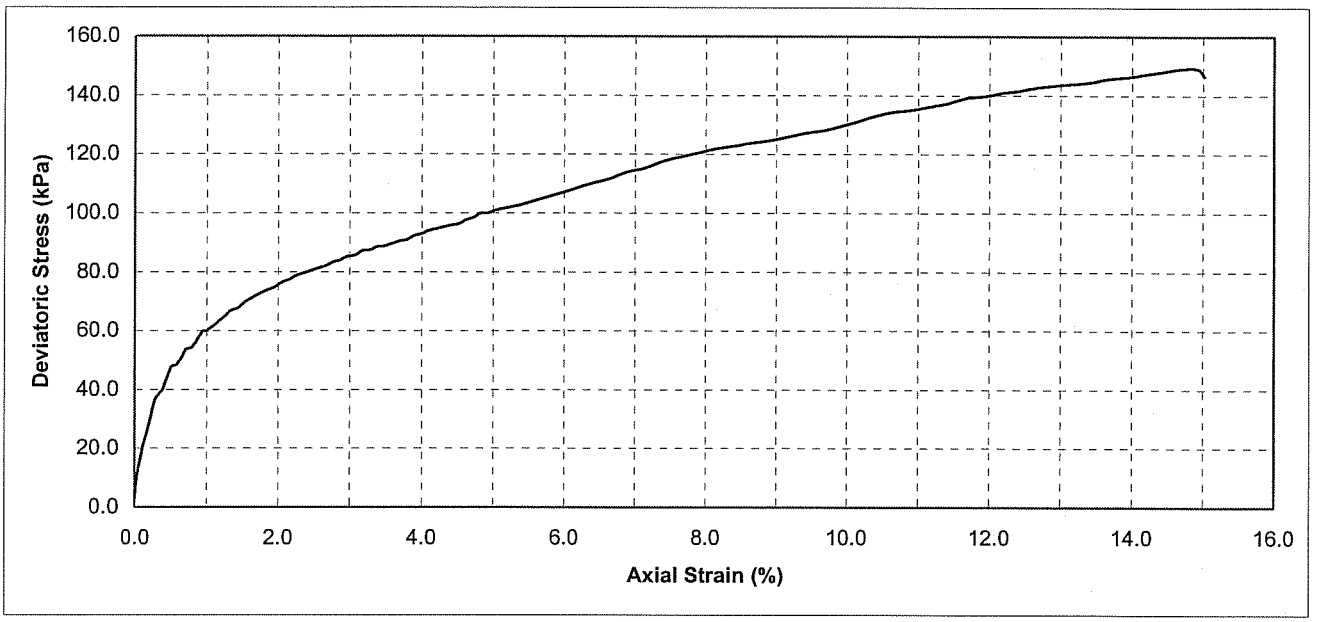
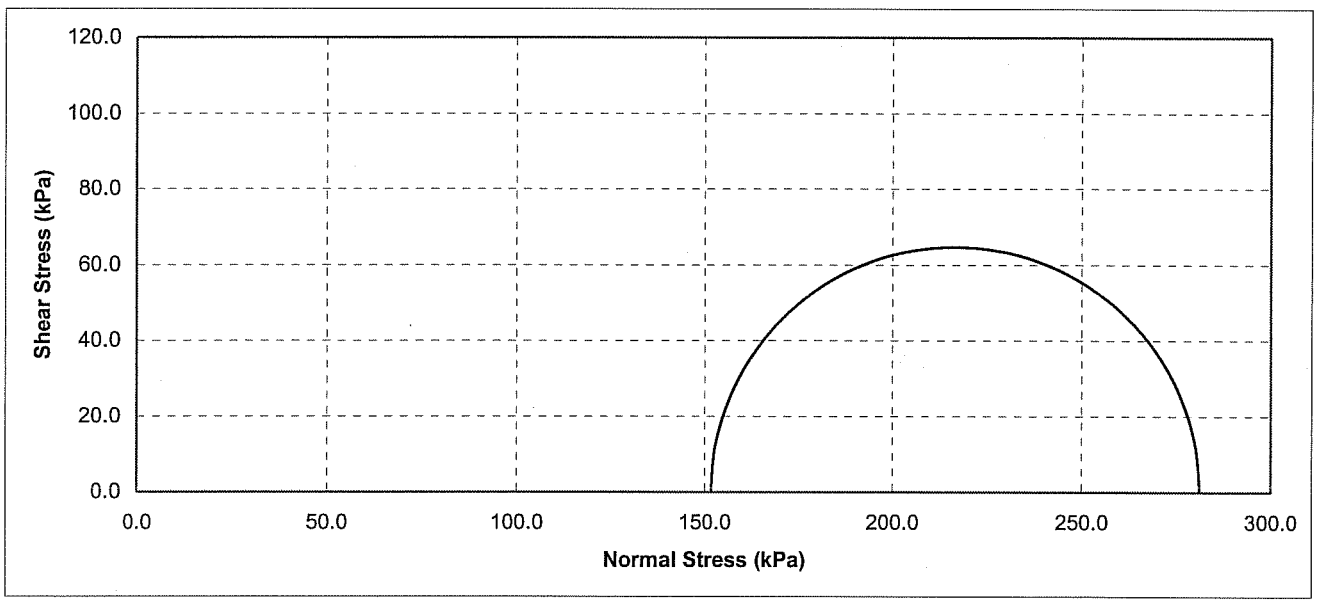
Dumbarton Toll Bridge

UNCONSOLIDATED UNDRAINED TEST
(ASTM D2850)

Project No. : 06-159 **Date :** 05/15/07

Figure No. :





Boring No.	Sample No.	Depth (m)	Soil Type	Dry Density (kN/m^3)	Moisture Content (%)	Conf. Stress (kPa)	Max. Dev. Stress (kPa)	Initial Saturation (%)
06-12	D-5	10.36	Bluish Gray, FAT CLAY (CH)	15.4	25.6	151.8	129.4	96.1

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Dumbarton Toll Bridge

UNCONSOLIDATED UNDRAINED TEST
(ASTM D2850)

Project No. : 06-159 **Date :** 05/15/07 **Figure No. :**

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

ASTM D2850

Project Name:	Dumbarton Toll Bridge			**Project No:**	06-159
Boring No.:	06-12	**Tested by:**	R.J.	**Date:**	05/15/07
Depth (ft):	104	**Checked by:**		**Date:**	
Sample No.	D-18	**Sample Type:**	R		

Sample Description: Olive Brown, LEAN CLAY (CL)

	1	2	3		
Diameter (in.):	2.414	2.415	2.414	Average:	2.414
Height (in.):	4.989	5.007	5.015	Average:	5.004

Moisture Content Calculation		
Wt. Wet Sample + Container (gms):		228.53
Wt. Dry Sample + Container (gms):		197.85
Container (gms)	No. 27	57.51
Moisture Content (%)		**21.9**

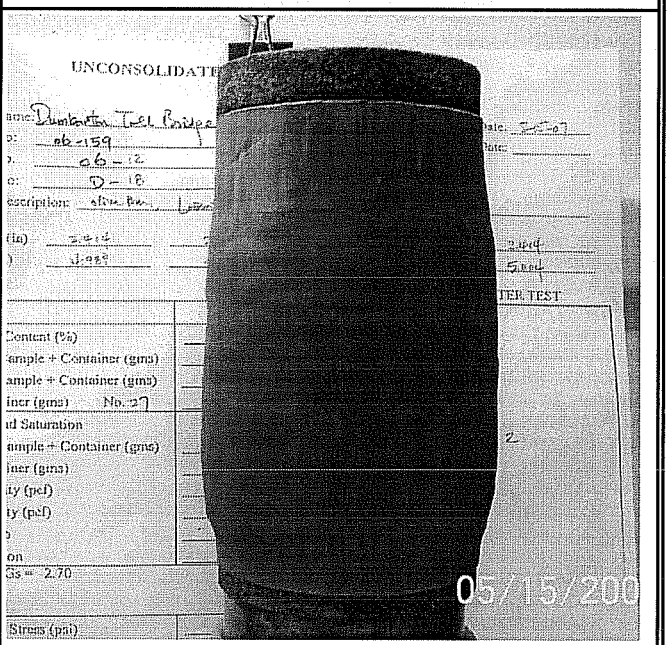
Density and Saturation	
Wt. Wet Sample + Container (gms)	1004.34
Container (gms)	228.92
Wet Density (pcf)	**128.9**
Dry Density (pcf)	**105.7**
Void Ratio	**0.593**
% Saturation	**99.5**

Assume Gs=2.70

Test Data Filename:	06159B12D18.trx

SKETCH / PHOTO AFTER TEST:

PHOTO FILE NAME: D:\06-159 Dumbarton\lab\100_3600.JPG



Shear	
Rate of Deformation (% strain / min) =	**1**
Confining Stress (ksf):	**7.20**

Failure Criterion: **criterion 2 is used**

1. the maximum deviator stress within 15% strain
2. the stress at 10% strain for no peak stress.

At Failure	
Deviator Stress (ksf)	**3.94**
Eff. Minor Principal Stress (ksf)=	**7.20**
Eff. Major Principal Stress (ksf)=	**11.14**
Axial Strain (%)=	**9.89**

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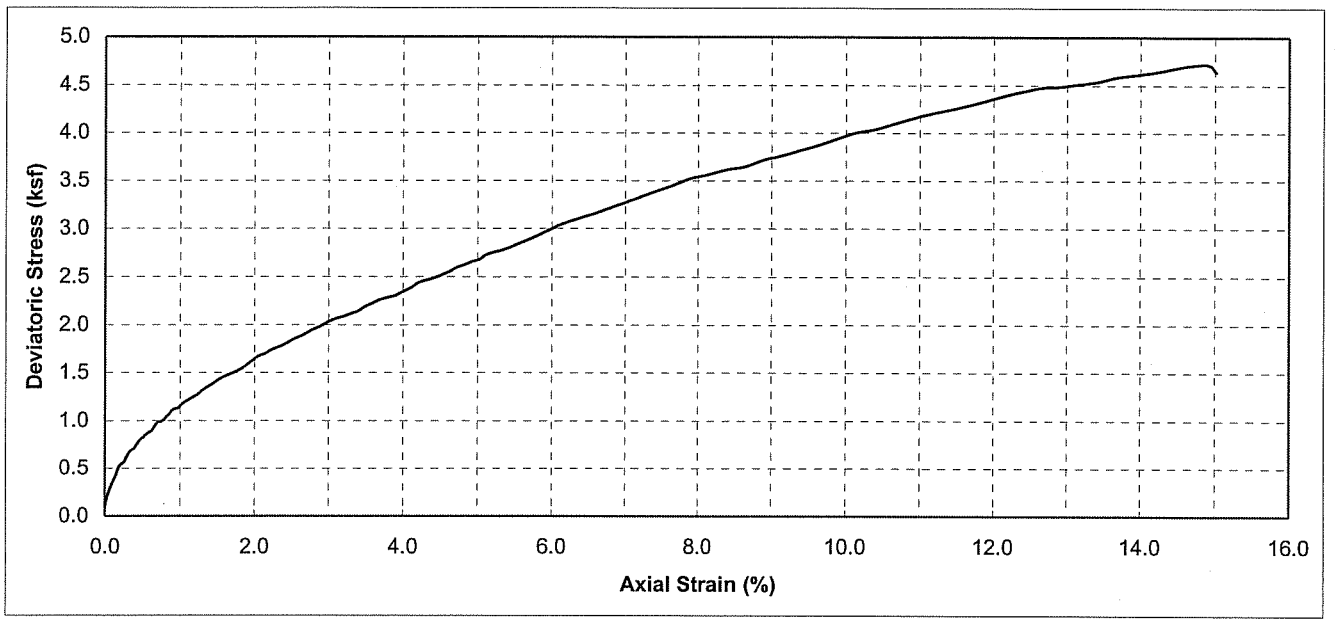
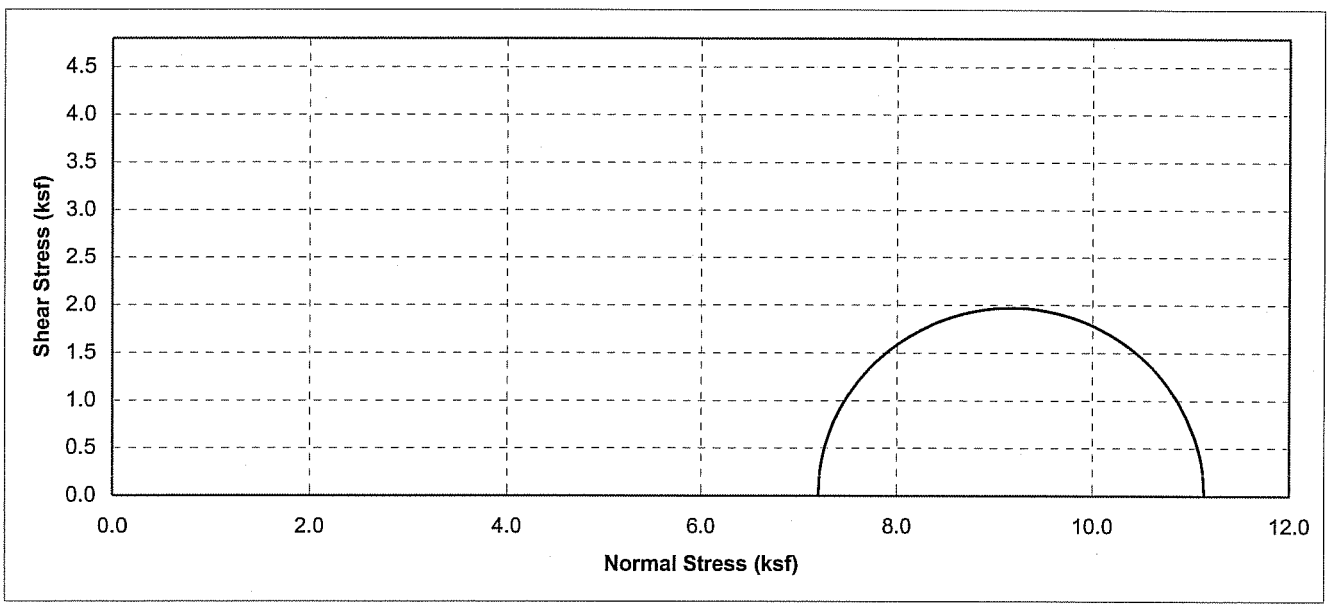
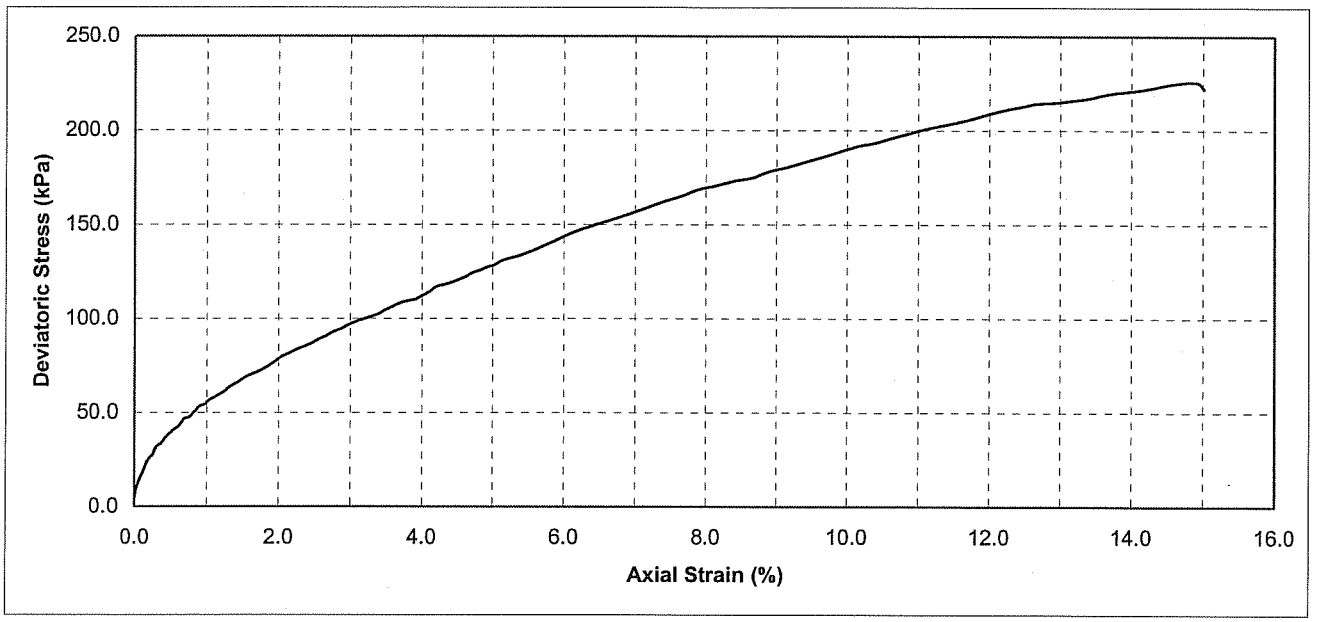
Geotechnical and Earthquake Engineering

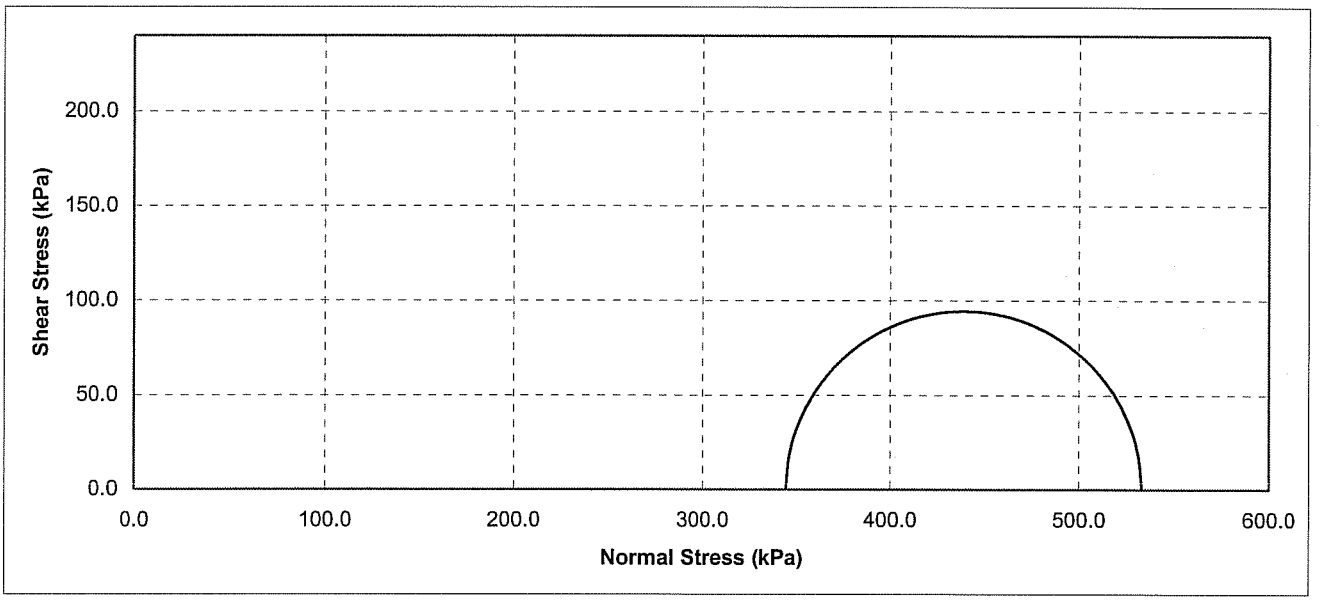




Boring No.	Sample No.	Depth (ft)	Soil Type	Dry Density (pcf)	Moisture Content (%)	Conf. Stress (ksf)	Max. Dev. Stress (ksf)	Initial Saturation (%)
06-12	D-18	104	Olive Brown, LEAN CLAY (CL)	105.7	21.86	7.20	3.94	99.5

Earth Mechanics, Inc. Geotechnical and Earthquake Engineering	**Dumbarton Toll Bridge**
	UNCONSOLIDATED UNDRAINED TEST
Project No. : 06-159 **Date :** 05/15/07	(ASTM D2850) Figure No. :





Boring No.	Sample No.	Depth (m)	Soil Type	Dry Density (kN/m^3)	Moisture Content (%)	Conf. Stress (kPa)	Max. Dev. Stress (kPa)	Initial Saturation (%)
06-12	D-18	31.70	Olive Brown, LEAN CLAY (CL)	16.6	21.9	344.7	188.6	99.5

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Dumbarton Toll Bridge

UNCONSOLIDATED UNDRAINED TEST
(ASTM D2850)

Project No. : 06-159 **Date :** 05/15/07

Figure No. :

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

ASTM D2850

Project Name:	Dumbarton Toll Bridge			**Project No:**	06-159
Boring No.:	06-13	**Tested by:**	R.J.	**Date:**	05/15/07
Depth (ft):	34	**Checked by:**		**Date:**	
Sample No.	D-7	**Sample Type:**	R		

Sample Description: Dark Gray, FAT CLAY (CH)

	1	2	3		
Diameter (in.):	2.414	2.414	2.415	Average:	2.414
Height (in.):	5.035	5.017	5.037	Average:	5.030

Moisture Content Calculation		
Wt. Wet Sample + Container (gms):		177.63
Wt. Dry Sample + Container (gms):		127.36
Container (gms)	No. 29	56.76
Moisture Content (%)		**71.2**

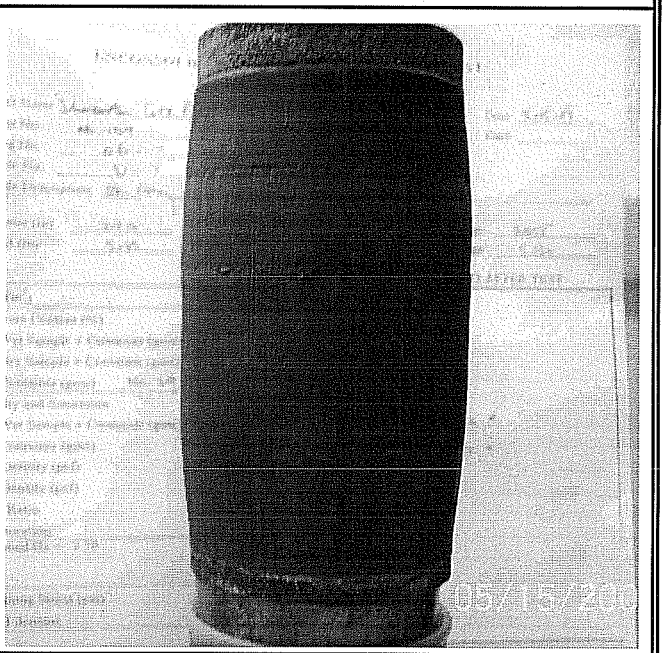
Density and Saturation	
Wt. Wet Sample + Container (gms)	831.61
Container (gms)	228.92
Wet Density (pcf)	**99.6**
Dry Density (pcf)	**58.2**
Void Ratio	**1.897**
% Saturation	**101.3**

Assume Gs=2.70

Test Data Filename:	

SKETCH / PHOTO AFTER TEST:

PHOTO FILE NAME: D:\06-159 Dumbarton\lab\100_3603.JPG



Shear	
Rate of Deformation (% strain / min) =	**1**
Confining Stress (ksf):	**2.73**

Failure Criterion: **criterion 2 is used**

1. the maximum deviator stress within 15% strain
2. the stress at 10% strain for no peak stress.

At Failure	
Deviator Stress (ksf)	**0.83**
Eff. Minor Principal Stress (ksf)=	**2.73**
Eff. Major Principal Stress (ksf)=	**3.56**
Axial Strain (%)=	**9.92**

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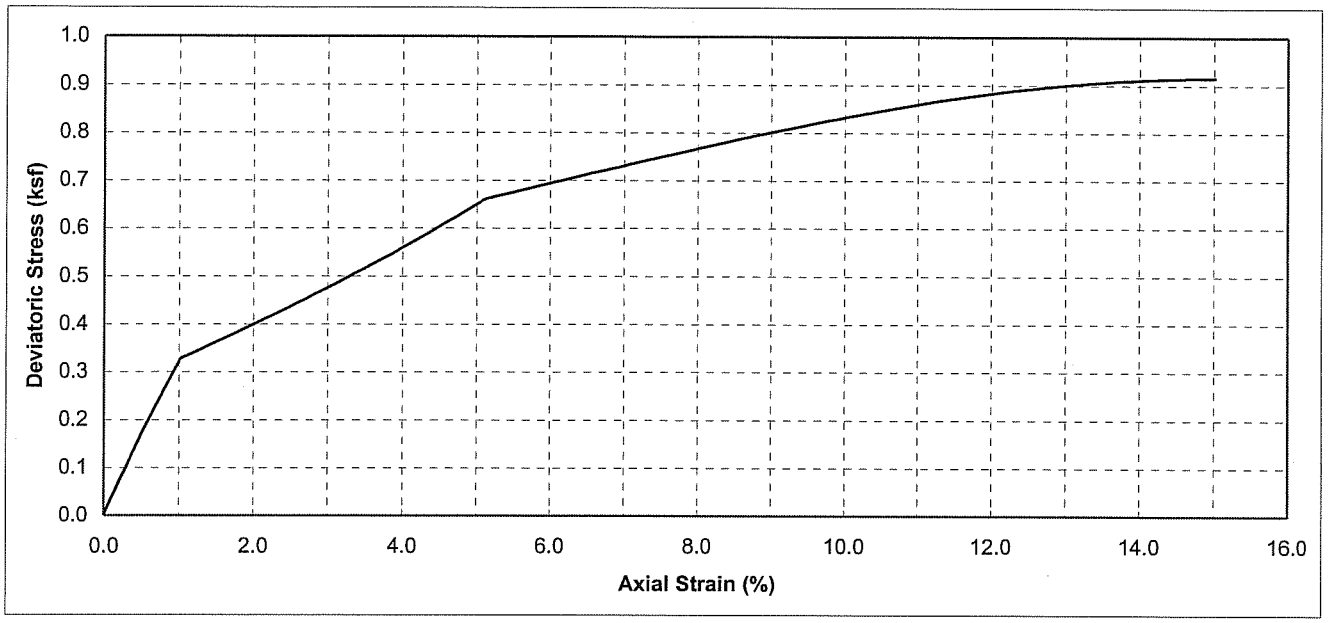
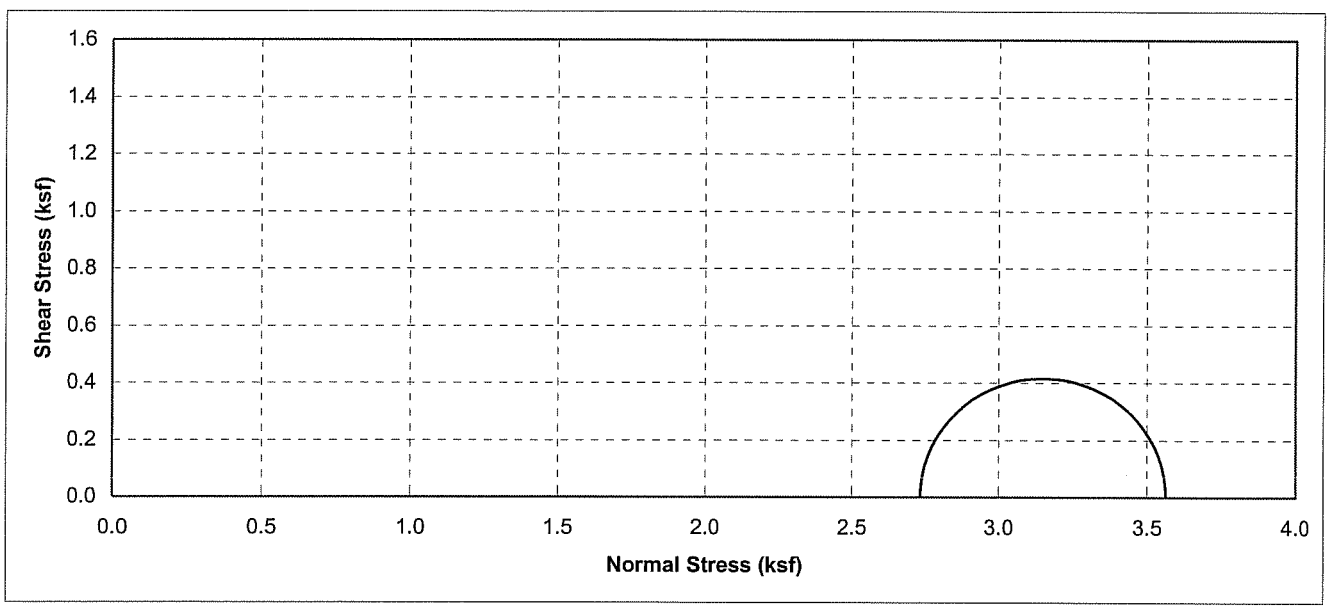
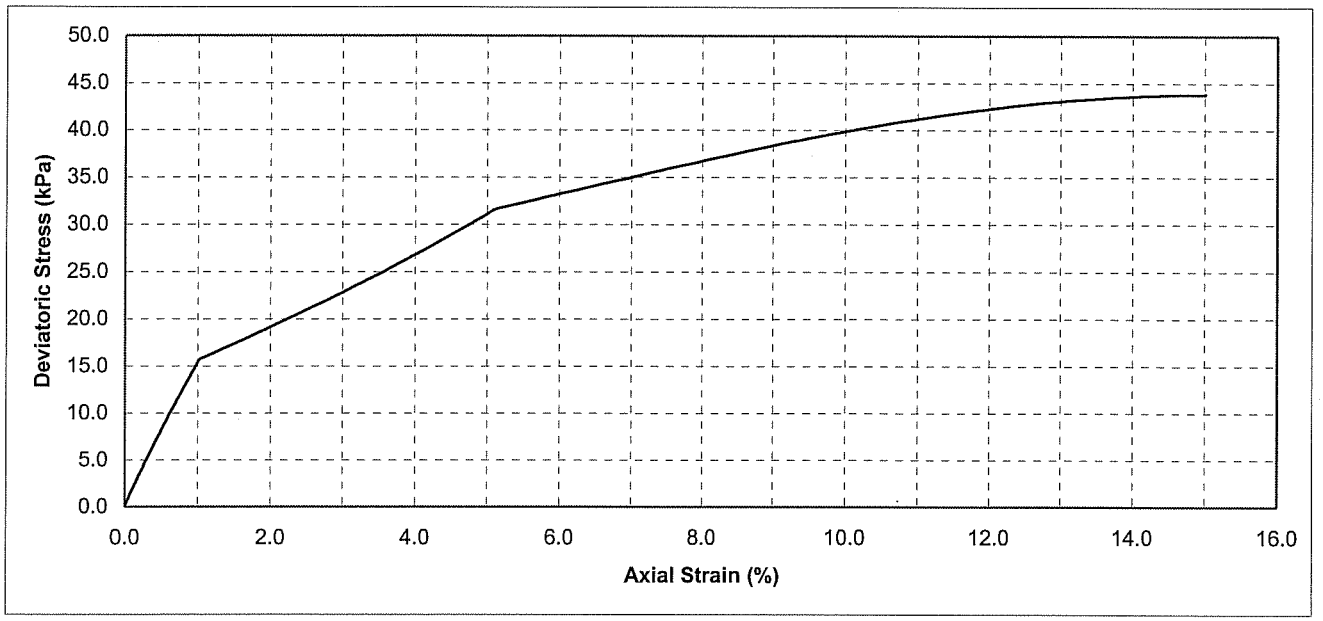
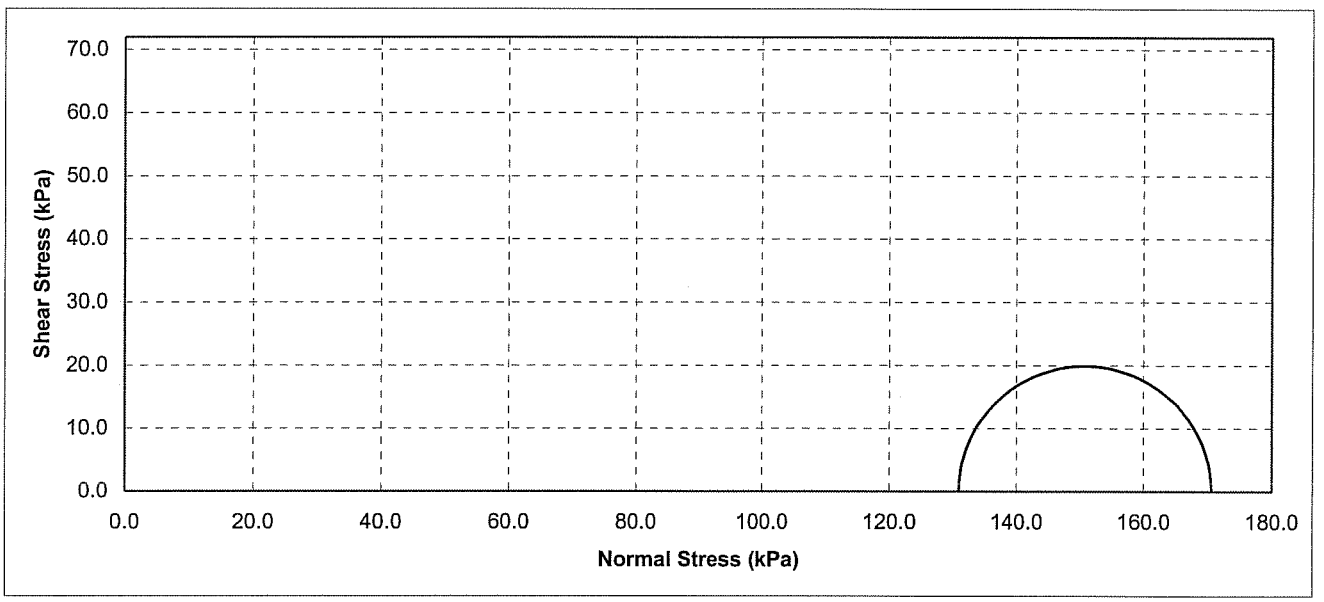




Boring No.	Sample No.	Depth (ft)	Soil Type	Dry Density (pcf)	Moisture Content (%)	Conf. Stress (ksf)	Max. Dev. Stress (ksf)	Initial Saturation (%)
06-13	D-7	34	Dark Gray, FAT CLAY (CH)	58.2	71.20	2.73	0.83	101.3

Earth Mechanics, Inc. Geotechnical and Earthquake Engineering	**Dumbarton Toll Bridge**
	UNCONSOLIDATED UNDRAINED TEST
Project No. : 06-159 **Date :** 05/15/07	**(ASTM D2850)** Figure No. :





Boring No.	Sample No.	Depth (m)	Soil Type	Dry Density (kN/m^3)	Moisture Content (%)	Conf. Stress (kPa)	Max. Dev. Stress (kPa)	Initial Saturation (%)
06-13	D-7	10.36	Dark Gray, FAT CLAY (CH)	9.1	71.2	130.9	39.7	101.3

Earth Mechanics, Inc. Geotechnical and Earthquake Engineering	**Dumbarton Toll Bridge**
	UNCONSOLIDATED UNDRAINED TEST
Project No. : 06-159 **Date :** 05/15/07	**(ASTM D2850)** Figure No. :

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

ASTM D2850

Project Name:	Dumbarton Toll Bridge			**Project No:**	06-159
Boring No.:	06-13	**Tested by:**	R.J.	**Date:**	05/15/07
Depth (ft):	139	**Checked by:**		**Date:**	
Sample No.	D-24	**Sample Type:**	R		

Sample Description: Bluish Brown With Olive Brown, LEAN CLAY With Sand (CL)

	1	2	3		
Diameter (in.):	2.415	2.415	2.416	Average:	2.415
Height (in.):	5.097	5.123	5.095	Average:	5.105

Moisture Content Calculation		
Wt. Wet Sample + Container (gms):		208.32
Wt. Dry Sample + Container (gms):		166.36
Container (gms)	No. 28	57.63
Moisture Content (%)		**38.6**

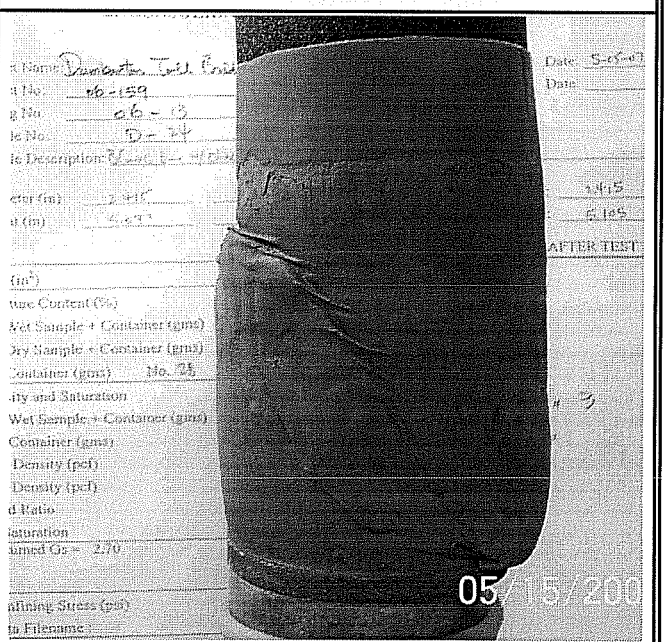
Density and Saturation	
Wt. Wet Sample + Container (gms)	918.24
Container (gms)	228.92
Wet Density (pcf)	**112.2**
Dry Density (pcf)	**81.0**
Void Ratio	**1.081**
% Saturation	**96.4**

Assume Gs=2.70

Test Data Filename:	06159B13D24.trx

SKETCH / PHOTO AFTER TEST:

PHOTO FILE NAME: D:\06-159 Dumbarton\lab\100_3602.JPG



Shear	
Rate of Deformation (% strain / min) =	**1**
Confining Stress (ksf):	**7.20**

Failure Criterion: **criterion 1 is used**

1. the maximum deviator stress within 15% strain
2. the stress at 10% strain for no peak stress.

At Failure	
Deviator Stress (ksf)	**4.15**
Eff. Minor Principal Stress (ksf)=	**7.20**
Eff. Major Principal Stress (ksf)=	**11.35**
Axial Strain (%)=	**8.90**

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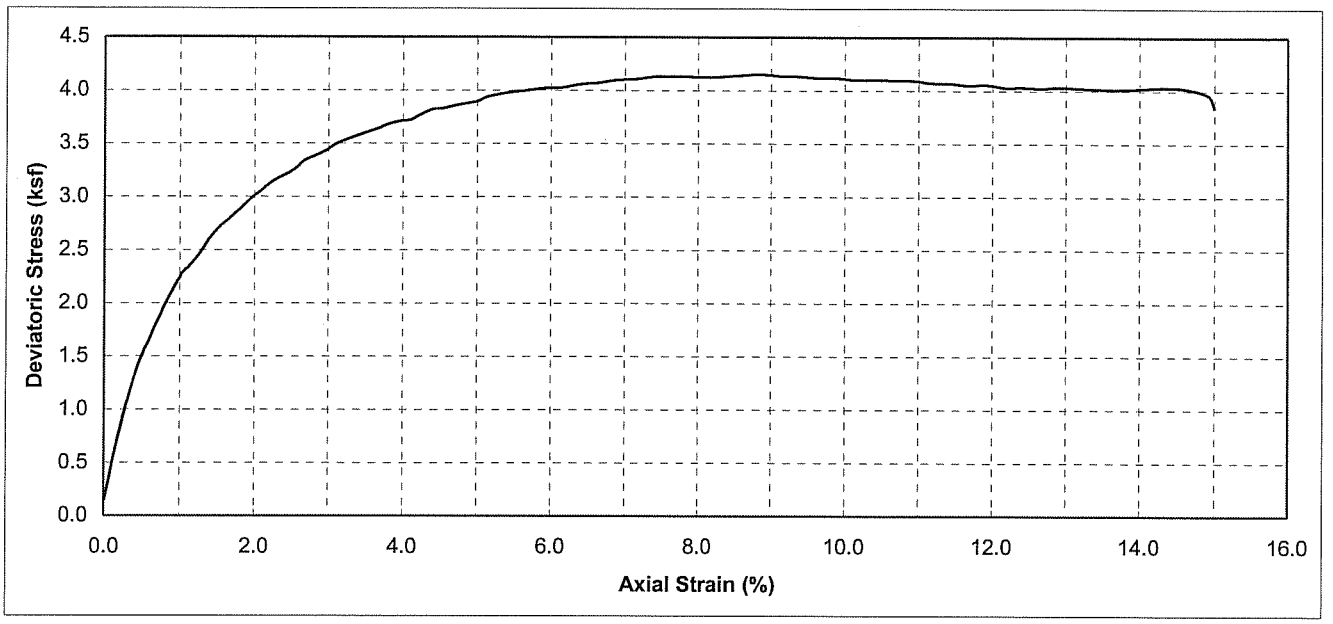
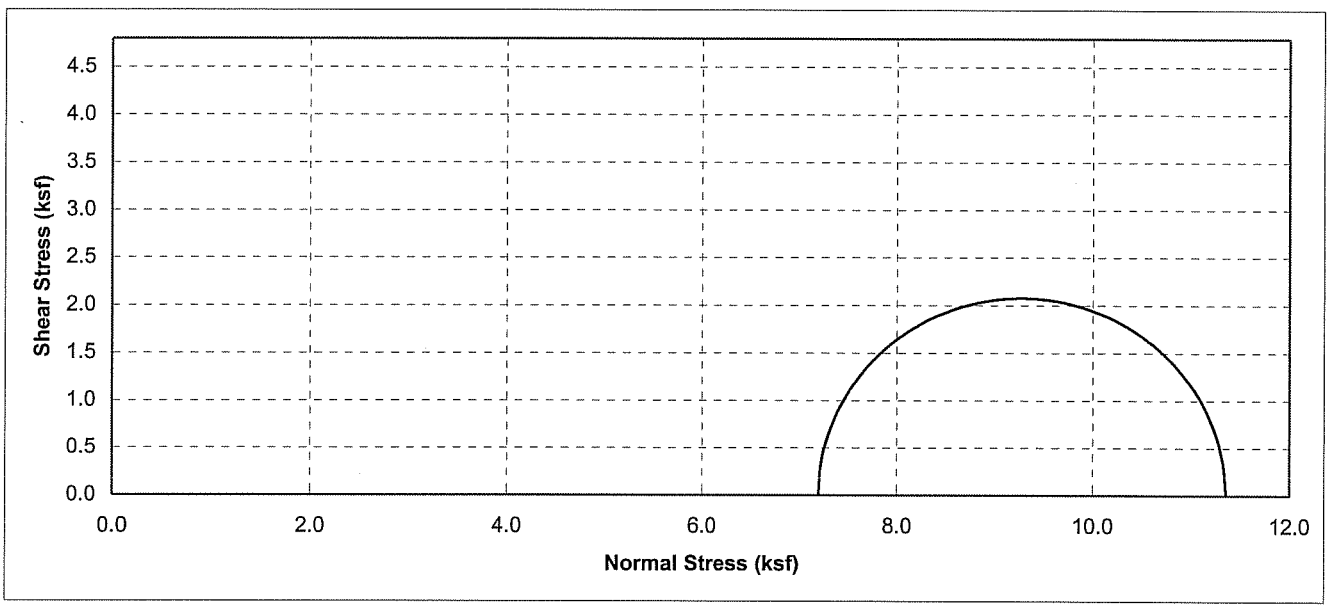




Boring No.	Sample No.	Depth (ft)	Soil Type	Dry Density (pcf)	Moisture Content (%)	Conf. Stress (ksf)	Max. Dev. Stress (ksf)	Initial Saturation (%)
06-13	D-24	139	Bluish Brown With Olive Brown, LEAN CLAY With Sand	81.0	38.59	7.20	4.15	96.4

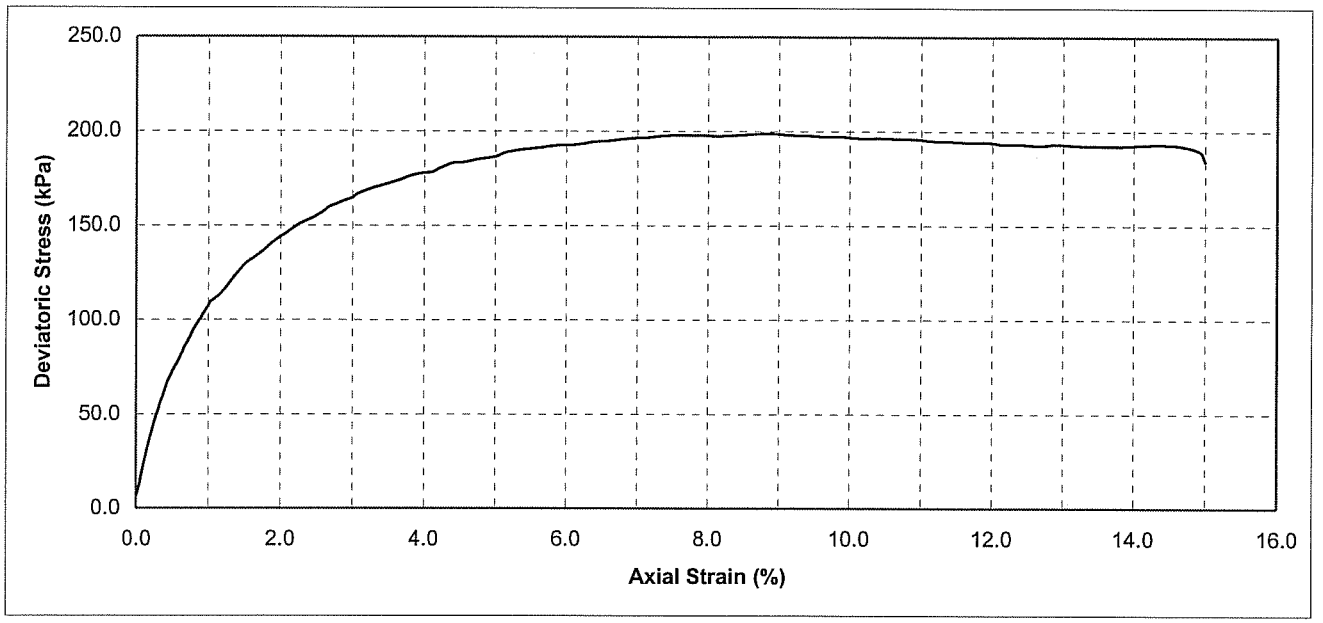
Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

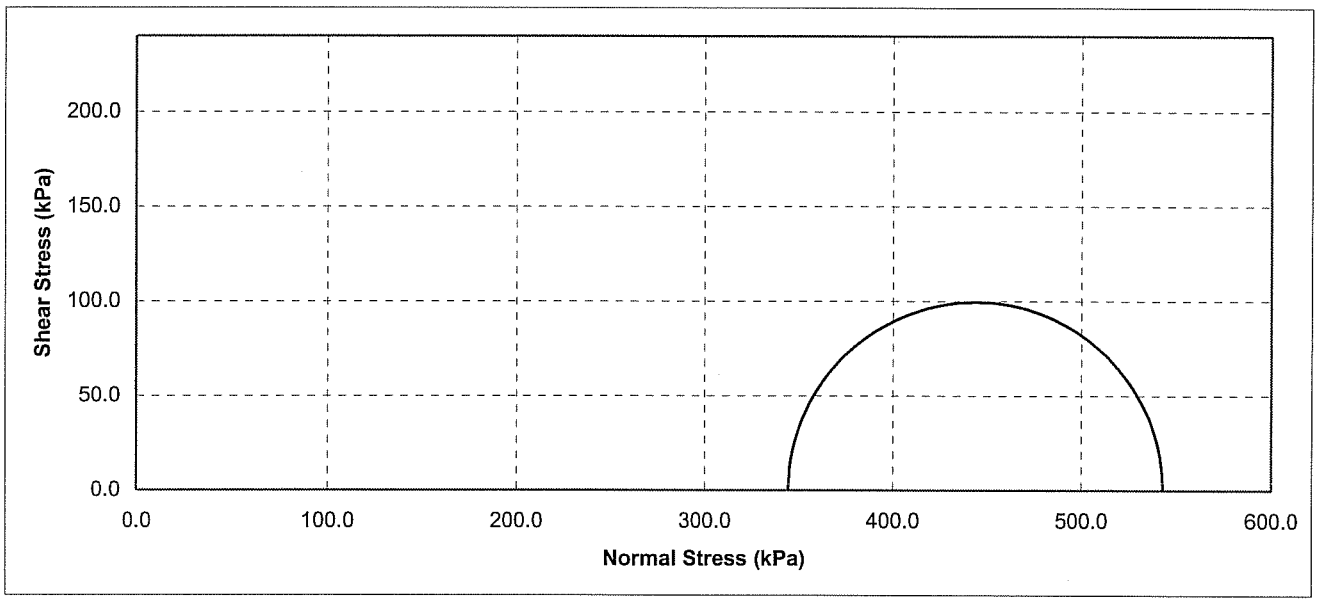
Dumbarton Toll Bridge

UNCONSOLIDATED UNDRAINED TEST
(ASTM D2850)

Figure No. :

Project No. : 06-159 **Date :** 05/15/07





Boring No.	Sample No.	Depth (m)	Soil Type	Dry Density (kN/m^3)	Moisture Content (%)	Conf. Stress (kPa)	Max. Dev. Stress (kPa)	Initial Saturation (%)
06-13	D-24	42.37	Bluish Brown With Olive Brown, LEAN CLAY With Sand	12.7	38.6	344.6	198.8	96.4

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

Dumbarton Toll Bridge

UNCONSOLIDATED UNDRAINED TEST
(ASTM D2850)

Project No. : 06-159 **Date :** 05/15/07

Figure No. :

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

ASTM D2850

Project Name:	Dumbarton Toll Bridge			**Project No:**	06-159
Boring No.:	06-14	**Tested by:**	R.J.	**Date:**	05/15/07
Depth (ft):	49	**Checked by:**		**Date:**	
Sample No.	D-10	**Sample Type:**	R		

Sample Description: Olive Brown, LEAN CLAY (CL)

	1	2	3		
Diameter (in.):	2.405	2.408	2.407	Average:	2.407
Height (in.):	4.988	4.982	5.009	Average:	4.993

Moisture Content Calculation		
Wt. Wet Sample + Container (gms):		199.92
Wt. Dry Sample + Container (gms):		164.69
Container (gms)	No. 30	60.57
Moisture Content (%)		**33.8**

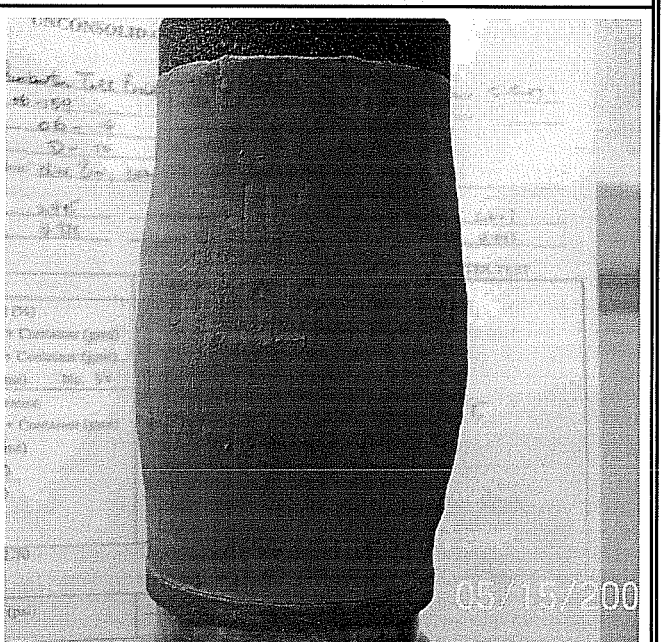
Density and Saturation	
Wt. Wet Sample + Container (gms)	946.87
Container (gms)	228.92
Wet Density (pcf)	**120.3**
Dry Density (pcf)	**89.9**
Void Ratio	**0.875**
% Saturation	**104.4**

Assume Gs=2.70

Test Data Filename:	06159B14D10.trx

SKETCH / PHOTO AFTER TEST:

PHOTO FILE NAME: D:\06-159 Dumbarton\lab\100_3604.JPG



Shear	
Rate of Deformation (% strain / min) =	**1**
Confining Stress (ksf):	**3.89**

Failure Criterion: **criterion 2 is used**

1. the maximum deviator stress within 15% strain
2. the stress at 10% strain for no peak stress.

At Failure	
Deviator Stress (ksf)	**1.93**
Eff. Minor Principal Stress (ksf)=	**3.89**
Eff. Major Principal Stress (ksf)=	**5.82**
Axial Strain (%)=	**9.90**

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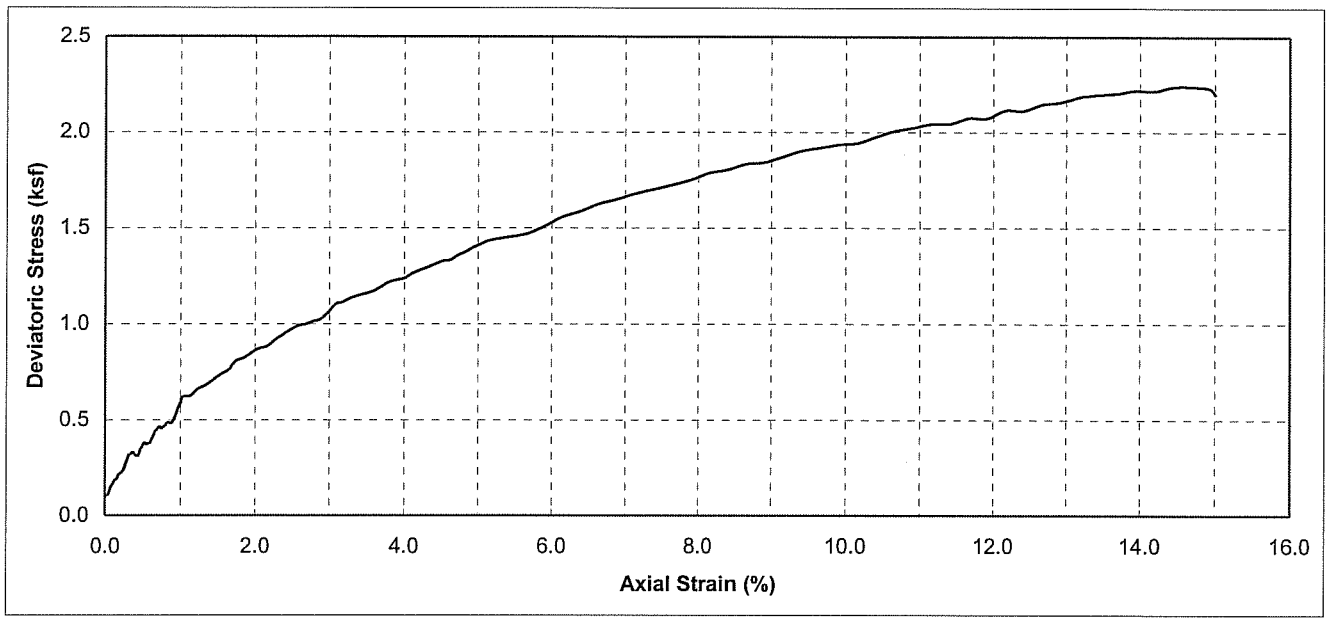
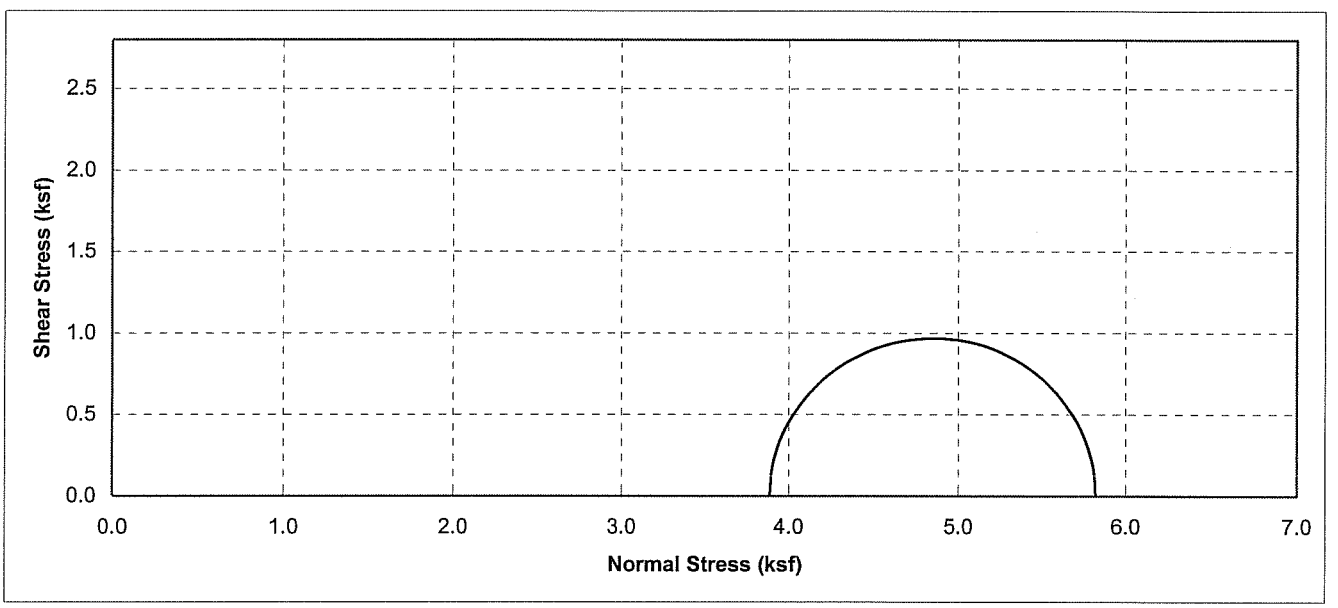
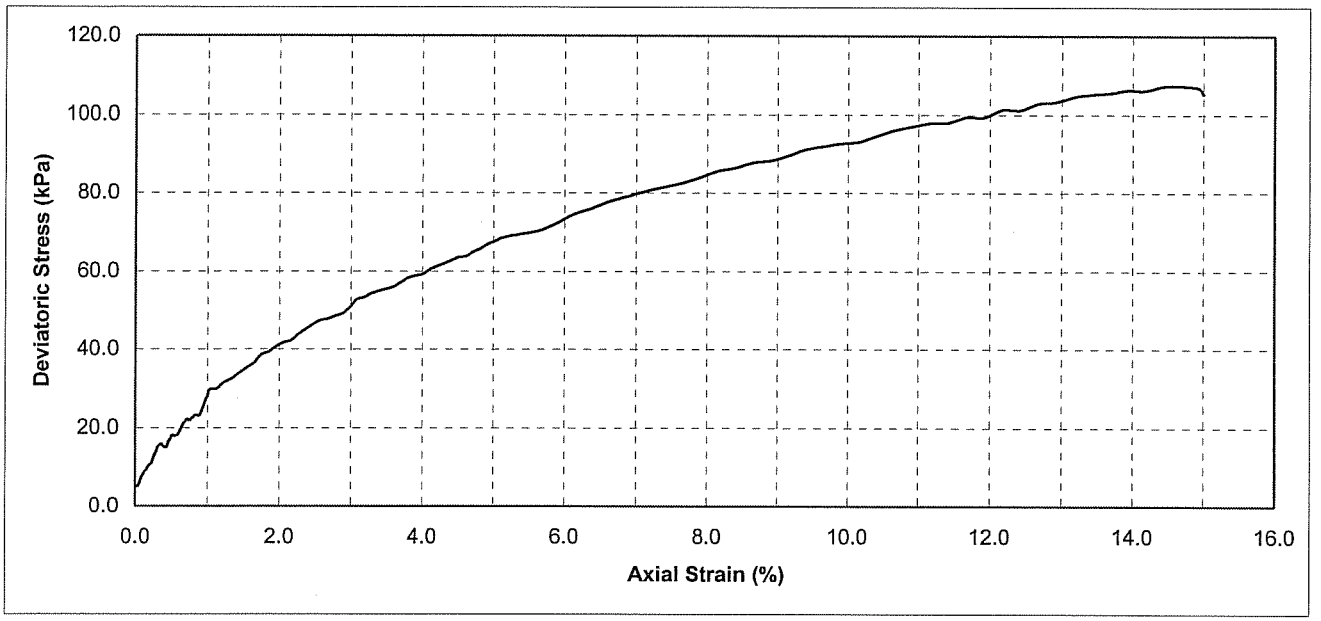
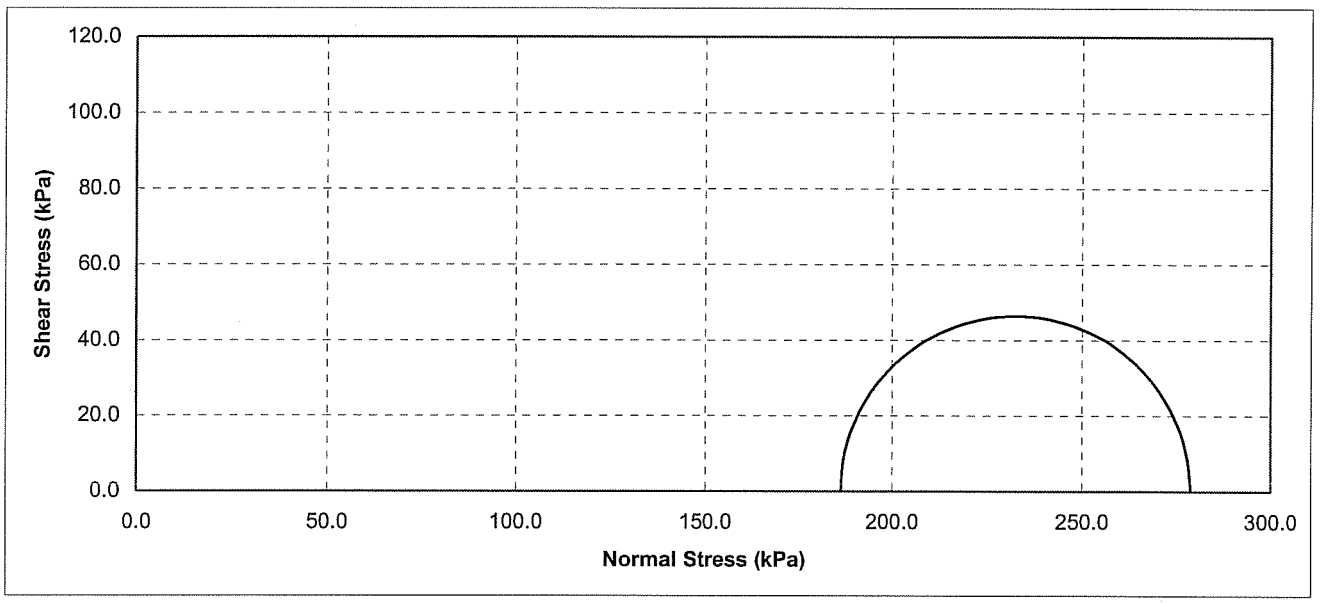




Boring No.	Sample No.	Depth (ft)	Soil Type	Dry Density (pcf)	Moisture Content (%)	Conf. Stress (ksf)	Max. Dev. Stress (ksf)	Initial Saturation (%)
06-14	D-10	49	Olive Brown, LEAN CLAY (CL)	89.9	33.84	3.89	1.93	104.4

Earth Mechanics, Inc. Geotechnical and Earthquake Engineering		**Dumbarton Toll Bridge**
		UNCONSOLIDATED UNDRAINED TEST
Project No. : 06-159	**Date :** 05/15/07	**(ASTM D2850)** Figure No. :





Boring No.	Sample No.	Depth (m)	Soil Type	Dry Density (kN/m^3)	Moisture Content (%)	Conf. Stress (kPa)	Max. Dev. Stress (kPa)	Initial Saturation (%)
06-14	D-10	14.94	Olive Brown, LEAN CLAY (CL)	14.1	33.8	186.2	92.6	104.4

Earth Mechanics, Inc. Geotechnical and Earthquake Engineering	**Dumbarton Toll Bridge**
	UNCONSOLIDATED UNDRAINED TEST
Project No. : 06-159 **Date :** 05/15/07	**(ASTM D2850)** Figure No. :

DIRECT SHEAR TEST

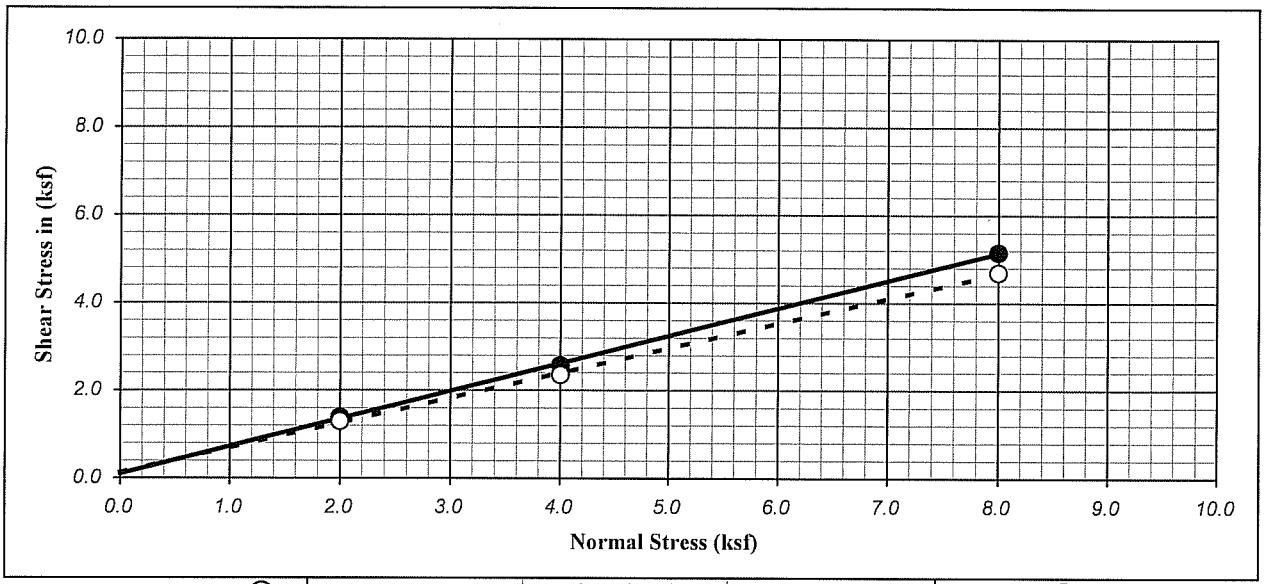
ASTM D-3080-90

Project No. : 06-159 **Project Name :** BATA/Dumbarton Toll Bridge

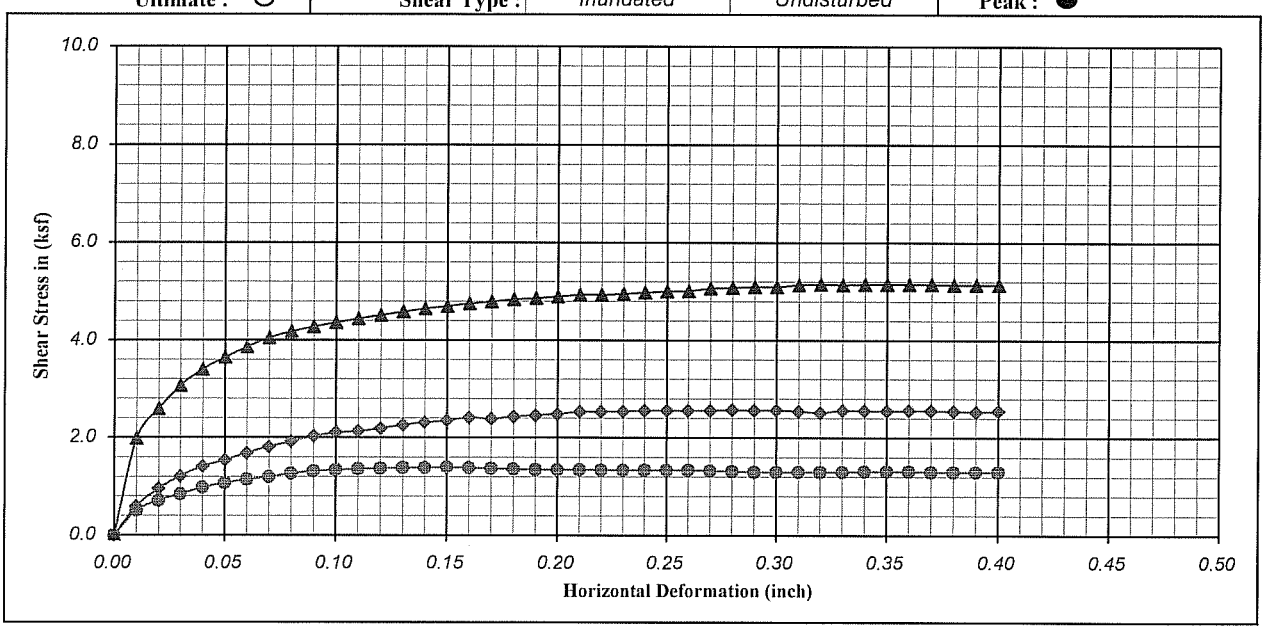
Boring No. : 06-1			Saturated		Field Moisture	x	Inundated	**Specific Gravity** (Assumed) :	2.70
Sample No. : D-7		x	Undisturbed		Remolded		Consolidated-Drained	**Shear Rate** (inch/min) :	0.02
Depth (ft/m) :	34.0 / 10.37	x	Shear Once		Reshear		Residual	**Data File Number :**	615903
Description :	Silty Sand with pockets of Silt (SM)								

Percent Saturation (%)	97.60		**File No. :**	615903 1			**Shear Deflection**		**Normal Stress (psf/ksf/kPa)**										
Prepared By : RJ	**Date :** 2/2/5/07		**Normal Stress**						2000	2.00	95.8	4000	4.0	191.5	8000	8.0	383.0		
Tested By : RJ	**Date :** 2/2/5/07								**Shear Stress (psf/ksf/kPa)**										
Computed By : LCC	**Date :** 03/07/07		**2.00**	(ksf)			(inch)	(mm)											
Checked By :	**Date :**						0.00	0.00	0.0	0.0	0.0	0.00	0.0	0.00	0.00	0.0	0.0		
Percent Consolidation (%)		**Before**		**After**			0.010	0.03	504	0.50	24.1	588	0.59	28.2	1980	1.98	94.5		
Height of Sample (inch)		1.00		1.0000			0.020	0.05	708	0.71	33.9	948	0.95	45.4	2592	2.59	123.6		
Diameter of Sample (inch)		2.42		2.42			0.030	0.08	840	0.84	40.2	1212	1.21	58.0	3060	3.06	146.0		
Dial Reading-Consolidation (inch)							0.040	0.10	972	0.97	46.5	1404	1.40	67.2	3396	3.40	162.0		
Weight of Soil + Ring (gm)		189.18					0.050	0.13	1068	1.07	51.1	1536	1.54	73.5	3648	3.65	174.0		
Weight of Ring (gm)		45.84					0.060	0.15	1140	1.14	54.6	1680	1.68	80.4	3864	3.86	184.3		
Weight of Wet Soil + Cont. (gm)				145.80			0.070	0.18	1188	1.19	56.9	1812	1.81	86.8	4044	4.04	192.9		
Weight of Dry Soil + Cont. (gm)				112.03			0.080	0.20	1260	1.26	60.3	1920	1.92	91.9	4176	4.18	199.2		
Weight of Cont. (gm) **No.**				3.71			0.090	0.23	1308	1.31	62.6	2028	2.03	97.1	4272	4.27	203.8		
Moisture Content (%)				31.18			0.100	0.25	1332	1.33	63.8	2100	2.10	100.5	4356	4.36	207.8		
Wet Density (pcf / kN/m^3)		118.72	18.69				0.110	0.28	1356	1.36	64.9	2124	2.12	101.7	4440	4.44	211.8		
Dry Density (pcf / kN/m^3)		90.50	14.25				0.120	0.30	1368	1.37	65.5	2184	2.18	104.6	4512	4.51	215.2		
Percent Saturation (%)	91.89		**File No. :**	615903 2			0.130	0.33	1380	1.38	66.1	2256	2.26	108.0	4584	4.58	218.7		
Prepared By : RJ	**Date :** 2/2/5/07		**Normal Stress**				0.140	0.36	1380	1.38	66.1	2316	2.32	110.9	4644	4.64	221.5		
Tested By : RJ	**Date :** 2/2/5/07		**4.00**	(ksf)			0.150	0.38	1392	1.39	66.6	2352	2.35	112.6	4692	4.69	223.8		
Percent Consolidation (%)		**Before**		**After**			0.160	0.41	1380	1.38	66.1	2412	2.41	115.5	4752	4.75	226.7		
Height of Sample (inch)		1.00		1.0000			0.170	0.43	1368	1.37	65.5	2388	2.39	114.3	4788	4.79	228.4		
Diameter of Sample (inch)		2.42		2.42			0.180	0.46	1356	1.36	64.9	2436	2.44	116.6	4836	4.84	230.7		
Dial Reading-Consolidation (inch)							0.190	0.48	1344	1.34	64.4	2460	2.46	117.8	4860	4.86	231.8		
Weight of Soil + Ring (gm)		183.91					0.200	0.51	1344	1.34	64.4	2484	2.48	118.9	4896	4.90	233.5		
Weight of Ring (gm)		46.77					0.210	0.53	1344	1.34	64.4	2532	2.53	121.2	4932	4.93	235.3		
Weight of Wet Soil + Cont. (gm)				133.16			0.220	0.56	1332	1.33	63.8	2532	2.53	121.2	4932	4.93	235.3		
Weight of Dry Soil + Cont. (gm)				100.83			0.230	0.58	1332	1.33	63.8	2544	2.54	121.8	4956	4.96	236.4		
Weight of Cont. (gm) **No.**				3.69			0.240	0.61	1332	1.33	63.8	2556	2.56	122.4	4980	4.98	237.6		
Moisture Content (%)				33.28			0.250	0.64	1332	1.33	63.8	2556	2.56	122.4	5004	5.00	238.7		
Wet Density (pcf / kN/m^3)		113.58	17.88				0.260	0.66	1332	1.33	63.8	2556	2.56	122.4	5016	5.02	239.3		
Dry Density (pcf / kN/m^3)		85.22	13.41				0.270	0.69	1320	1.32	63.2	2556	2.56	122.4	5064	5.06	241.6		
Percent Saturation (%)	98.04		**File No. :**	615903 3			0.280	0.71	1308	1.31	62.6	2568	2.57	123.0	5076	5.08	242.1		
Prepared By : RJ	**Date :** 2/2/5/07		**Normal Stress**				0.290	0.74	1296	1.30	62.1	2568	2.57	123.0	5100	5.10	243.3		
Tested By : RJ	**Date :** 2/2/5/07		**8.00**	(ksf)			0.300	0.76	1296	1.30	62.1	2568	2.57	123.0	5100	5.10	243.3		
Percent Consolidation (%)		**Before**		**After**			0.310	0.79	1296	1.30	62.1	2544	2.54	121.8	5136	5.14	245.0		
Height of Sample (inch)		1.00		1.0000			0.320	0.81	1296	1.30	62.1	2520	2.52	120.7	5148	5.15	245.6		
Diameter of Sample (inch)		2.42		2.42			0.330	0.84	1296	1.30	62.1	2556	2.56	122.4	5136	5.14	245.0		
Dial Reading-Consolidation (inch)							0.340	0.86	1308	1.31	62.6	2556	2.56	122.4	5148	5.15	245.6		
Weight of Soil + Ring (gm)		191.80					0.350	0.89	1308	1.31	62.6	2544	2.54	121.8	5148	5.15	245.6		
Weight of Ring (gm)		45.31					0.360	0.91	1308	1.31	62.6	2556	2.56	122.4	5148	5.15	245.6		
Weight of Wet Soil + Cont. (gm)				146.20			0.370	0.94	1296	1.30	62.1	2556	2.56	122.4	5148	5.15	245.6		
Weight of Dry Soil + Cont. (gm)				114.57			0.380	0.97	1296	1.30	62.1	2544	2.54	121.8	5136	5.14	245.0		
Weight of Cont. (gm) **No.**				3.69			0.390	0.99	1296	1.30	62.1	2532	2.53	121.2	5136	5.14	245.0		
Moisture Content (%)				28.53			0.400	1.02	1296	1.30	62.1	2544	2.54	121.8	5136	5.14	245.0		
Wet Density (pcf / kN/m^3)		121.33	19.10					0.00											
Dry Density (pcf / kN/m^3)		94.40	14.86					0.00											

Strength	(ksf)	(kPa)	(ksf)	(kPa)	(ksf)	(kPa)		0.00
Peak	1.39	66.65	2.57	122.96	5.15	246.49		0.00
Ultimate	1.30	62.05	2.35	112.61	4.69	224.65		0.00



Ultimate : ○	Shear Type :	Inundated	Undisturbed	Peak : ●



Boring No. : 06-1		**Strength Intercept (C) :**	0.10	(ksf)	**Peak**	0.13	(ksf)	**Ultimate**
Sample No. : D-7			4.88	(kPa)		6.03	(kPa)	
Depth (ft/m) : 34.0	10.37	**Friction Angle (ϕ) :**	32.16	Degree		29.63	Degree	
Description : Silty Sand with pockets of Silt (SM)						**Shear Rate** (inch/minute) :		0.02

SYMBOL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DRY DENSITY (kN/m^3)	VOID RATIO	NORMAL STRESS (ksf)	NORMAL STRESS (kPa)	PEAK STRESS (ksf)	PEAK STRESS (kPa)	ULTIMATE STRESS (ksf)	ULTIMATE STRESS (kPa)
●	31.18	90.50	14.25	0.86	2.00	95.76	1.39	66.65	1.30	62.05
◆	33.28	85.22	13.41	0.98	4.00	191.52	2.57	122.96	2.35	112.61
▲	28.53	94.40	14.86	0.79	8.00	383.04	5.15	246.49	4.69	224.65

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

Dumbarton Toll Bridge

DIRECT SHEAR TEST (ASTM D-3080)

Project No. : 06-159 | **Date :** 2/2/5/07

Figure No. :

DIRECT SHEAR TEST

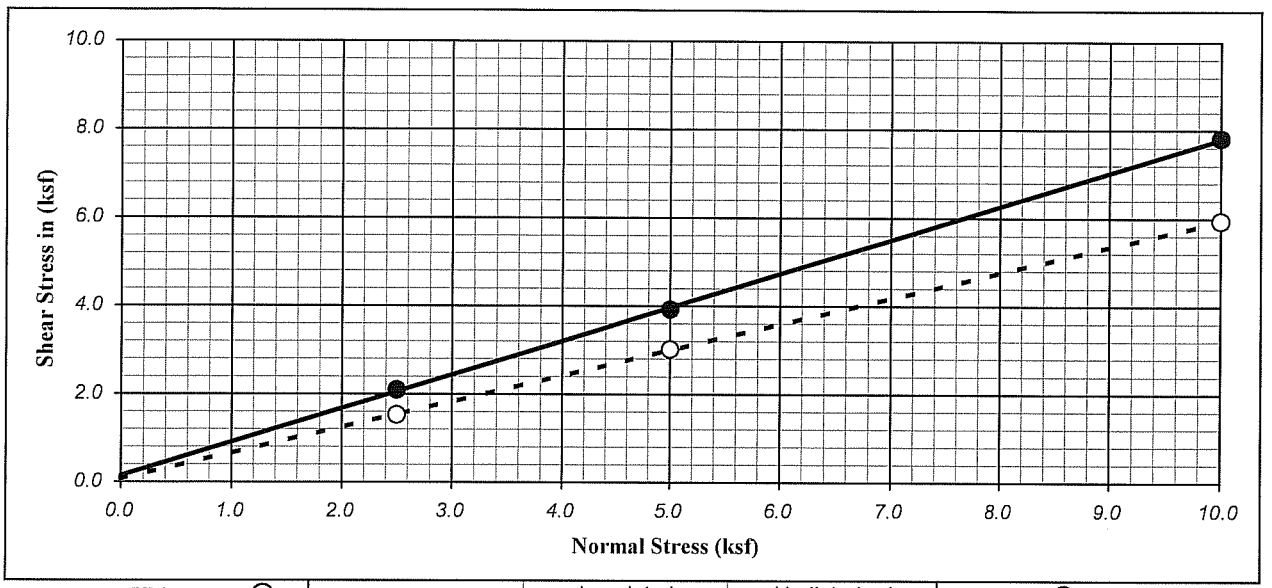
ASTM D-3080-90

Project No. : 06-159 **Project Name :** BATA/Dumbarton Toll Bridge

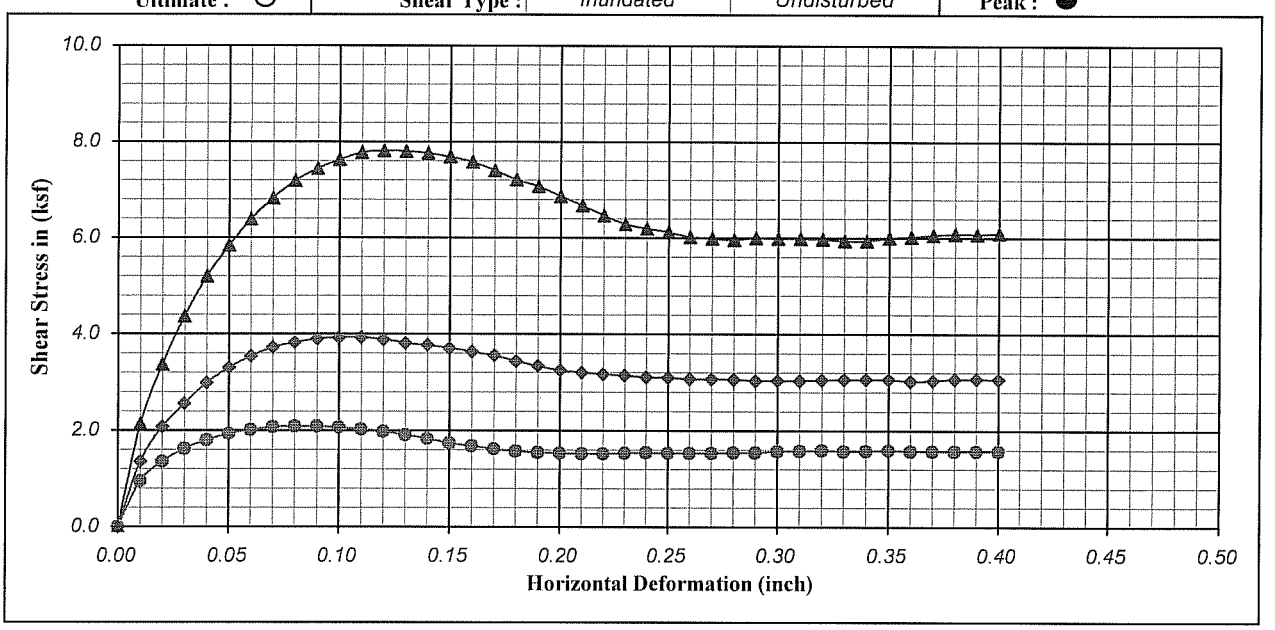
Boring No. : 06-1			Saturated		Field Moisture	x	Inundated	**Specific Gravity** (Assumed) :	2.70
Sample No. : D-15		x	Undisturbed		Remolded		Consolidated-Drained	**Shear Rate** (inch/min) :	0.02
Depth (ft/m) : 74.0	22.57	x	Shear Once		Reshear		Residual	**Data File Number :**	615904
Description : Sand with Gravel (SP)									

Percent Saturation (%)	100.68		**File No. :**	615904 1			**Shear Deflection**		**Normal Stress (psf/ksf/kPa)**											
Prepared By : RJ	**Date :** 02/25/07		**Normal Stress**						2500	2.50	119.7	5000	5.0	239.4	10000	10.0	478.8			
Tested By : RJ	**Date :** 02/25/07						(inch)	(mm)	**Shear Stress (psf/ksf/kPa)**											
Computed By : LCC	**Date :** 03/07/07		**2.50**	(ksf)			0.000	0.00	0.0	0.0	0.0	0.00	0.0	0.00	0.0	0.0	0.0			
Checked By :	**Date :**						0.010	0.03	948	0.95	45.4	1356	1.36	64.9	2136	2.14	101.9			
Percent Consolidation (%)		**Before**		**After**			0.020	0.05	1356	1.36	64.9	2076	2.08	99.4	3372	3.37	160.9			
Height of Sample (inch)		1.00		1.0000			0.030	0.08	1620	1.62	77.6	2556	2.56	122.4	4368	4.37	208.4			
Diameter of Sample (inch)		2.42		2.42			0.040	0.10	1800	1.80	86.2	2988	2.99	143.1	5196	5.20	247.9			
Dial Reading-Consolidation (inch)							0.050	0.13	1932	1.93	92.5	3300	3.30	158.0	5843	5.84	278.7			
Weight of Soil + Ring (gm)		200.07					0.060	0.15	2016	2.02	96.5	3540	3.54	169.5	6383	6.38	304.5			
Weight of Ring (gm)		43.52					0.070	0.18	2076	2.08	99.4	3720	3.72	178.1	6827	6.83	325.7			
Weight of Wet Soil + Cont. (gm)				157.66			0.080	0.20	2088	2.09	100.0	3828	3.83	183.3	7187	7.19	342.8			
Weight of Dry Soil + Cont. (gm)				130.18			0.090	0.23	2088	2.09	100.0	3900	3.90	186.7	7439	7.44	354.9			
Weight of Cont. (gm) No.				3.62			0.100	0.25	2064	2.06	98.8	3924	3.92	187.9	7631	7.63	364.0			
Moisture Content (%)				21.71			0.110	0.28	2028	2.03	97.1	3924	3.92	187.9	7775	7.78	370.9			
Wet Density (pcf / kN/m³)		129.66	20.41				0.120	0.30	1980	1.98	94.8	3888	3.89	186.2	7811	7.81	372.6			
Dry Density (pcf / kN/m³)		106.53	16.77				0.130	0.33	1908	1.91	91.4	3816	3.82	182.7	7799	7.80	372.0			
Percent Saturation (%)	98.37		**File No. :**	615904 2			0.140	0.36	1836	1.84	87.9	3768	3.77	180.4	7763	7.76	370.3			
Prepared By : RJ	**Date :** 02/25/07		**Normal Stress**				0.150	0.38	1740	1.74	83.3	3708	3.71	177.5	7691	7.69	366.9			
Tested By : RJ	**Date :** 02/25/07		**5.00**	(ksf)			0.160	0.41	1680	1.68	80.4	3636	3.64	174.1	7583	7.58	361.7			
Percent Consolidation (%)		**Before**		**After**			0.170	0.43	1620	1.62	77.6	3552	3.55	170.1	7403	7.40	353.1			
Height of Sample (inch)		1.00		1.0000			0.180	0.46	1572	1.57	75.3	3444	3.44	164.9	7211	7.21	344.0			
Diameter of Sample (inch)		2.42		2.42			0.190	0.48	1548	1.55	74.1	3336	3.34	159.7	7067	7.07	337.1			
Dial Reading-Consolidation (inch)							0.200	0.51	1536	1.54	73.5	3252	3.25	155.7	6863	6.86	327.4			
Weight of Soil + Ring (gm)		201.09					0.210	0.53	1524	1.52	73.0	3204	3.20	153.4	6671	6.67	318.2			
Weight of Ring (gm)		45.28					0.220	0.56	1524	1.52	73.0	3168	3.17	151.7	6467	6.47	308.5			
Weight of Wet Soil + Cont. (gm)				156.99			0.230	0.58	1536	1.54	73.5	3144	3.14	150.5	6287	6.29	299.9			
Weight of Dry Soil + Cont. (gm)				130.07			0.240	0.61	1548	1.55	74.1	3108	3.11	148.8	6191	6.19	295.3			
Weight of Cont. (gm) No.				3.60			0.250	0.64	1536	1.54	73.5	3096	3.10	148.2	6119	6.12	291.9			
Moisture Content (%)				21.29			0.260	0.66	1536	1.54	73.5	3072	3.07	147.1	6023	6.02	287.3			
Wet Density (pcf / kN/m³)		129.05	20.31				0.270	0.69	1536	1.54	73.5	3072	3.07	147.1	5987	5.99	285.6			
Dry Density (pcf / kN/m³)		106.40	16.75				0.280	0.71	1548	1.55	74.1	3060	3.06	146.5	5963	5.96	284.4			
Percent Saturation (%)	101.15		**File No. :**	615904 3			0.290	0.74	1548	1.55	74.1	3036	3.04	145.4	5999	6.00	286.2			
Prepared By : RJ	**Date :** 02/25/07		**Normal Stress**				0.300	0.76	1572	1.57	75.3	3036	3.04	145.4	5987	5.99	285.6			
Tested By : RJ	**Date :** 02/25/07		**10.00**	(ksf)			0.310	0.79	1584	1.58	75.8	3036	3.04	145.4	5987	5.99	285.6			
Percent Consolidation (%)		**Before**		**After**			0.320	0.81	1596	1.60	76.4	3048	3.05	145.9	5975	5.98	285.0			
Height of Sample (inch)		1.00		1.0000			0.330	0.84	1572	1.57	75.3	3060	3.06	146.5	5939	5.94	283.3			
Diameter of Sample (inch)		2.42		2.42			0.340	0.86	1584	1.58	75.8	3060	3.06	146.5	5939	5.94	283.3			
Dial Reading-Consolidation (inch)							0.350	0.89	1596	1.60	76.4	3060	3.06	146.5	5999	6.00	286.2			
Weight of Soil + Ring (gm)		202.85					0.360	0.91	1572	1.57	75.3	3024	3.02	144.8	6023	6.02	287.3			
Weight of Ring (gm)		45.07					0.370	0.94	1572	1.57	75.3	3036	3.04	145.4	6059	6.06	289.0			
Weight of Wet Soil + Cont. (gm)				159.07			0.380	0.97	1572	1.57	75.3	3072	3.07	147.1	6083	6.08	290.2			
Weight of Dry Soil + Cont. (gm)				132.07			0.390	0.99	1572	1.57	75.3	3072	3.07	147.1	6071	6.07	289.6			
Weight of Cont. (gm) No.				3.59			0.400	1.02	1572	1.57	75.3	3060	3.06	146.5	6095	6.10	290.7			
Moisture Content (%)				21.01				0.00												
Wet Density (pcf / kN/m³)		130.68	20.57					0.00												
Dry Density (pcf / kN/m³)		107.98	17.00					0.00												

Strength	(ksf)	(kPa)	(ksf)	(kPa)	(ksf)	(kPa)
Peak	2.09	99.97	3.92	187.88	7.81	373.99
Ultimate	1.52	72.97	3.02	144.79	5.94	284.36



Ultimate : ○	Shear Type :	Inundated	Undisturbed	Peak : ●



Boring No. : 06-1		**Strength Intercept (C) :**	0.14	(ksf)	**Peak**	0.07	(ksf)	**Ultimate**
Sample No. : D-15			6.92	(kPa)		3.18	(kPa)	
Depth (ft/m) : 74.0	22.57	**Friction Angle (ϕ) :**	37.42	Degree		30.45	Degree	
Description : Sand with Gravel (SP)						**Shear Rate** (inch/minute) :		0.02

SYMBOL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DRY DENSITY (kN/m^3)	VOID RATIO	NORMAL STRESS (ksf)	NORMAL STRESS (kPa)	PEAK STRESS (ksf)	PEAK STRESS (kPa)	ULTIMATE STRESS (ksf)	ULTIMATE STRESS (kPa)
●	21.71	106.53	16.77	0.58	2.50	119.70	2.09	99.97	1.52	72.97
◆	21.29	106.40	16.75	0.58	5.00	239.40	3.92	187.88	3.02	144.79
▲	21.01	107.98	17.00	0.56	10.00	478.80	7.81	373.99	5.94	284.36

Earth Mechanics, Inc.
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Dumbarton Toll Bridge

DIRECT SHEAR TEST (ASTM D-3080)

Project No. : 06-159 | **Date :** 02/25/07

Figure No. :

DIRECT SHEAR TEST

ASTM D-3080-90

Project No. : 06-159 **Project Name :** BATA/Dumbarton Toll Bridge

Boring No. : 06-2			Saturated		Field Moisture	x	Inundated	**Specific Gravity** (Assumed) :	2.70
Sample No. : D-4		x	Undisturbed		Remolded		Consolidated-Drained	**Shear Rate** (inch/min) :	0.02
Depth (ft/m) :	24.0 7.32	x	Shear Once		Reshear		Residual	**Data File Number :**	615905
Description : Clayey Sand (SC)									

Percent Saturation (%)	97.23		**File No. :**	615905 1																		
Prepared By : RJ	**Date :** 02/25/07		**Normal Stress**																			
Tested By : RJ	**Date :** 02/25/07																					
Computed By : LCC	**Date :** 03/07/07		**2.50**	(ksf)																		
Checked By :	**Date :**																					
Percent Consolidation (%)		**Before**		**After**																		
Height of Sample (inch)		1.00		1.0000																		
Diameter of Sample (inch)		2.42		2.42																		
Dial Reading-Consolidation (inch)																						
Weight of Soil + Ring (gm)		196.64																				
Weight of Ring (gm)		43.63																				
Weight of Wet Soil + Cont. (gm)				151.58																		
Weight of Dry Soil + Cont. (gm)				124.09																		
Weight of Cont. (gm) No.				3.60																		
Moisture Content (%)				22.82																		
Wet Density (pcf / kN/m³)		126.73	19.95																			
Dry Density (pcf / kN/m³)		103.19	16.24																			
Percent Saturation (%)	102.28		**File No. :**	615905 2																		
Prepared By : RJ	**Date :** 02/25/07		**Normal Stress**																			
Tested By : RJ	**Date :** 02/25/07		**5.00**	(ksf)																		
Percent Consolidation (%)		**Before**		**After**																		
Height of Sample (inch)		1.00		1.0000																		
Diameter of Sample (inch)		2.42		2.42																		
Dial Reading-Consolidation (inch)																						
Weight of Soil + Ring (gm)		201.80																				
Weight of Ring (gm)		43.64																				
Weight of Wet Soil + Cont. (gm)				155.73																		
Weight of Dry Soil + Cont. (gm)				129.12																		
Weight of Cont. (gm) No.				3.59																		
Moisture Content (%)				21.20																		
Wet Density (pcf / kN/m³)		130.99	20.62																			
Dry Density (pcf / kN/m³)		108.08	17.01																			
Percent Saturation (%)	95.02		**File No. :**	615905 3																		
Prepared By : RJ	**Date :** 02/25/07		**Normal Stress**																			
Tested By : RJ	**Date :** 02/25/07		**10.00**	(ksf)																		
Percent Consolidation (%)		**Before**		**After**																		
Height of Sample (inch)		1.00		1.0000																		
Diameter of Sample (inch)		2.42		2.42																		
Dial Reading-Consolidation (inch)																						
Weight of Soil + Ring (gm)		196.98																				
Weight of Ring (gm)		42.87																				
Weight of Wet Soil + Cont. (gm)				148.38																		
Weight of Dry Soil + Cont. (gm)				123.18																		
Weight of Cont. (gm) No.				3.64																		
Moisture Content (%)				21.08																		
Wet Density (pcf / kN/m³)		127.64	20.09																			
Dry Density (pcf / kN/m³)		105.42	16.59																			

Strength	(ksf)	(kPa)	(ksf)	(kPa)	(ksf)	(kPa)
Peak	1.69	81.01	3.48	166.62	6.29	301.02
Ultimate	1.60	76.42	3.16	151.11	5.88	281.49

Shear Deflection (inch)	(mm)	**Normal Stress (psf/ksf/kPa)** 2500	2.50	119.7	5000	5.0	239.4	10000	10.0	478.8
		Shear Stress (psf/ksf/kPa)								
0.000	0.00	0.0	0.0	0.0	0.00	0.0	0.00	0.0	0.0	0.0
0.010	0.03	312	0.31	14.9	732	0.73	35.0	1560	1.56	74.4
0.020	0.05	468	0.47	22.4	1164	1.16	55.7	2340	2.34	111.6
0.030	0.08	636	0.64	30.5	1560	1.56	74.7	3036	3.04	144.8
0.040	0.10	780	0.78	37.3	1872	1.87	89.6	3480	3.48	166.0
0.050	0.13	924	0.92	44.2	2172	2.17	104.0	3900	3.90	186.0
0.060	0.15	1044	1.04	50.0	2412	2.41	115.5	4140	4.14	197.5
0.070	0.18	1116	1.12	53.4	2592	2.59	124.1	4500	4.50	214.7
0.080	0.20	1212	1.21	58.0	2748	2.75	131.6	4788	4.79	228.4
0.090	0.23	1308	1.31	62.6	2904	2.90	139.0	4992	4.99	238.1
0.100	0.25	1368	1.37	65.5	3048	3.05	145.9	5196	5.20	247.9
0.110	0.28	1428	1.43	68.4	3132	3.13	150.0	5376	5.38	256.4
0.120	0.30	1488	1.49	71.2	3228	3.23	154.6	5531	5.53	263.8
0.130	0.33	1536	1.54	73.5	3300	3.30	158.0	5627	5.63	268.4
0.140	0.36	1560	1.56	74.7	3372	3.37	161.5	5747	5.75	274.1
0.150	0.38	1596	1.60	76.4	3408	3.41	163.2	5879	5.88	280.4
0.160	0.41	1620	1.62	77.6	3432	3.43	164.3	5963	5.96	284.4
0.170	0.43	1644	1.64	78.7	3468	3.47	166.0	6023	6.02	287.3
0.180	0.46	1656	1.66	79.3	3468	3.47	166.0	6083	6.08	290.2
0.190	0.48	1692	1.69	81.0	3480	3.48	166.6	6083	6.08	290.2
0.200	0.51	1692	1.69	81.0	3468	3.47	166.0	6155	6.16	293.6
0.210	0.53	1692	1.69	81.0	3444	3.44	164.9	6215	6.22	296.5
0.220	0.56	1680	1.68	80.4	3420	3.42	163.7	6227	6.23	297.0
0.230	0.58	1680	1.68	80.4	3408	3.41	163.2	6239	6.24	297.6
0.240	0.61	1692	1.69	81.0	3384	3.38	162.0	6239	6.24	297.6
0.250	0.64	1692	1.69	81.0	3372	3.37	161.5	6227	6.23	297.0
0.260	0.66	1692	1.69	81.0	3336	3.34	159.7	6191	6.19	295.3
0.270	0.69	1680	1.68	80.4	3324	3.32	159.2	6203	6.20	295.9
0.280	0.71	1644	1.64	78.7	3312	3.31	158.6	6203	6.20	295.9
0.290	0.74	1656	1.66	79.3	3300	3.30	158.0	6239	6.24	297.6
0.300	0.76	1644	1.64	78.7	3276	3.28	156.9	6251	6.25	298.2
0.310	0.79	1644	1.64	78.7	3264	3.26	156.3	6275	6.28	299.3
0.320	0.81	1656	1.66	79.3	3264	3.26	156.3	6275	6.28	299.3
0.330	0.84	1656	1.66	79.3	3252	3.25	155.7	6275	6.28	299.3
0.340	0.86	1656	1.66	79.3	3252	3.25	155.7	6287	6.29	299.9
0.350	0.89	1644	1.64	78.7	3240	3.24	155.1	6275	6.28	299.3
0.360	0.91	1644	1.64	78.7	3228	3.23	154.6	6239	6.24	297.6
0.370	0.94	1644	1.64	78.7	3204	3.20	153.4	6263	6.26	298.8
0.380	0.97	1644	1.64	78.7	3168	3.17	151.7	6275	6.28	299.3
0.390	0.99	1656	1.66	79.3	3168	3.17	151.7	6287	6.29	299.9
0.400	1.02	1644	1.64	78.7	3156	3.16	151.1	6263	6.26	298.8
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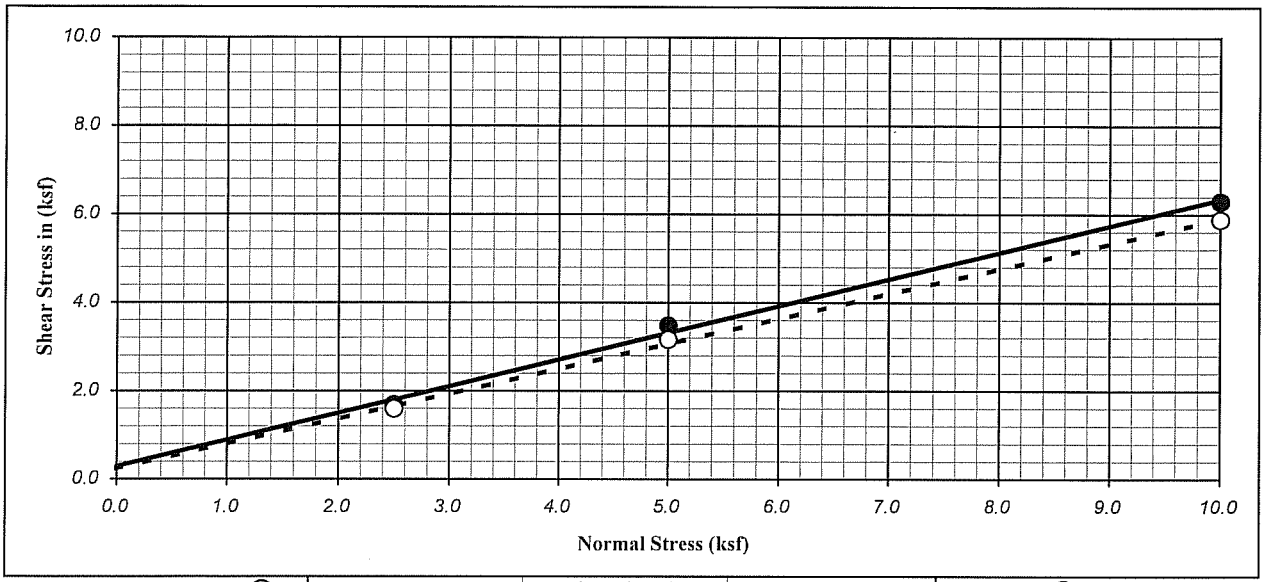
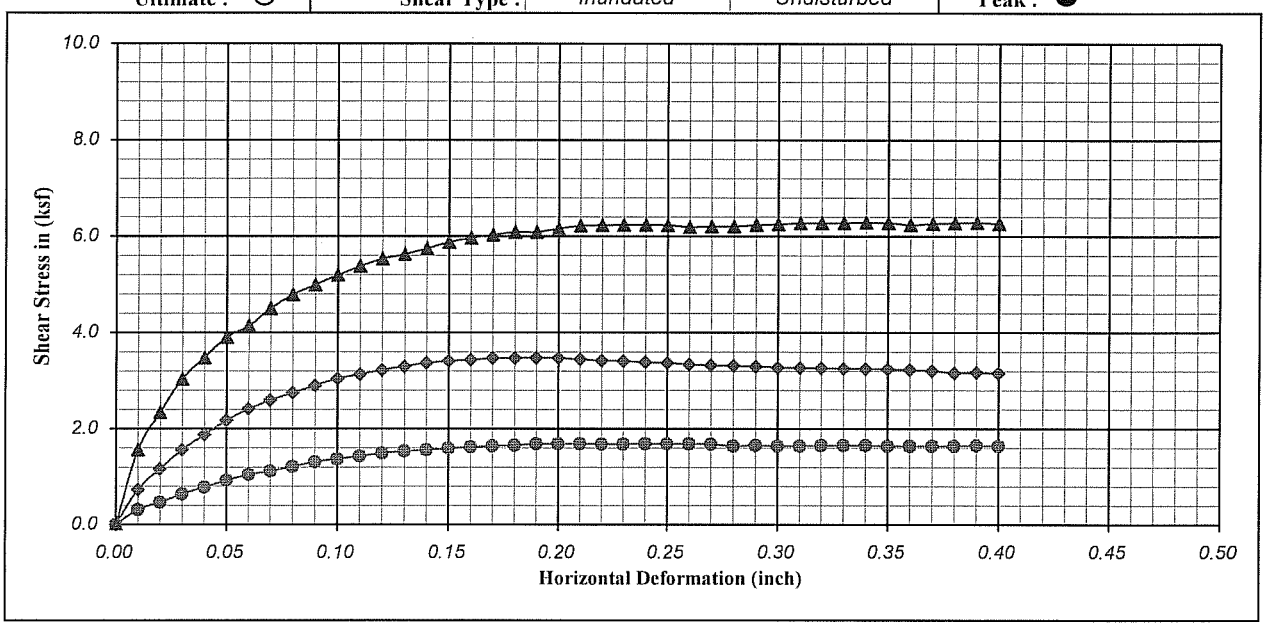


Ultimate : ○	Shear Type :	Inundated	Undisturbed	Peak : ●



Boring No. : 06-2		**Strength Intercept (C) :**	0.29	(ksf)	**Peak**	0.23	(ksf)	**Ultimate**
Sample No. : D-4			13.81	(kPa)		11.23	(kPa)	
Depth (ft/m) : 24.0	7.32	**Friction Angle (ϕ) :**	31.19	Degree		29.57	Degree	
Description : Clayey Sand (SC)						**Shear Rate** (inch/minute) :		0.02

SYMBOL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DRY DENSITY (kN/m^3)	VOID RATIO	NORMAL STRESS (ksf)	NORMAL STRESS (kPa)	PEAK STRESS (ksf)	PEAK STRESS (kPa)	ULTIMATE STRESS (ksf)	ULTIMATE STRESS (kPa)
●	22.82	103.19	16.24	0.63	2.50	119.70	1.69	81.01	1.60	76.42
◆	21.20	108.08	17.01	0.56	5.00	239.40	3.48	166.62	3.16	151.11
▲	21.08	105.42	16.59	0.60	10.00	478.80	6.29	301.02	5.88	281.49

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

Dumbarton Toll Bridge

DIRECT SHEAR TEST (ASTM D-3080)

Project No. : 06-159 | **Date :** 02/25/07

Figure No. :

DIRECT SHEAR TEST

ASTM D-3080-90

Project No. : 06-159 **Project Name :** BATA/Dumbarton Toll Bridge

Boring No. :	06-2		Saturated		Field Moisture	x	Inundated — **Specific Gravity** (Assumed) **:** 2.70
Sample No. :	D-11	x	Undisturbed		Remolded		Consolidated-Drained — **Shear Rate** (inch/min) **:** 0.02
Depth (ft/m) **:**	59.0 / 18.00	x	Shear Once		Reshear		Residual — **Data File Number :** 615906
Description :	Silty Sand (SM)						

Specimen 1

Percent Saturation (%)	103.57	**File No. :** 615906 1
Prepared By : RJ	**Date :** 02/26/07	**Normal Stress**
Tested By : RJ	**Date :** 02/26/07	
Computed By : LCC	**Date :** 03/07/07	**2.50 (ksf)**
Checked By :	**Date :**	

	Before		After
Percent Consolidation (%)			
Height of Sample (inch)	1.00		1.0000
Diameter of Sample (inch)	2.42		2.42
Dial Reading-Consolidation (inch)			
Weight of Soil + Ring (gm)	194.16		
Weight of Ring (gm)	43.60		
Weight of Wet Soil + Cont. (gm)			148.74
Weight of Dry Soil + Cont. (gm)			116.97
Weight of Cont. (gm) No.			3.61
Moisture Content (%)			28.03
Wet Density (pcf / kN/m³)	124.70	19.63	
Dry Density (pcf / kN/m³)	97.40	15.33	

Specimen 2

Percent Saturation (%)	98.07	**File No. :** 615906 2
Prepared By : RJ	**Date :** 02/26/07	**Normal Stress**
Tested By : RJ	**Date :** 02/26/07	**5.00 (ksf)**

	Before		After
Percent Consolidation (%)			
Height of Sample (inch)	1.00		1.0000
Diameter of Sample (inch)	2.42		2.42
Dial Reading-Consolidation (inch)			
Weight of Soil + Ring (gm)	186.79		
Weight of Ring (gm)	43.37		
Weight of Wet Soil + Cont. (gm)			143.27
Weight of Dry Soil + Cont. (gm)			109.89
Weight of Cont. (gm) No.			3.63
Moisture Content (%)			31.41
Wet Density (pcf / kN/m³)	118.78	18.70	
Dry Density (pcf / kN/m³)	90.39	14.23	

Specimen 3

Percent Saturation (%)	92.57	**File No. :** 615906 3
Prepared By : RJ	**Date :** 02/26/07	**Normal Stress**
Tested By : RJ	**Date :** 02/26/07	**10.00 (ksf)**

	Before		After
Percent Consolidation (%)			
Height of Sample (inch)	1.00		1.0000
Diameter of Sample (inch)	2.42		2.42
Dial Reading-Consolidation (inch)			
Weight of Soil + Ring (gm)	188.78		
Weight of Ring (gm)	44.31		
Weight of Wet Soil + Cont. (gm)			141.76
Weight of Dry Soil + Cont. (gm)			112.30
Weight of Cont. (gm) No.			3.61
Moisture Content (%)			27.10
Wet Density (pcf / kN/m³)	119.65	18.83	
Dry Density (pcf / kN/m³)	94.14	14.82	

Strength	(ksf)	(kPa)	(ksf)	(kPa)	(ksf)	(kPa)
Peak	1.90	90.78	3.31	158.58	6.28	300.45
Ultimate	1.58	75.84	3.11	148.81	5.89	282.06

Shear Data

Shear Deflection (inch)	Shear Deflection (mm)	Normal Stress (psf/ksf/kPa): 2500	2.50	119.7	5000	5.0	239.4	10000	10.0	478.8
		Shear Stress (psf/ksf/kPa)								
0.000	0.00	0.0	0.0	0.0	0.00	0.0	0.00	0.0	0.0	0.0
0.010	0.03	312	0.31	14.9	900	0.90	43.1	1356	1.36	64.7
0.020	0.05	564	0.56	27.0	1380	1.38	66.1	2388	2.39	113.9
0.030	0.08	780	0.78	37.3	1776	1.78	85.0	3108	3.11	148.3
0.040	0.10	960	0.96	46.0	2076	2.08	99.4	3744	3.74	178.6
0.050	0.13	1140	1.14	54.6	2316	2.32	110.9	4164	4.16	198.6
0.060	0.15	1284	1.28	61.5	2520	2.52	120.7	4500	4.50	214.7
0.070	0.18	1428	1.43	68.4	2700	2.70	129.3	4812	4.81	229.5
0.080	0.20	1560	1.56	74.7	2832	2.83	135.6	5064	5.06	241.6
0.090	0.23	1656	1.66	79.3	2940	2.94	140.8	5244	5.24	250.2
0.100	0.25	1740	1.74	83.3	3036	3.04	145.4	5423	5.42	258.7
0.110	0.28	1812	1.81	86.8	3108	3.11	148.8	5567	5.57	265.6
0.120	0.30	1860	1.86	89.1	3168	3.17	151.7	5687	5.69	271.3
0.130	0.33	1884	1.88	90.2	3216	3.22	154.0	5819	5.82	277.6
0.140	0.36	1896	1.90	90.8	3240	3.24	155.1	5879	5.88	280.4
0.150	0.38	1884	1.88	90.2	3276	3.28	156.9	5939	5.94	283.3
0.160	0.41	1860	1.86	89.1	3300	3.30	158.0	5951	5.95	283.9
0.170	0.43	1836	1.84	87.9	3312	3.31	158.6	5999	6.00	286.2
0.180	0.46	1836	1.84	87.9	3312	3.31	158.6	6047	6.05	288.5
0.190	0.48	1788	1.79	85.6	3276	3.28	156.9	6083	6.08	290.2
0.200	0.51	1740	1.74	83.3	3240	3.24	155.1	6155	6.16	293.6
0.210	0.53	1692	1.69	81.0	3204	3.20	153.4	6191	6.19	295.3
0.220	0.56	1644	1.64	78.7	3156	3.16	151.1	6239	6.24	297.6
0.230	0.58	1620	1.62	77.6	3132	3.13	150.0	6275	6.28	299.3
0.240	0.61	1608	1.61	77.0	3108	3.11	148.8	6275	6.28	299.3
0.250	0.64	1596	1.60	76.4	3108	3.11	148.8	6191	6.19	295.3
0.260	0.66	1596	1.60	76.4	3108	3.11	148.8	6095	6.10	290.7
0.270	0.69	1584	1.58	75.8	3108	3.11	148.8	6023	6.02	287.3
0.280	0.71	1584	1.58	75.8	3120	3.12	149.4	5927	5.93	282.7
0.290	0.74	1584	1.58	75.8	3132	3.13	150.0	5903	5.90	281.6
0.300	0.76	1584	1.58	75.8	3132	3.13	150.0	5903	5.90	281.6
0.310	0.79	1584	1.58	75.8	3156	3.16	151.1	5891	5.89	281.0
0.320	0.81	1596	1.60	76.4	3144	3.14	150.5	5903	5.90	281.6
0.330	0.84	1596	1.60	76.4	3156	3.16	151.1	5915	5.92	282.2
0.340	0.86	1596	1.60	76.4	3156	3.16	151.1	5939	5.94	283.3
0.350	0.89	1596	1.60	76.4	3156	3.16	151.1	5951	5.95	283.9
0.360	0.91	1596	1.60	76.4	3156	3.16	151.1	5963	5.96	284.4
0.370	0.94	1596	1.60	76.4	3156	3.16	151.1	5963	5.96	284.4
0.380	0.97	1608	1.61	77.0	3168	3.17	151.7	5975	5.98	285.0
0.390	0.99	1608	1.61	77.0	3168	3.17	151.7	5987	5.99	285.6
0.400	1.02	1620	1.62	77.6	3168	3.17	151.7	5987	5.99	285.6
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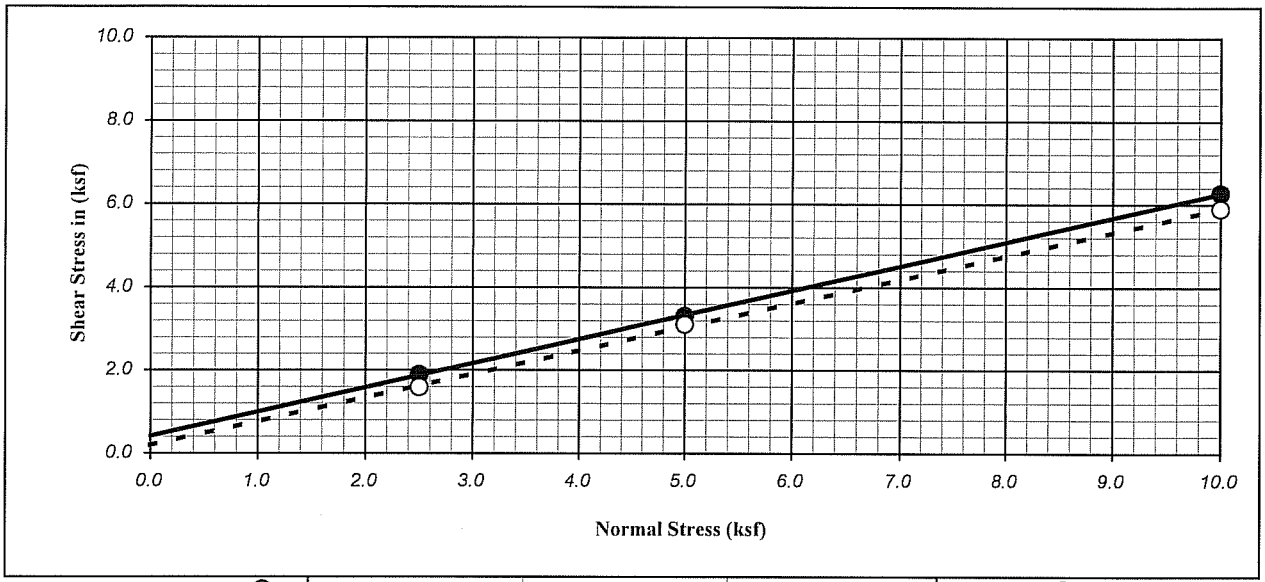
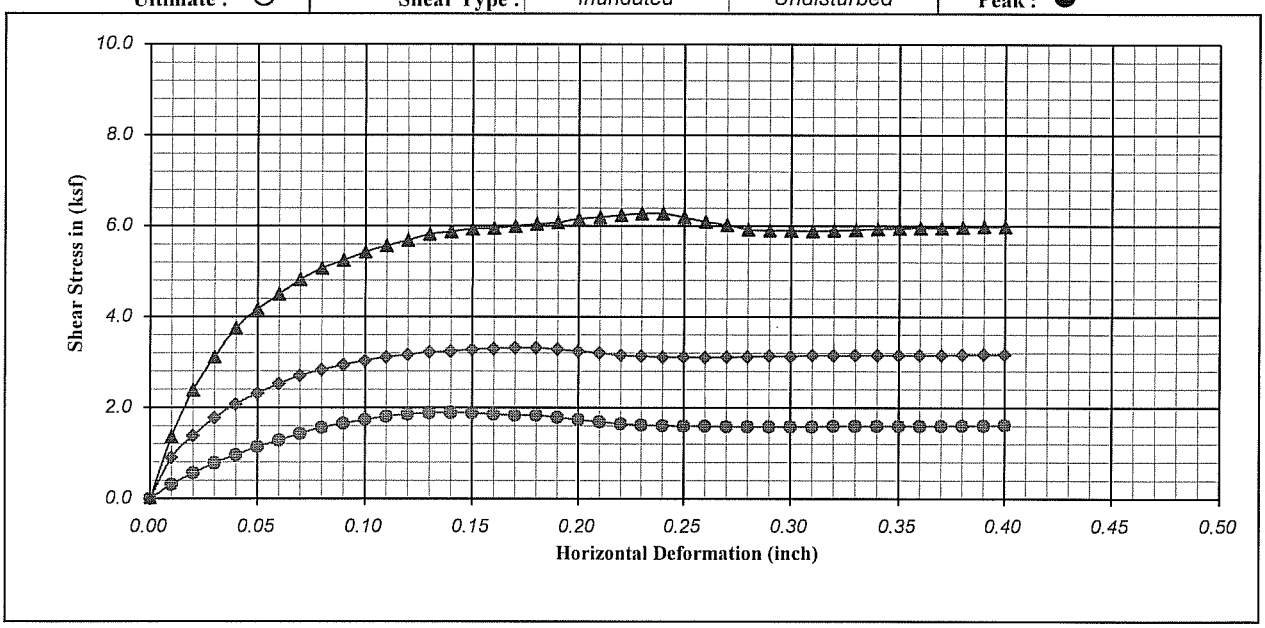


Ultimate : ○	Shear Type :	Inundated	Undisturbed	Peak : ●



Boring No. : 06-2		**Strength Intercept (C) :**	0.41	(ksf)	**Peak**	0.19	(ksf)	**Ultimate**
Sample No. : D-11			19.85	(kPa)		9.22	(kPa)	
Depth (ft/m) : 59.0	18.00	**Friction Angle (ϕ) :**	30.33	Degree		29.76	Degree	
Description : Silty Sand (SM)						**Shear Rate** (inch/minute) :		0.02

SYMBOL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DRY DENSITY (kN/m^3)	VOID RATIO	NORMAL STRESS (ksf)	NORMAL STRESS (kPa)	PEAK STRESS (ksf)	PEAK STRESS (kPa)	ULTIMATE STRESS (ksf)	ULTIMATE STRESS (kPa)
●	28.03	97.40	15.33	0.73	2.50	119.70	1.90	90.78	1.58	75.84
◆	31.41	90.39	14.23	0.86	5.00	239.40	3.31	158.58	3.11	148.81
▲	27.10	94.14	14.82	0.79	10.00	478.80	6.28	300.45	5.89	282.06

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

Dumbarton Toll Bridge

DIRECT SHEAR TEST (ASTM D-3080)

Project No. : 06-159 | **Date :** 02/26/07

Figure No. :

DIRECT SHEAR TEST

ASTM D-3080-90

Project No. : 06-159 **Project Name :** BATA/Dumbarton Toll Bridge

Boring No. : 06-2		**Saturated**		**Field Moisiture**	x	**Inundated**		**Specific Gravity** (Assumed) :	2.70
Sample No. : D-19	x	**Undisturbed**		**Remolded**		**Consolidated-Drained**		**Shear Rate** (inch/min) :	0.02
Depth (ft/m) : 99.0 30.20	x	**Shear Once**		**Reshear**		**Residual**		**Data File Number :**	615907
Description : Sand (SP)									

Percent Saturation (%)	101.03		**File No. :**	615907 1																			
Prepared By : RJ	**Date :** 02/26/07		**Normal Stress**																				
Tested By : RJ	**Date :** 02/26/07																						
Computed By : LCC	**Date :** 03/07/07		**2.50**	(ksf)																			
Checked By :	**Date :**																						
Percent Consolidation (%)		**Before**		**After**																			
Height of Sample (inch)		1.00		1.0000																			
Diameter of Sample (inch)		2.42		2.42																			
Dial Reading-Consolidation (inch)																							
Weight of Soil + Ring (gm)		206.29																					
Weight of Ring (gm)		46.04																					
Weight of Wet Soil + Cont. (gm)				162.68																			
Weight of Dry Soil + Cont. (gm)				137.00																			
Weight of Cont. (gm) No.				3.63																			
Moisture Content (%)				19.25																			
Wet Density (pcf / kN/m³)	132.72	20.89																					
Dry Density (pcf / kN/m³)	111.29	17.52																					
Percent Saturation (%)	95.68		**File No. :**	615907 2																			
Prepared By : RJ	**Date :** 02/26/07		**Normal Stress**																				
Tested By : RJ	**Date :** 02/26/07		**5.00**	(ksf)																			
Percent Consolidation (%)		**Before**		**After**																			
Height of Sample (inch)		1.00		1.0000																			
Diameter of Sample (inch)		2.42		2.42																			
Dial Reading-Consolidation (inch)																							
Weight of Soil + Ring (gm)		201.57																					
Weight of Ring (gm)		43.62																					
Weight of Wet Soil + Cont. (gm)				158.06																			
Weight of Dry Soil + Cont. (gm)				133.60																			
Weight of Cont. (gm) No.				3.61																			
Moisture Content (%)				18.82																			
Wet Density (pcf / kN/m³)	130.82	20.59																					
Dry Density (pcf / kN/m³)	110.10	17.33																					
Percent Saturation (%)	102.50		**File No. :**	615907 3																			
Prepared By : RJ	**Date :** 02/26/07		**Normal Stress**																				
Tested By : RJ	**Date :** 02/26/07		**10.00**	(ksf)																			
Percent Consolidation (%)		**Before**		**After**																			
Height of Sample (inch)		1.00		1.0000																			
Diameter of Sample (inch)		2.42		2.42																			
Dial Reading-Consolidation (inch)																							
Weight of Soil + Ring (gm)		207.90																					
Weight of Ring (gm)		45.61																					
Weight of Wet Soil + Cont. (gm)				161.96																			
Weight of Dry Soil + Cont. (gm)				137.34																			
Weight of Cont. (gm) No.				3.59																			
Moisture Content (%)				18.41																			
Wet Density (pcf / kN/m³)	134.41	21.16																					
Dry Density (pcf / kN/m³)	113.52	17.87																					

Strength	(ksf)	(kPa)	(ksf)	(kPa)	(ksf)	(kPa)
Peak	2.29	109.74	4.19	200.52	7.98	382.03
Ultimate	1.52	72.97	3.06	146.51	6.50	311.36

Shear Deflection (inch)	(mm)	**Normal Stress (psf/ksf/kPa)** 2500	2.50	119.7	5000	5.0	239.4	10000	10.0	478.8
		Shear Stress (psf/ksf/kPa)								
0.000	0.00	0.0	0.0	0.0	0.00	0.0	0.00	0.0	0.0	0.0
0.010	0.03	1008	1.01	48.3	1284	1.28	61.5	1956	1.96	93.3
0.020	0.05	1356	1.36	64.9	2028	2.03	97.1	3300	3.30	157.4
0.030	0.08	1668	1.67	79.9	2508	2.51	120.1	4356	4.36	207.8
0.040	0.10	1884	1.88	90.2	2928	2.93	140.2	5220	5.22	249.0
0.050	0.13	2052	2.05	98.2	3240	3.24	155.1	5963	5.96	284.4
0.060	0.15	2184	2.18	104.6	3492	3.49	167.2	6539	6.54	311.9
0.070	0.18	2256	2.26	108.0	3720	3.72	178.1	7043	7.04	336.0
0.080	0.20	2292	2.29	109.7	3900	3.90	186.7	7403	7.40	353.1
0.090	0.23	2280	2.28	109.2	4020	4.02	192.5	7691	7.69	366.9
0.100	0.25	2232	2.23	106.9	4116	4.12	197.1	7871	7.87	375.5
0.110	0.28	2160	2.16	103.4	4188	4.19	200.5	7955	7.96	379.5
0.120	0.30	2088	2.09	100.0	4188	4.19	200.5	7979	7.98	380.6
0.130	0.33	2004	2.00	96.0	4176	4.18	199.9	7907	7.91	377.2
0.140	0.36	1920	1.92	91.9	4116	4.12	197.1	7739	7.74	369.2
0.150	0.38	1836	1.84	87.9	4056	4.06	194.2	7523	7.52	358.9
0.160	0.41	1740	1.74	83.3	3948	3.95	189.0	7283	7.28	347.4
0.170	0.43	1644	1.64	78.7	3804	3.80	182.1	7067	7.07	337.1
0.180	0.46	1596	1.60	76.4	3672	3.67	175.8	6827	6.83	325.7
0.190	0.48	1548	1.55	74.1	3492	3.49	167.2	6719	6.72	320.5
0.200	0.51	1536	1.54	73.5	3396	3.40	162.6	6623	6.62	315.9
0.210	0.53	1524	1.52	73.0	3324	3.32	159.2	6563	6.56	313.1
0.220	0.56	1548	1.55	74.1	3252	3.25	155.7	6635	6.64	316.5
0.230	0.58	1536	1.54	73.5	3252	3.25	155.7	6611	6.61	315.4
0.240	0.61	1548	1.55	74.1	3216	3.22	154.0	6647	6.65	317.1
0.250	0.64	1536	1.54	73.5	3204	3.20	153.4	6635	6.64	316.5
0.260	0.66	1548	1.55	74.1	3204	3.20	153.4	6611	6.61	315.4
0.270	0.69	1548	1.55	74.1	3204	3.20	153.4	6623	6.62	315.9
0.280	0.71	1548	1.55	74.1	3204	3.20	153.4	6635	6.64	316.5
0.290	0.74	1572	1.57	75.3	3180	3.18	152.3	6611	6.61	315.4
0.300	0.76	1560	1.56	74.7	3180	3.18	152.3	6671	6.67	318.2
0.310	0.79	1596	1.60	76.4	3156	3.16	151.1	6587	6.59	314.2
0.320	0.81	1572	1.57	75.3	3156	3.16	151.1	6575	6.58	313.6
0.330	0.84	1572	1.57	75.3	3168	3.17	151.7	6611	6.61	315.4
0.340	0.86	1584	1.58	75.8	3132	3.13	150.0	6563	6.56	313.1
0.350	0.89	1572	1.57	75.3	3120	3.12	149.4	6539	6.54	311.9
0.360	0.91	1572	1.57	75.3	3096	3.10	148.2	6587	6.59	314.2
0.370	0.94	1560	1.56	74.7	3120	3.12	149.4	6515	6.52	310.8
0.380	0.97	1560	1.56	74.7	3120	3.12	149.4	6515	6.52	310.8
0.390	0.99	1560	1.56	74.7	3084	3.08	147.7	6503	6.50	310.2
0.400	1.02	1536	1.54	73.5	3060	3.06	146.5	6515	6.52	310.8
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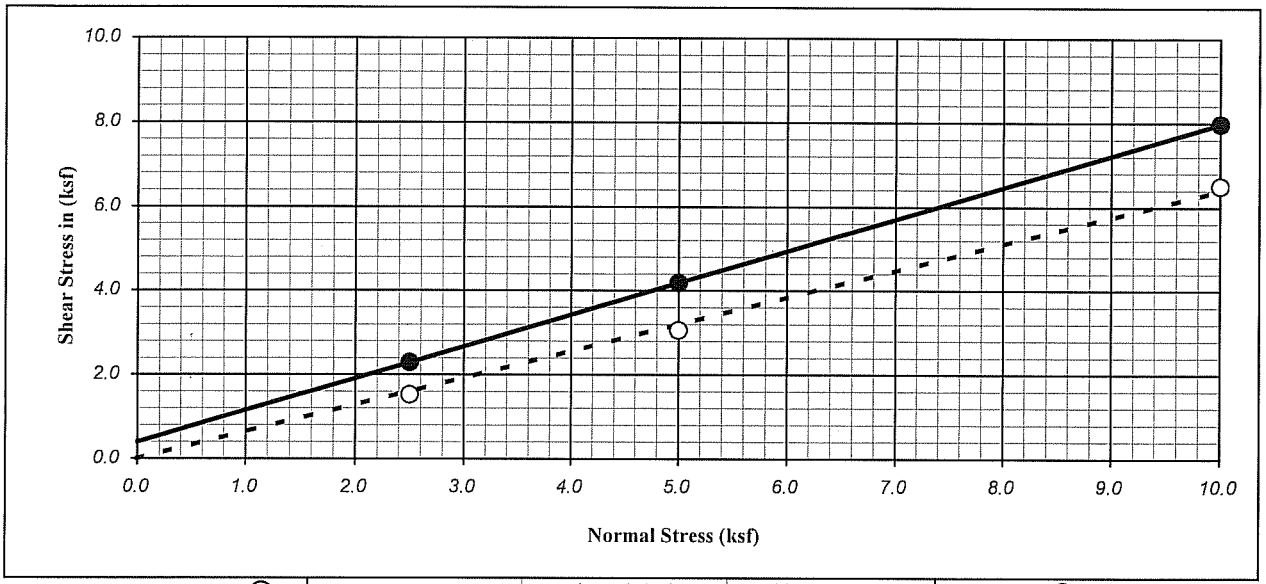
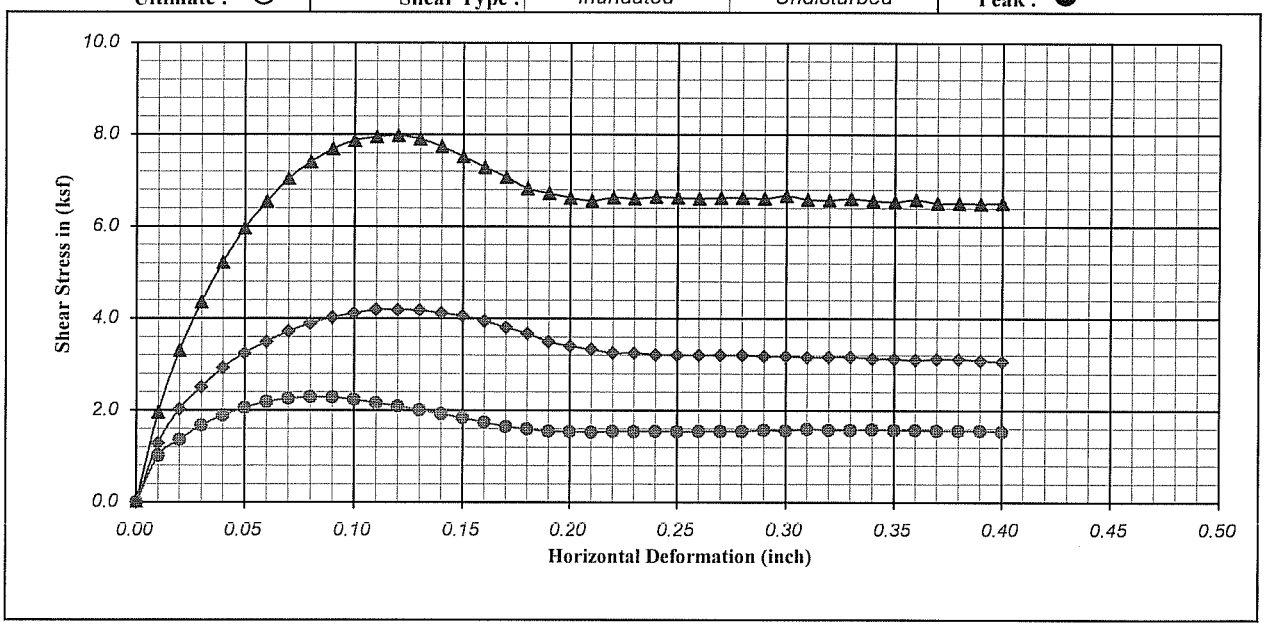


Ultimate : ○	Shear Type :	Inundated	Undisturbed	Peak : ●



Boring No.	: 06-2	**Strength Intercept (C) :**	0.40	(ksf)	**Peak**	0.00	(ksf)	**Ultimate**
Sample No.	: D-19		18.98	(kPa)		0.00	(kPa)	
Depth (ft/m)	: 99.0 30.20	**Friction Angle (ϕ) :**	37.17	Degree		32.66	Degree	
Description	: Sand (SP)					**Shear Rate** (inch/minute) :		0.02

SYMBOL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DRY DENSITY (kN/m^3)	VOID RATIO	NORMAL STRESS (ksf)	NORMAL STRESS (kPa)	PEAK STRESS (ksf)	PEAK STRESS (kPa)	ULTIMATE STRESS (ksf)	ULTIMATE STRESS (kPa)
●	19.25	111.29	17.52	0.51	2.50	119.70	2.29	109.74	1.52	72.97
◆	18.82	110.10	17.33	0.53	5.00	239.40	4.19	200.52	3.06	146.51
▲	18.41	113.52	17.87	0.48	10.00	478.80	7.98	382.03	6.50	311.36

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

Dumbarton Toll Bridge

DIRECT SHEAR TEST (ASTM D-3080)

Project No. : 06-159 **Date :** 02/26/07

Figure No. :

DIRECT SHEAR TEST

ASTM D-3080-90

Project No. : 06-159 **Project Name :** BATA/Dumbarton Toll Bridge

Boring No. : 06-3			Saturated		Field Moisture	x	Inundated	**Specific Gravity** (Assumed) :	2.70
Sample No. : D-11		x	Undisturbed		Remolded		Consolidated-Drained	**Shear Rate** (inch/min) :	0.02
Depth (ft/m) : 57.0	17.39	x	Shear Once		Reshear		Residual	**Data File Number :**	615908
Description : Sand with Silt (SP-SM)									

Percent Saturation (%)	99.14		**File No. :**	615908 1																		
Prepared By : RJ	**Date :** 02/28/07		**Normal Stress**																			
Tested By : RJ	**Date :** 02/28/07																					
Computed By : LCC	**Date :** 03/07/07		**2.50**	(ksf)																		
Checked By :	**Date :**																					
Percent Consolidation (%)		**Before**		**After**																		
Height of Sample (inch)		1.00		1.0000																		
Diameter of Sample (inch)		2.42		2.42																		
Dial Reading-Consolidation (inch)																						
Weight of Soil + Ring (gm)		203.21																				
Weight of Ring (gm)		45.20																				
Weight of Wet Soil + Cont. (gm)				160.71																		
Weight of Dry Soil + Cont. (gm)				134.45																		
Weight of Cont. (gm) No.				3.58																		
Moisture Content (%)				20.07																		
Wet Density (pcf / kN/m³)		130.87	20.60																			
Dry Density (pcf / kN/m³)		109.00	17.16																			
Percent Saturation (%)	99.85		**File No. :**	615908 2																		
Prepared By : RJ	**Date :** 02/28/07		**Normal Stress**																			
Tested By : RJ	**Date :** 02/28/07		**5.00**	(ksf)																		
Percent Consolidation (%)		**Before**		**After**																		
Height of Sample (inch)		1.00		1.0000																		
Diameter of Sample (inch)		2.42		2.42																		
Dial Reading-Consolidation (inch)																						
Weight of Soil + Ring (gm)		204.49																				
Weight of Ring (gm)		45.26																				
Weight of Wet Soil + Cont. (gm)				161.15																		
Weight of Dry Soil + Cont. (gm)				135.43																		
Weight of Cont. (gm) No.				3.57																		
Moisture Content (%)				19.51																		
Wet Density (pcf / kN/m³)		131.88	20.76																			
Dry Density (pcf / kN/m³)		110.35	17.37																			
Percent Saturation (%)	98.73		**File No. :**	615908 3																		
Prepared By : RJ	**Date :** 02/28/07		**Normal Stress**																			
Tested By : RJ	**Date :** 02/28/07		**10.00**	(ksf)																		
Percent Consolidation (%)		**Before**		**After**																		
Height of Sample (inch)		1.00		1.0000																		
Diameter of Sample (inch)		2.42		2.42																		
Dial Reading-Consolidation (inch)																						
Weight of Soil + Ring (gm)		203.51																				
Weight of Ring (gm)		45.55																				
Weight of Wet Soil + Cont. (gm)				159.11																		
Weight of Dry Soil + Cont. (gm)				133.25																		
Weight of Cont. (gm) No.				3.59																		
Moisture Content (%)				19.94																		
Wet Density (pcf / kN/m³)		130.83	20.59																			
Dry Density (pcf / kN/m³)		109.07	17.17																			

Strength	(ksf)	(kPa)	(ksf)	(kPa)	(ksf)	(kPa)
Peak	1.84	87.91	3.71	177.54	7.09	339.52
Ultimate	1.52	72.97	3.02	144.79	5.80	277.46

Shear Deflection (inch)	(mm)	**Normal Stress (psf/ksf/kPa)** 2500	2.50	119.7	5000	5.0	239.4	10000	10.0	478.8
		Shear Stress (psf/ksf/kPa)								
0.000	0.00	0.0	0.0	0.0	0.00	0.0	0.00	0.0	0.0	0.0
0.010	0.03	636	0.64	30.5	1260	1.26	60.3	1860	1.86	88.7
0.020	0.05	984	0.98	47.1	1968	1.97	94.2	2964	2.96	141.4
0.030	0.08	1224	1.22	58.6	2448	2.45	117.2	3888	3.89	185.5
0.040	0.10	1404	1.40	67.2	2820	2.82	135.0	4620	4.62	220.4
0.050	0.13	1536	1.54	73.5	3108	3.11	148.8	5244	5.24	250.2
0.060	0.15	1644	1.64	78.7	3348	3.35	160.3	5747	5.75	274.1
0.070	0.18	1716	1.72	82.2	3492	3.49	167.2	6131	6.13	292.5
0.080	0.20	1788	1.79	85.6	3612	3.61	172.9	6467	6.47	308.5
0.090	0.23	1824	1.82	87.3	3684	3.68	176.4	6707	6.71	319.9
0.100	0.25	1836	1.84	87.9	3708	3.71	177.5	6863	6.86	327.4
0.110	0.28	1812	1.81	86.8	3696	3.70	177.0	6971	6.97	332.5
0.120	0.30	1788	1.79	85.6	3672	3.67	175.8	7067	7.07	337.1
0.130	0.33	1752	1.75	83.9	3624	3.62	173.5	7091	7.09	338.3
0.140	0.36	1728	1.73	82.7	3588	3.59	171.8	7067	7.07	337.1
0.150	0.38	1704	1.70	81.6	3540	3.54	169.5	7019	7.02	334.8
0.160	0.41	1668	1.67	79.9	3492	3.49	167.2	6947	6.95	331.4
0.170	0.43	1656	1.66	79.3	3420	3.42	163.7	6863	6.86	327.4
0.180	0.46	1620	1.62	77.6	3348	3.35	160.3	6755	6.76	322.2
0.190	0.48	1620	1.62	77.6	3252	3.25	155.7	6599	6.60	314.8
0.200	0.51	1608	1.61	77.0	3156	3.16	151.1	6479	6.48	309.1
0.210	0.53	1596	1.60	76.4	3084	3.08	147.7	6347	6.35	302.8
0.220	0.56	1584	1.58	75.8	3036	3.04	145.4	6215	6.22	296.5
0.230	0.58	1572	1.57	75.3	3024	3.02	144.8	6059	6.06	289.0
0.240	0.61	1572	1.57	75.3	3048	3.05	145.9	5915	5.92	282.2
0.250	0.64	1572	1.57	75.3	3060	3.06	146.5	5843	5.84	278.7
0.260	0.66	1560	1.56	74.7	3120	3.12	149.4	5795	5.80	276.4
0.270	0.69	1560	1.56	74.7	3168	3.17	151.7	5807	5.81	277.0
0.280	0.71	1548	1.55	74.1	3180	3.18	152.3	5795	5.80	276.4
0.290	0.74	1536	1.54	73.5	3216	3.22	154.0	5795	5.80	276.4
0.300	0.76	1548	1.55	74.1	3264	3.26	156.3	5831	5.83	278.2
0.310	0.79	1548	1.55	74.1	3252	3.25	155.7	5819	5.82	277.6
0.320	0.81	1536	1.54	73.5	3264	3.26	156.3	5843	5.84	278.7
0.330	0.84	1536	1.54	73.5	3288	3.29	157.4	5843	5.84	278.7
0.340	0.86	1536	1.54	73.5	3288	3.29	157.4	5843	5.84	278.7
0.350	0.89	1524	1.52	73.0	3312	3.31	158.6	5843	5.84	278.7
0.360	0.91	1524	1.52	73.0	3324	3.32	159.2	5867	5.87	279.9
0.370	0.94	1536	1.54	73.5	3312	3.31	158.6	5867	5.87	279.9
0.380	0.97	1536	1.54	73.5	3300	3.30	158.0	5867	5.87	279.9
0.390	0.99	1536	1.54	73.5	3312	3.31	158.6	5903	5.90	281.6
0.400	1.02	1536	1.54	73.5	3324	3.32	159.2	5891	5.89	281.0
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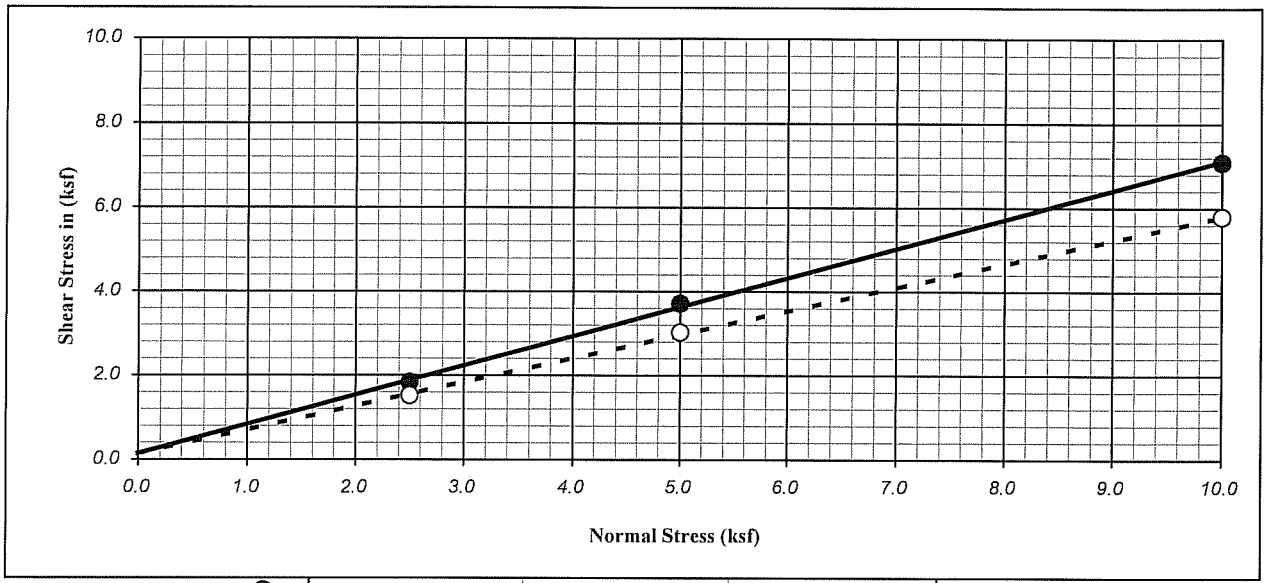
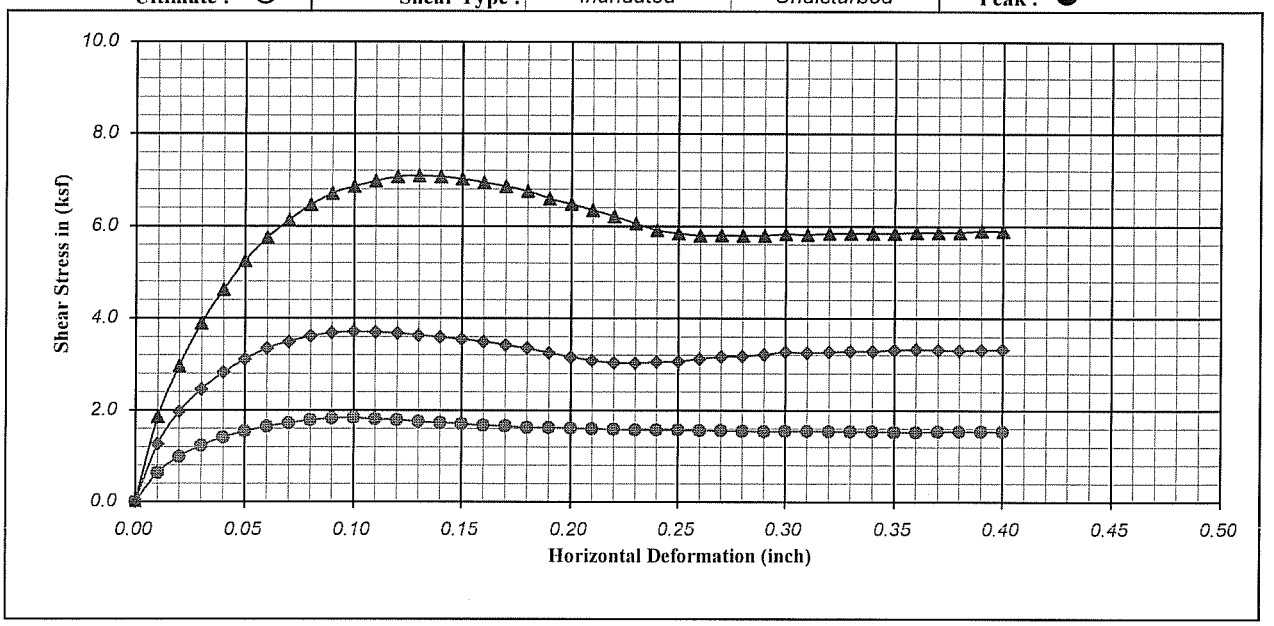


Ultimate : ○	Shear Type :	Inundated	Undisturbed	Peak : ●



Boring No.	: 06-3		**Strength Intercept (C) :**	0.14	(ksf)	**Peak**	0.14	(ksf)	**Ultimate**
Sample No.	: D-11			6.92	(kPa)		6.63	(kPa)	
Depth (ft/m)	: 57.0	17.39	**Friction Angle (ϕ) :**	34.89	Degree		29.57	Degree	
Description	: Sand with Silt (SP-SM)						**Shear Rate** (inch/minute) :		0.02

SYMBOL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DRY DENSITY (kN/m^3)	VOID RATIO	NORMAL STRESS (ksf)	NORMAL STRESS (kPa)	PEAK STRESS (ksf)	PEAK STRESS (kPa)	ULTIMATE STRESS (ksf)	ULTIMATE STRESS (kPa)
●	20.07	109.00	17.16	0.55	2.50	119.70	1.84	87.91	1.52	72.97
◆	19.51	110.35	17.37	0.53	5.00	239.40	3.71	177.54	3.02	144.79
▲	19.94	109.07	17.17	0.55	10.00	478.80	7.09	339.52	5.80	277.46

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

Dumbarton Toll Bridge

DIRECT SHEAR TEST (ASTM D-3080)

Project No. : 06-159 | **Date :** 02/28/07

Figure No. :

DIRECT SHEAR TEST

ASTM D-3080-90

Project No. : 06-159 **Project Name :** BATA/Dumbarton Toll Bridge

Boring No. : 06-3			Saturated		Field Moisture	x	Inundated	**Specific Gravity** (Assumed) :	2.70
Sample No. : D-15		x	Undisturbed		Remolded		Consolidated-Drained	**Shear Rate** (inch/min) :	0.02
Depth (ft/m) : 77.0	23.49	x	Shear Once		Reshear		Residual	**Data File Number :**	615909
Description : Silty Sand (SM)									

Percent Saturation (%)	97.66		**File No. :**	615909 1																		
Prepared By : RJ	**Date :** 02/28/07		**Normal Stress**																			
Tested By : RJ	**Date :** 02/28/07																					
Computed By : LCC	**Date :** 03/07/07		**2.50**	(ksf)																		
Checked By :	**Date :**																					
Percent Consolidation (%)		**Before**		**After**																		
Height of Sample (inch)		1.00		1.0000																		
Diameter of Sample (inch)		2.42		2.42																		
Dial Reading-Consolidation (inch)																						
Weight of Soil + Ring (gm)		200.45																				
Weight of Ring (gm)		46.36																				
Weight of Wet Soil + Cont. (gm)				155.10																		
Weight of Dry Soil + Cont. (gm)				127.58																		
Weight of Cont. (gm) No.				3.70																		
Moisture Content (%)				22.22																		
Wet Density (pcf / kN/m^3)		127.62	20.09																			
Dry Density (pcf / kN/m^3)		104.42	16.44																			
Percent Saturation (%)	100.49		**File No. :**	615909 2																		
Prepared By : RJ	**Date :** 02/28/07		**Normal Stress**																			
Tested By : RJ	**Date :** 02/28/07		**5.00**	(ksf)																		
Percent Consolidation (%)		**Before**		**After**																		
Height of Sample (inch)		1.00		1.0000																		
Diameter of Sample (inch)		2.42		2.42																		
Dial Reading-Consolidation (inch)																						
Weight of Soil + Ring (gm)		198.07																				
Weight of Ring (gm)		45.41																				
Weight of Wet Soil + Cont. (gm)				153.71																		
Weight of Dry Soil + Cont. (gm)				124.07																		
Weight of Cont. (gm) No.				3.65																		
Moisture Content (%)				24.61																		
Wet Density (pcf / kN/m^3)		126.44	19.90																			
Dry Density (pcf / kN/m^3)		101.46	15.97																			
Percent Saturation (%)	95.60		**File No. :**	615909 3																		
Prepared By : RJ	**Date :** 02/28/07		**Normal Stress**																			
Tested By : RJ	**Date :** 02/28/07		**10.00**	(ksf)																		
Percent Consolidation (%)		**Before**		**After**																		
Height of Sample (inch)		1.00		1.0000																		
Diameter of Sample (inch)		2.42		2.42																		
Dial Reading-Consolidation (inch)																						
Weight of Soil + Ring (gm)		197.37																				
Weight of Ring (gm)		46.98																				
Weight of Wet Soil + Cont. (gm)				150.58																		
Weight of Dry Soil + Cont. (gm)				122.12																		
Weight of Cont. (gm) No.				3.61																		
Moisture Content (%)				24.01																		
Wet Density (pcf / kN/m^3)		124.56	19.61																			
Dry Density (pcf / kN/m^3)		100.44	15.81																			

Strength	(ksf)	(kPa)	(ksf)	(kPa)	(ksf)	(kPa)
Peak	1.72	82.16	3.46	165.47	6.78	324.58
Ultimate	1.60	76.42	2.89	138.47	6.19	296.43

Shear Deflection (inch)	(mm)	**Normal Stress (psf/ksf/kPa)** 2500	2.50	119.7	5000	5.0	239.4	10000	10.0	478.8
		Shear Stress (psf/ksf/kPa)								
0.000	0.00	0.0	0.0	0.0	0.00	0.0	0.00	0.0	0.0	0.0
0.010	0.03	588	0.59	28.2	1056	1.06	50.6	1656	1.66	79.0
0.020	0.05	852	0.85	40.8	1632	1.63	78.1	2616	2.62	124.8
0.030	0.08	1044	1.04	50.0	2088	2.09	100.0	3408	3.41	162.6
0.040	0.10	1212	1.21	58.0	2412	2.41	115.5	4008	4.01	191.2
0.050	0.13	1332	1.33	63.8	2688	2.69	128.7	4548	4.55	216.9
0.060	0.15	1440	1.44	68.9	2904	2.90	139.0	4968	4.97	237.0
0.070	0.18	1524	1.52	73.0	3060	3.06	146.5	5352	5.35	255.3
0.080	0.20	1596	1.60	76.4	3204	3.20	153.4	5651	5.65	269.6
0.090	0.23	1644	1.64	78.7	3300	3.30	158.0	5891	5.89	281.0
0.100	0.25	1668	1.67	79.9	3372	3.37	161.5	6107	6.11	291.3
0.110	0.28	1668	1.67	79.9	3420	3.42	163.7	6287	6.29	299.9
0.120	0.30	1692	1.69	81.0	3456	3.46	165.5	6419	6.42	306.2
0.130	0.33	1716	1.72	82.2	3456	3.46	165.5	6539	6.54	311.9
0.140	0.36	1716	1.72	82.2	3444	3.44	164.9	6623	6.62	315.9
0.150	0.38	1716	1.72	82.2	3420	3.42	163.7	6695	6.70	319.4
0.160	0.41	1716	1.72	82.2	3372	3.37	161.5	6755	6.76	322.2
0.170	0.43	1716	1.72	82.2	3348	3.35	160.3	6779	6.78	323.4
0.180	0.46	1692	1.69	81.0	3276	3.28	156.9	6779	6.78	323.4
0.190	0.48	1668	1.67	79.9	3228	3.23	154.6	6731	6.73	321.1
0.200	0.51	1656	1.66	79.3	3144	3.14	150.5	6671	6.67	318.2
0.210	0.53	1644	1.64	78.7	3060	3.06	146.5	6587	6.59	314.2
0.220	0.56	1632	1.63	78.1	3000	3.00	143.6	6515	6.52	310.8
0.230	0.58	1620	1.62	77.6	2940	2.94	140.8	6443	6.44	307.3
0.240	0.61	1596	1.60	76.4	2916	2.92	139.6	6407	6.41	305.6
0.250	0.64	1596	1.60	76.4	2892	2.89	138.5	6419	6.42	306.2
0.260	0.66	1596	1.60	76.4	2892	2.89	138.5	6419	6.42	306.2
0.270	0.69	1596	1.60	76.4	2904	2.90	139.0	6443	6.44	307.3
0.280	0.71	1596	1.60	76.4	2904	2.90	139.0	6419	6.42	306.2
0.290	0.74	1596	1.60	76.4	2940	2.94	140.8	6419	6.42	306.2
0.300	0.76	1596	1.60	76.4	2952	2.95	141.3	6359	6.36	303.3
0.310	0.79	1596	1.60	76.4	2952	2.95	141.3	6299	6.30	300.5
0.320	0.81	1596	1.60	76.4	2964	2.96	141.9	6227	6.23	297.0
0.330	0.84	1596	1.60	76.4	2976	2.98	142.5	6203	6.20	295.9
0.340	0.86	1596	1.60	76.4	2976	2.98	142.5	6191	6.19	295.3
0.350	0.89	1596	1.60	76.4	2988	2.99	143.1	6227	6.23	297.0
0.360	0.91	1596	1.60	76.4	2976	2.98	142.5	6251	6.25	298.2
0.370	0.94	1596	1.60	76.4	2988	2.99	143.1	6323	6.32	301.6
0.380	0.97	1608	1.61	77.0	2964	2.96	141.9	6347	6.35	302.8
0.390	0.99	1608	1.61	77.0	2976	2.98	142.5	6359	6.36	303.3
0.400	1.02	1620	1.62	77.6	2964	2.96	141.9	6407	6.41	305.6
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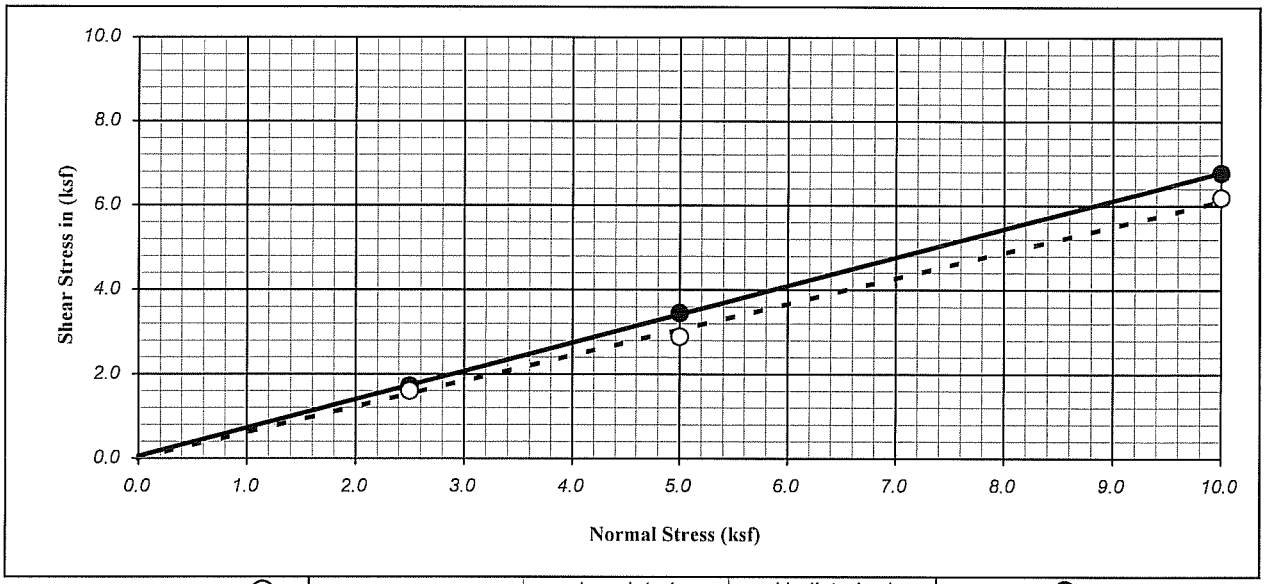
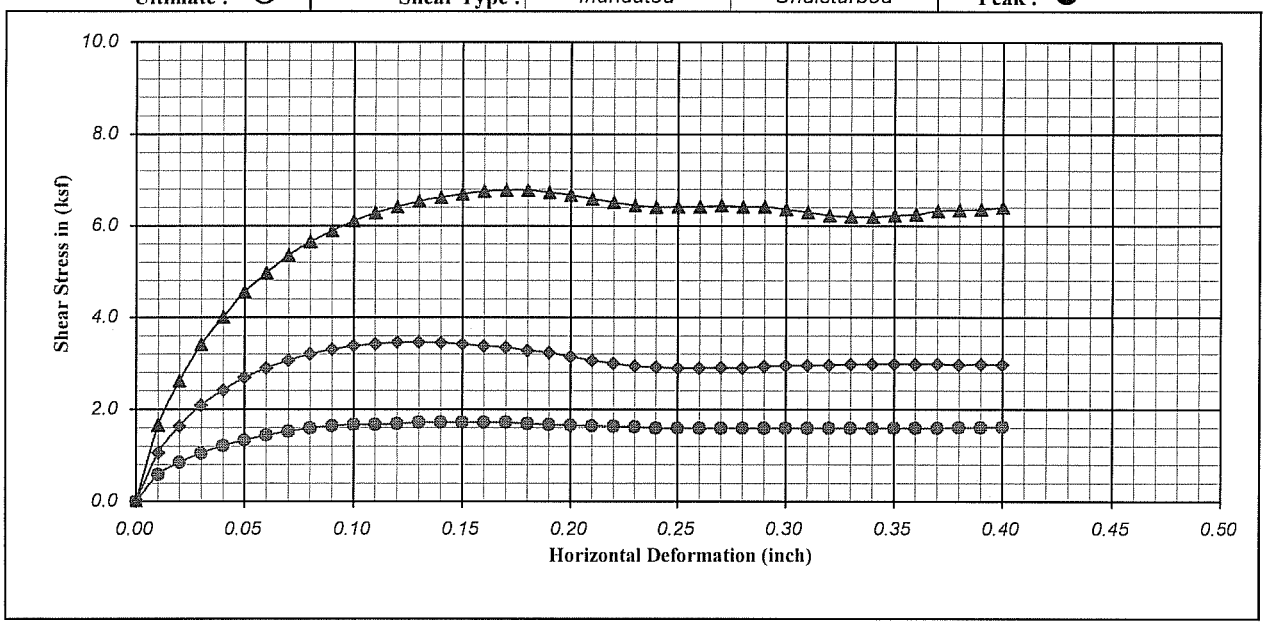


Ultimate : ○	Shear Type :	Inundated	Undisturbed	Peak : ●



Boring No. : 06-3		**Strength Intercept (C) :**	0.05	(ksf)	**Peak**	0.00	(ksf)	**Ultimate**
Sample No. : D-15			2.61	(kPa)		0.00	(kPa)	
Depth (ft/m) : 77.0	23.49	**Friction Angle (ϕ) :**	33.96	Degree		31.48	Degree	
Description : Silty Sand (SM)						**Shear Rate** (inch/minute) :		0.02

SYMBOL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DRY DENSITY (kN/m^3)	VOID RATIO	NORMAL STRESS (ksf)	NORMAL STRESS (kPa)	PEAK STRESS (ksf)	PEAK STRESS (kPa)	ULTIMATE STRESS (ksf)	ULTIMATE STRESS (kPa)
●	22.22	104.42	16.44	0.61	2.50	119.70	1.72	82.16	1.60	76.42
◆	24.61	101.46	15.97	0.66	5.00	239.40	3.46	165.47	2.89	138.47
▲	24.01	100.44	15.81	0.68	10.00	478.80	6.78	324.58	6.19	296.43

Earth Mechanics, Inc.
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Dumbarton Toll Bridge

DIRECT SHEAR TEST (ASTM D-3080)

Project No. : 06-159 | **Date :** 02/28/07

Figure No. :

DIRECT SHEAR TEST

ASTM D-3080-90

Project No. : 06-159 **Project Name :** BATA/Dumbarton Toll Bridge

Boring No. : 06-8			Saturated		Field Moisture	x	Inundated	**Specific Gravity** (Assumed) :	2.70
Sample No. : D-7		x	Undisturbed		Remolded		Consolidated-Drained	**Shear Rate** (inch/min) :	0.02
Depth (ft/m) :	40.0 / 12.20	x	Shear Once		Reshear		Residual	**Data File Number :**	615901
Description : Sand (SP)									

Percent Saturation (%)	101.50	**File No. :**	615901 1		
Prepared By : RJ	**Date :** 02/18/07	**Normal Stress**			
Tested By : RJ	**Date :** 02/18/07				
Computed By : LCC	**Date :** 02/20/07	**2.00**	(ksf)		
Checked By :	**Date :**				

	Before	After
Percent Consolidation (%)		
Height of Sample (inch)	1.00	1.0000
Diameter of Sample (inch)	2.42	2.42
Dial Reading-Consolidation (inch)		
Weight of Soil + Ring (gm)	201.62	
Weight of Ring (gm)	45.64	
Weight of Wet Soil + Cont. (gm)		157.05
Weight of Dry Soil + Cont. (gm)		128.90
Weight of Cont. (gm) No.		3.72
Moisture Content (%)		22.49
Wet Density (pcf / kN/m³)	129.19 / 20.33	
Dry Density (pcf / kN/m³)	105.47 / 16.60	

Percent Saturation (%)	96.00	**File No. :**	615901 2		
Prepared By : RJ	**Date :** 02/18/07	**Normal Stress**			
Tested By : RJ	**Date :** 02/18/07	**4.00**	(ksf)		

	Before	After
Percent Consolidation (%)		
Height of Sample (inch)	1.00	1.0000
Diameter of Sample (inch)	2.42	2.42
Dial Reading-Consolidation (inch)		
Weight of Soil + Ring (gm)	200.31	
Weight of Ring (gm)	45.47	
Weight of Wet Soil + Cont. (gm)		155.33
Weight of Dry Soil + Cont. (gm)		129.03
Weight of Cont. (gm) No.		3.70
Moisture Content (%)		20.98
Wet Density (pcf / kN/m³)	128.24 / 20.19	
Dry Density (pcf / kN/m³)	106.00 / 16.68	

Percent Saturation (%)	124.49	**File No. :**	615901 4		
Prepared By : RJ	**Date :** 02/18/07	**Normal Stress**			
Tested By : RJ	**Date :** 02/18/07	**8.00**	(ksf)		

	Before	After
Percent Consolidation (%)		
Height of Sample (inch)	1.00	1.0000
Diameter of Sample (inch)	2.42	2.42
Dial Reading-Consolidation (inch)		
Weight of Soil + Ring (gm)	208.20	
Weight of Ring (gm)	45.81	
Weight of Wet Soil + Cont. (gm)		162.98
Weight of Dry Soil + Cont. (gm)		128.45
Weight of Cont. (gm) No.		3.64
Moisture Content (%)		27.67
Wet Density (pcf / kN/m³)	134.50 / 21.17	
Dry Density (pcf / kN/m³)	105.35 / 16.58	

Strength	(ksf)	(kPa)	(ksf)	(kPa)	(ksf)	(kPa)
Peak	1.66	79.29	3.05	145.94	6.79	325.15
Ultimate	1.19	56.88	2.35	112.61	5.02	240.17

Shear Deflection (inch)	(mm)	**Normal Stress (psf/ksf/kPa)** 2000	2.00	95.8	4000	4.0	191.5	8000	8.0	383.0
		Shear Stress (psf/ksf/kPa)								
0.00	0.00	0.0	0.0	0.0	0.00	0.0	0.00	0.00	0.0	0.0
0.010	0.03	804	0.80	38.5	1104	1.10	52.9	1956	1.96	93.3
0.020	0.05	1140	1.14	54.6	1668	1.67	79.9	3096	3.10	147.7
0.030	0.08	1356	1.36	64.9	2088	2.09	100.0	3996	4.00	190.6
0.040	0.10	1500	1.50	71.8	2388	2.39	114.3	4680	4.68	223.2
0.050	0.13	1596	1.60	76.4	2604	2.60	124.7	5220	5.22	249.0
0.060	0.15	1644	1.64	78.7	2784	2.78	133.3	5675	5.68	270.7
0.070	0.18	1656	1.66	79.3	2916	2.92	139.6	6035	6.04	287.9
0.080	0.20	1656	1.66	79.3	2988	2.99	143.1	6311	6.31	301.0
0.090	0.23	1632	1.63	78.1	3036	3.04	145.4	6479	6.48	309.1
0.100	0.25	1620	1.62	77.6	3048	3.05	145.9	6635	6.64	316.5
0.110	0.28	1572	1.57	75.3	3036	3.04	145.4	6779	6.78	323.4
0.120	0.30	1536	1.54	73.5	3024	3.02	144.8	6767	6.77	322.8
0.130	0.33	1488	1.49	71.2	2988	2.99	143.1	6755	6.76	322.2
0.140	0.36	1452	1.45	69.5	2964	2.96	141.9	6791	6.79	323.9
0.150	0.38	1404	1.40	67.2	2928	2.93	140.2	6683	6.68	318.8
0.160	0.41	1356	1.36	64.9	2904	2.90	139.0	6647	6.65	317.1
0.170	0.43	1332	1.33	63.8	2868	2.87	137.3	6563	6.56	313.1
0.180	0.46	1308	1.31	62.6	2796	2.80	133.9	6503	6.50	310.2
0.190	0.48	1260	1.26	60.3	2724	2.72	130.4	6455	6.46	307.9
0.200	0.51	1248	1.25	59.8	2652	2.65	127.0	6407	6.41	305.6
0.210	0.53	1224	1.22	58.6	2544	2.54	121.8	6323	6.32	301.6
0.220	0.56	1212	1.21	58.0	2460	2.46	117.8	6263	6.26	298.8
0.230	0.58	1200	1.20	57.5	2412	2.41	115.5	6227	6.23	297.0
0.240	0.61	1188	1.19	56.9	2364	2.36	113.2	6131	6.13	292.5
0.250	0.64	1200	1.20	57.5	2352	2.35	112.6	6119	6.12	291.9
0.260	0.66	1200	1.20	57.5	2364	2.36	113.2	6107	6.11	291.3
0.270	0.69	1200	1.20	57.5	2364	2.36	113.2	6011	6.01	286.7
0.280	0.71	1188	1.19	56.9	2376	2.38	113.8	5903	5.90	281.6
0.290	0.74	1200	1.20	57.5	2400	2.40	114.9	5915	5.92	282.2
0.300	0.76	1212	1.21	58.0	2424	2.42	116.1	5831	5.83	278.2
0.310	0.79	1212	1.21	58.0	2436	2.44	116.6	5699	5.70	271.9
0.320	0.81	1212	1.21	58.0	2460	2.46	117.8	5675	5.68	270.7
0.330	0.84	1212	1.21	58.0	2484	2.48	118.9	5579	5.58	266.1
0.340	0.86	1200	1.20	57.5	2484	2.48	118.9	5376	5.38	256.4
0.350	0.89	1200	1.20	57.5	2484	2.48	118.9	5316	5.32	253.6
0.360	0.91	1200	1.20	57.5	2484	2.48	118.9	5208	5.21	248.4
0.370	0.94	1200	1.20	57.5	2508	2.51	120.1	5244	5.24	250.2
0.380	0.97	1188	1.19	56.9	2520	2.52	120.7	5124	5.12	244.4
0.390	0.99	1200	1.20	57.5	2508	2.51	120.1	5064	5.06	241.6
0.400	1.02	1188	1.19	56.9	2544	2.54	121.8	5016	5.02	239.3
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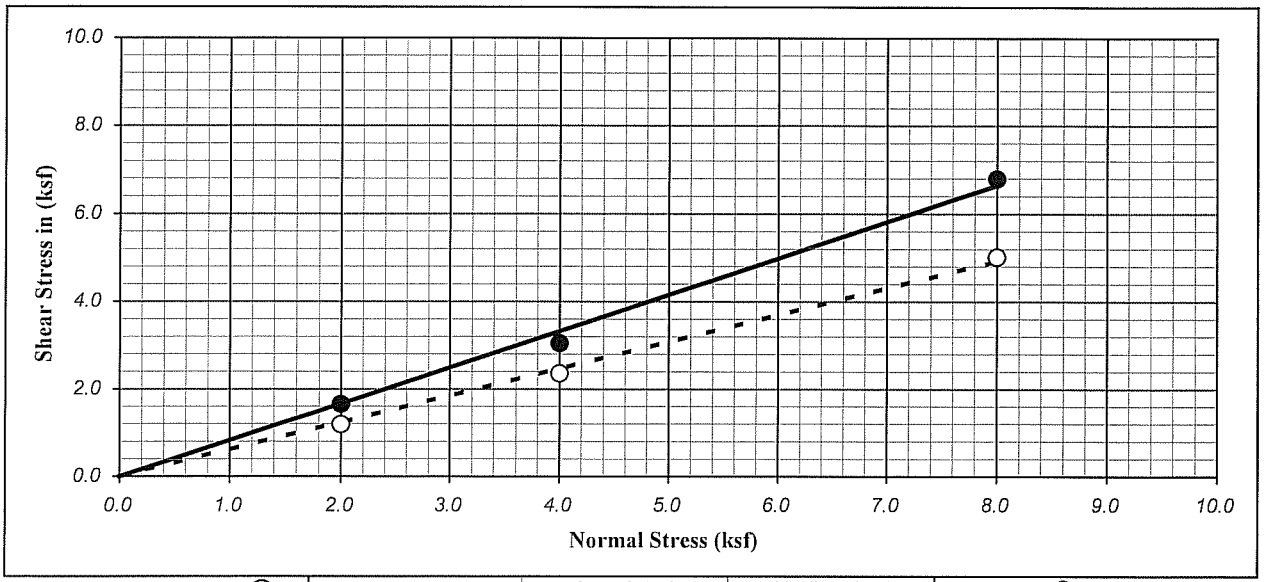
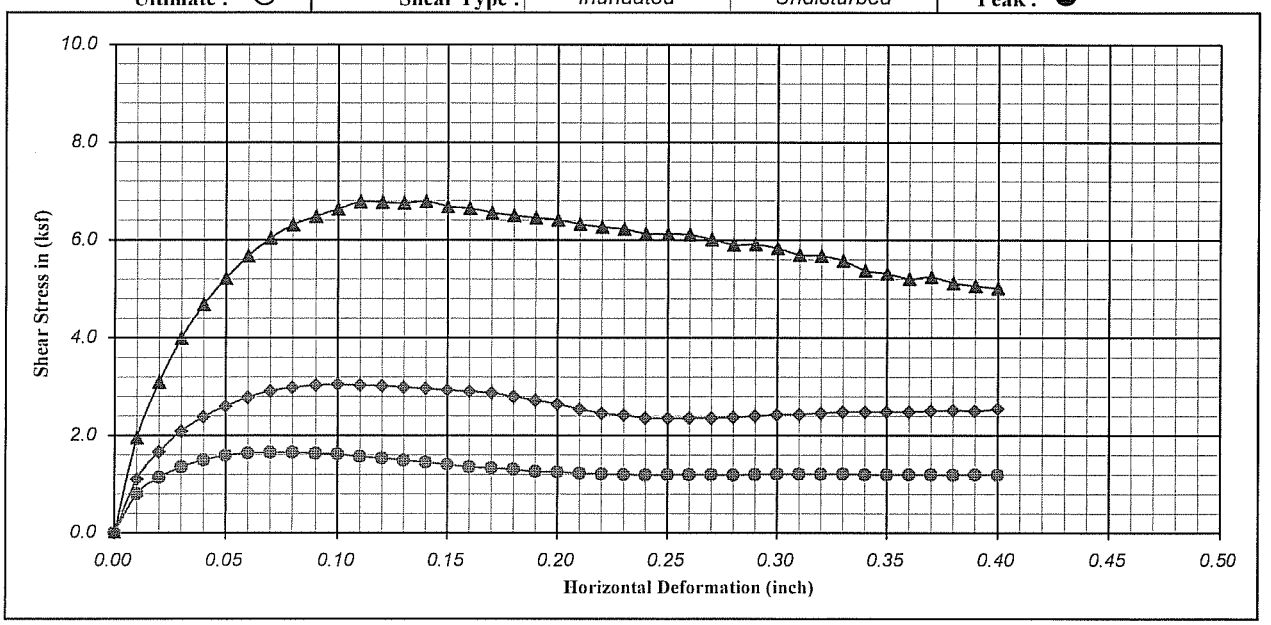


Ultimate : ○	Shear Type :	Inundated	Undisturbed	Peak : ●



Boring No. : 06-8		**Strength Intercept (C) :**	0.00	(ksf)	**Peak**	0.00	(ksf)	**Ultimate**
Sample No. : D-7			0.00	(kPa)		0.00	(kPa)	
Depth (ft/m) : 40.0	12.20	**Friction Angle (ϕ) :**	39.74	Degree		31.72	Degree	
Description : Sand (SP)						**Shear Rate** (inch/minute) :		0.02

SYMBOL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DRY DENSITY (kN/m^3)	VOID RATIO	NORMAL STRESS (ksf)	NORMAL STRESS (kPa)	PEAK STRESS (ksf)	PEAK STRESS (kPa)	ULTIMATE STRESS (ksf)	ULTIMATE STRESS (kPa)
●	22.49	105.47	16.60	0.60	2.00	95.76	1.66	79.29	1.19	56.88
◆	20.98	106.00	16.68	0.59	4.00	191.52	3.05	145.94	2.35	112.61
▲	27.67	105.35	16.58	0.60	8.00	383.04	6.79	325.15	5.02	240.17

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

Dumbarton Toll Bridge

DIRECT SHEAR TEST (ASTM D-3080)

Project No. : 06-159 | **Date :** 02/18/07 | Figure No. :

DIRECT SHEAR TEST

ASTM D-3080-90

Project No. : 06-159 **Project Name :** BATA/Dumbarton Toll Bridge

Boring No. :	06-8		Saturated		Field Moisture	x	Inundated	Specific Gravity (Assumed) : 2.70
Sample No. :	D-11	x	Undisturbed		Remolded		Consolidated-Drained	Shear Rate (inch/min) : 0.02
Depth (ft/m) :	58.0 / 17.69	x	Shear Once		Reshear		Residual	Data File Number : 615902

Description : Silty Sand (SM)

Specimen 1

Percent Saturation (%)	98.00	File No. :	615902 1
Prepared By : RJ	Date : 02/18/07	Normal Stress	
Tested By : RJ	Date : 02/18/07		
Computed By : LCC	Date : 02/20/07	2.50	(ksf)
Checked By :	Date :		

Percent Consolidation (%)	Before		After
Height of Sample (inch)	1.00		1.0000
Diameter of Sample (inch)	2.42		2.42
Dial Reading-Consolidation (inch)			
Weight of Soil + Ring (gm)	198.27		
Weight of Ring (gm)	45.18		
Weight of Wet Soil + Cont. (gm)			155.13
Weight of Dry Soil + Cont. (gm)			126.71
Weight of Cont. (gm) No.			3.72
Moisture Content (%)			23.11
Wet Density (pcf / kN/m³)	126.79	19.96	
Dry Density (pcf / kN/m³)	102.99	16.21	

Specimen 2

Percent Saturation (%)	99.25	File No. :	615902 2
Prepared By : RJ	Date : 02/18/07	Normal Stress	
Tested By : RJ	Date : 02/18/07	5.00	(ksf)

Percent Consolidation (%)	Before		After
Height of Sample (inch)	1.00		1.0000
Diameter of Sample (inch)	2.42		2.42
Dial Reading-Consolidation (inch)			
Weight of Soil + Ring (gm)	198.71		
Weight of Ring (gm)	45.04		
Weight of Wet Soil + Cont. (gm)			154.24
Weight of Dry Soil + Cont. (gm)			125.84
Weight of Cont. (gm) No.			3.63
Moisture Content (%)			23.24
Wet Density (pcf / kN/m³)	127.27	20.03	
Dry Density (pcf / kN/m³)	103.27	16.26	

Specimen 3

Percent Saturation (%)	105.29	File No. :	615902 3
Prepared By : RJ	Date : 02/18/07	Normal Stress	
Tested By : RJ	Date : 02/18/07	10.00	(ksf)

Percent Consolidation (%)	Before		After
Height of Sample (inch)	1.00		1.0000
Diameter of Sample (inch)	2.42		2.42
Dial Reading-Consolidation (inch)			
Weight of Soil + Ring (gm)	202.76		
Weight of Ring (gm)	45.12		
Weight of Wet Soil + Cont. (gm)			159.35
Weight of Dry Soil + Cont. (gm)			130.38
Weight of Cont. (gm) No.			3.65
Moisture Content (%)			22.86
Wet Density (pcf / kN/m³)	130.56	20.55	
Dry Density (pcf / kN/m³)	106.27	16.73	

Strength	(ksf)	(kPa)	(ksf)	(kPa)	(ksf)	(kPa)
Peak	1.98	94.80	3.58	171.22	6.56	314.24
Ultimate	1.52	72.97	2.89	138.47	5.80	277.46

Shear Data

Shear Deflection		Normal Stress (psf/ksf/kPa)								
		2500	2.50	119.7	5000	5.0	239.4	10000	10.0	478.8
(inch)	(mm)	Shear Stress (psf/ksf/kPa)								
0.000	0.00	0.0	0.0	0.0	0.00	0.0	0.00	0.0	0.0	0.0
0.010	0.03	804	0.80	38.5	1224	1.22	58.6	1968	1.97	93.9
0.020	0.05	1188	1.19	56.9	1884	1.88	90.2	3060	3.06	146.0
0.030	0.08	1452	1.45	69.5	2328	2.33	111.5	3900	3.90	186.0
0.040	0.10	1656	1.66	79.3	2652	2.65	127.0	4500	4.50	214.7
0.050	0.13	1788	1.79	85.6	2916	2.92	139.6	4980	4.98	237.6
0.060	0.15	1884	1.88	90.2	3108	3.11	148.8	5340	5.34	254.7
0.070	0.18	1944	1.94	93.1	3276	3.28	156.9	5651	5.65	269.6
0.080	0.20	1968	1.97	94.2	3396	3.40	162.6	5903	5.90	281.6
0.090	0.23	1980	1.98	94.8	3480	3.48	166.6	6047	6.05	288.5
0.100	0.25	1968	1.97	94.2	3540	3.54	169.5	6191	6.19	295.3
0.110	0.28	1956	1.96	93.7	3564	3.56	170.6	6299	6.30	300.5
0.120	0.30	1920	1.92	91.9	3576	3.58	171.2	6395	6.40	305.1
0.130	0.33	1872	1.87	89.6	3552	3.55	170.1	6455	6.46	307.9
0.140	0.36	1824	1.82	87.3	3540	3.54	169.5	6503	6.50	310.2
0.150	0.38	1764	1.76	84.5	3516	3.52	168.3	6539	6.54	311.9
0.160	0.41	1716	1.72	82.2	3480	3.48	166.6	6539	6.54	311.9
0.170	0.43	1668	1.67	79.9	3444	3.44	164.9	6551	6.55	312.5
0.180	0.46	1620	1.62	77.6	3396	3.40	162.6	6563	6.56	313.1
0.190	0.48	1584	1.58	75.8	3348	3.35	160.3	6539	6.54	311.9
0.200	0.51	1560	1.56	74.7	3300	3.30	158.0	6515	6.52	310.8
0.210	0.53	1548	1.55	74.1	3228	3.23	154.6	6491	6.49	309.6
0.220	0.56	1548	1.55	74.1	3144	3.14	150.5	6443	6.44	307.3
0.230	0.58	1536	1.54	73.5	3060	3.06	146.5	6383	6.38	304.5
0.240	0.61	1524	1.52	73.0	3000	3.00	143.6	6287	6.29	299.9
0.250	0.64	1524	1.52	73.0	2940	2.94	140.8	6215	6.22	296.5
0.260	0.66	1548	1.55	74.1	2916	2.92	139.6	6131	6.13	292.5
0.270	0.69	1524	1.52	73.0	2904	2.90	139.0	6059	6.06	289.0
0.280	0.71	1524	1.52	73.0	2892	2.89	138.5	6035	6.04	287.9
0.290	0.74	1536	1.54	73.5	2892	2.89	138.5	5999	6.00	286.2
0.300	0.76	1536	1.54	73.5	2892	2.89	138.5	5951	5.95	283.9
0.310	0.79	1536	1.54	73.5	2916	2.92	139.6	5903	5.90	281.6
0.320	0.81	1536	1.54	73.5	2904	2.90	139.0	5879	5.88	280.4
0.330	0.84	1536	1.54	73.5	2892	2.89	138.5	5867	5.87	279.9
0.340	0.86	1548	1.55	74.1	2916	2.92	139.6	5819	5.82	277.6
0.350	0.89	1548	1.55	74.1	2904	2.90	139.0	5831	5.83	278.2
0.360	0.91	1560	1.56	74.7	2916	2.92	139.6	5843	5.84	278.7
0.370	0.94	1560	1.56	74.7	2916	2.92	139.6	5831	5.83	278.2
0.380	0.97	1572	1.57	75.3	2916	2.92	139.6	5855	5.86	279.3
0.390	0.99	1572	1.57	75.3	2916	2.92	139.6	5819	5.82	277.6
0.400	1.02	1584	1.58	75.8	2916	2.92	139.6	5795	5.80	276.4
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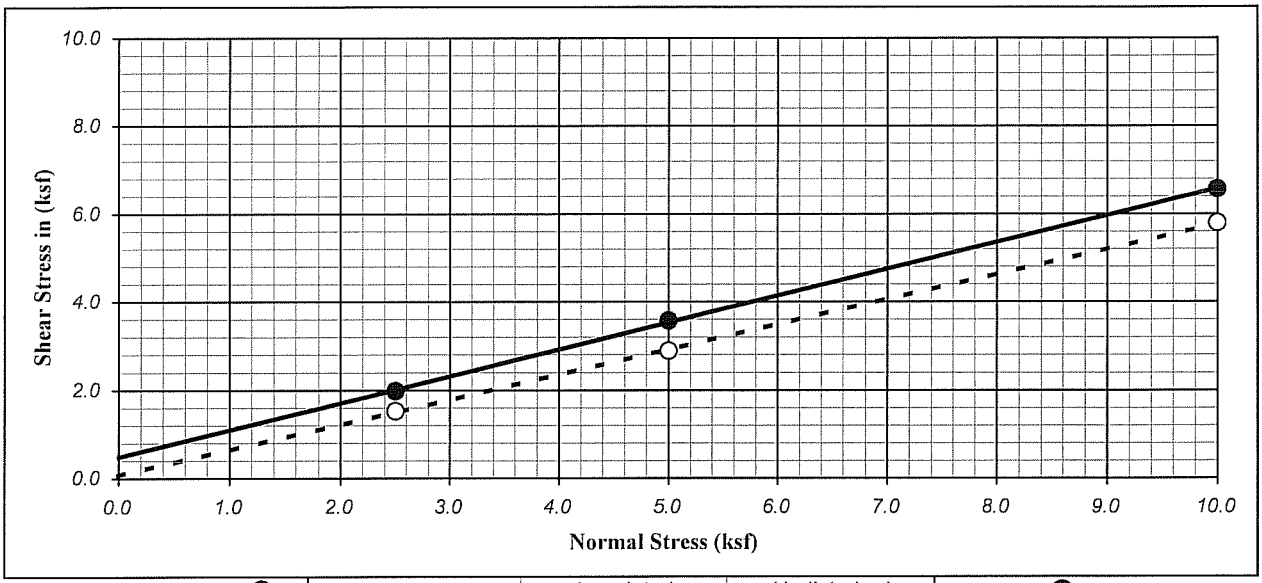
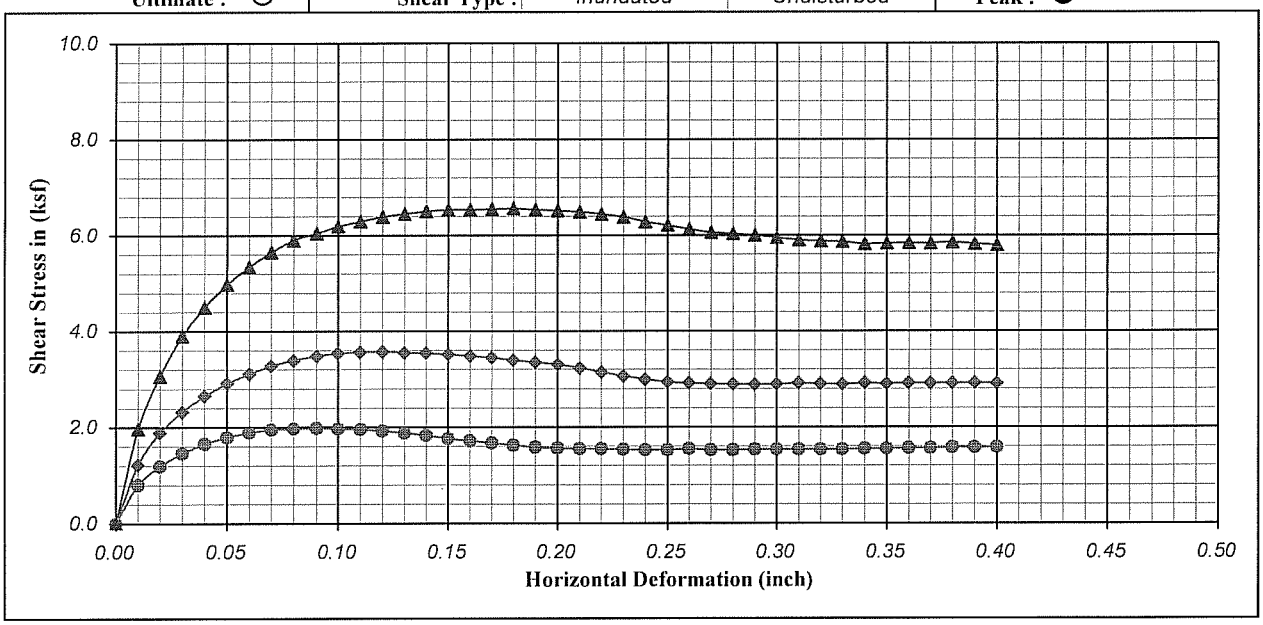


Ultimate : ○	Shear Type :	Inundated	Undisturbed	Peak : ●



Boring No. : 06-8		**Strength Intercept (C) :**	0.49	(ksf)	**Peak**	0.07	(ksf)	**Ultimate**
Sample No. : D-11			23.29	(kPa)		3.47	(kPa)	
Depth (ft/m) : 58.0	17.69	**Friction Angle (ϕ) :**	31.35	Degree		29.73	Degree	
Description : Silty Sand (SM)						**Shear Rate** (inch/minute) :		0.02

SYMBOL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DRY DENSITY (kN/m^3)	VOID RATIO	NORMAL STRESS (ksf)	NORMAL STRESS (kPa)	PEAK STRESS (ksf)	PEAK STRESS (kPa)	ULTIMATE STRESS (ksf)	ULTIMATE STRESS (kPa)
●	23.11	102.99	16.21	0.64	2.50	119.70	1.98	94.80	1.52	72.97
◆	23.24	103.27	16.26	0.63	5.00	239.40	3.58	171.22	2.89	138.47
▲	22.86	106.27	16.73	0.59	10.00	478.80	6.56	314.24	5.80	277.46

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

Dumbarton Toll Bridge

DIRECT SHEAR TEST (ASTM D-3080)

Project No. : 06-159 | **Date :** 02/18/07

Figure No. :

DIRECT SHEAR TEST

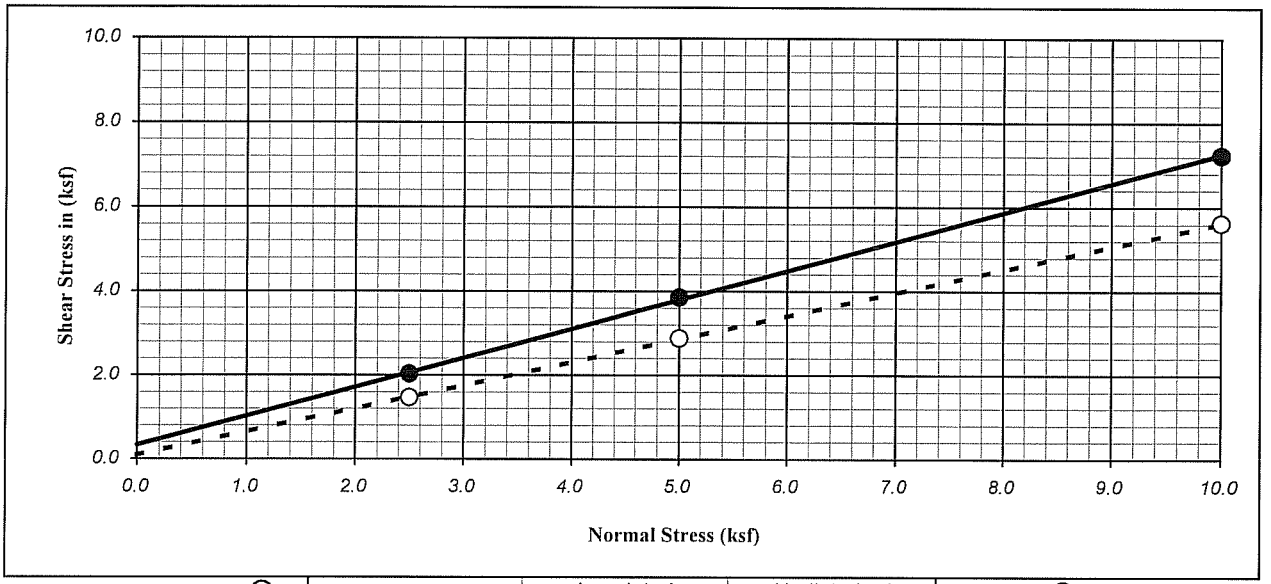
ASTM D-3080-90

Project No. : 06-159 **Project Name :** BATA/Dumbarton Toll Bridge

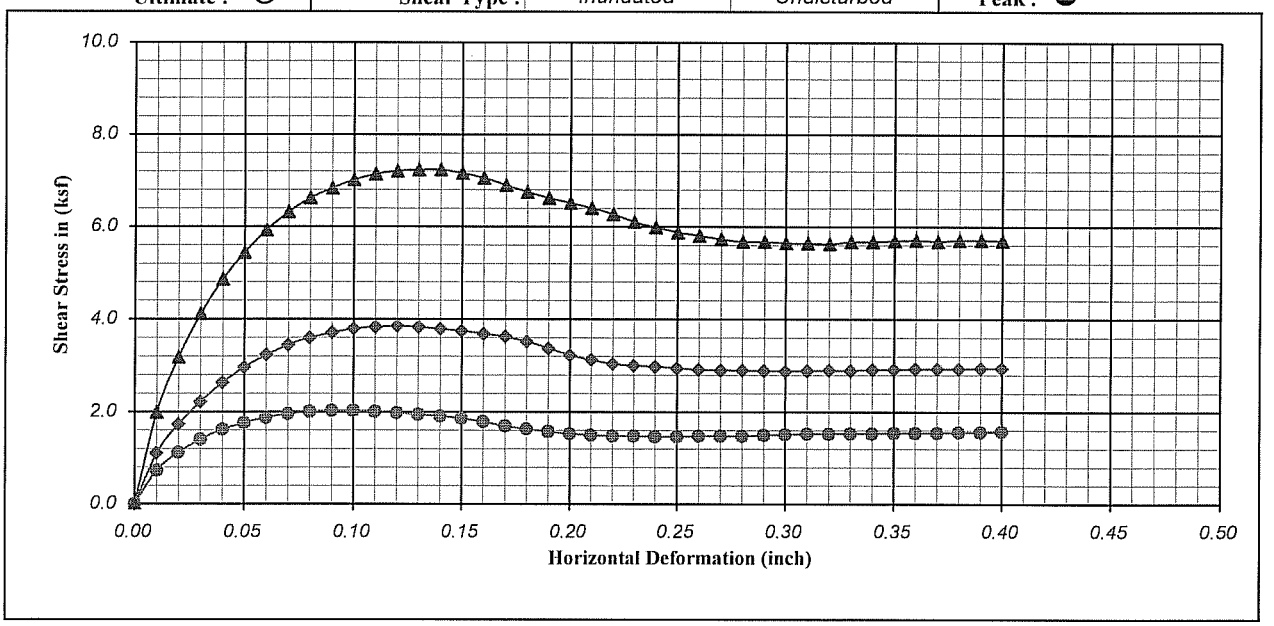
Boring No. : 06-9		Saturated		Field Moisiture	x	Inundated		**Specific Gravity** (Assumed) :	2.70
Sample No. : D-20	x	Undisturbed		Remolded		Consolidated-Drained		**Shear Rate** (inch/min) :	0.02
Depth (ft/m) : 100.0 30.50	x	Shear Once		Reshear		Residual		**Data File Number :**	615910
Description : Silty Sand (SM)									

Percent Saturation (%)	103.03		**File No. :**	615910 1			**Shear Deflection**		**Normal Stress (psf/ksf/kPa)**											
Prepared By : RJ	**Date :** 02/28/07		**Normal Stress**						2500	2.50	119.7	5000	5.0	239.4	10000	10.0	478.8			
Tested By : RJ	**Date :** 02/28/07						(inch)	(mm)	**Shear Stress (psf/ksf/kPa)**											
Computed By : LCC	**Date :** 03/07/07		2.50	(ksf)			0.000	0.00	0.0	0.0	0.0	0.00	0.0	0.00	0.0	0.0	0.0			
Checked By :	**Date :**						0.010	0.03	732	0.73	35.0	1104	1.10	52.9	1992	1.99	95.0			
Percent Consolidation (%)		**Before**		**After**			0.020	0.05	1116	1.12	53.4	1728	1.73	82.7	3180	3.18	151.7			
Height of Sample (inch)		1.00		1.0000			0.030	0.08	1404	1.40	67.2	2220	2.22	106.3	4116	4.12	196.3			
Diameter of Sample (inch)		2.42		2.42			0.040	0.10	1620	1.62	77.6	2628	2.63	125.8	4860	4.86	231.8			
Dial Reading-Consolidation (inch)							0.050	0.13	1764	1.76	84.5	2964	2.96	141.9	5435	5.44	259.3			
Weight of Soil + Ring (gm)		197.39					0.060	0.15	1872	1.87	89.6	3228	3.23	154.6	5927	5.93	282.7			
Weight of Ring (gm)		45.71					0.070	0.18	1956	1.96	93.7	3444	3.44	164.9	6323	6.32	301.6			
Weight of Wet Soil + Cont. (gm)				150.66			0.080	0.20	2004	2.00	96.0	3600	3.60	172.4	6623	6.62	315.9			
Weight of Dry Soil + Cont. (gm)				119.65			0.090	0.23	2028	2.03	97.1	3708	3.71	177.5	6839	6.84	326.2			
Weight of Cont. (gm) No.				3.61			0.100	0.25	2028	2.03	97.1	3792	3.79	181.6	7019	7.02	334.8			
Moisture Content (%)				26.72			0.110	0.28	2004	2.00	96.0	3828	3.83	183.3	7139	7.14	340.5			
Wet Density (pcf / kN/m^3)		125.63	19.77				0.120	0.30	1980	1.98	94.8	3852	3.85	184.4	7211	7.21	344.0			
Dry Density (pcf / kN/m^3)		99.13	15.60				0.130	0.33	1944	1.94	93.1	3828	3.83	183.3	7235	7.24	345.1			
Percent Saturation (%)	100.09		**File No. :**	615910 2			0.140	0.36	1908	1.91	91.4	3792	3.79	181.6	7235	7.24	345.1			
Prepared By : RJ	**Date :** 02/28/07		**Normal Stress**				0.150	0.38	1860	1.86	89.1	3744	3.74	179.3	7163	7.16	341.7			
Tested By : RJ	**Date :** 02/28/07		5.00	(ksf)			0.160	0.41	1788	1.79	85.6	3684	3.68	176.4	7055	7.06	336.5			
Percent Consolidation (%)		**Before**		**After**			0.170	0.43	1692	1.69	81.0	3624	3.62	173.5	6899	6.90	329.1			
Height of Sample (inch)		1.00		1.0000			0.180	0.46	1632	1.63	78.1	3516	3.52	168.3	6755	6.76	322.2			
Diameter of Sample (inch)		2.42		2.42			0.190	0.48	1572	1.57	75.3	3372	3.37	161.5	6623	6.62	315.9			
Dial Reading-Consolidation (inch)							0.200	0.51	1524	1.52	73.0	3228	3.23	154.6	6515	6.52	310.8			
Weight of Soil + Ring (gm)		196.21					0.210	0.53	1500	1.50	71.8	3120	3.12	149.4	6407	6.41	305.6			
Weight of Ring (gm)		45.64					0.220	0.56	1476	1.48	70.7	3036	3.04	145.4	6275	6.28	299.3			
Weight of Wet Soil + Cont. (gm)				150.50			0.230	0.58	1476	1.48	70.7	3000	3.00	143.6	6107	6.11	291.3			
Weight of Dry Soil + Cont. (gm)				120.07			0.240	0.61	1464	1.46	70.1	2976	2.98	142.5	5987	5.99	285.6			
Weight of Cont. (gm) No.				3.61			0.250	0.64	1464	1.46	70.1	2940	2.94	140.8	5879	5.88	280.4			
Moisture Content (%)				26.13			0.260	0.66	1476	1.48	70.7	2916	2.92	139.6	5807	5.81	277.0			
Wet Density (pcf / kN/m^3)		124.71	19.63				0.270	0.69	1476	1.48	70.7	2904	2.90	139.0	5735	5.74	273.6			
Dry Density (pcf / kN/m^3)		98.87	15.56				0.280	0.71	1476	1.48	70.7	2892	2.89	138.5	5675	5.68	270.7			
Percent Saturation (%)	100.64		**File No. :**	615910 3			0.290	0.74	1500	1.50	71.8	2892	2.89	138.5	5675	5.68	270.7			
Prepared By : RJ	**Date :** 02/28/07		**Normal Stress**				0.300	0.76	1512	1.51	72.4	2880	2.88	137.9	5651	5.65	269.6			
Tested By : RJ	**Date :** 02/28/07		10.00	(ksf)			0.310	0.79	1524	1.52	73.0	2892	2.89	138.5	5639	5.64	269.0			
Percent Consolidation (%)		**Before**		**After**			0.320	0.81	1524	1.52	73.0	2892	2.89	138.5	5627	5.63	268.4			
Height of Sample (inch)		1.00		1.0000			0.330	0.84	1536	1.54	73.5	2892	2.89	138.5	5675	5.68	270.7			
Diameter of Sample (inch)		2.42		2.42			0.340	0.86	1536	1.54	73.5	2916	2.92	139.6	5675	5.68	270.7			
Dial Reading-Consolidation (inch)							0.350	0.89	1548	1.55	74.1	2916	2.92	139.6	5699	5.70	271.9			
Weight of Soil + Ring (gm)		198.47					0.360	0.91	1548	1.55	74.1	2928	2.93	140.2	5711	5.71	272.4			
Weight of Ring (gm)		45.30					0.370	0.94	1548	1.55	74.1	2928	2.93	140.2	5687	5.69	271.3			
Weight of Wet Soil + Cont. (gm)				152.66			0.380	0.97	1560	1.56	74.7	2928	2.93	140.2	5711	5.71	272.4			
Weight of Dry Soil + Cont. (gm)				123.55			0.390	0.99	1560	1.56	74.7	2940	2.94	140.8	5711	5.71	272.4			
Weight of Cont. (gm) No.				3.63			0.400	1.02	1572	1.57	75.3	2940	2.94	140.8	5699	5.70	271.9			
Moisture Content (%)				24.27				0.00												
Wet Density (pcf / kN/m^3)		126.86	19.97					0.00												
Dry Density (pcf / kN/m^3)		102.08	16.07					0.00												

Strength	(ksf)	(kPa)	(ksf)	(kPa)	(ksf)	(kPa)
Peak	2.03	97.10	3.85	184.43	7.24	346.41
Ultimate	1.46	70.10	2.88	137.89	5.63	269.42



Ultimate : ○	Shear Type :	Inundated	Undisturbed	Peak : ●



Boring No. : 06-9		**Strength Intercept (C) :**	0.34	(ksf)		0.09	(ksf)		
Sample No. : D-20			16.11	(kPa)	**Peak**	4.33	(kPa)	**Ultimate**	
Depth (ft/m) : ####	30.50	**Friction Angle (ϕ) :**	34.67	Degree		29.00	Degree		
Description : Silty Sand (SM)							**Shear Rate** (inch/minute) :		0.02

SYMBOL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DRY DENSITY (kN/m^3)	VOID RATIO	NORMAL STRESS (ksf)	NORMAL STRESS (kPa)	PEAK STRESS (ksf)	PEAK STRESS (kPa)	ULTIMATE STRESS (ksf)	ULTIMATE STRESS (kPa)
●	26.72	99.13	15.60	0.70	2.50	119.70	2.03	97.10	1.46	70.10
◆	26.13	98.87	15.56	0.70	5.00	239.40	3.85	184.43	2.88	137.89
▲	24.27	102.08	16.07	0.65	10.00	478.80	7.24	346.41	5.63	269.42

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

Dumbarton Toll Bridge

DIRECT SHEAR TEST (ASTM D-3080)

Project No. : 06-159 | **Date :** 02/28/07 | Figure No. :

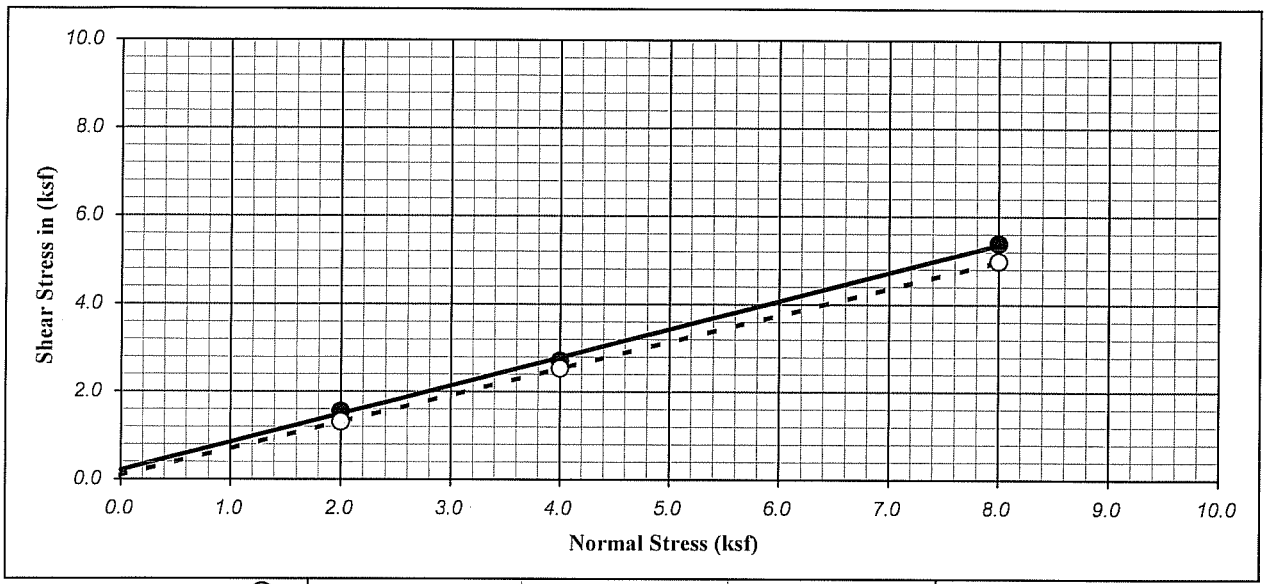
DIRECT SHEAR TEST

ASTM D-3080-90

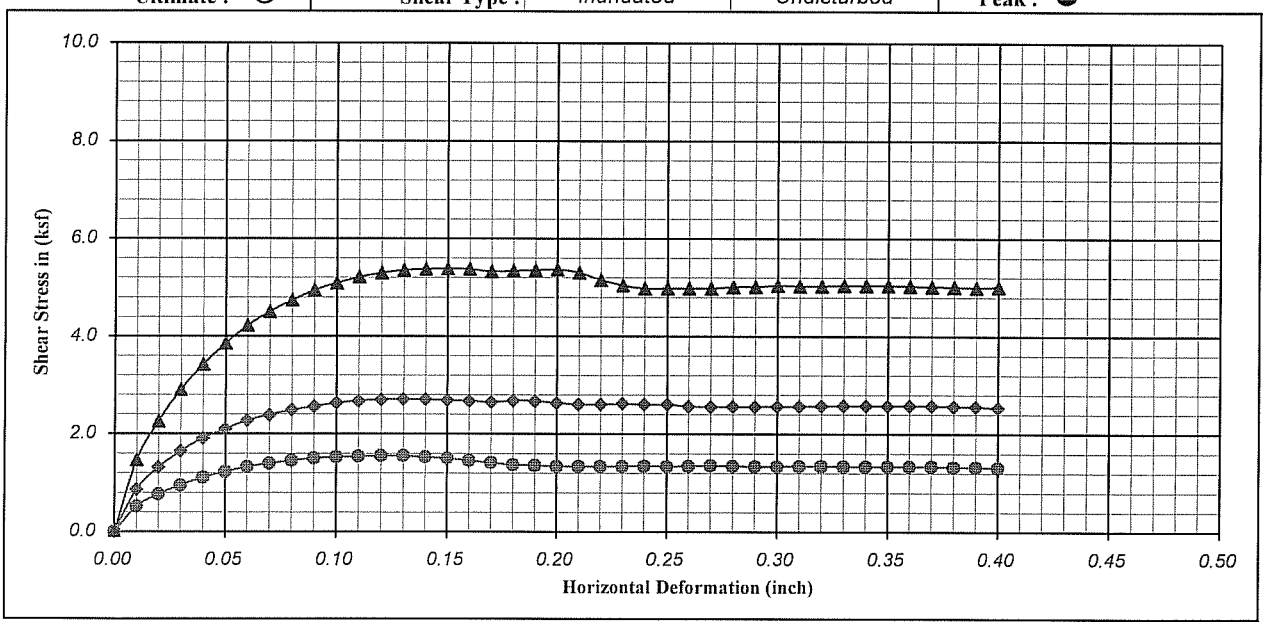
Project No. : 06-159 **Project Name :** BATA/Dumbarton Toll Bridge

Boring No. : 06-11			Saturated		Field Moisture	x	Inundated	**Specific Gravity** (Assumed) :	2.70
Sample No. : D-7		x	Undisturbed		Remolded		Consolidated-Drained	**Shear Rate** (inch/min) :	0.02
Depth (ft/m) :	40.0 12.20	x	Shear Once		Reshear		Residual	**Data File Number :**	615901
Description : Silty Sand (SM)									

Percent Saturation (%)	102.40		**File No. :**	615901 1			**Shear Deflection**		**Normal Stress (psf/ksf/kPa)**										
Prepared By : RJ	**Date :** 05/13/07		**Normal Stress**				2000	2.00	95.8	4000	4.0	191.5	8000	8.0	383.0				
Tested By : RJ	**Date :** 05/13/07						(inch)	(mm)	**Shear Stress (psf/ksf/kPa)**										
Computed By : LCC	**Date :** 05/15/07		**2.00**	(ksf)			0.00	0.00	0.0	0.0	0.0	0.00	0.0	0.00	0.0	0.0	0.0		
Checked By :	**Date :**						0.010	0.03	516	0.52	24.7	864	0.86	41.4	1464	1.46	69.8		
Percent Consolidation (%)		**Before**		**After**			0.020	0.05	768	0.77	36.8	1308	1.31	62.6	2256	2.26	107.6		
Height of Sample (inch)		1.00		1.0000			0.030	0.08	948	0.95	45.4	1644	1.64	78.7	2904	2.90	138.5		
Diameter of Sample (inch)		2.42		2.42			0.040	0.10	1104	1.10	52.9	1908	1.91	91.4	3420	3.42	163.1		
Dial Reading-Consolidation (inch)							0.050	0.13	1224	1.22	58.6	2100	2.10	100.5	3852	3.85	183.7		
Weight of Soil + Ring (gm)		201.53					0.060	0.15	1320	1.32	63.2	2268	2.27	108.6	4224	4.22	201.5		
Weight of Ring (gm)		45.28					0.070	0.18	1392	1.39	66.6	2388	2.39	114.3	4500	4.50	214.7		
Weight of Wet Soil + Cont. (gm)				158.10			0.080	0.20	1452	1.45	69.5	2484	2.48	118.9	4740	4.74	226.1		
Weight of Dry Soil + Cont. (gm)				129.55			0.090	0.23	1500	1.50	71.8	2556	2.56	122.4	4944	4.94	235.8		
Weight of Cont. (gm) **No.**				3.63			0.100	0.25	1524	1.52	73.0	2628	2.63	125.8	5088	5.09	242.7		
Moisture Content (%)				22.67			0.110	0.28	1536	1.54	73.5	2676	2.68	128.1	5208	5.21	248.4		
Wet Density (pcf / kN/m³)		129.41	20.37				0.120	0.30	1548	1.55	74.1	2700	2.70	129.3	5292	5.29	252.4		
Dry Density (pcf / kN/m³)		105.49	16.60				0.130	0.33	1548	1.55	74.1	2712	2.71	129.9	5352	5.35	255.3		
Percent Saturation (%)	99.95		**File No. :**	615901 2			0.140	0.36	1524	1.52	73.0	2700	2.70	129.3	5376	5.38	256.4		
Prepared By : RJ	**Date :** 05/13/07		**Normal Stress**				0.150	0.38	1500	1.50	71.8	2688	2.69	128.7	5388	5.39	257.0		
Tested By : RJ	**Date :** 05/13/07		**4.00**	(ksf)			0.160	0.41	1452	1.45	69.5	2676	2.68	128.1	5376	5.38	256.4		
Percent Consolidation (%)		**Before**		**After**			0.170	0.43	1416	1.42	67.8	2652	2.65	127.0	5328	5.33	254.2		
Height of Sample (inch)		1.00		1.0000			0.180	0.46	1368	1.37	65.5	2676	2.68	128.1	5340	5.34	254.7		
Diameter of Sample (inch)		2.42		2.42			0.190	0.48	1356	1.36	64.9	2676	2.68	128.1	5352	5.35	255.3		
Dial Reading-Consolidation (inch)							0.200	0.51	1332	1.33	63.8	2628	2.63	125.8	5364	5.36	255.9		
Weight of Soil + Ring (gm)		200.94					0.210	0.53	1332	1.33	63.8	2604	2.60	124.7	5304	5.30	253.0		
Weight of Ring (gm)		45.25					0.220	0.56	1332	1.33	63.8	2604	2.60	124.7	5148	5.15	245.6		
Weight of Wet Soil + Cont. (gm)				157.24			0.230	0.58	1332	1.33	63.8	2616	2.62	125.3	5040	5.04	240.4		
Weight of Dry Soil + Cont. (gm)				129.50			0.240	0.61	1344	1.34	64.4	2604	2.60	124.7	4980	4.98	237.6		
Weight of Cont. (gm) **No.**				3.62			0.250	0.64	1332	1.33	63.8	2604	2.60	124.7	4980	4.98	237.6		
Moisture Content (%)				22.04			0.260	0.66	1344	1.34	64.4	2568	2.57	123.0	4980	4.98	237.6		
Wet Density (pcf / kN/m³)		128.95	20.30				0.270	0.69	1356	1.36	64.9	2556	2.56	122.4	4980	4.98	237.6		
Dry Density (pcf / kN/m³)		105.66	16.63				0.280	0.71	1344	1.34	64.4	2556	2.56	122.4	5004	5.00	238.7		
Percent Saturation (%)	98.70		**File No. :**	615901 3			0.290	0.74	1332	1.33	63.8	2556	2.56	122.4	5016	5.02	239.3		
Prepared By : RJ	**Date :** 05/13/07		**Normal Stress**				0.300	0.76	1332	1.33	63.8	2568	2.57	123.0	5040	5.04	240.4		
Tested By : RJ	**Date :** 05/13/07		**8.00**	(ksf)			0.310	0.79	1344	1.34	64.4	2568	2.57	123.0	5028	5.03	239.8		
Percent Consolidation (%)		**Before**		**After**			0.320	0.81	1344	1.34	64.4	2580	2.58	123.5	5028	5.03	239.8		
Height of Sample (inch)		1.00		1.0000			0.330	0.84	1332	1.33	63.8	2580	2.58	123.5	5040	5.04	240.4		
Diameter of Sample (inch)		2.42		2.42			0.340	0.86	1332	1.33	63.8	2580	2.58	123.5	5040	5.04	240.4		
Dial Reading-Consolidation (inch)							0.350	0.89	1332	1.33	63.8	2580	2.58	123.5	5040	5.04	240.4		
Weight of Soil + Ring (gm)		200.37					0.360	0.91	1332	1.33	63.8	2580	2.58	123.5	5028	5.03	239.8		
Weight of Ring (gm)		45.33					0.370	0.94	1332	1.33	63.8	2580	2.58	123.5	5016	5.02	239.3		
Weight of Wet Soil + Cont. (gm)				154.56			0.380	0.97	1320	1.32	63.2	2568	2.57	123.0	5004	5.00	238.7		
Weight of Dry Soil + Cont. (gm)				127.37			0.390	0.99	1320	1.32	63.2	2556	2.56	122.4	4992	4.99	238.1		
Weight of Cont. (gm) **No.**				3.65			0.400	1.02	1308	1.31	62.6	2532	2.53	121.2	5004	5.00	238.7		
Moisture Content (%)				21.98				0.00											
Wet Density (pcf / kN/m³)		128.41	20.21					0.00											
Dry Density (pcf / kN/m³)		105.27	16.57					0.00											
Strength	(ksf) (kPa)	(ksf)	(kPa)	(ksf)	(kPa)			0.00											
Peak	1.55 74.12	2.71	129.85	5.39	257.98			0.00											
Ultimate	1.31 62.63	2.53	121.23	4.98	238.44			0.00											



Ultimate : ○	Shear Type :	Inundated	Undisturbed	Peak : ●



Boring No. : 06-11		**Strength Intercept (C) :**	0.21	(ksf)	**Peak**	0.08	(ksf)	**Ultimate**
Sample No. : D-7			10.05	(kPa)		4.02	(kPa)	
Depth (ft/m) : 40.0	12.20	**Friction Angle (ϕ) :**	32.79	Degree		31.47	Degree	
Description : Silty Sand (SM)					**Shear Rate** (inch/minute) :		0.02	

SYMBOL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DRY DENSITY (kN/m^3)	VOID RATIO	NORMAL STRESS (ksf)	NORMAL STRESS (kPa)	PEAK STRESS (ksf)	PEAK STRESS (kPa)	ULTIMATE STRESS (ksf)	ULTIMATE STRESS (kPa)
●	22.67	105.49	16.60	0.60	2.00	95.76	1.55	74.12	1.31	62.63
◆	22.04	105.66	16.63	0.60	4.00	191.52	2.71	129.85	2.53	121.23
▲	21.98	105.27	16.57	0.60	8.00	383.04	5.39	257.98	4.98	238.44

Earth Mechanics, Inc.
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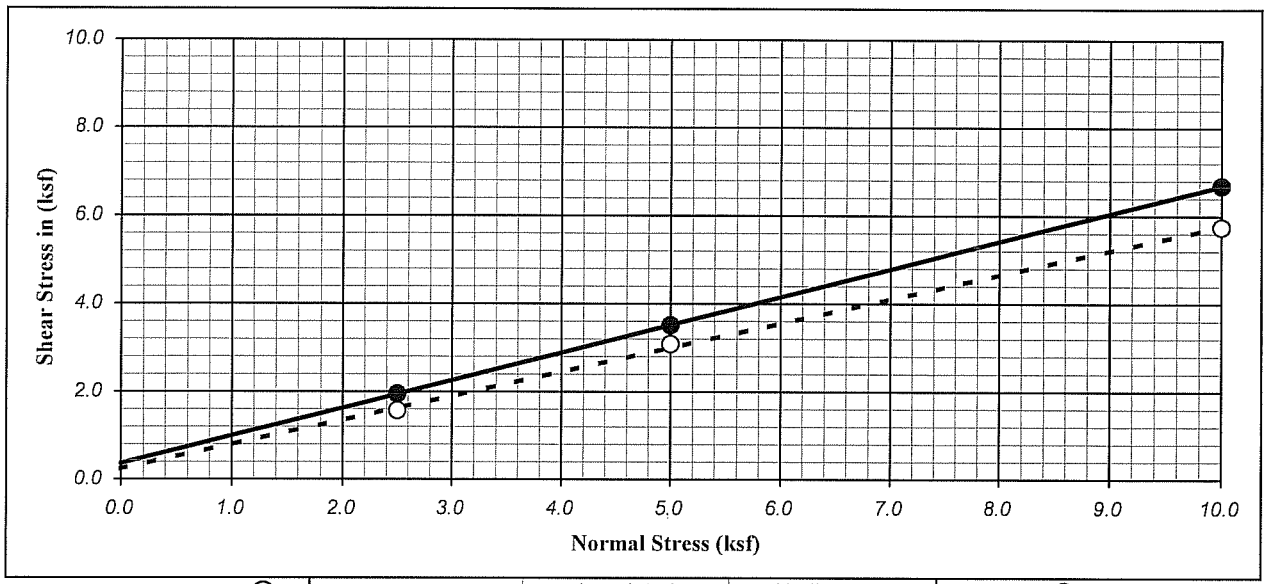
Dumbarton Toll Bridge

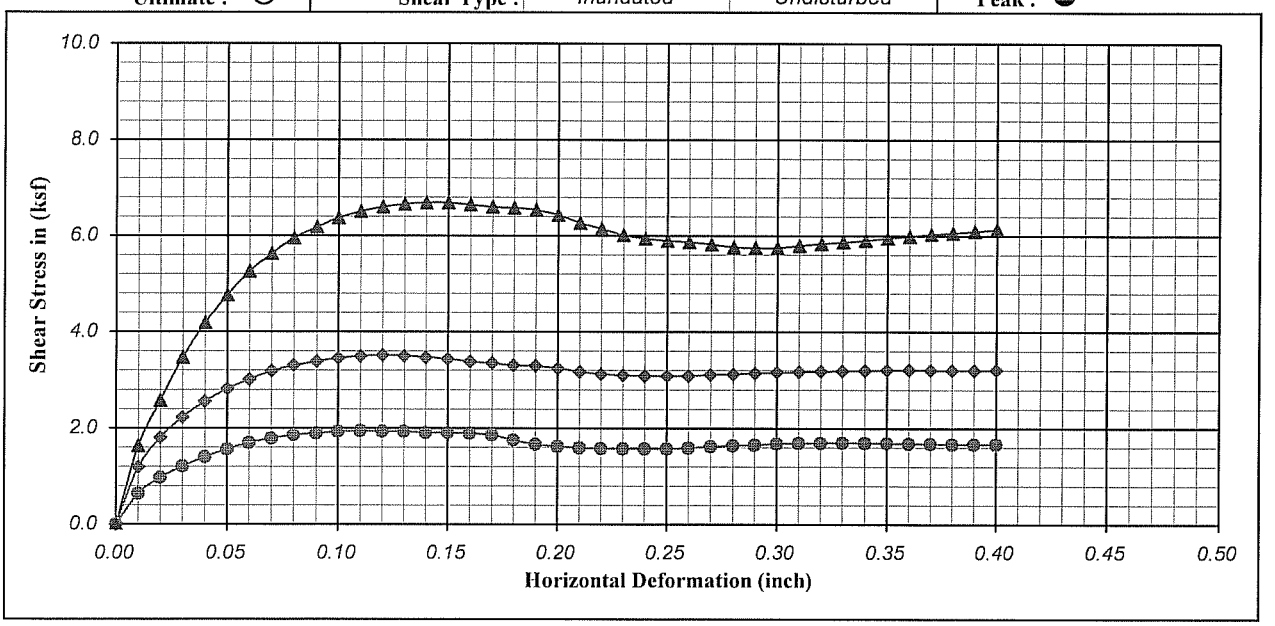
DIRECT SHEAR TEST (ASTM D-3080)

Project No. : 06-159 | **Date :** 05/13/07

Figure No. :



Ultimate : ○	Shear Type :	Inundated	Undisturbed	Peak : ●



Boring No. : 06-11		**Strength Intercept (C) :**	0.36	(ksf)	**Peak**	0.24	(ksf)	**Ultimate**
Sample No. : D-13			17.26	(kPa)		11.52	(kPa)	
Depth (ft/m) : 70.0	21.35	**Friction Angle (ϕ) :**	32.30	Degree		28.95	Degree	
Description : Silty Sand (SM)						**Shear Rate** (inch/minute) :		0.02

SYMBOL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DRY DENSITY (kN/m^3)	VOID RATIO	NORMAL STRESS (ksf)	NORMAL STRESS (kPa)	PEAK STRESS (ksf)	PEAK STRESS (kPa)	ULTIMATE STRESS (ksf)	ULTIMATE STRESS (kPa)
●	21.04	109.48	17.23	0.54	2.50	119.70	1.94	93.08	1.57	75.27
◆	22.67	107.28	16.89	0.57	5.00	239.40	3.52	168.35	3.08	147.66
▲	22.53	105.99	16.68	0.59	10.00	478.80	6.68	319.98	5.75	275.17

Earth Mechanics, Inc.
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Dumbarton Toll Bridge

DIRECT SHEAR TEST (ASTM D-3080)

Project No. : 06-159 | **Date :** 05/13/07 | Figure No. :

DIRECT SHEAR TEST

ASTM D-3080-90

Project No. : 06-159 **Project Name :** BATA/Dumbarton Toll Bridge

Boring No. : 06-12			Saturated		Field Moisture	x	Inundated	**Specific Gravity** (Assumed) :	2.70
Sample No. : D-9		x	Undisturbed		Remolded		Consolidated-Drained	**Shear Rate** (inch/min) :	0.02
Depth (ft/m) :	54.0 16.47	x	Shear Once		Reshear		Residual	**Data File Number :**	615912
Description : Silty Sand (SM)									

Percent Saturation (%)	102.46	**File No. :**	615912 1																	
Prepared By : RJ	**Date :** 05/13/07	**Normal Stress**																		
Tested By : RJ	**Date :** 05/13/07																			
Computed By : LCC	**Date :** 05/15/07	2.50	(ksf)																	
Checked By :	**Date :**																			
Percent Consolidation (%)		**Before**		**After**																
Height of Sample (inch)		1.00		1.0000																
Diameter of Sample (inch)		2.42		2.42																
Dial Reading-Consolidation (inch)																				
Weight of Soil + Ring (gm)		203.86																		
Weight of Ring (gm)		45.50																		
Weight of Wet Soil + Cont. (gm)				159.92																
Weight of Dry Soil + Cont. (gm)				132.67																
Weight of Cont. (gm) No.				3.66																
Moisture Content (%)				21.12																
Wet Density (pcf / kN/m³)		131.16	20.64																	
Dry Density (pcf / kN/m³)		108.29	17.04																	
Percent Saturation (%)	99.20	**File No. :**	615912 2																	
Prepared By : RJ	**Date :** 05/13/07	**Normal Stress**																		
Tested By : RJ	**Date :** 05/13/07	5.00	(ksf)																	
Percent Consolidation (%)		**Before**		**After**																
Height of Sample (inch)		1.00		1.0000																
Diameter of Sample (inch)		2.42		2.42																
Dial Reading-Consolidation (inch)																				
Weight of Soil + Ring (gm)		202.14																		
Weight of Ring (gm)		45.37																		
Weight of Wet Soil + Cont. (gm)				158.86																
Weight of Dry Soil + Cont. (gm)				131.97																
Weight of Cont. (gm) No.				3.61																
Moisture Content (%)				20.95																
Wet Density (pcf / kN/m³)		129.84	20.44																	
Dry Density (pcf / kN/m³)		107.35	16.90																	
Percent Saturation (%)	99.26	**File No. :**	615912 3																	
Prepared By : RJ	**Date :** 05/13/07	**Normal Stress**																		
Tested By : RJ	**Date :** 05/13/07	10.00	(ksf)																	
Percent Consolidation (%)		**Before**		**After**																
Height of Sample (inch)		1.00		1.0000																
Diameter of Sample (inch)		2.42		2.42																
Dial Reading-Consolidation (inch)																				
Weight of Soil + Ring (gm)		201.86																		
Weight of Ring (gm)		45.62																		
Weight of Wet Soil + Cont. (gm)				157.47																
Weight of Dry Soil + Cont. (gm)				130.41																
Weight of Cont. (gm) No.				3.66																
Moisture Content (%)				21.35																
Wet Density (pcf / kN/m³)		129.40	20.37																	
Dry Density (pcf / kN/m³)		106.64	16.78																	

Strength	(ksf)	(kPa)	(ksf)	(kPa)	(ksf)	(kPa)
Peak	1.85	88.48	3.76	179.84	7.04	337.22
Ultimate	1.48	70.67	3.06	146.51	5.77	276.32

Shear Deflection (inch)	(mm)	**Normal Stress (psf/ksf/kPa)** 2500	2.50	119.7	5000	5.0	239.4	10000	10.0	478.8
		Shear Stress (psf/ksf/kPa)								
0.000	0.00	0.0	0.0	0.0	0.00	0.0	0.00	0.0	0.0	0.0
0.010	0.03	636	0.64	30.5	1284	1.28	61.5	1896	1.90	90.4
0.020	0.05	936	0.94	44.8	1956	1.96	93.7	3084	3.08	147.1
0.030	0.08	1116	1.12	53.4	2412	2.41	115.5	3996	4.00	190.6
0.040	0.10	1284	1.28	61.5	2784	2.78	133.3	4692	4.69	223.8
0.050	0.13	1404	1.40	67.2	3060	3.06	146.5	5244	5.24	250.2
0.060	0.15	1512	1.51	72.4	3300	3.30	158.0	5723	5.72	273.0
0.070	0.18	1608	1.61	77.0	3468	3.47	166.0	6095	6.10	290.7
0.080	0.20	1692	1.69	81.0	3588	3.59	171.8	6371	6.37	303.9
0.090	0.23	1740	1.74	83.3	3672	3.67	175.8	6611	6.61	315.4
0.100	0.25	1788	1.79	85.6	3720	3.72	178.1	6779	6.78	323.4
0.110	0.28	1836	1.84	87.9	3756	3.76	179.8	6887	6.89	328.5
0.120	0.30	1848	1.85	88.5	3744	3.74	179.3	6971	6.97	332.5
0.130	0.33	1848	1.85	88.5	3708	3.71	177.5	7019	7.02	334.8
0.140	0.36	1836	1.84	87.9	3660	3.66	175.2	7043	7.04	336.0
0.150	0.38	1812	1.81	86.8	3612	3.61	172.9	7043	7.04	336.0
0.160	0.41	1812	1.81	86.8	3552	3.55	170.1	7019	7.02	334.8
0.170	0.43	1812	1.81	86.8	3492	3.49	167.2	6959	6.96	332.0
0.180	0.46	1800	1.80	86.2	3444	3.44	164.9	6899	6.90	329.1
0.190	0.48	1764	1.76	84.5	3396	3.40	162.6	6839	6.84	326.2
0.200	0.51	1716	1.72	82.2	3348	3.35	160.3	6719	6.72	320.5
0.210	0.53	1668	1.67	79.9	3276	3.28	156.9	6587	6.59	314.2
0.220	0.56	1608	1.61	77.0	3216	3.22	154.0	6431	6.43	306.8
0.230	0.58	1560	1.56	74.7	3168	3.17	151.7	6299	6.30	300.5
0.240	0.61	1512	1.51	72.4	3132	3.13	150.0	6179	6.18	294.8
0.250	0.64	1476	1.48	70.7	3084	3.08	147.7	6071	6.07	289.6
0.260	0.66	1476	1.48	70.7	3084	3.08	147.7	5975	5.98	285.0
0.270	0.69	1488	1.49	71.2	3060	3.06	146.5	5903	5.90	281.6
0.280	0.71	1500	1.50	71.8	3084	3.08	147.7	5831	5.83	278.2
0.290	0.74	1500	1.50	71.8	3060	3.06	146.5	5819	5.82	277.6
0.300	0.76	1488	1.49	71.2	3084	3.08	147.7	5795	5.80	276.4
0.310	0.79	1500	1.50	71.8	3108	3.11	148.8	5771	5.77	275.3
0.320	0.81	1524	1.52	73.0	3120	3.12	149.4	5783	5.78	275.9
0.330	0.84	1524	1.52	73.0	3120	3.12	149.4	5795	5.80	276.4
0.340	0.86	1524	1.52	73.0	3156	3.16	151.1	5807	5.81	277.0
0.350	0.89	1524	1.52	73.0	3192	3.19	152.8	5843	5.84	278.7
0.360	0.91	1536	1.54	73.5	3180	3.18	152.3	5891	5.89	281.0
0.370	0.94	1548	1.55	74.1	3180	3.18	152.3	5915	5.92	282.2
0.380	0.97	1548	1.55	74.1	3192	3.19	152.8	5939	5.94	283.3
0.390	0.99	1548	1.55	74.1	3204	3.20	153.4	5999	6.00	286.2
0.400	1.02	1548	1.55	74.1	3228	3.23	154.6	6011	6.01	286.7
	0.00									
	0.00									
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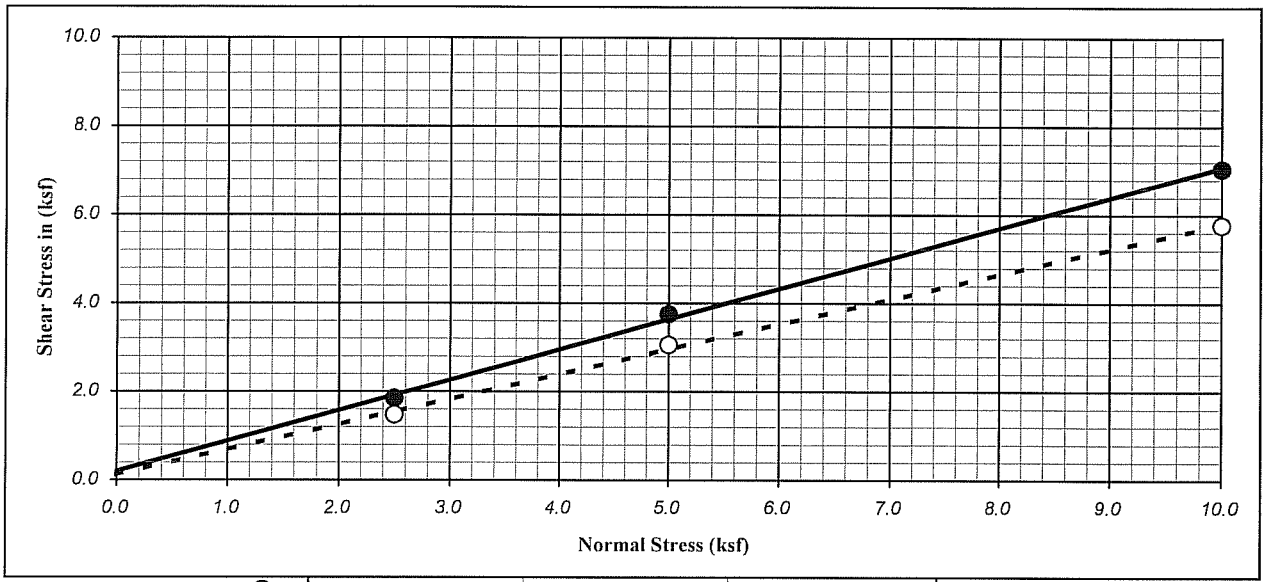
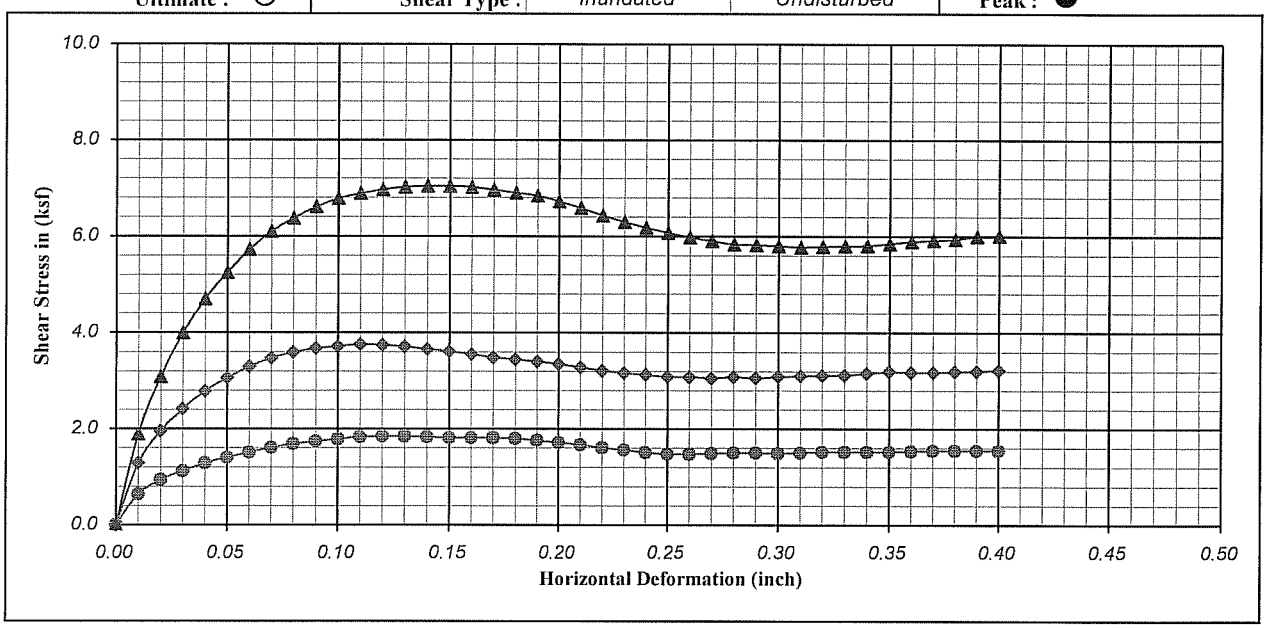


Ultimate : ○	Shear Type :	Inundated	Undisturbed	Peak : ●



Boring No. : 06-12		**Strength Intercept (C) :**	0.20	(ksf)	**Peak**	0.12	(ksf)	**Ultimate**
Sample No. : D-9			9.79	(kPa)		5.77	(kPa)	
Depth (ft/m) : 54.0	16.47	**Friction Angle (ϕ) :**	34.51	Degree		29.61	Degree	
Description : Silty Sand (SM)						**Shear Rate** (inch/minute) :		0.02

SYMBOL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DRY DENSITY (kN/m^3)	VOID RATIO	NORMAL STRESS (ksf)	NORMAL STRESS (kPa)	PEAK STRESS (ksf)	PEAK STRESS (kPa)	ULTIMATE STRESS (ksf)	ULTIMATE STRESS (kPa)
●	21.12	108.29	17.04	0.56	2.50	119.70	1.85	88.48	1.48	70.67
◆	20.95	107.35	16.90	0.57	5.00	239.40	3.76	179.84	3.06	146.51
▲	21.35	106.64	16.78	0.58	10.00	478.80	7.04	337.22	5.77	276.32

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

Dumbarton Toll Bridge

DIRECT SHEAR TEST (ASTM D-3080)

Project No. : 06-159 | **Date :** 05/13/07 | Figure No. :

DIRECT SHEAR TEST

ASTM D-3080-90

Project No. : 06-159 **Project Name :** BATA/Dumbarton Toll Bridge

Boring No. : 06-13			Saturated		Field Moisture	x	Inundated	**Specific Gravity** (Assumed) :	2.70
Sample No. : D-11		x	Undisturbed		Remolded		Consolidated-Drained	**Shear Rate** (inch/min) :	0.02
Depth (ft/m) : 54.0	16.47	x	Shear Once		Reshear		Residual	**Data File Number :**	615913
Description : Silty Sand (SM)									

Percent Saturation (%)	101.17		**File No. :**	615913 1																
Prepared By : RJ	**Date :** 05/14/07																			
Tested By : RJ	**Date :** 05/14/07		**Normal Stress**																	
Computed By : LCC	**Date :** 05/15/07																			
Checked By :	**Date :**		**2.50**	(ksf)																
Percent Consolidation (%)		**Before**		**After**																
Height of Sample (inch)		1.00		1.0000																
Diameter of Sample (inch)		2.42		2.42																
Dial Reading-Consolidation (inch)																				
Weight of Soil + Ring (gm)		196.23																		
Weight of Ring (gm)		43.68																		
Weight of Wet Soil + Cont. (gm)				153.65																
Weight of Dry Soil + Cont. (gm)				123.61																
Weight of Cont. (gm) No.				3.62																
Moisture Content (%)				25.04																
Wet Density (pcf / kN/m³)		126.35	19.89																	
Dry Density (pcf / kN/m³)		101.05	15.90																	
Percent Saturation (%)	101.01		**File No. :**	615913 2																
Prepared By : RJ	**Date :** 05/14/07		**Normal Stress**																	
Tested By : RJ	**Date :** 05/14/07		**5.00**	(ksf)																
Percent Consolidation (%)		**Before**		**After**																
Height of Sample (inch)		1.00		1.0000																
Diameter of Sample (inch)		2.42		2.42																
Dial Reading-Consolidation (inch)																				
Weight of Soil + Ring (gm)		196.56																		
Weight of Ring (gm)		43.68																		
Weight of Wet Soil + Cont. (gm)				153.45																
Weight of Dry Soil + Cont. (gm)				123.78																
Weight of Cont. (gm) No.				3.60																
Moisture Content (%)				24.69																
Wet Density (pcf / kN/m³)		126.62	19.93																	
Dry Density (pcf / kN/m³)		101.55	15.98																	
Percent Saturation (%)	95.96		**File No. :**	615913 3																
Prepared By : RJ	**Date :** 05/14/07		**Normal Stress**																	
Tested By : RJ	**Date :** 05/14/07		**10.00**	(ksf)																
Percent Consolidation (%)		**Before**		**After**																
Height of Sample (inch)		1.00		1.0000																
Diameter of Sample (inch)		2.42		2.42																
Dial Reading-Consolidation (inch)																				
Weight of Soil + Ring (gm)		195.39																		
Weight of Ring (gm)		45.40																		
Weight of Wet Soil + Cont. (gm)				149.83																
Weight of Dry Soil + Cont. (gm)				121.06																
Weight of Cont. (gm) No.				3.62																
Moisture Content (%)				24.50																
Wet Density (pcf / kN/m³)		124.23	19.55																	
Dry Density (pcf / kN/m³)		99.78	15.71																	

Strength	(ksf)	(kPa)	(ksf)	(kPa)	(ksf)	(kPa)
Peak	1.87	89.63	3.43	164.32	6.50	311.36
Ultimate	1.52	72.97	2.94	140.77	5.70	272.87

Shear Deflection (inch)	(mm)	**Normal Stress (psf/ksf/kPa)** 2500	2.50	119.7	5000	5.0	239.4	10000	10.0	478.8
		Shear Stress (psf/ksf/kPa)								
0.000	0.00	0.0	0.0	0.0	0.00	0.0	0.00	0.0	0.0	0.0
0.010	0.03	612	0.61	29.3	1284	1.28	61.5	1860	1.86	88.7
0.020	0.05	984	0.98	47.1	1980	1.98	94.8	3036	3.04	144.8
0.030	0.08	1272	1.27	60.9	2460	2.46	117.8	3876	3.88	184.9
0.040	0.10	1476	1.48	70.7	2808	2.81	134.4	4560	4.56	217.5
0.050	0.13	1644	1.64	78.7	3048	3.05	145.9	5052	5.05	241.0
0.060	0.15	1752	1.75	83.9	3204	3.20	153.4	5459	5.46	260.4
0.070	0.18	1812	1.81	86.8	3324	3.32	159.2	5771	5.77	275.3
0.080	0.20	1860	1.86	89.1	3384	3.38	162.0	5987	5.99	285.6
0.090	0.23	1872	1.87	89.6	3420	3.42	163.7	6179	6.18	294.8
0.100	0.25	1872	1.87	89.6	3420	3.42	163.7	6311	6.31	301.0
0.110	0.28	1860	1.86	89.1	3420	3.42	163.7	6395	6.40	305.1
0.120	0.30	1836	1.84	87.9	3432	3.43	164.3	6455	6.46	307.9
0.130	0.33	1812	1.81	86.8	3420	3.42	163.7	6479	6.48	309.1
0.140	0.36	1776	1.78	85.0	3408	3.41	163.2	6503	6.50	310.2
0.150	0.38	1764	1.76	84.5	3372	3.37	161.5	6491	6.49	309.6
0.160	0.41	1764	1.76	84.5	3288	3.29	157.4	6467	6.47	308.5
0.170	0.43	1764	1.76	84.5	3204	3.20	153.4	6395	6.40	305.1
0.180	0.46	1740	1.74	83.3	3132	3.13	150.0	6275	6.28	299.3
0.190	0.48	1704	1.70	81.6	3060	3.06	146.5	6155	6.16	293.6
0.200	0.51	1608	1.61	77.0	2976	2.98	142.5	6083	6.08	290.2
0.210	0.53	1548	1.55	74.1	2940	2.94	140.8	6059	6.06	289.0
0.220	0.56	1524	1.52	73.0	2940	2.94	140.8	6059	6.06	289.0
0.230	0.58	1536	1.54	73.5	2964	2.96	141.9	6035	6.04	287.9
0.240	0.61	1548	1.55	74.1	2988	2.99	143.1	6059	6.06	289.0
0.250	0.64	1572	1.57	75.3	3024	3.02	144.8	6059	6.06	289.0
0.260	0.66	1572	1.57	75.3	3048	3.05	145.9	6035	6.04	287.9
0.270	0.69	1584	1.58	75.8	3060	3.06	146.5	5999	6.00	286.2
0.280	0.71	1584	1.58	75.8	3084	3.08	147.7	5939	5.94	283.3
0.290	0.74	1584	1.58	75.8	3096	3.10	148.2	5867	5.87	279.9
0.300	0.76	1584	1.58	75.8	3096	3.10	148.2	5771	5.77	275.3
0.310	0.79	1596	1.60	76.4	3120	3.12	149.4	5723	5.72	273.0
0.320	0.81	1596	1.60	76.4	3120	3.12	149.4	5699	5.70	271.9
0.330	0.84	1596	1.60	76.4	3132	3.13	150.0	5723	5.72	273.0
0.340	0.86	1596	1.60	76.4	3144	3.14	150.5	5723	5.72	273.0
0.350	0.89	1596	1.60	76.4	3144	3.14	150.5	5747	5.75	274.1
0.360	0.91	1584	1.58	75.8	3132	3.13	150.0	5771	5.77	275.3
0.370	0.94	1584	1.58	75.8	3132	3.13	150.0	5795	5.80	276.4
0.380	0.97	1572	1.57	75.3	3120	3.12	149.4	5819	5.82	277.6
0.390	0.99	1572	1.57	75.3	3132	3.13	150.0	5855	5.86	279.3
0.400	1.02	1572	1.57	75.3	3120	3.12	149.4	5879	5.88	280.4
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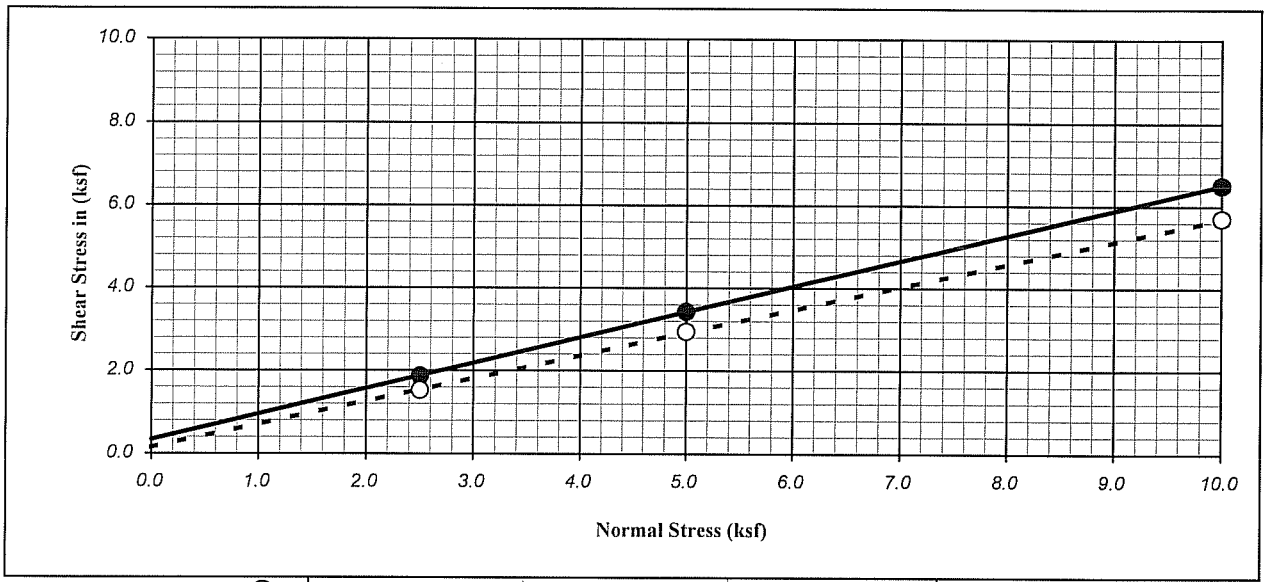
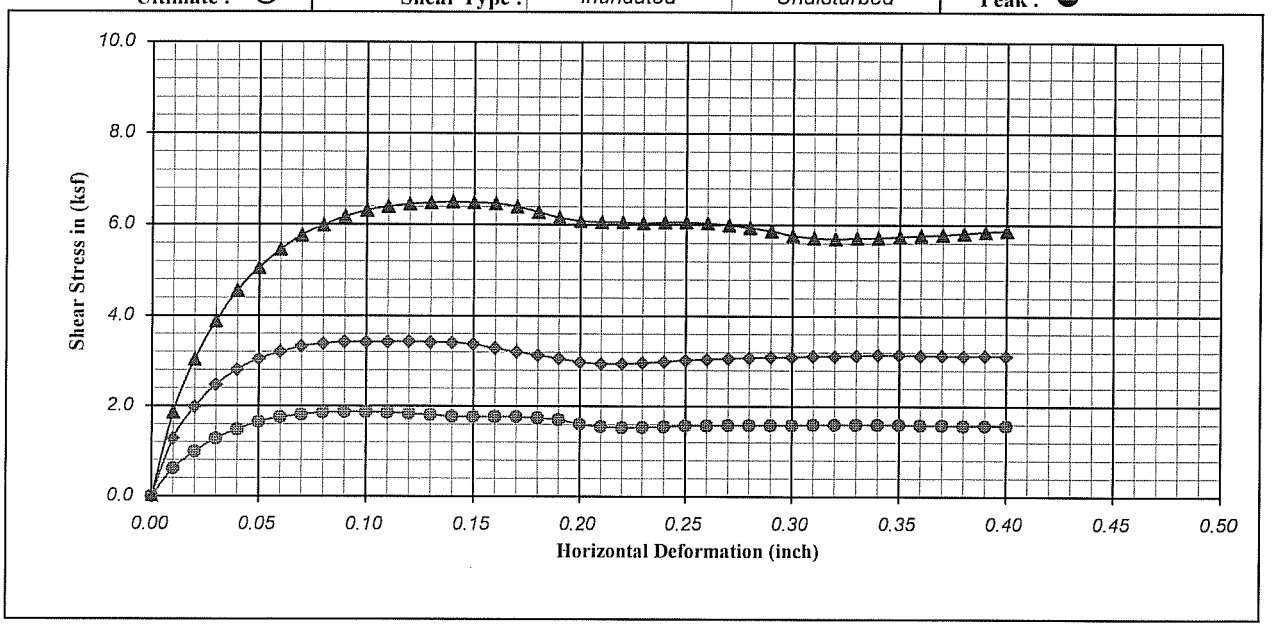


Ultimate : ○	Shear Type :	Inundated	Undisturbed	Peak : ●



Boring No. : 06-13		**Strength Intercept (C) :**	0.34	(ksf)	**Peak**	0.14	(ksf)	**Ultimate**
Sample No. : D-11			16.11	(kPa)		6.92	(kPa)	
Depth (ft/m) : 54.0	16.47	**Friction Angle (ϕ) :**	31.67	Degree		29.07	Degree	
Description : Silty Sand (SM)						**Shear Rate** (inch/minute) :		0.02

SYMBOL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DRY DENSITY (kN/m^3)	VOID RATIO	NORMAL STRESS (ksf)	NORMAL STRESS (kPa)	PEAK STRESS (ksf)	PEAK STRESS (kPa)	ULTIMATE STRESS (ksf)	ULTIMATE STRESS (kPa)
●	25.04	101.05	15.90	0.67	2.50	119.70	1.87	89.63	1.52	72.97
◆	24.69	101.55	15.98	0.66	5.00	239.40	3.43	164.32	2.94	140.77
▲	24.50	99.78	15.71	0.69	10.00	478.80	6.50	311.36	5.70	272.87

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

Dumbarton Toll Bridge

DIRECT SHEAR TEST (ASTM D-3080)

Project No. : 06-159 | **Date :** 05/14/07

Figure No. :

DIRECT SHEAR TEST

ASTM D-3080-90

Project No. : 06-159 **Project Name :** BATA/Dumbarton Toll Bridge

Boring No. : 06-13			Saturated		Field Moisiture	x	Inundated	**Specific Gravity** (Assumed) :	2.70
Sample No. : D-19		x	Undisturbed		Remolded		Consolidated-Drained	**Shear Rate** (inch/min) :	0.02
Depth (ft/m) :	94.0 28.67	x	Shear Once		Reshear		Residual	**Data File Number :**	615914
Description :	Silty Sand (SM)								

Percent Saturation (%)	105.70		**File No. :**	615914 1																		
Prepared By : RJ	**Date :** 05/14/07																					
Tested By : RJ	**Date :** 05/14/07																					
Computed By : LCC	**Date :** 05/15/07																					
Checked By :	**Date :**																					
Percent Consolidation (%)		**Before**		**After**																		
Height of Sample (inch)		1.00		1.0000																		
Diameter of Sample (inch)		2.42		2.42																		
Dial Reading-Consolidation (inch)																						
Weight of Soil + Ring (gm)		199.24																				
Weight of Ring (gm)		43.62																				
Weight of Wet Soil + Cont. (gm)				157.49																		
Weight of Dry Soil + Cont. (gm)				127.02																		
Weight of Cont. (gm) No.				3.62																		
Moisture Content (%)				24.69																		
Wet Density (pcf / kN/m³)		128.89	20.29																			
Dry Density (pcf / kN/m³)		103.37	16.27																			
Percent Saturation (%)	102.86		**File No. :**	615914 2																		
Prepared By : RJ	**Date :** 05/14/07																					
Tested By : RJ	**Date :** 05/14/07																					
Percent Consolidation (%)		**Before**		**After**																		
Height of Sample (inch)		1.00		1.0000																		
Diameter of Sample (inch)		2.42		2.42																		
Dial Reading-Consolidation (inch)																						
Weight of Soil + Ring (gm)		198.42																				
Weight of Ring (gm)		43.53																				
Weight of Wet Soil + Cont. (gm)				153.68																		
Weight of Dry Soil + Cont. (gm)				124.69																		
Weight of Cont. (gm) No.				3.65																		
Moisture Content (%)				23.95																		
Wet Density (pcf / kN/m³)		128.28	20.19																			
Dry Density (pcf / kN/m³)		103.50	16.29																			
Percent Saturation (%)	102.49		**File No. :**	615914 3																		
Prepared By : RJ	**Date :** 05/14/07																					
Tested By : RJ	**Date :** 05/14/07																					
Percent Consolidation (%)		**Before**		**After**																		
Height of Sample (inch)		1.00		1.0000																		
Diameter of Sample (inch)		2.42		2.42																		
Dial Reading-Consolidation (inch)																						
Weight of Soil + Ring (gm)		199.43																				
Weight of Ring (gm)		43.80																				
Weight of Wet Soil + Cont. (gm)				154.02																		
Weight of Dry Soil + Cont. (gm)				125.71																		
Weight of Cont. (gm) No.				3.66																		
Moisture Content (%)				23.20																		
Wet Density (pcf / kN/m³)		128.90	20.29																			
Dry Density (pcf / kN/m³)		104.63	16.47																			

Strength	(ksf)	(kPa)	(ksf)	(kPa)	(ksf)	(kPa)
Peak	1.93	92.50	3.73	178.69	6.89	329.75
Ultimate	1.49	71.25	2.87	137.32	5.75	275.17

Shear Deflection (inch)	(mm)	**Normal Stress (psf/ksf/kPa)** 2500	2.50	119.7	5000	5.0	239.4	10000	10.0	478.8
		Shear Stress (psf/ksf/kPa)								
0.000	0.00	0.0	0.0	0.0	0.00	0.0	0.00	0.0	0.0	0.0
0.010	0.03	732	0.73	35.0	1176	1.18	56.3	1860	1.86	88.7
0.020	0.05	1128	1.13	54.0	1956	1.96	93.7	3060	3.06	146.0
0.030	0.08	1416	1.42	67.8	2496	2.50	119.5	4044	4.04	192.9
0.040	0.10	1620	1.62	77.6	2892	2.89	138.5	4740	4.74	226.1
0.050	0.13	1764	1.76	84.5	3180	3.18	152.3	5352	5.35	255.3
0.060	0.15	1824	1.82	87.3	3396	3.40	162.6	5831	5.83	278.2
0.070	0.18	1860	1.86	89.1	3552	3.55	170.1	6167	6.17	294.2
0.080	0.20	1908	1.91	91.4	3660	3.66	175.2	6443	6.44	307.3
0.090	0.23	1932	1.93	92.5	3708	3.71	177.5	6635	6.64	316.5
0.100	0.25	1932	1.93	92.5	3732	3.73	178.7	6779	6.78	323.4
0.110	0.28	1896	1.90	90.8	3732	3.73	178.7	6851	6.85	326.8
0.120	0.30	1860	1.86	89.1	3696	3.70	177.0	6887	6.89	328.5
0.130	0.33	1812	1.81	86.8	3648	3.65	174.7	6875	6.88	328.0
0.140	0.36	1764	1.76	84.5	3600	3.60	172.4	6803	6.80	324.5
0.150	0.38	1668	1.67	79.9	3564	3.56	170.6	6755	6.76	322.2
0.160	0.41	1572	1.57	75.3	3516	3.52	168.3	6671	6.67	318.2
0.170	0.43	1512	1.51	72.4	3444	3.44	164.9	6587	6.59	314.2
0.180	0.46	1488	1.49	71.2	3348	3.35	160.3	6467	6.47	308.5
0.190	0.48	1500	1.50	71.8	3252	3.25	155.7	6311	6.31	301.0
0.200	0.51	1500	1.50	71.8	3156	3.16	151.1	6155	6.16	293.6
0.210	0.53	1524	1.52	73.0	3084	3.08	147.7	5975	5.98	285.0
0.220	0.56	1548	1.55	74.1	3048	3.05	145.9	5855	5.86	279.3
0.230	0.58	1548	1.55	74.1	3012	3.01	144.2	5843	5.84	278.7
0.240	0.61	1560	1.56	74.7	2976	2.98	142.5	5795	5.80	276.4
0.250	0.64	1572	1.57	75.3	2952	2.95	141.3	5771	5.77	275.3
0.260	0.66	1608	1.61	77.0	2916	2.92	139.6	5747	5.75	274.1
0.270	0.69	1644	1.64	78.7	2892	2.89	138.5	5747	5.75	274.1
0.280	0.71	1656	1.66	79.3	2880	2.88	137.9	5759	5.76	274.7
0.290	0.74	1668	1.67	79.9	2880	2.88	137.9	5747	5.75	274.1
0.300	0.76	1692	1.69	81.0	2880	2.88	137.9	5771	5.77	275.3
0.310	0.79	1692	1.69	81.0	2868	2.87	137.3	5759	5.76	274.7
0.320	0.81	1704	1.70	81.6	2892	2.89	138.5	5783	5.78	275.9
0.330	0.84	1716	1.72	82.2	2880	2.88	137.9	5795	5.80	276.4
0.340	0.86	1716	1.72	82.2	2892	2.89	138.5	5807	5.81	277.0
0.350	0.89	1716	1.72	82.2	2892	2.89	138.5	5807	5.81	277.0
0.360	0.91	1716	1.72	82.2	2880	2.88	137.9	5819	5.82	277.6
0.370	0.94	1704	1.70	81.6	2892	2.89	138.5	5843	5.84	278.7
0.380	0.97	1668	1.67	79.9	2904	2.90	139.0	5855	5.86	279.3
0.390	0.99	1632	1.63	78.1	2904	2.90	139.0	5867	5.87	279.9
0.400	1.02	1620	1.62	77.6	2928	2.93	140.2	5903	5.90	281.6
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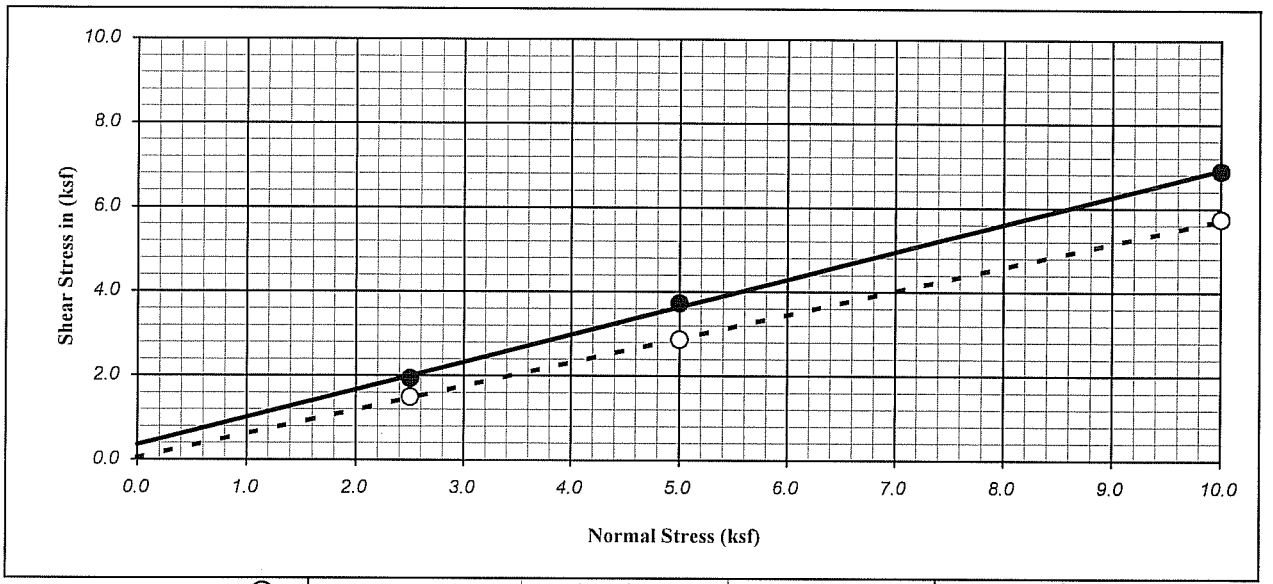
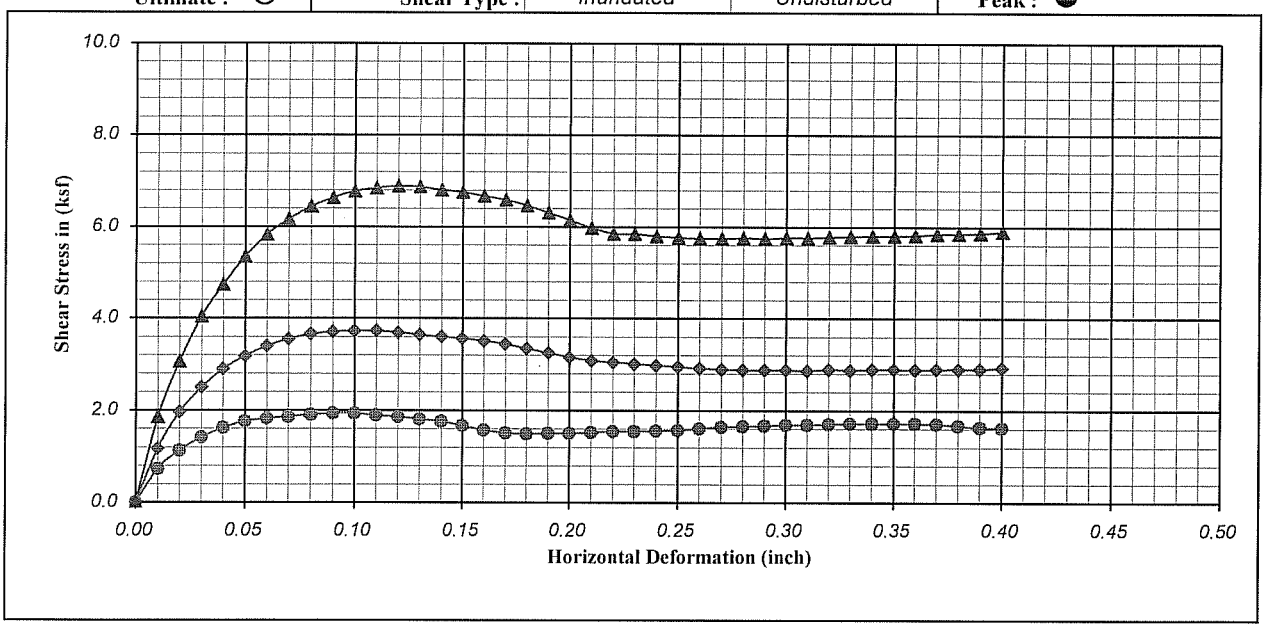
	0.00									
	0.00									
	0.00									
	0.00									



Ultimate : ○	Shear Type :	Inundated	Undisturbed	Peak : ●



Boring No.	: 06-13	**Strength Intercept (C) :**	0.35	(ksf)	**Peak**	0.05	(ksf)	**Ultimate**
Sample No.	: D-19		16.97	(kPa)		2.32	(kPa)	
Depth (ft/m)	: 94.0 28.67	**Friction Angle (ϕ) :**	33.28	Degree		29.64	Degree	
Description	: Silty Sand (SM)					**Shear Rate** (inch/minute) :		0.02

SYMBOL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DRY DENSITY (kN/m^3)	VOID RATIO	NORMAL STRESS (ksf)	NORMAL STRESS (kPa)	PEAK STRESS (ksf)	PEAK STRESS (kPa)	ULTIMATE STRESS (ksf)	ULTIMATE STRESS (kPa)
●	24.69	103.37	16.27	0.63	2.50	119.70	1.93	92.50	1.49	71.25
◆	23.95	103.50	16.29	0.63	5.00	239.40	3.73	178.69	2.87	137.32
▲	23.20	104.63	16.47	0.61	10.00	478.80	6.89	329.75	5.75	275.17

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

Dumbarton Toll Bridge

DIRECT SHEAR TEST (ASTM D-3080)

Project No. : 06-159 **Date :** 05/14/07

Figure No. :

DIRECT SHEAR TEST

ASTM D-3080-90

Project No. : 06-159 **Project Name :** BATA/Dumbarton Toll Bridge

Boring No. : 06-14			Saturated		Field Moisture	x	Inundated	**Specific Gravity** (Assumed) :	2.70
Sample No. : D-18		x	Undisturbed		Remolded		Consolidated-Drained	**Shear Rate** (inch/min) :	0.02
Depth (ft/m) :	89.0 27.15	x	Shear Once		Reshear		Residual	**Data File Number :**	615916
Description :	Sand with Silt (SP-SM)								

Percent Saturation (%)	104.06		**File No. :**	615916 1																
Prepared By : RJ	**Date :** 02/28/07																			
Tested By : RJ	**Date :** 02/28/07		**Normal Stress**																	
Computed By : LCC	**Date :** 03/07/07																			
Checked By :	**Date :**		**2.50**	(ksf)																
Percent Consolidation (%)		**Before**		**After**																
Height of Sample (inch)		1.00		1.0000																
Diameter of Sample (inch)		2.42		2.42																
Dial Reading-Consolidation (inch)																				
Weight of Soil + Ring (gm)		200.26																		
Weight of Ring (gm)		43.61																		
Weight of Wet Soil + Cont. (gm)				159.26																
Weight of Dry Soil + Cont. (gm)				130.07																
Weight of Cont. (gm) No.				3.69																
Moisture Content (%)				23.10																
Wet Density (pcf / kN/m³)		129.74	20.42																	
Dry Density (pcf / kN/m³)		105.40	16.59																	
Percent Saturation (%)	102.31		**File No. :**	615916 2																
Prepared By : RJ	**Date :** 02/28/07		**Normal Stress**																	
Tested By : RJ	**Date :** 02/28/07		**5.00**	(ksf)																
Percent Consolidation (%)		**Before**		**After**																
Height of Sample (inch)		1.00		1.0000																
Diameter of Sample (inch)		2.42		2.42																
Dial Reading-Consolidation (inch)																				
Weight of Soil + Ring (gm)		198.01																		
Weight of Ring (gm)		43.43																		
Weight of Wet Soil + Cont. (gm)				156.13																
Weight of Dry Soil + Cont. (gm)				126.69																
Weight of Cont. (gm) No.				3.71																
Moisture Content (%)				23.94																
Wet Density (pcf / kN/m³)		128.03	20.15																	
Dry Density (pcf / kN/m³)		103.30	16.26																	
Percent Saturation (%)	101.16		**File No. :**	615916 3																
Prepared By : RJ	**Date :** 02/28/07		**Normal Stress**																	
Tested By : RJ	**Date :** 02/28/07		**10.00**	(ksf)																
Percent Consolidation (%)		**Before**		**After**																
Height of Sample (inch)		1.00		1.0000																
Diameter of Sample (inch)		2.42		2.42																
Dial Reading-Consolidation (inch)																				
Weight of Soil + Ring (gm)		199.85																		
Weight of Ring (gm)		45.24																		
Weight of Wet Soil + Cont. (gm)				155.64																
Weight of Dry Soil + Cont. (gm)				126.84																
Weight of Cont. (gm) No.				3.69																
Moisture Content (%)				23.39																
Wet Density (pcf / kN/m³)		128.05	20.16																	
Dry Density (pcf / kN/m³)		103.78	16.34																	

Strength	(ksf)	(kPa)	(ksf)	(kPa)	(ksf)	(kPa)
Peak	2.10	100.55	3.95	189.03	7.18	343.54
Ultimate	1.43	68.37	2.82	135.02	5.57	266.55

Shear Deflection (inch)	(mm)	**Normal Stress (psf/ksf/kPa)** 2500	2.50	119.7	5000	5.0	239.4	10000	10.0	478.8
		Shear Stress (psf/ksf/kPa)								
0.000	0.00	0.0	0.0	0.0	0.00	0.0	0.00	0.0	0.0	0.0
0.010	0.03	876	0.88	41.9	1272	1.27	60.9	1716	1.72	81.9
0.020	0.05	1332	1.33	63.8	2064	2.06	98.8	2772	2.77	132.2
0.030	0.08	1656	1.66	79.3	2628	2.63	125.8	3708	3.71	176.9
0.040	0.10	1860	1.86	89.1	3060	3.06	146.5	4476	4.48	213.5
0.050	0.13	1980	1.98	94.8	3384	3.38	162.0	5148	5.15	245.6
0.060	0.15	2052	2.05	98.2	3624	3.62	173.5	5687	5.69	271.3
0.070	0.18	2100	2.10	100.5	3780	3.78	181.0	6131	6.13	292.5
0.080	0.20	2088	2.09	100.0	3876	3.88	185.6	6467	6.47	308.5
0.090	0.23	2052	2.05	98.2	3924	3.92	187.9	6755	6.76	322.2
0.100	0.25	1980	1.98	94.8	3948	3.95	189.0	6947	6.95	331.4
0.110	0.28	1896	1.90	90.8	3924	3.92	187.9	7091	7.09	338.3
0.120	0.30	1788	1.79	85.6	3888	3.89	186.2	7151	7.15	341.1
0.130	0.33	1716	1.72	82.2	3828	3.83	183.3	7175	7.18	342.3
0.140	0.36	1644	1.64	78.7	3744	3.74	179.3	7139	7.14	340.5
0.150	0.38	1584	1.58	75.8	3660	3.66	175.2	7079	7.08	337.7
0.160	0.41	1524	1.52	73.0	3564	3.56	170.6	6995	7.00	333.7
0.170	0.43	1488	1.49	71.2	3432	3.43	164.3	6863	6.86	327.4
0.180	0.46	1452	1.45	69.5	3288	3.29	157.4	6707	6.71	319.9
0.190	0.48	1428	1.43	68.4	3156	3.16	151.1	6587	6.59	314.2
0.200	0.51	1428	1.43	68.4	3024	3.02	144.8	6479	6.48	309.1
0.210	0.53	1440	1.44	68.9	2940	2.94	140.8	6323	6.32	301.6
0.220	0.56	1428	1.43	68.4	2892	2.89	138.5	6227	6.23	297.0
0.230	0.58	1428	1.43	68.4	2844	2.84	136.2	6119	6.12	291.9
0.240	0.61	1428	1.43	68.4	2820	2.82	135.0	6035	6.04	287.9
0.250	0.64	1452	1.45	69.5	2820	2.82	135.0	5939	5.94	283.3
0.260	0.66	1464	1.46	70.1	2856	2.86	136.7	5879	5.88	280.4
0.270	0.69	1452	1.45	69.5	2820	2.82	135.0	5855	5.86	279.3
0.280	0.71	1464	1.46	70.1	2820	2.82	135.0	5819	5.82	277.6
0.290	0.74	1464	1.46	70.1	2820	2.82	135.0	5783	5.78	275.9
0.300	0.76	1452	1.45	69.5	2832	2.83	135.6	5735	5.74	273.6
0.310	0.79	1464	1.46	70.1	2832	2.83	135.6	5675	5.68	270.7
0.320	0.81	1464	1.46	70.1	2832	2.83	135.6	5615	5.62	267.8
0.330	0.84	1476	1.48	70.7	2820	2.82	135.0	5615	5.62	267.8
0.340	0.86	1476	1.48	70.7	2820	2.82	135.0	5591	5.59	266.7
0.350	0.89	1476	1.48	70.7	2820	2.82	135.0	5603	5.60	267.3
0.360	0.91	1476	1.48	70.7	2820	2.82	135.0	5567	5.57	265.6
0.370	0.94	1476	1.48	70.7	2856	2.86	136.7	5579	5.58	266.1
0.380	0.97	1464	1.46	70.1	2868	2.87	137.3	5567	5.57	265.6
0.390	0.99	1476	1.48	70.7	2844	2.84	136.2	5567	5.57	265.6
0.400	1.02	1464	1.46	70.1	2820	2.82	135.0	5591	5.59	266.7
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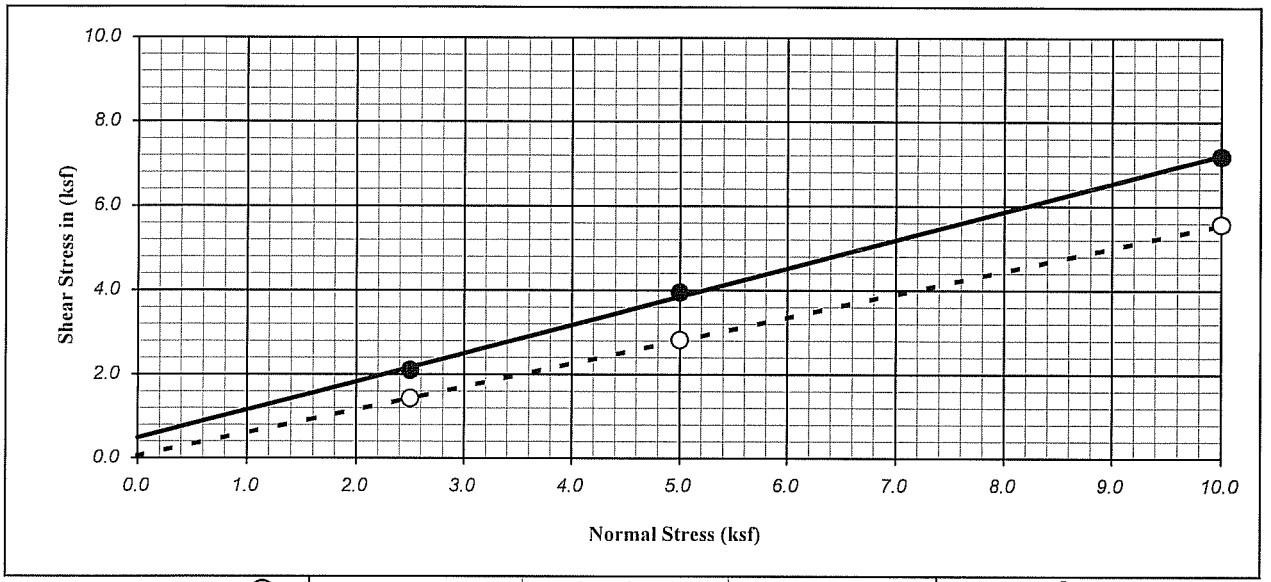
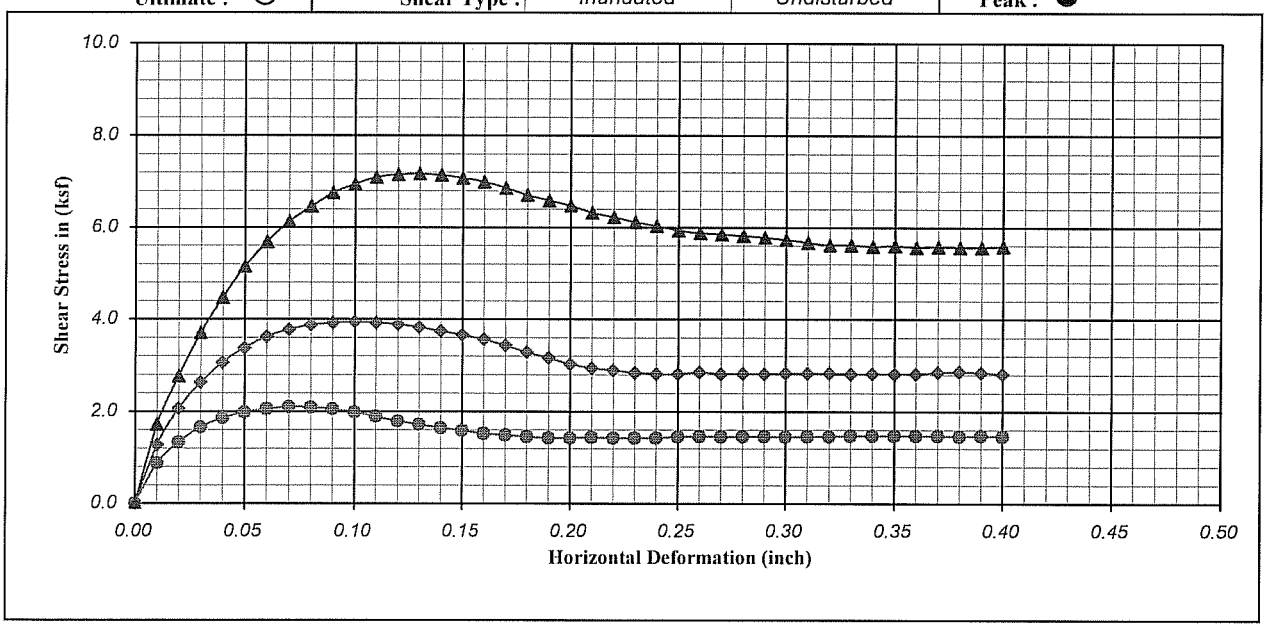


Ultimate : ○	Shear Type :	Inundated	Undisturbed	Peak : ●



Boring No. : 06-14		**Strength Intercept (C) :**	0.49	(ksf)	**Peak**	0.05	(ksf)	**Ultimate**
Sample No. : D-18			23.29	(kPa)		2.61	(kPa)	
Depth (ft/m) : 89.0	27.15	**Friction Angle (ϕ) :**	33.91	Degree		28.88	Degree	
Description : Sand with Silt (SP-SM)						**Shear Rate** (inch/minute) :		0.02

SYMBOL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DRY DENSITY (kN/m^3)	VOID RATIO	NORMAL STRESS (ksf)	NORMAL STRESS (kPa)	PEAK STRESS (ksf)	PEAK STRESS (kPa)	ULTIMATE STRESS (ksf)	ULTIMATE STRESS (kPa)
●	23.10	105.40	16.59	0.60	2.50	119.70	2.10	100.55	1.43	68.37
◆	23.94	103.30	16.26	0.63	5.00	239.40	3.95	189.03	2.82	135.02
▲	23.39	103.78	16.34	0.62	10.00	478.80	7.18	343.54	5.57	266.55

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

Dumbarton Toll Bridge

DIRECT SHEAR TEST (ASTM D-3080)

Project No. : 06-159 | **Date :** 02/28/07 | **Figure No. :**

MEASUREMENT OF SOIL CORROSIVITY

Project No. : 06-159	**Project Name :** BATA / Dumbarton Toll Bridge		
Boring No. : 06- 01	**Depth (ft/m) :**	19.0	
Sample No. : S – 4	**Description :** DK Bluish Gray, FAT CLAY (CH)		

**** Sample for Corrosivity tests must screen through No. 8 Sieve*

Measurement of Soil Resistivity (ASTM G-57-78 / CT- 643)

Test Standard	ASTM	*	CAL. TRAN.	Wt of Wet Soil + Cont. (gm)	210.42	Weight of Total
Soil Box Diamension (cm)	22.86 X 3.81 X 2.54		15.31 X 10.04 X4.41	Wt of Dry Soil + Cont. (gm)	142.29	Sample for Test (gm)
(L X W X H) / (inch)	9.0 X 1.5 X 1.0		6.04X 3.95 X 1.74	Wt. of Cont. No.	1 57.25	83.52
Soil Box Constant (C)	1.0		6.72	Setup Moisture Content (%) 19.88	80.12	

Trial	Resistivity Meter Reading (ohm-cm)						Prepared By : MT	Date : 02/21/07
	As received	1	2	3	4	5	Tested By : MT	Date : 02/21/07
Water added	0.0	534					Calculated By : MT	Date : 02/21/07
Meter reading	100x1.0	100x1.0					Checked By : R.J.	Date : 2-25-07
Resistivity	100	100					Minimum Resistivity :	100

Measurement of Soil pH (ASTM G-51-77 / CT- 643)

Weight 30 gm soil sample and add 30 ml distilled water, stir to a soil slurry and settle at least 1hr.

Prepared By	: MT	Date : 02/21/07	Time :	17:25	Beaker No. :	11	pH Reading			
Tested By	: MT	Date : 02/23/07	Weigh of Wetsoil (gm)			30.08	Trial	1	2	3	Average
Calculated By	: MT	Date : 02/23/07	Distilled Water added (ml)			30.06	Test Time	15:00	15:15	15:30	
Checked By	: R.J.	Date : 2-25-07	Moisture Content (%)			80.12	Reading	7.48	7.50	7.50	7.49

Measurement of Soil Soluble Sulfate Content (CT - 417)

Weight 100.0 gm of sample soil & add 300 ml. of distilled water. Stopper and shake well. Allow to settle overnight. Prepare two 30 (ml.) of water layer into a 150 (ml.) beaker, dilute to 100 (ml.), add 5 (ml.) conditioning reagent. Turbidity Blank - Adjust the stirrer to the maximum speed, add 1 spoonfull Barium Chloride & start timing. Stir for exactly 1 minute.

Flask No. : 40	Prepared By : MT	Date : 02/21/07
Weight of Soil (gm) : 100.02	Tested By : MT	Date : 02/23/07
Distilled Water (ml.) : 300.06	Calculated By : MT	Date : 02/24/07
Shaking at : 17:15	Checked By : R.J.	Date : 2-25-07
Reshaking at : 18:15		

Total Water Sample Prepared	60.09	With BaCL		1	< Beaker Number >			2	Blank
Distilled Water added (ml)	200.01			100.01	Tested Sample Volume			100.00	
Time Intervals	0:00:00	0:00:30	0:01:00	0:01:30	0:02:00	0:02:30	0:03:00	0:04:00	Maximum
With BaCL (time) 12:18:00	12:22:00	12:22:30	12:23:00	12:23:30	12:24:00	12:24:30	12:25:00	12:26:00	
Turbidity with BaCL (NTV)		430	430	427	425	422	419	418	430
Blank (time) 12:14:00	12:18:00	12:18:30	12:19:00	12:19:30	12:20:00	12:20:30	12:21:00	12:22:00	
Turbidity Blank (NTV)		1.86	1.84	1.82	1.81	1.82	1.81	1.84	1.86
Difference (ppm)									428.14
SO_4 (from graph) (ppm)									930

Measurement of Soil Chloride Content (CT - 422)

*1. Weight 100.0 gm sample soil & add 300 ml. of distilled water. Stopper and shake vigorously for 20 seconds, reshaking after one hour and let it settle over night. 2. Pour 30 ml aliquot of filtered solution into a 150 ml beaker, then check pH. If pH is in the range 6 through 8, go to step 4. If ph below 6, add Sodium Hydroxide and if above 8, add Acetic Acid to adjust to the range. 4. Add two drops of Potassium Chromate solution before titrate with Silver Nitrate and change color from Yellow to Red. ** If the titration is over 30 ml., take a smaller sample. Dilute any smaller sample to about 50 ml..*

Flask No. : 40	Prepared By : MT	Date : 02/21/07
Wt. of Soil (gm) : 100.02	Tested By : MT	Date : 02/23/07
Distilled Water (ml.) : 300.06	Calculated By : MT	Date : 02/24/07
Shaking at : 17:15	Checked By : R.J.	Date : 2-25-07
Reshaking at : 18:15	Vaccum & Filter at :	
Remark :		

Titration of (I ml.) Sample Diluted to (F ml.)	29	< Beaker No. >		35		
Total Sample Prepared :	Initial	Final	Total	Initial	Final	Total
Sample Volume (ml)	30.09			30.05		
pH of Liquid Sample	7.42			7.41		
Sodium Hydroxide added (ml)	-	-	-	-	-	-
Acetic Acid added (ml)	-	-	-	-	-	-
Silver Nitrate added (ml)	0.0	88.0	88.0	0.0	90.0	90.0
ppm CL= 100x(ml of Sil.Ni.-0.2 ml blank)F/I			8780			8980
Moisture - Free CL = ppm CL X 100 / (100 - w)			44165			45171

Average
89.0
8880
44668

MEASUREMENT OF SOIL CORROSIVITY

Project No. : 06-159	Project Name : BATA / Dumbarton Toll Bridge		
Boring No. : 06-01	Depth (ft/m) :	39.0	
Sample No. : S-8	Description :	DK Bluish Gray, FAT CLAY (CH)	

*** Sample for Corrosivity tests must screen through No. 8 Sieve

Measurement of Soil Resistivity (ASTM G-57-78 / CT-643)

Test Standard	ASTM	*	CAL. TRAN.	Wt of Wet Soil + Cont.(gm)		248.46	Weight of Total
Soil Box Diamension (cm)	22.86 X 3.81 X 2.54		15.31 X 10.04 X4.41	Wt of Dry Soil + Cont.(gm)		178.01	Sample for Test (gm)
(L X W X H) / (inch)	9.0 X 1.5 X 1.0		6.04X 3.95 X 1.74	Wt. of Cont. No.	4	58.96	82.90
Soil Box Constant (C)	1.0		6.72	Setup Moisture Content (%)	40.82	59.18	

Trial	Resistivity Meter Reading (ohm-cm)						Prepared By : MT	Date : 02/21/07
	As received	1	2	3	4	5	Tested By : MT	Date : 02/21/07
Water added	0.0	5.45					Calculated By : MT	Date : 02/21/07
Meter reading	10 x 7.2	10 x 7.5					Checked By : R.J.	Date : 2-25-07
Resistivity	72	75					Minimum Resistivity :	72

Measurement of Soil pH (ASTM G-51-77 / CT-643)

Weight 30 gm soil sample and add 30 ml distilled water, stir to a soil slurry and settle at least 1hr.

						pH Reading				
Prepared By	: MT	Date : 02/21/07	Time : 17:30	Beaker No. :	26	Trial	1	2	3	Average
Tested By	: MT	Date : 02/23/07	Weigh of Wetsoil (gm)		30.09	Test Time	15:45	16:00	16:15	
Calculated By	: MT	Date : 02/23/07	Distilled Water added (ml)		30.06	Reading	7.97	7.97	7.95	7.96
Checked By	: R.J.	Date : 2-25-07	Moisture Content (%)		59.18					

Measurement of Soil Soluble Sulfate Content (CT-417)

Weight 100.0 gm of sample soil & add 300 ml. of distilled water. Stopper and shake well. Allow to settle overnight. Prepare two 30 (ml.) of water layer into a 150 (ml.) beaker, dilute to 100 (ml.), add 5 (ml.) conditioning reagent. Turbidity Blank - Adjust the stirrer to the maximum speed, add 1 spoonfull Barium Chloride & start timing. Stir for exactly 1 minute.

Flask No. : 35	Prepared By : MT	Date : 02/21/07
Weight of Soil (gm) : 100.09	Tested By : MT	Date : 02/23/07
Distilled Water (ml.) : 300.05	Calculated By : MT	Date : 02/24/07
Shaking at : 17:20	Checked By : R.J.	Date : 2-25-07
Reshaking at : 18:20		

Total Water Sample Prepared	60.08	With BaCL		3	< Beaker Number >			4	Blank
Distilled Water added (ml)	200.02			100.00	Tested Sample Volume			100.02	
Time Intervals	0:00:00	0:00:30	0:01:00	0:01:30	0:02:00	0:02:30	0:03:00	0:04:00	Maximum
With BaCL (time) 12:26:00	12:30:00	12:30:30	12:31:00	12:31:30	12:32:00	12:32:30	12:33:00	12:34:00	
Turbidity with BaCL (NTV)		290	292	289	286	285	283	280	292
Blank (time) 12:22:00	12:26:00	12:26:30	12:27:00	12:27:30	12:28:00	12:28:30	12:29:00	12:30:00	
Turbidity Blank (NTV)		1.89	1.89	1.88	1.87	1.85	1.91	1.90	1.91
Difference (ppm)									290.09
SO_4 (from graph) (ppm)									640

Measurement of Soil Chloride Content (CT-422)

*1. Weight 100.0 gm sample soil & add 300 ml. of distilled water. Stopper and shake vigorously for 20 seconds, reshaking after one hour and let it settle over night. 2. Pour 30 ml aliquot of filtered solution into a 150 ml beaker, then check pH. If pH is in the range 6 through 8, go to step 4. If ph below 6, add Sodium Hydroxide and if above 8, add Acetic Acid to adjust to the range. 4. Add two drops of Potassium Chromate solution before titrate with Silver Nitrate and change color from Yellow to Red. ** If the titration is over 30 ml., take a smaller sample. Dilute any smaller sample to about 50 ml..*

Flask No. : 35	Prepared By : MT	Date : 02/21/07
Wt. of Soil (gm) : 100.09	Tested By : MT	Date : 02/23/07
Distilled Water (ml.) : 300.05	Calculated By : MT	Date : 02/24/07
Shaking at : 17:20	Checked By : R.J.	Date : 2-25-07
Reshaking at : 18:20	Vaccum & Filter at :	

Remark :

Titration of (I ml.) Sample Diluted to (F ml.)	12	< Beaker No. >			15	
Total Sample Prepared :	Initial	Final	Total	Initial	Final	Total
Sample Volume (ml)	30.09			30.09		
pH of Liquid Sample	7.95			7.97		
Sodium Hydroxide added (ml)	-	-	-	-	-	-
Acetic Acid added (ml)	-	-	-	-	-	-
Silver Nitrate added (ml)	0.00	101.5	101.5	0.00	100.0	100.0
ppm CL= 100x(ml of Sil.Ni.-0.2 ml blank)*F/I			10130			9980
Moisture - Free CL = ppm CL X 100 / (100 - w)			24816			24449

Average
100.75
10055
24633

MEASUREMENT OF SOIL CORROSIVITY

Project No. : 06-159	**Project Name :** BATA / Dumbarton Toll Bridge		
Boring No. : 06- 02	**Depth (ft/m) :**	34.0	
Sample No. : S-6	**Description :**	JK - Greenish Grey, Elastic SILT (MH)	

**** Sample for Corrosivity tests must screen through No. 8 Sieve*

Measurement of Soil Resistivity (ASTM G-57-78 / CT-643)

Test Standard	ASTM	*	CAL. TRAN.	Wt of Wet Soil + Cont.(gm)		213.83	Weight of Total
Soil Box Diamension (cm)	22.86 X 3.81 X 2.54		15.31 X 10.04 X4.41	Wt of Dry Soil + Cont.(gm)		145.57	Sample for Test (gm)
(L X W X H) / (inch)	9.0 X 1.5 X 1.0		6.04X 3.95 X 1.74	Wt. of Cont. No.	18	57.45	79.67
Soil Box Constant (C)	1.0		6.72	Setup Moisture Content (%)	22.54	77.46	

Trial	Resistivity Meter Reading (ohm-cm)						Prepared By : MT	Date : 03/02/07
	As received	1	2	3	4	5	Tested By : MT	Date : 03/02/07
Water added	0.0	3.24	2.73				Calculated By : MT	Date : 03/02/07
Meter reading	10 X 6.2	10 X 6.0	10 X 6.2				Checked By : R.J.	Date : 3-6-07
Resistivity	62	60	62				Minimum Resistivity :	60

Measurement of Soil pH (ASTM G-51-77 / CT-643)

Weight 30 gm soil sample and add 30 ml distilled water, stir to a soil slurry and settle at least 1hr.

								pH Reading				
Prepared By	: MT	**Date :** 03/01/07	**Time :**	16:20	**Beaker No. :**	11	**Trial**	1	2	3	Average
Tested By	: MT	**Date :** 03/02/07	**Weigh of Wetsoil (gm)**			30.03	**Test Time**	19:00	19:15	19:30	
Calculated By	: MT	**Date :** 03/02/07	**Distilled Water added (ml)**			30.06	**Reading**	7.14	7.13	7.15	7.14
Checked By	: R.J.	**Date :** 3-6-07	**Moisture Content (%)**			77.46					

Measurement of Soil Soluble Sulfate Content (CT - 417)

Weight 100.0 gm of sample soil & add 300 ml. of distilled water. Stopper and shake well. Allow to settle overnight. Prepare two 30 (ml.) of water layer into a 150 (ml.) beaker, dilute to 100 (ml.), add 5 (ml.) conditioning reagent. Turbidity Blank - Adjust the stirrer to the maximum speed, add 1 spoonfull Barium Chloride & start timing. Stir for exactly 1 minute.

Flask No. : 3	**Prepared By :** MT	**Date :** 03/01/07
Weight of Soil (gm) : 100.07	**Tested By :** MT	**Date :** 03/02/07
Distilled Water (ml.) : 100.08	**Calculated By :** MT	**Date :** 03/02/07
Shaking at : 18:10	**Checked By :** R.J.	**Date :** 3-7-07
Reshaking at : 19:10		

Total Water Sample Prepared	60.06	With BaCL		1	< Beaker Number >			2	Blank
Distilled Water added (ml)	200.09			100.03	Tested Sample Volume			100.06	
Time Intervals	0:00:00	0:00:30	0:01:00	0:01:30	0:02:00	0:02:30	0:03:00	0:04:00	Maximum
With BaCL (time) 18:05:00	18:12:00	18:12:30	18:13:00	18:13:30	18:14:00	18:14:30	18:15:00	18:16:00	
Turbidity with BaCL (NTV)		337	336	334	332	330	329	326	337
Blank (time) 18:04:00	18:08:00	18:08:30	18:09:00	18:09:30	18:10:00	18:10:30	18:11:00	18:12:00	
Turbidity Blank (NTV)		1.22	1.21	1.21	1.23	1.22	1.22	1.21	1.23
Difference (ppm)									335.77
SO_4 (from graph) (ppm)									7400

Measurement of Soil Chloride Content (CT - 422)

*1. Weight 100.0 gm sample soil & add 300 ml. of distilled water. Stopper and shake vigorously for 20 seconds, reshaking after one hour and let it settle over night. 2. Pour 30 ml aliquot of filtered solution into a 150 ml beaker, then check pH. If pH is in the range 6 through 8, go to step 4. If ph below 6, add Sodium Hydroxide and if above 8, add Acetic Acid to adjust to the range. 4. Add two drops of Potassium Chromate solution before titrate with Silver Nitrate and change color from Yellow to Red. ** If the titration is over 30 ml., take a smaller sample. Dilute any smaller sample to about 50 ml..*

Flask No. :	**Prepared By :** MT	**Date :** 03/01/07
Wt. of Soil (gm) :	**Tested By :** MT	**Date :** 03/02/07
Distilled Water (ml.) :	**Calculated By :** MT	**Date :** 03/02/07
Shaking at :	**Checked By :** R.J.	**Date :** 3-7-07
Reshaking at :	**Vaccum & Filter at :**	
Remark :		

Titration of (I ml.) Sample Diluted to (F ml.)	29	< Beaker No. >			36	
Total Sample Prepared :	Initial	Final	Total	Initial	Final	Total
Sample Volume (ml)	30.05			30.01		
pH of Liquid Sample	6.99			7.07		
Sodium Hydroxide added (ml)	-	-	-	-	-	-
Acetic Acid added (ml)	-	-	-	-	-	-
Silver Nitrate added (ml)	5.0	107.0	102.0	5.0	115.0	110.0
ppm CL= 100x(ml of Sil.Ni.-0.2 ml blank)F/I			10180			10980
Moisture - Free CL = ppm CL X 100 / (100 - w)			45164			48713

Average 106
10580
46939

MEASUREMENT OF SOIL CORROSIVITY

Project No. : 06-159	**Project Name :** BATA / Dumbarton Toll Bridge		
Boring No. : 06- 2	**Depth (ft/m) :**	44.0	
Sample No. : S-8	**Description :**	DK Greenish Gray, Elastic SILT (MH)	

**** Sample for Corrosivity tests must screen through No. 8 Sieve*

Measurement of Soil Resistivity (ASTM G-57-78 / CT- 643)

Test Standard		ASTM	*	CAL. TRAN.	Wt of Wet Soil + Cont.(gm)		228.47	Weight of Total
Soil Box Diamension (cm)		22.86 X 3.81 X 2.54		15.31 X 10.04 X4.41	Wt of Dry Soil + Cont.(gm)		169.66	Sample for Test (gm)
(L X W X H) / (inch)		9.0 X 1.5 X 1.0		6.04X 3.95 X 1.74	Wt. of Cont. No.	20	57.04	81.99
Soil Box Constant (C)		1.0		6.72	Setup Moisture Content (%)	47.78	52.22	

Trial	Resistivity Meter Reading (ohm-cm)						Prepared By : MT	Date : 02/21/07
	As received	1	2	3	4	5	Tested By : MT	Date : 02/21/07
Water added	0.0	3.05					Calculated By : MT	Date : 02/21/07
Meter reading	10X5.6	10X5.6					Checked By : R.J.	Date : 2-25-07
Resistivity	56	56					Minimum Resistivity :	56

Measurement of Soil pH (ASTM G-51-77 / CT- 643)

Weight 30 gm soil sample and add 30 ml distilled water, stir to a soil slurry and settle at least 1hr.

Prepared By	: MT	**Date :** 02/21/07	**Time :**	17:40	**Beaker No. :**	31	7.72	**pH Reading**		
Tested By	: MT	**Date :** 02/23/07	**Weigh of Wetsoil (gm)**			30.08	**Trial**	**1**	**2**	**3**	**Average**
Calculated By	: MT	**Date :** 02/23/07	**Distilled Water added (ml)**			30.05	**Test Time**	16:30	16:45	17:00	
Checked By	: R.J.	**Date :** 2-25-07	**Moisture Content (%)**			52.22	**Reading**	7.83	7.82	7.85	7.83

Measurement of Soil Soluble Sulfate Content (CT - 417)

Weight 100.0 gm of sample soil & add 300 ml. of distilled water. Stopper and shake well. Allow to settle overnight. Prepare two 30 (ml.) of water layer into a 150 (ml.) beaker, dilute to 100 (ml.), add 5 (ml.) conditioning reagent. Turbidity Blank - Adjust the stirrer to the maximum speed, add 1 spoonfull Barium Chloride & start timing. Stir for exactly 1 minute.

Flask No. : 3	**Prepared By :** MT	**Date :** 02/21/07
Weight of Soil (gm) : 100.09	**Tested By :** MT	**Date :** 02/23/07
Distilled Water (ml.) : 300.09	**Calculated By :** MT	**Date :** 02/24/07
Shaking at : 17:30	**Checked By :** R.J.	**Date :** 2-25-07
Reshaking at : 18:30		

Total Water Sample Prepared		60.00	**With BaCL**		5	< **Beaker Number** >			6	**Blank**
Distilled Water added (ml)		200.06			100.06	**Tested Sample Volume**			100.00	
Time Intervals		0:00:00	0:00:30	0:01:00	0:01:30	0:02:00	0:02:30	0:03:00	0:04:00	**Maximum**
With BaCL (time)	12:34:00	12:38:00	12:38:30	12:39:00	12:39:30	12:40:00	12:40:30	12:41:00	12:42:00	
Turbidity with BaCL (NTV)			331	327	323	318	310	307	301	331
Blank (time)	12:33:00	12:34:00	12:34:30	12:35:00	12:35:30	12:36:00	12:36:30	12:37:00	12:38:00	
Turbidity Blank (NTV)			2.20	2.17	2.22	2.14	2.15	2.17	2.21	2.22
Difference (ppm)										328.78
SO_4 (from graph) (ppm)										720

Measurement of Soil Chloride Content (CT - 422)

*1. Weight 100.0 gm sample soil & add 300 mL of distilled water. Stopper and shake vigorously for 20 seconds, reshaking after one hour and let it settle over night. 2. Pour 30 ml aliquot of filtered solution into a 150 ml beaker, then check pH. If pH is in the range 6 through 8, go to step 4. If ph below 6, add Sodium Hydroxide and if above 8, add Acetic Acid to adjust to the range. 4. Add two drops of Potassium Chromate solution before titrate with Silver Nitrate and change color from Yellow to Red. ** If the titration is over 30 ml., take a smaller sample. Dilute any smaller sample to about 50 ml..*

Flask No. : 3	**Prepared By :** MT	**Date :** 02/21/07
Wt. of Soil (gm) : 100.09	**Tested By :** MT	**Date :** 02/23/07
Distilled Water (ml.) : 300.09	**Calculated By :** MT	**Date :** 02/24/07
Shaking at : 17:30	**Checked By :** R.J.	**Date :** 2-25-07
Reshaking at : 18:30	**Vaccum & Filter at :**	
Remark :		

Titration of (I ml.) Sample Diluted to (F ml.)	19	< Beaker No. >			40	
Total Sample Prepared :	**Initial**	**Final**	**Total**	**Initial**	**Final**	**Total**
Sample Volume (ml)	30.02			30.06		
pH of Liquid Sample	7.54			7.56		
Sodium Hydroxide added (ml)	-	-	-	-	-	-
Acetic Acid added (ml)	-	-	-	-	-	-
Silver Nitrate added (ml)	0.0	142.0	142.0	0.00	150.0	150.0
ppm CL= 100x(ml of Sil.Ni.-0.2 ml blank)*F/I			14180			14980
Moisture - Free CL = ppm CL X 100 / (100 - w)			29678			31352

Average
146.0
14580
30515

MEASUREMENT OF SOIL CORROSIVITY

Project No.	: 06-159	**Project Name :** BATA / Dumbarton Toll Bridge	
Boring No.	: 06- 6	**Depth (ft/m) :** 25.0	
Sample No.	: S – 5	**Description :** CL, Lean CLAY	

**** Sample for Corrosivity tests must screen through No. 8 Sieve*

Measurement of Soil Resistivity (ASTM G-57-78 / CT- 643)

Test Standard	ASTM	*	CAL. TRAN.	Wt of Wet Soil + Cont. (gm)		235.91	Weight of Total
Soil Box Diamension (cm)	22.86 X 3.81 X 2.54		15.31 X 10.04 X4.41	Wt of Dry Soil + Cont. (gm)		203.31	Sample for Test (gm)
(L X W X H) / (inch)	9.0 X 1.5 X 1.0		6.04X 3.95 X 1.74	Wt. of Cont. No.	7	58.90	83.63
Soil Box Constant (C)	1.0		6.72	Setup Moisture Content (%)	17.43	22.57	

Trial	Resistivity Meter Reading (ohm-cm)						Prepared By : MT	Date : 02/14/07
	As received	1	2	3	4	5	Tested By : MT	Date : 02/14/07
Water added	0.0	9.60	4.27	3.68			Calculated By : MT	Date : 02/14/07
Meter reading	100 X 2.1	100.1.4	100 X 1.3	100 X 1.3			Checked By : R.J.	Date : 2-18-07
Resistivity	210	140	130	130			Minimum Resistivity :	130

Measurement of Soil pH (ASTM G-51-77 / CT- 643)

Weight 30 gm soil sample and add 30 ml distilled water, stir to a soil slurry and settle at least 1hr.

Prepared By	: MT	Date : 02/14/07	Time :	17:00	Beaker No. :	11	**pH Reading**			
Tested By	: MT	Date : 02/16/07	Weigh of Wetsoil (gm)			30.04	Trial	1	2	3	Average
Calculated By	: MT	Date : 02/16/07	Distilled Water added (ml)			30.05	Test Time	15:00	15:15	15:30	
Checked By	: R.J.	Date : 2-18-07	Moisture Content (%)			22.57	Reading	8.20	8.21	8.18	8.20

Measurement of Soil Soluble Sulfate Content (CT - 417)

Weight 100.0 gm of sample soil & add 300 ml. of distilled water. Stopper and shake well. Allow to settle overnight. Prepare two 30 (ml.) of water layer into a 150 (ml.) beaker, dilute to 100 (ml.), add 5 (ml.) conditioning reagent. Turbidity Blank - Adjust the stirrer to the maximum speed, add 1 spoonfull Barium Chloride & start timing. Stir for exactly 1 minute.

Flask No. :	1	**Prepared By :** MT	**Date :** 02/14/07
Weight of Soil (gm) :	100.03	**Tested By :** MT	**Date :** 02/16/07
Distilled Water (ml.) :	300.05	**Calculated By :** MT	**Date :** 02/18/07
Shaking at :	16:50	**Checked By :** R.J.	**Date :** 2-18-07
Reshaking at :	17:50		

Total Water Sample Prepared		60.03	With BaCL		1	< Beaker Number >			2	Blank
Distilled Water added (ml)		200.02			100.02	Tested Sample Volume			100.00	
Time Intervals		0:00:00	0:00:30	0:01:00	0:01:30	0:02:00	0:02:30	0:03:00	0:04:00	Maximum
With BaCL (time)	12:38:00	12:42:00	12:42:30	12:43:00	12:43:30	12:44:00	12:44:30	12:45:00	12:46:00	
Turbidity with BaCL (NTV)			141	141	141	141	141	141	141	141
Blank (time)	12:34:00	12:38:00	12:38:30	12:39:00	12:39:30	12:40:00	12:40:30	12:41:00	12:42:00	
Turbidity Blank (NTV)			3.09	3.06	3.07	3.10	3.14	3.09	3.09	3.14
Difference (ppm)										137.86
SO_4 (from graph) (ppm)										300.0

Measurement of Soil Chloride Content (CT - 422)

*1. Weight 100.0 gm sample soil & add 300 ml. of distilled water. Stopper and shake vigorously for 20 seconds, reshaking after one hour and let it settle over night. 2. Pour 30 ml aliquot of filtered solution into a 150 ml beaker, then check pH. If pH is in the range 6 through 8, go to step 4. If ph below 6, add Sodium Hydroxide and if above 8, add Acetic Acid to adjust to the range. 4. Add two drops of Potassium Chromate solution before titrate with Silver Nitrate and change color from Yellow to Red. ** If the titration is over 30 ml., take a smaller sample. Dilute any smaller sample to about 50 ml..*

Flask No. :	1	**Prepared By :** MT	**Date :** 02/14/07
Wt. of Soil (gm) :	100.03	**Tested By :** MT	**Date :** 02/16/07
Distilled Water (ml.) :	300.05	**Calculated By :** MT	**Date :** 02/18/07
Shaking at :	16:50	**Checked By :** R.J.	**Date :** 2-18-07
Reshaking at :	17:50	**Vaccum & Filter at :**	
Remark :			

Titration of (I ml.) Sample Diluted to (F ml.)	29	< Beaker No.			35	
Total Sample Prepared :	**Initial**	**Final**	**Total**	**Initial**	**Final**	**Total**	
Sample Volume (ml)	30.02			30.00			
pH of Liquid Sample	7.36			7.51			
Sodium Hydroxide added (ml)	-	-	-	-	-	-	
Acetic Acid added (ml)	-	-	-	-	-	-	
Silver Nitrate added (ml)	5.0	74.0	69.0	5.0	74.5	69.5	Average 69.25
ppm CL= 100x(ml of Sil.Ni.-0.2 ml blank)F/I			6880			6930	6905
Moisture - Free CL = ppm CL X 100 / (100 - w)			8886			8950	8918

MEASUREMENT OF SOIL CORROSIVITY

Project No. : 06-159	**Project Name :** BATA / Dumbarton Toll Bridge		
Boring No. : 06- 6	**Depth (ft/m) :**	55.0	
Sample No. : S-11	**Description :**	CL, LEAN CLAY	

**** Sample for Corrosivity tests must screen through No. 8 Sieve*

Measurement of Soil Resistivity (ASTM G-57-78 / CT-643)

Test Standard	ASTM	*	CAL. TRAN.
Soil Box Diamension (cm)	22.86 X 3.81 X 2.54		15.31 X 10.04 X4.41
(L X W X H) / (inch)	9.0 X 1.5 X 1.0		6.04X 3.95 X 1.74
Soil Box Constant(C)	1.0		6.72

Wt of Wet Soil + Cont. (gm)		205.93	Weight of Total
Wt of Dry Soil + Cont. (gm)		174.23	Sample for Test (gm)
Wt. of Cont. No.	11	58.63	89.93
Setup Moisture Content (%)	7258	27.42	

Trial	Resistivity Meter Reading (ohm-cm)					
	As received	1	2	3	4	5
Water added	0.0	9.92	3.56			
Meter reading	100x4.7	100x4.6	100x4.6			
Resistivity	470	460	460			

Prepared By : MT	Date : 02/14/07
Tested By : MT	Date : 02/14/07
Calculated By : MT	Date : 02/14/07
Checked By : R.J.	Date : 2-18-07
Minimum Resistivity :	460

Measurement of Soil pH (ASTM G-51-77 / CT-643)

Weight 30 gm soil sample and add 30 ml distilled water, stir to a soil slurry and settle at least 1hr.

Prepared By	: MT	Date : 02/14/07	Time : 17:15	Beaker No. :	36
Tested By	: MT	Date : 02/16/07	Weigh of Wetsoil (gm)		30.08
Calculated By	: MT	Date : 02/16/07	Distilled Water added (ml)		30.05
Checked By	: R.J.	Date : 2-18-07	Moisture Content (%)		27.42

pH Reading				
Trial	1	2	3	Average
Test Time	15:45	16:00	16:15	
Reading	8.23	8.25	8.26	8.25

Measurement of Soil Soluble Sulfate Content (CT - 417)

Weight 100.0 gm of sample soil & add 300 ml. of distilled water. Stopper and shake well. Allow to settle overnight. Prepare two 30 (ml.) of water layer into a 150 (ml.) beaker, dilute to 100 (ml.), add 5 (ml.) conditioning reagent. Turbidity Blank - Adjust the stirrer to the maximum speed, add 1 spoonfull Barium Chloride & start timing. Stir for exactly 1 minute.

Flask No. : 40	Prepared By : MT	Date : 02/14/07
Weight of Soil (gm) : 100.06	Tested By : MT	Date : 02/16/07
Distilled Water (ml.) : 300.05	Calculated By : MT	Date : 02/18/07
Shaking at : 17:05	Checked By : R.J.	Date : 2-18-07
Reshaking at : 18:05		

Total Water Sample Prepared	60.05	With BaCL		3	< Beaker Number >			4	Blank
Distilled Water added (ml)	200.04			100.01	Tested Sample Volume			100.03	
Time Intervals	0:00:00	0:00:30	0:01:00	0:01:30	0:02:00	0:02:30	0:03:00	0:04:00	Maximum
With BaCL (time) 12:46:00	12:50:00	12:50:30	12:51:00	12:51:30	12:52:00	12:52:30	12:53:00	12:54:00	
Turbidity with BaCL (NTV)		31.8	31.6	31.6	31.6	31.6	31.6	31.6	31.8
Blank (time) 12:42:00	12:46:00	12:46:30	12:47:00	12:47:30	12:48:00	12:48:30	12:49:00	12:50:00	
Turbidity Blank (NTV)		3.69	3.63	3.64	3.66	3.68	3.67	3.65	3.69
Difference (ppm)									28.11
SO_4 (from graph) (ppm)									70

Measurement of Soil Chloride Content (CT - 422)

*1. Weight 100.0 gm sample soil & add 300 ml. of distilled water. Stopper and shake vigorously for 20 seconds, reshaking after one hour and let it settle over night. 2. Pour 30 ml aliquot of filtered solution into a 150 ml beaker, then check pH. If pH is in the range 6 through 8, go to step 4. If ph below 6, add Sodium Hydroxide and if above 8, add Acetic Acid to adjust to the range. 4. Add two drops of Potassium Chromate solution before titrate with Silver Nitrate and change color from Yellow to Red. ** If the titration is over 30 ml., take a smaller sample. Dilute any smaller sample to about 50 ml..*

Flask No. : 40	Prepared By : MT	Date : 02/14/07
Wt. of Soil (gm) : 100.06	Tested By : MT	Date : 02/16/07
Distilled Water (ml.) : 300.05	Calculated By : MT	Date : 02/18/07
Shaking at : 17:05	Checked By : R.J.	Date : 2-18-07
Reshaking at : 18:05	Vaccum & Filter at :	

Remark :

Titration of (I ml.) Sample Diluted to (F ml.)	16	< Beaker No. >			34	
Total Sample Prepared :	Initial	Final	Total	Initial	Final	Total
Sample Volume (ml)	30.06			30.08		
pH of Liquid Sample	7.49			7.49		
Sodium Hydroxide added (ml)	-	-	-	-	-	-
Acetic Acid added (ml)	-	-	-	-	-	-
Silver Nitrate added (ml)	5.0	19.5	14.5	19.5	34.1	14.6
ppm CL= 100x(ml of Sil.Ni.-0.2 ml blank)F/I			1430			1440
Moisture - Free CL = ppm CL X 100 / (100 - w)			1970			1984

Average
1455
1435
1977

MEASUREMENT OF SOIL CORROSIVITY

Project No. : 06-159	**Project Name :** BATA / Dumbarton Toll Bridge		
Boring No. : 06- 8	**Depth (ft/m) :**	20.0	
Sample No. : S-3	**Description :**	CL, Lean CLAY	

**** Sample for Corrosivity tests must screen through No. 8 Sieve*

Measurement of Soil Resistivity (ASTM G-57-78 / CT- 643)

Test Standard	ASTM	*	CAL. TRAN.	Wt of Wet Soil + Cont. (gm)		233.02	Weight of Total
Soil Box Diamension (cm)	22.86 X 3.81 X 2.54		15.31 X 10.04 X4.41	Wt of Dry Soil + Cont. (gm)		198.51	Sample for Test (gm)
(L X W X H) / (inch)	9.0 X 1.5 X 1.0		6.04X 3.95 X 1.74	Wt. of Cont. No.	26	58.40	85.73
Soil Box Constant (C)	1.0		6.72	Setup Moisture Content (%)	75.37	24.63	

Trial	Resistivity Meter Reading (ohm-cm)						Prepared By : MT	Date : 02/14/07
	As received	1	2	3	4	5	Tested By : MT	Date : 02/14/07
Water added	0.0	10.07	5.02				Calculated By : MT	Date : 02/14/07
Meter reading	100x2.9	100x1.8	100x1.8				Checked By : R.J.	Date : 2/18/07
Resistivity	290	180	180				Minimum Resistivity :	180

Measurement of Soil pH (ASTM G-51-77 / CT- 643)

Weight 30 gm soil sample and add 30 ml distilled water, stir to a soil slurry and settle at least 1hr.

							pH Reading				
Prepared By	: MT	Date : 02/14/07	Time :	17:25	Beaker No. :	26	Trial	1	2	3	Average
Tested By	: MT	Date : 02/16/07	Weigh of Wetsoil (gm)			30.09	Test Time	16:30	16:45	17:00	
Calculated By	: MT	Date : 02/16/07	Distilled Water added (ml)			30.06	Reading	8.30	8.29	8.27	8.29
Checked By	: R.J.	Date : 2/18/07	Moisture Content (%)			24.63					

Measurement of Soil Soluble Sulfate Content (CT - 417)

Weight 100.0 gm of sample soil & add 300 ml. of distilled water. Stopper and shake well. Allow to settle overnight. Prepare two 30 (ml.) of water layer into a 150 (ml.) beaker, dilute to 100 (ml.), add 5 (ml.) conditioning reagent. Turbidity Blank - Adjust the stirrer to the maximum speed, add 1 spoonfull Barium Chloride & start timing. Stir for exactly 1 minute.

Flask No. : 8	Prepared By : MT	Date : 02/14/07
Weight of Soil (gm) : 100.05	Tested By : MT	Date : 02/16/07
Distilled Water (ml.) : 300.09	Calculated By : MT	Date : 02/18/07
Shaking at : 17:15	Checked By : R.J.	Date : 2/18/07
Reshaking at : 18:15		

Total Water Sample Prepared	60.07	With BaCL		5	< Beaker Number >			6	Blank
Distilled Water added (ml)	200.07			100.06	Tested Sample Volume			100.01	
Time Intervals	0:00:00	0:00:30	0:01:00	0:01:30	0:02:00	0:02:30	0:03:00	0:04:00	Maximum
With BaCL (time) 12:54:00	12:58:00	12:58:30	12:59:00	12:59:30	13:00:00	13:00:30	13:01:00	13:02:00	
Turbidity with BaCL (NTV)		84.9	84.2	84.7	84.4	84.1	83.7	83.5	84.9
Blank (time) 12:50:00	12:54:00	12:54:30	12:55:00	12:55:30	12:56:00	12:56:30	12:57:00	12:58:00	
Turbidity Blank (NTV)		4.31	4.07	4.09	4.07	4.09	4.07	4.09	4.31
Difference (ppm)									80.59
SO_4 (from graph) (ppm)									180

Measurement of Soil Chloride Content (CT - 422)

*1. Weight 100.0 gm sample soil & add 300 ml. of distilled water. Stopper and shake vigorously for 20 seconds, reshaking after one hour and let it settle over night. 2. Pour 30 ml aliquot of filtered solution into a 150 ml beaker, then check pH. If pH is in the range 6 through 8, go to step 4. If ph below 6, add Sodium Hydroxide and if above 8, add Acetic Acid to adjust to the range. 4. Add two drops of Potassium Chromate solution before titrate with Silver Nitrate and change color from Yellow to Red. ** If the titration is over 30 ml., take a smaller sample. Dilute any smaller sample to about 50 ml..*

Flask No. : 8	Prepared By : MT	Date : 02/14/07
Wt. of Soil (gm) : 100.05	Tested By : MT	Date : 02/16/07
Distilled Water (ml.) : 300.09	Calculated By : MT	Date : 02/18/07
Shaking at : 17:15	Checked By : R.J.	Date : 2/18/07
Reshaking at : 18:15	Vaccum & Filter at :	

Remark :

Titration of (I ml.) Sample Diluted to (F ml.)	15	< Beaker No.			> 28		
Total Sample Prepared :	Initial	Final	Total	Initial	Final	Total	
Sample Volume (ml)	30.00			30.08			
pH of Liquid Sample	7.67			7.68			
Sodium Hydroxide added (ml)	-	-	-	-	-	-	
Acetic Acid added (ml)	5.0	-	-	-	-	-	
Silver Nitrate added (ml)	5.0	50.8	45.8	1.0	46.2	45.2	Average 45.5
ppm CL= 100x(ml of Sil.Ni.-0.2 ml blank)*F/I			4560			4500	4530
Moisture - Free CL = ppm CL X 100 / (100 - w)			6050			5971	6010

MEASUREMENT OF SOIL CORROSIVITY

Project No. : 06-159	Project Name : BATA / Dumbarton Toll Bridge		
Boring No. : 06- 8	Depth (ft/m) :	63.0	
Sample No. : S - 12	Description :	CL, Lean CLAY	

*** *Sample for Corrosivity tests must screen through No. 8 Sieve*

Measurement of Soil Resistivity (ASTM G-57-78 / CT- 643)

Test Standard	ASTM	*	CAL. TRAN.	Wt of Wet Soil + Cont.(gm)		207.51	Weight of Total
Soil Box Diamension (cm)	22.86 X 3.81 X 2.54		15.31 X 10.04 X4.41	Wt of Dry Soil + Cont.(gm)		184.21	Sample for Test (gm)
(L X W X H) / (inch)	9.0 X 1.5 X 1.0		6.04X 3.95 X 1.74	Wt. of Cont. No.	29	56.80	92.62
Soil Box Constant(C)	1.0		6.72	Setup Moisture Content(%)	8.71	18.29	

Trial	Resistivity Meter Reading (ohm-cm)						Prepared By : MT	Date : 02/14/07
	As received	1	2	3	4	5	Tested By : MT	Date : 02/14/07
Water added	0.0	9.59	2.19				Calculated By : MT	Date : 02/14/07
Meter reading	100X2.3	100X2.2	100 x 2.3				Checked By : R.J.	Date : 2-18-07
Resistivity	230	220	230				Minimum Resistivity :	220

Measurement of Soil pH (ASTM G-51-77 / CT- 643)

Weight 30 gm soil sample and add 30 ml distilled water, stir to a soil slurry and settle at least 1hr.

						pH Reading				
Prepared By	: MT	Date : 02/14/07	Time : 17:40	Beaker No. :	31	Trial	1	2	3	Average
Tested By	: MT	Date : 02/16/07	Weigh of Wetsoil (gm)		30.01	Test Time	17:15	17:30	17:45	
Calculated By	: MT	Date : 02/16/07	Distilled Water added (ml)		30.01	Reading	8.20	8.21	8.20	8.20
Checked By	: R.J.	Date : 2-18-07	Moisture Content (%)		18.29					

Measurement of Soil Soluble Sulfate Content (CT - 417)

Weight 100.0 gm of sample soil & add 300 ml. of distilled water. Stopper and shake well. Allow to settle overnight. Prepare two 30 (ml.) of water layer into a 150 (ml.) beaker, dilute to 100 (ml.), add 5 (ml.) conditioning reagent. Turbidity Blank - Adjust the stirrer to the maximum speed, add 1 spoonfull Barium Chloride & start timing. Stir for exactly 1 minute.

Flask No. : 37	Prepared By : MT	Date : 02/14/07
Weight of Soil (gm) : 100.02	Tested By : MT	Date : 02/16/07
Distilled Water (ml.) : 300.09	Calculated By : MT	Date 02/18/07
Shaking at : 17:30	Checked By : R.J.	Date : 2-18-07
Reshaking at : 18:30		

Total Water Sample Prepared	60.09	With BaCL		7	< Beaker Number >			8	Blank
Distilled Water added (ml)	200.04			100.00	Tested Sample Volume			100.04	
Time Intervals	0:00:00	0:00:30	0:01:00	0:01:30	0:02:00	0:02:30	0:03:00	0:04:00	Maximum
With BaCL (time) 13:02:00	13:06:00	13:06:30	13:07:00	13:07:30	13:08:00	13:08:30	13:09:00	13:10:00	
Turbidity with BaCL (NTV)		58.6	58.7	58.9	57.7	57.0	56.8	56.6	58.9
Blank (time) 13:58:00	13:02:00	13:02:30	13:03:00	13:03:30	13:04:00	13:04:30	13:05:00	13:06:00	
Turbidity Blank (NTV)		12.3	12.2	12.2	12.2	12.1	12.1	12.1	12.3
Difference (ppm)									46.6
SO_4 (from graph) (ppm)									100

Measurement of Soil Chloride Content (CT - 422)

*1. Weight 100.0 gm sample soil & add 300 ml. of distilled water. Stopper and shake vigorously for 20 seconds, reshaking after one hour and let it settle over night. 2. Pour 30 ml aliquot of filtered solution into a 150 ml beaker, then check pH. If pH is in the range 6 through 8, go to step 4. If ph below 6, add Sodium Hydroxide and if above 8, add Acetic Acid to adjust to the range. 4. Add two drops of Potassium Chromate solution before titrate with Silver Nitrate and change color from Yellow to Red. ** If the titration is over 30 ml., take a smaller sample. Dilute any smaller sample to about 50 ml..*

Flask No. : 37	Prepared By : MT	Date : 02/14/07
Wt. of Soil (gm) : 100.02	Tested By : MT	Date : 02/16/07
Distilled Water (ml.) : 300.09	Calculated By : MT	Date : 02/18/07
Shaking at : 17:30	Checked By : R.J.	Date : 2-18-07
Reshaking at : 18:30	Vaccum & Filter at :	

Remark :

Titration of (I ml.) Sample Diluted to (F ml.)	38	< Beaker No. >		39			
Total Sample Prepared :	Initial	Final	Total	Initial	Final	Total	
Sample Volume (ml)	30.09			30.01			
pH of Liquid Sample	7.53			7.47			
Sodium Hydroxide added (ml)	-	-	-	-	-	-	
Acetic Acid added (ml)	-	-	-	-	-	-	
Silver Nitrate added (ml)	5.0	39.8	34.8	5.0	39.0	34.0	Average 34.4
ppm CL= 100x(ml of Sil.Ni.-0.2 ml blank)*F/I			3460			3380	3420
Moisture - Free CL = ppm CL X 100 / (100 - w)			4235			4137	4186

MEASUREMENT OF SOIL CORROSIVITY

Project No. : 06-159	**Project Name :** BATA / Dumbarton Toll Bridge		
Boring No. : 06- 09	**Depth (ft/m) :**	5.0	
Sample No. : S-1	**Description :**	Dk Gray, Elastic SILT (MH)	

**** Sample for Corrosivity tests must screen through No. 8 Sieve*

Measurement of Soil Resistivity (ASTM G-57-78 / CT- 643)

Test Standard	ASTM	*	CAL. TRAN.
Soil Box Diamension (cm)	22.86 X 3.81 X 2.54		15.31 X 10.04 X4.41
(L X W X H) / (inch)	9.0 X 1.5 X 1.0		6.04X 3.95 X 1.74
Soil Box Constant (C)	1.0		6.72

Wt of Wet Soil + Cont. (gm)		207.20	Weight of Total
Wt of Dry Soil + Cont. (gm)		136.22	Sample for Test (gm)
Wt. of Cont. No.	16	57.42	82.25
Setup Moisture Content (%) 9.92		90.08	

Trial	Resistivity Meter Reading (ohm-cm)					
	As received	1	2	3	4	5
Water added	0.0	3.65				
Meter reading	10x5.5	10x5.9				
Resistivity	55	59				

Prepared By : MT	Date : 02/21/07
Tested By : MT	Date : 02/21/07
Calculated By : MT	Date : 02/21/07
Checked By : R.J.	Date : 2-25-07
Minimum Resistivity :	55

Measurement of Soil pH (ASTM G-51-77 / CT- 643)

Weight 30 gm soil sample and add 30 ml distilled water, stir to a soil slurry and settle at least 1hr.

Prepared By	: MT	Date : 02/21/07	Time : 17:50	Beaker No. :	36
Tested By	: MT	Date : 02/23/07	Weigh of Wetsoil (gm)		30.00
Calculated By	: MT	Date : 02/23/07	Distilled Water added (ml)		30.08
Checked By	: R.J.	Date : 2-25-07	Moisture Content (%)		90.08

pH Reading				
Trial	1	2	3	Average
Test Time	17:15	17:30	17:45	
Reading	7.63	7.65	7.65	7.64

Measurement of Soil Soluble Sulfate Content (CT - 417)

Weight 100.0 gm of sample soil & add 300 ml. of distilled water. Stopper and shake well. Allow to settle overnight. Prepare two 30 (ml.) of water layer into a 150 (ml.) beaker, dilute to 100 (ml.), add 5 (ml.) conditioning reagent. Turbidity Blank - Adjust the stirrer to the maximum speed, add 1 spoonfull Barium Chloride & start timing. Stir for exactly 1 minute.

Flask No. : 8		Prepared By : MT	Date : 02/21/07
Weight of Soil (gm) : 100.09		Tested By : MT	Date : 02/23/07
Distilled Water (ml.) : 300.09		Calculated By : MT	Date : 02/24/07
Shaking at : 17:40		Checked By : R.J.	Date : 2-25-07
Reshaking at : 18:40			

Total Water Sample Prepared	60.04	With BaCL		7	< Beaker Number			8	Blank
Distilled Water added (ml)	200.03			100.03	< Tested Sample Volume			100.00	
Time Intervals	0:00:00	0:00:30	0:01:00	0:01:30	0:02:00	0:02:30	0:03:00	0:04:00	Maximum
With BaCL (time) 12:42:00	12:42:00	12:46:00	12:46:30	12:47:00	12:47:30	12:48:00	12:48:30	12:49:00	12:50:00	
Turbidity with BaCL (NTV)		149	147	146	144	141	141	137	149
Blank (time) 12:38:00	12:42:00	12:42:30	12:43:00	12:43:30	12:44:00	12:44:30	12:45:00	12:46:00	
Turbidity Blank (NTV)		2.31	2.26	2.28	2.28	2.28	2.31	2.31	2.31
Difference (ppm)									146.69
SO_4 (from graph) (ppm)									320

Measurement of Soil Chloride Content (CT - 422)

*1. Weight 100.0 gm sample soil & add 300 ml. of distilled water. Stopper and shake vigorously for 20 seconds, reshaking after one hour and let it settle over night. 2. Pour 30 ml aliquot of filtered solution into a 150 ml beaker, then check pH. If pH is in the range 6 through 8, go to step 4. If ph below 6, add Sodium Hydroxide and if above 8, add Acetic Acid to adjust to the range. 4. Add two drops of Potassium Chromate solution before titrate with Silver Nitrate and change color from Yellow to Red. ** If the titration is over 30 ml., take a smaller sample. Dilute any smaller sample to about 50 ml..*

Flask No. : 8		Prepared By : MT	Date : 02/21/07
Wt. of Soil (gm) : 100.09		Tested By : MT	Date : 02/23/07
Distilled Water (ml.) : 300.09		Calculated By : MT	Date : 02/24/07
Shaking at : 17:40		Checked By : R.J.	Date : 2-25-07
Reshaking at : 18:40		Vaccum & Filter at :	

Remark :

Titration of (I ml.) Sample Diluted to (F ml.)	24	< Beaker No.			38	
Total Sample Prepared :	Initial	Final	Total	Initial	Final	Total
Sample Volume (ml)	30.03			30.09		
pH of Liquid Sample	7.57			7.59		
Sodium Hydroxide added (ml)	-	-	-	-	-	-
Acetic Acid added (ml)	-	-	-	-	-	-
Silver Nitrate added (ml)	6.0	116.0	116.0	0.6	120.0	120.0
ppm CL= 100x(ml of Sil.Ni.-0.2 ml blank)*F/I			11580			11980
Moisture - Free CL = ppm CL X 100 / (100 - w)			116734			120766

Average
118.6
11780
118750

MEASUREMENT OF SOIL CORROSIVITY

Project No. : 06-159	**Project Name :** BATA / Dumbarton Toll Bridge		
Boring No. : 06- 9	**Depth (ft/m) :**	20.0	
Sample No. : S - 4	**Description :**	DK Grey, SILT (ML) a lot of Peat	

**** Sample for Corrosivity tests must screen through No. 8 Sieve*

Measurement of Soil Resistivity (ASTM G-57-78 / CT- 643)

Test Standard	ASTM	*	CAL. TRAN.	Wt of Wet Soil + Cont.(gm)	189.99	Weight of Total
Soil Box Diamension (cm)	22.86 X 3.81 X 2.54		15.31 X 10.04 X4.41	Wt of Dry Soil + Cont.(gm)	116.10	Sample for Test (gm)
(L X W X H) / (inch)	9.0 X 1.5 X 1.0		6.04X 3.95 X 1.74	Wt. of Cont. No.	57.45	83.08
Soil Box Constant(C)	1.0		6.72	Setup Moisture Content(%)	125.98	

Trial	Resistivity Meter Reading (ohm-cm)						Prepared By : MT	Date : 03/02/07
	As received	1	2	3	4	5	Tested By : MT	Date : 03/02/07
Water added	0.0	3.95	2.61				Calculated By : MT	Date : 03/02/07
Meter reading	10 x 7.3	10 x 6.9	10 x 8.0				Checked By : R.J.	Date : 3-7-07
Resistivity	730	690	800				Minimum Resistivity :	690

Measurement of Soil pH (ASTM G-51-77 / CT- 643)

Weight 30 gm soil sample and add 30 ml distilled water, stir to a soil slurry and settle at least 1hr.

Prepared By	: MT	Date : 03/01/07	Time :	18:10	Beaker No. :	15	**pH Reading**			
Tested By	: MT	Date : 03/02/07	Weigh of Wetsoil (gm)			30.06	Trial	1	2	3	Average
Calculated By	: MT	Date : 03/02/07	Distilled Water added (ml)			30.01	Test Time	19:45	20:00	20:15	
Checked By	: R.J.	Date : 3-7-07	Moisture Content (%)			125.98	Reading	6.97	7.00	6.98	6.98

Measurement of Soil Soluble Sulfate Content (CT - 417)

Weight 100.0 gm of sample soil & add 300 ml. of distilled water. Stopper and shake well. Allow to settle overnight. Prepare two 30 (ml.) of water layer into a 150 (ml.) beaker, dilute to 100 (ml.), add 5 (ml.) conditioning reagent. Turbidity Blank - Adjust the stirrer to the maximum speed, add 1 spoonfull Barium Chloride & start timing. Stir for exactly 1 minute.

Flask No. : 40	Prepared By : MT	Date : 03/01/07
Weight of Soil (gm) : 100.03	Tested By : MT	Date : 03/02/07
Distilled Water (ml.) : 300.03	Calculated By : MT	Date : 03/02/07
Shaking at : 18:00	Checked By : R.J.	Date : 3-7-07
Reshaking at : 19:00		

Total Water Sample Prepared	60.06	With BaCL		3	< Beaker Number >			4	Blank
Distilled Water added (ml)	200.02			100.02	Tested Sample Volume			100.00	
Time Intervals	0:00:00	0:00:30	0:01:00	0:01:30	0:02:00	0:02:30	0:03:00	0:04:00	Maximum
With BaCL (time) 18:16:00	18:20:00	18:20:30	18:21:00	18:21:30	18:22:00	18:22:30	18:23:00	18:24:00	
Turbidity with BaCL (NTV)		320	316	305	297	293	293	275	320
Blank (time) 18:12:00	18:16:00	18:16:30	18:17:00	18:17:30	18:18:00	18:18:30	18:19:00	18:20:00	
Turbidity Blank (NTV)		3.30	3.26	3.31	3.31	3.30	3.30	3.30	3.31
Difference (ppm)									316.69
SO_4 (from graph) (ppm)									690

Measurement of Soil Chloride Content (CT - 422)

*1. Weight 100.0 gm sample soil & add 300 ml. of distilled water. Stopper and shake vigorously for 20 seconds, reshaking after one hour and let it settle over night. 2. Pour 30 ml aliquot of filtered solution into a 150 ml beaker, then check pH. If pH is in the range 6 through 8, go to step 4. If ph below 6, add Sodium Hydroxide and if above 8, add Acetic Acid to adjust to the range. 4. Add two drops of Potassium Chromate solution before titrate with Silver Nitrate and change color from Yellow to Red. ** If the titration is over 30 ml., take a smaller sample. Dilute any smaller sample to about 50 ml..*

Flask No. : 40	Prepared By : MT	Date : 03/01/07
Wt. of Soil (gm) : 100.03	Tested By : MT	Date : 03/02/07
Distilled Water (ml.) : 300.03	Calculated By : MT	Date : 03/02/07
Shaking at : 18:00	Checked By : R.J.	Date : 3-7-07
Reshaking at : 19:00	Vaccum & Filter at :	

Remark :

Titration of (I ml.) Sample Diluted to (F ml.)	31	< Beaker No. >		38		
Total Sample Prepared :	Initial	Final	Total	Initial	Final	Total
Sample Volume (ml)	30.09			30.03		
pH of Liquid Sample	6.91			6.89		
Sodium Hydroxide added (ml)	-	-	-	-	-	-
Acetic Acid added (ml)	-	-	-	-	-	-
Silver Nitrate added (ml)	5.0	117.0	112.0	5.0	125.0	120.0
ppm CL= 100x(ml of Sil.Ni.-0.2 ml blank)F/I			11180			11980
Moisture - Free CL = ppm CL X 100 / (100 - w)						

Average
116.0
11580
>14588

MEASUREMENT OF SOIL CORROSIVITY

Project No.	: 06-159	**Project Name :** BATA / Dumbarton Toll Bridge			
Boring No.	: 06 - 11	**Depth (ft/m) :**	10.0		
Sample No.	: D - 1	**Description :**	DK Greenish Gray, FAT CLAY w/ Organics (CH)		

**** Sample for Corrosivity tests must screen through No. 8 Sieve*

Measurement of Soil Resistivity (ASTM G-57-78 / CT-643)

Test Standard	ASTM	X	CAL. TRAN.	Wt of Wet Soil + Cont. (gm)		167.51	Weight of Total
Soil Box Diamension (cm)	22.86 X 3.81 X 2.54		15.31 X 10.04 X4.41	Wt of Dry Soil + Cont. (gm)		114.60	Sample for Test (gm)
(L X W X H) / (inch)	9.0 X 1.5 X 1.0		6.04X 3.95 X 1.74	Wt. of Cont. No.	19	58.18	77.89
Soil Box Constant (C)	1.0		6.72	Setup Moisture Content (%)	6.22	93.78	

Trial	Resistivity Meter Reading (ohm-cm)						Prepared By : M.T.	Date : 5/08/07
	As received	1	2	3	4	5	Tested By : M.T.	Date : 5/08/07
Water added	0.0	3.91					Calculated By : M.T.	Date : 5/08/07
Meter reading	10 x 5.9	10 x 6.0					Checked By : R.Y.	Date : 5-10-07
Resistivity	59	60					Minimum Resistivity :	59

Measurement of Soil pH (ASTM G-51-77 / CT-643)

*Weight **30 gm** soil sample and add **30 ml** distilled water, stir to a soil slurry and settle at least **1 hr.***

Prepared By	: M.T.	**Date :** 5/08/07	**Time :** 16:50	**Beaker No. :** 26		**pH Reading**				
Tested By	: M.T.	**Date :** 5/09/07	**Weigh of Wetsoil (gm)**		30.03	**Trial**	1	2	3	Average
Calculated By	: M.T.	**Date :** 5/09/07	**Distilled Water added (ml)**		30.09	**Test Time**	13:30	13:45	14:00	
Checked By	: R.Y.	**Date :** 5-10-07	**Moisture Content (%)**		93.78	**Reading**	7.29	7.32	7.32	

Measurement of Soil Soluble Sulfate Content (CT - 417)

*Weight **100.0 gm** of sample soil & add **300 ml.** of distilled water. Stopper and shake well. Allow to settle overnight. Prepare two **30 (ml.)** of water layer into a **150 (ml.)** beaker, dilute to **100 (ml.)**, add **5 (ml.)** conditioning reagent. Turbidity Blank - Adjust the stirrer to the maximum speed, add 1 spoonfull Barium Chloride & start timing. Stir for exactly 1 minute.*

Flask No. : 37	**Prepared By :** M.T.	**Date :** 5/08/07
Weight of Soil (gm) : 100.03	**Tested By :** M.T.	**Date :** 5/09/07
Distilled Water (ml.) : 300.05	**Calculated By :** M.T.	**Date :** 5/09/07
Shaking at : 16:40	**Checked By :** R.Y.	**Date :** 5-10-07
Reshaking at : 17:40		

Total Water Sample Prepared	60.07	With BaCL		7	< Beaker Number			8	Blank
Distilled Water added (ml)	200.06			100.06	Tested Sample Volume			100.00	
Time Intervals	0:00:00	0:00:30	0:01:00	0:01:30	0:02:00	0:02:30	0:03:00	0:04:00	Maximum
With BaCL (time) 15:49:00	15:53:00	15:53:30	15:54:00	15:54:30	15:55:00	15:55:30	15:56:00	15:57:00	
Turbidity with BaCL (NTV)		68.4	67.4	65.7	61.2	59.9	59.2	59.6	68.4
Blank (time) 15:45:00	15:49:00	15:49:30	15:50:00	15:50:30	15:51:00	15:51:30	15:52:00	15:53:00	
Turbidity Blank (NTV)		3.13	3.09	3.09	3.08	3.07	3.06	3.05	3.13
Difference (ppm)									65.27
SO_4 (from graph) (ppm)									140

Measurement of Soil Chloride Content (CT - 422)

*1. Weight **100.0 gm** sample soil & add **300 ml.** of distilled water. Stopper and shake vigorously for 20 seconds, reshaking after one hour and let it settle over night. 2. Pour 30 ml aliquot of filtered solution into a 150 ml beaker, then check pH. If pH is in the range 6 through 8, go to step 4. If ph below 6, add Sodium Hydroxide and if above 8, add Acetic Acid to adjust to the range. 4. Add two drops of Potassium Chromate solution before titrate with Silver Nitrate and change color from Yellow to Red. ** If the titration is over 30 ml., take a smaller sample. Dilute any smaller sample to about 50 ml..*

Flask No. : 37	**Prepared By :** M.T.	**Date :** 5/08/07
Wt. of Soil (gm) : 100.03	**Tested By :** M.T.	**Date :** 5/09/07
Distilled Water (ml.) : 300.05	**Calculated By :** M.T.	**Date :** 5/09/07
Shaking at : 16:40	**Checked By :** R.Y.	**Date :** 5-10-07
Reshaking at : 17:40	**Vaccum & Filter at :**	

Remark :

Titration of (I ml.) Sample Diluted to (F ml.)	15	< Beaker No.			25	
Total Sample Prepared :	**Initial**	**Final**	**Total**	**Initial**	**Final**	**Total**	
Sample Volume (ml)	30.05			30.03			
pH of Liquid Sample	7.59			7.39			
Sodium Hydroxide added (ml)	-	-	-	-	-	-	
Acetic Acid added (ml)	-	-	-	-	-	-	
Silver Nitrate added (ml)	5.0	83.5	78.5	5.0	84.5	79.5	Average 79.0
ppm CL= 100x(ml of Sil.Ni.-0.2 ml blank)*F/I			7830			8430	7880
Moisture - Free CL = ppm CL X 100 / (100 - w)			125884			135531	126688

MEASUREMENT OF SOIL CORROSIVITY

Project No. : 06-159	**Project Name :** BATA / Dumbarton Toll Bridge		
Boring No. : 06-12	**Depth (ft/m) :**	24.0	
Sample No. : D-3	**Description :**	DK BLuish Gray, LEAN CLAY w/ many Root	

**** Sample for Corrosivity tests must screen through No. 8 Sieve*

Measurement of Soil Resistivity (ASTM G-57-78 / CT-643)

Test Standard	ASTM	X	CAL. TRAN.	Wt of Wet Soil + Cont. (gm)		158.25	Weight of Total
Soil Box Diamension (cm)	22.86 X 3.81 X 2.54		15.31 X 10.04 X4.41	Wt of Dry Soil + Cont. (gm)		102.09	Sample for Test (gm)
(L X W X H) / (inch)	9.0 X 1.5 X 1.0		6.04X 3.95 X 1.74	Wt. of Cont. No.	15	57.11	63.51
Soil Box Constant (C)	1.0		6.72	Setup Moisture Content (%)		124.86	

Trial	Resistivity Meter Reading (ohm-cm)						Prepared By : M.T.	Date : 05/10/07
	As received	1	2	3	4	5	Tested By : M.T.	Date : 05/10/07
Water added	0.0	7.14	4.33				Calculated By : M.T.	Date : 05/10/07
Meter reading	10 x 6.9	10 x 5.7	10 x 5.7				Checked By : R.Y.	Date : 5/15/07
Resistivity	69	57	57				Minimum Resistivity :	57

Measurement of Soil pH (ASTM G-51-77 / CT-643)

*Weight **30 gm** soil sample and add **30 ml** distilled water, stir to a soil slurry and settle at least 1 **hr.***

						pH Reading			
Prepared By	: M.T.	Date : 05/10/07	Time : 13:40	Beaker No. :	24	Trial	1	2	3	Average
Tested By	: M.T.	Date : 05/11/07	Weigh of Wetsoil (gm)		30.00	Test Time	15:00	15:15	15:30	
Calculated By	: M.T.	Date : 05/11/07	Distilled Water added (ml)		30.05	Reading	7.89	7.91	7.92	7.91
Checked By	: R.Y.	Date : 5/15/07	Moisture Content (%)		124.86					

Measurement of Soil Soluble Sulfate Content (CT - 417)

*Weight **100.0 gm** of sample soil & add **300 ml.** of distilled water. Stopper and shake well. Allow to settle overnight. Prepare two **30 (ml.)** of water layer into a **150 (ml.)** beaker, dilute to **100 (ml.)**, add **5 (mL)** conditioning reagent. Turbidity Blank - Adjust the stirrer to the maximum speed, add 1 spoonfull Barium Chloride & start timing. Stir for exactly 1 minute.*

Flask No. : 34	Prepared By : M.T.	Date : 05/10/07
Weight of Soil (gm) : 100.02	Tested By : M.T.	Date : 05/11/07
Distilled Water (mL) : 300.05	Calculated By : M.T.	Date : 05/11/07
Shaking at : 13:30	Checked By : R.Y.	Date : 5/15/07
Reshaking at : 14:30		

Total Water Sample Prepared	60.00	With BaCL		1	< Beaker Number >			2	Blank
Distilled Water added (ml)	200.03			100.03	Tested Sample Volume			100.00	
Time Intervals	0:00:00	0:00:30	0:01:00	0:01:30	0:02:00	0:02:30	0:03:00	0:04:00	Maximum
With BaCL (time) 17:37:00	17:41:00	17:41:30	17:42:00	17:42:30	17:43:00	17:43:30	17:44:00	17:45:00	
Turbidity with BaCL (NTV)		81.7	81.7	81.6	81.3	80.9	80.5	79.9	81.7
Blank (time) 17:33:00	17:37:00	17:37:30	17:38:00	17:38:30	17:39:00	17:39:30	17:40:00	17:41:00	
Turbidity Blank (NTV)		1.16	1.14	1.14	1.15	1.15	1.24	1.18	1.24
Difference (ppm)									80.46
SO_4 (from graph) (ppm)									180

Measurement of Soil Chloride Content (CT - 422)

*1. Weight **100.0 gm** sample soil & add **300 ml.** of distilled water. Stopper and shake vigorously for 20 seconds, reshaking after one hour and let it settle over night. 2. Pour 30 ml aliquot of filtered solution into a 150 ml beaker, then check pH. If pH is in the range 6 through 8, go to step 4. If ph below 6, add Sodium Hydroxide and if above 8, add Acetic Acid to adjust to the range. 4. Add two drops of Potassium Chromate solution before titrate with Silver Nitrate and change color from Yellow to Red. ** If the titration is over 30 ml., take a smaller sample. Dilute any smaller sample to about 50 ml..*

Flask No. : 34	Prepared By : M.T.	Date : 05/10/07
Wt. of Soil (gm) : 100.02	Tested By : M.T.	Date : 05/11/07
Distilled Water (mL) : 300.05	Calculated By : M.T.	Date : 05/11/07
Shaking at : 13:30	Checked By : R.Y.	Date : 5/15/07
Reshaking at : 14:30	Vaccum & Filter at :	
Remark :		

Titration of (I ml.) Sample Diluted to (F ml.)	11	< Beaker No. >		36		
Total Sample Prepared :	Initial	Final	Total	Initial	Final	Total
Sample Volume (ml)	30.02			30.09		
pH of Liquid Sample	7.90			7.97		
Sodium Hydroxide added (ml)	-	-	-	-	-	-
Acetic Acid added (ml)	-	-	-	-	-	-
Silver Nitrate added (ml)	5.0	170.0	165.0	5.0	175.0	170.0
ppm CL= 100x(ml of Sil.Ni.-0.2 ml blank)*F/I			16400			16900
Moisture - Free CL = ppm CL X 100 / (100 - w)			20577			21201

Average	167.5
	16750
	20889

MEASUREMENT OF SOIL CORROSIVITY

Project No. : 06-159	Project Name : BATA / Dumbarton Toll Bridge		
Boring No. : 06-12	Depth (ft/m) :	44.0	
Sample No. : D-7	Description :	DK Yellowish Gray, SILTY SAND (SM)	

**** Sample for Corrosivity tests must screen through No. 8 Sieve*

Measurement of Soil Resistivity (ASTM G-57-78 / CT-643)

Test Standard	ASTM	X	CAL. TRAN.	Wt of Wet Soil + Cont. (gm)		206.35	Weight of Total
Soil Box Diamension (cm)	22.86 X 3.81 X 2.54		15.31 X 10.04 X4.41	Wt of Dry Soil + Cont. (gm)		175.56	Sample for Test (gm)
(L X W X H) / (inch)	9.0 X 1.5 X 1.0		6.04X 3.95 X 1.74	Wt. of Cont. No.	16	57.39	74.87
Soil Box Constant (C)	1.0		6.72	Setup Moisture Content (%)	73.94	26.06	

Trial	Resistivity Meter Reading (ohm-cm)						Prepared By : M.T.	Date : 05/10/07
	As received	1	2	3	4	5	Tested By : M.T.	Date : 05/10/07
Water added	0.0	3.45					Calculated By : M.T.	Date : 05/10/07
Meter reading	100x1.5	100x1.5					Checked By : R.Y	Date : 5-15-07
Resistivity	150	150					Minimum Resistivity :	150

Measurement of Soil pH (ASTM G-51-77 / CT-643)

*Weight **30 gm** soil sample and add **30 ml** distilled water, stir to a soil slurry and settle at least **1 hr**.*

Prepared By	: M.T.	Date : 05/10/07	Time :	13:50	Beaker No. :	16	pH Reading			
Tested By	: M.T.	Date : 05/11/07	Weigh of Wetsoil (gm)			30.03	Trial	1	2	3	Average
Calculated By	: M.T.	Date : 05/11/07	Distilled Water added (ml)			30.02	Test Time	15:45	16:00	16:15	
Checked By	: R.Y	Date : 5/11/07	Moisture Content (%)			26.06	Reading	8.48	8.50	8.51	8.50

Measurement of Soil Soluble Sulfate Content (CT - 417)

*Weight **100.0 gm** of sample soil & add **300 ml** of distilled water. Stopper and shake well. Allow to settle overnight. Prepare two **30 (ml.)** of water layer into a **150 (ml.)** beaker, dilute to **100 (ml.)**, add **5 (ml.)** conditioning reagent. Turbidity Blank - Adjust the stirrer to the maximum speed, add 1 spoonfull Barium Chloride & start timing. Stir for exactly 1 minute.*

Flask No. : 35	Prepared By : M.T.	Date : 05/10/07
Weight of Soil (gm) : 100.02	Tested By : M.T.	Date : 05/11/07
Distilled Water (ml.) : 300.02	Calculated By : M.T.	Date : 05/11/07
Shaking at : 13:40	Checked By : R.Y	Date : 5-15-07
Reshaking at : 14:40		

Total Water Sample Prepared	60.05	With BaCL		3	< Beaker Number >			4	Blank
Distilled Water added (ml)	200.09			100.00	Tested Sample Volume			100.09	
Time Intervals	0:00:00	0:00:30	0:01:00	0:01:30	0:02:00	0:02:30	0:03:00	0:04:00	Maximum
With BaCL (time) 17:45:00	17:49:00	17:49:30	17:50:00	17:50:30	17:51:00	17:51:30	17:52:00	17:53:00	
Turbidity with BaCL (NTV)		46.9	47.0	46.9	46.6	46.4	46.3	46.3	47.0
Blank (time) 17:41:00	17:45:00	17:46:30	17:46:00	17:46:30	17:47:00	17:47:30	17:48:00	17:49:00	
Turbidity Blank (NTV)		2.27	2.25	2.28	2.28	2.27	2.27	2.27	2.28
Difference (ppm)									44.72
SO_4 (from graph) (ppm)									100

Measurement of Soil Chloride Content (CT - 422)

*1. Weight **100.0 gm** sample soil & add **300 ml** of distilled water. Stopper and shake vigorously for 20 seconds, reshaking after one hour and let it settle over night. 2. Pour 30 ml aliquot of filtered solution into a 150 ml beaker, then check pH. If pH is in the range 6 through 8, go to step 4. If ph below 6, add Sodium Hydroxide and if above 8, add Acetic Acid to adjust to the range. 4. Add two drops of Potassium Chromate solution before titrate with Silver Nitrate and change color from Yellow to Red. ** If the titration is over 30 ml., take a smaller sample. Dilute any smaller sample to about 50 ml..*

Flask No. : 35	Prepared By : M.T.	Date : 05/10/07
Wt. of Soil (gm) : 100.02	Tested By : M.T.	Date : 05/11/07
Distilled Water (ml.) : 300.02	Calculated By : M.T.	Date : 05/11/07
Shaking at : 13:40	Checked By : R.Y	Date : 5-15-07
Reshaking at : 14:40	Vaccum & Filter at :	
Remark :		

Titration of (I ml.) Sample Diluted to (F ml.)	18	< Beaker No.			> 38	
Total Sample Prepared :	Initial	Final	Total	Initial	Final	Total
Sample Volume (ml)	30.03			30.07		
pH of Liquid Sample	7.77			7.61		
Sodium Hydroxide added (ml)	-	-	-	-	-	-
Acetic Acid added (ml)	-	-	-	-	-	-
Silver Nitrate added (ml)	5.0	48.0	43.0	5.0	46.0	41.0
ppm CL= 100x(ml of Sil.Ni.-0.2 ml blank)*F/I			4280			4080
Moisture - Free CL = ppm CL X 100 / (100 - w)			5789			5518

Average 42.0	Average
4180	4180
5653	5653

MEASUREMENT OF SOIL CORROSIVITY

Project No. : 06-159	**Project Name :** BATA / Dumbarton Toll Bridge		
Boring No. : 06-13	**Depth (ft/m) :** 14.0		
Sample No. : D-3	**Description :** DK Bluish Gray, SILT w/ SAND (ML)		

**** Sample for Corrosivity tests must screen through No. 8 Sieve*

Measurement of Soil Resistivity (ASTM G-57-78 / CT-643)

Test Standard	ASTM	X	CAL. TRAN.	**Wt of Wet Soil + Cont. (gm)**	193.83	**Weight of Total**
Soil Box Diamension (cm)	22.86 X 3.81 X 2.54		15.31 X 10.04 X4.41	**Wt of Dry Soil + Cont. (gm)**	155.50	**Sample for Test (gm)**
(L X W X H) / (inch)	9.0 X 1.5 X 1.0		6.04X 3.95 X 1.74	**Wt. of Cont. No.** 17	57.15	74.15
Soil Box Constant (C)	1.0		6.72	**Setup Moisture Content (%)** 61.03	38.97	

Trial	**Resistivity Meter Reading (ohm-cm)**							
	As received	1	2	3	4	5		
Water added	0.0	6.45					**Prepared By :** M.T.	**Date :** 05/10/07
Meter reading	10 x 3.4	10 x 3.4					**Tested By :** M.T.	**Date :** 05/10/07
Resistivity	34	34					**Calculated By :** M.T.	**Date :** 05/10/07
							Checked By : R.Y.	**Date :** 5/15/07
							Minimum Resistivity :	34

Measurement of Soil pH (ASTM G-51-77 / CT-643)

Weight 30 gm soil sample and add 30 ml distilled water, stir to a soil slurry and settle at least 1 hr.

						pH Reading				
Prepared By	: M.T.	**Date :** 05/10/07	**Time :** 14:10	**Beaker No. :** 15		**Trial**	1	2	3	**Average**
Tested By	: M.T.	**Date :** 05/11/07	**Weigh of Wetsoil (gm)**		30.02	**Test Time**	16:30	16:45	17:00	
Calculated By	: M.T.	**Date :** 05/11/07	**Distilled Water added (ml)**		30.03	**Reading**	7.29	7.27	7.27	7.28
Checked By	: R.Y.	**Date :** 5/15/07	**Moisture Content (%)**		38.97					

Measurement of Soil Soluble Sulfate Content (CT - 417)

Weight 100.0 gm of sample soil & add 300 ml. of distilled water. Stopper and shake well. Allow to settle overnight. Prepare two 30 (ml.) of water layer into a 150 (ml.) beaker, dilute to 100 (ml.), add 5 (ml.) conditioning reagent. Turbidity Blank - Adjust the stirrer to the maximum speed, add 1 spoonfull Barium Chloride & start timing. Stir for exactly 1 minute.

Flask No. : 1	**Prepared By :** M.T.	**Date :** 05/10/07
Weight of Soil (gm) : 100.09	**Tested By :** M.T.	**Date :** 05/11/07
Distilled Water (ml.) : 300.05	**Calculated By :** M.T.	**Date :** 05/11/07
Shaking at : 14:00	**Checked By :** R.Y.	**Date :** 5.15.07
Reshaking at : 15:00		

Total Water Sample Prepared	60.07	**With BaCL**		5	< **Beaker Number** >			6	**Blank**
Distilled Water added (ml)	200.07			100.05	**Tested Sample Volume**			100.02	
Time Intervals	0:00:00	0:00:30	0:01:00	0:01:30	0:02:00	0:02:30	0:03:00	0:04:00	**Maximum**
With BaCL (time) 17.53.00	17:57:00	17:57:30	17:58:00	17:58:30	17:59:00	17:59:30	18:00:00	18:01:00	
Turbidity with BaCL (NTV)		28.9	29.1	29.0	28.9	28.9	28.8	28.5	29.1
Blank (time) 17.49.00	17:53:00	17:53:30	17:54:00	17:54:30	17:55:00	17:55:30	17:56:00	17:57:00	
Turbidity Blank (NTV)		0.681	0.678	0.680	0.681	0.677	0.679	0.693	0-693
Difference (ppm)									28.407
SO_4 (from graph) (ppm)									70

Measurement of Soil Chloride Content (CT - 422)

*1. Weight 100.0 gm sample soil & add 300 ml. of distilled water. Stopper and shake vigorously for 20 seconds, reshaking after one hour and let it settle over night. 2. Pour 30 ml aliquot of filtered solution into a 150 ml beaker, then check pH. If pH is in the range 6 through 8, go to step 4. If ph below 6, add Sodium Hydroxide and if above 8, add Acetic Acid to adjust to the range. 4. Add two drops of Potassium Chromate solution before titrate with Silver Nitrate and change color from Yellow to Red. ** If the titration is over 30 ml., take a smaller sample. Dilute any smaller sample to about 50 ml..*

Flask No. : 1	**Prepared By :** M.T.	**Date :** 05/10/07
Wt. of Soil (gm) : 100.09	**Tested By :** M.T.	**Date :** 05/11/07
Distilled Water (mL) : 300.05	**Calculated By :** M.T.	**Date :** 05/11/07
Shaking at : 14:00	**Checked By :** R.Y.	**Date :** 5-15-07
Reshaking at : 15:00	**Vaccum & Filter at :**	
Remark :		

Titration of (I ml.) Sample Diluted to (F ml.)	25	< **Beaker No.** >				40	
Total Sample Prepared :	**Initial**	**Final**	**Total**	**Initial**	**Final**	**Total**	
Sample Volume (ml)	30.05			30.07			
pH of Liquid Sample	7.92			7.95			
Sodium Hydroxide added (ml)	-	-	-	-	-	-	
Acetic Acid added (ml)	-	-	-	-	-	-	
Silver Nitrate added (ml)	5.0	275.0	270.0	5.0	285.0	280.0	**Average** 275.0
ppm CL= 100x(ml of Sil.Ni.-0.2 ml blank)*F/I			26980			27980	27480
Moisture - Free CL = ppm CL X 100 / (100 - w)			44208			45846	45027

MEASUREMENT OF SOIL CORROSIVITY

Project No. : 06-159	Project Name : BATA / Dumbarton Toll Bridge		
Boring No. : 06-13	Depth (ft/m) :	39.0	
Sample No. : S-8	Description :	DK Bluish Gray FAT CLAY (CH)	

*** *Sample for Corrosivity tests must screen through No. 8 Sieve*

Measurement of Soil Resistivity (ASTM G-57-78 / CT-643)

Test Standard	ASTM	X	CAL. TRAN.	Wt of Wet Soil + Cont. (gm)	232.83	Weight of Total
Soil Box Diamension (cm)	22.86 X 3.81 X 2.54		15.31 X 10.04 X4.41	Wt of Dry Soil + Cont. (gm)	163.16	Sample for Test (gm)
(L X W X H) / (inch)	9.0 X 1.5 X 1.0		6.04X 3.95 X 1.74	Wt. of Cont. No. 19	58.16	74.65
Soil Box Constant (C)	1.0		6.72	Setup Moisture Content (%) 33.65	66.35	

Trial	Resistivity Meter Reading (ohm-cm)						
	As received	1	2	3	4	5	
Water added	0.0	4.25	3.00				
Meter reading	10X5.5	10X5.2	10X5.2				
Resistivity	55	52	52				

Prepared By : M.T.	Date : 05/10/07
Tested By : M.T.	Date 05/10/07
Calculated By : M.T.	Date : 05/10/07
Checked By : R.Q.	Date : 5-12-07
Minimum Resistivity :	52

Measurement of Soil pH (ASTM G-51-77 / CT-643)

Weight 30 gm soil sample and add 30 ml distilled water, stir to a soil slurry and settle at least 1 hr.

Prepared By	: M.T.	Date : 05/10/07	Time : 14:25	Beaker No. :	12
Tested By	: M.T.	Date : 05/11/07	Weigh of Wetsoil (gm)		30.05
Calculated By	: M.T.	Date : 05/11/07	Distilled Water added (ml)		30.05
Checked By	: R.Q.	Date : 5-15-07	Moisture Content (%)		66.35

pH Reading				
Trial	1	2	3	Average
Test Time	17:15	17:30	17:45	
Reading	6.75	6.76	6.76	6.76

Measurement of Soil Soluble Sulfate Content (CT - 417)

Weight 100.0 gm of sample soil & add 300 ml. of distilled water. Stopper and shake well. Allow to settle overnight. Prepare two 30 (mL) of water layer into a 150 (mL) beaker, dilute to 100 (ml.), add 5 (mL) conditioning reagent. Turbidity Blank - Adjust the stirrer to the maximum speed, add 1 spoonfull Barium Chloride & start timing. Stir for exactly 1 minute.

Flask No. : 2	Prepared By : M.T.	Date : 05/10/07
Weight of Soil (gm) : 100.07	Tested By : M.T.	Date : 05/11/07
Distilled Water (ml.) : 300.06	Calculated By : M.T.	Date : 05/11/07
Shaking at : 14:15	Checked By : R.Q.	Date : 5-15-07
Reshaking at : 15:15		

Total Water Sample Prepared	60.02	With BaCL		7	< Beaker Number >			8	Blank
Distilled Water added (ml)	200.05			100.00	Tested Sample Volume			100.05	
Time Intervals	0:00:00	0:00:30	0:01:00	0:01:30	0:02:00	0:02:30	0:03:00	0:04:00	Maximum
With BaCL (time)	18:05:00	18:05:30	18:06:00	18:06:30	18:07:00	18:07:30	18:08:00	18:09:00	
Turbidity with BaCL (NTV)		304	288	282	277	273	274	275	304
Blank (time)	18:01:00	18:01:30	18:02:00	18:02:30	18:03:00	18:03:30	18:04:00	18:05:00	
Turbidity Blank (NTV)		2.27	2.27	2.27	2.25	2.24	2.24	2.30	2.30
Difference (ppm)									301.7
SO_4 (from graph) (ppm)									655

Measurement of Soil Chloride Content (CT - 422)

*1. Weight 100.0 gm sample soil & add 300 mL of distilled water. Stopper and shake vigorously for 20 seconds, reshaking after one hour and let it settle over night. 2. Pour 30 ml aliquot of filtered solution into a 150 ml beaker, then check pH. If pH is in the range 6 through 8, go to step 4. If ph below 6, add Sodium Hydroxide and if above 8, add A cetic Acid to adjust to the range. 4. Add two drops of Potassium Chromate solution before titrate with Silver Nitrate and change color from Yellow to Red. ** If the titration is over 30 ml., take a smaller sample. Dilute any smaller sample to about 50 ml..*

Flask No. : 2	Prepared By : M.T.	Date : 05/10/07
Wt. of Soil (gm) : 100.07	Tested By : M.T.	Date 05/11/07
Distilled Water (mL) : 300.06	Calculated By : M.T.	Date 05/11/07
Shaking at : 14:15	Checked By : R.Q.	Date : 5-15-07
Reshaking at : 15:15	Vaccum & Filter at :	

Remark :

Titration of (I ml.) Sample Diluted to (F ml.)	26	< Beaker No. >		35			
Total Sample Prepared :	Initial	Final	Total	Initial	Final	Total	
Sample Volume (ml)	30.00			36.05			
pH of Liquid Sample	6.87			6.53			
Sodium Hydroxide added (ml)	-	-	-	-	-	-	
Acetic Acid added (ml)	-	-	-	-	-	-	
Silver Nitrate added (ml)	5.0	135.0	130.0	5.0	145.0	140.0	Average 135
ppm CL= 100x(ml of Sil.Ni.-0.2 ml blank)*F/I			12980			13980	13480
Moisture - Free CL = ppm CL X 100 / (100 - w)			38574			41545	40059

MEASUREMENT OF SOIL CORROSIVITY

Project No. : 06-159	Project Name : BATA / Dumbarton Toll Bridge		
Boring No. : 06 - 14	Depth (ft/m) :	9.0	
Sample No. : B-2	Description :	DK Bluish Gray, FAT CLAY (CH)	

*** Sample for Corrosivity tests must screen through No. 8 Sieve

Measurement of Soil Resistivity (ASTM G-57-78 / CT-643)

Test Standard	ASTM	X	CAL. TRAN.	Wt of Wet Soil + Cont. (gm)	168.57	Weight of Total Sample for Test (gm)
Soil Box Diamension (cm)	22.86 X 3.81 X 2.54		15.31 X 10.04 X4.41	Wt of Dry Soil + Cont. (gm)	117.29	
(L X W X H) / (inch)	9.0 X 1.5 X 1.0		6.04X 3.95 X 1.74	Wt. of Cont. No. 21	57.76	74.03
Soil Box Constant (C)	1.0		6.72	Setup Moisture Content (%) 13.86	86.14	

Trial	Resistivity Mefer Reading (ohm-cm)						Prepared By : M.T.	Date : 05/10/07
	As received	1	2	3	4	5	Tested By : M.T.	Date : 05/10/07
Water added	0.0	5.73					Calculated By : M.T.	Date : 05/10/07
Meter reading	10 x 4.1	10 x 4.1					Checked By : R.Y.	Date : 5-15-07
Resistivity	41	41					Minimum Resistivity :	41

Measurement of Soil pH (ASTM G-51-77 / CT-643)

Weight 30 gm soil sample and add 30 ml distilled water, stir to a soil slurry and settle at least 1 hr.

Prepared By	: M.T.	Date : 05/10/07	Time :	14:40	Beaker No. :	29	pH Reading			
Tested By	: M.T.	Date : 05/11/07	Weigh of Wetsoil (gm)			30.02	Trial	1	2	3	Average
Calculated By	: M.T.	Date : 05/11/07	Distilled Water added (ml)			30.04	Test Time	18:00	18:15	18:30	
Checked By	: R.Y.	Date : 5-15-07	Moisture Content (%)			86.14	Reading	7.65	7.67	7.67	7.66

Measurement of Soil Soluble Sulfate Content (CT - 417)

Weight 100.0 gm of sample soil & add 300 mL of distilled water. Stopper and shake well. Allow to settle overnight. Prepare two 30 (mL) of water layer into a 150 (mL) beaker, dilute to 100 (mL), add 5 (mL) conditioning reagent. Turbidity Blank - Adjust the stirrer to the maximum speed, add 1 spoonfull Barium Chloride & start timing. Stir for exactly 1 minute.

Flask No. : 10	Prepared By : M.T.	Date : 05/10/07
Weight of Soil (gm) : 100.03	Tested By : M.T.	Date : 05/11/07
Distilled Water (mL) : 300.09	Calculated By : M.T.	Date : 05/11/07
Shaking at : 14:30	Checked By : R.Y.	Date : 5-15-07
Reshaking at : 15:30		

Total Water Sample Prepared	60.07	With BaCL		9	< Beaker Number >			10	Blank
Distilled Water added (ml)	200.07			100.07	Tested Sample Volume			100.00	
Time Intervals	0:00:00	0:00:30	0:01:00	0:01:30	0:02:00	0:02:30	0:03:00	0:04:00	Maximum
With BaCL (time) 18:09:00	18:13:00	18:13:30	18:14:00	18:14:30	18:15:00	18:15:30	18:16:00	18:17:00	
Turbidity with BaCL (NTV)		54.9	54.8	54.9	55.0	54.7	55.1	55.5	55.5
Blank (time) 18:05:00	18:09:00	18:09:30	18:10:00	18:10:30	18:11:00	18:11:30	18:12:00	18:13:00	
Turbidity Blank (NTV)		1.37	1.33	1.35	1.36	1.36	1.35	1.31	1.37
Difference (ppm)									54.13
SO_4 (from graph) (ppm)									120

Measurement of Soil Chloride Content (CT - 422)

*1. Weight 100.0 gm sample soil & add 300 mL of distilled water. Stopper and shake vigorously for 20 seconds, reshaking after one hour and let it settle over night. 2. Pour 30 ml aliquot of filtered solution into a 150 ml beaker, then check pH. If pH is in the range 6 through 8, go to step 4. If ph below 6, add Sodium Hydroxide and if above 8, add Acetic Acid to adjust to the range. 4. Add two drops of Potassium Chromate solution before titrate with Silver Nitrate and change color from Yellow to Red. ** If the titration is over 30 ml., take a smaller sample. Dilute any smaller sample to about 50 ml..*

Flask No. : 10	Prepared By : M.T.	Date : 05/10/07
Wt. of Soil (gm) : 100.03	Tested By : M.T.	Date : 05/11/07
Distilled Water (mL) : 300.09	Calculated By : M.T.	Date : 05/11/07
Shaking at : 14:30	Checked By : R.Y.	Date : 5-15-07
Reshaking at : 15:30	Vaccum & Filter at :	
Remark :		

Titration of (I ml.) Sample Diluted to (F ml.)	19	< Beaker No. >		39			
Total Sample Prepared :	Initial	Final	Total	Initial	Final	Total	
Sample Volume (ml)	30.09			30.05			
pH of Liquid Sample	7.79			7.87			
Sodium Hydroxide added (ml)	-	-	-	-	-	-	
Acetic Acid added (ml)	-	-	-	-	-	-	
Silver Nitrate added (ml)	5.0	210.0	205.0	5.0	215.0	210.0	Average 207.5
ppm CL= 100x(ml of Sil.Ni.-0.2 ml blank)*F/I			20480			20980	20730
Moisture - Free CL = ppm CL X 100 / (100 - w)			147763			151371	149567

MEASUREMENT OF SOIL CORROSIVITY

Project No.	: 06-159	Project Name :	BATA / Dumbarton Toll Bridge		
Boring No.	: 06-14	Depth (ft/m) :	39.0		
Sample No.	: D-8	Description :	Dk Bluish Gray, LEAN CLAY (CL)		

*** *Sample for Corrosivity tests must screen through No. 8 Sieve*

Measurement of Soil Resistivity (ASTM G-57-78 / CT-643)

Test Standard	ASTM	X	CAL. TRAN.	Wt of Wet Soil + Cont. (gm)		206.16	Weight of Total
Soil Box Diamension (cm)	22.86 X 3.81 X 2.54		15.31 X 10.04 X4.41	Wt of Dry Soil + Cont. (gm)		173.57	Sample for Test (gm)
(L X W X H) / (inch)	9.0 X 1.5 X 1.0		6.04X 3.95 X 1.74	Wt. of Cont. No.	18	57.42	75.39
Soil Box Constant (C)	1.0		6.72	Setup Moisture Content (%)	7/94	28.06	

Trial	Resistivity Meter Reading (ohm-cm)						
	As received	1	2	3	4	5	
Water added	0.0	6.27	5.45	3.81	2.92	X	
Meter reading	100x1.2	10x9.9	10x9.6	10x9.2	10x9.3		
Resistivity	120	99	96	92	93		

Prepared By : M.T.	Date : 05/10/07
Tested By : M.T.	Date : 05/10/07
Calculated By : M.T.	Date : 05/10/07
Checked By : R.Y	Date : 5/15-07
Minimum Resistivity :	92

Measurement of Soil pH (ASTM G-51-77 / CT-643)

Weight 30 gm soil sample and add 30 ml distilled water, stir to a soil slurry and settle at least 1 hr.

Prepared By	: M.T.	Date : 05/10/07	Time : 15:10	Beaker No. :	28
Tested By	: M.T.	Date : 05/11/07	Weigh of Wetsoil (gm)		30.02
Calculated By	: M.T.	Date : 05/11/07	Distilled Water added (ml)		30.09
Checked By	: R.Y	Date : 5/15-07	Moisture Content (%)		28.06

pH Reading				
Trial	1	2	3	Average
Test Time	18:45	19:00	19:15	
Reading	7.81	7.86	7.86	7.84

Measurement of Soil Soluble Sulfate Content (CT - 417)

Weight 100.0 gm of sample soil & add 300 ml. of distilled water. Stopper and shake well. Allow to settle overnight. Prepare two 30 (ml.) of water layer into a 150 (ml.) beaker, dilute to 100 (ml.), add 5 (ml.) conditioning reagent. Turbidity Blank - Adjust the stirrer to the maximum speed, add 1 spoonfull Barium Chloride & start timing. Stir for exactly 1 minute.

Flask No. : 3	Prepared By : M.T.	Date : 05/10/07
Weight of Soil (gm) : 100.09	Tested By : M.T.	Date : 05/11/07
Distilled Water (ml.) : 300.07	Calculated By : M.T.	Date : 05/11/07
Shaking at : 16:00	Checked By : R.Y	Date : 5/15-07
Reshaking at : 16:00		

Total Water Sample Prepared	60.07	With BaCL		11	< Beaker Number >			12	Blank
Distilled Water added (ml)	200.09			100.05	Tested Sample Volume			100.04	
Time Intervals	0:00:00	0:00:30	0:01:00	0:01:30	0:02:00	0:02:30	0:03:00	0:04:00	Maximum
With BaCL (time) 18:17:00	18:21:00	18:21:30	18:22:00	18:22:30	18:23:00	18:23:30	18:24:00	18:25:00	
Turbidity with BaCL (NTV)		36.5	35.9	34.9	34.8	34.4	34.7	34.1	36.5
Blank (time) 18:13:00	18:17:00	18:17:30	18:18:00	18:18:30	18:19:00	18:19:30	18:20:00	18:21:00	
Turbidity Blank (NTV)		2.29	2.27	2.27	2.27	2.27	2.28	2.27	2.29
Difference (ppm)									34.21
SO_4 (from graph) (ppm)									80

Measurement of Soil Chloride Content (CT - 422)

*1. Weight 100.0 gm sample soil & add 300 ml of distilled water. Stopper and shake vigorously for 20 seconds, reshaking after one hour and let it settle over night. 2. Pour 30 ml aliquot of filtered solution into a 150 ml beaker, then check pH. If pH is in the range 6 through 8, go to step 4. If ph below 6, add Sodium Hydroxide and if above 8, add Acetic Acid to adjust to the range. 4. Add two drops of Potassium Chromate solution before titrate with Silver Nitrate and change color from Yellow to Red. ** If the titration is over 30 ml., take a smaller sample. Dilute any smaller sample to about 50 ml..*

Flask No. : 3	Prepared By : M.T.	Date : 05/10/07
Wt. of Soil (gm) : 100.09	Tested By : M.T.	Date : 05/11/07
Distilled Water (ml.) : 300.07	Calculated By : M.T.	Date : 05/11/07
Shaking at : 15:00	Checked By : R.Y	Date : 5/15-07
Reshaking at : 16:00	Vaccum & Filter at :	

Remark :

Titration of (I ml.) Sample Diluted to (F ml.)	10	< Beaker No.			> 34	
Total Sample Prepared :	Initial	Final	Total	Initial	Final	Total
Sample Volume (ml)	30.06			30.06		
pH of Liquid Sample	7.97			7.95		
Sodium Hydroxide added (ml)	-	-	-	-	-	-
Acetic Acid added (ml)	-	-	-	-	-	-
Silver Nitrate added (ml)	5.0	75.0	70.0	5.0	70.0	65.0
ppm CL= 100x(ml of Sil.Ni.-0.2 ml blank)*F/I			6980			6480
Moisture - Free CL = ppm CL X 100 / (100 - w)			9703			9008

Average
67.5
6730
9355

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Soil Interactions Laboratory UCDAVIS

July 19, 2007

Dr. Hubert Law
Vice President
Earth Mechanics, Inc.

Subject: Laboratory testing results for Dumbarton-Antioch Bridge project.

Dear Dr. Law,

The purpose of this letter is to summarize the results from the advanced laboratory testing program on samples obtained from boring 06-07 as part of the Dumbarton-Antioch bridge project.

Summary:
The testing program consisted of direct simple shear (DSS), direct interface shear (IDST, MS-IDST), and consolidation (CT) tests. A total of 52 tests have been performed as outlined in Table 1, with 17 being DSS tests, 28 being direct interface shear tests, and 7 being consolidation tests. Additional tests have been performed in modification of the testing program in order to better elucidate the effect of shearing rate on mobilized soil strength.

This letter is organized beginning with a brief summary of the primary observations followed by testing program details, consolidation results and assessment of sample quality, direct simple shear test results (DSS), and direct interface shear testing results (IDST, MS-IDST).

Primary Observations:
The primary observations made are as follows:

- Soil sampled in tube sample S-12 is layered with distinct silt seams, brittle, and highly variable. Soil sampled in tube samples S-11 and S-6 is less variable.
- Quality of tube samples is "poor" to "very poor" based on standardized sample quality metrics using consolidation data.
- Soil strength can vary considerably within a tube sample due to depositional-induced stratigraphic variability and sample disturbance, thereby largely obscuring any effect of strain rate on strength. This was a particularly significant issue for tube sample S-12.
- Simple shear test (DSS) results on five specimens from tube sample S-12 consolidated to the in situ stress (σ_{vo}') were sufficiently variable that no reliable measure of rate effects on strength could be determined.
- Simple shear test (DSS) results of three specimens from tube samples S-11 and S-6 consolidated to the in situ stress (σ_{vo}') showed more consistent trends due to less variability between tested specimens.

DRAFT

- Interface shear test (IDST) results on five specimens from tube sample S-12 consolidated to the in situ stress (σ_{vo}') were sufficiently variable that no reliable measure of rate effects on interface strength could be determined.
- A modified multi-stage interface shear test (MS-IDST) using a single soil specimen from tube sample S-11 produced more reliable data for estimating rate effects. No strength increase was observed at displacement rates between 0.00018 and 0.18 in/min. Between 0.18 and 1.8 in/min the strength increases between about 5% and 20%. MS-IDST test results from a soil specimen from tube sample S-6 produced a similar trend, with the primary strength increase occurring at high shearing rates.
- Results from DSS, IDST, and MS-IDST tests on soil specimens from tube sample S-11 that was first normally consolidated (by consolidating to two times the estimated preconsolidation stress) produced similar trends to the test results from tube samples S-11 and S-6 consolidated to the estimated in situ stress.
- The simple shear (DSS) and multi-stage interface shear test (MS-IDST) results using specimens from tube samples S-11 and S-6 indicate strength gain primarily occurring at high strain (displacement) rates, a trend also observed in a previous study of old bay mud (Fugro 1998).

Testing Overview:

Upon receipt and examination of the samples it was determined that sample S-17 was not provided and was to be located by Earth Mechanics.

For the first phase of the testing program tube samples S-12 and S-13 were to be used. Sample S-13, which was not overpushed per the borelog record, could not be used as the lower two-thirds of the tube was oblong (about 3.25" by 2.75" at the cutting shoe). Sample S-12, which was overpushed per the borelog record, was used instead. The remainder of the tests were performed on specimens from tube samples S-11 and S-6.

Tube sections were carefully cut with a pipe cutter while the tube was secured with two heavy ring clamps to prevent subjecting the soil to radial strains due to tube deformation during cutting. The samples were extruded from the tube in the direction of original sampling, and specimens were carefully trimmed from the extruded sample using a cutting ring secured in a cutting jig. Water contents of the samples were obtained from cuttings made during the trimming process as these were determined to represent the bulk water content of specimens.

The general test sequence was as follows: the specimen was placed in the respective device (simple shear, interface shear, consolidation) and subjected to a seating loading, the water bath was filled (for interface shear and consolidation), the specimen was loaded to either the estimated in situ stress or two times the estimated preconsolidation test (for simple shear and interface shear) for at least 8 hours, and testing was initiated. The estimated in situ vertical effective stress (σ'_{vo}) for tube samples S-12, S-11, and S-6 was 4,950 psf and 3,650 psf, and 2020 psf, respectively.

Two types of consolidation tests (CT) were performed on each sample. Incremental load (ICL) consolidation tests were performed with a load increment ratio (LIR) of 1.0, except near the estimated preconsolidation stress where an LIR of 0.5 was used in certain tests. Constant rate of strain (CRS) consolidation tests were performed at a strain rate of 1.0%/hr to a maximum stress of 64,000 psf.

DRAFT

Direct simple shear (DSS) tests were performed to 30% shear strain at rates of 1.5%/hr (duration = 1,000 min), 15%/hr (100 min), 150%/hr (10 min), 1,500%/hr (1 min), and 15,000%/hr (0.1 min). The DSS device is configured for constant volume (height) with free specimen drainage. For the 1.5%/hr test full drainage occurred and the change in vertical stress ($\Delta\sigma_v$) required to maintain a constant height is assumed equivalent to a proportional change in pore pressure (Δu) under undrained conditions. From this the effective vertical stress throughout shearing can be estimated. At higher strain rates fully drained conditions cannot be achieved. Therefore the effective vertical stress throughout shearing is unknown and the measurement shear resistance (strength) was normalized by the consolidation stress (σ'_{vc}), which is equal to the estimated in situ vertical effective stress (σ'_{vo}).

Interface direct shear tests (IDST) were performed by shearing to +1.75 inches, reconsolidating for at least 8 hours, and reverse shearing -1.75 inches back to the original position. The measured interface strength is similar to shearing against a rough concrete pile type surface (sandblasted glass used in the laboratory tests). Displacement rates of 0.00018in/min (9722 min) to 1.8in/min (0.9 min) at every log cycle interval were used to capture five orders of magnitude in shearing rate. The displacement rate corresponds to the shear strain rates in the DSS test (i.e. 0.00018in/min corresponds to a DSS strain rate of 1.5%/hr). Displacement rate terminology was used as shear strain is not uniform across sample height. IDST device is configured for constant stress boundary conditions as drainage and soil loss cannot be controlled between the specimen ring and the rough glass plate (pile). Based on ASTM D 3080-98 (2000) it was estimated that drained shearing conditions exist at the slowest rate of shear (i.e. 0.00018in/min). At higher shear displacement rates the pore pressures generated within the specimen are unknown and therefore the effective vertical stress is also unknown. As a result, the measurement shear resistance (strength) was normalized by the effective consolidation stress (σ'_{vc}), which is equal to the estimated in situ effective vertical stress (σ'_{vo}).

A new multi-stage interface direct shear test (MS-IDST) was developed to reduce the influence of soil variability on assessing the effect of strain (displacement) rate on soil strength. In this test a single soil specimen was prepared and then sheared +0.4 inches and -0.4 inches at the following displacement rates: 0.00018, 0.0018, 0.018, 0.18, 1.8, 0.018, and 0.00018in/min. After each stage the specimen was allowed to reconsolidate to the estimated in situ effective vertical stress (σ'_{vo}). This test effectively performed seven tests with one specimen, and the similarity between results obtained at the same displacement rate confirm reproducibility.

<u>Sample Variability:</u>
Observation during specimen preparation with tube sample S-12 include:

- Sample very brittle
- Slight to significant separation of samples at silt seams during extrusion
- Oxidation induced bonding between soil and inside weld seam of tube
- Silts seams present at vertical intervals down to 1 cm
- Trimming time per sample about 2.0 hours

Observation during specimen preparation with tube sample S-11 include:

- Soil more uniform (relative to S-12)
- Light brown / gray with rust mottling throughout
- Small siltstone type inclusions
- Trimming time per sample about 1.25 hours

DRAFT

Observation during specimen preparation with tube sample S-6 include:

- Soil very uniform (relative to S-11 S-12)
- Minimal layering and inclusions
- Soil soft(er) and easily trimmed
- Trimming time per sample about 1.0 hours

Index Test Results:

Index properties were performed on select tested soil specimens initially, and then for each tested specimen once it was determined that water content estimates using trimming accurately reflected the bulk sample water content. The soil tested from tube sample S-12 classifies primarily as CH while the soil tested from tube samples S-11 and S-6 classifies primarily as CL.

Consolidation (CT) Test Results and Sample Quality Designations:

Incremental load (ICL) and constant rate of strain (CRS) consolidation tests were performed on soil specimens from sample tubes S-12 (Figure 1), S-11 (Figure 2), and S-6 (Figure 3). As visually evident by the rounded curves the samples were disturbed to some degree.

The degree of disturbance was quantitatively assessed using the sample quality designation (SQD) method proposed by Terzaghi et al. (1996) and the $\Delta e/e_o$ method proposed by Lunne et al. (1997) (Table 2). For tube sample S-12 the SQD rating was "D" and the $\Delta e/e_o$ rating was "2" ("good to fair") to "4" ("very poor") among the samples. For tube sample S-11 the SQD rating was "C" to "D" and the $\Delta e/e_o$ rating was "3" ("poor") to "4" ("very poor") among the samples. For tube sample S-6 the SQD rating was "C" and the $\Delta e/e_o$ rating was "3" ("poor") among the samples.

The estimated preconsolidation stress, σ'_p, for tube sample S-12 was estimated to range from 10,000 psf to 10,400 psf, which results in an OCR of about 2.0. The estimated preconsolidation stress, σ'_p, for tube sample S-11 was estimated to range from 10,100 psf to 10,500 psf, which results in an OCR of about 2.8. The estimated preconsolidation stress, σ'_p, for tube sample S-6 was estimated to range from 5,000 psf to 6,500 psf, which results in an OCR of about 3.0.

Simple Shear (DSS) Test Results:

Simple shear tests were performed on five different specimens prepared from tube sample S-12 (see Table 1). Six simple shear tests were performed on specimens prepared from tube sample S-11. Three simple shear tests were performed on specimens prepared from tube sample S-6. All specimens were consolidated to the respective estimated in situ vertical effective stress with the exception of three specimens from tube sample S-11, which were consolidated to twice the estimated preconsolidated stress to ensure a normally consolidated condition.

The peak shear resistance of the soil in addition to the shear resistance at 25% shear strain is presented in Figures 4 through 7 (shear resistance normalized to the initial consolidation stress is also presented) due to varying stress-strain response at different rates (e.g. greater post-peak strain softening at higher rates). The solid symbols represent the peak shear resistance while the open symbols represent the shear resistance at 25% shear strain.

Comparison of the soil shear resistance measured in the DSS tests performed at 1.5%/hr against the in situ field vane test provides an indication of the degree of sample disturbance. The peak resistance measured by the field vane (FVT) (depth below mudline ~71.3) was 3.05 ksf while the peak shear resistance measured by the DSS tests was 1.25 ksf and 0.88 ksf for tube samples S-12 (~78.2 ft.) and

DRAFT

S-11 (~ 60.9 ft), respectively. Borelog notes (i.e. pressure required for tube penetration) and visual examination of tube samples indicate that the soil stratigraphy changes and becomes stronger with depth from S-11 to S-12. If the samples were undisturbed, the measured soil resistance would be expected to be similar to the FVT measured strength. It is noted that this lower measured strength also results in normalized strength ratios in the lower range of those reported in the literature (e.g. Ladd 1991).

As evident in Figures 4 through 6, a general trend of increasing strength with shearing rate is present, though not following a linear increase per log cycle. Simple shear test (DSS) results on five specimens from tube sample S-12 show different patterns for peak strength than for strength at 25% shear strain (Figure 4). The peak strength for the specimen tested at 15%/hr was 34% greater than the peak strength for the specimen tested at 1.5%/hr. However, the peak strengths for specimens tested at 150%/hr, 1500%/hr, and 15,000%/hr showed no pattern of further strength increase. The large strain (25%) strength initially increases between 1.5% and 15% strain rates as well, but then decreases steadily with increasing strain rate. This variability is due primarily to sample variability and disturbance, and therefore is likely not reproducible.

Observations during testing and specimen disassembly indicated that relatively uniform shear strain occurred across the specimen height initially. Beginning at shear strain levels corresponding to initial shear failure, the specimen tended to shear along fine silt seams, resulting in behavior similar to varved clays in which the soil strength in the DSS mode of shearing can be lower than soil strength measured in triaxial compression or extension shearing modes (e.g. DeGroot and Lutenegger 2003).

The increased soil uniformity in tube samples S-11 and S-6 relative to S-12 provides improved clarity in the effect of strain rate on strength (Figures 5 and 6). Simple shear test (DSS) results of peak strength on three specimens from tube sample S-11 show no change in strength between strain rates of 1.5%/hr and 150%/hr, followed by an increase of about 18% per log cycle between strain rates of 150%/hr and 15,000%/hr. Similarly, results from tube sample S-6 show no change in strength between strain rates of 1.5%/hr and 150%/hr, followed by an increase of up to 37% per log cycle between strain rates of 150%/hr and 15,000%/hr. Samples S-11 and S-6 was more uniform and did not contain thin silt seams. This trend is similar to that observed in a previous study of old bay mud (Fugro 1998). However, the large strain strength did not increase with increasing shear rate.

The testing program was designed to test soils at the in situ stress conditions, which corresponds to OCRs of about 2.0 and 2.8 for tube samples S-12 and S-11, respectively. A majority of the strength rate effects per log cycle reported in literature (i.e. 7% to 10% increase per log cycle) are for soft uniform clays tested in a normally consolidated condition (e.g. Mayne & Kulhawy 1990). To provide a more direct comparison three DSS tests (at rates of 1.5, 150, and 15,000%/hr) were performed on tube sample S-11 with specimens consolidated into the normally consolidated range ($\sigma'_{cv} = 2.0 \times \sigma'_{p}$) (Figure 7). Simple shear test (DSS) results of peak strength on three specimens from tube sample S-11 show no change in strength between strain rates of 1.5%/hr and 150%/hr. At higher rates an increase of about 6% per log cycle between strain rates of 150%/hr and 15,000%/hr is observed.

Interface Shear (IDST) Test Results:

Interface direct shear tests were performed on five different specimens prepared from tube sample S-12. The peak shear resistance of the soil in addition to the shear resistance at 0.4 inches (1 cm) of shear displacement is presented in Figure 8 (shear resistance normalized to the initial consolidation

DRAFT

stress is also presented). Results are presented for shearing in the initial ("positive") direction and in the reverse ("negative") direction. The solid symbols represent the initial peak shear resistance while the open symbols represent the shear resistance at 0.4 inches of shear displacement.

Interface shear test (IDST) results on sample S-12 indicate a rate of soil peak strength increase per log cycle of about 3.5% if only results from tests with displacement rates of 0.00018, 0.0018, and 1.8in/min are considered. However, the peak shear resistance in tests at displacement rates of 0.018 and 0.18in/min do not follow this trend as the values are lower than at other rates. Considering all the data a clear trend is not present aside from an increase in strength between the two highest rates of displacement. The large displacement strengths follow a trend similar to peak strengths. As with the DSS tests performed on soil specimens from tube sample S-12, the variability in results are dominated by soil variability between tested specimens and sample disturbance.

It is noted that the soil strength may be constant or initially decrease with increasing shearing rate before it increases (e.g. Tika et al. 1996, Randolph 2004). This occurs under shearing conditions where the drainage condition cannot be controlled, a condition present in the interface shear device (used herein) as well as in the field tests including the FVT, CPT, and full-flow penetrometers. At very slow shearing conditions (i.e. 0.00018in/min) full drainage occurs, no excess pore pressures develop, and a drained strength is measured. At very high rates (i.e. 1.8in/min) negligible drainage occurs, excess pore pressures fully develop, and an undrained condition may be assumed. At intermediate rates partial pore pressure dissipation can occur and, depending on the volumetric tendency of the soil, the soil strength may decrease or increase.

Multi-Stage Interface Shear (MS-IDST) Test Results:

The multi-stage interface shear test was developed to reduce the influence of specimen variability by performed multiple interface shear tests on a single specimen. This test was performed on tube samples S-11 and S-6 only as the entire tube sample S-12 had been used. The test consisted of seven stages in total, with duplicate tests at shear displacement rates of 0.018 and 0.00018in/min (Figures 9 through 11).

The peak shear resistance of the soil in addition to the shear resistance at 0.4 inches (1 cm) of shear displacement is presented (shear resistance normalized to the initial consolidation stress is also presented). Results are presented for shearing in the initial ("positive") direction and in the reverse ("negative") direction. The solid symbols represent the initial peak shear resistance while the open symbols represent the shear resistance at 0.4 inches of shear displacement.

Results from the MS-IDST test on a soil specimen from tube sample S-11 consolidated to the estimated in situ effective stress are presented in Figure 9. The variability in measured peak strength and large displacement strengths between shearing rates is reduced, indicating that multiple tests on a single specimen was useful in reducing the influence of soil variability (though tube sample S-11 itself was less variable than tube sample S-12). The interface shear strength remains relatively constant until higher displacement rates. No strength increase was observed at displacement rates between 0.00018 and 0.18 in/min. Between 0.18 and 1.8 in/min the strength increases between about 5 and 20%.

Results from the MS-IDST test on a soil specimen from tube sample S-6 consolidated to the estimated in situ effective stress are presented in Figure 10. A trend of increasing strength at higher shearing rates similar to S-11 is evident. No strength increase was observed at displacement rates

DRAFT

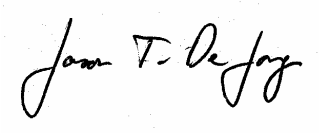
between 0.00018 and 0.018 in/min. Between 0.018 and 1.8 in/min the strength increases between about 5 and 25%.

The trends observed in the MS-IDST tests for tube samples S-11 and S-6 consolidated to the estimated in situ stress are similar to that observed in the respective DSS tests (Figures 5 and 6) and that reported in another study on old bay mud (Fugro 1998).

Results from the MS-IDST test on a soil specimen from tube sample S-11 consolidated into the normally consolidated range ($\sigma'_{cv} = 2.0 \times \sigma'_{p}$) are presented in Figure 11. Two additional individual IDST tests are also included in the plot. As evident, an initial decrease in interface strength is observed as the shearing rate is increased from 0.00018 to 0.0018 in/min. This is followed by minimal change in strength between rates of 0.0018 and 0.18 in/min. A steady increase in strength at a rate between 6% and 20% per log cycle occurs as the rate is further increased to 1.8 in/min. It is noted that this observed trend is consistent with previous observations that the soil strength may be constant or initially decrease with increasing shearing rate before it increases (e.g. Tika et al. 1996, Randolph 2004).

Closure:
It has been a pleasure performing this testing program, and feel free to contact me to discuss this letter further and/or to provide additional input into the ongoing and future testing.

Sincerely,



Jason T. DeJong

DRAFT

Table 1. Completed testing program.

Simple Shear Test Summary

Test #	Boring	Tube #	Depth Examined	Test Type	Shear Rate (%/hr)	Consolidation State
1	06-07	S-12	Intermediate	DSS	150	
2	06-07	S-12	Intermediate	DSS	15000	
3	06-07	S-12	Intermediate	DSS	15000	
4	06-07	S-12	Intermediate	DSS	1.5	
5	06-07	S-12	Intermediate	DSS	15	
6	06-07	S-12	Intermediate	DSS	1.5	
7	06-07	S-12	Intermediate	DSS	1500	Consolidated to Estimated In situ Stress
8	06-07	S-11	Intermediate	DSS	1.5	
9	06-07	S-11	Intermediate	DSS	15000	
10	06-07	S-11	Intermediate	DSS	150	
11	06-07	S-11	Intermediate	DSS	1.5	
12	06-07	S-6	Shallow	DSS	15000	
13	06-07	S-6	Shallow	DSS	150	
14	06-07	S-6	Shallow	DSS	1.5	
15	06-07	S-11	Intermediate	DSS	1.5	Consolidated to 2x Preconsolidation
16	06-07	S-11	Intermediate	DSS	150	
17	06-07	S-11	Intermediate	DSS	15000	

Interface Shear Test Summary

Test #	Boring	Tube #	Depth Examined	Test Type	Displacement Rate (in/min)	Consolidation State
18	06-07	S-12	Intermediate	IDST	0.00018	
19	06-07	S-12	Intermediate	IDST	0.0018	
20	06-07	S-12	Intermediate	IDST	0.018	
21	06-07	S-12	Intermediate	IDST	0.18	
22	06-07	S-12	Intermediate	IDST	1.8	
23	06-07	S-11	Intermediate	MS-IDST	0.00018	
24	06-07	S-11	Intermediate	MS-IDST	0.0018	
25	06-07	S-11	Intermediate	MS-IDST	0.018	
26	06-07	S-11	Intermediate	MS-IDST	0.18	
27	06-07	S-11	Intermediate	MS-IDST	1.8	Consolidated to Estimated In situ Stress
28	06-07	S-11	Intermediate	MS-IDST	0.018	
29	06-07	S-11	Intermediate	MS-IDST	0.00018	
30	06-07	S-6	Shallow	MS-IDST	0.00018	
31	06-07	S-6	Shallow	MS-IDST	0.0018	
32	06-07	S-6	Shallow	MS-IDST	0.018	
33	06-07	S-6	Shallow	MS-IDST	0.18	
34	06-07	S-6	Shallow	MS-IDST	1.8	
35	06-07	S-6	Shallow	MS-IDST	0.018	
36	06-07	S-6	Shallow	MS-IDST	0.00018	
37	06-07	S-11	Intermediate	MS-IDST	0.00018	
38	06-07	S-11	Intermediate	MS-IDST	0.0018	
39	06-07	S-11	Intermediate	MS-IDST	0.018	
40	06-07	S-11	Intermediate	MS-IDST	0.18	Consolidated to 2x Preconsolidation Stress (OCR = 1)
41	06-07	S-11	Intermediate	MS-IDST	1.8	
42	06-07	S-11	Intermediate	MS-IDST	0.018	
43	06-07	S-11	Intermediate	MS-IDST	0.00018	
44	06-07	S-11	Intermediate	IDST	1.8	
45	06-07	S-11	Intermediate	IDST	0.018	

Consolidation Shear Test Summary

Test #	Boring	Tube #	Depth Examined	Test Type
46	06-07	S-13	Intermediate	CRS
47	06-07	S-13	Intermediate	ICL
48	06-07	S-11	Intermediate	CRS
49	06-07	S-11	Intermediate	ICL
50	06-07	S-11	Intermediate	CRS
51	06-07	S-6	Shallow	CRS
52	06-07	S-6	Shallow	ICL

DRAFT

Table 2. Summary of sample quality metrics.

Specimen Quality Designation (SQD) (Terzaghi et al. 1996)		$\Delta e/e_0$ Criteria (Lunne et al. 1997)		
Volumetric Strain (%)	SQD	OCR = 1 – 2 $\Delta e/e_0$	OCR = 2 – 4 $\Delta e/e_0$	Rating*
< 1	A	< 0.04	< 0.03	Very good to excellent
1 – 2	B	0.04 – 0.07	0.03 – 0.05	Good to fair
2 – 4	C	0.07 – 0.14	0.05 – 0.10	Poor
4 – 8	D	> 0.14	> 0.10	Very poor
> 8	E			

* Refers to use of samples for measurement of mechanical properties

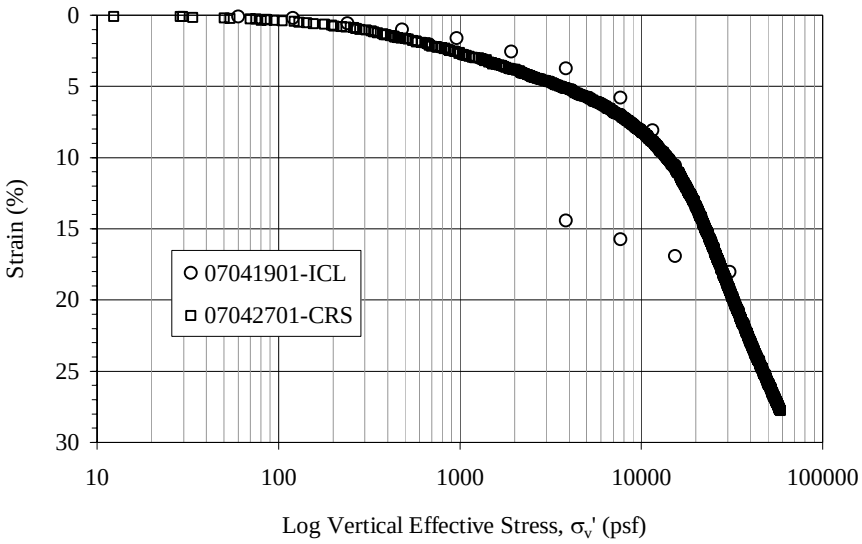


Figure 1. Consolidation test results from tube sample S-12.

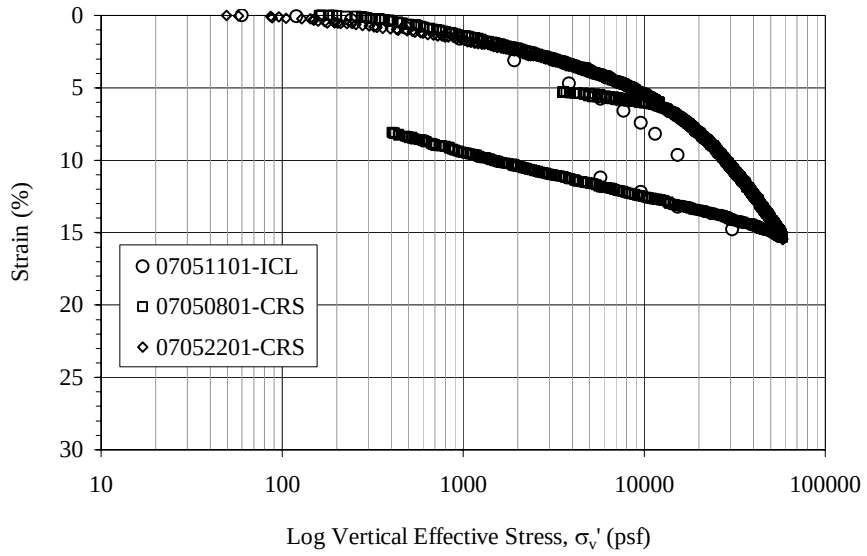


Figure 2. Consolidation test results from tube sample S-11.

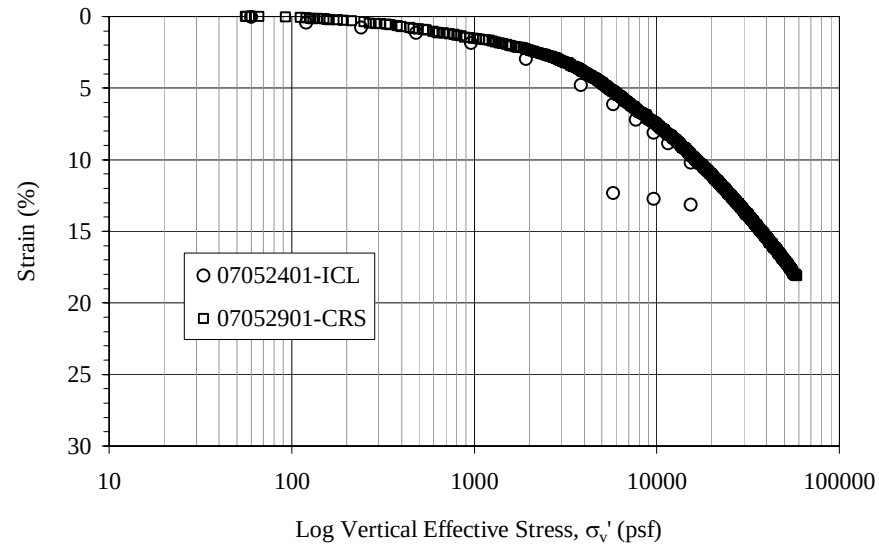


Figure 3. Consolidation test results from tube sample S-6.

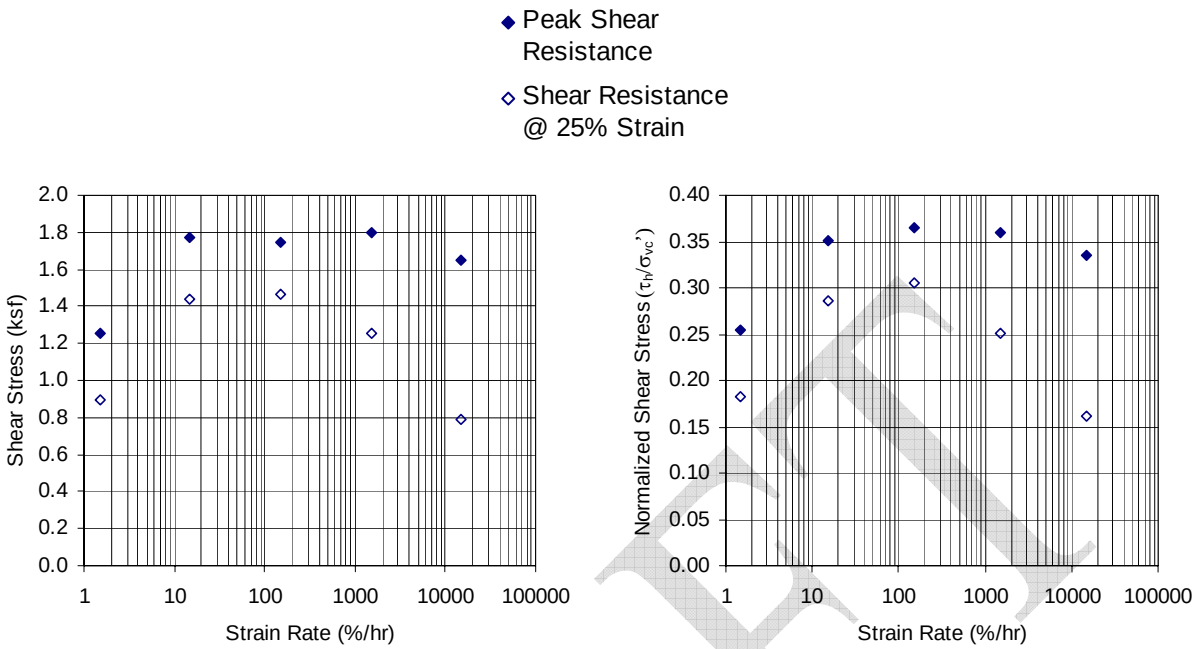


Figure 4. Simple shear (DSS) test results from tube sample S-12 consolidated to σ'_{vo}.

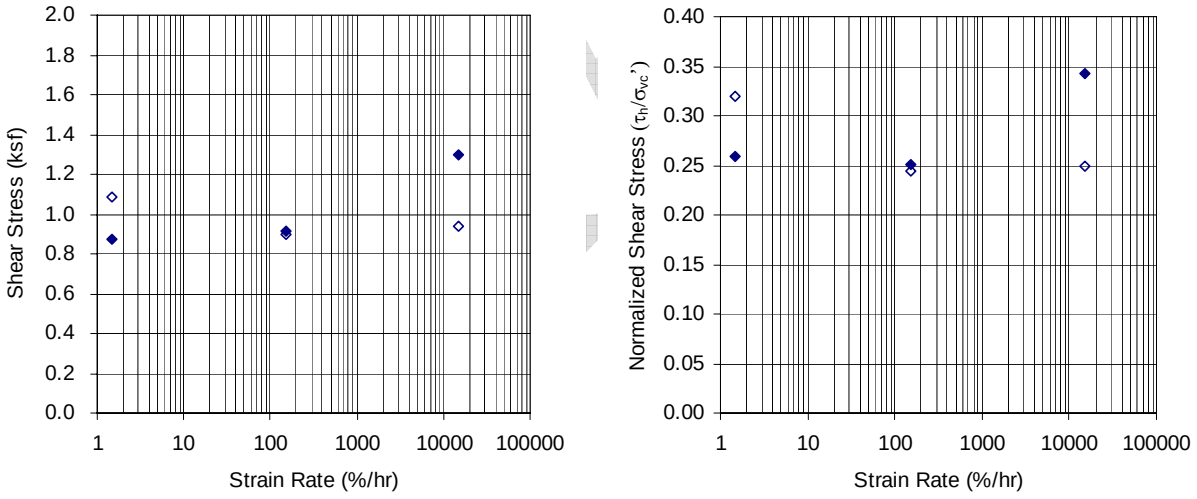


Figure 5. Simple shear (DSS) test results from tube sample S-11 consolidated to σ'_{vo}.

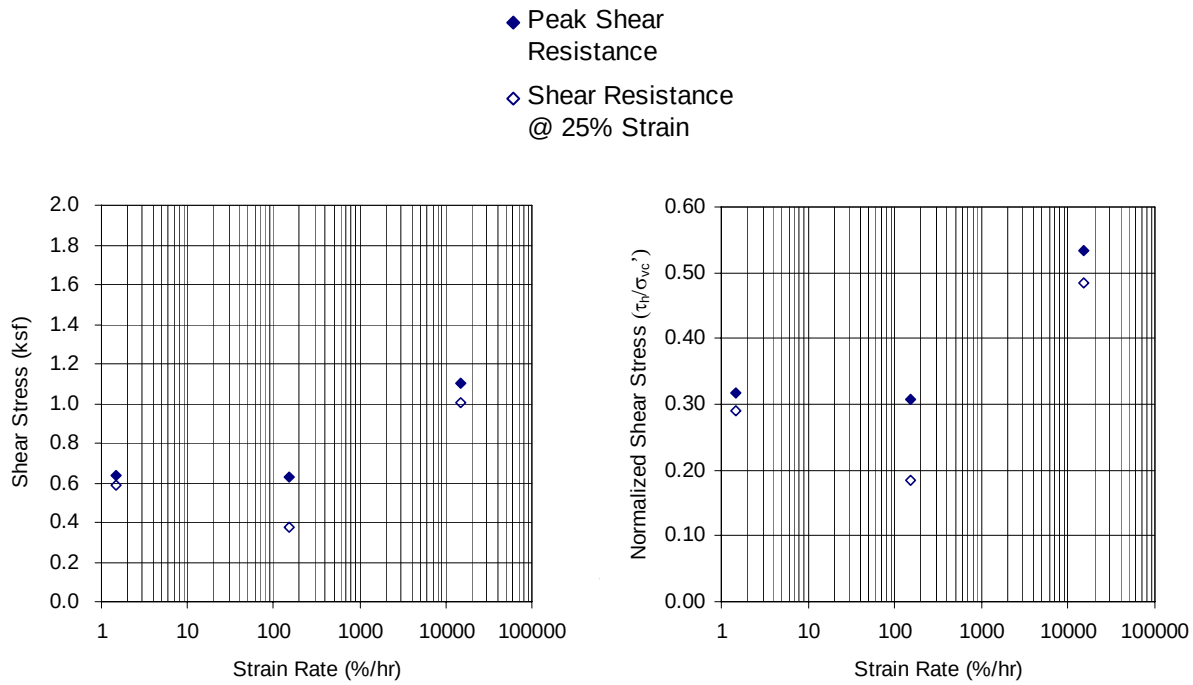


Figure 6. Simple shear (DSS) test results from tube sample S-6 consolidated to σ'_{vo}.

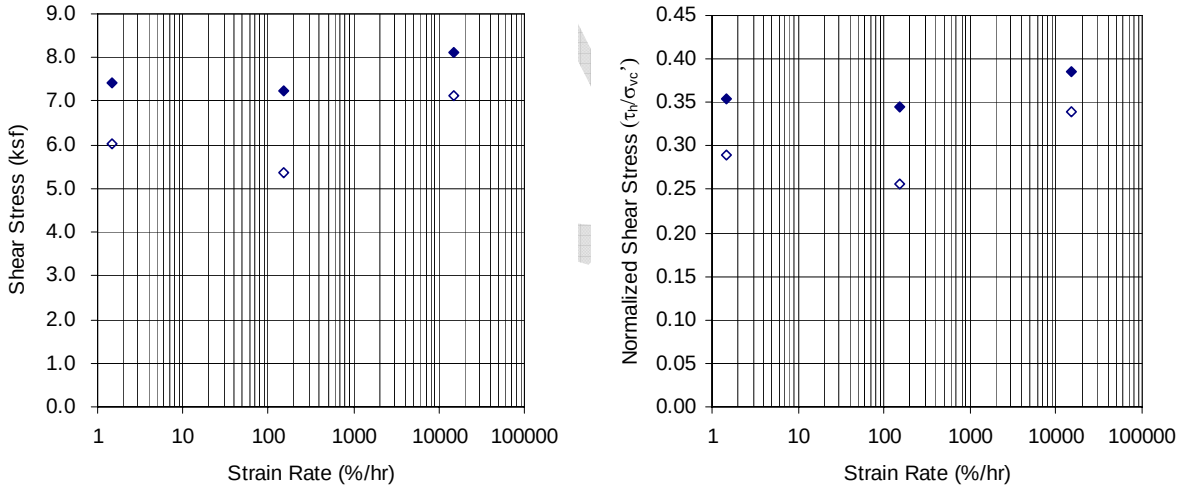


Figure 7. Simple shear (DSS) test results from tube sample S-11 consolidated to 2 x σ'_p (OCR = 1).

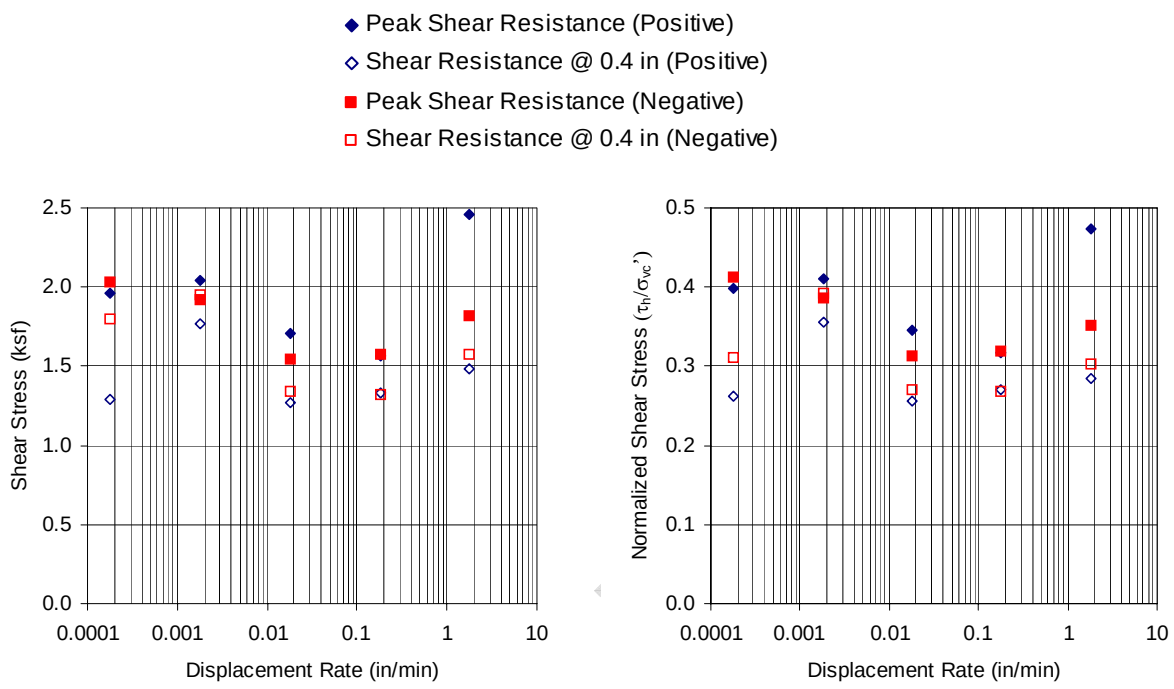


Figure 8. Interface direct shear test (IDST) results from tube sample S-12 consolidated to σ'_{vo}.

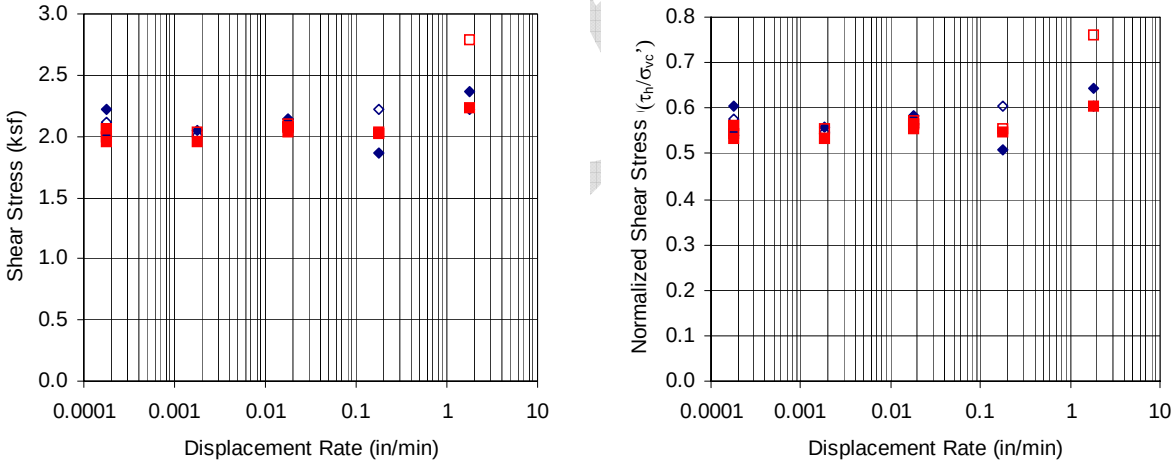


Figure 9. Multi-stage interface direct shear test (MS-IDST) results from tube sample S-11 consolidated to σ'_{vo}.

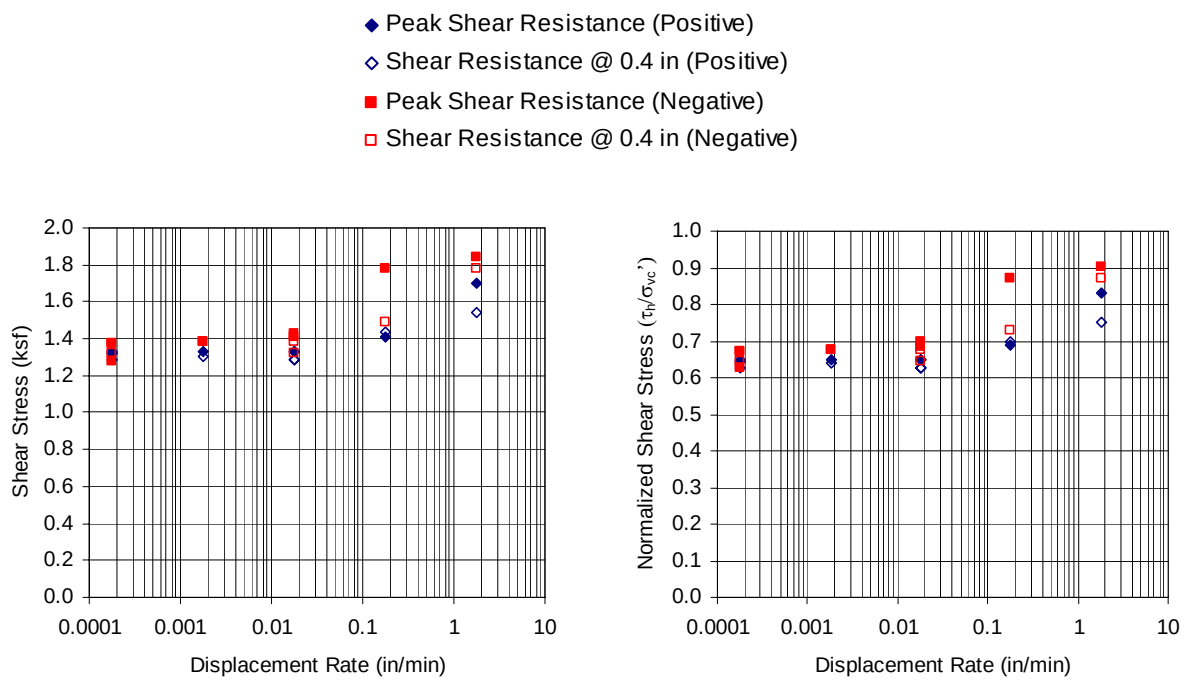


Figure 10. Multi-stage interface direct shear test (MS-IDST) results from tube sample S-6 consolidated to σ'_{vo}.

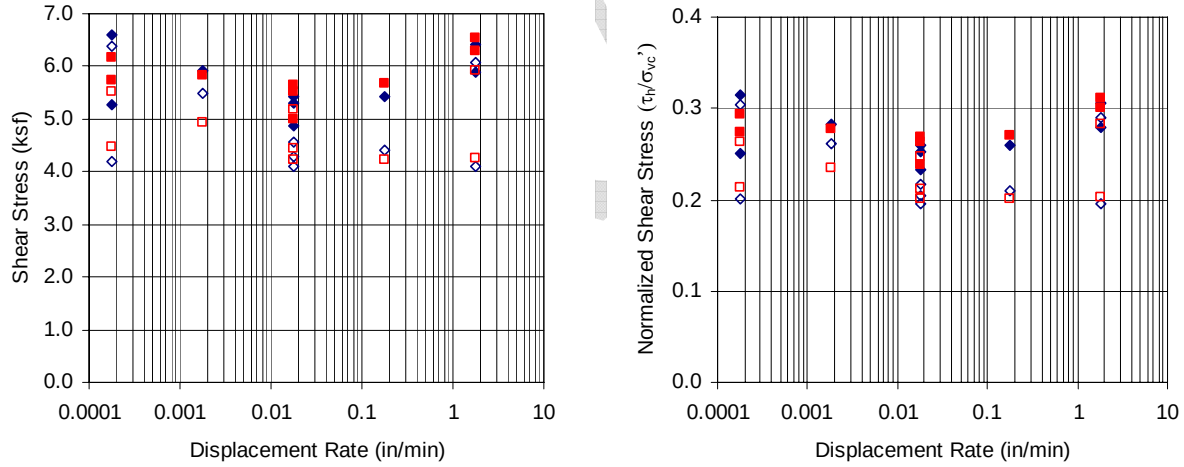


Figure 11. Multi-stage interface direct shear test (MS-IDST) and interface direct shear test (IDST) results from tube sample S-11 consolidated to 2 x σ'_p (OCR = 1).

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Soil Interactions Laboratory UCDAVIS

December 21, 2007

Dr. Hubert Law
Vice President
Earth Mechanics, Inc.

Subject: Evaluation of strength profile and strength rate effects for Dumbarton-Antioch Bridge.

Dear Dr. Law,

The purpose of this letter is to provide opinion of the soil strength profile and the rate dependence of strength based on the Dumbarton-Antioch bridge site investigation program (with focus on the laboratory test program performed on tube samples from boring 06-07).

Proposed Rate Dependence Relationship:
The following relationship has been proposed by Earth Mechanics, Inc. to capture the rate dependence of soil:

$$C_{eq} = (B/V) \log_{10} (V/V_{ref}) \quad (1)$$

where B is the rate coefficient (often presented as μ in units of % increase per log cycle), V is a displacement rate (or velocity), and V_{ref} is the reference velocity above which the strength begins to increase.

Therefore, the objective is to determine appropriate values for B and V_{ref} based on the laboratory data.

Summary of Further Data Analysis:
A subset of the test data presented in the memo dated July 19, 2007 is presented in Figures 1 and 2. Data from sample S-12 has not been included due to substantial material variability between tested specimens. The normalized strength (τ_h/σ'_{vc}) has been normalized against the normalized measured strength at the reference (slowest) testing rate (1.5%/hr for direct simple shear (DSS) and 0.00018 in/min for interface direct shear test (IDST)). In the IDST data the normalization was applied against the average of the strengths measured at the reference rate during the first and last stage of the tests. Peak strength and "residual strength" is presented for each test device. The "residual strength" is defined at 30% shear strain in the DSS device and at 1 cm of interface displacement in the IDST device. The "+" and "-" in the Figure 2 legend indicate positive and negative directions of shearing in the IDST.

The variability between data sets is attributed to the fine stratigraphic layering that exists at the specimen length scale (~1 cm) and at larger scales. This is consistent with soils in the San Antonio Formation, but was unexpected as the samples were initially thought to be old bay mud.

Comparison of the depth at which tube samples tested were obtained to the pier tip elevations can be made by examining the updated "Generalized Soil Profile Along Dumbarton Highway Alignment" sheets (in particular boring 06-07 on Sheet 2) and the 06-07 boring log. Pier 23 (adjacent to 06-07), as well as Piers 17 through 30, all have pile tip elevations between -90 and -100 feet (Pier 23 elevation is -95.5'). Samples S-6, S-11, and S-12 were obtained at approximate elevations of approximately -77', -105', and -122'. The FVT test in boring 06-07 was performed at -115' elevation.

Therefore, only sample S-6 was obtained above the tip of the pile. The results of sample S-6 are indicated with a dashed line in Figures 1 and 2 for clarity. An influence zone beneath the pile tip of two diameters is considered reasonable given that the pile (54" diameter, 5" wall thickness) was installed open ended. With a Pier 23 pile diameter of 54" this corresponds to about 108" and a corresponding elevation of about -104.5' (-95.5' + -9'). Therefore tube samples 11 and 12 as well as the FVT data, which are from the lower portion of the San Antonio Formation, are beyond the zone of soil which primarily influences pile performance.

Selection of Reference Velocity:

An increase in peak strength based on DSS data occurs between 150%/hr and 15,000%/hr (Figure 1a). This trend generally persists in the DSS residual strength data (Figure 1b) and in the peak and residual IDST data (Figure 2a & b).

The following is recommended for the reference velocity (displacement rate):
V_{ref} = 150 %/hr based on direct simple shear test data
V_{ref} = 0.018 in/min based on interface direct shear test data

These two values agree well when assuming a shear zone thickness of about 0.7" along the pile shaft.

Selection of Rate Coefficient:

The rate of strength increase is now considered at rates above the reference velocity. In all plots reference lines for 10, 20, and 30% strength increase per log cycle of rate are presented.

The rate of DSS peak strength increase varies from 5% to 35% per log cycle (Figure 1a). Rates from 0% to 32% per log cycle are observed in the IDST peak strength data (Figure 2a), albeit with greater data scatter. The normalized strength generally increases from Tube 11 normally consolidated specimens, to Tube 11 (over consolidated) specimens, to Tube 6 (over consolidated) specimens in both data sets.

The rate coefficient for all DSS and IDST data from Sample S-6 ranges from about 16% to 35%. It is recommended that S-6 data be primarily considered given that S-6 was the only tube tested that contained soil within the zone of influence of the pile. Data from S-11 indicates that the rate coefficient may vary within the San Antonio Formation and may decrease with depth.

Therefore a rate coefficient of about 10% may be reasonable for the San Antonio Formation soils. It his noted that this aggress well with rate factors of 9% and 10% that are commonly reported in the literature.

Translation between Displacement Rate (Velocity) and Strain Rate:

During earthquake loading it is estimated that the cycling amplitude (vertical displacement) of the pile will be between 2" and 5". The cycling period is estimated to be 0.5 to 1.0 seconds (based on discussions with Earth Mechanics, Inc.).

The anticipated displacement rate of the pile could range from 120 to 600 in/min, which is about two orders of magnitude larger than the fastest rate performed in the IDST laboratory test (1.8 in/min).

An equivalent strain rate is more difficult to determine as an estimate of the thickness of soil across which the pile displacement is evenly distributed must be made. The two conceptual options are localized displacement at the pile-soil interface and equal distribution of the displacement across a zone of finite thickness (between 10% and 100% of the pile diameter).

The shear stress in the soil (as a function of distance from the axis of the pile) decreases proportionally with the radius. The shear resistance per unit length of pile is equal to $2\pi R_{pile}\tau_{pile}$, where R_{pile} is the radius of the pile and τ_{pile} is the shear stress acting along the surface of the pile. The shear resistance per unit length at any larger radius is computed by $2\pi R\tau$ which must be equal to $2\pi R_{pile}\tau_{pile}$. Therefore, the shear stress decreases radially proportional to R/R_{pile} (recalling that $R > R_{pile}$). This results in the shear stress being highest at the pile interface. Therefore, it is probable that the displacement of the pile will be distributed within a narrow soil zone adjacent to the interface.

If localized pile-soil interface shearing occurs, the zone of soil engaged is likely less than 1". The corresponding shear strain (for a 1" zone) is about 12,000 to 60,000 %/min (or 720,000 to 3,600,000 %/hr). If the displacement is equally distributed over a distance equal to the pile diameter (54"), then the corresponding strain rate is about 222 to 1,111 %/min (or 13,333 to 66,666 %/hr). It is noted the effect of strain rate must then be extrapolated about two orders of magnitude beyond the maximum rate of 15,000 %/hr that was testing in the laboratory.

The objective is to translate the DSS and IDST laboratory data to the load transfer mechanism occurring along the pile in situ. Similarity between the IDST laboratory data and the estimated pile displacement rate can be considered equivalent if a localized failure mechanism occurs. Alternatively, if the pile displacement is diffused over a larger region, the calculation of a realistic equivalent shear strain and use of the DSS data is more challenging.

Discussion of Shearing Behavior:

The effect of rate on shearing resistance is different from the trends reported for normally consolidated clays in literature (e.g. Ladd 1991), which typically exhibit a constant rate effect beginning at a very slow (reference) shearing rate. The observed behavior may be better understood considering the potential for partially drained conditions, the partially granular characteristics of the soil, and interface direct shear test device conditions.

The coefficient of consolidation, estimated from incremental consolidation test, is about 1.1 to 5.8 x 10^{-3} cm^2/s for sample S-6 and about 2.0 to 3.5 x 10^{-3} cm^2/s for sample S-11. These values are about one order of magnitude faster than typical values for young bay mud (c_v = 2 to 4 x 10^{-4} cm^2/s). Given the higher rate of consolidation, it is likely that drained or partially drained conditions exist in the laboratory up to the reference rate (velocity, V_{ref}) proposed above.

The torque – rotation angle response measured by the FVT test was rather "jagged" (Figures 3a and b) and was not similar to the conventional smooth peak followed by softening response typically observed in soft clays, including the Young Bay Mud measured as part of this project (Figure 3c). This appears to indicate a partially granular shear response and that drained (or partially drained) conditions may have been present during testing. It is also noted that a peak strength or steady-state strength is not achieved, and it is unclear if the test was stopped because of device limitations (i.e. rotation limit, torque capacity). The other FVT data obtained on the project exhibit similar behavior, with the exception of the two shallow tests in boring 06-12 that appear to be performed in Young Bay Mud.

As discussed further in the memo dated July 19, 2007, observations of negligible change or a slight decrease in strength with an initial increase in shearing rate has been observed in test conditions where constant volume conditions are not maintained (e.g. direct shear test, interface shear test, and full-flow penetrometers) (e.g. Tika et al. 1996, Randolph 2004). The same conditions exist in the interface direct shear test setup used in this study. These studies have shown that a relatively constant strength increase per log cycle will occur when undrained conditions exist, typically at rates above a normalized reference velocity. When the shearing rate is lower than the normalized reference velocity, partially drained conditions exist and a minimal change in strength per log cycle of rate is observed.

Variation among Strength Measurements:
Selection of an appropriate base-line strength profile is necessary in addition to determining the appropriate factor for strength dependence on shearing rate.

Figure 4 presents information regarding Pier 23 depth, the estimated soil formations encountered, FVT data obtained by Gregg In Situ, Inc., and DSS and IDST strength data obtained by UC Davis overlaid on a plot prepared by Earth Mechanics. The original plot contains undrained shear strength estimates by Gregg In Situ, Inc. based on CPT data as well as the lower and upper bound values adopted for the bay bridge east span project (see reference in Figure). Only data points which fall into a soil classification category of "clay" or "clayey" are presented (based on discussions with Earth Mechanics, Inc.). This is why, for example, data is rather sparse for the depth range where the Posey Sand Formation primarily exists. Undrained shear strength values were estimated using an N_{kt} value of 15, a value automatically selected by Gregg In Situ, Inc (not calibrated to site specific data).

The following observations can be made:

- The CPT based strengths are higher than that obtained by all other measures, and are near the upper bound of typical values reported for the Bay Bridge East Span Project. It is recommended that the N_{kt} value of 15 used in this project be compared to the N_{kt} value used to estimate CPT based strengths for the Bay Bridge East Span Project.
- The FVT based strength estimates are generally lower than the CPT based strength estimates. In particular, FVT data from borings 06-05, 06-06, and 06-07 are all below the CPT based strength estimates but fall in the middle of the range estimated for the Bay Bridge East Span Project. It is recommended the reason for stopping the FVT tests prior to reaching a peak value or a steady state value is determined. If device/mechanical limitations were the reason, then it is likely that the actual soil strength is higher, and the FVT data should be considered as a minimum strength (not a lower bound) only. It would also be useful to include FVT data from the Bay Bridge East Span Project as well.

- The DSS and IDST strength estimates are consistently lower than the FVT and CPT based strengths. This is expected considering the relatively poor quality of samples obtained as assessed by the sample quality indices.
- The DSS strengths are consistently lower than the IDST strengths. This is due to the DSS device enabling the test specimen to deform with uniform shear strains up to the peak strength. At strain levels corresponding to the peak strength specimens were often observed to localize along a specific plane. Post-test specimen observations revealed that the localization typically occurred along stratrigraphic breaks/transitions. In contrast, the IDST device forces failure along a specific plane regardless of whether this plane corresponds to a stratrigraphic break/transition.

Based on the above observations it is suggested that additional analysis of the CPT and FVT data be performed prior to selecting upper and lower bounds for typical values of strength.

Relative Importance of Strength Profile versus Strength Rate Effect:
The primary issues of selecting appropriate upper and lower bounds and determining the rate effect on mobilized strength are of equal importance as one may relegate the other to be of secondary importance. The proposed rate dependence relationship for strength (as presented above) and the upper and lower bound strength profiles from the Bay Bridge East Span Project (dashed lines in Figure 4) are used to illustrate this.

The lower bound value of 0.7 tsf and the upper bound value of 1.8 tsf are assumed to be CPT based strength values that correspond to the baseline strength (they do not incorporate the effect of strain rate on mobilized strength). Therefore, herein it is assumed that these values are reasonable estimates of laboratory measured strengths in tests performed at conventional rates (e.g. 5% per hour for DSS).

Per the discussion above, it is estimated that the displacement rate along the pile is approximately 120 to 600 in/min. Implementing a value of V_{ref} = 0.018 in/min (based on IDST) and assuming a rate coefficient, B, of 0.1 (or 10% per log cycle), the strength is estimated to increase by about 40%.

This results in an increase in the lower bound value to 1.0 tsf and the upper bound value to 2.5 tsf. These values are indicated in Figure 4 with solid vertical lines. As evident in this hypothetical example, the range of strengths within the upper and lower bounds is larger than the estimated strength increase due to rate effects.

These values are intended as an example only, and should not be considered useful for analysis until the other items discussed in this memo are considered/resolved (e.g. CPT data, FVT data, estimated displacement rate, relationship between displacement rate and strain rate).

Recommended Additional Analysis:
The following actions are recommended to obtain a better understanding the of the strength profile and the relative contribution of rate effects:

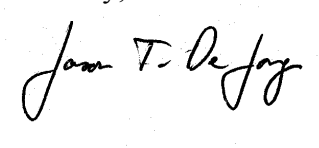
- Determine what N_{kt} value was used in the Bay Bridge East Span Project, and whether this value was obtained through site specific calibration.
- Determine why the VST tests were stopped before a torque-rotation curve with a clear peak strength followed by softening was obtained.
- Reprocess the data presented in Figure 4 within a normalized framework where strength can be normalized by the overburden stress and OCR. This may be particularly useful since the

ground surface elevations varying across the project alignment. It is expected that the scatter in CPT data will be reduced.

- Perform a separate analysis of the 06-CPT-17 CPT sounding with the laboratory and VST results obtained from Boring 06-07 using a normalized framework as described in the previous bullet. This site specific comparison of in situ and laboratory data will clarify the similarity/difference between the insitu data and laboratory tests. It may also enable site specific CPT strength factors to be determined that can then be used across the site.

Closure:
The discussion and comments herein are intended to provide clarity regarding the laboratory test program and my opinion regarding reasonable values for the rate dependence strength relationship and the strength profile for the project. Please feel free to contact me if you have further questions.

Sincerely,



Jason T. DeJong

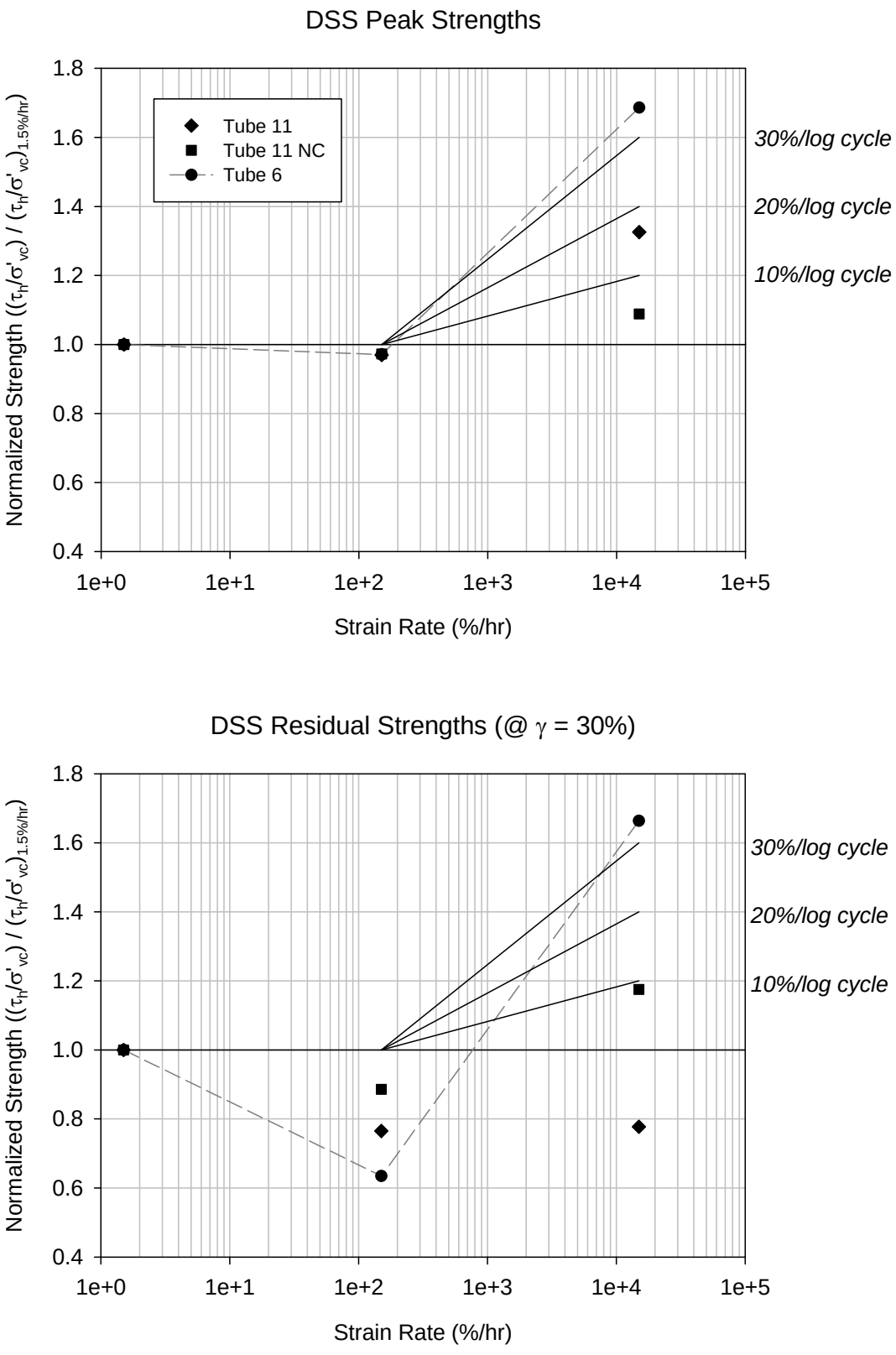
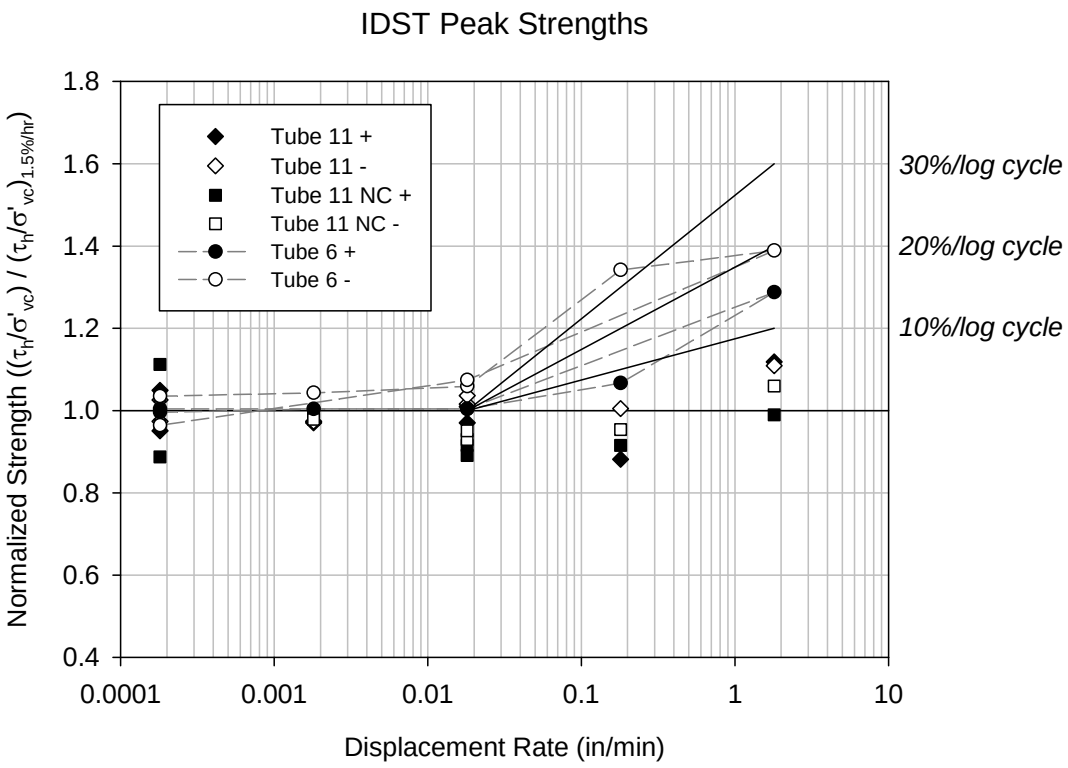


Figure 1. Plots of (a) peak and (b) residual measured DSS normalized strengths normalized to the strength measured at the reference (slowest rate).



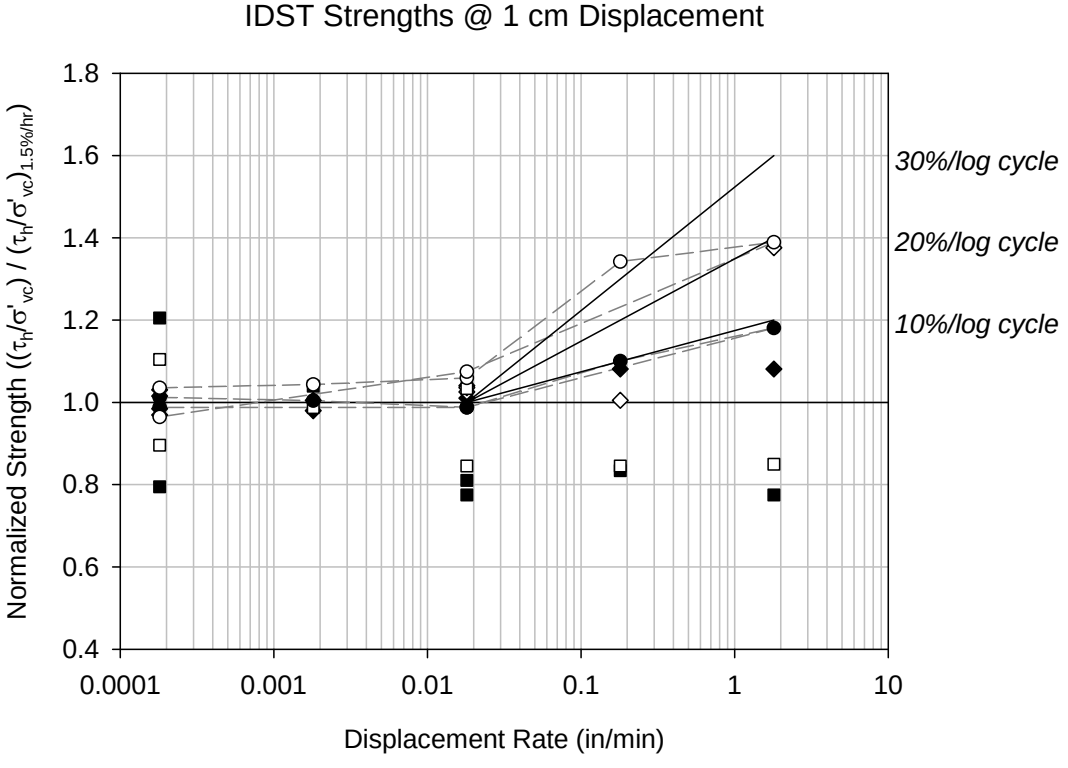


Figure 2. Plots of (a) peak and (b) residual measured IDST normalized strengths normalized to the strength measured at the reference (slowest rate).

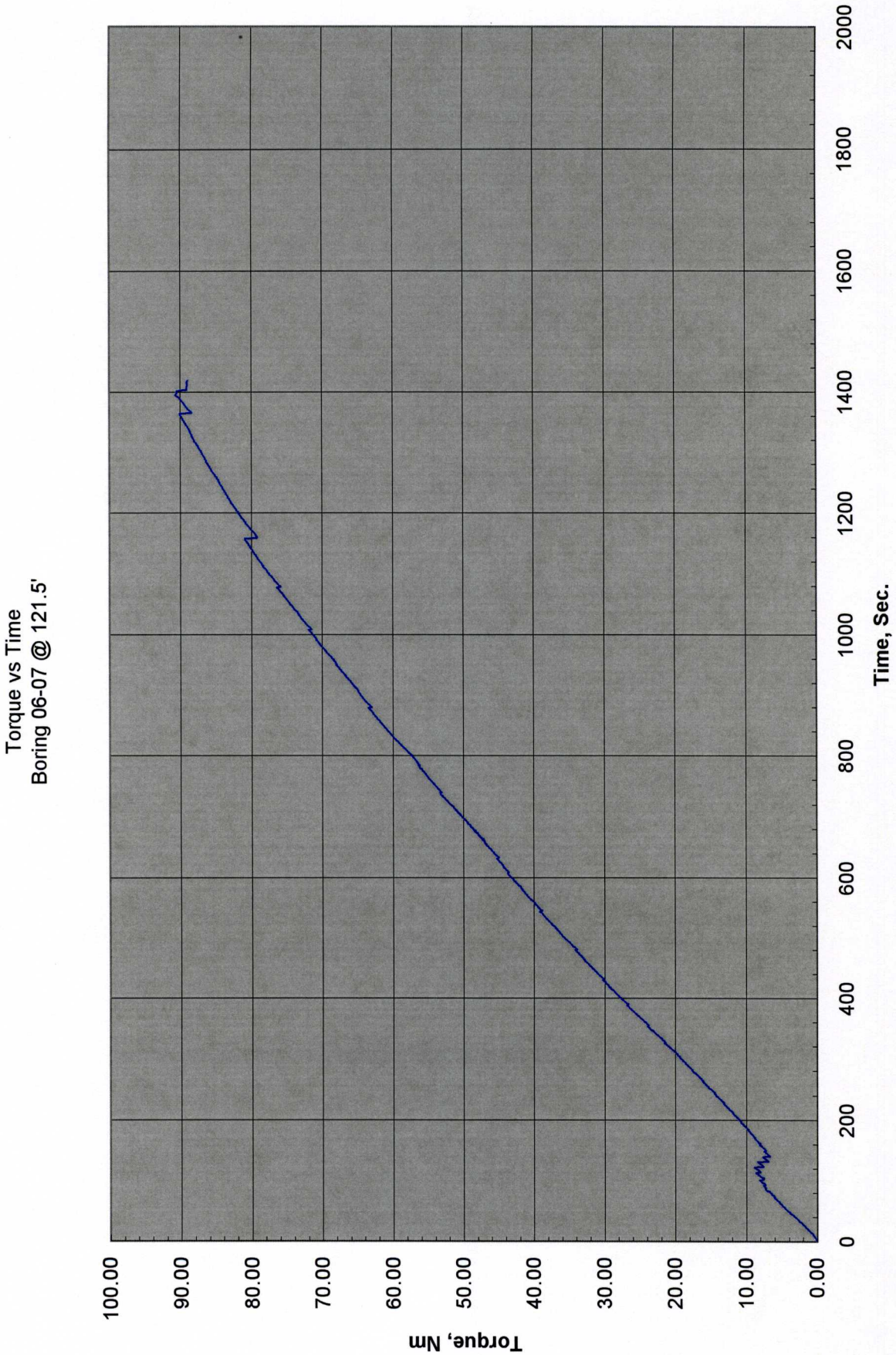


Figure 3a. Measured response in FVT test in Boring 06-07 (same boring as samples obtained for laboratory tests) (Figure from Gregg Insitu Report).

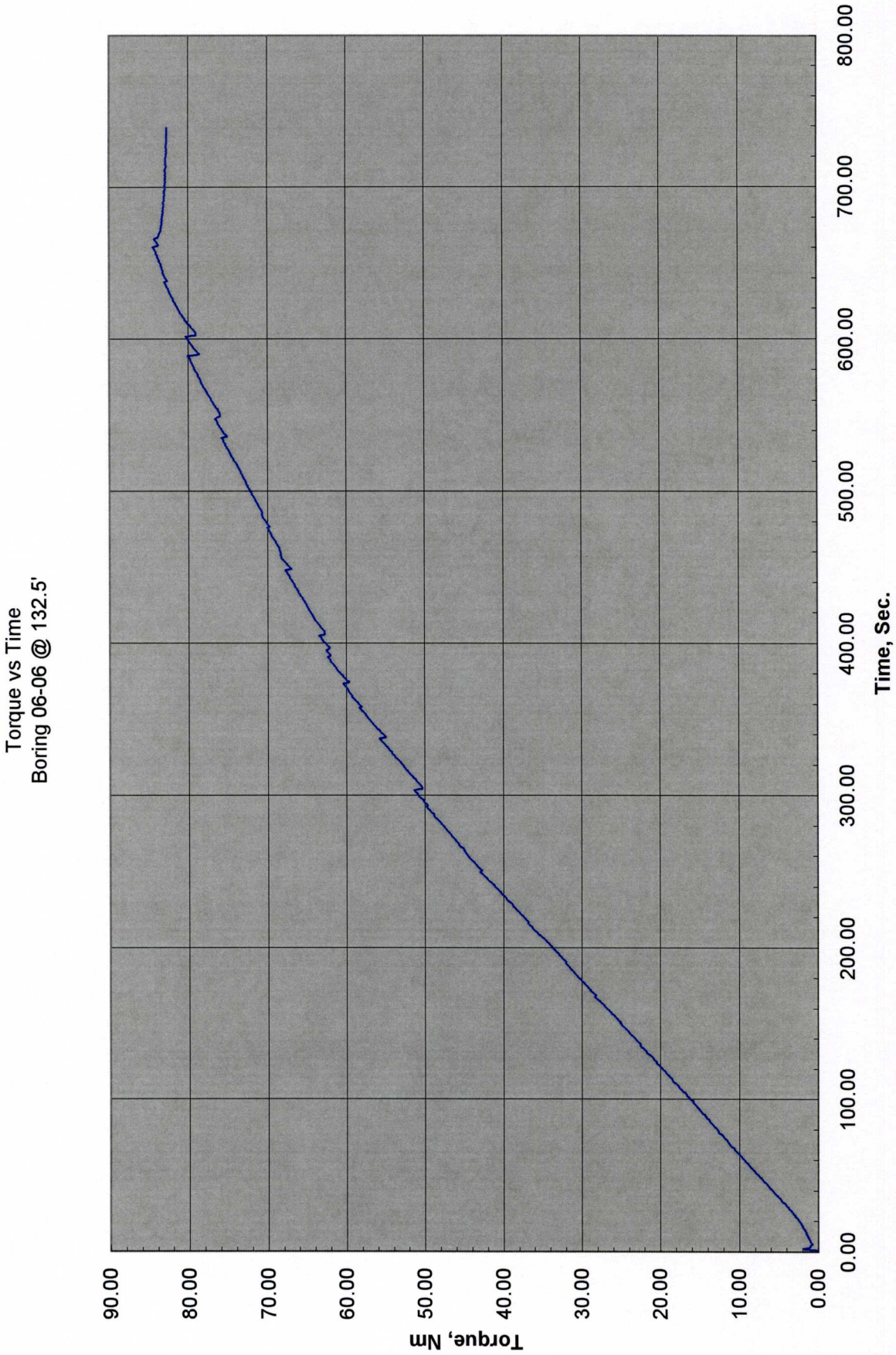


Figure 3b. Measured response in FVT test in Boring 06-06 (Figure from Gregg Insitu Report).

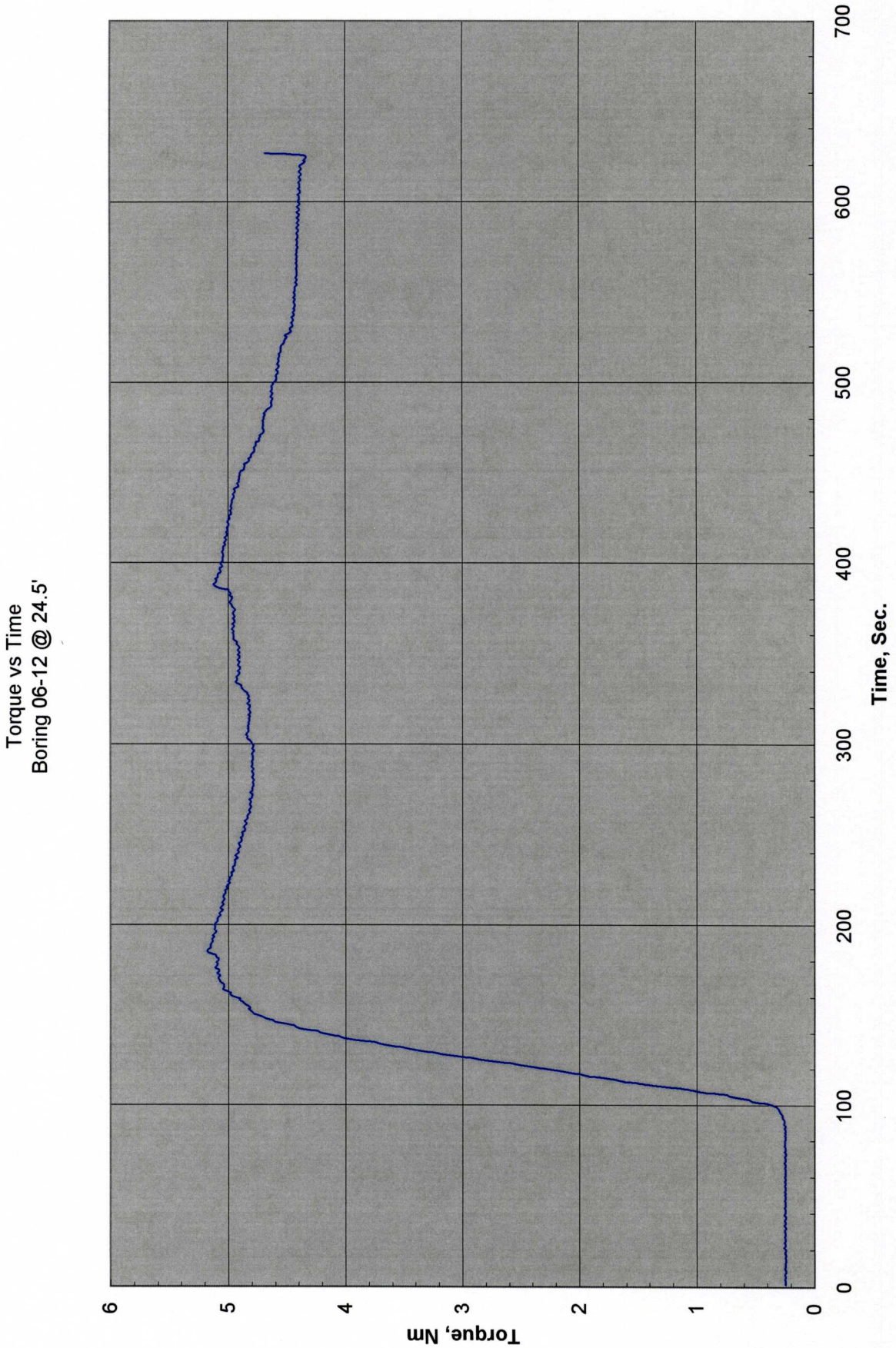


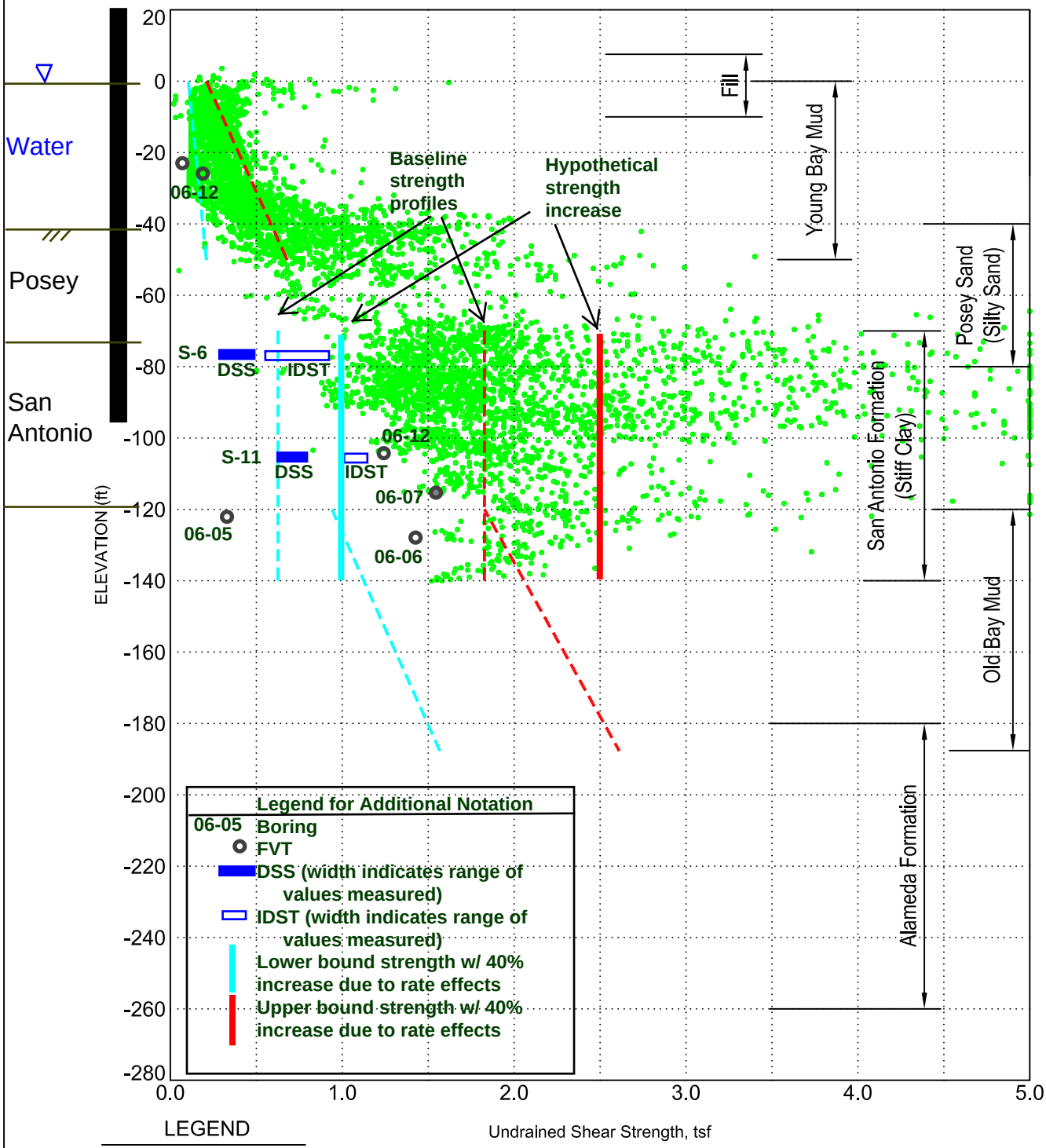
Figure 3c. Measured response in FVT test in Boring 06-12. Test likely in Young Bay Mud (note scale change) (Figure from Gregg Insitu Report).

Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering

SHEAR STRENGTH VS. ELEVATION

CLIENT _____ PROJECT NAME Dumbarton CPT Data 2006

PROJECT NUMBER _____ PROJECT LOCATION _____



LEGEND

- Undrained Shear Strength estimated from CPT test using
- Lower Bound of Typical Values *
- Upper Bound of Typical Values *

* Reference: Final Marine Geotechnical Site Characterization, San Francisco-Oakland Bay Bridge East Span Seismic Safety Project, Earth Mechanics & Fugro, 2001.

Figure 4. Summary of strength data (Figure modified from original Earth Mechanics, Inc. figure).

Figure I-1: *Quin Delta* at Dumbarton Bridge

Figure I-2: Mobile B-80 Drillrig on the *Quin Delta*

Figure I-3: Drilling during both day and night from the *Quin Delta* at Dumbarton Bridge

Figure I-4. Virgil Baker Conducting Vane Shear Testing

Figure I-5: Typical Old Bay Mud (upper photo) and San Antonio Formation (lower photo)

Figure I-6: CPT and Drilling Operations On-land

Figure I-7: P- and S-Wave Logging by GEOVision

Figure I-8: Comparison of Low and High Tides at Dumbarton Bridge

11. PUMP PLANT

State of California
DEPARTMENT OF TRANSPORTATION

Business, Transportation and Housing Agency

Memorandum

Flex your power!
Be energy efficient!

To: MR. JOE ESFANDIARY
Branch Chief
Structure Design Branch 1
Office of Transportation Architecture
Division of Engineering Services

Date: January 13, 2010

Attn: Chandra Bapat

File: 04-SM-84-PM 28.5/30.2
04-1A5221
Dumbarton Bridge Pump Station

From: MOHAMMAD DEHGHAN
Associate Material and Research Engineer
Office of Geotechnical Design – West
Geotechnical Services
Division of Engineering Services

MAHMOOD MOMENZADEH
Chief, Branch C
Office of Geotechnical Design – West
Geotechnical Services
Division of Engineering Services

Subject: Final Foundation Recommendations

INTRODUCTION

This memorandum provides foundation recommendations for a new Pump Station Building to be constructed north of the west abutment of the Dumbarton Bridge.
The proposed Pump Station will improve viability of the access road for the planned sanctuary during high tide

Information provided by the Structure Design indicate the floor plan area of the pump Station Building is approximately 16 ft by 32 ft and the bottom of the foundation slab is at Elevation –12.9 ft.

The existing ground surface elevation is approximately at 4.8 ft based on the layout plan provided by the District 4 Toll Bridge Program.

SUBSURFACE CONDITIONS

We have reviewed the available literature and the Log of Test Borings prepared in November and December of 2006 for the bridge seismic retrofit project by Earth Mechanics, Inc. consisting of borings 06-02 and a CPT-06-06. Boring 06-02 reached elevation of –140, and CPT-06-06 reached to elevation –100 ft. Based on these data the

subsurface condition of the site below the original ground elevation of 5.7 ft can be characterized as follows:

- An approximately 5 to 7 ft thick layer of very loose to dense poorly graded sand and gravel to elevation zero to –2 that is mainly submerged below the water table.

- An approximately 44 to 46 ft thick layer of soft to firm fat clay (Bay Mud) to about elevation –45 ft.

- An approximate 40 ft layer of mostly medium to dense silty sand poorly graded sand to about elevation –85 below which lies a 40 ft thick layer of hard lean clay.

CORROSIVITY

While we do not have any site-specific corrosion data, however, since Bay Mud is known to be corrosive, the site shall be considered corrosive.

SEISMICITY/LIQUEFACTION POTENTIAL

Hossain Salimi from Office of Geotechnical Design West has provided seismic recommendations for this structure and has identified that the subsurface soils of the site have a low liquefaction potential.

FOUNDATION RECOMMENDATIONS:

Driven piles are feasible based on the site conditions. Precast pre-stressed concrete driven piles Class 90 Alt "X" or Class 140 "X" are recommended to support the concrete slab under the proposed pump station, the 30 inch outfall pipe and any other settlement sensitive facilities connected to the pump station. In addition, if any component of the pump station that either is settlement sensitive or is imposing additional load on the existing ground shall be supported on piles. Pile recommendations are presented in Table below.

The 4-inch gravel cushion under the slab shall be compacted to a minimum of 95% relative density and shall have direct connection to the drain around the perimeter of the building to provide drainage of the building area.

Pile Data Table

Pile Type	Design Loading (kips)	Nominal Resistance (kips)		Design Tip Elevation (ft)	Specified Tip Elevation (ft)
		Compression	Tension		
Class 90 Alt "X"	90	180	67	-55	-55
Class 140 Alt "X"	140	280	113	-62	-62

Center-to-center pile spacing should not be less than 30.0 in. or 2.5 pile diameters. No reduction in pile vertical capacity is needed if center-to-center (CTC) spacing is 3D or greater.

Please check the above specified pile tip elevations against the pile tip elevations to satisfy the lateral load demand.

For below grade portion of the pump station, use at rest earth pressure coefficient of Ko=0.45 and the back fill effective unit weight of 57.5 pcf to calculate the backfill soil earth pressure plus the hydrostatic pressure assuming groundwater is at the surface. If there is a drainage provision below the building bottom slab, use backfill soil unit weight of 120 pcf and no hydrostatic pressure. Redistribute the calculated earth pressure along the wall height in a rectangular manner.

The backfill behind the below grade walls shall be structure backfill with Plastic Index less than 15. The backfill shall be placed and compacted in lift not exceeding 8 inches thickness in accordance with the Caltrans Standard Specifications.

CONSTRUCTION CONSIDERATIONS

- Hard driving may be encountered in the dense sand layer below the Bay Mud. However, the specified pile tip in the above table shall not be raised more than 5 ft.
- Piles for the support of the pump station can be driven from the existing ground using a follower.

- The soil profile and parameters attached to this report shall be used by contractor for temporary shoring design during the excavation and construction of the pump station.

- Since significant length of piles is in soft clay, the vertical alignment of piles shall be well maintained during pile driving.

- In order to prevent total and differential settlement of the ground and downdrag on piles due to presence soft Bay Mud, no additional surcharge or fill shall be placed on the existing ground near the pump station.

- Dewatering of the excavation site and design of seal course for the pump station are required and shall be responsibility of the Contractor.

- For temporary shoring design, add hydrostatic pressure to effective earth pressure and use the soil parameters as outlined in this report.

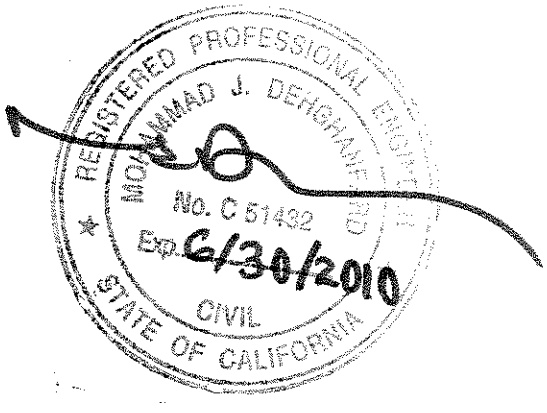
- For seepage (flow rate) in the project area, please refer to our report dated June 9, 2009, a copy of which is attached.

If you have any questions or need additional information, please contact Mohammad Dehghan at 510-286-4717 or Mahmood Momenzadeh at 510-286-5732.

Attachment:

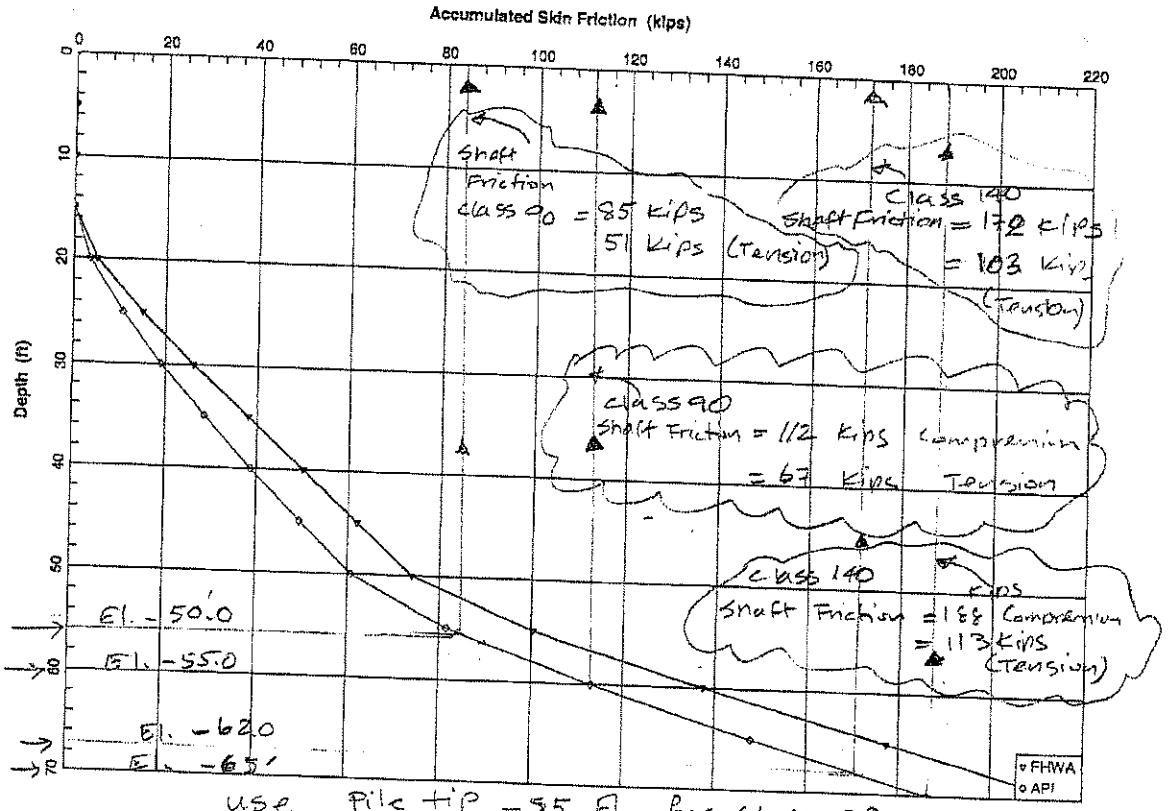
c: TPokrywka , MMomenzadeh, HSalimi, MDehghan, Project File, Route File

MDehghan/mm



EA: 1A5221
Pump station
DUMBARTON BY:

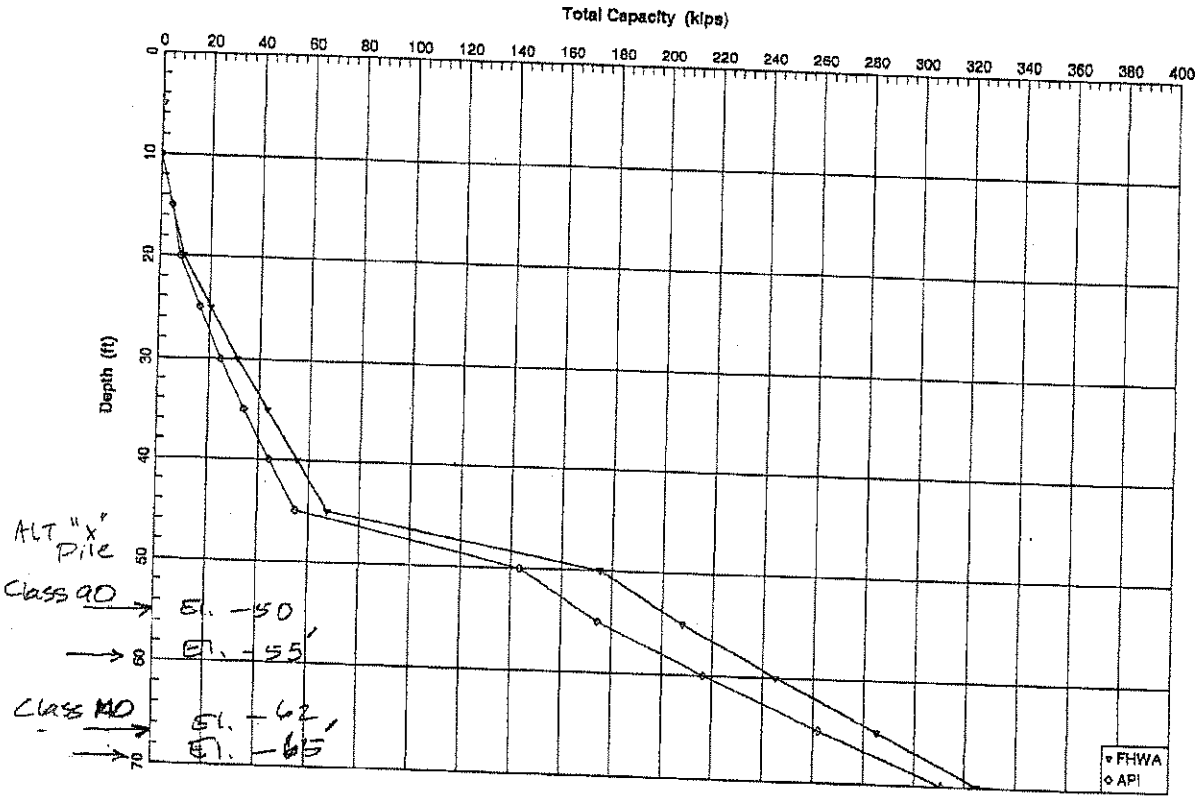
(Ultimate)



use Pile tip -55 El. for class 90
" " " -62 El for class 140

EA 1A5221
Pump Station
Pumbarton Br.

Ultimate



ALT "X" Pile

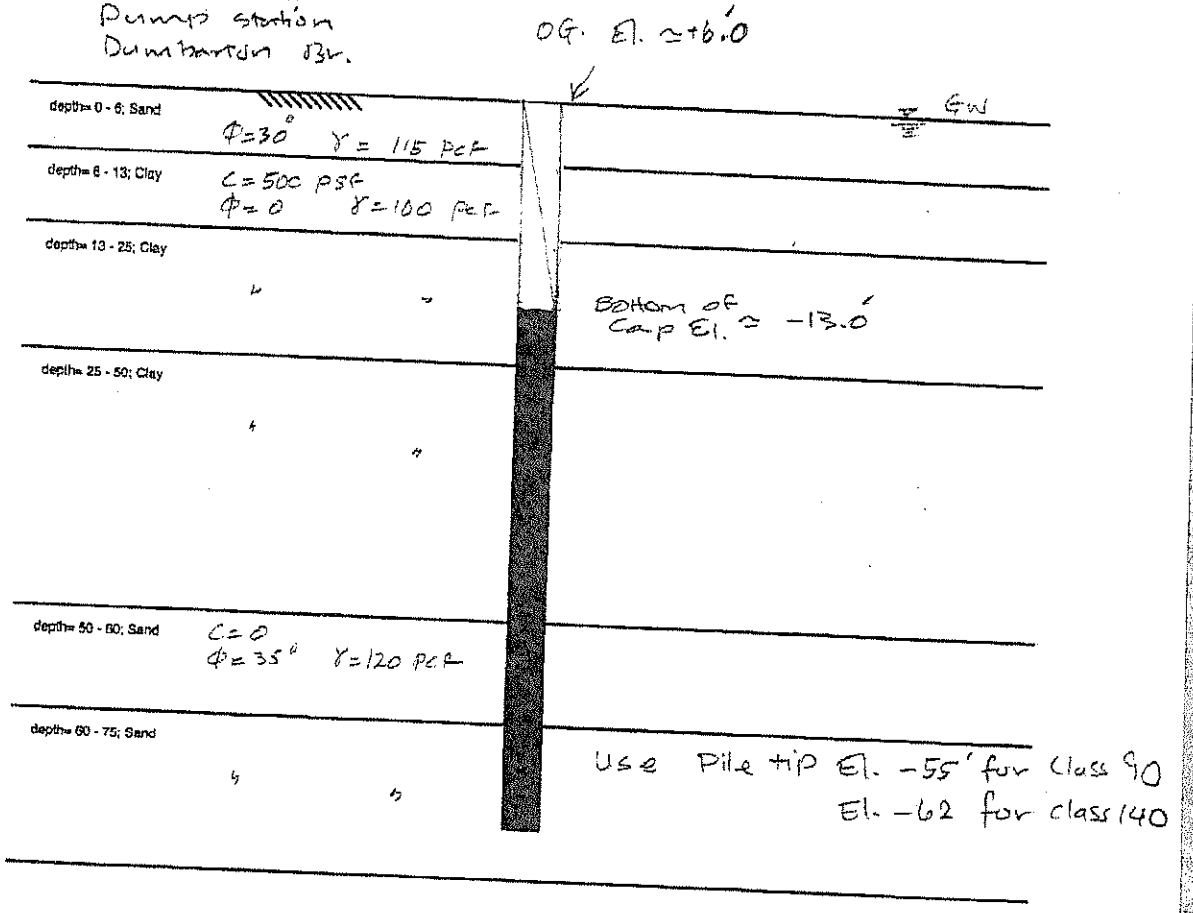
Class 90 → El. -50'

→ El. -55'

Class MO → El. -62'

→ El. -65'

EA 1A5221
Pump station
Dumbarton Blvd.



BENCH MARK

BM PRHV 38 Elev 12.3'

DIST	COUNTY	ROUTE	TOTAL PROJECT	SHEET No	TOTAL SHEETS
04	SM Alg	84	R28.6/R30.2 R0.0/R0.8		

06-30-10

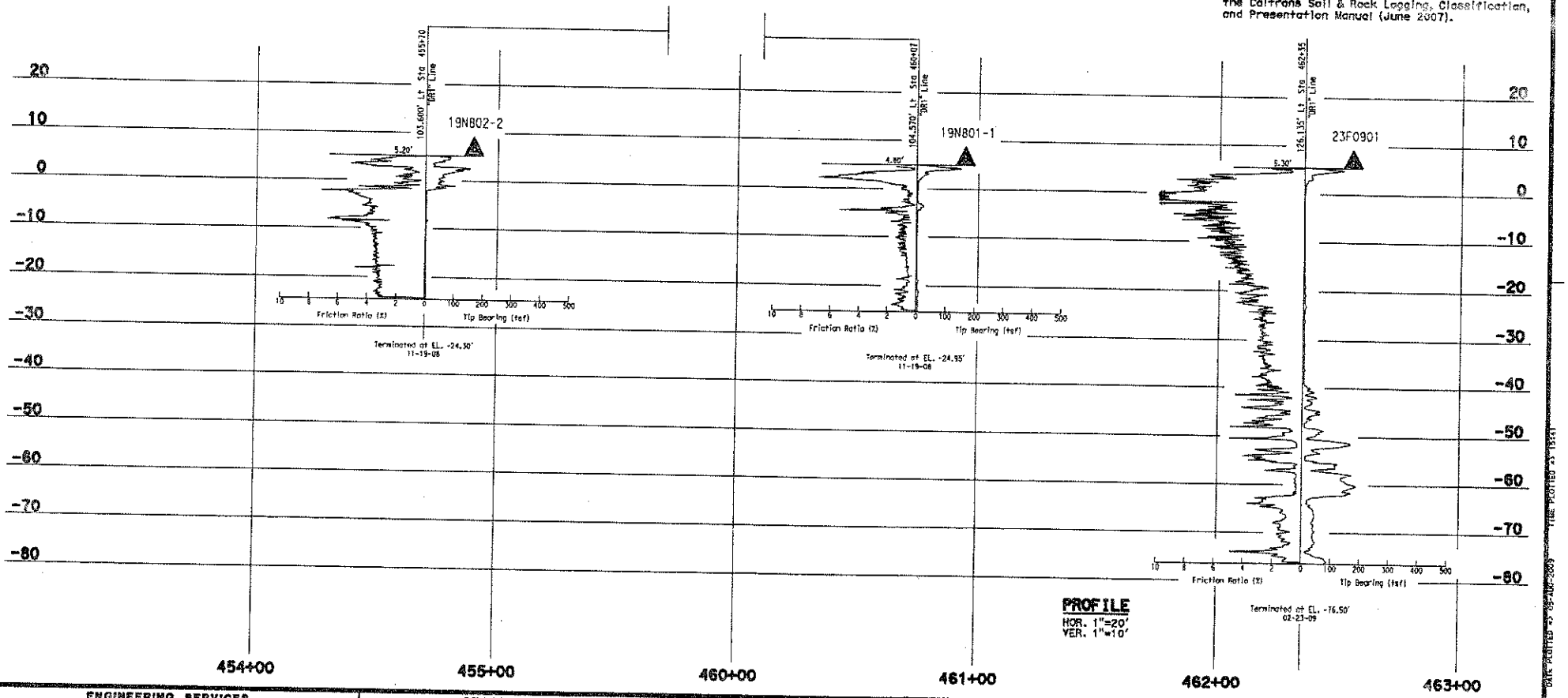
REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

(For Boring Location See Plan, LOTB Sheet 2 of 4)

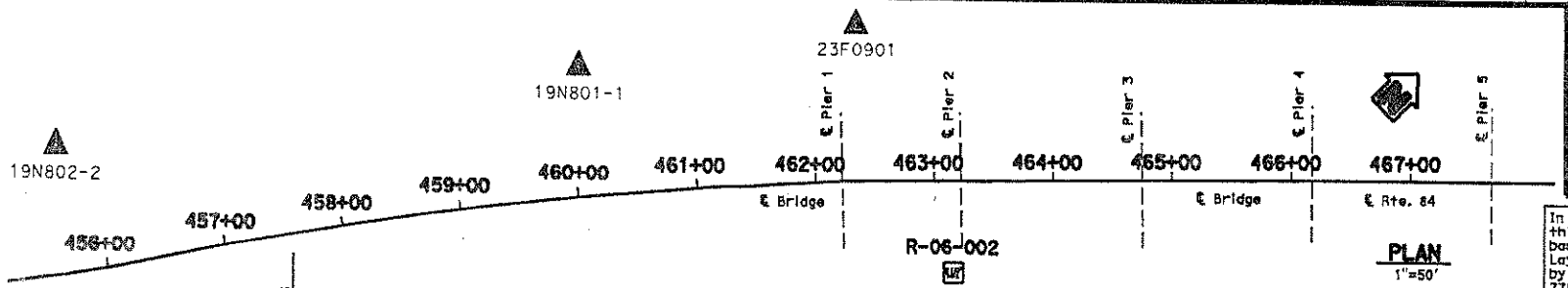
NOTE: This LOTB sheet was prepared in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007).



PROFILE
HOR. 1"=20'
VER. 1"=10'

ENGINEERING SERVICES	GEOTECHNICAL SERVICES	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF ENGINEERING SERVICES OFFICE OF GEOTECHNICAL DESIGN BRANCH	DUMBARTON BRIDGE
FUNCTIONAL SUPERVISOR: M. Monemzadeh	DRAWN BY: M. Reynolds 06/09	FIELD INVESTIGATION BY: M. Dehghan		LOG OF TEST BORINGS
USE CIVIL LOG OF TEST BORINGS SHEET	CHECKED BY:		CU 04 EA 1A5221	SHEET 1 OF 4

FILE => 1A5221x01.dgn



PLAN
1"=50'

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	Sol Alo	84	R28.8/R30.2 R0.0/R0.8		

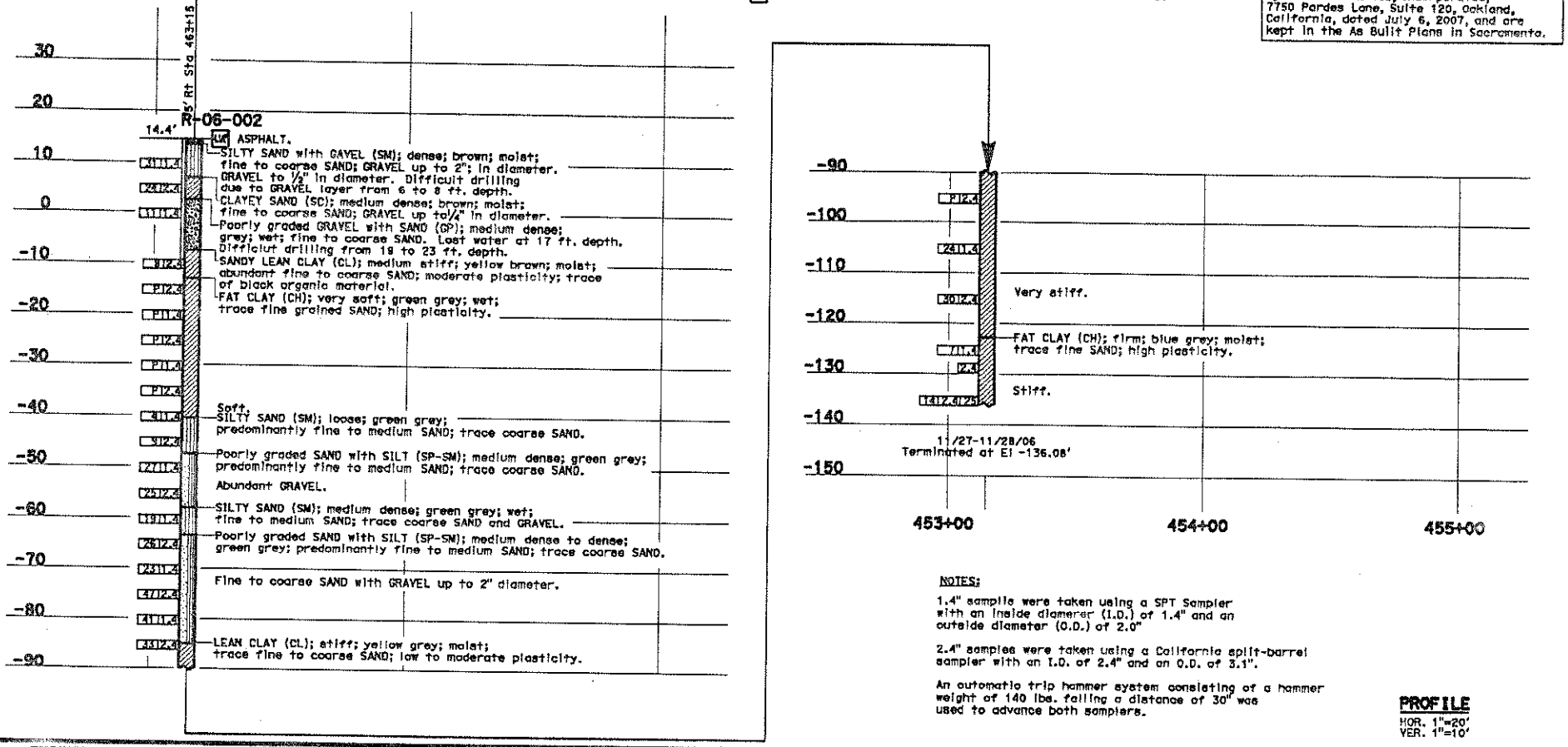
REGISTERED CIVIL ENGINEER — 08-05-09 DATE

PLANS APPROVAL DATE

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

REGISTERED PROFESSIONAL ENGINEER — Mohammad Dehghanian — No. 51432 — Exp. 6-30-10 — STATE OF CALIFORNIA

In order to create an electronic file, this Log of Test Boring was reconstructed based on an existing Log of Test Boring Layout for the Dumbarton Bridge performed by Earth Mechanics, Incorporated, 7750 Pardee Lane, Suite 120, Oakland, California, dated July 6, 2007, and are kept in the As Built Plans in Sacramento.



NOTES:

1.4" samples were taken using a SPT Sampler with an inside diameter (I.D.) of 1.4" and an outside diameter (O.D.) of 2.0"

2.4" samples were taken using a California split-barrel sampler with an I.D. of 2.4" and an O.D. of 3.1".

An automatic trip hammer system consisting of a hammer weight of 140 lbs. falling a distance of 30" was used to advance both samplers.

PROFILE
HOR. 1"=20'
VER. 1"=10'

ENGINEERING SERVICES	GEOTECHNICAL SERVICES	STATE OF CALIFORNIA	DIVISION OF ENGINEERING SERVICES OFFICE OF GEOTECHNICAL	DUMBARTON BRIDGE
FUNCTIONAL SUPERVISOR: N. Momenzadeh	DRAWN BY: N. Reynolds 06/09	DEPARTMENT OF TRANSPORTATION	DESIGN BRANCH	LOG OF TEST BORINGS
859 SOIL LOG OF TEST BORING SHEET	CHECKED BY: FIELD INVESTIGATION BY: N. Dehghan		CU 04 EA 1A5221	POST MILES R28.8/R30.2 R0.0/R0.8 — SHEET 2 OF 4

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DATE PLOTTED: 23 07/10/09
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REFERENCE: CALTRANS SOIL & ROCK LOGGING, CLASSIFICATION, AND PRESENTATION MANUAL (JUNE 2007)

DIST	COUNTY	ROUTE	POST MILES TOTAL	POST MILES PROJECT	SHEET No.	TOTAL SHEETS
04	SN Alp	84	R28.8/R30.2	Rd 0/20.4		

REGISTERED CIVIL ENGINEER — 08-06-09 DATE

PLANS APPROVAL DATE

Mohammad Dehghani Ghahnavieh No. 51438 6-30-10 CIVIL STATE OF CALIFORNIA

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

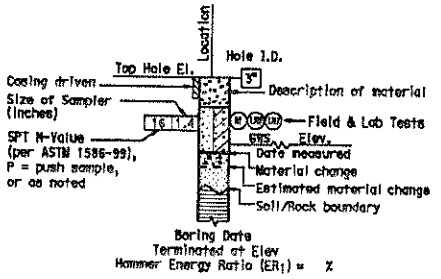
CEMENTATION	
Description	Criteria
Weak	Crumbles or breaks with handling or little finger pressure.
Moderate	Crumbles or breaks with considerable finger pressure.
Strong	Will not crumble or break with finger pressure.

CONSISTENCY OF COHESIVE SOILS				
Description	Unconfined Compressive Strength (tsf)	Pocket Penetrometer Measurement (tsf)	Torvane Measurement (tsf)	Field Approximation
Very Soft	< 0.25	< 0.25	< 0.12	Easily penetrated several inches by fist
Soft	0.25 to 0.50	0.25 to 0.50	0.12 to 0.25	Easily penetrated several inches by thumb
Medium Stiff	0.50 to 1.0	0.50 to 1.0	0.25 to 0.50	Penetrated several inches by thumb with moderate effort
Stiff	1 to 2	1 to 2	0.50 to 1.0	Readily indented by thumb but penetrated only with great effort
Very Stiff	2 to 4	2 to 4	1.0 to 2.0	Readily indented by thumbnail
Hard	> 4.0	> 4.0	> 2.0	Indented by thumbnail with difficulty

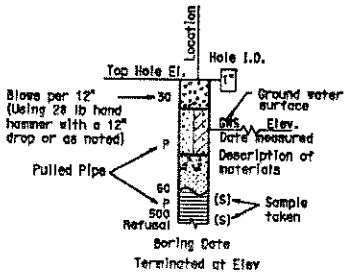
BOREHOLE IDENTIFICATION		
Symbol	Hole Type	Description
	A	Auger Boring
	R P	Rotary drilled boring Rotary percussion boring (air)
	R	Rotary drilled diamond core
	HD HA	Hand driven (1-inch soil tube) Hand Auger
	D	Dynamic Cone Penetration Boring
	CPT	Cone Penetration Test (ASTM D 5778-95)
	O	Other

Note: Size in inches.

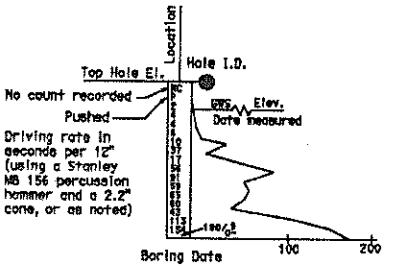
PLASTICITY OF FINE-GRAINED SOILS	
Description	Criteria
Nonplastic	A 1/8-inch thread cannot be rolled at any water content.
Low	The thread can barely be rolled and the lump cannot be formed when drier than the plastic limit.
Medium	The thread is easy to roll and not much time is required to reach the plastic limit. The thread cannot be rerolled after reaching the plastic limit. The lump crumbles when drier than the plastic limit.
High	It takes considerable time rolling and kneading to reach the plastic limit. The thread can be rerolled several times after reaching the plastic limit. The lump can be formed without crumbling when drier than the plastic limit.



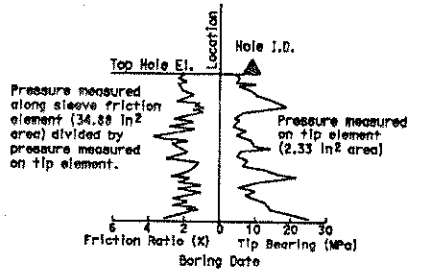
ROTARY BORING



HAND BORING



DYNAMIC CONE PENETRATION BORING



CONE PENETRATION TEST (CPT) SOUNDING

ENGINEERING SERVICES	GEOTECHNICAL SERVICES	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF ENGINEERING SERVICES OFFICE OF GEOTECHNICAL DESIGN BRANCH	SOIL LEGEND LOG OF TEST BORINGS
PREPARED BY N. Reynolds 08/09	M. Dehghan			
CHECKED BY				

CU 04 EA 1A5221

POST MILES R28.8/R30.2 Rd 0/20.4

FILE => 41A522X03.dgn

REFERENCE: CALTRANS SOIL & ROCK LOGGING, CLASSIFICATION, AND PRESENTATION MANUAL (JUNE 2007)

GROUP SYMBOLS AND NAMES

Graphic/Symbol	Group Names
GW	Well-graded GRAVEL Well-graded GRAVEL with SAND
GP	Poorly graded GRAVEL Poorly graded GRAVEL with SAND
GW-GM	Well-graded GRAVEL with SILT Well-graded GRAVEL with SILT and SAND
GW-GC	Well-graded GRAVEL with CLAY (or SILTY CLAY) Well-graded GRAVEL with CLAY and SAND (or SILTY CLAY and SAND)
GP-GM	Poorly graded GRAVEL with SILT Poorly graded GRAVEL with SILT and SAND
GP-GC	Poorly graded GRAVEL with CLAY (or SILTY CLAY) Poorly graded GRAVEL with CLAY and SAND (or SILTY CLAY and SAND)
GM	SILTY GRAVEL SILTY GRAVEL with SAND
GC	CLAYEY GRAVEL CLAYEY GRAVEL with SAND
GC-GM	SILTY, CLAYEY GRAVEL SILTY, CLAYEY GRAVEL with SAND
SW	Well-graded SAND Well-graded SAND with GRAVEL
SP	Poorly graded SAND Poorly graded SAND with GRAVEL
SW-SM	Well-graded SAND with SILT Well-graded SAND with SILT and GRAVEL
SW-SC	Well-graded SAND with CLAY (or SILTY CLAY) Well-graded SAND with CLAY and GRAVEL (or SILTY CLAY and GRAVEL)
SP-SM	Poorly graded SAND with SILT Poorly graded SAND with SILT and GRAVEL
SP-SC	Poorly graded SAND with CLAY (or SILTY CLAY) Poorly graded SAND with CLAY and GRAVEL (or SILTY CLAY and GRAVEL)
SM	SILTY SAND SILTY SAND with GRAVEL
SC	CLAYEY SAND CLAYEY SAND with GRAVEL
SC-SM	SILTY, CLAYEY SAND SILTY, CLAYEY SAND with GRAVEL
PT	PEAT
	COBBLES COBBLES and BOULDERS BOULDERS

Graphic/Symbol	Group Names
CL	Lean CLAY Lean CLAY with SAND Lean CLAY with GRAVEL SANDY lean CLAY SANDY lean CLAY with GRAVEL GRAVELLY lean CLAY GRAVELLY lean CLAY with SAND
CL-ML	SILTY CLAY SILTY CLAY with SAND SILTY CLAY with GRAVEL SANDY SILTY CLAY SANDY SILTY CLAY with GRAVEL GRAVELLY SILTY CLAY GRAVELLY SILTY CLAY with SAND
ML	SILT SILT with SAND SILT with GRAVEL SANDY SILT SANDY SILT with GRAVEL GRAVELLY SILT GRAVELLY SILT with SAND
OL	ORGANIC lean CLAY ORGANIC lean CLAY with SAND ORGANIC lean CLAY with GRAVEL SANDY ORGANIC lean CLAY SANDY ORGANIC lean CLAY with GRAVEL GRAVELLY ORGANIC lean CLAY GRAVELLY ORGANIC lean CLAY with SAND
OL	ORGANIC SILT ORGANIC SILT with SAND ORGANIC SILT with GRAVEL SANDY ORGANIC SILT SANDY ORGANIC SILT with GRAVEL GRAVELLY ORGANIC SILT GRAVELLY ORGANIC SILT with SAND
CH	Fat CLAY Fat CLAY with SAND Fat CLAY with GRAVEL SANDY fat CLAY SANDY fat CLAY with GRAVEL GRAVELLY fat CLAY GRAVELLY fat CLAY with SAND
MH	Elastic SILT Elastic SILT with SAND Elastic SILT with GRAVEL SANDY elastic SILT SANDY elastic SILT with GRAVEL GRAVELLY elastic SILT GRAVELLY elastic SILT with SAND
OH	ORGANIC fat CLAY ORGANIC fat CLAY with SAND ORGANIC fat CLAY with GRAVEL SANDY ORGANIC fat CLAY SANDY ORGANIC fat CLAY with GRAVEL GRAVELLY ORGANIC fat CLAY GRAVELLY ORGANIC fat CLAY with SAND
OH	ORGANIC elastic SILT ORGANIC elastic SILT with SAND ORGANIC elastic SILT with GRAVEL SANDY ORGANIC elastic SILT SANDY ORGANIC elastic SILT with GRAVEL GRAVELLY ORGANIC elastic SILT GRAVELLY ORGANIC elastic SILT with SAND
OL/OH	ORGANIC SOIL ORGANIC SOIL with SAND ORGANIC SOIL with GRAVEL SANDY ORGANIC SOIL SANDY ORGANIC SOIL with GRAVEL GRAVELLY ORGANIC SOIL GRAVELLY ORGANIC SOIL with SAND

FIELD AND LABORATORY TESTING

- (C) Consolidation (ASTM D 2435)
- (CL) Collapse Potential (ASTM D 5333)
- (CP) Compaction Curve (CTM 216)
- (CR) Corrosivity Testing (CTM 643, CTM 422, CTM 417)
- (CU) Consolidated Undrained Triaxial (ASTM D 4767)
- (DS) Direct Shear (ASTM D 3080)
- (EI) Expansion Index (ASTM D 4829)
- (M) Moisture Content (ASTM D 2216)
- (OC) Organic Content-% (ASTM D 2974)
- (P) Permeability (CTM 220)
- (PA) Particle Size Analysis (ASTM D 422)
- (PI) Plasticity Index (AASHTO T 90) Liquid Limit (AASHTO T 89)
- (PL) Point Load Index (ASTM D 5731)
- (PM) Pressure Meter
- (PP) Pocket Penetrometer
- (R) R-Value (CTM 301)
- (SE) Sand Equivalent (CTM 217)
- (SG) Specific Gravity (AASHTO T 100)
- (SL) Shrinkage Limit (ASTM D 427)
- (SW) Swell Potential (ASTM D 4546)
- (TV) Pocket Torvane
- (UC) Unconfined Compression-Soil (ASTM D 2166) Unconfined Compression-Rock (ASTM D 2938)
- (UU) Unconsolidated Undrained Triaxial (ASTM D 2850)
- (UW) Unit Weight (ASTM D 4767)
- (VS) Vane Shear (AASHTO T 223)

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
04	SM Ala	84	R28.87/R30.2 R0.0/R0.8		

08-05-09
REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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REGISTERED PROFESSIONAL ENGINEER
Mohammad Dehghanfard
No. 61432
6-30-10
CIVIL
STATE OF CALIFORNIA

APPARENT DENSITY OF COHESIONLESS SOILS

Description	SPT N_{60} (Blows / 12 inches)
Very loose	0 - 4
Loose	5 - 10
Medium Dense	11 - 30
Dense	31 - 50
Very Dense	> 50

MOISTURE

Description	Criteria
Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, usually soil is below water table

PERCENT OR PROPORTION OF SOILS

Description	Criteria
Trace	Particles are present but estimated to be less than 5%
Few	5 to 10%
Little	15 to 25%
Some	30 to 45%
Mostly	50 to 100%

PARTICLE SIZE

Description		Size
Boulder		> 12"
Cobble		3" to 12"
Gravel	Coarse	3/4" to 3"
	Fine	No. 4 to 3/4"
Sand	Coarse	No. 10 to No. 4
	Medium	No. 40 to No. 10
	Fine	No. 200 to No. 40

ENGINEERING SERVICES
PREPARED BY N. Reynolds 06/09
CHECKED BY

GEOTECHNICAL SERVICES
M. Dehghan

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES
OFFICES OF GEOTECHNICAL
DESIGN BRANCH

CU 04
EA 1A5221

FILE =) 41A522-04.dgn

SOIL LEGEND
LOG OF TEST BORINGS

SHEET 4 OF 4

State of California
DEPARTMENT OF TRANSPORTATION

Business, Transportation and Housing Agency

Memorandum

Flex your power!
Be energy efficient!

To: MR. HARDEEP TAKHAR
District Office Chief
Office of Water Quality Program

Attention: K. Taheri

Date: June 9, 2009

File: 04-SM/ALA-84
PM 29.0-30.15/0.0-1.2
04- 1A5221
Dumbarton Bridge
Pump Station & Barrier / Levee

From: MOHAMMAD DEHGHAN
Associate Materials & Research Engineer
Office of Geotechnical Design – West
Geotechnical Services
Division of Engineering Services

MAHMOOD MOMENZADEH
Chief, Branch C
Office of Geotechnical Design – West
Geotechnical Services
Division of Engineering Services

Subject: Seepage (Flow Rate) Estimation In The Project Area

This memo is in response to your request for estimating the subsurface soils permeability and groundwater flow rate at the above referenced project area. It is our understanding that this information will be used in estimating dewatering quantities.

Below is a summary of the anticipated soil conditions at this project area:

- The original ground elevation is at about 5.5 to 6.0 ft.
- An approximately 5 to 7 ft thick layer of very loose to dense poorly graded silty sand with gravel to sand with silt and gravel to elevation zero to –2 ft that is mostly submerged below the water table.
- An approximately 44 to 46 ft thick layer of soft to firm fat clay (Bay Mud) to about elevation –45 ft.
- An approximate 40 ft thick layer of mostly medium to dense silty sand poorly graded silty sand to about elevation –85 below which lies a 40 ft thick layer of hard lean clay.

HYDRAULIC CONDUCTIVITY ESTIMATE

Below is a summary of the approximate hydraulic conductivity range for the project area:

Unified Soil Classification	Hydraulic Conductivity Range, gpd/ft2 (m/sec)
Silty Sand with Gravel to Poorly Graded Sand with Silt and Gravel (SP/GP-SM)	1000 to 6000 ($5x10^{-4}$ to 3 10^{-3})
Bay Mud	2 $x10^{-4}$ to 0.2 ($1x10^{-10}$ to $1x10^{-7}$)

FLOW RATE

Our estimate of the seepage rate (flow rate) is for a trench about 6 ft deep, 4 ft wide and groundwater 3 ft below existing ground surface. We estimate the flow rate to vary from 0.8 gallon/min/ft^2 to 5 gallon/min/ft^2 of cross-sectional area of excavation below the groundwater table. These estimates are provided for estimating purposes only and should not be part of the contract package. The contractor can use the Hydraulic Conductivity Range provided above in conjunction with the boring logs (LOTBS) to compute his own flow rates.

Proper construction sequencing is vital to constructability of the proposed utility ditch in this area. We strongly recommend the installation of all of the sheet piles for the whole project before commencement of the ditch excavation. The proposed sheet piles once embedded in the Bay Mud as recommended in our previous report would lower the seepage flow into the ditch significantly.

As for dewatering for the construction of the pump station, we don't include shoring and dewatering plan and details in our foundation report. Design of shoring and dewatering is the responsibility of the contractor mostly because the types of equipment used and their expertise affect the design and application of these items.

Construction of an enclosed cofferdam (pit) below grade is required for the pump station construction. The contractor needs to keep the "pit" fairly dry while constructing the pump station. Further, the temporary shoring shall be embedded sufficiently deep below the bottom of the excavation into the Bay Mud to cut off the seepage water coming into the construction pit and prevent the excavation bottom heave. Following construction of the cofferdam, a seal course shall be placed at the bottom of the excavation to "seal" the pit from the water seeping into the pit from the bottom. Piles can be driven before or after seal is placed at the option of the contractor depending on his equipment and method used.

The seal course thickness and material should be designed by the contractor to prevent any significant heave.

If you have any questions or need additional information, please call me at (510) 286-4717 or Mahmood Momenzadeh at (510) 286-5732.

c: Joe Esfandiari (SD), TPokrywka, MMomenzadeh, Project File, Daily File

MDehghan/mm

12. SEEPAGE FLOW RATE ESTIMATION FOR PUMP PLANT

State of California
DEPARTMENT OF TRANSPORTATION

Business, Transportation and Housing Agency

Memorandum

Flex your power!
Be energy efficient!

To: MR. HARDEEP TAKHAR
District Office Chief
Office of Water Quality Program

Attention: K. Taheri

Date: June 18, 2009

File: 04-SM/ALA-84
PM 29.0-30.15/0.0-1.2
04- 1A5221
Dumbarton Bridge
Pump Station & Barrier / Levee

From: MOHAMMAD DEHGHAN
Associate Materials & Research Engineer
Office of Geotechnical Design – West
Geotechnical Services
Division of Engineering Services

MAHMOOD MOMENZADEH
Chief, Branch C
Office of Geotechnical Design – West
Geotechnical Services
Division of Engineering Services

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Unified Soil Classification	Hydraulic Conductivity Range, gpd/ft2 (m/sec)
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Bay Mud	2 $x10^{-4}$ to 0.2 ($1x10^{-10}$ to $1x10^{-7}$)

FLOW RATE

Our estimate of the seepage rate (flow rate) is for a trench about 6 ft. deep, 4 ft. wide and groundwater 3 ft below existing ground surface. We estimate the flow rate to vary from 0.8 gallon/min/ft^2 to 5 gallon/min/ft^2 of cross-sectional area of excavation below the groundwater table. These estimates are provided for estimating purposes only and should not be part of the contract package. The contractor can use the Hydraulic Conductivity range provided above in conjunction with the boring logs (LOTBS) to compute his own flow rates.

Proper construction sequencing is vital to constructability of the proposed utility ditch in this area. We strongly recommend the installation of all the sheet piles on both sides of the trench for the whole project before commencement of the ditch excavation. The proposed sheet piles once embedded in the Bay Mud as recommended in our previous report would lower the seepage flow into the ditch significantly.

As for dewatering for the construction of the pump station, we don't include shoring, dewatering plan and details in our foundation report. Design of shoring and dewatering is the responsibility of the contractor mostly because the types of equipment used and their expertise affect the design and application of these items.

Construction of an enclosed cofferdam (pit) below grade is required for the pump station construction. The contractor needs to keep the "pit" fairly dry while constructing the pump station. Furthermore, the temporary shoring shall be embedded sufficiently deep below the bottom of the excavation into the Bay Mud to cut off the seepage water coming into the construction pit and prevent the excavation bottom heave. Following construction of the cofferdam, a seal course shall be placed at the bottom of the excavation to "seal" the pit from the water seeping into the pit from the bottom.

The cofferdam and the seal course requirement are the responsibility of the contractor.

If you have any questions or need additional information, please call me at (510) 286-4717 or Mahmood Momenzadeh at (510) 286-5732.

c: Joe Esfandiari (SD), TPokrywka, MMomenzadeh, Project File, Daily File

MDehghan/mm

13. FINAL GEOTECH MEMO DUMBARTON BELVEDERE STAIRCASE

Earth Mechanics, Inc.
Geotechnical & Earthquake Engineering

TECHNICAL MEMORANDUM

EMI PROJECT NO: 06-160

DATE: December 15, 2009

PREPARED FOR: Mr. Saba Mohan / Caltrans

PREPARED BY: Te-Chih Ke / Earth Mechanics, Inc. (EMI)

SUBJECT: **Final Foundation Recommendations for the Belvedere Stairway near the West Trestle Bent W17 of Dumbarton Bridge**

Per your request, this memorandum was prepared to provide the foundation recommendations to support the Belvedere Staircase near the West Trestle Bent W17.

The closest soil borings conducted in 2007 are R-06-001 and R-06-002 (see Attachment 1). These borings are about 1,100 and 350 feet from the site, respectively. The idealized design soil properties and design groundwater depth were estimated based on these two borings and cone penetrometer tests.

Caltrans Standard Plan B2-5 (2006) for 70-ton service load shows four pile types as identified in the Pile Data Table. The design nominal resistance and resulting design and specified pile tip elevations are presented in Table 1. The piles were designed for a maximum pile-head settlement of 1/2 inch under service loading. Piles were assumed to be spaced more than 5 feet from other piles or structures. The pile capacities are based on soil resistance only and may be limited by the pile-head connection details and the strength of the pile material.

If you have any questions regarding the above information or require additional information, please call our office.

Sincerely,

EARTH MECHANICS, INC.

Te-Chih Ke, P.E.
Senior Staff Engineer
TCK/MK/hl
Attachment

(2) Log of Test Boring Sheets

17660 Newhope Street, Suite E, Fountain Valley, California 92708 Tel: (714) 751-3826 Fax: (714) 751-3928

TABLE 1. PILE DATA TABLE

Support Location	Pile Type	Nominal Resistance (kips)		Assumed Ground Surface El. (ft)	Design Tip El.* (ft)	Specified Tip El. (ft)
		Compr.	Tension			
Belvedere Staircase near West Trestle Bent W17	Standard Alt. "X" 12" Square PCC	280	150	+6	-72 (a) -72 (b)	-72
	Standard Alt. "Y" 15" Octagonal PCC	280	150	+6	-67 (a) -67 (b)	-67
	Standard Alt. "V" 14" Round Concrete	280	150	+6	-72 (a) -72 (b)	-72
	Standard Alt. "W" 14" Steel Pipe	280	150	+6	-72 (a) -72 (b)	-72

Notes: Design tip elevation is controlled by the following demands: (a) Compression, (b) Tension. The specified tip elevation should not be raised.

Note: Pile top elevation was assumed to be 5 feet below the ground surface.

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SM Alg	84	29.6/13.1 0.0/0.4		

Jody A. Castle 7/6/07
PROFESSIONAL GEOLOGIST DATE

PROFESSIONAL GEOLOGIST
J. CASTLE
No. PG 8162
Exp. 12-31-07
STATE OF CALIFORNIA

PLANS APPROVAL DATE

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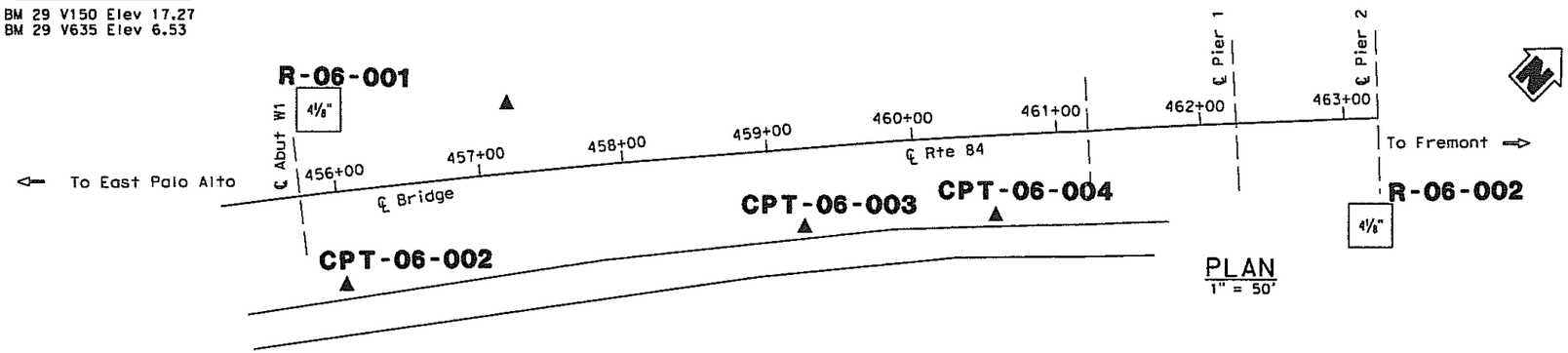
Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering
7750 Paradise Lane, Suite 120
Oakland, California 94621

BENCH MARK

BM 29 V150 Elev 17.27
BM 29 V635 Elev 6.53



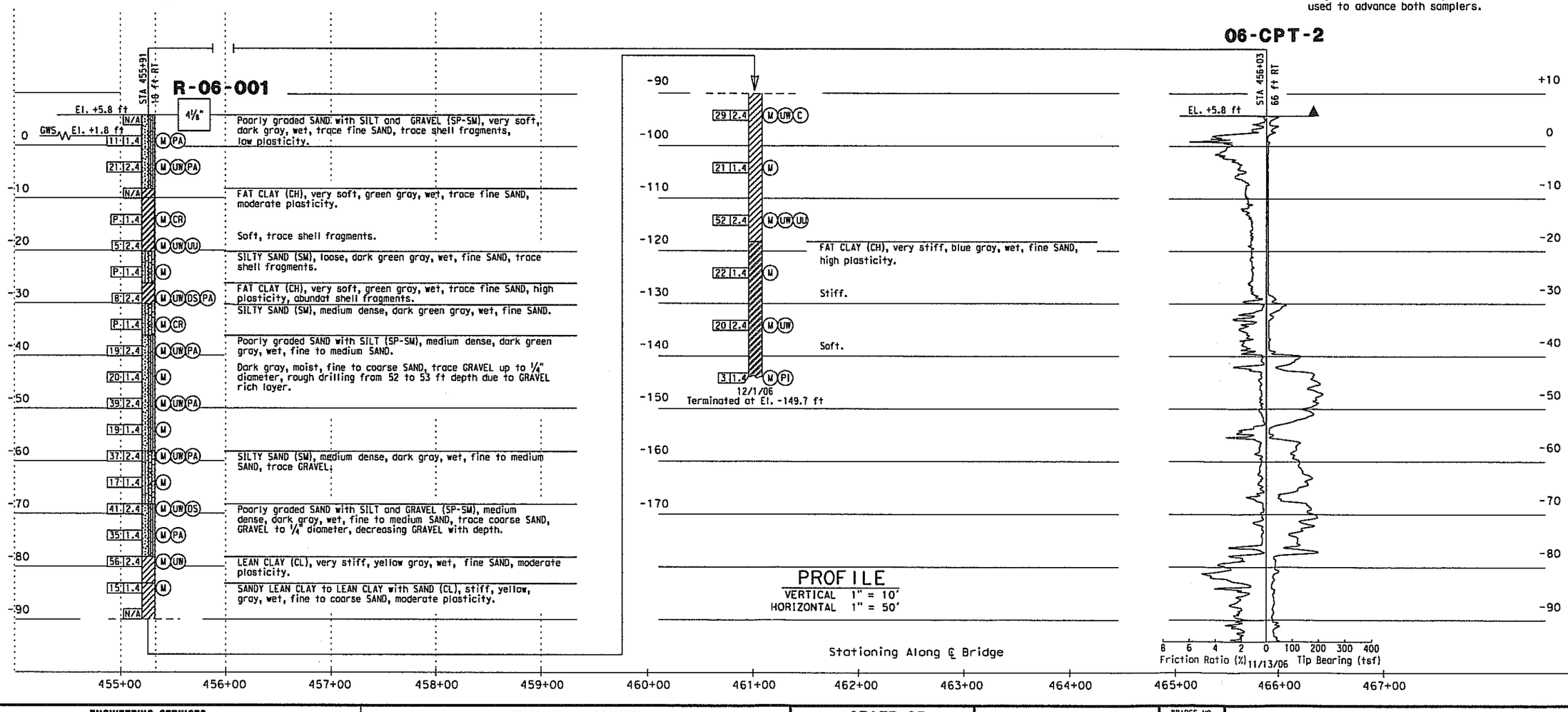
PLAN
1" = 50'

NOTES:

1.4" samples were taken using a SPT sampler with an inside diameter (I.D.) of 1.4" and an outside diameter (O.D.) of 2.0".

2.4" samples were taken using a California split-barrel sampler with an I.D. of 2.4" and an O.D. of 3.1".

An automatic trip hammer system consisting of a hammer weight of 140 lbs falling a distance of 30" was used to advance both samplers.



ENGINEERING SERVICES		GEOTECHNICAL SERVICES		STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION		BRIDGE NO.	DUMBARTON BRIDGE
FUNCTIONAL SUPERVISOR	DRAWN BY: A. ZAND, K. THANT	FIELD INVESTIGATION BY:	J. CASTLE		H. LAW PROJECT ENGINEER	35-0038 POST MILE	LOG OF TEST BORING NO. 1
NAME	CHECKED BY: E. BROWN, J. CASTLE					29.25	

OSF GEOTECHNICAL LOG OF TEST BORINGS SHEET

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

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▲ 06-CPT-008

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SM Alo	84	29.6/13.1 0.0/0.4		

Jody A. Castle 7/16/07
PROFESSIONAL GEOLOGIST DATE

J. CASTLE No. PG 8162 Exp. 12-31-07

PLANS APPROVAL DATE

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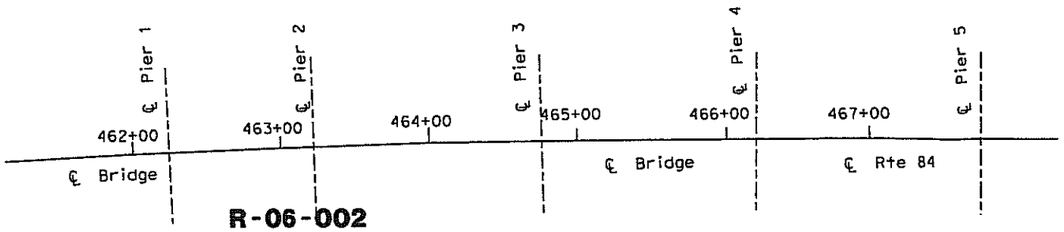
Earth Mechanics, Inc.
Geotechnical and Earthquake Engineering
7750 Pardee Lane, Suite 120
Oakland, California 94621

BENCH MARK

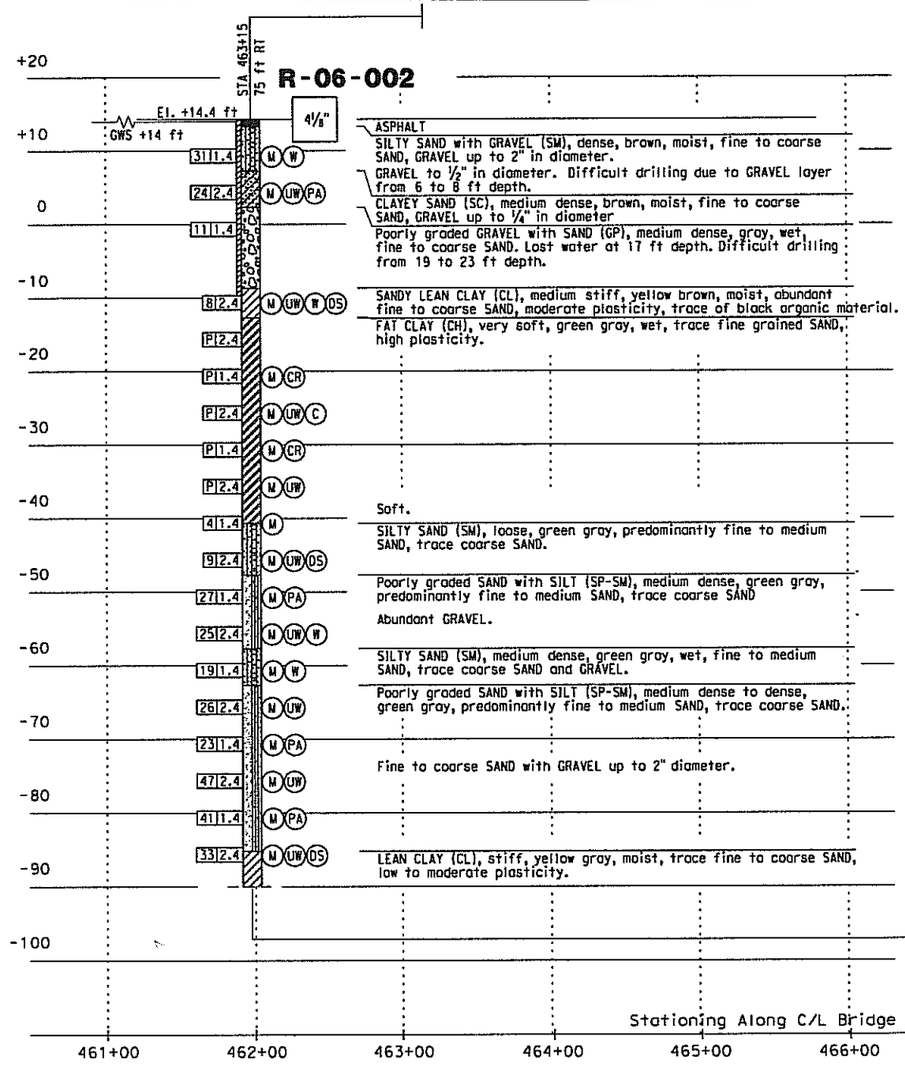
BM 29 V150 Elev 17.27
BM 29 V635 Elev 6.53

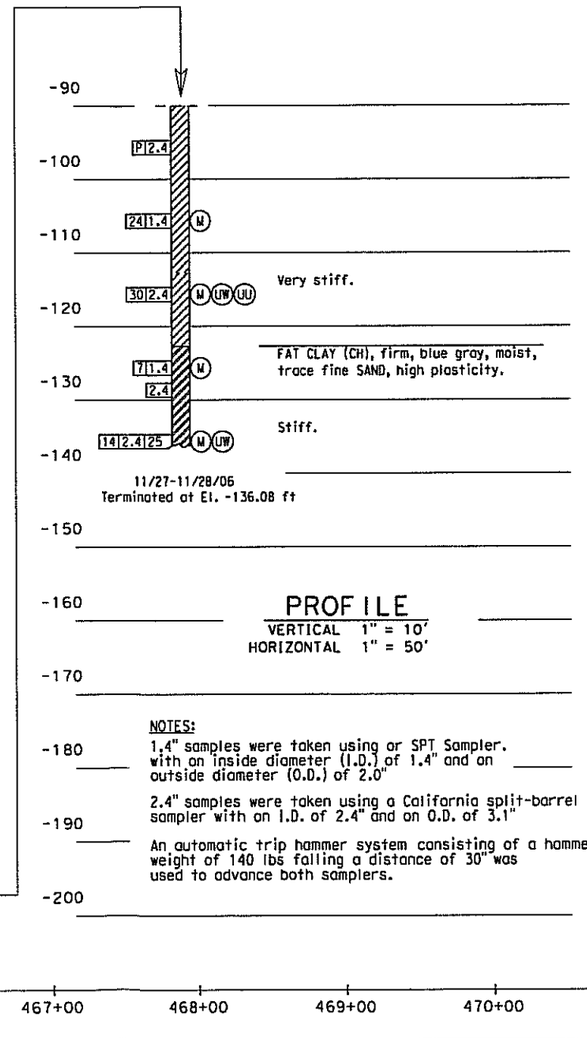


PLAN
1" = 50'

R-06-002

4⅛"





PROFILE
VERTICAL 1" = 10'
HORIZONTAL 1" = 50'

NOTES:

1.4" samples were taken using or SPT Sampler, with an inside diameter (I.D.) of 1.4" and an outside diameter (O.D.) of 2.0"

2.4" samples were taken using a California split-barrel sampler with an I.D. of 2.4" and an O.D. of 3.1"

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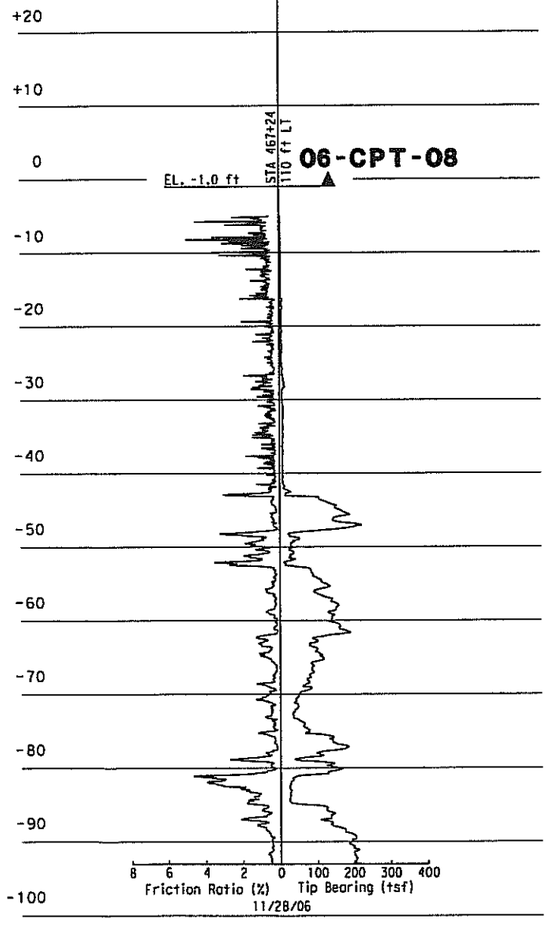

Stationing Along C/L Bridge

461+00 462+00 463+00 464+00 465+00 466+00 467+00 468+00 469+00 470+00 471+00 472+00 473+00

ENGINEERING SERVICES		GEOTECHNICAL SERVICES		STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION		BRIDGE NO.	DUMBARTON BRIDGE
FUNCTIONAL SUPERVISOR	DRAWN BY: A. ZAND, K. THANT	FIELD INVESTIGATION BY:	J. CASTLE		H. LAW PROJECT ENGINEER	28-0035	
NAME	CHECKED BY: E. BROWN, J. CASTLE					POST MILE 29.25	LOG OF TEST BORING NO. 4
OSF GEOTECHNICAL LOG OF TEST BORINGS SHEET	ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3			CU EA	DISREGARD PRINTS BEARING EARLIER REVISION DATES →	REVISION DATES (PRELIMINARY STAGE ONLY)	SHEET OF

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FILE => $REQUEST

14. DUMBARTON GROUND MOTION
&
14A1-14D APPENDICES

GROUND MOTION STUDY REPORT
DUMBARTON BRIDGE SEISMIC RETROFIT PROJECT

Task Order No. 2A

Prepared for:

Bay Area Toll Authority (BATA)
And
California Department of Transportation (Caltrans)

Submitted by:

EARTH MECHANICS, INC.

March 27, 2009

TABLE OF CONTENTS

1.0 INTRODUCTION 1-1

1.1 Overview 1-1
1.2 Scope of Work 1-1
1.3 Project Team 1-2
1.4 Organization of Report 1-2

2.0 SEISMIC HAZARD STUDY 2-1

2.1 Previous Seismic Hazard Studies 2-1
2.2 Seismic Hazard Updates for Dumbarton Bridge Retrofit Design 2-1
2.3 Chronological Development in the 1,000-Year UHS for Dumbarton Bridge Retrofit Project 2-2
2.4 UHS Hazard Results and Comparison to Deterministic Spectra 2-5
2.5 SEE and FEE Target Design Spectra 2-6
2.6 Time History Records for Design Analyses 2-6
2.6.1 SEE Time Histories 2-7
2.6.2 Lessons from Analyses using Seven Sets of SEE Time Histories 2-8
2.6.3 FEE Time Histories 2-10

3.0 SITE RESPONSE AND SOIL-STRUCTURE INTERACTION 3-1

3.1 Subsurface Conditions 3-1
3.2 Description of the Bridge 3-2
3.3 Dynamic Soil Properties 3-3
3.4 Free Field Site Response Analyses 3-4
3.5 Kinematic Soil-Pile Interaction Analysis 3-5
3.6 Pier Specific Kinematic Time Histories 3-7
3.7 Development of ARS Curves 3-8

4.0 CONCLUSIONS AND RECOMMENDATIONS 4-1

4.1 Conclusions 4-1
4.2 Recommendations 4-1

5.0 REFERENCES 5-1

6.0 APPENDICES 6-1

6.1 Appendix A: Detailed Probabilistic Seismic Hazard Analysis 6-2
6.2 Appendix B: Compatible-Compatible Time Histories 6-3
6.3 Appendix C: Pier-specific Kinematic Motions for SEE Motion Set 1-FN 6-4
6.4 Appendix D: Pier-specific Kinematic Motions for FEE Motion Set 1-FN 6-5

TABLES

Table 2-1: Acceleration Coefficients for SEE and FEE Reference Spectra 2-13
Table 2-2: Relative Displacement Values For See And Fee Reference Spectra 2-14
Table 2-3: 1,000 year mean magnitude, distance, and epsilon values for PGA and T=3.0 sec (fault normal component) based on the deaggregation of the hazard..... 2-15
Table 2-4: 100 year mean magnitude, distance, and epsilon values for PGA and T=3.0 sec (fault normal component) based on the deaggregation of the hazard 2-16
Table 2-5: Tabulation of Startup Motion Records for 100-Year FEE Time Histories 2-17
Table 3-1: Coordinates of the design ARS curves for the SEE event 3-10

FIGURES

Figure 1-1: Location of Dumbarton Toll Bridge 1-4
Figure 2-1: Comparisons Among 3-Series of 1,000-Year FN UHS 2-18
Figure 2-2: Comparison among Various NGA Models in Terms of 84% Deterministic Spectra For Magnitude 8 Event at 13.7 Km Distance for Vs = 760 and Vs = 400 mps 2-19
Figure 2-3: Comparison among Various NGA Models in Terms of 84% Deterministic Spectra For Smaller Magnitude Events at 13.7 Km Distance for Vs = 760 mps 2-20
Figure 2-4: Uniform hazard spectra and MCE spectra (Spectral Acceleration) 2-21
Figure 2-5: Uniform hazard spectra and MCE spectra (Spectral Displacement) 2-22
Figure 2-6: SEE and FEE Acceleration ref. spectra 2-23
Figure 2-7: SEE and FEE Displacement ref. spectra 2-24
Figure 2-8: Deaggregation of PGA hazard at the return period of 1,000 years 2-25
Figure 2-9: Deaggregation of T=3 Sec hazards at the return period of 1,000 years 2-26
Figure 2-10: Directivity deaggregation of Xcos(0) directivity parameter for the fault normal hazard at the return period of 1,000 years 2-27
Figure 2-11: Defining Principal Direction for Startup Motion Set-4 2-28
Figure 2-12: Feature of Time History of Set-4 Motion at 34-Degree C.C. Direction from FN 2-29
Figure 2-13: Average of 7 Sets of SEE Spectrum-Compatible Motion in Rotated Directions . 2-30
Figure 2-14: Deaggregation of PGA hazard at the return period of 100 years 2-31
Figure 2-15: Deaggregation of 3-Second hazard at the return period of 100 years 2-32
Figure 2-16: Example in Defining Principal Major Axes in the Startup Motion Set-1 2-33
Figure 2-17: Defining Principal Direction for Startup Motion Set-2 2-34
Figure 2-18: Defining Principal Direction for Startup Motion Set-3 2-35
Figure 2-19: Average of 7 Sets of FEE Spectrum-Compatible Motion in Rotated Directions . 2-36
Figure 3-1: Idealized soil profile along Dumbarton Bridge 3-11
Figure 3-2: Soil conditions and foundation data at Pier 2 3-15
Figure 3-3: Soil conditions and foundation data at Pier 9 3-16
Figure 3-4: Soil conditions and foundation data at Pier 15 3-17
Figure 3-5: Soil conditions and foundation data at Pier 17 3-18
Figure 3-6: Soil conditions and foundation data at Pier 23 3-19
Figure 3-7: Soil conditions and foundation data at Pier 30 3-20
Figure 3-8: Soil conditions and foundation data at Pier 43 3-21
Figure 3-9: Free-field site response (Acc. & Disp. time histories) for Pier 02 3-22
Figure 3-10: Free-field site response (Acc. & Disp. spectra) for Pier 02 3-23
Figure 3-11: Free-field site response (Acc. & Disp. time histories) for Pier 09 3-24
Figure 3-12: Free-field site response (Acc. & Disp. spectra) for Pier 09 3-25
Figure 3-13: Free-field site response (Acc. & Disp. time histories) for Pier 15 3-26
Figure 3-14: Free-field site response (Acc. & Disp. spectra) for Pier 15 3-27
Figure 3-15: Free-field site response (Acc. & Disp. time histories) for Pier 17 3-28
Figure 3-16: Free-field site response (Acc. & Disp. spectra) for Pier 17 3-29
Figure 3-17: Free-field site response (Acc. & Disp. time histories) for Pier 23 3-30
Figure 3-18: Free-field site response (Acc. & Disp. spectra) for Pier 23 3-31
Figure 3-19: Free-field site response (Acc. & Disp. time histories) for Pier 30 3-32
Figure 3-20: Free-field site response (Acc. & Disp. spectra) for Pier 30 3-33

Figure 3-21: Free-field site response (Acc. & Disp. time histories) for Pier 43 3-34
Figure 3-22: Free-field site response (Acc. & Disp. spectra) for Pier 43 3-35
Figure 3-23: Uniform shear strains for Pier 02 3-36
Figure 3-24: Uniform shear strains for Pier 09 3-37
Figure 3-25: Uniform shear strains for Pier 15 3-38
Figure 3-26: Uniform shear strains for Pier 17 3-39
Figure 3-27: Uniform shear strains for Pier 23 3-40
Figure 3-28: Uniform shear strains for Pier 30 3-41
Figure 3-29: Uniform shear strains for Pier 43 3-42
Figure 3-30: Variation of acceleration at ground vs at rock 3-43
Figure 3-31: Complete model for soil-structure interaction 3-44
Figure 3-32: Substructure model for soil-structure interaction 3-45
Figure 3-33: Kinematic spectra at Pier 2 3-46
Figure 3-34: Kinematic spectra at Pier 9 3-47
Figure 3-35: Kinematic spectra at Pier 15 3-48
Figure 3-36: Kinematic spectra at Pier 17 3-49
Figure 3-37: Kinematic spectra at Pier 23 3-50
Figure 3-38: Kinematic spectra at Pier 30 3-51
Figure 3-39: Kinematic spectra at Pier 43 3-52
Figure 3-40: ARS design curves for safety evauation earthquake (SEE) 3-53

1.0 INTRODUCTION

1.1 Overview

Earth Mechanics, Inc. (EMI) has been retained by the Bay Area Toll Authority (BATA) and California Department of Transportation (CALTRANS) to conduct geotechnical investigation to assist seismic evaluation and retrofit design of the Dumbarton Toll Bridge, San Mateo County, California. Structural analyses and retrofit designs of the bridge are conducted by structural engineers from the Engineering Service Center (ESC) within the CALTRANS. The seismic evaluation and retrofit strategy of the Dumbarton Bridge is a joint effort between EMI and CALTRANS.

The Dumbarton Bridge is an 8,600 feet long bridge structure connecting between cities of Newark and East Palo Alto in the San Francisco bay area. It is the southernmost toll crossing of the San Francisco Bay. The structure was designed in the late 1970's and the construction was completed in 1982. The structure consists of the main channel crossing, east and west approaches, and a trestle structure at the end of each approach structure.

The location of the Dumbarton Bridge and photograph of the structure are shown in Figure 1-1. The superstructure of the main channel consists of continuous twin steel box section with a single concrete deck over the two boxes. The steel boxes are supported on two hollow concrete columns battered in a V-shape which is in turn founded on pile foundations consisting of 54-inch diameter hollow concrete piles and 20 inch diameter steel pipe piles. The approach structures consist of pre-cast, pre-stressed bathtub girders with a single concrete deck spanning over the girders. The columns supporting the girders are similar to the main channel. The footings are supported on vertical piles made of 20-inch diameter steel pipe. The trestle structures are deck slabs supported on concrete pile extensions.

1.2 Scope of Work

The geotechnical investigation program conducted by EMI consists of the following three major elements:

Geotechnical Site Characterization: A number of soil borings (both marine and on-land), CPT soundings (marine and on-land), geophysical measurements, in-situ testing, laboratory testing, subsurface interpretation, and characterization of engineering properties of soils are performed. The operation of the field program, findings from the in-situ and laboratory testing, Logs-of-Test Borings (LOTBs), and the interpreted subsurface conditions are documented in an EMI report entitled "Geotechnical Site Characterization for Dumbarton Bridge Seismic Retrofit Project."

Ground Motion Study: The ground motion study includes probabilistic and deterministic seismic hazard analyses, development of reference rock motion criteria for the Safety Evaluation Earthquake (SEE) and Functional Evaluation Earthquake (FEE) events, generation of spectrum compatible time histories for site response analyses, and kinematic soil-structure interaction

analyses to develop ARS (Acceleration Response Spectrum) design curves and pier-specific kinematic time histories. The findings are documented in this report is entitled "Ground Motion Study for Dumbarton Bridge Seismic Retrofit Project."

Foundation Analysis: Detailed analyses of the foundations are conducted. The analyses include characterizations of lateral soil supports (p-y curves), and axial soil supports (t-z and q-u curves) along the pile. Pile capacity evaluations are conducted by performing axial and lateral load-deformation analyses on a single pile. The pile groups are characterized by linearized 6x6 stiffness and mass matrices to be used in a global bridge model for seismic response evaluation. The results are provided in an EMI report entitled "Foundation Analysis for Dumbarton Bridge Seismic Retrofit Project."

1.3 Project Team

The ground motion study for the Dumbarton Toll Bridge comprises a team effort by a group of professionals working on the project. The following individuals provided significant contribution to the current ground motion study:

- BATA: Jason Weinstein
- CALTRANS: Brian Maroney, Mo Pazooki, Saba Mohan, Robert Price, Mike Keever, Tariq Masroor, Yong-Phil Kim, Steve Mitchell, Anoosh Shamsabadi
- Peer Reviewers: I.M. Idriss, Frieder Seible, Joseph Nicoletti, Jerry Fox
- Consultants: Norm Abrahamson, Jennie Watson-Lamprey, Robert Pyke, Doug Hamilton
- EMI: Po Lam, Hubert Law, Chein-Tai Yang, Jody Castle, Te-Chih Ke, Zhao Cheng, Amir Zand

1.4 Organization of Report

This report documents the ground motion study conducted for the Dumbarton Bridge Seismic Retrofit Project. In addition to this introductory section, the report has been organized into the following sections:

- Section 2 - Probabilistic seismic hazard analyses to develop reference rock motion spectra. Uniform hazard spectra for six return periods are developed: 100-, 300-, 475-, 1,000-, 1,500-, and 2,000-year. The uniform hazard spectra are compared with deterministic spectra from the San Andreas and Hayward Faults using 50th and 85th percentile attenuations. The 1,000-year return period spectrum is adopted as the reference rock motion for the SEE. Seven sets of spectrum compatible time histories were developed for the SEE.

- Section 3 - Free-field site response analyses were conducted employing a one-dimensional site response program, SHAKE. The site response analyses provide depth varying free-field motions along the pile for the seven sets of earthquake time histories. Kinematic soil-pile interaction analyses were then carried out to develop of ARS (Acceleration Response Spectrum) design criteria for use in the response spectrum analyses of the structure considering various geotechnical uncertainties. To provide input ground motions for the time history analyses of the bridge, pier-specific kinematic time histories were developed.

- Section 4 - Conclusion section documenting major issues addressed in the ground motion studies. Recommendations on the use of the design ARS curves and pier-specific kinematic time histories are provided.

- Section 5 - References.

FIGURE 1-1: LOCATION OF DUMBARTON TOLL BRIDGE

2.0 SEISMIC HAZARD STUDY

2.1 Previous Seismic Hazard Studies

At the onset of the project, EMI conducted a task to gather information from relevant seismic hazard studies at the vicinity of the project site. The following lists some of these studies that were performed by others:

- A URS Corporation report entitled "Draft Seismicity, Bay Division Pipelines Reliability Upgrade, Bay Tunnel Project" dated January 5, 2007 (URS 2007). This study was conducted as part of the SFPUC new pipeline located about 1,200 feet from the Dumbarton Toll Bridge.

- A report from Norm Abrahamson entitled "Peak Velocities and Peak Accelerations for Bay Division Pipe Line" dated November 6, 2003 (Abrahamson 2003). This study was conducted for seismic retrofit of the existing BDPL 1 and 2 that are partially buried and partially supported on bridge.

- A Geomatrix Corporation report entitled "Seismic Ground Motion Study for Dumbarton Bridge, Report for Caltrans" (Geomatrix 1993). This report was produced as part of the overall ground motion studies for the toll bridge program.

However, significant advances have been made in seismology and geotechnical engineering in recent years, particularly in ground motion attenuation relationships and seismic source modeling. The EMI team conducted a very comprehensive seismic hazard study for the Dumbarton Bridge Seismic Retrofit Project, embracing the latest technology and tools available at the time. The analysis approach, assumptions, and findings are provided in the following sections.

2.2 Seismic Hazard Updates for Dumbarton Bridge Retrofit Design

A number of developments (from about mid 1990s to the current time) led to the need to update prior seismic hazard studies for the current Dumbarton Bridge Retrofit Design project. The following lists some of these developments:

- Ground motion criteria from the Geomatrix (1993) study adopted deterministic seismic hazard procedure for formulating the design ground motion criteria. However, starting from the San Francisco-Oakland Bay Bridge East Span project around 1997, probabilistic hazard procedures have increasingly been adopted for design applications from the recommendations of the Peer Review Panel and also the State Seismic Advisory Panel. Some of the examples included the Bay Bridge East Span project adopting the 1,500-year return period uniform hazard spectrum for design, the 1,000-year return period uniform hazard spectrum adopted by AASHTO in 2007 for safety level evaluation earthquake for designing transportation facilities throughout the U.S, and also, all recent long-span bridge

projects, including the New Gerald-Desmond Bridge in Long Beach, California which adopted 1,000-year return period for SEE. All these cited recent projects have adopted the probabilistic procedure as the basis for formulating the ground motion criteria for design. Such a procedure is also preferable for the Dumbarton Bridge in order to provide a flexible framework suitable for balancing risk versus cost for proposing the retrofit design to insurance companies and the bond holders who would be financing the project.

- Another reason toward the need for the update is due to changes in source characterization from the USGS Working Group on Earthquake Probabilities in Northern California (WG 2003). The 2003 WG report gives the time dependent probabilities of large earthquakes during the next 30 years on seven fault systems in Northern California: San Andreas, Hayward/Rodgers Creek, Calaveras, San Gregorio, Concord, Greenville, and Mt. Diablo. All of the faults except for the Mt Diablo fault have segmentation alternatives. The WG model includes Poisson and non-Poisson models of the earthquake recurrence as compared with only Poisson models in prior Working Group studies.

- The most important reason for the update is due to development in attenuation models. As part of the PEER Next Generation Attenuation (NGA) program, empirical attenuation relationships were developed by five separate modeling teams in 2006-2007[1]: Abrahamson and Silva, Boore and Atkinson, Campbell and Bozorgnia, Chiou and Youngs and Idriss. These newly developed NGA models represent improvements over prior vintage attenuation models (commonly referred as attenuation models dated back in the 1997s used for prior seismic hazard studies, including the 2002 Bay Bridge East Span study).

2.3 Chronological Development in the 1,000-Year UHS for Dumbarton Bridge Retrofit Project

The Dumbarton Bridge seismic retrofit project was initiated back in 2006, when NGA models are still being finalized. In the course of the Dumbarton Bridge retrofit project, three rounds of 1,000-year UHS solutions were generated for SEE retrofit design as the team gained insights on the newly developed NGA models. The following summarizes the chronological developments of the Dumbarton Bridge SEE reference rock spectra over the course of the project. The three versions of 1000-Year UHS are listed as follows:

1) Version-1 dated around April, 2007. This is the version of the PSHA study conducted back in late 2006 and early 2007 using preliminary versions of the NGA models. Those NGA models were later found to be poorly constrained at long period range (e.g. at 6-second period). Such a deficiency was later found to have an adversely impact for the design of the friction pendulum isolation bearings used for retrofitting the Dumbarton Bridge.

2) Version-2 dated November, 2008. This study was prompted in the course of designing the isolation bearing adopted for retrofit which led to revisiting the issue of the questionable long-period displacement curve shape in preliminary NGA models. Dr. Norm Abrahamson informed the team that the NGA models were updated and some limited study commenced

[1] http://peer.berkeley.edu/products/rep_nga_models.html

referred as the Series-2 PSHA. In this Series-2 PSHA, only the 1,000-Year UHS horizontal components were generated using the updated NGA models. Up to this point (including Version-1 and Version-2), all five NGA models were used (equal weight among each model).

3) Version-3 PSHA dated February, 2009. Further investigations of the NGA models revealed potential problems in the Boore and Atkinson and the Campbell and Bozorgnia NGA models at long period range, while the other three models appeared better constrained at very long periods. Since long-period response from large magnitude earthquakes are important for the Dumbarton Bridge, the Campbell and Bozorgnia and the Boore and Atkinson models were excluded from this version-3 PSHA and only the remaining three models were used for the Series-3 of PSHA.

Figure 2-1 presents some comparisons of the 1,000-year UHS for the Fault Normal (FN) component motion among the above listed versions of PSHA studies to illustrate some of the discussion above regarding the chronological development of the Dumbarton Bridge ground motion criteria. As can be observed in Figure 2-1, the main difference among the various PSHA solutions relates to the long-period motion (above 2-second period) demand, especially issues regarding the preliminary version of NGA developed prior to April, 2007. It can further be observed that the displacement spectral curve shape for some of the NGA models (even the updated version) do not conform to common expectation that the displacement spectrum should be asymptotic to the constant displacement demand at long period equal to the absolute peak displacement amplitude from the displacement time history record.

Further investigations of the NGA models (the updated version) are shown in Figures 2-2 and 2-3. Figure 2-2 presents the 84% deterministic spectra predicted by individual NGA models for a Magnitude 8 earthquake at 13.7 Km (based on the distance of the Dumbarton Bridge to the San Andreas and the Hayward faults). The top and the bottom figures present solutions for V_{s30} of 760 mps and 400 mps, respectively. It should be noted that the Idriss model was generated for a range of V_{s30} between 450 – 900 mps rather than a specific V_{s30} and the same spectral curve has been shown in both the top and the bottom figures. As seen from the figure, the displacement spectral curve shape in the Boore and Atkinson and the Campbell and Bozorgnia NGA models differs from the other three NGA models at long period (especially the Campbell and Bozorgnia model which appeared to exhibit common simplification that the spectral acceleration be proportional to 1/T (only appropriate at the 1-second constant velocity period range). Figure 2-3 presents similar 84% deterministic displacement spectra from the five NGA models for smaller magnitude events (i.e. M=7 and M=6). It can be observed that the anomalous displacement spectral shape becomes less pronounced for smaller magnitude events for the Campbell and Bozorgnia and the Boore and Atkinson NGA models.

The following summarizes lessons from the several series of PSHA analyses:

- Whereas, there is no direct comparison presented in this report to illustrate potential differences between the 2003 USGS Working Group Source Model (i.e. time dependent recurrence) with prior Source Models (used in prior vintage projects, including the 2002 San

Francisco Bay Bridge East Span Project and earlier versions of Toll Bridge Retrofit Projects dated before 1995), our project experience from the Bay Bridge project suggests that there is relatively little difference arising from variations in the Source Model. Some of our on-going Bay Bridge studies suggest that the 2003 Source Model leads to slightly lower ground motion (say 1-2%) as compared to prior vintage source models (dated before 2001).

- As shown in Figure 2-1, major differences arising from the application of NGA models relates to variation in the preliminary NGA models (version dated prior to 2007), as compared to the more updated NGA models. Furthermore, the difference becomes more pronounced only at long periods (above 2 second) for very large magnitude earthquakes.

- The problem regarding the anomalous displacement spectral curve shape associated with the Campbell and Bozorgnia NGA model and the Boore and Atkinson NGA model only applies to very large magnitude (M-8) events for very long-period motions. At the short-period range, all five NGA models are comparable even for magnitude 8. Also, for smaller magnitude events (M < 7), all five NGA models can be regarded as comparable even for long period motions (see Figure 2-3). As can be observed in Figure 2-1, for the 1,000-year UHS, there is little difference between averaging 5 versus 3 NGA models because the scenario earthquake for a 1000-year return period was found to be smaller than the magnitude 8 scenario. Ultimately, we elect to document the Series-3 PSHA (excluding the Campbell and Bozorgnia and the Boore and Atkinson models) in the Series-3 PSHA in order to avoid potential questions regarding longer return period UHS (say return period exceeding 2,000-year) presented in this report, when the displacement spectral curve shape for magnitude 8 for the two NGA models can become germane. In a nutshell, whereas we elected to conduct PSHA using only 3 NGA models for the Series-3 PSHA, this decision should not have much impact for the 1,000-year SEE and the 100-year FEE ground motion criteria.

- Whereas, the Series-3 PSHA are documented fully in this report (in Appendix A) for completeness, this Series-3 PSHA did not become finalized until February 2009, while an enormous amount of the retrofit design analyses (including generating spectrum-compatible motions, site response-kinematic SSI analyses and global dynamic response analyses) were completed prior to this date for the 1,000-year SEE scenario design. As can be observed in Figure 2-1, there is only minor differences between the Series-2 and the Series-3 1000-year UHS. Much of the SEE design analyses, conducted prior to February 2009, were based on input motions generated for the Series-2 PSHA (i.e. using all five of the updated NGA models). There is insufficient time (and also unnecessary) to repeat all the completed site response-kinematic SSI and global response analyses to update for the Series-3 PSHA. In a nutshell, SEE design analyses were based on the Series-2 1,000-year UHS. As the Series-3 PSHA became available by February 2009, the 100-year UHS from this Series-3 PSHA was used for FEE design.

Following definition of the reference rock input target spectrum, design analyses were conducted along the following steps:

1) Development of spectrum-compatible time histories of the reference rock motion.

2) Site response analyses for the horizontal component motions making use of the spectrum-compatible rock motions as input motion to propagate the motions to shallow depths.

3) For the vertical component motion, due to lack of a proven site response procedure, we follow the practice from prior projects (e.g. Bay Bridge) to directly make use of the vertical target spectrum from PSHA for design without site response analyses.

4) Kinematic SSI analyses are then conducted making use of the depth-varying free field input motions to statically condense the depth-varying motions for the kinematic pile cap motion for input to the designer's global model, which also included the foundation by 6x6 pile cap matrices (including mass, damping and stiffness representations).

As mentioned above, the Series-3 PSHA will be fully documented in Appendix A. However; the SEE reference spectra (presented in this report) were based on the Series-2 1,000-year UHS while the FEE reference spectra were based on the Series-3 100-year UHS. The forgoing sections summarize the Series-2 SEE and the Series-3 FEE design spectra. Site and kinematic response analyses for the SEE and FEE scenario design will be presented in Section 3. Documentation of spectrum-compatible reference input motions are provided in Appendix B and site response and kinematic SSI analyses are documented in Appendix C and Appendix D.

2.4 UHS Hazard Results and Comparison to Deterministic Spectra

Further details of the Series-3 PSHA are provided in Appendix A. This section provides a summary of the Uniform Hazard Spectra solutions and their comparison to the corresponding benchmark deterministic spectra.

Hazards were originally computed for both the east end and west end of the bridge. The hazard is similar at the two ends with the east end being slightly larger for shorter periods and larger annual probability levels (i.e., shorter return periods). The results from the west end site are slightly larger for the longer spectral periods and lower annual probability levels (i.e., longer return periods). For the average horizontal component, the largest difference between the east end and west site ground motions is less than 3% and less than 6% for the fault normal component. The design spectra are ultimately based on the spectra enveloping spectra over the east and west end sites.

The uniform hazard spectra (UHS) were computed for a suite of return periods between 100 and 2000 years. The fault normal (FN) spectra for these return periods are shown in Figure 2-4 and 2-5 for spectral acceleration and spectral displacement, respectively. The deterministic spectra for the average horizontal component without directivity effects are also shown in these figures. The median deterministic ground motions from the San Andreas faults correspond to return periods between 300 and 500 years. The 84% deterministic spectrum from the San Andreas faults corresponds to return period close to 2,000-year return period.

2.5 SEE and FEE Target Design Spectra

The design team started the Dumbarton Bridge retrofit project at the end of 2007 under very tight schedule. Significant amount of design analyses were conducted using the out-dated Series-1 input motion in the course of the project, especially analyses of the vulnerability of the as-built structure and also analyses to evaluate various versions of retrofit strategies. Toward the end of 2007, use of isolation bearings for the main span became the preferred retrofit strategy and design analyses moved toward designing the isolation bearing. It was discovered at that stage that the friction-pendulum isolators (a component central to the overall retrofit strategy for the main span) have an apparent response period at about 6 second and the size of the isolator will be highly dependent on the displacement demand around 6 second. Feedback from Dr. Norm Abrahamson led to the Series-2 and Series-3 PSHA.

As can be observed from Figure 2-1, the issue of displacement spectral shape at long period was found to have a profound influence (cost implication) on the design of the isolators. It should be realized that this topic is clouded by problems regarding long-period correction problems of historic strong motion records and common practice toward conservatism for the acceleration spectra at long period because of the low acceleration level in force-based design practice. However, the long-period motion became a major issue in the current Dumbarton Bridge retrofit project. Realizing that the Series-1 PSHA was based on out-dated NGA models, the Series-1 PSHA was abandoned and design analyses for the Dumbarton Bridge was switched to the Series-2 and Series-3 PSHA solutions.

The ultimately adopted SEE spectra are based on the Series-2 1000-year return period UHS and the FEE spectra are based on the Series-3 100-year return period UHS. Vertical spectra have also been shown in the figures. Figure 2-6 and 2-7 presents the SEE and FEE acceleration and displacement spectra, respectively. Table 2-1 and 2-2 provide tabulation of the acceleration and displacement spectra, respectively.

2.6 Time History Records for Design Analyses

The use of spectrum-compatible input time histories has been widely adopted for bridge design projects due to complexity in defining the predominant period for bridge structures and also in order to avoid the need for conducting design analyses using an excessive number of input time histories. Generally accepted practice is to use a minimum of 3 sets of input time histories. However, three sets of input motions are generally insufficient to achieve the desired statistical stability for the demand. Therefore, it is common practice to design for the maximum response from all three sets of input motions. The IBC calls for the use of at least seven sets of input motions if average demand is to be employed. Value Analysis Study of the Antioch and Dumbarton Bridges conducted in 2006 recommended generation of seven sets of spectrum-compatible time histories to establish adequate database for the seismic analyses of the bridge structure. The justification for seven sets of input time histories included the following reasons:

- Averaging a larger number of sets of time histories provides for a more stable framework for developing the ground motion design criterion than the enveloping concept, since that one single time history will have a smaller impact in changing the statistics (i.e. average and standard deviation, etc.) as compared to impacting the envelop measure of the data set.

- Averaging of a sufficiently large set of input time histories provides for a better basis for achieving the goal of designing the structure to a specific risk level compatible to the adopted return period. Enveloping multiple input time histories where each of the time history is already defined for a specific return period implies hidden conservatism which is difficult to quantify. Hence the enveloping concept implies an unstable basis for design along with its implied cost.

One of the questions that should be asked is that whether seven sets of input motions would be sufficient and what level of confidence would one achieve by conducting design analyses based on seven sets of input time histories. Some discussions are offered in later section in this respect.

2.6.1 *SEE Time Histories*

The magnitude-distance deaggregation for a 1,000 year return period hazard (adopted for SEE design) are shown in Figure 2-8 for PGA and Figure 2-9 for T=3.0 seconds (fault normal component). These figures show that nearby (i.e., distance less than 20 km) large magnitude (i.e., magnitudes greater than 6.5) events dominate the hazard at both short (PGA) and long (T=3.0 sec) spectral periods. At short periods, the hazard is dominated by earthquakes with magnitudes between 6.5-7.5 at distances of 10-20 km. At long periods (T=3.0 sec), the hazard is dominated by earthquakes with magnitudes between 6.5-8.0 at distances of 10-20 km. These controlling earthquakes correspond to the San Andreas and Hayward faults.

The deaggregation of the 1,000 year return period fault normal motion is shown as a function of Xcos(0) for spectral periods of 1.0 to 5.0 sec in Figure 2-10. Full forward directivity corresponds to Xcos(0)=0.4. This figure shows that a long spectral periods, the hazard is dominated by forward directivity conditions with a relative increase in the contribution as a function of the increase in spectral period. This indicates that the selection of time histories should be focused on forward directivity conditions. The scenario earthquake based on mean magnitude, distance for a 1,000-year return period is listed in Table 2-3.

Seven sets of spectrum-compatible time histories were developed by modifying startup motions (usually actual earthquake records) so that the resultant spectra are similar to the reference rock spectra. Various methods have been developed to perform the spectrum matching. A commonly used method adjusts the Fourier amplitude spectrum based on the ratio of the target response spectrum to the time history response spectrum while keeping the Fourier phase of the reference history fixed. An alternative approach for spectral matching adjusts the time history in the time domain by adding wavelets to the reference time history. In this study, the time domain method (Abrahamson 1998) is used.

As part of the spectral matching procedure, a baseline correction is applied to the ground motions. The baseline is computed by fitting the displacement time history to a high order polynomial (order 4 to 7) and excluding the constant and linear terms. The second derivative of this displacement baseline is computed and it is subtracted from the acceleration ground motion. The resulting ground motion is baseline corrected in acceleration, velocity, and displacement.

The same six sets of seed motions from the East Span San Francisco-Oakland Bay Bridge were adopted for the Dumbarton Bridge Seismic Retrofit Project. In addition, a recorded motion from the Taiwan Earthquake was added to create seven sets of time histories.

The following are a summary of seven seed motions that have been used to generate spectrum-compatible time histories:

- Set 1: El Centro records from the 1940 Imperial Valley earthquake (spliced with EC #6 records from 1979 Imperial Valley earthquake).
- Set 2: Synthetic records of M=8 earthquake on the San Andreas fault at a distance of 18 km.
- Set 3: Lucerne records from the 1992 Landers earthquake.
- Set 4: West Pico Canyon records from the 1994 Northridge earthquake.
- Set 5: LGPC records from the 1989 Loma Prieta earthquake.
- Set 6: Saratoga records from the 1989 Loma Prieta Earthquake.
- Set 7: WGK records from 1995 Taiwan Chi Chi Earthquake.

2.6.2 *Lessons from Analyses using Seven Sets of SEE Time Histories*

Plots of the above seven sets of spectrum-compatible motions are presented in Appendix-B. The following provides some discussions based on lessons from design analyses using the seven sets of spectrum-compatible SEE time histories.

Feedback from structural designers indicated that the Set-4 motion set appeared to be particularly energetic and showed higher demand for sizing the isolation bearing. Research on this subject suggest that a contributing reason might be the cross correlation feature of the two orthogonal fault normal and fault parallel component motions. It should be pointed out that spectrum matching is usually conducted at the reference fault normal and fault parallel axes. Whereas, a high degree of spectrum-compatibility feature can be achieved in these reference axes, there can be significant degree of variation from the intended target in rotated directions.

We have learnt from Professor Penzien (during the Ad Hoc SSI committee meetings back in

1995 at the start of the toll bridge retrofit project) that the startup motions for spectrum matching need to be rotated to the appropriate principal axes so as to minimize the degree of cross correlation of the two orthogonal horizontal component motion. Conducting spectrum matching at axes of sufficiently low cross-correlation tend to give the best chance for the resultant motion to have the intended shaking level in other rotated directions (i.e. when rotated from their reference axes). During the project, the seven sets of startup motions were first rotated to their principal major and principal minor axes. Motions at the principal major axes tend to have the highest and lowest demand (especially at long period range) and are used for spectrum matching to develop the resultant stronger fault normal and weaker fault parallel spectrum-compatible component motions.

Figure 2-11 presents the shaking feature of the Set-4 spectrum-compatible motion in rotated directions. The upper 6 plots show the spectral demand in 360 degree rotations at six period of response (i.e. at 1, 1.5, 2, 3, 4 and 5 second) while the bottom figures shows the cross-correlation coefficient calculated using the rotated pairs of orthogonal acceleration, velocity and displacement records. In the upper figures, the ground motions are rotated to various azimuths from the reference fault normal and fault parallel axes. The shaking implied by the Set-4 motion in rotated directions are shown in blue which can be compared to the black elliptical target spectrum constructed based on the fault normal and fault parallel target spectra. As can be observed in the figure, the Set-4 motion appeared to be highly spectrum-compatible in rotated directions at shorter periods (i.e. up to 4-second). However, there is some significant degree of deviation from the intended target for long period motions as evident from the 5-second spectral orientation plot in Figure 2-11. As shown in the figure, the motion at a 34-degree counter clockwise rotation from the fault normal direction has a relative displacement demand (i.e. Rd) at about 28 inches, which is higher than the theoretical maximum demand for the fault normal direction at 21.2 inches. The intended target at the 34-degree rotation was estimated at about 19.3 inches, or implying that there is about a 45% overshoot for the Set-4 input motion for the 5-second period response in the 34-degree rotation direction. The 19.3 inches demand at the 34-degree direction is inferred based on the elliptical pattern anchored by the fault normal and fault parallel demand at 21.2 and 16.6 inches, respectively.

Figure 2-12 also presents the time history record and its corresponding response spectra for the motion at 34-degree angle with respect to the fault normal direction. The figure shows that shaking at the 34-degree direction (shown in red) is very conservative, even when it is compared to the theoretical maximum shaking in the fault normal direction. The theoretical demand at a 34-degree direction should be in between the FN (black) and FP (Blue) target spectra. The Set-4 motion set appeared to have the most overshoot at long period from reviewing such spectral demand plots at rotated directions. This observation provides some explanation for response solution results from the designers in regards the anomalously high demand from the Set-4 motion. This is one of the reasons why averaging a sufficiently large number of sets of motions would be necessary so that the resultant design would comply with the basis implicit in the 1,000-year return period basis.

Figure 2-13 presents some statistics of the spectral demand from averaging seven sets of spectrum-compatible motions. The average of 7 sets of motions is shown in blue which can be

compared to the intended target (implied by the FN and FP target spectra) shown in black. In contrast to individual motion set which can deviate from the intended target demand in rotated directions, especially at long-periods (e.g. Motion Set-4 shown in Figure 2-11), the benefit of averaging seven sets of motion becomes evident from Figure 2-13. It can be observed from the figure that averaging 7 sets of input motions is very effective in arriving at the intended demand implied by the target fault normal and fault parallel spectra, not only in the principal axes of reference, but in all rotated directions. The overshoot or undershoot problem at a specific period and in a specific direction can be minimized when demand from seven sets of motions are averaged. Our prior experience in several other projects suggest that averaging 7 sets of motion lead to shaking within 10% of target demand at all periods and in all rotated directions. Whether seven sets of input motions would be sufficient for design need to be examined from other aspects, including in the context of nonlinear response effects and complexity arising from multi degree of response systems. These issues are obviously structural specific and require the feedbacks from structural engineers in answering the issues on a project specific basis. However, we believe that much of the issue in dependency of the response solutions to specific input time history might be due to lack of understanding and management of the cross correlation features in the three component input motion used in the context of three dimensional response analysis.

2.6.3 *FEE Time Histories*

Similar to SEE, seven sets of startup motions were selected for development of FEE input time histories for site response, kinematic SSI and dynamic response analyses of the global bridge model (conducted by the designers) for the FEE scenario design. Table 2-4 summarizes the mean magnitude and distance combination from PSHA solutions.

The magnitude-distance deaggregation for the 100 year return period hazard (adopted for FEE design) are shown in Figure 2-14 for PGA and Figure 2-15 for T = 3.0 seconds (fault normal component). Based on the deaggregation information, seven sets of startup motions were chosen as tabulated in Table 2-5. Again, detailed plots of the seven sets of resultant spectrum-compatible FEE motions are presented in Appendix B and the corresponding site response and kinematic SSI motions are presented in Appendix D.

The startup motions in Table 2-5, were originally from the PEER strong motion library. It should be noted that PEER has rotated these strong motion records to their theoretical FN and FP axes based on geological information. From our experience, there could be significant deviations in the true principal axes from individual strong motion records from the theoretical FN and FP axes. As commented by Professor Penzien, the original startup motions need to be rotated to their true principal axes as oppose to the theoretical FN and FP basis. Therefore we first examined the appropriate basis for principal axes for each of the seven sets of startup motion. It is clear that the orientation in the principal axes for a specific startup motion record would be period dependent and that high frequency (i.e. short period) motions tend to naturally have low cross correlation coefficients as compared to long period motions. Naturally, in the current application when long-period motions are of design interest (for designing the isolator),

we elected to place more emphasis on characteristics of long period motion. Displacement time history records are particularly useful for long period motions (say for period in excess of 3 second). Therefore, we first examined the orientation of the zero cross correlation coefficient developed from the original FN and FP displacement history records. Column 10 in Table 2-5 summarized the orientation for zero cross correlation coefficients implied by the displacement histories of the 7 sets of startup motions. Figure 2-16 is presented to illustrate the direction for zero cross correlation of the displacement record for Set-1 motion as an example. From the bottom figure, we deduced that the cross correlation coefficient of the displacement record will be zero at a 36.1 degree rotation in the counter clockwise direction from the FN axis. Therefore, the orthogonal FN and FP histories are first rotated to the 36.1 degree angle for the acceleration histories used for major principal and minor principal direction records which are used as startup motion record for spectra matching for the Set-1 motion. It is observed that we elected to define the principal axes based on a zero cross correlation coefficient of the displacement history records for 5 of the 7 sets of startup motions (Sets: 1, 4, 5, 6 and 7) in Table 2-5. However, we elected to deviate from this definition of zero cross correlation coefficient based on displacement histories for defining the principal directions for Set-2 and Set-3.

Figure 2-17 is shown illustrating the reason for defining the principal direction at 49 degree counter clockwise from the FN direction for Motion Set-2. It can be observed from the upper 6 figures showing principal spectral orientations at various periods, that these principal directions differ from the 28.1 degree orientation (from zero cross correlation coefficient from the displacement histories). Defining the principal direction at a 49 degree rotation from the FN direction (counter clockwise) will better reconcile with the principal directions observed from the period-dependent response spectra, especially for the 2 and the 4 second period spectra.

Figure 2-18 is shown illustrating the reason for defining the principal direction at the 19.5 degree counter clockwise from the FN direction for Motion Set-3. It can be observed from the upper 6 figures that the principal directions differ from the 16 degree orientation based on a zero cross correlation coefficient from displacement histories. Defining the principal direction at 19.5 degree rotation from the FN direction because this orientation is the direction for zero cross correlation from the velocity displacement histories and will generally better reconcile with the principal directions observed from several period dependent response spectra, especially at 1.5, 2, 4 and the 5 second periods.

From the information shown in Table 2-5, it is observed that principal axes from actual strong motion recordings deviate from the assumed FN and FP orientations to a very large degree, especially for more complex faulting mechanisms (i.e. more complex implied by strike/slip faults) as evident by the large deviation in Motion Sets No. 6 and 7 for the reverse fault condition.

Figure 2-19 presents some statistics of the spectral demand from averaging seven sets of FEE spectrum-compatible motions. The average of 7 sets of FEE motions have been shown in blue which can be compared to the intended target (implied by the FN and FP target spectra) shown in black. Again, the benefit of averaging seven sets of motion becomes evident from Figure 2-19. Averaging 7 sets of input motions was very effective in arriving at the intended demand implied

by the target fault normal and fault parallel spectra, not only in the principal axes used for referencing the original FN and FP target spectra, but also lead to the implicitly intended shaking intensity at all rotated directions for all periods of response.

TABLE 2-1: ACCELERATION COEFFICIENTS FOR SEE AND FEE REFERENCE SPECTRA

Period (sec)	1,000 year SEE 5% Damped Sa (g)			100 year SEE 5% Damped Sa (g)		
	Fault Normal	Fault Parallel	Vertical	Fault Normal	Fault Parallel	Vertical
0.010	0.434	0.434	0.371	0.182	0.182	0.133
0.020	0.434	0.434	0.371	0.182	0.182	0.133
0.030	0.434	0.434	0.480	0.194	0.194	0.167
0.050	0.549	0.549	0.633	0.219	0.219	0.215
0.075	0.693	0.693	0.756	0.280	0.280	0.263
0.100	0.837	0.837	0.788	0.357	0.357	0.283
0.150	1.011	1.011	0.717	0.435	0.435	0.277
0.200	1.065	1.065	0.604	0.467	0.467	0.242
0.240	1.055	1.055	0.558	0.474	0.474	0.226
0.300	1.009	1.009	0.486	0.451	0.451	0.198
0.400	0.893	0.893	0.413	0.402	0.402	0.168
0.500	0.781	0.781	0.355	0.347	0.347	0.142
0.750	0.576	0.576	0.269	0.244	0.244	0.100
1.000	0.457	0.453	0.218	0.183	0.183	0.079
1.500	0.310	0.301	0.154	0.120	0.120	0.054
2.000	0.217	0.202	0.110	0.084	0.084	0.041
3.000	0.142	0.124	0.078	0.049	0.049	0.028
4.000	0.108	0.087	0.067	0.031	0.031	0.021
5.000	0.088	0.068	0.055	0.021	0.021	0.016
7.500	0.050	0.040	0.033	0.010	0.010	0.009
10.000	0.029	0.024	0.020	0.007	0.007	0.007

Notes:
Reference V_{s30} = 400 mps.

TABLE 2-2: RELATIVE DISPLACEMENT VALUES FOR SEE AND FEE REFERENCE SPECTRA

Period (sec)	1,000 year SEE 5% Damped Rd (in)			100 year FEE 5% Damped Rd (in)		
	Fault Normal	Fault Parallel	Vertical	Fault Normal	Fault Parallel	Vertical
0.010	0.000	0.000	0.000	0.000	0.000	0.000
0.020	0.002	0.002	0.001	0.001	0.001	0.001
0.030	0.004	0.004	0.004	0.002	0.002	0.001
0.050	0.013	0.013	0.015	0.005	0.005	0.005
0.075	0.038	0.038	0.042	0.015	0.015	0.014
0.100	0.082	0.082	0.077	0.035	0.035	0.028
0.150	0.223	0.223	0.158	0.096	0.096	0.061
0.200	0.417	0.417	0.236	0.183	0.183	0.095
0.240	0.595	0.595	0.314	0.267	0.267	0.128
0.300	0.889	0.889	0.428	0.397	0.397	0.174
0.400	1.399	1.399	0.647	0.630	0.630	0.263
0.500	1.912	1.912	0.867	0.848	0.848	0.347
0.750	3.174	3.174	1.483	1.346	1.346	0.552
1.000	4.474	4.436	2.135	1.788	1.788	0.770
1.500	6.819	6.637	3.385	2.636	2.636	1.196
2.000	8.497	7.917	4.322	3.293	3.293	1.590
3.000	12.540	10.966	6.898	4.317	4.317	2.502
4.000	16.926	13.671	10.430	4.917	4.917	3.351
5.000	21.419	16.672	13.385	5.065	5.065	3.964
7.500	27.738	22.287	18.169	5.726	5.726	5.175
10.000	28.345	23.765	19.674	6.656	6.656	6.558

Note: reference V_{s30} = 400 mps.

TABLE 2-3: 1,000 YEAR MEAN MAGNITUDE, DISTANCE, AND EPSILON VALUES FOR PGA AND T=3.0 SEC (FAULT NORMAL COMPONENT) BASED ON THE DEAGGREGATION OF THE HAZARD

Parameter	PGA	T=3.0 Sec (Fault Normal)
Mean Magnitude	7.05	7.36
Mean Distance (km)	16.2	19.6
Mean Epsilon	1.89	1.31

TABLE 2-4: 100 YEAR MEAN MAGNITUDE, DISTANCE, AND EPSILON VALUES FOR PGA AND T=3.0 SEC (FAULT NORMAL COMPONENT) BASED ON THE DEAGGREGATION OF THE HAZARD

Parameter	PGA	T=3.0 Sec (Fault Normal)
Mean Magnitude	6	6
Mean Distance (km)	22	25

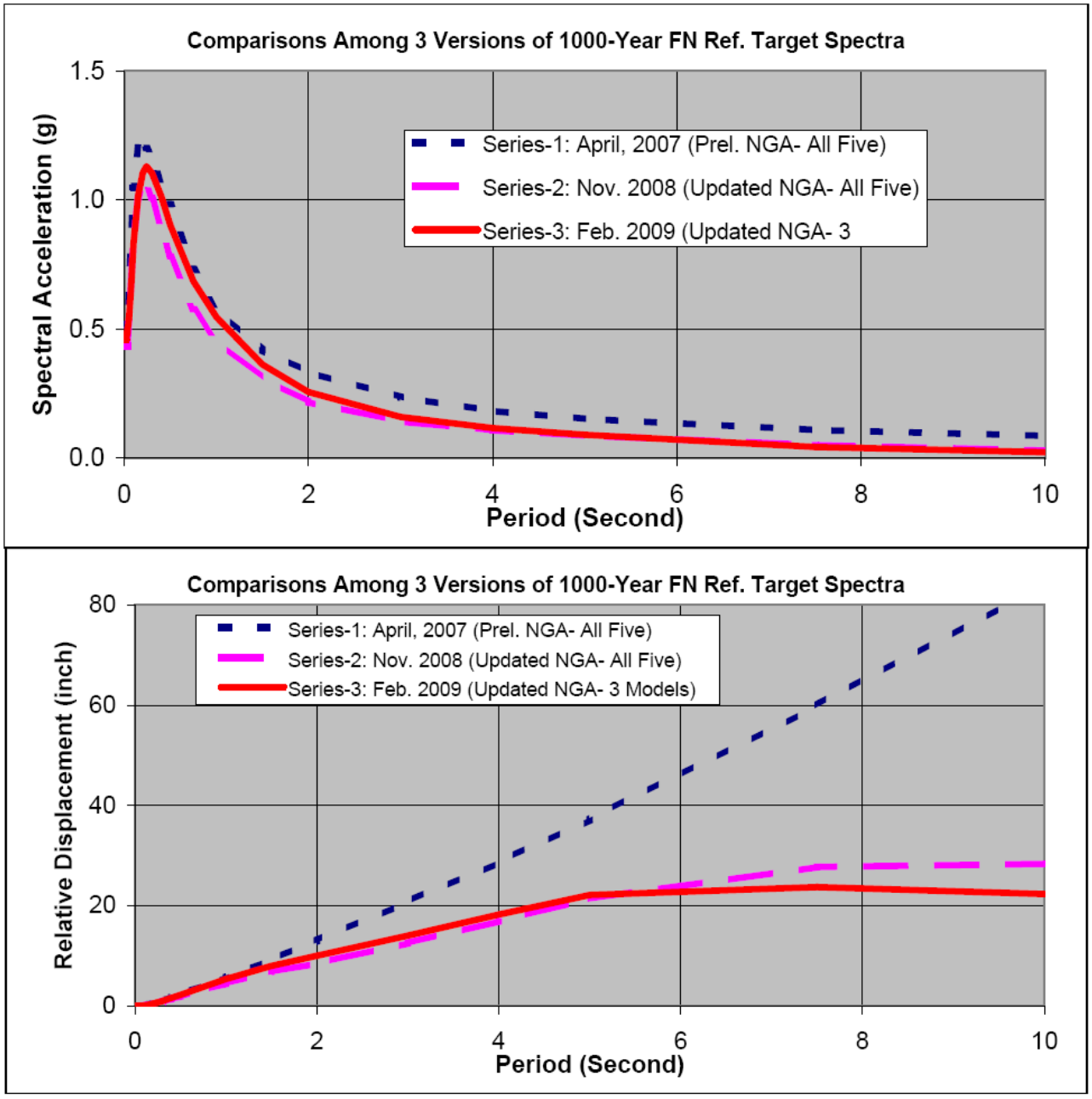
TABLE 2-5: TABULATION OF STARTUP MOTION RECORDS FOR 100-YEAR FEE TIME HISTORIES

Record Set No.	Year	Event	Mag	Mechanism	Station	Rjb(km)	Rrup(km)	Rec. Station V_{s30}(m/s)	Azimuth of zero c.c. of displ history wrt FN, Counter Clockwise (Deg)*	Princ. Dir wrt FN, Counter Clockwise (Deg)	Rationale of Princ Direction	Component Designation	Amax (g)	Vmax (in/s)	Dmax (in)
1	1966	Parkfield	6.2	Strike-Slip	Cholame - Shandon Array #8	12.9	12.9	257	36.1	36.1	Zero cross correlation of displ.history	C08-MAJ C08-MIN C08-UP	0.287 0.167 0.116	5.071 4.103 1.662	1.350 1.080 0.583
2	1979	Imperial Valley-06	6.5	Strike-Slip	Calexico Fire Station	10.4	10.4	231	28.1	49.0	Overall fit at periods of interest	H-CXO-MJ H-CXO-MN H-CXO-UP	0.207 0.270 0.187	6.625 9.082 2.623	2.923 4.248 0.977
3	1979	Imperial Valley-06	6.5	Strike-Slip	Cerro Prieto	15.2	15.2	660	16.0	19.5	Zero cross correlation of vel. history	H-CPE-MJ H-CPE-MN H-CPEDWN	0.124 0.194 0.075	4.734 3.463 1.118	1.447 0.705 0.381
4	1979	Imperial Valley-06	6.5	Strike-Slip	Compuertas	13.5	15.3	275	-5.6	0.0	Zero cross correlation of displ.history	H-CMP-MJ H-CMP-MN H-CMPDWN	0.124 0.194 0.075	4.734 3.463 1.118	1.447 0.705 0.381
5	1984	Morgan Hill	6.2	Strike-Slip	Gilroy Array #2	13.7	13.7	271	-7.7	0.0	Zero cross correlation of displ.history	G02-MAJ G02-MIN G02-UP	0.178 0.146 0.578	4.374 2.370 4.240	0.704 0.510 0.362
6	1994	Northridge-01	6.7	Reverse	LA - Centinela St	20.4	28.3	235	41.6	41.6	Zero cross correlation of displ.history	CEN-MAJ CEN-MIN CEN-UP	0.329 0.454 0.109	9.812 6.263 4.187	2.206 1.470 1.491
7	1994	Northridge-01	6.7	Reverse	Vasquez Rocks Park	23.1	23.6	996	104.0	104.0	Zero cross correlation of displ.history	VAS-MAJ VAS-MIN VAS-UP	0.142 0.165 0.091	5.397 6.219 2.417	1.569 0.960 0.633

Note:

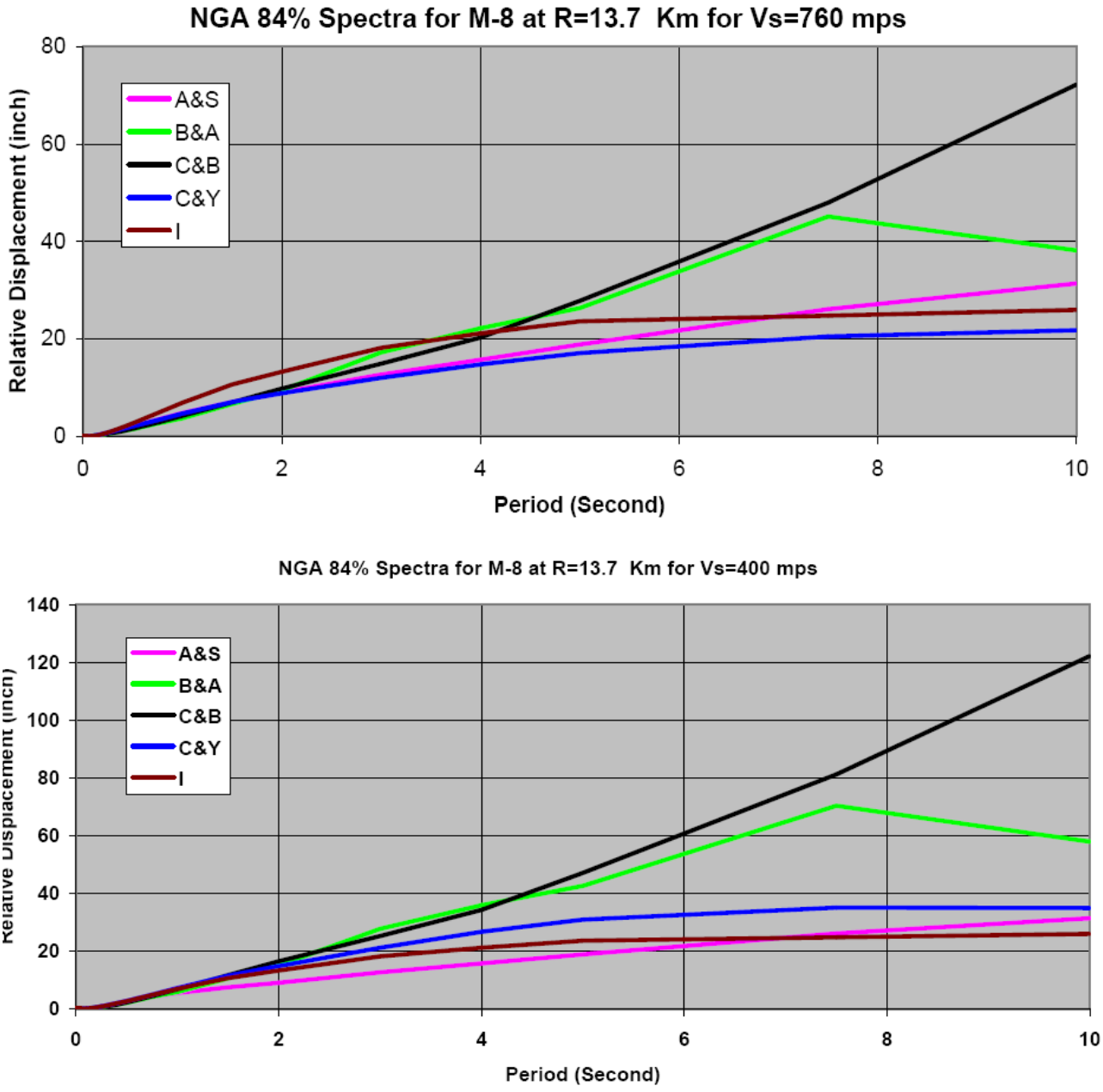
Column 10 tabulates the orientation of the principal major axis of the specific strong motion record based on zero cross correlation calculated from the FN and FP displacement time history records. The Table reveals that the principal axes for the Set-4 and the Set-5 startup motions are sufficiently close to the theoretical FN and FP axes. However, very large deviations from this basis are observed for other startup motion records. There are significant deviation among individual recording stations even from strong motions from the same earthquake event (e.g. comparing records 2-4 and record 6 and 7). For some records, the principal major direction aligned closer to the theoretical FP than the theoretical FN direction.

FIGURE 2-1: COMPARISONS AMONG 3-SERIES OF 1,000-YEAR FN UHS



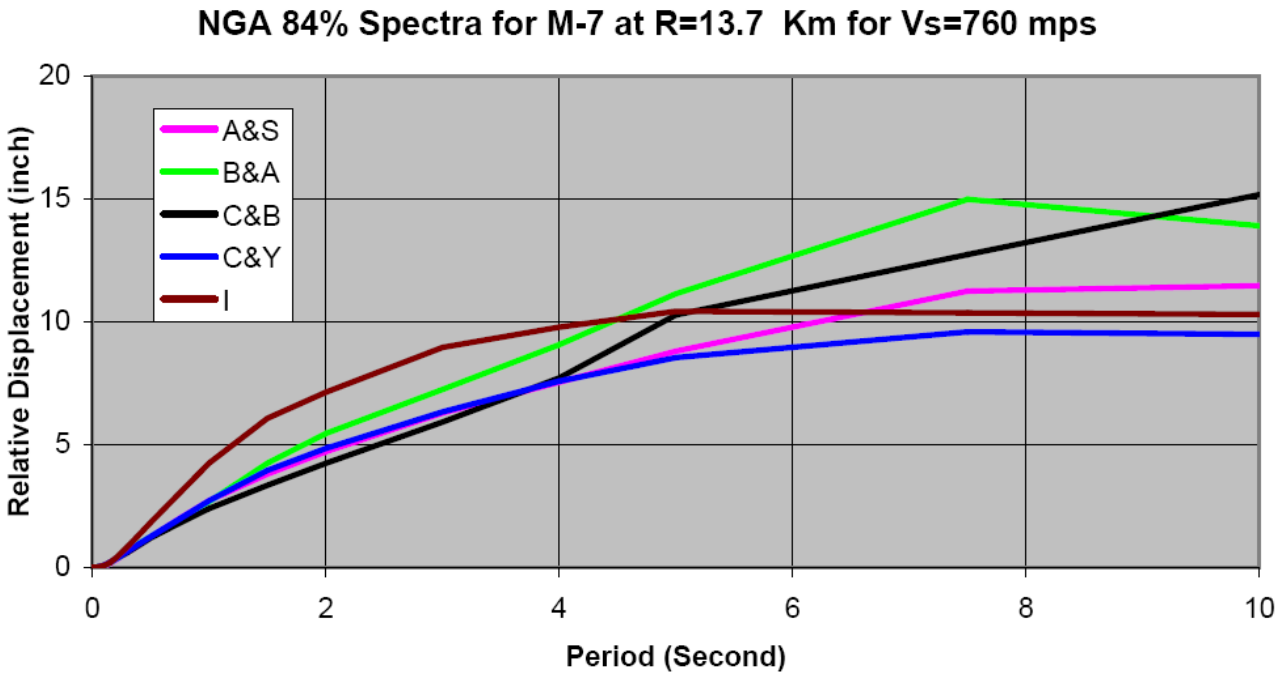
Note: V_{s30} at 400 mps was specified in all above NGA models, except for the Idriss's model, which is defined for average shear wave velocity between 450 – 900 m/s rather than a specific shear wave value. Nevertheless, Idriss's NGA model has been included in the above analyses.

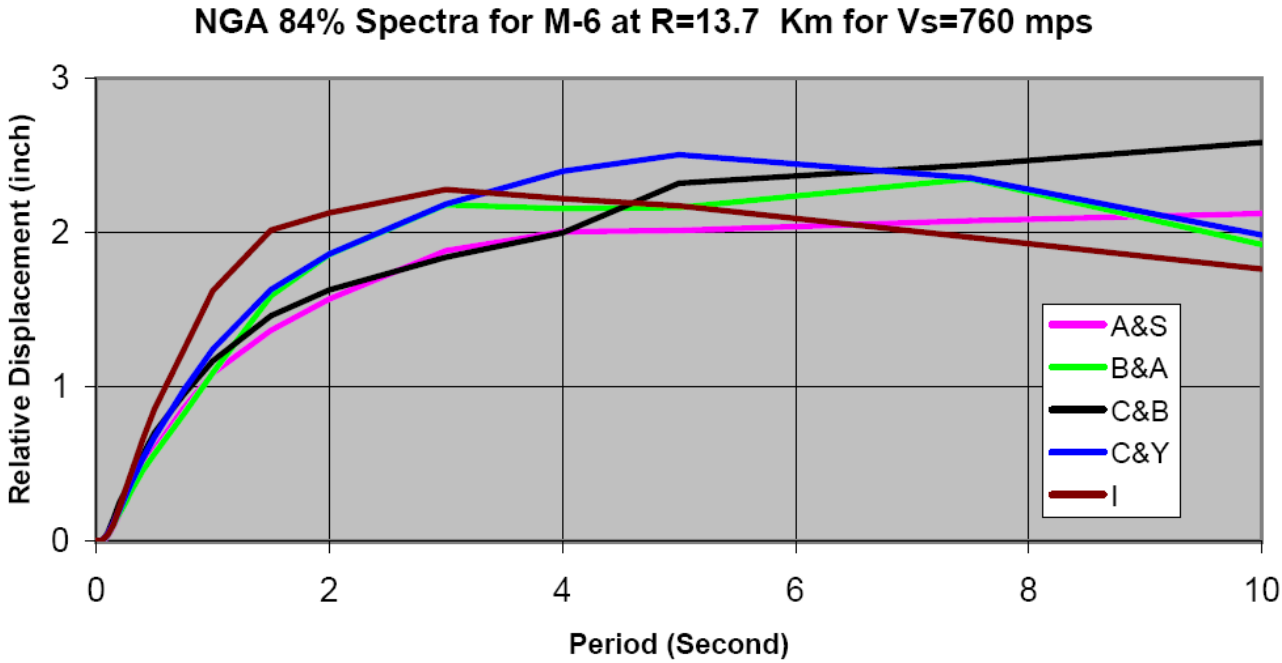
FIGURE 2-2: COMPARISON AMONG VARIOUS NGA MODELS IN TERMS OF 84% DETERMINISTIC SPECTRA FOR MAGNITUDE 8 EVENT AT 13.7 KM DISTANCE FOR VS = 760 AND VS = 400 MPS



Note: the Idriss NGA does not provide for specific V_{s30} input parameters and an identical spectrum is shown in both the Vs=760 mps and the Vs=400 mps plots.

FIGURE 2-3: COMPARISON AMONG VARIOUS NGA MODELS IN TERMS OF 84% DETERMINISTIC SPECTRA FOR SMALLER MAGNITUDE EVENTS AT 13.7 KM DISTANCE FOR VS = 760 MPS





Note: the Idriss NGA does not provide for a specific Vs30 input parameter.

FIGURE 2-4: UNIFORM HAZARD SPECTRA AND MCE SPECTRA (SPECTRAL ACCELERATION)

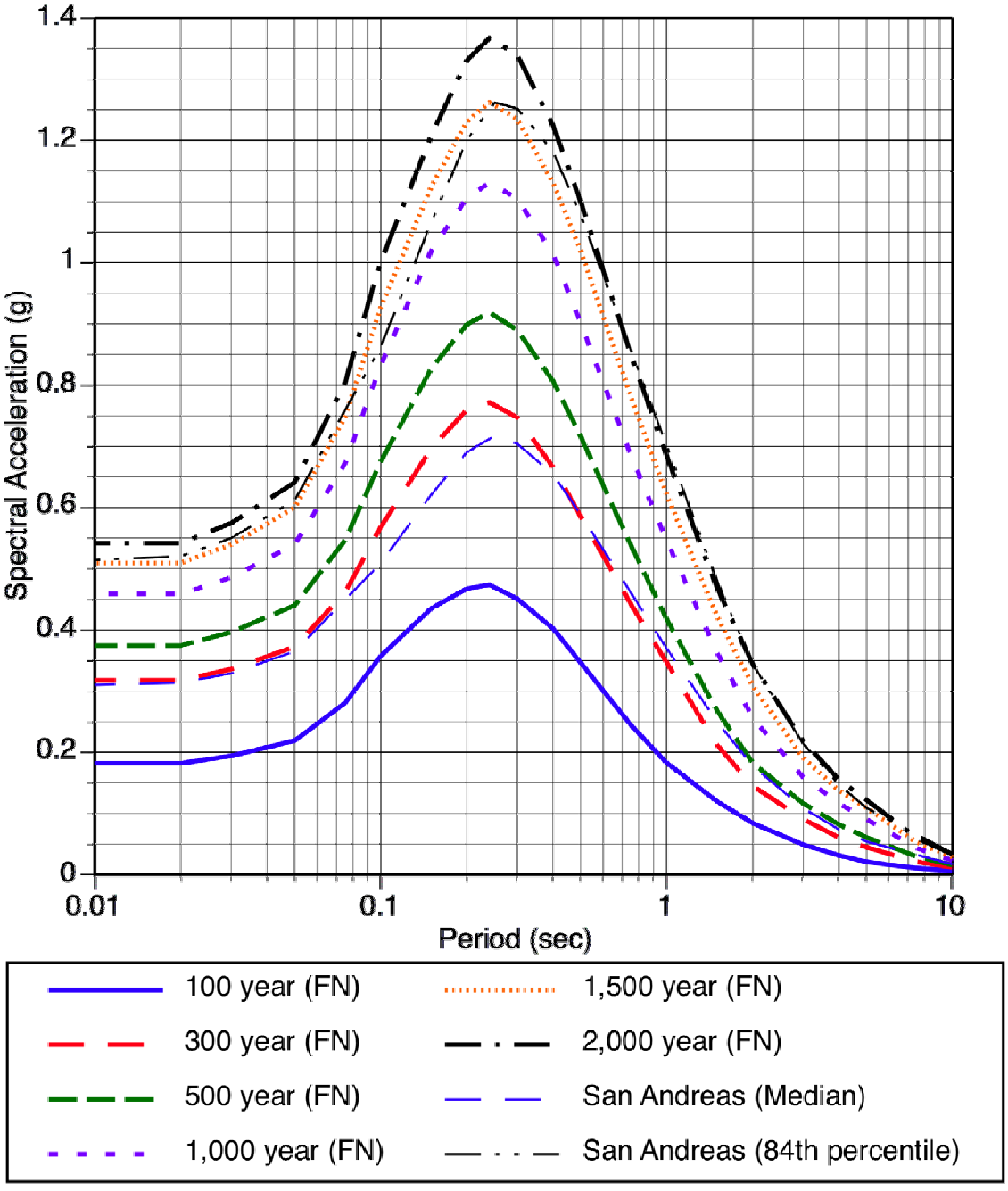


FIGURE 2-5: UNIFORM HAZARD SPECTRA AND MCE SPECTRA (SPECTRAL DISPLACEMENT)

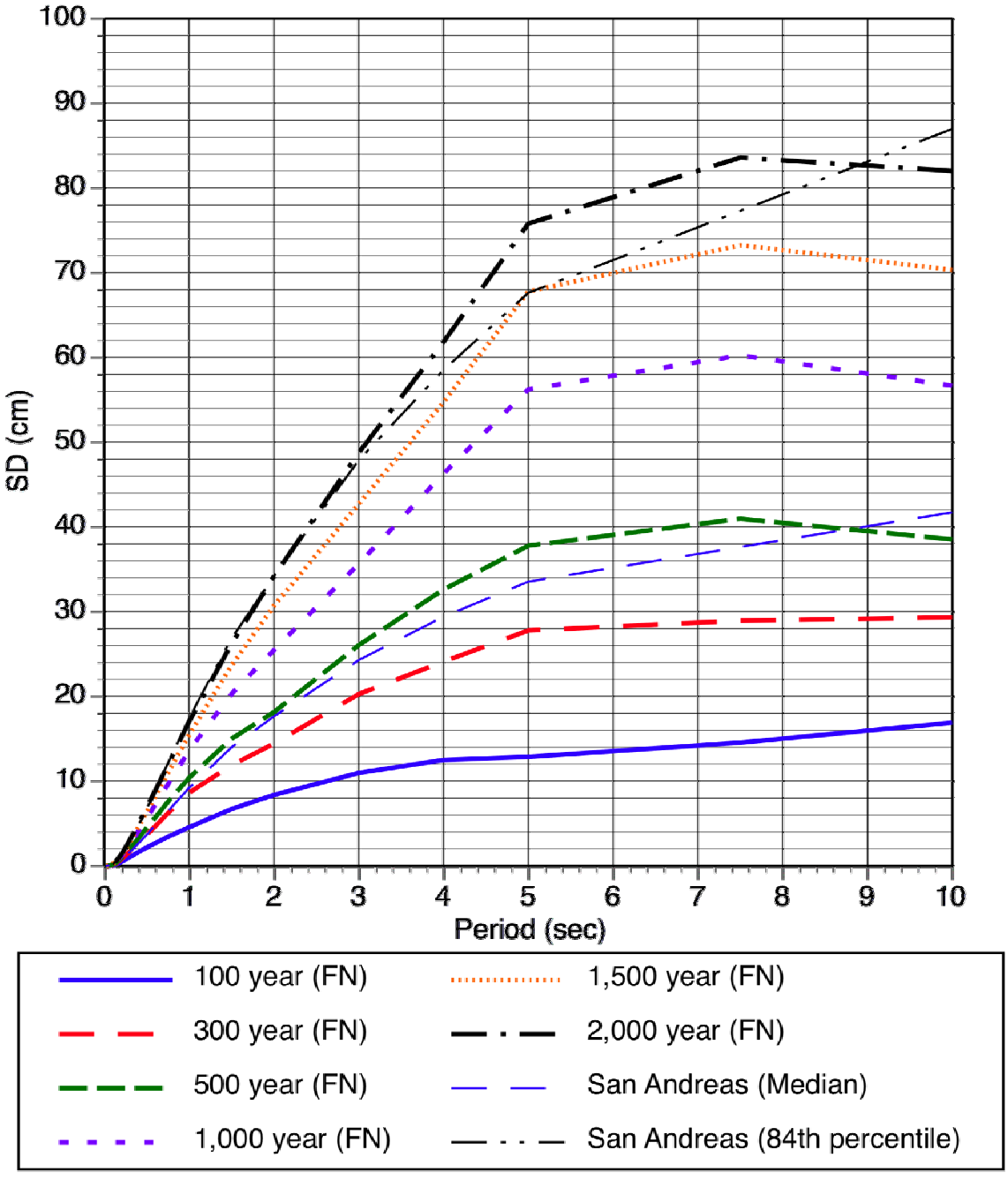


FIGURE 2-6: SEE AND FEE ACCELERATION REF. SPECTRA

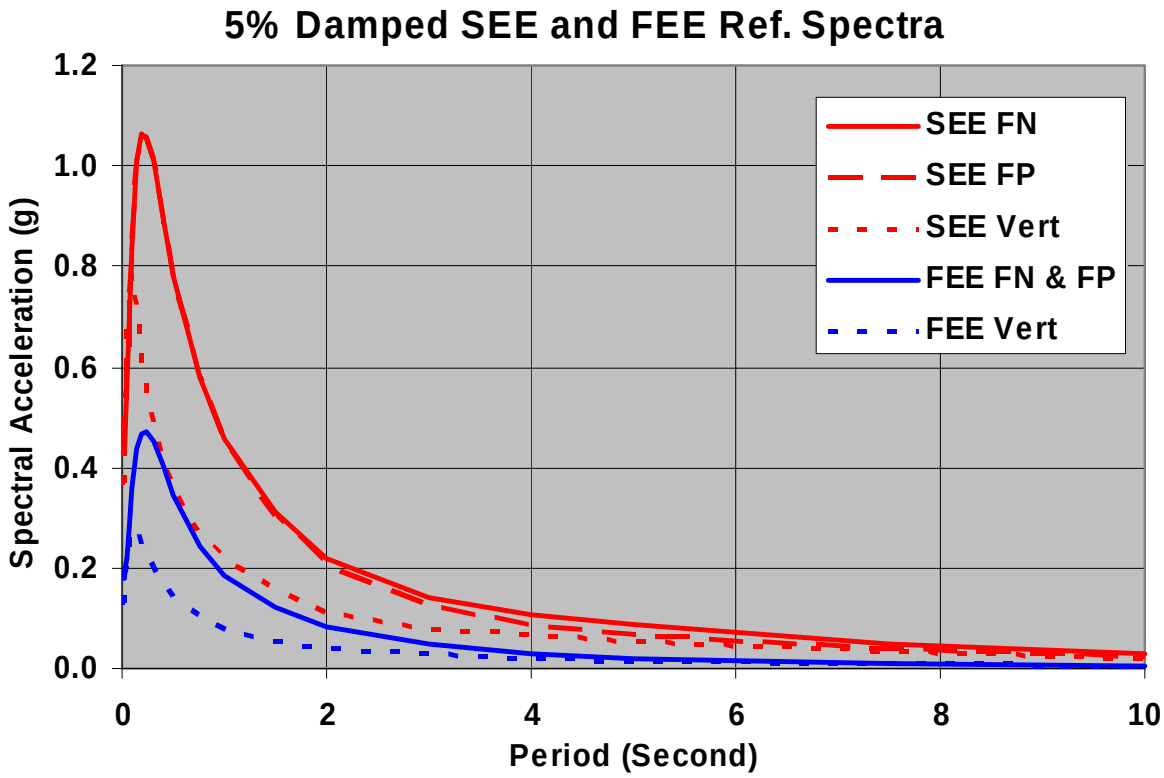
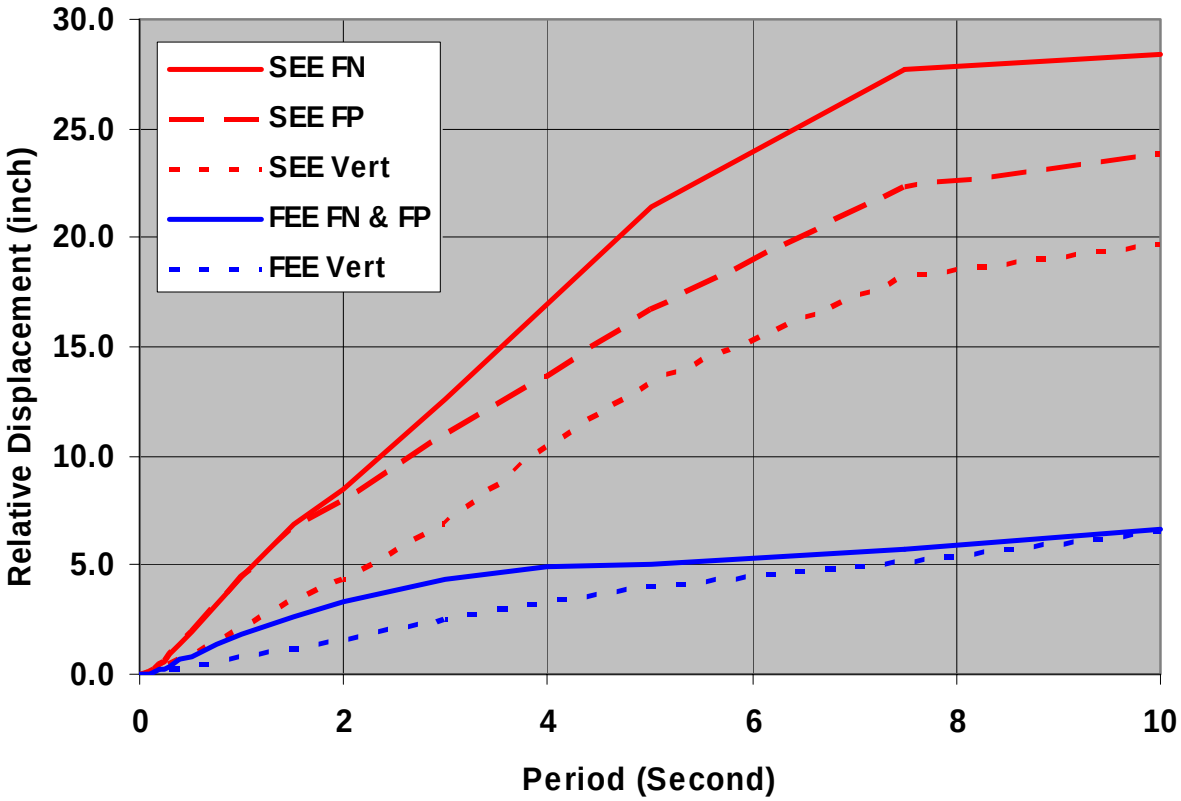


FIGURE 2-7: SEE AND FEE DISPLACEMENT REF. SPECTRA



Notes:

1) SEE Spectra are based on Series-2 PSHA (i.e. Averaging All Five Updated NGA).
2) FEE Spectra are based on Series-3 PSHA (i.e. Excluding C&B and B&A NGA Models).
3) V_{s30} defined at 400 mps, in all NGA Models, except for the Idriss Model.

FIGURE 2-8: DEAGGREGATION OF PGA HAZARD AT THE RETURN PERIOD OF 1,000 YEARS

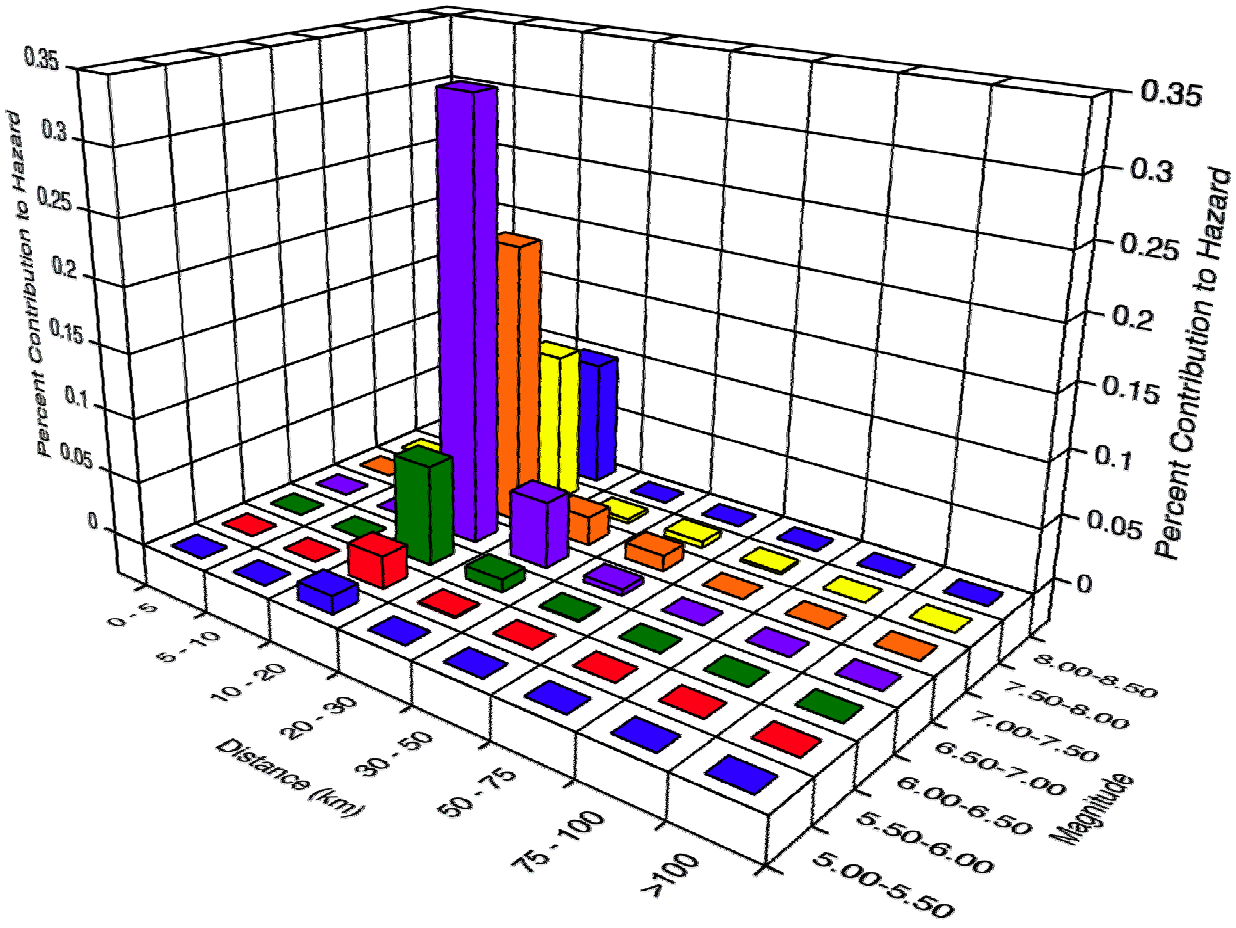


FIGURE 2-9: DEAGGREGATION OF T=3 SEC HAZARDS AT THE RETURN PERIOD OF 1,000 YEARS

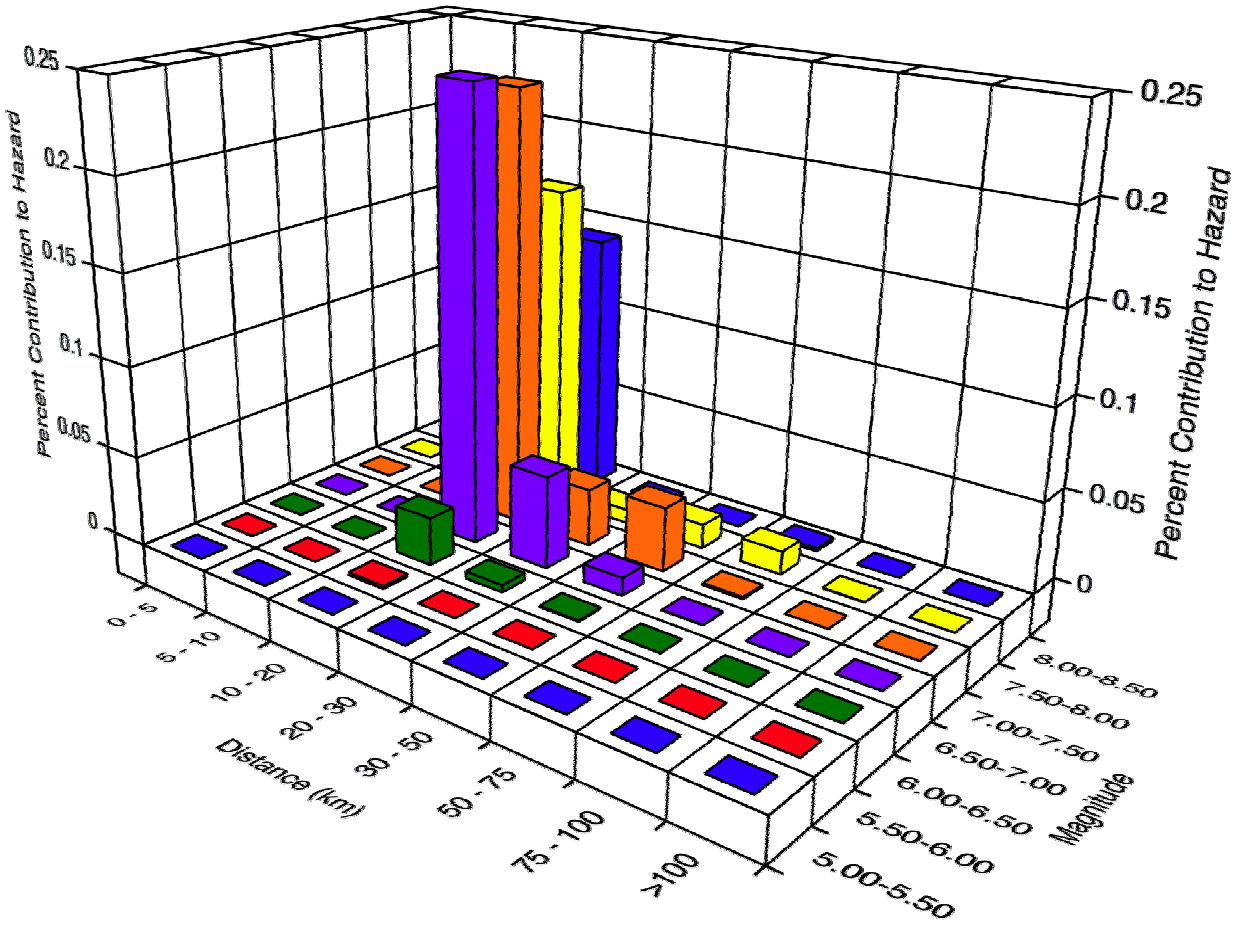


FIGURE 2-10: DIRECTIVITY DEAGGREGATION OF XCOS(0) DIRECTIVITY PARAMETER FOR THE FAULT NORMAL HAZARD AT THE RETURN PERIOD OF 1,000 YEARS

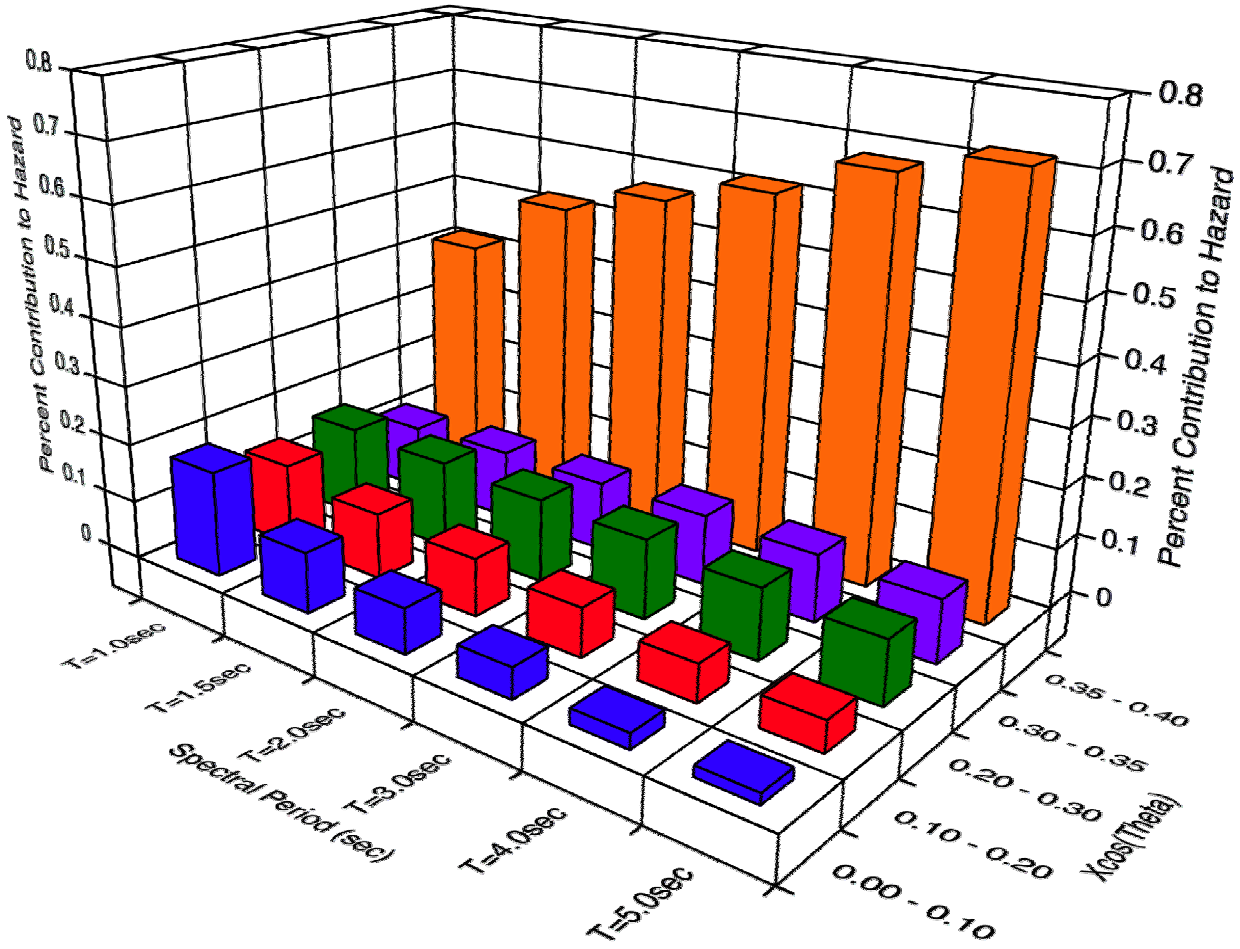


FIGURE 2-11: DEFINING PRINCIPAL DIRECTION FOR STARTUP MOTION SET-4

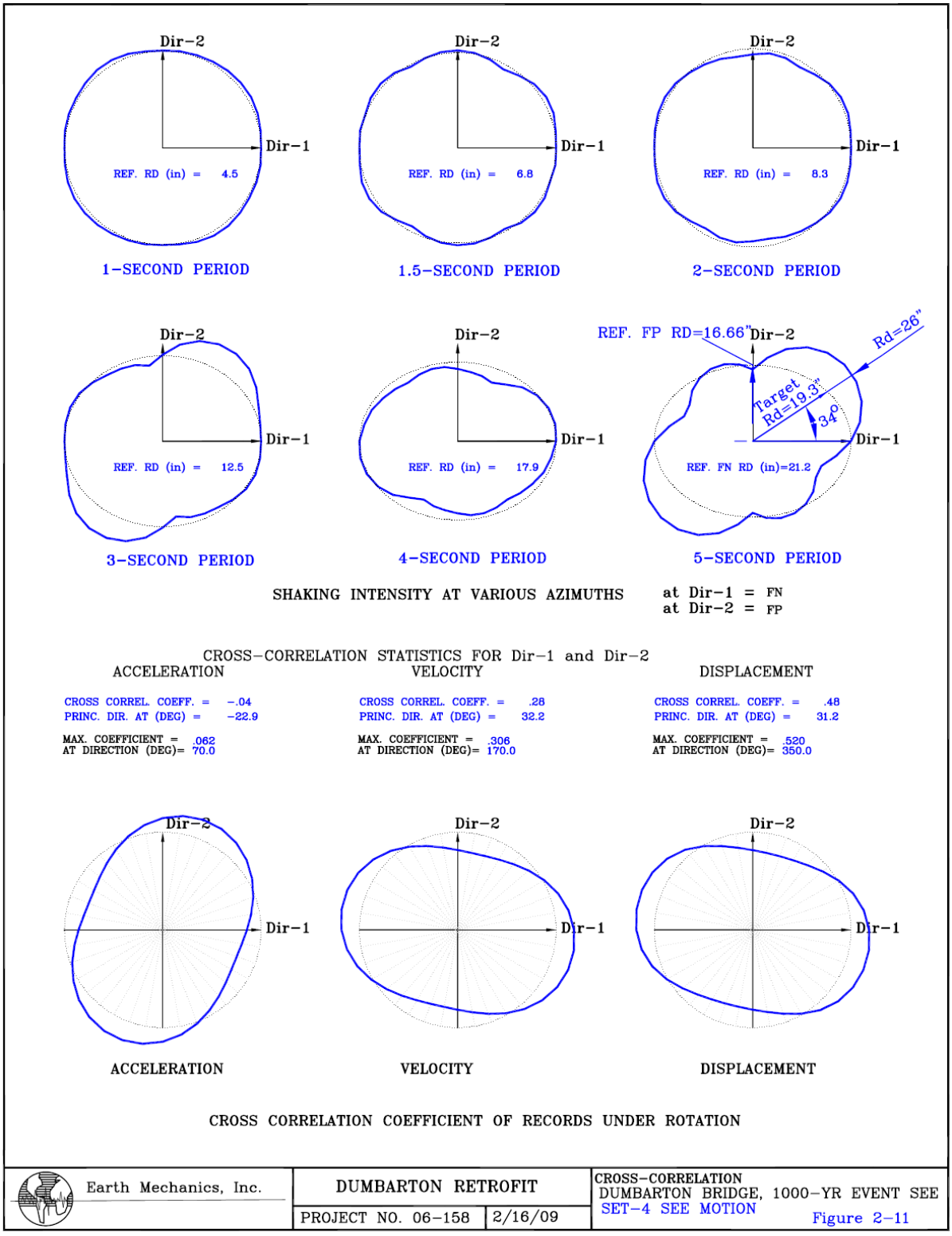


FIGURE 2-12: FEATURE OF TIME HISTORY OF SET-4 MOTION AT 34-DEGREE C.C. DIRECTION FROM FN

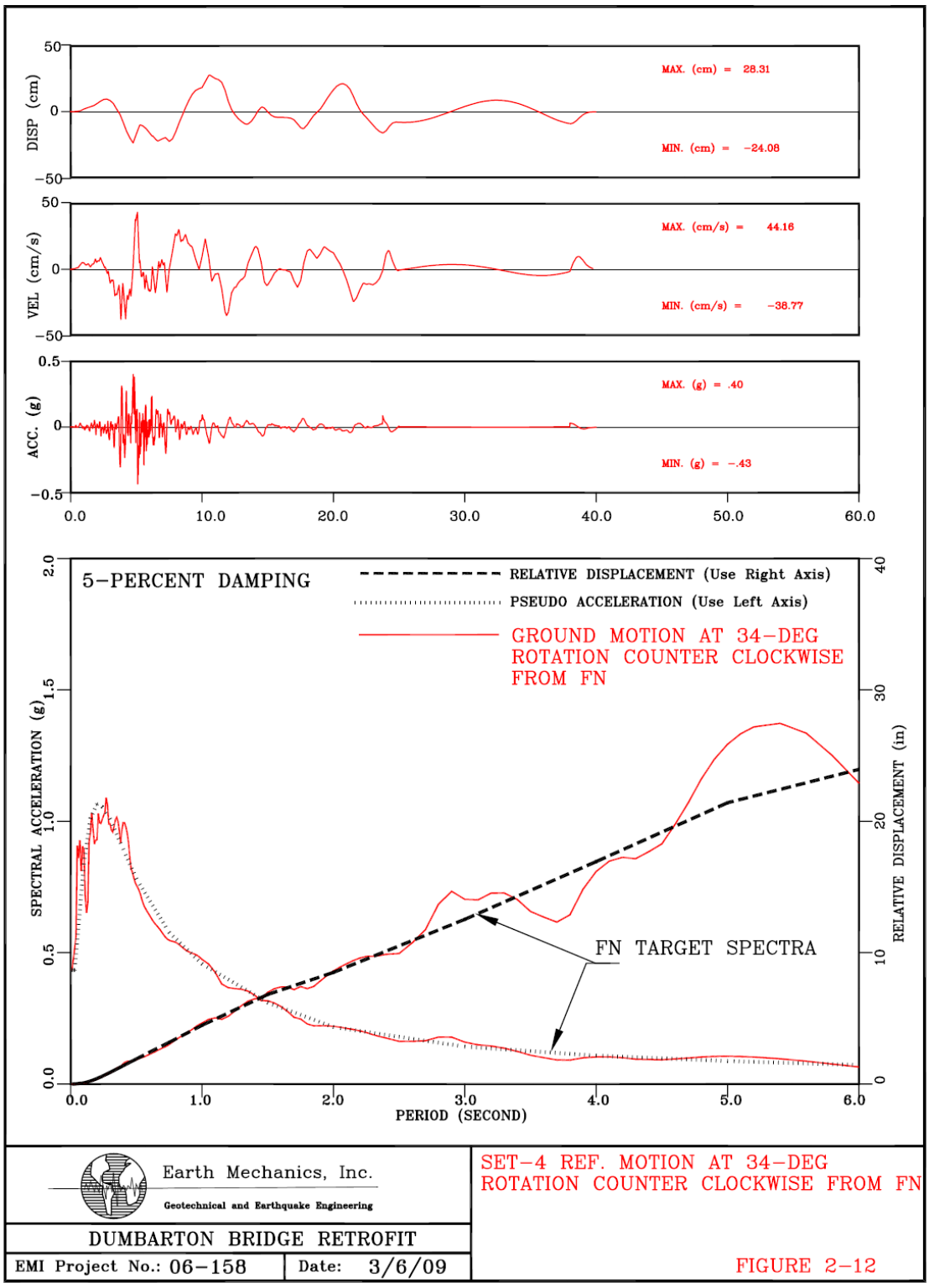
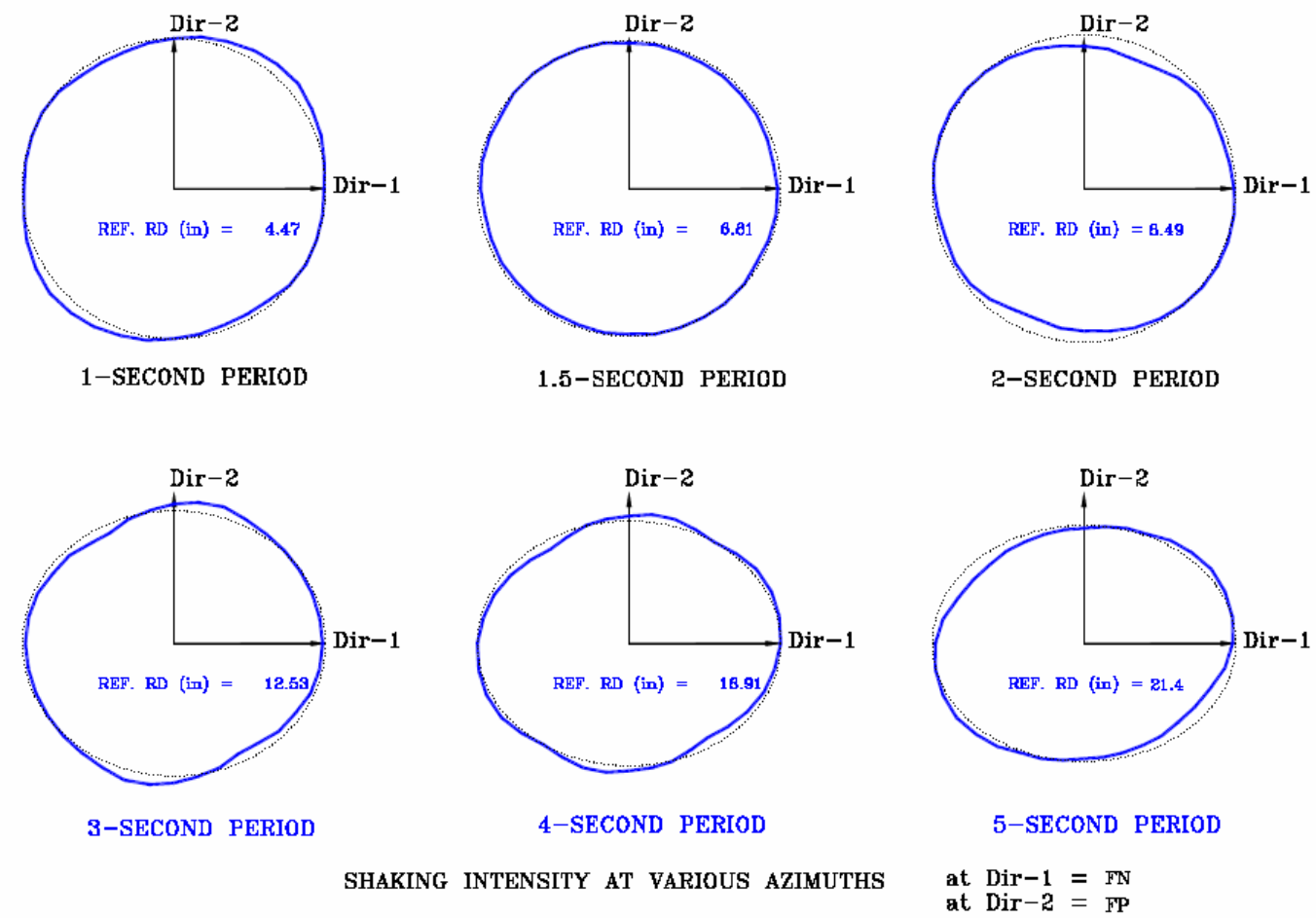


FIGURE 2-13: AVERAGE OF 7 SETS OF SEE SPECTRUM-COMPATIBLE MOTION IN ROTATED DIRECTIONS



Note: blue lines from averaging 7 sets of motion as compared o the black elliptical target implied by FN and FP target spectra.

FIGURE 2-14: DEAGGREGATION OF PGA HAZARD AT THE RETURN PERIOD OF 100 YEARS

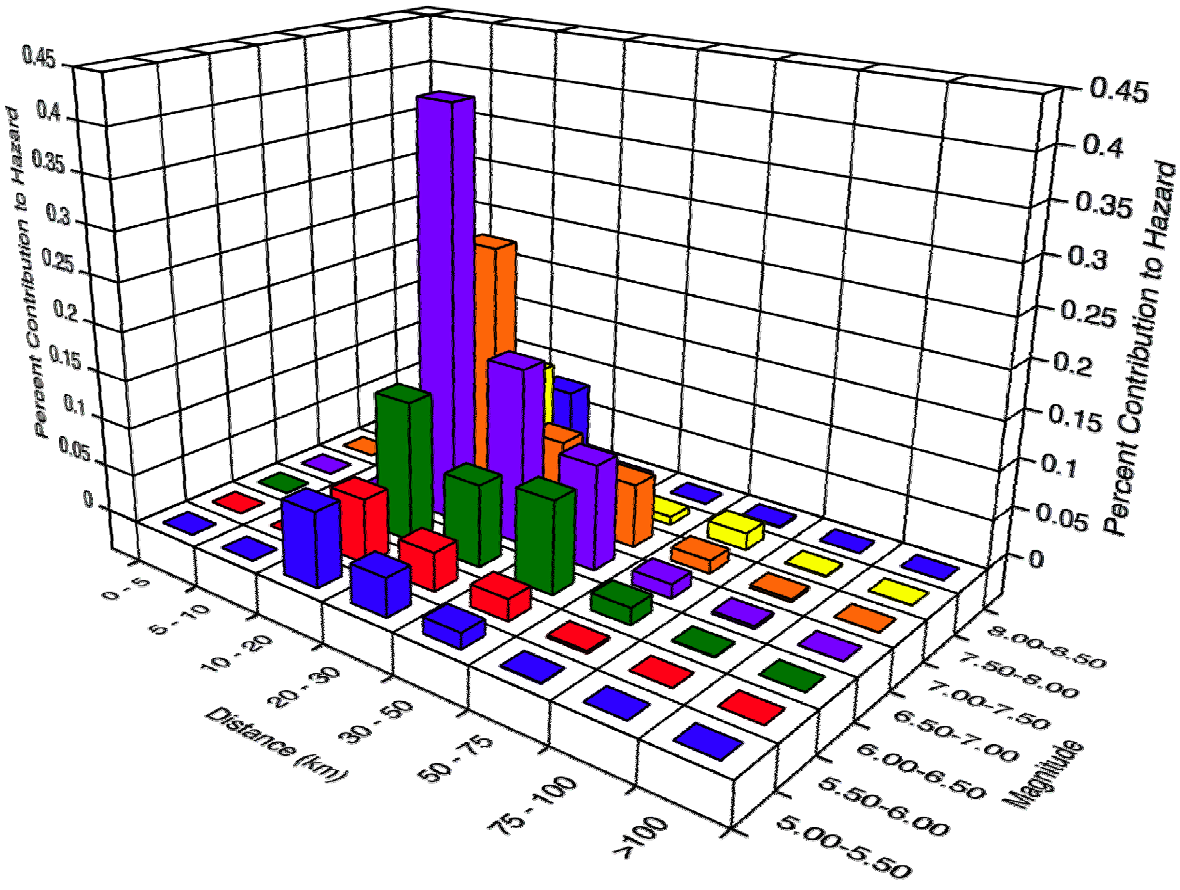


FIGURE 2-15: DEAGGREGATION OF 3-SECOND HAZARD AT THE RETURN PERIOD OF 100 YEARS

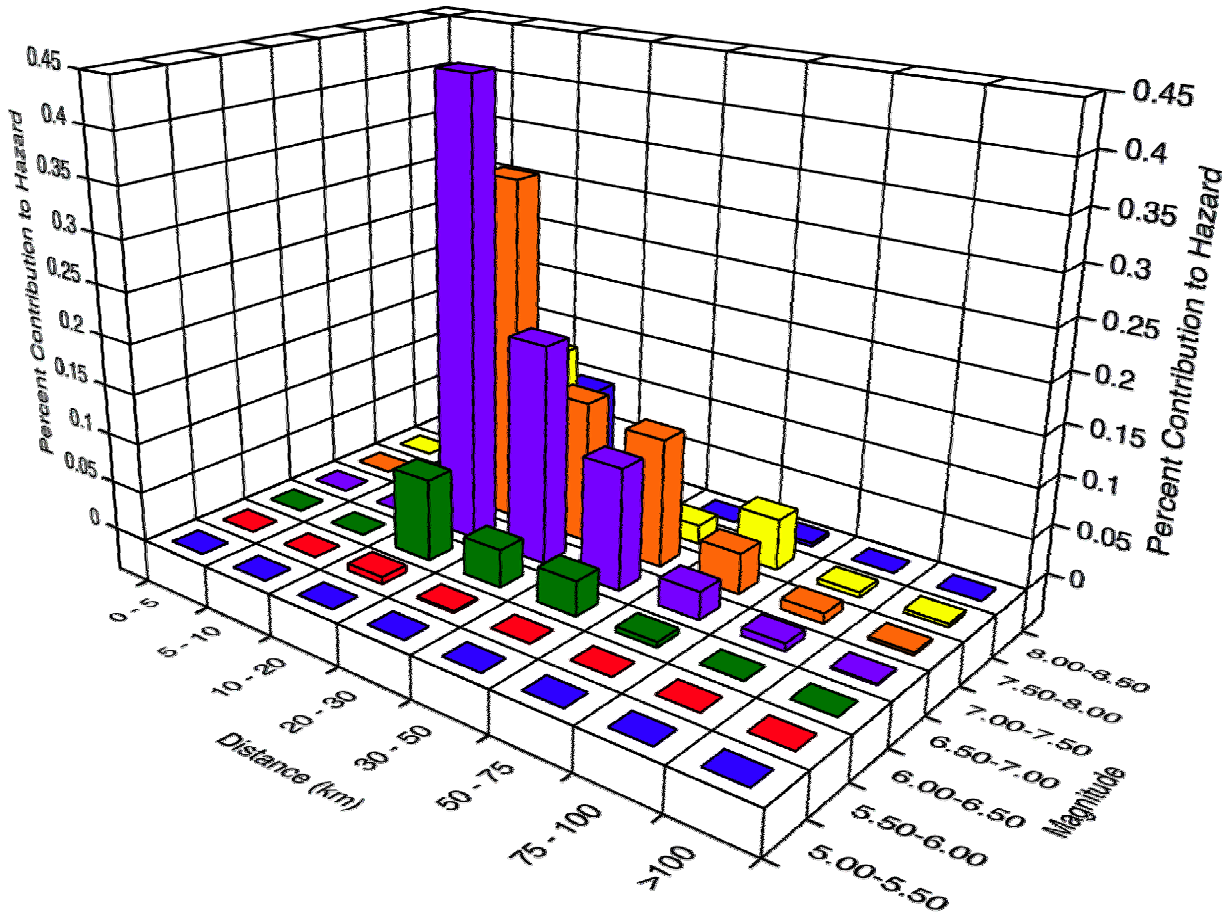


FIGURE 2-16: EXAMPLE IN DEFINING PRINCIPAL MAJOR AXES IN THE STARTUP MOTION SET-1

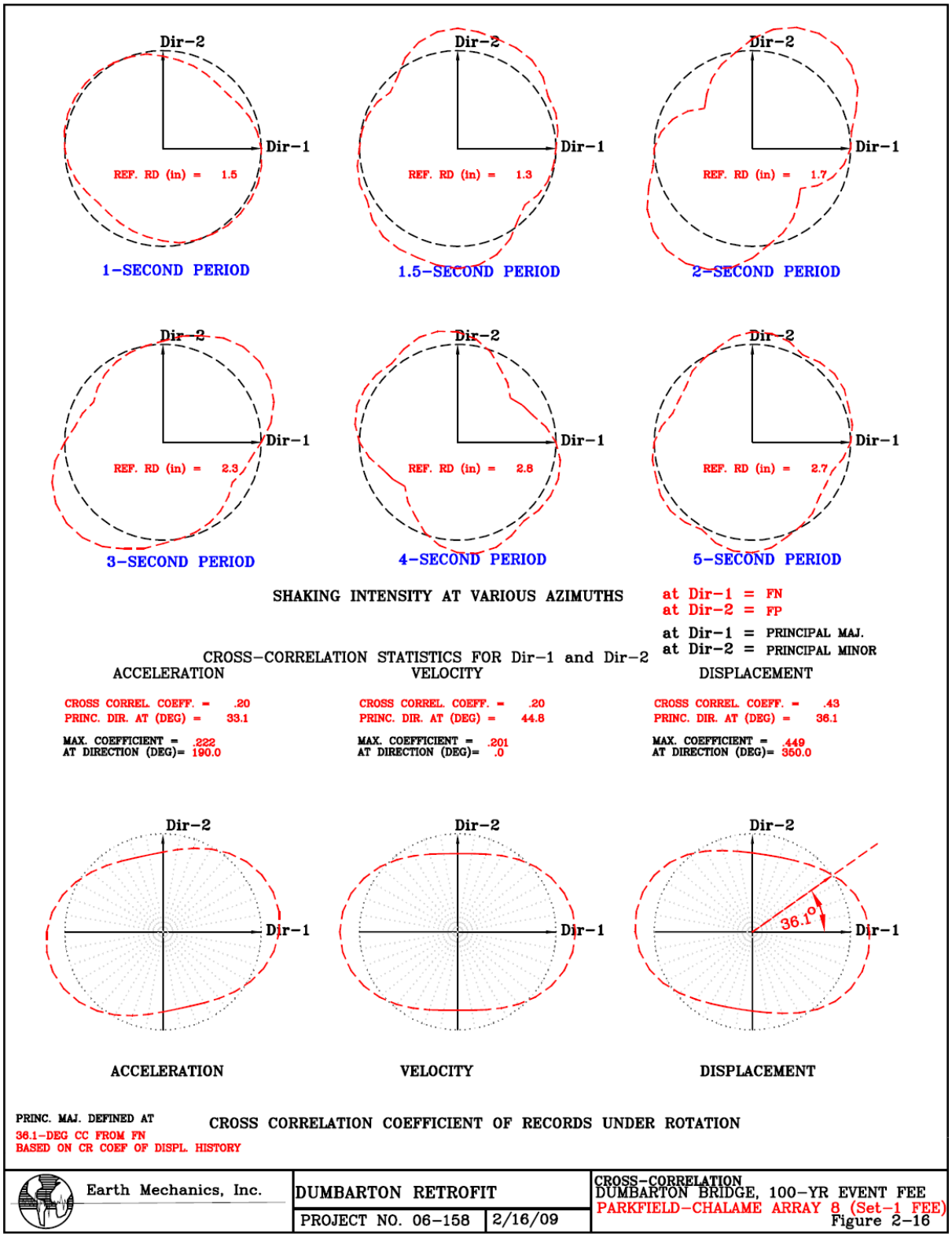


FIGURE 2-17: DEFINING PRINCIPAL DIRECTION FOR STARTUP MOTION SET-2

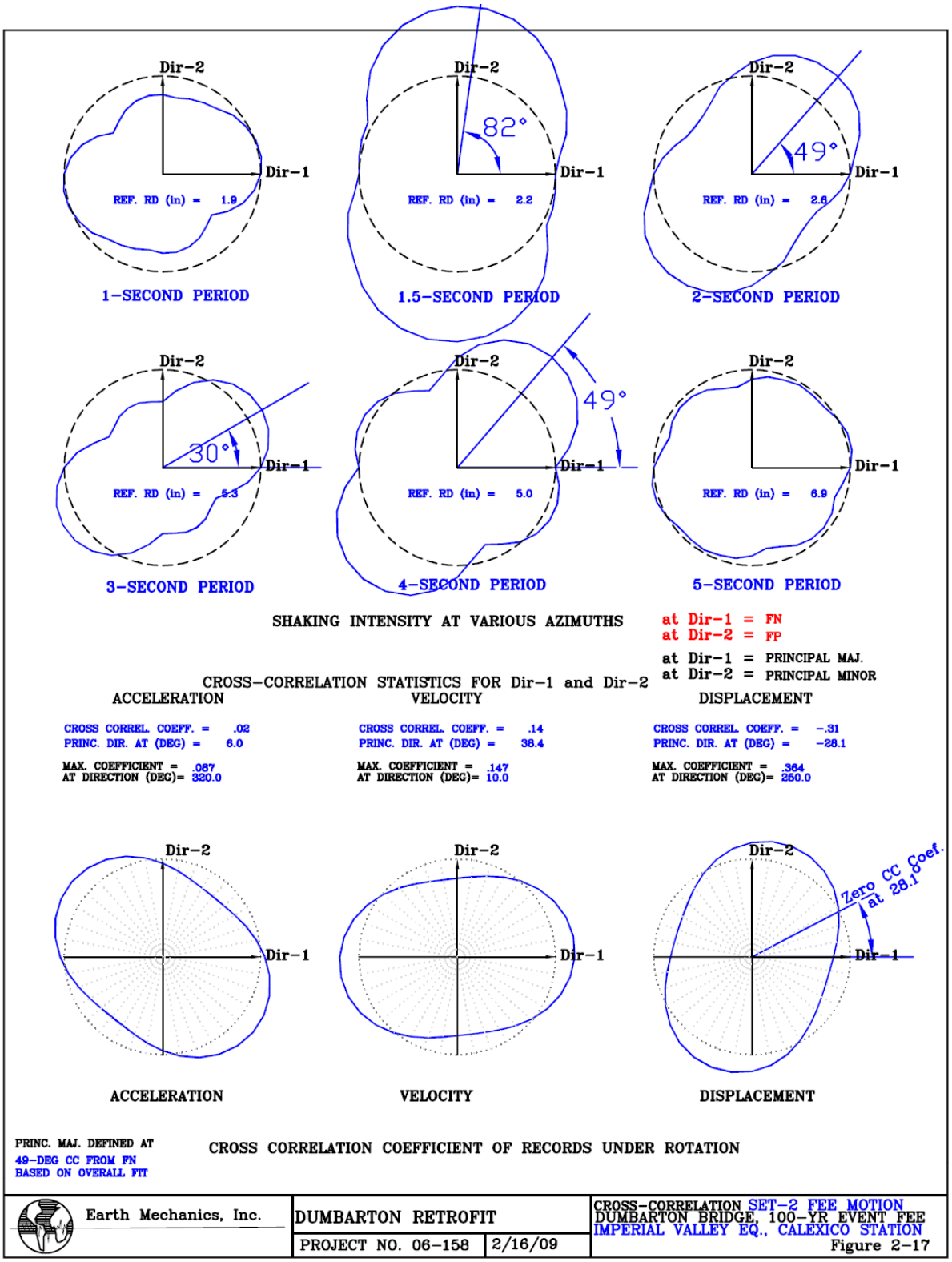


FIGURE 2-18: DEFINING PRINCIPAL DIRECTION FOR STARTUP MOTION SET-3

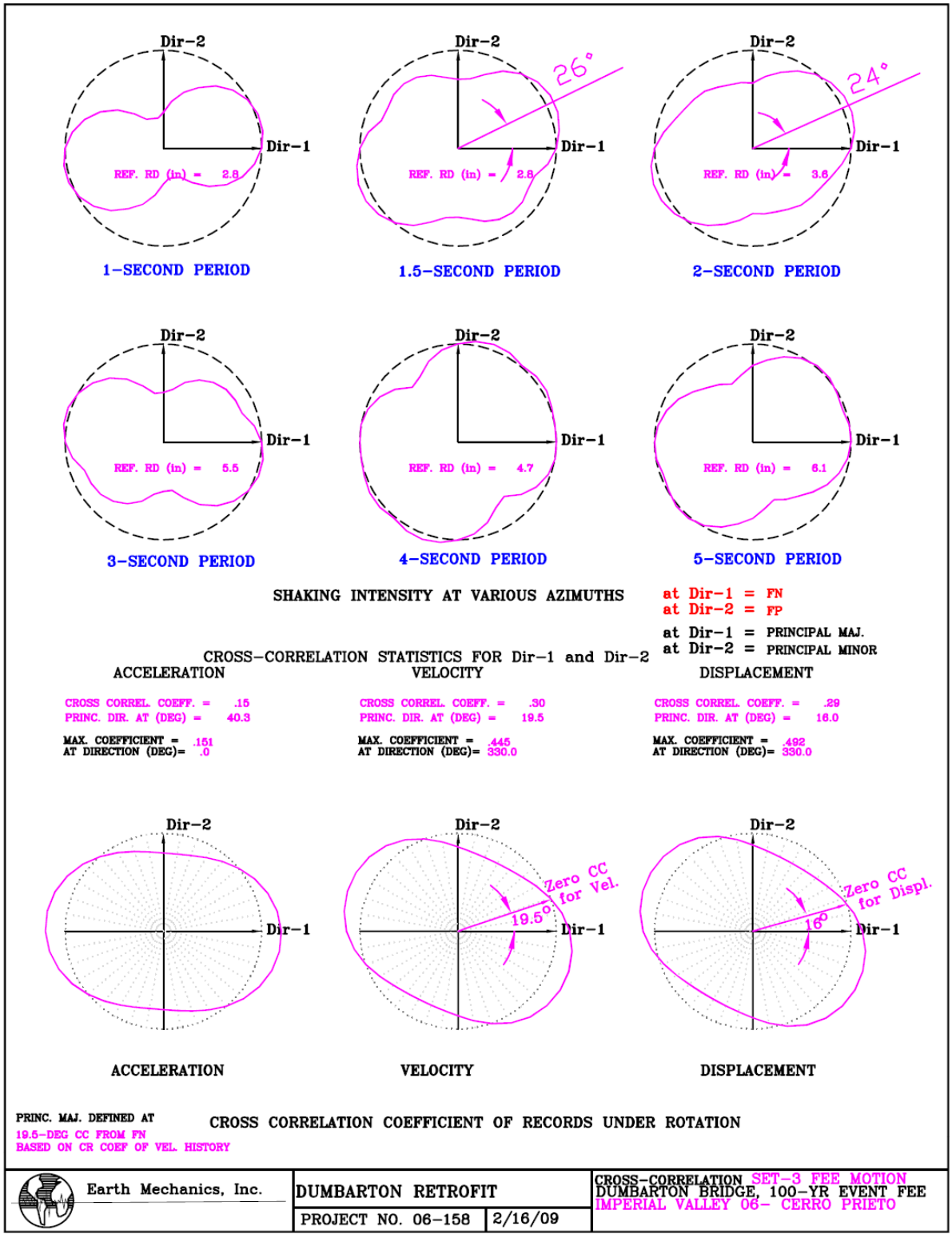
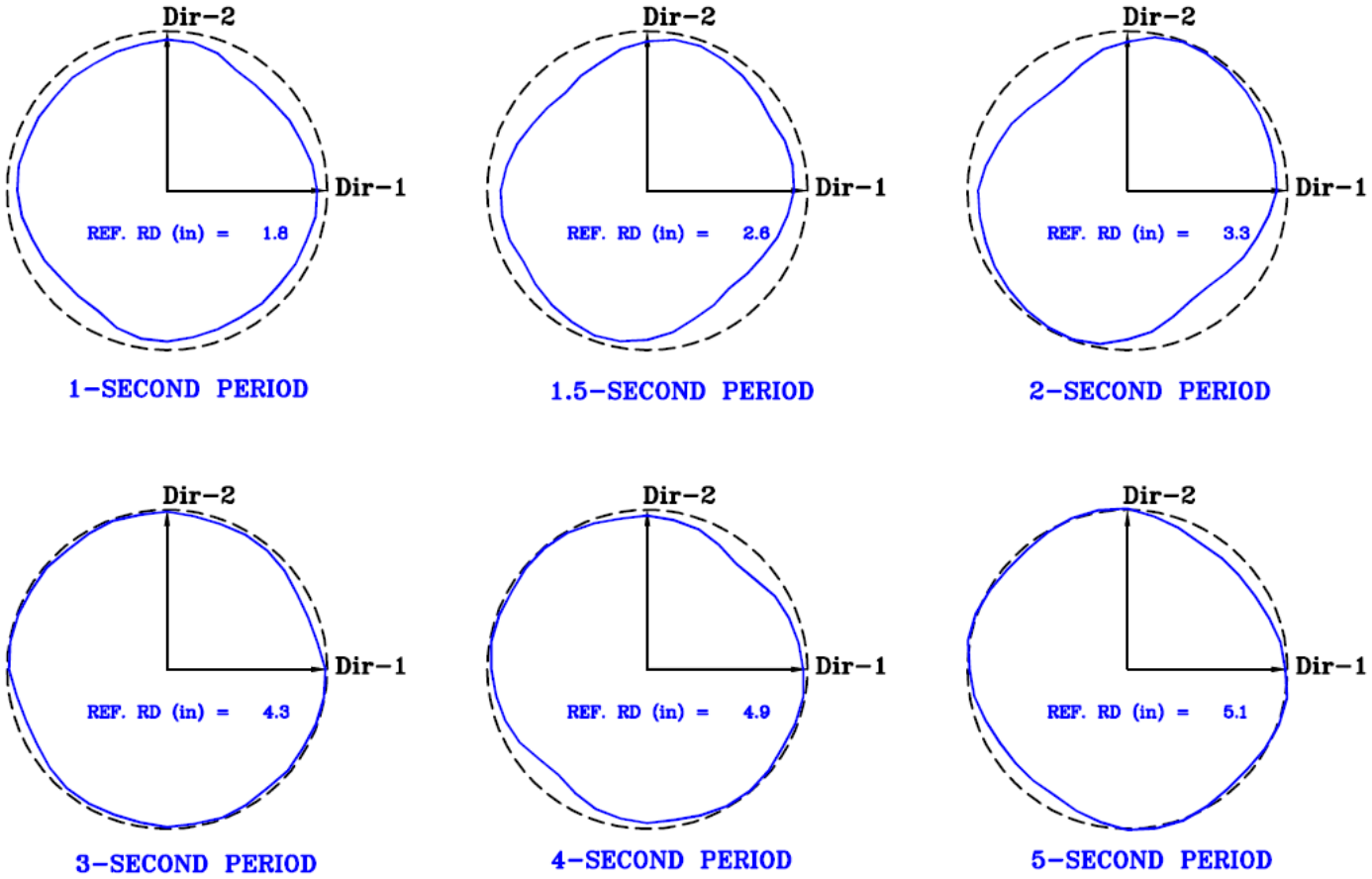


FIGURE 2-19: AVERAGE OF 7 SETS OF FEE SPECTRUM-COMPATIBLE MOTION IN ROTATED DIRECTIONS



Note: blue lines from averaging 7 sets of motion as compared o the black elliptical target implied by FN and FP target spectra.

3.0 SITE RESPONSE AND SOIL-STRUCTURE INTERACTION

3.1 Subsurface Conditions

As part of the geotechnical investigation program, EMI conducted extensive site exploration in the marine and on-land areas for the Dumbarton Toll Bridge. While most borings and CPT sounding investigated in this program penetrated depths of approximately 250 ft below the modern southern San Francisco Bay surface, some of the borings drilled by CALTRANS in 1995 were in excess of 600-feet depth. The following units have been identified and interpreted based on current and existing borehole data, geophysical information and previous work (see Figure 3-1).

- Fill: Silty clay and silty sand layer is from elevation approximately +10 to -10 feet, underlying the Trestles at both ends of the bridge.

- Young Bay Mud: Laterally continuous, very soft, plastic, organic-rich mud found from the modern Bay surface to approximately –40 to –60 feet elevation. Dredging in the center of the shipping channel has removed much of the upper 40 feet of mud. The wet, loose sediment is gray to dark gray, very fine-grained (clay, silt and fine-grained sand), and generally homogeneous. Bedding is usually absent although occasional parting surfaces and thin laminations of fine-grained sand occur locally. Thin, shell-rich layers are common.

- Quaternary Alluvium: Discontinuous, well-graded sand and gravel found beginning at the approximate lower boundary of the Young Bay Mud, generally between about –40 to -45 feet elevation. The loose, wet, deposit has an overall gray to very dark gray color. Gravels are fine to coarse in size with a maximum diameter of approximately 0.75 inch, subrounded to well-rounded, and are predominantly hard sandstone, siltstone and mudstone of probable Franciscan Formation origin. The gravel is mixed with coarse-grained to fine-grained gray sand, silt, and trace shell fragments.

- Posey Formation: The upper part of the Posey Formation is discontinuous, very stiff, plastic clay found at the approximate upper boundary of the Posey Formation, generally between about -30 to –60 feet elevation. The unit varies in thickness from about 5 to 15 feet and has an olive-gray to grayish brown mottled appearance. The middle part of the formation is silty sand which is generally continuous, medium density, interbedded sand and silty sand found between approximately -45 to -60 feet elevation. Where encountered, the unit thickness appears relatively constant (about 10 to 15 feet thick) with a gradational lower boundary of sand and gravel. Beds are generally thin (up to 2”) and tend to fine upward. The lower part of Posey Formation is generally continuous, medium dense, sand and sandy gravel found between approximately –60 to –85 feet elevation. The unit indiscriminately varies in thickness, from about 5 to 35 feet, and has a sharp lower contact with the underlying, fine-grained San Antonio Formation. In general, the beds coarsen downward grading from poorly- graded, medium-grained sand to well-graded, coarse sand and gravel.

- San Antonio Formation: Continuous, silty sand and silty clay found between about –65-ft.

and –125-ft. elevation. The unit varies in thickness, from 0 to 45 feet. The lower contact with the Old Bay Mud is gradational over about 20 feet. Overall color changes from mottled olive and gray to dark bluish gray, sediment becomes finer and more plastic, and shelly layers begin to occur. Silty sands are brown to olive brown, medium- to very fine-grained and are either massive or thinly interbedded with silty clay. Occasional beds contain highly oxidized, angular, coarse sand and fine gravel comprised primarily of sandstone and siltstone (Franciscan Formation). The silt and silty clay beds are yellowish brown, olive brown and olive gray, and often strongly mottled. Carbonate nodules up to 0.75-in., reddish brown oxidation and very fine sand lenses are common.

- Old Bay Mud (very stiff clay): Laterally continuous, very stiff, highly plastic, clay found from approximately -125 to -180 feet elevation. In this part of the San Francisco Bay, the unit ranges in thickness from 40-70 feet. The bluish gray to dark gray sediment is very fine-grained (predominantly clay and silt), and generally homogeneous. Olive gray to light gray mottles and thin, sandy shell layers occur frequently in the top 20 feet of the unit. Bedforms are common but faint, and distinguished by thin, horizontal laminations of fine-grained sand and silt. The Old Bay Mud differs from the Young Bay Mud in its stiffness, and can be distinguished from fine-grained sections of the overlying San Antonio Formation by its darker color, high plasticity and finer sand.

Underlying these soil units described above, Alameda Formation and Franciscan Formation can be found. Alameda Formation generally consists of very dense sand and gravel and very hard, plastic clay layers. Franciscan Formation is sedimentary rocks of siltstone and sandstone which is found at depths ranging from 450 feet to 600 feet.

Figure 3-1 presents the idealized subsurface soil profile developed along the bridge. Within the limit of bridge alignment, the subsurface conditions underlying the site are relatively uniform. A separate more detailed site characterization report has been prepared for the project documenting geology, site investigation, field and lab testing, and interpretation of geotechnical conditions along the bridge (EMI 2007).

3.2 Description of the Bridge

The Dumbarton Toll Bridge crosses the southern San Francisco Bay via California State Highway 84, and connects the cities of East Palo Alto, San Mateo County (southwest) and Newark, Alameda County (northeast). This 1.63 mile-long bridge is the southernmost of the highway bridges spanning the San Francisco Bay. The existing Dumbarton Toll Bridge was designed in the late 1970's and the construction was completed in 1982, replacing the original 1927-era structure located 90 feet south of the existing bridge; portions of the earlier structure exist today as fishing piers. The structure consists of the Main Channel crossing, East and West Approaches, and a Trestle structure at the end of each Approach structure. The bridge has three lanes in each direction and a separated bike/pedestrian lane on the eastbound side. A 340-foot center span provides 85 feet of vertical clearance for shipping. The approach spans on both sides of the Bay are of pre-stressed lightweight concrete girders supporting a lightweight concrete deck. The center spans are twin steel trapezoidal girders which also support a lightweight

concrete deck.

The entire existing bridge was supported on pile foundations. The West Approach is composed of Abutment 1 through Pier 16, each founded on 20-inch diameter steel pipe piles with a buried pile cap. For the Main-Crossing Channel, Piers 17 to 26 are supported on 54-inch diameter concrete hollow piles with a long cantilever pile length above mud-line, while Piers 27 to 30 are founded on 20-inch diameter steel pipe piles with a buried pile cap. The East Approach is composed of Piers 31 to 43 and Abutment 44, each carried by 20-inch diameter steel pipe piles with a buried pile cap.

The design load of a single 20" diameter pipe pile is 80 tons, and that of a single 54" diameter hollow pile is 250 tons. All the pile caps are rectangle-shaped in the plain view. The cap width varies from 20 to 39 feet, the cap length varies from 44 to 71 feet, and the cap thickness is between and 2.5 and 8 feet. Piers 23 and 24 in the middle of main crossing channel have the largest cap dimension. The number of piles per pier varies from 21 to 55. The elevation of pile top is between -22 and +1 feet, while that of pile tip is between -100 and -65 feet. The elevation of mudline varies from -48 to 10 feet, with the lowest range near Piers 21 and 22.

The Trestles at two ends of the Approaches were supported on pile extensions of 20"×20" cross-section, each end composed of 20 trestle bents with both the north and south faces supported by pre-cast retaining walls. Among these bents, East Bents 1, 20, and West Bents 1, 20 have narrow cap beam at the mudline. The design capacity of a single 20"×20" concrete pile is 90 tons.

Pile tip elevations at all piers are shown in Figure 3-1. Among all the bridge piers, seven representative piers were selected for development of ARS design criteria involving site response and kinematic soil-pile interaction analyses. The seven representative piers are:

- Piers 2, 9, and 15: within West Approach supported on 20 inch diameter steel pipe piles with a buried pile cap
- Piers 17 and 23: within Main Span founded on 54 inch diameter concrete pipe piles with a long cantilever pile length above mudline
- Piers 30 and 43: within East Approach supported 20 inch diameter steel pipe piles with a buried pile cap.

Idealization of the soil layers and shear wave velocities at these seven representative piers is shown on Figure 3-2 through Figure 3-8.

3.3 Dynamic Soil Properties

Small-strain shear modulus G_{max} is best estimated from shear wave velocity values that are measured in the field and by using the relationship of $G_{max} = \rho V_s^2$. In the equation, ρ is the soil density and V_s is the measured shear wave velocity. Down-hole seismic suspension logging (P-S logging) was conducted to supplement stratigraphic information and establish shear wave

velocity profiles of the subsurface. P-S logging was performed at six locations, both on-land and over-water. Detailed descriptions of the instrumentation, procedures results and analysis of the seismic suspension logging are presented in the site characterization report (EMI 2007).

The dynamic properties in terms of normalized shear modulus and damping curves have been studied by many researchers and the data have been correlated to the confining pressure for sand or Plasticity Index (PI) for clay (Darendeli 2001; EPRI 1993; Seed et al. 1986; Sun et al. 1988; Vucetic and Dobery 1991); The EPRI relationships for sands (1993) and the Vucetic and Dobry relationships for clay (1991) represent the most widely adopted model for site response analyses. The procedures have been adopted by CALTRANS (CSAB 1996) for bridges as well as by the Nuclear Regulatory Agency (REI 2002) for nuclear power plants.

The EPRI sand curves conform favorably with the well-known Seed et al sand relationship (Seed et al. 1986) at shallow depths. Therefore, we elected to adopt the Seed et al relationship for sand (1986) and the Vucetic and Dobry relationship for clays (1991). To account for potential variations in the determination of in situ soil properties, the following parametric studies were considered: (1) the best-estimate case established from the downhole shear wave velocity measurements, (2) a lower bound case and (3) an upper bound case. Scaling factors of 0.75 and 1.25 were used as multiplication factors on the best-estimate shear-wave velocity for lower and upper bound scenarios.

3.4 Free Field Site Response Analyses

Site response analyses were conducted using the computer program SHAKE91 (Idriss and Sun 1992) for equivalent linear analysis. The program SHAKE91 has been used for solving one-dimensional shear wave propagation problems for three decades. Engineers have accumulated knowledge from the performance of SHAKE91 in predicting seismic ground responses during earthquakes. However, it is recognized that site response analyses using an excessively long soil column can lead to unrealistic prediction of free-field motion. For those analyses, in general, the high frequency component of the surface motion is overly damped. Therefore, for this study, a relatively short soil column was chosen for the site response analyses; a transmitting boundary was chosen near elevation -250 feet where an average shear wave velocity of 400 meters per second is anticipated.

Free field site response analyses were conducted at each pier for the fault normal and fault parallel ground motions. However, no site response analysis was preformed for the vertical ground motion which is a practice adopted in all toll bridge programs. Horizontal free-field motions at different depths along the pile length are shown in Figure 3-9 through Figure 3-22; the site response results are only illustrated for the fault normal component of set 1 input motion. These free field motions are presented as acceleration and displacement time histories, spectral acceleration and spectral displacement. The uniforms shear strains (defined as 65% of the maximum shear strains) from the response analysis for these selected piers are presented in Figure 3-23 to Figure 3-29 from all seven input motions. Generally the uniform shear strains are less than 1.5% for all piers and all sets of input accelerations.

It is interesting to note the local site response effects. The approximate relations between PGA at

ground and on rock for selected piers are present in Figure 3-30. The differences between these curves are small for pier number 02, 09, 15, 17, 23, 30 and 43. It is implied that PGAs at ground due to the free field seismic response for these piers are approximately uniform. As may be seen in the same figure, for PGA on rock less than 0.4g, the curves for these piers is considerably lower than the curve suggested by Idriss (1991), which was based on the data of 1985 Mexico City and 1989 Loma Pieta earthquakes. One reason may due to the low stiffness and nonlinearity of soft soils (Young Bay Mud) at these piers.

3.5 Kinematic Soil-Pile Interaction Analysis

At soft bay mud sites, ground shaking changes dramatically at shallow depths. For the pile-supported structures at such soft soil sites, ground shaking is transmitted from the ground to the structure throughout the embedded pile length. The piles are supported on multiple soil layers (soil springs), and the characteristics of free-field motions of those soil layers could be significantly different from each other as illustrated in the site response results. This dynamic system can be regarded as a multiple-input, multiple-degree-of-freedom problem. The question arises as to which free-field motion should be used to define the response spectrum (S_a) in the earthquake-response analysis.

To rigorously develop the design response spectra for the pile-supported structure, soil-pile interaction was considered. The approach has been fully implemented in seismic retrofit as well as new design for the major toll bridges in California. We consider a global structural model (total system) consisting of superstructure, pile-cap, and pile-foundation, as shown in Figure 3-31. For the purpose of discussion, we neglect the damping term and assume a lumped mass system. The global bridge structure is excited by depth-varying input ground motions $\{x_g(t)\}$ along the pile length, and the equations of motion can be written as,

$$\begin{bmatrix} [m_s] & & \\ & [m_c] & \\ & & [m_p] \end{bmatrix} \begin{Bmatrix} \{\ddot{x}_s\} \\ \{\ddot{x}_c\} \\ \{\ddot{x}_p\} \end{Bmatrix} + \begin{bmatrix} [K_{ss}] & [K_{sc}] & \\ [K_{cs}] & [K_s]+[K_{cc}] & [K_{cp}] \\ & [K_{pc}] & [K_{pp}] \end{bmatrix} \begin{Bmatrix} \{x_s\} \\ \{x_c\} \\ \{x_p\} \end{Bmatrix} = \begin{Bmatrix} 0 \\ 0 \\ [K_g]\{x_g\} \end{Bmatrix}$$

where $\{x_s\}$, $\{x_c\}$ and $\{x_p\}$ are displacement vectors of the superstructure, pile-cap, and pile degrees of freedom, respectively relative to the earth inertia reference frame (i.e, total displacements). The pile-cap would have 6 degrees of freedom (three translations, and three rotations). We assume that mass of the pile is small, and can be ignored, i.e, $[m_p]=0$. Typically, this is the case because inertial forces of the piles are relatively small in relation to the more massive superstructure and therefore, neglecting the foundation inertial effect does not normally cause significant error. Then the system of equations becomes

$$\begin{bmatrix} [m_s] & & \\ & [m_c] & \\ & & [0] \end{bmatrix} \begin{Bmatrix} \{\ddot{x}_s\} \\ \{\ddot{x}_c\} \\ \{\ddot{x}_p\} \end{Bmatrix} + \begin{bmatrix} [K_{ss}] & [K_{sc}] & \\ [K_{cs}] & [K_s]+[K_{cc}] & [K_{cp}] \\ & [K_{pc}] & [K_{pp}] \end{bmatrix} \begin{Bmatrix} \{x_s\} \\ \{x_c\} \\ \{x_p\} \end{Bmatrix} = \begin{Bmatrix} 0 \\ 0 \\ [K_g]\{x_g\} \end{Bmatrix}$$

With the pile mass assumed to be zero, static condensation can be conducted to eliminate the pile degrees of freedom. Dynamic response analysis in the time domain can be conducted via the following equation derived from the first two sets of the above equation:

$$\begin{bmatrix} [m_s] & \\ & [m_c] \end{bmatrix} \begin{Bmatrix} \{\ddot{x}_s\} \\ \{\ddot{x}_c\} \end{Bmatrix} + \begin{bmatrix} [K_{ss}] & [K_{sc}] \\ [K_{cs}] & [K_s]+[K] \end{bmatrix} \begin{Bmatrix} \{x_s\} \\ \{x_c\} \end{Bmatrix} = \begin{Bmatrix} 0 \\ \{f\} \end{Bmatrix}$$

which only involves the superstructure $\{x_s\}$ and the pile cap variables $\{x_c\}$, and where [K] and {f} in the above equation are defined as:

$$[K] = [K_{cc}] - [K_{cp}][K_{pp}]^{-1}[K_{pc}]$$

$$[f] = -[K_{cp}][K_{pp}]^{-1}[K_g]\{x_g\}$$

It is noted that the resultant dynamic equations of motion contain only pile-cap and superstructure degrees of freedom, and in fact the solutions to these equations are what the structure engineers are seeking, which represent demands for the superstructure and the pile-cap. In such a way, the original configuration becomes a system of the superstructure and pile-cap, the latter of which is connected with the ground by an equivalent stiffness matrix of [K] and is subjected to an equivalent force of {f} (see Figure 3-32.a). This transformation of the original problem into the substructure system consisting only of superstructure and pile-cap is entirely based on classical static condensation. The stiffness and loading of pile foundation appear in the form of 6×6 condensed stiffness matrix [K] and a 6×1 time-series forcing function {f} applied at the pile-cap level. Both the stiffness matrix [K] (which is constant with time) and the forcing {f} (which is time dependent related to the time histories of the depth-varying free-field input ground motion$\{x_g(t)\}$) can be pre-calculated without knowledge of the response of the superstructure or the pile cap. Instead of using the forcing function {f} explicitly on the right hand side of the equations, we introduce a 6×1 vector {X}, such that:

$$\{f\} = [K]\{X\}$$

From the above equation, it can be noted that loading from ground excitation is introduced into the overall structure as a right hand vector in a form of a displacement vector {X} times the foundation stiffness [K]

$$\begin{bmatrix} [m_s] & \\ & [m_c] \end{bmatrix} \begin{Bmatrix} \{\ddot{x}_s\} \\ \{\ddot{x}_c\} \end{Bmatrix} + \begin{bmatrix} [K_{ss}] & [K_{sc}] \\ [K_{cs}] & [K_s]+[K] \end{bmatrix} \begin{Bmatrix} \{x_s\} \\ \{x_c\} \end{Bmatrix} = \begin{Bmatrix} 0 \\ [K]\{X\} \end{Bmatrix}$$

Upon inspection of the reduced equations of motion, {X} represents some form of rigid-base motion. The system becomes the superstructure and pile-cap which is connected with the ground by stiffness matrix [K] and the ground is subjected to the rigid-base motion of {X} (see Figure 3-32.b). This six-component motion {X} is termed "kinematic motion", and is a major element in defining ARS design criteria.

Theoretically, rigorous analysis of a pile foundation subjected to ground excitation would involve all six degrees of freedom kinematic motion in order to form the complete force vector {f}. In many cases, when the kinematic motion is derived at the pile-cap level, the axial pile stiffness would imply a very large rotational stiffness of the pile cap leading to negligible pile-cap rotations, and therefore the rotational components can be neglected. By eliminating the rotational components, the kinematic motion represents pure translational rigid-base motion compatible with most earthquake engineering analyses involving firm ground input motions. Thus, Duhamel integral of the kinematic motion that has zero rotation (i.e., kinematic translations at pile-cap) would lead to the response spectra for the superstructure model. A detailed discussion can be found in a MCEER report (Lam and Law 2000).

3.6 Pier Specific Kinematic Time Histories

The kinematic interaction analysis provides a rational means to develop appropriate response spectra to be used for response spectrum analysis as well as pier specific kinematic time histories for multi-support non-linear time history analysis of the bridge structure. The kinematic motion is calculated at the pile cap level and implicitly contains the statically condensed forces transmitted from the ground to the superstructure along the entire embedded pile length. Therefore, the effects of the depth-varying shaking intensity in soil column, the depth-varying soil stiffness, and the pile properties are included in the solution. The following pile properties were used in conducting kinematic soil-pile interaction analyses for development of pier specific kinematic motions and the ARS curves:

- 20-inch-diameter steel pipe piles:
  Effective pile EI = 3.6E+10 lb-in^2

- 20-inch-squarer concrete piles:
  Effective pile EI = 2.4E+10 lb-in^2

- 54-inch-diameter concrete piles:
  Effective pile EI = 8.3E+11 lb-in^2 (Infilled section)
  Effective pile EI = 5.8E+11 lb-in^2 (Hollow section)

A fixed pile head condition was assumed in all the cases. The analyses were conducted with the in-house computer program KIPS, which is dedicated to performing kinematic soil-pile interaction analyses (EMI 1999).

The kinematic time histories for each pier were developed using pier-specific subsurface conditions based on the best estimated properties. The results for the fault normal component of Motion set 1 of the SEE scenario and those for FEE scenario are included in Appendix C and Appendix D, respectively. Complete set of pier-specific kinematic motions for the fault normal and parallel components of both SEE and FEE scenarios are provided in a separate electronic file to the designers.

3.7 Development of ARS Curves

For development of ARS design curves, the kinematic motions of the seven selected piers were evaluated considering potential variations of dynamic soil properties. The variation consisted of three shear wave velocity scenarios: best estimated, lower bound, and upper bound. The selected piers (Piers 2, 9, 15, 17, 23, 30, and 43) should cover different pile types, different pile cantilever lengths, and subsurface conditions along the bridge. Spectral accelerations and displacements for each of the selected piers are presented in Figure 3-33 through Figure 3-39, showing all kinematic motions from seven input ground motions with three different shear wave velocity profiles (a total of 21 runs = 7x3). In each figure, mean and mean plus one standard deviation spectra computed from the 21 runs for each soil profile is presented. The mean spectrum represents the 50th percentile confident level, while mean plus one standard deviation spectrum represents the 84th percentile confident level accounting for variation in soil conditions and different ground motions. For comparison purpose, the reference SEE rock spectrum is also shown on the figures.

The shape of response spectra as obtained from kinematic soil-pile interaction analyses sometimes contains multiple peaks and valleys. From past experience, this type of spectrum shape with multiple peaks and valleys often results in difficulty with the structural design process. For example, the lengthening of a structural period could lead to a higher spectral acceleration and a higher load demand. For this reason, it was decided that the final ARS recommendations should be constrained by a well-behaved ARS curve shape for both spectral acceleration and displacement (i.e., the final ARS curves should not contain multiple peaks and valleys). With this consideration, "smooth" spectra were developed.

Another consideration is simplicity for the design process. Discussions with the structure designers led to a decision to keep a minimum number of ARS design curves for the response spectrum analyses. From a review of the kinematic spectra from the seven piers, it appears that two sets ARS curves would be adequate to cover horizontal loading for the entire bridge:

- ARS Curve 1: This ARS design curve covers Piers 1 through 16 and Piers 27 through 44, representing 20-inch diameter pipe piles with a buried pile-cap.

- ARS Curve 2: This ARS design curve cover Piers 17 through 26, representing 54-inch diameter concrete piles with a long cantilever pile extending above mudline.

The ARS Curve No. 2 recommended for Pier 17 to 26 has higher shaking at the shorter period range (0 to 2-Second). At these piers, the foundation system consists of 54-inch concrete piles, with the pile cap cantilevered typically about 48-ft above the mudline. For such cantilevered pile cap foundations, there is a significant rotational motion of the pile at the mudline elevation. The pile rotation, when amplified by the long cantilever height of the pile cap, leads to a higher kinematic pile cap motion as compared to embedded pile cap kinematic motions.

The ARS Curve No. 1 is higher than the ARS Curve No. 2 at the long period range (greater than 2-second), because the smaller piles associated with ARS Curve No. 1 would have shallower

soil-structure interaction zones (i.e. point of fixity of the pile) where the free field motions would have a consistently higher long-period spectral displacements at shallower depths within the soft bay mud.

The Trestles at two ends of the Approaches are supported on pile extensions, and two bents (W10 from West Trestle and E15 from East Trestle) were selected to perform site response and kinematic soil-pile interaction analyses. The procedures were the same as those of the Main Span and the Approaches. Based on the kinematic solutions for Trestle Bents W10 and E15, it was determined that ARS Curve 1 can be used for the Trestles.

For the vertical spectrum, we recommend using the reference vertical motion spectrum from PSHA without further site response analysis. The recommended SEE design spectra for 5 percent damping are presented on Figure 3-40 and their spectral coordinates are tabulated in Table 3-1.

TABLE 3-1: COORDINATES OF THE DESIGN ARS CURVES FOR THE SEE EVENT

Horizontal ARS Curve 1 (Pier 2 to Pier 16 and Pier 27 to Pier 44)		
Period (sec.)	**Sa (g)**	**Sd (inches)**
0.03	0.450	0.00
0.10	0.468	0.05
0.20	0.600	0.23
0.30	0.750	0.66
0.40	0.850	1.33
0.50	1.000	2.45
0.75	1.000	5.51
1.00	1.000	9.79
1.50	0.770	16.96
2.00	0.600	23.49
3.00	0.360	31.71
4.00	0.210	32.89
5.00	0.138	33.77
6.00	0.100	35.24
7.50	0.060	33.03
10.00	0.040	39.15

Horizontal ARS Curve 2 (ARS-2 for Pier 17 - Pier 26)		
Period (sec.)	**Sa (g)**	**Sd (inches)**
0.03	0.942	0.01
0.10	1.154	0.11
0.20	2.470	0.97
0.30	2.700	2.38
0.40	2.500	3.92
0.50	2.200	5.38
0.75	1.700	9.36
1.00	1.330	13.02
1.50	0.960	21.14
2.00	0.637	24.94
3.00	0.305	26.87
4.00	0.180	28.19
5.00	0.123	30.10
6.00	0.090	31.71
7.50	0.060	33.03
10.00	0.040	39.15

Vertical Spectrum (All Piers)		
Period (sec.)	**Sa (g)**	**Sd (inches)**
0.01	0.371	0.00
0.02	0.371	0.00
0.03	0.480	0.00
0.05	0.633	0.02
0.075	0.756	0.04
0.10	0.788	0.08
0.15	0.717	0.16
0.20	0.604	0.24
0.24	0.558	0.31
0.30	0.486	0.43
0.40	0.413	0.65
0.50	0.355	0.87
0.75	0.269	1.48
1.00	0.218	2.13
1.50	0.154	3.38
2.00	0.110	4.32
3.00	0.078	6.90
4.00	0.067	10.43
5.00	0.055	13.38
7.50	0.033	18.17
10.00	0.020	19.67

FIGURE 3-1: IDEALIZED SOIL PROFILE ALONG DUMBARTON BRIDGE

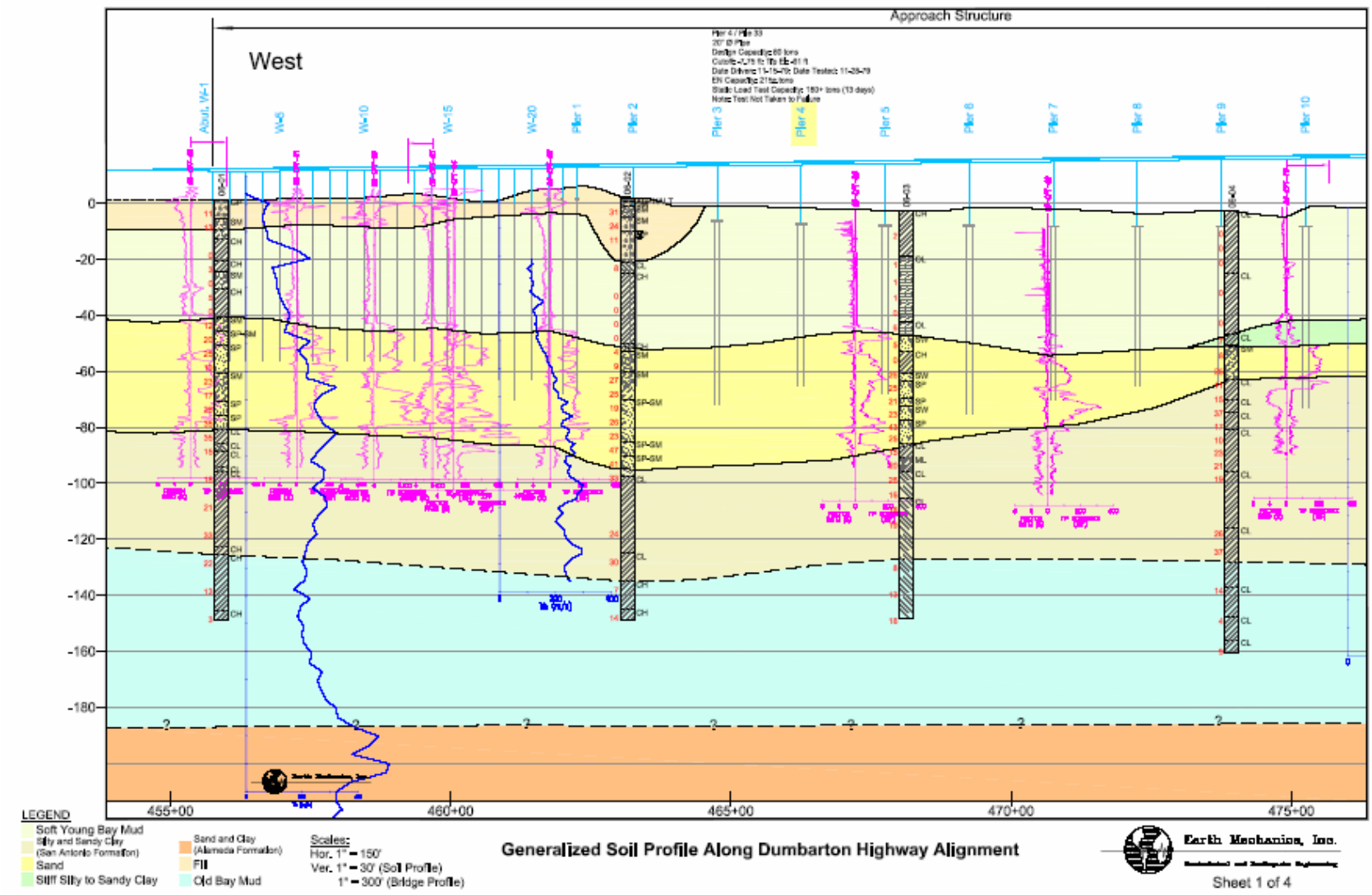


FIGURE 3-1: IDEALIZED SOIL PROFILE ALONG DUMBARTON BRIDGE (CONTINUED)

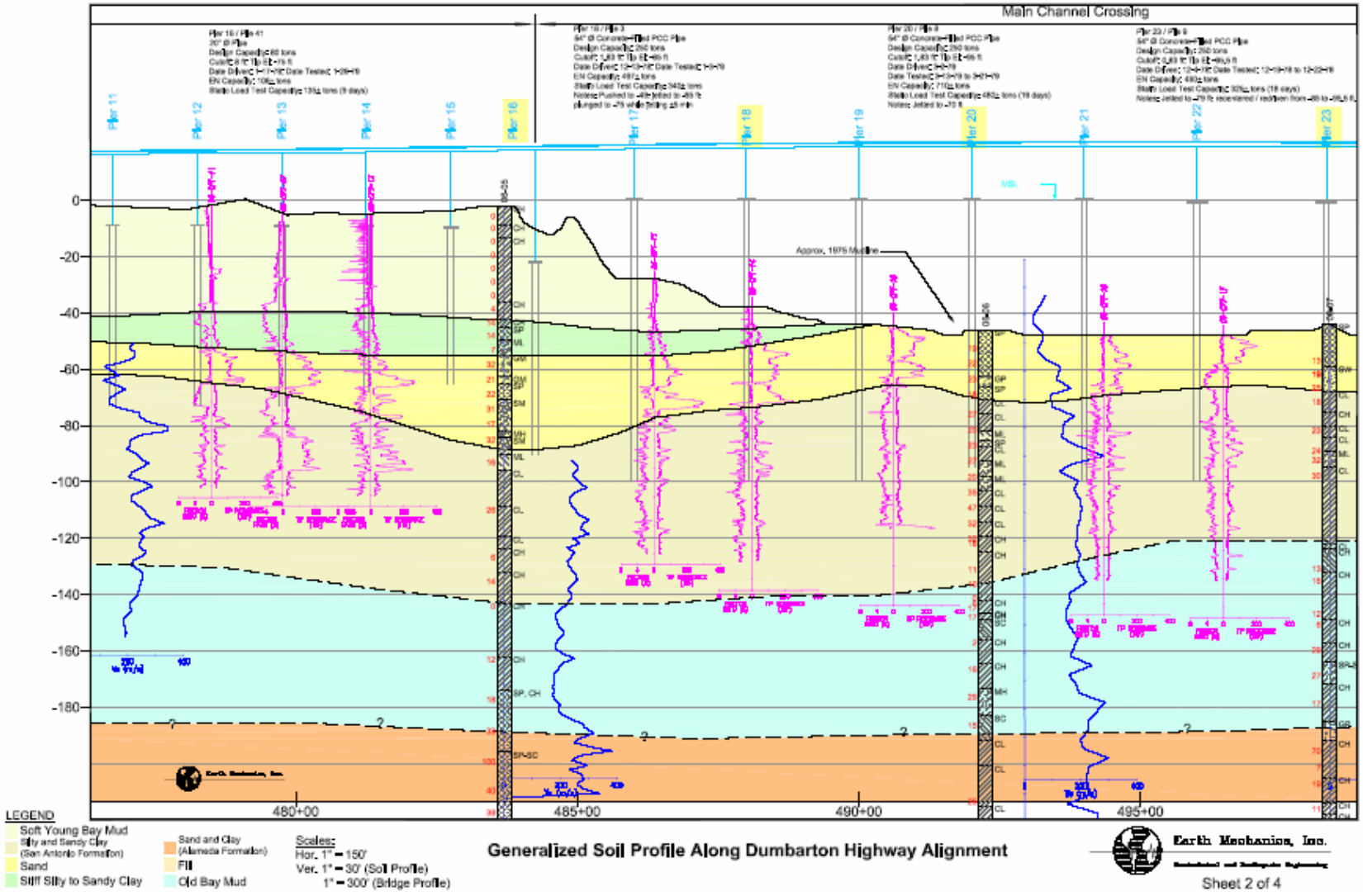


FIGURE 3-1: IDEALIZED SOIL PROFILE ALONG DUMBARTON BRIDGE (CONTINUED)

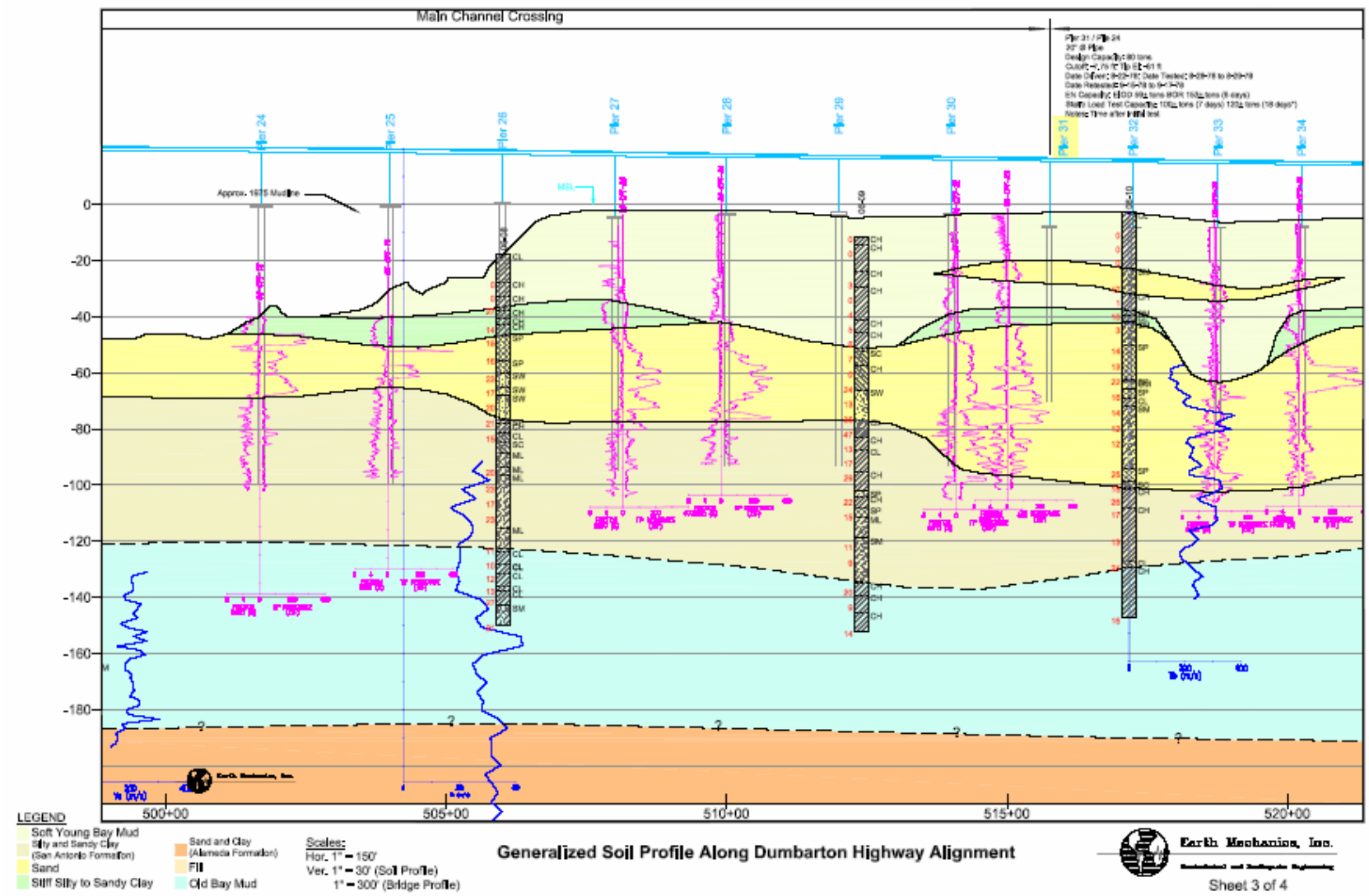


FIGURE 3-1: IDEALIZED SOIL PROFILE ALONG DUMBARTON BRIDGE (CONTINUED)

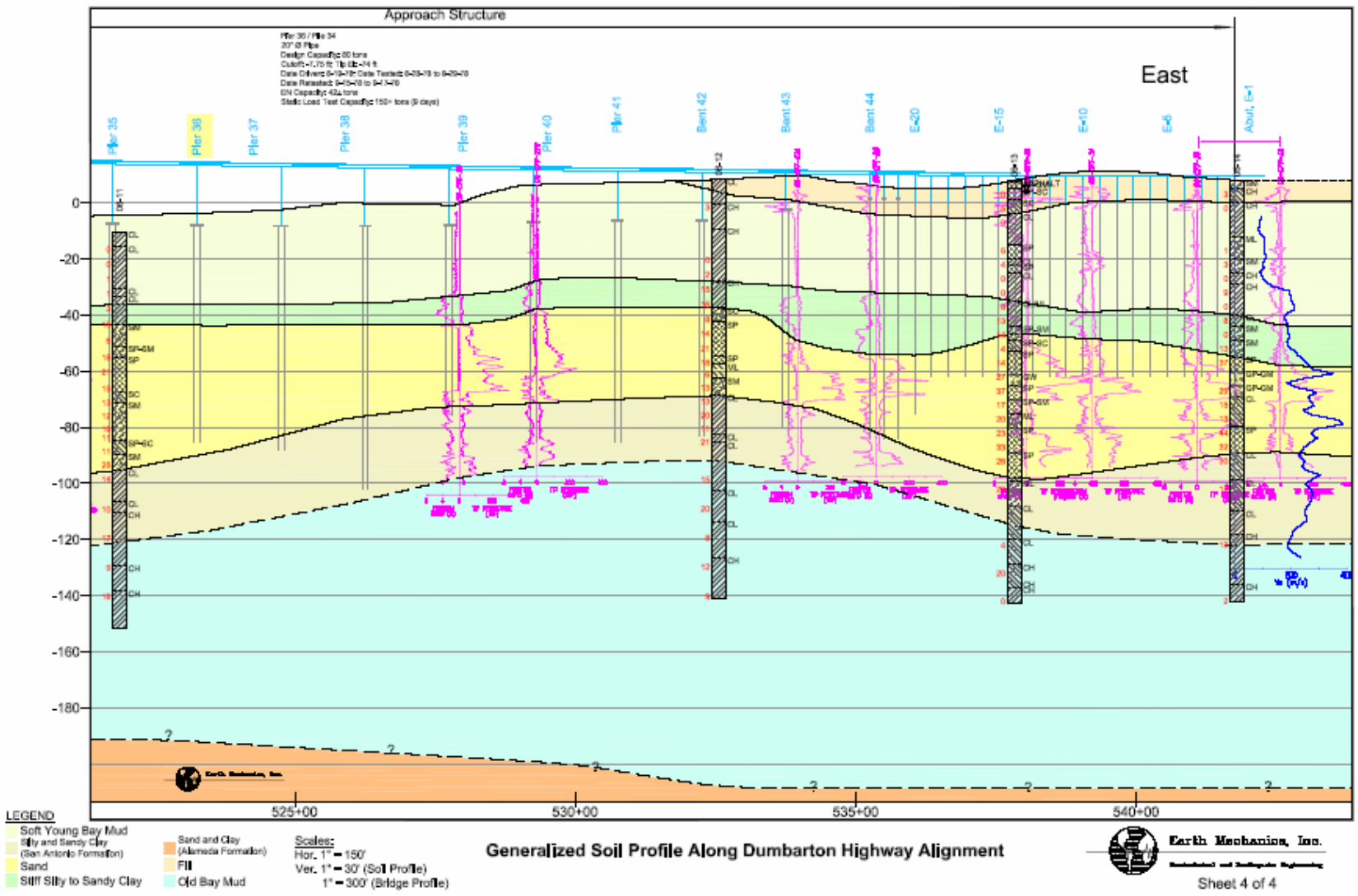


FIGURE 3-2: SOIL CONDITIONS AND FOUNDATION DATA AT PIER 2

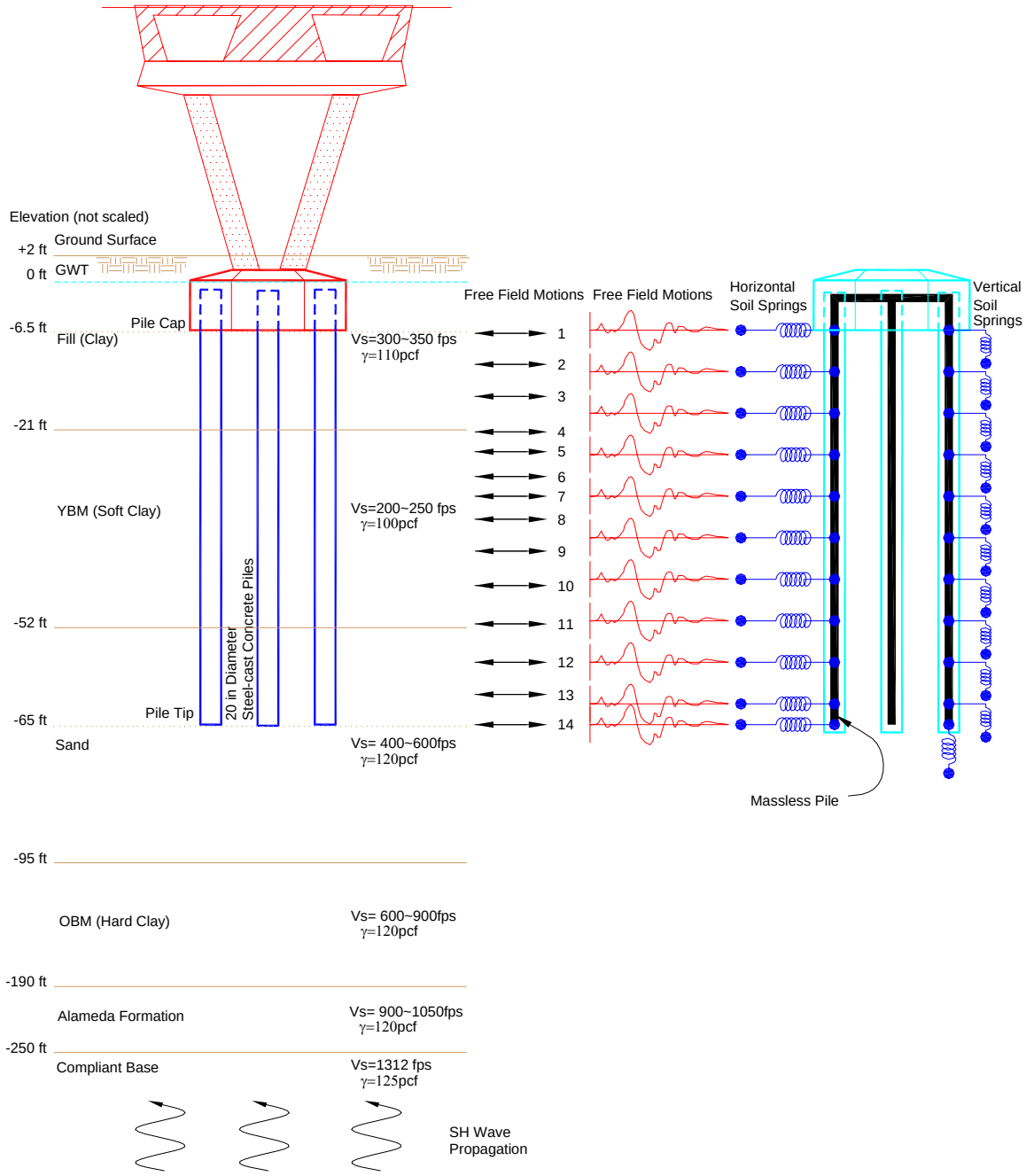


FIGURE 3-3: SOIL CONDITIONS AND FOUNDATION DATA AT PIER 9

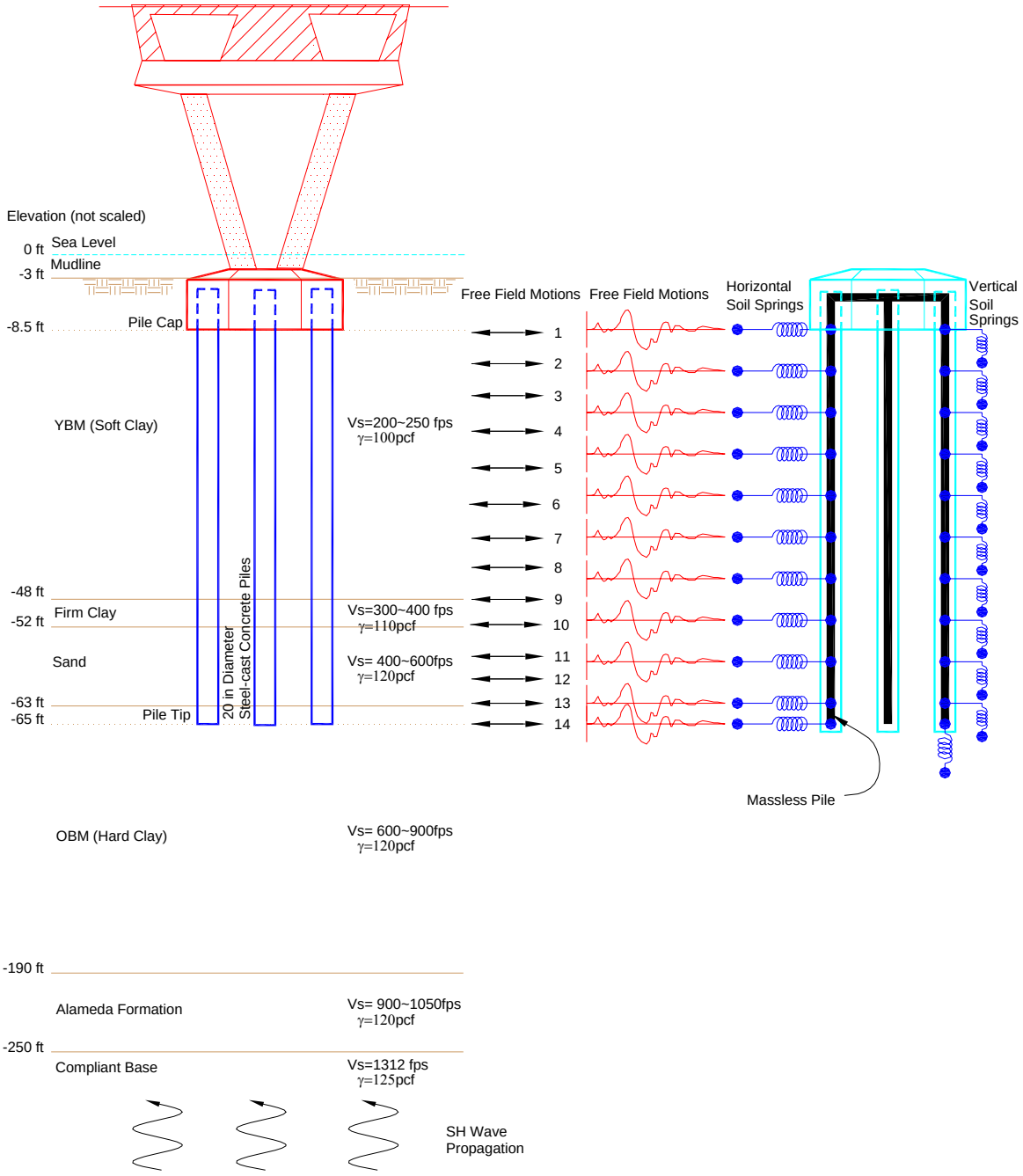


FIGURE 3-4: SOIL CONDITIONS AND FOUNDATION DATA AT PIER 15

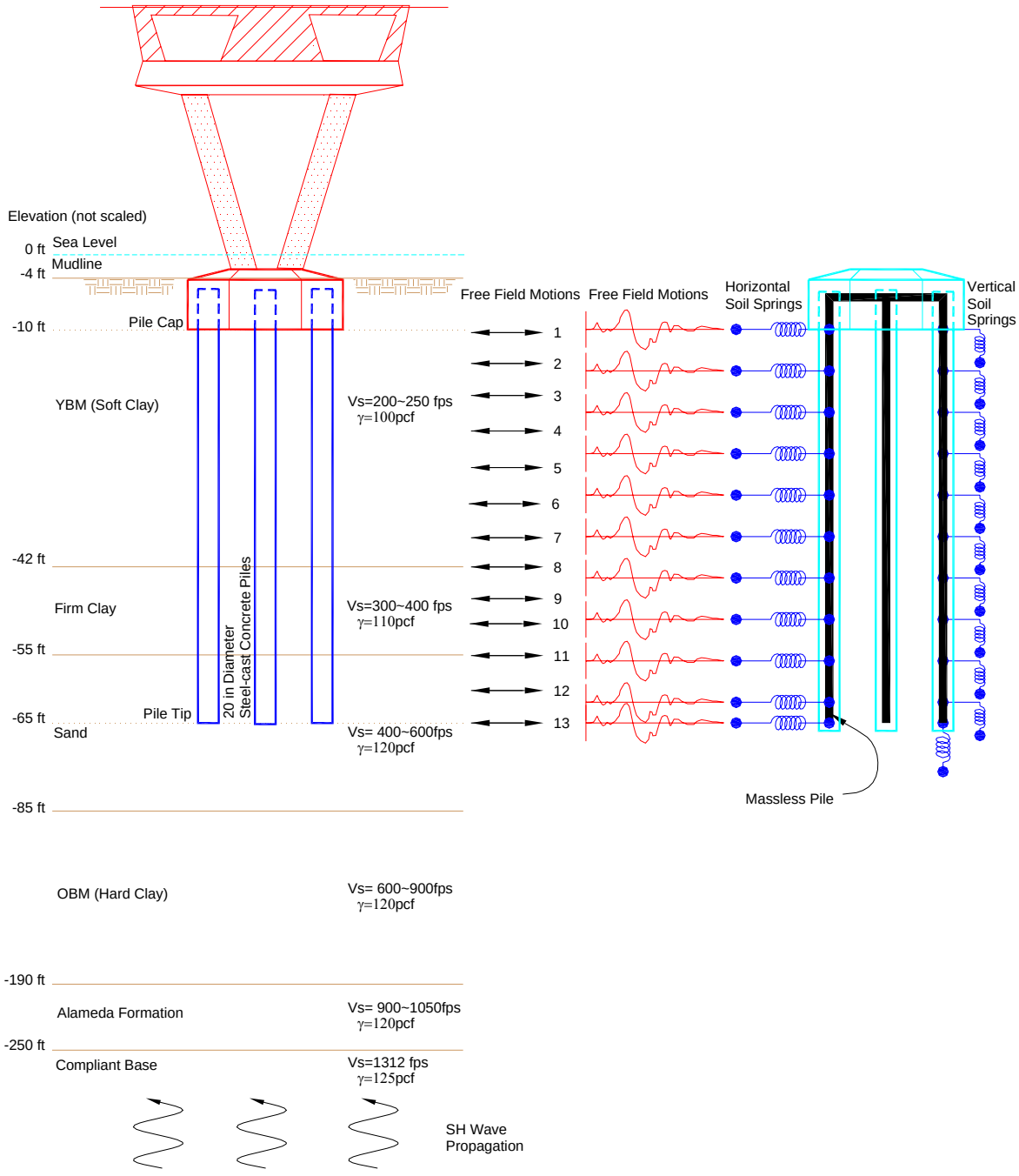


FIGURE 3-5: SOIL CONDITIONS AND FOUNDATION DATA AT PIER 17

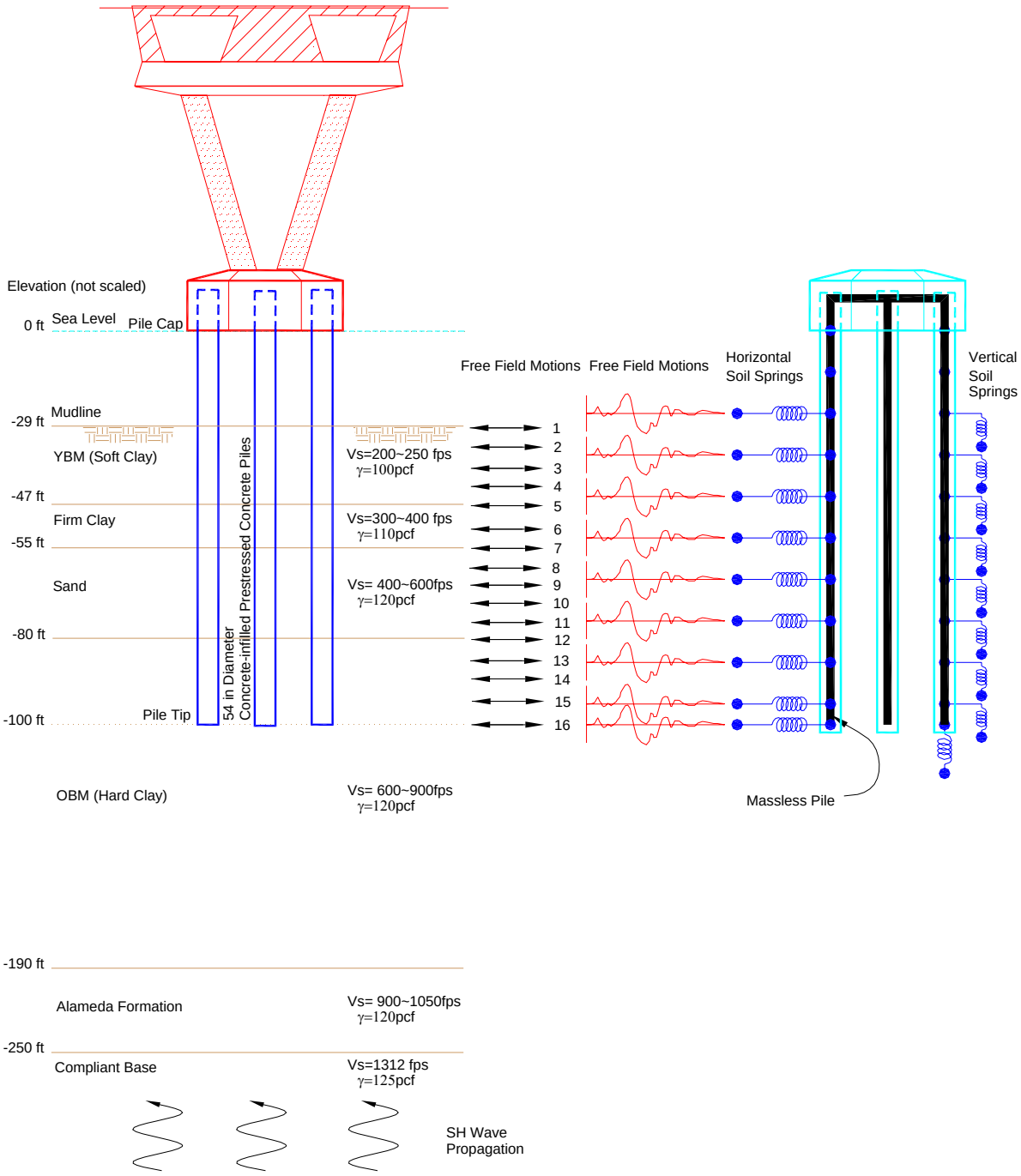


FIGURE 3-6: SOIL CONDITIONS AND FOUNDATION DATA AT PIER 23

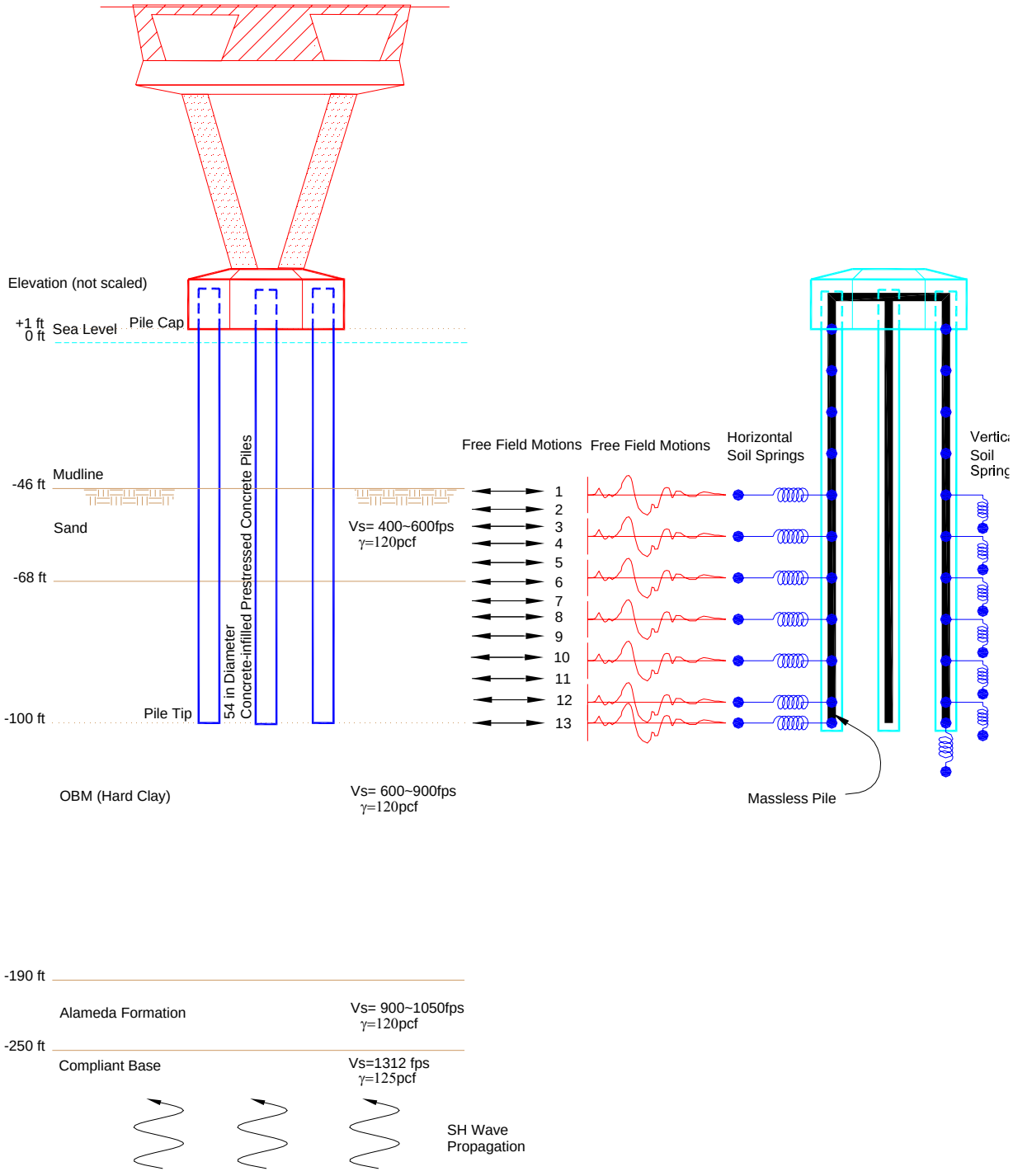


FIGURE 3-7: SOIL CONDITIONS AND FOUNDATION DATA AT PIER 30

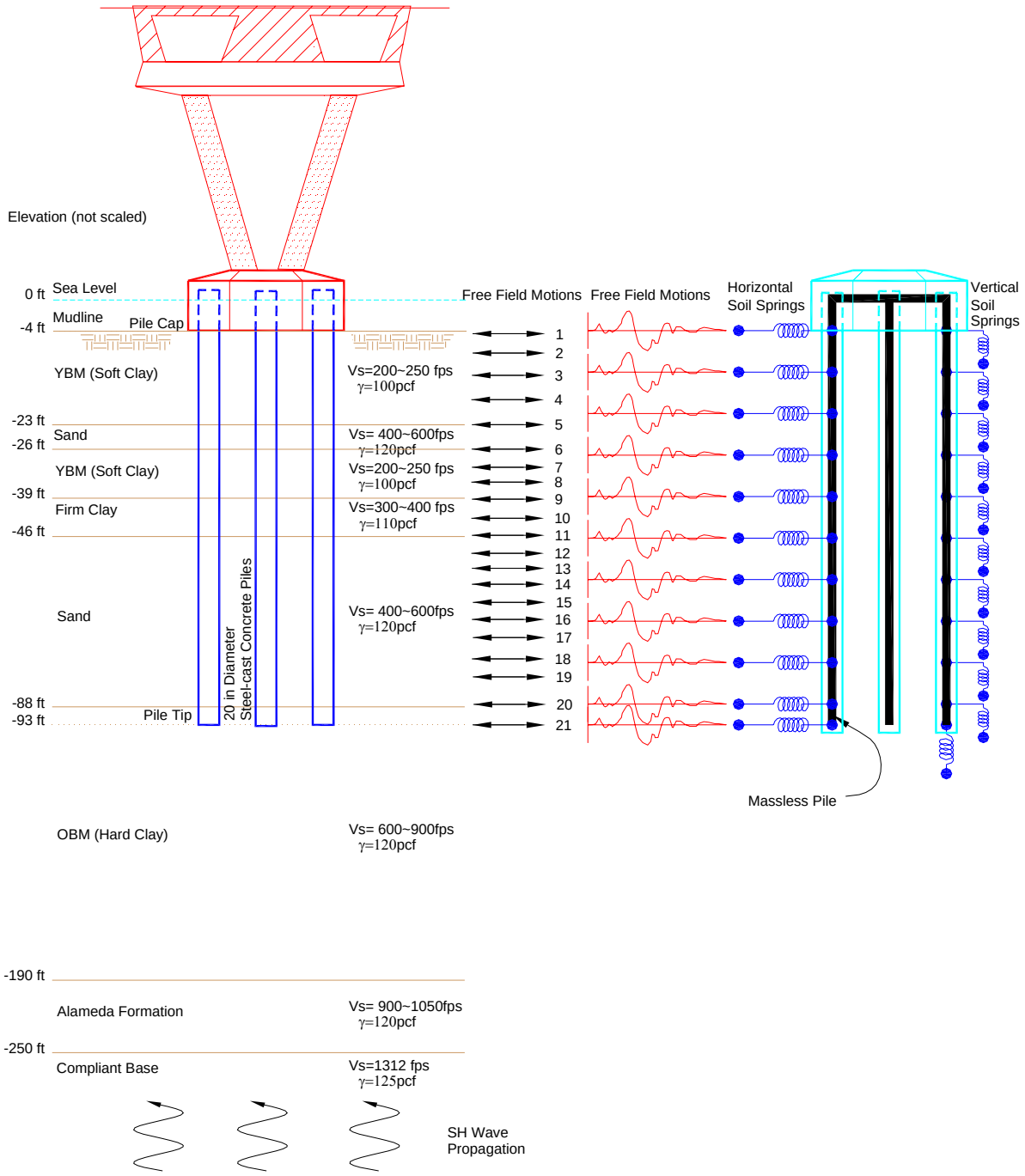


FIGURE 3-8: SOIL CONDITIONS AND FOUNDATION DATA AT PIER 43

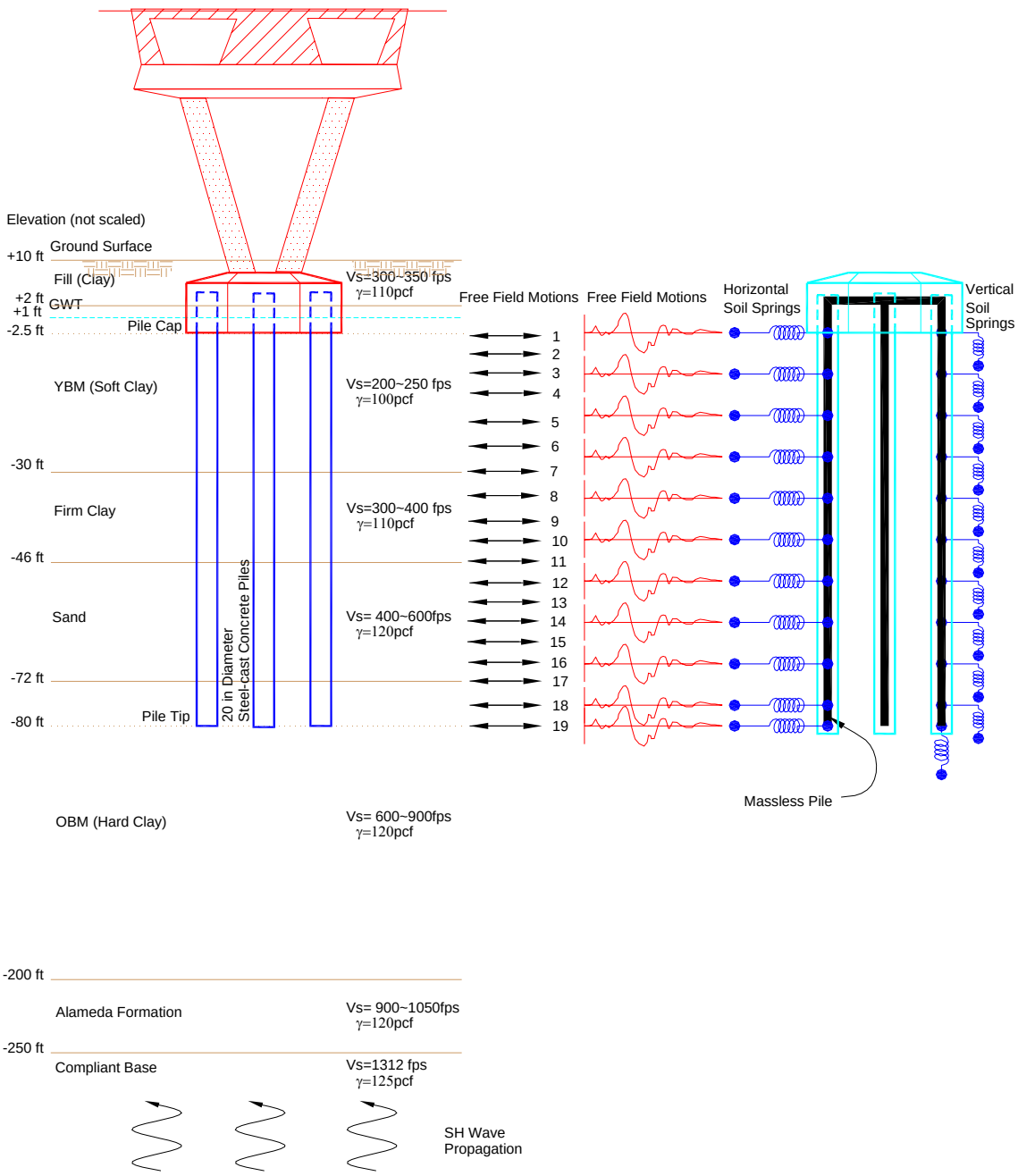


FIGURE 3-9: FREE-FIELD SITE RESPONSE (ACC. & DISP. TIME HISTORIES) FOR PIER 02

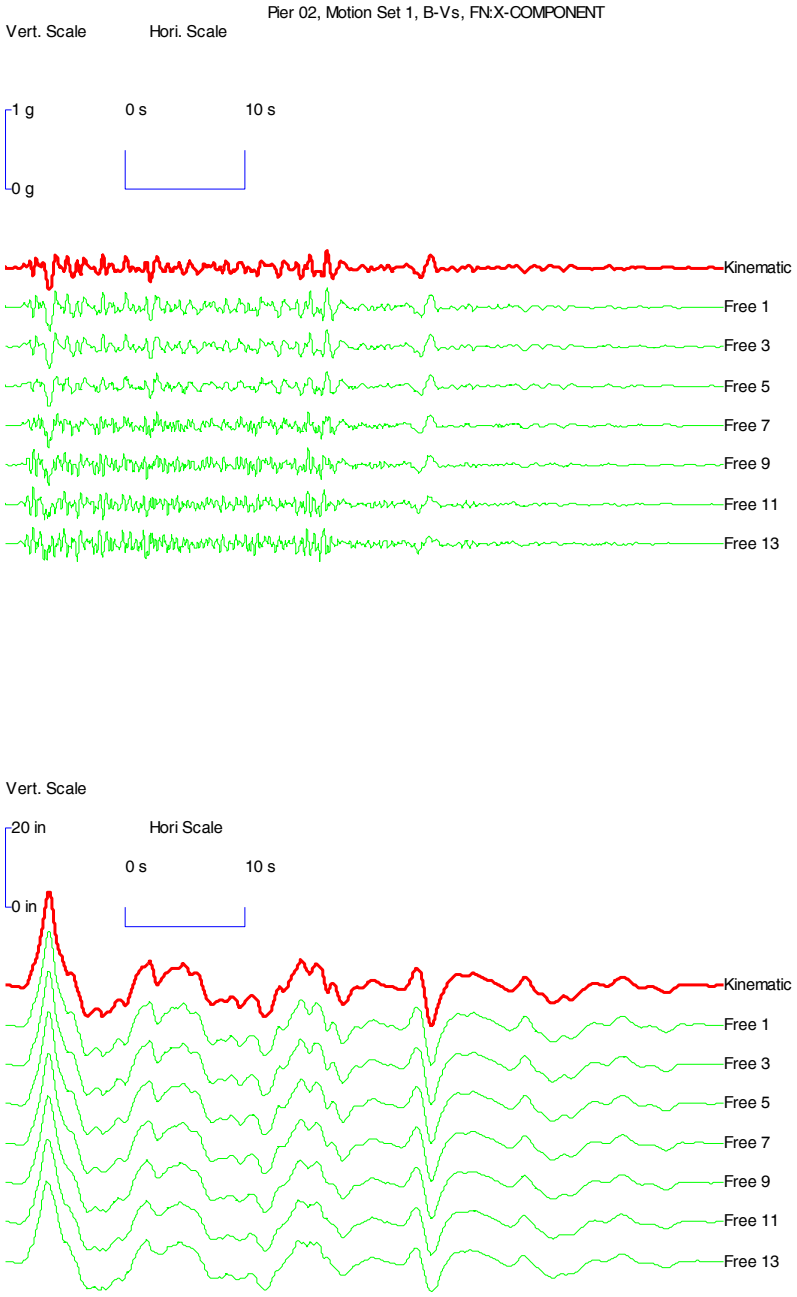


FIGURE 3-10: FREE-FIELD SITE RESPONSE (ACC. & DISP. SPECTRA) FOR PIER 02

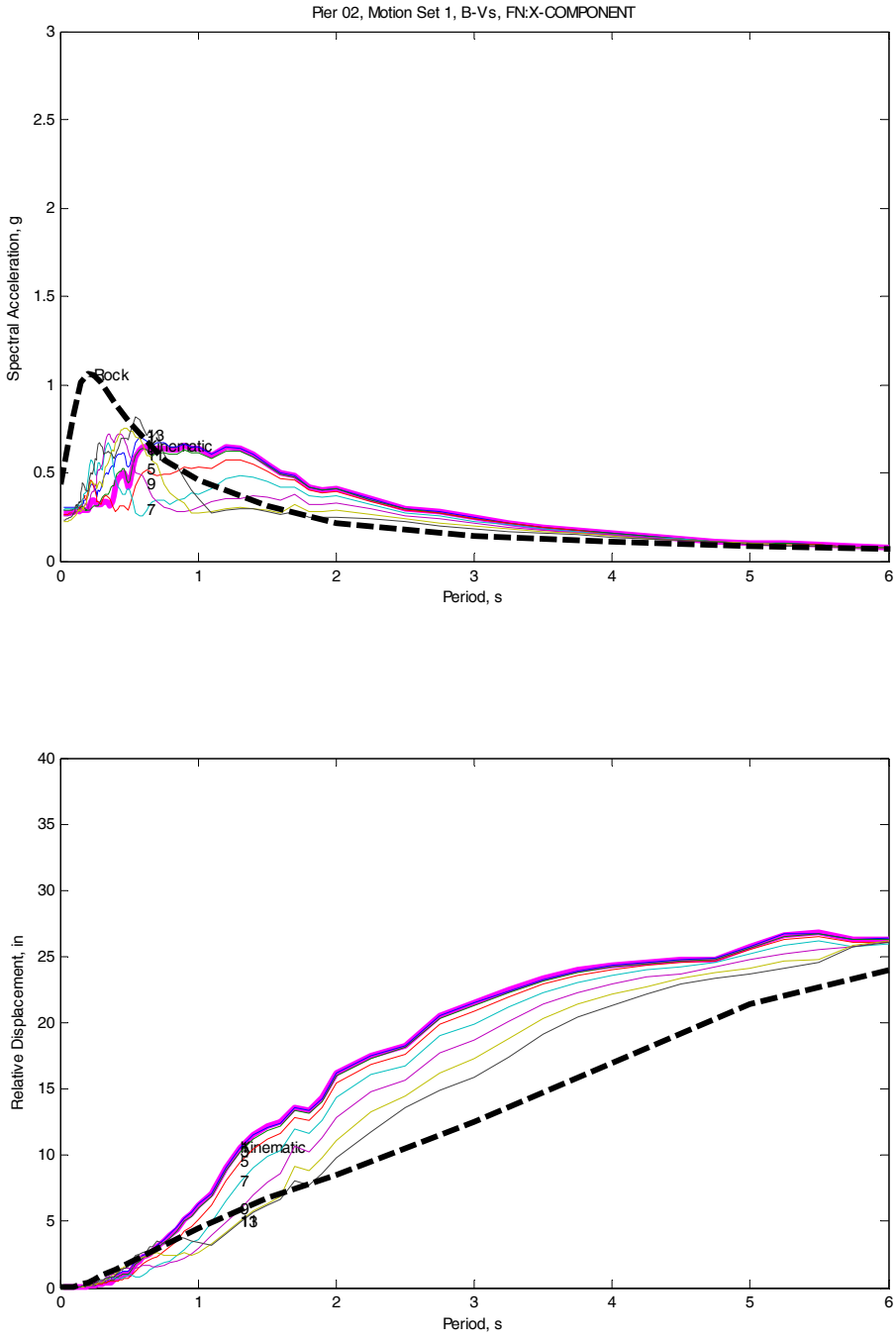


FIGURE 3-11: FREE-FIELD SITE RESPONSE (ACC. & DISP. TIME HISTORIES) FOR PIER 09

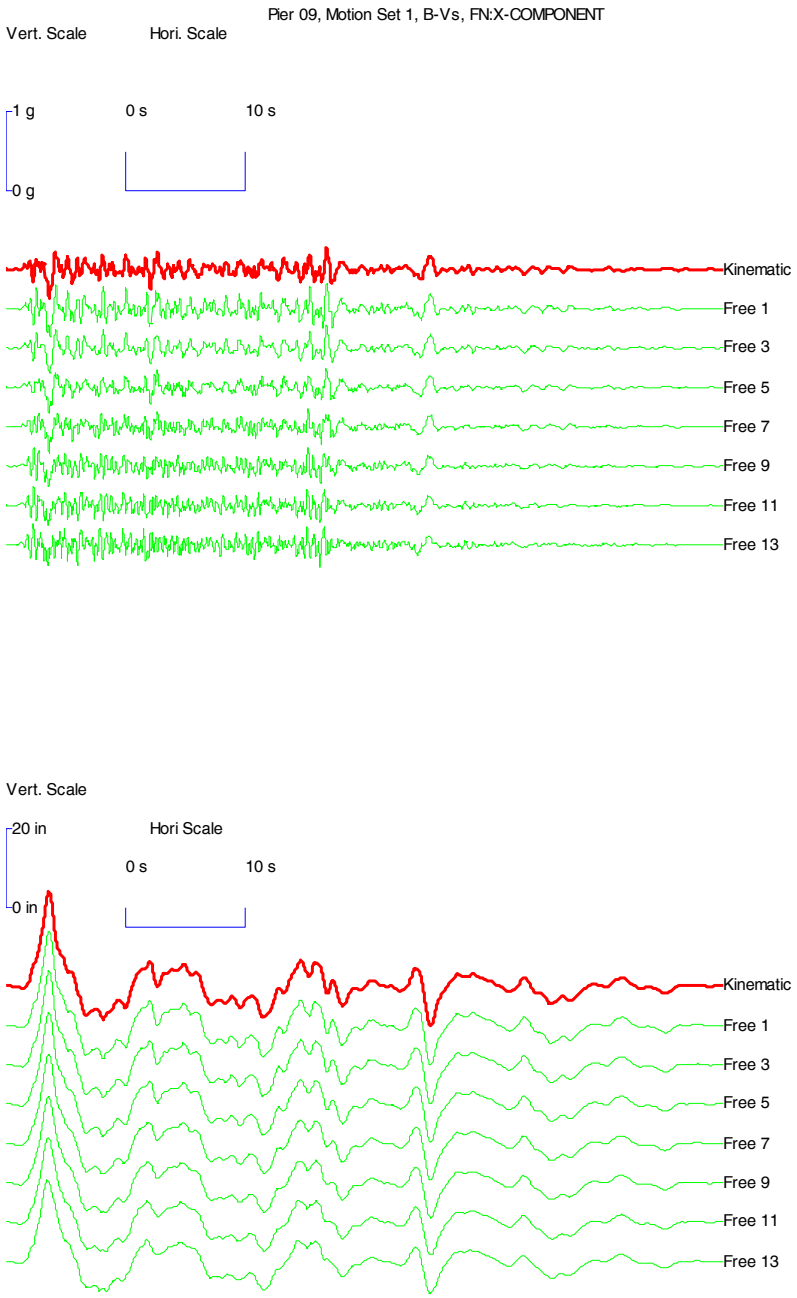
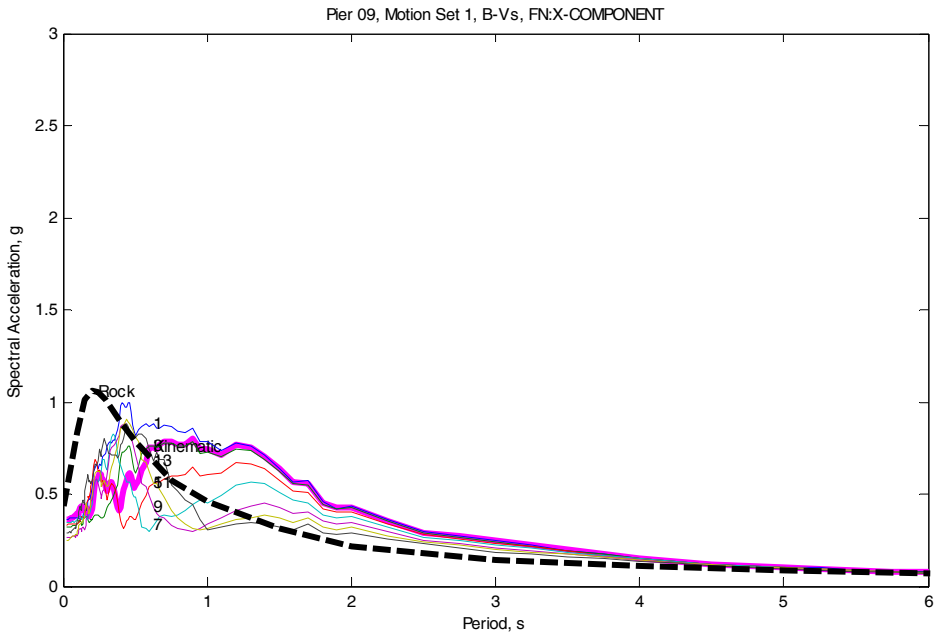


FIGURE 3-12: FREE-FIELD SITE RESPONSE (ACC. & DISP. SPECTRA) FOR PIER 09



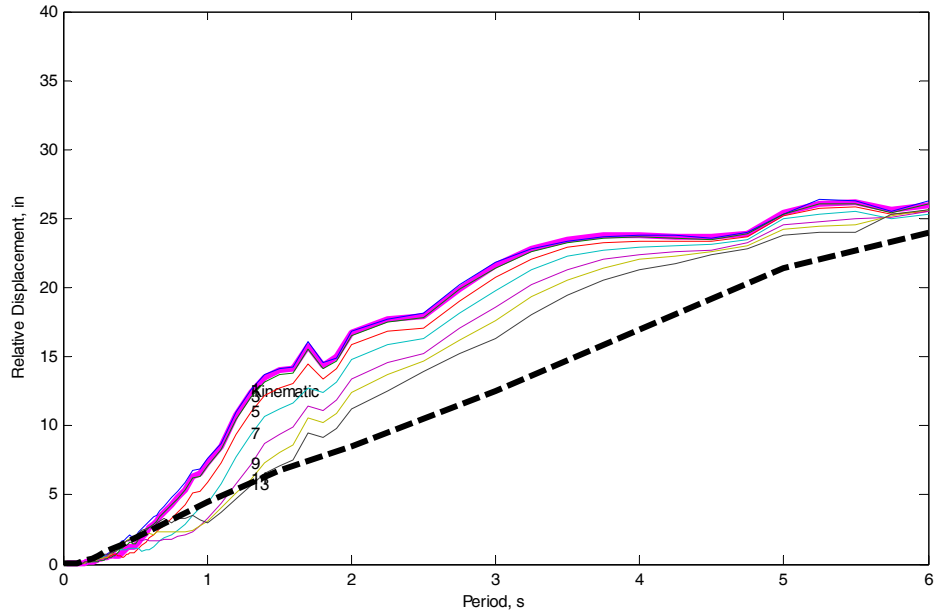


FIGURE 3-13: FREE-FIELD SITE RESPONSE (ACC. & DISP. TIME HISTORIES) FOR PIER 15

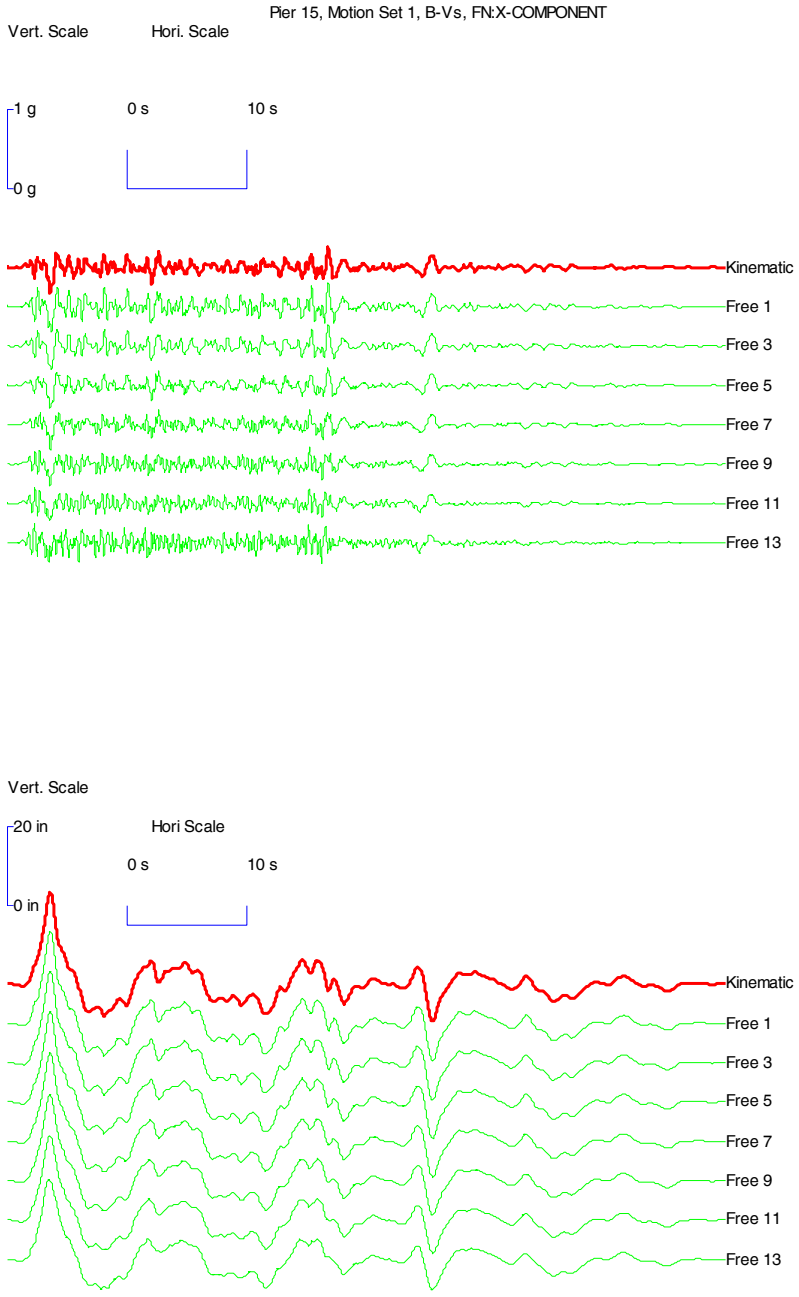
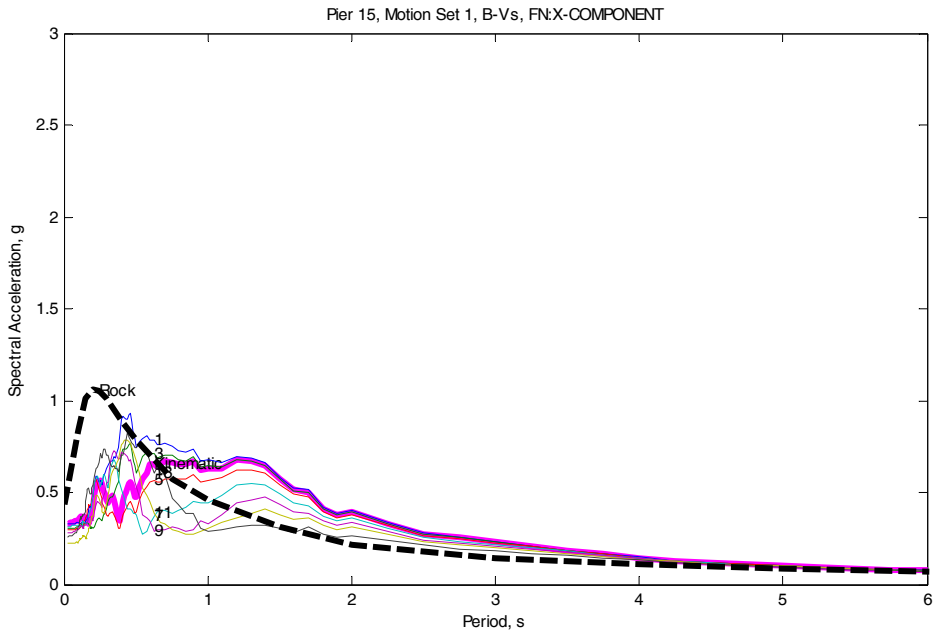


FIGURE 3-14: FREE-FIELD SITE RESPONSE (ACC. & DISP. SPECTRA) FOR PIER 15



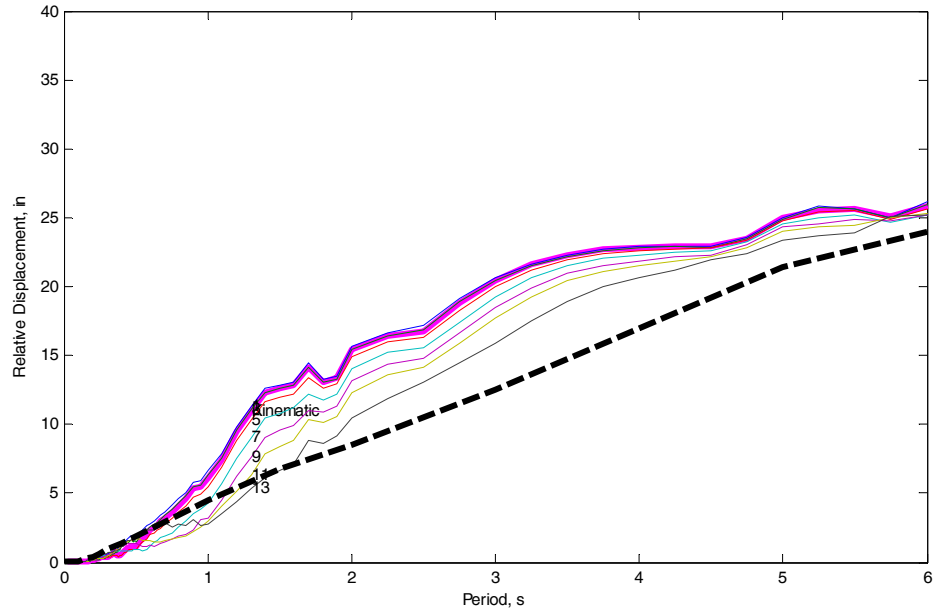


FIGURE 3-15: FREE-FIELD SITE RESPONSE (ACC. & DISP. TIME HISTORIES) FOR PIER 17

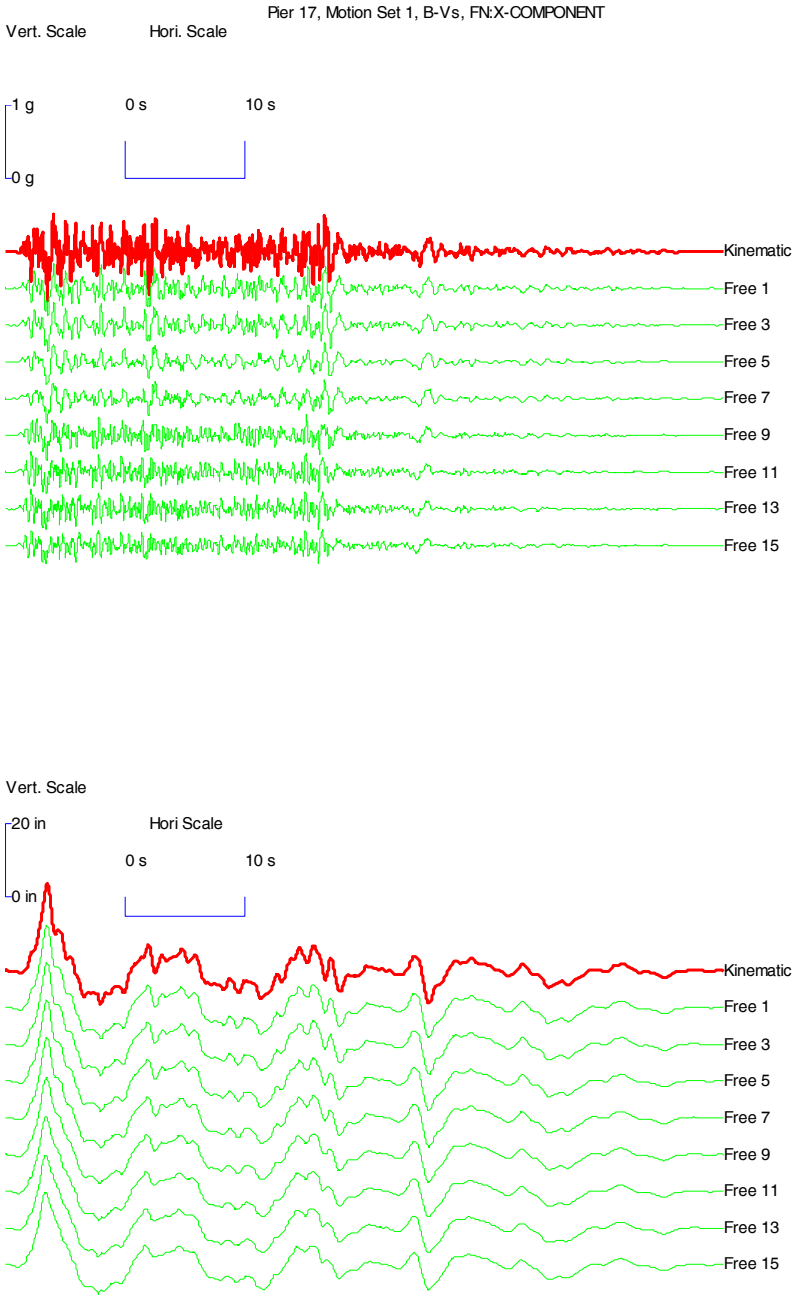
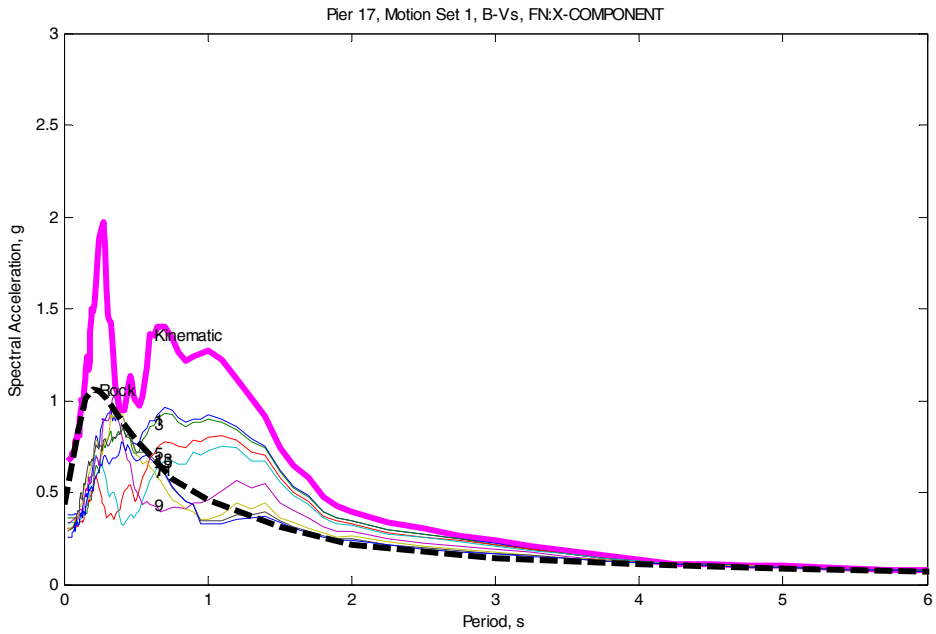


FIGURE 3-16: FREE-FIELD SITE RESPONSE (ACC. & DISP. SPECTRA) FOR PIER 17



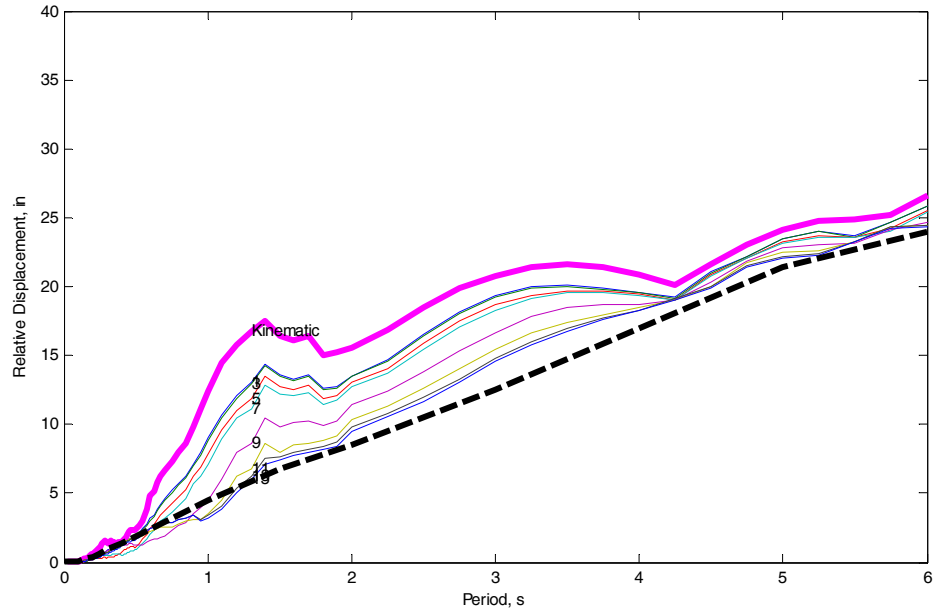


FIGURE 3-17: FREE-FIELD SITE RESPONSE (ACC. & DISP. TIME HISTORIES) FOR PIER 23

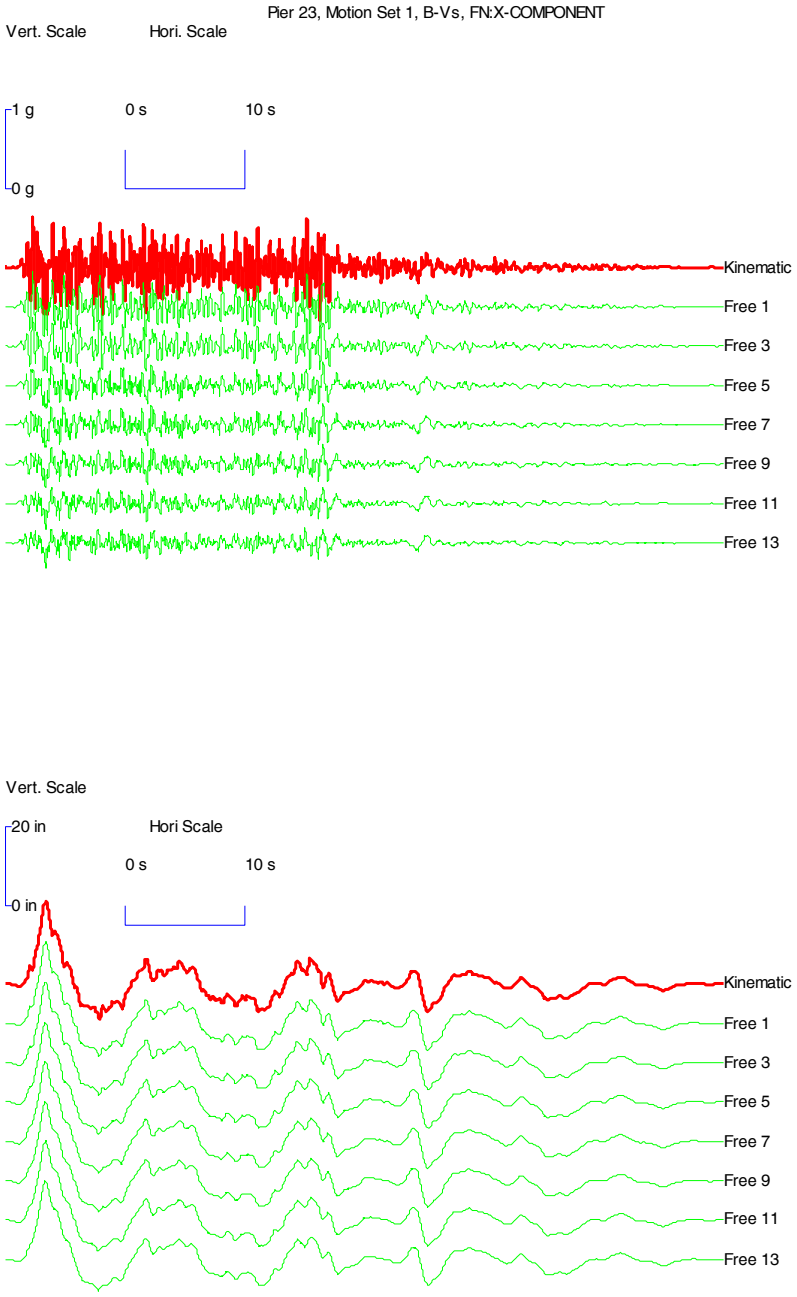
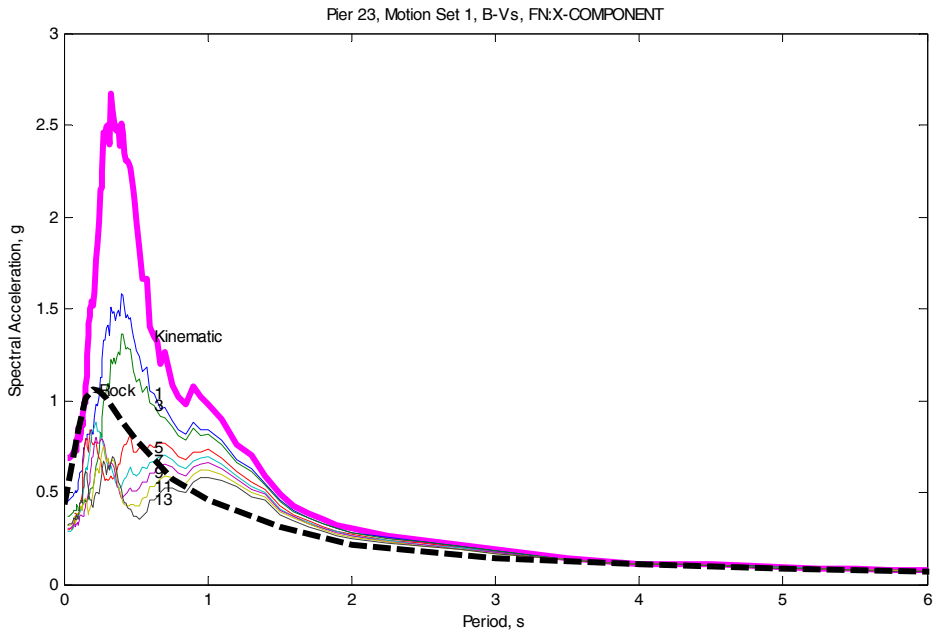


FIGURE 3-18: FREE-FIELD SITE RESPONSE (ACC. & DISP. SPECTRA) FOR PIER 23



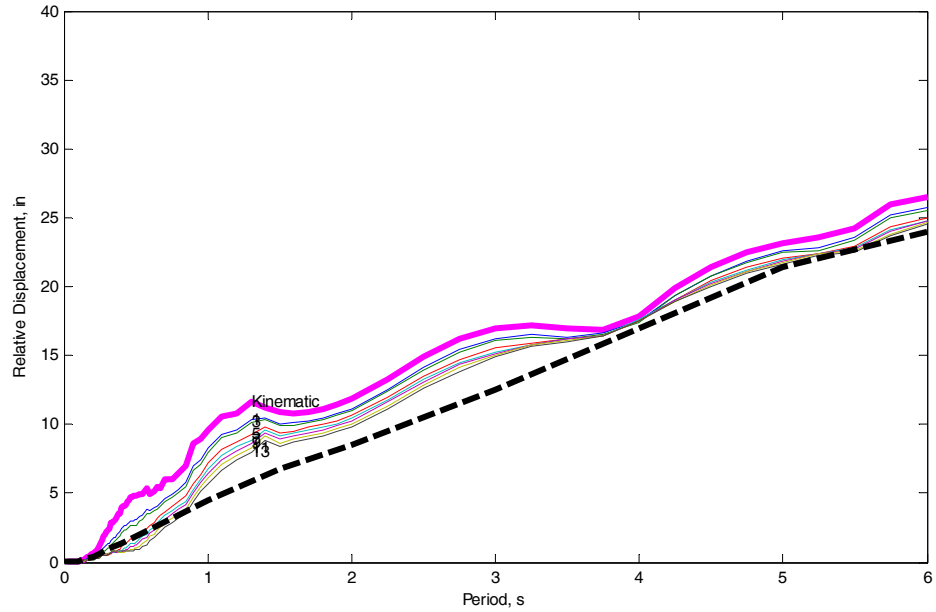


FIGURE 3-19: FREE-FIELD SITE RESPONSE (ACC. & DISP. TIME HISTORIES) FOR PIER 30

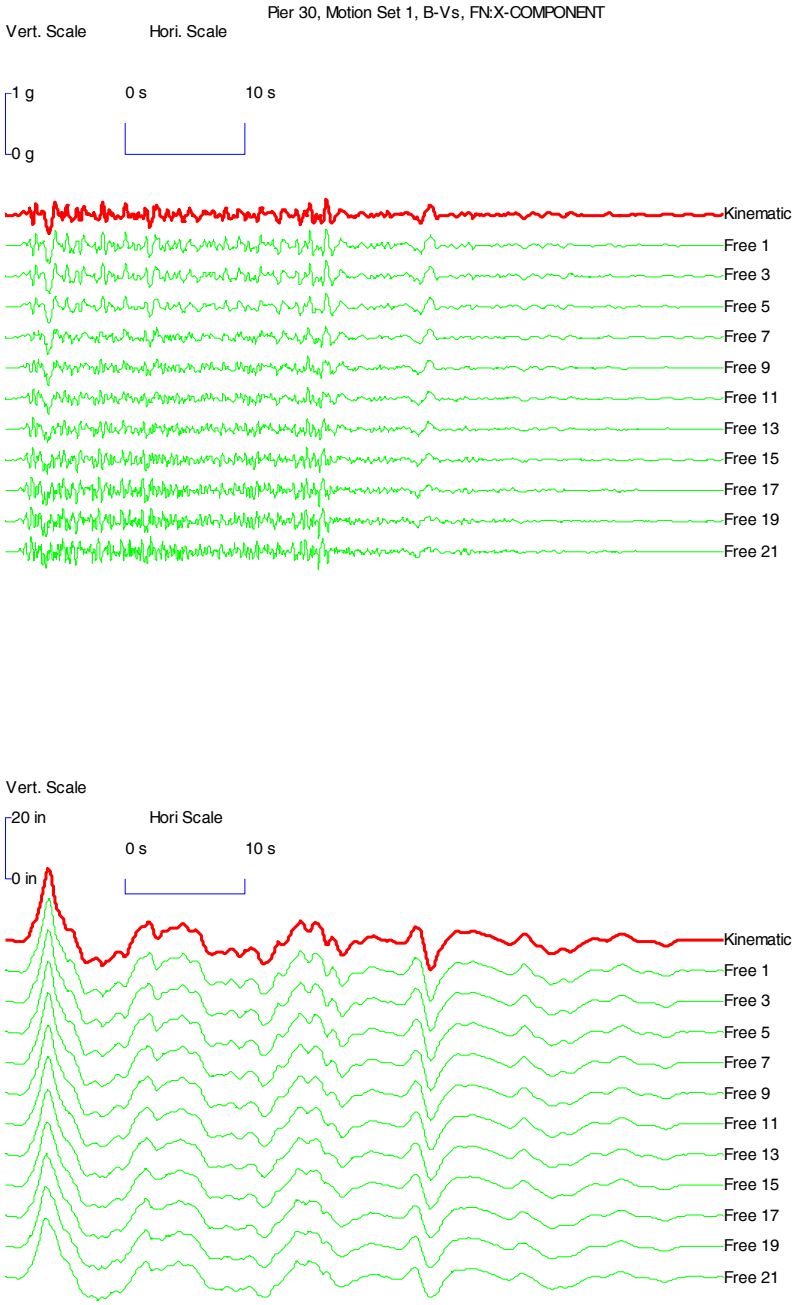
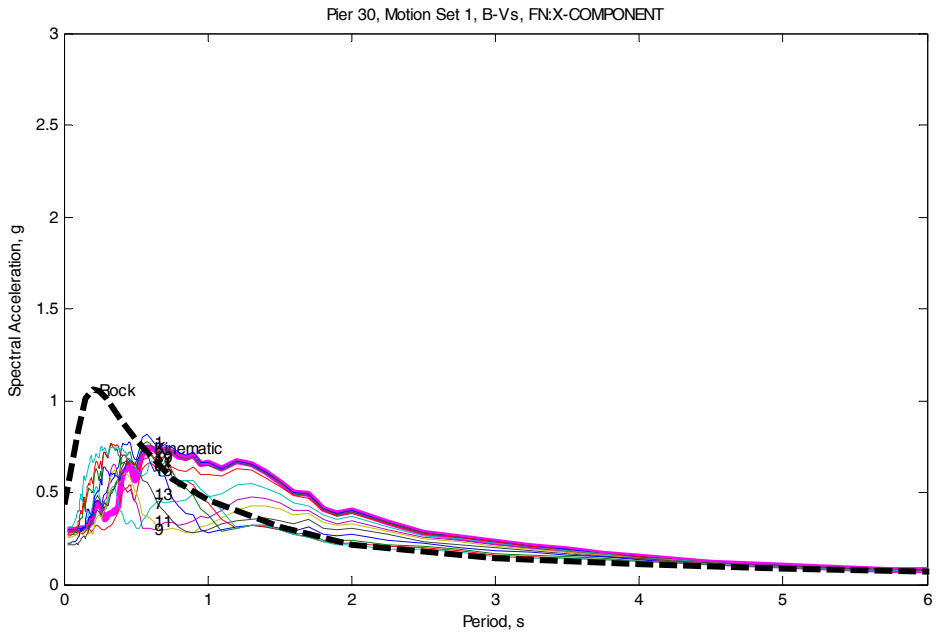


FIGURE 3-20: FREE-FIELD SITE RESPONSE (ACC. & DISP. SPECTRA) FOR PIER 30



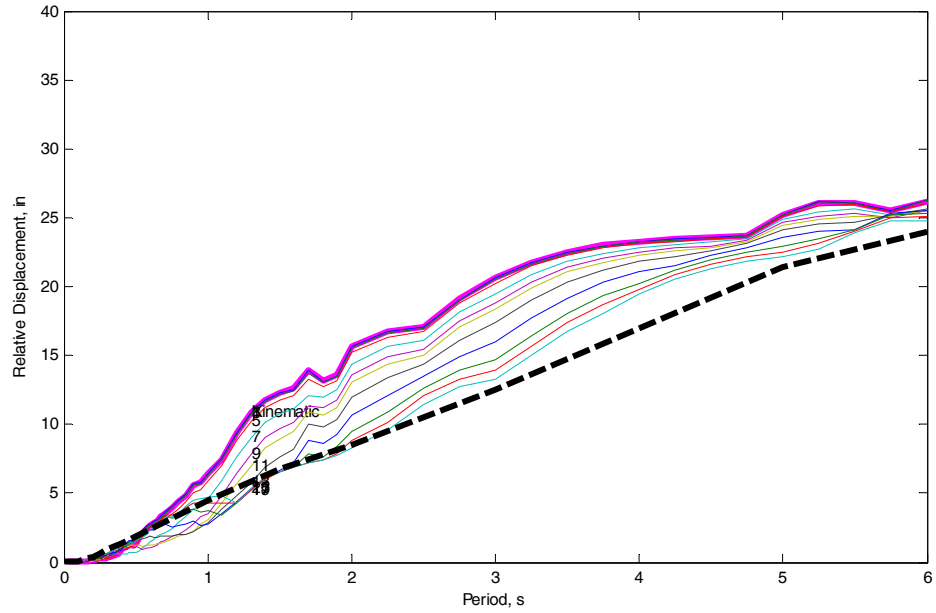


FIGURE 3-21: FREE-FIELD SITE RESPONSE (ACC. & DISP. TIME HISTORIES) FOR PIER 43

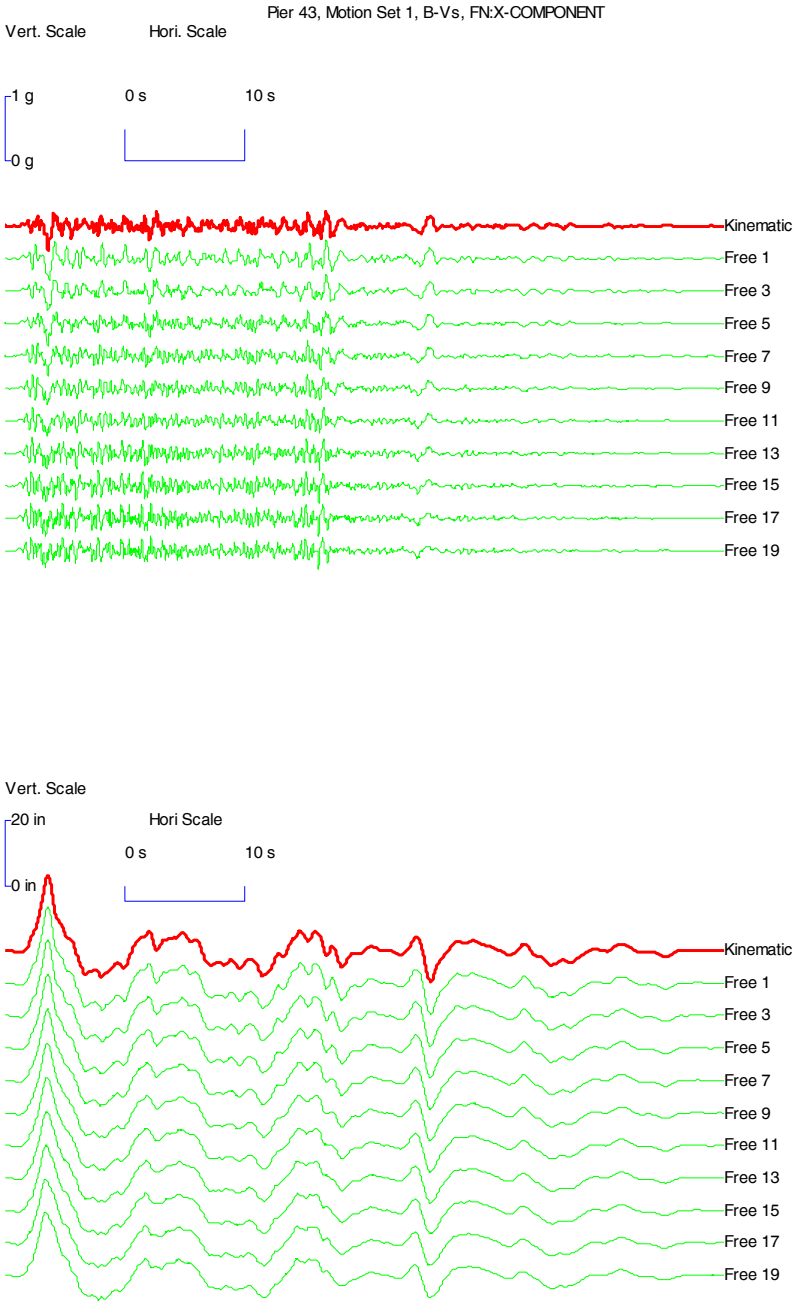


FIGURE 3-22: FREE-FIELD SITE RESPONSE (ACC. & DISP. SPECTRA) FOR PIER 43

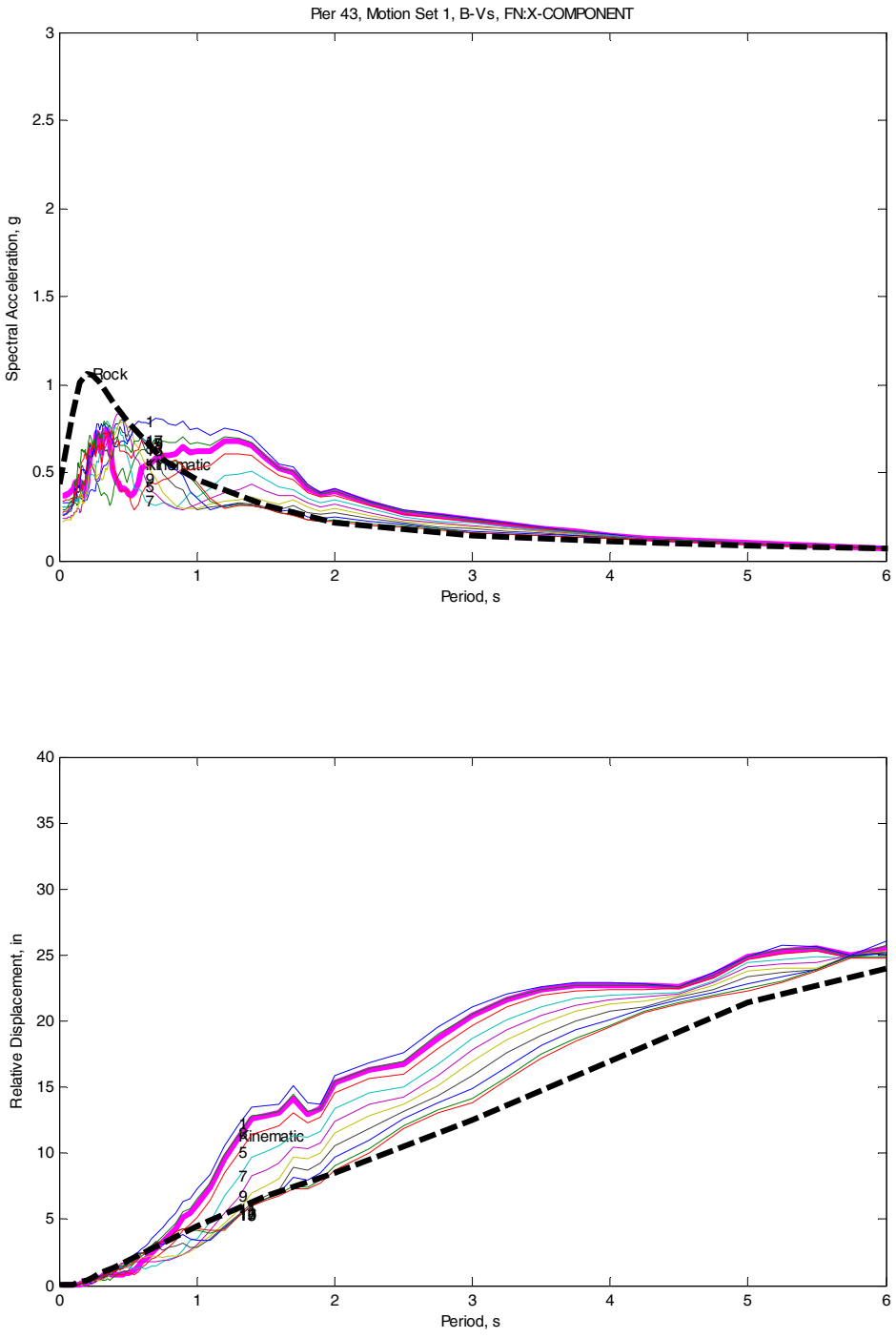


FIGURE 3-23: UNIFORM SHEAR STRAINS FOR PIER 02

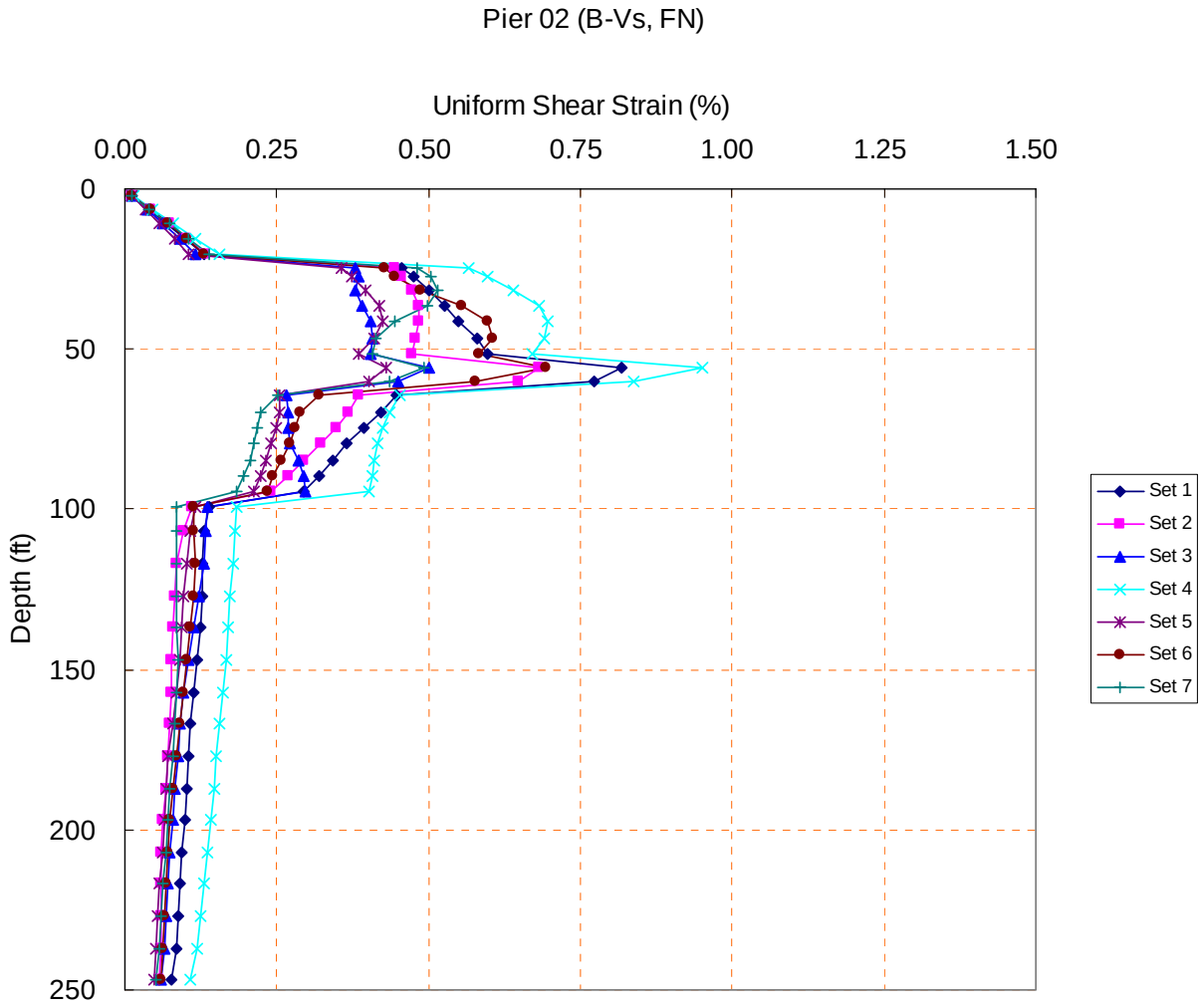


FIGURE 3-24: UNIFORM SHEAR STRAINS FOR PIER 09

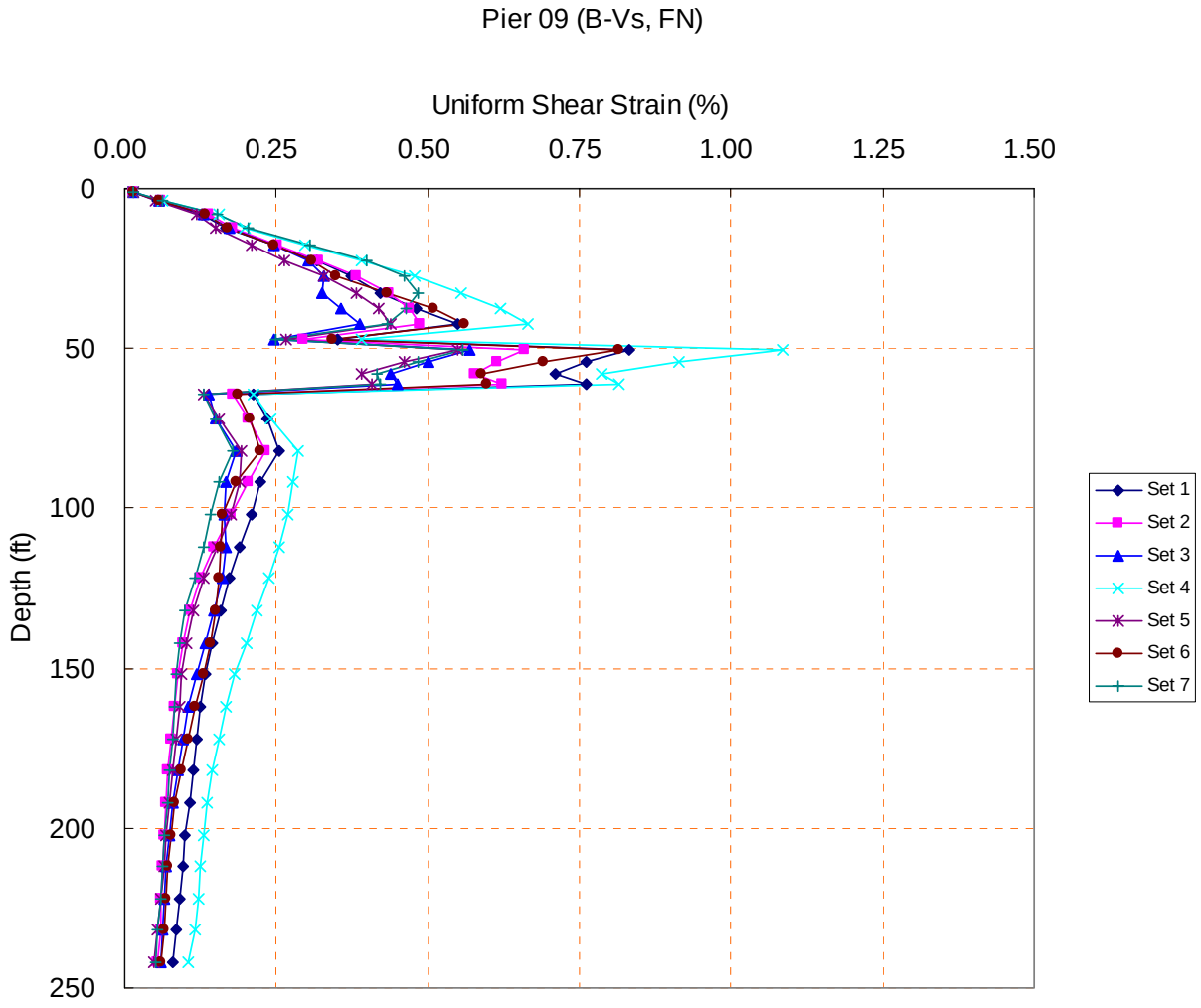


FIGURE 3-25: UNIFORM SHEAR STRAINS FOR PIER 15

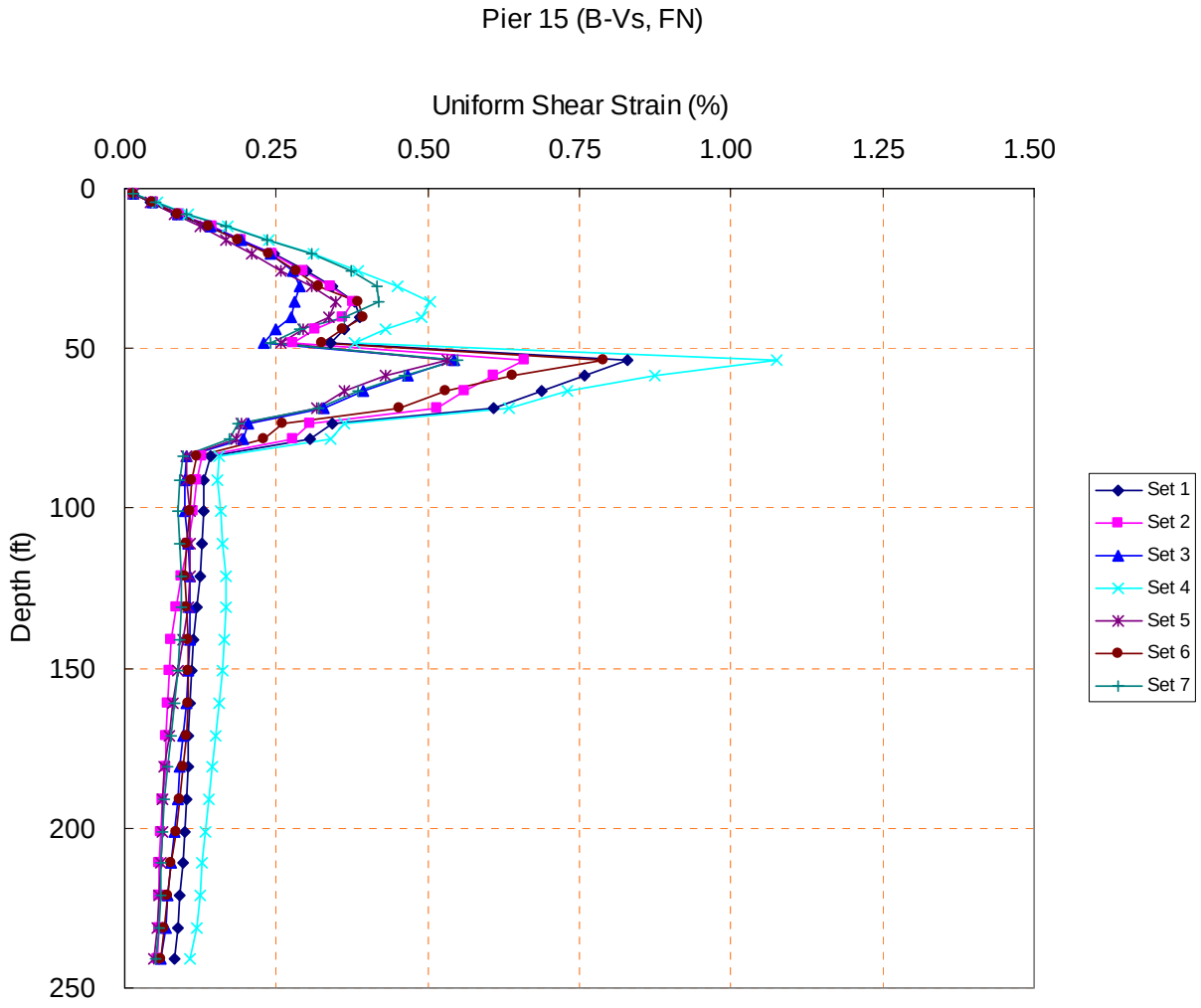


FIGURE 3-26: UNIFORM SHEAR STRAINS FOR PIER 17

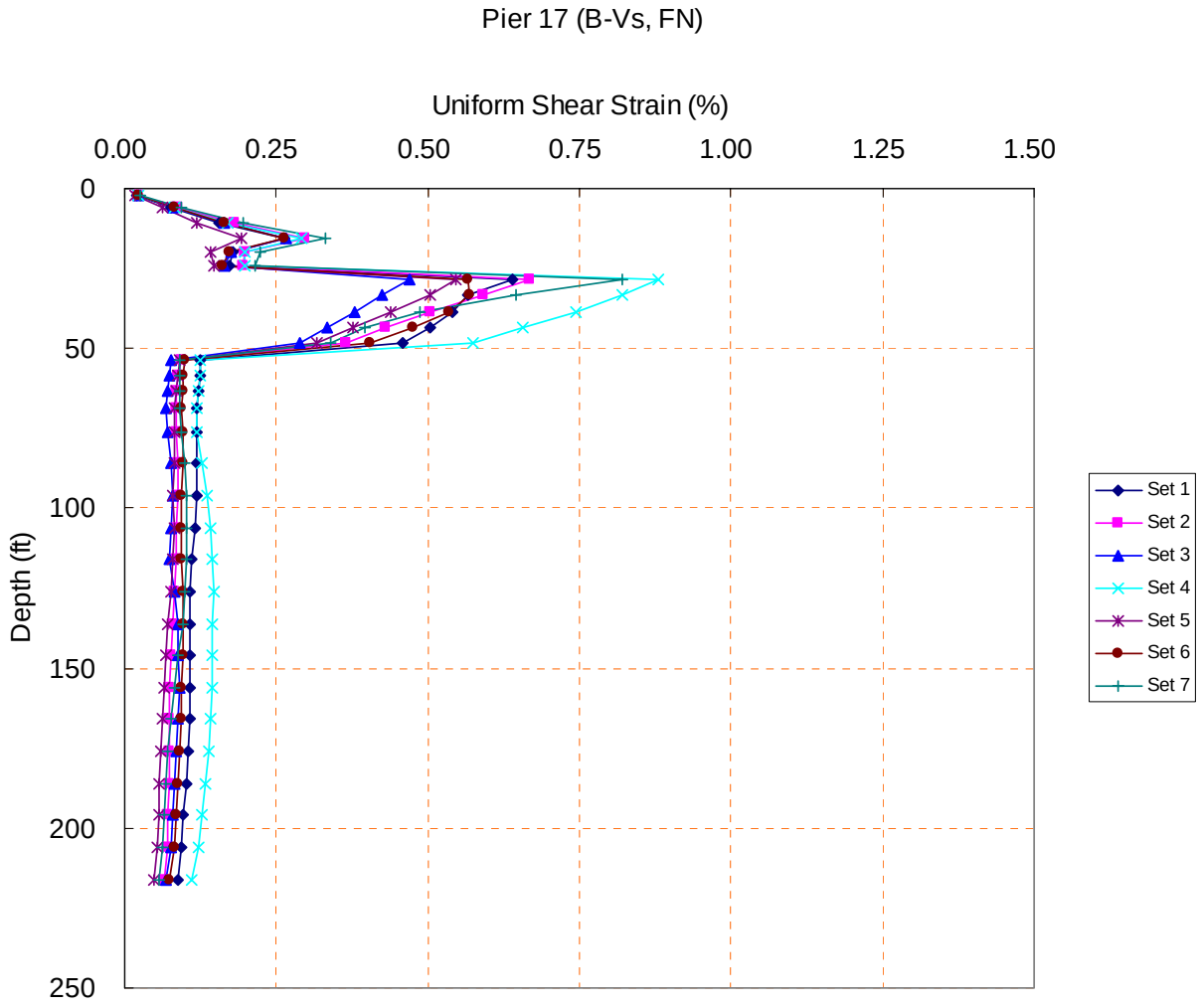


FIGURE 3-27: UNIFORM SHEAR STRAINS FOR PIER 23

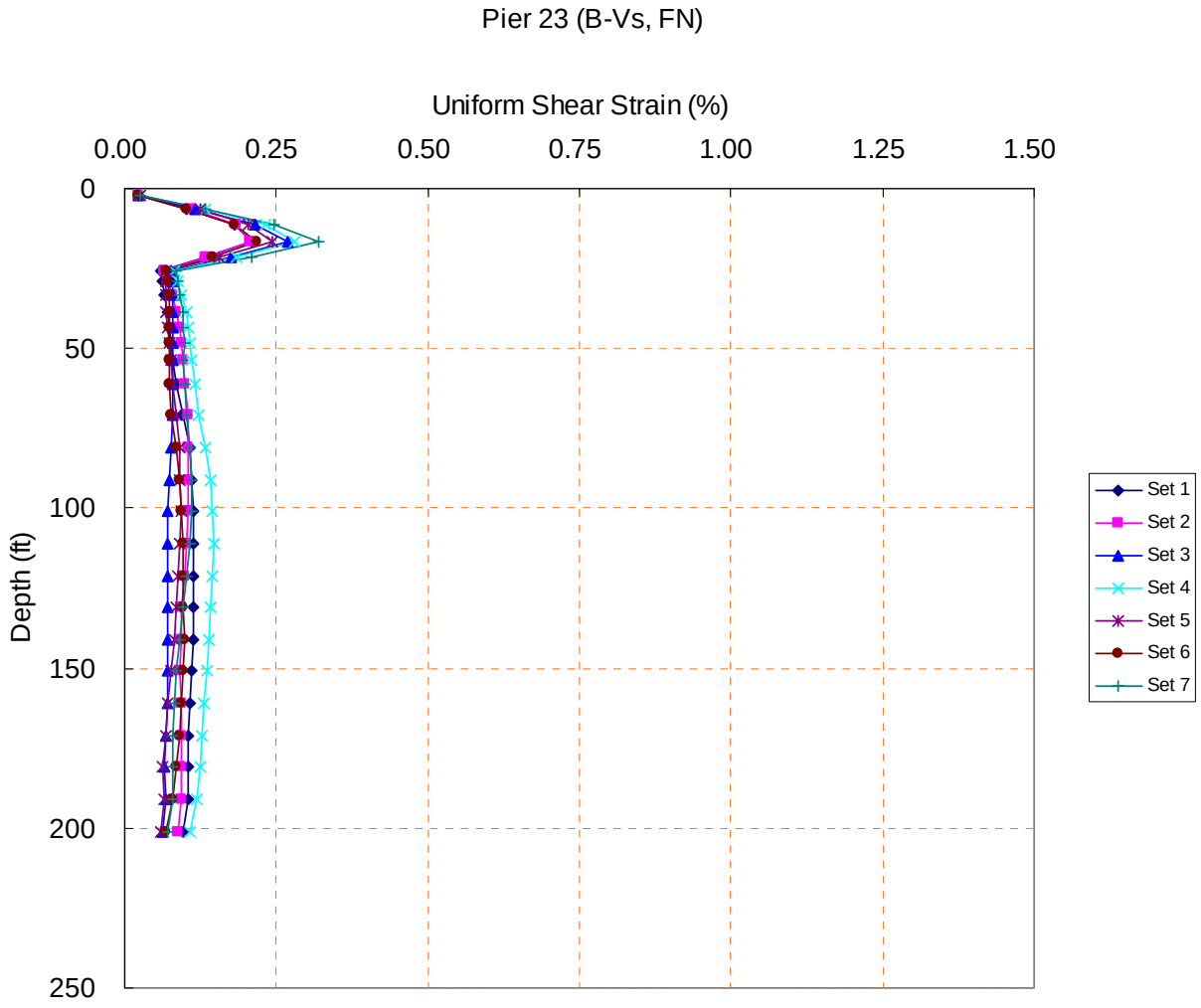


FIGURE 3-28: UNIFORM SHEAR STRAINS FOR PIER 30

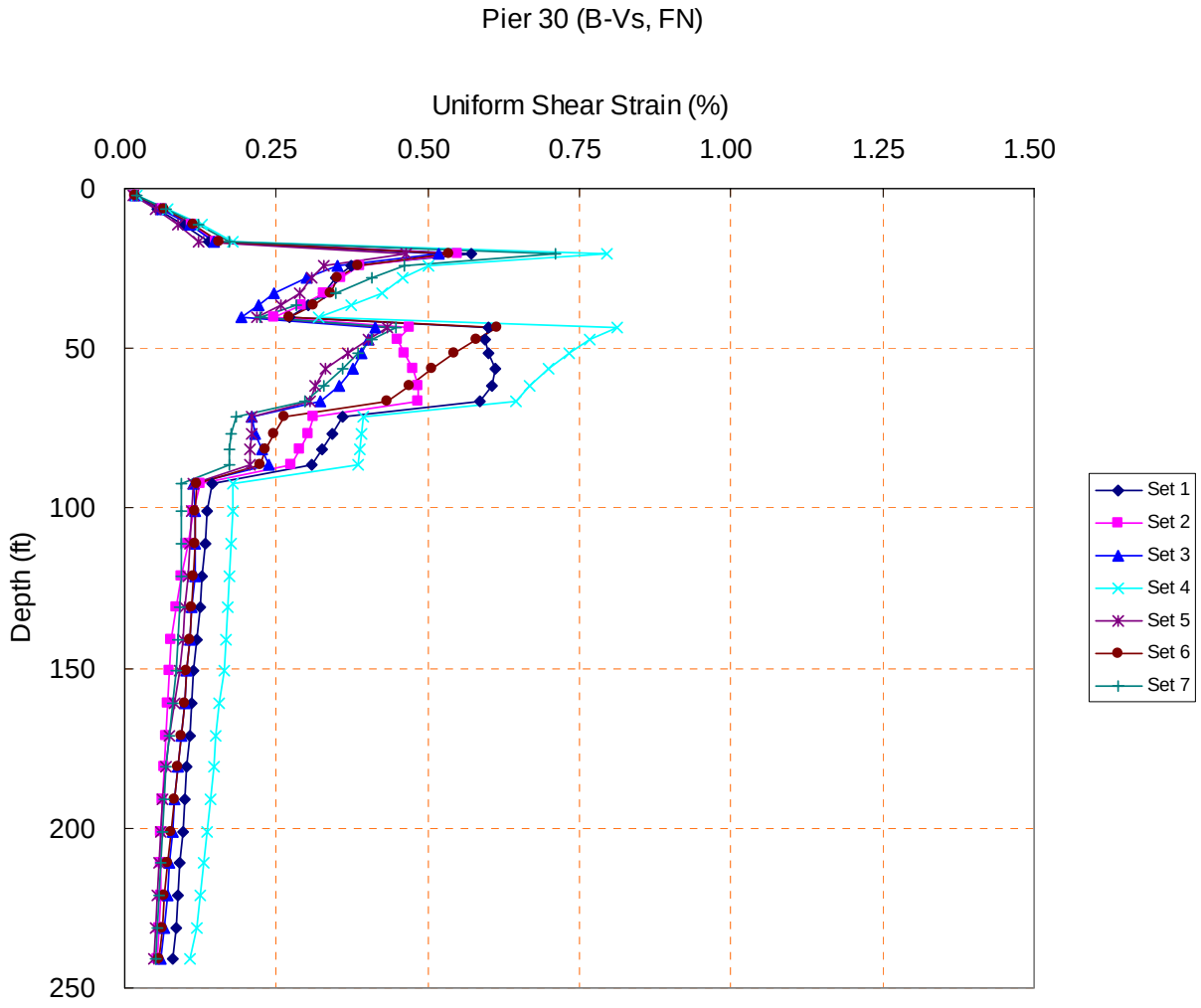


FIGURE 3-29: UNIFORM SHEAR STRAINS FOR PIER 43

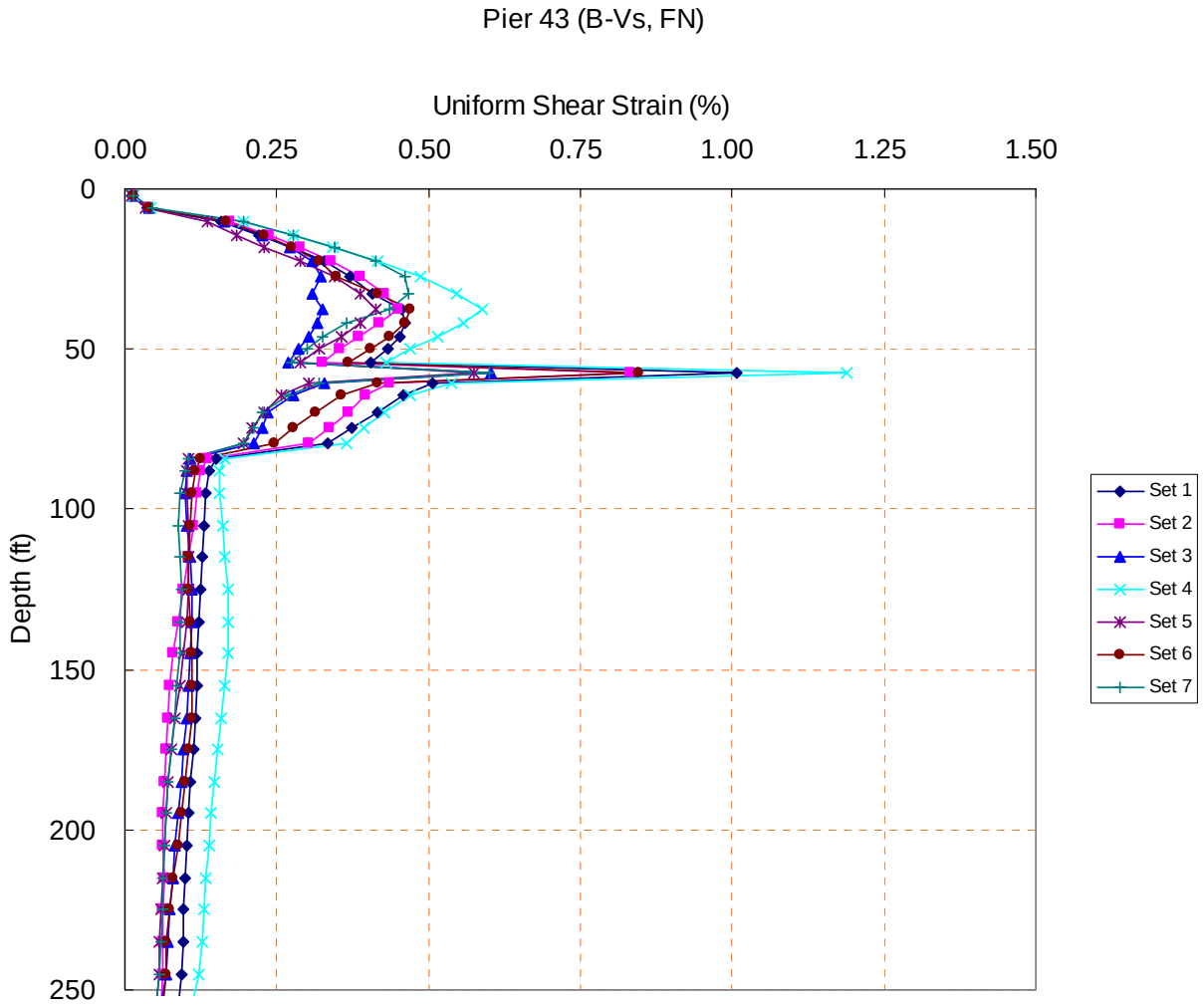


FIGURE 3-30: VARIATION OF ACCELERATION AT GROUND VS AT ROCK

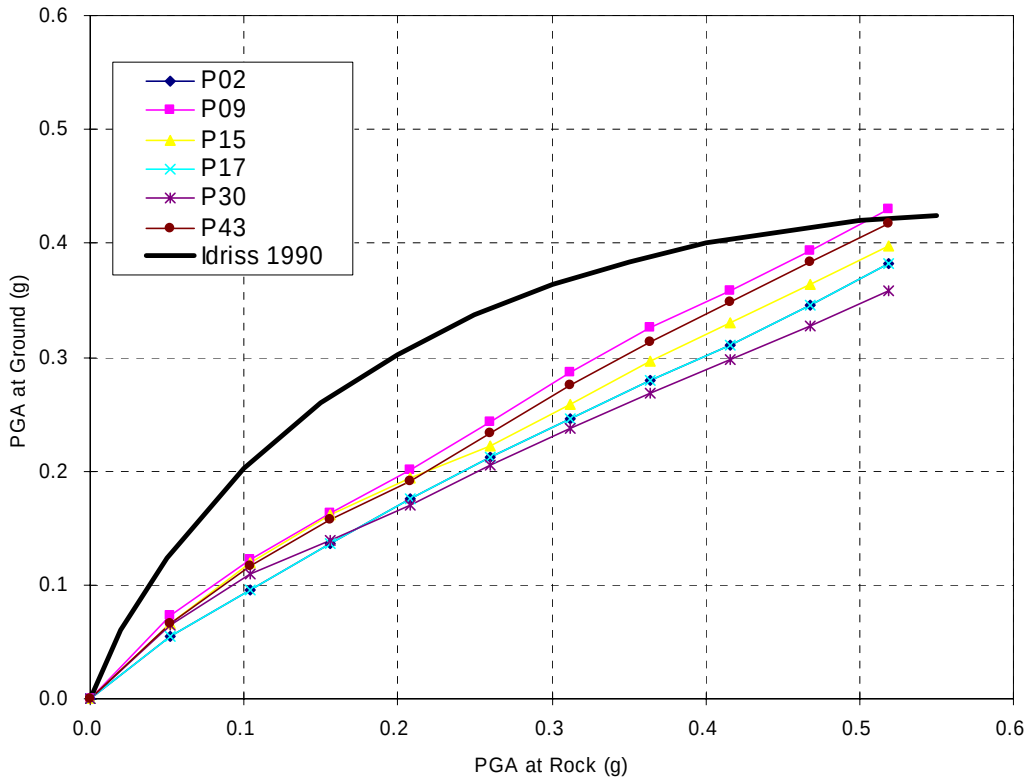


FIGURE 3-31: COMPLETE MODEL FOR SOIL-STRUCTURE INTERACTION

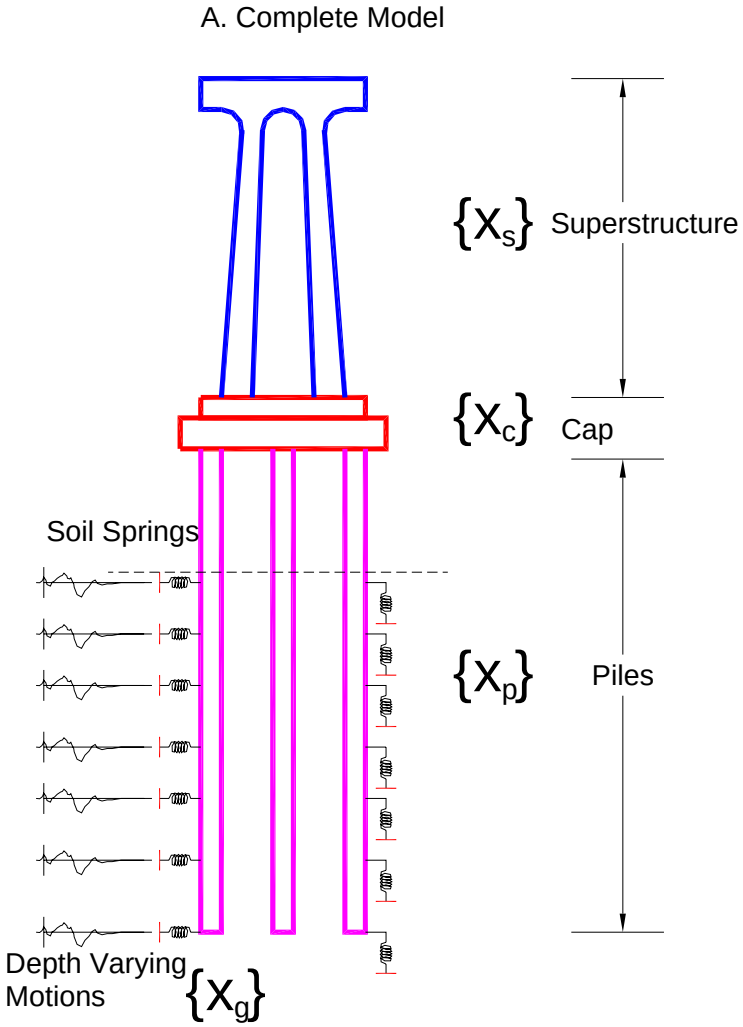


FIGURE 3-32: SUBSTRUCTURE MODEL FOR SOIL-STRUCTURE INTERACTION

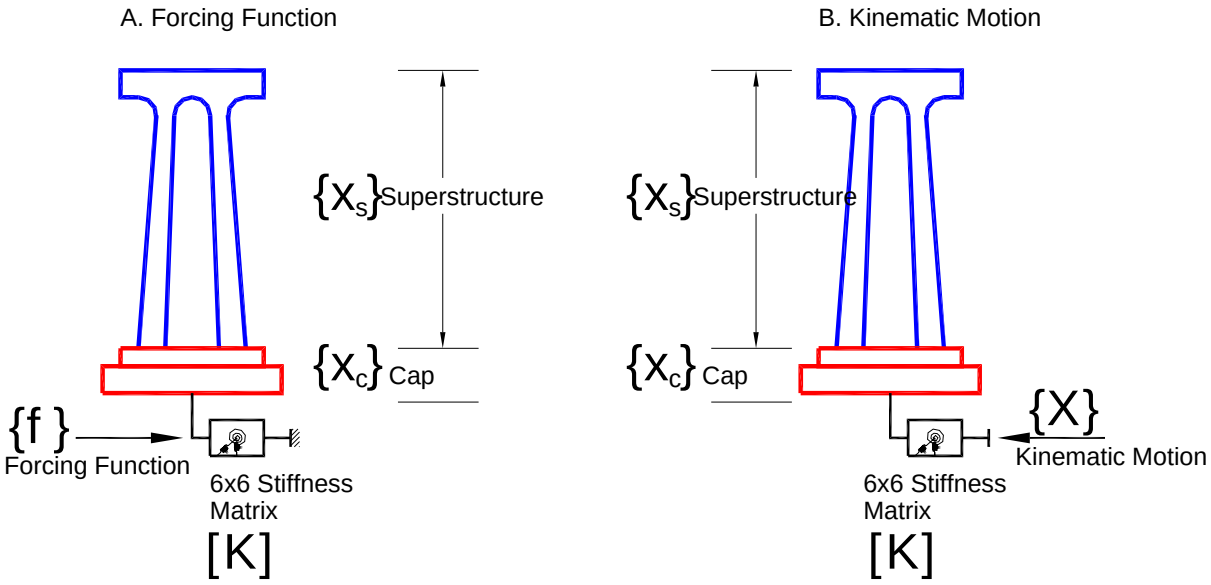


FIGURE 3-33: KINEMATIC SPECTRA AT PIER 2

Spectra in green are solutions using best-estimated, light grey using softer red using stiffer shear wave velocity profiles, dark black solid and dashed spectra are mean and 84% of all runs as compared to reference rock spectrum in black dots

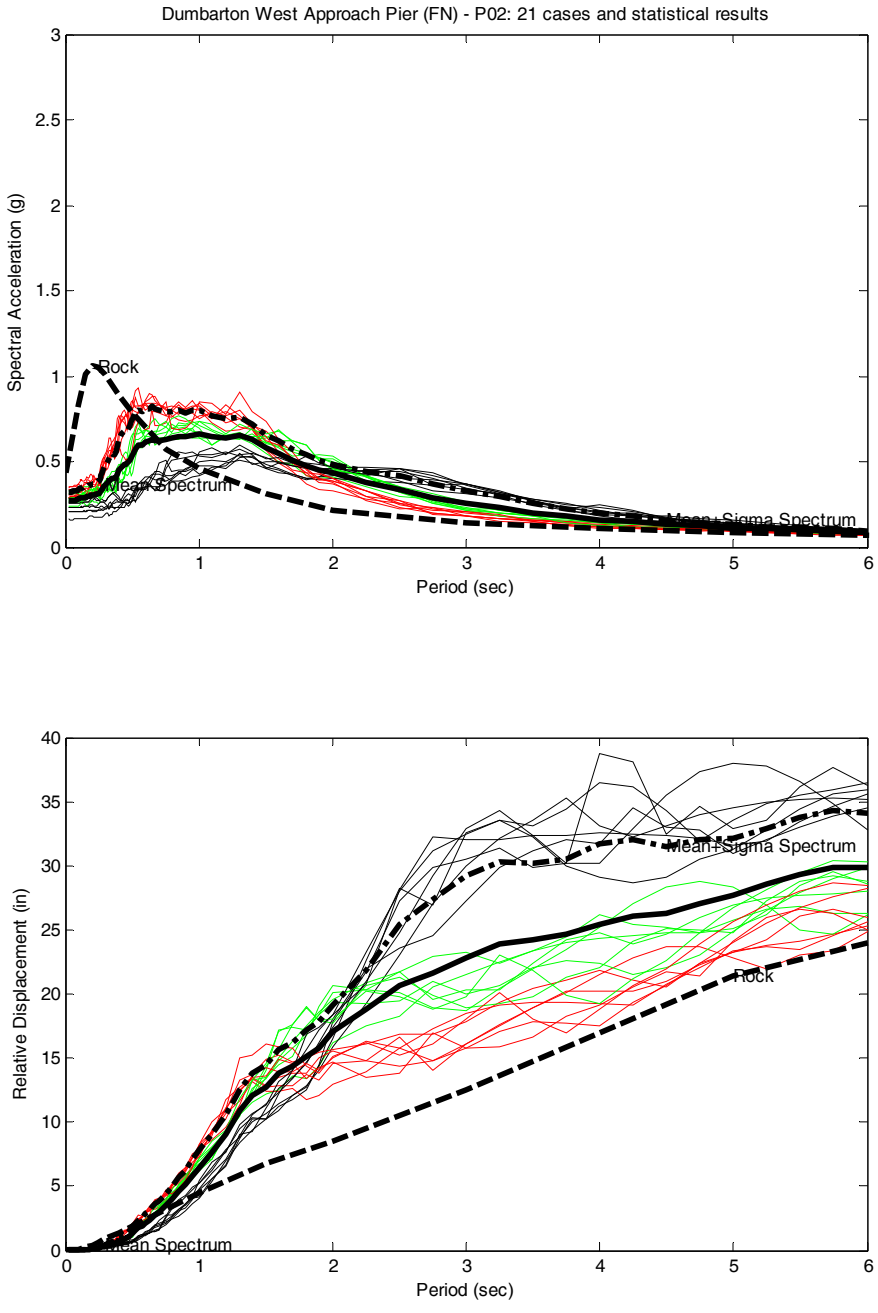


FIGURE 3-34: KINEMATIC SPECTRA AT PIER 9

Spectra in green are solutions using best-estimated, light grey using softer red using stiffer shear wave velocity profiles, dark black solid and dashed spectra are mean and 84% of all runs as compared to reference rock spectrum in black dots

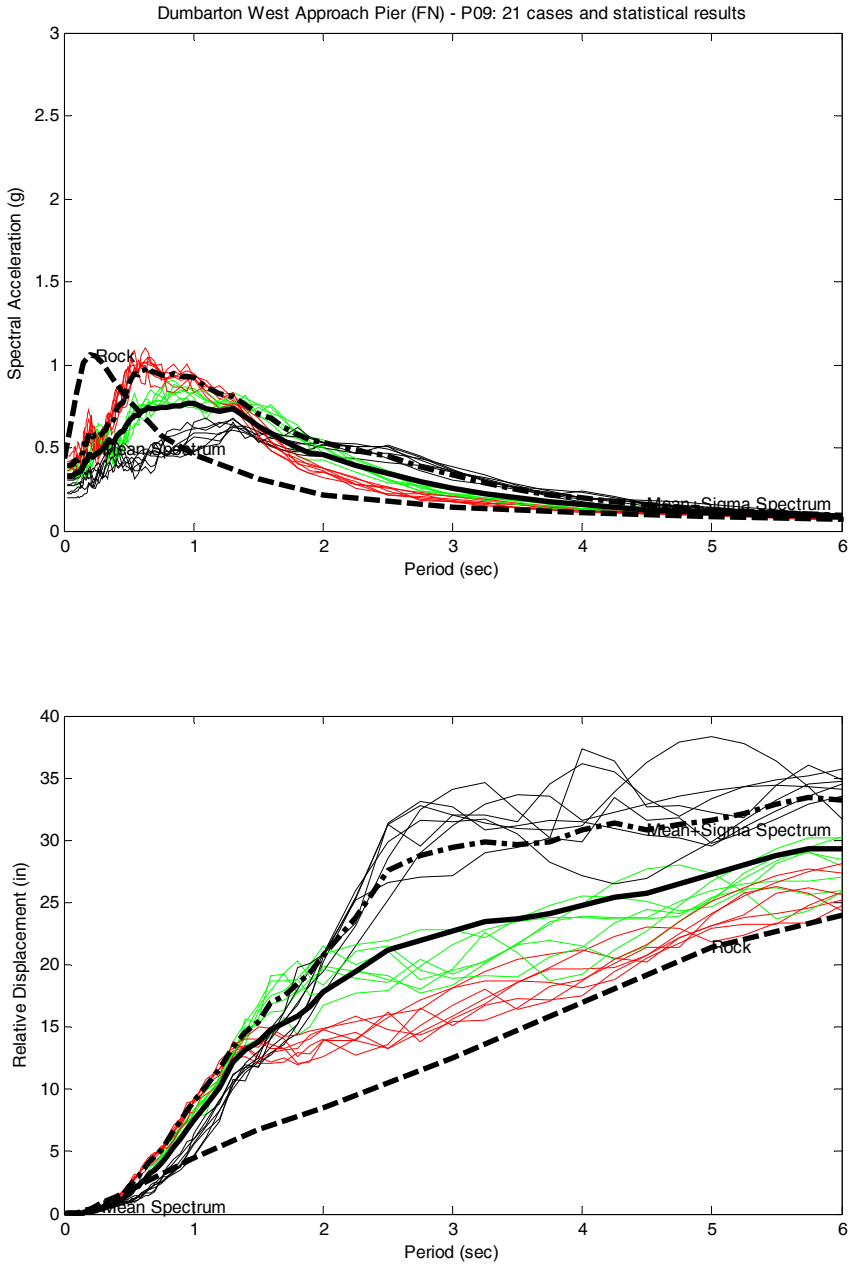


FIGURE 3-35: KINEMATIC SPECTRA AT PIER 15

Spectra in green are solutions using best-estimated, light grey using softer red using stiffer shear wave velocity profiles, dark black solid and dashed spectra are mean and 84% of all runs as compared to reference rock spectrum in black dots

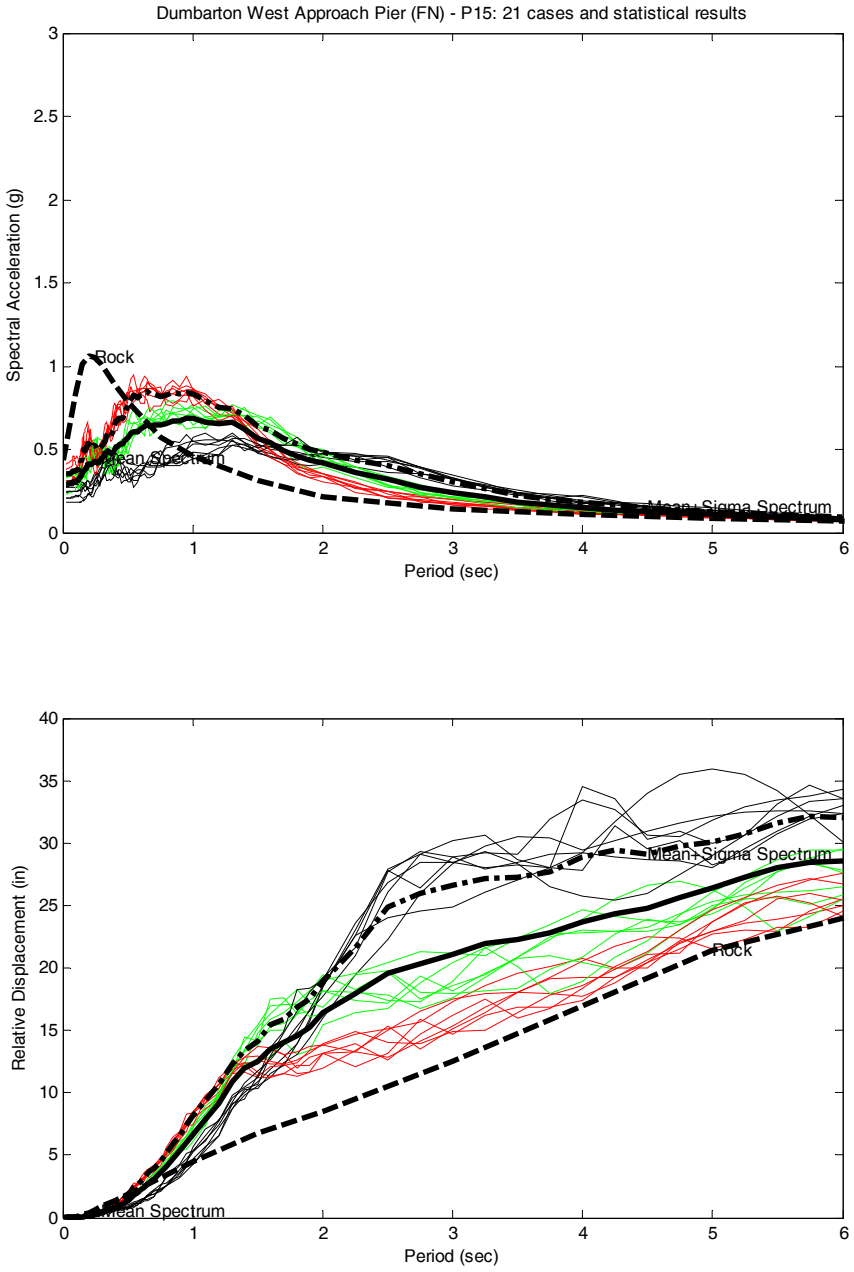


FIGURE 3-36: KINEMATIC SPECTRA AT PIER 17

Spectra in green are solutions using best-estimated, light grey using softer red using stiffer shear wave velocity profiles, dark black solid and dashed spectra are mean and 84% of all runs as compared to reference rock spectrum in black dots

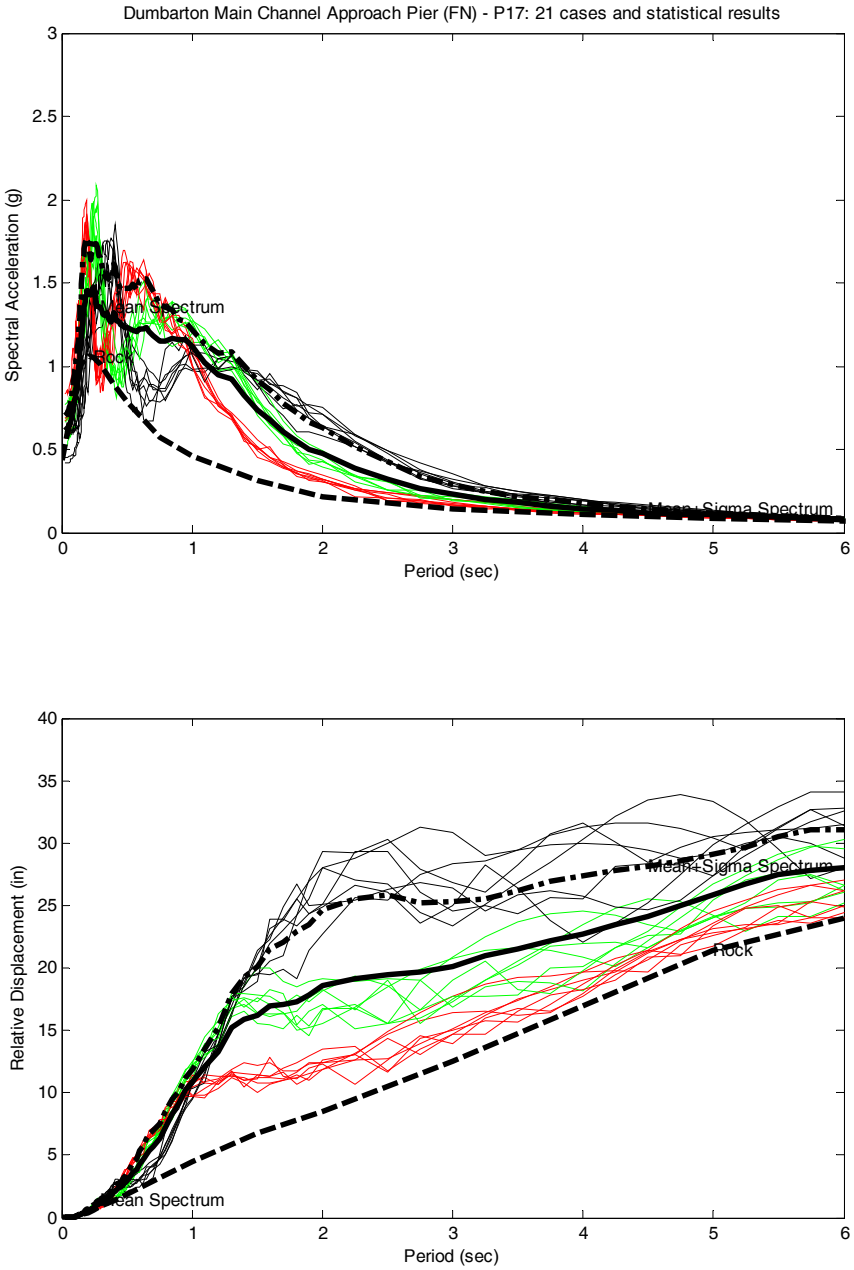


FIGURE 3-37: KINEMATIC SPECTRA AT PIER 23

Spectra in green are solutions using best-estimated, light grey using softer red using stiffer shear wave velocity profiles, dark black solid and dashed spectra are mean and 84% of all runs as compared to reference rock spectrum in black dots

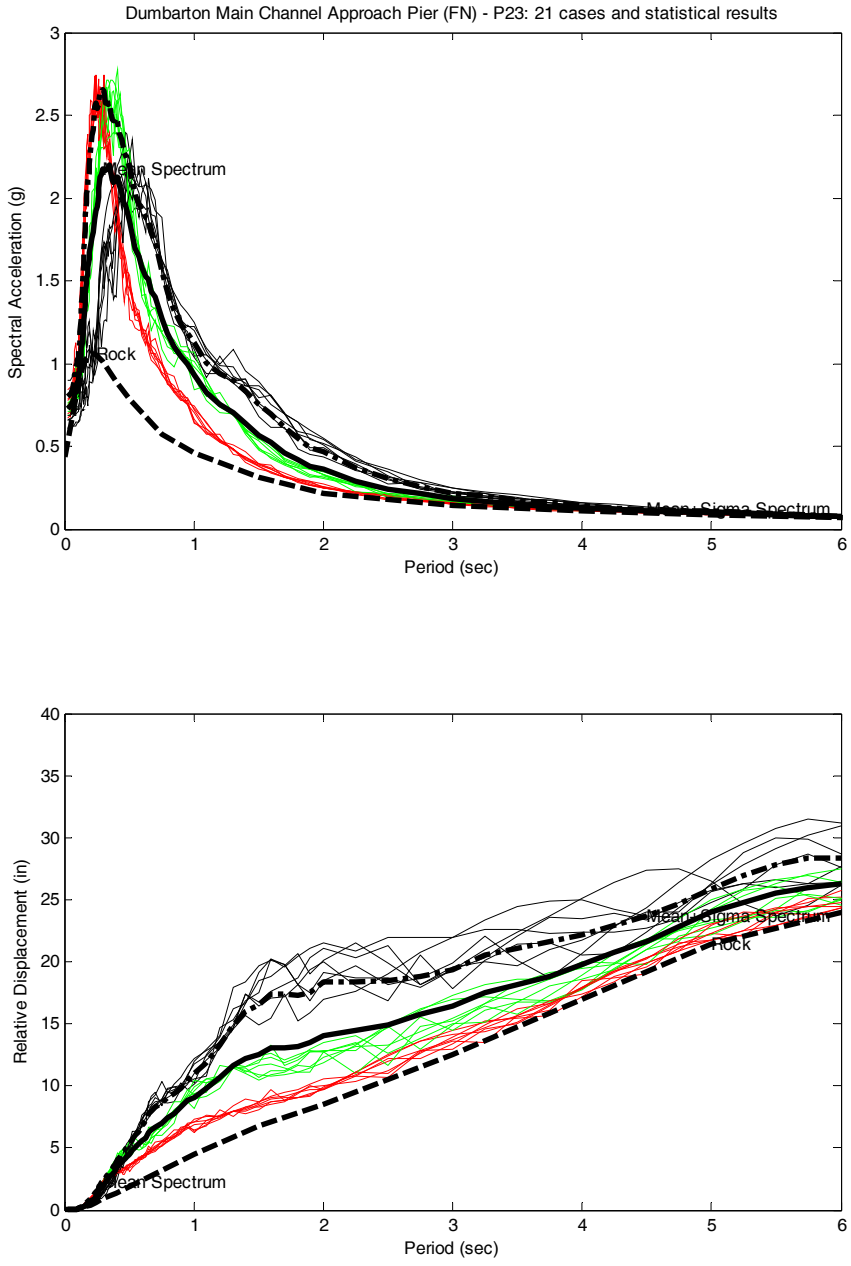


FIGURE 3-38: KINEMATIC SPECTRA AT PIER 30

Spectra in green are solutions using best-estimated, light grey using softer red using stiffer shear wave velocity profiles, dark black solid and dashed spectra are mean and 84% of all runs as compared to reference rock spectrum in black dots

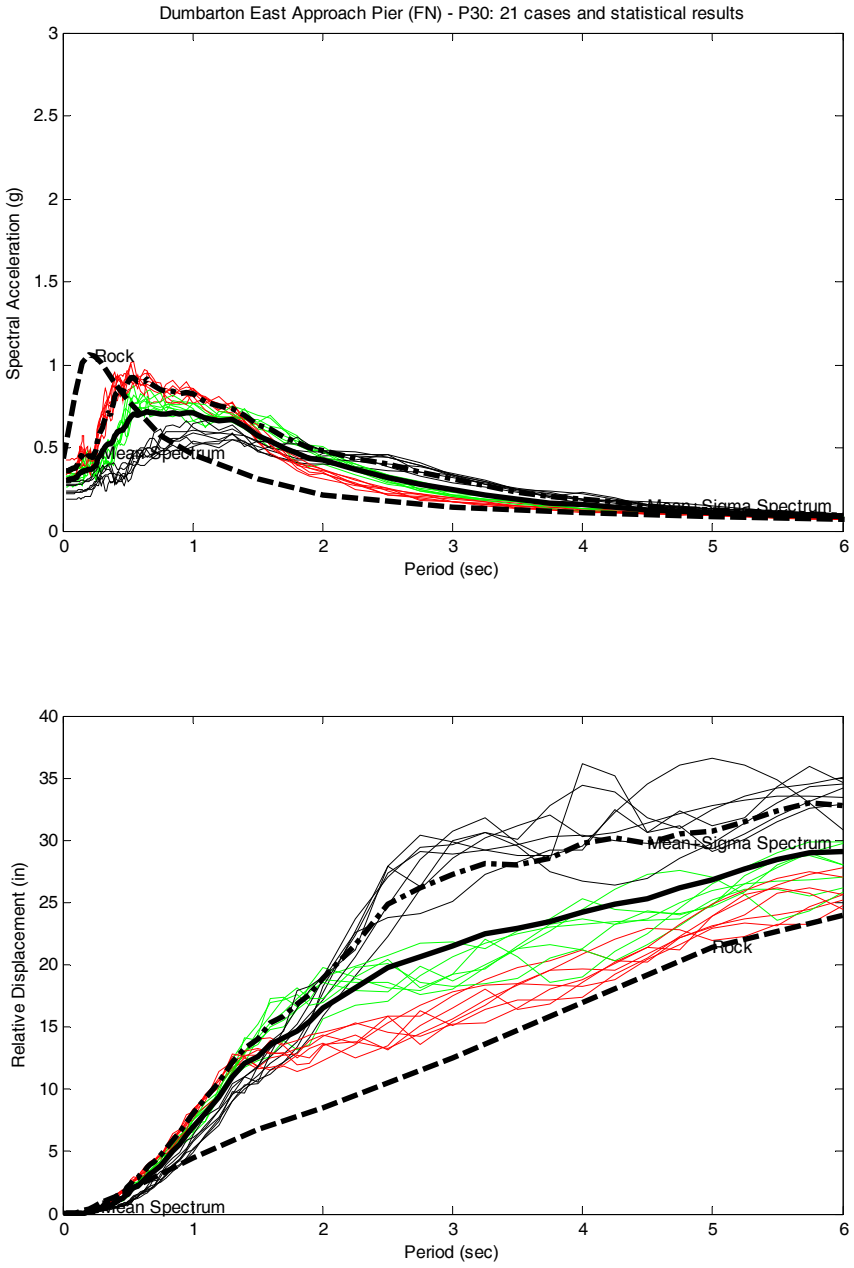


FIGURE 3-39: KINEMATIC SPECTRA AT PIER 43

Spectra in green are solutions using best-estimated, light grey using softer red using stiffer shear wave velocity profiles, dark black solid and dashed spectra are mean and 84% of all runs as compared to reference rock spectrum in black dots

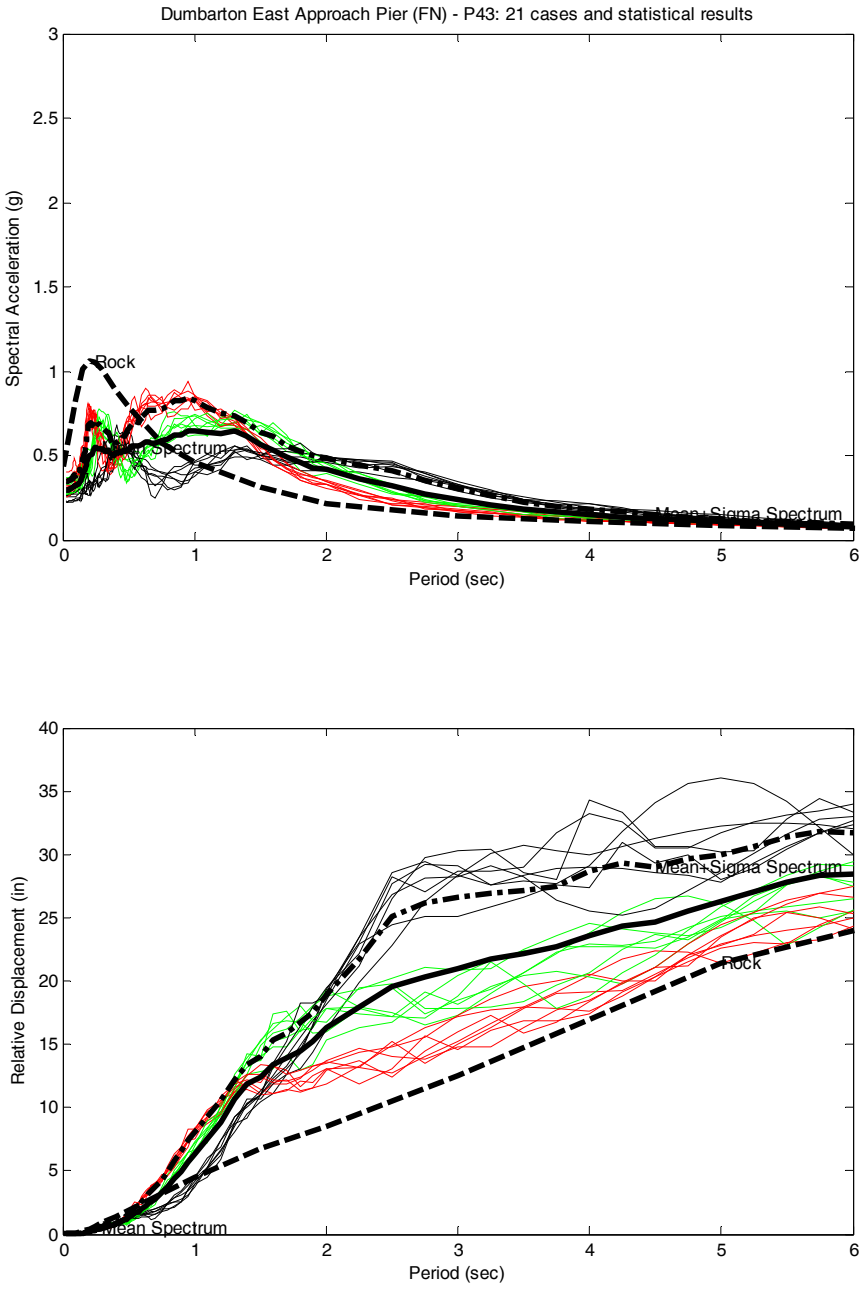
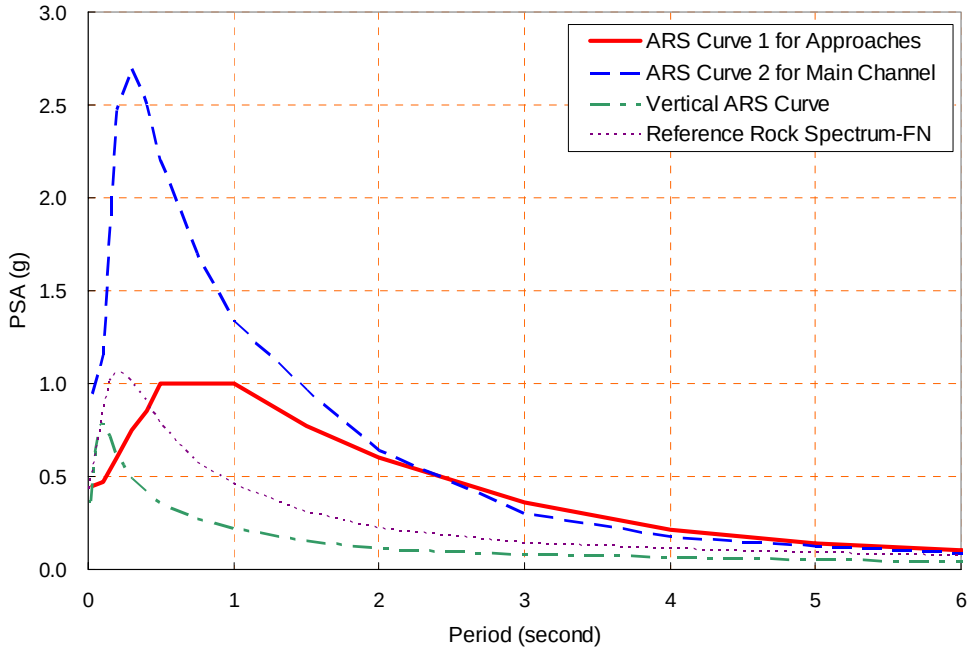
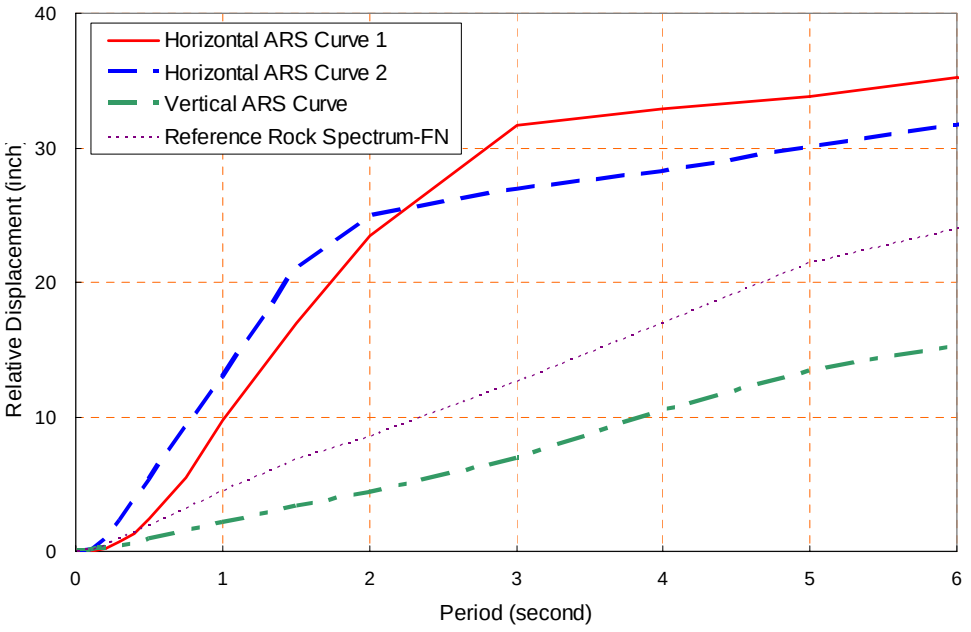


FIGURE 3-40: ARS DESIGN CURVES FOR SAFETY EVAUATION EARTHQUAKE (SEE)





4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

This Ground Motion Study report presents our findings on probabilistic earthquake analyses for the Dumbarton Bridge Seismic Retrofit Project and the results are compared with the deterministic spectra. Site response and kinematic soil-pile interaction analyses were conducted to derive the design ARS curves for the project and to develop pier-specific kinematic time histories. The following lists the major points from our conducted studies:

1. Uniform hazard spectra were developed for the reference rock motion at six return periods: 100-, 300-, 475-, 1,000-, 1,500-, and 2,000-years.

2. The 1,000-year return period spectra were adopted for the Safety Evaluation Earthquake (SEE). The return period for the Functional Evaluation Earthquake (FEE) has not been selected. The FEE level will be determined by checking the bridge functional performance once the bridge is designed for the safety level.

3. Seven sets of rock motion time histories have been developed for the SEE event. They are all spectrum compatible to the target spectrum; almost all the time histories were started from an actual earthquake record.

4. Free-field site response analyses were conducted at all piers. All seven time histories were used in the site response studies. Sensitivity site response analyses were conducted by lower bound, best estimated, and upper bound shear wave velocities.

5. Kinematic soil-pile interaction analyses have been carried out using the pile properties and configurations of the selected piers to provide ARS design spectra for the bridge.

6. Time histories of kinematic motion and depth-varying free-field motions were developed at all piers for non-linear time history analysis of the bridge.

4.2 Recommendations

Two sets of ARS design curves are recommended for the horizontal loading for the Safety Evaluation Earthquake; they are denoted as ARS Curve No. 1 and ARS Curve No. 2 as shown in Figure 3-40.

The ARS Curve No. 1 is recommended for all piers which have 20-inch diameter piles and the pile caps typically embedded below the mudline. It is applicable to all approach and trestle piers, and some piers of the Main Span (i.e., Piers 1-16, Piers 27-44, Bents W1-W20, and Bents E1-E20).

The ARS Curve No. 2 is recommended for Piers 17 to 26 of the Main Span, supported on 54-inch diameter concrete piles with the pile cap cantilevered above the mudline.

The single vertical ARS curve, as shown in Figure 3-17, is recommended all piers.

These ARS design curves should be treated as base input motion for the bridge superstructure in the earthquake response analyses. Since the ARS curve defines the level of ground shaking for the superstructure, the superstructure force must be the same irrespective of how the foundation is modeled. Therefore the same set of ARS curves should be used even the foundation substructure is modeled differently. Furthermore, to simplify the design process, no differentiation of ARS curve is made for the longitudinal and transverse directions. The developed ARS criteria correspond to shaking from the stronger fault normal (FN) component motion.

In accordance with the recommendations made during the 2006 Value Analysis Study of the Antioch and Dumbarton Bridges, the ARS design curves should be used for primary design of the bridge in the response spectrum analyses, and non-linear time history analyses are then used to check against the designs. This philosophy has been discussed and agreed by members of seismic peer review panel. Out of seven sets to time histories, three sets of time histories have been randomly selected for checking of the response spectrum design. Following the traditional toll bridge practice, enveloping seismic demands from the three sets of time histories are recommended. Alternatively, the average of seismic demands from all seven sets of time histories can be used.

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6.0 APPENDICES

6.1 Appendix A: Detailed Probabilistic Seismic Hazard Analysis

6.2 Appendix B: Compatible-Compatible Time Histories

6.3 Appendix C: Pier-specific Kinematic Motions for SEE Motion Set 1-FN

6.4 Appendix D: Pier-specific Kinematic Motions for FEE Motion Set 1-FN

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March 27, 2009

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Earth Mechanics, Inc.
Geotechnical & Earthquake Engineering

March 27, 2009

Jason Weinstein, Project Manager
BATA
Joseph P. Bort Metro Center
101 Eighth Street
Oakland CA 94607-4700

Subject: GROUND MOTION STUDY REPORT, DUMBARTON TOLL BRIDGE, SAN FRANCISCO BAY, CALIFORNIA

Dear Jason:

Ground motion studies were conducted for the Dumbarton Toll Bridge to support the evaluation of a seismic retrofit strategy and the development of plan and specifications for the retrofit construction. This report documents the ground motion studies and findings.

Should you have any questions regarding this report, please do not hesitate to contact me.

Sincerely,
EARTH MECHANICS, INC.

Hubert Law, PE, PhD
Principal

Distribution List:
- Jason Weinstein (1)
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6A APPENDIX A: PROBABILISTIC SEISMIC HAZRAD UPDATE ANALYSIS FOR DUMBARTON BRIDGE

Probabilistic Seismic Hazard Update Analysis for Dumbarton Bridge in the San Francisco Bay Area, California

Norman A. Abrahamson, Inc.
Piedmont, CA

February 12, 2009

CONTENTS

1 INTRODUCTION.. 1

2 SOURCE CHARACTERIZATION.. 2

2.1 Introduction 2

2.2 Fault Parameters 2

2.3 Magnitude Density Function 3

2.4 Rupture Dimension Relations 4

3 GROUND MOTION MODELS.. 9

3.1 Base Attenuation Relations 9

3.1.1 Long Period Evaluations 9

3.2 Directivity Models 9

3.3 Vertical Ground Motions 11

4 SEISMIC HAZARD ANALYSIS 15

4.1 Deterministic Ground Motions 15

4.2 Probabilistic Seismic Hazard Results 15

REFERENCES 43

1 Introduction

This report presents an updated evaluation of ground motions for the Dumbarton Bridge in the San Francisco Bay Area, California from a probabilistic seismic hazard analysis. The update includes the use of the final NGA models with a focus on the long period response.

The ground motions presented in this report have a return period of 1000 years. The horizontal spectra (5% spectral damping) are developed for a site condition with a shear wave velocity of 400 m/sec in the top 30 meters. Directivity effects are included for the horizontal component.

Ground motions are developed for the Dumbarton Bridge site using a probabilistic approach. The probabilistic seismic hazard analysis follows the standard approach first developed by Cornell (1968). This approach has been expanded to more fully treat both the randomness (aleatory variability) and the scientific uncertainty (epistemic uncertainty). The mathematical formulation of the hazard analysis used in this study is described in Appendix A.

2 Source Characterization

2.1 INTRODUCTION

The location of the project site relative to the major faults in the San Francisco Bay Area is shown in Figure 2-1 (see red star). The project site is located approximately equidistant from the Hayward and San Andreas faults. The Hayward fault is located approximately 13 km east of the east end of the bridge and the San Andreas is located approximately 14 km west of the west end of the bridge (see Figure 2-1). Due to their high activity rates and close distances to the site, these two faults dominate the seismic hazard at the site for the annual probability levels considered in this analysis.

2.2 FAULT PARAMETERS

For the major faults in northern California, the seismic source characterization is based on the 2003 USGS Working Group on Earthquake Probabilities in Northern California (WG, 2003). The 2003 WG report gives the probabilities of large earthquakes during the next 30 years on seven fault systems in Northern California: San Andreas, Hayward/Rodgers Creek, Calaveras, San Gregorio, Concord, Greenville, and Mt. Diablo. All of the faults except for the Mt Diablo fault have segmentation alternatives. The WG model includes Poisson and non-Poisson models of the earthquake recurrence.

The 2003 WG model allows for the fault segments to rupture separately or together. The 30-year probabilities of rupture of the individual segments and of all possible multiple segment ruptures are presented in the 2003 WG report. All of the combinations of ruptures given in the 2003 WG report are considered in the PSHA. The mean characteristic magnitudes and 30-year probabilities for the alternative rupture scenarios are listed in Table 2-1.

The 30-year probabilities given in the 2003 WG report are converted to equivalent recurrence intervals for use in the PHSA computer program. The equivalent recurrence interval is just the inverse of the equivalent annual rate assuming a Poisson recurrence:

$$Equivalent\ \mathrm{Re}currence\ Interval = \frac{30}{-\ln(1-P_{30})}$$

where P_{30} is the 30-year probability given in Table 2-1.

Other faults have been identified in the greater Bay Area region, but because of their insignificant contribution to the overall seismic hazard at the Dumbarton project sites, they were not considered in the PSHA.

2.3 MAGNITUDE DENSITY FUNCTION

The magnitude density function describes how the fault slip-rate is distributed in different size earthquakes. In this study, the characteristic model developed by Youngs and Coppersmith (1985) is used. This model is very similar to the 2003WG model; it has about 95% of the seismic moment in the characteristic part and about 5% of the seismic moment in the exponential tail, whereas the 2003 WG model has 6% of the moment in the exponential tail. The truncated exponential model is not considered because, when it is used for faults for which the activity rate is computed from the slip-rate, it leads to a large over-prediction of the historical rate of moderate magnitude earthquakes.

The minimum magnitude used in the hazard calculation is magnitude 5.0.

2.4 RUPTURE DIMENSION RELATIONS

The rupture dimension is modeled using the relations for fault area and fault width developed by Wells and Coppersmith (1994) for all source types. The rupture length is computed by dividing the area by the width.

Table 2-1. Seismic sources and source parameters based on the 2003 USGS Working Group Model. Weights for variable parameter values are indicated in parentheses.

Fault Mechanism	Segment Dip	Width (km) Top (km)	Mean Characteristic Magnitude	30-Year Probability
San Andreas	SCZ	15.0	6.84 (0.2) 7.03 (0.6)	0.026 (0.6) 0.0 (0.2)
SS	90.0	0.0	7.22 (0.2)	0.108 (0.2)
San Andreas	PN	13.0	6.95 (0.2) 7.15 (0.6)	0.044 (0.6) 0.0 (0.2)
SS	90.0	0.0	7.32 (0.2)	0.172 (0.2)
San Andreas	NCS	11.0	7.28 (0.2) 7.45 (0.6)	0.009 (0.6) 0.00 (0.2)
SS	90.0	0.0	7.61 (0.2)	0.037 (0.2)
San Andreas	NCN	11.0	7.12 (0.2) 7.29 (0.6)	0.009 (0.6) 0.0 (0.2)
SS	90.0	0.0	7.44 (0.2)	0.043 (0.2)
San Andreas	SCZ +PN	14.0	7.26 (0.2) 7.42 (0.6)	0.035 (0.6) 0.001 (0.2)
SS	90.0	0.0	7.56 (0.2)	0.102 (0.2)
San Andreas	NCS + NCN	11.0	7.53 (0.2) 7.70 (0.6)	0.034 (0.6) 0.001 (0.2)
SS	90.0	0.0	7.86 (0.2)	0.106 (0.2)
San Andreas	SCZ + PN + NCS	13.0	7.59 (0.2) 7.76 (0.6)	0.001 (0.6) 0.0(0.2)
SS	90.0	0.0	7.92 (0.2)	0.003 (0.2)
San Andreas	PN + NCS + NCN	11.7	7.65 (0.2) 7.83 (0.6)	0.002 (0.6) 0.0 (0.2)
SS	90.0	0.0	8.01 (0.2)	0.011 (0.2)
San Andreas	SCZ + PN + NCS + NCN	12.5	7.72 (0.2) 7.90 (0.6)	0.047 (0.6) 0.003 (0.2)
SS	90.0	0.0	8.10 (0.2)	0.138 (0.2)
San Andreas	floating	12.5	6.90 (0.2) 6.90 (0.6)	0.071 (0.6) 0.004 (0.2)
SS	90.0	0.0	6.90 (0.2)	0.264 (0.2)
Hayward	SH	12.0	6.36 (0.2) 6.67 (0.6)	0.113 (0.6) 0.022 (0.2)
SS	90.0	0.0	6.93 (0.2)	0.319 (0.2)
Hayward	NH	12.0	6.18 (0.2) 6.49 (0.6)	0.123 (0.6) 0.023 (0.2)
SS	90.0	0.0	6.78 (0.2)	0.360 (0.2)
Hayward	SH + NH	12.0	6.68 (0.2) 6.91 (0.6)	0.085 (0.6) 0.019 (0.2)
SS	90.0	0.0	7.12 (0.2)	0.232 (0.2)
Hayward	RC	12.0	6.81 (0.2) 6.98 (0.6)	0.152 (0.6) 0.041 (0.2)
SS	90.0	0.0	7.14 (0.2)	0.414 (0.2)

Table 2-1. (Cont'd)

Fault Mechanism	Segment Dip	Width (km) Top (km)	Mean Characteristic Magnitude	30-Year Probability
Hayward	NH + RC	12.0	6.94 (0.2)	0.018 (0.6)
			7.11 (0.6)	0.0 (0.2)
SS	90.0	0.0	7.28 (0.2)	0.066 (0.2)
Hayward	SH + NH + RC	12.0	7.09 (0.2)	0.010 (0.6)
			7.26 (0.6)	0.001 (0.2)
SS	90.0	0.0	7.42 (0.2)	0.033 (0.2)
Hayward	floating	12.0	6.90 (0.2)	0.007 (0.6)
			6.90 (0.6)	0.003 (0.2)
SS	90.0	0.0	6.90 (0.2)	0.016 (0.2)
Calaveras	SC	11.0	5.00 (0.2)	0.213 (0.6)
			5.79 (0.6)	0.0 (0.2)
SS	90.0	0.0	6.14 (0.2)	0.538 (0.2)
Calaveras	CC	11.0	5.75 (0.2)	0.138 (0.6)
			6.23 (0.6)	0.039 (0.2)
SS	90.0	0.0	6.68 (0.2)	0.297 (0.2)
Calaveras	SC + CC	11.0	5.87 (0.2)	0.050 (0.6)
			6.36 (0.6)	0.0 (0.2)
SS	90.0	0.0	6.75 (0.2)	0.203 (0.2)
Calaveras	NC	12.0	6.58 (0.2)	0.124 (0.6)
			6.78 (0.6)	0.030 (0.2)
SS	90.0	0.0	6.97 (0.2)	0.356 (0.2)
Calaveras	CC + NC	11.5	6.68 (0.2)	0.003 (0.6)
			6.90 (0.6)	0.0 (0.2)
SS	90.0	0.0	7.11 (0.2)	0.036 (0.2)
Calaveras	SC + CC + NC	11.3	6.72 (0.2)	0.020 (0.6)
			6.93 (0.6)	0.0 (0.2)
SS	90.0	0.0	7.14 (0.2)	0.079 (0.2)
Calaveras	floating	11.3	6.20 (0.2)	0.074 (0.6)
			6.20 (0.6)	0.017 (0.2)
SS	90.0	0.0	6.20 (0.2)	0.195 (0.2)
Calaveras	floating SC + CC	11.0	6.20 (0.2)	0.251 (0.6)
			6.20 (0.6)	0.051 (0.2)
SS	90.0	0.0	6.20 (0.2)	0.560 (0.2)
Concord/GV	CON	16.0	5.75 (0.2)	0.050 (0.6)
			6.25 (0.6)	0.003 (0.2)
SS	90.0	0.0	6.67 (0.2)	0.182 (0.2)
Concord/GV	SGV	14.0	5.75 (0.2)	0.023 (0.6)
			6.24 (0.6)	0.001 (0.2)
SS	90.0	0.0	6.65 (0.2)	0.087 (0.2)
Concord/GV	CON +SGV	15.0	6.13 (0.2)	0.016 (0.6)
			6.58 (0.6)	0.001 (0.2)
SS	90.0	0.0	6.91 (0.2)	0.067 (0.2)

Table 2-1. (Cont'd)

Fault Mechanism	Segment Dip	Width (km) Top (km)	Mean Characteristic Magnitude	30-Year Probability
Concord/GV	NGV	14.0	5.45 (0.2)	0.061 (0.6)
			6.02 (0.6)	0.004 (0.2)
SS	90.0	0.0	6.49 (0.2)	0.219 (0.2)
Concord/GV	SGV +NGV	14.0	6.03 (0.2)	0.032 (0.6)
			6.48 (0.6)	0.002 (0.2)
SS	90.0	0.0	6.81 (0.2)	0.115 (0.2)
Concord/GV	CON +SGV +NGV	14.7	6.34 (0.2)	0.060 (0.6)
			6.71 (0.6)	0.007 (0.2)
SS	90.0	0.0	7.00 (0.2)	0.222 (0.2)
Concord/GV	floating	14.7	6.20 (0.2)	0.062 (0.6)
			6.20 (0.6)	0.002 (0.2)
SS	90.0	0.0	6.20 (0.2)	0.296 (0.2)
San Gregorio	SGS	12.0	6.75 (0.2)	0.023 (0.6)
			6.96 (0.6)	0.0 (0.2)
SS	90.0	0.0	7.17 (0.2)	0.115 (0.2)
San Gregorio	SGN	13.0	7.04 (0.2)	0.039 (0.6)
			7.23 (0.6)	0.0 (0.2)
SS	90.0	0.0	7.41 (0.2)	0.175 (0.2)
San Gregorio	SGS +SGN	12.5	7.27 (0.2)	0.026 (0.6)
			7.44 (0.6)	0.0 (0.2)
SS	90.0	0.0	7.58 (0.2)	0.101 (0.2)
San Gregorio	floating	12.5	6.90 (0.2)	0.021 (0.6)
			6.90 (0.6)	0.008 (0.2)
SS	90.0	0.0	6.90 (0.2)	0.039 (0.2)
Greenville	SG	15.0	6.37 (0.2)	0.031 (0.6)
			6.60 (0.6)	0.0 (0.2)
SS	90.0	0.0	6.83 (0.2)	0.107 (0.2)
Greenville	NG	15.0	6.41 (0.2)	0.029 (0.6)
			6.66 (0.6)	0.0 (0.2)
SS	90.0	0.0	6.88 (0.2)	0.107 (0.2)
Greenville	SG +NG	15.0	6.74 (0.2)	0.015 (0.6)
			6.94 (0.6)	0.001 (0.2)
SS	90.0	0.0	7.13 (0.2)	0.047 (0.2)
Greenville	floating	15.0	6.20 (0.2)	0.004 (0.6)
			6.20 (0.6)	0.001 (0.2)
SS	90.0	0.0	6.20 (0.2)	0.009 (0.2)
Mt Diablo	MTD	14.2	6.42 (0.2)	0.075 (0.6)
			6.65 (0.6)	0.005 (0.2)
RV	27.4	4.0	6.89 (0.2)	0.241 (0.2)

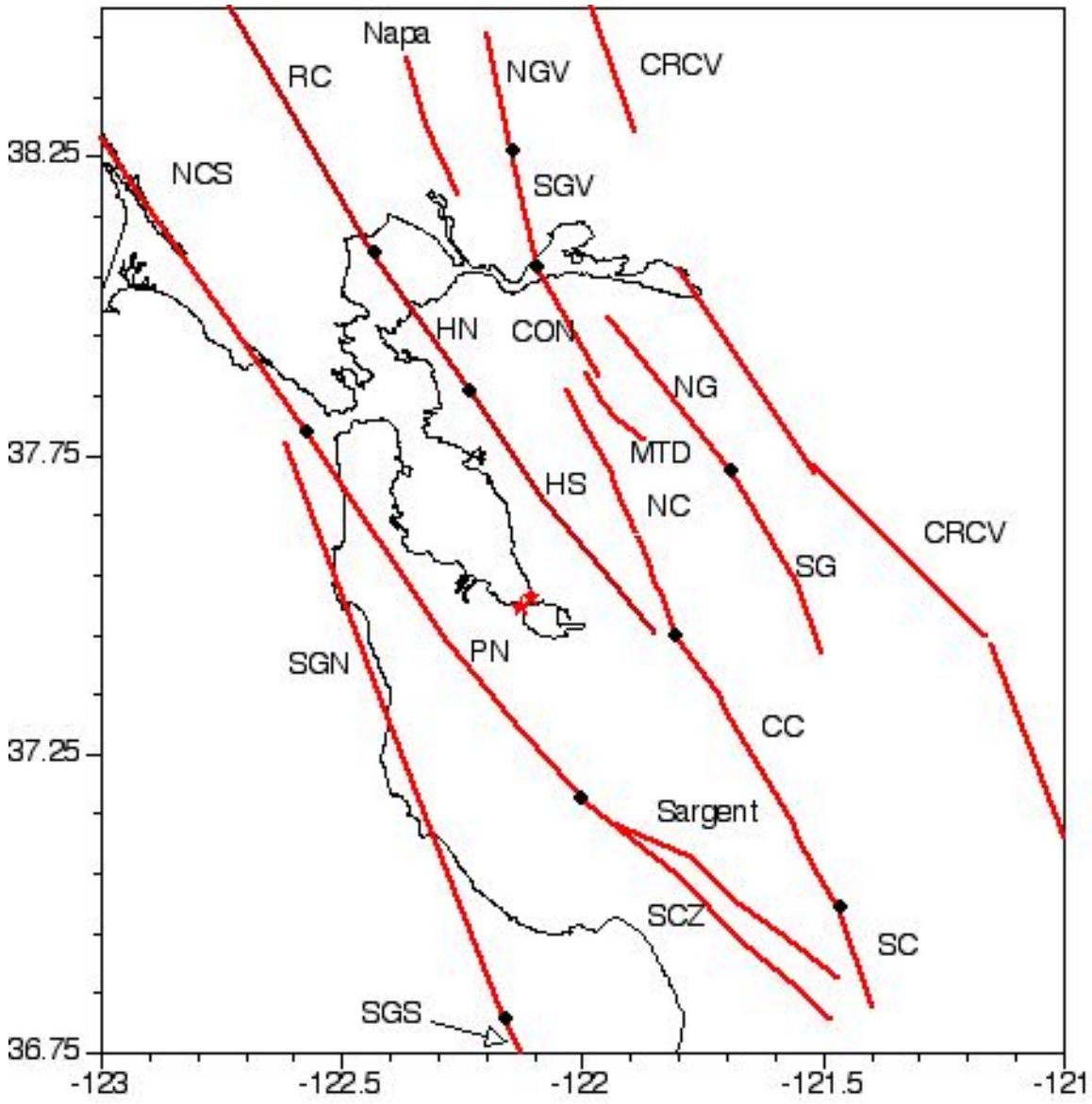

Figure 2-1. Map showing the location of the Dumbarton Bridge (red stars) and the nearby faults.

3 Ground Motion Models

3.1 BASE ATTENUATION RELATIONS

The five recently developed attenuation relationships as part of the PEER Next Generation Attenuation program are used. These empirical attenuation relationships were developed by five separate modeling teams: Abrahamson and Silva (2008), Boore and Atkinson (2008), Campbell and Bozorgnia (2008), Chiou and Youngs (2008) and Idriss (2008). These newly developed models represent updates to the previously published attenuation models: Abrahamson and Silva (1997), Boore et al. (1997), Campbell and Bozorgnia (2003), Sadigh et al. (1997), and Idriss (1991,1994ab) which have typically been used for ground motion studies. A key parameter used in four of the five NGA models is the used an average shear wave velocity in the top 30 m for the estimation of site effects on the predicted ground motion. The Idriss model is defined for a range of average shear wave velocity between 450 – 900 m/s rather than a specific shear wave value. While the specified V_{S30} of 400 m/s is outside of this range, we included this model as well.

3.1.1 Long Period Evaluation

The NGA models are evaluated in terms of their long period characteristics for the magnitude and distances import to the Dumbarton Bridge. As shown in Section 4, the Hayward and San Andreas Faults are located 13-15 km from the bridge. The displacement spectra for the five NGA models are shown in Figure 3.1, for M6, M7, and M8 strike-slip earthquakes for rock site conditions (Vs30=760 m/s) at a rupture distance of 13 km. The long period displacement spectra are similar for the 5 models for the M6 and M7 cases, but for the M8 case, two of the models (CB08 and BA08) do not show the expected curvature at long periods. The other three models of the models (CY08, AS08, I08) show the expected trend. Since long periods from large magnitudes are important for the Dumbarton Bridge, these three models are selected and given equal weight.

3.2 DIRECTIVITY MODELS

The three selected attenuation relations describe the attenuation of the average of the two horizontal components of ground motion. These attenuation relations were adjusted to account for near-fault directivity effects using a modified form of the Somerville et al. (1997) fault-rupture directivity model. Somerville et al. (1997) developed an empirically-based model quantifying the effects of rupture directivity on horizontal response spectra that can be used to scale the average horizontal component computed from attenuation relations. The Somerville et al. (1997) model comprises two period-dependent scaling factors that may be applied to any ground motion attenuation relationship. One of the factors accounts for the increase in shaking intensity in the average horizontal component of motion due to near-fault rupture directivity effects. The second factor reflects the directional nature of the shaking intensity using two ratios: fault normal (FN) and fault parallel (FP) versus the average (FA) component ratios. The two scaling factors depend on whether fault rupture is in the forward or backward direction, and also the length of fault rupturing toward the site.

The Somerville et al (1997) model for the directivity scaling for the average horizontal component was modified by Abrahamson (2000) to account for saturation of forward directivity effect. This modified model leads to smaller directivity effects than the Somerville et al model.

Recently, the ground motion data used in the NGA models has been evaluated for directivity effects in two studies. Watson-Lamprey (2007) used the same functional form as the Somerville et al. (1997) model and computed updated coefficients based on the residuals from the NGA models. She found that the directivity effects for the average horizontal were weaker than given in the Somerville et al. model. Spudich and Chiou (2008) used the NGA residuals to develop a directivity model that used a more complex functional form that had a stronger seismological basis. Applying this model leads to forward directivity for the average horizontal component that is similar to the Abrahamson (2000) model for forward directivity conditions. Based on this agreement, the Abrahamson (2000) model is used in this project for the average horizontal component. The standard deviation of the ground motion model is modified for all of the NGA models following Abrahamson (2000) to account for the reduction in the standard deviation that results from including directivity effects as part of the ground motion model.

The Somerville et al. (1997) is used for the FN/FA and FP/FA ratio. The fault normal component is taken as the major principal axis resulting in an FN/FA ratio larger than 1 and the fault parallel component is taken as the minor principal axis with an FP/FA ratio smaller than 1. Rupture directivity is only applied to the major faults (San Andreas, Hayward).

The Somerville et al (1997) and Abrahamson (2000) directivity models are only defined for spectral periods up to 6 seconds. From past large magnitude earthquakes (M7.6 1999 Kocaeli and M7.9 2002 Denali), the directivity effect was observed to reach a maximum at spectral periods of about 5 seconds. Since the directivity effect is related to the rise-time of the slip, it should decrease for spectral periods longer than the rise-time. Therefore, the directivity models were extrapolated to 10 seconds period by decreasing the directivity scale factor for period long than 5 seconds.

3.3 VERTICAL GROUND MOTIONS

Vertical spectra were developed by applying a vertical to horizontal spectra ratio (V/H) to the horizontal spectra. Updated vertical ground motion models have not been developed yet as part of the NGA project. Therefore, the V/H ratio was estimated based on the Abrahamson and Silva (1997) attenuation model. The V/H ratio is computed based on the controlling earthquakes for the bridge site locations (see Section 4 discussion on the deaggreagtion). The smoothed extrapolated values are listed in Table 3-1 and plotted in Figure 3-2. These V/H ratios were applied to the average horizontal PHSA ground motion values to generate the corresponding vertical UHS.

Table 3-1. Smoothed and extrapolated V/H Ratio.

Period (Sec)	M6.75, R22	M7.0, R20	M7.2 R17	M7.3 R17	M8, R15
0.01	0.733	0.757	0.791	0.808	0.884
0.02	0.733	0.757	0.791	0.808	0.884
0.03	0.861	0.905	0.963	0.989	1.106
0.05	0.981	1.049	1.133	1.172	1.336
0.075	0.937	1.004	1.087	1.125	1.287
0.10	0.791	0.847	0.915	0.947	1.081
0.12	0.724	0.765	0.814	0.836	0.941
0.15	0.636	0.660	0.689	0.703	0.775
0.17	0.586	0.602	0.622	0.632	0.689
0.20	0.518	0.527	0.540	0.546	0.588
0.24	0.478	0.482	0.489	0.493	0.524
0.3	0.439	0.438	0.439	0.440	0.461
0.4	0.417	0.410	0.407	0.407	0.419
0.5	0.409	0.399	0.394	0.393	0.399
0.75	0.410	0.400	0.400	0.393	0.398
1.0	0.431	0.413	0.403	0.399	0.391
1.5	0.454	0.437	0.428	0.425	0.414
2.0	0.483	0.464	0.456	0.453	0.436
3.0	0.579	0.563	0.555	0.551	0.526
4.0	0.681	0.667	0.660	0.656	0.622
5.0	0.781	0.769	0.762	0.758	0.714
7.5	0.900	0.890	0.880	0.870	0.840
10	0.980	0.970	0.960	0.950	0.920

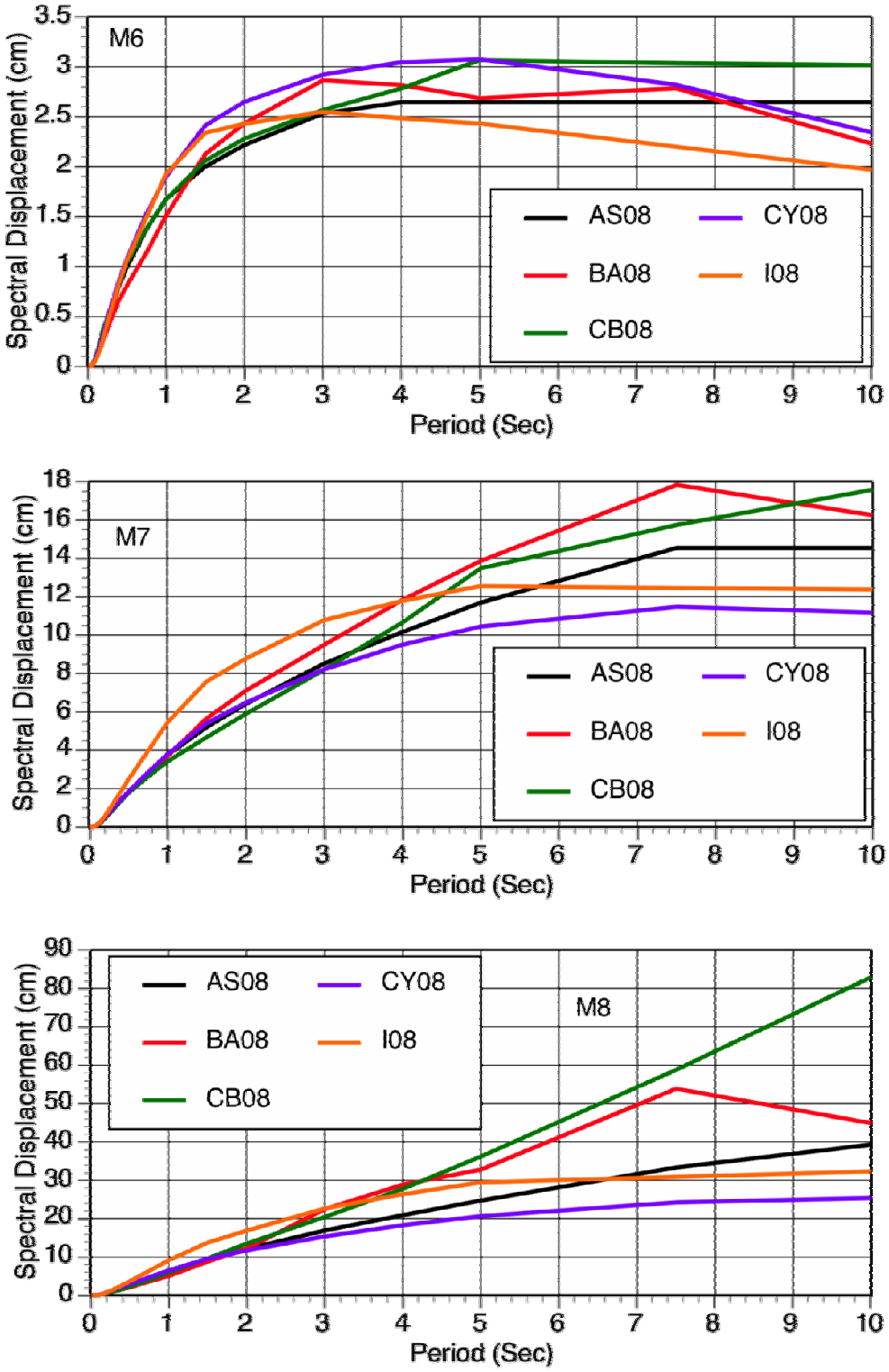

Figure 3-1. Comparison of the displacement response spectra at 5% damping from the five NGA models for M6 (top), M7 (center) and M8 (bottom) strike-slip earthquakes.

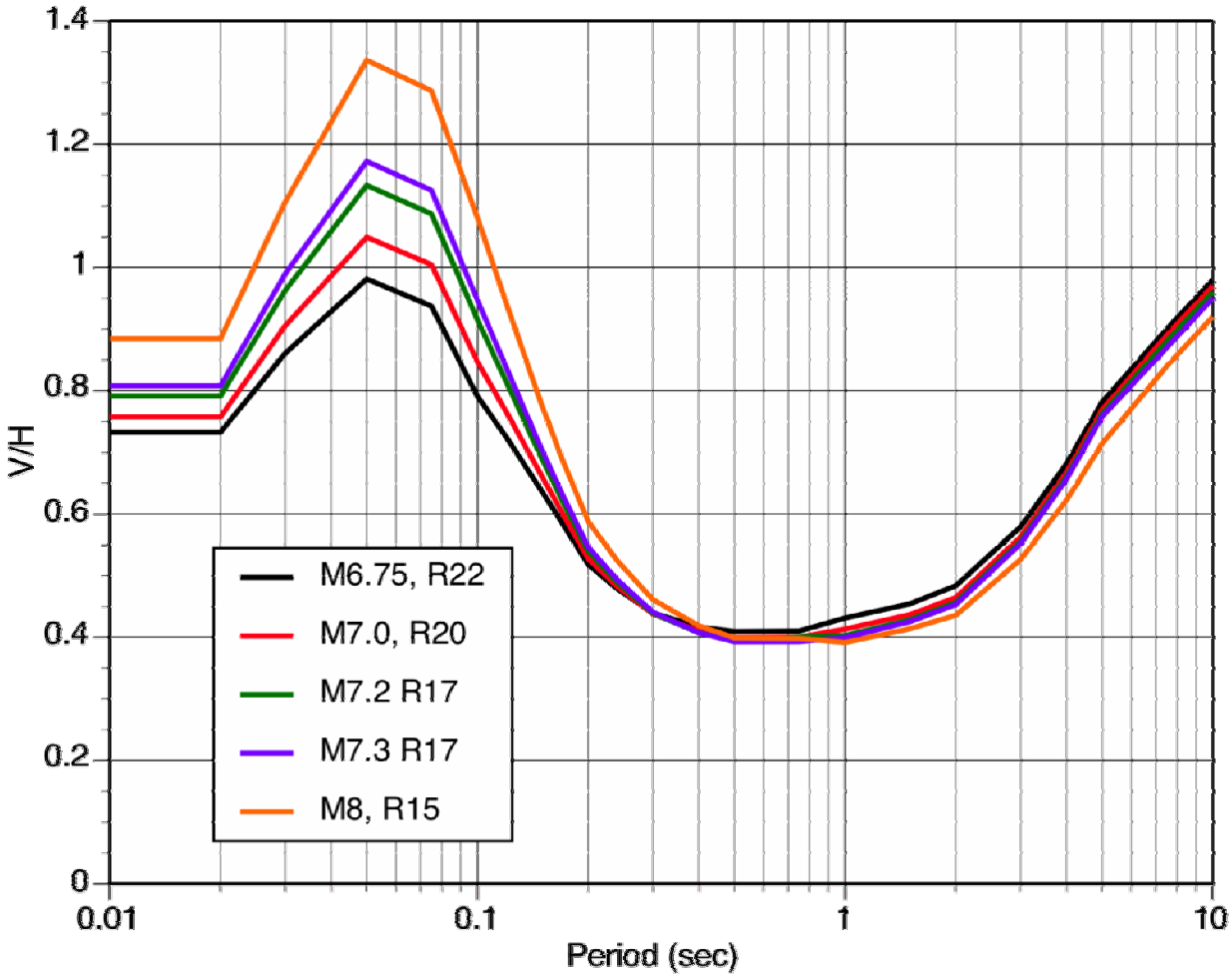

Figure 3-2. Smoothed and extrapolated V/H ratio.

4 Seismic Hazard Analysis

4.1 DETERMINISTIC GROUND MOTIONS

The San Andreas and Hayward faults are considered for the deterministic ground motions. The magnitudes and distances for the two faults are listed in Table 4-1. The eastern site is located closer to the Hayward fault and the western site is located closer to the San Andreas fault. For the deterministic spectra, only the Hayward earthquake at the eastern site distance and the San Andreas earthquake at the western site distance are considered. Due to the similar distances and larger magnitude for the San Andreas earthquake, the San Andreas Fault leads to the largest deterministic spectrum. The median and 84th percentile deterministic ground motions from the San Andreas fault are listed in Table 4-2 based on an equal weighting of the three NGA attenuation relationships used in the PSHA. These ground motion values do not include any amplification due to directivity effects and are estimated for a V_{S30}m of 400 m/sec.

4.2 PROBABILISTIC SEISMIC HAZARD RESULTS

The hazard was computed for both the east end and west end of the bridge. The hazard is similar at the two ends with the east end being slightly larger for shorter periods and larger annual probability levels (i.e., shorter return periods). The results from the west end site are slightly larger for the longer spectral periods and lower annual probability levels (i.e., longer return periods). For the average horizontal component, the largest difference between the east end and west site ground motions is less than 3% and less than 6% for the fault normal component. The ground motion values for the average horizontal, fault normal, fault parallel, and vertical components are given in the Tables 4-3.a through 4-3.f for return periods between 100 and 2,000 years. These values are based on the envelope of ground motions for the east and west end sites (the values controlled by the west end site are listed in bold).

The mean hazard curve and the contributing individual hazard curves for each seismic source used in the analysis are shown in Figure 4-1a for PGA and Figure 4-1b for spectral acceleration at T=3 seconds for the fault normal component, both at the east end site. At short spectral

periods, the Hayward and San Andreas fault have similar contribution to the 1,000 year return period ground motion. At long periods, the San Andreas fault is the dominant source at a 1,000 year return period. For the annual probability level of interest (i.e., 0.001), the San Andreas is the controlling seismic source.

The mean hazard curve for the east end site and the individual hazard curve for each of the three NGA ground motion models are shown in Figure 4-2a for PGA and Figure 4-2b for a spectral acceleration at T=3 seconds for the fault normal component. Overall, there is a very small range of the hazard from the three NGA models at both PGA and T=3 seconds. This very small range represents a major change from the previous ground motion models. The largest observed difference in ground motions based on the examples shown in Figures 4-2 is approximately 10% difference in PGA at the 1,000 year return period level.

Uniform Hazard Spectra

The uniform hazard spectra (UHS) were computed for a suite of return periods between 100 and 2,000 years for both the east and west end site locations. The average horizontal, fault normal (FN), fault parallel (FP), and vertical spectral for these return periods are listed in Tables 4-3a to 4-3f. Vertical spectra were developed based on the V/H ratio (see Section 3.3) calculated using Abrahamson and Silva (1997) for a magnitude 7.5 earthquake on the San Andreas based on the results of the deaggregation described below.

The UHS for the FN component for return periods from 100 to 2,000 years are shown in Figure 4-4a for spectra acceleration and in Figure 4-4b for spectral displacement. The deterministic spectra for the average horizontal component without directivity effects are also shown in these figures. The median ground motions from the San Andreas fault deterministic earthquake corresponds to return periods between 300 (short periods) and 500 years (long periods). At short spectral periods, the 84th percentile from the San Andreas faults corresponds to about a 1,500 year return period. At long periods (T > 0.5 sec), the 84th percentile from the San Andreas event corresponds to a return period of approximately 2,000 years.

The fault normal (FN), fault parallel (FP), and vertical UHS for a 1,000 year return period are plotted in Figures 4-5a and 4-5b for the spectral acceleration and spectral displacement, respectively. The values are listed in Table 4-3d.

Deaggregation

The hazard curve gives the combined effect of all magnitudes and distances on the probability of exceeding a given ground motion level. Since all of the sources, magnitudes, and distances are mixed together, it is difficult to get an intuitive understanding of what is controlling the hazard from the hazard curve by itself. To provide insight into what events (magnitude, distance, epsilon) are the most important for the hazard at a given ground motion level, the hazard curve is broken down into its contributions from different earthquake scenarios. This process is called deaggregation (e.g. Bazzurro and Cornell, 1999).

There are several ways that the deaggregation results can be displayed. First, the mean magnitude, distance, and epsilon corresponding to a given probability level can be computed. The mean magnitude, mean distance, and mean epsilon are shown in Figure 4-6 for PGA and T=3 sec (fault normal component). The specific values for a 1,000-year and 100-year return period are listed in Table 4-4 and Table 4-5, respectively.

One short coming of the mean values is that they may not be representative of the controlling source if the distributions are bi-modal. To address this short coming, the second common way of showing the deaggregation is to plot the contribution of magnitude-distance pairs to the hazard at a given return period. Using the joint distribution of the magnitude and distance avoids the potential problems with the mean, but the results are not as easily summarized as the mean values are. The magnitude-distance deaggregation for a 1,000 year return period hazard are shown in Figure 4-7a for PGA and Figure 4-7b for T = 3.0 seconds (fault normal component). These figures show that nearby (i.e., distance less than 20 km) large magnitude (i.e., magnitudes greater than 6.5) events dominate the hazard at both short (PGA) and long (T=3.0sec) spectral periods. At short periods, the hazard is dominated by earthquakes with magnitudes between 6.5-7.5 at distances of 10-20 km. At long periods (T=3.0sec), the hazard is dominated by earthquakes with magnitudes between 6.5-8.0 at distances of 10-20 km. These controlling earthquakes correspond to the San Andreas and Hayward faults.

The third way that the hazard is deaggregated is by the directivity parameter. In Figure 4-8, the deaggregation of the 1,000 year return period fault normal motion is shown as a function of Xcos(θ) for spectral periods of 1.0 to 5.0 sec. Full foward directivity corresponds to Xcos(θ)=0.4. This figure shows that a long spectral periods, the hazard is dominated by forward directivity conditions with a relative increase in the contribution as a function of the increase in spectral period. This indicates that the selection of time histories should be focused on forward directivity conditions.

In addition to SEE design based on the 1,000-year return period, functional evaluation analyses (FEE) are planned for the Dumbarton Bridge and a 100-year return period criterion has been planned for FEE. The magnitude-distance deaggregation for a 100 year return period hazard are shown in Figure 4-9 for PGA and Figure 4-10 for T = 3.0 seconds (fault normal component). Since that solutions for FN and FP component motions are identical for this 100 year return period UHS, it can be concluded that the directivity effect would be low.

Scenario Earthquake Spectra

The uniform hazard spectra provide the mean rate of exceeding a specified value of a single ground motion parameter. They do not provide, however, information about the joint occurrence of spectral values at differing spectral periods. The joint exceedance of the uniform hazard spectrum is less likely than the exceedance of a single spectral period. That is, if an above average ground motion occurs at one spectral period (say T=0.2 sec), then it is unlikely that a similar above average ground motion will also happen at all other spectral periods during that earthquake.

The expected spectrum for a given scenario can be computed using the correlation of the variability of the ground motion at different spectral periods. That is, we compute the expected shape of the response spectrum given that the ground motion has reached the UHS value at a specified spectral period. This is called the mean conditional spectrum by Baker and Cornell (2006). The expected scenario spectra have been calculated for T = 0.2 seconds and T = 1.0 seconds using the correlation model in Baker and Cornell (2006) based on a magnitude 7.5 earthquake on the San Andreas. The expected scenario spectra are shown in Figure 4-9. This

figure shows that if the 1,000 year UHS is reached at a specific spectral period, then we expect that the spectrum at the other spectral periods will fall below the UHS.

Table 4-1. Deterministic magnitude and distance values.

Event	Magnitude	Distance East Site (km)	Distance West Site (km)
Hayward	7.25	13.3	15.9
San Andreas	8.0	17.3	14.7

Table 4-2. Deterministic median and 84th percentile spectra for the San Andreas earthquake at the West site location.

Period (sec)	Median SA (g)	84th Percentile SA (g)
0.01	0.310	0.514
0.02	0.314	0.520
0.03	0.329	0.550
0.05	0.365	0.612
0.075		
0.10	0.509	0.863
0.15	0.621	1.065
0.20	0.690	1.201
0.25	0.717	1.262
0.30	0.704	1.252
0.40	0.654	1.182
0.50	0.589	1.078
0.75		
1.00	0.370	0.701
1.50	0.250	0.480
2.00	0.177	0.344
3.00	0.109	0.214
4.00	0.074	0.147
5.00	0.054	0.109
10.00	0.017	0.035

Table 4-3a. 100 Year UHS (5% damping) for the fault normal, fault parallel and vertical components of ground motion including the effects of rupture directivity.

	100 year			
Period (sec)	Ave Horizontal	Fault Normal	Fault Parallel	Vertical
0.01	0.1820	0.1820	0.1820	0.1334
0.02	0.1820	0.1820	0.1820	0.1334
0.03	0.1942	0.1942	0.1942	0.1672
0.05	0.2190	0.2190	0.2190	0.2148
0.75	0.2804	0.2804	0.2804	0.2627
0.10	0.3572	0.3572	0.3572	0.2825
0.15	0.4349	0.4349	0.4349	0.2766
0.20	0.4673	0.4673	0.4673	0.2421
0.24	0.4735	0.4735	0.4735	0.2263
0.30	0.4509	0.4509	0.4509	0.1979
0.40	0.4023	0.4023	0.4023	0.1678
0.50	0.3466	0.3466	0.3466	0.1418
0.75	0.2444	0.2444	0.2444	0.1002
1.00	0.1827	0.1827	0.1827	0.0787
1.50	0.1197	0.1197	0.1197	0.0543
2.00	0.0841	0.0841	0.0841	0.0406
3.00	0.0490	0.0490	0.0490	0.0284
4.00	0.0314	0.0314	0.0314	0.0214
5.00	0.0207	0.0207	0.0207	0.0162
7.50	0.0104	0.0104	0.0104	0.0094
10.00	0.0068	0.0068	0.0068	0.0067

Table 4-3b. 300 Year UHS (5% damping) for the fault normal, fault parallel and vertical components of ground motion including the effects of rupture directivity.

Period (sec)	300 year			
	Horizontal	Fault Normal	Fault Parallel	Vertical
0.01	0.3177	0.3177	0.3177	0.2405
0.02	0.3177	0.3177	0.3177	0.2405
0.03	0.3359	0.3359	0.3359	0.3040
0.05	0.3725	0.3725	0.3725	0.3908
0.075	0.4609	0.4609	0.4609	0.4627
0.10	0.5679	0.5679	0.5679	0.4810
0.15	0.6961	0.6961	0.6961	0.4594
0.20	0.7599	0.7599	0.7599	0.4005
0.24	0.7716	0.7716	0.7716	0.3719
0.30	0.7473	0.7473	0.7473	0.3273
0.40	0.6660	0.6660	0.6660	0.2731
0.50	0.5853	0.5853	0.5853	0.2335
0.75	0.4419	0.4419	0.4419	0.1768
1.00	0.3468	0.3468	0.3468	0.1432
1.50	0.2120	0.2120	0.2120	0.0926
2.00	0.1450	0.1450	0.1450	0.0673
3.00	0.0904	0.0906	0.0834	0.0509
4.00	0.0592	0.0606	0.0550	0.0395
5.00	0.0427	0.0447	0.0393	0.0328
7.50	0.0202	0.0207	0.0190	0.0180
10.00	0.0116	0.0118	0.0111	0.0113

Table 4-3c. 475 Year UHS (5% damping) for the fault normal, fault parallel and vertical components of ground motion including the effects of rupture directivity.

Period (sec)	475 year			
	Horizontal	Fault Normal	Fault Parallel	Vertical
0.01	0.3745	0.3745	0.3745	0.2962
0.02	0.3745	0.3745	0.3745	0.2962
0.03	0.3963	0.3963	0.3963	0.3816
0.05	0.4401	0.4401	0.4401	0.4986
0.075	0.5462	0.5462	0.5462	0.5937
0.10	0.6750	0.6750	0.6750	0.6176
0.15	0.8266	0.8266	0.8266	0.5695
0.20	0.8992	0.8992	0.8992	0.4856
0.24	0.9187	0.9187	0.9187	0.4492
0.30	0.8901	0.8901	0.8901	0.3908
0.40	0.8068	0.8068	0.8068	0.3284
0.50	0.7163	0.7163	0.7163	0.2822
0.75	0.5382	0.5382	0.5382	0.2153
1.00	0.4274	0.4175	0.4143	0.1722
1.50	0.2744	0.2680	0.2589	0.1174
2.00	0.1799	0.1824	0.1710	0.0820
3.00	0.1113	0.1164	0.1063	0.0618
4.00	0.0742	0.0820	0.0697	0.0490
5.00	0.0544	0.0608	0.0516	0.0415
7.50	0.0272	0.0293	0.0261	0.0239
10.00	0.0149	0.0155	0.0146	0.0143

Table 4-3d. 1,000 Year UHS (5% damping) for the fault normal, fault parallel and vertical components of ground motion including the effects of rupture directivity.

Period (sec)	1,000 year			
	Horizontal	Fault Normal	Fault Parallel	Vertical
0.01	0.4585	0.4585	0.4585	0.3705
0.02	0.4585	0.4585	0.4585	0.3705
0.03	0.4855	0.4855	0.4855	0.4802
0.05	0.5399	0.5399	0.5399	0.6328
0.075	0.6718	0.6718	0.6718	0.7558
0.10	0.8323	0.8323	0.8323	0.7882
0.15	1.0193	1.0193	1.0193	0.7166
0.20	1.1059	1.1059	1.1059	0.6038
0.24	1.1309	1.1309	1.1309	0.5575
0.30	1.1048	1.1048	1.1048	0.4861
0.40	1.0147	1.0147	1.0147	0.4130
0.50	0.9021	0.9021	0.9021	0.3545
0.75	0.6853	0.6853	0.6853	0.2693
1.00	0.5465	0.5465	0.5465	0.2181
1.50	0.3617	0.3627	0.3461	0.1537
2.00	0.2437	0.2559	0.2313	0.1104
3.00	0.1421	0.1593	0.1368	0.0783
4.00	0.1015	0.1164	0.0970	0.0666
5.00	0.0721	0.0905	0.0697	0.0547
7.50	0.0379	0.0431	0.0371	0.0330
10.00	0.0212	0.0228	0.0210	0.0201

Table 4-3e. 1,500 Year UHS (5% damping) for the fault normal, fault parallel and vertical components of ground motion including the effects of rupture directivity.

Period (sec)	1,500 year			
	Horizontal	Fault Normal	Fault Parallel	Vertical
0.01	0.5093	0.5093	0.5093	0.4115
0.02	0.5093	0.5093	0.5093	0.4115
0.03	0.5394	0.5394	0.5394	0.5335
0.05	0.6001	0.6001	0.6001	0.7033
0.075	0.7474	0.7474	0.7474	0.8408
0.10	0.9267	0.9267	0.9267	0.8776
0.15	1.1237	1.1237	1.1237	0.7900
0.20	1.2308	1.2308	1.2308	0.6720
0.24	1.2619	1.2619	1.2619	0.6221
0.30	1.2351	1.2351	1.2351	0.5434
0.40	1.1310	1.1310	1.1310	0.4603
0.50	1.0202	1.0202	1.0202	0.4009
0.75	0.7810	0.7810	0.7810	0.3069
1.00	0.6212	0.6212	0.6212	0.2479
1.50	0.4168	0.4224	0.4013	0.1771
2.00	0.2912	0.3085	0.2765	0.1319
3.00	0.1638	0.1909	0.1592	0.0903
4.00	0.1146	0.1376	0.1115	0.0752
5.00	0.0852	0.1091	0.0833	0.0646
7.50	0.0451	0.0524	0.0446	0.0392
10.00	0.0260	0.0283	0.0260	0.0247

Table 4-3f. 2,000 Year UHS (5% damping) for the fault normal, fault parallel and vertical components of ground motion including the effects of rupture directivity.

	2,000 year			
Period (sec)	Horizontal	Fault Normal	Fault Parallel	Vertical
0.01	0.5416	0.5416	0.5416	0.4376
0.02	0.5416	0.5416	0.5416	0.4376
0.03	0.5746	0.5746	0.5746	0.5683
0.05	0.6411	0.6411	0.6411	0.7514
0.075	0.8032	0.8032	0.8032	0.9036
0.10	1.0018	1.0018	1.0018	0.9487
0.15	1.2068	1.2068	1.2068	0.8484
0.20	1.3309	1.3309	1.3309	0.7267
0.24	1.3672	1.3672	1.3672	0.6740
0.30	1.3399	1.3399	1.3399	0.5896
0.40	1.2244	1.2244	1.2244	0.4983
0.50	1.1004	1.1004	1.1004	0.4325
0.75	0.8498	0.8498	0.8498	0.3340
1.00	0.6845	0.6845	0.6845	0.2731
1.50	0.4570	0.4684	0.4417	0.1942
2.00	0.3222	0.3435	0.3109	0.1460
3.00	0.1818	0.2179	0.1779	0.1002
4.00	0.1252	0.1555	0.1233	0.0821
5.00	0.0962	0.1220	0.0950	0.0729
7.50	0.0510	0.0598	0.0507	0.0444
10.00	0.0301	0.0330	0.0301	0.0286

Table 4-4. 1,000 year mean magnitude, distance, and epsilon values for PGA and T=3.0sec (fault normal component) based on the deaggregation of the hazard.

Parameter	PGA	T=3.0sec (Fault Normal)
Mean Magnitude	7.05	7.36
Mean Distance (km)	16.2	19.6
Mean Epsilon	1.89	1.31

Table 4-5. 100 year mean magnitude, distance, and epsilon values for PGA and T=3.0sec (fault normal component) based on the deaggregation of the hazard.

Parameter	PGA	T=3.0sec (Fault Normal)
Mean Magnitude	6	6
Mean Distance (km)	22	25

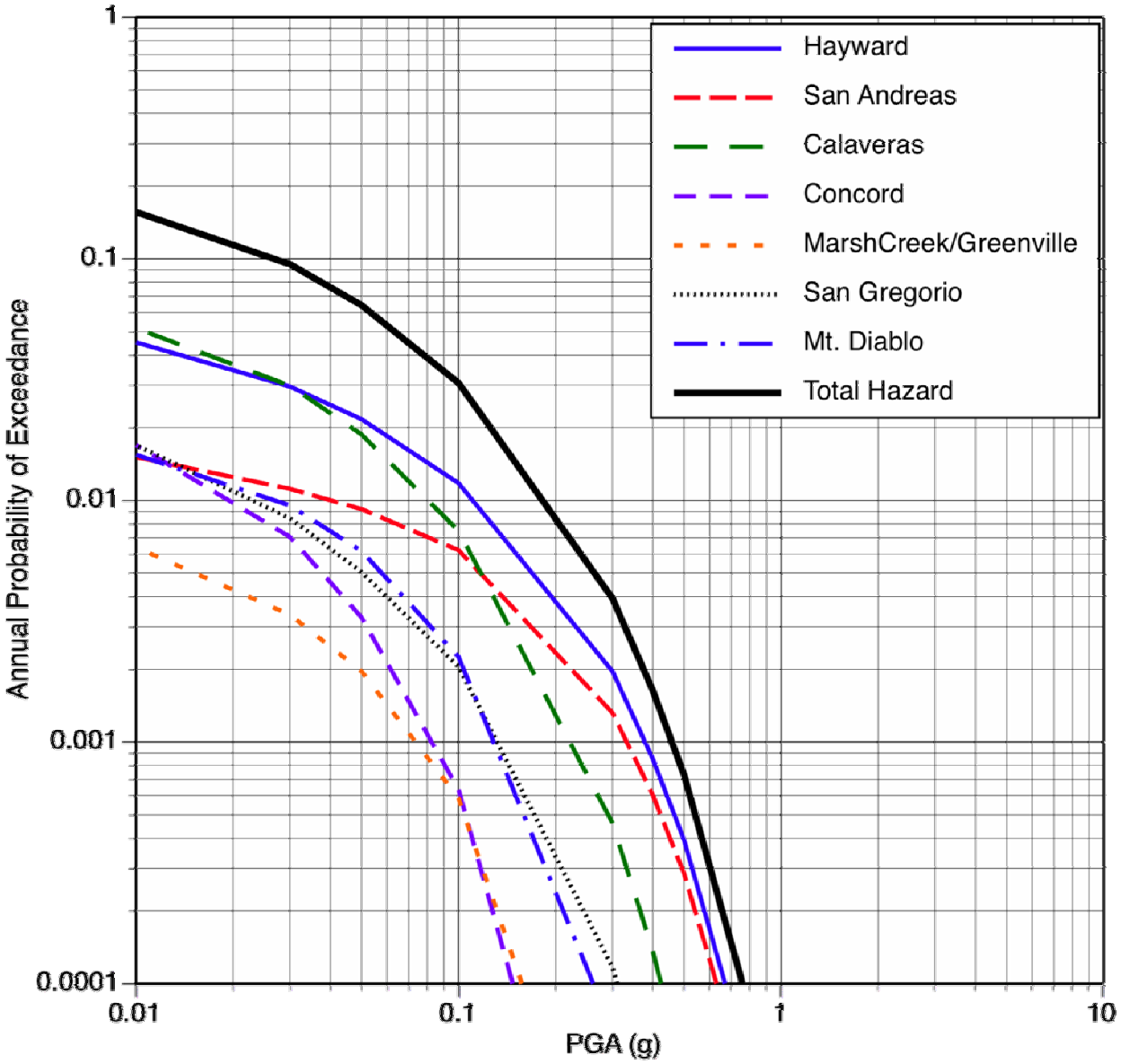

Figure 4-1a. Total PGA hazard curve (thick black line) for the east end site location along with the individual hazard curves for each seismic source as noted.

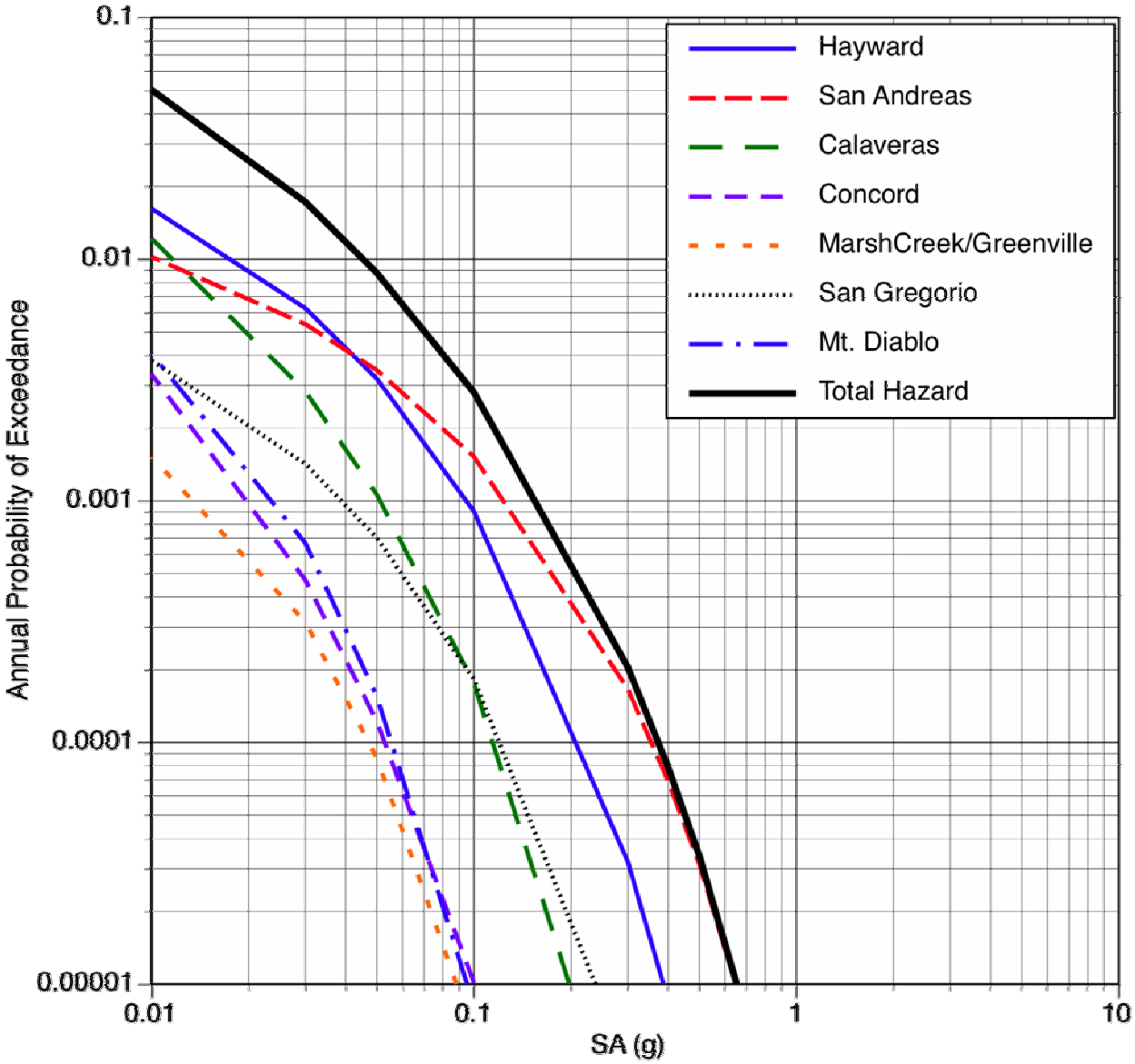

Figure 4-1b. Total T=3.0 second fault normal hazard curve (thick black line) for the east end site location along with the individual hazard curves for each seismic source as noted.

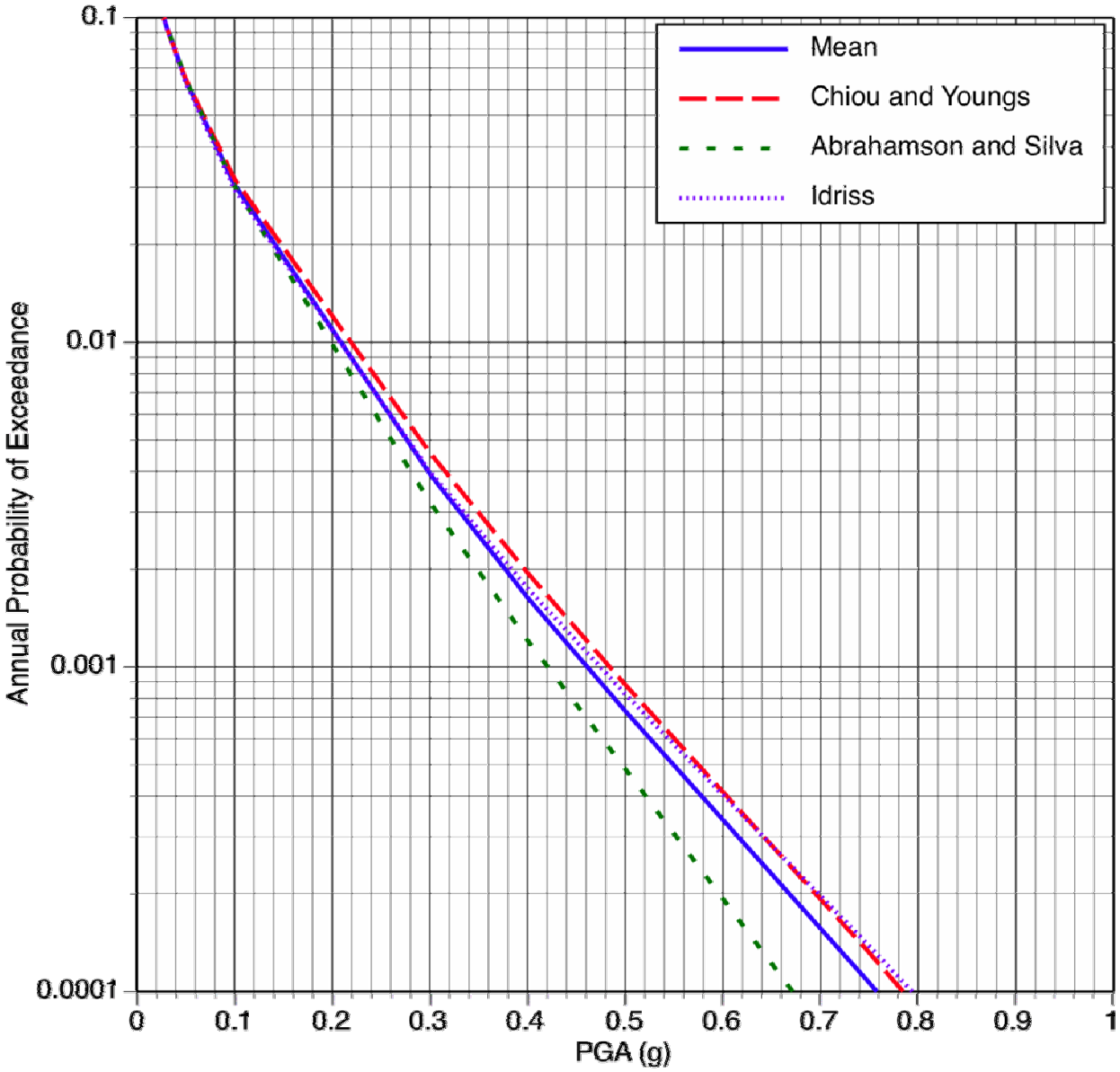

Figure 4-2a. Mean PGA hazard curve (thick blue line) for the east end site location along with the individual hazard curves for each ground motion prediction equation.

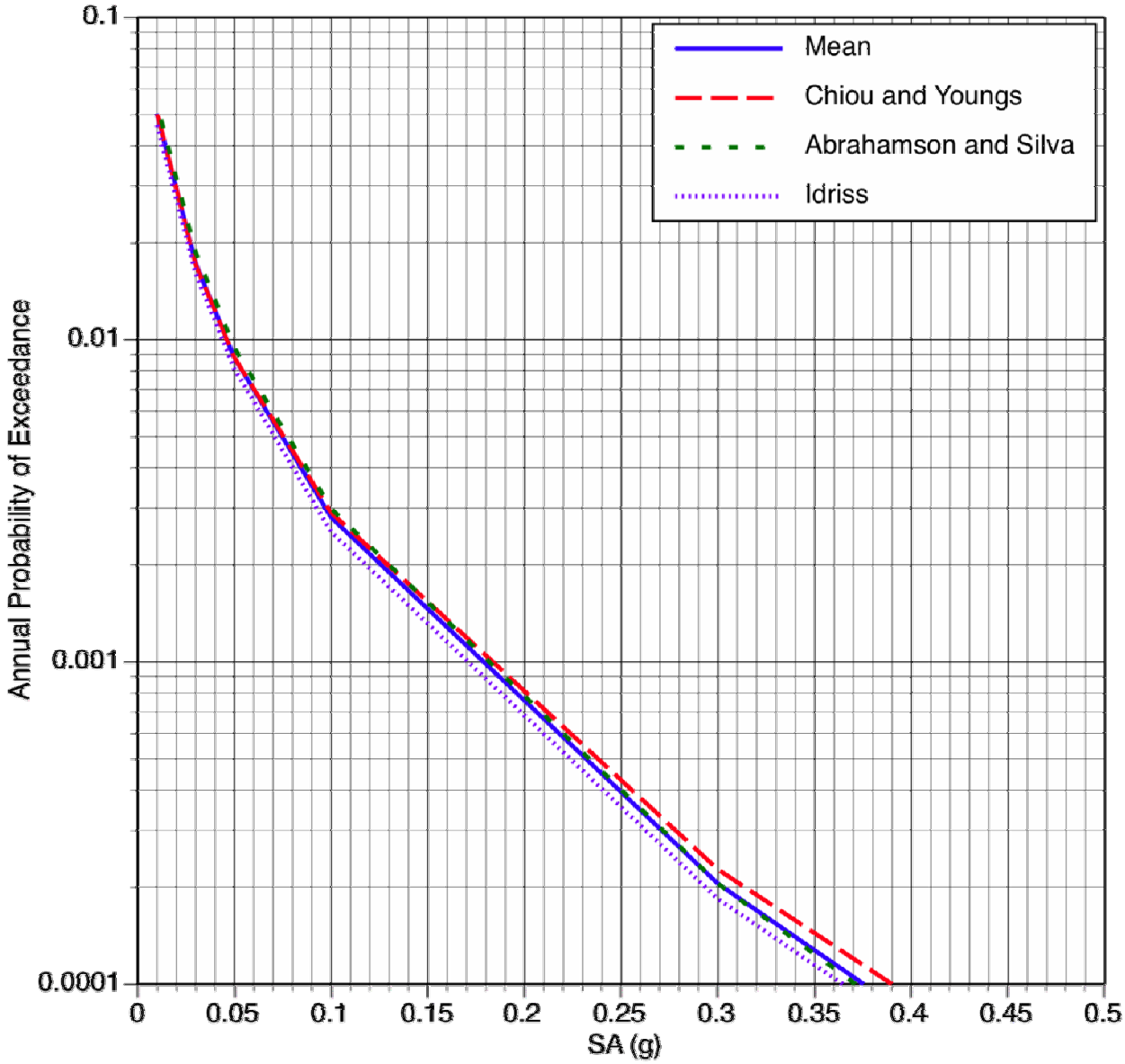

Figure 4-2b. Mean T = 3.0 seconds fault normal hazard curve (thick blue line) for the east end site location along with the individual hazard curves for each ground motion prediction equation.

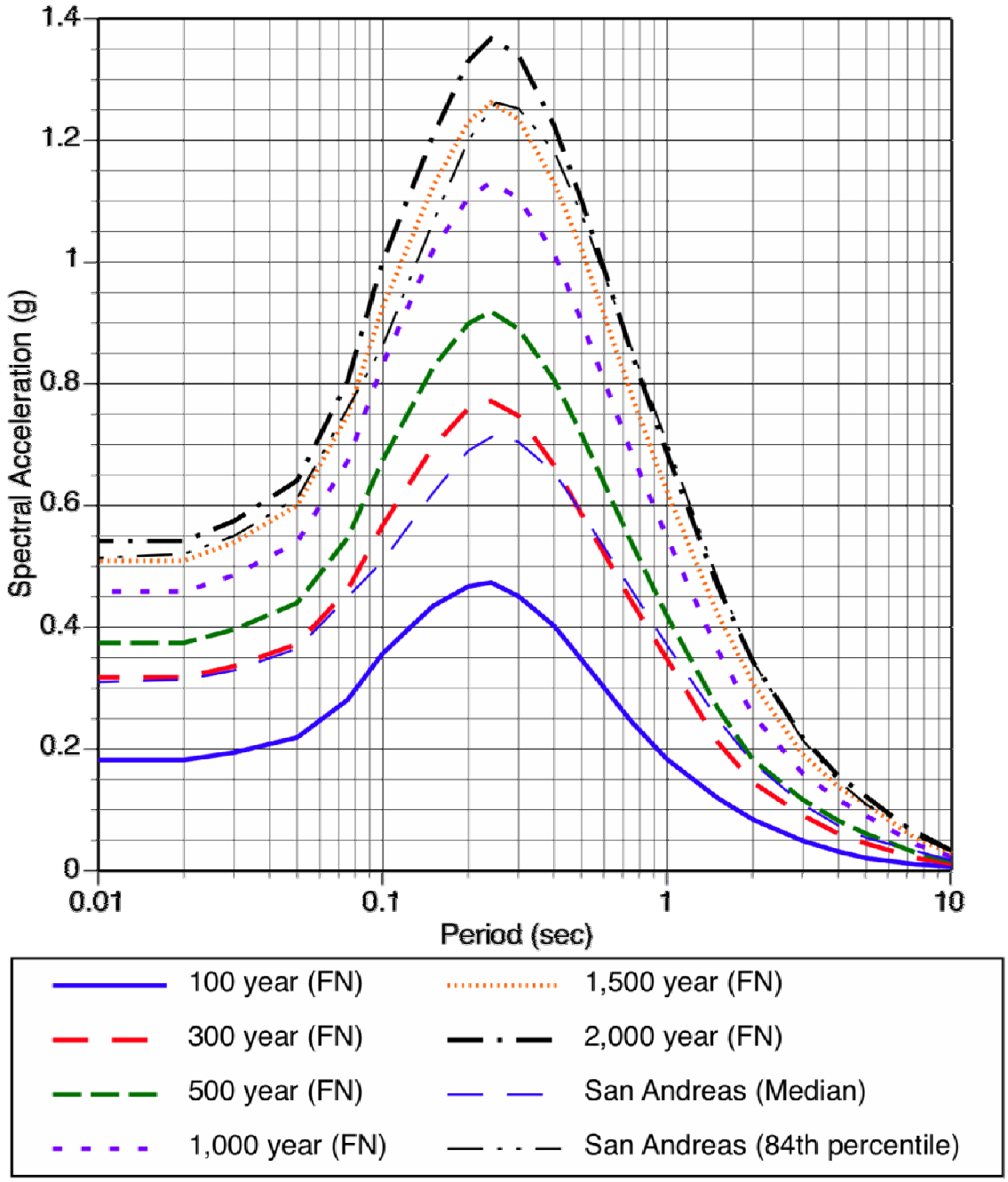

Figure 4-3a. Comparison of the UHS for the fault normal component with the deterministic spectra for the average horizontal component for the San Andreas Fault.

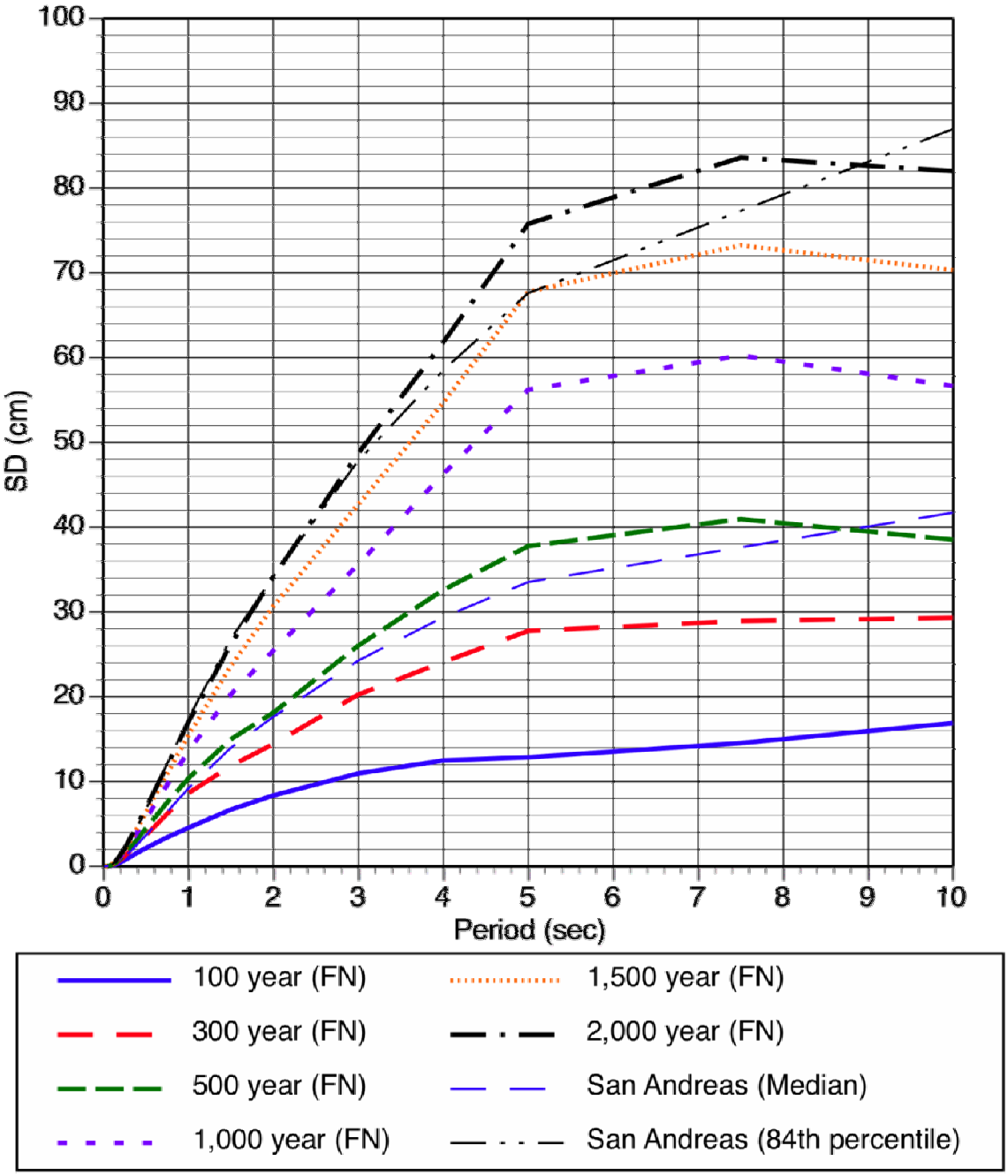

Figure 4-3b. Comparison of the UHS for the fault normal component with the deterministic spectra for the average horizontal component for the San Andreas Fault.

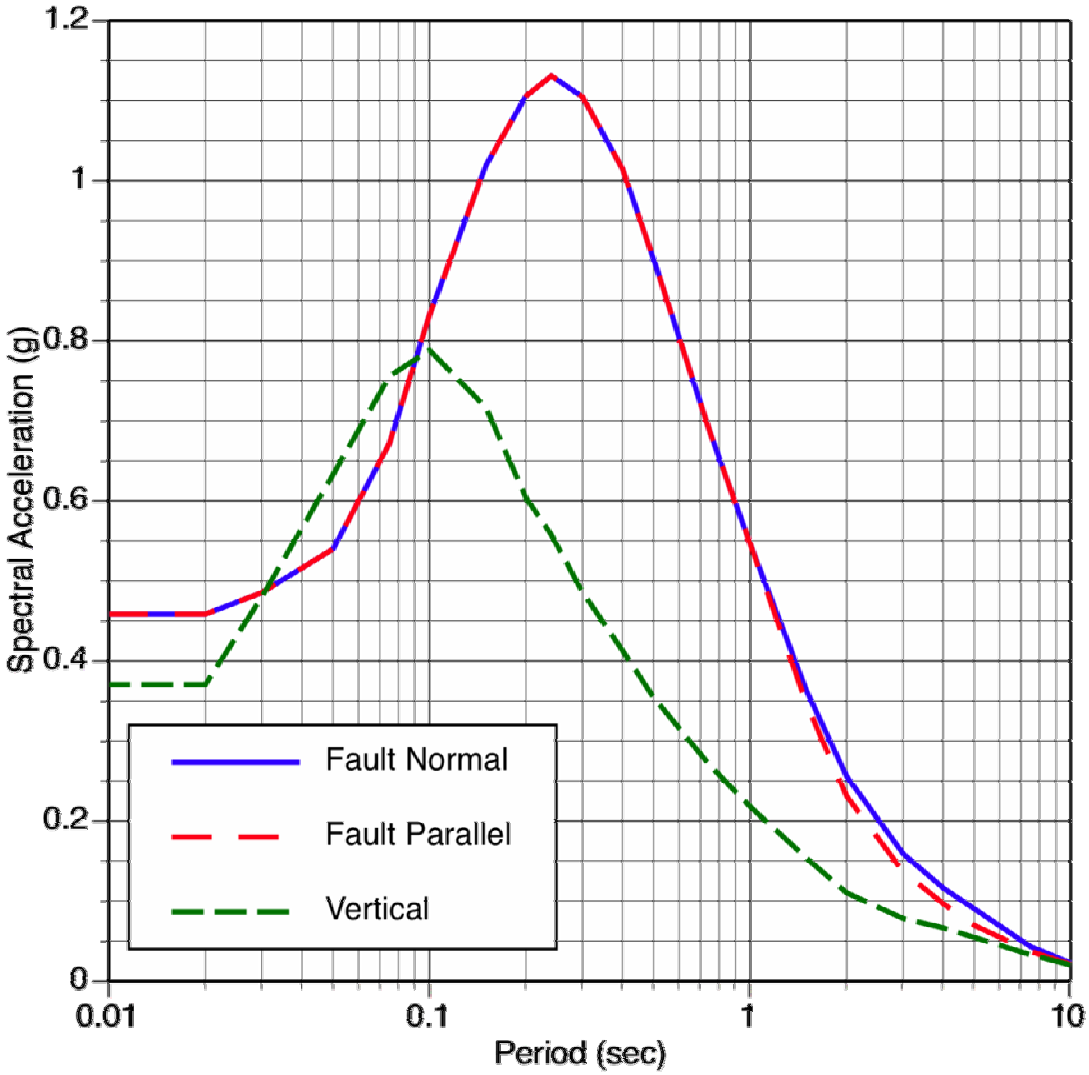

Figure 4-4a. Spectral acceleration for the fault normal, fault parallel, and vertical UHS with a 1,000 year return period.

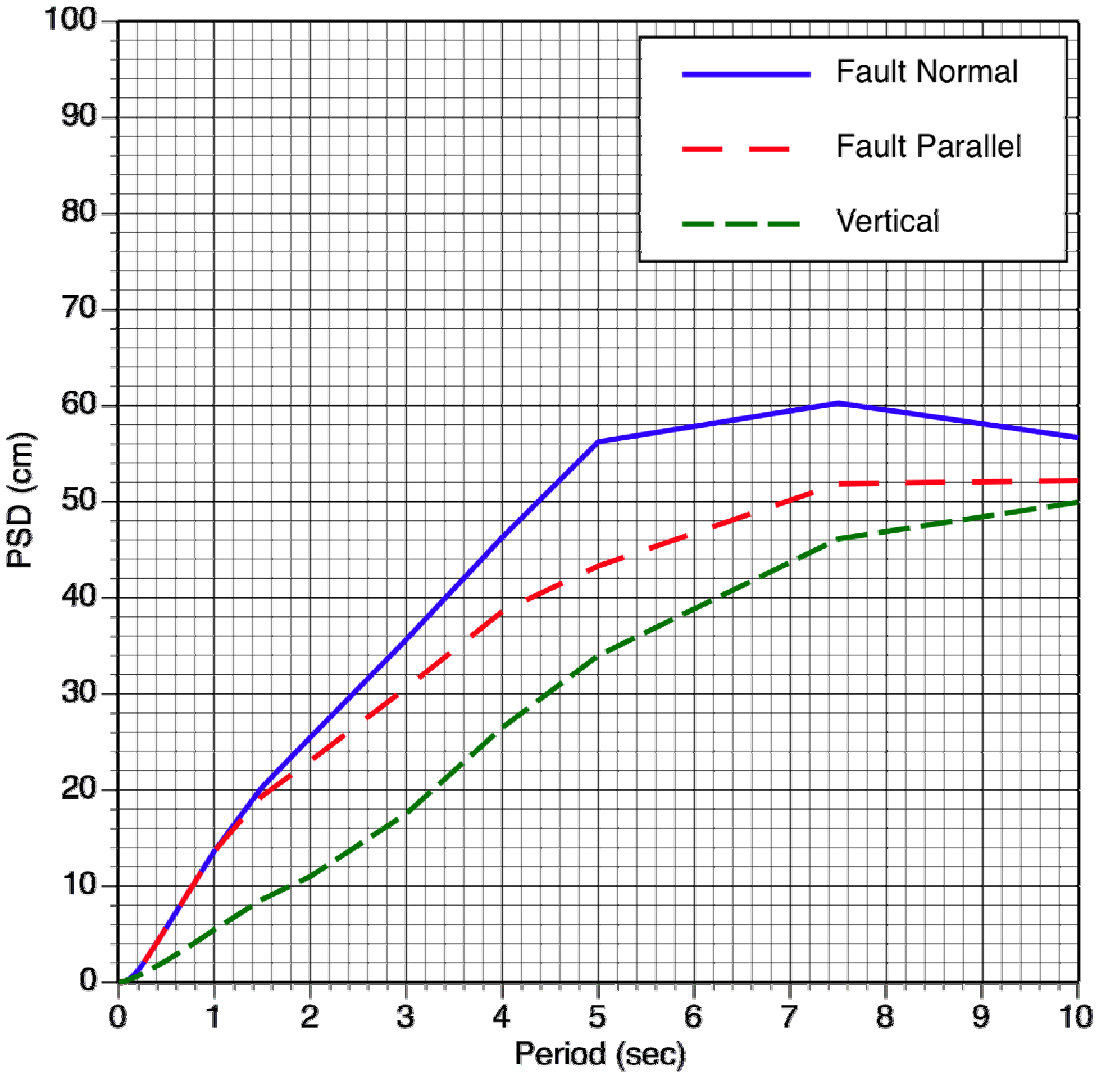

Figure 4-4b. Spectral displacement for the fault normal, fault parallel, and vertical UHS with a 1000 year return period.

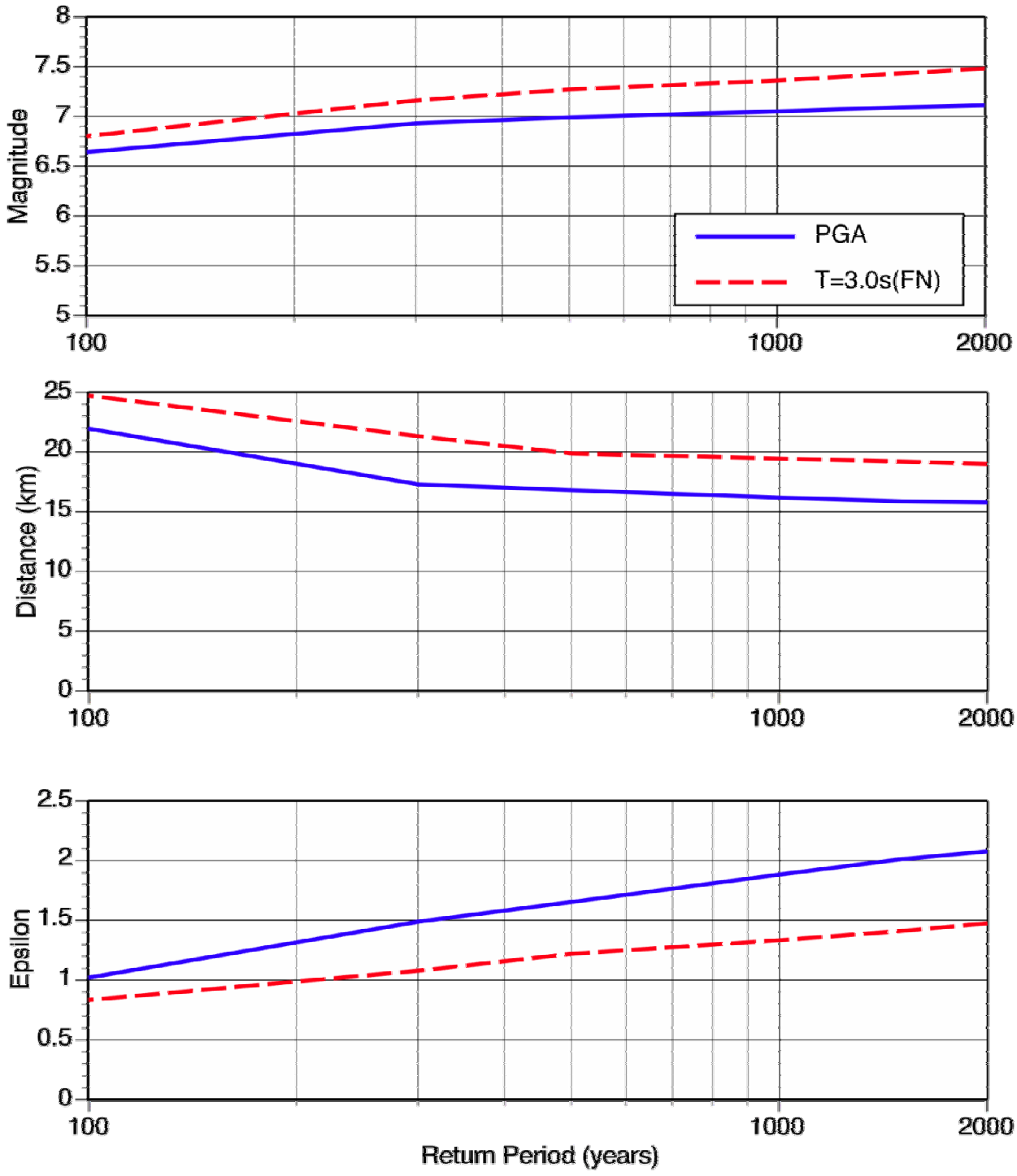

Figure 4-5. Mean magnitude, distance, and epsilon from the deaggregation for PGA and T=3 sec fault normal.

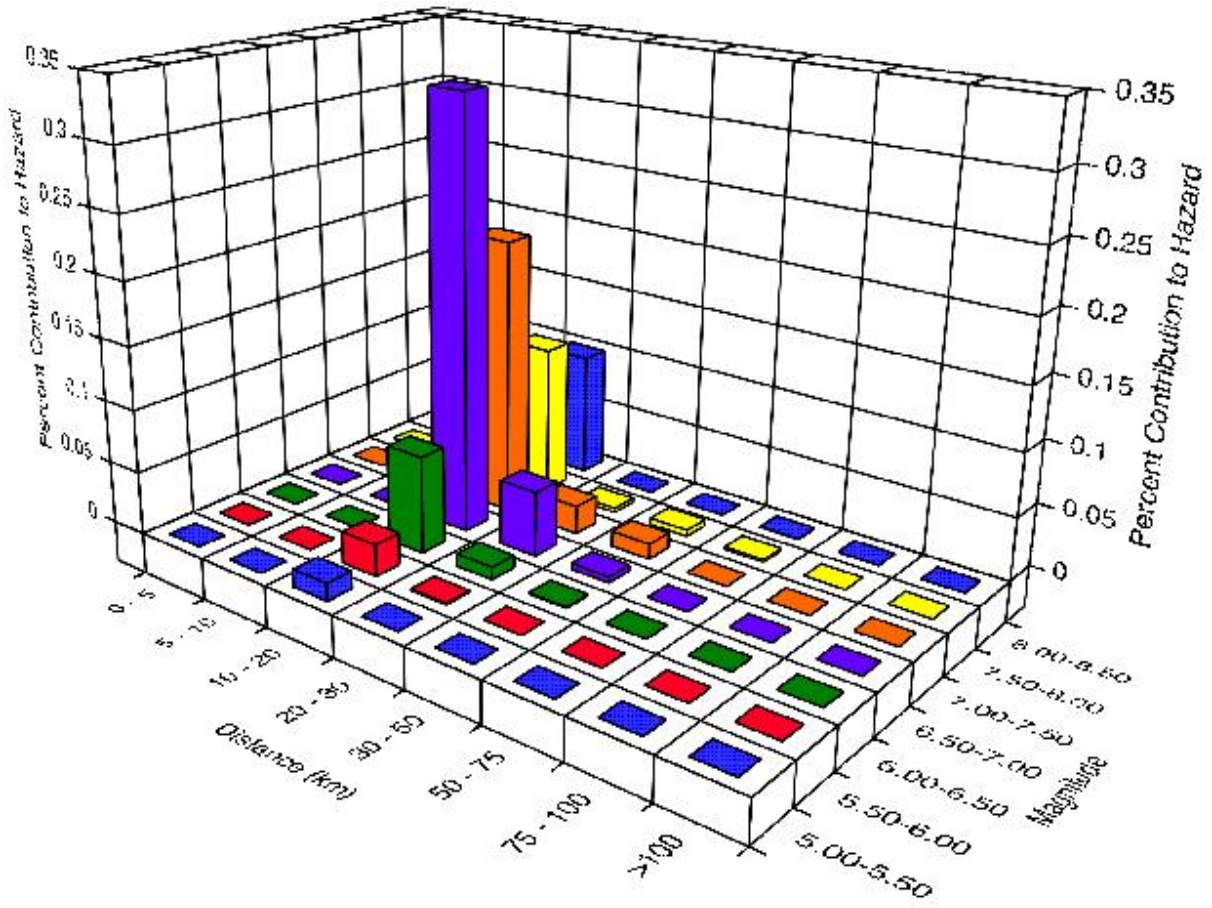

Figure 4-6a. Deaggregation of PGA hazard at the return period of 1,000 years.

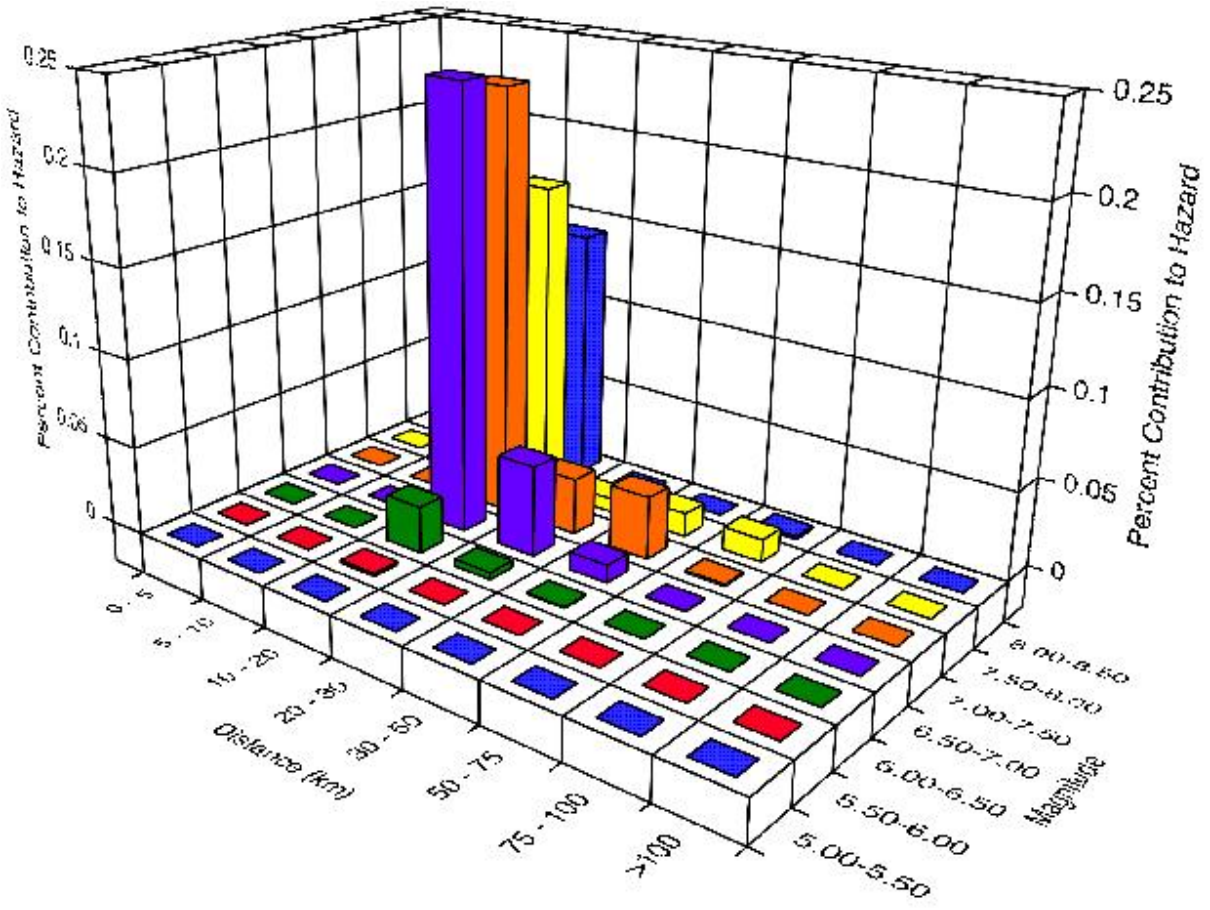

Figure 4-6b. Deaggregation of T=3.0 second fault normal hazard at the return period of 1,000 years.

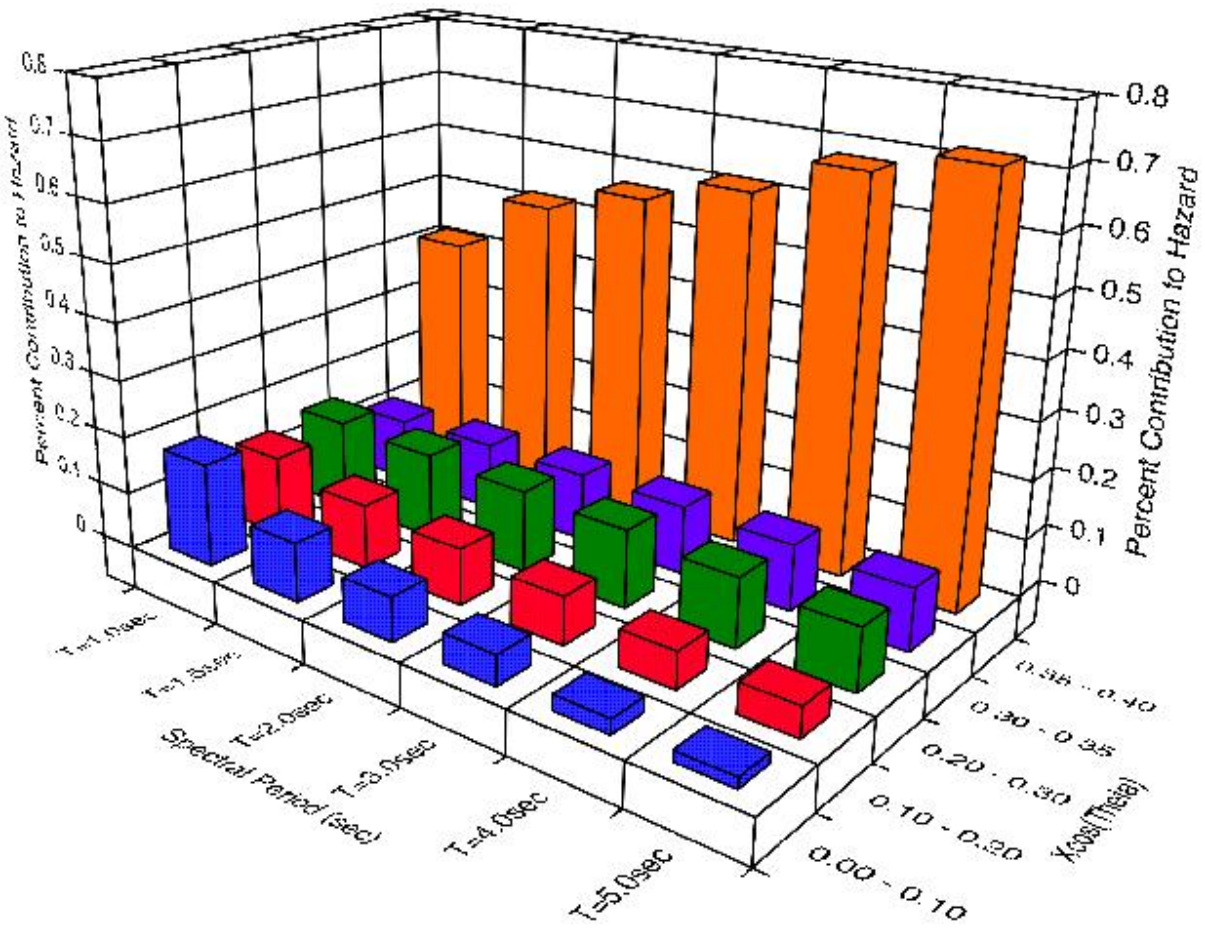

Figure 4-7. Directivity deaggregation of Xcos(Θ) directivity parameter for the fault normal hazard at the return period of 1,000 years.

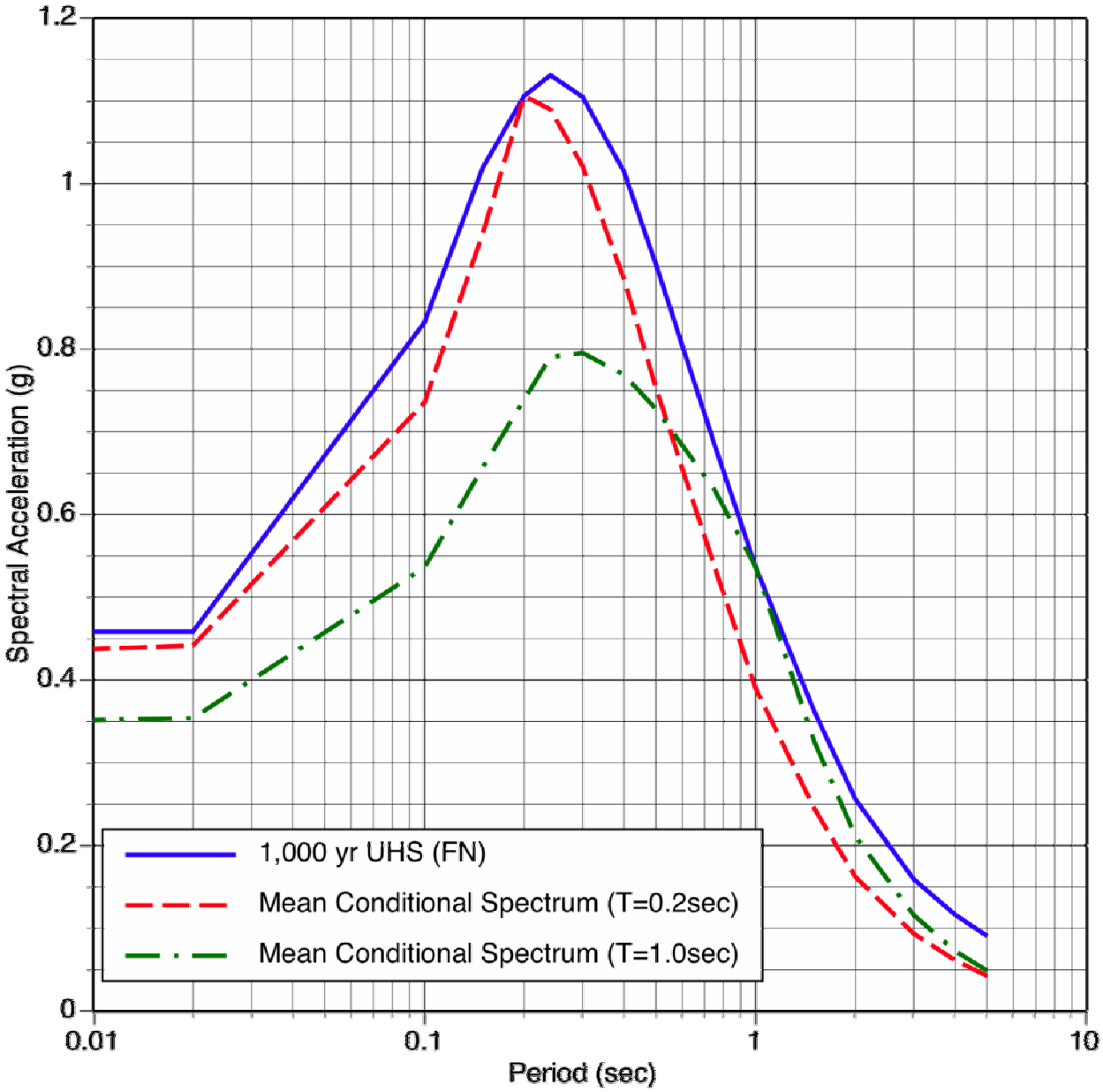

Figure 4-8. Comparison of the fault normal uniform hazard spectrum for a 1,000 year return period with the expected spectra for the T=0.2 sec and T=1.0 sec UHS values.

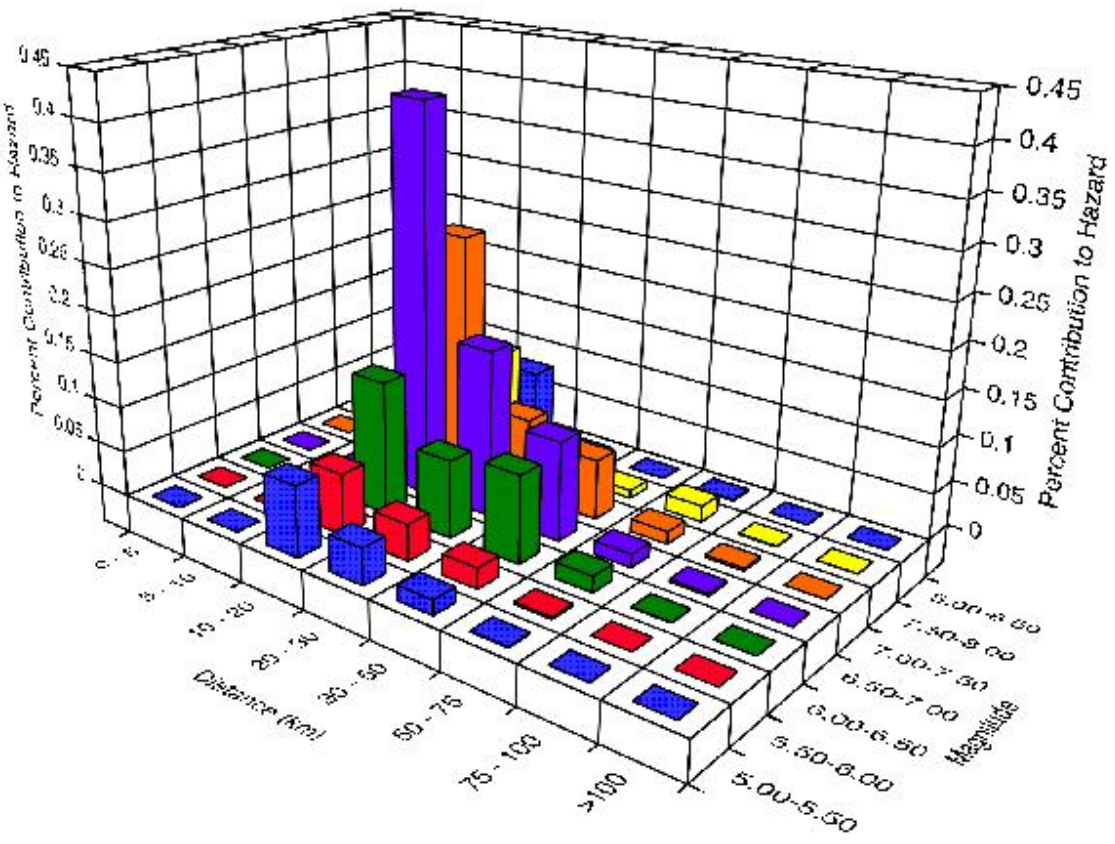

Figure 4-9. Deaggregation of PGA hazard at the return period of 100 years.

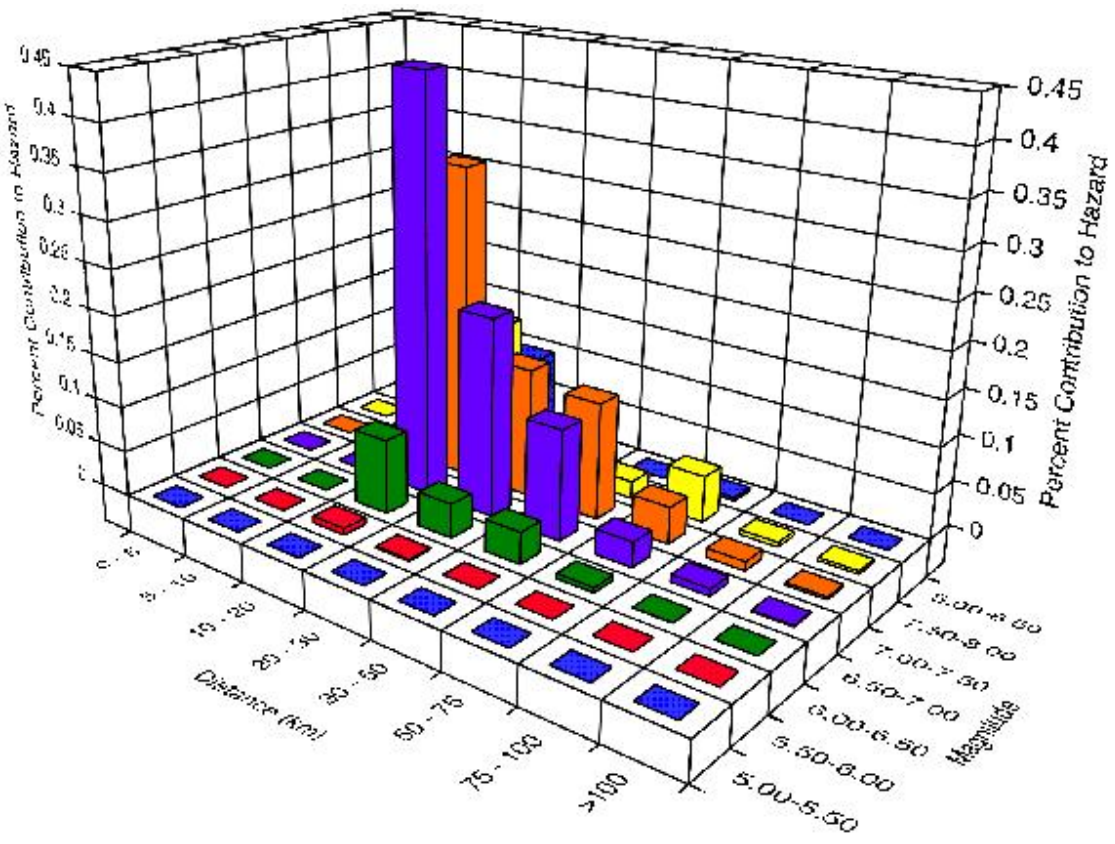

Figure 4-10. Deaggregation of T=3.0 second fault normal hazard at the return period of 100 years.

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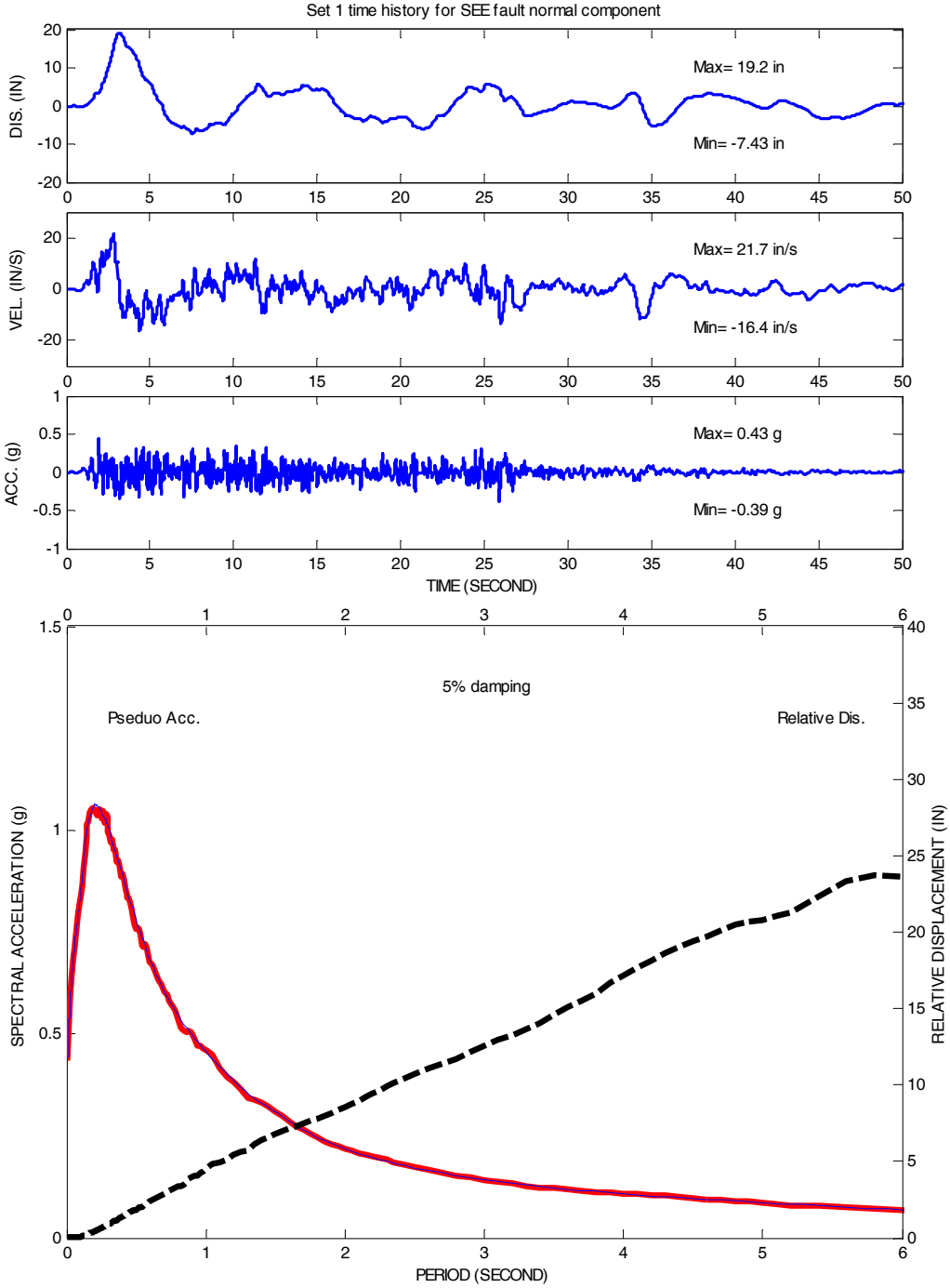
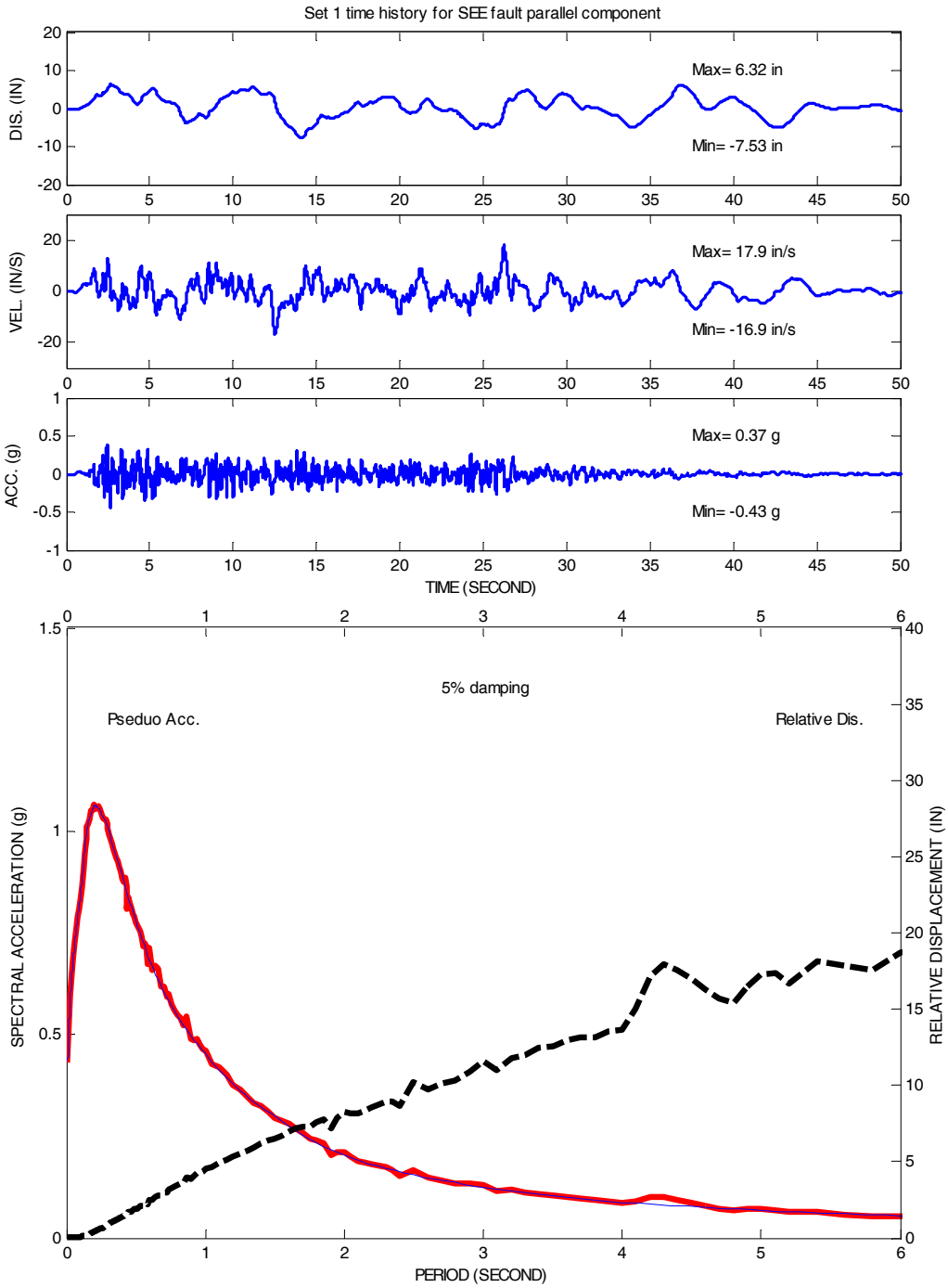
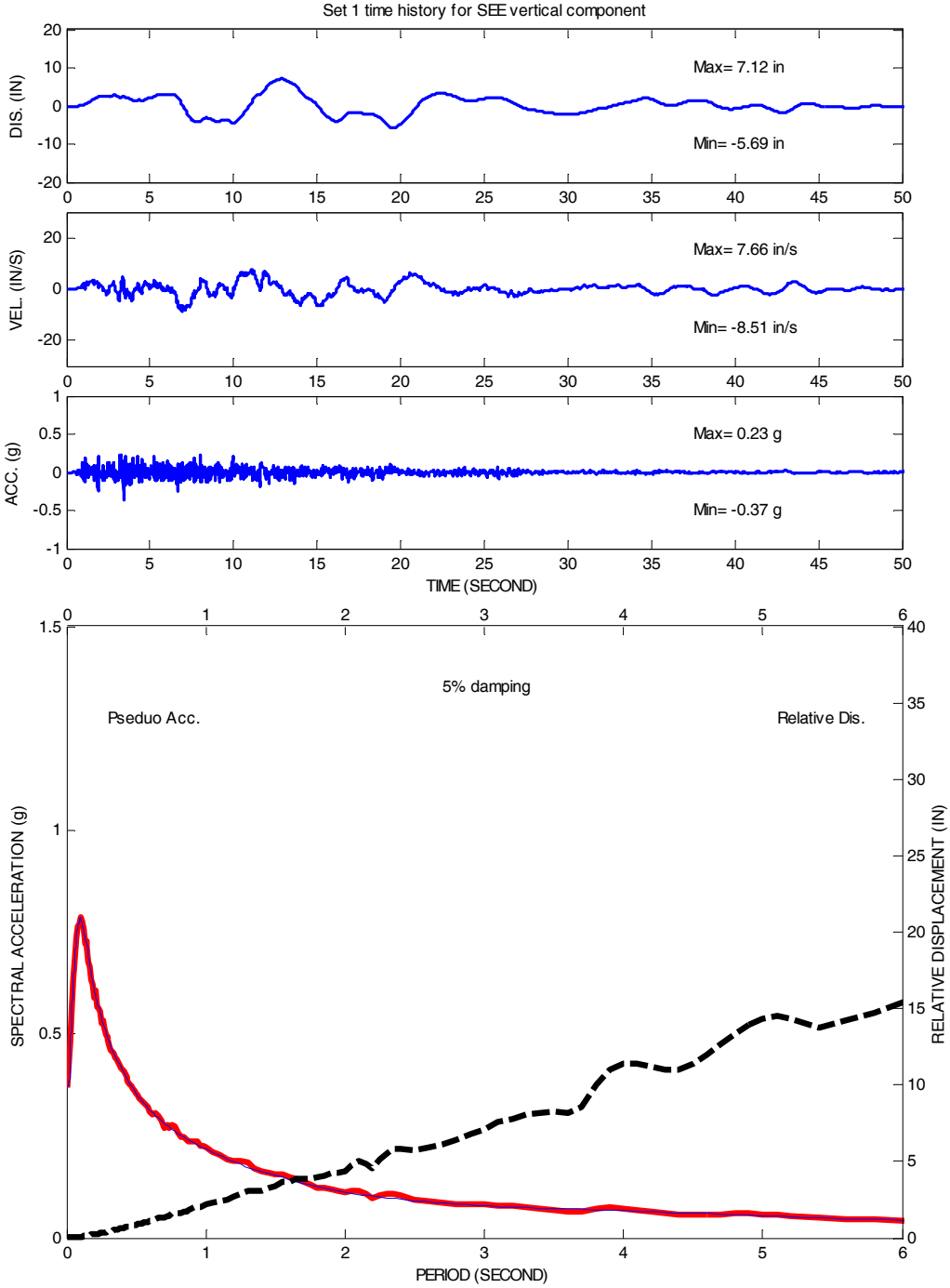
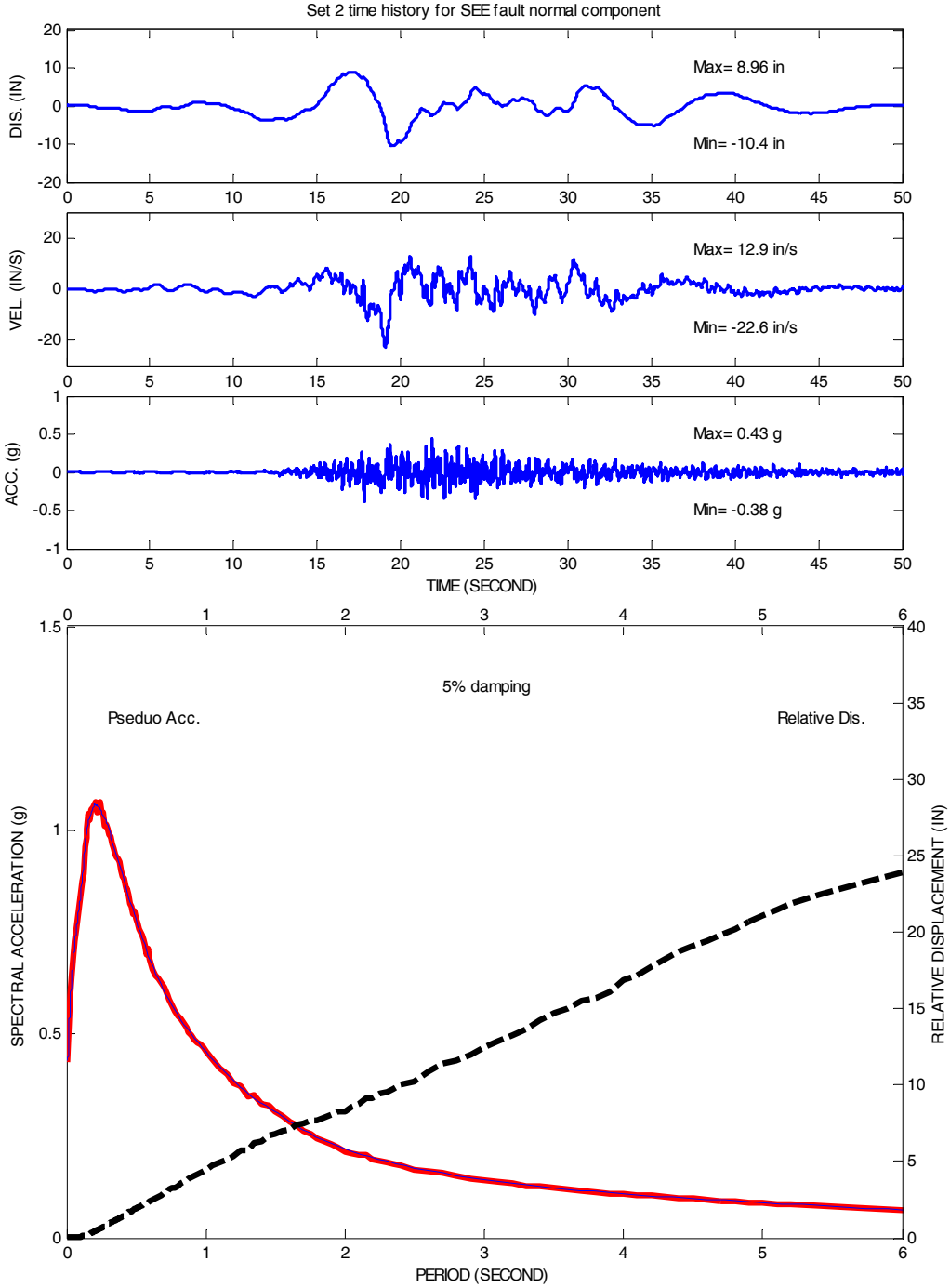
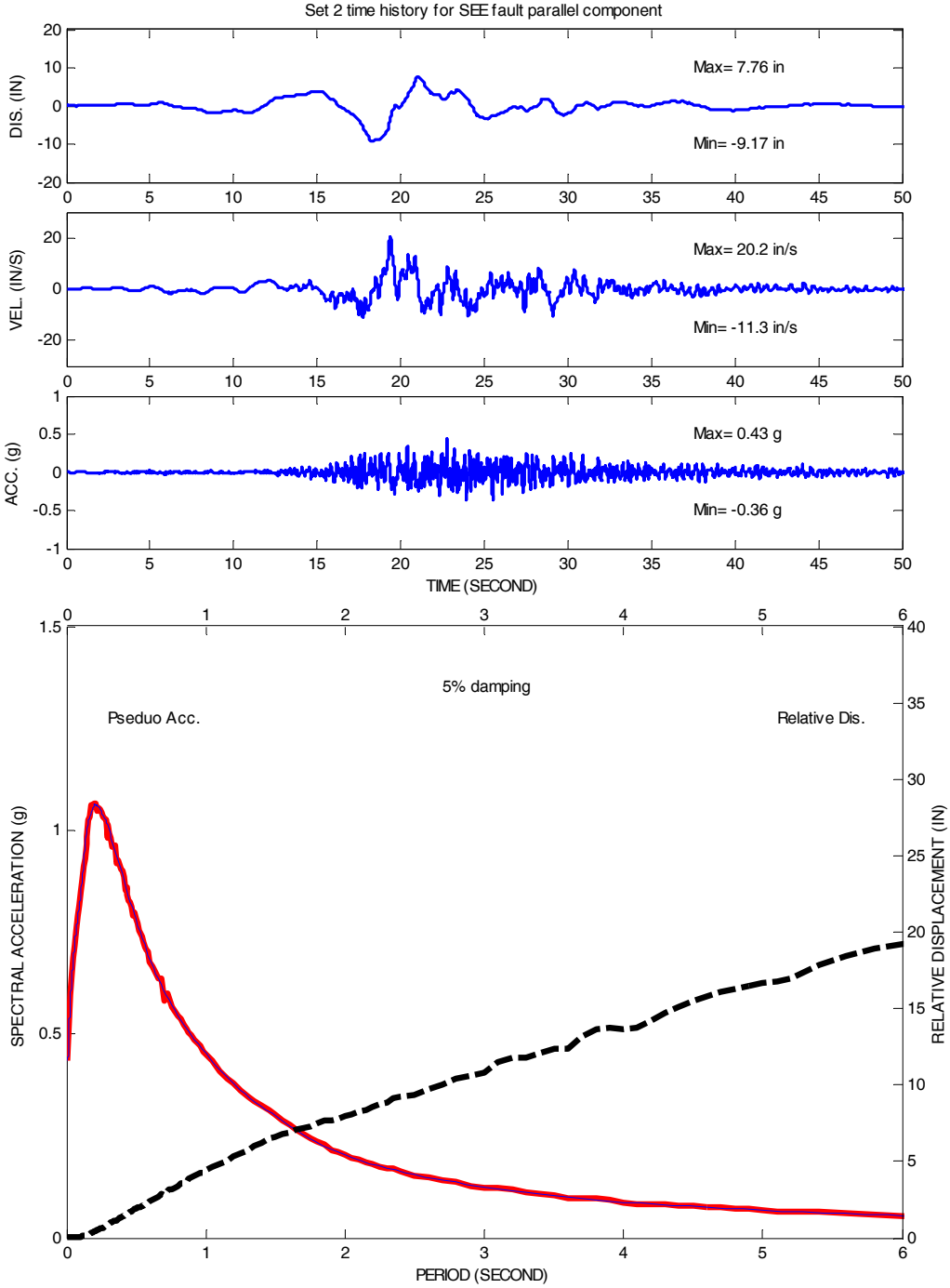
6B APPENDIX B: SPECTRUM-COMPATIBLE TIME HISTORIES


Set 1 time history for SEE fault normal component
DIS. (IN)
Max= 19.2 in
Min= -7.43 in
VEL. (IN/S)
Max= 21.7 in/s
Min= -16.4 in/s
ACC. (g)
Max= 0.43 g
Min= -0.39 g
TIME (SECOND)
5% damping
Pseduo Acc.
Relative Dis.
SPECTRAL ACCELERATION (g)
RELATIVE DISPLACEMENT (IN)
PERIOD (SECOND)


Set 1 time history for SEE fault parallel component
DIS. (IN)
Max= 6.32 in
Min= -7.53 in
VEL. (IN/S)
Max= 17.9 in/s
Min= -16.9 in/s
ACC. (g)
Max= 0.37 g
Min= -0.43 g
TIME (SECOND)
5% damping
Pseduo Acc.
Relative Dis.
SPECTRAL ACCELERATION (g)
RELATIVE DISPLACEMENT (IN)
PERIOD (SECOND)


Set 1 time history for SEE vertical component
DIS. (IN)
Max= 7.12 in
Min= -5.69 in
VEL. (IN/S)
Max= 7.66 in/s
Min= -8.51 in/s
ACC. (g)
Max= 0.23 g
Min= -0.37 g
TIME (SECOND)
5% damping
Pseduo Acc.
Relative Dis.
SPECTRAL ACCELERATION (g)
RELATIVE DISPLACEMENT (IN)
PERIOD (SECOND)


Set 2 time history for SEE fault normal component
DIS. (IN)
Max= 8.96 in
Min= -10.4 in
VEL. (IN/S)
Max= 12.9 in/s
Min= -22.6 in/s
ACC. (g)
Max= 0.43 g
Min= -0.38 g
TIME (SECOND)
5% damping
Pseduo Acc.
Relative Dis.
SPECTRAL ACCELERATION (g)
RELATIVE DISPLACEMENT (IN)
PERIOD (SECOND)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DIS. (IN)
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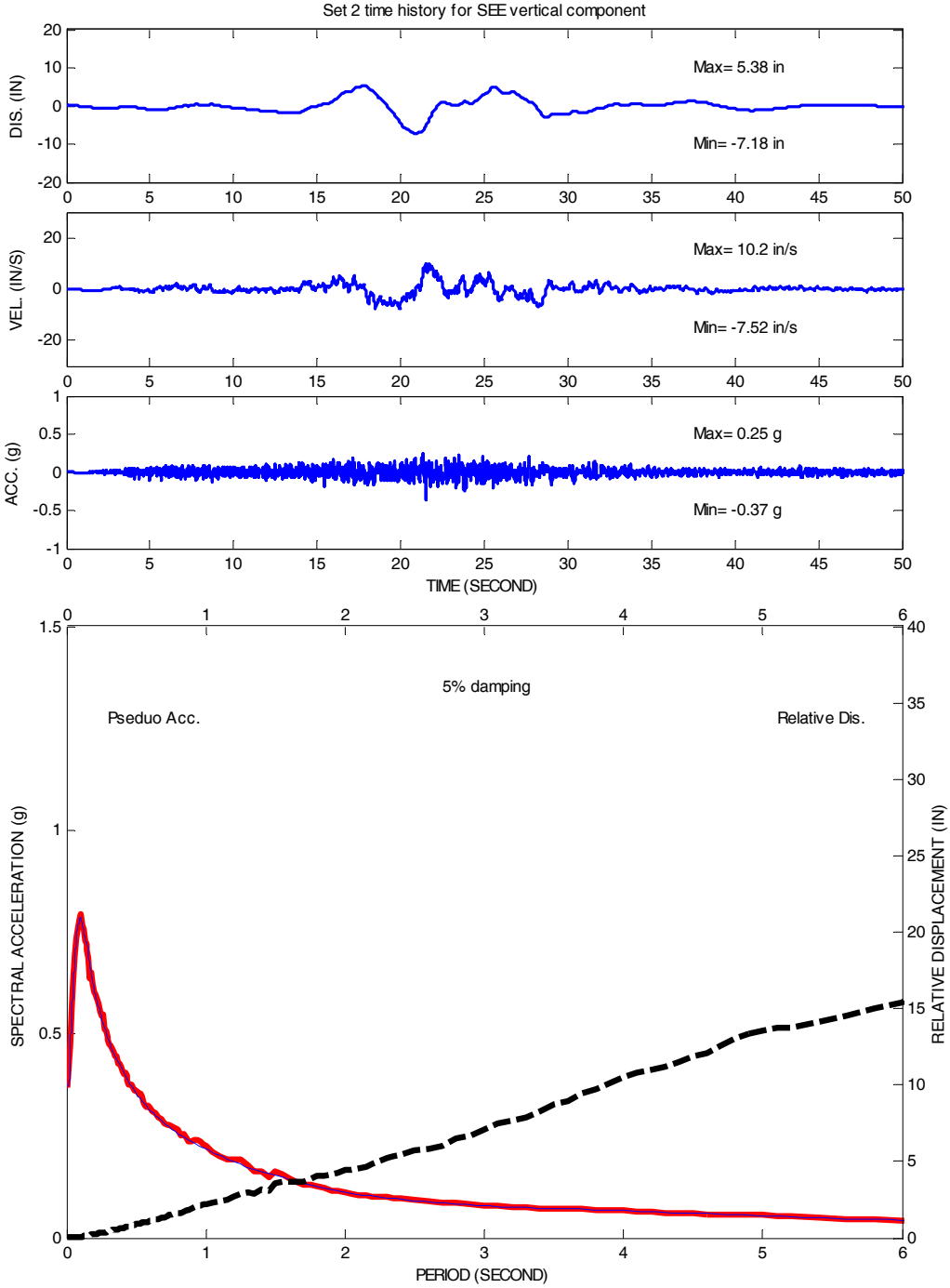
Min= -9.17 in
VEL. (IN/S)
Max= 20.2 in/s
Min= -11.3 in/s
ACC. (g)
Max= 0.43 g
Min= -0.36 g
TIME (SECOND)
5% damping
Pseduo Acc.
Relative Dis.
SPECTRAL ACCELERATION (g)
RELATIVE DISPLACEMENT (IN)
PERIOD (SECOND)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DIS. (IN)
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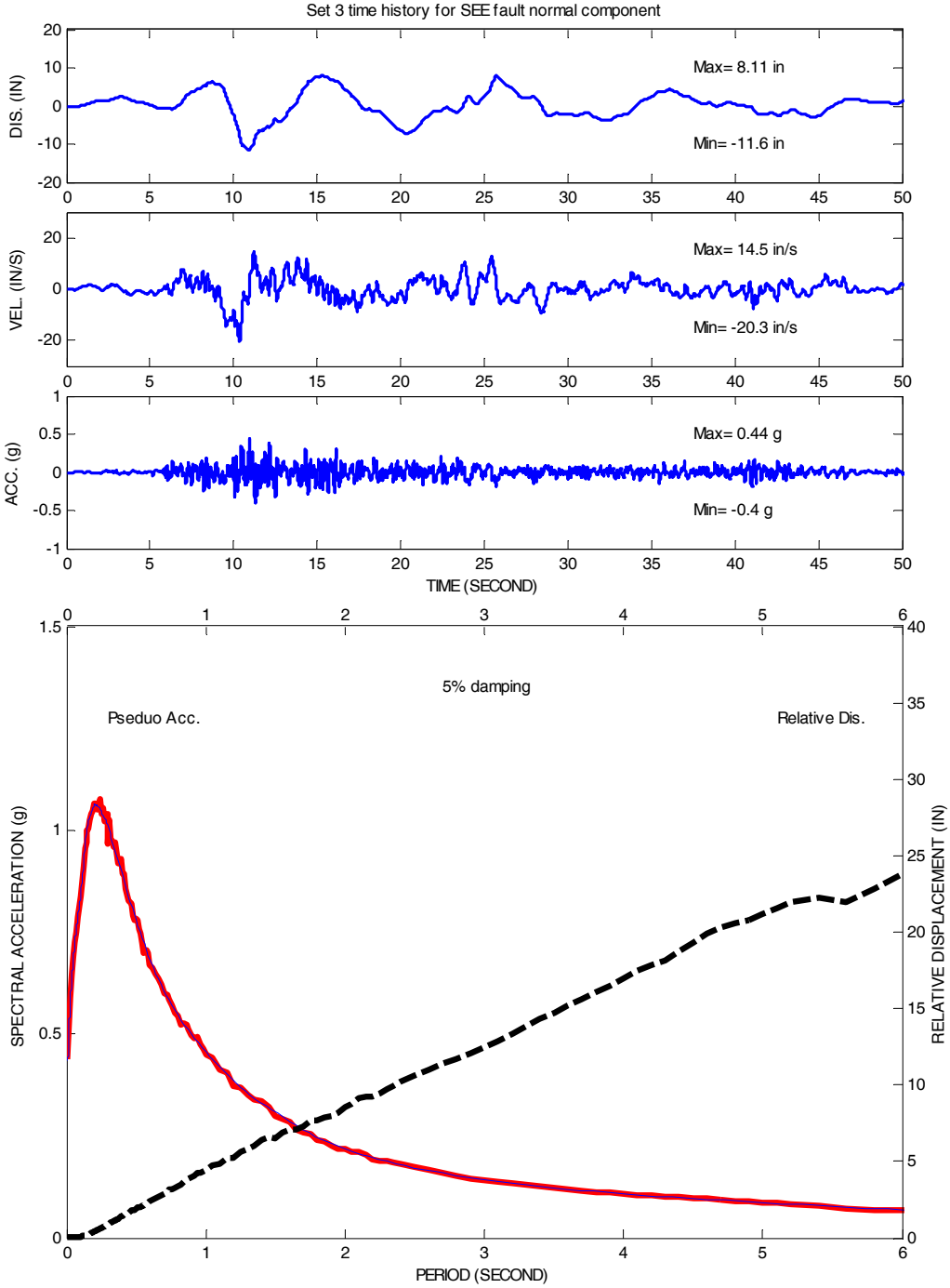
Min= -7.18 in
VEL. (IN/S)
Max= 10.2 in/s
Min= -7.52 in/s
ACC. (g)
Max= 0.25 g
Min= -0.37 g
TIME (SECOND)
5% damping
Pseduo Acc.
Relative Dis.
SPECTRAL ACCELERATION (g)
RELATIVE DISPLACEMENT (IN)
PERIOD (SECOND)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DIS. (IN)
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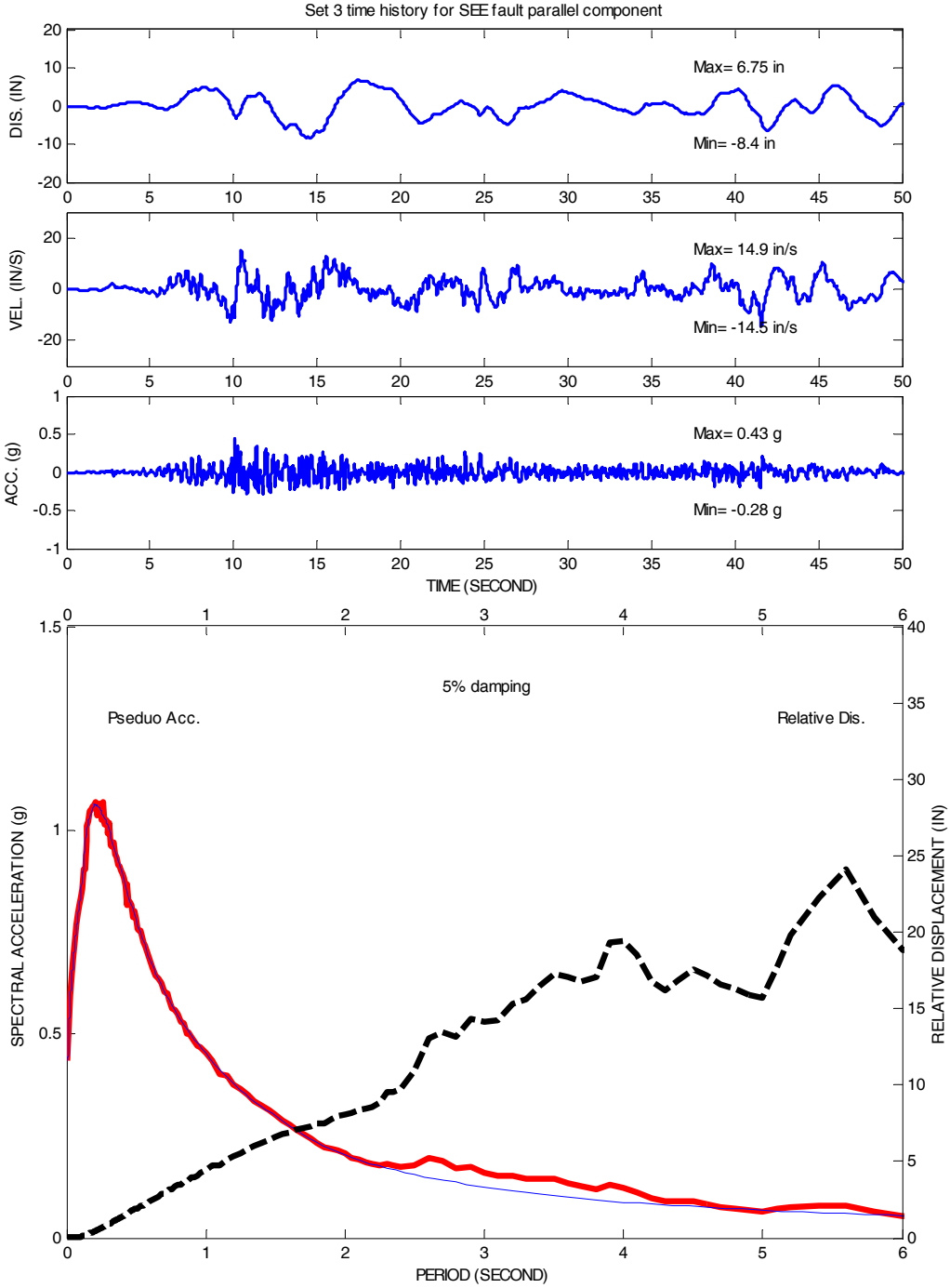
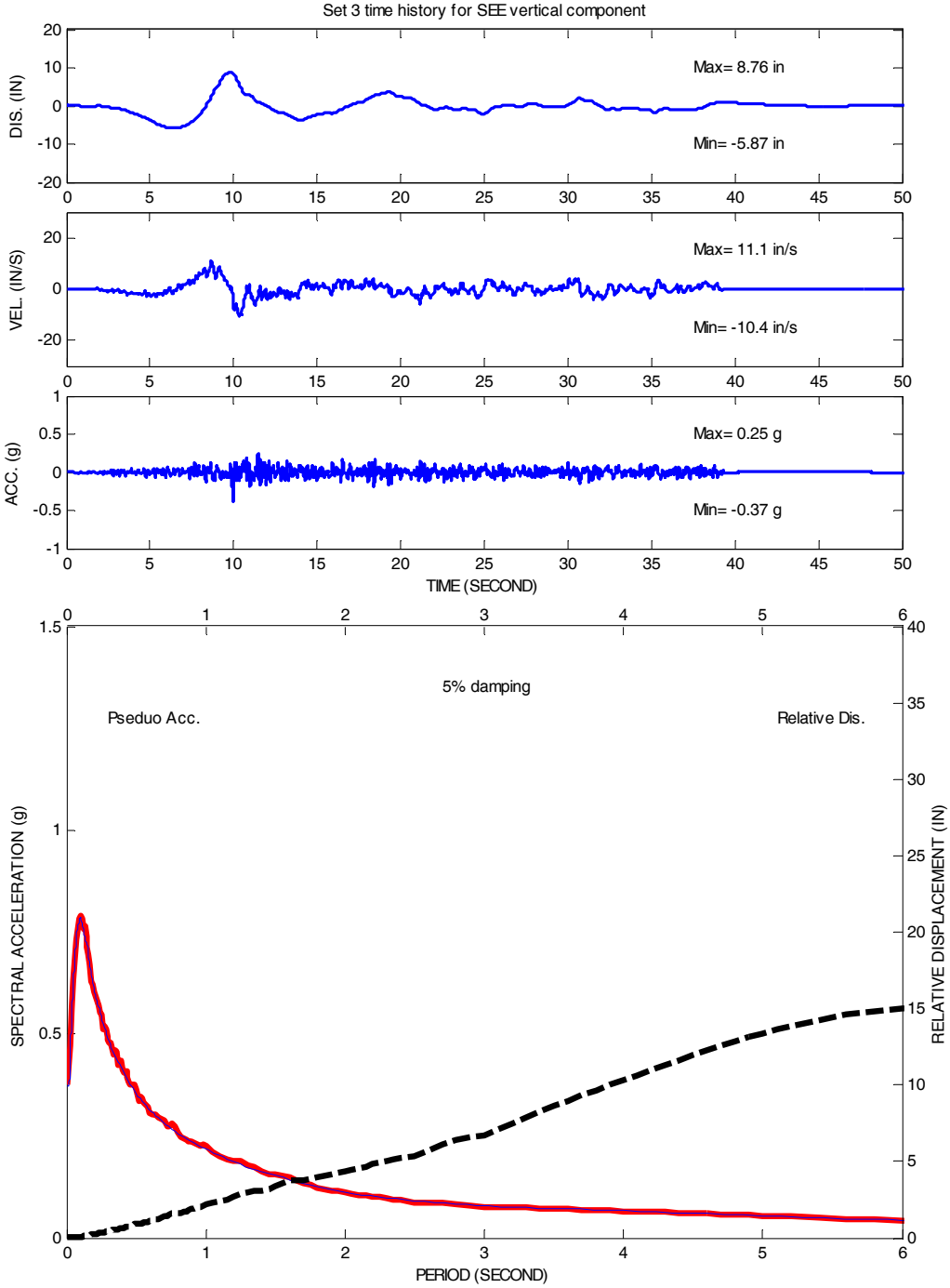
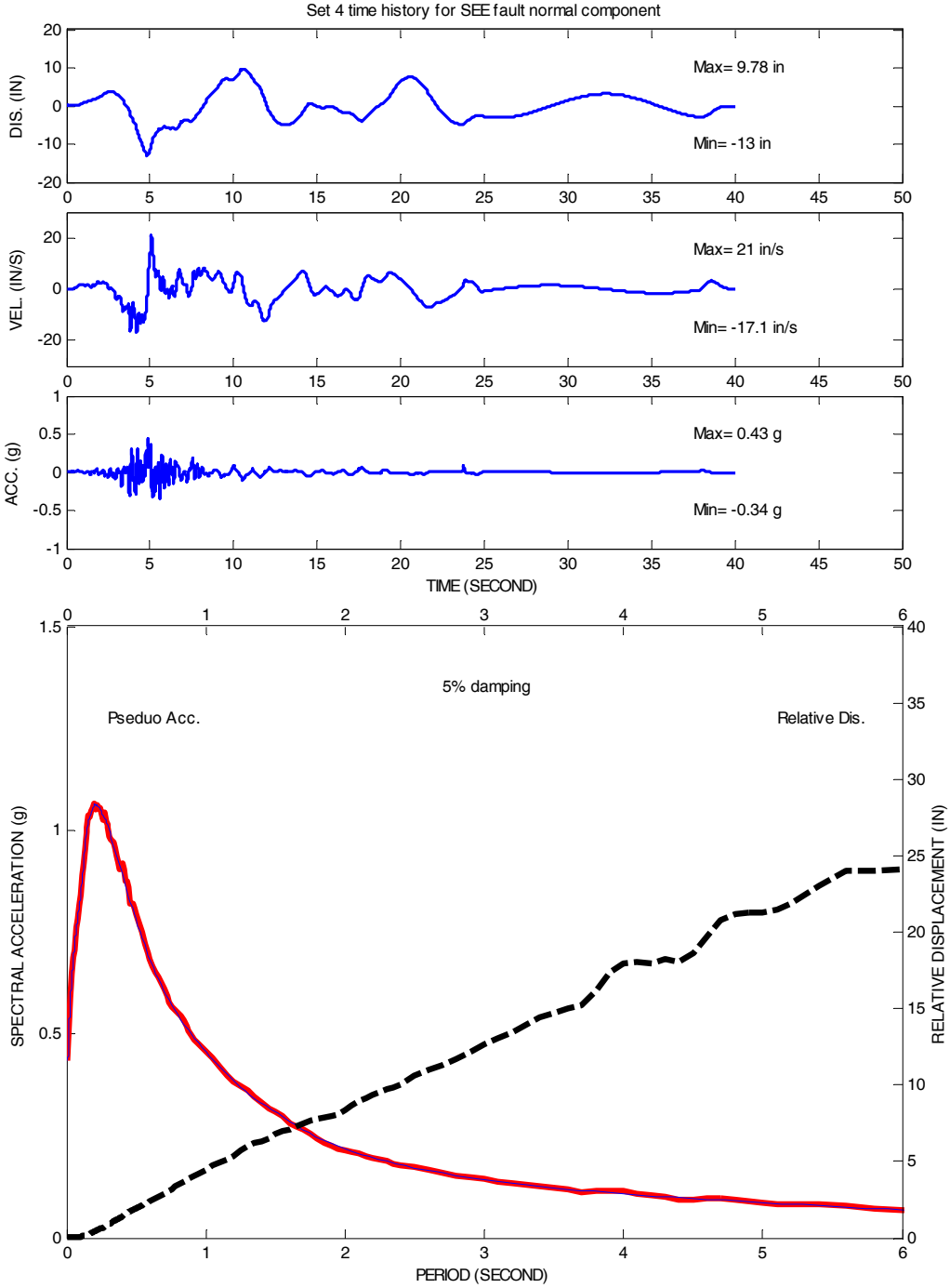
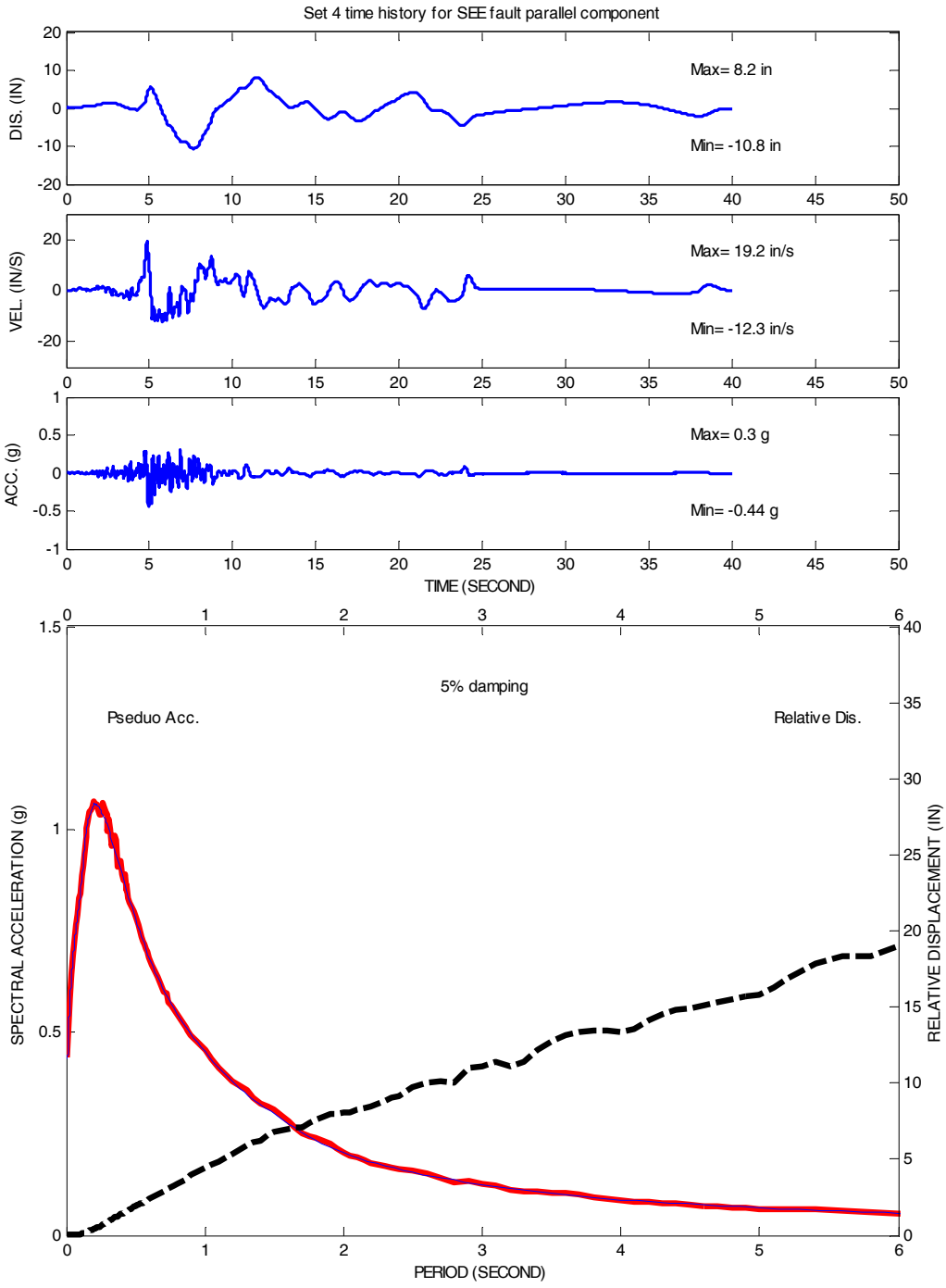
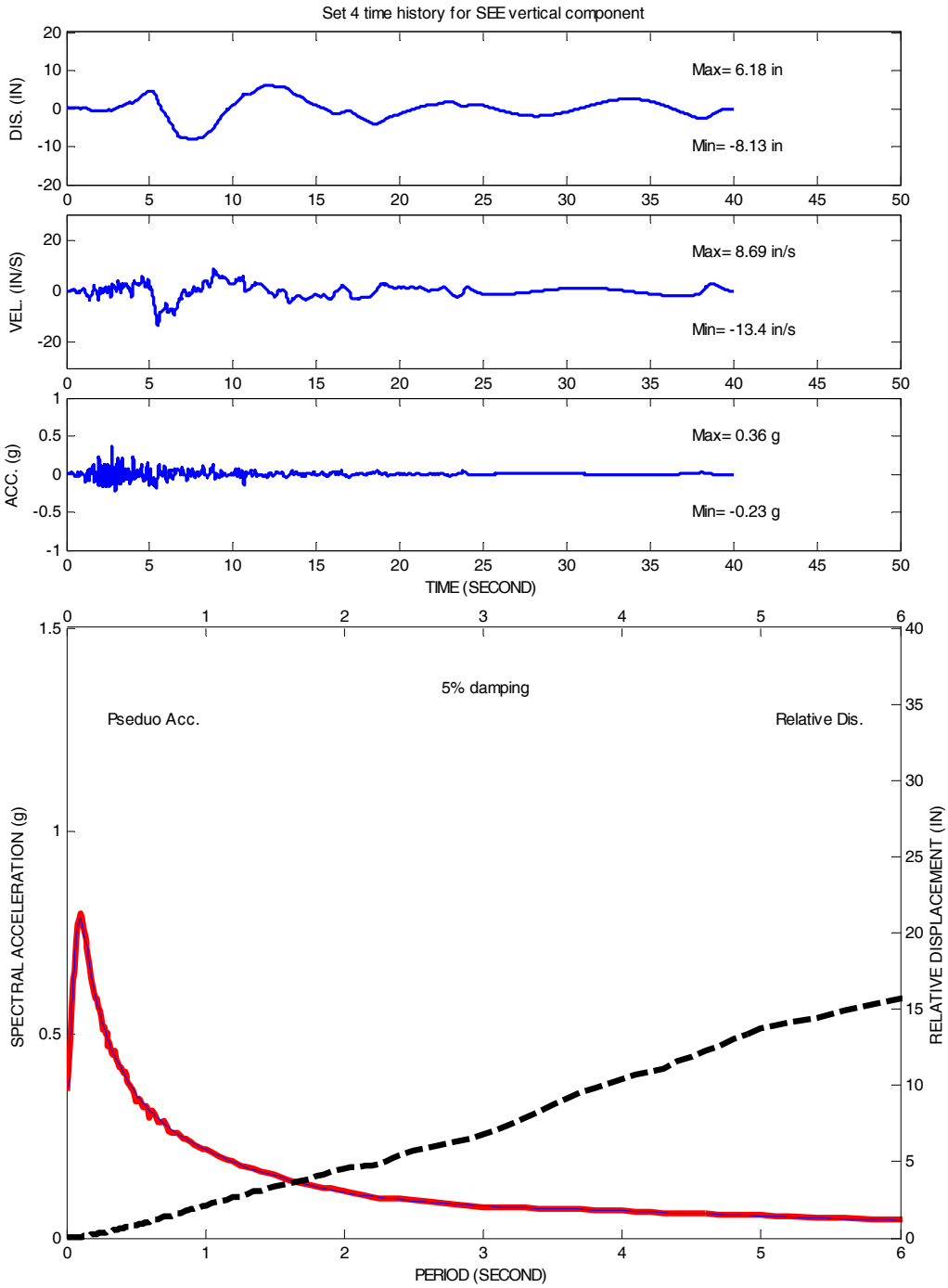
Min= -11.6 in
VEL. (IN/S)
Max= 14.5 in/s
Min= -20.3 in/s
ACC. (g)
Max= 0.44 g
Min= -0.4 g
TIME (SECOND)
5% damping
Pseduo Acc.
Relative Dis.
SPECTRAL ACCELERATION (g)
RELATIVE DISPLACEMENT (IN)
PERIOD (SECOND)

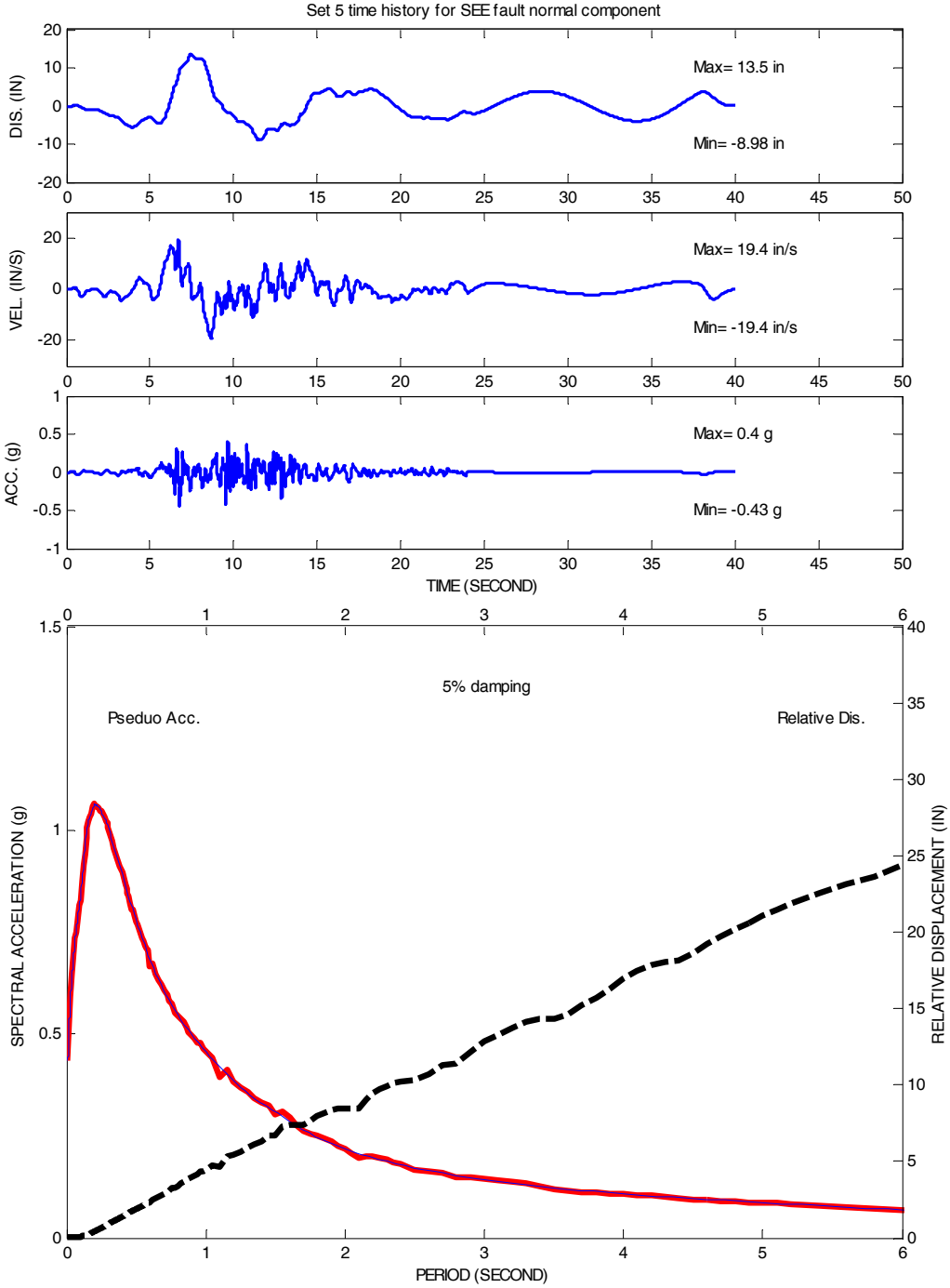

Set 3 time history for SEE fault parallel component
DIS. (IN)
Max= 6.75 in
Min= -8.4 in
VEL. (IN/S)
Max= 14.9 in/s
Min= -14.5 in/s
ACC. (g)
Max= 0.43 g
Min= -0.28 g
TIME (SECOND)
5% damping
Pseduo Acc.
Relative Dis.
SPECTRAL ACCELERATION (g)
RELATIVE DISPLACEMENT (IN)
PERIOD (SECOND)

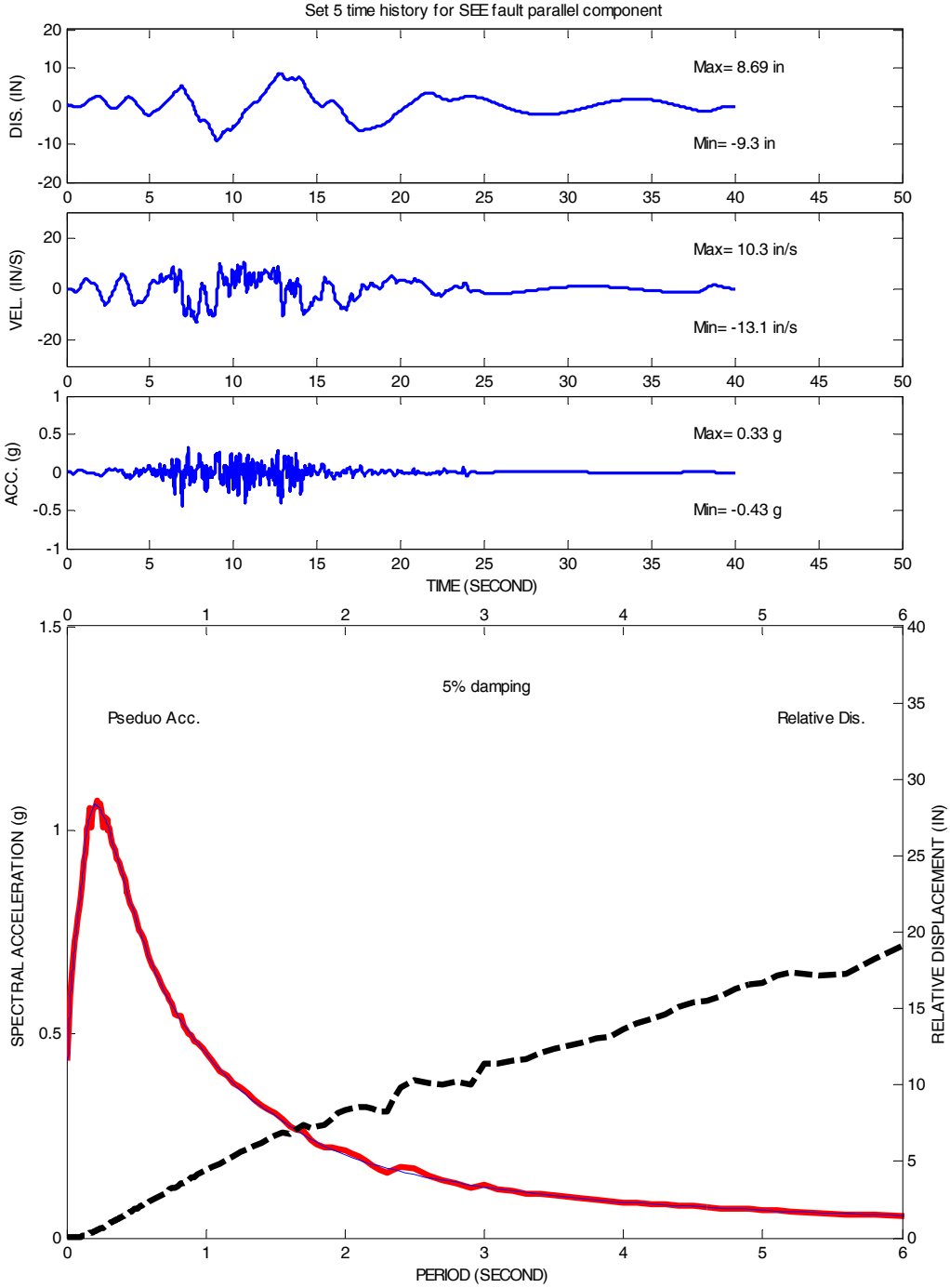

Set 3 time history for SEE vertical component
DIS. (IN)
Max= 8.76 in
Min= -5.87 in
VEL. (IN/S)
Max= 11.1 in/s
Min= -10.4 in/s
ACC. (g)
Max= 0.25 g
Min= -0.37 g
TIME (SECOND)
5% damping
Pseduo Acc.
Relative Dis.
SPECTRAL ACCELERATION (g)
RELATIVE DISPLACEMENT (IN)
PERIOD (SECOND)

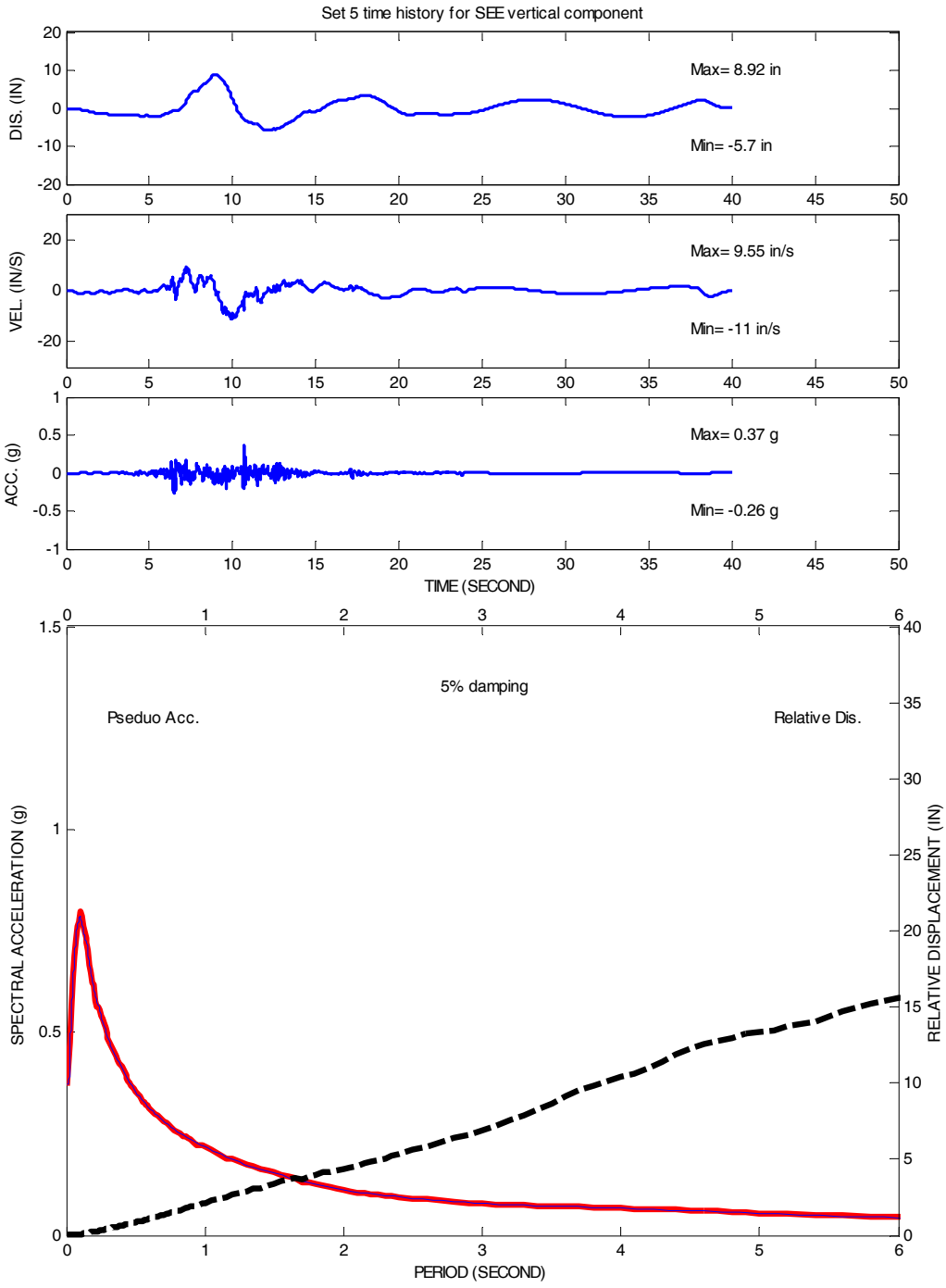

Set 4 time history for SEE fault normal component
DIS. (IN)
Max= 9.78 in
Min= -13 in
VEL. (IN/S)
Max= 21 in/s
Min= -17.1 in/s
ACC. (g)
Max= 0.43 g
Min= -0.34 g
TIME (SECOND)
5% damping
Pseduo Acc.
Relative Dis.
SPECTRAL ACCELERATION (g)
RELATIVE DISPLACEMENT (IN)
PERIOD (SECOND)


Set 4 time history for SEE fault parallel component
DIS. (IN)
Max= 8.2 in
Min= -10.8 in
VEL. (IN/S)
Max= 19.2 in/s
Min= -12.3 in/s
ACC. (g)
Max= 0.3 g
Min= -0.44 g
TIME (SECOND)
5% damping
Pseduo Acc.
Relative Dis.
SPECTRAL ACCELERATION (g)
RELATIVE DISPLACEMENT (IN)
PERIOD (SECOND)


Set 4 time history for SEE vertical component
DIS. (IN)
Max= 6.18 in
Min= -8.13 in
VEL. (IN/S)
Max= 8.69 in/s
Min= -13.4 in/s
ACC. (g)
Max= 0.36 g
Min= -0.23 g
TIME (SECOND)
5% damping
Pseduo Acc.
Relative Dis.
SPECTRAL ACCELERATION (g)
RELATIVE DISPLACEMENT (IN)
PERIOD (SECOND)


Set 5 time history for SEE fault normal component
DIS. (IN)
Max= 13.5 in
Min= -8.98 in
VEL. (IN/S)
Max= 19.4 in/s
Min= -19.4 in/s
ACC. (g)
Max= 0.4 g
Min= -0.43 g
TIME (SECOND)
5% damping
Pseduo Acc.
Relative Dis.
SPECTRAL ACCELERATION (g)
RELATIVE DISPLACEMENT (IN)
PERIOD (SECOND)


Set 5 time history for SEE fault parallel component
DIS. (IN)
Max= 8.69 in
Min= -9.3 in
VEL. (IN/S)
Max= 10.3 in/s
Min= -13.1 in/s
ACC. (g)
Max= 0.33 g
Min= -0.43 g
TIME (SECOND)
5% damping
Pseduo Acc.
Relative Dis.
SPECTRAL ACCELERATION (g)
RELATIVE DISPLACEMENT (IN)
PERIOD (SECOND)


Set 5 time history for SEE vertical component
DIS. (IN)
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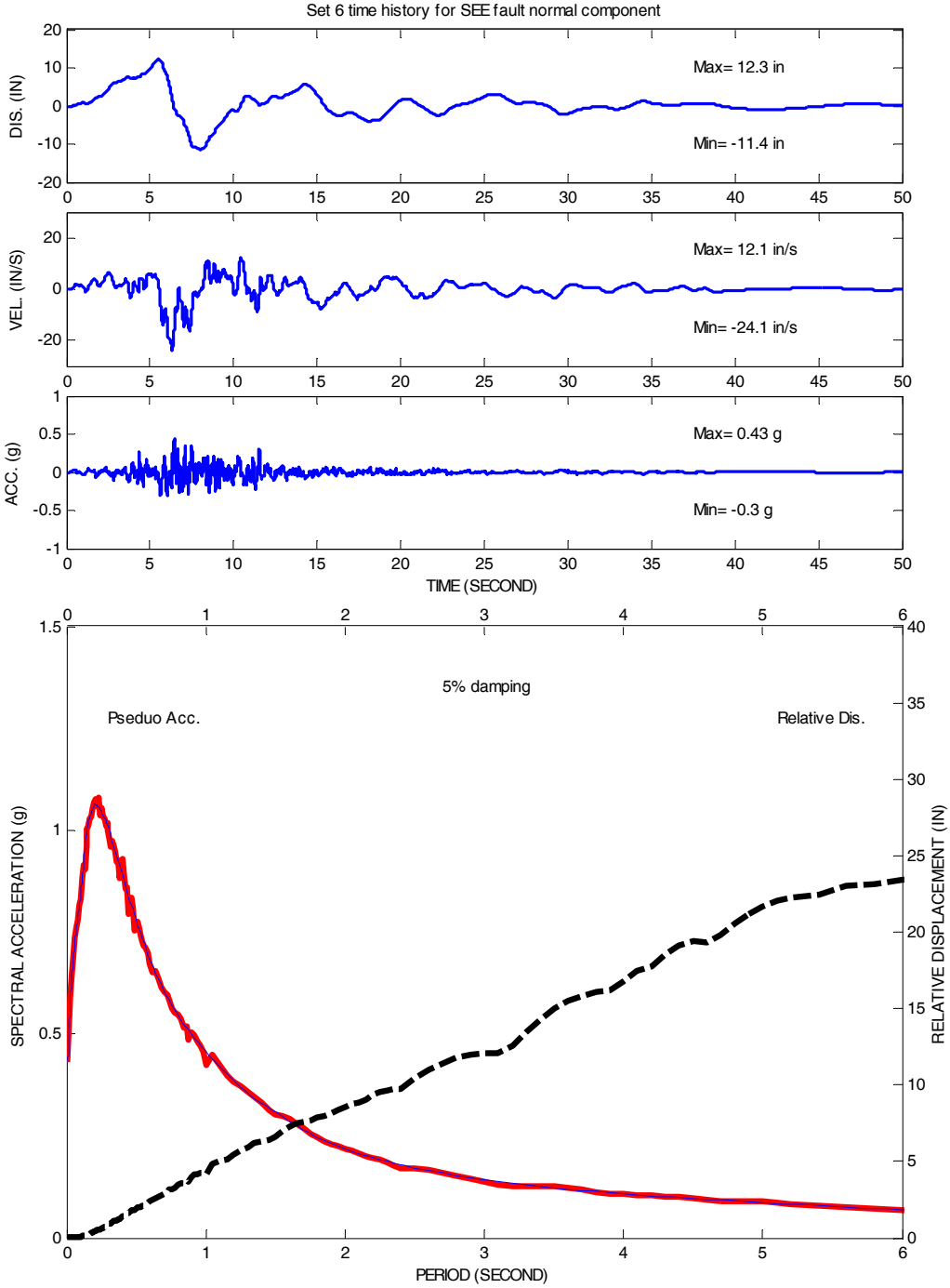
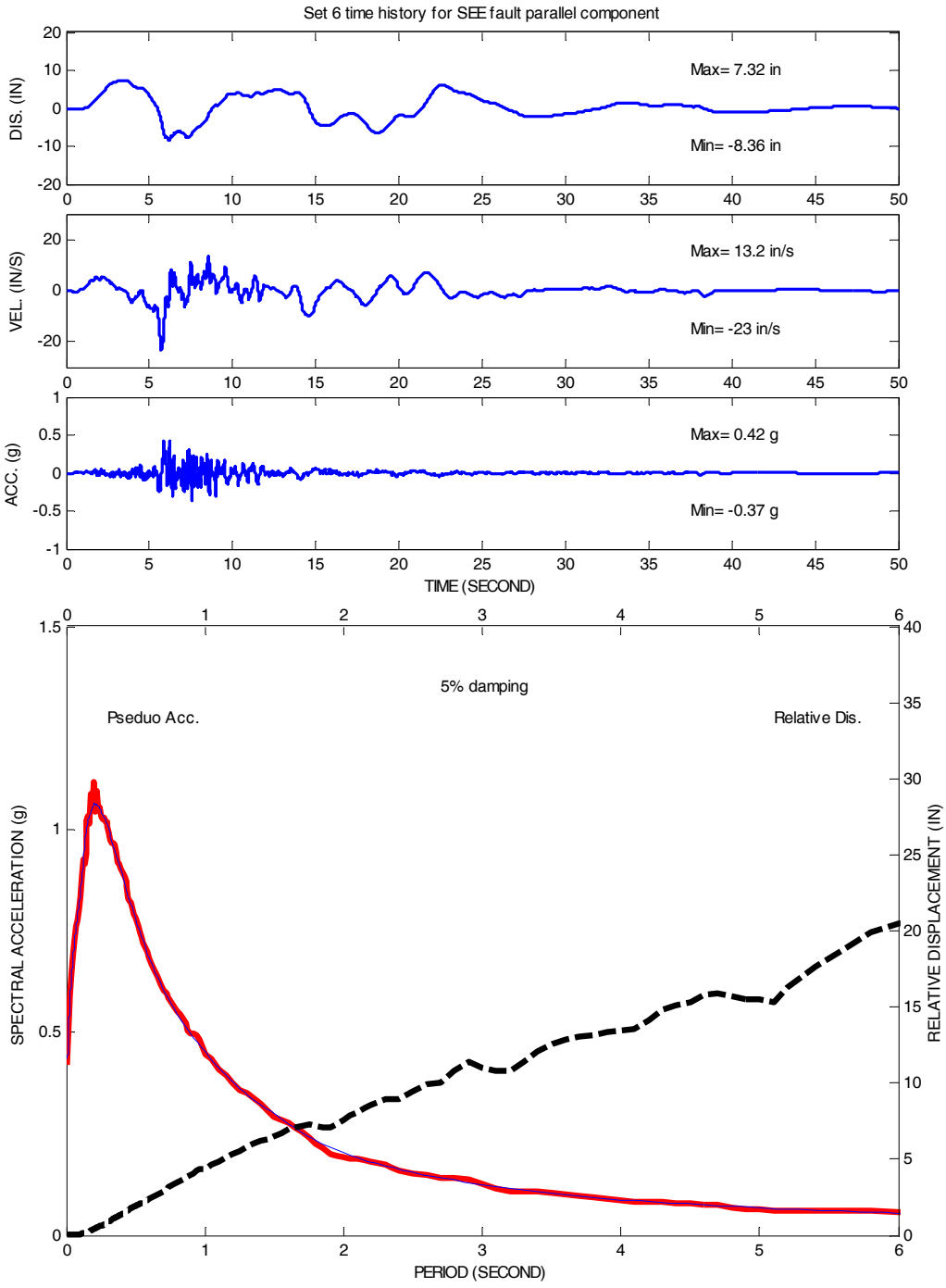
Min= -5.7 in
VEL. (IN/S)
Max= 9.55 in/s
Min= -11 in/s
ACC. (g)
Max= 0.37 g
Min= -0.26 g
TIME (SECOND)
5% damping
Pseduo Acc.
Relative Dis.
SPECTRAL ACCELERATION (g)
RELATIVE DISPLACEMENT (IN)
PERIOD (SECOND)


Set 6 time history for SEE fault normal component
DIS. (IN)
Max= 12.3 in
Min= -11.4 in
VEL. (IN/S)
Max= 12.1 in/s
Min= -24.1 in/s
ACC. (g)
Max= 0.43 g
Min= -0.3 g
TIME (SECOND)
5% damping
Pseduo Acc.
Relative Dis.
SPECTRAL ACCELERATION (g)
RELATIVE DISPLACEMENT (IN)
PERIOD (SECOND)


Set 6 time history for SEE fault parallel component
DIS. (IN)
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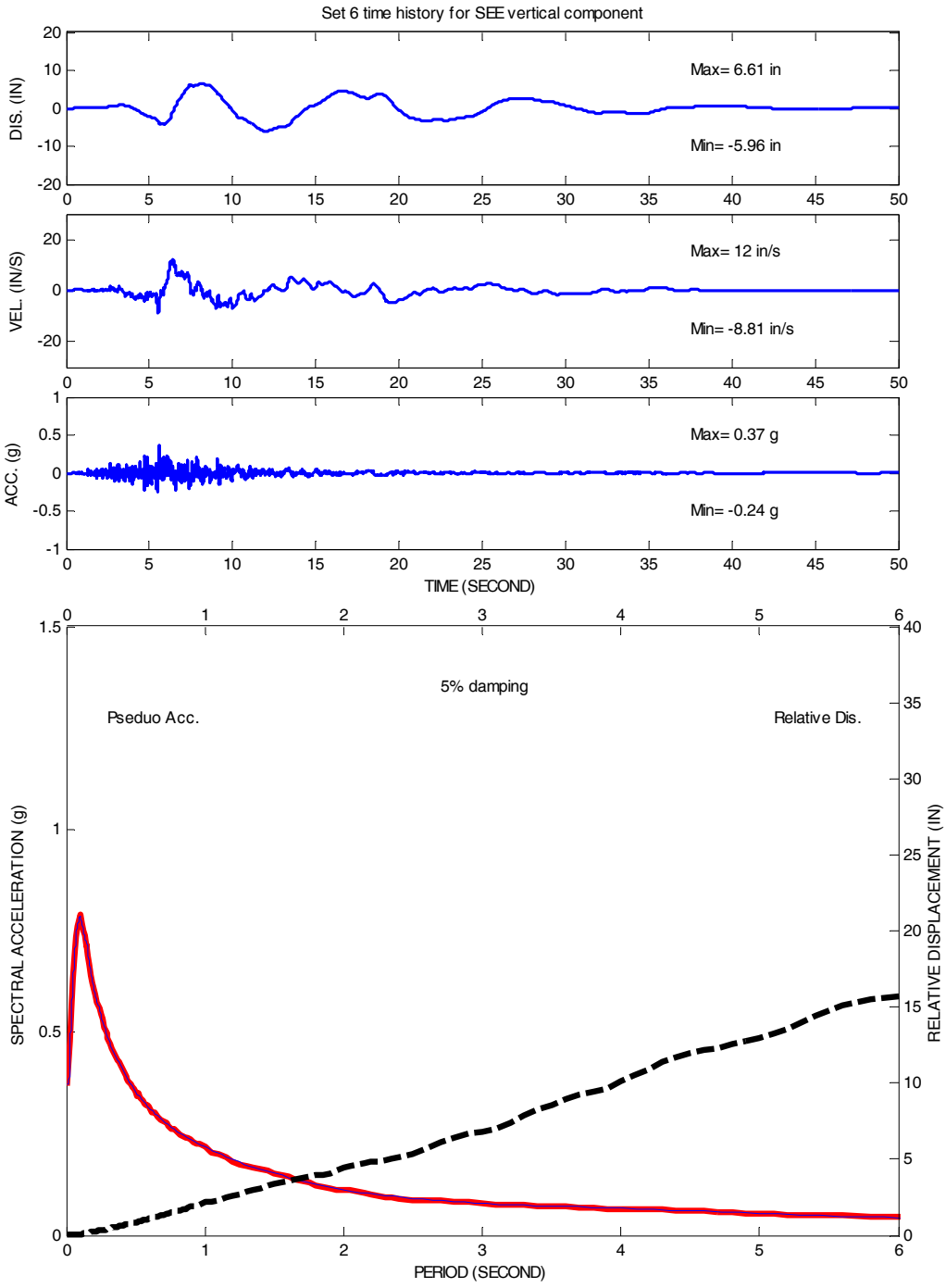
Min= -8.36 in
VEL. (IN/S)
Max= 13.2 in/s
Min= -23 in/s
ACC. (g)
Max= 0.42 g
Min= -0.37 g
TIME (SECOND)
5% damping
Pseduo Acc.
Relative Dis.
SPECTRAL ACCELERATION (g)
RELATIVE DISPLACEMENT (IN)
PERIOD (SECOND)


Set 6 time history for SEE vertical component
DIS. (IN)
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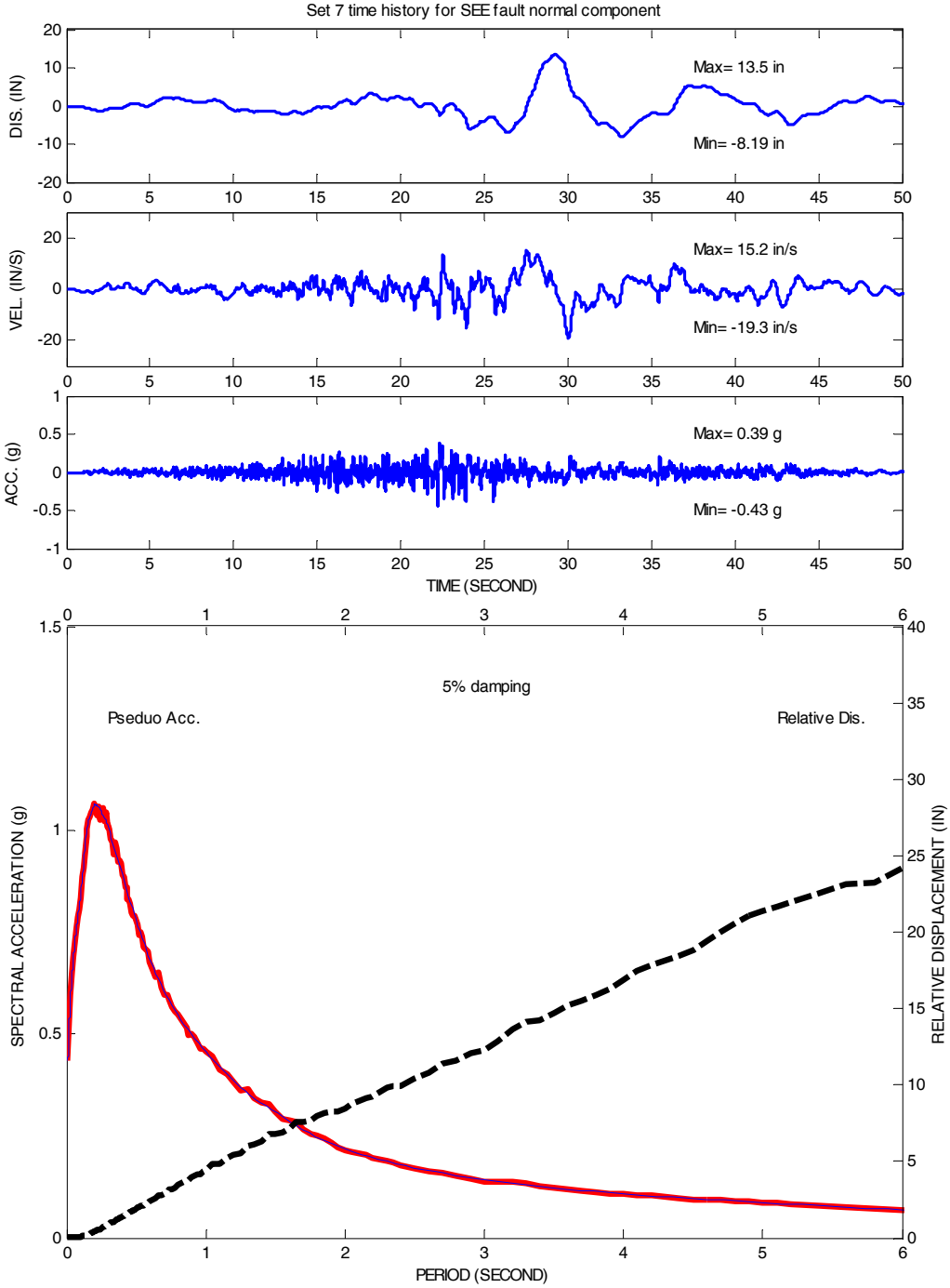
Min= -5.96 in
VEL. (IN/S)
Max= 12 in/s
Min= -8.81 in/s
ACC. (g)
Max= 0.37 g
Min= -0.24 g
TIME (SECOND)
5% damping
Pseduo Acc.
Relative Dis.
SPECTRAL ACCELERATION (g)
RELATIVE DISPLACEMENT (IN)
PERIOD (SECOND)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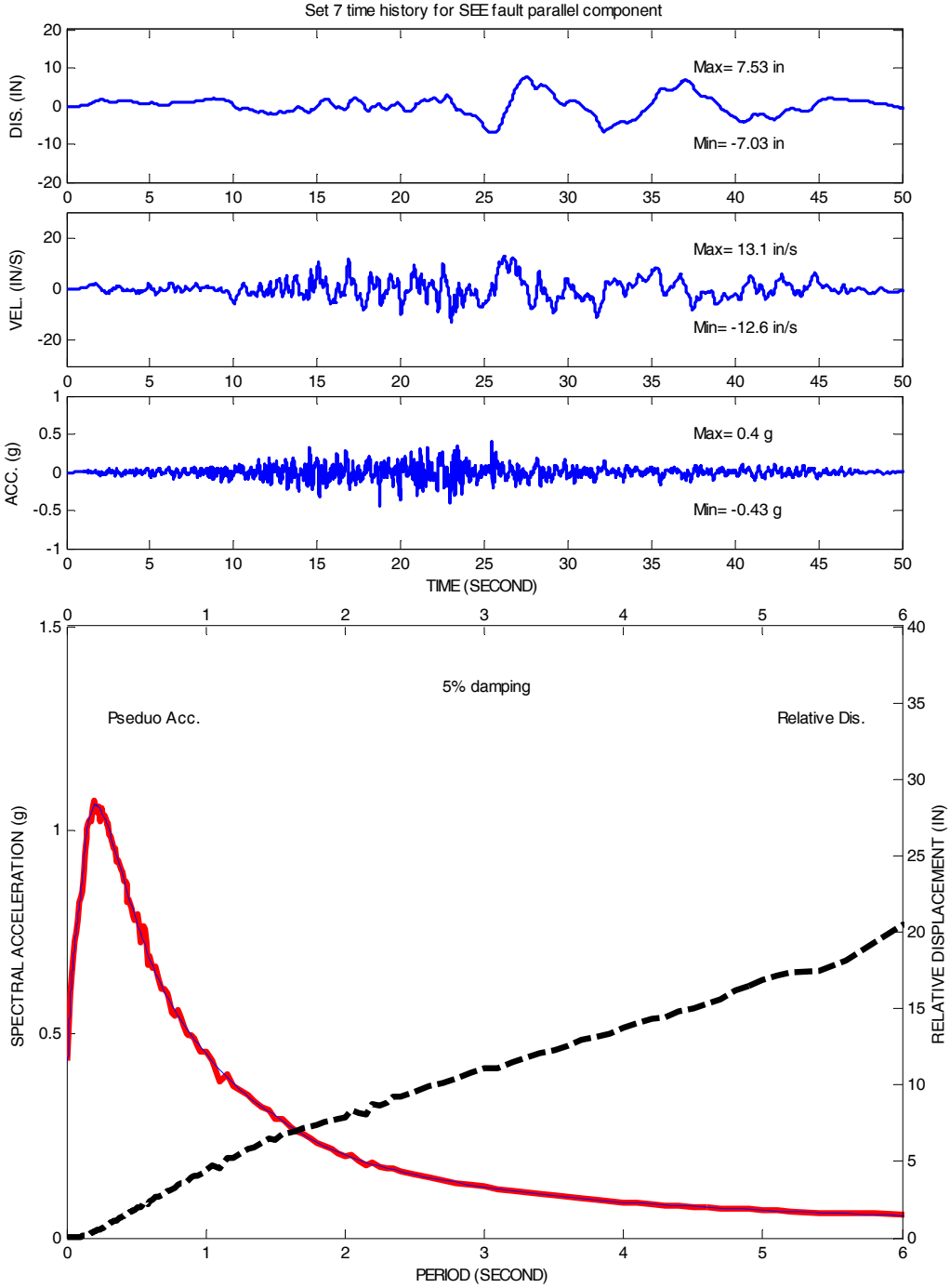
DIS. (IN)
Max= 13.5 in
Min= -8.19 in
VEL. (IN/S)
Max= 15.2 in/s
Min= -19.3 in/s
ACC. (g)
Max= 0.39 g
Min= -0.43 g
TIME (SECOND)
5% damping
Pseduo Acc.
Relative Dis.
SPECTRAL ACCELERATION (g)
RELATIVE DISPLACEMENT (IN)
PERIOD (SECOND)


Set 7 time history for SEE fault parallel component
DIS. (IN)
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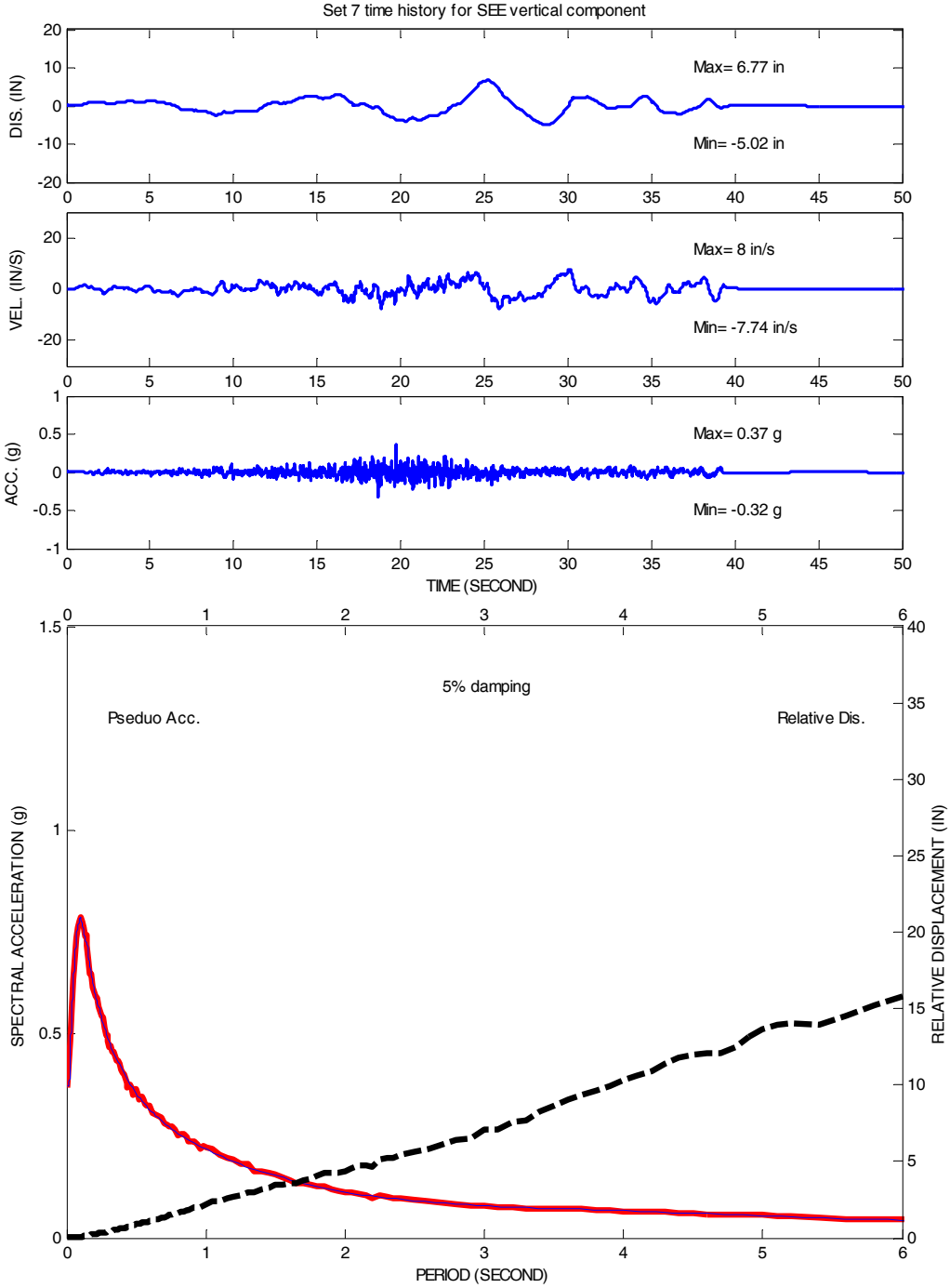
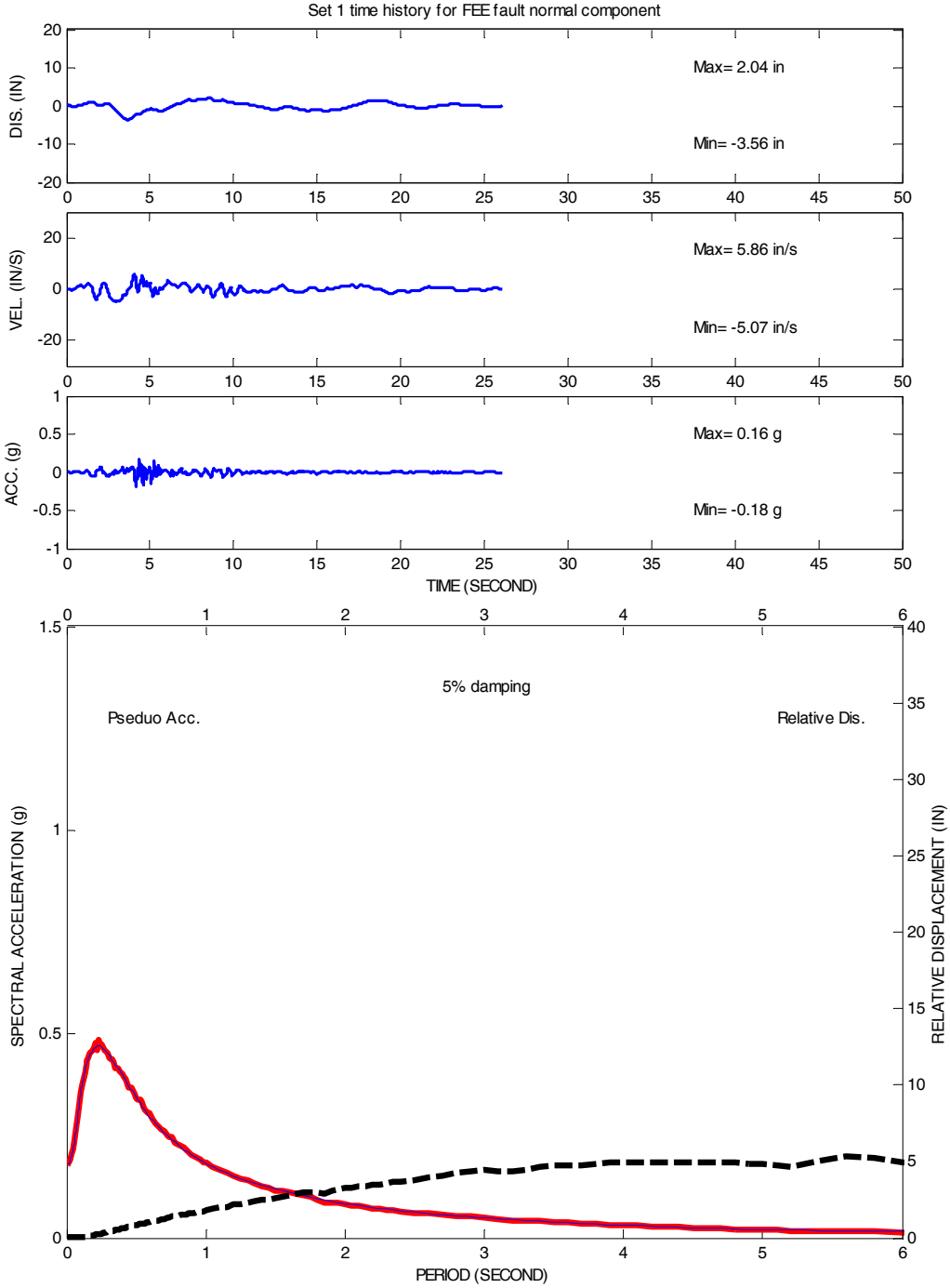
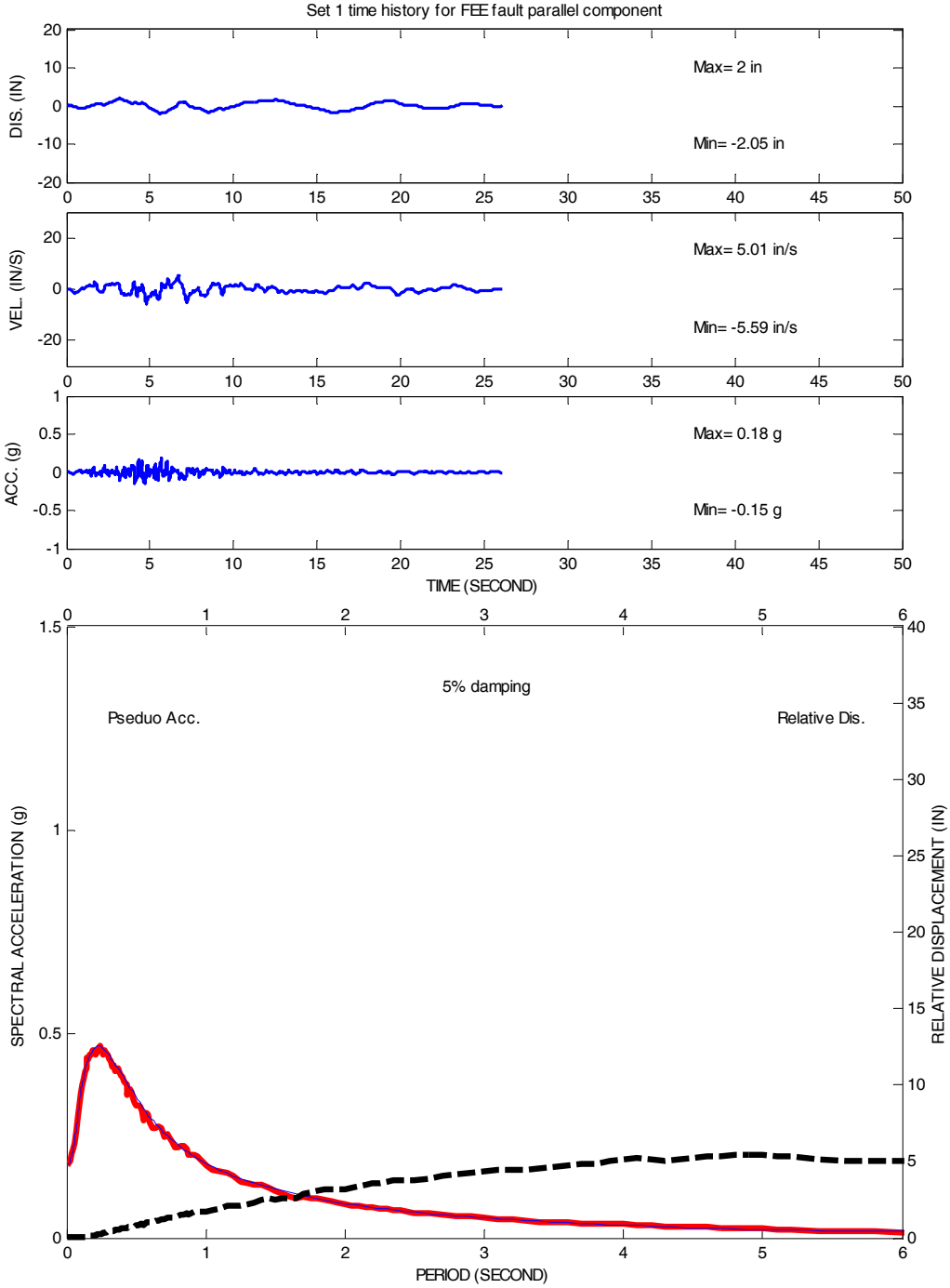
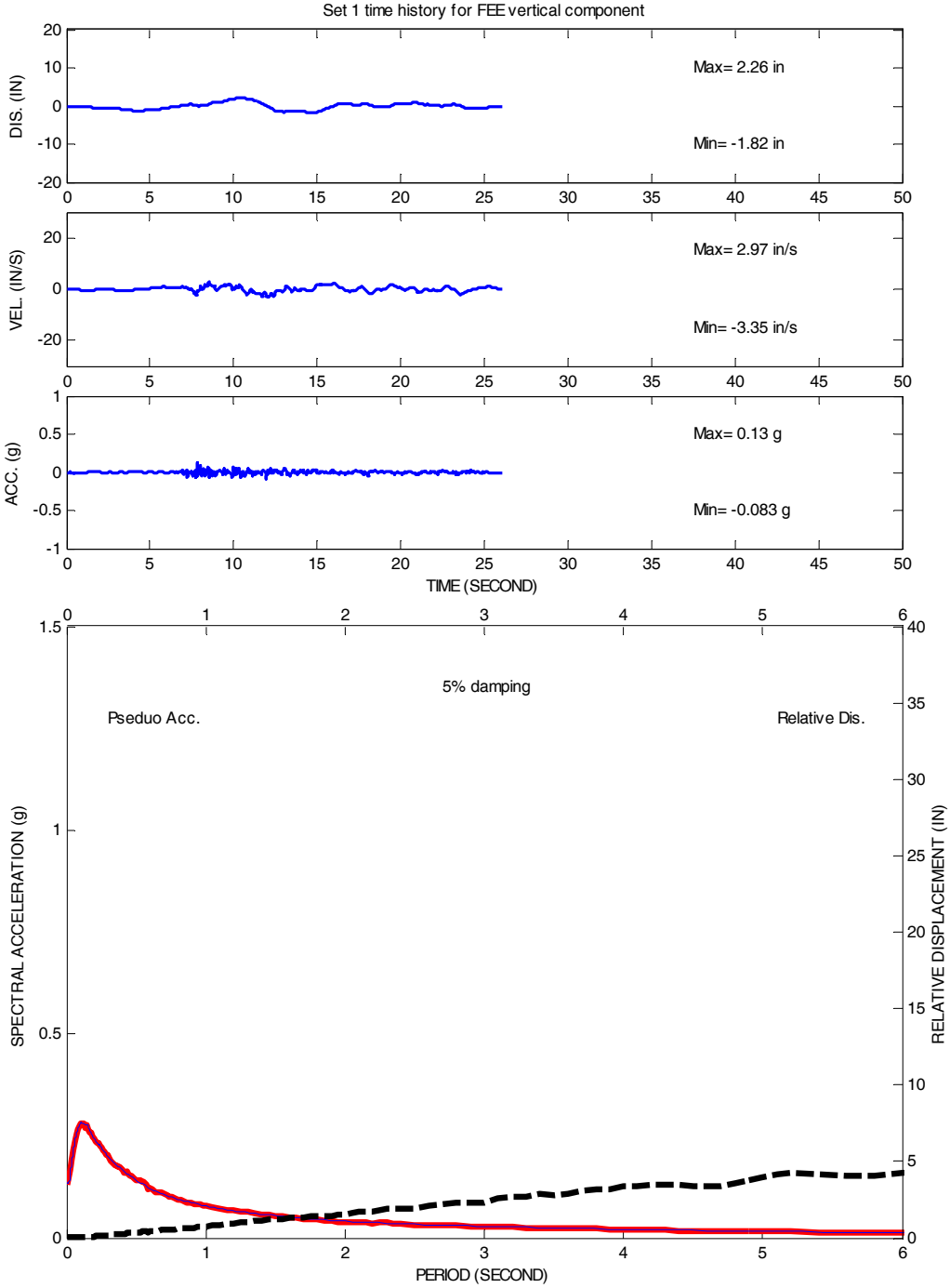
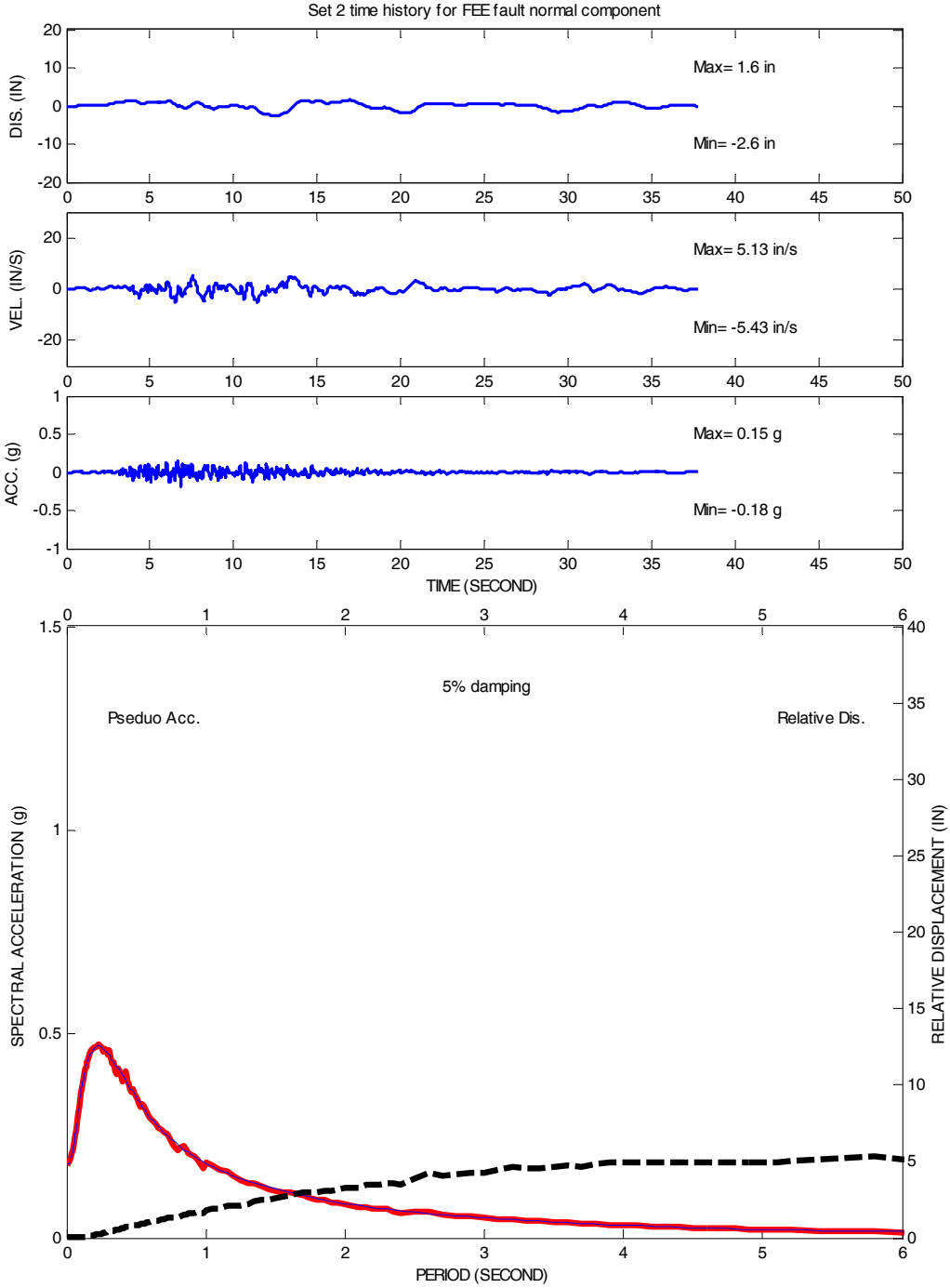
Min= -7.03 in
VEL. (IN/S)
Max= 13.1 in/s
Min= -12.6 in/s
ACC. (g)
Max= 0.4 g
Min= -0.43 g
TIME (SECOND)
5% damping
Pseduo Acc.
Relative Dis.
SPECTRAL ACCELERATION (g)
RELATIVE DISPLACEMENT (IN)
PERIOD (SECOND)

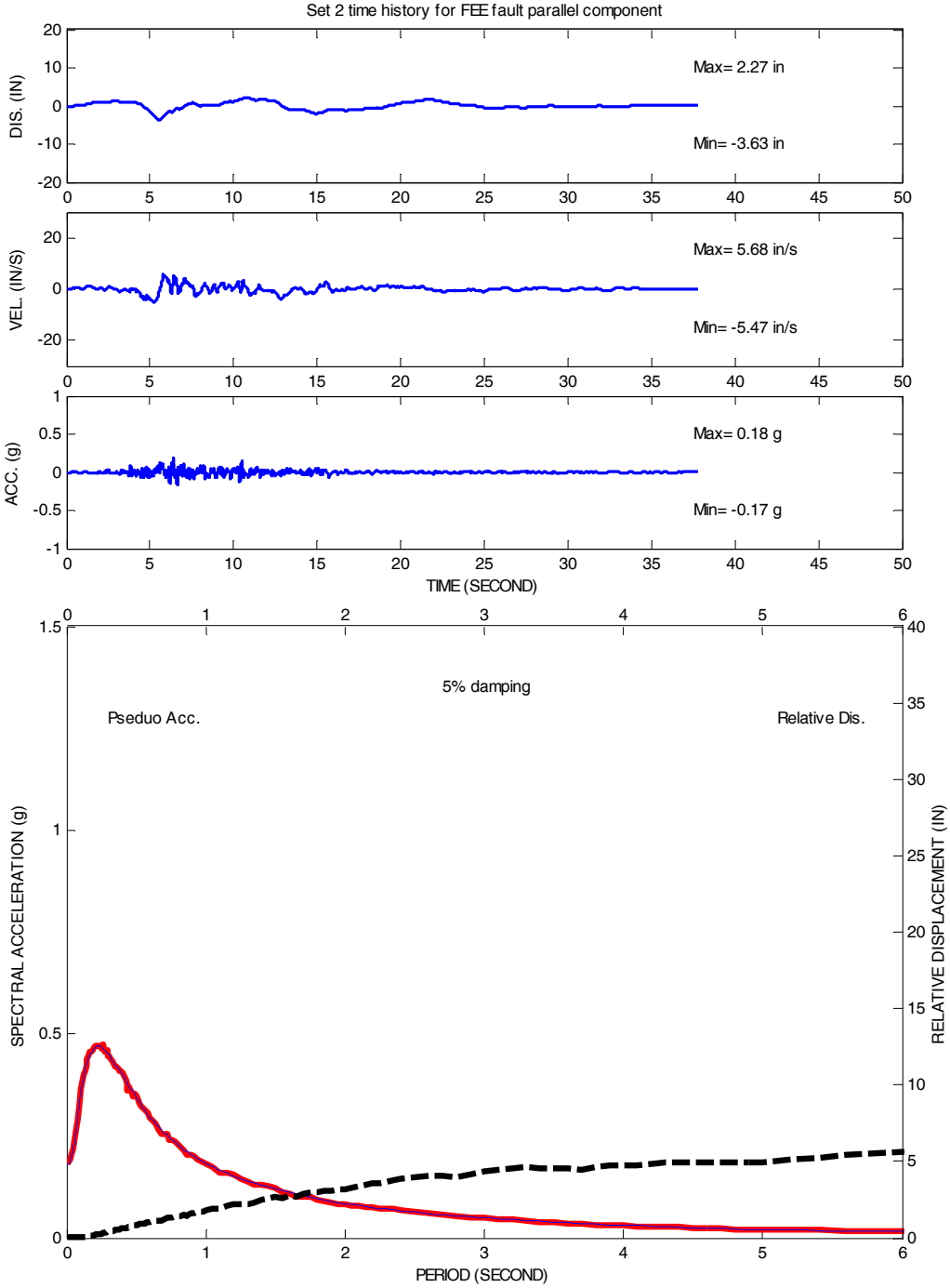

Set 7 time history for SEE vertical component
DIS. (IN)
Max= 6.77 in
Min= -5.02 in
VEL. (IN/S)
Max= 8 in/s
Min= -7.74 in/s
ACC. (g)
Max= 0.37 g
Min= -0.32 g
TIME (SECOND)
5% damping
Pseduo Acc.
Relative Dis.
SPECTRAL ACCELERATION (g)
RELATIVE DISPLACEMENT (IN)
PERIOD (SECOND)

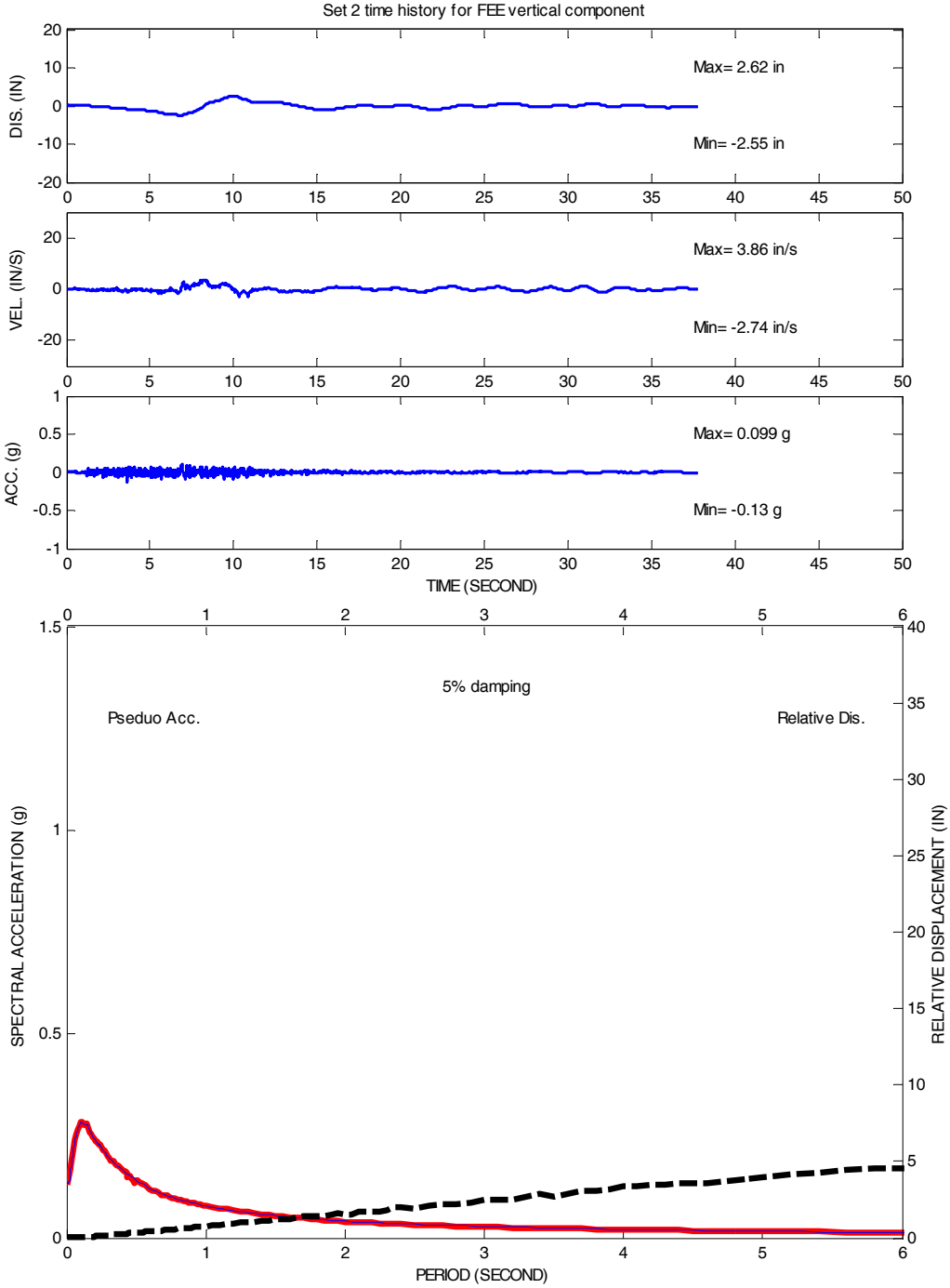

Set 1 time history for FEE fault normal component
DIS. (IN)
Max= 2.04 in
Min= -3.56 in
VEL. (IN/S)
Max= 5.86 in/s
Min= -5.07 in/s
ACC. (g)
Max= 0.16 g
Min= -0.18 g
TIME (SECOND)
5% damping
Pseduo Acc.
Relative Dis.
SPECTRAL ACCELERATION (g)
RELATIVE DISPLACEMENT (IN)
PERIOD (SECOND)

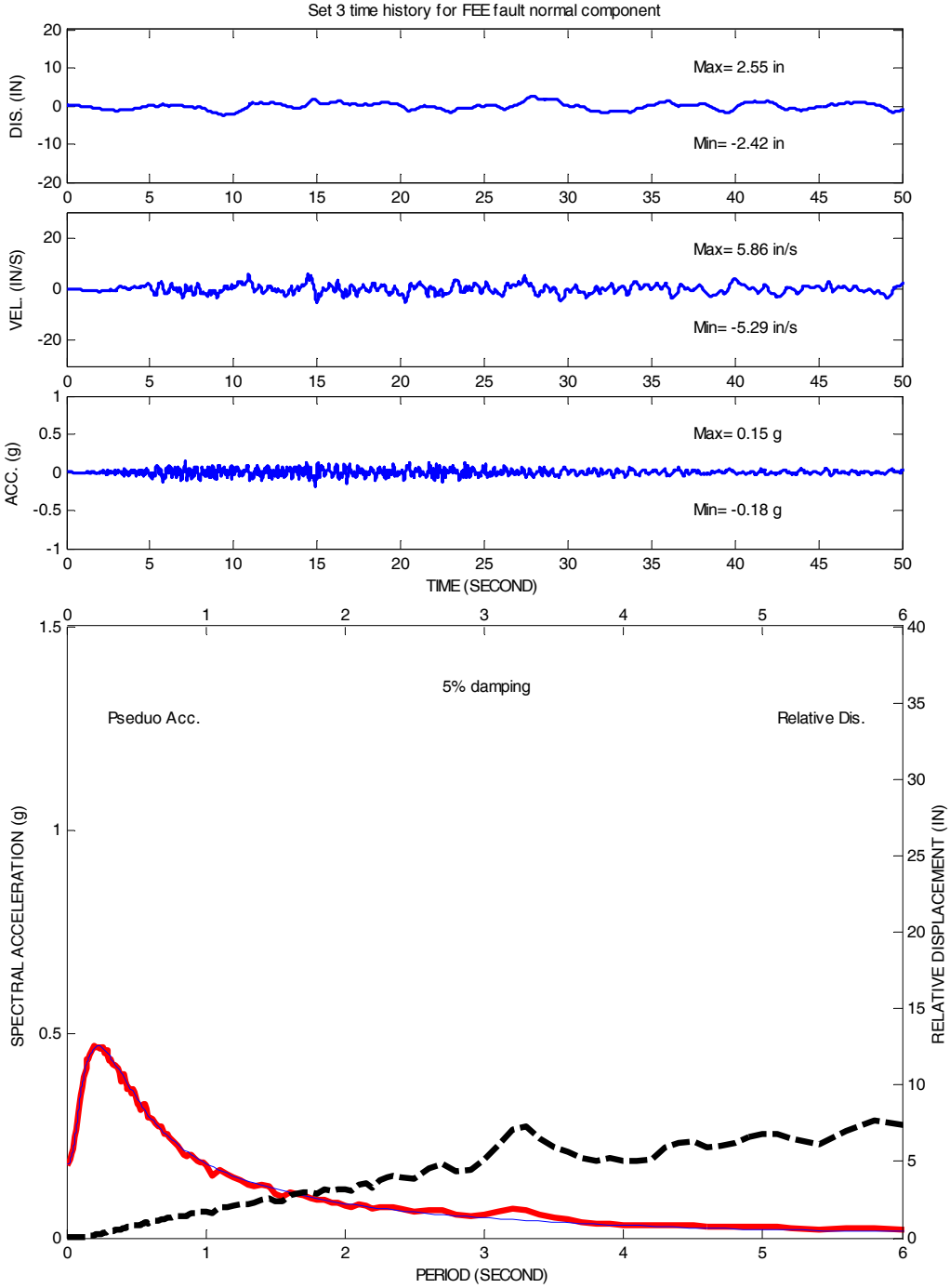

Set 1 time history for FEE fault parallel component
DIS. (IN)
Max= 2 in
Min= -2.05 in
VEL. (IN/S)
Max= 5.01 in/s
Min= -5.59 in/s
ACC. (g)
Max= 0.18 g
Min= -0.15 g
TIME (SECOND)
5% damping
Pseduo Acc.
Relative Dis.
SPECTRAL ACCELERATION (g)
RELATIVE DISPLACEMENT (IN)
PERIOD (SECOND)

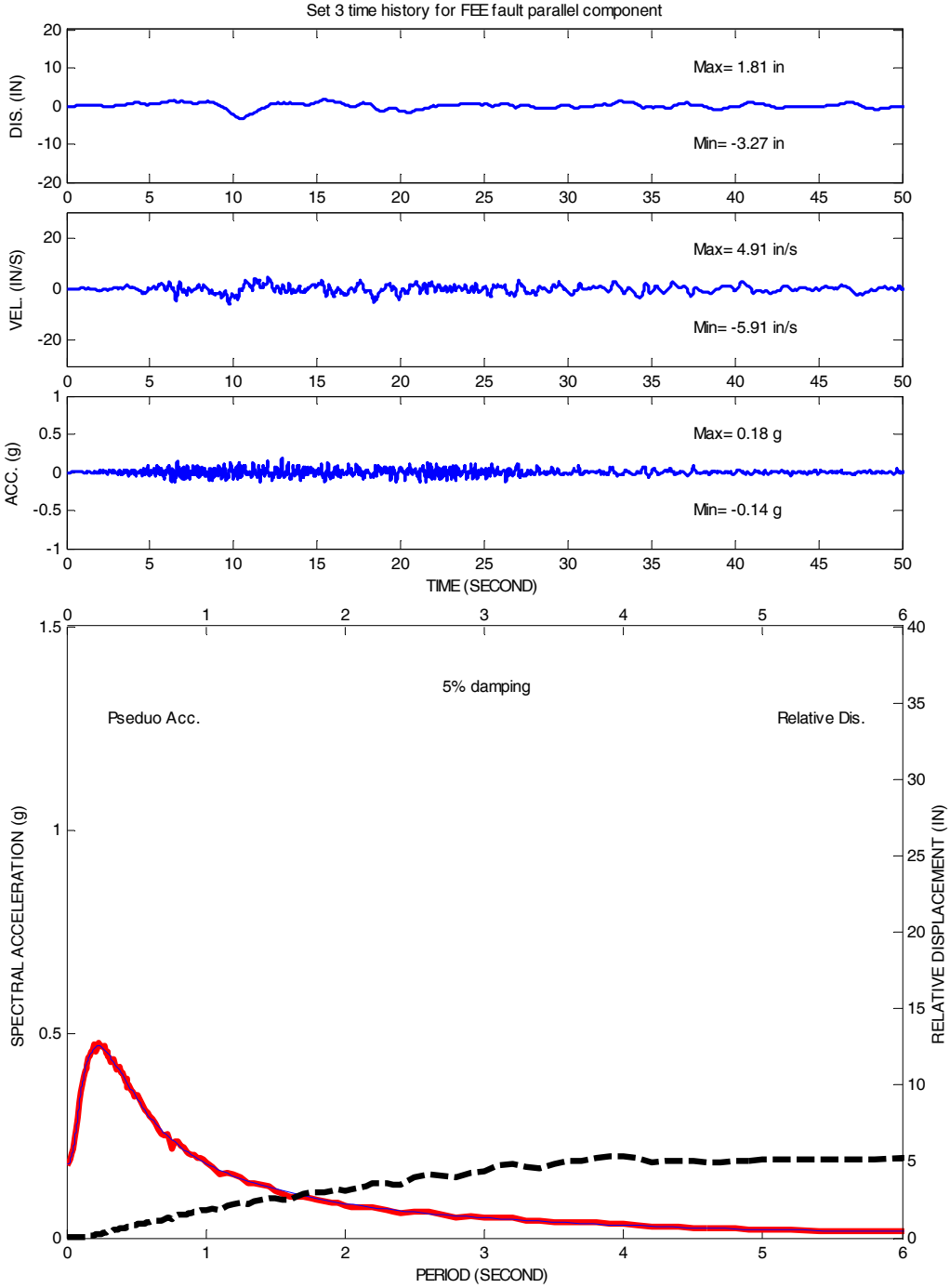

Set 1 time history for FEE vertical component
DIS. (IN)
Max= 2.26 in
Min= -1.82 in
VEL. (IN/S)
Max= 2.97 in/s
Min= -3.35 in/s
ACC. (g)
Max= 0.13 g
Min= -0.083 g
TIME (SECOND)
5% damping
Pseduo Acc.
Relative Dis.
SPECTRAL ACCELERATION (g)
RELATIVE DISPLACEMENT (IN)
PERIOD (SECOND)

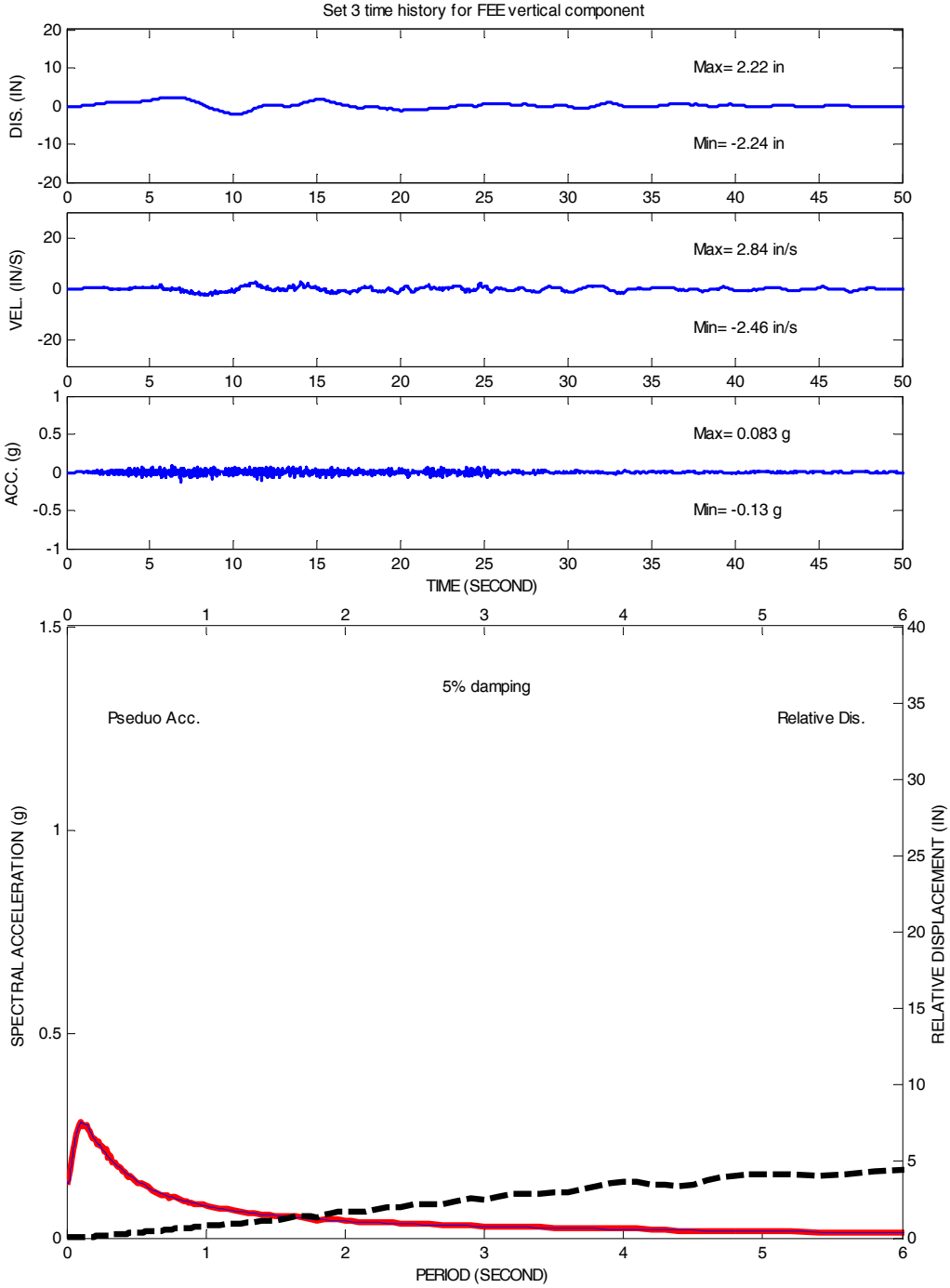

Set 2 time history for FEE fault normal component
DIS. (IN)
Max= 1.6 in
Min= -2.6 in
VEL. (IN/S)
Max= 5.13 in/s
Min= -5.43 in/s
ACC. (g)
Max= 0.15 g
Min= -0.18 g
TIME (SECOND)
5% damping
Pseduo Acc.
Relative Dis.
SPECTRAL ACCELERATION (g)
RELATIVE DISPLACEMENT (IN)
PERIOD (SECOND)

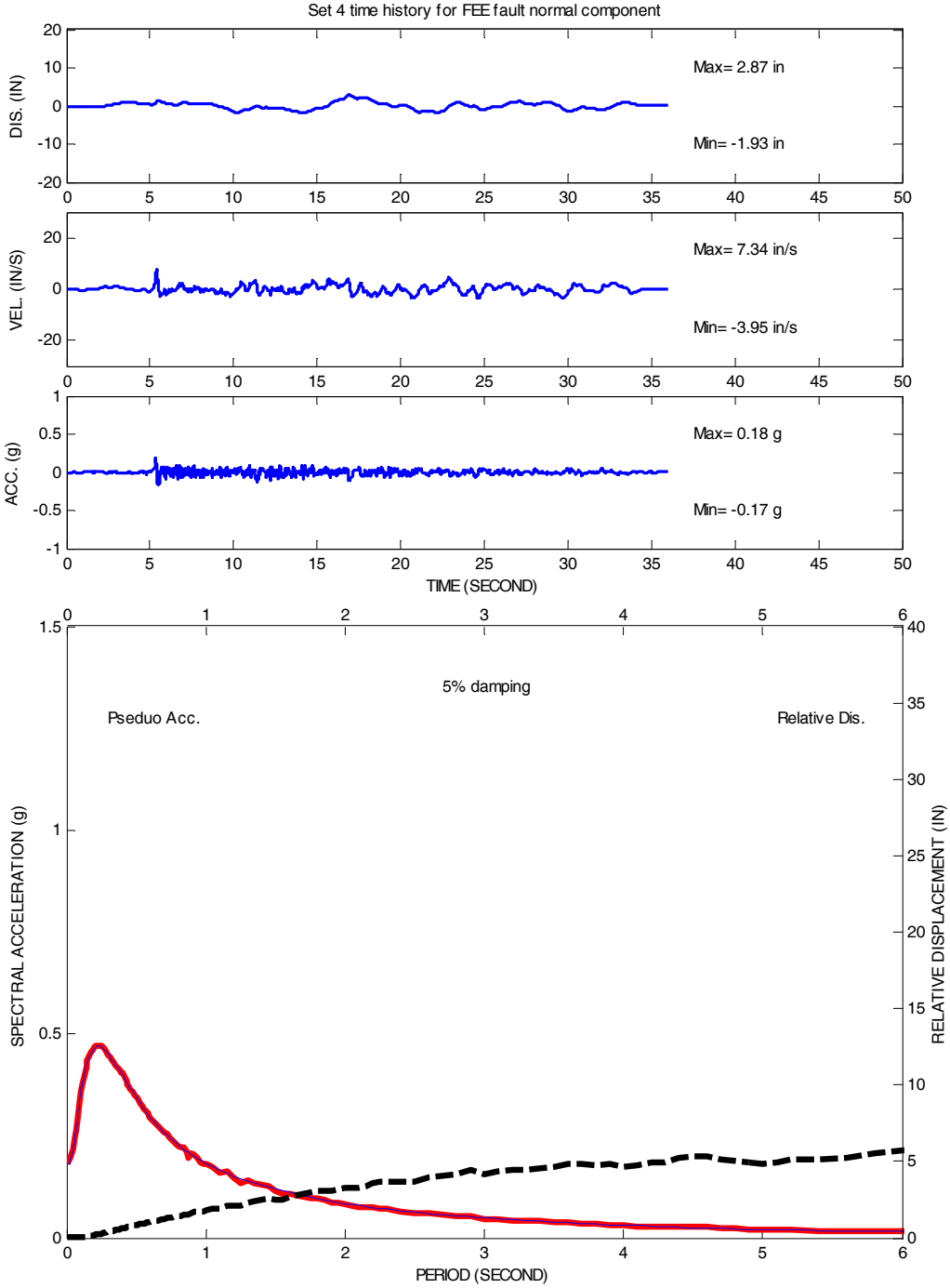

Set 2 time history for FEE fault parallel component
DIS. (IN)
Max= 2.27 in
Min= -3.63 in
VEL. (IN/S)
Max= 5.68 in/s
Min= -5.47 in/s
ACC. (g)
Max= 0.18 g
Min= -0.17 g
TIME (SECOND)
5% damping
Pseduo Acc.
Relative Dis.
SPECTRAL ACCELERATION (g)
RELATIVE DISPLACEMENT (IN)
PERIOD (SECOND)

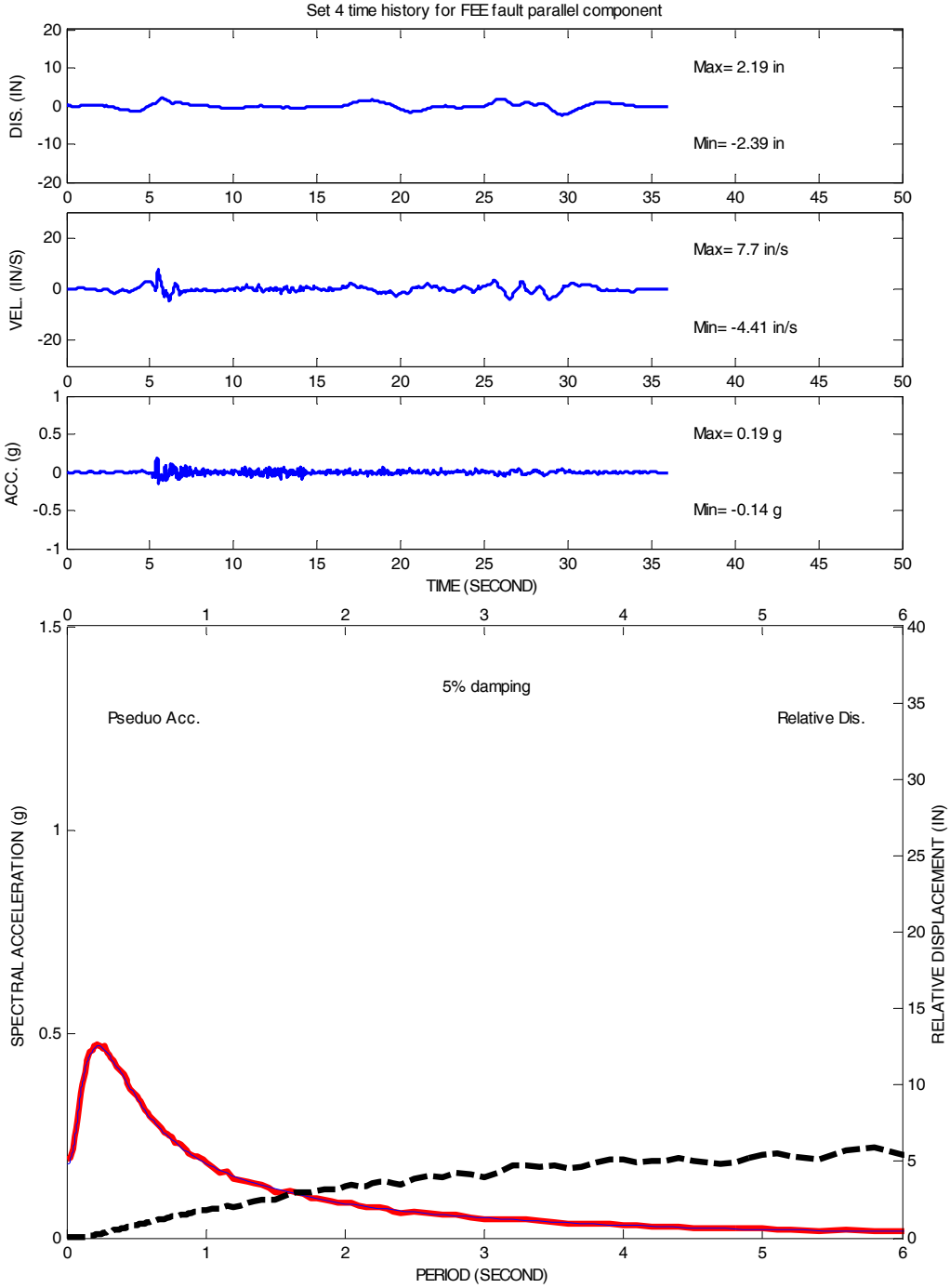

Set 2 time history for FEE vertical component
DIS. (IN)
Max= 2.62 in
Min= -2.55 in
VEL. (IN/S)
Max= 3.86 in/s
Min= -2.74 in/s
ACC. (g)
Max= 0.099 g
Min= -0.13 g
TIME (SECOND)
5% damping
Pseduo Acc.
Relative Dis.
SPECTRAL ACCELERATION (g)
RELATIVE DISPLACEMENT (IN)
PERIOD (SECOND)

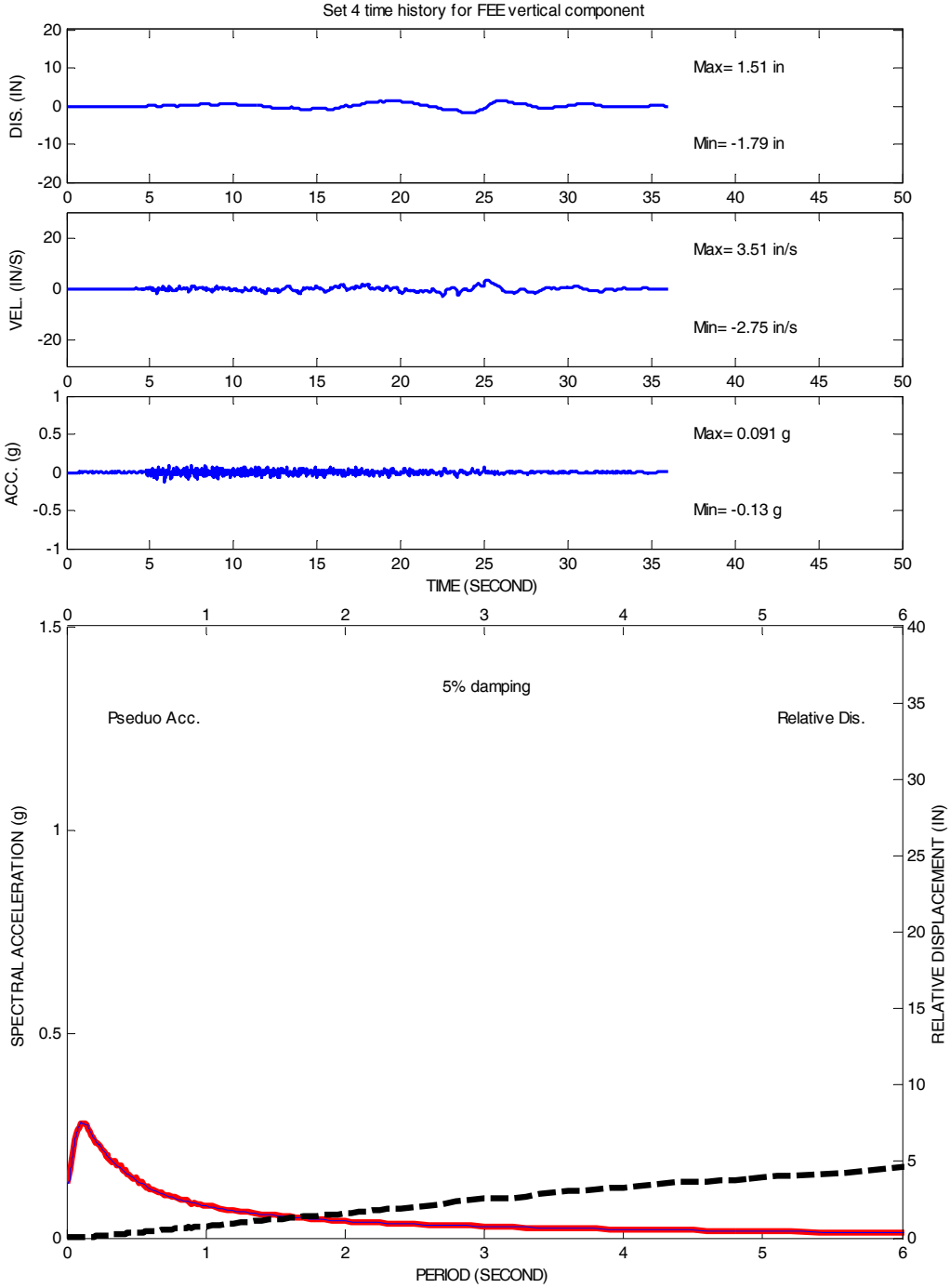

Set 3 time history for FEE fault normal component
DIS. (IN)
Max= 2.55 in
Min= -2.42 in
VEL. (IN/S)
Max= 5.86 in/s
Min= -5.29 in/s
ACC. (g)
Max= 0.15 g
Min= -0.18 g
TIME (SECOND)
5% damping
Pseduo Acc.
Relative Dis.
SPECTRAL ACCELERATION (g)
RELATIVE DISPLACEMENT (IN)
PERIOD (SECOND)

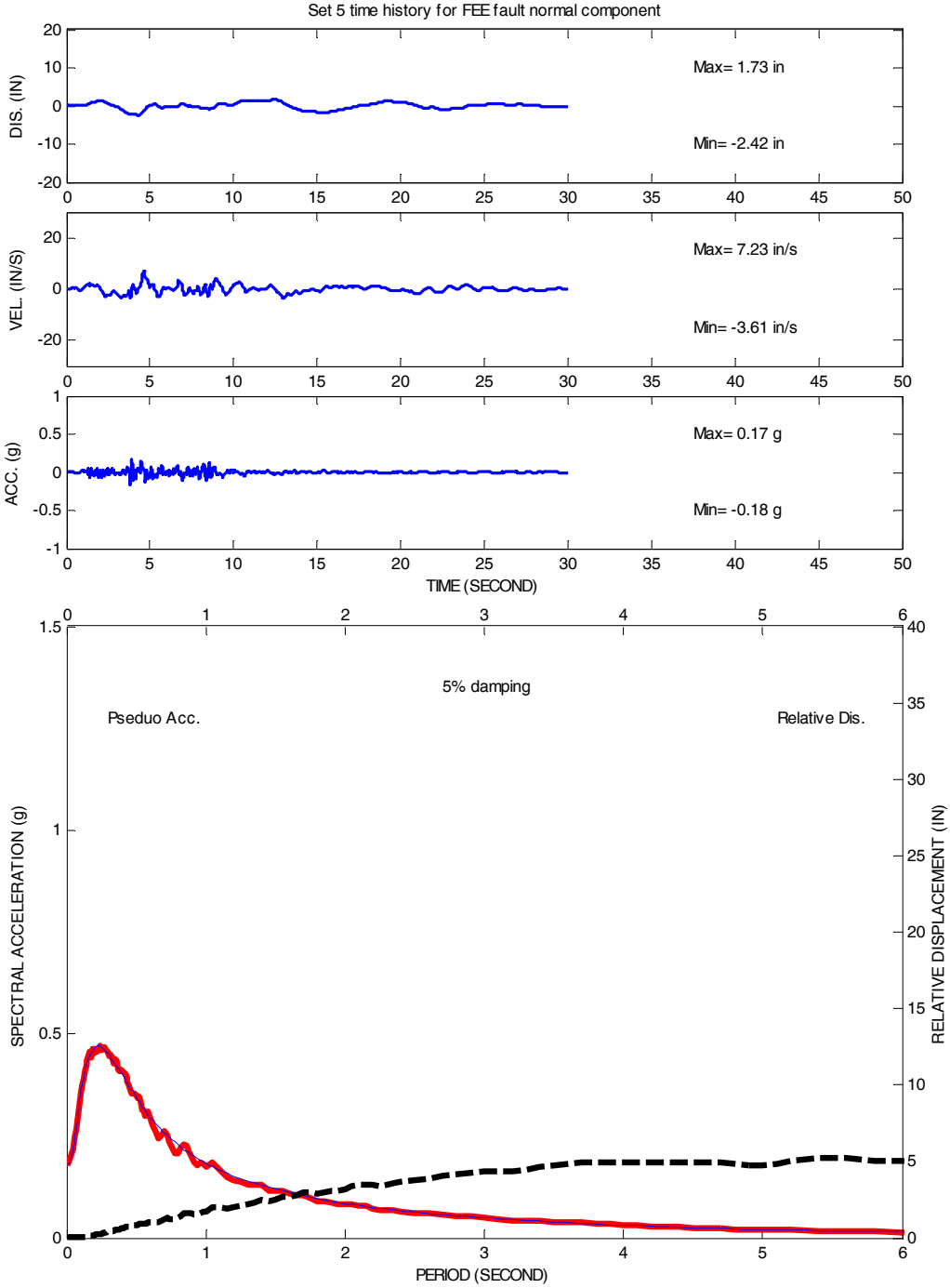

Set 3 time history for FEE fault parallel component
DIS. (IN)
Max= 1.81 in
Min= -3.27 in
VEL. (IN/S)
Max= 4.91 in/s
Min= -5.91 in/s
ACC. (g)
Max= 0.18 g
Min= -0.14 g
TIME (SECOND)
5% damping
Pseduo Acc.
Relative Dis.
SPECTRAL ACCELERATION (g)
RELATIVE DISPLACEMENT (IN)
PERIOD (SECOND)

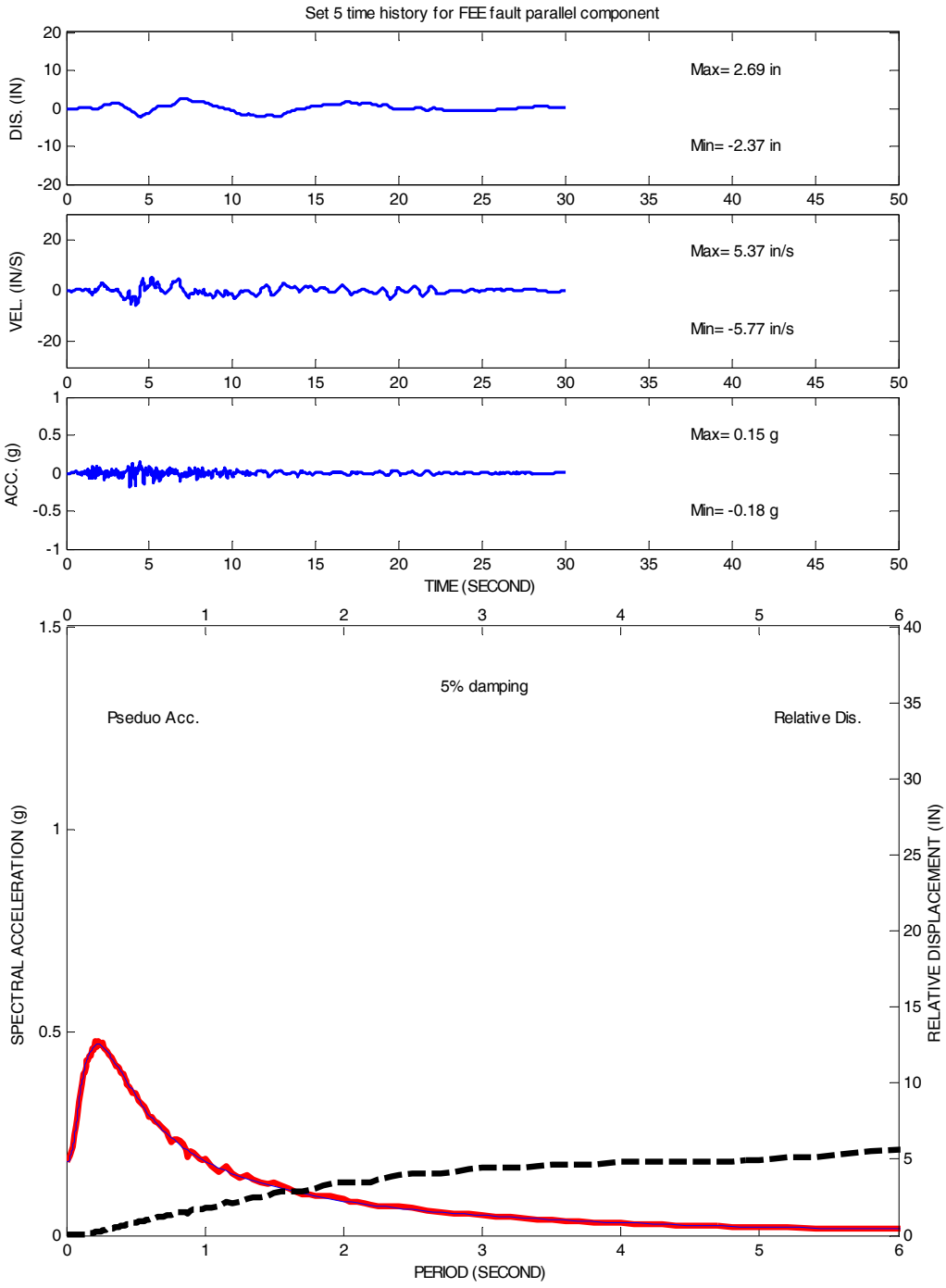

Set 3 time history for FEE vertical component
DIS. (IN)
Max= 2.22 in
Min= -2.24 in
VEL. (IN/S)
Max= 2.84 in/s
Min= -2.46 in/s
ACC. (g)
Max= 0.083 g
Min= -0.13 g
TIME (SECOND)
5% damping
Pseduo Acc.
Relative Dis.
SPECTRAL ACCELERATION (g)
RELATIVE DISPLACEMENT (IN)
PERIOD (SECOND)

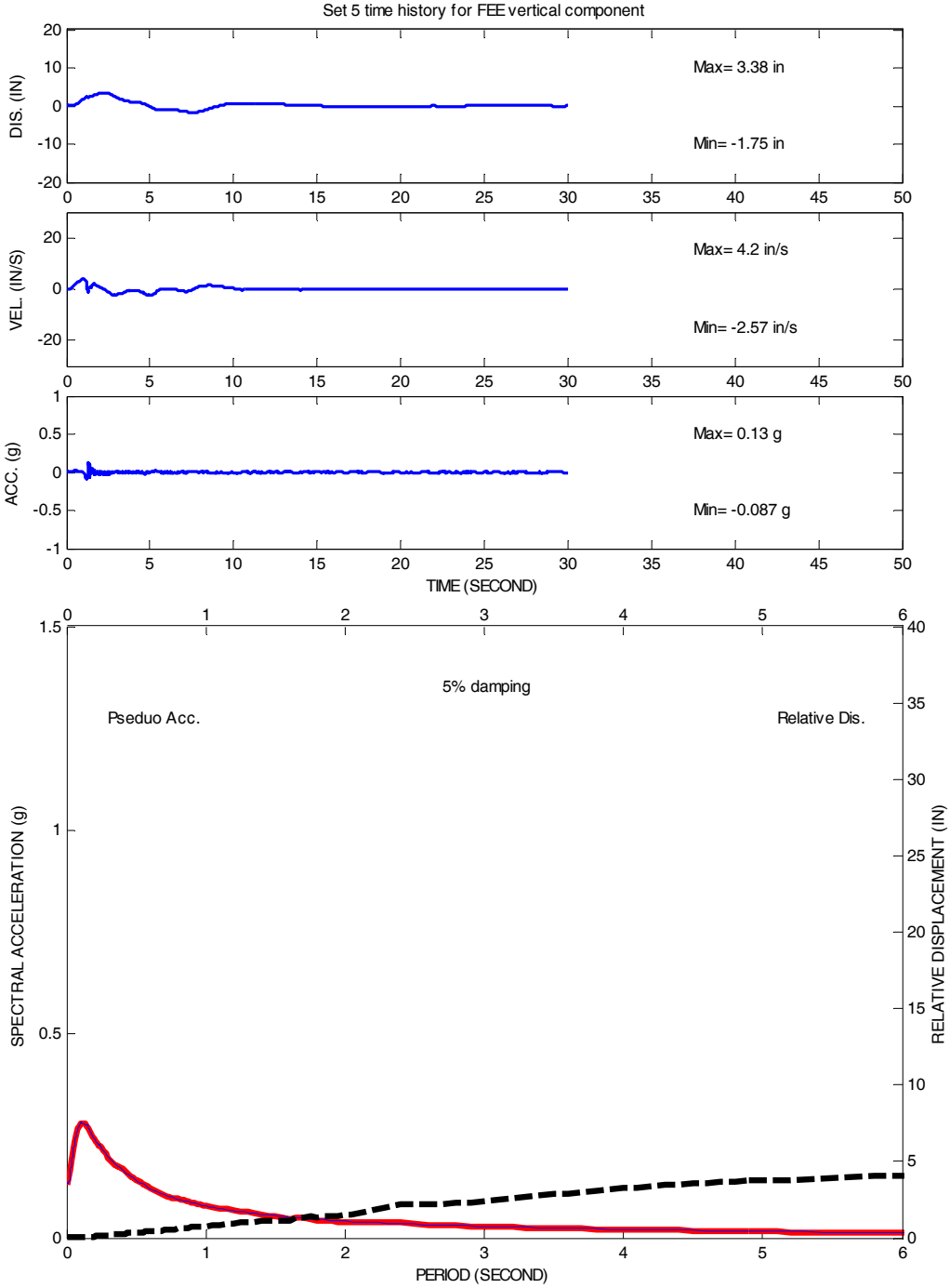

Set 4 time history for FEE fault normal component
DIS. (IN)
Max= 2.87 in
Min= -1.93 in
VEL. (IN/S)
Max= 7.34 in/s
Min= -3.95 in/s
ACC. (g)
Max= 0.18 g
Min= -0.17 g
TIME (SECOND)
5% damping
Pseduo Acc.
Relative Dis.
SPECTRAL ACCELERATION (g)
RELATIVE DISPLACEMENT (IN)
PERIOD (SECOND)

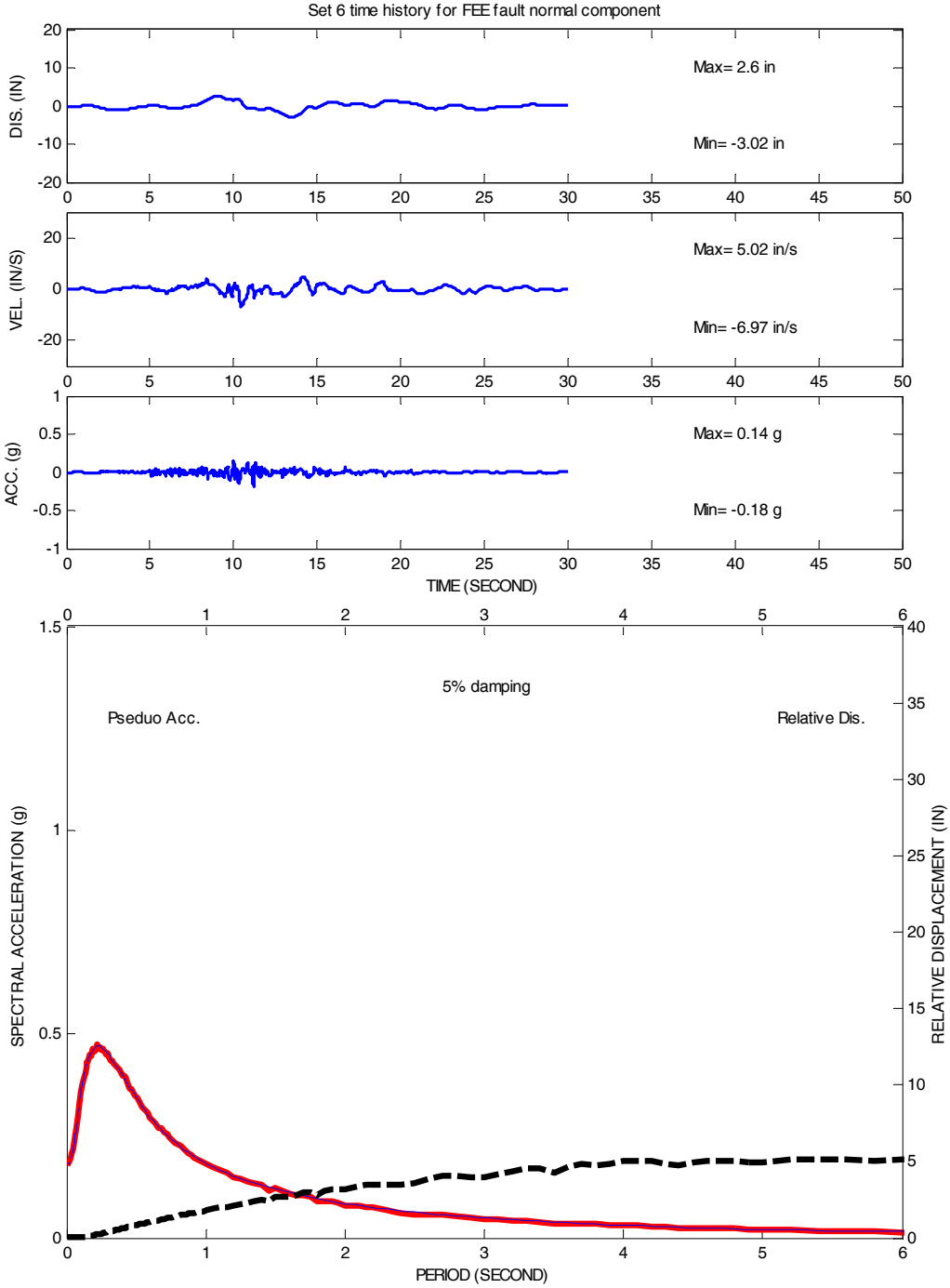

Set 4 time history for FEE fault parallel component
DIS. (IN)
Max= 2.19 in
Min= -2.39 in
VEL. (IN/S)
Max= 7.7 in/s
Min= -4.41 in/s
ACC. (g)
Max= 0.19 g
Min= -0.14 g
TIME (SECOND)
5% damping
Pseduo Acc.
Relative Dis.
SPECTRAL ACCELERATION (g)
RELATIVE DISPLACEMENT (IN)
PERIOD (SECOND)

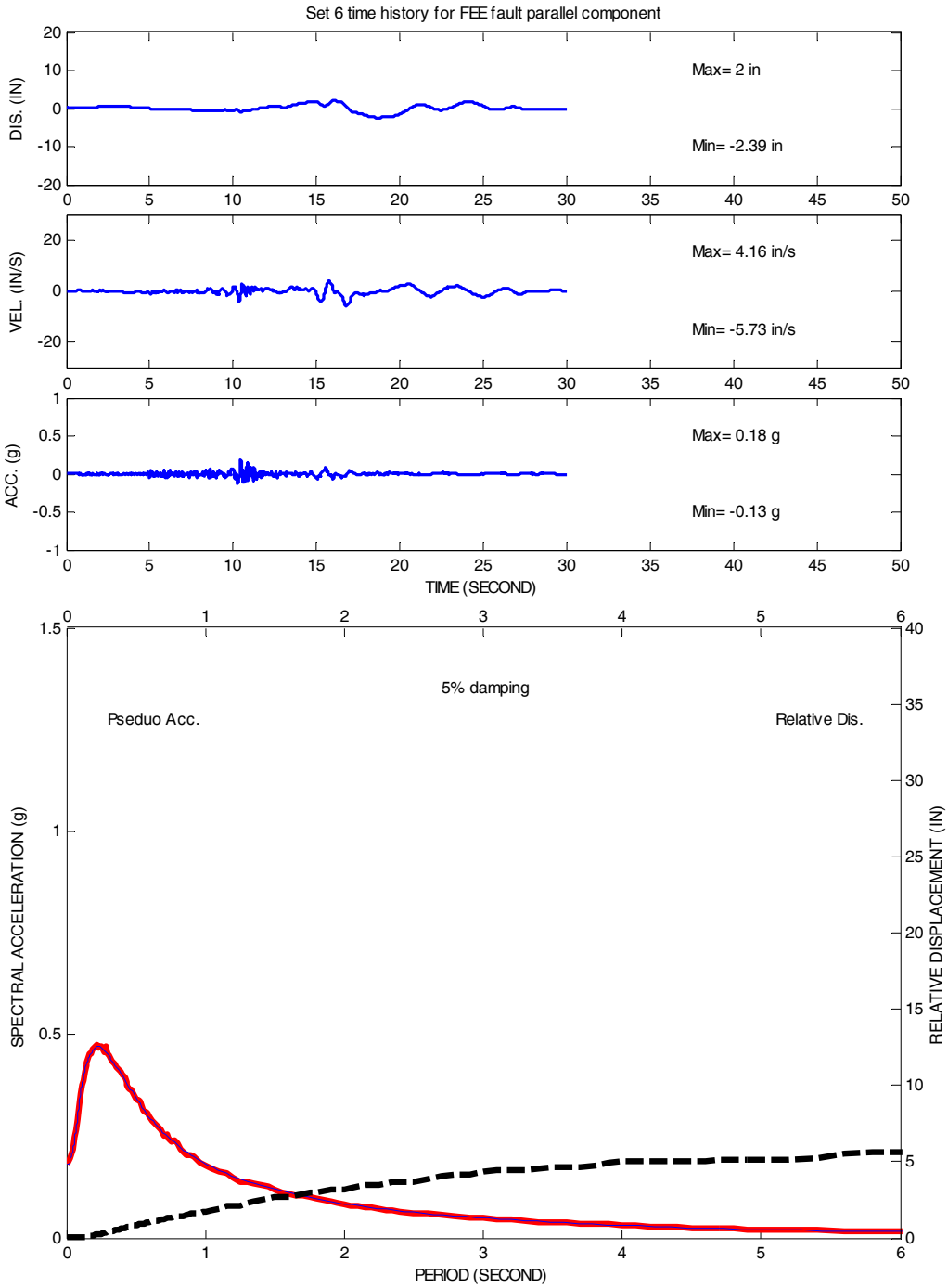

Set 4 time history for FEE vertical component
DIS. (IN)
Max= 1.51 in
Min= -1.79 in
VEL. (IN/S)
Max= 3.51 in/s
Min= -2.75 in/s
ACC. (g)
Max= 0.091 g
Min= -0.13 g
TIME (SECOND)
5% damping
Pseduo Acc.
Relative Dis.
SPECTRAL ACCELERATION (g)
RELATIVE DISPLACEMENT (IN)
PERIOD (SECOND)

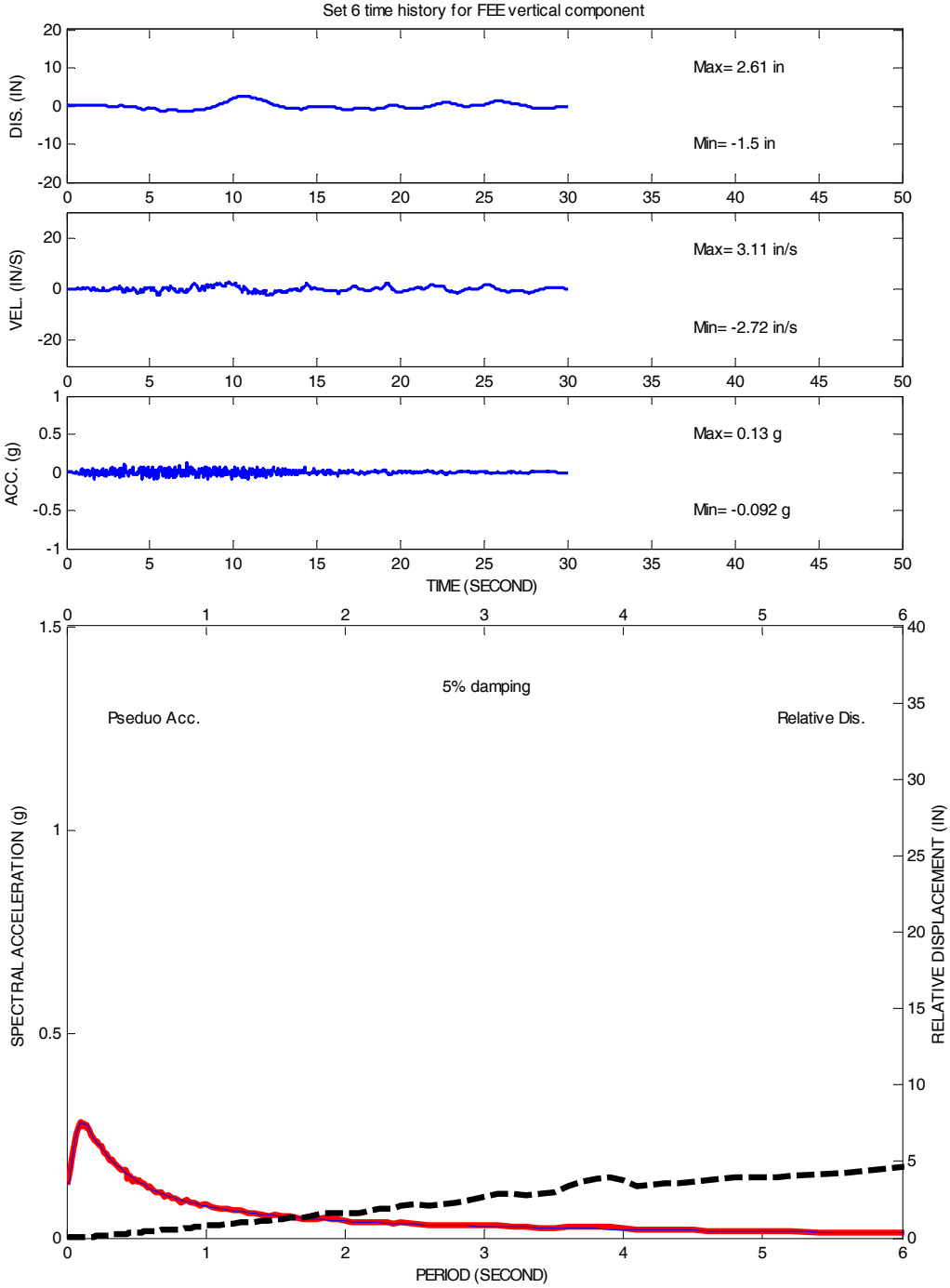

Set 5 time history for FEE fault normal component
DIS. (IN)
Max= 1.73 in
Min= -2.42 in
VEL. (IN/S)
Max= 7.23 in/s
Min= -3.61 in/s
ACC. (g)
Max= 0.17 g
Min= -0.18 g
TIME (SECOND)
5% damping
Pseduo Acc.
Relative Dis.
SPECTRAL ACCELERATION (g)
RELATIVE DISPLACEMENT (IN)
PERIOD (SECOND)

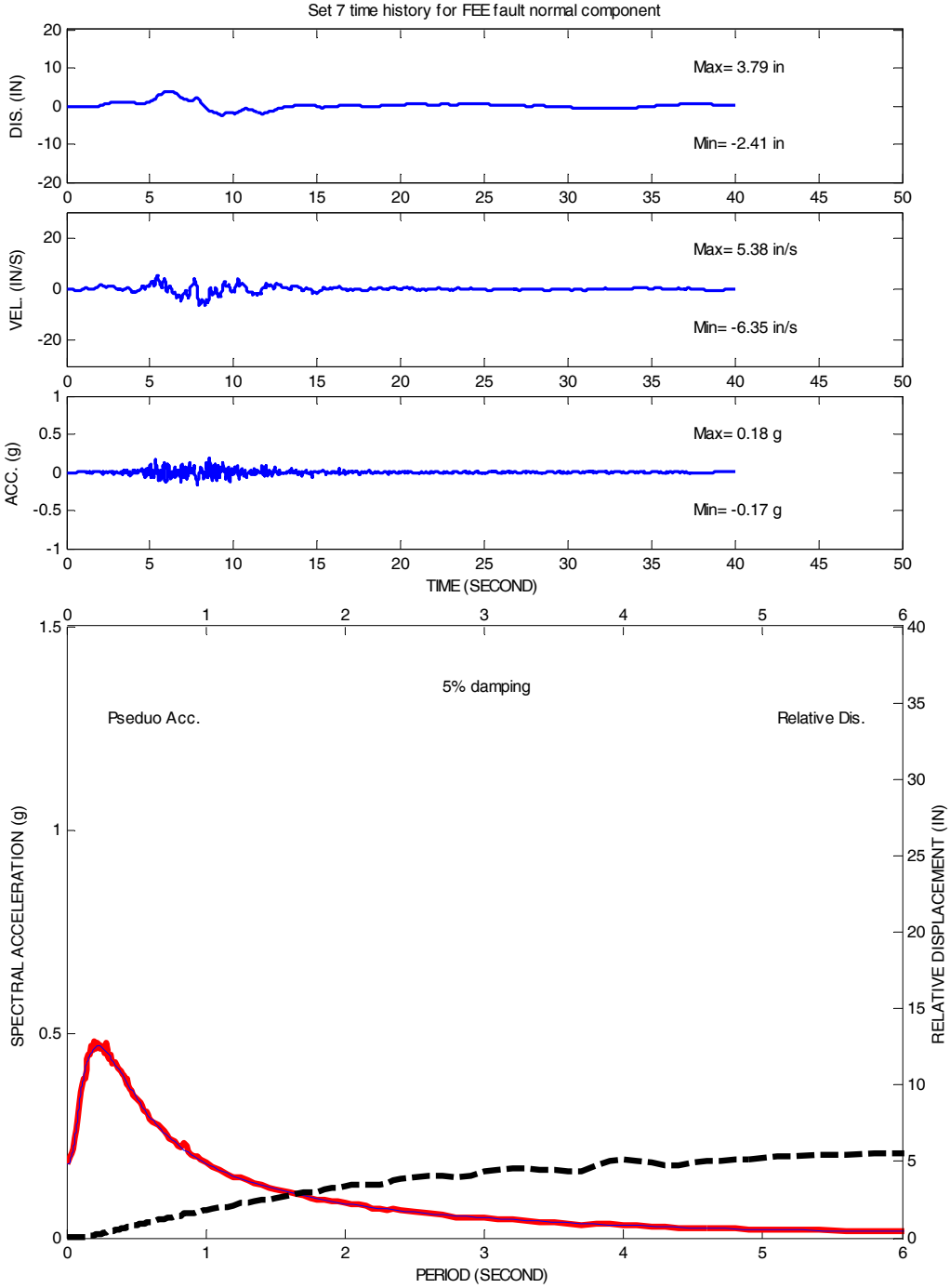

Set 5 time history for FEE fault parallel component
DIS. (IN)
Max= 2.69 in
Min= -2.37 in
VEL. (IN/S)
Max= 5.37 in/s
Min= -5.77 in/s
ACC. (g)
Max= 0.15 g
Min= -0.18 g
TIME (SECOND)
5% damping
Pseduo Acc.
Relative Dis.
SPECTRAL ACCELERATION (g)
RELATIVE DISPLACEMENT (IN)
PERIOD (SECOND)

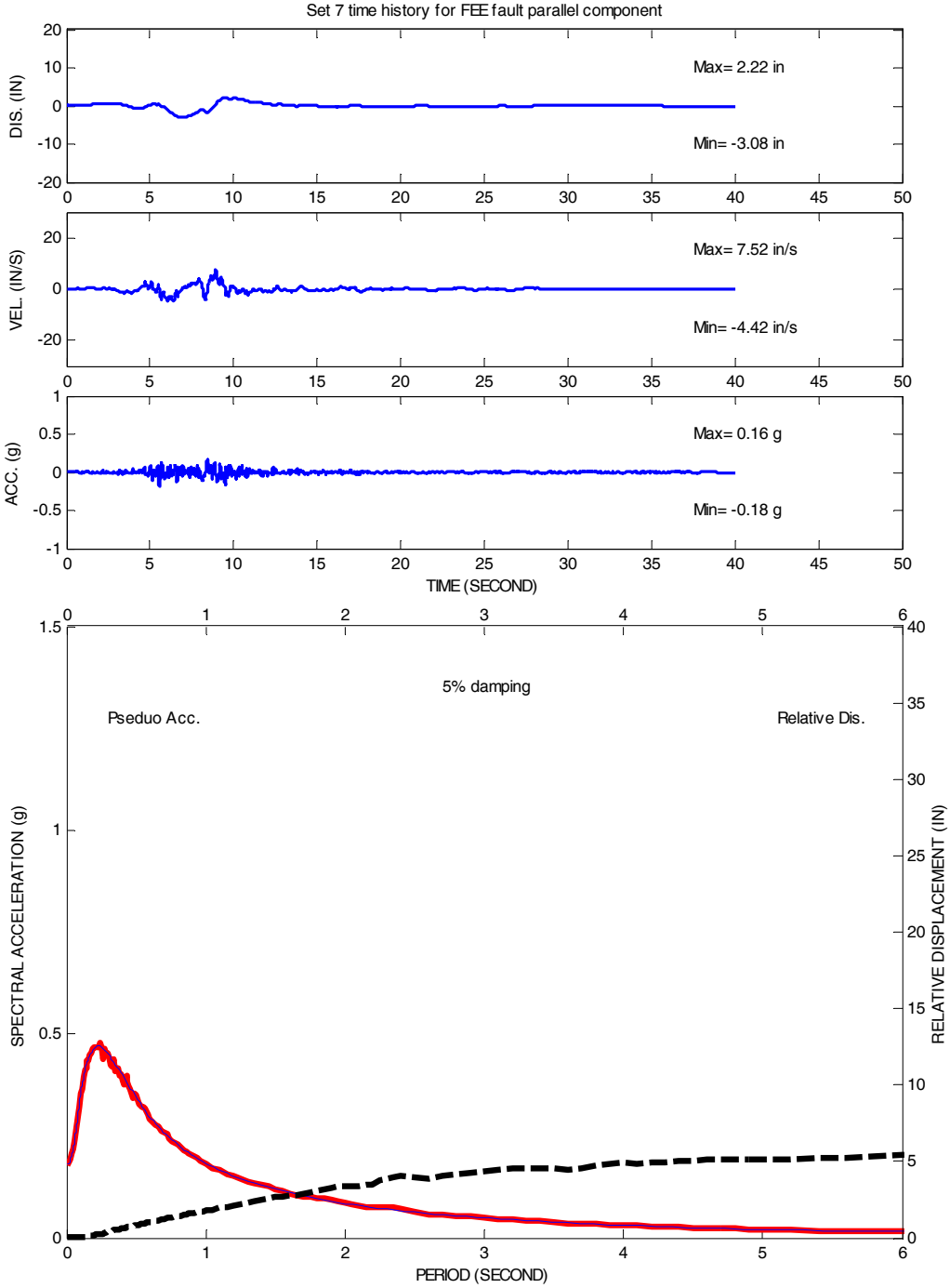

Set 5 time history for FEE vertical component
DIS. (IN)
Max= 3.38 in
Min= -1.75 in
VEL. (IN/S)
Max= 4.2 in/s
Min= -2.57 in/s
ACC. (g)
Max= 0.13 g
Min= -0.087 g
TIME (SECOND)
5% damping
Pseduo Acc.
Relative Dis.
SPECTRAL ACCELERATION (g)
RELATIVE DISPLACEMENT (IN)
PERIOD (SECOND)

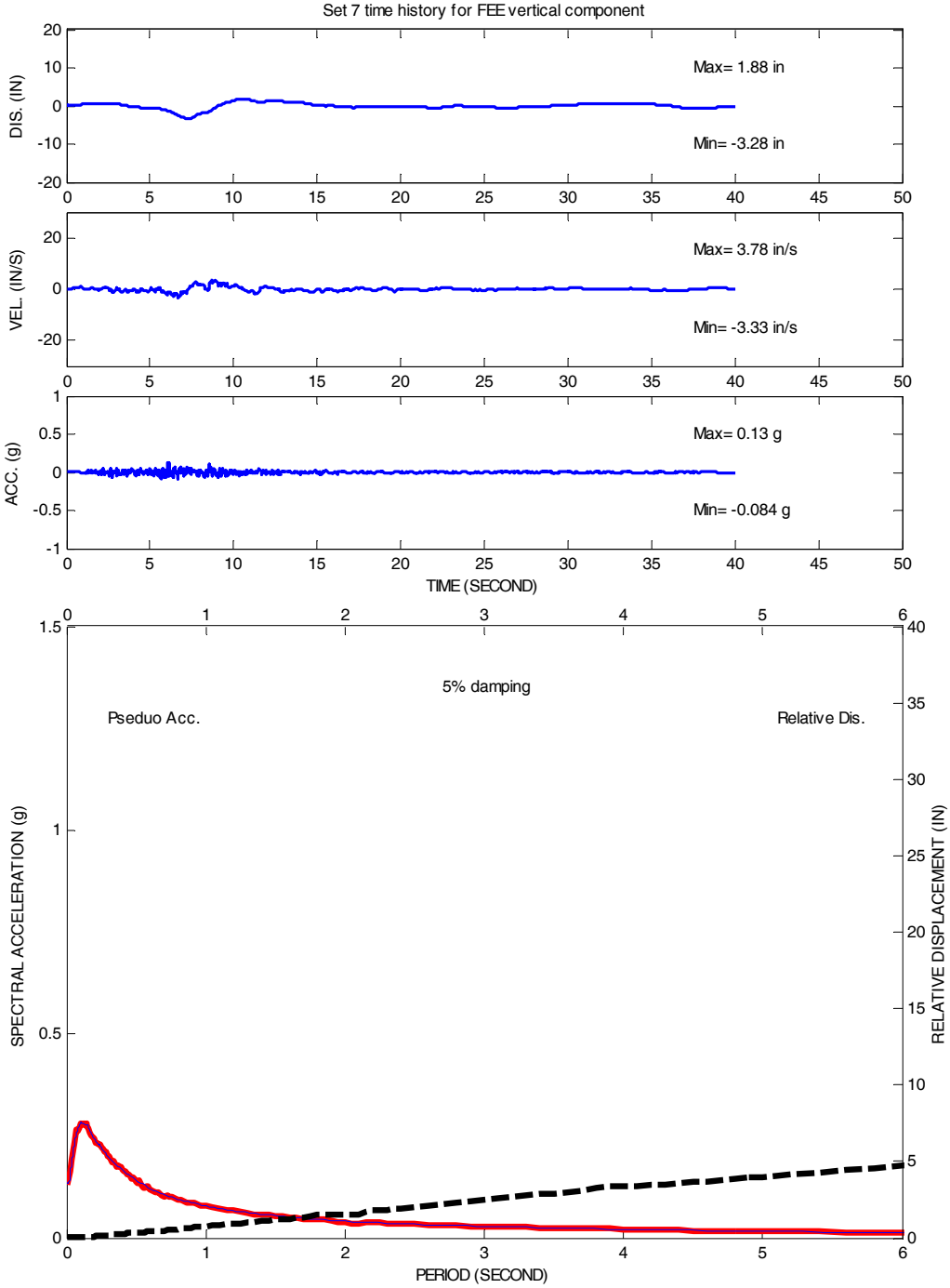

Set 6 time history for FEE fault normal component
DIS. (IN)
Max= 2.6 in
Min= -3.02 in
VEL. (IN/S)
Max= 5.02 in/s
Min= -6.97 in/s
ACC. (g)
Max= 0.14 g
Min= -0.18 g
TIME (SECOND)
5% damping
Pseduo Acc.
Relative Dis.
SPECTRAL ACCELERATION (g)
RELATIVE DISPLACEMENT (IN)
PERIOD (SECOND)


Set 6 time history for FEE fault parallel component
DIS. (IN)
Max= 2 in
Min= -2.39 in
VEL. (IN/S)
Max= 4.16 in/s
Min= -5.73 in/s
ACC. (g)
Max= 0.18 g
Min= -0.13 g
TIME (SECOND)
5% damping
Pseduo Acc.
Relative Dis.
SPECTRAL ACCELERATION (g)
RELATIVE DISPLACEMENT (IN)
PERIOD (SECOND)


Set 6 time history for FEE vertical component
DIS. (IN)
Max= 2.61 in
Min= -1.5 in
VEL. (IN/S)
Max= 3.11 in/s
Min= -2.72 in/s
ACC. (g)
Max= 0.13 g
Min= -0.092 g
TIME (SECOND)
5% damping
Pseduo Acc.
Relative Dis.
SPECTRAL ACCELERATION (g)
RELATIVE DISPLACEMENT (IN)
PERIOD (SECOND)

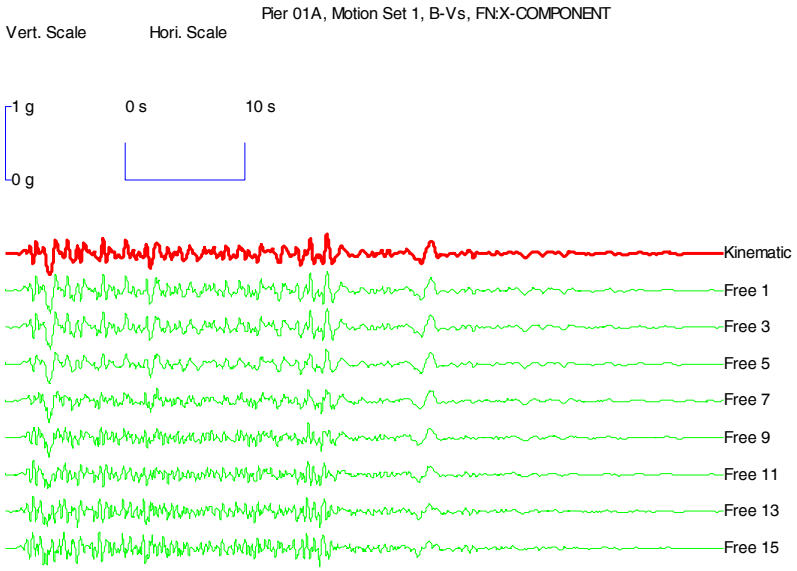

Set 7 time history for FEE fault normal component
DIS. (IN)
Max= 3.79 in
Min= -2.41 in
VEL. (IN/S)
Max= 5.38 in/s
Min= -6.35 in/s
ACC. (g)
Max= 0.18 g
Min= -0.17 g
TIME (SECOND)
5% damping
Pseduo Acc.
Relative Dis.
SPECTRAL ACCELERATION (g)
RELATIVE DISPLACEMENT (IN)
PERIOD (SECOND)

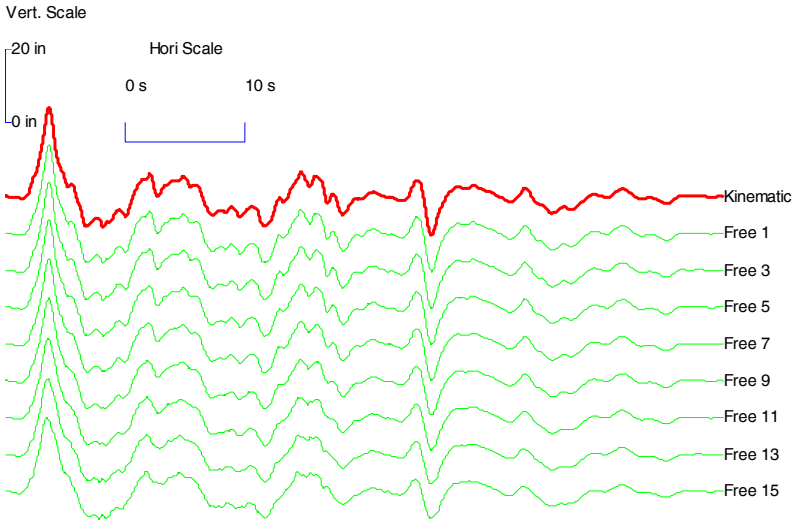

Set 7 time history for FEE fault parallel component
DIS. (IN)
Max= 2.22 in
Min= -3.08 in
VEL. (IN/S)
Max= 7.52 in/s
Min= -4.42 in/s
ACC. (g)
Max= 0.16 g
Min= -0.18 g
TIME (SECOND)
5% damping
Pseduo Acc.
Relative Dis.
SPECTRAL ACCELERATION (g)
RELATIVE DISPLACEMENT (IN)
PERIOD (SECOND)

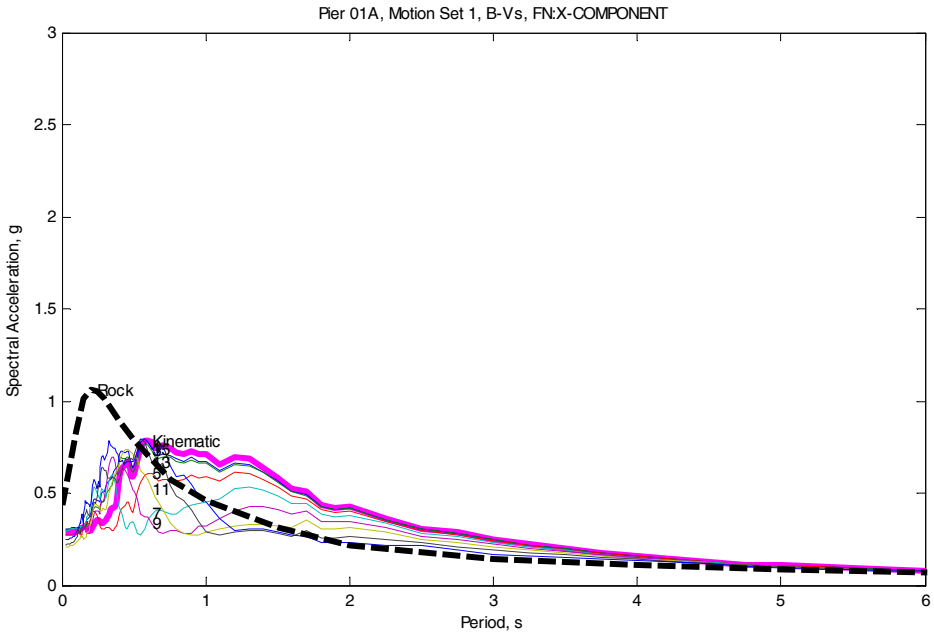

Set 7 time history for FEE vertical component
DIS. (IN)
Max= 1.88 in
Min= -3.28 in
VEL. (IN/S)
Max= 3.78 in/s
Min= -3.33 in/s
ACC. (g)
Max= 0.13 g
Min= -0.084 g
TIME (SECOND)
5% damping
Pseduo Acc.
Relative Dis.
SPECTRAL ACCELERATION (g)
RELATIVE DISPLACEMENT (IN)
PERIOD (SECOND)

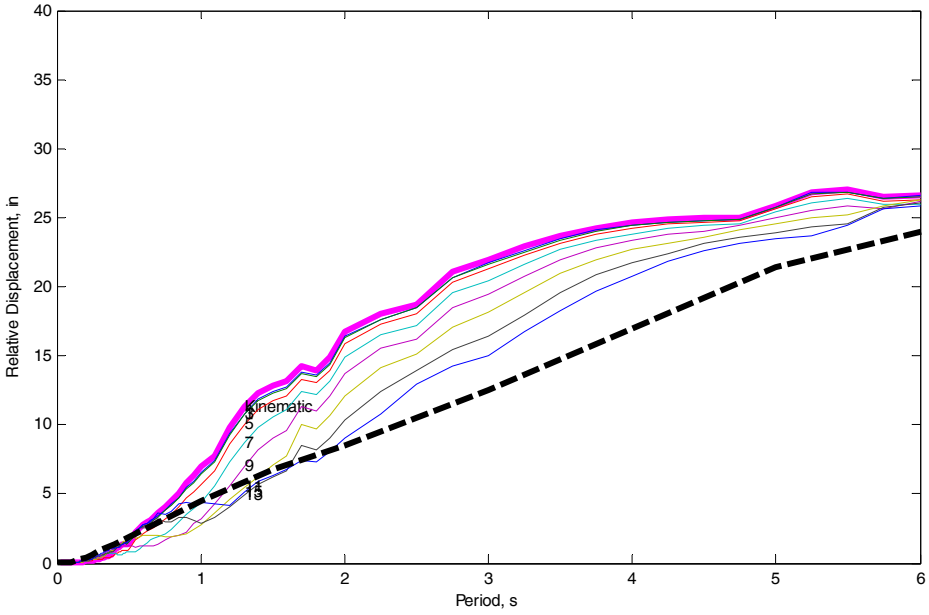
6C APPENDIX C: PIER-SPECIFIC KINEMATIC MOTIONS FOR SEE MOTION SET1-FN

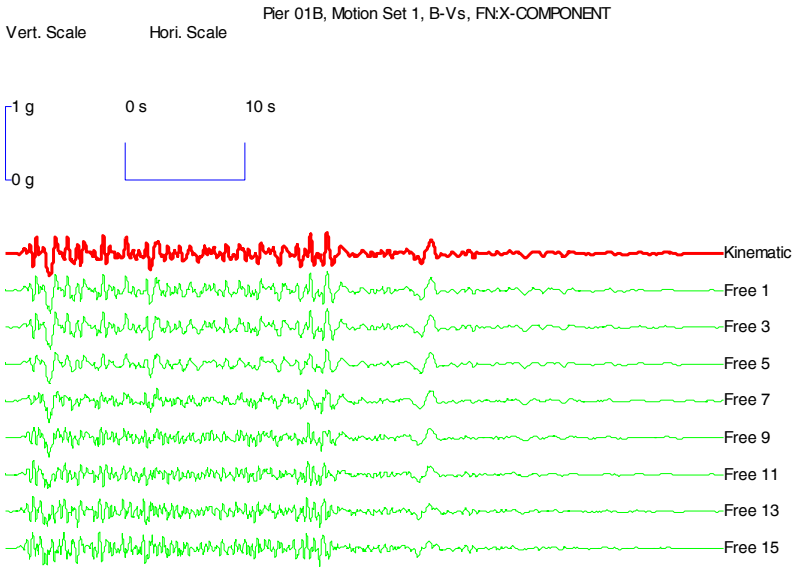
Note: In the following are included the time-history and spectral plots of depth-varying free-field motions and kinematic motions of 44 Dumbarton piers for the fault normal component (FN) of Motion Set 1 only. Complete set of pier-specific kinematic motions for the fault normal and parallel components of the SEE scenario are provided in a separate electronic file to the designers..

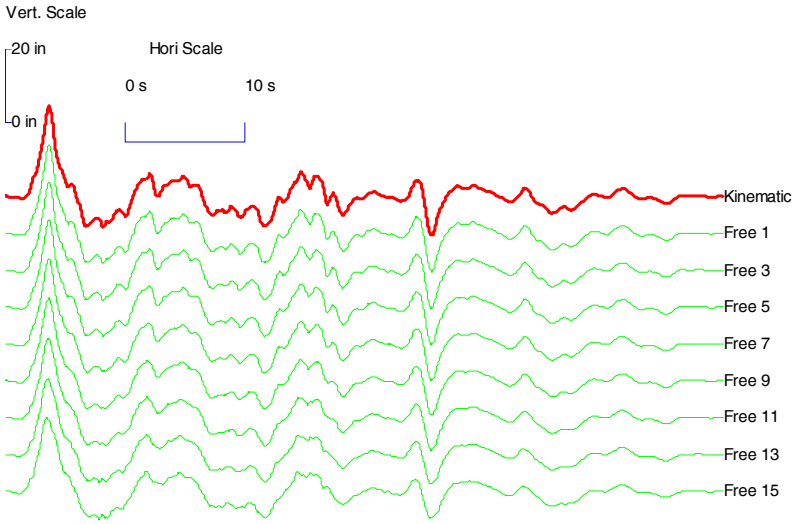

Pier 01A, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15

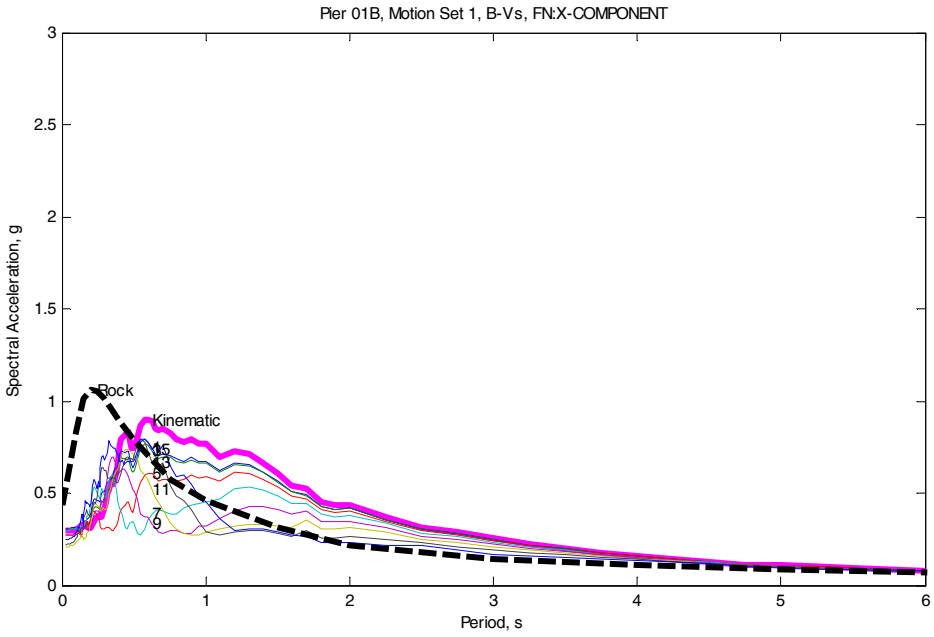

Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15

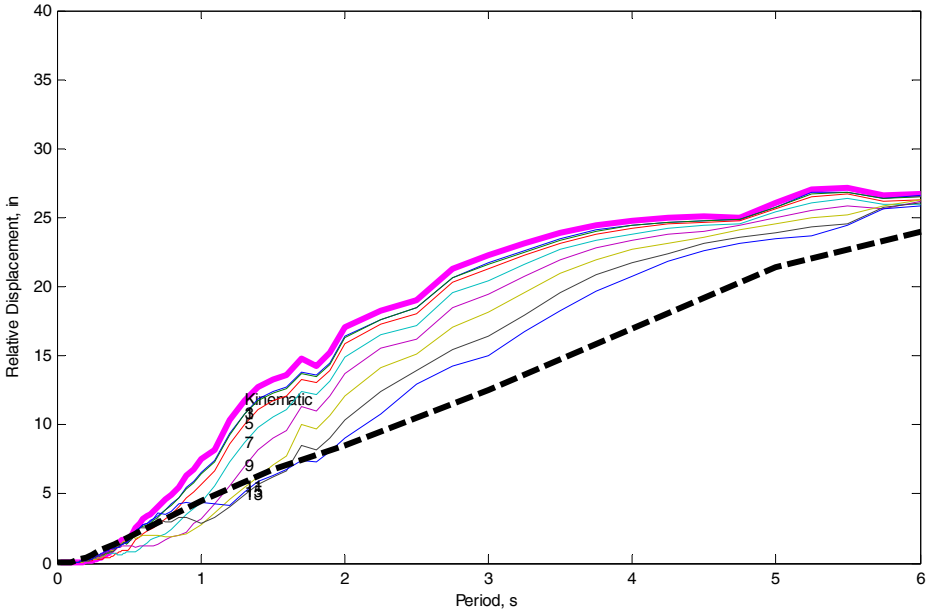

Pier 01A, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Rock
Kinematic
3
5
11
7
9

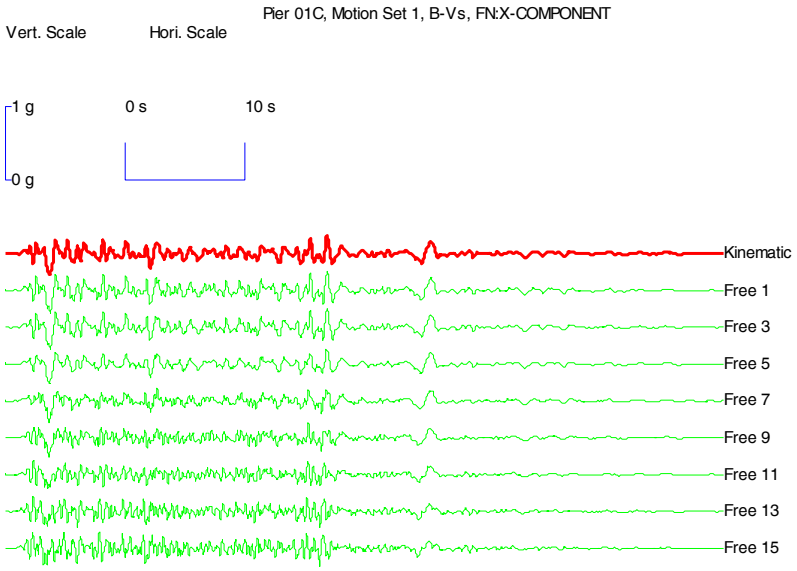

Relative Displacement, in
Period, s
Kinematic
3
5
7
9
11
13

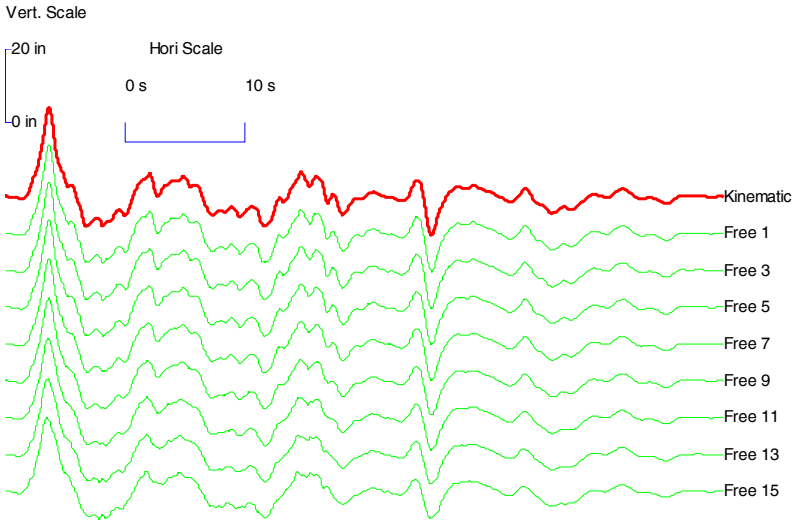

Pier 01B, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15

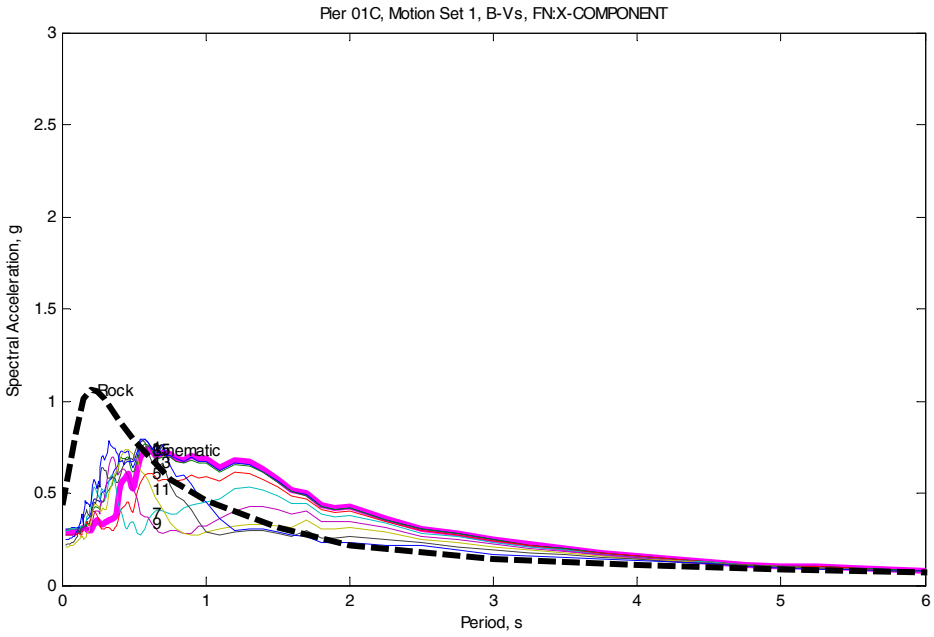

Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15


Pier 01B, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Rock
Kinematic
15
13
5
11
7
9


Relative Displacement, in
Period, s
Kinematic
3
5
7
9
11
13


Pier 01C, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15


Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15


Pier 01C, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Rock
Kinematic
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1.5
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3
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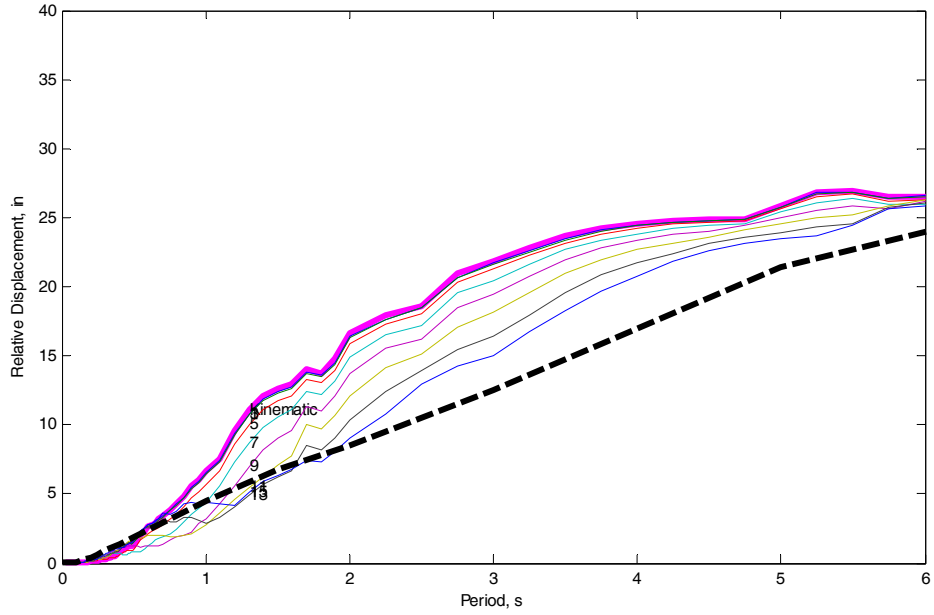
Relative Displacement, in
Period, s
Kinematic
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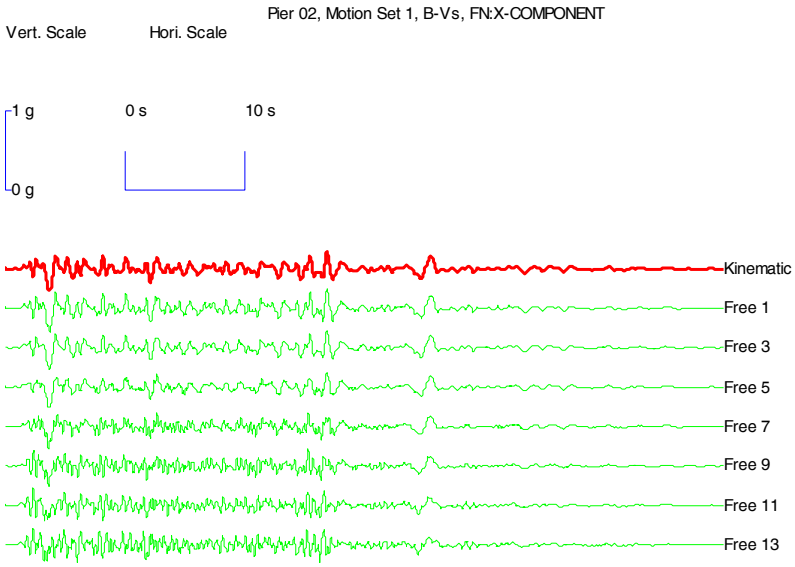
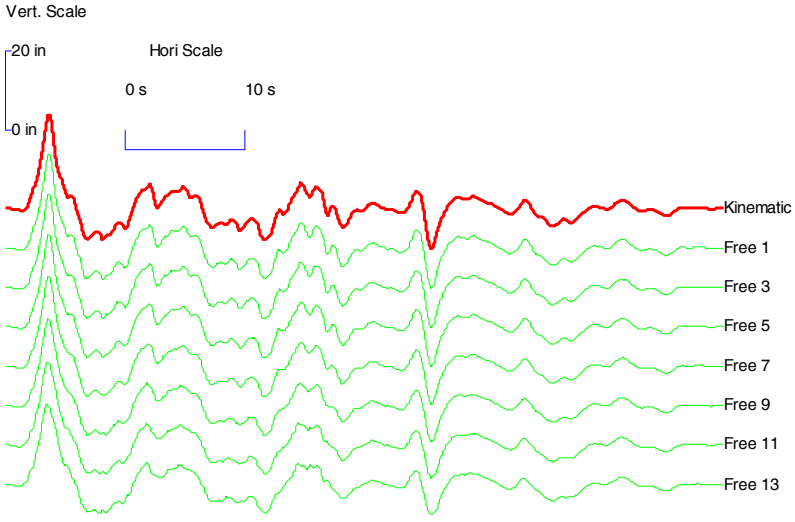
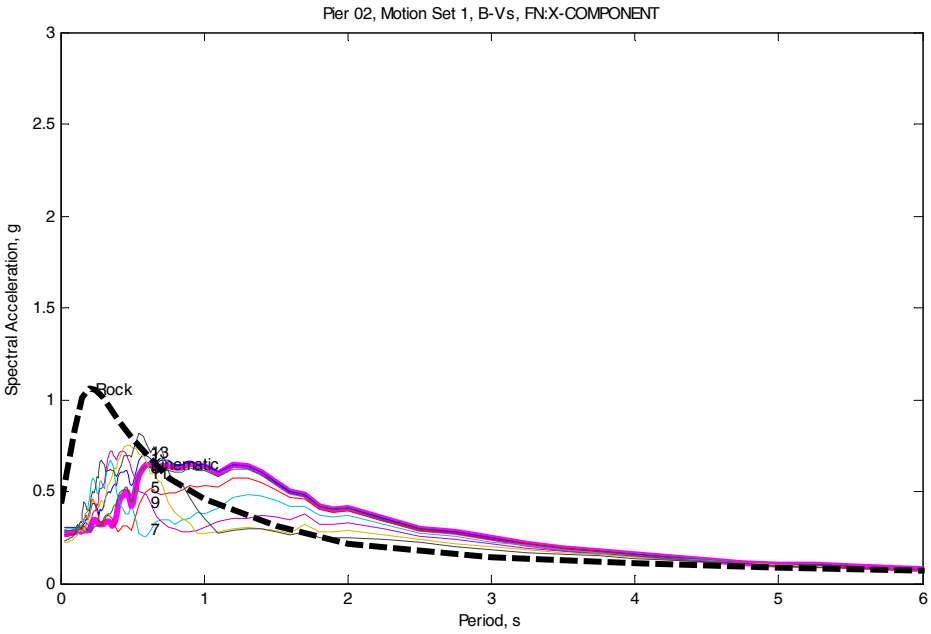

Pier 02, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13


Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13


Pier 02, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Rock
13
Kinematic
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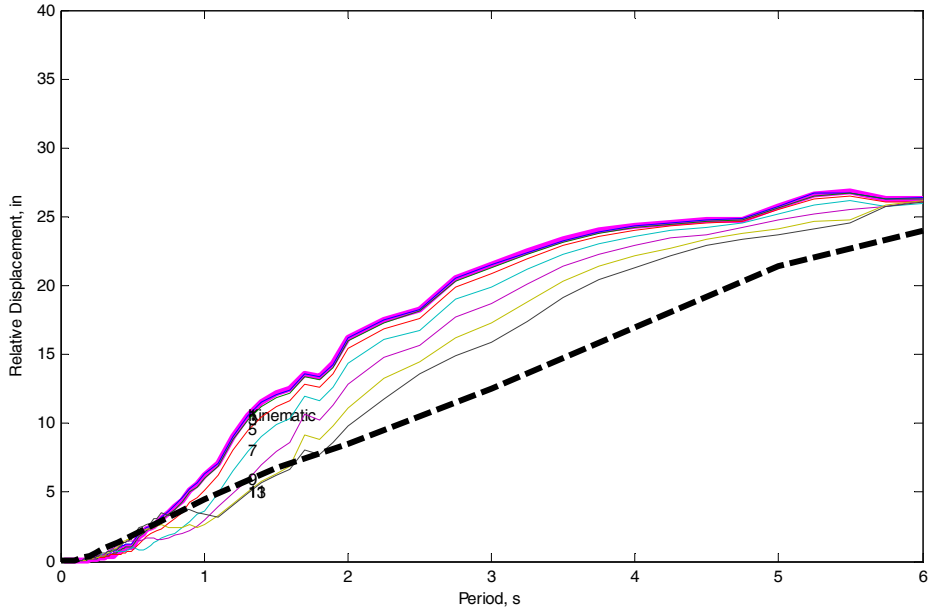
Relative Displacement, in
Period, s
Kinematic
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7
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5
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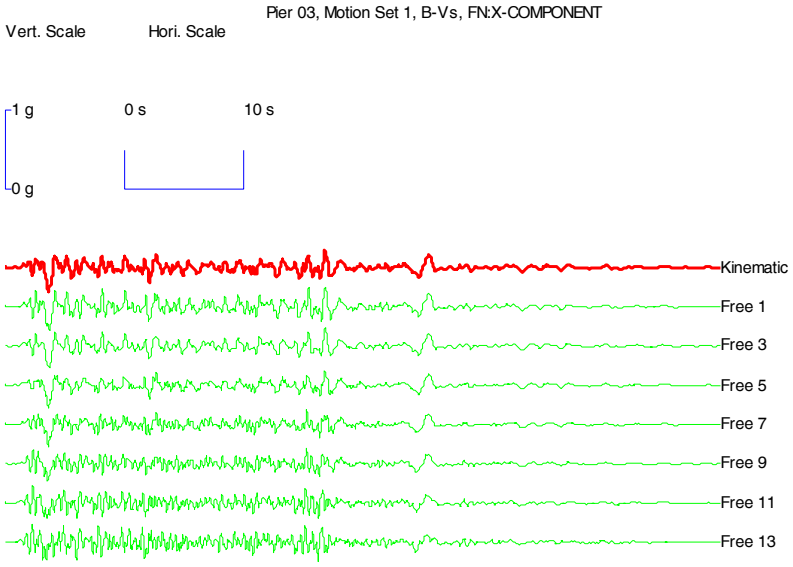
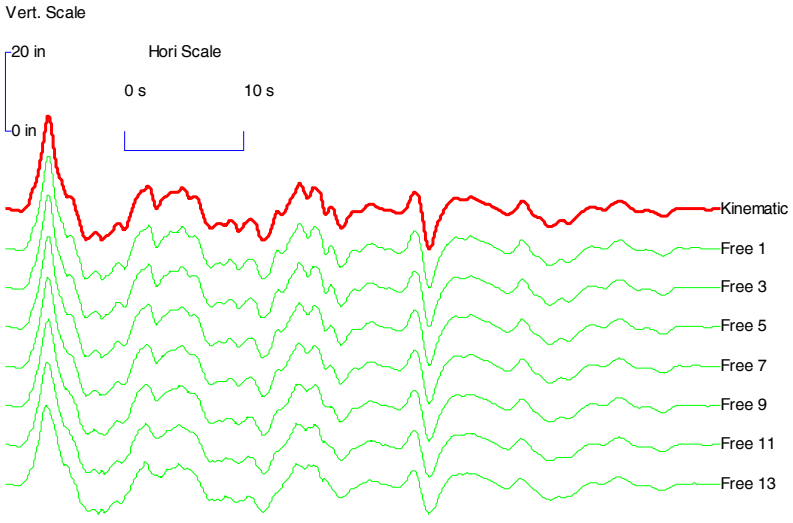
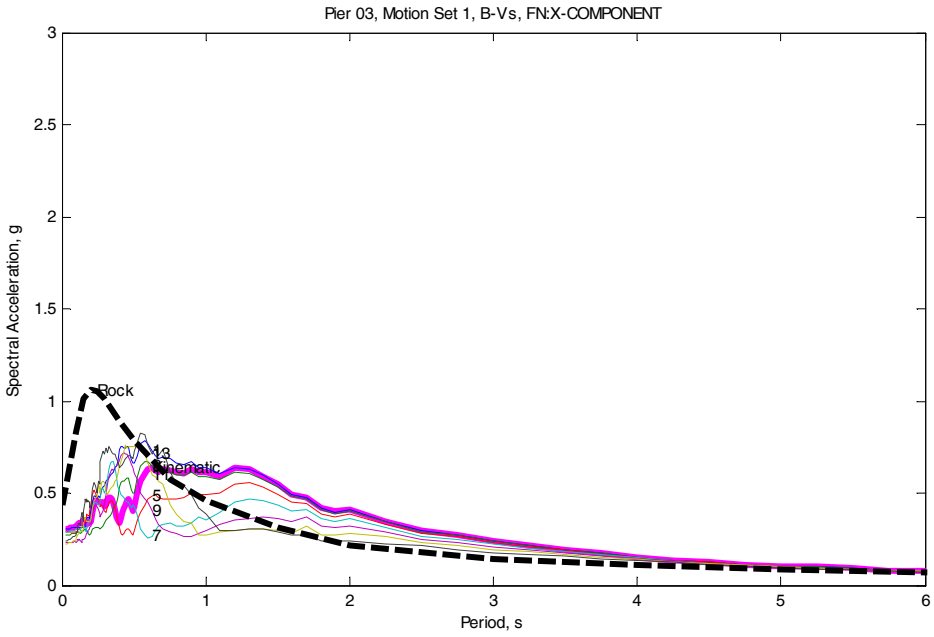

Pier 03, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13


Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13


Pier 03, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Rock
13
Kinematic
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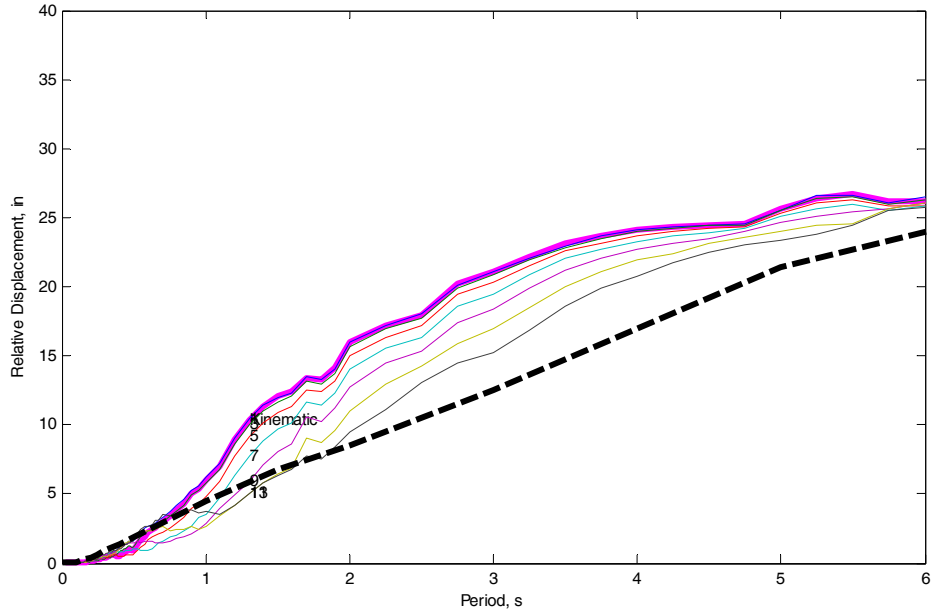
Relative Displacement, in
Period, s
Kinematic
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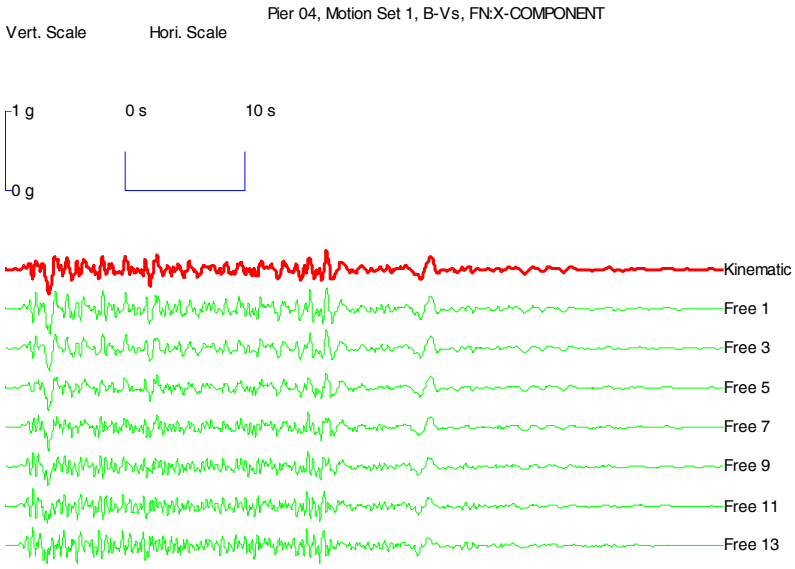
Pier 04, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
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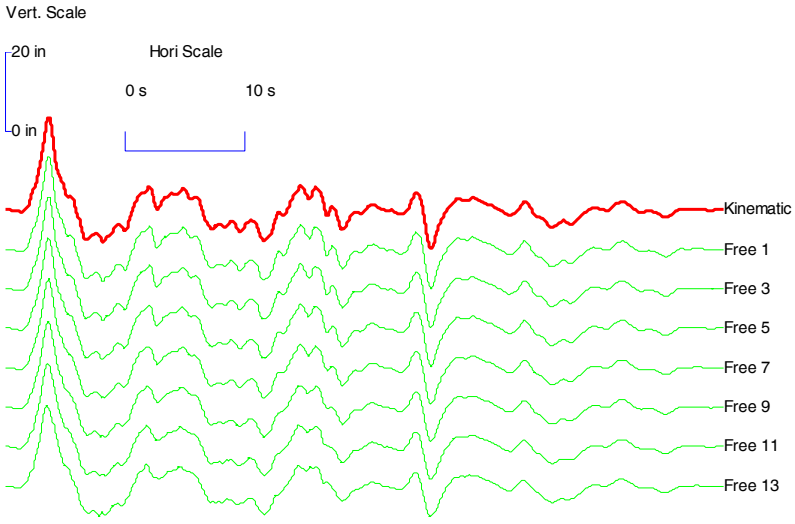
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13


Vert. Scale
Hori Scale
20 in
0 in
0 s
10 s
Kinematic
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Free 3
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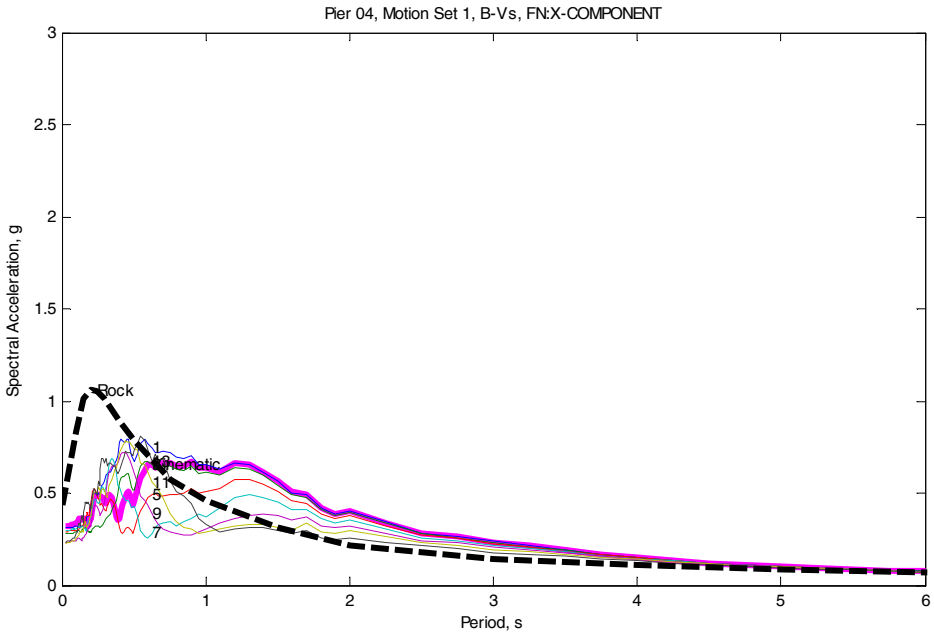
Free 13


Pier 04, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Rock
Kinematic
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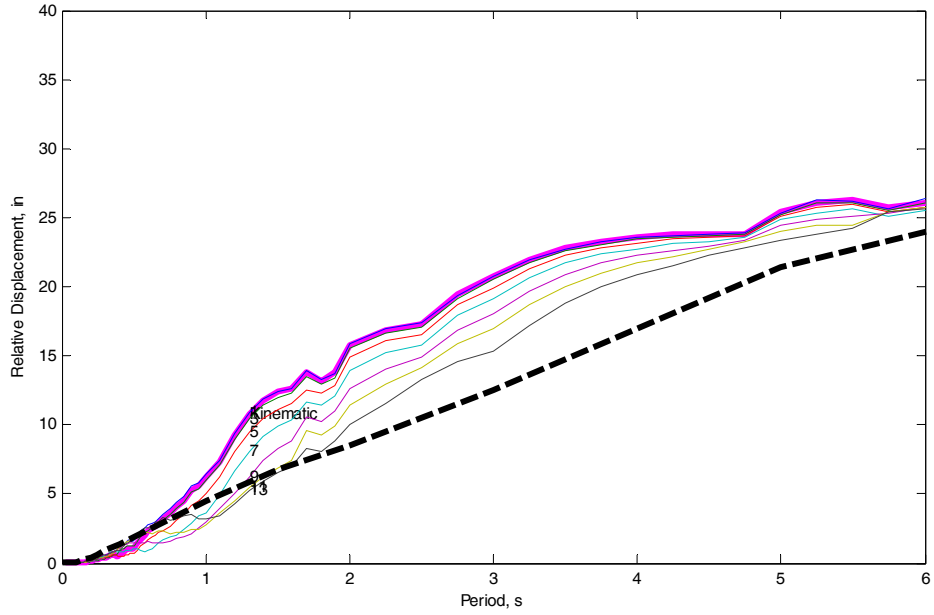
Relative Displacement, in
Period, s
Kinematic
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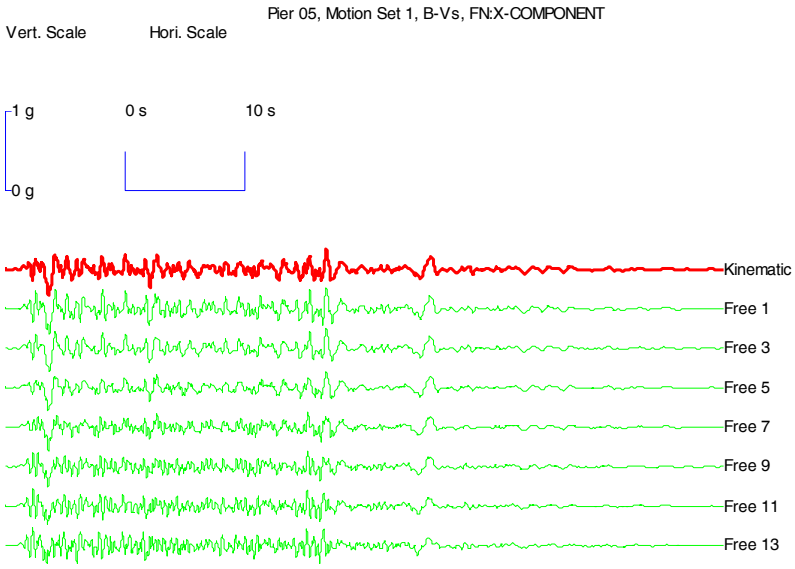
Pier 05, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
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Free 3
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Free 7
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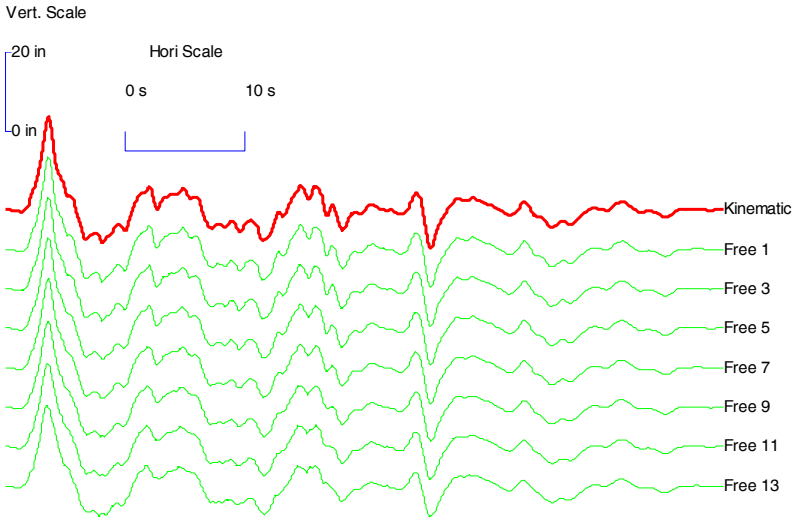
Free 11
Free 13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Hori Scale
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Kinematic
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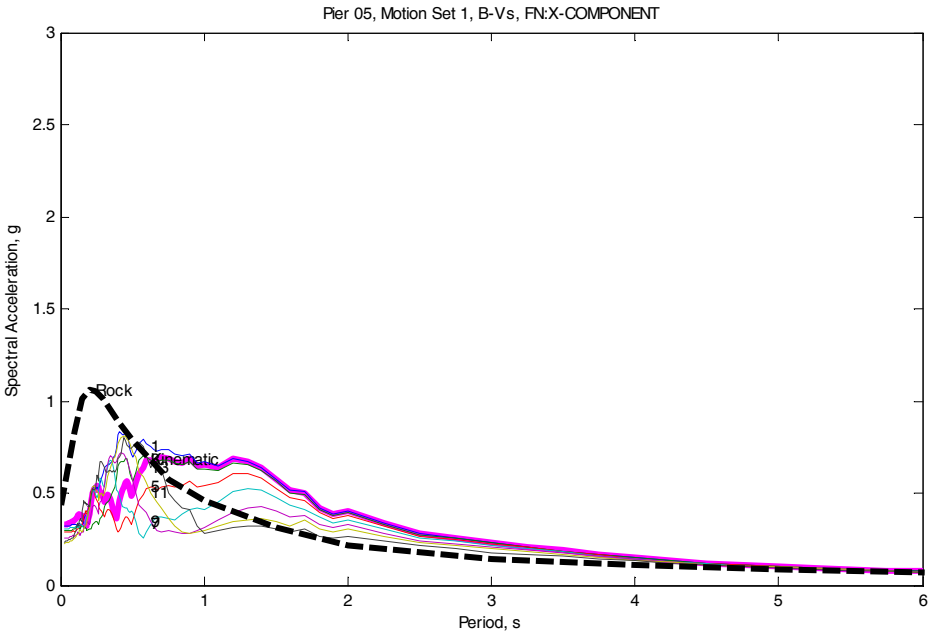
Pier 05, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Rock
Kinematic
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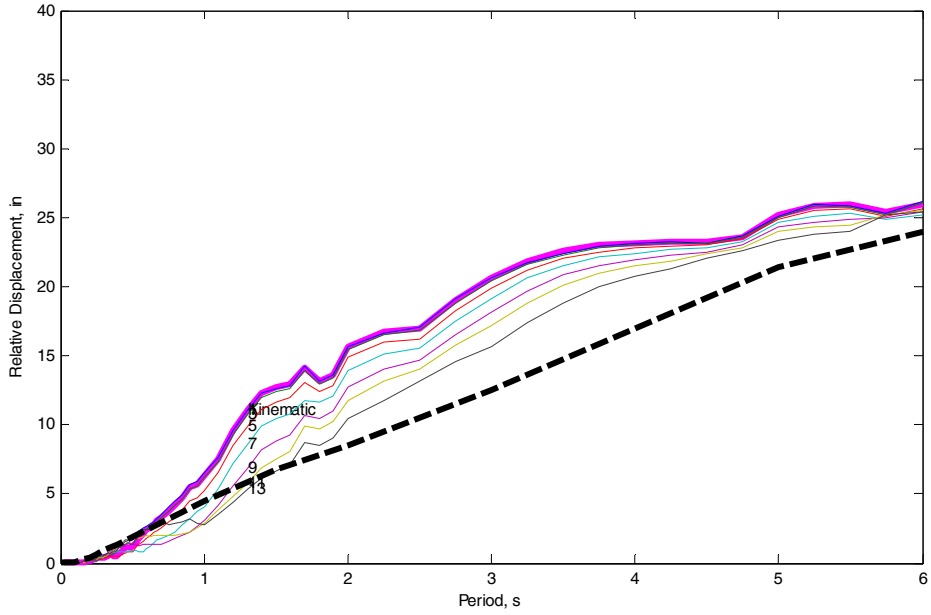
Relative Displacement, in
Period, s
Kinematic
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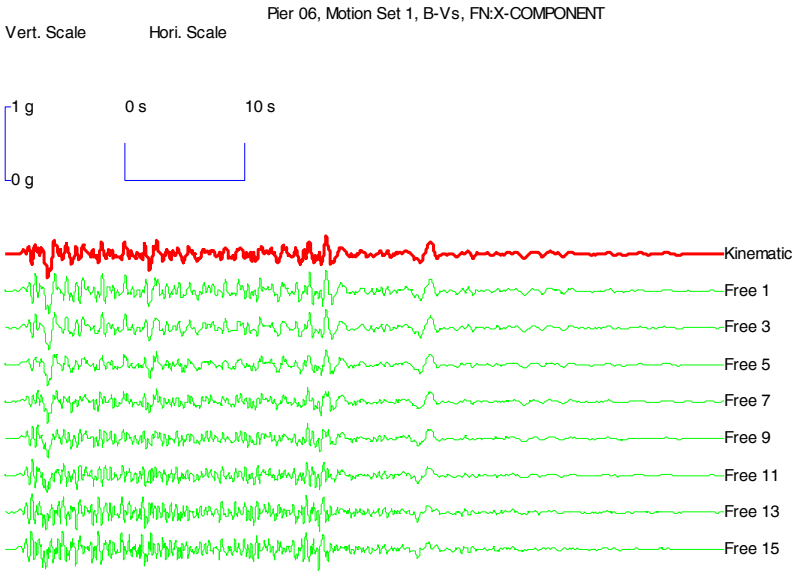
Pier 06, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
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Free 5
Free 7
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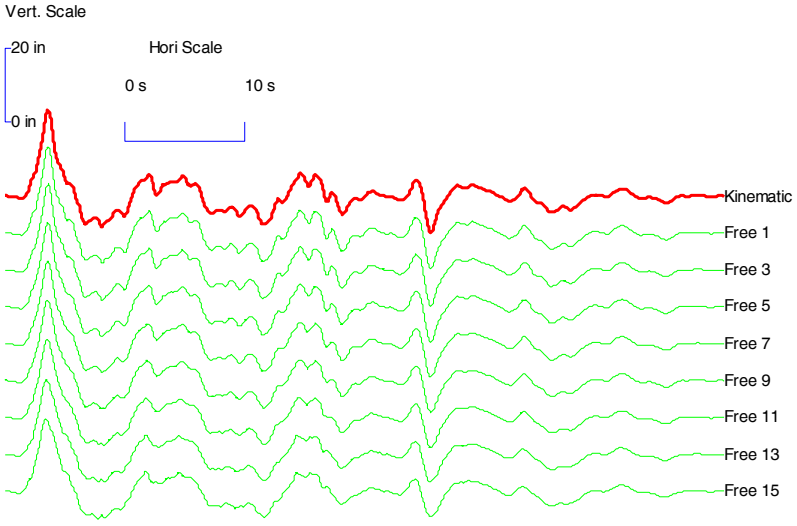
Free 11
Free 13
Free 15


Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
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Free 5
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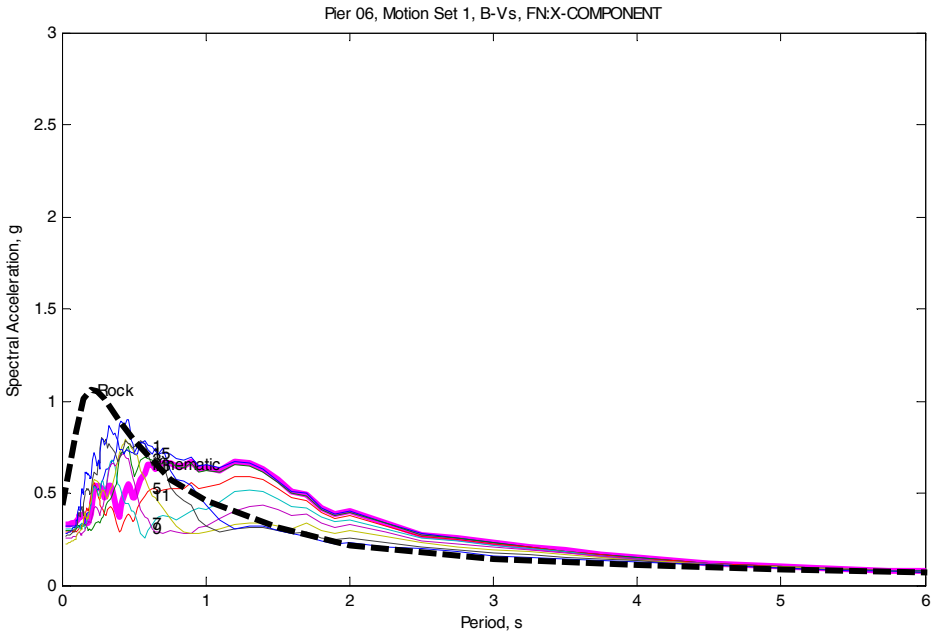
Free 15


Pier 06, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Rock
Kinematic
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3
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1.5
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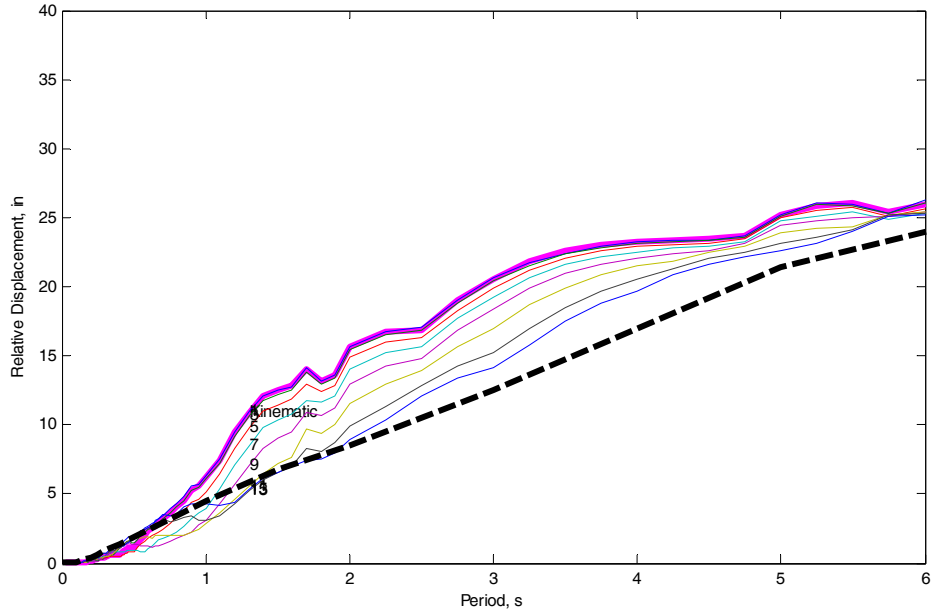
Relative Displacement, in
Period, s
Kinematic
1
3
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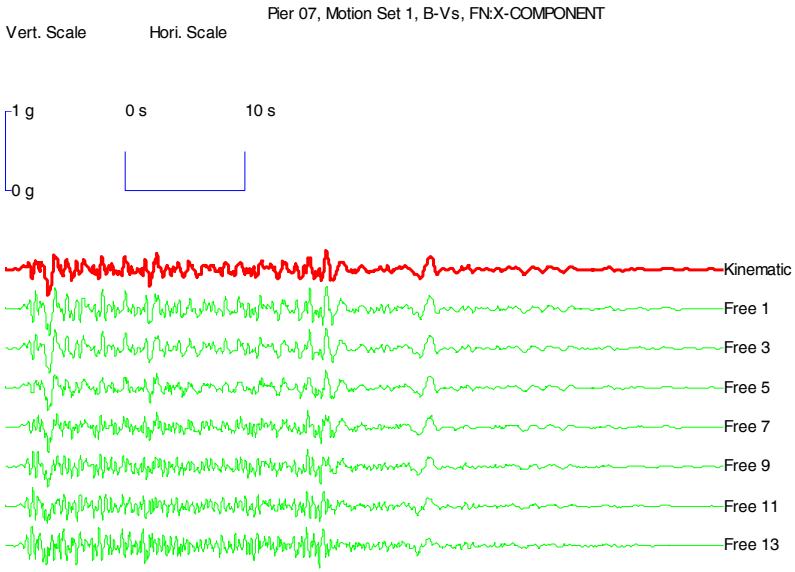
Pier 07, Motion Set 1, B-Vs, FN:X-COMPONENT
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Hori. Scale
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0 g
0 s
10 s
Kinematic
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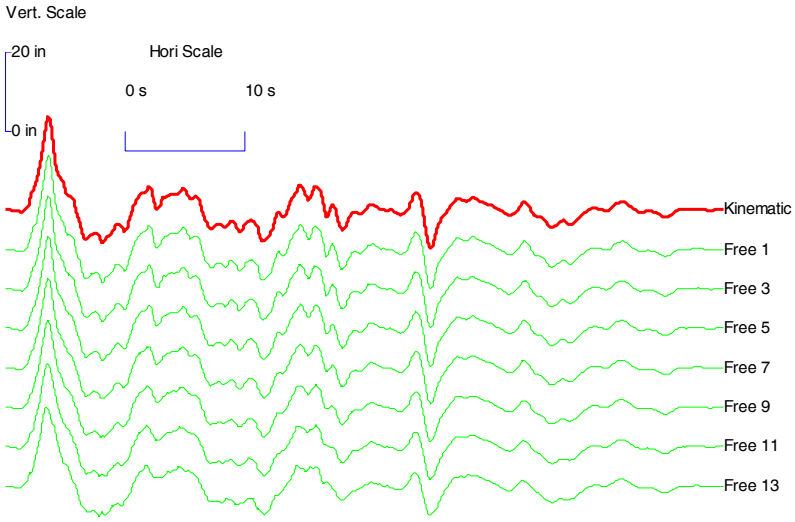
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13


Vert. Scale
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0 in
Hori Scale
0 s
10 s
Kinematic
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Free 3
Free 5
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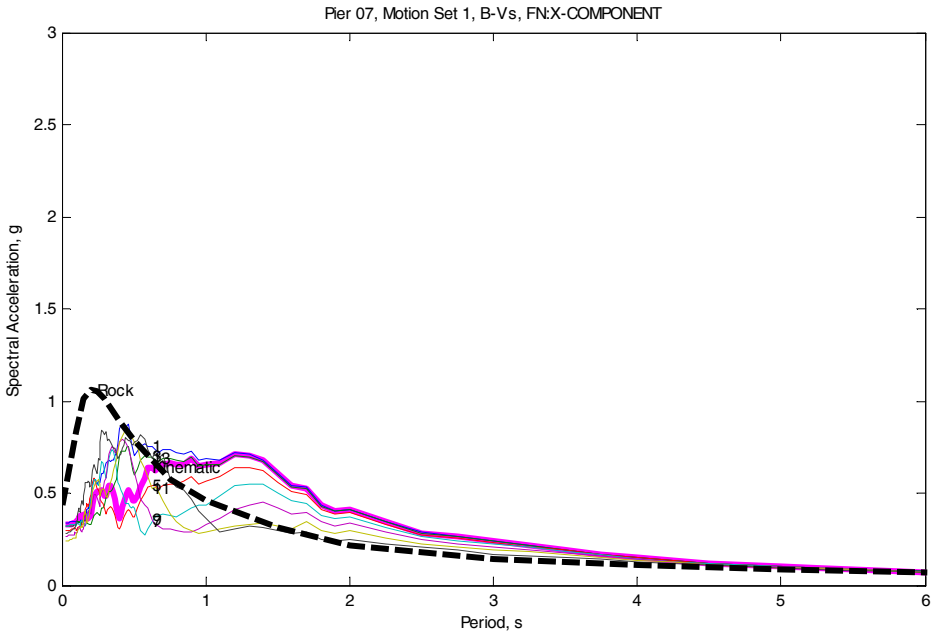
Free 11
Free 13


Pier 07, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Rock
Kinematic
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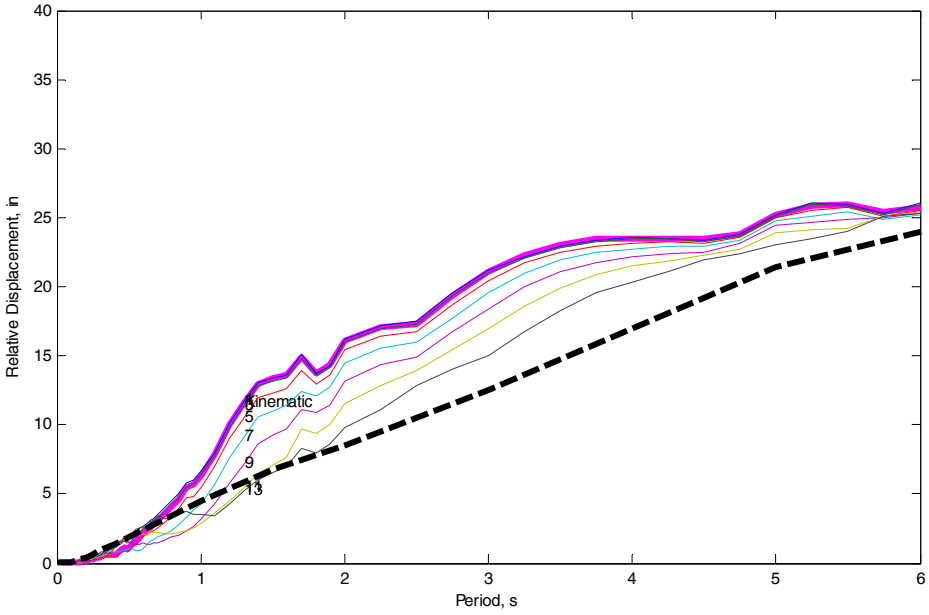
Relative Displacement, in
Period, s
Kinematic
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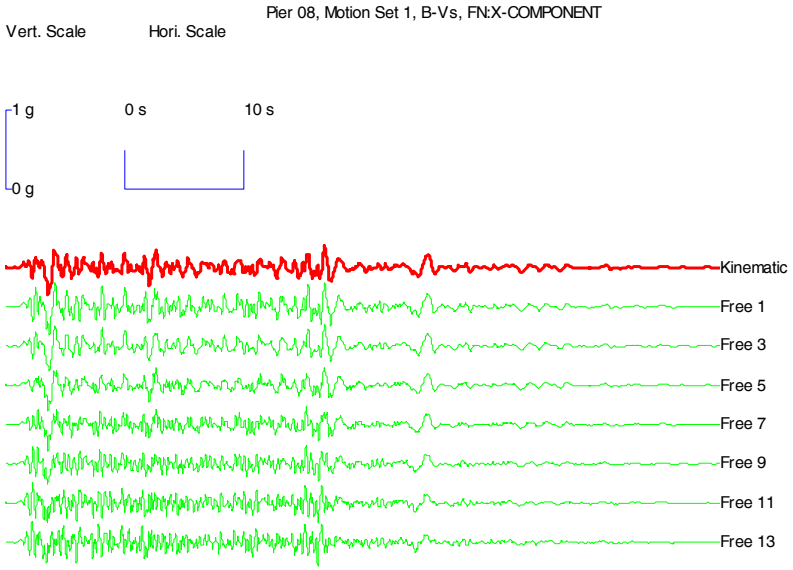
Pier 08, Motion Set 1, B-Vs, FN:X-COMPONENT
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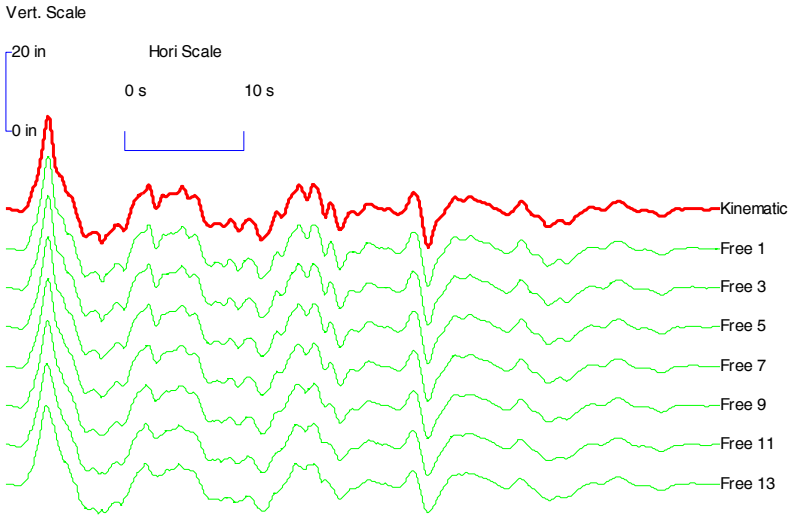
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13


Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
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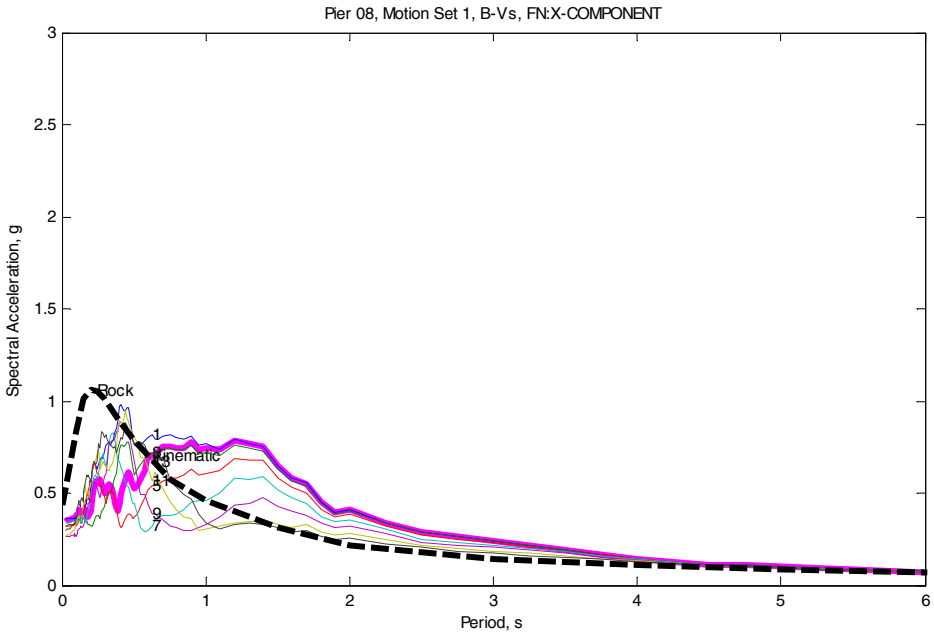
Free 11
Free 13


Pier 08, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Rock
Kinematic
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1.5
2
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3
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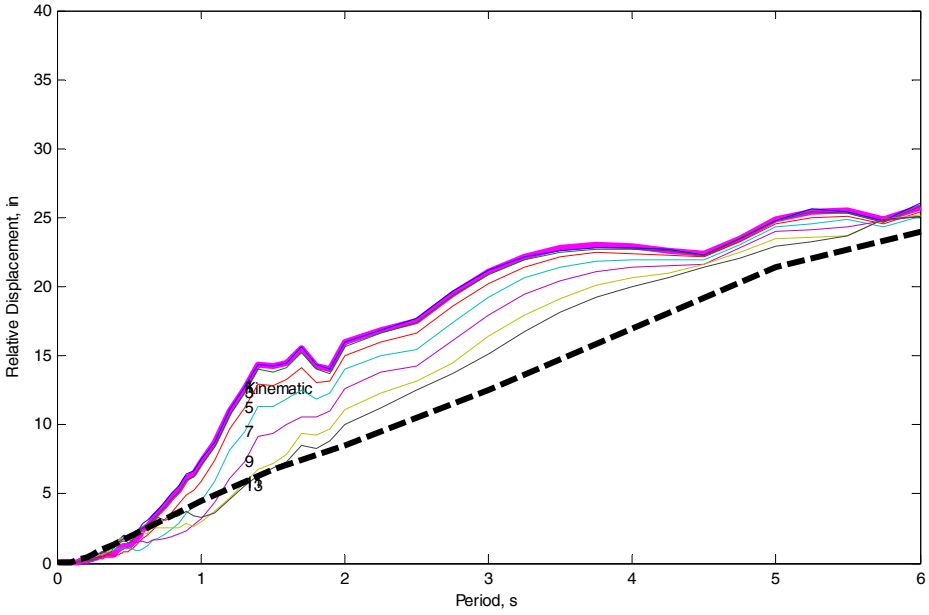
Relative Displacement, in
Period, s
Kinematic
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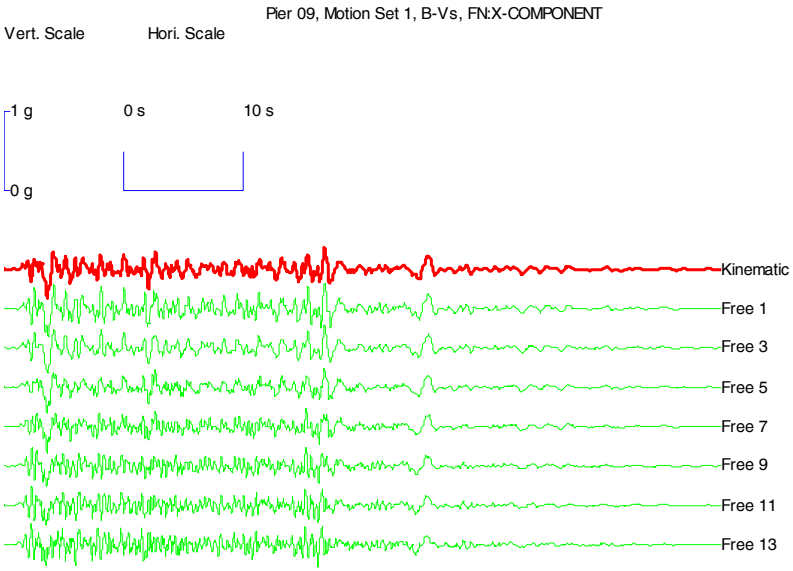
Pier 09, Motion Set 1, B-Vs, FN:X-COMPONENT
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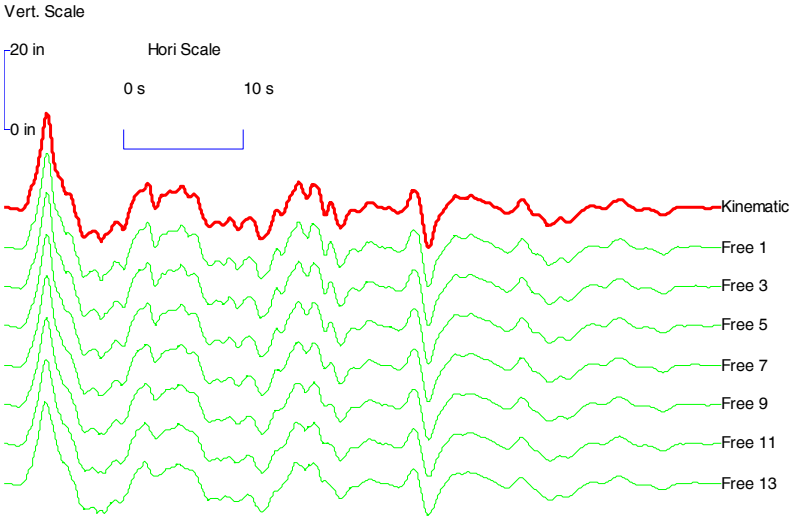
Hori. Scale
1 g
0 s
10 s
0 g
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13


Vert. Scale
20 in
Hori Scale
0 s
10 s
0 in
Kinematic
Free 1
Free 3
Free 5
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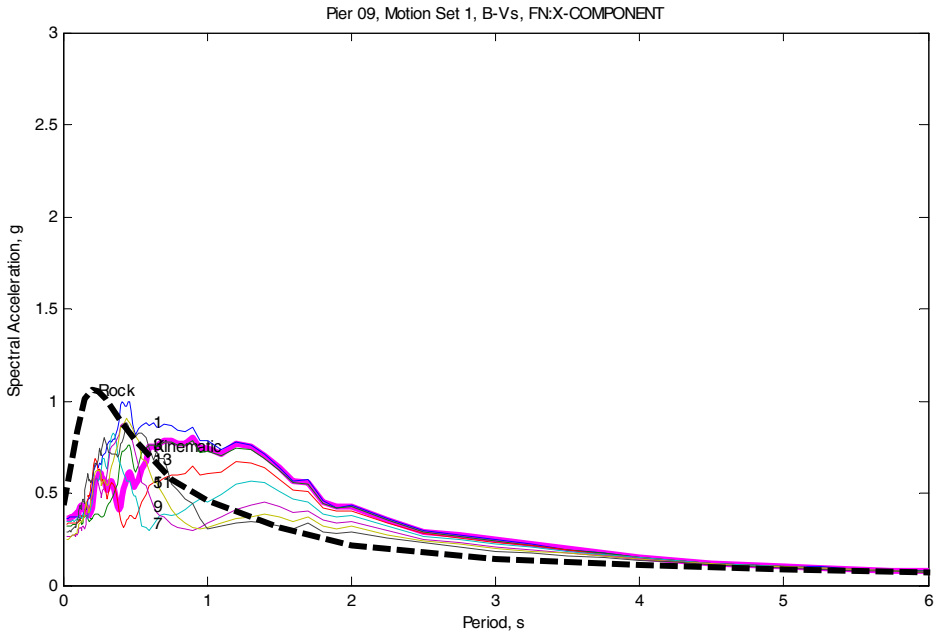
Free 13


Pier 09, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Rock
1
Kinematic
13
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1.5
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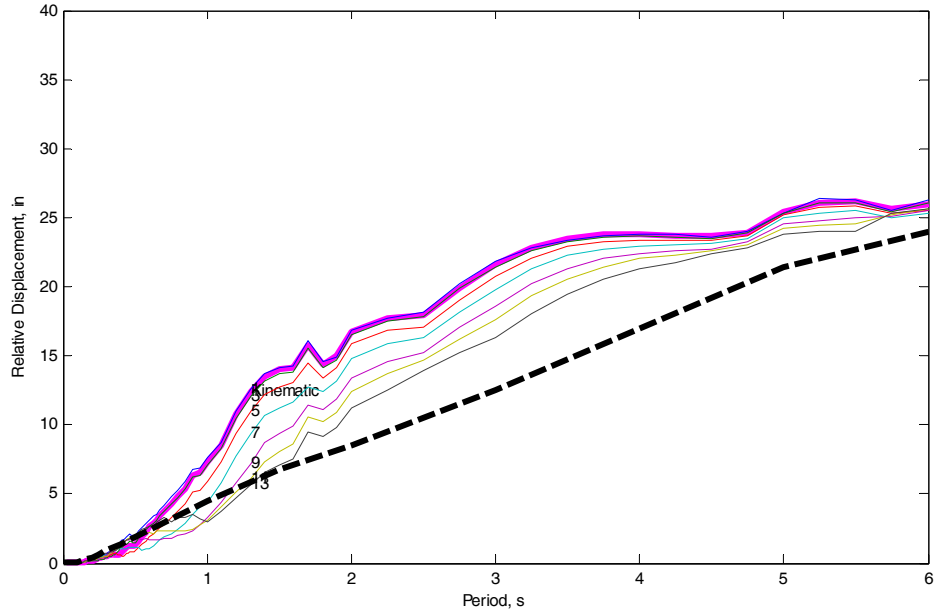
Relative Displacement, in
Period, s
Kinematic
3
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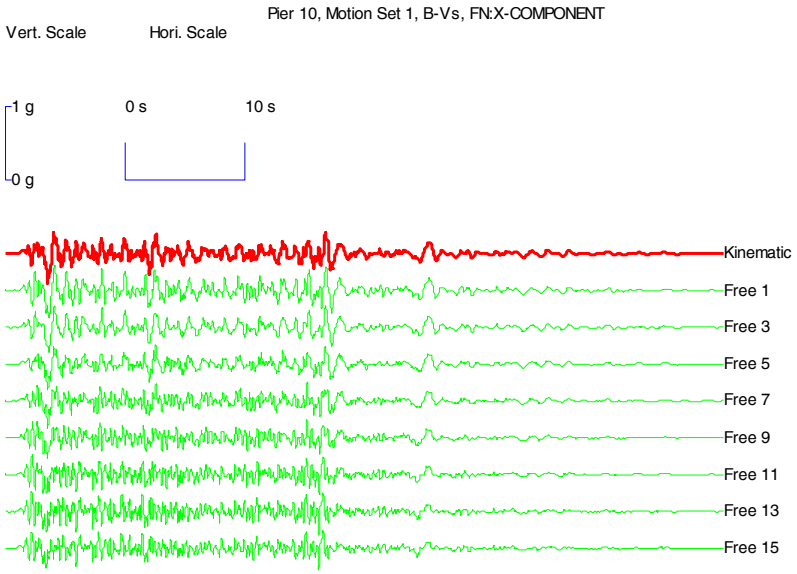
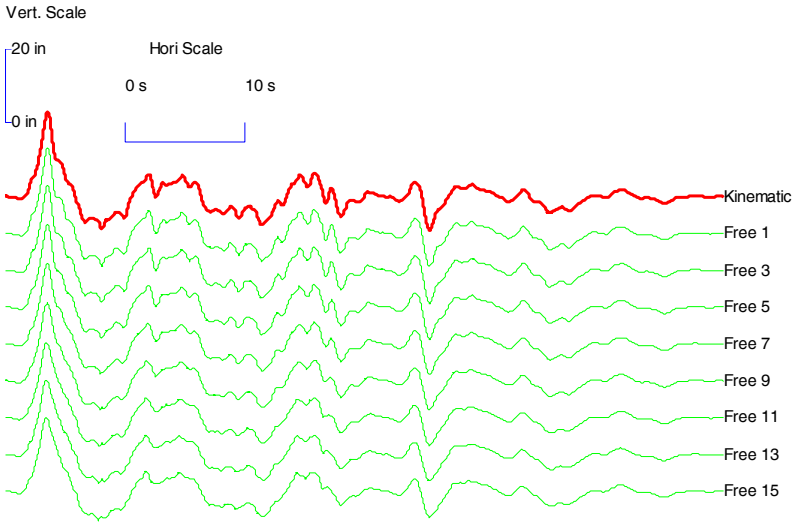

Pier 10, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15


Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
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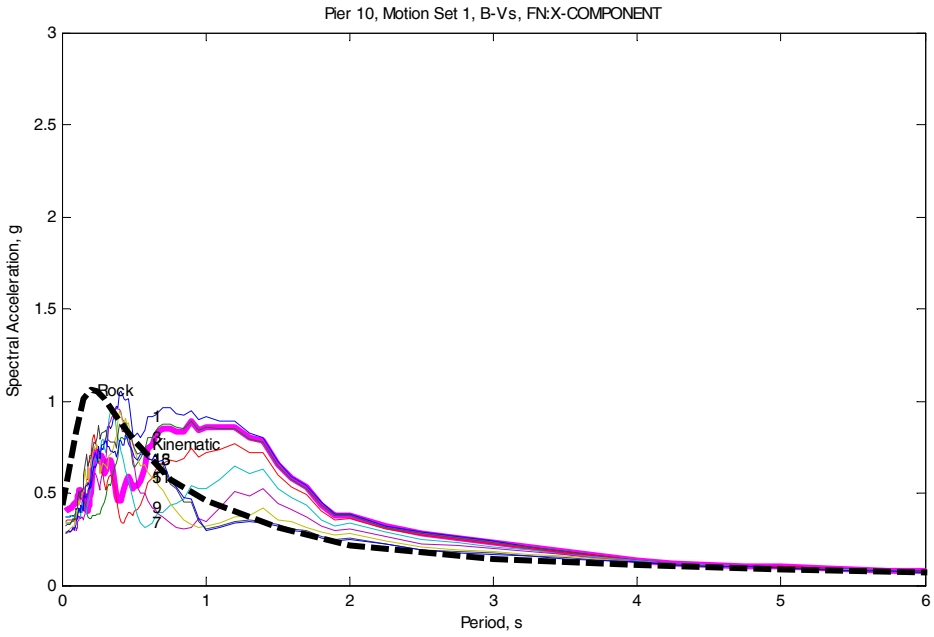
Free 11
Free 13
Free 15


Pier 10, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Rock
Kinematic
1
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9
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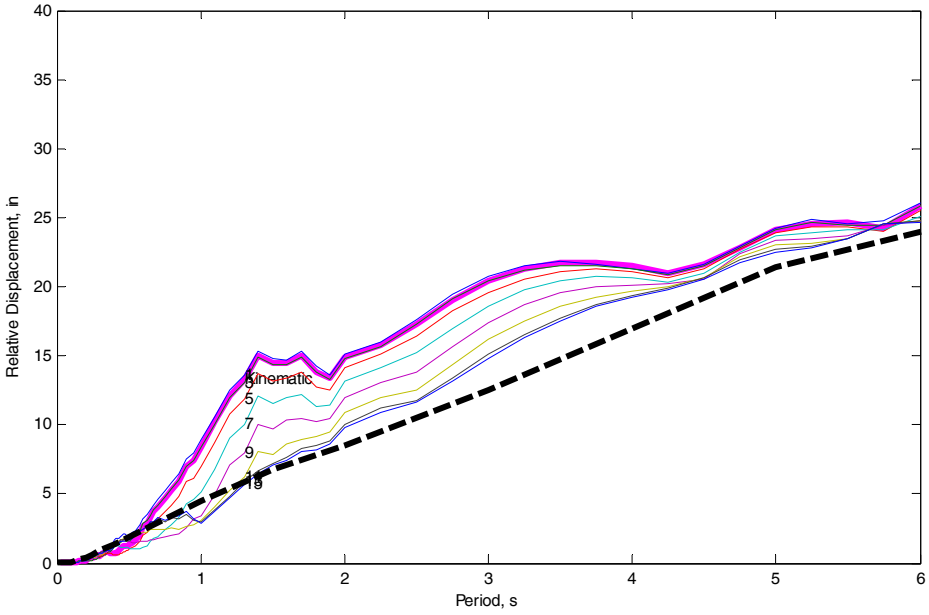
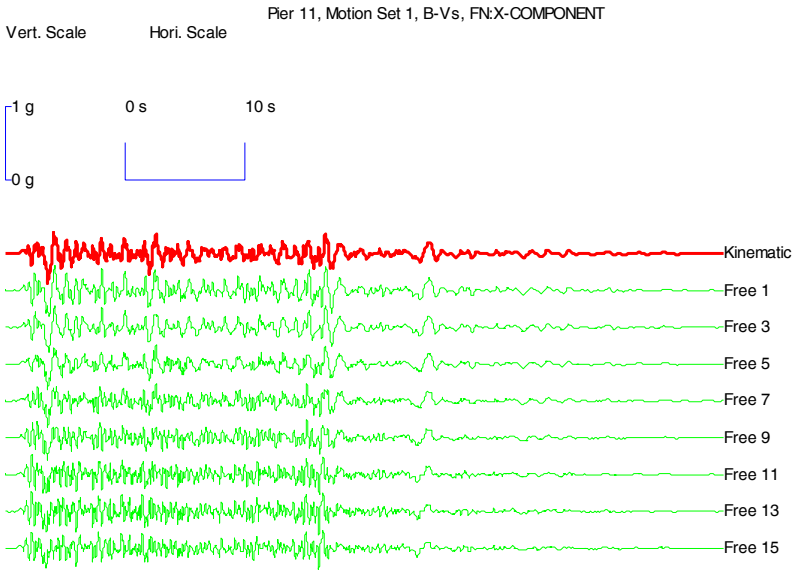
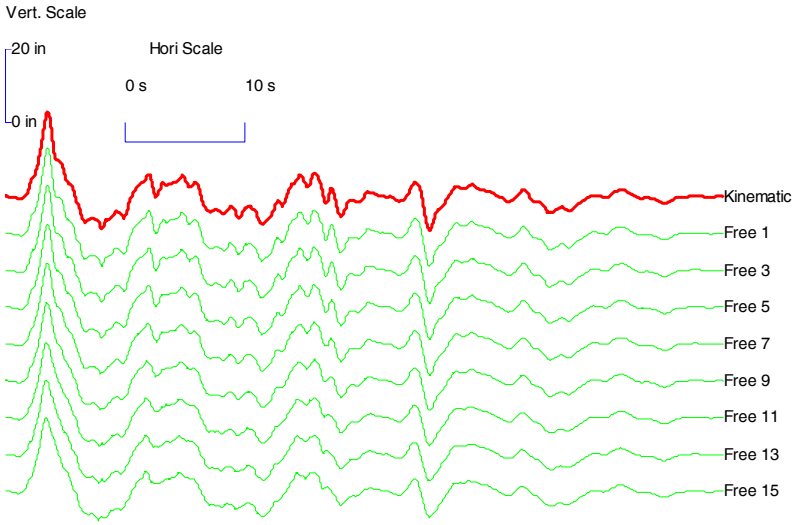
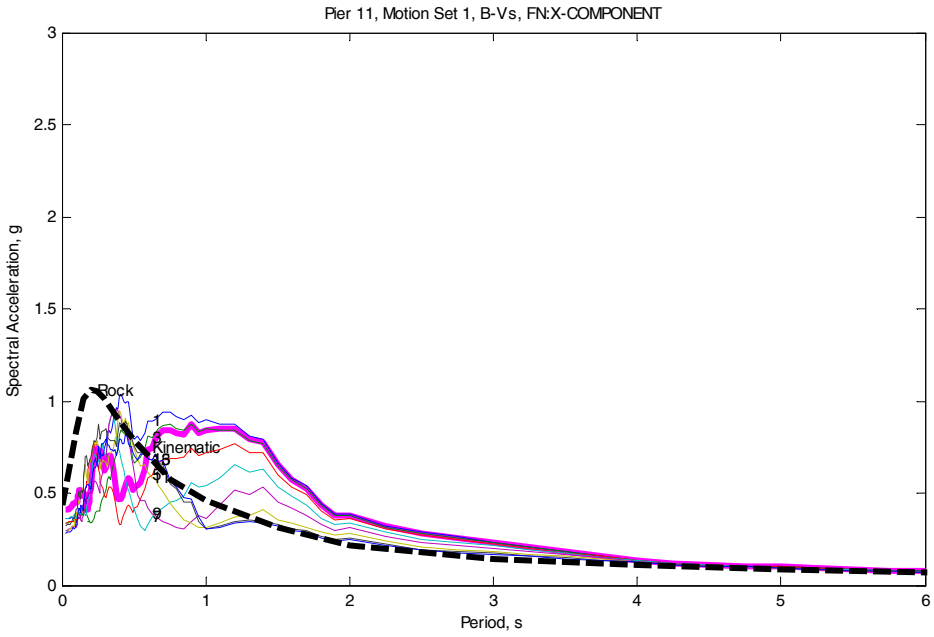

Relative Displacement, in
Period, s
Kinematic
5
7
9
19


Pier 11, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15


Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15


Pier 11, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Rock
Kinematic
1
3
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0.5
1
1.5
2
2.5
3
0
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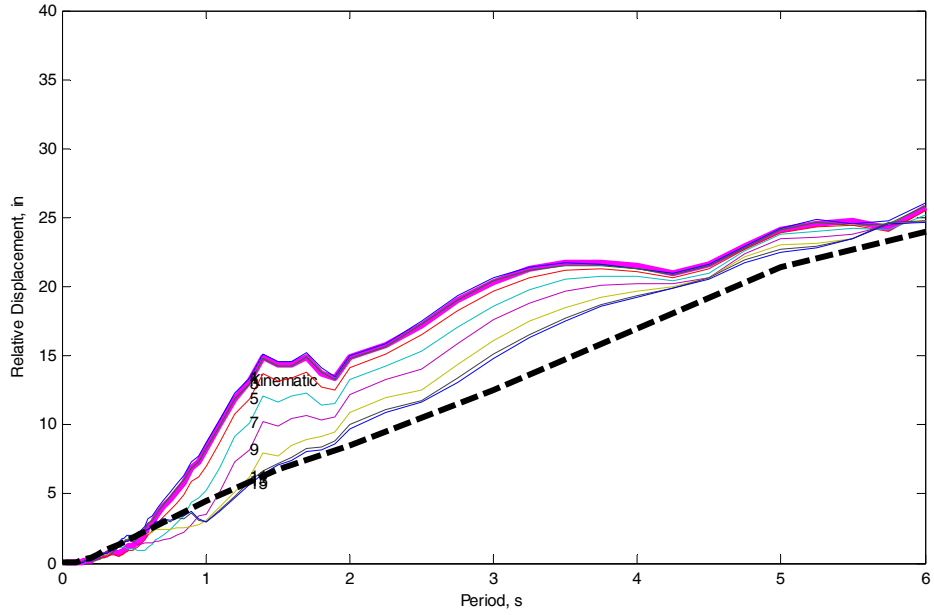
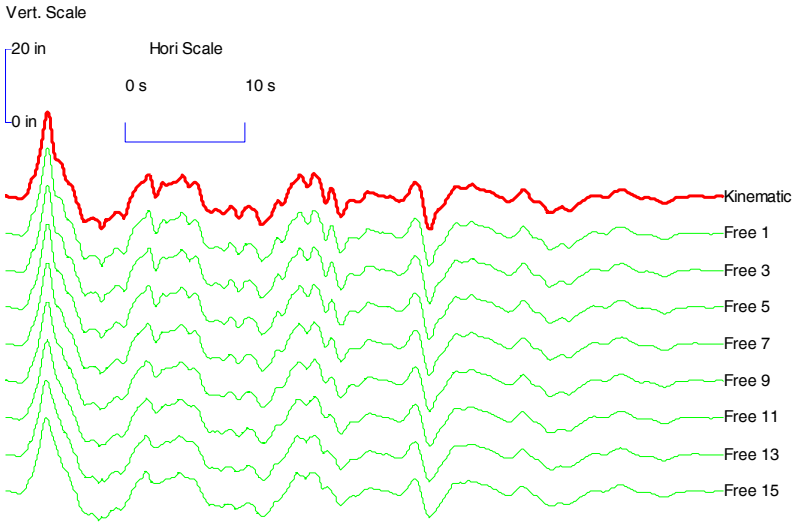
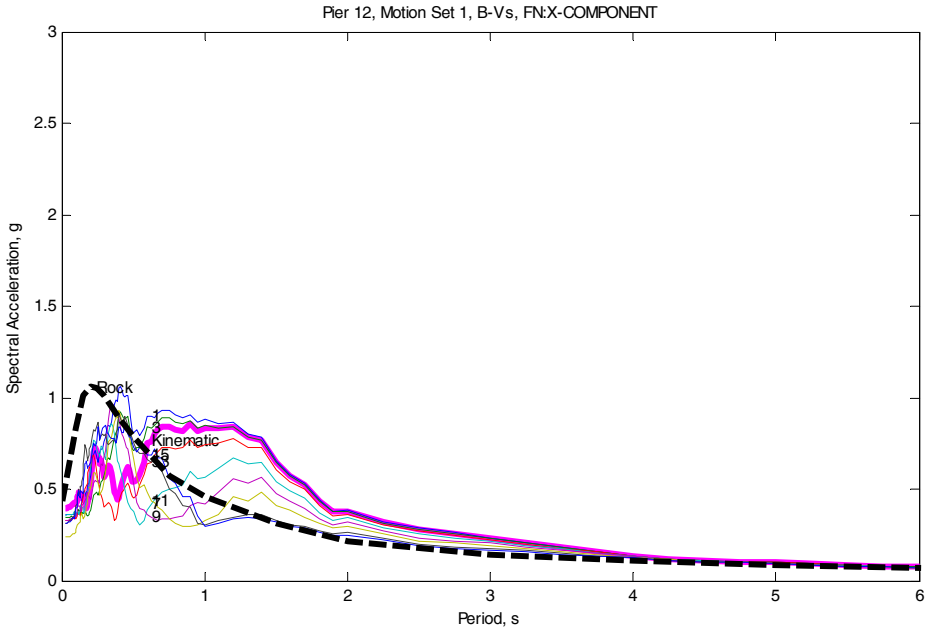
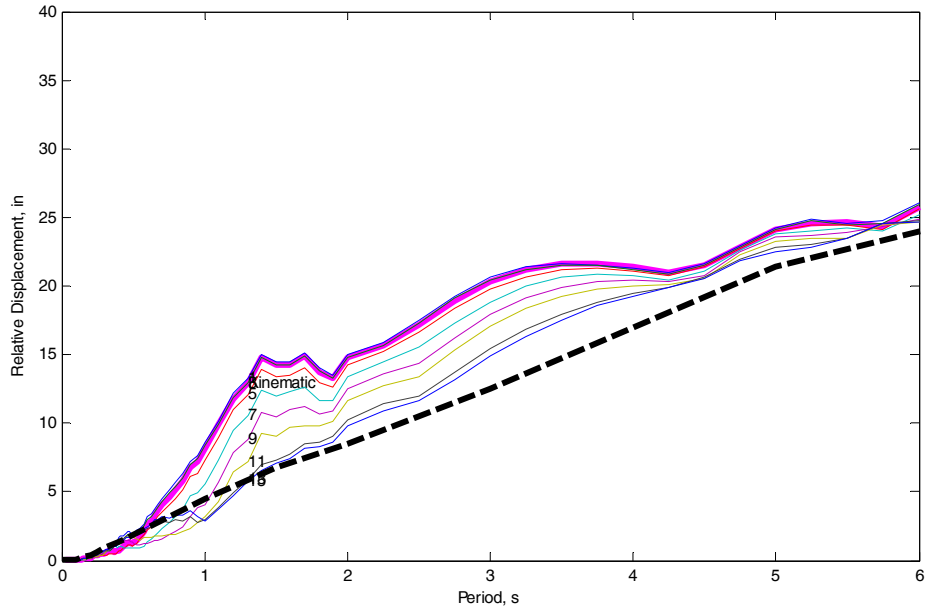
2
3
4
5
6

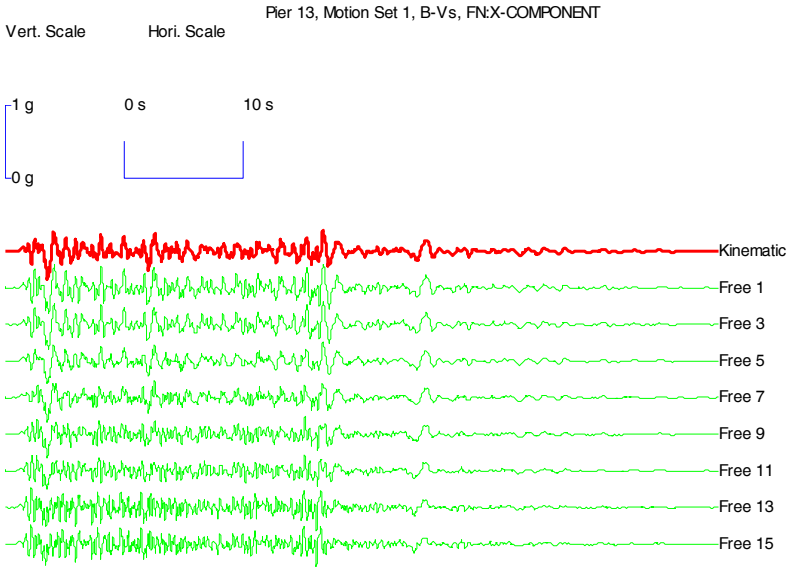

Relative Displacement, in
Period, s
Kinematic
3
5
7
9
1
19
0
5
10
15
20
25
30
35
40
0
1
2
3
4
5
6

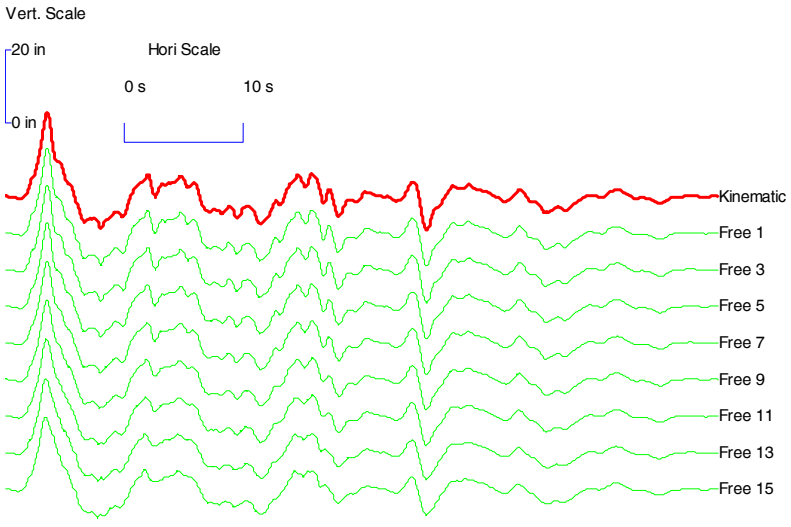
Pier 12, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15

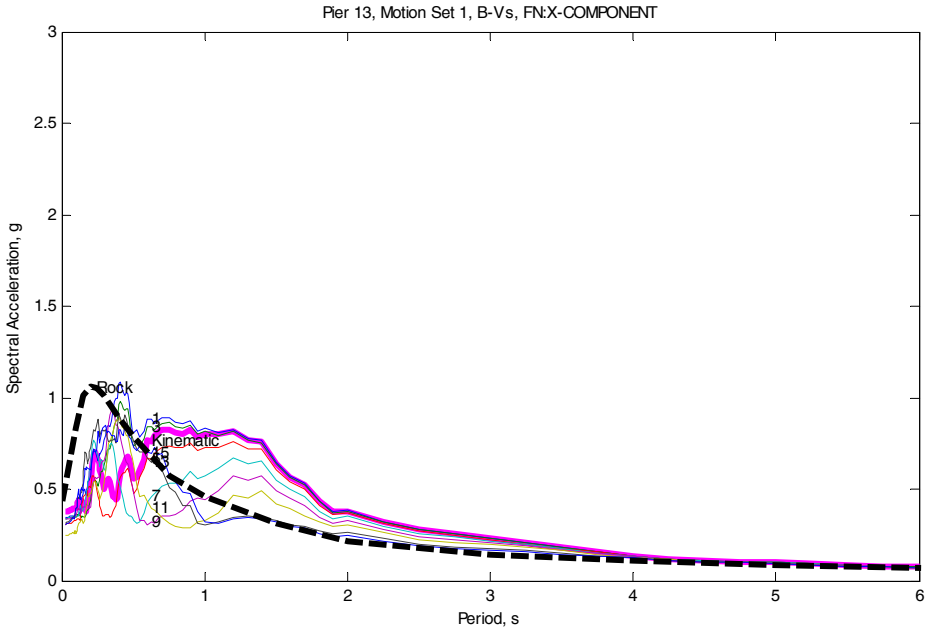

Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15


Pier 12, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Rock
Kinematic
1
3
15
13
11
9


Relative Displacement, in
Period, s
Kinematic
5
7
9
11
13


Pier 13, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15


Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15


Pier 13, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Rock
Kinematic
1
3
5
7
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11
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0
0.5
1
1.5
2
2.5
3
0
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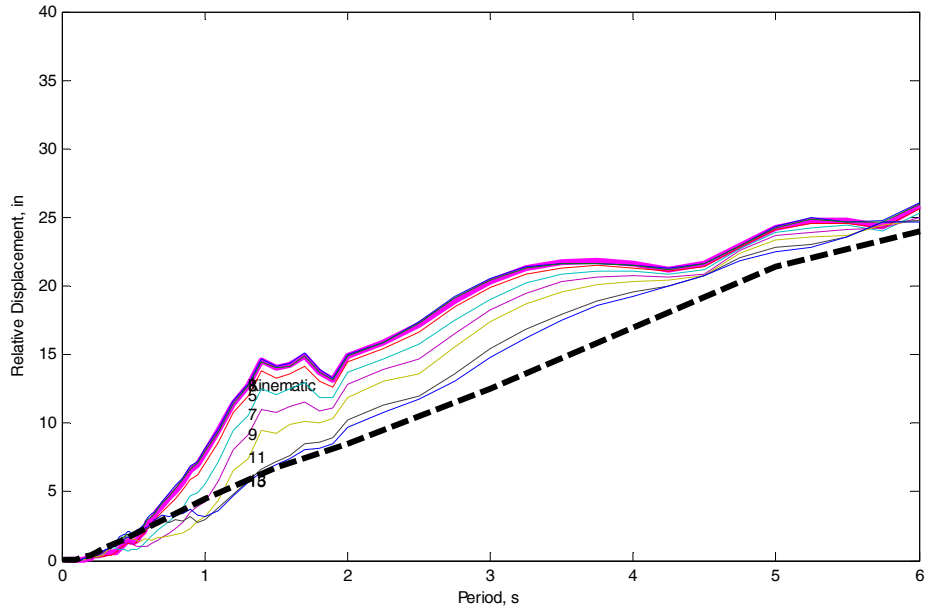
2
3
4
5
6


Relative Displacement, in
Period, s
Kinematic
5
7
9
11
13
0
5
10
15
20
25
30
35
40
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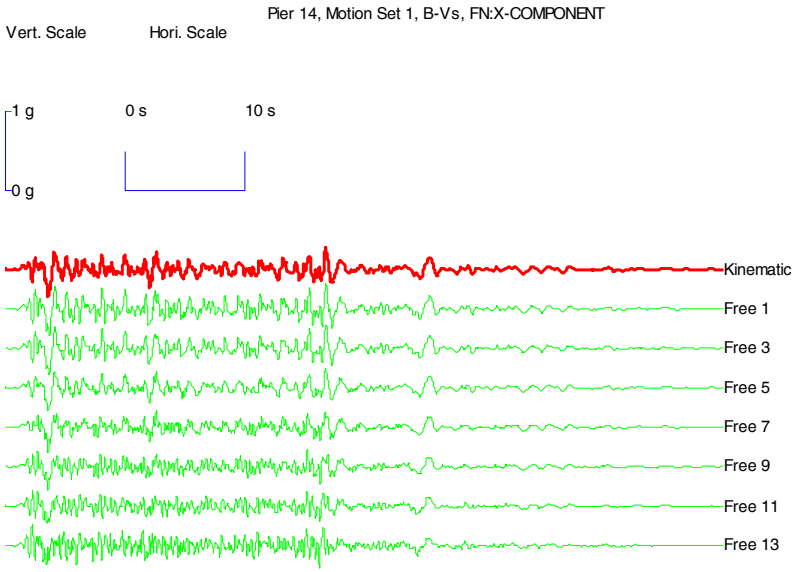
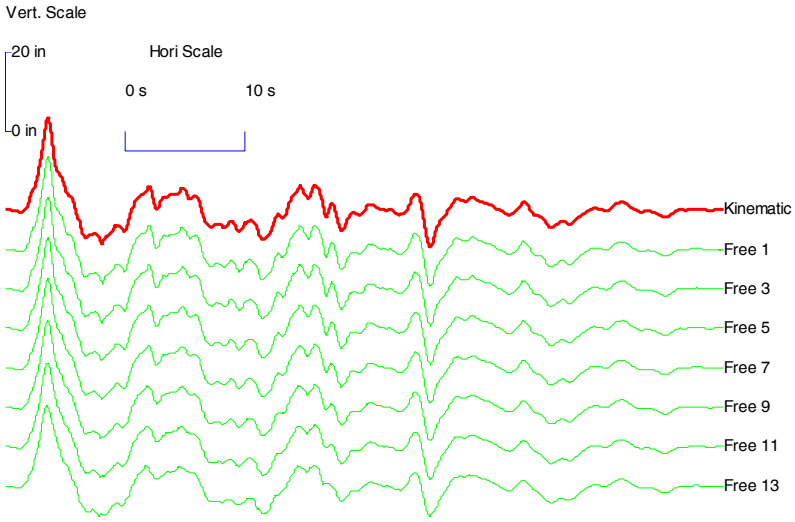
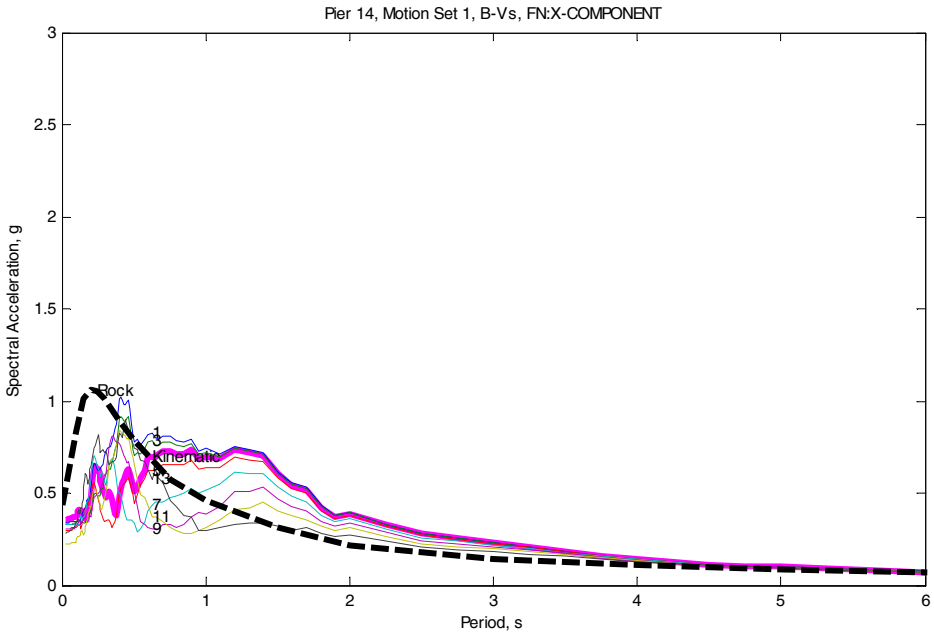
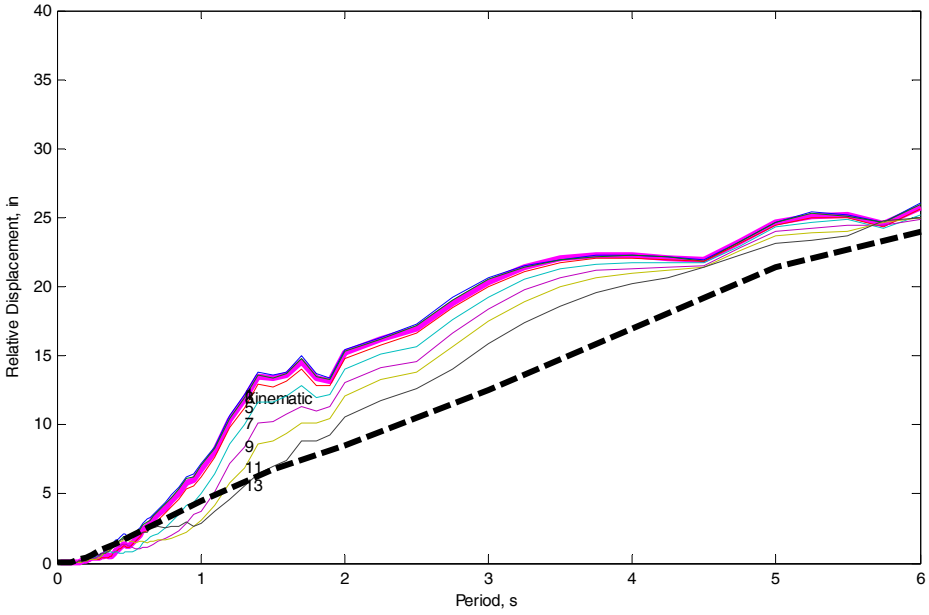
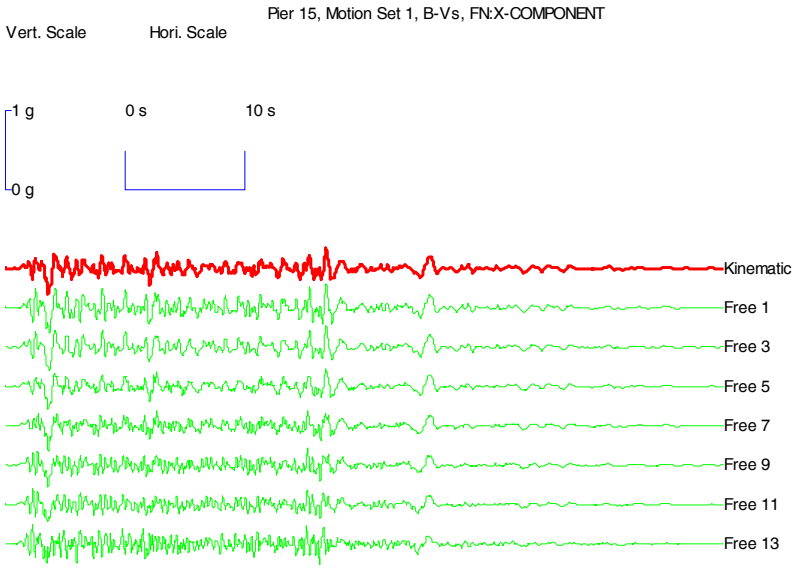
3
4
5
6

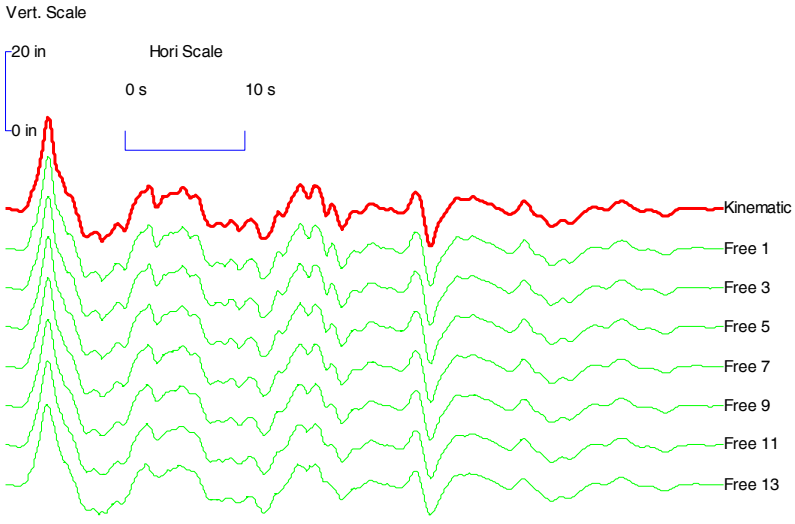

Pier 14, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13

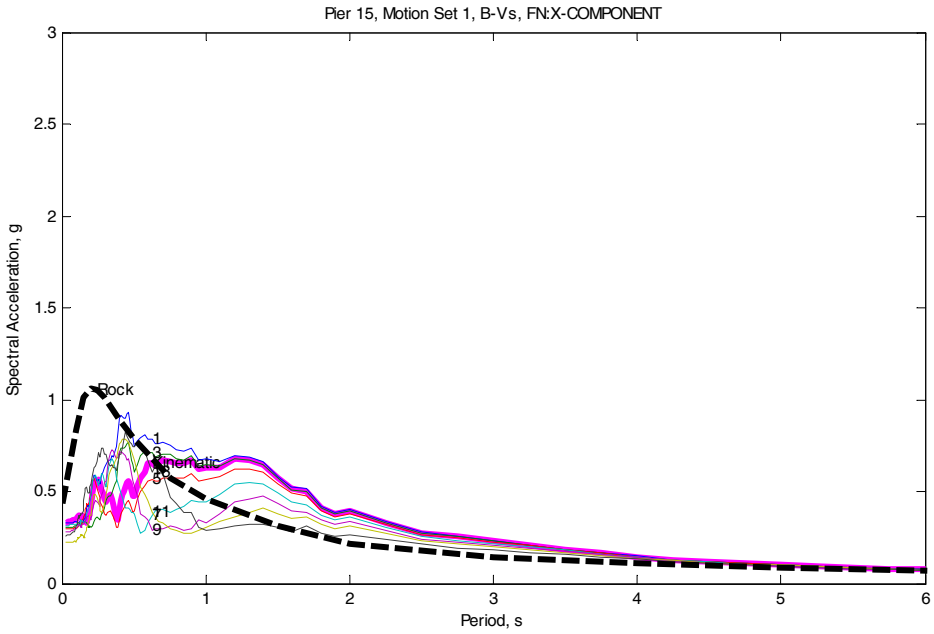

Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13

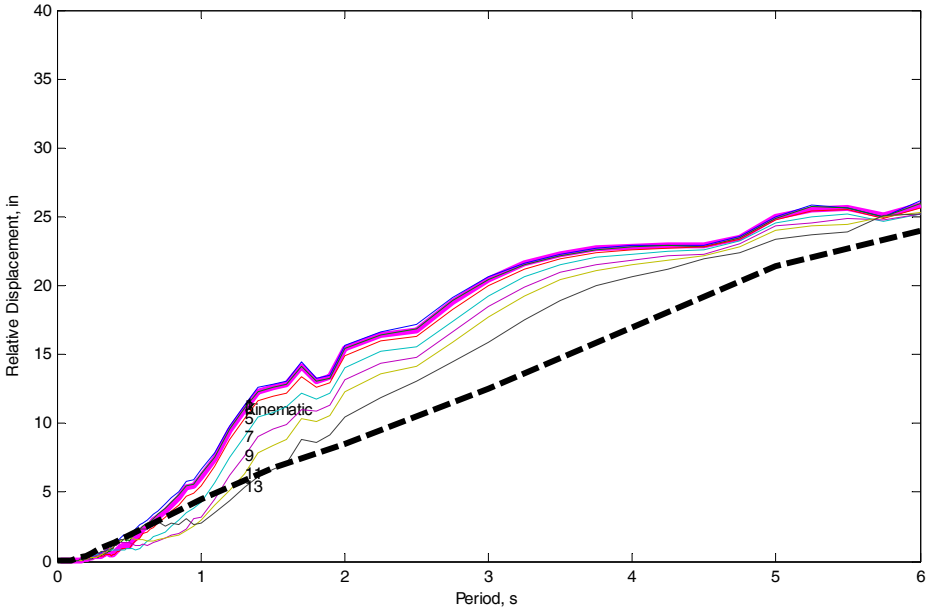

Pier 14, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Rock
Kinematic
1
3
13
7
11
9

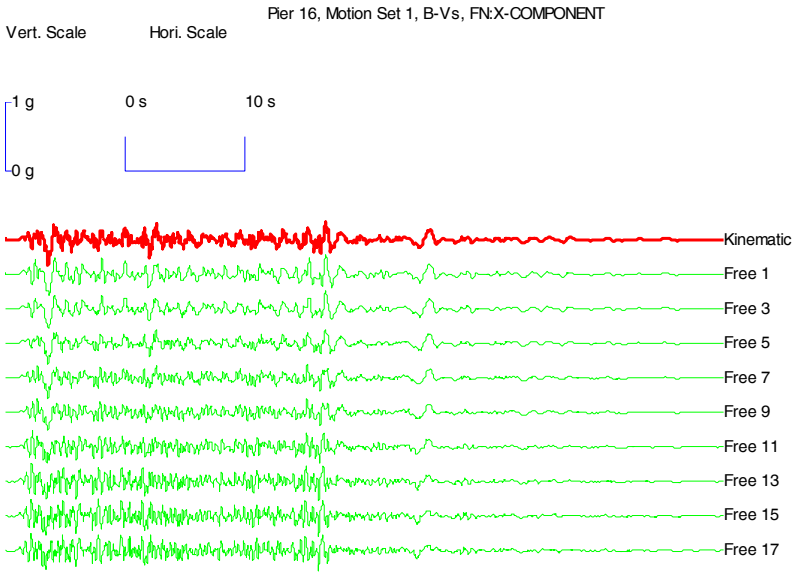

Relative Displacement, in
Period, s
Kinematic
5
7
9
11
13

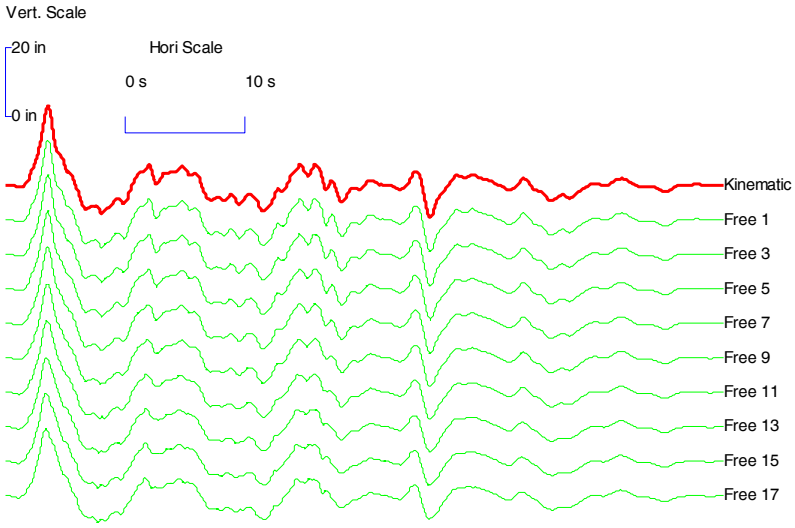

Pier 15, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13

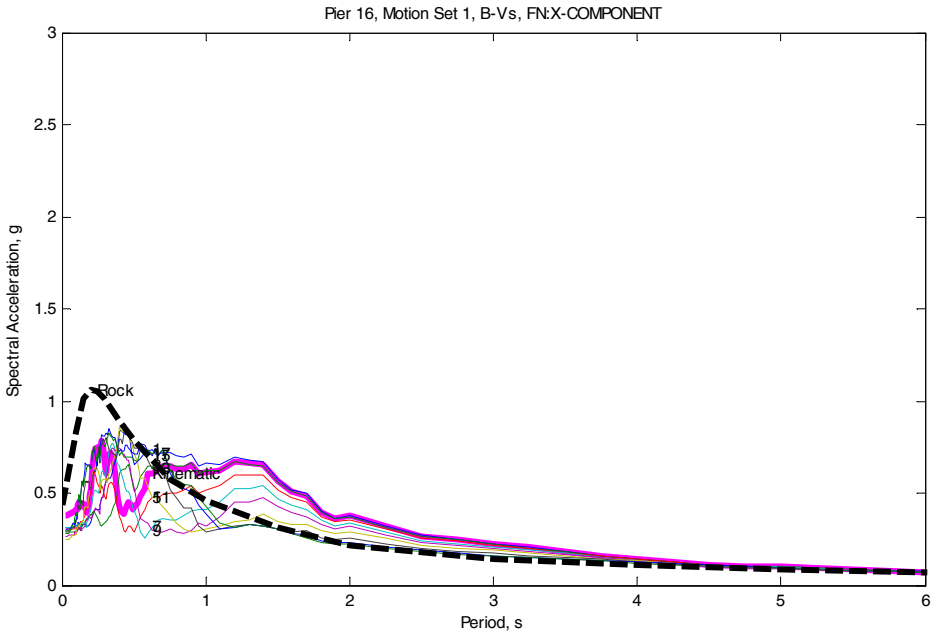

Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13

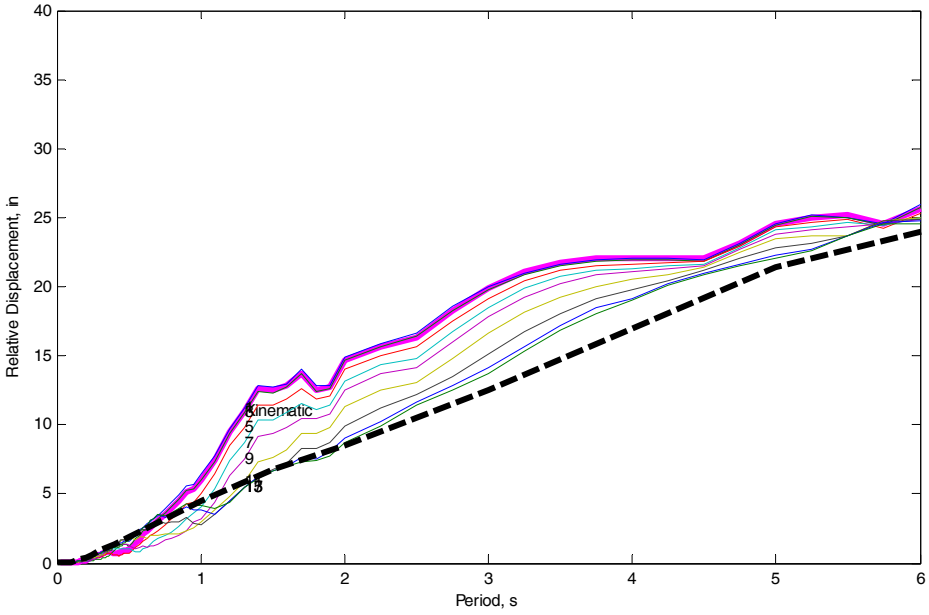

Pier 15, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Rock
1
3
Kinematic
5
11
9

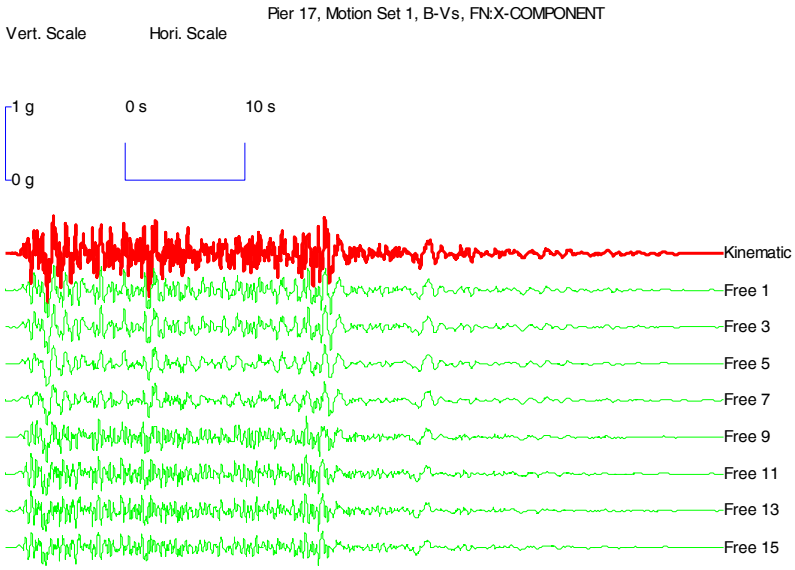

Relative Displacement, in
Period, s
Kinematic
5
7
9
11
13

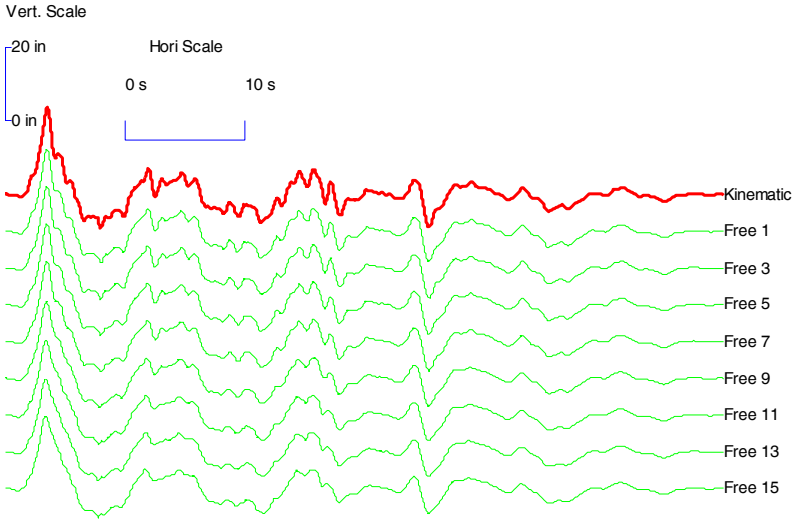

Pier 16, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17

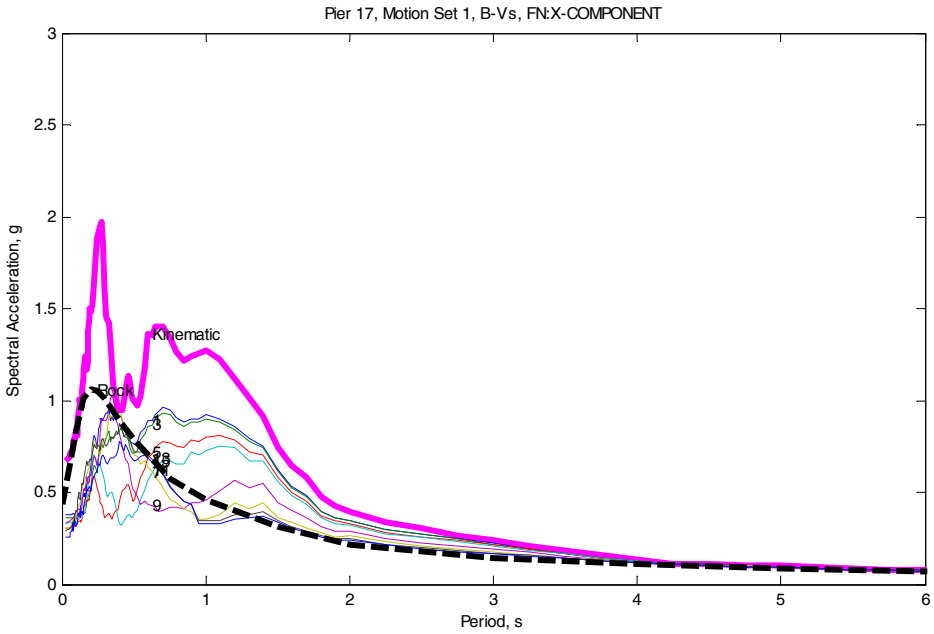

Vert. Scale
Hori Scale
20 in
0 in
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17


Pier 16, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Rock
Kinematic
0
0.5
1
1.5
2
2.5
3
0
1
2
3
4
5
6


Relative Displacement, in
Period, s
Kinematic
0
5
10
15
20
25
30
35
40
0
1
2
3
4
5
6


Pier 17, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15


Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15


Pier 17, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Kinematic
Rock
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1.5
2
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3
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3
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5
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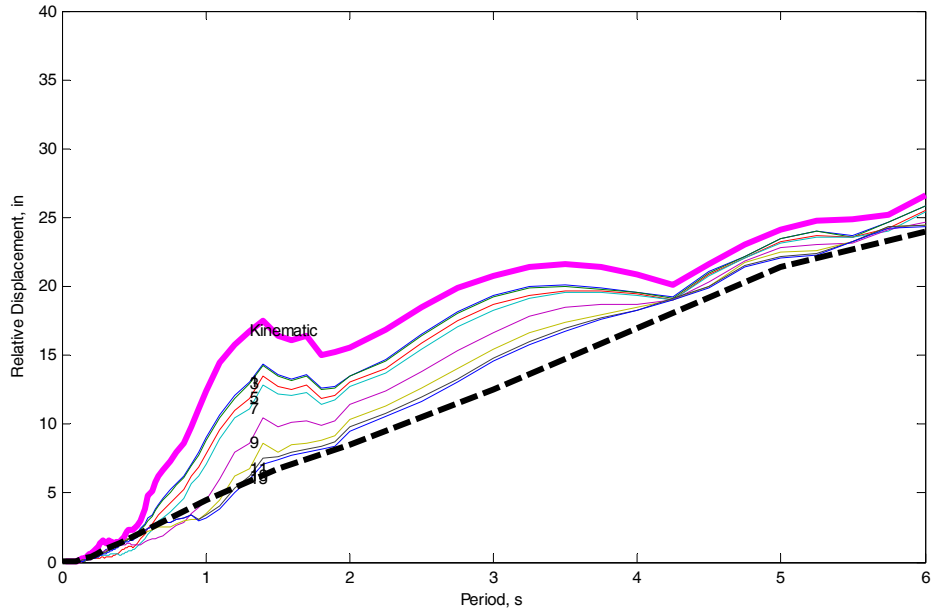
Relative Displacement, in
Period, s
Kinematic
3
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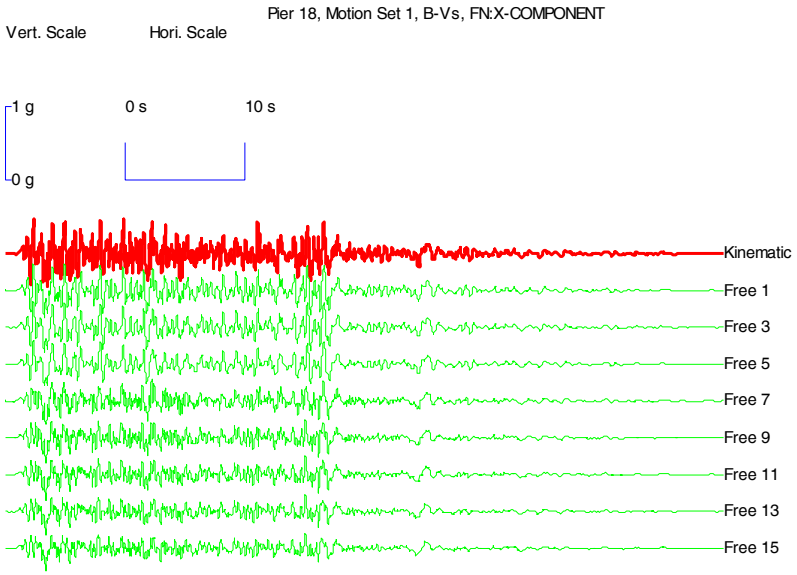
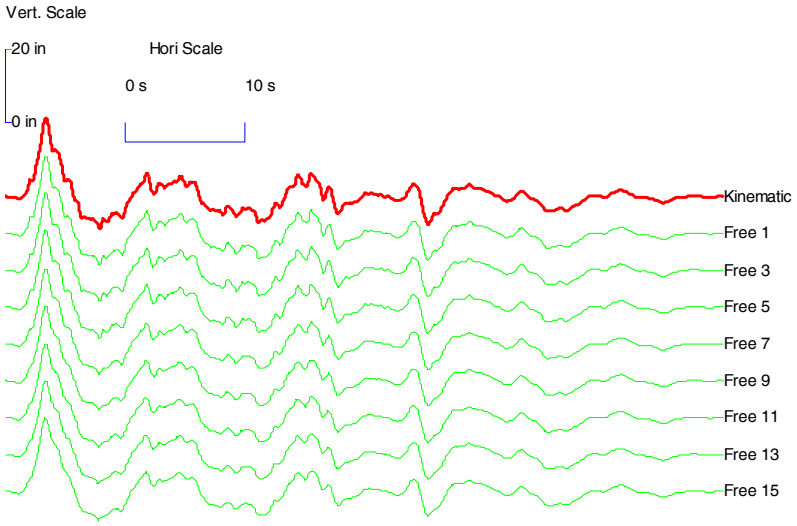
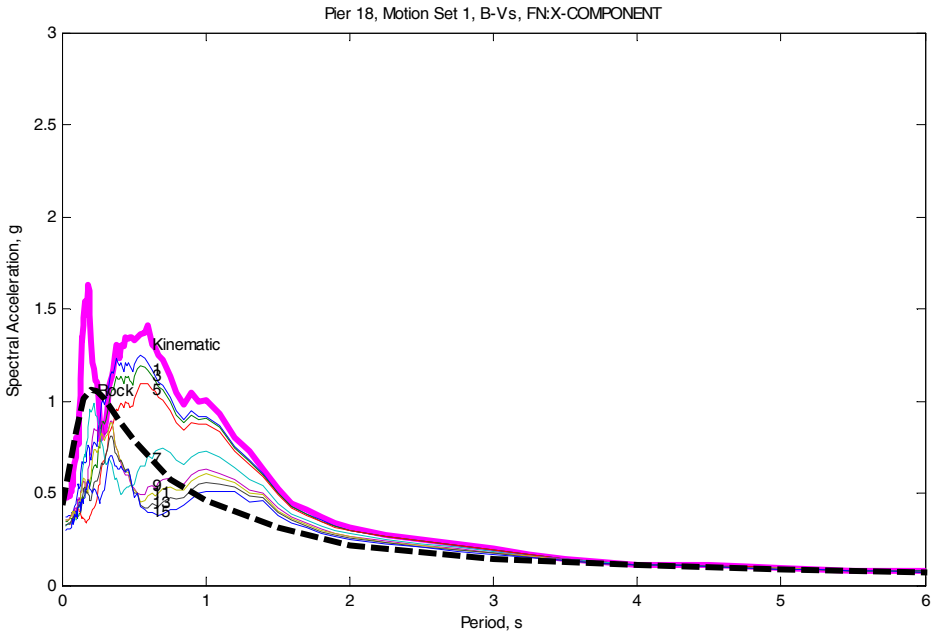

Pier 18, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15


Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15


Pier 18, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Kinematic
Rock
5
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9
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13
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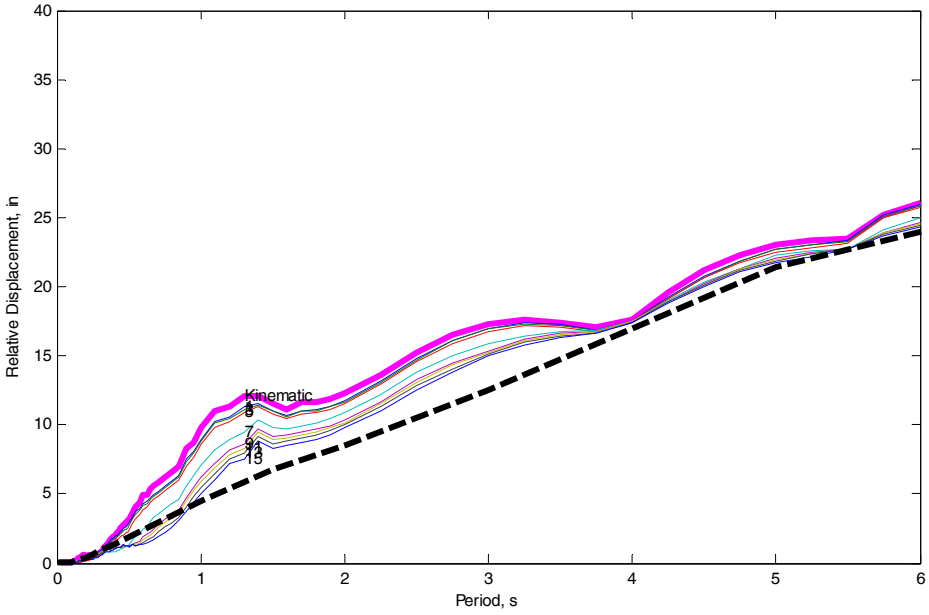
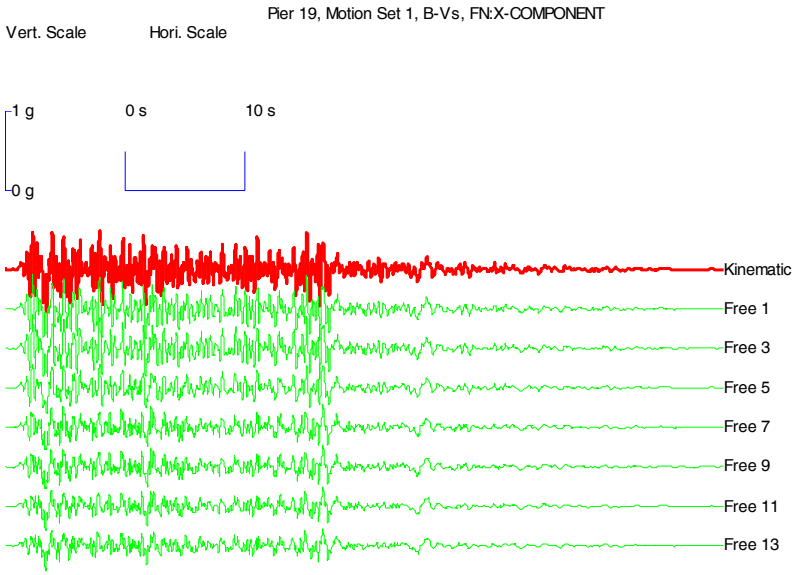
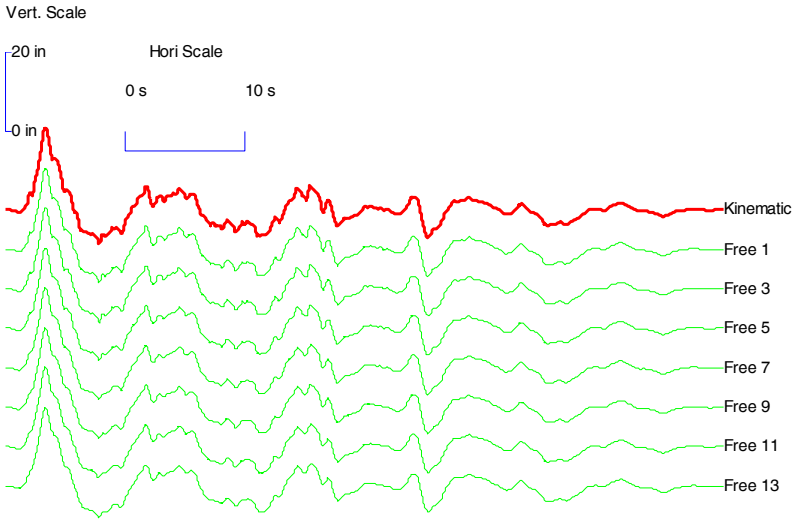
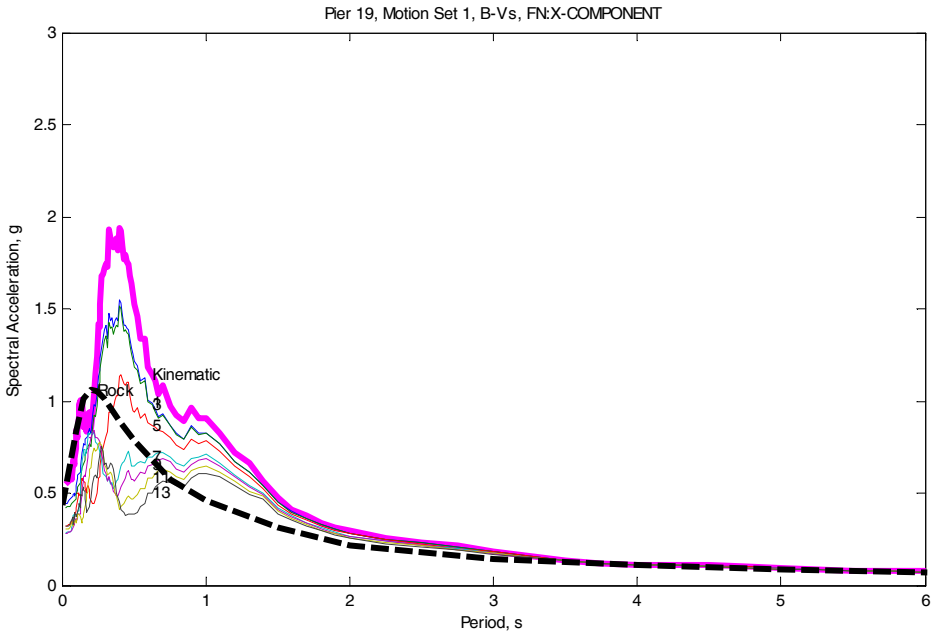
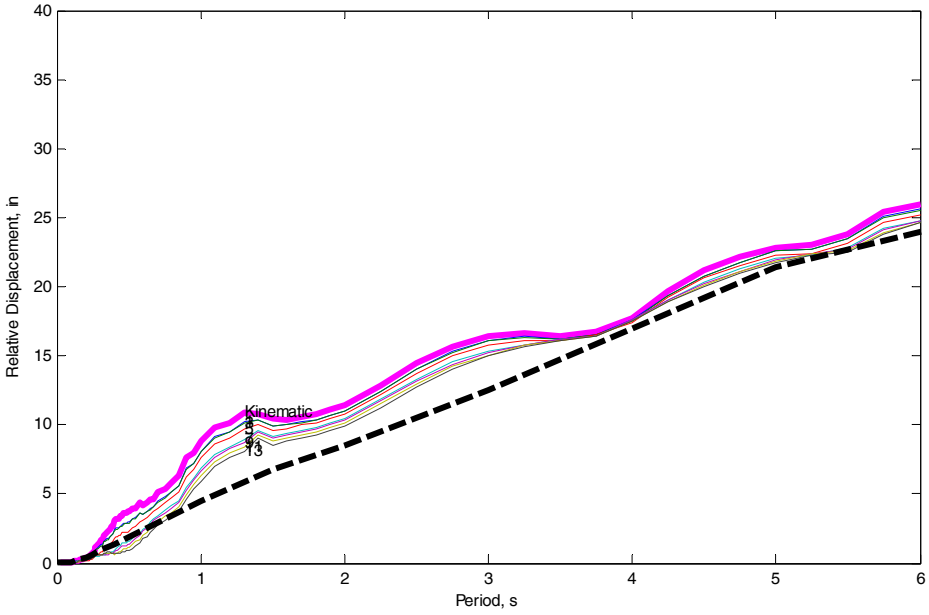
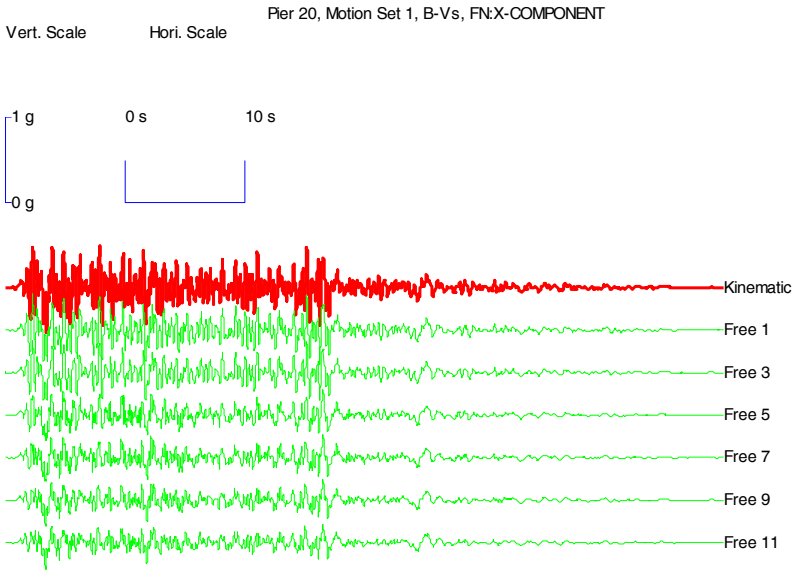

Relative Displacement, in
Period, s
Kinematic
5
7
9
11
13
15

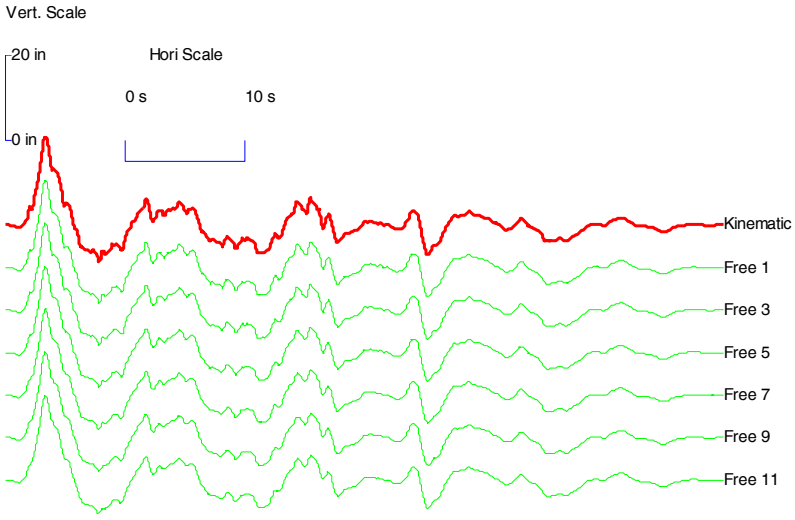

Pier 19, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13

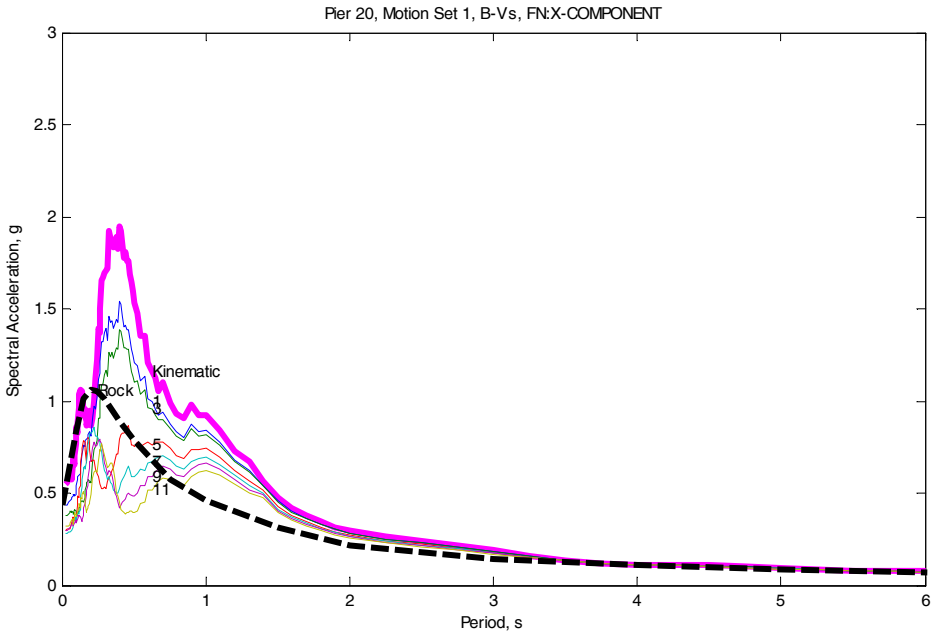

Vert. Scale
Hori Scale
20 in
0 in
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13


Pier 19, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Kinematic
Rock
3
5
7
11
13


Relative Displacement, in
Period, s
Kinematic
3
5
7
11
13


Pier 20, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 s
10 s
0 g
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11


Vert. Scale
20 in
Hori Scale
0 s
10 s
0 in
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11


Pier 20, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Kinematic
Rock
1
3
5
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11
0
0.5
1
1.5
2
2.5
3
0
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3
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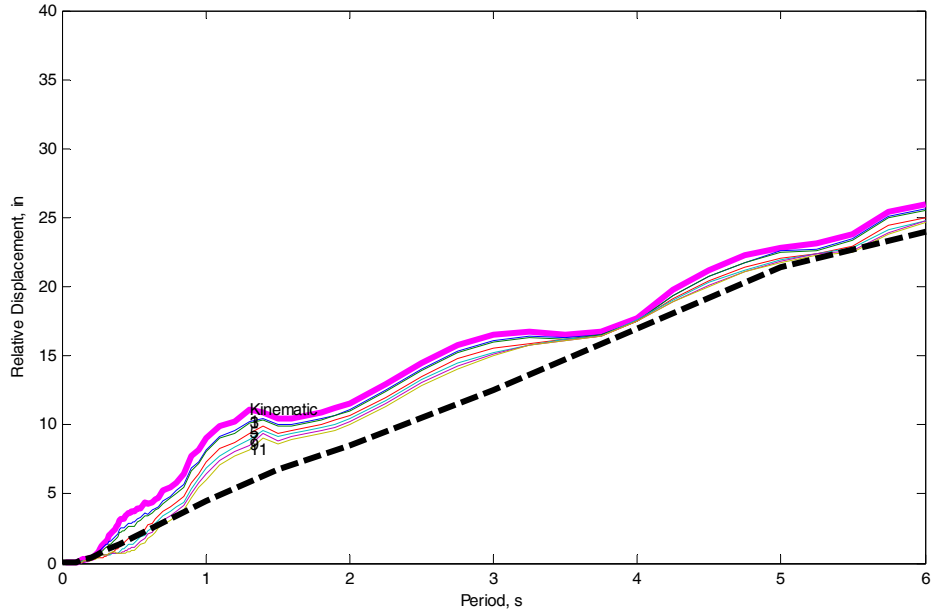
5
6


Relative Displacement, in
Period, s
Kinematic
1
3
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7
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15
20
25
30
35
40
0
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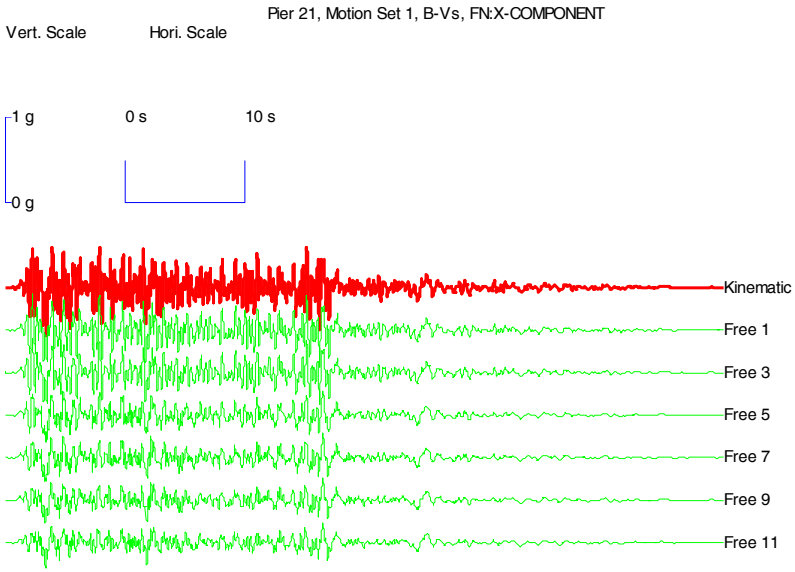
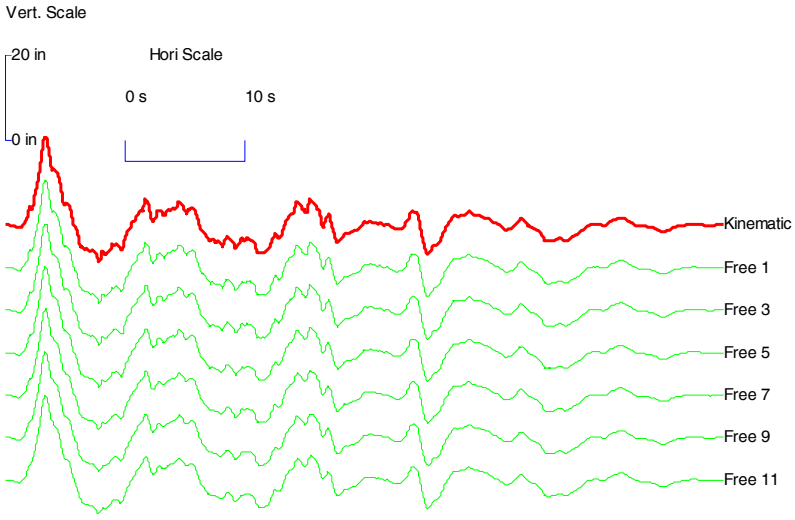
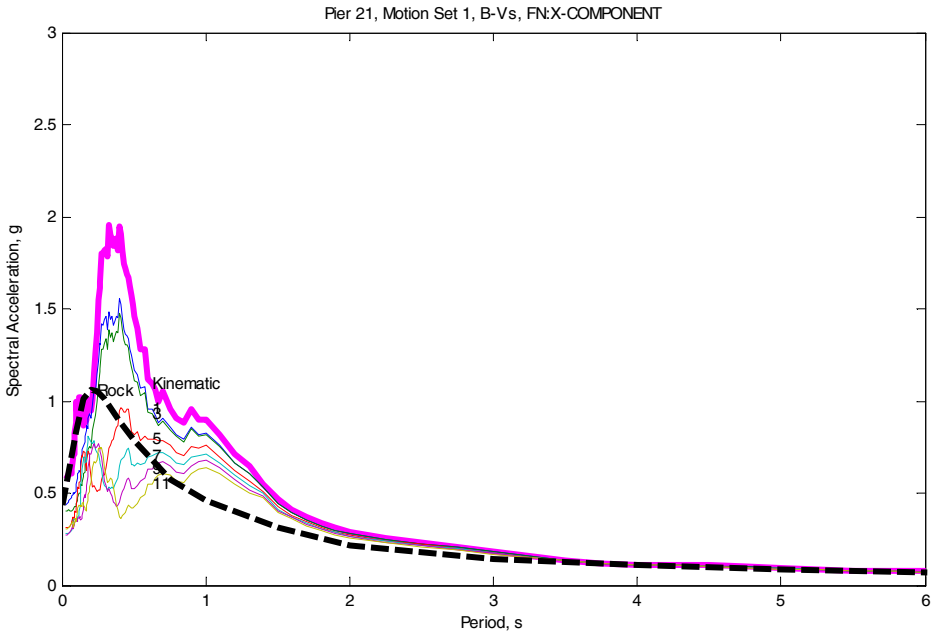
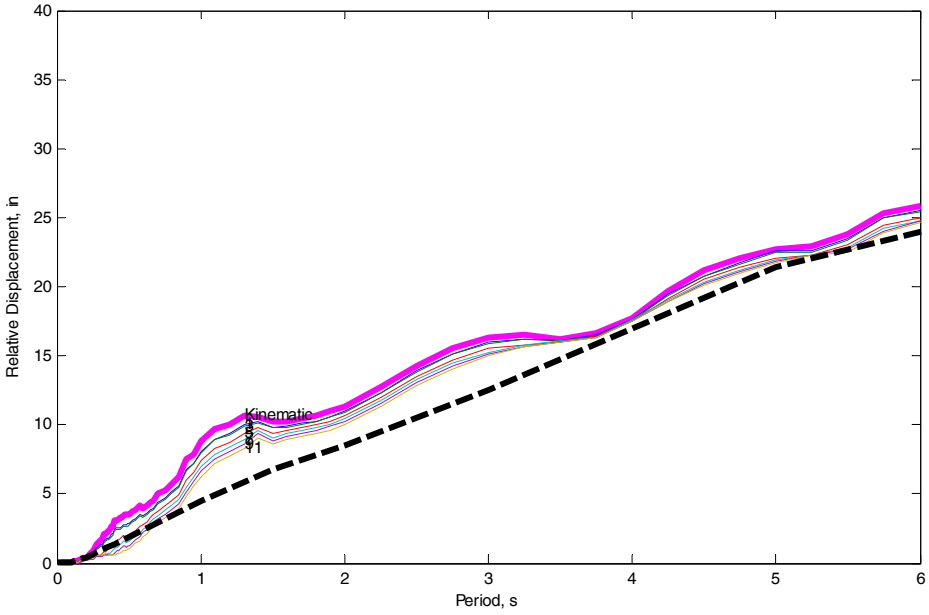
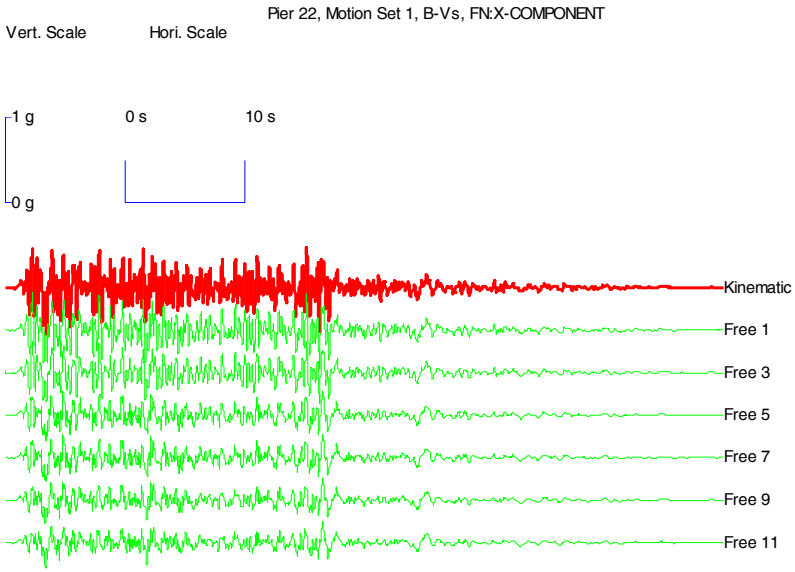
3
4
5
6

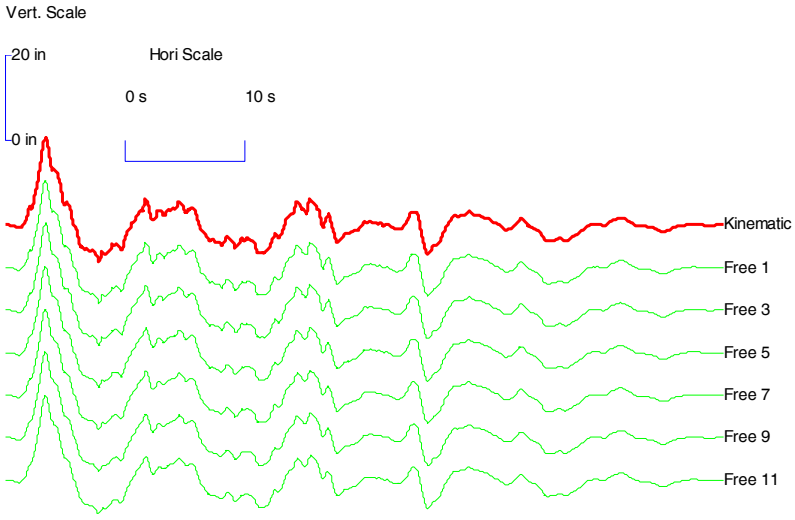

Pier 21, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 s
10 s
0 g
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11

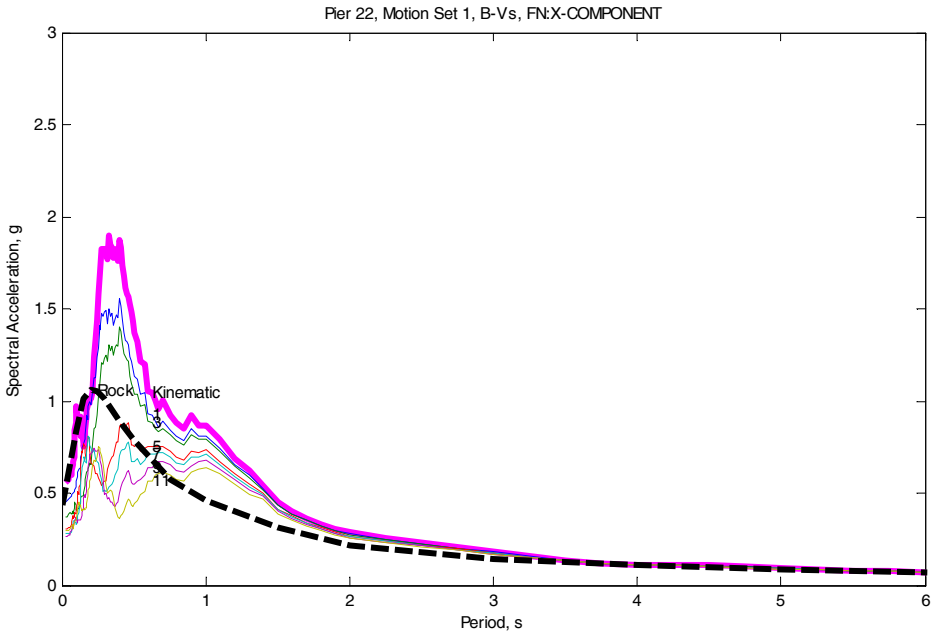

Vert. Scale
20 in
Hori Scale
0 s
10 s
0 in
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11

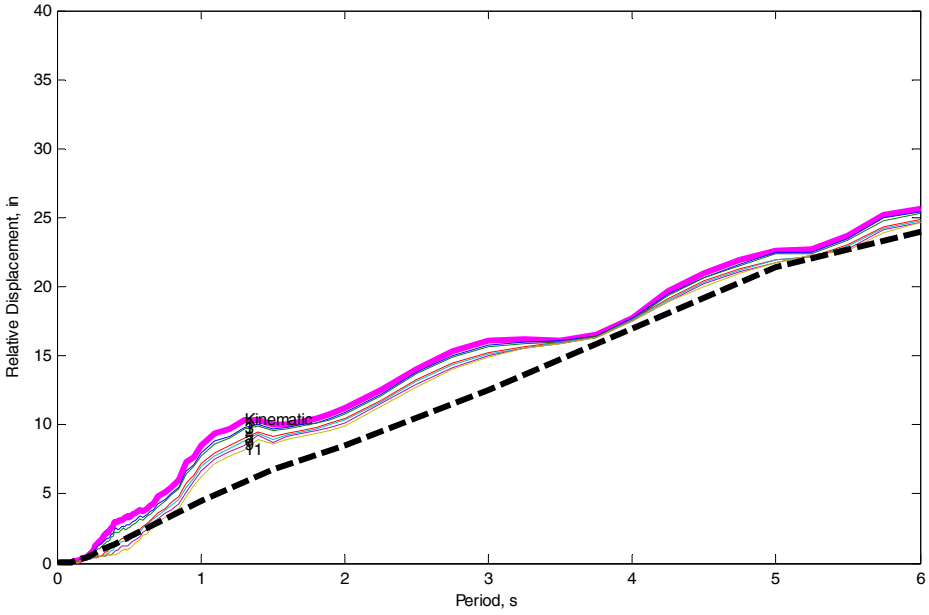

Pier 21, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Rock
Kinematic
3
5
7
11

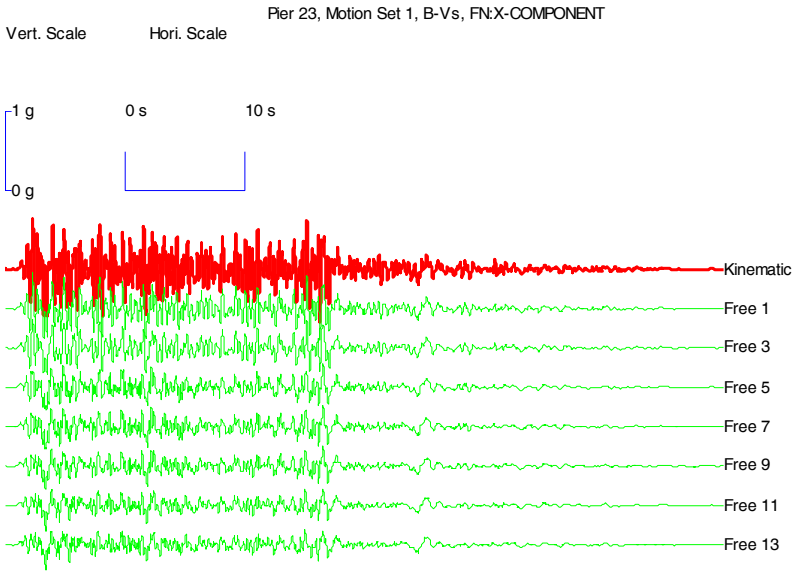

Relative Displacement, in
Period, s
Kinematic
3
5
7
11

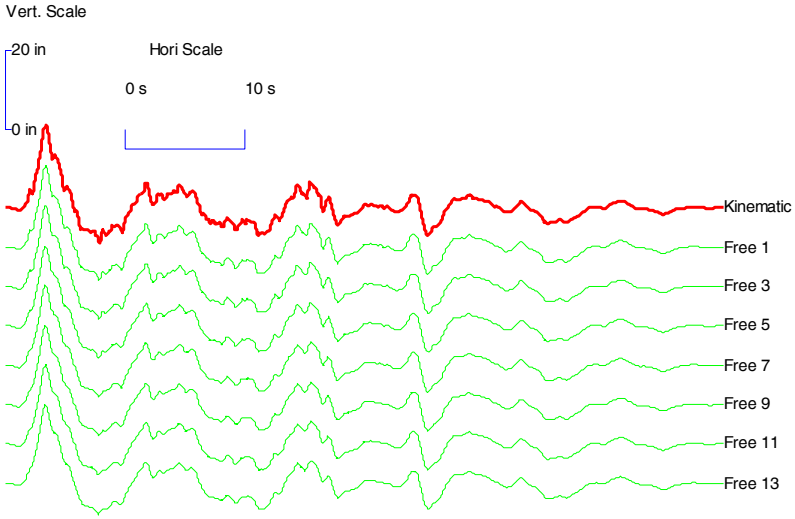

Pier 22, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 s
10 s
0 g
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11

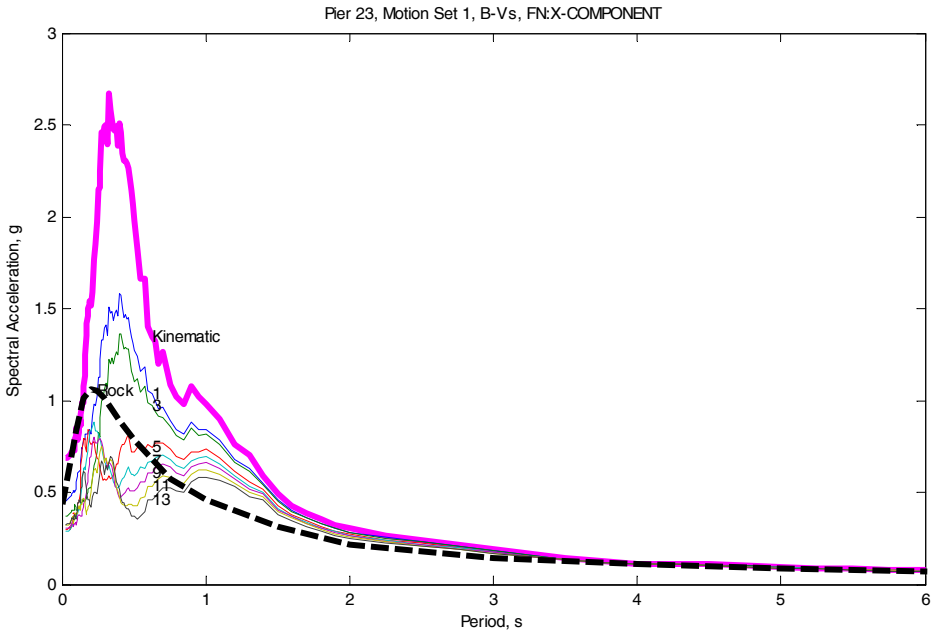

Vert. Scale
20 in
Hori Scale
0 s
10 s
0 in
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11

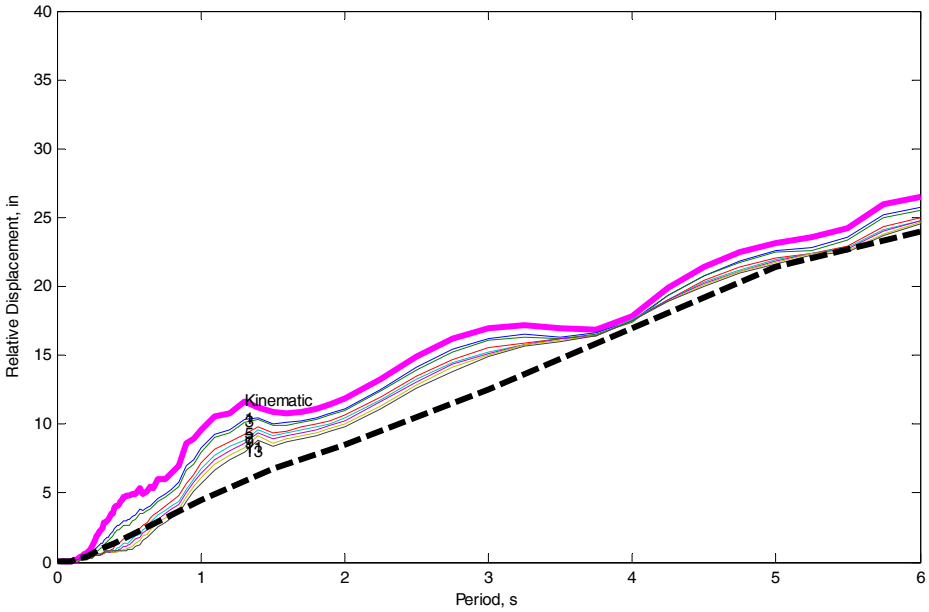

Pier 22, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Rock
Kinematic
1
3
5
11

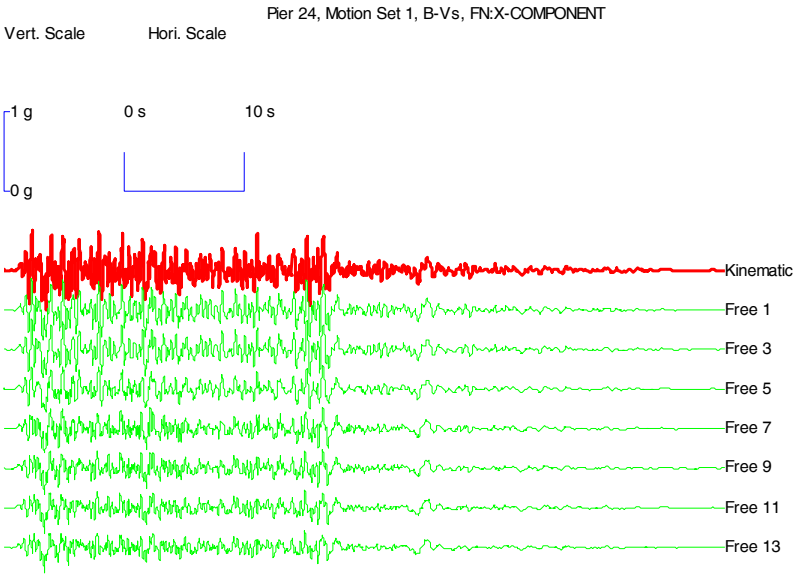

Relative Displacement, in
Period, s
Kinematic
11

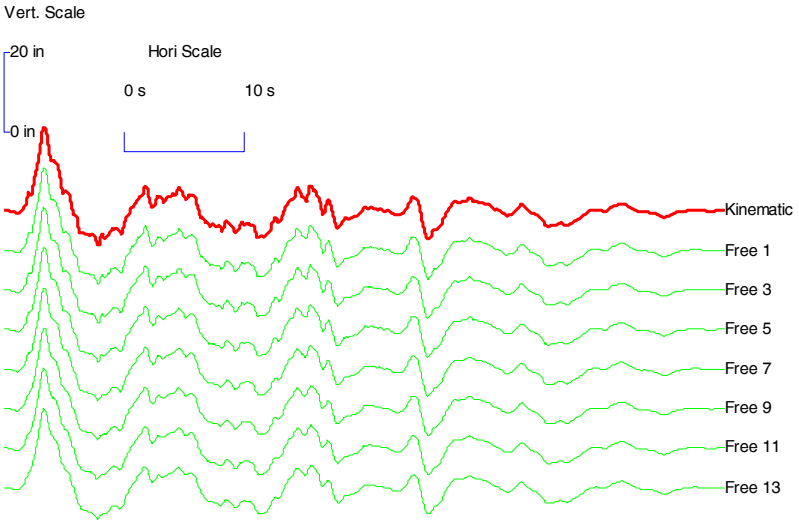

Pier 23, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 s
10 s
0 g
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13

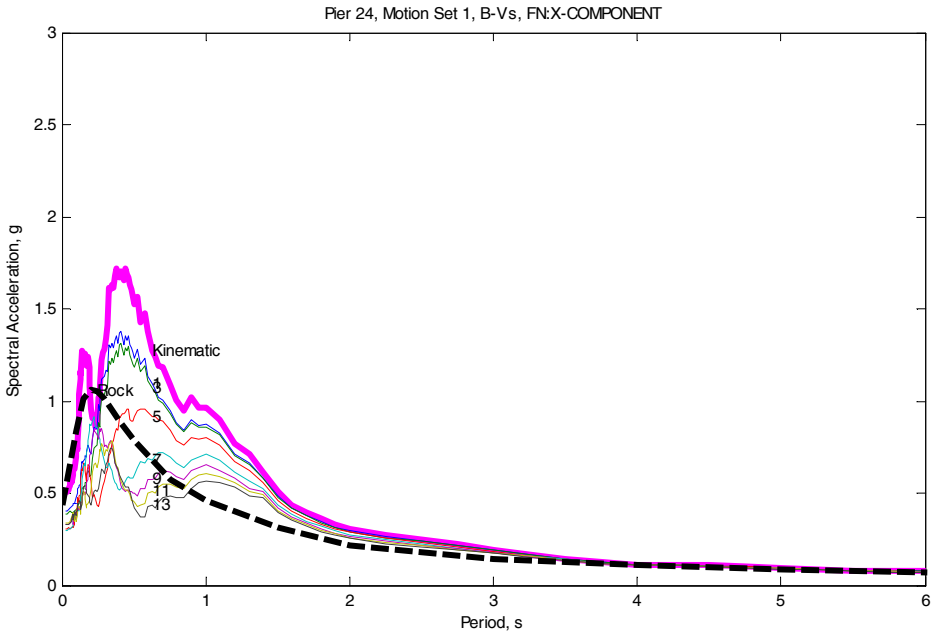

Vert. Scale
20 in
Hori Scale
0 s
10 s
0 in
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13

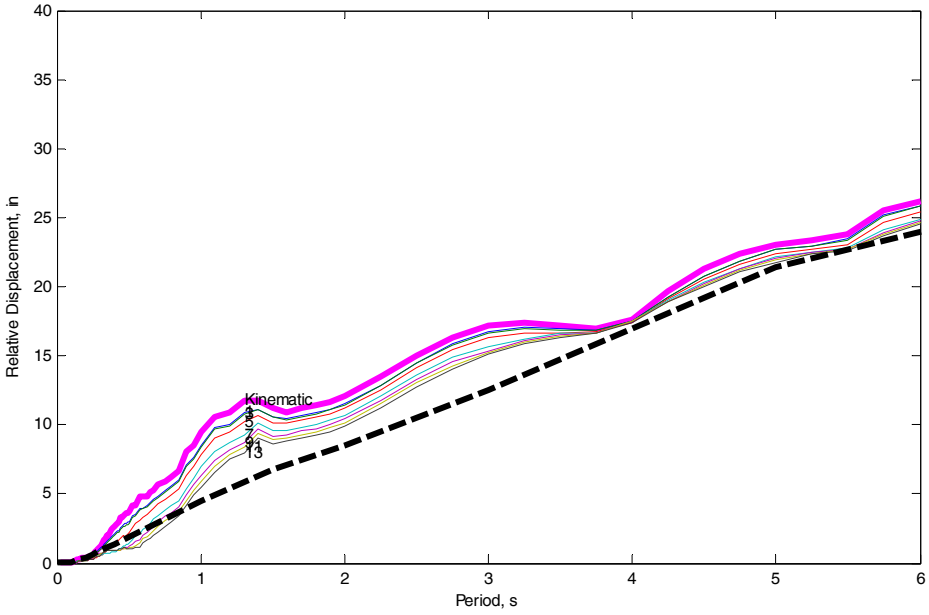

Pier 23, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Kinematic
Rock
1
3
5
9
11
13

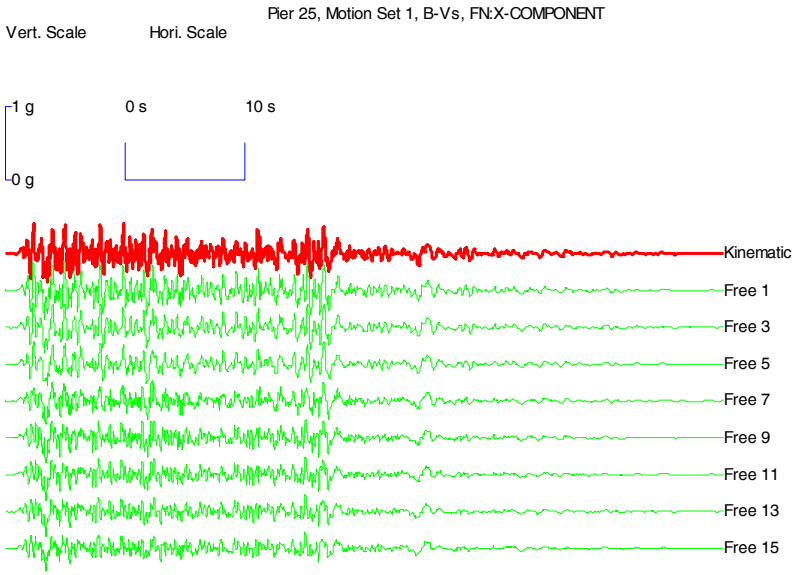

Relative Displacement, in
Period, s
Kinematic
1
3
5
9
11
13

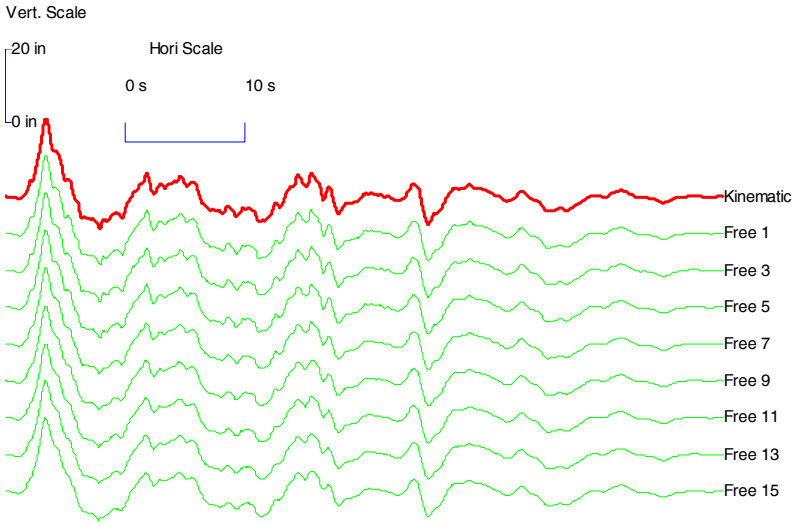

Pier 24, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 s
10 s
0 g
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13

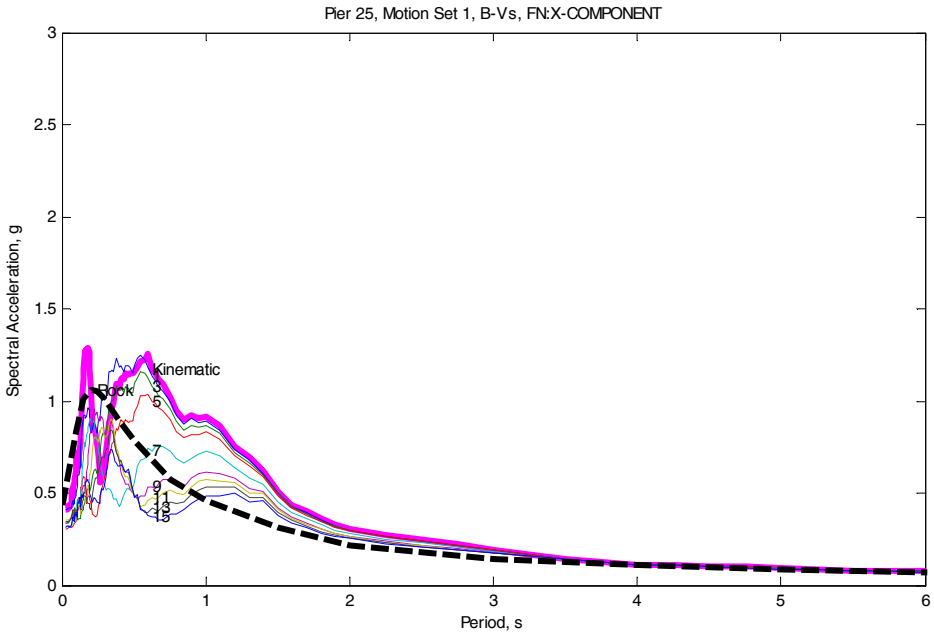

Vert. Scale
20 in
Hori Scale
0 s
10 s
0 in
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13

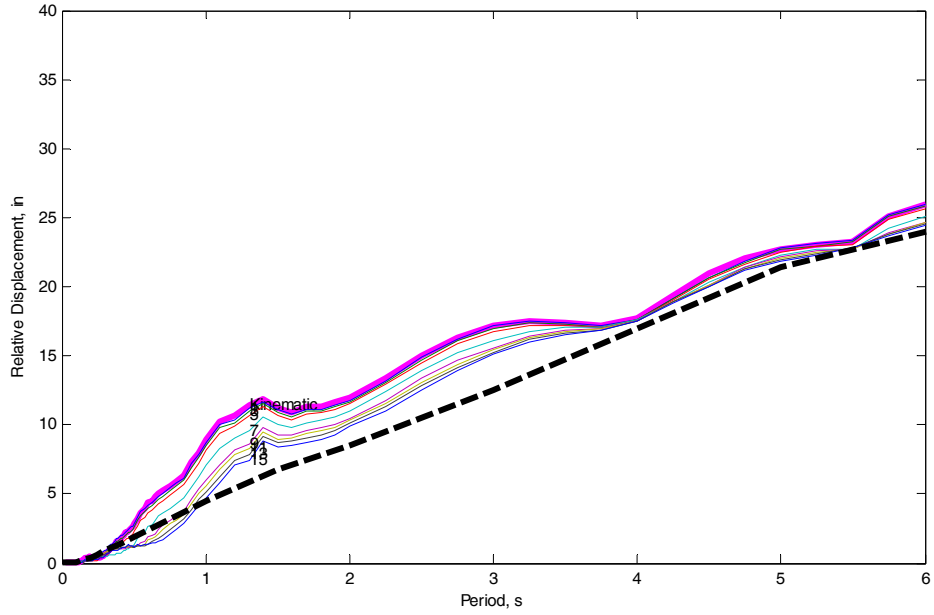

Pier 24, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Kinematic
Rock
3
5
7
9
11
13

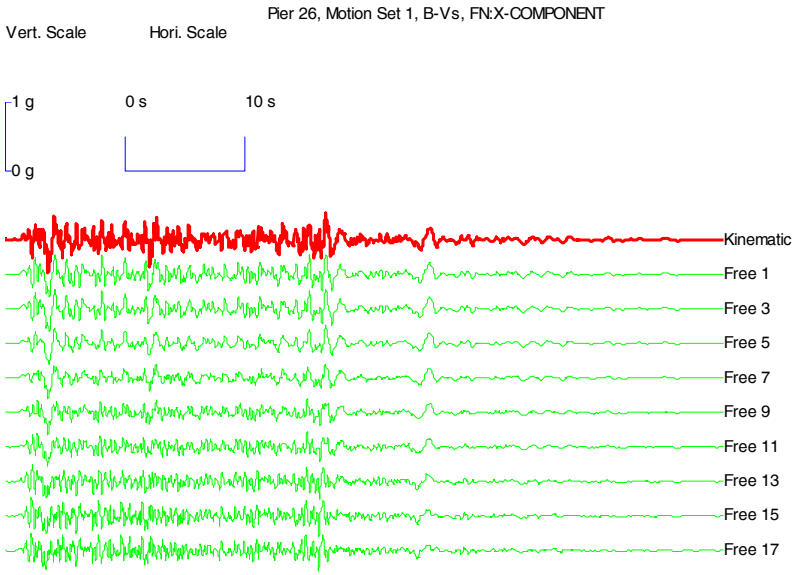

Relative Displacement, in
Period, s
Kinematic
Rock
13

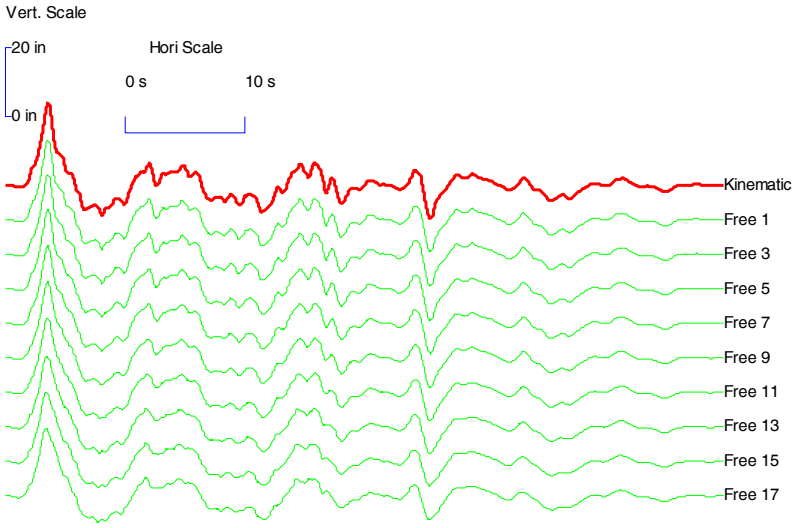

Pier 25, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15

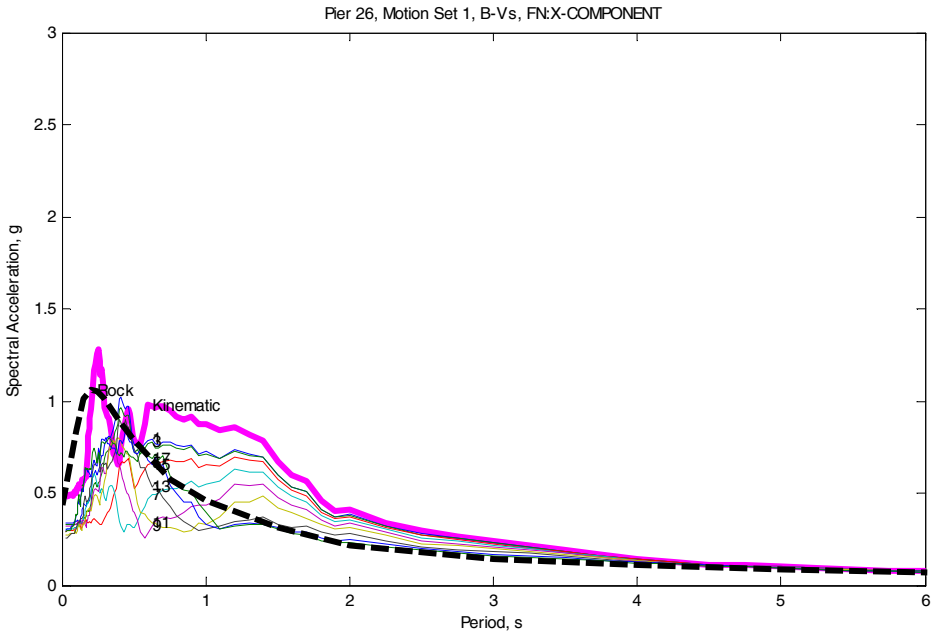

Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15

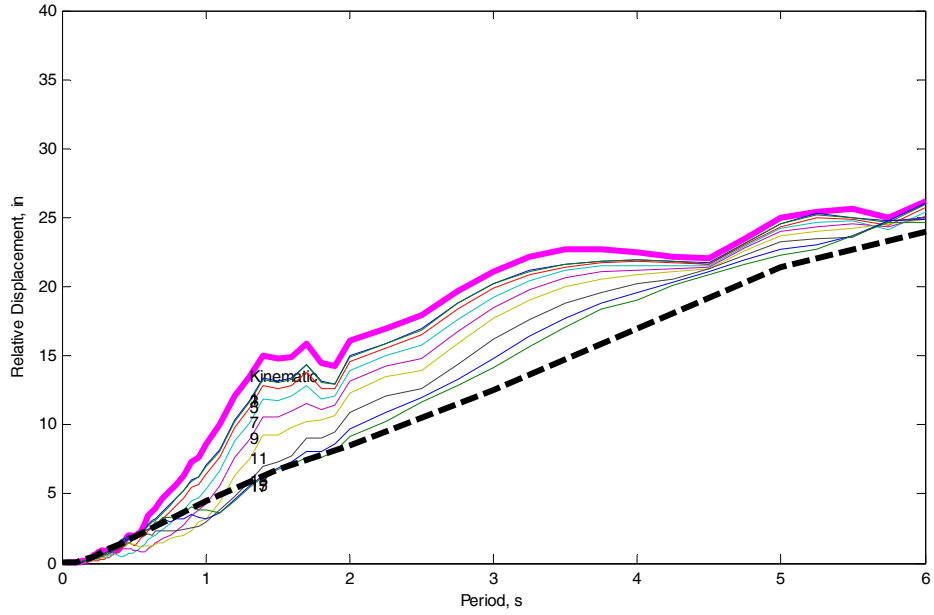

Pier 25, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Kinematic
Rock
3
5
7
9
11
13
15

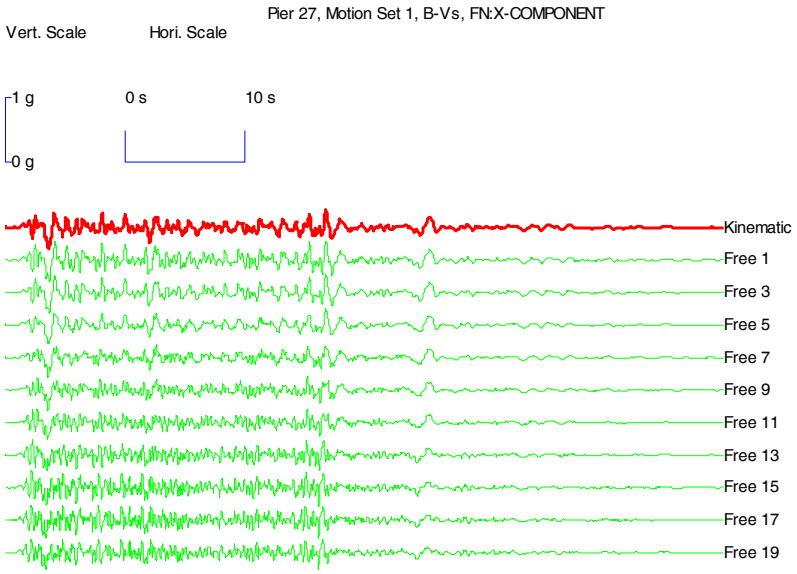

Relative Displacement, in
Period, s
Kinematic
3
5
7
9
11
13
15

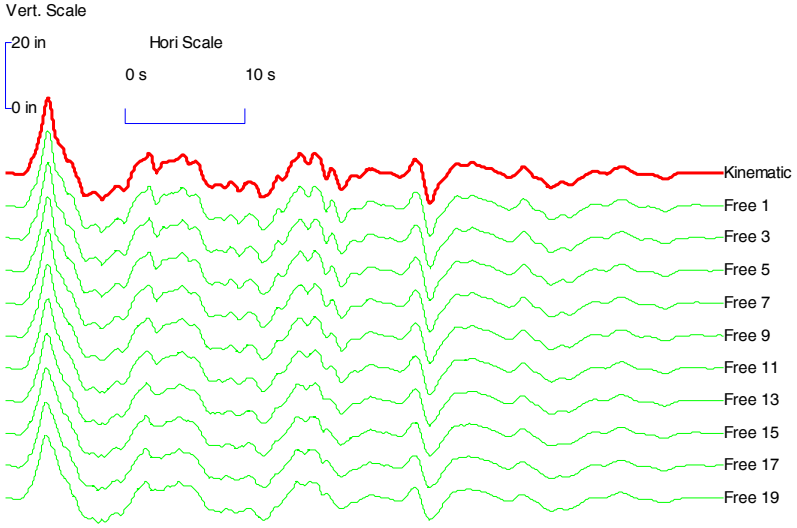

Pier 26, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17

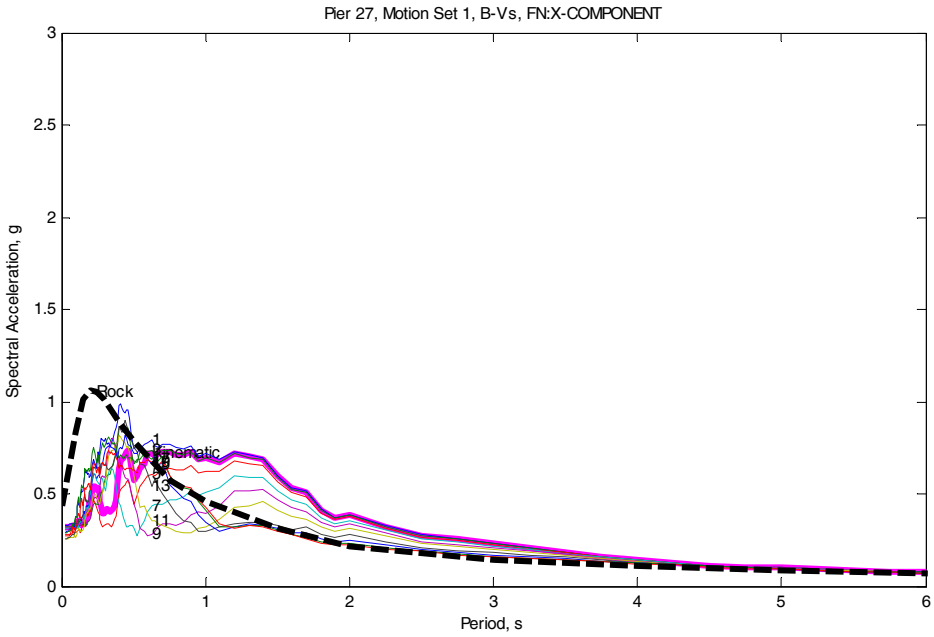

Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17

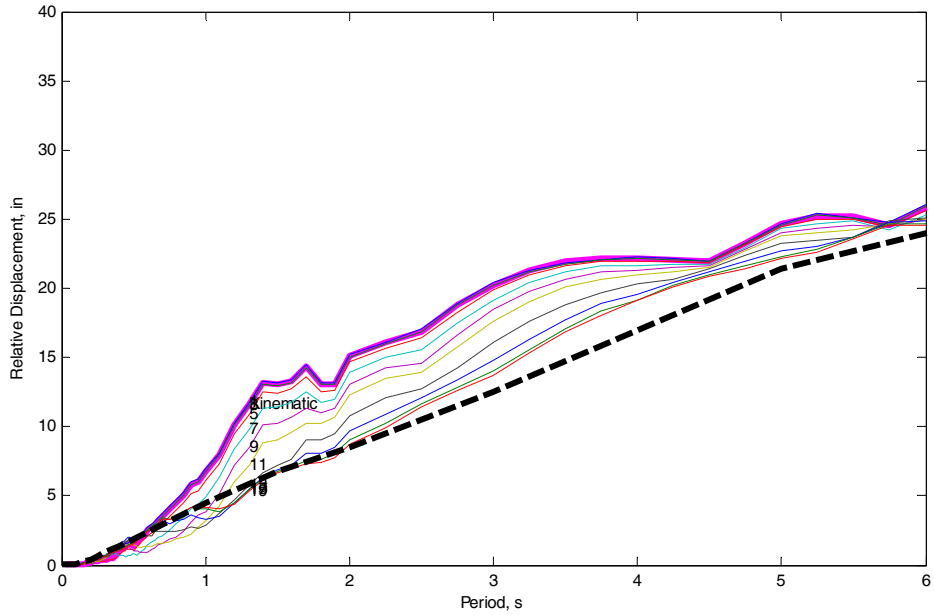

Pier 26, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Rock
Kinematic
3
5
7
9
11
13
15

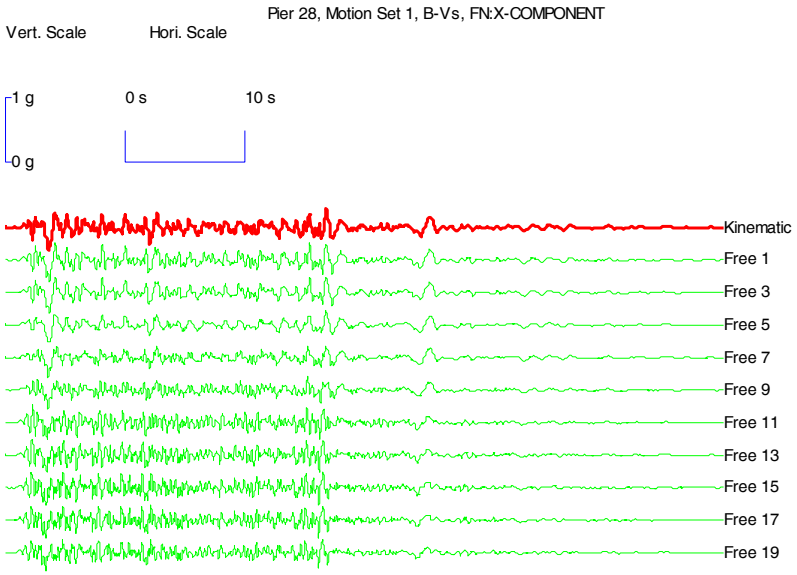

Relative Displacement, in
Period, s
Kinematic
3
5
7
9
11
13
15

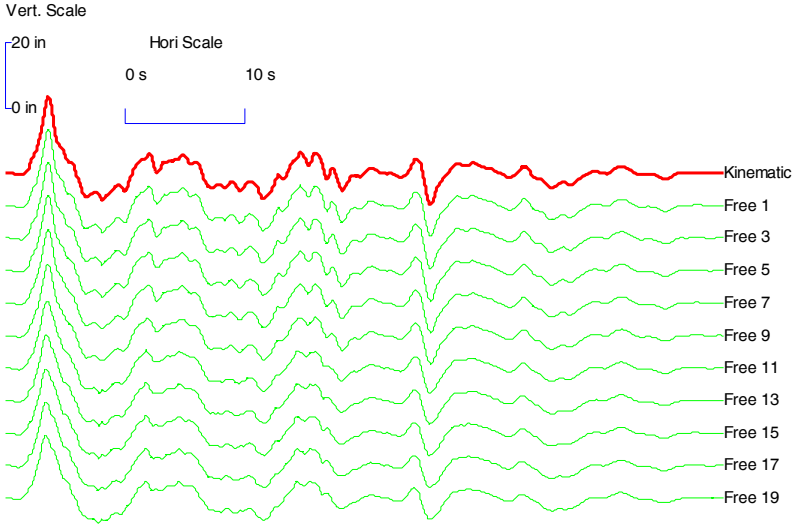

Pier 27, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17
Free 19

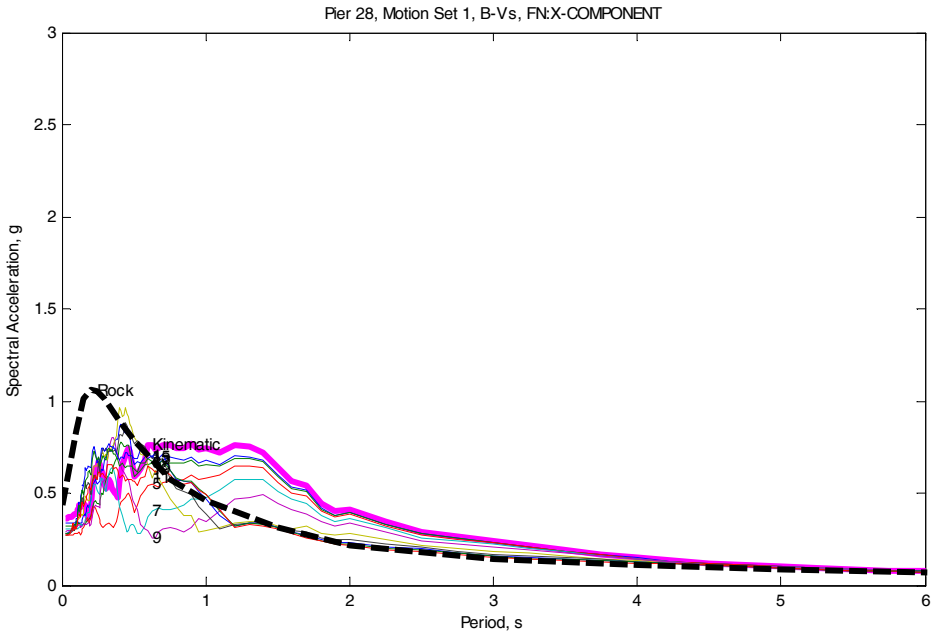

Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17
Free 19


Pier 27, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Rock
Kinematic
1
3
5
7
9
11
13


Relative Displacement, in
Period, s
Kinematic
5
7
9
11


Pier 28, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17
Free 19


Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17
Free 19


Pier 28, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Rock
Kinematic
1
3
5
7
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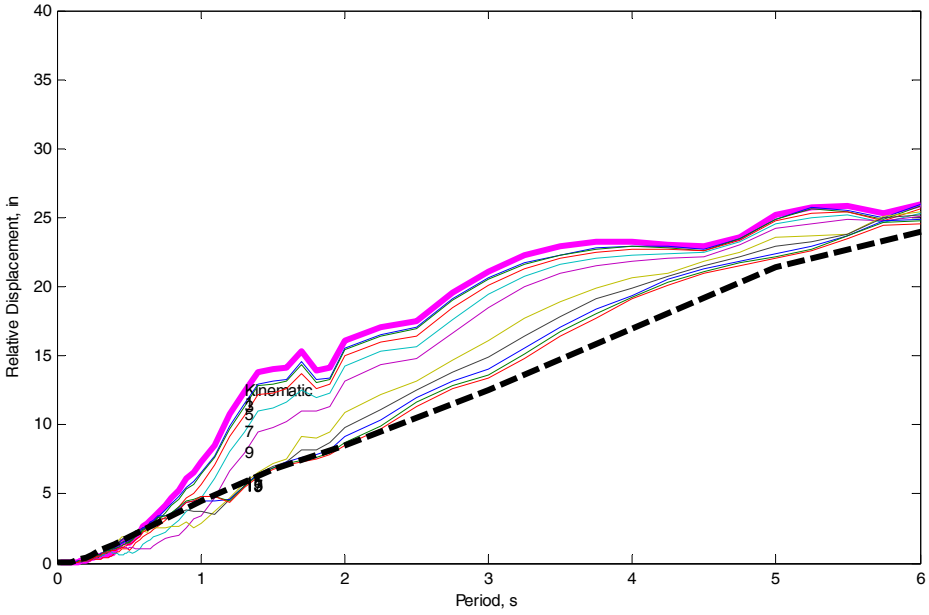
0
0.5
1
1.5
2
2.5
3
0
1
2
3
4
5
6


Relative Displacement, in
Period, s
Kinematic
1
3
5
7
9
15
0
5
10
15
20
25
30
35
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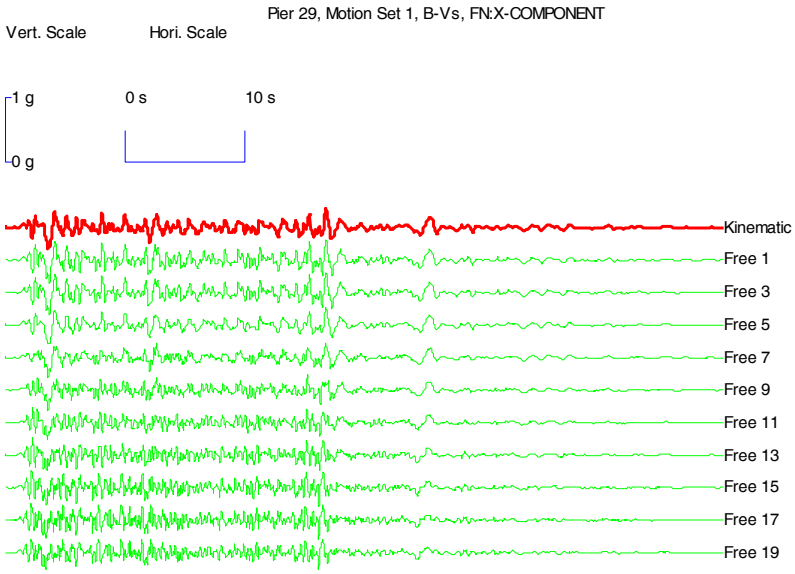
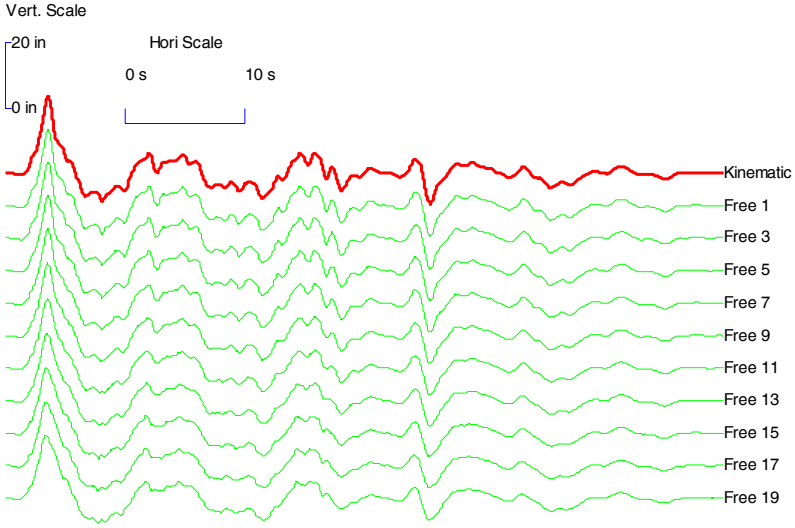
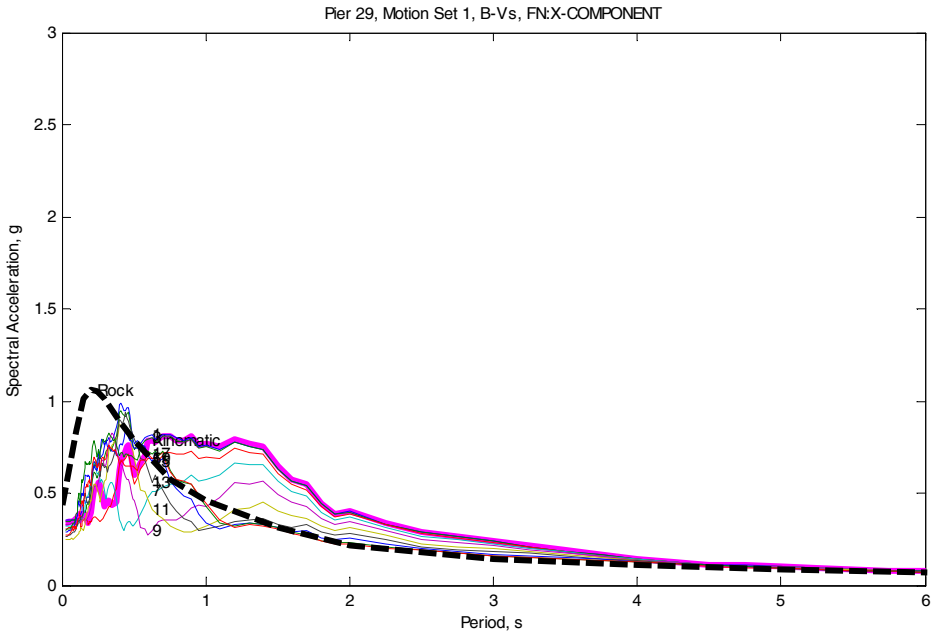
2
3
4
5
6


Pier 29, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17
Free 19


Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17
Free 19


Pier 29, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Rock
Kinematic
13
7
11
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0
0.5
1
1.5
2
2.5
3
0
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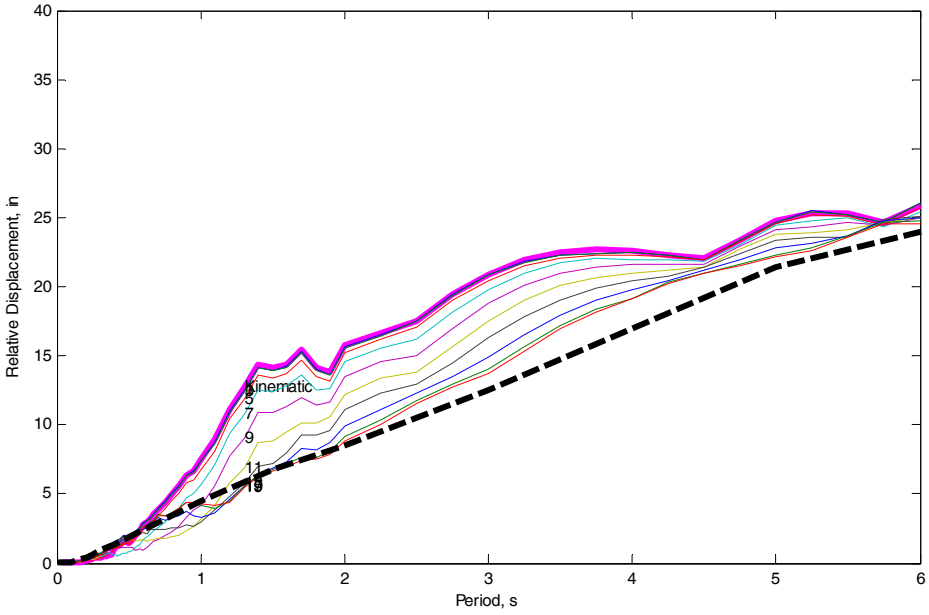
2
3
4
5
6


Relative Displacement, in
Period, s
Kinematic
5
7
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0
5
10
15
20
25
30
35
40
0
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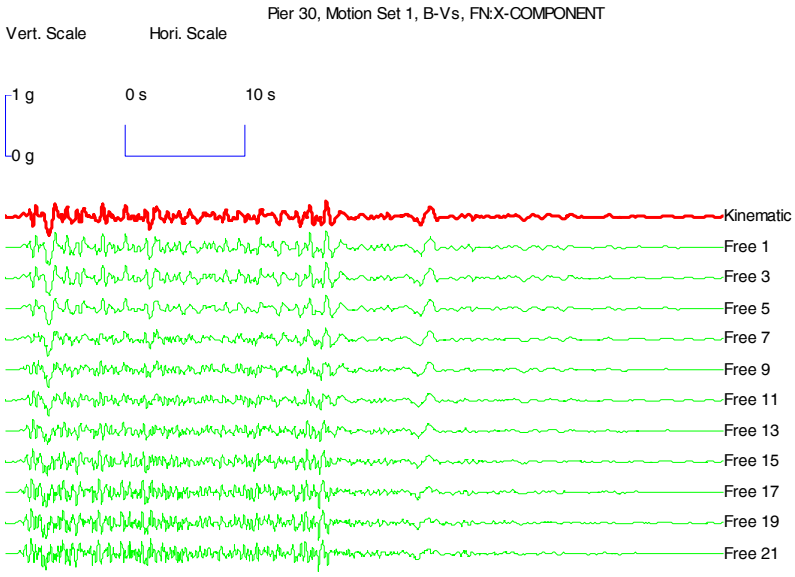
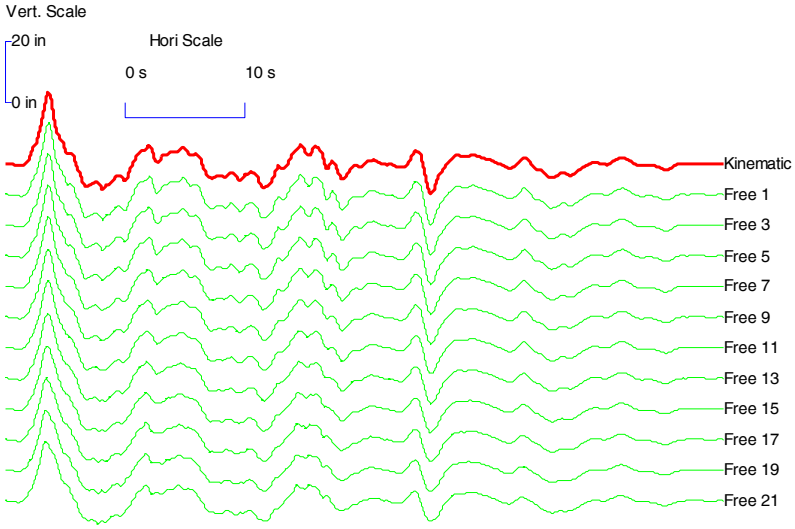
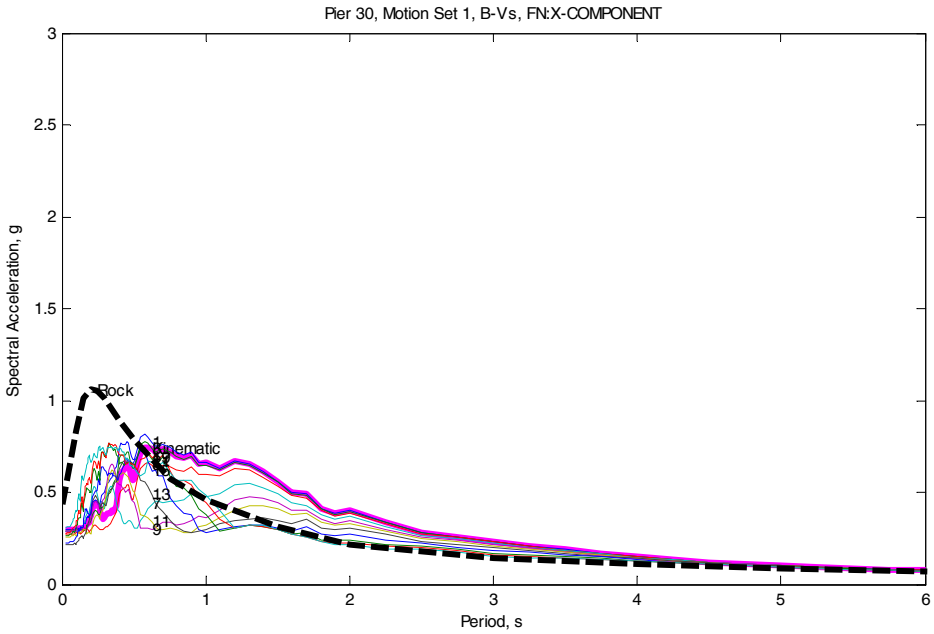
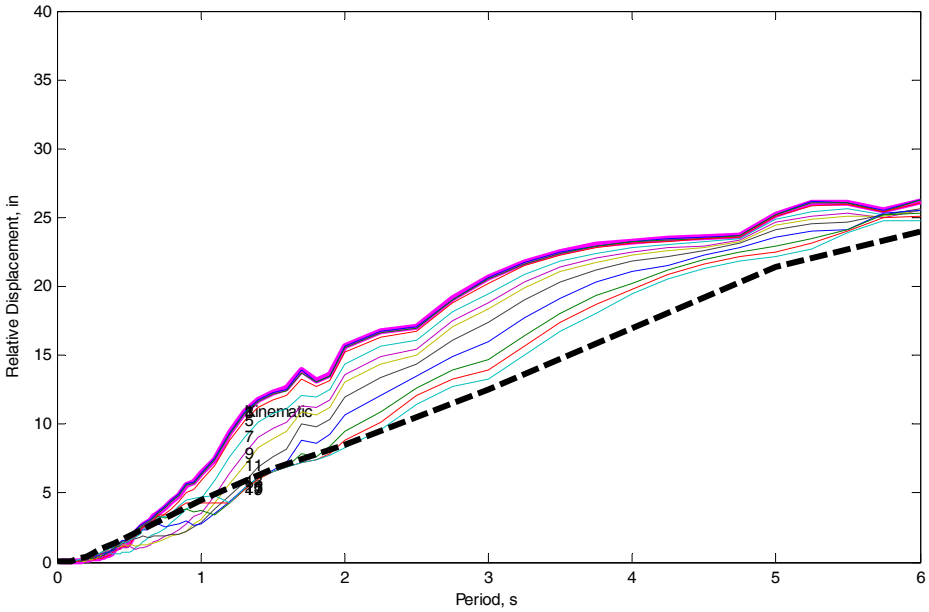
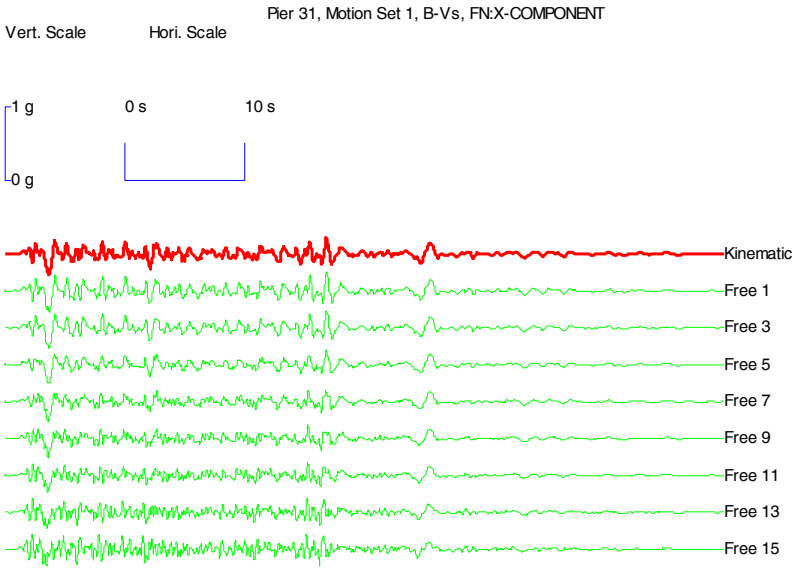
3
4
5
6

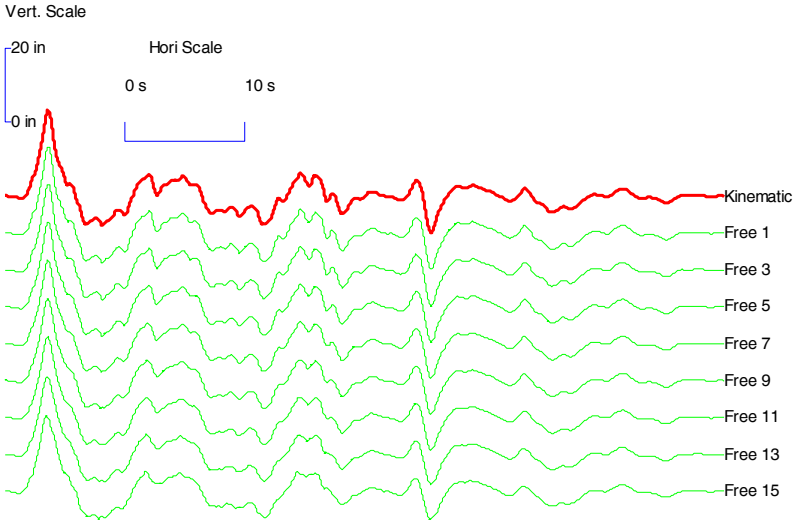

Pier 30, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17
Free 19
Free 21

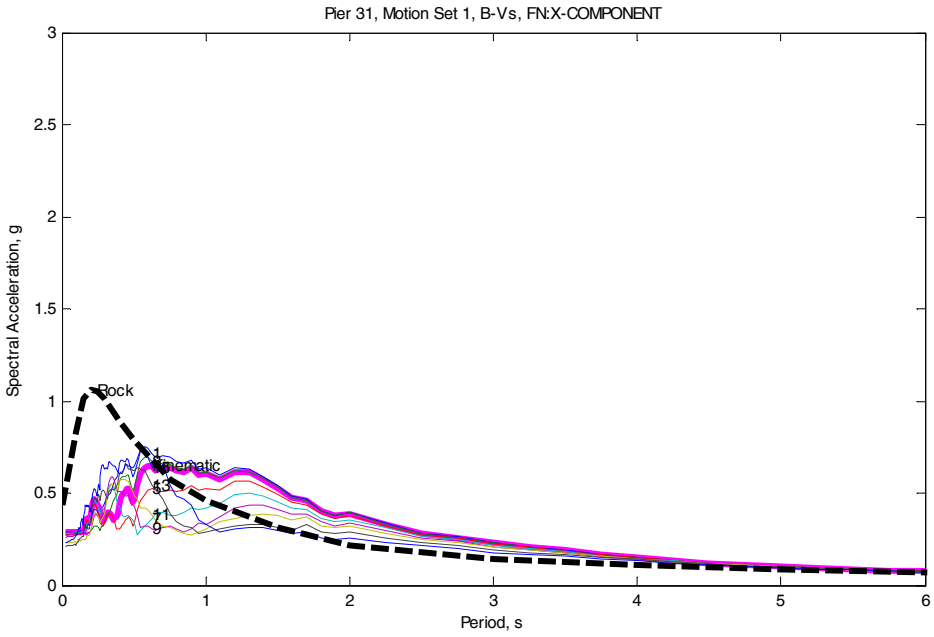

Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17
Free 19
Free 21

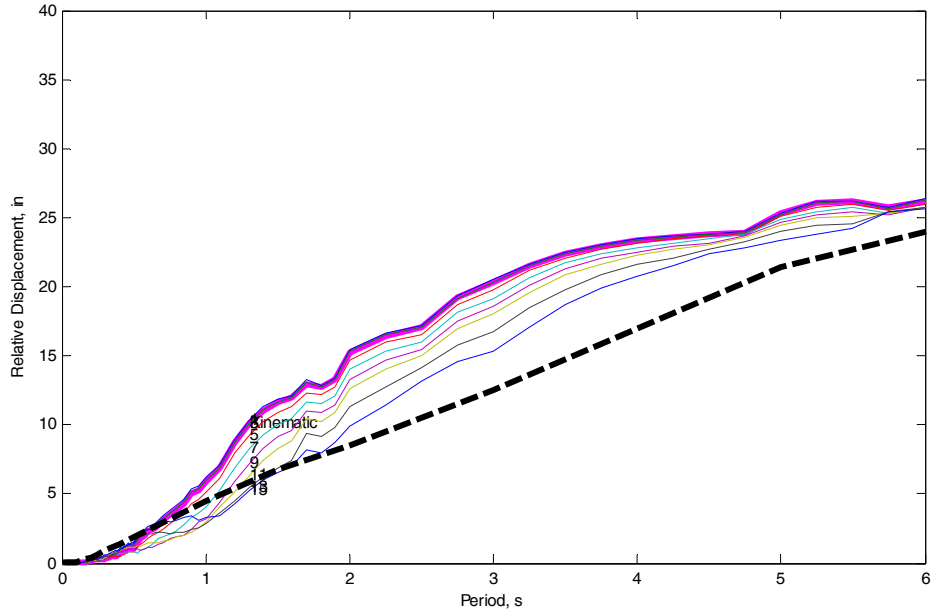

Pier 30, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Rock
Kinematic
13
11
9


Relative Displacement, in
Period, s
Kinematic
5
7
9
11


Pier 31, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15


Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15


Pier 31, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Rock
Kinematic
1
5
13
11
9
0
0.5
1
1.5
2
2.5
3
0
1
2
3
4
5
6


Relative Displacement, in
Period, s
Kinematic
5
7
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0
5
10
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20
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40
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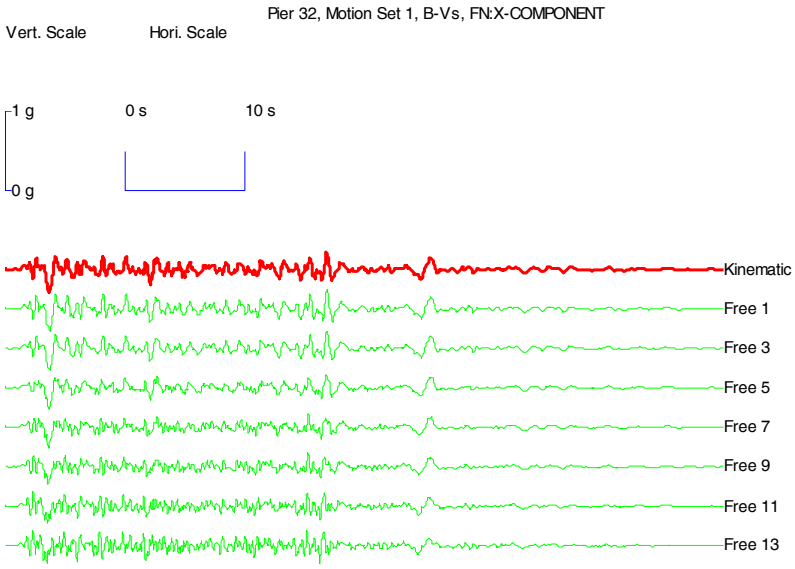
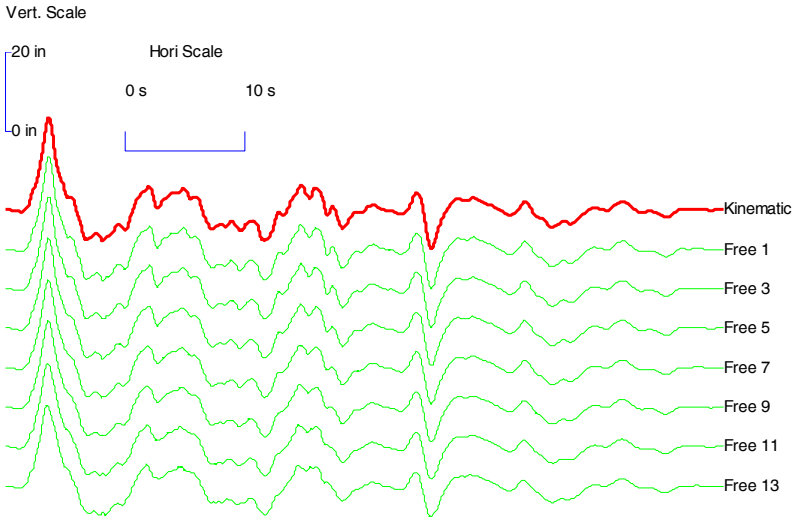
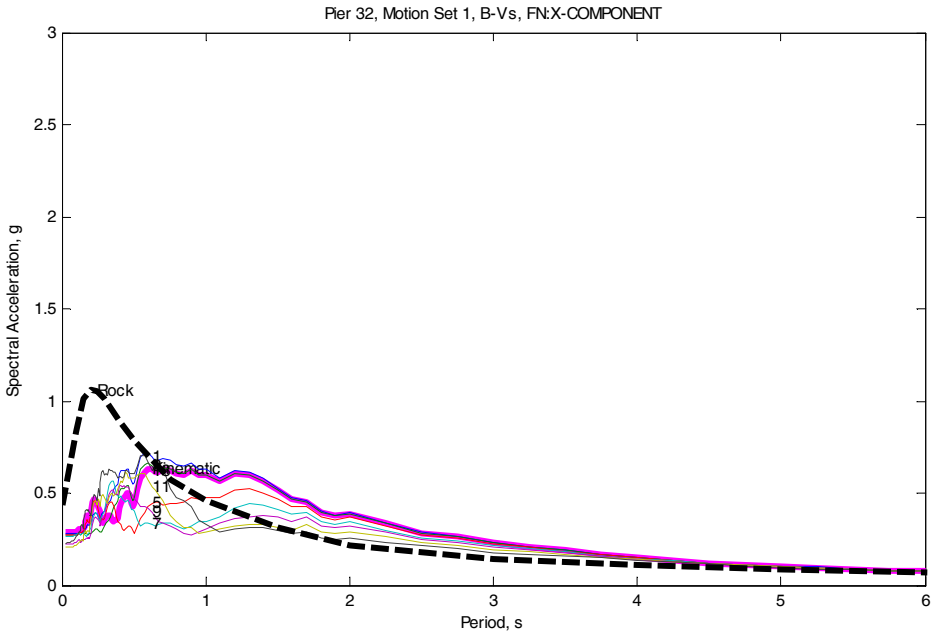
1
2
3
4
5
6


Pier 32, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13


Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13


Pier 32, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Rock
1
Kinematic
11
5
7
0
0.5
1
1.5
2
2.5
3
0
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2
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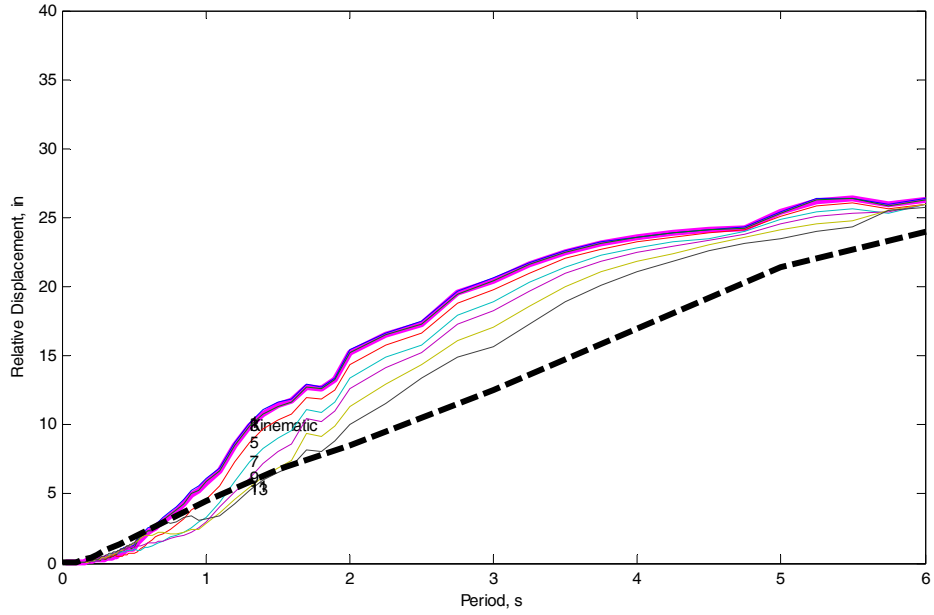
5
6


Relative Displacement, in
Period, s
Kinematic
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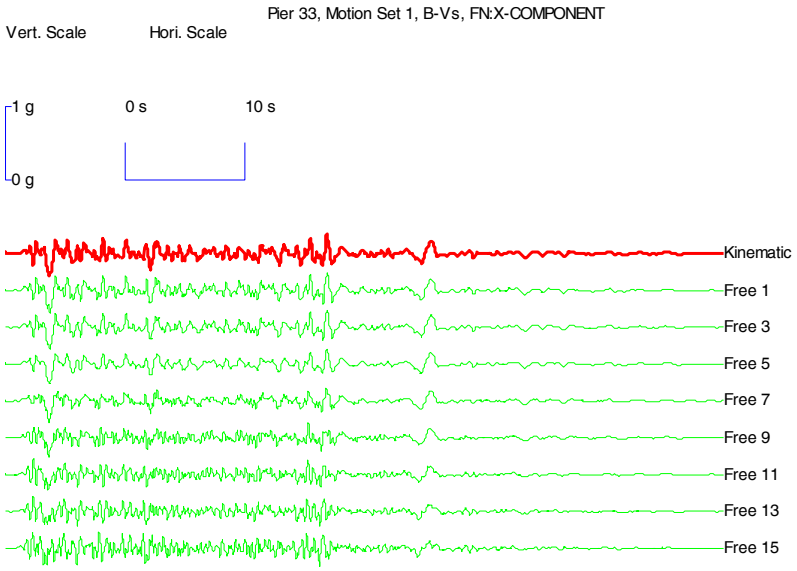
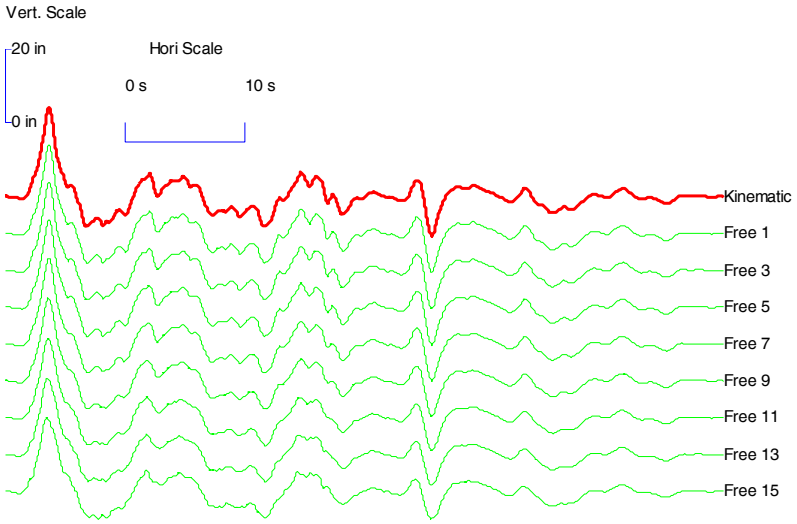

Pier 33, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15


Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
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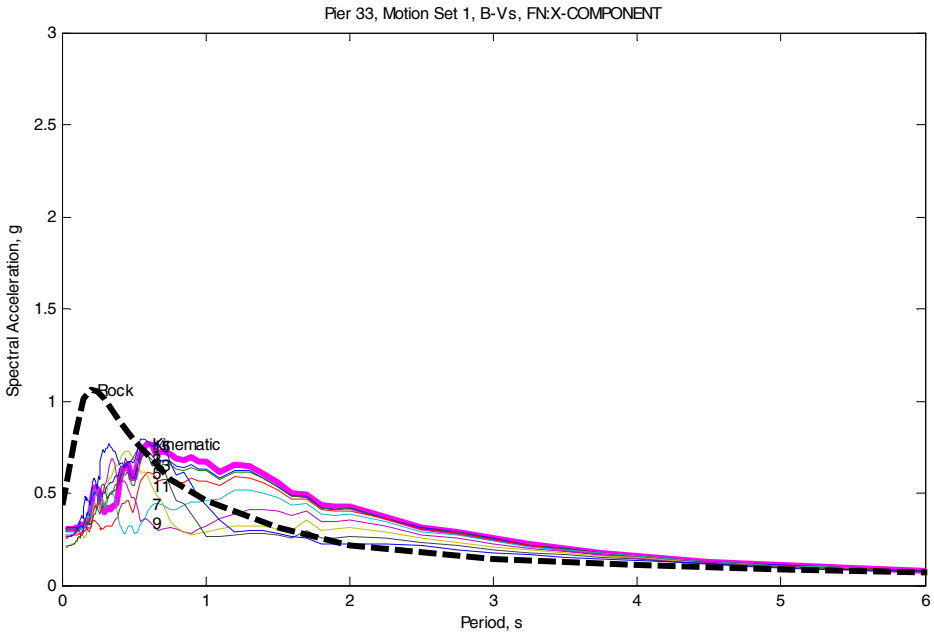
Free 11
Free 13
Free 15


Pier 33, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Rock
Kinematic
3
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1.5
2
2.5
3
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3
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5
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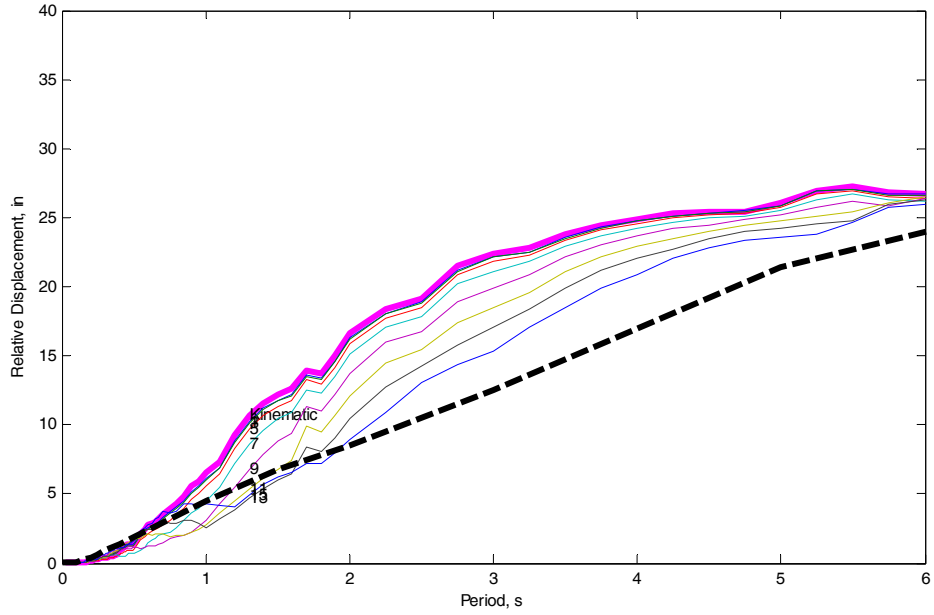
Relative Displacement, in
Period, s
Kinematic
3
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11
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0
5
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20
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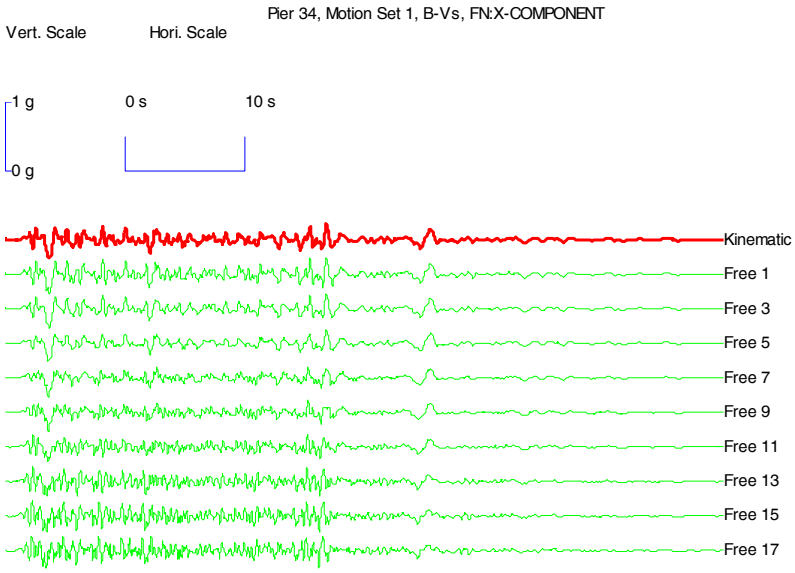
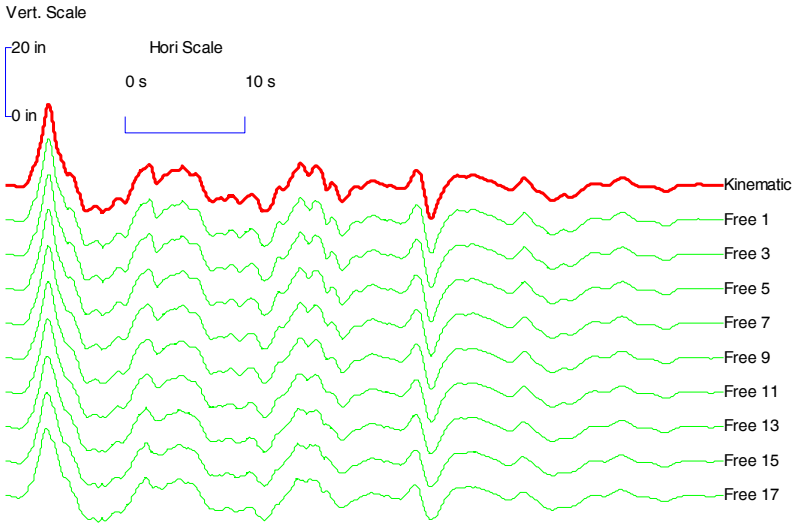
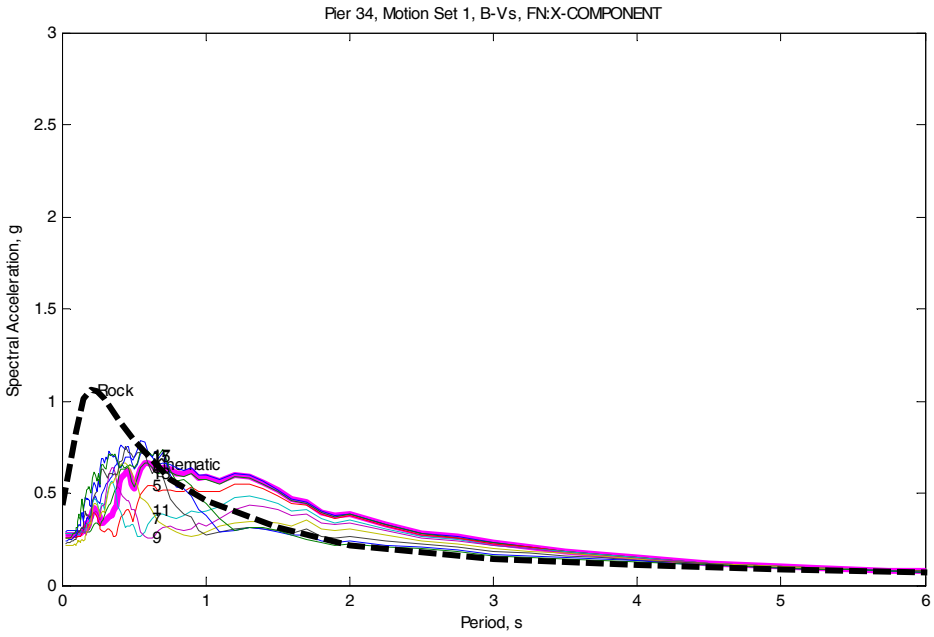
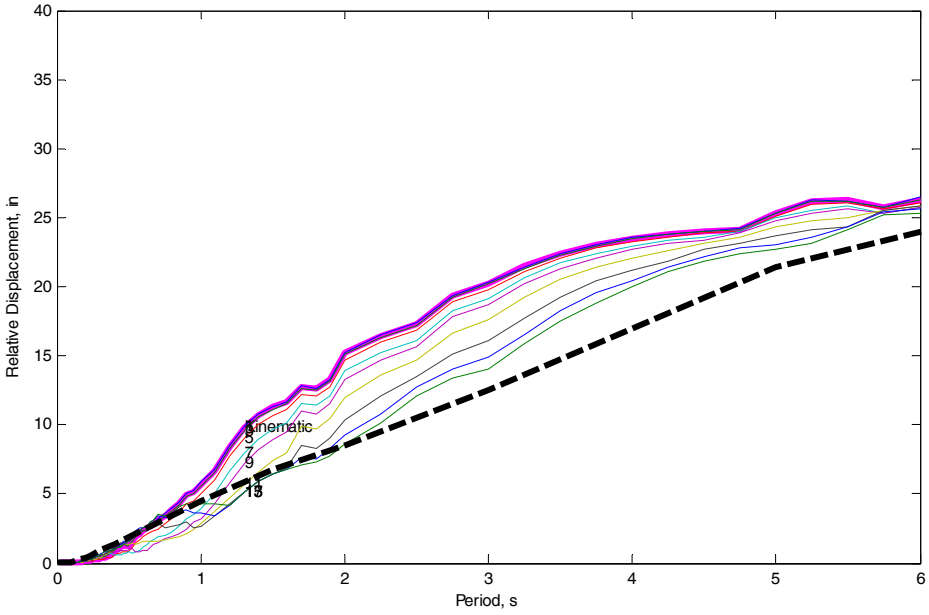
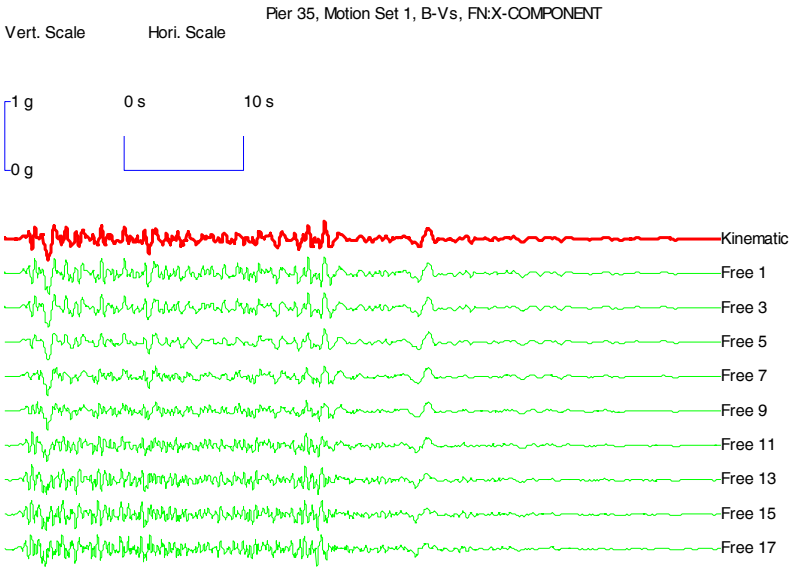
3
4
5
6

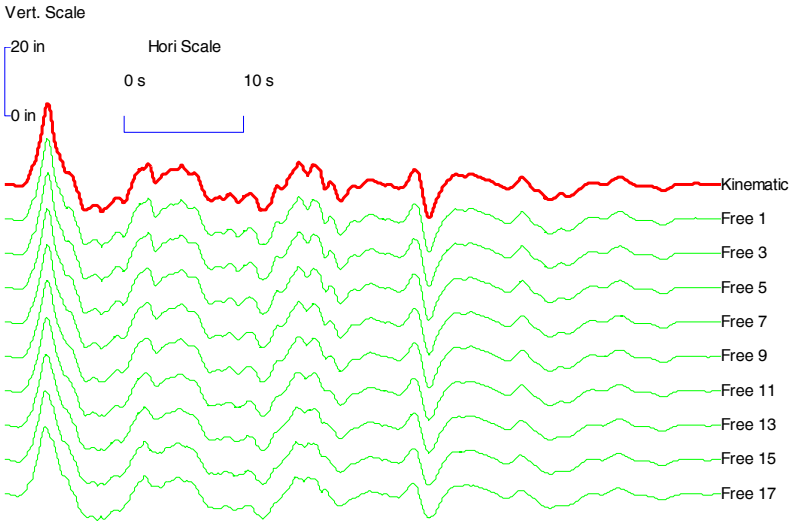

Pier 34, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17

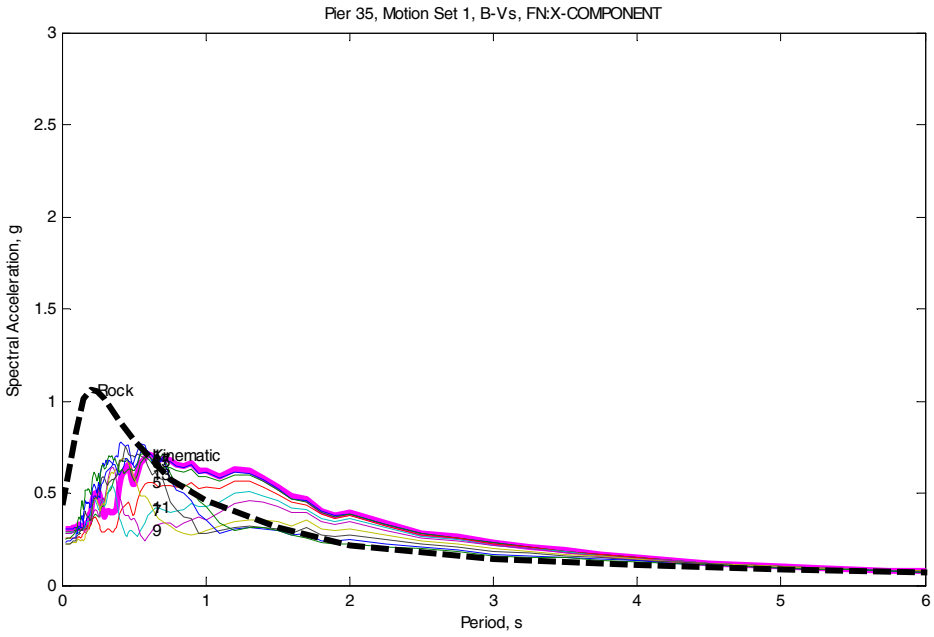

Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17

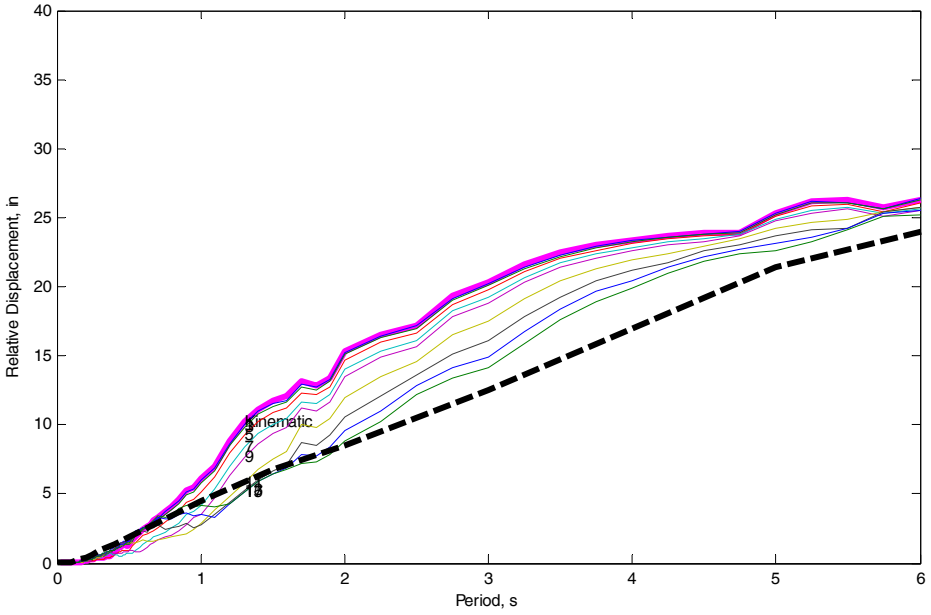

Pier 34, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Rock
Kinematic
5
11
7
9

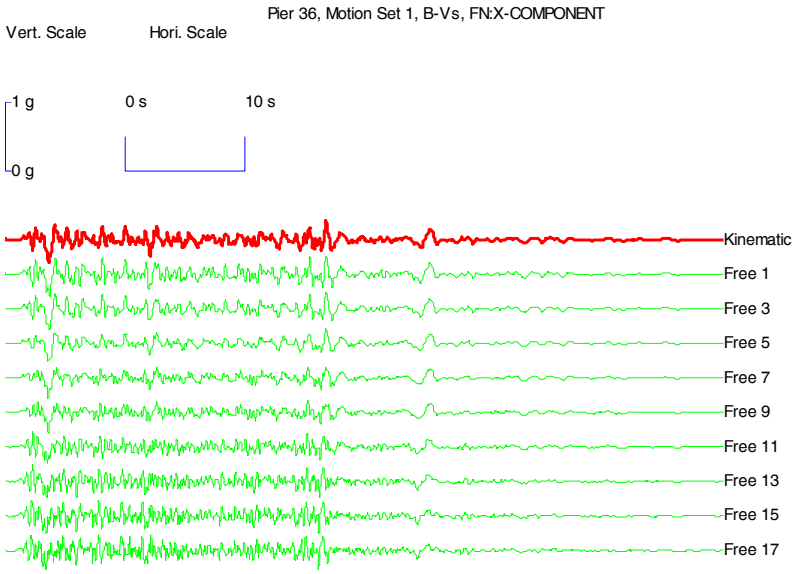

Relative Displacement, in
Period, s
Kinematic
5
7
9

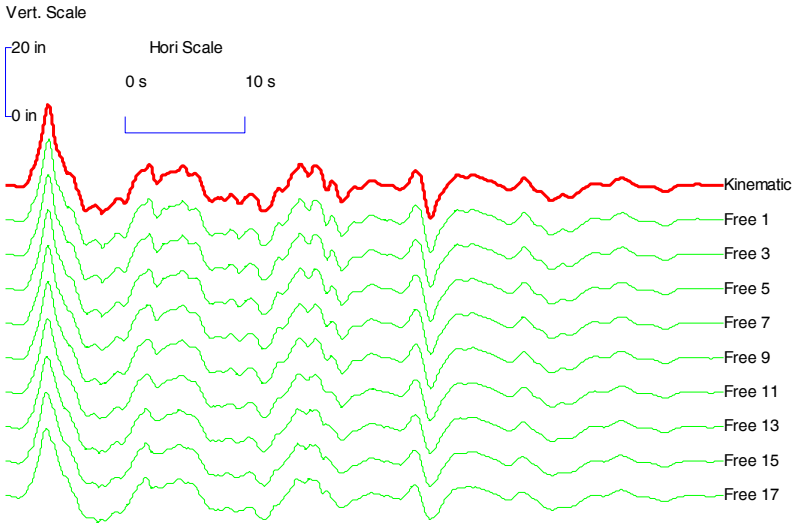

Pier 35, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17

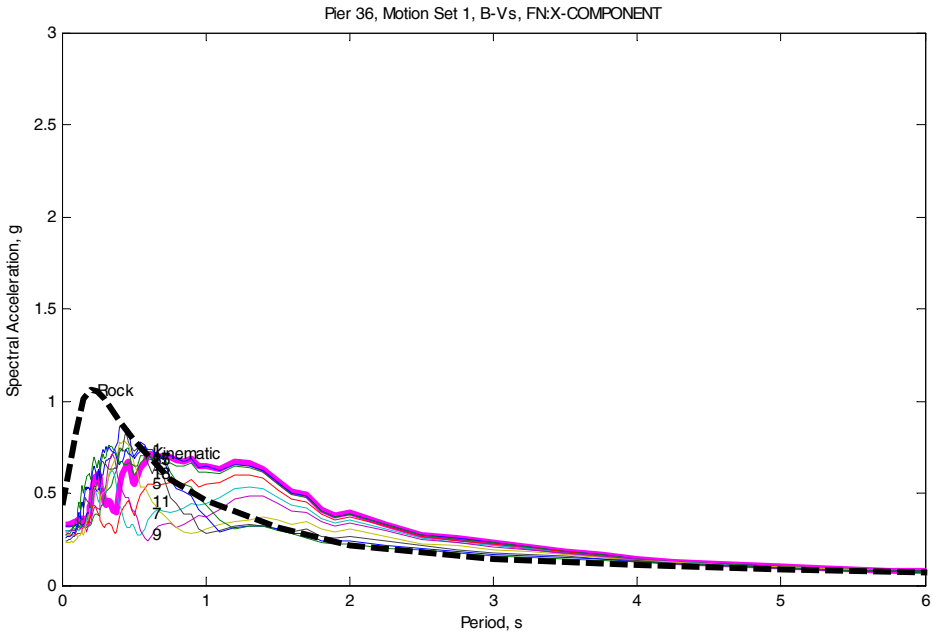

Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17


Pier 35, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Rock
Kinematic
5
11
9


Relative Displacement, in
Period, s
Kinematic
9


Pier 36, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17


Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17


Pier 36, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Rock
Kinematic
1
3
5
11
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1
1.5
2
2.5
3
0
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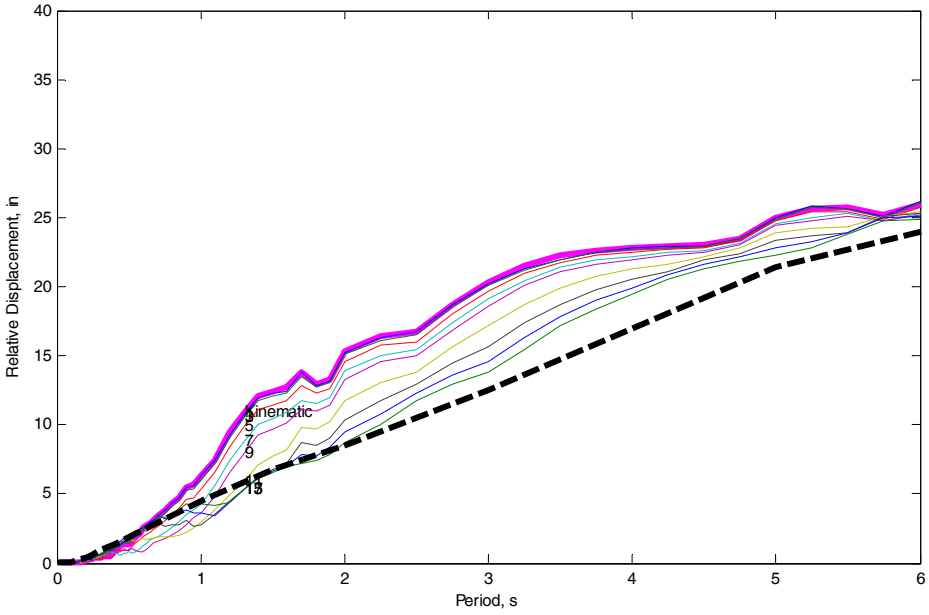
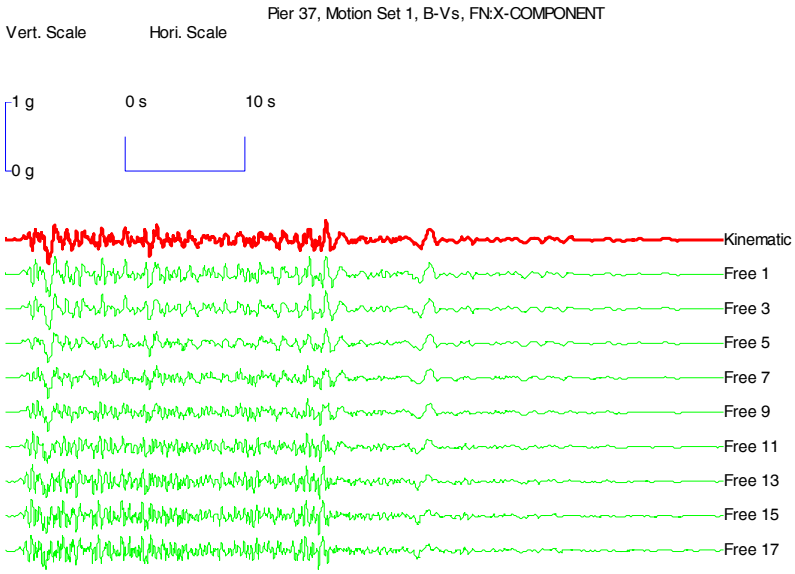
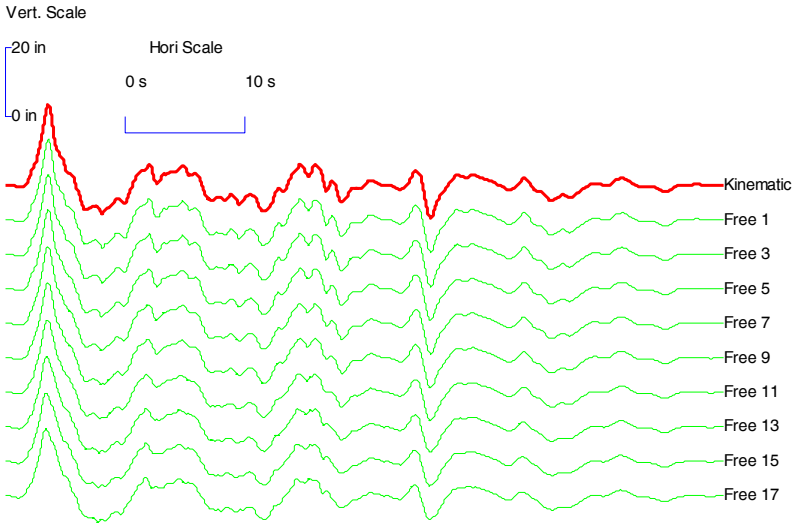
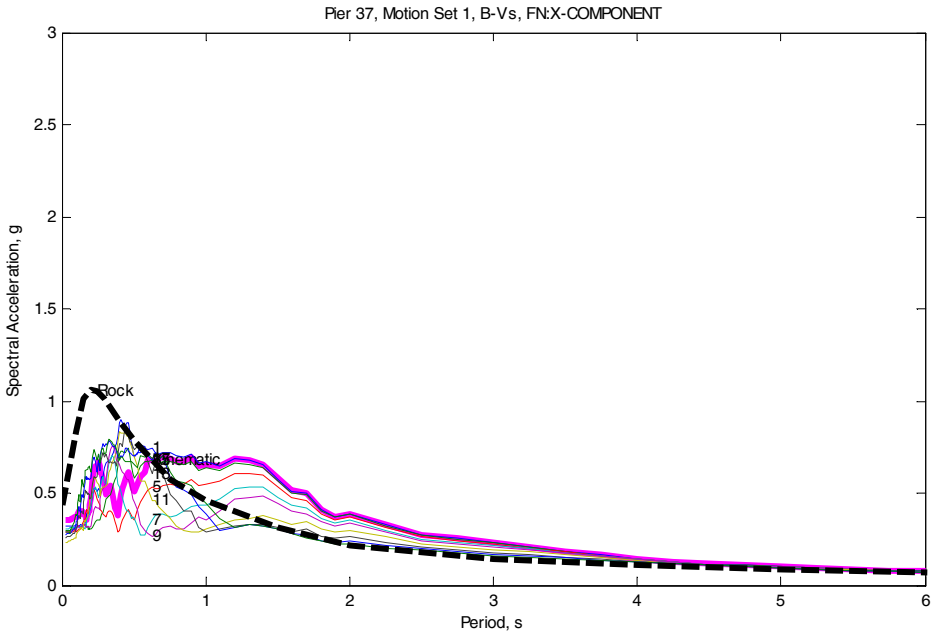
3
4
5
6


Relative Displacement, in
Period, s
Kinematic
1
5
7
9
13
0
5
10
15
20
25
30
35
40
0
1
2
3
4
5
6


Pier 37, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17


Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17


Pier 37, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Rock
Kinematic
1
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1.5
2
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3
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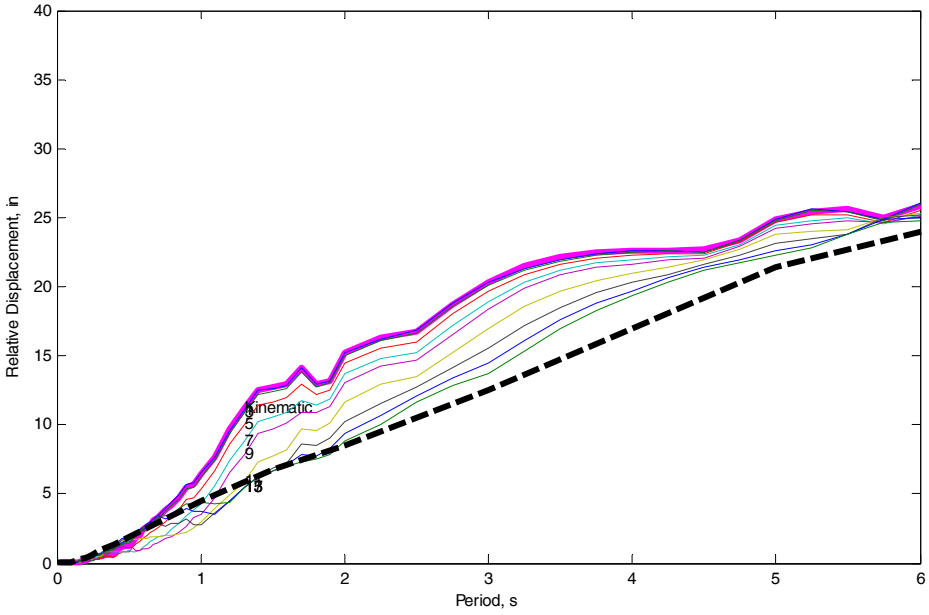
Relative Displacement, in
Period, s
Kinematic
5
7
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0
5
10
15
20
25
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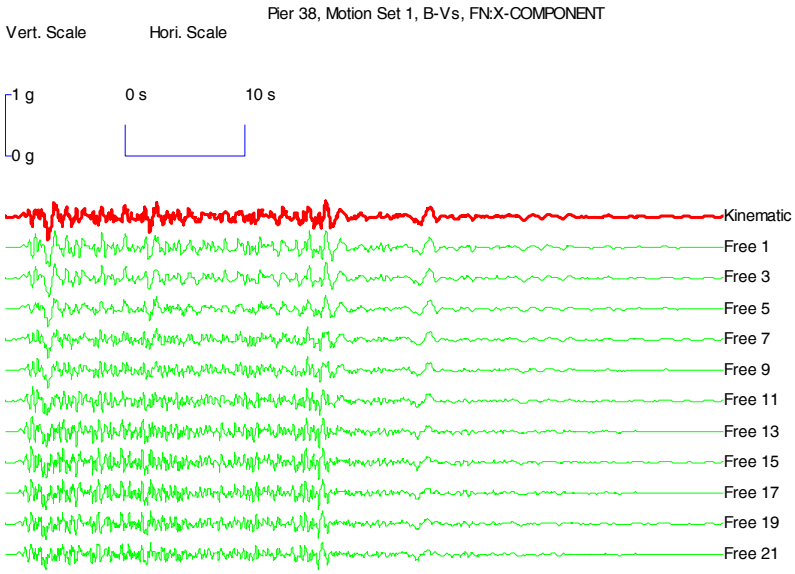
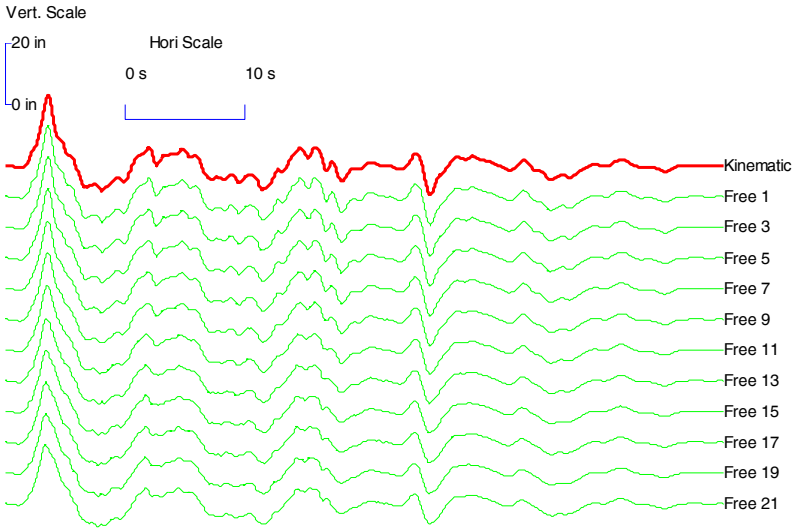
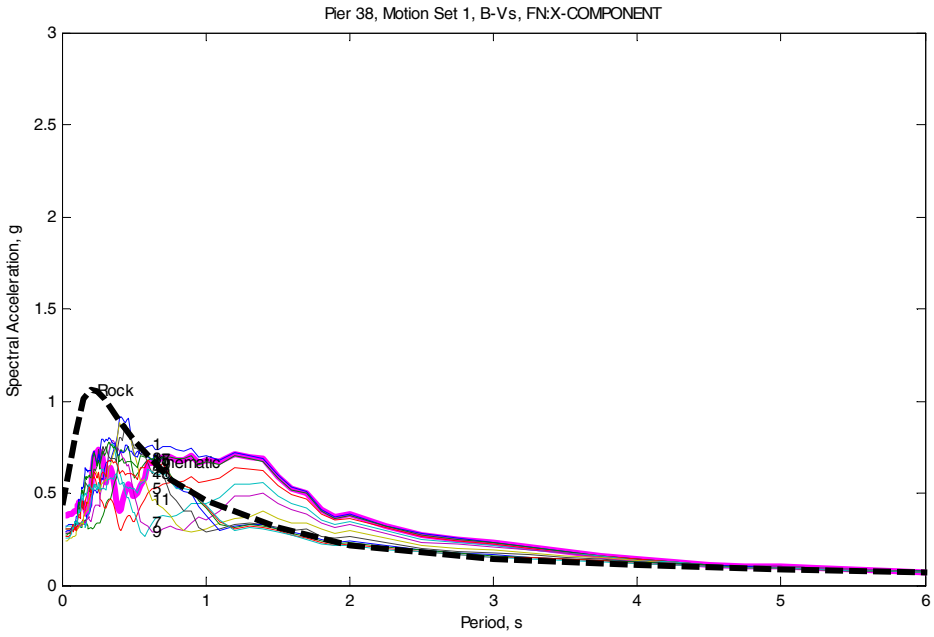
3
4
5
6


Pier 38, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17
Free 19
Free 21


Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17
Free 19
Free 21


Pier 38, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Rock
Kinematic
1
3
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11
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0.5
1
1.5
2
2.5
3
0
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2
3
4
5
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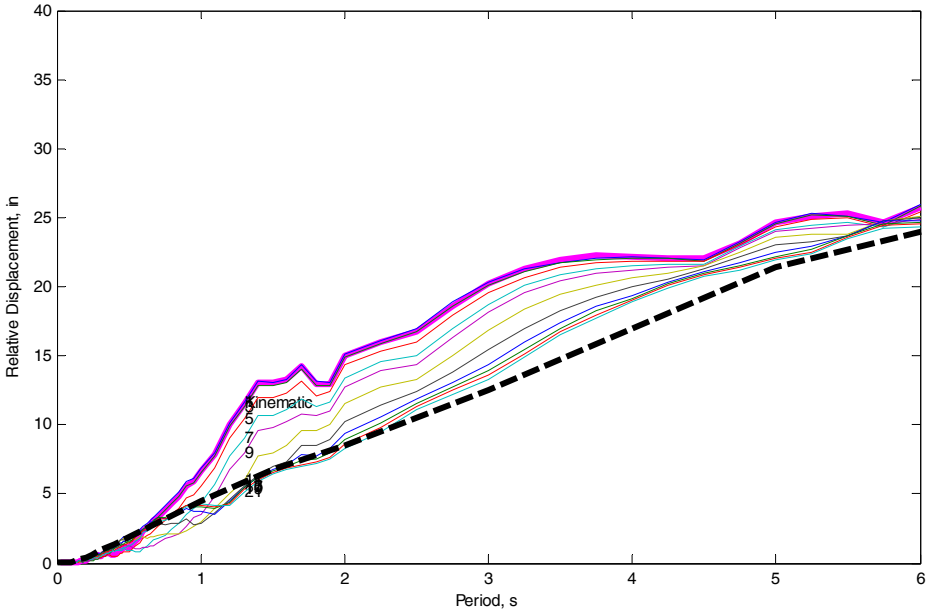
Relative Displacement, in
Period, s
Kinematic
1
3
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7
9
11
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20
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40
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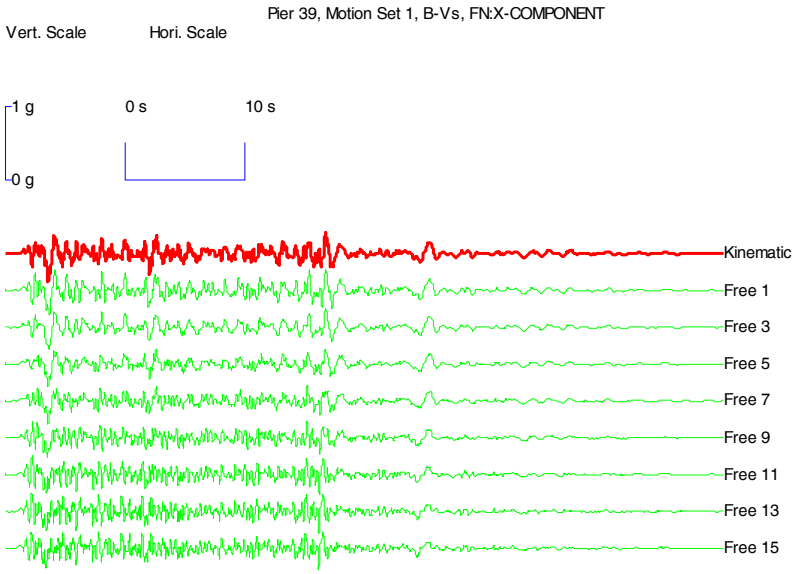
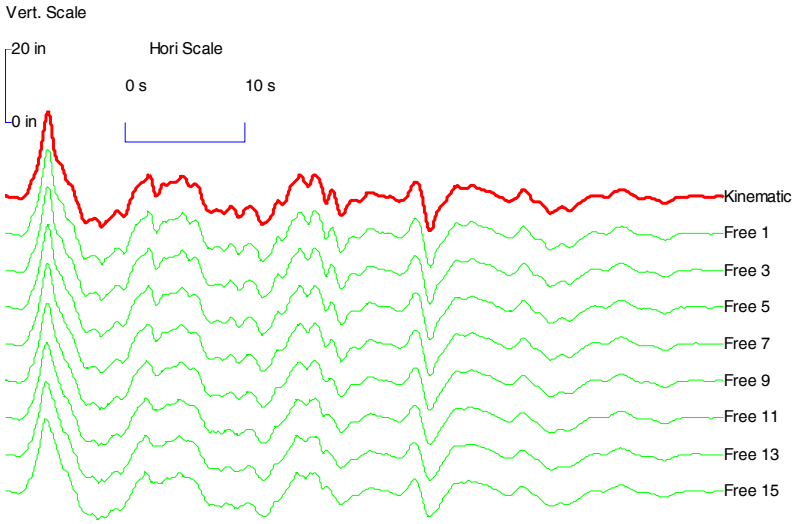

Pier 39, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15


Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
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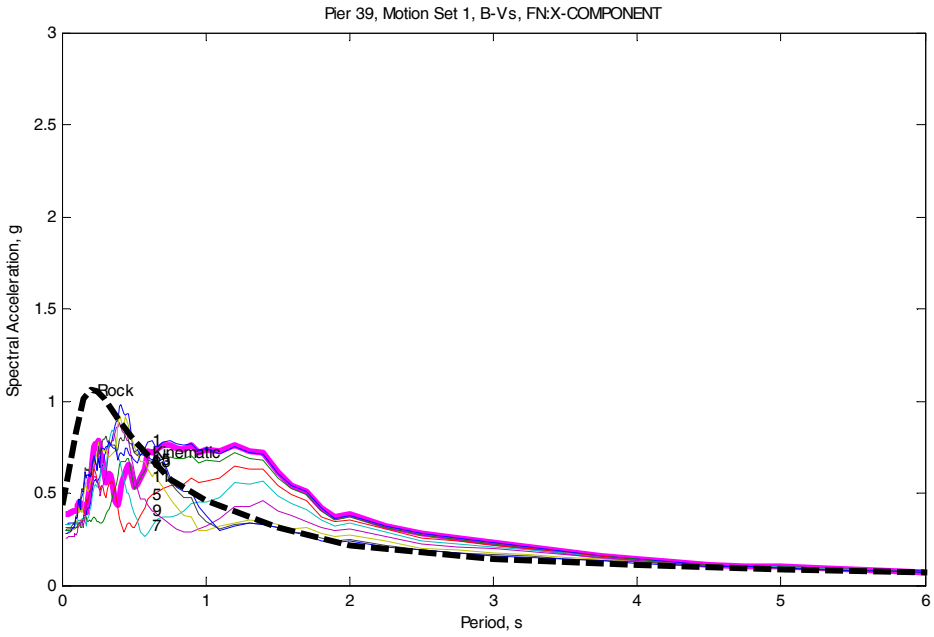
Free 11
Free 13
Free 15


Pier 39, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Rock
Kinematic
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1.5
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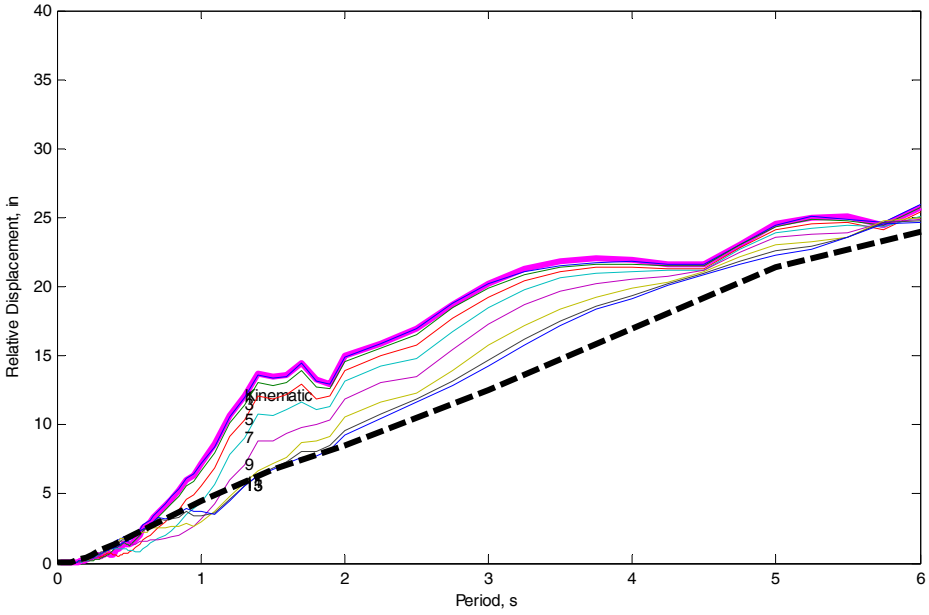
Relative Displacement, in
Period, s
Kinematic
3
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20
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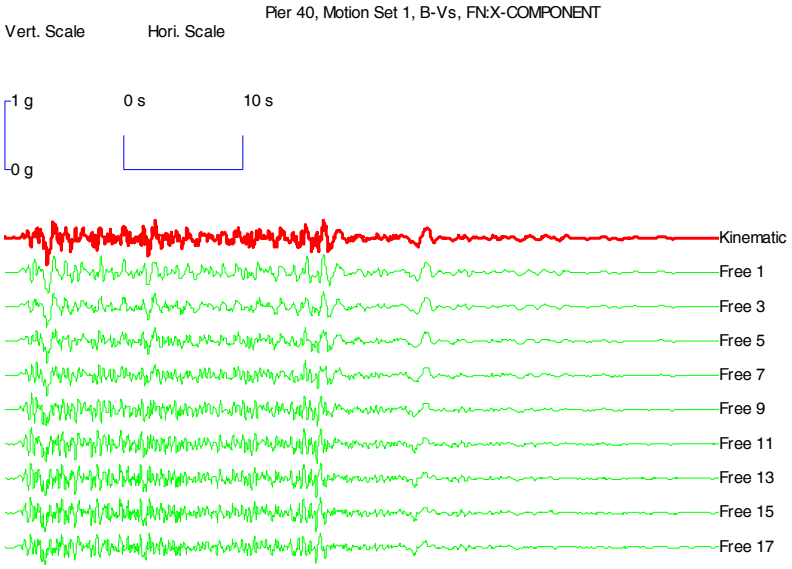
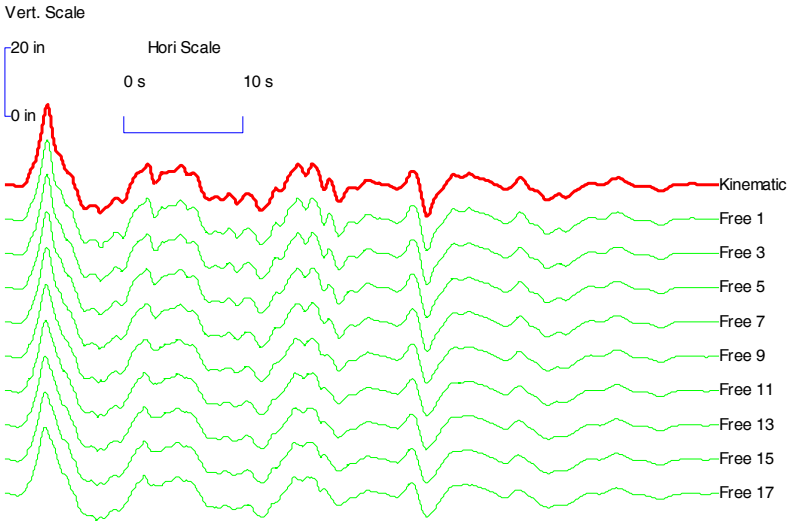
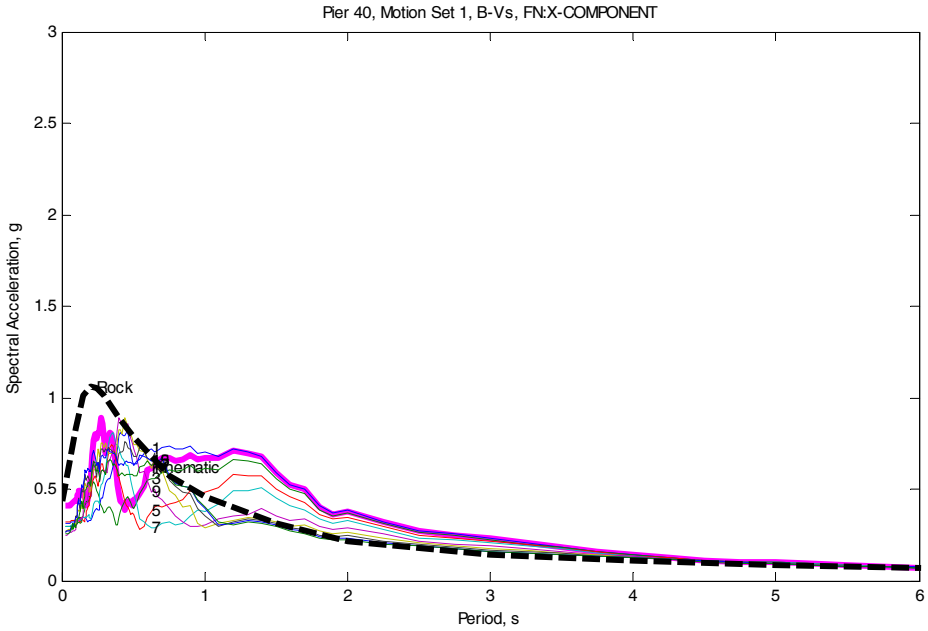

Pier 40, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17


Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17


Pier 40, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Rock
Kinematic
1
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7
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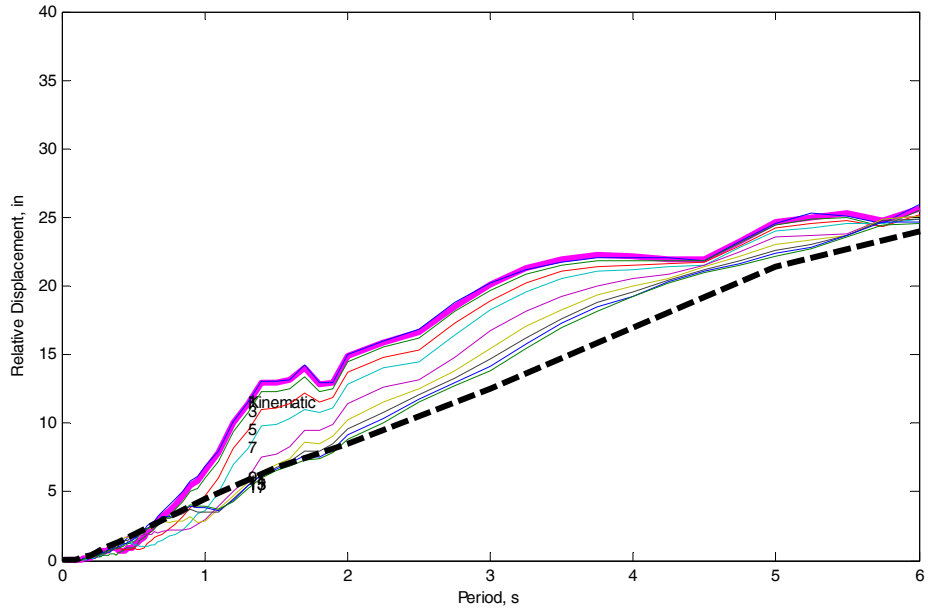
0.5
1
1.5
2
2.5
3
0
1
2
3
4
5
6


Relative Displacement, in
Period, s
Kinematic
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10
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20
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30
35
40
0
1
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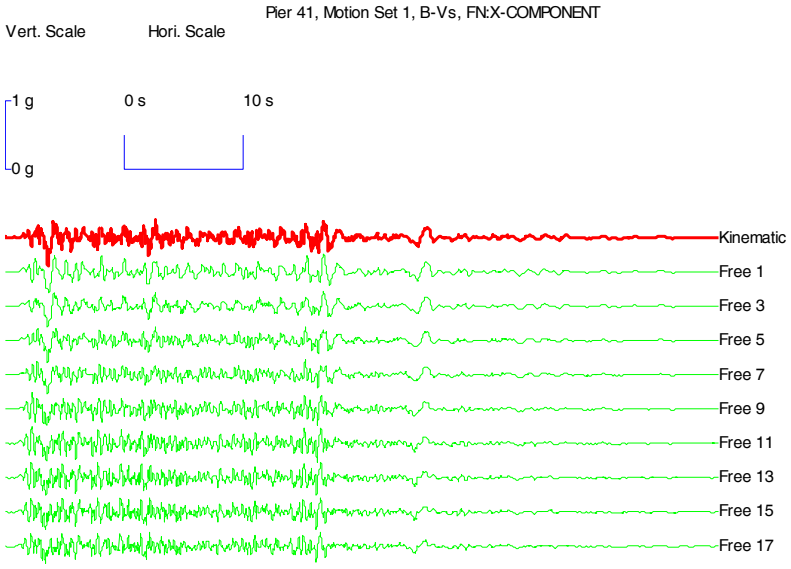
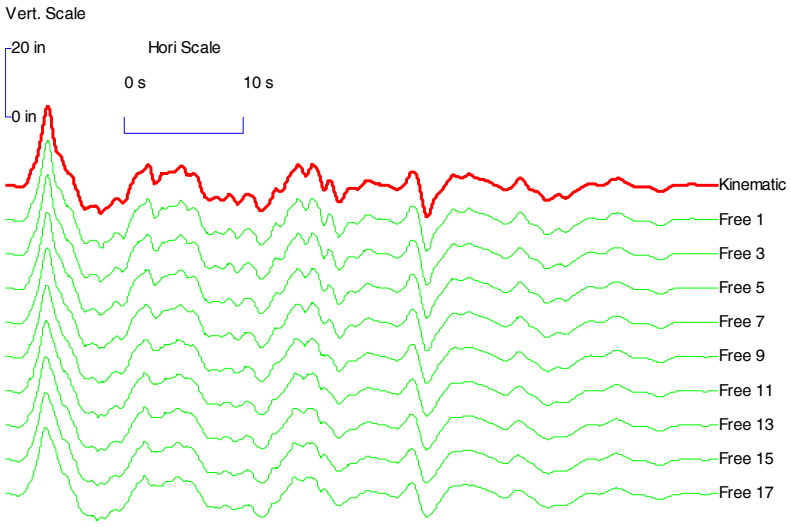
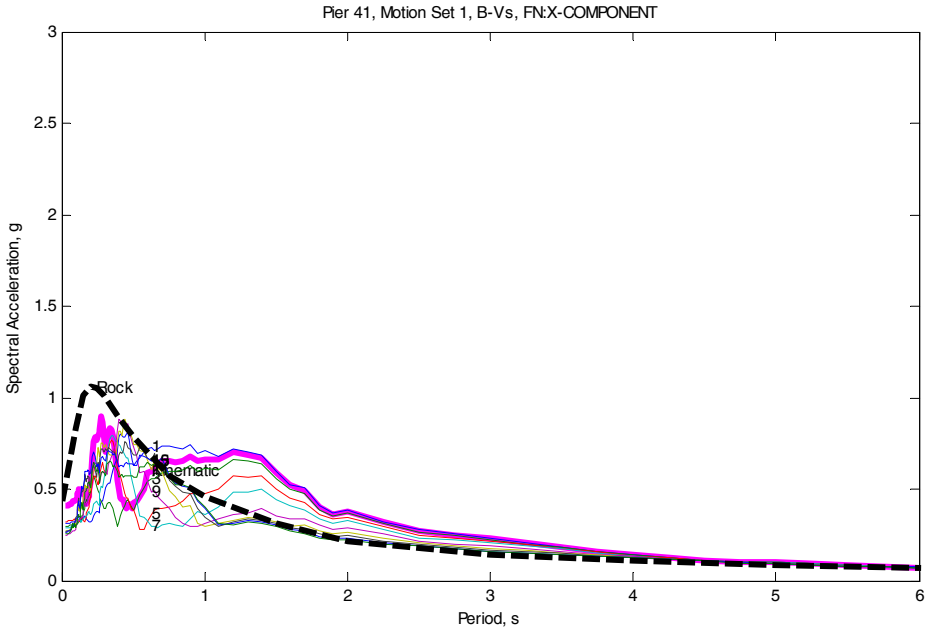
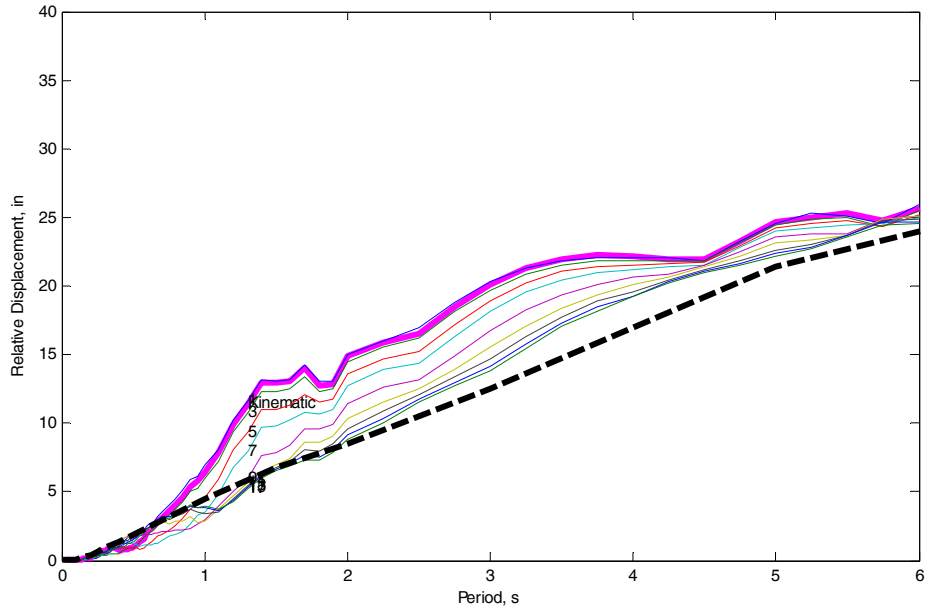
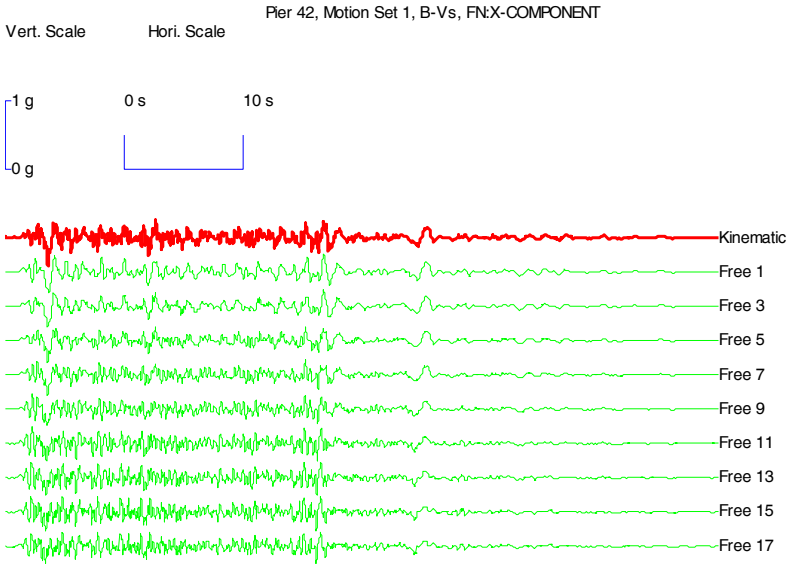
3
4
5
6

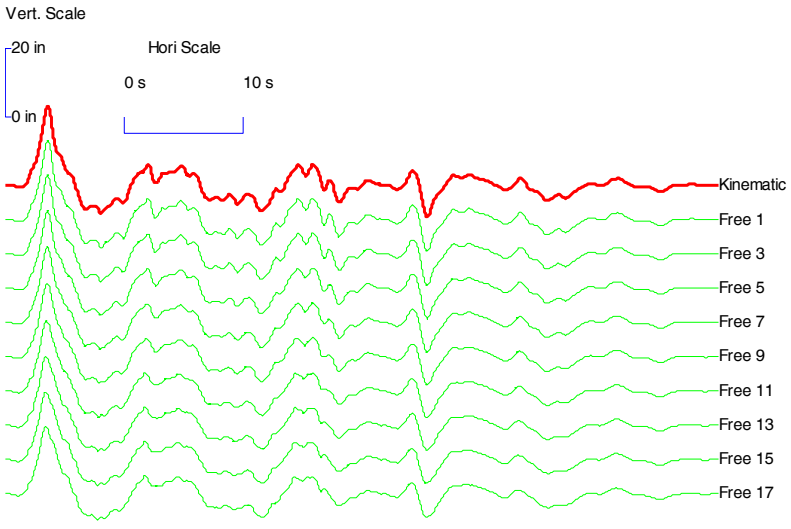

Pier 41, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17

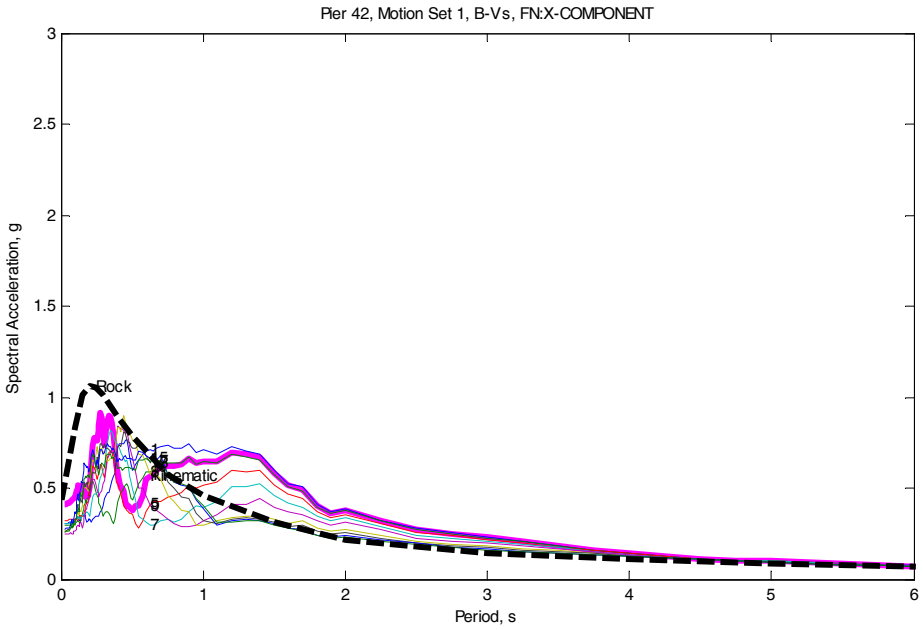

Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17

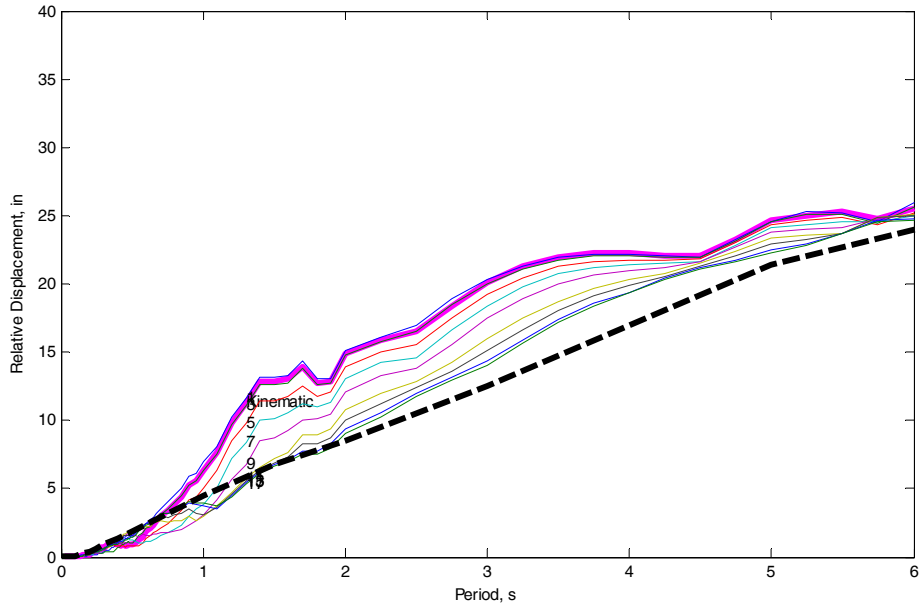

Pier 41, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Rock
Kinematic
1
3
5
7
9
0
0.5
1
1.5
2
2.5
3
0
1
2
3
4
5
6

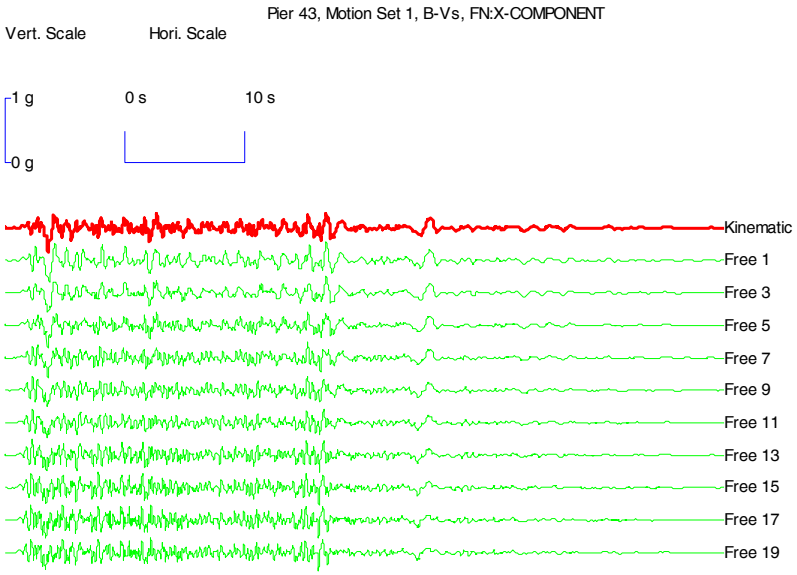

Relative Displacement, in
Period, s
Kinematic
1
3
5
7
9
0
5
10
15
20
25
30
35
40
0
1
2
3
4
5
6

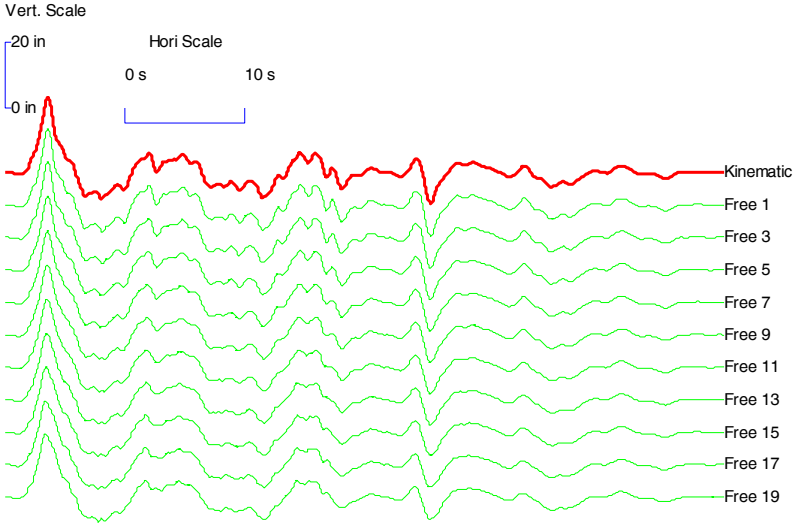

Pier 42, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17

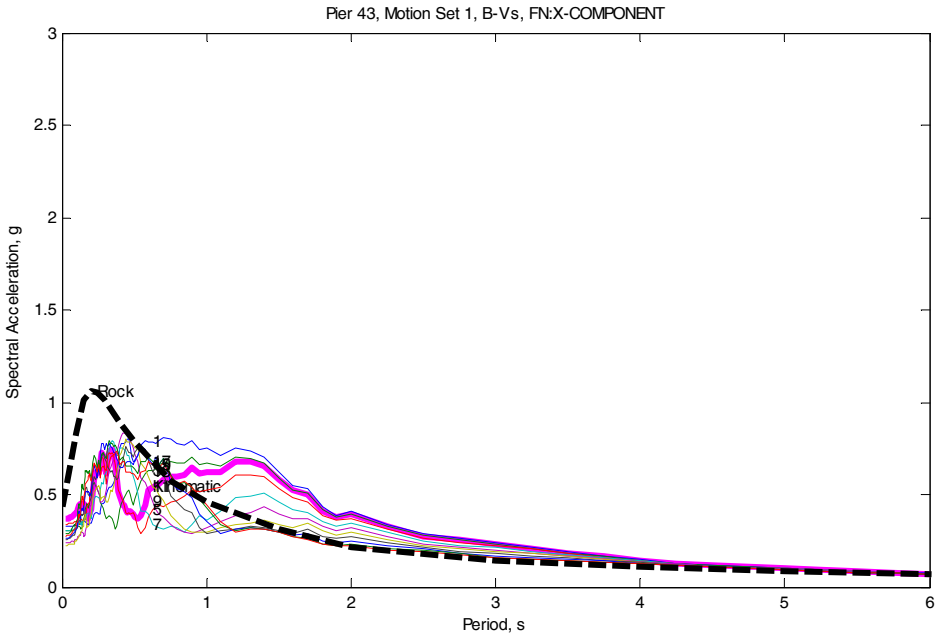

Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17

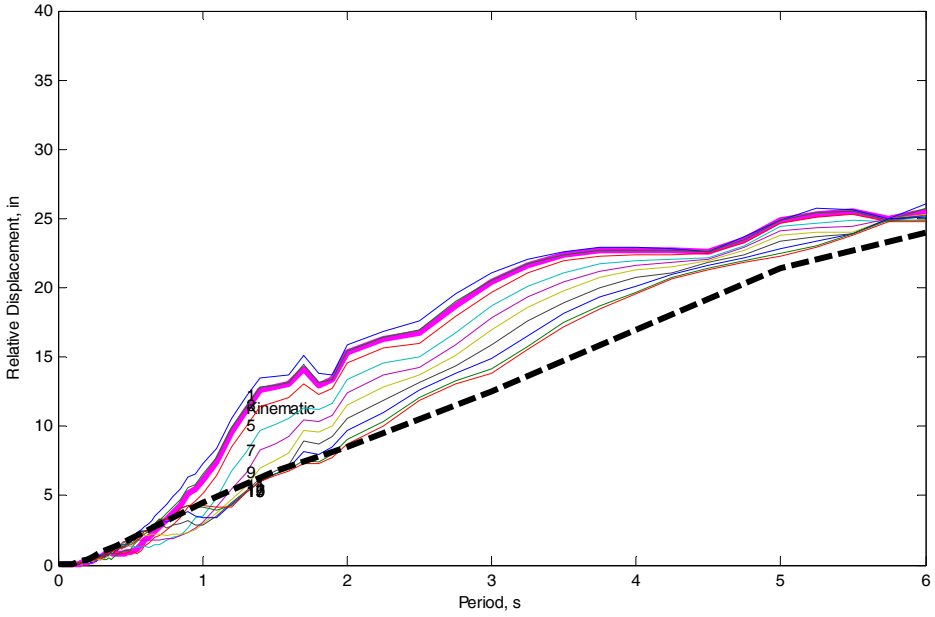

Pier 42, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Rock
Kinematic
1
5
7
0
0.5
1
1.5
2
2.5
3
0
1
2
3
4
5
6

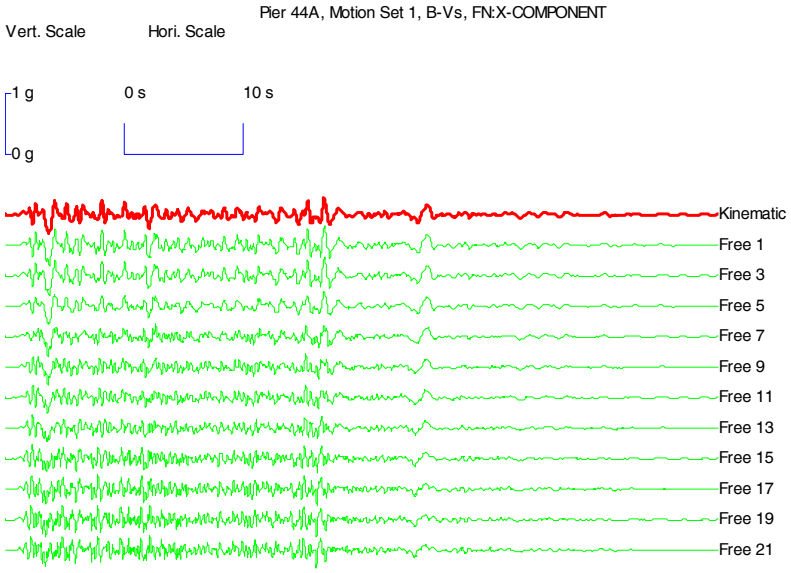

Relative Displacement, in
Period, s
Kinematic
1
5
7
9
15
0
5
10
15
20
25
30
35
40
0
1
2
3
4
5
6

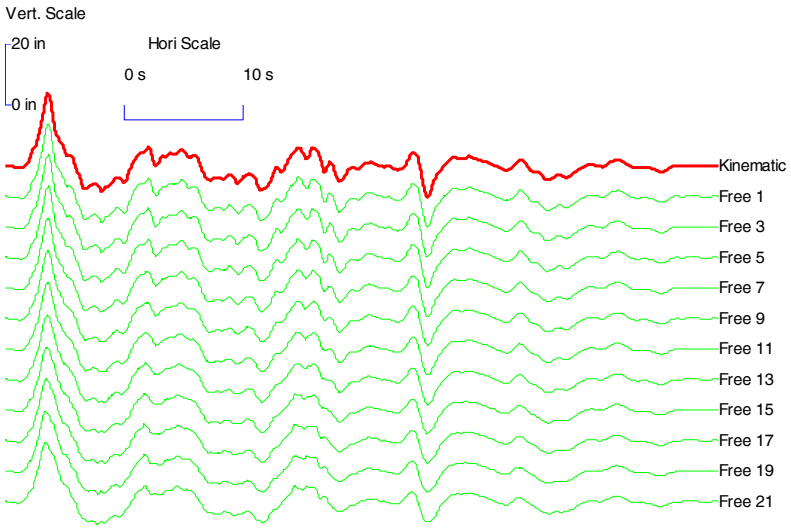

Pier 43, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17
Free 19

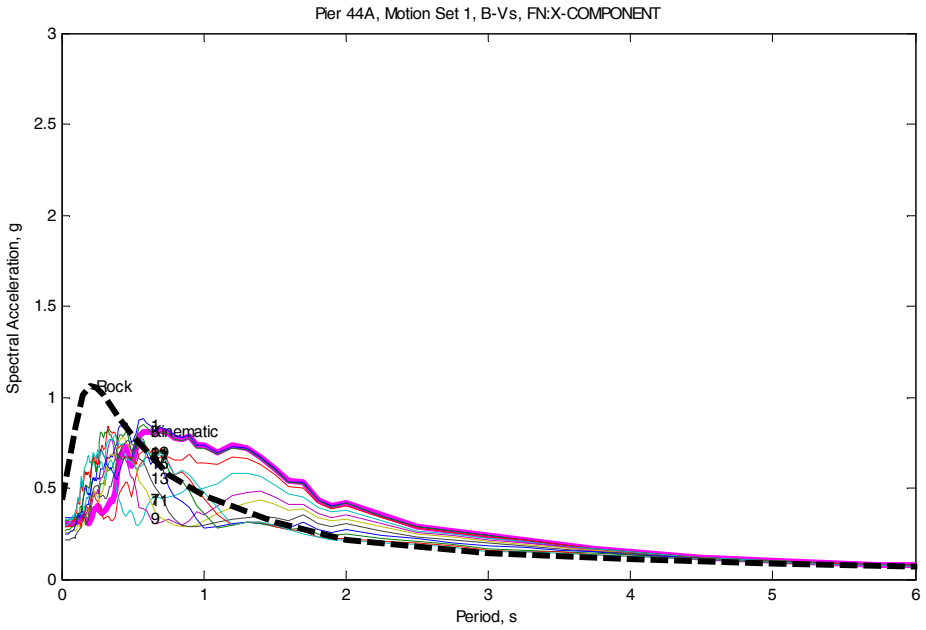

Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17
Free 19

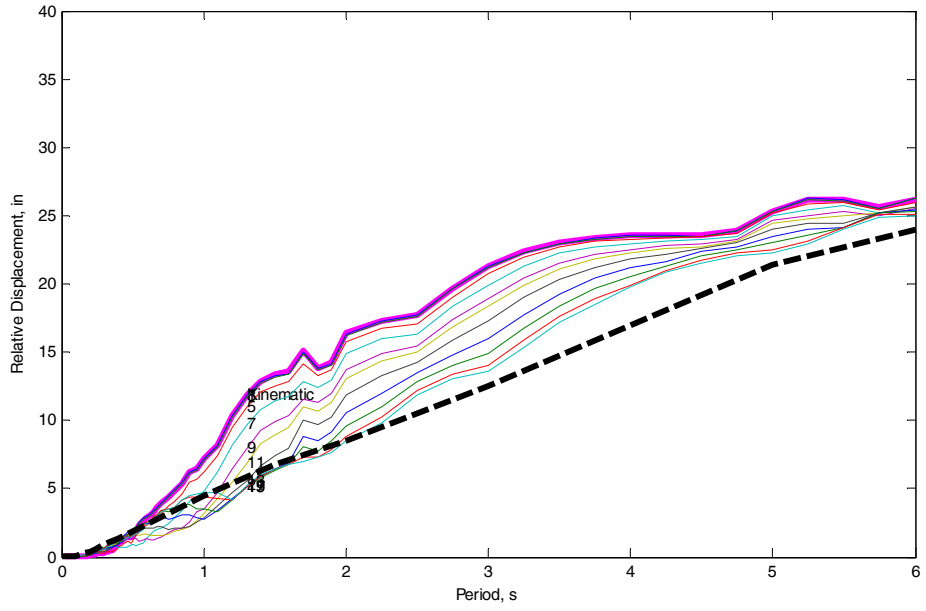

Pier 43, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Rock
Kinematic
1
5
7
9

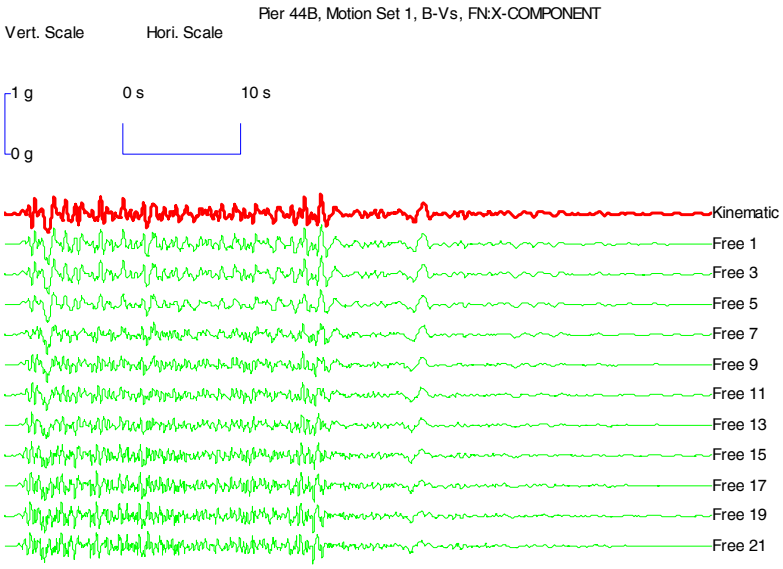

Relative Displacement, in
Period, s
Kinematic
1
5
7
9

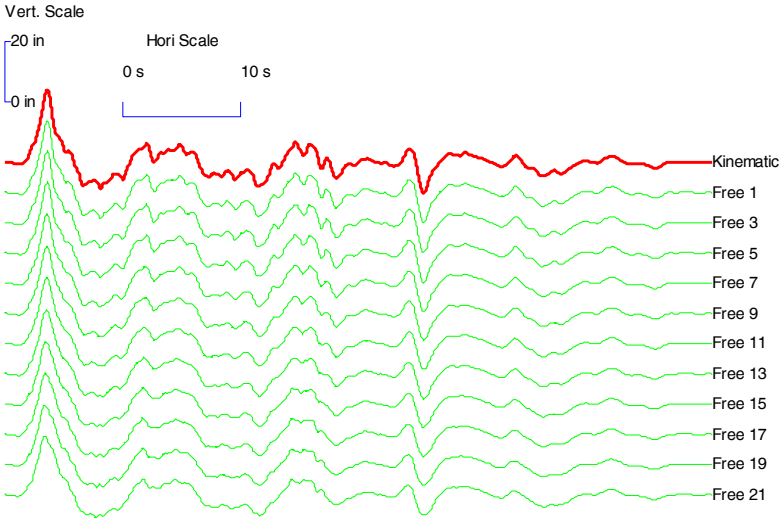

Pier 44A, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17
Free 19
Free 21

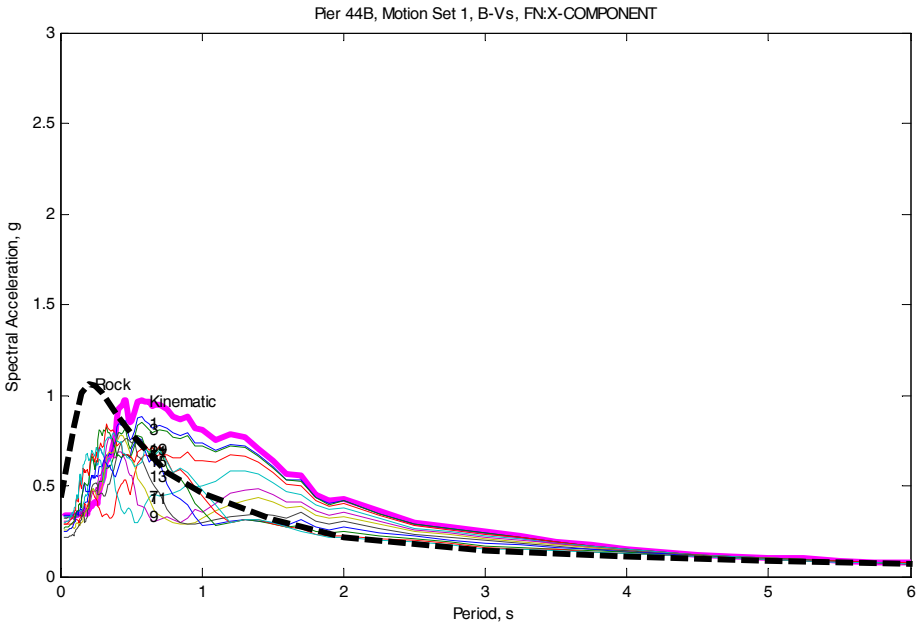

Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17
Free 19
Free 21

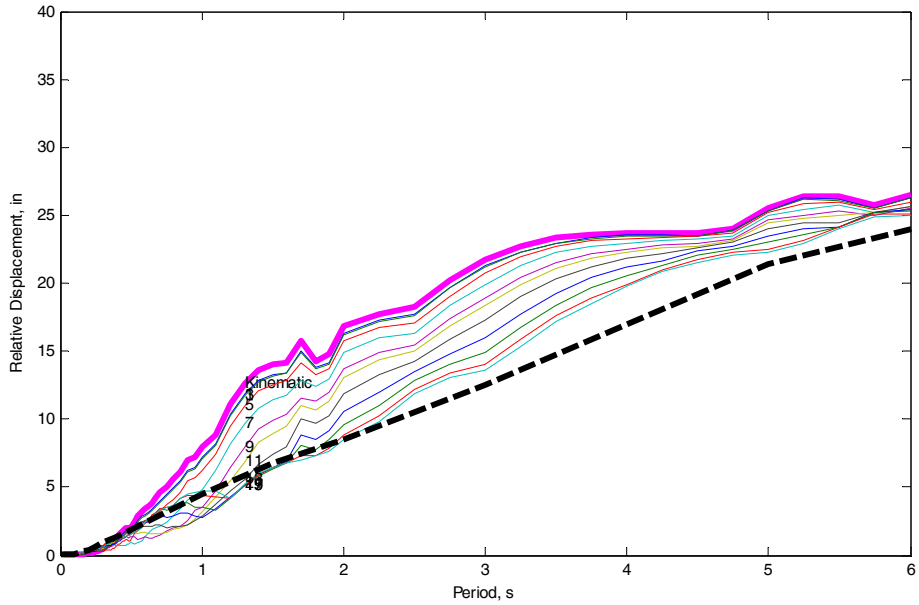

Pier 44A, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Rock
Kinematic
13
7
9

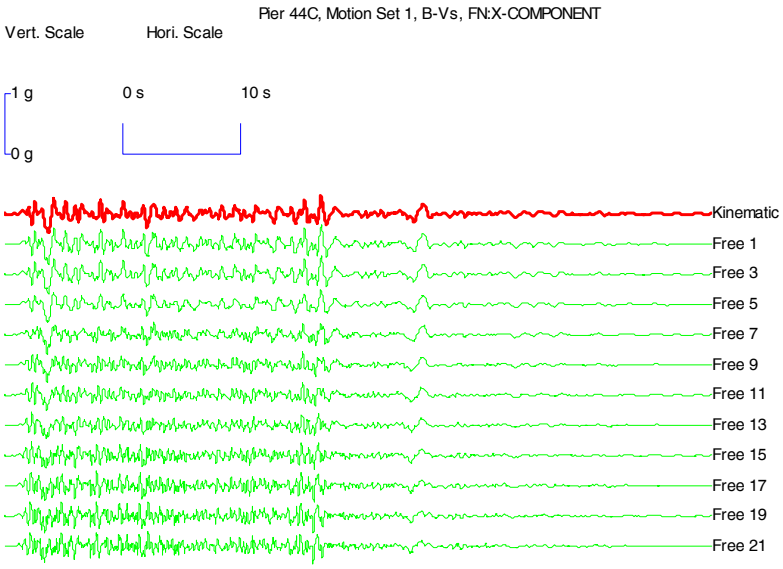

Relative Displacement, in
Period, s
Kinematic
5
7
9
11

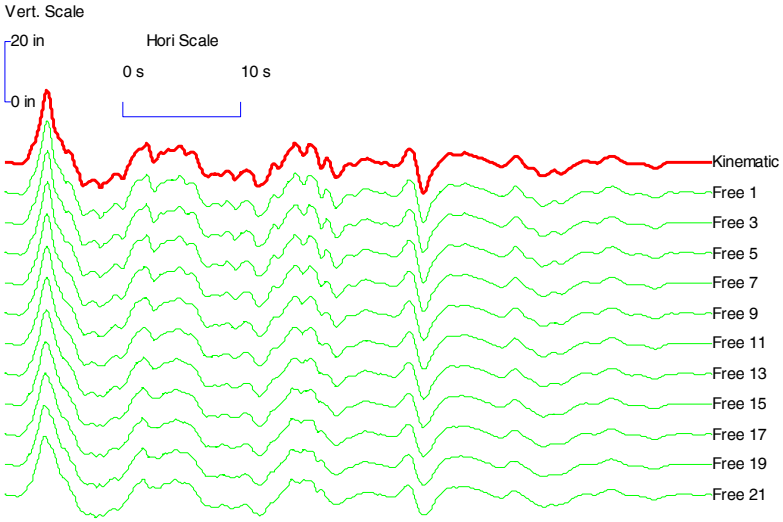

Pier 44B, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17
Free 19
Free 21

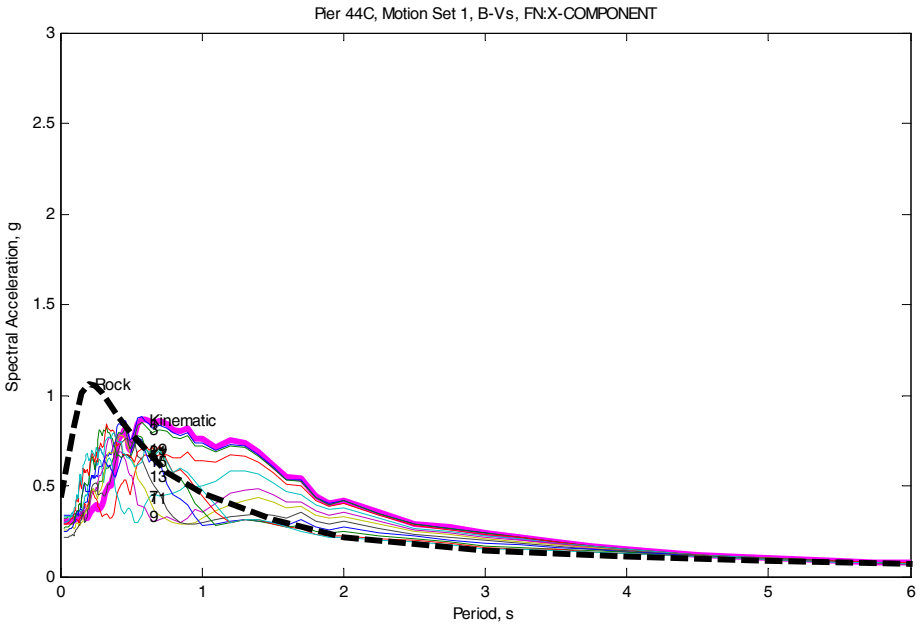

Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17
Free 19
Free 21

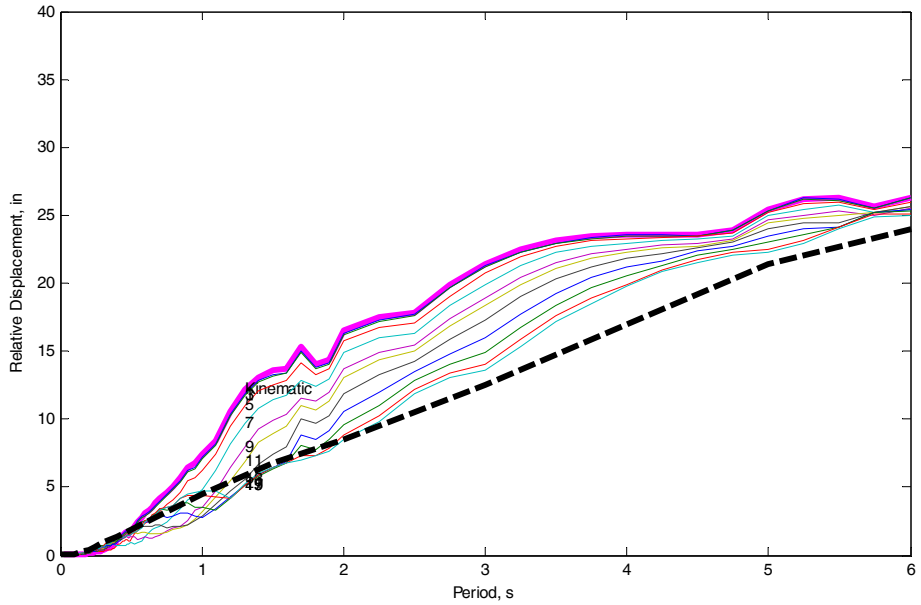

Pier 44B, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Rock
Kinematic
1
3
13
11
9


Relative Displacement, in
Period, s
Kinematic
9
7
11


Pier 44C, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17
Free 19
Free 21

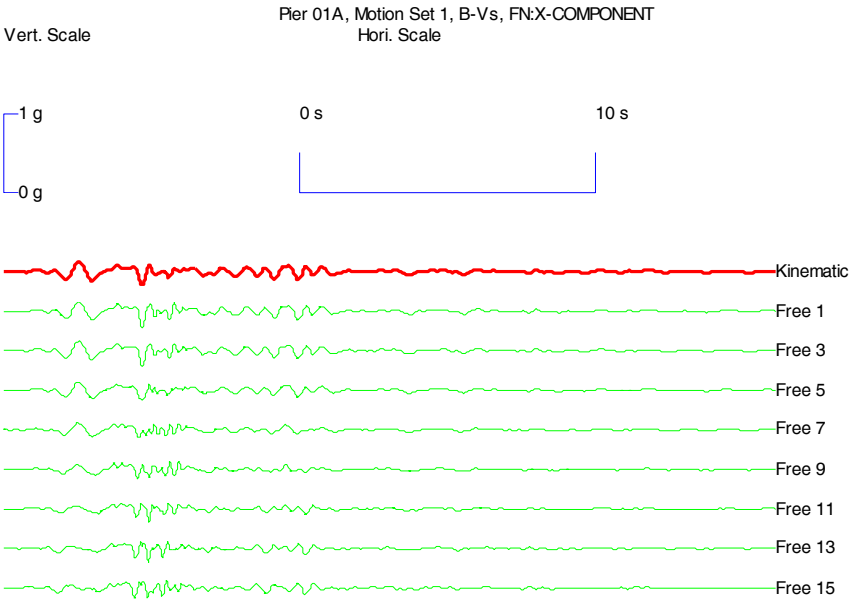

Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17
Free 19
Free 21

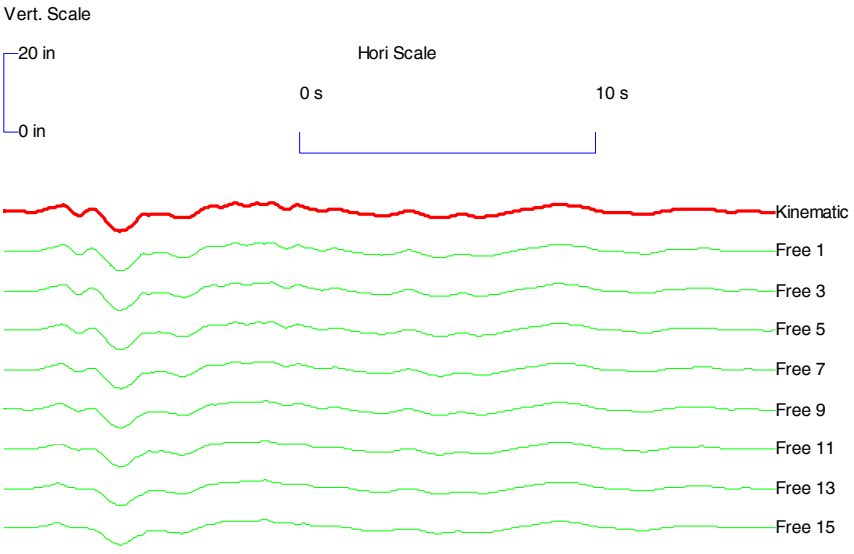

Pier 44C, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Rock
Kinematic
9
11
13
7
5

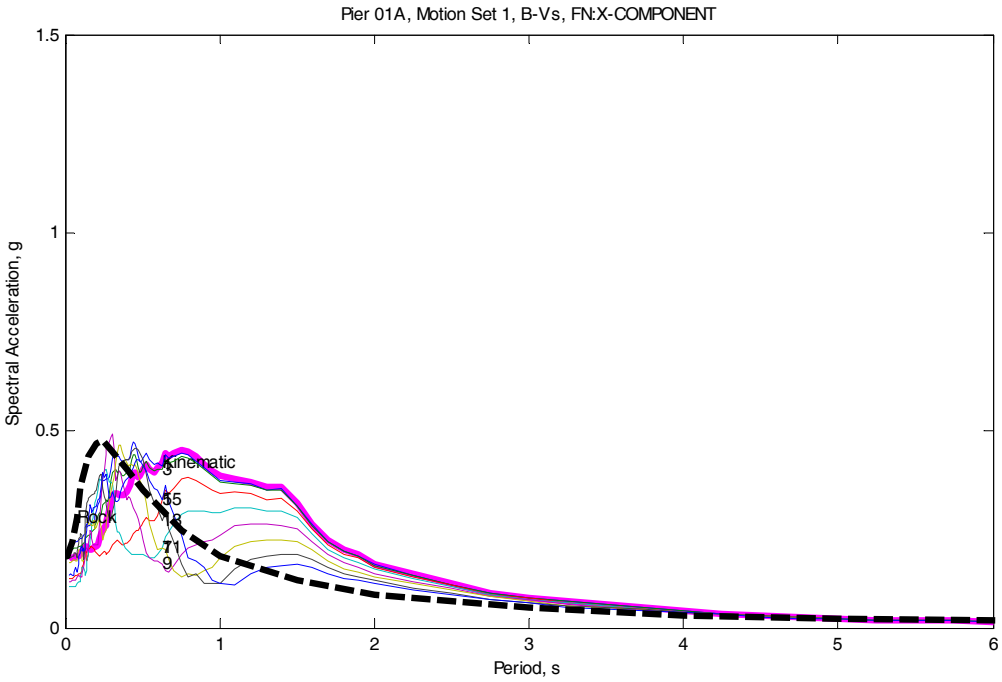

Relative Displacement, in
Period, s
Kinematic
5
7
9
11

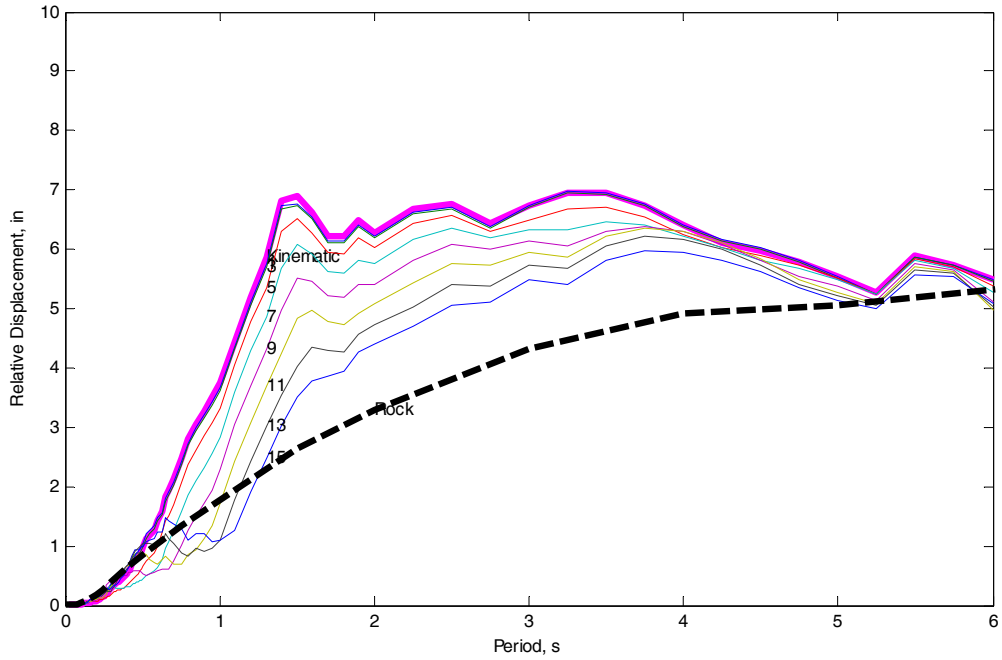
6D APPENDIX D: PIER-SPECIFIC KINEMATIC MOTIONS FOR FEE MOTION SET1-FN

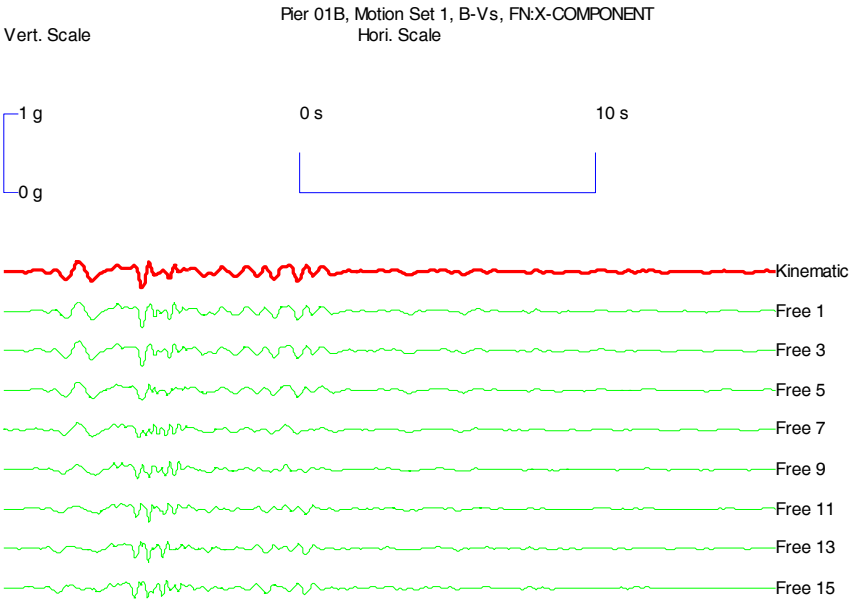
Note: In the following are included the time-history and spectral plots of depth-varying free-field motions and kinematic motions of 44 Dumbarton piers for the fault normal component (FN) of Motion Set 1 only. Complete set of pier-specific kinematic motions for the fault normal and parallel components of the FEE scenario are provided in a separate electronic file to the designers..

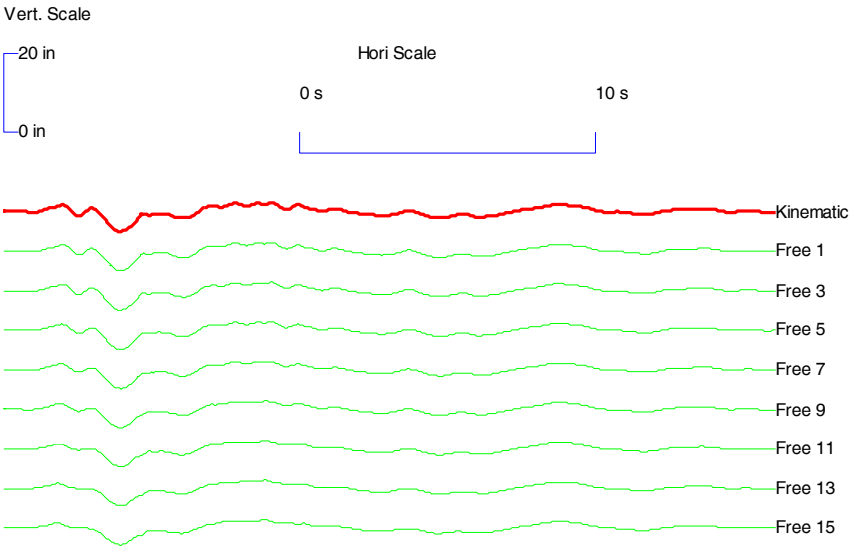

Pier 01A, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15

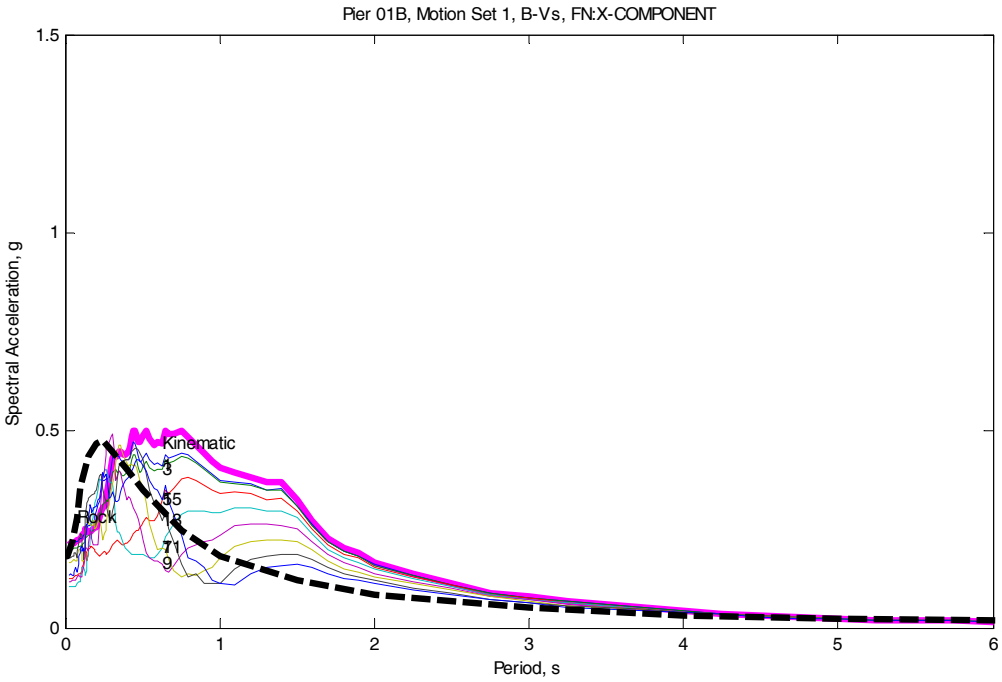

Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15

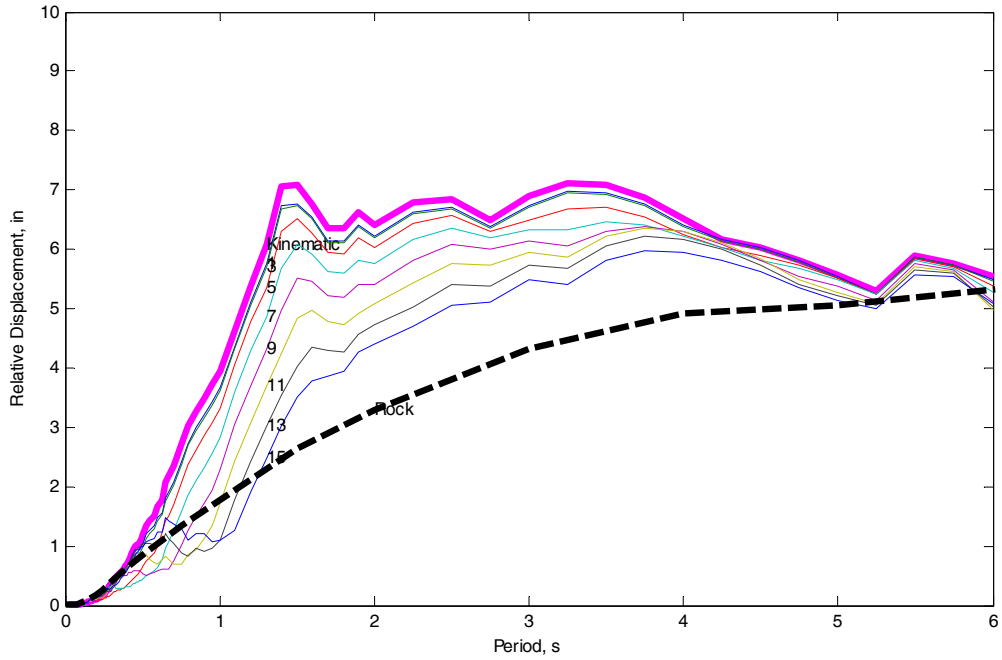

Pier 01A, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
kinematic
3
5
7
9
11
13
15
Rock

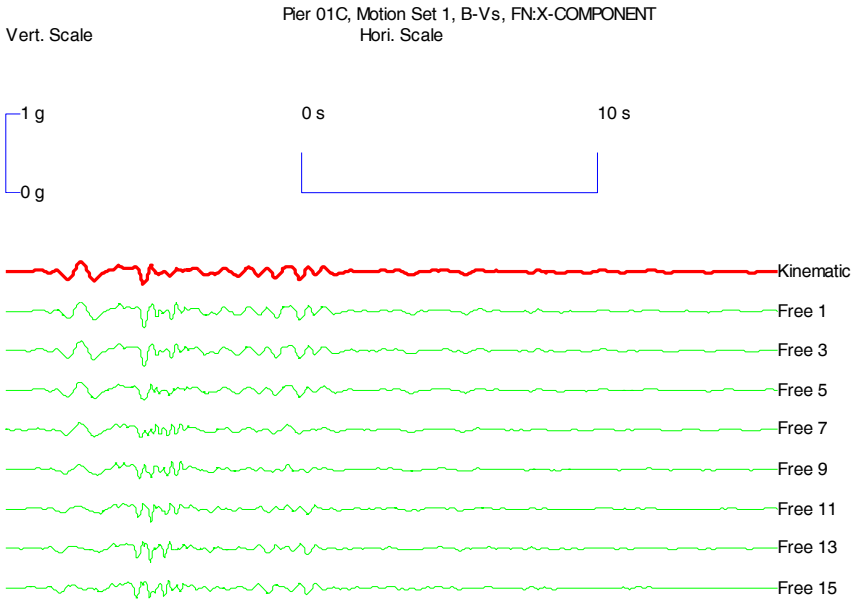

Relative Displacement, in
Period, s
kinematic
3
5
7
9
11
13
15
Rock

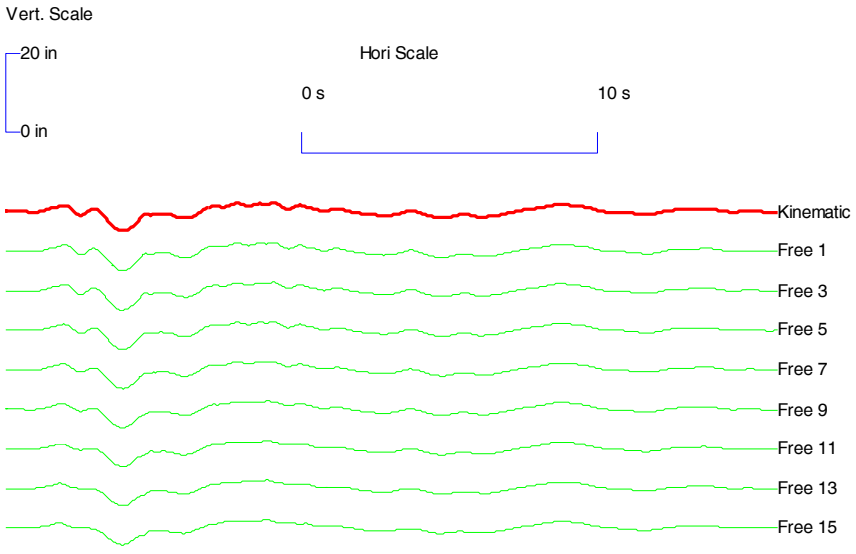

Pier 01B, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15

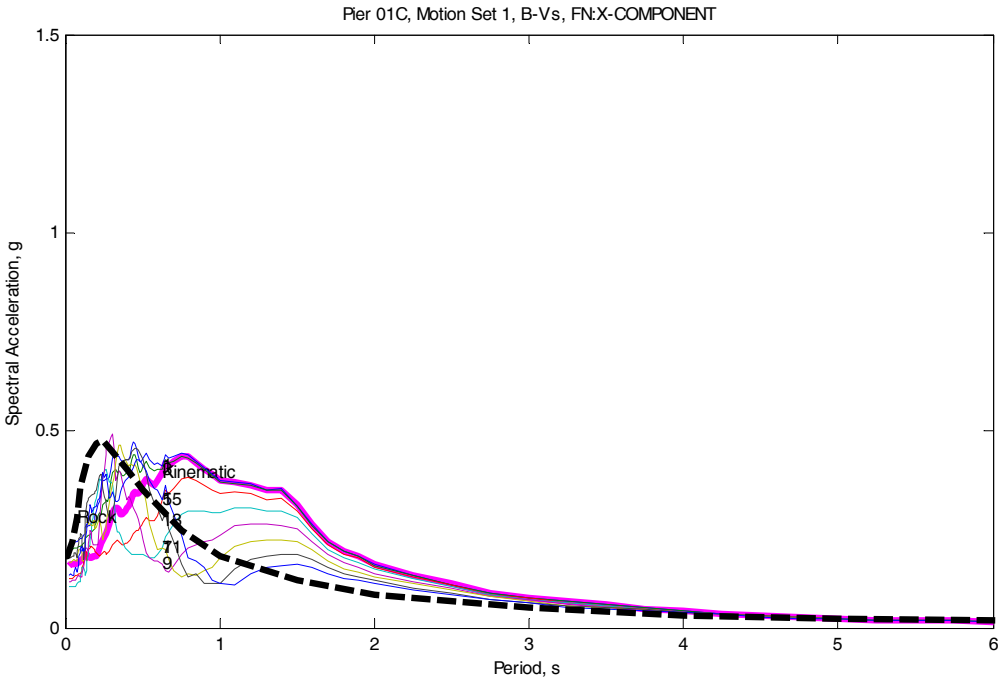

Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15

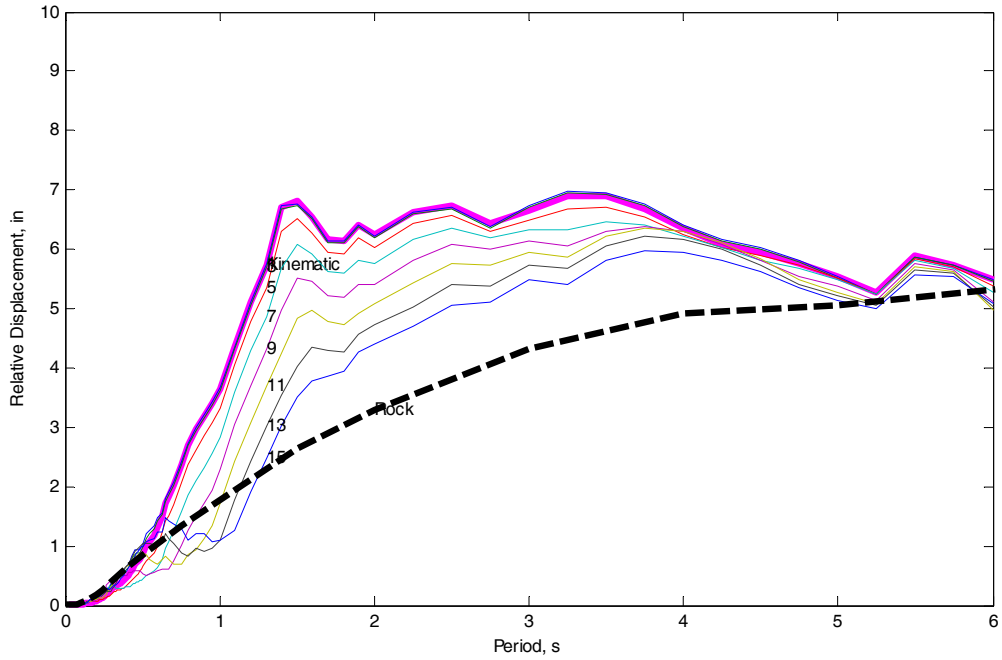

Pier 01B, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Kinematic
3
5
7
9
Rock

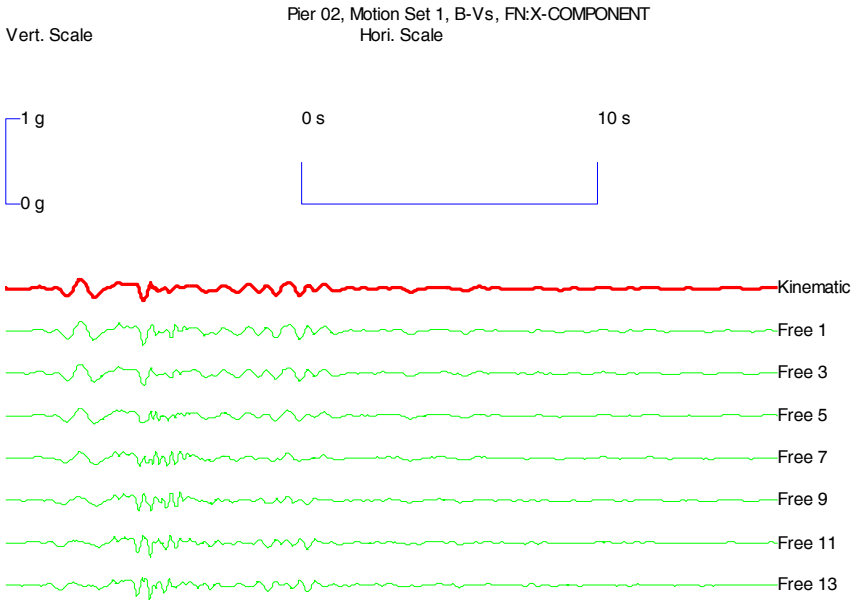

Relative Displacement, in
Period, s
Kinematic
3
5
7
9
11
13
15
Rock

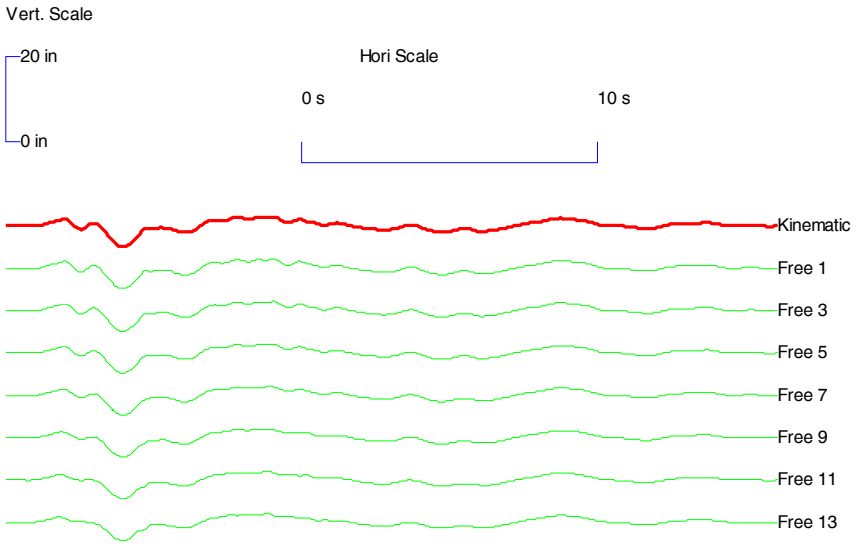

Pier 01C, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15

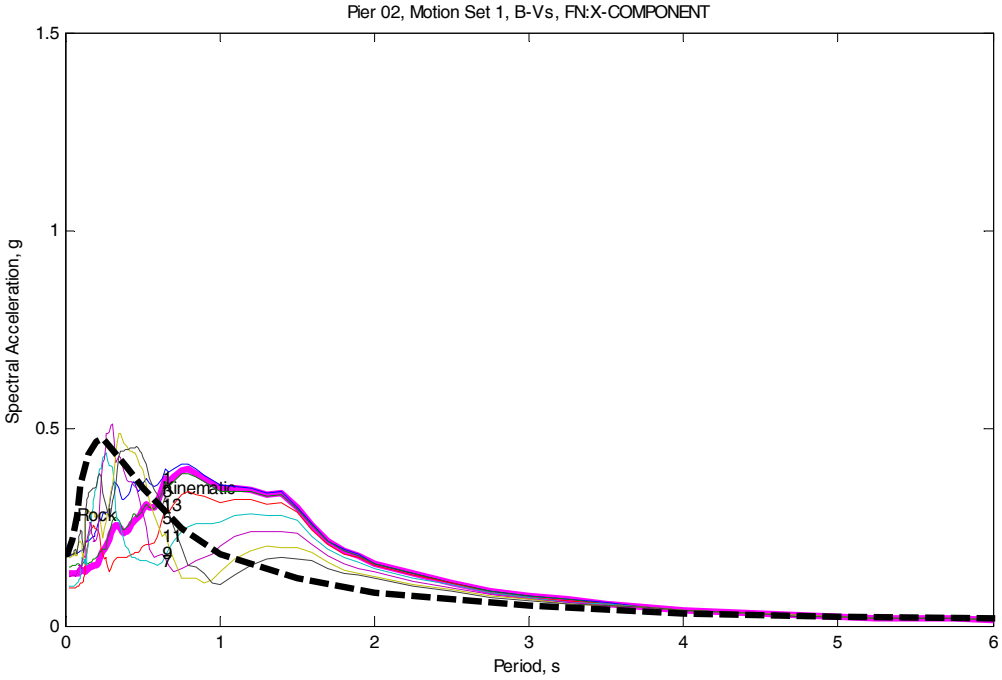

Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15

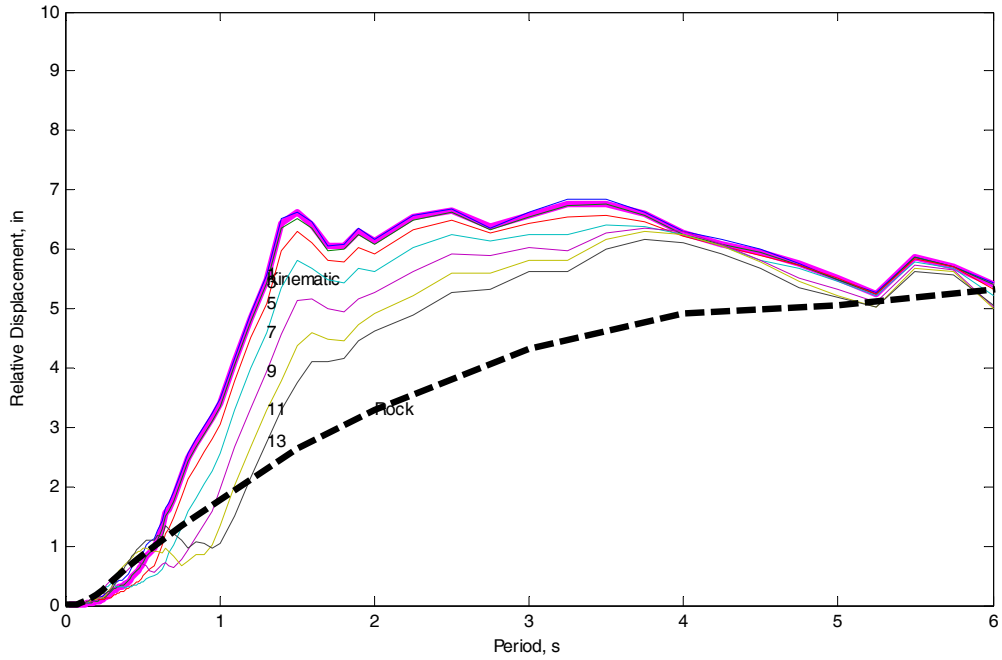

Pier 01C, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Kinematic
5
7
9
11
13
15
Rock

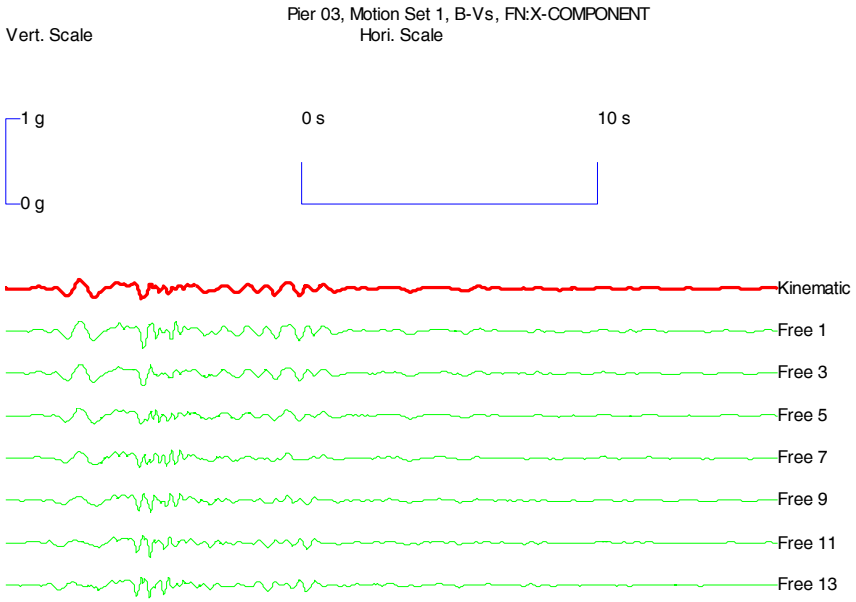

Relative Displacement, in
Period, s
Kinematic
5
7
9
11
13
15
Rock

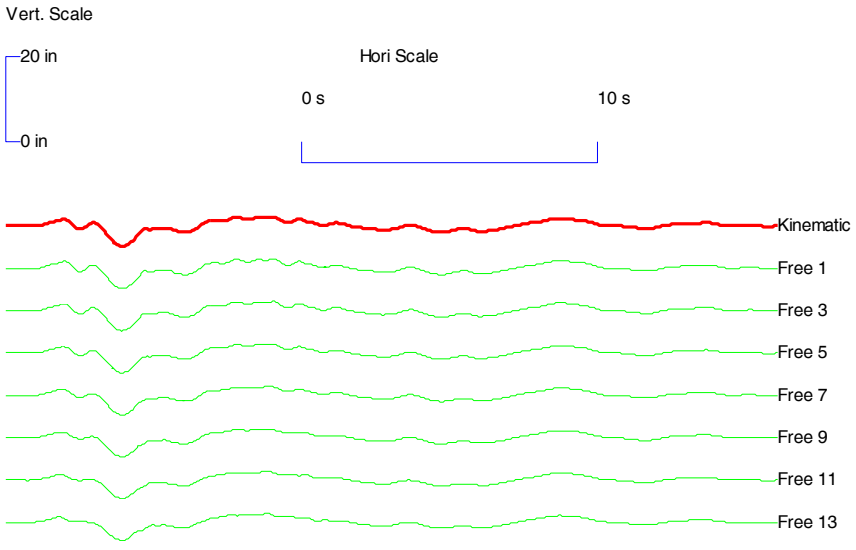

Pier 02, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13


Vert. Scale
Hori Scale
20 in
0 in
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13


Pier 02, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Kinematic
Rock
13
11
9
7
5
3
1
0
0.5
1
1.5
0
1
2
3
4
5
6


Relative Displacement, in
Period, s
Kinematic
Rock
13
11
9
7
5
3
1
0
1
2
3
4
5
6
7
8
9
10
0
1
2
3
4
5
6


Pier 03, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13


Vert. Scale
Hori Scale
20 in
0 in
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
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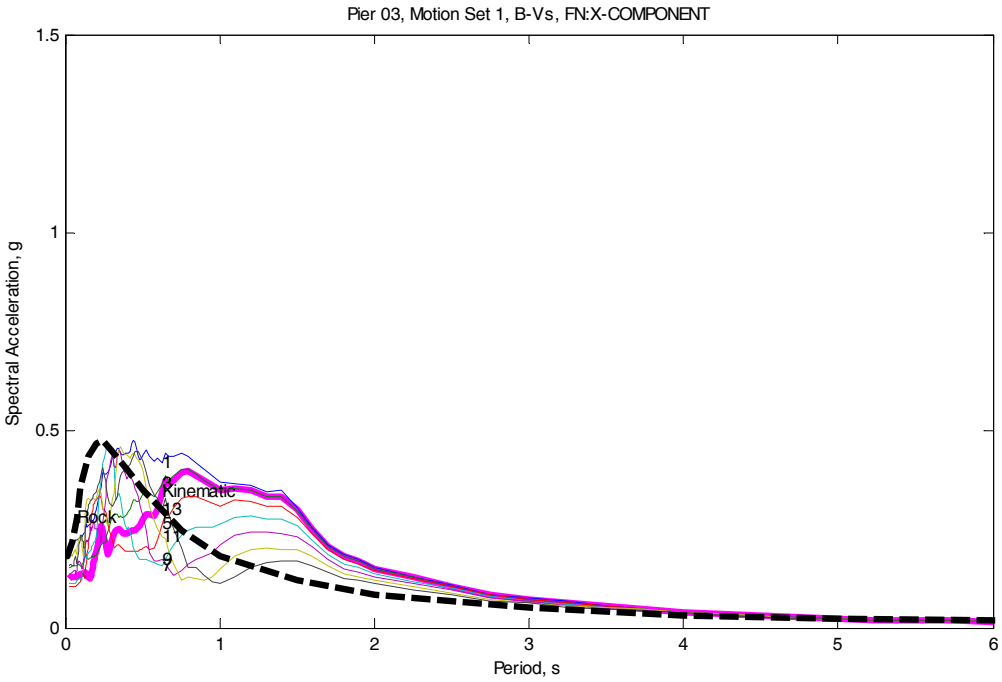
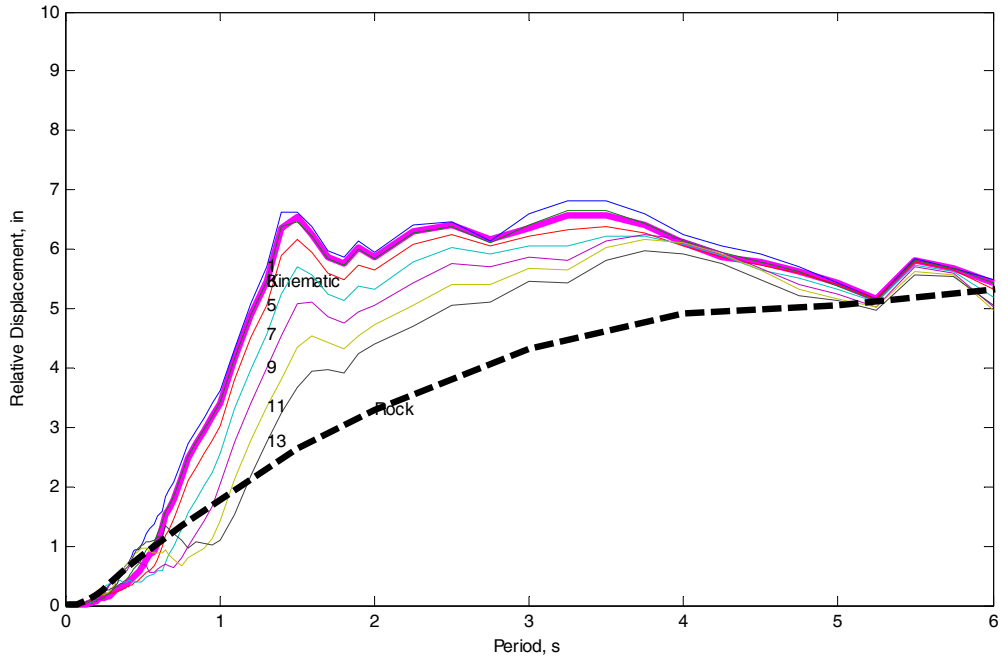
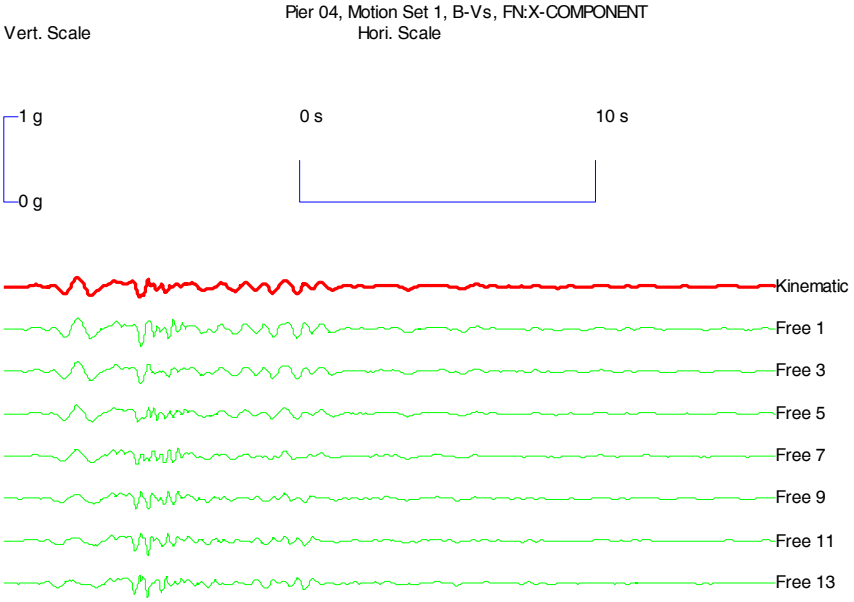
Free 11
Free 13


Pier 03, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
1
Kinematic
13
5
11
Rock
9
7


Relative Displacement, in
Period, s
1
Kinematic
5
7
9
11
13
Rock


Pier 04, Motion Set 1, B-Vs, FN:X-COMPONENT
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Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
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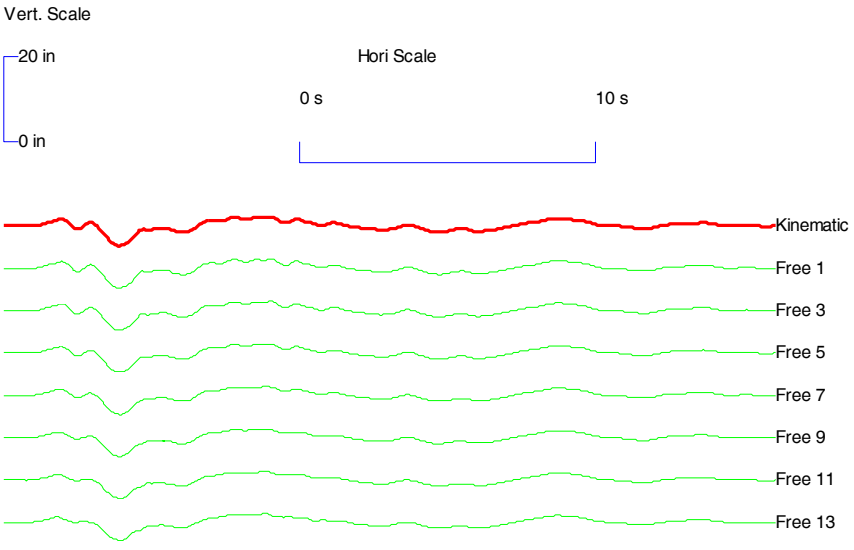
Free 9
Free 11
Free 13


Vert. Scale
Hori Scale
20 in
0 in
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
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Free 11
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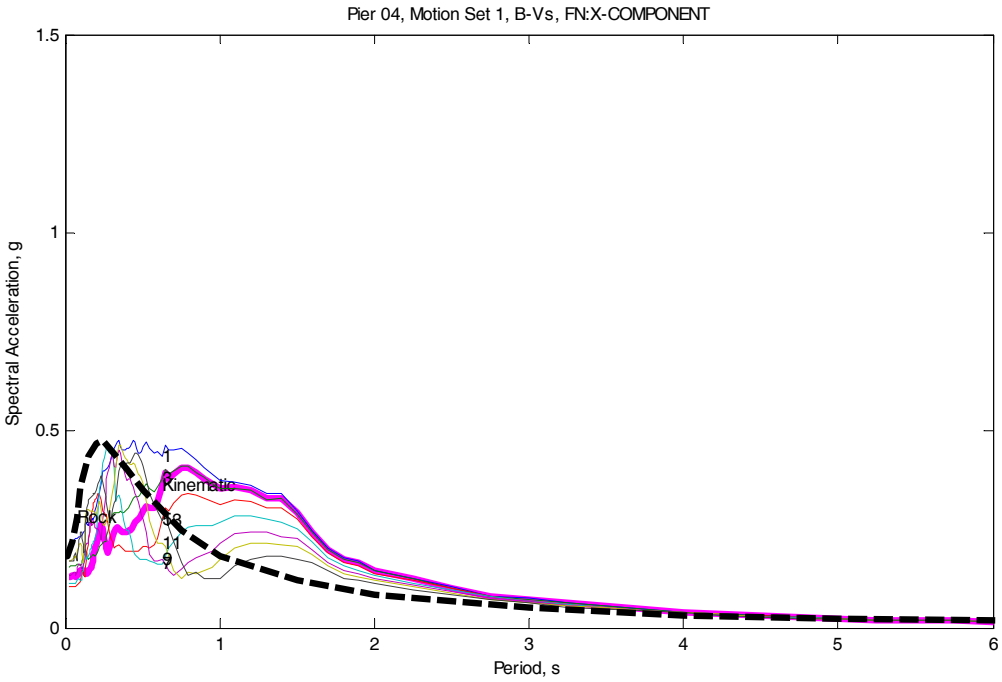
Pier 04, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
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Kinematic
Rock
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11
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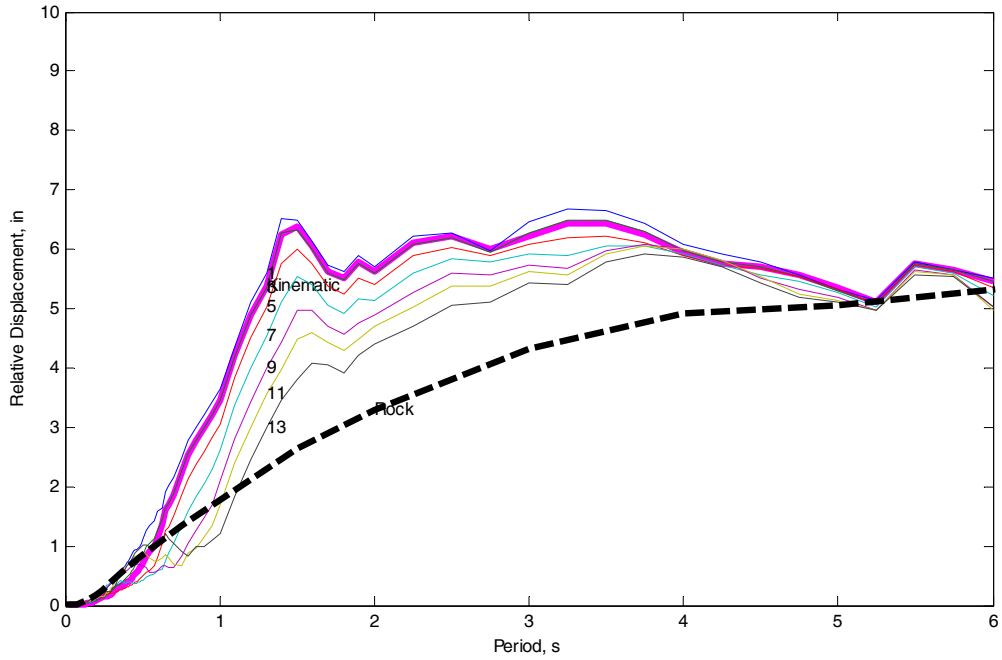
Relative Displacement, in
Period, s
1
Kinematic
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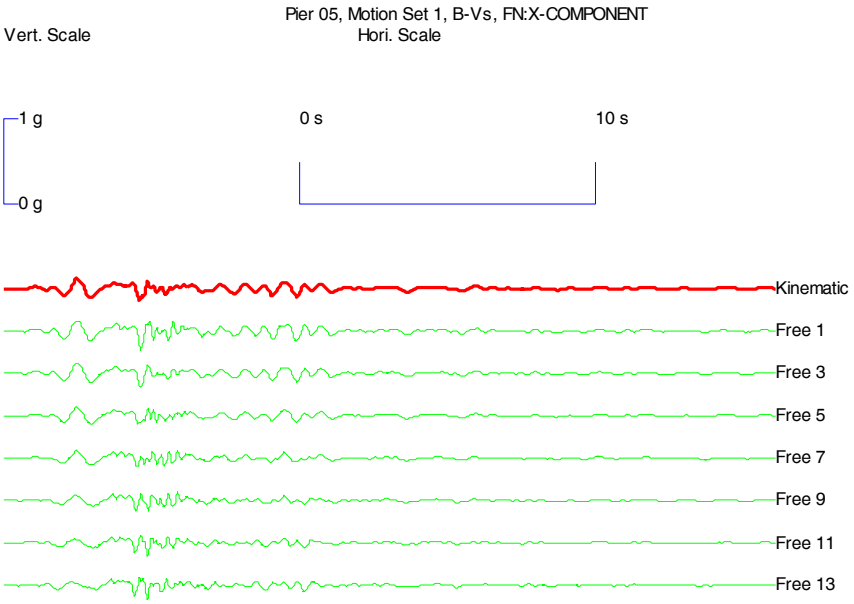
13
Rock


Pier 05, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
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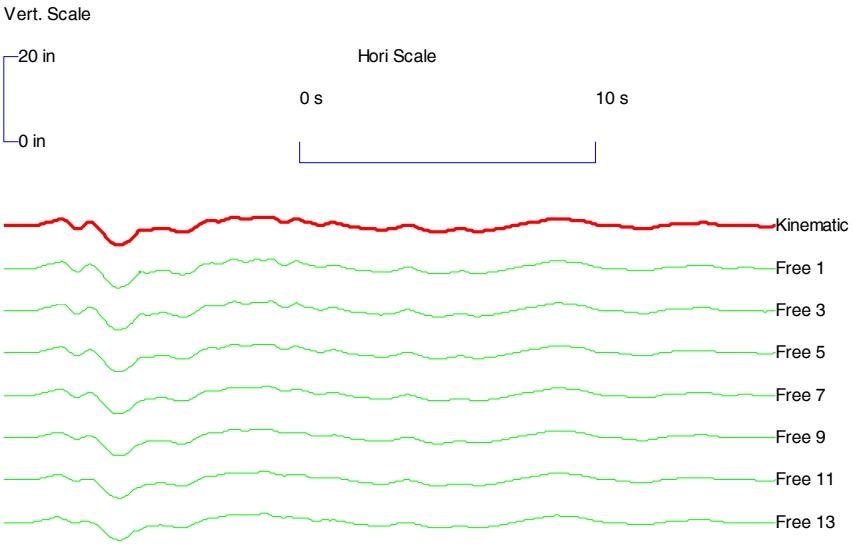
Free 7
Free 9
Free 11
Free 13


Vert. Scale
Hori Scale
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0 in
0 s
10 s
Kinematic
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Free 3
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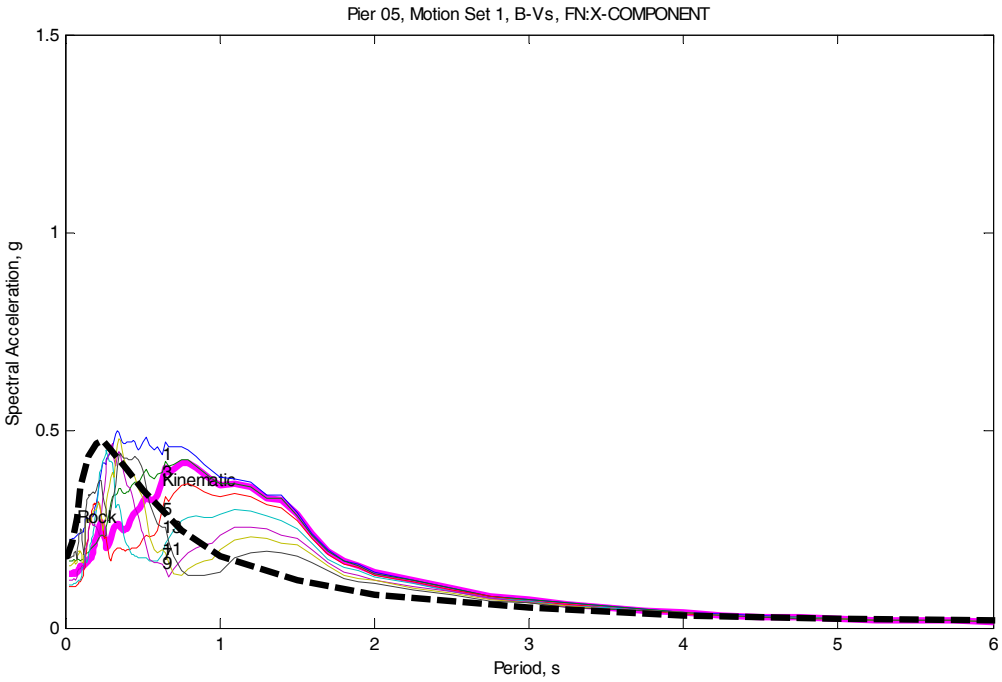
Free 13


Pier 05, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Kinematic
Rock
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1.5
0
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5
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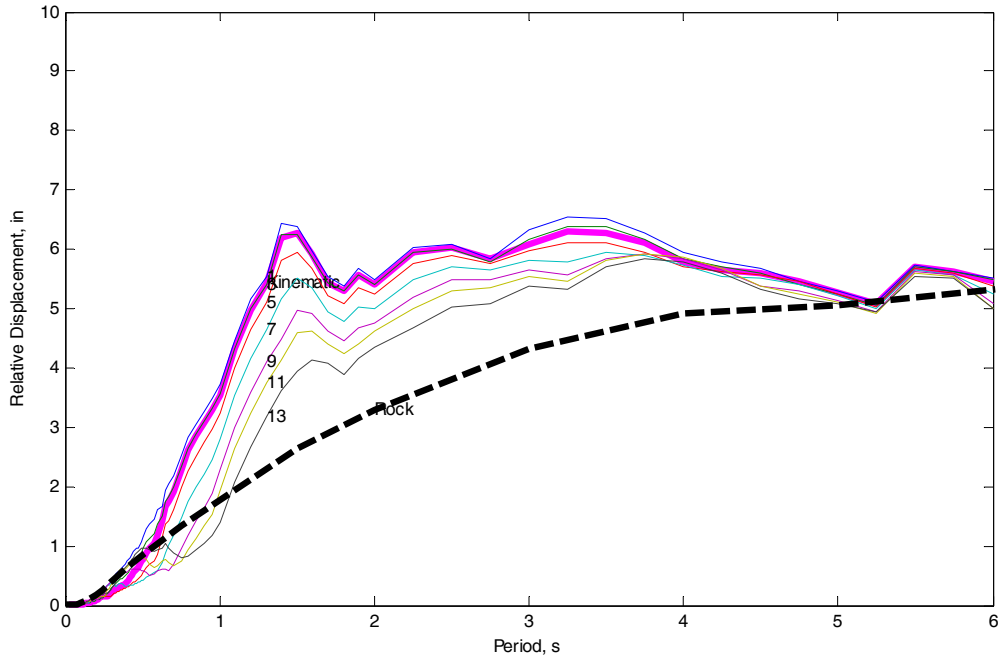
Relative Displacement, in
Period, s
Kinematic
Rock
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5
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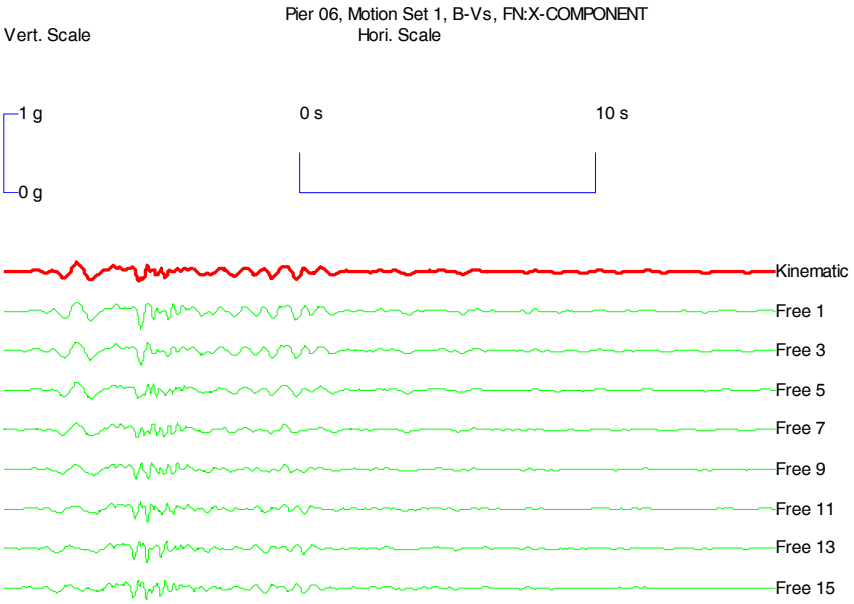
Pier 06, Motion Set 1, B-Vs, FN:X-COMPONENT
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Hori. Scale
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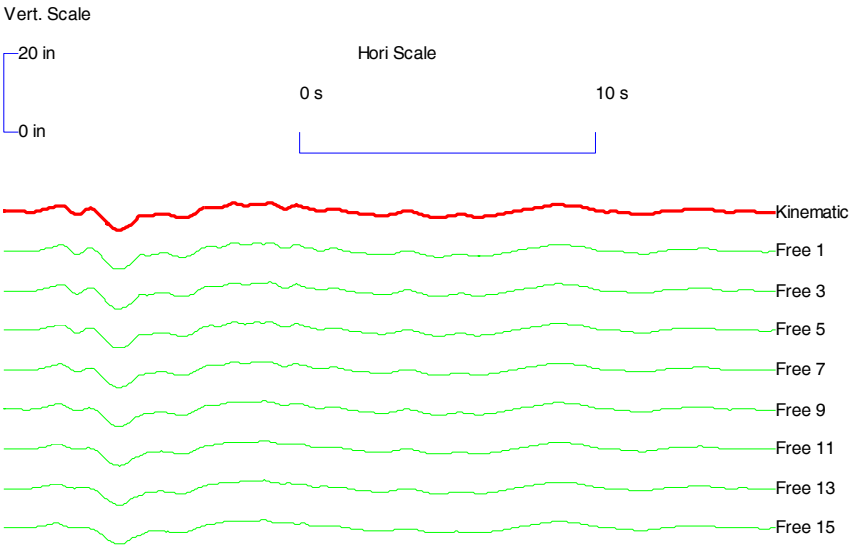
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15


Vert. Scale
20 in
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Hori Scale
0 s
10 s
Kinematic
Free 1
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Free 5
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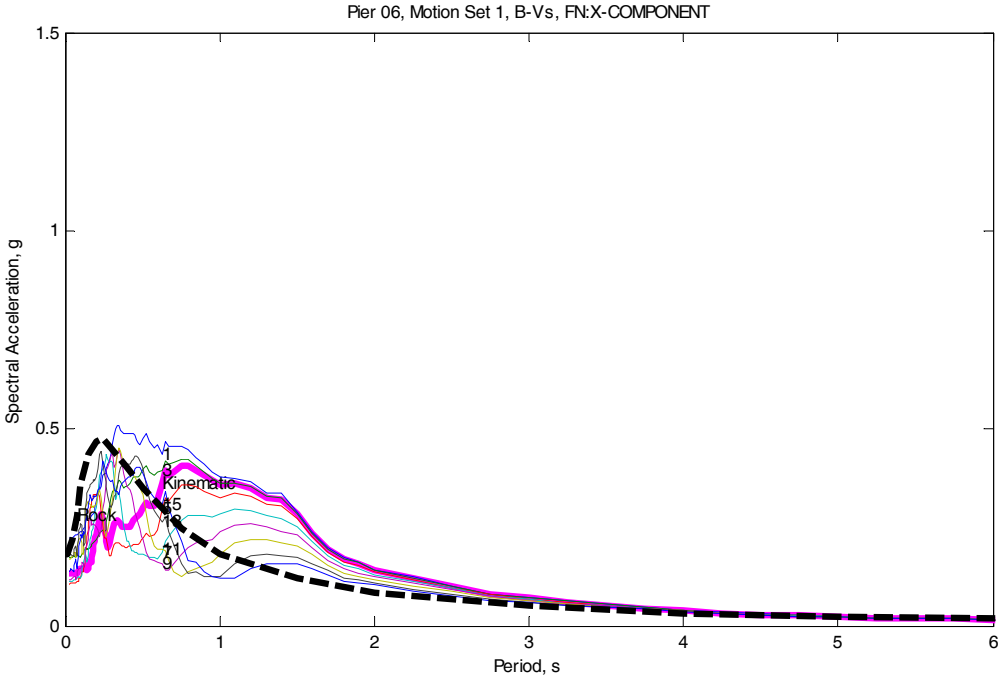
Free 11
Free 13
Free 15


Pier 06, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Kinematic
Rock
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1.5
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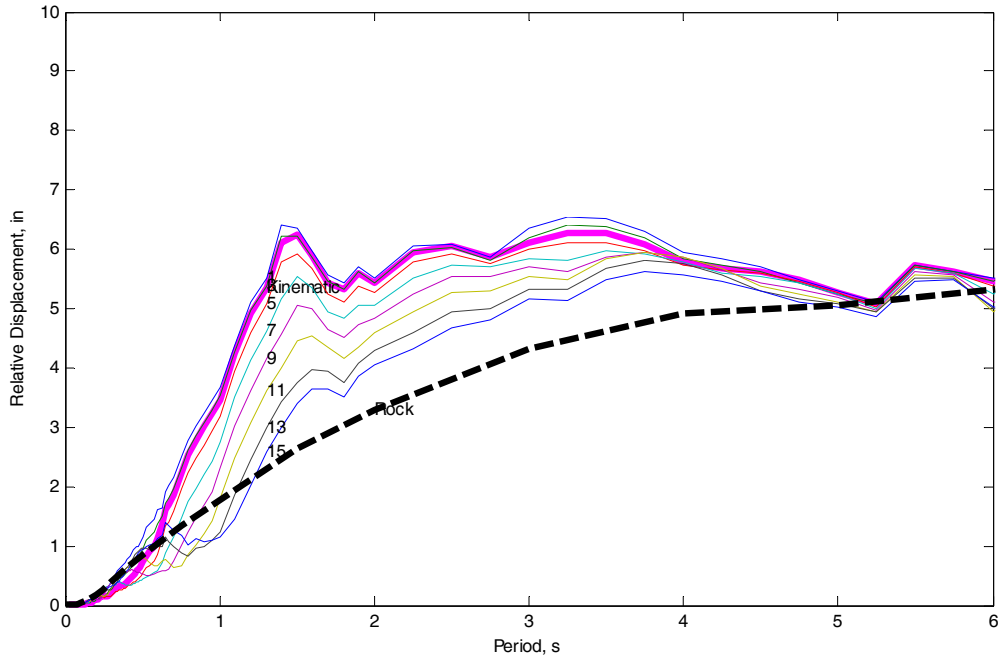
Relative Displacement, in
Period, s
Kinematic
Rock
1
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5
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9
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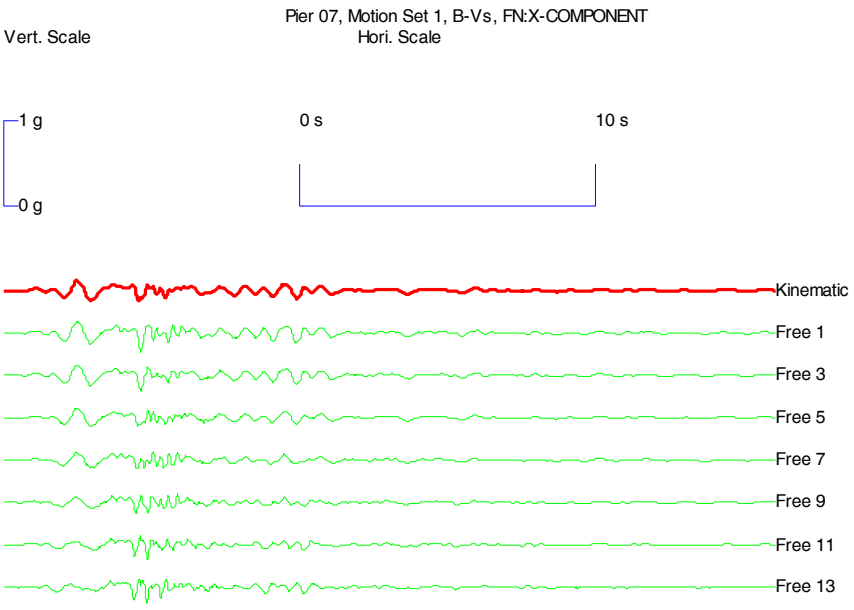
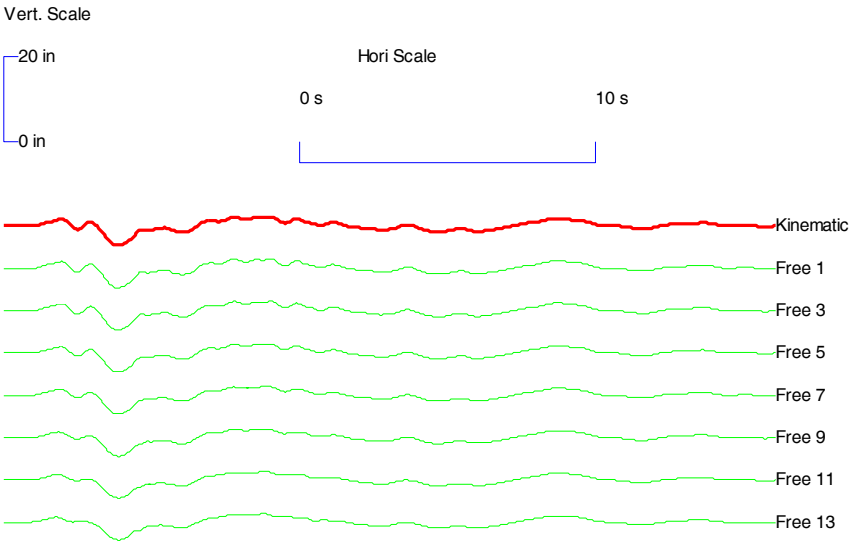

Pier 07, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13


Vert. Scale
Hori Scale
20 in
0 in
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
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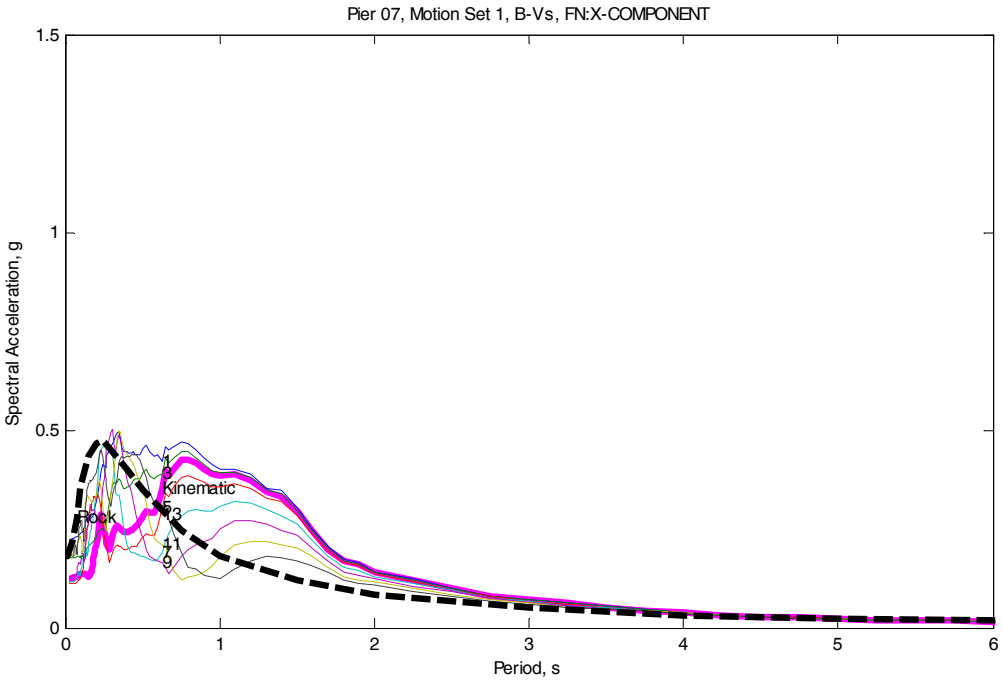
Free 13


Pier 07, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Kinematic
Rock
1
3
13
11
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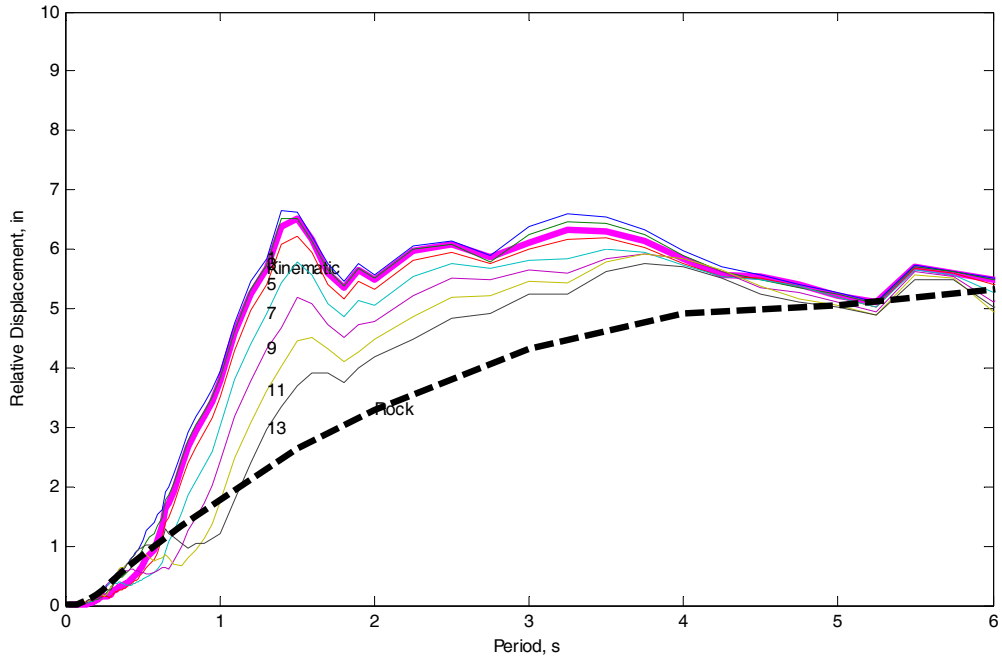
Relative Displacement, in
Period, s
Kinematic
Rock
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11
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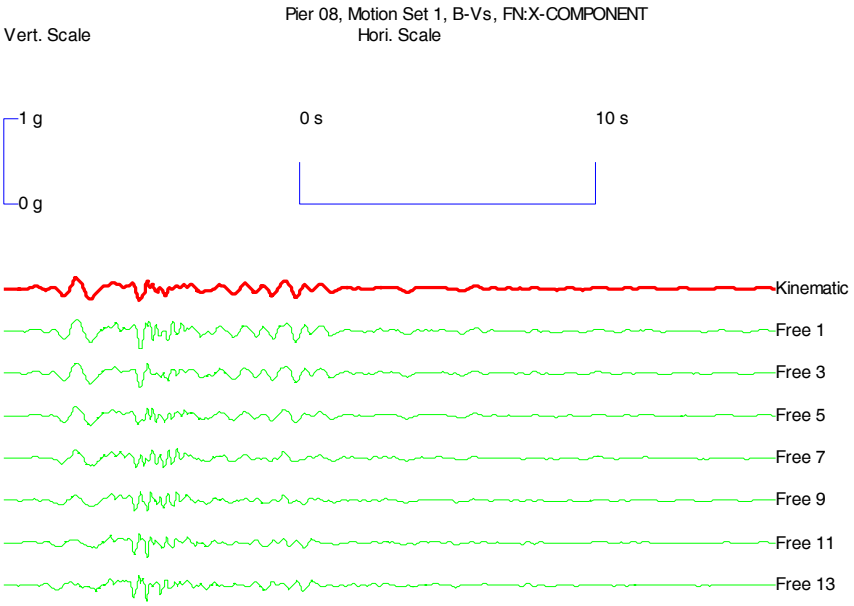
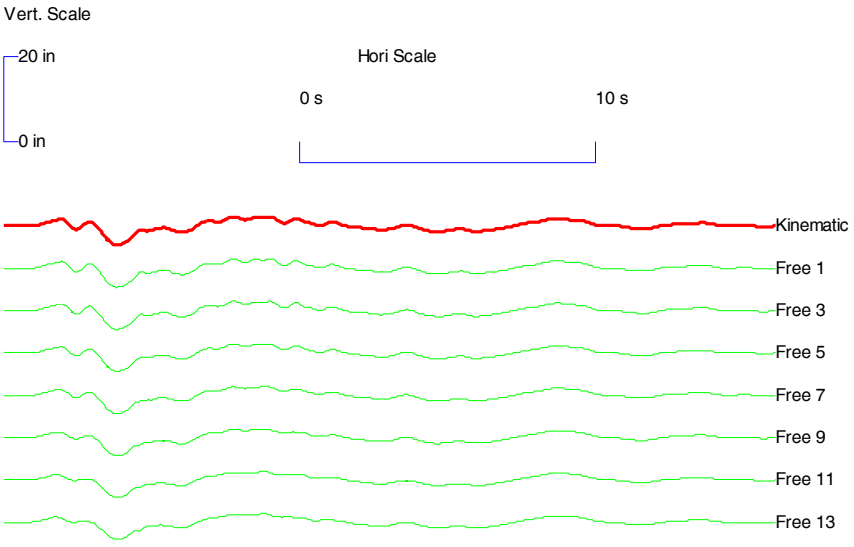

Pier 08, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13


Vert. Scale
Hori Scale
20 in
0 in
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
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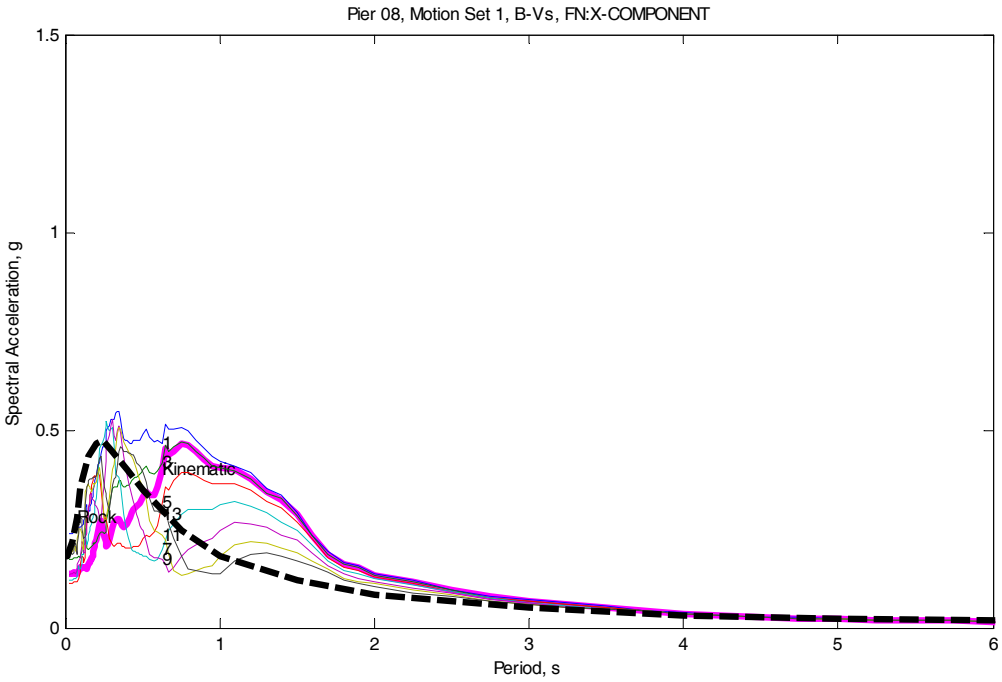
Pier 08, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Kinematic
Rock
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11
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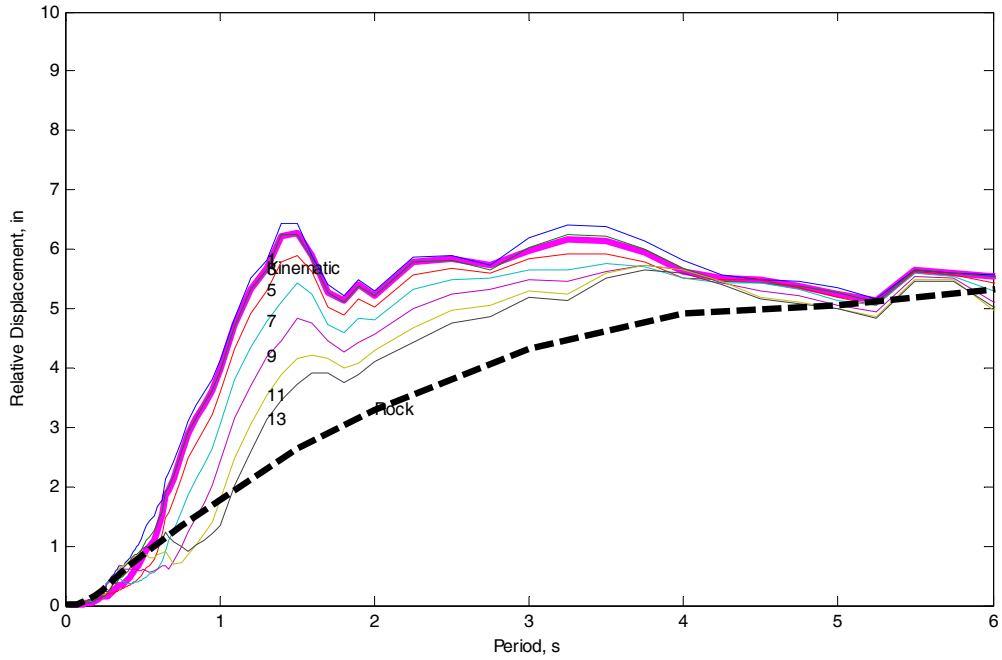
Relative Displacement, in
Period, s
Kinematic
Rock
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11
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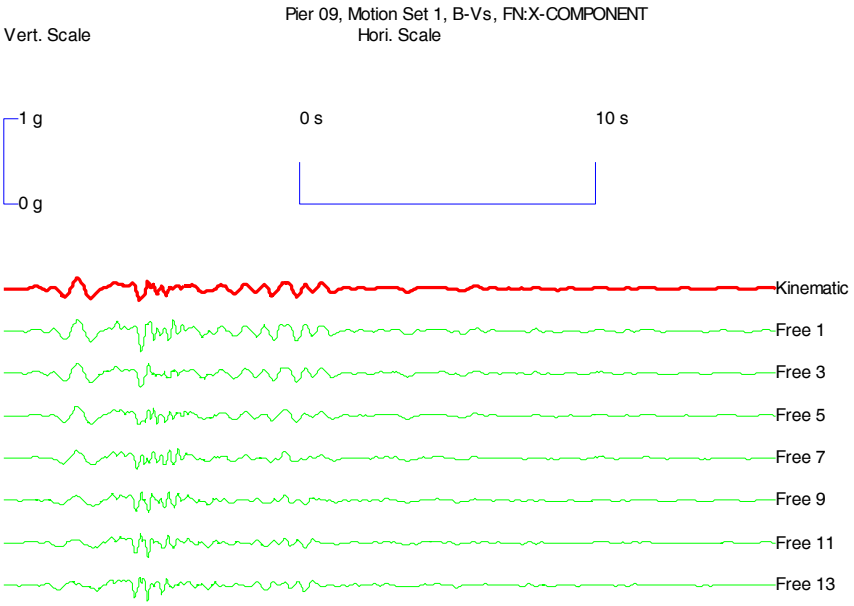
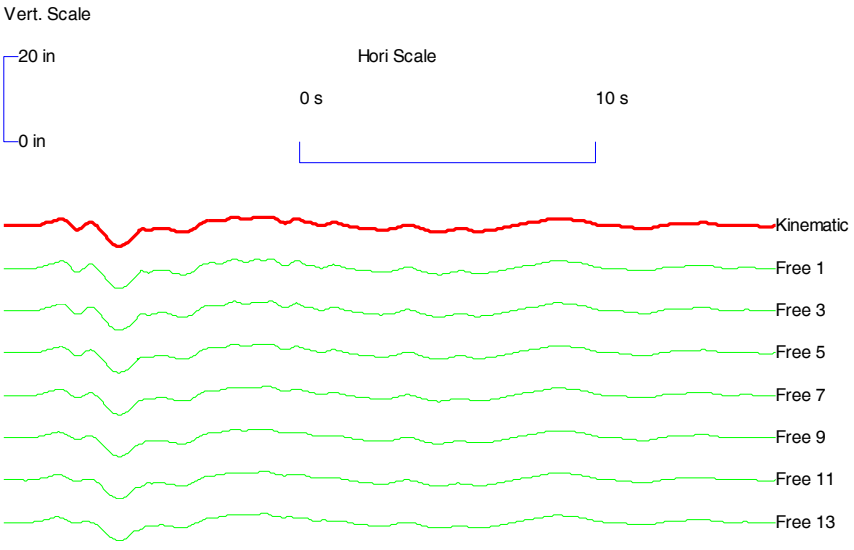

Pier 09, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13


Vert. Scale
Hori Scale
20 in
0 in
0 s
10 s
Kinematic
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Free 3
Free 5
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Free 9
Free 11
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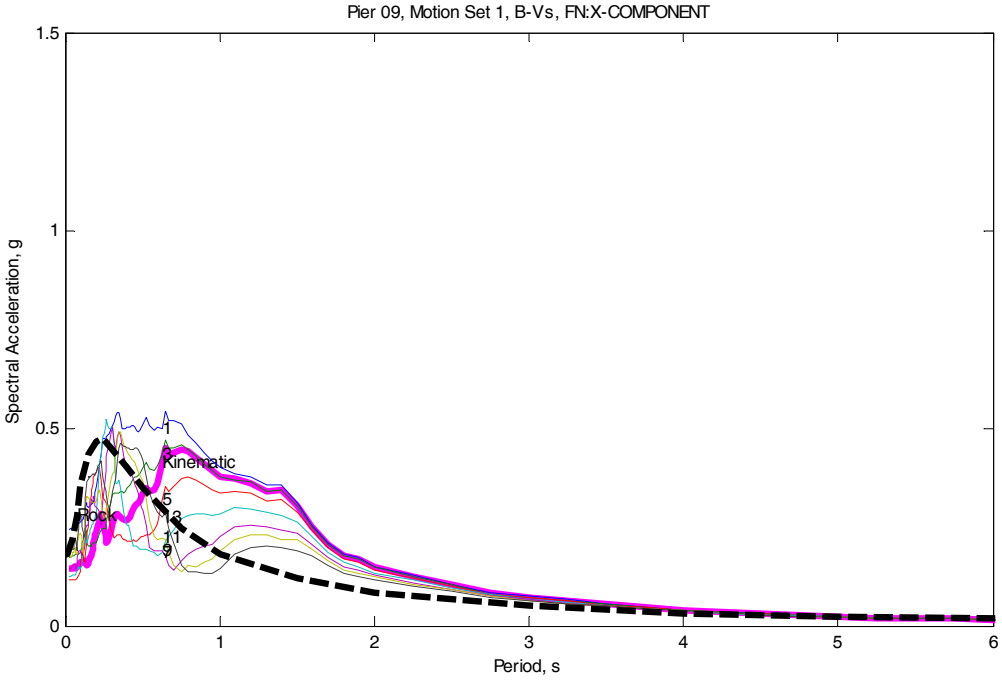
Pier 09, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
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Kinematic
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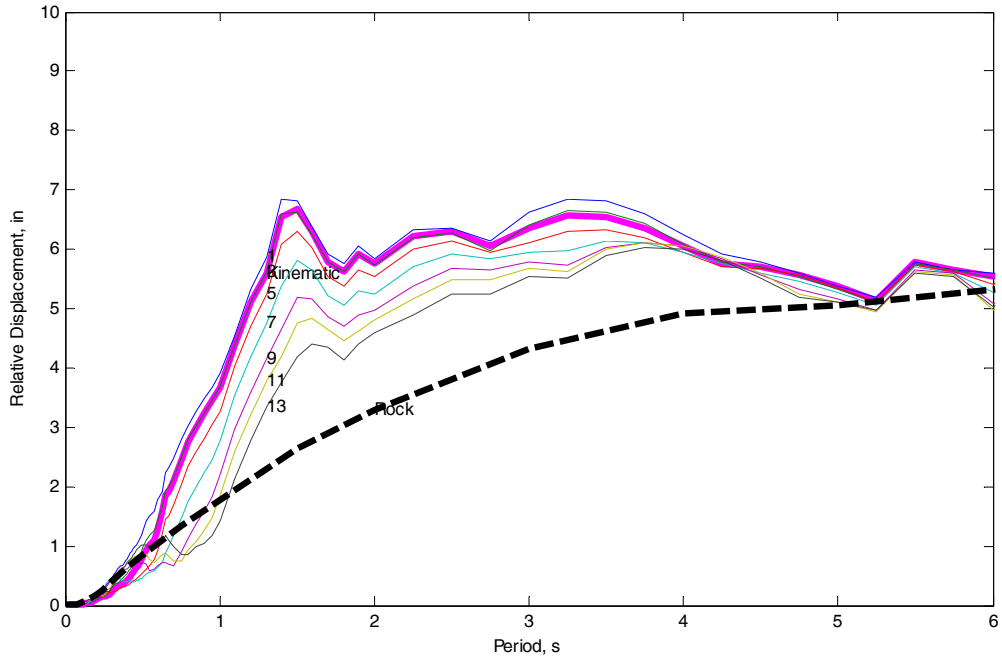
11
9
Rock


Relative Displacement, in
Period, s
1
Kinematic
5
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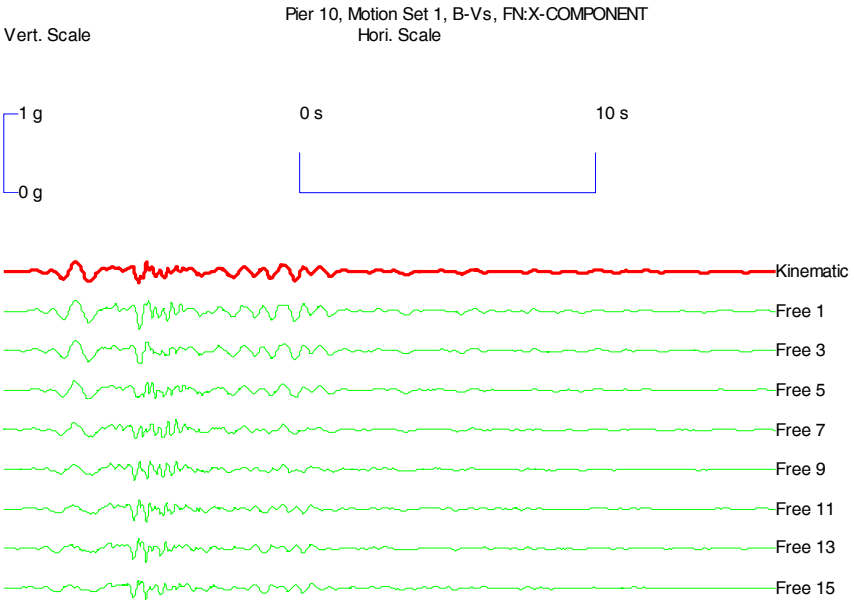
9
11
13
Rock


Pier 10, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
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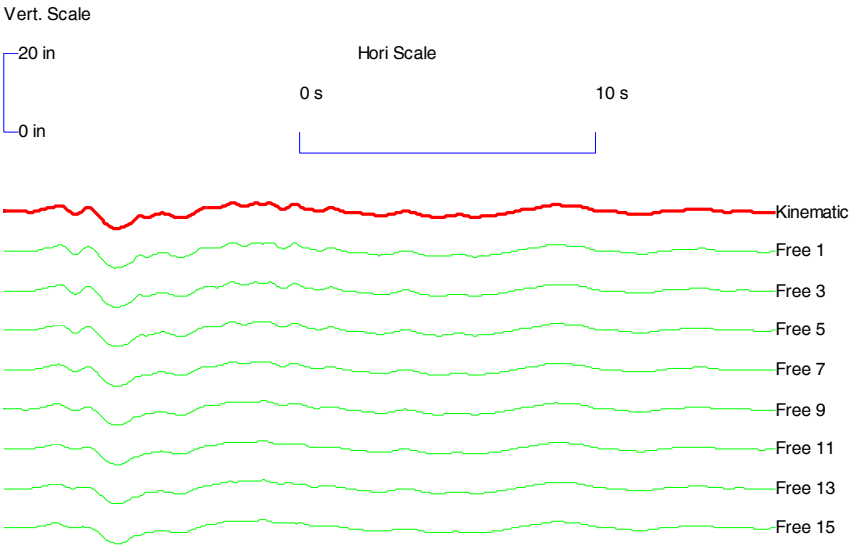
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15


Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
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Free 11
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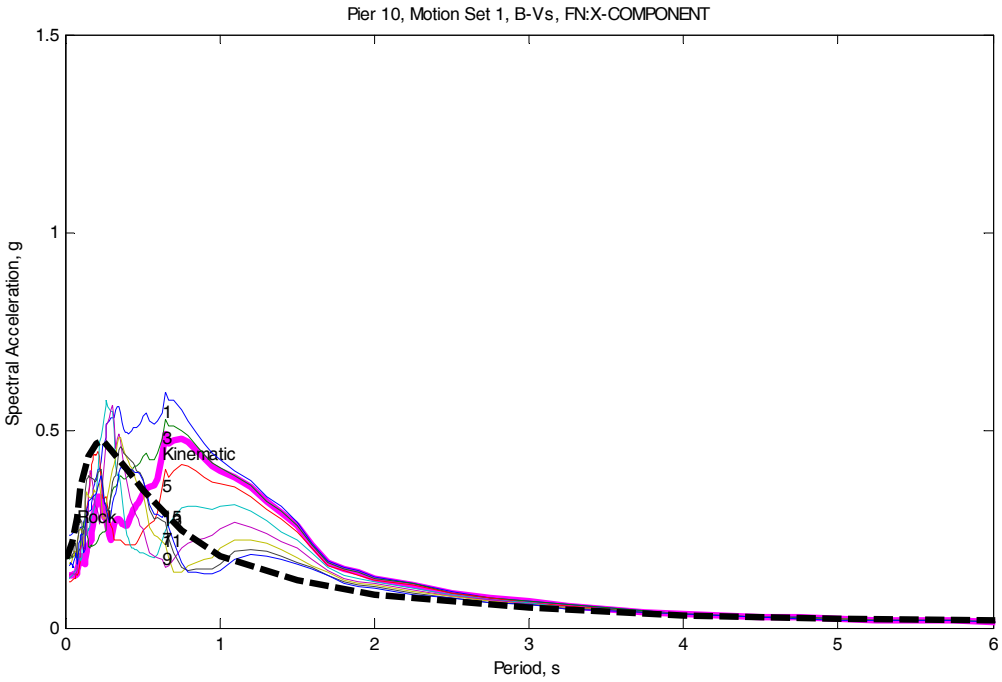
Free 15


Pier 10, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
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3
Kinematic
5
Rock
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1.5
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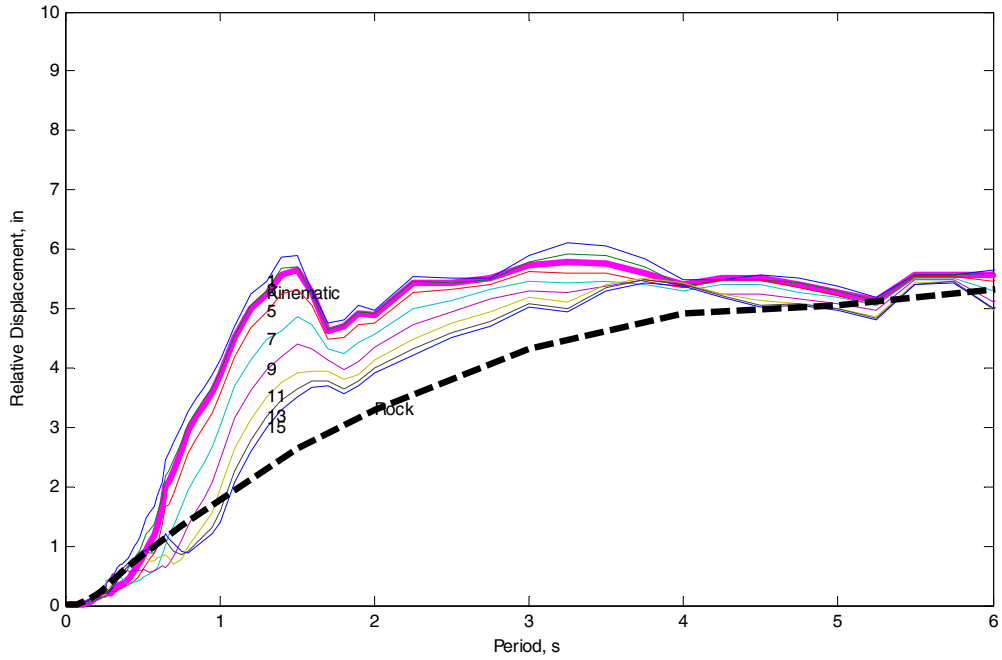
Relative Displacement, in
Period, s
1
3
Kinematic
5
7
9
11
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Rock
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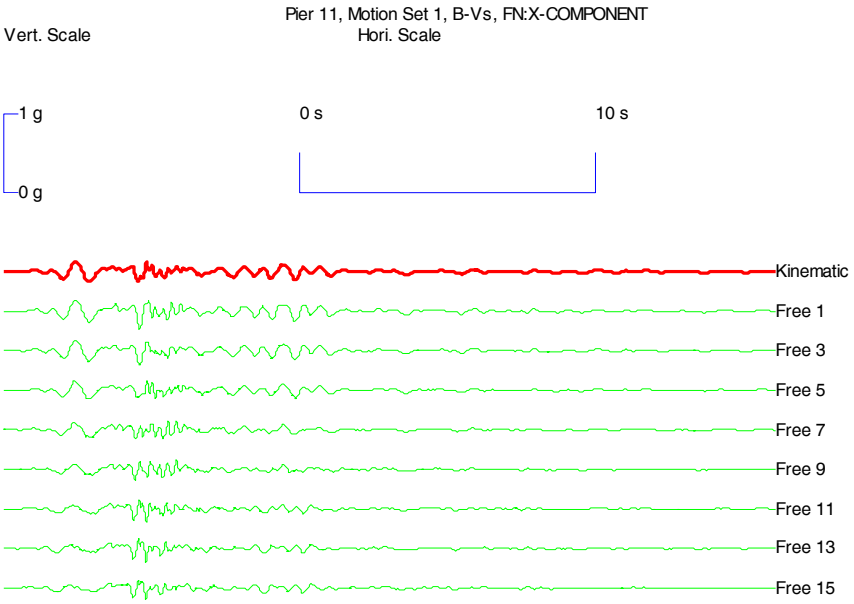
Pier 11, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
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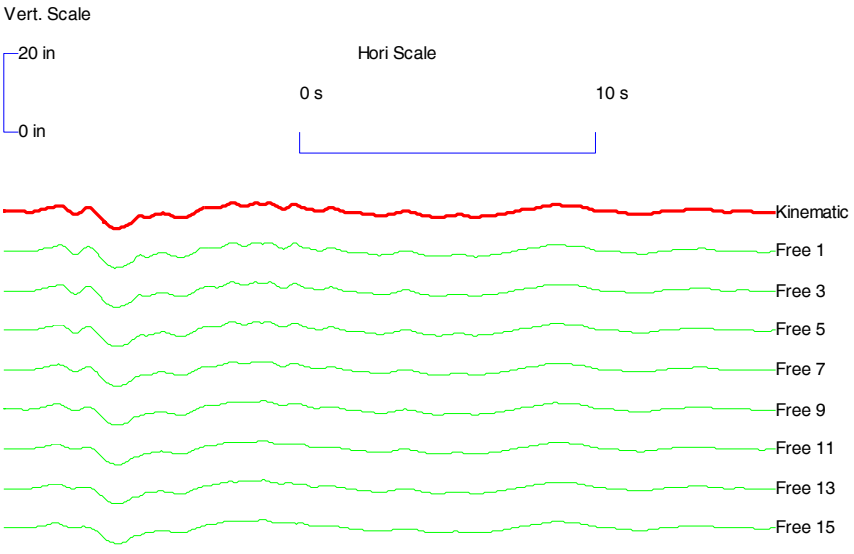
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15


Vert. Scale
20 in
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Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
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Free 11
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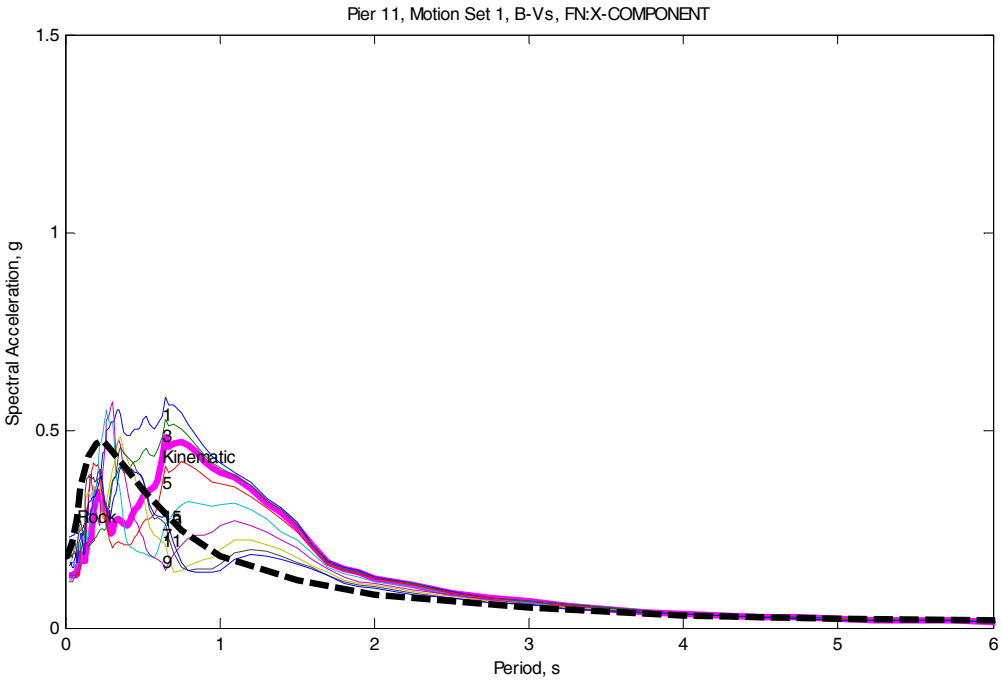
Pier 11, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Kinematic
Rock
1
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13
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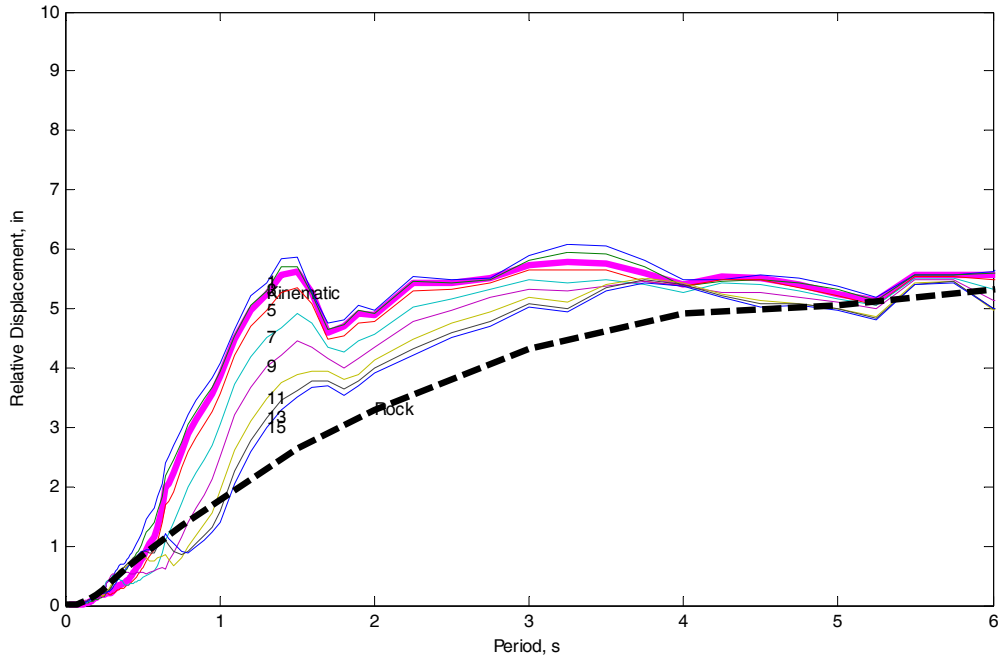
Relative Displacement, in
Period, s
Kinematic
Rock
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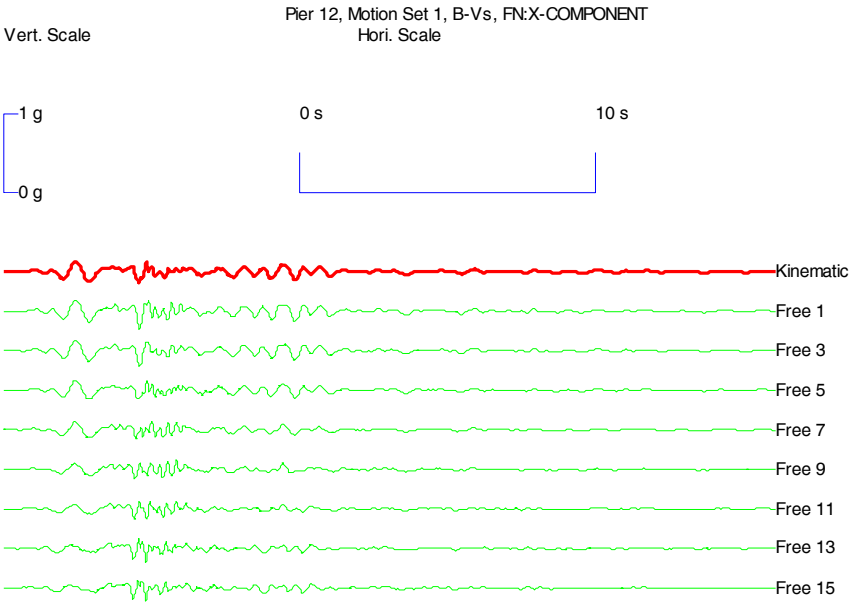
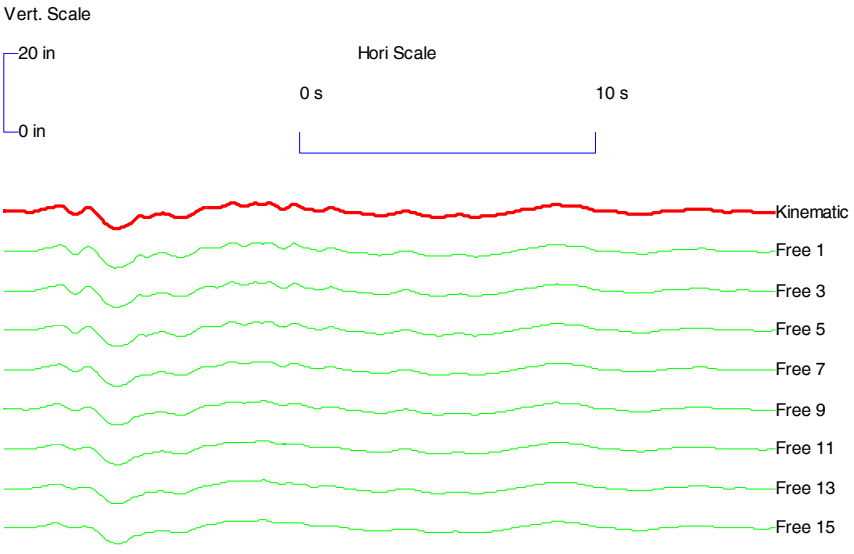
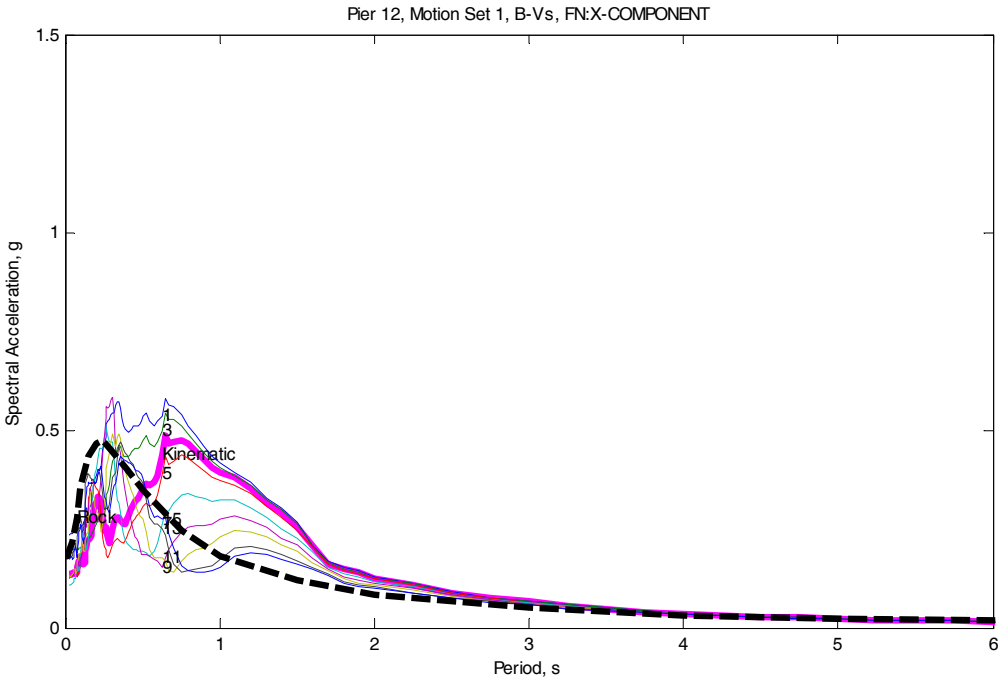

Pier 12, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15


Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15


Pier 12, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Kinematic
Rock
1
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13
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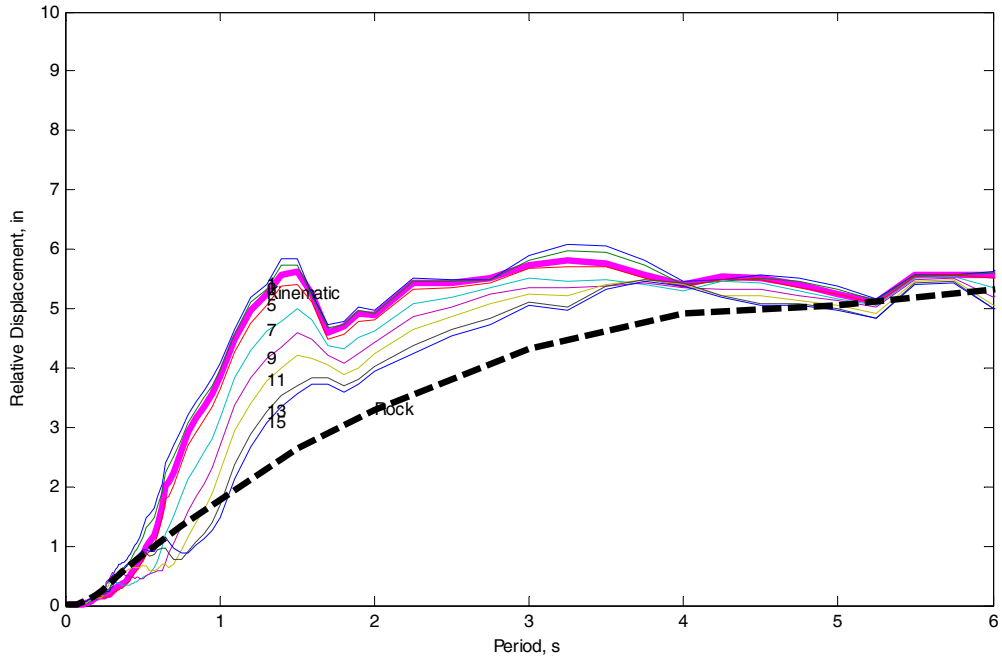
Relative Displacement, in
Period, s
Kinematic
Rock
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13
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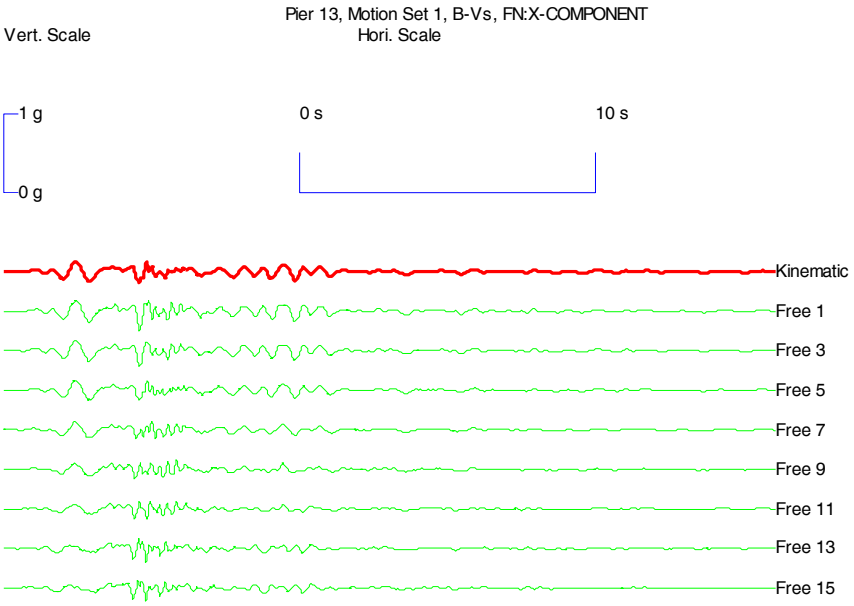
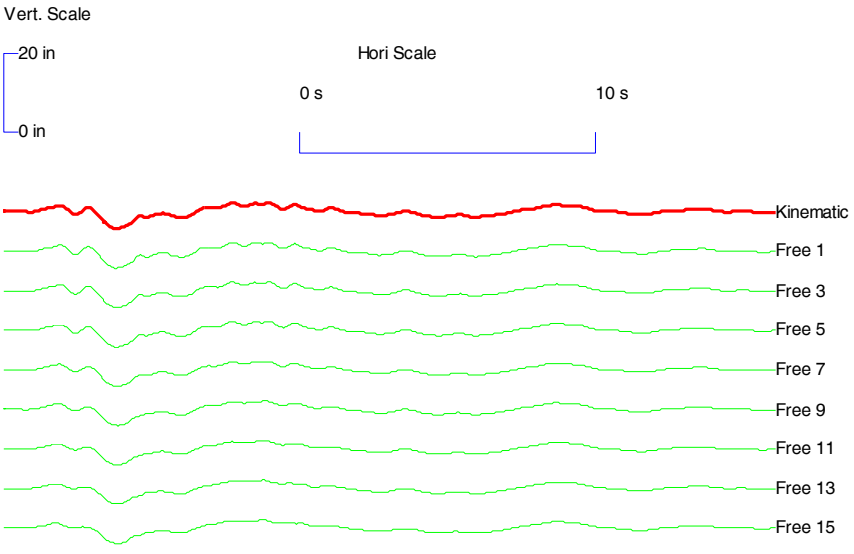

Pier 13, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15


Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
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Free 5
Free 7
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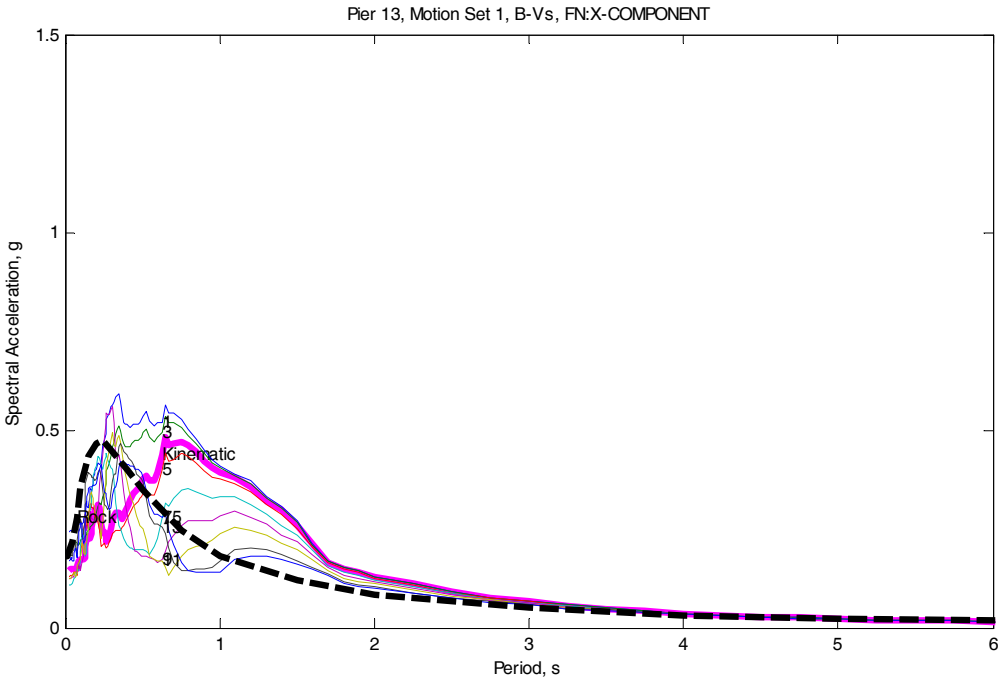
Free 11
Free 13
Free 15


Pier 13, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Kinematic
Rock
1
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13
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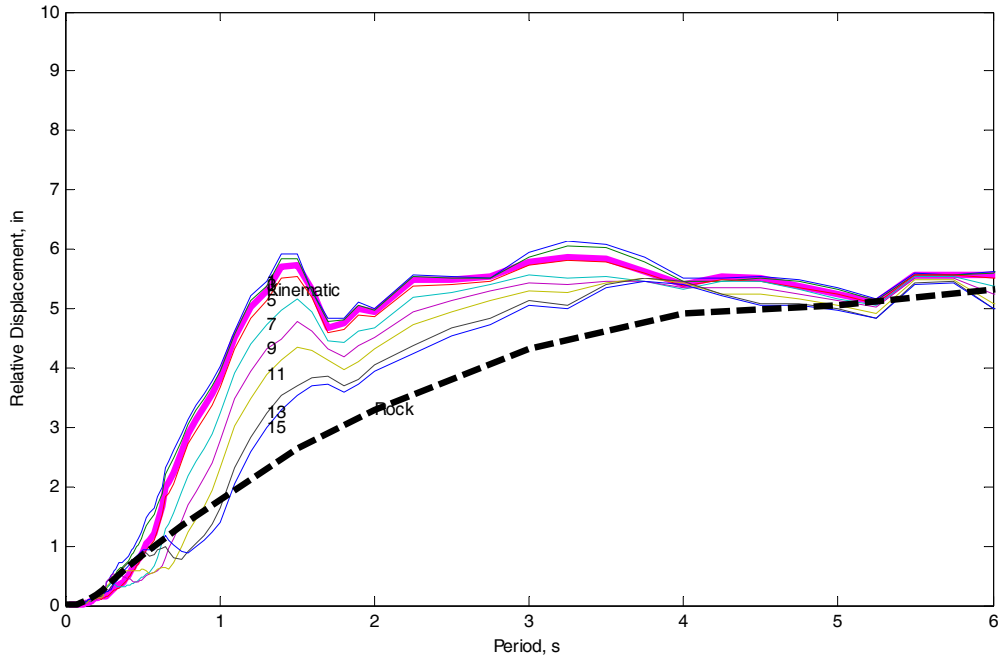
Relative Displacement, in
Period, s
Kinematic
Rock
1
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11
13
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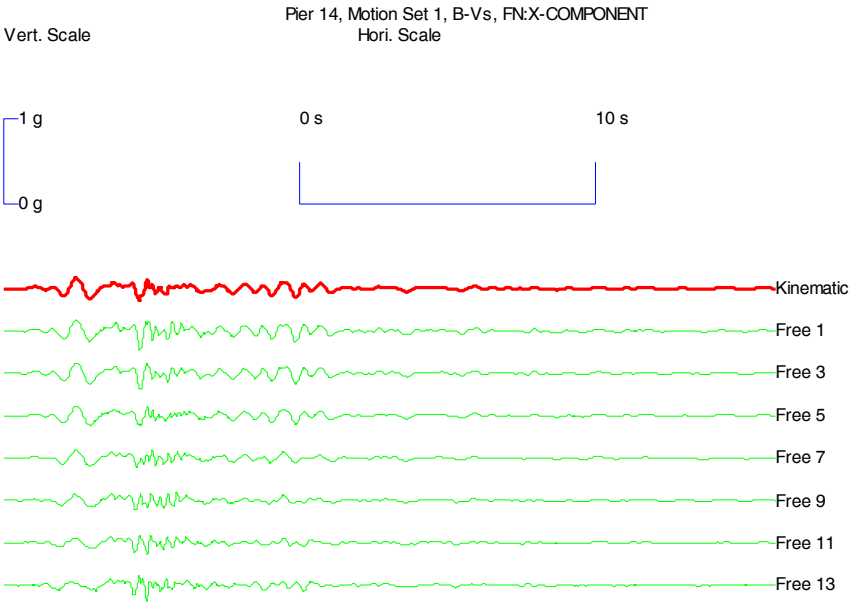
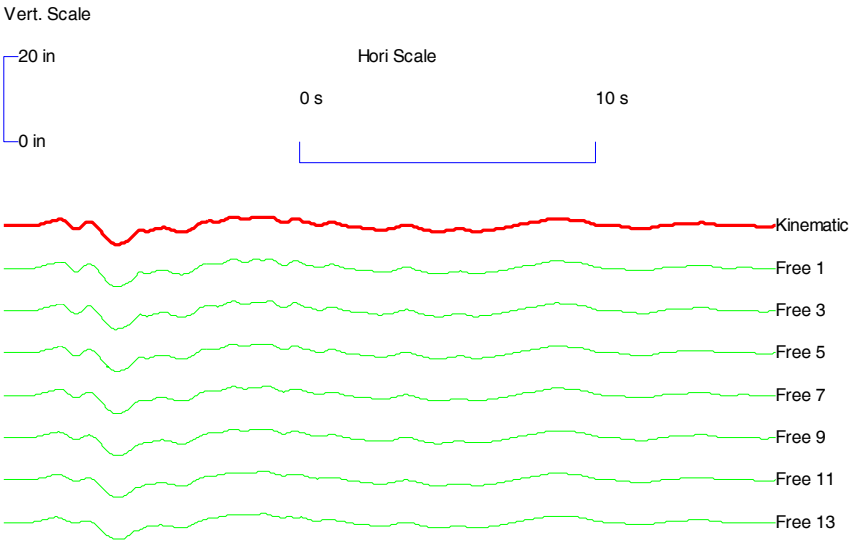

Pier 14, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13


Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
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Free 3
Free 5
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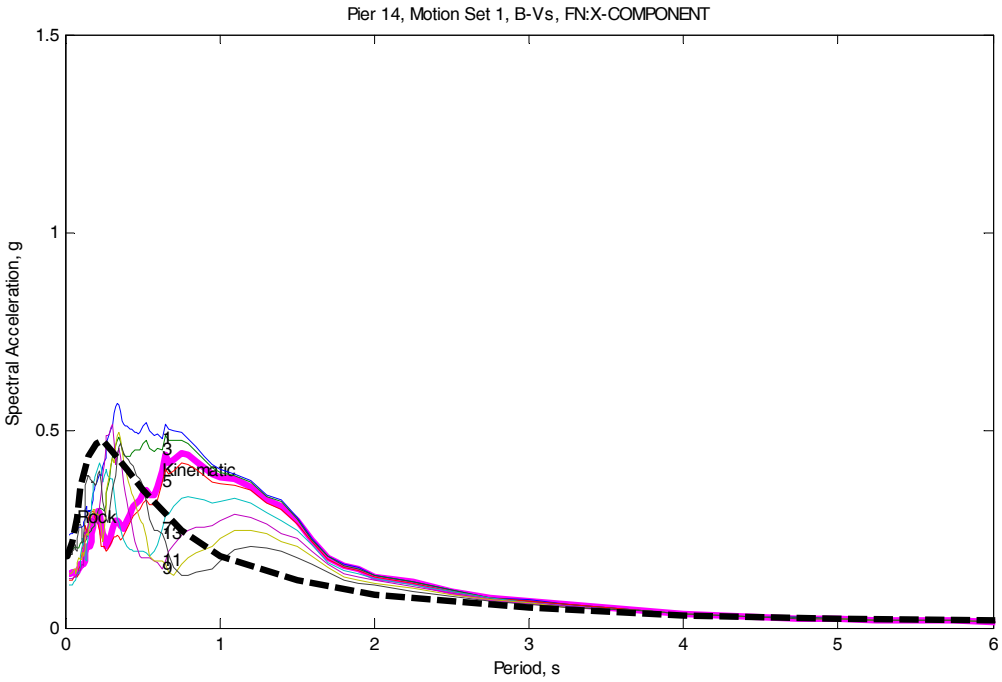
Free 9
Free 11
Free 13


Pier 14, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Kinematic
Rock
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11
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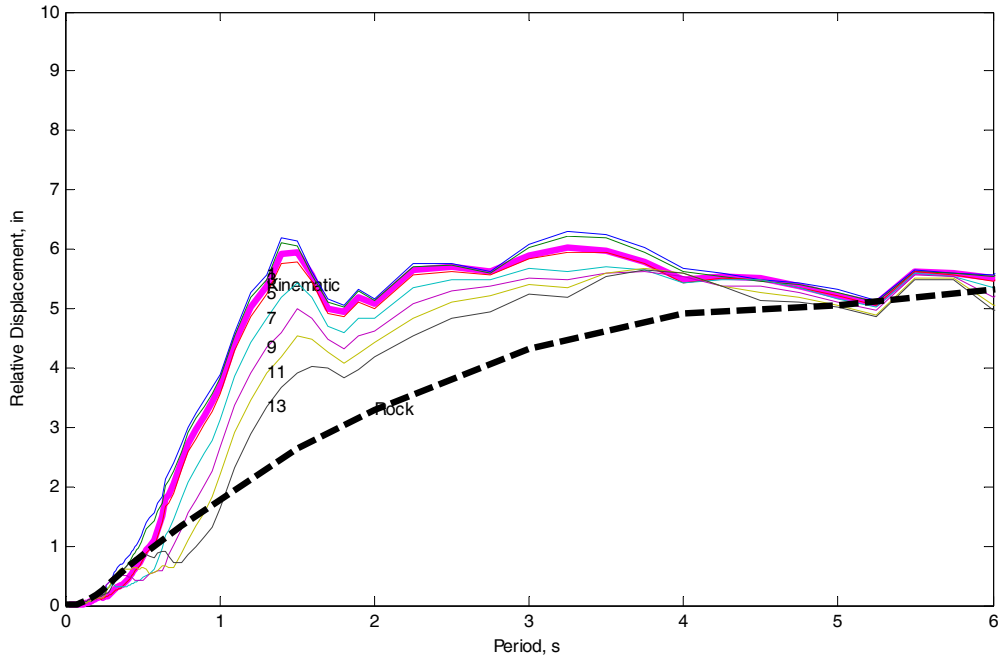
Relative Displacement, in
Period, s
Kinematic
Rock
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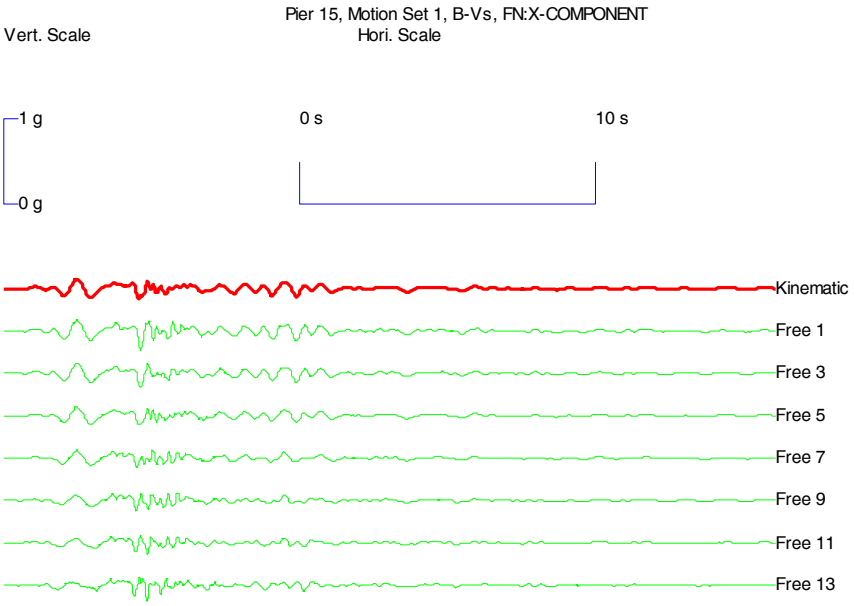
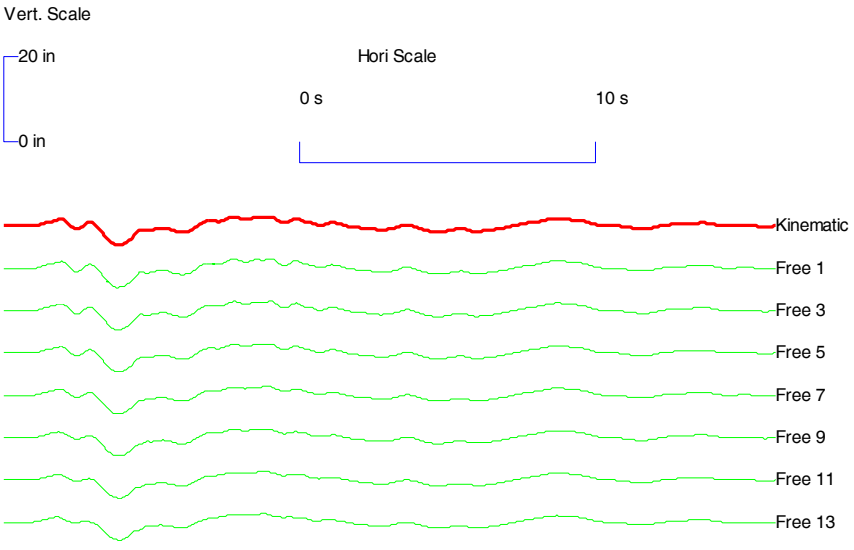

Pier 15, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13


Vert. Scale
Hori Scale
20 in
0 in
0 s
10 s
Kinematic
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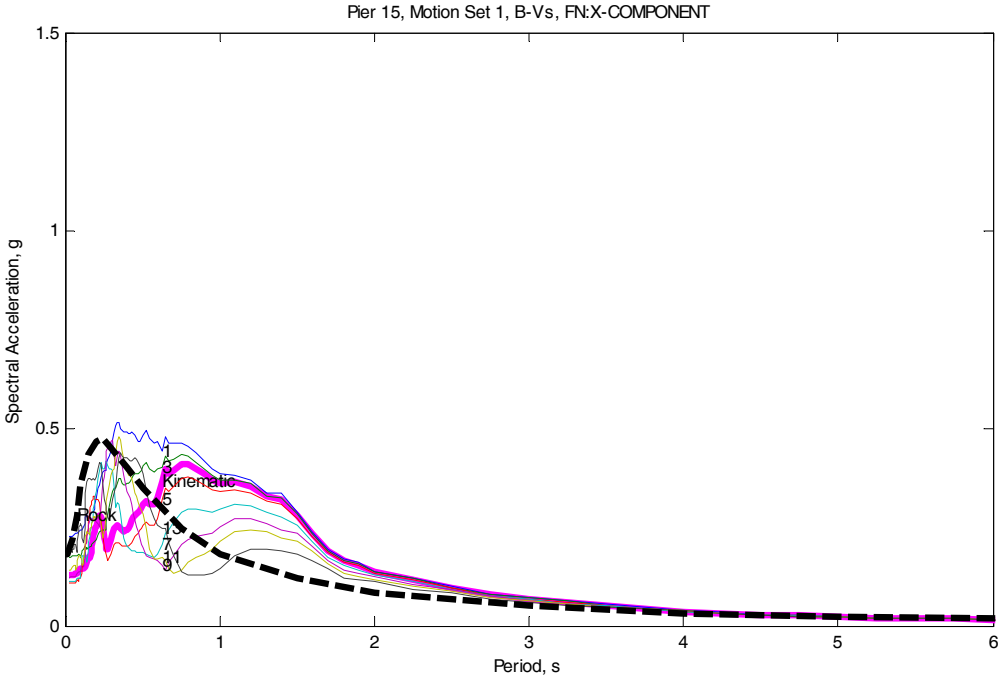
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13


Pier 15, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Kinematic
Rock
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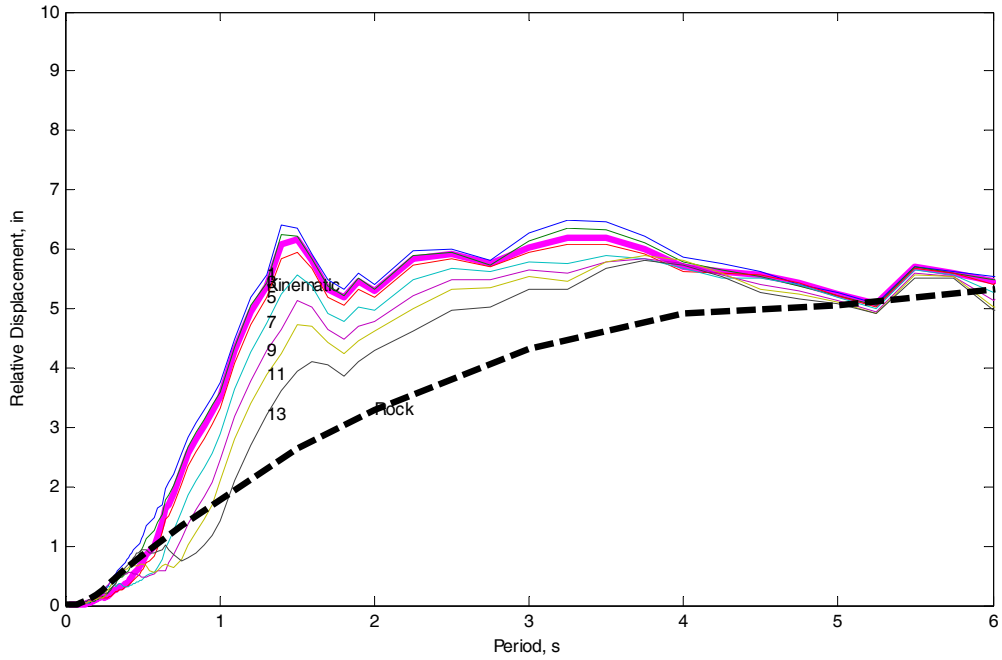
Relative Displacement, in
Period, s
Kinematic
Rock
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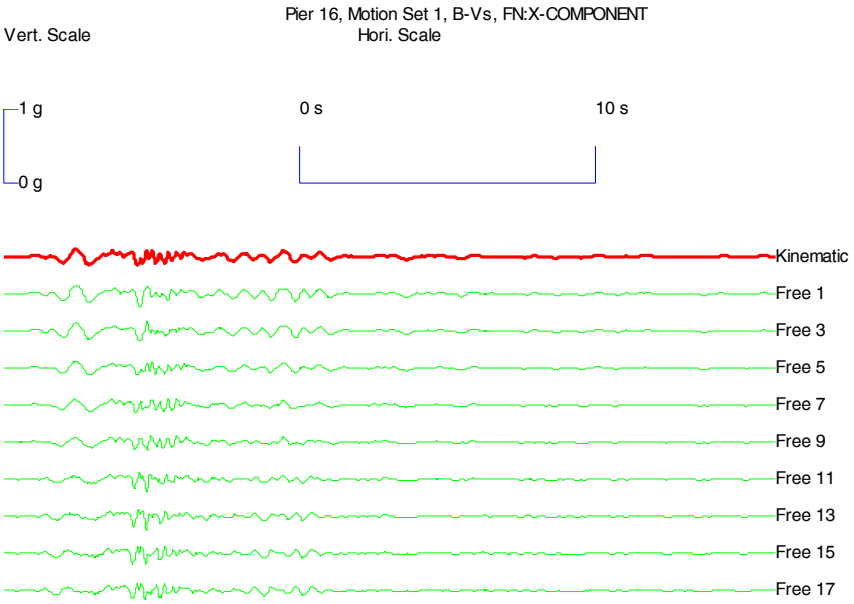
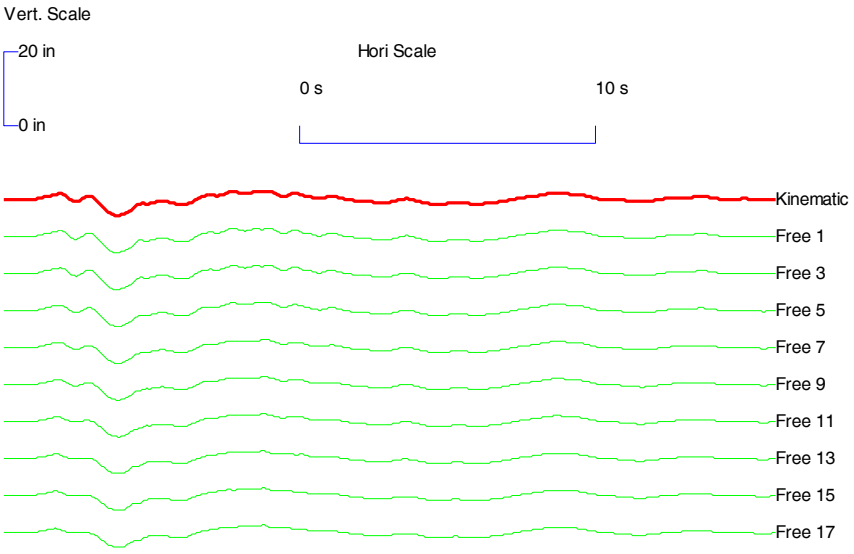
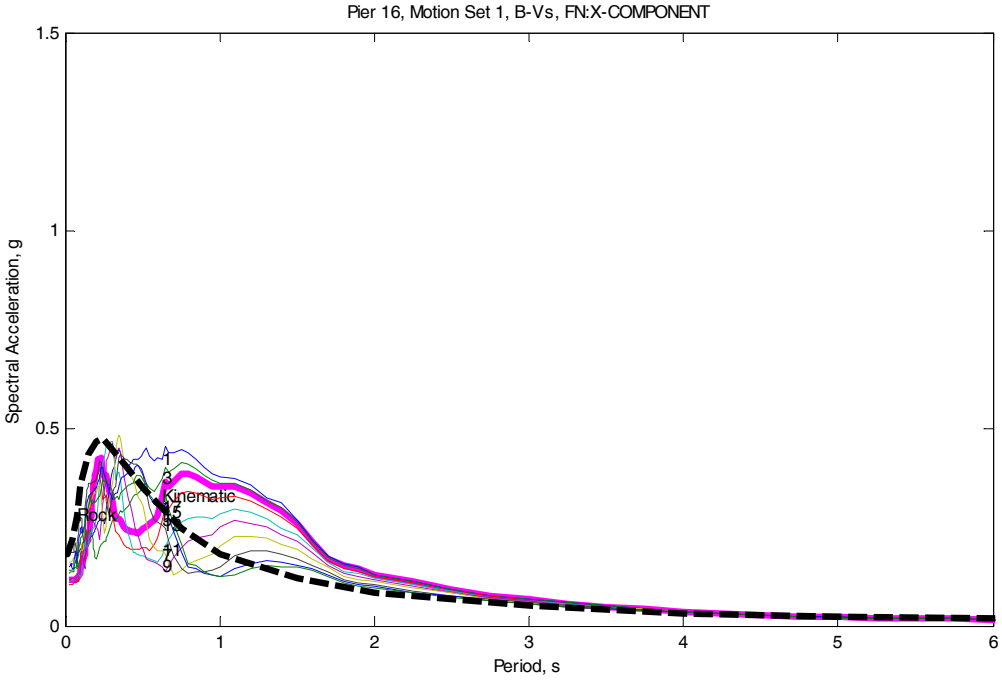
11
13


Pier 16, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17


Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17


Pier 16, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Kinematic
Rock
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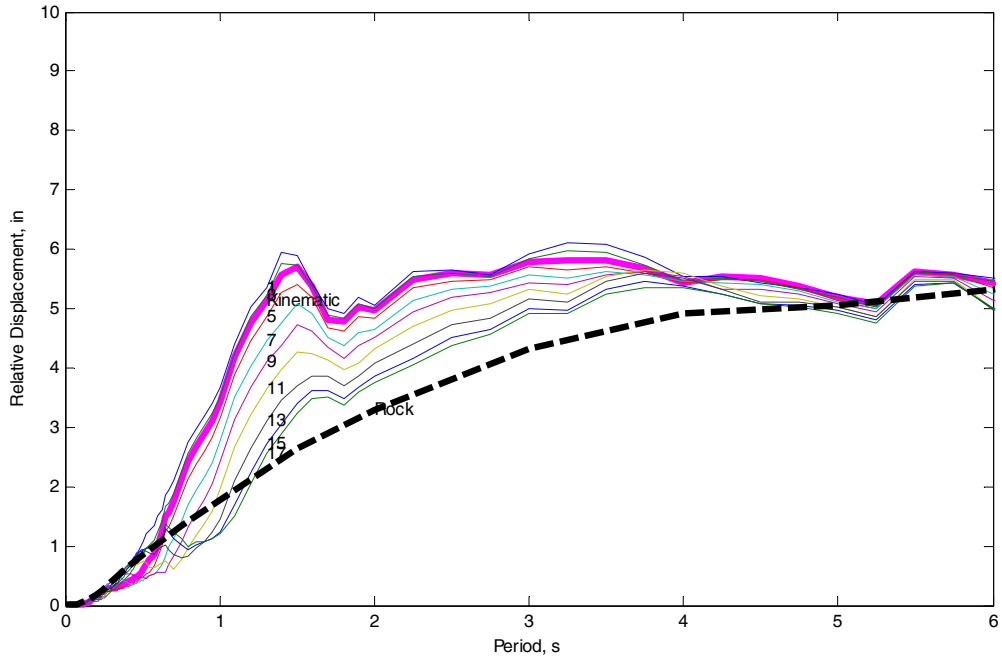
17


Relative Displacement, in
Period, s
Kinematic
Rock
1
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5
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13
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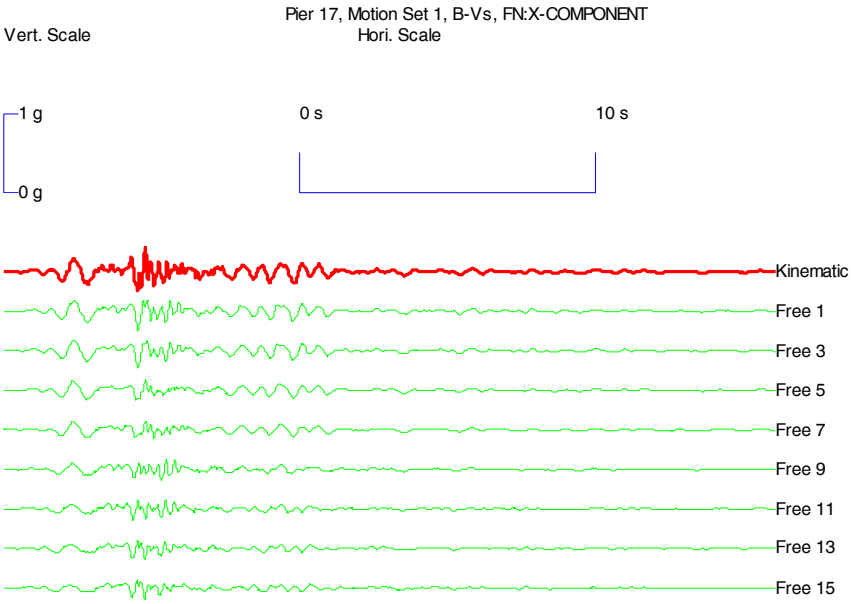
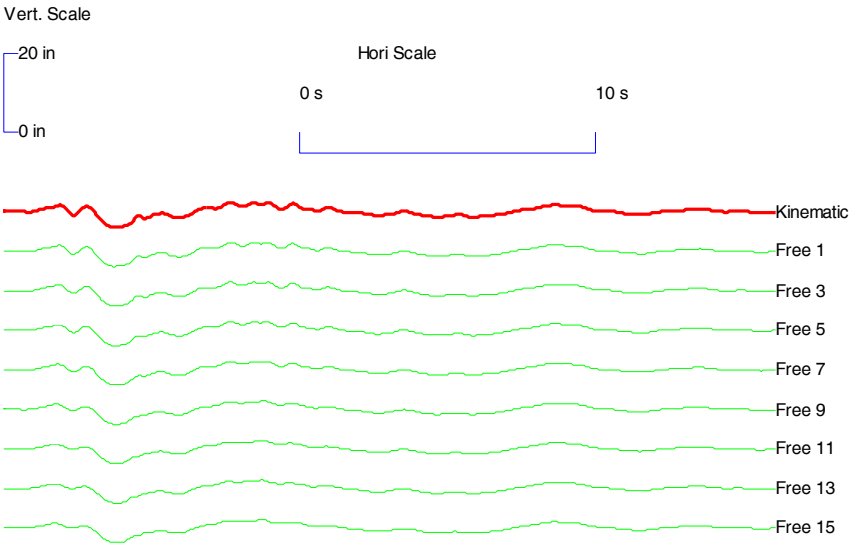
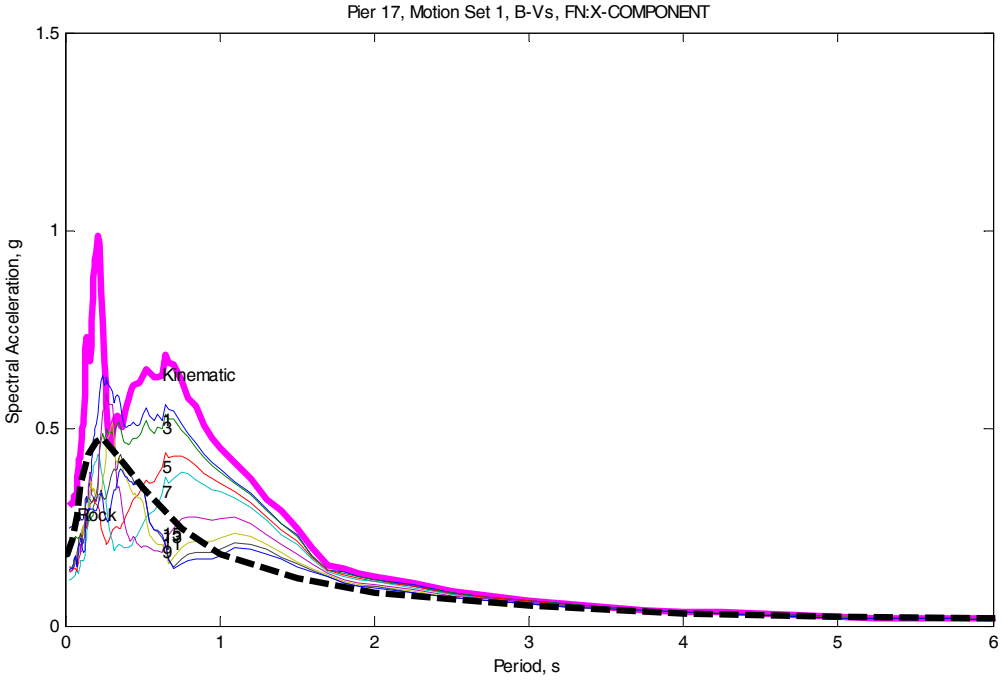
17


Pier 17, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15


Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15


Pier 17, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Kinematic
Rock
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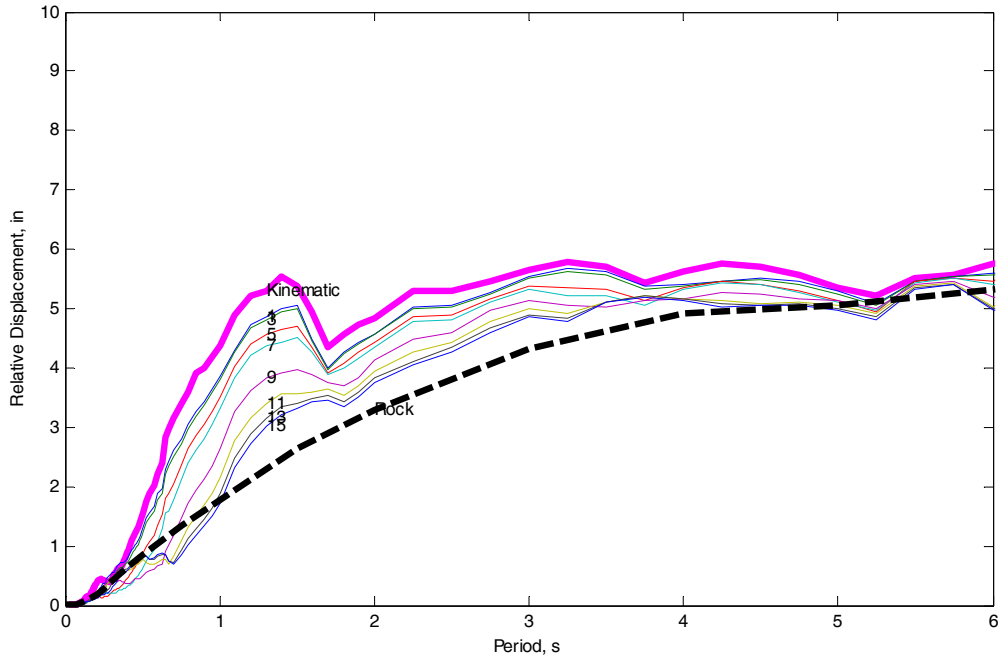
Relative Displacement, in
Period, s
Kinematic
Rock
1
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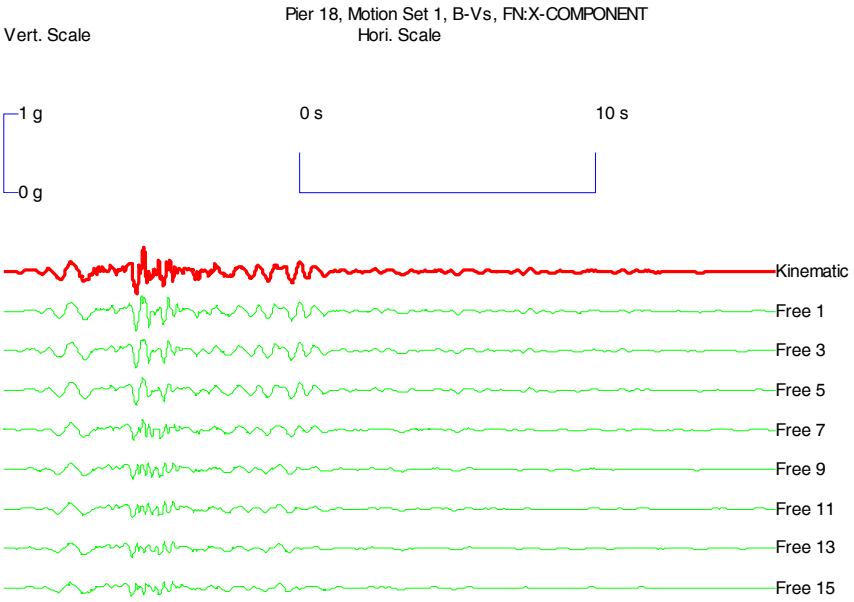
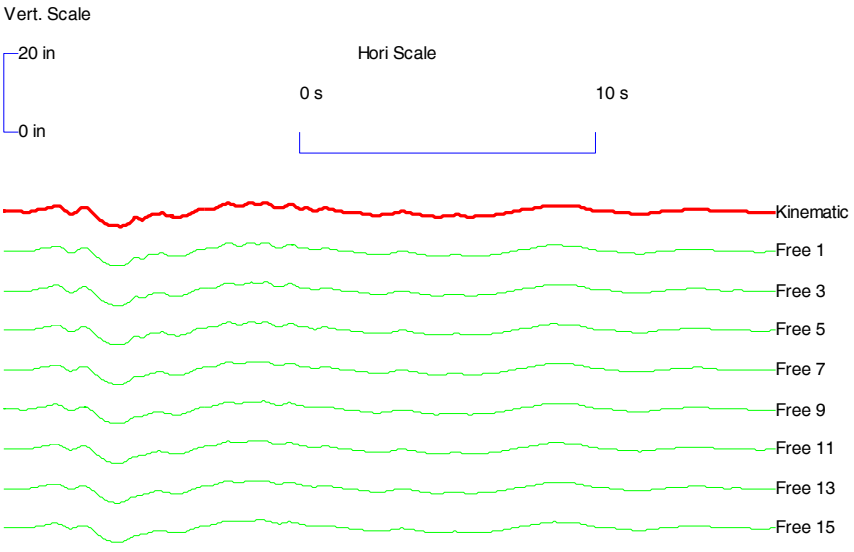
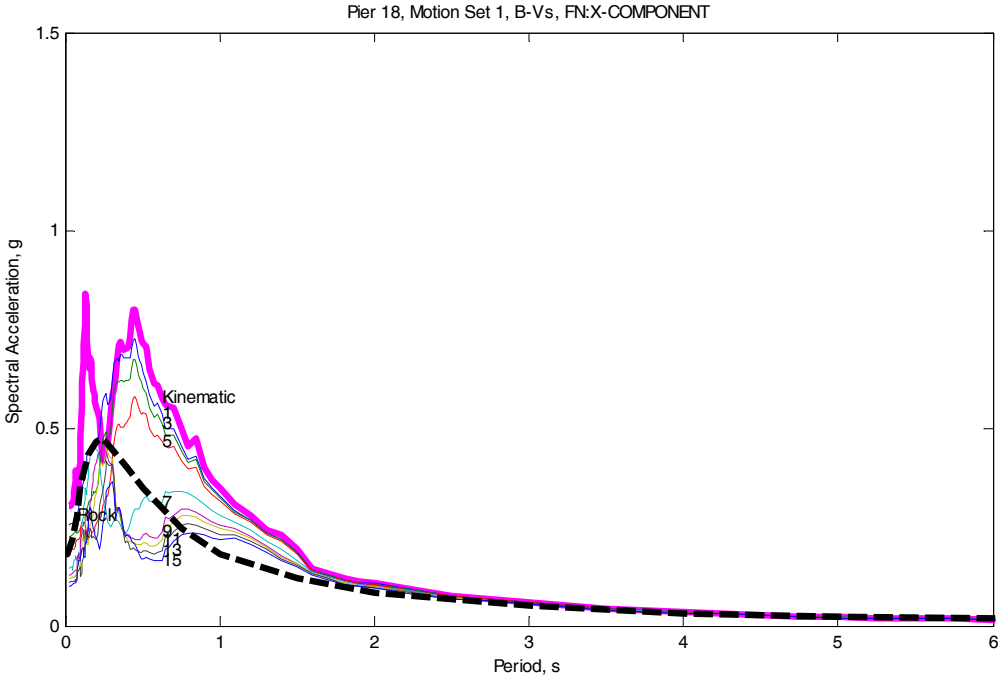

Pier 18, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15


Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15


Pier 18, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Kinematic
Rock
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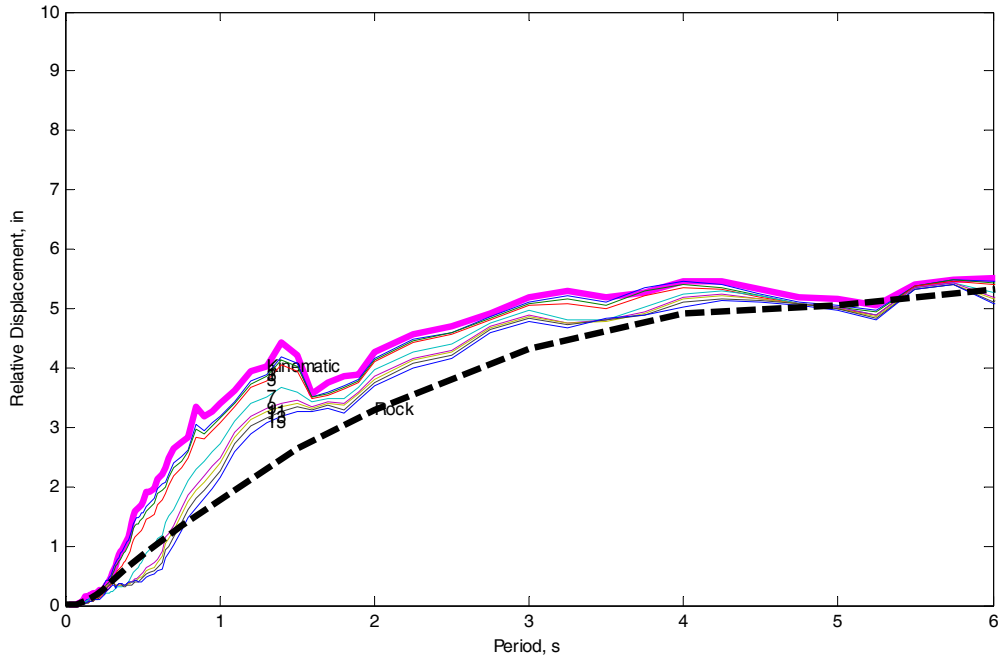
Relative Displacement, in
Period, s
Kinematic
Rock
3
5
7
9
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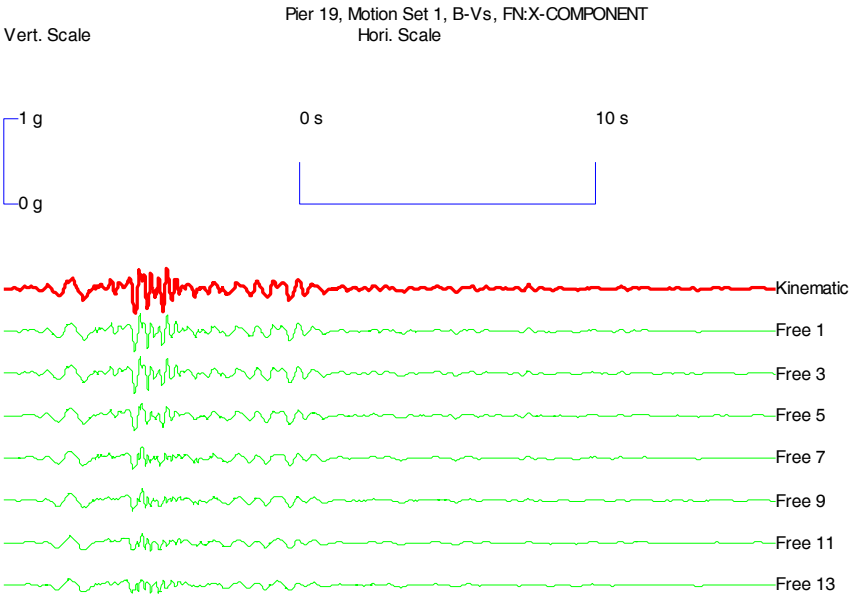
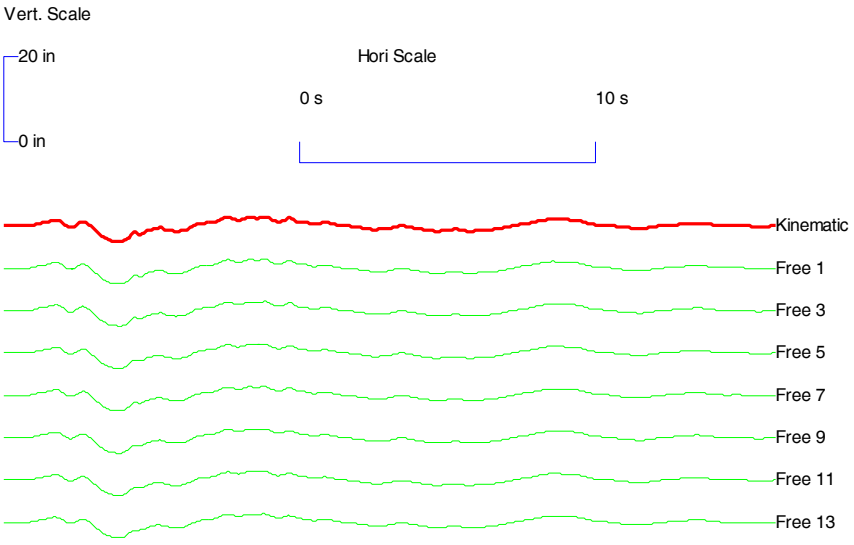

Pier 19, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13


Vert. Scale
Hori Scale
20 in
0 in
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
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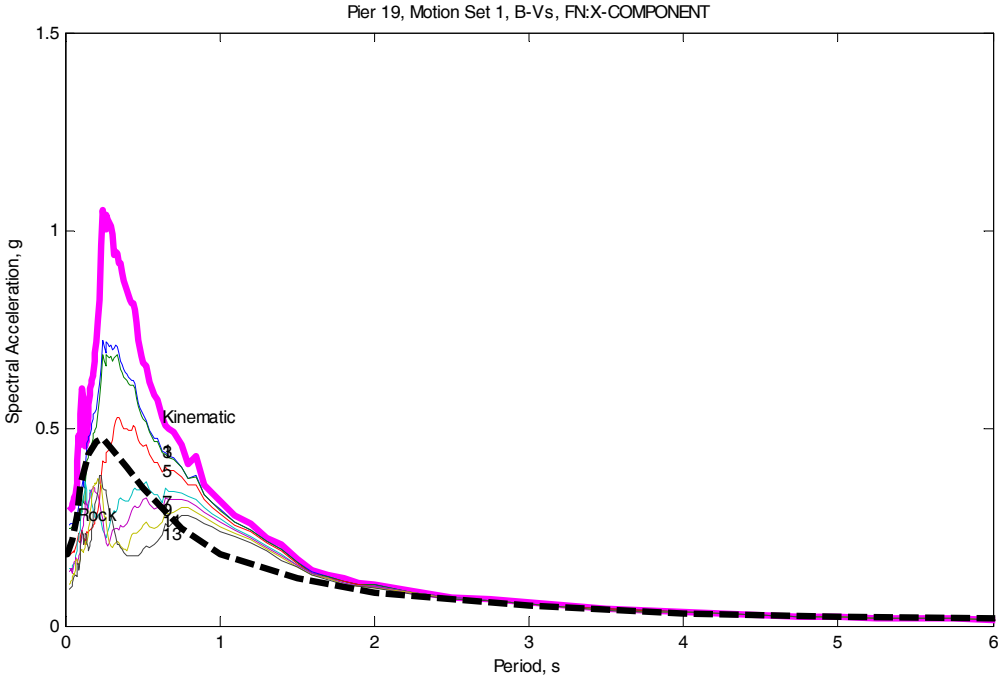
Free 9
Free 11
Free 13


Pier 19, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Kinematic
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1.5
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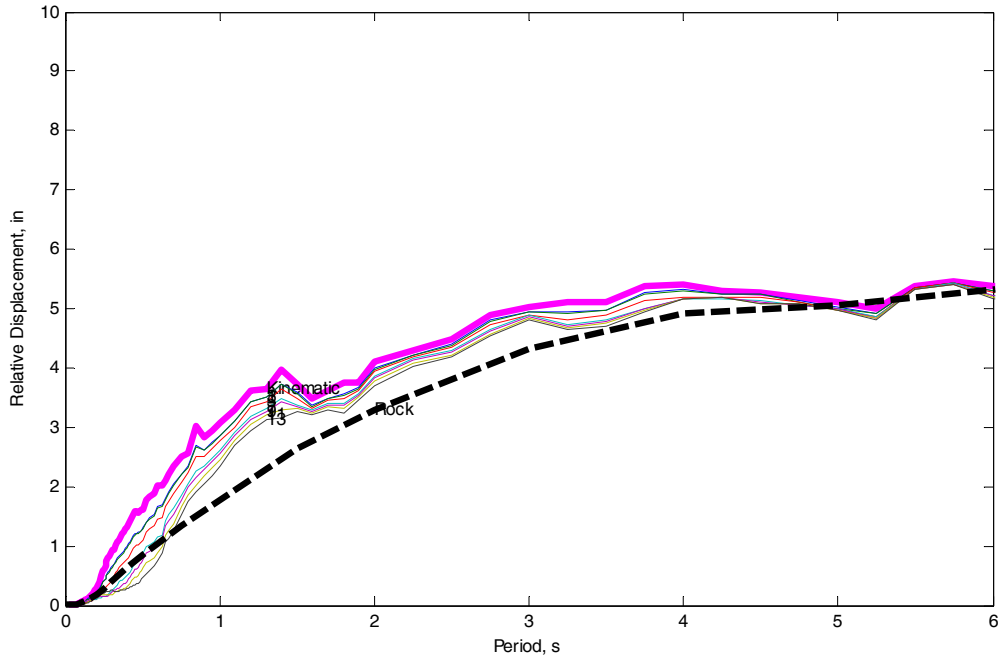
Relative Displacement, in
Period, s
Kinematic
Rock
3
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7
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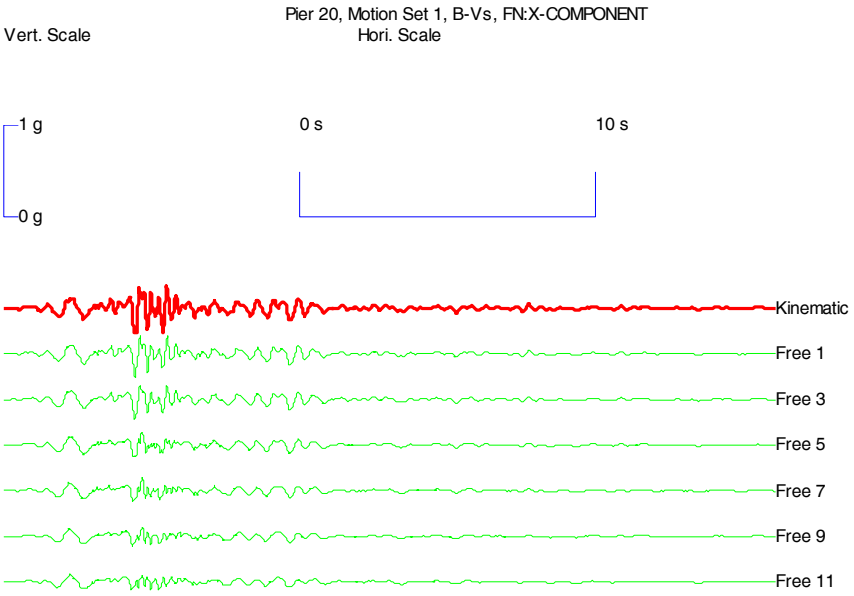
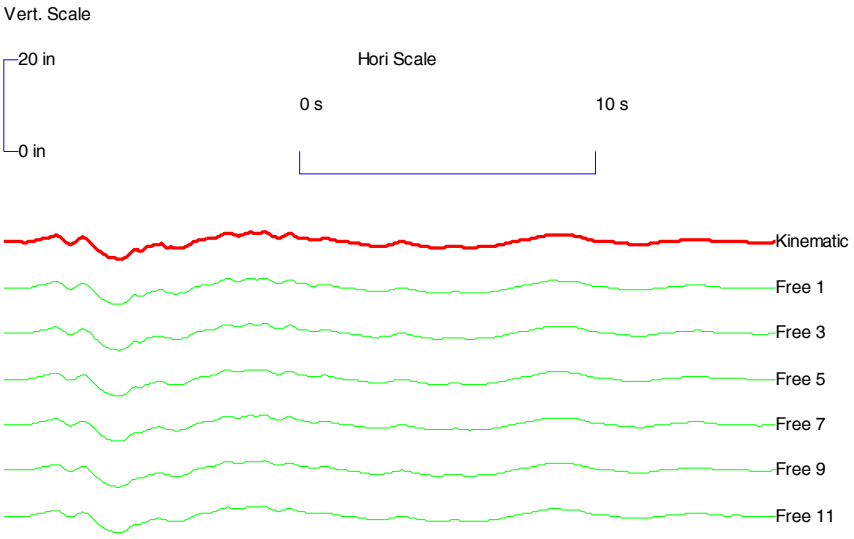
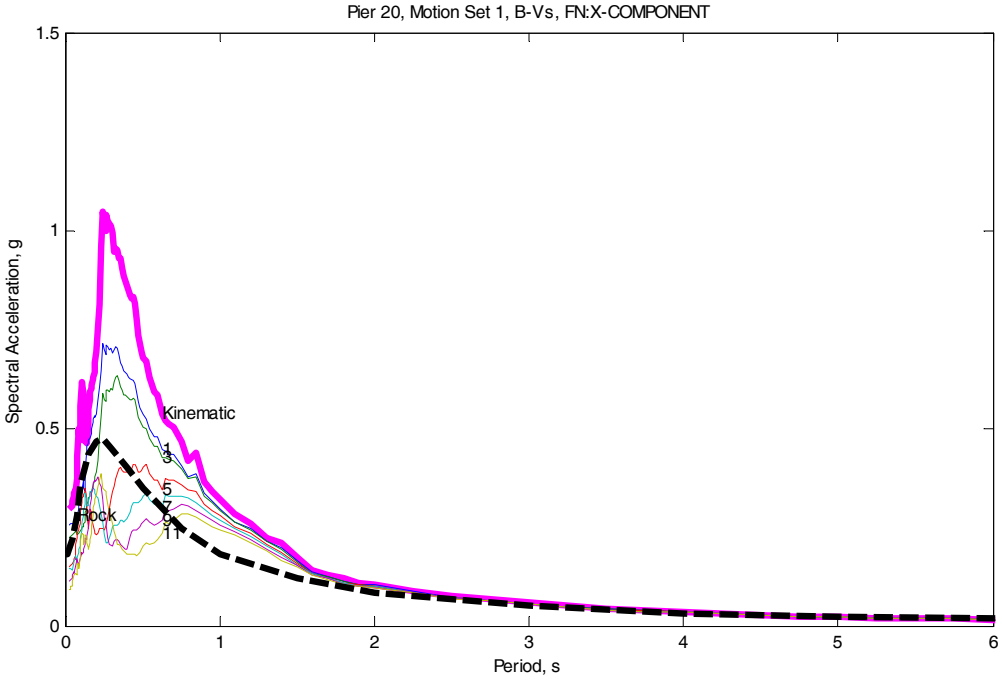

Pier 20, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11


Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11


Pier 20, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Kinematic
Rock
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1.5
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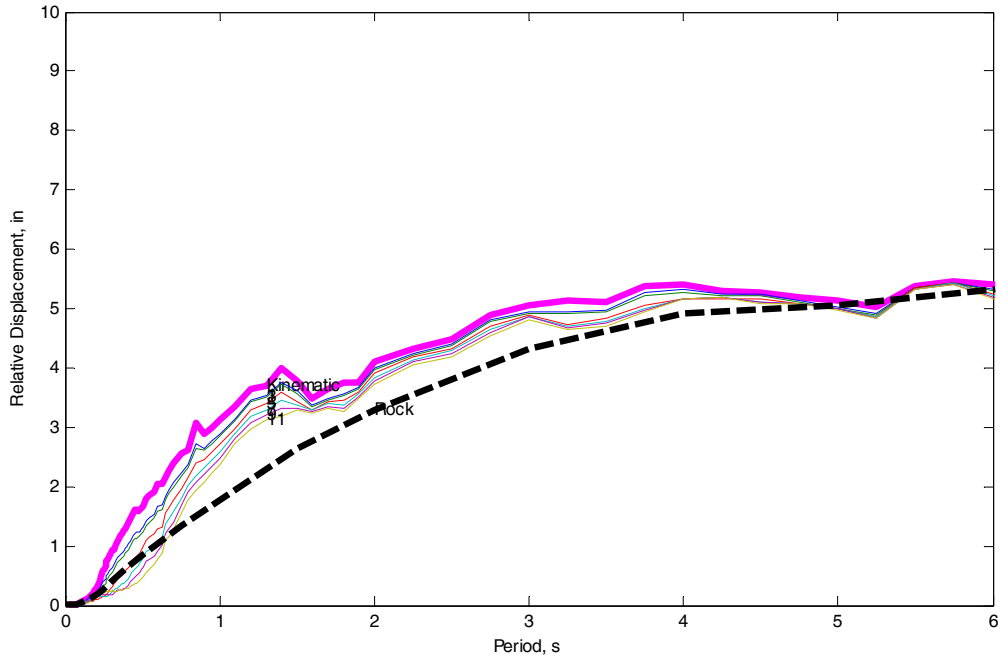
Relative Displacement, in
Period, s
Kinematic
Rock
1
3
5
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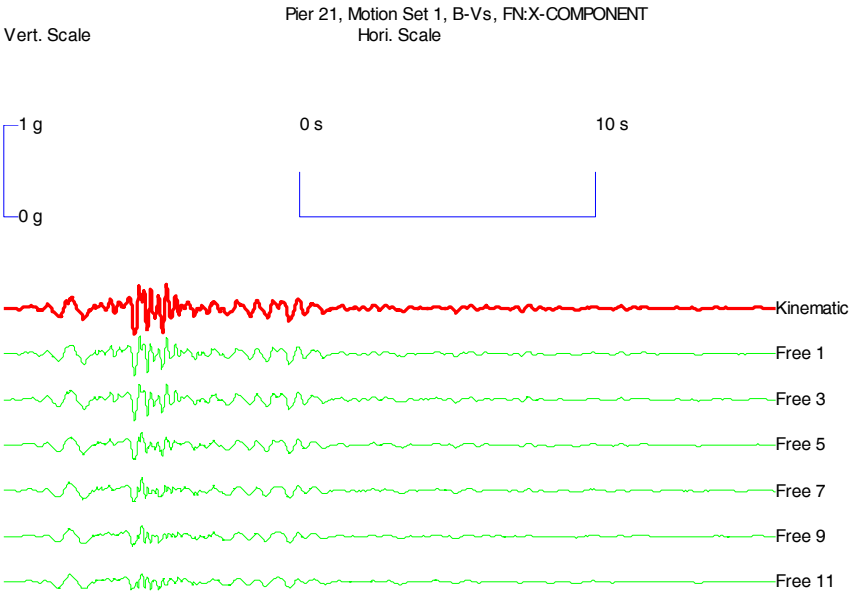
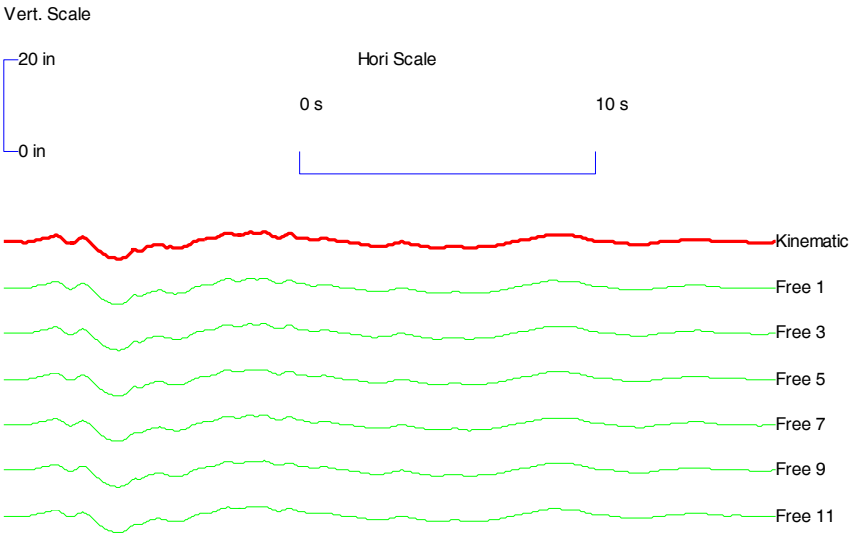
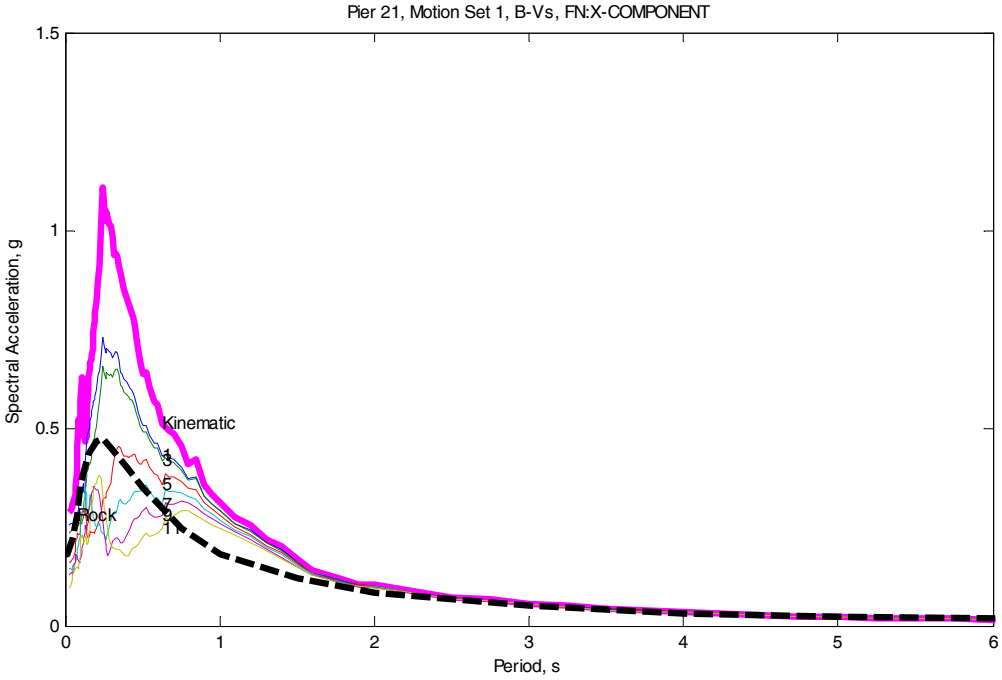

Pier 21, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11


Vert. Scale
Hori Scale
20 in
0 in
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11


Pier 21, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Kinematic
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11
Rock
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1.5
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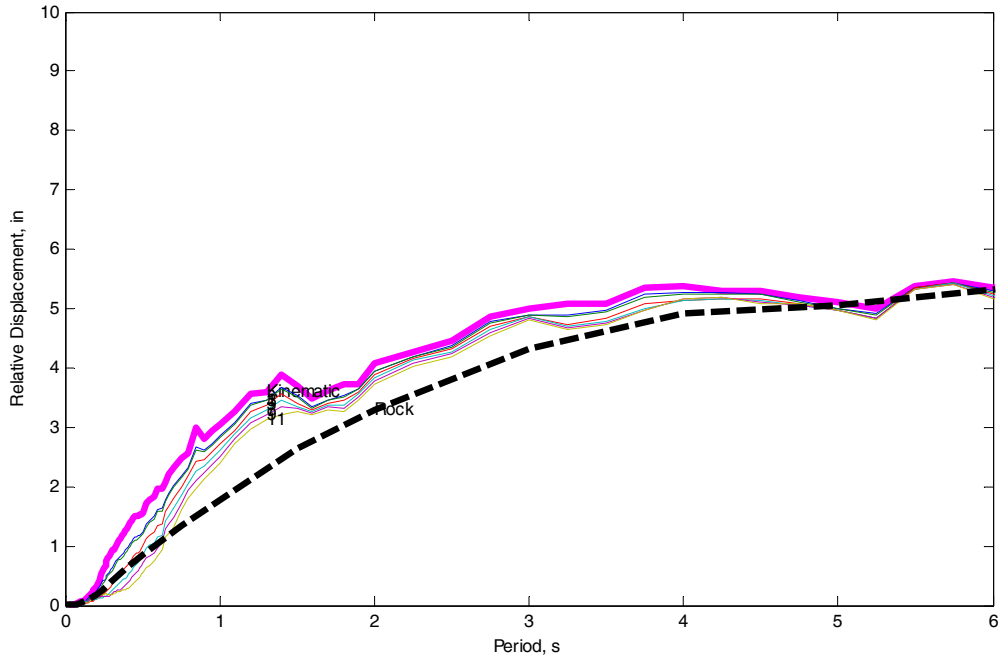
Relative Displacement, in
Period, s
Kinematic
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Rock
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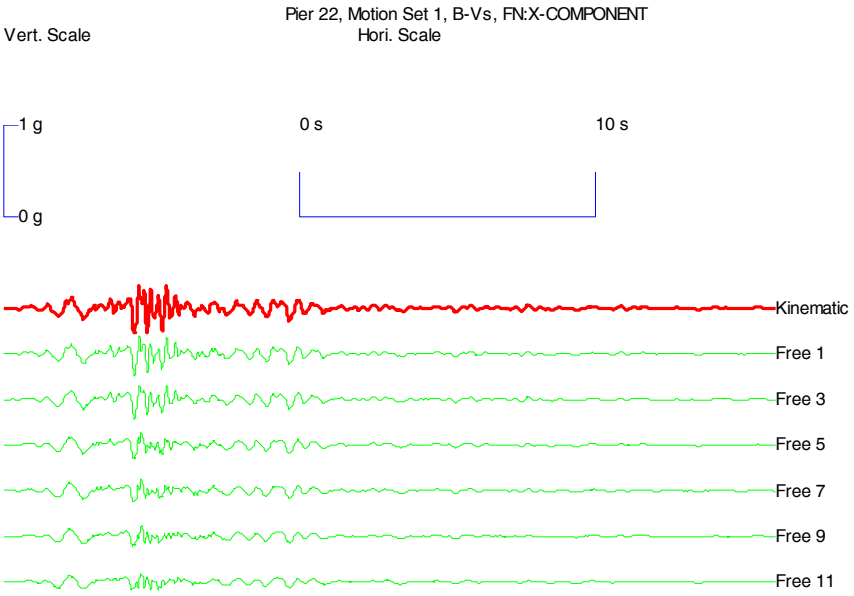
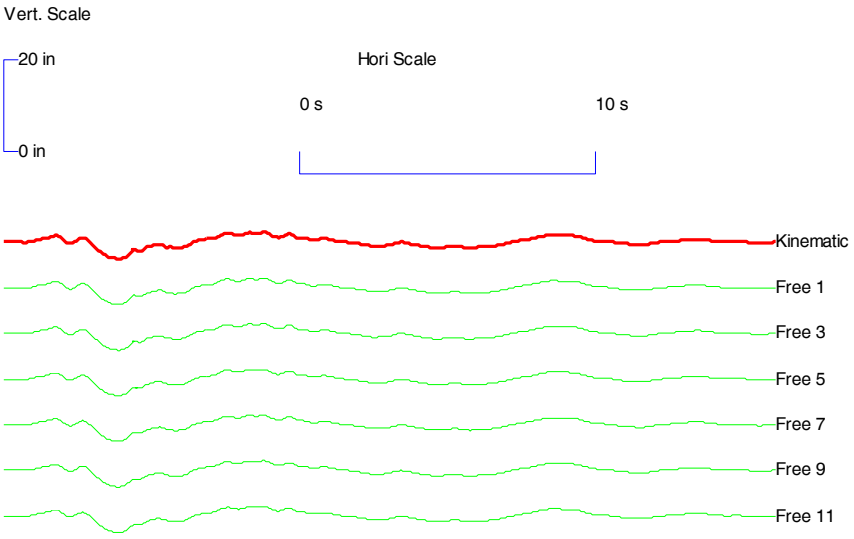
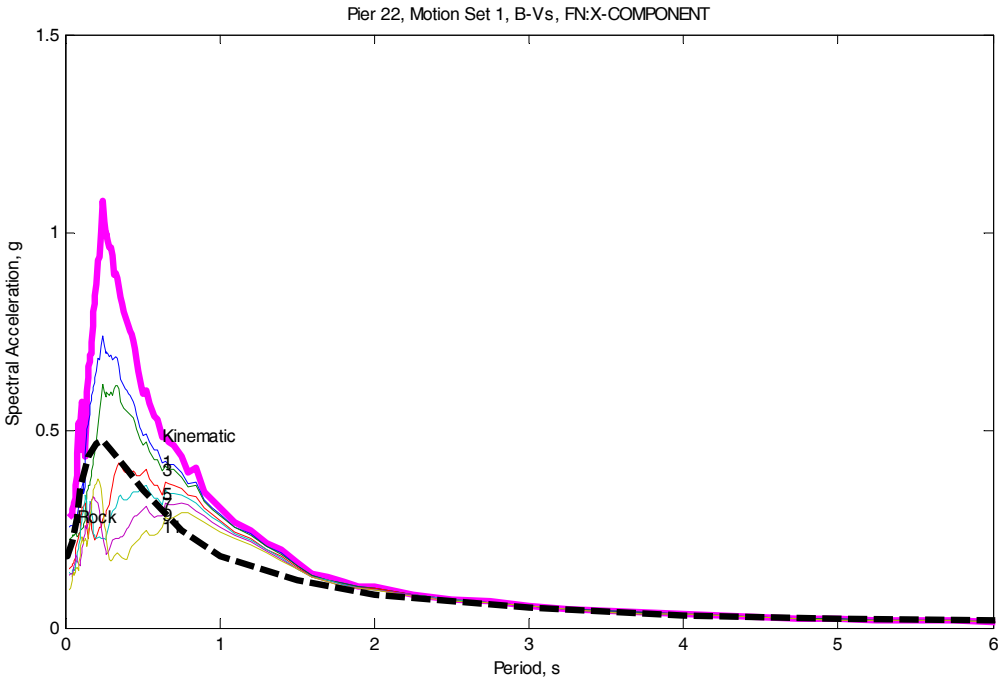

Pier 22, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11


Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11


Pier 22, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Kinematic
Rock
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1.5
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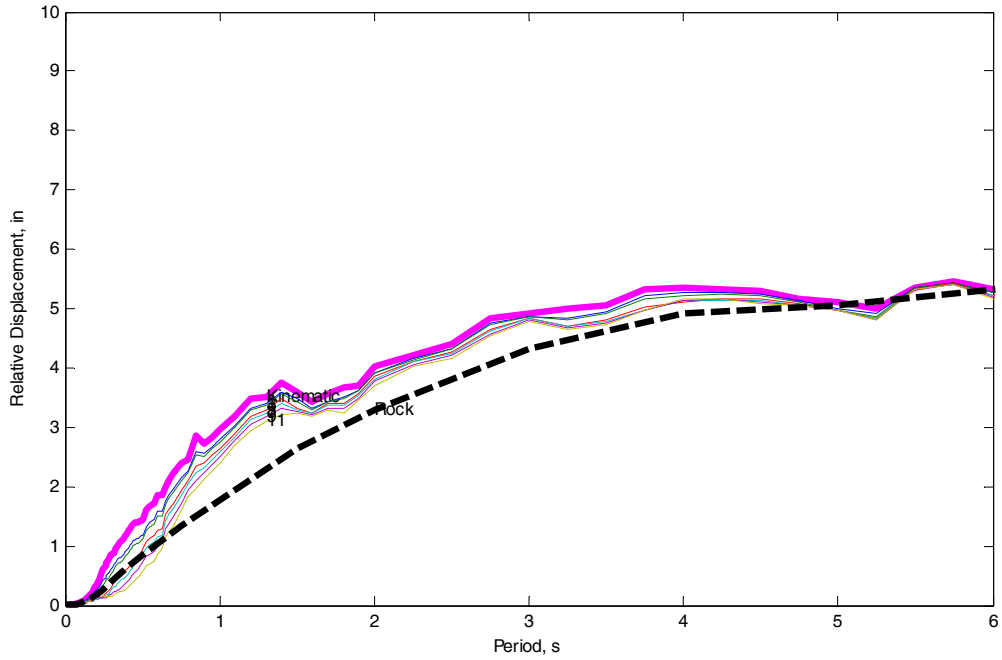
Relative Displacement, in
Period, s
Kinematic
Rock
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2
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4
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6
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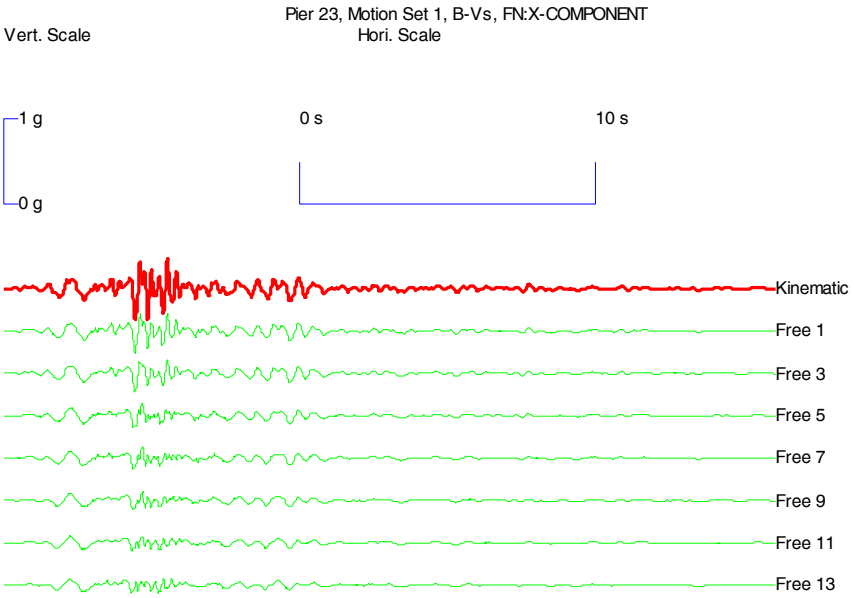
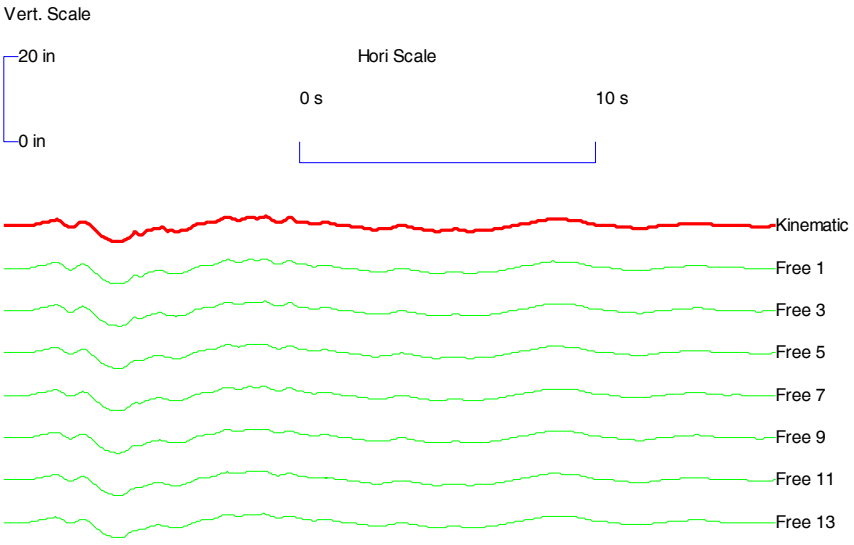
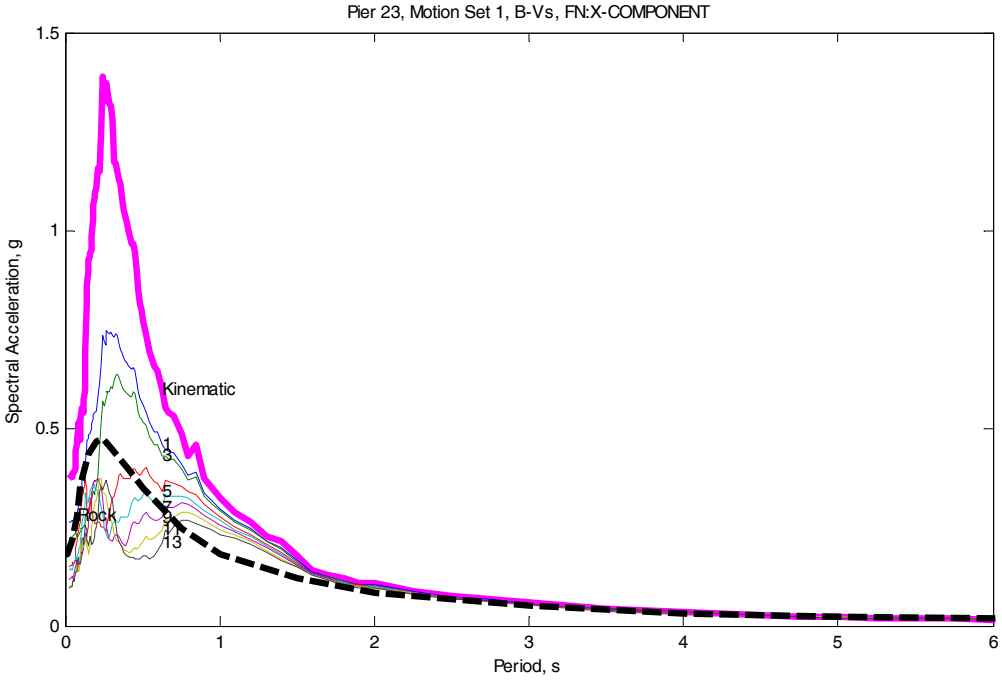

Pier 23, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13


Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13


Pier 23, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Kinematic
Rock
1
3
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7
9
11
13
0
0.5
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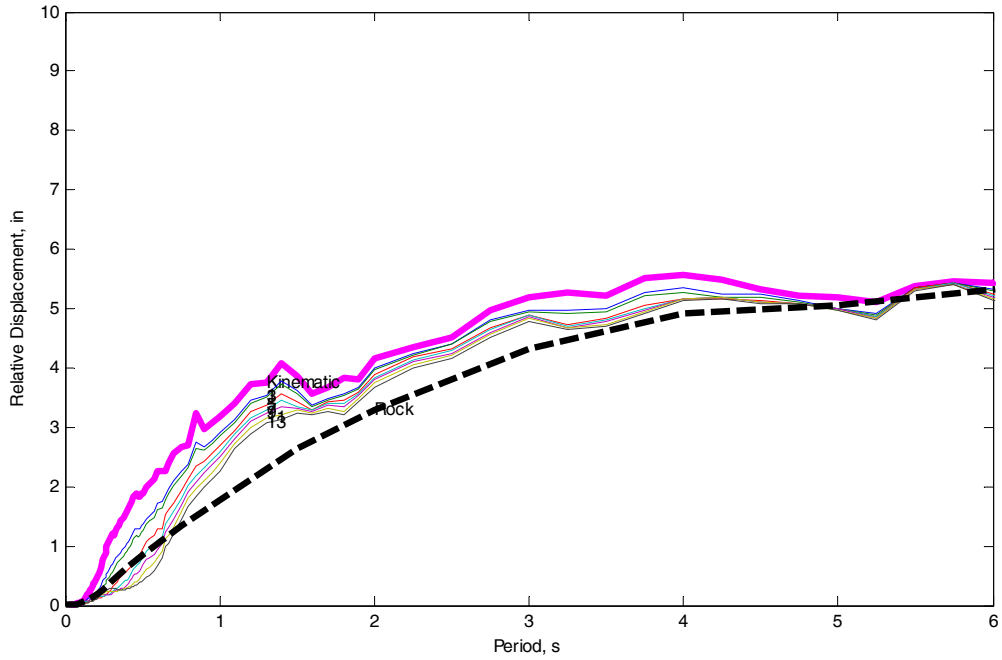
5
6


Relative Displacement, in
Period, s
Kinematic
Rock
1
3
5
7
9
11
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2
3
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6
7
8
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10
0
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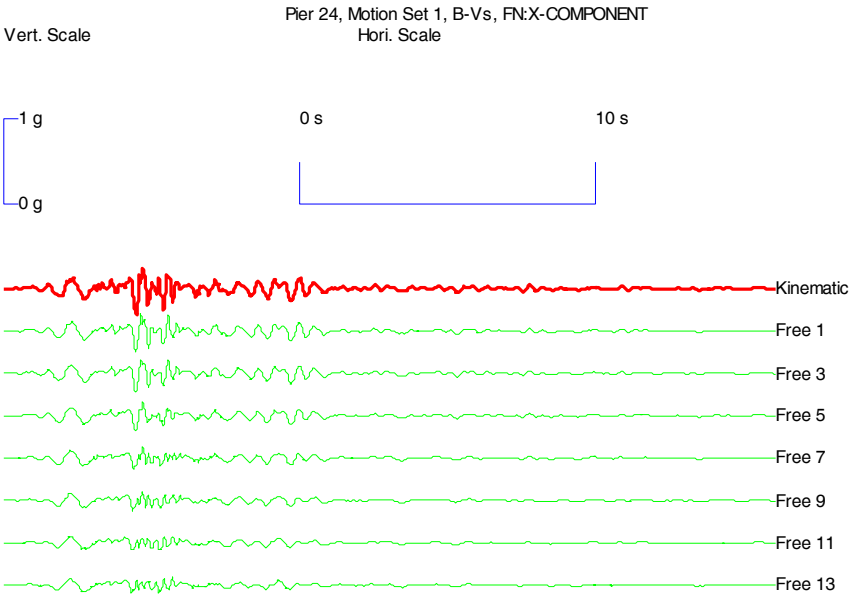
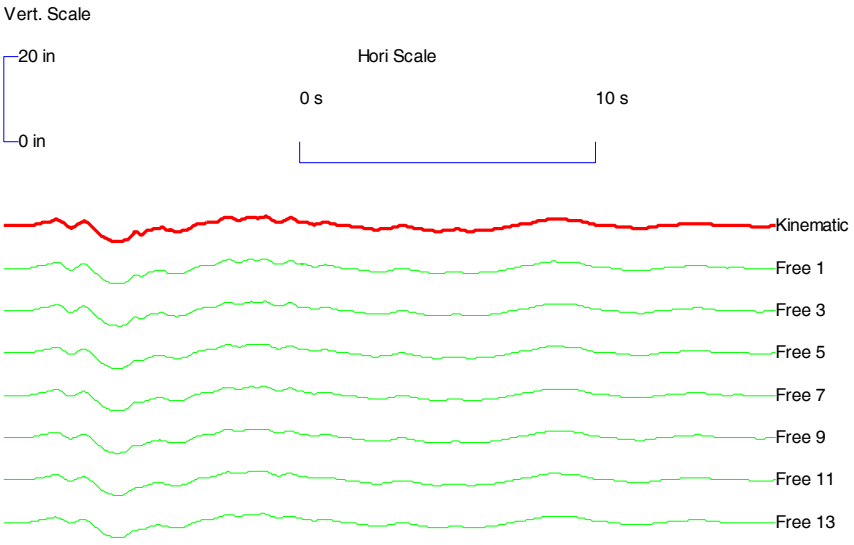
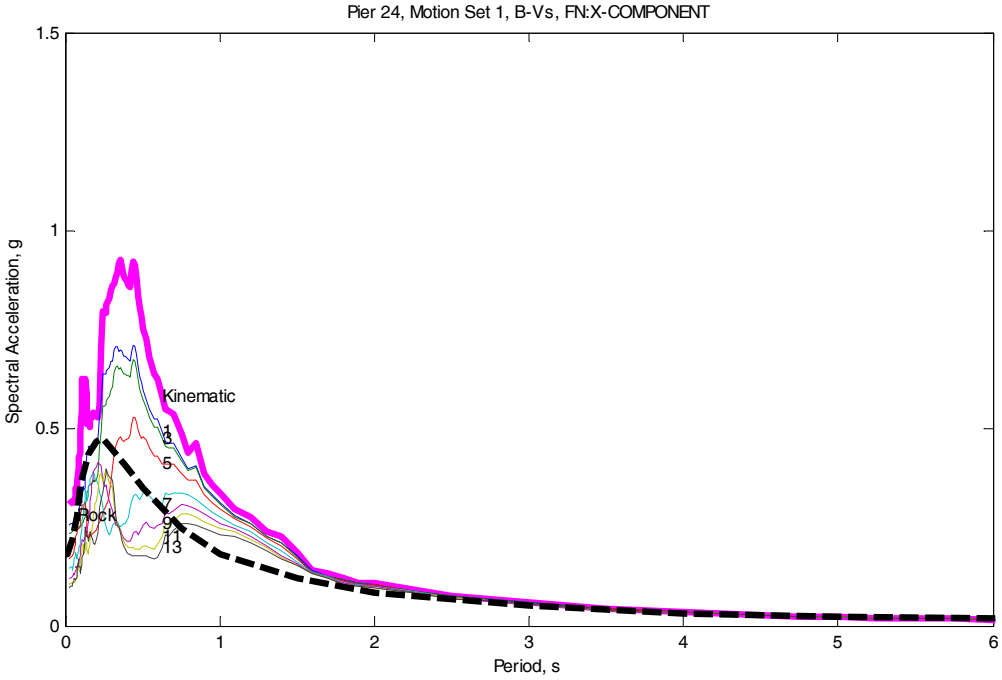
2
3
4
5
6


Pier 24, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13


Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13


Pier 24, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Kinematic
Rock
3
5
7
9
11
13
0
0.5
1
1.5
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4
5
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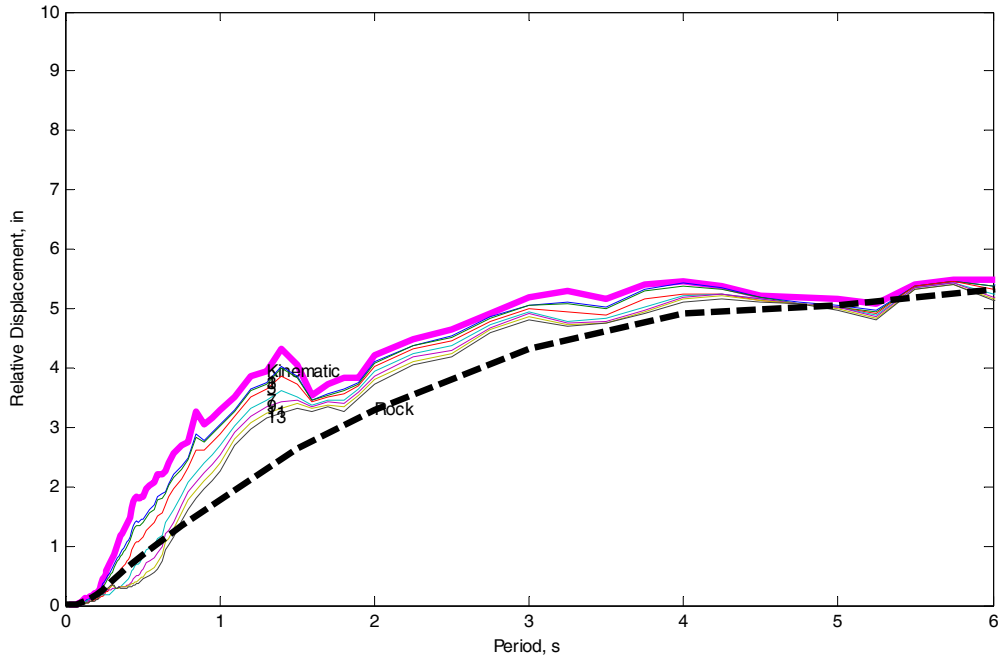
Relative Displacement, in
Period, s
Kinematic
Rock
3
5
7
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11
13
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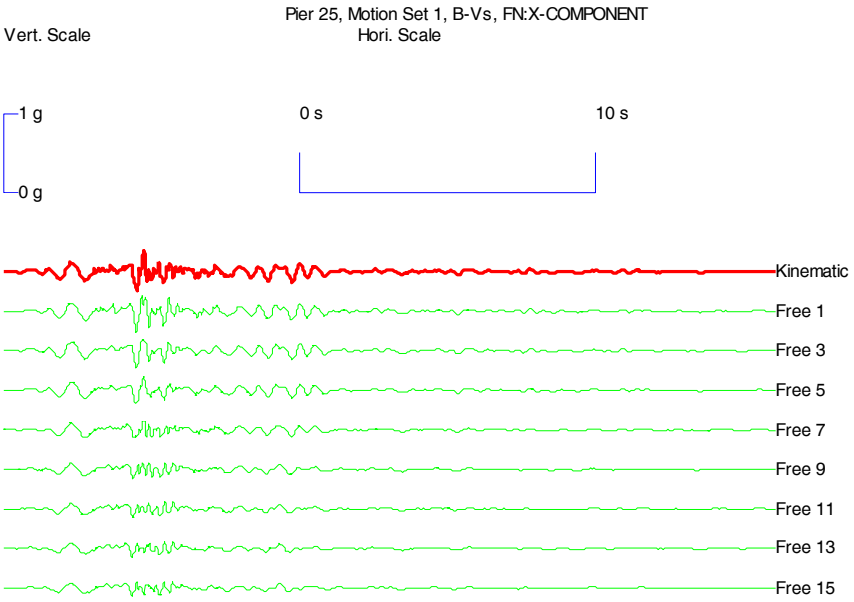
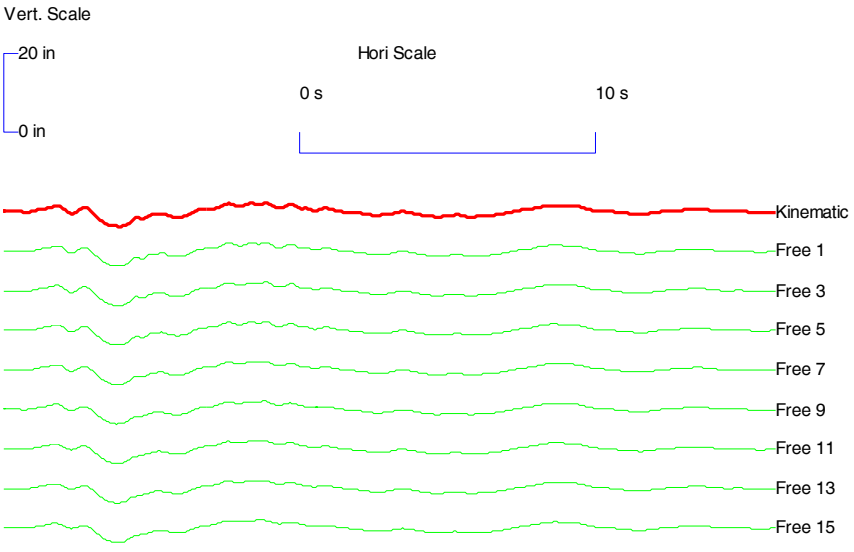
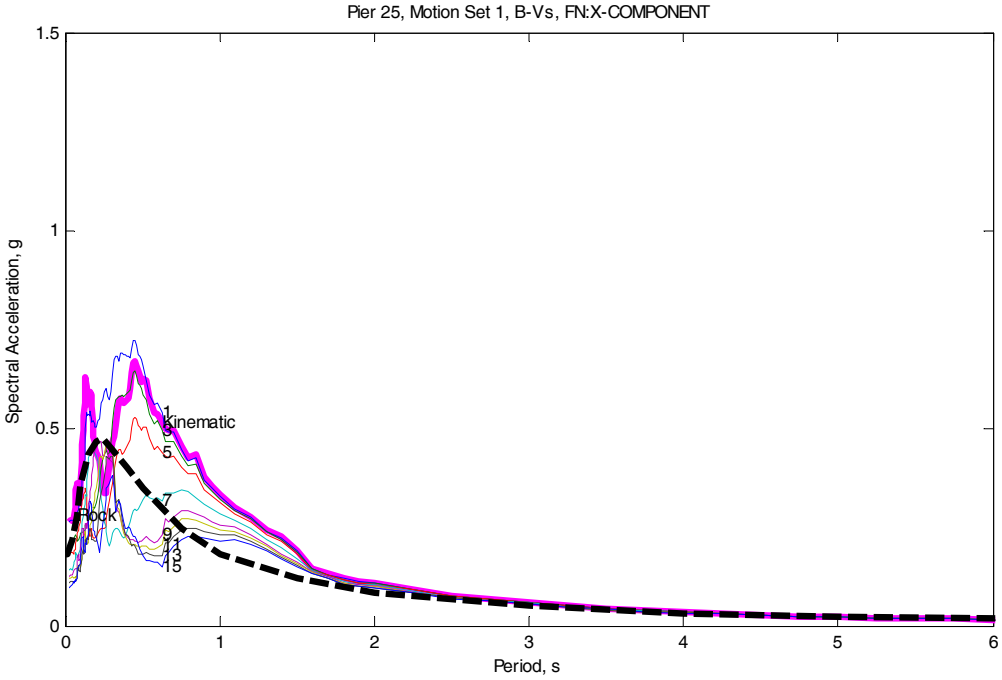

Pier 25, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15


Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15


Pier 25, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Kinematic
Rock
1
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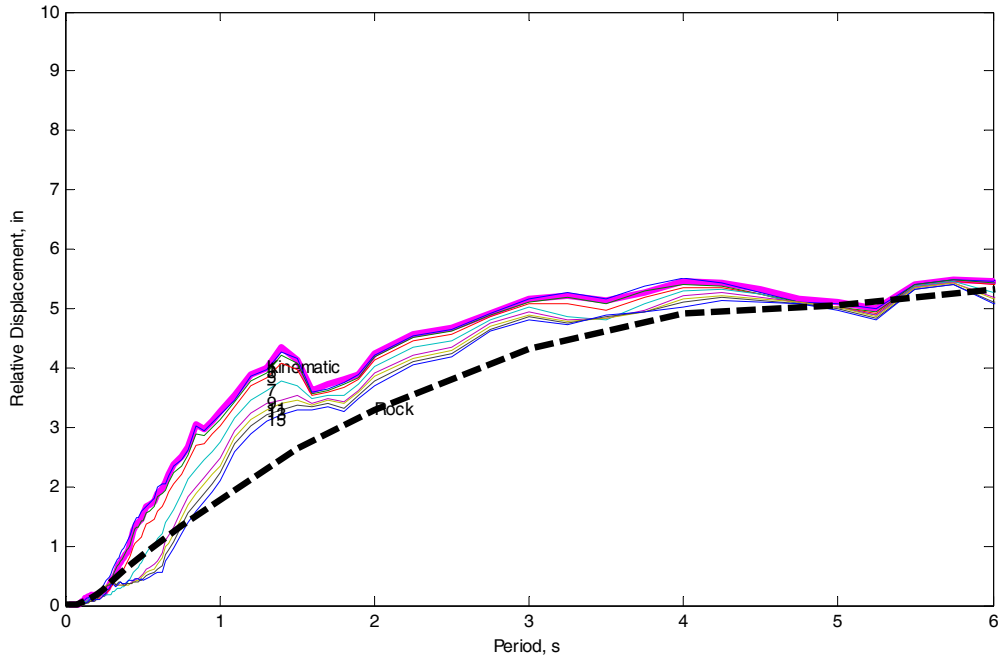
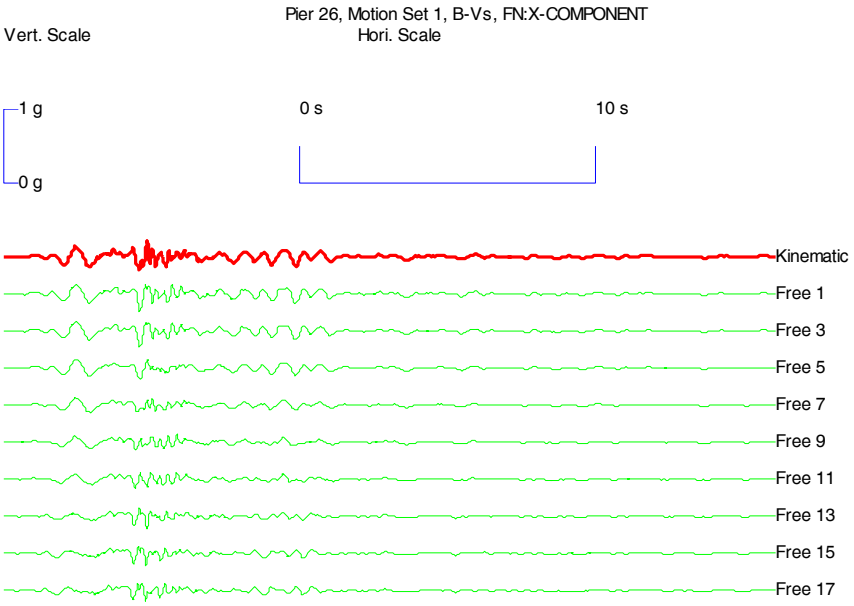
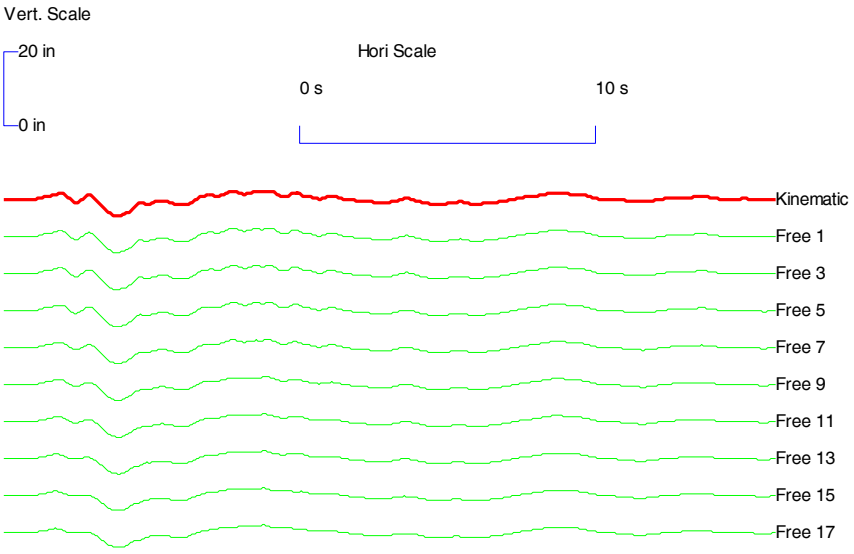
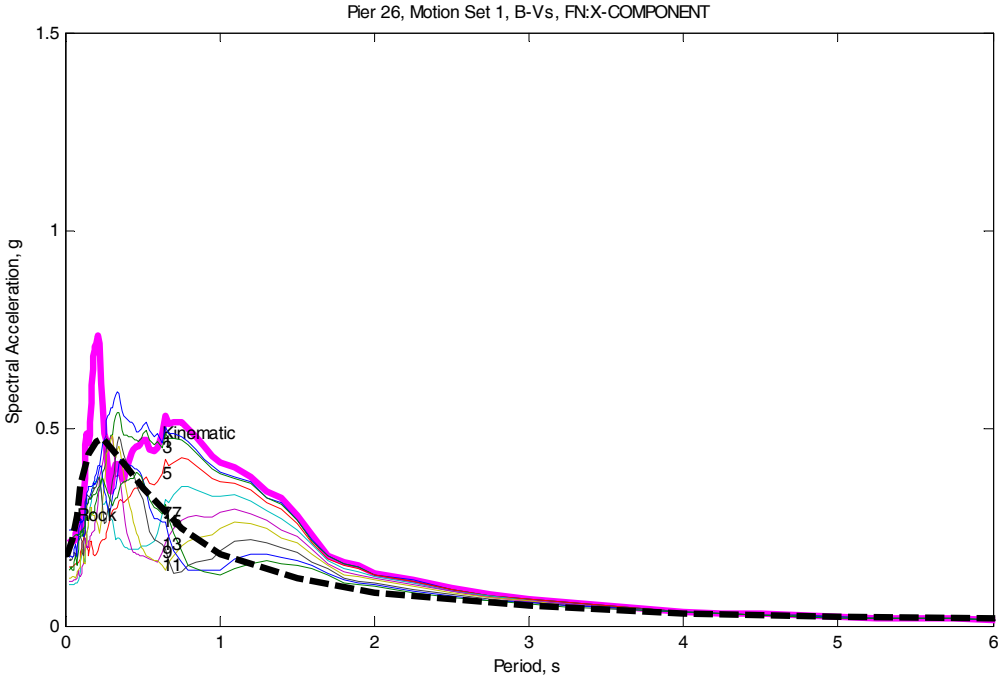
13
15


Relative Displacement, in
Period, s
Kinematic
Rock
1
3
5
7
9
11
13
15


Pier 26, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17


Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17


Pier 26, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Kinematic
3
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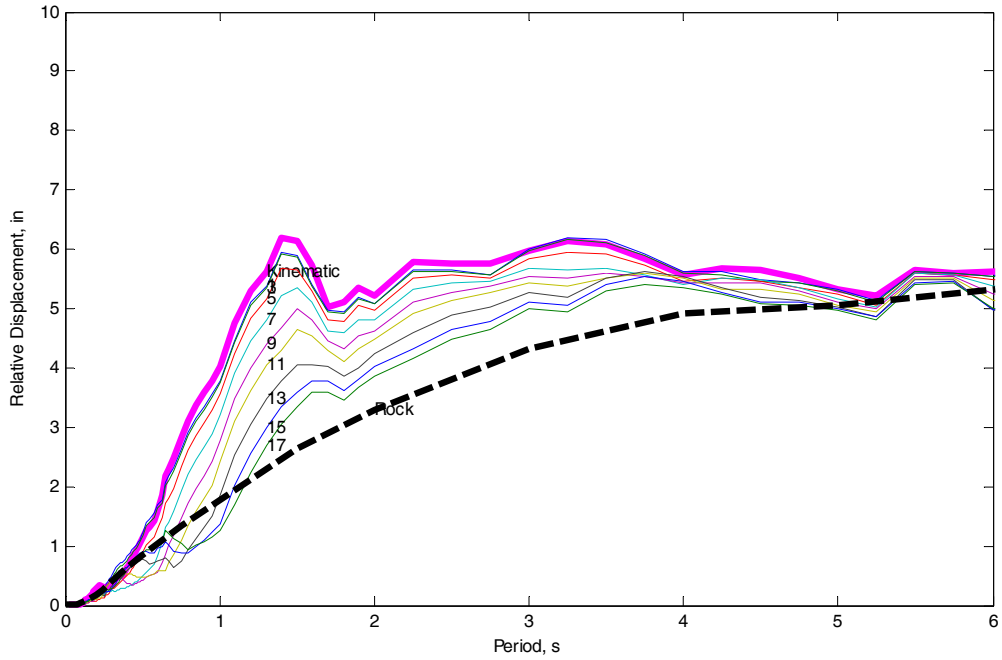
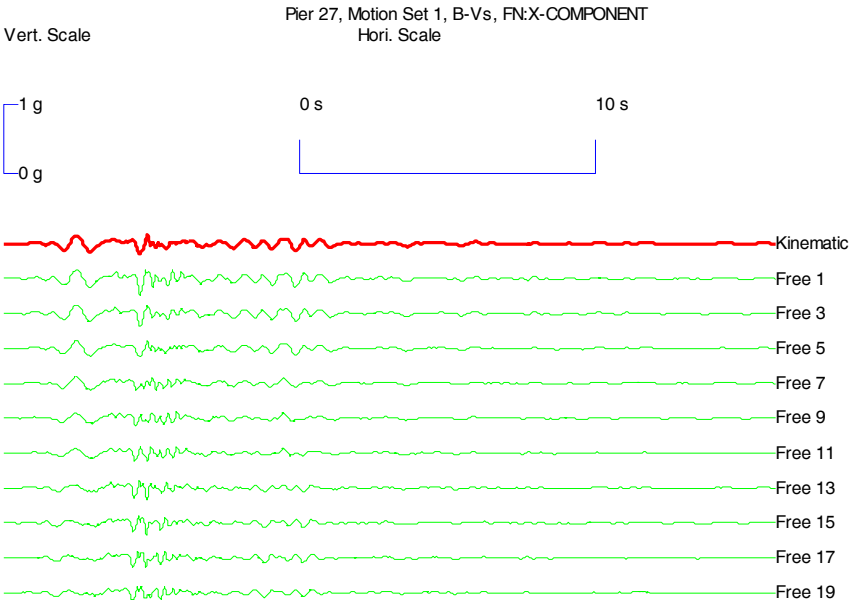
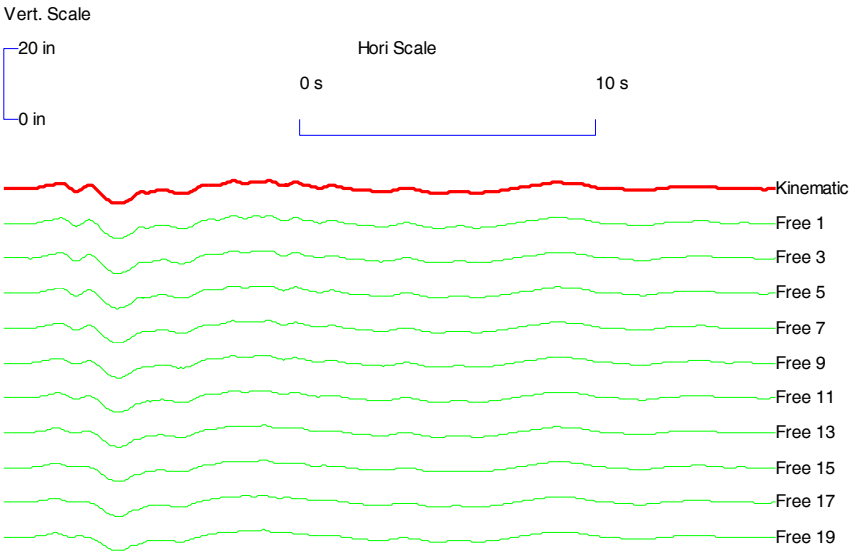
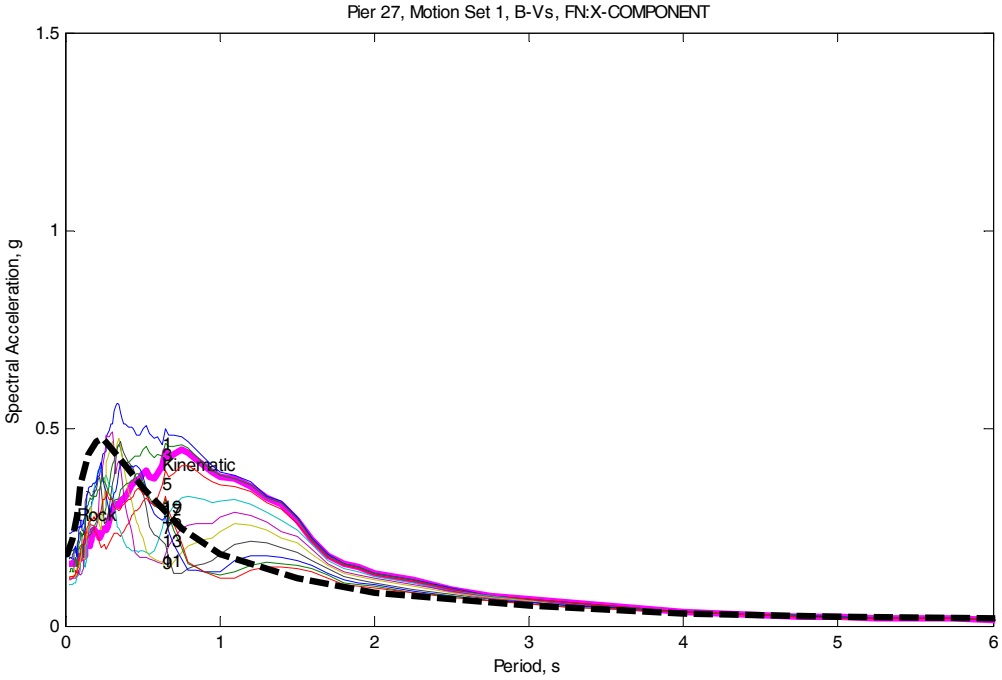
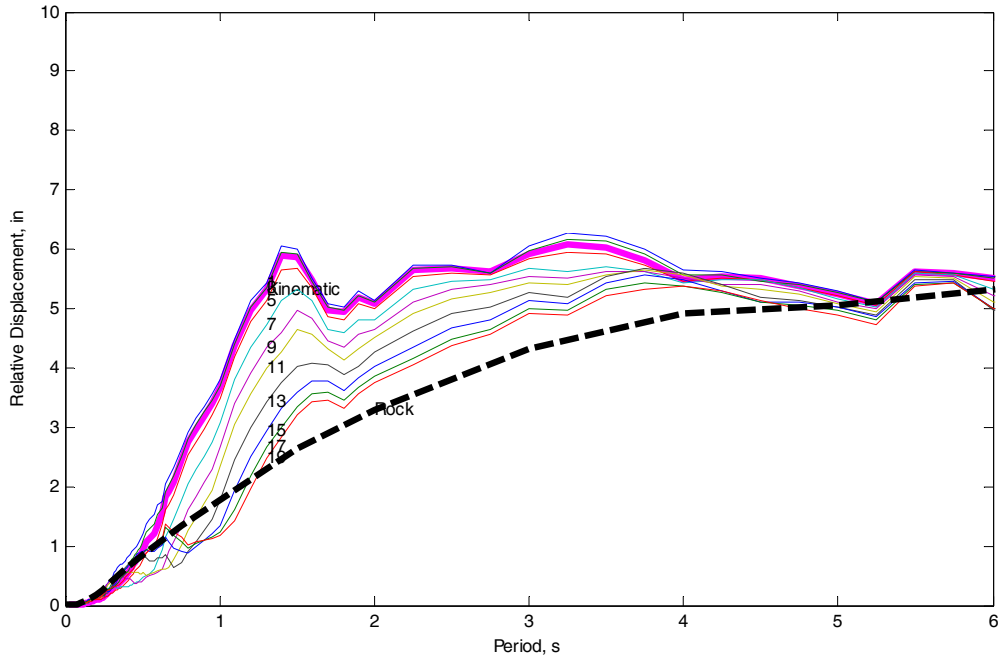
9
11
13
Rock

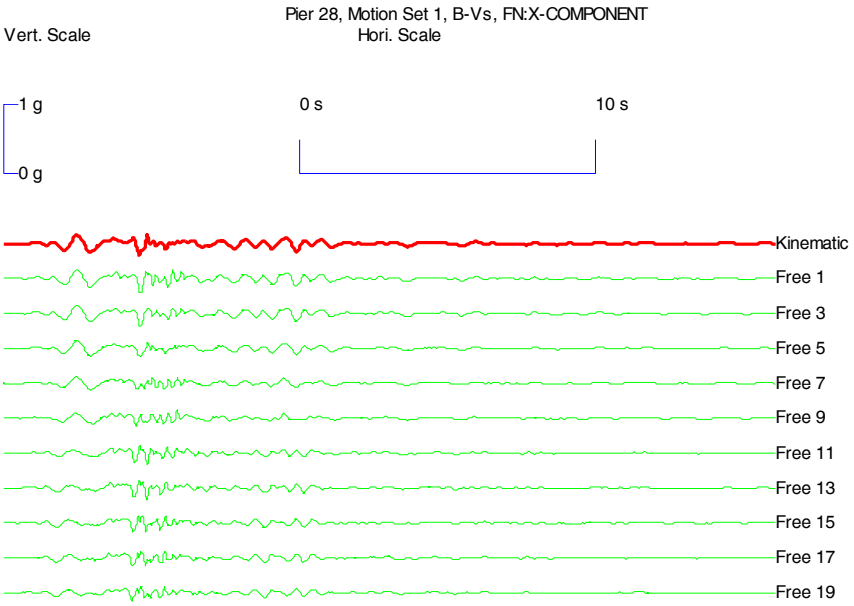

Relative Displacement, in
Period, s
Kinematic
3
5
7
9
11
13
15
17
Rock

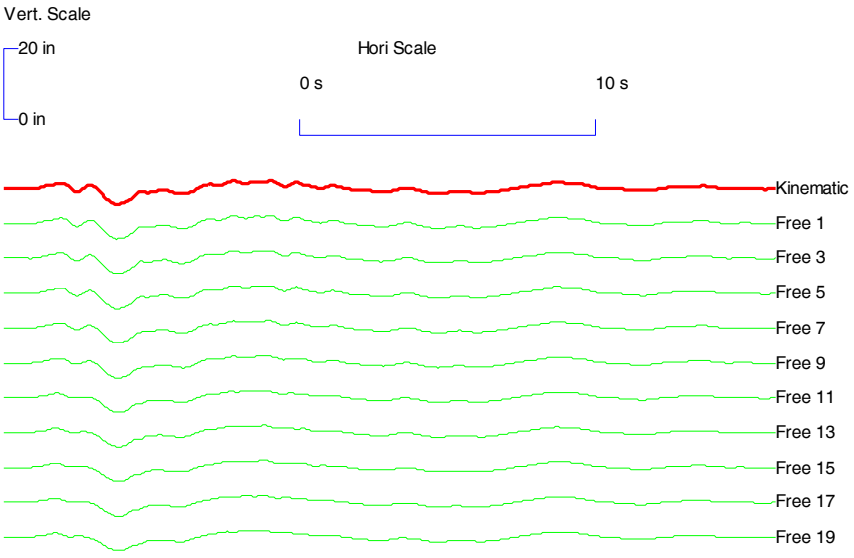

Pier 27, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17
Free 19

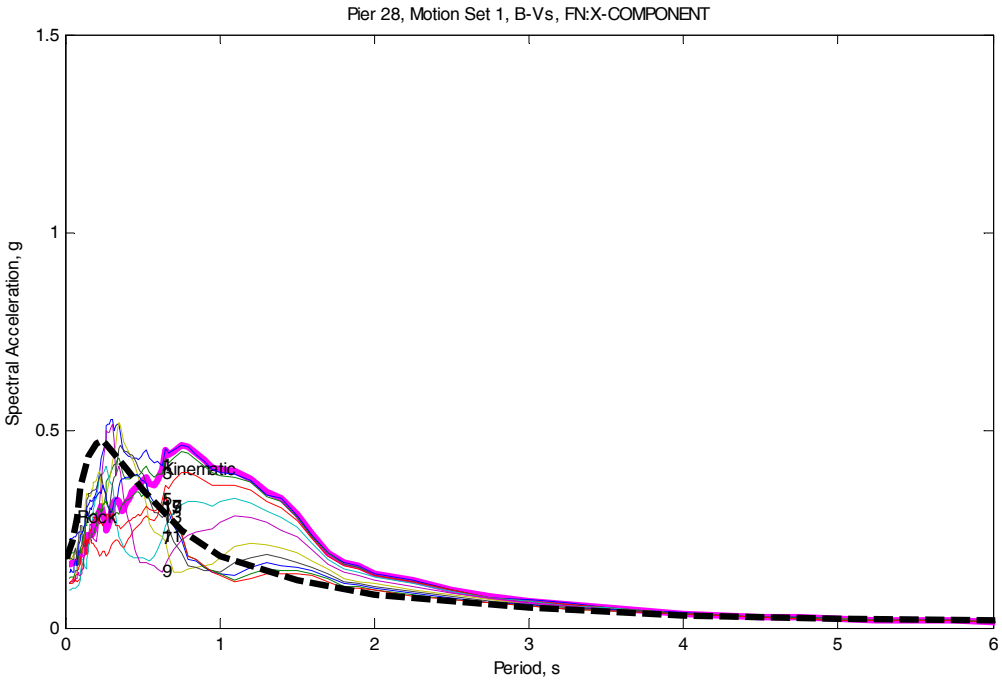

Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17
Free 19


Pier 27, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Kinematic
Rock
1
3
5
7
9
11
13
91


Relative Displacement, in
Period, s
Kinematic
Rock
5
7
9
11
13
15
17
19


Pier 28, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17
Free 19


Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17
Free 19


Pier 28, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
kinematic
rock
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0
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1.5
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3
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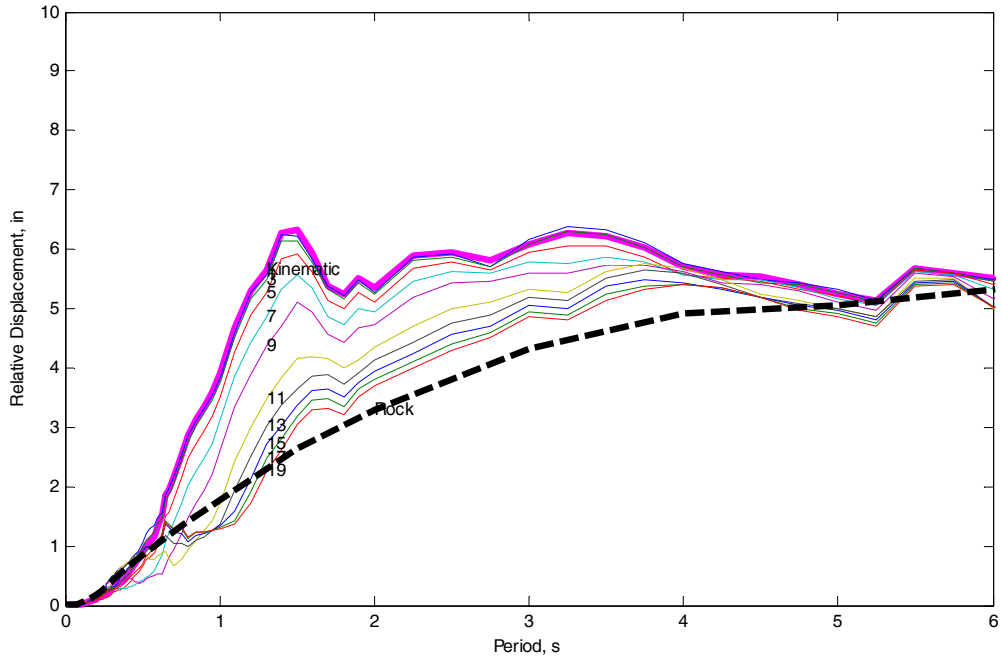
6


Relative Displacement, in
Period, s
kinematic
5
7
9
11
13
15
19
rock
0
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2
3
4
5
6
7
8
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10
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1
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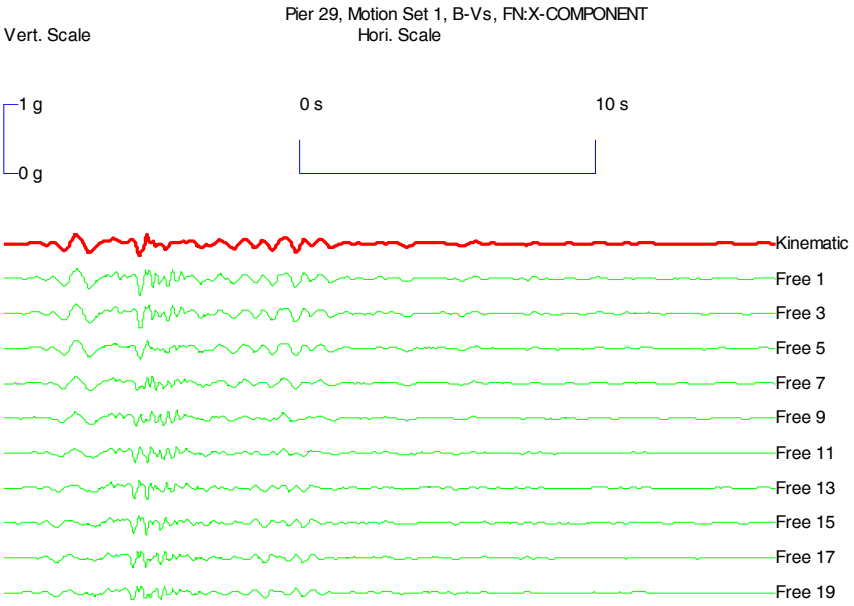
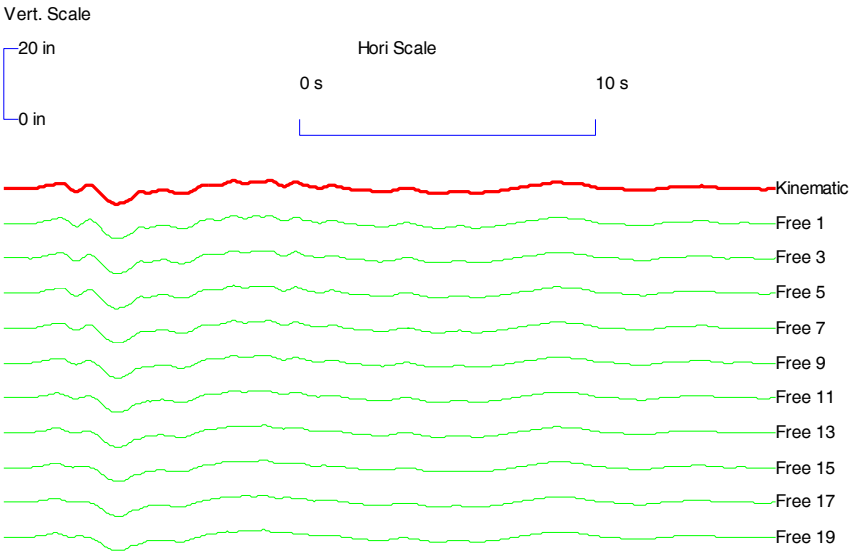
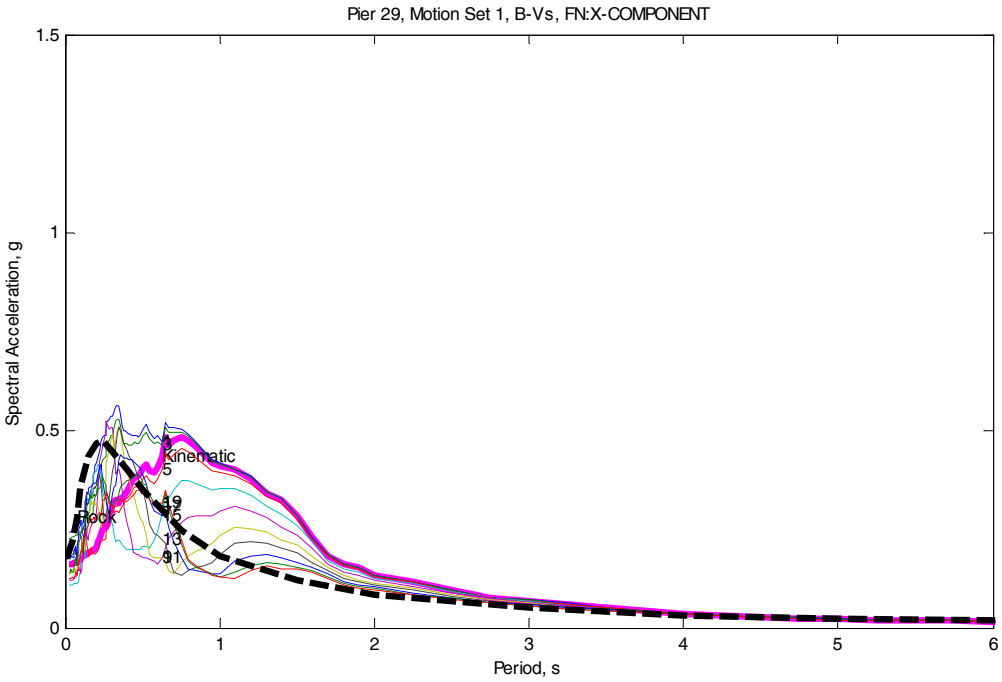
3
4
5
6


Pier 29, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17
Free 19


Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17
Free 19


Pier 29, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Kinematic
Rock
3
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9
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11
0
0.5
1
1.5
0
1
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3
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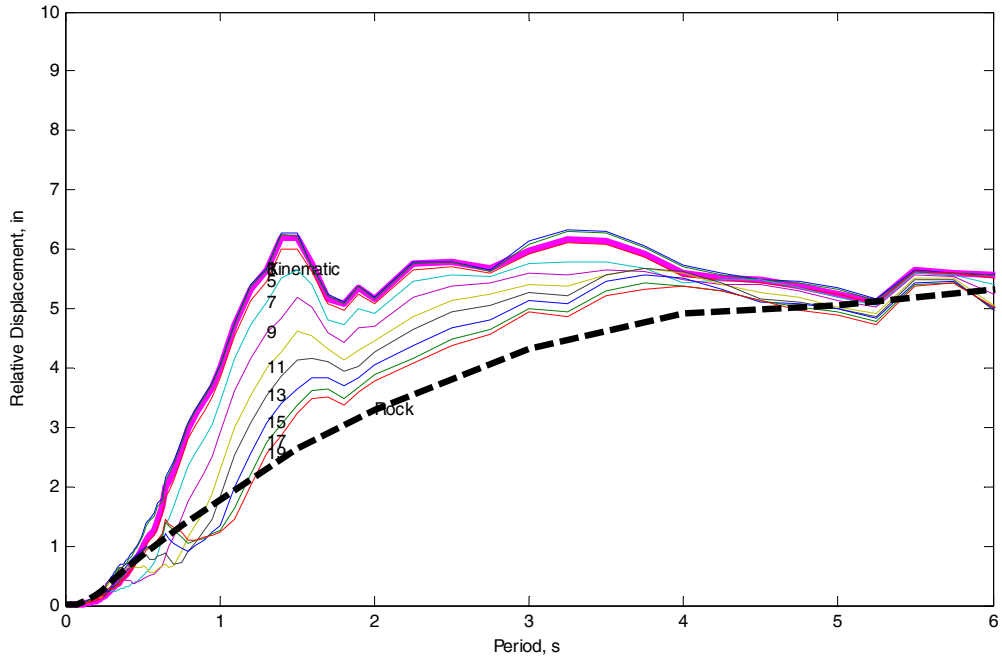
5
6


Relative Displacement, in
Period, s
Kinematic
Rock
5
7
9
11
13
15
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19
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2
3
4
5
6
7
8
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10
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3
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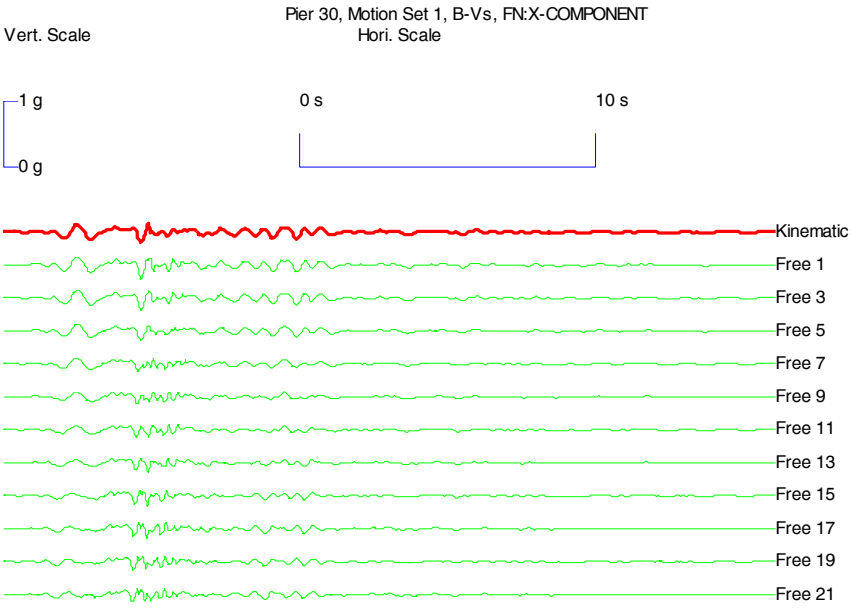
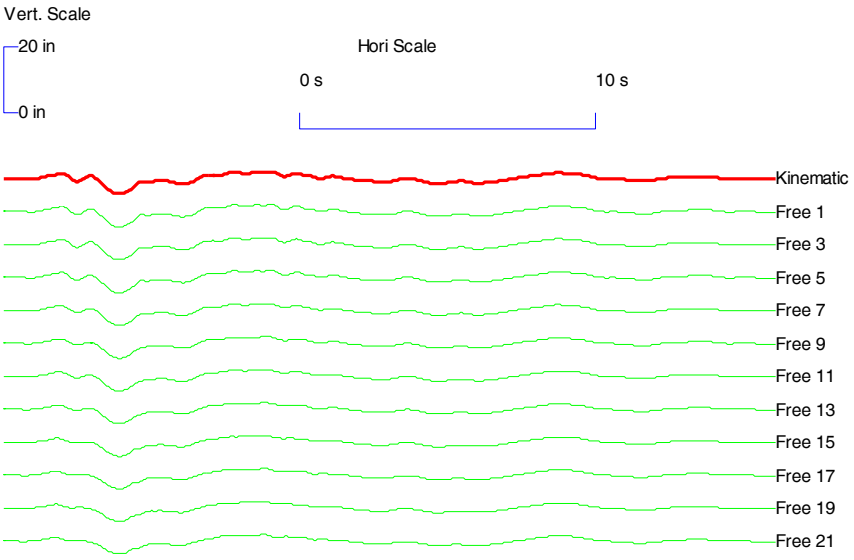
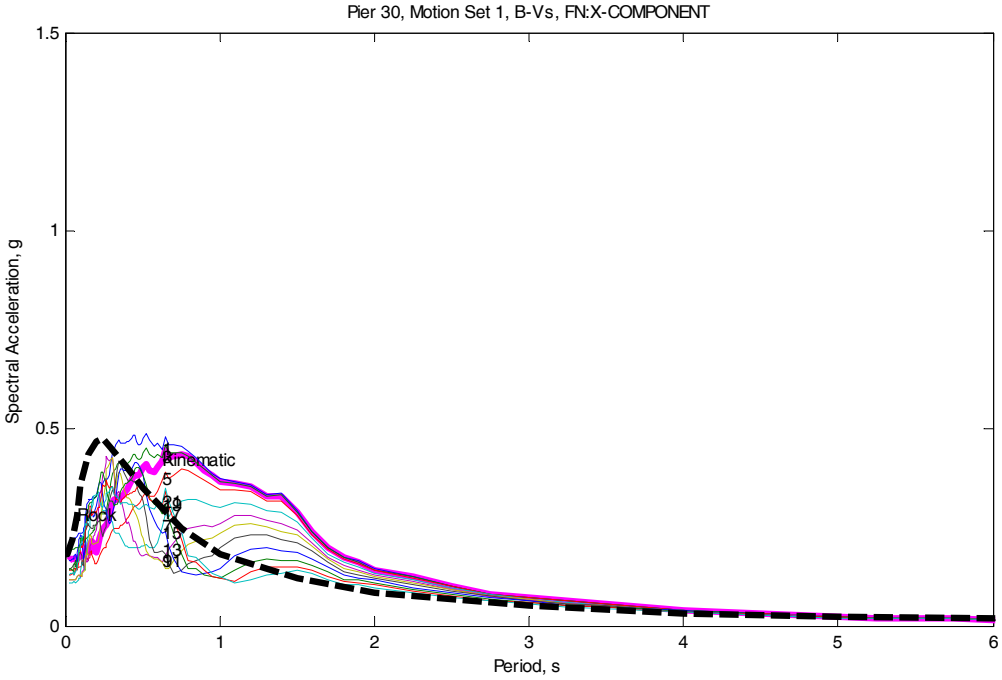
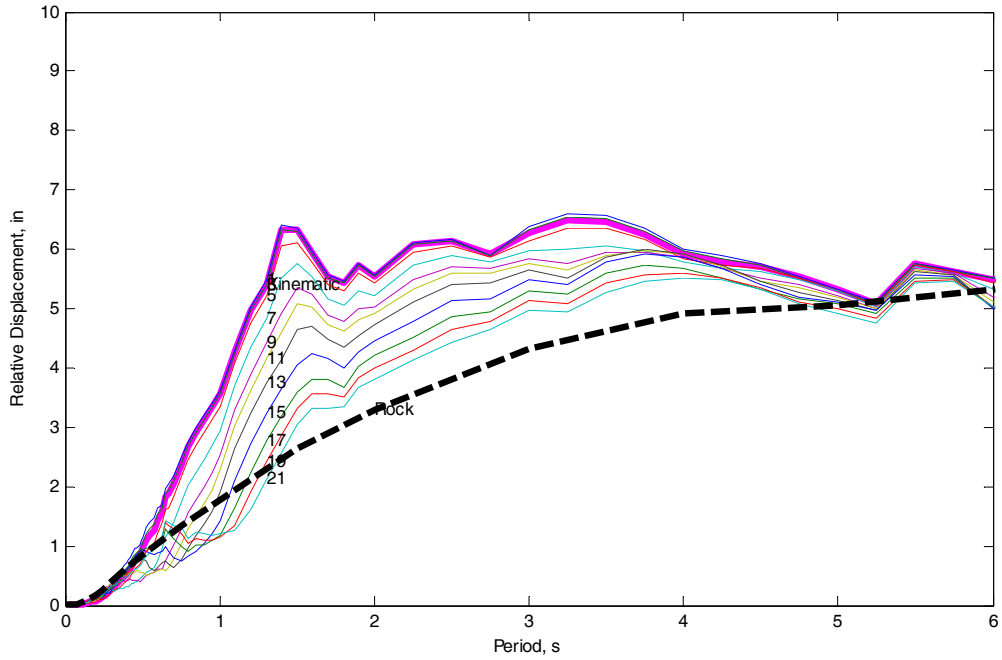
5
6


Pier 30, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17
Free 19
Free 21


Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17
Free 19
Free 21


Pier 30, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Kinematic
Rock
5
9
11
13
21
0
0.5
1
1.5
0
1
2
3
4
5
6


Relative Displacement, in
Period, s
Kinematic
Rock
5
7
9
11
13
15
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21
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6
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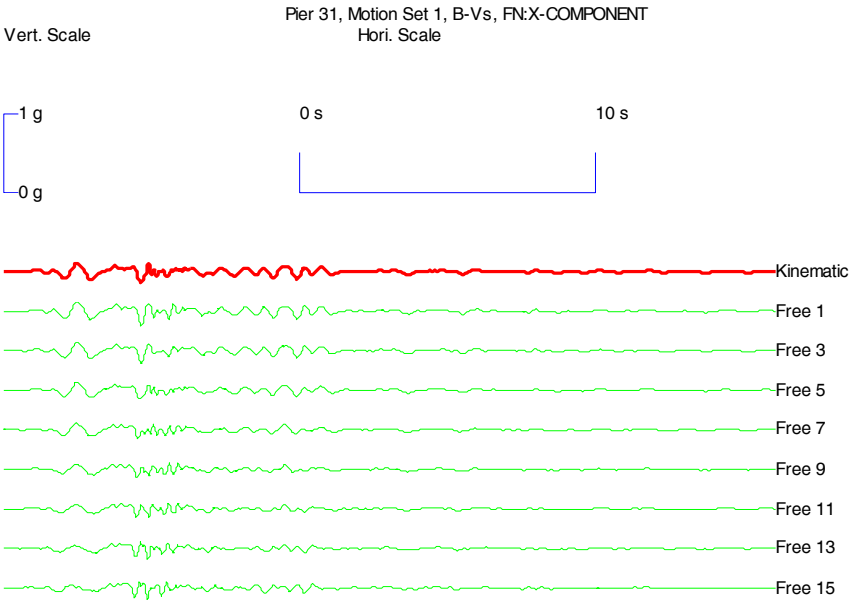
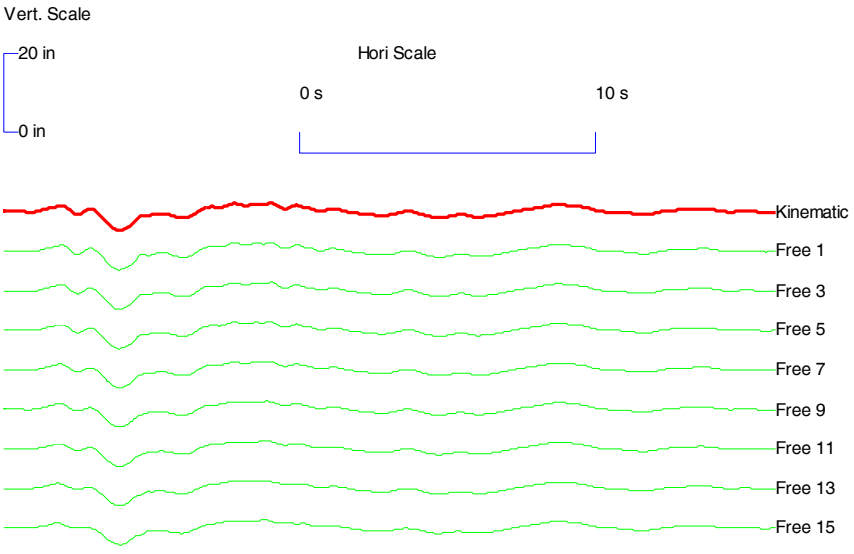
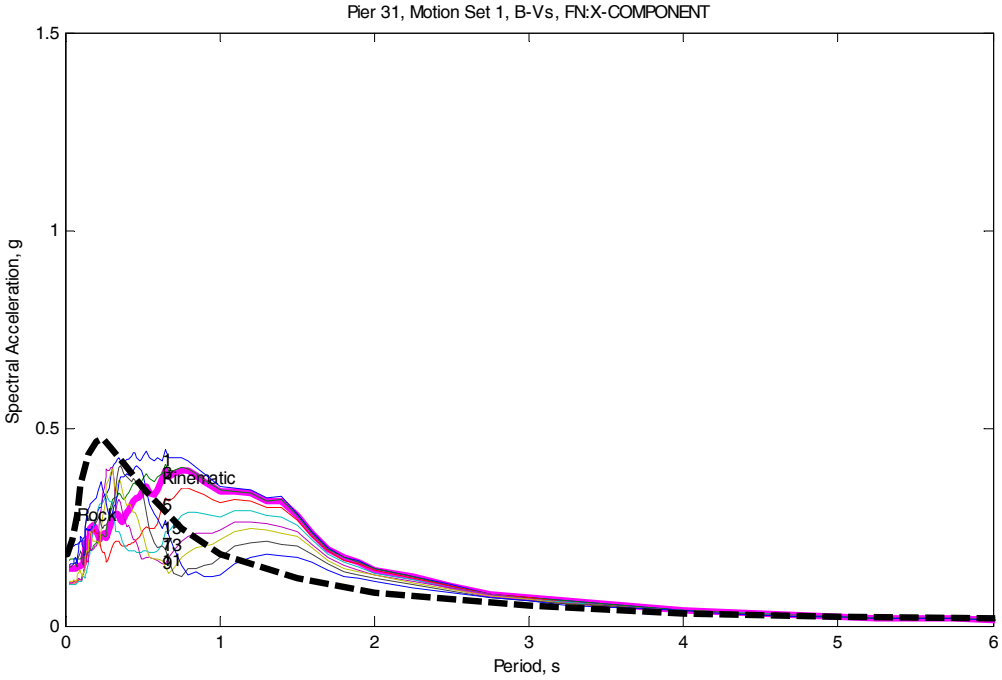

Pier 31, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15


Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15


Pier 31, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Kinematic
Rock
1
5
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11
13
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0
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1
1.5
0
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5
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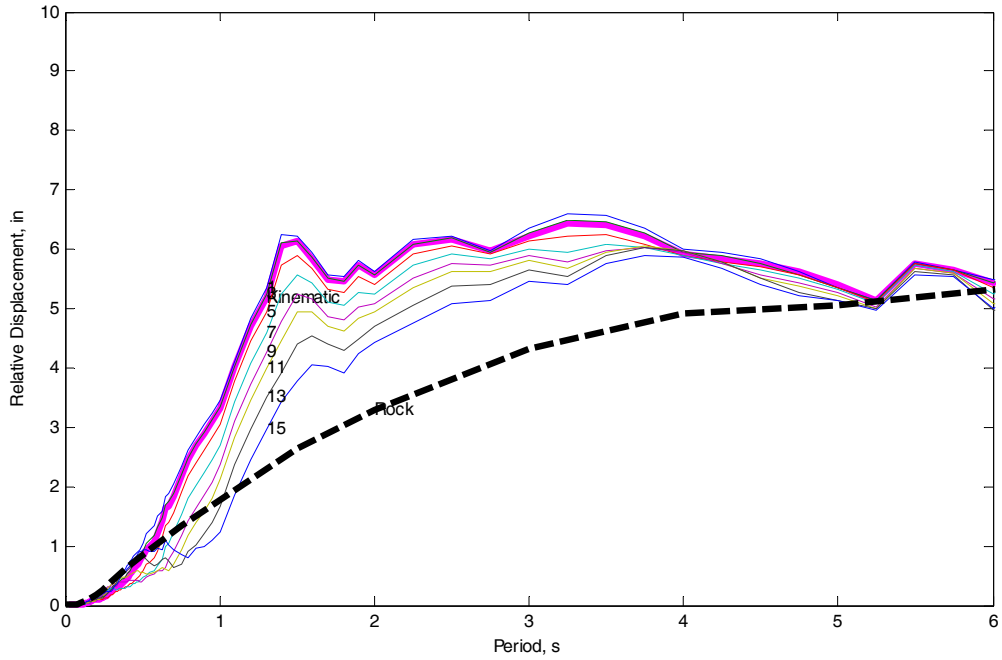
Relative Displacement, in
Period, s
Kinematic
Rock
1
5
7
9
11
13
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6
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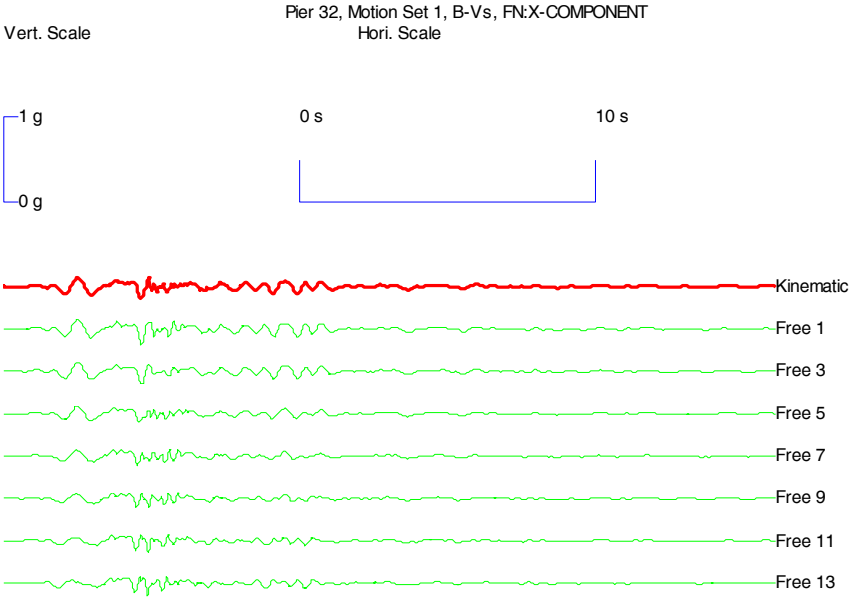
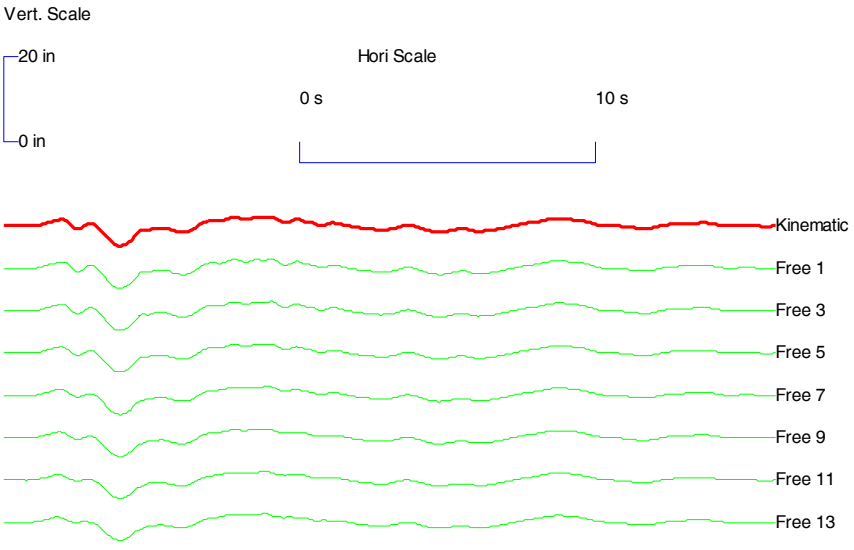
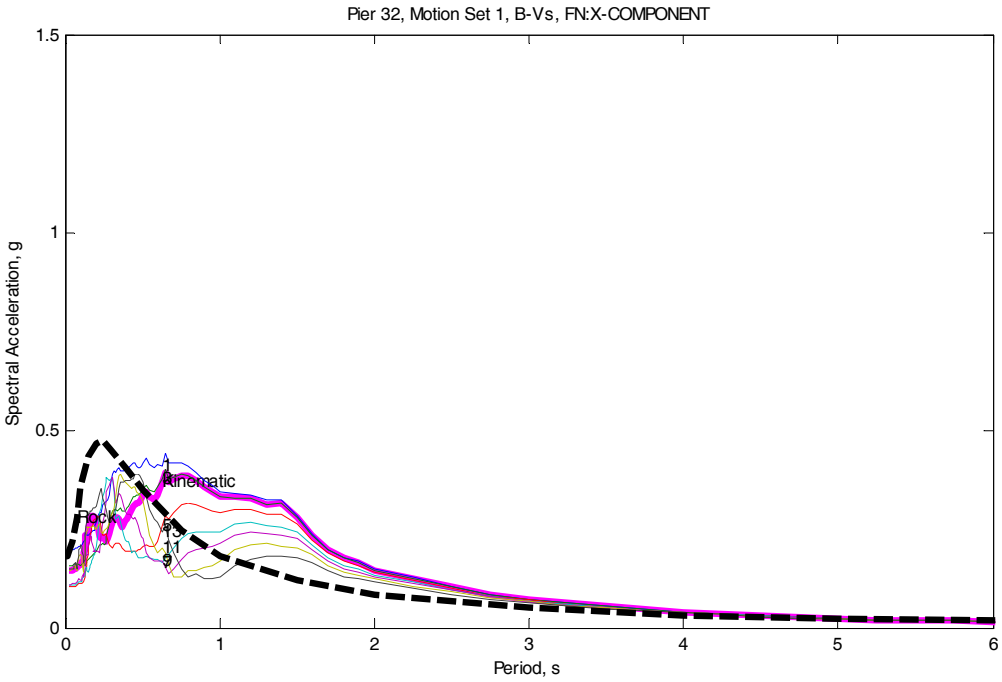
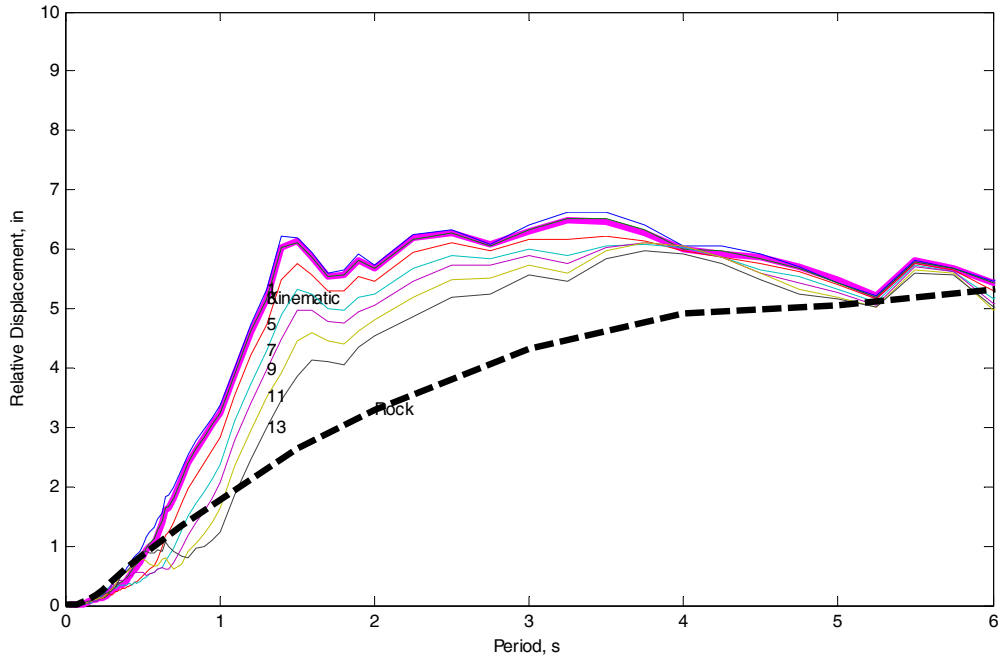
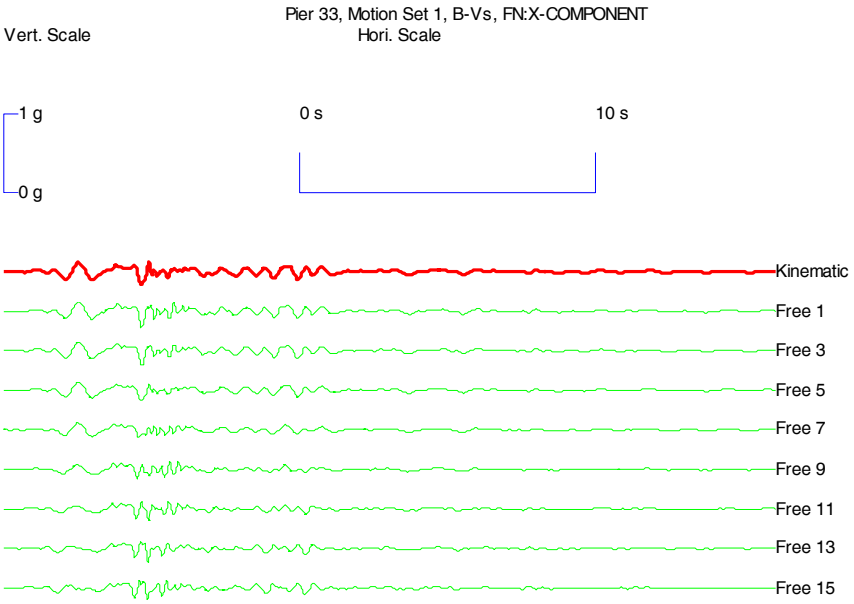
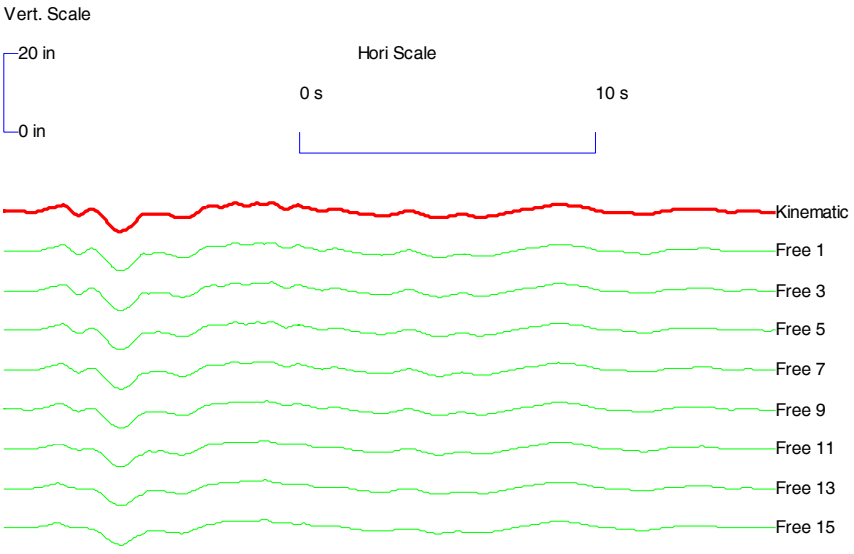

Pier 32, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13

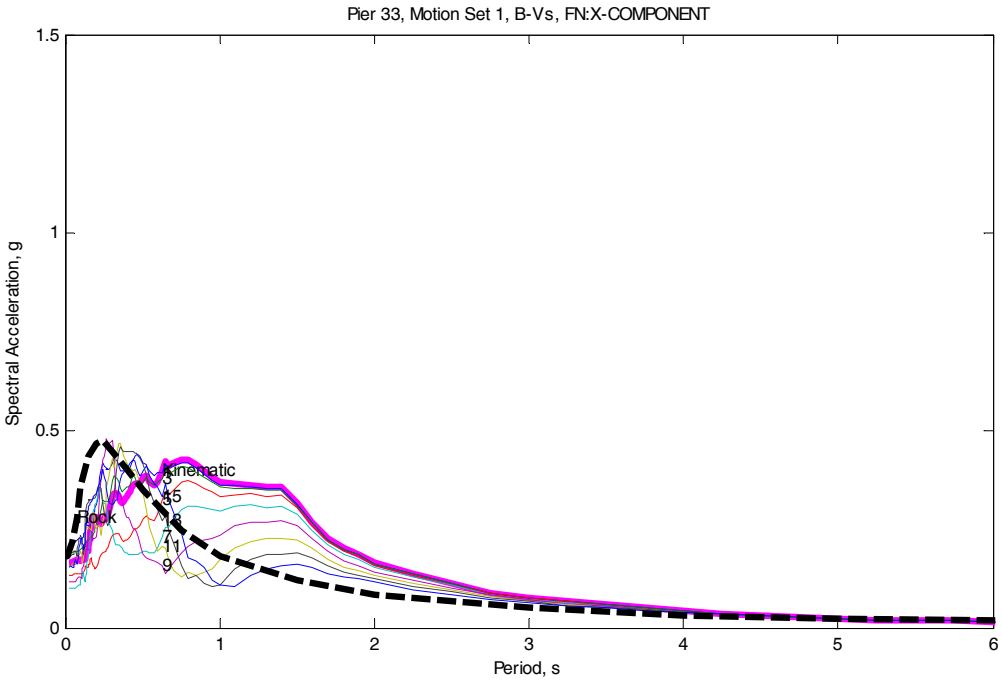

Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13

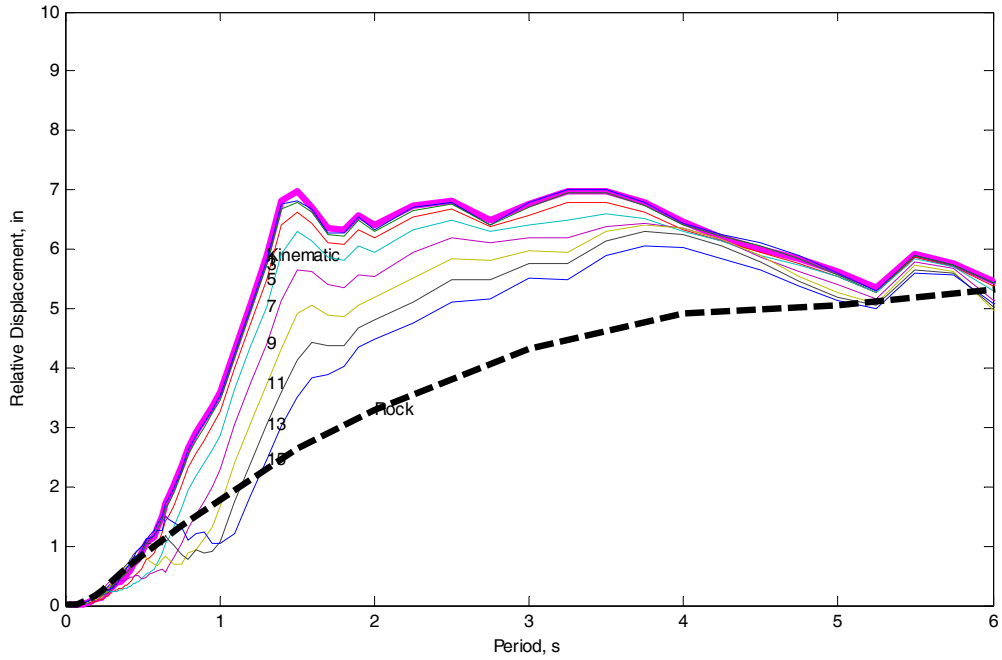

Pier 32, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Kinematic
Rock
13
11
9
1.5
1
0.5
0
0
1
2
3
4
5
6

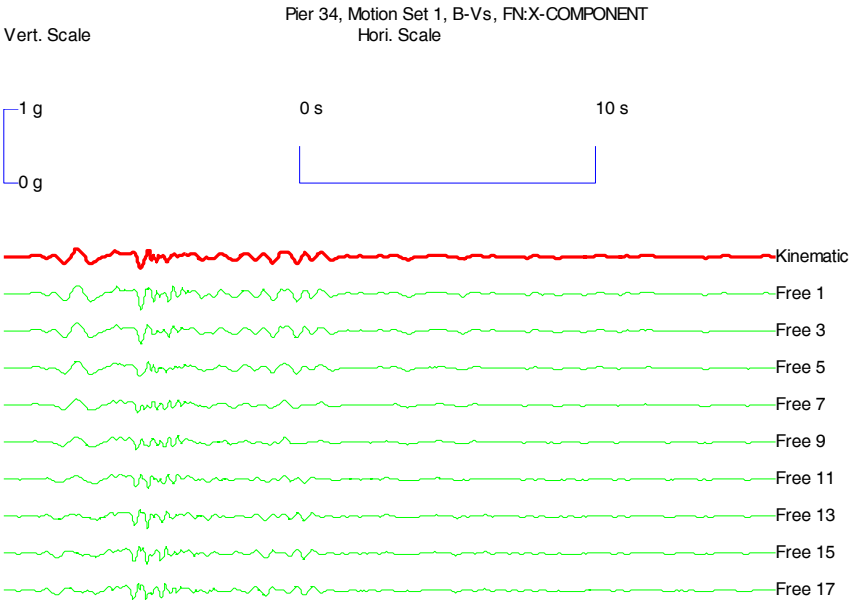

Relative Displacement, in
Period, s
Kinematic
Rock
1
5
7
9
11
13
10
9
8
7
6
5
4
3
2
1
0
0
1
2
3
4
5
6

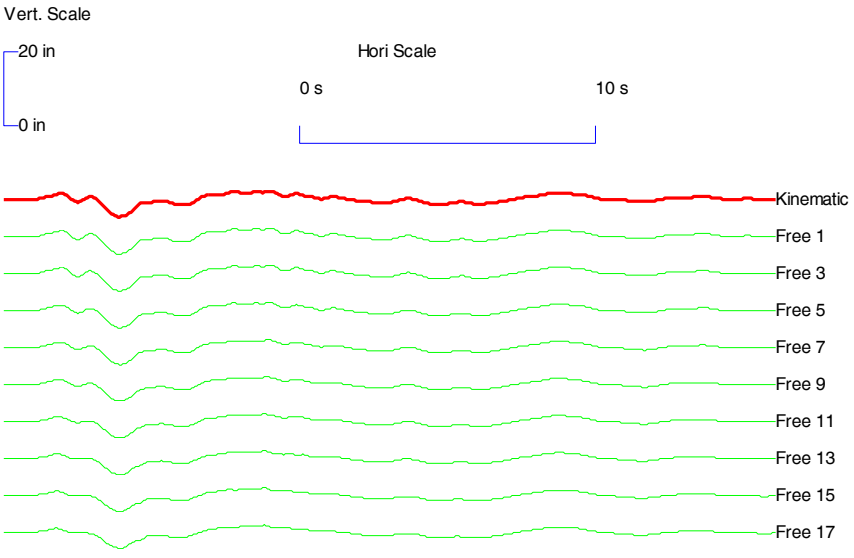

Pier 33, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15

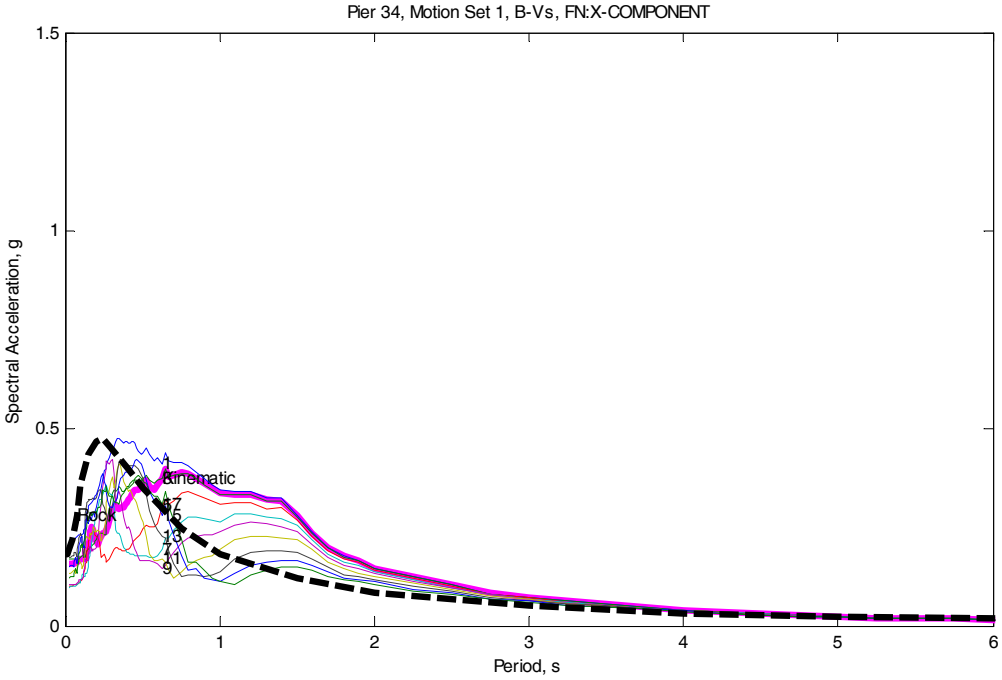

Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15

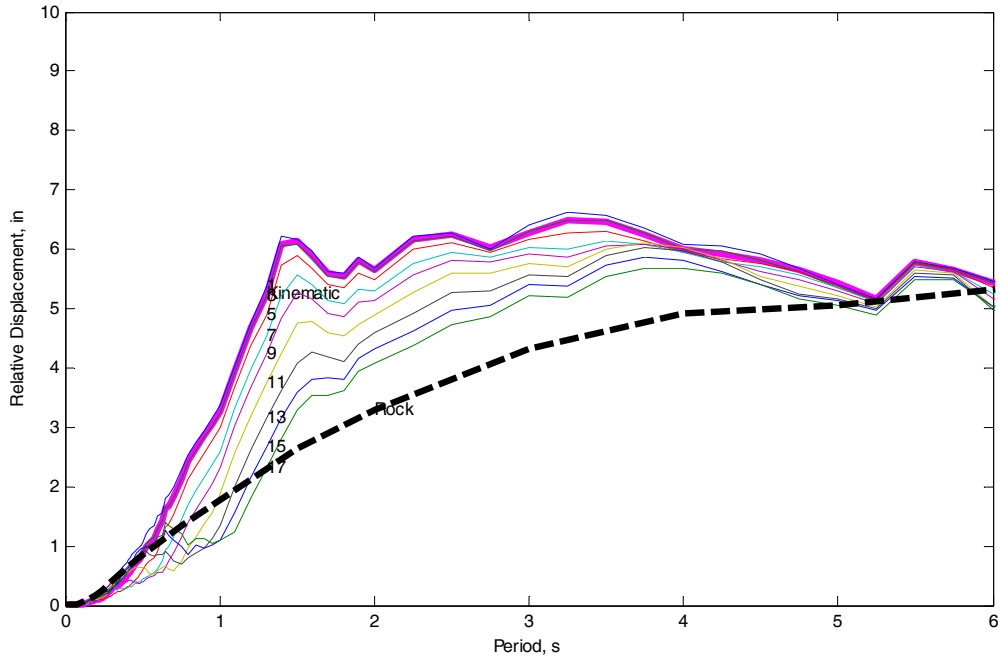

Pier 33, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Kinematic
Rock
3
5
7
9
11

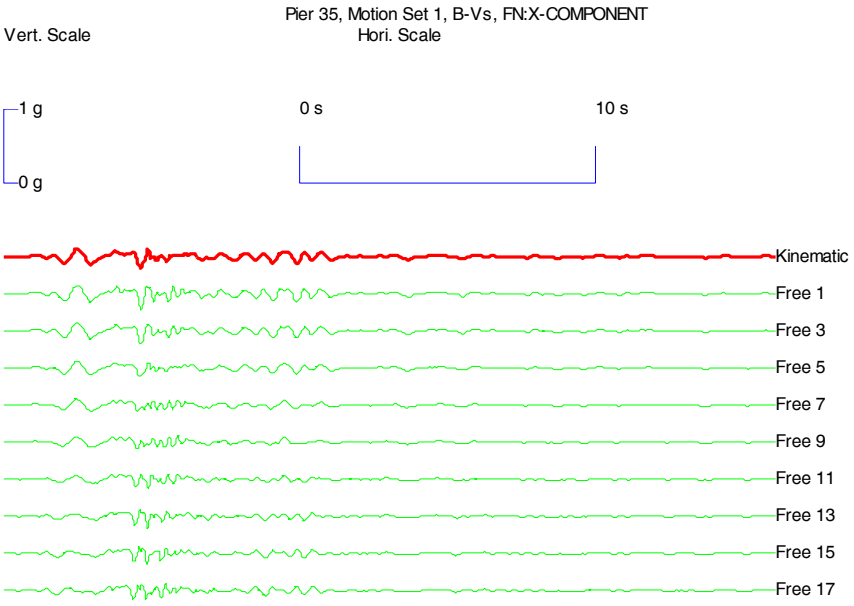

Relative Displacement, in
Period, s
Kinematic
Rock
3
5
7
9
11
13
15

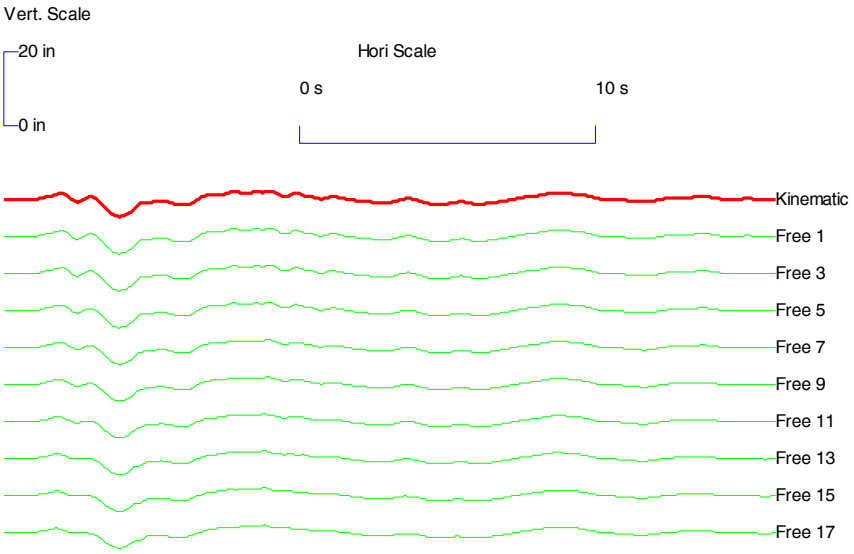

Pier 34, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17

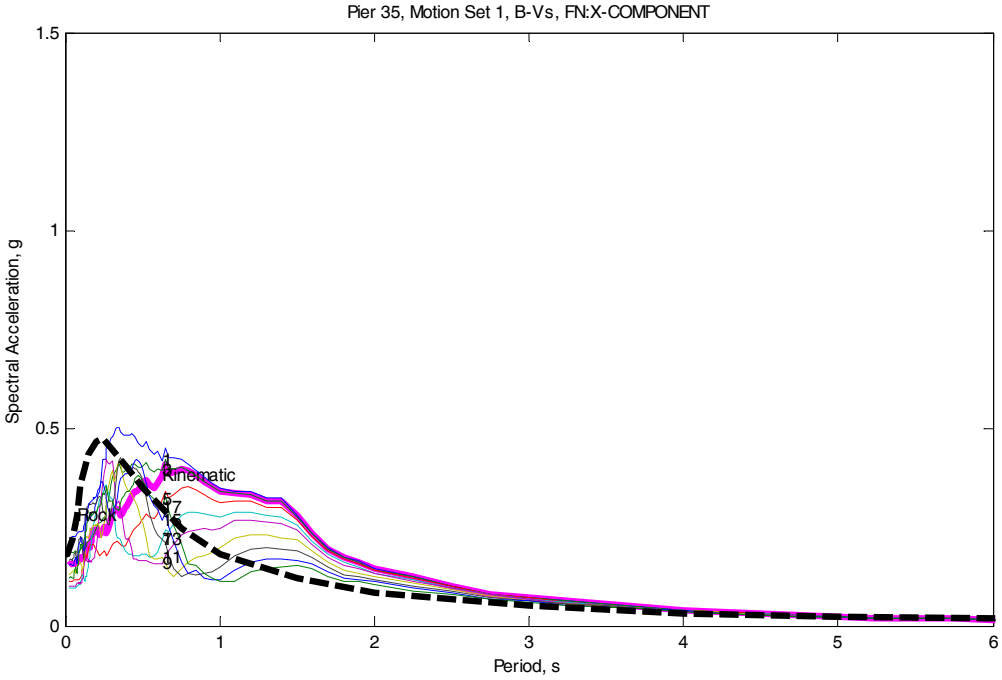

Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17

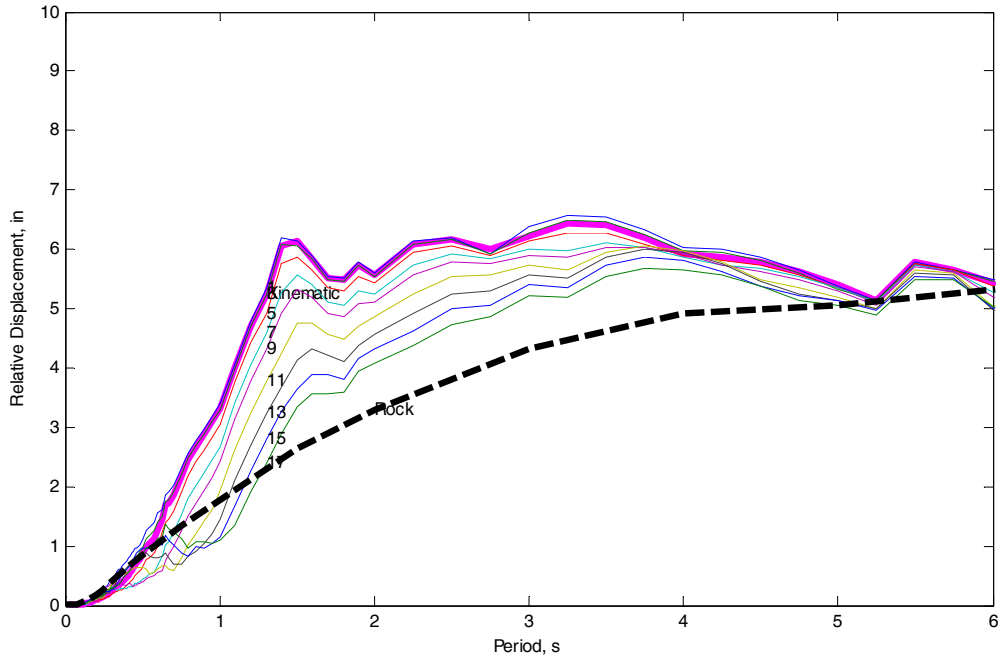

Pier 34, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
1.5
1
0.5
0
0
1
2
3
4
5
6
1
Kinematic
17
15
13
11
9
Rock

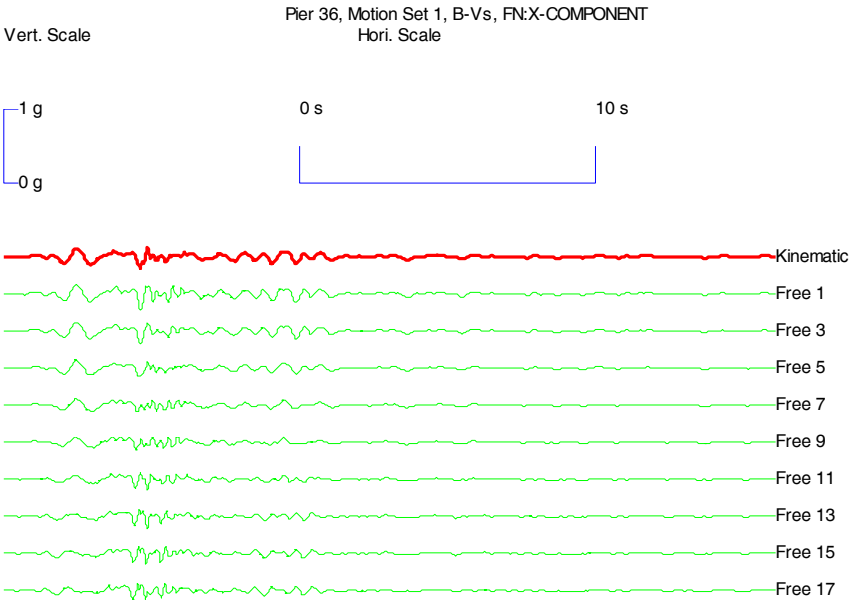

Relative Displacement, in
Period, s
10
9
8
7
6
5
4
3
2
1
0
0
1
2
3
4
5
6
1
Kinematic
5
7
9
11
13
15
17
Rock

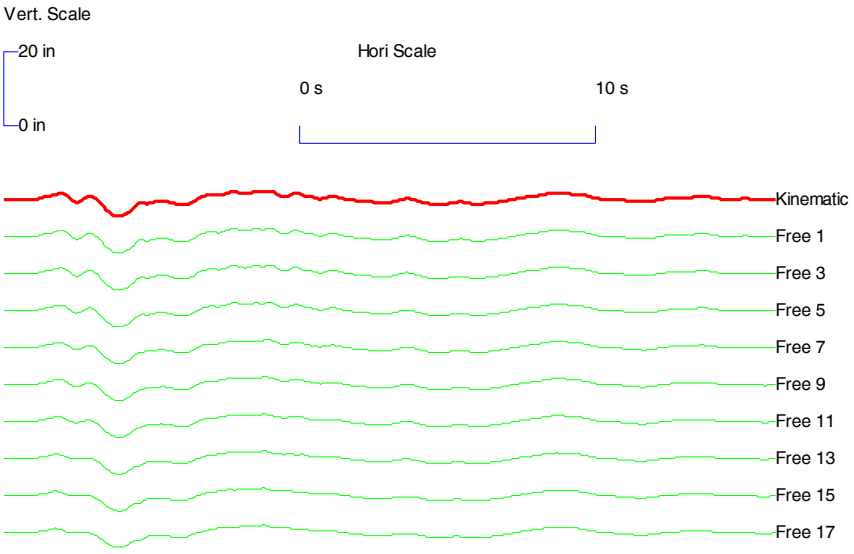

Pier 35, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17

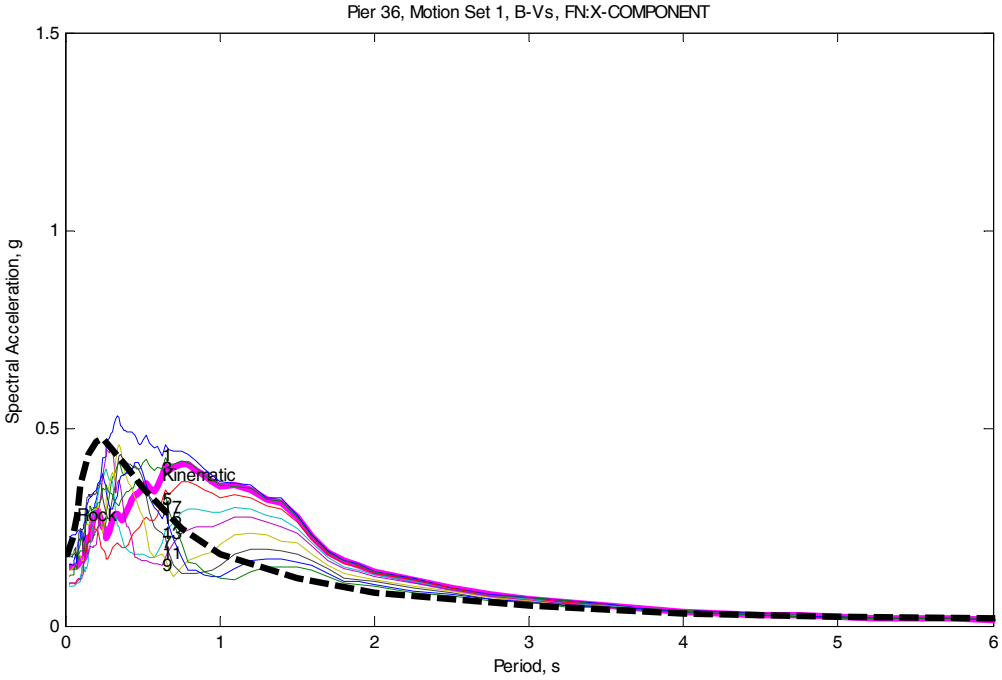

Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17

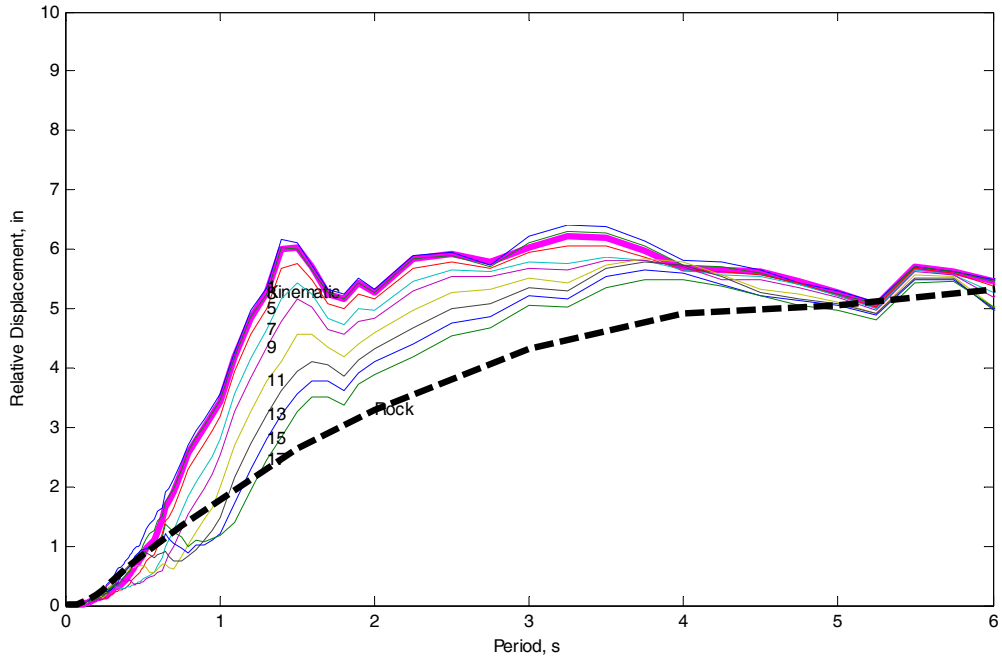

Pier 35, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Kinematic
Rock
3
5
7
9
11
13
15
1
0
0.5
1
1.5
0
1
2
3
4
5
6

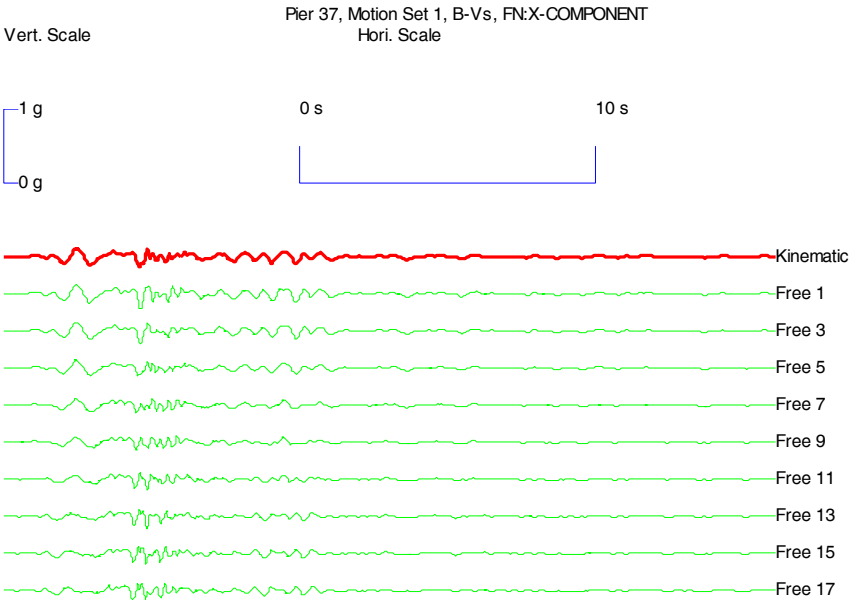

Relative Displacement, in
Period, s
Kinematic
Rock
3
5
7
9
11
13
15
1
0
1
2
3
4
5
6
7
8
9
10
0
1
2
3
4
5
6

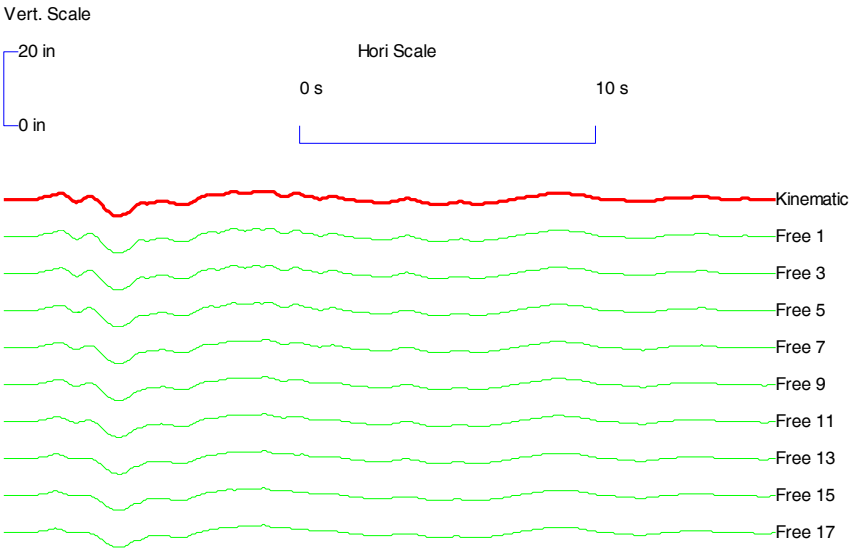

Pier 36, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17

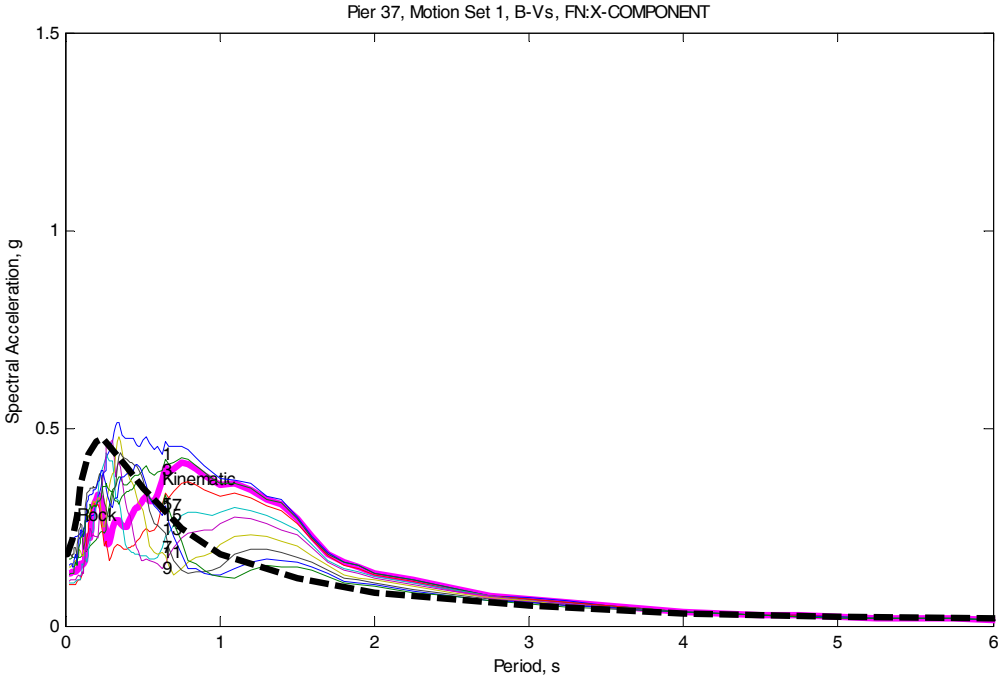

Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17


Pier 36, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Kinematic
Rock
1.5
1
0.5
0
0
1
2
3
4
5
6


Relative Displacement, in
Period, s
Kinematic
Rock
10
9
8
7
6
5
4
3
2
1
0
0
1
2
3
4
5
6


Pier 37, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17


Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17


Pier 37, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Kinematic
Rock
3
5
7
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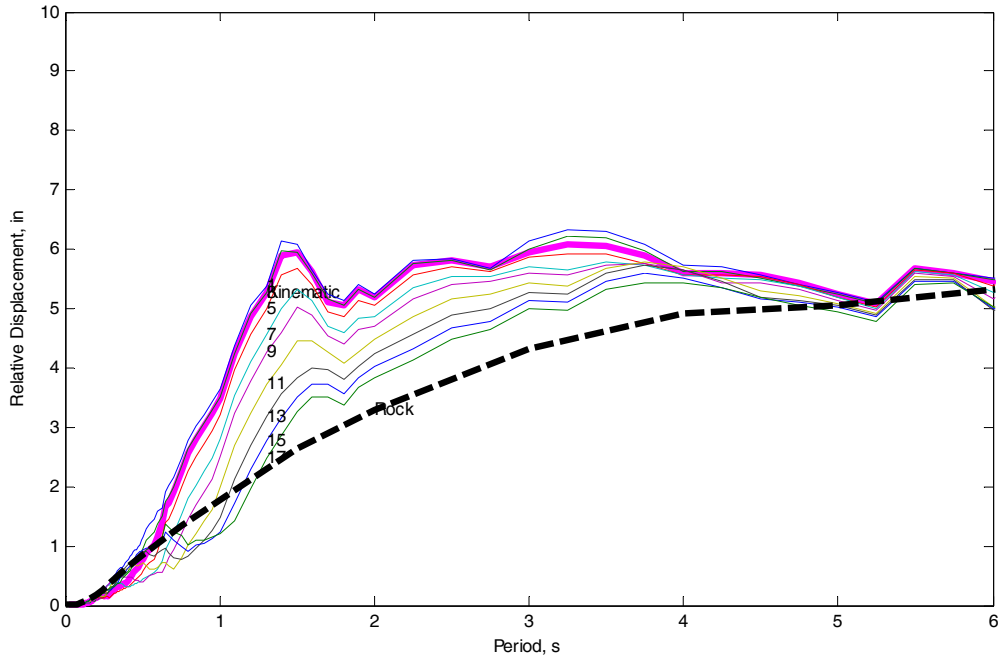
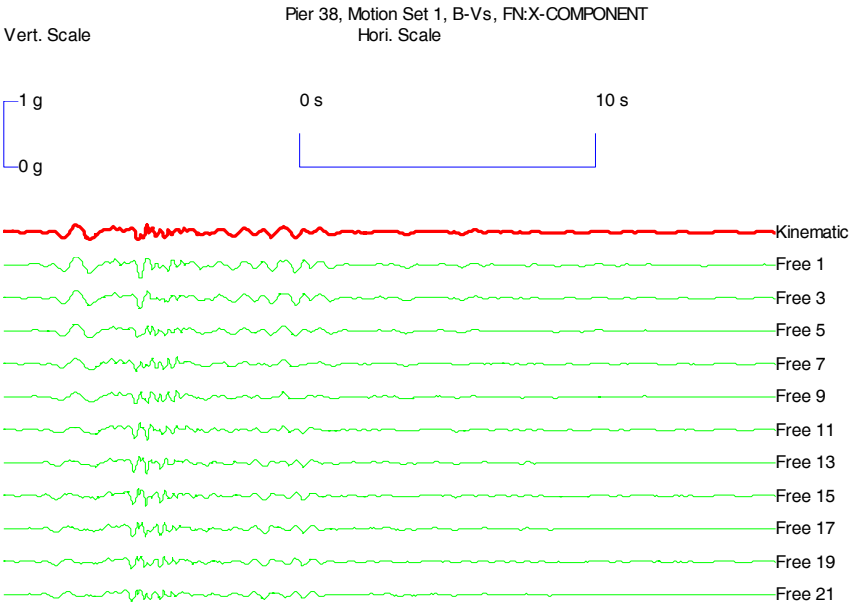
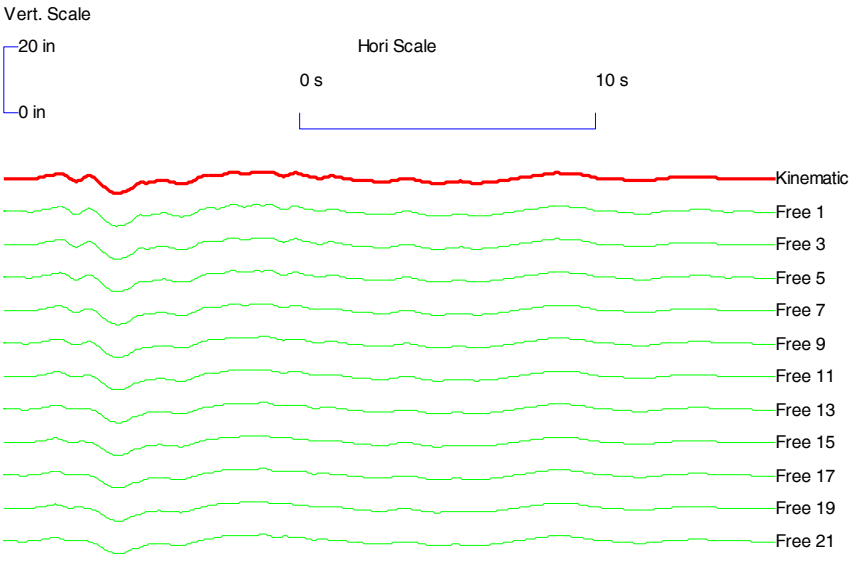
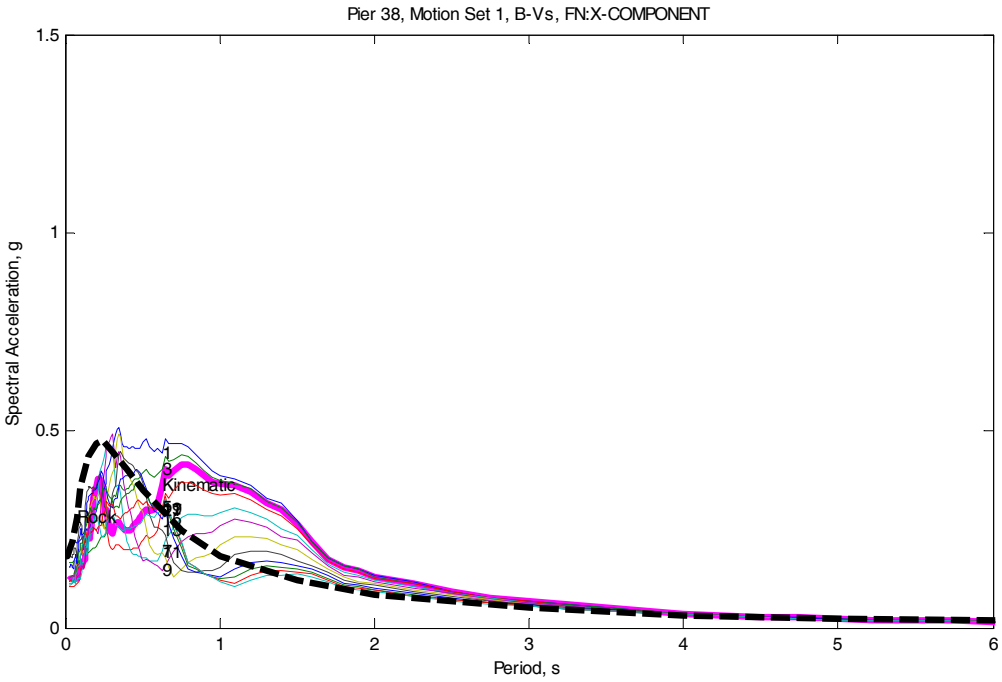
11
13
15
17


Relative Displacement, in
Period, s
Kinematic
Rock
5
7
9
11
13
15
17


Pier 38, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17
Free 19
Free 21


Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17
Free 19
Free 21


Pier 38, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Kinematic
Rock
1
3
5
7
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11
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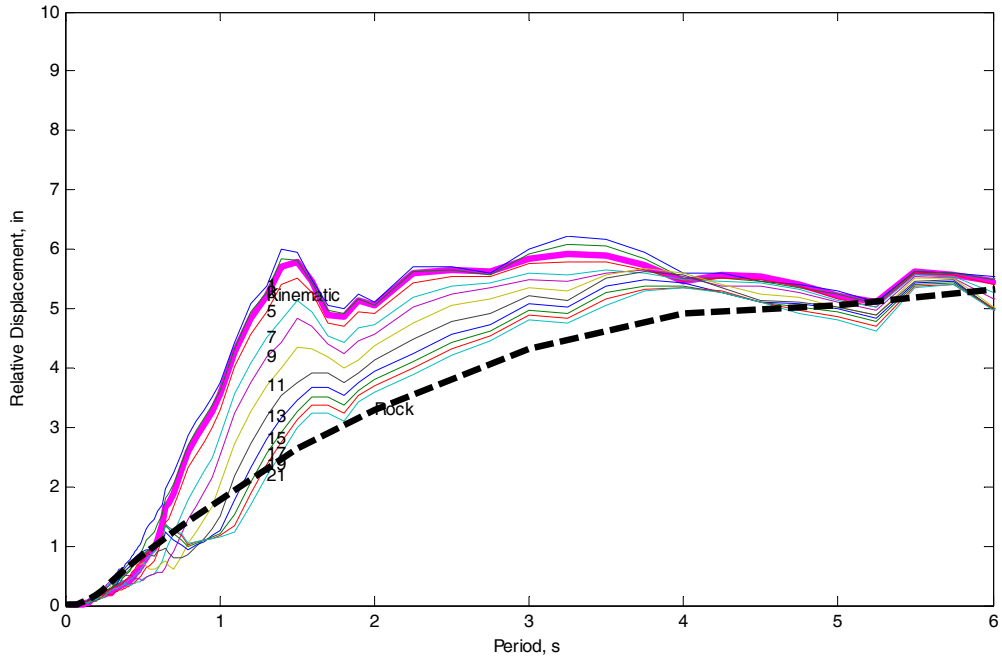
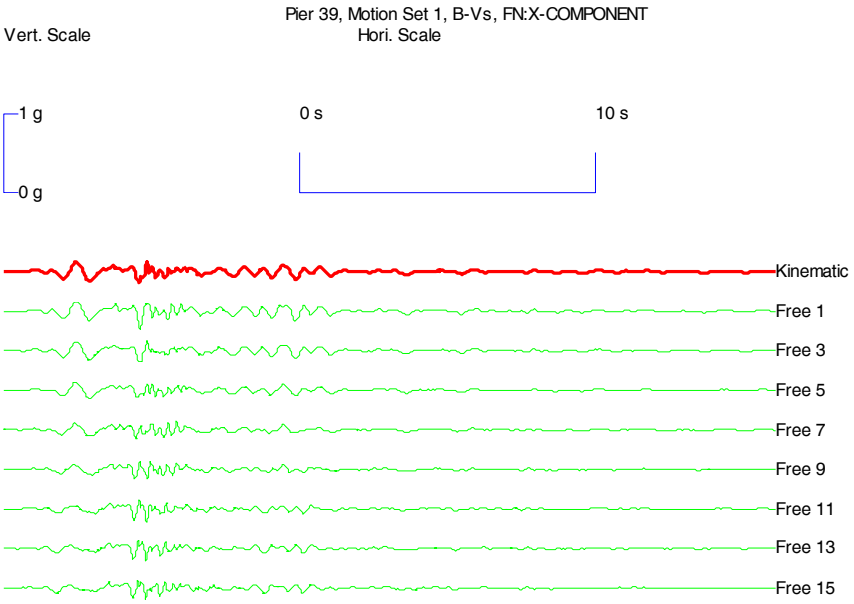
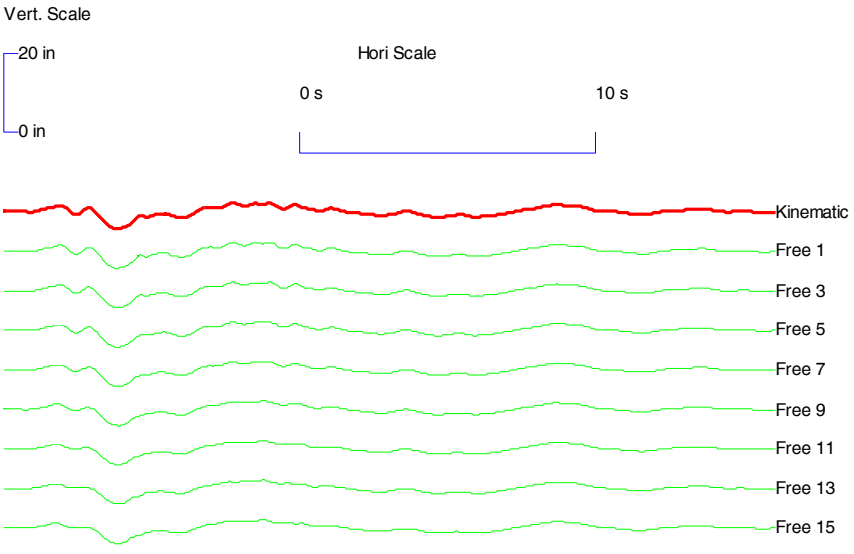
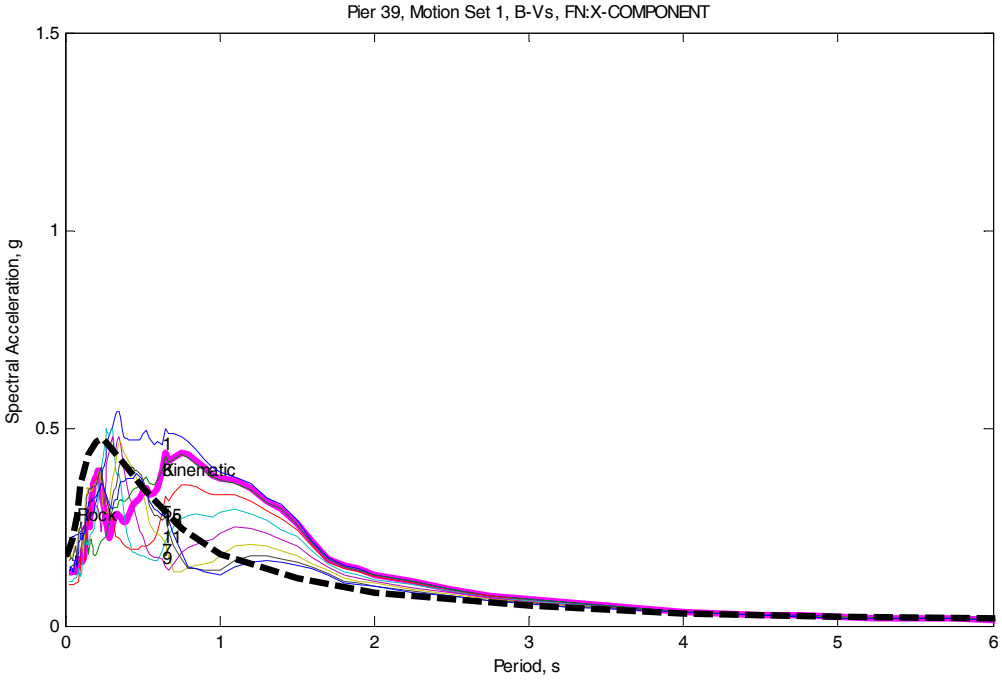
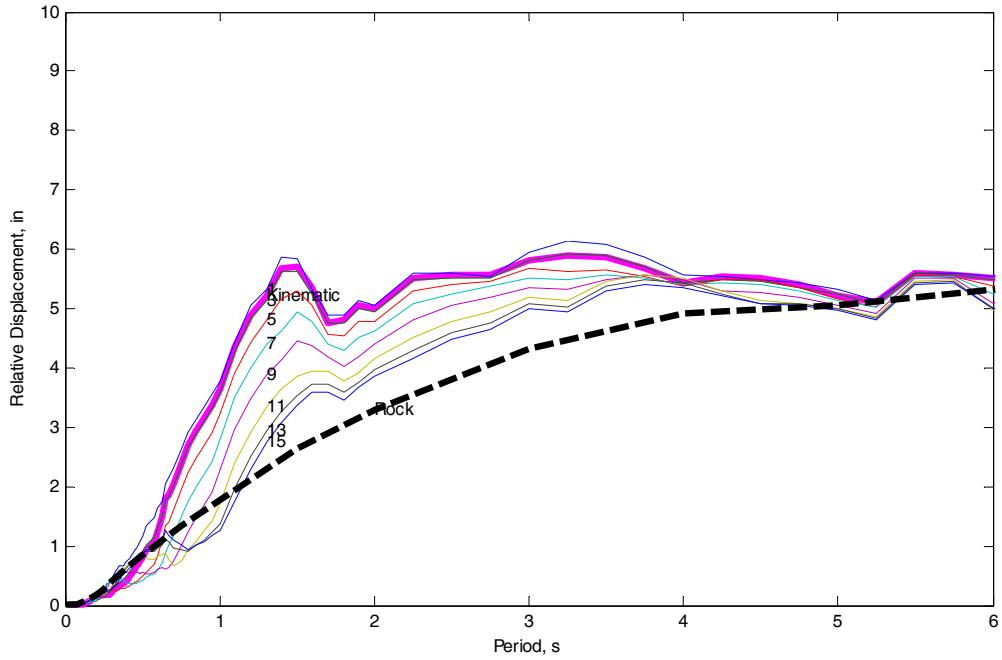
15
17
19
21

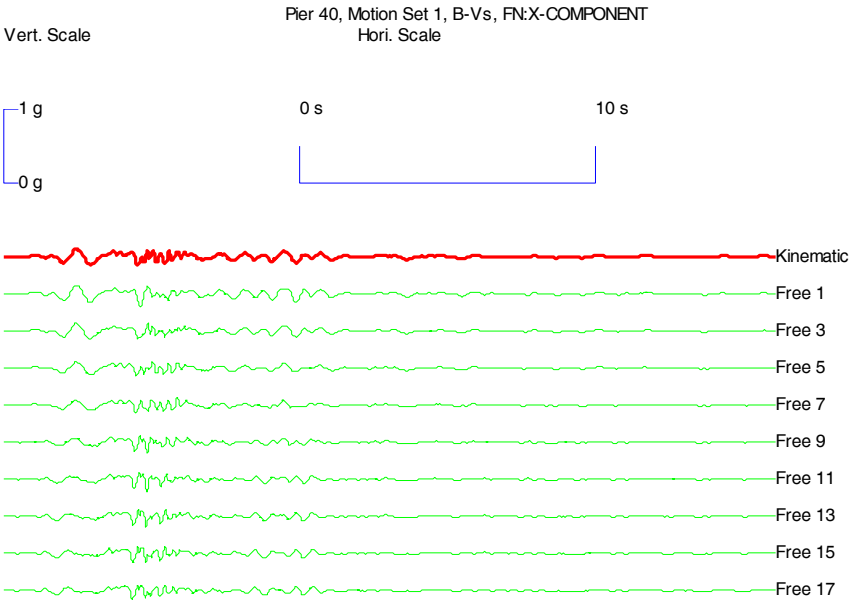

Relative Displacement, in
Period, s
Kinematic
Rock
1
5
7
9
11
13
15
17
19
21

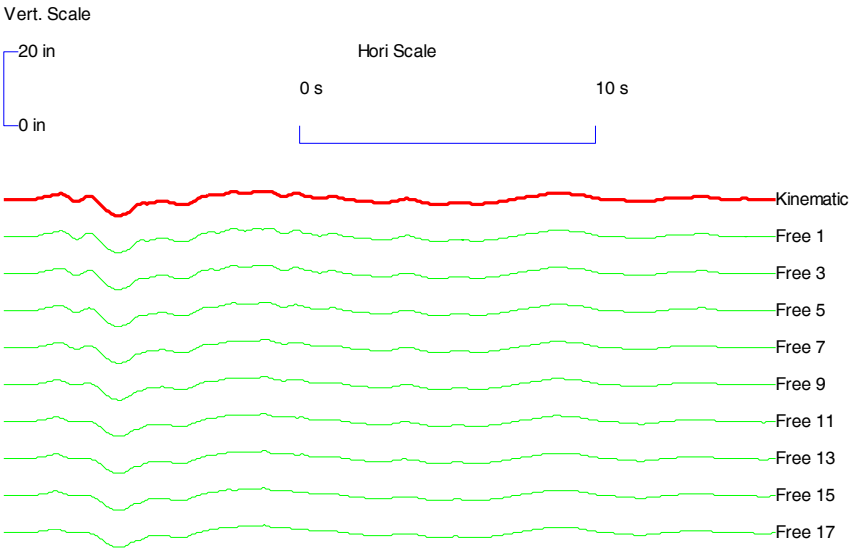

Pier 39, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15

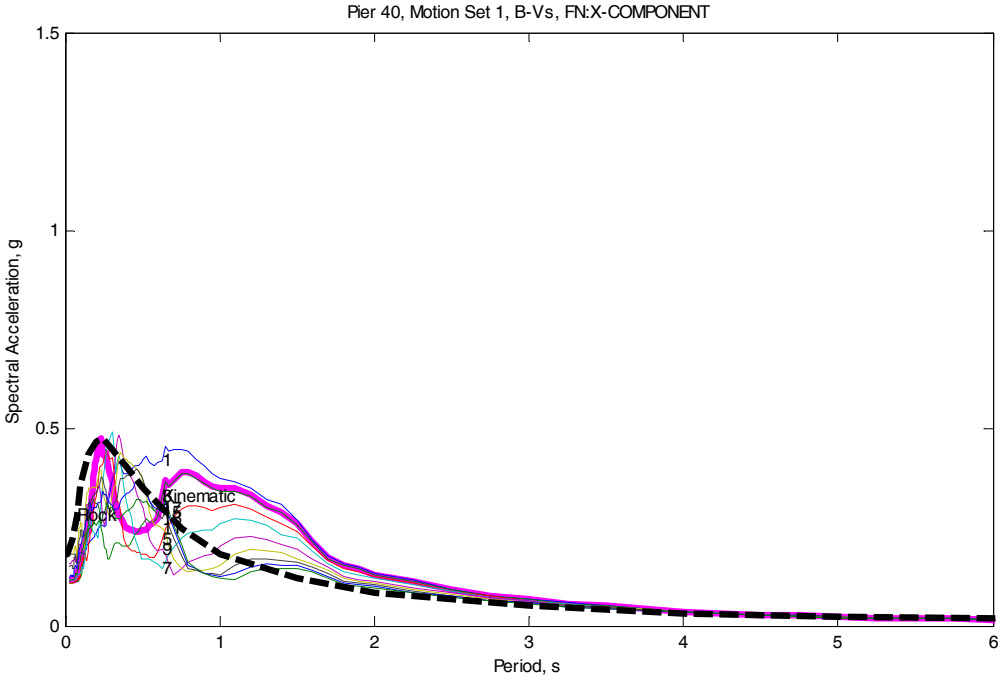

Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15

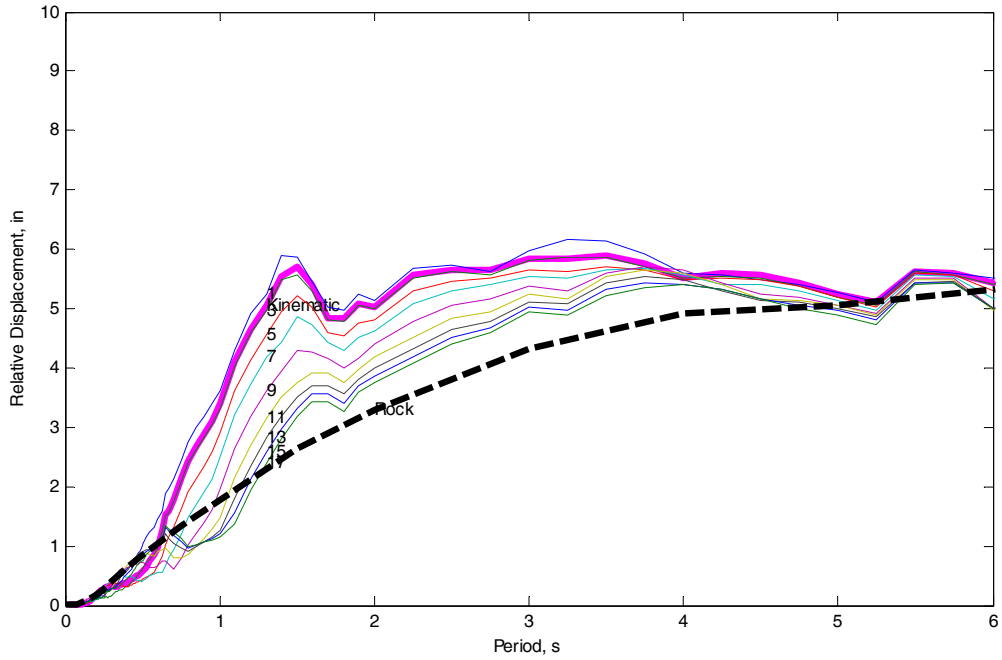

Pier 39, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
Kinematic
Rock
1
3
5
7
9
0
0.5
1
1.5
0
1
2
3
4
5
6

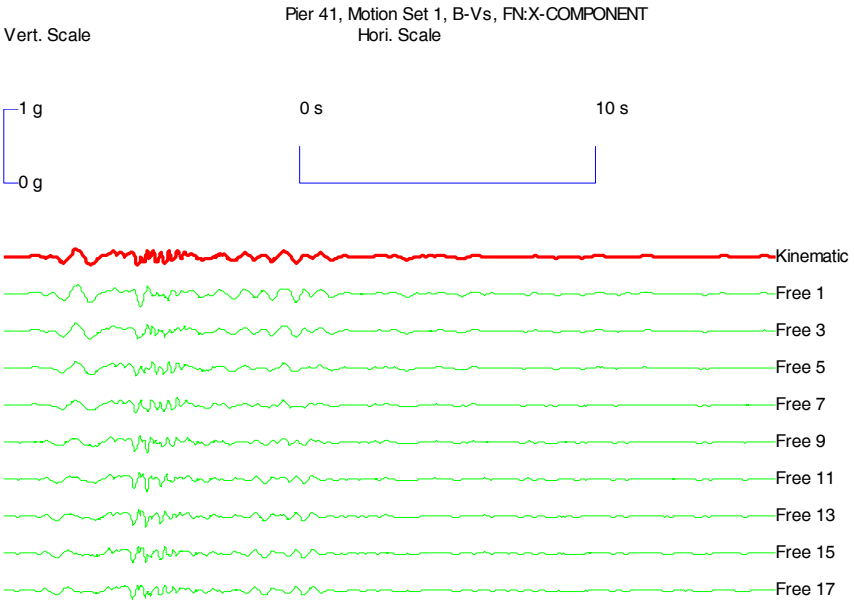

Relative Displacement, in
Period, s
Kinematic
Rock
1
3
5
7
9
11
13
15
0
1
2
3
4
5
6
7
8
9
10
0
1
2
3
4
5
6

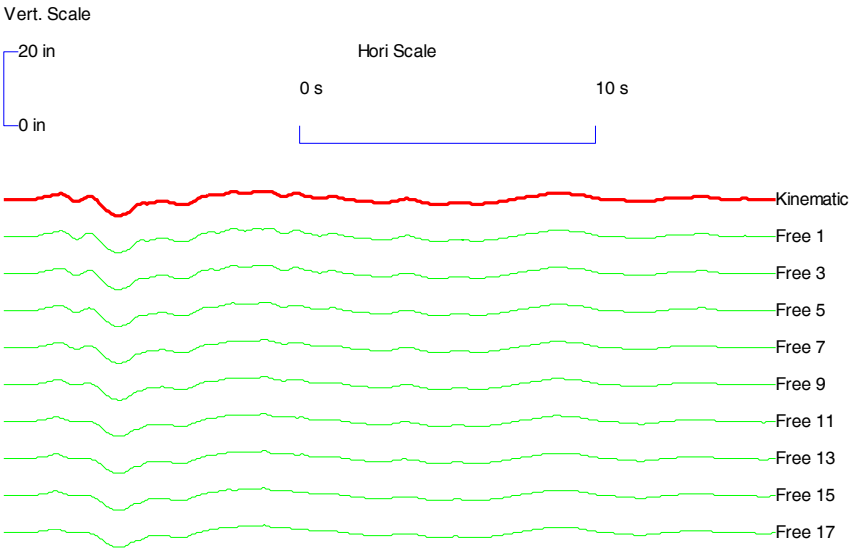

Pier 40, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17

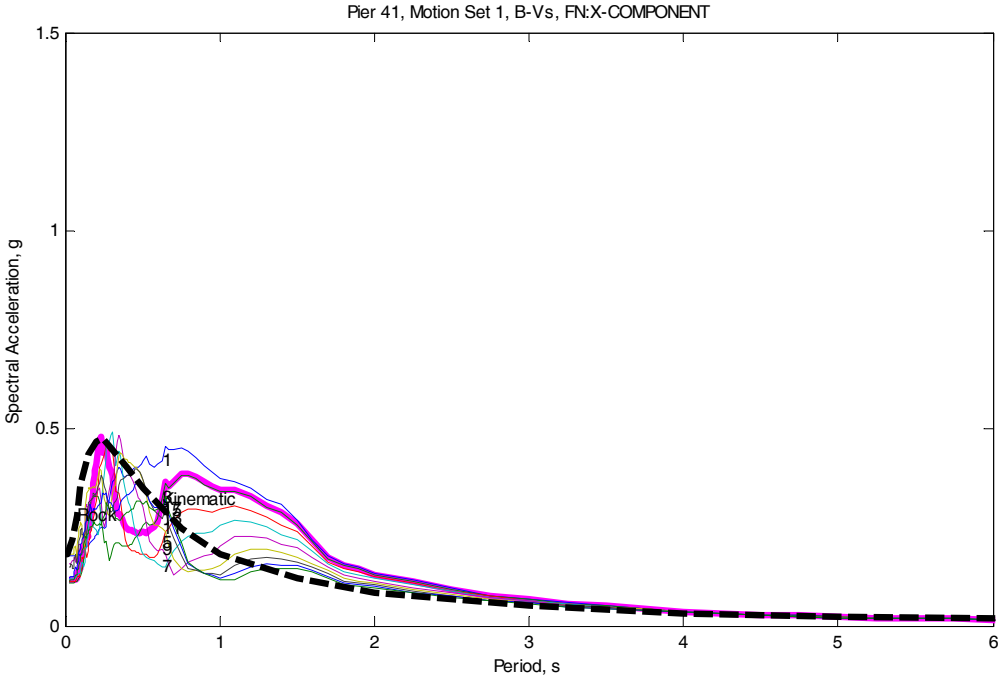

Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17

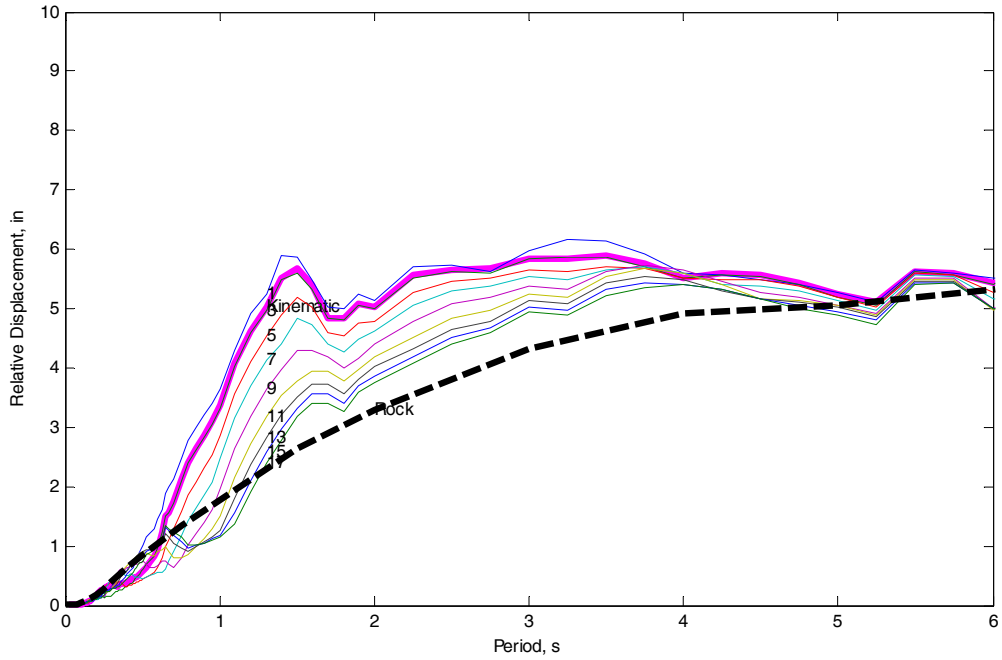

Pier 40, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
1.5
1
0.5
0
0
1
2
3
4
5
6
1
Kinematic
Rock
3
5
7
9

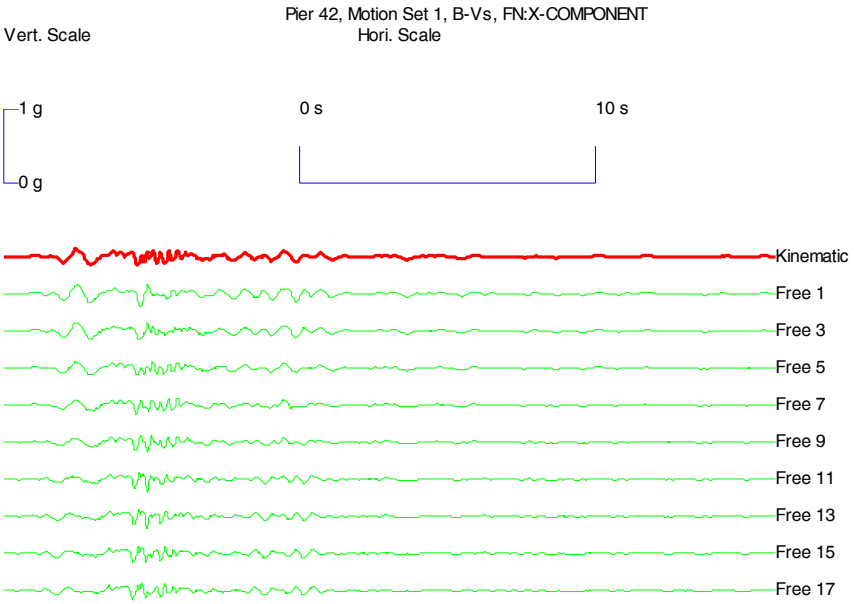

Relative Displacement, in
Period, s
10
9
8
7
6
5
4
3
2
1
0
0
1
2
3
4
5
6
1
Kinematic
3
5
7
9
11
13
15
Rock


Pier 41, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17


Vert. Scale
20 in
0 in
Hori Scale
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
Free 15
Free 17


Pier 41, Motion Set 1, B-Vs, FN:X-COMPONENT
Spectral Acceleration, g
Period, s
1.5
1
0.5
0
0
1
2
3
4
5
6
1
Kinematic
Rock
3
9
7


Relative Displacement, in
Period, s
10
9
8
7
6
5
4
3
2
1
0
0
1
2
3
4
5
6
1
Kinematic
3
5
7
9
11
13
15
Rock


Pier 42, Motion Set 1, B-Vs, FN:X-COMPONENT
Vert. Scale
Hori. Scale
1 g
0 g
0 s
10 s
Kinematic
Free 1
Free 3
Free 5
Free 7
Free 9
Free 11
Free 13
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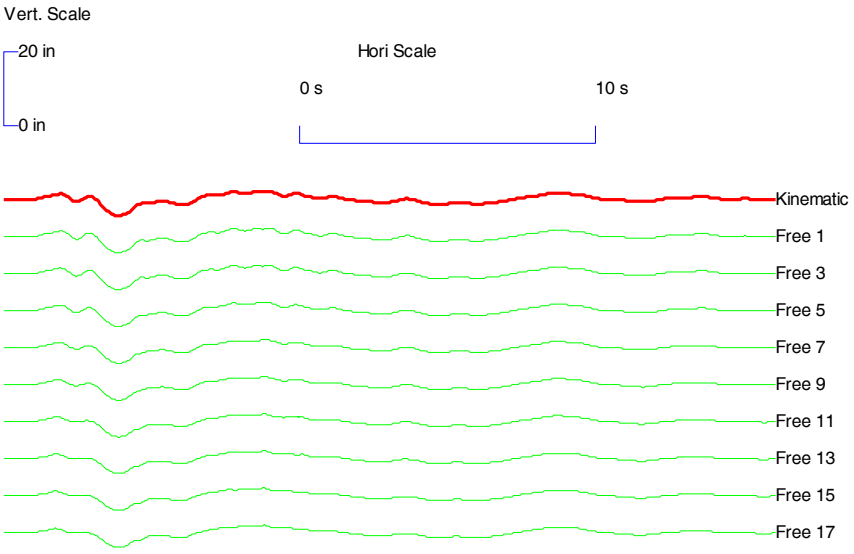
Free 17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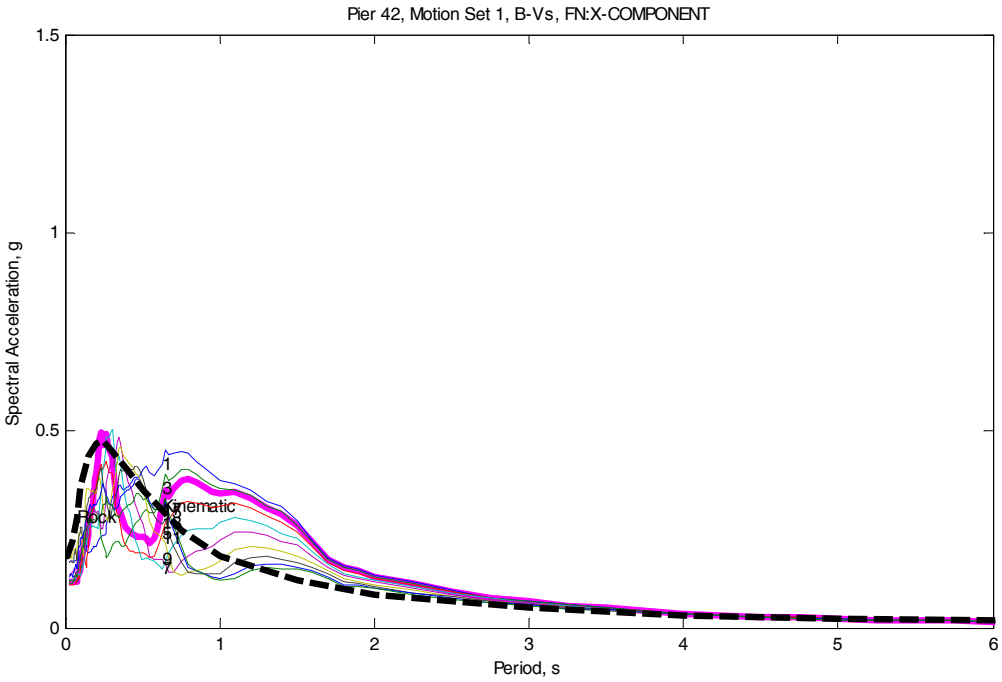
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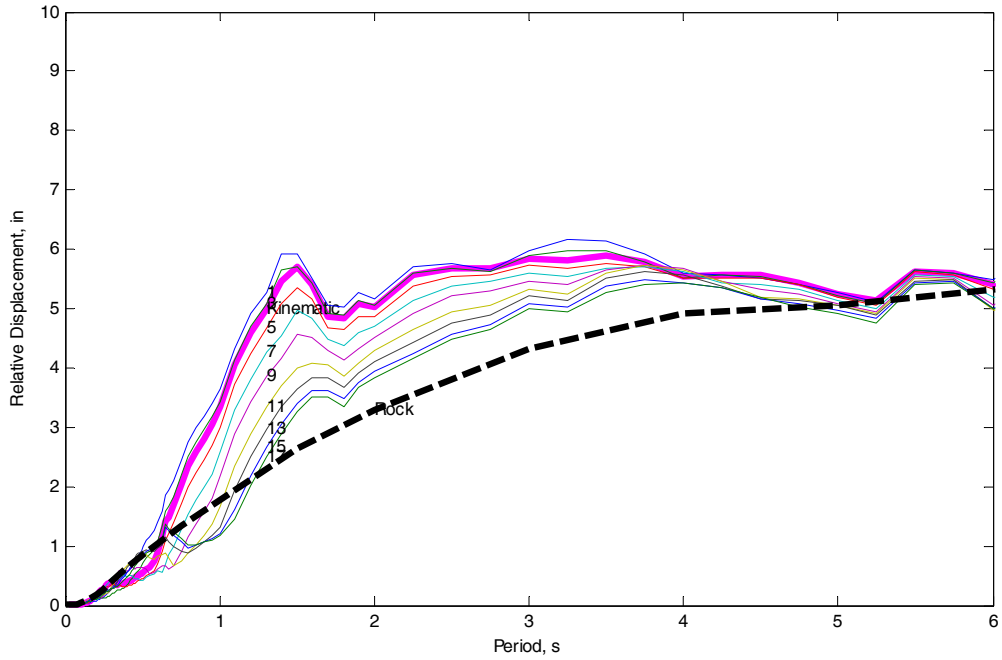
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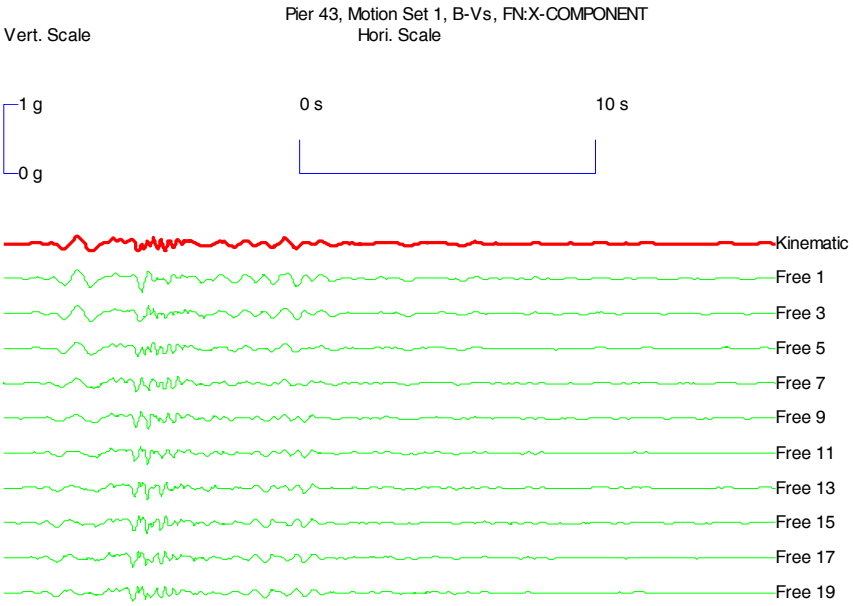
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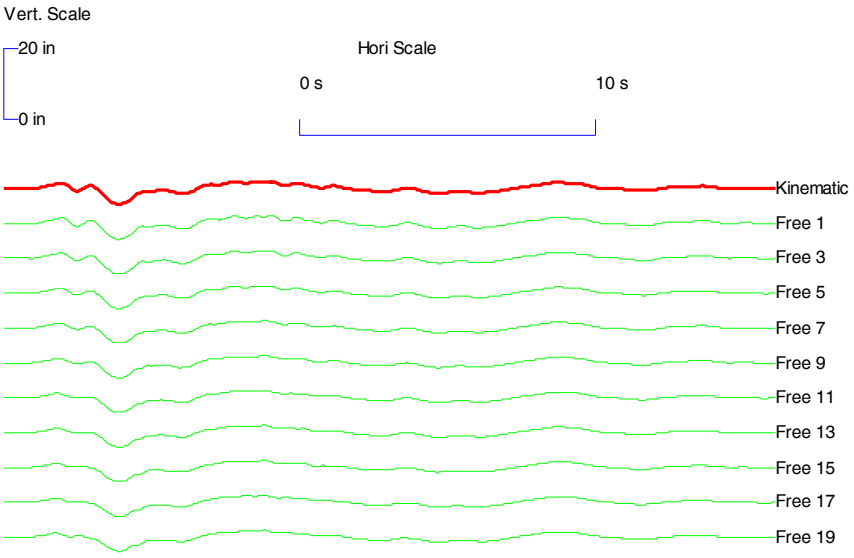
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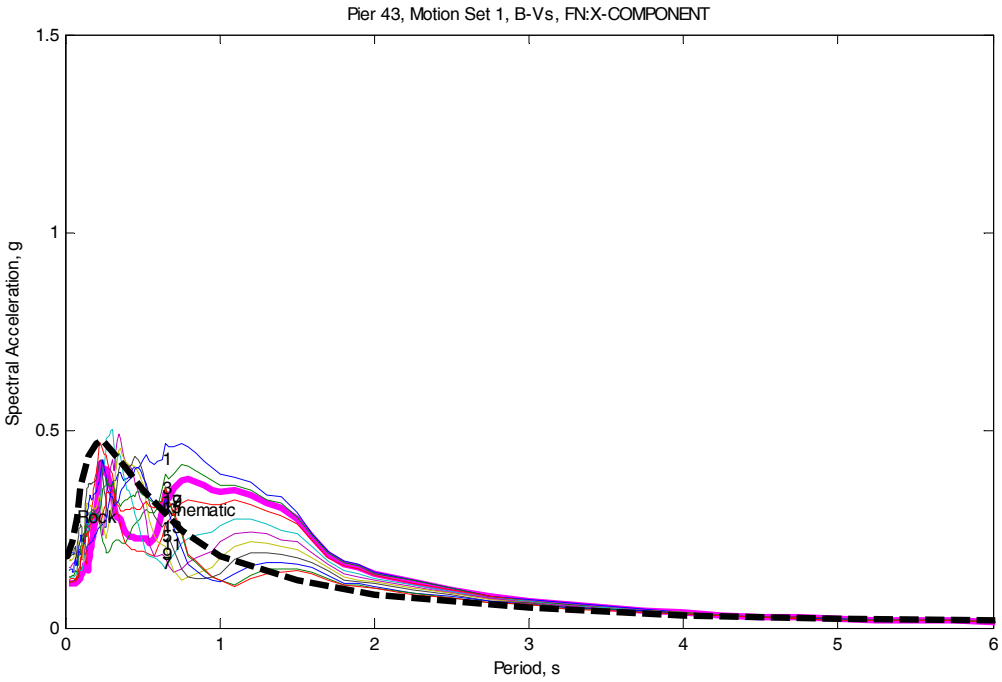
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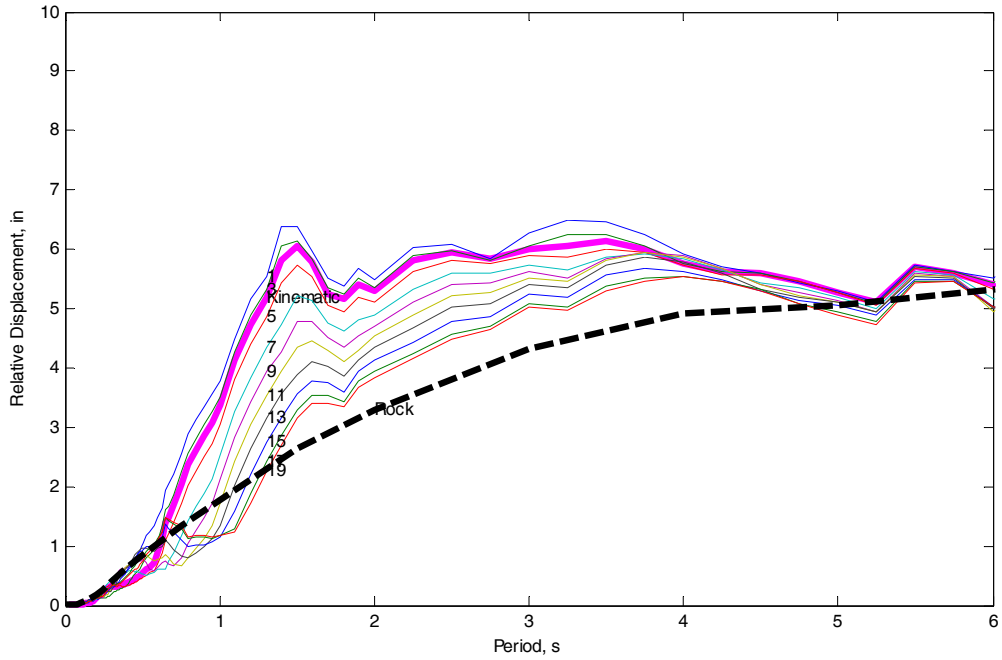
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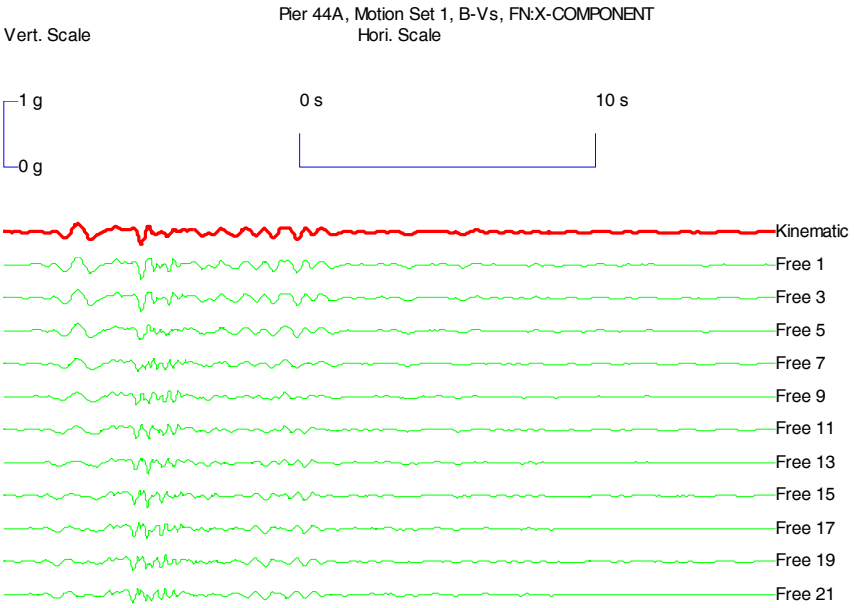
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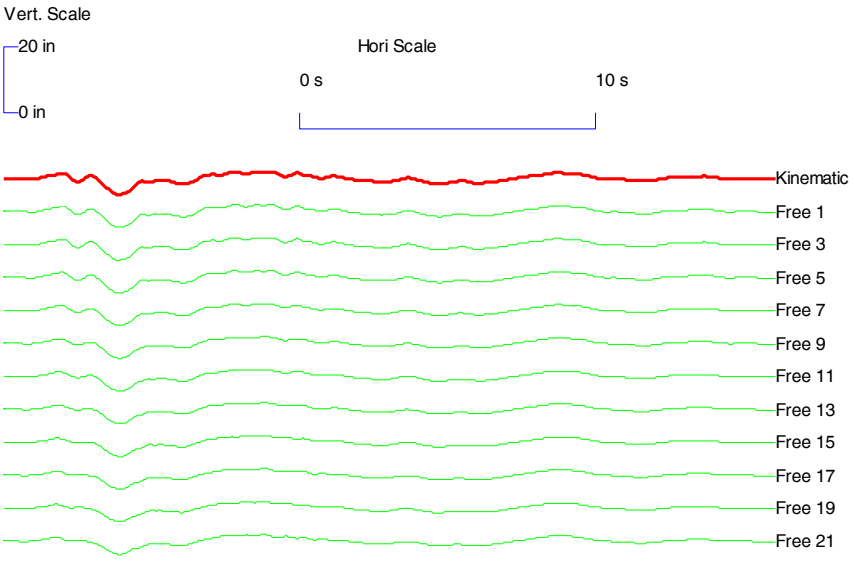
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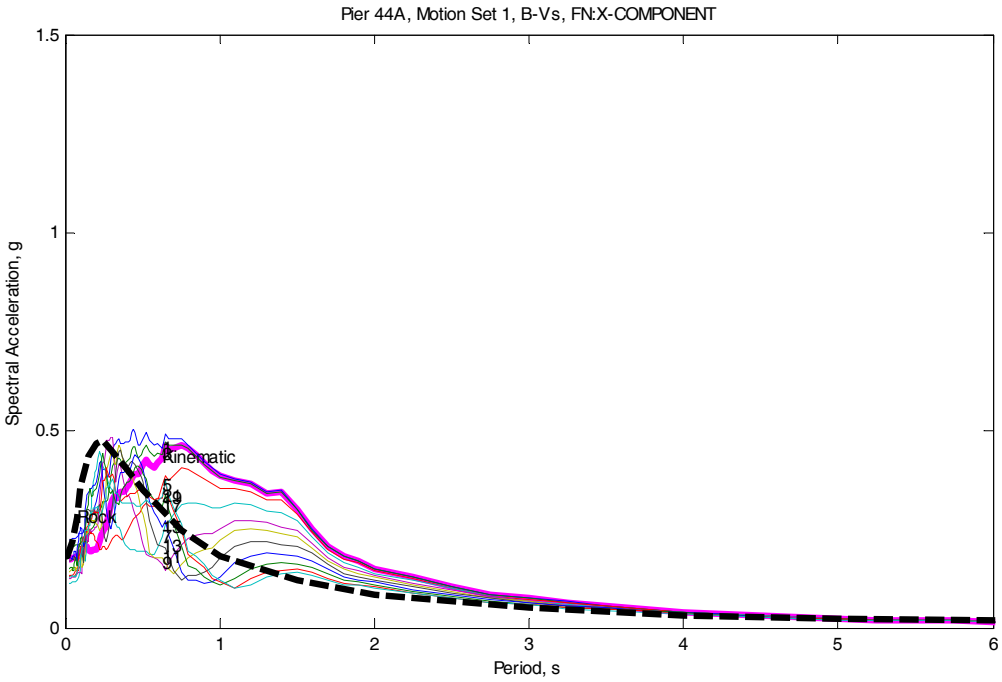
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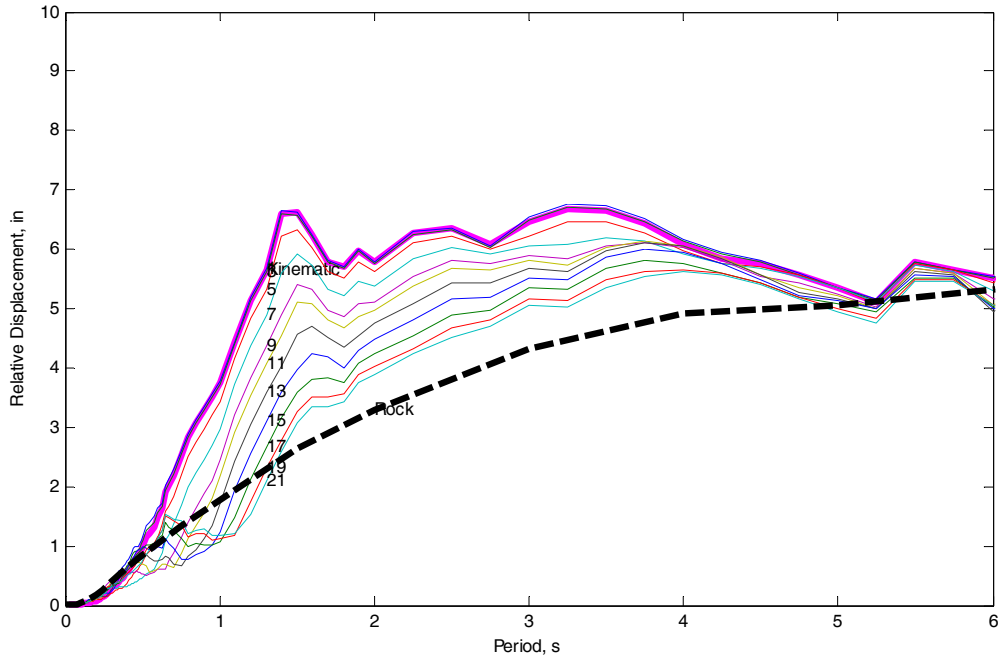
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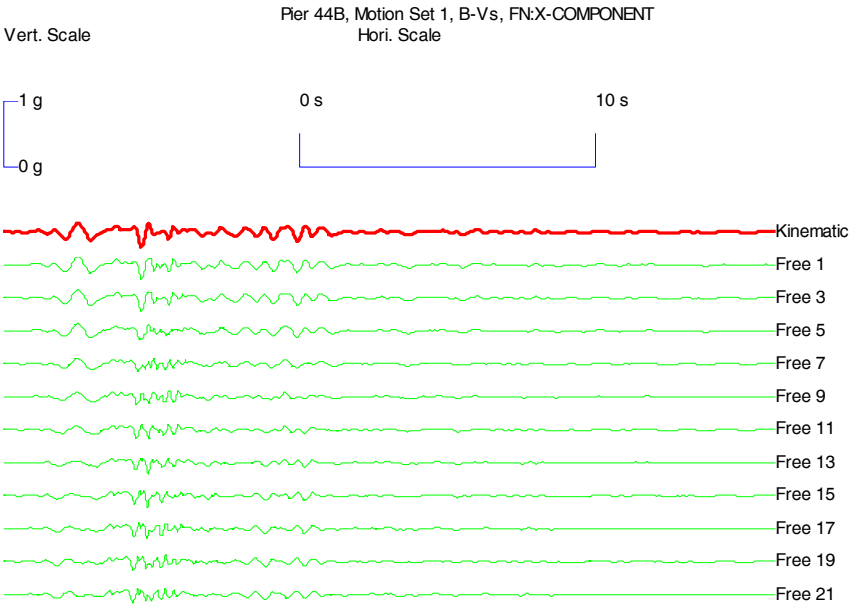
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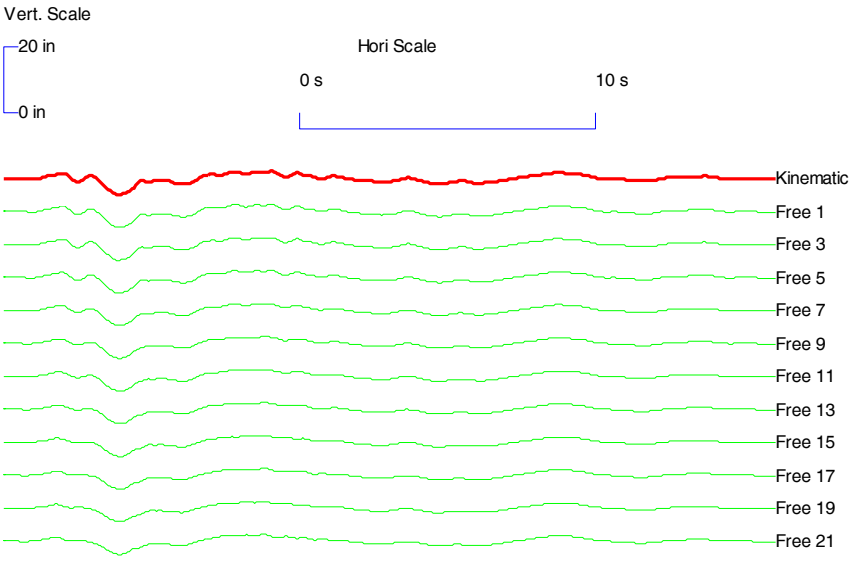
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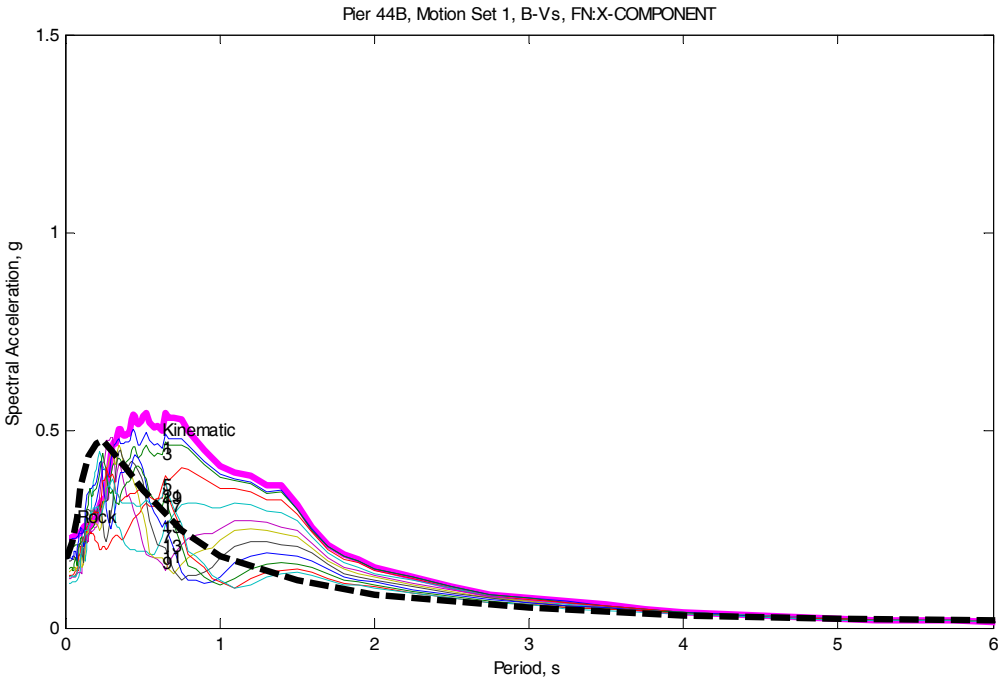
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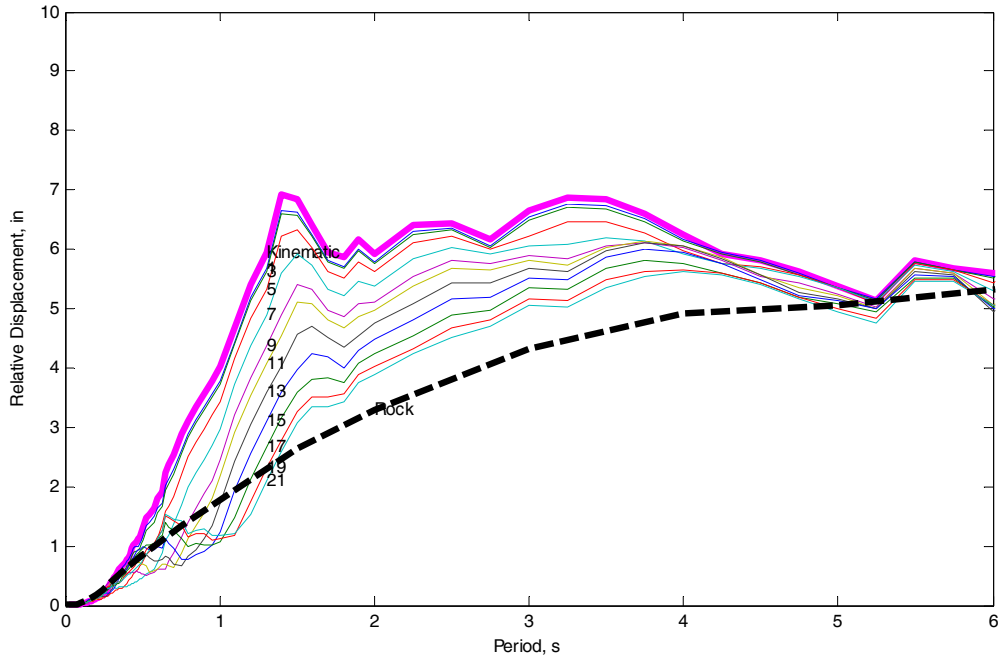
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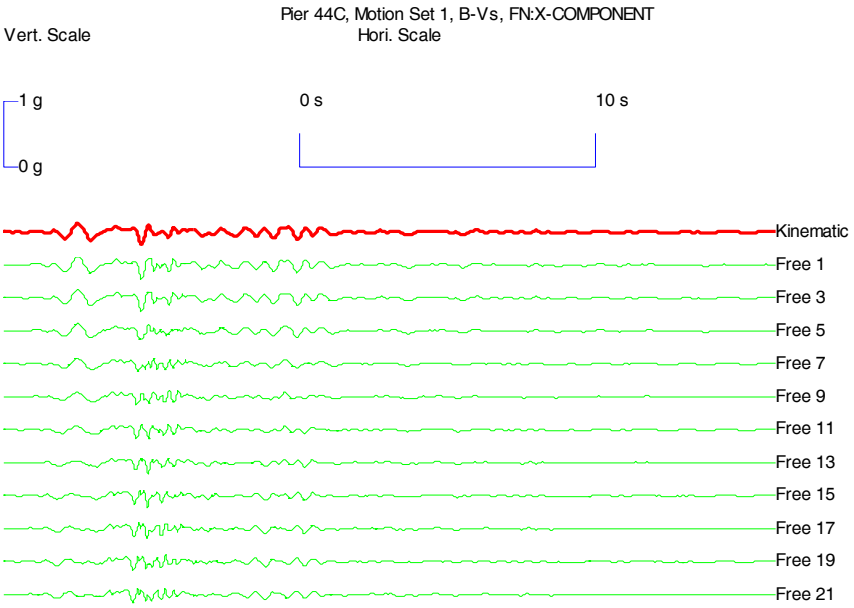
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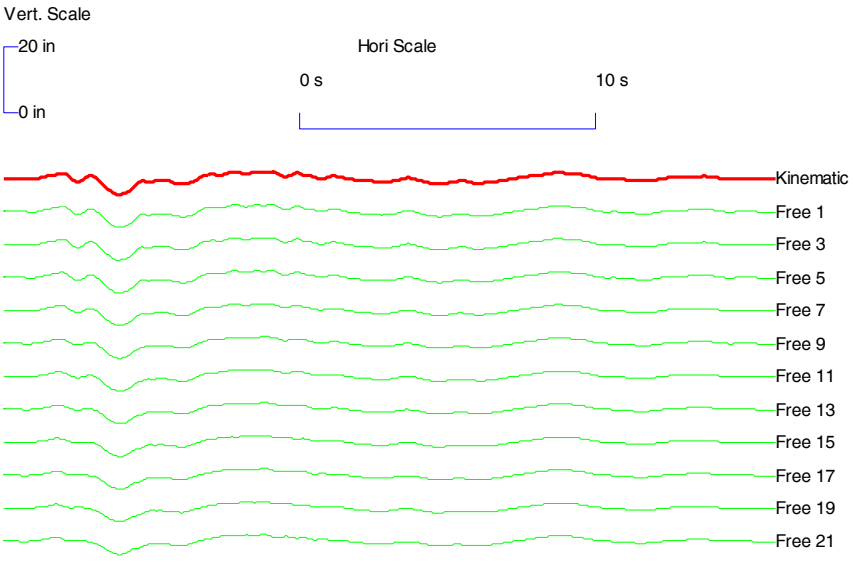
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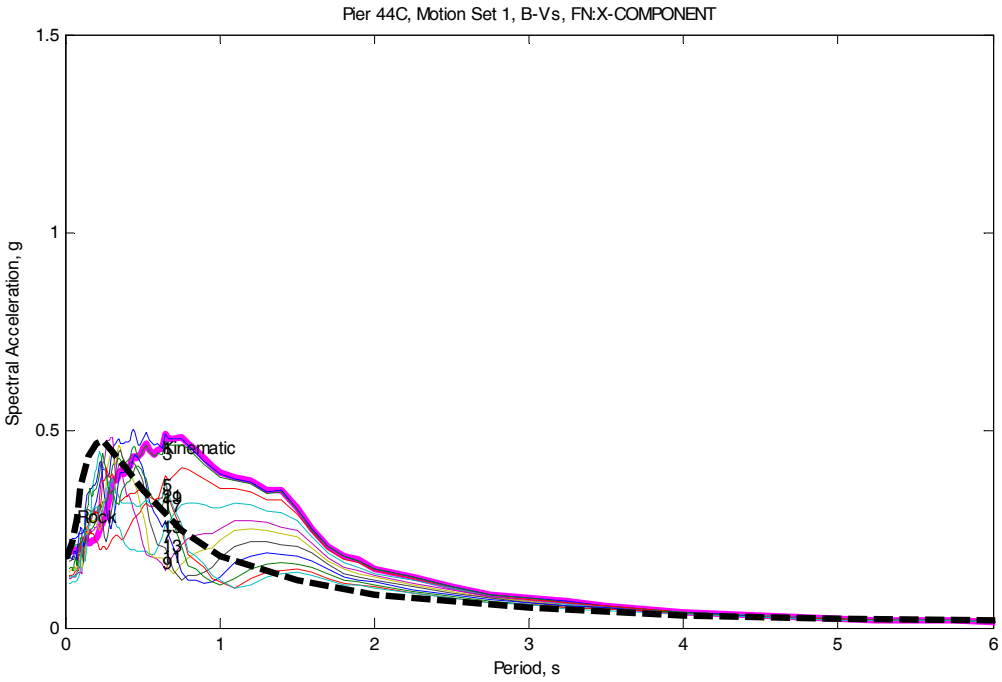
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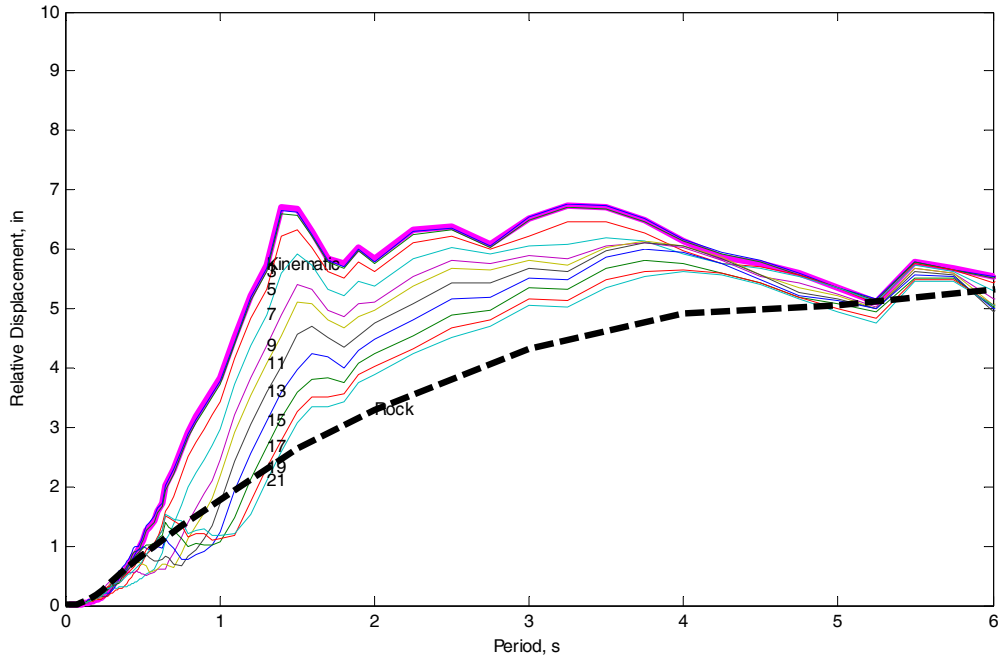
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15. TO-18 ACM_LCP_LSI REPORT

ASBESTOS AND LEAD-CONTAINING PAINT SURVEY, AND LIMITED SITE INVESTIGATION REPORT

DUMBARTON BRIDGE RETROFIT PROJECT ALAMEDA AND SAN MATEO COUNTIES, CALIFORNIA

PREPARED FOR:
CALTRANS DISTRICT 4
OFFICE OF ENVIRONMENTAL ENGINEERING
111 GRAND AVENUE, 14TH FLOOR
OAKLAND, CA 94612

PREPARED BY:
GEOCON CONSULTANTS, INC.
6671 BRISA STREET
LIVERMORE, CALIFORNIA

GEOCON PROJECT NO. E8435-06-18/-41
CALTRANS EA 04-1A5221

OCTOBER 2009

TABLE OF CONTENTS

ASBESTOS AND LEAD-CONTAINING PAINT SURVEY, AND LIMITED SITE INVESTIGATION REPORT

Page

REPORT LIMITATIONS i
PROJECT TEAM iii
EXECUTIVE SUMMARY iv
1.0 INTRODUCTION 1
1.1 Site Description and Proposed Improvements 1
1.2 Purpose 1
2.0 BACKGROUND 1
2.1 Asbestos 1
2.2 Lead Paint 2
2.3 Hazardous Waste Determination 3
2.4 Architectural Drawings and Previous Survey Activities 4
3.0 SCOPE OF SERVICES 4
3.1 Pre-Field Activities 4
3.2 Field Activities 4
4.0 INVESTIGATIVE METHODS 5
4.1 Asbestos 5
4.2 Lead Paint 5
4.3 Debris Material 5
4.4 Treated Wood 6
5.0 INVESTIGATIVE RESULTS 6
5.1 Asbestos 6
5.2 Lead Paint 6
5.3 Debris Material 7
5.4 Treated Wood 7
6.0 CONCLUSIONS 8
6.1 Asbestos 8
6.2 Lead Paint 8
6.3 Debris Material 8
6.4 Treated Wood 9

FIGURES
1. Vicinity Map
2. Site Plan (Ravenswood Pier)
3. Site Plan (Marshlands Road)

TABLE OF CONTENTS (continued)

TABLES
1. Summary of Analytical Laboratory Test Results – Asbestos
2. Summary of Analytical Laboratory Test Results – Paint and Coating
3. Summary of CAM 17 Metals Results - Debris Material
4. Summary of Organics Results – Debris Material
5. Summary of Metals and Organics Results - Treated Wood

SITE PHOTOGRAPHS (1 through 21)

APPENDIX
A. Laboratory Analytical Reports and Chain-of-Custody Documentation

REPORT LIMITATIONS

This asbestos and lead-containing paint (LCP) survey was conducted in conformance with generally accepted standards of practice for identifying and evaluating asbestos and LCP in structures. Due to the nature of structure surveys, asbestos and LCP use, and laboratory analytical limitations, some asbestos or LCP in the structures may not have been identified. Structure spaces such as cavities, crawlspaces, and pipe chases may have been concealed to our investigator. Previous structure renovation work may have concealed or covered spaces or materials, or may have partially demolished materials and left debris in inaccessible areas. Additionally, renovation activities may have partially replaced asbestos with indistinguishable non-asbestos materials. Asbestos or LCP may exist in areas of the structures not accessible or sampled in conjunction with this Task Order.

During renovation or demolition operations, suspect materials may be uncovered which are different from those accessible for sampling during this assessment. Personnel in charge of renovation/demolition should be alerted to note materials uncovered during such activities that differ substantially from those included in this or previous assessment reports. If suspect materials are found, additional sampling and analysis should be performed to determine if the materials contain asbestos or lead.

This report has been prepared exclusively for the State of California Department of Transportation (Caltrans) District 4. The information contained herein is only valid as of the date of the report, and will require an update to reflect additional information obtained.

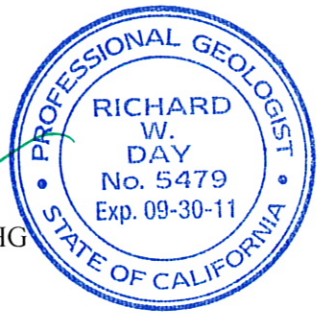
This asbestos and LCP survey, and limited site investigation report is not a comprehensive site characterization and should not be construed as such. The findings as presented in this report are predicated on the results of the limited sampling and laboratory testing performed. In addition, the information obtained is not intended to address potential impacts related to sources other than those specified herein. Therefore, the report should be deemed conclusive with respect to only the information obtained. We make no warranty, express or implied, with respect to the content of this report or any subsequent reports, correspondence or consultation. Geocon strived to perform the services summarized herein in accordance with the local standard of care in the geographic region at the time the services were rendered.

The contents of this report reflect the views of the author who is responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the State of California or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation.

GEOCON CONSULTANTS, INC

Chris Giuntoli, CAC
Senior Project Scientist

Richard Day, CEG, CHG
Regional Manager



CALIFORNIA DEPARTMENT OF TRANSPORTATION – DISTRICT 4
OFFICE OF ENVIRONMENTAL ENGINEERING

Reviewed By:	Recommended by:	Approved By:
Roya Azarmi Task Order Manager	Charles Smith District Branch Chief	Allen Baradar, P.E., REA District Office Chief

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EXECUTIVE SUMMARY

This asbestos and lead-containing paint (LCP) survey, and limited site investigation report was prepared for the Dumbarton Bridge Retrofit Project in Alameda and San Mateo Counties, California. The project location is the Ravenswood Pier and Marshlands Road located adjacent to and south of the Dumbarton Bridge as depicted on the Vicinity Map, Figure 1. The project location also includes the stairway leading to and from the bicycle path on the south side of the western portion of the Dumbarton Bridge, also depicted on Figure 1.

Our primary objectives at the project location prior to demolition activities were to: 1) determine and quantify asbestos and LCP, and characterize surface debris and treated wood at the Ravenswood Pier and 2) characterize treated wood at Marshlands Road guard rail posts and the Dumbarton Bridge bicycle path stairway. The information obtained from this investigation will be used by Caltrans to coordinate proposed demolition activities, determine appropriate abatement/disposal costs, and identify health and safety concerns during improvements.

The field investigation for asbestos, LCP, and debris material sampling was performed on March 26, 2009. Treated wood sampling at the project location was conducted on June 11 and July 17, 2009. The following field activities were performed at the project location during asbestos, LCP, debris material, and treated wood sampling efforts:

- Collected a total of eleven bulk suspect asbestos samples;
- Collected a total of 13 suspect LCP samples;
- Collected a total of ten debris samples from the Ravenswood Pier deck,
- Collected a total of eight composite samples of treated wood from the Ravenswood Pier structure and associated areas, and two composite samples from the Marshlands Road guard rail posts, and
- Transported samples to Caltrans-approved, California-certified environmental laboratories.

Samples were collected from locations as shown in the Site Plans, Figures 2 and 3. Suspect asbestos and LCP sample identification numbers and sample results are summarized in Tables 1 and 2, respectively. Debris material sample identification numbers and sample results are summarized in Tables 3 and 4. Treated wood sample identification numbers and sample results are summarized in Table 5. Materials represented by the samples collected are presented in the Site Photographs.

Results

Asbestos

No asbestos fibers were detected in samples of suspect materials collected at the project location. Laboratory results for the asbestos samples are summarized in Table 1. Reproductions of the laboratory report and COC documentation are presented in Appendix A.

Lead

Laboratory analyses for lead paint indicated the following:

- Samples representing approximately 300 square feet of peeling and flaking blue paint on the pedestrian railing exhibited total lead concentrations ranging from 120,000 to 140,000 milligrams per kilogram (mg/kg) and TCLP soluble lead concentrations of 290 and 1,800 milligrams per liter (mg/l).
- A sample representing intact green paint on the pilings of the fishing deck platform at the end of the pier exhibited a total lead concentration of 180 mg/kg. WET soluble lead was not detected in the sample above the laboratory reporting limit of 0.25 mg/l.
- A sample representing approximately 200 square feet of peeling and flaking white paint on the fishing alcoves on the pier deck exhibited a total lead concentration of 130,000 mg/kg and a TCLP soluble lead concentration of 70 mg/l.
- Samples representing approximately 40,000 square feet of peeling and flaking gray/orange paint on the pier girder system exhibited total lead concentrations ranging from 170 to 180,000 mg/kg and a TCLP soluble lead concentration of 210 mg/l.
- A sample representing approximately 800 square feet of peeling yellow thermoplastic paint on the pier deck exhibited a total lead concentration of 950 mg/kg, a WET soluble lead concentration of 23 mg/l, and a TCLP soluble lead concentration of 6.0 mg/l.
- Samples representing approximately 40,000 square feet of peeling and flaking gray/black coating on the pier girder system exhibited total lead concentrations ranging from 62,000 to 93,000 mg/kg and a TCLP soluble lead concentration of 16 mg/l.

Paint sample laboratory results are summarized in Table 2. Reproductions of the laboratory report and COC documentation are presented in Appendix A.

Debris Material

Laboratory analyses for the debris material samples indicated the following:

- Various CAM 17 Metals were detected in the debris material samples, though only lead was identified at concentrations above 10 times its Soluble Threshold Limit Concentration (STLC). WET soluble lead concentrations ranged from 4.1 to 34 mg/l. TCLP soluble lead concentrations ranged from less than (<) 0.25 to 0.91 mg/l.
- Chlorinated pesticides were identified in five of the ten samples at concentrations of up to 19 micrograms per kilogram (ug/kg) of 4,4'-DDT, 16 ug/kg of 4,4'-DDE, 14 ug/kg of chlordane, and 1.2 ug/kg of both alpha and gamma chlordane.

- The PCBs Aroclor 1254 and Aroclor 1260 were detected in three of the ten samples at concentrations of up to 240 and 170 ug/kg, respectively.
- SVOCs were not detected in the debris material samples above their respective laboratory reporting limits.

The debris material is widely scattered at varying quantities, so a total quantity could not be measured. Based on visual observation the total quantity of debris material is likely less than 10 cubic yards. Debris material sample laboratory results are summarized in Tables 3 and 4. Reproductions of the laboratory report and COC documentation are presented in Appendix A.

Treated Wood

Laboratory analyses for the treated wood samples indicated the following:

- Zinc was detected in the composite treated wood samples at concentrations ranging from 4.7 to 23 mg/kg. Arsenic, chromium, and copper were not detected in the samples above their respective laboratory reporting limits.
- Pentachlorophenol (PCP) was detected in three of the six composite treated wood samples collected from the Ravenswood pier at concentrations ranging from 3.8 to 670 mg/kg.
- PCP was detected in one of the two composite treated wood samples collected from the bicycle path stairway at a concentration of 190 mg/kg.
- PCP was detected in the two composite treated wood samples collected from the Marshlands Road guard rail posts at 2,700 mg/kg (exceeding the TTLC). The PAHs 2-methynaphthalene, naphthalene, and phenanthrene were also detected in these samples.

PCP was not detected above the laboratory reporting limit in composite wood samples collected from: 1) wood stairs leading to the Dumbarton Bridge pedestrian walkway, 2) railing caps on the Ravenswood Pier railing, 3) benches on the Ravenswood Pier, or 4) railing caps on the fishing platform railing at the end of the Ravenswood Pier. Laboratory results for treated wood composite samples are summarized in Table 5. Reproductions of the laboratory reports and COC documentation are presented in Appendix A.

Conclusions

Asbestos

Since no asbestos was detected, the Cal/OSHA asbestos standard does not apply for activities disturbing suspect materials represented by samples collected during our survey. In addition, suspect materials represented by samples collected during our survey would not be considered a California hazardous waste based on asbestos content.

In accordance with Bay Area Air Quality Management District Regulation 11, Rule 2, written notification is required ten working days prior to commencement of *any* demolition activity (whether asbestos is present or not).

Lead

Blue deteriorated paint on pedestrian railing, white deteriorated paint on the concrete fishing alcoves, gray/orange deteriorated paint and gray/black deteriorated coating on the pier girder system, and deteriorated yellow thermoplastic paint on the pier deck would be considered both a California and Federal (RCRA) hazardous waste, based on lead content. We recommend that all paints at the project location be treated as lead-containing for purposes of determining the applicability of the Cal/OSHA lead standard during any future maintenance, renovation, and demolition activities. This recommendation is based on LCP sample results and the fact that lead was a common ingredient of paints manufactured before 1978 and is still an ingredient of some industrial paints. In accordance with Title 8, CCR, Section 1532.1(p), written notification to the nearest Cal/OSHA district office is required at least 24 hours prior to certain lead-related work.

Debris Material

Soluble lead concentrations in the debris samples exceeded the STLC for lead level of 5.0 mg/l. Consequently, debris material present on the Ravenswood Pier deck would be considered a California (but not a Federal [RCRA]) hazardous waste, based on lead content.

Treated Wood

Total PCP concentrations in four of the treated wood composite samples at the Ravenswood Pier and the two composite samples collected from the Marshlands Road guard rail posts exceeded the TTLC for PCP level of 17 mg/kg. Consequently, treated wood from the corresponding pier components and guard rail posts would be considered a California hazardous waste based on PCP content.

Total PCP concentrations in two of the treated wood composite samples at the Ravenswood Pier, one of the treated wood composite samples from the bicycle path stairway, and the two composite samples collected from the Marshlands Road guard rail posts exceeded the TTLC for PCP of 17 mg/kg. Consequently, treated wood from the corresponding pier components and guard rail posts would be considered a California hazardous waste based on PCP content. Treated wood waste that is considered a hazardous waste may be handled under alternative management standards.

ASBESTOS AND LEAD-CONTAINING PAINT SURVEY, AND LIMITED SITE INVESTIGATION REPORT

1.0 INTRODUCTION

This asbestos and lead-containing paint (LCP) survey and limited site investigation report was prepared for the Dumbarton Bridge Retrofit Project in Alameda and San Mateo Counties, California. This report documents the investigation sampling methods and laboratory analytical data.

1.1 Site Description and Proposed Improvements

The project location is the Ravenswood Pier and Marshlands Road located south of and adjacent to the western and eastern portions, respectively, of the existing Dumbarton Bridge as depicted on the Vicinity Map, Figure 1. The location also includes the stairway leading to and from the bicycle path on the south side of the western portion of the Dumbarton Bridge, also depicted on Figure 1. Caltrans has requested an investigation at the project location to provide data regarding the presence of asbestos and LCP, and determine the chemical nature of debris material and treated wood that may require special handling or disposal requirements prior to demolition activities.

1.2 Purpose

This report documents the investigation sampling methods and laboratory analytical data. Our primary objectives at the project location prior to demolition activities were to: 1) determine and quantify asbestos and LCP, and characterize surface debris and treated wood at the Ravenswood Pier and 2) characterize treated wood at Marshlands Road guard rail posts and the Dumbarton Bridge bicycle path stairway. The information obtained from this investigation will be used by Caltrans to coordinate proposed demolition activities, determine appropriate abatement/disposal costs, and identify health and safety concerns during improvements.

2.0 BACKGROUND

2.1 Asbestos

The *Code of Federal Regulations (CFR),* 40 CFR 61, Subpart M, National Emissions Standards for Hazardous Air Pollutants (NESHAP) and Federal Occupational Safety and Health Administration (FED OSHA) classify asbestos-containing material (ACM) as any material or product that contains *greater than* 1% asbestos. Nonfriable ACM is classified by NESHAP as either Category I or Category II material defined as follows:

- **Category I** – asbestos-containing packings, gaskets, resilient floor coverings, and asphalt roofing products.
- **Category II** – all remaining types of nonfriable asbestos-containing material not included in Category I that when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure.

Regulated asbestos-containing material (RACM), a hazardous waste when friable, is classified as any manufactured material that contains *greater than* 1% asbestos by dry weight *and* is:

- Friable; or
- Category I material that has become friable; or
- Category I material that has been subjected to sanding, grinding, cutting, or abrading; or
- Category II nonfriable material that has a high probability of becoming crumbled, pulverized, or reduced to a powder during demolition or renovation activities.

Activities that disturb materials containing *any* amount of asbestos are subject to certain requirements of the Cal/OSHA asbestos standard contained in Title 8, CCR Section 1529. Typically, removal or disturbance of more than 100 square feet of material containing more than 0.1% asbestos must be performed by a registered asbestos abatement contractor, but associated waste labeling is not required if the material contains 1% or less asbestos. When the asbestos content of a material exceeds 1%, virtually all requirements of the standard become effective.

Materials containing more than 1% asbestos are also subject to NESHAP regulations (40 CFR Part 61, Subpart M). RACM (friable ACM and nonfriable ACM that will become friable during demolition operations) must be removed from structures prior to demolition. Certain nonfriable ACM and materials containing 1% or less asbestos may remain in structures during demolition; however, there are waste handling/disposal issues and Cal/OSHA work requirements that must be followed. Contractors are responsible for segregating and characterizing waste streams prior to disposal.

With respect to potential worker exposure, notification, and registration requirements, Cal/OSHA defines asbestos-containing construction material (ACCM) as construction material that contains more than 0.1% asbestos (Title 8, CCR 341.6).

2.2 Lead Paint

Construction activities (including demolition) that disturb materials or paints containing *any* amount of lead are subject to certain requirements of the Cal/OSHA lead standard contained in Title 8, CCR, Section 1532.1. Deteriorated paint is defined by Title 17, CCR, Division 1, Chapter 8, §35022 as a surface coating that is cracking, chalking, flaking, chipping, peeling, non-intact, failed, or otherwise separating from a component. Demolition of a deteriorated LCP component would require waste characterization and appropriate disposal. Most landfill facilities and recyclers currently accept intact LCP on a component; however, contractors are responsible for segregating and characterizing waste streams prior to disposal.

For a solid waste containing lead, the waste is classified as California hazardous when: 1) the total lead content equals or exceeds the respective Total Threshold Limit Concentration (TTLC) of 1,000 milligrams per kilogram (mg/kg); or 2) the soluble lead content equals or exceeds the respective Soluble Threshold Limit Concentration (STLC) of 5 milligrams per liter (mg/l) based on the standard Waste Extraction Test (WET). A waste has the potential for exceeding the lead STLC when the waste's total lead content is greater than or equal to ten times the respective STLC value since the WET uses a 1:10 dilution ratio. Hence, when total lead is detected at a concentration greater than or equal to 50 mg/kg, and assuming that 100 percent of the total lead is soluble, soluble lead analysis is required. Lead-containing waste is classified as "Resource, Conservation, and Recovery Act" (RCRA) hazardous, or Federal hazardous, when the soluble lead content equals or exceeds the Federal regulatory level of 5 mg/l based on the Toxicity Characteristic Leaching Procedure (TCLP).

The above regulatory criteria are based on chemical concentrations. Wastes may also be classified as hazardous based on other criteria such as ignitability; however, for the purposes of this investigation, toxicity (i.e., lead concentrations) is the primary factor considered for waste classification since waste generated during the construction activities would not likely warrant testing for ignitability or other criteria. Waste that is classified as either California hazardous or RCRA hazardous requires management as a hazardous waste.

Potential hazards exist to workers who remove or cut through LCP coatings during demolition. Dust containing hazardous concentrations of lead may be generated during scraping or cutting materials coated with LCP. Torching of these materials may produce lead oxide fumes. Therefore, air monitoring and/or respiratory protection may be required during the demolition of materials coated with LCP. Guidelines regarding regulatory provisions for construction work where workers may be exposed to lead are presented in the Title 8, CCR, Section 1532.1.

2.3 Hazardous Waste Determination

Regulatory criteria to classify a waste as "California hazardous" for handling and disposal purposes are contained in the *California Code of Regulations (CCR)*, Title 22, Division 4.5, Chapter 11, Article 3, §66261.24. Criteria to classify a waste as "RCRA hazardous" are contained in Chapter 40 of the Code of Federal Regulations (40 CFR), Section 261.

For a target analyte, waste is classified as California hazardous when: 1) the total content of the analyte exceeds the respective TTLC; or 2) the soluble analyte content exceeds the respective STLC based on the standard WET. A waste has the potential of exceeding the STLC when the waste's total analyte content is greater than or equal to ten times the respective STLC value since the WET uses a 1:10 dilution ratio. Hence, when a total analyte is detected at a concentration greater than or equal to

ten times the respective STLC, and assuming that 100 percent of the total analyte are soluble, soluble analyte analysis is required. A material is classified as RCRA hazardous, or Federal hazardous, when the soluble analyte content exceeds the Federal regulatory level based on the TCLP.

The above regulatory criteria are based on chemical concentrations. Wastes may also be classified as hazardous based on other criteria such as ignitability; however, for the purposes of this investigation, toxicity (i.e., analyte concentrations) is the primary factor considered for waste classification since waste generated during the construction activities would not likely warrant testing for ignitability or other criteria. Waste that is classified as either California hazardous or RCRA hazardous requires management as a hazardous waste. Treated wood waste that is classified as hazardous waste may be managed under Title 22, CCR, Division 4.5, Chapter 34, "Alternative Management Standards for Treated Wood Waste."

2.4 Architectural Drawings and Previous Survey Activities

Architectural drawings and previous survey reports for the project location were not available for our review.

3.0 SCOPE OF SERVICES

The following scope of services was performed:

3.1 Pre-Field Activities

- Prepared the *Upland Site Investigation Workplan, Dumbarton Bridge Retrofit Project*, dated February 19, 2009, to provide guidelines on personal safety during the field activities.
- Prepared a *Health and Safety Plan*, dated January 2009, to provide guidelines on the use of personal protective equipment and the health and safety procedures implemented during the field activities.
- Retained the services of EMSL, Inc., (EMSL) a Caltrans-approved laboratory accredited by the National Voluntary Laboratory Accreditation Program (NVLAP), to perform the asbestos analyses.
- Retained the services of Advanced Technology Laboratories (ATL), a Caltrans-approved laboratory, to perform the lead paint, debris, and treated wood sample analyses.

3.2 Field Activities

Mr. Chris Giuntoli, a California-Certified Asbestos Consultant (CAC), certification No. 02-3163 (expiration June 19, 20010), and Certified Lead Paint Inspector/Assessor with the California Department of Public Health (DPH), certification number I-5502 (expiration June 14, 2010) performed the asbestos and LCP survey on March 26, 2009. Mr. Giuntoli collected additional paint and coating samples on July 17, 2009. A total of eleven bulk samples of suspect ACM were collected. A total of 13 bulk samples of suspect LCP and coating material were collected.

Mr. Giuntoli collected a total of ten samples of surface debris material from the Ravenswood Pier deck on March 26, 2009. On June 11, 2009, Mr. Richard Day collected a total of eight composite samples of treated wood from the Ravenswood Pier and associated construction materials. On July 17, 2009, Mr. Giuntoli collected two treated wood composite samples from guard rail posts adjacent to the terminus of Marshlands Road leading to the fishing pier adjacent to the eastern end of the Dumbarton Bridge.

4.0 INVESTIGATIVE METHODS

4.1 Asbestos

Bulk asbestos samples were collected after first wetting friable material with a light mist of water. The samples were then cut from the substrate and transferred to labeled containers and sealed. Five suspect materials were identified during the survey (see Table 1). Sampling locations were distributed throughout the homogeneous areas (spaces where the material was observed).

We relinquished bulk samples for asbestos analysis using standard chain-of-custody (COC) documentation. Asbestos content was determined using Environmental Protection Agency (EPA) Test Method 600/R-93/116 for polarized light microscopy (PLM).

4.2 Lead Paint

One bulk paint sample of intact paint and twelve samples of deteriorated paint were collected using techniques presented in U.S. Department of Housing and Urban Development (HUD) guidelines.

> *It was <u>not</u> Geocon's intent during this inspection to conduct an evaluation of lead-based paint hazards in accordance with HUD guidelines. HUD protocol generally requires a very extensive sampling strategy that includes sampling of paint on each surface type.*

We relinquished the bulk paint samples for lead analysis using standard COC documentation. Total lead content was determined using EPA Test Method 6010B. WET soluble lead and TCLP soluble lead content were determined following EPA Test Methods 7420 and 1311, respectively.

4.3 Debris Material

Ten samples of surficial debris material consisting of a mix of gravel, sand, and soil present on the Ravenswood Pier deck were collected using a stainless steel trowel and relinquished using standard COC documentation. The debris material samples were analyzed for California Assessment Manual 17 (CAM 17) Metals using EPA Test Methods 6010B and 7471A, semi-volatile organic compounds (SVOCs) by EPA Test Method 8270C, chlorinated pesticides using EPA Test Method 8081A, and polychlorinated biphenyls (PCBs) using EPA Test Method 8082. WET soluble lead and TCLP soluble lead content were determined following EPA Test Methods 7420 and 1311, respectively.

4.4 Treated Wood

Six composite samples of treated wood at the Ravenswood Pier, two composite treated wood samples from the Dumbarton Bridge bicycle path stairway, and two composite treated wood samples from the Marshlands Road guard rail posts were collected using a power drill and wood auger drill bits, and relinquished using standard COC documentation. The treated wood samples were analyzed for arsenic, chromium, copper, and zinc using EPA Test Method 6010B, and polycyclic aromatic hydrocarbons (PAHs) by EPA Test Method 8270C.

5.0 INVESTIGATIVE RESULTS

The laboratory analyses indicated the following:

5.1 Asbestos

No asbestos fibers were detected in samples of suspect materials collected at the project location. Laboratory results for the asbestos samples are summarized in Table 1. Reproductions of the laboratory report and COC documentation are presented in Appendix A.

5.2 Lead Paint

Laboratory analyses for the paint samples indicated the following:

- Samples representing approximately 300 square feet of peeling and flaking blue paint on the pedestrian railing exhibited total lead concentrations ranging from 120,000 to 140,000 mg/kg and TCLP soluble lead concentrations of 290 and 1,800 mg/l.
- A sample representing intact green paint on the pilings of the fishing deck platform at the end of the pier exhibited a total lead concentration of 180 mg/kg. WET soluble lead was not detected in the sample above the laboratory reporting limit of 0.25 mg/l.
- A sample representing approximately 200 square feet of peeling and flaking white paint on the fishing alcoves on the pier deck exhibited a total lead concentration of 130,000 mg/kg and a TCLP soluble lead concentration of 70 mg/l.
- Samples representing approximately 40,000 square feet of peeling and flaking gray/orange paint on the pier girder system exhibited total lead concentrations ranging from 170 to 180,000 mg/kg and a TCLP soluble lead concentration of 210 mg/l.
- A sample representing approximately 800 square feet of peeling yellow thermoplastic paint on the pier deck exhibited a total lead concentration of 950 mg/kg, a WET soluble lead concentration of 23 mg/l, and a TCLP soluble lead concentration of 6.0 mg/l.
- Samples representing approximately 40,000 square feet of peeling and flaking gray/black coating on the pier girder system exhibited total lead concentrations ranging from 62,000 to 93,000 mg/kg and a TCLP soluble lead concentration of 16 mg/l.

Paint sample laboratory results are summarized in Table 2. Reproductions of the laboratory report and COC documentation are presented in Appendix A.

5.3 Debris Material

Laboratory analyses for the debris material samples indicated the following:

- Various CAM 17 Metals were detected in the debris material samples, though only lead was identified at concentrations above 10 times its STLC. WET soluble lead concentrations ranged from 4.1 to 34 mg/l. TCLP soluble lead concentrations ranged from less than (<) 0.25 to 0.91 mg/l.
- Chlorinated pesticides were identified in five of the ten samples at concentrations of up to 19 micrograms per kilogram (ug/kg) of 4,4'-DDT, 16 ug/kg of 4,4'-DDE, 14 ug/kg of chlordane, and 1.2 ug/kg of both alpha and gamma chlordane.
- The PCBs Aroclor 1254 and Aroclor 1260 were detected in three of the ten samples at concentrations of up to 240 and 170 ug/kg, respectively.

SVOCs were not detected in the debris material samples above their respective laboratory reporting limits. Laboratory results for the debris material samples are summarized in Tables 4 and 5. Reproductions of the laboratory report and COC documentation are presented in Appendix A.

5.4 Treated Wood

Laboratory analyses for the treated wood samples indicated the following:

- Zinc was detected in the composite treated wood samples at concentrations ranging from 4.7 to 23 mg/kg. Arsenic, chromium, and copper were not detected in the samples above their respective laboratory reporting limits.
- Pentachlorophenol (PCP) was detected in three of the six composite treated wood samples collected from the Ravenswood pier at concentrations ranging from 3.8 to 670 mg/kg.
- PCP was detected in one of the two composite treated wood samples collected from the bicycle path stairway at a concentration of 190 mg/kg.
- PCP was detected in the two composite treated wood samples collected from the Marshlands Road guard rail posts at 2,700 mg/kg (exceeding the TTLC). The PAHs 2-methynaphthalene, naphthalene, and phenanthrene were also detected in these samples.

PCP was not detected above the laboratory reporting limit in composite wood samples collected from: 1) wood stairs leading to the Dumbarton Bridge pedestrian walkway, 2) railing caps on the Ravenswood Pier railing, 3) benches on the Ravenswood Pier, or 4) railing caps on the fishing platform railing at the end of the Ravenswood Pier. Laboratory results for the treated wood composite samples are summarized in Table 6. Reproductions of the laboratory report and COC documentation are presented in Appendix A.

6.0 CONCLUSIONS

6.1 Asbestos

Since no asbestos was detected, the Cal/OSHA asbestos standard does not apply for activities disturbing suspect materials represented by samples collected during our survey. In addition, suspect materials represented by samples collected during our survey would not be considered a California hazardous waste based on asbestos content.

In accordance with Bay Area Air Quality Management District Regulation 11, Rule 2, written notification is required ten working days prior to commencement of *any* demolition activity (whether asbestos is present or not).

6.2 Lead Paint

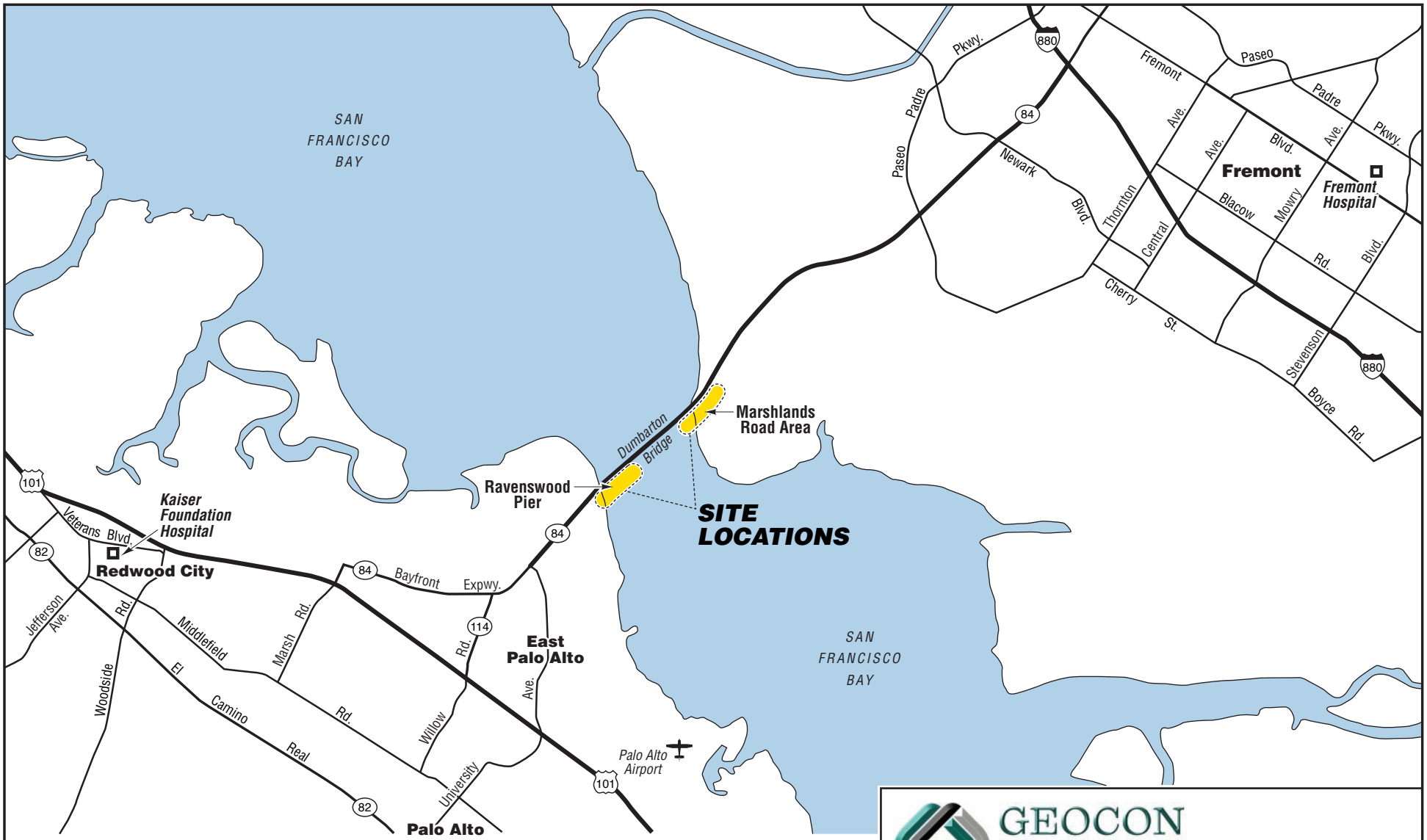
Blue deteriorated paint on pedestrian railing, white deteriorated paint on the concrete fishing alcoves, gray/orange deteriorated paint and gray/black deteriorated coating on the pier girder system, and deteriorated yellow thermoplastic paint on the pier deck would be considered both a California and Federal (RCRA) hazardous waste, based on lead content. We recommend that all paints at the project location be treated as lead-containing for purposes of determining the applicability of the Cal/OSHA lead standard during any future maintenance, renovation, and demolition activities. This recommendation is based on LCP sample results and the fact that lead was a common ingredient of paints manufactured before 1978 and is still an ingredient of some industrial paints. In accordance with Title 8, CCR, Section 1532.1(p), written notification to the nearest Cal/OSHA district office is required at least 24 hours prior to certain lead-related work.

6.3 Debris Material

WET soluble lead concentrations in the debris samples exceeded the STLC for lead of 5.0 mg/l, but did not exceed the TCLP for lead of 5 mg/l. Consequently, debris material present on the Ravenswood Pier deck would be considered a California (but not a Federal [RCRA]) hazardous waste based on lead content. The debris material is widely scattered at varying quantities, so a total quantity could not be measured. Based on visual observation the total quantity of debris material is likely less than 10 cubic yards.

6.4 Treated Wood

Total PCP concentrations in two of the treated wood composite samples at the Ravenswood Pier, one of the treated wood composite samples from the pedestrian stairway, and the two composite samples collected from the Marshlands Road guard rail posts exceeded the TTLC for PCP of 17 mg/kg. Consequently, treated wood from the corresponding pier components and guard rail posts would be considered a California hazardous waste based on PCP content. Treated wood waste that is classified as hazardous waste may be managed under Title 22, CCR, Division 4.5, Chapter 34, "Alternative Management Standards for Treated Wood Waste."



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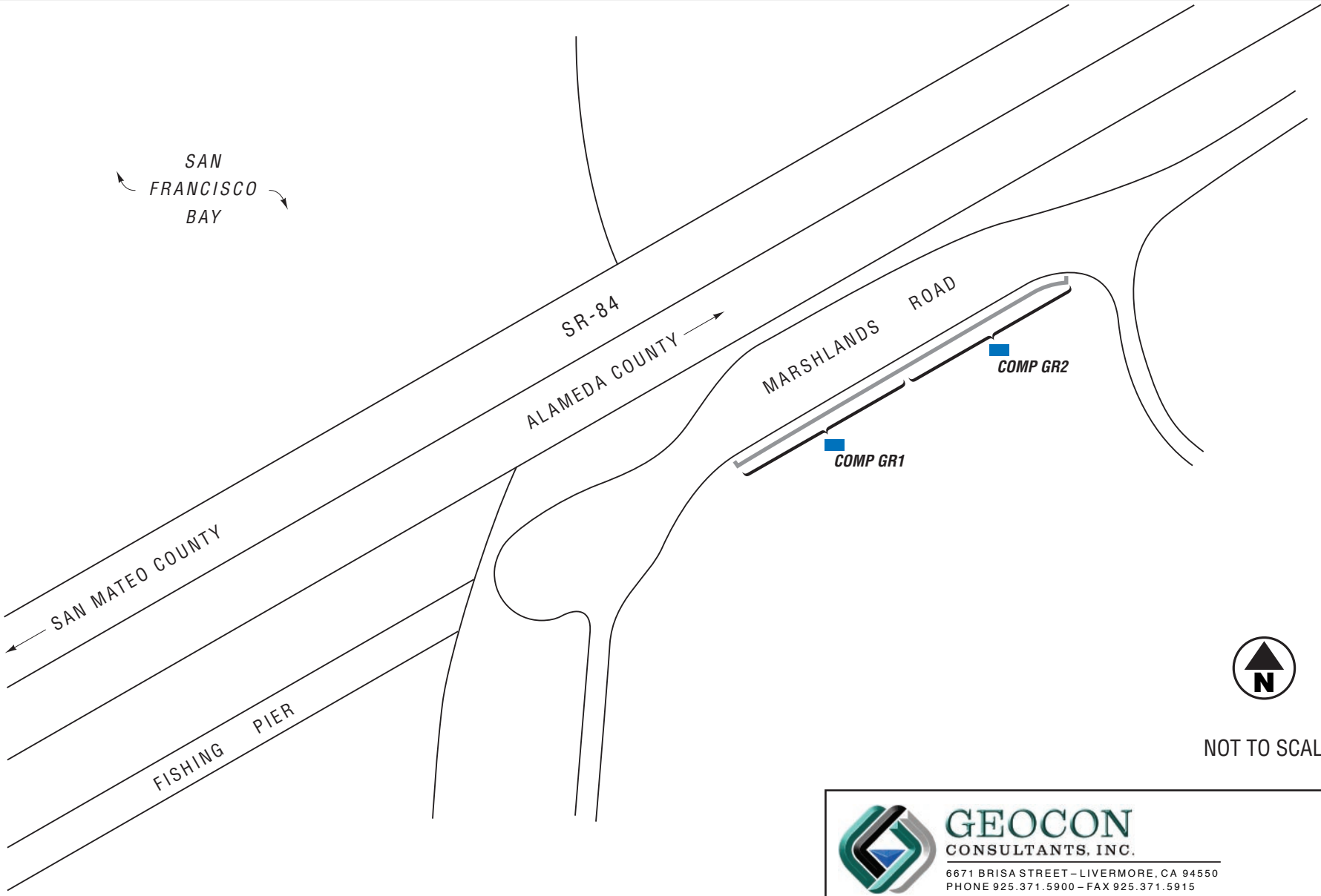
Dumbarton Bridge Retrofit Project

Alameda and San Mateo Counties, California

VICINITY MAP

GEOCON Proj. No. E8435-06-18/-41

Task Order No. 18/41 | October 2009 | Figure 1



NOT TO SCALE

LEGEND:

- Approximate Composite Wood Sample Location

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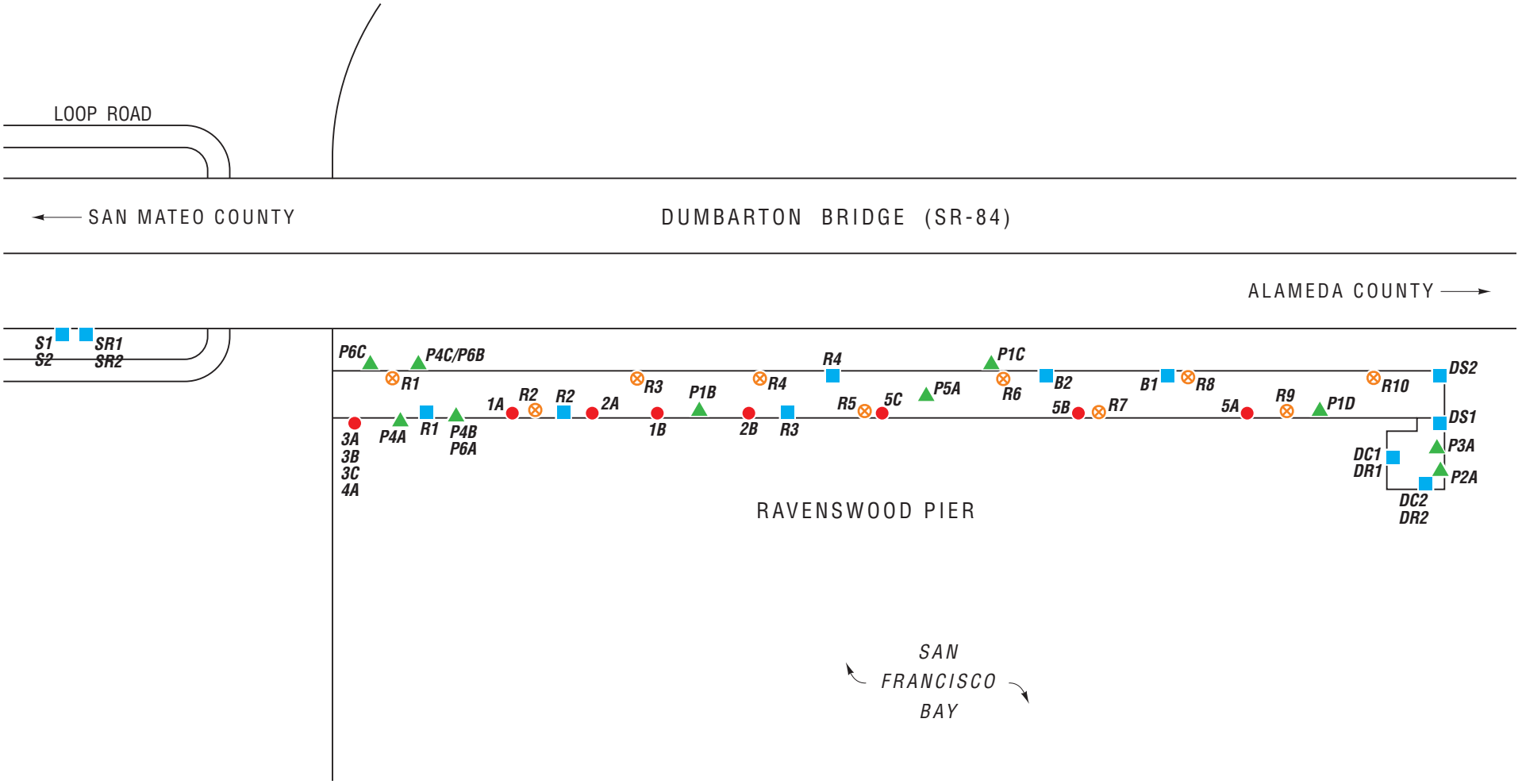
Dumbarton Bridge Retrofit Project (Marshlands Road)

Alameda and San Mateo Counties, California

SITE PLAN

GEOCON Proj. No. E8435-06-18/-41

Task Order No. 18/41 | October 2009 | Figure 3



LEGEND:

- Approximate Asbestos Sample Location
- Approximate Paint Sample Location
- Approximate Debris Sample Location
- Approximate Wood Sample Location

NOT TO SCALE

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Dumbarton Bridge Retrofit Project (Ravenswood Pier)

Alameda and San Mateo Counties, California

SITE PLAN

GEOCON Proj. No. E8435-06-18/-41

Task Order No. 18/41 | October 2009 | Figure 2

TABLE 1
Summary of Analytical Laboratory Test Results - Asbestos
Dumbarton Bridge Retrofit Project
Ravenswood Pier
Alameda and San Mateo Counties, California

Polarized Light Microscopy (PLM) - EPA Test Method 600/R-93/116

Sample ID	Description of Suspect Material	Approximate Quantity	Friable	Site Photo	Asbestos Content
RP-1A	Gray elastomeric deck joint material	NA	NA	2	ND
RP-1B					ND
RP-2A	Brown fiberboard (curb joint material)	NA	NA	3	ND
RP-2B					ND
RP-3A	Asphalt girder coating (west abutment)	NA	NA	4	ND
RP-3B					ND
RP-3C					ND
RP-4A	Gray girder paint	NA	NA	5	ND
RP-5A	Shotcrete patching (pier pilings)	NA	NA	6	ND
RP-5B					ND
RP-5C					ND

Notes:
NA = Not applicable
ND = No asbestos fibers detected

TABLE 2
Summary of Analytical Laboratory Test Results - Paint and Coating
Dumbarton Bridge Retrofit Project
Ravenswood Pier
Alameda and San Mateo Counties, California

Total & Soluble Lead

Sample No.	Paint Description	Approximate Quantity Peeling & Flaking	Site Photo	Total Lead (mg/kg)	WET Lead (mg/l)	TCLP Lead (mg/l)
RP-P1A	Blue deck railing	500 square feet	7	130,000	---	290
RP-P1B				120,000	---	---
RP-P1C				130,000	---	---
RP-P1D				140,000	---	1,800
RP-P2A	Green fishing deck pilings	Intact	8	180	<0.25	---
RP-P3A	White concrete fishing alcoves	300 square feet	9	130,000	---	70
RP-P4A	Gray/orange girder system	40,000 square feet	10 and 11	170	0.29	---
RP-P4B				180,000	---	210
RP-P4C				130,000	---	---
RP-P5A	Yellow thermoplastic striping	1,000 square feet	12	950	23	6.0
RP-P6A	Gray and black girder coating	40,000 square feet	10 and 11	93,000	---	---
RP-P6B				81,000	---	16
RP-P6C				62,000	---	---

Notes:
mg/kg = milligrams per kilogram (EPA Test Method 6010)
WET = Waste Extraction Test (EPA Test Method 7420)
TCLP = Toxicity Characteristic Leaching Procedure (EPA Test Method 1311)
mg/l = milligrams per liter
--- = Not Analyzed

TABLE 3
Summary of CAM 17 Metals Results - Debris Material
Dumbarton Bridge Retrofit Project
Ravenswood Pier
Alameda and San Mateo Counties, California

Sample I.D.	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc	Mercury
R-1	<2.0	2.8	140	<1.0	1.4	38	8.6	62	190	2.0	40	<1.0	<1.0	<1.0	30	340	0.11
									7.9 */<0.25*								
R-2	<2.0	2.7	110	<1.0	1.4	30	10	62	230	2.2	35	<1.0	<1.0	<1.0	21	290	<0.10
									16 */0.29*								
R-3	<2.0	2.5	130	<1.0	1.3	27	12	57	350	1.5	34	<1.0	<1.0	<1.0	23	290	<0.10
									29 */0.37*								
R-4	<2.0	1.9	58	<1.0	<1.0	19	6.7	41	200	1.3	18	<1.0	<1.0	<1.0	17	170	0.26
									25 */0.37*								
R-5	<2.0	<1.0	32	<1.0	<1.0	12	3.5	15	130	<1.0	13	<1.0	<1.0	<1.0	9.6	110	<0.10
									20 */0.43*								
R-6	<2.0	<1.0	61	<1.0	<1.0	8.5	3.1	14	120	<1.0	10	<1.0	<1.0	<1.0	7.9	66	<0.10
									19 */0.42*								
R-7	<2.0	1.6	39	<1.0	<1.0	20	5.1	21	350	<1.0	24	<1.0	<1.0	<1.0	13	170	<0.10
									16 */0.91*								
R-8	<2.0	2.0	80	<1.0	1.1	25	9.1	30	390	<1.0	26	<1.0	<1.0	<1.0	20	390	0.14
									34 */0.37*								
R-9	<2.0	1.7	65	<1.0	<1.0	20	5.5	27	430	<1.0	19	<1.0	<1.0	<1.0	17	310	0.11
									4.9								

TABLE 3
Summary of CAM 17 Metals Results - Debris Material
Dumbarton Bridge Retrofit Project
Ravenswood Pier
Alameda and San Mateo Counties, California

Sample I.D.	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc	Mercury
R-10	<2.0	2.2	67	<1.0	<1.0	21	4.6	28	690 *4.1*	1.0	20	<1.0	<1.0	<1.0	17	270	<0.10
TTLC	500	500	10,000	75	100	2,500*	8,000	2,500	1,000	3,500	2,000	100	500	700	2,400	5,000	20
STLC (mg/l)	15	5.0	100	0.75	1.0	5*	80	25	5.0	350	20	1.0	5.0	7.0	24	250	0.20

Notes:

Results are presented in units of milligrams per kilogram (mg/kg)

< = Analyte was not detected above the stated laboratory reporting limit

TTLC = Total Threshold Limit Concentration

STLC = Soluble Threshold Limit Concentration, shown in units of milligrams per liter (mg/l).

* = Value for Chromium III, no standard for total chromium

BOLD = Value exceeds one or more applicable standards

Results in italics are soluble concentrations in milligrams per liter (mg/l) analyzed using the Waste Extraction Test (WET) and Toxicity Characteristic Leaching Procedure (TCLP), respectively.

TABLE 4
Summary of Organics Results - Debris Material
Dumbarton Bridge Retrofit Project
Ravenswood Pier
Alameda and San Mateo Counties, California

Sample I.D.	SVOCs (ug/kg)	Chlorinated Pesticides (ug/kg)	PCBs (ug/kg)
R-1	ND	4,4'-DDT = 7.4	Aroclor 1254 = 84 Aroclor 1260 = 51
R-2	ND	4,4'-DDT = 19	Aroclor 1254 = 240 Aroclor 1260 = 170
R-3	ND	ND	Aroclor 1254 = 41 Aroclor 1260 = 22
R-4	ND	4,4'-DDT = 2.5 alpha-Chlordane = 1.2 Chlordane = 14 gamma-Chlordane = 1.2	Aroclor 1254 = 37 Aroclor 1260 = 21
R-5	ND	4,4'-DDE = 16	ND
R-6	ND	4,4'-DDT = 10	ND
R-7	ND	ND	ND
R-8	ND	ND	ND
R-9	ND	ND	ND
R-10	ND	ND	ND
Total Threshold Limit Concentration (TTLC)	---	DDD, DDE, DDT = 1,000	PCBs (all aroclors) = 50,000

Notes:
SVOCs = Semivolatile Organic Compounds
PCBs = Polychlorinated Biphenyl Compounds
ug/kg = micrograms per kilogram
ND = Not detected

TABLE 5
Summary of Metals and Organics Results - Treated Wood
Dumbarton Bridge Retrofit Project
Alameda and San Mateo Counties, California

Sample I.D.	Site Photo	Arsenic	Chromium	Copper	Zinc	PNAs
Ravenswood Pier						
Comp S1 and S2	13	<4.0	<4.0	<8.0	17	ND
Comp SR1 and SR2	14	<4.0	<4.0	<8.0	9.2	**PCP = 190**
Comp R1 and R2	15	<4.0	<4.0	<8.0	7.2	ND
Comp R3 and R4	15	<4.0	<4.0	<8.0	23	ND
Comp DR1 and DR2	16	<4.0	<4.0	<8.0	18	**PCP = 600**
Comp DS1 and DS2	17	---	---	---	---	**PCP = 670**
Comp DC1 and DC2	18	<4.0	<4.0	<8.0	9.5	PCP = 3.8
Comp B1 and B2	19	<4.0	<4.0	<8.0	4.7	ND
Marshlands Road Guard Rail						
Comp GR1	20 and 21	<2.0	<2.0	<4.0	7.8	**PCP = 2,700** 2-Methylnaphthalene = 1,200 Naphthalene = 130 Phenanthrene = 110
Comp GR2	20 and 21	<2.0	<2.0	<4.0	11	**PCP = 2,700** 2-Methylnaphthalene = 520 Naphthalene = 51 Phenanthrene = 84
TTLC		500	2,500*	2,500	5,000	PCP = 17
STLC (mg/l)		5.0	5*	25	250	PCP = 1.7

Notes:

Results are presented in units of milligrams per kilogram (mg/kg)

< = Analyte was not detected above the stated laboratory reporting limit

PNAs = Polynuclear aromatic hydrocarbons

TTLC = Total Threshold Limit Concentration

STLC = Soluble Threshold Limit Concentration, shown in units of milligrams per liter (mg/l).

* = Value for Chromium III, no standard for total chromium

ND = Not detected above the compound's Method Reporting Limit

PCP = pentachlorophenol

--- = Not analyzed; insufficient sample volume

BOLD = Value exceeds one or more applicable standards

Photo 1 – Ravenswood Pier

Photo 2 – Elastomeric deck joint material at Ravenswood Pier

Photo 3 – Brown fiberboard (joint fill material) at Ravenswood Pier

GEOCON
CONSULTANTS, INC.
6671 BRISA STREET – LIVERMORE, CA 94550
PHONE 925.371.5900 – FAX 925.371.5915

PHOTOGRAPHS 1, 2, & 3		
Dumbarton Bridge Retrofit Project Alameda and San Mateo Counties, California		
E8435-06-18/-41		October 2009

Photo 4 – Asphalt coating (girder system) at Ravenswood Pier

Photo 5 – Gray paint (girder system) at Ravenswood Pier

Photo 6 – Shotcrete (pier pilings) at Ravenswood Pier

GEOCON
CONSULTANTS, INC.
6671 BRISA STREET – LIVERMORE, CA 94550
PHONE 925.371.5900 – FAX 925.371.5915

PHOTOGRAPHS 4, 5, & 6		
Dumbarton Bridge Retrofit Project Alameda and San Mateo Counties, California		
E8435-06-18/-41		October 2009

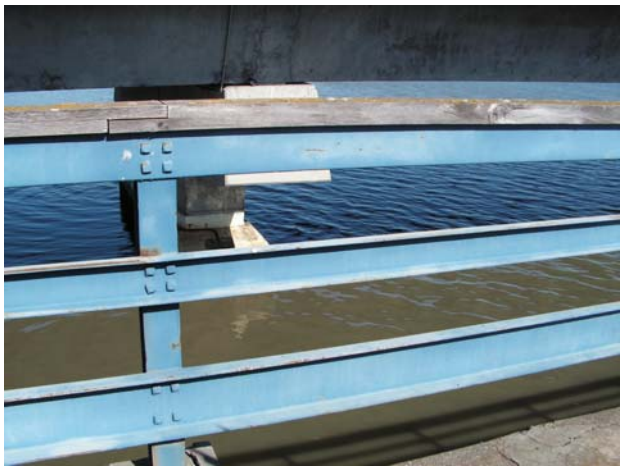

Photo 7 – Blue paint (pier railing) at Ravenswood Pier

Photo 8 – Green paint (fishing platform pilings) at Ravenswood Pier

Photo 9 – Deteriorated white paint (fishing alcoves) at Ravenswood Pier

GEOCON
CONSULTANTS, INC.
6671 BRISA STREET – LIVERMORE, CA 94550
PHONE 925.371.5900 – FAX 925.371.5915

PHOTOGRAPHS 7 and 8		
Dumbarton Bridge Retrofit Project Alameda and San Mateo Counties, California		
E8435-06-18/-41		October 2009

Photo 10 – Deteriorated orange and gray paint on the girder system of the Ravenswood Pier

Photo 11 – Deteriorated gray and black coating on the girder system of the Ravenswood Pier

Photo 12 – Yellow roadway striping (center of pier deck) at Ravenswood Pier

Photo 13 – Wood stairs to Dumbarton Bridge pedestrian walkway (represented by Comp S1 and S2 samples) at the western side of the Dumbarton Bridge

Photo 14 – Wood stair rail to Dumbarton Bridge pedestrian walkway (represented by Comp SR1 and SR2 samples) at the western side of the Dumbarton Bridge

Photo 15 – Wood rail cap (represented by Comp R1 through R4 samples) at the Ravenswood Pier

Photo 16 – Wood deck railing at the fishing platform (represented by Comp DR1 and DR2 samples) at the end of the Ravenswood Pier

Photo 17 – Wood stairs at the fishing platform (represented by Comp DS1 and DS2 samples) at the end of the Ravenswood Pier

Photo 18 – Wood deck rail cap (represented by Comp DC1 and DC2 samples) at the end of the Ravenswood Pier

APPENDIX A

April 07, 2009

Chris Giuntoli
Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550

TEL: (925) 371-5900
FAX: (925) 371-5915

ELAP No.: 1838
NELAP No.: 02107CA
NEVADA.: CA-401
CSDLAC No.: 10196

Workorder No.: 104784

RE: DUMBARTON BRIDGE RETROFIT, E8435-0

Attention: Chris Giuntoli

Enclosed are the results for sample(s) received on March 28, 2009 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter and the case narrative are an integral part of this analytical report and cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

CLIENT: Geocon Consultants, Inc.
Project: DUMBARTON BRIDGE RETROFIT, E8435-0
Lab Order: 104784

CASE NARRATIVE

Analytical Comments for Method 6010

Dilution was necessary for samples 104784-001A, 104784-002A, 104784-003A, 104784-004A, 104784-006A and 104784-008A, due to sample matrix.

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT: Geocon Consultants, Inc. **Lab Order:** 104784
Project: DUMBARTON BRIDGE RETROFIT, E8435-0

Lab ID: 104784-001 **Collection Date:** 3/26/2009
Client Sample ID: RP-P1A **Matrix:** PAINT CHIP

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP6_090406C	QC Batch: 54487			PrepDate: 4/3/2009	Analyst: **CL**	
Lead	130000	200		mg/Kg	100	4/6/2009 11:14 AM

Lab ID: 104784-002 **Collection Date:** 3/26/2009
Client Sample ID: RP-P1B **Matrix:** PAINT CHIP

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP6_090406C	QC Batch: 54487			PrepDate: 4/3/2009	Analyst: **CL**	
Lead	120000	200		mg/Kg	100	4/6/2009 11:15 AM

Lab ID: 104784-003 **Collection Date:** 3/26/2009
Client Sample ID: RP-P1C **Matrix:** PAINT CHIP

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP6_090406C	QC Batch: 54487			PrepDate: 4/3/2009	Analyst: **CL**	
Lead	130000	200		mg/Kg	100	4/6/2009 11:16 AM

Lab ID: 104784-004 **Collection Date:** 3/26/2009
Client Sample ID: RP-P1D **Matrix:** PAINT CHIP

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP6_090406C	QC Batch: 54487			PrepDate: 4/3/2009	Analyst: **CL**	
Lead	140000	200		mg/Kg	100	4/6/2009 11:17 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Geocon Consultants, Inc. **Lab Order:** 104784
Project: DUMBARTON BRIDGE RETROFIT, E8435-0

Lab ID: 104784-005 **Collection Date:** 3/26/2009
Client Sample ID: RP-P2A **Matrix:** PAINT CHIP

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP6_090406C	QC Batch: 54487			PrepDate: 4/3/2009	Analyst: **CL**	
Lead	180	2.0		mg/Kg	1	4/6/2009 11:17 AM

Lab ID: 104784-006 **Collection Date:** 3/26/2009
Client Sample ID: RP-P3A **Matrix:** PAINT CHIP

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP6_090406C	QC Batch: 54487			PrepDate: 4/3/2009	Analyst: **CL**	
Lead	130000	200		mg/Kg	100	4/6/2009 11:18 AM

Lab ID: 104784-007 **Collection Date:** 3/26/2009
Client Sample ID: RP-P4A **Matrix:** PAINT CHIP

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP6_090406C	QC Batch: 54487			PrepDate: 4/3/2009	Analyst: **CL**	
Lead	170	2.0		mg/Kg	1	4/6/2009 11:19 AM

Lab ID: 104784-008 **Collection Date:** 3/26/2009
Client Sample ID: RP-P5A **Matrix:** PAINT CHIP

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090403H	QC Batch: 54487			PrepDate: 4/3/2009	Analyst: **admin**	
Lead	950	40		mg/Kg	20	4/3/2009 11:40 PM

Qualifiers:
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference
- DO Surrogate Diluted Out
- E Value above quantitation range
- ND Not Detected at the Reporting Limit

Results are wet unless otherwise specified

CLIENT: Geocon Consultants, Inc.
Work Order: 104784
Project: DUMBARTON BRIDGE RETROFIT, E8435-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **LCSD-54487**	SampType: **LCSD**	TestCode: **6010_S**	Units: **mg/Kg**	Prep Date: **4/3/2009**	RunNo: **107824**
Client ID: **LCSS02**	Batch ID: **54487**	TestNo: **EPA 6010B**	**EPA 3050B**	Analysis Date: **4/3/2009**	SeqNo: **1690623**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	54.897	1.0	50.00	0.1703	109	80	120	49.20	10.9	20	

Sample ID: **MB-54487**	SampType: **MBLK**	TestCode: **6010_S**	Units: **mg/Kg**	Prep Date: **4/3/2009**	RunNo: **107824**
Client ID: **PBS**	Batch ID: **54487**	TestNo: **EPA 6010B**	**EPA 3050B**	Analysis Date: **4/3/2009**	SeqNo: **1690625**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	0.170	1.0									

Sample ID: **LCS-54487**	SampType: **LCS**	TestCode: **6010_S**	Units: **mg/Kg**	Prep Date: **4/3/2009**	RunNo: **107824**
Client ID: **LCSS**	Batch ID: **54487**	TestNo: **EPA 6010B**	**EPA 3050B**	Analysis Date: **4/3/2009**	SeqNo: **1690626**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	49.198	1.0	50.00	0.1703	98.1	80	120				

Sample ID: **MB-54487-MS**	SampType: **MS**	TestCode: **6010_S**	Units: **mg/Kg**	Prep Date: **4/3/2009**	RunNo: **107824**
Client ID: **ZZZZZZ**	Batch ID: **54487**	TestNo: **EPA 6010B**	**EPA 3050B**	Analysis Date: **4/3/2009**	SeqNo: **1690627**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	128.013	1.0	125.0	0.1703	102	33	120				

Sample ID: **MB-54487-MSD**	SampType: **MSD**	TestCode: **6010_S**	Units: **mg/Kg**	Prep Date: **4/3/2009**	RunNo: **107824**
Client ID: **ZZZZZZ**	Batch ID: **54487**	TestNo: **EPA 6010B**	**EPA 3050B**	Analysis Date: **4/3/2009**	SeqNo: **1690628**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	122.208	1.0	125.0	0.1703	97.6	33	120	128.0	4.64	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CHAIN OF CUSTODY RECORD

Pg 1 of 1

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#: _____
Logged By: _____ Date: 3/28/09

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: GSO

Sample Condition Upon Receipt
1. CHILLED 3.2 Y ☑ N ☐ 4. SEALED Y ☐ N ☐
2. HEADSPACE (VOA) Y ☐ N ☐ 5. # OF SPLS MATCH COC Y ☐ N ☐
3. CONTAINER INTACT Y ☐ N ☐ 6. PRESERVED Y ☐ N ☐

Client: GEOCON CONSULTANTS, INC.
Address: 6671 Brisa Street
City Livermore State CA Zip Code 94550
TEL: (925) 371-5900
FAX: (925) 371-5915
Attn: CHRIS GIUNTOLI

Project Name: DUMBARTON BRIDGE RETROFIT
Project #: E8435-06-18
Sampler: (Printed Name) CGIUNTOLI (Signature)

Relinquished by: (Signature and Printed Name) Chris Giuntoli Date: 3/27/09 Time: 1630 Received by: (Signature and Printed Name) GSO Date: Time:
Relinquished by: (Signature and Printed Name) Date: Time: Received by: (Signature and Printed Name) Date: 3/28/09 Time: 0830
Relinquished by: (Signature and Printed Name) Date: Time: Received by: (Signature and Printed Name) Date: Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
C. GIUNTOLI Print Name 3/26/09 Date
Signature

Send Report To:
Attn: _____
Co: SAME AS ABOVE
Address _____
City _____ State _____ Zip _____

Bill To:
Attn: _____
Co: SAME AS ABOVE
Address _____
City _____ State _____ Zip _____

Special Instructions/Comments:
SOLUBLE LEAD MAY BE REQUESTED BASED ON TOTAL LEAD RESULTS
PROVIDE EDD W/ RESULTS

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

Circle or Add Analysis(es) Requested

SPECIFY APPROPRIATE MATRIX

PRESERVATION

Q A / Q C
RTNE ☐
CT ☒
SWRCB ☐
Logcode _____
OTHER _____

ITEM	LAB USE ONLY: Batch # / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	6010B (Total Metal)	8015B (GRO) / BTEX	8015B (DRO)	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000) TOTAL LEAD	SOIL	WATER	GROUND WATER	WASTEWATER	PAINT	TAT	Container(s) #	Container(s) Type	REMARKS
	104784-01	RP-P1A	3/26/09										X				X		E	1	P B	
	-02	RP-P1B																				
	-03	RP-P1C																				
	-04	RP-P1D																				
	-05	RP-P2A																				
	-06	RP-P3A																				
	-07	RP-P4A																				
	-08	RP-P5A																				

- TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter.

April 17, 2009

Chris Giuntoli
Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550

TEL: (925) 371-5900
FAX: (925) 371-5915

ELAP No.: 1838
NELAP No.: 02107CA
NEVADA.: CA-401
CSDLAC No.: 10196

Workorder No.: 104784

RE: DUMBARTON BRIDGE RETROFIT, E8435-0

Attention: Chris Giuntoli

Enclosed are the results for sample(s) received on March 28, 2009 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

This is an addendum report. Please incorporate with documentation previously submitted.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Project: DUMBARTON BRIDGE RETROFIT, E8435-0
Lab Order: 104784

CASE NARRATIVE

Analytical Comments for Method 7420

Dilution was necessary for samples 104784-001A, 104784-004A, 104784-006A and 104784-008A, due to sample matrix.

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

Advanced Technology Laboratories

Date: 4/17/2009

ANALYTICAL RESULTS

LEAD BY ATOMIC ABSORPTION (STLC)
WET/ EPA 7420

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	104784
Project:	DUMBARTON BRIDGE RETROFIT, E8435-0	**Date Received**	3/28/2009 8:30:00 AM
Project No:		**Matrix:**	Paint Chip
Analyte:	Lead	**Analyst:**	VV

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
104784-005A	RP-P2A	ND	mg/L	54680	0.25	1	3/26/2009	4/17/2009
104784-007A	RP-P4A	0.29	mg/L	54680	0.25	1	3/26/2009	4/17/2009
104784-008A	RP-P5A	23	mg/L	54680	1.0	4	3/26/2009	4/17/2009

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

Date: 4/17/2009

ANALYTICAL RESULTS

LEAD BY ATOMIC ABSORPTION (TCLP)
EPA 1311/ 7420

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	104784
Project:	DUMBARTON BRIDGE RETROFIT, E8435-0	**Date Received**	3/28/2009 8:30:00 AM
Project No:		**Matrix:**	Paint Chip
Analyte:	Lead	**Analyst:**	VV

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
104784-001A	RP-P1A	290	mg/L	54690	12	50	3/26/2009	4/16/2009
104784-004A	RP-P1D	1800	mg/L	54690	100	400	3/26/2009	4/16/2009
104784-006A	RP-P3A	70	mg/L	54690	5.0	20	3/26/2009	4/16/2009
104784-008A	RP-P5A	6.0	mg/L	54690	0.25	1	3/26/2009	4/16/2009

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Geocon Consultants, Inc.
Work Order: 104784
Project: DUMBARTON BRIDGE RETROFIT, E8435-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 7420_ST

Sample ID: **MB-54680**	SampType: **MBLK**	TestCode: **7420_ST**	Units: **mg/L**	Prep Date:	RunNo: **108189**
Client ID: **PBS**	Batch ID: **54680**	TestNo: **WET/ EPA 74 WET**		Analysis Date: **4/17/2009**	SeqNo: **1697377**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25									

Sample ID: **LCS-54680**	SampType: **LCS**	TestCode: **7420_ST**	Units: **mg/L**	Prep Date:	RunNo: **108189**
Client ID: **LCSS**	Batch ID: **54680**	TestNo: **WET/ EPA 74 WET**		Analysis Date: **4/17/2009**	SeqNo: **1697378**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	4.863	0.25	5.000	0	97.3	80	120				

Sample ID: **104181-151ADUP**	SampType: **DUP**	TestCode: **7420_ST**	Units: **mg/L**	Prep Date:	RunNo: **108189**
Client ID: **ZZZZZZ**	Batch ID: **54680**	TestNo: **WET/ EPA 74 WET**		Analysis Date: **4/17/2009**	SeqNo: **1697380**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	5.128	0.25						5.189	1.19	20	

Sample ID: **104181-151A-MS**	SampType: **MS**	TestCode: **7420_ST**	Units: **mg/L**	Prep Date:	RunNo: **108189**
Client ID: **ZZZZZZ**	Batch ID: **54680**	TestNo: **WET/ EPA 74 WET**		Analysis Date: **4/17/2009**	SeqNo: **1697381**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	10.309	0.50	5.000	5.189	102	80	120				

Sample ID: **104181-151A-MSD**	SampType: **MSD**	TestCode: **7420_ST**	Units: **mg/L**	Prep Date:	RunNo: **108189**
Client ID: **ZZZZZZ**	Batch ID: **54680**	TestNo: **WET/ EPA 74 WET**		Analysis Date: **4/17/2009**	SeqNo: **1697382**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	10.175	0.50	5.000	5.189	99.7	80	120	10.31	1.31	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104784
Project: DUMBARTON BRIDGE RETROFIT, E8435-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 7420_TC

Sample ID: **MB-54690A**	SampType: **MBLK**	TestCode: **7420_TC**	Units: **mg/L**	Prep Date: **4/14/2009**	RunNo: **108143**
Client ID: **PBS**	Batch ID: **54690**	TestNo: **EPA 1311/ 74**	**EPA3010A**	Analysis Date: **4/16/2009**	SeqNo: **1696450**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25									

Sample ID: **MB-54678A TCLP**	SampType: **MBLK**	TestCode: **7420_TC**	Units: **mg/L**	Prep Date: **4/14/2009**	RunNo: **108143**
Client ID: **PBS**	Batch ID: **54690**	TestNo: **EPA 1311/ 74**	**EPA3010A**	Analysis Date: **4/16/2009**	SeqNo: **1696451**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25									

Sample ID: **LCS-54690**	SampType: **LCS**	TestCode: **7420_TC**	Units: **mg/L**	Prep Date: **4/14/2009**	RunNo: **108143**
Client ID: **LCSS**	Batch ID: **54690**	TestNo: **EPA 1311/ 74**	**EPA3010A**	Analysis Date: **4/16/2009**	SeqNo: **1696452**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	1.175	0.25	1.000	0	117	80	120				

Sample ID: **MB-54690-MS**	SampType: **MS**	TestCode: **7420_TC**	Units: **mg/L**	Prep Date: **4/14/2009**	RunNo: **108143**
Client ID: **ZZZZZZ**	Batch ID: **54690**	TestNo: **EPA 1311/ 74**	**EPA3010A**	Analysis Date: **4/16/2009**	SeqNo: **1696453**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	2.473	0.25	2.500	0	98.9	70	130				

Sample ID: **MB-54690-MSD**	SampType: **MSD**	TestCode: **7420_TC**	Units: **mg/L**	Prep Date: **4/14/2009**	RunNo: **108143**
Client ID: **ZZZZZZ**	Batch ID: **54690**	TestNo: **EPA 1311/ 74**	**EPA3010A**	Analysis Date: **4/16/2009**	SeqNo: **1696454**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	2.468	0.25	2.500	0	98.7	70	130	2.473	0.210	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104784
Project: DUMBARTON BRIDGE RETROFIT, E8435-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 7420_TC

Sample ID: **104784-004A-DUP** SampType: **DUP** TestCode: **7420_TC** Units: **mg/L** Prep Date: **4/14/2009** RunNo: **108143**
Client ID: **RP-P1D** Batch ID: **54690** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **4/16/2009** SeqNo: **1696457**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	1828.908	100						1843	0.771	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

Diane Galvan

From: Chris Giuntoli [giuntoli@geoconinc.com]
Sent: Friday, April 10, 2009 10:29 AM
To: Diane Galvan
Subject: RE: Results/EDD - DUMBARTON BRIDGE RETROFIT (104784)

Hi Diane,

For Workorder No. 104784, please run TCLPs for lead on a standard TAT for the following samples:

RP-P1A
RP-P1D
RP-P3A and
RP-P5A

Also, please run WETs for lead on a standard TAT for the following samples:

RP-P2A
RP-P4A and
RP-P5A.

Thanks,
Chris

April 08, 2009

Chris Giuntoli
Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550

TEL: (925) 371-5900
FAX: (925) 371-5915

ELAP No.: 1838
NELAP No.: 02107CA
NEVADA.: CA-401
CSDLAC No.: 10196

Workorder No.: 104785

RE: DUMBARTON BRIDGE RETROFIT, E8435-0

Attention: Chris Giuntoli

Enclosed are the results for sample(s) received on March 28, 2009 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter and the case narrative are an integral part of this analytical report and cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Project: DUMBARTON BRIDGE RETROFIT, E8435-0
Lab Order: 104785

CASE NARRATIVE

Analytical Comments for Method 6010

Matrix Spike (MS) and /or Matrix Spike Duplicate (MSD) are/is outside recovery criteria for samples 104785-010AMS and 104785-010AMSD; however, the analytical batch was validated by the Laboratory Control Sample (LCS).

RPD for Duplicate (DUP) and/or Matrix Spike (MS) and /or Matrix Spike Duplicate (MSD) is outside criteria for samples 104785-010ADUP and 104785-010AMSD; however, the Laboratory Control Sample (LCS) validated the analytical batch.

Analytical Comments for Method 8081

Surrogate recovery biased low for sample 104785-010A, possibly due to matrix interferences.

RPD for Duplicate (DUP) is outside criteria for sample 104785-006ADUP; however, the Laboratory Control Sample (LCS) validated the analytical batch.

Analytical Comments for Method 8082

Surrogate recovery biased low for sample 104785-010A, possibly due to matrix interferences.

Analytical Comments for Method 8270

Dilution was necessary for samples 104785-001A, 104785-002A, 104785-003A, 104785-004A, 104785-005A, 104785-006A, 104785-007A, 104785-008A, 104785-009A and 104785-001A, due to sample matrix.

Matrix Spike (MS) and /or Matrix Spike Duplicate (MSD) are/is outside recovery criteria for sample 104786-003AMS; however, the analytical batch was validated by the Laboratory Control Sample (LCS).

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	R-1
Lab Order:	104785	**Collection Date:**	3/26/2009 11:35:00 AM
Project:	DUMBARTON BRIDGE RETROFIT, E843	**Matrix:**	SOIL
Lab ID:	104785-001A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090403F	QC Batch: 54488			PrepDate:	4/3/2009	Analyst: **admin**
Antimony	ND	2.0		mg/Kg	1	4/3/2009 05:37 PM
Arsenic	2.8	1.0		mg/Kg	1	4/3/2009 05:37 PM
Barium	140	1.0		mg/Kg	1	4/3/2009 05:37 PM
Beryllium	ND	1.0		mg/Kg	1	4/3/2009 05:37 PM
Cadmium	1.4	1.0		mg/Kg	1	4/3/2009 05:37 PM
Chromium	38	1.0		mg/Kg	1	4/3/2009 05:37 PM
Cobalt	8.6	1.0		mg/Kg	1	4/3/2009 05:37 PM
Copper	62	2.0		mg/Kg	1	4/3/2009 05:37 PM
Lead	190	1.0		mg/Kg	1	4/6/2009 11:23 AM
Molybdenum	2.0	1.0		mg/Kg	1	4/3/2009 05:37 PM
Nickel	40	1.0		mg/Kg	1	4/3/2009 05:37 PM
Selenium	ND	1.0		mg/Kg	1	4/3/2009 05:37 PM
Silver	ND	1.0		mg/Kg	1	4/3/2009 05:37 PM
Thallium	ND	1.0		mg/Kg	1	4/3/2009 05:37 PM
Vanadium	30	1.0		mg/Kg	1	4/3/2009 05:37 PM
Zinc	340	1.0		mg/Kg	1	4/3/2009 05:37 PM
ORGANOCHLORINE PESTICIDES BY GC/ECD						
	EPA 3550B			**EPA 8081A**		
RunID: GC13_090403B	QC Batch: 54460			PrepDate:	4/1/2009	Analyst: **HL**
4,4´-DDD	ND	2.0		µg/Kg	1	4/3/2009 11:39 AM
4,4´-DDE	ND	2.0		µg/Kg	1	4/3/2009 11:39 AM
4,4´-DDT	7.4	2.0		µg/Kg	1	4/3/2009 11:39 AM
Aldrin	ND	1.0		µg/Kg	1	4/3/2009 11:39 AM
alpha-BHC	ND	1.0		µg/Kg	1	4/3/2009 11:39 AM
alpha-Chlordane	ND	1.0		µg/Kg	1	4/3/2009 11:39 AM
beta-BHC	ND	1.0		µg/Kg	1	4/3/2009 11:39 AM
Chlordane	ND	8.5		µg/Kg	1	4/3/2009 11:39 AM
delta-BHC	ND	1.0		µg/Kg	1	4/3/2009 11:39 AM
Dieldrin	ND	2.0		µg/Kg	1	4/3/2009 11:39 AM
Endosulfan I	ND	1.0		µg/Kg	1	4/3/2009 11:39 AM
Endosulfan II	ND	2.0		µg/Kg	1	4/3/2009 11:39 AM
Endosulfan sulfate	ND	2.0		µg/Kg	1	4/3/2009 11:39 AM
Endrin	ND	2.0		µg/Kg	1	4/3/2009 11:39 AM
Endrin aldehyde	ND	2.0		µg/Kg	1	4/3/2009 11:39 AM
Endrin ketone	ND	2.0		µg/Kg	1	4/3/2009 11:39 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	R-1
Lab Order:	104785	**Collection Date:**	3/26/2009 11:35:00 AM
Project:	DUMBARTON BRIDGE RETROFIT, E843	**Matrix:**	SOIL
Lab ID:	104785-001A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ORGANOCHLORINE PESTICIDES BY GC/ECD						
	EPA 3550B			**EPA 8081A**		
RunID: GC13_090403B	QC Batch: 54460			PrepDate:	4/1/2009	Analyst: **HL**
gamma-BHC	ND	1.0		µg/Kg	1	4/3/2009 11:39 AM
gamma-Chlordane	ND	1.0		µg/Kg	1	4/3/2009 11:39 AM
Heptachlor	ND	1.0		µg/Kg	1	4/3/2009 11:39 AM
Heptachlor epoxide	ND	1.0		µg/Kg	1	4/3/2009 11:39 AM
Methoxychlor	ND	5.0		µg/Kg	1	4/3/2009 11:39 AM
Toxaphene	ND	50		µg/Kg	1	4/3/2009 11:39 AM
Surr: Decachlorobiphenyl	34.2	20-142		%REC	1	4/3/2009 11:39 AM
Surr: Tetrachloro-m-xylene	26.1	25-115		%REC	1	4/3/2009 11:39 AM
PCBS BY GC/ECD						
	EPA 3550B			**EPA 8082**		
RunID: GC5_090401B	QC Batch: 54460			PrepDate:	4/1/2009	Analyst: **BB**
Aroclor 1016	ND	16		µg/Kg	1	4/2/2009 02:29 AM
Aroclor 1221	ND	33		µg/Kg	1	4/2/2009 02:29 AM
Aroclor 1232	ND	16		µg/Kg	1	4/2/2009 02:29 AM
Aroclor 1242	ND	16		µg/Kg	1	4/2/2009 02:29 AM
Aroclor 1248	ND	16		µg/Kg	1	4/2/2009 02:29 AM
Aroclor 1254	84	16		µg/Kg	1	4/2/2009 02:29 AM
Aroclor 1260	51	16		µg/Kg	1	4/2/2009 02:29 AM
Aroclor 1262	ND	16		µg/Kg	1	4/2/2009 02:29 AM
Aroclor 1268	ND	16		µg/Kg	1	4/2/2009 02:29 AM
Surr: Decachlorobiphenyl	32.9	30-124		%REC	1	4/2/2009 02:29 AM
Surr: Tetrachloro-m-xylene	37.1	40-118	S	%REC	1	4/2/2009 02:29 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090402C	QC Batch: 54464			PrepDate:	4/2/2009	Analyst: **RQ**
Mercury	0.11	0.10		mg/Kg	1	4/2/2009 12:14 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090331A	QC Batch: 54354			PrepDate:	3/30/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
1,2-Dichlorobenzene	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
1,3-Dichlorobenzene	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
1,4-Dichlorobenzene	ND	5000		µg/Kg	5	3/31/2009 04:21 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	R-1
Lab Order:	104785	**Collection Date:**	3/26/2009 11:35:00 AM
Project:	DUMBARTON BRIDGE RETROFIT, E843	**Matrix:**	SOIL
Lab ID:	104785-001A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090331A QC Batch: 54354 PrepDate: 3/30/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
2,4,6-Trichlorophenol	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
2,4-Dichlorophenol	ND	25000		µg/Kg	5	3/31/2009 04:21 PM
2,4-Dimethylphenol	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
2,4-Dinitrophenol	ND	25000		µg/Kg	5	3/31/2009 04:21 PM
2,4-Dinitrotoluene	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
2,6-Dinitrotoluene	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
2-Chloronaphthalene	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
2-Chlorophenol	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
2-Methylnaphthalene	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
2-Methylphenol	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
2-Nitroaniline	ND	25000		µg/Kg	5	3/31/2009 04:21 PM
2-Nitrophenol	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
3,3´-Dichlorobenzidine	ND	9900		µg/Kg	5	3/31/2009 04:21 PM
3-Nitroaniline	ND	25000		µg/Kg	5	3/31/2009 04:21 PM
4,6-Dinitro-2-methylphenol	ND	25000		µg/Kg	5	3/31/2009 04:21 PM
4-Bromophenyl-phenylether	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
4-Chloro-3-methylphenol	ND	9900		µg/Kg	5	3/31/2009 04:21 PM
4-Chloroaniline	ND	9900		µg/Kg	5	3/31/2009 04:21 PM
4-Chlorophenyl-phenylether	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
4-Methylphenol	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
4-Nitroaniline	ND	25000		µg/Kg	5	3/31/2009 04:21 PM
4-Nitrophenol	ND	25000		µg/Kg	5	3/31/2009 04:21 PM
Acenaphthene	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
Acenaphthylene	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
Anthracene	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
Benzidine (M)	ND	25000		µg/Kg	5	3/31/2009 04:21 PM
Benzo(a)anthracene	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
Benzo(a)pyrene	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
Benzo(b)fluoranthene	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
Benzo(g,h,i)perylene	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
Benzo(k)fluoranthene	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
Benzoic acid	ND	25000		µg/Kg	5	3/31/2009 04:21 PM
Benzyl alcohol	ND	9900		µg/Kg	5	3/31/2009 04:21 PM
Bis(2-chloroethoxy)methane	ND	5000		µg/Kg	5	3/31/2009 04:21 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	R-1
Lab Order:	104785	**Collection Date:**	3/26/2009 11:35:00 AM
Project:	DUMBARTON BRIDGE RETROFIT, E843	**Matrix:**	SOIL
Lab ID:	104785-001A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 3550B				**EPA 8270C**		
RunID: MS 13_090331A	QC Batch: 54354			PrepDate:	3/30/2009	Analyst: **DMP**
Bis(2-chloroethyl)ether	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
Bis(2-chloroisopropyl)ether	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
Bis(2-ethylhexyl)phthalate	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
Butylbenzylphthalate	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
Chrysene	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
Di-n-butylphthalate	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
Di-n-octylphthalate	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
Dibenz(a,h)anthracene	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
Dibenzofuran	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
Diethylphthalate	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
Dimethylphthalate	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
Fluoranthene	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
Fluorene	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
Hexachlorobenzene	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
Hexachlorobutadiene	ND	9900		µg/Kg	5	3/31/2009 04:21 PM
Hexachlorocyclopentadiene	ND	9900		µg/Kg	5	3/31/2009 04:21 PM
Hexachloroethane	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
Indeno(1,2,3-cd)pyrene	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
Isophorone	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
N-Nitrosodi-n-propylamine	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
N-Nitrosodiphenylamine	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
Naphthalene	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
Nitrobenzene	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
Pentachlorophenol	ND	25000		µg/Kg	5	3/31/2009 04:21 PM
Phenanthrene	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
Phenol	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
Pyrene	ND	5000		µg/Kg	5	3/31/2009 04:21 PM
Surr: 1,2-Dichlorobenzene-d4	72.8	49-103		%REC	5	3/31/2009 04:21 PM
Surr: 2,4,6-Tribromophenol	67.4	47-129		%REC	5	3/31/2009 04:21 PM
Surr: 2-Chlorophenol-d4	80.6	54-109		%REC	5	3/31/2009 04:21 PM
Surr: 2-Fluorobiphenyl	82.7	59-108		%REC	5	3/31/2009 04:21 PM
Surr: 2-Fluorophenol	76.1	50-111		%REC	5	3/31/2009 04:21 PM
Surr: 4-Terphenyl-d14	97.3	58-135		%REC	5	3/31/2009 04:21 PM
Surr: Nitrobenzene-d5	78.5	54-115		%REC	5	3/31/2009 04:21 PM
Surr: Phenol-d5	78.4	58-112		%REC	5	3/31/2009 04:21 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	R-2
Lab Order:	104785	**Collection Date:**	3/26/2009 10:50:00 AM
Project:	DUMBARTON BRIDGE RETROFIT, E843	**Matrix:**	SOIL
Lab ID:	104785-002A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090403F	QC Batch: 54488			PrepDate: 4/3/2009		Analyst: **admin**
Antimony	ND	2.0		mg/Kg	1	4/3/2009 05:40 PM
Arsenic	2.7	1.0		mg/Kg	1	4/3/2009 05:40 PM
Barium	110	1.0		mg/Kg	1	4/3/2009 05:40 PM
Beryllium	ND	1.0		mg/Kg	1	4/3/2009 05:40 PM
Cadmium	1.4	1.0		mg/Kg	1	4/3/2009 05:40 PM
Chromium	30	1.0		mg/Kg	1	4/3/2009 05:40 PM
Cobalt	10	1.0		mg/Kg	1	4/3/2009 05:40 PM
Copper	62	2.0		mg/Kg	1	4/3/2009 05:40 PM
Lead	230	1.0		mg/Kg	1	4/6/2009 11:28 AM
Molybdenum	2.2	1.0		mg/Kg	1	4/3/2009 05:40 PM
Nickel	35	1.0		mg/Kg	1	4/3/2009 05:40 PM
Selenium	ND	1.0		mg/Kg	1	4/3/2009 05:40 PM
Silver	ND	1.0		mg/Kg	1	4/3/2009 05:40 PM
Thallium	ND	1.0		mg/Kg	1	4/3/2009 05:40 PM
Vanadium	21	1.0		mg/Kg	1	4/3/2009 05:40 PM
Zinc	290	1.0		mg/Kg	1	4/3/2009 05:40 PM
ORGANOCHLORINE PESTICIDES BY GC/ECD						
	EPA 3550B			**EPA 8081A**		
RunID: GC13_090403B	QC Batch: 54460			PrepDate: 4/1/2009		Analyst: **HL**
4,4´-DDD	ND	2.0		µg/Kg	1	4/3/2009 11:52 AM
4,4´-DDE	ND	2.0		µg/Kg	1	4/3/2009 11:52 AM
4,4´-DDT	19	2.0		µg/Kg	1	4/3/2009 11:52 AM
Aldrin	ND	1.0		µg/Kg	1	4/3/2009 11:52 AM
alpha-BHC	ND	1.0		µg/Kg	1	4/3/2009 11:52 AM
alpha-Chlordane	ND	1.0		µg/Kg	1	4/3/2009 11:52 AM
beta-BHC	ND	1.0		µg/Kg	1	4/3/2009 11:52 AM
Chlordane	ND	8.5		µg/Kg	1	4/3/2009 11:52 AM
delta-BHC	ND	1.0		µg/Kg	1	4/3/2009 11:52 AM
Dieldrin	ND	2.0		µg/Kg	1	4/3/2009 11:52 AM
Endosulfan I	ND	1.0		µg/Kg	1	4/3/2009 11:52 AM
Endosulfan II	ND	2.0		µg/Kg	1	4/3/2009 11:52 AM
Endosulfan sulfate	ND	2.0		µg/Kg	1	4/3/2009 11:52 AM
Endrin	ND	2.0		µg/Kg	1	4/3/2009 11:52 AM
Endrin aldehyde	ND	2.0		µg/Kg	1	4/3/2009 11:52 AM
Endrin ketone	ND	2.0		µg/Kg	1	4/3/2009 11:52 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	R-2
Lab Order:	104785	**Collection Date:**	3/26/2009 10:50:00 AM
Project:	DUMBARTON BRIDGE RETROFIT, E843	**Matrix:**	SOIL
Lab ID:	104785-002A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ORGANOCHLORINE PESTICIDES BY GC/ECD						
	EPA 3550B			**EPA 8081A**		
RunID: GC13_090403B	QC Batch: 54460			PrepDate:	4/1/2009	Analyst: **HL**
gamma-BHC	ND	1.0		µg/Kg	1	4/3/2009 11:52 AM
gamma-Chlordane	ND	1.0		µg/Kg	1	4/3/2009 11:52 AM
Heptachlor	ND	1.0		µg/Kg	1	4/3/2009 11:52 AM
Heptachlor epoxide	ND	1.0		µg/Kg	1	4/3/2009 11:52 AM
Methoxychlor	ND	5.0		µg/Kg	1	4/3/2009 11:52 AM
Toxaphene	ND	50		µg/Kg	1	4/3/2009 11:52 AM
Surr: Decachlorobiphenyl	49.6	20-142		%REC	1	4/3/2009 11:52 AM
Surr: Tetrachloro-m-xylene	30.1	25-115		%REC	1	4/3/2009 11:52 AM
PCBS BY GC/ECD						
	EPA 3550B			**EPA 8082**		
RunID: GC5_090401B	QC Batch: 54460			PrepDate:	4/1/2009	Analyst: **BB**
Aroclor 1016	ND	16		µg/Kg	1	4/2/2009 02:59 AM
Aroclor 1221	ND	33		µg/Kg	1	4/2/2009 02:59 AM
Aroclor 1232	ND	16		µg/Kg	1	4/2/2009 02:59 AM
Aroclor 1242	ND	16		µg/Kg	1	4/2/2009 02:59 AM
Aroclor 1248	ND	16		µg/Kg	1	4/2/2009 02:59 AM
Aroclor 1254	240	16		µg/Kg	1	4/2/2009 02:59 AM
Aroclor 1260	170	16		µg/Kg	1	4/2/2009 02:59 AM
Aroclor 1262	ND	16		µg/Kg	1	4/2/2009 02:59 AM
Aroclor 1268	ND	16		µg/Kg	1	4/2/2009 02:59 AM
Surr: Decachlorobiphenyl	39.8	30-124		%REC	1	4/2/2009 02:59 AM
Surr: Tetrachloro-m-xylene	47.7	40-118		%REC	1	4/2/2009 02:59 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090402C	QC Batch: 54464			PrepDate:	4/2/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	4/2/2009 12:16 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090331A	QC Batch: 54354			PrepDate:	3/30/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
1,2-Dichlorobenzene	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
1,3-Dichlorobenzene	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
1,4-Dichlorobenzene	ND	25000		µg/Kg	25	3/31/2009 01:55 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	R-2
Lab Order:	104785	**Collection Date:**	3/26/2009 10:50:00 AM
Project:	DUMBARTON BRIDGE RETROFIT, E843	**Matrix:**	SOIL
Lab ID:	104785-002A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090331A QC Batch: 54354 PrepDate: 3/30/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
2,4,6-Trichlorophenol	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
2,4-Dichlorophenol	ND	120000		µg/Kg	25	3/31/2009 01:55 PM
2,4-Dimethylphenol	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
2,4-Dinitrophenol	ND	120000		µg/Kg	25	3/31/2009 01:55 PM
2,4-Dinitrotoluene	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
2,6-Dinitrotoluene	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
2-Chloronaphthalene	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
2-Chlorophenol	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
2-Methylnaphthalene	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
2-Methylphenol	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
2-Nitroaniline	ND	120000		µg/Kg	25	3/31/2009 01:55 PM
2-Nitrophenol	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
3,3´-Dichlorobenzidine	ND	50000		µg/Kg	25	3/31/2009 01:55 PM
3-Nitroaniline	ND	120000		µg/Kg	25	3/31/2009 01:55 PM
4,6-Dinitro-2-methylphenol	ND	120000		µg/Kg	25	3/31/2009 01:55 PM
4-Bromophenyl-phenylether	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
4-Chloro-3-methylphenol	ND	50000		µg/Kg	25	3/31/2009 01:55 PM
4-Chloroaniline	ND	50000		µg/Kg	25	3/31/2009 01:55 PM
4-Chlorophenyl-phenylether	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
4-Methylphenol	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
4-Nitroaniline	ND	120000		µg/Kg	25	3/31/2009 01:55 PM
4-Nitrophenol	ND	120000		µg/Kg	25	3/31/2009 01:55 PM
Acenaphthene	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
Acenaphthylene	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
Anthracene	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
Benzidine (M)	ND	120000		µg/Kg	25	3/31/2009 01:55 PM
Benzo(a)anthracene	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
Benzo(a)pyrene	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
Benzo(b)fluoranthene	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
Benzo(g,h,i)perylene	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
Benzo(k)fluoranthene	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
Benzoic acid	ND	120000		µg/Kg	25	3/31/2009 01:55 PM
Benzyl alcohol	ND	50000		µg/Kg	25	3/31/2009 01:55 PM
Bis(2-chloroethoxy)methane	ND	25000		µg/Kg	25	3/31/2009 01:55 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	R-2
Lab Order:	104785	**Collection Date:**	3/26/2009 10:50:00 AM
Project:	DUMBARTON BRIDGE RETROFIT, E843	**Matrix:**	SOIL
Lab ID:	104785-002A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090331A QC Batch: 54354 PrepDate: 3/30/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
Bis(2-chloroisopropyl)ether	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
Bis(2-ethylhexyl)phthalate	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
Butylbenzylphthalate	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
Chrysene	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
Di-n-butylphthalate	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
Di-n-octylphthalate	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
Dibenz(a,h)anthracene	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
Dibenzofuran	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
Diethylphthalate	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
Dimethylphthalate	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
Fluoranthene	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
Fluorene	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
Hexachlorobenzene	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
Hexachlorobutadiene	ND	50000		µg/Kg	25	3/31/2009 01:55 PM
Hexachlorocyclopentadiene	ND	50000		µg/Kg	25	3/31/2009 01:55 PM
Hexachloroethane	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
Indeno(1,2,3-cd)pyrene	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
Isophorone	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
N-Nitrosodi-n-propylamine	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
N-Nitrosodiphenylamine	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
Naphthalene	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
Nitrobenzene	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
Pentachlorophenol	ND	120000		µg/Kg	25	3/31/2009 01:55 PM
Phenanthrene	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
Phenol	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
Pyrene	ND	25000		µg/Kg	25	3/31/2009 01:55 PM
Surr: 1,2-Dichlorobenzene-d4	81.1	49-103		%REC	25	3/31/2009 01:55 PM
Surr: 2,4,6-Tribromophenol	52.6	47-129		%REC	25	3/31/2009 01:55 PM
Surr: 2-Chlorophenol-d4	84.1	54-109		%REC	25	3/31/2009 01:55 PM
Surr: 2-Fluorobiphenyl	87.1	59-108		%REC	25	3/31/2009 01:55 PM
Surr: 2-Fluorophenol	80.3	50-111		%REC	25	3/31/2009 01:55 PM
Surr: 4-Terphenyl-d14	104	58-135		%REC	25	3/31/2009 01:55 PM
Surr: Nitrobenzene-d5	71.3	54-115		%REC	25	3/31/2009 01:55 PM
Surr: Phenol-d5	75.8	58-112		%REC	25	3/31/2009 01:55 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	R-3
Lab Order:	104785	**Collection Date:**	3/26/2009 11:00:00 AM
Project:	DUMBARTON BRIDGE RETROFIT, E843	**Matrix:**	SOIL
Lab ID:	104785-003A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090403F	QC Batch: 54488			PrepDate:	4/3/2009	Analyst: **admin**
Antimony	ND	2.0		mg/Kg	1	4/3/2009 05:44 PM
Arsenic	2.5	1.0		mg/Kg	1	4/3/2009 05:44 PM
Barium	130	1.0		mg/Kg	1	4/3/2009 05:44 PM
Beryllium	ND	1.0		mg/Kg	1	4/3/2009 05:44 PM
Cadmium	1.3	1.0		mg/Kg	1	4/3/2009 05:44 PM
Chromium	27	1.0		mg/Kg	1	4/3/2009 05:44 PM
Cobalt	12	1.0		mg/Kg	1	4/3/2009 05:44 PM
Copper	57	2.0		mg/Kg	1	4/3/2009 05:44 PM
Lead	350	1.0		mg/Kg	1	4/6/2009 11:29 AM
Molybdenum	1.5	1.0		mg/Kg	1	4/3/2009 05:44 PM
Nickel	34	1.0		mg/Kg	1	4/3/2009 05:44 PM
Selenium	ND	1.0		mg/Kg	1	4/3/2009 05:44 PM
Silver	ND	1.0		mg/Kg	1	4/3/2009 05:44 PM
Thallium	ND	1.0		mg/Kg	1	4/3/2009 05:44 PM
Vanadium	23	1.0		mg/Kg	1	4/3/2009 05:44 PM
Zinc	290	1.0		mg/Kg	1	4/3/2009 05:44 PM
ORGANOCHLORINE PESTICIDES BY GC/ECD						
	EPA 3550B			**EPA 8081A**		
RunID: GC13_090403B	QC Batch: 54460			PrepDate:	4/1/2009	Analyst: **HL**
4,4´-DDD	ND	2.0		µg/Kg	1	4/3/2009 12:05 PM
4,4´-DDE	ND	2.0		µg/Kg	1	4/3/2009 12:05 PM
4,4´-DDT	ND	2.0		µg/Kg	1	4/3/2009 12:05 PM
Aldrin	ND	1.0		µg/Kg	1	4/3/2009 12:05 PM
alpha-BHC	ND	1.0		µg/Kg	1	4/3/2009 12:05 PM
alpha-Chlordane	ND	1.0		µg/Kg	1	4/3/2009 12:05 PM
beta-BHC	ND	1.0		µg/Kg	1	4/3/2009 12:05 PM
Chlordane	ND	8.5		µg/Kg	1	4/3/2009 12:05 PM
delta-BHC	ND	1.0		µg/Kg	1	4/3/2009 12:05 PM
Dieldrin	ND	2.0		µg/Kg	1	4/3/2009 12:05 PM
Endosulfan I	ND	1.0		µg/Kg	1	4/3/2009 12:05 PM
Endosulfan II	ND	2.0		µg/Kg	1	4/3/2009 12:05 PM
Endosulfan sulfate	ND	2.0		µg/Kg	1	4/3/2009 12:05 PM
Endrin	ND	2.0		µg/Kg	1	4/3/2009 12:05 PM
Endrin aldehyde	ND	2.0		µg/Kg	1	4/3/2009 12:05 PM
Endrin ketone	ND	2.0		µg/Kg	1	4/3/2009 12:05 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	R-3
Lab Order:	104785	**Collection Date:**	3/26/2009 11:00:00 AM
Project:	DUMBARTON BRIDGE RETROFIT, E843	**Matrix:**	SOIL
Lab ID:	104785-003A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ORGANOCHLORINE PESTICIDES BY GC/ECD						
	EPA 3550B			**EPA 8081A**		
RunID: GC13_090403B	QC Batch: 54460			PrepDate:	4/1/2009	Analyst: **HL**
gamma-BHC	ND	1.0		µg/Kg	1	4/3/2009 12:05 PM
gamma-Chlordane	ND	1.0		µg/Kg	1	4/3/2009 12:05 PM
Heptachlor	ND	1.0		µg/Kg	1	4/3/2009 12:05 PM
Heptachlor epoxide	ND	1.0		µg/Kg	1	4/3/2009 12:05 PM
Methoxychlor	ND	5.0		µg/Kg	1	4/3/2009 12:05 PM
Toxaphene	ND	50		µg/Kg	1	4/3/2009 12:05 PM
Surr: Decachlorobiphenyl	57.1	20-142		%REC	1	4/3/2009 12:05 PM
Surr: Tetrachloro-m-xylene	40.6	25-115		%REC	1	4/3/2009 12:05 PM
PCBS BY GC/ECD						
	EPA 3550B			**EPA 8082**		
RunID: GC5_090401B	QC Batch: 54460			PrepDate:	4/1/2009	Analyst: **BB**
Aroclor 1016	ND	16		µg/Kg	1	4/2/2009 03:29 AM
Aroclor 1221	ND	33		µg/Kg	1	4/2/2009 03:29 AM
Aroclor 1232	ND	16		µg/Kg	1	4/2/2009 03:29 AM
Aroclor 1242	ND	16		µg/Kg	1	4/2/2009 03:29 AM
Aroclor 1248	ND	16		µg/Kg	1	4/2/2009 03:29 AM
Aroclor 1254	41	16		µg/Kg	1	4/2/2009 03:29 AM
Aroclor 1260	22	16		µg/Kg	1	4/2/2009 03:29 AM
Aroclor 1262	ND	16		µg/Kg	1	4/2/2009 03:29 AM
Aroclor 1268	ND	16		µg/Kg	1	4/2/2009 03:29 AM
Surr: Decachlorobiphenyl	55.1	30-124		%REC	1	4/2/2009 03:29 AM
Surr: Tetrachloro-m-xylene	65.2	40-118		%REC	1	4/2/2009 03:29 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090402C	QC Batch: 54464			PrepDate:	4/2/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	4/2/2009 12:18 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090331A	QC Batch: 54354			PrepDate:	3/30/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
1,2-Dichlorobenzene	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
1,3-Dichlorobenzene	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
1,4-Dichlorobenzene	ND	5000		µg/Kg	5	3/31/2009 02:25 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	R-3
Lab Order:	104785	**Collection Date:**	3/26/2009 11:00:00 AM
Project:	DUMBARTON BRIDGE RETROFIT, E843	**Matrix:**	SOIL
Lab ID:	104785-003A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090331A QC Batch: 54354 PrepDate: 3/30/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
2,4,6-Trichlorophenol	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
2,4-Dichlorophenol	ND	25000		µg/Kg	5	3/31/2009 02:25 PM
2,4-Dimethylphenol	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
2,4-Dinitrophenol	ND	25000		µg/Kg	5	3/31/2009 02:25 PM
2,4-Dinitrotoluene	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
2,6-Dinitrotoluene	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
2-Chloronaphthalene	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
2-Chlorophenol	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
2-Methylnaphthalene	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
2-Methylphenol	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
2-Nitroaniline	ND	25000		µg/Kg	5	3/31/2009 02:25 PM
2-Nitrophenol	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
3,3´-Dichlorobenzidine	ND	9900		µg/Kg	5	3/31/2009 02:25 PM
3-Nitroaniline	ND	25000		µg/Kg	5	3/31/2009 02:25 PM
4,6-Dinitro-2-methylphenol	ND	25000		µg/Kg	5	3/31/2009 02:25 PM
4-Bromophenyl-phenylether	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
4-Chloro-3-methylphenol	ND	9900		µg/Kg	5	3/31/2009 02:25 PM
4-Chloroaniline	ND	9900		µg/Kg	5	3/31/2009 02:25 PM
4-Chlorophenyl-phenylether	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
4-Methylphenol	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
4-Nitroaniline	ND	25000		µg/Kg	5	3/31/2009 02:25 PM
4-Nitrophenol	ND	25000		µg/Kg	5	3/31/2009 02:25 PM
Acenaphthene	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
Acenaphthylene	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
Anthracene	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
Benzidine (M)	ND	25000		µg/Kg	5	3/31/2009 02:25 PM
Benzo(a)anthracene	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
Benzo(a)pyrene	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
Benzo(b)fluoranthene	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
Benzo(g,h,i)perylene	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
Benzo(k)fluoranthene	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
Benzoic acid	ND	25000		µg/Kg	5	3/31/2009 02:25 PM
Benzyl alcohol	ND	9900		µg/Kg	5	3/31/2009 02:25 PM
Bis(2-chloroethoxy)methane	ND	5000		µg/Kg	5	3/31/2009 02:25 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	R-3
Lab Order:	104785	**Collection Date:**	3/26/2009 11:00:00 AM
Project:	DUMBARTON BRIDGE RETROFIT, E843	**Matrix:**	SOIL
Lab ID:	104785-003A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090331A QC Batch: 54354 PrepDate: 3/30/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
Bis(2-chloroisopropyl)ether	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
Bis(2-ethylhexyl)phthalate	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
Butylbenzylphthalate	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
Chrysene	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
Di-n-butylphthalate	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
Di-n-octylphthalate	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
Dibenz(a,h)anthracene	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
Dibenzofuran	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
Diethylphthalate	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
Dimethylphthalate	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
Fluoranthene	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
Fluorene	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
Hexachlorobenzene	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
Hexachlorobutadiene	ND	9900		µg/Kg	5	3/31/2009 02:25 PM
Hexachlorocyclopentadiene	ND	9900		µg/Kg	5	3/31/2009 02:25 PM
Hexachloroethane	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
Indeno(1,2,3-cd)pyrene	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
Isophorone	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
N-Nitrosodi-n-propylamine	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
N-Nitrosodiphenylamine	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
Naphthalene	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
Nitrobenzene	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
Pentachlorophenol	ND	25000		µg/Kg	5	3/31/2009 02:25 PM
Phenanthrene	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
Phenol	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
Pyrene	ND	5000		µg/Kg	5	3/31/2009 02:25 PM
Surr: 1,2-Dichlorobenzene-d4	84.8	49-103		%REC	5	3/31/2009 02:25 PM
Surr: 2,4,6-Tribromophenol	69.8	47-129		%REC	5	3/31/2009 02:25 PM
Surr: 2-Chlorophenol-d4	88.6	54-109		%REC	5	3/31/2009 02:25 PM
Surr: 2-Fluorobiphenyl	87.1	59-108		%REC	5	3/31/2009 02:25 PM
Surr: 2-Fluorophenol	84.5	50-111		%REC	5	3/31/2009 02:25 PM
Surr: 4-Terphenyl-d14	102	58-135		%REC	5	3/31/2009 02:25 PM
Surr: Nitrobenzene-d5	85.4	54-115		%REC	5	3/31/2009 02:25 PM
Surr: Phenol-d5	85.3	58-112		%REC	5	3/31/2009 02:25 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	R-4
Lab Order:	104785	**Collection Date:**	3/26/2009 11:20:00 AM
Project:	DUMBARTON BRIDGE RETROFIT, E843	**Matrix:**	SOIL
Lab ID:	104785-004A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090403F	QC Batch: 54488			PrepDate:	4/3/2009	Analyst: **admin**
Antimony	ND	2.0		mg/Kg	1	4/3/2009 05:48 PM
Arsenic	1.9	1.0		mg/Kg	1	4/3/2009 05:48 PM
Barium	58	1.0		mg/Kg	1	4/3/2009 05:48 PM
Beryllium	ND	1.0		mg/Kg	1	4/3/2009 05:48 PM
Cadmium	ND	1.0		mg/Kg	1	4/3/2009 05:48 PM
Chromium	19	1.0		mg/Kg	1	4/3/2009 05:48 PM
Cobalt	6.7	1.0		mg/Kg	1	4/3/2009 05:48 PM
Copper	41	2.0		mg/Kg	1	4/3/2009 05:48 PM
Lead	200	1.0		mg/Kg	1	4/6/2009 11:30 AM
Molybdenum	1.3	1.0		mg/Kg	1	4/3/2009 05:48 PM
Nickel	18	1.0		mg/Kg	1	4/3/2009 05:48 PM
Selenium	ND	1.0		mg/Kg	1	4/3/2009 05:48 PM
Silver	ND	1.0		mg/Kg	1	4/3/2009 05:48 PM
Thallium	ND	1.0		mg/Kg	1	4/3/2009 05:48 PM
Vanadium	17	1.0		mg/Kg	1	4/3/2009 05:48 PM
Zinc	170	1.0		mg/Kg	1	4/3/2009 05:48 PM
ORGANOCHLORINE PESTICIDES BY GC/ECD						
	EPA 3550B			**EPA 8081A**		
RunID: GC13_090403B	QC Batch: 54460			PrepDate:	4/1/2009	Analyst: **HL**
4,4´-DDD	ND	2.0		µg/Kg	1	4/3/2009 12:18 PM
4,4´-DDE	ND	2.0		µg/Kg	1	4/3/2009 12:18 PM
4,4´-DDT	2.5	2.0		µg/Kg	1	4/3/2009 12:18 PM
Aldrin	ND	1.0		µg/Kg	1	4/3/2009 12:18 PM
alpha-BHC	ND	1.0		µg/Kg	1	4/3/2009 12:18 PM
alpha-Chlordane	1.2	1.0		µg/Kg	1	4/3/2009 12:18 PM
beta-BHC	ND	1.0		µg/Kg	1	4/3/2009 12:18 PM
Chlordane	14	8.5		µg/Kg	1	4/3/2009 12:18 PM
delta-BHC	ND	1.0		µg/Kg	1	4/3/2009 12:18 PM
Dieldrin	ND	2.0		µg/Kg	1	4/3/2009 12:18 PM
Endosulfan I	ND	1.0		µg/Kg	1	4/3/2009 12:18 PM
Endosulfan II	ND	2.0		µg/Kg	1	4/3/2009 12:18 PM
Endosulfan sulfate	ND	2.0		µg/Kg	1	4/3/2009 12:18 PM
Endrin	ND	2.0		µg/Kg	1	4/3/2009 12:18 PM
Endrin aldehyde	ND	2.0		µg/Kg	1	4/3/2009 12:18 PM
Endrin ketone	ND	2.0		µg/Kg	1	4/3/2009 12:18 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	R-4
Lab Order:	104785	**Collection Date:**	3/26/2009 11:20:00 AM
Project:	DUMBARTON BRIDGE RETROFIT, E843	**Matrix:**	SOIL
Lab ID:	104785-004A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ORGANOCHLORINE PESTICIDES BY GC/ECD						
	EPA 3550B			**EPA 8081A**		
RunID: GC13_090403B	QC Batch: 54460			PrepDate:	4/1/2009	Analyst: **HL**
gamma-BHC	ND	1.0		µg/Kg	1	4/3/2009 12:18 PM
gamma-Chlordane	1.2	1.0		µg/Kg	1	4/3/2009 12:18 PM
Heptachlor	ND	1.0		µg/Kg	1	4/3/2009 12:18 PM
Heptachlor epoxide	ND	1.0		µg/Kg	1	4/3/2009 12:18 PM
Methoxychlor	ND	5.0		µg/Kg	1	4/3/2009 12:18 PM
Toxaphene	ND	50		µg/Kg	1	4/3/2009 12:18 PM
Surr: Decachlorobiphenyl	62.4	20-142		%REC	1	4/3/2009 12:18 PM
Surr: Tetrachloro-m-xylene	42.4	25-115		%REC	1	4/3/2009 12:18 PM
PCBS BY GC/ECD						
	EPA 3550B			**EPA 8082**		
RunID: GC5_090401B	QC Batch: 54460			PrepDate:	4/1/2009	Analyst: **BB**
Aroclor 1016	ND	16		µg/Kg	1	4/2/2009 03:59 AM
Aroclor 1221	ND	33		µg/Kg	1	4/2/2009 03:59 AM
Aroclor 1232	ND	16		µg/Kg	1	4/2/2009 03:59 AM
Aroclor 1242	ND	16		µg/Kg	1	4/2/2009 03:59 AM
Aroclor 1248	ND	16		µg/Kg	1	4/2/2009 03:59 AM
Aroclor 1254	37	16		µg/Kg	1	4/2/2009 03:59 AM
Aroclor 1260	21	16		µg/Kg	1	4/2/2009 03:59 AM
Aroclor 1262	ND	16		µg/Kg	1	4/2/2009 03:59 AM
Aroclor 1268	ND	16		µg/Kg	1	4/2/2009 03:59 AM
Surr: Decachlorobiphenyl	61.0	30-124		%REC	1	4/2/2009 03:59 AM
Surr: Tetrachloro-m-xylene	77.4	40-118		%REC	1	4/2/2009 03:59 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090402C	QC Batch: 54464			PrepDate:	4/2/2009	Analyst: **RQ**
Mercury	0.26	0.10		mg/Kg	1	4/2/2009 12:24 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090331A	QC Batch: 54354			PrepDate:	3/30/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
1,2-Dichlorobenzene	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
1,3-Dichlorobenzene	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
1,4-Dichlorobenzene	ND	5000		µg/Kg	5	3/31/2009 02:55 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	R-4
Lab Order:	104785	**Collection Date:**	3/26/2009 11:20:00 AM
Project:	DUMBARTON BRIDGE RETROFIT, E843	**Matrix:**	SOIL
Lab ID:	104785-004A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090331A QC Batch: 54354 PrepDate: 3/30/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
2,4,6-Trichlorophenol	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
2,4-Dichlorophenol	ND	25000		µg/Kg	5	3/31/2009 02:55 PM
2,4-Dimethylphenol	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
2,4-Dinitrophenol	ND	25000		µg/Kg	5	3/31/2009 02:55 PM
2,4-Dinitrotoluene	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
2,6-Dinitrotoluene	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
2-Chloronaphthalene	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
2-Chlorophenol	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
2-Methylnaphthalene	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
2-Methylphenol	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
2-Nitroaniline	ND	25000		µg/Kg	5	3/31/2009 02:55 PM
2-Nitrophenol	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
3,3´-Dichlorobenzidine	ND	9900		µg/Kg	5	3/31/2009 02:55 PM
3-Nitroaniline	ND	25000		µg/Kg	5	3/31/2009 02:55 PM
4,6-Dinitro-2-methylphenol	ND	25000		µg/Kg	5	3/31/2009 02:55 PM
4-Bromophenyl-phenylether	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
4-Chloro-3-methylphenol	ND	9900		µg/Kg	5	3/31/2009 02:55 PM
4-Chloroaniline	ND	9900		µg/Kg	5	3/31/2009 02:55 PM
4-Chlorophenyl-phenylether	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
4-Methylphenol	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
4-Nitroaniline	ND	25000		µg/Kg	5	3/31/2009 02:55 PM
4-Nitrophenol	ND	25000		µg/Kg	5	3/31/2009 02:55 PM
Acenaphthene	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
Acenaphthylene	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
Anthracene	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
Benzidine (M)	ND	25000		µg/Kg	5	3/31/2009 02:55 PM
Benzo(a)anthracene	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
Benzo(a)pyrene	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
Benzo(b)fluoranthene	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
Benzo(g,h,i)perylene	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
Benzo(k)fluoranthene	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
Benzoic acid	ND	25000		µg/Kg	5	3/31/2009 02:55 PM
Benzyl alcohol	ND	9900		µg/Kg	5	3/31/2009 02:55 PM
Bis(2-chloroethoxy)methane	ND	5000		µg/Kg	5	3/31/2009 02:55 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	R-4
Lab Order:	104785	**Collection Date:**	3/26/2009 11:20:00 AM
Project:	DUMBARTON BRIDGE RETROFIT, E843	**Matrix:**	SOIL
Lab ID:	104785-004A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090331A QC Batch: 54354 PrepDate: 3/30/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
Bis(2-chloroisopropyl)ether	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
Bis(2-ethylhexyl)phthalate	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
Butylbenzylphthalate	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
Chrysene	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
Di-n-butylphthalate	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
Di-n-octylphthalate	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
Dibenz(a,h)anthracene	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
Dibenzofuran	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
Diethylphthalate	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
Dimethylphthalate	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
Fluoranthene	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
Fluorene	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
Hexachlorobenzene	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
Hexachlorobutadiene	ND	9900		µg/Kg	5	3/31/2009 02:55 PM
Hexachlorocyclopentadiene	ND	9900		µg/Kg	5	3/31/2009 02:55 PM
Hexachloroethane	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
Indeno(1,2,3-cd)pyrene	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
Isophorone	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
N-Nitrosodi-n-propylamine	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
N-Nitrosodiphenylamine	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
Naphthalene	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
Nitrobenzene	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
Pentachlorophenol	ND	25000		µg/Kg	5	3/31/2009 02:55 PM
Phenanthrene	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
Phenol	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
Pyrene	ND	5000		µg/Kg	5	3/31/2009 02:55 PM
Surr: 1,2-Dichlorobenzene-d4	90.1	49-103		%REC	5	3/31/2009 02:55 PM
Surr: 2,4,6-Tribromophenol	74.6	47-129		%REC	5	3/31/2009 02:55 PM
Surr: 2-Chlorophenol-d4	91.3	54-109		%REC	5	3/31/2009 02:55 PM
Surr: 2-Fluorobiphenyl	93.8	59-108		%REC	5	3/31/2009 02:55 PM
Surr: 2-Fluorophenol	89.9	50-111		%REC	5	3/31/2009 02:55 PM
Surr: 4-Terphenyl-d14	107	58-135		%REC	5	3/31/2009 02:55 PM
Surr: Nitrobenzene-d5	92.3	54-115		%REC	5	3/31/2009 02:55 PM
Surr: Phenol-d5	91.0	58-112		%REC	5	3/31/2009 02:55 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	R-5
Lab Order:	104785	**Collection Date:**	3/26/2009 2:55:00 PM
Project:	DUMBARTON BRIDGE RETROFIT, E843	**Matrix:**	SOIL
Lab ID:	104785-005A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090403F	QC Batch: 54488			PrepDate:	4/3/2009	Analyst: **admin**
Antimony	ND	2.0		mg/Kg	1	4/3/2009 05:51 PM
Arsenic	ND	1.0		mg/Kg	1	4/3/2009 05:51 PM
Barium	32	1.0		mg/Kg	1	4/3/2009 05:51 PM
Beryllium	ND	1.0		mg/Kg	1	4/3/2009 05:51 PM
Cadmium	ND	1.0		mg/Kg	1	4/3/2009 05:51 PM
Chromium	12	1.0		mg/Kg	1	4/3/2009 05:51 PM
Cobalt	3.5	1.0		mg/Kg	1	4/3/2009 05:51 PM
Copper	15	2.0		mg/Kg	1	4/3/2009 05:51 PM
Lead	130	1.0		mg/Kg	1	4/6/2009 11:31 AM
Molybdenum	ND	1.0		mg/Kg	1	4/3/2009 05:51 PM
Nickel	13	1.0		mg/Kg	1	4/3/2009 05:51 PM
Selenium	ND	1.0		mg/Kg	1	4/3/2009 05:51 PM
Silver	ND	1.0		mg/Kg	1	4/3/2009 05:51 PM
Thallium	ND	1.0		mg/Kg	1	4/3/2009 05:51 PM
Vanadium	9.6	1.0		mg/Kg	1	4/3/2009 05:51 PM
Zinc	110	1.0		mg/Kg	1	4/3/2009 05:51 PM
ORGANOCHLORINE PESTICIDES BY GC/ECD						
	EPA 3550B			**EPA 8081A**		
RunID: GC13_090403B	QC Batch: 54460			PrepDate:	4/1/2009	Analyst: **HL**
4,4´-DDD	ND	2.0		µg/Kg	1	4/3/2009 12:32 PM
4,4´-DDE	16	2.0		µg/Kg	1	4/3/2009 12:32 PM
4,4´-DDT	ND	2.0		µg/Kg	1	4/3/2009 12:32 PM
Aldrin	ND	1.0		µg/Kg	1	4/3/2009 12:32 PM
alpha-BHC	ND	1.0		µg/Kg	1	4/3/2009 12:32 PM
alpha-Chlordane	ND	1.0		µg/Kg	1	4/3/2009 12:32 PM
beta-BHC	ND	1.0		µg/Kg	1	4/3/2009 12:32 PM
Chlordane	ND	8.5		µg/Kg	1	4/3/2009 12:32 PM
delta-BHC	ND	1.0		µg/Kg	1	4/3/2009 12:32 PM
Dieldrin	ND	2.0		µg/Kg	1	4/3/2009 12:32 PM
Endosulfan I	ND	1.0		µg/Kg	1	4/3/2009 12:32 PM
Endosulfan II	ND	2.0		µg/Kg	1	4/3/2009 12:32 PM
Endosulfan sulfate	ND	2.0		µg/Kg	1	4/3/2009 12:32 PM
Endrin	ND	2.0		µg/Kg	1	4/3/2009 12:32 PM
Endrin aldehyde	ND	2.0		µg/Kg	1	4/3/2009 12:32 PM
Endrin ketone	ND	2.0		µg/Kg	1	4/3/2009 12:32 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	R-5
Lab Order:	104785	**Collection Date:**	3/26/2009 2:55:00 PM
Project:	DUMBARTON BRIDGE RETROFIT, E843	**Matrix:**	SOIL
Lab ID:	104785-005A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ORGANOCHLORINE PESTICIDES BY GC/ECD						
	EPA 3550B			**EPA 8081A**		
RunID: GC13_090403B	QC Batch: 54460			PrepDate:	4/1/2009	Analyst: **HL**
gamma-BHC	ND	1.0		µg/Kg	1	4/3/2009 12:32 PM
gamma-Chlordane	ND	1.0		µg/Kg	1	4/3/2009 12:32 PM
Heptachlor	ND	1.0		µg/Kg	1	4/3/2009 12:32 PM
Heptachlor epoxide	ND	1.0		µg/Kg	1	4/3/2009 12:32 PM
Methoxychlor	ND	5.0		µg/Kg	1	4/3/2009 12:32 PM
Toxaphene	ND	50		µg/Kg	1	4/3/2009 12:32 PM
Surr: Decachlorobiphenyl	132	20-142		%REC	1	4/3/2009 12:32 PM
Surr: Tetrachloro-m-xylene	38.5	25-115		%REC	1	4/3/2009 12:32 PM
PCBS BY GC/ECD						
	EPA 3550B			**EPA 8082**		
RunID: GC5_090401B	QC Batch: 54460			PrepDate:	4/1/2009	Analyst: **BB**
Aroclor 1016	ND	16		µg/Kg	1	4/2/2009 04:28 AM
Aroclor 1221	ND	33		µg/Kg	1	4/2/2009 04:28 AM
Aroclor 1232	ND	16		µg/Kg	1	4/2/2009 04:28 AM
Aroclor 1242	ND	16		µg/Kg	1	4/2/2009 04:28 AM
Aroclor 1248	ND	16		µg/Kg	1	4/2/2009 04:28 AM
Aroclor 1254	ND	16		µg/Kg	1	4/2/2009 04:28 AM
Aroclor 1260	ND	16		µg/Kg	1	4/2/2009 04:28 AM
Aroclor 1262	ND	16		µg/Kg	1	4/2/2009 04:28 AM
Aroclor 1268	ND	16		µg/Kg	1	4/2/2009 04:28 AM
Surr: Decachlorobiphenyl	52.1	30-124		%REC	1	4/2/2009 04:28 AM
Surr: Tetrachloro-m-xylene	77.6	40-118		%REC	1	4/2/2009 04:28 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090402C	QC Batch: 54464			PrepDate:	4/2/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	4/2/2009 12:26 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090331A	QC Batch: 54354			PrepDate:	3/30/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
1,2-Dichlorobenzene	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
1,3-Dichlorobenzene	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
1,4-Dichlorobenzene	ND	5000		µg/Kg	5	3/31/2009 03:24 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	R-5
Lab Order:	104785	**Collection Date:**	3/26/2009 2:55:00 PM
Project:	DUMBARTON BRIDGE RETROFIT, E843	**Matrix:**	SOIL
Lab ID:	104785-005A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090331A QC Batch: 54354 PrepDate: 3/30/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
2,4,6-Trichlorophenol	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
2,4-Dichlorophenol	ND	25000		µg/Kg	5	3/31/2009 03:24 PM
2,4-Dimethylphenol	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
2,4-Dinitrophenol	ND	25000		µg/Kg	5	3/31/2009 03:24 PM
2,4-Dinitrotoluene	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
2,6-Dinitrotoluene	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
2-Chloronaphthalene	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
2-Chlorophenol	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
2-Methylnaphthalene	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
2-Methylphenol	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
2-Nitroaniline	ND	25000		µg/Kg	5	3/31/2009 03:24 PM
2-Nitrophenol	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
3,3´-Dichlorobenzidine	ND	9900		µg/Kg	5	3/31/2009 03:24 PM
3-Nitroaniline	ND	25000		µg/Kg	5	3/31/2009 03:24 PM
4,6-Dinitro-2-methylphenol	ND	25000		µg/Kg	5	3/31/2009 03:24 PM
4-Bromophenyl-phenylether	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
4-Chloro-3-methylphenol	ND	9900		µg/Kg	5	3/31/2009 03:24 PM
4-Chloroaniline	ND	9900		µg/Kg	5	3/31/2009 03:24 PM
4-Chlorophenyl-phenylether	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
4-Methylphenol	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
4-Nitroaniline	ND	25000		µg/Kg	5	3/31/2009 03:24 PM
4-Nitrophenol	ND	25000		µg/Kg	5	3/31/2009 03:24 PM
Acenaphthene	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
Acenaphthylene	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
Anthracene	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
Benzidine (M)	ND	25000		µg/Kg	5	3/31/2009 03:24 PM
Benzo(a)anthracene	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
Benzo(a)pyrene	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
Benzo(b)fluoranthene	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
Benzo(g,h,i)perylene	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
Benzo(k)fluoranthene	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
Benzoic acid	ND	25000		µg/Kg	5	3/31/2009 03:24 PM
Benzyl alcohol	ND	9900		µg/Kg	5	3/31/2009 03:24 PM
Bis(2-chloroethoxy)methane	ND	5000		µg/Kg	5	3/31/2009 03:24 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	R-5
Lab Order:	104785	**Collection Date:**	3/26/2009 2:55:00 PM
Project:	DUMBARTON BRIDGE RETROFIT, E843	**Matrix:**	SOIL
Lab ID:	104785-005A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090331A QC Batch: 54354 PrepDate: 3/30/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
Bis(2-chloroisopropyl)ether	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
Bis(2-ethylhexyl)phthalate	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
Butylbenzylphthalate	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
Chrysene	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
Di-n-butylphthalate	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
Di-n-octylphthalate	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
Dibenz(a,h)anthracene	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
Dibenzofuran	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
Diethylphthalate	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
Dimethylphthalate	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
Fluoranthene	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
Fluorene	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
Hexachlorobenzene	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
Hexachlorobutadiene	ND	9900		µg/Kg	5	3/31/2009 03:24 PM
Hexachlorocyclopentadiene	ND	9900		µg/Kg	5	3/31/2009 03:24 PM
Hexachloroethane	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
Indeno(1,2,3-cd)pyrene	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
Isophorone	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
N-Nitrosodi-n-propylamine	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
N-Nitrosodiphenylamine	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
Naphthalene	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
Nitrobenzene	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
Pentachlorophenol	ND	25000		µg/Kg	5	3/31/2009 03:24 PM
Phenanthrene	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
Phenol	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
Pyrene	ND	5000		µg/Kg	5	3/31/2009 03:24 PM
Surr: 1,2-Dichlorobenzene-d4	89.3	49-103		%REC	5	3/31/2009 03:24 PM
Surr: 2,4,6-Tribromophenol	79.4	47-129		%REC	5	3/31/2009 03:24 PM
Surr: 2-Chlorophenol-d4	95.6	54-109		%REC	5	3/31/2009 03:24 PM
Surr: 2-Fluorobiphenyl	97.3	59-108		%REC	5	3/31/2009 03:24 PM
Surr: 2-Fluorophenol	91.4	50-111		%REC	5	3/31/2009 03:24 PM
Surr: 4-Terphenyl-d14	117	58-135		%REC	5	3/31/2009 03:24 PM
Surr: Nitrobenzene-d5	94.4	54-115		%REC	5	3/31/2009 03:24 PM
Surr: Phenol-d5	94.3	58-112		%REC	5	3/31/2009 03:24 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT: Geocon Consultants, Inc. **Client Sample ID:** R-6
Lab Order: 104785 **Collection Date:** 3/26/2009 2:50:00 PM
Project: DUMBARTON BRIDGE RETROFIT, E843 **Matrix:** SOIL
Lab ID: 104785-006A

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090403F	QC Batch: 54488			PrepDate:	4/3/2009	Analyst: **admin**
Antimony	ND	2.0		mg/Kg	1	4/3/2009 05:55 PM
Arsenic	ND	1.0		mg/Kg	1	4/3/2009 05:55 PM
Barium	61	1.0		mg/Kg	1	4/3/2009 05:55 PM
Beryllium	ND	1.0		mg/Kg	1	4/3/2009 05:55 PM
Cadmium	ND	1.0		mg/Kg	1	4/3/2009 05:55 PM
Chromium	8.5	1.0		mg/Kg	1	4/3/2009 05:55 PM
Cobalt	3.1	1.0		mg/Kg	1	4/3/2009 05:55 PM
Copper	14	2.0		mg/Kg	1	4/3/2009 05:55 PM
Lead	120	1.0		mg/Kg	1	4/6/2009 11:31 AM
Molybdenum	ND	1.0		mg/Kg	1	4/3/2009 05:55 PM
Nickel	10	1.0		mg/Kg	1	4/3/2009 05:55 PM
Selenium	ND	1.0		mg/Kg	1	4/3/2009 05:55 PM
Silver	ND	1.0		mg/Kg	1	4/3/2009 05:55 PM
Thallium	ND	1.0		mg/Kg	1	4/3/2009 05:55 PM
Vanadium	7.9	1.0		mg/Kg	1	4/3/2009 05:55 PM
Zinc	66	1.0		mg/Kg	1	4/3/2009 05:55 PM
ORGANOCHLORINE PESTICIDES BY GC/ECD						
	EPA 3550B			**EPA 8081A**		
RunID: GC13_090403B	QC Batch: 54460			PrepDate:	4/1/2009	Analyst: **HL**
4,4´-DDD	ND	2.0		µg/Kg	1	4/3/2009 11:12 AM
4,4´-DDE	ND	2.0		µg/Kg	1	4/3/2009 11:12 AM
4,4´-DDT	10	2.0		µg/Kg	1	4/3/2009 11:12 AM
Aldrin	ND	1.0		µg/Kg	1	4/3/2009 11:12 AM
alpha-BHC	ND	1.0		µg/Kg	1	4/3/2009 11:12 AM
alpha-Chlordane	ND	1.0		µg/Kg	1	4/3/2009 11:12 AM
beta-BHC	ND	1.0		µg/Kg	1	4/3/2009 11:12 AM
Chlordane	ND	8.5		µg/Kg	1	4/3/2009 11:12 AM
delta-BHC	ND	1.0		µg/Kg	1	4/3/2009 11:12 AM
Dieldrin	ND	2.0		µg/Kg	1	4/3/2009 11:12 AM
Endosulfan I	ND	1.0		µg/Kg	1	4/3/2009 11:12 AM
Endosulfan II	ND	2.0		µg/Kg	1	4/3/2009 11:12 AM
Endosulfan sulfate	ND	2.0		µg/Kg	1	4/3/2009 11:12 AM
Endrin	ND	2.0		µg/Kg	1	4/3/2009 11:12 AM
Endrin aldehyde	ND	2.0		µg/Kg	1	4/3/2009 11:12 AM
Endrin ketone	ND	2.0		µg/Kg	1	4/3/2009 11:12 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	R-6
Lab Order:	104785	**Collection Date:**	3/26/2009 2:50:00 PM
Project:	DUMBARTON BRIDGE RETROFIT, E843	**Matrix:**	SOIL
Lab ID:	104785-006A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ORGANOCHLORINE PESTICIDES BY GC/ECD						
	EPA 3550B			**EPA 8081A**		
RunID: GC13_090403B	QC Batch: 54460			PrepDate:	4/1/2009	Analyst: **HL**
gamma-BHC	ND	1.0		µg/Kg	1	4/3/2009 11:12 AM
gamma-Chlordane	ND	1.0		µg/Kg	1	4/3/2009 11:12 AM
Heptachlor	ND	1.0		µg/Kg	1	4/3/2009 11:12 AM
Heptachlor epoxide	ND	1.0		µg/Kg	1	4/3/2009 11:12 AM
Methoxychlor	ND	5.0		µg/Kg	1	4/3/2009 11:12 AM
Toxaphene	ND	50		µg/Kg	1	4/3/2009 11:12 AM
Surr: Decachlorobiphenyl	67.8	20-142		%REC	1	4/3/2009 11:12 AM
Surr: Tetrachloro-m-xylene	58.6	25-115		%REC	1	4/3/2009 11:12 AM
PCBS BY GC/ECD						
	EPA 3550B			**EPA 8082**		
RunID: GC5_090401B	QC Batch: 54460			PrepDate:	4/1/2009	Analyst: **BB**
Aroclor 1016	ND	16		µg/Kg	1	4/2/2009 04:58 AM
Aroclor 1221	ND	33		µg/Kg	1	4/2/2009 04:58 AM
Aroclor 1232	ND	16		µg/Kg	1	4/2/2009 04:58 AM
Aroclor 1242	ND	16		µg/Kg	1	4/2/2009 04:58 AM
Aroclor 1248	ND	16		µg/Kg	1	4/2/2009 04:58 AM
Aroclor 1254	ND	16		µg/Kg	1	4/2/2009 04:58 AM
Aroclor 1260	ND	16		µg/Kg	1	4/2/2009 04:58 AM
Aroclor 1262	ND	16		µg/Kg	1	4/2/2009 04:58 AM
Aroclor 1268	ND	16		µg/Kg	1	4/2/2009 04:58 AM
Surr: Decachlorobiphenyl	59.7	30-124		%REC	1	4/2/2009 04:58 AM
Surr: Tetrachloro-m-xylene	77.2	40-118		%REC	1	4/2/2009 04:58 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090402C	QC Batch: 54464			PrepDate:	4/2/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	4/2/2009 12:28 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090331A	QC Batch: 54354			PrepDate:	3/30/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
1,2-Dichlorobenzene	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
1,3-Dichlorobenzene	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
1,4-Dichlorobenzene	ND	5000		µg/Kg	5	3/31/2009 03:53 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	R-6
Lab Order:	104785	**Collection Date:**	3/26/2009 2:50:00 PM
Project:	DUMBARTON BRIDGE RETROFIT, E843	**Matrix:**	SOIL
Lab ID:	104785-006A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090331A QC Batch: 54354 PrepDate: 3/30/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
2,4,6-Trichlorophenol	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
2,4-Dichlorophenol	ND	25000		µg/Kg	5	3/31/2009 03:53 PM
2,4-Dimethylphenol	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
2,4-Dinitrophenol	ND	25000		µg/Kg	5	3/31/2009 03:53 PM
2,4-Dinitrotoluene	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
2,6-Dinitrotoluene	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
2-Chloronaphthalene	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
2-Chlorophenol	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
2-Methylnaphthalene	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
2-Methylphenol	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
2-Nitroaniline	ND	25000		µg/Kg	5	3/31/2009 03:53 PM
2-Nitrophenol	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
3,3´-Dichlorobenzidine	ND	9900		µg/Kg	5	3/31/2009 03:53 PM
3-Nitroaniline	ND	25000		µg/Kg	5	3/31/2009 03:53 PM
4,6-Dinitro-2-methylphenol	ND	25000		µg/Kg	5	3/31/2009 03:53 PM
4-Bromophenyl-phenylether	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
4-Chloro-3-methylphenol	ND	9900		µg/Kg	5	3/31/2009 03:53 PM
4-Chloroaniline	ND	9900		µg/Kg	5	3/31/2009 03:53 PM
4-Chlorophenyl-phenylether	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
4-Methylphenol	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
4-Nitroaniline	ND	25000		µg/Kg	5	3/31/2009 03:53 PM
4-Nitrophenol	ND	25000		µg/Kg	5	3/31/2009 03:53 PM
Acenaphthene	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
Acenaphthylene	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
Anthracene	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
Benzidine (M)	ND	25000		µg/Kg	5	3/31/2009 03:53 PM
Benzo(a)anthracene	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
Benzo(a)pyrene	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
Benzo(b)fluoranthene	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
Benzo(g,h,i)perylene	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
Benzo(k)fluoranthene	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
Benzoic acid	ND	25000		µg/Kg	5	3/31/2009 03:53 PM
Benzyl alcohol	ND	9900		µg/Kg	5	3/31/2009 03:53 PM
Bis(2-chloroethoxy)methane	ND	5000		µg/Kg	5	3/31/2009 03:53 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	R-6
Lab Order:	104785	**Collection Date:**	3/26/2009 2:50:00 PM
Project:	DUMBARTON BRIDGE RETROFIT, E843	**Matrix:**	SOIL
Lab ID:	104785-006A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 3550B				**EPA 8270C**		
RunID: MS 13_090331A	QC Batch: 54354			PrepDate: 3/30/2009		Analyst: **DMP**
Bis(2-chloroethyl)ether	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
Bis(2-chloroisopropyl)ether	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
Bis(2-ethylhexyl)phthalate	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
Butylbenzylphthalate	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
Chrysene	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
Di-n-butylphthalate	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
Di-n-octylphthalate	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
Dibenz(a,h)anthracene	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
Dibenzofuran	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
Diethylphthalate	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
Dimethylphthalate	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
Fluoranthene	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
Fluorene	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
Hexachlorobenzene	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
Hexachlorobutadiene	ND	9900		µg/Kg	5	3/31/2009 03:53 PM
Hexachlorocyclopentadiene	ND	9900		µg/Kg	5	3/31/2009 03:53 PM
Hexachloroethane	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
Indeno(1,2,3-cd)pyrene	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
Isophorone	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
N-Nitrosodi-n-propylamine	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
N-Nitrosodiphenylamine	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
Naphthalene	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
Nitrobenzene	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
Pentachlorophenol	ND	25000		µg/Kg	5	3/31/2009 03:53 PM
Phenanthrene	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
Phenol	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
Pyrene	ND	5000		µg/Kg	5	3/31/2009 03:53 PM
Surr: 1,2-Dichlorobenzene-d4	83.2	49-103		%REC	5	3/31/2009 03:53 PM
Surr: 2,4,6-Tribromophenol	74.5	47-129		%REC	5	3/31/2009 03:53 PM
Surr: 2-Chlorophenol-d4	87.7	54-109		%REC	5	3/31/2009 03:53 PM
Surr: 2-Fluorobiphenyl	89.3	59-108		%REC	5	3/31/2009 03:53 PM
Surr: 2-Fluorophenol	87.5	50-111		%REC	5	3/31/2009 03:53 PM
Surr: 4-Terphenyl-d14	109	58-135		%REC	5	3/31/2009 03:53 PM
Surr: Nitrobenzene-d5	88.3	54-115		%REC	5	3/31/2009 03:53 PM
Surr: Phenol-d5	86.5	58-112		%REC	5	3/31/2009 03:53 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	R-7
Lab Order:	104785	**Collection Date:**	3/26/2009 2:46:00 PM
Project:	DUMBARTON BRIDGE RETROFIT, E843	**Matrix:**	SOIL
Lab ID:	104785-007A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090403F	QC Batch: 54488			PrepDate:	4/3/2009	Analyst: **admin**
Antimony	ND	2.0		mg/Kg	1	4/3/2009 06:07 PM
Arsenic	1.6	1.0		mg/Kg	1	4/3/2009 06:07 PM
Barium	39	1.0		mg/Kg	1	4/3/2009 06:07 PM
Beryllium	ND	1.0		mg/Kg	1	4/3/2009 06:07 PM
Cadmium	ND	1.0		mg/Kg	1	4/3/2009 06:07 PM
Chromium	20	1.0		mg/Kg	1	4/3/2009 06:07 PM
Cobalt	5.1	1.0		mg/Kg	1	4/3/2009 06:07 PM
Copper	21	2.0		mg/Kg	1	4/3/2009 06:07 PM
Lead	350	1.0		mg/Kg	1	4/6/2009 11:32 AM
Molybdenum	ND	1.0		mg/Kg	1	4/3/2009 06:07 PM
Nickel	24	1.0		mg/Kg	1	4/3/2009 06:07 PM
Selenium	ND	1.0		mg/Kg	1	4/3/2009 06:07 PM
Silver	ND	1.0		mg/Kg	1	4/3/2009 06:07 PM
Thallium	ND	1.0		mg/Kg	1	4/3/2009 06:07 PM
Vanadium	13	1.0		mg/Kg	1	4/3/2009 06:07 PM
Zinc	170	1.0		mg/Kg	1	4/3/2009 06:07 PM
ORGANOCHLORINE PESTICIDES BY GC/ECD						
	EPA 3550B			**EPA 8081A**		
RunID: GC13_090403B	QC Batch: 54460			PrepDate:	4/1/2009	Analyst: **HL**
4,4´-DDD	ND	2.0		µg/Kg	1	4/3/2009 12:45 PM
4,4´-DDE	ND	2.0		µg/Kg	1	4/3/2009 12:45 PM
4,4´-DDT	ND	2.0		µg/Kg	1	4/3/2009 12:45 PM
Aldrin	ND	1.0		µg/Kg	1	4/3/2009 12:45 PM
alpha-BHC	ND	1.0		µg/Kg	1	4/3/2009 12:45 PM
alpha-Chlordane	ND	1.0		µg/Kg	1	4/3/2009 12:45 PM
beta-BHC	ND	1.0		µg/Kg	1	4/3/2009 12:45 PM
Chlordane	ND	8.5		µg/Kg	1	4/3/2009 12:45 PM
delta-BHC	ND	1.0		µg/Kg	1	4/3/2009 12:45 PM
Dieldrin	ND	2.0		µg/Kg	1	4/3/2009 12:45 PM
Endosulfan I	ND	1.0		µg/Kg	1	4/3/2009 12:45 PM
Endosulfan II	ND	2.0		µg/Kg	1	4/3/2009 12:45 PM
Endosulfan sulfate	ND	2.0		µg/Kg	1	4/3/2009 12:45 PM
Endrin	ND	2.0		µg/Kg	1	4/3/2009 12:45 PM
Endrin aldehyde	ND	2.0		µg/Kg	1	4/3/2009 12:45 PM
Endrin ketone	ND	2.0		µg/Kg	1	4/3/2009 12:45 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	R-7
Lab Order:	104785	**Collection Date:**	3/26/2009 2:46:00 PM
Project:	DUMBARTON BRIDGE RETROFIT, E843	**Matrix:**	SOIL
Lab ID:	104785-007A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ORGANOCHLORINE PESTICIDES BY GC/ECD						
	EPA 3550B			**EPA 8081A**		
RunID: GC13_090403B	QC Batch: 54460			PrepDate:	4/1/2009	Analyst: **HL**
gamma-BHC	ND	1.0		µg/Kg	1	4/3/2009 12:45 PM
gamma-Chlordane	ND	1.0		µg/Kg	1	4/3/2009 12:45 PM
Heptachlor	ND	1.0		µg/Kg	1	4/3/2009 12:45 PM
Heptachlor epoxide	ND	1.0		µg/Kg	1	4/3/2009 12:45 PM
Methoxychlor	ND	5.0		µg/Kg	1	4/3/2009 12:45 PM
Toxaphene	ND	50		µg/Kg	1	4/3/2009 12:45 PM
Surr: Decachlorobiphenyl	77.8	20-142		%REC	1	4/3/2009 12:45 PM
Surr: Tetrachloro-m-xylene	56.8	25-115		%REC	1	4/3/2009 12:45 PM
PCBS BY GC/ECD						
	EPA 3550B			**EPA 8082**		
RunID: GC5_090401B	QC Batch: 54460			PrepDate:	4/1/2009	Analyst: **BB**
Aroclor 1016	ND	16		µg/Kg	1	4/2/2009 05:28 AM
Aroclor 1221	ND	33		µg/Kg	1	4/2/2009 05:28 AM
Aroclor 1232	ND	16		µg/Kg	1	4/2/2009 05:28 AM
Aroclor 1242	ND	16		µg/Kg	1	4/2/2009 05:28 AM
Aroclor 1248	ND	16		µg/Kg	1	4/2/2009 05:28 AM
Aroclor 1254	ND	16		µg/Kg	1	4/2/2009 05:28 AM
Aroclor 1260	ND	16		µg/Kg	1	4/2/2009 05:28 AM
Aroclor 1262	ND	16		µg/Kg	1	4/2/2009 05:28 AM
Aroclor 1268	ND	16		µg/Kg	1	4/2/2009 05:28 AM
Surr: Decachlorobiphenyl	65.1	30-124		%REC	1	4/2/2009 05:28 AM
Surr: Tetrachloro-m-xylene	84.2	40-118		%REC	1	4/2/2009 05:28 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090402C	QC Batch: 54464			PrepDate:	4/2/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	4/2/2009 12:53 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS6_090401A	QC Batch: 54431			PrepDate:	4/1/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
1,2-Dichlorobenzene	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
1,3-Dichlorobenzene	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
1,4-Dichlorobenzene	ND	5000		µg/Kg	5	4/2/2009 01:02 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Geocon Consultants, Inc. **Client Sample ID:** R-7
Lab Order: 104785 **Collection Date:** 3/26/2009 2:46:00 PM
Project: DUMBARTON BRIDGE RETROFIT, E843 **Matrix:** SOIL
Lab ID: 104785-007A

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS
EPA 3550B **EPA 8270C**

RunID: MS6_090401A QC Batch: 54431 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
2,4,6-Trichlorophenol	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
2,4-Dichlorophenol	ND	25000		µg/Kg	5	4/2/2009 01:02 PM
2,4-Dimethylphenol	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
2,4-Dinitrophenol	ND	25000		µg/Kg	5	4/2/2009 01:02 PM
2,4-Dinitrotoluene	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
2,6-Dinitrotoluene	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
2-Chloronaphthalene	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
2-Chlorophenol	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
2-Methylnaphthalene	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
2-Methylphenol	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
2-Nitroaniline	ND	25000		µg/Kg	5	4/2/2009 01:02 PM
2-Nitrophenol	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
3,3´-Dichlorobenzidine	ND	9900		µg/Kg	5	4/2/2009 01:02 PM
3-Nitroaniline	ND	25000		µg/Kg	5	4/2/2009 01:02 PM
4,6-Dinitro-2-methylphenol	ND	25000		µg/Kg	5	4/2/2009 01:02 PM
4-Bromophenyl-phenylether	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
4-Chloro-3-methylphenol	ND	9900		µg/Kg	5	4/2/2009 01:02 PM
4-Chloroaniline	ND	9900		µg/Kg	5	4/2/2009 01:02 PM
4-Chlorophenyl-phenylether	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
4-Methylphenol	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
4-Nitroaniline	ND	25000		µg/Kg	5	4/2/2009 01:02 PM
4-Nitrophenol	ND	25000		µg/Kg	5	4/2/2009 01:02 PM
Acenaphthene	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
Acenaphthylene	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
Anthracene	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
Benzidine (M)	ND	25000		µg/Kg	5	4/2/2009 01:02 PM
Benzo(a)anthracene	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
Benzo(a)pyrene	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
Benzo(b)fluoranthene	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
Benzo(g,h,i)perylene	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
Benzo(k)fluoranthene	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
Benzoic acid	ND	25000		µg/Kg	5	4/2/2009 01:02 PM
Benzyl alcohol	ND	9900		µg/Kg	5	4/2/2009 01:02 PM
Bis(2-chloroethoxy)methane	ND	5000		µg/Kg	5	4/2/2009 01:02 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	R-7
Lab Order:	104785	**Collection Date:**	3/26/2009 2:46:00 PM
Project:	DUMBARTON BRIDGE RETROFIT, E843	**Matrix:**	SOIL
Lab ID:	104785-007A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS6_090401A QC Batch: 54431 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
Bis(2-chloroisopropyl)ether	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
Bis(2-ethylhexyl)phthalate	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
Butylbenzylphthalate	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
Chrysene	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
Di-n-butylphthalate	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
Di-n-octylphthalate	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
Dibenz(a,h)anthracene	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
Dibenzofuran	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
Diethylphthalate	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
Dimethylphthalate	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
Fluoranthene	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
Fluorene	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
Hexachlorobenzene	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
Hexachlorobutadiene	ND	9900		µg/Kg	5	4/2/2009 01:02 PM
Hexachlorocyclopentadiene	ND	9900		µg/Kg	5	4/2/2009 01:02 PM
Hexachloroethane	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
Indeno(1,2,3-cd)pyrene	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
Isophorone	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
N-Nitrosodi-n-propylamine	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
N-Nitrosodiphenylamine	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
Naphthalene	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
Nitrobenzene	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
Pentachlorophenol	ND	25000		µg/Kg	5	4/2/2009 01:02 PM
Phenanthrene	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
Phenol	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
Pyrene	ND	5000		µg/Kg	5	4/2/2009 01:02 PM
Surr: 1,2-Dichlorobenzene-d4	86.6	49-103		%REC	5	4/2/2009 01:02 PM
Surr: 2,4,6-Tribromophenol	83.3	47-129		%REC	5	4/2/2009 01:02 PM
Surr: 2-Chlorophenol-d4	87.1	54-109		%REC	5	4/2/2009 01:02 PM
Surr: 2-Fluorobiphenyl	91.9	59-108		%REC	5	4/2/2009 01:02 PM
Surr: 2-Fluorophenol	89.5	50-111		%REC	5	4/2/2009 01:02 PM
Surr: 4-Terphenyl-d14	107	58-135		%REC	5	4/2/2009 01:02 PM
Surr: Nitrobenzene-d5	101	54-115		%REC	5	4/2/2009 01:02 PM
Surr: Phenol-d5	86.2	58-112		%REC	5	4/2/2009 01:02 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	R-8
Lab Order:	104785	**Collection Date:**	3/26/2009 2:38:00 PM
Project:	DUMBARTON BRIDGE RETROFIT, E843	**Matrix:**	SOIL
Lab ID:	104785-008A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090403F	QC Batch: 54488			PrepDate: 4/3/2009		Analyst: **admin**
Antimony	ND	2.0		mg/Kg	1	4/3/2009 06:10 PM
Arsenic	2.0	1.0		mg/Kg	1	4/3/2009 06:10 PM
Barium	80	1.0		mg/Kg	1	4/3/2009 06:10 PM
Beryllium	ND	1.0		mg/Kg	1	4/3/2009 06:10 PM
Cadmium	1.1	1.0		mg/Kg	1	4/3/2009 06:10 PM
Chromium	25	1.0		mg/Kg	1	4/3/2009 06:10 PM
Cobalt	9.1	1.0		mg/Kg	1	4/3/2009 06:10 PM
Copper	30	2.0		mg/Kg	1	4/3/2009 06:10 PM
Lead	390	1.0		mg/Kg	1	4/6/2009 11:33 AM
Molybdenum	ND	1.0		mg/Kg	1	4/3/2009 06:10 PM
Nickel	26	1.0		mg/Kg	1	4/3/2009 06:10 PM
Selenium	ND	1.0		mg/Kg	1	4/3/2009 06:10 PM
Silver	ND	1.0		mg/Kg	1	4/3/2009 06:10 PM
Thallium	ND	1.0		mg/Kg	1	4/3/2009 06:10 PM
Vanadium	20	1.0		mg/Kg	1	4/3/2009 06:10 PM
Zinc	390	1.0		mg/Kg	1	4/3/2009 06:10 PM
ORGANOCHLORINE PESTICIDES BY GC/ECD						
	EPA 3550B			**EPA 8081A**		
RunID: GC13_090403B	QC Batch: 54460			PrepDate: 4/1/2009		Analyst: **HL**
4,4´-DDD	ND	2.0		µg/Kg	1	4/3/2009 12:58 PM
4,4´-DDE	ND	2.0		µg/Kg	1	4/3/2009 12:58 PM
4,4´-DDT	ND	2.0		µg/Kg	1	4/3/2009 12:58 PM
Aldrin	ND	1.0		µg/Kg	1	4/3/2009 12:58 PM
alpha-BHC	ND	1.0		µg/Kg	1	4/3/2009 12:58 PM
alpha-Chlordane	ND	1.0		µg/Kg	1	4/3/2009 12:58 PM
beta-BHC	ND	1.0		µg/Kg	1	4/3/2009 12:58 PM
Chlordane	ND	8.5		µg/Kg	1	4/3/2009 12:58 PM
delta-BHC	ND	1.0		µg/Kg	1	4/3/2009 12:58 PM
Dieldrin	ND	2.0		µg/Kg	1	4/3/2009 12:58 PM
Endosulfan I	ND	1.0		µg/Kg	1	4/3/2009 12:58 PM
Endosulfan II	ND	2.0		µg/Kg	1	4/3/2009 12:58 PM
Endosulfan sulfate	ND	2.0		µg/Kg	1	4/3/2009 12:58 PM
Endrin	ND	2.0		µg/Kg	1	4/3/2009 12:58 PM
Endrin aldehyde	ND	2.0		µg/Kg	1	4/3/2009 12:58 PM
Endrin ketone	ND	2.0		µg/Kg	1	4/3/2009 12:58 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	R-8
Lab Order:	104785	**Collection Date:**	3/26/2009 2:38:00 PM
Project:	DUMBARTON BRIDGE RETROFIT, E843	**Matrix:**	SOIL
Lab ID:	104785-008A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ORGANOCHLORINE PESTICIDES BY GC/ECD						
EPA 3550B				**EPA 8081A**		
RunID: GC13_090403B	QC Batch: 54460			PrepDate:	4/1/2009	Analyst: **HL**
gamma-BHC	ND	1.0		µg/Kg	1	4/3/2009 12:58 PM
gamma-Chlordane	ND	1.0		µg/Kg	1	4/3/2009 12:58 PM
Heptachlor	ND	1.0		µg/Kg	1	4/3/2009 12:58 PM
Heptachlor epoxide	ND	1.0		µg/Kg	1	4/3/2009 12:58 PM
Methoxychlor	ND	5.0		µg/Kg	1	4/3/2009 12:58 PM
Toxaphene	ND	50		µg/Kg	1	4/3/2009 12:58 PM
Surr: Decachlorobiphenyl	44.0	20-142		%REC	1	4/3/2009 12:58 PM
Surr: Tetrachloro-m-xylene	34.9	25-115		%REC	1	4/3/2009 12:58 PM
PCBS BY GC/ECD						
EPA 3550B				**EPA 8082**		
RunID: GC5_090401B	QC Batch: 54460			PrepDate:	4/1/2009	Analyst: **BB**
Aroclor 1016	ND	16		µg/Kg	1	4/2/2009 05:58 AM
Aroclor 1221	ND	33		µg/Kg	1	4/2/2009 05:58 AM
Aroclor 1232	ND	16		µg/Kg	1	4/2/2009 05:58 AM
Aroclor 1242	ND	16		µg/Kg	1	4/2/2009 05:58 AM
Aroclor 1248	ND	16		µg/Kg	1	4/2/2009 05:58 AM
Aroclor 1254	ND	16		µg/Kg	1	4/2/2009 05:58 AM
Aroclor 1260	ND	16		µg/Kg	1	4/2/2009 05:58 AM
Aroclor 1262	ND	16		µg/Kg	1	4/2/2009 05:58 AM
Aroclor 1268	ND	16		µg/Kg	1	4/2/2009 05:58 AM
Surr: Decachlorobiphenyl	42.6	30-124		%REC	1	4/2/2009 05:58 AM
Surr: Tetrachloro-m-xylene	54.2	40-118		%REC	1	4/2/2009 05:58 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090402C	QC Batch: 54464			PrepDate:	4/2/2009	Analyst: **RQ**
Mercury	0.14	0.10		mg/Kg	1	4/2/2009 12:55 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 3550B				**EPA 8270C**		
RunID: MS6_090401A	QC Batch: 54431			PrepDate:	4/1/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
1,2-Dichlorobenzene	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
1,3-Dichlorobenzene	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
1,4-Dichlorobenzene	ND	5000		µg/Kg	5	4/2/2009 01:31 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	R-8
Lab Order:	104785	**Collection Date:**	3/26/2009 2:38:00 PM
Project:	DUMBARTON BRIDGE RETROFIT, E843	**Matrix:**	SOIL
Lab ID:	104785-008A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS6_090401A QC Batch: 54431 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
2,4,6-Trichlorophenol	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
2,4-Dichlorophenol	ND	25000		µg/Kg	5	4/2/2009 01:31 PM
2,4-Dimethylphenol	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
2,4-Dinitrophenol	ND	25000		µg/Kg	5	4/2/2009 01:31 PM
2,4-Dinitrotoluene	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
2,6-Dinitrotoluene	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
2-Chloronaphthalene	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
2-Chlorophenol	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
2-Methylnaphthalene	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
2-Methylphenol	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
2-Nitroaniline	ND	25000		µg/Kg	5	4/2/2009 01:31 PM
2-Nitrophenol	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
3,3´-Dichlorobenzidine	ND	9900		µg/Kg	5	4/2/2009 01:31 PM
3-Nitroaniline	ND	25000		µg/Kg	5	4/2/2009 01:31 PM
4,6-Dinitro-2-methylphenol	ND	25000		µg/Kg	5	4/2/2009 01:31 PM
4-Bromophenyl-phenylether	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
4-Chloro-3-methylphenol	ND	9900		µg/Kg	5	4/2/2009 01:31 PM
4-Chloroaniline	ND	9900		µg/Kg	5	4/2/2009 01:31 PM
4-Chlorophenyl-phenylether	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
4-Methylphenol	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
4-Nitroaniline	ND	25000		µg/Kg	5	4/2/2009 01:31 PM
4-Nitrophenol	ND	25000		µg/Kg	5	4/2/2009 01:31 PM
Acenaphthene	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
Acenaphthylene	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
Anthracene	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
Benzidine (M)	ND	25000		µg/Kg	5	4/2/2009 01:31 PM
Benzo(a)anthracene	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
Benzo(a)pyrene	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
Benzo(b)fluoranthene	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
Benzo(g,h,i)perylene	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
Benzo(k)fluoranthene	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
Benzoic acid	ND	25000		µg/Kg	5	4/2/2009 01:31 PM
Benzyl alcohol	ND	9900		µg/Kg	5	4/2/2009 01:31 PM
Bis(2-chloroethoxy)methane	ND	5000		µg/Kg	5	4/2/2009 01:31 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	R-8
Lab Order:	104785	**Collection Date:**	3/26/2009 2:38:00 PM
Project:	DUMBARTON BRIDGE RETROFIT, E843	**Matrix:**	SOIL
Lab ID:	104785-008A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS6_090401A	QC Batch: 54431			PrepDate:	4/1/2009	Analyst: **DMP**
Bis(2-chloroethyl)ether	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
Bis(2-chloroisopropyl)ether	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
Bis(2-ethylhexyl)phthalate	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
Butylbenzylphthalate	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
Chrysene	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
Di-n-butylphthalate	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
Di-n-octylphthalate	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
Dibenz(a,h)anthracene	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
Dibenzofuran	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
Diethylphthalate	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
Dimethylphthalate	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
Fluoranthene	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
Fluorene	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
Hexachlorobenzene	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
Hexachlorobutadiene	ND	9900		µg/Kg	5	4/2/2009 01:31 PM
Hexachlorocyclopentadiene	ND	9900		µg/Kg	5	4/2/2009 01:31 PM
Hexachloroethane	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
Indeno(1,2,3-cd)pyrene	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
Isophorone	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
N-Nitrosodi-n-propylamine	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
N-Nitrosodiphenylamine	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
Naphthalene	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
Nitrobenzene	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
Pentachlorophenol	ND	25000		µg/Kg	5	4/2/2009 01:31 PM
Phenanthrene	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
Phenol	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
Pyrene	ND	5000		µg/Kg	5	4/2/2009 01:31 PM
Surr: 1,2-Dichlorobenzene-d4	75.7	49-103		%REC	5	4/2/2009 01:31 PM
Surr: 2,4,6-Tribromophenol	74.5	47-129		%REC	5	4/2/2009 01:31 PM
Surr: 2-Chlorophenol-d4	79.6	54-109		%REC	5	4/2/2009 01:31 PM
Surr: 2-Fluorobiphenyl	81.5	59-108		%REC	5	4/2/2009 01:31 PM
Surr: 2-Fluorophenol	78.2	50-111		%REC	5	4/2/2009 01:31 PM
Surr: 4-Terphenyl-d14	93.2	58-135		%REC	5	4/2/2009 01:31 PM
Surr: Nitrobenzene-d5	89.5	54-115		%REC	5	4/2/2009 01:31 PM
Surr: Phenol-d5	75.2	58-112		%REC	5	4/2/2009 01:31 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	R-9
Lab Order:	104785	**Collection Date:**	3/26/2009 2:25:00 PM
Project:	DUMBARTON BRIDGE RETROFIT, E843	**Matrix:**	SOIL
Lab ID:	104785-009A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090403F	QC Batch: 54488			PrepDate: 4/3/2009		Analyst: **admin**
Antimony	ND	2.0		mg/Kg	1	4/3/2009 06:14 PM
Arsenic	1.7	1.0		mg/Kg	1	4/3/2009 06:14 PM
Barium	65	1.0		mg/Kg	1	4/3/2009 06:14 PM
Beryllium	ND	1.0		mg/Kg	1	4/3/2009 06:14 PM
Cadmium	ND	1.0		mg/Kg	1	4/3/2009 06:14 PM
Chromium	20	1.0		mg/Kg	1	4/3/2009 06:14 PM
Cobalt	5.5	1.0		mg/Kg	1	4/3/2009 06:14 PM
Copper	27	2.0		mg/Kg	1	4/3/2009 06:14 PM
Lead	430	1.0		mg/Kg	1	4/6/2009 11:33 AM
Molybdenum	ND	1.0		mg/Kg	1	4/3/2009 06:14 PM
Nickel	19	1.0		mg/Kg	1	4/3/2009 06:14 PM
Selenium	ND	1.0		mg/Kg	1	4/3/2009 06:14 PM
Silver	ND	1.0		mg/Kg	1	4/3/2009 06:14 PM
Thallium	ND	1.0		mg/Kg	1	4/3/2009 06:14 PM
Vanadium	17	1.0		mg/Kg	1	4/3/2009 06:14 PM
Zinc	310	1.0		mg/Kg	1	4/3/2009 06:14 PM
ORGANOCHLORINE PESTICIDES BY GC/ECD						
	EPA 3550B			**EPA 8081A**		
RunID: GC13_090403B	QC Batch: 54460			PrepDate: 4/1/2009		Analyst: **HL**
4,4´-DDD	ND	2.0		µg/Kg	1	4/3/2009 01:11 PM
4,4´-DDE	ND	2.0		µg/Kg	1	4/3/2009 01:11 PM
4,4´-DDT	ND	2.0		µg/Kg	1	4/3/2009 01:11 PM
Aldrin	ND	1.0		µg/Kg	1	4/3/2009 01:11 PM
alpha-BHC	ND	1.0		µg/Kg	1	4/3/2009 01:11 PM
alpha-Chlordane	ND	1.0		µg/Kg	1	4/3/2009 01:11 PM
beta-BHC	ND	1.0		µg/Kg	1	4/3/2009 01:11 PM
Chlordane	ND	8.5		µg/Kg	1	4/3/2009 01:11 PM
delta-BHC	ND	1.0		µg/Kg	1	4/3/2009 01:11 PM
Dieldrin	ND	2.0		µg/Kg	1	4/3/2009 01:11 PM
Endosulfan I	ND	1.0		µg/Kg	1	4/3/2009 01:11 PM
Endosulfan II	ND	2.0		µg/Kg	1	4/3/2009 01:11 PM
Endosulfan sulfate	ND	2.0		µg/Kg	1	4/3/2009 01:11 PM
Endrin	ND	2.0		µg/Kg	1	4/3/2009 01:11 PM
Endrin aldehyde	ND	2.0		µg/Kg	1	4/3/2009 01:11 PM
Endrin ketone	ND	2.0		µg/Kg	1	4/3/2009 01:11 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	R-9
Lab Order:	104785	**Collection Date:**	3/26/2009 2:25:00 PM
Project:	DUMBARTON BRIDGE RETROFIT, E843	**Matrix:**	SOIL
Lab ID:	104785-009A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ORGANOCHLORINE PESTICIDES BY GC/ECD						
	EPA 3550B			**EPA 8081A**		
RunID: GC13_090403B	QC Batch: 54460			PrepDate:	4/1/2009	Analyst: **HL**
gamma-BHC	ND	1.0		µg/Kg	1	4/3/2009 01:11 PM
gamma-Chlordane	ND	1.0		µg/Kg	1	4/3/2009 01:11 PM
Heptachlor	ND	1.0		µg/Kg	1	4/3/2009 01:11 PM
Heptachlor epoxide	ND	1.0		µg/Kg	1	4/3/2009 01:11 PM
Methoxychlor	ND	5.0		µg/Kg	1	4/3/2009 01:11 PM
Toxaphene	ND	50		µg/Kg	1	4/3/2009 01:11 PM
Surr: Decachlorobiphenyl	72.8	20-142		%REC	1	4/3/2009 01:11 PM
Surr: Tetrachloro-m-xylene	50.7	25-115		%REC	1	4/3/2009 01:11 PM
PCBS BY GC/ECD						
	EPA 3550B			**EPA 8082**		
RunID: GC5_090401B	QC Batch: 54460			PrepDate:	4/1/2009	Analyst: **BB**
Aroclor 1016	ND	16		µg/Kg	1	4/2/2009 06:27 AM
Aroclor 1221	ND	33		µg/Kg	1	4/2/2009 06:27 AM
Aroclor 1232	ND	16		µg/Kg	1	4/2/2009 06:27 AM
Aroclor 1242	ND	16		µg/Kg	1	4/2/2009 06:27 AM
Aroclor 1248	ND	16		µg/Kg	1	4/2/2009 06:27 AM
Aroclor 1254	ND	16		µg/Kg	1	4/2/2009 06:27 AM
Aroclor 1260	ND	16		µg/Kg	1	4/2/2009 06:27 AM
Aroclor 1262	ND	16		µg/Kg	1	4/2/2009 06:27 AM
Aroclor 1268	ND	16		µg/Kg	1	4/2/2009 06:27 AM
Surr: Decachlorobiphenyl	53.3	30-124		%REC	1	4/2/2009 06:27 AM
Surr: Tetrachloro-m-xylene	74.0	40-118		%REC	1	4/2/2009 06:27 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090402C	QC Batch: 54464			PrepDate:	4/2/2009	Analyst: **RQ**
Mercury	0.11	0.10		mg/Kg	1	4/2/2009 12:57 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS6_090401A	QC Batch: 54431			PrepDate:	4/1/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
1,2-Dichlorobenzene	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
1,3-Dichlorobenzene	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
1,4-Dichlorobenzene	ND	5000		µg/Kg	5	4/2/2009 01:59 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	R-9
Lab Order:	104785	**Collection Date:**	3/26/2009 2:25:00 PM
Project:	DUMBARTON BRIDGE RETROFIT, E843	**Matrix:**	SOIL
Lab ID:	104785-009A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS6_090401A QC Batch: 54431 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
2,4,6-Trichlorophenol	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
2,4-Dichlorophenol	ND	25000		µg/Kg	5	4/2/2009 01:59 PM
2,4-Dimethylphenol	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
2,4-Dinitrophenol	ND	25000		µg/Kg	5	4/2/2009 01:59 PM
2,4-Dinitrotoluene	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
2,6-Dinitrotoluene	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
2-Chloronaphthalene	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
2-Chlorophenol	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
2-Methylnaphthalene	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
2-Methylphenol	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
2-Nitroaniline	ND	25000		µg/Kg	5	4/2/2009 01:59 PM
2-Nitrophenol	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
3,3´-Dichlorobenzidine	ND	9900		µg/Kg	5	4/2/2009 01:59 PM
3-Nitroaniline	ND	25000		µg/Kg	5	4/2/2009 01:59 PM
4,6-Dinitro-2-methylphenol	ND	25000		µg/Kg	5	4/2/2009 01:59 PM
4-Bromophenyl-phenylether	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
4-Chloro-3-methylphenol	ND	9900		µg/Kg	5	4/2/2009 01:59 PM
4-Chloroaniline	ND	9900		µg/Kg	5	4/2/2009 01:59 PM
4-Chlorophenyl-phenylether	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
4-Methylphenol	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
4-Nitroaniline	ND	25000		µg/Kg	5	4/2/2009 01:59 PM
4-Nitrophenol	ND	25000		µg/Kg	5	4/2/2009 01:59 PM
Acenaphthene	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
Acenaphthylene	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
Anthracene	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
Benzidine (M)	ND	25000		µg/Kg	5	4/2/2009 01:59 PM
Benzo(a)anthracene	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
Benzo(a)pyrene	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
Benzo(b)fluoranthene	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
Benzo(g,h,i)perylene	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
Benzo(k)fluoranthene	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
Benzoic acid	ND	25000		µg/Kg	5	4/2/2009 01:59 PM
Benzyl alcohol	ND	9900		µg/Kg	5	4/2/2009 01:59 PM
Bis(2-chloroethoxy)methane	ND	5000		µg/Kg	5	4/2/2009 01:59 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	R-9
Lab Order:	104785	**Collection Date:**	3/26/2009 2:25:00 PM
Project:	DUMBARTON BRIDGE RETROFIT, E843	**Matrix:**	SOIL
Lab ID:	104785-009A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS6_090401A QC Batch: 54431 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
Bis(2-chloroisopropyl)ether	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
Bis(2-ethylhexyl)phthalate	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
Butylbenzylphthalate	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
Chrysene	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
Di-n-butylphthalate	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
Di-n-octylphthalate	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
Dibenz(a,h)anthracene	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
Dibenzofuran	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
Diethylphthalate	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
Dimethylphthalate	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
Fluoranthene	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
Fluorene	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
Hexachlorobenzene	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
Hexachlorobutadiene	ND	9900		µg/Kg	5	4/2/2009 01:59 PM
Hexachlorocyclopentadiene	ND	9900		µg/Kg	5	4/2/2009 01:59 PM
Hexachloroethane	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
Indeno(1,2,3-cd)pyrene	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
Isophorone	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
N-Nitrosodi-n-propylamine	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
N-Nitrosodiphenylamine	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
Naphthalene	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
Nitrobenzene	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
Pentachlorophenol	ND	25000		µg/Kg	5	4/2/2009 01:59 PM
Phenanthrene	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
Phenol	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
Pyrene	ND	5000		µg/Kg	5	4/2/2009 01:59 PM
Surr: 1,2-Dichlorobenzene-d4	86.6	49-103		%REC	5	4/2/2009 01:59 PM
Surr: 2,4,6-Tribromophenol	76.7	47-129		%REC	5	4/2/2009 01:59 PM
Surr: 2-Chlorophenol-d4	85.1	54-109		%REC	5	4/2/2009 01:59 PM
Surr: 2-Fluorobiphenyl	89.9	59-108		%REC	5	4/2/2009 01:59 PM
Surr: 2-Fluorophenol	87.1	50-111		%REC	5	4/2/2009 01:59 PM
Surr: 4-Terphenyl-d14	95.0	58-135		%REC	5	4/2/2009 01:59 PM
Surr: Nitrobenzene-d5	95.2	54-115		%REC	5	4/2/2009 01:59 PM
Surr: Phenol-d5	83.9	58-112		%REC	5	4/2/2009 01:59 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	R-10
Lab Order:	104785	**Collection Date:**	3/26/2009 2:20:00 PM
Project:	DUMBARTON BRIDGE RETROFIT, E843	**Matrix:**	SOIL
Lab ID:	104785-010A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090403F	QC Batch: 54488			PrepDate:	4/3/2009	Analyst: **admin**
Antimony	ND	2.0		mg/Kg	1	4/3/2009 06:18 PM
Arsenic	2.2	1.0		mg/Kg	1	4/3/2009 06:18 PM
Barium	67	1.0		mg/Kg	1	4/3/2009 06:18 PM
Beryllium	ND	1.0		mg/Kg	1	4/3/2009 06:18 PM
Cadmium	ND	1.0		mg/Kg	1	4/3/2009 06:18 PM
Chromium	21	1.0		mg/Kg	1	4/3/2009 06:18 PM
Cobalt	4.6	1.0		mg/Kg	1	4/3/2009 06:18 PM
Copper	28	2.0		mg/Kg	1	4/3/2009 06:18 PM
Lead	690	2.0		mg/Kg	2	4/8/2009 09:29 AM
Molybdenum	1.0	1.0		mg/Kg	1	4/3/2009 06:18 PM
Nickel	20	1.0		mg/Kg	1	4/3/2009 06:18 PM
Selenium	ND	1.0		mg/Kg	1	4/3/2009 06:18 PM
Silver	ND	1.0		mg/Kg	1	4/3/2009 06:18 PM
Thallium	ND	1.0		mg/Kg	1	4/3/2009 06:18 PM
Vanadium	17	1.0		mg/Kg	1	4/3/2009 06:18 PM
Zinc	270	1.0		mg/Kg	1	4/3/2009 06:18 PM
ORGANOCHLORINE PESTICIDES BY GC/ECD						
	EPA 3550B			**EPA 8081A**		
RunID: GC13_090403B	QC Batch: 54460			PrepDate:	4/1/2009	Analyst: **HL**
4,4´-DDD	ND	2.0		µg/Kg	1	4/3/2009 01:25 PM
4,4´-DDE	ND	2.0		µg/Kg	1	4/3/2009 01:25 PM
4,4´-DDT	ND	2.0		µg/Kg	1	4/3/2009 01:25 PM
Aldrin	ND	1.0		µg/Kg	1	4/3/2009 01:25 PM
alpha-BHC	ND	1.0		µg/Kg	1	4/3/2009 01:25 PM
alpha-Chlordane	ND	1.0		µg/Kg	1	4/3/2009 01:25 PM
beta-BHC	ND	1.0		µg/Kg	1	4/3/2009 01:25 PM
Chlordane	ND	8.5		µg/Kg	1	4/3/2009 01:25 PM
delta-BHC	ND	1.0		µg/Kg	1	4/3/2009 01:25 PM
Dieldrin	ND	2.0		µg/Kg	1	4/3/2009 01:25 PM
Endosulfan I	ND	1.0		µg/Kg	1	4/3/2009 01:25 PM
Endosulfan II	ND	2.0		µg/Kg	1	4/3/2009 01:25 PM
Endosulfan sulfate	ND	2.0		µg/Kg	1	4/3/2009 01:25 PM
Endrin	ND	2.0		µg/Kg	1	4/3/2009 01:25 PM
Endrin aldehyde	ND	2.0		µg/Kg	1	4/3/2009 01:25 PM
Endrin ketone	ND	2.0		µg/Kg	1	4/3/2009 01:25 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	R-10
Lab Order:	104785	**Collection Date:**	3/26/2009 2:20:00 PM
Project:	DUMBARTON BRIDGE RETROFIT, E843	**Matrix:**	SOIL
Lab ID:	104785-010A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ORGANOCHLORINE PESTICIDES BY GC/ECD						
EPA 3550B				**EPA 8081A**		
RunID: GC13_090403B	QC Batch: 54460			PrepDate:	4/1/2009	Analyst: **HL**
gamma-BHC	ND	1.0		µg/Kg	1	4/3/2009 01:25 PM
gamma-Chlordane	ND	1.0		µg/Kg	1	4/3/2009 01:25 PM
Heptachlor	ND	1.0		µg/Kg	1	4/3/2009 01:25 PM
Heptachlor epoxide	ND	1.0		µg/Kg	1	4/3/2009 01:25 PM
Methoxychlor	ND	5.0		µg/Kg	1	4/3/2009 01:25 PM
Toxaphene	ND	50		µg/Kg	1	4/3/2009 01:25 PM
Surr: Decachlorobiphenyl	36.2	20-142		%REC	1	4/3/2009 01:25 PM
Surr: Tetrachloro-m-xylene	23.6	25-115	S	%REC	1	4/3/2009 01:25 PM
PCBS BY GC/ECD						
EPA 3550B				**EPA 8082**		
RunID: GC5_090401B	QC Batch: 54460			PrepDate:	4/1/2009	Analyst: **BB**
Aroclor 1016	ND	16		µg/Kg	1	4/2/2009 06:57 AM
Aroclor 1221	ND	33		µg/Kg	1	4/2/2009 06:57 AM
Aroclor 1232	ND	16		µg/Kg	1	4/2/2009 06:57 AM
Aroclor 1242	ND	16		µg/Kg	1	4/2/2009 06:57 AM
Aroclor 1248	ND	16		µg/Kg	1	4/2/2009 06:57 AM
Aroclor 1254	ND	16		µg/Kg	1	4/2/2009 06:57 AM
Aroclor 1260	ND	16		µg/Kg	1	4/2/2009 06:57 AM
Aroclor 1262	ND	16		µg/Kg	1	4/2/2009 06:57 AM
Aroclor 1268	ND	16		µg/Kg	1	4/2/2009 06:57 AM
Surr: Decachlorobiphenyl	30.1	30-124		%REC	1	4/2/2009 06:57 AM
Surr: Tetrachloro-m-xylene	42.5	40-118		%REC	1	4/2/2009 06:57 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090402C	QC Batch: 54464			PrepDate:	4/2/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	4/2/2009 12:09 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 3550B				**EPA 8270C**		
RunID: MS6_090401A	QC Batch: 54431			PrepDate:	4/1/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
1,2-Dichlorobenzene	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
1,3-Dichlorobenzene	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
1,4-Dichlorobenzene	ND	5000		µg/Kg	5	4/2/2009 02:26 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	R-10
Lab Order:	104785	**Collection Date:**	3/26/2009 2:20:00 PM
Project:	DUMBARTON BRIDGE RETROFIT, E843	**Matrix:**	SOIL
Lab ID:	104785-010A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS6_090401A QC Batch: 54431 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
2,4,6-Trichlorophenol	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
2,4-Dichlorophenol	ND	25000		µg/Kg	5	4/2/2009 02:26 PM
2,4-Dimethylphenol	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
2,4-Dinitrophenol	ND	25000		µg/Kg	5	4/2/2009 02:26 PM
2,4-Dinitrotoluene	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
2,6-Dinitrotoluene	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
2-Chloronaphthalene	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
2-Chlorophenol	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
2-Methylnaphthalene	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
2-Methylphenol	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
2-Nitroaniline	ND	25000		µg/Kg	5	4/2/2009 02:26 PM
2-Nitrophenol	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
3,3´-Dichlorobenzidine	ND	9900		µg/Kg	5	4/2/2009 02:26 PM
3-Nitroaniline	ND	25000		µg/Kg	5	4/2/2009 02:26 PM
4,6-Dinitro-2-methylphenol	ND	25000		µg/Kg	5	4/2/2009 02:26 PM
4-Bromophenyl-phenylether	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
4-Chloro-3-methylphenol	ND	9900		µg/Kg	5	4/2/2009 02:26 PM
4-Chloroaniline	ND	9900		µg/Kg	5	4/2/2009 02:26 PM
4-Chlorophenyl-phenylether	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
4-Methylphenol	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
4-Nitroaniline	ND	25000		µg/Kg	5	4/2/2009 02:26 PM
4-Nitrophenol	ND	25000		µg/Kg	5	4/2/2009 02:26 PM
Acenaphthene	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
Acenaphthylene	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
Anthracene	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
Benzidine (M)	ND	25000		µg/Kg	5	4/2/2009 02:26 PM
Benzo(a)anthracene	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
Benzo(a)pyrene	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
Benzo(b)fluoranthene	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
Benzo(g,h,i)perylene	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
Benzo(k)fluoranthene	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
Benzoic acid	ND	25000		µg/Kg	5	4/2/2009 02:26 PM
Benzyl alcohol	ND	9900		µg/Kg	5	4/2/2009 02:26 PM
Bis(2-chloroethoxy)methane	ND	5000		µg/Kg	5	4/2/2009 02:26 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
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H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	R-10
Lab Order:	104785	**Collection Date:**	3/26/2009 2:20:00 PM
Project:	DUMBARTON BRIDGE RETROFIT, E843	**Matrix:**	SOIL
Lab ID:	104785-010A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS6_090401A QC Batch: 54431 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
Bis(2-chloroisopropyl)ether	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
Bis(2-ethylhexyl)phthalate	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
Butylbenzylphthalate	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
Chrysene	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
Di-n-butylphthalate	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
Di-n-octylphthalate	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
Dibenz(a,h)anthracene	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
Dibenzofuran	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
Diethylphthalate	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
Dimethylphthalate	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
Fluoranthene	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
Fluorene	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
Hexachlorobenzene	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
Hexachlorobutadiene	ND	9900		µg/Kg	5	4/2/2009 02:26 PM
Hexachlorocyclopentadiene	ND	9900		µg/Kg	5	4/2/2009 02:26 PM
Hexachloroethane	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
Indeno(1,2,3-cd)pyrene	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
Isophorone	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
N-Nitrosodi-n-propylamine	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
N-Nitrosodiphenylamine	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
Naphthalene	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
Nitrobenzene	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
Pentachlorophenol	ND	25000		µg/Kg	5	4/2/2009 02:26 PM
Phenanthrene	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
Phenol	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
Pyrene	ND	5000		µg/Kg	5	4/2/2009 02:26 PM
Surr: 1,2-Dichlorobenzene-d4	76.7	49-103		%REC	5	4/2/2009 02:26 PM
Surr: 2,4,6-Tribromophenol	70.9	47-129		%REC	5	4/2/2009 02:26 PM
Surr: 2-Chlorophenol-d4	79.1	54-109		%REC	5	4/2/2009 02:26 PM
Surr: 2-Fluorobiphenyl	83.6	59-108		%REC	5	4/2/2009 02:26 PM
Surr: 2-Fluorophenol	80.6	50-111		%REC	5	4/2/2009 02:26 PM
Surr: 4-Terphenyl-d14	91.6	58-135		%REC	5	4/2/2009 02:26 PM
Surr: Nitrobenzene-d5	89.9	54-115		%REC	5	4/2/2009 02:26 PM
Surr: Phenol-d5	78.5	58-112		%REC	5	4/2/2009 02:26 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT: Geocon Consultants, Inc.
Work Order: 104785
Project: DUMBARTON BRIDGE RETROFIT, E8435-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **MB-54488** SampType: **MBLK** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **4/3/2009** RunNo: **107826**
Client ID: **PBS** Batch ID: **54488** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **4/3/2009** SeqNo: **1690642**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	2.0									
Arsenic	ND	1.0									
Barium	0.136	1.0									
Beryllium	ND	1.0									
Cadmium	0.017	1.0									
Chromium	ND	1.0									
Cobalt	ND	1.0									
Copper	ND	2.0									
Molybdenum	ND	1.0									
Nickel	0.062	1.0									
Selenium	ND	1.0									
Silver	ND	1.0									
Thallium	ND	1.0									
Vanadium	0.042	1.0									
Zinc	0.713	1.0									

Sample ID: **LCS-54488** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **4/3/2009** RunNo: **107826**
Client ID: **LCSS** Batch ID: **54488** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **4/3/2009** SeqNo: **1690643**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	45.099	2.0	50.00	0	90.2	80	120				
Arsenic	42.631	1.0	50.00	0	85.3	80	120				
Barium	47.919	1.0	50.00	0.1363	95.6	80	120				
Beryllium	45.699	1.0	50.00	0	91.4	80	120				
Cadmium	45.894	1.0	50.00	0.01710	91.8	80	120				
Chromium	43.475	1.0	50.00	0	87.0	80	120				
Cobalt	47.577	1.0	50.00	0	95.2	80	120				
Copper	47.820	2.0	50.00	0	95.6	80	120				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104785
Project: DUMBARTON BRIDGE RETROFIT, E8435-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **LCS-54488**	SampType: **LCS**	TestCode: **6010_S**	Units: **mg/Kg**	Prep Date: **4/3/2009**	RunNo: **107826**
Client ID: **LCSS**	Batch ID: **54488**	TestNo: **EPA 6010B**	**EPA 3050B**	Analysis Date: **4/3/2009**	SeqNo: **1690643**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	47.003	1.0	50.00	0	94.0	80	120				
Nickel	45.690	1.0	50.00	0.06206	91.3	80	120				
Selenium	41.893	1.0	50.00	0	83.8	80	120				
Silver	46.509	1.0	50.00	0	93.0	80	120				
Thallium	40.512	1.0	50.00	0	81.0	80	120				
Vanadium	48.054	1.0	50.00	0.04186	96.0	80	120				
Zinc	45.405	1.0	50.00	0.7132	89.4	80	120				

Sample ID: **104785-010ADUP**	SampType: **DUP**	TestCode: **6010_S**	Units: **mg/Kg**	Prep Date: **4/3/2009**	RunNo: **107826**
Client ID: **R-10**	Batch ID: **54488**	TestNo: **EPA 6010B**	**EPA 3050B**	Analysis Date: **4/3/2009**	SeqNo: **1690654**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	0.767	2.0						0.8630	0	20	
Arsenic	2.105	1.0						2.177	3.37	20	
Barium	73.542	1.0						66.98	9.35	20	
Beryllium	ND	1.0						0	0	20	
Cadmium	0.861	1.0						0.7760	0	20	
Chromium	20.980	1.0						20.61	1.77	20	
Cobalt	6.258	1.0						4.631	29.9	20	R
Copper	26.524	2.0						28.12	5.83	20	
Molybdenum	0.641	1.0						1.032	0	20	
Nickel	20.613	1.0						20.33	1.40	20	
Selenium	ND	1.0						0	0	20	
Silver	ND	1.0						0	0	20	
Thallium	ND	1.0						0	0	20	
Vanadium	19.276	1.0						17.42	10.1	20	
Zinc	688.640	1.0						270.9	87.1	20	R

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104785
Project: DUMBARTON BRIDGE RETROFIT, E8435-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **104785-010AMS** SampType: **MS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **4/3/2009** RunNo: **107826**
Client ID: **R-10** Batch ID: **54488** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **4/3/2009** SeqNo: **1690655**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	97.756	2.0	125.0	0.8630	77.5	25	106				
Arsenic	107.111	1.0	125.0	2.177	83.9	42	113				
Barium	188.897	1.0	125.0	66.98	97.5	19	140				
Beryllium	108.835	1.0	125.0	0	87.1	50	109				
Cadmium	99.681	1.0	125.0	0.7760	79.1	48	106				
Chromium	124.530	1.0	125.0	20.61	83.1	44	116				
Cobalt	108.709	1.0	125.0	4.631	83.3	47	107				
Copper	151.605	2.0	125.0	28.12	98.8	49	124				
Molybdenum	106.969	1.0	125.0	1.032	84.7	46	111				
Nickel	122.738	1.0	125.0	20.33	81.9	43	111				
Selenium	105.765	1.0	125.0	0	84.6	43	104				
Silver	115.125	1.0	125.0	0	92.1	53	114				
Thallium	91.955	1.0	125.0	0	73.6	41	107				
Vanadium	130.135	1.0	125.0	17.42	90.2	48	116				
Zinc	562.959	1.0	125.0	270.9	234	24	129				S

Sample ID: **104785-010AMSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **4/3/2009** RunNo: **107826**
Client ID: **R-10** Batch ID: **54488** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **4/3/2009** SeqNo: **1690656**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	99.841	2.0	125.0	0.8630	79.2	25	106	97.76	2.11	20	
Arsenic	109.550	1.0	125.0	2.177	85.9	42	113	107.1	2.25	20	
Barium	186.548	1.0	125.0	66.98	95.7	19	140	188.9	1.25	20	
Beryllium	110.120	1.0	125.0	0	88.1	50	109	108.8	1.17	20	
Cadmium	101.325	1.0	125.0	0.7760	80.4	48	106	99.68	1.64	20	
Chromium	124.282	1.0	125.0	20.61	82.9	44	116	124.5	0.200	20	
Cobalt	109.269	1.0	125.0	4.631	83.7	47	107	108.7	0.513	20	
Copper	160.990	2.0	125.0	28.12	106	49	124	151.6	6.00	20	
Molybdenum	107.945	1.0	125.0	1.032	85.5	46	111	107.0	0.908	20	
Nickel	128.941	1.0	125.0	20.33	86.9	43	111	122.7	4.93	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104785
Project: DUMBARTON BRIDGE RETROFIT, E8435-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **104785-010AMSD**	SampType: **MSD**	TestCode: **6010_S**	Units: **mg/Kg**	Prep Date: **4/3/2009**	RunNo: **107826**
Client ID: **R-10**	Batch ID: **54488**	TestNo: **EPA 6010B**	**EPA 3050B**	Analysis Date: **4/3/2009**	SeqNo: **1690656**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Selenium	107.414	1.0	125.0	0	85.9	43	104	105.8	1.55	20	
Silver	118.328	1.0	125.0	0	94.7	53	114	115.1	2.74	20	
Thallium	91.458	1.0	125.0	0	73.2	41	107	91.96	0.542	20	
Vanadium	135.331	1.0	125.0	17.42	94.3	48	116	130.1	3.91	20	
Zinc	396.857	1.0	125.0	270.9	101	24	129	563.0	34.6	20	R

Sample ID: **MB-54488**	SampType: **MBLK**	TestCode: **6010_S**	Units: **mg/Kg**	Prep Date: **4/3/2009**	RunNo: **107843**
Client ID: **PBS**	Batch ID: **54488**	TestNo: **EPA 6010B**	**EPA 3050B**	Analysis Date: **4/6/2009**	SeqNo: **1690978**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	1.0									

Sample ID: **LCS-54488**	SampType: **LCS**	TestCode: **6010_S**	Units: **mg/Kg**	Prep Date: **4/3/2009**	RunNo: **107843**
Client ID: **LCSS**	Batch ID: **54488**	TestNo: **EPA 6010B**	**EPA 3050B**	Analysis Date: **4/6/2009**	SeqNo: **1690979**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	48.010	1.0	50.00	0	96.0	80	120				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104785
Project: DUMBARTON BRIDGE RETROFIT, E8435-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **MB-54544** SampType: **MBLK** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **4/6/2009** RunNo: **107908**
Client ID: **PBS** Batch ID: **54544** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **4/7/2009** SeqNo: **1692117**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	0.314	2.0									
Arsenic	ND	1.0									
Barium	ND	1.0									
Beryllium	ND	1.0									
Cadmium	0.016	1.0									
Chromium	ND	1.0									
Cobalt	ND	1.0									
Copper	ND	2.0									
Lead	0.453	1.0									
Molybdenum	ND	1.0									
Nickel	ND	1.0									
Selenium	ND	1.0									
Silver	ND	1.0									
Thallium	ND	1.0									
Vanadium	ND	1.0									
Zinc	ND	1.0									

Sample ID: **LCS-54544** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **4/6/2009** RunNo: **107908**
Client ID: **LCSS** Batch ID: **54544** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **4/7/2009** SeqNo: **1692118**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	48.174	2.0	50.00	0.3141	95.7	80	120				
Arsenic	47.111	1.0	50.00	0	94.2	80	120				
Barium	50.888	1.0	50.00	0	102	80	120				
Beryllium	48.667	1.0	50.00	0	97.3	80	120				
Cadmium	48.720	1.0	50.00	0.01587	97.4	80	120				
Chromium	46.089	1.0	50.00	0	92.2	80	120				
Cobalt	50.659	1.0	50.00	0	101	80	120				
Copper	50.535	2.0	50.00	0	101	80	120				
Lead	49.219	1.0	50.00	0.4533	97.5	80	120				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Geocon Consultants, Inc.
Work Order: 104785
Project: DUMBARTON BRIDGE RETROFIT, E8435-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **LCS-54544** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **4/6/2009** RunNo: **107908**
Client ID: **LCSS** Batch ID: **54544** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **4/7/2009** SeqNo: **1692118**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	51.036	1.0	50.00	0	102	80	120				
Nickel	48.041	1.0	50.00	0	96.1	80	120				
Selenium	44.622	1.0	50.00	0	89.2	80	120				
Silver	43.468	1.0	50.00	0	86.9	80	120				
Thallium	43.842	1.0	50.00	0	87.7	80	120				
Vanadium	50.887	1.0	50.00	0	102	80	120				
Zinc	47.638	1.0	50.00	0	95.3	80	120				

Sample ID: **104785-010AMS** SampType: **MS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **4/3/2009** RunNo: **107908**
Client ID: **R-10** Batch ID: **54544** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **4/7/2009** SeqNo: **1692121**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	108.967	2.0	125.0	1.074	86.3	25	106				
Arsenic	118.466	1.0	125.0	2.816	92.5	42	113				
Barium	176.655	1.0	125.0	95.25	65.1	19	140				
Beryllium	111.332	1.0	125.0	0	89.1	50	109				
Cadmium	102.820	1.0	125.0	0.9519	81.5	48	106				
Chromium	121.168	1.0	125.0	23.14	78.4	44	116				
Cobalt	107.684	1.0	125.0	5.515	81.7	47	107				
Copper	145.995	2.0	125.0	27.86	94.5	49	124				
Lead	1661.633	1.0	125.0	685.5	781	33	120				S
Molybdenum	112.634	1.0	125.0	0.2826	89.9	46	111				
Nickel	120.579	1.0	125.0	22.18	78.7	43	111				
Selenium	114.764	1.0	125.0	1.061	91.0	43	104				
Silver	121.893	1.0	125.0	0	97.5	53	114				
Thallium	95.023	1.0	125.0	0	76.0	41	107				
Vanadium	130.382	1.0	125.0	21.29	87.3	48	116				
Zinc	429.218	1.0	125.0	299.0	104	24	129				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104785
Project: DUMBARTON BRIDGE RETROFIT, E8435-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **104785-010AMSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **4/3/2009** RunNo: **107908**
Client ID: **R-10** Batch ID: **54544** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **4/7/2009** SeqNo: **1692122**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	112.379	2.0	125.0	1.074	89.0	25	106	109.0	3.08	20	
Arsenic	122.034	1.0	125.0	2.816	95.4	42	113	118.5	2.97	20	
Barium	199.315	1.0	125.0	95.25	83.3	19	140	176.7	12.1	20	
Beryllium	117.293	1.0	125.0	0	93.8	50	109	111.3	5.21	20	
Cadmium	108.140	1.0	125.0	0.9519	85.8	48	106	102.8	5.04	20	
Chromium	129.912	1.0	125.0	23.14	85.4	44	116	121.2	6.97	20	
Cobalt	114.800	1.0	125.0	5.515	87.4	47	107	107.7	6.40	20	
Copper	156.734	2.0	125.0	27.86	103	49	124	146.0	7.09	20	
Lead	1317.783	1.0	125.0	685.5	506	33	120	1662	23.1	20	SR
Molybdenum	118.481	1.0	125.0	0.2826	94.6	46	111	112.6	5.06	20	
Nickel	129.559	1.0	125.0	22.18	85.9	43	111	120.6	7.18	20	
Selenium	119.137	1.0	125.0	1.061	94.5	43	104	114.8	3.74	20	
Silver	125.150	1.0	125.0	0	100	53	114	121.9	2.64	20	
Thallium	99.837	1.0	125.0	0	79.9	41	107	95.02	4.94	20	
Vanadium	139.815	1.0	125.0	21.29	94.8	48	116	130.4	6.98	20	
Zinc	366.826	1.0	125.0	299.0	54.2	24	129	429.2	15.7	20	

Sample ID: **104785-010ADUP** SampType: **DUP** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **4/6/2009** RunNo: **107908**
Client ID: **R-10** Batch ID: **54544** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **4/8/2009** SeqNo: **1692248**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	0.920	4.0						1.208	0	20	
Arsenic	2.131	2.0						2.424	12.8	20	
Barium	91.883	2.0						94.51	2.82	20	
Beryllium	ND	2.0						0	0	20	
Cadmium	0.779	2.0						0.8701	0	20	
Chromium	20.684	2.0						22.99	10.6	20	
Cobalt	4.869	2.0						5.677	15.3	20	
Copper	20.388	4.0						26.10	24.6	20	R
Lead	911.565	2.0						691.2	27.5	20	R

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104785
Project: DUMBARTON BRIDGE RETROFIT, E8435-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **104785-010ADUP** SampType: **DUP** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **4/6/2009** RunNo: **107908**
Client ID: **R-10** Batch ID: **54544** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **4/8/2009** SeqNo: **1692248**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	0.214	2.0						0.3650	0	20	
Nickel	20.658	2.0						22.73	9.55	20	
Selenium	ND	2.0						0	0	20	
Silver	ND	2.0						0	0	20	
Thallium	ND	2.0						0	0	20	
Vanadium	18.404	2.0						20.84	12.4	20	
Zinc	299.725	2.0						307.8	2.67	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104785
Project: DUMBARTON BRIDGE RETROFIT, E8435-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 7471_S

Sample ID: **MB-54464**	SampType: **MBLK**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **4/2/2009**	RunNo: **107730**
Client ID: **PBS**	Batch ID: **54464**	TestNo: **EPA 7471A**		Analysis Date: **4/2/2009**	SeqNo: **1688988**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.10									

Sample ID: **LCS-54464**	SampType: **LCS**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **4/2/2009**	RunNo: **107730**
Client ID: **LCSS**	Batch ID: **54464**	TestNo: **EPA 7471A**		Analysis Date: **4/2/2009**	SeqNo: **1688989**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.843	0.10	0.8300	0	102	80	120				

Sample ID: **104785-010A-MS**	SampType: **MS**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **4/2/2009**	RunNo: **107730**
Client ID: **R-10**	Batch ID: **54464**	TestNo: **EPA 7471A**		Analysis Date: **4/2/2009**	SeqNo: **1688990**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.864	0.10	0.8300	0.04215	99.1	70	130				

Sample ID: **104785-010A-MSD**	SampType: **MSD**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **4/2/2009**	RunNo: **107730**
Client ID: **R-10**	Batch ID: **54464**	TestNo: **EPA 7471A**		Analysis Date: **4/2/2009**	SeqNo: **1688991**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.877	0.10	0.8300	0.04215	101	70	130	0.8644	1.40	20	

Sample ID: **104785-010A-DUP**	SampType: **DUP**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **4/2/2009**	RunNo: **107730**
Client ID: **R-10**	Batch ID: **54464**	TestNo: **EPA 7471A**		Analysis Date: **4/2/2009**	SeqNo: **1688993**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.040	0.10						0.04215	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104785
Project: DUMBARTON BRIDGE RETROFIT, E8435-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID: **MB-54460** SampType: **MBLK** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107810**
Client ID: **PBS** Batch ID: **54460** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **4/3/2009** SeqNo: **1690313**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDD	ND	2.0									
4,4´-DDE	ND	2.0									
4,4´-DDT	ND	2.0									
Aldrin	ND	1.0									
alpha-BHC	ND	1.0									
alpha-Chlordane	ND	1.0									
beta-BHC	ND	1.0									
Chlordane	ND	8.5									
delta-BHC	ND	1.0									
Dieldrin	ND	2.0									
Endosulfan I	ND	1.0									
Endosulfan II	ND	2.0									
Endosulfan sulfate	ND	2.0									
Endrin	ND	2.0									
Endrin aldehyde	ND	2.0									
Endrin ketone	ND	2.0									
gamma-BHC	ND	1.0									
gamma-Chlordane	ND	1.0									
Heptachlor	ND	1.0									
Heptachlor epoxide	ND	1.0									
Methoxychlor	ND	5.0									
Toxaphene	ND	50									
Surr: Tetrachloro-m-xylene	11.346		16.67		68.1	25	115				
Surr: Decachlorobiphenyl	12.462		16.67		74.8	20	142				

Sample ID: **LCS-54460** SampType: **LCS** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107810**
Client ID: **LCSS** Batch ID: **54460** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **4/3/2009** SeqNo: **1690314**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aldrin	13.781	1.0	16.67	0	82.7	59	113				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104785
Project: DUMBARTON BRIDGE RETROFIT, E8435-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID: **LCS-54460** SampType: **LCS** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107810**
Client ID: **LCSS** Batch ID: **54460** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **4/3/2009** SeqNo: **1690314**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dieldrin	14.040	2.0	16.67	0	84.2	59	108				
Endrin	13.677	2.0	16.67	0	82.0	41	132				
gamma-BHC	13.331	1.0	16.67	0	80.0	60	111				
Heptachlor	12.982	1.0	16.67	0	77.9	62	108				
Surr: Tetrachloro-m-xylene	11.848		16.67		71.1	25	115				
Surr: Decachlorobiphenyl	13.110		16.67		78.6	20	142				

Sample ID: **MB-54460MS** SampType: **MS** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107810**
Client ID: **ZZZZZZ** Batch ID: **54460** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **4/3/2009** SeqNo: **1690315**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDT	13.042	2.0	16.67	0	78.2	29	143				
Aldrin	13.916	1.0	16.67	0	83.5	44	131				
Dieldrin	14.205	2.0	16.67	0	85.2	40	136				
Endrin	13.655	2.0	16.67	0	81.9	41	146				
gamma-BHC	13.417	1.0	16.67	0	80.5	45	129				
Heptachlor	13.103	1.0	16.67	0	78.6	48	126				
Surr: Tetrachloro-m-xylene	11.994		16.67		72.0	25	115				
Surr: Decachlorobiphenyl	13.147		16.67		78.9	20	142				

Sample ID: **MB-54460MSD** SampType: **MSD** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107810**
Client ID: **ZZZZZZ** Batch ID: **54460** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **4/3/2009** SeqNo: **1690316**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDT	12.968	2.0	16.67	0	77.8	29	143	13.04	0.568	20	
Aldrin	13.931	1.0	16.67	0	83.6	44	131	13.92	0.107	20	
Dieldrin	14.186	2.0	16.67	0	85.1	40	136	14.20	0.131	20	
Endrin	13.445	2.0	16.67	0	80.7	41	146	13.66	1.55	20	
gamma-BHC	13.418	1.0	16.67	0	80.5	45	129	13.42	0.00497	20	
Heptachlor	13.094	1.0	16.67	0	78.5	48	126	13.10	0.0700	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Geocon Consultants, Inc.
Work Order: 104785
Project: DUMBARTON BRIDGE RETROFIT, E8435-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID: **MB-54460MSD**	SampType: **MSD**	TestCode: **8081_S**	Units: **µg/Kg**	Prep Date: **4/1/2009**	RunNo: **107810**
Client ID: **ZZZZZZ**	Batch ID: **54460**	TestNo: **EPA 8081A**	**EPA 3550B**	Analysis Date: **4/3/2009**	SeqNo: **1690316**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Tetrachloro-m-xylene	11.833		16.67		71.0	25	115		0	0	
Surr: Decachlorobiphenyl	12.667		16.67		76.0	20	142		0	0	

Sample ID: **104785-006ADUP**	SampType: **DUP**	TestCode: **8081_S**	Units: **µg/Kg**	Prep Date: **4/1/2009**	RunNo: **107810**
Client ID: **R-6**	Batch ID: **54460**	TestNo: **EPA 8081A**	**EPA 3550B**	Analysis Date: **4/3/2009**	SeqNo: **1690318**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDD	ND	2.0						0.5002	0	20	
4,4´-DDE	ND	2.0						0	0	20	
4,4´-DDT	7.390	2.0						10.13	31.3	20	R
Aldrin	ND	1.0						0	0	20	
alpha-BHC	ND	1.0						0	0	20	
alpha-Chlordane	ND	1.0						0	0	20	
beta-BHC	ND	1.0						0	0	20	
Chlordane	ND	8.5						0	0	20	
delta-BHC	ND	1.0						0	0	20	
Dieldrin	ND	2.0						0	0	20	
Endosulfan I	ND	1.0						0	0	20	
Endosulfan II	ND	2.0						0	0	20	
Endosulfan sulfate	ND	2.0						0	0	20	
Endrin	ND	2.0						0	0	20	
Endrin aldehyde	ND	2.0						0	0	20	
Endrin ketone	ND	2.0						0	0	20	
gamma-BHC	ND	1.0						0	0	20	
gamma-Chlordane	ND	1.0						0	0	20	
Heptachlor	ND	1.0						0	0	20	
Heptachlor epoxide	ND	1.0						0	0	20	
Methoxychlor	ND	5.0						0	0	20	
Toxaphene	ND	50						0	0	20	
Surr: Tetrachloro-m-xylene	7.873		16.67		47.2	25	115		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104785
Project: DUMBARTON BRIDGE RETROFIT, E8435-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID: **104785-006ADUP** SampType: **DUP** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107810**
Client ID: **R-6** Batch ID: **54460** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **4/3/2009** SeqNo: **1690318**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Decachlorobiphenyl	9.029		16.67		54.2	20	142		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104785
Project: DUMBARTON BRIDGE RETROFIT, E8435-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 8082_S

Sample ID: **MB-54460** SampType: **MBLK** TestCode: **8082_S** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107724**
Client ID: **PBS** Batch ID: **54460** TestNo: **EPA 8082** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1688838**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016	ND	16									
Aroclor 1221	ND	33									
Aroclor 1232	ND	16									
Aroclor 1242	ND	16									
Aroclor 1248	ND	16									
Aroclor 1254	ND	16									
Aroclor 1260	ND	16									
Aroclor 1262	ND	16									
Aroclor 1268	ND	16									
Surr: Decachlorobiphenyl	10.480		16.67		62.9	30	124				
Surr: Tetrachloro-m-xylene	12.388		16.67		74.3	40	118				

Sample ID: **LCS-54460** SampType: **LCS** TestCode: **8082_S** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107724**
Client ID: **LCSS** Batch ID: **54460** TestNo: **EPA 8082** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1688839**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016	116.143	16	166.7	0	69.7	56	113				
Aroclor 1260	119.284	16	166.7	0	71.6	58	111				
Surr: Decachlorobiphenyl	10.722		16.67		64.3	30	124				
Surr: Tetrachloro-m-xylene	12.596		16.67		75.6	40	118				

Sample ID: **104818-001AMS** SampType: **MS** TestCode: **8082_S** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107724**
Client ID: **ZZZZZZ** Batch ID: **54460** TestNo: **EPA 8082** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1688840**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016	117.182	16	166.7	0	70.3	51	111				
Aroclor 1260	125.196	16	166.7	0	75.1	39	123				
Surr: Decachlorobiphenyl	12.740		16.67		76.4	30	124				
Surr: Tetrachloro-m-xylene	13.464		16.67		80.8	40	118				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104785
Project: DUMBARTON BRIDGE RETROFIT, E8435-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 8082_S

Sample ID: **104818-001AMSD** SampType: **MSD** TestCode: **8082_S** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107724**
Client ID: **ZZZZZZ** Batch ID: **54460** TestNo: **EPA 8082** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1688841**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016	116.690	16	166.7	0	70.0	51	111	117.2	0.421	20	
Aroclor 1260	124.019	16	166.7	0	74.4	39	123	125.2	0.945	20	
Surr: Decachlorobiphenyl	12.763		16.67		76.6	30	124		0	0	
Surr: Tetrachloro-m-xylene	13.563		16.67		81.4	40	118		0	0	

Sample ID: **104785-006ADUP** SampType: **DUP** TestCode: **8082_S** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107724**
Client ID: **R-6** Batch ID: **54460** TestNo: **EPA 8082** **EPA 3550B** Analysis Date: **4/2/2009** SeqNo: **1689444**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016	ND	16						0	0	20	
Aroclor 1221	ND	33						0	0	20	
Aroclor 1232	ND	16						0	0	20	
Aroclor 1242	ND	16						0	0	20	
Aroclor 1248	ND	16						0	0	20	
Aroclor 1254	ND	16						0	0	20	
Aroclor 1260	ND	16						0	0	20	
Aroclor 1262	ND	16						0	0	20	
Aroclor 1268	ND	16						0	0	20	
Surr: Decachlorobiphenyl	9.607		16.67		57.6	30	124		0	0	
Surr: Tetrachloro-m-xylene	12.698		16.67		76.2	40	118		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104785
Project: DUMBARTON BRIDGE RETROFIT, E8435-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-54354** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/30/2009** RunNo: **107647**
Client ID: **PBS** Batch ID: **54354** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/31/2009** SeqNo: **1687259**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	330									
1,2-Dichlorobenzene	ND	330									
1,3-Dichlorobenzene	ND	330									
1,4-Dichlorobenzene	ND	330									
2,4,5-Trichlorophenol	ND	330									
2,4,6-Trichlorophenol	ND	330									
2,4-Dichlorophenol	ND	1600									
2,4-Dimethylphenol	ND	330									
2,4-Dinitrophenol	ND	1600									
2,4-Dinitrotoluene	ND	330									
2,6-Dinitrotoluene	ND	330									
2-Chloronaphthalene	ND	330									
2-Chlorophenol	ND	330									
2-Methylnaphthalene	ND	330									
2-Methylphenol	ND	330									
2-Nitroaniline	ND	1600									
2-Nitrophenol	ND	330									
3,3´-Dichlorobenzidine	ND	660									
3-Nitroaniline	ND	1600									
4,6-Dinitro-2-methylphenol	ND	1600									
4-Bromophenyl-phenylether	ND	330									
4-Chloro-3-methylphenol	ND	660									
4-Chloroaniline	ND	660									
4-Chlorophenyl-phenylether	ND	330									
4-Methylphenol	ND	330									
4-Nitroaniline	ND	1600									
4-Nitrophenol	ND	1600									
Acenaphthene	ND	330									
Acenaphthylene	ND	330									
Anthracene	ND	330									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104785
Project: DUMBARTON BRIDGE RETROFIT, E8435-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-54354** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/30/2009** RunNo: **107647**
Client ID: **PBS** Batch ID: **54354** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/31/2009** SeqNo: **1687259**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzidine (M)	ND	1600									
Benzo(a)anthracene	ND	330									
Benzo(a)pyrene	ND	330									
Benzo(b)fluoranthene	ND	330									
Benzo(g,h,i)perylene	ND	330									
Benzo(k)fluoranthene	ND	330									
Benzoic acid	ND	1600									
Benzyl alcohol	ND	660									
Bis(2-chloroethoxy)methane	ND	330									
Bis(2-chloroethyl)ether	ND	330									
Bis(2-chloroisopropyl)ether	ND	330									
Bis(2-ethylhexyl)phthalate	ND	330									
Butylbenzylphthalate	ND	330									
Chrysene	ND	330									
Di-n-butylphthalate	ND	330									
Di-n-octylphthalate	ND	330									
Dibenz(a,h)anthracene	ND	330									
Dibenzofuran	ND	330									
Diethylphthalate	ND	330									
Dimethylphthalate	ND	330									
Fluoranthene	ND	330									
Fluorene	ND	330									
Hexachlorobenzene	ND	330									
Hexachlorobutadiene	ND	660									
Hexachlorocyclopentadiene	ND	660									
Hexachloroethane	ND	330									
Indeno(1,2,3-cd)pyrene	ND	330									
Isophorone	ND	330									
N-Nitrosodi-n-propylamine	ND	330									
N-Nitrosodiphenylamine	ND	330									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104785
Project: DUMBARTON BRIDGE RETROFIT, E8435-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-54354** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/30/2009** RunNo: **107647**
Client ID: **PBS** Batch ID: **54354** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/31/2009** SeqNo: **1687259**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	330									
Nitrobenzene	ND	330									
Pentachlorophenol	ND	1600									
Phenanthrene	ND	330									
Phenol	ND	330									
Pyrene	ND	330									
Surr: 1,2-Dichlorobenzene-d4	2835.333		3330		85.1	49	103				
Surr: 2,4,6-Tribromophenol	2910.000		3330		87.4	47	129				
Surr: 2-Chlorophenol-d4	2983.000		3330		89.6	54	109				
Surr: 2-Fluorobiphenyl	3010.667		3330		90.4	59	108				
Surr: 2-Fluorophenol	2927.000		3330		87.9	50	111				
Surr: 4-Terphenyl-d14	3985.000		3330		120	58	135				
Surr: Nitrobenzene-d5	2997.333		3330		90.0	54	115				
Surr: Phenol-d5	2993.667		3330		89.9	58	112				

Sample ID: **LCS-54354** SampType: **LCS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/30/2009** RunNo: **107647**
Client ID: **LCSS** Batch ID: **54354** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/31/2009** SeqNo: **1687260**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	2947.000	330	3330	0	88.5	61	107				
1,4-Dichlorobenzene	2668.333	330	3330	0	80.1	56	100				
2,4-Dinitrotoluene	3662.333	330	3330	0	110	72	130				
2-Chlorophenol	2923.000	330	3330	0	87.8	64	105				
4-Chloro-3-methylphenol	3688.667	660	3330	0	111	74	125				
4-Nitrophenol	3688.333	1600	3330	0	111	77	137				
Acenaphthene	3154.667	330	3330	0	94.7	63	117				
N-Nitrosodi-n-propylamine	3209.333	330	3330	0	96.4	71	121				
Pentachlorophenol	2943.000	1600	3330	0	88.4	69	125				
Phenol	3075.000	330	3330	0	92.3	67	111				
Pyrene	3574.333	330	3330	0	107	60	122				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104785
Project: DUMBARTON BRIDGE RETROFIT, E8435-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **LCS-54354** SampType: **LCS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/30/2009** RunNo: **107647**
Client ID: **LCSS** Batch ID: **54354** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/31/2009** SeqNo: **1687260**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 1,2-Dichlorobenzene-d4	2650.333		3330		79.6	49	103				
Surr: 2,4,6-Tribromophenol	3487.667		3330		105	47	129				
Surr: 2-Chlorophenol-d4	2799.333		3330		84.1	54	109				
Surr: 2-Fluorobiphenyl	3153.000		3330		94.7	59	108				
Surr: 2-Fluorophenol	2679.000		3330		80.5	50	111				
Surr: 4-Terphenyl-d14	3714.333		3330		112	58	135				
Surr: Nitrobenzene-d5	2897.333		3330		87.0	54	115				
Surr: Phenol-d5	2870.000		3330		86.2	58	112				

Sample ID: **104753-018AMS** SampType: **MS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/30/2009** RunNo: **107647**
Client ID: **ZZZZZZ** Batch ID: **54354** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/31/2009** SeqNo: **1687261**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	3054.667	330	3330	0	91.7	60	105				
1,4-Dichlorobenzene	2721.667	330	3330	0	81.7	50	99				
2,4-Dinitrotoluene	3513.000	330	3330	0	105	70	130				
2-Chlorophenol	3205.000	330	3330	0	96.2	58	107				
4-Chloro-3-methylphenol	3679.333	660	3330	0	110	72	124				
4-Nitrophenol	3644.667	1600	3330	0	109	69	139				
Acenaphthene	3303.000	330	3330	0	99.2	59	118				
N-Nitrosodi-n-propylamine	3221.000	330	3330	0	96.7	61	125				
Pentachlorophenol	3109.667	1600	3330	0	93.4	56	131				
Phenol	3277.667	330	3330	0	98.4	60	113				
Pyrene	3229.667	330	3330	0	97.0	51	130				
Surr: 1,2-Dichlorobenzene-d4	2682.000		3330		80.5	49	103				
Surr: 2,4,6-Tribromophenol	3414.667		3330		103	47	129				
Surr: 2-Chlorophenol-d4	2975.000		3330		89.3	54	109				
Surr: 2-Fluorobiphenyl	3186.667		3330		95.7	59	108				
Surr: 2-Fluorophenol	2893.667		3330		86.9	50	111				
Surr: 4-Terphenyl-d14	3688.000		3330		111	58	135				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104785
Project: DUMBARTON BRIDGE RETROFIT, E8435-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104753-018AMS**	SampType: **MS**	TestCode: **8270_S_FUL**	Units: **µg/Kg**	Prep Date: **3/30/2009**	RunNo: **107647**
Client ID: **ZZZZZZ**	Batch ID: **54354**	TestNo: **EPA 8270C**	**EPA 3550B**	Analysis Date: **3/31/2009**	SeqNo: **1687261**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	2938.333		3330		88.2	54	115				
Surr: Phenol-d5	3019.667		3330		90.7	58	112				

Sample ID: **104753-018AMSD**	SampType: **MSD**	TestCode: **8270_S_FUL**	Units: **µg/Kg**	Prep Date: **3/30/2009**	RunNo: **107647**
Client ID: **ZZZZZZ**	Batch ID: **54354**	TestNo: **EPA 8270C**	**EPA 3550B**	Analysis Date: **3/31/2009**	SeqNo: **1687262**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	3058.000	330	3330	0	91.8	60	105	3055	0.109	20	
1,4-Dichlorobenzene	2702.333	330	3330	0	81.2	50	99	2722	0.713	20	
2,4-Dinitrotoluene	3420.667	330	3330	0	103	70	130	3513	2.66	20	
2-Chlorophenol	3154.333	330	3330	0	94.7	58	107	3205	1.59	20	
4-Chloro-3-methylphenol	3684.667	660	3330	0	111	72	124	3679	0.145	20	
4-Nitrophenol	3548.333	1600	3330	0	107	69	139	3645	2.68	20	
Acenaphthene	3258.000	330	3330	0	97.8	59	118	3303	1.37	20	
N-Nitrosodi-n-propylamine	3171.000	330	3330	0	95.2	61	125	3221	1.56	20	
Pentachlorophenol	3152.667	1600	3330	0	94.7	56	131	3110	1.37	20	
Phenol	3242.000	330	3330	0	97.4	60	113	3278	1.09	20	
Pyrene	3224.000	330	3330	0	96.8	51	130	3230	0.176	20	
Surr: 1,2-Dichlorobenzene-d4	2667.667		3330		80.1	49	103		0	0	
Surr: 2,4,6-Tribromophenol	3447.667		3330		104	47	129		0	0	
Surr: 2-Chlorophenol-d4	2961.333		3330		88.9	54	109		0	0	
Surr: 2-Fluorobiphenyl	3168.667		3330		95.2	59	108		0	0	
Surr: 2-Fluorophenol	2911.333		3330		87.4	50	111		0	0	
Surr: 4-Terphenyl-d14	3765.000		3330		113	58	135		0	0	
Surr: Nitrobenzene-d5	2955.667		3330		88.8	54	115		0	0	
Surr: Phenol-d5	3005.000		3330		90.2	58	112		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104785
Project: DUMBARTON BRIDGE RETROFIT, E8435-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104753-018ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/30/2009** RunNo: **107647**
Client ID: **ZZZZZZ** Batch ID: **54354** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/31/2009** SeqNo: **1687263**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	330						0	0	20	
1,2-Dichlorobenzene	ND	330						0	0	20	
1,3-Dichlorobenzene	ND	330						0	0	20	
1,4-Dichlorobenzene	ND	330						0	0	20	
2,4,5-Trichlorophenol	ND	330						0	0	20	
2,4,6-Trichlorophenol	ND	330						0	0	20	
2,4-Dichlorophenol	ND	1600						0	0	20	
2,4-Dimethylphenol	ND	330						0	0	20	
2,4-Dinitrophenol	ND	1600						0	0	20	
2,4-Dinitrotoluene	ND	330						0	0	20	
2,6-Dinitrotoluene	ND	330						0	0	20	
2-Chloronaphthalene	ND	330						0	0	20	
2-Chlorophenol	ND	330						0	0	20	
2-Methylnaphthalene	ND	330						0	0	20	
2-Methylphenol	ND	330						0	0	20	
2-Nitroaniline	ND	1600						0	0	20	
2-Nitrophenol	ND	330						0	0	20	
3,3´-Dichlorobenzidine	ND	660						0	0	20	
3-Nitroaniline	ND	1600						0	0	20	
4,6-Dinitro-2-methylphenol	ND	1600						0	0	20	
4-Bromophenyl-phenylether	ND	330						0	0	20	
4-Chloro-3-methylphenol	ND	660						0	0	20	
4-Chloroaniline	ND	660						0	0	20	
4-Chlorophenyl-phenylether	ND	330						0	0	20	
4-Methylphenol	ND	330						0	0	20	
4-Nitroaniline	ND	1600						0	0	20	
4-Nitrophenol	ND	1600						0	0	20	
Acenaphthene	ND	330						0	0	20	
Acenaphthylene	ND	330						0	0	20	
Anthracene	ND	330						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104785
Project: DUMBARTON BRIDGE RETROFIT, E8435-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104753-018ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/30/2009** RunNo: **107647**
Client ID: **ZZZZZZ** Batch ID: **54354** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/31/2009** SeqNo: **1687263**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzidine (M)	ND	1600						0	0	20	
Benzo(a)anthracene	ND	330						0	0	20	
Benzo(a)pyrene	ND	330						0	0	20	
Benzo(b)fluoranthene	ND	330						0	0	20	
Benzo(g,h,i)perylene	ND	330						0	0	20	
Benzo(k)fluoranthene	ND	330						0	0	20	
Benzoic acid	ND	1600						0	0	20	
Benzyl alcohol	ND	660						0	0	20	
Bis(2-chloroethoxy)methane	ND	330						0	0	20	
Bis(2-chloroethyl)ether	ND	330						0	0	20	
Bis(2-chloroisopropyl)ether	ND	330						0	0	20	
Bis(2-ethylhexyl)phthalate	ND	330						0	0	20	
Butylbenzylphthalate	ND	330						0	0	20	
Chrysene	ND	330						0	0	20	
Di-n-butylphthalate	ND	330						0	0	20	
Di-n-octylphthalate	ND	330						0	0	20	
Dibenz(a,h)anthracene	ND	330						0	0	20	
Dibenzofuran	ND	330						0	0	20	
Diethylphthalate	ND	330						0	0	20	
Dimethylphthalate	ND	330						0	0	20	
Fluoranthene	ND	330						0	0	20	
Fluorene	ND	330						0	0	20	
Hexachlorobenzene	ND	330						0	0	20	
Hexachlorobutadiene	ND	660						0	0	20	
Hexachlorocyclopentadiene	ND	660						0	0	20	
Hexachloroethane	ND	330						0	0	20	
Indeno(1,2,3-cd)pyrene	ND	330						0	0	20	
Isophorone	ND	330						0	0	20	
N-Nitrosodi-n-propylamine	ND	330						0	0	20	
N-Nitrosodiphenylamine	ND	330						0	0	20	

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits

Calculations are based on raw values

- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Geocon Consultants, Inc.
Work Order: 104785
Project: DUMBARTON BRIDGE RETROFIT, E8435-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104753-018ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/30/2009** RunNo: **107647**
Client ID: **ZZZZZZ** Batch ID: **54354** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/31/2009** SeqNo: **1687263**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	330						0	0	20	
Nitrobenzene	ND	330						0	0	20	
Pentachlorophenol	ND	1600						0	0	20	
Phenanthrene	ND	330						0	0	20	
Phenol	ND	330						0	0	20	
Pyrene	ND	330						0	0	20	
Surr: 1,2-Dichlorobenzene-d4	2941.333		3330		88.3	49	103		0	0	
Surr: 2,4,6-Tribromophenol	3585.000		3330		108	47	129		0	0	
Surr: 2-Chlorophenol-d4	3248.333		3330		97.5	54	109		0	0	
Surr: 2-Fluorobiphenyl	3322.000		3330		99.8	59	108		0	0	
Surr: 2-Fluorophenol	3235.667		3330		97.2	50	111		0	0	
Surr: 4-Terphenyl-d14	4391.000		3330		132	58	135		0	0	
Surr: Nitrobenzene-d5	3144.000		3330		94.4	54	115		0	0	
Surr: Phenol-d5	3323.000		3330		99.8	58	112		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104785
Project: DUMBARTON BRIDGE RETROFIT, E8435-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-54431** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107714**
Client ID: **PBS** Batch ID: **54431** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1688683**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	330									
1,2-Dichlorobenzene	ND	330									
1,3-Dichlorobenzene	ND	330									
1,4-Dichlorobenzene	ND	330									
2,4,5-Trichlorophenol	ND	330									
2,4,6-Trichlorophenol	ND	330									
2,4-Dichlorophenol	ND	1600									
2,4-Dimethylphenol	ND	330									
2,4-Dinitrophenol	ND	1600									
2,4-Dinitrotoluene	ND	330									
2,6-Dinitrotoluene	ND	330									
2-Chloronaphthalene	ND	330									
2-Chlorophenol	ND	330									
2-Methylnaphthalene	ND	330									
2-Methylphenol	ND	330									
2-Nitroaniline	ND	1600									
2-Nitrophenol	ND	330									
3,3´-Dichlorobenzidine	ND	660									
3-Nitroaniline	ND	1600									
4,6-Dinitro-2-methylphenol	ND	1600									
4-Bromophenyl-phenylether	ND	330									
4-Chloro-3-methylphenol	ND	660									
4-Chloroaniline	ND	660									
4-Chlorophenyl-phenylether	ND	330									
4-Methylphenol	ND	330									
4-Nitroaniline	ND	1600									
4-Nitrophenol	ND	1600									
Acenaphthene	ND	330									
Acenaphthylene	ND	330									
Anthracene	ND	330									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104785
Project: DUMBARTON BRIDGE RETROFIT, E8435-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-54431** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107714**
Client ID: **PBS** Batch ID: **54431** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1688683**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzidine (M)	ND	1600									
Benzo(a)anthracene	ND	330									
Benzo(a)pyrene	ND	330									
Benzo(b)fluoranthene	ND	330									
Benzo(g,h,i)perylene	ND	330									
Benzo(k)fluoranthene	ND	330									
Benzoic acid	ND	1600									
Benzyl alcohol	ND	660									
Bis(2-chloroethoxy)methane	ND	330									
Bis(2-chloroethyl)ether	ND	330									
Bis(2-chloroisopropyl)ether	ND	330									
Bis(2-ethylhexyl)phthalate	ND	330									
Butylbenzylphthalate	ND	330									
Chrysene	ND	330									
Di-n-butylphthalate	ND	330									
Di-n-octylphthalate	ND	330									
Dibenz(a,h)anthracene	ND	330									
Dibenzofuran	ND	330									
Diethylphthalate	ND	330									
Dimethylphthalate	ND	330									
Fluoranthene	ND	330									
Fluorene	ND	330									
Hexachlorobenzene	ND	330									
Hexachlorobutadiene	ND	660									
Hexachlorocyclopentadiene	ND	660									
Hexachloroethane	ND	330									
Indeno(1,2,3-cd)pyrene	ND	330									
Isophorone	ND	330									
N-Nitrosodi-n-propylamine	ND	330									
N-Nitrosodiphenylamine	ND	330									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104785
Project: DUMBARTON BRIDGE RETROFIT, E8435-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-54431** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107714**
Client ID: **PBS** Batch ID: **54431** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1688683**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	330									
Nitrobenzene	ND	330									
Pentachlorophenol	ND	1600									
Phenanthrene	ND	330									
Phenol	ND	330									
Pyrene	ND	330									
Surr: 1,2-Dichlorobenzene-d4	2927.000		3330		87.9	49	103				
Surr: 2,4,6-Tribromophenol	3146.000		3330		94.5	47	129				
Surr: 2-Chlorophenol-d4	3045.000		3330		91.4	54	109				
Surr: 2-Fluorobiphenyl	3136.333		3330		94.2	59	108				
Surr: 2-Fluorophenol	3081.667		3330		92.5	50	111				
Surr: 4-Terphenyl-d14	4006.667		3330		120	58	135				
Surr: Nitrobenzene-d5	3030.000		3330		91.0	54	115				
Surr: Phenol-d5	3086.667		3330		92.7	58	112				

Sample ID: **LCS-54431** SampType: **LCS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107714**
Client ID: **LCSS** Batch ID: **54431** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1688684**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	3264.000	330	3330	0	98.0	61	107				
1,4-Dichlorobenzene	2877.333	330	3330	0	86.4	56	100				
2,4-Dinitrotoluene	3647.667	330	3330	0	110	72	130				
2-Chlorophenol	3297.333	330	3330	0	99.0	64	105				
4-Chloro-3-methylphenol	4129.000	660	3330	0	124	74	125				
4-Nitrophenol	4302.667	1600	3330	0	129	77	137				
Acenaphthene	3663.000	330	3330	0	110	63	117				
N-Nitrosodi-n-propylamine	3576.000	330	3330	0	107	71	121				
Pentachlorophenol	3366.000	1600	3330	0	101	69	125				
Phenol	3462.000	330	3330	0	104	67	111				
Pyrene	3543.333	330	3330	0	106	60	122				

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike/Surrogate outside of limits due to matrix interference
- DO Surrogate Diluted Out
- Calculations are based on raw values

CLIENT: Geocon Consultants, Inc.
Work Order: 104785
Project: DUMBARTON BRIDGE RETROFIT, E8435-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **LCS-54431** SampType: **LCS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107714**
Client ID: **LCSS** Batch ID: **54431** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1688684**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 1,2-Dichlorobenzene-d4	2820.333		3330		84.7	49	103				
Surr: 2,4,6-Tribromophenol	3688.333		3330		111	47	129				
Surr: 2-Chlorophenol-d4	3016.000		3330		90.6	54	109				
Surr: 2-Fluorobiphenyl	3454.333		3330		104	59	108				
Surr: 2-Fluorophenol	2979.000		3330		89.5	50	111				
Surr: 4-Terphenyl-d14	3531.333		3330		106	58	135				
Surr: Nitrobenzene-d5	3157.000		3330		94.8	54	115				
Surr: Phenol-d5	3202.000		3330		96.2	58	112				

Sample ID: **104786-003AMS** SampType: **MS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107714**
Client ID: **ZZZZZZ** Batch ID: **54431** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1688685**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	3200.333	330	3330	0	96.1	60	105				
1,4-Dichlorobenzene	2906.000	330	3330	0	87.3	50	99				
2,4-Dinitrotoluene	3826.667	330	3330	0	115	70	130				
2-Chlorophenol	3412.000	330	3330	0	102	58	107				
4-Chloro-3-methylphenol	4163.000	660	3330	0	125	72	124				S
4-Nitrophenol	4502.333	1600	3330	0	135	69	139				
Acenaphthene	3707.667	330	3330	0	111	59	118				
N-Nitrosodi-n-propylamine	3498.333	330	3330	0	105	61	125				
Pentachlorophenol	3556.667	1600	3330	0	107	56	131				
Phenol	3597.000	330	3330	0	108	60	113				
Pyrene	3732.000	330	3330	0	112	51	130				
Surr: 1,2-Dichlorobenzene-d4	2804.000		3330		84.2	49	103				
Surr: 2,4,6-Tribromophenol	3841.333		3330		115	47	129				
Surr: 2-Chlorophenol-d4	3131.000		3330		94.0	54	109				
Surr: 2-Fluorobiphenyl	3442.000		3330		103	59	108				
Surr: 2-Fluorophenol	3119.000		3330		93.7	50	111				
Surr: 4-Terphenyl-d14	3586.000		3330		108	58	135				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104785
Project: DUMBARTON BRIDGE RETROFIT, E8435-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104786-003AMS**	SampType: **MS**	TestCode: **8270_S_FUL**	Units: **µg/Kg**	Prep Date: **4/1/2009**	RunNo: **107714**
Client ID: **ZZZZZZ**	Batch ID: **54431**	TestNo: **EPA 8270C**	**EPA 3550B**	Analysis Date: **4/1/2009**	SeqNo: **1688685**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	3091.333		3330		92.8	54	115				
Surr: Phenol-d5	3259.333		3330		97.9	58	112				

Sample ID: **104786-003AMSD**	SampType: **MSD**	TestCode: **8270_S_FUL**	Units: **µg/Kg**	Prep Date: **4/1/2009**	RunNo: **107714**
Client ID: **ZZZZZZ**	Batch ID: **54431**	TestNo: **EPA 8270C**	**EPA 3550B**	Analysis Date: **4/1/2009**	SeqNo: **1688686**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	3258.667	330	3330	0	97.9	60	105	3200	1.81	20	
1,4-Dichlorobenzene	2913.000	330	3330	0	87.5	50	99	2906	0.241	20	
2,4-Dinitrotoluene	3598.000	330	3330	0	108	70	130	3827	6.16	20	
2-Chlorophenol	3382.667	330	3330	0	102	58	107	3412	0.863	20	
4-Chloro-3-methylphenol	4030.333	660	3330	0	121	72	124	4163	3.24	20	
4-Nitrophenol	4306.000	1600	3330	0	129	69	139	4502	4.46	20	
Acenaphthene	3633.000	330	3330	0	109	59	118	3708	2.03	20	
N-Nitrosodi-n-propylamine	3485.333	330	3330	0	105	61	125	3498	0.372	20	
Pentachlorophenol	3356.000	1600	3330	0	101	56	131	3557	5.81	20	
Phenol	3573.667	330	3330	0	107	60	113	3597	0.651	20	
Pyrene	3461.667	330	3330	0	104	51	130	3732	7.52	20	
Surr: 1,2-Dichlorobenzene-d4	2829.333		3330		85.0	49	103		0	0	
Surr: 2,4,6-Tribromophenol	3622.667		3330		109	47	129		0	0	
Surr: 2-Chlorophenol-d4	3088.333		3330		92.7	54	109		0	0	
Surr: 2-Fluorobiphenyl	3373.000		3330		101	59	108		0	0	
Surr: 2-Fluorophenol	3101.333		3330		93.1	50	111		0	0	
Surr: 4-Terphenyl-d14	3443.333		3330		103	58	135		0	0	
Surr: Nitrobenzene-d5	3103.667		3330		93.2	54	115		0	0	
Surr: Phenol-d5	3222.333		3330		96.8	58	112		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104785
Project: DUMBARTON BRIDGE RETROFIT, E8435-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104786-003ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107714**
Client ID: **ZZZZZZ** Batch ID: **54431** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1688687**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	330						0	0	20	
1,2-Dichlorobenzene	ND	330						0	0	20	
1,3-Dichlorobenzene	ND	330						0	0	20	
1,4-Dichlorobenzene	ND	330						0	0	20	
2,4,5-Trichlorophenol	ND	330						0	0	20	
2,4,6-Trichlorophenol	ND	330						0	0	20	
2,4-Dichlorophenol	ND	1600						0	0	20	
2,4-Dimethylphenol	ND	330						0	0	20	
2,4-Dinitrophenol	ND	1600						0	0	20	
2,4-Dinitrotoluene	ND	330						0	0	20	
2,6-Dinitrotoluene	ND	330						0	0	20	
2-Chloronaphthalene	ND	330						0	0	20	
2-Chlorophenol	ND	330						0	0	20	
2-Methylnaphthalene	ND	330						0	0	20	
2-Methylphenol	ND	330						0	0	20	
2-Nitroaniline	ND	1600						0	0	20	
2-Nitrophenol	ND	330						0	0	20	
3,3´-Dichlorobenzidine	ND	660						0	0	20	
3-Nitroaniline	ND	1600						0	0	20	
4,6-Dinitro-2-methylphenol	ND	1600						0	0	20	
4-Bromophenyl-phenylether	ND	330						0	0	20	
4-Chloro-3-methylphenol	ND	660						0	0	20	
4-Chloroaniline	ND	660						0	0	20	
4-Chlorophenyl-phenylether	ND	330						0	0	20	
4-Methylphenol	ND	330						0	0	20	
4-Nitroaniline	ND	1600						0	0	20	
4-Nitrophenol	ND	1600						0	0	20	
Acenaphthene	ND	330						0	0	20	
Acenaphthylene	ND	330						0	0	20	
Anthracene	ND	330						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104785
Project: DUMBARTON BRIDGE RETROFIT, E8435-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104786-003ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107714**
Client ID: **ZZZZZZ** Batch ID: **54431** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1688687**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzidine (M)	ND	1600						0	0	20	
Benzo(a)anthracene	ND	330						0	0	20	
Benzo(a)pyrene	ND	330						0	0	20	
Benzo(b)fluoranthene	ND	330						0	0	20	
Benzo(g,h,i)perylene	ND	330						0	0	20	
Benzo(k)fluoranthene	ND	330						0	0	20	
Benzoic acid	ND	1600						0	0	20	
Benzyl alcohol	ND	660						0	0	20	
Bis(2-chloroethoxy)methane	ND	330						0	0	20	
Bis(2-chloroethyl)ether	ND	330						0	0	20	
Bis(2-chloroisopropyl)ether	ND	330						0	0	20	
Bis(2-ethylhexyl)phthalate	ND	330						0	0	20	
Butylbenzylphthalate	ND	330						0	0	20	
Chrysene	ND	330						0	0	20	
Di-n-butylphthalate	ND	330						0	0	20	
Di-n-octylphthalate	ND	330						0	0	20	
Dibenz(a,h)anthracene	ND	330						0	0	20	
Dibenzofuran	ND	330						0	0	20	
Diethylphthalate	ND	330						0	0	20	
Dimethylphthalate	ND	330						0	0	20	
Fluoranthene	ND	330						0	0	20	
Fluorene	ND	330						0	0	20	
Hexachlorobenzene	ND	330						0	0	20	
Hexachlorobutadiene	ND	660						0	0	20	
Hexachlorocyclopentadiene	ND	660						0	0	20	
Hexachloroethane	ND	330						0	0	20	
Indeno(1,2,3-cd)pyrene	ND	330						0	0	20	
Isophorone	ND	330						0	0	20	
N-Nitrosodi-n-propylamine	ND	330						0	0	20	
N-Nitrosodiphenylamine	ND	330						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104785
Project: DUMBARTON BRIDGE RETROFIT, E8435-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104786-003ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107714**
Client ID: **ZZZZZZ** Batch ID: **54431** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1688687**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	330						0	0	20	
Nitrobenzene	ND	330						0	0	20	
Pentachlorophenol	ND	1600						0	0	20	
Phenanthrene	ND	330						0	0	20	
Phenol	ND	330						0	0	20	
Pyrene	ND	330						0	0	20	
Surr: 1,2-Dichlorobenzene-d4	2677.333		3330		80.4	49	103		0	0	
Surr: 2,4,6-Tribromophenol	3321.000		3330		99.7	47	129		0	0	
Surr: 2-Chlorophenol-d4	2896.000		3330		87.0	54	109		0	0	
Surr: 2-Fluorobiphenyl	3102.667		3330		93.2	59	108		0	0	
Surr: 2-Fluorophenol	2950.333		3330		88.6	50	111		0	0	
Surr: 4-Terphenyl-d14	4254.667		3330		128	58	135		0	0	
Surr: Nitrobenzene-d5	2881.667		3330		86.5	54	115		0	0	
Surr: Phenol-d5	3029.000		3330		91.0	58	112		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CHAIN OF CUSTODY RECORD

Pg 1 of 1

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#: _____
Logged By: _____ Date: 3/28/09

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: GSO

Sample Condition Upon Receipt
1. CHILLED 3.2 Y☐ N☐ 4. SEALED Y☐ N☐
2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐
3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client: GEOCON CONSULTANTS, INC.
Address: 6671 Brisa Street
City Livermore State CA Zip Code 94550
TEL: (925) 371-5900
FAX: (925) 371-5915
Attn: CHRIS GIUNTOLI

Project Name: DUMBARTON BRIDGE RETROFIT
Project #: E8435-06-18
Sampler: (Printed Name) CGIUNTOLI (Signature)

Relinquished by: (Signature and Printed Name) Date: 3/27/09 Time: 1630
Received by: (Signature and Printed Name) Date: 3/28/09 Time: 0830
Relinquished by: (Signature and Printed Name) Date: Time:
Received by: (Signature and Printed Name) Date: Time:
Relinquished by: (Signature and Printed Name) Date: Time:
Received by: (Signature and Printed Name) Date: Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
CGIUNTOLI 3/26/09
Print Name Date
Signature

Send Report To:
Attn: _____
Co: SAME AS ABOVE
Address _____
City _____ State _____ Zip _____

Bill To:
Attn: _____
Co: SAME AS ABOVE
Address _____
City _____ State _____ Zip _____

Special Instructions/Comments:
* 8270 TO INCLUDE SVOCs AND PAHs
PROVIDE EDD WITH RESULTS

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

Circle or Add Analysis(es) Requested

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA) + PAH *	6010B (Total Metal)	8015B (GRO) / BTEX	8015B (DRO)	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	PCBs (8082)	CHLORINATED PESTICIDES (8081)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	10485-01	R-1	3/26/09	1135			X					X	X	X		X				E	2	S	T	C	
	-02	R-2		1050																				
	-03	R-3		1100																				
	-04	R-4		1120																				
	-05	R-5		1455																				
	-06	R-6		1450																				
	-07	R-7		1446																				
	-08	R-8		1438																				
	-09	R-9		1425																				
	-10	R-10		1420																				

Q A / Q C: RTNE ☐ CT ☒ SWRCB ☐ Logcode _____ OTHER _____

• TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter.

April 17, 2009

Chris Giuntoli
Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550

TEL: (925) 371-5900
FAX: (925) 371-5915

ELAP No.: 1838
NELAP No.: 02107CA
NEVADA.: CA-401
CSDLAC No.: 10196

Workorder No.: 104785

RE: DUMBARTON BRIDGE RETROFIT, E8435-0

Attention: Chris Giuntoli

Enclosed are the results for sample(s) received on March 28, 2009 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

This is an addendum report. Please incorporate with documentation previously submitted.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

for Eddie F. Rodriguez
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

CLIENT: Geocon Consultants, Inc.
Project: DUMBARTON BRIDGE RETROFIT, E8435-0
Lab Order: 104785

CASE NARRATIVE

Analytical Comments for Method 7420

Dilution was necessary for samples 104785-002A, 104785-003A, 104785-004A, 104785-005A, 104785-006A, 104785-007A and 104785-008A, due to sample matrix.

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

Advanced Technology Laboratories

Date: 4/17/2009

ANALYTICAL RESULTS

LEAD BY ATOMIC ABSORPTION (STLC)
WET/ EPA 7420

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	104785
Project:	DUMBARTON BRIDGE RETROFIT, E8435-0	**Date Received**	3/28/2009 8:30:00 AM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	VV

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
104785-001A	R-1	7.9	mg/L	54691	0.25	1	3/26/2009	4/17/2009
104785-002A	R-2	16	mg/L	54691	0.50	2	3/26/2009	4/17/2009
104785-003A	R-3	29	mg/L	54691	2.5	10	3/26/2009	4/17/2009
104785-004A	R-4	25	mg/L	54691	1.2	5	3/26/2009	4/17/2009
104785-005A	R-5	20	mg/L	54691	1.0	4	3/26/2009	4/17/2009
104785-006A	R-6	19	mg/L	54691	1.0	4	3/26/2009	4/17/2009
104785-007A	R-7	16	mg/L	54691	0.50	2	3/26/2009	4/17/2009
104785-008A	R-8	34	mg/L	54691	2.5	10	3/26/2009	4/17/2009
104785-009A	R-9	4.9	mg/L	54691	0.25	1	3/26/2009	4/17/2009
104785-010A	R-10	4.1	mg/L	54691	0.25	1	3/26/2009	4/17/2009

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Geocon Consultants, Inc.
Work Order: 104785
Project: DUMBARTON BRIDGE RETROFIT, E8435-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 7420_ST

Sample ID: **MB-54691A**	SampType: **MBLK**	TestCode: **7420_ST**	Units: **mg/L**	Prep Date: **4/14/2009**	RunNo: **108203**
Client ID: **PBS**	Batch ID: **54691**	TestNo: **WET/ EPA 74 WET**		Analysis Date: **4/17/2009**	SeqNo: **1697589**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25									

Sample ID: **LCS-54691**	SampType: **LCS**	TestCode: **7420_ST**	Units: **mg/L**	Prep Date: **4/14/2009**	RunNo: **108203**
Client ID: **LCSS**	Batch ID: **54691**	TestNo: **WET/ EPA 74 WET**		Analysis Date: **4/17/2009**	SeqNo: **1697590**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	5.065	0.25	5.000	0	101	80	120				

Sample ID: **104785-010A-DUP**	SampType: **DUP**	TestCode: **7420_ST**	Units: **mg/L**	Prep Date: **4/14/2009**	RunNo: **108203**
Client ID: **R-10**	Batch ID: **54691**	TestNo: **WET/ EPA 74 WET**		Analysis Date: **4/17/2009**	SeqNo: **1697601**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	4.046	0.25						4.085	0.957	20	

Sample ID: **104785-010A-MS**	SampType: **MS**	TestCode: **7420_ST**	Units: **mg/L**	Prep Date: **4/14/2009**	RunNo: **108203**
Client ID: **R-10**	Batch ID: **54691**	TestNo: **WET/ EPA 74 WET**		Analysis Date: **4/17/2009**	SeqNo: **1697602**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	8.834	0.25	5.000	4.085	95.0	80	120				

Sample ID: **104785-010A-MSD**	SampType: **MSD**	TestCode: **7420_ST**	Units: **mg/L**	Prep Date: **4/14/2009**	RunNo: **108203**
Client ID: **R-10**	Batch ID: **54691**	TestNo: **WET/ EPA 74 WET**		Analysis Date: **4/17/2009**	SeqNo: **1697603**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	8.757	0.25	5.000	4.085	93.4	80	120	8.834	0.871	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

Diane Galvan

From: Chris Giuntoli [giuntoli@geoconinc.com]
Sent: Monday, April 13, 2009 4:19 PM
To: Diane Galvan
Subject: RE: Results/EDD - DUMBARTON BRIDGE RETROFIT (104785)

Diane,

For Work Order No. 104785, please run WETs for lead on a 7-day TAT for the ten samples R-1 through R-10.

Thanks,
Chris

April 27, 2009

Chris Giuntoli
Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550

TEL: (925) 371-5900
FAX: (925) 371-5915

ELAP No.: 1838
NELAP No.: 02107CA
NEVADA.: CA-401
CSDLAC No.: 10196

Workorder No.: 104785

RE: DUMBARTON BRIDGE RETROFIT, E8435-0

Attention: Chris Giuntoli

Enclosed are the results for sample(s) received on March 28, 2009 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

This is an addendum report. Please incorporate with documentation previously submitted.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Project: DUMBARTON BRIDGE RETROFIT, E8435-0
Lab Order: 104785

CASE NARRATIVE

Analytical Comments for Method 7420

RPD for Duplicate (DUP) is outside criteria for sample 104528-004ADUP; however, the Laboratory Control Sample (LCS) validated the analytical batch.

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

Advanced Technology Laboratories

Date: 4/27/2009

ANALYTICAL RESULTS

LEAD BY ATOMIC ABSORPTION (TCLP)
EPA 1311/ 7420

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	104785
Project:	DUMBARTON BRIDGE RETROFIT, E8435-0	**Date Received**	3/28/2009 8:30:00 AM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	VV

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
104785-001A	R-1	ND	mg/L	54937	0.25	1	3/26/2009	4/23/2009
104785-002A	R-2	0.29	mg/L	54937	0.25	1	3/26/2009	4/23/2009
104785-003A	R-3	0.37	mg/L	54937	0.25	1	3/26/2009	4/23/2009
104785-004A	R-4	0.37	mg/L	54937	0.25	1	3/26/2009	4/23/2009
104785-005A	R-5	0.43	mg/L	54937	0.25	1	3/26/2009	4/23/2009
104785-006A	R-6	0.42	mg/L	54937	0.25	1	3/26/2009	4/23/2009
104785-007A	R-7	0.91	mg/L	54937	0.25	1	3/26/2009	4/23/2009
104785-008A	R-8	0.37	mg/L	54937	0.25	1	3/26/2009	4/23/2009

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Geocon Consultants, Inc.
Work Order: 104785
Project: DUMBARTON BRIDGE RETROFIT, E8435-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 7420_TC

Sample ID: **MB-54937A**	SampType: **MBLK**	TestCode: **7420_TC**	Units: **mg/L**	Prep Date: **4/23/2009**	RunNo: **108425**
Client ID: **PBS**	Batch ID: **54937**	TestNo: **EPA 1311/ 74**	**EPA3010A**	Analysis Date: **4/23/2009**	SeqNo: **1701209**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25									

Sample ID: **MB-54948A TCLP**	SampType: **MBLK**	TestCode: **7420_TC**	Units: **mg/L**	Prep Date: **4/23/2009**	RunNo: **108425**
Client ID: **PBS**	Batch ID: **54937**	TestNo: **EPA 1311/ 74**	**EPA3010A**	Analysis Date: **4/23/2009**	SeqNo: **1701210**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25									

Sample ID: **LCS-54937**	SampType: **LCS**	TestCode: **7420_TC**	Units: **mg/L**	Prep Date: **4/23/2009**	RunNo: **108425**
Client ID: **LCSS**	Batch ID: **54937**	TestNo: **EPA 1311/ 74**	**EPA3010A**	Analysis Date: **4/23/2009**	SeqNo: **1701211**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	1.178	0.25	1.000	0	118	80	120				

Sample ID: **104528-004A-DUP**	SampType: **DUP**	TestCode: **7420_TC**	Units: **mg/L**	Prep Date: **4/23/2009**	RunNo: **108425**
Client ID: **ZZZZZZ**	Batch ID: **54937**	TestNo: **EPA 1311/ 74**	**EPA3010A**	Analysis Date: **4/23/2009**	SeqNo: **1701213**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	0.321	0.25						0	200	20	R

Sample ID: **104528-004A-MS**	SampType: **MS**	TestCode: **7420_TC**	Units: **mg/L**	Prep Date: **4/23/2009**	RunNo: **108425**
Client ID: **ZZZZZZ**	Batch ID: **54937**	TestNo: **EPA 1311/ 74**	**EPA3010A**	Analysis Date: **4/23/2009**	SeqNo: **1701214**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	3.229	0.25	2.500	0	129	70	130				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104785
Project: DUMBARTON BRIDGE RETROFIT, E8435-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 7420_TC

Sample ID: **MB-54937B**	SampType: **MBLK**	TestCode: **7420_TC**	Units: **mg/L**	Prep Date: **4/23/2009**	RunNo: **108425**
Client ID: **PBS**	Batch ID: **54937**	TestNo: **EPA 1311/ 74**	**EPA3010A**	Analysis Date: **4/23/2009**	SeqNo: **1701224**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25									

Sample ID: **MB-54948B TCLP**	SampType: **MBLK**	TestCode: **7420_TC**	Units: **mg/L**	Prep Date: **4/23/2009**	RunNo: **108425**
Client ID: **PBS**	Batch ID: **54937**	TestNo: **EPA 1311/ 74**	**EPA3010A**	Analysis Date: **4/23/2009**	SeqNo: **1701225**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25									

Sample ID: **105058-127A-DUP**	SampType: **DUP**	TestCode: **7420_TC**	Units: **mg/L**	Prep Date: **4/23/2009**	RunNo: **108425**
Client ID: **ZZZZZZ**	Batch ID: **54937**	TestNo: **EPA 1311/ 74**	**EPA3010A**	Analysis Date: **4/23/2009**	SeqNo: **1701232**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	0.340	0.25						0.3138	7.90	20	

Sample ID: **105058-127A-MS**	SampType: **MS**	TestCode: **7420_TC**	Units: **mg/L**	Prep Date: **4/23/2009**	RunNo: **108425**
Client ID: **ZZZZZZ**	Batch ID: **54937**	TestNo: **EPA 1311/ 74**	**EPA3010A**	Analysis Date: **4/23/2009**	SeqNo: **1701233**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	2.743	0.25	2.500	0.3138	97.2	70	130				

Sample ID: **105058-127A-MSD**	SampType: **MSD**	TestCode: **7420_TC**	Units: **mg/L**	Prep Date: **4/23/2009**	RunNo: **108425**
Client ID: **ZZZZZZ**	Batch ID: **54937**	TestNo: **EPA 1311/ 74**	**EPA3010A**	Analysis Date: **4/23/2009**	SeqNo: **1701234**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	2.670	0.25	2.500	0.3138	94.2	70	130	2.743	2.72	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

Diane Galvan

From: Chris Giuntoli [giuntoli@geoconinc.com]
Sent: Tuesday, April 21, 2009 9:54 AM
To: Diane Galvan
Subject: RE: Additional Results/EDD - DUMBARTON BRIDGE RETROFIT (104785)

Hi Diane,

For Workorder No. 104785, please run TCLPs for lead on sample IDs R-1 through R-8 (STLC results over 5.0 mg/l) on a standard TAT.

Thanks,
Chris

June 17, 2009

Chris Giuntoli
Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550
TEL: (925) 371-5900
FAX: (925) 371-5915

ELAP No.: 1838
NELAP No.: 02107CA
NEVADA.: CA-401
CSDLAC No.: 10196

Workorder No.: 105904

RE: DUMBARTON BRIDGE, E8415-06-18

Attention: Chris Giuntoli

Enclosed are the results for sample(s) received on June 12, 2009 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

for Eddie F. Rodriguez
Laboratory Director

The cover letter and the case narrative are an integral part of this analytical report and cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

CLIENT: Geocon Consultants, Inc.
Project: DUMBARTON BRIDGE, E8415-06-18
Lab Order: 105904

CASE NARRATIVE

Sample Receiving / General Comments

There was not enough sample to perform EPA 6010B analysis for sample Comp DS1 & DS2. The client was notified on 06/17/09.

Analytical Comments for Method 6010B

RPD for Duplicate (DUP) is outside criteria for sample 105904-024ADUP, ; however, the analytical batch was validated by the Laboratory Control Sample (LCS).

Analytical Comments for Method 8270C

Dilution was necessary for samples 105904-017A, 105904-018A, 105904-019A, 105904-020A, 105904-021A, 105904-022A and 105904-024A due to dark sample extract.

Surrogate recovery biased low for sample 105904-024A, possibly due to matrix interferences.

Matrix Spike (MS) and /or Matrix Spike Duplicate (MSD) are/is outside recovery criteria for samples 105905-001AMSD; however, the analytical batch was validated by the Laboratory Control Sample (LCS).

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	Comp S1 & S2
Lab Order:	105904	**Collection Date:**	6/11/2009
Project:	DUMBARTON BRIDGE, E8415-06-18	**Matrix:**	WOOD
Lab ID:	105904-017A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B				**EPA 6010B**		
RunID: ICP8_090617A	QC Batch: 55917			PrepDate: 6/16/2009	Analyst: **CL**	
Arsenic	ND	4.0		mg/Kg	1	6/17/2009 11:38 AM
Chromium	ND	4.0		mg/Kg	1	6/17/2009 11:38 AM
Copper	ND	8.0		mg/Kg	1	6/17/2009 11:38 AM
Zinc	17	4.0		mg/Kg	1	6/17/2009 11:38 AM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 3550B				**EPA 8270C**		
RunID: MS 13_090615A	QC Batch: 55905			PrepDate: 6/15/2009	Analyst: **DMP**	
2-Methylnaphthalene	ND	1600		µg/Kg	5	6/15/2009 09:34 PM
Acenaphthene	ND	1600		µg/Kg	5	6/15/2009 09:34 PM
Acenaphthylene	ND	1600		µg/Kg	5	6/15/2009 09:34 PM
Anthracene	ND	1600		µg/Kg	5	6/15/2009 09:34 PM
Benzo(a)anthracene	ND	1600		µg/Kg	5	6/15/2009 09:34 PM
Benzo(a)pyrene	ND	1600		µg/Kg	5	6/15/2009 09:34 PM
Benzo(b)fluoranthene	ND	1600		µg/Kg	5	6/15/2009 09:34 PM
Benzo(g,h,i)perylene	ND	1600		µg/Kg	5	6/15/2009 09:34 PM
Benzo(k)fluoranthene	ND	1600		µg/Kg	5	6/15/2009 09:34 PM
Chrysene	ND	1600		µg/Kg	5	6/15/2009 09:34 PM
Dibenz(a,h)anthracene	ND	1600		µg/Kg	5	6/15/2009 09:34 PM
Fluoranthene	ND	1600		µg/Kg	5	6/15/2009 09:34 PM
Fluorene	ND	1600		µg/Kg	5	6/15/2009 09:34 PM
Indeno(1,2,3-cd)pyrene	ND	1600		µg/Kg	5	6/15/2009 09:34 PM
Naphthalene	ND	1600		µg/Kg	5	6/15/2009 09:34 PM
Pentachlorophenol	ND	8200		µg/Kg	5	6/15/2009 09:34 PM
Phenanthrene	ND	1600		µg/Kg	5	6/15/2009 09:34 PM
Pyrene	ND	1600		µg/Kg	5	6/15/2009 09:34 PM
Surr: 1,2-Dichlorobenzene-d4	63.9	49-103		%REC	5	6/15/2009 09:34 PM
Surr: 2-Fluorobiphenyl	80.1	59-108		%REC	5	6/15/2009 09:34 PM
Surr: 4-Terphenyl-d14	100	58-135		%REC	5	6/15/2009 09:34 PM
Surr: Nitrobenzene-d5	75.9	54-115		%REC	5	6/15/2009 09:34 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	Comp SR1 & SR2
Lab Order:	105904	**Collection Date:**	6/11/2009
Project:	DUMBARTON BRIDGE, E8415-06-18	**Matrix:**	WOOD
Lab ID:	105904-018A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B				**EPA 6010B**		
RunID: ICP8_090617A	QC Batch: 55917			PrepDate: 6/16/2009	Analyst: **CL**	
Arsenic	ND	4.0		mg/Kg	1	6/17/2009 11:42 AM
Chromium	ND	4.0		mg/Kg	1	6/17/2009 11:42 AM
Copper	ND	8.0		mg/Kg	1	6/17/2009 11:42 AM
Zinc	9.2	4.0		mg/Kg	1	6/17/2009 11:42 AM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 3550B				**EPA 8270C**		
RunID: MS 13_090615A	QC Batch: 55905			PrepDate: 6/15/2009	Analyst: **DMP**	
2-Methylnaphthalene	ND	1600		µg/Kg	5	6/15/2009 10:03 PM
Acenaphthene	ND	1600		µg/Kg	5	6/15/2009 10:03 PM
Acenaphthylene	ND	1600		µg/Kg	5	6/15/2009 10:03 PM
Anthracene	ND	1600		µg/Kg	5	6/15/2009 10:03 PM
Benzo(a)anthracene	ND	1600		µg/Kg	5	6/15/2009 10:03 PM
Benzo(a)pyrene	ND	1600		µg/Kg	5	6/15/2009 10:03 PM
Benzo(b)fluoranthene	ND	1600		µg/Kg	5	6/15/2009 10:03 PM
Benzo(g,h,i)perylene	ND	1600		µg/Kg	5	6/15/2009 10:03 PM
Benzo(k)fluoranthene	ND	1600		µg/Kg	5	6/15/2009 10:03 PM
Chrysene	ND	1600		µg/Kg	5	6/15/2009 10:03 PM
Dibenz(a,h)anthracene	ND	1600		µg/Kg	5	6/15/2009 10:03 PM
Fluoranthene	ND	1600		µg/Kg	5	6/15/2009 10:03 PM
Fluorene	ND	1600		µg/Kg	5	6/15/2009 10:03 PM
Indeno(1,2,3-cd)pyrene	ND	1600		µg/Kg	5	6/15/2009 10:03 PM
Naphthalene	ND	1600		µg/Kg	5	6/15/2009 10:03 PM
Pentachlorophenol	190000	82000		µg/Kg	50	6/16/2009 06:44 PM
Phenanthrene	ND	1600		µg/Kg	5	6/15/2009 10:03 PM
Pyrene	ND	1600		µg/Kg	5	6/15/2009 10:03 PM
Surr: 1,2-Dichlorobenzene-d4	83.1	49-103		%REC	50	6/16/2009 06:44 PM
Surr: 1,2-Dichlorobenzene-d4	81.2	49-103		%REC	5	6/15/2009 10:03 PM
Surr: 2-Fluorobiphenyl	92.0	59-108		%REC	5	6/15/2009 10:03 PM
Surr: 2-Fluorobiphenyl	91.6	59-108		%REC	50	6/16/2009 06:44 PM
Surr: 4-Terphenyl-d14	104	58-135		%REC	50	6/16/2009 06:44 PM
Surr: 4-Terphenyl-d14	117	58-135		%REC	5	6/15/2009 10:03 PM
Surr: Nitrobenzene-d5	91.0	54-115		%REC	5	6/15/2009 10:03 PM
Surr: Nitrobenzene-d5	72.6	54-115		%REC	50	6/16/2009 06:44 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	Comp R1 & R2
Lab Order:	105904	**Collection Date:**	6/11/2009
Project:	DUMBARTON BRIDGE, E8415-06-18	**Matrix:**	WOOD
Lab ID:	105904-019A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B				**EPA 6010B**		
RunID: ICP8_090617A	QC Batch: 55917			PrepDate: 6/16/2009	Analyst: **CL**	
Arsenic	ND	4.0		mg/Kg	1	6/17/2009 11:46 AM
Chromium	ND	4.0		mg/Kg	1	6/17/2009 11:46 AM
Copper	ND	8.0		mg/Kg	1	6/17/2009 11:46 AM
Zinc	7.2	4.0		mg/Kg	1	6/17/2009 11:46 AM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 3550B				**EPA 8270C**		
RunID: MS 13_090615A	QC Batch: 55905			PrepDate: 6/15/2009	Analyst: **DMP**	
2-Methylnaphthalene	ND	1600		µg/Kg	5	6/15/2009 10:32 PM
Acenaphthene	ND	1600		µg/Kg	5	6/15/2009 10:32 PM
Acenaphthylene	ND	1600		µg/Kg	5	6/15/2009 10:32 PM
Anthracene	ND	1600		µg/Kg	5	6/15/2009 10:32 PM
Benzo(a)anthracene	ND	1600		µg/Kg	5	6/15/2009 10:32 PM
Benzo(a)pyrene	ND	1600		µg/Kg	5	6/15/2009 10:32 PM
Benzo(b)fluoranthene	ND	1600		µg/Kg	5	6/15/2009 10:32 PM
Benzo(g,h,i)perylene	ND	1600		µg/Kg	5	6/15/2009 10:32 PM
Benzo(k)fluoranthene	ND	1600		µg/Kg	5	6/15/2009 10:32 PM
Chrysene	ND	1600		µg/Kg	5	6/15/2009 10:32 PM
Dibenz(a,h)anthracene	ND	1600		µg/Kg	5	6/15/2009 10:32 PM
Fluoranthene	ND	1600		µg/Kg	5	6/15/2009 10:32 PM
Fluorene	ND	1600		µg/Kg	5	6/15/2009 10:32 PM
Indeno(1,2,3-cd)pyrene	ND	1600		µg/Kg	5	6/15/2009 10:32 PM
Naphthalene	ND	1600		µg/Kg	5	6/15/2009 10:32 PM
Pentachlorophenol	ND	8200		µg/Kg	5	6/15/2009 10:32 PM
Phenanthrene	ND	1600		µg/Kg	5	6/15/2009 10:32 PM
Pyrene	ND	1600		µg/Kg	5	6/15/2009 10:32 PM
Surr: 1,2-Dichlorobenzene-d4	68.1	49-103		%REC	5	6/15/2009 10:32 PM
Surr: 2-Fluorobiphenyl	82.9	59-108		%REC	5	6/15/2009 10:32 PM
Surr: 4-Terphenyl-d14	97.9	58-135		%REC	5	6/15/2009 10:32 PM
Surr: Nitrobenzene-d5	70.2	54-115		%REC	5	6/15/2009 10:32 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	Comp R3 & R4
Lab Order:	105904	**Collection Date:**	6/11/2009
Project:	DUMBARTON BRIDGE, E8415-06-18	**Matrix:**	WOOD
Lab ID:	105904-020A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B				**EPA 6010B**		
RunID: ICP8_090617A	QC Batch: 55917			PrepDate: 6/16/2009	Analyst: **CL**	
Arsenic	ND	4.0		mg/Kg	1	6/17/2009 11:50 AM
Chromium	ND	4.0		mg/Kg	1	6/17/2009 11:50 AM
Copper	ND	8.0		mg/Kg	1	6/17/2009 11:50 AM
Zinc	23	4.0		mg/Kg	1	6/17/2009 11:50 AM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 3550B				**EPA 8270C**		
RunID: MS 13_090615A	QC Batch: 55905			PrepDate: 6/15/2009	Analyst: **DMP**	
2-Methylnaphthalene	ND	1600		µg/Kg	5	6/15/2009 11:00 PM
Acenaphthene	ND	1600		µg/Kg	5	6/15/2009 11:00 PM
Acenaphthylene	ND	1600		µg/Kg	5	6/15/2009 11:00 PM
Anthracene	ND	1600		µg/Kg	5	6/15/2009 11:00 PM
Benzo(a)anthracene	ND	1600		µg/Kg	5	6/15/2009 11:00 PM
Benzo(a)pyrene	ND	1600		µg/Kg	5	6/15/2009 11:00 PM
Benzo(b)fluoranthene	ND	1600		µg/Kg	5	6/15/2009 11:00 PM
Benzo(g,h,i)perylene	ND	1600		µg/Kg	5	6/15/2009 11:00 PM
Benzo(k)fluoranthene	ND	1600		µg/Kg	5	6/15/2009 11:00 PM
Chrysene	ND	1600		µg/Kg	5	6/15/2009 11:00 PM
Dibenz(a,h)anthracene	ND	1600		µg/Kg	5	6/15/2009 11:00 PM
Fluoranthene	ND	1600		µg/Kg	5	6/15/2009 11:00 PM
Fluorene	ND	1600		µg/Kg	5	6/15/2009 11:00 PM
Indeno(1,2,3-cd)pyrene	ND	1600		µg/Kg	5	6/15/2009 11:00 PM
Naphthalene	ND	1600		µg/Kg	5	6/15/2009 11:00 PM
Pentachlorophenol	ND	8200		µg/Kg	5	6/15/2009 11:00 PM
Phenanthrene	ND	1600		µg/Kg	5	6/15/2009 11:00 PM
Pyrene	ND	1600		µg/Kg	5	6/15/2009 11:00 PM
Surr: 1,2-Dichlorobenzene-d4	68.9	49-103		%REC	5	6/15/2009 11:00 PM
Surr: 2-Fluorobiphenyl	79.7	59-108		%REC	5	6/15/2009 11:00 PM
Surr: 4-Terphenyl-d14	92.3	58-135		%REC	5	6/15/2009 11:00 PM
Surr: Nitrobenzene-d5	67.3	54-115		%REC	5	6/15/2009 11:00 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Geocon Consultants, Inc. **Client Sample ID:** Comp DR1 & DR2
Lab Order: 105904 **Collection Date:** 6/11/2009
Project: DUMBARTON BRIDGE, E8415-06-18 **Matrix:** WOOD
Lab ID: 105904-021A

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B			**EPA 6010B**			
RunID: ICP8_090617A	QC Batch: 55917			PrepDate: 6/16/2009	Analyst: **CL**	
Arsenic	ND	4.0		mg/Kg	1	6/17/2009 11:55 AM
Chromium	ND	4.0		mg/Kg	1	6/17/2009 11:55 AM
Copper	ND	8.0		mg/Kg	1	6/17/2009 11:55 AM
Zinc	18	4.0		mg/Kg	1	6/17/2009 11:55 AM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 3550B			**EPA 8270C**			
RunID: MS 13_090615A	QC Batch: 55905			PrepDate: 6/15/2009	Analyst: **DMP**	
2-Methylnaphthalene	ND	1600		µg/Kg	5	6/15/2009 11:29 PM
Acenaphthene	ND	1600		µg/Kg	5	6/15/2009 11:29 PM
Acenaphthylene	ND	1600		µg/Kg	5	6/15/2009 11:29 PM
Anthracene	ND	1600		µg/Kg	5	6/15/2009 11:29 PM
Benzo(a)anthracene	ND	1600		µg/Kg	5	6/15/2009 11:29 PM
Benzo(a)pyrene	ND	1600		µg/Kg	5	6/15/2009 11:29 PM
Benzo(b)fluoranthene	ND	1600		µg/Kg	5	6/15/2009 11:29 PM
Benzo(g,h,i)perylene	ND	1600		µg/Kg	5	6/15/2009 11:29 PM
Benzo(k)fluoranthene	ND	1600		µg/Kg	5	6/15/2009 11:29 PM
Chrysene	ND	1600		µg/Kg	5	6/15/2009 11:29 PM
Dibenz(a,h)anthracene	ND	1600		µg/Kg	5	6/15/2009 11:29 PM
Fluoranthene	ND	1600		µg/Kg	5	6/15/2009 11:29 PM
Fluorene	ND	1600		µg/Kg	5	6/15/2009 11:29 PM
Indeno(1,2,3-cd)pyrene	ND	1600		µg/Kg	5	6/15/2009 11:29 PM
Naphthalene	ND	1600		µg/Kg	5	6/15/2009 11:29 PM
Pentachlorophenol	600000	330000		µg/Kg	200	6/16/2009 07:12 PM
Phenanthrene	ND	1600		µg/Kg	5	6/15/2009 11:29 PM
Pyrene	ND	1600		µg/Kg	5	6/15/2009 11:29 PM
Surr: 1,2-Dichlorobenzene-d4	74.1	49-103		%REC	200	6/16/2009 07:12 PM
Surr: 1,2-Dichlorobenzene-d4	72.2	49-103		%REC	5	6/15/2009 11:29 PM
Surr: 2-Fluorobiphenyl	82.0	59-108		%REC	5	6/15/2009 11:29 PM
Surr: 2-Fluorobiphenyl	80.1	59-108		%REC	200	6/16/2009 07:12 PM
Surr: 4-Terphenyl-d14	88.1	58-135		%REC	200	6/16/2009 07:12 PM
Surr: 4-Terphenyl-d14	99.3	58-135		%REC	5	6/15/2009 11:29 PM
Surr: Nitrobenzene-d5	71.4	54-115		%REC	5	6/15/2009 11:29 PM
Surr: Nitrobenzene-d5	60.1	54-115		%REC	200	6/16/2009 07:12 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	Comp DS1 & DS2
Lab Order:	105904	**Collection Date:**	6/11/2009
Project:	DUMBARTON BRIDGE, E8415-06-18	**Matrix:**	WOOD
Lab ID:	105904-022A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090615A QC Batch: 55905 PrepDate: 6/15/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2-Methylnaphthalene	ND	1900		µg/Kg	5	6/15/2009 11:58 PM
Acenaphthene	ND	1900		µg/Kg	5	6/15/2009 11:58 PM
Acenaphthylene	ND	1900		µg/Kg	5	6/15/2009 11:58 PM
Anthracene	ND	1900		µg/Kg	5	6/15/2009 11:58 PM
Benzo(a)anthracene	ND	1900		µg/Kg	5	6/15/2009 11:58 PM
Benzo(a)pyrene	ND	1900		µg/Kg	5	6/15/2009 11:58 PM
Benzo(b)fluoranthene	ND	1900		µg/Kg	5	6/15/2009 11:58 PM
Benzo(g,h,i)perylene	ND	1900		µg/Kg	5	6/15/2009 11:58 PM
Benzo(k)fluoranthene	ND	1900		µg/Kg	5	6/15/2009 11:58 PM
Chrysene	ND	1900		µg/Kg	5	6/15/2009 11:58 PM
Dibenz(a,h)anthracene	ND	1900		µg/Kg	5	6/15/2009 11:58 PM
Fluoranthene	ND	1900		µg/Kg	5	6/15/2009 11:58 PM
Fluorene	ND	1900		µg/Kg	5	6/15/2009 11:58 PM
Indeno(1,2,3-cd)pyrene	ND	1900		µg/Kg	5	6/15/2009 11:58 PM
Naphthalene	ND	1900		µg/Kg	5	6/15/2009 11:58 PM
Pentachlorophenol	670000	390000		µg/Kg	200	6/16/2009 07:39 PM
Phenanthrene	ND	1900		µg/Kg	5	6/15/2009 11:58 PM
Pyrene	ND	1900		µg/Kg	5	6/15/2009 11:58 PM
Surr: 1,2-Dichlorobenzene-d4	61.7	49-103		%REC	5	6/15/2009 11:58 PM
Surr: 1,2-Dichlorobenzene-d4	62.1	49-103		%REC	200	6/16/2009 07:39 PM
Surr: 2-Fluorobiphenyl	76.1	59-108		%REC	200	6/16/2009 07:39 PM
Surr: 2-Fluorobiphenyl	72.8	59-108		%REC	5	6/15/2009 11:58 PM
Surr: 4-Terphenyl-d14	86.1	58-135		%REC	200	6/16/2009 07:39 PM
Surr: 4-Terphenyl-d14	91.7	58-135		%REC	5	6/15/2009 11:58 PM
Surr: Nitrobenzene-d5	64.7	54-115		%REC	5	6/15/2009 11:58 PM
Surr: Nitrobenzene-d5	56.1	54-115		%REC	200	6/16/2009 07:39 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	Comp DC1 & DC2
Lab Order:	105904	**Collection Date:**	6/11/2009
Project:	DUMBARTON BRIDGE, E8415-06-18	**Matrix:**	WOOD
Lab ID:	105904-023A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B				**EPA 6010B**		
RunID: ICP8_090617A	QC Batch: 55917			PrepDate: 6/16/2009	Analyst: **CL**	
Arsenic	ND	4.0		mg/Kg	1	6/17/2009 12:00 PM
Chromium	ND	4.0		mg/Kg	1	6/17/2009 12:00 PM
Copper	ND	8.0		mg/Kg	1	6/17/2009 12:00 PM
Zinc	9.5	4.0		mg/Kg	1	6/17/2009 12:00 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 3550B				**EPA 8270C**		
RunID: MS 13_090615A	QC Batch: 55905			PrepDate: 6/15/2009	Analyst: **DMP**	
2-Methylnaphthalene	ND	330		µg/Kg	1	6/16/2009 08:08 PM
Acenaphthene	ND	330		µg/Kg	1	6/16/2009 08:08 PM
Acenaphthylene	ND	330		µg/Kg	1	6/16/2009 08:08 PM
Anthracene	ND	330		µg/Kg	1	6/16/2009 08:08 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	6/16/2009 08:08 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	6/16/2009 08:08 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	6/16/2009 08:08 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	6/16/2009 08:08 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	6/16/2009 08:08 PM
Chrysene	ND	330		µg/Kg	1	6/16/2009 08:08 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	6/16/2009 08:08 PM
Fluoranthene	ND	330		µg/Kg	1	6/16/2009 08:08 PM
Fluorene	ND	330		µg/Kg	1	6/16/2009 08:08 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	6/16/2009 08:08 PM
Naphthalene	ND	330		µg/Kg	1	6/16/2009 08:08 PM
Pentachlorophenol	3800	1600		µg/Kg	1	6/16/2009 08:08 PM
Phenanthrene	ND	330		µg/Kg	1	6/16/2009 08:08 PM
Pyrene	ND	330		µg/Kg	1	6/16/2009 08:08 PM
Surr: 1,2-Dichlorobenzene-d4	64.2	49-103		%REC	1	6/16/2009 08:08 PM
Surr: 2-Fluorobiphenyl	76.5	59-108		%REC	1	6/16/2009 08:08 PM
Surr: 4-Terphenyl-d14	88.0	58-135		%REC	1	6/16/2009 08:08 PM
Surr: Nitrobenzene-d5	68.7	54-115		%REC	1	6/16/2009 08:08 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	Comp B1 & B2
Lab Order:	105904	**Collection Date:**	6/11/2009
Project:	DUMBARTON BRIDGE, E8415-06-18	**Matrix:**	WOOD
Lab ID:	105904-024A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B				**EPA 6010B**		
RunID: ICP8_090617A	QC Batch: 55917			PrepDate: 6/16/2009		Analyst: **CL**
Arsenic	ND	4.0		mg/Kg	1	6/17/2009 12:04 PM
Chromium	ND	4.0		mg/Kg	1	6/17/2009 12:04 PM
Copper	ND	8.0		mg/Kg	1	6/17/2009 12:04 PM
Zinc	4.7	4.0		mg/Kg	1	6/17/2009 12:04 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 3550B				**EPA 8270C**		
RunID: MS 13_090615A	QC Batch: 55905			PrepDate: 6/15/2009		Analyst: **DMP**
2-Methylnaphthalene	ND	1600		µg/Kg	5	6/16/2009 12:56 AM
Acenaphthene	ND	1600		µg/Kg	5	6/16/2009 12:56 AM
Acenaphthylene	ND	1600		µg/Kg	5	6/16/2009 12:56 AM
Anthracene	ND	1600		µg/Kg	5	6/16/2009 12:56 AM
Benzo(a)anthracene	ND	1600		µg/Kg	5	6/16/2009 12:56 AM
Benzo(a)pyrene	ND	1600		µg/Kg	5	6/16/2009 12:56 AM
Benzo(b)fluoranthene	ND	1600		µg/Kg	5	6/16/2009 12:56 AM
Benzo(g,h,i)perylene	ND	1600		µg/Kg	5	6/16/2009 12:56 AM
Benzo(k)fluoranthene	ND	1600		µg/Kg	5	6/16/2009 12:56 AM
Chrysene	ND	1600		µg/Kg	5	6/16/2009 12:56 AM
Dibenz(a,h)anthracene	ND	1600		µg/Kg	5	6/16/2009 12:56 AM
Fluoranthene	ND	1600		µg/Kg	5	6/16/2009 12:56 AM
Fluorene	ND	1600		µg/Kg	5	6/16/2009 12:56 AM
Indeno(1,2,3-cd)pyrene	ND	1600		µg/Kg	5	6/16/2009 12:56 AM
Naphthalene	ND	1600		µg/Kg	5	6/16/2009 12:56 AM
Pentachlorophenol	ND	8200		µg/Kg	5	6/16/2009 12:56 AM
Phenanthrene	ND	1600		µg/Kg	5	6/16/2009 12:56 AM
Pyrene	ND	1600		µg/Kg	5	6/16/2009 12:56 AM
Surr: 1,2-Dichlorobenzene-d4	45.7	49-103	S	%REC	5	6/16/2009 12:56 AM
Surr: 2-Fluorobiphenyl	62.7	59-108		%REC	5	6/16/2009 12:56 AM
Surr: 4-Terphenyl-d14	79.7	58-135		%REC	5	6/16/2009 12:56 AM
Surr: Nitrobenzene-d5	45.7	54-115	S	%REC	5	6/16/2009 12:56 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Geocon Consultants, Inc.
Work Order: 105904
Project: DUMBARTON BRIDGE, E8415-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **MB-55917** SampType: **MBLK** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **6/16/2009** RunNo: **109961**
Client ID: **PBS** Batch ID: **55917** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **6/17/2009** SeqNo: **1726737**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	1.0									
Chromium	ND	1.0									
Copper	ND	2.0									
Zinc	ND	1.0									

Sample ID: **LCS-55917** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **6/16/2009** RunNo: **109961**
Client ID: **LCSS** Batch ID: **55917** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **6/17/2009** SeqNo: **1726738**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	48.880	1.0	50.00	0	97.8	80	120				
Chromium	47.376	1.0	50.00	0	94.8	80	120				
Copper	52.423	2.0	50.00	0	105	80	120				
Zinc	49.031	1.0	50.00	0	98.1	80	120				

Sample ID: **105904-024ADUP** SampType: **DUP** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **6/16/2009** RunNo: **109961**
Client ID: **Comp B1 & B2** Batch ID: **55917** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **6/17/2009** SeqNo: **1726746**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	4.0						0	0	20	
Chromium	ND	4.0						0	0	20	
Copper	1.553	8.0						1.550	0	20	
Zinc	6.055	4.0						4.652	26.2	20	R

Sample ID: **MB-55917MS** SampType: **MS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **6/16/2009** RunNo: **109961**
Client ID: **ZZZZZZ** Batch ID: **55917** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **6/17/2009** SeqNo: **1726747**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	115.528	1.0	125.0	0	92.4	42	113				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 105904
Project: DUMBARTON BRIDGE, E8415-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **MB-55917MS** SampType: **MS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **6/16/2009** RunNo: **109961**
Client ID: **ZZZZZZ** Batch ID: **55917** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **6/17/2009** SeqNo: **1726747**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	116.531	1.0	125.0	0	93.2	44	116				
Copper	125.443	2.0	125.0	0	100	49	124				
Zinc	118.075	1.0	125.0	0	94.5	24	129				

Sample ID: **MB-55917MSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **6/16/2009** RunNo: **109961**
Client ID: **ZZZZZZ** Batch ID: **55917** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **6/17/2009** SeqNo: **1726748**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	111.210	1.0	125.0	0	89.0	42	113	115.5	3.81	20	
Chromium	111.977	1.0	125.0	0	89.6	44	116	116.5	3.99	20	
Copper	120.429	2.0	125.0	0	96.3	49	124	125.4	4.08	20	
Zinc	113.368	1.0	125.0	0	90.7	24	129	118.1	4.07	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 105904
Project: DUMBARTON BRIDGE, E8415-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-55905** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **6/15/2009** RunNo: **109894**
Client ID: **PBS** Batch ID: **55905** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **6/15/2009** SeqNo: **1725604**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
2-Methylnaphthalene	ND	330									
Acenaphthene	ND	330									
Acenaphthylene	ND	330									
Anthracene	ND	330									
Benzo(a)anthracene	ND	330									
Benzo(a)pyrene	ND	330									
Benzo(b)fluoranthene	ND	330									
Benzo(g,h,i)perylene	ND	330									
Benzo(k)fluoranthene	ND	330									
Chrysene	ND	330									
Dibenz(a,h)anthracene	ND	330									
Fluoranthene	ND	330									
Fluorene	ND	330									
Indeno(1,2,3-cd)pyrene	ND	330									
Naphthalene	ND	330									
Pentachlorophenol	ND	1600									
Phenanthrene	ND	330									
Pyrene	ND	330									
Surr: 1,2-Dichlorobenzene-d4	2696.333		3330		81.0	49	103				
Surr: 2-Fluorobiphenyl	2760.000		3330		82.9	59	108				
Surr: 4-Terphenyl-d14	3449.000		3330		104	58	135				
Surr: Nitrobenzene-d5	2991.000		3330		89.8	54	115				

Sample ID: **LCS-55905** SampType: **LCS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **6/15/2009** RunNo: **109894**
Client ID: **LCSS** Batch ID: **55905** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **6/15/2009** SeqNo: **1725605**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	2970.000	330	3330	0	89.2	61	107				
1,4-Dichlorobenzene	2700.667	330	3330	0	81.1	56	100				
2,4-Dinitrotoluene	3746.000	330	3330	0	112	72	130				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Geocon Consultants, Inc.
Work Order: 105904
Project: DUMBARTON BRIDGE, E8415-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **LCS-55905** SampType: **LCS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **6/15/2009** RunNo: **109894**
Client ID: **LCSS** Batch ID: **55905** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **6/15/2009** SeqNo: **1725605**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
2-Chlorophenol	2932.667	330	3330	0	88.1	64	105				
4-Chloro-3-methylphenol	3576.667	660	3330	0	107	74	125				
4-Nitrophenol	3690.667	1600	3330	0	111	77	137				
Acenaphthene	3021.333	330	3330	0	90.7	63	117				
N-Nitrosodi-n-propylamine	3092.000	330	3330	0	92.9	71	121				
Pentachlorophenol	4076.333	1600	3330	0	122	69	125				
Phenol	3028.000	330	3330	0	90.9	67	111				
Pyrene	3332.333	330	3330	0	100	60	122				
Surr: 1,2-Dichlorobenzene-d4	2607.667		3330		78.3	49	103				
Surr: 2,4,6-Tribromophenol	3797.667		3330		114	47	129				
Surr: 2-Chlorophenol-d4	2798.333		3330		84.0	54	109				
Surr: 2-Fluorobiphenyl	2897.000		3330		87.0	59	108				
Surr: 2-Fluorophenol	2723.000		3330		81.8	50	111				
Surr: 4-Terphenyl-d14	3431.333		3330		103	58	135				
Surr: Nitrobenzene-d5	2955.000		3330		88.7	54	115				
Surr: Phenol-d5	2853.333		3330		85.7	58	112				

Sample ID: **105905-001AMS** SampType: **MS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **6/15/2009** RunNo: **109894**
Client ID: **ZZZZZZ** Batch ID: **55905** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **6/15/2009** SeqNo: **1725606**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acenaphthene	3087.000	330	3330	0	92.7	59	118				
Pentachlorophenol	4108.000	1600	3330	0	123	56	131				
Pyrene	3301.667	330	3330	0	99.1	51	130				
Surr: 1,2-Dichlorobenzene-d4	2708.000		3330		81.3	49	103				
Surr: 2-Fluorobiphenyl	2929.333		3330		88.0	59	108				
Surr: 4-Terphenyl-d14	3426.667		3330		103	58	135				
Surr: Nitrobenzene-d5	2986.667		3330		89.7	54	115				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Geocon Consultants, Inc.
Work Order: 105904
Project: DUMBARTON BRIDGE, E8415-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **105905-001AMSD** SampType: **MSD** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **6/15/2009** RunNo: **109894**
Client ID: **ZZZZZZ** Batch ID: **55905** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **6/15/2009** SeqNo: **1725607**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acenaphthene	3258.667	330	3330	0	97.9	59	118	3087	5.41	20	
Pentachlorophenol	4396.000	1600	3330	0	132	56	131	4108	6.77	20	S
Pyrene	3475.333	330	3330	0	104	51	130	3302	5.13	20	
Surr: 1,2-Dichlorobenzene-d4	2915.000		3330		87.5	49	103		0	0	
Surr: 2-Fluorobiphenyl	3097.333		3330		93.0	59	108		0	0	
Surr: 4-Terphenyl-d14	3598.000		3330		108	58	135		0	0	
Surr: Nitrobenzene-d5	3260.667		3330		97.9	54	115		0	0	

Sample ID: **105905-001ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **6/15/2009** RunNo: **109894**
Client ID: **ZZZZZZ** Batch ID: **55905** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **6/15/2009** SeqNo: **1725609**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
2-Methylnaphthalene	ND	330						0	0	20	
Acenaphthene	ND	330						0	0	20	
Acenaphthylene	ND	330						0	0	20	
Anthracene	ND	330						0	0	20	
Benzo(a)anthracene	ND	330						0	0	20	
Benzo(a)pyrene	ND	330						0	0	20	
Benzo(b)fluoranthene	ND	330						0	0	20	
Benzo(g,h,i)perylene	ND	330						0	0	20	
Benzo(k)fluoranthene	ND	330						0	0	20	
Chrysene	ND	330						0	0	20	
Dibenz(a,h)anthracene	ND	330						0	0	20	
Fluoranthene	ND	330						0	0	20	
Fluorene	ND	330						0	0	20	
Indeno(1,2,3-cd)pyrene	ND	330						0	0	20	
Naphthalene	ND	330						0	0	20	
Pentachlorophenol	ND	1600						0	0	20	
Phenanthrene	ND	330						0	0	20	
Pyrene	ND	330						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 105904
Project: DUMBARTON BRIDGE, E8415-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **105905-001ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **6/15/2009** RunNo: **109894**
Client ID: **ZZZZZZ** Batch ID: **55905** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **6/15/2009** SeqNo: **1725609**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 1,2-Dichlorobenzene-d4	3014.333		3330		90.5	49	103		0	0	
Surr: 2-Fluorobiphenyl	3065.000		3330		92.0	59	108		0	0	
Surr: 4-Terphenyl-d14	3535.667		3330		106	58	135		0	0	
Surr: Nitrobenzene-d5	3425.667		3330		103	54	115		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CHAIN OF CUSTODY RECORD

Pg 1 of 1

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#: _____

Logged By: _____ Date: 6/12/09

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: GSO

Sample Condition Upon Receipt (3.9)
1. CHILLED Y☑ N☐ 4. SEALED Y☐ N☑
2. HEADSPACE (VOA) Y☐ N☐ N/A 5. # OF SPLS MATCH COC Y☑ N☐
3. CONTAINER INTACT Y☑ N☐ 6. PRESERVED Y☐ N☑

Client: GEOCON CONSULTANTS, INC.
Attn: CHRIS GIUNTOLI
Address: 6671 Brisa Street
City Livermore State CA Zip Code 94550
TEL: (925) 371-5900
FAX: (925) 371-5915

Project Name: DUMBARTON BRIDGE Project #: E845-06-18
Sampler: (Printed Name) RICK DAY (Signature) _____ 6/11/09

Relinquished by: (Signature and Printed Name)	Date: 6/11/09	Time:	Received by: (Signature and Printed Name) GSO	Date: 6/11/09	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date: 6/12/09	Time: 915
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
RDay 6/y
Print Name Date
Signature

Send Report To:
Attn: _____
Co: SAME AS ABOVE
Address _____
City _____ State _____ Zip _____

Bill To:
Attn: _____
Co: SAME AS ABOVE
Address _____
City _____ State _____ Zip _____

Special Instructions/Comments:

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

Circle or Add Analysis(es) Requested

SPECIFY APPROPRIATE MATRIX

PRESERVATION

Q A / Q C
RTNE ☐
CT ☑
SWRCB ☐
Logcode _____
OTHER _____

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (PAH)	6010B (Total Metal)	8015B (GRO) / BTEX	8015B (DRO)	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	As, Cd, Cu, Zn	SOIL	WATER	GROUND WATER	WASTEWATER	WOUD	TAT	Container(s) #	Container(s) Type	REMARKS
	105704-001, 02	Comp S1 & S2	6/11	1308										X				X			2	J G	
	03, 04	Comp SR1 & SR2		1317																	2		
	05, 06	Comp R1 & R2		1235																	2		
	07, 08	Comp R3 & R4		1247																	2		
	09, 10	Comp DR1 & DR2		1122																	2		
	11, 12	Comp DS1 & DS2		1144																	2		
	13, 14	Comp DC1 & DC2		1127																	2		
	15, 16	Comp B1 & B2		1205																	2		

- TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=Hcl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter.

Diane Galvan

From: Rick Day [day@geoconinc.com]
Sent: Friday, June 12, 2009 10:07 AM
To: Diane Galvan
Subject: Dumbarton Bridge wood samples

E8435-06-18
Dumbarton Bridge

Hi Diane –

Today, you should receive samples collected yesterday from the Dumbarton Bridge – the cooler includes soil, groundwater, and wood samples.

Please homogenize, composite, and analyze the wood samples on a 72-hr TAT.

The soil and groundwater samples remain at standard TAT.

Thanks,
Rick.

Richard Day, PG, CEG, CHG
Vice President

Please visit our new website at http://www.geoconinc.com

GEOCON Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550
925-371-5900 (office)
925-872-5860 (mobile)
day@geoconinc.com

GEOCON

GEOTECHNICAL - ENVIRONMENTAL - MATERIALS

San Diego Murrieta Burbank San Bernardino Bakersfield Sacramento Livermore Carson City Las Vegas Portland

CONFIDENTIALITY NOTICE: This e-mail may contain confidential and privileged material for the sole use of the intended recipient(s). Any review, use, distribution or disclosure by others is strictly prohibited. If you have received this communication in error, please notify the sender immediately by e-mail and delete the message and any file attachments from your computer. Thank you.

July 28, 2009

Chris Giuntoli
Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550
TEL: (925) 371-5900
FAX: (925) 371-5915

ELAP No.: 1838
NELAP No.: 02107CA
NEVADA.: CA-401
CSDLAC No.: 10196

Workorder No.: 106485

RE: DUMBARTON BRIDGE, E8435-06-18

Attention: Chris Giuntoli

Enclosed are the results for sample(s) received on July 21, 2009 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter and the case narrative are an integral part of this analytical report and cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

CLIENT: Geocon Consultants, Inc.
Project: DUMBARTON BRIDGE, E8435-06-18
Lab Order: 106485

CASE NARRATIVE

Analytical Comments for Method 6010

Dilution was necessary for samples 106485-001A, 106485-002A, 106485-003A, 106485-004A and 106485-005A, due to sample matrix.

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT: Geocon Consultants, Inc. **Lab Order:** 106485
Project: DUMBARTON BRIDGE, E8435-06-18

Lab ID: 106485-001 **Collection Date:** 7/17/2009
Client Sample ID: RP-P4B **Matrix:** PAINT CHIPS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090727B	QC Batch: 56851			PrepDate: 7/26/2009	Analyst: **CL**	
Lead	180000	200		mg/Kg	100	7/27/2009 02:42 PM

Lab ID: 106485-002 **Collection Date:** 7/17/2009
Client Sample ID: RP-P4C **Matrix:** PAINT CHIPS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090727B	QC Batch: 56851			PrepDate: 7/26/2009	Analyst: **CL**	
Lead	130000	200		mg/Kg	100	7/27/2009 02:46 PM

Lab ID: 106485-003 **Collection Date:** 7/17/2009
Client Sample ID: RP-P6A **Matrix:** PAINT CHIPS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090727B	QC Batch: 56851			PrepDate: 7/26/2009	Analyst: **CL**	
Lead	93000	100		mg/Kg	50	7/27/2009 03:16 PM

Lab ID: 106485-004 **Collection Date:** 7/17/2009
Client Sample ID: RP-P6B **Matrix:** PAINT CHIPS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090727B	QC Batch: 56851			PrepDate: 7/26/2009	Analyst: **CL**	
Lead	81000	200		mg/Kg	100	7/27/2009 03:01 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Geocon Consultants, Inc. **Lab Order:** 106485
Project: DUMBARTON BRIDGE, E8435-06-18

Lab ID: 106485-005 **Collection Date:** 7/17/2009
Client Sample ID: RP-P6C **Matrix:** PAINT CHIPS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090727B	QC Batch: 56851			PrepDate: 7/26/2009	Analyst: **CL**	
Lead	62000	200		mg/Kg	100	7/27/2009 03:05 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Geocon Consultants, Inc.
Work Order: 106485
Project: DUMBARTON BRIDGE, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **LCS-56851**	SampType: **LCS**	TestCode: **6010_S**	Units: **mg/Kg**	Prep Date: **7/26/2009**	RunNo: **111167**
Client ID: **LCSS**	Batch ID: **56851**	TestNo: **EPA 6010B**	**EPA 3050B**	Analysis Date: **7/27/2009**	SeqNo: **1751590**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	50.899	1.0	50.00	0	102	80	120				

Sample ID: **MB-56851**	SampType: **MBLK**	TestCode: **6010_S**	Units: **mg/Kg**	Prep Date: **7/26/2009**	RunNo: **111167**
Client ID: **PBS**	Batch ID: **56851**	TestNo: **EPA 6010B**	**EPA 3050B**	Analysis Date: **7/27/2009**	SeqNo: **1751596**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	1.0									

Sample ID: **106545-008ADUP**	SampType: **DUP**	TestCode: **6010_S**	Units: **mg/Kg**	Prep Date: **7/26/2009**	RunNo: **111167**
Client ID: **ZZZZZZ**	Batch ID: **56851**	TestNo: **EPA 6010B**	**EPA 3050B**	Analysis Date: **7/27/2009**	SeqNo: **1751801**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	6.930	1.0						7.246	4.46	20	

Sample ID: **106545-008AMS**	SampType: **MS**	TestCode: **6010_S**	Units: **mg/Kg**	Prep Date: **7/26/2009**	RunNo: **111167**
Client ID: **ZZZZZZ**	Batch ID: **56851**	TestNo: **EPA 6010B**	**EPA 3050B**	Analysis Date: **7/27/2009**	SeqNo: **1751802**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	100.948	1.0	125.0	7.246	75.0	33	120				

Sample ID: **106545-008AMSD**	SampType: **MSD**	TestCode: **6010_S**	Units: **mg/Kg**	Prep Date: **7/26/2009**	RunNo: **111167**
Client ID: **ZZZZZZ**	Batch ID: **56851**	TestNo: **EPA 6010B**	**EPA 3050B**	Analysis Date: **7/27/2009**	SeqNo: **1751803**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	98.723	1.0	125.0	7.246	73.2	33	120	100.9	2.23	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CHAIN OF CUSTODY RECORD

Pg 1 of 1

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#: _____
Logged By: _____ Date: 7/21/09

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: GSO

Sample Condition Upon Receipt
1. CHILLED 4.9 Y☐ N☐ 4. SEALED Y☐ N☒
2. HEADSPACE (VOA) Y☐ N☐ M 5. # OF SPLS MATCH COC Y☑ N☐
3. CONTAINER INTACT Y☑ N☐ 6. PRESERVED Y☐ N☑

Client: GEOCON CONSULTANTS, INC.	Address: 6671 Brisa Street		TEL: (925) 371-5900
Attn: CHRIS GIUNTOLI	City Livermore	State CA Zip Code 94550	FAX: (925) 371-5915

Project Name: DUMBARTON BRIDGE Project #: E8435-06-18 Sampler: (Printed Name) CHRIS GIUNTOLI (Signature)

Relinquished by: (Signature and Printed Name)	Date: 7/20/09	Time: 1645	Received by: (Signature and Printed Name)	Date: 7/21/09	Time: 9:30
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: CGIUNTOLI (Print Name) 7/20/09 (Date) (Signature)

Send Report To:
Attn: _____
Co: SAME AS ABOVE
Address _____
City _____ State _____ Zip _____

Bill To:
Attn: _____
Co: SAME AS ABOVE
Address _____
City _____ State _____ Zip _____

Special Instructions/Comments:
*SOLUBLE LEAD MAY BE REQUESTED BASED ON TOTAL LEAD RESULTS

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

Circle or Add Analysis(es) Requested

SPECIFY APPROPRIATE MATRIX

PRESERVATION

Q A / Q C
RTNE ☐
CT ☒
SWRCB ☐
Logcode ____
OTHER ____

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	6010B (Total Metal)	8015B (GRO) / BTEX	8015B (DRO)	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000) TOTAL LEAD *	SOIL	WATER	GROUND WATER	WASTEWATER	PAINT CHIPS	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	106485-01	RP-P4B	7/17/09										X				X		E	1	P B		
	-2	RP-P4C																					
	-3	RP-P6A																					
	-4	RP-P6B																					
	-5	RP-P6C																					

- TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=Hcl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter.

July 31, 2009

Chris Giuntoli
Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550
TEL: (925) 371-5900
FAX: (925) 371-5915

ELAP No.: 1838
NELAP No.: 02107CA
NEVADA.: CA-401
CSDLAC No.: 10196

Workorder No.: 106485

RE: DUMBARTON BRIDGE, E8435-06-18

Attention: Chris Giuntoli

Enclosed are the results for sample(s) received on July 21, 2009 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

This is an addendum report. Please incorporate with documentation previously submitted.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

CLIENT: Geocon Consultants, Inc.
Project: DUMBARTON BRIDGE, E8435-06-18
Lab Order: 106485

CASE NARRATIVE

Analytical Comments for Method 7420

Dilution was necessary for samples 106485-001A and 106485-004A, due to sample matrix.

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

Advanced Technology Laboratories

Date: 7/31/2009

ANALYTICAL RESULTS

LEAD BY ATOMIC ABSORPTION (TCLP)
EPA 1311/ 7420

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	106485
Project:	DUMBARTON BRIDGE, E8435-06-18	**Date Received**	7/21/2009 9:30:00 AM
Project No:		**Matrix:**	Paint Chips
Analyte:	Lead	**Analyst:**	IL

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
106485-001A	RP-P4B	210	mg/L	56959	12	50	7/17/2009	7/30/2009
106485-004A	RP-P6B	16	mg/L	56959	0.50	2	7/17/2009	7/30/2009

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Geocon Consultants, Inc.
Work Order: 106485
Project: DUMBARTON BRIDGE, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 7420_TC

Sample ID: **MB-56959A**	SampType: **MBLK**	TestCode: **7420_TC**	Units: **mg/L**	Prep Date: **7/30/2009**	RunNo: **111281**
Client ID: **PBS**	Batch ID: **56959**	TestNo: **EPA 1311/ 74**	**EPA3010A**	Analysis Date: **7/30/2009**	SeqNo: **1753631**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25									

Sample ID: **MB-56937A TCLP**	SampType: **MBLK**	TestCode: **7420_TC**	Units: **mg/L**	Prep Date: **7/30/2009**	RunNo: **111281**
Client ID: **PBS**	Batch ID: **56959**	TestNo: **EPA 1311/ 74**	**EPA3010A**	Analysis Date: **7/30/2009**	SeqNo: **1753632**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25									

Sample ID: **LCS-56959**	SampType: **LCS**	TestCode: **7420_TC**	Units: **mg/L**	Prep Date: **7/30/2009**	RunNo: **111281**
Client ID: **LCSS**	Batch ID: **56959**	TestNo: **EPA 1311/ 74**	**EPA3010A**	Analysis Date: **7/30/2009**	SeqNo: **1753633**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	1.045	0.25	1.000	0	104	80	120				

Sample ID: **MB-56959-MS**	SampType: **MS**	TestCode: **7420_TC**	Units: **mg/L**	Prep Date: **7/30/2009**	RunNo: **111281**
Client ID: **ZZZZZZ**	Batch ID: **56959**	TestNo: **EPA 1311/ 74**	**EPA3010A**	Analysis Date: **7/30/2009**	SeqNo: **1753634**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	2.316	0.25	2.500	0	92.6	70	130				

Sample ID: **MB-56959-MSD**	SampType: **MSD**	TestCode: **7420_TC**	Units: **mg/L**	Prep Date: **7/30/2009**	RunNo: **111281**
Client ID: **ZZZZZZ**	Batch ID: **56959**	TestNo: **EPA 1311/ 74**	**EPA3010A**	Analysis Date: **7/30/2009**	SeqNo: **1753635**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	2.328	0.25	2.500	0	93.1	70	130	2.316	0.541	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 106485
Project: DUMBARTON BRIDGE, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 7420_TC

Sample ID: **106485-004A-DUP** SampType: **DUP** TestCode: **7420_TC** Units: **mg/L** Prep Date: **7/30/2009** RunNo: **111281**
Client ID: **RP-P6B** Batch ID: **56959** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **7/30/2009** SeqNo: **1753639**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	15.744	0.50						15.80	0.356	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

Diane Galvan

From: Chris Giuntoli [giuntoli@geoconinc.com]

Sent: Tuesday, July 28, 2009 4:11 PM

To: Diane Galvan

Subject: RE: Results/EDD - DUMBARTON BRIDGE (106485)

Hi Diane,

For workorder no. 106485, please run TCLPs for lead on a standard TAT for samples RP-P4B and RP-P6B.

Thanks,
Chris

July 28, 2009

Chris Giuntoli
Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550

TEL: (925) 371-5900
FAX: (925) 371-5915

ELAP No.: 1838
NELAP No.: 02107CA
NEVADA.: CA-401
CSDLAC No.: 10196

Workorder No.: 106486

RE: DUMBARTON BRIDGE, E8435-06-18

Attention: Chris Giuntoli

Enclosed are the results for sample(s) received on July 21, 2009 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter and the case narrative are an integral part of this analytical report and cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

CLIENT: Geocon Consultants, Inc.
Project: DUMBARTON BRIDGE, E8435-06-18
Lab Order: 106486

CASE NARRATIVE

Analytical Comments for Method 8270

Dilution was necessary for samples 106486-003A and 106486-004A, due to sample matrix.

Surrogate recoveries were diluted out for samples 106486-003A and 106486-004A.

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	COMP GR-1
Lab Order:	106486	**Collection Date:**	7/17/2009 3:00:00 PM
Project:	DUMBARTON BRIDGE, E8435-06-18	**Matrix:**	WOOD
Lab ID:	106486-003A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B				**EPA 6010B**		
RunID: ICP8_090727B	QC Batch: 56851			PrepDate: 7/26/2009	Analyst: **CL**	
Arsenic	ND	2.0		mg/Kg	1	7/27/2009 03:09 PM
Chromium	ND	2.0		mg/Kg	1	7/27/2009 03:09 PM
Copper	ND	4.0		mg/Kg	1	7/27/2009 03:09 PM
Zinc	7.8	2.0		mg/Kg	1	7/27/2009 03:09 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 3550B				**EPA 8270C**		
RunID: MS 13_090727A	QC Batch: 56839			PrepDate: 7/24/2009	Analyst: **DMP**	
2-Methylnaphthalene	1200000	250000		µg/Kg	250	7/27/2009 05:34 PM
Acenaphthene	ND	25000		µg/Kg	25	7/27/2009 02:41 PM
Acenaphthylene	ND	25000		µg/Kg	25	7/27/2009 02:41 PM
Anthracene	ND	25000		µg/Kg	25	7/27/2009 02:41 PM
Benzo(a)anthracene	ND	25000		µg/Kg	25	7/27/2009 02:41 PM
Benzo(a)pyrene	ND	25000		µg/Kg	25	7/27/2009 02:41 PM
Benzo(b)fluoranthene	ND	25000		µg/Kg	25	7/27/2009 02:41 PM
Benzo(g,h,i)perylene	ND	25000		µg/Kg	25	7/27/2009 02:41 PM
Benzo(k)fluoranthene	ND	25000		µg/Kg	25	7/27/2009 02:41 PM
Chrysene	ND	25000		µg/Kg	25	7/27/2009 02:41 PM
Dibenz(a,h)anthracene	ND	25000		µg/Kg	25	7/27/2009 02:41 PM
Fluoranthene	ND	25000		µg/Kg	25	7/27/2009 02:41 PM
Fluorene	ND	25000		µg/Kg	25	7/27/2009 02:41 PM
Indeno(1,2,3-cd)pyrene	ND	25000		µg/Kg	25	7/27/2009 02:41 PM
Naphthalene	130000	25000		µg/Kg	25	7/27/2009 02:41 PM
Pentachlorophenol	2700000	1200000		µg/Kg	250	7/27/2009 05:34 PM
Phenanthrene	110000	25000		µg/Kg	25	7/27/2009 02:41 PM
Pyrene	ND	25000		µg/Kg	25	7/27/2009 02:41 PM
Surr: 1,2-Dichlorobenzene-d4	99.1	49-103		%REC	25	7/27/2009 02:41 PM
Surr: 1,2-Dichlorobenzene-d4	0	49-103	SDO	%REC	250	7/27/2009 05:34 PM
Surr: 2-Fluorobiphenyl	0	59-108	SDO	%REC	250	7/27/2009 05:34 PM
Surr: 2-Fluorobiphenyl	101	59-108		%REC	25	7/27/2009 02:41 PM
Surr: 4-Terphenyl-d14	123	58-135		%REC	25	7/27/2009 02:41 PM
Surr: 4-Terphenyl-d14	0	58-135	SDO	%REC	250	7/27/2009 05:34 PM
Surr: Nitrobenzene-d5	82.6	54-115		%REC	25	7/27/2009 02:41 PM
Surr: Nitrobenzene-d5	0	54-115	SDO	%REC	250	7/27/2009 05:34 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	COMP GR-2
Lab Order:	106486	**Collection Date:**	7/17/2009 3:15:00 PM
Project:	DUMBARTON BRIDGE, E8435-06-18	**Matrix:**	WOOD
Lab ID:	106486-004A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B				**EPA 6010B**		
RunID: ICP8_090727B	QC Batch: 56851			PrepDate: 7/26/2009	Analyst: **CL**	
Arsenic	ND	2.0		mg/Kg	1	7/27/2009 03:12 PM
Chromium	ND	2.0		mg/Kg	1	7/27/2009 03:12 PM
Copper	ND	4.0		mg/Kg	1	7/27/2009 03:12 PM
Zinc	11	2.0		mg/Kg	1	7/27/2009 03:12 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 3550B				**EPA 8270C**		
RunID: MS 13_090727A	QC Batch: 56839			PrepDate: 7/24/2009	Analyst: **DMP**	
2-Methylnaphthalene	520000	250000		µg/Kg	250	7/27/2009 06:02 PM
Acenaphthene	ND	25000		µg/Kg	25	7/27/2009 03:10 PM
Acenaphthylene	ND	25000		µg/Kg	25	7/27/2009 03:10 PM
Anthracene	ND	25000		µg/Kg	25	7/27/2009 03:10 PM
Benzo(a)anthracene	ND	25000		µg/Kg	25	7/27/2009 03:10 PM
Benzo(a)pyrene	ND	25000		µg/Kg	25	7/27/2009 03:10 PM
Benzo(b)fluoranthene	ND	25000		µg/Kg	25	7/27/2009 03:10 PM
Benzo(g,h,i)perylene	ND	25000		µg/Kg	25	7/27/2009 03:10 PM
Benzo(k)fluoranthene	ND	25000		µg/Kg	25	7/27/2009 03:10 PM
Chrysene	ND	25000		µg/Kg	25	7/27/2009 03:10 PM
Dibenz(a,h)anthracene	ND	25000		µg/Kg	25	7/27/2009 03:10 PM
Fluoranthene	ND	25000		µg/Kg	25	7/27/2009 03:10 PM
Fluorene	ND	25000		µg/Kg	25	7/27/2009 03:10 PM
Indeno(1,2,3-cd)pyrene	ND	25000		µg/Kg	25	7/27/2009 03:10 PM
Naphthalene	51000	25000		µg/Kg	25	7/27/2009 03:10 PM
Pentachlorophenol	2700000	1200000		µg/Kg	250	7/27/2009 06:02 PM
Phenanthrene	84000	25000		µg/Kg	25	7/27/2009 03:10 PM
Pyrene	ND	25000		µg/Kg	25	7/27/2009 03:10 PM
Surr: 1,2-Dichlorobenzene-d4	101	49-103		%REC	25	7/27/2009 03:10 PM
Surr: 1,2-Dichlorobenzene-d4	0	49-103	SDO	%REC	250	7/27/2009 06:02 PM
Surr: 2-Fluorobiphenyl	98.3	59-108		%REC	25	7/27/2009 03:10 PM
Surr: 2-Fluorobiphenyl	0	59-108	SDO	%REC	250	7/27/2009 06:02 PM
Surr: 4-Terphenyl-d14	113	58-135		%REC	25	7/27/2009 03:10 PM
Surr: 4-Terphenyl-d14	0	58-135	SDO	%REC	250	7/27/2009 06:02 PM
Surr: Nitrobenzene-d5	71.3	54-115		%REC	25	7/27/2009 03:10 PM
Surr: Nitrobenzene-d5	0	54-115	SDO	%REC	250	7/27/2009 06:02 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Geocon Consultants, Inc.
Work Order: 106486
Project: DUMBARTON BRIDGE, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **LCS-56851** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **7/26/2009** RunNo: **111167**
Client ID: **LCSS** Batch ID: **56851** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **7/27/2009** SeqNo: **1751590**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	48.504	1.0	50.00	0	97.0	80	120				
Chromium	49.640	1.0	50.00	0	99.3	80	120				
Copper	51.164	2.0	50.00	0	102	80	120				
Zinc	48.690	1.0	50.00	0	97.4	80	120				

Sample ID: **MB-56851** SampType: **MBLK** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **7/26/2009** RunNo: **111167**
Client ID: **PBS** Batch ID: **56851** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **7/27/2009** SeqNo: **1751596**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	1.0									
Chromium	ND	1.0									
Copper	ND	2.0									
Zinc	ND	1.0									

Sample ID: **106545-008ADUP** SampType: **DUP** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **7/26/2009** RunNo: **111167**
Client ID: **ZZZZZZ** Batch ID: **56851** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **7/27/2009** SeqNo: **1751801**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	1.0						0	0	20	
Chromium	29.941	1.0						30.54	1.98	20	
Copper	14.956	2.0						15.52	3.69	20	
Zinc	58.486	1.0						61.52	5.05	20	

Sample ID: **106545-008AMS** SampType: **MS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **7/26/2009** RunNo: **111167**
Client ID: **ZZZZZZ** Batch ID: **56851** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **7/27/2009** SeqNo: **1751802**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	80.097	1.0	125.0	0	64.1	42	113				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 106486
Project: DUMBARTON BRIDGE, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **106545-008AMS** SampType: **MS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **7/26/2009** RunNo: **111167**
Client ID: **ZZZZZZ** Batch ID: **56851** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **7/27/2009** SeqNo: **1751802**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	126.582	1.0	125.0	30.54	76.8	44	116				
Copper	122.724	2.0	125.0	15.52	85.8	49	124				
Zinc	152.773	1.0	125.0	61.52	73.0	24	129				

Sample ID: **106545-008AMSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **7/26/2009** RunNo: **111167**
Client ID: **ZZZZZZ** Batch ID: **56851** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **7/27/2009** SeqNo: **1751803**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	78.447	1.0	125.0	0	62.8	42	113	80.10	2.08	20	
Chromium	125.814	1.0	125.0	30.54	76.2	44	116	126.6	0.609	20	
Copper	121.609	2.0	125.0	15.52	84.9	49	124	122.7	0.913	20	
Zinc	159.223	1.0	125.0	61.52	78.2	24	129	152.8	4.13	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 106486
Project: DUMBARTON BRIDGE, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-56839** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **7/24/2009** RunNo: **111192**
Client ID: **PBS** Batch ID: **56839** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **7/27/2009** SeqNo: **1752014**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
2-Methylnaphthalene	ND	330									
Acenaphthene	ND	330									
Acenaphthylene	ND	330									
Anthracene	ND	330									
Benzo(a)anthracene	ND	330									
Benzo(a)pyrene	ND	330									
Benzo(b)fluoranthene	ND	330									
Benzo(g,h,i)perylene	ND	330									
Benzo(k)fluoranthene	ND	330									
Chrysene	ND	330									
Dibenz(a,h)anthracene	ND	330									
Fluoranthene	ND	330									
Fluorene	ND	330									
Indeno(1,2,3-cd)pyrene	ND	330									
Naphthalene	ND	330									
Pentachlorophenol	ND	1600									
Phenanthrene	ND	330									
Pyrene	ND	330									
Surr: 1,2-Dichlorobenzene-d4	2249.333		3330		67.5	49	103				
Surr: 2-Fluorobiphenyl	2311.000		3330		69.4	59	108				
Surr: 4-Terphenyl-d14	3135.333		3330		94.2	58	135				
Surr: Nitrobenzene-d5	2241.667		3330		67.3	54	115				

Sample ID: **LCS-56839** SampType: **LCS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **7/24/2009** RunNo: **111192**
Client ID: **LCSS** Batch ID: **56839** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **7/27/2009** SeqNo: **1752015**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	3010.333	330	3330	0	90.4	61	107				
1,4-Dichlorobenzene	2984.333	330	3330	0	89.6	56	100				
2,4-Dinitrotoluene	3345.000	330	3330	0	100	72	130				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 106486
Project: DUMBARTON BRIDGE, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **LCS-56839** SampType: **LCS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **7/24/2009** RunNo: **111192**
Client ID: **LCSS** Batch ID: **56839** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **7/27/2009** SeqNo: **1752015**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
2-Chlorophenol	2857.000	330	3330	0	85.8	64	105				
4-Chloro-3-methylphenol	3101.667	660	3330	0	93.1	74	125				
4-Nitrophenol	2935.667	1600	3330	0	88.2	77	137				
Acenaphthene	3155.333	330	3330	0	94.8	63	117				
N-Nitrosodi-n-propylamine	3258.000	330	3330	0	97.8	71	121				
Pentachlorophenol	3077.333	1600	3330	0	92.4	69	125				
Phenol	2915.333	330	3330	0	87.5	67	111				
Pyrene	3176.333	330	3330	0	95.4	60	122				
Surr: 1,2-Dichlorobenzene-d4	2911.333		3330		87.4	49	103				
Surr: 2,4,6-Tribromophenol	3227.667		3330		96.9	47	129				
Surr: 2-Chlorophenol-d4	3030.333		3330		91.0	54	109				
Surr: 2-Fluorobiphenyl	3105.000		3330		93.2	59	108				
Surr: 2-Fluorophenol	2953.667		3330		88.7	50	111				
Surr: 4-Terphenyl-d14	3374.333		3330		101	58	135				
Surr: Nitrobenzene-d5	2854.667		3330		85.7	54	115				
Surr: Phenol-d5	3052.000		3330		91.7	58	112				

Sample ID: **106478-042AMS** SampType: **MS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **7/24/2009** RunNo: **111192**
Client ID: **ZZZZZZ** Batch ID: **56839** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **7/27/2009** SeqNo: **1752016**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acenaphthene	3245.000	5000	3330	0	97.4	59	118				
Pentachlorophenol	3985.000	25000	3330	0	120	56	131				
Pyrene	3625.000	5000	3330	0	109	51	130				
Surr: 1,2-Dichlorobenzene-d4	3075.000		3330		92.3	49	103				
Surr: 2-Fluorobiphenyl	3245.000		3330		97.4	59	108				
Surr: 4-Terphenyl-d14	3815.000		3330		115	58	135				
Surr: Nitrobenzene-d5	2985.000		3330		89.6	54	115				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 106486
Project: DUMBARTON BRIDGE, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **106478-042AMSD** SampType: **MSD** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **7/24/2009** RunNo: **111192**
Client ID: **ZZZZZZ** Batch ID: **56839** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **7/27/2009** SeqNo: **1752017**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acenaphthene	2850.000	5000	3330	0	85.6	59	118	3245	0	20	
Pentachlorophenol	2605.000	25000	3330	0	78.2	56	131	3985	0	20	
Pyrene	3165.000	5000	3330	0	95.0	51	130	3625	0	20	
Surr: 1,2-Dichlorobenzene-d4	2600.000		3330		78.1	49	103		0	0	
Surr: 2-Fluorobiphenyl	2910.000		3330		87.4	59	108		0	0	
Surr: 4-Terphenyl-d14	3505.000		3330		105	58	135		0	0	
Surr: Nitrobenzene-d5	2620.000		3330		78.7	54	115		0	0	

Sample ID: **106478-042ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **7/24/2009** RunNo: **111192**
Client ID: **ZZZZZZ** Batch ID: **56839** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **7/27/2009** SeqNo: **1752056**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
2-Methylnaphthalene	ND	5000						0	0	20	
Acenaphthene	ND	5000						0	0	20	
Acenaphthylene	ND	5000						0	0	20	
Anthracene	ND	5000						0	0	20	
Benzo(a)anthracene	ND	5000						0	0	20	
Benzo(a)pyrene	ND	5000						0	0	20	
Benzo(b)fluoranthene	ND	5000						0	0	20	
Benzo(g,h,i)perylene	ND	5000						0	0	20	
Benzo(k)fluoranthene	ND	5000						0	0	20	
Chrysene	ND	5000						0	0	20	
Dibenz(a,h)anthracene	ND	5000						0	0	20	
Fluoranthene	ND	5000						0	0	20	
Fluorene	ND	5000						0	0	20	
Indeno(1,2,3-cd)pyrene	ND	5000						0	0	20	
Naphthalene	ND	5000						0	0	20	
Pentachlorophenol	ND	25000						0	0	20	
Phenanthrene	ND	5000						0	0	20	
Pyrene	ND	5000						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 106486
Project: DUMBARTON BRIDGE, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **106478-042ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **7/24/2009** RunNo: **111192**
Client ID: **ZZZZZZ** Batch ID: **56839** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **7/27/2009** SeqNo: **1752056**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 1,2-Dichlorobenzene-d4	2660.000		3330		79.9	49	103		0	0	
Surr: 2-Fluorobiphenyl	2845.000		3330		85.4	59	108		0	0	
Surr: 4-Terphenyl-d14	3725.000		3330		112	58	135		0	0	
Surr: Nitrobenzene-d5	2615.000		3330		78.5	54	115		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CHAIN OF CUSTODY RECORD

Pg 1 of 1

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#: _____
Logged By: _____ Date: 7/21/09

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: GSO

Sample Condition Upon Receipt: 4.9
1. CHILLED Y☑ N☐ 4. SEALED Y☐ N☑
2. HEADSPACE (VOA) n/a Y☐ N☐ 5. # OF SPLS MATCH COC Y☑ N☐
3. CONTAINER INTACT Y☑ N☐ 6. PRESERVED Y☐ N☑

Client: GEOCON CONSULTANTS, INC.	Address: 6671 Brisa Street	TEL: (925) 371-5900
Attn: CHRIS GIUNTOLI	City Livermore State CA Zip Code 94550	FAX: (925) 371-5915

Project Name: DUMBARTON BRIDGE Project #: E8435-06-18 Sampler: (Printed Name) CHRIS GIUNTOLI (Signature)

Relinquished by: (Signature and Printed Name)	Date: 7/20/09	Time: 1645	Received by: (Signature and Printed Name) Christine	Date: 07/21/09	Time: 9:30
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: C GIUNTOLI 7/20/09 (Print Name / Date)
Signature

Send Report To:
Attn: _____
Co: SAME AS ABOVE
Address _____
City _____ State _____ Zip _____

Bill To:
Attn: _____
Co: SAME AS ABOVE
Address _____
City _____ State _____ Zip _____

Special Instructions/Comments:
COMPOSITE SAMPLE CONTAINERS FROM EACH SAMPLE GROUP - ANALYZE 2 COMPOSITE SAMPLES
NEED EDD W/ LAB REPORT

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

Circle or Add Analysis(es) Requested: 8081A (Pesticides) | 8082 (PCB) | 8260B (Volatiles) | 8270C PCP + PAH | 6010B (Total Metal) | 8015B (GRO) / BTEX | 8015B (DRO) | 8021 (BTEX) | TITLE 22 / CAM 17 (6010 / 7000) As, Cr, Cu, Zn

SPECIFY APPROPRIATE MATRIX: SOIL | WATER | GROUND WATER | WASTEWATER | WOOD

PRESERVATION

Q A / Q C: RTNE ☐ CT ☒ SWRCB ☐ Logcode ____ OTHER ____

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	TAT	Container(s): #	Type	REMARKS
	106458 ... 01	COMP GR-1	7/17/09	1500	E	2	J G	
	↓ ... 02	COMP GR-2	↓	1515	↓	↓	↓ ↓	

- TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=Hcl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter.

090902266

90902266

EMSL – San Leandro ◆ 2235 Polvorosa Ave, Suite 230, San Leandro, CA 94577

EMSL ANALYTICAL, INC.

(888) 455-3675 ◆ Phone (510) 895-3675 ◆ Fax (510) 895-3680 ◆ sanleandrolab@emsl.com

EMSL Rep: DAN KOCHER
Company: GEOCON CONSULTANTS, INC.
Contact: CHRIS GIUNTOLI
Address: 6671 BRISA ST
City & State: LIVERMORE, CA **Zip** 94550
Phone: 925-371-5900
☒ **Email Results** GIUNTOLI@GEOCONINC.COM
Project Name or Number: E8435-06-18

Third Party Billing **requires written authorization from third party*
EMSL-Bill to:
Contact:
Address:
City & State: **Zip**
Fax:
☐ **Fax results**
Purchase Order Number:

TURNAROUND TIME

☐ 3 Hours	☐ 6 Hours	☐ 24 Hours	☐ 48 Hours	☐ 72 Hours	☒ 5 Days	☐ 10 Days

SAMPLE MATRIX

☐ Air	☒ Bulk	☐ Soil	☐ Wipe	☐ Micro-Vac	☐ Drinking Water	☐ Wastewater	☐ Chips	☐ Other

ASBESTOS ANALYSIS

PCM - Air
☐ NIOSH 7400 (A) Issue 2: August 1994
☐ OSHA w/ Time Weighted Average

TEM AIR
☐ AHERA 40 CFR, Part 763 Subpart E
☐ NIOSH 7402 Issue 2
☐ EPA Level II

PLM - Bulk
☒ EPA 600/R-93/116
☐ **+ Add Gravimetric Reduction (EPA NOB)**
PLM CARB 435 Level: ☐ A (0.25%) ☐ B (0.1%)
☐ NIOSH 9002
☐ EPA Point Count (400 Points)
☐ **+ Add Gravimetric Reduction (EPA NOB)**
☐ EPA Point Count (1,000 Points)
☐ **+ Add Gravimetric Reduction (EPA NOB)**
☐ Standard Addition Point Count

SOILS
PLM CARB 435 Level: ☐ A (0.25%) ☐ B (0.1%)
TEM CARB 435 Level: ☐ B (0.1%) ☐ C (0.01%) ☐ D (0.001%) ☐ E (0.0005%) ☐ F (0.0001%)
☐ EMSL MSD 9000 Method fibers/gram
☐ Superfund EPA 540-R097-028 (dust generation)
EPA Protocol ☐ Qualitative ☐ Quantitative

TEM BULK
☐ TEM EPA NOB, EPA 600/R-93/116 Section 2.5.5.1 (TEM % by VAE)
☐ Chatfield SOP-1988-02
☐ TEM EPA 600/R-93/116 Section 2.5.5.2 (TEM % by Mass)

TEM MICROVAC
☐ ASTM D 5755 (Quantitative)

TEM WIPE
☐ ASTM D-6480 (Quantitative)

TEM WATER
☐ EPA 100.2 (≥10 microns)
☐ Modified EPA 100.2 (≥ 0.5 microns)
OTHER:

LEAD ANALYSIS

Flame Atomic Absorption
☐ Wipe, SW846-7420 ☐ ASTM ☐ non ASTM
☐ Soil, SW846-7420
☐ Air, NIOSH 7082
☐ Chips, SW846-7420 or AOAC 5.009 (974.02)
☐ Wastewater, SW 846-7420

☐ TCLP LEAD SW846-1311/7420

Graphite Furnace Atomic Absorption
☐ Air, NIOSH 7105
☐ Wastewater, SW846-7421
☐ Soil, SW846-7421
☐ Drinking Water, EPA 239.2

ICP – Inductively Coupled Plasma
☐ Wipe, SW846-6010 ☐ ASTM ☐ non ASTM
☐ Soil, SW846-6010
☐ Air, NIOSH 7300

MATERIALS ANALYSIS

☐ Particle Identification
☐ Full Particle Identification
☐ Dust Mites and Insect Fragments
☐ Particle Size & Distribution
☐ Product Comparison
☐ Paint Characterization
☐ Failure Analysis
☐ Corrosion Analysis
☐ Glove Box Containment Study
☐ Petrographic Examination of Concrete
☐ Portland Cement in Workplace Atmospheres (OSHA ID-143)
☐ Man Made Vitrous Fibers – MMVF's
☐ Synthetic Fiber Identification
☐ Other:

MICROBIAL ANALYSIS

Air Samples
☐ Mold & Fungi by Air O Cell
☐ Mold & Fungi by Agar Plate count & id
☐ Bacterial Count and Gram Stain
☐ Bacterial Count and Identification

Water Samples
☐ Total Coliforms, Fecal Coliforms
☐ Escherichia Coli, Fecal Streptococcus
☐ Legionella
☐ Salmonella
☐ Giardia and Cryptosporidium

Wipe and Bulk Samples
☐ Mold & Fungi – Direct Examination
☐ Mold & Fungi – (Culture follow up to direct examination if necessary)
☐ Mold & Fungi – Culture (Count & ID)
☐ Mold & Fungi – Culture (Count only)
☐ Bacterial Count & Gram Stain
☐ Bacterial Count & Identification (3 most prominent types)
☐ Other:

IAQ ANALYSIS

☐ Nuisance Dust (NIOSH 0500 & 0600)
☐ Airborne Dust (PM10, TSP)
☐ Silica Analysis by XRD ☐ NIOSH 7500
☐ HVAC Efficiency
☐ Carbon Black
☐ Airborne Oil Mist
☐ Other:

Relinquished:	Chris Giuntoli	**Date:**	3/27/08	**Time:**	1600
Received:	Fed Ex	**Date:**	3/30/09	**Time:**	8:30 AM Fed Ex
Relinquished:		**Date:**		**Time:**	
Received:		**Date:**		**Time:**	

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EMSL – San Leandro ◆ 2235 Polvorosa Ave, Suite 230, San Leandro, CA 94577

	SAMPLE NUMBER	SAMPLE DESCRIPTION	LOCATION	VOLUME Air (L) Area (Inches sq.)
1	RP-5A	SHOTCRETE		
2	RP-5B	↓		
3	RP-5C			
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				

Client Sample # (S) _____ - _____ TOTAL SAMPLE # _____

Relinquished: _____ Date: _____ Time: _____
Received: _____ Date: _____ Time: _____
Relinquished: _____ Date: _____ Time: _____
Received: _____ Date: _____ Time: _____

EMSL Analytical, Inc
2235 Polvorosa Ave , Suite 230, San Leandro, CA 94577
Phone: (510) 895-3675 Fax: (510) 895-3680 Email: milpitaslab@emsl.com

Attn: **Chris Giuntoli**
Geocon Consultants
6671 Brisa Street
Livermore, CA 94550

Fax: (925) 371-5915 Phone: (925) 371-5900
Project: **E8435-06-18**

Customer ID: GECN21
Customer PO: E8435-06-18
Received: 03/30/09 9:30 PM
EMSL Order: 090902266

EMSL Proj: E8435-06-**
Analysis Date: 3/30/2009
Report Date: 3/30/2009

Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Location**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
RP-5A, Shot crete *090902266-0001*		Gray Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
RP-5B, Shot crete *090902266-0002*		Gray Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
RP-5C, Shot crete *090902266-0003*		Gray Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**

Analyst(s)

Jorge Leon (3)

Baojia Ke, Laboratory Manager
or other approved signatory

Due to magnification limitations inherent in PLM, asbestos fibers in dimensions below the resolution capability of PLM may not be detected. Samples reported as <1% or none detected may require additional testing by TEM to confirm asbestos quantities. The above test report relates only to the items tested and may not be reproduced in any form without the express written approval of EMSL Analytical, Inc. EMSL's liability is limited to the cost of analysis. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client.Samples received in good condition unless otherwise noted.
NVLAP Lab Code 101048-3

THIS IS THE LAST PAGE OF THE REPORT.

090902268

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(888) 455-3675 ◆ Phone (510) 895-3675 ◆ Fax (510) 895-3680 ◆ sanleandrolab@emsl.com

EMSL Rep:	DAN KOCHER	*Third Party Billing*	**requires written authorization from third party*
Company:	GEOCON CONSULTANTS, INC.	**EMSL-Bill to:**	
Contact:	CHRIS GIUNTOLI	**Contact:**	
Address:	6671 BRISA ST	**Address:**	
City & State:	LIVERMORE, CA Zip 94550	**City & State:**	Zip
Phone:	925-371-5900	**Fax:**	
☒ **Email Results**	GIUNTOLI@GEOCONINC.COM	☐ **Fax results**	
Project Name or Number:	EB435-06-18	**Purchase Order Number:**	

TURNAROUND TIME

☐ 3 Hours	☐ 6 Hours	☐ 12 Hours	☐ 24 Hours	☐ 48 Hours	☐ 72 Hours	☐ 4 Days	☒ 5 Days	☐ 6-10 Days

SAMPLE MATRIX

☐ Air	☒ Bulk	☐ Soil	☐ Wipe	☐ Micro-Vac	☐ Drinking Water	☐ Wastewater	☐ Chips	☐ Other

ASBESTOS ANALYSIS

PCM - Air
- ☐ NIOSH 7400 (A) Issue 2: August 1994
- ☐ OSHA w/TWA

TEM AIR
- ☐ AHERA 40 CFR, Part 763 Subpart E
- ☐ NIOSH 7402 Issue 2
- ☐ EPA Level II

PLM - Bulk
- ☒ EPA 600/R-93/116
- ☐ NY Stratified Point Count
- CARB 435 Level: ☐ A ☐ B ☐ C ☐ D ☐ E
- ☐ NIOSH 9002
- ☐ PLM NOB (Gravimetric) NYS 198.1
- ☐ EPA Point Count (400 Points)
- ☐ EPA Point Count (1,000 Points)
- ☐ Standard Addition Point Count

SOILS
- EPA Protocol ☐ Qualitative ☐ Quantitative
- CARB 435 Level: ☐ A ☐ B ☐ C ☐ D ☐ E
- ☐ EMSL MSD 9000 Method fibers/gram
- ☐ Superfund EPA 540-R097-028 (dust generation)

TEM BULK
- ☐ Drop Mount (Qualitative)
- ☐ Chatfield SOP-1988-02
- ☐ TEM NOB (Gravimetric) NY 198.4

TEM MICROVAC
- ☐ ASTM D 5755-95 (Quantitative)

TEM WIPE
- ☐ ASTM D-6480-99
- ☐ Qualitative ☐

TEM WATER
- ☐ EPA 100.1
- ☐ EPA 100.2
- ☐ NYS 198.2

OTHER:

LEAD ANALYSIS

Flame Atomic Absorption
- ☐ Wipe, SW846-7420 ☐ ASTM ☐ non ASTM
- ☐ Soil, SW846-7420
- ☐ Air, NIOSH 7082
- ☐ Chips, SW846-7420 or AOAC 5.009 (974.02)
- ☐ Wastewater, SW 846-7420
- ☐ TCLP LEAD SW846-1311/7420

Graphite Furnace Atomic Absorption
- ☐ Air, NIOSH 7105
- ☐ Wastewater, SW846-7421
- ☐ Soil, SW846-7421
- ☐ Drinking Water, EPA 239.2

ICP – Inductively Coupled Plasma
- ☐ Wipe, SW846-6010 ☐ ASTM ☐ non ASTM
- ☐ Soil, SW846-6010
- ☐ Air, NIOSH 7300

MATERIALS ANALYSIS

- ☐ Full Particle Identification
- ☐ Optical Particle Identification
- ☐ Dust Mites and Insect Fragments
- ☐ Particle Size & Distribution
- ☐ Product Comparison
- ☐ Paint Characterizaton
- ☐ Failure Analysis
- ☐ Corrosion Analysis
- ☐ Glove Box Containment Study
- ☐ Petrographic Examination of Concrete
- ☐ Portland Cement in Workplace Atmospheres (OSHA ID-143)
- ☐ Man Made Vitrous Fibers – MMVF's
- ☐ Synthetic Fiber Identification
- ☐ Other:

MICROBIAL ANALYSIS

Air Samples
- ☐ Mold & Fungi by Air O Cell
- ☐ Mold & Fungi by Agar Plate count & id
- ☐ Bacterial Count and Gram Stain
- ☐ Bacterial Count and Identification

Water Samples
- ☐ Total Coliforms, Fecal Coliforms
- ☐ Escherichia Coli, Fecal Streptococcus
- ☐ Legionella
- ☐ Salmonella
- ☐ Giardia and Cryptosporidium

Wipe and Bulk Samples
- ☐ Mold & Fungi – Direct Examination
- ☐ Mold & Fungi – (Culture follow up to direct examination if necessary)
- ☐ Mold & Fungi – Culture (Count & ID)
- ☐ Mold & Fungi – Culture (Count only)
- ☐ Bacterial Count & Gram Stain
- ☐ Bacterial Count & Identification (3 most prominent types)
- ☐ Other:

IAQ ANALYSIS

- ☐ Nuisance Dust (NIOSH 0500 & 0600)
- ☐ Airborne Dust (PM10, TSP)
- ☐ Silica Analysis by XRD ☐ Niosh 7500
- ☐ HVAC Efficiency
- ☐ Carbon Black
- ☐ Airborne Oil Mist
- ☐ Other:

Client Sample # (S) - TOTAL SAMPLE # 8

Relinquished:		**Date:**	3/27/09	**Time:**	1600
Received:		**Date:**	3/30/09	**Time:**	8:30 AM Fed Ex
Relinquished:		**Date:**		**Time:**	
Received:		**Date:**		**Time:**	

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SAMPLE NUMBER	SAMPLE DESCRIPTION/LOCATION	VOLUME Air (L) Area (Inches sq.)
RP-1A	GRAY ELASTOMERIC DJM	
RP-1B	↓	
RP-2A	BROWN FIBER BOARD	
RP-2B	↓	
RP-3A	ASPHALT COATING	
RP-3B	↓	
RP-3C	↓	
RP-4A	GRAY PAINT	

Relinquished: _____ Date: _____ Time: _____
Received: _____ Date: _____ Time: _____
Relinquished: _____ Date: _____ Time: _____
Received: _____ Date: _____ Time: _____

EMSL Analytical, Inc
2235 Polvorosa Ave , Suite 230, San Leandro, CA 94577
Phone: (510) 895-3675 Fax: (510) 895-3680 Email: milpitaslab@emsl.com

Attn: **Chris Giuntoli**
Geocon Consultants
6671 Brisa Street
Livermore, CA 94550

Fax: (925) 371-5915 Phone: (925) 371-5900
Project: **E8435-06-18**

Customer ID: GECN21
Customer PO: E8435-06-18
Received: 03/30/09 8:30 AM
EMSL Order: 090902268

EMSL Proj: E8435-06-**
Analysis Date: 3/30/2009
Report Date: 3/30/2009

Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos				Asbestos
Sample	**Location**	**Appearance**	**%**	**Fibrous**	**%**	**Non-Fibrous**	**% Type**
RP-1A, Elastomeric DJM *090902268-0001*		Gray Non-Fibrous Homogeneous	2%	Cellulose	98%	Non-fibrous (other)	**None Detected**
RP-1B, Elastomeric DJM *090902268-0002*		Gray Non-Fibrous Homogeneous	2%	Cellulose	98%	Non-fibrous (other)	**None Detected**
RP-2A, Fiberboard *090902268-0003*		Brown Fibrous Homogeneous	95%	Cellulose	5%	Non-fibrous (other)	**None Detected**
RP-2B, Fiberboard *090902268-0004*		Brown Fibrous Homogeneous	95%	Cellulose	5%	Non-fibrous (other)	**None Detected**
RP-3A, Asphalt coating *090902268-0005*		Black Fibrous Heterogeneous	5%	Cellulose	95%	Non-fibrous (other)	**None Detected**
RP-3B, Asphalt coating *090902268-0006*		Black Fibrous Heterogeneous	5%	Cellulose	95%	Non-fibrous (other)	**None Detected**
RP-3C, Asphalt coating, paint *090902268-0007*		Black, Silver Fibrous Heterogeneous	5%	Cellulose	95%	Non-fibrous (other)	**None Detected**

Sample has inseperable layers. Sample analyzed as single sample and not layered out.

Analyst(s)

Alan Tahran (8)

Baojia Ke, Laboratory Manager
or other approved signatory

Due to magnification limitations inherent in PLM, asbestos fibers in dimensions below the resolution capability of PLM may not be detected. Samples reported as <1% or none detected may require additional testing by TEM to confirm asbestos quantities. The above test report relates only to the items tested and may not be reproduced in any form without the express written approval of EMSL Analytical, Inc. EMSL's liability is limited to the cost of analysis. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client.Samples received in good condition unless otherwise noted.

NVLAP Lab Code 101048-3

EMSL Analytical, Inc
2235 Polvorosa Ave , Suite 230, San Leandro, CA 94577
Phone: (510) 895-3675 Fax: (510) 895-3680 Email: milpitaslab@emsl.com

Attn: **Chris Giuntoli**
Geocon Consultants
6671 Brisa Street
Livermore, CA 94550

Fax: (925) 371-5915 Phone: (925) 371-5900
Project: **E8435-06-18**

Customer ID: GECN21
Customer PO: E8435-06-18
Received: 03/30/09 8:30 AM
EMSL Order: 090902268

EMSL Proj: E8435-06-**
Analysis Date: 3/30/2009
Report Date: 3/30/2009

Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Location**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
RP-4A, Paint *090902268-0008*		Red, Silver Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**

Analyst(s)

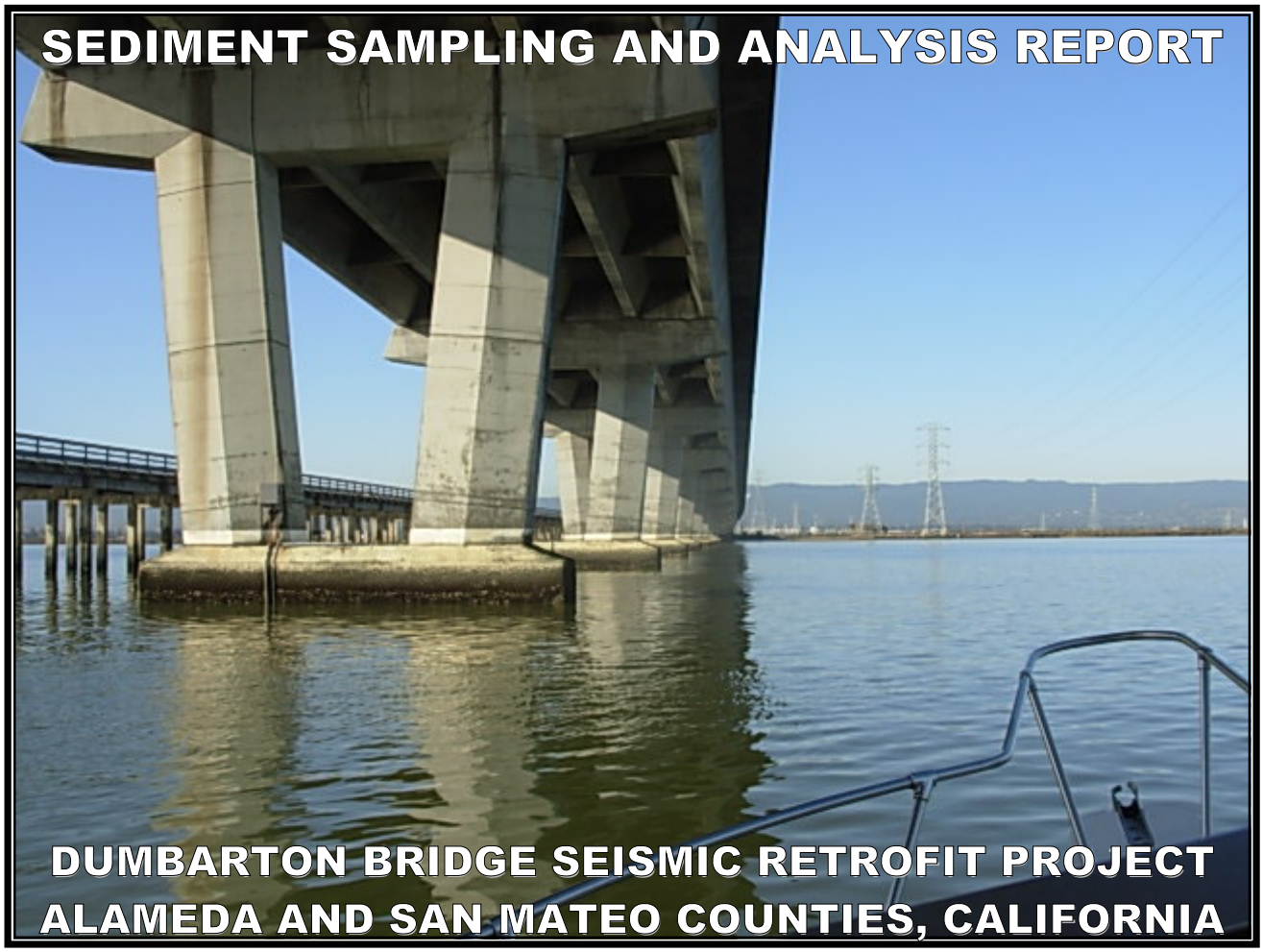
Alan Tahran (8)

Baojia Ke, Laboratory Manager
or other approved signatory

Due to magnification limitations inherent in PLM, asbestos fibers in dimensions below the resolution capability of PLM may not be detected. Samples reported as <1% or none detected may require additional testing by TEM to confirm asbestos quantities. The above test report relates only to the items tested and may not be reproduced in any form without the express written approval of EMSL Analytical, Inc. EMSL's liability is limited to the cost of analysis. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client.Samples received in good condition unless otherwise noted.
NVLAP Lab Code 101048-3

16. E8435-06-18 SEDIMENT REPORT

SEDIMENT SAMPLING AND ANALYSIS REPORT



DUMBARTON BRIDGE SEISMIC RETROFIT PROJECT
ALAMEDA AND SAN MATEO COUNTIES, CALIFORNIA

PREPARED FOR:
CALTRANS DISTRICT 4
OFFICE OF ENVIRONMENTAL ENGINEERING
111 GRAND AVENUE, 14TH FLOOR
OAKLAND, CALIFORNIA

PREPARED BY:
GEOCON CONSULTANTS, INC.
6671 BRISA STREET
LIVERMORE, CALIFORNIA

GEOCON PROJECT NO. E8435-06-18/-41
CALTRANS EA NO. 04-1A5221

NOVEMBER 2009

TABLE OF CONTENTS

REPORT LIMITATIONS iii

ACRONYMS AND ABBREVIATIONS iv

PROJECT TEAM vi

EXECUTIVE SUMMARY vii

1.0 INTRODUCTION 1

2.0 REGULATORY CRITERIA 2
- 2.1 Hazardous Waste Determination 2
- 2.2 Environmental Screening Levels 3
- 2.3 Sanitary Landfill Acceptance Criteria 3

3.0 SEDIMENT SAMPLING AND ANALYSIS 4
- 3.1 Sediment Sample Methodology 4
- 3.2 Sediment Sample Analyses 5
  - 3.2.1 Biological Testing 5
  - 3.2.2 Physical and Chemical Testing 6

4.0 SEDIMENT SAMPLE RESULTS 8
- 4.1 PER Biological Test Results 8
  - 4.1.1 Biological Testing QA/QC 8
- 4.2 CRG Physical Properties Test Results 8
- 4.3 Chemical Test Results 9
  - 4.3.1 CRG Marine Chemistry Test Results 9
  - 4.3.2 ATL Chemical Test Results 10

5.0 SUMMARY OF FINDINGS AND RECOMMENDATIONS 13

5.0 REFERENCES 14

FIGURES
1. Vicinity Map
2. Sample Location Map

SITE PHOTOGRAPHS

TABLES
1. Sediment Core Logs
2. Summary of Physical Properties
3. Summary of TOC, Oil & Grease, Organotin, PCB, and Organochlorine Pesticide Results
4. Summary of PAH Results
5. Summary of Priority Pollutant Total Metals Results
6. Summary of PCBs by Congener
7. Summary of Organic Results
8. Summary of CAM 17 Total Metals Results
9. Summary of Soluble Metals Results

APPENDICES

A. Example Sanitary Landfill Acceptance Criteria
B. Pacific EcoRisk *Data Report, Biological Testing of Sediment Samples Collected from the Dumbarton Bridge*
C. CRG Analytical Laboratory Data Sheets
D. ATL Analytical Laboratory Data Sheets

REPORT LIMITATIONS

Geocon Consultants, Inc. (Geocon) prepared this report exclusively for the State of California Department of Transportation (Caltrans) District 4. The information contained herein is only valid as of the date of the report and will require an update to reflect additional information obtained.

This report is not a comprehensive site characterization and should not be construed as such. The findings as presented in this report are predicated on the results of the limited sampling and laboratory testing performed. In addition, the information obtained is not intended to address potential impacts related to sources other than those specified herein. Therefore, the report should be deemed conclusive with respect to only the information obtained. We make no warranty, express or implied, with respect to the content of this report or any subsequent reports, correspondence or consultation. Geocon strived to perform the services summarized herein in accordance with the local standard of care in the geographic region at the time the services were rendered.

The contents of this report reflect the views of the author who is responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the State of California or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation.

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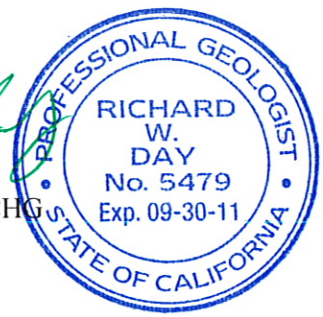

CALIFORNIA DEPARTMENT OF TRANSPORTATION – DISTRICT 4
OFFICE OF ENVIRONMENTAL ENGINEERING – HAZARDOUS WASTE BRANCH

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ACRONYMS AND ABBREVIATIONS

ATL	Advanced Technology Laboratories, Inc.
Caltrans	State of California – Department of Transportation
CAM	California Assessment Manual
CCR	California Code of Regulations
CEG	Certified Engineering Geologist
CFR	Code of Federal Regulations
CHG	Certified Hydrogeologist
Chromium III	Trivalent Chromium
Chromium VI	Hexavalent Chromium
CRG	CRG Marine Laboratories, Inc.
DDE	dichlorodiphenyldichloroethylene
DMMO	Dredged Material Management Office
DRET	Dredging Elutriate Test
Dup	Duplicate
EA	Expenditure Authorization
EPA	U.S. Environmental Protection Agency
ESL	SFRWQCB Environmental Screening Level
Geocon	Geocon Consultants, Inc.
GPS	Global Positioning System
$K_2Cr_2O_7$	Potassium Dichromate
LC_{50}	Lethal Concentration to 50% of a group of organisms
LCS	Laboratory Control Sample
<	less than
L/SP	Liquid/Suspended Phase
(m)	Modified
MDL	Method Detection Limit
mg/kg	milligrams per kilogram
mg/dry kg	milligrams per kilogram dry weight
mg/l	milligrams per liter
ng/dry g	nanograms per gram dry weight
ND	none detected
%	percent
PAHs	Polynuclear Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
PE	Professional Engineer
PER	Pacific EcoRisk Environmental Consulting & Testing

PG	Professional Geologist
ppt	parts per trillion
PQL	Practical Quantitation Limit
QA/QC	Quality Assurance/Quality Control
RCRA	Resource, Conservation, and Recovery Act
RSD	Relative Standard Deviation
SFRWQCB	San Francisco Bay Regional Water Quality Control Board
SM	Standard Method
STLC	Soluble Threshold Limit Concentration
TCLP	Toxicity Characteristic Leaching Procedure
TEG	TEG Oceanographic Services
TO	Task Order
TOC	Total Organic Carbon
TPHd	Total Petroleum Hydrocarbons as Diesel
TPHmo	Total Petroleum Hydrocarbons as Motor Oil
TTLC	Total Threshold Limit Concentration
ug/kg	micrograms per kilogram
ug/dry kg	micrograms per kilogram dry weight
USACE	United States Army Corps of Engineers
WET	Waste Extraction Test

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EXECUTIVE SUMMARY

This report presents the results of the San Francisco Bay sediment investigation performed by the California Department of Transportation (Caltrans) District 4 and Geocon Consultants, Inc. (Geocon) for the Dumbarton Bridge Retrofit Project. This report was prepared under Caltrans Contract No. 04A2912, Task Order Nos. 18 (TO-18) and 41 (TO-41), and Expenditure Authorization (EA) No. 04-1A5221. The project location is depicted on the Vicinity Map, Figure 1.

Caltrans proposes seismic retrofit construction activities at the Dumbarton Bridge. The existing bridge structure is comprised of 5 components: A main channel crossing at the middle of the bridge, approach structures at each end of the main crossing, and trestle structures at the end of each approach structure.

The purpose of bay sediment sampling (the subject of this report) is to generate a statistically significant characterization of the upper two feet of sediments for upland landfill disposal and to demonstrate that the disruption of sediment associated with the strengthening of the west and east approaches to the Dumbarton Bridge will not have adverse environmental effects.

The sediment sampling methodologies and laboratory analyses presented in this report were conducted in general accordance with the Caltrans-approved *Sampling and Analysis Plan, Dumbarton Bridge Retrofit Project*, dated February 19, 2009.

On March 10 and 11, 2009, Geocon oversaw the collection of sediment samples from locations along the east and west approaches of the Dumbarton Bridge. Eleven sediment samples (P5 to P15) were collected to characterize sediment that may be disturbed or excavated for the strengthening of the west approach sections and nine sediment samples (P32 to P40) were collected to characterize sediment that may be disturbed or excavated for the strengthening of the east approach sections. The samples were collected immediately north of the bridge and the approximate sample locations are shown on Figure 2.

Ten sediment samples (collected from even-numbered piers) were submitted to Pacific EcoRisk Environmental Consulting and Testing (PER) for 96-hour liquid/suspended particulate phase (L/SP) testing using *Americamysis bahia* (aka mysids). The L/SP testing was conducted following guidelines established by the U.S. Army Corps of Engineers (USACE) report *Dredging Elutriate Test (DRET) Development. Contract Report D95-1* (USACE 1995).

Ten sediment samples (collected from even-numbered piers) were submitted to CRG Marine Laboratories (CRG) for physical and marine chemistry testing. Physical properties tests included percent solids following Environmental Protection Agency (EPA) Method 160.3 and particle size distribution following Standard Method (SM) 2560D. Marine chemistry analysis conducted by CRG included the following:

- Total organic carbon (TOC) following EPA Method 9060A(m)
- Priority pollutant metals following EPA Method 6020(m)
- Mercury following EPA Method 245.7(m)
- Organotins following Krone, et al., (1989)
- Polynuclear aromatic hydrocarbons (PAHs), organochlorine pesticides, and polychlorinated biphenyls (PCBs) following EPA Method 8270C(m)
- Oil & grease following SM 5520E

Each analysis was performed in general accordance with the *Sampling and Analysis Plan Guidance for Dredging Projects Within the San Francisco District* prepared by Dredged Material Management Office (DMMO), dated July 1999, and the *Evaluation of Dredged Material Proposed for Ocean Disposal, Testing Manual*, prepared by EPA/USACE, dated February 1991. Sediment sample results were reported on a dry weight basis and method detection limits were equal to or more stringent than those shown in the DMMO *Sample Analysis Plan* guidance document.

Ten sediment samples (collected from odd-numbered piers) were submitted to Advanced Technology Laboratories (ATL) for the following standard chemical analyses:

- California Assessment Manual (CAM) 17 metals following EPA Method 6010/7471
- Total petroleum hydrocarbons as diesel (TPHd) and motor oil (TPHmo) (with silica gel cleanup) following EPA Method 8015B(m)
- PAHs following EPA Method 8270C
- Organochlorine pesticides following EPA Method 8081
- PCBs following EPA Method 8082

The results of the biological testing by PER indicate there were no significant reductions in survival in the Dumbarton Bridge sediment sample composite DRET elutriates. The LC_{50} of the mysid test populations was greater than 100 percent elutriate solution for each of the ten sediment composite samples tested.

Results of the chemical tests conducted by CRG and ATL are summarized as follows:

- TOC was reported by CRG at 0.9 to 1.92 percent dry weight.
- Oil and grease was reported in six of the ten samples analyzed by CRG at estimated concentrations of 0.1 ug/dry kg. The other four samples were reported as <0.1 ug/dry kg.
- PCBs were not detected above laboratory reporting limits in the sediment samples analyzed by CRG and ATL. With the exception of sample P-12, PCB congeners were not detected above the laboratory reporting limit by CRG. Congeners PCB118 and PCB138 were estimated by CRG in sample P-12 at concentrations of 1.9 and 2.3 ng/dry g, respectively.
- Organotins were not detected above laboratory reporting limits in the samples analyzed by CRG.
- Total PAH concentrations, reported in dry weight by CRG using marine testing protocols, ranged from 101 to 9,028.2 ug/dry kg. PAHs were not detected above the laboratory reporting limits (in wet weight) in samples analyzed by ATL using standard chemistry test methods
- Estimated organochlorine pesticides concentrations, reported in dry weight by CRG, ranged from 1.2 to 5.8 ug/dry kg. Organochlorine pesticides were not detected above the laboratory reporting limits (in wet weight) in samples analyzed by ATL.
- Arsenic, lead, mercury, and vanadium were reported at total concentrations exceeding SFRWQCB residential land use and/or commercial/industrial land use ESLs.
- The reported total metal concentrations are less than or within published background levels for California soils.

Based on the bioassay, physical, and marine chemistry results, the disruption of shallow sediment in the vicinity of Dumbarton Bridge piers P5 to P15 and P32 to P40 will not have adverse environmental effects.

Based on the chemical test results, sediment excavated from the vicinity of Dumbarton Bridge piers P5 to P15 and P32 to P40 will not be considered a California hazardous waste. The sediment contains metals at concentrations that exceed SFRWQCB residential and commercial/industrial land use ESLs, and metal concentrations greater than example sanitary landfill total result thresholds. The sediment also contains PAHs as reported using marine testing protocols. Accordingly, offsite reuse or disposal of excavated sediment may be restricted depending on proposed use. The reported metal concentrations are less than or within published background levels for California soils.

SEDIMENT SAMPLING AND ANALYSIS REPORT

1.0 INTRODUCTION

This report presents the results of the San Francisco Bay sediment investigation performed by the California Department of Transportation (Caltrans) District 4 and Geocon Consultants, Inc. (Geocon) for the Dumbarton Bridge Retrofit Project. This report was prepared under Caltrans Contract No. 04A2912, Task Order Nos. 18 (TO-18) and 41 (TO-41), and Expenditure Authorization (EA) No. 04-1A5221. The project location is depicted on the Vicinity Map, Figure 1.

Caltrans proposes seismic retrofit construction activities at the Dumbarton Bridge. The existing bridge structure is comprised of 5 components: A main channel crossing at the middle of the bridge, approach structures at each end of the main crossing, and trestle structures at the end of each approach structure. The project consists of the following major retrofit activities involving the substructure and ancillary structures.

Installation of Concrete Footing Overlay and Column Jacket

Install a concrete footing overlay and column jacket to strengthen the footing to column connection on the main channel section. No sediment disturbance is anticipated.

Strengthen the West and East Approach Sections

Strengthen the west and east approach sections by providing concrete bolsters on the sides of the footing pedestal and concrete column jackets. Minor sediment excavation is anticipated to accomplish this task.

Removal, Modification, and Replacement of the Existing Curtain Walls

Remove, modify, and replace the existing curtain walls on the east and west trestle sections and install new open-ended steel-shell piles with pile-cap extensions connected to outriggers at specific existing bent caps to strengthen the bridge frames. The connection between the new steel-shell piles and pile-cap extensions may require removal of soil and groundwater to place reinforced concrete. This work will be performed at upland locations.

Removal of Old Ravenswood Fishing Pier

Demolish and remove the remaining 2,200-foot-long portion of the old 1927 bridge, which was converted into the Ravenswood Fishing Pier, located on the west side of the channel. The pier is being demolished because of its deteriorated condition and to make room for a temporary trestle to access the west approach section to perform retrofit work.. The pier consists of a concrete deck supported by concrete bents and metal stringers. Potential hazardous materials on the pier include lead-containing

paint, asbestos-containing bearing and seal material, contaminated debris (inorganic and organic pollutants), and bird guano. It is anticipated that the piles will be pulled out or cut off below the mud line.

Construction of Two Temporary Access Trestles

To accommodate construction activities, it is anticipated that two temporary access trestles extending to the ends of the east and west approaches will be constructed on the south side of the bridge. The foundation would consist of open-ended steel piles, which would be removed after completion of the project.

Flood Barrier

A barrier will be installed adjacent to the west end of the bridge to prevent water from flooding the parking lot during high tides. Soil excavation and dewatering will be necessary to construct the barrier and associated drainage systems. This work will be performed at upland locations.

The purpose of bay sediment sampling (the subject of this report) is to generate a statistically significant characterization of the upper two feet of sediments for upland landfill disposal and to demonstrate that the disruption of sediment associated with the strengthening of the west and east approaches to the Dumbarton Bridge will not have adverse environmental effects.

2.0 REGULATORY CRITERIA

2.1 Hazardous Waste Determination

Regulatory criteria to classify a waste as California hazardous for handling and disposal purposes are contained in the CCR, Title 22, Division 4.5, Chapter 11, Article 3, §66261.24. Criteria to classify a waste as Resource, Conservation, and Recovery Act (RCRA) hazardous are contained in Chapter 40 of the Code of Federal Regulations (40 CFR), Section 261.

For waste containing metals, the waste is classified as California hazardous when: 1) the total metal content exceeds the respective Total Threshold Limit Concentration (TTLC); or 2) the soluble metal content exceeds the respective Soluble Threshold Limit Concentration (STLC) based on the standard WET analysis. A waste has the potential of exceeding the STLC when the waste's total metal content is greater than or equal to ten times the respective STLC value since the WET uses a 1:10 dilution ratio. Hence, when a total metal is detected at a concentration greater than or equal to ten times the respective STLC, and assuming that 100 percent of the total metals are soluble, soluble metal analysis is required. A material is classified as RCRA hazardous, or Federal hazardous, when the soluble metal content exceeds the Federal regulatory level based on the Toxicity Characteristic Leaching Procedure (TCLP).

The STLC for chromium and/or chromium (III) compounds is 560 mg/l; the soluble TCLP regulatory level for chromium is 5 mg/l. Therefore, soluble WET chromium concentrations that are below 560 mg/l are not considered California Hazardous waste. If the soluble TCLP chromium concentration is less than 5 mg/l and soluble WET chromium equals or exceeds 560 mg/l and the waste is not otherwise classified as RCRA hazardous, it would be considered non-RCRA hazardous waste.

The above regulatory criteria are based on chemical concentrations. Wastes may also be classified as hazardous based on other criteria such as ignitability and corrosivity; however, for the purposes of this investigation, toxicity (i.e., chemical concentrations) is the primary factor considered for waste classification since waste generated during the construction activities would not likely warrant testing for ignitability or other criteria. Waste that is classified as either California hazardous or RCRA hazardous requires management as a hazardous waste.

2.2 Environmental Screening Levels

The San Francisco Bay Regional Water Quality Control Board (SFRWQCB) prepared a technical report entitled *Screening For Environmental Concerns At Sites With Contaminated Soil and Groundwater, Interim Final- November 2007 (Revised May 2008)* that presents Environmental Screening Levels (ESLs) for soil, groundwater, soil gas, and surface water, to assist in evaluating sites impacted by releases of hazardous chemicals. The ESLs are conservative values for more than 100 commonly detected contaminants, which may be used to compare with environmental data collected at a site. ESLs are strictly risk assessment tools and "not regulatory clean up standards." The presence of a chemical at concentrations in excess of an ESL does not necessarily indicate that adverse impacts to human health or the environment are occurring; this simply indicates that a potential for adverse risk may exist and that additional evaluation is or may be warranted (SFRWQCB, 2008).

For purposes of this evaluation, residential and commercial land use ESLs for shallow soil where groundwater is a current or potential source of drinking water (Table A, SFRWQCB 2008) and ESLs for construction/trench worker direct exposure (Table K-3, SFRWQCB 2008) were used for comparison.

2.3 Sanitary Landfill Acceptance Criteria

Sanitary landfills have differing acceptance criteria that are generally based on the leaching potential of contaminants from waste material. At the request of Caltrans, soluble analyses were performed on selected samples to provide information to landfill operators for evaluating waste acceptance. The Newby Island Sanitary Landfill is located approximately 16 miles from the Dumbarton Bridge west approach and their sanitary landfill acceptance criteria are provided as an example in Appendix A.

3.0 SEDIMENT SAMPLING AND ANALYSIS

The sediment sampling methodologies and laboratory analyses presented in this report were conducted in general accordance with the Caltrans-approved *Sampling and Analysis Plan, Dumbarton Bridge Retrofit Project*, dated February 19, 2009.

On March 10 and 11, 2009, Geocon oversaw the collection of sediment samples from locations along the east and west approaches of the Dumbarton Bridge. Eleven sediment samples (P5 to P15) were collected to characterize sediment that may be disturbed or excavated for the strengthening of the west approach sections and nine sediment samples (P32 to P40) were collected to characterize sediment that may be disturbed or excavated for the strengthening of the east approach sections. The samples were collected immediately north of the bridge and the approximate samples locations are shown on Figure 2. Differential global positioning system (GPS) sample locations are provided in Table 1.

One sediment core was collected to a depth of two feet below the mud line at each pier location. No sediment samples were collected from piers P1 to P4 (west approach) and P41 to P44 (east approach) as retrofit work is not planned at these locations.

Before the sample cores were placed into the coolers, Geocon observed characteristics such as color, grain size, and odor. Table 1 summarizes the sediment core descriptions for each sample.

3.1 Sediment Sample Methodology

Sediment cores were collected by TEG Oceanographic Services (TEG) using a pneumatic-powered jack hammer, drive rods, and core-barrel sampler. The pneumatic hammer was suspended over the sample location using a boom and winch as shown in Photograph 1. The hammer was then used to advance a four-inch-diameter stainless steel core-barrel sampler lined with a plastic bag insert into undisturbed bay sediment. The core-barrel sampler was attached to a stainless drive rod in order to reach the bottom surface, which was encountered at depths of 1.5 to 6 feet during the sampling activities.

After the core-barrel sampler was hydraulically advanced two feet into the bay sediment, the drive rod and sampler were retrieved back into the marine vessel using the boom and winch. The plastic bag insert was then removed from the core-barrel sampler; the ends were sealed with plastic zip-ties, and the samples were then placed in a chest cooled with ice for storage and transport to Pacific EcoRisk Environmental Consulting and Testing (PER) for biological testing.

Sediment samples submitted to CRG Marine Laboratories (CRG) and Advanced Technology Laboratories (ATL) for physical and chemical testing were collected in two four-ounce glass jars. The jars were filled using excess sediment from the ends of the plastic bag inserts prior to sealing the bags for biological testing at PER.

Prior to the collection of sediment samples at each location, the core-barrel sampler was thoroughly scrubbed and washed with seawater to remove all residual sediment from the previous sample location. A new plastic bag insert was placed inside the core-barrel sampler prior to the collection of the subsequent sediment sample.

Approximately 20 gallons of sea water were collected on March 11, 2009, at the conclusion of the field sampling. The sea water was collected in four 5-gallon plastic drinking water containers. The water was delivered to PER on March 12, 2009, along with the sediment samples.

All samples were delivered to each analytical laboratory under chain-of-custody protocol. The samples were maintained by PER in the dark under refrigeration at ≤4 degrees Celsius until they were analyzed.

3.2 Sediment Sample Analyses

Sediment samples were collected from 20 piers during this investigation. To reduce analytical costs, the sediment samples collected from even-numbered piers were submitted for physical properties, marine chemistry, and biological testing, and the sediment samples collected from the odd-numbered piers were submitted for standard chemical analysis. Sediment samples for biological testing were submitted to PER located in Fairfield, California; samples for physical properties and marine chemistry analyses were submitted to CRG located in Torrance, California; and samples for standard chemical analyses were submitted to ATL located in Signal Hill, California.

3.2.1 Biological Testing

Ten sediment samples (collected from even-numbered piers) were submitted to PER for 96-hour liquid/suspended particulate phase (L/SP) testing using *Americamysis bahia* (aka mysids) provided by Aquatic BioSystems located in Fort Collins, Colorado. The L/SP testing was conducted following guidelines established by the U.S. Army Corps of Engineers (USACE) report *Dredging Elutriate Test (DRET) Development. Contract Report D95-1* (USACE 1995).

3.2.1.1 Biological Laboratory Testing Methodology

PER prepared elutriate test solutions by first oven-drying an aliquot of each sediment sample to find its dry weight. Once the dry weight had been obtained, 10 grams of sediment was then mixed for one hour (with aeration) with one liter of site sea water to form 10 grams (dry weight) per liter elutriate solution. After mixing, the sediment-water mixture was allowed to settle for one hour, at which time the supernatant was siphoned out and was used as the DRET elutriate test solution.

Laboratory control/dilution water for the tests was prepared to a salinity of 25 parts per trillion (ppt) using artificial sea salt (Crystal Sea Salt® - bioassay grade). The dilution water and the DRET elutriates were then used to prepare test treatment concentrations of 0 (laboratory control sample), 10, 50, and 100 percent elutriate.

Five test replicates of each elutriate concentration per sample location were then prepared. Each replicate test sample was initiated with 10 randomly selected 4-day-old mysids. The test replicates were then stored in a room at 20 degrees Celsius under a 2:1 light to dark photoperiod.

Water quality conditions were monitored daily from one randomly selected test replicate per test concentration, and dead mysids were removed from any test replicate via pipette. The test replicates were fed brine shrimp nauplii on a daily basis for the duration of the 96-hour test.

3.2.1.2 Biological Laboratory QA/QC

Reference toxicant testing was simultaneously conducted with the elutriate tests to assess the test organisms (*Americamysis bahia*) to chemical stress. The reference toxicant test was conducted using laboratory control water spiked with potassium dichromate ($K_2Cr_2O_7$) at concentrations of 1.75, 3.5, 7.0, 14, and 24 milligrams per liter (mg/l). The results of the reference toxicant testing were then compared with recent previous toxicant test results performed by PER to assess the quality of the test organisms used in the elutriate tests.

3.2.2 Physical and Chemical Testing

Sediment samples were collected from 20 piers. Ten sediment samples (collected from even-numbered piers) were submitted to CRG for physical and marine chemistry testing. Physical properties tests included percent solids following Environmental Protection Agency (EPA) Method 160.3 and particle size distribution following Standard Method (SM) 2560D. Marine chemistry analysis conducted by CRG included the following:

- Total organic carbon (TOC) following EPA Method 9060A(m)
- Priority pollutant metals following EPA Method 6020(m)
- Mercury following EPA Method 245.7(m)
- Organotins following Krone, et al., (1989)
- Polynuclear aromatic hydrocarbons (PAHs), organochlorine pesticides, and poly-chlorinated biphenyls (PCBs) following EPA Method 8270C(m)
- Oil & grease following SM 5520E

Each analysis was be performed in general accordance with the *Sampling and Analysis Plan Guidance for Dredging Projects Within the San Francisco District* prepared by Dredged Material Management Office (DMMO), dated July 1999, and the *Evaluation of Dredged Material Proposed for Ocean Disposal, Testing Manual*, prepared by EPA/USACE, dated February 1991. Sediment sample results were reported on a dry weight basis and method detection limits were equal to or more stringent than those shown in the DMMO *Sample Analysis Plan* guidance document.

Ten sediment samples (collected from odd-numbered piers) were submitted to ATL for the following standard chemical analyses:

- California Assessment Manual (CAM) 17 metals following EPA Method 6010/7471
- Total petroleum hydrocarbons as diesel (TPHd) and motor oil (TPHmo) (with silica gel cleanup) following EPA Method 8015B(m)
- PAHs following EPA Method 8270C
- Organochlorine pesticides following EPA Method 8081
- PCBs following EPA Method 8082

3.2.2.1 Laboratory QA/QC

Quality Assurance/Quality Control (QA/QC) procedures included documentation of the following criteria for each sample matrix type at an approximately 10% frequency:

Accuracy – All samples for organic analysis were spiked with surrogates to determine accuracy. Sample spikes were added prior to processing each sample and were carried throughout the entire analytical procedure. Results from spikes were reported in percent recovery with acceptance ranges and amount spiked or true values.

Precision - The analysis of duplicate samples or duplicate spiked samples can be used to determine analytical precision. Duplicate samples results can also indicate homogeneity of the sample matrix. Relative standard deviations (RSDs) were calculated for all duplicate samples and duplicate spiked samples, and were reported along with acceptance ranges.

All QA/QC records for the various testing programs are kept on file by the analytical laboratories for review by regulatory agency personnel.

4.0 SEDIMENT SAMPLE RESULTS

4.1 PER Biological Test Results

PER reported "that there were no significant reductions in survival in the Dumbarton Bridge composite DRET elutriates" for sediment samples obtained from Piers 6, 8, 10, 12, 14, 32, 34, 36, 38, and 40.

The DRET test results indicate there was greater than or equal to 96 percent survival. The lethal concentration for 50 percent (LC_{50}) of the mysid test populations was greater than 100 percent elutriate solution for each of the ten sediment samples.

A copy of PER's *Data Report* detailing the results of the biological testing is provided as Appendix B.

4.1.1 Biological Testing QA/QC

Results of the reference toxicant testing using potassium dichromate ($K_2Cr_2O_7$) indicate the LC_{50} for the test organisms (*Americamysis bahia*) was 8.17 milligrams per liter (mg/l) chromium, which PER reports is consistent with previous performance of this test in their laboratory and indicates that the test organisms responded to toxic stress in a typical fashion. The typical LC_{50} response range for *Americamysis bahia* is 4.35 to 9.08 mg/l chromium (±2 standard deviations).

4.2 CRG Physical Properties Test Results

CRG analyzed sediment samples collected near Piers 6, 8, 10, 12, 14, 32, 34, 36, 38, and 40 for percent solids and particle size distribution for potential marine disposal purposes. The physical properties results are summarized in Table 2 and the laboratory data sheets for these samples are provided in Appendix C.

4.3 Chemical Test Results

Sediments samples analyzed by CRG were reported in dry weight concentrations for evaluating potential marine disposal and sediment samples analyzed by ATL were reported in wet weight concentrations for evaluating upland reuse and landfill disposal.

4.3.1 CRG Marine Chemistry Test Results

CRG sediment sample results are tabulated in Tables 3 through 6, and Table 8; copies of the analytical laboratory data sheets are provided in Appendix C.

Oil and grease dry weight percentages ranged from less than (<) the laboratory reporting limit of 0.1 to estimated values of 0.1; total organic carbon (TOC) percentages (dry weight) ranged from 0.9 in sediment sample P-12 to 1.92 in sediment sample P-14 (see Table 3)

Organotins and polychlorinated biphenyls (PCBs) were reported as non-detect in the sediment samples analyzed by CRG (see Table 3)

With the exception of 4,4'-dichlorodiphenyldichloroethene (4,4'-DDE), organochlorine pesticides were not detected above laboratory reporting limits in the sediment samples. 4,4'-DDE was reported at estimated concentrations ranging from 1.2 to 5.8 micrograms per kilogram dry weight (ug/dry kg) in sediment samples P-6, P-10, P-12, and P-14 (see Table 3).

Total PAH concentrations were reported in all sediment samples ranging from 101 ug/dry kg in sample P-40 to 9,028 ug/dry kg in P-38 (see Table 4).

Arsenic, chromium, lead, mercury, and vanadium concentrations (reported in dry weight) in all sediment samples exceeded their respective example sanitary landfill total result threshold concentrations. The corresponding wet weight concentrations for the samples were calculated using each sample's moisture content, which was derived from the percent solids results summarized in Table 2. If the calculated wet weight concentration also exceeded the example sanitary landfill total result threshold then the sample was submitted to ATL for waste extraction test (WET) analysis. The WET analysis was performed by ATL because CRG is not state-certified to perform the WET method. The results of the WET analyses performed by ATL are further discussed in Section 4.3.2.

PCB congeners were reported as non-detect, except in sediment sample P-12 where congeners PCB118 and PCB138 were estimated at concentrations of 1.9 and 2.3 nanograms per gram dry weight (ng/dry g), respectively. (see Table 6).

4.3.1.1 CRG Laboratory QA/QC

CRG flagged at least one analyte in each of the samples for one or more of the following reasons:

- J Analyte was detected at a concentration below the reporting limit and above laboratory method detection limit. Reported value is estimated.
- M3 Spike or surrogate compound recovery was out of control due to matrix interference. The associated method blank spike or surrogate compound was in control and therefore the sample data was reported without further clarification.
- Q3 RPD values are not accurate and are not applicable because the results for R1 and/or R2 are lower than 10 times the method detection limit (MDL).

A list of the sample analyses and their corresponding flags is presented in CRG's laboratory report provided in Appendix C.

4.3.2 ATL Chemical Test Results

ATL sediment sample results are tabulated in Tables 7 through 9; copies of the analytical laboratory data sheets are provided in Appendix D.

Organochlorine pesticides, PCBs, and PAHs were not detected above laboratory reporting limits in the sediment samples analyzed by ATL (see Table 7).

TPHd and TPHmo were detected in two sediment samples (P-5 and P-15). TPHd was reported in sediment sample P-7 at 1.6 mg/kg and in sample P-15 at 5.6 mg/kg; TPHmo was reported at 2.6 mg/kg (P-7) and 10 mg/kg (P-15). TPHd and TPHmo were not detected in the other sediment samples above the laboratory reporting limit of 1 mg/kg. (see Table 7).

CAM 17 metals were not reported at concentrations exceeding their respective TTLC values or at concentrations greater than ten times their respective STLC values (see Table 8).

Several CAM 17 metals were reported at total concentrations exceeding SFRWQCB ESLs (see Table 8) and example sanitary landfill total result thresholds (see Appendix A) as outlined below:

- Arsenic concentrations ranged from 2.0 to 5.1 mg/kg and exceeded the residential land use ESL (0.39 mg/kg) and commercial land use ESL (1.6 mg/kg). The reported arsenic concentrations did not exceed the construction/trench worker exposure ESL of 15 mg/kg.

Two of the sediment samples (P-9 and P-39) had reported arsenic concentrations (4.6 and 5.1 mg/kg, respectively) greater than the example sanitary landfill total result threshold of 4.5 mg/kg for arsenic.

The reported arsenic concentrations are within the published background levels (0.6 to 11 mg/kg) for arsenic present in California soils as presented in *Background Concentrations of Trace and Major Elements in California Soils* (Kearney Foundation of Soil Science, Division of Agriculture and Natural Resources, University of California, March 1996).

- Lead concentrations ranged from 3.8 to 34 mg/kg and are less than the residential land use, commercial land use, and construction/trench worker exposure ESLs (200, 750, and 750 mg/kg, respectively).

  Two of the sediment samples (P-7 and P-13) had reported lead concentrations (34 and 22 mg/kg, respectively) greater than an example sanitary landfill total result threshold of 20 mg/kg for lead.

  The reported lead concentrations are below or within the published background levels (12.4 to 97.1 mg/kg) for lead present in California soils as presented in *Background Concentrations of Trace and Major Elements in California Soils* (Kearney Foundation of Soil Science, Division of Agriculture and Natural Resources, University of California, March 1996).

- Mercury concentrations ranged from <0.10 to 0.42 mg/kg and are less than the residential land use, commercial land use, and construction/trench worker exposure ESLs (1, 3, 10, and 58 mg/kg, respectively).

  Six sediment samples had reported mercury concentrations (0.11 to 0.42 mg/kg) greater than the example sanitary landfill total result threshold of 0.0108 mg/kg for mercury. It is also noted that in the four samples where mercury was not detected had a laboratory reporting limit of 0.10 mg/kg, which exceeds an example sanitary landfill total result threshold of 0.0108 mg/kg for mercury.

  The reported mercury concentrations are within the published background levels (0.05 to 0.90 mg/kg) for mercury present in California soils as presented in *Background Concentrations of Trace and Major Elements in California Soils* (Kearney Foundation of Soil Science, Division of Agriculture and Natural Resources, University of California, March 1996).

- Vanadium concentrations ranged from 22 to 36 mg/kg and exceeded the residential land use ESL of 16 mg/kg. The reported arsenic concentrations did not exceed the commercial land use ESL of 200 mg/kg or the construction/trench worker exposure ESL of 770 mg/kg.

  All of the sediment samples had reported vanadium concentrations greater than an example sanitary landfill total result threshold of 18 mg/kg for vanadium.

  The reported vanadium concentrations are less than the published background levels (39 to 288 mg/kg) for vanadium present in California soils as presented in *Background Concentrations of Trace and Major Elements in California Soils* (Kearney Foundation of Soil Science, Division of Agriculture and Natural Resources, University of California, March 1996).

The sediment samples analyzed by CRG and by ATL that exceeded example sanitary landfill total result thresholds were further analyzed using the WET method to assess soluble metal concentrations. The samples were analyzed for one or more metal (arsenic, chromium, lead, mercury, and/or vanadium).

The WET metal results are summarized in Table 9. It is noted that the practical quantitation limit (PQL) for each soluble metal was 1.0 mg/l. This was sufficient to assess whether chromium, lead, and vanadium exceeded their respective example sanitary landfill soluble result thresholds.

Using the MDL concentration of 0.088 mg/l for arsenic, ATL was able to estimate arsenic concentrations to below an example sanitary landfill soluble result threshold of 0.45 mg/l. This could not be done for mercury as the MDL of 0.23 mg/l is greater than an example sanitary landfill soluble result threshold of 0.00108 mg/l. Accordingly, mercury was reported at estimated concentrations of <0.23 mg/l in all samples analyzed using the WET sample methodology.

4.3.2.1 ATL Laboratory QA/QC

Arsenic, chromium, lead, mercury, and vanadium samples submitted for solubility testing were diluted 20 times due to matrix interference, and the soluble mercury analysis was conducted outside the laboratory hold time (identified by "H" flag in Appendix D).

Several sample results submitted for WET analysis were flagged by ATL as "J – Analyte detected below the quantitation limit" and thus their results are estimated. The "J" flagged metals sample results are included in Appendix D.

5.0 SUMMARY OF FINDINGS AND RECOMMENDATIONS

The results of the biological testing by PER indicate there were no significant reductions in survival in the Dumbarton Bridge sediment sample composite DRET elutriates. The LC_{50} of the mysid test populations was greater than 100 percent elutriate solution for each of the ten sediment composite samples tested.

Results of the chemical tests conducted by CRG and ATL are summarized as follows:

- TOC was reported by CRG at 0.9 to 1.92 percent dry weight.
- Oil and grease was reported in six of the ten samples analyzed by CRG at estimated concentrations of 0.1 ug/dry kg. The other four samples were reported as <0.1 ug/dry kg.
- PCBs were not detected above laboratory reporting limits in the sediment samples analyzed by CRG and ATL. With the exception of sample P-12, PCB congeners were not detected above the laboratory reporting limit by CRG. Congeners PCB118 and PCB138 were estimated by CRG in sample P-12 at concentrations of 1.9 and 2.3 ng/dry g, respectively.
- Organotins were not detected above laboratory reporting limits in the samples analyzed by CRG.
- Total PAH concentrations, reported in dry weight by CRG, ranged from 101 to 9,028.2 ug/dry kg. PAHs were not detected above the laboratory reporting limits (in wet weight) in samples analyzed by ATL.
- Estimated organochlorine pesticides concentrations, reported in dry weight by CRG, ranged from 1.2 to 5.8 ug/dry kg. Organochlorine pesticides were not detected above the laboratory reporting limits (in wet weight) in samples analyzed by ATL.
- Arsenic, lead, mercury, and vanadium were reported at total concentrations exceeding SFRWQCB residential land use and/or commercial/industrial land use ESLs, and example sanitary landfill total result thresholds. Soluble WET metal results did not exceed the example sanitary landfill soluble result thresholds.
- The reported total metal concentrations are less than or within published background levels for California soils.

Based on the bioassay, physical, and marine chemistry results, the disruption of shallow sediment in the vicinity of Dumbarton Bridge piers P5 to P15 and P32 to P40 will not have adverse environmental effects.

Based on the chemical test results, sediment excavated from the vicinity of Dumbarton Bridge piers P5 to P15 and P32 to P40 will not be considered a California hazardous waste. The sediment contains metals at concentrations that exceed SFRWQCB residential and commercial/industrial land use ESLs, and metal concentrations greater than example sanitary landfill total result thresholds. The sediment also contains PAHs as reported using marine testing protocols. Accordingly, offsite reuse or disposal of excavated sediment may be restricted depending on proposed use. The reported metal concentrations are less than or within published background levels for California soils.

5.0 REFERENCES

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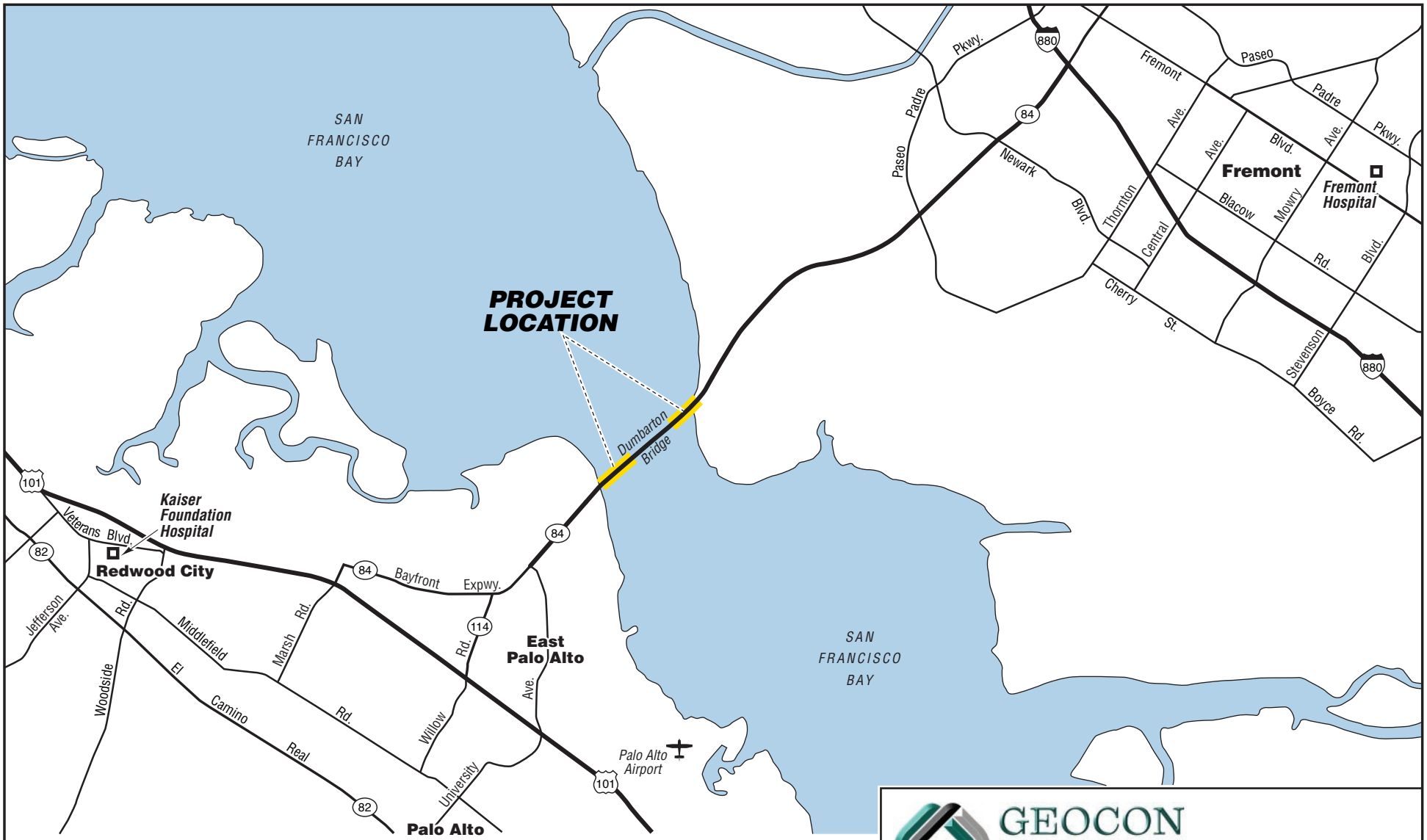

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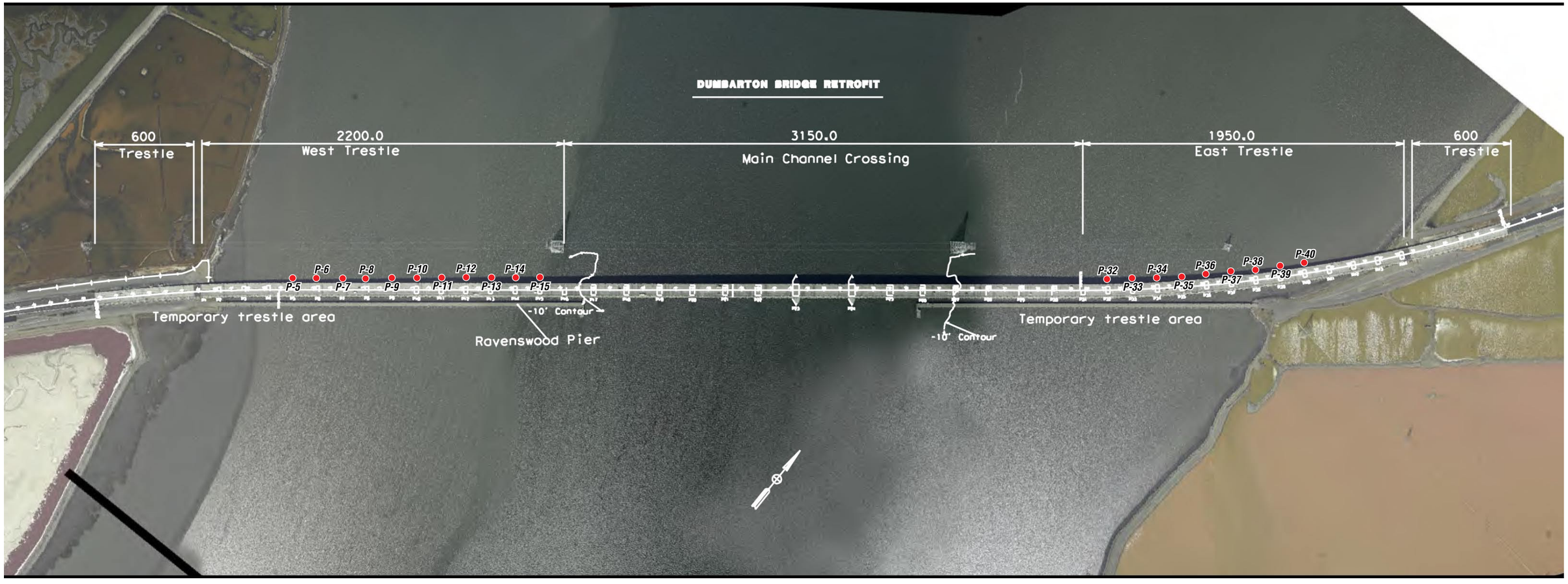
Dumbarton Bridge Retrofit Project (Bridge No. 35-0038)

Alameda and San Mateo Counties, California

VICINITY MAP

GEOCON Proj. No. E8435-06-18

Task Order No. 18 | November 2009 | Figure 1



LEGEND:

P-1● Approximate Sediment Sample Location

0 600

Scale in Feet

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Dumbarton Bridge Retrofit Project (Bridge No. 35-0038)

Alameda and San Mateo Counties, California	**SAMPLE LOCATION MAP**	
GEOCON Proj. No. E8435-06-18		
Task Order No. 18	November 2009	Figure 2

Photo 1 – Boom, winch, and pneumatic hammer

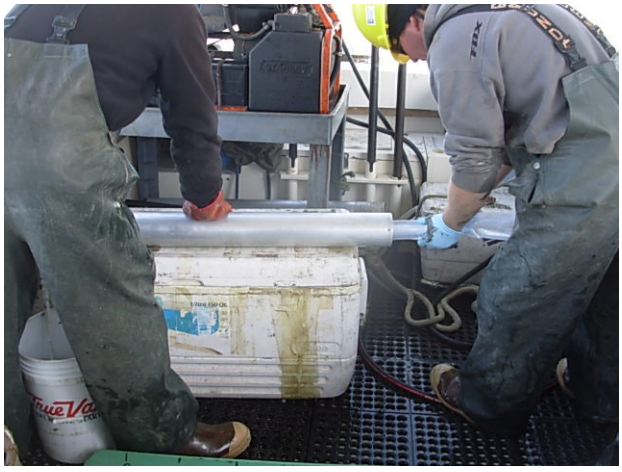

Photo 2 – Core barrel sampler being lined with plastic insert

Photo 3 – Sediment sample after being removed from sampler

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SITE PHOTOS		
Dumbarton Bridge Retrofit Project Alameda and San Mateo Counties, California		
E8435-06-18		November 2009

TABLE 1
SEDIMENT CORE LOGS
Dumbarton Bridge

Location	Date	Latitude	Longitude	Water Depth	Sample Depth	Sediment Description
P-5	10-Mar-09	37° 30' 1.2"	-122° 07' 37.92"	5.0'	0-2'	Dark grey, bay mud, soft to firm, H_2S odor, 20% shells
P-6	10-Mar-09	37° 30' 1.98"	-122° 07' 36.24"	5.5'	0-2'	Dark grey, bay mud, soft to firm, H_2S odor, some shells
P-7	10-Mar-09	37° 30' 3.06"	-122° 07' 34.86"	5.8'	0-2'	Dark grey, bay mud, soft to firm, H_2S odor, 20% shells
P-8	10-Mar-09	37° 30' 4.26"	-122° 07' 33.6"	6.0'	0-2'	Dark grey, bay mud, soft to firm, H_2S odor, 20% shells
P-9	10-Mar-09	37° 30' 5.1"	-122° 07' 31.92"	5.9'	0-2'	Dark grey, bay mud, soft to firm, no H_2S odor, little to no shells
P-10	10-Mar-09	37° 30' 5.94"	-122° 07' 30.42"	5.3'	0-2'	Dark grey, bay mud, soft to firm, H_2S odor, 20% shells
P-11	10-Mar-09	37° 30' 6.72"	-122° 07' 27.9"	4.9'	0-2'	Dark grey, bay mud, soft to firm, H_2S odor, 20% shells
P-12	10-Mar-09	37° 30' 7.56"	-122° 07' 28.2"	4.3'	0-2'	Dark grey, bay mud, firm, no H_2S odor, some shells
P-13	10-Mar-09	37° 30' 8.88"	-122° 07' 26.28'	2.5'	0-2'	Dark grey, bay mud, soft, no H_2S odor, some shells
P-14	10-Mar-09	37° 30' 11.4"	-122° 07' 25.56"	2.2'	0-2'	Dark grey, bay mud, soft, no H_2S odor, some shells
P-15	10-Mar-09	37° 30' 11.4"	-122° 07' 23.88'	1.5'	0-2'	Dark grey, bay mud, soft, no H_2S odor, some shells
P-32	11-Mar-09	37° 30' 32.94"	-122° 06' 50.58'	2.1'	0-2'	Dark grey, bay mud, soft to firm, H_2S odor, little to no shells
P-33	11-Mar-09	37° 30' 33.78"	-122° 06' 49.14'	2.8'	0-2'	Dark grey, bay mud, soft to firm, H_2S odor, some sand, no shells
P-34	11-Mar-09	37° 30' 34.86"	-122° 06' 48.48'	2.9'	0-2'	Dark grey, bay mud, soft to firm, H_2S odor, some sand, no shells
P-35	11-Mar-09	37° 30' 35.82"	-122° 06' 47.1'	4.2'	0-2'	Dark grey, bay mud, soft to firm, H_2S odor, little to no shells
P-36	11-Mar-09	37° 30' 36.42"	-122° 06' 46.26'	4.4'	0-2'	Dark grey, bay mud, soft to firm, H_2S odor, some shells
P-37	11-Mar-09	37° 30' 37.74"	-122° 06' 43.8"	5.5'	0-2'	Dark grey, bay mud, soft to firm, slight H_2S odor, little to no shells
P-38	11-Mar-09	37° 30' 38.76"	-122° 06' 42.72"	5.4'	0-2'	Dark grey, bay mud, soft to firm, H_2S odor, some sand, no shells
P-39	11-Mar-09	37° 30' 39.72"	-122° 06' 41.22"	5.2'	0-2'	Dark grey, bay mud, soft, no H_2S odor, some gravel
P-40	11-Mar-09	37° 30' 40.74"	-122° 06' 40.2"	5.1'	0-2'	Dark grey, bay mud, soft to firm, no H_2S odor, no shells

TABLE 2
SUMMARY OF PHYSICAL PROPERTIES
Dumbarton Bridge
Analyses by CRG Marine Laboratories, Inc.

	P-6	P-8	P-8 (Dup)	P-10	P-12	P-14	P-32	P-34	P-36	P-38	P-40
Grain Size (%)											
Gravel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sand	12.20	18.15	18.93	17.99	22.15	27.54	23.09	17.15	26.90	31.04	10.86
Silt	65.29	63.20	61.75	61.25	57.97	57.11	60.05	63.28	56.33	54.26	69.41
Clay	22.51	18.66	19.32	20.75	19.89	15.35	16.86	19.57	16.77	14.71	19.73
Solids (%)	52.4	60.2	---	55.1	56.2	43.6	52.1	55.8	60.9	63.7	55.8

TABLE 3
SUMMARY OF TOC, OIL & GREASE, ORGANOTIN, PCB, AND ORGANOCHLORINE PESTICIDE RESULTS
Dumbarton Bridge
Analyses by CRG Marine Laboratories, Inc.

	P-6	P-8	P-10	P-12	P-14	P-32	P-34	P-36	P-38	P-40
Total Organic Carbon (% Dry Weight)	1.33	0.59	0.94	0.9	1.92	1.43	1.38	1.22	1.08	1.1
Oil & Grease (% Dry Weight)	0.01	<0.01	0.01	0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01
Organotins (ug/dry kg)										
Dibutyltin	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Monobutyltin	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Tetrabutyltin	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Tributyltin	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCBs (ug/dry kg)										
Aroclor 1016	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Aroclor 1221	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Aroclor 1232	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Aroclor 1242	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Aroclor 1248	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Aroclor 1254	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Aroclor 1260	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Total:	0	0	0	0	0	0	0	0	0	0
Organochlorine Pesticides (ug/dry kg)										
2,4'-DDD	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
2,4'-DDE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
2,4'-DDT	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
4,4'-DDD	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
4,4'-DDE	1.4	<1	2.9	5.8	1.2	<1	<1	<1	<1	<1
4,4'-DDT	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Aldrin	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
BHC-alpha	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
BHC-beta	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
BHC-delta	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
BHC-gamma	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chlordane-alpha	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chlordane-gamma	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
cis-Nonachlor	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
DCPA (Dacthal)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Dicofol	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dieldrin	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Endosulfan Sulfate	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Endosulfan-I	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Endosulfan-II	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Endrin	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Endrin Aldehyde	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Endrin Ketone	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Heptachlor	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Heptachlor Epoxide	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Methoxychlor	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Mirex	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Oxychlordane	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Perthane	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Toxaphene	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
trans-Nonachlor	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total:	1.4	0	2.9	5.8	1.2	0	0	0	0	0

Notes:
< = not detected at or above laboratory reporting limit
ug/dry kg = micrograms per kilogram dry weight

TABLE 4
SUMMARY OF PAH RESULTS
Dumbarton Bridge
Analyses by CRG Marine Laboratories, Inc.

Analyte	P-6	P-8	P-10	P-12	P-14	P-32	P-34	P-36	P-38	P-40
1-Methylnaphthalene	6	3.7	6.2	6.5	9.1	3.3	4.2	2.9	8.5	2.2
1-Methylphenanthrene	20.1	14.1	13.5	22.3	61.9	12.2	37.6	6.7	43.1	3.6
2,3,5-Trimethylnaphthalene	1.8	1.3	2.2	2.2	5.5	1.3	1.6	1.9	3.9	< 1
2,6-Dimethylnaphthalene	6.9	4	7	8.2	20.3	5.9	6.2	5.3	7.9	5.7
2-Methylnaphthalene	9.5	5.7	8.6	7.9	11.4	4.7	6.8	5.5	9.5	3.8
Acenaphthene	11.1	7.4	14.9	19.2	32.2	5.9	19.4	4.1	25	< 1
Acenaphthylene	30.2	22.9	24.5	29.2	45	12.3	22.4	5.6	45.1	< 1
Anthracene	61.7	37.1	51.1	94.3	155.5	32.1	113.2	14.6	120.9	1.1
Benz[a]anthracene	199.3	129.2	204.7	277.4	368.1	97.8	234.9	45.7	451.9	< 1
Benzo[a]pyrene	518.3	342.2	469.9	540.7	692.3	176.9	288	90.7	859.6	< 1
Benzo[b]fluoranthene	323.3	220.6	311.6	323.5	398.7	120.2	148.2	58.7	506.7	4.6
Benzo[e]pyrene	301.3	186.5	273.9	298.1	380.8	111.4	155	58.4	513.2	< 1
Benzo[g,h,i]perylene	666.4	459.4	596.3	599.3	692.9	230	201	105.7	983.4	3.6
Benzo[k]fluoranthene	155	108	154.1	170.6	210.5	64.6	111.1	28.6	255.5	< 1
Biphenyl	9.5	6.2	9	9.4	11.4	5	4.4	3.7	9.2	3.1
Chrysene	233.3	149.6	233.8	306.7	418.9	115.2	231.9	56.3	507.2	3.4
Dibenz[a,h]anthracene	70	46.1	68.2	84.6	99.9	34.6	51.1	14.1	121	< 1
Dibenzothiophene	17.1	10.5	18.3	21.7	27.8	13.9	15.9	6.6	30.8	< 1
Fluoranthene	509.1	361.1	484.3	725.3	1176.3	231.8	472.1	118	1234.4	2.6
Fluorene	15	9.4	14.2	21	27.8	7.3	24	6.1	30.3	3.5
Indeno[1,2,3-c,d]pyrene	581.1	399	513.4	547	628	203.1	195.8	97.6	883.4	< 1
Naphthalene	29.3	21	27.7	30.2	35.3	11	13.2	9.8	32.9	2.8
Perylene	122.8	89.3	129.2	133.3	176.4	61.8	67.7	63.5	232	49.3
Phenanthrene	189.3	130.2	191.3	306.8	431.8	92.2	279.7	53.2	441.3	8.6
Pyrene	684.5	483.5	617.5	894.4	1543	300.2	636.8	163.4	1671.5	3.1
Total:	4,771.9	3,248.0	4,445.4	5,479.8	7,660.8	1,954.7	3,342.2	1,026.7	9,028.2	101.0

Notes:
Results shown in micrograms per kilograms dry weight (ug/dry kg)

TABLE 5
SUMMARY OF PRIORITY POLLUTANT TOTAL METALS RESULTS
Dumbarton Bridge
Analyses by CRG Marine Laboratories, Inc.

Sample ID	Units	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Molybdenum	Nickel	Selenium	Silver	Stontium	Thallium	Tin	Titanium	Vanadium	Zinc
P-6	mg/dry kg	20,890	0.256	10.98	73.05	0.504	0.244	86.04	14.62	32.26	32,980	27.01	407.1	0.31	0.556	72.58	0.343	0.217	47.82	0.128	2.988	578.6	70.17	101
P-8	mg/dry kg	9,109	0.199	6.043	39.89	0.2	0.159	33.37	7.007	12.66	12,620	17.76	400.4	0.12	0.337	29.47	0.161	0.199	737.9	0.06	1.118	329.3	31	35.02
P-10	mg/dry kg	21,330	0.331	12.88	94.03	0.496	0.277	80.51	15.4	37.47	34,090	23.91	449.5	0.28	0.721	75.85	0.436	0.271	144.6	0.128	2.753	702.5	68.65	95.33
P-12	mg/dry kg	19,550	0.24	6.932	78.24	0.448	0.269	74.67	13.29	33.58	28,350	25.9	390.4	0.23	0.933	67.95	0.435	0.201	173.4	0.115	3.142	620.5	58.56	94.32
P-14	mg/dry kg	21,720	0.237	9.318	75.64	0.509	0.186	83.55	15.28	35.12	33,380	23	514	0.25	0.483	75.16	0.44	0.173	133.9	0.127	2.331	736.7	67.24	98.86
P-32	mg/dry kg	22,530	0.224	7.009	115.6	0.52	0.2	91.75	15.83	31.25	31,360	21.49	408.9	0.19	0.671	80.95	0.351	0.255	78.91	0.135	2.223	781	71.49	95.07
P-34	mg/dry kg	19,850	0.199	10.3	83.13	0.483	0.173	74.6	13.85	27.89	29,260	13.95	427.7	0.2	0.488	72.1	0.346	0.269	58.83	0.122	1.102	562	63.15	66.83
P-36	mg/dry kg	17,360	0.109	7.721	79.45	0.392	0.14	77.21	12.83	18.25	26,690	6.596	340.3	0.04	0.83	70.62	0.336	0.183	58.69	0.112	0.633	691.2	56.6	58.06
P-38	mg/dry kg	19,440	0.162	10.27	86.07	0.416	0.326	73.61	13.63	25.4	27,900	19.3	691.9	0.19	0.428	63.78	0.276	0.182	54.91	0.124	5.699	765.2	63.45	77.26
P-40	mg/dry kg	21,060	0.082	6.538	72.8	0.44	0.149	75.64	12.1	18.73	29,630	6.764	353.1	0.05	0.428	67.62	0.329	0.21	44.52	0.123	0.678	797.8	59.34	62.15
California Hazardous Waste Criteria																								
TTLC	mg/kg	---	500	500	10,000	75	100	2,500*	8,000	2,500	---	1,000	---	20	3,500	2,000	100	500	---	700	---	---	2,400	5,000
STLC	mg/l	---	15	5	100	0.75	1	5**	80	25	---	5	---	0.2	350	20	1	5	---	7	---	---	24	250
Environmental Screening Levels																								
Residential Land Use	mg/kg	---	6.3	0.39	750	4.0	1.7	750*	40	230	---	200	---	1.3	40	150	10	20	---	1.3	---	---	16	600
Commercial/Industrial Land Use	mg/kg	---	40	1.6	1,500	8.0	7.4	750*	80	230	---	750	---	10	40	150	10	40	---	16	---	---	200	600
Construction/Trench Worker Exposure	mg/kg	---	310	15	2,600	98	39	1,200,000*	94	310,000	---	750	---	58	3,900	260	3,900	3,900	---	62	---	---	770	230,000

Notes:
mg/dry kg = milligrams per kilogram (dry weight)
mg/kg = milligrams per kilogram (wet weight)
mg/l = milligrams per liter
< = not detected at or above laboratory reporting limit
TTLC = total threshold limit concentration
STLC = soluble threshold limit concentration
* = for Chromium or Chromium III compounds
** = for Chromium VI compounds
Environmental Screening Levels (ESLs) from SFRWQCB (2008) Table A for residential and commercial/industiral land use and Table K-3 for construction/trench worker exposure

TABLE 6
SUMMARY OF PCBs BY CONGENER
Dumbarton Bridge
Analyses by CRG Marine Laboratories, Inc.

Analyte	P-6	P-8	P-10	P-12	P-14	P-32	P-34	P-36	P-38	P-40
PCB003	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB008	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB018	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB028	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB031	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB033	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB037	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB044	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB049	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB052	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB056/060	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB066	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB070	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB074	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB077	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB081	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB087	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB095	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB097	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB099	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB101	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB105	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB110	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB114	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB118	<1	<1	<1	1.9	<1	<1	<1	<1	<1	<1
PCB119	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB123	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB126	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB128	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB138	<1	<1	<1	2.3	<1	<1	<1	<1	<1	<1
PCB141	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB149	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB151	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB153	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB156	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB157	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB158	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB167	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB168+132	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB169	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB170	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB174	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB177	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB180	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB183	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB187	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB189	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB194	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB195	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB200	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB201	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB203	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB206	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PCB209	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total:	0	0	0	4.2	0	0	0	0	0	0

Notes:

Results shown in nanograms per gram dry weight (ng/dry g)

< = not detected at or above laboratory reporting limit

TABLE 7
SUMMARY OF ORGANIC RESULTS
Dumbarton Bridge
Analyses by Advanced Technology Laboratories

Sample ID	TPHd (mg/kg)	TPHmo (mg/kg)	Pesticides (ug/kg)	PCBs (ug/kg)	PAHs (ug/kg)
P-5	<1.0	<1.0	ND	ND	ND
P-7	1.6	2.6	ND	ND	ND
P-9	<1.0	<1.0	ND	ND	ND
P-11	<1.0	<1.0	ND	ND	ND
P-13	<1.0	<1.0	ND	ND	ND
P-15	5.6	10	ND	ND	ND
P-33	<1.0	<1.0	ND	ND	ND
P-35	<1.0	<1.0	ND	ND	ND
P-37	<1.0	<1.0	ND	ND	ND
P-39	<1.0	<1.0	ND	ND	ND

Notes:
TPHd = total petroleum hydrocarbons as diesel
TPHmo = total petroleum hydrocarbons as motor oil
PCBs = polychlorinated biphenyls
PAHs = polynuclear aromatic hydrocarbons
mg/kg = milligrams per kilogram (wet weight)
ug/kg = micrograms per kilogram (wet weight)
ND = none detected
< = not detected at or above laboratory reporting limit

TABLE 8
SUMMARY OF TOTAL CAM 17 METALS RESULTS
Dumbarton Bridge
Analyses by Advanced Technology Laboratories

Sample ID	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
P-5	<2.0	2.9	30	<1.0	<1.0	37	6.4	19	12	0.14	<1.0	37	<1.0	<1.0	<1.0	30	52
P-7	<2.0	3.3	26	<1.0	<1.0	27	5.4	18	34	<0.10	<1.0	28	<1.0	<1.0	<1.0	22	36
P-9	<2.0	4.6	27	<1.0	<1.0	37	7.4	20	16	0.20	<1.0	39	<1.0	<1.0	<1.0	29	57
P-11	<2.0	2.7	26	<1.0	<1.0	27	5.1	18	7.6	0.11	<1.0	29	<1.0	<1.0	<1.0	25	39
P-13	<2.0	2.0	36	<1.0	<1.0	34	7.7	20	22	0.12	<1.0	33	<1.0	<1.0	<1.0	36	48
P-15	<2.0	2.7	32	<1.0	<1.0	39	6.7	20	13	0.42	<1.0	39	<1.0	<1.0	<1.0	31	56
P-33	<2.0	3.5	27	<1.0	<1.0	43	7.3	16	3.8	<0.10	<1.0	49	<1.0	<1.0	<1.0	31	40
P-35	<2.0	4.3	26	<1.0	<1.0	34	6.1	13	4.2	<0.10	<1.0	36	<1.0	<1.0	<1.0	29	34
P-37	<2.0	4.0	28	<1.0	<1.0	39	7.1	15	5.2	<0.10	<1.0	41	<1.0	<1.0	<1.0	32	38
P-39	<2.0	5.1	36	<1.0	<1.0	41	8.1	20	14	0.19	<1.0	40	<1.0	<1.0	<1.0	35	54
California Hazardous Waste Criteria																	
TTLC mg/kg	500	500	10,000	75	100	2,500*	8,000	2,500	1,000	20	3,500	2,000	100	500	700	2,400	5,000
STLC mg/l	15	5	100	0.75	1	5**	80	25	5	0.2	350	20	1	5	7	24	250
Environmental Screening Levels																	
Residential Land Use mg/kg	6.3	0.39	750	4.0	1.7	750*	40	230	200	1.3	40	150	10	20	1.3	16	600
Commercial/Industrial Land Use mg/kg	40	1.6	1,500	8.0	7.4	750*	80	230	750	10	40	150	10	40	16	200	600
Construction/Trench Worker Exposure mg/kg	310	15	2,600	98	39	1,200,000*	94	310,000	750	58	3,900	260	3,900	3,900	62	770	230,000

Notes:
Results presented in milligrams per kilogram wet weight (mg/kg)
mg/l = milligrams per liter
< = not detected at or above laboratory reporting limit
TTLC = total threshold limit concentration
STLC = soluble threshold limit concentration
* = for Chromium or Chromium III compounds
** = for Chromium VI compounds
Environmental Screening Levels (ESLs) from SFRWQCB (2008) Table A for residential and commercial/industiral land use and Table K-3 for construction/trench worker exposure

TABLE 9
SUMMARY OF SOLUBLE METALS RESULTS
Dumbarton Bridge
Analyses by Advanced Technology Laboratories

Sample ID	Arsenic	Chromium	Lead	Mercury	Vanadium
P-5	---	---	---	<0.23	0.53
P-6	0.17	0.29	---	---	0.68
P-7	---	---	<0.042	---	0.35
P-8	---	---	---	<0.23	0.46
P-9	0.19	---	---	<0.23	0.64
P-10	0.20	---	---	<0.23	0.61
P-11	---	---	---	<0.23	0.42
P-12	---	---	---	<0.23	0.50
P-13			0.34	<0.23	0.44
P-14	---	---	---	<0.23	0.52
P-15	---	---	---	<0.23	0.59
P-32	---	0.21	---	<0.23	0.41
P-33	---	---	---	---	0.60
P-34	0.16	---	---	---	0.85
P-35	---	---	---	---	0.59
P-36	0.16	0.19	---	---	0.50
P-37	---	---	---	---	0.85
P-38	0.29	0.28	---	<0.23	0.71
P-39	0.27	---	---	<0.23	0.55
P-40	---	---	---	<0.23	0.54
California Hazardous Waste Criteria					
STLC	5	5**	5	0.2	24

Notes:
Results shown in milligrams per liter (mg/l)
< = not detected at or above laboratory reporting limit
--- = not analyzed
STLC = soluble threshold limit concentration
** = for Chromium VI compounds

APPENDIX A

NEWBY ISLAND SANITARY LANDFILL

ORGANIC CONSTITUENTS

Petroleum Hydrocarbon Thresholds

Subtitle D Cell

All cells meeting Subtitle D standards have no maximum acceptable limits on Total Petroleum Hydrocarbon content.

BTEX Thresholds

	Soluble Thresholds (TCLP:mg/L)	Total Result Thresholds (mg/kg)*
Benzene	0.03	0.60
Toluene	1.2	24.0
Ethylbenzene	0.9	18.0
Xylenes	0.6	12.0

For thresholds on other organic compounds at the Newby Island Landfill, please call (510) 447-0491.

INORGANIC CONSTITUENTS

Concentration:	Soluble Thresholds (STLC) mg/L	Total Thresholds (TTLC)* mg/kg
Antimony	0.45	4.5
Arsenic	0.45	4.5
Barium	90.0	900.0
Beryllium	.09	0.9
Cadmium	0.45	4.5
Chromium	4.5	45.0
Cobalt	4.5	45.0
Copper	18.0	180.0
Lead	1.35	20.0
Mercury	0.00108	0.0108
Molybdenum	0.9	9.0
Nickel	9.0	90.0
Selenium	0.9	9.0
Silver	4.5	45.0
Thallium	0.18	1.8
Vanadium	1.8	18.0
Zinc	180.0	1800.0

* Results over these limits require the Waste Extraction Test, but do not necessarily disqualify the acceptance of the material.

APPENDIX B

Data Report

Biological Testing of Sediment Samples Collected from the Dumbarton Bridge

Prepared for

Geocon Consultants, Inc.
6671 Brisa St.
Livermore, CA 94550

Prepared by

Pacific EcoRisk
2250 Cordelia Road
Fairfield, CA 94534

April 2009

PACIFIC ECORISK
ENVIRONMENTAL CONSULTING & TESTING

Data Report

Biological Testing of Sediment Samples Collected from the Dumbarton Bridge

Prepared for

Geocon Consultants, Inc.
6671 Brisa St.
Livermore, CA 94550

Prepared by

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2250 Cordelia Road
Fairfield, CA 94534

April 2009

Biological Testing of Sediment Samples Collected from The Dumbarton Bridge

Table of Contents

Page

1. INTRODUCTION 1
2. METHODS 1
   - 2.1 Biological Testing Procedures 1
   - 2.2 Receipt and Handling of Sediment Samples 1
   - 2.3 Water Column Toxicity Test Procedures 1
     - 2.3.1 Preparation of DRET Elutriates 1
     - 2.3.2 Sediment Elutriate Toxicity Testing with *Americamysis bahia* 1
       - 2.3.2.1 Reference Toxicant Testing of the *Americamysis bahia* 2
3. BIOLOGICAL TESTING RESULTS 3
   - 3.1 Toxicity of the Dumbarton Bridge Sediment Elutriates to *Americamysis bahia* 3
     - 3.1.1 Reference Toxicant Toxicity to *Americamysis bahia* 6
   - 3.2 Biological Testing Quality Lab Control Summary 7
4. REFERENCES 7

Appendices

Appendix A Chain-of-Custody Records for the Collection and Delivery of the Dumbarton Bridge Sediments

Appendix B Test Data and Summary of Statistics for the Toxicity Evaluation of Dumbarton Bridge Sediment DRET tests with Mysid *(Americamysis bahia)* Larvae

Appendix C Test Data and Summary of Statistics for the Reference Toxicant Evaluation of Mysid *(Americamysis bahia)* Larvae

Appendix D Bioassay Standard Test Conditions

List of Tables

Page

Table 3-1. Effects of P-6 composite sediment DRET elutriates on *Americamysis bahia*. 3
Table 3-2. Effects of P-8 composite sediment DRET elutriates on *Americamysis bahia*. 3
Table 3-3. Effects of P-10 composite sediment DRET elutriates on *Americamysis bahia*. 3
Table 3-4. Effects of P-12 composite sediment DRET elutriates on *Americamysis bahia*. 4
Table 3-5. Effects of P-14 composite sediment DRET elutriates on *Americamysis bahia*. 4
Table 3-6. Effects of P-32 composite sediment DRET elutriates on *Americamysis bahia*. 4
Table 3-7. Effects of P-34 composite sediment DRET elutriates on *Americamysis bahia*. 5
Table 3-8. Effects of P-36 composite sediment DRET elutriates on *Americamysis bahia*. 5
Table 3-9. Effects of P-38 composite sediment DRET elutriates on *Americamysis bahia*. 5
Table 3-10. Effects of P-40 composite sediment DRET elutriates on *Americamysis bahia*. 6
Table 3-11. Reference toxicant testing: Effects of chromium on *Americamysis bahia*..... 6
Table 3-12. Summary of Reference Toxicant Database for *Americamysis bahia*..... 6

1. INTRODUCTION

Geocon Consultants, Inc. (Geocon) contracted Pacific EcoRisk (PER) to perform Dredging Elutriate Tests (DRET) of sediments from the Dumbarton Bridge. The performance and results of this testing are presented in this report.

2. METHODS

2.1 Biological Testing Procedures

The methods used in conducting these tests followed the guidelines established by the U.S. Army Corps of Engineers report "Dredging Elutriate Test (DRET) Development. Contract Report D-95-1" (USACE 1995).

2.2 Receipt and Handling of Sediment Samples

On March 10 and 11, 2009, Geocon staff collected sediment samples and a site water sample from the Dumbarton Bridge area. These samples were delivered on March 12, on ice and under chain-of-custody, to the PER testing lab. Upon receipt at the PER testing laboratory, all samples were logged in and stored at ≤6°C in the dark until needed. The chain-of-custody records for the collection and delivery of these samples are provided in Appendix A.

2.3 Water Column Toxicity Test Procedures

2.3.1 Preparation of DRET Elutriates

Prior to preparation of the DRET elutriates, each of the sediment samples were homogenized in a stainless steel bowl using a stainless steel spoon. An aliquote of each sediment sample was used to determine the dry weight basis of each homogenized sediment by oven-drying a known volume of sediment. The resulting dry weight concentration of each sediment was used to calculate the volume of sediment and water that would be required to prepare an elutriate slurry at a sediment concentration of 10 g/L (dry weight basis). Each of the elutriates were prepared for each of the site sediments by mixing each sediment with site water at a 10 gm/L (dry wt) ratio on a stir plate (with aeration) for 60 minutes. After mixing, the sediment-water mixture was allowed to settle for 1 hour. The resulting supernatant was carefully siphoned out; this supernatant comprised the 100% DRET elutriate test solution for each sample.

2.3.2 Sediment Elutriate Toxicity Testing with *Americamysis bahia*

The DRET elutriate toxicity test with *Americamysis bahia* consists of a 96-hr static bioassay in which mysids are exposed to the DRET elutriates, and the effects on mysid survival determined.

The specific procedures used in this test are described below. This sediment elutriate test was initiated on March 19, 2009.

The *Americamysis bahia* used in these tests were obtained from a commercial supplier (Aquatic BioSystems, Fort Collins, CO); upon receipt in the laboratory, the mysids were maintained in small tanks of 25 ppt seawater at 20°C, and were fed brine shrimp nauplii *ad libitum*.

The Lab Control/dilution water for this test was prepared by salting up reverse-osmosis, de-ionized water to a salinity of 25 ppt using a commercial artificial sea salt (Crystal Sea Salt®-bioassay grade). The Lab Control/dilution water and the 100% Dumbarton Bridge sediment DRET elutriates were used to prepare test solutions at test treatment concentrations of 10%, 50%, and 100% elutriate. Initial routine water quality characteristics (pH, D.O., and salinity) were measured for each treatment test solution prior to use in this test.

There were 5 test replicates at each treatment, each replicate consisting of a 400 mL glass beaker containing 200 mL of appropriate test solution. The test was initiated with the allocation of 10 randomly-selected 4-day old mysids into each test replicate. The test replicates were then placed into a temperature-controlled room at 20°C under a 16L:8D photoperiod.

Each day, water quality conditions were determined for one randomly-selected replicate per treatment, and the test replicates were examined to determine the number of surviving organisms, with any dead organisms being removed via pipette. Each day, the replicates were fed brine shrimp nauplii.

After 96 (±2) hrs exposure, the tests were terminated. At test termination, the final water quality conditions were determined for one randomly-selected replicate per treatment, after which each of the test replicates were examined to determine the number of surviving mysids. The resulting survival data were then statistically analyzed and key dose-response EC point estimates determined for each site sediment elutriate using the CETIS® statistical software (Tidepool Scientific, McKinleyville, CA). The results of this test are summarized in Section 3.1.

2.3.2.1 Reference Toxicant Testing of the *Americamysis bahia*

In order to assess the sensitivity of these test organisms to chemical stress, a reference toxicant test was performed concurrently with the elutriate tests. The reference toxicant test was performed similarly to the sediment elutriate tests, but used test solutions consisting of Lab Control water spiked with chromium (as $K_2Cr_2O_7$) at test concentrations of 1.75, 3.5, 7, 14, and 28 mg/L, instead of elutriate dilutions. The resulting test response data were statistically analyzed to determine key dose-response point estimates (e.g., EC_{50}); all statistical analyses were made using the CETIS® software. These response endpoints were then compared to the typical response range established by the mean ± 2 SD of the point estimates generated by the 20 most-recent previous reference toxicant tests performed by this lab. The results of this test are summarized in Section 3.1.1.

3. BIOLOGICAL TESTING RESULTS

3.1 Toxicity of the Dumbarton Bridge Elutriates to *Americamysis bahia*

The results of this test are summarized below in Tables 3-1 through 3-10. There was ≥96% survival at the Lab Control treatments; there were no significant reductions in survival in the Dumbarton Bridge composite DRET elutriates. The LC_{50} was >100% elutriate for each sediment. The test data and summary of statistical analyses for these tests are attached as Appendix B. Summaries of test conditions and test acceptability criteria are provided in Appendix D.

Table 3-1. Effects of P-6 sediment DRET elutriate on *Americamysis bahia*.

Elutriate Treatment	% Survival in Test Replicates					Mean % Survival
	Rep A	Rep B	Rep C	Rep D	Rep E	
Lab Control	100	100	100	100	100	100
10%	100	100	100	100	90	98
50%	100	100	100	100	100	100
100%	100	100	100	100	100	100
LC_{50} =	>100% elutriate					

Table 3-2. Effects of P-8 sediment DRET elutriate on *Americamysis bahia*.

Elutriate Treatment	% Survival in Test Replicates					Mean % Survival
	Rep A	Rep B	Rep C	Rep D	Rep E	
Lab Control	100	100	100	100	100	100
10%	90	100	100	100	100	98
50%	100	100	100	100	100	100
100%	100	100	100	100	100	100
LC_{50} =	>100% elutriate					

Table 3-3. Effects of P-10 sediment DRET elutriate on *Americamysis bahia*.

Elutriate Treatment	% Survival in Test Replicates					Mean % Survival
	Rep A	Rep B	Rep C	Rep D	Rep E	
Lab Control	100	100	100	100	100	100
10%	100	100	100	100	100	100
50%	100	100	100	90	100	98
100%	100	100	100	100	100	100
LC_{50} =	>100% elutriate					

Table 3-4. Effects of P-12 sediment DRET elutriate on *Americamysis bahia*.

Elutriate Treatment	% Survival in Test Replicates					Mean % Survival
	Rep A	Rep B	Rep C	Rep D	Rep E	
Lab Control	100	80	100	100	100	96
10%	100	100	100	100	100	100
50%	90	100	70	100	100	92
100%	88.9	100	100	100	100	97.8
LC_{50} =	>100% elutriate					

Table 3-5. Effects of P-14 sediment DRET elutriate on *Americamysis bahia*.

Elutriate Treatment	% Survival in Test Replicates					Mean % Survival
	Rep A	Rep B	Rep C	Rep D	Rep E	
Lab Control	100	100	100	100	100	100
10%	100	100	100	90	100	98
50%	100	100	100	100	100	100
100%	100	100	100	100	100	100
LC_{50} =	>100% elutriate					

Table 3-6. Effects of P-32 sediment DRET elutriate on *Americamysis bahia*.

Elutriate Treatment	% Survival in Test Replicates					Mean % Survival
	Rep A	Rep B	Rep C	Rep D	Rep E	
Lab Control	100	100	100	90	100	98
10%	90	100	100	100	100	98
50%	88.9	100	100	90	90	93.8
100%	100	100	90	100	100	98
LC_{50} =	>100% elutriate					

Table 3-7. Effects of P-34 sediment DRET elutriate on *Americamysis bahia*.

Elutriate Treatment	% Survival in Test Replicates					Mean % Survival
	Rep A	Rep B	Rep C	Rep D	Rep E	
Lab Control	100	100	100	100	100	100
10%	100	100	100	100	100	100
50%	100	100	100	100	100	100
100%	100	100	100	100	100	100
LC_{50} =	>100% elutriate					

Table 3-8. Effects of P-36 sediment DRET elutriate on *Americamysis bahia*.

Elutriate Treatment	% Survival in Test Replicates					Mean % Survival
	Rep A	Rep B	Rep C	Rep D	Rep E	
Lab Control	100	90	100	100	100	98
10%	100	100	100	100	100	100
50%	80	100	100	100	100	96
100%	100	100	100	100	100	100
LC_{50} =	>100% elutriate					

Table 3-9. Effects of P-38 sediment DRET elutriate on *Americamysis bahia*.

Elutriate Treatment	% Survival in Test Replicates					Mean % Survival
	Rep A	Rep B	Rep C	Rep D	Rep E	
Lab Control	100	100	90	100	100	98
10%	100	100	100	100	100	100
50%	100	100	100	100	90	98
100%	100	100	100	100	100	100
LC_{50} =	>100% elutriate					

Table 3-10. Effects of P-40 sediment DRET elutriate on *Americamysis bahia*.

Elutriate Treatment	% Survival in Test Replicates					Mean % Survival
	Rep A	Rep B	Rep C	Rep D	Rep E	
Lab Control	100	100	100	100	100	100
10%	90	100	100	100	100	98
50%	100	100	90	100	100	98
100%	100	100	100	100	100	100
LC_{50} =	>100% elutriate					

3.1.1 Reference Toxicant Toxicity to *Americamysis bahia*

The results of this test are summarized in Table 3-11. There was 100% survival in the Lab Control treatment; the LC_{50} was 8.17 mg/L Cr, which is consistent with previous performance of this test in our laboratory (Table 3-12), indicating that these test organisms were responding to toxic stress in a typical fashion. The test data and summary of statistical analyses for this test are attached as Appendix C.

Table 3-11. Reference toxicant testing: Effects of chromium on *Americamysis bahia*.

Cr Treatment (mg/L)	Mean % Survival
Lab Control	100
0.88	97.5
1.75	100
3.5	97.5
7	**77.5***
14	**5***
28	**0***
LC_{50} (=LC_{50}) =	8.17 mg/L Cr

* Significantly less than the Lab Control treatment response at $p < 0.05$.

Table 3-12. Summary of Reference Toxicant Database for *Americamysis bahia*.

Current LC_{50}	Typical Response Range (mean ± 2SD)
8.17 mg/L Cr	4.35 – 9.08 mg/L Cr

3.2 Biological Testing Quality Lab Control Summary

The biological testing of the Dumbarton Bridge sediments incorporated standard QA/QC procedures to ensure that the test results were valid. Standard QA/QC procedures included the use of negative Controls, positive Controls (reference toxicant testing), test replicates, and measurements of water quality during testing.

Sediments for the bioassay testing were stored appropriately at $\leq$6°C and were used within the 8 week holding time period.

All measurements of routine water quality characteristics were performed as described in the PER Lab Standard Operating Procedures (SOPs). All biological testing water quality conditions were within the appropriate limits. Laboratory instruments were calibrated daily according to Lab SOPs, and calibration data were logged and initialed.

Negative Lab Control – The biological responses for all of the test organisms at the negative Lab Control treatments were within acceptable limits.

Positive Lab Control – The accuracy of the responses of the test organisms to toxic stress was also evaluated using positive Lab Controls (reference toxicant testing). The key test dose-response LC point estimates determined for each test species were within the reference toxicant test acceptability ranges, indicating that each of these test species was responding to toxic stress in a typical fashion.

4. REFERENCES

USACE (1995) Dredging Elutriate Test Development. Contract Report D-95-1. U.S. Army Corps of Engineers, Washington, DC.

Appendix A

Chain-of-Custody Records for the Collection and Delivery of the Dumbarton Bridge Sediments

CHAIN OF CUSTODY RECORD

PACIFIC ECORISK
2250 Cordelia Rd
Fairfield, CA 94534
Ph: (707) 207-7760
Fax: (707) 207-7916
www.pacificecorisk.com

RESULTS TO:
Geocon Consultants, Inc.
6671 Brisa St.
Livermore, CA 94550
Attn: John Love
Phone: (925) 371-5900
Email: love@geoconinc.com

BILL TO:
← Same
Attn:
Phone:
Email:

PROJECT: Dumbarton Bridge - Caltrans

ANALYSES REQUESTED

SAMPLE IDENTIFICATION	DATE	TIME	SAMPLE MATRIX	GRAB/ COMP.	# CONTAINERS/TYPE	Mysid DRET elutriate testing							REMARKS
P-6	3/10/09	12:30	sediment	Grab	2 /plastic sleeve	X							
P-8		13:20			2 /	X							
P-10		11:05			2 /	X							
P-12		10:00			2 /	X							
P-14		8:55			2 /	X							
P-32	3/11/09	10:10			2 /	X							
P-34		10:45			2 /	X							
P-36		11:30			2 /	X							

METHOD OF SHIPMENT: FedEx:_____ UPS:_____ HAND: X OTHER:_____

COMMENTS:

CODES:

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	PAGE #
	3/12/09	11:30	Y. Khudiyeva	3/12/09	11:30	OF

WHITE - RETURN W/ SAMPLE YELLOW - KEEP FOR YOUR RECORDS

14/53

CHAIN OF CUSTODY RECORD

PACIFIC ECORISK
2250 Cordelia Rd
Fairfield, CA 94534
Ph: (707) 207-7760
Fax: (707) 207-7916
www.pacificecorisk.com

RESULTS TO:
Geocon Consultants, Inc.
6671 Brisa St.
Livermore, CA 94550
Attn: John Love
Phone: (925) 371-5900
Email: love@geoconinc.com

BILL TO:
← same
Attn:
Phone:
Email:

PROJECT: Dumbarton Bridge - Caltrans

SAMPLE IDENTIFICATION	DATE	TIME	SAMPLE MATRIX	GRAB/ COMP.	# CONTAINERS/TYPE	ANALYSES REQUESTED: Mysid DRET elutriate testing								REMARKS
P-38	3/11/09	12:15	sediment	Grab	3 / plastic sleeve	X								
P-40	↓	13:00	↓	↓	2 / ↓	X								
					/									
Site Water (Dumbarton Bridge)	↓	13:15	water	Grab	4 / 5gal plastic	X								
					/									
					/									
					/									
					/									

METHOD OF SHIPMENT: FedEx:_____ UPS:_____ HAND: X OTHER:_____

COMMENTS:

CODES:

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	PAGE #
[signature]	3/12/09	11:30	Y. Khadigeva	3/12/09	11:30	OF

WHITE - RETURN W/ SAMPLE YELLOW - KEEP FOR YOUR RECORDS

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Appendix B

Test Data and Summary of Statistics for the Toxicity Evaluation of Dumbarton Bridge Sediment DRET tests with Mysid *(Americamysis bahia)* Larvae

Acute Mysid Survival Test — Pacific EcoRisk

Batch ID:	08-2080-8461	**Test Type:**	Survival (96h)	**Analyst:**	Jason Walker
Start Date:	19 Mar-09 14:00	**Protocol:**	EPA-821-R-02-012 (2002)	**Diluent:**	Laboratory Water
Ending Date:	23 Mar-09 14:00	**Species:**	Americamysis bahia	**Brine:**	Crystal Sea
Duration:	96h	**Source:**	Aquatic Biosystems, CO	**Age:**	4

Sample ID:	04-3643-5213	**Code:**	P-6	**Client:**	GeoCon Consultants, Inc.
Sample Date:	10 Mar-09 12:30	**Material:**	Elutriate	**Project:**	14582
Receive Date:	12 Mar-09 11:30	**Source:**	GeoCon Consultants, Inc.		
Sample Age:	9d 2h (5 °C)	**Station:**	P-6		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
03-8480-6411	96h Survival Rate	100	>100	N/A	4.35%	1	Steel Many-One Rank Test

96h Survival Rate Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	5	1	1	1	1	1	0	0	0.0%	0.0%
10		5	0.98	0.963	0.997	0.9	1	0.00816	0.0447	4.56%	2.0%
50		5	1	1	1	1	1	0	0	0.0%	0.0%
100		5	1	1	1	1	1	0	0	0.0%	0.0%

96h Survival Rate Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Water Contr	1	1	1	1	1
10		1	1	1	1	0.9
50		1	1	1	1	1
100		1	1	1	1	1

Acute Mysid Survival Test — Pacific EcoRisk

Analysis ID:	03-8480-6411	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.7.0
Analyzed:	30 Mar-09 13:19	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)		C > T	Not Run	100	>100	N/A	1	4.35%

Steel Many-One Rank Test

Control	vs	Conc-%	Test Stat	Critical	Ties	P-Value	Decision(5%)
Lab Water Control		10	25	17	1	0.5314	Non-Significant Effect
		50	27.5	17	1	0.7500	Non-Significant Effect
		100	27.5	17	1	0.7500	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.003853909	0.001284636	3	0.965	0.4335	Non-Significant Effect
Error	0.02130757	0.001331723	16			
Total	0.02516148	0.002616359	19			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Mod Levene Equality of Variance	0.965	5.95	0.4411	Equal Variances
Distribution	Shapiro-Wilk Normality	0.525		<0.0001	Non-normal Distribution

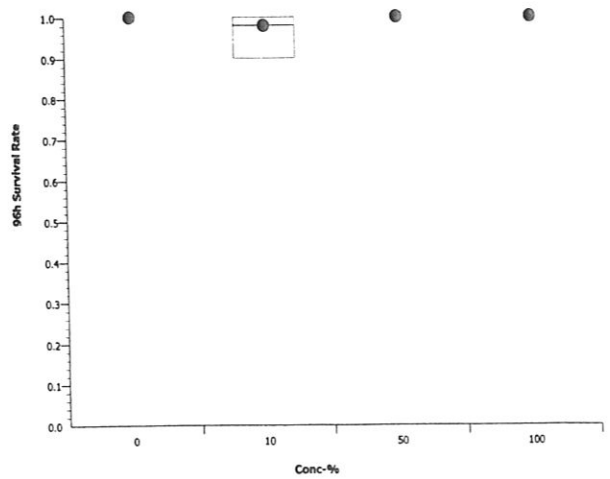
96h Survival Rate Summary

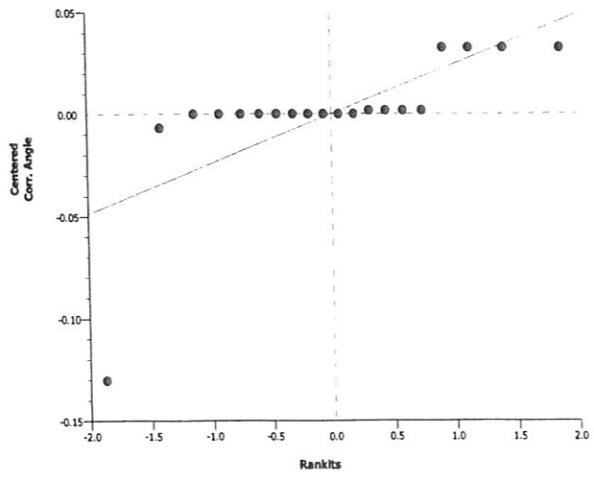
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	5	1	1	1	1	1	0	0	0.0%	0.0%
10		5	0.98	0.963	0.997	0.9	1	0.0083	0.0447	4.56%	2.0%
50		5	1	1	1	1	1	0	0	0.0%	0.0%
100		5	1	1	1	1	1	0	0	0.0%	0.0%

Angular (Corrected) Transformed Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Cont	5	1.41	1.41	1.41	1.41	1.41	0	0	0.0%	0.0%
10		5	1.38	1.35	1.41	1.25	1.41	0.0135	0.0729	5.28%	2.31%
50		5	1.41	1.41	1.41	1.4	1.41	0.000721	0.00388	0.28%	0.12%
100		5	1.41	1.41	1.41	1.41	1.41	0	0	0.0%	0.0%

Graphics





96 Hour Acute *Americamysis bahia* Water Column Toxicity Test

Client: GeoCon Consultants, Inc.
Test Material: P-6
Test ID#: 32366 Project #: 14582
Test Date: 3/19/09 Randomization: 5.4.5 ~~PA~~ 5.5.5

Organism Log #: 4445 Age: 4 days
Organism Supplier: ABS
Control/Diluent: 25 ppt Lab Water
Control Water Batch: 712

Treatment (% Elutriate)	Temp (°C)	pH new	pH old	D.O. (mg/L) new	D.O. (mg/L) old	Salinity (ppt) new	Salinity (ppt) old	# Live Organisms Rep A	Rep B	Rep C	Rep D	Rep E	SIGN-OFF
Control	20.5	8.00		7.9		24.9		10	10	10	10	10	Test Solution Prep: RV/PA
10	20.5	8.09		8.0		25.1		10	10	10	10	10	New WQ: SL
50	20.5	8.16		8.0		24.9		10	10	10	10	10	Initiation Date: 3/19/09
100	20.5	8.25		8.5		24.6		10	10	10	10	10	Initiation Time: 1400
Meter ID	26A	pH12		D013		EC01							Initiation Signoff: JRC
Control	20.5		8.09		7.3		25.4	10	10	10	10	10	Count Date: 3-20-09
10	20.5		8.13		7.1		25.0	10	10	10	10	10	Count Time: 0930
50	20.5		8.16		7.2		25.5	10	10	10	10	10	Count Signoff: CJ
100	20.5		8.30		7.2		25.0	10	10	10	10	10	Old WQ: MEC
Meter ID	26A		pH12		D013		EC05						
Control	20.4		7.86		6.8	25.8	~~26.2~~ JRC	10	10	10	10	10	Count Date: 3/21/09
10	20.4		7.97		6.8	25.3	~~26.2~~ JRC	10	9 10 JR	10	10	10	Count Time: 1010
50	20.4		7.97		7.1	25.0	~~26.2~~ JRC	10	10	10	10	10	Count Signoff: JR
100	20.4		7.96		7.0	25.3	~~26.0~~ JRC	10	10	10	10	10	Old WQ: DGW
Meter ID	26A		pH12		D014		EC01						
Control	20.4		7.73		8.6		25.7	10	10	10	10	10	Count Date: 3/22/09
10	20.4		7.74		8.6		25.8	10	10	10	10	10	Count Time: 1130
50	20.4		7.77		7.9		25.7	10	10	10	10	10	Count Signoff: SH
100	20.4		7.84		8.0		25.9	10	10	10	10	10	Old WQ: AR
Meter ID	26A		pH12		D012		EC01						
Control	20.0		8.02		7.6		25.5	10	10	10	10	10	Termination Date: 3/23/09
10	20.0		8.06		7.8		25.6	10	10	10	10	9	Termination Time: 1400
50	20.0		8.10		7.7		25.9	10	10	10	9	10	Termination Signoff: SA
100	20.0		8.15		7.6		25.8	10	10	10	10	10	Old WQ: SA/SL
Meter ID	26A		pH03		D013		EC01						

Acute Mysid Survival Test — **Pacific EcoRisk**

Batch ID:	08-2080-8461	**Test Type:**	Survival (96h)	**Analyst:**	Jason Walker
Start Date:	19 Mar-09 14:00	**Protocol:**	EPA-821-R-02-012 (2002)	**Diluent:**	Laboratory Water
Ending Date:	23 Mar-09 14:00	**Species:**	Americamysis bahia	**Brine:**	Crystal Sea
Duration:	96h	**Source:**	Aquatic Biosystems, CO	**Age:**	4

Sample ID:	21-3685-7370	**Code:**	P-8	**Client:**	GeoCon Consultants, Inc.
Sample Date:	10 Mar-09 13:20	**Material:**	Elutriate	**Project:**	14582
Receive Date:	12 Mar-09 11:30	**Source:**	GeoCon Consultants, Inc.		
Sample Age:	9d 1h (5 °C)	**Station:**	P-8		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
15-4984-1182	96h Survival Rate	100	>100	N/A	4.35%	1	Steel Many-One Rank Test

96h Survival Rate Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	5	1	1	1	1	1	0	0	0.0%	0.0%
10		5	0.98	0.963	0.997	0.9	1	0.00816	0.0447	4.56%	2.0%
50		5	1	1	1	1	1	0	0	0.0%	0.0%
100		5	1	1	1	1	1	0	0	0.0%	0.0%

96h Survival Rate Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Water Contr	1	1	1	1	1
10		0.9	1	1	1	1
50		1	1	1	1	1
100		1	1	1	1	1

Acute Mysid Survival Test — Pacific EcoRisk

Analysis ID:	15-4984-1182	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.7.0
Analyzed:	30 Mar-09 13:20	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)		C > T	Not Run	100	>100	N/A	1	4.35%

Steel Many-One Rank Test

Control	vs	Conc-%	Test Stat	Critical	Ties	P-Value	Decision(5%)
Lab Water Control		10	25	17	1	0.5314	Non-Significant Effect
		50	27.5	17	1	0.7500	Non-Significant Effect
		100	27.5	17	1	0.7500	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.0039839	0.001327967	3	1	0.4182	Non-Significant Effect
Error	0.02124747	0.001327967	16			
Total	0.02523137	0.002655933	19			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Mod Levene Equality of Variance	1	5.95	0.4262	Equal Variances
Distribution	Shapiro-Wilk Normality	0.497		<0.0001	Non-normal Distribution

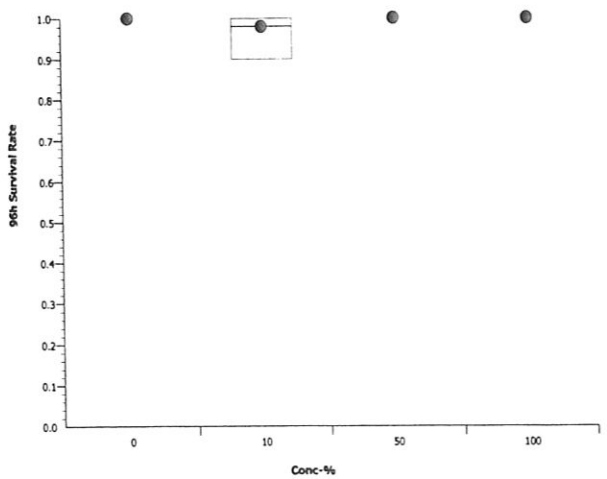
96h Survival Rate Summary

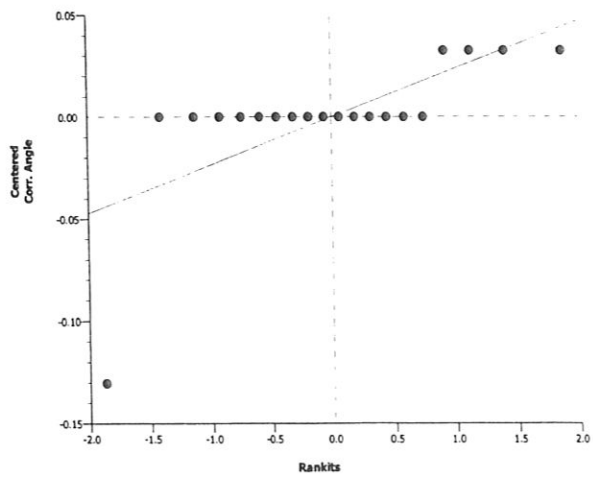
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	5	1	1	1	1	1	0	0	0.0%	0.0%
10		5	0.98	0.963	0.997	0.9	1	0.0083	0.0447	4.56%	2.0%
50		5	1	1	1	1	1	0	0	0.0%	0.0%
100		5	1	1	1	1	1	0	0	0.0%	0.0%

Angular (Corrected) Transformed Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Cont	5	1.41	1.41	1.41	1.41	1.41	0	0	0.0%	0.0%
10		5	1.38	1.35	1.41	1.25	1.41	0.0135	0.0729	5.28%	2.31%
50		5	1.41	1.41	1.41	1.41	1.41	0	0	0.0%	0.0%
100		5	1.41	1.41	1.41	1.41	1.41	0	0	0.0%	0.0%

Graphics





96 Hour Acute *Americamysis bahia* Water Column Toxicity Test

Client: GeoCon Consultants, Inc.
Test Material: P-8
Test ID#: 32367 Project #: 14582
Test Date: 3/19/09 Randomization: 5.4.6

Organism Log #: 4445 Age: 4 days
Organism Supplier: ABS
Control/Diluent: 25 ppt Lab Water
Control Water Batch: 712

Treatment (% Elutriate)	Temp (°C)	pH new	pH old	D.O. (mg/L) new	D.O. (mg/L) old	Salinity (ppt) new	Salinity (ppt) old	# Live Organisms Rep A	Rep B	Rep C	Rep D	Rep E	SIGN-OFF
Control	20.5	8.00		7.9		24.9		10	10	10	10	10	Test Solution Prep: RV/PA
10	20.5	8.08		7.8		25.1		10	10	10	10	10	New WQ: SL
50	20.5	8.14		7.9		24.8		10	10	10	10	10	Initiation Date: 3/19/09
100	20.5	8.24		8.9		24.7		10	10	10	10	10	Initiation Time: 1400
Meter ID	26A	PH12		DO13		EC01							Initiation Signoff: JR
Control	20.5		8.15		7.2		25.2	10	10	10	10	10	Count Date: 3-20-09
10	20.5		8.12		7.1		25.3	10	10	10	10	10	Count Time: 0930
50	20.5		8.12		6.3		25.1	10	10	10	10	10	Count Signoff: W
100	20.5		8.28		7.0		25.0	10	10	10	10	10	Old WQ: MEC
Meter ID	26A		pH12		DO13		EC05						
Control	20.4		7.87		6.9		25.7	10	10	10	10	10	Count Date: 3/21/09
10	20.4		7.80		6.8		26.0	10	10	10	10	10	Count Time: 1010
50	20.4		7.95		6.8		25.9	10	10	10	10	10	Count Signoff: JR
100	20.4		7.93		6.5		25.8	10	10	10	10	10	Old WQ: MEC
Meter ID	26A		pH12		DO14		EC01						
Control	20.4		7.66		9.2		25.6	10	10	10	10	10	Count Date: 3/22/09
10	20.4		7.73		8.3		25.5	9	10	10	10	10	Count Time: 1130
50	20.4		7.77		8.1		25.8	10	10	10	10	10	Count Signoff: SH
100	20.4		7.81		8.0		25.9	10	10	10	10	10	Old WQ: AR
Meter ID	26A		pH12		DO12		EC01						
Control	20.0		8.04		8.0		25.5	10	10	10	10	10	Termination Date: 3/23/09
10	20.0		8.03		7.7		25.5	9	10	10	10	10	Termination Time: 1400
50	20.0		8.09		7.6		25.2	10	10	10	10	10	Termination Signoff: JR
100	20.0		8.10		7.4		25.8	10	10	10	10	10	Old WQ: SL
Meter ID	26A		pH03		DO13		EC05						

Acute Mysid Survival Test — Pacific EcoRisk

Batch ID:	08-2080-8461	**Test Type:**	Survival (96h)	**Analyst:**	Jason Walker
Start Date:	19 Mar-09 14:00	**Protocol:**	EPA-821-R-02-012 (2002)	**Diluent:**	Laboratory Water
Ending Date:	23 Mar-09 14:00	**Species:**	Americamysis bahia	**Brine:**	Crystal Sea
Duration:	96h	**Source:**	Aquatic Biosystems, CO	**Age:**	4

Sample ID:	15-5137-2311	**Code:**	P-10	**Client:**	GeoCon Consultants, Inc.
Sample Date:	10 Mar-09 11:05	**Material:**	Elutriate	**Project:**	14582
Receive Date:	12 Mar-09 11:30	**Source:**	GeoCon Consultants, Inc.		
Sample Age:	9d 3h (5 °C)	**Station:**	P-10		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
11-6157-1573	96h Survival Rate	100	>100	N/A	4.33%	1	Steel Many-One Rank Test

96h Survival Rate Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	5	1	1	1	1	1	0	0	0.0%	0.0%
10		5	1	1	1	1	1	0	0	0.0%	0.0%
50		5	0.98	0.963	0.997	0.9	1	0.00816	0.0447	4.56%	2.0%
100		5	1	1	1	1	1	0	0	0.0%	0.0%

96h Survival Rate Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Water Contr	1	1	1	1	1
10		1	1	1	1	1
50		1	1	1	0.9	1
100		1	1	1	1	1

Acute Mysid Survival Test — **Pacific EcoRisk**

Analysis ID:	11-6157-1573	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.7.0
Analyzed:	30 Mar-09 13:22	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)		C > T	Not Run	100	>100	N/A	1	4.33%

Steel Many-One Rank Test

Control	vs	Conc-%	Test Stat	Critical	Ties	P-Value	Decision(5%)
Lab Water Control		10	27.5	17	1	0.7500	Non-Significant Effect
		50	25	17	1	0.5314	Non-Significant Effect
		100	27.5	17	1	0.7500	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.00413643	0.00137881	3	1.06	0.3946	Non-Significant Effect
Error	0.02086274	0.001303921	16			
Total	0.02499917	0.002682731	19			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Mod Levene Equality of Variance	1.07	5.95	0.3995	Equal Variances
Distribution	Shapiro-Wilk Normality	0.55		<0.0001	Non-normal Distribution

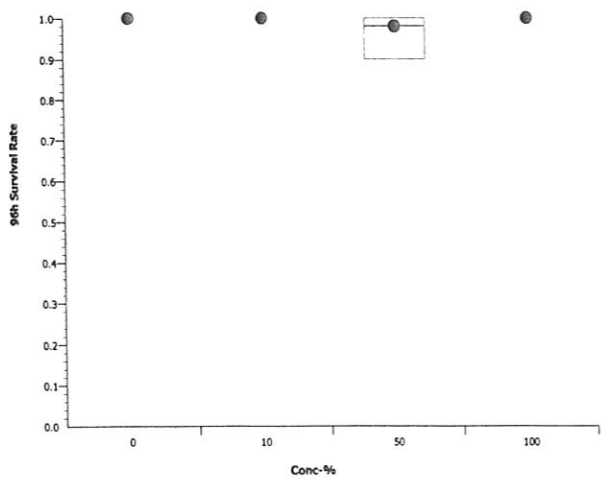
96h Survival Rate Summary

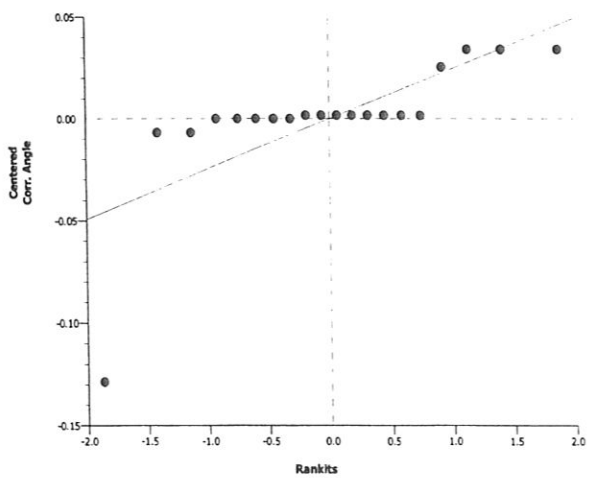
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	5	1	1	1	1	1	0	0	0.0%	0.0%
10		5	1	1	1	1	1	0	0	0.0%	0.0%
50		5	0.98	0.963	0.997	0.9	1	0.0083	0.0447	4.56%	2.0%
100		5	1	1	1	1	1	0	0	0.0%	0.0%

Angular (Corrected) Transformed Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Cont	5	1.41	1.41	1.41	1.41	1.41	0	0	0.0%	0.0%
10		5	1.41	1.41	1.41	1.4	1.41	0.000721	0.00388	0.28%	0.12%
50		5	1.38	1.35	1.41	1.25	1.41	0.0134	0.072	5.23%	2.43%
100		5	1.41	1.41	1.41	1.4	1.41	0.000721	0.00388	0.28%	0.12%

Graphics





96 Hour Acute *Americamysis bahia* Water Column Toxicity Test

Client: GeoCon Consultants, Inc.
Test Material: P-10
Test ID#: 32368 Project #: 14582
Test Date: 3.19.09 Randomization: 5.5.5

Organism Log #: 4445 Age: 4 days
Organism Supplier: ABS
Control/Diluent: 25 ppt Lab Water
Control Water Batch: 712

Treatment (% Elutriate)	Temp (°C)	pH new	pH old	D.O. (mg/L) new	D.O. (mg/L) old	Salinity (ppt) new	Salinity (ppt) old	# Live Organisms Rep A	Rep B	Rep C	Rep D	Rep E	SIGN-OFF
Control	20.5	8.00		7.9		24.9		10	10	10	10	10	Test Solution Prep: RV/PA
10	20.5	8.09		7.9		25.2		10	10	10	10	10	New WQ: SL
50	20.5	8.16		8.1		25.0		10	10	10	10	10	Initiation Date: 3.19.09
100	20.5	8.23		8.2		24.7		10	10	10	10	10	Initiation Time: 1400
Meter ID	26A	pH12		DO13		EC01							Initiation Signoff: EKK
Control	20.5		8.11		6.9		25.1	10	10	10	10	10	Count Date: 3/20/09
10	20.5		8.11		6.8		25.4	10	10	10	10	10	Count Time: 0930
50	20.5		8.15		6.6		25.3	10	10	10	10	10	Count Signoff: W
100	20.5		8.30		7.0		25.0	10	10	10	10	10	Old WQ: MEC
Meter ID	26A		pH12		DO13		EC05						
Control	20.4		7.89		7.1		25.9	10	10	10	10	10	Count Date: 3/21/09
10	20.4		7.92		7.4	252	~~26.4~~ JPC 25.4	10	10	10	10	10	Count Time: 1010
50	20.4		7.96		7.0		25.5	10	10	10	10	10	Count Signoff: JZ
100	20.4		~~25.0~~ 7.99		7.0		25.9	10	10	10	10	10	Old WQ: DCV
Meter ID	26A		pH12		DO14		EC01						
Control	20.4		7.78		8.2		25.7	10	10	10	10	10	Count Date: 3/22/09
10	20.4		7.78		8.3		25.5	10	9	10	10	10	Count Time: 1130
50	20.4		7.82		8.2		25.8	10	9	10	9	10	Count Signoff: JZ
100	20.4		7.89		8.0		25.8	9	10	10	10	10	Old WQ: JZ/AR
Meter ID	26A		pH12		DO12		EC04						
Control	~~25.4~~ 20.0		8.06		7.6		26.0	10	10	10	10	10	Termination Date: 3/23/09
10	~~20.4~~ 20.0		8.07		7.7		25.9	10	9	10	10	10	Termination Time: 1400
50	~~25.4~~ 20.0		8.01		7.3		25.7	10	9	10	9	10	Termination Signoff: JW
100	~~20.4~~ 20.0		8.14		7.6		26.0	9	10	10	10	10	Old WQ: JW/SL
Meter ID	26A		pH03		DO13		EC05						

Acute Mysid Survival Test — **Pacific EcoRisk**

Batch ID:	08-2080-8461	**Test Type:**	Survival (96h)	**Analyst:**	Jason Walker
Start Date:	19 Mar-09 14:00	**Protocol:**	EPA-821-R-02-012 (2002)	**Diluent:**	Laboratory Water
Ending Date:	23 Mar-09 14:00	**Species:**	Americamysis bahia	**Brine:**	Crystal Sea
Duration:	96h	**Source:**	Aquatic Biosystems, CO	**Age:**	4

Sample ID:	03-5460-9246	**Code:**	P-12	**Client:**	GeoCon Consultants, Inc.
Sample Date:	10 Mar-09 10:00	**Material:**	Elutriate	**Project:**	14582
Receive Date:	12 Mar-09 11:30	**Source:**	GeoCon Consultants, Inc.		
Sample Age:	9d 4h (5 °C)	**Station:**	P-12		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
08-6353-8869	96h Survival Rate	100	>100	N/A	11.0%	1	Steel Many-One Rank Test

96h Survival Rate Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	5	0.96	0.927	0.993	0.8	1	0.0163	0.0894	9.32%	0.0%
10		5	1	1	1	1	1	0	0	0.0%	-4.17%
50		5	0.92	0.871	0.969	0.7	1	0.0238	0.13	14.2%	4.17%
100		5	0.978	0.959	0.996	0.889	1	0.00907	0.0497	5.08%	-1.85%

96h Survival Rate Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Water Contr	1	0.8	1	1	1
10		1	1	1	1	1
50		0.9	1	0.7	1	1
100		0.889	1	1	1	1

Acute Mysid Survival Test — Pacific EcoRisk

Analysis ID:	08-6353-8869	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.7.0
Analyzed:	30 Mar-09 13:25	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)		C > T	Not Run	100	>100	N/A	1	11.0%

Steel Many-One Rank Test

Control	vs	Conc-%	Test Stat	Critical	Ties	P-Value	Decision(5%)
Lab Water Control		10	30	17	1	0.8988	Non-Significant Effect
		50	25	17	1	0.5314	Non-Significant Effect
		100	28	17	1	0.7865	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.03609792	0.01203264	3	0.815	0.5040	Non-Significant Effect
Error	0.2360911	0.0147557	16			
Total	0.2721891	0.02678834	19			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Mod Levene Equality of Variance	0.848	5.95	0.4937	Equal Variances
Distribution	Shapiro-Wilk Normality	0.795		0.0007	Non-normal Distribution

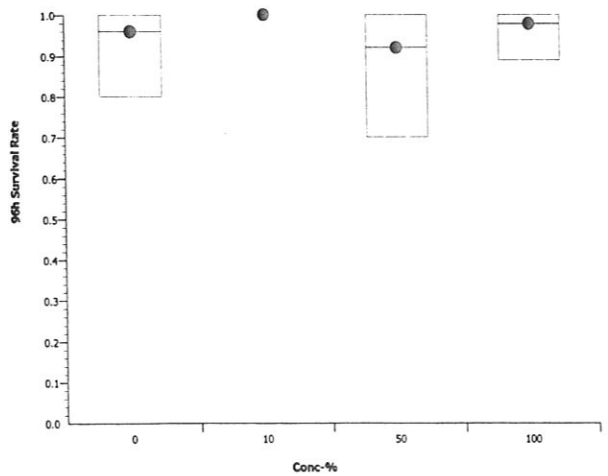
96h Survival Rate Summary

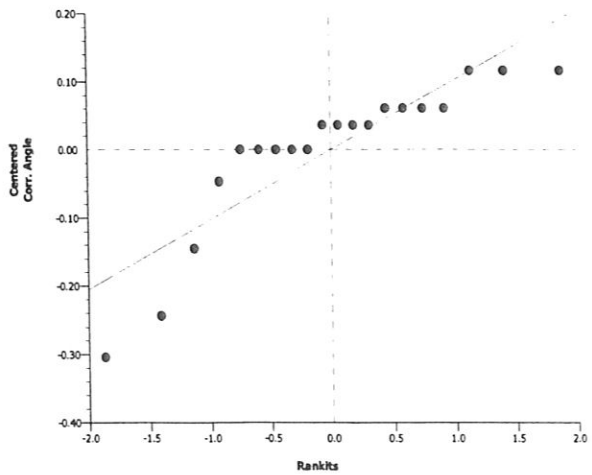
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	5	0.96	0.926	0.994	0.8	1	0.0166	0.0894	9.32%	0.0%
10		5	1	1	1	1	1	0	0	0.0%	-4.17%
50		5	0.92	0.87	0.97	0.7	1	0.0242	0.13	14.2%	4.17%
100		5	0.978	0.959	0.997	0.889	1	0.00923	0.0497	5.08%	-1.85%

Angular (Corrected) Transformed Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Cont	5	1.35	1.3	1.4	1.11	1.41	0.0253	0.136	10.1%	0.0%
10		5	1.41	1.41	1.41	1.41	1.41	0	0	0.0%	-4.51%
50		5	1.3	1.23	1.37	0.991	1.41	0.0342	0.184	14.2%	4.13%
100		5	1.38	1.35	1.41	1.23	1.41	0.015	0.081	5.89%	-1.83%

Graphics





96 Hour Acute *Americamysis bahia* Water Column Toxicity Test

Client: GeoCon Consultants, Inc.
Test Material: P-12
Test ID#: 32369 Project #: 14582
Test Date: 3.19.09 Randomization: 5.5.5

Organism Log #: 4445 Age: 4 days
Organism Supplier: ABS
Control/Diluent: 25 ppt Lab Water
Control Water Batch: 712

Treatment (% Elutriate)	Temp (°C)	pH new	pH old	D.O. (mg/L) new	D.O. (mg/L) old	Salinity (ppt) new	Salinity (ppt) old	# Live Organisms Rep A	Rep B	Rep C	Rep D	Rep E	SIGN-OFF
Control	20.5	8.00		7.9		24.9		10	10	10	10	10	Test Solution Prep: RV/PA
10	20.5	8.09		7.8		24.9		10	10	10	10	10	New WQ: SL
50	20.5	8.15		8.0		24.9		10	10	10	10	10	Initiation Date: 3.19.09
100	20.5	8.23		8.4		24.7		10	10	10	10	10	Initiation Time: 1400
Meter ID	26A	pH12		DO13		EC01							Initiation Signoff: EKK
Control	20.5		~~8.29~~ 8.17		7.1		24.9	10	9	10	10	10	Count Date: 3-20-09
10	20.5		8.13		7.0		25.5	10	10	10	10	10	Count Time: 0930
50	20.5		8.18		6.8		25.4	10	10	10	10	10	Count Signoff: CW
100	20.5		8.29		6.9		25.2	10	10	10	10	10	Old WQ: MEC
Meter ID	26A		pH12		DO13		EC05						
Control	20.4		7.89		7.3		25.9	10	9	10	10	10	Count Date: 3/21/09
10	20.4		7.93		7.3	24.7	~~25.1~~ 25.1	10	10	10	10	10	Count Time: 1010
50	20.4		7.97		7.1		25.9	10	10	8	10	10	Count Signoff: JL
100	20.4		8.01		7.3		25.8	10	10	10	10	10	Old WQ: DGW
Meter ID	26A		pH12		DO14		EC01						
Control	20.4		7.83		8.4		25.6	10	8	10	10	10	Count Date: 3/22/09
10	20.4		7.79		8.5		25.1	10	10	10	10	10	Count Time: 1130
50	20.4		7.85		8.0		25.7	9	10	7	10	10	Count Signoff: ZW
100	20.4		7.93		7.7		25.5	8	10	10	10	10	Old WQ: ZW/AR
Meter ID	26A		pH12		DO12		~~EC05~~ EC05						
Control	20.0		8.01		7.5		25.4	10	8	10	10	10	Termination Date: 3/23/09
10	20.0		7.99		7.3		24.7	10	10	10	10	10	Termination Time: 1400
50	20.0		8.09		7.5		25.7	9	10	7	10	10	Termination Signoff: JAW
100	20.0		8.16		7.6		25.9	8	10	10	10	10	Old WQ: JAW/SL
Meter ID	26A		pH03		DO13		EC05						

CETIS Summary Report

Acute Mysid Survival Test — **Pacific EcoRisk**

Batch ID:	08-2080-8461	**Test Type:**	Survival (96h)	**Analyst:**	Jason Walker
Start Date:	19 Mar-09 14:00	**Protocol:**	EPA-821-R-02-012 (2002)	**Diluent:**	Laboratory Water
Ending Date:	23 Mar-09 14:00	**Species:**	Americamysis bahia	**Brine:**	Crystal Sea
Duration:	96h	**Source:**	Aquatic Biosystems, CO	**Age:**	4

Sample ID:	21-4025-7309	**Code:**	P-14	**Client:**	GeoCon Consultants, Inc.
Sample Date:	10 Mar-09 08:55	**Material:**	Elutriate	**Project:**	14582
Receive Date:	12 Mar-09 11:30	**Source:**	GeoCon Consultants, Inc.		
Sample Age:	9d 5h (5 °C)	**Station:**	P-14		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
06-9417-9087	96h Survival Rate	100	>100	N/A	4.27%	1	Steel Many-One Rank Test

96h Survival Rate Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	5	1	1	1	1	1	0	0	0.0%	0.0%
10		5	0.98	0.963	0.997	0.9	1	0.00816	0.0447	4.56%	2.0%
50		5	1	1	1	1	1	0	0	0.0%	0.0%
100		5	1	1	1	1	1	0	0	0.0%	0.0%

96h Survival Rate Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Water Contr	1	1	1	1	1
10		1	1	1	0.9	1
50		1	1	1	1	1
100		1	1	1	1	1

CETIS Analytical Report

Report Date: 30 Mar-09 13:56 (p 1 of 1)
Test Code: 06-0911-3531/32370

Acute Mysid Survival Test — **Pacific EcoRisk**

Analysis ID:	06-9417-9087	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.7.0
Analyzed:	30 Mar-09 13:27	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)		C > T	Not Run	100	>100	N/A	1	4.27%

Steel Many-One Rank Test

Control	vs	Conc-%	Test Stat	Critical	Ties	P-Value	Decision(5%)
Lab Water Control		10	25	17	1	0.5314	Non-Significant Effect
		50	27.5	17	1	0.7500	Non-Significant Effect
		100	27.5	17	1	0.7500	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.005356672	0.001785557	3	1.45	0.2643	Non-Significant Effect
Error	0.0196425	0.001227656	16			
Total	0.02499917	0.003013214	19			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Mod Levene Equality of Variance	1.16	5.95	0.3670	Equal Variances
Distribution	Shapiro-Wilk Normality	0.509		<0.0001	Non-normal Distribution

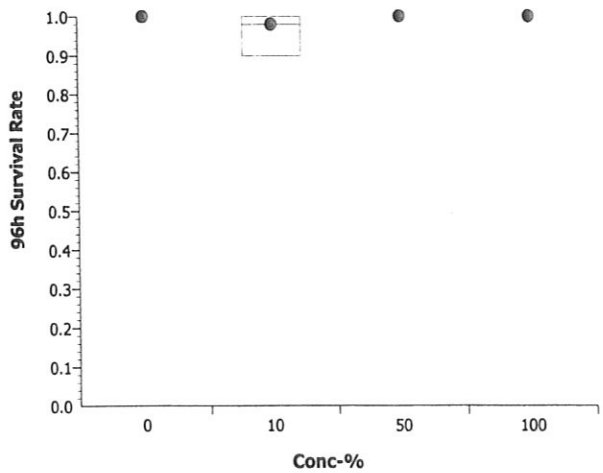
96h Survival Rate Summary

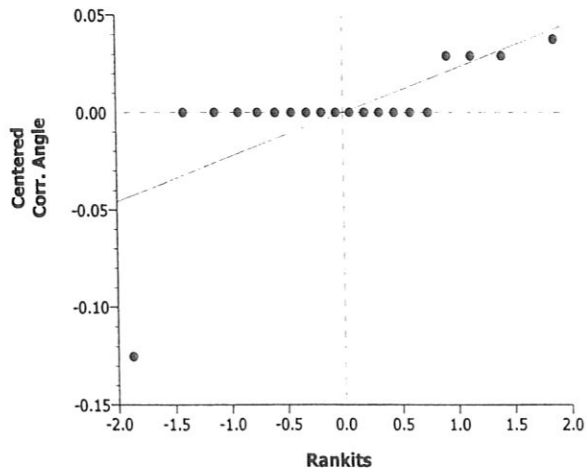
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	5	1	1	1	1	1	0	0	0.0%	0.0%
10		5	0.98	0.963	0.997	0.9	1	0.0083	0.0447	4.56%	2.0%
50		5	1	1	1	1	1	0	0	0.0%	0.0%
100		5	1	1	1	1	1	0	0	0.0%	0.0%

Angular (Corrected) Transformed Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Cont	5	1.41	1.41	1.41	1.41	1.41	0	0	0.0%	0.0%
10		5	1.37	1.35	1.4	1.25	1.41	0.013	0.0701	5.1%	2.68%
50		5	1.41	1.41	1.41	1.41	1.41	0	0	0.0%	0.0%
100		5	1.41	1.41	1.41	1.41	1.41	0	0	0.0%	0.0%

Graphics





96 Hour Acute *Americamysis bahia* Water Column Toxicity Test

Client: GeoCon Consultants, Inc.
Test Material: P-14
Test ID#: 32370 Project #: 14582
Test Date: 3/19/09 Randomization: 5,4,1

Organism Log #: 445 Age: 4d
Organism Supplier: ABS
Control/Diluent: 25 ppt Lab Water
Control Water Batch: 712

Treatment (% Elutriate)	Temp (°C)	pH new	pH old	D.O. (mg/L) new	D.O. (mg/L) old	Salinity (ppt) new	Salinity (ppt) old	# Live Organisms Rep A	Rep B	Rep C	Rep D	Rep E	SIGN-OFF
Control	20.5	8.00		7.9		24.9		10	10	10	10	10	Test Solution Prep: RV/PA
10	20.5	8.09		7.8		25.0		10	10	10	10	10	New WQ: SL
50	20.5	8.13		8.1		24.9		10	10	10	10	10	Initiation Date: 3/19/09
100	20.5	8.19		8.4		24.8		10	10	10	10	10	Initiation Time: 1400
Meter ID	26A	pH12		DO13		EC01							Initiation Signoff: JRW
Control	20.5		8.10		6.9		24.7	10	10	10	10	10	Count Date: 3-20-09
10	20.5		8.13		6.8		25.2	10	10	10	10	10	Count Time: 0930
50	20.5		8.15		6.5		25.1	10	10	10	10	10	Count Signoff: W
100	20.5		8.26		6.7		24.9	10	10	10	10	10	Old WQ: MEC
Meter ID	26A		pH12		DO13		EC05						
Control	20.4		7.79		~~7.6~~ 7.1		24.8	10	10	10	10	10	Count Date: 3/21/09
10	20.4		7.88		7.2		25.2	10	10	10	10	10	Count Time: 1010
50	20.4		7.94		7.2		25.7	10	10	10	10	10	Count Signoff: JR
100	20.4		7.94		7.0		25.6	10	10	10	10	10	Old WQ: SGO
Meter ID	26A		pH12		DO14		EC01						
Control	20.4		7.75		8.8		25.8	10	10	10	10	10	Count Date: 3/22/09
10	20.4		7.75		8.0		25.8	9	10	9	9	10	Count Time: 1130
50	20.4		7.81		8.0		25.9	10	10	10	10	10	Count Signoff: SH
100	20.4		7.84		8.1		25.9	10	10	10	10	10	Old WQ: AR
Meter ID	26A		pH12		DO12		EC01						
Control	20.0		8.08		7.7		26.0	10	10	10	10	10	Termination Date: 3/23/09
10	20.0		8.07		7.7		25.6	9	9	9	9	10	Termination Time: 1400
50	20.0		8.12		7.6		25.5	10	10	10	10	10	Termination Signoff: SH
100	20.0		8.17		7.6		25.8	10	10	10	10	10	Old WQ: SH/SL
Meter ID	26A		pH03		DO13		EC01						

Acute Mysid Survival Test — **Pacific EcoRisk**

Batch ID:	08-2080-8461	**Test Type:**	Survival (96h)	**Analyst:**	Jason Walker
Start Date:	19 Mar-09 14:00	**Protocol:**	EPA-821-R-02-012 (2002)	**Diluent:**	Laboratory Water
Ending Date:	23 Mar-09 14:00	**Species:**	Americamysis bahia	**Brine:**	Crystal Sea
Duration:	96h	**Source:**	Aquatic Biosystems, CO	**Age:**	4

Sample ID:	15-2170-1596	**Code:**	P-32	**Client:**	GeoCon Consultants, Inc.
Sample Date:	11 Mar-09 10:10	**Material:**	Elutriate	**Project:**	14582
Receive Date:	12 Mar-09 11:30	**Source:**	GeoCon Consultants, Inc.		
Sample Age:	8d 4h (5 °C)	**Station:**	P-32		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
13-7870-5480	96h Survival Rate	100	>100	N/A	7.06%	1	Steel Many-One Rank Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
05-2534-2485	96h Survival Rate	EC5	12700	N/A	N/A	0.00788	Linear Regression (MLE)
		EC10	567000	N/A	N/A	0.000176	
		EC15	7360000	N/A	N/A	0.0000136	
		EC20	56500000	N/A	N/A	0.0000017	
		EC25	324000000	N/A	N/A	0.0000003	
		EC40	266000000	N/A	N/A	0.0000000	
		EC50	376000000	N/A	N/A	0.0000000	

96h Survival Rate Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	5	0.98	0.963	0.997	0.9	1	0.00816	0.0447	4.56%	0.0%
10		5	0.98	0.963	0.997	0.9	1	0.00816	0.0447	4.56%	0.0%
50		5	0.938	0.917	0.959	0.889	1	0.0104	0.057	6.08%	4.31%
100		5	0.98	0.963	0.997	0.9	1	0.00816	0.0447	4.56%	0.0%

96h Survival Rate Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Water Contr	1	1	1	0.9	1
10		0.9	1	1	1	1
50		0.889	1	1	0.9	0.9
100		1	1	0.9	1	1

Acute Mysid Survival Test — **Pacific EcoRisk**

Analysis ID:	13-7870-5480	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.7.0
Analyzed:	30 Mar-09 13:34	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)		C > T	Not Run	100	>100	N/A	1	7.06%

Steel Many-One Rank Test

Control	vs	Conc-%	Test Stat	Critical	Ties	P-Value	Decision(5%)
Lab Water Control		10	27.5	17	2	0.7500	Non-Significant Effect
		50	22	17	2	0.2647	Non-Significant Effect
		100	27.5	17	2	0.7500	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.01746626	0.005822087	3	0.953	0.4385	Non-Significant Effect
Error	0.09772838	0.006108024	16			
Total	0.1151946	0.01193011	19			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Bartlett Equality of Variance	0.356	11.3	0.9492	Equal Variances
Distribution	Shapiro-Wilk Normality	0.797		0.0008	Non-normal Distribution

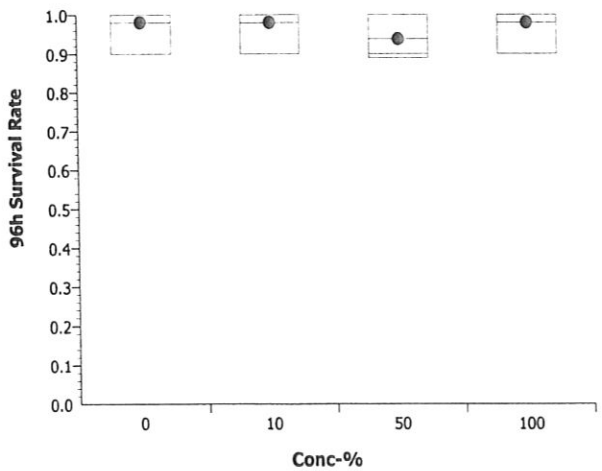
96h Survival Rate Summary

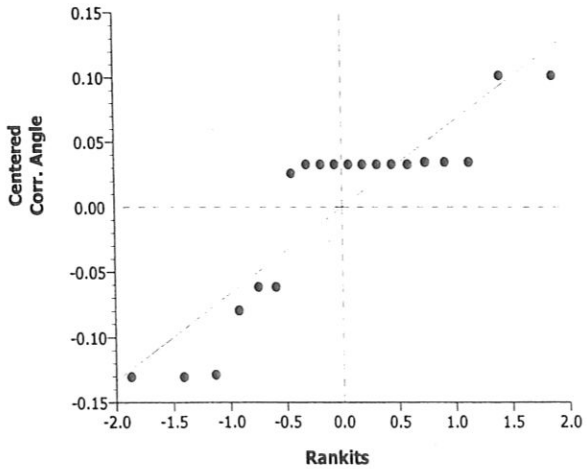
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	5	0.98	0.963	0.997	0.9	1	0.0083	0.0447	4.56%	0.0%
10		5	0.98	0.963	0.997	0.9	1	0.0083	0.0447	4.56%	0.0%
50		5	0.938	0.916	0.959	0.889	1	0.0106	0.057	6.08%	4.31%
100		5	0.98	0.963	0.997	0.9	1	0.0083	0.0447	4.56%	0.0%

Angular (Corrected) Transformed Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Cont	5	1.38	1.35	1.41	1.25	1.41	0.0134	0.072	5.23%	0.0%
10		5	1.38	1.35	1.41	1.25	1.41	0.0135	0.0729	5.28%	-0.13%
50		5	1.31	1.28	1.35	1.23	1.41	0.0172	0.0929	7.09%	4.87%
100		5	1.38	1.35	1.41	1.25	1.41	0.0135	0.0729	5.28%	-0.13%

Graphics





Acute Mysid Survival Test — Pacific EcoRisk

Analysis ID:	05-2534-2485	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.7.0
Analyzed:	30 Mar-09 13:34	**Analysis:**	Linear Regression (MLE)	**Official Results:**	Yes

Linear Regression Options

Model Function	Threshold Option	Threshold	Optimized	Pooled	Het Corr	Weighted
Log-Normal [NED=A+B*log(X)]	Control Threshold	0.0204082	Yes	No	No	Yes

Regression Summary

Iters	LL	AICc	Mu	Sigma	G Stat	Chi-Sq	Critical	P-Value	Decision(5%)
37	-10.8	26.7	11.1	4.54	106	7.59	22.4	0.8690	Non-Significant Heterogeneity

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	12700	N/A	N/A	0.00788	N/A	N/A
EC10	567000	N/A	N/A	0.000176	N/A	N/A
EC15	7360000	N/A	N/A	0.0000136	N/A	N/A
EC20	56500000	N/A	N/A	0.0000017	N/A	N/A
EC25	324000000	N/A	N/A	0.0000003	N/A	N/A
EC40	266000000	N/A	N/A	0.0000000	N/A	N/A
EC50	376000000	N/A	N/A	0.0000000	N/A	N/A

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(5%)
Threshold	0.0199	0.0199	-0.0192	0.059	0.998	0.3366	Non-Significant Parameter
Slope	0.22	1.16	-2.04	2.48	0.191	0.8518	Non-Significant Parameter
Intercept	2.45	2.07	-1.6	6.51	1.19	0.2572	Non-Significant Parameter

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(5%)
Variances	Mod Levene Equality of Variance	0.335	4.26	0.7241	Equal Variances
Distribution	Shapiro-Wilk Normality	0.651		<0.0001	Non-normal Distribution

96h Survival Rate Summary

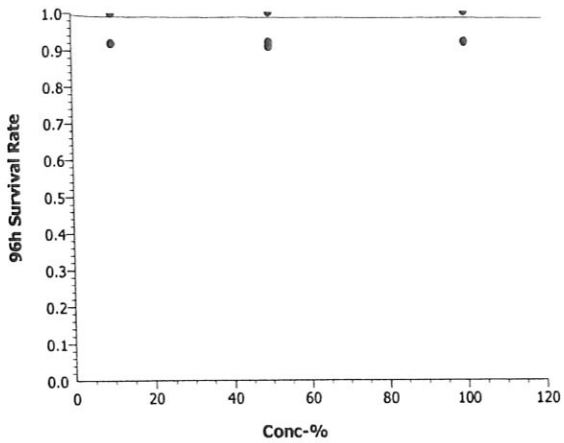
			Calculated Variate(A/B)								
Conc-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	Diff%	A	B
0	Lab Water Contr	5	0.98	0.9	1	0.00816	0.0447	4.56%	0.0%	48	49
10		5	0.98	0.9	1	0.00816	0.0447	4.56%	0.0%	49	50
50		5	0.938	0.889	1	0.0104	0.057	6.08%	4.31%	46	49
100		5	0.98	0.9	1	0.00816	0.0447	4.56%	0.0%	49	50

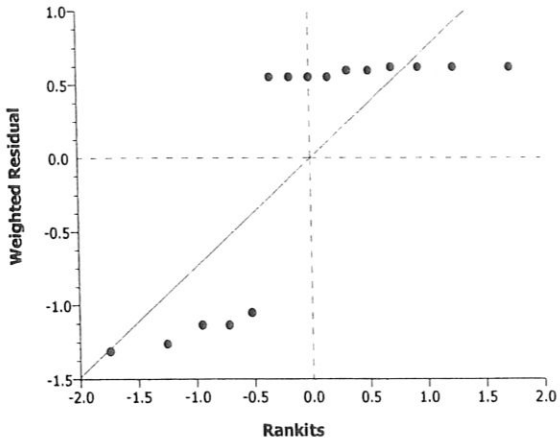
96h Survival Rate Detail

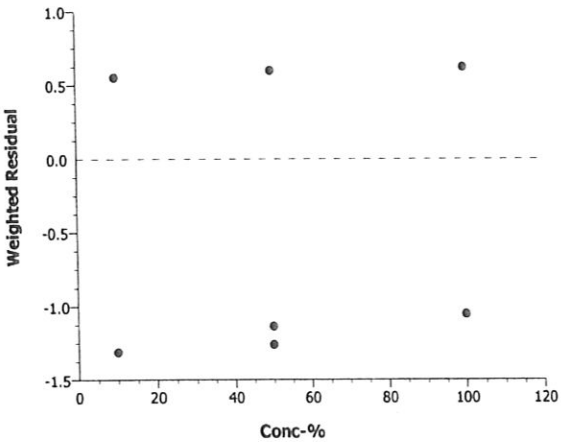
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Water Control	1	1	1	0.9	1
10		0.9	1	1	1	1
50		0.889	1	1	0.9	0.9
100		1	1	0.9	1	1

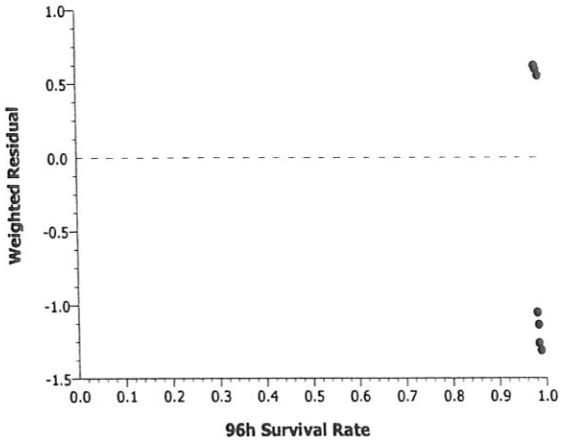
Acute Mysid Survival Test					Pacific EcoRisk
Analysis ID:	05-2534-2485	Endpoint:	96h Survival Rate	CETIS Version:	CETISv1.7.0
Analyzed:	30 Mar-09 13:34	Analysis:	Linear Regression (MLE)	Official Results:	Yes

Graphics









96 Hour Acute *Americamysis bahia* Water Column Toxicity Test

Client: GeoCon Consultants, Inc.
Test Material: P-32
Test ID#: 32371 Project # 14582
Test Date: 3/19/09 Randomization: 5.4.1

Organism Log #: 4445 Age: 4d
Organism Supplier: ABS
Control/Diluent: 25 ppt Lab Water
Control Water Batch: 712

Treatment (% Elutriate)	Temp (°C)	pH new	pH old	D.O. (mg/L) new	D.O. (mg/L) old	Salinity (ppt) new	Salinity (ppt) old	# Live Organisms Rep A	Rep B	Rep C	Rep D	Rep E	SIGN-OFF
Control	20.5	8.00		7.9		24.9		10	10	10	10	10	Test Solution Prep: RM/PA
10	20.5	8.08		7.8		25.0		10	10	10	10	10	New WQ: SL
50	20.5	8.14		8.0		24.9		10	10	10	10	10	Initiation Date: 3/19/09
100	20.5	8.21		8.6		24.8		10	10	10	10	10	Initiation Time: 1400
Meter ID	26A	pH12		DO13		EC01							Initiation Signoff: PA
Control	20.5		8.15		7.1		24.8	10	10	10	10	10	Count Date: 3-20-09
10	20.5		8.14		6.9		25.3	10	10	10	10	10	Count Time: 3-20-09
50	20.5		8.16		6.6		25.3	9/10	10	10	10	10	Count Signoff: W
100	20.5		8.30		7.1		25.2	10	10	10	10	10	Old WQ: MEC
Meter ID	26A		pH12		DO13		EC05						
Control	20.4		7.84		7.3		26.0	10	10	10	10	10	Count Date: 3/21/09
10	20.4		7.87		7.2		~~26.1~~ 25.9	10	10	10	10	10	Count Time: 1010
50	20.4		7.93		6.9		~~26.1~~ 25.9	10	10	10	10	10	Count Signoff: JR
100	20.4		7.98		7.1		25.6	10	10	10	10	10	Old WQ: DGV
Meter ID	26A		pH12		DO14		EC01						
Control	20.4		7.81		9.1		25.3	10	9	10	9	10	Count Date: 3/22/09
10	20.4		7.79		8.4		25.7	9	10	10	10	10	Count Time: 1130
50	20.4		7.83		8.2		25.4	8	10	10	9	9	Count Signoff: JW
100	20.4		7.91		8.0		25.4	10	10	10	10	10	Old WQ: KM/AR
Meter ID	26A		pH12		DO12		EC05						
Control	20.0		8.04		7.16		25.2	10	9	10	9	9/10	Termination Date: 3/23/09
10	20.0		8.03		7.5		25.6	9	10	10	10	10	Termination Time: 1400
50	20.0		8.10		7.4		25.3	8	10	10	9	9	Termination Signoff: JW
100	20.0		8.14		7.2		25.6	10	10	9	10	10	Old WQ: SL
Meter ID	26A		pH03		DO13		EC05						

Acute Mysid Survival Test — **Pacific EcoRisk**

Batch ID:	08-2080-8461	**Test Type:**	Survival (96h)	**Analyst:**	Jason Walker
Start Date:	19 Mar-09 14:00	**Protocol:**	EPA-821-R-02-012 (2002)	**Diluent:**	Laboratory Water
Ending Date:	23 Mar-09 14:00	**Species:**	Americamysis bahia	**Brine:**	Crystal Sea
Duration:	96h	**Source:**	Aquatic Biosystems, CO	**Age:**	4

Sample ID:	14-0001-5528	**Code:**	P-34	**Client:**	GeoCon Consultants, Inc.
Sample Date:	11 Mar-09 10:45	**Material:**	Elutriate	**Project:**	14582
Receive Date:	12 Mar-09 11:30	**Source:**	GeoCon Consultants, Inc.		
Sample Age:	8d 3h (5 °C)	**Station:**	P-34		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
10-6166-2195	96h Survival Rate	100	>100	N/A	2.59%	1	Steel Many-One Rank Test

96h Survival Rate Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	5	1	1	1	1	1	0	0	0.0%	0.0%
10		5	1	1	1	1	1	0	0	0.0%	0.0%
50		5	1	1	1	1	1	0	0	0.0%	0.0%
100		5	1	1	1	1	1	0	0	0.0%	0.0%

96h Survival Rate Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Water Contr	1	1	1	1	1
10		1	1	1	1	1
50		1	1	1	1	1
100		1	1	1	1	1

Acute Mysid Survival Test — **Pacific EcoRisk**

Analysis ID:	10-6166-2195	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.7.0
Analyzed:	30 Mar-09 13:35	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)		C > T	Not Run	100	>100	N/A	1	2.59%

Steel Many-One Rank Test

Control	vs	Conc-%	Test Stat	Critical	Ties	P-Value	Decision(5%)
Lab Water Control		10	27.5	17	1	0.7500	Non-Significant Effect
		50	27.5	17	1	0.7500	Non-Significant Effect
		100	27.5	17	1	0.7500	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	1.126978E-05	3.756594E-06	3	1	0.4182	Non-Significant Effect
Error	6.01055E-05	3.756594E-06	16			
Total	7.137528E-05	7.513187E-06	19			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Mod Levene Equality of Variance	1	5.95	0.4262	Equal Variances
Distribution	Shapiro-Wilk Normality	0.497		<0.0001	Non-normal Distribution

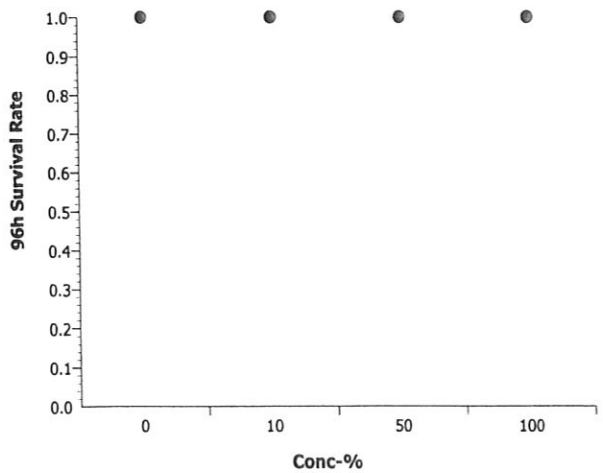
96h Survival Rate Summary

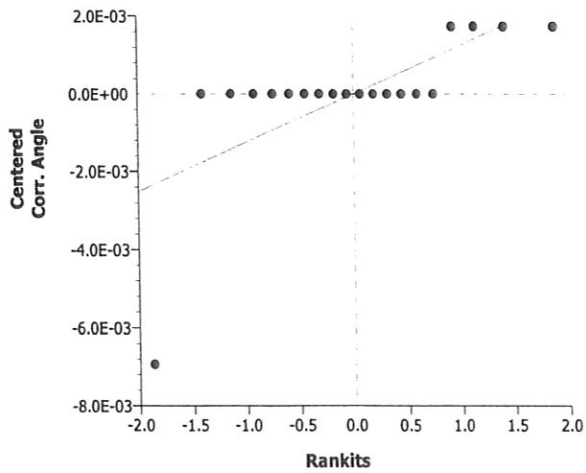
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	5	1	1	1	1	1	0	0	0.0%	0.0%
10		5	1	1	1	1	1	0	0	0.0%	0.0%
50		5	1	1	1	1	1	0	0	0.0%	0.0%
100		5	1	1	1	1	1	0	0	0.0%	0.0%

Angular (Corrected) Transformed Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Cont	5	1.41	1.41	1.41	1.41	1.41	0	0	0.0%	0.0%
10		5	1.41	1.41	1.41	1.41	1.41	0	0	0.0%	0.0%
50		5	1.41	1.41	1.41	1.4	1.41	0.000721	0.00388	0.28%	0.12%
100		5	1.41	1.41	1.41	1.41	1.41	0	0	0.0%	0.0%

Graphics





96 Hour Acute *Americamysis bahia* Water Column Toxicity Test

Client: GeoCon Consultants, Inc.
Test Material: P-34
Test ID#: 32372 Project # 14582
Test Date: 3/19/09 Randomization: S.A.1

Organism Log #: 4445 Age: 4d
Organism Supplier: ABS
Control/Diluent: 25 ppt Lab Water
Control Water Batch: 712

Treatment (% Elutriate)	Temp (°C)	pH new	pH old	D.O. (mg/L) new	D.O. (mg/L) old	Salinity (ppt) new	Salinity (ppt) old	# Live Organisms Rep A	Rep B	Rep C	Rep D	Rep E	SIGN-OFF
Control	20.5	8.00		7.9		24.9		10	10	10	10	10	Test Solution Prep: RV/PA
10	20.5	8.08		7.8		25.1		10	10	10	10	10	New WQ: SL
50	20.5	8.12		7.9		24.9		10	10	10	10	10	Initiation Date: 3/19/09
100	20.5	8.18		8.5		24.7		10	10	10	10	10	Initiation Time: 1400
Meter ID	26A	pH12		DO13		EC01							Initiation Signoff: JPL
Control	20.5		8.15		7.0		25.2	10	10	10	10	10	Count Date: 3-20-09
10	20.5		8.14		7.0		25.5	10	10	10	11	10	Count Time: 0930
50	20.5		8.16		6.8		25.5	10	10	10	10	10	Count Signoff: CJ
100	20.5		8.29		7.1		25.2	10	10	10	10	10	Old WQ: MEC
Meter ID	26A		pH12		DO13		EC05						
Control	20.4		7.89		7.2		26.0	10	10	10	10	10	Count Date: 3/21/09
10	20.4		7.90		7.4		25.8	10	10	10	10	10	Count Time: 1010
50	20.4		7.95		7.2		25.7	10	10	10	10	10	Count Signoff: JL
100	20.4		7.99		7.0		25.5	10	10	10	10	10	Old WQ: DGU
Meter ID	26A		pH12		DO14		EC01						
Control	20.4		7.69		9.1		25.7	10	10	10	10	10	Count Date: 3/22/09
10	20.4		7.78		8.1		25.8	10	10	10	10	10	Count Time: 1130
50	20.4		7.83		7.9		25.7	~~8~~ 9	10	10	10	10	Count Signoff: SH
100	20.4		7.86		7.7		26.0	10	10	10	10	10	Old WQ: AR
Meter ID	26A		pH12		DO12		EC01						
Control	20.0		8.07		7.7		26.0	10	10	10	10	10	Termination Date: 3/23/09
10	20.0		8.07		7.5		25.9	10	10	10	10	10	Termination Time: 1400
50	20.0		8.12		7.5		26.0	9	10	10	10	10	Termination Signoff: SH
100	20.0		8.14		7.4		25.5	10	10	10	10	10	Old WQ: SH/SL
Meter ID	26A		pH03		DO13		EC01						

Acute Mysid Survival Test — **Pacific EcoRisk**

Batch ID:	08-2080-8461	**Test Type:**	Survival (96h)	**Analyst:**	Jason Walker
Start Date:	19 Mar-09 14:00	**Protocol:**	EPA-821-R-02-012 (2002)	**Diluent:**	Laboratory Water
Ending Date:	23 Mar-09 14:00	**Species:**	Americamysis bahia	**Brine:**	Crystal Sea
Duration:	96h	**Source:**	Aquatic Biosystems, CO	**Age:**	4

Sample ID:	06-1296-5162	**Code:**	P-36	**Client:**	GeoCon Consultants, Inc.
Sample Date:	11 Mar-09 11:30	**Material:**	Elutriate	**Project:**	14582
Receive Date:	12 Mar-09 11:30	**Source:**	GeoCon Consultants, Inc.		
Sample Age:	8d 3h (5 °C)	**Station:**	P-36		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
05-2131-0992	96h Survival Rate	100	>100	N/A	6.89%	1	Steel Many-One Rank Test

96h Survival Rate Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	5	0.98	0.963	0.997	0.9	1	0.00816	0.0447	4.56%	0.0%
10		5	1	1	1	1	1	0	0	0.0%	-2.04%
50		5	0.96	0.927	0.993	0.8	1	0.0163	0.0894	9.32%	2.04%
100		5	1	1	1	1	1	0	0	0.0%	-2.04%

96h Survival Rate Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Water Contr	1	0.9	1	1	1
10		1	1	1	1	1
50		0.8	1	1	1	1
100		1	1	1	1	1

Acute Mysid Survival Test — Pacific EcoRisk

Analysis ID:	05-2131-0992	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.7.0
Analyzed:	30 Mar-09 13:36	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)		C > T	Not Run	100	>100	N/A	1	6.89%

Steel Many-One Rank Test

Control	vs	Conc-%	Test Stat	Critical	Ties	P-Value	Decision(5%)
Lab Water Control		10	30	17	1	0.8988	Non-Significant Effect
		50	27	17	1	0.7105	Non-Significant Effect
		100	30	17	1	0.8988	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.01295708	0.004319028	3	0.723	0.5530	Non-Significant Effect
Error	0.09560277	0.005975173	16			
Total	0.1085598	0.0102942	19			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Mod Levene Equality of Variance	0.723	5.95	0.5575	Equal Variances
Distribution	Shapiro-Wilk Normality	0.652		<0.0001	Non-normal Distribution

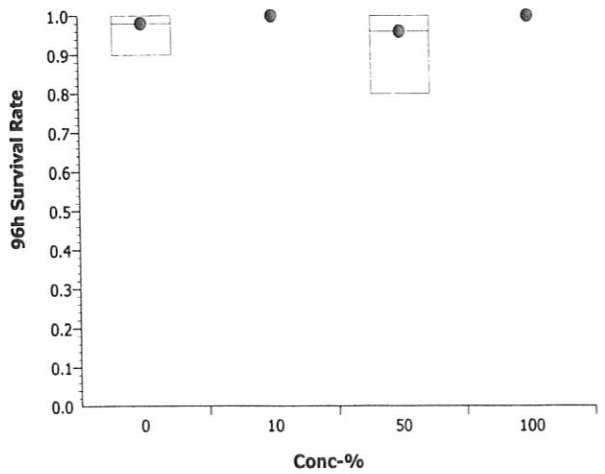
96h Survival Rate Summary

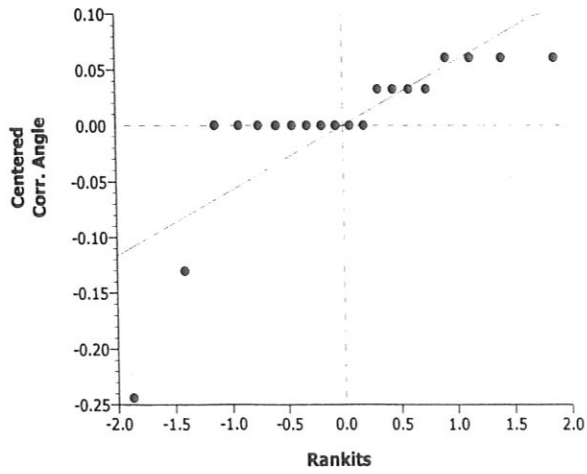
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	5	0.98	0.963	0.997	0.9	1	0.0083	0.0447	4.56%	0.0%
10		5	1	1	1	1	1	0	0	0.0%	-2.04%
50		5	0.96	0.926	0.994	0.8	1	0.0166	0.0894	9.32%	2.04%
100		5	1	1	1	1	1	0	0	0.0%	-2.04%

Angular (Corrected) Transformed Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Cont	5	1.38	1.35	1.41	1.25	1.41	0.0135	0.0729	5.28%	0.0%
10		5	1.41	1.41	1.41	1.41	1.41	0	0	0.0%	-2.36%
50		5	1.35	1.3	1.4	1.11	1.41	0.0253	0.136	10.1%	2.06%
100		5	1.41	1.41	1.41	1.41	1.41	0	0	0.0%	-2.36%

Graphics





96 Hour Acute *Americamysis bahia* Water Column Toxicity Test

Client: GeoCon Consultants, Inc.
Test Material: P-36
Test ID#: 32373 Project #: 14582
Test Date: 3/19/09 Randomization: 5.4.4

Organism Log #: 4445 Age: 4d
Organism Supplier: ABS
Control/Diluent: 25 ppt Lab Water
Control Water Batch: 712

Treatment (% Elutriate)	Temp (°C)	pH new	pH old	D.O. (mg/L) new	D.O. (mg/L) old	Salinity (ppt) new	Salinity (ppt) old	# Live Organisms Rep A	Rep B	Rep C	Rep D	Rep E	SIGN-OFF
Control	20.5	8.00		7.9		24.9		10	10	10	10	10	Test Solution Prep: RVPA
10	20.5	8.08		7.8		25.0		10	10	10	10	10	New WQ: SL
50	20.5	8.15		7.9		24.8		10	10	10	10	10	Initiation Date: 3/19/09
100	20.5	8.22		8.4		24.7		10	10	10	10	10	Initiation Time: 1400
Meter ID	26A	pH12		DO13		EC01							Initiation Signoff: PQ
Control	20.5		8.15		7.1		25.1	10	10	10	10	10	Count Date: 3-20-09
10	20.5		8.13		7.0		25.2	10	10	10	10	10	Count Time: 0930
50	20.5		8.17		6.8		25.3	9	10	10	10	10	Count Signoff: CJ
100	20.5		8.30		7.1		25.2	10	10	10	10	10	Old WQ: MEC
Meter ID	26A		pH12		DO13		EC05						
Control	20.4		7.62		6.8	25.8	~~26.1~~ JRL	10	10	10	10	10	Count Date: 3/21/09
10	20.4		7.89		7.0	25.7	~~25.8~~ JRL	10	10	10	10	10	Count Time: 1010
50	20.4		7.96		7.1		25.7	9	10	10	9 JW 10	10	Count Signoff: JR
100	20.4		8.01		7.0		25.5	10	10	10	10	10	Old WQ: DGJ
Meter ID	26A		pH12		DO14		EC01						
Control	20.4		7.81		8.9		~~25.8~~ ~~25.6~~	10	9	10	10	10	Count Date: 3/22/09
10	20.4		7.79		8.4		25.6	10	10	10	10	10	Count Time: 1130
50	20.4		7.80		8.2		25.8	9	10	10	10	10	Count Signoff: JW
100	20.4		7.74		8.8		25.7	10	10	10	10	10	Old WQ: JW/AE
Meter ID	26A		pH12		DO12		EC05						
Control	20.0		8.04		7.4		25.5	10	9	10	10	10	Termination Date: 3/23/09
10	20.0		8.10		7.6		25.8	10	10	10	10	10	Termination Time: 1400
50	20.0		8.12		7.5		25.7	8	10	10	10	10	Termination Signoff: JW
100	20.0		8.10		7.4		25.8	10	10	10	10	10	Old WQ: SL
Meter ID	26A		pH03		DO13		EC05						

Acute Mysid Survival Test — **Pacific EcoRisk**

Batch ID:	08-2080-8461	**Test Type:**	Survival (96h)	**Analyst:**	Jason Walker
Start Date:	19 Mar-09 14:00	**Protocol:**	EPA-821-R-02-012 (2002)	**Diluent:**	Laboratory Water
Ending Date:	23 Mar-09 14:00	**Species:**	Americamysis bahia	**Brine:**	Crystal Sea
Duration:	96h	**Source:**	Aquatic Biosystems, CO	**Age:**	4

Sample ID:	14-2522-4738	**Code:**	P-38	**Client:**	GeoCon Consultants, Inc.
Sample Date:	11 Mar-09 12:15	**Material:**	Elutriate	**Project:**	14582
Receive Date:	12 Mar-09 11:30	**Source:**	GeoCon Consultants, Inc.		
Sample Age:	8d 2h (5 °C)	**Station:**	P-38		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
15-7136-7241	96h Survival Rate	100	>100	N/A	4.91%	1	Steel Many-One Rank Test

96h Survival Rate Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	5	0.98	0.963	0.997	0.9	1	0.00816	0.0447	4.56%	0.0%
10		5	1	1	1	1	1	0	0	0.0%	-2.04%
50		5	0.98	0.963	0.997	0.9	1	0.00816	0.0447	4.56%	0.0%
100		5	1	1	1	1	1	0	0	0.0%	-2.04%

96h Survival Rate Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Water Contr	1	1	0.9	1	1
10		1	1	1	1	1
50		1	1	1	1	0.9
100		1	1	1	1	1

CETIS Analytical Report

Report Date: 30 Mar-09 14:05 (p 1 of 1)
Test Code: 12-1381-5025/32374

Acute Mysid Survival Test — **Pacific EcoRisk**

Analysis ID:	15-7136-7241	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.7.0
Analyzed:	30 Mar-09 13:37	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)		C > T	Not Run	100	>100	N/A	1	4.91%

Steel Many-One Rank Test

Control	vs	Conc-%	Test Stat	Critical	Ties	P-Value	Decision(5%)
Lab Water Control		10	30	17	1	0.8988	Non-Significant Effect
		50	27.5	17	2	0.7500	Non-Significant Effect
		100	30	17	1	0.8988	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.005311866	0.001770622	3	0.667	0.5847	Non-Significant Effect
Error	0.04249493	0.002655933	16			
Total	0.0478068	0.004426555	19			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Mod Levene Equality of Variance	0.667	5.95	0.5885	Equal Variances
Distribution	Shapiro-Wilk Normality	0.604		<0.0001	Non-normal Distribution

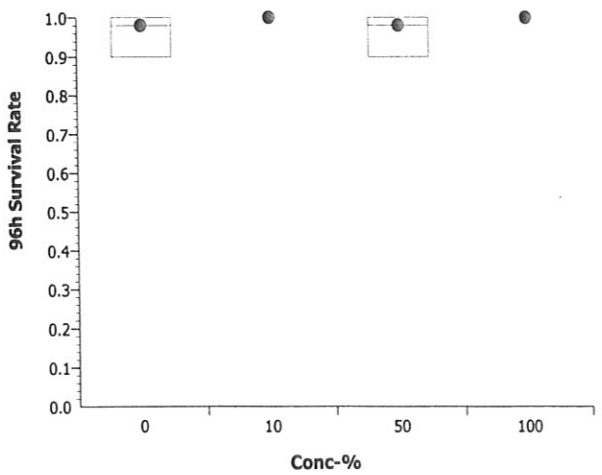
96h Survival Rate Summary

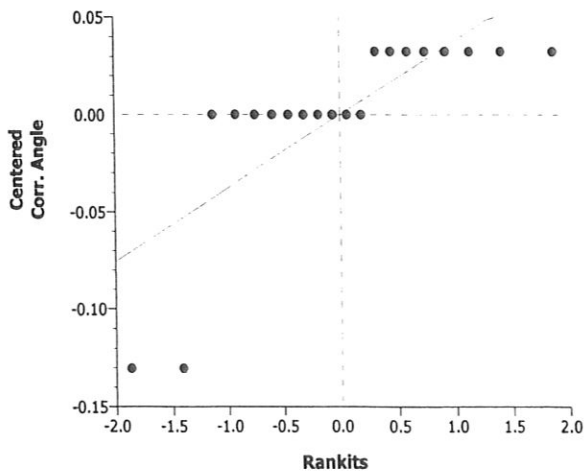
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	5	0.98	0.963	0.997	0.9	1	0.0083	0.0447	4.56%	0.0%
10		5	1	1	1	1	1	0	0	0.0%	-2.04%
50		5	0.98	0.963	0.997	0.9	1	0.0083	0.0447	4.56%	0.0%
100		5	1	1	1	1	1	0	0	0.0%	-2.04%

Angular (Corrected) Transformed Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Cont	5	1.38	1.35	1.41	1.25	1.41	0.0135	0.0729	5.28%	0.0%
10		5	1.41	1.41	1.41	1.41	1.41	0	0	0.0%	-2.36%
50		5	1.38	1.35	1.41	1.25	1.41	0.0135	0.0729	5.28%	0.0%
100		5	1.41	1.41	1.41	1.41	1.41	0	0	0.0%	-2.36%

Graphics





96 Hour Acute *Americamysis bahia* Water Column Toxicity Test

Client: GeoCon Consultants, Inc.
Test Material: P-38
Test ID#: 32374 Project #: 14582
Test Date: 3/19/09 Randomization: 5:41

Organism Log #: 4445 Age: 4 days
Organism Supplier: ABS
Control/Diluent: 25 ppt Lab Water
Control Water Batch: 712

Treatment (% Elutriate)	Temp (°C)	pH new	pH old	D.O. (mg/L) new	D.O. (mg/L) old	Salinity (ppt) new	Salinity (ppt) old	# Live Organisms Rep A	Rep B	Rep C	Rep D	Rep E	SIGN-OFF
Control	20.5	8.00		7.9		24.9		10	10	10	10	10	Test Solution Prep: RV/ PA
10	20.5	8.07		7.6		25.0		10	10	10	10	10	New WQ: SL
50	20.5	8.13		7.6		24.9		10	10	10	10	10	Initiation Date: 3/19/09
100	20.5	8.22		8.0		24.7		10	10	10	10	10	Initiation Time: 1400
Meter ID	26A	pH12		D013		EC01							Initiation Signoff:
Control	20.5		8.15		7.2		25.4	10	10	9	10	10	Count Date: 3-20-09
10	20.5		8.12		6.9		25.6	10	10	10	10	10	Count Time: 0930
50	20.5		8.16		6.6		25.3	10	10	10	10	10	Count Signoff:
100	20.5		8.28		7.1		25.1	10	10	10	10	10	Old WQ: MEC
Meter ID	26A		pH12		D013		EC05						
Control	20.4		7.93		7.4	25.1	~~26.2~~ 26.0	10	10	9	10	10	Count Date: 3/21/09
10	20.4		7.92		7.2		26.0	10	10	10	10	10	Count Time: 1010
50	20.4		7.93		7.2		25.9	10	10	10	10	9	Count Signoff:
100	20.4		7.97		7.0		25.9	10	10	10	10	10	Old WQ:
Meter ID	26A		pH12		D014		EC01						
Control	20.4		7.82		8.9		25.3	10	10	9	10	10	Count Date: 3/22/09
10	20.4		7.78		8.2		24.8	10	10	10	10	10	Count Time: 1130
50	20.4		7.81		8.0		25.8	10	10	10	10	9	Count Signoff:
100	20.4		7.88		8.0		25.4	10	10	10	10	10	Old WQ:
Meter ID	26A		pH12		D014		EC05						
Control	20.0		8.04		7.8		25.1	10	10	9	10	10	Termination Date: 3/23/09
10	20.0		8.07		7.5		25.9	10	10	10	10	10	Termination Time: 1400
50	20.0		8.05		7.5		25.5	10	10	10	10	9	Termination Signoff:
100	20.0		8.14		7.5		25.3	10	10	10	10	10	Old WQ: SH/ SL
Meter ID	26A		pH03		D013		EC01						

Acute Mysid Survival Test — **Pacific EcoRisk**

Batch ID:	08-2080-8461	**Test Type:**	Survival (96h)	**Analyst:**	Jason Walker
Start Date:	19 Mar-09 14:00	**Protocol:**	EPA-821-R-02-012 (2002)	**Diluent:**	Laboratory Water
Ending Date:	23 Mar-09 14:00	**Species:**	Americamysis bahia	**Brine:**	Crystal Sea
Duration:	96h	**Source:**	Aquatic Biosystems, CO	**Age:**	4

Sample ID:	10-9055-3256	**Code:**	P-40	**Client:**	GeoCon Consultants, Inc.
Sample Date:	11 Mar-09 13:00	**Material:**	Elutriate	**Project:**	14582
Receive Date:	12 Mar-09 11:30	**Source:**	GeoCon Consultants, Inc.		
Sample Age:	8d 1h (5 °C)	**Station:**	P-40		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
03-9593-1144	96h Survival Rate	100	>100	N/A	5.24%	1	Steel Many-One Rank Test

96h Survival Rate Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	5	1	1	1	1	1	0	0	0.0%	0.0%
10		5	0.98	0.963	0.997	0.9	1	0.00816	0.0447	4.56%	2.0%
50		5	0.98	0.963	0.997	0.9	1	0.00816	0.0447	4.56%	2.0%
100		5	1	1	1	1	1	0	0	0.0%	0.0%

96h Survival Rate Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Water Contr	1	1	1	1	1
10		0.9	1	1	1	1
50		1	1	0.9	1	1
100		1	1	1	1	1

Acute Mysid Survival Test — **Pacific EcoRisk**

Analysis ID:	03-9593-1144	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.7.0
Analyzed:	30 Mar-09 13:40	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)		C > T	Not Run	100	>100	N/A	1	5.24%

Steel Many-One Rank Test

Control	vs	Conc-%	Test Stat	Critical	Ties	P-Value	Decision(5%)
Lab Water Control		10	25	17	1	0.5314	Non-Significant Effect
		50	25	17	1	0.5314	Non-Significant Effect
		100	27.5	17	1	0.7500	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.005605657	0.001868552	3	0.712	0.5589	Non-Significant Effect
Error	0.04198999	0.002624375	16			
Total	0.04759565	0.004492927	19			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Mod Levene Equality of Variance	0.715	5.95	0.5616	Equal Variances
Distribution	Shapiro-Wilk Normality	0.617		<0.0001	Non-normal Distribution

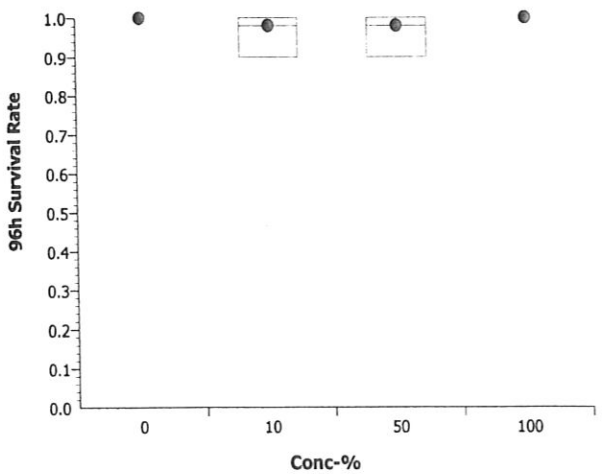
96h Survival Rate Summary

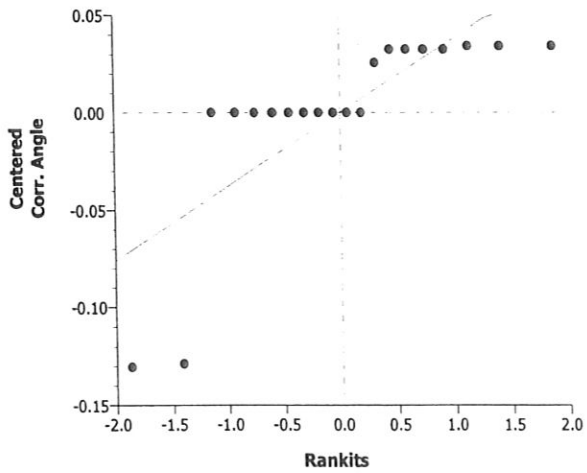
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	5	1	1	1	1	1	0	0	0.0%	0.0%
10		5	0.98	0.963	0.997	0.9	1	0.0083	0.0447	4.56%	2.0%
50		5	0.98	0.963	0.997	0.9	1	0.0083	0.0447	4.56%	2.0%
100		5	1	1	1	1	1	0	0	0.0%	0.0%

Angular (Corrected) Transformed Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Cont	5	1.41	1.41	1.41	1.41	1.41	0	0	0.0%	0.0%
10		5	1.38	1.35	1.41	1.25	1.41	0.0135	0.0729	5.28%	2.31%
50		5	1.38	1.35	1.41	1.25	1.41	0.0134	0.072	5.23%	2.43%
100		5	1.41	1.41	1.41	1.41	1.41	0	0	0.0%	0.0%

Graphics





96 Hour Acute *Americamysis bahia* Water Column Toxicity Test

Client: GeoCon Consultants, Inc.
Test Material: P-40
Test ID#: 32375 Project #: 14582
Test Date: 3/19/09 Randomization: 5.4.5

Organism Log #: 4445 Age: 4d
Organism Supplier: ABS
Control/Diluent: 25 ppt Lab Water
Control Water Batch: 712

Treatment (% Elutriate)	Temp (°C)	pH new	pH old	D.O. (mg/L) new	D.O. (mg/L) old	Salinity (ppt) new	Salinity (ppt) old	# Live Organisms Rep A	Rep B	Rep C	Rep D	Rep E	SIGN-OFF
Control	20.5	8.00		7.9		24.9		10	10	10	10	10	Test Solution Prep: RV/PA
10	20.5	8.07		7.7		25.0		10	10	10	10	10	New WQ: SL
50	20.5	8.13		7.8		25.0		10	10	10	10	10	Initiation Date: 3/19/09
100	20.5	8.18		8.1		24.6		10	10	10	10	10	Initiation Time: 1400
Meter ID	26A	pH12		0013		EC01							Initiation Signoff: PA
Control	20.5		8.13		6.9		24.8	10	10	10	10	10	Count Date: 3-20-09
10	20.5		8.14		6.9		25.1	10	10	10	10	10	Count Time: 0930
50	20.5		8.19		6.5		25.0	10	10	10	10	10	Count Signoff:
100	20.5		8.30		6.9		25.0	10	10	10	10	10	Old WQ: MEC
Meter ID	26A		pH12		D013		EC05						
Control	20.4		7.93		7.3		26.0	10	10	10	10	10	Count Date: 3/21/09
10	20.4		7.97		7.3		25.9	9	10	10	10	10	Count Time: 1010
50	20.4		7.96		7.0		25.9	10	10	10	10	10	Count Signoff: JZ
100	20.4		7.96		6.5		25.9	10	10	10	10	10	Old WQ:
Meter ID	26A		pH12		D014		EC01						
Control	20.4		7.80		9.0		25.7	10	10	9	10	10	Count Date: 3/22/09
10	20.4		7.76		8.3		25.7	9	10	10	10	10	Count Time: 1130
50	20.4		7.80		8.1		25.7	10	~~10~~ 9	9	10	10	Count Signoff: SH
100	20.4		7.88		8.2		25.7	10	10	10	10	10	Old WQ:
Meter ID	26A		pH12		D012		EC01						
Control	20.0		8.06		7.5		26.0	10	10	10	10	10	Termination Date: 3/23/09
10	20.0		8.06		7.4		26.0	9	10	10	10	10	Termination Time: 1400
50	20.0		8.12		7.5		25.8	10	9	9	10	10	Termination Signoff: SH
100	20.0		8.15		7.4		25.7	10	10	10	10	10	Old WQ: SH/SL
Meter ID	26A		pH03		D013		EC01						

Appendix C

Test Data and Summary of Statistics for the Reference Toxicant Evaluation of Mysid *(Americamysis bahia)* Larvae

Acute Mysid Survival Test — Pacific EcoRisk

Batch ID:	09-0213-2831	**Test Type:**	Survival (96h)	**Analyst:**	Rivian Villanueva
Start Date:	19 Mar-09 15:00	**Protocol:**	EPA-821-R-02-012 (2002)	**Diluent:**	Laboratory Water
Ending Date:	23 Mar-09 13:15	**Species:**	Americamysis bahia	**Brine:**	Crystal Sea
Duration:	94h	**Source:**	Aquatic Biosystems, CO	**Age:**	4

Sample ID:	07-3945-3485	**Code:**	K2Cr2O7	**Client:**	Reference Toxicant
Sample Date:	19 Mar-09 15:00	**Material:**	Potassium dichromate	**Project:**	14589
Receive Date:	19 Mar-09 15:00	**Source:**	Reference Toxicant		
Sample Age:	N/A (20.5 °C)	**Station:**	In House		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
17-9265-8355	96h Survival Rate	3.5	7	4.95	12.4%		Dunnett's Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	mg/L	95% LCL	95% UCL	TU	Method
12-8377-1832	96h Survival Rate	EC5	3.4	N/A	N/A		Linear Regression (MLE)
		EC10	4.13	N/A	N/A		
		EC15	4.7	N/A	N/A		
		EC20	5.22	N/A	N/A		
		EC25	5.7	N/A	N/A		
		EC40	7.14	N/A	N/A		
		EC50	8.17	N/A	N/A		

96h Survival Rate Summary

Conc-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	4	1	1	1	1	1	0	0	0.0%	0.0%
0.88		4	0.975	0.956	0.994	0.9	1	0.00913	0.05	5.13%	2.5%
1.75		4	1	1	1	1	1	0	0	0.0%	0.0%
3.5		4	0.975	0.956	0.994	0.9	1	0.00913	0.05	5.13%	2.5%
7		4	0.775	0.704	0.846	0.5	0.9	0.0346	0.189	24.4%	22.5%
14		4	0.05	0.0127	0.0873	0	0.2	0.0183	0.1	200.0%	95.0%
28		4	0	0	0	0	0	0	0		100.0%

96h Survival Rate Detail

Conc-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Lab Water Contr	1	1	1	1
0.88		1	1	1	0.9
1.75		1	1	1	1
3.5		1	1	0.9	1
7		0.5	0.9	0.9	0.8
14		0	0	0	0.2
28		0	0	0	0

96 Hour Acute *Americamysis bahia* Reference Toxicant Test

Client: **Reference Toxicant**
Test Material: Potassium dichromate
Test ID#: 32381 Project # 14589
Test Date: 3/19/09 Randomization: 4:7:1

Organism Log #: 4445 Age: 4 days
Organism Supplier: ABS
Control/Diluent: DI + Crystal Sea @ 25 ppt
Control Water Batch: 712

Treatment (mg Cr/L)	Temp (°C)	pH new	pH old	D.O. (mg/L) new	D.O. (mg/L) old	Salinity (ppt) new	Salinity (ppt) old	# Live Organisms Rep A	Rep B	Rep C	Rep D	SIGN-OFF
Control	20.5	7.84		8.3		24.7		10	10	10	10	Test Solution Prep: JRE
0.88	20.5	8.02		7.6		25.0		10	10	10	10	New WQ: 0600
1.75	20.5	8.03		6.9		25.0		10	10	10	10	Initiation Date: 3/19/09
3.5	20.5	8.02		7.0		25.1		10	10	10	10	Initiation Time: 1500
7	20.5	7.98		7.2		25.0		10	10	10	10	Initiation Signoff: JRE
14	20.5	7.89		7.5		24.8		10	10	10	10	
28	20.5	6.98		7.2		25.0		10	10	10	10	
Meter ID	26A	DH12		D013		EC01						
Control	20.5		8.04		7.1		25.3	10	10	10	10	Count Date: 3-20-09
0.88	20.5		8.12		7.0		25.5	10	10	10	10	Count Time: 0930
1.75	20.5		8.15		7.1		25.4	10	10	10	10	Count Signoff: EW
3.5	20.5		8.16		7.1		25.7	10	10	9	10	Old WQ: MEC
7	20.5		8.17		7.1		25.6	10	10	10	10	
14	20.5		8.14		7.0		25.1	10	10	10	10	
28	20.5		8.06		7.2		25.3	10	9	9	9	
Meter ID	26A		DH12		D013		EC05	—	—	—	—	
Control	20.4	8.13	7.76	8.4	7.3	24.5	25.7	10	10	10	10	Test Solution Prep: 3/21/09 QD
0.88	20.4	8.03	7.81	8.5	7.2	25.0	26.0	10	10	10	9	New WQ: MEC
1.75	20.4	7.99	7.84	8.5	7.3	25.0	25.9	10	10	10	10	Renewal Date: 3/24/09
3.5	20.4	7.92	7.86	8.6	7.3	25.0	26.3	10	10	9	10	Renewal Time: 1045
7	20.4	7.75	7.84	8.7	7.3	24.9	26.1	9	10	10	10	Renewal Signoff: EKK
14	20.4	7.44	7.79	8.9	7.1	24.7	25.8	3	3	5	6	Old WQ: MEC
28	20.4	6.97	7.81	9.6	7.4	24.6	26.2	0	0	0	0	
Meter ID	26A	DH12	DH12	D013	D014	EC05	EC01	—	—	—	—	
Control	20.4		7.90		7.2		25.2	10	10	10	10	Count Date: 3/22/09
0.88	20.4		7.92		7.6		25.7	10	10	10	9	Count Time: 1045
1.75	20.4		7.92		7.3		25.7	10	10	10	10	Count Signoff: EH
3.5	20.4		7.90		7.3		25.8	10	10	9	10	Old WQ: A12
7	20.4		7.88		7.4		25.7	6	10	10	10	
14	20.4		7.85		7.4		25.7	0	1	0	4	
28	—		—		—		—	—	—	—	—	
Meter ID	26A		pH03		D013		EC04	—	—	—	—	
Control	20.0		8.09		7.5		25.6	10	10	10	10	Termination Date: 3/23/09
0.88	20.0		8.06		7.4		26.0	10	10	10	9	Termination Time: 1315
1.75	20.0		8.06		7.4		25.7	10	10	10	10	Termination Signoff: JRE
3.5	20.0		8.07		7.4		25.9	10	10	9	10	Old WQ: Brine Shrimp
7	20.0		8.03		7.3		25.5	5	9	9	8	
14	20.0		8.04		7.4		25.6	—	0	—	2	
28	—		—		—		—	—	—	—	—	
Meter ID	26A		pH03		D013		EC05	—	—	—	—	

Appendix D

Bioassay Standard Test Conditions

SUMMARY OF TEST CONDITIONS AND TEST ACCEPTABILITY CRITERIA FOR THE MYSID (*Americamysis bahia*) ACUTE TOXICITY WATER COLUMN TEST	
1. Test type	Static non-renewal
2. Test duration	96 hours
3. Salinity	25-30 ppt ± 10 ppt
4. Temperature	20 ± 1°C
5. Light quality	Ambient Laboratory
6. Light intensity	50 –100 ft c.
7. Photoperiod	16L/8D
8. Test chamber size	400 mL beaker
9. Test solution volume	200 mL
10. Renewal of seawater	None
11. Age of test organisms	1-5 days; 24 hour range in age
12. # of organisms per test chamber	10
13. # of replicate chambers per concentration	5
14. # of organisms per concentration	50
15. Feeding regime	daily
16. Test chamber cleaning	Lab washing prior to test
17. Test chamber aeration	If needed to maintain >40% saturation
18. Elutriate preparation water	Site water or Clean sea water
19. Test concentrations	Test sites, and Lab Control
20. Dilution series	Four concentrations (10, 50, 100%) and a Lab Control.
21. Dilution water	Natural seawater/artificial seawater
22. Endpoints	% Survival
22. Sampling holding requirements	< 8 weeks
23. Sample volume required	2L
24. Test acceptability criteria	≥90% survival in the Lab Controls

APPENDIX C

CRG Marine Laboratories, Inc.
"A Center for Excellence in Analytical Chemistry and Environmental Microbiology"

April 14, 2009

Geocon Consultants Inc.
6671 Brisa Street
Livermore, CA 94550

Re:	CRG Marine Laboratories	Project ID:	GCC001-09
	Geocon Consultants Inc.	Project ID:	Caltrans-Dumbarton Bridge / E8435-06-18

ATTN: Richard Day

CRG Laboratories is pleased to provide you with the enclosed analytical data report for your Caltrans-Dumbarton Bridge / E8435-06-18 project. According to the chain-of-custody, 10 samples were received intact at CRG on 3/13/2009 . Per your instructions, the samples were analyzed for:

- Oil & Grease Using Method SM 5520 E
- Percent Solids Using Method SM 2540 B
- Total Organic Carbon Using Method SM 5310 B
- Trace Metals By ICPMS Using Method EPA 6020m
- Mercury (Hg) By CVAFS Using Method EPA 245.7m
- Aroclor PCBs By GCMS Using Method EPA 8270Cm
- Chlorinated Pesticides By GCMS Using Method EPA 8270Cm
- Organotins By GCMS Using Method Krone et al., 1989
- PCB Congeners By GCMS Using Method EPA 8270Cm
- Polynuclear Aromatic Hydrocarbons By GCMS Using Method EPA 8270Cm

The following analysis were subcontracted to other laboratories, results are included:

- Particle Size

Please don't hesitate to call if you have any questions and thank you very much for using our laboratory for your analytical needs.

Regards,
Eugene Chae

Reviewed and Approved _____

Project Sample List

Geocon Consultants Inc.

CRG Project ID: **GCC001-09**

Project Officer: Richard Day

Project Description: Caltrans-Dumbarton Bridge / E8435-06-18

CRG Sample ID#	*Client Sample ID*	*Sample Description*	*Date Sampled*	*Matrix*
83331	P-14		10-Mar-09	Sediment
83332	P-12		10-Mar-09	Sediment
83333	P-10		10-Mar-09	Sediment
83334	P-6		10-Mar-09	Sediment
83335	P-8		10-Mar-09	Sediment
83336	P-32		11-Mar-09	Sediment
83337	P-34		11-Mar-09	Sediment
83338	P-36		11-Mar-09	Sediment
83339	P-38		11-Mar-09	Sediment
83340	P-40		11-Mar-09	Sediment

CRG's QUALITY ASSURANCE PROGRAM SUMMARY

BATCH: CRG's Quality Assurance Program Document defines a batch as a group of 20 or fewer samples of similar matrix, processed together under the same conditions and with the same reagents. Quality control samples are associated with each batch and are used to assess the validity of the sample analyses. CRG typically uses batch sizes of 10-15 samples.

PROCEDURAL BLANKS: Laboratory contamination was controlled through the analysis of procedural blanks on a minimum frequency of 1 per batch. CRG's Quality Assurance Program Document requires that all procedural blanks be below 10 times the MDL and all detectable constituents in the blanks be flagged in the sample results. The Procedural Blanks are presented in the Procedural Blank section of this report.

ACCURACY: Accuracy of the project data was indicated by analysis of matrix spikes (MS/MSD), surrogate spikes, certified reference materials, positive controls, and/or laboratory control materials on a minimum frequency of 1 per batch. CRG's Quality Assurance Program Document requires that 95% of the target compounds greater than 10 times the MDL be within the specified acceptance limits. The Acceptance Ranges are presented in the Accuracy Data section of this report.

PRECISION: Precision of the project data was determined by analysis of duplicate matrix spikes, blank spikes, and/or duplicate test sample analysis on a minimum frequency of 1 per batch. CRG's Quality Assurance Program Document requires that for 95% of the compounds >10 times the MDL, the % Relative Percent Difference (%RPD) should be within the specified acceptance range. The %RPD for the duplicate test sample analysis can be significantly affected by the homogeneity of the sample matrix within the sample container itself causing additional variability in the analytical results. In these cases, the QA/QC Acceptance Limits may be exceeded. The %RPD and Acceptance Ranges are presented in the Precision Data section of this report.

TOTAL/DISSOLVED: In some instances, the results for the "Dissolved" fraction can be higher than the "Total" fraction for a particular parameter. This is typically caused by the analytical variation for each result and indicates that the target parameter is primarily in the dissolved phase.

GLOSSARY OF TERMS

Qualifier	Definition
B	Analyte was detected in the associated method blank.
E	Analyte concentration exceeds the calibration range
H	Sample received and/or analyzed past the recommended holding time.
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
M1	Recovery of the MS and/or MSD compound was out of control due to matrix interference.
M2	The MS/MSD RPD was out of control due to matrix interference.
M3	Detection of the analyte was difficult due to matrix interference.
M4	Spike or surrogate compound recovery was out of control due to matrix interference. The associated method blank spike or surrogate compound was in control and therefore the sample data was reported without further clarification.

M5	Recovery of the MS and/or MSD compound was out of control due to an unknown compound(s) in the sample that interferes with the known target compound causing an increased response.
M6	Recovery of the MS and/or MSD compound was out of control due to unknown heavy hydrocarbons detected in the sample which elevates the baseline.
ND or U	Parameter not detected at the indicated reporting limit.
NES	Not enough sample.
Q1	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration.
Q2	The sample RPD was out of control. Sample is heterogeneous and sample homogeneity could not be readily achieved using routine laboratory practices.
Q3	RPD values are not accurate and not applicable because the results for R1 and/or R2 are lower than 10 times the MDL.
Q4	Due to the sample rate of the instrument, the peak area was underestimated because the apex of the peak was missed. This random error has caused this compound to fail for the spike and/or precision. This failure does not indicate any significant problems with the analysis of this sample and the data passes CRG's QAPP requirements.
Q5	Precision failed due to one of the sample extractions having lower recoveries than the duplicate.
Q6	CRG's Quality Assurance Program Document allows for 5% of the target compounds greater than 10 times the MDL to be outside the specified acceptance limits for precision and/or accuracy. This is often due to random error and cannot be attributed to a specific issue.
Q7	Toxaphene results are based on a commercial Toxaphene mixture of unknown composition and therefore the concentrations listed in this report are estimated.
Q8	The result for the constituent is similar to what is seen with inadvertent sample contamination in the lab during preparation. Unfortunately, either the holding time has expired and/or there was no more sample to re-extract.

Qualifier Summary for GCC001-09

Chlorinated Pesticides

Sample ID	*Client Sample ID*	*Qualifier*	*Parameter*
83340-MS1	P-40	M4	2,4'-DDT
83340-MS2	P-40	M4	2,4'-DDT
83331-R1	P-14	J	4,4'-DDE
83333-R1	P-10	J	4,4'-DDE
83334-R1	P-6	J	4,4'-DDE
83340-MS1	P-40	M4	4,4'-DDT
83340-MS2	P-40	M4	4,4'-DDT
83340-MS2	P-40	M4	Endrin Ketone
83340-MS1	P-40	M4	Heptachlor
83340-MS2	P-40	M4	Heptachlor
83340-MS1	P-40	M4	Methoxychlor
83340-MS2	P-40	M4	Methoxychlor

Qualifier Summary for GCC001-09

General Chemistry

Sample ID	*Client Sample ID*	*Qualifier*	*Parameter*
83331-R1	P-14	J	Oil & Grease
83331-R2	P-14	J	Oil & Grease
83332-R1	P-12	J	Oil & Grease
83333-R1	P-10	J	Oil & Grease
83334-R1	P-6	J	Oil & Grease
83337-R1	P-34	J	Oil & Grease
83339-R1	P-38	J	Oil & Grease

Qualifier Summary for GCC001-09

Organotins

Sample ID	*Client Sample ID*	*Qualifier*	*Parameter*
83340-MS2	P-40	M4	(Tripentyltin)
83340-MS2	P-40	M4	Tetrabutyltin
83340-MS2	P-40	M4	Tributyltin

Qualifier Summary for GCC001-09

PCB Congeners

Sample ID	*Client Sample ID*	*Qualifier*	*Parameter*
83332-R1	P-12	J	PCB118
83332-R1	P-12	J	PCB138

Qualifier Summary for GCC001-09

Polynuclear Aromatic Hydrocarbons

Sample ID	*Client Sample ID*	*Qualifier*	*Parameter*
83335-R1	P-8	J	1-Methylnaphthalene
83336-R1	P-32	J	1-Methylnaphthalene
83337-R1	P-34	J	1-Methylnaphthalene
83338-R1	P-36	J	1-Methylnaphthalene
83340-R1	P-40	J	1-Methylnaphthalene
83340-R2	P-40	J	1-Methylnaphthalene
83340-R1	P-40	J	1-Methylphenanthrene
83340-R2	P-40	J	1-Methylphenanthrene
83332-R1	P-12	J	2,3,5-Trimethylnaphthalene
83333-R1	P-10	J	2,3,5-Trimethylnaphthalene
83334-R1	P-6	J	2,3,5-Trimethylnaphthalene
83335-R1	P-8	J	2,3,5-Trimethylnaphthalene
83336-R1	P-32	J	2,3,5-Trimethylnaphthalene
83337-R1	P-34	J	2,3,5-Trimethylnaphthalene
83338-R1	P-36	J	2,3,5-Trimethylnaphthalene
83339-R1	P-38	J	2,3,5-Trimethylnaphthalene
83335-R1	P-8	J	2,6-Dimethylnaphthalene
83336-R1	P-32	J	2-Methylnaphthalene
83340-R1	P-40	J	2-Methylnaphthalene
83340-R2	P-40	J	2-Methylnaphthalene
83338-R1	P-36	J	Acenaphthene
83340-R1	P-40	J	Anthracene
83340-R2	P-40	J	Anthracene
83340-R2	P-40	J,Q3	Benz[a]anthracene
83340-R2	P-40	J,Q3	Benzo[a]pyrene
83340-R1	P-40	J	Benzo[b]fluoranthene
83340-R2	P-40	J	Benzo[b]fluoranthene
83340-R2	P-40	Q3	Benzo[e]pyrene
83340-R1	P-40	J	Benzo[g,h,i]perylene
83340-R2	P-40	J	Benzo[g,h,i]perylene
83340-R2	P-40	J	Benzo[k]fluoranthene
83337-R1	P-34	J	Biphenyl
83338-R1	P-36	J	Biphenyl
83340-R1	P-40	J	Biphenyl
83340-R2	P-40	J	Biphenyl
83340-R1	P-40	J	Chrysene

Qualifier Summary for GCC001-09

Polynuclear Aromatic Hydrocarbons

Sample ID	*Client Sample ID*	*Qualifier*	*Parameter*
83340-R2	P-40	J	Chrysene
83340-R1	P-40	J	Fluoranthene
83340-R2	P-40	J,Q3	Fluoranthene
83340-R1	P-40	J	Fluorene
83340-R2	P-40	J	Fluorene
83340-R1	P-40	J	Naphthalene
83340-R2	P-40	J	Naphthalene
83340-R1	P-40	J	Pyrene
83340-R2	P-40	J,Q3	Pyrene

Qualifier Summary for GCC001-09

Trace Metals

Sample ID	*Client Sample ID*	*Qualifier*	*Parameter*
83340-R2	P-40	Q3	Mercury (Hg)

DATA REPORT

CRG Marine Laboratories, Inc.

2020 Del Amo Blvd., Suite 200, Torrance, CA 90501-1206 (310) 533-5190 FAX (310) 533-5003 crglabs@sbcglobal.net

Aroclor PCBs

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
83331-R1 P-14					**Sediment**	**Sampled: 10-Mar-09 08:55**			**Received: 13-Mar-09**	
Aroclor 1016	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1221	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1232	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1242	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1248	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1254	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1260	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
83332-R1 P-12					**Sediment**	**Sampled: 10-Mar-09 10:00**			**Received: 13-Mar-09**	
Aroclor 1016	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1221	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1232	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1242	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1248	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1254	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1260	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
83333-R1 P-10					**Sediment**	**Sampled: 10-Mar-09 11:05**			**Received: 13-Mar-09**	
Aroclor 1016	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1221	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1232	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1242	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1248	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1254	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1260	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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Aroclor PCBs

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
83334-R1 P-6					**Sediment**	**Sampled: 10-Mar-09 12:30**			**Received: 13-Mar-09**	
Aroclor 1016	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1221	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1232	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1242	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1248	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1254	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1260	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
83335-R1 P-8					**Sediment**	**Sampled: 10-Mar-09 13:20**			**Received: 13-Mar-09**	
Aroclor 1016	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1221	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1232	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1242	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1248	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1254	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1260	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
83336-R1 P-32					**Sediment**	**Sampled: 11-Mar-09 10:10**			**Received: 13-Mar-09**	
Aroclor 1016	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1221	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1232	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1242	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1248	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1254	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1260	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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Aroclor PCBs

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
83337-R1 P-34					**Sediment**	**Sampled: 11-Mar-09 10:45**			**Received: 13-Mar-09**	
Aroclor 1016	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1221	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1232	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1242	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1248	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1254	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1260	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
83338-R1 P-36					**Sediment**	**Sampled: 11-Mar-09 11:30**			**Received: 13-Mar-09**	
Aroclor 1016	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1221	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1232	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1242	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1248	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1254	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1260	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
83339-R1 P-38					**Sediment**	**Sampled: 11-Mar-09 12:15**			**Received: 13-Mar-09**	
Aroclor 1016	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1221	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1232	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1242	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1248	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1254	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1260	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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Aroclor PCBs

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
83340-R1 **P-40**					**Sediment**	**Sampled: 11-Mar-09**	**13:00**		**Received: 13-Mar-09**	
Aroclor 1016	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1221	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1232	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1242	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1248	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1254	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aroclor 1260	NA	ND	10	20	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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Chlorinated Pesticides

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
83331-R1 P-14					**Sediment**	**Sampled: 10-Mar-09 08:55**			**Received: 13-Mar-09**	
(PCB030)	NA	79			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(PCB112)	NA	99			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(PCB198)	NA	96			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(TCMX)	NA	73			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2,4'-DDD	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2,4'-DDE	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2,4'-DDT	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
4,4'-DDD	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
4,4'-DDE	NA	1.2	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	J
4,4'-DDT	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aldrin	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
BHC-alpha	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
BHC-beta	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
BHC-delta	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
BHC-gamma	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Chlordane-alpha	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Chlordane-gamma	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
cis-Nonachlor	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
DCPA (Dacthal)	NA	ND	5	10	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Dicofol	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Dieldrin	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endosulfan Sulfate	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endosulfan-I	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endosulfan-II	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endrin	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endrin Aldehyde	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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Chlorinated Pesticides

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
Endrin Ketone	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Heptachlor	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Heptachlor Epoxide	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Methoxychlor	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Mirex	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Oxychlordane	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Perthane	NA	ND	5	10	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Toxaphene	NA	ND	10	50	ng/dry g	46103	3/18/2009	4/1/2009	EPA 8270Cm	
trans-Nonachlor	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
83332-R1 P-12					**Sediment**	**Sampled: 10-Mar-09 10:00**			**Received: 13-Mar-09**	
(PCB030)	NA	77			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(PCB112)	NA	105			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(PCB198)	NA	101			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(TCMX)	NA	76			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2,4'-DDD	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2,4'-DDE	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2,4'-DDT	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
4,4'-DDD	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
4,4'-DDE	NA	5.8	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
4,4'-DDT	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aldrin	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
BHC-alpha	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
BHC-beta	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
BHC-delta	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
BHC-gamma	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Chlordane-alpha	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Chlordane-gamma	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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Chlorinated Pesticides

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
cis-Nonachlor	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
DCPA (Dacthal)	NA	ND	5	10	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Dicofol	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Dieldrin	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endosulfan Sulfate	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endosulfan-I	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endosulfan-II	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endrin	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endrin Aldehyde	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endrin Ketone	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Heptachlor	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Heptachlor Epoxide	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Methoxychlor	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Mirex	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Oxychlordane	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Perthane	NA	ND	5	10	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Toxaphene	NA	ND	10	50	ng/dry g	46103	3/18/2009	4/1/2009	EPA 8270Cm	
trans-Nonachlor	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
83333-R1 P-10					**Sediment**	**Sampled: 10-Mar-09 11:05**			**Received: 13-Mar-09**	
(PCB030)	NA	83			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(PCB112)	NA	109			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(PCB198)	NA	101			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(TCMX)	NA	75			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2,4'-DDD	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2,4'-DDE	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2,4'-DDT	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
4,4'-DDD	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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Chlorinated Pesticides

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
4,4'-DDE	NA	2.9	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	J
4,4'-DDT	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aldrin	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
BHC-alpha	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
BHC-beta	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
BHC-delta	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
BHC-gamma	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Chlordane-alpha	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Chlordane-gamma	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
cis-Nonachlor	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
DCPA (Dacthal)	NA	ND	5	10	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Dicofol	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Dieldrin	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endosulfan Sulfate	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endosulfan-I	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endosulfan-II	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endrin	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endrin Aldehyde	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endrin Ketone	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Heptachlor	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Heptachlor Epoxide	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Methoxychlor	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Mirex	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Oxychlordane	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Perthane	NA	ND	5	10	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Toxaphene	NA	ND	10	50	ng/dry g	46103	3/18/2009	4/1/2009	EPA 8270Cm	
trans-Nonachlor	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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Chlorinated Pesticides

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
83334-R1 P-6					**Sediment**	**Sampled: 10-Mar-09 12:30**			**Received: 13-Mar-09**	
(PCB030)	NA	84			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(PCB112)	NA	107			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(PCB198)	NA	102			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(TCMX)	NA	79			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2,4'-DDD	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2,4'-DDE	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2,4'-DDT	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
4,4'-DDD	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
4,4'-DDE	NA	1.4	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	J
4,4'-DDT	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aldrin	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
BHC-alpha	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
BHC-beta	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
BHC-delta	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
BHC-gamma	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Chlordane-alpha	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Chlordane-gamma	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
cis-Nonachlor	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
DCPA (Dacthal)	NA	ND	5	10	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Dicofol	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Dieldrin	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endosulfan Sulfate	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endosulfan-I	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endosulfan-II	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endrin	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endrin Aldehyde	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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Chlorinated Pesticides

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
Endrin Ketone	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Heptachlor	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Heptachlor Epoxide	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Methoxychlor	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Mirex	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Oxychlordane	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Perthane	NA	ND	5	10	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Toxaphene	NA	ND	10	50	ng/dry g	46103	3/18/2009	4/1/2009	EPA 8270Cm	
trans-Nonachlor	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
83335-R1 P-8					**Sediment**	**Sampled: 10-Mar-09 13:20**			**Received: 13-Mar-09**	
(PCB030)	NA	85			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(PCB112)	NA	103			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(PCB198)	NA	103			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(TCMX)	NA	84			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2,4'-DDD	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2,4'-DDE	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2,4'-DDT	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
4,4'-DDD	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
4,4'-DDE	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
4,4'-DDT	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aldrin	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
BHC-alpha	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
BHC-beta	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
BHC-delta	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
BHC-gamma	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Chlordane-alpha	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Chlordane-gamma	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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Chlorinated Pesticides

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
cis-Nonachlor	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
DCPA (Dacthal)	NA	ND	5	10	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Dicofol	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Dieldrin	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endosulfan Sulfate	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endosulfan-I	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endosulfan-II	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endrin	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endrin Aldehyde	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endrin Ketone	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Heptachlor	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Heptachlor Epoxide	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Methoxychlor	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Mirex	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Oxychlordane	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Perthane	NA	ND	5	10	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Toxaphene	NA	ND	10	50	ng/dry g	46103	3/18/2009	4/1/2009	EPA 8270Cm	
trans-Nonachlor	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
83336-R1 P-32					**Sediment**	**Sampled: 11-Mar-09 10:10**			**Received: 13-Mar-09**	
(PCB030)	NA	79			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(PCB112)	NA	108			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(PCB198)	NA	99			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(TCMX)	NA	73			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2,4'-DDD	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2,4'-DDE	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2,4'-DDT	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
4,4'-DDD	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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Chlorinated Pesticides

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
4,4'-DDE	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
4,4'-DDT	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aldrin	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
BHC-alpha	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
BHC-beta	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
BHC-delta	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
BHC-gamma	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Chlordane-alpha	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Chlordane-gamma	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
cis-Nonachlor	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
DCPA (Dacthal)	NA	ND	5	10	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Dicofol	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Dieldrin	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endosulfan Sulfate	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endosulfan-I	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endosulfan-II	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endrin	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endrin Aldehyde	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endrin Ketone	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Heptachlor	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Heptachlor Epoxide	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Methoxychlor	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Mirex	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Oxychlordane	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Perthane	NA	ND	5	10	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Toxaphene	NA	ND	10	50	ng/dry g	46103	3/18/2009	4/1/2009	EPA 8270Cm	
trans-Nonachlor	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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Chlorinated Pesticides

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
83337-R1 P-34					**Sediment**	**Sampled: 11-Mar-09 10:45**			**Received: 13-Mar-09**	
(PCB030)	NA	75			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(PCB112)	NA	105			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(PCB198)	NA	105			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(TCMX)	NA	70			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2,4'-DDD	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2,4'-DDE	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2,4'-DDT	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
4,4'-DDD	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
4,4'-DDE	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
4,4'-DDT	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aldrin	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
BHC-alpha	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
BHC-beta	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
BHC-delta	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
BHC-gamma	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Chlordane-alpha	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Chlordane-gamma	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
cis-Nonachlor	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
DCPA (Dacthal)	NA	ND	5	10	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Dicofol	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Dieldrin	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endosulfan Sulfate	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endosulfan-I	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endosulfan-II	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endrin	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endrin Aldehyde	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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Chlorinated Pesticides

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
Endrin Ketone	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Heptachlor	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Heptachlor Epoxide	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Methoxychlor	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Mirex	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Oxychlordane	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Perthane	NA	ND	5	10	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Toxaphene	NA	ND	10	50	ng/dry g	46103	3/18/2009	4/1/2009	EPA 8270Cm	
trans-Nonachlor	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
83338-R1 P-36					**Sediment**	**Sampled: 11-Mar-09 11:30**			**Received: 13-Mar-09**	
(PCB030)	NA	97			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(PCB112)	NA	118			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(PCB198)	NA	116			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(TCMX)	NA	83			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2,4'-DDD	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2,4'-DDE	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2,4'-DDT	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
4,4'-DDD	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
4,4'-DDE	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
4,4'-DDT	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aldrin	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
BHC-alpha	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
BHC-beta	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
BHC-delta	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
BHC-gamma	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Chlordane-alpha	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Chlordane-gamma	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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Chlorinated Pesticides

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
cis-Nonachlor	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
DCPA (Dacthal)	NA	ND	5	10	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Dicofol	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Dieldrin	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endosulfan Sulfate	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endosulfan-I	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endosulfan-II	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endrin	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endrin Aldehyde	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endrin Ketone	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Heptachlor	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Heptachlor Epoxide	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Methoxychlor	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Mirex	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Oxychlordane	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Perthane	NA	ND	5	10	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Toxaphene	NA	ND	10	50	ng/dry g	46103	3/18/2009	4/1/2009	EPA 8270Cm	
trans-Nonachlor	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
83339-R1 P-38					**Sediment**	**Sampled: 11-Mar-09 12:15**			**Received: 13-Mar-09**	
(PCB030)	NA	66			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(PCB112)	NA	96			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(PCB198)	NA	94			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(TCMX)	NA	58			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2,4'-DDD	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2,4'-DDE	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2,4'-DDT	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
4,4'-DDD	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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Chlorinated Pesticides

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
4,4'-DDE	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
4,4'-DDT	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aldrin	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
BHC-alpha	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
BHC-beta	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
BHC-delta	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
BHC-gamma	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Chlordane-alpha	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Chlordane-gamma	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
cis-Nonachlor	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
DCPA (Dacthal)	NA	ND	5	10	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Dicofol	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Dieldrin	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endosulfan Sulfate	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endosulfan-I	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endosulfan-II	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endrin	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endrin Aldehyde	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endrin Ketone	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Heptachlor	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Heptachlor Epoxide	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Methoxychlor	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Mirex	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Oxychlordane	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Perthane	NA	ND	5	10	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Toxaphene	NA	ND	10	50	ng/dry g	46103	3/18/2009	4/1/2009	EPA 8270Cm	
trans-Nonachlor	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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Chlorinated Pesticides

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
83340-R1 P-40					**Sediment**	**Sampled: 11-Mar-09 13:00**			**Received: 13-Mar-09**	
(PCB030)	NA	92			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(PCB112)	NA	111			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(PCB198)	NA	106			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(TCMX)	NA	83			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2,4'-DDD	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2,4'-DDE	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2,4'-DDT	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
4,4'-DDD	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
4,4'-DDE	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
4,4'-DDT	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Aldrin	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
BHC-alpha	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
BHC-beta	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
BHC-delta	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
BHC-gamma	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Chlordane-alpha	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Chlordane-gamma	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
cis-Nonachlor	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
DCPA (Dacthal)	NA	ND	5	10	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Dicofol	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Dieldrin	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endosulfan Sulfate	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endosulfan-I	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endosulfan-II	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endrin	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Endrin Aldehyde	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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Chlorinated Pesticides

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
Endrin Ketone	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Heptachlor	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Heptachlor Epoxide	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Methoxychlor	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Mirex	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Oxychlordane	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Perthane	NA	ND	5	10	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Toxaphene	NA	ND	10	50	ng/dry g	46103	3/18/2009	4/1/2009	EPA 8270Cm	
trans-Nonachlor	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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General Chemistry

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
83331-R1 P-14					**Sediment**	**Sampled: 10-Mar-09 08:55**			**Received: 13-Mar-09**	
Oil & Grease	NA	0.01	0.01	0.02	% Dry Weight	6214004	3/19/2009	3/19/2009	SM 5520 E	J
Percent Solids	NA	43.6	0.1	0.1	Percent	59066	3/18/2009	3/18/2009	SM 2540 B	
Total Organic Carbon	NA	1.92	0.01	0.02	% Dry Weight	6228017	3/24/2009	3/24/2009	SM 5310 B	
83332-R1 P-12					**Sediment**	**Sampled: 10-Mar-09 10:00**			**Received: 13-Mar-09**	
Oil & Grease	NA	0.01	0.01	0.02	% Dry Weight	6214004	3/19/2009	3/19/2009	SM 5520 E	J
Percent Solids	NA	56.2	0.1	0.1	Percent	59066	3/18/2009	3/18/2009	SM 2540 B	
Total Organic Carbon	NA	0.9	0.01	0.02	% Dry Weight	6228017	3/24/2009	3/24/2009	SM 5310 B	
83333-R1 P-10					**Sediment**	**Sampled: 10-Mar-09 11:05**			**Received: 13-Mar-09**	
Oil & Grease	NA	0.01	0.01	0.02	% Dry Weight	6214004	3/19/2009	3/19/2009	SM 5520 E	J
Percent Solids	NA	55.1	0.1	0.1	Percent	59066	3/18/2009	3/18/2009	SM 2540 B	
Total Organic Carbon	NA	0.94	0.01	0.02	% Dry Weight	6228017	3/24/2009	3/24/2009	SM 5310 B	
83334-R1 P-6					**Sediment**	**Sampled: 10-Mar-09 12:30**			**Received: 13-Mar-09**	
Oil & Grease	NA	0.01	0.01	0.02	% Dry Weight	6214004	3/19/2009	3/19/2009	SM 5520 E	J
Percent Solids	NA	52.4	0.1	0.1	Percent	59066	3/18/2009	3/18/2009	SM 2540 B	
Total Organic Carbon	NA	1.33	0.01	0.02	% Dry Weight	6228017	3/24/2009	3/24/2009	SM 5310 B	
83335-R1 P-8					**Sediment**	**Sampled: 10-Mar-09 13:20**			**Received: 13-Mar-09**	
Oil & Grease	NA	ND	0.01	0.02	% Dry Weight	6214004	3/19/2009	3/19/2009	SM 5520 E	
Percent Solids	NA	60.2	0.1	0.1	Percent	59066	3/18/2009	3/18/2009	SM 2540 B	
Total Organic Carbon	NA	0.59	0.01	0.02	% Dry Weight	6228017	3/24/2009	3/24/2009	SM 5310 B	
83336-R1 P-32					**Sediment**	**Sampled: 11-Mar-09 10:10**			**Received: 13-Mar-09**	
Oil & Grease	NA	ND	0.01	0.02	% Dry Weight	6214004	3/19/2009	3/19/2009	SM 5520 E	

CRG Marine Laboratories, Inc.

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General Chemistry

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
Percent Solids	NA	52.1	0.1	0.1	Percent	59066	3/18/2009	3/18/2009	SM 2540 B	
Total Organic Carbon	NA	1.43	0.01	0.02	% Dry Weight	6228017	3/24/2009	3/24/2009	SM 5310 B	
83337-R1 P-34					**Sediment**	**Sampled: 11-Mar-09 10:45**			**Received: 13-Mar-09**	
Oil & Grease	NA	0.01	0.01	0.02	% Dry Weight	6214004	3/19/2009	3/19/2009	SM 5520 E	J
Percent Solids	NA	55.8	0.1	0.1	Percent	59066	3/18/2009	3/18/2009	SM 2540 B	
Total Organic Carbon	NA	1.38	0.01	0.02	% Dry Weight	6228017	3/24/2009	3/24/2009	SM 5310 B	
83338-R1 P-36					**Sediment**	**Sampled: 11-Mar-09 11:30**			**Received: 13-Mar-09**	
Oil & Grease	NA	ND	0.01	0.02	% Dry Weight	6214004	3/19/2009	3/19/2009	SM 5520 E	
Percent Solids	NA	60.9	0.1	0.1	Percent	59066	3/18/2009	3/18/2009	SM 2540 B	
Total Organic Carbon	NA	1.22	0.01	0.02	% Dry Weight	6228017	3/24/2009	3/24/2009	SM 5310 B	
83339-R1 P-38					**Sediment**	**Sampled: 11-Mar-09 12:15**			**Received: 13-Mar-09**	
Oil & Grease	NA	0.01	0.01	0.02	% Dry Weight	6214004	3/19/2009	3/19/2009	SM 5520 E	J
Percent Solids	NA	63.7	0.1	0.1	Percent	59066	3/18/2009	3/18/2009	SM 2540 B	
Total Organic Carbon	NA	1.08	0.01	0.02	% Dry Weight	6228017	3/24/2009	3/24/2009	SM 5310 B	
83340-R1 P-40					**Sediment**	**Sampled: 11-Mar-09 13:00**			**Received: 13-Mar-09**	
Oil & Grease	NA	ND	0.01	0.02	% Dry Weight	6214004	3/19/2009	3/19/2009	SM 5520 E	
Percent Solids	NA	55.8	0.1	0.1	Percent	59066	3/18/2009	3/18/2009	SM 2540 B	
Total Organic Carbon	NA	1.1	0.01	0.02	% Dry Weight	6228017	3/24/2009	3/24/2009	SM 5310 B	

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Organotins

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
83331-R1 P-14					**Sediment**	**Sampled: 10-Mar-09 08:55**			**Received: 13-Mar-09**	
(Tripentyltin)	NA	90			% Recovery	46155	3/30/2009	4/2/2009	Krone et al., 1989	
Dibutyltin	NA	ND	1	3	ng/dry g	46155	3/30/2009	4/2/2009	Krone et al., 1989	
Monobutyltin	NA	ND	1	3	ng/dry g	46155	3/30/2009	4/2/2009	Krone et al., 1989	
Tetrabutyltin	NA	ND	1	3	ng/dry g	46155	3/30/2009	4/2/2009	Krone et al., 1989	
Tributyltin	NA	ND	1	3	ng/dry g	46155	3/30/2009	4/2/2009	Krone et al., 1989	
83332-R1 P-12					**Sediment**	**Sampled: 10-Mar-09 10:00**			**Received: 13-Mar-09**	
(Tripentyltin)	NA	92			% Recovery	46155	3/30/2009	4/2/2009	Krone et al., 1989	
Dibutyltin	NA	ND	1	3	ng/dry g	46155	3/30/2009	4/2/2009	Krone et al., 1989	
Monobutyltin	NA	ND	1	3	ng/dry g	46155	3/30/2009	4/2/2009	Krone et al., 1989	
Tetrabutyltin	NA	ND	1	3	ng/dry g	46155	3/30/2009	4/2/2009	Krone et al., 1989	
Tributyltin	NA	ND	1	3	ng/dry g	46155	3/30/2009	4/2/2009	Krone et al., 1989	
83333-R1 P-10					**Sediment**	**Sampled: 10-Mar-09 11:05**			**Received: 13-Mar-09**	
(Tripentyltin)	NA	90			% Recovery	46155	3/30/2009	4/2/2009	Krone et al., 1989	
Dibutyltin	NA	ND	1	3	ng/dry g	46155	3/30/2009	4/2/2009	Krone et al., 1989	
Monobutyltin	NA	ND	1	3	ng/dry g	46155	3/30/2009	4/2/2009	Krone et al., 1989	
Tetrabutyltin	NA	ND	1	3	ng/dry g	46155	3/30/2009	4/2/2009	Krone et al., 1989	
Tributyltin	NA	ND	1	3	ng/dry g	46155	3/30/2009	4/2/2009	Krone et al., 1989	
83334-R1 P-6					**Sediment**	**Sampled: 10-Mar-09 12:30**			**Received: 13-Mar-09**	
(Tripentyltin)	NA	94			% Recovery	46155	3/30/2009	4/2/2009	Krone et al., 1989	
Dibutyltin	NA	ND	1	3	ng/dry g	46155	3/30/2009	4/2/2009	Krone et al., 1989	
Monobutyltin	NA	ND	1	3	ng/dry g	46155	3/30/2009	4/2/2009	Krone et al., 1989	
Tetrabutyltin	NA	ND	1	3	ng/dry g	46155	3/30/2009	4/2/2009	Krone et al., 1989	
Tributyltin	NA	ND	1	3	ng/dry g	46155	3/30/2009	4/2/2009	Krone et al., 1989	

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Organotins

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
83335-R1 P-8					**Sediment**	**Sampled: 10-Mar-09 13:20**			**Received: 13-Mar-09**	
(Tripentyltin)	NA	96			% Recovery	46155	3/30/2009	4/2/2009	Krone et al., 1989	
Dibutyltin	NA	ND	1	3	ng/dry g	46155	3/30/2009	4/2/2009	Krone et al., 1989	
Monobutyltin	NA	ND	1	3	ng/dry g	46155	3/30/2009	4/2/2009	Krone et al., 1989	
Tetrabutyltin	NA	ND	1	3	ng/dry g	46155	3/30/2009	4/2/2009	Krone et al., 1989	
Tributyltin	NA	ND	1	3	ng/dry g	46155	3/30/2009	4/2/2009	Krone et al., 1989	
83336-R1 P-32					**Sediment**	**Sampled: 11-Mar-09 10:10**			**Received: 13-Mar-09**	
(Tripentyltin)	NA	92			% Recovery	46155	3/30/2009	4/2/2009	Krone et al., 1989	
Dibutyltin	NA	ND	1	3	ng/dry g	46155	3/30/2009	4/2/2009	Krone et al., 1989	
Monobutyltin	NA	ND	1	3	ng/dry g	46155	3/30/2009	4/2/2009	Krone et al., 1989	
Tetrabutyltin	NA	ND	1	3	ng/dry g	46155	3/30/2009	4/2/2009	Krone et al., 1989	
Tributyltin	NA	ND	1	3	ng/dry g	46155	3/30/2009	4/2/2009	Krone et al., 1989	
83337-R1 P-34					**Sediment**	**Sampled: 11-Mar-09 10:45**			**Received: 13-Mar-09**	
(Tripentyltin)	NA	86			% Recovery	46155	3/30/2009	4/2/2009	Krone et al., 1989	
Dibutyltin	NA	ND	1	3	ng/dry g	46155	3/30/2009	4/2/2009	Krone et al., 1989	
Monobutyltin	NA	ND	1	3	ng/dry g	46155	3/30/2009	4/2/2009	Krone et al., 1989	
Tetrabutyltin	NA	ND	1	3	ng/dry g	46155	3/30/2009	4/2/2009	Krone et al., 1989	
Tributyltin	NA	ND	1	3	ng/dry g	46155	3/30/2009	4/2/2009	Krone et al., 1989	
83338-R1 P-36					**Sediment**	**Sampled: 11-Mar-09 11:30**			**Received: 13-Mar-09**	
(Tripentyltin)	NA	93			% Recovery	46155	3/30/2009	4/2/2009	Krone et al., 1989	
Dibutyltin	NA	ND	1	3	ng/dry g	46155	3/30/2009	4/2/2009	Krone et al., 1989	
Monobutyltin	NA	ND	1	3	ng/dry g	46155	3/30/2009	4/2/2009	Krone et al., 1989	
Tetrabutyltin	NA	ND	1	3	ng/dry g	46155	3/30/2009	4/2/2009	Krone et al., 1989	
Tributyltin	NA	ND	1	3	ng/dry g	46155	3/30/2009	4/2/2009	Krone et al., 1989	

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Organotins

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
83339-R1 P-38					**Sediment**	**Sampled: 11-Mar-09 12:15**			**Received: 13-Mar-09**	
(Tripentyltin)	NA	87			% Recovery	46155	3/30/2009	4/2/2009	Krone et al., 1989	
Dibutyltin	NA	ND	1	3	ng/dry g	46155	3/30/2009	4/2/2009	Krone et al., 1989	
Monobutyltin	NA	ND	1	3	ng/dry g	46155	3/30/2009	4/2/2009	Krone et al., 1989	
Tetrabutyltin	NA	ND	1	3	ng/dry g	46155	3/30/2009	4/2/2009	Krone et al., 1989	
Tributyltin	NA	ND	1	3	ng/dry g	46155	3/30/2009	4/2/2009	Krone et al., 1989	
83340-R1 P-40					**Sediment**	**Sampled: 11-Mar-09 13:00**			**Received: 13-Mar-09**	
(Tripentyltin)	NA	95			% Recovery	46155	3/30/2009	4/2/2009	Krone et al., 1989	
Dibutyltin	NA	ND	1	3	ng/dry g	46155	3/30/2009	4/2/2009	Krone et al., 1989	
Monobutyltin	NA	ND	1	3	ng/dry g	46155	3/30/2009	4/2/2009	Krone et al., 1989	
Tetrabutyltin	NA	ND	1	3	ng/dry g	46155	3/30/2009	4/2/2009	Krone et al., 1989	
Tributyltin	NA	ND	1	3	ng/dry g	46155	3/30/2009	4/2/2009	Krone et al., 1989	

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PCB Congeners

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
83331-R1 P-14					**Sediment**	**Sampled: 10-Mar-09 08:55**			**Received: 13-Mar-09**	
PCB003	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB008	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB018	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB028	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB031	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB033	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB037	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB044	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB049	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB052	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB056/060	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB066	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB070	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB074	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB077	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB081	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB087	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB095	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB097	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB099	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB101	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB105	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB110	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB114	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB118	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB119	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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PCB Congeners

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
PCB123	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB126	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB128	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB138	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB141	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB149	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB151	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB153	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB156	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB157	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB158	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB167	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB168+132	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB169	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB170	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB174	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB177	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB180	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB183	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB187	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB189	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB194	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB195	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB200	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB201	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB203	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB206	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB209	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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PCB Congeners

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
83332-R1 P-12					**Sediment**	**Sampled: 10-Mar-09 10:00**			**Received: 13-Mar-09**	
PCB003	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB008	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB018	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB028	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB031	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB033	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB037	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB044	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB049	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB052	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB056/060	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB066	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB070	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB074	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB077	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB081	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB087	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB095	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB097	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB099	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB101	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB105	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB110	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB114	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB118	NA	1.9	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	J
PCB119	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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PCB Congeners

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
PCB123	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB126	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB128	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB138	NA	2.3	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	J
PCB141	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB149	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB151	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB153	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB156	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB157	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB158	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB167	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB168+132	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB169	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB170	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB174	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB177	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB180	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB183	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB187	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB189	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB194	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB195	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB200	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB201	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB203	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB206	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB209	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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PCB Congeners

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
83333-R1 P-10					**Sediment**	**Sampled: 10-Mar-09 11:05**			**Received: 13-Mar-09**	
PCB003	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB008	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB018	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB028	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB031	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB033	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB037	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB044	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB049	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB052	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB056/060	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB066	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB070	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB074	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB077	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB081	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB087	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB095	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB097	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB099	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB101	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB105	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB110	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB114	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB118	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB119	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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PCB Congeners

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
PCB123	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB126	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB128	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB138	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB141	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB149	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB151	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB153	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB156	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB157	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB158	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB167	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB168+132	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB169	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB170	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB174	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB177	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB180	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB183	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB187	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB189	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB194	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB195	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB200	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB201	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB203	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB206	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB209	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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PCB Congeners

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
83334-R1 P-6					**Sediment**	**Sampled: 10-Mar-09 12:30**			**Received: 13-Mar-09**	
PCB003	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB008	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB018	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB028	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB031	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB033	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB037	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB044	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB049	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB052	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB056/060	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB066	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB070	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB074	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB077	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB081	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB087	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB095	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB097	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB099	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB101	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB105	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB110	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB114	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB118	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB119	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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PCB Congeners

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
PCB123	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB126	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB128	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB138	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB141	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB149	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB151	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB153	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB156	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB157	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB158	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB167	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB168+132	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB169	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB170	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB174	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB177	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB180	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB183	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB187	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB189	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB194	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB195	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB200	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB201	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB203	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB206	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB209	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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PCB Congeners

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
83335-R1 P-8					**Sediment**	**Sampled: 10-Mar-09 13:20**			**Received: 13-Mar-09**	
PCB003	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB008	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB018	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB028	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB031	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB033	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB037	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB044	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB049	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB052	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB056/060	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB066	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB070	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB074	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB077	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB081	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB087	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB095	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB097	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB099	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB101	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB105	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB110	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB114	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB118	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB119	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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PCB Congeners

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
PCB123	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB126	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB128	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB138	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB141	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB149	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB151	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB153	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB156	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB157	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB158	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB167	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB168+132	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB169	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB170	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB174	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB177	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB180	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB183	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB187	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB189	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB194	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB195	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB200	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB201	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB203	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB206	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB209	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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PCB Congeners

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
83336-R1 P-32					**Sediment**	**Sampled: 11-Mar-09 10:10**			**Received: 13-Mar-09**	
PCB003	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB008	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB018	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB028	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB031	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB033	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB037	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB044	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB049	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB052	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB056/060	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB066	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB070	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB074	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB077	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB081	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB087	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB095	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB097	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB099	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB101	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB105	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB110	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB114	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB118	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB119	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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PCB Congeners

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
PCB123	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB126	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB128	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB138	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB141	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB149	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB151	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB153	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB156	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB157	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB158	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB167	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB168+132	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB169	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB170	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB174	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB177	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB180	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB183	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB187	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB189	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB194	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB195	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB200	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB201	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB203	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB206	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB209	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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PCB Congeners

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
83337-R1 P-34					**Sediment**	**Sampled: 11-Mar-09 10:45**			**Received: 13-Mar-09**	
PCB003	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB008	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB018	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB028	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB031	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB033	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB037	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB044	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB049	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB052	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB056/060	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB066	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB070	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB074	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB077	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB081	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB087	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB095	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB097	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB099	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB101	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB105	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB110	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB114	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB118	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB119	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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PCB Congeners

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
PCB123	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB126	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB128	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB138	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB141	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB149	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB151	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB153	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB156	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB157	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB158	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB167	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB168+132	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB169	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB170	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB174	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB177	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB180	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB183	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB187	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB189	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB194	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB195	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB200	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB201	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB203	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB206	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB209	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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PCB Congeners

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
83338-R1 P-36					**Sediment**	**Sampled: 11-Mar-09 11:30**			**Received: 13-Mar-09**	
PCB003	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB008	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB018	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB028	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB031	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB033	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB037	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB044	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB049	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB052	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB056/060	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB066	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB070	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB074	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB077	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB081	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB087	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB095	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB097	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB099	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB101	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB105	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB110	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB114	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB118	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB119	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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PCB Congeners

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
PCB123	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB126	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB128	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB138	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB141	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB149	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB151	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB153	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB156	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB157	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB158	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB167	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB168+132	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB169	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB170	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB174	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB177	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB180	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB183	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB187	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB189	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB194	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB195	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB200	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB201	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB203	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB206	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB209	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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PCB Congeners

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
83339-R1 P-38					**Sediment**	**Sampled: 11-Mar-09 12:15**			**Received: 13-Mar-09**	
PCB003	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB008	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB018	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB028	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB031	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB033	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB037	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB044	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB049	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB052	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB056/060	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB066	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB070	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB074	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB077	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB081	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB087	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB095	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB097	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB099	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB101	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB105	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB110	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB114	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB118	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB119	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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PCB Congeners

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
PCB123	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB126	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB128	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB138	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB141	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB149	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB151	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB153	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB156	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB157	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB158	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB167	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB168+132	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB169	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB170	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB174	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB177	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB180	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB183	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB187	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB189	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB194	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB195	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB200	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB201	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB203	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB206	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB209	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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PCB Congeners

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
83340-R1 P-40					**Sediment**	**Sampled: 11-Mar-09 13:00**			**Received: 13-Mar-09**	
PCB003	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB008	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB018	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB028	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB031	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB033	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB037	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB044	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB049	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB052	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB056/060	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB066	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB070	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB074	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB077	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB081	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB087	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB095	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB097	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB099	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB101	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB105	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB110	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB114	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB118	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB119	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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PCB Congeners

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
PCB123	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB126	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB128	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB138	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB141	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB149	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB151	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB153	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB156	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB157	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB158	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB167	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB168+132	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB169	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB170	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB174	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB177	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB180	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB183	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB187	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB189	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB194	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB195	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB200	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB201	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB203	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB206	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
PCB209	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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Polynuclear Aromatic Hydrocarbons

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
83331-R1 P-14					**Sediment**	**Sampled: 10-Mar-09 08:55**			**Received: 13-Mar-09**	
(d10-Acenaphthene)	NA	83			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(d10-Phenanthrene)	NA	96			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(d12-Chrysene)	NA	79			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(d12-Perylene)	NA	97			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(d8-Naphthalene)	NA	64			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
1-Methylnaphthalene	NA	9.1	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
1-Methylphenanthrene	NA	61.9	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2,3,5-Trimethylnaphthalene	NA	5.5	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2,6-Dimethylnaphthalene	NA	20.3	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2-Methylnaphthalene	NA	11.4	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Acenaphthene	NA	32.2	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Acenaphthylene	NA	45	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Anthracene	NA	155.5	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benz[a]anthracene	NA	368.1	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[a]pyrene	NA	692.3	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[b]fluoranthene	NA	398.7	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[e]pyrene	NA	380.8	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[g,h,i]perylene	NA	692.9	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[k]fluoranthene	NA	210.5	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Biphenyl	NA	11.4	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Chrysene	NA	418.9	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Dibenz[a,h]anthracene	NA	99.9	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Dibenzothiophene	NA	27.8	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Fluoranthene	NA	1176.3	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Fluorene	NA	27.8	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Indeno[1,2,3-c,d]pyrene	NA	628	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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Polynuclear Aromatic Hydrocarbons

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
Naphthalene	NA	35.3	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Perylene	NA	176.4	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Phenanthrene	NA	431.8	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Pyrene	NA	1543	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
83332-R1 P-12					**Sediment**	**Sampled: 10-Mar-09 10:00**			**Received: 13-Mar-09**	
(d10-Acenaphthene)	NA	79			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(d10-Phenanthrene)	NA	93			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(d12-Chrysene)	NA	80			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(d12-Perylene)	NA	97			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(d8-Naphthalene)	NA	64			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
1-Methylnaphthalene	NA	6.5	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
1-Methylphenanthrene	NA	22.3	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2,3,5-Trimethylnaphthalene	NA	2.2	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	J
2,6-Dimethylnaphthalene	NA	8.2	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2-Methylnaphthalene	NA	7.9	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Acenaphthene	NA	19.2	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Acenaphthylene	NA	29.2	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Anthracene	NA	94.3	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benz[a]anthracene	NA	277.4	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[a]pyrene	NA	540.7	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[b]fluoranthene	NA	323.5	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[e]pyrene	NA	298.1	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[g,h,i]perylene	NA	599.3	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[k]fluoranthene	NA	170.6	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Biphenyl	NA	9.4	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Chrysene	NA	306.7	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Dibenz[a,h]anthracene	NA	84.6	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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Polynuclear Aromatic Hydrocarbons

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
Dibenzothiophene	NA	21.7	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Fluoranthene	NA	725.3	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Fluorene	NA	21	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Indeno[1,2,3-c,d]pyrene	NA	547	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Naphthalene	NA	30.2	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Perylene	NA	133.3	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Phenanthrene	NA	306.8	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Pyrene	NA	894.4	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
83333-R1 P-10					**Sediment**	**Sampled: 10-Mar-09 11:05**			**Received: 13-Mar-09**	
(d10-Acenaphthene)	NA	72			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(d10-Phenanthrene)	NA	85			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(d12-Chrysene)	NA	88			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(d12-Perylene)	NA	90			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(d8-Naphthalene)	NA	58			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
1-Methylnaphthalene	NA	6.2	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
1-Methylphenanthrene	NA	13.5	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2,3,5-Trimethylnaphthalene	NA	2.2	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	J
2,6-Dimethylnaphthalene	NA	7	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2-Methylnaphthalene	NA	8.6	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Acenaphthene	NA	14.9	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Acenaphthylene	NA	24.5	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Anthracene	NA	51.1	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benz[a]anthracene	NA	204.7	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[a]pyrene	NA	469.9	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[b]fluoranthene	NA	311.6	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[e]pyrene	NA	273.9	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[g,h,i]perylene	NA	596.3	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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Polynuclear Aromatic Hydrocarbons

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
Benzo[k]fluoranthene	NA	154.1	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Biphenyl	NA	9	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Chrysene	NA	233.8	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Dibenz[a,h]anthracene	NA	68.2	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Dibenzothiophene	NA	18.3	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Fluoranthene	NA	484.3	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Fluorene	NA	14.2	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Indeno[1,2,3-c,d]pyrene	NA	513.4	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Naphthalene	NA	27.7	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Perylene	NA	129.2	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Phenanthrene	NA	191.3	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Pyrene	NA	617.5	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
83334-R1 P-6					**Sediment**	**Sampled: 10-Mar-09 12:30**			**Received: 13-Mar-09**	
(d10-Acenaphthene)	NA	75			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(d10-Phenanthrene)	NA	90			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(d12-Chrysene)	NA	86			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(d12-Perylene)	NA	93			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(d8-Naphthalene)	NA	57			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
1-Methylnaphthalene	NA	6	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
1-Methylphenanthrene	NA	20.1	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2,3,5-Trimethylnaphthalene	NA	1.8	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	J
2,6-Dimethylnaphthalene	NA	6.9	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2-Methylnaphthalene	NA	9.5	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Acenaphthene	NA	11.1	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Acenaphthylene	NA	30.2	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Anthracene	NA	61.7	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benz[a]anthracene	NA	199.3	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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Polynuclear Aromatic Hydrocarbons

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
Benzo[a]pyrene	NA	518.3	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[b]fluoranthene	NA	323.3	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[e]pyrene	NA	301.3	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[g,h,i]perylene	NA	666.4	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[k]fluoranthene	NA	155	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Biphenyl	NA	9.5	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Chrysene	NA	233.3	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Dibenz[a,h]anthracene	NA	70	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Dibenzothiophene	NA	17.1	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Fluoranthene	NA	509.1	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Fluorene	NA	15	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Indeno[1,2,3-c,d]pyrene	NA	581.1	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Naphthalene	NA	29.3	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Perylene	NA	122.8	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Phenanthrene	NA	189.3	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Pyrene	NA	684.5	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
83335-R1 P-8					**Sediment**	**Sampled: 10-Mar-09 13:20**			**Received: 13-Mar-09**	
(d10-Acenaphthene)	NA	85			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(d10-Phenanthrene)	NA	90			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(d12-Chrysene)	NA	80			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(d12-Perylene)	NA	96			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(d8-Naphthalene)	NA	71			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
1-Methylnaphthalene	NA	3.7	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	J
1-Methylphenanthrene	NA	14.1	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2,3,5-Trimethylnaphthalene	NA	1.3	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	J
2,6-Dimethylnaphthalene	NA	4	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	J
2-Methylnaphthalene	NA	5.7	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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Polynuclear Aromatic Hydrocarbons

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
Acenaphthene	NA	7.4	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Acenaphthylene	NA	22.9	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Anthracene	NA	37.1	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benz[a]anthracene	NA	129.2	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[a]pyrene	NA	342.2	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[b]fluoranthene	NA	220.6	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[e]pyrene	NA	186.5	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[g,h,i]perylene	NA	459.4	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[k]fluoranthene	NA	108	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Biphenyl	NA	6.2	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Chrysene	NA	149.6	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Dibenz[a,h]anthracene	NA	46.1	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Dibenzothiophene	NA	10.5	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Fluoranthene	NA	361.1	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Fluorene	NA	9.4	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Indeno[1,2,3-c,d]pyrene	NA	399	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Naphthalene	NA	21	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Perylene	NA	89.3	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Phenanthrene	NA	130.2	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Pyrene	NA	483.5	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
83336-R1 P-32					**Sediment**	**Sampled: 11-Mar-09 10:10**			**Received: 13-Mar-09**	
(d10-Acenaphthene)	NA	69			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(d10-Phenanthrene)	NA	82			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(d12-Chrysene)	NA	82			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(d12-Perylene)	NA	88			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(d8-Naphthalene)	NA	52			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
1-Methylnaphthalene	NA	3.3	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	J

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Polynuclear Aromatic Hydrocarbons

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
1-Methylphenanthrene	NA	12.2	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2,3,5-Trimethylnaphthalene	NA	1.3	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	J
2,6-Dimethylnaphthalene	NA	5.9	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2-Methylnaphthalene	NA	4.7	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	J
Acenaphthene	NA	5.9	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Acenaphthylene	NA	12.3	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Anthracene	NA	32.1	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benz[a]anthracene	NA	97.8	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[a]pyrene	NA	176.9	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[b]fluoranthene	NA	120.2	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[e]pyrene	NA	111.4	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[g,h,i]perylene	NA	230	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[k]fluoranthene	NA	64.6	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Biphenyl	NA	5	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Chrysene	NA	115.2	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Dibenz[a,h]anthracene	NA	34.6	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Dibenzothiophene	NA	13.9	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Fluoranthene	NA	231.8	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Fluorene	NA	7.3	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Indeno[1,2,3-c,d]pyrene	NA	203.1	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Naphthalene	NA	11	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Perylene	NA	61.8	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Phenanthrene	NA	92.2	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Pyrene	NA	300.2	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
83337-R1 P-34					**Sediment**	**Sampled: 11-Mar-09 10:45**			**Received: 13-Mar-09**	
(d10-Acenaphthene)	NA	77			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(d10-Phenanthrene)	NA	88			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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Polynuclear Aromatic Hydrocarbons

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
(d12-Chrysene)	NA	90			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(d12-Perylene)	NA	95			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(d8-Naphthalene)	NA	65			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
1-Methylnaphthalene	NA	4.2	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	J
1-Methylphenanthrene	NA	37.6	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2,3,5-Trimethylnaphthalene	NA	1.6	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	J
2,6-Dimethylnaphthalene	NA	6.2	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2-Methylnaphthalene	NA	6.8	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Acenaphthene	NA	19.4	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Acenaphthylene	NA	22.4	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Anthracene	NA	113.2	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benz[a]anthracene	NA	234.9	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[a]pyrene	NA	288	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[b]fluoranthene	NA	148.2	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[e]pyrene	NA	155	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[g,h,i]perylene	NA	201	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[k]fluoranthene	NA	111.1	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Biphenyl	NA	4.4	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	J
Chrysene	NA	231.9	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Dibenz[a,h]anthracene	NA	51.1	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Dibenzothiophene	NA	15.9	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Fluoranthene	NA	472.1	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Fluorene	NA	24	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Indeno[1,2,3-c,d]pyrene	NA	195.8	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Naphthalene	NA	13.2	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Perylene	NA	67.7	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Phenanthrene	NA	279.7	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Pyrene	NA	636.8	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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Polynuclear Aromatic Hydrocarbons

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
83338-R1 P-36					**Sediment**	**Sampled: 11-Mar-09 11:30**			**Received: 13-Mar-09**	
(d10-Acenaphthene)	NA	89			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(d10-Phenanthrene)	NA	101			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(d12-Chrysene)	NA	102			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(d12-Perylene)	NA	111			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(d8-Naphthalene)	NA	72			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
1-Methylnaphthalene	NA	2.9	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	J
1-Methylphenanthrene	NA	6.7	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2,3,5-Trimethylnaphthalene	NA	1.9	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	J
2,6-Dimethylnaphthalene	NA	5.3	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2-Methylnaphthalene	NA	5.5	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Acenaphthene	NA	4.1	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	J
Acenaphthylene	NA	5.6	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Anthracene	NA	14.6	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benz[a]anthracene	NA	45.7	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[a]pyrene	NA	90.7	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[b]fluoranthene	NA	58.7	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[e]pyrene	NA	58.4	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[g,h,i]perylene	NA	105.7	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[k]fluoranthene	NA	28.6	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Biphenyl	NA	3.7	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	J
Chrysene	NA	56.3	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Dibenz[a,h]anthracene	NA	14.1	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Dibenzothiophene	NA	6.6	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Fluoranthene	NA	118	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Fluorene	NA	6.1	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Indeno[1,2,3-c,d]pyrene	NA	97.6	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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Polynuclear Aromatic Hydrocarbons

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
Naphthalene	NA	9.8	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Perylene	NA	63.5	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Phenanthrene	NA	53.2	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Pyrene	NA	163.4	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
83339-R1 P-38					**Sediment**	**Sampled: 11-Mar-09 12:15**			**Received: 13-Mar-09**	
(d10-Acenaphthene)	NA	66			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(d10-Phenanthrene)	NA	82			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(d12-Chrysene)	NA	80			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(d12-Perylene)	NA	89			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(d8-Naphthalene)	NA	52			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
1-Methylnaphthalene	NA	8.5	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
1-Methylphenanthrene	NA	43.1	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2,3,5-Trimethylnaphthalene	NA	3.9	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	J
2,6-Dimethylnaphthalene	NA	7.9	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2-Methylnaphthalene	NA	9.5	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Acenaphthene	NA	25	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Acenaphthylene	NA	45.1	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Anthracene	NA	120.9	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benz[a]anthracene	NA	451.9	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[a]pyrene	NA	859.6	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[b]fluoranthene	NA	506.7	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[e]pyrene	NA	513.2	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[g,h,i]perylene	NA	983.4	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[k]fluoranthene	NA	255.5	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Biphenyl	NA	9.2	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Chrysene	NA	507.2	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Dibenz[a,h]anthracene	NA	121	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	

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Polynuclear Aromatic Hydrocarbons

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
Dibenzothiophene	NA	30.8	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Fluoranthene	NA	1234.4	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Fluorene	NA	30.3	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Indeno[1,2,3-c,d]pyrene	NA	883.4	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Naphthalene	NA	32.9	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Perylene	NA	232	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Phenanthrene	NA	441.3	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Pyrene	NA	1671.5	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
83340-R1 P-40					**Sediment**	**Sampled: 11-Mar-09 13:00**			**Received: 13-Mar-09**	
(d10-Acenaphthene)	NA	88			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(d10-Phenanthrene)	NA	97			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(d12-Chrysene)	NA	100			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(d12-Perylene)	NA	105			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
(d8-Naphthalene)	NA	71			% Recovery	46103	3/18/2009	3/24/2009	EPA 8270Cm	
1-Methylnaphthalene	NA	2.2	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	J
1-Methylphenanthrene	NA	3.6	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	J
2,3,5-Trimethylnaphthalene	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2,6-Dimethylnaphthalene	NA	5.7	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
2-Methylnaphthalene	NA	3.8	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	J
Acenaphthene	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Acenaphthylene	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Anthracene	NA	1.1	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	J
Benz[a]anthracene	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[a]pyrene	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[b]fluoranthene	NA	4.6	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	J
Benzo[e]pyrene	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Benzo[g,h,i]perylene	NA	3.6	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	J

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Polynuclear Aromatic Hydrocarbons

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
Benzo[k]fluoranthene	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Biphenyl	NA	3.1	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	J
Chrysene	NA	3.4	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	J
Dibenz[a,h]anthracene	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Dibenzothiophene	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Fluoranthene	NA	2.6	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	J
Fluorene	NA	3.5	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	J
Indeno[1,2,3-c,d]pyrene	NA	ND	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Naphthalene	NA	2.8	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	J
Perylene	NA	49.3	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Phenanthrene	NA	8.6	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	
Pyrene	NA	3.1	1	5	ng/dry g	46103	3/18/2009	3/24/2009	EPA 8270Cm	J

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Trace Metals

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
83331-R1 P-14					**Sediment**	**Sampled: 10-Mar-09 08:55**			**Received: 13-Mar-09**	
Aluminum (Al)	NA	21720	1	5	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Antimony (Sb)	NA	0.237	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Arsenic (As)	NA	9.318	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Barium (Ba)	NA	75.64	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Beryllium (Be)	NA	0.509	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Cadmium (Cd)	NA	0.186	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Chromium (Cr)	NA	83.55	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Cobalt (Co)	NA	15.28	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Copper (Cu)	NA	35.12	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Iron (Fe)	NA	33380	1	5	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Lead (Pb)	NA	23	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Manganese (Mn)	NA	514	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Mercury (Hg)	NA	0.25	0.01	0.02	µg/dry g	5094	3/23/2009	3/26/2009	EPA 245.7m	
Molybdenum (Mo)	NA	0.483	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Nickel (Ni)	NA	75.16	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Selenium (Se)	NA	0.44	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Silver (Ag)	NA	0.173	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Strontium (Sr)	NA	133.9	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Thallium (Tl)	NA	0.127	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Tin (Sn)	NA	2.331	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Titanium (Ti)	NA	736.7	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Vanadium (V)	NA	67.24	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Zinc (Zn)	NA	98.86	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
83332-R1 P-12					**Sediment**	**Sampled: 10-Mar-09 10:00**			**Received: 13-Mar-09**	
Aluminum (Al)	NA	19550	1	5	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	

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Trace Metals

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
Antimony (Sb)	NA	0.24	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Arsenic (As)	NA	6.932	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Barium (Ba)	NA	78.24	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Beryllium (Be)	NA	0.448	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Cadmium (Cd)	NA	0.269	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Chromium (Cr)	NA	74.67	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Cobalt (Co)	NA	13.29	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Copper (Cu)	NA	33.58	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Iron (Fe)	NA	28350	1	5	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Lead (Pb)	NA	25.9	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Manganese (Mn)	NA	390.4	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Mercury (Hg)	NA	0.23	0.01	0.02	µg/dry g	5094	3/23/2009	3/26/2009	EPA 245.7m	
Molybdenum (Mo)	NA	0.933	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Nickel (Ni)	NA	67.95	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Selenium (Se)	NA	0.435	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Silver (Ag)	NA	0.201	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Strontium (Sr)	NA	173.4	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Thallium (Tl)	NA	0.115	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Tin (Sn)	NA	3.142	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Titanium (Ti)	NA	620.5	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Vanadium (V)	NA	58.56	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Zinc (Zn)	NA	94.32	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
83333-R1 P-10					**Sediment**	**Sampled: 10-Mar-09 11:05**			**Received: 13-Mar-09**	
Aluminum (Al)	NA	21330	1	5	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Antimony (Sb)	NA	0.331	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Arsenic (As)	NA	12.88	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Barium (Ba)	NA	94.03	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	

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Trace Metals

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
Beryllium (Be)	NA	0.496	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Cadmium (Cd)	NA	0.277	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Chromium (Cr)	NA	80.51	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Cobalt (Co)	NA	15.4	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Copper (Cu)	NA	37.47	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Iron (Fe)	NA	34090	1	5	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Lead (Pb)	NA	23.91	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Manganese (Mn)	NA	449.5	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Mercury (Hg)	NA	0.28	0.01	0.02	µg/dry g	5094	3/23/2009	3/26/2009	EPA 245.7m	
Molybdenum (Mo)	NA	0.721	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Nickel (Ni)	NA	75.85	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Selenium (Se)	NA	0.436	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Silver (Ag)	NA	0.271	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Strontium (Sr)	NA	144.6	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Thallium (Tl)	NA	0.128	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Tin (Sn)	NA	2.753	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Titanium (Ti)	NA	702.5	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Vanadium (V)	NA	68.65	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Zinc (Zn)	NA	95.33	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
83334-R1 P-6					**Sediment**	**Sampled: 10-Mar-09 12:30**			**Received: 13-Mar-09**	
Aluminum (Al)	NA	20890	1	5	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Antimony (Sb)	NA	0.256	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Arsenic (As)	NA	10.98	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Barium (Ba)	NA	73.05	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Beryllium (Be)	NA	0.504	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Cadmium (Cd)	NA	0.244	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Chromium (Cr)	NA	86.04	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	

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Trace Metals

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
Cobalt (Co)	NA	14.62	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Copper (Cu)	NA	32.26	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Iron (Fe)	NA	32980	1	5	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Lead (Pb)	NA	27.01	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Manganese (Mn)	NA	407.1	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Mercury (Hg)	NA	0.31	0.01	0.02	µg/dry g	5094	3/23/2009	3/26/2009	EPA 245.7m	
Molybdenum (Mo)	NA	0.556	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Nickel (Ni)	NA	72.58	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Selenium (Se)	NA	0.343	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Silver (Ag)	NA	0.217	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Strontium (Sr)	NA	47.82	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Thallium (Tl)	NA	0.128	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Tin (Sn)	NA	2.988	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Titanium (Ti)	NA	578.6	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Vanadium (V)	NA	70.17	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Zinc (Zn)	NA	101	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
83335-R1 P-8					**Sediment**	**Sampled: 10-Mar-09 13:20**			**Received: 13-Mar-09**	
Aluminum (Al)	NA	9109	1	5	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Antimony (Sb)	NA	0.199	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Arsenic (As)	NA	6.043	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Barium (Ba)	NA	39.89	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Beryllium (Be)	NA	0.2	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Cadmium (Cd)	NA	0.159	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Chromium (Cr)	NA	33.37	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Cobalt (Co)	NA	7.007	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Copper (Cu)	NA	12.66	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Iron (Fe)	NA	12620	1	5	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	

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Trace Metals

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
Lead (Pb)	NA	17.76	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Manganese (Mn)	NA	400.4	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Mercury (Hg)	NA	0.12	0.01	0.02	µg/dry g	5094	3/23/2009	3/26/2009	EPA 245.7m	
Molybdenum (Mo)	NA	0.337	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Nickel (Ni)	NA	29.47	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Selenium (Se)	NA	0.161	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Silver (Ag)	NA	0.199	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Strontium (Sr)	NA	737.9	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Thallium (Tl)	NA	0.06	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Tin (Sn)	NA	1.118	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Titanium (Ti)	NA	329.3	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Vanadium (V)	NA	31	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Zinc (Zn)	NA	35.02	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
83336-R1 P-32					**Sediment**	**Sampled: 11-Mar-09 10:10**			**Received: 13-Mar-09**	
Aluminum (Al)	NA	22530	1	5	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Antimony (Sb)	NA	0.224	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Arsenic (As)	NA	7.009	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Barium (Ba)	NA	115.6	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Beryllium (Be)	NA	0.52	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Cadmium (Cd)	NA	0.2	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Chromium (Cr)	NA	91.75	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Cobalt (Co)	NA	15.83	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Copper (Cu)	NA	31.25	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Iron (Fe)	NA	31360	1	5	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Lead (Pb)	NA	21.49	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Manganese (Mn)	NA	408.9	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Mercury (Hg)	NA	0.19	0.01	0.02	µg/dry g	5094	3/23/2009	3/26/2009	EPA 245.7m	

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Trace Metals

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
Molybdenum (Mo)	NA	0.671	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Nickel (Ni)	NA	80.95	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Selenium (Se)	NA	0.351	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Silver (Ag)	NA	0.255	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Strontium (Sr)	NA	78.91	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Thallium (Tl)	NA	0.135	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Tin (Sn)	NA	2.223	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Titanium (Ti)	NA	781	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Vanadium (V)	NA	71.49	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Zinc (Zn)	NA	95.07	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
83337-R1 P-34					**Sediment**	**Sampled: 11-Mar-09 10:45**			**Received: 13-Mar-09**	
Aluminum (Al)	NA	19850	1	5	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Antimony (Sb)	NA	0.199	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Arsenic (As)	NA	10.3	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Barium (Ba)	NA	83.13	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Beryllium (Be)	NA	0.483	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Cadmium (Cd)	NA	0.173	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Chromium (Cr)	NA	74.6	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Cobalt (Co)	NA	13.85	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Copper (Cu)	NA	27.89	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Iron (Fe)	NA	29260	1	5	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Lead (Pb)	NA	13.95	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Manganese (Mn)	NA	427.7	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Mercury (Hg)	NA	0.2	0.01	0.02	µg/dry g	5094	3/23/2009	3/26/2009	EPA 245.7m	
Molybdenum (Mo)	NA	0.488	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Nickel (Ni)	NA	72.1	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Selenium (Se)	NA	0.346	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	

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Trace Metals

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
Silver (Ag)	NA	0.269	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Strontium (Sr)	NA	58.83	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Thallium (Tl)	NA	0.122	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Tin (Sn)	NA	1.102	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Titanium (Ti)	NA	562	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Vanadium (V)	NA	63.15	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Zinc (Zn)	NA	66.83	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
83338-R1 P-36					**Sediment**	**Sampled: 11-Mar-09 11:30**			**Received: 13-Mar-09**	
Aluminum (Al)	NA	17360	1	5	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Antimony (Sb)	NA	0.109	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Arsenic (As)	NA	7.721	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Barium (Ba)	NA	79.45	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Beryllium (Be)	NA	0.392	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Cadmium (Cd)	NA	0.14	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Chromium (Cr)	NA	77.21	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Cobalt (Co)	NA	12.83	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Copper (Cu)	NA	18.25	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Iron (Fe)	NA	26690	1	5	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Lead (Pb)	NA	6.596	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Manganese (Mn)	NA	340.3	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Mercury (Hg)	NA	0.04	0.01	0.02	µg/dry g	5094	3/23/2009	3/26/2009	EPA 245.7m	
Molybdenum (Mo)	NA	0.83	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Nickel (Ni)	NA	70.62	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Selenium (Se)	NA	0.336	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Silver (Ag)	NA	0.183	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Strontium (Sr)	NA	58.69	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Thallium (Tl)	NA	0.112	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	

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Trace Metals

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
Tin (Sn)	NA	0.633	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Titanium (Ti)	NA	691.2	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Vanadium (V)	NA	56.6	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Zinc (Zn)	NA	58.06	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
83339-R1 P-38					**Sediment**	**Sampled: 11-Mar-09 12:15**			**Received: 13-Mar-09**	
Aluminum (Al)	NA	19440	1	5	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Antimony (Sb)	NA	0.162	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Arsenic (As)	NA	10.27	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Barium (Ba)	NA	86.07	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Beryllium (Be)	NA	0.416	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Cadmium (Cd)	NA	0.326	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Chromium (Cr)	NA	73.61	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Cobalt (Co)	NA	13.63	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Copper (Cu)	NA	25.4	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Iron (Fe)	NA	27900	1	5	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Lead (Pb)	NA	19.3	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Manganese (Mn)	NA	691.9	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Mercury (Hg)	NA	0.19	0.01	0.02	µg/dry g	5094	3/23/2009	3/26/2009	EPA 245.7m	
Molybdenum (Mo)	NA	0.428	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Nickel (Ni)	NA	63.78	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Selenium (Se)	NA	0.276	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Silver (Ag)	NA	0.182	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Strontium (Sr)	NA	54.91	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Thallium (Tl)	NA	0.124	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Tin (Sn)	NA	5.699	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Titanium (Ti)	NA	765.2	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Vanadium (V)	NA	63.45	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	

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Trace Metals

ANALYTICAL REPORT

Analyte	Fraction	Result	MDL	RL	Units	Batch	Prepared	Analyzed	Method	QA Code
Zinc (Zn)	NA	77.26	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
83340-R1 P-40					**Sediment**	**Sampled: 11-Mar-09 13:00**			**Received: 13-Mar-09**	
Aluminum (Al)	NA	21060	1	5	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Antimony (Sb)	NA	0.082	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Arsenic (As)	NA	6.538	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Barium (Ba)	NA	72.8	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Beryllium (Be)	NA	0.44	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Cadmium (Cd)	NA	0.149	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Chromium (Cr)	NA	75.64	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Cobalt (Co)	NA	12.1	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Copper (Cu)	NA	18.73	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Iron (Fe)	NA	29630	1	5	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Lead (Pb)	NA	6.764	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Manganese (Mn)	NA	353.1	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Mercury (Hg)	NA	0.05	0.01	0.02	µg/dry g	5094	3/23/2009	3/26/2009	EPA 245.7m	
Molybdenum (Mo)	NA	0.428	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Nickel (Ni)	NA	67.62	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Selenium (Se)	NA	0.329	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Silver (Ag)	NA	0.21	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Strontium (Sr)	NA	44.52	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Thallium (Tl)	NA	0.123	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Tin (Sn)	NA	0.678	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Titanium (Ti)	NA	797.8	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Vanadium (V)	NA	59.34	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	
Zinc (Zn)	NA	62.15	0.025	0.05	µg/dry g	21009	3/23/2009	3/31/2009	EPA 6020m	

QUALITY CONTROL REPORT

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Aroclor PCBs

QUALITY CONTROL REPORT

Analyte	Fraction	Batch ID	Result	MDL	RL	Units	Spike Level	Source Result	% Recovery	Acceptance Limits	Limit Pass/Fail	RPD	RPD LIMIT	Limit Pass/Fail	QA Code
			QAQC	Procedural Blank											
Lab Blank	**83330-B1**			**DI Water**											
Aroclor 1016	NA	46103	ND	10	20	ng/dry g									
Aroclor 1221	NA	46103	ND	10	20	ng/dry g									
Aroclor 1232	NA	46103	ND	10	20	ng/dry g									
Aroclor 1242	NA	46103	ND	10	20	ng/dry g									
Aroclor 1248	NA	46103	ND	10	20	ng/dry g									
Aroclor 1254	NA	46103	ND	10	20	ng/dry g									
Aroclor 1260	NA	46103	ND	10	20	ng/dry g									
			P-40												
Lab Dup	**83340-R2**			**Sediment**											
Aroclor 1016	NA	46103	ND	10	20	ng/dry g						0	30	PASS	
Aroclor 1221	NA	46103	ND	10	20	ng/dry g						0	30	PASS	
Aroclor 1232	NA	46103	ND	10	20	ng/dry g						0	30	PASS	
Aroclor 1242	NA	46103	ND	10	20	ng/dry g						0	30	PASS	
Aroclor 1248	NA	46103	ND	10	20	ng/dry g						0	30	PASS	
Aroclor 1254	NA	46103	ND	10	20	ng/dry g						0	30	PASS	
Aroclor 1260	NA	46103	ND	10	20	ng/dry g						0	30	PASS	

Prepared 3/18/2009 **Analyzed 24-Mar-09**

Prepared 3/18/2009 **Analyzed 24-Mar-09**

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Chlorinated Pesticides

QUALITY CONTROL REPORT

Analyte	Fraction	Batch ID	Result	MDL	RL	Units	Spike Level	Source Result	% Recovery	Acceptance Limits	Limit Pass/Fail	RPD	RPD LIMIT	Limit Pass/Fail	QA Code
Lab Blank	**83330-B1**		**QAQC**	**Procedural Blank DI Water**					**Prepared 3/18/2009**				**Analyzed 24-Mar-09**		
(PCB030)	NA	46103	76			% Recovery	100		76	61 - 120%	PASS				
(PCB112)	NA	46103	95			% Recovery	100		95	56 - 109%	PASS				
(PCB198)	NA	46103	95			% Recovery	100		95	56 - 110%	PASS				
(TCMX)	NA	46103	68			% Recovery	100		68	57 - 120%	PASS				
2,4'-DDD	NA	46103	ND	1	5	ng/dry g									
2,4'-DDE	NA	46103	ND	1	5	ng/dry g									
2,4'-DDT	NA	46103	ND	1	5	ng/dry g									
4,4'-DDD	NA	46103	ND	1	5	ng/dry g									
4,4'-DDE	NA	46103	ND	1	5	ng/dry g									
4,4'-DDT	NA	46103	ND	1	5	ng/dry g									
Aldrin	NA	46103	ND	1	5	ng/dry g									
BHC-alpha	NA	46103	ND	1	5	ng/dry g									
BHC-beta	NA	46103	ND	1	5	ng/dry g									
BHC-delta	NA	46103	ND	1	5	ng/dry g									
BHC-gamma	NA	46103	ND	1	5	ng/dry g									
Chlordane-alpha	NA	46103	ND	1	5	ng/dry g									
Chlordane-gamma	NA	46103	ND	1	5	ng/dry g									
cis-Nonachlor	NA	46103	ND	1	5	ng/dry g									
DCPA (Dacthal)	NA	46103	ND	5	10	ng/dry g									
Dicofol	NA	46103	ND	1	5	ng/dry g									
Dieldrin	NA	46103	ND	1	5	ng/dry g									
Endosulfan Sulfate	NA	46103	ND	1	5	ng/dry g									
Endosulfan-I	NA	46103	ND	1	5	ng/dry g									
Endosulfan-II	NA	46103	ND	1	5	ng/dry g									
Endrin	NA	46103	ND	1	5	ng/dry g									

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Chlorinated Pesticides

QUALITY CONTROL REPORT

Analyte	Fraction	Batch ID	Result	MDL	RL	Units	Spike Level	Source Result	% Recovery	Acceptance Limits	Limit Pass/Fail	RPD	RPD LIMIT	Limit Pass/Fail	QA Code
Endrin Aldehyde	NA	46103	ND	1	5	ng/dry g									
Endrin Ketone	NA	46103	ND	1	5	ng/dry g									
Heptachlor	NA	46103	ND	1	5	ng/dry g									
Heptachlor Epoxide	NA	46103	ND	1	5	ng/dry g									
Methoxychlor	NA	46103	ND	1	5	ng/dry g									
Mirex	NA	46103	ND	1	5	ng/dry g									
Oxychlordane	NA	46103	ND	1	5	ng/dry g									
Perthane	NA	46103	ND	5	10	ng/dry g									
Toxaphene	NA	46103	ND	10	50	ng/dry g									
trans-Nonachlor	NA	46103	ND	1	5	ng/dry g									

QAQC **Procedural Blank** **Prepared 3/18/2009** **Analyzed 24-Mar-09**

Blank Spike	**83330-BS1**											
(PCB030)	NA	46103	76			% Recovery	100	0	76	61 - 120%	PASS	
(PCB112)	NA	46103	96			% Recovery	100	0	96	56 - 109%	PASS	
(PCB198)	NA	46103	95			% Recovery	100	0	95	56 - 110%	PASS	
(TCMX)	NA	46103	68			% Recovery	100	0	68	57 - 120%	PASS	
2,4'-DDD	NA	46103	73.9	1	5	ng/dry g	93.6	0	79	50 - 135%	PASS	
2,4'-DDE	NA	46103	81.6	1	5	ng/dry g	93.6	0	87	60 - 130%	PASS	
2,4'-DDT	NA	46103	82.3	1	5	ng/dry g	93.6	0	88	40 - 135%	PASS	
4,4'-DDD	NA	46103	79.2	1	5	ng/dry g	93.6	0	85	58 - 127%	PASS	
4,4'-DDE	NA	46103	76.1	1	5	ng/dry g	93.6	0	81	65 - 130%	PASS	
4,4'-DDT	NA	46103	75.6	1	5	ng/dry g	93.6	0	81	35 - 140%	PASS	
Aldrin	NA	46103	68.9	1	5	ng/dry g	93.6	0	74	49 - 122%	PASS	
BHC-alpha	NA	46103	69.5	1	5	ng/dry g	93.6	0	74	54 - 119%	PASS	
BHC-beta	NA	46103	90.1	1	5	ng/dry g	93.6	0	96	35 - 130%	PASS	
BHC-delta	NA	46103	72	1	5	ng/dry g	93.6	0	77	58 - 119%	PASS	
BHC-gamma	NA	46103	72.2	1	5	ng/dry g	93.6	0	77	51 - 127%	PASS	

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Chlorinated Pesticides

QUALITY CONTROL REPORT

Analyte	Fraction	Batch ID	Result	MDL	RL	Units	Spike Level	Source Result	% Recovery	Acceptance Limits	Limit Pass/Fail	RPD	RPD LIMIT	Limit Pass/Fail	QA Code
Chlordane-alpha	NA	46103	76.3	1	5	ng/dry g	93.6	0	82	58 - 119%	PASS				
Chlordane-gamma	NA	46103	73.5	1	5	ng/dry g	93.6	0	79	58 - 118%	PASS				
cis-Nonachlor	NA	46103	88.2	1	5	ng/dry g	93.6	0	94	48 - 126%	PASS				
DCPA (Dacthal)	NA	46103	76.5	5	10	ng/dry g	93.6	0	82	63 - 116%	PASS				
Dicofol	NA	46103	59.7	1	5	ng/dry g	93.6	0	64	23 - 132%	PASS				
Dieldrin	NA	46103	78.3	1	5	ng/dry g	93.6	0	84	47 - 129%	PASS				
Endosulfan Sulfate	NA	46103	89.6	1	5	ng/dry g	93.6	0	96	60 - 123%	PASS				
Endosulfan-I	NA	46103	80.5	1	5	ng/dry g	93.6	0	86	66 - 127%	PASS				
Endosulfan-II	NA	46103	98.6	1	5	ng/dry g	93.6	0	105	61 - 126%	PASS				
Endrin	NA	46103	82.5	1	5	ng/dry g	93.6	0	88	64 - 136%	PASS				
Endrin Aldehyde	NA	46103	80.3	1	5	ng/dry g	93.6	0	86	0 - 138%	PASS				
Endrin Ketone	NA	46103	83.1	1	5	ng/dry g	93.6	0	89	52 - 135%	PASS				
Heptachlor	NA	46103	59.8	1	5	ng/dry g	93.6	0	64	46 - 148%	PASS				
Heptachlor Epoxide	NA	46103	81.3	1	5	ng/dry g	93.6	0	87	62 - 129%	PASS				
Methoxychlor	NA	46103	73.2	1	5	ng/dry g	93.6	0	78	5 - 170%	PASS				
Mirex	NA	46103	86.7	1	5	ng/dry g	93.6	0	93	45 - 128%	PASS				
Oxychlordane	NA	46103	76.7	1	5	ng/dry g	93.6	0	82	66 - 128%	PASS				
Perthane	NA	46103	77.9	5	10	ng/dry g	93.6	0	83	51 - 133%	PASS				
Toxaphene	NA	46103	274.4	10	50	ng/dry g	234	0	117	38 - 136%	PASS				
trans-Nonachlor	NA	46103	75.9	1	5	ng/dry g	93.6	0	81	59 - 122%	PASS				
Blank Spike Dup 83330-BS2				**QAQC**	**Procedural Blank DI Water**				**Prepared 3/18/2009**		**Analyzed 24-Mar-09**				
(PCB030)	NA	46103	69			% Recovery	100	0	69	61 - 120%	PASS	10	30	PASS	
(PCB112)	NA	46103	86			% Recovery	100	0	86	56 - 109%	PASS	11	30	PASS	
(PCB198)	NA	46103	87			% Recovery	100	0	87	56 - 110%	PASS	9	30	PASS	
(TCMX)	NA	46103	62			% Recovery	100	0	62	57 - 120%	PASS	9	30	PASS	
2,4'-DDD	NA	46103	64.9	1	5	ng/dry g	93.6	0	69	50 - 135%	PASS	14	30	PASS	

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Chlorinated Pesticides

QUALITY CONTROL REPORT

Analyte	Fraction	Batch ID	Result	MDL	RL	Units	Spike Level	Source Result	% Recovery	Acceptance Limits	Limit Pass/Fail	RPD	RPD LIMIT	Limit Pass/Fail	QA Code
2,4'-DDE	NA	46103	74.9	1	5	ng/dry g	93.6	0	80	60 - 130%	PASS	8	30	PASS	
2,4'-DDT	NA	46103	75.7	1	5	ng/dry g	93.6	0	81	40 - 135%	PASS	8	30	PASS	
4,4'-DDD	NA	46103	71.6	1	5	ng/dry g	93.6	0	76	58 - 127%	PASS	11	30	PASS	
4,4'-DDE	NA	46103	67.9	1	5	ng/dry g	93.6	0	73	65 - 130%	PASS	10	30	PASS	
4,4'-DDT	NA	46103	72.3	1	5	ng/dry g	93.6	0	77	35 - 140%	PASS	5	30	PASS	
Aldrin	NA	46103	57.1	1	5	ng/dry g	93.6	0	61	49 - 122%	PASS	19	30	PASS	
BHC-alpha	NA	46103	57.7	1	5	ng/dry g	93.6	0	62	54 - 119%	PASS	18	30	PASS	
BHC-beta	NA	46103	71.8	1	5	ng/dry g	93.6	0	77	35 - 130%	PASS	22	30	PASS	
BHC-delta	NA	46103	66.9	1	5	ng/dry g	93.6	0	71	58 - 119%	PASS	8	30	PASS	
BHC-gamma	NA	46103	61.9	1	5	ng/dry g	93.6	0	66	51 - 127%	PASS	15	30	PASS	
Chlordane-alpha	NA	46103	74.4	1	5	ng/dry g	93.6	0	79	58 - 119%	PASS	4	30	PASS	
Chlordane-gamma	NA	46103	66	1	5	ng/dry g	93.6	0	71	58 - 118%	PASS	11	30	PASS	
cis-Nonachlor	NA	46103	87.6	1	5	ng/dry g	93.6	0	94	48 - 126%	PASS	0	30	PASS	
DCPA (Dacthal)	NA	46103	75.7	5	10	ng/dry g	93.6	0	81	63 - 116%	PASS	1	30	PASS	
Dicofol	NA	46103	56.5	1	5	ng/dry g	93.6	0	60	23 - 132%	PASS	6	30	PASS	
Dieldrin	NA	46103	71.8	1	5	ng/dry g	93.6	0	77	47 - 129%	PASS	9	30	PASS	
Endosulfan Sulfate	NA	46103	85.7	1	5	ng/dry g	93.6	0	92	60 - 123%	PASS	4	30	PASS	
Endosulfan-I	NA	46103	68.5	1	5	ng/dry g	93.6	0	73	66 - 127%	PASS	16	30	PASS	
Endosulfan-II	NA	46103	87.2	1	5	ng/dry g	93.6	0	93	61 - 126%	PASS	12	30	PASS	
Endrin	NA	46103	97.7	1	5	ng/dry g	93.6	0	104	64 - 136%	PASS	17	30	PASS	
Endrin Aldehyde	NA	46103	72.5	1	5	ng/dry g	93.6	0	77	0 - 138%	PASS	11	30	PASS	
Endrin Ketone	NA	46103	74.3	1	5	ng/dry g	93.6	0	79	52 - 135%	PASS	12	30	PASS	
Heptachlor	NA	46103	58.5	1	5	ng/dry g	93.6	0	62	46 - 148%	PASS	3	30	PASS	
Heptachlor Epoxide	NA	46103	64.7	1	5	ng/dry g	93.6	0	69	62 - 129%	PASS	23	30	PASS	
Methoxychlor	NA	46103	61.8	1	5	ng/dry g	93.6	0	66	5 - 170%	PASS	17	30	PASS	
Mirex	NA	46103	77.6	1	5	ng/dry g	93.6	0	83	45 - 128%	PASS	11	30	PASS	
Oxychlordane	NA	46103	73.1	1	5	ng/dry g	93.6	0	78	66 - 128%	PASS	5	30	PASS	
Perthane	NA	46103	72.5	5	10	ng/dry g	93.6	0	77	51 - 133%	PASS	8	30	PASS	

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Chlorinated Pesticides

QUALITY CONTROL REPORT

Analyte	Fraction	Batch ID	Result	MDL	RL	Units	Spike Level	Source Result	% Recovery	Acceptance Limits	Limit Pass/Fail	RPD	RPD LIMIT	Limit Pass/Fail	QA Code
Toxaphene	NA	46103	266.5	10	50	ng/dry g	234	0	114	38 - 136%	PASS	3	30	PASS	
trans-Nonachlor	NA	46103	70.3	1	5	ng/dry g	93.6	0	75	59 - 122%	PASS	8	30	PASS	
			P-40						**Prepared 3/18/2009**				**Analyzed 24-Mar-09**		
Matrix Spike	**83340-MS1**			**Sediment**											
(PCB030)	NA	46103	81			% Recovery	100	0	81	61 - 120%	PASS				
(PCB112)	NA	46103	102			% Recovery	100	0	102	56 - 109%	PASS				
(PCB198)	NA	46103	100			% Recovery	100	0	100	56 - 110%	PASS				
(TCMX)	NA	46103	78			% Recovery	100	0	78	57 - 120%	PASS				
2,4'-DDD	NA	46103	91.3	1	5	ng/dry g	94.9	0	96	50 - 135%	PASS				
2,4'-DDE	NA	46103	87	1	5	ng/dry g	94.9	0	92	60 - 130%	PASS				
2,4'-DDT	NA	46103	9.9	1	5	ng/dry g	94.9	0	10	40 - 135%	FAIL				M4
4,4'-DDD	NA	46103	105	1	5	ng/dry g	94.9	0	111	58 - 127%	PASS				
4,4'-DDE	NA	46103	79.9	1	5	ng/dry g	94.9	0	84	65 - 130%	PASS				
4,4'-DDT	NA	46103	0	1	5	ng/dry g	94.9	0	0	35 - 140%	FAIL				M4
Aldrin	NA	46103	74.2	1	5	ng/dry g	94.9	0	78	49 - 122%	PASS				
BHC-alpha	NA	46103	75.8	1	5	ng/dry g	94.9	0	80	54 - 119%	PASS				
BHC-beta	NA	46103	71.1	1	5	ng/dry g	94.9	0	75	35 - 130%	PASS				
BHC-delta	NA	46103	87.3	1	5	ng/dry g	94.9	0	92	58 - 119%	PASS				
BHC-gamma	NA	46103	70.1	1	5	ng/dry g	94.9	0	74	51 - 127%	PASS				
Chlordane-alpha	NA	46103	85.2	1	5	ng/dry g	94.9	0	90	58 - 119%	PASS				
Chlordane-gamma	NA	46103	81.3	1	5	ng/dry g	94.9	0	86	58 - 118%	PASS				
cis-Nonachlor	NA	46103	94.4	1	5	ng/dry g	94.9	0	99	48 - 126%	PASS				
DCPA (Dacthal)	NA	46103	87.6	5	10	ng/dry g	94.9	0	92	63 - 116%	PASS				
Dicofol	NA	46103	28.3	1	5	ng/dry g	94.9	0	30	23 - 132%	PASS				
Dieldrin	NA	46103	79.5	1	5	ng/dry g	94.9	0	84	47 - 129%	PASS				
Endosulfan Sulfate	NA	46103	108.5	1	5	ng/dry g	94.9	0	114	60 - 123%	PASS				
Endosulfan-I	NA	46103	89.9	1	5	ng/dry g	94.9	0	95	66 - 127%	PASS				

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Chlorinated Pesticides

QUALITY CONTROL REPORT

Analyte	Fraction	Batch ID	Result	MDL	RL	Units	Spike Level	Source Result	% Recovery	Acceptance Limits	Limit Pass/Fail	RPD	RPD LIMIT	Limit Pass/Fail	QA Code
Endosulfan-II	NA	46103	102.3	1	5	ng/dry g	94.9	0	108	61 - 126%	PASS				
Endrin	NA	46103	80.5	1	5	ng/dry g	94.9	0	85	64 - 136%	PASS				
Endrin Aldehyde	NA	46103	88.5	1	5	ng/dry g	94.9	0	93	0 - 138%	PASS				
Endrin Ketone	NA	46103	51.9	1	5	ng/dry g	94.9	0	55	52 - 135%	PASS				
Heptachlor	NA	46103	20.6	1	5	ng/dry g	94.9	0	22	46 - 148%	FAIL				M4
Heptachlor Epoxide	NA	46103	82.3	1	5	ng/dry g	94.9	0	87	62 - 129%	PASS				
Methoxychlor	NA	46103	0	1	5	ng/dry g	94.9	0	0	5 - 170%	FAIL				M4
Mirex	NA	46103	68.8	1	5	ng/dry g	94.9	0	72	45 - 128%	PASS				
Oxychlordane	NA	46103	69.7	1	5	ng/dry g	94.9	0	73	66 - 128%	PASS				
Perthane	NA	46103	98.1	5	10	ng/dry g	94.9	0	103	51 - 133%	PASS				
Toxaphene	NA	46103	142.4	10	50	ng/dry g	237.2	0	60	38 - 136%	PASS				
trans-Nonachlor	NA	46103	75.8	1	5	ng/dry g	94.9	0	80	59 - 122%	PASS				
			P-40						**Prepared 3/18/2009**				**Analyzed 24-Mar-09**		
Matrix Spike Dup 83340-MS2				**Sediment**											
(PCB030)	NA	46103	86			% Recovery	100	0	86	61 - 120%	PASS	6	30	PASS	
(PCB112)	NA	46103	103			% Recovery	100	0	103	56 - 109%	PASS	1	30	PASS	
(PCB198)	NA	46103	105			% Recovery	100	0	105	56 - 110%	PASS	5	30	PASS	
(TCMX)	NA	46103	80			% Recovery	100	0	80	57 - 120%	PASS	3	30	PASS	
2,4'-DDD	NA	46103	87.5	1	5	ng/dry g	91.9	0	95	50 - 135%	PASS	1	30	PASS	
2,4'-DDE	NA	46103	90.1	1	5	ng/dry g	91.9	0	98	60 - 130%	PASS	6	30	PASS	
2,4'-DDT	NA	46103	6.3	1	5	ng/dry g	91.9	0	7	40 - 135%	FAIL	35	30	FAIL	M4
4,4'-DDD	NA	46103	101.9	1	5	ng/dry g	91.9	0	111	58 - 127%	PASS	0	30	PASS	
4,4'-DDE	NA	46103	87.9	1	5	ng/dry g	91.9	0	96	65 - 130%	PASS	13	30	PASS	
4,4'-DDT	NA	46103	0	1	5	ng/dry g	91.9	0	0	35 - 140%	FAIL	0	30	PASS	M4
Aldrin	NA	46103	78.9	1	5	ng/dry g	91.9	0	86	49 - 122%	PASS	10	30	PASS	
BHC-alpha	NA	46103	71.6	1	5	ng/dry g	91.9	0	78	54 - 119%	PASS	3	30	PASS	
BHC-beta	NA	46103	73.6	1	5	ng/dry g	91.9	0	80	35 - 130%	PASS	6	30	PASS	

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Chlorinated Pesticides

QUALITY CONTROL REPORT

Analyte	Fraction	Batch ID	Result	MDL	RL	Units	Spike Level	Source Result	% Recovery	Acceptance Limits	Limit Pass/Fail	RPD	RPD LIMIT	Limit Pass/Fail	QA Code
BHC-delta	NA	46103	82	1	5	ng/dry g	91.9	0	89	58 - 119%	PASS	3	30	PASS	
BHC-gamma	NA	46103	61.3	1	5	ng/dry g	91.9	0	67	51 - 127%	PASS	10	30	PASS	
Chlordane-alpha	NA	46103	84.3	1	5	ng/dry g	91.9	0	92	58 - 119%	PASS	2	30	PASS	
Chlordane-gamma	NA	46103	83.3	1	5	ng/dry g	91.9	0	91	58 - 118%	PASS	6	30	PASS	
cis-Nonachlor	NA	46103	89.2	1	5	ng/dry g	91.9	0	97	48 - 126%	PASS	2	30	PASS	
DCPA (Dacthal)	NA	46103	88.7	5	10	ng/dry g	91.9	0	97	63 - 116%	PASS	5	30	PASS	
Dicofol	NA	46103	30.5	1	5	ng/dry g	91.9	0	33	23 - 132%	PASS	10	30	PASS	
Dieldrin	NA	46103	71.4	1	5	ng/dry g	91.9	0	78	47 - 129%	PASS	7	30	PASS	
Endosulfan Sulfate	NA	46103	97.1	1	5	ng/dry g	91.9	0	106	60 - 123%	PASS	7	30	PASS	
Endosulfan-I	NA	46103	98.5	1	5	ng/dry g	91.9	0	107	66 - 127%	PASS	12	30	PASS	
Endosulfan-II	NA	46103	96.2	1	5	ng/dry g	91.9	0	105	61 - 126%	PASS	3	30	PASS	
Endrin	NA	46103	90.9	1	5	ng/dry g	91.9	0	99	64 - 136%	PASS	15	30	PASS	
Endrin Aldehyde	NA	46103	94.7	1	5	ng/dry g	91.9	0	103	0 - 138%	PASS	10	30	PASS	
Endrin Ketone	NA	46103	41.6	1	5	ng/dry g	91.9	0	45	52 - 135%	FAIL	20	30	PASS	M4
Heptachlor	NA	46103	20.3	1	5	ng/dry g	91.9	0	22	46 - 148%	FAIL	0	30	PASS	M4
Heptachlor Epoxide	NA	46103	86	1	5	ng/dry g	91.9	0	94	62 - 129%	PASS	8	30	PASS	
Methoxychlor	NA	46103	0	1	5	ng/dry g	91.9	0	0	5 - 170%	FAIL	0	30	PASS	M4
Mirex	NA	46103	63.6	1	5	ng/dry g	91.9	0	69	45 - 128%	PASS	6	30	PASS	
Oxychlordane	NA	46103	68.5	1	5	ng/dry g	91.9	0	75	66 - 128%	PASS	3	30	PASS	
Perthane	NA	46103	100.8	5	10	ng/dry g	91.9	0	110	51 - 133%	PASS	7	30	PASS	
Toxaphene	NA	46103	154.2	10	50	ng/dry g	229.7	0	67	38 - 136%	PASS	11	30	PASS	
trans-Nonachlor	NA	46103	76.2	1	5	ng/dry g	91.9	0	83	59 - 122%	PASS	4	30	PASS	
				P-40					Prepared 3/18/2009				Analyzed 24-Mar-09		
Lab Dup	**83340-R2**				**Sediment**										
(PCB030)	NA	46103	86			% Recovery	100		86	61 - 120%	PASS	7	30	PASS	
(PCB112)	NA	46103	100			% Recovery	100		100	56 - 109%	PASS	10	30	PASS	
(PCB198)	NA	46103	98			% Recovery	100		98	56 - 110%	PASS	8	30	PASS	

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Chlorinated Pesticides

QUALITY CONTROL REPORT

Analyte	Fraction	Batch ID	Result	MDL	RL	Units	Spike Level	Source Result	% Recovery	Acceptance Limits	Limit Pass/Fail	RPD	RPD LIMIT	Limit Pass/Fail	QA Code
(TCMX)	NA	46103	80			% Recovery	100		80	57 - 120%	PASS	4	30	PASS	
2,4'-DDD	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
2,4'-DDE	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
2,4'-DDT	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
4,4'-DDD	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
4,4'-DDE	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
4,4'-DDT	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
Aldrin	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
BHC-alpha	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
BHC-beta	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
BHC-delta	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
BHC-gamma	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
Chlordane-alpha	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
Chlordane-gamma	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
cis-Nonachlor	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
DCPA (Dacthal)	NA	46103	ND	5	10	ng/dry g						0	30	PASS	
Dicofol	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
Dieldrin	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
Endosulfan Sulfate	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
Endosulfan-I	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
Endosulfan-II	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
Endrin	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
Endrin Aldehyde	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
Endrin Ketone	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
Heptachlor	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
Heptachlor Epoxide	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
Methoxychlor	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
Mirex	NA	46103	ND	1	5	ng/dry g						0	30	PASS	

GCC001-09 Caltrans-Dumbarton Bridge / E8435-06-18

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Chlorinated Pesticides

QUALITY CONTROL REPORT

Analyte	Fraction	Batch ID	Result	MDL	RL	Units	Spike Level	Source Result	% Recovery	Acceptance Limits	Limit Pass/Fail	RPD	RPD LIMIT	Limit Pass/Fail	QA Code
Oxychlordane	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
Perthane	NA	46103	ND	5	10	ng/dry g						0	30	PASS	
Toxaphene	NA	46103	ND	10	50	ng/dry g						0	30	PASS	
trans-Nonachlor	NA	46103	ND	1	5	ng/dry g						0	30	PASS	

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General Chemistry

QUALITY CONTROL REPORT

Analyte	Batch ID	Result	MDL	RL	Units	Spike Level	Source Result	% Recovery	Acceptance Limits	Limit Pass/Fail	RPD	RPD LIMIT	Limit Pass/Fail	QA Code
Fraction: NA **QAQC** **Procedural Blank**														
Lab Blank **83330-B1** **DI Water**														
Oil & Grease Prepared: 19-Mar-09 Analyzed: 19-Mar-09	6214004	ND	0.01	0.02	% Dry Weight									
Percent Solids Prepared: 18-Mar-09 Analyzed: 18-Mar-09	59066	ND	0.1	0.1	Percent									
Total Organic Carbon Prepared: 24-Mar-09 Analyzed: 24-Mar-09	6228017	ND	0.01	0.02	% Dry Weight									
Fraction: NA **QAQC** **Procedural Blank**														
Blank Spike **83330-BS1** **DI Water**														
Oil & Grease Prepared: 19-Mar-09 Analyzed: 19-Mar-09	6214004	43.3	0.01	0.02	% Dry Weight	40	0	108	70 - 130%	PASS				
Total Organic Carbon Prepared: 24-Mar-09 Analyzed: 24-Mar-09	6228017	14.2	0.01	0.02	% Dry Weight	12	0	118	50 - 150%	PASS				
Fraction: NA **QAQC** **Procedural Blank**														
Blank Spike Dup **83330-BS2** **DI Water**														
Oil & Grease Prepared: 19-Mar-09 Analyzed: 19-Mar-09	6214004	43.1	0.01	0.02	% Dry Weight	40	0	108	70 - 130%	PASS	0	30	PASS	
Total Organic Carbon Prepared: 24-Mar-09 Analyzed: 24-Mar-09	6228017	14.17	0.01	0.02	% Dry Weight	12	0	118	50 - 150%	PASS	0	30	PASS	
Fraction: NA **P-14**														
Matrix Spike **83331-MS1** **Sediment**														
Oil & Grease Prepared: 19-Mar-09 Analyzed: 19-Mar-09	6214004	0.68	0.01	0.02	% Dry Weight	0.6	0.01	112	70 - 130%	PASS				

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General Chemistry

QUALITY CONTROL REPORT

Analyte	Batch ID	Result	MDL	RL	Units	Spike Level	Source Result	% Recovery	Acceptance Limits	Limit Pass/Fail	RPD	RPD LIMIT	Limit Pass/Fail	QA Code
Fraction: NA			**P-14**											
Matrix Spike Dup 83331-MS2			**Sediment**											
Oil & Grease Prepared: 19-Mar-09 Analyzed: 19-Mar-09	6214004	0.65	0.01	0.02	% Dry Weight	0.61	0.01	105	70 - 130%	PASS	6	30	PASS	
Fraction: NA			**P-14**											
Lab Dup 83331-R2			**Sediment**											
Oil & Grease Prepared: 19-Mar-09 Analyzed: 19-Mar-09	6214004	0.01	0.01	0.02	% Dry Weight						0	30	PASS	J
Total Organic Carbon Prepared: 24-Mar-09 Analyzed: 24-Mar-09	6228017	1.82	0.01	0.02	% Dry Weight						5	30	PASS	
Fraction: NA			**P-40**											
Lab Dup 83340-R2			**Sediment**											
Percent Solids Prepared: 18-Mar-09 Analyzed: 18-Mar-09	59066	56.1	0.1	0.1	Percent						1	30	PASS	
Fraction: NA			**QAQC**	**SRM 1944**										
CRM 83821-CRM1			**Sediment**											
Total Organic Carbon Prepared: 24-Mar-09 Analyzed: 24-Mar-09	6228017	5.07	0.01	0.02	% Dry Weight	4.4		115	3.3 - 5.5	PASS				

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Organotins

QUALITY CONTROL REPORT

Analyte	Fraction	Batch ID	Result	MDL	RL	Units	Spike Level	Source Result	% Recovery	Acceptance Limits	Limit Pass/Fail	RPD	RPD LIMIT	Limit Pass/Fail	QA Code
Lab Blank	**83330-B1**		**QAQC**	**Procedural Blank DI Water**					**Prepared 3/30/2009**		**Analyzed 02-Apr-09**				
(Tripentyltin)	NA	46155	89			% Recovery	100		89	38 - 116%	PASS				
Dibutyltin	NA	46155	ND	1	3	ng/dry g									
Monobutyltin	NA	46155	ND	1	3	ng/dry g									
Tetrabutyltin	NA	46155	ND	1	3	ng/dry g									
Tributyltin	NA	46155	ND	1	3	ng/dry g									
Blank Spike	**83330-BS1**		**QAQC**	**Procedural Blank DI Water**					**Prepared 3/30/2009**		**Analyzed 02-Apr-09**				
(Tripentyltin)	NA	46155	108			% Recovery	100	0	108	38 - 116%	PASS				
Tetrabutyltin	NA	46155	113.1	1	3	ng/dry g	117	0	97	46 - 103%	PASS				
Tributyltin	NA	46155	128	1	3	ng/dry g	117	0	109	42 - 118%	PASS				
Blank Spike Dup	**83330-BS2**		**QAQC**	**Procedural Blank DI Water**					**Prepared 3/30/2009**		**Analyzed 02-Apr-09**				
(Tripentyltin)	NA	46155	106			% Recovery	100	0	106	38 - 116%	PASS	2	30	PASS	
Tetrabutyltin	NA	46155	119.5	1	3	ng/dry g	117	0	102	46 - 103%	PASS	5	30	PASS	
Tributyltin	NA	46155	129.1	1	3	ng/dry g	117	0	110	42 - 118%	PASS	1	30	PASS	
Matrix Spike	**83340-MS1**		**P-40**	**Sediment**					**Prepared 3/30/2009**		**Analyzed 02-Apr-09**				
(Tripentyltin)	NA	46155	108			% Recovery	100	0	108	38 - 116%	PASS				
Tetrabutyltin	NA	46155	118.3	1	3	ng/dry g	116.5	0	102	46 - 103%	PASS				
Tributyltin	NA	46155	132.7	1	3	ng/dry g	116.5	0	114	42 - 118%	PASS				
Matrix Spike Dup	**83340-MS2**		**P-40**	**Sediment**					**Prepared 3/30/2009**		**Analyzed 02-Apr-09**				
(Tripentyltin)	NA	46155	117			% Recovery	100	0	117	38 - 116%	FAIL	8	30	PASS	M4

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Organotins

QUALITY CONTROL REPORT

Analyte	Fraction	Batch ID	Result	MDL	RL	Units	Spike Level	Source Result	% Recovery	Acceptance Limits	Limit Pass/Fail	RPD	RPD LIMIT	Limit Pass/Fail	QA Code
Tetrabutyltin	NA	46155	130.9	1	3	ng/dry g	115.8	0	113	46 - 103%	FAIL	10	30	PASS	M4
Tributyltin	NA	46155	140.9	1	3	ng/dry g	115.8	0	122	42 - 118%	FAIL	7	30	PASS	M4
				P-40					**Prepared 3/30/2009**			**Analyzed 02-Apr-09**			
Lab Dup	**83340-R2**			**Sediment**											
(Tripentyltin)	NA	46155	90			% Recovery	100		90	38 - 116%	PASS	5	30	PASS	
Dibutyltin	NA	46155	ND	1	3	ng/dry g						0	30	PASS	
Monobutyltin	NA	46155	ND	1	3	ng/dry g						0	30	PASS	
Tetrabutyltin	NA	46155	ND	1	3	ng/dry g						0	30	PASS	
Tributyltin	NA	46155	ND	1	3	ng/dry g						0	30	PASS	

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PCB Congeners

QUALITY CONTROL REPORT

Analyte	Fraction	Batch ID	Result	MDL	RL	Units	Spike Level	Source Result	% Recovery	Acceptance Limits	Limit Pass/Fail	RPD	RPD LIMIT	Limit Pass/Fail	QA Code
			QAQC	Procedural Blank						Prepared 3/18/2009			Analyzed 24-Mar-09		
Lab Blank	**83330-B1**			**DI Water**											
PCB003	NA	46103	ND	1	5	ng/dry g									
PCB008	NA	46103	ND	1	5	ng/dry g									
PCB018	NA	46103	ND	1	5	ng/dry g									
PCB028	NA	46103	ND	1	5	ng/dry g									
PCB031	NA	46103	ND	1	5	ng/dry g									
PCB033	NA	46103	ND	1	5	ng/dry g									
PCB037	NA	46103	ND	1	5	ng/dry g									
PCB044	NA	46103	ND	1	5	ng/dry g									
PCB049	NA	46103	ND	1	5	ng/dry g									
PCB052	NA	46103	ND	1	5	ng/dry g									
PCB056/060	NA	46103	ND	1	5	ng/dry g									
PCB066	NA	46103	ND	1	5	ng/dry g									
PCB070	NA	46103	ND	1	5	ng/dry g									
PCB074	NA	46103	ND	1	5	ng/dry g									
PCB077	NA	46103	ND	1	5	ng/dry g									
PCB081	NA	46103	ND	1	5	ng/dry g									
PCB087	NA	46103	ND	1	5	ng/dry g									
PCB095	NA	46103	ND	1	5	ng/dry g									
PCB097	NA	46103	ND	1	5	ng/dry g									
PCB099	NA	46103	ND	1	5	ng/dry g									
PCB101	NA	46103	ND	1	5	ng/dry g									
PCB105	NA	46103	ND	1	5	ng/dry g									
PCB110	NA	46103	ND	1	5	ng/dry g									
PCB114	NA	46103	ND	1	5	ng/dry g									
PCB118	NA	46103	ND	1	5	ng/dry g									

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PCB Congeners

QUALITY CONTROL REPORT

Analyte	Fraction	Batch ID	Result	MDL	RL	Units	Spike Level	Source Result	% Recovery	Acceptance Limits	Limit Pass/Fail	RPD	RPD LIMIT	Limit Pass/Fail	QA Code
PCB119	NA	46103	ND	1	5	ng/dry g									
PCB123	NA	46103	ND	1	5	ng/dry g									
PCB126	NA	46103	ND	1	5	ng/dry g									
PCB128	NA	46103	ND	1	5	ng/dry g									
PCB138	NA	46103	ND	1	5	ng/dry g									
PCB141	NA	46103	ND	1	5	ng/dry g									
PCB149	NA	46103	ND	1	5	ng/dry g									
PCB151	NA	46103	ND	1	5	ng/dry g									
PCB153	NA	46103	ND	1	5	ng/dry g									
PCB156	NA	46103	ND	1	5	ng/dry g									
PCB157	NA	46103	ND	1	5	ng/dry g									
PCB158	NA	46103	ND	1	5	ng/dry g									
PCB167	NA	46103	ND	1	5	ng/dry g									
PCB168+132	NA	46103	ND	1	5	ng/dry g									
PCB169	NA	46103	ND	1	5	ng/dry g									
PCB170	NA	46103	ND	1	5	ng/dry g									
PCB174	NA	46103	ND	1	5	ng/dry g									
PCB177	NA	46103	ND	1	5	ng/dry g									
PCB180	NA	46103	ND	1	5	ng/dry g									
PCB183	NA	46103	ND	1	5	ng/dry g									
PCB187	NA	46103	ND	1	5	ng/dry g									
PCB189	NA	46103	ND	1	5	ng/dry g									
PCB194	NA	46103	ND	1	5	ng/dry g									
PCB195	NA	46103	ND	1	5	ng/dry g									
PCB200	NA	46103	ND	1	5	ng/dry g									
PCB201	NA	46103	ND	1	5	ng/dry g									
PCB203	NA	46103	ND	1	5	ng/dry g									
PCB206	NA	46103	ND	1	5	ng/dry g									

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PCB Congeners

QUALITY CONTROL REPORT

Analyte	Fraction	Batch ID	Result	MDL	RL	Units	Spike Level	Source Result	% Recovery	Acceptance Limits	Limit Pass/Fail	RPD	RPD LIMIT	Limit Pass/Fail	QA Code
PCB209	NA	46103	ND	1	5	ng/dry g									
			QAQC	Procedural Blank					Prepared 3/18/2009				Analyzed 24-Mar-09		
Blank Spike	**83330-BS1**			**DI Water**											
PCB003	NA	46103	57.9	1	5	ng/dry g	74.9	0	77	41 - 132%	PASS				
PCB008	NA	46103	62.1	1	5	ng/dry g	74.9	0	83	52 - 125%	PASS				
PCB018	NA	46103	66.4	1	5	ng/dry g	74.9	0	89	51 - 119%	PASS				
PCB028	NA	46103	65.4	1	5	ng/dry g	74.9	0	87	51 - 122%	PASS				
PCB031	NA	46103	60.1	1	5	ng/dry g	74.9	0	80	54 - 125%	PASS				
PCB033	NA	46103	65.7	1	5	ng/dry g	74.9	0	88	53 - 121%	PASS				
PCB037	NA	46103	63.3	1	5	ng/dry g	74.9	0	85	52 - 129%	PASS				
PCB044	NA	46103	70	1	5	ng/dry g	74.9	0	93	51 - 131%	PASS				
PCB049	NA	46103	68.8	1	5	ng/dry g	74.9	0	92	47 - 122%	PASS				
PCB052	NA	46103	66.8	1	5	ng/dry g	74.9	0	89	51 - 120%	PASS				
PCB056/060	NA	46103	68	1	5	ng/dry g	74.9	0	91	37 - 143%	PASS				
PCB066	NA	46103	62	1	5	ng/dry g	74.9	0	83	56 - 117%	PASS				
PCB070	NA	46103	69.4	1	5	ng/dry g	74.9	0	93	54 - 116%	PASS				
PCB074	NA	46103	64.3	1	5	ng/dry g	74.9	0	86	56 - 122%	PASS				
PCB077	NA	46103	60.6	1	5	ng/dry g	74.9	0	81	58 - 123%	PASS				
PCB081	NA	46103	62	1	5	ng/dry g	74.9	0	83	59 - 122%	PASS				
PCB087	NA	46103	66.4	1	5	ng/dry g	74.9	0	89	52 - 126%	PASS				
PCB095	NA	46103	73.2	1	5	ng/dry g	74.9	0	98	44 - 124%	PASS				
PCB097	NA	46103	67.4	1	5	ng/dry g	74.9	0	90	47 - 131%	PASS				
PCB099	NA	46103	68.1	1	5	ng/dry g	74.9	0	91	54 - 124%	PASS				
PCB101	NA	46103	67.4	1	5	ng/dry g	74.9	0	90	49 - 117%	PASS				
PCB105	NA	46103	63	1	5	ng/dry g	74.9	0	84	55 - 125%	PASS				
PCB110	NA	46103	68.4	1	5	ng/dry g	74.9	0	91	51 - 120%	PASS				
PCB114	NA	46103	63.2	1	5	ng/dry g	74.9	0	84	61 - 123%	PASS				

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PCB Congeners

QUALITY CONTROL REPORT

Analyte	Fraction	Batch ID	Result	MDL	RL	Units	Spike Level	Source Result	% Recovery	Acceptance Limits	Limit Pass/Fail	RPD	RPD LIMIT	Limit Pass/Fail	QA Code
PCB118	NA	46103	65.7	1	5	ng/dry g	74.9	0	88	60 - 120%	PASS				
PCB119	NA	46103	69.7	1	5	ng/dry g	74.9	0	93	49 - 122%	PASS				
PCB123	NA	46103	68.7	1	5	ng/dry g	74.9	0	92	53 - 125%	PASS				
PCB126	NA	46103	65.5	1	5	ng/dry g	74.9	0	87	58 - 129%	PASS				
PCB128	NA	46103	69.5	1	5	ng/dry g	74.9	0	93	56 - 125%	PASS				
PCB138	NA	46103	65.2	1	5	ng/dry g	74.9	0	87	51 - 125%	PASS				
PCB141	NA	46103	68.2	1	5	ng/dry g	74.9	0	91	54 - 127%	PASS				
PCB149	NA	46103	70.6	1	5	ng/dry g	74.9	0	94	48 - 130%	PASS				
PCB151	NA	46103	71.9	1	5	ng/dry g	74.9	0	96	47 - 130%	PASS				
PCB153	NA	46103	63.5	1	5	ng/dry g	74.9	0	85	54 - 122%	PASS				
PCB156	NA	46103	66.1	1	5	ng/dry g	74.9	0	88	56 - 128%	PASS				
PCB157	NA	46103	65.4	1	5	ng/dry g	74.9	0	87	55 - 122%	PASS				
PCB158	NA	46103	69.5	1	5	ng/dry g	74.9	0	93	59 - 128%	PASS				
PCB167	NA	46103	59.7	1	5	ng/dry g	74.9	0	80	50 - 126%	PASS				
PCB168+132	NA	46103	140.2	1	5	ng/dry g	149.8	0	94	52 - 118%	PASS				
PCB169	NA	46103	57.1	1	5	ng/dry g	74.9	0	76	55 - 139%	PASS				
PCB170	NA	46103	66.6	1	5	ng/dry g	74.9	0	89	54 - 121%	PASS				
PCB174	NA	46103	76.1	1	5	ng/dry g	74.9	0	102	52 - 136%	PASS				
PCB177	NA	46103	78.3	1	5	ng/dry g	74.9	0	105	61 - 127%	PASS				
PCB180	NA	46103	70.4	1	5	ng/dry g	74.9	0	94	58 - 125%	PASS				
PCB183	NA	46103	70.4	1	5	ng/dry g	74.9	0	94	49 - 122%	PASS				
PCB187	NA	46103	68.6	1	5	ng/dry g	74.9	0	92	54 - 126%	PASS				
PCB189	NA	46103	64.4	1	5	ng/dry g	74.9	0	86	55 - 129%	PASS				
PCB194	NA	46103	65.4	1	5	ng/dry g	74.9	0	87	64 - 124%	PASS				
PCB195	NA	46103	67.8	1	5	ng/dry g	74.9	0	91	55 - 130%	PASS				
PCB200	NA	46103	73.7	1	5	ng/dry g	74.9	0	98	50 - 127%	PASS				
PCB201	NA	46103	72.5	1	5	ng/dry g	74.9	0	97	60 - 130%	PASS				
PCB203	NA	46103	74.4	1	5	ng/dry g	74.9	0	99	60 - 125%	PASS				

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PCB Congeners

QUALITY CONTROL REPORT

Analyte	Fraction	Batch ID	Result	MDL	RL	Units	Spike Level	Source Result	% Recovery	Acceptance Limits	Limit Pass/Fail	RPD	RPD LIMIT	Limit Pass/Fail	QA Code
PCB206	NA	46103	72.4	1	5	ng/dry g	74.9	0	97	61 - 126%	PASS				
PCB209	NA	46103	70	1	5	ng/dry g	74.9	0	93	50 - 137%	PASS				
Blank Spike Dup 83330-BS2			**QAQC**	**Procedural Blank DI Water**					**Prepared 3/18/2009**		**Analyzed 24-Mar-09**				
PCB003	NA	46103	53.5	1	5	ng/dry g	74.9	0	71	41 - 132%	PASS	8	30	PASS	
PCB008	NA	46103	56.5	1	5	ng/dry g	74.9	0	75	52 - 125%	PASS	10	30	PASS	
PCB018	NA	46103	59.2	1	5	ng/dry g	74.9	0	79	51 - 119%	PASS	12	30	PASS	
PCB028	NA	46103	57.9	1	5	ng/dry g	74.9	0	77	51 - 122%	PASS	12	30	PASS	
PCB031	NA	46103	55.5	1	5	ng/dry g	74.9	0	74	54 - 125%	PASS	8	30	PASS	
PCB033	NA	46103	59.7	1	5	ng/dry g	74.9	0	80	53 - 121%	PASS	10	30	PASS	
PCB037	NA	46103	51.7	1	5	ng/dry g	74.9	0	69	52 - 129%	PASS	21	30	PASS	
PCB044	NA	46103	62.1	1	5	ng/dry g	74.9	0	83	51 - 131%	PASS	11	30	PASS	
PCB049	NA	46103	63.9	1	5	ng/dry g	74.9	0	85	47 - 122%	PASS	8	30	PASS	
PCB052	NA	46103	61.7	1	5	ng/dry g	74.9	0	82	51 - 120%	PASS	8	30	PASS	
PCB056/060	NA	46103	59.7	1	5	ng/dry g	74.9	0	80	37 - 143%	PASS	13	30	PASS	
PCB066	NA	46103	58.6	1	5	ng/dry g	74.9	0	78	56 - 117%	PASS	6	30	PASS	
PCB070	NA	46103	62	1	5	ng/dry g	74.9	0	83	54 - 116%	PASS	11	30	PASS	
PCB074	NA	46103	57.2	1	5	ng/dry g	74.9	0	76	56 - 122%	PASS	12	30	PASS	
PCB077	NA	46103	54.7	1	5	ng/dry g	74.9	0	73	58 - 123%	PASS	10	30	PASS	
PCB081	NA	46103	60	1	5	ng/dry g	74.9	0	80	59 - 122%	PASS	4	30	PASS	
PCB087	NA	46103	60.6	1	5	ng/dry g	74.9	0	81	52 - 126%	PASS	9	30	PASS	
PCB095	NA	46103	60.8	1	5	ng/dry g	74.9	0	81	44 - 124%	PASS	19	30	PASS	
PCB097	NA	46103	64.9	1	5	ng/dry g	74.9	0	87	47 - 131%	PASS	3	30	PASS	
PCB099	NA	46103	62.5	1	5	ng/dry g	74.9	0	83	54 - 124%	PASS	9	30	PASS	
PCB101	NA	46103	61.3	1	5	ng/dry g	74.9	0	82	49 - 117%	PASS	9	30	PASS	
PCB105	NA	46103	58.2	1	5	ng/dry g	74.9	0	78	55 - 125%	PASS	7	30	PASS	
PCB110	NA	46103	62	1	5	ng/dry g	74.9	0	83	51 - 120%	PASS	9	30	PASS	

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PCB Congeners

QUALITY CONTROL REPORT

Analyte	Fraction	Batch ID	Result	MDL	RL	Units	Spike Level	Source Result	% Recovery	Acceptance Limits	Limit Pass/Fail	RPD	RPD LIMIT	Limit Pass/Fail	QA Code
PCB114	NA	46103	60.6	1	5	ng/dry g	74.9	0	81	61 - 123%	PASS	4	30	PASS	
PCB118	NA	46103	58	1	5	ng/dry g	74.9	0	77	60 - 120%	PASS	13	30	PASS	
PCB119	NA	46103	64.3	1	5	ng/dry g	74.9	0	86	49 - 122%	PASS	8	30	PASS	
PCB123	NA	46103	58.9	1	5	ng/dry g	74.9	0	79	53 - 125%	PASS	15	30	PASS	
PCB126	NA	46103	60.1	1	5	ng/dry g	74.9	0	80	58 - 129%	PASS	8	30	PASS	
PCB128	NA	46103	58	1	5	ng/dry g	74.9	0	77	56 - 125%	PASS	19	30	PASS	
PCB138	NA	46103	60.8	1	5	ng/dry g	74.9	0	81	51 - 125%	PASS	7	30	PASS	
PCB141	NA	46103	62.4	1	5	ng/dry g	74.9	0	83	54 - 127%	PASS	9	30	PASS	
PCB149	NA	46103	64.1	1	5	ng/dry g	74.9	0	86	48 - 130%	PASS	9	30	PASS	
PCB151	NA	46103	65.5	1	5	ng/dry g	74.9	0	87	47 - 130%	PASS	10	30	PASS	
PCB153	NA	46103	59.3	1	5	ng/dry g	74.9	0	79	54 - 122%	PASS	7	30	PASS	
PCB156	NA	46103	58	1	5	ng/dry g	74.9	0	77	56 - 128%	PASS	13	30	PASS	
PCB157	NA	46103	57	1	5	ng/dry g	74.9	0	76	55 - 122%	PASS	13	30	PASS	
PCB158	NA	46103	65.7	1	5	ng/dry g	74.9	0	88	59 - 128%	PASS	6	30	PASS	
PCB167	NA	46103	60.8	1	5	ng/dry g	74.9	0	81	50 - 126%	PASS	1	30	PASS	
PCB168+132	NA	46103	129.3	1	5	ng/dry g	149.8	0	86	52 - 118%	PASS	9	30	PASS	
PCB169	NA	46103	52.6	1	5	ng/dry g	74.9	0	70	55 - 139%	PASS	8	30	PASS	
PCB170	NA	46103	62.8	1	5	ng/dry g	74.9	0	84	54 - 121%	PASS	6	30	PASS	
PCB174	NA	46103	67.6	1	5	ng/dry g	74.9	0	90	52 - 136%	PASS	12	30	PASS	
PCB177	NA	46103	68.9	1	5	ng/dry g	74.9	0	92	61 - 127%	PASS	13	30	PASS	
PCB180	NA	46103	57.8	1	5	ng/dry g	74.9	0	77	58 - 125%	PASS	20	30	PASS	
PCB183	NA	46103	67.1	1	5	ng/dry g	74.9	0	90	49 - 122%	PASS	4	30	PASS	
PCB187	NA	46103	59.1	1	5	ng/dry g	74.9	0	79	54 - 126%	PASS	15	30	PASS	
PCB189	NA	46103	57.2	1	5	ng/dry g	74.9	0	76	55 - 129%	PASS	12	30	PASS	
PCB194	NA	46103	61.8	1	5	ng/dry g	74.9	0	83	64 - 124%	PASS	5	30	PASS	
PCB195	NA	46103	62.2	1	5	ng/dry g	74.9	0	83	55 - 130%	PASS	9	30	PASS	
PCB200	NA	46103	63.7	1	5	ng/dry g	74.9	0	85	50 - 127%	PASS	14	30	PASS	
PCB201	NA	46103	68.3	1	5	ng/dry g	74.9	0	91	60 - 130%	PASS	6	30	PASS	

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PCB Congeners

QUALITY CONTROL REPORT

Analyte	Fraction	Batch ID	Result	MDL	RL	Units	Spike Level	Source Result	% Recovery	Acceptance Limits	Limit Pass/Fail	RPD	RPD LIMIT	Limit Pass/Fail	QA Code
PCB203	NA	46103	65.1	1	5	ng/dry g	74.9	0	87	60 - 125%	PASS	13	30	PASS	
PCB206	NA	46103	59.7	1	5	ng/dry g	74.9	0	80	61 - 126%	PASS	19	30	PASS	
PCB209	NA	46103	67.9	1	5	ng/dry g	74.9	0	91	50 - 137%	PASS	2	30	PASS	
			P-40						**Prepared 3/18/2009**			**Analyzed 24-Mar-09**			
Matrix Spike	**83340-MS1**			**Sediment**											
PCB003	NA	46103	66.5	1	5	ng/dry g	75.9	0	88	41 - 132%	PASS				
PCB008	NA	46103	70.4	1	5	ng/dry g	75.9	0	93	52 - 125%	PASS				
PCB018	NA	46103	74.1	1	5	ng/dry g	75.9	0	98	51 - 119%	PASS				
PCB028	NA	46103	78.4	1	5	ng/dry g	75.9	0	103	51 - 122%	PASS				
PCB031	NA	46103	72.4	1	5	ng/dry g	75.9	0	95	54 - 125%	PASS				
PCB033	NA	46103	78.7	1	5	ng/dry g	75.9	0	104	53 - 121%	PASS				
PCB037	NA	46103	76.5	1	5	ng/dry g	75.9	0	101	52 - 129%	PASS				
PCB044	NA	46103	77.5	1	5	ng/dry g	75.9	0	102	51 - 131%	PASS				
PCB049	NA	46103	75.1	1	5	ng/dry g	75.9	0	99	47 - 122%	PASS				
PCB052	NA	46103	74.6	1	5	ng/dry g	75.9	0	98	51 - 120%	PASS				
PCB056/060	NA	46103	79.2	1	5	ng/dry g	75.9	0	104	37 - 143%	PASS				
PCB066	NA	46103	73.7	1	5	ng/dry g	75.9	0	97	56 - 117%	PASS				
PCB070	NA	46103	75.1	1	5	ng/dry g	75.9	0	99	54 - 116%	PASS				
PCB074	NA	46103	77.4	1	5	ng/dry g	75.9	0	102	56 - 122%	PASS				
PCB077	NA	46103	74.6	1	5	ng/dry g	75.9	0	98	58 - 123%	PASS				
PCB081	NA	46103	73.5	1	5	ng/dry g	75.9	0	97	59 - 122%	PASS				
PCB087	NA	46103	78.2	1	5	ng/dry g	75.9	0	103	52 - 126%	PASS				
PCB095	NA	46103	77	1	5	ng/dry g	75.9	0	101	44 - 124%	PASS				
PCB097	NA	46103	75.3	1	5	ng/dry g	75.9	0	99	47 - 131%	PASS				
PCB099	NA	46103	77.9	1	5	ng/dry g	75.9	0	103	54 - 124%	PASS				
PCB101	NA	46103	77.7	1	5	ng/dry g	75.9	0	102	49 - 117%	PASS				
PCB105	NA	46103	73.3	1	5	ng/dry g	75.9	0	97	55 - 125%	PASS				

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PCB Congeners

QUALITY CONTROL REPORT

Analyte	Fraction	Batch ID	Result	MDL	RL	Units	Spike Level	Source Result	% Recovery	Acceptance Limits	Limit Pass/Fail	RPD	RPD LIMIT	Limit Pass/Fail	QA Code
PCB110	NA	46103	79.5	1	5	ng/dry g	75.9	0	105	51 - 120%	PASS				
PCB114	NA	46103	75.3	1	5	ng/dry g	75.9	0	99	61 - 123%	PASS				
PCB118	NA	46103	73.9	1	5	ng/dry g	75.9	0	97	60 - 120%	PASS				
PCB119	NA	46103	75	1	5	ng/dry g	75.9	0	99	49 - 122%	PASS				
PCB123	NA	46103	77	1	5	ng/dry g	75.9	0	101	53 - 125%	PASS				
PCB126	NA	46103	85.2	1	5	ng/dry g	75.9	0	112	58 - 129%	PASS				
PCB128	NA	46103	81.5	1	5	ng/dry g	75.9	0	107	56 - 125%	PASS				
PCB138	NA	46103	74.9	1	5	ng/dry g	75.9	0	99	51 - 125%	PASS				
PCB141	NA	46103	75	1	5	ng/dry g	75.9	0	99	54 - 127%	PASS				
PCB149	NA	46103	76.4	1	5	ng/dry g	75.9	0	101	48 - 130%	PASS				
PCB151	NA	46103	79.6	1	5	ng/dry g	75.9	0	105	47 - 130%	PASS				
PCB153	NA	46103	72.2	1	5	ng/dry g	75.9	0	95	54 - 122%	PASS				
PCB156	NA	46103	79	1	5	ng/dry g	75.9	0	104	56 - 128%	PASS				
PCB157	NA	46103	77.5	1	5	ng/dry g	75.9	0	102	55 - 122%	PASS				
PCB158	NA	46103	75.9	1	5	ng/dry g	75.9	0	100	59 - 128%	PASS				
PCB167	NA	46103	72.8	1	5	ng/dry g	75.9	0	96	50 - 126%	PASS				
PCB168+132	NA	46103	153.3	1	5	ng/dry g	151.8	0	101	52 - 118%	PASS				
PCB169	NA	46103	78.2	1	5	ng/dry g	75.9	0	103	55 - 139%	PASS				
PCB170	NA	46103	75.5	1	5	ng/dry g	75.9	0	99	54 - 121%	PASS				
PCB174	NA	46103	81.9	1	5	ng/dry g	75.9	0	108	52 - 136%	PASS				
PCB177	NA	46103	81.4	1	5	ng/dry g	75.9	0	107	61 - 127%	PASS				
PCB180	NA	46103	78.4	1	5	ng/dry g	75.9	0	103	58 - 125%	PASS				
PCB183	NA	46103	81.2	1	5	ng/dry g	75.9	0	107	49 - 122%	PASS				
PCB187	NA	46103	79.1	1	5	ng/dry g	75.9	0	104	54 - 126%	PASS				
PCB189	NA	46103	81.6	1	5	ng/dry g	75.9	0	108	55 - 129%	PASS				
PCB194	NA	46103	78.6	1	5	ng/dry g	75.9	0	104	64 - 124%	PASS				
PCB195	NA	46103	80.4	1	5	ng/dry g	75.9	0	106	55 - 130%	PASS				
PCB200	NA	46103	77.1	1	5	ng/dry g	75.9	0	102	50 - 127%	PASS				

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PCB Congeners

QUALITY CONTROL REPORT

Analyte	Fraction	Batch ID	Result	MDL	RL	Units	Spike Level	Source Result	% Recovery	Acceptance Limits	Limit Pass/Fail	RPD	RPD LIMIT	Limit Pass/Fail	QA Code
PCB201	NA	46103	76.1	1	5	ng/dry g	75.9	0	100	60 - 130%	PASS				
PCB203	NA	46103	83.1	1	5	ng/dry g	75.9	0	109	60 - 125%	PASS				
PCB206	NA	46103	83.8	1	5	ng/dry g	75.9	0	110	61 - 126%	PASS				
PCB209	NA	46103	83.4	1	5	ng/dry g	75.9	0	110	50 - 137%	PASS				
				P-40					**Prepared 3/18/2009**				**Analyzed 24-Mar-09**		
Matrix Spike Dup 83340-MS2				**Sediment**											
PCB003	NA	46103	67.2	1	5	ng/dry g	73.5	0	91	41 - 132%	PASS	3	30	PASS	
PCB008	NA	46103	71	1	5	ng/dry g	73.5	0	97	52 - 125%	PASS	4	30	PASS	
PCB018	NA	46103	74.6	1	5	ng/dry g	73.5	0	101	51 - 119%	PASS	3	30	PASS	
PCB028	NA	46103	76.1	1	5	ng/dry g	73.5	0	104	51 - 122%	PASS	1	30	PASS	
PCB031	NA	46103	74	1	5	ng/dry g	73.5	0	101	54 - 125%	PASS	6	30	PASS	
PCB033	NA	46103	76.8	1	5	ng/dry g	73.5	0	104	53 - 121%	PASS	0	30	PASS	
PCB037	NA	46103	73.6	1	5	ng/dry g	73.5	0	100	52 - 129%	PASS	1	30	PASS	
PCB044	NA	46103	74.5	1	5	ng/dry g	73.5	0	101	51 - 131%	PASS	1	30	PASS	
PCB049	NA	46103	78.2	1	5	ng/dry g	73.5	0	106	47 - 122%	PASS	7	30	PASS	
PCB052	NA	46103	76.9	1	5	ng/dry g	73.5	0	105	51 - 120%	PASS	7	30	PASS	
PCB056/060	NA	46103	78.2	1	5	ng/dry g	73.5	0	106	37 - 143%	PASS	2	30	PASS	
PCB066	NA	46103	77.7	1	5	ng/dry g	73.5	0	106	56 - 117%	PASS	9	30	PASS	
PCB070	NA	46103	78.5	1	5	ng/dry g	73.5	0	107	54 - 116%	PASS	8	30	PASS	
PCB074	NA	46103	78.6	1	5	ng/dry g	73.5	0	107	56 - 122%	PASS	5	30	PASS	
PCB077	NA	46103	72.1	1	5	ng/dry g	73.5	0	98	58 - 123%	PASS	0	30	PASS	
PCB081	NA	46103	70.7	1	5	ng/dry g	73.5	0	96	59 - 122%	PASS	1	30	PASS	
PCB087	NA	46103	75.5	1	5	ng/dry g	73.5	0	103	52 - 126%	PASS	0	30	PASS	
PCB095	NA	46103	76.4	1	5	ng/dry g	73.5	0	104	44 - 124%	PASS	3	30	PASS	
PCB097	NA	46103	75.9	1	5	ng/dry g	73.5	0	103	47 - 131%	PASS	4	30	PASS	
PCB099	NA	46103	79.1	1	5	ng/dry g	73.5	0	108	54 - 124%	PASS	5	30	PASS	
PCB101	NA	46103	72.9	1	5	ng/dry g	73.5	0	99	49 - 117%	PASS	3	30	PASS	

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PCB Congeners

QUALITY CONTROL REPORT

Analyte	Fraction	Batch ID	Result	MDL	RL	Units	Spike Level	Source Result	% Recovery	Acceptance Limits	Limit Pass/Fail	RPD	RPD LIMIT	Limit Pass/Fail	QA Code
PCB105	NA	46103	71	1	5	ng/dry g	73.5	0	97	55 - 125%	PASS	0	30	PASS	
PCB110	NA	46103	79.4	1	5	ng/dry g	73.5	0	108	51 - 120%	PASS	3	30	PASS	
PCB114	NA	46103	75.1	1	5	ng/dry g	73.5	0	102	61 - 123%	PASS	3	30	PASS	
PCB118	NA	46103	71.5	1	5	ng/dry g	73.5	0	97	60 - 120%	PASS	0	30	PASS	
PCB119	NA	46103	77.3	1	5	ng/dry g	73.5	0	105	49 - 122%	PASS	6	30	PASS	
PCB123	NA	46103	74.3	1	5	ng/dry g	73.5	0	101	53 - 125%	PASS	0	30	PASS	
PCB126	NA	46103	77.4	1	5	ng/dry g	73.5	0	105	58 - 129%	PASS	6	30	PASS	
PCB128	NA	46103	75.3	1	5	ng/dry g	73.5	0	102	56 - 125%	PASS	5	30	PASS	
PCB138	NA	46103	74.8	1	5	ng/dry g	73.5	0	102	51 - 125%	PASS	3	30	PASS	
PCB141	NA	46103	72	1	5	ng/dry g	73.5	0	98	54 - 127%	PASS	1	30	PASS	
PCB149	NA	46103	73	1	5	ng/dry g	73.5	0	99	48 - 130%	PASS	2	30	PASS	
PCB151	NA	46103	76.1	1	5	ng/dry g	73.5	0	104	47 - 130%	PASS	1	30	PASS	
PCB153	NA	46103	75.4	1	5	ng/dry g	73.5	0	103	54 - 122%	PASS	8	30	PASS	
PCB156	NA	46103	75.3	1	5	ng/dry g	73.5	0	102	56 - 128%	PASS	2	30	PASS	
PCB157	NA	46103	76.1	1	5	ng/dry g	73.5	0	104	55 - 122%	PASS	2	30	PASS	
PCB158	NA	46103	79.3	1	5	ng/dry g	73.5	0	108	59 - 128%	PASS	8	30	PASS	
PCB167	NA	46103	74.8	1	5	ng/dry g	73.5	0	102	50 - 126%	PASS	6	30	PASS	
PCB168+132	NA	46103	149.8	1	5	ng/dry g	147	0	102	52 - 118%	PASS	1	30	PASS	
PCB169	NA	46103	79.3	1	5	ng/dry g	73.5	0	108	55 - 139%	PASS	5	30	PASS	
PCB170	NA	46103	79.3	1	5	ng/dry g	73.5	0	108	54 - 121%	PASS	9	30	PASS	
PCB174	NA	46103	82.6	1	5	ng/dry g	73.5	0	112	52 - 136%	PASS	4	30	PASS	
PCB177	NA	46103	78.8	1	5	ng/dry g	73.5	0	107	61 - 127%	PASS	0	30	PASS	
PCB180	NA	46103	79.5	1	5	ng/dry g	73.5	0	108	58 - 125%	PASS	5	30	PASS	
PCB183	NA	46103	81.5	1	5	ng/dry g	73.5	0	111	49 - 122%	PASS	4	30	PASS	
PCB187	NA	46103	76.3	1	5	ng/dry g	73.5	0	104	54 - 126%	PASS	0	30	PASS	
PCB189	NA	46103	76.7	1	5	ng/dry g	73.5	0	104	55 - 129%	PASS	4	30	PASS	
PCB194	NA	46103	81.5	1	5	ng/dry g	73.5	0	111	64 - 124%	PASS	7	30	PASS	
PCB195	NA	46103	80.8	1	5	ng/dry g	73.5	0	110	55 - 130%	PASS	4	30	PASS	

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PCB Congeners

QUALITY CONTROL REPORT

Analyte	Fraction	Batch ID	Result	MDL	RL	Units	Spike Level	Source Result	% Recovery	Acceptance Limits	Limit Pass/Fail	RPD	RPD LIMIT	Limit Pass/Fail	QA Code
PCB200	NA	46103	74.9	1	5	ng/dry g	73.5	0	102	50 - 127%	PASS	0	30	PASS	
PCB201	NA	46103	76.1	1	5	ng/dry g	73.5	0	104	60 - 130%	PASS	4	30	PASS	
PCB203	NA	46103	79.2	1	5	ng/dry g	73.5	0	108	60 - 125%	PASS	1	30	PASS	
PCB206	NA	46103	81	1	5	ng/dry g	73.5	0	110	61 - 126%	PASS	0	30	PASS	
PCB209	NA	46103	81.9	1	5	ng/dry g	73.5	0	111	50 - 137%	PASS	1	30	PASS	
			P-40						**Prepared 3/18/2009**				**Analyzed 24-Mar-09**		
Lab Dup	**83340-R2**			**Sediment**											
PCB003	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB008	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB018	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB028	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB031	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB033	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB037	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB044	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB049	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB052	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB056/060	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB066	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB070	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB074	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB077	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB081	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB087	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB095	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB097	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB099	NA	46103	ND	1	5	ng/dry g						0	30	PASS	

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PCB Congeners

QUALITY CONTROL REPORT

Analyte	Fraction	Batch ID	Result	MDL	RL	Units	Spike Level	Source Result	% Recovery	Acceptance Limits	Limit Pass/Fail	RPD	RPD LIMIT	Limit Pass/Fail	QA Code
PCB101	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB105	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB110	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB114	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB118	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB119	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB123	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB126	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB128	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB138	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB141	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB149	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB151	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB153	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB156	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB157	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB158	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB167	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB168+132	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB169	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB170	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB174	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB177	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB180	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB183	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB187	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB189	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB194	NA	46103	ND	1	5	ng/dry g						0	30	PASS	

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PCB Congeners

QUALITY CONTROL REPORT

Analyte	Fraction	Batch ID	Result	MDL	RL	Units	Spike Level	Source Result	% Recovery	Acceptance Limits	Limit Pass/Fail	RPD	RPD LIMIT	Limit Pass/Fail	QA Code
PCB195	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB200	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB201	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB203	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB206	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
PCB209	NA	46103	ND	1	5	ng/dry g						0	30	PASS	

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Polynuclear Aromatic Hydrocarbons

QUALITY CONTROL REPORT

Analyte	Fraction	Batch ID	Result	MDL	RL	Units	Spike Level	Source Result	% Recovery	Acceptance Limits	Limit Pass/Fail	RPD	RPD LIMIT	Limit Pass/Fail	QA Code
Lab Blank 83330-B1			**QAQC**	**Procedural Blank DI Water**					**Prepared 3/18/2009**		**Analyzed 24-Mar-09**				
(d10-Acenaphthene)	NA	46103	81			% Recovery	100		81	5 - 105%	PASS				
(d10-Phenanthrene)	NA	46103	82			% Recovery	100		82	0 - 137%	PASS				
(d12-Chrysene)	NA	46103	113			% Recovery	100		113	0 - 153%	PASS				
(d12-Perylene)	NA	46103	88			% Recovery	100		88	0 - 183%	PASS				
(d8-Naphthalene)	NA	46103	68			% Recovery	100		68	2 - 121%	PASS				
1-Methylnaphthalene	NA	46103	ND	1	5	ng/dry g									
1-Methylphenanthrene	NA	46103	ND	1	5	ng/dry g									
2,3,5-Trimethylnaphthalene	NA	46103	ND	1	5	ng/dry g									
2,6-Dimethylnaphthalene	NA	46103	ND	1	5	ng/dry g									
2-Methylnaphthalene	NA	46103	ND	1	5	ng/dry g									
Acenaphthene	NA	46103	ND	1	5	ng/dry g									
Acenaphthylene	NA	46103	ND	1	5	ng/dry g									
Anthracene	NA	46103	ND	1	5	ng/dry g									
Benz[a]anthracene	NA	46103	ND	1	5	ng/dry g									
Benzo[a]pyrene	NA	46103	ND	1	5	ng/dry g									
Benzo[b]fluoranthene	NA	46103	ND	1	5	ng/dry g									
Benzo[e]pyrene	NA	46103	ND	1	5	ng/dry g									
Benzo[g,h,i]perylene	NA	46103	ND	1	5	ng/dry g									
Benzo[k]fluoranthene	NA	46103	ND	1	5	ng/dry g									
Biphenyl	NA	46103	ND	1	5	ng/dry g									
Chrysene	NA	46103	ND	1	5	ng/dry g									
Dibenz[a,h]anthracene	NA	46103	ND	1	5	ng/dry g									
Dibenzothiophene	NA	46103	ND	1	5	ng/dry g									
Fluoranthene	NA	46103	ND	1	5	ng/dry g									
Fluorene	NA	46103	ND	1	5	ng/dry g									

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Polynuclear Aromatic Hydrocarbons

QUALITY CONTROL REPORT

Analyte	Fraction	Batch ID	Result	MDL	RL	Units	Spike Level	Source Result	% Recovery	Acceptance Limits	Limit Pass/Fail	RPD	RPD LIMIT	Limit Pass/Fail	QA Code
Indeno[1,2,3-c,d]pyrene	NA	46103	ND	1	5	ng/dry g									
Naphthalene	NA	46103	ND	1	5	ng/dry g									
Perylene	NA	46103	ND	1	5	ng/dry g									
Phenanthrene	NA	46103	ND	1	5	ng/dry g									
Pyrene	NA	46103	ND	1	5	ng/dry g									
Blank Spike 83330-BS1			**QAQC**	**Procedural Blank DI Water**					**Prepared 3/18/2009**		**Analyzed 24-Mar-09**				
(d10-Acenaphthene)	NA	46103	80			% Recovery	100	0	80	5 - 105%	PASS				
(d10-Phenanthrene)	NA	46103	86			% Recovery	100	0	86	0 - 137%	PASS				
(d12-Chrysene)	NA	46103	103			% Recovery	100	0	103	0 - 153%	PASS				
(d12-Perylene)	NA	46103	86			% Recovery	100	0	86	0 - 183%	PASS				
(d8-Naphthalene)	NA	46103	64			% Recovery	100	0	64	2 - 121%	PASS				
1-Methylnaphthalene	NA	46103	147	1	5	ng/dry g	187.2	0	79	30 - 104%	PASS				
1-Methylphenanthrene	NA	46103	170.4	1	5	ng/dry g	187.2	0	91	51 - 122%	PASS				
2,3,5-Trimethylnaphthalene	NA	46103	168.1	1	5	ng/dry g	187.2	0	90	44 - 105%	PASS				
2,6-Dimethylnaphthalene	NA	46103	150.7	1	5	ng/dry g	187.2	0	81	36 - 104%	PASS				
2-Methylnaphthalene	NA	46103	141.1	1	5	ng/dry g	187.2	0	75	32 - 105%	PASS				
Acenaphthene	NA	46103	160.2	1	5	ng/dry g	187.2	0	86	35 - 111%	PASS				
Acenaphthylene	NA	46103	147.1	1	5	ng/dry g	187.2	0	79	34 - 107%	PASS				
Anthracene	NA	46103	156.6	1	5	ng/dry g	187.2	0	84	30 - 123%	PASS				
Benz[a]anthracene	NA	46103	181.7	1	5	ng/dry g	187.2	0	97	46 - 147%	PASS				
Benzo[a]pyrene	NA	46103	169.5	1	5	ng/dry g	187.2	0	91	42 - 156%	PASS				
Benzo[b]fluoranthene	NA	46103	185.6	1	5	ng/dry g	187.2	0	99	36 - 154%	PASS				
Benzo[e]pyrene	NA	46103	188.2	1	5	ng/dry g	187.2	0	101	31 - 151%	PASS				
Benzo[g,h,i]perylene	NA	46103	187.9	1	5	ng/dry g	187.2	0	100	44 - 157%	PASS				
Benzo[k]fluoranthene	NA	46103	175.2	1	5	ng/dry g	187.2	0	94	43 - 151%	PASS				
Biphenyl	NA	46103	156.9	1	5	ng/dry g	187.2	0	84	36 - 102%	PASS				

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Polynuclear Aromatic Hydrocarbons

QUALITY CONTROL REPORT

Analyte	Fraction	Batch ID	Result	MDL	RL	Units	Spike Level	Source Result	% Recovery	Acceptance Limits	Limit Pass/Fail	RPD	RPD LIMIT	Limit Pass/Fail	QA Code
Chrysene	NA	46103	192.9	1	5	ng/dry g	187.2	0	103	42 - 150%	PASS				
Dibenz[a,h]anthracene	NA	46103	179.4	1	5	ng/dry g	187.2	0	96	40 - 160%	PASS				
Dibenzothiophene	NA	46103	167.1	1	5	ng/dry g	187.2	0	89	54 - 114%	PASS				
Fluoranthene	NA	46103	177.8	1	5	ng/dry g	187.2	0	95	40 - 134%	PASS				
Fluorene	NA	46103	166.6	1	5	ng/dry g	187.2	0	89	44 - 109%	PASS				
Indeno[1,2,3-c,d]pyrene	NA	46103	193.2	1	5	ng/dry g	187.2	0	103	38 - 158%	PASS				
Naphthalene	NA	46103	127.3	1	5	ng/dry g	187.2	0	68	21 - 105%	PASS				
Perylene	NA	46103	177	1	5	ng/dry g	187.2	0	95	44 - 141%	PASS				
Phenanthrene	NA	46103	168.4	1	5	ng/dry g	187.2	0	90	32 - 123%	PASS				
Pyrene	NA	46103	177.1	1	5	ng/dry g	187.2	0	95	40 - 143%	PASS				
Blank Spike Dup 83330-BS2				**QAQC**	**Procedural Blank DI Water**				**Prepared 3/18/2009**			**Analyzed 24-Mar-09**			
(d10-Acenaphthene)	NA	46103	73			% Recovery	100	0	73	5 - 105%	PASS	9	30	PASS	
(d10-Phenanthrene)	NA	46103	78			% Recovery	100	0	78	0 - 137%	PASS	10	30	PASS	
(d12-Chrysene)	NA	46103	102			% Recovery	100	0	102	0 - 153%	PASS	1	30	PASS	
(d12-Perylene)	NA	46103	79			% Recovery	100	0	79	0 - 183%	PASS	8	30	PASS	
(d8-Naphthalene)	NA	46103	59			% Recovery	100	0	59	2 - 121%	PASS	8	30	PASS	
1-Methylnaphthalene	NA	46103	130.4	1	5	ng/dry g	187.2	0	70	30 - 104%	PASS	12	30	PASS	
1-Methylphenanthrene	NA	46103	153.9	1	5	ng/dry g	187.2	0	82	51 - 122%	PASS	10	30	PASS	
2,3,5-Trimethylnaphthalene	NA	46103	157.4	1	5	ng/dry g	187.2	0	84	44 - 105%	PASS	7	30	PASS	
2,6-Dimethylnaphthalene	NA	46103	141.5	1	5	ng/dry g	187.2	0	76	36 - 104%	PASS	6	30	PASS	
2-Methylnaphthalene	NA	46103	127	1	5	ng/dry g	187.2	0	68	32 - 105%	PASS	10	30	PASS	
Acenaphthene	NA	46103	144.5	1	5	ng/dry g	187.2	0	77	35 - 111%	PASS	11	30	PASS	
Acenaphthylene	NA	46103	134.4	1	5	ng/dry g	187.2	0	72	34 - 107%	PASS	9	30	PASS	
Anthracene	NA	46103	138.8	1	5	ng/dry g	187.2	0	74	30 - 123%	PASS	13	30	PASS	
Benz[a]anthracene	NA	46103	181.6	1	5	ng/dry g	187.2	0	97	46 - 147%	PASS	0	30	PASS	
Benzo[a]pyrene	NA	46103	162.2	1	5	ng/dry g	187.2	0	87	42 - 156%	PASS	4	30	PASS	

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Polynuclear Aromatic Hydrocarbons

QUALITY CONTROL REPORT

Analyte	Fraction	Batch ID	Result	MDL	RL	Units	Spike Level	Source Result	% Recovery	Acceptance Limits	Limit Pass/Fail	RPD	RPD LIMIT	Limit Pass/Fail	QA Code
Benzo[b]fluoranthene	NA	46103	179.6	1	5	ng/dry g	187.2	0	96	36 - 154%	PASS	3	30	PASS	
Benzo[e]pyrene	NA	46103	197.4	1	5	ng/dry g	187.2	0	105	31 - 151%	PASS	4	30	PASS	
Benzo[g,h,i]perylene	NA	46103	190.4	1	5	ng/dry g	187.2	0	102	44 - 157%	PASS	2	30	PASS	
Benzo[k]fluoranthene	NA	46103	165.6	1	5	ng/dry g	187.2	0	88	43 - 151%	PASS	7	30	PASS	
Biphenyl	NA	46103	138.5	1	5	ng/dry g	187.2	0	74	36 - 102%	PASS	13	30	PASS	
Chrysene	NA	46103	190.5	1	5	ng/dry g	187.2	0	102	42 - 150%	PASS	1	30	PASS	
Dibenz[a,h]anthracene	NA	46103	161.5	1	5	ng/dry g	187.2	0	86	40 - 160%	PASS	11	30	PASS	
Dibenzothiophene	NA	46103	154.2	1	5	ng/dry g	187.2	0	82	54 - 114%	PASS	8	30	PASS	
Fluoranthene	NA	46103	162.3	1	5	ng/dry g	187.2	0	87	40 - 134%	PASS	9	30	PASS	
Fluorene	NA	46103	147.7	1	5	ng/dry g	187.2	0	79	44 - 109%	PASS	12	30	PASS	
Indeno[1,2,3-c,d]pyrene	NA	46103	175.1	1	5	ng/dry g	187.2	0	94	38 - 158%	PASS	9	30	PASS	
Naphthalene	NA	46103	117.9	1	5	ng/dry g	187.2	0	63	21 - 105%	PASS	8	30	PASS	
Perylene	NA	46103	150.4	1	5	ng/dry g	187.2	0	80	44 - 141%	PASS	17	30	PASS	
Phenanthrene	NA	46103	152.1	1	5	ng/dry g	187.2	0	81	32 - 123%	PASS	11	30	PASS	
Pyrene	NA	46103	160.8	1	5	ng/dry g	187.2	0	86	40 - 143%	PASS	10	30	PASS	
			P-40						**Prepared 3/18/2009**				**Analyzed 24-Mar-09**		
Matrix Spike 83340-MS1						**Sediment**									
(d10-Acenaphthene)	NA	46103	80			% Recovery	100	0	80	5 - 105%	PASS				
(d10-Phenanthrene)	NA	46103	88			% Recovery	100	0	88	0 - 137%	PASS				
(d12-Chrysene)	NA	46103	81			% Recovery	100	0	81	0 - 153%	PASS				
(d12-Perylene)	NA	46103	87			% Recovery	100	0	87	0 - 183%	PASS				
(d8-Naphthalene)	NA	46103	68			% Recovery	100	0	68	2 - 121%	PASS				
1-Methylnaphthalene	NA	46103	156.9	1	5	ng/dry g	189.8	2	82	30 - 104%	PASS				
1-Methylphenanthrene	NA	46103	189.7	1	5	ng/dry g	189.8	4	98	51 - 122%	PASS				
2,3,5-Trimethylnaphthalene	NA	46103	179.8	1	5	ng/dry g	189.8	0	95	44 - 105%	PASS				
2,6-Dimethylnaphthalene	NA	46103	163	1	5	ng/dry g	189.8	5.4	83	36 - 104%	PASS				
2-Methylnaphthalene	NA	46103	153.3	1	5	ng/dry g	189.8	3.7	79	32 - 105%	PASS				

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Polynuclear Aromatic Hydrocarbons

QUALITY CONTROL REPORT

Analyte	Fraction	Batch ID	Result	MDL	RL	Units	Spike Level	Source Result	% Recovery	Acceptance Limits	Limit Pass/Fail	RPD	RPD LIMIT	Limit Pass/Fail	QA Code
Acenaphthene	NA	46103	164.8	1	5	ng/dry g	189.8	0	87	35 - 111%	PASS				
Acenaphthylene	NA	46103	175.9	1	5	ng/dry g	189.8	0	93	34 - 107%	PASS				
Anthracene	NA	46103	171.4	1	5	ng/dry g	189.8	1	90	30 - 123%	PASS				
Benz[a]anthracene	NA	46103	171.9	1	5	ng/dry g	189.8	0	91	46 - 147%	PASS				
Benzo[a]pyrene	NA	46103	185.6	1	5	ng/dry g	189.8	0	98	42 - 156%	PASS				
Benzo[b]fluoranthene	NA	46103	183.8	1	5	ng/dry g	189.8	4.8	94	36 - 154%	PASS				
Benzo[e]pyrene	NA	46103	179.9	1	5	ng/dry g	189.8	0	95	31 - 151%	PASS				
Benzo[g,h,i]perylene	NA	46103	232.8	1	5	ng/dry g	189.8	3.2	121	44 - 157%	PASS				
Benzo[k]fluoranthene	NA	46103	172.4	1	5	ng/dry g	189.8	0	91	43 - 151%	PASS				
Biphenyl	NA	46103	158.5	1	5	ng/dry g	189.8	3	82	36 - 102%	PASS				
Chrysene	NA	46103	156	1	5	ng/dry g	189.8	3.5	80	42 - 150%	PASS				
Dibenz[a,h]anthracene	NA	46103	236.2	1	5	ng/dry g	189.8	0	124	40 - 160%	PASS				
Dibenzothiophene	NA	46103	176.4	1	5	ng/dry g	189.8	0	93	54 - 114%	PASS				
Fluoranthene	NA	46103	198.1	1	5	ng/dry g	189.8	3.2	103	40 - 134%	PASS				
Fluorene	NA	46103	175.6	1	5	ng/dry g	189.8	3.8	91	44 - 109%	PASS				
Indeno[1,2,3-c,d]pyrene	NA	46103	226.1	1	5	ng/dry g	189.8	0	119	38 - 158%	PASS				
Naphthalene	NA	46103	138.6	1	5	ng/dry g	189.8	2.8	72	21 - 105%	PASS				
Perylene	NA	46103	236.8	1	5	ng/dry g	189.8	48.8	99	44 - 141%	PASS				
Phenanthrene	NA	46103	175.8	1	5	ng/dry g	189.8	8.3	88	32 - 123%	PASS				
Pyrene	NA	46103	200.2	1	5	ng/dry g	189.8	3.9	103	40 - 143%	PASS				
			P-40					**Prepared**	**3/18/2009**		**Analyzed**	**24-Mar-09**			
Matrix Spike Dup 83340-MS2			**Sediment**												
(d10-Acenaphthene)	NA	46103	88			% Recovery	100	0	88	5 - 105%	PASS	10	30	PASS	
(d10-Phenanthrene)	NA	46103	95			% Recovery	100	0	95	0 - 137%	PASS	8	30	PASS	
(d12-Chrysene)	NA	46103	100			% Recovery	100	0	100	0 - 153%	PASS	21	30	PASS	
(d12-Perylene)	NA	46103	104			% Recovery	100	0	104	0 - 183%	PASS	18	30	PASS	
(d8-Naphthalene)	NA	46103	75			% Recovery	100	0	75	2 - 121%	PASS	10	30	PASS	

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Polynuclear Aromatic Hydrocarbons

QUALITY CONTROL REPORT

Analyte	Fraction	Batch ID	Result	MDL	RL	Units	Spike Level	Source Result	% Recovery	Acceptance Limits	Limit Pass/Fail	RPD	RPD LIMIT	Limit Pass/Fail	QA Code
1-Methylnaphthalene	NA	46103	159.1	1	5	ng/dry g	183.8	2	85	30 - 104%	PASS	4	30	PASS	
1-Methylphenanthrene	NA	46103	193.6	1	5	ng/dry g	183.8	4	103	51 - 122%	PASS	5	30	PASS	
2,3,5-Trimethylnaphthalene	NA	46103	187.9	1	5	ng/dry g	183.8	0	102	44 - 105%	PASS	7	30	PASS	
2,6-Dimethylnaphthalene	NA	46103	166.9	1	5	ng/dry g	183.8	5.4	88	36 - 104%	PASS	6	30	PASS	
2-Methylnaphthalene	NA	46103	165	1	5	ng/dry g	183.8	3.7	88	32 - 105%	PASS	11	30	PASS	
Acenaphthene	NA	46103	169.7	1	5	ng/dry g	183.8	0	92	35 - 111%	PASS	6	30	PASS	
Acenaphthylene	NA	46103	183.1	1	5	ng/dry g	183.8	0	100	34 - 107%	PASS	7	30	PASS	
Anthracene	NA	46103	176.4	1	5	ng/dry g	183.8	1	95	30 - 123%	PASS	5	30	PASS	
Benz[a]anthracene	NA	46103	200.5	1	5	ng/dry g	183.8	0	109	46 - 147%	PASS	18	30	PASS	
Benzo[a]pyrene	NA	46103	198.7	1	5	ng/dry g	183.8	0	108	42 - 156%	PASS	10	30	PASS	
Benzo[b]fluoranthene	NA	46103	205.6	1	5	ng/dry g	183.8	4.8	109	36 - 154%	PASS	15	30	PASS	
Benzo[e]pyrene	NA	46103	202	1	5	ng/dry g	183.8	0	110	31 - 151%	PASS	15	30	PASS	
Benzo[g,h,i]perylene	NA	46103	229.1	1	5	ng/dry g	183.8	3.2	123	44 - 157%	PASS	2	30	PASS	
Benzo[k]fluoranthene	NA	46103	199.4	1	5	ng/dry g	183.8	0	108	43 - 151%	PASS	18	30	PASS	
Biphenyl	NA	46103	167.9	1	5	ng/dry g	183.8	3	90	36 - 102%	PASS	9	30	PASS	
Chrysene	NA	46103	185.9	1	5	ng/dry g	183.8	3.5	99	42 - 150%	PASS	21	30	PASS	
Dibenz[a,h]anthracene	NA	46103	227.7	1	5	ng/dry g	183.8	0	124	40 - 160%	PASS	0	30	PASS	
Dibenzothiophene	NA	46103	178.9	1	5	ng/dry g	183.8	0	97	54 - 114%	PASS	4	30	PASS	
Fluoranthene	NA	46103	207.2	1	5	ng/dry g	183.8	3.2	111	40 - 134%	PASS	7	30	PASS	
Fluorene	NA	46103	177.4	1	5	ng/dry g	183.8	3.8	94	44 - 109%	PASS	3	30	PASS	
Indeno[1,2,3-c,d]pyrene	NA	46103	229.4	1	5	ng/dry g	183.8	0	125	38 - 158%	PASS	5	30	PASS	
Naphthalene	NA	46103	145.1	1	5	ng/dry g	183.8	2.8	77	21 - 105%	PASS	7	30	PASS	
Perylene	NA	46103	253.9	1	5	ng/dry g	183.8	48.8	112	44 - 141%	PASS	12	30	PASS	
Phenanthrene	NA	46103	188.2	1	5	ng/dry g	183.8	8.3	98	32 - 123%	PASS	11	30	PASS	
Pyrene	NA	46103	207.7	1	5	ng/dry g	183.8	3.9	111	40 - 143%	PASS	7	30	PASS	

Lab Dup **83340-R2** **P-40** **Sediment** **Prepared 3/18/2009** **Analyzed 24-Mar-09**

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Polynuclear Aromatic Hydrocarbons

QUALITY CONTROL REPORT

Analyte	Fraction	Batch ID	Result	MDL	RL	Units	Spike Level	Source Result	% Recovery	Acceptance Limits	Limit Pass/Fail	RPD	RPD LIMIT	Limit Pass/Fail	QA Code
(d10-Acenaphthene)	NA	46103	83			% Recovery	100		83	5 - 105%	PASS	6	30	PASS	
(d10-Phenanthrene)	NA	46103	90			% Recovery	100		90	0 - 137%	PASS	7	30	PASS	
(d12-Chrysene)	NA	46103	91			% Recovery	100		91	0 - 153%	PASS	9	30	PASS	
(d12-Perylene)	NA	46103	96			% Recovery	100		96	0 - 183%	PASS	9	30	PASS	
(d8-Naphthalene)	NA	46103	70			% Recovery	100		70	2 - 121%	PASS	1	30	PASS	
1-Methylnaphthalene	NA	46103	1.9	1	5	ng/dry g						15	30	PASS	J
1-Methylphenanthrene	NA	46103	4.4	1	5	ng/dry g						20	30	PASS	J
2,3,5-Trimethylnaphthalene	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
2,6-Dimethylnaphthalene	NA	46103	5.2	1	5	ng/dry g						9	30	PASS	
2-Methylnaphthalene	NA	46103	3.5	1	5	ng/dry g						8	30	PASS	J
Acenaphthene	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
Acenaphthylene	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
Anthracene	NA	46103	1	1	5	ng/dry g						10	30	PASS	J
Benz[a]anthracene	NA	46103	1.5	1	5	ng/dry g						40	30	FAIL	J,Q3
Benzo[a]pyrene	NA	46103	3.9	1	5	ng/dry g						118	30	FAIL	J,Q3
Benzo[b]fluoranthene	NA	46103	4.9	1	5	ng/dry g						6	30	PASS	J
Benzo[e]pyrene	NA	46103	5.6	1	5	ng/dry g						139	30	FAIL	Q3
Benzo[g,h,i]perylene	NA	46103	2.9	1	5	ng/dry g						22	30	PASS	J
Benzo[k]fluoranthene	NA	46103	1.1	1	5	ng/dry g						10	30	PASS	J
Biphenyl	NA	46103	2.9	1	5	ng/dry g						7	30	PASS	J
Chrysene	NA	46103	3.5	1	5	ng/dry g						3	30	PASS	J
Dibenz[a,h]anthracene	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
Dibenzothiophene	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
Fluoranthene	NA	46103	3.7	1	5	ng/dry g						35	30	FAIL	J,Q3
Fluorene	NA	46103	4.1	1	5	ng/dry g						16	30	PASS	J
Indeno[1,2,3-c,d]pyrene	NA	46103	ND	1	5	ng/dry g						0	30	PASS	
Naphthalene	NA	46103	2.9	1	5	ng/dry g						4	30	PASS	J
Perylene	NA	46103	48.2	1	5	ng/dry g						2	30	PASS	

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Polynuclear Aromatic Hydrocarbons

QUALITY CONTROL REPORT

Analyte	Fraction	Batch ID	Result	MDL	RL	Units	Spike Level	Source Result	% Recovery	Acceptance Limits	Limit Pass/Fail	RPD	RPD LIMIT	Limit Pass/Fail	QA Code
Phenanthrene	NA	46103	8	1	5	ng/dry g						7	30	PASS	
Pyrene	NA	46103	4.7	1	5	ng/dry g						41	30	FAIL	J,Q3

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Trace Metals

QUALITY CONTROL REPORT

Analyte	Fraction	Batch ID	Result	MDL	RL	Units	Spike Level	Source Result	% Recovery	Acceptance Limits	Limit Pass/Fail	RPD	RPD LIMIT	Limit Pass/Fail	QA Code
			QAQC	Procedural Blank						Prepared 3/23/2009			Analyzed 31-Mar-09		
Lab Blank	**83330-B1**			**DI Water**											
Aluminum (Al)	NA	21009	ND	1	5	µg/dry g									
Antimony (Sb)	NA	21009	ND	0.025	0.05	µg/dry g									
Arsenic (As)	NA	21009	ND	0.025	0.05	µg/dry g									
Barium (Ba)	NA	21009	ND	0.025	0.05	µg/dry g									
Beryllium (Be)	NA	21009	ND	0.025	0.05	µg/dry g									
Cadmium (Cd)	NA	21009	ND	0.025	0.05	µg/dry g									
Chromium (Cr)	NA	21009	ND	0.025	0.05	µg/dry g									
Cobalt (Co)	NA	21009	ND	0.025	0.05	µg/dry g									
Copper (Cu)	NA	21009	ND	0.025	0.05	µg/dry g									
Iron (Fe)	NA	21009	ND	1	5	µg/dry g									
Lead (Pb)	NA	21009	ND	0.025	0.05	µg/dry g									
Manganese (Mn)	NA	21009	ND	0.025	0.05	µg/dry g									
Mercury (Hg)	NA	5094	ND	0.01	0.02	µg/dry g									
Molybdenum (Mo)	NA	21009	ND	0.025	0.05	µg/dry g									
Nickel (Ni)	NA	21009	ND	0.025	0.05	µg/dry g									
Selenium (Se)	NA	21009	ND	0.025	0.05	µg/dry g									
Silver (Ag)	NA	21009	ND	0.025	0.05	µg/dry g									
Strontium (Sr)	NA	21009	ND	0.025	0.05	µg/dry g									
Thallium (Tl)	NA	21009	ND	0.025	0.05	µg/dry g									
Tin (Sn)	NA	21009	ND	0.025	0.05	µg/dry g									
Titanium (Ti)	NA	21009	ND	0.025	0.05	µg/dry g									
Vanadium (V)	NA	21009	ND	0.025	0.05	µg/dry g									
Zinc (Zn)	NA	21009	ND	0.025	0.05	µg/dry g									
			QAQC	Procedural Blank						Prepared 3/23/2009			Analyzed 31-Mar-09		
Blank Spike	**83330-BS1**			**DI Water**											

CRG Marine Laboratories, Inc.

2020 Del Amo Blvd., Suite 200, Torrance, CA 90501-1206 (310) 533-5190 FAX (310) 533-5003 crglabs@sbcglobal.net

Trace Metals

QUALITY CONTROL REPORT

Analyte	Fraction	Batch ID	Result	MDL	RL	Units	Spike Level	Source Result	% Recovery	Acceptance Limits	Limit Pass/Fail	RPD	RPD LIMIT	Limit Pass/Fail	QA Code
Aluminum (Al)	NA	21009	1.9	1	5	µg/dry g	2	0	95	66 - 135%	PASS				
Antimony (Sb)	NA	21009	0.207	0.025	0.05	µg/dry g	0.2	0	103	70 - 130%	PASS				
Arsenic (As)	NA	21009	1.642	0.025	0.05	µg/dry g	2	0	82	70 - 139%	PASS				
Barium (Ba)	NA	21009	2.482	0.025	0.05	µg/dry g	2	0	124	69 - 128%	PASS				
Beryllium (Be)	NA	21009	1.335	0.025	0.05	µg/dry g	2	0	67	39 - 132%	PASS				
Cadmium (Cd)	NA	21009	0.205	0.025	0.05	µg/dry g	0.2	0	102	70 - 130%	PASS				
Chromium (Cr)	NA	21009	1.778	0.025	0.05	µg/dry g	2	0	89	69 - 130%	PASS				
Cobalt (Co)	NA	21009	1.759	0.025	0.05	µg/dry g	2	0	88	79 - 127%	PASS				
Copper (Cu)	NA	21009	1.692	0.025	0.05	µg/dry g	2	0	85	76 - 125%	PASS				
Iron (Fe)	NA	21009	1.9	1	5	µg/dry g	2	0	95	74 - 125%	PASS				
Lead (Pb)	NA	21009	2.049	0.025	0.05	µg/dry g	2	0	102	78 - 130%	PASS				
Manganese (Mn)	NA	21009	1.81	0.025	0.05	µg/dry g	2	0	90	68 - 132%	PASS				
Mercury (Hg)	NA	5094	1.8	0.01	0.02	µg/dry g	2	0	90	55 - 147%	PASS				
Molybdenum (Mo)	NA	21009	2.063	0.025	0.05	µg/dry g	2	0	103	70 - 130%	PASS				
Nickel (Ni)	NA	21009	1.718	0.025	0.05	µg/dry g	2	0	86	73 - 126%	PASS				
Selenium (Se)	NA	21009	1.816	0.025	0.05	µg/dry g	2	0	91	66 - 138%	PASS				
Silver (Ag)	NA	21009	0.196	0.025	0.05	µg/dry g	0.2	0	98	60 - 150%	PASS				
Strontium (Sr)	NA	21009	2.23	0.025	0.05	µg/dry g	2	0	112	74 - 135%	PASS				
Thallium (Tl)	NA	21009	2.037	0.025	0.05	µg/dry g	2	0	102	70 - 134%	PASS				
Tin (Sn)	NA	21009	2.263	0.025	0.05	µg/dry g	2	0	113	70 - 136%	PASS				
Titanium (Ti)	NA	21009	1.722	0.025	0.05	µg/dry g	2	0	86	66 - 132%	PASS				
Vanadium (V)	NA	21009	1.782	0.025	0.05	µg/dry g	2	0	89	67 - 133%	PASS				
Zinc (Zn)	NA	21009	1.575	0.025	0.05	µg/dry g	2	0	79	69 - 135%	PASS				
Blank Spike Dup 83330-BS2				**QAQC Procedural Blank DI Water**					**Prepared 3/23/2009**		**Analyzed 31-Mar-09**				
Aluminum (Al)	NA	21009	1.8	1	5	µg/dry g	2	0	90	66 - 135%	PASS	5	30	PASS	
Antimony (Sb)	NA	21009	0.207	0.025	0.05	µg/dry g	0.2	0	103	70 - 130%	PASS	0	30	PASS	

CRG Marine Laboratories, Inc.

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Trace Metals

QUALITY CONTROL REPORT

Analyte	Fraction	Batch ID	Result	MDL	RL	Units	Spike Level	Source Result	% Recovery	Acceptance Limits	Limit Pass/Fail	RPD	RPD LIMIT	Limit Pass/Fail	QA Code
Arsenic (As)	NA	21009	1.562	0.025	0.05	µg/dry g	2	0	78	70 - 139%	PASS	5	30	PASS	
Barium (Ba)	NA	21009	2.524	0.025	0.05	µg/dry g	2	0	126	69 - 128%	PASS	2	30	PASS	
Beryllium (Be)	NA	21009	1.349	0.025	0.05	µg/dry g	2	0	67	39 - 132%	PASS	0	30	PASS	
Cadmium (Cd)	NA	21009	0.204	0.025	0.05	µg/dry g	0.2	0	102	70 - 130%	PASS	0	30	PASS	
Chromium (Cr)	NA	21009	1.727	0.025	0.05	µg/dry g	2	0	86	69 - 130%	PASS	3	30	PASS	
Cobalt (Co)	NA	21009	1.743	0.025	0.05	µg/dry g	2	0	87	79 - 127%	PASS	1	30	PASS	
Copper (Cu)	NA	21009	1.7	0.025	0.05	µg/dry g	2	0	85	76 - 125%	PASS	0	30	PASS	
Iron (Fe)	NA	21009	1.8	1	5	µg/dry g	2	0	90	74 - 125%	PASS	5	30	PASS	
Lead (Pb)	NA	21009	2.062	0.025	0.05	µg/dry g	2	0	103	78 - 130%	PASS	1	30	PASS	
Manganese (Mn)	NA	21009	1.711	0.025	0.05	µg/dry g	2	0	86	68 - 132%	PASS	5	30	PASS	
Mercury (Hg)	NA	5094	1.8	0.01	0.02	µg/dry g	2	0	90	55 - 147%	PASS	0	30	PASS	
Molybdenum (Mo)	NA	21009	2.068	0.025	0.05	µg/dry g	2	0	103	70 - 130%	PASS	0	30	PASS	
Nickel (Ni)	NA	21009	1.71	0.025	0.05	µg/dry g	2	0	86	73 - 126%	PASS	0	30	PASS	
Selenium (Se)	NA	21009	2.066	0.025	0.05	µg/dry g	2	0	103	66 - 138%	PASS	12	30	PASS	
Silver (Ag)	NA	21009	0.196	0.025	0.05	µg/dry g	0.2	0	98	60 - 150%	PASS	0	30	PASS	
Strontium (Sr)	NA	21009	2.219	0.025	0.05	µg/dry g	2	0	111	74 - 135%	PASS	1	30	PASS	
Thallium (Tl)	NA	21009	2.055	0.025	0.05	µg/dry g	2	0	103	70 - 134%	PASS	1	30	PASS	
Tin (Sn)	NA	21009	2.26	0.025	0.05	µg/dry g	2	0	113	70 - 136%	PASS	0	30	PASS	
Titanium (Ti)	NA	21009	1.666	0.025	0.05	µg/dry g	2	0	83	66 - 132%	PASS	4	30	PASS	
Vanadium (V)	NA	21009	1.719	0.025	0.05	µg/dry g	2	0	86	67 - 133%	PASS	3	30	PASS	
Zinc (Zn)	NA	21009	1.509	0.025	0.05	µg/dry g	2	0	75	69 - 135%	PASS	5	30	PASS	
			P-40						Prepared 3/23/2009			Analyzed 31-Mar-09			
Lab Dup	**83340-R2**			**Sediment**											
Aluminum (Al)	NA	21009	19090	1	5	µg/dry g						10	30	PASS	
Antimony (Sb)	NA	21009	0.095	0.025	0.05	µg/dry g						15	30	PASS	
Arsenic (As)	NA	21009	6.501	0.025	0.05	µg/dry g						1	30	PASS	
Barium (Ba)	NA	21009	63.73	0.025	0.05	µg/dry g						13	30	PASS	

CRG Marine Laboratories, Inc.

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Trace Metals

QUALITY CONTROL REPORT

Analyte	Fraction	Batch ID	Result	MDL	RL	Units	Spike Level	Source Result	% Recovery	Acceptance Limits	Limit Pass/Fail	RPD	RPD LIMIT	Limit Pass/Fail	QA Code
Beryllium (Be)	NA	21009	0.422	0.025	0.05	µg/dry g						4	30	PASS	
Cadmium (Cd)	NA	21009	0.149	0.025	0.05	µg/dry g						0	30	PASS	
Chromium (Cr)	NA	21009	72.9	0.025	0.05	µg/dry g						4	30	PASS	
Cobalt (Co)	NA	21009	12.21	0.025	0.05	µg/dry g						1	30	PASS	
Copper (Cu)	NA	21009	19.3	0.025	0.05	µg/dry g						3	30	PASS	
Iron (Fe)	NA	21009	29250	1	5	µg/dry g						1	30	PASS	
Lead (Pb)	NA	21009	6.856	0.025	0.05	µg/dry g						1	30	PASS	
Manganese (Mn)	NA	21009	348	0.025	0.05	µg/dry g						1	30	PASS	
Mercury (Hg)	NA	5094	0.03	0.01	0.02	µg/dry g						50	30	FAIL	Q3
Molybdenum (Mo)	NA	21009	0.462	0.025	0.05	µg/dry g						8	30	PASS	
Nickel (Ni)	NA	21009	68.4	0.025	0.05	µg/dry g						1	30	PASS	
Selenium (Se)	NA	21009	0.308	0.025	0.05	µg/dry g						7	30	PASS	
Silver (Ag)	NA	21009	0.245	0.025	0.05	µg/dry g						15	30	PASS	
Strontium (Sr)	NA	21009	42.53	0.025	0.05	µg/dry g						5	30	PASS	
Thallium (Tl)	NA	21009	0.12	0.025	0.05	µg/dry g						2	30	PASS	
Tin (Sn)	NA	21009	0.755	0.025	0.05	µg/dry g						11	30	PASS	
Titanium (Ti)	NA	21009	699.7	0.025	0.05	µg/dry g						13	30	PASS	
Vanadium (V)	NA	21009	55.78	0.025	0.05	µg/dry g						6	30	PASS	
Zinc (Zn)	NA	21009	63.67	0.025	0.05	µg/dry g						2	30	PASS	
CRM	**83364-CRM1**		**QAQC**	**CRM (RTC016-050) Lot# BE016 Sediment**					**Prepared 3/23/2009**				**Analyzed 31-Mar-09**		
Aluminum (Al)	NA	21009	9876	1	5	µg/dry g	11940		83	1270 - 22610	PASS				
Arsenic (As)	NA	21009	6.859	0.025	0.05	µg/dry g	6.56		105	4.64 - 8.48	PASS				
Beryllium (Be)	NA	21009	0.475	0.025	0.05	µg/dry g	0.44		108	0.20 - 0.69	PASS				
Cadmium (Cd)	NA	21009	0.259	0.025	0.05	µg/dry g	0.34		76	0.04 - 0.63	PASS				
Chromium (Cr)	NA	21009	17.53	0.025	0.05	µg/dry g	18.8		93	6.19 - 31.4	PASS				
Cobalt (Co)	NA	21009	6.028	0.025	0.05	µg/dry g	6.16		98	4.72 - 7.60	PASS				

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Trace Metals

QUALITY CONTROL REPORT

Analyte	Fraction	Batch ID	Result	MDL	RL	Units	Spike Level	Source Result	% Recovery	Acceptance Limits	Limit Pass/Fail	RPD	RPD LIMIT	Limit Pass/Fail	QA Code
Copper (Cu)	NA	21009	13.79	0.025	0.05	µg/dry g	14.8		93	12.2 - 17.5	PASS				
Iron (Fe)	NA	21009	16070	1	5	µg/dry g	18540		87	13720 - 2336	PASS				
Lead (Pb)	NA	21009	14.89	0.025	0.05	µg/dry g	14.4		103	10.9 - 17.9	PASS				
Manganese (Mn)	NA	21009	171.7	0.025	0.05	µg/dry g	195		88	153 - 238	PASS				
Mercury (Hg)	NA	5094	0.12	0.01	0.02	µg/dry g	0.158		76	0.010 - 0.357	PASS				
Nickel (Ni)	NA	21009	16.51	0.025	0.05	µg/dry g	16.7		99	12.4 - 21.1	PASS				
Tin (Sn)	NA	21009	0.894	0.025	0.05	µg/dry g	1		89	0.66 - 1.34	PASS				
Vanadium (V)	NA	21009	31.11	0.025	0.05	µg/dry g	31.9		98	6.9 - 56.9	PASS				
Zinc (Zn)	NA	21009	65.52	0.025	0.05	µg/dry g	63.5		103	50.3 - 76.6	PASS				

SUB-CONTRACT LAB REPORT

AQUATIC BIOASSAY & CONSULTING LABORATORIES, INC.

April 2nd, 2009

CRG Marine Laboratories
Rich Gossett
2020 Del Amo Blvd., Suite 200
Torrance, CA 90501

Dear Mr. Gossett:

Aquatic Bioassay & Consulting Laboratories is pleased to provide you with the enclosed data report for grain size analysis. Grain size test are conducted under guidelines prescribed in *Standard Methods for the Examination of Water and Wastewater* (APHA, 20th Edition), Section 2560 D.

Please contact me with any questions or issues you may have regarding this invoice.

Yours very truly,

Scott Johnson
Environmental Programs
(805) 643-5621 ex.11

Project ID: 363-09
Client: CRG Marine Laboratories
Analysis: Grain Size
Method: SM 2560 D
Matrix: Sediment
Delivered: April 2, 2009

		phi Size																										
		<-1	-0.5	0	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10	10.5	11	11.5	>12
		Microns																										
		>2000	1410	1000	710	500	354	250	177	125	88.4	62.5	44.2	31.3	22.1	15.6	11.1	7.8	5.5	3.9	2.8	1.95	1.38	0.98	0.69	0.49	0.35	<0.24
Sample ID	Lab Rep.	coarse sand	coarse sand	med sand	med sand	med sand	med sand	fine sand	very fine sand	very fine sand	very fine sand	very fine sand	very fine sand	course silt	course silt	course silt	silt	fine silt	very fine silt	very fine silt	clay	clay	clay	clay	clay	clay	clay	clay
P-10	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.40	2.23	6.18	9.19	9.36	8.10	7.09	6.88	7.69	8.15	7.81	6.17	5.67	3.87	2.35	2.65	3.04	2.25	0.86	0.05
P-12	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.42	2.81	8.10	10.82	9.33	7.12	5.98	6.02	7.20	8.08	7.94	6.29	5.67	3.74	2.20	2.49	2.81	2.09	0.83	0.05
P-14	1	0.00	0.00	0.00	0.00	0.00	0.00	0.14	1.70	5.44	9.84	10.43	8.52	6.90	6.25	6.49	7.61	8.14	7.58	5.63	4.70	2.88	1.64	1.78	2.00	1.59	0.71	0.05
P-32	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.77	3.58	8.56	10.17	8.82	7.45	6.83	6.95	7.95	8.37	7.79	5.88	5.06	3.23	1.87	2.06	2.39	1.68	0.57	0.00
P-34	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.73	2.73	5.86	7.84	8.72	8.81	8.36	7.87	8.18	8.05	7.45	5.84	5.38	3.67	2.22	2.57	2.94	2.01	0.73	0.05
P-36	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.90	3.99	9.69	12.32	10.88	8.46	6.84	6.22	6.57	6.57	6.06	4.73	4.35	3.03	1.91	2.18	2.50	1.95	0.82	0.05
P-38	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	3.35	10.67	16.53	15.23	10.20	6.40	4.76	4.62	4.69	4.58	3.79	3.61	2.58	1.69	1.97	2.27	1.77	0.76	0.05
P-40	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.71	2.99	7.10	10.68	11.17	9.80	8.46	8.31	7.95	7.31	5.73	5.28	3.62	2.22	2.54	2.98	2.20	0.84	0.05
P-06	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.92	3.79	7.43	9.17	8.78	7.91	7.54	8.24	8.63	8.34	6.67	6.15	4.19	2.51	2.84	3.27	2.50	0.98	0.06
P-08	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.36	2.14	6.23	9.41	9.59	8.34	7.41	7.28	8.15	8.48	7.91	6.04	5.34	3.49	2.06	2.36	2.67	1.94	0.76	0.05
P-08	2	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.84	2.68	6.22	9.08	9.48	8.30	7.29	7.05	7.83	8.16	7.68	5.96	5.34	3.53	2.10	2.45	2.83	2.14	0.87	0.06

Project ID: 363-09
Client: CRG Marine Laboratories
Analysis: Grain Size
Method: SM 2560 D
Matrix: Sediment
Delivered: April 2, 2009

				Summary (Percent)					Percentile (microns)					Percentile (phi)					Microns			phi			Dispersion or Sorting Index	Distribution (phi)	
Sample ID	Lab Rep.	Sample Date	Analysis Date	Gravel*	Sand	Silt	Clay	Silt-Clay	5%	16%	50%	84%	95%	5%	16%	50%	84%	95%	Mean	Median	Mode	Mean	Median	Mode		Skewness	Kurtosis
P-10	1	10-Mar-09	25-Mar-09	0.00	17.99	61.25	20.75	82.01	0.60	2.07	10.81	47.65	77.38	10.72	8.93	6.54	4.39	3.69	22.28	10.81	37.94	5.49	6.54	4.72	2.27	-0.46	-2.55
P-12	1	10-Mar-09	25-Mar-09	0.00	22.15	57.97	19.89	77.85	0.63	2.18	11.48	53.82	81.95	10.66	8.85	6.45	4.21	3.61	24.57	11.48	51.54	5.35	6.45	4.28	2.32	-0.48	-2.52
P-14	1	10-Mar-09	25-Mar-09	0.00	27.54	57.11	15.35	72.46	0.78	2.91	14.97	65.01	102.21	10.33	8.44	6.07	3.94	3.29	30.32	14.97	53.72	5.04	6.07	4.22	2.25	-0.45	-2.57
P-32	1	11-Mar-09	25-Mar-09	0.00	23.09	60.05	16.86	76.91	0.73	2.63	12.95	56.26	86.11	10.43	8.58	6.27	4.15	3.53	26.12	12.95	52.33	5.26	6.27	4.25	2.22	-0.46	-2.56
P-34	1	11-Mar-09	25-Mar-09	0.00	17.15	63.28	19.57	82.85	0.63	2.20	11.55	46.50	80.66	10.64	8.84	6.44	4.43	3.63	22.66	11.55	26.49	5.47	6.44	5.24	2.21	-0.44	-2.59
P-36	1	11-Mar-09	25-Mar-09	0.00	26.90	56.33	16.77	73.10	0.66	2.63	18.25	60.05	88.06	10.58	8.58	5.78	4.06	3.50	29.27	18.25	51.68	5.10	5.78	4.27	2.26	-0.30	-2.56
P-38	1	11-Mar-09	25-Mar-09	0.00	31.04	54.26	14.71	68.96	0.71	3.14	27.56	60.58	85.14	10.48	8.33	5.18	4.04	3.55	32.29	27.56	50.10	4.95	5.18	4.32	2.14	-0.11	-2.62
P-40	1	11-Mar-09	25-Mar-09	0.00	10.86	69.41	19.73	89.14	0.61	2.17	11.54	37.44	58.83	10.70	8.86	6.44	4.74	4.09	18.71	11.54	26.67	5.74	6.44	5.23	2.06	-0.34	-2.60
P-06	1	10-Mar-09	25-Mar-09	0.00	12.20	65.29	22.51	87.80	0.57	1.89	9.20	38.31	61.83	10.79	9.06	6.77	4.71	4.01	18.20	9.20	36.26	5.78	6.77	4.79	2.18	-0.45	-2.56
P-08	1	10-Mar-09	25-Mar-09	0.00	18.15	63.20	18.66	81.85	0.65	2.34	11.50	47.83	76.93	10.60	8.75	6.45	4.38	3.70	22.59	11.50	37.92	5.47	6.45	4.72	2.18	-0.45	-2.58
P-08	2	10-Mar-09	25-Mar-09	0.00	18.93	61.75	19.32	81.07	0.62	2.24	11.68	49.43	81.88	10.67	8.82	6.42	4.34	3.61	23.74	11.68	37.73	5.40	6.42	4.73	2.24	-0.46	-2.58

*Percentage of the sample retained on a 2 mm sieve.

CRG Marine Laboratories

2020 Del Amo Blvd., Suite 200, Torrance, CA 90501-1206
Phone: (310)533-5190 Fax: (310)533-5003

CHAIN-OF-CUSTODY RECORD

To: ABC

Client Name: CRG Marine Laboratories, Inc.
Address: 2020 Del Amo Blvd. Suite 200
Torrance, CA 90501
Project ID: 363-09

Subcontract Manager: Sheri Fama
Phone: (310)533-5190 x 116
Fax: (310)533-5003
Email: subcontract@crglabs.com

Sampling Comments:
Total # of Samples: 10
Correct Containers: Yes
Sample Temperature: Cold
Sample Preservation:

Reporting Comments:
Report Format: pdf + Excel EDD
Turn-Around Time: Standard

*****Please email Report+EDD or questions to subcontract@crglabs.com*****

Client SID:	Sample Description:	Sample Date:	Sample Time:	Matrix:	Containers:	Analyses:
P-10		3/10/2009	11:05	Sediment	Ziploc Bag	Grain Size
P-12		3/10/2009	10:00	Sediment	Ziploc Bag	Grain Size
P-14		3/10/2009	08:55	Sediment	Ziploc Bag	Grain Size
P-32	03.11.09 SP	3/10/2009	10:10	Sediment	Ziploc Bag	Grain Size
P-34		3/10/2009	10:45	Sediment	Ziploc Bag	Grain Size
P-36		3/10/2009	11:30	Sediment	Ziploc Bag	Grain Size
P-38		3/10/2009	12:15	Sediment	Ziploc Bag	Grain Size
P-40	03.11.09 SP	3/10/2009	13:00	Sediment	Ziploc Bag	Grain Size
P-6		3/10/2009	12:30	Sediment	Ziploc Bag	Grain Size
P-8		3/10/2009	13:20	Sediment	Ziploc Bag	Grain Size

Relinquished By: CRG Marine Laboratories, Inc.	Relinquished By: CRG Marine Laboratories, Inc.	Relinquished By: CRG Marine Laboratories, Inc.
Signature: Sheri Fama Date: 031809	Signature: Date:	Signature: Date:
Print: Sheri Fama Time: 1500	Print: Time:	Print: Time:
Received By: CRG Marine Laboratories, Inc.	**Received By:** CRG Marine Laboratories, Inc.	**Received By:** CRG Marine Laboratories, Inc.
Signature: Date:	Signature: Date:	Signature: Date:
Print: Time:	Print: Time:	Print: Time:

Please Return All Coolers Upon Receival Of Samples. Thank you.

CHAIN-OF-CUSTODY

RID: 363-09

CRG Marine Laboratories, Inc.

2020 Del Amo Blvd., Suite 200, Torrance, CA 90501-1206
PHONE (310) 533-5190 FAX (310) 533-5003

CHAIN-OF-CUSTODY

PAGE 1 of 1

Client Name	Geocon Consultants, Inc.
Address	6671 Brisa Street Livermore, CA 94550
Project Manager	John Love
Email	love@geoconinc.com
Phone	(925) 371-5900
FAX	(925) 371-5915
Project Name/Number	Caltrans-Dumbarton Bridge / E8435-06-18
P.O. Number	
Sampled By	John Love

	Client Sample ID / Description	Sample Date	Sample Time	Sample Matrix*	Container Quantity	Container Type	Particle Size Distribution (SM 2560D)	Total Organic Carbon (EPA 9060A)	Percent Solids (EPA 160.3)	Priority Pollutant Metals (EPA 6020)	Mercury (EPA 245.7)	Organotins (according to Krone, et al., (1989))	PAHs, Organochlorine Pesticides, PCBs (EPA 8270C)	Oil & Grease (SM 5520E)
93331	1 P-14	3/10/2009	8:55	SED	2	4 oz glass jar	x	x	x	x	x	x	x	x
83332	2 P-12	3/10/2009	10:00	SED	2	4 oz glass jar	x	x	x	x	x	x	x	x
83333	3 P-10	3/10/2009	11:05	SED	2	4 oz glass jar	x	x	x	x	x	x	x	x
83334	4 P-6	3/10/2009	12:30	SED	2	4 oz glass jar	x	x	x	x	x	x	x	x
83335	5 P-8	3/10/2009	13:20	SED	2	4 oz glass jar	x	x	x	x	x	x	x	x
83336	6 P-32	3/11/2009	10:10	SED	2	4 oz glass jar	x	x	x	x	x	x	x	x
83337	7 P-34	3/11/2009	10:45	SED	2	4 oz glass jar	x	x	x	x	x	x	x	x
83338	8 P-36	3/11/2009	11:30	SED	2	4 oz glass jar	x	x	x	x	x	x	x	x
83339	9 P-38	3/11/2009	12:15	SED	2	4 oz glass jar	x	x	x	x	x	x	x	x
83340	10 P-40	3/11/2009	13:00	SED	2	4 oz glass jar								

REQUESTED ANALYSES

CRG Containers:	Yes	No		
Type of Ice used	Wet	Blue	None	
Sample Preservative:	Yes	No		

TAT: **STD** 15-20 bd **RUSH** specify in comments section

COMMENTS:

Standard turnaround

CRG Project ID: _____

RELINQUISHED BY			
Signature:	[signature]	**DATE:**	3/12/09
Print:	John Love	**TIME:**	17:00
Company:	Geocon Consultants		

RECEIVED BY			
Signature:	[signature]	**DATE:**	03/13/09
Print:	Shenfema	**TIME:**	0845
Company:	CRG		

RELINQUISHED BY			
Signature:		**DATE:**	
Print:		**TIME:**	
Company:			

RECEIVED BY			
Signature:		**DATE:**	
Print:		**TIME:**	
Company:			

*CRG MATRIX CODES: (SED = Sediment); (TISS = Tissue); (SW = Seawater, Saltwater); (FW = Freshwater); (WW = Wastewater); (STRMW = Stormwater); (W = other Water)

CRG Marine Laboratories, Inc.
"A Center for Excellence in Analytical Chemistry and Environmental Microbiology"
2020 Del Amo Blvd., Suite 200, Torrance, CA 90501-1206 (310) 533-5190 Fax (310) 533-5003 www.crglabs.com

CRG PID	CRG RID
GCC001-09	363-09

SAMPLE RECEIPT FORM

CLIENT: Geocon Date Received: Mar 13, 2009 Total # of Samples: 10

COURIER INFORMATION

○ CRG ◉ OTHER ○ FEDEX tracking # 16537222446
○ CLIENT GSO ○ UPS

SF

TEMPERATURE

6 °C ◉ WET ICE ○ BLUE ICE ○ NO ICE

CLIENT COC

◉ INCLUDED ◉ SIGNED
○ NOT INCLUDED ○ NOT SIGNED

SAMPLE MATRIX

○ LIQUID ○ TISSUE
☐ Composite at CRG, equal ☐ Homogenized
☐ Composite at CRG, flow-weighted ☐ Unhomogenized
◉ SOLID ○ OTHER _____

Received By : ____

CONDITION OF SAMPLES UPON VERIFICATION

	Yes	No	NA
All sample containers received intact and in good condition.....	☒	☐	☐
All samples listed on COC(s) are present.....	☒	☐	☐
All sample IDs on containers are consistent with sample IDs on COC(s).....	☒	☐	☐
Correct containers used for analyses requested.....	☒	☐	☐
All samples received within method holding time.....	☒	☐	☐

SF

Samples verified by : ____

NOTES

Print Form

APPENDIX D

March 20, 2009

John Love
Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550
TEL: (925) 525-4142
FAX: (925) 371-5915

ELAP No.: 1838
NELAP No.: 02107CA
NEVADA.: CA-401
CSDLAC No.: 10196

Workorder No.: 104477

RE: Caltrans-Dumbartan Bridge, E8435-06-18

Attention: John Love

Enclosed are the results for sample(s) received on March 13, 2009 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P-15
Lab Order:	104477	**Collection Date:**	3/10/2009 8:30:00 AM
Project:	Caltrans-Dumbartan Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104477-001A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090320H	QC Batch: 53943			PrepDate: 3/18/2009		Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	3/20/2009 02:35 PM
Arsenic	2.7	1.0		mg/Kg	1	3/20/2009 02:35 PM
Barium	32	1.0		mg/Kg	1	3/20/2009 02:35 PM
Beryllium	ND	1.0		mg/Kg	1	3/20/2009 02:35 PM
Cadmium	ND	1.0		mg/Kg	1	3/20/2009 02:35 PM
Chromium	39	1.0		mg/Kg	1	3/20/2009 02:35 PM
Cobalt	6.7	1.0		mg/Kg	1	3/20/2009 02:35 PM
Copper	20	2.0		mg/Kg	1	3/20/2009 02:35 PM
Lead	13	1.0		mg/Kg	1	3/20/2009 02:35 PM
Molybdenum	ND	1.0		mg/Kg	1	3/20/2009 02:35 PM
Nickel	39	1.0		mg/Kg	1	3/20/2009 02:35 PM
Selenium	ND	1.0		mg/Kg	1	3/20/2009 02:35 PM
Silver	ND	1.0		mg/Kg	1	3/20/2009 02:35 PM
Thallium	ND	1.0		mg/Kg	1	3/20/2009 02:35 PM
Vanadium	31	1.0		mg/Kg	1	3/20/2009 02:35 PM
Zinc	56	1.0		mg/Kg	1	3/20/2009 02:35 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090319B	QC Batch: 53969			PrepDate: 3/18/2009		Analyst: **CBR**
DRO	5.6	1.0		mg/Kg	1	3/19/2009 06:47 PM
ORO	10	1.0		mg/Kg	1	3/19/2009 06:47 PM
Surr: p-Terphenyl	96.7	30-130		%REC	1	3/19/2009 06:47 PM
ORGANOCHLORINE PESTICIDES BY GC/ECD						
	EPA 3550B			**EPA 8081A**		
RunID: GC10_090318B	QC Batch: 53983			PrepDate: 3/18/2009		Analyst: **SMH**
4,4´-DDD	ND	2.0		µg/Kg	1	3/18/2009 11:32 PM
4,4´-DDE	ND	2.0		µg/Kg	1	3/18/2009 11:32 PM
4,4´-DDT	ND	2.0		µg/Kg	1	3/18/2009 11:32 PM
Aldrin	ND	1.0		µg/Kg	1	3/18/2009 11:32 PM
alpha-BHC	ND	1.0		µg/Kg	1	3/18/2009 11:32 PM
alpha-Chlordane	ND	1.0		µg/Kg	1	3/18/2009 11:32 PM
beta-BHC	ND	1.0		µg/Kg	1	3/18/2009 11:32 PM
Chlordane	ND	8.5		µg/Kg	1	3/18/2009 11:32 PM
delta-BHC	ND	1.0		µg/Kg	1	3/18/2009 11:32 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Geocon Consultants, Inc. **Client Sample ID:** P-15
Lab Order: 104477 **Collection Date:** 3/10/2009 8:30:00 AM
Project: Caltrans-Dumbartan Bridge, E8435-06-18 **Matrix:** SOIL
Lab ID: 104477-001A

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ORGANOCHLORINE PESTICIDES BY GC/ECD						
	EPA 3550B			**EPA 8081A**		
RunID: GC10_090318B	QC Batch: 53983			PrepDate:	3/18/2009	Analyst: **SMH**
Dieldrin	ND	2.0		µg/Kg	1	3/18/2009 11:32 PM
Endosulfan I	ND	1.0		µg/Kg	1	3/18/2009 11:32 PM
Endosulfan II	ND	2.0		µg/Kg	1	3/18/2009 11:32 PM
Endosulfan sulfate	ND	2.0		µg/Kg	1	3/18/2009 11:32 PM
Endrin	ND	2.0		µg/Kg	1	3/18/2009 11:32 PM
Endrin aldehyde	ND	2.0		µg/Kg	1	3/18/2009 11:32 PM
Endrin ketone	ND	2.0		µg/Kg	1	3/18/2009 11:32 PM
gamma-BHC	ND	1.0		µg/Kg	1	3/18/2009 11:32 PM
gamma-Chlordane	ND	1.0		µg/Kg	1	3/18/2009 11:32 PM
Heptachlor	ND	1.0		µg/Kg	1	3/18/2009 11:32 PM
Heptachlor epoxide	ND	1.0		µg/Kg	1	3/18/2009 11:32 PM
Methoxychlor	ND	5.0		µg/Kg	1	3/18/2009 11:32 PM
Toxaphene	ND	50		µg/Kg	1	3/18/2009 11:32 PM
Surr: Decachlorobiphenyl	74.7	20-142		%REC	1	3/18/2009 11:32 PM
Surr: Tetrachloro-m-xylene	69.0	25-115		%REC	1	3/18/2009 11:32 PM
PCBS BY GC/ECD						
	EPA 3550B			**EPA 8082**		
RunID: GC5_090318A	QC Batch: 53983			PrepDate:	3/18/2009	Analyst: **HL**
Aroclor 1016	ND	16		µg/Kg	1	3/18/2009 09:41 PM
Aroclor 1221	ND	33		µg/Kg	1	3/18/2009 09:41 PM
Aroclor 1232	ND	16		µg/Kg	1	3/18/2009 09:41 PM
Aroclor 1242	ND	16		µg/Kg	1	3/18/2009 09:41 PM
Aroclor 1248	ND	16		µg/Kg	1	3/18/2009 09:41 PM
Aroclor 1254	ND	16		µg/Kg	1	3/18/2009 09:41 PM
Aroclor 1260	ND	16		µg/Kg	1	3/18/2009 09:41 PM
Aroclor 1262	ND	16		µg/Kg	1	3/18/2009 09:41 PM
Aroclor 1268	ND	16		µg/Kg	1	3/18/2009 09:41 PM
Surr: Decachlorobiphenyl	88.1	30-124		%REC	1	3/18/2009 09:41 PM
Surr: Tetrachloro-m-xylene	90.7	40-118		%REC	1	3/18/2009 09:41 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA5_090319A	QC Batch: 53935			PrepDate:	3/18/2009	Analyst: **RQ**
Mercury	0.42	0.10		mg/Kg	1	3/19/2009 09:51 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P-15
Lab Order:	104477	**Collection Date:**	3/10/2009 8:30:00 AM
Project:	Caltrans-Dumbartan Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104477-001A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090318B QC Batch: 53913 PrepDate: 3/17/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2-Methylnaphthalene	ND	330		µg/Kg	1	3/18/2009 04:45 PM
Acenaphthene	ND	330		µg/Kg	1	3/18/2009 04:45 PM
Acenaphthylene	ND	330		µg/Kg	1	3/18/2009 04:45 PM
Anthracene	ND	330		µg/Kg	1	3/18/2009 04:45 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	3/18/2009 04:45 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	3/18/2009 04:45 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	3/18/2009 04:45 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	3/18/2009 04:45 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	3/18/2009 04:45 PM
Chrysene	ND	330		µg/Kg	1	3/18/2009 04:45 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	3/18/2009 04:45 PM
Fluoranthene	ND	330		µg/Kg	1	3/18/2009 04:45 PM
Fluorene	ND	330		µg/Kg	1	3/18/2009 04:45 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	3/18/2009 04:45 PM
Naphthalene	ND	330		µg/Kg	1	3/18/2009 04:45 PM
Phenanthrene	ND	330		µg/Kg	1	3/18/2009 04:45 PM
Pyrene	ND	330		µg/Kg	1	3/18/2009 04:45 PM
Surr: 1,2-Dichlorobenzene-d4	62.2	49-103		%REC	1	3/18/2009 04:45 PM
Surr: 2-Fluorobiphenyl	80.7	59-108		%REC	1	3/18/2009 04:45 PM
Surr: 4-Terphenyl-d14	100	58-135		%REC	1	3/18/2009 04:45 PM
Surr: Nitrobenzene-d5	66.9	54-115		%REC	1	3/18/2009 04:45 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Geocon Consultants, Inc. **Client Sample ID:** P-13
Lab Order: 104477 **Collection Date:** 3/10/2009 9:30:00 AM
Project: Caltrans-Dumbartan Bridge, E8435-06-18 **Matrix:** SOIL
Lab ID: 104477-002A

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090320H	QC Batch: 53943			PrepDate: 3/18/2009		Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	3/20/2009 02:37 PM
Arsenic	2.0	1.0		mg/Kg	1	3/20/2009 02:37 PM
Barium	36	1.0		mg/Kg	1	3/20/2009 02:37 PM
Beryllium	ND	1.0		mg/Kg	1	3/20/2009 02:37 PM
Cadmium	ND	1.0		mg/Kg	1	3/20/2009 02:37 PM
Chromium	34	1.0		mg/Kg	1	3/20/2009 02:37 PM
Cobalt	7.7	1.0		mg/Kg	1	3/20/2009 02:37 PM
Copper	20	2.0		mg/Kg	1	3/20/2009 02:37 PM
Lead	22	1.0		mg/Kg	1	3/20/2009 02:37 PM
Molybdenum	ND	1.0		mg/Kg	1	3/20/2009 02:37 PM
Nickel	33	1.0		mg/Kg	1	3/20/2009 02:37 PM
Selenium	ND	1.0		mg/Kg	1	3/20/2009 02:37 PM
Silver	ND	1.0		mg/Kg	1	3/20/2009 02:37 PM
Thallium	ND	1.0		mg/Kg	1	3/20/2009 02:37 PM
Vanadium	36	1.0		mg/Kg	1	3/20/2009 02:37 PM
Zinc	48	1.0		mg/Kg	1	3/20/2009 02:37 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090319B	QC Batch: 53969			PrepDate: 3/18/2009		Analyst: **CBR**
DRO	ND	1.0		mg/Kg	1	3/19/2009 06:04 PM
ORO	ND	1.0		mg/Kg	1	3/19/2009 06:04 PM
Surr: p-Terphenyl	98.2	30-130		%REC	1	3/19/2009 06:04 PM
ORGANOCHLORINE PESTICIDES BY GC/ECD						
	EPA 3550B			**EPA 8081A**		
RunID: GC10_090318B	QC Batch: 53983			PrepDate: 3/18/2009		Analyst: **SMH**
4,4´-DDD	ND	2.0		µg/Kg	1	3/18/2009 11:46 PM
4,4´-DDE	ND	2.0		µg/Kg	1	3/18/2009 11:46 PM
4,4´-DDT	ND	2.0		µg/Kg	1	3/18/2009 11:46 PM
Aldrin	ND	1.0		µg/Kg	1	3/18/2009 11:46 PM
alpha-BHC	ND	1.0		µg/Kg	1	3/18/2009 11:46 PM
alpha-Chlordane	ND	1.0		µg/Kg	1	3/18/2009 11:46 PM
beta-BHC	ND	1.0		µg/Kg	1	3/18/2009 11:46 PM
Chlordane	ND	8.5		µg/Kg	1	3/18/2009 11:46 PM
delta-BHC	ND	1.0		µg/Kg	1	3/18/2009 11:46 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Geocon Consultants, Inc. **Client Sample ID:** P-13
Lab Order: 104477 **Collection Date:** 3/10/2009 9:30:00 AM
Project: Caltrans-Dumbartan Bridge, E8435-06-18 **Matrix:** SOIL
Lab ID: 104477-002A

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ORGANOCHLORINE PESTICIDES BY GC/ECD						
	EPA 3550B			**EPA 8081A**		
RunID: GC10_090318B	QC Batch: 53983			PrepDate:	3/18/2009	Analyst: **SMH**
Dieldrin	ND	2.0		µg/Kg	1	3/18/2009 11:46 PM
Endosulfan I	ND	1.0		µg/Kg	1	3/18/2009 11:46 PM
Endosulfan II	ND	2.0		µg/Kg	1	3/18/2009 11:46 PM
Endosulfan sulfate	ND	2.0		µg/Kg	1	3/18/2009 11:46 PM
Endrin	ND	2.0		µg/Kg	1	3/18/2009 11:46 PM
Endrin aldehyde	ND	2.0		µg/Kg	1	3/18/2009 11:46 PM
Endrin ketone	ND	2.0		µg/Kg	1	3/18/2009 11:46 PM
gamma-BHC	ND	1.0		µg/Kg	1	3/18/2009 11:46 PM
gamma-Chlordane	ND	1.0		µg/Kg	1	3/18/2009 11:46 PM
Heptachlor	ND	1.0		µg/Kg	1	3/18/2009 11:46 PM
Heptachlor epoxide	ND	1.0		µg/Kg	1	3/18/2009 11:46 PM
Methoxychlor	ND	5.0		µg/Kg	1	3/18/2009 11:46 PM
Toxaphene	ND	50		µg/Kg	1	3/18/2009 11:46 PM
Surr: Decachlorobiphenyl	75.7	20-142		%REC	1	3/18/2009 11:46 PM
Surr: Tetrachloro-m-xylene	73.8	25-115		%REC	1	3/18/2009 11:46 PM
PCBS BY GC/ECD						
	EPA 3550B			**EPA 8082**		
RunID: GC5_090318A	QC Batch: 53983			PrepDate:	3/18/2009	Analyst: **HL**
Aroclor 1016	ND	16		µg/Kg	1	3/18/2009 10:11 PM
Aroclor 1221	ND	33		µg/Kg	1	3/18/2009 10:11 PM
Aroclor 1232	ND	16		µg/Kg	1	3/18/2009 10:11 PM
Aroclor 1242	ND	16		µg/Kg	1	3/18/2009 10:11 PM
Aroclor 1248	ND	16		µg/Kg	1	3/18/2009 10:11 PM
Aroclor 1254	ND	16		µg/Kg	1	3/18/2009 10:11 PM
Aroclor 1260	ND	16		µg/Kg	1	3/18/2009 10:11 PM
Aroclor 1262	ND	16		µg/Kg	1	3/18/2009 10:11 PM
Aroclor 1268	ND	16		µg/Kg	1	3/18/2009 10:11 PM
Surr: Decachlorobiphenyl	92.9	30-124		%REC	1	3/18/2009 10:11 PM
Surr: Tetrachloro-m-xylene	88.6	40-118		%REC	1	3/18/2009 10:11 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA5_090319A	QC Batch: 53935			PrepDate:	3/18/2009	Analyst: **RQ**
Mercury	0.12	0.10		mg/Kg	1	3/19/2009 09:53 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P-13
Lab Order:	104477	**Collection Date:**	3/10/2009 9:30:00 AM
Project:	Caltrans-Dumbartan Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104477-002A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090318B QC Batch: 53913 PrepDate: 3/17/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2-Methylnaphthalene	ND	330		µg/Kg	1	3/18/2009 05:13 PM
Acenaphthene	ND	330		µg/Kg	1	3/18/2009 05:13 PM
Acenaphthylene	ND	330		µg/Kg	1	3/18/2009 05:13 PM
Anthracene	ND	330		µg/Kg	1	3/18/2009 05:13 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	3/18/2009 05:13 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	3/18/2009 05:13 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	3/18/2009 05:13 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	3/18/2009 05:13 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	3/18/2009 05:13 PM
Chrysene	ND	330		µg/Kg	1	3/18/2009 05:13 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	3/18/2009 05:13 PM
Fluoranthene	ND	330		µg/Kg	1	3/18/2009 05:13 PM
Fluorene	ND	330		µg/Kg	1	3/18/2009 05:13 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	3/18/2009 05:13 PM
Naphthalene	ND	330		µg/Kg	1	3/18/2009 05:13 PM
Phenanthrene	ND	330		µg/Kg	1	3/18/2009 05:13 PM
Pyrene	ND	330		µg/Kg	1	3/18/2009 05:13 PM
Surr: 1,2-Dichlorobenzene-d4	80.2	49-103		%REC	1	3/18/2009 05:13 PM
Surr: 2-Fluorobiphenyl	95.6	59-108		%REC	1	3/18/2009 05:13 PM
Surr: 4-Terphenyl-d14	109	58-135		%REC	1	3/18/2009 05:13 PM
Surr: Nitrobenzene-d5	83.9	54-115		%REC	1	3/18/2009 05:13 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P-11
Lab Order:	104477	**Collection Date:**	3/10/2009 10:40:00 AM
Project:	Caltrans-Dumbartan Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104477-003A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090320H	QC Batch: 53943			PrepDate: 3/18/2009		Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	3/20/2009 02:40 PM
Arsenic	2.7	1.0		mg/Kg	1	3/20/2009 02:40 PM
Barium	26	1.0		mg/Kg	1	3/20/2009 02:40 PM
Beryllium	ND	1.0		mg/Kg	1	3/20/2009 02:40 PM
Cadmium	ND	1.0		mg/Kg	1	3/20/2009 02:40 PM
Chromium	27	1.0		mg/Kg	1	3/20/2009 02:40 PM
Cobalt	5.1	1.0		mg/Kg	1	3/20/2009 02:40 PM
Copper	18	2.0		mg/Kg	1	3/20/2009 02:40 PM
Lead	7.6	1.0		mg/Kg	1	3/20/2009 02:40 PM
Molybdenum	ND	1.0		mg/Kg	1	3/20/2009 02:40 PM
Nickel	29	1.0		mg/Kg	1	3/20/2009 02:40 PM
Selenium	ND	1.0		mg/Kg	1	3/20/2009 02:40 PM
Silver	ND	1.0		mg/Kg	1	3/20/2009 02:40 PM
Thallium	ND	1.0		mg/Kg	1	3/20/2009 02:40 PM
Vanadium	25	1.0		mg/Kg	1	3/20/2009 02:40 PM
Zinc	39	1.0		mg/Kg	1	3/20/2009 02:40 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090319B	QC Batch: 53969			PrepDate: 3/18/2009		Analyst: **CBR**
DRO	ND	1.0		mg/Kg	1	3/19/2009 05:32 PM
ORO	ND	1.0		mg/Kg	1	3/19/2009 05:32 PM
Surr: p-Terphenyl	97.7	30-130		%REC	1	3/19/2009 05:32 PM
ORGANOCHLORINE PESTICIDES BY GC/ECD						
	EPA 3550B			**EPA 8081A**		
RunID: GC10_090318B	QC Batch: 53983			PrepDate: 3/18/2009		Analyst: **SMH**
4,4´-DDD	ND	2.0		µg/Kg	1	3/19/2009 12:00 AM
4,4´-DDE	ND	2.0		µg/Kg	1	3/19/2009 12:00 AM
4,4´-DDT	ND	2.0		µg/Kg	1	3/19/2009 12:00 AM
Aldrin	ND	1.0		µg/Kg	1	3/19/2009 12:00 AM
alpha-BHC	ND	1.0		µg/Kg	1	3/19/2009 12:00 AM
alpha-Chlordane	ND	1.0		µg/Kg	1	3/19/2009 12:00 AM
beta-BHC	ND	1.0		µg/Kg	1	3/19/2009 12:00 AM
Chlordane	ND	8.5		µg/Kg	1	3/19/2009 12:00 AM
delta-BHC	ND	1.0		µg/Kg	1	3/19/2009 12:00 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P-11
Lab Order:	104477	**Collection Date:**	3/10/2009 10:40:00 AM
Project:	Caltrans-Dumbartan Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104477-003A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ORGANOCHLORINE PESTICIDES BY GC/ECD						
	EPA 3550B			**EPA 8081A**		
RunID: GC10_090318B	QC Batch: 53983			PrepDate:	3/18/2009	Analyst: **SMH**
Dieldrin	ND	2.0		µg/Kg	1	3/19/2009 12:00 AM
Endosulfan I	ND	1.0		µg/Kg	1	3/19/2009 12:00 AM
Endosulfan II	ND	2.0		µg/Kg	1	3/19/2009 12:00 AM
Endosulfan sulfate	ND	2.0		µg/Kg	1	3/19/2009 12:00 AM
Endrin	ND	2.0		µg/Kg	1	3/19/2009 12:00 AM
Endrin aldehyde	ND	2.0		µg/Kg	1	3/19/2009 12:00 AM
Endrin ketone	ND	2.0		µg/Kg	1	3/19/2009 12:00 AM
gamma-BHC	ND	1.0		µg/Kg	1	3/19/2009 12:00 AM
gamma-Chlordane	ND	1.0		µg/Kg	1	3/19/2009 12:00 AM
Heptachlor	ND	1.0		µg/Kg	1	3/19/2009 12:00 AM
Heptachlor epoxide	ND	1.0		µg/Kg	1	3/19/2009 12:00 AM
Methoxychlor	ND	5.0		µg/Kg	1	3/19/2009 12:00 AM
Toxaphene	ND	50		µg/Kg	1	3/19/2009 12:00 AM
Surr: Decachlorobiphenyl	78.6	20-142		%REC	1	3/19/2009 12:00 AM
Surr: Tetrachloro-m-xylene	77.0	25-115		%REC	1	3/19/2009 12:00 AM
PCBS BY GC/ECD						
	EPA 3550B			**EPA 8082**		
RunID: GC5_090318A	QC Batch: 53983			PrepDate:	3/18/2009	Analyst: **HL**
Aroclor 1016	ND	16		µg/Kg	1	3/18/2009 10:40 PM
Aroclor 1221	ND	33		µg/Kg	1	3/18/2009 10:40 PM
Aroclor 1232	ND	16		µg/Kg	1	3/18/2009 10:40 PM
Aroclor 1242	ND	16		µg/Kg	1	3/18/2009 10:40 PM
Aroclor 1248	ND	16		µg/Kg	1	3/18/2009 10:40 PM
Aroclor 1254	ND	16		µg/Kg	1	3/18/2009 10:40 PM
Aroclor 1260	ND	16		µg/Kg	1	3/18/2009 10:40 PM
Aroclor 1262	ND	16		µg/Kg	1	3/18/2009 10:40 PM
Aroclor 1268	ND	16		µg/Kg	1	3/18/2009 10:40 PM
Surr: Decachlorobiphenyl	94.0	30-124		%REC	1	3/18/2009 10:40 PM
Surr: Tetrachloro-m-xylene	98.0	40-118		%REC	1	3/18/2009 10:40 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA5_090319A	QC Batch: 53935			PrepDate:	3/18/2009	Analyst: **RQ**
Mercury	0.11	0.10		mg/Kg	1	3/19/2009 09:55 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P-11
Lab Order:	104477	**Collection Date:**	3/10/2009 10:40:00 AM
Project:	Caltrans-Dumbartan Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104477-003A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090318B QC Batch: 53913 PrepDate: 3/17/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2-Methylnaphthalene	ND	330		µg/Kg	1	3/18/2009 05:40 PM
Acenaphthene	ND	330		µg/Kg	1	3/18/2009 05:40 PM
Acenaphthylene	ND	330		µg/Kg	1	3/18/2009 05:40 PM
Anthracene	ND	330		µg/Kg	1	3/18/2009 05:40 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	3/18/2009 05:40 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	3/18/2009 05:40 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	3/18/2009 05:40 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	3/18/2009 05:40 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	3/18/2009 05:40 PM
Chrysene	ND	330		µg/Kg	1	3/18/2009 05:40 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	3/18/2009 05:40 PM
Fluoranthene	ND	330		µg/Kg	1	3/18/2009 05:40 PM
Fluorene	ND	330		µg/Kg	1	3/18/2009 05:40 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	3/18/2009 05:40 PM
Naphthalene	ND	330		µg/Kg	1	3/18/2009 05:40 PM
Phenanthrene	ND	330		µg/Kg	1	3/18/2009 05:40 PM
Pyrene	ND	330		µg/Kg	1	3/18/2009 05:40 PM
Surr: 1,2-Dichlorobenzene-d4	81.8	49-103		%REC	1	3/18/2009 05:40 PM
Surr: 2-Fluorobiphenyl	101	59-108		%REC	1	3/18/2009 05:40 PM
Surr: 4-Terphenyl-d14	113	58-135		%REC	1	3/18/2009 05:40 PM
Surr: Nitrobenzene-d5	87.3	54-115		%REC	1	3/18/2009 05:40 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P-5
Lab Order:	104477	**Collection Date:**	3/10/2009 12:00:00 PM
Project:	Caltrans-Dumbartan Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104477-004A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090320H	QC Batch: 53943			PrepDate: 3/18/2009		Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	3/20/2009 02:43 PM
Arsenic	2.9	1.0		mg/Kg	1	3/20/2009 02:43 PM
Barium	30	1.0		mg/Kg	1	3/20/2009 02:43 PM
Beryllium	ND	1.0		mg/Kg	1	3/20/2009 02:43 PM
Cadmium	ND	1.0		mg/Kg	1	3/20/2009 02:43 PM
Chromium	37	1.0		mg/Kg	1	3/20/2009 02:43 PM
Cobalt	6.4	1.0		mg/Kg	1	3/20/2009 02:43 PM
Copper	19	2.0		mg/Kg	1	3/20/2009 02:43 PM
Lead	12	1.0		mg/Kg	1	3/20/2009 02:43 PM
Molybdenum	ND	1.0		mg/Kg	1	3/20/2009 02:43 PM
Nickel	37	1.0		mg/Kg	1	3/20/2009 02:43 PM
Selenium	ND	1.0		mg/Kg	1	3/20/2009 02:43 PM
Silver	ND	1.0		mg/Kg	1	3/20/2009 02:43 PM
Thallium	ND	1.0		mg/Kg	1	3/20/2009 02:43 PM
Vanadium	30	1.0		mg/Kg	1	3/20/2009 02:43 PM
Zinc	52	1.0		mg/Kg	1	3/20/2009 02:43 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090319B	QC Batch: 53969			PrepDate: 3/18/2009		Analyst: **CBR**
DRO	ND	1.0		mg/Kg	1	3/19/2009 05:43 PM
ORO	ND	1.0		mg/Kg	1	3/19/2009 05:43 PM
Surr: p-Terphenyl	95.6	30-130		%REC	1	3/19/2009 05:43 PM
ORGANOCHLORINE PESTICIDES BY GC/ECD						
	EPA 3550B			**EPA 8081A**		
RunID: GC10_090318B	QC Batch: 53983			PrepDate: 3/18/2009		Analyst: **SMH**
4,4´-DDD	ND	2.0		µg/Kg	1	3/19/2009 12:14 AM
4,4´-DDE	ND	2.0		µg/Kg	1	3/19/2009 12:14 AM
4,4´-DDT	ND	2.0		µg/Kg	1	3/19/2009 12:14 AM
Aldrin	ND	1.0		µg/Kg	1	3/19/2009 12:14 AM
alpha-BHC	ND	1.0		µg/Kg	1	3/19/2009 12:14 AM
alpha-Chlordane	ND	1.0		µg/Kg	1	3/19/2009 12:14 AM
beta-BHC	ND	1.0		µg/Kg	1	3/19/2009 12:14 AM
Chlordane	ND	8.5		µg/Kg	1	3/19/2009 12:14 AM
delta-BHC	ND	1.0		µg/Kg	1	3/19/2009 12:14 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Geocon Consultants, Inc. **Client Sample ID:** P-5
Lab Order: 104477 **Collection Date:** 3/10/2009 12:00:00 PM
Project: Caltrans-Dumbartan Bridge, E8435-06-18 **Matrix:** SOIL
Lab ID: 104477-004A

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ORGANOCHLORINE PESTICIDES BY GC/ECD						
	EPA 3550B			**EPA 8081A**		
RunID: GC10_090318B	QC Batch: 53983			PrepDate:	3/18/2009	Analyst: **SMH**
Dieldrin	ND	2.0		µg/Kg	1	3/19/2009 12:14 AM
Endosulfan I	ND	1.0		µg/Kg	1	3/19/2009 12:14 AM
Endosulfan II	ND	2.0		µg/Kg	1	3/19/2009 12:14 AM
Endosulfan sulfate	ND	2.0		µg/Kg	1	3/19/2009 12:14 AM
Endrin	ND	2.0		µg/Kg	1	3/19/2009 12:14 AM
Endrin aldehyde	ND	2.0		µg/Kg	1	3/19/2009 12:14 AM
Endrin ketone	ND	2.0		µg/Kg	1	3/19/2009 12:14 AM
gamma-BHC	ND	1.0		µg/Kg	1	3/19/2009 12:14 AM
gamma-Chlordane	ND	1.0		µg/Kg	1	3/19/2009 12:14 AM
Heptachlor	ND	1.0		µg/Kg	1	3/19/2009 12:14 AM
Heptachlor epoxide	ND	1.0		µg/Kg	1	3/19/2009 12:14 AM
Methoxychlor	ND	5.0		µg/Kg	1	3/19/2009 12:14 AM
Toxaphene	ND	50		µg/Kg	1	3/19/2009 12:14 AM
Surr: Decachlorobiphenyl	74.2	20-142		%REC	1	3/19/2009 12:14 AM
Surr: Tetrachloro-m-xylene	74.1	25-115		%REC	1	3/19/2009 12:14 AM
PCBS BY GC/ECD						
	EPA 3550B			**EPA 8082**		
RunID: GC5_090318A	QC Batch: 53983			PrepDate:	3/18/2009	Analyst: **HL**
Aroclor 1016	ND	16		µg/Kg	1	3/18/2009 11:10 PM
Aroclor 1221	ND	33		µg/Kg	1	3/18/2009 11:10 PM
Aroclor 1232	ND	16		µg/Kg	1	3/18/2009 11:10 PM
Aroclor 1242	ND	16		µg/Kg	1	3/18/2009 11:10 PM
Aroclor 1248	ND	16		µg/Kg	1	3/18/2009 11:10 PM
Aroclor 1254	ND	16		µg/Kg	1	3/18/2009 11:10 PM
Aroclor 1260	ND	16		µg/Kg	1	3/18/2009 11:10 PM
Aroclor 1262	ND	16		µg/Kg	1	3/18/2009 11:10 PM
Aroclor 1268	ND	16		µg/Kg	1	3/18/2009 11:10 PM
Surr: Decachlorobiphenyl	86.9	30-124		%REC	1	3/18/2009 11:10 PM
Surr: Tetrachloro-m-xylene	112	40-118		%REC	1	3/18/2009 11:10 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA5_090319A	QC Batch: 53935			PrepDate:	3/18/2009	Analyst: **RQ**
Mercury	0.14	0.10		mg/Kg	1	3/19/2009 10:03 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P-5
Lab Order:	104477	**Collection Date:**	3/10/2009 12:00:00 PM
Project:	Caltrans-Dumbartan Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104477-004A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090318B QC Batch: 53913 PrepDate: 3/17/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2-Methylnaphthalene	ND	330		µg/Kg	1	3/18/2009 06:07 PM
Acenaphthene	ND	330		µg/Kg	1	3/18/2009 06:07 PM
Acenaphthylene	ND	330		µg/Kg	1	3/18/2009 06:07 PM
Anthracene	ND	330		µg/Kg	1	3/18/2009 06:07 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	3/18/2009 06:07 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	3/18/2009 06:07 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	3/18/2009 06:07 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	3/18/2009 06:07 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	3/18/2009 06:07 PM
Chrysene	ND	330		µg/Kg	1	3/18/2009 06:07 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	3/18/2009 06:07 PM
Fluoranthene	ND	330		µg/Kg	1	3/18/2009 06:07 PM
Fluorene	ND	330		µg/Kg	1	3/18/2009 06:07 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	3/18/2009 06:07 PM
Naphthalene	ND	330		µg/Kg	1	3/18/2009 06:07 PM
Phenanthrene	ND	330		µg/Kg	1	3/18/2009 06:07 PM
Pyrene	ND	330		µg/Kg	1	3/18/2009 06:07 PM
Surr: 1,2-Dichlorobenzene-d4	72.5	49-103		%REC	1	3/18/2009 06:07 PM
Surr: 2-Fluorobiphenyl	93.4	59-108		%REC	1	3/18/2009 06:07 PM
Surr: 4-Terphenyl-d14	108	58-135		%REC	1	3/18/2009 06:07 PM
Surr: Nitrobenzene-d5	81.0	54-115		%REC	1	3/18/2009 06:07 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P-7
Lab Order:	104477	**Collection Date:**	3/10/2009 12:50:00 PM
Project:	Caltrans-Dumbartan Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104477-005A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B				**EPA 6010B**		
RunID: ICP8_090320H	QC Batch: 53943			PrepDate: 3/18/2009		Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	3/20/2009 02:46 PM
Arsenic	3.3	1.0		mg/Kg	1	3/20/2009 02:46 PM
Barium	26	1.0		mg/Kg	1	3/20/2009 02:46 PM
Beryllium	ND	1.0		mg/Kg	1	3/20/2009 02:46 PM
Cadmium	ND	1.0		mg/Kg	1	3/20/2009 02:46 PM
Chromium	27	1.0		mg/Kg	1	3/20/2009 02:46 PM
Cobalt	5.4	1.0		mg/Kg	1	3/20/2009 02:46 PM
Copper	18	2.0		mg/Kg	1	3/20/2009 02:46 PM
Lead	34	1.0		mg/Kg	1	3/20/2009 02:46 PM
Molybdenum	ND	1.0		mg/Kg	1	3/20/2009 02:46 PM
Nickel	28	1.0		mg/Kg	1	3/20/2009 02:46 PM
Selenium	ND	1.0		mg/Kg	1	3/20/2009 02:46 PM
Silver	ND	1.0		mg/Kg	1	3/20/2009 02:46 PM
Thallium	ND	1.0		mg/Kg	1	3/20/2009 02:46 PM
Vanadium	22	1.0		mg/Kg	1	3/20/2009 02:46 PM
Zinc	36	1.0		mg/Kg	1	3/20/2009 02:46 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
EPA 3550B				**EPA 8015B(M)**		
RunID: GC16_090319B	QC Batch: 53969			PrepDate: 3/18/2009		Analyst: **CBR**
DRO	1.6	1.0		mg/Kg	1	3/19/2009 06:38 PM
ORO	2.6	1.0		mg/Kg	1	3/19/2009 06:38 PM
Surr: p-Terphenyl	82.1	30-130		%REC	1	3/19/2009 06:38 PM
ORGANOCHLORINE PESTICIDES BY GC/ECD						
EPA 3550B				**EPA 8081A**		
RunID: GC10_090318B	QC Batch: 53983			PrepDate: 3/18/2009		Analyst: **SMH**
4,4´-DDD	ND	2.0		µg/Kg	1	3/19/2009 12:28 AM
4,4´-DDE	ND	2.0		µg/Kg	1	3/19/2009 12:28 AM
4,4´-DDT	ND	2.0		µg/Kg	1	3/19/2009 12:28 AM
Aldrin	ND	1.0		µg/Kg	1	3/19/2009 12:28 AM
alpha-BHC	ND	1.0		µg/Kg	1	3/19/2009 12:28 AM
alpha-Chlordane	ND	1.0		µg/Kg	1	3/19/2009 12:28 AM
beta-BHC	ND	1.0		µg/Kg	1	3/19/2009 12:28 AM
Chlordane	ND	8.5		µg/Kg	1	3/19/2009 12:28 AM
delta-BHC	ND	1.0		µg/Kg	1	3/19/2009 12:28 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Geocon Consultants, Inc. **Client Sample ID:** P-7
Lab Order: 104477 **Collection Date:** 3/10/2009 12:50:00 PM
Project: Caltrans-Dumbartan Bridge, E8435-06-18 **Matrix:** SOIL
Lab ID: 104477-005A

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ORGANOCHLORINE PESTICIDES BY GC/ECD						
	EPA 3550B			**EPA 8081A**		
RunID: GC10_090318B	QC Batch: 53983			PrepDate:	3/18/2009	Analyst: **SMH**
Dieldrin	ND	2.0		µg/Kg	1	3/19/2009 12:28 AM
Endosulfan I	ND	1.0		µg/Kg	1	3/19/2009 12:28 AM
Endosulfan II	ND	2.0		µg/Kg	1	3/19/2009 12:28 AM
Endosulfan sulfate	ND	2.0		µg/Kg	1	3/19/2009 12:28 AM
Endrin	ND	2.0		µg/Kg	1	3/19/2009 12:28 AM
Endrin aldehyde	ND	2.0		µg/Kg	1	3/19/2009 12:28 AM
Endrin ketone	ND	2.0		µg/Kg	1	3/19/2009 12:28 AM
gamma-BHC	ND	1.0		µg/Kg	1	3/19/2009 12:28 AM
gamma-Chlordane	ND	1.0		µg/Kg	1	3/19/2009 12:28 AM
Heptachlor	ND	1.0		µg/Kg	1	3/19/2009 12:28 AM
Heptachlor epoxide	ND	1.0		µg/Kg	1	3/19/2009 12:28 AM
Methoxychlor	ND	5.0		µg/Kg	1	3/19/2009 12:28 AM
Toxaphene	ND	50		µg/Kg	1	3/19/2009 12:28 AM
Surr: Decachlorobiphenyl	75.8	20-142		%REC	1	3/19/2009 12:28 AM
Surr: Tetrachloro-m-xylene	74.1	25-115		%REC	1	3/19/2009 12:28 AM
PCBS BY GC/ECD						
	EPA 3550B			**EPA 8082**		
RunID: GC5_090318A	QC Batch: 53983			PrepDate:	3/18/2009	Analyst: **HL**
Aroclor 1016	ND	16		µg/Kg	1	3/18/2009 11:40 PM
Aroclor 1221	ND	33		µg/Kg	1	3/18/2009 11:40 PM
Aroclor 1232	ND	16		µg/Kg	1	3/18/2009 11:40 PM
Aroclor 1242	ND	16		µg/Kg	1	3/18/2009 11:40 PM
Aroclor 1248	ND	16		µg/Kg	1	3/18/2009 11:40 PM
Aroclor 1254	ND	16		µg/Kg	1	3/18/2009 11:40 PM
Aroclor 1260	ND	16		µg/Kg	1	3/18/2009 11:40 PM
Aroclor 1262	ND	16		µg/Kg	1	3/18/2009 11:40 PM
Aroclor 1268	ND	16		µg/Kg	1	3/18/2009 11:40 PM
Surr: Decachlorobiphenyl	91.4	30-124		%REC	1	3/18/2009 11:40 PM
Surr: Tetrachloro-m-xylene	93.7	40-118		%REC	1	3/18/2009 11:40 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA5_090319A	QC Batch: 53935			PrepDate:	3/18/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	3/19/2009 10:05 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P-7
Lab Order:	104477	**Collection Date:**	3/10/2009 12:50:00 PM
Project:	Caltrans-Dumbartan Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104477-005A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090318B QC Batch: 53913 PrepDate: 3/17/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2-Methylnaphthalene	ND	330		µg/Kg	1	3/18/2009 06:35 PM
Acenaphthene	ND	330		µg/Kg	1	3/18/2009 06:35 PM
Acenaphthylene	ND	330		µg/Kg	1	3/18/2009 06:35 PM
Anthracene	ND	330		µg/Kg	1	3/18/2009 06:35 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	3/18/2009 06:35 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	3/18/2009 06:35 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	3/18/2009 06:35 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	3/18/2009 06:35 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	3/18/2009 06:35 PM
Chrysene	ND	330		µg/Kg	1	3/18/2009 06:35 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	3/18/2009 06:35 PM
Fluoranthene	ND	330		µg/Kg	1	3/18/2009 06:35 PM
Fluorene	ND	330		µg/Kg	1	3/18/2009 06:35 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	3/18/2009 06:35 PM
Naphthalene	ND	330		µg/Kg	1	3/18/2009 06:35 PM
Phenanthrene	ND	330		µg/Kg	1	3/18/2009 06:35 PM
Pyrene	ND	330		µg/Kg	1	3/18/2009 06:35 PM
Surr: 1,2-Dichlorobenzene-d4	77.8	49-103		%REC	1	3/18/2009 06:35 PM
Surr: 2-Fluorobiphenyl	97.0	59-108		%REC	1	3/18/2009 06:35 PM
Surr: 4-Terphenyl-d14	110	58-135		%REC	1	3/18/2009 06:35 PM
Surr: Nitrobenzene-d5	84.8	54-115		%REC	1	3/18/2009 06:35 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Geocon Consultants, Inc. **Client Sample ID:** P-33
Lab Order: 104477 **Collection Date:** 3/11/2009 10:30:00 AM
Project: Caltrans-Dumbartan Bridge, E8435-06-18 **Matrix:** SOIL
Lab ID: 104477-006A

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090320H	QC Batch: 53943			PrepDate: 3/18/2009		Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	3/20/2009 02:57 PM
Arsenic	3.5	1.0		mg/Kg	1	3/20/2009 02:57 PM
Barium	27	1.0		mg/Kg	1	3/20/2009 02:57 PM
Beryllium	ND	1.0		mg/Kg	1	3/20/2009 02:57 PM
Cadmium	ND	1.0		mg/Kg	1	3/20/2009 02:57 PM
Chromium	43	1.0		mg/Kg	1	3/20/2009 02:57 PM
Cobalt	7.3	1.0		mg/Kg	1	3/20/2009 02:57 PM
Copper	16	2.0		mg/Kg	1	3/20/2009 02:57 PM
Lead	3.8	1.0		mg/Kg	1	3/20/2009 02:57 PM
Molybdenum	ND	1.0		mg/Kg	1	3/20/2009 02:57 PM
Nickel	49	1.0		mg/Kg	1	3/20/2009 02:57 PM
Selenium	ND	1.0		mg/Kg	1	3/20/2009 02:57 PM
Silver	ND	1.0		mg/Kg	1	3/20/2009 02:57 PM
Thallium	ND	1.0		mg/Kg	1	3/20/2009 02:57 PM
Vanadium	31	1.0		mg/Kg	1	3/20/2009 02:57 PM
Zinc	40	1.0		mg/Kg	1	3/20/2009 02:57 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090319B	QC Batch: 53969			PrepDate: 3/18/2009		Analyst: **CBR**
DRO	ND	1.0		mg/Kg	1	3/19/2009 05:01 PM
ORO	ND	1.0		mg/Kg	1	3/19/2009 05:01 PM
Surr: p-Terphenyl	99.7	30-130		%REC	1	3/19/2009 05:01 PM
ORGANOCHLORINE PESTICIDES BY GC/ECD						
	EPA 3550B			**EPA 8081A**		
RunID: GC10_090318B	QC Batch: 53983			PrepDate: 3/18/2009		Analyst: **SMH**
4,4´-DDD	ND	2.0		µg/Kg	1	3/19/2009 12:41 AM
4,4´-DDE	ND	2.0		µg/Kg	1	3/19/2009 12:41 AM
4,4´-DDT	ND	2.0		µg/Kg	1	3/19/2009 12:41 AM
Aldrin	ND	1.0		µg/Kg	1	3/19/2009 12:41 AM
alpha-BHC	ND	1.0		µg/Kg	1	3/19/2009 12:41 AM
alpha-Chlordane	ND	1.0		µg/Kg	1	3/19/2009 12:41 AM
beta-BHC	ND	1.0		µg/Kg	1	3/19/2009 12:41 AM
Chlordane	ND	8.5		µg/Kg	1	3/19/2009 12:41 AM
delta-BHC	ND	1.0		µg/Kg	1	3/19/2009 12:41 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P-33
Lab Order:	104477	**Collection Date:**	3/11/2009 10:30:00 AM
Project:	Caltrans-Dumbartan Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104477-006A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ORGANOCHLORINE PESTICIDES BY GC/ECD						
	EPA 3550B			**EPA 8081A**		
RunID: GC10_090318B	QC Batch: 53983			PrepDate:	3/18/2009	Analyst: **SMH**
Dieldrin	ND	2.0		µg/Kg	1	3/19/2009 12:41 AM
Endosulfan I	ND	1.0		µg/Kg	1	3/19/2009 12:41 AM
Endosulfan II	ND	2.0		µg/Kg	1	3/19/2009 12:41 AM
Endosulfan sulfate	ND	2.0		µg/Kg	1	3/19/2009 12:41 AM
Endrin	ND	2.0		µg/Kg	1	3/19/2009 12:41 AM
Endrin aldehyde	ND	2.0		µg/Kg	1	3/19/2009 12:41 AM
Endrin ketone	ND	2.0		µg/Kg	1	3/19/2009 12:41 AM
gamma-BHC	ND	1.0		µg/Kg	1	3/19/2009 12:41 AM
gamma-Chlordane	ND	1.0		µg/Kg	1	3/19/2009 12:41 AM
Heptachlor	ND	1.0		µg/Kg	1	3/19/2009 12:41 AM
Heptachlor epoxide	ND	1.0		µg/Kg	1	3/19/2009 12:41 AM
Methoxychlor	ND	5.0		µg/Kg	1	3/19/2009 12:41 AM
Toxaphene	ND	50		µg/Kg	1	3/19/2009 12:41 AM
Surr: Decachlorobiphenyl	79.1	20-142		%REC	1	3/19/2009 12:41 AM
Surr: Tetrachloro-m-xylene	73.6	25-115		%REC	1	3/19/2009 12:41 AM
PCBS BY GC/ECD						
	EPA 3550B			**EPA 8082**		
RunID: GC5_090318A	QC Batch: 53983			PrepDate:	3/18/2009	Analyst: **HL**
Aroclor 1016	ND	16		µg/Kg	1	3/19/2009 12:10 AM
Aroclor 1221	ND	33		µg/Kg	1	3/19/2009 12:10 AM
Aroclor 1232	ND	16		µg/Kg	1	3/19/2009 12:10 AM
Aroclor 1242	ND	16		µg/Kg	1	3/19/2009 12:10 AM
Aroclor 1248	ND	16		µg/Kg	1	3/19/2009 12:10 AM
Aroclor 1254	ND	16		µg/Kg	1	3/19/2009 12:10 AM
Aroclor 1260	ND	16		µg/Kg	1	3/19/2009 12:10 AM
Aroclor 1262	ND	16		µg/Kg	1	3/19/2009 12:10 AM
Aroclor 1268	ND	16		µg/Kg	1	3/19/2009 12:10 AM
Surr: Decachlorobiphenyl	94.8	30-124		%REC	1	3/19/2009 12:10 AM
Surr: Tetrachloro-m-xylene	87.1	40-118		%REC	1	3/19/2009 12:10 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA5_090319A	QC Batch: 53935			PrepDate:	3/18/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	3/19/2009 10:07 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P-33
Lab Order:	104477	**Collection Date:**	3/11/2009 10:30:00 AM
Project:	Caltrans-Dumbartan Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104477-006A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090318B QC Batch: 53913 PrepDate: 3/17/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2-Methylnaphthalene	ND	330		µg/Kg	1	3/18/2009 07:02 PM
Acenaphthene	ND	330		µg/Kg	1	3/18/2009 07:02 PM
Acenaphthylene	ND	330		µg/Kg	1	3/18/2009 07:02 PM
Anthracene	ND	330		µg/Kg	1	3/18/2009 07:02 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	3/18/2009 07:02 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	3/18/2009 07:02 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	3/18/2009 07:02 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	3/18/2009 07:02 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	3/18/2009 07:02 PM
Chrysene	ND	330		µg/Kg	1	3/18/2009 07:02 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	3/18/2009 07:02 PM
Fluoranthene	ND	330		µg/Kg	1	3/18/2009 07:02 PM
Fluorene	ND	330		µg/Kg	1	3/18/2009 07:02 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	3/18/2009 07:02 PM
Naphthalene	ND	330		µg/Kg	1	3/18/2009 07:02 PM
Phenanthrene	ND	330		µg/Kg	1	3/18/2009 07:02 PM
Pyrene	ND	330		µg/Kg	1	3/18/2009 07:02 PM
Surr: 1,2-Dichlorobenzene-d4	82.6	49-103		%REC	1	3/18/2009 07:02 PM
Surr: 2-Fluorobiphenyl	98.0	59-108		%REC	1	3/18/2009 07:02 PM
Surr: 4-Terphenyl-d14	113	58-135		%REC	1	3/18/2009 07:02 PM
Surr: Nitrobenzene-d5	88.3	54-115		%REC	1	3/18/2009 07:02 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P-35
Lab Order:	104477	**Collection Date:**	3/11/2009 11:10:00 AM
Project:	Caltrans-Dumbartan Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104477-007A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B				**EPA 6010B**		
RunID: ICP8_090320H	QC Batch: 53943			PrepDate: 3/18/2009		Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	3/20/2009 03:00 PM
Arsenic	4.3	1.0		mg/Kg	1	3/20/2009 03:00 PM
Barium	26	1.0		mg/Kg	1	3/20/2009 03:00 PM
Beryllium	ND	1.0		mg/Kg	1	3/20/2009 03:00 PM
Cadmium	ND	1.0		mg/Kg	1	3/20/2009 03:00 PM
Chromium	34	1.0		mg/Kg	1	3/20/2009 03:00 PM
Cobalt	6.1	1.0		mg/Kg	1	3/20/2009 03:00 PM
Copper	13	2.0		mg/Kg	1	3/20/2009 03:00 PM
Lead	4.2	1.0		mg/Kg	1	3/20/2009 03:00 PM
Molybdenum	ND	1.0		mg/Kg	1	3/20/2009 03:00 PM
Nickel	36	1.0		mg/Kg	1	3/20/2009 03:00 PM
Selenium	ND	1.0		mg/Kg	1	3/20/2009 03:00 PM
Silver	ND	1.0		mg/Kg	1	3/20/2009 03:00 PM
Thallium	ND	1.0		mg/Kg	1	3/20/2009 03:00 PM
Vanadium	29	1.0		mg/Kg	1	3/20/2009 03:00 PM
Zinc	34	1.0		mg/Kg	1	3/20/2009 03:00 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
EPA 3550B				**EPA 8015B(M)**		
RunID: GC16_090319B	QC Batch: 53969			PrepDate: 3/18/2009		Analyst: **CBR**
DRO	ND	1.0		mg/Kg	1	3/19/2009 05:12 PM
ORO	ND	1.0		mg/Kg	1	3/19/2009 05:12 PM
Surr: p-Terphenyl	89.3	30-130		%REC	1	3/19/2009 05:12 PM
ORGANOCHLORINE PESTICIDES BY GC/ECD						
EPA 3550B				**EPA 8081A**		
RunID: GC10_090318B	QC Batch: 53983			PrepDate: 3/18/2009		Analyst: **SMH**
4,4´-DDD	ND	2.0		µg/Kg	1	3/19/2009 12:55 AM
4,4´-DDE	ND	2.0		µg/Kg	1	3/19/2009 12:55 AM
4,4´-DDT	ND	2.0		µg/Kg	1	3/19/2009 12:55 AM
Aldrin	ND	1.0		µg/Kg	1	3/19/2009 12:55 AM
alpha-BHC	ND	1.0		µg/Kg	1	3/19/2009 12:55 AM
alpha-Chlordane	ND	1.0		µg/Kg	1	3/19/2009 12:55 AM
beta-BHC	ND	1.0		µg/Kg	1	3/19/2009 12:55 AM
Chlordane	ND	8.5		µg/Kg	1	3/19/2009 12:55 AM
delta-BHC	ND	1.0		µg/Kg	1	3/19/2009 12:55 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P-35
Lab Order:	104477	**Collection Date:**	3/11/2009 11:10:00 AM
Project:	Caltrans-Dumbartan Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104477-007A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ORGANOCHLORINE PESTICIDES BY GC/ECD						
	EPA 3550B			**EPA 8081A**		
RunID: GC10_090318B	QC Batch: 53983			PrepDate:	3/18/2009	Analyst: **SMH**
Dieldrin	ND	2.0		µg/Kg	1	3/19/2009 12:55 AM
Endosulfan I	ND	1.0		µg/Kg	1	3/19/2009 12:55 AM
Endosulfan II	ND	2.0		µg/Kg	1	3/19/2009 12:55 AM
Endosulfan sulfate	ND	2.0		µg/Kg	1	3/19/2009 12:55 AM
Endrin	ND	2.0		µg/Kg	1	3/19/2009 12:55 AM
Endrin aldehyde	ND	2.0		µg/Kg	1	3/19/2009 12:55 AM
Endrin ketone	ND	2.0		µg/Kg	1	3/19/2009 12:55 AM
gamma-BHC	ND	1.0		µg/Kg	1	3/19/2009 12:55 AM
gamma-Chlordane	ND	1.0		µg/Kg	1	3/19/2009 12:55 AM
Heptachlor	ND	1.0		µg/Kg	1	3/19/2009 12:55 AM
Heptachlor epoxide	ND	1.0		µg/Kg	1	3/19/2009 12:55 AM
Methoxychlor	ND	5.0		µg/Kg	1	3/19/2009 12:55 AM
Toxaphene	ND	50		µg/Kg	1	3/19/2009 12:55 AM
Surr: Decachlorobiphenyl	80.3	20-142		%REC	1	3/19/2009 12:55 AM
Surr: Tetrachloro-m-xylene	81.2	25-115		%REC	1	3/19/2009 12:55 AM
PCBS BY GC/ECD						
	EPA 3550B			**EPA 8082**		
RunID: GC5_090318A	QC Batch: 53983			PrepDate:	3/18/2009	Analyst: **HL**
Aroclor 1016	ND	16		µg/Kg	1	3/19/2009 01:09 AM
Aroclor 1221	ND	33		µg/Kg	1	3/19/2009 01:09 AM
Aroclor 1232	ND	16		µg/Kg	1	3/19/2009 01:09 AM
Aroclor 1242	ND	16		µg/Kg	1	3/19/2009 01:09 AM
Aroclor 1248	ND	16		µg/Kg	1	3/19/2009 01:09 AM
Aroclor 1254	ND	16		µg/Kg	1	3/19/2009 01:09 AM
Aroclor 1260	ND	16		µg/Kg	1	3/19/2009 01:09 AM
Aroclor 1262	ND	16		µg/Kg	1	3/19/2009 01:09 AM
Aroclor 1268	ND	16		µg/Kg	1	3/19/2009 01:09 AM
Surr: Decachlorobiphenyl	96.5	30-124		%REC	1	3/19/2009 01:09 AM
Surr: Tetrachloro-m-xylene	95.2	40-118		%REC	1	3/19/2009 01:09 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA5_090319A	QC Batch: 53935			PrepDate:	3/18/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	3/19/2009 10:08 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P-35
Lab Order:	104477	**Collection Date:**	3/11/2009 11:10:00 AM
Project:	Caltrans-Dumbartan Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104477-007A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090319A QC Batch: 53989 PrepDate: 3/19/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2-Methylnaphthalene	ND	330		µg/Kg	1	3/19/2009 01:07 PM
Acenaphthene	ND	330		µg/Kg	1	3/19/2009 01:07 PM
Acenaphthylene	ND	330		µg/Kg	1	3/19/2009 01:07 PM
Anthracene	ND	330		µg/Kg	1	3/19/2009 01:07 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	3/19/2009 01:07 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	3/19/2009 01:07 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	3/19/2009 01:07 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	3/19/2009 01:07 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	3/19/2009 01:07 PM
Chrysene	ND	330		µg/Kg	1	3/19/2009 01:07 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	3/19/2009 01:07 PM
Fluoranthene	ND	330		µg/Kg	1	3/19/2009 01:07 PM
Fluorene	ND	330		µg/Kg	1	3/19/2009 01:07 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	3/19/2009 01:07 PM
Naphthalene	ND	330		µg/Kg	1	3/19/2009 01:07 PM
Phenanthrene	ND	330		µg/Kg	1	3/19/2009 01:07 PM
Pyrene	ND	330		µg/Kg	1	3/19/2009 01:07 PM
Surr: 1,2-Dichlorobenzene-d4	84.4	49-103		%REC	1	3/19/2009 01:07 PM
Surr: 2-Fluorobiphenyl	103	59-108		%REC	1	3/19/2009 01:07 PM
Surr: 4-Terphenyl-d14	106	58-135		%REC	1	3/19/2009 01:07 PM
Surr: Nitrobenzene-d5	89.7	54-115		%REC	1	3/19/2009 01:07 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Geocon Consultants, Inc. **Client Sample ID:** P-37
Lab Order: 104477 **Collection Date:** 3/11/2009 11:50:00 AM
Project: Caltrans-Dumbartan Bridge, E8435-06-18 **Matrix:** SOIL
Lab ID: 104477-008A

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090320H	QC Batch: 53943			PrepDate: 3/18/2009		Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	3/20/2009 03:02 PM
Arsenic	4.0	1.0		mg/Kg	1	3/20/2009 03:02 PM
Barium	28	1.0		mg/Kg	1	3/20/2009 03:02 PM
Beryllium	ND	1.0		mg/Kg	1	3/20/2009 03:02 PM
Cadmium	ND	1.0		mg/Kg	1	3/20/2009 03:02 PM
Chromium	39	1.0		mg/Kg	1	3/20/2009 03:02 PM
Cobalt	7.1	1.0		mg/Kg	1	3/20/2009 03:02 PM
Copper	15	2.0		mg/Kg	1	3/20/2009 03:02 PM
Lead	5.2	1.0		mg/Kg	1	3/20/2009 03:02 PM
Molybdenum	ND	1.0		mg/Kg	1	3/20/2009 03:02 PM
Nickel	41	1.0		mg/Kg	1	3/20/2009 03:02 PM
Selenium	ND	1.0		mg/Kg	1	3/20/2009 03:02 PM
Silver	ND	1.0		mg/Kg	1	3/20/2009 03:02 PM
Thallium	ND	1.0		mg/Kg	1	3/20/2009 03:02 PM
Vanadium	32	1.0		mg/Kg	1	3/20/2009 03:02 PM
Zinc	38	1.0		mg/Kg	1	3/20/2009 03:02 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090319B	QC Batch: 53969			PrepDate: 3/18/2009		Analyst: **CBR**
DRO	ND	1.0		mg/Kg	1	3/19/2009 06:15 PM
ORO	ND	1.0		mg/Kg	1	3/19/2009 06:15 PM
Surr: p-Terphenyl	96.5	30-130		%REC	1	3/19/2009 06:15 PM
ORGANOCHLORINE PESTICIDES BY GC/ECD						
	EPA 3550B			**EPA 8081A**		
RunID: GC10_090318B	QC Batch: 53983			PrepDate: 3/18/2009		Analyst: **SMH**
4,4´-DDD	ND	2.0		µg/Kg	1	3/19/2009 01:09 AM
4,4´-DDE	ND	2.0		µg/Kg	1	3/19/2009 01:09 AM
4,4´-DDT	ND	2.0		µg/Kg	1	3/19/2009 01:09 AM
Aldrin	ND	1.0		µg/Kg	1	3/19/2009 01:09 AM
alpha-BHC	ND	1.0		µg/Kg	1	3/19/2009 01:09 AM
alpha-Chlordane	ND	1.0		µg/Kg	1	3/19/2009 01:09 AM
beta-BHC	ND	1.0		µg/Kg	1	3/19/2009 01:09 AM
Chlordane	ND	8.5		µg/Kg	1	3/19/2009 01:09 AM
delta-BHC	ND	1.0		µg/Kg	1	3/19/2009 01:09 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P-37
Lab Order:	104477	**Collection Date:**	3/11/2009 11:50:00 AM
Project:	Caltrans-Dumbartan Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104477-008A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ORGANOCHLORINE PESTICIDES BY GC/ECD						
	EPA 3550B			**EPA 8081A**		
RunID: GC10_090318B	QC Batch: 53983			PrepDate:	3/18/2009	Analyst: **SMH**
Dieldrin	ND	2.0		µg/Kg	1	3/19/2009 01:09 AM
Endosulfan I	ND	1.0		µg/Kg	1	3/19/2009 01:09 AM
Endosulfan II	ND	2.0		µg/Kg	1	3/19/2009 01:09 AM
Endosulfan sulfate	ND	2.0		µg/Kg	1	3/19/2009 01:09 AM
Endrin	ND	2.0		µg/Kg	1	3/19/2009 01:09 AM
Endrin aldehyde	ND	2.0		µg/Kg	1	3/19/2009 01:09 AM
Endrin ketone	ND	2.0		µg/Kg	1	3/19/2009 01:09 AM
gamma-BHC	ND	1.0		µg/Kg	1	3/19/2009 01:09 AM
gamma-Chlordane	ND	1.0		µg/Kg	1	3/19/2009 01:09 AM
Heptachlor	ND	1.0		µg/Kg	1	3/19/2009 01:09 AM
Heptachlor epoxide	ND	1.0		µg/Kg	1	3/19/2009 01:09 AM
Methoxychlor	ND	5.0		µg/Kg	1	3/19/2009 01:09 AM
Toxaphene	ND	50		µg/Kg	1	3/19/2009 01:09 AM
Surr: Decachlorobiphenyl	79.1	20-142		%REC	1	3/19/2009 01:09 AM
Surr: Tetrachloro-m-xylene	78.1	25-115		%REC	1	3/19/2009 01:09 AM
PCBS BY GC/ECD						
	EPA 3550B			**EPA 8082**		
RunID: GC5_090318A	QC Batch: 53983			PrepDate:	3/18/2009	Analyst: **HL**
Aroclor 1016	ND	16		µg/Kg	1	3/19/2009 01:39 AM
Aroclor 1221	ND	33		µg/Kg	1	3/19/2009 01:39 AM
Aroclor 1232	ND	16		µg/Kg	1	3/19/2009 01:39 AM
Aroclor 1242	ND	16		µg/Kg	1	3/19/2009 01:39 AM
Aroclor 1248	ND	16		µg/Kg	1	3/19/2009 01:39 AM
Aroclor 1254	ND	16		µg/Kg	1	3/19/2009 01:39 AM
Aroclor 1260	ND	16		µg/Kg	1	3/19/2009 01:39 AM
Aroclor 1262	ND	16		µg/Kg	1	3/19/2009 01:39 AM
Aroclor 1268	ND	16		µg/Kg	1	3/19/2009 01:39 AM
Surr: Decachlorobiphenyl	93.4	30-124		%REC	1	3/19/2009 01:39 AM
Surr: Tetrachloro-m-xylene	93.9	40-118		%REC	1	3/19/2009 01:39 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA5_090319A	QC Batch: 53935			PrepDate:	3/18/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	3/19/2009 10:10 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P-37
Lab Order:	104477	**Collection Date:**	3/11/2009 11:50:00 AM
Project:	Caltrans-Dumbartan Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104477-008A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090319A QC Batch: 53989 PrepDate: 3/19/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2-Methylnaphthalene	ND	330		µg/Kg	1	3/19/2009 01:34 PM
Acenaphthene	ND	330		µg/Kg	1	3/19/2009 01:34 PM
Acenaphthylene	ND	330		µg/Kg	1	3/19/2009 01:34 PM
Anthracene	ND	330		µg/Kg	1	3/19/2009 01:34 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	3/19/2009 01:34 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	3/19/2009 01:34 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	3/19/2009 01:34 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	3/19/2009 01:34 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	3/19/2009 01:34 PM
Chrysene	ND	330		µg/Kg	1	3/19/2009 01:34 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	3/19/2009 01:34 PM
Fluoranthene	ND	330		µg/Kg	1	3/19/2009 01:34 PM
Fluorene	ND	330		µg/Kg	1	3/19/2009 01:34 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	3/19/2009 01:34 PM
Naphthalene	ND	330		µg/Kg	1	3/19/2009 01:34 PM
Phenanthrene	ND	330		µg/Kg	1	3/19/2009 01:34 PM
Pyrene	ND	330		µg/Kg	1	3/19/2009 01:34 PM
Surr: 1,2-Dichlorobenzene-d4	83.4	49-103		%REC	1	3/19/2009 01:34 PM
Surr: 2-Fluorobiphenyl	101	59-108		%REC	1	3/19/2009 01:34 PM
Surr: 4-Terphenyl-d14	99.3	58-135		%REC	1	3/19/2009 01:34 PM
Surr: Nitrobenzene-d5	88.0	54-115		%REC	1	3/19/2009 01:34 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Geocon Consultants, Inc. **Client Sample ID:** P-39
Lab Order: 104477 **Collection Date:** 3/11/2009 12:40:00 PM
Project: Caltrans-Dumbartan Bridge, E8435-06-18 **Matrix:** SOIL
Lab ID: 104477-009A

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090320H	QC Batch: 53943			PrepDate: 3/18/2009		Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	3/20/2009 03:05 PM
Arsenic	5.1	1.0		mg/Kg	1	3/20/2009 03:05 PM
Barium	36	1.0		mg/Kg	1	3/20/2009 03:05 PM
Beryllium	ND	1.0		mg/Kg	1	3/20/2009 03:05 PM
Cadmium	ND	1.0		mg/Kg	1	3/20/2009 03:05 PM
Chromium	41	1.0		mg/Kg	1	3/20/2009 03:05 PM
Cobalt	8.1	1.0		mg/Kg	1	3/20/2009 03:05 PM
Copper	20	2.0		mg/Kg	1	3/20/2009 03:05 PM
Lead	14	1.0		mg/Kg	1	3/20/2009 03:05 PM
Molybdenum	ND	1.0		mg/Kg	1	3/20/2009 03:05 PM
Nickel	40	1.0		mg/Kg	1	3/20/2009 03:05 PM
Selenium	ND	1.0		mg/Kg	1	3/20/2009 03:05 PM
Silver	ND	1.0		mg/Kg	1	3/20/2009 03:05 PM
Thallium	ND	1.0		mg/Kg	1	3/20/2009 03:05 PM
Vanadium	35	1.0		mg/Kg	1	3/20/2009 03:05 PM
Zinc	54	1.0		mg/Kg	1	3/20/2009 03:05 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090319B	QC Batch: 53969			PrepDate: 3/18/2009		Analyst: **CBR**
DRO	ND	1.0		mg/Kg	1	3/19/2009 05:21 PM
ORO	ND	1.0		mg/Kg	1	3/19/2009 05:21 PM
Surr: p-Terphenyl	78.9	30-130		%REC	1	3/19/2009 05:21 PM
ORGANOCHLORINE PESTICIDES BY GC/ECD						
	EPA 3550B			**EPA 8081A**		
RunID: GC10_090318B	QC Batch: 53983			PrepDate: 3/18/2009		Analyst: **SMH**
4,4´-DDD	ND	2.0		µg/Kg	1	3/19/2009 01:23 AM
4,4´-DDE	ND	2.0		µg/Kg	1	3/19/2009 01:23 AM
4,4´-DDT	ND	2.0		µg/Kg	1	3/19/2009 01:23 AM
Aldrin	ND	1.0		µg/Kg	1	3/19/2009 01:23 AM
alpha-BHC	ND	1.0		µg/Kg	1	3/19/2009 01:23 AM
alpha-Chlordane	ND	1.0		µg/Kg	1	3/19/2009 01:23 AM
beta-BHC	ND	1.0		µg/Kg	1	3/19/2009 01:23 AM
Chlordane	ND	8.5		µg/Kg	1	3/19/2009 01:23 AM
delta-BHC	ND	1.0		µg/Kg	1	3/19/2009 01:23 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Geocon Consultants, Inc. **Client Sample ID:** P-39
Lab Order: 104477 **Collection Date:** 3/11/2009 12:40:00 PM
Project: Caltrans-Dumbartan Bridge, E8435-06-18 **Matrix:** SOIL
Lab ID: 104477-009A

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ORGANOCHLORINE PESTICIDES BY GC/ECD						
	EPA 3550B			**EPA 8081A**		
RunID: GC10_090318B	QC Batch: 53983			PrepDate:	3/18/2009	Analyst: **SMH**
Dieldrin	ND	2.0		µg/Kg	1	3/19/2009 01:23 AM
Endosulfan I	ND	1.0		µg/Kg	1	3/19/2009 01:23 AM
Endosulfan II	ND	2.0		µg/Kg	1	3/19/2009 01:23 AM
Endosulfan sulfate	ND	2.0		µg/Kg	1	3/19/2009 01:23 AM
Endrin	ND	2.0		µg/Kg	1	3/19/2009 01:23 AM
Endrin aldehyde	ND	2.0		µg/Kg	1	3/19/2009 01:23 AM
Endrin ketone	ND	2.0		µg/Kg	1	3/19/2009 01:23 AM
gamma-BHC	ND	1.0		µg/Kg	1	3/19/2009 01:23 AM
gamma-Chlordane	ND	1.0		µg/Kg	1	3/19/2009 01:23 AM
Heptachlor	ND	1.0		µg/Kg	1	3/19/2009 01:23 AM
Heptachlor epoxide	ND	1.0		µg/Kg	1	3/19/2009 01:23 AM
Methoxychlor	ND	5.0		µg/Kg	1	3/19/2009 01:23 AM
Toxaphene	ND	50		µg/Kg	1	3/19/2009 01:23 AM
Surr: Decachlorobiphenyl	81.4	20-142		%REC	1	3/19/2009 01:23 AM
Surr: Tetrachloro-m-xylene	82.1	25-115		%REC	1	3/19/2009 01:23 AM
PCBS BY GC/ECD						
	EPA 3550B			**EPA 8082**		
RunID: GC5_090318A	QC Batch: 53983			PrepDate:	3/18/2009	Analyst: **HL**
Aroclor 1016	ND	16		µg/Kg	1	3/19/2009 02:09 AM
Aroclor 1221	ND	33		µg/Kg	1	3/19/2009 02:09 AM
Aroclor 1232	ND	16		µg/Kg	1	3/19/2009 02:09 AM
Aroclor 1242	ND	16		µg/Kg	1	3/19/2009 02:09 AM
Aroclor 1248	ND	16		µg/Kg	1	3/19/2009 02:09 AM
Aroclor 1254	ND	16		µg/Kg	1	3/19/2009 02:09 AM
Aroclor 1260	ND	16		µg/Kg	1	3/19/2009 02:09 AM
Aroclor 1262	ND	16		µg/Kg	1	3/19/2009 02:09 AM
Aroclor 1268	ND	16		µg/Kg	1	3/19/2009 02:09 AM
Surr: Decachlorobiphenyl	97.6	30-124		%REC	1	3/19/2009 02:09 AM
Surr: Tetrachloro-m-xylene	101	40-118		%REC	1	3/19/2009 02:09 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA5_090319A	QC Batch: 53935			PrepDate:	3/18/2009	Analyst: **RQ**
Mercury	0.19	0.10		mg/Kg	1	3/19/2009 10:12 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P-39
Lab Order:	104477	**Collection Date:**	3/11/2009 12:40:00 PM
Project:	Caltrans-Dumbartan Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104477-009A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090319A QC Batch: 53989 PrepDate: 3/19/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2-Methylnaphthalene	ND	330		µg/Kg	1	3/19/2009 02:01 PM
Acenaphthene	ND	330		µg/Kg	1	3/19/2009 02:01 PM
Acenaphthylene	ND	330		µg/Kg	1	3/19/2009 02:01 PM
Anthracene	ND	330		µg/Kg	1	3/19/2009 02:01 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	3/19/2009 02:01 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	3/19/2009 02:01 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	3/19/2009 02:01 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	3/19/2009 02:01 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	3/19/2009 02:01 PM
Chrysene	ND	330		µg/Kg	1	3/19/2009 02:01 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	3/19/2009 02:01 PM
Fluoranthene	ND	330		µg/Kg	1	3/19/2009 02:01 PM
Fluorene	ND	330		µg/Kg	1	3/19/2009 02:01 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	3/19/2009 02:01 PM
Naphthalene	ND	330		µg/Kg	1	3/19/2009 02:01 PM
Phenanthrene	ND	330		µg/Kg	1	3/19/2009 02:01 PM
Pyrene	ND	330		µg/Kg	1	3/19/2009 02:01 PM
Surr: 1,2-Dichlorobenzene-d4	79.6	49-103		%REC	1	3/19/2009 02:01 PM
Surr: 2-Fluorobiphenyl	97.8	59-108		%REC	1	3/19/2009 02:01 PM
Surr: 4-Terphenyl-d14	102	58-135		%REC	1	3/19/2009 02:01 PM
Surr: Nitrobenzene-d5	85.8	54-115		%REC	1	3/19/2009 02:01 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Geocon Consultants, Inc.
Work Order: 104477
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **MB-53943** SampType: **MBLK** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/18/2009** RunNo: **107204**
Client ID: **PBS** Batch ID: **53943** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/20/2009** SeqNo: **1678879**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	2.0									
Arsenic	ND	1.0									
Barium	ND	1.0									
Beryllium	ND	1.0									
Cadmium	ND	1.0									
Chromium	ND	1.0									
Cobalt	ND	1.0									
Copper	ND	2.0									
Lead	ND	1.0									
Molybdenum	ND	1.0									
Nickel	ND	1.0									
Selenium	ND	1.0									
Silver	0.027	1.0									
Thallium	ND	1.0									
Vanadium	ND	1.0									
Zinc	ND	1.0									

Sample ID: **LCS-53943** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/18/2009** RunNo: **107204**
Client ID: **LCSS** Batch ID: **53943** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/20/2009** SeqNo: **1678880**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	49.939	2.0	50.00	0	99.9	80	120				
Arsenic	49.776	1.0	50.00	0	99.6	80	120				
Barium	50.840	1.0	50.00	0	102	80	120				
Beryllium	48.852	1.0	50.00	0	97.7	80	120				
Cadmium	50.336	1.0	50.00	0	101	80	120				
Chromium	46.630	1.0	50.00	0	93.3	80	120				
Cobalt	51.057	1.0	50.00	0	102	80	120				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Geocon Consultants, Inc.
Work Order: 104477
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **LCS-53943** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/18/2009** RunNo: **107204**
Client ID: **LCSS** Batch ID: **53943** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/20/2009** SeqNo: **1678880**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Copper	50.249	2.0	50.00	0	100	80	120				
Lead	50.261	1.0	50.00	0	101	80	120				
Molybdenum	50.580	1.0	50.00	0	101	80	120				
Nickel	49.303	1.0	50.00	0	98.6	80	120				
Selenium	47.424	1.0	50.00	0	94.8	80	120				
Silver	48.941	1.0	50.00	0.02716	97.8	80	120				
Thallium	44.781	1.0	50.00	0	89.6	80	120				
Vanadium	51.193	1.0	50.00	0	102	80	120				
Zinc	49.814	1.0	50.00	0	99.6	80	120				

Sample ID: **104480-011ADUP** SampType: **DUP** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/18/2009** RunNo: **107204**
Client ID: **ZZZZZZ** Batch ID: **53943** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/20/2009** SeqNo: **1678891**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	2.0						0	0	20	
Arsenic	0.611	1.0						0.6187	0	20	
Barium	11.664	1.0						11.67	0.0315	20	
Beryllium	ND	1.0						0	0	20	
Cadmium	0.205	1.0						0.1712	0	20	
Chromium	9.939	1.0						9.418	5.38	20	
Cobalt	2.182	1.0						2.167	0.661	20	
Copper	2.636	2.0						2.589	1.79	20	
Lead	1.179	1.0						1.122	4.88	20	
Molybdenum	ND	1.0						0	0	20	
Nickel	3.659	1.0						3.362	8.45	20	
Selenium	ND	1.0						0	0	20	
Silver	ND	1.0						0	0	20	
Thallium	ND	1.0						0	0	20	
Vanadium	23.817	1.0						24.45	2.63	20	
Zinc	11.768	1.0						11.86	0.813	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Geocon Consultants, Inc.
Work Order: 104477
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **104480-011AMS** SampType: **MS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/18/2009** RunNo: **107204**
Client ID: **ZZZZZZ** Batch ID: **53943** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/20/2009** SeqNo: **1678892**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	96.357	2.0	125.0	0	77.1	25	106				
Arsenic	99.346	1.0	125.0	0.6187	79.0	42	113				
Barium	116.370	1.0	125.0	11.67	83.8	19	140				
Beryllium	105.404	1.0	125.0	0	84.3	50	109				
Cadmium	104.198	1.0	125.0	0.1712	83.2	48	106				
Chromium	108.734	1.0	125.0	9.418	79.5	44	116				
Cobalt	106.642	1.0	125.0	2.167	83.6	47	107				
Copper	113.233	2.0	125.0	2.589	88.5	49	124				
Lead	106.492	1.0	125.0	1.122	84.3	33	120				
Molybdenum	103.649	1.0	125.0	0	82.9	46	111				
Nickel	108.066	1.0	125.0	3.362	83.8	43	111				
Selenium	98.661	1.0	125.0	0	78.9	43	104				
Silver	106.889	1.0	125.0	0	85.5	53	114				
Thallium	94.728	1.0	125.0	0	75.8	41	107				
Vanadium	130.519	1.0	125.0	24.45	84.9	48	116				
Zinc	115.580	1.0	125.0	11.86	83.0	24	129				

Sample ID: **104480-011AMSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/18/2009** RunNo: **107204**
Client ID: **ZZZZZZ** Batch ID: **53943** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/20/2009** SeqNo: **1678893**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	97.320	2.0	125.0	0	77.9	25	106	96.36	0.995	20	
Arsenic	100.488	1.0	125.0	0.6187	79.9	42	113	99.35	1.14	20	
Barium	115.638	1.0	125.0	11.67	83.2	19	140	116.4	0.631	20	
Beryllium	104.005	1.0	125.0	0	83.2	50	109	105.4	1.34	20	
Cadmium	103.650	1.0	125.0	0.1712	82.8	48	106	104.2	0.528	20	
Chromium	107.829	1.0	125.0	9.418	78.7	44	116	108.7	0.836	20	
Cobalt	106.075	1.0	125.0	2.167	83.1	47	107	106.6	0.533	20	
Copper	112.440	2.0	125.0	2.589	87.9	49	124	113.2	0.703	20	
Lead	105.772	1.0	125.0	1.122	83.7	33	120	106.5	0.678	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Geocon Consultants, Inc.
Work Order: 104477
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **104480-011AMSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/18/2009** RunNo: **107204**
Client ID: **ZZZZZZ** Batch ID: **53943** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/20/2009** SeqNo: **1678893**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	102.415	1.0	125.0	0	81.9	46	111	103.6	1.20	20	
Nickel	107.170	1.0	125.0	3.362	83.0	43	111	108.1	0.833	20	
Selenium	99.583	1.0	125.0	0	79.7	43	104	98.66	0.930	20	
Silver	106.188	1.0	125.0	0	85.0	53	114	106.9	0.658	20	
Thallium	95.558	1.0	125.0	0	76.4	41	107	94.73	0.872	20	
Vanadium	130.048	1.0	125.0	24.45	84.5	48	116	130.5	0.362	20	
Zinc	116.274	1.0	125.0	11.86	83.5	24	129	115.6	0.599	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104477
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 7471_S

Sample ID: **MB-53935**	SampType: **MBLK**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **3/18/2009**	RunNo: **107108**
Client ID: **PBS**	Batch ID: **53935**	TestNo: **EPA 7471A**		Analysis Date: **3/19/2009**	SeqNo: **1677199**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.10									

Sample ID: **LCS-53935**	SampType: **LCS**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **3/18/2009**	RunNo: **107108**
Client ID: **LCSS**	Batch ID: **53935**	TestNo: **EPA 7471A**		Analysis Date: **3/19/2009**	SeqNo: **1677200**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.794	0.10	0.8300	0	95.7	80	120				

Sample ID: **104480-011A-MS**	SampType: **MS**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **3/18/2009**	RunNo: **107108**
Client ID: **ZZZZZZ**	Batch ID: **53935**	TestNo: **EPA 7471A**		Analysis Date: **3/19/2009**	SeqNo: **1677201**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.777	0.10	0.8300	0	93.6	70	130				

Sample ID: **104480-011A-MSD**	SampType: **MSD**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **3/18/2009**	RunNo: **107108**
Client ID: **ZZZZZZ**	Batch ID: **53935**	TestNo: **EPA 7471A**		Analysis Date: **3/19/2009**	SeqNo: **1677202**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.777	0.10	0.8300	0	93.6	70	130	0.7769	0.00781	20	

Sample ID: **104480-011A-DUP**	SampType: **DUP**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **3/18/2009**	RunNo: **107108**
Client ID: **ZZZZZZ**	Batch ID: **53935**	TestNo: **EPA 7471A**		Analysis Date: **3/19/2009**	SeqNo: **1677204**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.10						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104477
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_S_DM LLSGT

Sample ID: **MB-53969**	SampType: **MBLK**	TestCode: **8015_S_DM L**	Units: **mg/Kg**	Prep Date: **3/18/2009**	RunNo: **107150**
Client ID: **PBS**	Batch ID: **53969**	TestNo: **EPA 8015B(M**	**EPA 3550B**	Analysis Date: **3/19/2009**	SeqNo: **1677854**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	ND	1.0									
ORO	ND	1.0									
Surr: p-Terphenyl	2.979		2.670		112	30	130				

Sample ID: **LCS-53969**	SampType: **LCS**	TestCode: **8015_S_DM L**	Units: **mg/Kg**	Prep Date: **3/18/2009**	RunNo: **107150**
Client ID: **LCSS**	Batch ID: **53969**	TestNo: **EPA 8015B(M**	**EPA 3550B**	Analysis Date: **3/19/2009**	SeqNo: **1677855**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	18.601	1.0	33.00	0	56.4	35	124				
Surr: p-Terphenyl	2.277		2.670		85.3	30	130				

Sample ID: **104477-004ADUP**	SampType: **DUP**	TestCode: **8015_S_DM L**	Units: **mg/Kg**	Prep Date: **3/18/2009**	RunNo: **107150**
Client ID: **P-5**	Batch ID: **53969**	TestNo: **EPA 8015B(M**	**EPA 3550B**	Analysis Date: **3/19/2009**	SeqNo: **1677861**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	ND	1.0						0	0	20	
ORO	ND	1.0						0	0	20	
Surr: p-Terphenyl	2.490		2.670		93.3	30	130		0	0	

Sample ID: **104477-004AMS**	SampType: **MS**	TestCode: **8015_S_DM L**	Units: **mg/Kg**	Prep Date: **3/18/2009**	RunNo: **107150**
Client ID: **P-5**	Batch ID: **53969**	TestNo: **EPA 8015B(M**	**EPA 3550B**	Analysis Date: **3/19/2009**	SeqNo: **1677867**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	18.727	1.0	33.00	0	56.7	12	125				
Surr: p-Terphenyl	1.986		2.670		74.4	30	130				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104477
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_S_DM LLSGT

Sample ID: **104477-004AMSD** SampType: **MSD** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **3/18/2009** RunNo: **107150**
Client ID: **P-5** Batch ID: **53969** TestNo: **EPA 8015B(M** **EPA 3550B** Analysis Date: **3/19/2009** SeqNo: **1677868**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	19.515	1.0	33.00	0	59.1	12	125	18.73	4.12	20	
Surr: p-Terphenyl	2.180		2.670		81.7	30	130		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104477
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID: **MB-53983** SampType: **MBLK** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **3/18/2009** RunNo: **107096**
Client ID: **PBS** Batch ID: **53983** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **3/18/2009** SeqNo: **1676917**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDD	ND	2.0									
4,4´-DDE	ND	2.0									
4,4´-DDT	ND	2.0									
Aldrin	ND	1.0									
alpha-BHC	ND	1.0									
alpha-Chlordane	ND	1.0									
beta-BHC	ND	1.0									
Chlordane	ND	8.5									
delta-BHC	ND	1.0									
Dieldrin	ND	2.0									
Endosulfan I	ND	1.0									
Endosulfan II	ND	2.0									
Endosulfan sulfate	ND	2.0									
Endrin	ND	2.0									
Endrin aldehyde	ND	2.0									
Endrin ketone	ND	2.0									
gamma-BHC	ND	1.0									
gamma-Chlordane	ND	1.0									
Heptachlor	ND	1.0									
Heptachlor epoxide	ND	1.0									
Methoxychlor	ND	5.0									
Toxaphene	ND	50									
Surr: Tetrachloro-m-xylene	11.396		16.67		68.4	25	115				
Surr: Decachlorobiphenyl	10.369		16.67		62.2	20	142				

Sample ID: **LCS-53983** SampType: **LCS** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **3/18/2009** RunNo: **107096**
Client ID: **LCSS** Batch ID: **53983** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **3/18/2009** SeqNo: **1676918**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aldrin	12.919	1.0	16.67	0	77.5	59	113				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Geocon Consultants, Inc.
Work Order: 104477
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID: **LCS-53983** SampType: **LCS** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **3/18/2009** RunNo: **107096**
Client ID: **LCSS** Batch ID: **53983** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **3/18/2009** SeqNo: **1676918**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dieldrin	12.838	2.0	16.67	0	77.0	59	108				
Endrin	12.467	2.0	16.67	0	74.8	41	132				
gamma-BHC	12.323	1.0	16.67	0	73.9	60	111				
Heptachlor	12.518	1.0	16.67	0	75.1	62	108				
Surr: Tetrachloro-m-xylene	11.481		16.67		68.9	25	115				
Surr: Decachlorobiphenyl	10.752		16.67		64.5	20	142				

Sample ID: **104564-004AMS** SampType: **MS** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **3/18/2009** RunNo: **107096**
Client ID: **ZZZZZZ** Batch ID: **53983** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **3/18/2009** SeqNo: **1676919**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDT	14.320	2.0	16.67	0	85.9	29	143				
Aldrin	15.086	1.0	16.67	0	90.5	44	131				
Dieldrin	15.445	2.0	16.67	0	92.6	40	136				
Endrin	15.235	2.0	16.67	0	91.4	41	146				
gamma-BHC	14.666	1.0	16.67	0	88.0	45	129				
Heptachlor	14.890	1.0	16.67	0	89.3	48	126				
Surr: Tetrachloro-m-xylene	12.972		16.67		77.8	25	115				
Surr: Decachlorobiphenyl	12.950		16.67		77.7	20	142				

Sample ID: **104564-004AMSD** SampType: **MSD** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **3/18/2009** RunNo: **107096**
Client ID: **ZZZZZZ** Batch ID: **53983** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **3/18/2009** SeqNo: **1676920**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDT	14.709	2.0	16.67	0	88.2	29	143	14.32	2.68	20	
Aldrin	15.509	1.0	16.67	0	93.0	44	131	15.09	2.77	20	
Dieldrin	15.857	2.0	16.67	0	95.1	40	136	15.44	2.64	20	
Endrin	15.665	2.0	16.67	0	94.0	41	146	15.23	2.79	20	
gamma-BHC	14.991	1.0	16.67	0	89.9	45	129	14.67	2.20	20	
Heptachlor	15.304	1.0	16.67	0	91.8	48	126	14.89	2.74	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Geocon Consultants, Inc.
Work Order: 104477
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID: **104564-004AMSD** SampType: **MSD** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **3/18/2009** RunNo: **107096**
Client ID: **ZZZZZZ** Batch ID: **53983** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **3/18/2009** SeqNo: **1676920**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Tetrachloro-m-xylene	13.277		16.67		79.6	25	115		0	0	
Surr: Decachlorobiphenyl	13.372		16.67		80.2	20	142		0	0	

Sample ID: **104564-003ADUP** SampType: **DUP** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **3/18/2009** RunNo: **107096**
Client ID: **ZZZZZZ** Batch ID: **53983** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **3/18/2009** SeqNo: **1676923**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDD	ND	2.0						0	0	20	
4,4´-DDE	ND	2.0						0	0	20	
4,4´-DDT	ND	2.0						0	0	20	
Aldrin	ND	1.0						0	0	20	
alpha-BHC	ND	1.0						0	0	20	
alpha-Chlordane	ND	1.0						0	0	20	
beta-BHC	ND	1.0						0	0	20	
Chlordane	ND	8.5						0	0	20	
delta-BHC	ND	1.0						0	0	20	
Dieldrin	ND	2.0						0	0	20	
Endosulfan I	ND	1.0						0	0	20	
Endosulfan II	ND	2.0						0	0	20	
Endosulfan sulfate	ND	2.0						0	0	20	
Endrin	ND	2.0						0	0	20	
Endrin aldehyde	ND	2.0						0	0	20	
Endrin ketone	ND	2.0						0	0	20	
gamma-BHC	ND	1.0						0	0	20	
gamma-Chlordane	ND	1.0						0	0	20	
Heptachlor	ND	1.0						0	0	20	
Heptachlor epoxide	ND	1.0						0	0	20	
Methoxychlor	ND	5.0						0	0	20	
Toxaphene	ND	50						0	0	20	
Surr: Tetrachloro-m-xylene	12.908		16.67		77.4	25	115		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104477
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID: **104564-003ADUP** SampType: **DUP** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **3/18/2009** RunNo: **107096**
Client ID: **ZZZZZZ** Batch ID: **53983** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **3/18/2009** SeqNo: **1676923**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Decachlorobiphenyl	12.405		16.67		74.4	20	142		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104477
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8082_S

Sample ID: **MB-53983**	SampType: **MBLK**	TestCode: **8082_S**	Units: **µg/Kg**	Prep Date: **3/18/2009**	RunNo: **107098**
Client ID: **PBS**	Batch ID: **53983**	TestNo: **EPA 8082**	**EPA 3550B**	Analysis Date: **3/18/2009**	SeqNo: **1677037**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016	ND	16									
Aroclor 1221	ND	33									
Aroclor 1232	ND	16									
Aroclor 1242	ND	16									
Aroclor 1248	ND	16									
Aroclor 1254	ND	16									
Aroclor 1260	ND	16									
Aroclor 1262	ND	16									
Aroclor 1268	ND	16									
Surr: Decachlorobiphenyl	17.255		16.67		104	30	124				
Surr: Tetrachloro-m-xylene	18.990		16.67		114	40	118				

Sample ID: **LCSA-53983**	SampType: **LCS**	TestCode: **8082_S**	Units: **µg/Kg**	Prep Date: **3/18/2009**	RunNo: **107098**
Client ID: **LCSS**	Batch ID: **53983**	TestNo: **EPA 8082**	**EPA 3550B**	Analysis Date: **3/18/2009**	SeqNo: **1677038**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016	124.470	16	166.7	0	74.7	56	113				
Aroclor 1260	132.636	16	166.7	0	79.6	58	111				
Surr: Decachlorobiphenyl	12.992		16.67		77.9	30	124				
Surr: Tetrachloro-m-xylene	13.789		16.67		82.7	40	118				

Sample ID: **MB-53983MSA**	SampType: **MS**	TestCode: **8082_S**	Units: **µg/Kg**	Prep Date: **3/18/2009**	RunNo: **107098**
Client ID: **ZZZZZZ**	Batch ID: **53983**	TestNo: **EPA 8082**	**EPA 3550B**	Analysis Date: **3/18/2009**	SeqNo: **1677039**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016	122.549	16	166.7	0	73.5	51	111				
Aroclor 1260	131.541	16	166.7	0	78.9	39	123				
Surr: Decachlorobiphenyl	12.984		16.67		77.9	30	124				
Surr: Tetrachloro-m-xylene	13.684		16.67		82.1	40	118				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104477
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8082_S

Sample ID: **MB-53983MSDA**	SampType: **MSD**	TestCode: **8082_S**	Units: **µg/Kg**	Prep Date: **3/18/2009**	RunNo: **107098**
Client ID: **ZZZZZZ**	Batch ID: **53983**	TestNo: **EPA 8082**	**EPA 3550B**	Analysis Date: **3/18/2009**	SeqNo: **1677040**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016	122.304	16	166.7	0	73.4	51	111	122.5	0.200	20	
Aroclor 1260	132.109	16	166.7	0	79.3	39	123	131.5	0.430	20	
Surr: Decachlorobiphenyl	13.008		16.67		78.0	30	124		0	0	
Surr: Tetrachloro-m-xylene	13.674		16.67		82.0	40	118		0	0	

Sample ID: **104477-006ADUPA**	SampType: **DUP**	TestCode: **8082_S**	Units: **µg/Kg**	Prep Date: **3/18/2009**	RunNo: **107098**
Client ID: **P-33**	Batch ID: **53983**	TestNo: **EPA 8082**	**EPA 3550B**	Analysis Date: **3/19/2009**	SeqNo: **1677047**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016	ND	16						0	0	20	
Aroclor 1221	ND	33						0	0	20	
Aroclor 1232	ND	16						0	0	20	
Aroclor 1242	ND	16						0	0	20	
Aroclor 1248	ND	16						0	0	20	
Aroclor 1254	ND	16						0	0	20	
Aroclor 1260	ND	16						0	0	20	
Aroclor 1262	ND	16						0	0	20	
Aroclor 1268	ND	16						0	0	20	
Surr: Decachlorobiphenyl	15.538		16.67		93.2	30	124		0	0	
Surr: Tetrachloro-m-xylene	14.524		16.67		87.1	40	118		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104477
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-53913** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/17/2009** RunNo: **107063**
Client ID: **PBS** Batch ID: **53913** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/18/2009** SeqNo: **1676346**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
2-Methylnaphthalene	ND	330									
Acenaphthene	ND	330									
Acenaphthylene	ND	330									
Anthracene	ND	330									
Benzo(a)anthracene	ND	330									
Benzo(a)pyrene	ND	330									
Benzo(b)fluoranthene	ND	330									
Benzo(g,h,i)perylene	ND	330									
Benzo(k)fluoranthene	ND	330									
Chrysene	ND	330									
Dibenz(a,h)anthracene	ND	330									
Fluoranthene	ND	330									
Fluorene	ND	330									
Indeno(1,2,3-cd)pyrene	ND	330									
Naphthalene	ND	330									
Phenanthrene	ND	330									
Pyrene	ND	330									
Surr: 1,2-Dichlorobenzene-d4	2764.000		3330		83.0	49	103				
Surr: 2-Fluorobiphenyl	2861.333		3330		85.9	59	108				
Surr: 4-Terphenyl-d14	3270.333		3330		98.2	58	135				
Surr: Nitrobenzene-d5	2946.000		3330		88.5	54	115				

Sample ID: **LCS-53913** SampType: **LCS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/17/2009** RunNo: **107063**
Client ID: **LCSS** Batch ID: **53913** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/18/2009** SeqNo: **1676347**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	3015.000	330	3330	0	90.5	61	107				
1,4-Dichlorobenzene	2946.333	330	3330	0	88.5	56	100				
2,4-Dinitrotoluene	2881.667	330	3330	0	86.5	72	130				
2-Chlorophenol	3040.667	330	3330	0	91.3	64	105				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Geocon Consultants, Inc.
Work Order: 104477
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **LCS-53913** SampType: **LCS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/17/2009** RunNo: **107063**
Client ID: **LCSS** Batch ID: **53913** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/18/2009** SeqNo: **1676347**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4-Chloro-3-methylphenol	3238.333	660	3330	0	97.2	74	125				
4-Nitrophenol	3607.667	1600	3330	0	108	77	137				
Acenaphthene	3078.667	330	3330	0	92.5	63	117				
N-Nitrosodi-n-propylamine	3246.333	330	3330	0	97.5	71	121				
Pentachlorophenol	3209.000	1600	3330	0	96.4	69	125				
Phenol	3257.000	330	3330	0	97.8	67	111				
Pyrene	3154.667	330	3330	0	94.7	60	122				
Surr: 1,2-Dichlorobenzene-d4	2838.667		3330		85.2	49	103				
Surr: 2,4,6-Tribromophenol	3264.333		3330		98.0	47	129				
Surr: 2-Chlorophenol-d4	3013.667		3330		90.5	54	109				
Surr: 2-Fluorobiphenyl	3129.667		3330		94.0	59	108				
Surr: 2-Fluorophenol	2846.333		3330		85.5	50	111				
Surr: 4-Terphenyl-d14	3058.333		3330		91.8	58	135				
Surr: Nitrobenzene-d5	3045.333		3330		91.5	54	115				
Surr: Phenol-d5	3033.333		3330		91.1	58	112				

Sample ID: **104496-018AMS** SampType: **MS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/17/2009** RunNo: **107063**
Client ID: **ZZZZZZ** Batch ID: **53913** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/18/2009** SeqNo: **1676348**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acenaphthene	3143.000	330	3330	0	94.4	59	118				
Pyrene	3198.333	330	3330	0	96.0	51	130				
Surr: 1,2-Dichlorobenzene-d4	2679.333		3330		80.5	49	103				
Surr: 2-Fluorobiphenyl	3172.000		3330		95.3	59	108				
Surr: 4-Terphenyl-d14	3137.000		3330		94.2	58	135				
Surr: Nitrobenzene-d5	2962.333		3330		89.0	54	115				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Geocon Consultants, Inc.
Work Order: 104477
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104496-018AMSD** SampType: **MSD** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/17/2009** RunNo: **107063**
Client ID: **ZZZZZZ** Batch ID: **53913** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/18/2009** SeqNo: **1676349**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acenaphthene	2863.000	330	3330	0	86.0	59	118	3143	9.32	20	
Pyrene	3010.667	330	3330	0	90.4	51	130	3198	6.04	20	
Surr: 1,2-Dichlorobenzene-d4	2463.000		3330		74.0	49	103		0	0	
Surr: 2-Fluorobiphenyl	2850.667		3330		85.6	59	108		0	0	
Surr: 4-Terphenyl-d14	2910.333		3330		87.4	58	135		0	0	
Surr: Nitrobenzene-d5	2687.333		3330		80.7	54	115		0	0	

Sample ID: **104496-018ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/17/2009** RunNo: **107063**
Client ID: **ZZZZZZ** Batch ID: **53913** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/18/2009** SeqNo: **1676350**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
2-Methylnaphthalene	ND	330						0	0	20	
Acenaphthene	ND	330						0	0	20	
Acenaphthylene	ND	330						0	0	20	
Anthracene	ND	330						0	0	20	
Benzo(a)anthracene	ND	330						0	0	20	
Benzo(a)pyrene	ND	330						0	0	20	
Benzo(b)fluoranthene	ND	330						0	0	20	
Benzo(g,h,i)perylene	ND	330						0	0	20	
Benzo(k)fluoranthene	ND	330						0	0	20	
Chrysene	ND	330						0	0	20	
Dibenz(a,h)anthracene	ND	330						0	0	20	
Fluoranthene	ND	330						0	0	20	
Fluorene	ND	330						0	0	20	
Indeno(1,2,3-cd)pyrene	ND	330						0	0	20	
Naphthalene	ND	330						0	0	20	
Phenanthrene	ND	330						0	0	20	
Pyrene	ND	330						0	0	20	
Surr: 1,2-Dichlorobenzene-d4	2552.667		3330		76.7	49	103		0	0	
Surr: 2-Fluorobiphenyl	2943.667		3330		88.4	59	108		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104477
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104496-018ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/17/2009** RunNo: **107063**
Client ID: **ZZZZZZ** Batch ID: **53913** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/18/2009** SeqNo: **1676350**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 4-Terphenyl-d14	3568.333		3330		107	58	135		0	0	
Surr: Nitrobenzene-d5	2861.000		3330		85.9	54	115		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104477
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-53989** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/19/2009** RunNo: **107125**
Client ID: **PBS** Batch ID: **53989** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/19/2009** SeqNo: **1677459**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
2-Methylnaphthalene	ND	330									
Acenaphthene	ND	330									
Acenaphthylene	ND	330									
Anthracene	ND	330									
Benzo(a)anthracene	ND	330									
Benzo(a)pyrene	ND	330									
Benzo(b)fluoranthene	ND	330									
Benzo(g,h,i)perylene	ND	330									
Benzo(k)fluoranthene	ND	330									
Chrysene	ND	330									
Dibenz(a,h)anthracene	ND	330									
Fluoranthene	ND	330									
Fluorene	ND	330									
Indeno(1,2,3-cd)pyrene	ND	330									
Naphthalene	ND	330									
Phenanthrene	ND	330									
Pyrene	ND	330									
Surr: 1,2-Dichlorobenzene-d4	2720.000		3330		81.7	49	103				
Surr: 2-Fluorobiphenyl	2917.667		3330		87.6	59	108				
Surr: 4-Terphenyl-d14	3400.667		3330		102	58	135				
Surr: Nitrobenzene-d5	2801.667		3330		84.1	54	115				

Sample ID: **LCS-53989** SampType: **LCS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/19/2009** RunNo: **107125**
Client ID: **LCSS** Batch ID: **53989** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/19/2009** SeqNo: **1677460**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	2990.667	330	3330	0	89.8	61	107				
1,4-Dichlorobenzene	2753.333	330	3330	0	82.7	56	100				
2,4-Dinitrotoluene	3370.333	330	3330	0	101	72	130				
2-Chlorophenol	3117.333	330	3330	0	93.6	64	105				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Geocon Consultants, Inc.
Work Order: 104477
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **LCS-53989** SampType: **LCS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/19/2009** RunNo: **107125**
Client ID: **LCSS** Batch ID: **53989** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/19/2009** SeqNo: **1677460**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4-Chloro-3-methylphenol	3571.333	660	3330	0	107	74	125				
4-Nitrophenol	3125.000	1600	3330	0	93.8	77	137				
Acenaphthene	3155.333	330	3330	0	94.8	63	117				
N-Nitrosodi-n-propylamine	2914.000	330	3330	0	87.5	71	121				
Pentachlorophenol	3197.667	1600	3330	0	96.0	69	125				
Phenol	3124.333	330	3330	0	93.8	67	111				
Pyrene	2991.333	330	3330	0	89.8	60	122				
Surr: 1,2-Dichlorobenzene-d4	2797.333		3330		84.0	49	103				
Surr: 2,4,6-Tribromophenol	3546.333		3330		106	47	129				
Surr: 2-Chlorophenol-d4	2944.667		3330		88.4	54	109				
Surr: 2-Fluorobiphenyl	3064.000		3330		92.0	59	108				
Surr: 2-Fluorophenol	2841.333		3330		85.3	50	111				
Surr: 4-Terphenyl-d14	3196.333		3330		96.0	58	135				
Surr: Nitrobenzene-d5	2877.333		3330		86.4	54	115				
Surr: Phenol-d5	3035.667		3330		91.2	58	112				

Sample ID: **104404-011AMS** SampType: **MS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/19/2009** RunNo: **107125**
Client ID: **ZZZZZZ** Batch ID: **53989** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/19/2009** SeqNo: **1677461**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acenaphthene	3413.667	330	3330	0	103	59	118				
Pyrene	3310.000	330	3330	0	99.4	51	130				
Surr: 1,2-Dichlorobenzene-d4	2603.667		3330		78.2	49	103				
Surr: 2-Fluorobiphenyl	3234.667		3330		97.1	59	108				
Surr: 4-Terphenyl-d14	3061.333		3330		91.9	58	135				
Surr: Nitrobenzene-d5	2726.333		3330		81.9	54	115				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104477
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104404-011AMSD** SampType: **MSD** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/19/2009** RunNo: **107125**
Client ID: **ZZZZZZ** Batch ID: **53989** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/19/2009** SeqNo: **1677462**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acenaphthene	3573.000	330	3330	0	107	59	118	3414	4.56	20	
Pyrene	3247.000	330	3330	0	97.5	51	130	3310	1.92	20	
Surr: 1,2-Dichlorobenzene-d4	2810.333		3330		84.4	49	103		0	0	
Surr: 2-Fluorobiphenyl	3430.000		3330		103	59	108		0	0	
Surr: 4-Terphenyl-d14	3215.000		3330		96.5	58	135		0	0	
Surr: Nitrobenzene-d5	2849.333		3330		85.6	54	115		0	0	

Sample ID: **104477-009ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/19/2009** RunNo: **107125**
Client ID: **P-39** Batch ID: **53989** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/19/2009** SeqNo: **1677490**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	330						0	0	20	
1,2-Dichlorobenzene	ND	330						0	0	20	
1,2-Diphenylhydrazine	ND	330						0	0	20	
1,3-Dichlorobenzene	ND	330						0	0	20	
1,4-Dichlorobenzene	ND	330						0	0	20	
1,4-Dioxane	ND	330						0	0	20	
2,4,5-Trichlorophenol	ND	330						0	0	20	
2,4,6-Trichlorophenol	ND	330						0	0	20	
2,4-Dichlorophenol	ND	1600						0	0	20	
2,4-Dimethylphenol	ND	330						0	0	20	
2,4-Dinitrophenol	ND	1600						0	0	20	
2,4-Dinitrotoluene	ND	330						0	0	20	
2,6-Dinitrotoluene	ND	330						0	0	20	
2-Chloronaphthalene	ND	330						0	0	20	
2-Chlorophenol	ND	330						0	0	20	
2-Methylnaphthalene	ND	330						0	0	20	
2-Methylphenol	ND	330						0	0	20	
2-Nitroaniline	ND	1600						0	0	20	
2-Nitrophenol	ND	330						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104477
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104477-009ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/19/2009** RunNo: **107125**
Client ID: **P-39** Batch ID: **53989** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/19/2009** SeqNo: **1677490**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
3,3´-Dichlorobenzidine	ND	660						0	0	20	
3-Nitroaniline	ND	1600						0	0	20	
4,6-Dinitro-2-methylphenol	ND	1600						0	0	20	
4-Bromophenyl-phenylether	ND	330						0	0	20	
4-Chloro-3-methylphenol	ND	660						0	0	20	
4-Chloroaniline	ND	660						0	0	20	
4-Chlorophenyl-phenylether	ND	330						0	0	20	
3/4-Methylphenol	ND	330						0	0	20	
4-Methylphenol	ND	330						0	0	20	
4-Nitroaniline	ND	1600						0	0	20	
4-Nitrophenol	ND	1600						0	0	20	
Acenaphthene	ND	330						0	0	20	
Acenaphthylene	ND	330						0	0	20	
Aniline	ND	330						0	0	20	
Anthracene	ND	330						0	0	20	
Benzidine (M)	ND	1600						0	0	20	
Benzo(a)anthracene	ND	330						0	0	20	
Benzo(a)pyrene	ND	330						0	0	20	
Benzo(b)fluoranthene	ND	330						0	0	20	
Benzo(g,h,i)perylene	ND	330						0	0	20	
Benzo(k)fluoranthene	ND	330						0	0	20	
Benzoic acid	ND	1600						0	0	20	
Benzyl alcohol	ND	660						0	0	20	
Bis(2-chloroethoxy)methane	ND	330						0	0	20	
Bis(2-chloroethyl)ether	ND	330						0	0	20	
Bis(2-chloroisopropyl)ether	ND	330						0	0	20	
Bis(2-ethylhexyl)phthalate	ND	330						0	0	20	
Butylbenzylphthalate	ND	330						0	0	20	
Carbazole	ND	330						0	0	20	
Chrysene	ND	330						0	0	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Geocon Consultants, Inc.
Work Order: 104477
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104477-009ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/19/2009** RunNo: **107125**
Client ID: **P-39** Batch ID: **53989** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/19/2009** SeqNo: **1677490**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Di-n-butylphthalate	ND	330						0	0	20	
Di-n-octylphthalate	ND	330						0	0	20	
Dibenz(a,h)anthracene	ND	330						0	0	20	
Dibenzofuran	ND	330						0	0	20	
Diethylphthalate	ND	330						0	0	20	
Dimethylphthalate	ND	330						0	0	20	
Fluoranthene	ND	330						0	0	20	
Fluorene	ND	330						0	0	20	
Hexachlorobenzene	ND	330						0	0	20	
Hexachlorobutadiene	ND	660						0	0	20	
Hexachlorocyclopentadiene	ND	660						0	0	20	
Hexachloroethane	ND	330						0	0	20	
Indeno(1,2,3-cd)pyrene	ND	330						0	0	20	
Isophorone	ND	330						0	0	20	
N-Nitrosodi-n-propylamine	ND	330						0	0	20	
N-Nitrosodimethylamine	ND	330						0	0	20	
N-Nitrosodiphenylamine	ND	330						0	0	20	
Naphthalene	ND	330						0	0	20	
Nitrobenzene	ND	330						0	0	20	
Pentachlorophenol	ND	1600						0	0	20	
Phenanthrene	ND	330						0	0	20	
Phenol	ND	330						0	0	20	
Pyrene	ND	330						0	0	20	
Pyridine	ND	1600						0	0	20	
Surr: 1,2-Dichlorobenzene-d4	2727.000		3330		81.9	49	103		0	0	
Surr: 2,4,6-Tribromophenol	3935.000		3330		118	47	129		0	0	
Surr: 2-Chlorophenol-d4	2911.667		3330		87.4	54	109		0	0	
Surr: 2-Fluorobiphenyl	3227.000		3330		96.9	59	108		0	0	
Surr: 2-Fluorophenol	2895.000		3330		86.9	50	111		0	0	
Surr: 4-Terphenyl-d14	3451.000		3330		104	58	135		0	0	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Geocon Consultants, Inc.
Work Order: 104477
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104477-009ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/19/2009** RunNo: **107125**
Client ID: **P-39** Batch ID: **53989** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/19/2009** SeqNo: **1677490**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	2903.000		3330		87.2	54	115		0	0	
Surr: Phenol-d5	3067.000		3330		92.1	58	112		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CHAIN OF CUSTODY RECORD

Pg 1 of 1

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#: _____

Logged By: _____ Date: 3/13/09

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: GSO

Sample Condition Upon Receipt: 2.4
1. CHILLED Y☐ N☐ 4. SEALED Y☐ N☐
2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐
3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client: GEOCON CONSULTANTS, INC.
Attn:
Address: 6671 Brisa Street
City Livermore State CA Zip Code 94550
TEL: (925) 371-5900
FAX: (925) 371-5915

Project Name: Caltrans - Dumbarton Bridge Project #: E8435-06-18 Sampler: (Printed Name) J. Love (Signature)

Relinquished by: (Signature and Printed Name)	Date: 3/12/09	Time: 17:00	Received by: (Signature and Printed Name) Mark	Date: 3/13/09	Time: 8:30
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: John Love 3/12/09 (Print Name / Date)
Signature

Send Report To:
Attn: _____
Co: SAME AS ABOVE
Address _____
City _____ State _____ Zip _____

Bill To:
Attn: _____
Co: SAME AS ABOVE
Address _____
City _____ State _____ Zip _____

Special Instructions/Comments: Add silica gel cleanup (soil)

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

Circle or Add Analysis(es) Requested: 8081A (Pesticides); 8082 (PCB); 8260B (Volatiles); 8270C (BNA); 6010B (Total Metal); 8015B (GRO) / BTEX; 8015B (DRO); 8021 (BTEX); TITLE 22 / CAM 17 (6010 / 7000); TPHd+TPHmo w/silica gel; PAHs (8270C)

SPECIFY APPROPRIATE MATRIX: SOIL; WATER; GROUND WATER; WASTEWATER

PRESERVATION

Q A / Q C: RTNE ☐ CT ☐ SWRCB ☐ Logcode ____ OTHER ____

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	TAT	Container(s) #	Container(s) Type	REMARKS
	104477-01	P-15	3/10/09	8:30	E	2	J G	
	-2	P-13		9:30				
	-3	P-11		10:40				
	-4	P-5		12:00				
	-5	P-7		12:50				
	-6	P-33	3/11/09	10:30				
	-7	P-35		11:10				
	-8	P-37		11:50				
	-9	P-39		12:40				

- TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr; B= Emergency Next workday; C= Critical 2 Workdays; D= Urgent 3 Workdays; E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=Hcl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter.

March 20, 2009

John Love
Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550

TEL: (925) 525-4142
FAX: (925) 371-5915

ELAP No.: 1838
NELAP No.: 02107CA
NEVADA.: CA-401
CSDLAC No.: 10196

Workorder No.: 104505

RE: Caltrans-Dumbartan Bridge, E8435-06-18

Attention: John Love

Enclosed are the results for sample(s) received on March 16, 2009 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P-9
Lab Order:	104505	**Collection Date:**	3/10/2009 1:50:00 PM
Project:	Caltrans-Dumbartan Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104505-001A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090320I	QC Batch: 54016			PrepDate:	3/19/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	3/20/2009 04:04 PM
Arsenic	4.6	1.0		mg/Kg	1	3/20/2009 04:04 PM
Barium	27	1.0		mg/Kg	1	3/20/2009 04:04 PM
Beryllium	ND	1.0		mg/Kg	1	3/20/2009 04:04 PM
Cadmium	ND	1.0		mg/Kg	1	3/20/2009 04:04 PM
Chromium	37	1.0		mg/Kg	1	3/20/2009 04:04 PM
Cobalt	7.4	1.0		mg/Kg	1	3/20/2009 04:04 PM
Copper	20	2.0		mg/Kg	1	3/20/2009 04:04 PM
Lead	16	1.0		mg/Kg	1	3/20/2009 04:04 PM
Molybdenum	ND	1.0		mg/Kg	1	3/20/2009 04:04 PM
Nickel	39	1.0		mg/Kg	1	3/20/2009 04:04 PM
Selenium	ND	1.0		mg/Kg	1	3/20/2009 04:04 PM
Silver	ND	1.0		mg/Kg	1	3/20/2009 04:04 PM
Thallium	ND	1.0		mg/Kg	1	3/20/2009 04:04 PM
Vanadium	29	1.0		mg/Kg	1	3/20/2009 04:04 PM
Zinc	57	1.0		mg/Kg	1	3/20/2009 04:04 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090319B	QC Batch: 53969			PrepDate:	3/18/2009	Analyst: **CBR**
DRO	ND	1.0		mg/Kg	1	3/19/2009 06:26 PM
ORO	ND	1.0		mg/Kg	1	3/19/2009 06:26 PM
Surr: p-Terphenyl	84.4	30-130		%REC	1	3/19/2009 06:26 PM
ORGANOCHLORINE PESTICIDES BY GC/ECD						
	EPA 3550B			**EPA 8081A**		
RunID: GC10_090318B	QC Batch: 53983			PrepDate:	3/18/2009	Analyst: **SMH**
4,4´-DDD	ND	2.0		µg/Kg	1	3/18/2009 11:19 PM
4,4´-DDE	ND	2.0		µg/Kg	1	3/18/2009 11:19 PM
4,4´-DDT	ND	2.0		µg/Kg	1	3/18/2009 11:19 PM
Aldrin	ND	1.0		µg/Kg	1	3/18/2009 11:19 PM
alpha-BHC	ND	1.0		µg/Kg	1	3/18/2009 11:19 PM
alpha-Chlordane	ND	1.0		µg/Kg	1	3/18/2009 11:19 PM
beta-BHC	ND	1.0		µg/Kg	1	3/18/2009 11:19 PM
Chlordane	ND	8.5		µg/Kg	1	3/18/2009 11:19 PM
delta-BHC	ND	1.0		µg/Kg	1	3/18/2009 11:19 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Geocon Consultants, Inc. **Client Sample ID:** P-9
Lab Order: 104505 **Collection Date:** 3/10/2009 1:50:00 PM
Project: Caltrans-Dumbartan Bridge, E8435-06-18 **Matrix:** SOIL
Lab ID: 104505-001A

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ORGANOCHLORINE PESTICIDES BY GC/ECD						
	EPA 3550B			**EPA 8081A**		
RunID: GC10_090318B	QC Batch: 53983			PrepDate:	3/18/2009	Analyst: **SMH**
Dieldrin	ND	2.0		µg/Kg	1	3/18/2009 11:19 PM
Endosulfan I	ND	1.0		µg/Kg	1	3/18/2009 11:19 PM
Endosulfan II	ND	2.0		µg/Kg	1	3/18/2009 11:19 PM
Endosulfan sulfate	ND	2.0		µg/Kg	1	3/18/2009 11:19 PM
Endrin	ND	2.0		µg/Kg	1	3/18/2009 11:19 PM
Endrin aldehyde	ND	2.0		µg/Kg	1	3/18/2009 11:19 PM
Endrin ketone	ND	2.0		µg/Kg	1	3/18/2009 11:19 PM
gamma-BHC	ND	1.0		µg/Kg	1	3/18/2009 11:19 PM
gamma-Chlordane	ND	1.0		µg/Kg	1	3/18/2009 11:19 PM
Heptachlor	ND	1.0		µg/Kg	1	3/18/2009 11:19 PM
Heptachlor epoxide	ND	1.0		µg/Kg	1	3/18/2009 11:19 PM
Methoxychlor	ND	5.0		µg/Kg	1	3/18/2009 11:19 PM
Toxaphene	ND	50		µg/Kg	1	3/18/2009 11:19 PM
Surr: Decachlorobiphenyl	82.2	20-142		%REC	1	3/18/2009 11:19 PM
Surr: Tetrachloro-m-xylene	84.0	25-115		%REC	1	3/18/2009 11:19 PM
PCBS BY GC/ECD						
	EPA 3550B			**EPA 8082**		
RunID: GC5_090318A	QC Batch: 53983			PrepDate:	3/18/2009	Analyst: **HL**
Aroclor 1016	ND	16		µg/Kg	1	3/19/2009 02:38 AM
Aroclor 1221	ND	33		µg/Kg	1	3/19/2009 02:38 AM
Aroclor 1232	ND	16		µg/Kg	1	3/19/2009 02:38 AM
Aroclor 1242	ND	16		µg/Kg	1	3/19/2009 02:38 AM
Aroclor 1248	ND	16		µg/Kg	1	3/19/2009 02:38 AM
Aroclor 1254	ND	16		µg/Kg	1	3/19/2009 02:38 AM
Aroclor 1260	ND	16		µg/Kg	1	3/19/2009 02:38 AM
Aroclor 1262	ND	16		µg/Kg	1	3/19/2009 02:38 AM
Aroclor 1268	ND	16		µg/Kg	1	3/19/2009 02:38 AM
Surr: Decachlorobiphenyl	101	30-124		%REC	1	3/19/2009 02:38 AM
Surr: Tetrachloro-m-xylene	103	40-118		%REC	1	3/19/2009 02:38 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA5_090320B	QC Batch: 54019			PrepDate:	3/19/2009	Analyst: **RQ**
Mercury	0.20	0.10		mg/Kg	1	3/20/2009 10:47 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P-9
Lab Order:	104505	**Collection Date:**	3/10/2009 1:50:00 PM
Project:	Caltrans-Dumbartan Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104505-001A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090319A QC Batch: 53989 PrepDate: 3/19/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2-Methylnaphthalene	ND	330		µg/Kg	1	3/20/2009 12:10 PM
Acenaphthene	ND	330		µg/Kg	1	3/20/2009 12:10 PM
Acenaphthylene	ND	330		µg/Kg	1	3/20/2009 12:10 PM
Anthracene	ND	330		µg/Kg	1	3/20/2009 12:10 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	3/20/2009 12:10 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	3/20/2009 12:10 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	3/20/2009 12:10 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	3/20/2009 12:10 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	3/20/2009 12:10 PM
Chrysene	ND	330		µg/Kg	1	3/20/2009 12:10 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	3/20/2009 12:10 PM
Fluoranthene	ND	330		µg/Kg	1	3/20/2009 12:10 PM
Fluorene	ND	330		µg/Kg	1	3/20/2009 12:10 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	3/20/2009 12:10 PM
Naphthalene	ND	330		µg/Kg	1	3/20/2009 12:10 PM
Phenanthrene	ND	330		µg/Kg	1	3/20/2009 12:10 PM
Pyrene	ND	330		µg/Kg	1	3/20/2009 12:10 PM
Surr: 1,2-Dichlorobenzene-d4	89.6	49-103		%REC	1	3/20/2009 12:10 PM
Surr: 2-Fluorobiphenyl	106	59-108		%REC	1	3/20/2009 12:10 PM
Surr: 4-Terphenyl-d14	107	58-135		%REC	1	3/20/2009 12:10 PM
Surr: Nitrobenzene-d5	94.5	54-115		%REC	1	3/20/2009 12:10 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT: Geocon Consultants, Inc.
Work Order: 104505
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **MB-54016** SampType: **MBLK** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/19/2009** RunNo: **107209**
Client ID: **PBS** Batch ID: **54016** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/20/2009** SeqNo: **1678990**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	2.0									
Arsenic	ND	1.0									
Barium	ND	1.0									
Beryllium	ND	1.0									
Cadmium	ND	1.0									
Chromium	ND	1.0									
Cobalt	ND	1.0									
Copper	ND	2.0									
Lead	ND	1.0									
Molybdenum	ND	1.0									
Nickel	ND	1.0									
Selenium	ND	1.0									
Silver	0.036	1.0									
Thallium	ND	1.0									
Vanadium	ND	1.0									
Zinc	0.248	1.0									

Sample ID: **LCS-54016** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/19/2009** RunNo: **107209**
Client ID: **LCSS** Batch ID: **54016** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/20/2009** SeqNo: **1678991**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	47.798	2.0	50.00	0	95.6	80	120				
Arsenic	46.440	1.0	50.00	0	92.9	80	120				
Barium	49.712	1.0	50.00	0	99.4	80	120				
Beryllium	48.015	1.0	50.00	0	96.0	80	120				
Cadmium	47.844	1.0	50.00	0	95.7	80	120				
Chromium	45.362	1.0	50.00	0	90.7	80	120				
Cobalt	49.217	1.0	50.00	0	98.4	80	120				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104505
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **LCS-54016**	SampType: **LCS**	TestCode: **6010_S**	Units: **mg/Kg**	Prep Date: **3/19/2009**	RunNo: **107209**
Client ID: **LCSS**	Batch ID: **54016**	TestNo: **EPA 6010B**	**EPA 3050B**	Analysis Date: **3/20/2009**	SeqNo: **1678991**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Copper	49.871	2.0	50.00	0	99.7	80	120				
Lead	48.991	1.0	50.00	0	98.0	80	120				
Molybdenum	49.147	1.0	50.00	0	98.3	80	120				
Nickel	47.526	1.0	50.00	0	95.1	80	120				
Selenium	44.900	1.0	50.00	0	89.8	80	120				
Silver	47.755	1.0	50.00	0.03571	95.4	80	120				
Thallium	42.758	1.0	50.00	0	85.5	80	120				
Vanadium	50.241	1.0	50.00	0	100	80	120				
Zinc	47.140	1.0	50.00	0.2477	93.8	80	120				

Sample ID: **104517-003ADUP**	SampType: **DUP**	TestCode: **6010_S**	Units: **mg/Kg**	Prep Date: **3/19/2009**	RunNo: **107209**
Client ID: **ZZZZZZ**	Batch ID: **54016**	TestNo: **EPA 6010B**	**EPA 3050B**	Analysis Date: **3/20/2009**	SeqNo: **1679001**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	2.0						0	0	20	
Arsenic	ND	1.0						0	0	20	
Barium	126.313	1.0						136.8	7.95	20	
Beryllium	ND	1.0						0	0	20	
Cadmium	0.310	1.0						0.3055	0	20	
Chromium	5.148	1.0						5.085	1.23	20	
Cobalt	5.045	1.0						5.000	0.878	20	
Copper	7.219	2.0						7.401	2.50	20	
Lead	0.589	1.0						0.6162	0	20	
Molybdenum	ND	1.0						0	0	20	
Nickel	2.446	1.0						2.380	2.73	20	
Selenium	ND	1.0						0	0	20	
Silver	ND	1.0						0	0	20	
Thallium	ND	1.0						0	0	20	
Vanadium	35.418	1.0						35.12	0.853	20	
Zinc	24.481	1.0						24.17	1.30	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104505
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **104517-003AMS** SampType: **MS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/19/2009** RunNo: **107209**
Client ID: **ZZZZZZ** Batch ID: **54016** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/20/2009** SeqNo: **1679002**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	85.444	2.0	125.0	0	68.4	25	106				
Arsenic	95.725	1.0	125.0	0	76.6	42	113				
Barium	220.058	1.0	125.0	136.8	66.6	19	140				
Beryllium	99.780	1.0	125.0	0	79.8	50	109				
Cadmium	99.017	1.0	125.0	0.3055	79.0	48	106				
Chromium	99.405	1.0	125.0	5.085	75.5	44	116				
Cobalt	103.264	1.0	125.0	5.000	78.6	47	107				
Copper	114.908	2.0	125.0	7.401	86.0	49	124				
Lead	101.704	1.0	125.0	0.6162	80.9	33	120				
Molybdenum	99.498	1.0	125.0	0	79.6	46	111				
Nickel	101.274	1.0	125.0	2.380	79.1	43	111				
Selenium	96.836	1.0	125.0	0	77.5	43	104				
Silver	103.969	1.0	125.0	0	83.2	53	114				
Thallium	89.659	1.0	125.0	0	71.7	41	107				
Vanadium	135.499	1.0	125.0	35.12	80.3	48	116				
Zinc	120.330	1.0	125.0	24.17	76.9	24	129				

Sample ID: **104517-003AMSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/19/2009** RunNo: **107209**
Client ID: **ZZZZZZ** Batch ID: **54016** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/20/2009** SeqNo: **1679003**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	91.335	2.0	125.0	0	73.1	25	106	85.44	6.66	20	
Arsenic	102.715	1.0	125.0	0	82.2	42	113	95.72	7.05	20	
Barium	243.692	1.0	125.0	136.8	85.5	19	140	220.1	10.2	20	
Beryllium	106.821	1.0	125.0	0	85.5	50	109	99.78	6.82	20	
Cadmium	106.369	1.0	125.0	0.3055	84.9	48	106	99.02	7.16	20	
Chromium	107.130	1.0	125.0	5.085	81.6	44	116	99.40	7.48	20	
Cobalt	111.454	1.0	125.0	5.000	85.2	47	107	103.3	7.63	20	
Copper	125.688	2.0	125.0	7.401	94.6	49	124	114.9	8.96	20	
Lead	107.155	1.0	125.0	0.6162	85.2	33	120	101.7	5.22	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104505
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **104517-003AMSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/19/2009** RunNo: **107209**
Client ID: **ZZZZZZ** Batch ID: **54016** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/20/2009** SeqNo: **1679003**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	106.298	1.0	125.0	0	85.0	46	111	99.50	6.61	20	
Nickel	108.607	1.0	125.0	2.380	85.0	43	111	101.3	6.99	20	
Selenium	102.630	1.0	125.0	0	82.1	43	104	96.84	5.81	20	
Silver	112.143	1.0	125.0	0	89.7	53	114	104.0	7.56	20	
Thallium	95.114	1.0	125.0	0	76.1	41	107	89.66	5.90	20	
Vanadium	150.540	1.0	125.0	35.12	92.3	48	116	135.5	10.5	20	
Zinc	131.336	1.0	125.0	24.17	85.7	24	129	120.3	8.75	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104505
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 7471_S

Sample ID: **MB-54019**	SampType: **MBLK**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **3/19/2009**	RunNo: **107171**
Client ID: **PBS**	Batch ID: **54019**	TestNo: **EPA 7471A**		Analysis Date: **3/20/2009**	SeqNo: **1678327**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.10									

Sample ID: **LCS-54019**	SampType: **LCS**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **3/19/2009**	RunNo: **107171**
Client ID: **LCSS**	Batch ID: **54019**	TestNo: **EPA 7471A**		Analysis Date: **3/20/2009**	SeqNo: **1678328**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.790	0.10	0.8300	0	95.2	80	120				

Sample ID: **104505-001A-MS**	SampType: **MS**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **3/19/2009**	RunNo: **107171**
Client ID: **P-9**	Batch ID: **54019**	TestNo: **EPA 7471A**		Analysis Date: **3/20/2009**	SeqNo: **1678329**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.954	0.10	0.8300	0.1990	91.0	70	130				

Sample ID: **104505-001A-MSD**	SampType: **MSD**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **3/19/2009**	RunNo: **107171**
Client ID: **P-9**	Batch ID: **54019**	TestNo: **EPA 7471A**		Analysis Date: **3/20/2009**	SeqNo: **1678330**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.913	0.10	0.8300	0.1990	86.1	70	130	0.9543	4.37	20	

Sample ID: **104505-001A-DUP**	SampType: **DUP**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **3/19/2009**	RunNo: **107171**
Client ID: **P-9**	Batch ID: **54019**	TestNo: **EPA 7471A**		Analysis Date: **3/20/2009**	SeqNo: **1678332**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.201	0.10						0.1990	0.809	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104505
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_S_DM LLSGT

Sample ID: **MB-53969**	SampType: **MBLK**	TestCode: **8015_S_DM L**	Units: **mg/Kg**	Prep Date: **3/18/2009**	RunNo: **107150**
Client ID: **PBS**	Batch ID: **53969**	TestNo: **EPA 8015B(M**	**EPA 3550B**	Analysis Date: **3/19/2009**	SeqNo: **1677854**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	ND	1.0									
ORO	ND	1.0									
Surr: p-Terphenyl	2.979		2.670		112	30	130				

Sample ID: **LCS-53969**	SampType: **LCS**	TestCode: **8015_S_DM L**	Units: **mg/Kg**	Prep Date: **3/18/2009**	RunNo: **107150**
Client ID: **LCSS**	Batch ID: **53969**	TestNo: **EPA 8015B(M**	**EPA 3550B**	Analysis Date: **3/19/2009**	SeqNo: **1677855**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	18.601	1.0	33.00	0	56.4	35	124				
Surr: p-Terphenyl	2.277		2.670		85.3	30	130				

Sample ID: **104477-004ADUP**	SampType: **DUP**	TestCode: **8015_S_DM L**	Units: **mg/Kg**	Prep Date: **3/18/2009**	RunNo: **107150**
Client ID: **ZZZZZZ**	Batch ID: **53969**	TestNo: **EPA 8015B(M**	**EPA 3550B**	Analysis Date: **3/19/2009**	SeqNo: **1677861**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	ND	1.0						0	0	20	
ORO	ND	1.0						0	0	20	
Surr: p-Terphenyl	2.490		2.670		93.3	30	130		0	0	

Sample ID: **104477-004AMS**	SampType: **MS**	TestCode: **8015_S_DM L**	Units: **mg/Kg**	Prep Date: **3/18/2009**	RunNo: **107150**
Client ID: **ZZZZZZ**	Batch ID: **53969**	TestNo: **EPA 8015B(M**	**EPA 3550B**	Analysis Date: **3/19/2009**	SeqNo: **1677867**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	18.727	1.0	33.00	0	56.7	12	125				
Surr: p-Terphenyl	1.986		2.670		74.4	30	130				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104505
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_S_DM LLSGT

Sample ID: **104477-004AMSD** SampType: **MSD** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **3/18/2009** RunNo: **107150**
Client ID: **ZZZZZZ** Batch ID: **53969** TestNo: **EPA 8015B(M EPA 3550B** Analysis Date: **3/19/2009** SeqNo: **1677868**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	19.515	1.0	33.00	0	59.1	12	125	18.73	4.12	20	
Surr: p-Terphenyl	2.180		2.670		81.7	30	130		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104505
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID: **MB-53983** SampType: **MBLK** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **3/18/2009** RunNo: **107096**
Client ID: **PBS** Batch ID: **53983** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **3/18/2009** SeqNo: **1676917**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDD	ND	2.0									
4,4´-DDE	ND	2.0									
4,4´-DDT	ND	2.0									
Aldrin	ND	1.0									
alpha-BHC	ND	1.0									
alpha-Chlordane	ND	1.0									
beta-BHC	ND	1.0									
Chlordane	ND	8.5									
delta-BHC	ND	1.0									
Dieldrin	ND	2.0									
Endosulfan I	ND	1.0									
Endosulfan II	ND	2.0									
Endosulfan sulfate	ND	2.0									
Endrin	ND	2.0									
Endrin aldehyde	ND	2.0									
Endrin ketone	ND	2.0									
gamma-BHC	ND	1.0									
gamma-Chlordane	ND	1.0									
Heptachlor	ND	1.0									
Heptachlor epoxide	ND	1.0									
Methoxychlor	ND	5.0									
Toxaphene	ND	50									
Surr: Tetrachloro-m-xylene	11.396		16.67		68.4	25	115				
Surr: Decachlorobiphenyl	10.369		16.67		62.2	20	142				

Sample ID: **LCS-53983** SampType: **LCS** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **3/18/2009** RunNo: **107096**
Client ID: **LCSS** Batch ID: **53983** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **3/18/2009** SeqNo: **1676918**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aldrin	12.919	1.0	16.67	0	77.5	59	113				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104505
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID: **LCS-53983** SampType: **LCS** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **3/18/2009** RunNo: **107096**
Client ID: **LCSS** Batch ID: **53983** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **3/18/2009** SeqNo: **1676918**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dieldrin	12.838	2.0	16.67	0	77.0	59	108				
Endrin	12.467	2.0	16.67	0	74.8	41	132				
gamma-BHC	12.323	1.0	16.67	0	73.9	60	111				
Heptachlor	12.518	1.0	16.67	0	75.1	62	108				
Surr: Tetrachloro-m-xylene	11.481		16.67		68.9	25	115				
Surr: Decachlorobiphenyl	10.752		16.67		64.5	20	142				

Sample ID: **104564-004AMS** SampType: **MS** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **3/18/2009** RunNo: **107096**
Client ID: **ZZZZZZ** Batch ID: **53983** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **3/18/2009** SeqNo: **1676919**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDT	14.320	2.0	16.67	0	85.9	29	143				
Aldrin	15.086	1.0	16.67	0	90.5	44	131				
Dieldrin	15.445	2.0	16.67	0	92.6	40	136				
Endrin	15.235	2.0	16.67	0	91.4	41	146				
gamma-BHC	14.666	1.0	16.67	0	88.0	45	129				
Heptachlor	14.890	1.0	16.67	0	89.3	48	126				
Surr: Tetrachloro-m-xylene	12.972		16.67		77.8	25	115				
Surr: Decachlorobiphenyl	12.950		16.67		77.7	20	142				

Sample ID: **104564-004AMSD** SampType: **MSD** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **3/18/2009** RunNo: **107096**
Client ID: **ZZZZZZ** Batch ID: **53983** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **3/18/2009** SeqNo: **1676920**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDT	14.709	2.0	16.67	0	88.2	29	143	14.32	2.68	20	
Aldrin	15.509	1.0	16.67	0	93.0	44	131	15.09	2.77	20	
Dieldrin	15.857	2.0	16.67	0	95.1	40	136	15.44	2.64	20	
Endrin	15.665	2.0	16.67	0	94.0	41	146	15.23	2.79	20	
gamma-BHC	14.991	1.0	16.67	0	89.9	45	129	14.67	2.20	20	
Heptachlor	15.304	1.0	16.67	0	91.8	48	126	14.89	2.74	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104505
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID: **104564-004AMSD** SampType: **MSD** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **3/18/2009** RunNo: **107096**
Client ID: **ZZZZZZ** Batch ID: **53983** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **3/18/2009** SeqNo: **1676920**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Tetrachloro-m-xylene	13.277		16.67		79.6	25	115		0	0	
Surr: Decachlorobiphenyl	13.372		16.67		80.2	20	142		0	0	

Sample ID: **104564-003ADUP** SampType: **DUP** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **3/18/2009** RunNo: **107096**
Client ID: **ZZZZZZ** Batch ID: **53983** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **3/18/2009** SeqNo: **1676923**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDD	ND	2.0						0	0	20	
4,4´-DDE	ND	2.0						0	0	20	
4,4´-DDT	ND	2.0						0	0	20	
Aldrin	ND	1.0						0	0	20	
alpha-BHC	ND	1.0						0	0	20	
alpha-Chlordane	ND	1.0						0	0	20	
beta-BHC	ND	1.0						0	0	20	
Chlordane	ND	8.5						0	0	20	
delta-BHC	ND	1.0						0	0	20	
Dieldrin	ND	2.0						0	0	20	
Endosulfan I	ND	1.0						0	0	20	
Endosulfan II	ND	2.0						0	0	20	
Endosulfan sulfate	ND	2.0						0	0	20	
Endrin	ND	2.0						0	0	20	
Endrin aldehyde	ND	2.0						0	0	20	
Endrin ketone	ND	2.0						0	0	20	
gamma-BHC	ND	1.0						0	0	20	
gamma-Chlordane	ND	1.0						0	0	20	
Heptachlor	ND	1.0						0	0	20	
Heptachlor epoxide	ND	1.0						0	0	20	
Methoxychlor	ND	5.0						0	0	20	
Toxaphene	ND	50						0	0	20	
Surr: Tetrachloro-m-xylene	12.908		16.67		77.4	25	115		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104505
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID: **104564-003ADUP** SampType: **DUP** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **3/18/2009** RunNo: **107096**
Client ID: **ZZZZZZ** Batch ID: **53983** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **3/18/2009** SeqNo: **1676923**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Decachlorobiphenyl	12.405		16.67		74.4	20	142		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104505
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8082_S

Sample ID: **MB-53983** SampType: **MBLK** TestCode: **8082_S** Units: **µg/Kg** Prep Date: **3/18/2009** RunNo: **107098**
Client ID: **PBS** Batch ID: **53983** TestNo: **EPA 8082** **EPA 3550B** Analysis Date: **3/18/2009** SeqNo: **1677037**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016	ND	16									
Aroclor 1221	ND	33									
Aroclor 1232	ND	16									
Aroclor 1242	ND	16									
Aroclor 1248	ND	16									
Aroclor 1254	ND	16									
Aroclor 1260	ND	16									
Aroclor 1262	ND	16									
Aroclor 1268	ND	16									
Surr: Decachlorobiphenyl	17.255		16.67		104	30	124				
Surr: Tetrachloro-m-xylene	18.990		16.67		114	40	118				

Sample ID: **LCSA-53983** SampType: **LCS** TestCode: **8082_S** Units: **µg/Kg** Prep Date: **3/18/2009** RunNo: **107098**
Client ID: **LCSS** Batch ID: **53983** TestNo: **EPA 8082** **EPA 3550B** Analysis Date: **3/18/2009** SeqNo: **1677038**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016	124.470	16	166.7	0	74.7	56	113				
Aroclor 1260	132.636	16	166.7	0	79.6	58	111				
Surr: Decachlorobiphenyl	12.992		16.67		77.9	30	124				
Surr: Tetrachloro-m-xylene	13.789		16.67		82.7	40	118				

Sample ID: **MB-53983MSA** SampType: **MS** TestCode: **8082_S** Units: **µg/Kg** Prep Date: **3/18/2009** RunNo: **107098**
Client ID: **ZZZZZZ** Batch ID: **53983** TestNo: **EPA 8082** **EPA 3550B** Analysis Date: **3/18/2009** SeqNo: **1677039**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016	122.549	16	166.7	0	73.5	51	111				
Aroclor 1260	131.541	16	166.7	0	78.9	39	123				
Surr: Decachlorobiphenyl	12.984		16.67		77.9	30	124				
Surr: Tetrachloro-m-xylene	13.684		16.67		82.1	40	118				

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits

Calculations are based on raw values

- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Geocon Consultants, Inc.
Work Order: 104505
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8082_S

Sample ID: **MB-53983MSDA** SampType: **MSD** TestCode: **8082_S** Units: **µg/Kg** Prep Date: **3/18/2009** RunNo: **107098**
Client ID: **ZZZZZZ** Batch ID: **53983** TestNo: **EPA 8082** **EPA 3550B** Analysis Date: **3/18/2009** SeqNo: **1677040**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016	122.304	16	166.7	0	73.4	51	111	122.5	0.200	20	
Aroclor 1260	132.109	16	166.7	0	79.3	39	123	131.5	0.430	20	
Surr: Decachlorobiphenyl	13.008		16.67		78.0	30	124		0	0	
Surr: Tetrachloro-m-xylene	13.674		16.67		82.0	40	118		0	0	

Sample ID: **104477-006ADUPA** SampType: **DUP** TestCode: **8082_S** Units: **µg/Kg** Prep Date: **3/18/2009** RunNo: **107098**
Client ID: **ZZZZZZ** Batch ID: **53983** TestNo: **EPA 8082** **EPA 3550B** Analysis Date: **3/19/2009** SeqNo: **1677047**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016	ND	16						0	0	20	
Aroclor 1221	ND	33						0	0	20	
Aroclor 1232	ND	16						0	0	20	
Aroclor 1242	ND	16						0	0	20	
Aroclor 1248	ND	16						0	0	20	
Aroclor 1254	ND	16						0	0	20	
Aroclor 1260	ND	16						0	0	20	
Aroclor 1262	ND	16						0	0	20	
Aroclor 1268	ND	16						0	0	20	
Surr: Decachlorobiphenyl	15.538		16.67		93.2	30	124		0	0	
Surr: Tetrachloro-m-xylene	14.524		16.67		87.1	40	118		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104505
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-53989** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/19/2009** RunNo: **107125**
Client ID: **PBS** Batch ID: **53989** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/19/2009** SeqNo: **1677459**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
2-Methylnaphthalene	ND	330									
Acenaphthene	ND	330									
Acenaphthylene	ND	330									
Anthracene	ND	330									
Benzo(a)anthracene	ND	330									
Benzo(a)pyrene	ND	330									
Benzo(b)fluoranthene	ND	330									
Benzo(g,h,i)perylene	ND	330									
Benzo(k)fluoranthene	ND	330									
Chrysene	ND	330									
Dibenz(a,h)anthracene	ND	330									
Fluoranthene	ND	330									
Fluorene	ND	330									
Indeno(1,2,3-cd)pyrene	ND	330									
Naphthalene	ND	330									
Phenanthrene	ND	330									
Pyrene	ND	330									
Surr: 1,2-Dichlorobenzene-d4	2720.000		3330		81.7	49	103				
Surr: 2-Fluorobiphenyl	2917.667		3330		87.6	59	108				
Surr: 4-Terphenyl-d14	3400.667		3330		102	58	135				
Surr: Nitrobenzene-d5	2801.667		3330		84.1	54	115				

Sample ID: **LCS-53989** SampType: **LCS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/19/2009** RunNo: **107125**
Client ID: **LCSS** Batch ID: **53989** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/19/2009** SeqNo: **1677460**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	2990.667	330	3330	0	89.8	61	107				
1,4-Dichlorobenzene	2753.333	330	3330	0	82.7	56	100				
2,4-Dinitrotoluene	3370.333	330	3330	0	101	72	130				
2-Chlorophenol	3117.333	330	3330	0	93.6	64	105				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Geocon Consultants, Inc.
Work Order: 104505
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **LCS-53989** SampType: **LCS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/19/2009** RunNo: **107125**
Client ID: **LCSS** Batch ID: **53989** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/19/2009** SeqNo: **1677460**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4-Chloro-3-methylphenol	3571.333	660	3330	0	107	74	125				
4-Nitrophenol	3125.000	1600	3330	0	93.8	77	137				
Acenaphthene	3155.333	330	3330	0	94.8	63	117				
N-Nitrosodi-n-propylamine	2914.000	330	3330	0	87.5	71	121				
Pentachlorophenol	3197.667	1600	3330	0	96.0	69	125				
Phenol	3124.333	330	3330	0	93.8	67	111				
Pyrene	2991.333	330	3330	0	89.8	60	122				
Surr: 1,2-Dichlorobenzene-d4	2797.333		3330		84.0	49	103				
Surr: 2,4,6-Tribromophenol	3546.333		3330		106	47	129				
Surr: 2-Chlorophenol-d4	2944.667		3330		88.4	54	109				
Surr: 2-Fluorobiphenyl	3064.000		3330		92.0	59	108				
Surr: 2-Fluorophenol	2841.333		3330		85.3	50	111				
Surr: 4-Terphenyl-d14	3196.333		3330		96.0	58	135				
Surr: Nitrobenzene-d5	2877.333		3330		86.4	54	115				
Surr: Phenol-d5	3035.667		3330		91.2	58	112				

Sample ID: **104404-011AMS** SampType: **MS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/19/2009** RunNo: **107125**
Client ID: **ZZZZZZ** Batch ID: **53989** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/19/2009** SeqNo: **1677461**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acenaphthene	3413.667	330	3330	0	103	59	118				
Pyrene	3310.000	330	3330	0	99.4	51	130				
Surr: 1,2-Dichlorobenzene-d4	2603.667		3330		78.2	49	103				
Surr: 2-Fluorobiphenyl	3234.667		3330		97.1	59	108				
Surr: 4-Terphenyl-d14	3061.333		3330		91.9	58	135				
Surr: Nitrobenzene-d5	2726.333		3330		81.9	54	115				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104505
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104404-011AMSD** SampType: **MSD** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/19/2009** RunNo: **107125**
Client ID: **ZZZZZZ** Batch ID: **53989** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/19/2009** SeqNo: **1677462**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acenaphthene	3573.000	330	3330	0	107	59	118	3414	4.56	20	
Pyrene	3247.000	330	3330	0	97.5	51	130	3310	1.92	20	
Surr: 1,2-Dichlorobenzene-d4	2810.333		3330		84.4	49	103		0	0	
Surr: 2-Fluorobiphenyl	3430.000		3330		103	59	108		0	0	
Surr: 4-Terphenyl-d14	3215.000		3330		96.5	58	135		0	0	
Surr: Nitrobenzene-d5	2849.333		3330		85.6	54	115		0	0	

Sample ID: **104477-009ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/19/2009** RunNo: **107125**
Client ID: **ZZZZZZ** Batch ID: **53989** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/19/2009** SeqNo: **1677490**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
2-Methylnaphthalene	ND	330						0	0	20	
Acenaphthene	ND	330						0	0	20	
Acenaphthylene	ND	330						0	0	20	
Anthracene	ND	330						0	0	20	
Benzo(a)anthracene	ND	330						0	0	20	
Benzo(a)pyrene	ND	330						0	0	20	
Benzo(b)fluoranthene	ND	330						0	0	20	
Benzo(g,h,i)perylene	ND	330						0	0	20	
Benzo(k)fluoranthene	ND	330						0	0	20	
Chrysene	ND	330						0	0	20	
Dibenz(a,h)anthracene	ND	330						0	0	20	
Fluoranthene	ND	330						0	0	20	
Fluorene	ND	330						0	0	20	
Indeno(1,2,3-cd)pyrene	ND	330						0	0	20	
Naphthalene	ND	330						0	0	20	
Phenanthrene	ND	330						0	0	20	
Pyrene	ND	330						0	0	20	
Surr: 1,2-Dichlorobenzene-d4	2727.000		3330		81.9	49	103		0	0	
Surr: 2-Fluorobiphenyl	3227.000		3330		96.9	59	108		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104505
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104477-009ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/19/2009** RunNo: **107125**
Client ID: **ZZZZZZ** Batch ID: **53989** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/19/2009** SeqNo: **1677490**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 4-Terphenyl-d14	3451.000		3330		104	58	135		0	0	
Surr: Nitrobenzene-d5	2903.000		3330		87.2	54	115		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CHAIN OF CUSTODY RECORD

Pg 1 of 1

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#: _____
Logged By: _____ Date: 3/16/09

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: _____

Sample Condition Upon Receipt:
1. CHILLED Y☐ N☐ 4. SEALED Y☐ N☐
2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐
3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client: ~~Caltrans – Dumbarton Bridge~~ Geocon Consultants
Attn: John Love
Address: 6671 Brisa St.
City Livermore State CA Zip Code 94550
TEL: (925) 371-5900
FAX: (925) 371-5900

Project Name: Caltrans Dumbarton Bridge
Project #: E8435-06-18
Sampler: (Printed Name) J. Lor (Signature)

Relinquished by: (Signature and Printed Name)	Date: 3/12/09	Time: 17:00	Received by: (Signature and Printed Name)	Date: 3/16/09	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
John Love 3/12/09
Print Name Date
Signature

Send Report To:
Attn: _____
Co: same as above
Address _____
City _____ State _____ Zip _____

Bill To:
Attn: _____
Co: same as above
Address _____
City _____ State _____ Zip _____

Special Instructions/Comments:
Silica Gel cleanup (8015B)

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	6091A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	6010B (Total Metal)	8015B (GRO) / 8020 (BTEX)	8015B (DRO)	8021 (BTEX)	TITLE 22 / CAM 17 (6010/7000)	TPH as Diesel (8015B)	PAHs (8270C)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	104505 - 01	P-9	3/10/09	13:50	X	X							X	X	X						E	2	J/G		

Circle or Add Analysis(es) Requested
SPECIFY APPROPRIATE MATRIX
Container(s)
PRESERVATION
QA/QC: RTNE ☐ CT ☐ SWRCB ☐ Logcode _____ OTHER _____

- TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter.

May 18, 2009

John Love
Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550

TEL: (925) 525-4142
FAX: (925) 371-5915

ELAP No.: 1838
NELAP No.: 02107CA
NEVADA.: CA-401
CSDLAC No.: 10196

Workorder No.: 104477

RE: Caltrans-Dumbartan Bridge, E8435-06-18

Attention: John Love

Enclosed are the results for sample(s) received on March 13, 2009 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

This is an addendum report. Please incorporate with documentation previously submitted.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

Results were J-Flag. "J" is used to flag those results that are between the PQL (Practical Quantitation Limit) and the calculated MDL (Method Detection Limit). Results that are "J" Flagged are estimated values since it becomes difficult to accurately quantitate the analyte near the MDL.

Analytical Comments for Method 6010

Dilution was necessary for samples 104477-001A, 104477-002A, 104477-003A, 104477-004A, 104477-005A, 104477-006A, 104477-007A, 104477-008A and 104477-009A, due to sample matrix.

Analytical Comments for Method 7470

STLC Mercury analysis was requested beyond hold time. Results are flagged with an "H" qualifier.

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P-15
Lab Order:	104477	**Collection Date:**	3/10/2009 8:30:00 AM
Project:	Caltrans-Dumbartan Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104477-001A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC							
			WET/ EPA 6010B				
RunID: **ICP8_090511A**	QC Batch: **R108900**				PrepDate:		Analyst: **CL**
Vanadium	0.59	0.010	1.0	J	mg/L	20	5/11/2009 12:26 PM
MERCURY BY WET EXTRACTION							
			WET/ EPA 7470A				
RunID: **AA5_090508A**	QC Batch: **55229**				PrepDate: **5/8/2009**		Analyst: **RQ**
Mercury	ND	0.23	1.0	H	µg/L	1	5/8/2009 01:42 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P-13
Lab Order:	104477	**Collection Date:**	3/10/2009 9:30:00 AM
Project:	Caltrans-Dumbartan Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104477-002A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC							
			WET/ EPA 6010B				
RunID: **ICP8_090511A**	QC Batch: **R108900**				PrepDate:		Analyst: **CL**
Lead	0.34	0.042	1.0	J	mg/L	20	5/11/2009 12:30 PM
Vanadium	0.44	0.010	1.0	J	mg/L	20	5/11/2009 12:30 PM
MERCURY BY WET EXTRACTION							
			WET/ EPA 7470A				
RunID: **AA5_090508A**	QC Batch: **55229**				PrepDate: **5/8/2009**		Analyst: **RQ**
Mercury	ND	0.23	1.0	H	µg/L	1	5/8/2009 01:44 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P-11
Lab Order:	104477	**Collection Date:**	3/10/2009 10:40:00 AM
Project:	Caltrans-Dumbartan Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104477-003A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC							
			WET/ EPA 6010B				
RunID: **ICP8_090511A**	QC Batch: **R108900**				PrepDate:		Analyst: **CL**
Vanadium	0.42	0.010	1.0	J	mg/L	20	5/11/2009 12:34 PM
MERCURY BY WET EXTRACTION							
			WET/ EPA 7470A				
RunID: **AA5_090508A**	QC Batch: **55229**				PrepDate: **5/8/2009**		Analyst: **RQ**
Mercury	ND	0.23	1.0	H	µg/L	1	5/8/2009 01:51 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P-5
Lab Order:	104477	**Collection Date:**	3/10/2009 12:00:00 PM
Project:	Caltrans-Dumbartan Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104477-004A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC							
			WET/ EPA 6010B				
RunID: **ICP8_090511A**	QC Batch: **R108900**				PrepDate:		Analyst: **CL**
Vanadium	0.53	0.010	1.0	J	mg/L	20	5/11/2009 12:37 PM
MERCURY BY WET EXTRACTION							
			WET/ EPA 7470A				
RunID: **AA5_090508A**	QC Batch: **55229**				PrepDate: **5/8/2009**		Analyst: **RQ**
Mercury	ND	0.23	1.0	H	µg/L	1	5/8/2009 01:53 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P-7
Lab Order:	104477	**Collection Date:**	3/10/2009 12:50:00 PM
Project:	Caltrans-Dumbartan Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104477-005A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC							
			WET/ EPA 6010B				
RunID: **ICP8_090511A**	QC Batch: **R108900**				PrepDate:		Analyst: **CL**
Lead	ND	0.042	1.0		mg/L	20	5/11/2009 12:41 PM
Vanadium	0.35	0.010	1.0	J	mg/L	20	5/11/2009 12:41 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P-33
Lab Order:	104477	**Collection Date:**	3/11/2009 10:30:00 AM
Project:	Caltrans-Dumbartan Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104477-006A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC							
			WET/ EPA 6010B				
RunID: **ICP8_090511A**	QC Batch: **R108900**				PrepDate:		Analyst: **CL**
Vanadium	0.60	0.010	1.0	J	mg/L	20	5/11/2009 12:44 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P-35
Lab Order:	104477	**Collection Date:**	3/11/2009 11:10:00 AM
Project:	Caltrans-Dumbartan Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104477-007A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC							
			WET/ EPA 6010B				
RunID: **ICP8_090511A**	QC Batch: **R108900**				PrepDate:		Analyst: **CL**
Vanadium	0.59	0.010	1.0	J	mg/L	20	5/11/2009 12:48 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P-37
Lab Order:	104477	**Collection Date:**	3/11/2009 11:50:00 AM
Project:	Caltrans-Dumbartan Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104477-008A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC							
			WET/ EPA 6010B				
RunID: **ICP8_090511A**	QC Batch: **R108900**				PrepDate:		Analyst: **CL**
Vanadium	0.85	0.010	1.0	J	mg/L	20	5/11/2009 12:52 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P-39
Lab Order:	104477	**Collection Date:**	3/11/2009 12:40:00 PM
Project:	Caltrans-Dumbartan Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104477-009A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC							
			WET/ EPA 6010B				
RunID: **ICP8_090511A**	QC Batch: **R108900**				PrepDate:		Analyst: **CL**
Arsenic	0.27	0.088	1.0	J	mg/L	20	5/11/2009 12:56 PM
Vanadium	0.55	0.010	1.0	J	mg/L	20	5/11/2009 12:56 PM
MERCURY BY WET EXTRACTION							
			WET/ EPA 7470A				
RunID: **AA5_090508A**	QC Batch: **55229**				PrepDate: **5/8/2009**		Analyst: **RQ**
Mercury	ND	0.23	1.0	H	µg/L	1	5/8/2009 01:55 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT: Geocon Consultants, Inc.
Work Order: 104477
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_ST

Sample ID: **MB-55172A** SampType: **MBLK** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **108900**
Client ID: **PBS** Batch ID: **R108900** TestNo: **WET/ EPA 60** Analysis Date: **5/11/2009** SeqNo: **1709032**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	0.050									
Lead	ND	0.050									
Vanadium	ND	0.050									

Sample ID: **LCS-55172** SampType: **LCS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **108900**
Client ID: **LCSS** Batch ID: **R108900** TestNo: **WET/ EPA 60** Analysis Date: **5/11/2009** SeqNo: **1709033**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	0.998	0.050	1.000	0	99.8	85	115				
Lead	1.052	0.050	1.000	0	105	85	115				
Vanadium	1.017	0.050	1.000	0	102	85	115				

Sample ID: **104505-001A-DUP** SampType: **DUP** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **108900**
Client ID: **ZZZZZZ** Batch ID: **R108900** TestNo: **WET/ EPA 60** Analysis Date: **5/11/2009** SeqNo: **1709043**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	0.184	1.0						0.1935	0	20	J
Lead	0.847	1.0						1.036	0	20	J
Vanadium	0.705	1.0						0.6411	0	20	J

Sample ID: **104505-001A-MS** SampType: **MS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **108900**
Client ID: **ZZZZZZ** Batch ID: **R108900** TestNo: **WET/ EPA 60** Analysis Date: **5/11/2009** SeqNo: **1709044**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	2.649	1.0	2.500	0.1935	98.2	66	128				
Lead	3.351	1.0	2.500	1.036	92.6	71	121				
Vanadium	2.995	1.0	2.500	0.6411	94.2	79	118				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

CLIENT: Geocon Consultants, Inc.
Work Order: 104477
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_ST

Sample ID: **MB-55172B** SampType: **MBLK** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **108900**
Client ID: **PBS** Batch ID: **R108900** TestNo: **WET/ EPA 60** Analysis Date: **5/11/2009** SeqNo: **1709045**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	0.050									
Lead	ND	0.050									
Vanadium	ND	0.050									

Sample ID: **105364-010A-DUP** SampType: **DUP** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **108900**
Client ID: **ZZZZZZ** Batch ID: **R108900** TestNo: **WET/ EPA 60** Analysis Date: **5/11/2009** SeqNo: **1709056**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	0.231	1.0						0.2641	0	20	J
Lead	0.074	1.0						0.05913	0	20	J
Vanadium	0.542	1.0						0.5387	0	20	J

Sample ID: **105364-010A-MS** SampType: **MS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **108900**
Client ID: **ZZZZZZ** Batch ID: **R108900** TestNo: **WET/ EPA 60** Analysis Date: **5/11/2009** SeqNo: **1709057**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	2.535	1.0	2.500	0.2641	90.8	66	128				
Lead	2.385	1.0	2.500	0.05913	93.1	71	121				
Vanadium	2.843	1.0	2.500	0.5387	92.2	79	118				

Sample ID: **105364-010A-MSD** SampType: **MSD** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **108900**
Client ID: **ZZZZZZ** Batch ID: **R108900** TestNo: **WET/ EPA 60** Analysis Date: **5/11/2009** SeqNo: **1709058**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	2.656	1.0	2.500	0.2641	95.7	66	128	2.535	4.66	20	
Lead	2.546	1.0	2.500	0.05913	99.5	71	121	2.385	6.51	20	
Vanadium	2.951	1.0	2.500	0.5387	96.5	79	118	2.843	3.71	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

CLIENT: Geocon Consultants, Inc.
Work Order: 104477
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 7470_ST

Sample ID: **MB-55229**	SampType: **MBLK**	TestCode: **7470_ST**	Units: **µg/L**	Prep Date: **5/8/2009**	RunNo: **108861**
Client ID: **PBS**	Batch ID: **55229**	TestNo: **WET/ EPA 74**		Analysis Date: **5/8/2009**	SeqNo: **1708322**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.20									

Sample ID: **LCS-55229**	SampType: **LCS**	TestCode: **7470_ST**	Units: **µg/L**	Prep Date: **5/8/2009**	RunNo: **108861**
Client ID: **LCSS**	Batch ID: **55229**	TestNo: **WET/ EPA 74**		Analysis Date: **5/8/2009**	SeqNo: **1708323**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	9.787	0.20	10.00	0	97.9	85	115				

Sample ID: **MB-55172A STLC**	SampType: **MBLK**	TestCode: **7470_ST**	Units: **µg/L**	Prep Date: **5/8/2009**	RunNo: **108861**
Client ID: **PBS**	Batch ID: **55229**	TestNo: **WET/ EPA 74**		Analysis Date: **5/8/2009**	SeqNo: **1708324**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	1.0									

Sample ID: **104505-001A-MS**	SampType: **MS**	TestCode: **7470_ST**	Units: **µg/L**	Prep Date: **5/8/2009**	RunNo: **108861**
Client ID: **ZZZZZZ**	Batch ID: **55229**	TestNo: **WET/ EPA 74**		Analysis Date: **5/8/2009**	SeqNo: **1708325**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	49.046	1.0	50.00	0	98.1	70	130				H

Sample ID: **104505-001A-MSD**	SampType: **MSD**	TestCode: **7470_ST**	Units: **µg/L**	Prep Date: **5/8/2009**	RunNo: **108861**
Client ID: **ZZZZZZ**	Batch ID: **55229**	TestNo: **WET/ EPA 74**		Analysis Date: **5/8/2009**	SeqNo: **1708326**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	48.656	1.0	50.00	0	97.3	70	130	49.05	0.797	20	H

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

CLIENT: Geocon Consultants, Inc.
Work Order: 104477
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 7470_ST

Sample ID: **104505-001A-DUP** SampType: **DUP** TestCode: **7470_ST** Units: **µg/L** Prep Date: **5/8/2009** RunNo: **108861**
Client ID: **ZZZZZZ** Batch ID: **55229** TestNo: **WET/ EPA 74** Analysis Date: **5/8/2009** SeqNo: **1708328**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	1.0						0	0	20	H

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

Diane Galvan

From: John Love [love@geoconinc.com]
Sent: Monday, May 18, 2009 10:31 AM
To: Diane Galvan
Subject: Lab ID#s 105364, 104505, and 104477

Hi Diane:

I have a couple questions regarding the WET results from lab ID #s 105364, 104505, 104477. We had some samples analyzed for As, Cr, Pb, Hg, and Vn after we got the total results back. Anyway, we had the samples analyzed to see if they exceeded the Newby Island Landfills STLC acceptance criteria for disposal. I should have inquired before I requested the analysis if the lab could meet the detection limits set by Newby Island. It only matters in a couple of instances – that would be As and Hg.

My first question is whether ATL could have met the landfill's detection limit for Hg of 0.00108 mg/L? And, the second question is whether the lab could "J" flag the As results (if the results were between the PQL and MDL)? Apparently, the Newby Island STLC for As is 0.45 mg/L, which higher than the MDL of 0.088 mg/L and less than the PQL of 1.0 mg/L.

Thanks Diane.

John Love
Sr. Project Geologist

Please visit our new website at http://www.geoconinc.com

GEOCON Incorporated
6671 Brisa Street
Livermore, CA 94550
Tel (925) 371-5900

GEOTECHNICAL - ENVIRONMENTAL - MATERIALS

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May 18, 2009

John Love
Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550
TEL: (925) 525-4142
FAX: (925) 371-5915

ELAP No.: 1838
NELAP No.: 02107CA
NEVADA.: CA-401
CSDLAC No.: 10196

Workorder No.: 104505

RE: Caltrans-Dumbartan Bridge, E8435-06-18

Attention: John Love

Enclosed are the results for sample(s) received on March 16, 2009 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

This is an addendum report. Please incorporate with documentation previously submitted.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

CASE NARRATIVE

Results were J-Flag. "J" is used to flag those results that are between the PQL (Practical Quantitation Limit) and the calculated MDL (Method Detection Limit). Results that are "J" Flagged are estimated values since it becomes difficult to accurately quantitate the analyte near the MDL.

Analytical Comments for Method 6010

Dilution was necessary for sample 104505-001A, due to sample matrix.

Analytical Comments for Method 7470

STLC Mercury analysis was requested beyond hold time. Results are flagged with an "H" qualifier.

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P-9
Lab Order:	104505	**Collection Date:**	3/10/2009 1:50:00 PM
Project:	Caltrans-Dumbartan Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104505-001A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC							
			WET/ EPA 6010B				
RunID: **ICP8_090511A**	QC Batch: **R108900**				PrepDate:		Analyst: **CL**
Arsenic	0.19	0.088	1.0	J	mg/L	20	5/11/2009 03:31 PM
Vanadium	0.64	0.010	1.0	J	mg/L	20	5/11/2009 03:31 PM
MERCURY BY WET EXTRACTION							
			WET/ EPA 7470A				
RunID: **AA5_090508A**	QC Batch: **55229**				PrepDate: **5/8/2009**		Analyst: **RQ**
Mercury	ND	0.23	1.0	H	µg/L	1	5/8/2009 01:37 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT: Geocon Consultants, Inc.
Work Order: 104505
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_ST

Sample ID: **MB-55172A** SampType: **MBLK** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **108900**
Client ID: **PBS** Batch ID: **R108900** TestNo: **WET/ EPA 60** Analysis Date: **5/11/2009** SeqNo: **1709032**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	0.050									
Vanadium	ND	0.050									

Sample ID: **LCS-55172** SampType: **LCS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **108900**
Client ID: **LCSS** Batch ID: **R108900** TestNo: **WET/ EPA 60** Analysis Date: **5/11/2009** SeqNo: **1709033**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	0.998	0.050	1.000	0	99.8	85	115				
Vanadium	1.017	0.050	1.000	0	102	85	115				

Sample ID: **104505-001A-DUP** SampType: **DUP** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **108900**
Client ID: **P-9** Batch ID: **R108900** TestNo: **WET/ EPA 60** Analysis Date: **5/11/2009** SeqNo: **1709043**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	0.184	1.0						0.1935	0	20	J
Chromium	0.363	1.0						0.3231	0	20	J
Lead	0.847	1.0						1.036	0	20	J
Vanadium	0.705	1.0						0.6411	0	20	J

Sample ID: **104505-001A-MS** SampType: **MS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **108900**
Client ID: **P-9** Batch ID: **R108900** TestNo: **WET/ EPA 60** Analysis Date: **5/11/2009** SeqNo: **1709044**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	2.649	1.0	2.500	0.1935	98.2	66	128				
Chromium	2.622	1.0	2.500	0.3231	91.9	77	116				
Lead	3.351	1.0	2.500	1.036	92.6	71	121				
Vanadium	2.995	1.0	2.500	0.6411	94.2	79	118				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

CLIENT: Geocon Consultants, Inc.
Work Order: 104505
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_ST

Sample ID: **MB-55172B**	SampType: **MBLK**	TestCode: **6010_ST**	Units: **mg/L**	Prep Date:	RunNo: **108900**
Client ID: **PBS**	Batch ID: **R108900**	TestNo: **WET/ EPA 60**		Analysis Date: **5/11/2009**	SeqNo: **1709045**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	0.050									
Vanadium	ND	0.050									

Sample ID: **105364-010A-DUP**	SampType: **DUP**	TestCode: **6010_ST**	Units: **mg/L**	Prep Date:	RunNo: **108900**
Client ID: **ZZZZZZ**	Batch ID: **R108900**	TestNo: **WET/ EPA 60**		Analysis Date: **5/11/2009**	SeqNo: **1709056**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	0.231	1.0						0.2641	0	20	J
Vanadium	0.542	1.0						0.5387	0	20	J

Sample ID: **105364-010A-MS**	SampType: **MS**	TestCode: **6010_ST**	Units: **mg/L**	Prep Date:	RunNo: **108900**
Client ID: **ZZZZZZ**	Batch ID: **R108900**	TestNo: **WET/ EPA 60**		Analysis Date: **5/11/2009**	SeqNo: **1709057**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	2.535	1.0	2.500	0.2641	90.8	66	128				
Vanadium	2.843	1.0	2.500	0.5387	92.2	79	118				

Sample ID: **105364-010A-MSD**	SampType: **MSD**	TestCode: **6010_ST**	Units: **mg/L**	Prep Date:	RunNo: **108900**
Client ID: **ZZZZZZ**	Batch ID: **R108900**	TestNo: **WET/ EPA 60**		Analysis Date: **5/11/2009**	SeqNo: **1709058**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	2.656	1.0	2.500	0.2641	95.7	66	128	2.535	4.66	20	
Vanadium	2.951	1.0	2.500	0.5387	96.5	79	118	2.843	3.71	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

CLIENT: Geocon Consultants, Inc.
Work Order: 104505
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 7470_ST

Sample ID: **MB-55229**	SampType: **MBLK**	TestCode: **7470_ST**	Units: **µg/L**	Prep Date: **5/8/2009**	RunNo: **108861**
Client ID: **PBS**	Batch ID: **55229**	TestNo: **WET/ EPA 74**		Analysis Date: **5/8/2009**	SeqNo: **1708322**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.20									

Sample ID: **LCS-55229**	SampType: **LCS**	TestCode: **7470_ST**	Units: **µg/L**	Prep Date: **5/8/2009**	RunNo: **108861**
Client ID: **LCSS**	Batch ID: **55229**	TestNo: **WET/ EPA 74**		Analysis Date: **5/8/2009**	SeqNo: **1708323**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	9.787	0.20	10.00	0	97.9	85	115				

Sample ID: **MB-55172A STLC**	SampType: **MBLK**	TestCode: **7470_ST**	Units: **µg/L**	Prep Date: **5/8/2009**	RunNo: **108861**
Client ID: **PBS**	Batch ID: **55229**	TestNo: **WET/ EPA 74**		Analysis Date: **5/8/2009**	SeqNo: **1708324**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	1.0									

Sample ID: **104505-001A-MS**	SampType: **MS**	TestCode: **7470_ST**	Units: **µg/L**	Prep Date: **5/8/2009**	RunNo: **108861**
Client ID: **P-9**	Batch ID: **55229**	TestNo: **WET/ EPA 74**		Analysis Date: **5/8/2009**	SeqNo: **1708325**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	49.046	1.0	50.00	0	98.1	70	130				H

Sample ID: **104505-001A-MSD**	SampType: **MSD**	TestCode: **7470_ST**	Units: **µg/L**	Prep Date: **5/8/2009**	RunNo: **108861**
Client ID: **P-9**	Batch ID: **55229**	TestNo: **WET/ EPA 74**		Analysis Date: **5/8/2009**	SeqNo: **1708326**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	48.656	1.0	50.00	0	97.3	70	130	49.05	0.797	20	H

Qualifiers:

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J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

CLIENT: Geocon Consultants, Inc.
Work Order: 104505
Project: Caltrans-Dumbartan Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 7470_ST

Sample ID: **104505-001A-DUP** SampType: **DUP** TestCode: **7470_ST** Units: **µg/L** Prep Date: **5/8/2009** RunNo: **108861**
Client ID: **P-9** Batch ID: **55229** TestNo: **WET/ EPA 74** Analysis Date: **5/8/2009** SeqNo: **1708328**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	1.0						0	0	20	H

Qualifiers:

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Diane Galvan

From: John Love [love@geoconinc.com]
Sent: Monday, May 18, 2009 10:31 AM
To: Diane Galvan
Subject: Lab ID#s 105364, 104505, and 104477

Hi Diane:

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My first question is whether ATL could have met the landfill's detection limit for Hg of 0.00108 mg/L? And, the second question is whether the lab could "J" flag the As results (if the results were between the PQL and MDL)? Apparently, the Newby Island STLC for As is 0.45 mg/L, which higher than the MDL of 0.088 mg/L and less than the PQL of 1.0 mg/L.

Thanks Diane.

John Love
Sr. Project Geologist

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Livermore, CA 94550
Tel (925) 371-5900

GEOTECHNICAL - ENVIRONMENTAL - MATERIALS

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May 18, 2009

John Love
Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550
TEL: (925) 525-4142
FAX: (925) 371-5915

ELAP No.: 1838
NELAP No.: 02107CA
NEVADA.: CA-401
CSDLAC No.: 10196

Workorder No.: 105364

RE: Caltrans-Dumbartan Bridge, E8435-

Attention: John Love

Enclosed are the results for sample(s) received on May 05, 2009 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

This is an addendum report. Please incorporate with documentation previously submitted.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CASE NARRATIVE

Results were J-Flag. "J" is used to flag those results that are between the PQL (Practical Quantitation Limit) and the calculated MDL (Method Detection Limit). Results that are "J" Flagged are estimated values since it becomes difficult to accurately quantitate the analyte near the MDL.

Analytical Comments for Method 6010

Dilution was necessary for samples 105364-001A, 105364-002A, 105364-003A, 105364-004A, 105364-005A, 105364-006A, 105364-007A, 105364-008A and 105364-009A, due to sample matrix.

Analytical Comments for Method 7470

STLC Mercury analysis was requested beyond hold time. Results are flagged with an "H" qualifier.

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P-6
Lab Order:	105364	**Collection Date:**	3/10/2009 12:30:00 PM
Project:	Caltrans-Dumbartan Bridge, E8435-	**Matrix:**	SOIL
Lab ID:	105364-001A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC							
			WET/ EPA 6010B				
RunID: **ICP8_090511A**	QC Batch: **R108900**				PrepDate:		Analyst: **CL**
Arsenic	0.17	0.088	1.0	J	mg/L	20	5/11/2009 01:26 PM
Chromium	0.29	0.018	1.0	J	mg/L	20	5/11/2009 01:26 PM
Vanadium	0.68	0.010	1.0	J	mg/L	20	5/11/2009 01:26 PM
MERCURY BY WET EXTRACTION							
			WET/ EPA 7470A				
RunID: **AA5_090508B**	QC Batch: **55230**				PrepDate:	**5/8/2009**	Analyst: **RQ**
Mercury	ND	0.23	1.0	H	µg/L	1	5/8/2009 02:22 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P-8
Lab Order:	105364	**Collection Date:**	3/10/2009 1:20:00 PM
Project:	Caltrans-Dumbartan Bridge, E8435-	**Matrix:**	SOIL
Lab ID:	105364-002A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC							
			WET/ EPA 6010B				
RunID: **ICP8_090511A**	QC Batch: **R108900**				PrepDate:		Analyst: **CL**
Vanadium	0.46	0.010	1.0	J	mg/L	20	5/11/2009 01:30 PM
MERCURY BY WET EXTRACTION							
			WET/ EPA 7470A				
RunID: **AA5_090508B**	QC Batch: **55230**				PrepDate:	**5/8/2009**	Analyst: **RQ**
Mercury	ND	0.23	1.0	H	µg/L	1	5/8/2009 02:25 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P-10
Lab Order:	105364	**Collection Date:**	3/10/2009 11:05:00 AM
Project:	Caltrans-Dumbartan Bridge, E8435-	**Matrix:**	SOIL
Lab ID:	105364-003A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC							
			WET/ EPA 6010B				
RunID: **ICP8_090511A**	QC Batch: **R108900**				PrepDate:		Analyst: **CL**
Arsenic	0.20	0.088	1.0	J	mg/L	20	5/11/2009 01:33 PM
Vanadium	0.61	0.010	1.0	J	mg/L	20	5/11/2009 01:33 PM
MERCURY BY WET EXTRACTION							
			WET/ EPA 7470A				
RunID: **AA5_090508B**	QC Batch: **55230**				PrepDate: **5/8/2009**		Analyst: **RQ**
Mercury	ND	0.23	1.0	H	µg/L	1	5/8/2009 02:27 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P-12
Lab Order:	105364	**Collection Date:**	3/10/2009 10:00:00 AM
Project:	Caltrans-Dumbartan Bridge, E8435-	**Matrix:**	SOIL
Lab ID:	105364-004A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC							
			WET/ EPA 6010B				
RunID: **ICP8_090511A**	QC Batch: **R108900**				PrepDate:		Analyst: **CL**
Vanadium	0.50	0.010	1.0	J	mg/L	20	5/11/2009 01:37 PM
MERCURY BY WET EXTRACTION							
			WET/ EPA 7470A				
RunID: **AA5_090508B**	QC Batch: **55230**				PrepDate: **5/8/2009**		Analyst: **RQ**
Mercury	ND	0.23	1.0	H	µg/L	1	5/8/2009 02:29 PM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P-14
Lab Order:	105364	**Collection Date:**	3/10/2009 8:55:00 AM
Project:	Caltrans-Dumbartan Bridge, E8435-	**Matrix:**	SOIL
Lab ID:	105364-005A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC							
			WET/ EPA 6010B				
RunID: **ICP8_090511A**	QC Batch: **R108900**				PrepDate:		Analyst: **CL**
Vanadium	0.52	0.010	1.0	J	mg/L	20	5/11/2009 01:41 PM
MERCURY BY WET EXTRACTION							
			WET/ EPA 7470A				
RunID: **AA5_090508B**	QC Batch: **55230**				PrepDate: **5/8/2009**		Analyst: **RQ**
Mercury	ND	0.23	1.0	H	µg/L	1	5/8/2009 02:31 PM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P-32
Lab Order:	105364	**Collection Date:**	3/11/2009 10:10:00 AM
Project:	Caltrans-Dumbartan Bridge, E8435-	**Matrix:**	SOIL
Lab ID:	105364-006A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC							
			WET/ EPA 6010B				
RunID: **ICP8_090511A**	QC Batch: **R108900**				PrepDate:		Analyst: **CL**
Chromium	0.21	0.018	1.0	J	mg/L	20	5/11/2009 01:52 PM
Vanadium	0.41	0.010	1.0	J	mg/L	20	5/11/2009 01:52 PM
MERCURY BY WET EXTRACTION							
			WET/ EPA 7470A				
RunID: **AA5_090508B**	QC Batch: **55230**				PrepDate: **5/8/2009**		Analyst: **RQ**
Mercury	ND	0.23	1.0	H	µg/L	1	5/8/2009 02:34 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P-34
Lab Order:	105364	**Collection Date:**	3/11/2009 11:45:00 AM
Project:	Caltrans-Dumbartan Bridge, E8435-	**Matrix:**	SOIL
Lab ID:	105364-007A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC							
WET/ EPA 6010B							
RunID: **ICP8_090511A**	QC Batch: **R108900**				PrepDate:		Analyst: **CL**
Arsenic	0.16	0.088	1.0	J	mg/L	20	5/11/2009 01:56 PM
Vanadium	0.85	0.010	1.0	J	mg/L	20	5/11/2009 01:56 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P-36
Lab Order:	105364	**Collection Date:**	3/11/2009 11:30:00 AM
Project:	Caltrans-Dumbartan Bridge, E8435-	**Matrix:**	SOIL
Lab ID:	105364-008A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC							
			WET/ EPA 6010B				
RunID: **ICP8_090511A**	QC Batch: **R108900**				PrepDate:		Analyst: **CL**
Arsenic	0.16	0.088	1.0	J	mg/L	20	5/11/2009 02:00 PM
Chromium	0.19	0.018	1.0	J	mg/L	20	5/11/2009 02:00 PM
Vanadium	0.50	0.010	1.0	J	mg/L	20	5/11/2009 02:00 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P-38
Lab Order:	105364	**Collection Date:**	3/11/2009 12:15:00 PM
Project:	Caltrans-Dumbartan Bridge, E8435-	**Matrix:**	SOIL
Lab ID:	105364-009A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC							
WET/ EPA 6010B							
RunID: **ICP8_090511A**	QC Batch: **R108900**				PrepDate:		Analyst: **CL**
Arsenic	0.29	0.088	1.0	J	mg/L	20	5/11/2009 02:04 PM
Chromium	0.28	0.018	1.0	J	mg/L	20	5/11/2009 02:04 PM
Vanadium	0.71	0.010	1.0	J	mg/L	20	5/11/2009 02:04 PM
MERCURY BY WET EXTRACTION							
WET/ EPA 7470A							
RunID: **AA5_090508B**	QC Batch: **55230**				PrepDate: **5/8/2009**		Analyst: **RQ**
Mercury	ND	0.23	1.0	H	µg/L	1	5/8/2009 02:36 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	P-40
Lab Order:	105364	**Collection Date:**	3/11/2009 1:00:00 PM
Project:	Caltrans-Dumbartan Bridge, E8435-	**Matrix:**	SOIL
Lab ID:	105364-010A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC							
			WET/ EPA 6010B				
RunID: **ICP8_090511A**	QC Batch: **R108900**				PrepDate:		Analyst: **CL**
Vanadium	0.54	0.010	1.0	J	mg/L	20	5/11/2009 02:07 PM
MERCURY BY WET EXTRACTION							
			WET/ EPA 7470A				
RunID: **AA5_090508B**	QC Batch: **55230**				PrepDate: **5/8/2009**		Analyst: **RQ**
Mercury	ND	0.23	1.0	H	µg/L	1	5/8/2009 02:18 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT: Geocon Consultants, Inc.
Work Order: 105364
Project: Caltrans-Dumbartan Bridge, E8435-

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_ST

Sample ID: **MB-55172A** SampType: **MBLK** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **108900**
Client ID: **PBS** Batch ID: **R108900** TestNo: **WET/ EPA 60** Analysis Date: **5/11/2009** SeqNo: **1709032**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	0.050									
Chromium	ND	0.050									
Vanadium	ND	0.050									

Sample ID: **LCS-55172** SampType: **LCS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **108900**
Client ID: **LCSS** Batch ID: **R108900** TestNo: **WET/ EPA 60** Analysis Date: **5/11/2009** SeqNo: **1709033**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	0.998	0.050	1.000	0	99.8	85	115				
Chromium	0.942	0.050	1.000	0	94.2	85	115				
Vanadium	1.017	0.050	1.000	0	102	85	115				

Sample ID: **104505-001A-DUP** SampType: **DUP** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **108900**
Client ID: **ZZZZZZ** Batch ID: **R108900** TestNo: **WET/ EPA 60** Analysis Date: **5/11/2009** SeqNo: **1709043**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	0.184	1.0						0.1935	0	20	J
Chromium	0.363	1.0						0.3231	0	20	J
Vanadium	0.705	1.0						0.6411	0	20	J

Sample ID: **104505-001A-MS** SampType: **MS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **108900**
Client ID: **ZZZZZZ** Batch ID: **R108900** TestNo: **WET/ EPA 60** Analysis Date: **5/11/2009** SeqNo: **1709044**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	2.649	1.0	2.500	0.1935	98.2	66	128				
Chromium	2.622	1.0	2.500	0.3231	91.9	77	116				
Vanadium	2.995	1.0	2.500	0.6411	94.2	79	118				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

CLIENT: Geocon Consultants, Inc.
Work Order: 105364
Project: Caltrans-Dumbartan Bridge, E8435-

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_ST

Sample ID: **MB-55172B** SampType: **MBLK** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **108900**
Client ID: **PBS** Batch ID: **R108900** TestNo: **WET/ EPA 60** Analysis Date: **5/11/2009** SeqNo: **1709045**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	0.050									
Chromium	ND	0.050									
Vanadium	ND	0.050									

Sample ID: **105364-010A-DUP** SampType: **DUP** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **108900**
Client ID: **P-40** Batch ID: **R108900** TestNo: **WET/ EPA 60** Analysis Date: **5/11/2009** SeqNo: **1709056**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	0.231	1.0						0.2641	0	20	J
Chromium	0.205	1.0						0.2027	0	20	J
Lead	0.074	1.0						0.05913	0	20	J
Vanadium	0.542	1.0						0.5387	0	20	J

Sample ID: **105364-010A-MS** SampType: **MS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **108900**
Client ID: **P-40** Batch ID: **R108900** TestNo: **WET/ EPA 60** Analysis Date: **5/11/2009** SeqNo: **1709057**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	2.535	1.0	2.500	0.2641	90.8	66	128				
Chromium	2.448	1.0	2.500	0.2027	89.8	77	116				
Lead	2.385	1.0	2.500	0.05913	93.1	71	121				
Vanadium	2.843	1.0	2.500	0.5387	92.2	79	118				

Sample ID: **105364-010A-MSD** SampType: **MSD** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **108900**
Client ID: **P-40** Batch ID: **R108900** TestNo: **WET/ EPA 60** Analysis Date: **5/11/2009** SeqNo: **1709058**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	2.656	1.0	2.500	0.2641	95.7	66	128	2.535	4.66	20	
Chromium	2.481	1.0	2.500	0.2027	91.1	77	116	2.448	1.35	20	
Lead	2.546	1.0	2.500	0.05913	99.5	71	121	2.385	6.51	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

CLIENT: Geocon Consultants, Inc.
Work Order: 105364
Project: Caltrans-Dumbartan Bridge, E8435-

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_ST

Sample ID: **105364-010A-MSD** SampType: **MSD** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **108900**
Client ID: **P-40** Batch ID: **R108900** TestNo: **WET/ EPA 60** Analysis Date: **5/11/2009** SeqNo: **1709058**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Vanadium	2.951	1.0	2.500	0.5387	96.5	79	118	2.843	3.71	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

CLIENT: Geocon Consultants, Inc.
Work Order: 105364
Project: Caltrans-Dumbartan Bridge, E8435-

ANALYTICAL QC SUMMARY REPORT

TestCode: 7470_ST

Sample ID: **MB-55230**	SampType: **MBLK**	TestCode: **7470_ST**	Units: **µg/L**	Prep Date: **5/8/2009**	RunNo: **108862**
Client ID: **PBS**	Batch ID: **55230**	TestNo: **WET/ EPA 74**		Analysis Date: **5/8/2009**	SeqNo: **1708355**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.20									

Sample ID: **LCS-55230**	SampType: **LCS**	TestCode: **7470_ST**	Units: **µg/L**	Prep Date: **5/8/2009**	RunNo: **108862**
Client ID: **LCSS**	Batch ID: **55230**	TestNo: **WET/ EPA 74**		Analysis Date: **5/8/2009**	SeqNo: **1708356**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	9.918	0.20	10.00	0	99.2	85	115				

Sample ID: **MB-55172B STLC**	SampType: **MBLK**	TestCode: **7470_ST**	Units: **µg/L**	Prep Date: **5/8/2009**	RunNo: **108862**
Client ID: **PBS**	Batch ID: **55230**	TestNo: **WET/ EPA 74**		Analysis Date: **5/8/2009**	SeqNo: **1708357**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	1.0									

Sample ID: **105364-010A-MS**	SampType: **MS**	TestCode: **7470_ST**	Units: **µg/L**	Prep Date: **5/8/2009**	RunNo: **108862**
Client ID: **P-40**	Batch ID: **55230**	TestNo: **WET/ EPA 74**		Analysis Date: **5/8/2009**	SeqNo: **1708358**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	46.655	1.0	50.00	0	93.3	70	130				H

Sample ID: **105364-010A-MSD**	SampType: **MSD**	TestCode: **7470_ST**	Units: **µg/L**	Prep Date: **5/8/2009**	RunNo: **108862**
Client ID: **P-40**	Batch ID: **55230**	TestNo: **WET/ EPA 74**		Analysis Date: **5/8/2009**	SeqNo: **1708359**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	46.527	1.0	50.00	0	93.1	70	130	46.65	0.275	20	H

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

CLIENT: Geocon Consultants, Inc.
Work Order: 105364
Project: Caltrans-Dumbartan Bridge, E8435-

ANALYTICAL QC SUMMARY REPORT

TestCode: 7470_ST

Sample ID: **105364-010A-DUP** SampType: **DUP** TestCode: **7470_ST** Units: **µg/L** Prep Date: **5/8/2009** RunNo: **108862**
Client ID: **P-40** Batch ID: **55230** TestNo: **WET/ EPA 74** Analysis Date: **5/8/2009** SeqNo: **1708361**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	1.0						0	0	20	H

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

Diane Galvan

From: John Love [love@geoconinc.com]
Sent: Monday, May 18, 2009 10:31 AM
To: Diane Galvan
Subject: Lab ID#s 105364, 104505, and 104477

Hi Diane:

I have a couple questions regarding the WET results from lab ID #s 105364, 104505, 104477. We had some samples analyzed for As, Cr, Pb, Hg, and Vn after we got the total results back. Anyway, we had the samples analyzed to see if they exceeded the Newby Island Landfills STLC acceptance criteria for disposal. I should have inquired before I requested the analysis if the lab could meet the detection limits set by Newby Island. It only matters in a couple of instances – that would be As and Hg.

My first question is whether ATL could have met the landfill's detection limit for Hg of 0.00108 mg/L? And, the second question is whether the lab could "J" flag the As results (if the results were between the PQL and MDL)? Apparently, the Newby Island STLC for As is 0.45 mg/L, which higher than the MDL of 0.088 mg/L and less than the PQL of 1.0 mg/L.

Thanks Diane.

John Love
Sr. Project Geologist

Please visit our new website at http://www.geoconinc.com

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17.UPLAND REPORT

UPLAND SITE INVESTIGATION REPORT

DUMBARTON BRIDGE SEISMIC RETROFIT PROJECT
ALAMEDA AND SAN MATEO COUNTIES, CALIFORNIA

PREPARED FOR:
CALTRANS DISTRICT 4
OFFICE OF ENVIRONMENTAL ENGINEERING
111 GRAND AVENUE, 14TH FLOOR
OAKLAND, CALIFORNIA

PREPARED BY:
GEOCON CONSULTANTS, INC.
6671 BRISA STREET
LIVERMORE, CALIFORNIA

GEOCON PROJECT NO. E8435-06-18/-41
CALTRANS EA NO. 04-1A5221

DECEMBER 2009

TABLE OF CONTENTS

REPORT LIMITATIONS i

PROJECT TEAM ii

EXECUTIVE SUMMARY iii

1.0 INTRODUCTION 1

2.0 REGULATORY CRITERIA 2
- 2.1 Hazardous Waste Determination 2
- 2.2 Environmental Screening Levels 3
- 2.3 Sanitary Landfill Acceptance Criteria 3

3.0 SOIL AND GROUNDWATER SAMPLING 4
- 3.1 Sample Methodology 4
- 3.2 Soil and Groundwater Sample Analyses 5

4.0 SOIL AND GROUNDWATER SAMPLE RESULTS 7
- 4.1 Soil Sample Results 7
- 4.2 Groundwater Sample Results 10
- 4.3 Laboratory QA/QC 12
- 4.4 Soil and Groundwater Conditions 12

5.0 SUMMARY OF FINDINGS 13

FIGURES
1. Vicinity Map
2. East Approach Sample Location Map
3. West Approach Sample Location Map

TABLES
1. Boring Coordinates
2. Summary of Organic Results - Soil
3. Summary of CAM 17 Metals Results –Soil
4. Summary of Soluble Metals Results
5. Summary of Organic Results - Groundwater
6. Summary of CAM 17 Metals Results – Groundwater
7. Summary of Laboratory QA/QC Comments

APPENDICES
A. Example Sanitary Landfill Acceptance Criteria
B. ACPWA and SMCHSD Permits
C. Analytical Laboratory Reports
D. Soil Boring Logs

REPORT LIMITATIONS

Geocon Consultants, Inc. (Geocon) prepared this report exclusively for the State of California Department of Transportation (Caltrans) District 4. The information contained herein is only valid as of the date of the report and will require an update to reflect additional information obtained.

This report is not a comprehensive site characterization and should not be construed as such. The findings as presented in this report are predicated on the results of the limited sampling and laboratory testing performed. In addition, the information obtained is not intended to address potential impacts related to sources other than those specified herein. Therefore, the report should be deemed conclusive with respect to only the information obtained. We make no warranty, express or implied, with respect to the content of this report or any subsequent reports, correspondence or consultation. Geocon strived to perform the services summarized herein in accordance with the local standard of care in the geographic region at the time the services were rendered.

The contents of this report reflect the views of the author who is responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the State of California or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation.

GEOCON CONSULTANTS, INC

John Love, PG
Senior Geologist

Richard Day, CEG, CHG
Regional Manager

CALIFORNIA DEPARTMENT OF TRANSPORTATION – DISTRICT 4
OFFICE OF ENVIRONMENTAL ENGINEERING – HAZARDOUS WASTE BRANCH

Reviewed By:	Recommended By:	Approved By:
Roya Azarmi Task Order Manager	Charles Smith, PE District Branch Chief	Allen Baradar, PE District Office Chief

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EXECUTIVE SUMMARY

This report presents the results of the upland site investigation performed by Geocon and the California Department of Transportation (Caltrans) District 4 for the Dumbarton Bridge Seismic Retrofit Project. This report was prepared under Caltrans Contract No. 04A2912, Task Order Nos. 18 and 41 (TO-18 and TO-41). The project locations are depicted on the Vicinity Map, Figure 1.

Caltrans proposes seismic retrofit construction activities at the Dumbarton Bridge. The existing bridge is comprised of five components: main channel crossing at the middle of the bridge, approach structures at each end of the main crossing, and trestle structures at the ends of each approach structure.

The objective of the upland site investigation was to establish soil and groundwater concentrations prior to soil excavation and groundwater discharge associated with the removal, modification, and replacement of the Dumbarton Bridge curtain walls; installation of new columns on the trestle structure; and construction of the flood barrier and pumping plant. Data obtained during the investigation will be used to evaluate waste handling and disposal options and establish health and safety protocols for construction workers.

The soil and groundwater sampling methodologies and laboratory analyses presented in this report were conducted in general accordance with the Caltrans-approved *Upland Site Investigation Workplan, Dumbarton Bridge Retrofit Project*, dated February 19, 2009.

On March 19, 2009, ten soil borings were advanced near the east approach to the Dumbarton Bridge On March 26, 2009, 15 soil borings were advanced near the west approach, and on June 11, 2009, six additional borings (SS-1, SS-2, PP1, PP2GW, PP3 and FW4A) were advanced near the west approach to supplement data generated during the March 26, 2009, field investigation. The soil boring location coordinates were located using a global positioning satellite (GPS) system. The GPS coordinates are tabulated on Table 1.

Soil borings near the east approach were advanced using a direct-push sample rig provided by Gregg Drilling, under permit from the Alameda County Public Works Agency (ACPWA). Borings advanced near the east approach are shown on the East Approach Sample Location Map, Figure 2

Soil borings advanced near the west approach were advanced by Geocon using a direct-push sample rig and hand-auger sampling equipment, under permit from the San Mateo County Environmental Heath Services Division (SMCEHSD). Eight of the 21 borings near the west approach were hand-auger borings (FW1 to FW5, FW4A, SS-1, and SS-2) advanced to depths ranging from ground surface to 2 feet. Hand-auger sampling equipment was used to collect soil samples from borings FW1 to FW5, FW4A, SS-1, and SS-2 at sample depths of 0 and 2 feet. The soil boring locations advanced near the west approach are shown on the West Approach Sample Location Map, Figure 3.

Soils encountered on the east and west sides of the Dumbarton Bridge consisted of sandy and gravelly fill soils with some clays to depths ranging from 7 to 14 feet. Underlying the fill soils was bay mud. The bay mud extended to the total depth of each borehole which ranged from 15 to 20 feet. A hydrogen sulfide odor was observed in the bay mud and off gassing was observed bubbling through groundwater in E10A.

Groundwater was encountered in all boreholes, except E5A and the shallow hand auger borings (FW1 to FW5, FW4A, SS-1, and SS-2). Groundwater was generally encountered under confined conditions at depths ranging from 5 to 14 feet, and static groundwater was observed in most locations between 2 and 4 feet. Groundwater was not encountered in E5A to a depth of 20 feet (the total depth of the borehole).

Soil samples collected from borings located near the east and west approaches were analyzed for one or more of the following:

- Total petroleum hydrocarbons as diesel (TPHd) and motor oil (TPHmo) with silica gel cleanup, following EPA Test Method 8015B modified;
- Semi-volatile organic compounds (SVOCs) following EPA Test Method 8270C; and
- CAM 17 metals following EPA Test Methods 6010/7470.

Grab-groundwater samples collected from the same borings were analyzed for the following:

- TPHg following EPA Test Method 8015B modified;
- TPHd and TPHmo with silica gel cleanup, following EPA Test Method 8015B modified ;
- Oil and grease following EPA Test Method 1664;
- VOCs following EPA Test Method 8260;
- SVOCs following EPA Test Method 8270C;

- Total dissolved solids (TDS) following Standard Method (SM) 2540C;
- Cyanide following SM 4500C;
- Dissolved sulfide following SM 4500S; and
- CAM 17 metals following EPA Test Method 6010/7470, with select samples being further analyzed for soluble metals using waste extraction test (WET) methodology.

A total of 80 soil samples were collected from 26 soil boring locations. Results of soil sample chemical tests are summarized as follows:

- TPHd was reported in three surface soil samples at concentrations above its residential and commercial land use environmental screening levels (ESLs) of 83 mg/kg. The reported TPHd concentrations did not exceed the construction/trench worker ESL of 4,200 mg/kg.
- TPHmo was also reported in three surface soil samples at concentrations above its residential ESL of 370 mg/kg. The reported TPHmo concentrations did not exceed the commercial land use ESL of 2,500 mg/kg or the construction/trench worker ESL of 4,200 mg/kg.
- Benzo(b)fluoranthene was reported at concentrations exceeding the SFRWQCB residential land use ESL; phenol was reported at concentrations exceeding the residential and commercial land use ESLs. No SVOCs were reported at concentrations above the construction/trench worker ESLs.
- Inorganic soil sample results indicate arsenic, lead, mercury, nickel, vanadium, and zinc are present at concentrations in soil that exceed an ESL and/or the example sanitary landfill total result thresholds. Some soil samples that exceeded the example sanitary landfill total result thresholds were further analyzed for solubility potential using WET methodology.
- CAM 17 metals were not reported at concentrations exceeding their respective TTLC values (see Table 3). Lead and nickel were the only metals with reported concentrations greater than ten times their respective STLC values. The reported soluble lead and nickel concentrations did not exceed their respective STLC values (see Table 4). Arsenic, chromium, lead, mercury, nickel, vanadium, and zinc were reported at total concentrations that exceeded one or more SFRWQCB ESLs and/or the example sanitary landfill total results thresholds.
- Soil samples collected on March 19 and 26, 2009, at depths of 5 feet or less that exceeded the example sanitary landfill total result thresholds were further analyzed for solubility potential using WET methodology. The only sample which exceeded an example sanitary landfill soluble result threshold was lead at a concentration of 2.5 mg/l in the surface sample collected from E5B (0').

Groundwater samples were collected from eight borings. Results of groundwater chemical tests are summarized as follows:

- TPHg was not detected above laboratory reporting limits. Reported TPHd concentrations ranged from 0.054 mg/l to 0.27 mg/l, and reported TPHmo concentrations ranged from 0.074 mg/l to 0.17 mg/l. The TPHd concentration of 0.27 mg/l exceeded the freshwater, marine, and estuarine surface water body ESLs. The TPHmo concentration of 0.17 mg/l exceeded the freshwater surface water body ESL.

- Oil and grease and cyanide were reported as non-detect in all seven grab groundwater samples.

- VOCs were reported as non-detect in all groundwater samples, except W20AGW, where chloromethane was reported at a concentration of 0.56 microgram per liter (µg/l).

- SVOCs were reported as non-detect in the eight groundwater samples.

- Sulfide was detected in the grab-groundwater sample collected from E20AGW at a concentration of 0.030 mg/l.

- TDS was reported in all grab-groundwater at concentrations ranging from 12,000 mg/l to 30,000 mg/l. These concentrations exceed the secondary drinking water MCL of 1,500 mg/l, which indicates that the groundwater is not a potential source of drinking water.

- The trip blanks analyzed for VOCs and TPHg were reported as non-detect for all target analytes.

- Antimony, barium, chromium, cobalt, copper, molybdenum, nickel, selenium, vanadium, and zinc were detected above the laboratory reporting limits in the seven filtered grab-groundwater samples collected for laboratory analysis.

- Cobalt, copper, nickel, selenium, vanadium, and zinc were reported in the filtered samples at concentrations that exceeded one or more ESLs, and nickel was reported in a filtered grab-groundwater sample at a concentration exceeding the drinking water MCL of 0.10 mg/l.

Based on the soil sample results, soil excavated from the east and west approaches will not be considered a California hazardous waste. The soil contains metals at concentrations that exceed SFRWQCB residential and commercial/industrial land use ESLs, and metal concentrations greater than example sanitary landfill total result thresholds. The reported metal concentrations are generally within published background levels for California soils.

Some of the soil also contains TPHd, TPHmo, or SVOCs that exceed one or more ESLs. Accordingly, offsite reuse or disposal of excavated soil may be restricted depending on proposed use.

Based on the grab-groundwater sample results, groundwater generated from the east and west may contain TPHd, TPHmo, and CAM 17 metals that exceed one or more SFRWQCB ESLs. Accordingly, groundwater may require treatment to reduce organic and inorganic concentrations prior to discharge.

UPLAND SITE INVESTIGATION REPORT

1.0 INTRODUCTION

This report presents the results of the upland site investigation performed by Geocon and the California Department of Transportation (Caltrans) District 4 for the Dumbarton Bridge Seismic Retrofit Project. This report was prepared under Caltrans Contract No. 04A2912, Task Order Nos. 18 and 41 (TO-18 and TO-41). The project locations are depicted on the Vicinity Map, Figure 1.

The existing Dumbarton bridge structure is comprised of five components: main channel crossing at the middle of the bridge, approach structures at each end of the main crossing, and trestle structures at the ends of each approach structure. Caltrans proposes seismic retrofit construction activities consisting of the following major retrofit activities involving the substructure and ancillary structures.

Installation of Concrete Footing Overlay and Column Jacket - Install a concrete footing overlay and column jacket to strengthen the footing to column connection on the main channel section. No sediment disturbance is anticipated.

Strengthen the West and East Approach Sections - Strengthen the west and east approach sections by providing concrete bolsters on the sides of the footing pedestal and concrete column jackets. Minor sediment excavation is anticipated to accomplish this task.

Removal, Modification, and Replacement of the Existing Curtain Walls - Remove, modify, and replace the existing curtain walls on the east and west trestle sections and install new open-ended steel-shell piles with pile-cap extensions connected to outriggers at specific existing bent caps to strengthen the bridge frames. The connection between the new steel-shell piles and pile-cap extensions will require removal of soil and groundwater to place reinforced concrete. This work will be performed at upland locations.

Removal of Old Ravenswood Fishing Pier - Demolish and remove the remaining 2,200-foot-long portion of the old 1927 bridge, which was converted into the Ravenswood Fishing Pier, located on the west side of the channel. The pier is being demolished because of its deteriorated condition and to make room for a temporary trestle to access the west approach section. The pier consists of a concrete deck supported by concrete bents and metal stringers. Potential hazardous materials on the pier include lead-containing paint, asbestos-containing bearing and seal material, contaminated debris (inorganic and organic pollutants), and bird guano. It is anticipated that the piles will be pulled out or cut off below the mud line.

Construction of Two Temporary Access Trestles - To accommodate construction activities, it is anticipated that two temporary access trestles extending to the ends of the east and west approaches will be constructed on the south side of the bridge. The foundation would consist of open-ended steel piles, which would be removed after completion of the project.

Installation of a Flood Barrier and Pumping Plant

A barrier will be installed adjacent to the west end of the bridge to prevent water from flooding the parking lot during high tides. A new drainage system that includes a pumping plant will also be installed. Soil excavation and groundwater removal will be required for this work. This work will be performed at upland locations.

The objective of the upland site investigation was to establish soil and groundwater concentrations prior to soil excavation and groundwater discharge associated with the removal, modification, and replacement of the Dumbarton Bridge curtain walls; installation of new columns at the trestle structure; and construction of the flood barrier and pumping plant. Data obtained during the investigation will be used to evaluate waste handling and disposal options and establish health and safety protocols for construction workers.

2.0 REGULATORY CRITERIA

2.1 Hazardous Waste Determination

Regulatory criteria to classify a waste as California hazardous for handling and disposal purposes are contained in the CCR, Title 22, Division 4.5, Chapter 11, Article 3, §66261.24. Criteria to classify a waste as Resource, Conservation, and Recovery Act (RCRA) hazardous are contained in Chapter 40 of the Code of Federal Regulations (40 CFR), Section 261.

For waste containing metals, the waste is classified as California hazardous when: 1) the total metal content exceeds the respective Total Threshold Limit Concentration (TTLC); or 2) the soluble metal content exceeds the respective Soluble Threshold Limit Concentration (STLC) based on the standard WET analysis. A waste has the potential of exceeding the STLC when the waste's total metal content is greater than or equal to ten times the respective STLC value since the WET uses a 1:10 dilution ratio. Hence, when a total metal is detected at a concentration greater than or equal to ten times the respective STLC, and assuming that 100 percent of the total metals are soluble, soluble metal analysis is required. A material is classified as RCRA hazardous, or Federal hazardous, when the soluble metal content exceeds the Federal regulatory level based on the Toxicity Characteristic Leaching Procedure (TCLP).

The STLC for chromium and/or chromium (III) compounds is 560 mg/l; the soluble TCLP regulatory level for chromium is 5 mg/l. Therefore, soluble WET chromium concentrations that are below 560 mg/l are not considered California Hazardous waste. If the soluble TCLP chromium concentration is less than 5 mg/l and soluble WET chromium equals or exceeds 560 mg/l and the waste is not otherwise classified as RCRA hazardous, it would be considered non-RCRA hazardous waste.

The above regulatory criteria are based on chemical concentrations. Wastes may also be classified as hazardous based on other criteria such as ignitability and corrosivity; however, for the purposes of this investigation, toxicity (i.e., chemical concentrations) is the primary factor considered for waste classification since waste generated during the construction activities would not likely warrant testing for ignitability or other criteria. Waste that is classified as either California hazardous or RCRA hazardous requires management as a hazardous waste.

2.2 Environmental Screening Levels

The San Francisco Bay Regional Water Quality Control Board (SFRWQCB) prepared a technical report entitled *Screening For Environmental Concerns At Sites With Contaminated Soil and Groundwater, Interim Final- November 2007 (Revised May 2008)* that presents Environmental Screening Levels (ESLs) for soil, groundwater, soil gas, and surface water, to assist in evaluating sites impacted by releases of hazardous chemicals. The ESLs are conservative values for more than 100 commonly detected contaminants, which may be used to compare with environmental data collected at a site. ESLs are strictly risk assessment tools and "not regulatory clean up standards." The presence of a chemical at concentrations in excess of an ESL does not necessarily indicate that adverse impacts to human health or the environment are occurring; this simply indicates that a potential for adverse risk may exist and that additional evaluation is or may be warranted (SFRWQCB, 2008).

For purposes of this evaluation, residential and commercial land use ESLs for shallow soil where groundwater is a current or potential source of drinking water (Table A, SFRWQCB 2008); ESLs for construction/trench worker direct exposure (Table K-3, SFRWQCB 2008); and ESLs for surface water bodies (Table F, SFRWQCB 2008) were used for comparison.

2.3 Sanitary Landfill Acceptance Criteria

Sanitary landfills have differing acceptance criteria that are generally based on the leaching potential of contaminants from waste material. At the request of Caltrans, soluble analyses were performed on selected samples to provide information to landfill operators for evaluating waste acceptance. The Newby Island Sanitary Landfill is located approximately 16 miles from the Dumbarton Bridge west approach and their sanitary landfill acceptance criteria are provided as an example in Appendix A.

3.0 SOIL AND GROUNDWATER SAMPLING

The soil and groundwater sampling methodologies and laboratory analyses presented in this report were conducted in general accordance with the Caltrans-approved *Upland Site Investigation Workplan, Dumbarton Bridge Retrofit Project*, dated February 19, 2009.

On March 19, 2009, ten soil borings were advanced near the east approach to the Dumbarton Bridge On March 26, 2009, 15 soil borings were advanced near the west approach, and on June 11, 2009, six additional borings (SS-1, SS-2, PP1, PP2GW, PP3 and FW4A) were advanced near the west approach to supplement data generated during the March 26, 2009, field investigation. The soil boring location coordinates were located using a global positioning satellite (GPS) system. The GPS coordinates are tabulated on Table 1.

Soil borings near the east approach were advanced using a direct-push sample rig provided by Gregg Drilling, under permit from the Alameda County Public Works Agency (ACPWA). Borings advanced near the east approach are shown on the East Approach Sample Location Map, Figure 2

Soil borings advanced near the west approach were advanced by Geocon using a direct-push sample rig and hand-auger sampling equipment, under permit from the San Mateo County Environmental Heath Services Division (SMCEHSD). Eight of the 21 borings near the west approach were hand-auger borings (FW1 to FW5, FW4A, SS-1, and SS-2) advanced to depths ranging from ground surface to 2 feet. Hand-auger sampling equipment was used to collect soil samples from borings FW1 to FW5, FW4A, SS-1, and SS-2 at sample depths of 0 and 2 feet. The soil boring locations advanced near the west approach are shown on the West Approach Sample Location Map, Figure 3.

Copies of the ACPWA and SMCEHSD soil boring permits are provided in Appendix B.

3.1 Sample Methodology

Soil samples were collected from 23 soil borings located near the east and west approaches to the Dumbarton Bridge using a direct-push sample rig. The direct push soil samples were collected by hydraulically advancing a 4-foot-long core barrel sampler lined with an acetate sample tube into undisturbed soil at 4-foot intervals until target depths, ranging in most instances from 10 to 15.5 feet, were reached. Soil samples were collected for laboratory analysis by cutting an approximate 6-inch-long section from the acetate tube, capping the ends with Teflon tape and plastic end caps, and then placing the sample in an ice-cooled chest.

Soil samples were typically collected for laboratory analysis at depths of 0, 5, 10, and 15 feet unless poor sample recovery or absence of groundwater altered the sample plan. Soil borings extended to depths no greater than 2 feet were advanced and sampled using hand auger sampling equipment.

Grab-groundwater samples were extracted from the direct push borings using a peristaltic pump fitted with ¼-inch-diamater polyethylene tubing. Groundwater was discharged at ground surface into the appropriate sample containers. Subsamples to be analyzed for California Assessment Manual (CAM) 17 metals were field-filtered using a 0.45-micron filter fitted to the end of the peristaltic pump discharge tubing prior to being discharged into the preserved (with HNO_3) sample container.

Upon sample collection, the groundwater samples were placed in an ice-cooled chest for temporary storage. The soil and groundwater samples were transported under chain-of-custody protocol to Advanced Technology Laboratories (ATL), a State of California-certified laboratory, located in Signal Hill, California.

Rinsate fluids and soil cuttings generated during the field sampling were containerized, and transported back to the Geocon warehouse in Livermore for temporary storage and disposal.

3.1.1 Field Sample QA/QC

All sampling equipment was cleaned between sample locations using a non-phosphate detergent and deionized water rinse.

Trip blanks were submitted in all ice chests containing groundwater samples. The trip blanks were analyzed for volatile organic compounds (VOCs) and total petroleum hydrocarbons as gasoline (TPHg).

3.2 Soil and Groundwater Sample Analyses

Soil samples collected from borings located near the east and west approaches were analyzed for one or more of the following:

- Total petroleum hydrocarbons as diesel (TPHd) and motor oil (TPHmo) with silica gel cleanup, following EPA Test Method 8015B modified;
- Semi-volatile organic compounds (SVOCs) following EPA Test Method 8270C; and
- CAM 17 metals following EPA Test Methods 6010/7470.

Grab-groundwater samples collected from a subsample of the same borings were analyzed for the following:

- TPHg following EPA Test Method 8015B modified;
- TPHd and TPHmo with silica gel cleanup, following EPA Test Method 8015B modified ;
- Oil and grease following EPA Test Method 1664;
- VOCs following EPA Test Method 8260;
- SVOCs following EPA Test Method 8270C;
- Total dissolved solids (TDS) following Standard Method (SM) 2540C;
- Cyanide following SM 4500C;
- Dissolved sulfide following SM 4500S; and
- CAM 17 metals following EPA Test Method 6010/7470.

Please note that due to poor groundwater recharge in boring PP2GW, groundwater samples collected from this location were only analyzed for TPHg, TPHd, TPHmo, VOCs and SVOCs.

3.2.1 Laboratory QA/QC

Quality Assurance/Quality Control (QA/QC) procedures included documentation of the following criteria for each sample matrix type at a 10% frequency:

Accuracy – All samples for organic analysis were spiked with surrogates to determine accuracy. Sample spikes were added prior to processing each sample and were carried throughout the entire analytical procedure. Results from spikes were reported in percent recovery with acceptance ranges and amount spiked or true values.

Precision - The analysis of duplicate samples or duplicate spiked samples can be used to determine analytical precision. Duplicate samples results can also indicate homogeneity of the sample matrix. Relative standard deviations (RSDs) were calculated for all duplicate samples and duplicate spiked samples and were reported along with acceptance ranges.

All QA/QC records for the various testing programs are kept on file by the analytical laboratories for review by regulatory agency personnel.

4.0 SOIL AND GROUNDWATER SAMPLE RESULTS

Soil sample results are summarized on Tables 2 through 4 and groundwater sample results are presented on Tables 5 and 6. Copies of the analytical laboratory data sheets are provided in Appendix C.

4.1 Soil Sample Results

A total of 80 soil samples were collected from 26 soil boring locations. Organic analyses included TPHd, TPHmo, and SVOCs. Inorganic analysis consisted of total CAM 17 metals with select samples being further analyzed for soluble metals using waste extraction test (WET) methodology.

Organic Results

Organic soil sample results are presented on Table 2.

TPHd and TPHmo were reported in at least one soil sample collected from each soil boring advanced near the east and west approaches to the Dumbarton Bridge. TPHd was reported at concentrations ranging from 1.0 to 450 mg/kg and TPHmo was reported at concentrations ranging from 1.0 to 1,800 mg/kg.

TPHd was reported in three samples [E5B (0'), FW5 (0'), and PP2GW (0')] at concentrations above its residential and commercial land use ESLs of 83 mg/kg. TPHd was reported at a concentration of 380 mg/kg in E5B (0'), 280 mg/kg in FW5 (0'), and 450 mg/kg in PP2GW (0'). The reported TPHd concentrations did not exceed the construction/trench worker ESL of 4,200 mg/kg.

TPHmo was reported in the same three samples [E5B (0'), FW5 (0'), and PP2GW (0')] at concentrations above its residential ESL of 370 mg/kg. The reported TPHmo concentrations did not exceed the commercial land use ESL of 2,500 mg/kg or the construction/trench worker ESL of 4,200 mg/kg.

Detected SVOCs include benzo(b)fluoranthene, fluoranthene, phenol, and 4-methylphenol.

Benzo(b)fluoranthene was reported at concentrations of 420 ug/kg in W10AGW (0') and 870 ug/kg in W15BGW (0'), both of which exceed the residential land use ESL of 380 ug/kg. The reported benzo(b)fluoranthene concentrations did not exceed the commercial land use ESL of 1,300 ug/kg or the construction/trench worker ESL of 15,000 ug/kg.

Flouranthene was reported at concentrations of 480 ug/kg and 990 ug/kg in soil samples W10AGW (0') and W15BGW (0'), respectively. The reported fluoranthene concentrations are less than the residential land use ESL of 40,000 ug/kg.

Phenol was reported at concentrations of 650 ug/kg in W10BGW (15'), 1,100 ug/kg in E20AGW (5'), and 1,000 ug/kg in W10B (15') above its residential and commercial land use ESLs of 76 ug/kg. The reported phenol concentrations did not exceed the construction/trench worker ESL of 230,000,000 ug/kg

4-methylphenol was reported at a concentration of 1,000 ug/kg in soil sample W15BGW (10'). ESLs are not established for 4-methylphenol.

Inorganic Results

CAM 17 metals were not reported at concentrations exceeding their respective TTLC values (see Table 3). Lead and nickel were the only metals with reported concentrations greater than ten times their respective STLC values. The reported soluble lead and nickel concentrations did not exceed their respective STLC values (see Table 4).

Several CAM 17 metals were reported at total concentrations that exceeded a SFRWQCB ESL (see Table 3) or the example sanitary landfill total results thresholds (see Appendix A) as outlined below:

- The detected arsenic concentrations ranged from 1.1 to 12 mg/kg and exceeded the SFRWQCB residential land use ESL (0.39 mg/kg) and commercial land use ESL (1.6 mg/kg). The reported arsenic concentrations did not exceed the construction/trench worker exposure ESL of 15 mg/kg. The reported arsenic concentrations in some soil samples equaled or exceeded the example sanitary landfill total result threshold of 4.5 mg/kg for arsenic.

  The reported arsenic concentrations are consistent with the published background levels (0.6 to 11 mg/kg) for arsenic present in California soils as presented in *Background Concentrations of Trace and Major Elements in California Soils* (Kearney Foundation of Soil Science, Division of Agriculture and Natural Resources, University of California, March 1996).

- Chromium concentrations ranged from 18 to 290 mg/kg. Total chromium was reported in 29 soil samples at concentrations equaling or exceeding the example sanitary landfill total result threshold of 45 mg/kg.

- Lead concentrations ranged from 2.5 to 61 mg/kg and did not exceed the SFRWQCB residential land use ESL of 200 mg/kg. Lead was reported in five soil samples at concentrations exceeding the example sanitary landfill total result threshold of 20 mg/kg.

  The reported lead concentrations are below or within the published background levels (12.4 to 97.1 mg/kg) for lead present in California soils as presented in *Background Concentrations of Trace and Major Elements in California Soils* (Kearney Foundation of Soil Science, Division of Agriculture and Natural Resources, University of California, March 1996).

- Mercury concentrations ranged from <0.10 to 0.33 mg/kg and are less than the SFRWQCB residential land use, commercial land use, and construction/trench worker exposure ESLs (1.3, 10, and 58 mg/kg, respectively).

Sixteen soil samples had reported mercury concentrations (0.10 to 0.33 mg/kg) greater than the example sanitary landfill total result threshold of 0.0108 mg/kg for mercury. It is also noted that in samples where mercury was not detected had a laboratory reporting limit of 0.10 mg/kg, which exceeds an example sanitary landfill total result threshold of 0.0108 mg/kg for mercury.

The reported mercury concentrations are within the published background levels (0.05 to 0.90 mg/kg) for mercury present in California soils as presented in *Background Concentrations of Trace and Major Elements in California Soils* (Kearney Foundation of Soil Science, Division of Agriculture and Natural Resources, University of California, March 1996).

- The reported nickel concentrations ranged from 25 to 280 mg/kg and exceeded the SFRWQCB residential and commercial land use ESL of 150 mg/kg and the construction/trench worker exposure ESL of 260 mg/kg. The reported nickel concentrations in some soil samples equaled or exceeded the example sanitary landfill total result threshold of 90 mg/kg for nickel.

  The reported nickel concentrations are consistent with the published background levels (9 to 509 mg/kg) for nickel present in California soils as presented in *Background Concentrations of Trace and Major Elements in California Soils* (Kearney Foundation of Soil Science, Division of Agriculture and Natural Resources, University of California, March 1996).

- Vanadium concentrations ranged from 25 to 66 mg/kg, with concentrations in all soil samples exceeding the SFRWQCB residential land use ESL of 16 mg/kg. The reported vanadium concentrations did not exceed the commercial land use ESL of 200 mg/kg or the construction/trench worker ESL of 750 mg/kg.

  All of the soil samples had reported vanadium concentrations greater than an example sanitary landfill total result threshold of 18 mg/kg for vanadium.

  The reported vanadium concentrations are less than or within the published background levels (39 to 288 mg/kg) for vanadium present in California soils as presented in *Background Concentrations of Trace and Major Elements in California Soils* (Kearney Foundation of Soil Science, Division of Agriculture and Natural Resources, University of California, March 1996).

- Zinc concentrations ranged from 23 to 3,100 mg/kg, with a concentration in one sol sample [FW4 (0')] exceeding the SFRWQCB residential and commercial land use ESL of 600 mg/kg. The reported zinc concentrations did not exceed the construction/trench worker ESL of 230,000 mg/kg.

  With the exception of sample FW4 (0'), all of the soil samples had reported zinc concentrations less than an example sanitary landfill total result threshold of 1,800 mg/kg for zinc..

  Also with the exception of sample FW4 (0'), the reported zinc concentrations are less than the published background levels (133 to 236 mg/kg) for zinc present in California soils as presented in *Background Concentrations of Trace and Major Elements in California Soils* (Kearney Foundation of Soil Science, Division of Agriculture and Natural Resources, University of California, March 1996).

Soil samples collected on March 19 and 26, 2009, at depths of 5 feet or less that exceeded the example sanitary landfill total result thresholds were further analyzed for solubility potential using waste extraction test (WET) methodology. These sample results are summarized on Table 4.

The only sample which exceeded an example sanitary landfill soluble result threshold was lead at a concentration of 2.5 milligrams per liter (mg/l) in the surface sample collected from E5B (0'). The example sanitary landfill soluble result threshold for lead is 1.35 mg/l.

4.2 Groundwater Sample Results

Groundwater samples were collected for laboratory analysis from borings E10BGW, E20AGW, E20BGW, PP2GW, W5BGW, W10AGW, W15BGW, and W20AGW. Copies of the analytical laboratory data sheets are provided in Appendix C.

Organics Results
Groundwater sample results for organic analytes are presented on Table 5.

TPHg was reported as non-detect in all eight borings where groundwater samples were collected for laboratory analysis. TPHd and TPHmo were detected in borings E20AGW, E20BGW, and PP2GW.

TPHd concentrations ranged from 0.054 mg/l in PP2GW to 0.27 mg/l in E20AGW, and TPHmo concentrations ranged from 0.074 mg/l in PP2GW to 0.17 mg/l in E20BGW.

The TPHd concentration of 0.27 mg/l reported in the groundwater sample collected from A20AGW exceeded the freshwater (0.1 mg/l), marine (0.21 mg/l), and estuarine (0.21 mg/l) surface water body ESLs. The TPHmo concentration of 0.17 mg/l reported in the groundwater sample collected from E20BGW exceeded the freshwater (0.1 mg/l) surface water body ESL.

Oil and grease and cyanide were reported as non-detect in all seven grab groundwater samples.

VOCs were reported as non-detect in all groundwater samples, except W20AGW, where chloromethane was reported at a concentration of 0.56 microgram per liter (µg/l).

SVOCs were reported as non-detect in the eight groundwater samples.

Sulfide was detected in the grab-groundwater sample collected from E20AGW at a concentration of 0.030 mg/l. It was reported as non-detect in the other six grab-groundwater samples.

TDS was reported in all grab-groundwater at concentrations ranging from 12,000 mg/l in W5BGW to 30,000 mg/l in E20BGW. These concentrations exceed the secondary drinking water maximum contaminant level (MCL) of 1,500 mg/l.

The trip blanks analyzed for VOCs and TPHg were reported as non-detect for all target analytes.

Inorganic Results

CAM 17 metals grab-groundwater filtered sample results are tabulated on Table 6.

Antimony, barium, chromium, cobalt, copper, molybdenum, nickel, selenium, vanadium, and zinc were detected above the laboratory reporting limits in the seven grab-groundwater filtered samples collected for laboratory analysis.

Cobalt, copper, nickel, selenium, vanadium, and zinc were reported in the filtered samples at concentrations that exceeded two or more ESLs, and nickel was reported in groundwater samples collected from W10AGW and W15AGW at concentrations exceeding the drinking water MCL of 0.10 mg/l.

Cobalt concentrations reported in the filtered groundwater samples collected from E10BGW, E20BGW, W5BGW, W10BGW, and W15BGW exceeded the freshwater, marine, and estuarine surface water body ESLs of 0.003 mg/l. Cobalt concentrations in these five groundwater samples ranged from 0.024 mg/l in W5BGW to 0.10 mg/l in W10AGW.

Copper was reported in the filtered groundwater samples collected from E10BGW and E20BGW at concentrations of 0.11 and 0.085 mg/l, respectively. Both of these concentrations exceed the freshwater (0.1 mg/l), marine (0.21 mg/l), and estuarine (0.21 mg/l) surface water body ESLs.

Nickel was reported at concentrations ranging from 0.037 to 0.22 mg/l in six of the seven filtered groundwater samples. The lowest concentration of 0.037 mg/l reported in the groundwater sample collected from W20AGW exceeded the marine and estuarine surface water body ESLs of 0.0082 mg/l. The other five samples additionally exceeded the freshwater surface water body ESL of 0.052 mg/l. The nickel concentrations in W10AGW and W15BGW exceeded the drinking water MCL of 0.1 mg/l.

Selenium was reported in the filtered groundwater sample collected from W5BGW at a concentration of 0.012 mg/l. This concentration exceeds the freshwater and estuarine surface water body ESLs 0.005 mg/l.

Vanadium was reported in the filtered groundwater samples collected from E10BGW and E20BGW at concentrations of 0.056 and 0.045 mg/l, respectively. Both of these concentrations exceed the freshwater (0.015 mg/l), marine (0.019 mg/l), and estuarine (0.019 mg/l) surface water body ESLs.

Zinc was reported at a concentration of 0.45 mg/l in the filtered groundwater sample collected from W15BGW. This concentration exceeds the freshwater (0.012 mg/l), marine (0.081 mg/l), and estuarine (0.081 mg/l) surface water body ESLs.

4.3 Laboratory QA/QC

The following comments were noted by ATL for several soil and groundwater samples:

- Sample was diluted due to matrix interference;
- Sample was diluted due to matrix interference. Surrogate was diluted out for sample;
- Relative percent difference (RPD) outside accepted recovery limits; however the analytical batch was validated by the laboratory control sample (LCS);
- RPD outside accepted recovery limits. Spike/surrogate outside of limits due to matrix interference; however the analytical batch was validated by the LCS;
- Surrogate recovery biased high for sample, possibly due to matrix interference; and
- Surrogate recovery biased low for sample, possibly due to matrix interference.

A list of the sample analyses and their corresponding comments are tabulated on Table 9.

4.4 Soil and Groundwater Conditions

Soils encountered on the east and west sides of the Dumbarton Bridge consisted of sandy and gravelly fill soils with some clays to depths ranging from 7 to 14 feet. Underlying the fill soils was bay mud. The bay mud extended to the total depth of each borehole which ranged from 15 to 20 feet. A hydrogen sulfide odor was observed in the bay mud and off gassing was observed bubbling through groundwater in E10A.

Groundwater was encountered in all boreholes, except E5A and the shallow hand auger borings (FW1 to FW5, FW4A, SS1, and SS2). Groundwater was generally encountered under confined conditions at depths ranging from 5 to 14 feet, and static groundwater was observed in most locations between 2 and 4 feet. Groundwater was not encountered in E5A to a depth of 20 feet (the total depth of the borehole).

Copies of soil boring logs are provided in Appendix D.

5.0 SUMMARY OF FINDINGS

A total of 80 soil samples were collected from 26 soil boring locations. Organic analyses included TPHd, TPHmo, and SVOCs. Inorganic analysis consisted of CAM 17 metals analyzed for TTLC and select samples were analyzed for STLC using WET analytical methodology.

Results of soil sample chemical tests are summarized as follows:

- TPHd was reported in three surface soil samples at concentrations above its residential and commercial land use ESLs of 83 mg/kg. The reported TPHd concentrations did not exceed the construction/trench worker ESL of 4,200 mg/kg.

- TPHmo was also reported in three soil surface samples at concentrations above its residential ESL of 370 mg/kg. The reported TPHmo concentrations did not exceed the commercial land use ESL of 2,500 mg/kg or the construction/trench worker ESL of 4,200 mg/kg.

- Benzo(b)fluoranthene was reported at concentrations exceeding the SFRWQCB residential land use ESL; phenol was reported at concentrations exceeding the residential and commercial land use ESLs. No SVOCs were reported at concentrations above the construction/trench worker ESLs.

- Inorganic soil sample results indicate arsenic, lead, mercury, nickel, vanadium, and zinc are present at concentrations in soil that exceed an ESL and/or the example sanitary landfill total result thresholds. Some soil samples that exceeded the example sanitary landfill total result thresholds were further analyzed for solubility potential using WET methodology.

- CAM 17 metals were not reported at concentrations exceeding their respective TTLC values (see Table 3). Lead and nickel were the only metals with reported concentrations greater than ten times their respective STLC values. The reported soluble lead and nickel concentrations did not exceed their respective STLC values (see Table 4). Arsenic, chromium, lead, mercury, nickel, vanadium, and zinc were reported at total concentrations that exceeded one or more SFRWQCB ESLs and/or the example sanitary landfill total results thresholds.

- Soil samples collected on March 19 and 26, 2009, at depths of 5 feet or less that exceeded the example sanitary landfill total result thresholds were further analyzed for solubility potential using WET methodology. The only sample which exceeded an example sanitary landfill soluble result threshold was lead at a concentration of 2.5 mg/l in the surface sample collected from E5B (0').

Based on the soil sample results, soil excavated from the east and west approaches will not be considered a California hazardous waste. The soil contains metals at concentrations that exceed SFRWQCB residential and commercial/industrial land use ESLs, and metal concentrations greater than example sanitary landfill total result thresholds. The reported metal concentrations are generally within published background levels for California soils.

Some of the also contains TPHd, TPHmo, and some SVOCs that exceed one or more ESLs. Accordingly, offsite reuse or disposal of excavated soil may be restricted depending on proposed use.

Groundwater samples collected eight borings were analyzed for TPHg, TPHd, TPHmo, VOCs, SVOCs, oil and grease, sulfide, cyanide, TDS, and CAM 17 metals. Results of groundwater chemical tests are summarized as follows:

- TPHg was not detected above laboratory reporting limits. Reported TPHd concentrations ranged from 0.054 mg/l to 0.27 mg/l, and reported TPHmo concentrations ranged from 0.074 mg/l to 0.17 mg/l. The TPHd concentration of 0.27 mg/l exceeded the freshwater, marine, and estuarine ESLs. The TPHmo concentration of 0.17 mg/l exceeded the freshwater ESL.

- Oil and grease and cyanide were reported as non-detect in all seven grab groundwater samples.

- VOCs were reported as non-detect in all groundwater samples, except W20AGW, where chloromethane was reported at a concentration of 0.56 microgram per liter (µg/l).

- SVOCs were reported as non-detect in the eight groundwater samples.

- Sulfide was detected in the grab-groundwater sample collected from E20AGW at a concentration of 0.030 mg/l.

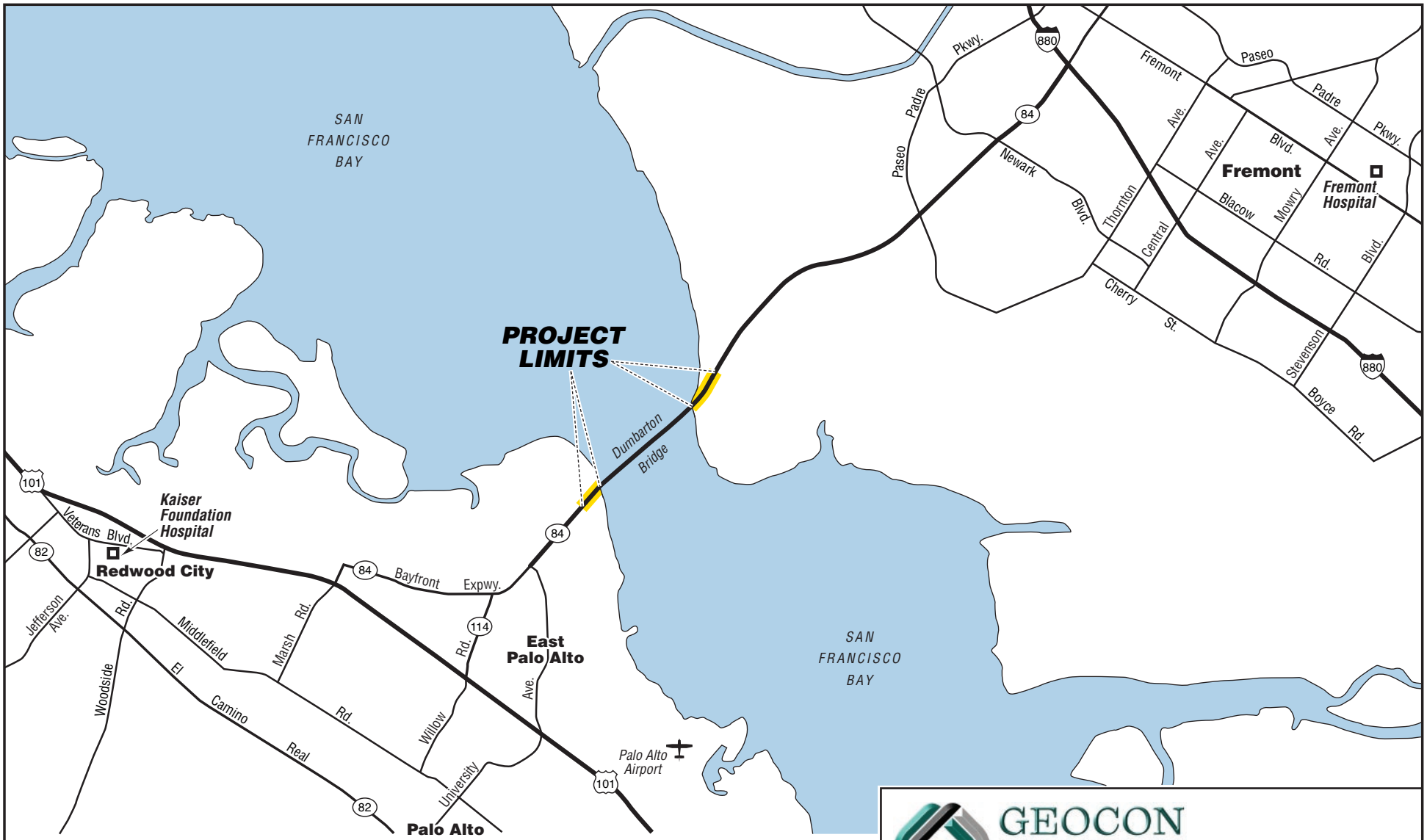
- TDS was reported in all grab-groundwater at concentrations ranging from 12,000 mg/l to 30,000 mg/l. These concentrations exceed the secondary drinking water MCL of 1,500 mg/l, which indicates that groundwater at the site is not a potential source of drinking water.

- The trip blanks analyzed for VOCs and TPHg were reported as non-detect for all target analytes.

- Antimony, barium, chromium, cobalt, copper, molybdenum, nickel, selenium, vanadium, and zinc were detected above the laboratory reporting limits in the seven grab-groundwater samples collected and filtered for laboratory analysis.

- Cobalt, copper, nickel, selenium, vanadium, and zinc were reported at concentrations that exceeded one or more ESLs, and nickel was reported in a filtered grab-groundwater sample at a concentration exceeding the drinking water MCL of 0.10 mg/l.

Based on the grab-groundwater sample results, groundwater generated from the east and west may contain TPHd, TPHmo, and CAM 17 metals that exceed one or more SFRWQCB ESLs. Accordingly, groundwater may require treatment to reduce organic and inorganic concentrations prior to discharge.



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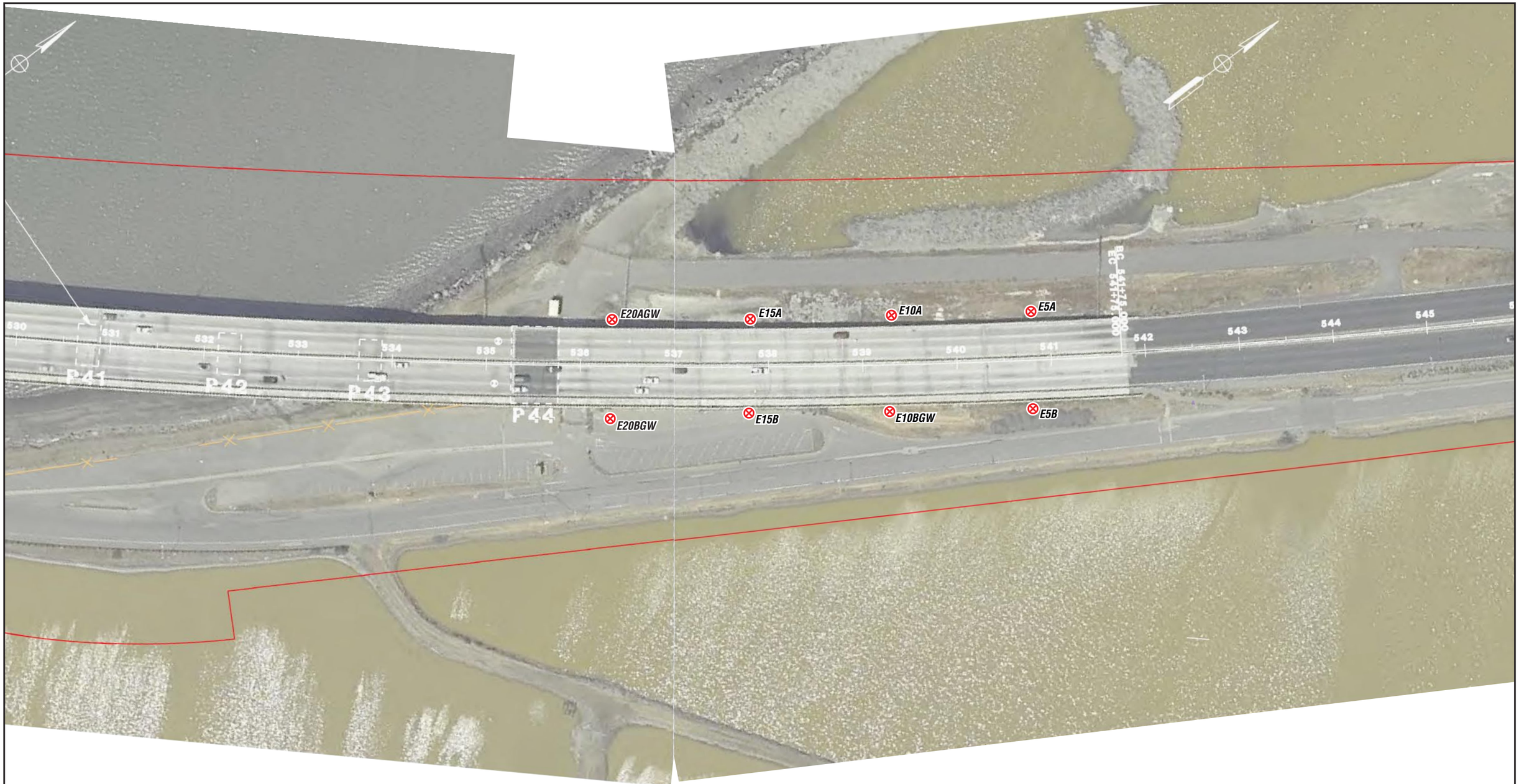
Dumbarton Bridge Retrofit Project (Bridge No. 35-0038)

Alameda and San Mateo Counties, California

VICINITY MAP

GEOCON Proj. No. E8435-06-18/-41

Task Order No. 18/41 | December 2009 | Figure 1



LEGEND:

FW1 ⊗ Approximate Sample Location

0 100
Scale in Feet

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Dumbarton Bridge Retrofit Project (Bridge No. 35-0038)

Alameda and San Mateo Counties, California	**East Approach Sample Location Map**	
GEOCON Proj. No. E8435-06-18/-41		
Task Order No. 18/41	December 2009	Figure 2

LEGEND:

FW1 ⊗ Approximate Sample Location

0 100
Scale in Feet

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Dumbarton Bridge Retrofit Project (Bridge No. 35-0038)

Alameda and San Mateo Counties, California	**West Approach Sample Location Map**
GEOCON Proj. No. E8435-06-18/-41	
Task Order No. 18/41	December 2009 — Figure 3

TABLE 1
BORING COORDINATES
Dumbarton Bridge

Sample Location	Northing	Easting
E5A	2,013,538.183	6,095,071.456
E5B	2,013,483.146	6,095,152.601
E10A	2,013,457.193	6,095,014.476
E10BGW	2,013,396.759	6,095,087.236
E15A	2,013,335.293	6,094,922.828
E15B	2,013,281.018	6,095,000.402
E20AGW	2,013,233.184	6,094,840.808
E20BGW	2,013,179.750	6,094,924.184
FW1	2,007,854.743	6,088,639.485
FW2	2,007,986.236	6,088,769.154
FW3	2,008,128.336	6,088,911.586
FW4	2,008,270.494	6,089,052.590
FW5	2,008,455.302	6,089,205.010
PP1	2,008,382.240	6,089,284.920
PP2	2,008,473.337	6,089,235.667
PP3	2,008,444.512	6,089,220.715
SS-1	2,008,321.407	6,089,421.044
SS-2	2,008,355.776	6,089,444.946
W5A	2,008,018.301	6,088,872.004
W5BGW	2,007,946.029	6,088,951.668
W10AGW	2,008,134.920	6,088,991.936
W10B	2,008,059.000	6,089,062.301
W15A	2,008,237.147	6,089,101.402
W15GW	2,008,153.843	6,089,163.088
W20AGW	2,008,311.650	6,089,177.217
W20B	2,008,233.165	6,089,248.608

Coodinates shown in NAD83, Zone 3, feet.

TABLE 2
SUMMARY OF ORGANIC RESULTS - SOIL
Dumbarton Bridge

Sample ID	TPHd (mg/kg)	TPHmo (mg/kg)	SVOCs (ug/kg)
East Approach Samples			
E5A (0')	<1.0	<1.0	ND
E5A (5')	2.4	1.5	ND
E5A (10')	1.2	<1.0	ND
E5A (15')	<1.0	<1.0	ND
E5A (20')	<1.0	<1.0	ND
E5B (0')	380	1,200	ND
E5B (5')	9.5	30	ND
E5B (10')	2.9	5.4	ND
E5B (15')	3.1	2.6	ND
E10A (0')	2.0	<1.0	ND
E10A (5')	1.0	1.9	ND
E10A (9')	<1.0	<1.0	ND
E10A (15')	<1.0	<1.0	ND
E10BGW (0')	26	130	ND
E10BGW (5')	<1.0	<1.0	ND
E10BGW (15')	3.6	8.6	Phenol = 650
E15A (0')	19	20	ND
E15A (5')	2.5	3.8	ND
E15A (10')	<1.0	<1.0	ND
E15A (15')	<1.0	1.2	ND
E15B (0')	54	350	ND
E15B (5')	3.0	17	ND
E15B (10')	<1.0	3.5	ND
E20AGW (0')	17	42	ND
E20AGW (5')	1.2	1.1	Phenol = 1,100
E20BGW (0')	40	190	ND
E20BGW (5')	1.3	1.4	ND
E20BGW (10')	<1.0	<1.0	ND
E20BGW (15')	1.4	1.1	ND
West Approach Surface Samples			
FW1 (0')	37	230	ND
FW1 (2')	<1.0	1.2	ND
FW2 (0')	5.9	23	ND
FW2 (2')	<1.0	1.6	ND

TABLE 2
SUMMARY OF ORGANIC RESULTS - SOIL
Dumbarton Bridge

Sample ID	TPHd (mg/kg)	TPHmo (mg/kg)	SVOCs (ug/kg)
FW3 (0')	11	58	ND
FW3 (2')	1.4	1.7	ND
FW4 (0')	2.2	7.3	ND
FW4 (2')	<1.0	<1.0	ND
FW5 (0')	280	1,000	ND
FW5 (2')	5.7	17	ND
SS-1(0')	1.5	5.6	ND
SS-2 (0')	1.4	5.6	ND
West Approach Samples			
PP1 (0')	72	300	ND
PP1 (5')	<1.0	2.2	ND
PP1 (10')	<1.0	<1.0	ND
PP2GW (0')	450	1,800	ND
PP2GW (5')	14	50	ND
PP2GW (10')	<1.0	1.6	ND
PP3 (0')	<1.0	2.2	ND
PP3 (5')	<1.0	2.3	ND
PP3 (10')	<1.0	<1.0	ND
W5A (0')	6.5	13	ND
W5A (5')	<1.0	<1.0	ND
W5A (10')	2.8	2.7	ND
W5A (15')	<1.0	<1.0	ND
W5BGW (0')	11	54	ND
W5BGW (5')	<1.0	<1.0	ND
W5BGW (10')	<1.0	<1.0	ND
W10AGW (0')	18	65	Benzo(b)fluoranthene = 420 Fluoranthene = 480
W10AGW (5')	<1.0	<1.0	ND
W10AGW (10')	2.5	5.6	ND
W10AGW (10')	<1.0	<1.0	ND

TABLE 2
SUMMARY OF ORGANIC RESULTS - SOIL
Dumbarton Bridge

Sample ID	TPHd (mg/kg)	TPHmo (mg/kg)	SVOCs (ug/kg)
W10B (0')	6.4	26	ND
W10B (5')	1.5	<1.0	ND
W10B (10')	<1.0	<1.0	ND
W10B (15')	<1.0	<1.0	Phenol = 1,000
W15A (0')	<1.0	<1.0	ND
W15A (5')	<1.0	1.7	ND
W15A (10')	2.8	2.4	ND
W15A (15')	<1.0	<1.0	ND
W15BGW (0')	11	76	Benzo(b)fluoranthene = 870 Fluoranthene = 990
W15BGW (10')	<1.0	<1.0	4-Methylphenol = 1,000
W15BGW (15')	<1.0	<1.0	ND
W20AGW (0')	2.9	2.9	ND
W20AGW (5')	4.1	2.5	ND
W20AGW (10')	2.8	2.1	ND
W20AGW (15')	1	1	ND
W20B (0')	5.2	18	ND
W20B (10')	<1.0	<1.0	ND
W20B (15')	1.3	<1.0	ND
Environmental Screening Levels			
Residential Land Use	83	370	Phenol = 76 Benzo(b)fluoranthene = 380 Fluoranthene = 40,000
Commercial/Industrial Land Use	83	2,500	Phenol = 76 Benzo(b)fluoranthene = 1,300 Fluoranthene = 40,000
Construction/Trench Worker Exposure	4,200	12,000	Phenol = 230,000,000 Benzo(b)fluoranthene = 15,000 Fluoranthene = 14,000,000

Notes:
mg/kg = Milligrams per kilograms
ug/kg = Micrograms per kilograms
TPHd = Total petroleum hydrocarbons as diesel
TPHmo = Total petroleum hydrocarbons as motor oil
SVOCs = Semi-volatile organic compounds
ND = None detected
Environmental Screening Levels (ESLs) from SFRWQCB (2008) Table A for residential and commercial/industiral land use and Table K-3 for construction/trench worker exposure.

TABLE 3
SUMMARY OF CAM 17 METALS RESULTS - SOIL
Dumbarton Bridge

Sample ID	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenu	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
E5A (0')	<2.0	1.9	120	<1.0	<1.0	28	10	25	2.5	<0.10	<1.0	34	<1.0	<1.0	<1.0	33	32
E5A (5')	<2.0	5.4	130	<1.0	<1.0	58	12	25	6.4	<0.10	<1.0	86	<1.0	<1.0	<1.0	29	48
E5A (10')	<2.0	3.6	60	<1.0	<1.0	44	8.2	21	5.0	<0.10	<1.0	50	<1.0	<1.0	<1.0	35	42
E5A (15')	<2.0	3.1	29	<1.0	<1.0	33	6.6	11	3.0	<0.10	<1.0	38	<1.0	<1.0	<1.0	26	35
E5A (20')	<2.0	2.0	55	<1.0	<1.0	51	8.4	21	5.2	<0.10	<1.0	71	<1.0	<1.0	<1.0	25	45
E5B (0')	<2.0	<1.0	93	<1.0	<1.0	27	7.9	24	61	<0.10	<1.0	34	<1.0	<1.0	<1.0	35	78
E5B (5')	<2.0	4.7	97	<1.0	<1.0	50	11	24	9.7	<0.10	<1.0	76	<1.0	<1.0	<1.0	28	46
E5B (10')	<2.0	3.4	26	<1.0	<1.0	40	7.3	15	4.7	<0.10	<1.0	44	<1.0	<1.0	<1.0	31	41
E5B (15')	<2.0	3.1	28	<1.0	<1.0	34	6.9	12	3.8	<0.10	<1.0	40	<1.0	<1.0	<1.0	27	36
E10A (0')	<2.0	<1.0	42	<1.0	<1.0	42	18	38	<1.0	<0.10	<1.0	36	<1.0	<1.0	<1.0	66	44
E10A (5')	<2.0	3.7	120	<1.0	1.4	54	13	30	4.9	<0.10	<1.0	75	<1.0	<1.0	<1.0	38	50
E10A (9')	<2.0	3.4	22	<1.0	<1.0	32	6.4	11	3.1	<0.10	<1.0	37	<1.0	<1.0	<1.0	25	37
E10A (15')	<2.0	3.7	31	<1.0	<1.0	36	7.8	14	3.2	<0.10	<1.0	45	<1.0	<1.0	<1.0	26	39
E10BGW (0')	<2.0	1.7	120	<1.0	<1.0	39	12	37	23	<0.10	<1.0	45	<1.0	<1.0	<1.0	43	68
E10BGW (5')	<2.0	4.8	180	<1.0	<1.0	56	12	33	6.3	<0.10	<1.0	82	<1.0	<1.0	<1.0	36	49
E10BGW (15')	<2.0	3.5	27	<1.0	<1.0	35	6.9	13	3.4	<0.10	<1.0	40	<1.0	<1.0	<1.0	28	37
E15A (0')	<2.0	2.8	550	<1.0	<1.0	22	10	72	5.8	<0.10	<1.0	30	3.3	<1.0	<1.0	42	48
E15A (5')	<2.0	5.6	140	<1.0	<1.0	61	12	28	6.7	<0.10	<1.0	91	1.1	<1.0	<1.0	33	54
E15A (10')	<2.0	4.5	190	<1.0	<1.0	39	12	31	5.7	<0.10	<1.0	53	2.1	<1.0	<1.0	39	46
E15A (15')	<2.0	3.9	26	<1.0	<1.0	35	7.8	11	2.7	<0.10	<1.0	42	<1.0	<1.0	<1.0	26	36
E15B (0')	<2.0	1.9	260	<1.0	<1.0	41	15	52	3.9	<0.10	<1.0	45	<1.0	<1.0	<1.0	51	47
E15B (5')	<2.0	1.7	280	<1.0	<1.0	22	11	66	3.7	<0.10	<1.0	31	<1.0	<1.0	<1.0	36	40
E15B (10')	<2.0	3.1	120	<1.0	<1.0	33	8.5	28	12	<0.10	2.7	44	1.1	<1.0	<1.0	31	43
E20AGW (0')	<2.0	<1.0	85	<1.0	<1.0	30	14	35	15	<0.10	<1.0	30	<1.0	<1.0	<1.0	50	110
E20AGW (5')	<2.0	2.7	160	<1.0	<1.0	54	17	51	4.6	<0.10	<1.0	58	<1.0	<1.0	<1.0	61	57

TABLE 3
SUMMARY OF CAM 17 METALS RESULTS - SOIL
Dumbarton Bridge

Sample ID	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenu	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
E20BGW (0')	<2.0	<1.0	100	<1.0	<1.0	33	9.7	28	5.8	<0.10	<1.0	39	<1.0	<1.0	<1.0	41	34
E20BGW (5')	<2.0	4.7	230	<1.0	<1.0	53	12	33	5.8	<0.10	<1.0	77	<1.0	<1.0	<1.0	36	48
E20BGW (10')	<2.0	4.9	120	<1.0	<1.0	58	11	25	6.3	<0.10	<1.0	87	<1.0	<1.0	<1.0	30	50
E20BGW (15')	<2.0	4.1	23	<1.0	<1.0	37	6.7	13	4.1	<0.10	<1.0	41	<1.0	<1.0	<1.0	30	41
FW1 (0')	<2.0	1.7	93	<1.0	<1.0	34	9.6	27	6.7	0.14	<1.0	42	<1.0	<1.0	<1.0	37	41
FW1 (2')	<2.0	1.9	110	<1.0	<1.0	49	11	28	4.7	<0.10	<1.0	57	<1.0	<1.0	<1.0	43	42
FW2 (0')	<2.0	3.1	88	<1.0	<1.0	56	13	33	8.5	<0.10	<1.0	68	<1.0	<1.0	<1.0	46	55
FW2 (2')	<2.0	3.6	160	<1.0	<1.0	29	9.0	19	6.3	0.10	<1.0	36	<1.0	<1.0	<1.0	33	39
FW3 (0')	<2.0	2.1	110	<1.0	<1.0	45	11	32	16	<0.10	<1.0	49	1.4	<1.0	<1.0	41	64
FW3 (2')	<2.0	3.9	150	<1.0	<1.0	66	16	34	6.3	<0.10	<1.0	81	1.2	<1.0	<1.0	47	50
FW4 (0')	<2.0	3.0	94	<1.0	<1.0	290	14	44	23	0.13	<1.0	76	1.9	<1.0	<1.0	44	3,100
FW4A (0')	<2.0	4.7	100	<1.0	<1.0	88	21	21	37	0.19	<1.0	76	<1.0	<1.0	<1.0	44	53
FW4 (2')	<2.0	3.5	140	<1.0	<1.0	55	13	33	4.6	0.11	<1.0	67	1.0	<1.0	<1.0	46	49
FW5 (0')	<2.0	1.1	170	<1.0	<1.0	18	5.9	20	10	<0.10	<1.0	26	<1.0	<1.0	<1.0	37	35
FW5 (2')	<2.0	<1.0	100	<1.0	<1.0	36	14	37	3.4	<0.10	<1.0	34	1.7	<1.0	<1.0	58	41
PP1 (0')	<2.0	2.6	120	<1.0	<1.0	54	13	32	7.4	0.16	<1.0	65	<1.0	<1.0	<1.0	47	48
PP1 (5')	<2.0	3.4	26	<1.0	<1.0	42	5.0	18	6.7	0.18	<1.0	39	<1.0	<1.0	<1.0	36	46
PP1 (10')	<2.0	3.2	18	<1.0	<1.0	36	6.2	13	4.4	<0.10	<1.0	40	<1.0	<1.0	<1.0	30	40
PP2GW (0')	<2.0	2.3	160	<1.0	<1.0	38	9.5	38	33	<0.10	<1.0	42	<1.0	<1.0	<1.0	43	51
PP2GW (5')	<2.0	2.0	130	<1.0	<1.0	41	12	29	11	0.19	<1.0	52	<1.0	<1.0	<1.0	44	45
PP2GW (10')	<2.0	5.2	19	<1.0	<1.0	31	6.5	20	9.2	0.22	<1.0	36	<1.0	<1.0	<1.0	29	42
PP3 (0')	<2.0	5.7	110	<1.0	<1.0	52	12	30	12	0.25	<1.0	63	<1.0	<1.0	<1.0	44	56
PP3 (5')	<2.0	3.8	68	<1.0	<1.0	43	7.6	21	9.0	<0.10	<1.0	42	<1.0	<1.0	<1.0	37	46
PP3 (10')	<2.0	3.0	23	<1.0	<1.0	39	6.6	20	12	0.26	<1.0	40	<1.0	<1.0	<1.0	36	53

TABLE 3
SUMMARY OF CAM 17 METALS RESULTS - SOIL
Dumbarton Bridge

Sample ID	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenu	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
SS-1 (0')	<2.0	1.2	57	<1.0	<1.0	160	21	49	<1.0	<0.10	<1.0	260	<1.0	<1.0	<1.0	41	31
SS-2 (0')	<2.0	1.2	42	<1.0	<1.0	200	22	24	4.8	0.12	<1.0	280	<1.0	<1.0	<1.0	41	40
W5A (0')	<2.0	<1.0	65	<1.0	<1.0	43	16	43	<1.0	<0.10	<1.0	38	<1.0	<1.0	<1.0	62	38
W5A (5')	<2.0	4.9	44	<1.0	<1.0	51	7.3	17	10	<0.10	1.5	48	<1.0	<1.0	<1.0	41	50
W5A (10')	<2.0	3.9	93	<1.0	<1.0	83	16	31	4.5	0.11	<1.0	110	<1.0	<1.0	<1.0	43	40
W5A (15')	<2.0	2.7	22	<1.0	<1.0	43	7.3	18	5.0	<0.10	<1.0	47	<1.0	<1.0	<1.0	34	44
W5BGW (0')	<2.0	<1.0	54	<1.0	<1.0	43	18	47	<1.0	<0.10	<1.0	44	<1.0	<1.0	<1.0	66	40
W5BGW (5')	<2.0	<1.0	26	<1.0	<1.0	41	12	25	<1.0	<0.10	<1.0	25	<1.0	<1.0	<1.0	61	34
W5BGW (15')	<2.0	2.5	19	<1.0	<1.0	38	6.4	15	5.0	<0.10	<1.0	40	<1.0	<1.0	<1.0	32	40
W10AGW (0')	<2.0	<1.0	38	<1.0	<1.0	46	16	42	<1.0	<0.10	<1.0	32	<1.0	<1.0	<1.0	56	35
W10AGW (5')	<2.0	3.6	120	<1.0	<1.0	100	19	30	3.8	<0.10	<1.0	140	<1.0	<1.0	<1.0	40	43
W10AGW (10')	<2.0	1.6	98	<1.0	<1.0	50	9.0	23	3.6	<0.10	1.1	55	<1.0	<1.0	<1.0	33	36
W10AGW (15')	<2.0	4.5	25	<1.0	<1.0	41	7.6	14	5.1	<0.10	1.7	47	<1.0	<1.0	<1.0	35	39
W10B (0')	<2.0	<1.0	61	<1.0	<1.0	47	16	43	<1.0	<0.10	<1.0	40	<1.0	<1.0	<1.0	51	34
W10B (5')	<2.0	2.9	100	<1.0	<1.0	25	7.6	19	7.4	<0.10	<1.0	37	<1.0	<1.0	<1.0	30	49
W10B (10')	<2.0	5.8	20	<1.0	<1.0	40	7.5	15	6.9	<0.10	2.2	45	<1.0	<1.0	<1.0	36	44
W10B (15')	<2.0	1.3	15	<1.0	<1.0	28	3.4	9.3	4.0	<0.10	3.0	31	<1.0	<1.0	<1.0	26	28
W15A (0')	<2.0	<1.0	69	<1.0	<1.0	40	17	46	<1.0	<0.10	<1.0	34	3.2	<1.0	<1.0	60	44
W15A (5')	<2.0	12	98	<1.0	<1.0	26	11	36	1.7	<0.10	1.8	27	1.9	<1.0	<1.0	50	36
W15A (10')	<2.0	5.6	68	<1.0	<1.0	47	10	24	22	0.22	<1.0	59	2.1	<1.0	<1.0	38	66
W15A (15')	<2.0	2.9	15	<1.0	<1.0	23	2.7	8.9	2.8	<0.10	2.8	27	1.1	<1.0	<1.0	26	23
W15BGW (0')	<2.0	<1.0	100	<1.0	<1.0	46	17	47	<1.0	<0.10	<1.0	40	1.9	<1.0	<1.0	37	34
W15BGW (10')	<2.0	3.5	16	<1.0	<1.0	28	13	11	4.0	<0.10	2.7	44	1.3	<1.0	<1.0	28	30
W15BGW (15')	<2.0	3.4	18	<1.0	<1.0	35	6.4	16	4.0	<0.10	<1.0	39	1.6	<1.0	<1.0	28	39

TABLE 3
SUMMARY OF CAM 17 METALS RESULTS - SOIL
Dumbarton Bridge

Sample ID	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenu	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
W20AGW (0')	<2.0	<1.0	46	<1.0	<1.0	32	14	31	<1.0	<0.10	<1.0	26	2.6	<1.0	<1.0	54	41
W20AGW (5')	<2.0	<1.0	79	<1.0	<1.0	49	17	45	3.8	<0.10	<1.0	36	2.2	<1.0	<1.0	52	38
W20AGW (10')	<2.0	5.1	35	<1.0	<1.0	44	9.2	26	18	0.33	<1.0	51	1.2	<1.0	<1.0	38	65
W20AGW (15')	<2.0	5.1	34	<1.0	<1.0	42	10	26	11	0.21	<1.0	50	<1.0	<1.0	<1.0	36	47
W20B (0')	<2.0	<1.0	66	<1.0	<1.0	48	17	43	<1.0	<0.10	<1.0	42	1.6	<1.0	<1.0	44	34
W20B (10')	<2.0	3.3	20	<1.0	<1.0	42	7.9	18	4.8	<0.10	<1.0	48	1.8	<1.0	<1.0	33	45
W20B (15')	<2.0	4.4	16	<1.0	<1.0	35	5.0	9.9	6.6	<0.10	<1.0	38	1.5	<1.0	<1.0	29	37
California Hazardous Waste Criteria																	
TTLC mg/kg	500	500	10,000	75	100	2,500*	8,000	2,500	1,000	20	3,500	2,000	100	500	700	2,400	5,000
STLC mg/l	15	5	100	0.75	1	5**	80	25	5	0.2	350	20	1	5	7	24	250
Environmental Screening Levels																	
Residential Land Use mg/kg	6.3	0.39	750	4.0	1.7	750*	40	230	200	1.3	40	150	10	20	1.3	16	600
Commercial/Industrial Land Use mg/kg	40	1.6	1,500	8.0	7.4	750*	80	230	750	10	40	150	10	40	16	200	600
Construction/Trench Worker Exposure mg/kg	310	15	2,600	98	39	1,200,000*	94	310,000	750	58	3,900	260	3,900	3,900	62	770	230,000

Notes:

Results presented in milligrams per kilogram wet weight (mg/kg)

mg/l = milligrams per liter

< = not detected at or above laboratory reporting limit

TTLC = total threshold limit concentration

STLC = soluble threshold limit concentration

* = for Chromium or Chromium III compounds

** = for Chromium VI compounds

Environmental Screening Levels (ESLs) from SFRWQCB (2008) Table A for residential and commercial/industiral land use and Table K-3 for construction/trench worker exposure

TABLE 4
SUMMARY OF SOLUBLE METALS RESULTS
Dumbarton Bridge

Sample ID	Arsenic	Chromium	Lead	Nickel	Mercury	Vanadium
E5A (5')	<0.088	0.067	---	---	---	0.17
E5B (0')	---	---	2.5	---	---	0.13
E5B (5')	0.12	0.063	---	---	---	0.15
E10BGW (0')	---	---	0.64	---	---	0.31
E10BGW (5')	<0.088	0.1	---	---	---	0.29
E15A (5')	<0.088	0.091	---	0.36	---	0.15
E20AGW (5')	---	0.09	---	---	---	0.32
E20BGW (5')	<0.088	0.084	---	---	---	0.18
FW1 (0')	---	---	---	---	0.23	0.33
FW1 (2')	---	0.17	---	---	---	0.6
FW2 (0')	---	0	---	---	---	0.47
FW2 (2')	---	---	---	---	<0.23	0.25
FW3 (0')	---	2.0	---	---	---	0.60
FW3 (2')	---	0.22	---	---	---	0.46
FW4 (0')	---	1.2	0.22	---	<0.23	0.48
FW4 (2')	---	0.21	---	---	<0.23	0.55
W5A (5')	0.34	0.38	---	1.0	---	1.2
W10AGW (5')	---	0.11	---	1.6	---	0.24
W10B (0')	---	0.13	---	---	---	0.22
W15BGW (0')	---	0.11	---	---	---	0.15
W20AGW (5')	---	0.11	---	---	---	0.34
W20B (0')	---	0.11	---	---	---	0.18
California Hazardous Waste Criteria						
STLC	5	5**	5	20	0.2	24

Notes:
Results shown in milligrams per liter (mg/l)
< = not detected at or above laboratory reporting limit
--- = not analyzed
STLC = soluble threshold limit concentration
** = for Chromium VI compounds

TABLE 5
SUMMARY OF ORGANIC RESULTS - GROUNDWATER
Dumbarton Bridge

Sample ID	TPHg (mg/l)	TPHd (mg/l)	TPHmo (mg/l)	Oil and Grease (mg/l)	VOCs (ug/l)	SVOCs (ug/l)	Total Dissolved Solids (mg/l)	Cyanide (mg/l)	Sulfide (mg/l)
East Approach Samples									
E10BGW	<0.050	<0.050	<0.050	<4.4	ND	ND	27,000	<0.010	<0.010
E20AGW	<0.050	0.27	0.094	<4.5	ND	ND	18,000	<0.010	0.030
E20BGW	<0.050	0.061	0.17	<4.6	ND	ND	30,000	<0.010	<0.010
West Approach Samples									
PP2GW	<0.050	0.054	0.074	---	ND	ND	---	---	---
W5BGW	<0.050	<0.062	<0.062	<4.4	ND	ND	12,000	<0.010	<0.010
W10AGW	<0.050	<0.062	<0.062	<4.7	ND	ND	23,000	<0.010	<0.010
W15BGW	<0.050	<0.062	<0.062	<4.4	ND	ND	20,000	<0.010	<0.010
W20AGW	<0.050	<0.12	<0.12	<4.6	Chloromethane = 0.56	ND	17,000	<0.040	<0.010
California MCLs	---	---	---	---	---	---	*1,500	0.15	---
Groundwater ESLs	0.1	0.1	0.1	---	Chloromethane = 41	---	---	0.001	---
Surface Water ESLs									
Freshwater	0.1	0.1	0.1	---	Chloromethane = 80	---	---	0.0052	---
Marine	0.21	0.21	0.21	---	Chloromethane = 3,200	---	---	0.001	---
Estuarine	0.21	0.21	0.21	---	Chloromethane = 1,100	---	---	0.001	---

Notes:
mg/l = Milligrams per liter
ug/l = Micrograms per liter
TPHg = total petroleum hydrocarbons as gasoline
TPHd = Total petroleum hydrocarbons as diesel
TPHmo = Total Petroleum Hydrocarbons as motor oil
VOCs = Volatile organic compounds
SVOCs = Semi-volatile organic compounds
MCL = Maximum Contaminant Level, Title 22, CCR, Division 4, Chapter 15, Article 4, September 12, 2003.
ESL = Environmental Screening Levels, Tables A, b and F, SFRWQCB, Revised May 2008.
ND, < = Not detected above laboratory reporting limit
* = Secondary MCL
--- = Not analyzed or No standard.

TABLE 6
SUMMARY OF CAM17 METALS RESULTS - GROUNDWATER
Dumbarton Bridge

Sample ID	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenun	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
East Approach Samples																	
E10BGW	<0.025	<0.050	0.29	<0.015	<0.015	0.02	0.081	0.11	<0.025	<0.00020	<0.025	0.098	<0.025	<0.025	<0.025	0.056	0.066
E20AGW	<0.025	<0.050	0.19	<0.015	<0.015	<0.015	<0.015	<0.025	<0.025	<0.00020	<0.025	<0.025	<0.050	<0.015	<0.075	<0.015	<0.050
E20BGW	0.035	<0.050	0.37	<0.015	<0.015	<0.015	0.087	0.085	<0.025	<0.00020	<0.025	0.080	<0.050	<0.015	<0.075	0.045	0.055
West Approach Samples																	
W5BGW	<0.0050	<0.010	0.24	<0.0030	<0.0030	<0.0030	0.024	<0.0050	<0.0050	<0.00020	0.0097	0.062	0.012	<0.0030	<0.015	<0.0030	0.025
W10AGW	<0.025	<0.050	0.26	<0.015	<0.015	<0.015	0.10	<0.025	<0.025	<0.00020	<0.025	0.13	<0.050	<0.015	<0.075	<0.015	<0.050
W15BGW	<0.025	<0.050	0.16	<0.015	<0.015	<0.015	0.070	<0.025	<0.025	<0.00020	<0.025	0.22	<0.050	<0.015	<0.075	<0.015	0.45
W20AGW	<0.025	<0.050	0.10	<0.015	<0.015	<0.015	<0.015	<0.025	<0.025	<0.00020	<0.025	0.037	<0.050	<0.015	<0.075	<0.015	0.058
California MCLs																	
Primary	0.006	0.05	1.0	0.004	0.005	0.05	---	---	---	0.002	---	0.1	0.05	---	0.002	---	---
Secondary	---	---	---	---	---	---	---	1.0	---	---	---	---	---	0.1	---	---	5.0
Groundwater ESLs																	
Current/Potential Source	0.006	0.036	1.0	0.00053	0.00025	0.05	0.003	0.0031	0.0025	0.000025	0.035	0.0082	0.005	0.00019	0.002	0.015	0.081
Not Current/Potential Source	0.03	0.036	1.0	0.00053	0.00025	0.18	0.003	0.0031	0.0025	0.000025	0.24	0.0082	0.005	0.00019	0.004	0.019	0.081
Surface Water ESLs																	
Freshwater	0.006	0.00014	1.0	0.00270	0.00025	0.05	0.003	0.0090	0.0025	0.000025	0.035	0.052	0.005	0.00034	0.002	0.015	0.12
Marine	0.5	0.00014	1.0	0.00053	0.00930	0.18	0.003	0.0031	0.0056	0.000025	0.24	0.0082	0.071	0.00019	0.004	0.019	0.081
Estuarine	0.03	0.00014	1.0	0.00053	0.00025	0.18	0.003	0.0031	0.0025	0.000025	0.24	0.0082	0.005	0.00019	0.004	0.019	0.081

Notes:
Subsamples for CAM 17 metals analysis were field filtered using a 0.45-micron filter prior to sample preservation.
Data are shown in units of milligrams per liter (mg/l), with the exception of mercury, which is presented in micrograms per liter (ug/l).
< = Not detected above the stated laboratory reporting limit
MCLs = Maximum Contaminant Levels, Title 22, CCR, Division 4, Chapter 15, Article 4, September 12, 2003.
ESLs = Environmental Screening Levels, Tables A, B, and F, SFRWQCB, Revised May 2008.
GW = Groundwater
--- = Not analyzed or No standard.
< = Analyte was not detected above the laboratory reporting limit

TABLE 7
SUMMARY OF LABORATORY QA/QC COMMENTS
Dumbarton Bridge

Sample ID	Matrix	Analytical Method	Sample Type	Laboratory Comment
E5A (0')	Soil	EPA 8015B	QA/QC - DUP	RPD outside accepted recovery limits; however the analytical batch was validated by the LCS.
E5A (5')	Soil	EPA 6010B	Field Sample (STLC)	Sample was diluted due to matrix interference.
E5B (0')	Soil	EPA 8015B	Field Sample	Sample was diluted due to matrix interference. Surrogate was diluted out for sample.
E5B (0')	Soil	EPA 6010B	Field Sample (STLC)	Sample was diluted due to matrix interference.
E5B (10')	Soil	EPA 8270C	Field Sample	Sample was diluted due to matrix interference. Surrogate was diluted out for sample.
E5B (5')	Soil	EPA 6010B	Field Sample (STLC)	Sample was diluted due to matrix interference.
E10BGW	Water	EPA 6010B	Field Sample	Sample was diluted due to matrix interference.
E10BGW (0')	Soil	EPA 8015B	Field Sample	Sample was diluted due to matrix interference.
E10BGW (0')	Soil	EPA 6010B	Field Sample (STLC)	Sample was diluted due to matrix interference.
E10BGW (5')	Soil	EPA 6010B	Field Sample (STLC)	Sample was diluted due to matrix interference.
E15A (0')	Soil	EPA 8015B	QA/QC - DUP, MSD	RPD outside accepted recovery limits; however the analytical batch was validated by the LCS.
E15A (5')	Soil	EPA 6010B	Field Sample (STLC)	Sample was diluted due to matrix interference.
E15B (0')	Soil	EPA 6010B	QA/QC - MS, MSD	RPD outside accepted recovery limits. Spike/Surrogate outside of limits due to matrix interference; however the analytical batch was validated by the LCS.
E15B (0')	Soil	EPA 8015B	Field Sample	Sample was diluted due to matrix interference. Surrogate was diluted out for sample.
E15B (0')	Soil	EPA 8270C	Field Sample	Sample was diluted due to matrix interference. Surrogate was diluted out for sample.
E15B (5')	Soil	EPA 8270C	Field Sample	Sample was diluted due to matrix interference. Surrogate was diluted out for sample.
E20AGW	Water	EPA 6010B	Field Sample	Sample was diluted due to matrix interference.
E20AGW (5')	Soil	EPA 6010B	Field Sample (STLC)	Sample was diluted due to matrix interference.
E20BGW	Water	EPA 6010B	Field Sample	Sample was diluted due to matrix interference.
E20BGW	Water	EPA 6010B	QA/QC - DUP	RPD outside accepted recovery limits; however the analytical batch was validated by the LCS.
E20BGW	Water	EPA 8270C	Field Sample	Surrogate recovery biased high for sample, possibly due to matrix interference; however the results were non-detect for analytes of interest and reanalysis of the sample was not necessary.
E20BGW (0')	Soil	EPA 8015B	Field Sample	Sample was diluted due to matrix interference
E20BGW (0')	Soil	EPA 8015B	QA/QC - DUP, MS, MSD	RPD outside accepted recovery limits. Spike/Surrogate outside of limits due to matrix interference; however the analytical batch was validated by the LCS.
E20BGW (0')	Soil	EPA 8270C	Field Sample	Sample was diluted due to matrix interference.
E20BGW (5')	Soil	EPA 6010B	Field Sample (STLC)	Sample was diluted due to matrix interference.
FW1 (0')	Soil	EPA 8015B	Field Sample	Sample was diluted due to matrix interference. Surrogate was diluted out for sample.
FW1 (0')	Soil	EPA 6010B	Field Sample (STLC)	Sample was diluted due to matrix interference.
FW1 (2')	Soil	EPA 6010B	Field Sample (STLC)	Sample was diluted due to matrix interference.
FW2 (0')	Soil	EPA 6010B	Field Sample (STLC)	Sample was diluted due to matrix interference.
FW2 (2')	Soil	EPA 8270C	Field Sample	Surrogate recovery biased high for sample, possibly due to matrix interference.
FW2 (2')	Soil	EPA 6010B	Field Sample (STLC)	Sample was diluted due to matrix interference.
FW3 (0')	Soil	EPA 8015B	Field Sample	Sample was diluted due to matrix interference. Surrogate was diluted out.
FW3 (0')	Soil	EPA 8270C	Field Sample	Sample was diluted due to matrix interference.
FW3 (0')	Soil	EPA 6010B	Field Sample (STLC)	Sample was diluted due to matrix interference.
FW3 (2')	Soil	EPA 6010B	Field Sample (STLC)	Sample was diluted due to matrix interference.
FW4 (0')	Soil	EPA 6010B	Field Sample (STLC)	Sample was diluted due to matrix interference.
FW4 (2')	Soil	EPA 6010B	Field Sample (STLC)	Sample was diluted due to matrix interference.
FW4A (0')	Soil	EPA 6010B	QA/QC - DUP	RPD outside accepted recovery limits; however the analytical batch was validated by the LCS.
FW5 (0')	Soil	EPA 8015B	Field Sample	Sample was diluted due to matrix interference. Surrogate was diluted out.
FW5 (0')	Soil	EPA 8270C	Field Sample	Sample was diluted due to matrix interference.
FW5 (2')	Soil	EPA 6010B	QA/QC - DUP, MSD	RPD outside accepted recovery limits; however the analytical batch was validated by the LCS.
FW5 (2')	Soil	EPA 8015B	QA/QC - DUP	RPD outside accepted recovery limits; however the analytical batch was validated by the LCS.
PP1 (0')	Soil	EPA 8015B	Field Sample	Sample was diluted due to matrix interference. Surrogate recovery was diluted out.

TABLE 7
SUMMARY OF LABORATORY QA/QC COMMENTS
Dumbarton Bridge

Sample ID	Matrix	Analytical Method	Sample Type	Laboratory Comment
PP1 (0')	Soil	EPA 8270C	Field Sample	Sample was diluted due to matrix interference.
PP1 (0')	Soil	EPA 8015B	QA/QC - DUP, MS, MSD	RPD outside accepted recovery limits. Spike/Surrogate outside of limits due to matrix interference; however the analytical batch was validated by the LCS.
PP2GW (0')	Soil	EPA 8015B	Field Sample	Sample was diluted due to matrix interference. Surrogate recovery was diluted out.
PP2GW (0')	Soil	EPA 8270C	Field Sample	Sample was diluted due to matrix interference.
PP2GW (0')	Soil	EPA 8015B	QA/QC - DUP, MS, MSD	RPD outside accepted recovery limits. Spike/Surrogate outside of limits due to matrix interference; however the analytical batch was validated by the LCS.
PP2GW (5')	Soil	EPA 8270C	Field Sample	Sample was diluted due to matrix interference.
PP3 (0')	Soil	EPA 8015B	QA/QC - DUP	RPD outside accepted recovery limits; however the batch was validated by the LCS.
PP3 (0')	Soil	EPA 8270C	QA/QC - MSD	Spike/Surrogate outside of limits due to matrix interference; however the analytical batch was validated by the LCS.
SS-2	Soil	EPA 6010B	QA/QC - DUP, MS, MSD	RPD outside accepted recovery limits. Spike/Surrogate outside of limits due to matrix interference; however the analytical batch was validated by the LCS.
W5A (5')	Soil	EPA 6010B	Field Sample (STLC)	Sample was diluted due to matrix interference.
W5BGW	Water	EPA 8015B	Field Sample	Surrogate recovery biased low for sample, possibly due to matrix interference.
W5BGW (0')	Soil	EPA 8270C	QA/QC - MS	Spike/Surrogate outside of limits due to matrix interference; however the analytical batch was validated by the LCS.
W5BGW (15')	Soil	EPA 8270C	QA/QC - MSD	Spike/Surrogate outside of limits due to matrix interference; however the analytical batch was validated by the LCS.
W10AGW	Water	EPA 6010B	QA/QC - DUP	RPD outside accepted recovery limits; however the analytical batch was validated by the LCS.
W10AGW	Water	EPA 6010B	Field Sample	Sample was diluted due to matrix interference.
W10AGW (10')	Soil	EPA 8015B	QA/QC - DUP	RPD outside accepted recovery limits; however the analytical batch was validated by the LCS.
W10AGW (15')	Soil	EPA 8270C	QA/QC - MSD	Spike/Surrogate outside of limits due to matrix interference; however the analytical batch was validated by the LCS.
W10AGW (5')	Soil	EPA 6010B	QA/QC - DUP, MSD	RPD outside accepted recovery limits. Spike/Surrogate outside of limits due to matrix interference; however the analytical batch was validated by the LCS.
W10AGW (5')	Soil	EPA 6010B	Field Sample (STLC)	Sample was diluted due to matrix interference.
W10B (0')	Soil	EPA 6010B	Field Sample (STLC)	Sample was diluted due to matrix interference.
W10B (10')	Soil	EPA 8270C	Field Sample	Surrogate recovery biased high for sample, possibly due to matrix interference.
W15A (0')	Soil	EPA 8015B	QA/QC - DUP, MSD	RPD outside accepted recovery limits; however the analytical batch was validated by the LCS.
W15BGW	Water	EPA 6010B	Field Sample	Sample was diluted due to matrix interference.
W15BGW (0')	Soil	EPA 8015B	Field Sample	Sample was diluted due to matrix interference. Surrogate was diluted out.
W15BGW (0')	Soil	EPA 8270C	Field Sample	Sample was diluted due to matrix interference.
W15BGW (0')	Soil	EPA 6010B	Field Sample (STLC)	Sample was diluted due to matrix interference.
W20AGW	Water	SM 4500	Field Sample	Sample was diluted due to matrix interference.
W20AGW	Water	EPA 6010B	Field Sample	Sample was diluted due to matrix interference.
W20AGW (15')	Soil	EPA 8270C	Field Sample	Surrogate recovery biased high for sample, possibly due to matrix interference.
W20AGW (5')	Soil	EPA 6010B	Field Sample (STLC)	Sample was diluted due to matrix interference.
W20B (0')	Soil	EPA 6010B	Field Sample (STLC)	Sample was diluted due to matrix interference.

Notes:
RPD - Relative percent difference
LCS - Laboratory control sample

APPENDIX A

NEWBY ISLAND SANITARY LANDFILL

ORGANIC CONSTITUENTS

Petroleum Hydrocarbon Thresholds

Subtitle D Cell

All cells meeting Subtitle D standards have no maximum acceptable limits on Total Petroleum Hydrocarbon content.

BTEX Thresholds

	Soluble Thresholds (TCLP:mg/L)	Total Result Thresholds (mg/kg)*
Benzene	0.03	0.60
Toluene	1.2	24.0
Ethylbenzene	0.9	18.0
Xylenes	0.6	12.0

For thresholds on other organic compounds at the Newby Island Landfill, please call (510) 447-0491.

INORGANIC CONSTITUENTS

Concentration:	Soluble Thresholds (STLC) mg/L	Total Thresholds (TTLC)* mg/kg
Antimony	0.45	4.5
Arsenic	0.45	4.5
Barium	90.0	900.0
Beryllium	.09	0.9
Cadmium	0.45	4.5
Chromium	4.5	45.0
Cobalt	4.5	45.0
Copper	18.0	180.0
Lead	1.35	20.0
Mercury	0.00108	0.0108
Molybdenum	0.9	9.0
Nickel	9.0	90.0
Selenium	0.9	9.0
Silver	4.5	45.0
Thallium	0.18	1.8
Vanadium	1.8	18.0
Zinc	180.0	1800.0

* Results over these limits require the Waste Extraction Test, but do not necessarily disqualify the acceptance of the material.

APPENDIX B

ALAMEDA COUNTY WATER DISTRICT
43885 South Grimmer Blvd. • P.O. Box 5110
Fremont, California 94537-5110
Engineering Department 1 (510) 668-4460

APPLICATION FOR DRILLING PERMIT

(APPLICATION TO BE TYPED)

WELL ORDINANCE
___ City of Fremont No. 963
_✓_ City of Newark No. 136
___ City of Union City No. 109-73

Application Received Date: 3/2/09 By: MM
Permit Issued Date: 3/12/09
Permit Expiration Date: 5/12/09
Job No. 1037
Permit No. 2009-040
Well No. N/A

JOB ADDRESS 50' to 500' east of the approach to the Dumbarton Bridge (Hwy 84).

PROPERTY OWNER
NAME: Caltrans - District 4
ADDRESS: 111 Grand Avenue, 14th flr
Oakland, CA 94623
TELEPHONE: (Ms. Roya Azarmi) 510-286-6117

CONSULTING ENGINEER
NAME: Geocon Consultants, Inc.
ADDRESS: 6671 Brisa St.
Livermore, CA 94550
TELEPHONE: (925) 371-5900 RG/CEG/RCE NO. 6315

WELL DRILLING CONTRACTOR
NAME: Geocon Consultants, Inc.
ADDRESS: 6671 Brisa St
Livermore CA 94550
TELEPHONE: (925) 371-5900 STATE LIC. NO. C57 716050

When properly signed

THIS APPLICATION IS A VALID PERMIT

to perform only work described below at the given job address, in accordance with the City Ordinance checked above and all other applicable laws and regulations. Discontinuation of work may result in revocation of permit by Inspecting Officer. ***Permittee must schedule the work in advance with the Inspecting Officer,*** *ACWD's approval of drawings, designs, specifications, reports and incidental work or materials shall not in any way relieve the applicant of responsibility for the technical adequacy of the work. Except for special circumstances, all work to be inspected must be performed within ACWD work hours - 7:00 a.m. to 4:30 p.m., Monday through Friday.*

PLEASE CHECK TYPE OF PROPOSED WORK

WATER (Pumping) WELL		GEOTECHNICAL INVESTIGATION		CHEMICAL INVESTIGATION			
Construction	___						
Repair or Reconstruction	___	Exploratory Holes	___	Exploratory Holes	X	Monitoring Well Const. (Chemical Leak)	___
Destruction	___	Monitoring Wells, Construction	___	Vapor Sampling Investigation	___	Monitoring Well Const. (Compliance Wells)	___
Cathodic Protection Hole	___	Monitoring Wells, Destruction	___	Monitoring Well Destruction	___	Monitoring Well Const. (Baseline Study)	___
Dewatering	___			Air Sparging Well	___	Vapor Extraction Well	___

Description of Proposed Work: Drill 8 exploratory borings, collect soil and groundwater samples for soil profiling and health and safety purposes associated with the Dumbarton Bridge retrofit project.

TOTAL ESTIMATED COST $ ___

PERMIT CONDITIONS: Exploratory Borings to be backfilled with neat cement from bottom of borehole to surface.

FEES:

ESTIMATE
- Private ___
- Public (Governmental) Agency ✓
- Public Utility ___
- Permit Issuance Fee $ 0
- Field Investigation and Inspection Fee $ ___
- ESTIMATE TOTAL $ 0

ACTUAL
- Permit Issuance Fee $ 0
- Field Investigation and Inspection Fee $ ___
- TOTAL $ 0

DEPOSIT:
Date Received ___
P.O. NO. ___ Cash ___ Check No. ~~[illegible]~~ MM
Estimated Amount $ 0
Actual Amount $ 0
Difference $ 0
Refund $ ___ Date ___
Billed $ ___ Date ___

GUARANTEE OF PERFORMANCE
Cash Deposit ___ Bond ___
Amount $ ___ Date ___
(NOT TO EXCEEDED TOTAL ESTIMATED COST)
Return Amount $ ___ Date ___

ACWD SITE NO. 902
APPROVED FOR SCHEDULING BY: BC DATE: 3/4/09
INSPECTING OFFICER APPROVAL: Michelle Ng DATE: 3/12/09

I hereby agree to comply with all conditions of this permit in accordance with the City Well Ordinance checked above, and to furnish the Alameda County Water District a completed copy of D.W.R. water well Drillers Report (form 188) or acceptable facsimile as well as any chemical testing results within fifteen (15) days after completion.

Title: Sr. Project Geologist Signature: [signature] Date: 2/24/09
Representing: Geocon Consultants Name (printed): John Love

ACWD #458 8-03

ORDINANCE: 04023

ENVIRONMENTAL HEALTH
SAN MATEO COUNTY

Protecting Our Health and Environment

PERMIT 09- 0392

P/E: 2010 MONITORING WELLS - INSTALLATION/DESTRUCTION

FACILITY:
WEST END DUMBARTON BRIDGE, MENLO PARK

OWNER:
CALTRANS-DISTRICT 4
111 GRAND AVENUE, 9TH FL
OAKLAND

WP0007498
NO APN LISTED
AMOUNT PAID: 544.00

CONTRACTOR:
GEOCON CONSULTANTS, INC

TERMS & CONDITIONS:

CONSTRUCT SOIL BORINGS (8)
CONSULTANT: GEOCON CONSULTANTS, INC
(RICK DAY)

DENO MILANO
ENVIRONMENTAL HEALTH SPECIALIST

DATE ISSUED: 3/9/2009

EXPIRATION DATE: 7/9/2009

THIS PERMIT IS NONTRANSFERABLE AND MUST BE POSTED ON-SITE IN A CONSPICUOUS PLACE

CLE 064667

2009 SUBSURFACE DRILLING PERMIT APPLICATION
ENVIRONMENTAL HEALTH SERVICES DIVISION

SAN MATEO COUNTY HEALTH DEPARTMENT
2000 ALAMEDA DE LAS PULGAS, SUITE 100, SAN MATEO CA 94403
VOICE (650) 372-6200 FAX (650) 627-8244

PAID 544.00

SAN MATEO COUNTY ENVIRONMENTAL HEALTH

ALLOW FIVE (5) WORKING DAYS FOR PROCESSING PERMIT

MAR 02 2009

Fees: $544 (env/wells) and $340 (geo borings only)

DRILLING DATE & TIME MUST BE SCHEDULED WITH COUNTY STAFF AT LEAST THREE (3) WORKING DAYS IN ADVANCE

RECEIVED

PURPOSE OF APPLICATION: ☐ GROUNDWATER MONITORING WELL INSTALLATION/DESTRUCTION ☐ CONSTRUCT SOIL BORINGS ☐ VAPOR WELL INSTALLATION/DESTRUCTION ☐ PERMIT EXTENSION OF PERMIT #MW
NO. OF WELLS _____ NO. OF BORINGS 8 WELL/BORING NAMES W5A, W5BGW, W10AGW, W10B W15A, W15BGW, W20AGW, W20B

dgm

PURPOSE OF DRILLING: ☒ ENVIRONMENTAL ☐ GEOTECHNICAL

REQUIRED BY: ☐ COUNTY GROUNDWATER PROTECTION PROGRAM ☐ RWQCB/DTSC/USEPA (Provide approval letter) ☒ OTHER (i.e. voluntary)

dgm

Site Name Dumbarton Bridge - West Trestle Assessor's Parcel # NA (one per permit)
Drilling Location Address 0 to 600' of approach to Dumbarton Bridge City MENLO PARK
To Be Constructed In: ☒ Public Property ☐ Private Property ☐ Refuse ☐ Other _____
Maximum Proposed Depth Wells/Borings 15 (feet) Drilling Method Direct-Push
Boring Diameter 2" Casing Diameter _____ Screen Interval _____
Development Method _____ (additional 72 hour staff notification required)
Destruction Method (6 gallons water max per 94 lb cement, up to 5% bentonite): ☐ Pressure grouting (provide well construction logs) ☐ Overdrilling

WELL/BORING OWNER: (WELL/BORING OWNER NAME OR CONTACT NAME SHOULD MATCH SIGNATURE)

Name Caltrans - District 4 Contact Person Ms. Roya Azarmi
Address 111 Grand Ave 9th flr City, State, ZIP Oakland, CA 94623
Telephone (510) 286-6117 Email Roya_Azarmi@dot.ca.gov

It is my responsibility to notify the County of any known changes in the purpose of this well/boring from that which is indicated on this application. It is my responsibility to notify the County of any known damage to the well, and to maintain the well in good condition. (*Letter signed by well/boring owner/contact person, containing above language and attesting to knowledge of all permit requirements and conditions, may be substituted for signature on permit application.*)

Date _____

Well/Boring Owner's/Contact Person's Signature see attached signature page

PROPERTY OWNER: (NAME AS APPEARS ON ASSESSOR'S ROLES SHOULD MATCH SIGNATURE)

Name same as well/boring owner Contact Person _____
Address _____ City, State, ZIP _____
Telephone _____ Email _____

I understand that a well/boring is being installed on my property. I agree to notify the County and Well Owner of any known damage to the well. (*Letter signed by property owner, containing above language, or encroachment permit may be substituted for signature on permit application.*)

Property Owner's Signature See attached signature page **Date** _____

Drilling Company: Geocon Consultants, Inc. Contact Person Rick Day
Address: 6671 Brisa St. C57 Drillers License # 716050
City, State, ZIP Livermore, CA 94550 Telephone/Email (925) 371-5900 / day@geoconinc.com

I certify that the well/boring will be constructed in compliance with the conditions of this permit (see reverse), the San Mateo County Ordinance, and the State Water Well Standards, and that the license listed above is considered current and active by the Contractors State License Board.

Driller's Signature _____ **Date** _____

Consultant Company: Geocon Consultants, Inc. Project Manager Rick Day
Address: 6671 Brisa St. Telephone (925) 371-5900
City, State, ZIP Livermore, CA 94550 Email day@geoconinc.com

I certify that this application is correct to the best of my knowledge. I certify the well/boring will be constructed/destroyed in compliance with the conditions of this permit (see reverse), the San Mateo County Ordinance, and the State Water Well Standards. I understand that I am responsible for General Conditions "D and E" of this permit. I certify if I indicated the purpose of drilling is geotechnical, then no one will use the boring to collect any samples for environmental analyses. (*Responsible Professional must be a California Professional Geologist or Civil Engineer.*)

Responsible Professional's Name (Please print legibly) John Love

Responsible Professional's Signature _____ **Date** 2/27/09

California Professional Geologist (PG) No. 6315 **or Civil Engineer No.** _____

Please see additional pages of application for requirements, general permit conditions, instructions, and fees

Revised every January 1

 2009 SUBSURFACE DRILLING PERMIT APPLICATION

REQUIREMENTS:

An accurate & correct map of existing and proposed well/boring locations **must** be included with the permit application. The well/boring location map **must** include the following.

1. North arrow, existing & historic site features, wells, approximate property lines and any other pertinent existing & historic features and information.
2. Proposed well/boring locations to scale.

A work plan describing the drilling and construction/destruction methodology, at a minimum, is **required** by County Staff. Upon review of information on this application and the submitted work plan, and subject to approval noted below, a permit will be issued allowing well/boring owner, driller, and responsible professional (consultant) to perform the specified work. The permit is subject to both General and Special Conditions stated below. A copy of the approved Subsurface Drilling Permit **must** be available on site while work related to the permit is being performed. Drilling date and time **must** be scheduled with County staff at least three (3) working days in advance of field work. Drilling may begin at the notified date and time whether County staff is present or not.

GENERAL CONDITIONS:

A. Well and boring construction and destruction under this permit is subject to the Standards for the Construction of Wells in San Mateo County, County Groundwater Protection Program (GPP) Guidelines, Policies & Procedures, the State Water Well Standards, and any instructions by a Health Department representative.

B. Well/Boring Owner, Driller, and Responsible Professional assume responsibility for all activities and uses under the permit, including compliance with Workmen's Compensation Laws, and indemnify, defend and save the County of San Mateo, its' officers, agents and employees, free and harmless from any and all expense, cost, or liability in connection with or resulting from work or stopped-work associated with the permit, including, but not limited to, property damage, personal injury, wrongful death, and loss of income.

C. All borings **must** be properly destroyed (grouted/sealed) within 24 hours of drilling unless special conditions are approved in writing as part of this permit.

D. Analytical results of all soil and groundwater samples collected during the execution of drilling under this permit **must** be submitted to County GPP staff by the Responsible Professional within 60 days of sample collection. If contamination is discovered during drilling, verbal notification to County GPP by the Responsible Professional is **required** within 72 hours of discovery. Proper storage, labeling & disposal of investigation-derived residual wastes are the responsibility of the consultant unless stated otherwise contractually.

E. In addition to the County copy of the State DWR Form 188, boring logs and well construction details for all borings/wells except geotechnical borings, signed by a Responsible Professional, **must** be submitted to County GPP by the Responsible Professional within 60 days of drilling/construction/destruction. As-built locations/dimensions **must** be finalized in subsequent report of findings submitted to County GPP by the Responsible Professional within 60 days of drilling/construction/destruction.

F. Permit is valid only for the purpose specified herein. No change in construction procedure, as described on this permit application, in the associated workplan, or in the special conditions below, will be allowed except upon written permission from the County.

G. Permit is valid for one mobilization only and is automatically canceled if not exercised, or if an extension is not applied for and granted by County GPP, within 120 days of the original permit issuance date. Failure to notify staff of cancellation or delay in start time, at least one minute prior to notified start time, will result in the Consultant will be billed an Inspection Cancellation fee of $249 for 2009 if GPP staff attempted to perform an inspection.

H. Wells installed under this permit may not be used for domestic, municipal, commercial, or irrigation water supply.

I. All work plans and reports related to work performed under County oversight **must** conform to County GPP guidelines, Regional Water Quality Control Board guidelines, and State Water Well Standards.

J. Top-of-casing elevation of all wells **must** be surveyed to the nearest 0.01-foot relative to Mean Sea Level (NAVD88) and submitted to County GPP within 60 days of drilling, and to State GeoTracker as appropriate.

K. Latitude and longitude of all wells **must** be surveyed with sub-meter accuracy relative to NAD83 and submitted to County GPP within 60 days of drilling, and to State GeoTracker as appropriate.

L. Violation of any requirement or general or special permit condition may result in an order by GPP staff to cease work under this permit, correct the violation, and potentially re-permit the work as a new mobilization.

SPECIAL CONDITIONS:_____

Approved:_____ RO/SD#_____ Date: 3-3-09

ORDINANCE: 04023

ENVIRONMENTAL HEALTH
SAN MATEO COUNTY

Protecting Our Health and Environment

PERMIT 09- 1004

P/E: 2010 MONITORING WELLS - INSTALLATION/DESTRUCTION

FACILITY:
500' WEST OF DUMBARTON BRIDGE, MP

OWNER:
CALTRANS- DISTRICT 4
111 GRAND AVENUE
OAKLAND

WP0007672
NO APN LISTED
AMOUNT PAID: 544.00

CONTRACTOR:
GEOCON CONSULTANTS, INC

TERMS & CONDITIONS:

CONSTRUCT SOIL BORINGS (4)
CONSULTANT: GEOCON CONSULTANTS, INC
(RICK DAY)
SEE SPECIAL CONDITIONS NOTED ON APPLICATION

DENO MILANO

ENVIRONMENTAL HEALTH SPECIALIST

DATE ISSUED: 6/11/2009

EXPIRATION DATE: 10/12/2009

THIS PERMIT IS NONTRANSFERABLE AND MUST BE POSTED ON-SITE IN A CONSPICUOUS PLACE

SAN MATEO COUNTY ENVIRONMENTAL HEALTH

JUN - 1 2009

RECEIVED

2009 SUBSURFACE DRILLING PERMIT APPLICATION

ENVIRONMENTAL HEALTH SERVICES DIVISION

SAN MATEO COUNTY HEALTH DEPARTMENT
2000 ALAMEDA DE LAS PULGAS, SUITE 100, SAN MATEO CA 94403
VOICE (650) 372-6200 FAX (650) 627-8244

PAID 65417 • 544.00

DATE mail

ALLOW FIVE (5) WORKING DAYS FOR PROCESSING PERMIT

Fees: $544 (env/wells) and $340 (geo borings only)

DRILLING DATE & TIME MUST BE SCHEDULED WITH COUNTY STAFF AT LEAST THREE (3) WORKING DAYS IN ADVANCE

PURPOSE OF APPLICATION: ☐ GROUNDWATER MONITORING WELL INSTALLATION/DESTRUCTION ☑ CONSTRUCT SOIL BORINGS ☐ VAPOR WELL INSTALLATION/DESTRUCTION ☐ PERMIT EXTENSION OF PERMIT #MW

NO. OF WELLS ____ NO. OF BORINGS 4 WELL/BORING NAMES F2A, F2B, F2C, F2D

PURPOSE OF DRILLING: ☐ ENVIRONMENTAL ☐ GEOTECHNICAL

REQUIRED BY: ☐ COUNTY GROUNDWATER PROTECTION PROGRAM ☐ RWQCB/DTSC/USEPA (Provide approval letter) ☑ OTHER (i.e. voluntary)

Site Name Dumbarton Bridge Assessor's Parcel # NA (one per permit)

Drilling Location Address 500' west of Dumbarton Bridge City Menlo Park

To Be Constructed In: ☑ Public Property ☐ Private Property ☐ Refuse ☐ Other ____

Maximum Proposed Depth Wells/Borings 15 (feet) Drilling Method Direct Push

Boring Diameter 2" Casing Diameter ____ Screen Interval ____

Development Method ____ (additional 72 hour staff notification required)

Destruction Method (6 gallons water max per 94 lb cement, up to 5% bentonite): ☐ Pressure grouting (provide well construction logs) ☐ Overdrilling

WELL/BORING OWNER: (WELL/BORING OWNER NAME OR CONTACT NAME SHOULD MATCH SIGNATURE)

Name Caltrans - District 4 (Attn: Q-way) Contact Person Charles Smith

Address 111 Grand Ave City, State, ZIP Oakland, CA 94623

Telephone (510) 286-5635 Email charles_smith@dot.ca.gov

It is my responsibility to notify the County of any known changes in the purpose of this well/boring from that which is indicated on this application. It is my responsibility to notify the County of any known damage to the well, and to maintain the well in good condition. *(Letter signed by well boring owner contact person, containing above language and attesting to knowledge of all permit requirements and conditions, may be substituted for signature on permit application.)*

Well/Boring Owner's/Contact Person's Signature Charles D. Smith **Date** 5-27-09

PROPERTY OWNER: (NAME AS APPEARS ON ASSESSOR'S ROLES SHOULD MATCH SIGNATURE)

Name same as well/Boring owner Contact Person we provided property info

Address ____ City, State, ZIP ____ for tax rolls.

Telephone ____ Email ____

I understand that a well/boring is being installed on my property. I agree to notify the County and Well Owner of any known damage to the well *(Letter signed by property owner, containing above language, or encroachment permit may be substituted for signature on permit application.)*

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Drilling Company: Geocon Consultants, Inc. Contact Person John Love

Address: 6671 Brisa St. C57 Drillers License # 716050

City, State, ZIP Livermore, CA 94550 Telephone/Email 925-371-5900 / love@geoconinc.com

I certify that the well/boring will be constructed in compliance with the conditions of this permit (see reverse), the San Mateo County Ordinance, and the State Water Well Standards, and that the license listed above is considered current and active by the Contractors State License Board

Driller's Signature [signature] **Date** 5/27/09

Consultant Company: Geocon Consultants, Inc. Project Manager Rick Day

Address: 6671 Brisa St. Telephone 925-371-5900

City, State, ZIP Livermore, CA 94550 Email day@geoconinc.com

I certify that this application is correct to the best of my knowledge. I certify the well boring will be constructed destroyed in compliance with the conditions of this permit (see reverse), the San Mateo County Ordinance, and the State Water Well Standards. I understand that I am responsible for General Conditions "D and E" of this permit. I certify if I indicated the purpose of drilling is geotechnical, then no one will use the boring to collect any samples for environmental analyses. *(Responsible Professional must be a California Professional Geologist or Civil Engineer.)*

Responsible Professional's Name (Please print legibly) John Love

Responsible Professional's Signature [signature] **Date** 5/27/09

California Professional Geologist (PG) No. 6315 **or Civil Engineer No.** ____

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Revised every January 1

 2009 SUBSURFACE DRILLING PERMIT APPLICATION

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GENERAL CONDITIONS:

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B. Well/Boring Owner, Driller, and Responsible Professional assume responsibility for all activities and uses under the permit, including compliance with Workmen's Compensation Laws, and indemnify, defend and save the County of San Mateo, its' officers, agents and employees, free and harmless from any and all expense, cost, or liability in connection with or resulting from work or stopped-work associated with the permit, including, but not limited to, property damage, personal injury, wrongful death, and loss of income.

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K. Latitude and longitude of all wells **must** be surveyed with sub-meter accuracy relative to NAD83 and submitted to County GPP within 60 days of drilling, and to State GeoTracker as appropriate.

L. Violation of any requirement or general or special permit condition may result in an order by GPP staff to cease work under this permit, correct the violation, and potentially re-permit the work as a new mobilization.

SPECIAL CONDITIONS: Phone conversation w/ Ch. Smith verified Caltrans ownership.

Approved: [signature] RO/SD# Date: 6.11.09

Revised every January 1

APPENDIX C

June 09, 2009

John Love
Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550
TEL: (925) 525-4142
FAX: (925) 371-5915

ELAP No.: 1838
NELAP No.: 02107CA
NEVADA.: CA-401
CSDLAC No.: 10196

Workorder No.: 104789

RE: Caltrans Dumbarton Bridge, E8435-06-18

Attention: John Love

Enclosed are the results for sample(s) received on March 28, 2009 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

This is an addendum report. Please incorporate with documentation previously submitted.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

CLIENT: Geocon Consultants, Inc.
Project: Caltrans Dumbarton Bridge, E8435-06-18
Lab Order: 104789

CASE NARRATIVE

Results were J-Flag. "J" is used to flag those results that are between the PQL (Practical Quantitation Limit) and the calculated MDL (Method Detection Limit). Results that are "J" Flagged are estimated values since it becomes difficult to accurately quantitate the analyte near the MDL.

Analytical Comments for Method 6010

Dilution was necessary for samples 104789-001E, 104789-004A, 104789-007A, 104789-008A, 104789-009A and 104789-010A, due to sample matrix.

Analytical Comments for Method 7470

Samples 104789-009A, 104789-010A, 104789-010ADUP, 104789-010AMS and 104789-010AMSD were analyzed for WET Mercury beyond hold time, per client request. Results are flagged with an "H" qualifier.

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W20AGW (5')
Lab Order:	104789	**Collection Date:**	3/26/2009 9:43:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104789-004A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC							
			WET/ EPA 6010B				
RunID: **ICP8_090608C**	QC Batch: **R109661**				PrepDate:		Analyst: **CL**
Chromium	0.11	0.018	1.0	J	mg/L	20	6/8/2009 05:42 PM
Vanadium	0.34	0.010	1.0	J	mg/L	20	6/8/2009 05:42 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	FW3 (0')
Lab Order:	104789	**Collection Date:**	3/26/2009 11:15:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104789-007A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC							
WET/ EPA 6010B							
RunID: **ICP8_090608C**	QC Batch: **R109661**				PrepDate:		Analyst: **CL**
Chromium	2.0	0.018	1.0		mg/L	20	6/8/2009 05:45 PM
Vanadium	0.60	0.010	1.0	J	mg/L	20	6/8/2009 05:45 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	FW3 (2')
Lab Order:	104789	**Collection Date:**	3/26/2009 11:20:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104789-008A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC							
WET/ EPA 6010B							
RunID: **ICP8_090608C**	QC Batch: **R109661**				PrepDate:		Analyst: **CL**
Chromium	0.22	0.018	1.0	J	mg/L	20	6/8/2009 05:49 PM
Vanadium	0.46	0.010	1.0	J	mg/L	20	6/8/2009 05:49 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	FW4 (0')
Lab Order:	104789	**Collection Date:**	3/26/2009 11:25:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104789-009A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC							
			WET/ EPA 6010B				
RunID: **ICP8_090608D**	QC Batch: **R109662**				PrepDate:		Analyst: **CL**
Chromium	1.2	0.018	1.0		mg/L	20	6/8/2009 06:16 PM
Lead	0.22	0.042	1.0	J	mg/L	20	6/8/2009 06:16 PM
Vanadium	0.48	0.010	1.0	J	mg/L	20	6/8/2009 06:16 PM
MERCURY BY WET EXTRACTION							
			WET/ EPA 7470A				
RunID: **AA5_090608A**	QC Batch: **55727**				PrepDate:	**6/5/2009**	Analyst: **IL**
Mercury	ND	0.23	1.0	H	µg/L	1	6/8/2009 10:43 AM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	FW4 (2')
Lab Order:	104789	**Collection Date:**	3/26/2009 11:35:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104789-010A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC							
			WET/ EPA 6010B				
RunID: **ICP8_090608D**	QC Batch: **R109662**				PrepDate:		Analyst: **CL**
Chromium	0.21	0.018	1.0	J	mg/L	20	6/8/2009 06:27 PM
Vanadium	0.55	0.010	1.0	J	mg/L	20	6/8/2009 06:27 PM
MERCURY BY WET EXTRACTION							
			WET/ EPA 7470A				
RunID: **AA5_090608A**	QC Batch: **55727**				PrepDate: **6/5/2009**		Analyst: **IL**
Mercury	ND	0.23	1.0	H	µg/L	1	6/8/2009 10:30 AM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_ST

Sample ID: **MB-55695A** SampType: **MBLK** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **PBS** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722211**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	ND	0.050									
Lead	0.004	0.050									
Vanadium	ND	0.050									

Sample ID: **LCS-55695** SampType: **LCS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **LCSS** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722212**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	0.919	0.050	1.000	0	91.9	85	115				
Lead	1.021	0.050	1.000	0.003711	102	85	115				
Vanadium	1.004	0.050	1.000	0	100	85	115				

Sample ID: **104787-004ADUP** SampType: **DUP** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **ZZZZZZ** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722223**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	0.068	1.0						0.1096	0	20	
Lead	ND	1.0						0	0	20	
Vanadium	0.204	1.0						0.2437	0	20	

Sample ID: **104787-004AMS** SampType: **MS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **ZZZZZZ** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722224**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	2.444	1.0	2.500	0.1096	93.4	77	116				
Lead	2.320	1.0	2.500	0	92.8	71	121				
Vanadium	2.743	1.0	2.500	0.2437	100	79	118				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_ST

Sample ID: **MB-55695B** SampType: **MBLK** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **PBS** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722225**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	ND	0.050									
Lead	ND	0.050									
Vanadium	ND	0.050									

Sample ID: **104789-008ADUP** SampType: **DUP** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **FW3 (2')** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722236**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	1.0						0	0	20	
Chromium	0.235	1.0						0.2217	0	20	
Lead	ND	1.0						0	0	20	
Nickel	0.433	1.0						0.4102	0	20	
Vanadium	0.470	1.0						0.4639	0	20	

Sample ID: **104789-008AMS** SampType: **MS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **FW3 (2')** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722237**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	2.584	1.0	2.500	0	103	66	128				
Chromium	2.649	1.0	2.500	0.2217	97.1	77	116				
Lead	2.522	1.0	2.500	0	101	71	121				
Nickel	3.028	1.0	2.500	0.4102	105	63	125				
Vanadium	2.991	1.0	2.500	0.4639	101	79	118				

Sample ID: **104789-008AMSD** SampType: **MSD** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **FW3 (2')** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722238**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	2.571	1.0	2.500	0	103	66	128	2.584	0.510	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_ST

Sample ID: **104789-008AMSD** SampType: **MSD** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **FW3 (2')** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722238**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	2.612	1.0	2.500	0.2217	95.6	77	116	2.649	1.40	20	
Lead	2.484	1.0	2.500	0	99.4	71	121	2.522	1.49	20	
Nickel	2.994	1.0	2.500	0.4102	103	63	125	3.028	1.14	20	
Vanadium	2.980	1.0	2.500	0.4639	101	79	118	2.991	0.375	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_ST

Sample ID: **MB-55696** SampType: **MBLK** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109662**
Client ID: **PBS** Batch ID: **R109662** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722240**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	ND	0.050									
Lead	ND	0.050									
Vanadium	ND	0.050									

Sample ID: **LCS-55696** SampType: **LCS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109662**
Client ID: **LCSS** Batch ID: **R109662** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722241**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	0.920	0.050	1.000	0	92.0	85	115				
Lead	1.051	0.050	1.000	0	105	85	115				
Vanadium	1.005	0.050	1.000	0	101	85	115				

Sample ID: **104789-010ADUP** SampType: **DUP** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109662**
Client ID: **FW4 (2')** Batch ID: **R109662** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722244**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	0.207	1.0						0.2108	0	20	
Lead	ND	1.0						0	0	20	
Vanadium	0.551	1.0						0.5452	0	20	

Sample ID: **104789-010AMS** SampType: **MS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109662**
Client ID: **FW4 (2')** Batch ID: **R109662** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722245**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	2.529	1.0	2.500	0.2108	92.7	77	116				
Lead	2.428	1.0	2.500	0	97.1	71	121				
Vanadium	2.986	1.0	2.500	0.5452	97.6	79	118				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_ST

Sample ID: **104789-010AMSD** SampType: **MSD** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109662**
Client ID: **FW4 (2')** Batch ID: **R109662** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722246**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	2.502	1.0	2.500	0.2108	91.7	77	116	2.529	1.04	20	
Lead	2.403	1.0	2.500	0	96.1	71	121	2.428	1.04	20	
Vanadium	2.987	1.0	2.500	0.5452	97.7	79	118	2.986	0.0463	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 7470_ST

Sample ID: **MB-55727A**	SampType: **MBLK**	TestCode: **7470_ST**	Units: **µg/L**	Prep Date: **6/5/2009**	RunNo: **109646**
Client ID: **PBS**	Batch ID: **55727**	TestNo: **WET/ EPA 74**		Analysis Date: **6/8/2009**	SeqNo: **1721974**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.20									

Sample ID: **LCS-55727**	SampType: **LCS**	TestCode: **7470_ST**	Units: **µg/L**	Prep Date: **6/5/2009**	RunNo: **109646**
Client ID: **LCSS**	Batch ID: **55727**	TestNo: **WET/ EPA 74**		Analysis Date: **6/8/2009**	SeqNo: **1721975**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	9.723	0.20	10.00	0	97.2	85	115				

Sample ID: **MB-55695B STLC**	SampType: **MBLK**	TestCode: **7470_ST**	Units: **µg/L**	Prep Date: **6/5/2009**	RunNo: **109646**
Client ID: **PBS**	Batch ID: **55727**	TestNo: **WET/ EPA 74**		Analysis Date: **6/8/2009**	SeqNo: **1721976**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	1.0									

Sample ID: **MB-55696A STLC**	SampType: **MBLK**	TestCode: **7470_ST**	Units: **µg/L**	Prep Date: **6/5/2009**	RunNo: **109646**
Client ID: **PBS**	Batch ID: **55727**	TestNo: **WET/ EPA 74**		Analysis Date: **6/8/2009**	SeqNo: **1721977**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	1.0									

Sample ID: **104789-010A-MS**	SampType: **MS**	TestCode: **7470_ST**	Units: **µg/L**	Prep Date: **6/5/2009**	RunNo: **109646**
Client ID: **FW4 (2')**	Batch ID: **55727**	TestNo: **WET/ EPA 74**		Analysis Date: **6/8/2009**	SeqNo: **1721978**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	36.621	1.0	50.00	0	73.2	70	130				H

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 7470_ST

Sample ID: **104789-010A-MSD** SampType: **MSD** TestCode: **7470_ST** Units: **µg/L** Prep Date: **6/5/2009** RunNo: **109646**
Client ID: **FW4 (2')** Batch ID: **55727** TestNo: **WET/ EPA 74** Analysis Date: **6/8/2009** SeqNo: **1721979**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	39.935	1.0	50.00	0	79.9	70	130	36.62	8.66	20	H

Sample ID: **104789-010A-DUP** SampType: **DUP** TestCode: **7470_ST** Units: **µg/L** Prep Date: **6/5/2009** RunNo: **109646**
Client ID: **FW4 (2')** Batch ID: **55727** TestNo: **WET/ EPA 74** Analysis Date: **6/8/2009** SeqNo: **1721981**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	1.0						0	0	20	H

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

Diane Galvan

From: John Love [love@geoconinc.com]
Sent: Wednesday, June 03, 2009 10:50 AM
To: Diane Galvan
Subject: WET Request
Attachments: COC Caltrans Dumbarton Bridge.pdf

Hi Diane:

Caltrans would like to run a waste extraction test on several samples for select metals from the Dumbarton Bridge project. I've attached the COCs for the samples they wanted analyzed for STLC. Let me know if you have any questions.

Thanks Diane.

John Love
Sr. Project Geologist

Please visit our new website at http://www.geoconinc.com

GEOCON Incorporated
6671 Brisa Street
Livermore, CA 94550
Tel (925) 371-5900

GEOTECHNICAL - ENVIRONMENTAL - MATERIALS

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CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#: _____

Logged By: _____ Date: _____

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: _____

Sample Condition Upon Receipt: 1. CHILLED Y☐ N☐ 4. SEALED Y☐ N☐ 2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐ 3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client: Geocon Consultants, Inc. Address: 6671 Brisa St. TEL: (925) 371-5900
Attn: John Love City Livermore State CA Zip Code 94550 FAX: (925) 371-5915

Project Name: Caltrans - Dumbarton Bridge Project #: E8435-06-18 Sampler: (Printed Name) John Love (Signature)

Relinquished by: (Signature and Printed Name) John Love	Date: 6/3/09	Time:	Received by: (Signature and Printed Name)	Date: Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date: Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date: Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: John Love 6/3/09 (Print Name / Date) (Signature)

Send Report To: Attn: _____ Co: same as above Address _____ City _____ State _____ Zip _____

Bill To: Attn: _____ Co: same as above Address _____ City _____ State _____ Zip _____

Special Instructions/Comments:

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

Circle or Add Analysis(es) Requested

SPECIFY APPROPRIATE MATRIX

PRESERVATION

Q A / Q C: RTNE ☐ CT ☐ SWRCB ☐ Logcode _____ OTHER _____

ITEM	LAB USE ONLY: Batch # / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	8010B (Total Metal)	8015B (GRO) / 8020 (BTEX)	8015B (DRO)	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	V: (WET)	As: (WET)	Cr: (WET)	Pb: (WET)	Hg: (WET)	Ni: (WET)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	REMARKS
		ESA (5')	3/24/09									X		X	X				X					E	1	T P	
		ESB (0')										X				X			X								
		ESB (5')										X		X	X				X								
		E10BGW (0')										X				X			X								
		E10BGW (5')										X		X	X				X								
		E15A (5')										X		x	x			X	X								
		E20AGW (5')										X			X				X								
		~~E8GW~~ E20BGW (5')										X		x	x				X								
		WSA (5')										X		x	x			X	X								
		W10AGW (5')										X			X			X	X								

* TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=Hcl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter.

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#: _____

Logged By: _____ Date: _____

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: _____

Sample Condition Upon Receipt
1. CHILLED Y☐ N☐ 4. SEALED Y☐ N☐
2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐
3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client:
Attn:
Address: 6671 Brisa St.
City Livermore State CA Zip Code 94550
TEL: (925) 371-5900
FAX: (925) 371-5915

Project Name: Caltrans- Dumbarton Bridge Project #: E8435-06-18 Sampler: (Printed Name) John Love (Signature)

Relinquished by: (Signature and Printed Name) John Love	Date: 6/3/09	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
John Love 6/3/09 (Print Name / Date)
(Signature)

Send Report To:
Attn: _____
Co: same as above
Address _____
City _____ State ____ Zip ____

Bill To:
Attn: _____
Co: same as above
Address _____
City _____ State ____ Zip ____

Special Instructions/Comments:

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- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

Circle or Add Analysis(es) Requested

SPECIFY APPROPRIATE MATRIX

PRESERVATION

Q A / Q C
RTNE ☐ CT ☐ SWRCB ☐ Logcode ____ OTHER ____

ITEM	LAB USE ONLY: Batch # / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	8010B (Total Metals)	8015B (GRO) / 8020 (BTEX)	8015B (DRO)	TITLE 22 / CAM 17 (6010 / 7000)	As (WET)	Cr (WET)	Pb (WET)	Hg (WET)	Ni (WET)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	REMARKS
		W10B (0')	3/4/01							X			X				X						E	1	T P	
		W15BGW (0')								X			X				X									
		W20AGW (5')								X			X				X									
		W20B (0')								X			X				X									
		FW1 (0')								X					X		X							T m	
		FW1 (2')								X			X				X									
		FW2 (0')								X			X				X									
		FW2 (2')								X					X		X									
		FW3 (0')								X			X				X									
		FW3 (2')								X			X				X									

• TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=Hcl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: White with report, Yellow to folder, Pink to submitter.

CHAIN OF CUSTODY RECORD

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Logged By: _____ Date: _____

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: _____

Sample Condition Upon Receipt: 1. CHILLED Y☐ N☐ 4. SEALED Y☐ N☐ 2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐ 3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client: ~~Caltrans - Dumbarton Bridge~~ Geocon Consultants
Attn: John Love
Address: 6671 Brisa St.
City Livermore State CA Zip Code
TEL: (925) 371-5900
FAX: (925) 371-5915

Project Name: Caltrans - Dumbarton Bridge Project #: E8435-06-18 Sampler: (Printed Name) John Love (Signature)

Relinquished by: (Signature and Printed Name) John Love	Date: 6/3/09	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
John Love 6/3/09
Print Name Date
Signature

Send Report To:
Attn: _____
Co: same as above
Address _____
City _____ State ____ Zip ____

Bill To:
Attn: _____
Co: same as above
Address _____
City _____ State ____ Zip ____

Special Instructions/Comments:

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time
		FW4 (0')	3/2/09	
		FW4 (2')	↓	

Circle or Add Analysis(es) Requested

8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	8010B (Total Metals)	8015B (GRO) / 8020 (BTEX)	8015B (DRO)	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	VA (WET)	CC (WET)	Hg (WET)	PB (WET)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
								X	X	X	X		X				E	1	T M		
								X	X	X			X				↓	↓	↓ ↓		

SPECIFY APPROPRIATE MATRIX

QA/QC: RTNE ☐ CT ☐ SWRCB ☐ Logcode ____ OTHER ____

- TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter.

March 31, 2009

John Love
Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550

TEL: (925) 525-4142
FAX: (925) 371-5915

ELAP No.: 1838
NELAP No.: 02107CA
NEVADA.: CA-401
CSDLAC No.: 10196

Workorder No.: 104670

RE: Caltrans Dumbarton Bridge, E8435-06-01

Attention: John Love

Enclosed are the results for sample(s) received on March 21, 2009 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter and the case narrative are an integral part of this analytical report and cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Project: Caltrans Dumbarton Bridge, E8435-06-01
Lab Order: 104670

CASE NARRATIVE

Analytical Comments for Method 6010

Dilution was necessary for sample 104670-001E, due to sample matrix.

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E10BGW
Lab Order:	104670	**Collection Date:**	3/19/2009 10:15:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-01	**Matrix:**	WATER
Lab ID:	104670-001A		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS11_090325A QC Batch: A09VW055 PrepDate: Analyst: **SLL**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	3/25/2009 03:08 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	3/25/2009 03:08 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	3/25/2009 03:08 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	3/25/2009 03:08 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	3/25/2009 03:08 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	3/25/2009 03:08 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	3/25/2009 03:08 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	3/25/2009 03:08 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	3/25/2009 03:08 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	3/25/2009 03:08 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	3/25/2009 03:08 PM
1,2-Dibromo-3-chloropropane	ND	0.50		µg/L	1	3/25/2009 03:08 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	3/25/2009 03:08 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	3/25/2009 03:08 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	3/25/2009 03:08 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	3/25/2009 03:08 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	3/25/2009 03:08 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	3/25/2009 03:08 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	3/25/2009 03:08 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	3/25/2009 03:08 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	3/25/2009 03:08 PM
2-Chlorotoluene	ND	0.50		µg/L	1	3/25/2009 03:08 PM
4-Chlorotoluene	ND	0.50		µg/L	1	3/25/2009 03:08 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	3/25/2009 03:08 PM
Benzene	ND	0.50		µg/L	1	3/25/2009 03:08 PM
Bromobenzene	ND	0.50		µg/L	1	3/25/2009 03:08 PM
Bromodichloromethane	ND	0.50		µg/L	1	3/25/2009 03:08 PM
Bromoform	ND	0.50		µg/L	1	3/25/2009 03:08 PM
Bromomethane	ND	0.50		µg/L	1	3/25/2009 03:08 PM
Carbon tetrachloride	ND	0.50		µg/L	1	3/25/2009 03:08 PM
Chlorobenzene	ND	0.50		µg/L	1	3/25/2009 03:08 PM
Chloroethane	ND	0.50		µg/L	1	3/25/2009 03:08 PM
Chloroform	ND	0.50		µg/L	1	3/25/2009 03:08 PM
Chloromethane	ND	0.50		µg/L	1	3/25/2009 03:08 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	3/25/2009 03:08 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E10BGW
Lab Order:	104670	**Collection Date:**	3/19/2009 10:15:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-01	**Matrix:**	WATER
Lab ID:	104670-001A		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS11_090325A QC Batch: A09VW055 PrepDate: Analyst: **SLL**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
cis-1,3-Dichloropropene	ND	0.50		µg/L	1	3/25/2009 03:08 PM
Dibromochloromethane	ND	0.50		µg/L	1	3/25/2009 03:08 PM
Dibromomethane	ND	0.50		µg/L	1	3/25/2009 03:08 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	3/25/2009 03:08 PM
Ethylbenzene	ND	0.50		µg/L	1	3/25/2009 03:08 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	3/25/2009 03:08 PM
Isopropylbenzene	ND	0.50		µg/L	1	3/25/2009 03:08 PM
m,p-Xylene	ND	1.0		µg/L	1	3/25/2009 03:08 PM
Methylene chloride	ND	1.0		µg/L	1	3/25/2009 03:08 PM
n-Butylbenzene	ND	0.50		µg/L	1	3/25/2009 03:08 PM
n-Propylbenzene	ND	0.50		µg/L	1	3/25/2009 03:08 PM
Naphthalene	ND	0.50		µg/L	1	3/25/2009 03:08 PM
o-Xylene	ND	0.50		µg/L	1	3/25/2009 03:08 PM
sec-Butylbenzene	ND	0.50		µg/L	1	3/25/2009 03:08 PM
Styrene	ND	0.50		µg/L	1	3/25/2009 03:08 PM
tert-Butylbenzene	ND	0.50		µg/L	1	3/25/2009 03:08 PM
Tetrachloroethene	ND	0.50		µg/L	1	3/25/2009 03:08 PM
Toluene	ND	0.50		µg/L	1	3/25/2009 03:08 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	3/25/2009 03:08 PM
Trichloroethene	ND	0.50		µg/L	1	3/25/2009 03:08 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	3/25/2009 03:08 PM
Vinyl chloride	ND	0.50		µg/L	1	3/25/2009 03:08 PM
Surr: 1,2-Dichloroethane-d4	92.4	70-130		%REC	1	3/25/2009 03:08 PM
Surr: 4-Bromofluorobenzene	78.6	70-130		%REC	1	3/25/2009 03:08 PM
Surr: Dibromofluoromethane	92.1	70-130		%REC	1	3/25/2009 03:08 PM
Surr: Toluene-d8	92.5	70-130		%REC	1	3/25/2009 03:08 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E10BGW
Lab Order:	104670	**Collection Date:**	3/19/2009 10:15:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-01	**Matrix:**	WATER
Lab ID:	104670-001B		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
GASOLINE RANGE ORGANICS BY GC/FID						
		EPA 8015B(M)				
RunID: GC6_090325A	QC Batch: I09VW059			PrepDate:		Analyst: **BD**
GRO	ND	0.050		mg/L	1	3/26/2009 12:47 AM
Surr: Bromofluorobenzene (FID)	90.1	71-130		%REC	1	3/26/2009 12:47 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E10BGW
Lab Order:	104670	**Collection Date:**	3/19/2009 10:15:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-01	**Matrix:**	WATER
Lab ID:	104670-001C		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3510C **EPA 8270C**

RunID: MS 13_090324B QC Batch: 54166 PrepDate: 3/24/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,2,4-Trichlorobenzene	ND	10		µg/L	1	3/25/2009 12:59 PM
1,2-Dichlorobenzene	ND	10		µg/L	1	3/25/2009 12:59 PM
1,3-Dichlorobenzene	ND	10		µg/L	1	3/25/2009 12:59 PM
1,4-Dichlorobenzene	ND	10		µg/L	1	3/25/2009 12:59 PM
2,4,5-Trichlorophenol	ND	10		µg/L	1	3/25/2009 12:59 PM
2,4,6-Trichlorophenol	ND	10		µg/L	1	3/25/2009 12:59 PM
2,4-Dichlorophenol	ND	10		µg/L	1	3/25/2009 12:59 PM
2,4-Dimethylphenol	ND	10		µg/L	1	3/25/2009 12:59 PM
2,4-Dinitrophenol	ND	50		µg/L	1	3/25/2009 12:59 PM
2,4-Dinitrotoluene	ND	10		µg/L	1	3/25/2009 12:59 PM
2,6-Dinitrotoluene	ND	10		µg/L	1	3/25/2009 12:59 PM
2-Chloronaphthalene	ND	10		µg/L	1	3/25/2009 12:59 PM
2-Chlorophenol	ND	10		µg/L	1	3/25/2009 12:59 PM
2-Methylnaphthalene	ND	10		µg/L	1	3/25/2009 12:59 PM
2-Methylphenol	ND	10		µg/L	1	3/25/2009 12:59 PM
2-Nitroaniline	ND	50		µg/L	1	3/25/2009 12:59 PM
2-Nitrophenol	ND	10		µg/L	1	3/25/2009 12:59 PM
3,3´-Dichlorobenzidine	ND	20		µg/L	1	3/25/2009 12:59 PM
3-Nitroaniline	ND	50		µg/L	1	3/25/2009 12:59 PM
4,6-Dinitro-2-methylphenol	ND	50		µg/L	1	3/25/2009 12:59 PM
4-Bromophenyl-phenylether	ND	10		µg/L	1	3/25/2009 12:59 PM
4-Chloro-3-methylphenol	ND	50		µg/L	1	3/25/2009 12:59 PM
4-Chloroaniline	ND	20		µg/L	1	3/25/2009 12:59 PM
4-Chlorophenyl-phenylether	ND	10		µg/L	1	3/25/2009 12:59 PM
4-Methylphenol	ND	10		µg/L	1	3/25/2009 12:59 PM
4-Nitroaniline	ND	20		µg/L	1	3/25/2009 12:59 PM
4-Nitrophenol	ND	50		µg/L	1	3/25/2009 12:59 PM
Acenaphthene	ND	10		µg/L	1	3/25/2009 12:59 PM
Acenaphthylene	ND	10		µg/L	1	3/25/2009 12:59 PM
Anthracene	ND	10		µg/L	1	3/25/2009 12:59 PM
Benzidine (M)	ND	50		µg/L	1	3/25/2009 12:59 PM
Benzo(a)anthracene	ND	10		µg/L	1	3/25/2009 12:59 PM
Benzo(a)pyrene	ND	10		µg/L	1	3/25/2009 12:59 PM
Benzo(b)fluoranthene	ND	10		µg/L	1	3/25/2009 12:59 PM
Benzo(g,h,i)perylene	ND	10		µg/L	1	3/25/2009 12:59 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E10BGW
Lab Order:	104670	**Collection Date:**	3/19/2009 10:15:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-01	**Matrix:**	WATER
Lab ID:	104670-001C		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3510C **EPA 8270C**

RunID: MS 13_090324B QC Batch: 54166 PrepDate: 3/24/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Benzo(k)fluoranthene	ND	10		µg/L	1	3/25/2009 12:59 PM
Benzoic acid	ND	50		µg/L	1	3/25/2009 12:59 PM
Benzyl alcohol	ND	20		µg/L	1	3/25/2009 12:59 PM
Bis(2-chloroethoxy)methane	ND	10		µg/L	1	3/25/2009 12:59 PM
Bis(2-chloroethyl)ether	ND	10		µg/L	1	3/25/2009 12:59 PM
Bis(2-chloroisopropyl)ether	ND	10		µg/L	1	3/25/2009 12:59 PM
Bis(2-ethylhexyl)phthalate	ND	10		µg/L	1	3/25/2009 12:59 PM
Butylbenzylphthalate	ND	10		µg/L	1	3/25/2009 12:59 PM
Chrysene	ND	10		µg/L	1	3/25/2009 12:59 PM
Di-n-butylphthalate	ND	10		µg/L	1	3/25/2009 12:59 PM
Di-n-octylphthalate	ND	10		µg/L	1	3/25/2009 12:59 PM
Dibenz(a,h)anthracene	ND	10		µg/L	1	3/25/2009 12:59 PM
Dibenzofuran	ND	10		µg/L	1	3/25/2009 12:59 PM
Diethylphthalate	ND	10		µg/L	1	3/25/2009 12:59 PM
Dimethylphthalate	ND	10		µg/L	1	3/25/2009 12:59 PM
Fluoranthene	ND	10		µg/L	1	3/25/2009 12:59 PM
Fluorene	ND	10		µg/L	1	3/25/2009 12:59 PM
Hexachlorobenzene	ND	10		µg/L	1	3/25/2009 12:59 PM
Hexachlorobutadiene	ND	20		µg/L	1	3/25/2009 12:59 PM
Hexachlorocyclopentadiene	ND	10		µg/L	1	3/25/2009 12:59 PM
Hexachloroethane	ND	10		µg/L	1	3/25/2009 12:59 PM
Indeno(1,2,3-cd)pyrene	ND	10		µg/L	1	3/25/2009 12:59 PM
Isophorone	ND	10		µg/L	1	3/25/2009 12:59 PM
N-Nitrosodi-n-propylamine	ND	10		µg/L	1	3/25/2009 12:59 PM
N-Nitrosodiphenylamine	ND	10		µg/L	1	3/25/2009 12:59 PM
Naphthalene	ND	10		µg/L	1	3/25/2009 12:59 PM
Nitrobenzene	ND	10		µg/L	1	3/25/2009 12:59 PM
Pentachlorophenol	ND	50		µg/L	1	3/25/2009 12:59 PM
Phenanthrene	ND	10		µg/L	1	3/25/2009 12:59 PM
Phenol	ND	10		µg/L	1	3/25/2009 12:59 PM
Pyrene	ND	10		µg/L	1	3/25/2009 12:59 PM
Surr: 1,2-Dichlorobenzene-d4	72.5	42-98		%REC	1	3/25/2009 12:59 PM
Surr: 2,4,6-Tribromophenol	99.9	60-128		%REC	1	3/25/2009 12:59 PM
Surr: 2-Chlorophenol-d4	75.5	43-102		%REC	1	3/25/2009 12:59 PM
Surr: 2-Fluorobiphenyl	89.4	50-108		%REC	1	3/25/2009 12:59 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E10BGW
Lab Order:	104670	**Collection Date:**	3/19/2009 10:15:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-01	**Matrix:**	WATER
Lab ID:	104670-001C		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 3510C				**EPA 8270C**		
RunID: MS 13_090324B	QC Batch: 54166			PrepDate: 3/24/2009	Analyst: **DMP**	
Surr: 2-Fluorophenol	50.6	22-69		%REC	1	3/25/2009 12:59 PM
Surr: 4-Terphenyl-d14	112	66-130		%REC	1	3/25/2009 12:59 PM
Surr: Nitrobenzene-d5	82.1	47-117		%REC	1	3/25/2009 12:59 PM
Surr: Phenol-d5	37.6	16-50		%REC	1	3/25/2009 12:59 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E10BGW
Lab Order:	104670	**Collection Date:**	3/19/2009 10:15:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-01	**Matrix:**	WATER
Lab ID:	104670-001D		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
EPA 3510C				**EPA 8015B**		
RunID: GC16_090324C	QC Batch: 54132			PrepDate:	3/23/2009	Analyst: **CBR**
DRO	ND	0.050		mg/L	1	3/24/2009 04:57 PM
ORO	ND	0.050		mg/L	1	3/24/2009 04:57 PM
Surr: p-Terphenyl	70.9	35-131		%REC	1	3/24/2009 04:57 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E10BGW
Lab Order:	104670	**Collection Date:**	3/19/2009 10:15:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-01	**Matrix:**	WATER
Lab ID:	104670-001E		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3010A			**EPA 6010B**		
RunID: ICP8_090325E	QC Batch: 54177			PrepDate:	3/24/2009	Analyst: **CL**
Antimony	ND	0.025		mg/L	5	3/27/2009 05:14 PM
Arsenic	ND	0.050		mg/L	5	3/27/2009 05:14 PM
Barium	0.29	0.015		mg/L	5	3/27/2009 05:14 PM
Beryllium	ND	0.015		mg/L	5	3/27/2009 05:14 PM
Cadmium	ND	0.015		mg/L	5	3/27/2009 05:14 PM
Chromium	0.020	0.015		mg/L	5	3/27/2009 05:14 PM
Cobalt	0.081	0.015		mg/L	5	3/27/2009 05:14 PM
Copper	0.11	0.025		mg/L	5	3/27/2009 05:14 PM
Lead	ND	0.025		mg/L	5	3/27/2009 05:14 PM
Molybdenum	ND	0.025		mg/L	5	3/27/2009 05:14 PM
Nickel	0.098	0.025		mg/L	5	3/27/2009 05:14 PM
Selenium	ND	0.050		mg/L	5	3/27/2009 05:14 PM
Silver	ND	0.015		mg/L	5	3/27/2009 05:14 PM
Thallium	ND	0.075		mg/L	5	3/27/2009 05:14 PM
Vanadium	0.056	0.015		mg/L	5	3/27/2009 05:14 PM
Zinc	0.066	0.050		mg/L	5	3/27/2009 05:14 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7470A		
RunID: AA1_090324E	QC Batch: 54176			PrepDate:	3/24/2009	Analyst: **RQ**
Mercury	ND	0.20		µg/L	1	3/24/2009 05:31 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E10BGW
Lab Order:	104670	**Collection Date:**	3/19/2009 10:15:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-01	**Matrix:**	WATER
Lab ID:	104670-001F		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
TOTAL FILTERABLE RESIDUE						
		SM2540C				
RunID: WETCHEM_090324E	QC Batch: 54245			PrepDate: 3/24/2009	Analyst: **DDL**	
Total Dissolved Solids (Residue, Filterable)	27000	200		mg/L	1	3/24/2009 03:00 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E10BGW
Lab Order:	104670	**Collection Date:**	3/19/2009 10:15:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-01	**Matrix:**	WATER
Lab ID:	104670-001G		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
CYANIDE, TOTAL						
	SM4500-CN E					
RunID: WETCHEM3_090327B	QC Batch: 54306			PrepDate: 3/26/2009		Analyst: **MFP**
Cyanide	ND	0.010		mg/L	1	3/27/2009

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E10BGW
Lab Order:	104670	**Collection Date:**	3/19/2009 10:15:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-01	**Matrix:**	WATER
Lab ID:	104670-001H		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
SULFIDE, DISSOLVED						
		SM4500-S= D				
RunID: WETCHEM3_090325D	QC Batch: R107551			PrepDate: 3/25/2009		Analyst: **MFP**
Sulfide	ND	0.010		mg/L	1	3/25/2009

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E10BGW
Lab Order:	104670	**Collection Date:**	3/19/2009 10:15:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-01	**Matrix:**	WATER
Lab ID:	104670-001I		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
OIL & GREASE						
		EPA 1664 _HEM				
RunID: WETCHEM2_090327B	QC Batch: 54301			PrepDate:	3/27/2009	Analyst: **KXV**
Oil & Grease	ND	4.4		mg/L	1	3/27/2009

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	Trip Blank (E10BGW)
Lab Order:	104670	**Collection Date:**	3/19/2009 4:00:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-01	**Matrix:**	WATER
Lab ID:	104670-002A		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS11_090325A QC Batch: A09VW055 PrepDate: Analyst: **SLL**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	3/25/2009 04:26 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	3/25/2009 04:26 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	3/25/2009 04:26 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	3/25/2009 04:26 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	3/25/2009 04:26 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	3/25/2009 04:26 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	3/25/2009 04:26 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	3/25/2009 04:26 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	3/25/2009 04:26 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	3/25/2009 04:26 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	3/25/2009 04:26 PM
1,2-Dibromo-3-chloropropane	ND	0.50		µg/L	1	3/25/2009 04:26 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	3/25/2009 04:26 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	3/25/2009 04:26 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	3/25/2009 04:26 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	3/25/2009 04:26 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	3/25/2009 04:26 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	3/25/2009 04:26 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	3/25/2009 04:26 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	3/25/2009 04:26 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	3/25/2009 04:26 PM
2-Chlorotoluene	ND	0.50		µg/L	1	3/25/2009 04:26 PM
4-Chlorotoluene	ND	0.50		µg/L	1	3/25/2009 04:26 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	3/25/2009 04:26 PM
Benzene	ND	0.50		µg/L	1	3/25/2009 04:26 PM
Bromobenzene	ND	0.50		µg/L	1	3/25/2009 04:26 PM
Bromodichloromethane	ND	0.50		µg/L	1	3/25/2009 04:26 PM
Bromoform	ND	0.50		µg/L	1	3/25/2009 04:26 PM
Bromomethane	ND	0.50		µg/L	1	3/25/2009 04:26 PM
Carbon tetrachloride	ND	0.50		µg/L	1	3/25/2009 04:26 PM
Chlorobenzene	ND	0.50		µg/L	1	3/25/2009 04:26 PM
Chloroethane	ND	0.50		µg/L	1	3/25/2009 04:26 PM
Chloroform	ND	0.50		µg/L	1	3/25/2009 04:26 PM
Chloromethane	ND	0.50		µg/L	1	3/25/2009 04:26 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	3/25/2009 04:26 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	Trip Blank (E10BGW)
Lab Order:	104670	**Collection Date:**	3/19/2009 4:00:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-01	**Matrix:**	WATER
Lab ID:	104670-002A		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS11_090325A QC Batch: A09VW055 PrepDate: Analyst: **SLL**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
cis-1,3-Dichloropropene	ND	0.50		µg/L	1	3/25/2009 04:26 PM
Dibromochloromethane	ND	0.50		µg/L	1	3/25/2009 04:26 PM
Dibromomethane	ND	0.50		µg/L	1	3/25/2009 04:26 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	3/25/2009 04:26 PM
Ethylbenzene	ND	0.50		µg/L	1	3/25/2009 04:26 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	3/25/2009 04:26 PM
Isopropylbenzene	ND	0.50		µg/L	1	3/25/2009 04:26 PM
m,p-Xylene	ND	1.0		µg/L	1	3/25/2009 04:26 PM
Methylene chloride	ND	1.0		µg/L	1	3/25/2009 04:26 PM
n-Butylbenzene	ND	0.50		µg/L	1	3/25/2009 04:26 PM
n-Propylbenzene	ND	0.50		µg/L	1	3/25/2009 04:26 PM
Naphthalene	ND	0.50		µg/L	1	3/25/2009 04:26 PM
o-Xylene	ND	0.50		µg/L	1	3/25/2009 04:26 PM
sec-Butylbenzene	ND	0.50		µg/L	1	3/25/2009 04:26 PM
Styrene	ND	0.50		µg/L	1	3/25/2009 04:26 PM
tert-Butylbenzene	ND	0.50		µg/L	1	3/25/2009 04:26 PM
Tetrachloroethene	ND	0.50		µg/L	1	3/25/2009 04:26 PM
Toluene	ND	0.50		µg/L	1	3/25/2009 04:26 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	3/25/2009 04:26 PM
Trichloroethene	ND	0.50		µg/L	1	3/25/2009 04:26 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	3/25/2009 04:26 PM
Vinyl chloride	ND	0.50		µg/L	1	3/25/2009 04:26 PM
Surr: 1,2-Dichloroethane-d4	86.0	70-130		%REC	1	3/25/2009 04:26 PM
Surr: 4-Bromofluorobenzene	87.6	70-130		%REC	1	3/25/2009 04:26 PM
Surr: Dibromofluoromethane	92.0	70-130		%REC	1	3/25/2009 04:26 PM
Surr: Toluene-d8	98.6	70-130		%REC	1	3/25/2009 04:26 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	Trip Blank (E10BGW)
Lab Order:	104670	**Collection Date:**	3/19/2009 4:00:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-01	**Matrix:**	WATER
Lab ID:	104670-002B		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
GASOLINE RANGE ORGANICS BY GC/FID						
		EPA 8015B(M)				
RunID: GC6_090325A	QC Batch: I09VW059			PrepDate:		Analyst: **BD**
GRO	ND	0.050		mg/L	1	3/25/2009 07:13 PM
Surr: Bromofluorobenzene (FID)	105	71-130		%REC	1	3/25/2009 07:13 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Geocon Consultants, Inc.
Work Order: 104670
Project: Caltrans Dumbarton Bridge, E8435-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 160.1_2540C_W

Sample ID: **104591-003D-DUP** SampType: **DUP** TestCode: **160.1_2540C** Units: **mg/L** Prep Date: **3/24/2009** RunNo: **107417**
Client ID: **ZZZZZZ** Batch ID: **54245** TestNo: **SM2540C** Analysis Date: **3/24/2009** SeqNo: **1682672**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	918.000	20						894.0	2.65	10	

Sample ID: **LCS-54245** SampType: **LCS** TestCode: **160.1_2540C** Units: **mg/L** Prep Date: **3/24/2009** RunNo: **107417**
Client ID: **LCSW** Batch ID: **54245** TestNo: **SM2540C** Analysis Date: **3/24/2009** SeqNo: **1682679**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	984.000	10	970.0	0	101	80	120				

Sample ID: **MB-54245** SampType: **MBLK** TestCode: **160.1_2540C** Units: **mg/L** Prep Date: **3/24/2009** RunNo: **107417**
Client ID: **PBW** Batch ID: **54245** TestNo: **SM2540C** Analysis Date: **3/24/2009** SeqNo: **1682680**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	ND	10									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104670
Project: Caltrans Dumbarton Bridge, E8435-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 1664_HEM_W

Sample ID: **MB-54301**	SampType: **MBLK**	TestCode: **1664_HEM_**	Units: **mg/L**	Prep Date: **3/27/2009**	RunNo: **107539**
Client ID: **PBW**	Batch ID: **54301**	TestNo: **EPA 1664 _H**		Analysis Date: **3/27/2009**	SeqNo: **1684957**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Oil & Grease	ND	4.0									

Sample ID: **LCS-54301**	SampType: **LCS**	TestCode: **1664_HEM_**	Units: **mg/L**	Prep Date: **3/27/2009**	RunNo: **107539**
Client ID: **LCSW**	Batch ID: **54301**	TestNo: **EPA 1664 _H**		Analysis Date: **3/27/2009**	SeqNo: **1684958**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Oil & Grease	33.900	4.0	40.00	0	84.8	78	114				

Sample ID: **MB-54301-MS**	SampType: **MS**	TestCode: **1664_HEM_**	Units: **mg/L**	Prep Date: **3/27/2009**	RunNo: **107539**
Client ID: **ZZZZZZ**	Batch ID: **54301**	TestNo: **EPA 1664 _H**		Analysis Date: **3/27/2009**	SeqNo: **1684962**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Oil & Grease	36.100	4.0	40.00	0	90.3	78	114				

Sample ID: **MB-54301-MSD**	SampType: **MSD**	TestCode: **1664_HEM_**	Units: **mg/L**	Prep Date: **3/27/2009**	RunNo: **107539**
Client ID: **ZZZZZZ**	Batch ID: **54301**	TestNo: **EPA 1664 _H**		Analysis Date: **3/27/2009**	SeqNo: **1684963**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Oil & Grease	34.800	4.0	40.00	0	87.0	78	114	36.10	3.67	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104670
Project: Caltrans Dumbarton Bridge, E8435-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 335.2_4500CNE_W

Sample ID: **104672-001GDUP**	SampType: **DUP**	TestCode: **335.2_4500C**	Units: **mg/L**	Prep Date: **3/26/2009**	RunNo: **107557**
Client ID: **ZZZZZZ**	Batch ID: **54306**	TestNo: **SM4500-CN E**		Analysis Date: **3/27/2009**	SeqNo: **1685204**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide	ND	0.010						0	0	30	

Sample ID: **104710-004AMS**	SampType: **MS**	TestCode: **335.2_4500C**	Units: **mg/L**	Prep Date: **3/26/2009**	RunNo: **107557**
Client ID: **ZZZZZZ**	Batch ID: **54306**	TestNo: **SM4500-CN E**		Analysis Date: **3/27/2009**	SeqNo: **1685207**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide	0.376	0.010	0.4000	0	94.0	80	120				

Sample ID: **104710-004AMSD**	SampType: **MSD**	TestCode: **335.2_4500C**	Units: **mg/L**	Prep Date: **3/26/2009**	RunNo: **107557**
Client ID: **ZZZZZZ**	Batch ID: **54306**	TestNo: **SM4500-CN E**		Analysis Date: **3/27/2009**	SeqNo: **1685208**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide	0.386	0.010	0.4000	0	96.5	80	120	0.3760	2.62	20	

Sample ID: **LCS-54306**	SampType: **LCS**	TestCode: **335.2_4500C**	Units: **mg/L**	Prep Date: **3/26/2009**	RunNo: **107557**
Client ID: **LCSW**	Batch ID: **54306**	TestNo: **SM4500-CN E**		Analysis Date: **3/27/2009**	SeqNo: **1685209**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide	0.394	0.010	0.4000	0	98.5	80	120				

Sample ID: **MB-54306**	SampType: **MBLK**	TestCode: **335.2_4500C**	Units: **mg/L**	Prep Date: **3/26/2009**	RunNo: **107557**
Client ID: **PBW**	Batch ID: **54306**	TestNo: **SM4500-CN E**		Analysis Date: **3/27/2009**	SeqNo: **1685210**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide	ND	0.010									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104670
Project: Caltrans Dumbarton Bridge, E8435-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 376.2_4500S2_WD

Sample ID: **104670-001HDUP**	SampType: **DUP**	TestCode: **376.2_4500S2**	Units: **mg/L**	Prep Date: **3/25/2009**	RunNo: **107551**
Client ID: **E10BGW**	Batch ID: **R107551**	TestNo: **SM4500-S= D**		Analysis Date: **3/25/2009**	SeqNo: **1685133**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfide	ND	0.010						0.005000	0	30	

Sample ID: **104670-001HMS**	SampType: **MS**	TestCode: **376.2_4500S2**	Units: **mg/L**	Prep Date: **3/25/2009**	RunNo: **107551**
Client ID: **E10BGW**	Batch ID: **R107551**	TestNo: **SM4500-S= D**		Analysis Date: **3/25/2009**	SeqNo: **1685134**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfide	0.984	0.010	1.000	0.005000	97.9	70	120				

Sample ID: **104670-001HMSD**	SampType: **MSD**	TestCode: **376.2_4500S2**	Units: **mg/L**	Prep Date: **3/25/2009**	RunNo: **107551**
Client ID: **E10BGW**	Batch ID: **R107551**	TestNo: **SM4500-S= D**		Analysis Date: **3/25/2009**	SeqNo: **1685135**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfide	0.986	0.010	1.000	0.005000	98.1	70	120	0.9840	0.203	20	

Sample ID: **LCS-R107551**	SampType: **LCS**	TestCode: **376.2_4500S2**	Units: **mg/L**	Prep Date: **3/25/2009**	RunNo: **107551**
Client ID: **LCSW**	Batch ID: **R107551**	TestNo: **SM4500-S= D**		Analysis Date: **3/25/2009**	SeqNo: **1685138**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfide	0.985	0.010	1.000	0	98.5	80	120				

Sample ID: **MB-R107551**	SampType: **MBLK**	TestCode: **376.2_4500S2**	Units: **mg/L**	Prep Date: **3/25/2009**	RunNo: **107551**
Client ID: **PBW**	Batch ID: **R107551**	TestNo: **SM4500-S= D**		Analysis Date: **3/25/2009**	SeqNo: **1685139**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfide	ND	0.010									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104670
Project: Caltrans Dumbarton Bridge, E8435-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_W

Sample ID: **MB-54177** SampType: **MBLK** TestCode: **6010_W** Units: **mg/L** Prep Date: **3/24/2009** RunNo: **107425**
Client ID: **PBW** Batch ID: **54177** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **3/25/2009** SeqNo: **1682896**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	0.0050									
Arsenic	ND	0.010									
Barium	ND	0.0030									
Beryllium	ND	0.0030									
Cadmium	ND	0.0030									
Chromium	ND	0.0030									
Cobalt	ND	0.0030									
Copper	ND	0.0050									
Lead	ND	0.0050									
Molybdenum	ND	0.0050									
Nickel	ND	0.0050									
Selenium	ND	0.010									
Silver	ND	0.0030									
Thallium	ND	0.015									
Vanadium	ND	0.0030									
Zinc	ND	0.010									

Sample ID: **LCS-54177** SampType: **LCS** TestCode: **6010_W** Units: **mg/L** Prep Date: **3/24/2009** RunNo: **107425**
Client ID: **LCSW** Batch ID: **54177** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **3/25/2009** SeqNo: **1682897**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	1.014	0.0050	1.000	0	101	85	115				
Arsenic	0.993	0.010	1.000	0	99.3	85	115				
Barium	0.999	0.0030	1.000	0	99.9	85	115				
Beryllium	1.006	0.0030	1.000	0	101	85	115				
Cadmium	0.994	0.0030	1.000	0	99.4	85	115				
Chromium	0.908	0.0030	1.000	0	90.8	85	115				
Cobalt	1.002	0.0030	1.000	0	100	85	115				
Copper	1.002	0.0050	1.000	0	100	85	115				
Lead	1.028	0.0050	1.000	0	103	85	115				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104670
Project: Caltrans Dumbarton Bridge, E8435-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_W

Sample ID: **LCS-54177** SampType: **LCS** TestCode: **6010_W** Units: **mg/L** Prep Date: **3/24/2009** RunNo: **107425**
Client ID: **LCSW** Batch ID: **54177** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **3/25/2009** SeqNo: **1682897**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	0.998	0.0050	1.000	0	99.8	85	115				
Nickel	0.978	0.0050	1.000	0	97.8	85	115				
Selenium	0.972	0.010	1.000	0	97.2	85	115				
Silver	0.978	0.0030	1.000	0	97.8	85	115				
Thallium	0.887	0.015	1.000	0	88.7	85	115				
Vanadium	1.012	0.0030	1.000	0	101	85	115				
Zinc	0.989	0.010	1.000	0	98.9	85	115				

Sample ID: **104670-001EDUP** SampType: **DUP** TestCode: **6010_W** Units: **mg/L** Prep Date: **3/24/2009** RunNo: **107425**
Client ID: **E10BGW** Batch ID: **54177** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **3/27/2009** SeqNo: **1685462**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	0.025						0	0	20	
Arsenic	ND	0.050						0	0	20	
Barium	0.293	0.015						0.2893	1.18	20	
Beryllium	ND	0.015						0	0	20	
Cadmium	ND	0.015						0	0	20	
Chromium	0.019	0.015						0.02000	5.82	20	
Cobalt	0.083	0.015						0.08113	2.53	20	
Copper	0.107	0.025						0.1081	1.36	20	
Lead	ND	0.025						0	0	20	
Molybdenum	ND	0.025						0	0	20	
Nickel	0.097	0.025						0.09793	1.25	20	
Selenium	0.041	0.050						0.04471	0	20	
Silver	ND	0.015						0	0	20	
Thallium	ND	0.075						0	0	20	
Vanadium	0.057	0.015						0.05563	1.76	20	
Zinc	0.064	0.050						0.06589	2.68	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104670
Project: Caltrans Dumbarton Bridge, E8435-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_W

Sample ID: **104670-001EMS** SampType: **MS** TestCode: **6010_W** Units: **mg/L** Prep Date: **3/24/2009** RunNo: **107425**
Client ID: **E10BGW** Batch ID: **54177** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **3/27/2009** SeqNo: **1685463**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	2.782	0.025	2.500	0	111	64	130				
Arsenic	2.780	0.050	2.500	0	111	66	128				
Barium	2.807	0.015	2.500	0.2893	101	60	129				
Beryllium	2.539	0.015	2.500	0	102	77	118				
Cadmium	2.589	0.015	2.500	0	104	72	122				
Chromium	2.388	0.015	2.500	0.02000	94.7	77	116				
Cobalt	2.684	0.015	2.500	0.08113	104	66	124				
Copper	3.021	0.025	2.500	0.1081	117	70	130				
Lead	2.418	0.025	2.500	0	96.7	71	121				
Molybdenum	2.635	0.025	2.500	0	105	64	129				
Nickel	2.663	0.025	2.500	0.09793	103	63	125				
Selenium	2.853	0.050	2.500	0.04471	112	73	124				
Silver	2.873	0.015	2.500	0	115	60	138				
Thallium	2.177	0.075	2.500	0	87.1	66	125				
Vanadium	2.642	0.015	2.500	0.05563	103	79	118				
Zinc	2.723	0.050	2.500	0.06589	106	71	120				

Sample ID: **104670-001EMSD** SampType: **MSD** TestCode: **6010_W** Units: **mg/L** Prep Date: **3/24/2009** RunNo: **107425**
Client ID: **E10BGW** Batch ID: **54177** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **3/27/2009** SeqNo: **1685464**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	2.878	0.025	2.500	0	115	64	130	2.782	3.38	20	
Arsenic	2.888	0.050	2.500	0	116	66	128	2.780	3.81	20	
Barium	2.893	0.015	2.500	0.2893	104	60	129	2.807	3.05	20	
Beryllium	2.622	0.015	2.500	0	105	77	118	2.539	3.21	20	
Cadmium	2.650	0.015	2.500	0	106	72	122	2.589	2.33	20	
Chromium	2.465	0.015	2.500	0.02000	97.8	77	116	2.388	3.17	20	
Cobalt	2.760	0.015	2.500	0.08113	107	66	124	2.684	2.82	20	
Copper	3.138	0.025	2.500	0.1081	121	70	130	3.021	3.82	20	
Lead	2.444	0.025	2.500	0	97.8	71	121	2.418	1.09	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104670
Project: Caltrans Dumbarton Bridge, E8435-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_W

Sample ID: **104670-001EMSD** SampType: **MSD** TestCode: **6010_W** Units: **mg/L** Prep Date: **3/24/2009** RunNo: **107425**
Client ID: **E10BGW** Batch ID: **54177** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **3/27/2009** SeqNo: **1685464**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	2.722	0.025	2.500	0	109	64	129	2.635	3.26	20	
Nickel	2.728	0.025	2.500	0.09793	105	63	125	2.663	2.42	20	
Selenium	2.917	0.050	2.500	0.04471	115	73	124	2.853	2.23	20	
Silver	2.984	0.015	2.500	0	119	60	138	2.873	3.80	20	
Thallium	2.244	0.075	2.500	0	89.7	66	125	2.177	3.00	20	
Vanadium	2.725	0.015	2.500	0.05563	107	79	118	2.642	3.12	20	
Zinc	2.778	0.050	2.500	0.06589	108	71	120	2.723	1.98	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104670
Project: Caltrans Dumbarton Bridge, E8435-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 7470_W

Sample ID: **MB-54176**	SampType: **MBLK**	TestCode: **7470_W**	Units: **µg/L**	Prep Date: **3/24/2009**	RunNo: **107348**
Client ID: **PBW**	Batch ID: **54176**	TestNo: **EPA 7470A**		Analysis Date: **3/24/2009**	SeqNo: **1681496**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.20									

Sample ID: **LCS-54176**	SampType: **LCS**	TestCode: **7470_W**	Units: **µg/L**	Prep Date: **3/24/2009**	RunNo: **107348**
Client ID: **LCSW**	Batch ID: **54176**	TestNo: **EPA 7470A**		Analysis Date: **3/24/2009**	SeqNo: **1681497**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	10.623	0.20	10.00	0	106	85	115				

Sample ID: **104671-001E-MS**	SampType: **MS**	TestCode: **7470_W**	Units: **µg/L**	Prep Date: **3/24/2009**	RunNo: **107348**
Client ID: **ZZZZZZ**	Batch ID: **54176**	TestNo: **EPA 7470A**		Analysis Date: **3/24/2009**	SeqNo: **1681498**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	10.044	0.20	10.00	0	100	70	130				

Sample ID: **104671-001E-MSD**	SampType: **MSD**	TestCode: **7470_W**	Units: **µg/L**	Prep Date: **3/24/2009**	RunNo: **107348**
Client ID: **ZZZZZZ**	Batch ID: **54176**	TestNo: **EPA 7470A**		Analysis Date: **3/24/2009**	SeqNo: **1681499**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	10.254	0.20	10.00	0	103	70	130	10.04	2.07	20	

Sample ID: **104671-001E-DUP**	SampType: **DUP**	TestCode: **7470_W**	Units: **µg/L**	Prep Date: **3/24/2009**	RunNo: **107348**
Client ID: **ZZZZZZ**	Batch ID: **54176**	TestNo: **EPA 7470A**		Analysis Date: **3/24/2009**	SeqNo: **1681501**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.20						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104670
Project: Caltrans Dumbarton Bridge, E8435-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_W_DM_LLSGT

Sample ID: **MB-54132**	SampType: **MBLK**	TestCode: **8015_W_DM_**	Units: **mg/L**	Prep Date: **3/23/2009**	RunNo: **107368**
Client ID: **PBW**	Batch ID: **54132**	TestNo: **EPA 8015B**	**EPA 3510C**	Analysis Date: **3/24/2009**	SeqNo: **1681880**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	ND	0.050									
ORO	ND	0.050									
Surr: p-Terphenyl	0.061		0.08000		76.1	35	131				

Sample ID: **LCS-54132**	SampType: **LCS**	TestCode: **8015_W_DM_**	Units: **mg/L**	Prep Date: **3/23/2009**	RunNo: **107368**
Client ID: **LCSW**	Batch ID: **54132**	TestNo: **EPA 8015B**	**EPA 3510C**	Analysis Date: **3/24/2009**	SeqNo: **1681881**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	0.834	0.050	1.000	0	83.4	42	118				
Surr: p-Terphenyl	0.048		0.08000		59.4	35	131				

Sample ID: **MB-54132MS**	SampType: **MS**	TestCode: **8015_W_DM_**	Units: **mg/L**	Prep Date: **3/23/2009**	RunNo: **107368**
Client ID: **ZZZZZZ**	Batch ID: **54132**	TestNo: **EPA 8015B**	**EPA 3510C**	Analysis Date: **3/24/2009**	SeqNo: **1681882**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	0.796	0.050	1.000	0	79.6	42	118				
Surr: p-Terphenyl	0.047		0.08000		59.3	35	131				

Sample ID: **MB-54132MSD**	SampType: **MSD**	TestCode: **8015_W_DM_**	Units: **mg/L**	Prep Date: **3/23/2009**	RunNo: **107368**
Client ID: **ZZZZZZ**	Batch ID: **54132**	TestNo: **EPA 8015B**	**EPA 3510C**	Analysis Date: **3/24/2009**	SeqNo: **1681883**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	0.779	0.050	1.000	0	77.9	42	118	0.7963	2.14	20	
Surr: p-Terphenyl	0.045		0.08000		55.9	35	131		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104670
Project: Caltrans Dumbarton Bridge, E8435-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_W_GP LL

Sample ID: **I090324LCS1** SampType: **LCS** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107446**
Client ID: **LCSW** Batch ID: **I09VW059** TestNo: **EPA 8015B(M** Analysis Date: **3/25/2009** SeqNo: **1683167**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	0.918	0.050	1.000	0	91.8	69	125				
Surr: Bromofluorobenzene (FID)	107.244		100.0		107	71	130				

Sample ID: **I090324MB1MS** SampType: **MS** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107446**
Client ID: **ZZZZZZ** Batch ID: **I09VW059** TestNo: **EPA 8015B(M** Analysis Date: **3/25/2009** SeqNo: **1683168**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	0.881	0.050	1.000	0	88.1	69	125				
Surr: Bromofluorobenzene (FID)	106.574		100.0		107	71	130				

Sample ID: **I090324MB1MSD** SampType: **MSD** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107446**
Client ID: **ZZZZZZ** Batch ID: **I09VW059** TestNo: **EPA 8015B(M** Analysis Date: **3/25/2009** SeqNo: **1683169**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	0.933	0.050	1.000	0	93.3	69	125	0.8810	5.73	20	
Surr: Bromofluorobenzene (FID)	106.811		100.0		107	71	130		0	0	

Sample ID: **I090324MB1** SampType: **MBLK** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107446**
Client ID: **PBW** Batch ID: **I09VW059** TestNo: **EPA 8015B(M** Analysis Date: **3/25/2009** SeqNo: **1683170**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	ND	0.050									
Surr: Bromofluorobenzene (FID)	103.794		100.0		104	71	130				

Sample ID: **104704-012BDUP** SampType: **DUP** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107446**
Client ID: **ZZZZZZ** Batch ID: **I09VW059** TestNo: **EPA 8015B(M** Analysis Date: **3/25/2009** SeqNo: **1683177**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	ND	0.050						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104670
Project: Caltrans Dumbarton Bridge, E8435-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_W_GP LL

Sample ID: **104704-012BDUP** SampType: **DUP** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107446**
Client ID: **ZZZZZZ** Batch ID: **I09VW059** TestNo: **EPA 8015B(M** Analysis Date: **3/25/2009** SeqNo: **1683177**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Bromofluorobenzene (FID)	99.751		100.0		99.8	71	130		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104670
Project: Caltrans Dumbarton Bridge, E8435-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **A090325LCS1** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107370**
Client ID: **LCSW** Batch ID: **A09VW055** TestNo: **EPA 8260B** Analysis Date: **3/25/2009** SeqNo: **1681894**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	18.000	0.50	20.00	0	90.0	70	130				
Benzene	37.610	0.50	40.00	0	94.0	70	130				
Chlorobenzene	20.210	0.50	20.00	0	101	70	130				
MTBE	18.680	0.50	20.00	0	93.4	70	130				
Toluene	38.430	0.50	40.00	0	96.1	70	130				
Trichloroethene	18.830	0.50	20.00	0	94.2	70	130				
Surr: 1,2-Dichloroethane-d4	21.170		25.00		84.7	70	130				
Surr: 4-Bromofluorobenzene	21.700		25.00		86.8	70	130				
Surr: Dibromofluoromethane	21.360		25.00		85.4	70	130				
Surr: Toluene-d8	23.200		25.00		92.8	70	130				

Sample ID: **A090325MB2MS** SampType: **MS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107370**
Client ID: **ZZZZZZ** Batch ID: **A09VW055** TestNo: **EPA 8260B** Analysis Date: **3/25/2009** SeqNo: **1681895**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	16.710	0.50	20.00	0	83.6	70	130				
Benzene	36.110	0.50	40.00	0	90.3	70	130				
Chlorobenzene	19.150	0.50	20.00	0	95.8	70	130				
Toluene	36.280	0.50	40.00	0	90.7	70	130				
Trichloroethene	17.840	0.50	20.00	0	89.2	70	130				
Surr: 1,2-Dichloroethane-d4	22.120		25.00		88.5	70	130				
Surr: 4-Bromofluorobenzene	22.220		25.00		88.9	70	130				
Surr: Dibromofluoromethane	22.040		25.00		88.2	70	130				
Surr: Toluene-d8	23.270		25.00		93.1	70	130				

Sample ID: **A090325MB2MSD** SampType: **MSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107370**
Client ID: **ZZZZZZ** Batch ID: **A09VW055** TestNo: **EPA 8260B** Analysis Date: **3/25/2009** SeqNo: **1681896**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	16.090	0.50	20.00	0	80.4	70	130	16.71	3.78	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104670
Project: Caltrans Dumbarton Bridge, E8435-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **A090325MB2MSD** SampType: **MSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107370**
Client ID: **ZZZZZZ** Batch ID: **A09VW055** TestNo: **EPA 8260B** Analysis Date: **3/25/2009** SeqNo: **1681896**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	36.800	0.50	40.00	0	92.0	70	130	36.11	1.89	20	
Chlorobenzene	19.230	0.50	20.00	0	96.2	70	130	19.15	0.417	20	
Toluene	36.830	0.50	40.00	0	92.1	70	130	36.28	1.50	20	
Trichloroethene	17.730	0.50	20.00	0	88.6	70	130	17.84	0.618	20	
Surr: 1,2-Dichloroethane-d4	22.390		25.00		89.6	70	130		0	20	
Surr: 4-Bromofluorobenzene	22.020		25.00		88.1	70	130		0	20	
Surr: Dibromofluoromethane	22.210		25.00		88.8	70	130		0	20	
Surr: Toluene-d8	23.490		25.00		94.0	70	130		0	20	

Sample ID: **A090325MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107370**
Client ID: **PBW** Batch ID: **A09VW055** TestNo: **EPA 8260B** Analysis Date: **3/25/2009** SeqNo: **1681897**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	0.50									
1,1,1-Trichloroethane	ND	0.50									
1,1,2,2-Tetrachloroethane	ND	0.50									
1,1,2-Trichloroethane	ND	0.50									
1,1-Dichloroethane	ND	0.50									
1,1-Dichloroethene	ND	0.50									
1,1-Dichloropropene	ND	0.50									
1,2,3-Trichlorobenzene	ND	0.50									
1,2,3-Trichloropropane	ND	0.50									
1,2,4-Trichlorobenzene	ND	0.50									
1,2,4-Trimethylbenzene	ND	0.50									
1,2-Dibromo-3-chloropropane	ND	0.50									
1,2-Dibromoethane	ND	0.50									
1,2-Dichlorobenzene	ND	0.50									
1,2-Dichloroethane	ND	0.50									
1,2-Dichloropropane	ND	0.50									
1,3,5-Trimethylbenzene	ND	0.50									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104670
Project: Caltrans Dumbarton Bridge, E8435-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **A090325MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107370**
Client ID: **PBW** Batch ID: **A09VW055** TestNo: **EPA 8260B** Analysis Date: **3/25/2009** SeqNo: **1681897**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,3-Dichlorobenzene	ND	0.50									
1,3-Dichloropropane	ND	0.50									
1,4-Dichlorobenzene	ND	0.50									
2,2-Dichloropropane	ND	0.50									
2-Chlorotoluene	ND	0.50									
4-Chlorotoluene	ND	0.50									
4-Isopropyltoluene	ND	0.50									
Benzene	ND	0.50									
Bromobenzene	ND	0.50									
Bromodichloromethane	ND	0.50									
Bromoform	ND	0.50									
Bromomethane	ND	0.50									
Carbon tetrachloride	ND	0.50									
Chlorobenzene	ND	0.50									
Chloroethane	ND	0.50									
Chloroform	ND	0.50									
Chloromethane	ND	0.50									
cis-1,2-Dichloroethene	ND	0.50									
cis-1,3-Dichloropropene	ND	0.50									
Dibromochloromethane	ND	0.50									
Dibromomethane	ND	0.50									
Dichlorodifluoromethane	ND	0.50									
Ethylbenzene	ND	0.50									
Hexachlorobutadiene	ND	0.50									
Isopropylbenzene	ND	0.50									
m,p-Xylene	ND	1.0									
Methylene chloride	ND	1.0									
n-Butylbenzene	ND	0.50									
n-Propylbenzene	ND	0.50									
Naphthalene	ND	0.50									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104670
Project: Caltrans Dumbarton Bridge, E8435-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **A090325MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107370**
Client ID: **PBW** Batch ID: **A09VW055** TestNo: **EPA 8260B** Analysis Date: **3/25/2009** SeqNo: **1681897**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
o-Xylene	ND	0.50									
sec-Butylbenzene	ND	0.50									
Styrene	ND	0.50									
tert-Butylbenzene	ND	0.50									
Tetrachloroethene	ND	0.50									
Toluene	ND	0.50									
trans-1,2-Dichloroethene	ND	0.50									
Trichloroethene	ND	0.50									
Trichlorofluoromethane	ND	0.50									
Vinyl chloride	ND	0.50									
Surr: 1,2-Dichloroethane-d4	21.220		25.00		84.9	70	130				
Surr: 4-Bromofluorobenzene	21.340		25.00		85.4	70	130				
Surr: Dibromofluoromethane	22.250		25.00		89.0	70	130				
Surr: Toluene-d8	23.670		25.00		94.7	70	130				

Sample ID: **104670-001A** SampType: **DUP** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107370**
Client ID: **E10BGW** Batch ID: **A09VW055** TestNo: **EPA 8260B** Analysis Date: **3/25/2009** SeqNo: **1682854**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	0.50						0	0	20	
1,1,1-Trichloroethane	ND	0.50						0	0	20	
1,1,2,2-Tetrachloroethane	ND	0.50						0	0	20	
1,1,2-Trichloroethane	ND	0.50						0	0	20	
1,1-Dichloroethane	ND	0.50						0	0	20	
1,1-Dichloroethene	ND	0.50						0	0	20	
1,1-Dichloropropene	ND	0.50						0	0	20	
1,2,3-Trichlorobenzene	ND	0.50						0	0	20	
1,2,3-Trichloropropane	ND	0.50						0	0	20	
1,2,4-Trichlorobenzene	ND	0.50						0	0	20	
1,2,4-Trimethylbenzene	ND	0.50						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104670
Project: Caltrans Dumbarton Bridge, E8435-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **104670-001A** SampType: **DUP** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107370**
Client ID: **E10BGW** Batch ID: **A09VW055** TestNo: **EPA 8260B** Analysis Date: **3/25/2009** SeqNo: **1682854**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2-Dibromo-3-chloropropane	ND	0.50						0	0	20	
1,2-Dibromoethane	ND	0.50						0	0	20	
1,2-Dichlorobenzene	ND	0.50						0	0	20	
1,2-Dichloroethane	ND	0.50						0	0	20	
1,2-Dichloropropane	ND	0.50						0	0	20	
1,3,5-Trimethylbenzene	ND	0.50						0	0	20	
1,3-Dichlorobenzene	ND	0.50						0	0	20	
1,3-Dichloropropane	ND	0.50						0	0	20	
1,4-Dichlorobenzene	ND	0.50						0	0	20	
2,2-Dichloropropane	ND	0.50						0	0	20	
2-Chlorotoluene	ND	0.50						0	0	20	
4-Chlorotoluene	ND	0.50						0	0	20	
4-Isopropyltoluene	ND	0.50						0	0	20	
Benzene	ND	0.50						0	0	20	
Bromobenzene	ND	0.50						0	0	20	
Bromodichloromethane	ND	0.50						0	0	20	
Bromoform	ND	0.50						0	0	20	
Bromomethane	ND	0.50						0	0	20	
Carbon tetrachloride	ND	0.50						0	0	20	
Chlorobenzene	ND	0.50						0	0	20	
Chloroethane	ND	0.50						0	0	20	
Chloroform	ND	0.50						0	0	20	
Chloromethane	ND	0.50						0	0	20	
cis-1,2-Dichloroethene	ND	0.50						0	0	20	
cis-1,3-Dichloropropene	ND	0.50						0	0	20	
Dibromochloromethane	ND	0.50						0	0	20	
Dibromomethane	ND	0.50						0	0	20	
Dichlorodifluoromethane	ND	0.50						0	0	20	
Ethylbenzene	ND	0.50						0	0	20	
Hexachlorobutadiene	ND	0.50						0	0	20	

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike/Surrogate outside of limits due to matrix interference
- DO Surrogate Diluted Out

Calculations are based on raw values

CLIENT: Geocon Consultants, Inc.
Work Order: 104670
Project: Caltrans Dumbarton Bridge, E8435-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **104670-001A** SampType: **DUP** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107370**
Client ID: **E10BGW** Batch ID: **A09VW055** TestNo: **EPA 8260B** Analysis Date: **3/25/2009** SeqNo: **1682854**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Isopropylbenzene	ND	0.50						0	0	20	
m,p-Xylene	ND	1.0						0	0	20	
Methylene chloride	ND	1.0						0	0	20	
n-Butylbenzene	ND	0.50						0	0	20	
n-Propylbenzene	ND	0.50						0	0	20	
Naphthalene	ND	0.50						0	0	20	
o-Xylene	ND	0.50						0	0	20	
sec-Butylbenzene	ND	0.50						0	0	20	
Styrene	ND	0.50						0	0	20	
tert-Butylbenzene	ND	0.50						0	0	20	
Tetrachloroethene	ND	0.50						0	0	20	
Toluene	ND	0.50						0	0	20	
trans-1,2-Dichloroethene	ND	0.50						0	0	20	
Trichloroethene	ND	0.50						0	0	20	
Trichlorofluoromethane	ND	0.50						0	0	20	
Vinyl chloride	ND	0.50						0	0	20	
Surr: 1,2-Dichloroethane-d4	22.230		25.00		88.9	70	130		0	0	
Surr: 4-Bromofluorobenzene	18.050		25.00		72.2	70	130		0	0	
Surr: Dibromofluoromethane	22.230		25.00		88.9	70	130		0	0	
Surr: Toluene-d8	21.510		25.00		86.0	70	130		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104670
Project: Caltrans Dumbarton Bridge, E8435-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_W_FULL

Sample ID: **MB-54166** SampType: **MBLK** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **3/24/2009** RunNo: **107376**
Client ID: **PBW** Batch ID: **54166** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **3/24/2009** SeqNo: **1681962**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	10									
1,2-Dichlorobenzene	ND	10									
1,3-Dichlorobenzene	ND	10									
1,4-Dichlorobenzene	ND	10									
2,4,5-Trichlorophenol	ND	10									
2,4,6-Trichlorophenol	ND	10									
2,4-Dichlorophenol	ND	10									
2,4-Dimethylphenol	ND	10									
2,4-Dinitrophenol	ND	50									
2,4-Dinitrotoluene	ND	10									
2,6-Dinitrotoluene	ND	10									
2-Chloronaphthalene	ND	10									
2-Chlorophenol	ND	10									
2-Methylnaphthalene	ND	10									
2-Methylphenol	ND	10									
2-Nitroaniline	ND	50									
2-Nitrophenol	ND	10									
3,3´-Dichlorobenzidine	ND	20									
3-Nitroaniline	ND	50									
4,6-Dinitro-2-methylphenol	ND	50									
4-Bromophenyl-phenylether	ND	10									
4-Chloro-3-methylphenol	ND	50									
4-Chloroaniline	ND	20									
4-Chlorophenyl-phenylether	ND	10									
4-Methylphenol	ND	10									
4-Nitroaniline	ND	20									
4-Nitrophenol	ND	50									
Acenaphthene	ND	10									
Acenaphthylene	ND	10									
Anthracene	ND	10									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104670
Project: Caltrans Dumbarton Bridge, E8435-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_W_FULL

Sample ID: **MB-54166** SampType: **MBLK** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **3/24/2009** RunNo: **107376**
Client ID: **PBW** Batch ID: **54166** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **3/24/2009** SeqNo: **1681962**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzidine (M)	ND	50									
Benzo(a)anthracene	ND	10									
Benzo(a)pyrene	ND	10									
Benzo(b)fluoranthene	ND	10									
Benzo(g,h,i)perylene	ND	10									
Benzo(k)fluoranthene	ND	10									
Benzoic acid	ND	50									
Benzyl alcohol	ND	20									
Bis(2-chloroethoxy)methane	ND	10									
Bis(2-chloroethyl)ether	ND	10									
Bis(2-chloroisopropyl)ether	ND	10									
Bis(2-ethylhexyl)phthalate	ND	10									
Butylbenzylphthalate	ND	10									
Chrysene	ND	10									
Di-n-butylphthalate	ND	10									
Di-n-octylphthalate	5.740	10									
Dibenz(a,h)anthracene	ND	10									
Dibenzofuran	ND	10									
Diethylphthalate	ND	10									
Dimethylphthalate	ND	10									
Fluoranthene	ND	10									
Fluorene	ND	10									
Hexachlorobenzene	ND	10									
Hexachlorobutadiene	ND	20									
Hexachlorocyclopentadiene	ND	10									
Hexachloroethane	ND	10									
Indeno(1,2,3-cd)pyrene	ND	10									
Isophorone	ND	10									
N-Nitrosodi-n-propylamine	ND	10									
N-Nitrosodiphenylamine	ND	10									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104670
Project: Caltrans Dumbarton Bridge, E8435-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_W_FULL

Sample ID: **MB-54166** SampType: **MBLK** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **3/24/2009** RunNo: **107376**
Client ID: **PBW** Batch ID: **54166** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **3/24/2009** SeqNo: **1681962**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	10									
Nitrobenzene	ND	10									
Pentachlorophenol	ND	50									
Phenanthrene	ND	10									
Phenol	ND	10									
Pyrene	ND	10									
Surr: 1,2-Dichlorobenzene-d4	73.410		100.0		73.4	42	98				
Surr: 2,4,6-Tribromophenol	90.220		100.0		90.2	60	128				
Surr: 2-Chlorophenol-d4	74.010		100.0		74.0	43	102				
Surr: 2-Fluorobiphenyl	86.200		100.0		86.2	50	108				
Surr: 2-Fluorophenol	44.070		100.0		44.1	22	69				
Surr: 4-Terphenyl-d14	113.710		100.0		114	66	130				
Surr: Nitrobenzene-d5	81.810		100.0		81.8	47	117				
Surr: Phenol-d5	30.270		100.0		30.3	16	50				

Sample ID: **LCS-54166** SampType: **LCS** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **3/24/2009** RunNo: **107376**
Client ID: **LCSW** Batch ID: **54166** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **3/24/2009** SeqNo: **1681963**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	77.690	10	100.0	0	77.7	54	110				
1,4-Dichlorobenzene	69.200	10	100.0	0	69.2	48	103				
2,4-Dinitrotoluene	100.870	10	100.0	0	101	69	136				
2-Chlorophenol	74.030	10	100.0	0	74.0	53	100				
4-Chloro-3-methylphenol	97.020	50	100.0	0	97.0	70	124				
4-Nitrophenol	45.380	50	100.0	0	45.4	32	69				
Acenaphthene	92.390	10	100.0	0	92.4	64	118				
N-Nitrosodi-n-propylamine	88.510	10	100.0	0	88.5	62	130				
Pentachlorophenol	90.260	50	100.0	0	90.3	64	130				
Phenol	32.980	10	100.0	0	33.0	25	50				
Pyrene	98.570	10	100.0	0	98.6	66	123				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104670
Project: Caltrans Dumbarton Bridge, E8435-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_W_FULL

Sample ID: **LCS-54166** SampType: **LCS** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **3/24/2009** RunNo: **107376**
Client ID: **LCSW** Batch ID: **54166** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **3/24/2009** SeqNo: **1681963**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 1,2-Dichlorobenzene-d4	68.740		100.0		68.7	42	98				
Surr: 2,4,6-Tribromophenol	100.260		100.0		100	60	128				
Surr: 2-Chlorophenol-d4	70.600		100.0		70.6	43	102				
Surr: 2-Fluorobiphenyl	86.200		100.0		86.2	50	108				
Surr: 2-Fluorophenol	43.020		100.0		43.0	22	69				
Surr: 4-Terphenyl-d14	99.980		100.0		100	66	130				
Surr: Nitrobenzene-d5	79.360		100.0		79.4	47	117				
Surr: Phenol-d5	30.370		100.0		30.4	16	50				

Sample ID: **MB-54166MS** SampType: **MS** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **3/24/2009** RunNo: **107376**
Client ID: **ZZZZZZ** Batch ID: **54166** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **3/24/2009** SeqNo: **1681964**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	81.950	10	100.0	0	82.0	54	110				
1,4-Dichlorobenzene	72.760	10	100.0	0	72.8	48	103				
2,4-Dinitrotoluene	102.350	10	100.0	0	102	69	136				
2-Chlorophenol	79.790	10	100.0	0	79.8	53	100				
4-Chloro-3-methylphenol	98.240	50	100.0	0	98.2	70	124				
4-Nitrophenol	45.840	50	100.0	0	45.8	32	69				
Acenaphthene	94.310	10	100.0	0	94.3	64	118				
N-Nitrosodi-n-propylamine	93.950	10	100.0	0	94.0	62	130				
Pentachlorophenol	94.370	50	100.0	0	94.4	64	130				
Phenol	35.000	10	100.0	0	35.0	25	50				
Pyrene	98.890	10	100.0	0	98.9	66	123				
Surr: 1,2-Dichlorobenzene-d4	72.030		100.0		72.0	42	98				
Surr: 2,4,6-Tribromophenol	100.850		100.0		101	60	128				
Surr: 2-Chlorophenol-d4	74.980		100.0		75.0	43	102				
Surr: 2-Fluorobiphenyl	87.830		100.0		87.8	50	108				
Surr: 2-Fluorophenol	44.110		100.0		44.1	22	69				
Surr: 4-Terphenyl-d14	99.670		100.0		99.7	66	130				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104670
Project: Caltrans Dumbarton Bridge, E8435-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_W_FULL

Sample ID: **MB-54166MS**	SampType: **MS**	TestCode: **8270_W_FUL**	Units: **µg/L**	Prep Date: **3/24/2009**	RunNo: **107376**
Client ID: **ZZZZZZ**	Batch ID: **54166**	TestNo: **EPA 8270C**	**EPA 3510C**	Analysis Date: **3/24/2009**	SeqNo: **1681964**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	83.520		100.0		83.5	47	117				
Surr: Phenol-d5	31.470		100.0		31.5	16	50				

Sample ID: **MB-54166MSD**	SampType: **MSD**	TestCode: **8270_W_FUL**	Units: **µg/L**	Prep Date: **3/24/2009**	RunNo: **107376**
Client ID: **ZZZZZZ**	Batch ID: **54166**	TestNo: **EPA 8270C**	**EPA 3510C**	Analysis Date: **3/24/2009**	SeqNo: **1681965**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	73.880	10	100.0	0	73.9	54	110	81.95	10.4	20	
1,4-Dichlorobenzene	61.770	10	100.0	0	61.8	48	103	72.76	16.3	20	
2,4-Dinitrotoluene	106.240	10	100.0	0	106	69	136	102.4	3.73	20	
2-Chlorophenol	79.410	10	100.0	0	79.4	53	100	79.79	0.477	20	
4-Chloro-3-methylphenol	101.520	50	100.0	0	102	70	124	98.24	3.28	20	
4-Nitrophenol	48.930	50	100.0	0	48.9	32	69	45.84	0	20	
Acenaphthene	95.950	10	100.0	0	96.0	64	118	94.31	1.72	20	
N-Nitrosodi-n-propylamine	94.740	10	100.0	0	94.7	62	130	93.95	0.837	20	
Pentachlorophenol	97.610	50	100.0	0	97.6	64	130	94.37	3.38	20	
Phenol	35.850	10	100.0	0	35.8	25	50	35.00	2.40	20	
Pyrene	104.480	10	100.0	0	104	66	123	98.89	5.50	20	
Surr: 1,2-Dichlorobenzene-d4	69.160		100.0		69.2	42	98		0	0	
Surr: 2,4,6-Tribromophenol	102.850		100.0		103	60	128		0	0	
Surr: 2-Chlorophenol-d4	73.820		100.0		73.8	43	102		0	0	
Surr: 2-Fluorobiphenyl	88.680		100.0		88.7	50	108		0	0	
Surr: 2-Fluorophenol	44.970		100.0		45.0	22	69		0	0	
Surr: 4-Terphenyl-d14	102.500		100.0		103	66	130		0	0	
Surr: Nitrobenzene-d5	82.080		100.0		82.1	47	117		0	0	
Surr: Phenol-d5	32.180		100.0		32.2	16	50		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#:

Logged By: Date: 3/21/09

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: GSO

Sample Condition Upon Receipt: 3.4
1. CHILLED Y☑ N☐ 4. SEALED Y☐ N☑
2. HEADSPACE (VOA) Y☑ N☐ 5. # OF SPLS MATCH COC Y☑ N☐
3. CONTAINER INTACT Y☑ N☐ 6. PRESERVED Y☑ N☐

Client: Geocon Consultants, Inc.
Attn: John Love
Address: 6671 Brisa St.
City Livermore State CA Zip Code 94550
TEL: (925) 371-5900
FAX: (925) 371-5915

Project Name: Caltrans Dumbarton Bridge
Project #: E8435-06-01
Sampler: (Printed Name) John Love (Signature)

Relinquished by: (Signature and Printed Name) John Love Date: 3/20/09 Time: 16:00 Received by: (Signature and Printed Name) Date: 3/21/09 Time: 8:30
Relinquished by: (Signature and Printed Name) Date: Time: Received by: (Signature and Printed Name) Date: Time:
Relinquished by: (Signature and Printed Name) Date: Time: Received by: (Signature and Printed Name) Date: Time:

I hereby authorize ATL to perform the work indicated below.
Project Mgr /Submitter: John Love 3/20/09 (Print Name / Date)
Signature

Send Report To:
Attn:
Co: same as above
Address
City State Zip

Bill To:
Attn:
Co: same as above
Address
City State Zip

Special Instructions/Comments:
Metals sample was field filtered
Select clean up

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (SVOCs)	6010B (Total Metal)	8015B (GRO)	8015B (DRO) + TPH/mo w/ silica gel	8021 (BTEX)	TITLE 22 / CAM 17 (6010/7000)	TDS	Oil & Grease	Cyanide	Dissolved Sulfide	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	104670-001	E10BGW	3/19/09	10:15			X															E	3	VG	H	
						X																	1	LG		
								X															2	VG	H	
									X														1	LG		
										X													1	PP	N	
											X												1	PP		
												X											1	JG	H	
													X										1	PP	O	
														X									1	PP	O	+AlCl3
	↓	Trip Blank (E10BGW)	3/19/09	16:00			X		X													↓	2	VG	H	

- TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=Hcl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

QA/QC: RTNE ☐ CT ☐ SWRCB ☐ Logcode OTHER

DISTRIBUTION: White with report, Yellow to folder, Pink to submitter.

March 31, 2009

John Love
Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550

TEL: (925) 525-4142
FAX: (925) 371-5915

ELAP No.: 1838
NELAP No.: 02107CA
NEVADA.: CA-401
CSDLAC No.: 10196

Workorder No.: 104671

RE: Caltrans Dumbarton Bridge, E8435-06-18

Attention: John Love

Enclosed are the results for sample(s) received on March 21, 2009 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter and the case narrative are an integral part of this analytical report and cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Project: Caltrans Dumbarton Bridge, E8435-06-18
Lab Order: 104671

CASE NARRATIVE

Analytical Comments for Method 6010

Dilution was necessary for sample 104671-001E, due to sample matrix.

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E20AGW
Lab Order:	104671	**Collection Date:**	3/19/2009 1:05:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104671-001A		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS11_090325A QC Batch: A09VW055 PrepDate: Analyst: **SLL**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	3/25/2009 06:05 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	3/25/2009 06:05 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	3/25/2009 06:05 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	3/25/2009 06:05 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	3/25/2009 06:05 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	3/25/2009 06:05 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	3/25/2009 06:05 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	3/25/2009 06:05 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	3/25/2009 06:05 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	3/25/2009 06:05 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	3/25/2009 06:05 PM
1,2-Dibromo-3-chloropropane	ND	0.50		µg/L	1	3/25/2009 06:05 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	3/25/2009 06:05 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	3/25/2009 06:05 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	3/25/2009 06:05 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	3/25/2009 06:05 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	3/25/2009 06:05 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	3/25/2009 06:05 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	3/25/2009 06:05 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	3/25/2009 06:05 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	3/25/2009 06:05 PM
2-Chlorotoluene	ND	0.50		µg/L	1	3/25/2009 06:05 PM
4-Chlorotoluene	ND	0.50		µg/L	1	3/25/2009 06:05 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	3/25/2009 06:05 PM
Benzene	ND	0.50		µg/L	1	3/25/2009 06:05 PM
Bromobenzene	ND	0.50		µg/L	1	3/25/2009 06:05 PM
Bromodichloromethane	ND	0.50		µg/L	1	3/25/2009 06:05 PM
Bromoform	ND	0.50		µg/L	1	3/25/2009 06:05 PM
Bromomethane	ND	0.50		µg/L	1	3/25/2009 06:05 PM
Carbon tetrachloride	ND	0.50		µg/L	1	3/25/2009 06:05 PM
Chlorobenzene	ND	0.50		µg/L	1	3/25/2009 06:05 PM
Chloroethane	ND	0.50		µg/L	1	3/25/2009 06:05 PM
Chloroform	ND	0.50		µg/L	1	3/25/2009 06:05 PM
Chloromethane	ND	0.50		µg/L	1	3/25/2009 06:05 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	3/25/2009 06:05 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E20AGW
Lab Order:	104671	**Collection Date:**	3/19/2009 1:05:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104671-001A		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS11_090325A QC Batch: A09VW055 PrepDate: Analyst: **SLL**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
cis-1,3-Dichloropropene	ND	0.50		µg/L	1	3/25/2009 06:05 PM
Dibromochloromethane	ND	0.50		µg/L	1	3/25/2009 06:05 PM
Dibromomethane	ND	0.50		µg/L	1	3/25/2009 06:05 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	3/25/2009 06:05 PM
Ethylbenzene	ND	0.50		µg/L	1	3/25/2009 06:05 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	3/25/2009 06:05 PM
Isopropylbenzene	ND	0.50		µg/L	1	3/25/2009 06:05 PM
m,p-Xylene	ND	1.0		µg/L	1	3/25/2009 06:05 PM
Methylene chloride	ND	1.0		µg/L	1	3/25/2009 06:05 PM
n-Butylbenzene	ND	0.50		µg/L	1	3/25/2009 06:05 PM
n-Propylbenzene	ND	0.50		µg/L	1	3/25/2009 06:05 PM
Naphthalene	ND	0.50		µg/L	1	3/25/2009 06:05 PM
o-Xylene	ND	0.50		µg/L	1	3/25/2009 06:05 PM
sec-Butylbenzene	ND	0.50		µg/L	1	3/25/2009 06:05 PM
Styrene	ND	0.50		µg/L	1	3/25/2009 06:05 PM
tert-Butylbenzene	ND	0.50		µg/L	1	3/25/2009 06:05 PM
Tetrachloroethene	ND	0.50		µg/L	1	3/25/2009 06:05 PM
Toluene	ND	0.50		µg/L	1	3/25/2009 06:05 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	3/25/2009 06:05 PM
Trichloroethene	ND	0.50		µg/L	1	3/25/2009 06:05 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	3/25/2009 06:05 PM
Vinyl chloride	ND	0.50		µg/L	1	3/25/2009 06:05 PM
Surr: 1,2-Dichloroethane-d4	85.0	70-130		%REC	1	3/25/2009 06:05 PM
Surr: 4-Bromofluorobenzene	81.2	70-130		%REC	1	3/25/2009 06:05 PM
Surr: Dibromofluoromethane	88.0	70-130		%REC	1	3/25/2009 06:05 PM
Surr: Toluene-d8	91.1	70-130		%REC	1	3/25/2009 06:05 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E20AGW
Lab Order:	104671	**Collection Date:**	3/19/2009 1:05:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104671-001B		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
GASOLINE RANGE ORGANICS BY GC/FID						
		EPA 8015B(M)				
RunID: GC6_090325A	QC Batch: I09VW059			PrepDate:		Analyst: **BD**
GRO	ND	0.050		mg/L	1	3/26/2009 12:16 AM
Surr: Bromofluorobenzene (FID)	97.2	71-130		%REC	1	3/26/2009 12:16 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E20AGW
Lab Order:	104671	**Collection Date:**	3/19/2009 1:05:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104671-001C		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3510C **EPA 8270C**

RunID: MS 13_090324B QC Batch: 54166 PrepDate: 3/24/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,2,4-Trichlorobenzene	ND	10		µg/L	1	3/25/2009 01:26 PM
1,2-Dichlorobenzene	ND	10		µg/L	1	3/25/2009 01:26 PM
1,3-Dichlorobenzene	ND	10		µg/L	1	3/25/2009 01:26 PM
1,4-Dichlorobenzene	ND	10		µg/L	1	3/25/2009 01:26 PM
2,4,5-Trichlorophenol	ND	10		µg/L	1	3/25/2009 01:26 PM
2,4,6-Trichlorophenol	ND	10		µg/L	1	3/25/2009 01:26 PM
2,4-Dichlorophenol	ND	10		µg/L	1	3/25/2009 01:26 PM
2,4-Dimethylphenol	ND	10		µg/L	1	3/25/2009 01:26 PM
2,4-Dinitrophenol	ND	50		µg/L	1	3/25/2009 01:26 PM
2,4-Dinitrotoluene	ND	10		µg/L	1	3/25/2009 01:26 PM
2,6-Dinitrotoluene	ND	10		µg/L	1	3/25/2009 01:26 PM
2-Chloronaphthalene	ND	10		µg/L	1	3/25/2009 01:26 PM
2-Chlorophenol	ND	10		µg/L	1	3/25/2009 01:26 PM
2-Methylnaphthalene	ND	10		µg/L	1	3/25/2009 01:26 PM
2-Methylphenol	ND	10		µg/L	1	3/25/2009 01:26 PM
2-Nitroaniline	ND	50		µg/L	1	3/25/2009 01:26 PM
2-Nitrophenol	ND	10		µg/L	1	3/25/2009 01:26 PM
3,3´-Dichlorobenzidine	ND	20		µg/L	1	3/25/2009 01:26 PM
3-Nitroaniline	ND	50		µg/L	1	3/25/2009 01:26 PM
4,6-Dinitro-2-methylphenol	ND	50		µg/L	1	3/25/2009 01:26 PM
4-Bromophenyl-phenylether	ND	10		µg/L	1	3/25/2009 01:26 PM
4-Chloro-3-methylphenol	ND	50		µg/L	1	3/25/2009 01:26 PM
4-Chloroaniline	ND	20		µg/L	1	3/25/2009 01:26 PM
4-Chlorophenyl-phenylether	ND	10		µg/L	1	3/25/2009 01:26 PM
4-Methylphenol	ND	10		µg/L	1	3/25/2009 01:26 PM
4-Nitroaniline	ND	20		µg/L	1	3/25/2009 01:26 PM
4-Nitrophenol	ND	50		µg/L	1	3/25/2009 01:26 PM
Acenaphthene	ND	10		µg/L	1	3/25/2009 01:26 PM
Acenaphthylene	ND	10		µg/L	1	3/25/2009 01:26 PM
Anthracene	ND	10		µg/L	1	3/25/2009 01:26 PM
Benzidine (M)	ND	50		µg/L	1	3/25/2009 01:26 PM
Benzo(a)anthracene	ND	10		µg/L	1	3/25/2009 01:26 PM
Benzo(a)pyrene	ND	10		µg/L	1	3/25/2009 01:26 PM
Benzo(b)fluoranthene	ND	10		µg/L	1	3/25/2009 01:26 PM
Benzo(g,h,i)perylene	ND	10		µg/L	1	3/25/2009 01:26 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E20AGW
Lab Order:	104671	**Collection Date:**	3/19/2009 1:05:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104671-001C		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3510C **EPA 8270C**

RunID: MS 13_090324B QC Batch: 54166 PrepDate: 3/24/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Benzo(k)fluoranthene	ND	10		µg/L	1	3/25/2009 01:26 PM
Benzoic acid	ND	50		µg/L	1	3/25/2009 01:26 PM
Benzyl alcohol	ND	20		µg/L	1	3/25/2009 01:26 PM
Bis(2-chloroethoxy)methane	ND	10		µg/L	1	3/25/2009 01:26 PM
Bis(2-chloroethyl)ether	ND	10		µg/L	1	3/25/2009 01:26 PM
Bis(2-chloroisopropyl)ether	ND	10		µg/L	1	3/25/2009 01:26 PM
Bis(2-ethylhexyl)phthalate	ND	10		µg/L	1	3/25/2009 01:26 PM
Butylbenzylphthalate	ND	10		µg/L	1	3/25/2009 01:26 PM
Chrysene	ND	10		µg/L	1	3/25/2009 01:26 PM
Di-n-butylphthalate	ND	10		µg/L	1	3/25/2009 01:26 PM
Di-n-octylphthalate	ND	10		µg/L	1	3/25/2009 01:26 PM
Dibenz(a,h)anthracene	ND	10		µg/L	1	3/25/2009 01:26 PM
Dibenzofuran	ND	10		µg/L	1	3/25/2009 01:26 PM
Diethylphthalate	ND	10		µg/L	1	3/25/2009 01:26 PM
Dimethylphthalate	ND	10		µg/L	1	3/25/2009 01:26 PM
Fluoranthene	ND	10		µg/L	1	3/25/2009 01:26 PM
Fluorene	ND	10		µg/L	1	3/25/2009 01:26 PM
Hexachlorobenzene	ND	10		µg/L	1	3/25/2009 01:26 PM
Hexachlorobutadiene	ND	20		µg/L	1	3/25/2009 01:26 PM
Hexachlorocyclopentadiene	ND	10		µg/L	1	3/25/2009 01:26 PM
Hexachloroethane	ND	10		µg/L	1	3/25/2009 01:26 PM
Indeno(1,2,3-cd)pyrene	ND	10		µg/L	1	3/25/2009 01:26 PM
Isophorone	ND	10		µg/L	1	3/25/2009 01:26 PM
N-Nitrosodi-n-propylamine	ND	10		µg/L	1	3/25/2009 01:26 PM
N-Nitrosodiphenylamine	ND	10		µg/L	1	3/25/2009 01:26 PM
Naphthalene	ND	10		µg/L	1	3/25/2009 01:26 PM
Nitrobenzene	ND	10		µg/L	1	3/25/2009 01:26 PM
Pentachlorophenol	ND	50		µg/L	1	3/25/2009 01:26 PM
Phenanthrene	ND	10		µg/L	1	3/25/2009 01:26 PM
Phenol	ND	10		µg/L	1	3/25/2009 01:26 PM
Pyrene	ND	10		µg/L	1	3/25/2009 01:26 PM
Surr: 1,2-Dichlorobenzene-d4	75.1	42-98		%REC	1	3/25/2009 01:26 PM
Surr: 2,4,6-Tribromophenol	107	60-128		%REC	1	3/25/2009 01:26 PM
Surr: 2-Chlorophenol-d4	77.4	43-102		%REC	1	3/25/2009 01:26 PM
Surr: 2-Fluorobiphenyl	93.3	50-108		%REC	1	3/25/2009 01:26 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E20AGW
Lab Order:	104671	**Collection Date:**	3/19/2009 1:05:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104671-001C		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 3510C				**EPA 8270C**		
RunID: MS 13_090324B	QC Batch: 54166			PrepDate: 3/24/2009	Analyst: **DMP**	
Surr: 2-Fluorophenol	46.6	22-69		%REC	1	3/25/2009 01:26 PM
Surr: 4-Terphenyl-d14	114	66-130		%REC	1	3/25/2009 01:26 PM
Surr: Nitrobenzene-d5	85.5	47-117		%REC	1	3/25/2009 01:26 PM
Surr: Phenol-d5	33.3	16-50		%REC	1	3/25/2009 01:26 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E20AGW
Lab Order:	104671	**Collection Date:**	3/19/2009 1:05:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104671-001D		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
EPA 3510C				**EPA 8015B**		
RunID: GC16_090324C	QC Batch: 54132			PrepDate: 3/23/2009	Analyst: **CBR**	
DRO	0.27	0.050		mg/L	1	3/24/2009 05:06 PM
ORO	0.094	0.050		mg/L	1	3/24/2009 05:06 PM
Surr: p-Terphenyl	103	35-131		%REC	1	3/24/2009 05:06 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E20AGW
Lab Order:	104671	**Collection Date:**	3/19/2009 1:05:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104671-001E		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3010A			**EPA 6010B**		
RunID: ICP8_090325E	QC Batch: 54177			PrepDate:	3/24/2009	Analyst: **CL**
Antimony	ND	0.025		mg/L	5	3/27/2009 05:46 PM
Arsenic	ND	0.050		mg/L	5	3/27/2009 05:46 PM
Barium	0.19	0.015		mg/L	5	3/27/2009 05:46 PM
Beryllium	ND	0.015		mg/L	5	3/27/2009 05:46 PM
Cadmium	ND	0.015		mg/L	5	3/27/2009 05:46 PM
Chromium	ND	0.015		mg/L	5	3/27/2009 05:46 PM
Cobalt	ND	0.015		mg/L	5	3/27/2009 05:46 PM
Copper	ND	0.025		mg/L	5	3/27/2009 05:46 PM
Lead	ND	0.025		mg/L	5	3/27/2009 05:46 PM
Molybdenum	ND	0.025		mg/L	5	3/27/2009 05:46 PM
Nickel	ND	0.025		mg/L	5	3/27/2009 05:46 PM
Selenium	ND	0.050		mg/L	5	3/27/2009 05:46 PM
Silver	ND	0.015		mg/L	5	3/27/2009 05:46 PM
Thallium	ND	0.075		mg/L	5	3/27/2009 05:46 PM
Vanadium	ND	0.015		mg/L	5	3/27/2009 05:46 PM
Zinc	ND	0.050		mg/L	5	3/27/2009 05:46 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7470A		
RunID: AA1_090324E	QC Batch: 54176			PrepDate:	3/24/2009	Analyst: **RQ**
Mercury	ND	0.20		µg/L	1	3/24/2009 05:26 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range	
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit	
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified	
	DO	Surrogate Diluted Out			

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E20AGW
Lab Order:	104671	**Collection Date:**	3/19/2009 1:05:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104671-001F		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
TOTAL FILTERABLE RESIDUE						
		SM2540C				
RunID: WETCHEM_090324E	QC Batch: 54245			PrepDate: 3/24/2009	Analyst: **DDL**	
Total Dissolved Solids (Residue, Filterable)	18000	200		mg/L	1	3/24/2009 03:00 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E20AGW
Lab Order:	104671	**Collection Date:**	3/19/2009 1:05:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104671-001G		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
CYANIDE, TOTAL						
	SM4500-CN E					
RunID: WETCHEM3_090327B	QC Batch: 54306			PrepDate:	3/26/2009	Analyst: **MFP**
Cyanide	ND	0.010		mg/L	1	3/27/2009

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E20AGW
Lab Order:	104671	**Collection Date:**	3/19/2009 1:05:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104671-001H		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
SULFIDE, DISSOLVED						
		SM4500-S= D				
RunID: WETCHEM3_090325D	QC Batch: R107551			PrepDate: 3/25/2009		Analyst: **MFP**
Sulfide	0.030	0.010		mg/L	1	3/25/2009

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E20AGW
Lab Order:	104671	**Collection Date:**	3/19/2009 1:05:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104671-001I		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
OIL & GREASE						
		EPA 1664 _HEM				
RunID: WETCHEM2_090327B	QC Batch: 54301			PrepDate:	3/27/2009	Analyst: **KXV**
Oil & Grease	ND	4.5		mg/L	1	3/27/2009

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	Trip Blank (E20AGW)
Lab Order:	104671	**Collection Date:**	3/19/2009 4:00:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104671-002A		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS11_090325A QC Batch: A09VW055 PrepDate: Analyst: **SLL**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	3/25/2009 04:48 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	3/25/2009 04:48 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	3/25/2009 04:48 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	3/25/2009 04:48 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	3/25/2009 04:48 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	3/25/2009 04:48 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	3/25/2009 04:48 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	3/25/2009 04:48 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	3/25/2009 04:48 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	3/25/2009 04:48 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	3/25/2009 04:48 PM
1,2-Dibromo-3-chloropropane	ND	0.50		µg/L	1	3/25/2009 04:48 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	3/25/2009 04:48 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	3/25/2009 04:48 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	3/25/2009 04:48 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	3/25/2009 04:48 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	3/25/2009 04:48 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	3/25/2009 04:48 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	3/25/2009 04:48 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	3/25/2009 04:48 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	3/25/2009 04:48 PM
2-Chlorotoluene	ND	0.50		µg/L	1	3/25/2009 04:48 PM
4-Chlorotoluene	ND	0.50		µg/L	1	3/25/2009 04:48 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	3/25/2009 04:48 PM
Benzene	ND	0.50		µg/L	1	3/25/2009 04:48 PM
Bromobenzene	ND	0.50		µg/L	1	3/25/2009 04:48 PM
Bromodichloromethane	ND	0.50		µg/L	1	3/25/2009 04:48 PM
Bromoform	ND	0.50		µg/L	1	3/25/2009 04:48 PM
Bromomethane	ND	0.50		µg/L	1	3/25/2009 04:48 PM
Carbon tetrachloride	ND	0.50		µg/L	1	3/25/2009 04:48 PM
Chlorobenzene	ND	0.50		µg/L	1	3/25/2009 04:48 PM
Chloroethane	ND	0.50		µg/L	1	3/25/2009 04:48 PM
Chloroform	ND	0.50		µg/L	1	3/25/2009 04:48 PM
Chloromethane	ND	0.50		µg/L	1	3/25/2009 04:48 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	3/25/2009 04:48 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	Trip Blank (E20AGW)
Lab Order:	104671	**Collection Date:**	3/19/2009 4:00:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104671-002A		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS11_090325A QC Batch: A09VW055 PrepDate: Analyst: **SLL**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
cis-1,3-Dichloropropene	ND	0.50		µg/L	1	3/25/2009 04:48 PM
Dibromochloromethane	ND	0.50		µg/L	1	3/25/2009 04:48 PM
Dibromomethane	ND	0.50		µg/L	1	3/25/2009 04:48 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	3/25/2009 04:48 PM
Ethylbenzene	ND	0.50		µg/L	1	3/25/2009 04:48 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	3/25/2009 04:48 PM
Isopropylbenzene	ND	0.50		µg/L	1	3/25/2009 04:48 PM
m,p-Xylene	ND	1.0		µg/L	1	3/25/2009 04:48 PM
Methylene chloride	ND	1.0		µg/L	1	3/25/2009 04:48 PM
n-Butylbenzene	ND	0.50		µg/L	1	3/25/2009 04:48 PM
n-Propylbenzene	ND	0.50		µg/L	1	3/25/2009 04:48 PM
Naphthalene	ND	0.50		µg/L	1	3/25/2009 04:48 PM
o-Xylene	ND	0.50		µg/L	1	3/25/2009 04:48 PM
sec-Butylbenzene	ND	0.50		µg/L	1	3/25/2009 04:48 PM
Styrene	ND	0.50		µg/L	1	3/25/2009 04:48 PM
tert-Butylbenzene	ND	0.50		µg/L	1	3/25/2009 04:48 PM
Tetrachloroethene	ND	0.50		µg/L	1	3/25/2009 04:48 PM
Toluene	0.63	0.50		µg/L	1	3/25/2009 04:48 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	3/25/2009 04:48 PM
Trichloroethene	ND	0.50		µg/L	1	3/25/2009 04:48 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	3/25/2009 04:48 PM
Vinyl chloride	ND	0.50		µg/L	1	3/25/2009 04:48 PM
Surr: 1,2-Dichloroethane-d4	86.5	70-130		%REC	1	3/25/2009 04:48 PM
Surr: 4-Bromofluorobenzene	86.1	70-130		%REC	1	3/25/2009 04:48 PM
Surr: Dibromofluoromethane	90.6	70-130		%REC	1	3/25/2009 04:48 PM
Surr: Toluene-d8	97.2	70-130		%REC	1	3/25/2009 04:48 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	Trip Blank (E20AGW)
Lab Order:	104671	**Collection Date:**	3/19/2009 4:00:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104671-002B		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
GASOLINE RANGE ORGANICS BY GC/FID						
		EPA 8015B(M)				
RunID: GC6_090325A	QC Batch: I09VW059			PrepDate:		Analyst: **BD**
GRO	ND	0.050		mg/L	1	3/25/2009 06:43 PM
Surr: Bromofluorobenzene (FID)	102	71-130		%REC	1	3/25/2009 06:43 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Geocon Consultants, Inc.
Work Order: 104671
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 160.1_2540C_W

Sample ID: **104591-003D-DUP**	SampType: **DUP**	TestCode: **160.1_2540C**	Units: **mg/L**	Prep Date: **3/24/2009**	RunNo: **107417**
Client ID: **ZZZZZZ**	Batch ID: **54245**	TestNo: **SM2540C**		Analysis Date: **3/24/2009**	SeqNo: **1682672**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	918.000	20						894.0	2.65	10	

Sample ID: **LCS-54245**	SampType: **LCS**	TestCode: **160.1_2540C**	Units: **mg/L**	Prep Date: **3/24/2009**	RunNo: **107417**
Client ID: **LCSW**	Batch ID: **54245**	TestNo: **SM2540C**		Analysis Date: **3/24/2009**	SeqNo: **1682679**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	984.000	10	970.0	0	101	80	120				

Sample ID: **MB-54245**	SampType: **MBLK**	TestCode: **160.1_2540C**	Units: **mg/L**	Prep Date: **3/24/2009**	RunNo: **107417**
Client ID: **PBW**	Batch ID: **54245**	TestNo: **SM2540C**		Analysis Date: **3/24/2009**	SeqNo: **1682680**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	ND	10									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104671
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 1664_HEM_W

Sample ID: **MB-54301**	SampType: **MBLK**	TestCode: **1664_HEM_**	Units: **mg/L**	Prep Date: **3/27/2009**	RunNo: **107539**
Client ID: **PBW**	Batch ID: **54301**	TestNo: **EPA 1664 _H**		Analysis Date: **3/27/2009**	SeqNo: **1684957**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Oil & Grease	ND	4.0									

Sample ID: **LCS-54301**	SampType: **LCS**	TestCode: **1664_HEM_**	Units: **mg/L**	Prep Date: **3/27/2009**	RunNo: **107539**
Client ID: **LCSW**	Batch ID: **54301**	TestNo: **EPA 1664 _H**		Analysis Date: **3/27/2009**	SeqNo: **1684958**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Oil & Grease	33.900	4.0	40.00	0	84.8	78	114				

Sample ID: **MB-54301-MS**	SampType: **MS**	TestCode: **1664_HEM_**	Units: **mg/L**	Prep Date: **3/27/2009**	RunNo: **107539**
Client ID: **ZZZZZZ**	Batch ID: **54301**	TestNo: **EPA 1664 _H**		Analysis Date: **3/27/2009**	SeqNo: **1684962**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Oil & Grease	36.100	4.0	40.00	0	90.3	78	114				

Sample ID: **MB-54301-MSD**	SampType: **MSD**	TestCode: **1664_HEM_**	Units: **mg/L**	Prep Date: **3/27/2009**	RunNo: **107539**
Client ID: **ZZZZZZ**	Batch ID: **54301**	TestNo: **EPA 1664 _H**		Analysis Date: **3/27/2009**	SeqNo: **1684963**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Oil & Grease	34.800	4.0	40.00	0	87.0	78	114	36.10	3.67	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104671
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 335.2_4500CNE_W

Sample ID: **104672-001GDUP**	SampType: **DUP**	TestCode: **335.2_4500C**	Units: **mg/L**	Prep Date: **3/26/2009**	RunNo: **107557**
Client ID: **ZZZZZZ**	Batch ID: **54306**	TestNo: **SM4500-CN E**		Analysis Date: **3/27/2009**	SeqNo: **1685204**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide	ND	0.010						0	0	30	

Sample ID: **104710-004AMS**	SampType: **MS**	TestCode: **335.2_4500C**	Units: **mg/L**	Prep Date: **3/26/2009**	RunNo: **107557**
Client ID: **ZZZZZZ**	Batch ID: **54306**	TestNo: **SM4500-CN E**		Analysis Date: **3/27/2009**	SeqNo: **1685207**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide	0.376	0.010	0.4000	0	94.0	80	120				

Sample ID: **104710-004AMSD**	SampType: **MSD**	TestCode: **335.2_4500C**	Units: **mg/L**	Prep Date: **3/26/2009**	RunNo: **107557**
Client ID: **ZZZZZZ**	Batch ID: **54306**	TestNo: **SM4500-CN E**		Analysis Date: **3/27/2009**	SeqNo: **1685208**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide	0.386	0.010	0.4000	0	96.5	80	120	0.3760	2.62	20	

Sample ID: **LCS-54306**	SampType: **LCS**	TestCode: **335.2_4500C**	Units: **mg/L**	Prep Date: **3/26/2009**	RunNo: **107557**
Client ID: **LCSW**	Batch ID: **54306**	TestNo: **SM4500-CN E**		Analysis Date: **3/27/2009**	SeqNo: **1685209**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide	0.394	0.010	0.4000	0	98.5	80	120				

Sample ID: **MB-54306**	SampType: **MBLK**	TestCode: **335.2_4500C**	Units: **mg/L**	Prep Date: **3/26/2009**	RunNo: **107557**
Client ID: **PBW**	Batch ID: **54306**	TestNo: **SM4500-CN E**		Analysis Date: **3/27/2009**	SeqNo: **1685210**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide	ND	0.010									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104671
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 376.2_4500S2_WD

Sample ID: **104670-001HDUP**	SampType: **DUP**	TestCode: **376.2_4500S2**	Units: **mg/L**	Prep Date: **3/25/2009**	RunNo: **107551**
Client ID: **ZZZZZZ**	Batch ID: **R107551**	TestNo: **SM4500-S= D**		Analysis Date: **3/25/2009**	SeqNo: **1685133**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfide	ND	0.010						0.005000	0	30	

Sample ID: **104670-001HMS**	SampType: **MS**	TestCode: **376.2_4500S2**	Units: **mg/L**	Prep Date: **3/25/2009**	RunNo: **107551**
Client ID: **ZZZZZZ**	Batch ID: **R107551**	TestNo: **SM4500-S= D**		Analysis Date: **3/25/2009**	SeqNo: **1685134**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfide	0.984	0.010	1.000	0.005000	97.9	70	120				

Sample ID: **104670-001HMSD**	SampType: **MSD**	TestCode: **376.2_4500S2**	Units: **mg/L**	Prep Date: **3/25/2009**	RunNo: **107551**
Client ID: **ZZZZZZ**	Batch ID: **R107551**	TestNo: **SM4500-S= D**		Analysis Date: **3/25/2009**	SeqNo: **1685135**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfide	0.986	0.010	1.000	0.005000	98.1	70	120	0.9840	0.203	20	

Sample ID: **LCS-R107551**	SampType: **LCS**	TestCode: **376.2_4500S2**	Units: **mg/L**	Prep Date: **3/25/2009**	RunNo: **107551**
Client ID: **LCSW**	Batch ID: **R107551**	TestNo: **SM4500-S= D**		Analysis Date: **3/25/2009**	SeqNo: **1685138**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfide	0.985	0.010	1.000	0	98.5	80	120				

Sample ID: **MB-R107551**	SampType: **MBLK**	TestCode: **376.2_4500S2**	Units: **mg/L**	Prep Date: **3/25/2009**	RunNo: **107551**
Client ID: **PBW**	Batch ID: **R107551**	TestNo: **SM4500-S= D**		Analysis Date: **3/25/2009**	SeqNo: **1685139**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfide	ND	0.010									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104671
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_W

Sample ID: **MB-54177** SampType: **MBLK** TestCode: **6010_W** Units: **mg/L** Prep Date: **3/24/2009** RunNo: **107425**
Client ID: **PBW** Batch ID: **54177** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **3/25/2009** SeqNo: **1682896**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	0.0050									
Arsenic	ND	0.010									
Barium	ND	0.0030									
Beryllium	ND	0.0030									
Cadmium	ND	0.0030									
Chromium	ND	0.0030									
Cobalt	ND	0.0030									
Copper	ND	0.0050									
Lead	ND	0.0050									
Molybdenum	ND	0.0050									
Nickel	ND	0.0050									
Selenium	ND	0.010									
Silver	ND	0.0030									
Thallium	ND	0.015									
Vanadium	ND	0.0030									
Zinc	ND	0.010									

Sample ID: **LCS-54177** SampType: **LCS** TestCode: **6010_W** Units: **mg/L** Prep Date: **3/24/2009** RunNo: **107425**
Client ID: **LCSW** Batch ID: **54177** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **3/25/2009** SeqNo: **1682897**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	1.014	0.0050	1.000	0	101	85	115				
Arsenic	0.993	0.010	1.000	0	99.3	85	115				
Barium	0.999	0.0030	1.000	0	99.9	85	115				
Beryllium	1.006	0.0030	1.000	0	101	85	115				
Cadmium	0.994	0.0030	1.000	0	99.4	85	115				
Chromium	0.908	0.0030	1.000	0	90.8	85	115				
Cobalt	1.002	0.0030	1.000	0	100	85	115				
Copper	1.002	0.0050	1.000	0	100	85	115				
Lead	1.028	0.0050	1.000	0	103	85	115				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104671
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_W

Sample ID: **LCS-54177** SampType: **LCS** TestCode: **6010_W** Units: **mg/L** Prep Date: **3/24/2009** RunNo: **107425**
Client ID: **LCSW** Batch ID: **54177** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **3/25/2009** SeqNo: **1682897**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	0.998	0.0050	1.000	0	99.8	85	115				
Nickel	0.978	0.0050	1.000	0	97.8	85	115				
Selenium	0.972	0.010	1.000	0	97.2	85	115				
Silver	0.978	0.0030	1.000	0	97.8	85	115				
Thallium	0.887	0.015	1.000	0	88.7	85	115				
Vanadium	1.012	0.0030	1.000	0	101	85	115				
Zinc	0.989	0.010	1.000	0	98.9	85	115				

Sample ID: **104670-001EDUP** SampType: **DUP** TestCode: **6010_W** Units: **mg/L** Prep Date: **3/24/2009** RunNo: **107425**
Client ID: **ZZZZZZ** Batch ID: **54177** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **3/27/2009** SeqNo: **1685462**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	0.025						0	0	20	
Arsenic	ND	0.050						0	0	20	
Barium	0.293	0.015						0.2893	1.18	20	
Beryllium	ND	0.015						0	0	20	
Cadmium	ND	0.015						0	0	20	
Chromium	0.019	0.015						0.02000	5.82	20	
Cobalt	0.083	0.015						0.08113	2.53	20	
Copper	0.107	0.025						0.1081	1.36	20	
Lead	ND	0.025						0	0	20	
Molybdenum	ND	0.025						0	0	20	
Nickel	0.097	0.025						0.09793	1.25	20	
Selenium	0.041	0.050						0.04471	0	20	
Silver	ND	0.015						0	0	20	
Thallium	ND	0.075						0	0	20	
Vanadium	0.057	0.015						0.05563	1.76	20	
Zinc	0.064	0.050						0.06589	2.68	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104671
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_W

Sample ID: **104670-001EMS** SampType: **MS** TestCode: **6010_W** Units: **mg/L** Prep Date: **3/24/2009** RunNo: **107425**
Client ID: **ZZZZZZ** Batch ID: **54177** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **3/27/2009** SeqNo: **1685463**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	2.782	0.025	2.500	0	111	64	130				
Arsenic	2.780	0.050	2.500	0	111	66	128				
Barium	2.807	0.015	2.500	0.2893	101	60	129				
Beryllium	2.539	0.015	2.500	0	102	77	118				
Cadmium	2.589	0.015	2.500	0	104	72	122				
Chromium	2.388	0.015	2.500	0.02000	94.7	77	116				
Cobalt	2.684	0.015	2.500	0.08113	104	66	124				
Copper	3.021	0.025	2.500	0.1081	117	70	130				
Lead	2.418	0.025	2.500	0	96.7	71	121				
Molybdenum	2.635	0.025	2.500	0	105	64	129				
Nickel	2.663	0.025	2.500	0.09793	103	63	125				
Selenium	2.853	0.050	2.500	0.04471	112	73	124				
Silver	2.873	0.015	2.500	0	115	60	138				
Thallium	2.177	0.075	2.500	0	87.1	66	125				
Vanadium	2.642	0.015	2.500	0.05563	103	79	118				
Zinc	2.723	0.050	2.500	0.06589	106	71	120				

Sample ID: **104670-001EMSD** SampType: **MSD** TestCode: **6010_W** Units: **mg/L** Prep Date: **3/24/2009** RunNo: **107425**
Client ID: **ZZZZZZ** Batch ID: **54177** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **3/27/2009** SeqNo: **1685464**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	2.878	0.025	2.500	0	115	64	130	2.782	3.38	20	
Arsenic	2.888	0.050	2.500	0	116	66	128	2.780	3.81	20	
Barium	2.893	0.015	2.500	0.2893	104	60	129	2.807	3.05	20	
Beryllium	2.622	0.015	2.500	0	105	77	118	2.539	3.21	20	
Cadmium	2.650	0.015	2.500	0	106	72	122	2.589	2.33	20	
Chromium	2.465	0.015	2.500	0.02000	97.8	77	116	2.388	3.17	20	
Cobalt	2.760	0.015	2.500	0.08113	107	66	124	2.684	2.82	20	
Copper	3.138	0.025	2.500	0.1081	121	70	130	3.021	3.82	20	
Lead	2.444	0.025	2.500	0	97.8	71	121	2.418	1.09	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104671
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_W

Sample ID: **104670-001EMSD** SampType: **MSD** TestCode: **6010_W** Units: **mg/L** Prep Date: **3/24/2009** RunNo: **107425**
Client ID: **ZZZZZZ** Batch ID: **54177** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **3/27/2009** SeqNo: **1685464**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	2.722	0.025	2.500	0	109	64	129	2.635	3.26	20	
Nickel	2.728	0.025	2.500	0.09793	105	63	125	2.663	2.42	20	
Selenium	2.917	0.050	2.500	0.04471	115	73	124	2.853	2.23	20	
Silver	2.984	0.015	2.500	0	119	60	138	2.873	3.80	20	
Thallium	2.244	0.075	2.500	0	89.7	66	125	2.177	3.00	20	
Vanadium	2.725	0.015	2.500	0.05563	107	79	118	2.642	3.12	20	
Zinc	2.778	0.050	2.500	0.06589	108	71	120	2.723	1.98	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104671
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 7470_W

Sample ID: **MB-54176**	SampType: **MBLK**	TestCode: **7470_W**	Units: **µg/L**	Prep Date: **3/24/2009**	RunNo: **107348**
Client ID: **PBW**	Batch ID: **54176**	TestNo: **EPA 7470A**		Analysis Date: **3/24/2009**	SeqNo: **1681496**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.20									

Sample ID: **LCS-54176**	SampType: **LCS**	TestCode: **7470_W**	Units: **µg/L**	Prep Date: **3/24/2009**	RunNo: **107348**
Client ID: **LCSW**	Batch ID: **54176**	TestNo: **EPA 7470A**		Analysis Date: **3/24/2009**	SeqNo: **1681497**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	10.623	0.20	10.00	0	106	85	115				

Sample ID: **104671-001E-MS**	SampType: **MS**	TestCode: **7470_W**	Units: **µg/L**	Prep Date: **3/24/2009**	RunNo: **107348**
Client ID: **E20AGW**	Batch ID: **54176**	TestNo: **EPA 7470A**		Analysis Date: **3/24/2009**	SeqNo: **1681498**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	10.044	0.20	10.00	0	100	70	130				

Sample ID: **104671-001E-MSD**	SampType: **MSD**	TestCode: **7470_W**	Units: **µg/L**	Prep Date: **3/24/2009**	RunNo: **107348**
Client ID: **E20AGW**	Batch ID: **54176**	TestNo: **EPA 7470A**		Analysis Date: **3/24/2009**	SeqNo: **1681499**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	10.254	0.20	10.00	0	103	70	130	10.04	2.07	20	

Sample ID: **104671-001E-DUP**	SampType: **DUP**	TestCode: **7470_W**	Units: **µg/L**	Prep Date: **3/24/2009**	RunNo: **107348**
Client ID: **E20AGW**	Batch ID: **54176**	TestNo: **EPA 7470A**		Analysis Date: **3/24/2009**	SeqNo: **1681501**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.20						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104671
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_W_DM_LLSGT

Sample ID: **MB-54132** SampType: **MBLK** TestCode: **8015_W_DM_** Units: **mg/L** Prep Date: **3/23/2009** RunNo: **107368**
Client ID: **PBW** Batch ID: **54132** TestNo: **EPA 8015B** **EPA 3510C** Analysis Date: **3/24/2009** SeqNo: **1681880**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	ND	0.050									
ORO	ND	0.050									
Surr: p-Terphenyl	0.061		0.08000		76.1	35	131				

Sample ID: **LCS-54132** SampType: **LCS** TestCode: **8015_W_DM_** Units: **mg/L** Prep Date: **3/23/2009** RunNo: **107368**
Client ID: **LCSW** Batch ID: **54132** TestNo: **EPA 8015B** **EPA 3510C** Analysis Date: **3/24/2009** SeqNo: **1681881**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	0.834	0.050	1.000	0	83.4	42	118				
Surr: p-Terphenyl	0.048		0.08000		59.4	35	131				

Sample ID: **MB-54132MS** SampType: **MS** TestCode: **8015_W_DM_** Units: **mg/L** Prep Date: **3/23/2009** RunNo: **107368**
Client ID: **ZZZZZZ** Batch ID: **54132** TestNo: **EPA 8015B** **EPA 3510C** Analysis Date: **3/24/2009** SeqNo: **1681882**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	0.796	0.050	1.000	0	79.6	42	118				
Surr: p-Terphenyl	0.047		0.08000		59.3	35	131				

Sample ID: **MB-54132MSD** SampType: **MSD** TestCode: **8015_W_DM_** Units: **mg/L** Prep Date: **3/23/2009** RunNo: **107368**
Client ID: **ZZZZZZ** Batch ID: **54132** TestNo: **EPA 8015B** **EPA 3510C** Analysis Date: **3/24/2009** SeqNo: **1681883**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	0.779	0.050	1.000	0	77.9	42	118	0.7963	2.14	20	
Surr: p-Terphenyl	0.045		0.08000		55.9	35	131		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104671
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_W_GP LL

Sample ID: **I090324LCS1** SampType: **LCS** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107446**
Client ID: **LCSW** Batch ID: **I09VW059** TestNo: **EPA 8015B(M** Analysis Date: **3/25/2009** SeqNo: **1683167**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	0.918	0.050	1.000	0	91.8	69	125				
Surr: Bromofluorobenzene (FID)	107.244		100.0		107	71	130				

Sample ID: **I090324MB1MS** SampType: **MS** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107446**
Client ID: **ZZZZZZ** Batch ID: **I09VW059** TestNo: **EPA 8015B(M** Analysis Date: **3/25/2009** SeqNo: **1683168**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	0.881	0.050	1.000	0	88.1	69	125				
Surr: Bromofluorobenzene (FID)	106.574		100.0		107	71	130				

Sample ID: **I090324MB1MSD** SampType: **MSD** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107446**
Client ID: **ZZZZZZ** Batch ID: **I09VW059** TestNo: **EPA 8015B(M** Analysis Date: **3/25/2009** SeqNo: **1683169**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	0.933	0.050	1.000	0	93.3	69	125	0.8810	5.73	20	
Surr: Bromofluorobenzene (FID)	106.811		100.0		107	71	130		0	0	

Sample ID: **I090324MB1** SampType: **MBLK** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107446**
Client ID: **PBW** Batch ID: **I09VW059** TestNo: **EPA 8015B(M** Analysis Date: **3/25/2009** SeqNo: **1683170**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	ND	0.050									
Surr: Bromofluorobenzene (FID)	103.794		100.0		104	71	130				

Sample ID: **104704-012BDUP** SampType: **DUP** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107446**
Client ID: **ZZZZZZ** Batch ID: **I09VW059** TestNo: **EPA 8015B(M** Analysis Date: **3/25/2009** SeqNo: **1683177**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	ND	0.050						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104671
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_W_GP LL

Sample ID: **104704-012BDUP** SampType: **DUP** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107446**
Client ID: **ZZZZZZ** Batch ID: **I09VW059** TestNo: **EPA 8015B(M** Analysis Date: **3/25/2009** SeqNo: **1683177**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Bromofluorobenzene (FID)	99.751		100.0		99.8	71	130		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104671
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **A090325LCS1** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107370**
Client ID: **LCSW** Batch ID: **A09VW055** TestNo: **EPA 8260B** Analysis Date: **3/25/2009** SeqNo: **1681894**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	18.000	0.50	20.00	0	90.0	70	130				
Benzene	37.610	0.50	40.00	0	94.0	70	130				
Chlorobenzene	20.210	0.50	20.00	0	101	70	130				
MTBE	18.680	0.50	20.00	0	93.4	70	130				
Toluene	38.430	0.50	40.00	0	96.1	70	130				
Trichloroethene	18.830	0.50	20.00	0	94.2	70	130				
Surr: 1,2-Dichloroethane-d4	21.170		25.00		84.7	70	130				
Surr: 4-Bromofluorobenzene	21.700		25.00		86.8	70	130				
Surr: Dibromofluoromethane	21.360		25.00		85.4	70	130				
Surr: Toluene-d8	23.200		25.00		92.8	70	130				

Sample ID: **A090325MB2MS** SampType: **MS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107370**
Client ID: **ZZZZZZ** Batch ID: **A09VW055** TestNo: **EPA 8260B** Analysis Date: **3/25/2009** SeqNo: **1681895**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	16.710	0.50	20.00	0	83.6	70	130				
Benzene	36.110	0.50	40.00	0	90.3	70	130				
Chlorobenzene	19.150	0.50	20.00	0	95.8	70	130				
Toluene	36.280	0.50	40.00	0	90.7	70	130				
Trichloroethene	17.840	0.50	20.00	0	89.2	70	130				
Surr: 1,2-Dichloroethane-d4	22.120		25.00		88.5	70	130				
Surr: 4-Bromofluorobenzene	22.220		25.00		88.9	70	130				
Surr: Dibromofluoromethane	22.040		25.00		88.2	70	130				
Surr: Toluene-d8	23.270		25.00		93.1	70	130				

Sample ID: **A090325MB2MSD** SampType: **MSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107370**
Client ID: **ZZZZZZ** Batch ID: **A09VW055** TestNo: **EPA 8260B** Analysis Date: **3/25/2009** SeqNo: **1681896**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	16.090	0.50	20.00	0	80.4	70	130	16.71	3.78	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104671
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **A090325MB2MSD** SampType: **MSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107370**
Client ID: **ZZZZZZ** Batch ID: **A09VW055** TestNo: **EPA 8260B** Analysis Date: **3/25/2009** SeqNo: **1681896**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	36.800	0.50	40.00	0	92.0	70	130	36.11	1.89	20	
Chlorobenzene	19.230	0.50	20.00	0	96.2	70	130	19.15	0.417	20	
Toluene	36.830	0.50	40.00	0	92.1	70	130	36.28	1.50	20	
Trichloroethene	17.730	0.50	20.00	0	88.6	70	130	17.84	0.618	20	
Surr: 1,2-Dichloroethane-d4	22.390		25.00		89.6	70	130		0	20	
Surr: 4-Bromofluorobenzene	22.020		25.00		88.1	70	130		0	20	
Surr: Dibromofluoromethane	22.210		25.00		88.8	70	130		0	20	
Surr: Toluene-d8	23.490		25.00		94.0	70	130		0	20	

Sample ID: **A090325MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107370**
Client ID: **PBW** Batch ID: **A09VW055** TestNo: **EPA 8260B** Analysis Date: **3/25/2009** SeqNo: **1681897**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	0.50									
1,1,1-Trichloroethane	ND	0.50									
1,1,2,2-Tetrachloroethane	ND	0.50									
1,1,2-Trichloroethane	ND	0.50									
1,1-Dichloroethane	ND	0.50									
1,1-Dichloroethene	ND	0.50									
1,1-Dichloropropene	ND	0.50									
1,2,3-Trichlorobenzene	ND	0.50									
1,2,3-Trichloropropane	ND	0.50									
1,2,4-Trichlorobenzene	ND	0.50									
1,2,4-Trimethylbenzene	ND	0.50									
1,2-Dibromo-3-chloropropane	ND	0.50									
1,2-Dibromoethane	ND	0.50									
1,2-Dichlorobenzene	ND	0.50									
1,2-Dichloroethane	ND	0.50									
1,2-Dichloropropane	ND	0.50									
1,3,5-Trimethylbenzene	ND	0.50									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104671
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **A090325MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107370**
Client ID: **PBW** Batch ID: **A09VW055** TestNo: **EPA 8260B** Analysis Date: **3/25/2009** SeqNo: **1681897**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,3-Dichlorobenzene	ND	0.50									
1,3-Dichloropropane	ND	0.50									
1,4-Dichlorobenzene	ND	0.50									
2,2-Dichloropropane	ND	0.50									
2-Chlorotoluene	ND	0.50									
4-Chlorotoluene	ND	0.50									
4-Isopropyltoluene	ND	0.50									
Benzene	ND	0.50									
Bromobenzene	ND	0.50									
Bromodichloromethane	ND	0.50									
Bromoform	ND	0.50									
Bromomethane	ND	0.50									
Carbon tetrachloride	ND	0.50									
Chlorobenzene	ND	0.50									
Chloroethane	ND	0.50									
Chloroform	ND	0.50									
Chloromethane	ND	0.50									
cis-1,2-Dichloroethene	ND	0.50									
cis-1,3-Dichloropropene	ND	0.50									
Dibromochloromethane	ND	0.50									
Dibromomethane	ND	0.50									
Dichlorodifluoromethane	ND	0.50									
Ethylbenzene	ND	0.50									
Hexachlorobutadiene	ND	0.50									
Isopropylbenzene	ND	0.50									
m,p-Xylene	ND	1.0									
Methylene chloride	ND	1.0									
n-Butylbenzene	ND	0.50									
n-Propylbenzene	ND	0.50									
Naphthalene	ND	0.50									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104671
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **A090325MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107370**
Client ID: **PBW** Batch ID: **A09VW055** TestNo: **EPA 8260B** Analysis Date: **3/25/2009** SeqNo: **1681897**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
o-Xylene	ND	0.50									
sec-Butylbenzene	ND	0.50									
Styrene	ND	0.50									
tert-Butylbenzene	ND	0.50									
Tetrachloroethene	ND	0.50									
Toluene	ND	0.50									
trans-1,2-Dichloroethene	ND	0.50									
Trichloroethene	ND	0.50									
Trichlorofluoromethane	ND	0.50									
Vinyl chloride	ND	0.50									
Surr: 1,2-Dichloroethane-d4	21.220		25.00		84.9	70	130				
Surr: 4-Bromofluorobenzene	21.340		25.00		85.4	70	130				
Surr: Dibromofluoromethane	22.250		25.00		89.0	70	130				
Surr: Toluene-d8	23.670		25.00		94.7	70	130				

Sample ID: **104670-001A** SampType: **DUP** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107370**
Client ID: **ZZZZZZ** Batch ID: **A09VW055** TestNo: **EPA 8260B** Analysis Date: **3/25/2009** SeqNo: **1682854**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	0.50						0	0	20	
1,1,1-Trichloroethane	ND	0.50						0	0	20	
1,1,2,2-Tetrachloroethane	ND	0.50						0	0	20	
1,1,2-Trichloroethane	ND	0.50						0	0	20	
1,1-Dichloroethane	ND	0.50						0	0	20	
1,1-Dichloroethene	ND	0.50						0	0	20	
1,1-Dichloropropene	ND	0.50						0	0	20	
1,2,3-Trichlorobenzene	ND	0.50						0	0	20	
1,2,3-Trichloropropane	ND	0.50						0	0	20	
1,2,4-Trichlorobenzene	ND	0.50						0	0	20	
1,2,4-Trimethylbenzene	ND	0.50						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104671
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **104670-001A** SampType: **DUP** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107370**
Client ID: **ZZZZZZ** Batch ID: **A09VW055** TestNo: **EPA 8260B** Analysis Date: **3/25/2009** SeqNo: **1682854**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2-Dibromo-3-chloropropane	ND	0.50						0	0	20	
1,2-Dibromoethane	ND	0.50						0	0	20	
1,2-Dichlorobenzene	ND	0.50						0	0	20	
1,2-Dichloroethane	ND	0.50						0	0	20	
1,2-Dichloropropane	ND	0.50						0	0	20	
1,3,5-Trimethylbenzene	ND	0.50						0	0	20	
1,3-Dichlorobenzene	ND	0.50						0	0	20	
1,3-Dichloropropane	ND	0.50						0	0	20	
1,4-Dichlorobenzene	ND	0.50						0	0	20	
2,2-Dichloropropane	ND	0.50						0	0	20	
2-Chlorotoluene	ND	0.50						0	0	20	
4-Chlorotoluene	ND	0.50						0	0	20	
4-Isopropyltoluene	ND	0.50						0	0	20	
Benzene	ND	0.50						0	0	20	
Bromobenzene	ND	0.50						0	0	20	
Bromodichloromethane	ND	0.50						0	0	20	
Bromoform	ND	0.50						0	0	20	
Bromomethane	ND	0.50						0	0	20	
Carbon tetrachloride	ND	0.50						0	0	20	
Chlorobenzene	ND	0.50						0	0	20	
Chloroethane	ND	0.50						0	0	20	
Chloroform	ND	0.50						0	0	20	
Chloromethane	ND	0.50						0	0	20	
cis-1,2-Dichloroethene	ND	0.50						0	0	20	
cis-1,3-Dichloropropene	ND	0.50						0	0	20	
Dibromochloromethane	ND	0.50						0	0	20	
Dibromomethane	ND	0.50						0	0	20	
Dichlorodifluoromethane	ND	0.50						0	0	20	
Ethylbenzene	ND	0.50						0	0	20	
Hexachlorobutadiene	ND	0.50						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104671
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **104670-001A** SampType: **DUP** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107370**
Client ID: **ZZZZZZ** Batch ID: **A09VW055** TestNo: **EPA 8260B** Analysis Date: **3/25/2009** SeqNo: **1682854**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Isopropylbenzene	ND	0.50						0	0	20	
m,p-Xylene	ND	1.0						0	0	20	
Methylene chloride	ND	1.0						0	0	20	
n-Butylbenzene	ND	0.50						0	0	20	
n-Propylbenzene	ND	0.50						0	0	20	
Naphthalene	ND	0.50						0	0	20	
o-Xylene	ND	0.50						0	0	20	
sec-Butylbenzene	ND	0.50						0	0	20	
Styrene	ND	0.50						0	0	20	
tert-Butylbenzene	ND	0.50						0	0	20	
Tetrachloroethene	ND	0.50						0	0	20	
Toluene	ND	0.50						0	0	20	
trans-1,2-Dichloroethene	ND	0.50						0	0	20	
Trichloroethene	ND	0.50						0	0	20	
Trichlorofluoromethane	ND	0.50						0	0	20	
Vinyl chloride	ND	0.50						0	0	20	
Surr: 1,2-Dichloroethane-d4	22.230		25.00		88.9	70	130		0	0	
Surr: 4-Bromofluorobenzene	18.050		25.00		72.2	70	130		0	0	
Surr: Dibromofluoromethane	22.230		25.00		88.9	70	130		0	0	
Surr: Toluene-d8	21.510		25.00		86.0	70	130		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104671
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_W_FULL

Sample ID: **MB-54166** SampType: **MBLK** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **3/24/2009** RunNo: **107376**
Client ID: **PBW** Batch ID: **54166** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **3/24/2009** SeqNo: **1681962**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	10									
1,2-Dichlorobenzene	ND	10									
1,3-Dichlorobenzene	ND	10									
1,4-Dichlorobenzene	ND	10									
2,4,5-Trichlorophenol	ND	10									
2,4,6-Trichlorophenol	ND	10									
2,4-Dichlorophenol	ND	10									
2,4-Dimethylphenol	ND	10									
2,4-Dinitrophenol	ND	50									
2,4-Dinitrotoluene	ND	10									
2,6-Dinitrotoluene	ND	10									
2-Chloronaphthalene	ND	10									
2-Chlorophenol	ND	10									
2-Methylnaphthalene	ND	10									
2-Methylphenol	ND	10									
2-Nitroaniline	ND	50									
2-Nitrophenol	ND	10									
3,3´-Dichlorobenzidine	ND	20									
3-Nitroaniline	ND	50									
4,6-Dinitro-2-methylphenol	ND	50									
4-Bromophenyl-phenylether	ND	10									
4-Chloro-3-methylphenol	ND	50									
4-Chloroaniline	ND	20									
4-Chlorophenyl-phenylether	ND	10									
4-Methylphenol	ND	10									
4-Nitroaniline	ND	20									
4-Nitrophenol	ND	50									
Acenaphthene	ND	10									
Acenaphthylene	ND	10									
Anthracene	ND	10									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104671
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_W_FULL

Sample ID: **MB-54166** SampType: **MBLK** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **3/24/2009** RunNo: **107376**
Client ID: **PBW** Batch ID: **54166** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **3/24/2009** SeqNo: **1681962**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzidine (M)	ND	50									
Benzo(a)anthracene	ND	10									
Benzo(a)pyrene	ND	10									
Benzo(b)fluoranthene	ND	10									
Benzo(g,h,i)perylene	ND	10									
Benzo(k)fluoranthene	ND	10									
Benzoic acid	ND	50									
Benzyl alcohol	ND	20									
Bis(2-chloroethoxy)methane	ND	10									
Bis(2-chloroethyl)ether	ND	10									
Bis(2-chloroisopropyl)ether	ND	10									
Bis(2-ethylhexyl)phthalate	ND	10									
Butylbenzylphthalate	ND	10									
Chrysene	ND	10									
Di-n-butylphthalate	ND	10									
Di-n-octylphthalate	5.740	10									
Dibenz(a,h)anthracene	ND	10									
Dibenzofuran	ND	10									
Diethylphthalate	ND	10									
Dimethylphthalate	ND	10									
Fluoranthene	ND	10									
Fluorene	ND	10									
Hexachlorobenzene	ND	10									
Hexachlorobutadiene	ND	20									
Hexachlorocyclopentadiene	ND	10									
Hexachloroethane	ND	10									
Indeno(1,2,3-cd)pyrene	ND	10									
Isophorone	ND	10									
N-Nitrosodi-n-propylamine	ND	10									
N-Nitrosodiphenylamine	ND	10									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104671
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_W_FULL

Sample ID: **MB-54166** SampType: **MBLK** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **3/24/2009** RunNo: **107376**
Client ID: **PBW** Batch ID: **54166** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **3/24/2009** SeqNo: **1681962**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	10									
Nitrobenzene	ND	10									
Pentachlorophenol	ND	50									
Phenanthrene	ND	10									
Phenol	ND	10									
Pyrene	ND	10									
Surr: 1,2-Dichlorobenzene-d4	73.410		100.0		73.4	42	98				
Surr: 2,4,6-Tribromophenol	90.220		100.0		90.2	60	128				
Surr: 2-Chlorophenol-d4	74.010		100.0		74.0	43	102				
Surr: 2-Fluorobiphenyl	86.200		100.0		86.2	50	108				
Surr: 2-Fluorophenol	44.070		100.0		44.1	22	69				
Surr: 4-Terphenyl-d14	113.710		100.0		114	66	130				
Surr: Nitrobenzene-d5	81.810		100.0		81.8	47	117				
Surr: Phenol-d5	30.270		100.0		30.3	16	50				

Sample ID: **LCS-54166** SampType: **LCS** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **3/24/2009** RunNo: **107376**
Client ID: **LCSW** Batch ID: **54166** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **3/24/2009** SeqNo: **1681963**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	77.690	10	100.0	0	77.7	54	110				
1,4-Dichlorobenzene	69.200	10	100.0	0	69.2	48	103				
2,4-Dinitrotoluene	100.870	10	100.0	0	101	69	136				
2-Chlorophenol	74.030	10	100.0	0	74.0	53	100				
4-Chloro-3-methylphenol	97.020	50	100.0	0	97.0	70	124				
4-Nitrophenol	45.380	50	100.0	0	45.4	32	69				
Acenaphthene	92.390	10	100.0	0	92.4	64	118				
N-Nitrosodi-n-propylamine	88.510	10	100.0	0	88.5	62	130				
Pentachlorophenol	90.260	50	100.0	0	90.3	64	130				
Phenol	32.980	10	100.0	0	33.0	25	50				
Pyrene	98.570	10	100.0	0	98.6	66	123				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104671
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_W_FULL

Sample ID: **LCS-54166** SampType: **LCS** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **3/24/2009** RunNo: **107376**
Client ID: **LCSW** Batch ID: **54166** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **3/24/2009** SeqNo: **1681963**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 1,2-Dichlorobenzene-d4	68.740		100.0		68.7	42	98				
Surr: 2,4,6-Tribromophenol	100.260		100.0		100	60	128				
Surr: 2-Chlorophenol-d4	70.600		100.0		70.6	43	102				
Surr: 2-Fluorobiphenyl	86.200		100.0		86.2	50	108				
Surr: 2-Fluorophenol	43.020		100.0		43.0	22	69				
Surr: 4-Terphenyl-d14	99.980		100.0		100	66	130				
Surr: Nitrobenzene-d5	79.360		100.0		79.4	47	117				
Surr: Phenol-d5	30.370		100.0		30.4	16	50				

Sample ID: **MB-54166MS** SampType: **MS** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **3/24/2009** RunNo: **107376**
Client ID: **ZZZZZZ** Batch ID: **54166** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **3/24/2009** SeqNo: **1681964**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	81.950	10	100.0	0	82.0	54	110				
1,4-Dichlorobenzene	72.760	10	100.0	0	72.8	48	103				
2,4-Dinitrotoluene	102.350	10	100.0	0	102	69	136				
2-Chlorophenol	79.790	10	100.0	0	79.8	53	100				
4-Chloro-3-methylphenol	98.240	50	100.0	0	98.2	70	124				
4-Nitrophenol	45.840	50	100.0	0	45.8	32	69				
Acenaphthene	94.310	10	100.0	0	94.3	64	118				
N-Nitrosodi-n-propylamine	93.950	10	100.0	0	94.0	62	130				
Pentachlorophenol	94.370	50	100.0	0	94.4	64	130				
Phenol	35.000	10	100.0	0	35.0	25	50				
Pyrene	98.890	10	100.0	0	98.9	66	123				
Surr: 1,2-Dichlorobenzene-d4	72.030		100.0		72.0	42	98				
Surr: 2,4,6-Tribromophenol	100.850		100.0		101	60	128				
Surr: 2-Chlorophenol-d4	74.980		100.0		75.0	43	102				
Surr: 2-Fluorobiphenyl	87.830		100.0		87.8	50	108				
Surr: 2-Fluorophenol	44.110		100.0		44.1	22	69				
Surr: 4-Terphenyl-d14	99.670		100.0		99.7	66	130				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104671
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_W_FULL

Sample ID: **MB-54166MS**	SampType: **MS**	TestCode: **8270_W_FUL**	Units: **µg/L**	Prep Date: **3/24/2009**	RunNo: **107376**
Client ID: **ZZZZZZ**	Batch ID: **54166**	TestNo: **EPA 8270C**	**EPA 3510C**	Analysis Date: **3/24/2009**	SeqNo: **1681964**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	83.520		100.0		83.5	47	117				
Surr: Phenol-d5	31.470		100.0		31.5	16	50				

Sample ID: **MB-54166MSD**	SampType: **MSD**	TestCode: **8270_W_FUL**	Units: **µg/L**	Prep Date: **3/24/2009**	RunNo: **107376**
Client ID: **ZZZZZZ**	Batch ID: **54166**	TestNo: **EPA 8270C**	**EPA 3510C**	Analysis Date: **3/24/2009**	SeqNo: **1681965**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	73.880	10	100.0	0	73.9	54	110	81.95	10.4	20	
1,4-Dichlorobenzene	61.770	10	100.0	0	61.8	48	103	72.76	16.3	20	
2,4-Dinitrotoluene	106.240	10	100.0	0	106	69	136	102.4	3.73	20	
2-Chlorophenol	79.410	10	100.0	0	79.4	53	100	79.79	0.477	20	
4-Chloro-3-methylphenol	101.520	50	100.0	0	102	70	124	98.24	3.28	20	
4-Nitrophenol	48.930	50	100.0	0	48.9	32	69	45.84	0	20	
Acenaphthene	95.950	10	100.0	0	96.0	64	118	94.31	1.72	20	
N-Nitrosodi-n-propylamine	94.740	10	100.0	0	94.7	62	130	93.95	0.837	20	
Pentachlorophenol	97.610	50	100.0	0	97.6	64	130	94.37	3.38	20	
Phenol	35.850	10	100.0	0	35.8	25	50	35.00	2.40	20	
Pyrene	104.480	10	100.0	0	104	66	123	98.89	5.50	20	
Surr: 1,2-Dichlorobenzene-d4	69.160		100.0		69.2	42	98		0	0	
Surr: 2,4,6-Tribromophenol	102.850		100.0		103	60	128		0	0	
Surr: 2-Chlorophenol-d4	73.820		100.0		73.8	43	102		0	0	
Surr: 2-Fluorobiphenyl	88.680		100.0		88.7	50	108		0	0	
Surr: 2-Fluorophenol	44.970		100.0		45.0	22	69		0	0	
Surr: 4-Terphenyl-d14	102.500		100.0		103	66	130		0	0	
Surr: Nitrobenzene-d5	82.080		100.0		82.1	47	117		0	0	
Surr: Phenol-d5	32.180		100.0		32.2	16	50		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CHAIN OF CUSTODY RECORD

Pg 1 of 1

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#: _____
Logged By: _____ Date: 3/21/09

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: GSO

Sample Condition Upon Receipt: 3.0
1. CHILLED Y☐ N☐ 4. SEALED Y☐ N☑
2. HEADSPACE (VOA) Y☑ N☐ 5. # OF SPLS MATCH COC Y☑ N☐
3. CONTAINER INTACT Y☑ N☐ 6. PRESERVED Y☑ N☑

Client: Geocon Consultants, Inc.
Attn: John Love
Address: 6671 Brisa St.
City Livermore State CA Zip Code 94550
TEL: (925) 371-5900
FAX: (925) 371-5915

Project Name: Caltrans Dumbarton Bridge
Project #: E8435-06-18
Sampler: (Printed Name) John Love (Signature)

Relinquished by: (Signature and Printed Name) John Love	Date: 3/20/09	Time: 16:00	Received by: (Signature and Printed Name)	Date: 3/21/09	Time: 8:30
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:

I hereby authorize ATL to perform the work indicated below.
Project Mgr /Submitter:
John Love 3/20/09
Print Name Date
Signature

Send Report To:
Attn: _____
Co: same as above
Address _____
City _____ State _____ Zip _____

Bill To:
Attn: _____
Co: same as above
Address _____
City _____ State _____ Zip _____

Special Instructions/Comments:
gel cleanup metals sample was field filtered

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time
	1034671-001	E20AGW	3/19/09	13:05
2		Trip Blank (E20AGW)	3/19/09	16:00

Circle or Add Analysis(es) Requested

8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C-~~SIM~~ (SVOCs)	6010B (Total Metal)	8015B (GRO) ~~& BTEX~~	8015B (DRO) + TPHmo w/ SGC	8021 (BTEX)	TITLE 22 (CAM 17 (6010/7000))	TDS	Oil & Grease	Cyanide	Dissolved Sulfide
		X										
			X									
				X								
					X							
						X						
							X					
								X				
									X			
										X		
											X	
		X		X								

SPECIFY APPROPRIATE MATRIX: SOIL | WATER | GROUND WATER | WASTEWATER

TAT	Container(s) #	Type	PRESERVATION	REMARKS
E	3	V G	H	
	1	L G		
	2	V G	H	
	1	L G		
	1	P P	N	
	1	P P		
	1	J G	H	
	1	P P	O	
	1	P P	O	+ $AlCl_3$
E	2	V G	H	

Q A / Q C: RTNE ☐ CT ☐ SWRCB ☐ Logcode ____ OTHER ____

- TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter.

March 31, 2009

John Love
Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550
TEL: (925) 525-4142
FAX: (925) 371-5915

ELAP No.: 1838
NELAP No.: 02107CA
NEVADA.: CA-401
CSDLAC No.: 10196

Workorder No.: 104672

RE: Caltrans Dumbarton Bridge, E8435-06-18

Attention: John Love

Enclosed are the results for sample(s) received on March 21, 2009 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter and the case narrative are an integral part of this analytical report and cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Project: Caltrans Dumbarton Bridge, E8435-06-18
Lab Order: 104672

CASE NARRATIVE

Analytical Comments for Method 6010

Dilution was necessary for sample 104672-001E, due to sample matrix.

RPD for Duplicate (DUP) is outside criteria for sample 104672-001EDUP; however, the Laboratory Control Sample (LCS) validated the analytical batch.

Analytical Comments for Method 8270

Surrogate recovery biased high for sample 104672-001C, possibly due to matrix interferences; however the results were non-detect (ND) for analytes of interest and reanalysis of the sample was not necessary.

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E20BGW
Lab Order:	104672	**Collection Date:**	3/19/2009 9:10:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104672-001A		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS11_090325A QC Batch: A09VW055 PrepDate: Analyst: **SLL**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	3/25/2009 05:46 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	3/25/2009 05:46 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	3/25/2009 05:46 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	3/25/2009 05:46 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	3/25/2009 05:46 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	3/25/2009 05:46 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	3/25/2009 05:46 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	3/25/2009 05:46 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	3/25/2009 05:46 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	3/25/2009 05:46 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	3/25/2009 05:46 PM
1,2-Dibromo-3-chloropropane	ND	0.50		µg/L	1	3/25/2009 05:46 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	3/25/2009 05:46 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	3/25/2009 05:46 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	3/25/2009 05:46 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	3/25/2009 05:46 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	3/25/2009 05:46 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	3/25/2009 05:46 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	3/25/2009 05:46 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	3/25/2009 05:46 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	3/25/2009 05:46 PM
2-Chlorotoluene	ND	0.50		µg/L	1	3/25/2009 05:46 PM
4-Chlorotoluene	ND	0.50		µg/L	1	3/25/2009 05:46 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	3/25/2009 05:46 PM
Benzene	ND	0.50		µg/L	1	3/25/2009 05:46 PM
Bromobenzene	ND	0.50		µg/L	1	3/25/2009 05:46 PM
Bromodichloromethane	ND	0.50		µg/L	1	3/25/2009 05:46 PM
Bromoform	ND	0.50		µg/L	1	3/25/2009 05:46 PM
Bromomethane	ND	0.50		µg/L	1	3/25/2009 05:46 PM
Carbon tetrachloride	ND	0.50		µg/L	1	3/25/2009 05:46 PM
Chlorobenzene	ND	0.50		µg/L	1	3/25/2009 05:46 PM
Chloroethane	ND	0.50		µg/L	1	3/25/2009 05:46 PM
Chloroform	ND	0.50		µg/L	1	3/25/2009 05:46 PM
Chloromethane	ND	0.50		µg/L	1	3/25/2009 05:46 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	3/25/2009 05:46 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E20BGW
Lab Order:	104672	**Collection Date:**	3/19/2009 9:10:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104672-001A		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS11_090325A QC Batch: A09VW055 PrepDate: Analyst: **SLL**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
cis-1,3-Dichloropropene	ND	0.50		µg/L	1	3/25/2009 05:46 PM
Dibromochloromethane	ND	0.50		µg/L	1	3/25/2009 05:46 PM
Dibromomethane	ND	0.50		µg/L	1	3/25/2009 05:46 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	3/25/2009 05:46 PM
Ethylbenzene	ND	0.50		µg/L	1	3/25/2009 05:46 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	3/25/2009 05:46 PM
Isopropylbenzene	ND	0.50		µg/L	1	3/25/2009 05:46 PM
m,p-Xylene	ND	1.0		µg/L	1	3/25/2009 05:46 PM
Methylene chloride	ND	1.0		µg/L	1	3/25/2009 05:46 PM
n-Butylbenzene	ND	0.50		µg/L	1	3/25/2009 05:46 PM
n-Propylbenzene	ND	0.50		µg/L	1	3/25/2009 05:46 PM
Naphthalene	ND	0.50		µg/L	1	3/25/2009 05:46 PM
o-Xylene	ND	0.50		µg/L	1	3/25/2009 05:46 PM
sec-Butylbenzene	ND	0.50		µg/L	1	3/25/2009 05:46 PM
Styrene	ND	0.50		µg/L	1	3/25/2009 05:46 PM
tert-Butylbenzene	ND	0.50		µg/L	1	3/25/2009 05:46 PM
Tetrachloroethene	ND	0.50		µg/L	1	3/25/2009 05:46 PM
Toluene	ND	0.50		µg/L	1	3/25/2009 05:46 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	3/25/2009 05:46 PM
Trichloroethene	ND	0.50		µg/L	1	3/25/2009 05:46 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	3/25/2009 05:46 PM
Vinyl chloride	ND	0.50		µg/L	1	3/25/2009 05:46 PM
Surr: 1,2-Dichloroethane-d4	93.1	70-130		%REC	1	3/25/2009 05:46 PM
Surr: 4-Bromofluorobenzene	73.0	70-130		%REC	1	3/25/2009 05:46 PM
Surr: Dibromofluoromethane	94.1	70-130		%REC	1	3/25/2009 05:46 PM
Surr: Toluene-d8	93.0	70-130		%REC	1	3/25/2009 05:46 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E20BGW
Lab Order:	104672	**Collection Date:**	3/19/2009 9:10:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104672-001B		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
GASOLINE RANGE ORGANICS BY GC/FID						
		EPA 8015B(M)				
RunID: GC6_090325A	QC Batch: I09VW059			PrepDate:		Analyst: **BD**
GRO	ND	0.050		mg/L	1	3/25/2009 11:46 PM
Surr: Bromofluorobenzene (FID)	91.9	71-130		%REC	1	3/25/2009 11:46 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E20BGW
Lab Order:	104672	**Collection Date:**	3/19/2009 9:10:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104672-001C		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3510C **EPA 8270C**

RunID: MS 13_090324B QC Batch: 54166 PrepDate: 3/24/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,2,4-Trichlorobenzene	ND	10		µg/L	1	3/25/2009 01:53 PM
1,2-Dichlorobenzene	ND	10		µg/L	1	3/25/2009 01:53 PM
1,3-Dichlorobenzene	ND	10		µg/L	1	3/25/2009 01:53 PM
1,4-Dichlorobenzene	ND	10		µg/L	1	3/25/2009 01:53 PM
2,4,5-Trichlorophenol	ND	10		µg/L	1	3/25/2009 01:53 PM
2,4,6-Trichlorophenol	ND	10		µg/L	1	3/25/2009 01:53 PM
2,4-Dichlorophenol	ND	10		µg/L	1	3/25/2009 01:53 PM
2,4-Dimethylphenol	ND	10		µg/L	1	3/25/2009 01:53 PM
2,4-Dinitrophenol	ND	50		µg/L	1	3/25/2009 01:53 PM
2,4-Dinitrotoluene	ND	10		µg/L	1	3/25/2009 01:53 PM
2,6-Dinitrotoluene	ND	10		µg/L	1	3/25/2009 01:53 PM
2-Chloronaphthalene	ND	10		µg/L	1	3/25/2009 01:53 PM
2-Chlorophenol	ND	10		µg/L	1	3/25/2009 01:53 PM
2-Methylnaphthalene	ND	10		µg/L	1	3/25/2009 01:53 PM
2-Methylphenol	ND	10		µg/L	1	3/25/2009 01:53 PM
2-Nitroaniline	ND	50		µg/L	1	3/25/2009 01:53 PM
2-Nitrophenol	ND	10		µg/L	1	3/25/2009 01:53 PM
3,3´-Dichlorobenzidine	ND	20		µg/L	1	3/25/2009 01:53 PM
3-Nitroaniline	ND	50		µg/L	1	3/25/2009 01:53 PM
4,6-Dinitro-2-methylphenol	ND	50		µg/L	1	3/25/2009 01:53 PM
4-Bromophenyl-phenylether	ND	10		µg/L	1	3/25/2009 01:53 PM
4-Chloro-3-methylphenol	ND	50		µg/L	1	3/25/2009 01:53 PM
4-Chloroaniline	ND	20		µg/L	1	3/25/2009 01:53 PM
4-Chlorophenyl-phenylether	ND	10		µg/L	1	3/25/2009 01:53 PM
4-Methylphenol	ND	10		µg/L	1	3/25/2009 01:53 PM
4-Nitroaniline	ND	20		µg/L	1	3/25/2009 01:53 PM
4-Nitrophenol	ND	50		µg/L	1	3/25/2009 01:53 PM
Acenaphthene	ND	10		µg/L	1	3/25/2009 01:53 PM
Acenaphthylene	ND	10		µg/L	1	3/25/2009 01:53 PM
Anthracene	ND	10		µg/L	1	3/25/2009 01:53 PM
Benzidine (M)	ND	50		µg/L	1	3/25/2009 01:53 PM
Benzo(a)anthracene	ND	10		µg/L	1	3/25/2009 01:53 PM
Benzo(a)pyrene	ND	10		µg/L	1	3/25/2009 01:53 PM
Benzo(b)fluoranthene	ND	10		µg/L	1	3/25/2009 01:53 PM
Benzo(g,h,i)perylene	ND	10		µg/L	1	3/25/2009 01:53 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E20BGW
Lab Order:	104672	**Collection Date:**	3/19/2009 9:10:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104672-001C		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3510C **EPA 8270C**

RunID: MS 13_090324B QC Batch: 54166 PrepDate: 3/24/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Benzo(k)fluoranthene	ND	10		µg/L	1	3/25/2009 01:53 PM
Benzoic acid	ND	50		µg/L	1	3/25/2009 01:53 PM
Benzyl alcohol	ND	20		µg/L	1	3/25/2009 01:53 PM
Bis(2-chloroethoxy)methane	ND	10		µg/L	1	3/25/2009 01:53 PM
Bis(2-chloroethyl)ether	ND	10		µg/L	1	3/25/2009 01:53 PM
Bis(2-chloroisopropyl)ether	ND	10		µg/L	1	3/25/2009 01:53 PM
Bis(2-ethylhexyl)phthalate	ND	10		µg/L	1	3/25/2009 01:53 PM
Butylbenzylphthalate	ND	10		µg/L	1	3/25/2009 01:53 PM
Chrysene	ND	10		µg/L	1	3/25/2009 01:53 PM
Di-n-butylphthalate	ND	10		µg/L	1	3/25/2009 01:53 PM
Di-n-octylphthalate	ND	10		µg/L	1	3/25/2009 01:53 PM
Dibenz(a,h)anthracene	ND	10		µg/L	1	3/25/2009 01:53 PM
Dibenzofuran	ND	10		µg/L	1	3/25/2009 01:53 PM
Diethylphthalate	ND	10		µg/L	1	3/25/2009 01:53 PM
Dimethylphthalate	ND	10		µg/L	1	3/25/2009 01:53 PM
Fluoranthene	ND	10		µg/L	1	3/25/2009 01:53 PM
Fluorene	ND	10		µg/L	1	3/25/2009 01:53 PM
Hexachlorobenzene	ND	10		µg/L	1	3/25/2009 01:53 PM
Hexachlorobutadiene	ND	20		µg/L	1	3/25/2009 01:53 PM
Hexachlorocyclopentadiene	ND	10		µg/L	1	3/25/2009 01:53 PM
Hexachloroethane	ND	10		µg/L	1	3/25/2009 01:53 PM
Indeno(1,2,3-cd)pyrene	ND	10		µg/L	1	3/25/2009 01:53 PM
Isophorone	ND	10		µg/L	1	3/25/2009 01:53 PM
N-Nitrosodi-n-propylamine	ND	10		µg/L	1	3/25/2009 01:53 PM
N-Nitrosodiphenylamine	ND	10		µg/L	1	3/25/2009 01:53 PM
Naphthalene	ND	10		µg/L	1	3/25/2009 01:53 PM
Nitrobenzene	ND	10		µg/L	1	3/25/2009 01:53 PM
Pentachlorophenol	ND	50		µg/L	1	3/25/2009 01:53 PM
Phenanthrene	ND	10		µg/L	1	3/25/2009 01:53 PM
Phenol	ND	10		µg/L	1	3/25/2009 01:53 PM
Pyrene	ND	10		µg/L	1	3/25/2009 01:53 PM
Surr: 1,2-Dichlorobenzene-d4	73.2	42-98		%REC	1	3/25/2009 01:53 PM
Surr: 2,4,6-Tribromophenol	99.8	60-128		%REC	1	3/25/2009 01:53 PM
Surr: 2-Chlorophenol-d4	78.0	43-102		%REC	1	3/25/2009 01:53 PM
Surr: 2-Fluorobiphenyl	86.6	50-108		%REC	1	3/25/2009 01:53 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E20BGW
Lab Order:	104672	**Collection Date:**	3/19/2009 9:10:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104672-001C		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 3510C				**EPA 8270C**		
RunID: MS 13_090324B	QC Batch: 54166			PrepDate: 3/24/2009	Analyst: **DMP**	
Surr: 2-Fluorophenol	57.3	22-69		%REC	1	3/25/2009 01:53 PM
Surr: 4-Terphenyl-d14	103	66-130		%REC	1	3/25/2009 01:53 PM
Surr: Nitrobenzene-d5	83.6	47-117		%REC	1	3/25/2009 01:53 PM
Surr: Phenol-d5	50.4	16-50	S	%REC	1	3/25/2009 01:53 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E20BGW
Lab Order:	104672	**Collection Date:**	3/19/2009 9:10:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104672-001D		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
EPA 3510C				**EPA 8015B**		
RunID: GC16_090324C	QC Batch: 54132			PrepDate: 3/23/2009		Analyst: **CBR**
DRO	0.061	0.050		mg/L	1	3/24/2009 05:15 PM
ORO	0.17	0.050		mg/L	1	3/24/2009 05:15 PM
Surr: p-Terphenyl	70.8	35-131		%REC	1	3/24/2009 05:15 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E20BGW
Lab Order:	104672	**Collection Date:**	3/19/2009 9:10:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104672-001E		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3010A			**EPA 6010B**		
RunID: ICP8_090326A	QC Batch: 54221			PrepDate:	3/25/2009	Analyst: **CL**
Antimony	0.035	0.025		mg/L	5	3/26/2009 12:25 PM
Arsenic	ND	0.050		mg/L	5	3/26/2009 12:25 PM
Barium	0.37	0.015		mg/L	5	3/26/2009 12:25 PM
Beryllium	ND	0.015		mg/L	5	3/26/2009 12:25 PM
Cadmium	ND	0.015		mg/L	5	3/26/2009 12:25 PM
Chromium	ND	0.015		mg/L	5	3/26/2009 12:25 PM
Cobalt	0.087	0.015		mg/L	5	3/26/2009 12:25 PM
Copper	0.085	0.025		mg/L	5	3/26/2009 12:25 PM
Lead	ND	0.025		mg/L	5	3/26/2009 12:25 PM
Molybdenum	ND	0.025		mg/L	5	3/26/2009 12:25 PM
Nickel	0.080	0.025		mg/L	5	3/26/2009 12:25 PM
Selenium	ND	0.050		mg/L	5	3/26/2009 12:25 PM
Silver	ND	0.015		mg/L	5	3/26/2009 12:25 PM
Thallium	ND	0.075		mg/L	5	3/26/2009 12:25 PM
Vanadium	0.045	0.015		mg/L	5	3/26/2009 12:25 PM
Zinc	0.055	0.050		mg/L	5	3/26/2009 12:25 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7470A		
RunID: AA1_090327H	QC Batch: 54279			PrepDate:	3/27/2009	Analyst: **RQ**
Mercury	ND	0.20		µg/L	1	3/27/2009 05:02 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E20BGW
Lab Order:	104672	**Collection Date:**	3/19/2009 9:10:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104672-001F		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
TOTAL FILTERABLE RESIDUE						
		SM2540C				
RunID: WETCHEM_090324E	QC Batch: 54245			PrepDate: 3/24/2009	Analyst: **DDL**	
Total Dissolved Solids (Residue, Filterable)	30000	200		mg/L	1	3/24/2009 03:00 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E20BGW
Lab Order:	104672	**Collection Date:**	3/19/2009 9:10:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104672-001G		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
CYANIDE, TOTAL						
		SM4500-CN E				
RunID: WETCHEM3_090327B	QC Batch: 54306			PrepDate:	3/26/2009	Analyst: **MFP**
Cyanide	ND	0.010		mg/L	1	3/27/2009

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E20BGW
Lab Order:	104672	**Collection Date:**	3/19/2009 9:10:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104672-001H		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
SULFIDE, DISSOLVED						
		SM4500-S= D				
RunID: WETCHEM3_090325D	QC Batch: R107551			PrepDate: 3/25/2009		Analyst: **MFP**
Sulfide	ND	0.010		mg/L	1	3/25/2009

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E20BGW
Lab Order:	104672	**Collection Date:**	3/19/2009 9:10:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104672-001I		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
OIL & GREASE						
		EPA 1664 _HEM				
RunID: WETCHEM2_090327B	QC Batch: 54301			PrepDate:	3/27/2009	Analyst: **KXV**
Oil & Grease	ND	4.6		mg/L	1	3/27/2009

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	Trip Blank (E20BGW)
Lab Order:	104672	**Collection Date:**	3/19/2009 4:00:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104672-002A		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS11_090325A QC Batch: A09VW055 PrepDate: Analyst: **SLL**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	3/25/2009 05:27 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	3/25/2009 05:27 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	3/25/2009 05:27 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	3/25/2009 05:27 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	3/25/2009 05:27 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	3/25/2009 05:27 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	3/25/2009 05:27 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	3/25/2009 05:27 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	3/25/2009 05:27 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	3/25/2009 05:27 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	3/25/2009 05:27 PM
1,2-Dibromo-3-chloropropane	ND	0.50		µg/L	1	3/25/2009 05:27 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	3/25/2009 05:27 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	3/25/2009 05:27 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	3/25/2009 05:27 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	3/25/2009 05:27 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	3/25/2009 05:27 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	3/25/2009 05:27 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	3/25/2009 05:27 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	3/25/2009 05:27 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	3/25/2009 05:27 PM
2-Chlorotoluene	ND	0.50		µg/L	1	3/25/2009 05:27 PM
4-Chlorotoluene	ND	0.50		µg/L	1	3/25/2009 05:27 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	3/25/2009 05:27 PM
Benzene	ND	0.50		µg/L	1	3/25/2009 05:27 PM
Bromobenzene	ND	0.50		µg/L	1	3/25/2009 05:27 PM
Bromodichloromethane	ND	0.50		µg/L	1	3/25/2009 05:27 PM
Bromoform	ND	0.50		µg/L	1	3/25/2009 05:27 PM
Bromomethane	ND	0.50		µg/L	1	3/25/2009 05:27 PM
Carbon tetrachloride	ND	0.50		µg/L	1	3/25/2009 05:27 PM
Chlorobenzene	ND	0.50		µg/L	1	3/25/2009 05:27 PM
Chloroethane	ND	0.50		µg/L	1	3/25/2009 05:27 PM
Chloroform	ND	0.50		µg/L	1	3/25/2009 05:27 PM
Chloromethane	ND	0.50		µg/L	1	3/25/2009 05:27 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	3/25/2009 05:27 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	Trip Blank (E20BGW)
Lab Order:	104672	**Collection Date:**	3/19/2009 4:00:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104672-002A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS11_090325A	QC Batch: A09VW055			PrepDate:		Analyst: **SLL**
cis-1,3-Dichloropropene	ND	0.50		µg/L	1	3/25/2009 05:27 PM
Dibromochloromethane	ND	0.50		µg/L	1	3/25/2009 05:27 PM
Dibromomethane	ND	0.50		µg/L	1	3/25/2009 05:27 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	3/25/2009 05:27 PM
Ethylbenzene	ND	0.50		µg/L	1	3/25/2009 05:27 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	3/25/2009 05:27 PM
Isopropylbenzene	ND	0.50		µg/L	1	3/25/2009 05:27 PM
m,p-Xylene	ND	1.0		µg/L	1	3/25/2009 05:27 PM
Methylene chloride	ND	1.0		µg/L	1	3/25/2009 05:27 PM
n-Butylbenzene	ND	0.50		µg/L	1	3/25/2009 05:27 PM
n-Propylbenzene	ND	0.50		µg/L	1	3/25/2009 05:27 PM
Naphthalene	ND	0.50		µg/L	1	3/25/2009 05:27 PM
o-Xylene	ND	0.50		µg/L	1	3/25/2009 05:27 PM
sec-Butylbenzene	ND	0.50		µg/L	1	3/25/2009 05:27 PM
Styrene	ND	0.50		µg/L	1	3/25/2009 05:27 PM
tert-Butylbenzene	ND	0.50		µg/L	1	3/25/2009 05:27 PM
Tetrachloroethene	ND	0.50		µg/L	1	3/25/2009 05:27 PM
Toluene	0.58	0.50		µg/L	1	3/25/2009 05:27 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	3/25/2009 05:27 PM
Trichloroethene	ND	0.50		µg/L	1	3/25/2009 05:27 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	3/25/2009 05:27 PM
Vinyl chloride	ND	0.50		µg/L	1	3/25/2009 05:27 PM
Surr: 1,2-Dichloroethane-d4	80.6	70-130		%REC	1	3/25/2009 05:27 PM
Surr: 4-Bromofluorobenzene	79.7	70-130		%REC	1	3/25/2009 05:27 PM
Surr: Dibromofluoromethane	83.7	70-130		%REC	1	3/25/2009 05:27 PM
Surr: Toluene-d8	88.6	70-130		%REC	1	3/25/2009 05:27 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	Trip Blank (E20BGW)
Lab Order:	104672	**Collection Date:**	3/19/2009 4:00:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104672-002B		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
GASOLINE RANGE ORGANICS BY GC/FID						
		EPA 8015B(M)				
RunID: GC6_090325A	QC Batch: I09VW059			PrepDate:		Analyst: **BD**
GRO	ND	0.050		mg/L	1	3/25/2009 07:43 PM
Surr: Bromofluorobenzene (FID)	104	71-130		%REC	1	3/25/2009 07:43 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Geocon Consultants, Inc.
Work Order: 104672
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 160.1_2540C_W

Sample ID: **104591-003D-DUP**	SampType: **DUP**	TestCode: **160.1_2540C**	Units: **mg/L**	Prep Date: **3/24/2009**	RunNo: **107417**
Client ID: **ZZZZZZ**	Batch ID: **54245**	TestNo: **SM2540C**		Analysis Date: **3/24/2009**	SeqNo: **1682672**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	918.000	20						894.0	2.65	10	

Sample ID: **LCS-54245**	SampType: **LCS**	TestCode: **160.1_2540C**	Units: **mg/L**	Prep Date: **3/24/2009**	RunNo: **107417**
Client ID: **LCSW**	Batch ID: **54245**	TestNo: **SM2540C**		Analysis Date: **3/24/2009**	SeqNo: **1682679**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	984.000	10	970.0	0	101	80	120				

Sample ID: **MB-54245**	SampType: **MBLK**	TestCode: **160.1_2540C**	Units: **mg/L**	Prep Date: **3/24/2009**	RunNo: **107417**
Client ID: **PBW**	Batch ID: **54245**	TestNo: **SM2540C**		Analysis Date: **3/24/2009**	SeqNo: **1682680**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	ND	10									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104672
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 1664_HEM_W

Sample ID: **MB-54301**	SampType: **MBLK**	TestCode: **1664_HEM_**	Units: **mg/L**	Prep Date: **3/27/2009**	RunNo: **107539**
Client ID: **PBW**	Batch ID: **54301**	TestNo: **EPA 1664 _H**		Analysis Date: **3/27/2009**	SeqNo: **1684957**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Oil & Grease	ND	4.0									

Sample ID: **LCS-54301**	SampType: **LCS**	TestCode: **1664_HEM_**	Units: **mg/L**	Prep Date: **3/27/2009**	RunNo: **107539**
Client ID: **LCSW**	Batch ID: **54301**	TestNo: **EPA 1664 _H**		Analysis Date: **3/27/2009**	SeqNo: **1684958**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Oil & Grease	33.900	4.0	40.00	0	84.8	78	114				

Sample ID: **MB-54301-MS**	SampType: **MS**	TestCode: **1664_HEM_**	Units: **mg/L**	Prep Date: **3/27/2009**	RunNo: **107539**
Client ID: **ZZZZZZ**	Batch ID: **54301**	TestNo: **EPA 1664 _H**		Analysis Date: **3/27/2009**	SeqNo: **1684962**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Oil & Grease	36.100	4.0	40.00	0	90.3	78	114				

Sample ID: **MB-54301-MSD**	SampType: **MSD**	TestCode: **1664_HEM_**	Units: **mg/L**	Prep Date: **3/27/2009**	RunNo: **107539**
Client ID: **ZZZZZZ**	Batch ID: **54301**	TestNo: **EPA 1664 _H**		Analysis Date: **3/27/2009**	SeqNo: **1684963**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Oil & Grease	34.800	4.0	40.00	0	87.0	78	114	36.10	3.67	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104672
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 335.2_4500CNE_W

Sample ID: **104672-001GDUP**	SampType: **DUP**	TestCode: **335.2_4500C**	Units: **mg/L**	Prep Date: **3/26/2009**	RunNo: **107557**
Client ID: **E20BGW**	Batch ID: **54306**	TestNo: **SM4500-CN E**		Analysis Date: **3/27/2009**	SeqNo: **1685204**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide	ND	0.010						0	0	30	

Sample ID: **104710-004AMS**	SampType: **MS**	TestCode: **335.2_4500C**	Units: **mg/L**	Prep Date: **3/26/2009**	RunNo: **107557**
Client ID: **ZZZZZZ**	Batch ID: **54306**	TestNo: **SM4500-CN E**		Analysis Date: **3/27/2009**	SeqNo: **1685207**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide	0.376	0.010	0.4000	0	94.0	80	120				

Sample ID: **104710-004AMSD**	SampType: **MSD**	TestCode: **335.2_4500C**	Units: **mg/L**	Prep Date: **3/26/2009**	RunNo: **107557**
Client ID: **ZZZZZZ**	Batch ID: **54306**	TestNo: **SM4500-CN E**		Analysis Date: **3/27/2009**	SeqNo: **1685208**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide	0.386	0.010	0.4000	0	96.5	80	120	0.3760	2.62	20	

Sample ID: **LCS-54306**	SampType: **LCS**	TestCode: **335.2_4500C**	Units: **mg/L**	Prep Date: **3/26/2009**	RunNo: **107557**
Client ID: **LCSW**	Batch ID: **54306**	TestNo: **SM4500-CN E**		Analysis Date: **3/27/2009**	SeqNo: **1685209**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide	0.394	0.010	0.4000	0	98.5	80	120				

Sample ID: **MB-54306**	SampType: **MBLK**	TestCode: **335.2_4500C**	Units: **mg/L**	Prep Date: **3/26/2009**	RunNo: **107557**
Client ID: **PBW**	Batch ID: **54306**	TestNo: **SM4500-CN E**		Analysis Date: **3/27/2009**	SeqNo: **1685210**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide	ND	0.010									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104672
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 376.2_4500S2_WD

Sample ID: **104670-001HDUP**	SampType: **DUP**	TestCode: **376.2_4500S2**	Units: **mg/L**	Prep Date: **3/25/2009**	RunNo: **107551**
Client ID: **ZZZZZZ**	Batch ID: **R107551**	TestNo: **SM4500-S= D**		Analysis Date: **3/25/2009**	SeqNo: **1685133**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfide	ND	0.010						0.005000	0	30	

Sample ID: **104670-001HMS**	SampType: **MS**	TestCode: **376.2_4500S2**	Units: **mg/L**	Prep Date: **3/25/2009**	RunNo: **107551**
Client ID: **ZZZZZZ**	Batch ID: **R107551**	TestNo: **SM4500-S= D**		Analysis Date: **3/25/2009**	SeqNo: **1685134**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfide	0.984	0.010	1.000	0.005000	97.9	70	120				

Sample ID: **104670-001HMSD**	SampType: **MSD**	TestCode: **376.2_4500S2**	Units: **mg/L**	Prep Date: **3/25/2009**	RunNo: **107551**
Client ID: **ZZZZZZ**	Batch ID: **R107551**	TestNo: **SM4500-S= D**		Analysis Date: **3/25/2009**	SeqNo: **1685135**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfide	0.986	0.010	1.000	0.005000	98.1	70	120	0.9840	0.203	20	

Sample ID: **LCS-R107551**	SampType: **LCS**	TestCode: **376.2_4500S2**	Units: **mg/L**	Prep Date: **3/25/2009**	RunNo: **107551**
Client ID: **LCSW**	Batch ID: **R107551**	TestNo: **SM4500-S= D**		Analysis Date: **3/25/2009**	SeqNo: **1685138**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfide	0.985	0.010	1.000	0	98.5	80	120				

Sample ID: **MB-R107551**	SampType: **MBLK**	TestCode: **376.2_4500S2**	Units: **mg/L**	Prep Date: **3/25/2009**	RunNo: **107551**
Client ID: **PBW**	Batch ID: **R107551**	TestNo: **SM4500-S= D**		Analysis Date: **3/25/2009**	SeqNo: **1685139**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfide	ND	0.010									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104672
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_W

Sample ID: **MB-54221** SampType: **MBLK** TestCode: **6010_W** Units: **mg/L** Prep Date: **3/25/2009** RunNo: **107447**
Client ID: **PBW** Batch ID: **54221** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **3/26/2009** SeqNo: **1683193**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	0.0050									
Arsenic	ND	0.010									
Barium	ND	0.0030									
Beryllium	ND	0.0030									
Cadmium	ND	0.0030									
Chromium	ND	0.0030									
Cobalt	ND	0.0030									
Copper	ND	0.0050									
Lead	ND	0.0050									
Molybdenum	ND	0.0050									
Nickel	ND	0.0050									
Selenium	ND	0.010									
Silver	ND	0.0030									
Thallium	ND	0.015									
Vanadium	ND	0.0030									
Zinc	ND	0.010									

Sample ID: **LCS-54221** SampType: **LCS** TestCode: **6010_W** Units: **mg/L** Prep Date: **3/25/2009** RunNo: **107447**
Client ID: **LCSW** Batch ID: **54221** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **3/26/2009** SeqNo: **1683194**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	1.029	0.0050	1.000	0	103	85	115				
Arsenic	1.013	0.010	1.000	0	101	85	115				
Barium	1.022	0.0030	1.000	0	102	85	115				
Beryllium	1.009	0.0030	1.000	0	101	85	115				
Cadmium	1.000	0.0030	1.000	0	100	85	115				
Chromium	0.932	0.0030	1.000	0	93.2	85	115				
Cobalt	1.028	0.0030	1.000	0	103	85	115				
Copper	1.036	0.0050	1.000	0	104	85	115				
Lead	1.025	0.0050	1.000	0	103	85	115				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104672
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_W

Sample ID: **LCS-54221** SampType: **LCS** TestCode: **6010_W** Units: **mg/L** Prep Date: **3/25/2009** RunNo: **107447**
Client ID: **LCSW** Batch ID: **54221** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **3/26/2009** SeqNo: **1683194**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	1.011	0.0050	1.000	0	101	85	115				
Nickel	0.999	0.0050	1.000	0	99.9	85	115				
Selenium	0.981	0.010	1.000	0	98.1	85	115				
Silver	1.007	0.0030	1.000	0	101	85	115				
Thallium	0.916	0.015	1.000	0	91.6	85	115				
Vanadium	1.027	0.0030	1.000	0	103	85	115				
Zinc	0.992	0.010	1.000	0	99.2	85	115				

Sample ID: **104692-008AMS** SampType: **MS** TestCode: **6010_W** Units: **mg/L** Prep Date: **3/25/2009** RunNo: **107447**
Client ID: **ZZZZZZ** Batch ID: **54221** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **3/26/2009** SeqNo: **1683198**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	2.626	0.0050	2.500	0	105	64	130				
Arsenic	2.623	0.010	2.500	0	105	66	128				
Barium	2.559	0.0030	2.500	0.03399	101	60	129				
Beryllium	2.633	0.0030	2.500	0	105	77	118				
Cadmium	2.513	0.0030	2.500	0	101	72	122				
Chromium	2.425	0.0030	2.500	0	97.0	77	116				
Cobalt	2.500	0.0030	2.500	0	100	66	124				
Copper	2.615	0.0050	2.500	0	105	70	130				
Lead	2.563	0.0050	2.500	0	103	71	121				
Molybdenum	2.584	0.0050	2.500	0	103	64	129				
Nickel	2.521	0.0050	2.500	0.002789	101	63	125				
Selenium	2.561	0.010	2.500	0	102	73	124				
Silver	2.588	0.0030	2.500	0	104	60	138				
Thallium	2.385	0.015	2.500	0	95.4	66	125				
Vanadium	2.628	0.0030	2.500	0.001706	105	79	118				
Zinc	2.532	0.010	2.500	0.01241	101	71	120				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Geocon Consultants, Inc.
Work Order: 104672
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_W

Sample ID: **104692-008AMSD** SampType: **MSD** TestCode: **6010_W** Units: **mg/L** Prep Date: **3/25/2009** RunNo: **107447**
Client ID: **ZZZZZZ** Batch ID: **54221** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **3/26/2009** SeqNo: **1683199**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	2.589	0.0050	2.500	0	104	64	130	2.626	1.40	20	
Arsenic	2.585	0.010	2.500	0	103	66	128	2.623	1.45	20	
Barium	2.567	0.0030	2.500	0.03399	101	60	129	2.559	0.307	20	
Beryllium	2.607	0.0030	2.500	0	104	77	118	2.633	0.976	20	
Cadmium	2.513	0.0030	2.500	0	101	72	122	2.513	0.0195	20	
Chromium	2.433	0.0030	2.500	0	97.3	77	116	2.425	0.315	20	
Cobalt	2.502	0.0030	2.500	0	100	66	124	2.500	0.0619	20	
Copper	2.633	0.0050	2.500	0	105	70	130	2.615	0.684	20	
Lead	2.518	0.0050	2.500	0	101	71	121	2.563	1.77	20	
Molybdenum	2.595	0.0050	2.500	0	104	64	129	2.584	0.415	20	
Nickel	2.515	0.0050	2.500	0.002789	101	63	125	2.521	0.240	20	
Selenium	2.524	0.010	2.500	0	101	73	124	2.561	1.44	20	
Silver	2.598	0.0030	2.500	0	104	60	138	2.588	0.365	20	
Thallium	2.361	0.015	2.500	0	94.5	66	125	2.385	0.999	20	
Vanadium	2.637	0.0030	2.500	0.001706	105	79	118	2.628	0.345	20	
Zinc	2.528	0.010	2.500	0.01241	101	71	120	2.532	0.125	20	

Sample ID: **104672-001EDUP** SampType: **DUP** TestCode: **6010_W** Units: **mg/L** Prep Date: **3/25/2009** RunNo: **107447**
Client ID: **E20BGW** Batch ID: **54221** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **3/26/2009** SeqNo: **1683313**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	0.025						0.005803	0	20	
Arsenic	ND	0.050						0.01317	0	20	
Barium	0.381	0.015						0.3123	19.8	20	
Beryllium	ND	0.015						0	0	20	
Cadmium	ND	0.015						0	0	20	
Chromium	ND	0.015						0.006480	0	20	
Cobalt	0.091	0.015						0.07202	22.8	20	R
Copper	0.089	0.025						0.08578	4.10	20	
Lead	ND	0.025						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104672
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_W

Sample ID: **104672-001EDUP** SampType: **DUP** TestCode: **6010_W** Units: **mg/L** Prep Date: **3/25/2009** RunNo: **107447**
Client ID: **E20BGW** Batch ID: **54221** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **3/26/2009** SeqNo: **1683313**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	ND	0.025						0	0	20	
Nickel	0.082	0.025						0.06387	25.4	20	R
Selenium	0.060	0.050						0.03332	57.8	20	R
Silver	0.012	0.015						0.01189	0	20	
Thallium	ND	0.075						0	0	20	
Vanadium	0.046	0.015						0.03931	16.6	20	
Zinc	0.056	0.050						0.03896	36.1	20	R

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104672
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 7470_W

Sample ID: **MB-54279**	SampType: **MBLK**	TestCode: **7470_W**	Units: **µg/L**	Prep Date: **3/27/2009**	RunNo: **107548**
Client ID: **PBW**	Batch ID: **54279**	TestNo: **EPA 7470A**		Analysis Date: **3/27/2009**	SeqNo: **1685048**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.20									

Sample ID: **LCS-54279**	SampType: **LCS**	TestCode: **7470_W**	Units: **µg/L**	Prep Date: **3/27/2009**	RunNo: **107548**
Client ID: **LCSW**	Batch ID: **54279**	TestNo: **EPA 7470A**		Analysis Date: **3/27/2009**	SeqNo: **1685049**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	11.236	0.20	10.00	0	112	85	115				

Sample ID: **104758-001F-MS**	SampType: **MS**	TestCode: **7470_W**	Units: **µg/L**	Prep Date: **3/27/2009**	RunNo: **107548**
Client ID: **ZZZZZZ**	Batch ID: **54279**	TestNo: **EPA 7470A**		Analysis Date: **3/27/2009**	SeqNo: **1685050**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	10.388	0.20	10.00	0	104	70	130				

Sample ID: **104758-001F-MSD**	SampType: **MSD**	TestCode: **7470_W**	Units: **µg/L**	Prep Date: **3/27/2009**	RunNo: **107548**
Client ID: **ZZZZZZ**	Batch ID: **54279**	TestNo: **EPA 7470A**		Analysis Date: **3/27/2009**	SeqNo: **1685051**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	10.235	0.20	10.00	0	102	70	130	10.39	1.49	20	

Sample ID: **104672-001E-DUP**	SampType: **DUP**	TestCode: **7470_W**	Units: **µg/L**	Prep Date: **3/27/2009**	RunNo: **107548**
Client ID: **E20BGW**	Batch ID: **54279**	TestNo: **EPA 7470A**		Analysis Date: **3/27/2009**	SeqNo: **1685054**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.110	0.20						0.1034	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104672
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_W_DM_LLSGT

Sample ID: **MB-54132**	SampType: **MBLK**	TestCode: **8015_W_DM_**	Units: **mg/L**	Prep Date: **3/23/2009**	RunNo: **107368**
Client ID: **PBW**	Batch ID: **54132**	TestNo: **EPA 8015B**	**EPA 3510C**	Analysis Date: **3/24/2009**	SeqNo: **1681880**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	ND	0.050									
ORO	ND	0.050									
Surr: p-Terphenyl	0.061		0.08000		76.1	35	131				

Sample ID: **LCS-54132**	SampType: **LCS**	TestCode: **8015_W_DM_**	Units: **mg/L**	Prep Date: **3/23/2009**	RunNo: **107368**
Client ID: **LCSW**	Batch ID: **54132**	TestNo: **EPA 8015B**	**EPA 3510C**	Analysis Date: **3/24/2009**	SeqNo: **1681881**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	0.834	0.050	1.000	0	83.4	42	118				
Surr: p-Terphenyl	0.048		0.08000		59.4	35	131				

Sample ID: **MB-54132MS**	SampType: **MS**	TestCode: **8015_W_DM_**	Units: **mg/L**	Prep Date: **3/23/2009**	RunNo: **107368**
Client ID: **ZZZZZZ**	Batch ID: **54132**	TestNo: **EPA 8015B**	**EPA 3510C**	Analysis Date: **3/24/2009**	SeqNo: **1681882**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	0.796	0.050	1.000	0	79.6	42	118				
Surr: p-Terphenyl	0.047		0.08000		59.3	35	131				

Sample ID: **MB-54132MSD**	SampType: **MSD**	TestCode: **8015_W_DM_**	Units: **mg/L**	Prep Date: **3/23/2009**	RunNo: **107368**
Client ID: **ZZZZZZ**	Batch ID: **54132**	TestNo: **EPA 8015B**	**EPA 3510C**	Analysis Date: **3/24/2009**	SeqNo: **1681883**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	0.779	0.050	1.000	0	77.9	42	118	0.7963	2.14	20	
Surr: p-Terphenyl	0.045		0.08000		55.9	35	131		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104672
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_W_GP LL

Sample ID: **I090324LCS1** SampType: **LCS** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107446**
Client ID: **LCSW** Batch ID: **I09VW059** TestNo: **EPA 8015B(M** Analysis Date: **3/25/2009** SeqNo: **1683167**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	0.918	0.050	1.000	0	91.8	69	125				
Surr: Bromofluorobenzene (FID)	107.244		100.0		107	71	130				

Sample ID: **I090324MB1MS** SampType: **MS** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107446**
Client ID: **ZZZZZZ** Batch ID: **I09VW059** TestNo: **EPA 8015B(M** Analysis Date: **3/25/2009** SeqNo: **1683168**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	0.881	0.050	1.000	0	88.1	69	125				
Surr: Bromofluorobenzene (FID)	106.574		100.0		107	71	130				

Sample ID: **I090324MB1MSD** SampType: **MSD** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107446**
Client ID: **ZZZZZZ** Batch ID: **I09VW059** TestNo: **EPA 8015B(M** Analysis Date: **3/25/2009** SeqNo: **1683169**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	0.933	0.050	1.000	0	93.3	69	125	0.8810	5.73	20	
Surr: Bromofluorobenzene (FID)	106.811		100.0		107	71	130		0	0	

Sample ID: **I090324MB1** SampType: **MBLK** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107446**
Client ID: **PBW** Batch ID: **I09VW059** TestNo: **EPA 8015B(M** Analysis Date: **3/25/2009** SeqNo: **1683170**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	ND	0.050									
Surr: Bromofluorobenzene (FID)	103.794		100.0		104	71	130				

Sample ID: **104704-012BDUP** SampType: **DUP** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107446**
Client ID: **ZZZZZZ** Batch ID: **I09VW059** TestNo: **EPA 8015B(M** Analysis Date: **3/25/2009** SeqNo: **1683177**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	ND	0.050						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104672
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_W_GP LL

Sample ID: **104704-012BDUP** SampType: **DUP** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107446**
Client ID: **ZZZZZZ** Batch ID: **I09VW059** TestNo: **EPA 8015B(M** Analysis Date: **3/25/2009** SeqNo: **1683177**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Bromofluorobenzene (FID)	99.751		100.0		99.8	71	130		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104672
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **A090325LCS1** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107370**
Client ID: **LCSW** Batch ID: **A09VW055** TestNo: **EPA 8260B** Analysis Date: **3/25/2009** SeqNo: **1681894**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	18.000	0.50	20.00	0	90.0	70	130				
Benzene	37.610	0.50	40.00	0	94.0	70	130				
Chlorobenzene	20.210	0.50	20.00	0	101	70	130				
MTBE	18.680	0.50	20.00	0	93.4	70	130				
Toluene	38.430	0.50	40.00	0	96.1	70	130				
Trichloroethene	18.830	0.50	20.00	0	94.2	70	130				
Surr: 1,2-Dichloroethane-d4	21.170		25.00		84.7	70	130				
Surr: 4-Bromofluorobenzene	21.700		25.00		86.8	70	130				
Surr: Dibromofluoromethane	21.360		25.00		85.4	70	130				
Surr: Toluene-d8	23.200		25.00		92.8	70	130				

Sample ID: **A090325MB2MS** SampType: **MS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107370**
Client ID: **ZZZZZZ** Batch ID: **A09VW055** TestNo: **EPA 8260B** Analysis Date: **3/25/2009** SeqNo: **1681895**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	16.710	0.50	20.00	0	83.6	70	130				
Benzene	36.110	0.50	40.00	0	90.3	70	130				
Chlorobenzene	19.150	0.50	20.00	0	95.8	70	130				
Toluene	36.280	0.50	40.00	0	90.7	70	130				
Trichloroethene	17.840	0.50	20.00	0	89.2	70	130				
Surr: 1,2-Dichloroethane-d4	22.120		25.00		88.5	70	130				
Surr: 4-Bromofluorobenzene	22.220		25.00		88.9	70	130				
Surr: Dibromofluoromethane	22.040		25.00		88.2	70	130				
Surr: Toluene-d8	23.270		25.00		93.1	70	130				

Sample ID: **A090325MB2MSD** SampType: **MSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107370**
Client ID: **ZZZZZZ** Batch ID: **A09VW055** TestNo: **EPA 8260B** Analysis Date: **3/25/2009** SeqNo: **1681896**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	16.090	0.50	20.00	0	80.4	70	130	16.71	3.78	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104672
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **A090325MB2MSD** SampType: **MSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107370**
Client ID: **ZZZZZZ** Batch ID: **A09VW055** TestNo: **EPA 8260B** Analysis Date: **3/25/2009** SeqNo: **1681896**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	36.800	0.50	40.00	0	92.0	70	130	36.11	1.89	20	
Chlorobenzene	19.230	0.50	20.00	0	96.2	70	130	19.15	0.417	20	
Toluene	36.830	0.50	40.00	0	92.1	70	130	36.28	1.50	20	
Trichloroethene	17.730	0.50	20.00	0	88.6	70	130	17.84	0.618	20	
Surr: 1,2-Dichloroethane-d4	22.390		25.00		89.6	70	130		0	20	
Surr: 4-Bromofluorobenzene	22.020		25.00		88.1	70	130		0	20	
Surr: Dibromofluoromethane	22.210		25.00		88.8	70	130		0	20	
Surr: Toluene-d8	23.490		25.00		94.0	70	130		0	20	

Sample ID: **A090325MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107370**
Client ID: **PBW** Batch ID: **A09VW055** TestNo: **EPA 8260B** Analysis Date: **3/25/2009** SeqNo: **1681897**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	0.50									
1,1,1-Trichloroethane	ND	0.50									
1,1,2,2-Tetrachloroethane	ND	0.50									
1,1,2-Trichloroethane	ND	0.50									
1,1-Dichloroethane	ND	0.50									
1,1-Dichloroethene	ND	0.50									
1,1-Dichloropropene	ND	0.50									
1,2,3-Trichlorobenzene	ND	0.50									
1,2,3-Trichloropropane	ND	0.50									
1,2,4-Trichlorobenzene	ND	0.50									
1,2,4-Trimethylbenzene	ND	0.50									
1,2-Dibromo-3-chloropropane	ND	0.50									
1,2-Dibromoethane	ND	0.50									
1,2-Dichlorobenzene	ND	0.50									
1,2-Dichloroethane	ND	0.50									
1,2-Dichloropropane	ND	0.50									
1,3,5-Trimethylbenzene	ND	0.50									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104672
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **A090325MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107370**
Client ID: **PBW** Batch ID: **A09VW055** TestNo: **EPA 8260B** Analysis Date: **3/25/2009** SeqNo: **1681897**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,3-Dichlorobenzene	ND	0.50									
1,3-Dichloropropane	ND	0.50									
1,4-Dichlorobenzene	ND	0.50									
2,2-Dichloropropane	ND	0.50									
2-Chlorotoluene	ND	0.50									
4-Chlorotoluene	ND	0.50									
4-Isopropyltoluene	ND	0.50									
Benzene	ND	0.50									
Bromobenzene	ND	0.50									
Bromodichloromethane	ND	0.50									
Bromoform	ND	0.50									
Bromomethane	ND	0.50									
Carbon tetrachloride	ND	0.50									
Chlorobenzene	ND	0.50									
Chloroethane	ND	0.50									
Chloroform	ND	0.50									
Chloromethane	ND	0.50									
cis-1,2-Dichloroethene	ND	0.50									
cis-1,3-Dichloropropene	ND	0.50									
Dibromochloromethane	ND	0.50									
Dibromomethane	ND	0.50									
Dichlorodifluoromethane	ND	0.50									
Ethylbenzene	ND	0.50									
Hexachlorobutadiene	ND	0.50									
Isopropylbenzene	ND	0.50									
m,p-Xylene	ND	1.0									
Methylene chloride	ND	1.0									
n-Butylbenzene	ND	0.50									
n-Propylbenzene	ND	0.50									
Naphthalene	ND	0.50									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104672
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **A090325MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107370**
Client ID: **PBW** Batch ID: **A09VW055** TestNo: **EPA 8260B** Analysis Date: **3/25/2009** SeqNo: **1681897**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
o-Xylene	ND	0.50									
sec-Butylbenzene	ND	0.50									
Styrene	ND	0.50									
tert-Butylbenzene	ND	0.50									
Tetrachloroethene	ND	0.50									
Toluene	ND	0.50									
trans-1,2-Dichloroethene	ND	0.50									
Trichloroethene	ND	0.50									
Trichlorofluoromethane	ND	0.50									
Vinyl chloride	ND	0.50									
Surr: 1,2-Dichloroethane-d4	21.220		25.00		84.9	70	130				
Surr: 4-Bromofluorobenzene	21.340		25.00		85.4	70	130				
Surr: Dibromofluoromethane	22.250		25.00		89.0	70	130				
Surr: Toluene-d8	23.670		25.00		94.7	70	130				

Sample ID: **104670-001A** SampType: **DUP** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107370**
Client ID: **ZZZZZZ** Batch ID: **A09VW055** TestNo: **EPA 8260B** Analysis Date: **3/25/2009** SeqNo: **1682854**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	0.50						0	0	20	
1,1,1-Trichloroethane	ND	0.50						0	0	20	
1,1,2,2-Tetrachloroethane	ND	0.50						0	0	20	
1,1,2-Trichloroethane	ND	0.50						0	0	20	
1,1-Dichloroethane	ND	0.50						0	0	20	
1,1-Dichloroethene	ND	0.50						0	0	20	
1,1-Dichloropropene	ND	0.50						0	0	20	
1,2,3-Trichlorobenzene	ND	0.50						0	0	20	
1,2,3-Trichloropropane	ND	0.50						0	0	20	
1,2,4-Trichlorobenzene	ND	0.50						0	0	20	
1,2,4-Trimethylbenzene	ND	0.50						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104672
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **104670-001A** SampType: **DUP** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107370**
Client ID: **ZZZZZZ** Batch ID: **A09VW055** TestNo: **EPA 8260B** Analysis Date: **3/25/2009** SeqNo: **1682854**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2-Dibromo-3-chloropropane	ND	0.50						0	0	20	
1,2-Dibromoethane	ND	0.50						0	0	20	
1,2-Dichlorobenzene	ND	0.50						0	0	20	
1,2-Dichloroethane	ND	0.50						0	0	20	
1,2-Dichloropropane	ND	0.50						0	0	20	
1,3,5-Trimethylbenzene	ND	0.50						0	0	20	
1,3-Dichlorobenzene	ND	0.50						0	0	20	
1,3-Dichloropropane	ND	0.50						0	0	20	
1,4-Dichlorobenzene	ND	0.50						0	0	20	
2,2-Dichloropropane	ND	0.50						0	0	20	
2-Chlorotoluene	ND	0.50						0	0	20	
4-Chlorotoluene	ND	0.50						0	0	20	
4-Isopropyltoluene	ND	0.50						0	0	20	
Benzene	ND	0.50						0	0	20	
Bromobenzene	ND	0.50						0	0	20	
Bromodichloromethane	ND	0.50						0	0	20	
Bromoform	ND	0.50						0	0	20	
Bromomethane	ND	0.50						0	0	20	
Carbon tetrachloride	ND	0.50						0	0	20	
Chlorobenzene	ND	0.50						0	0	20	
Chloroethane	ND	0.50						0	0	20	
Chloroform	ND	0.50						0	0	20	
Chloromethane	ND	0.50						0	0	20	
cis-1,2-Dichloroethene	ND	0.50						0	0	20	
cis-1,3-Dichloropropene	ND	0.50						0	0	20	
Dibromochloromethane	ND	0.50						0	0	20	
Dibromomethane	ND	0.50						0	0	20	
Dichlorodifluoromethane	ND	0.50						0	0	20	
Ethylbenzene	ND	0.50						0	0	20	
Hexachlorobutadiene	ND	0.50						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104672
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **104670-001A** SampType: **DUP** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107370**
Client ID: **ZZZZZZ** Batch ID: **A09VW055** TestNo: **EPA 8260B** Analysis Date: **3/25/2009** SeqNo: **1682854**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Isopropylbenzene	ND	0.50						0	0	20	
m,p-Xylene	ND	1.0						0	0	20	
Methylene chloride	ND	1.0						0	0	20	
n-Butylbenzene	ND	0.50						0	0	20	
n-Propylbenzene	ND	0.50						0	0	20	
Naphthalene	ND	0.50						0	0	20	
o-Xylene	ND	0.50						0	0	20	
sec-Butylbenzene	ND	0.50						0	0	20	
Styrene	ND	0.50						0	0	20	
tert-Butylbenzene	ND	0.50						0	0	20	
Tetrachloroethene	ND	0.50						0	0	20	
Toluene	ND	0.50						0	0	20	
trans-1,2-Dichloroethene	ND	0.50						0	0	20	
Trichloroethene	ND	0.50						0	0	20	
Trichlorofluoromethane	ND	0.50						0	0	20	
Vinyl chloride	ND	0.50						0	0	20	
Surr: 1,2-Dichloroethane-d4	22.230		25.00		88.9	70	130		0	0	
Surr: 4-Bromofluorobenzene	18.050		25.00		72.2	70	130		0	0	
Surr: Dibromofluoromethane	22.230		25.00		88.9	70	130		0	0	
Surr: Toluene-d8	21.510		25.00		86.0	70	130		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104672
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_W_FULL

Sample ID: **MB-54166** SampType: **MBLK** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **3/24/2009** RunNo: **107376**
Client ID: **PBW** Batch ID: **54166** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **3/24/2009** SeqNo: **1681962**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	10									
1,2-Dichlorobenzene	ND	10									
1,3-Dichlorobenzene	ND	10									
1,4-Dichlorobenzene	ND	10									
2,4,5-Trichlorophenol	ND	10									
2,4,6-Trichlorophenol	ND	10									
2,4-Dichlorophenol	ND	10									
2,4-Dimethylphenol	ND	10									
2,4-Dinitrophenol	ND	50									
2,4-Dinitrotoluene	ND	10									
2,6-Dinitrotoluene	ND	10									
2-Chloronaphthalene	ND	10									
2-Chlorophenol	ND	10									
2-Methylnaphthalene	ND	10									
2-Methylphenol	ND	10									
2-Nitroaniline	ND	50									
2-Nitrophenol	ND	10									
3,3´-Dichlorobenzidine	ND	20									
3-Nitroaniline	ND	50									
4,6-Dinitro-2-methylphenol	ND	50									
4-Bromophenyl-phenylether	ND	10									
4-Chloro-3-methylphenol	ND	50									
4-Chloroaniline	ND	20									
4-Chlorophenyl-phenylether	ND	10									
4-Methylphenol	ND	10									
4-Nitroaniline	ND	20									
4-Nitrophenol	ND	50									
Acenaphthene	ND	10									
Acenaphthylene	ND	10									
Anthracene	ND	10									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104672
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_W_FULL

Sample ID: **MB-54166** SampType: **MBLK** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **3/24/2009** RunNo: **107376**
Client ID: **PBW** Batch ID: **54166** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **3/24/2009** SeqNo: **1681962**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzidine (M)	ND	50									
Benzo(a)anthracene	ND	10									
Benzo(a)pyrene	ND	10									
Benzo(b)fluoranthene	ND	10									
Benzo(g,h,i)perylene	ND	10									
Benzo(k)fluoranthene	ND	10									
Benzoic acid	ND	50									
Benzyl alcohol	ND	20									
Bis(2-chloroethoxy)methane	ND	10									
Bis(2-chloroethyl)ether	ND	10									
Bis(2-chloroisopropyl)ether	ND	10									
Bis(2-ethylhexyl)phthalate	ND	10									
Butylbenzylphthalate	ND	10									
Chrysene	ND	10									
Di-n-butylphthalate	ND	10									
Di-n-octylphthalate	5.740	10									
Dibenz(a,h)anthracene	ND	10									
Dibenzofuran	ND	10									
Diethylphthalate	ND	10									
Dimethylphthalate	ND	10									
Fluoranthene	ND	10									
Fluorene	ND	10									
Hexachlorobenzene	ND	10									
Hexachlorobutadiene	ND	20									
Hexachlorocyclopentadiene	ND	10									
Hexachloroethane	ND	10									
Indeno(1,2,3-cd)pyrene	ND	10									
Isophorone	ND	10									
N-Nitrosodi-n-propylamine	ND	10									
N-Nitrosodiphenylamine	ND	10									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104672
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_W_FULL

Sample ID: **MB-54166** SampType: **MBLK** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **3/24/2009** RunNo: **107376**
Client ID: **PBW** Batch ID: **54166** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **3/24/2009** SeqNo: **1681962**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	10									
Nitrobenzene	ND	10									
Pentachlorophenol	ND	50									
Phenanthrene	ND	10									
Phenol	ND	10									
Pyrene	ND	10									
Surr: 1,2-Dichlorobenzene-d4	73.410		100.0		73.4	42	98				
Surr: 2,4,6-Tribromophenol	90.220		100.0		90.2	60	128				
Surr: 2-Chlorophenol-d4	74.010		100.0		74.0	43	102				
Surr: 2-Fluorobiphenyl	86.200		100.0		86.2	50	108				
Surr: 2-Fluorophenol	44.070		100.0		44.1	22	69				
Surr: 4-Terphenyl-d14	113.710		100.0		114	66	130				
Surr: Nitrobenzene-d5	81.810		100.0		81.8	47	117				
Surr: Phenol-d5	30.270		100.0		30.3	16	50				

Sample ID: **LCS-54166** SampType: **LCS** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **3/24/2009** RunNo: **107376**
Client ID: **LCSW** Batch ID: **54166** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **3/24/2009** SeqNo: **1681963**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	77.690	10	100.0	0	77.7	54	110				
1,4-Dichlorobenzene	69.200	10	100.0	0	69.2	48	103				
2,4-Dinitrotoluene	100.870	10	100.0	0	101	69	136				
2-Chlorophenol	74.030	10	100.0	0	74.0	53	100				
4-Chloro-3-methylphenol	97.020	50	100.0	0	97.0	70	124				
4-Nitrophenol	45.380	50	100.0	0	45.4	32	69				
Acenaphthene	92.390	10	100.0	0	92.4	64	118				
N-Nitrosodi-n-propylamine	88.510	10	100.0	0	88.5	62	130				
Pentachlorophenol	90.260	50	100.0	0	90.3	64	130				
Phenol	32.980	10	100.0	0	33.0	25	50				
Pyrene	98.570	10	100.0	0	98.6	66	123				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104672
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_W_FULL

Sample ID: **LCS-54166** SampType: **LCS** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **3/24/2009** RunNo: **107376**
Client ID: **LCSW** Batch ID: **54166** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **3/24/2009** SeqNo: **1681963**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 1,2-Dichlorobenzene-d4	68.740		100.0		68.7	42	98				
Surr: 2,4,6-Tribromophenol	100.260		100.0		100	60	128				
Surr: 2-Chlorophenol-d4	70.600		100.0		70.6	43	102				
Surr: 2-Fluorobiphenyl	86.200		100.0		86.2	50	108				
Surr: 2-Fluorophenol	43.020		100.0		43.0	22	69				
Surr: 4-Terphenyl-d14	99.980		100.0		100	66	130				
Surr: Nitrobenzene-d5	79.360		100.0		79.4	47	117				
Surr: Phenol-d5	30.370		100.0		30.4	16	50				

Sample ID: **MB-54166MS** SampType: **MS** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **3/24/2009** RunNo: **107376**
Client ID: **ZZZZZZ** Batch ID: **54166** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **3/24/2009** SeqNo: **1681964**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	81.950	10	100.0	0	82.0	54	110				
1,4-Dichlorobenzene	72.760	10	100.0	0	72.8	48	103				
2,4-Dinitrotoluene	102.350	10	100.0	0	102	69	136				
2-Chlorophenol	79.790	10	100.0	0	79.8	53	100				
4-Chloro-3-methylphenol	98.240	50	100.0	0	98.2	70	124				
4-Nitrophenol	45.840	50	100.0	0	45.8	32	69				
Acenaphthene	94.310	10	100.0	0	94.3	64	118				
N-Nitrosodi-n-propylamine	93.950	10	100.0	0	94.0	62	130				
Pentachlorophenol	94.370	50	100.0	0	94.4	64	130				
Phenol	35.000	10	100.0	0	35.0	25	50				
Pyrene	98.890	10	100.0	0	98.9	66	123				
Surr: 1,2-Dichlorobenzene-d4	72.030		100.0		72.0	42	98				
Surr: 2,4,6-Tribromophenol	100.850		100.0		101	60	128				
Surr: 2-Chlorophenol-d4	74.980		100.0		75.0	43	102				
Surr: 2-Fluorobiphenyl	87.830		100.0		87.8	50	108				
Surr: 2-Fluorophenol	44.110		100.0		44.1	22	69				
Surr: 4-Terphenyl-d14	99.670		100.0		99.7	66	130				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104672
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_W_FULL

Sample ID: **MB-54166MS** SampType: **MS** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **3/24/2009** RunNo: **107376**
Client ID: **ZZZZZZ** Batch ID: **54166** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **3/24/2009** SeqNo: **1681964**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	83.520		100.0		83.5	47	117				
Surr: Phenol-d5	31.470		100.0		31.5	16	50				

Sample ID: **MB-54166MSD** SampType: **MSD** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **3/24/2009** RunNo: **107376**
Client ID: **ZZZZZZ** Batch ID: **54166** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **3/24/2009** SeqNo: **1681965**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	73.880	10	100.0	0	73.9	54	110	81.95	10.4	20	
1,4-Dichlorobenzene	61.770	10	100.0	0	61.8	48	103	72.76	16.3	20	
2,4-Dinitrotoluene	106.240	10	100.0	0	106	69	136	102.4	3.73	20	
2-Chlorophenol	79.410	10	100.0	0	79.4	53	100	79.79	0.477	20	
4-Chloro-3-methylphenol	101.520	50	100.0	0	102	70	124	98.24	3.28	20	
4-Nitrophenol	48.930	50	100.0	0	48.9	32	69	45.84	0	20	
Acenaphthene	95.950	10	100.0	0	96.0	64	118	94.31	1.72	20	
N-Nitrosodi-n-propylamine	94.740	10	100.0	0	94.7	62	130	93.95	0.837	20	
Pentachlorophenol	97.610	50	100.0	0	97.6	64	130	94.37	3.38	20	
Phenol	35.850	10	100.0	0	35.8	25	50	35.00	2.40	20	
Pyrene	104.480	10	100.0	0	104	66	123	98.89	5.50	20	
Surr: 1,2-Dichlorobenzene-d4	69.160		100.0		69.2	42	98		0	0	
Surr: 2,4,6-Tribromophenol	102.850		100.0		103	60	128		0	0	
Surr: 2-Chlorophenol-d4	73.820		100.0		73.8	43	102		0	0	
Surr: 2-Fluorobiphenyl	88.680		100.0		88.7	50	108		0	0	
Surr: 2-Fluorophenol	44.970		100.0		45.0	22	69		0	0	
Surr: 4-Terphenyl-d14	102.500		100.0		103	66	130		0	0	
Surr: Nitrobenzene-d5	82.080		100.0		82.1	47	117		0	0	
Surr: Phenol-d5	32.180		100.0		32.2	16	50		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CHAIN OF CUSTODY RECORD

Pg 1 of 1

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#: _____
Logged By: _____ Date: 3/21/09

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: GSO

Sample Condition Upon Receipt
1. CHILLED 3.6 Y☑ N☐ 4. SEALED Y☐ N☑
2. HEADSPACE (VOA) Y☑ N☐ 5. # OF SPLS MATCH COC Y☑ N☐
3. CONTAINER INTACT Y☑ N☐ 6. PRESERVED Y☑ N☐

Client: Geocon Consultants, Inc.
Address: 6671 Brisa St.
City Livermore State CA Zip Code 94550
TEL: (925) 371-5900
FAX: (925) 371-5915
Attn: John Love

Project Name: Caltrans Dumbarton Bridge
Project #: E8435-06-18
Sampler: (Printed Name) John Love (Signature)

Relinquished by: (Signature and Printed Name) John Love	Date: 3/20/09	Time: 16:00	Received by: (Signature and Printed Name)	Date: 3/21/09	Time: 8:30
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
John Love 3/20/09
Print Name Date
Signature

Send Report To:
Attn: _____
Co: same as above
Address _____
City _____ State _____ Zip _____

Bill To:
Attn: _____
Co: same as above
Address _____
City _____ State _____ Zip _____

Special Instructions/Comments:
Se cleanup
Metals sample was Field Filtered.

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time
	104672-001	E20BGW	3/19/09	9:10
		Trip Blank (E20BGW)	3/19/09	16:00

Circle or Add Analysis(es) Requested

8081A (Pesticides)	8082 (PCBs)	8260B (Volatiles)	8270C (SVOCs)	6010B (Total Metal)	8015B (GRO)	8015B (DRO) + TPHmo w/ silica gel cleanup	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	TDS	Oil & Grease	Cyanide	Dissolved Sulfide
		X										
			X									
				X								
					X							
						X						
							X					
								X				
									X			
										X		
		X		X								

SPECIFY APPROPRIATE MATRIX: SOIL | WATER | GROUND WATER | WASTEWATER

TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
E	3	VOG	H	
	1	LG		
	2	VG	H	
	1	LG		
	1	PP	N	
	1	PP		
	1	JG	H	
	1	PP	O	
	1	PP	O	+ $AlCl_3$
E	2	VG	H	

Q A / Q C: RTNE ☐ CT ☐ SWRCB ☐ Logcode _____ OTHER _____

- TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=Hcl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: White with report, Yellow to folder, Pink to submitter.

March 31, 2009

John Love
Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550
TEL: (925) 525-4142
FAX: (925) 371-5915

ELAP No.: 1838
NELAP No.: 02107CA
NEVADA.: CA-401
CSDLAC No.: 10196

Workorder No.: 104673

RE: Caltrans Dumbarton Bridge, E8435-06-18

Attention: John Love

Enclosed are the results for sample(s) received on March 21, 2009 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter and the case narrative are an integral part of this analytical report and cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Project: Caltrans Dumbarton Bridge, E8435-06-18
Lab Order: 104673

CASE NARRATIVE

Analytical Comments for Method 6010

Matrix Spike (MS) and /or Matrix Spike Duplicate (MSD) are/is outside recovery criteria for samples 104674-005AMS and 104674-005AMSD; however, the analytical batch was validated by the Laboratory Control Sample (LCS).

RPD for Duplicate (DUP) is outside criteria for sample 104674-005ADUP; however, the Laboratory Control Sample (LCS) validated the analytical batch.

Analytical Comments for Method 8015 (DRO/ORO)

Matrix Spike (MS) and /or Matrix Spike Duplicate (MSD) are/is outside recovery criteria for sample 104673-003AMSD; however, the analytical batch was validated by the Laboratory Control Sample (LCS).

RPD for Duplicate (DUP) and/or Matrix Spike (MS)/Matrix Spike Duplicate (MSD) is outside criteria for samples 104673-003ADUP, 104673-003AMSD and 104673-011ADUP; however, the Laboratory Control Sample (LCS) validated the analytical batch.

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E20AGW (0')
Lab Order:	104673	**Collection Date:**	3/19/2009 12:30:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104673-001A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090327H	QC Batch: 54284			PrepDate:	3/27/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	3/27/2009 06:39 PM
Arsenic	ND	1.0		mg/Kg	1	3/27/2009 06:39 PM
Barium	85	1.0		mg/Kg	1	3/27/2009 06:39 PM
Beryllium	ND	1.0		mg/Kg	1	3/27/2009 06:39 PM
Cadmium	ND	1.0		mg/Kg	1	3/27/2009 06:39 PM
Chromium	30	1.0		mg/Kg	1	3/27/2009 06:39 PM
Cobalt	14	1.0		mg/Kg	1	3/27/2009 06:39 PM
Copper	35	2.0		mg/Kg	1	3/27/2009 06:39 PM
Lead	15	1.0		mg/Kg	1	3/27/2009 06:39 PM
Molybdenum	ND	1.0		mg/Kg	1	3/27/2009 06:39 PM
Nickel	30	1.0		mg/Kg	1	3/27/2009 06:39 PM
Selenium	ND	1.0		mg/Kg	1	3/27/2009 06:39 PM
Silver	ND	1.0		mg/Kg	1	3/27/2009 06:39 PM
Thallium	ND	1.0		mg/Kg	1	3/27/2009 06:39 PM
Vanadium	50	1.0		mg/Kg	1	3/27/2009 06:39 PM
Zinc	110	1.0		mg/Kg	1	3/27/2009 06:39 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090324D	QC Batch: 54184			PrepDate:	3/24/2009	Analyst: **CBR**
DRO	17	1.0		mg/Kg	1	3/24/2009 07:22 PM
ORO	42	1.0		mg/Kg	1	3/24/2009 07:22 PM
Surr: p-Terphenyl	70.6	30-130		%REC	1	3/24/2009 07:22 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090327C	QC Batch: 54280			PrepDate:	3/27/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	3/27/2009 01:58 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090325B	QC Batch: 54222			PrepDate:	3/25/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	3/25/2009 04:51 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	3/25/2009 04:51 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	3/25/2009 04:51 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	3/25/2009 04:51 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E20AGW (0')
Lab Order:	104673	**Collection Date:**	3/19/2009 12:30:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104673-001A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090325B QC Batch: 54222 PrepDate: 3/25/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	3/25/2009 04:51 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	3/25/2009 04:51 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	3/25/2009 04:51 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	3/25/2009 04:51 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	3/25/2009 04:51 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	3/25/2009 04:51 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	3/25/2009 04:51 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	3/25/2009 04:51 PM
2-Chlorophenol	ND	330		µg/Kg	1	3/25/2009 04:51 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	3/25/2009 04:51 PM
2-Methylphenol	ND	330		µg/Kg	1	3/25/2009 04:51 PM
2-Nitroaniline	ND	1600		µg/Kg	1	3/25/2009 04:51 PM
2-Nitrophenol	ND	330		µg/Kg	1	3/25/2009 04:51 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	3/25/2009 04:51 PM
3-Nitroaniline	ND	1600		µg/Kg	1	3/25/2009 04:51 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	3/25/2009 04:51 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	3/25/2009 04:51 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	3/25/2009 04:51 PM
4-Chloroaniline	ND	660		µg/Kg	1	3/25/2009 04:51 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	3/25/2009 04:51 PM
4-Methylphenol	ND	330		µg/Kg	1	3/25/2009 04:51 PM
4-Nitroaniline	ND	1600		µg/Kg	1	3/25/2009 04:51 PM
4-Nitrophenol	ND	1600		µg/Kg	1	3/25/2009 04:51 PM
Acenaphthene	ND	330		µg/Kg	1	3/25/2009 04:51 PM
Acenaphthylene	ND	330		µg/Kg	1	3/25/2009 04:51 PM
Anthracene	ND	330		µg/Kg	1	3/25/2009 04:51 PM
Benzidine (M)	ND	1600		µg/Kg	1	3/25/2009 04:51 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	3/25/2009 04:51 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	3/25/2009 04:51 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	3/25/2009 04:51 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	3/25/2009 04:51 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	3/25/2009 04:51 PM
Benzoic acid	ND	1600		µg/Kg	1	3/25/2009 04:51 PM
Benzyl alcohol	ND	660		µg/Kg	1	3/25/2009 04:51 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	3/25/2009 04:51 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E20AGW (0')
Lab Order:	104673	**Collection Date:**	3/19/2009 12:30:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104673-001A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090325B QC Batch: 54222 PrepDate: 3/25/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	3/25/2009 04:51 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	3/25/2009 04:51 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	3/25/2009 04:51 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	3/25/2009 04:51 PM
Chrysene	ND	330		µg/Kg	1	3/25/2009 04:51 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	3/25/2009 04:51 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	3/25/2009 04:51 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	3/25/2009 04:51 PM
Dibenzofuran	ND	330		µg/Kg	1	3/25/2009 04:51 PM
Diethylphthalate	ND	330		µg/Kg	1	3/25/2009 04:51 PM
Dimethylphthalate	ND	330		µg/Kg	1	3/25/2009 04:51 PM
Fluoranthene	ND	330		µg/Kg	1	3/25/2009 04:51 PM
Fluorene	ND	330		µg/Kg	1	3/25/2009 04:51 PM
Hexachlorobenzene	ND	330		µg/Kg	1	3/25/2009 04:51 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	3/25/2009 04:51 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	3/25/2009 04:51 PM
Hexachloroethane	ND	330		µg/Kg	1	3/25/2009 04:51 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	3/25/2009 04:51 PM
Isophorone	ND	330		µg/Kg	1	3/25/2009 04:51 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	3/25/2009 04:51 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	3/25/2009 04:51 PM
Naphthalene	ND	330		µg/Kg	1	3/25/2009 04:51 PM
Nitrobenzene	ND	330		µg/Kg	1	3/25/2009 04:51 PM
Pentachlorophenol	ND	1600		µg/Kg	1	3/25/2009 04:51 PM
Phenanthrene	ND	330		µg/Kg	1	3/25/2009 04:51 PM
Phenol	ND	330		µg/Kg	1	3/25/2009 04:51 PM
Pyrene	ND	330		µg/Kg	1	3/25/2009 04:51 PM
Surr: 1,2-Dichlorobenzene-d4	78.3	49-103		%REC	1	3/25/2009 04:51 PM
Surr: 2,4,6-Tribromophenol	100	47-129		%REC	1	3/25/2009 04:51 PM
Surr: 2-Chlorophenol-d4	89.5	54-109		%REC	1	3/25/2009 04:51 PM
Surr: 2-Fluorobiphenyl	88.2	59-108		%REC	1	3/25/2009 04:51 PM
Surr: 2-Fluorophenol	89.1	50-111		%REC	1	3/25/2009 04:51 PM
Surr: 4-Terphenyl-d14	114	58-135		%REC	1	3/25/2009 04:51 PM
Surr: Nitrobenzene-d5	84.2	54-115		%REC	1	3/25/2009 04:51 PM
Surr: Phenol-d5	92.3	58-112		%REC	1	3/25/2009 04:51 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E20AGW (5')
Lab Order:	104673	**Collection Date:**	3/19/2009 12:31:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104673-002A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090327H	QC Batch: 54284			PrepDate:	3/27/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	3/27/2009 06:42 PM
Arsenic	2.7	1.0		mg/Kg	1	3/27/2009 06:42 PM
Barium	160	1.0		mg/Kg	1	3/27/2009 06:42 PM
Beryllium	ND	1.0		mg/Kg	1	3/27/2009 06:42 PM
Cadmium	ND	1.0		mg/Kg	1	3/27/2009 06:42 PM
Chromium	54	1.0		mg/Kg	1	3/27/2009 06:42 PM
Cobalt	17	1.0		mg/Kg	1	3/27/2009 06:42 PM
Copper	51	2.0		mg/Kg	1	3/27/2009 06:42 PM
Lead	4.6	1.0		mg/Kg	1	3/27/2009 06:42 PM
Molybdenum	ND	1.0		mg/Kg	1	3/27/2009 06:42 PM
Nickel	58	1.0		mg/Kg	1	3/27/2009 06:42 PM
Selenium	ND	1.0		mg/Kg	1	3/27/2009 06:42 PM
Silver	ND	1.0		mg/Kg	1	3/27/2009 06:42 PM
Thallium	ND	1.0		mg/Kg	1	3/27/2009 06:42 PM
Vanadium	61	1.0		mg/Kg	1	3/27/2009 06:42 PM
Zinc	57	1.0		mg/Kg	1	3/27/2009 06:42 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090324D	QC Batch: 54184			PrepDate:	3/24/2009	Analyst: **CBR**
DRO	1.2	1.0		mg/Kg	1	3/24/2009 05:51 PM
ORO	1.1	1.0		mg/Kg	1	3/24/2009 05:51 PM
Surr: p-Terphenyl	54.7	30-130		%REC	1	3/24/2009 05:51 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090327C	QC Batch: 54280			PrepDate:	3/27/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	3/27/2009 02:00 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090325B	QC Batch: 54222			PrepDate:	3/25/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	3/25/2009 05:18 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	3/25/2009 05:18 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	3/25/2009 05:18 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	3/25/2009 05:18 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E20AGW (5')
Lab Order:	104673	**Collection Date:**	3/19/2009 12:31:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104673-002A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090325B QC Batch: 54222 PrepDate: 3/25/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	3/25/2009 05:18 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	3/25/2009 05:18 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	3/25/2009 05:18 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	3/25/2009 05:18 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	3/25/2009 05:18 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	3/25/2009 05:18 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	3/25/2009 05:18 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	3/25/2009 05:18 PM
2-Chlorophenol	ND	330		µg/Kg	1	3/25/2009 05:18 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	3/25/2009 05:18 PM
2-Methylphenol	ND	330		µg/Kg	1	3/25/2009 05:18 PM
2-Nitroaniline	ND	1600		µg/Kg	1	3/25/2009 05:18 PM
2-Nitrophenol	ND	330		µg/Kg	1	3/25/2009 05:18 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	3/25/2009 05:18 PM
3-Nitroaniline	ND	1600		µg/Kg	1	3/25/2009 05:18 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	3/25/2009 05:18 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	3/25/2009 05:18 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	3/25/2009 05:18 PM
4-Chloroaniline	ND	660		µg/Kg	1	3/25/2009 05:18 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	3/25/2009 05:18 PM
4-Methylphenol	ND	330		µg/Kg	1	3/25/2009 05:18 PM
4-Nitroaniline	ND	1600		µg/Kg	1	3/25/2009 05:18 PM
4-Nitrophenol	ND	1600		µg/Kg	1	3/25/2009 05:18 PM
Acenaphthene	ND	330		µg/Kg	1	3/25/2009 05:18 PM
Acenaphthylene	ND	330		µg/Kg	1	3/25/2009 05:18 PM
Anthracene	ND	330		µg/Kg	1	3/25/2009 05:18 PM
Benzidine (M)	ND	1600		µg/Kg	1	3/25/2009 05:18 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	3/25/2009 05:18 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	3/25/2009 05:18 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	3/25/2009 05:18 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	3/25/2009 05:18 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	3/25/2009 05:18 PM
Benzoic acid	ND	1600		µg/Kg	1	3/25/2009 05:18 PM
Benzyl alcohol	ND	660		µg/Kg	1	3/25/2009 05:18 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	3/25/2009 05:18 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E20AGW (5')
Lab Order:	104673	**Collection Date:**	3/19/2009 12:31:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104673-002A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090325B QC Batch: 54222 PrepDate: 3/25/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	3/25/2009 05:18 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	3/25/2009 05:18 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	3/25/2009 05:18 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	3/25/2009 05:18 PM
Chrysene	ND	330		µg/Kg	1	3/25/2009 05:18 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	3/25/2009 05:18 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	3/25/2009 05:18 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	3/25/2009 05:18 PM
Dibenzofuran	ND	330		µg/Kg	1	3/25/2009 05:18 PM
Diethylphthalate	ND	330		µg/Kg	1	3/25/2009 05:18 PM
Dimethylphthalate	ND	330		µg/Kg	1	3/25/2009 05:18 PM
Fluoranthene	ND	330		µg/Kg	1	3/25/2009 05:18 PM
Fluorene	ND	330		µg/Kg	1	3/25/2009 05:18 PM
Hexachlorobenzene	ND	330		µg/Kg	1	3/25/2009 05:18 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	3/25/2009 05:18 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	3/25/2009 05:18 PM
Hexachloroethane	ND	330		µg/Kg	1	3/25/2009 05:18 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	3/25/2009 05:18 PM
Isophorone	ND	330		µg/Kg	1	3/25/2009 05:18 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	3/25/2009 05:18 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	3/25/2009 05:18 PM
Naphthalene	ND	330		µg/Kg	1	3/25/2009 05:18 PM
Nitrobenzene	ND	330		µg/Kg	1	3/25/2009 05:18 PM
Pentachlorophenol	ND	1600		µg/Kg	1	3/25/2009 05:18 PM
Phenanthrene	ND	330		µg/Kg	1	3/25/2009 05:18 PM
Phenol	1100	330		µg/Kg	1	3/25/2009 05:18 PM
Pyrene	ND	330		µg/Kg	1	3/25/2009 05:18 PM
Surr: 1,2-Dichlorobenzene-d4	82.0	49-103		%REC	1	3/25/2009 05:18 PM
Surr: 2,4,6-Tribromophenol	104	47-129		%REC	1	3/25/2009 05:18 PM
Surr: 2-Chlorophenol-d4	92.3	54-109		%REC	1	3/25/2009 05:18 PM
Surr: 2-Fluorobiphenyl	91.5	59-108		%REC	1	3/25/2009 05:18 PM
Surr: 2-Fluorophenol	92.9	50-111		%REC	1	3/25/2009 05:18 PM
Surr: 4-Terphenyl-d14	115	58-135		%REC	1	3/25/2009 05:18 PM
Surr: Nitrobenzene-d5	88.2	54-115		%REC	1	3/25/2009 05:18 PM
Surr: Phenol-d5	95.4	58-112		%REC	1	3/25/2009 05:18 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E15A (0')
Lab Order:	104673	**Collection Date:**	3/19/2009 1:27:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104673-003A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090327H	QC Batch: 54284			PrepDate:	3/27/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	3/27/2009 06:45 PM
Arsenic	2.8	1.0		mg/Kg	1	3/27/2009 06:45 PM
Barium	550	1.0		mg/Kg	1	3/27/2009 06:45 PM
Beryllium	ND	1.0		mg/Kg	1	3/27/2009 06:45 PM
Cadmium	ND	1.0		mg/Kg	1	3/27/2009 06:45 PM
Chromium	22	1.0		mg/Kg	1	3/27/2009 06:45 PM
Cobalt	10	1.0		mg/Kg	1	3/27/2009 06:45 PM
Copper	72	2.0		mg/Kg	1	3/27/2009 06:45 PM
Lead	5.8	1.0		mg/Kg	1	3/27/2009 06:45 PM
Molybdenum	ND	1.0		mg/Kg	1	3/27/2009 06:45 PM
Nickel	30	1.0		mg/Kg	1	3/27/2009 06:45 PM
Selenium	3.3	1.0		mg/Kg	1	3/27/2009 06:45 PM
Silver	ND	1.0		mg/Kg	1	3/27/2009 06:45 PM
Thallium	ND	1.0		mg/Kg	1	3/27/2009 06:45 PM
Vanadium	42	1.0		mg/Kg	1	3/27/2009 06:45 PM
Zinc	48	1.0		mg/Kg	1	3/27/2009 06:45 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090324D	QC Batch: 54184			PrepDate:	3/24/2009	Analyst: **CBR**
DRO	19	1.0		mg/Kg	1	3/24/2009 06:54 PM
ORO	20	1.0		mg/Kg	1	3/24/2009 06:54 PM
Surr: p-Terphenyl	54.2	30-130		%REC	1	3/24/2009 06:54 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090327C	QC Batch: 54280			PrepDate:	3/27/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	3/27/2009 02:02 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090325B	QC Batch: 54222			PrepDate:	3/25/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	3/25/2009 05:46 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	3/25/2009 05:46 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	3/25/2009 05:46 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	3/25/2009 05:46 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E15A (0')
Lab Order:	104673	**Collection Date:**	3/19/2009 1:27:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104673-003A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090325B QC Batch: 54222 PrepDate: 3/25/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	3/25/2009 05:46 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	3/25/2009 05:46 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	3/25/2009 05:46 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	3/25/2009 05:46 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	3/25/2009 05:46 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	3/25/2009 05:46 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	3/25/2009 05:46 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	3/25/2009 05:46 PM
2-Chlorophenol	ND	330		µg/Kg	1	3/25/2009 05:46 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	3/25/2009 05:46 PM
2-Methylphenol	ND	330		µg/Kg	1	3/25/2009 05:46 PM
2-Nitroaniline	ND	1600		µg/Kg	1	3/25/2009 05:46 PM
2-Nitrophenol	ND	330		µg/Kg	1	3/25/2009 05:46 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	3/25/2009 05:46 PM
3-Nitroaniline	ND	1600		µg/Kg	1	3/25/2009 05:46 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	3/25/2009 05:46 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	3/25/2009 05:46 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	3/25/2009 05:46 PM
4-Chloroaniline	ND	660		µg/Kg	1	3/25/2009 05:46 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	3/25/2009 05:46 PM
4-Methylphenol	ND	330		µg/Kg	1	3/25/2009 05:46 PM
4-Nitroaniline	ND	1600		µg/Kg	1	3/25/2009 05:46 PM
4-Nitrophenol	ND	1600		µg/Kg	1	3/25/2009 05:46 PM
Acenaphthene	ND	330		µg/Kg	1	3/25/2009 05:46 PM
Acenaphthylene	ND	330		µg/Kg	1	3/25/2009 05:46 PM
Anthracene	ND	330		µg/Kg	1	3/25/2009 05:46 PM
Benzidine (M)	ND	1600		µg/Kg	1	3/25/2009 05:46 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	3/25/2009 05:46 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	3/25/2009 05:46 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	3/25/2009 05:46 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	3/25/2009 05:46 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	3/25/2009 05:46 PM
Benzoic acid	ND	1600		µg/Kg	1	3/25/2009 05:46 PM
Benzyl alcohol	ND	660		µg/Kg	1	3/25/2009 05:46 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	3/25/2009 05:46 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E15A (0')
Lab Order:	104673	**Collection Date:**	3/19/2009 1:27:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104673-003A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090325B QC Batch: 54222 PrepDate: 3/25/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	3/25/2009 05:46 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	3/25/2009 05:46 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	3/25/2009 05:46 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	3/25/2009 05:46 PM
Chrysene	ND	330		µg/Kg	1	3/25/2009 05:46 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	3/25/2009 05:46 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	3/25/2009 05:46 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	3/25/2009 05:46 PM
Dibenzofuran	ND	330		µg/Kg	1	3/25/2009 05:46 PM
Diethylphthalate	ND	330		µg/Kg	1	3/25/2009 05:46 PM
Dimethylphthalate	ND	330		µg/Kg	1	3/25/2009 05:46 PM
Fluoranthene	ND	330		µg/Kg	1	3/25/2009 05:46 PM
Fluorene	ND	330		µg/Kg	1	3/25/2009 05:46 PM
Hexachlorobenzene	ND	330		µg/Kg	1	3/25/2009 05:46 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	3/25/2009 05:46 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	3/25/2009 05:46 PM
Hexachloroethane	ND	330		µg/Kg	1	3/25/2009 05:46 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	3/25/2009 05:46 PM
Isophorone	ND	330		µg/Kg	1	3/25/2009 05:46 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	3/25/2009 05:46 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	3/25/2009 05:46 PM
Naphthalene	ND	330		µg/Kg	1	3/25/2009 05:46 PM
Nitrobenzene	ND	330		µg/Kg	1	3/25/2009 05:46 PM
Pentachlorophenol	ND	1600		µg/Kg	1	3/25/2009 05:46 PM
Phenanthrene	ND	330		µg/Kg	1	3/25/2009 05:46 PM
Phenol	ND	330		µg/Kg	1	3/25/2009 05:46 PM
Pyrene	ND	330		µg/Kg	1	3/25/2009 05:46 PM
Surr: 1,2-Dichlorobenzene-d4	83.2	49-103		%REC	1	3/25/2009 05:46 PM
Surr: 2,4,6-Tribromophenol	101	47-129		%REC	1	3/25/2009 05:46 PM
Surr: 2-Chlorophenol-d4	94.1	54-109		%REC	1	3/25/2009 05:46 PM
Surr: 2-Fluorobiphenyl	93.7	59-108		%REC	1	3/25/2009 05:46 PM
Surr: 2-Fluorophenol	93.6	50-111		%REC	1	3/25/2009 05:46 PM
Surr: 4-Terphenyl-d14	110	58-135		%REC	1	3/25/2009 05:46 PM
Surr: Nitrobenzene-d5	92.1	54-115		%REC	1	3/25/2009 05:46 PM
Surr: Phenol-d5	96.5	58-112		%REC	1	3/25/2009 05:46 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT: Geocon Consultants, Inc. **Client Sample ID:** E15A (5')
Lab Order: 104673 **Collection Date:** 3/19/2009 1:29:00 PM
Project: Caltrans Dumbarton Bridge, E8435-06-18 **Matrix:** SOIL
Lab ID: 104673-004A

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090327H	QC Batch: 54284			PrepDate:	3/27/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	3/27/2009 06:50 PM
Arsenic	5.6	1.0		mg/Kg	1	3/27/2009 06:50 PM
Barium	140	1.0		mg/Kg	1	3/27/2009 06:50 PM
Beryllium	ND	1.0		mg/Kg	1	3/27/2009 06:50 PM
Cadmium	ND	1.0		mg/Kg	1	3/27/2009 06:50 PM
Chromium	61	1.0		mg/Kg	1	3/27/2009 06:50 PM
Cobalt	12	1.0		mg/Kg	1	3/27/2009 06:50 PM
Copper	28	2.0		mg/Kg	1	3/27/2009 06:50 PM
Lead	6.7	1.0		mg/Kg	1	3/27/2009 06:50 PM
Molybdenum	ND	1.0		mg/Kg	1	3/27/2009 06:50 PM
Nickel	91	1.0		mg/Kg	1	3/27/2009 06:50 PM
Selenium	1.1	1.0		mg/Kg	1	3/27/2009 06:50 PM
Silver	ND	1.0		mg/Kg	1	3/27/2009 06:50 PM
Thallium	ND	1.0		mg/Kg	1	3/27/2009 06:50 PM
Vanadium	33	1.0		mg/Kg	1	3/27/2009 06:50 PM
Zinc	54	1.0		mg/Kg	1	3/27/2009 06:50 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090324D	QC Batch: 54184			PrepDate:	3/24/2009	Analyst: **CBR**
DRO	2.5	1.0		mg/Kg	1	3/24/2009 07:03 PM
ORO	3.8	1.0		mg/Kg	1	3/24/2009 07:03 PM
Surr: p-Terphenyl	53.7	30-130		%REC	1	3/24/2009 07:03 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090327C	QC Batch: 54280			PrepDate:	3/27/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	3/27/2009 02:08 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090325B	QC Batch: 54222			PrepDate:	3/25/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	3/25/2009 06:13 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	3/25/2009 06:13 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	3/25/2009 06:13 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	3/25/2009 06:13 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E15A (5')
Lab Order:	104673	**Collection Date:**	3/19/2009 1:29:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104673-004A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090325B QC Batch: 54222 PrepDate: 3/25/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	3/25/2009 06:13 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	3/25/2009 06:13 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	3/25/2009 06:13 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	3/25/2009 06:13 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	3/25/2009 06:13 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	3/25/2009 06:13 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	3/25/2009 06:13 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	3/25/2009 06:13 PM
2-Chlorophenol	ND	330		µg/Kg	1	3/25/2009 06:13 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	3/25/2009 06:13 PM
2-Methylphenol	ND	330		µg/Kg	1	3/25/2009 06:13 PM
2-Nitroaniline	ND	1600		µg/Kg	1	3/25/2009 06:13 PM
2-Nitrophenol	ND	330		µg/Kg	1	3/25/2009 06:13 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	3/25/2009 06:13 PM
3-Nitroaniline	ND	1600		µg/Kg	1	3/25/2009 06:13 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	3/25/2009 06:13 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	3/25/2009 06:13 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	3/25/2009 06:13 PM
4-Chloroaniline	ND	660		µg/Kg	1	3/25/2009 06:13 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	3/25/2009 06:13 PM
4-Methylphenol	ND	330		µg/Kg	1	3/25/2009 06:13 PM
4-Nitroaniline	ND	1600		µg/Kg	1	3/25/2009 06:13 PM
4-Nitrophenol	ND	1600		µg/Kg	1	3/25/2009 06:13 PM
Acenaphthene	ND	330		µg/Kg	1	3/25/2009 06:13 PM
Acenaphthylene	ND	330		µg/Kg	1	3/25/2009 06:13 PM
Anthracene	ND	330		µg/Kg	1	3/25/2009 06:13 PM
Benzidine (M)	ND	1600		µg/Kg	1	3/25/2009 06:13 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	3/25/2009 06:13 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	3/25/2009 06:13 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	3/25/2009 06:13 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	3/25/2009 06:13 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	3/25/2009 06:13 PM
Benzoic acid	ND	1600		µg/Kg	1	3/25/2009 06:13 PM
Benzyl alcohol	ND	660		µg/Kg	1	3/25/2009 06:13 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	3/25/2009 06:13 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E15A (5')
Lab Order:	104673	**Collection Date:**	3/19/2009 1:29:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104673-004A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090325B QC Batch: 54222 PrepDate: 3/25/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	3/25/2009 06:13 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	3/25/2009 06:13 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	3/25/2009 06:13 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	3/25/2009 06:13 PM
Chrysene	ND	330		µg/Kg	1	3/25/2009 06:13 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	3/25/2009 06:13 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	3/25/2009 06:13 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	3/25/2009 06:13 PM
Dibenzofuran	ND	330		µg/Kg	1	3/25/2009 06:13 PM
Diethylphthalate	ND	330		µg/Kg	1	3/25/2009 06:13 PM
Dimethylphthalate	ND	330		µg/Kg	1	3/25/2009 06:13 PM
Fluoranthene	ND	330		µg/Kg	1	3/25/2009 06:13 PM
Fluorene	ND	330		µg/Kg	1	3/25/2009 06:13 PM
Hexachlorobenzene	ND	330		µg/Kg	1	3/25/2009 06:13 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	3/25/2009 06:13 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	3/25/2009 06:13 PM
Hexachloroethane	ND	330		µg/Kg	1	3/25/2009 06:13 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	3/25/2009 06:13 PM
Isophorone	ND	330		µg/Kg	1	3/25/2009 06:13 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	3/25/2009 06:13 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	3/25/2009 06:13 PM
Naphthalene	ND	330		µg/Kg	1	3/25/2009 06:13 PM
Nitrobenzene	ND	330		µg/Kg	1	3/25/2009 06:13 PM
Pentachlorophenol	ND	1600		µg/Kg	1	3/25/2009 06:13 PM
Phenanthrene	ND	330		µg/Kg	1	3/25/2009 06:13 PM
Phenol	ND	330		µg/Kg	1	3/25/2009 06:13 PM
Pyrene	ND	330		µg/Kg	1	3/25/2009 06:13 PM
Surr: 1,2-Dichlorobenzene-d4	82.0	49-103		%REC	1	3/25/2009 06:13 PM
Surr: 2,4,6-Tribromophenol	98.6	47-129		%REC	1	3/25/2009 06:13 PM
Surr: 2-Chlorophenol-d4	92.4	54-109		%REC	1	3/25/2009 06:13 PM
Surr: 2-Fluorobiphenyl	92.0	59-108		%REC	1	3/25/2009 06:13 PM
Surr: 2-Fluorophenol	92.8	50-111		%REC	1	3/25/2009 06:13 PM
Surr: 4-Terphenyl-d14	111	58-135		%REC	1	3/25/2009 06:13 PM
Surr: Nitrobenzene-d5	92.5	54-115		%REC	1	3/25/2009 06:13 PM
Surr: Phenol-d5	94.2	58-112		%REC	1	3/25/2009 06:13 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT: Geocon Consultants, Inc. **Client Sample ID:** E15A (10')
Lab Order: 104673 **Collection Date:** 3/19/2009 1:35:00 PM
Project: Caltrans Dumbarton Bridge, E8435-06-18 **Matrix:** SOIL
Lab ID: 104673-005A

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090327H	QC Batch: 54284			PrepDate:	3/27/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	3/27/2009 06:53 PM
Arsenic	4.5	1.0		mg/Kg	1	3/27/2009 06:53 PM
Barium	190	1.0		mg/Kg	1	3/27/2009 06:53 PM
Beryllium	ND	1.0		mg/Kg	1	3/27/2009 06:53 PM
Cadmium	ND	1.0		mg/Kg	1	3/27/2009 06:53 PM
Chromium	39	1.0		mg/Kg	1	3/27/2009 06:53 PM
Cobalt	12	1.0		mg/Kg	1	3/27/2009 06:53 PM
Copper	31	2.0		mg/Kg	1	3/27/2009 06:53 PM
Lead	5.7	1.0		mg/Kg	1	3/27/2009 06:53 PM
Molybdenum	ND	1.0		mg/Kg	1	3/27/2009 06:53 PM
Nickel	53	1.0		mg/Kg	1	3/27/2009 06:53 PM
Selenium	2.1	1.0		mg/Kg	1	3/27/2009 06:53 PM
Silver	ND	1.0		mg/Kg	1	3/27/2009 06:53 PM
Thallium	ND	1.0		mg/Kg	1	3/27/2009 06:53 PM
Vanadium	39	1.0		mg/Kg	1	3/27/2009 06:53 PM
Zinc	46	1.0		mg/Kg	1	3/27/2009 06:53 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090324D	QC Batch: 54184			PrepDate:	3/24/2009	Analyst: **CBR**
DRO	ND	1.0		mg/Kg	1	3/24/2009 06:45 PM
ORO	ND	1.0		mg/Kg	1	3/24/2009 06:45 PM
Surr: p-Terphenyl	56.3	30-130		%REC	1	3/24/2009 06:45 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090327C	QC Batch: 54280			PrepDate:	3/27/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	3/27/2009 02:10 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090325B	QC Batch: 54222			PrepDate:	3/25/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	3/25/2009 06:41 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	3/25/2009 06:41 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	3/25/2009 06:41 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	3/25/2009 06:41 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E15A (10')
Lab Order:	104673	**Collection Date:**	3/19/2009 1:35:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104673-005A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090325B QC Batch: 54222 PrepDate: 3/25/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	3/25/2009 06:41 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	3/25/2009 06:41 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	3/25/2009 06:41 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	3/25/2009 06:41 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	3/25/2009 06:41 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	3/25/2009 06:41 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	3/25/2009 06:41 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	3/25/2009 06:41 PM
2-Chlorophenol	ND	330		µg/Kg	1	3/25/2009 06:41 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	3/25/2009 06:41 PM
2-Methylphenol	ND	330		µg/Kg	1	3/25/2009 06:41 PM
2-Nitroaniline	ND	1600		µg/Kg	1	3/25/2009 06:41 PM
2-Nitrophenol	ND	330		µg/Kg	1	3/25/2009 06:41 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	3/25/2009 06:41 PM
3-Nitroaniline	ND	1600		µg/Kg	1	3/25/2009 06:41 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	3/25/2009 06:41 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	3/25/2009 06:41 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	3/25/2009 06:41 PM
4-Chloroaniline	ND	660		µg/Kg	1	3/25/2009 06:41 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	3/25/2009 06:41 PM
4-Methylphenol	ND	330		µg/Kg	1	3/25/2009 06:41 PM
4-Nitroaniline	ND	1600		µg/Kg	1	3/25/2009 06:41 PM
4-Nitrophenol	ND	1600		µg/Kg	1	3/25/2009 06:41 PM
Acenaphthene	ND	330		µg/Kg	1	3/25/2009 06:41 PM
Acenaphthylene	ND	330		µg/Kg	1	3/25/2009 06:41 PM
Anthracene	ND	330		µg/Kg	1	3/25/2009 06:41 PM
Benzidine (M)	ND	1600		µg/Kg	1	3/25/2009 06:41 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	3/25/2009 06:41 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	3/25/2009 06:41 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	3/25/2009 06:41 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	3/25/2009 06:41 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	3/25/2009 06:41 PM
Benzoic acid	ND	1600		µg/Kg	1	3/25/2009 06:41 PM
Benzyl alcohol	ND	660		µg/Kg	1	3/25/2009 06:41 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	3/25/2009 06:41 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E15A (10')
Lab Order:	104673	**Collection Date:**	3/19/2009 1:35:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104673-005A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090325B QC Batch: 54222 PrepDate: 3/25/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	3/25/2009 06:41 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	3/25/2009 06:41 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	3/25/2009 06:41 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	3/25/2009 06:41 PM
Chrysene	ND	330		µg/Kg	1	3/25/2009 06:41 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	3/25/2009 06:41 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	3/25/2009 06:41 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	3/25/2009 06:41 PM
Dibenzofuran	ND	330		µg/Kg	1	3/25/2009 06:41 PM
Diethylphthalate	ND	330		µg/Kg	1	3/25/2009 06:41 PM
Dimethylphthalate	ND	330		µg/Kg	1	3/25/2009 06:41 PM
Fluoranthene	ND	330		µg/Kg	1	3/25/2009 06:41 PM
Fluorene	ND	330		µg/Kg	1	3/25/2009 06:41 PM
Hexachlorobenzene	ND	330		µg/Kg	1	3/25/2009 06:41 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	3/25/2009 06:41 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	3/25/2009 06:41 PM
Hexachloroethane	ND	330		µg/Kg	1	3/25/2009 06:41 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	3/25/2009 06:41 PM
Isophorone	ND	330		µg/Kg	1	3/25/2009 06:41 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	3/25/2009 06:41 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	3/25/2009 06:41 PM
Naphthalene	ND	330		µg/Kg	1	3/25/2009 06:41 PM
Nitrobenzene	ND	330		µg/Kg	1	3/25/2009 06:41 PM
Pentachlorophenol	ND	1600		µg/Kg	1	3/25/2009 06:41 PM
Phenanthrene	ND	330		µg/Kg	1	3/25/2009 06:41 PM
Phenol	ND	330		µg/Kg	1	3/25/2009 06:41 PM
Pyrene	ND	330		µg/Kg	1	3/25/2009 06:41 PM
Surr: 1,2-Dichlorobenzene-d4	79.9	49-103		%REC	1	3/25/2009 06:41 PM
Surr: 2,4,6-Tribromophenol	100	47-129		%REC	1	3/25/2009 06:41 PM
Surr: 2-Chlorophenol-d4	91.3	54-109		%REC	1	3/25/2009 06:41 PM
Surr: 2-Fluorobiphenyl	91.5	59-108		%REC	1	3/25/2009 06:41 PM
Surr: 2-Fluorophenol	91.2	50-111		%REC	1	3/25/2009 06:41 PM
Surr: 4-Terphenyl-d14	109	58-135		%REC	1	3/25/2009 06:41 PM
Surr: Nitrobenzene-d5	90.1	54-115		%REC	1	3/25/2009 06:41 PM
Surr: Phenol-d5	93.5	58-112		%REC	1	3/25/2009 06:41 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E15A (15')
Lab Order:	104673	**Collection Date:**	3/19/2009 1:40:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104673-006A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090327H	QC Batch: 54284			PrepDate: 3/27/2009	Analyst: **CL**	
Antimony	ND	2.0		mg/Kg	1	3/27/2009 06:56 PM
Arsenic	3.9	1.0		mg/Kg	1	3/27/2009 06:56 PM
Barium	26	1.0		mg/Kg	1	3/27/2009 06:56 PM
Beryllium	ND	1.0		mg/Kg	1	3/27/2009 06:56 PM
Cadmium	ND	1.0		mg/Kg	1	3/27/2009 06:56 PM
Chromium	35	1.0		mg/Kg	1	3/27/2009 06:56 PM
Cobalt	7.8	1.0		mg/Kg	1	3/27/2009 06:56 PM
Copper	11	2.0		mg/Kg	1	3/27/2009 06:56 PM
Lead	2.7	1.0		mg/Kg	1	3/27/2009 06:56 PM
Molybdenum	ND	1.0		mg/Kg	1	3/27/2009 06:56 PM
Nickel	42	1.0		mg/Kg	1	3/27/2009 06:56 PM
Selenium	ND	1.0		mg/Kg	1	3/27/2009 06:56 PM
Silver	ND	1.0		mg/Kg	1	3/27/2009 06:56 PM
Thallium	ND	1.0		mg/Kg	1	3/27/2009 06:56 PM
Vanadium	26	1.0		mg/Kg	1	3/27/2009 06:56 PM
Zinc	36	1.0		mg/Kg	1	3/27/2009 06:56 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090324D	QC Batch: 54184			PrepDate: 3/24/2009	Analyst: **CBR**	
DRO	ND	1.0		mg/Kg	1	3/24/2009 06:00 PM
ORO	1.2	1.0		mg/Kg	1	3/24/2009 06:00 PM
Surr: p-Terphenyl	56.0	30-130		%REC	1	3/24/2009 06:00 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090327C	QC Batch: 54280			PrepDate: 3/27/2009	Analyst: **RQ**	
Mercury	ND	0.10		mg/Kg	1	3/27/2009 02:12 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090325B	QC Batch: 54222			PrepDate: 3/25/2009	Analyst: **DMP**	
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	3/25/2009 07:08 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	3/25/2009 07:08 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	3/25/2009 07:08 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	3/25/2009 07:08 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E15A (15')
Lab Order:	104673	**Collection Date:**	3/19/2009 1:40:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104673-006A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090325B QC Batch: 54222 PrepDate: 3/25/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	3/25/2009 07:08 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	3/25/2009 07:08 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	3/25/2009 07:08 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	3/25/2009 07:08 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	3/25/2009 07:08 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	3/25/2009 07:08 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	3/25/2009 07:08 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	3/25/2009 07:08 PM
2-Chlorophenol	ND	330		µg/Kg	1	3/25/2009 07:08 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	3/25/2009 07:08 PM
2-Methylphenol	ND	330		µg/Kg	1	3/25/2009 07:08 PM
2-Nitroaniline	ND	1600		µg/Kg	1	3/25/2009 07:08 PM
2-Nitrophenol	ND	330		µg/Kg	1	3/25/2009 07:08 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	3/25/2009 07:08 PM
3-Nitroaniline	ND	1600		µg/Kg	1	3/25/2009 07:08 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	3/25/2009 07:08 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	3/25/2009 07:08 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	3/25/2009 07:08 PM
4-Chloroaniline	ND	660		µg/Kg	1	3/25/2009 07:08 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	3/25/2009 07:08 PM
4-Methylphenol	ND	330		µg/Kg	1	3/25/2009 07:08 PM
4-Nitroaniline	ND	1600		µg/Kg	1	3/25/2009 07:08 PM
4-Nitrophenol	ND	1600		µg/Kg	1	3/25/2009 07:08 PM
Acenaphthene	ND	330		µg/Kg	1	3/25/2009 07:08 PM
Acenaphthylene	ND	330		µg/Kg	1	3/25/2009 07:08 PM
Anthracene	ND	330		µg/Kg	1	3/25/2009 07:08 PM
Benzidine (M)	ND	1600		µg/Kg	1	3/25/2009 07:08 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	3/25/2009 07:08 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	3/25/2009 07:08 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	3/25/2009 07:08 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	3/25/2009 07:08 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	3/25/2009 07:08 PM
Benzoic acid	ND	1600		µg/Kg	1	3/25/2009 07:08 PM
Benzyl alcohol	ND	660		µg/Kg	1	3/25/2009 07:08 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	3/25/2009 07:08 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E15A (15')
Lab Order:	104673	**Collection Date:**	3/19/2009 1:40:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104673-006A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090325B QC Batch: 54222 PrepDate: 3/25/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	3/25/2009 07:08 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	3/25/2009 07:08 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	3/25/2009 07:08 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	3/25/2009 07:08 PM
Chrysene	ND	330		µg/Kg	1	3/25/2009 07:08 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	3/25/2009 07:08 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	3/25/2009 07:08 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	3/25/2009 07:08 PM
Dibenzofuran	ND	330		µg/Kg	1	3/25/2009 07:08 PM
Diethylphthalate	ND	330		µg/Kg	1	3/25/2009 07:08 PM
Dimethylphthalate	ND	330		µg/Kg	1	3/25/2009 07:08 PM
Fluoranthene	ND	330		µg/Kg	1	3/25/2009 07:08 PM
Fluorene	ND	330		µg/Kg	1	3/25/2009 07:08 PM
Hexachlorobenzene	ND	330		µg/Kg	1	3/25/2009 07:08 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	3/25/2009 07:08 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	3/25/2009 07:08 PM
Hexachloroethane	ND	330		µg/Kg	1	3/25/2009 07:08 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	3/25/2009 07:08 PM
Isophorone	ND	330		µg/Kg	1	3/25/2009 07:08 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	3/25/2009 07:08 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	3/25/2009 07:08 PM
Naphthalene	ND	330		µg/Kg	1	3/25/2009 07:08 PM
Nitrobenzene	ND	330		µg/Kg	1	3/25/2009 07:08 PM
Pentachlorophenol	ND	1600		µg/Kg	1	3/25/2009 07:08 PM
Phenanthrene	ND	330		µg/Kg	1	3/25/2009 07:08 PM
Phenol	ND	330		µg/Kg	1	3/25/2009 07:08 PM
Pyrene	ND	330		µg/Kg	1	3/25/2009 07:08 PM
Surr: 1,2-Dichlorobenzene-d4	84.7	49-103		%REC	1	3/25/2009 07:08 PM
Surr: 2,4,6-Tribromophenol	106	47-129		%REC	1	3/25/2009 07:08 PM
Surr: 2-Chlorophenol-d4	93.9	54-109		%REC	1	3/25/2009 07:08 PM
Surr: 2-Fluorobiphenyl	95.2	59-108		%REC	1	3/25/2009 07:08 PM
Surr: 2-Fluorophenol	94.3	50-111		%REC	1	3/25/2009 07:08 PM
Surr: 4-Terphenyl-d14	116	58-135		%REC	1	3/25/2009 07:08 PM
Surr: Nitrobenzene-d5	91.9	54-115		%REC	1	3/25/2009 07:08 PM
Surr: Phenol-d5	96.0	58-112		%REC	1	3/25/2009 07:08 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E10A (0')
Lab Order:	104673	**Collection Date:**	3/19/2009 2:08:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104673-007A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090327H	QC Batch: 54284			PrepDate:	3/27/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	3/27/2009 07:07 PM
Arsenic	ND	1.0		mg/Kg	1	3/27/2009 07:07 PM
Barium	42	1.0		mg/Kg	1	3/27/2009 07:07 PM
Beryllium	ND	1.0		mg/Kg	1	3/27/2009 07:07 PM
Cadmium	ND	1.0		mg/Kg	1	3/27/2009 07:07 PM
Chromium	42	1.0		mg/Kg	1	3/27/2009 07:07 PM
Cobalt	18	1.0		mg/Kg	1	3/27/2009 07:07 PM
Copper	38	2.0		mg/Kg	1	3/27/2009 07:07 PM
Lead	ND	1.0		mg/Kg	1	3/27/2009 07:07 PM
Molybdenum	ND	1.0		mg/Kg	1	3/27/2009 07:07 PM
Nickel	36	1.0		mg/Kg	1	3/27/2009 07:07 PM
Selenium	ND	1.0		mg/Kg	1	3/27/2009 07:07 PM
Silver	ND	1.0		mg/Kg	1	3/27/2009 07:07 PM
Thallium	ND	1.0		mg/Kg	1	3/27/2009 07:07 PM
Vanadium	66	1.0		mg/Kg	1	3/27/2009 07:07 PM
Zinc	44	1.0		mg/Kg	1	3/27/2009 07:07 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090324D	QC Batch: 54184			PrepDate:	3/24/2009	Analyst: **CBR**
DRO	2.0	1.0		mg/Kg	1	3/24/2009 06:09 PM
ORO	ND	1.0		mg/Kg	1	3/24/2009 06:09 PM
Surr: p-Terphenyl	75.2	30-130		%REC	1	3/24/2009 06:09 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090327C	QC Batch: 54280			PrepDate:	3/27/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	3/27/2009 02:14 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090325B	QC Batch: 54222			PrepDate:	3/25/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	3/25/2009 07:36 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	3/25/2009 07:36 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	3/25/2009 07:36 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	3/25/2009 07:36 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E10A (0')
Lab Order:	104673	**Collection Date:**	3/19/2009 2:08:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104673-007A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090325B QC Batch: 54222 PrepDate: 3/25/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	3/25/2009 07:36 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	3/25/2009 07:36 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	3/25/2009 07:36 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	3/25/2009 07:36 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	3/25/2009 07:36 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	3/25/2009 07:36 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	3/25/2009 07:36 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	3/25/2009 07:36 PM
2-Chlorophenol	ND	330		µg/Kg	1	3/25/2009 07:36 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	3/25/2009 07:36 PM
2-Methylphenol	ND	330		µg/Kg	1	3/25/2009 07:36 PM
2-Nitroaniline	ND	1600		µg/Kg	1	3/25/2009 07:36 PM
2-Nitrophenol	ND	330		µg/Kg	1	3/25/2009 07:36 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	3/25/2009 07:36 PM
3-Nitroaniline	ND	1600		µg/Kg	1	3/25/2009 07:36 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	3/25/2009 07:36 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	3/25/2009 07:36 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	3/25/2009 07:36 PM
4-Chloroaniline	ND	660		µg/Kg	1	3/25/2009 07:36 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	3/25/2009 07:36 PM
4-Methylphenol	ND	330		µg/Kg	1	3/25/2009 07:36 PM
4-Nitroaniline	ND	1600		µg/Kg	1	3/25/2009 07:36 PM
4-Nitrophenol	ND	1600		µg/Kg	1	3/25/2009 07:36 PM
Acenaphthene	ND	330		µg/Kg	1	3/25/2009 07:36 PM
Acenaphthylene	ND	330		µg/Kg	1	3/25/2009 07:36 PM
Anthracene	ND	330		µg/Kg	1	3/25/2009 07:36 PM
Benzidine (M)	ND	1600		µg/Kg	1	3/25/2009 07:36 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	3/25/2009 07:36 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	3/25/2009 07:36 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	3/25/2009 07:36 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	3/25/2009 07:36 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	3/25/2009 07:36 PM
Benzoic acid	ND	1600		µg/Kg	1	3/25/2009 07:36 PM
Benzyl alcohol	ND	660		µg/Kg	1	3/25/2009 07:36 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	3/25/2009 07:36 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E10A (0')
Lab Order:	104673	**Collection Date:**	3/19/2009 2:08:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104673-007A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090325B QC Batch: 54222 PrepDate: 3/25/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	3/25/2009 07:36 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	3/25/2009 07:36 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	3/25/2009 07:36 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	3/25/2009 07:36 PM
Chrysene	ND	330		µg/Kg	1	3/25/2009 07:36 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	3/25/2009 07:36 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	3/25/2009 07:36 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	3/25/2009 07:36 PM
Dibenzofuran	ND	330		µg/Kg	1	3/25/2009 07:36 PM
Diethylphthalate	ND	330		µg/Kg	1	3/25/2009 07:36 PM
Dimethylphthalate	ND	330		µg/Kg	1	3/25/2009 07:36 PM
Fluoranthene	ND	330		µg/Kg	1	3/25/2009 07:36 PM
Fluorene	ND	330		µg/Kg	1	3/25/2009 07:36 PM
Hexachlorobenzene	ND	330		µg/Kg	1	3/25/2009 07:36 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	3/25/2009 07:36 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	3/25/2009 07:36 PM
Hexachloroethane	ND	330		µg/Kg	1	3/25/2009 07:36 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	3/25/2009 07:36 PM
Isophorone	ND	330		µg/Kg	1	3/25/2009 07:36 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	3/25/2009 07:36 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	3/25/2009 07:36 PM
Naphthalene	ND	330		µg/Kg	1	3/25/2009 07:36 PM
Nitrobenzene	ND	330		µg/Kg	1	3/25/2009 07:36 PM
Pentachlorophenol	ND	1600		µg/Kg	1	3/25/2009 07:36 PM
Phenanthrene	ND	330		µg/Kg	1	3/25/2009 07:36 PM
Phenol	ND	330		µg/Kg	1	3/25/2009 07:36 PM
Pyrene	ND	330		µg/Kg	1	3/25/2009 07:36 PM
Surr: 1,2-Dichlorobenzene-d4	87.4	49-103		%REC	1	3/25/2009 07:36 PM
Surr: 2,4,6-Tribromophenol	106	47-129		%REC	1	3/25/2009 07:36 PM
Surr: 2-Chlorophenol-d4	95.8	54-109		%REC	1	3/25/2009 07:36 PM
Surr: 2-Fluorobiphenyl	93.8	59-108		%REC	1	3/25/2009 07:36 PM
Surr: 2-Fluorophenol	96.0	50-111		%REC	1	3/25/2009 07:36 PM
Surr: 4-Terphenyl-d14	124	58-135		%REC	1	3/25/2009 07:36 PM
Surr: Nitrobenzene-d5	92.8	54-115		%REC	1	3/25/2009 07:36 PM
Surr: Phenol-d5	98.4	58-112		%REC	1	3/25/2009 07:36 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT: Geocon Consultants, Inc. **Client Sample ID:** E10A (5')
Lab Order: 104673 **Collection Date:** 3/19/2009 2:11:00 PM
Project: Caltrans Dumbarton Bridge, E8435-06-18 **Matrix:** SOIL
Lab ID: 104673-008A

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090327H	QC Batch: 54284			PrepDate: 3/27/2009	Analyst: **CL**	
Antimony	ND	2.0		mg/Kg	1	3/27/2009 07:10 PM
Arsenic	3.7	1.0		mg/Kg	1	3/27/2009 07:10 PM
Barium	120	1.0		mg/Kg	1	3/27/2009 07:10 PM
Beryllium	ND	1.0		mg/Kg	1	3/27/2009 07:10 PM
Cadmium	1.4	1.0		mg/Kg	1	3/27/2009 07:10 PM
Chromium	54	1.0		mg/Kg	1	3/27/2009 07:10 PM
Cobalt	13	1.0		mg/Kg	1	3/27/2009 07:10 PM
Copper	30	2.0		mg/Kg	1	3/27/2009 07:10 PM
Lead	4.9	1.0		mg/Kg	1	3/27/2009 07:10 PM
Molybdenum	ND	1.0		mg/Kg	1	3/27/2009 07:10 PM
Nickel	75	1.0		mg/Kg	1	3/27/2009 07:10 PM
Selenium	ND	1.0		mg/Kg	1	3/27/2009 07:10 PM
Silver	ND	1.0		mg/Kg	1	3/27/2009 07:10 PM
Thallium	ND	1.0		mg/Kg	1	3/27/2009 07:10 PM
Vanadium	38	1.0		mg/Kg	1	3/27/2009 07:10 PM
Zinc	50	1.0		mg/Kg	1	3/27/2009 07:10 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090324D	QC Batch: 54184			PrepDate: 3/24/2009	Analyst: **CBR**	
DRO	1.0	1.0		mg/Kg	1	3/24/2009 06:18 PM
ORO	1.9	1.0		mg/Kg	1	3/24/2009 06:18 PM
Surr: p-Terphenyl	82.2	30-130		%REC	1	3/24/2009 06:18 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090327C	QC Batch: 54280			PrepDate: 3/27/2009	Analyst: **RQ**	
Mercury	ND	0.10		mg/Kg	1	3/27/2009 02:17 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090325B	QC Batch: 54222			PrepDate: 3/25/2009	Analyst: **DMP**	
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	3/25/2009 08:04 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	3/25/2009 08:04 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	3/25/2009 08:04 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	3/25/2009 08:04 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E10A (5')
Lab Order:	104673	**Collection Date:**	3/19/2009 2:11:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104673-008A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090325B QC Batch: 54222 PrepDate: 3/25/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	3/25/2009 08:04 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	3/25/2009 08:04 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	3/25/2009 08:04 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	3/25/2009 08:04 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	3/25/2009 08:04 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	3/25/2009 08:04 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	3/25/2009 08:04 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	3/25/2009 08:04 PM
2-Chlorophenol	ND	330		µg/Kg	1	3/25/2009 08:04 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	3/25/2009 08:04 PM
2-Methylphenol	ND	330		µg/Kg	1	3/25/2009 08:04 PM
2-Nitroaniline	ND	1600		µg/Kg	1	3/25/2009 08:04 PM
2-Nitrophenol	ND	330		µg/Kg	1	3/25/2009 08:04 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	3/25/2009 08:04 PM
3-Nitroaniline	ND	1600		µg/Kg	1	3/25/2009 08:04 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	3/25/2009 08:04 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	3/25/2009 08:04 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	3/25/2009 08:04 PM
4-Chloroaniline	ND	660		µg/Kg	1	3/25/2009 08:04 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	3/25/2009 08:04 PM
4-Methylphenol	ND	330		µg/Kg	1	3/25/2009 08:04 PM
4-Nitroaniline	ND	1600		µg/Kg	1	3/25/2009 08:04 PM
4-Nitrophenol	ND	1600		µg/Kg	1	3/25/2009 08:04 PM
Acenaphthene	ND	330		µg/Kg	1	3/25/2009 08:04 PM
Acenaphthylene	ND	330		µg/Kg	1	3/25/2009 08:04 PM
Anthracene	ND	330		µg/Kg	1	3/25/2009 08:04 PM
Benzidine (M)	ND	1600		µg/Kg	1	3/25/2009 08:04 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	3/25/2009 08:04 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	3/25/2009 08:04 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	3/25/2009 08:04 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	3/25/2009 08:04 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	3/25/2009 08:04 PM
Benzoic acid	ND	1600		µg/Kg	1	3/25/2009 08:04 PM
Benzyl alcohol	ND	660		µg/Kg	1	3/25/2009 08:04 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	3/25/2009 08:04 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E10A (5')
Lab Order:	104673	**Collection Date:**	3/19/2009 2:11:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104673-008A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090325B QC Batch: 54222 PrepDate: 3/25/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	3/25/2009 08:04 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	3/25/2009 08:04 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	3/25/2009 08:04 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	3/25/2009 08:04 PM
Chrysene	ND	330		µg/Kg	1	3/25/2009 08:04 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	3/25/2009 08:04 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	3/25/2009 08:04 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	3/25/2009 08:04 PM
Dibenzofuran	ND	330		µg/Kg	1	3/25/2009 08:04 PM
Diethylphthalate	ND	330		µg/Kg	1	3/25/2009 08:04 PM
Dimethylphthalate	ND	330		µg/Kg	1	3/25/2009 08:04 PM
Fluoranthene	ND	330		µg/Kg	1	3/25/2009 08:04 PM
Fluorene	ND	330		µg/Kg	1	3/25/2009 08:04 PM
Hexachlorobenzene	ND	330		µg/Kg	1	3/25/2009 08:04 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	3/25/2009 08:04 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	3/25/2009 08:04 PM
Hexachloroethane	ND	330		µg/Kg	1	3/25/2009 08:04 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	3/25/2009 08:04 PM
Isophorone	ND	330		µg/Kg	1	3/25/2009 08:04 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	3/25/2009 08:04 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	3/25/2009 08:04 PM
Naphthalene	ND	330		µg/Kg	1	3/25/2009 08:04 PM
Nitrobenzene	ND	330		µg/Kg	1	3/25/2009 08:04 PM
Pentachlorophenol	ND	1600		µg/Kg	1	3/25/2009 08:04 PM
Phenanthrene	ND	330		µg/Kg	1	3/25/2009 08:04 PM
Phenol	ND	330		µg/Kg	1	3/25/2009 08:04 PM
Pyrene	ND	330		µg/Kg	1	3/25/2009 08:04 PM
Surr: 1,2-Dichlorobenzene-d4	83.0	49-103		%REC	1	3/25/2009 08:04 PM
Surr: 2,4,6-Tribromophenol	106	47-129		%REC	1	3/25/2009 08:04 PM
Surr: 2-Chlorophenol-d4	92.0	54-109		%REC	1	3/25/2009 08:04 PM
Surr: 2-Fluorobiphenyl	93.0	59-108		%REC	1	3/25/2009 08:04 PM
Surr: 2-Fluorophenol	92.0	50-111		%REC	1	3/25/2009 08:04 PM
Surr: 4-Terphenyl-d14	117	58-135		%REC	1	3/25/2009 08:04 PM
Surr: Nitrobenzene-d5	88.8	54-115		%REC	1	3/25/2009 08:04 PM
Surr: Phenol-d5	94.3	58-112		%REC	1	3/25/2009 08:04 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E10A (9')
Lab Order:	104673	**Collection Date:**	3/19/2009 2:20:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104673-009A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090327H	QC Batch: 54284			PrepDate: 3/27/2009	Analyst: **CL**	
Antimony	ND	2.0		mg/Kg	1	3/27/2009 07:13 PM
Arsenic	3.4	1.0		mg/Kg	1	3/27/2009 07:13 PM
Barium	22	1.0		mg/Kg	1	3/27/2009 07:13 PM
Beryllium	ND	1.0		mg/Kg	1	3/27/2009 07:13 PM
Cadmium	ND	1.0		mg/Kg	1	3/27/2009 07:13 PM
Chromium	32	1.0		mg/Kg	1	3/27/2009 07:13 PM
Cobalt	6.4	1.0		mg/Kg	1	3/27/2009 07:13 PM
Copper	11	2.0		mg/Kg	1	3/27/2009 07:13 PM
Lead	3.1	1.0		mg/Kg	1	3/27/2009 07:13 PM
Molybdenum	ND	1.0		mg/Kg	1	3/27/2009 07:13 PM
Nickel	37	1.0		mg/Kg	1	3/27/2009 07:13 PM
Selenium	ND	1.0		mg/Kg	1	3/27/2009 07:13 PM
Silver	ND	1.0		mg/Kg	1	3/27/2009 07:13 PM
Thallium	ND	1.0		mg/Kg	1	3/27/2009 07:13 PM
Vanadium	25	1.0		mg/Kg	1	3/27/2009 07:13 PM
Zinc	37	1.0		mg/Kg	1	3/27/2009 07:13 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090324D	QC Batch: 54184			PrepDate: 3/24/2009	Analyst: **CBR**	
DRO	ND	1.0		mg/Kg	1	3/24/2009 06:27 PM
ORO	ND	1.0		mg/Kg	1	3/24/2009 06:27 PM
Surr: p-Terphenyl	66.4	30-130		%REC	1	3/24/2009 06:27 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090327C	QC Batch: 54280			PrepDate: 3/27/2009	Analyst: **RQ**	
Mercury	ND	0.10		mg/Kg	1	3/27/2009 02:19 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090325B	QC Batch: 54222			PrepDate: 3/25/2009	Analyst: **DMP**	
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	3/25/2009 08:32 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	3/25/2009 08:32 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	3/25/2009 08:32 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	3/25/2009 08:32 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E10A (9')
Lab Order:	104673	**Collection Date:**	3/19/2009 2:20:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104673-009A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090325B QC Batch: 54222 PrepDate: 3/25/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	3/25/2009 08:32 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	3/25/2009 08:32 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	3/25/2009 08:32 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	3/25/2009 08:32 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	3/25/2009 08:32 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	3/25/2009 08:32 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	3/25/2009 08:32 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	3/25/2009 08:32 PM
2-Chlorophenol	ND	330		µg/Kg	1	3/25/2009 08:32 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	3/25/2009 08:32 PM
2-Methylphenol	ND	330		µg/Kg	1	3/25/2009 08:32 PM
2-Nitroaniline	ND	1600		µg/Kg	1	3/25/2009 08:32 PM
2-Nitrophenol	ND	330		µg/Kg	1	3/25/2009 08:32 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	3/25/2009 08:32 PM
3-Nitroaniline	ND	1600		µg/Kg	1	3/25/2009 08:32 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	3/25/2009 08:32 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	3/25/2009 08:32 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	3/25/2009 08:32 PM
4-Chloroaniline	ND	660		µg/Kg	1	3/25/2009 08:32 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	3/25/2009 08:32 PM
4-Methylphenol	ND	330		µg/Kg	1	3/25/2009 08:32 PM
4-Nitroaniline	ND	1600		µg/Kg	1	3/25/2009 08:32 PM
4-Nitrophenol	ND	1600		µg/Kg	1	3/25/2009 08:32 PM
Acenaphthene	ND	330		µg/Kg	1	3/25/2009 08:32 PM
Acenaphthylene	ND	330		µg/Kg	1	3/25/2009 08:32 PM
Anthracene	ND	330		µg/Kg	1	3/25/2009 08:32 PM
Benzidine (M)	ND	1600		µg/Kg	1	3/25/2009 08:32 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	3/25/2009 08:32 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	3/25/2009 08:32 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	3/25/2009 08:32 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	3/25/2009 08:32 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	3/25/2009 08:32 PM
Benzoic acid	ND	1600		µg/Kg	1	3/25/2009 08:32 PM
Benzyl alcohol	ND	660		µg/Kg	1	3/25/2009 08:32 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	3/25/2009 08:32 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E10A (9')
Lab Order:	104673	**Collection Date:**	3/19/2009 2:20:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104673-009A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090325B QC Batch: 54222 PrepDate: 3/25/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	3/25/2009 08:32 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	3/25/2009 08:32 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	3/25/2009 08:32 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	3/25/2009 08:32 PM
Chrysene	ND	330		µg/Kg	1	3/25/2009 08:32 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	3/25/2009 08:32 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	3/25/2009 08:32 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	3/25/2009 08:32 PM
Dibenzofuran	ND	330		µg/Kg	1	3/25/2009 08:32 PM
Diethylphthalate	ND	330		µg/Kg	1	3/25/2009 08:32 PM
Dimethylphthalate	ND	330		µg/Kg	1	3/25/2009 08:32 PM
Fluoranthene	ND	330		µg/Kg	1	3/25/2009 08:32 PM
Fluorene	ND	330		µg/Kg	1	3/25/2009 08:32 PM
Hexachlorobenzene	ND	330		µg/Kg	1	3/25/2009 08:32 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	3/25/2009 08:32 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	3/25/2009 08:32 PM
Hexachloroethane	ND	330		µg/Kg	1	3/25/2009 08:32 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	3/25/2009 08:32 PM
Isophorone	ND	330		µg/Kg	1	3/25/2009 08:32 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	3/25/2009 08:32 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	3/25/2009 08:32 PM
Naphthalene	ND	330		µg/Kg	1	3/25/2009 08:32 PM
Nitrobenzene	ND	330		µg/Kg	1	3/25/2009 08:32 PM
Pentachlorophenol	ND	1600		µg/Kg	1	3/25/2009 08:32 PM
Phenanthrene	ND	330		µg/Kg	1	3/25/2009 08:32 PM
Phenol	ND	330		µg/Kg	1	3/25/2009 08:32 PM
Pyrene	ND	330		µg/Kg	1	3/25/2009 08:32 PM
Surr: 1,2-Dichlorobenzene-d4	77.7	49-103		%REC	1	3/25/2009 08:32 PM
Surr: 2,4,6-Tribromophenol	105	47-129		%REC	1	3/25/2009 08:32 PM
Surr: 2-Chlorophenol-d4	87.8	54-109		%REC	1	3/25/2009 08:32 PM
Surr: 2-Fluorobiphenyl	87.7	59-108		%REC	1	3/25/2009 08:32 PM
Surr: 2-Fluorophenol	88.3	50-111		%REC	1	3/25/2009 08:32 PM
Surr: 4-Terphenyl-d14	120	58-135		%REC	1	3/25/2009 08:32 PM
Surr: Nitrobenzene-d5	84.0	54-115		%REC	1	3/25/2009 08:32 PM
Surr: Phenol-d5	90.9	58-112		%REC	1	3/25/2009 08:32 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT: Geocon Consultants, Inc. **Client Sample ID:** E10A (15')
Lab Order: 104673 **Collection Date:** 3/19/2009 2:30:00 PM
Project: Caltrans Dumbarton Bridge, E8435-06-18 **Matrix:** SOIL
Lab ID: 104673-010A

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090327H	QC Batch: 54284			PrepDate: 3/27/2009		Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	3/27/2009 07:16 PM
Arsenic	3.7	1.0		mg/Kg	1	3/27/2009 07:16 PM
Barium	31	1.0		mg/Kg	1	3/27/2009 07:16 PM
Beryllium	ND	1.0		mg/Kg	1	3/27/2009 07:16 PM
Cadmium	ND	1.0		mg/Kg	1	3/27/2009 07:16 PM
Chromium	36	1.0		mg/Kg	1	3/27/2009 07:16 PM
Cobalt	7.8	1.0		mg/Kg	1	3/27/2009 07:16 PM
Copper	14	2.0		mg/Kg	1	3/27/2009 07:16 PM
Lead	3.2	1.0		mg/Kg	1	3/27/2009 07:16 PM
Molybdenum	ND	1.0		mg/Kg	1	3/27/2009 07:16 PM
Nickel	45	1.0		mg/Kg	1	3/27/2009 07:16 PM
Selenium	ND	1.0		mg/Kg	1	3/27/2009 07:16 PM
Silver	ND	1.0		mg/Kg	1	3/27/2009 07:16 PM
Thallium	ND	1.0		mg/Kg	1	3/27/2009 07:16 PM
Vanadium	26	1.0		mg/Kg	1	3/27/2009 07:16 PM
Zinc	39	1.0		mg/Kg	1	3/27/2009 07:16 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090324D	QC Batch: 54184			PrepDate: 3/24/2009		Analyst: **CBR**
DRO	ND	1.0		mg/Kg	1	3/24/2009 06:36 PM
ORO	ND	1.0		mg/Kg	1	3/24/2009 06:36 PM
Surr: p-Terphenyl	60.4	30-130		%REC	1	3/24/2009 06:36 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090327C	QC Batch: 54280			PrepDate: 3/27/2009		Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	3/27/2009 01:52 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090325B	QC Batch: 54222			PrepDate: 3/25/2009		Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	3/25/2009 09:01 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	3/25/2009 09:01 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	3/25/2009 09:01 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	3/25/2009 09:01 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E10A (15')
Lab Order:	104673	**Collection Date:**	3/19/2009 2:30:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104673-010A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090325B QC Batch: 54222 PrepDate: 3/25/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	3/25/2009 09:01 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	3/25/2009 09:01 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	3/25/2009 09:01 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	3/25/2009 09:01 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	3/25/2009 09:01 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	3/25/2009 09:01 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	3/25/2009 09:01 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	3/25/2009 09:01 PM
2-Chlorophenol	ND	330		µg/Kg	1	3/25/2009 09:01 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	3/25/2009 09:01 PM
2-Methylphenol	ND	330		µg/Kg	1	3/25/2009 09:01 PM
2-Nitroaniline	ND	1600		µg/Kg	1	3/25/2009 09:01 PM
2-Nitrophenol	ND	330		µg/Kg	1	3/25/2009 09:01 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	3/25/2009 09:01 PM
3-Nitroaniline	ND	1600		µg/Kg	1	3/25/2009 09:01 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	3/25/2009 09:01 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	3/25/2009 09:01 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	3/25/2009 09:01 PM
4-Chloroaniline	ND	660		µg/Kg	1	3/25/2009 09:01 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	3/25/2009 09:01 PM
4-Methylphenol	ND	330		µg/Kg	1	3/25/2009 09:01 PM
4-Nitroaniline	ND	1600		µg/Kg	1	3/25/2009 09:01 PM
4-Nitrophenol	ND	1600		µg/Kg	1	3/25/2009 09:01 PM
Acenaphthene	ND	330		µg/Kg	1	3/25/2009 09:01 PM
Acenaphthylene	ND	330		µg/Kg	1	3/25/2009 09:01 PM
Anthracene	ND	330		µg/Kg	1	3/25/2009 09:01 PM
Benzidine (M)	ND	1600		µg/Kg	1	3/25/2009 09:01 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	3/25/2009 09:01 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	3/25/2009 09:01 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	3/25/2009 09:01 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	3/25/2009 09:01 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	3/25/2009 09:01 PM
Benzoic acid	ND	1600		µg/Kg	1	3/25/2009 09:01 PM
Benzyl alcohol	ND	660		µg/Kg	1	3/25/2009 09:01 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	3/25/2009 09:01 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E10A (15')
Lab Order:	104673	**Collection Date:**	3/19/2009 2:30:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104673-010A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090325B QC Batch: 54222 PrepDate: 3/25/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	3/25/2009 09:01 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	3/25/2009 09:01 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	3/25/2009 09:01 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	3/25/2009 09:01 PM
Chrysene	ND	330		µg/Kg	1	3/25/2009 09:01 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	3/25/2009 09:01 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	3/25/2009 09:01 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	3/25/2009 09:01 PM
Dibenzofuran	ND	330		µg/Kg	1	3/25/2009 09:01 PM
Diethylphthalate	ND	330		µg/Kg	1	3/25/2009 09:01 PM
Dimethylphthalate	ND	330		µg/Kg	1	3/25/2009 09:01 PM
Fluoranthene	ND	330		µg/Kg	1	3/25/2009 09:01 PM
Fluorene	ND	330		µg/Kg	1	3/25/2009 09:01 PM
Hexachlorobenzene	ND	330		µg/Kg	1	3/25/2009 09:01 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	3/25/2009 09:01 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	3/25/2009 09:01 PM
Hexachloroethane	ND	330		µg/Kg	1	3/25/2009 09:01 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	3/25/2009 09:01 PM
Isophorone	ND	330		µg/Kg	1	3/25/2009 09:01 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	3/25/2009 09:01 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	3/25/2009 09:01 PM
Naphthalene	ND	330		µg/Kg	1	3/25/2009 09:01 PM
Nitrobenzene	ND	330		µg/Kg	1	3/25/2009 09:01 PM
Pentachlorophenol	ND	1600		µg/Kg	1	3/25/2009 09:01 PM
Phenanthrene	ND	330		µg/Kg	1	3/25/2009 09:01 PM
Phenol	ND	330		µg/Kg	1	3/25/2009 09:01 PM
Pyrene	ND	330		µg/Kg	1	3/25/2009 09:01 PM
Surr: 1,2-Dichlorobenzene-d4	77.2	49-103		%REC	1	3/25/2009 09:01 PM
Surr: 2,4,6-Tribromophenol	96.2	47-129		%REC	1	3/25/2009 09:01 PM
Surr: 2-Chlorophenol-d4	84.9	54-109		%REC	1	3/25/2009 09:01 PM
Surr: 2-Fluorobiphenyl	85.3	59-108		%REC	1	3/25/2009 09:01 PM
Surr: 2-Fluorophenol	84.9	50-111		%REC	1	3/25/2009 09:01 PM
Surr: 4-Terphenyl-d14	114	58-135		%REC	1	3/25/2009 09:01 PM
Surr: Nitrobenzene-d5	81.9	54-115		%REC	1	3/25/2009 09:01 PM
Surr: Phenol-d5	87.5	58-112		%REC	1	3/25/2009 09:01 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E5A (0')
Lab Order:	104673	**Collection Date:**	3/19/2009 2:49:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104673-011A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090327I	QC Batch: 54285			PrepDate:	3/27/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	3/27/2009 07:51 PM
Arsenic	1.9	1.0		mg/Kg	1	3/27/2009 07:51 PM
Barium	120	1.0		mg/Kg	1	3/27/2009 07:51 PM
Beryllium	ND	1.0		mg/Kg	1	3/27/2009 07:51 PM
Cadmium	ND	1.0		mg/Kg	1	3/27/2009 07:51 PM
Chromium	28	1.0		mg/Kg	1	3/27/2009 07:51 PM
Cobalt	10	1.0		mg/Kg	1	3/27/2009 07:51 PM
Copper	25	2.0		mg/Kg	1	3/27/2009 07:51 PM
Lead	2.5	1.0		mg/Kg	1	3/27/2009 07:51 PM
Molybdenum	ND	1.0		mg/Kg	1	3/27/2009 07:51 PM
Nickel	34	1.0		mg/Kg	1	3/27/2009 07:51 PM
Selenium	ND	1.0		mg/Kg	1	3/27/2009 07:51 PM
Silver	ND	1.0		mg/Kg	1	3/27/2009 07:51 PM
Thallium	ND	1.0		mg/Kg	1	3/27/2009 07:51 PM
Vanadium	33	1.0		mg/Kg	1	3/27/2009 07:51 PM
Zinc	32	1.0		mg/Kg	1	3/27/2009 07:51 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090324E	QC Batch: 54185			PrepDate:	3/24/2009	Analyst: **CBR**
DRO	ND	1.0		mg/Kg	1	3/24/2009 09:33 PM
ORO	ND	1.0		mg/Kg	1	3/24/2009 09:33 PM
Surr: p-Terphenyl	66.6	30-130		%REC	1	3/24/2009 09:33 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090327D	QC Batch: 54281			PrepDate:	3/27/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	3/27/2009 02:42 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090325C	QC Batch: 54223			PrepDate:	3/25/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	3/25/2009 11:21 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	3/25/2009 11:21 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	3/25/2009 11:21 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	3/25/2009 11:21 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E5A (0')
Lab Order:	104673	**Collection Date:**	3/19/2009 2:49:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104673-011A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090325C QC Batch: 54223 PrepDate: 3/25/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	3/25/2009 11:21 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	3/25/2009 11:21 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	3/25/2009 11:21 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	3/25/2009 11:21 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	3/25/2009 11:21 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	3/25/2009 11:21 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	3/25/2009 11:21 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	3/25/2009 11:21 PM
2-Chlorophenol	ND	330		µg/Kg	1	3/25/2009 11:21 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	3/25/2009 11:21 PM
2-Methylphenol	ND	330		µg/Kg	1	3/25/2009 11:21 PM
2-Nitroaniline	ND	1600		µg/Kg	1	3/25/2009 11:21 PM
2-Nitrophenol	ND	330		µg/Kg	1	3/25/2009 11:21 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	3/25/2009 11:21 PM
3-Nitroaniline	ND	1600		µg/Kg	1	3/25/2009 11:21 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	3/25/2009 11:21 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	3/25/2009 11:21 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	3/25/2009 11:21 PM
4-Chloroaniline	ND	660		µg/Kg	1	3/25/2009 11:21 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	3/25/2009 11:21 PM
4-Methylphenol	ND	330		µg/Kg	1	3/25/2009 11:21 PM
4-Nitroaniline	ND	1600		µg/Kg	1	3/25/2009 11:21 PM
4-Nitrophenol	ND	1600		µg/Kg	1	3/25/2009 11:21 PM
Acenaphthene	ND	330		µg/Kg	1	3/25/2009 11:21 PM
Acenaphthylene	ND	330		µg/Kg	1	3/25/2009 11:21 PM
Anthracene	ND	330		µg/Kg	1	3/25/2009 11:21 PM
Benzidine (M)	ND	1600		µg/Kg	1	3/25/2009 11:21 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	3/25/2009 11:21 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	3/25/2009 11:21 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	3/25/2009 11:21 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	3/25/2009 11:21 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	3/25/2009 11:21 PM
Benzoic acid	ND	1600		µg/Kg	1	3/25/2009 11:21 PM
Benzyl alcohol	ND	660		µg/Kg	1	3/25/2009 11:21 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	3/25/2009 11:21 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E5A (0')
Lab Order:	104673	**Collection Date:**	3/19/2009 2:49:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104673-011A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090325C QC Batch: 54223 PrepDate: 3/25/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	3/25/2009 11:21 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	3/25/2009 11:21 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	3/25/2009 11:21 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	3/25/2009 11:21 PM
Chrysene	ND	330		µg/Kg	1	3/25/2009 11:21 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	3/25/2009 11:21 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	3/25/2009 11:21 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	3/25/2009 11:21 PM
Dibenzofuran	ND	330		µg/Kg	1	3/25/2009 11:21 PM
Diethylphthalate	ND	330		µg/Kg	1	3/25/2009 11:21 PM
Dimethylphthalate	ND	330		µg/Kg	1	3/25/2009 11:21 PM
Fluoranthene	ND	330		µg/Kg	1	3/25/2009 11:21 PM
Fluorene	ND	330		µg/Kg	1	3/25/2009 11:21 PM
Hexachlorobenzene	ND	330		µg/Kg	1	3/25/2009 11:21 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	3/25/2009 11:21 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	3/25/2009 11:21 PM
Hexachloroethane	ND	330		µg/Kg	1	3/25/2009 11:21 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	3/25/2009 11:21 PM
Isophorone	ND	330		µg/Kg	1	3/25/2009 11:21 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	3/25/2009 11:21 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	3/25/2009 11:21 PM
Naphthalene	ND	330		µg/Kg	1	3/25/2009 11:21 PM
Nitrobenzene	ND	330		µg/Kg	1	3/25/2009 11:21 PM
Pentachlorophenol	ND	1600		µg/Kg	1	3/25/2009 11:21 PM
Phenanthrene	ND	330		µg/Kg	1	3/25/2009 11:21 PM
Phenol	ND	330		µg/Kg	1	3/25/2009 11:21 PM
Pyrene	ND	330		µg/Kg	1	3/25/2009 11:21 PM
Surr: 1,2-Dichlorobenzene-d4	84.9	49-103		%REC	1	3/25/2009 11:21 PM
Surr: 2,4,6-Tribromophenol	101	47-129		%REC	1	3/25/2009 11:21 PM
Surr: 2-Chlorophenol-d4	94.1	54-109		%REC	1	3/25/2009 11:21 PM
Surr: 2-Fluorobiphenyl	94.8	59-108		%REC	1	3/25/2009 11:21 PM
Surr: 2-Fluorophenol	94.5	50-111		%REC	1	3/25/2009 11:21 PM
Surr: 4-Terphenyl-d14	117	58-135		%REC	1	3/25/2009 11:21 PM
Surr: Nitrobenzene-d5	90.5	54-115		%REC	1	3/25/2009 11:21 PM
Surr: Phenol-d5	96.9	58-112		%REC	1	3/25/2009 11:21 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E5A (5')
Lab Order:	104673	**Collection Date:**	3/19/2009 2:51:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104673-012A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090327I	QC Batch: 54285			PrepDate:	3/27/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	3/27/2009 07:54 PM
Arsenic	5.4	1.0		mg/Kg	1	3/27/2009 07:54 PM
Barium	130	1.0		mg/Kg	1	3/27/2009 07:54 PM
Beryllium	ND	1.0		mg/Kg	1	3/27/2009 07:54 PM
Cadmium	ND	1.0		mg/Kg	1	3/27/2009 07:54 PM
Chromium	58	1.0		mg/Kg	1	3/27/2009 07:54 PM
Cobalt	12	1.0		mg/Kg	1	3/27/2009 07:54 PM
Copper	25	2.0		mg/Kg	1	3/27/2009 07:54 PM
Lead	6.4	1.0		mg/Kg	1	3/27/2009 07:54 PM
Molybdenum	ND	1.0		mg/Kg	1	3/27/2009 07:54 PM
Nickel	86	1.0		mg/Kg	1	3/27/2009 07:54 PM
Selenium	ND	1.0		mg/Kg	1	3/27/2009 07:54 PM
Silver	ND	1.0		mg/Kg	1	3/27/2009 07:54 PM
Thallium	ND	1.0		mg/Kg	1	3/27/2009 07:54 PM
Vanadium	29	1.0		mg/Kg	1	3/27/2009 07:54 PM
Zinc	48	1.0		mg/Kg	1	3/27/2009 07:54 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090324E	QC Batch: 54185			PrepDate:	3/24/2009	Analyst: **CBR**
DRO	2.4	1.0		mg/Kg	1	3/24/2009 10:20 PM
ORO	1.5	1.0		mg/Kg	1	3/24/2009 10:20 PM
Surr: p-Terphenyl	47.5	30-130		%REC	1	3/24/2009 10:20 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090327D	QC Batch: 54281			PrepDate:	3/27/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	3/27/2009 02:44 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090325C	QC Batch: 54223			PrepDate:	3/25/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	3/25/2009 11:49 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	3/25/2009 11:49 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	3/25/2009 11:49 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	3/25/2009 11:49 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E5A (5')
Lab Order:	104673	**Collection Date:**	3/19/2009 2:51:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104673-012A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090325C QC Batch: 54223 PrepDate: 3/25/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	3/25/2009 11:49 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	3/25/2009 11:49 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	3/25/2009 11:49 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	3/25/2009 11:49 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	3/25/2009 11:49 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	3/25/2009 11:49 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	3/25/2009 11:49 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	3/25/2009 11:49 PM
2-Chlorophenol	ND	330		µg/Kg	1	3/25/2009 11:49 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	3/25/2009 11:49 PM
2-Methylphenol	ND	330		µg/Kg	1	3/25/2009 11:49 PM
2-Nitroaniline	ND	1600		µg/Kg	1	3/25/2009 11:49 PM
2-Nitrophenol	ND	330		µg/Kg	1	3/25/2009 11:49 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	3/25/2009 11:49 PM
3-Nitroaniline	ND	1600		µg/Kg	1	3/25/2009 11:49 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	3/25/2009 11:49 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	3/25/2009 11:49 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	3/25/2009 11:49 PM
4-Chloroaniline	ND	660		µg/Kg	1	3/25/2009 11:49 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	3/25/2009 11:49 PM
4-Methylphenol	ND	330		µg/Kg	1	3/25/2009 11:49 PM
4-Nitroaniline	ND	1600		µg/Kg	1	3/25/2009 11:49 PM
4-Nitrophenol	ND	1600		µg/Kg	1	3/25/2009 11:49 PM
Acenaphthene	ND	330		µg/Kg	1	3/25/2009 11:49 PM
Acenaphthylene	ND	330		µg/Kg	1	3/25/2009 11:49 PM
Anthracene	ND	330		µg/Kg	1	3/25/2009 11:49 PM
Benzidine (M)	ND	1600		µg/Kg	1	3/25/2009 11:49 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	3/25/2009 11:49 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	3/25/2009 11:49 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	3/25/2009 11:49 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	3/25/2009 11:49 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	3/25/2009 11:49 PM
Benzoic acid	ND	1600		µg/Kg	1	3/25/2009 11:49 PM
Benzyl alcohol	ND	660		µg/Kg	1	3/25/2009 11:49 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	3/25/2009 11:49 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E5A (5')
Lab Order:	104673	**Collection Date:**	3/19/2009 2:51:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104673-012A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090325C QC Batch: 54223 PrepDate: 3/25/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	3/25/2009 11:49 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	3/25/2009 11:49 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	3/25/2009 11:49 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	3/25/2009 11:49 PM
Chrysene	ND	330		µg/Kg	1	3/25/2009 11:49 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	3/25/2009 11:49 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	3/25/2009 11:49 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	3/25/2009 11:49 PM
Dibenzofuran	ND	330		µg/Kg	1	3/25/2009 11:49 PM
Diethylphthalate	ND	330		µg/Kg	1	3/25/2009 11:49 PM
Dimethylphthalate	ND	330		µg/Kg	1	3/25/2009 11:49 PM
Fluoranthene	ND	330		µg/Kg	1	3/25/2009 11:49 PM
Fluorene	ND	330		µg/Kg	1	3/25/2009 11:49 PM
Hexachlorobenzene	ND	330		µg/Kg	1	3/25/2009 11:49 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	3/25/2009 11:49 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	3/25/2009 11:49 PM
Hexachloroethane	ND	330		µg/Kg	1	3/25/2009 11:49 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	3/25/2009 11:49 PM
Isophorone	ND	330		µg/Kg	1	3/25/2009 11:49 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	3/25/2009 11:49 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	3/25/2009 11:49 PM
Naphthalene	ND	330		µg/Kg	1	3/25/2009 11:49 PM
Nitrobenzene	ND	330		µg/Kg	1	3/25/2009 11:49 PM
Pentachlorophenol	ND	1600		µg/Kg	1	3/25/2009 11:49 PM
Phenanthrene	ND	330		µg/Kg	1	3/25/2009 11:49 PM
Phenol	ND	330		µg/Kg	1	3/25/2009 11:49 PM
Pyrene	ND	330		µg/Kg	1	3/25/2009 11:49 PM
Surr: 1,2-Dichlorobenzene-d4	84.3	49-103		%REC	1	3/25/2009 11:49 PM
Surr: 2,4,6-Tribromophenol	101	47-129		%REC	1	3/25/2009 11:49 PM
Surr: 2-Chlorophenol-d4	95.5	54-109		%REC	1	3/25/2009 11:49 PM
Surr: 2-Fluorobiphenyl	95.2	59-108		%REC	1	3/25/2009 11:49 PM
Surr: 2-Fluorophenol	95.4	50-111		%REC	1	3/25/2009 11:49 PM
Surr: 4-Terphenyl-d14	117	58-135		%REC	1	3/25/2009 11:49 PM
Surr: Nitrobenzene-d5	92.3	54-115		%REC	1	3/25/2009 11:49 PM
Surr: Phenol-d5	96.8	58-112		%REC	1	3/25/2009 11:49 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT: Geocon Consultants, Inc. **Client Sample ID:** E5A (10')
Lab Order: 104673 **Collection Date:** 3/19/2009 2:57:00 PM
Project: Caltrans Dumbarton Bridge, E8435-06-18 **Matrix:** SOIL
Lab ID: 104673-013A

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090327I	QC Batch: 54285			PrepDate:	3/27/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	3/27/2009 07:57 PM
Arsenic	3.6	1.0		mg/Kg	1	3/27/2009 07:57 PM
Barium	60	1.0		mg/Kg	1	3/27/2009 07:57 PM
Beryllium	ND	1.0		mg/Kg	1	3/27/2009 07:57 PM
Cadmium	ND	1.0		mg/Kg	1	3/27/2009 07:57 PM
Chromium	44	1.0		mg/Kg	1	3/27/2009 07:57 PM
Cobalt	8.2	1.0		mg/Kg	1	3/27/2009 07:57 PM
Copper	21	2.0		mg/Kg	1	3/27/2009 07:57 PM
Lead	5.0	1.0		mg/Kg	1	3/27/2009 07:57 PM
Molybdenum	ND	1.0		mg/Kg	1	3/27/2009 07:57 PM
Nickel	50	1.0		mg/Kg	1	3/27/2009 07:57 PM
Selenium	ND	1.0		mg/Kg	1	3/27/2009 07:57 PM
Silver	ND	1.0		mg/Kg	1	3/27/2009 07:57 PM
Thallium	ND	1.0		mg/Kg	1	3/27/2009 07:57 PM
Vanadium	35	1.0		mg/Kg	1	3/27/2009 07:57 PM
Zinc	42	1.0		mg/Kg	1	3/27/2009 07:57 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090324E	QC Batch: 54185			PrepDate:	3/24/2009	Analyst: **CBR**
DRO	1.2	1.0		mg/Kg	1	3/24/2009 09:43 PM
ORO	ND	1.0		mg/Kg	1	3/24/2009 09:43 PM
Surr: p-Terphenyl	73.0	30-130		%REC	1	3/24/2009 09:43 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090327D	QC Batch: 54281			PrepDate:	3/27/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	3/27/2009 02:46 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090325C	QC Batch: 54223			PrepDate:	3/25/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	3/26/2009 12:17 AM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	3/26/2009 12:17 AM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	3/26/2009 12:17 AM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	3/26/2009 12:17 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E5A (10')
Lab Order:	104673	**Collection Date:**	3/19/2009 2:57:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104673-013A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090325C QC Batch: 54223 PrepDate: 3/25/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	3/26/2009 12:17 AM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	3/26/2009 12:17 AM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	3/26/2009 12:17 AM
2,4-Dimethylphenol	ND	330		µg/Kg	1	3/26/2009 12:17 AM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	3/26/2009 12:17 AM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	3/26/2009 12:17 AM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	3/26/2009 12:17 AM
2-Chloronaphthalene	ND	330		µg/Kg	1	3/26/2009 12:17 AM
2-Chlorophenol	ND	330		µg/Kg	1	3/26/2009 12:17 AM
2-Methylnaphthalene	ND	330		µg/Kg	1	3/26/2009 12:17 AM
2-Methylphenol	ND	330		µg/Kg	1	3/26/2009 12:17 AM
2-Nitroaniline	ND	1600		µg/Kg	1	3/26/2009 12:17 AM
2-Nitrophenol	ND	330		µg/Kg	1	3/26/2009 12:17 AM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	3/26/2009 12:17 AM
3-Nitroaniline	ND	1600		µg/Kg	1	3/26/2009 12:17 AM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	3/26/2009 12:17 AM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	3/26/2009 12:17 AM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	3/26/2009 12:17 AM
4-Chloroaniline	ND	660		µg/Kg	1	3/26/2009 12:17 AM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	3/26/2009 12:17 AM
4-Methylphenol	ND	330		µg/Kg	1	3/26/2009 12:17 AM
4-Nitroaniline	ND	1600		µg/Kg	1	3/26/2009 12:17 AM
4-Nitrophenol	ND	1600		µg/Kg	1	3/26/2009 12:17 AM
Acenaphthene	ND	330		µg/Kg	1	3/26/2009 12:17 AM
Acenaphthylene	ND	330		µg/Kg	1	3/26/2009 12:17 AM
Anthracene	ND	330		µg/Kg	1	3/26/2009 12:17 AM
Benzidine (M)	ND	1600		µg/Kg	1	3/26/2009 12:17 AM
Benzo(a)anthracene	ND	330		µg/Kg	1	3/26/2009 12:17 AM
Benzo(a)pyrene	ND	330		µg/Kg	1	3/26/2009 12:17 AM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	3/26/2009 12:17 AM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	3/26/2009 12:17 AM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	3/26/2009 12:17 AM
Benzoic acid	ND	1600		µg/Kg	1	3/26/2009 12:17 AM
Benzyl alcohol	ND	660		µg/Kg	1	3/26/2009 12:17 AM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	3/26/2009 12:17 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E5A (10')
Lab Order:	104673	**Collection Date:**	3/19/2009 2:57:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104673-013A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090325C QC Batch: 54223 PrepDate: 3/25/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	3/26/2009 12:17 AM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	3/26/2009 12:17 AM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	3/26/2009 12:17 AM
Butylbenzylphthalate	ND	330		µg/Kg	1	3/26/2009 12:17 AM
Chrysene	ND	330		µg/Kg	1	3/26/2009 12:17 AM
Di-n-butylphthalate	ND	330		µg/Kg	1	3/26/2009 12:17 AM
Di-n-octylphthalate	ND	330		µg/Kg	1	3/26/2009 12:17 AM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	3/26/2009 12:17 AM
Dibenzofuran	ND	330		µg/Kg	1	3/26/2009 12:17 AM
Diethylphthalate	ND	330		µg/Kg	1	3/26/2009 12:17 AM
Dimethylphthalate	ND	330		µg/Kg	1	3/26/2009 12:17 AM
Fluoranthene	ND	330		µg/Kg	1	3/26/2009 12:17 AM
Fluorene	ND	330		µg/Kg	1	3/26/2009 12:17 AM
Hexachlorobenzene	ND	330		µg/Kg	1	3/26/2009 12:17 AM
Hexachlorobutadiene	ND	660		µg/Kg	1	3/26/2009 12:17 AM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	3/26/2009 12:17 AM
Hexachloroethane	ND	330		µg/Kg	1	3/26/2009 12:17 AM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	3/26/2009 12:17 AM
Isophorone	ND	330		µg/Kg	1	3/26/2009 12:17 AM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	3/26/2009 12:17 AM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	3/26/2009 12:17 AM
Naphthalene	ND	330		µg/Kg	1	3/26/2009 12:17 AM
Nitrobenzene	ND	330		µg/Kg	1	3/26/2009 12:17 AM
Pentachlorophenol	ND	1600		µg/Kg	1	3/26/2009 12:17 AM
Phenanthrene	ND	330		µg/Kg	1	3/26/2009 12:17 AM
Phenol	ND	330		µg/Kg	1	3/26/2009 12:17 AM
Pyrene	ND	330		µg/Kg	1	3/26/2009 12:17 AM
Surr: 1,2-Dichlorobenzene-d4	84.4	49-103		%REC	1	3/26/2009 12:17 AM
Surr: 2,4,6-Tribromophenol	98.3	47-129		%REC	1	3/26/2009 12:17 AM
Surr: 2-Chlorophenol-d4	93.7	54-109		%REC	1	3/26/2009 12:17 AM
Surr: 2-Fluorobiphenyl	93.2	59-108		%REC	1	3/26/2009 12:17 AM
Surr: 2-Fluorophenol	92.5	50-111		%REC	1	3/26/2009 12:17 AM
Surr: 4-Terphenyl-d14	112	58-135		%REC	1	3/26/2009 12:17 AM
Surr: Nitrobenzene-d5	90.8	54-115		%REC	1	3/26/2009 12:17 AM
Surr: Phenol-d5	95.1	58-112		%REC	1	3/26/2009 12:17 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT: Geocon Consultants, Inc. **Client Sample ID:** E5A (15')
Lab Order: 104673 **Collection Date:** 3/19/2009 3:02:00 PM
Project: Caltrans Dumbarton Bridge, E8435-06-18 **Matrix:** SOIL
Lab ID: 104673-014A

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090327I	QC Batch: 54285			PrepDate:	3/27/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	3/27/2009 08:00 PM
Arsenic	3.1	1.0		mg/Kg	1	3/27/2009 08:00 PM
Barium	29	1.0		mg/Kg	1	3/27/2009 08:00 PM
Beryllium	ND	1.0		mg/Kg	1	3/27/2009 08:00 PM
Cadmium	ND	1.0		mg/Kg	1	3/27/2009 08:00 PM
Chromium	33	1.0		mg/Kg	1	3/27/2009 08:00 PM
Cobalt	6.6	1.0		mg/Kg	1	3/27/2009 08:00 PM
Copper	11	2.0		mg/Kg	1	3/27/2009 08:00 PM
Lead	3.0	1.0		mg/Kg	1	3/27/2009 08:00 PM
Molybdenum	ND	1.0		mg/Kg	1	3/27/2009 08:00 PM
Nickel	38	1.0		mg/Kg	1	3/27/2009 08:00 PM
Selenium	ND	1.0		mg/Kg	1	3/27/2009 08:00 PM
Silver	ND	1.0		mg/Kg	1	3/27/2009 08:00 PM
Thallium	ND	1.0		mg/Kg	1	3/27/2009 08:00 PM
Vanadium	26	1.0		mg/Kg	1	3/27/2009 08:00 PM
Zinc	35	1.0		mg/Kg	1	3/27/2009 08:00 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090324E	QC Batch: 54185			PrepDate:	3/24/2009	Analyst: **CBR**
DRO	ND	1.0		mg/Kg	1	3/24/2009 09:52 PM
ORO	ND	1.0		mg/Kg	1	3/24/2009 09:52 PM
Surr: p-Terphenyl	63.3	30-130		%REC	1	3/24/2009 09:52 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090327D	QC Batch: 54281			PrepDate:	3/27/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	3/27/2009 02:48 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090325C	QC Batch: 54223			PrepDate:	3/25/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	3/26/2009 12:45 AM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	3/26/2009 12:45 AM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	3/26/2009 12:45 AM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	3/26/2009 12:45 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E5A (15')
Lab Order:	104673	**Collection Date:**	3/19/2009 3:02:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104673-014A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090325C QC Batch: 54223 PrepDate: 3/25/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	3/26/2009 12:45 AM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	3/26/2009 12:45 AM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	3/26/2009 12:45 AM
2,4-Dimethylphenol	ND	330		µg/Kg	1	3/26/2009 12:45 AM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	3/26/2009 12:45 AM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	3/26/2009 12:45 AM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	3/26/2009 12:45 AM
2-Chloronaphthalene	ND	330		µg/Kg	1	3/26/2009 12:45 AM
2-Chlorophenol	ND	330		µg/Kg	1	3/26/2009 12:45 AM
2-Methylnaphthalene	ND	330		µg/Kg	1	3/26/2009 12:45 AM
2-Methylphenol	ND	330		µg/Kg	1	3/26/2009 12:45 AM
2-Nitroaniline	ND	1600		µg/Kg	1	3/26/2009 12:45 AM
2-Nitrophenol	ND	330		µg/Kg	1	3/26/2009 12:45 AM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	3/26/2009 12:45 AM
3-Nitroaniline	ND	1600		µg/Kg	1	3/26/2009 12:45 AM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	3/26/2009 12:45 AM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	3/26/2009 12:45 AM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	3/26/2009 12:45 AM
4-Chloroaniline	ND	660		µg/Kg	1	3/26/2009 12:45 AM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	3/26/2009 12:45 AM
4-Methylphenol	ND	330		µg/Kg	1	3/26/2009 12:45 AM
4-Nitroaniline	ND	1600		µg/Kg	1	3/26/2009 12:45 AM
4-Nitrophenol	ND	1600		µg/Kg	1	3/26/2009 12:45 AM
Acenaphthene	ND	330		µg/Kg	1	3/26/2009 12:45 AM
Acenaphthylene	ND	330		µg/Kg	1	3/26/2009 12:45 AM
Anthracene	ND	330		µg/Kg	1	3/26/2009 12:45 AM
Benzidine (M)	ND	1600		µg/Kg	1	3/26/2009 12:45 AM
Benzo(a)anthracene	ND	330		µg/Kg	1	3/26/2009 12:45 AM
Benzo(a)pyrene	ND	330		µg/Kg	1	3/26/2009 12:45 AM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	3/26/2009 12:45 AM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	3/26/2009 12:45 AM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	3/26/2009 12:45 AM
Benzoic acid	ND	1600		µg/Kg	1	3/26/2009 12:45 AM
Benzyl alcohol	ND	660		µg/Kg	1	3/26/2009 12:45 AM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	3/26/2009 12:45 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E5A (15')
Lab Order:	104673	**Collection Date:**	3/19/2009 3:02:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104673-014A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090325C QC Batch: 54223 PrepDate: 3/25/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	3/26/2009 12:45 AM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	3/26/2009 12:45 AM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	3/26/2009 12:45 AM
Butylbenzylphthalate	ND	330		µg/Kg	1	3/26/2009 12:45 AM
Chrysene	ND	330		µg/Kg	1	3/26/2009 12:45 AM
Di-n-butylphthalate	ND	330		µg/Kg	1	3/26/2009 12:45 AM
Di-n-octylphthalate	ND	330		µg/Kg	1	3/26/2009 12:45 AM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	3/26/2009 12:45 AM
Dibenzofuran	ND	330		µg/Kg	1	3/26/2009 12:45 AM
Diethylphthalate	ND	330		µg/Kg	1	3/26/2009 12:45 AM
Dimethylphthalate	ND	330		µg/Kg	1	3/26/2009 12:45 AM
Fluoranthene	ND	330		µg/Kg	1	3/26/2009 12:45 AM
Fluorene	ND	330		µg/Kg	1	3/26/2009 12:45 AM
Hexachlorobenzene	ND	330		µg/Kg	1	3/26/2009 12:45 AM
Hexachlorobutadiene	ND	660		µg/Kg	1	3/26/2009 12:45 AM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	3/26/2009 12:45 AM
Hexachloroethane	ND	330		µg/Kg	1	3/26/2009 12:45 AM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	3/26/2009 12:45 AM
Isophorone	ND	330		µg/Kg	1	3/26/2009 12:45 AM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	3/26/2009 12:45 AM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	3/26/2009 12:45 AM
Naphthalene	ND	330		µg/Kg	1	3/26/2009 12:45 AM
Nitrobenzene	ND	330		µg/Kg	1	3/26/2009 12:45 AM
Pentachlorophenol	ND	1600		µg/Kg	1	3/26/2009 12:45 AM
Phenanthrene	ND	330		µg/Kg	1	3/26/2009 12:45 AM
Phenol	ND	330		µg/Kg	1	3/26/2009 12:45 AM
Pyrene	ND	330		µg/Kg	1	3/26/2009 12:45 AM
Surr: 1,2-Dichlorobenzene-d4	82.9	49-103		%REC	1	3/26/2009 12:45 AM
Surr: 2,4,6-Tribromophenol	98.5	47-129		%REC	1	3/26/2009 12:45 AM
Surr: 2-Chlorophenol-d4	90.9	54-109		%REC	1	3/26/2009 12:45 AM
Surr: 2-Fluorobiphenyl	90.6	59-108		%REC	1	3/26/2009 12:45 AM
Surr: 2-Fluorophenol	90.3	50-111		%REC	1	3/26/2009 12:45 AM
Surr: 4-Terphenyl-d14	113	58-135		%REC	1	3/26/2009 12:45 AM
Surr: Nitrobenzene-d5	88.2	54-115		%REC	1	3/26/2009 12:45 AM
Surr: Phenol-d5	92.5	58-112		%REC	1	3/26/2009 12:45 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT: Geocon Consultants, Inc. **Client Sample ID:** E5A (20')
Lab Order: 104673 **Collection Date:** 3/19/2009 3:15:00 PM
Project: Caltrans Dumbarton Bridge, E8435-06-18 **Matrix:** SOIL
Lab ID: 104673-015A

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090327I	QC Batch: 54285			PrepDate:	3/27/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	3/27/2009 08:03 PM
Arsenic	2.0	1.0		mg/Kg	1	3/27/2009 08:03 PM
Barium	55	1.0		mg/Kg	1	3/27/2009 08:03 PM
Beryllium	ND	1.0		mg/Kg	1	3/27/2009 08:03 PM
Cadmium	ND	1.0		mg/Kg	1	3/27/2009 08:03 PM
Chromium	51	1.0		mg/Kg	1	3/27/2009 08:03 PM
Cobalt	8.4	1.0		mg/Kg	1	3/27/2009 08:03 PM
Copper	21	2.0		mg/Kg	1	3/27/2009 08:03 PM
Lead	5.2	1.0		mg/Kg	1	3/27/2009 08:03 PM
Molybdenum	ND	1.0		mg/Kg	1	3/27/2009 08:03 PM
Nickel	71	1.0		mg/Kg	1	3/27/2009 08:03 PM
Selenium	ND	1.0		mg/Kg	1	3/27/2009 08:03 PM
Silver	ND	1.0		mg/Kg	1	3/27/2009 08:03 PM
Thallium	ND	1.0		mg/Kg	1	3/27/2009 08:03 PM
Vanadium	25	1.0		mg/Kg	1	3/27/2009 08:03 PM
Zinc	45	1.0		mg/Kg	1	3/27/2009 08:03 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090324E	QC Batch: 54185			PrepDate:	3/24/2009	Analyst: **CBR**
DRO	ND	1.0		mg/Kg	1	3/24/2009 10:01 PM
ORO	ND	1.0		mg/Kg	1	3/24/2009 10:01 PM
Surr: p-Terphenyl	67.3	30-130		%REC	1	3/24/2009 10:01 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090327D	QC Batch: 54281			PrepDate:	3/27/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	3/27/2009 02:50 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090325C	QC Batch: 54223			PrepDate:	3/25/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	3/26/2009 01:12 AM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	3/26/2009 01:12 AM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	3/26/2009 01:12 AM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	3/26/2009 01:12 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E5A (20')
Lab Order:	104673	**Collection Date:**	3/19/2009 3:15:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104673-015A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090325C QC Batch: 54223 PrepDate: 3/25/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	3/26/2009 01:12 AM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	3/26/2009 01:12 AM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	3/26/2009 01:12 AM
2,4-Dimethylphenol	ND	330		µg/Kg	1	3/26/2009 01:12 AM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	3/26/2009 01:12 AM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	3/26/2009 01:12 AM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	3/26/2009 01:12 AM
2-Chloronaphthalene	ND	330		µg/Kg	1	3/26/2009 01:12 AM
2-Chlorophenol	ND	330		µg/Kg	1	3/26/2009 01:12 AM
2-Methylnaphthalene	ND	330		µg/Kg	1	3/26/2009 01:12 AM
2-Methylphenol	ND	330		µg/Kg	1	3/26/2009 01:12 AM
2-Nitroaniline	ND	1600		µg/Kg	1	3/26/2009 01:12 AM
2-Nitrophenol	ND	330		µg/Kg	1	3/26/2009 01:12 AM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	3/26/2009 01:12 AM
3-Nitroaniline	ND	1600		µg/Kg	1	3/26/2009 01:12 AM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	3/26/2009 01:12 AM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	3/26/2009 01:12 AM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	3/26/2009 01:12 AM
4-Chloroaniline	ND	660		µg/Kg	1	3/26/2009 01:12 AM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	3/26/2009 01:12 AM
4-Methylphenol	ND	330		µg/Kg	1	3/26/2009 01:12 AM
4-Nitroaniline	ND	1600		µg/Kg	1	3/26/2009 01:12 AM
4-Nitrophenol	ND	1600		µg/Kg	1	3/26/2009 01:12 AM
Acenaphthene	ND	330		µg/Kg	1	3/26/2009 01:12 AM
Acenaphthylene	ND	330		µg/Kg	1	3/26/2009 01:12 AM
Anthracene	ND	330		µg/Kg	1	3/26/2009 01:12 AM
Benzidine (M)	ND	1600		µg/Kg	1	3/26/2009 01:12 AM
Benzo(a)anthracene	ND	330		µg/Kg	1	3/26/2009 01:12 AM
Benzo(a)pyrene	ND	330		µg/Kg	1	3/26/2009 01:12 AM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	3/26/2009 01:12 AM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	3/26/2009 01:12 AM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	3/26/2009 01:12 AM
Benzoic acid	ND	1600		µg/Kg	1	3/26/2009 01:12 AM
Benzyl alcohol	ND	660		µg/Kg	1	3/26/2009 01:12 AM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	3/26/2009 01:12 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E5A (20')
Lab Order:	104673	**Collection Date:**	3/19/2009 3:15:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104673-015A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090325C QC Batch: 54223 PrepDate: 3/25/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	3/26/2009 01:12 AM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	3/26/2009 01:12 AM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	3/26/2009 01:12 AM
Butylbenzylphthalate	ND	330		µg/Kg	1	3/26/2009 01:12 AM
Chrysene	ND	330		µg/Kg	1	3/26/2009 01:12 AM
Di-n-butylphthalate	ND	330		µg/Kg	1	3/26/2009 01:12 AM
Di-n-octylphthalate	ND	330		µg/Kg	1	3/26/2009 01:12 AM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	3/26/2009 01:12 AM
Dibenzofuran	ND	330		µg/Kg	1	3/26/2009 01:12 AM
Diethylphthalate	ND	330		µg/Kg	1	3/26/2009 01:12 AM
Dimethylphthalate	ND	330		µg/Kg	1	3/26/2009 01:12 AM
Fluoranthene	ND	330		µg/Kg	1	3/26/2009 01:12 AM
Fluorene	ND	330		µg/Kg	1	3/26/2009 01:12 AM
Hexachlorobenzene	ND	330		µg/Kg	1	3/26/2009 01:12 AM
Hexachlorobutadiene	ND	660		µg/Kg	1	3/26/2009 01:12 AM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	3/26/2009 01:12 AM
Hexachloroethane	ND	330		µg/Kg	1	3/26/2009 01:12 AM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	3/26/2009 01:12 AM
Isophorone	ND	330		µg/Kg	1	3/26/2009 01:12 AM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	3/26/2009 01:12 AM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	3/26/2009 01:12 AM
Naphthalene	ND	330		µg/Kg	1	3/26/2009 01:12 AM
Nitrobenzene	ND	330		µg/Kg	1	3/26/2009 01:12 AM
Pentachlorophenol	ND	1600		µg/Kg	1	3/26/2009 01:12 AM
Phenanthrene	ND	330		µg/Kg	1	3/26/2009 01:12 AM
Phenol	ND	330		µg/Kg	1	3/26/2009 01:12 AM
Pyrene	ND	330		µg/Kg	1	3/26/2009 01:12 AM
Surr: 1,2-Dichlorobenzene-d4	88.8	49-103		%REC	1	3/26/2009 01:12 AM
Surr: 2,4,6-Tribromophenol	101	47-129		%REC	1	3/26/2009 01:12 AM
Surr: 2-Chlorophenol-d4	97.5	54-109		%REC	1	3/26/2009 01:12 AM
Surr: 2-Fluorobiphenyl	96.6	59-108		%REC	1	3/26/2009 01:12 AM
Surr: 2-Fluorophenol	96.3	50-111		%REC	1	3/26/2009 01:12 AM
Surr: 4-Terphenyl-d14	120	58-135		%REC	1	3/26/2009 01:12 AM
Surr: Nitrobenzene-d5	96.3	54-115		%REC	1	3/26/2009 01:12 AM
Surr: Phenol-d5	98.9	58-112		%REC	1	3/26/2009 01:12 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT: Geocon Consultants, Inc.
Work Order: 104673
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **MB-54284** SampType: **MBLK** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/27/2009** RunNo: **107562**
Client ID: **PBS** Batch ID: **54284** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/27/2009** SeqNo: **1685362**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	2.0									
Arsenic	ND	1.0									
Barium	ND	1.0									
Beryllium	ND	1.0									
Cadmium	0.013	1.0									
Chromium	ND	1.0									
Cobalt	ND	1.0									
Copper	ND	2.0									
Lead	ND	1.0									
Molybdenum	ND	1.0									
Nickel	ND	1.0									
Selenium	ND	1.0									
Silver	ND	1.0									
Thallium	ND	1.0									
Vanadium	ND	1.0									
Zinc	ND	1.0									

Sample ID: **LCS-54284** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/27/2009** RunNo: **107562**
Client ID: **LCSS** Batch ID: **54284** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/27/2009** SeqNo: **1685363**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	51.689	2.0	50.00	0	103	80	120				
Arsenic	51.284	1.0	50.00	0	103	80	120				
Barium	53.678	1.0	50.00	0	107	80	120				
Beryllium	51.936	1.0	50.00	0	104	80	120				
Cadmium	52.823	1.0	50.00	0.01339	106	80	120				
Chromium	48.599	1.0	50.00	0	97.2	80	120				
Cobalt	54.214	1.0	50.00	0	108	80	120				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104673
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **LCS-54284** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/27/2009** RunNo: **107562**
Client ID: **LCSS** Batch ID: **54284** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/27/2009** SeqNo: **1685363**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Copper	53.021	2.0	50.00	0	106	80	120				
Lead	53.141	1.0	50.00	0	106	80	120				
Molybdenum	53.225	1.0	50.00	0	106	80	120				
Nickel	52.149	1.0	50.00	0	104	80	120				
Selenium	48.265	1.0	50.00	0	96.5	80	120				
Silver	49.115	1.0	50.00	0	98.2	80	120				
Thallium	47.138	1.0	50.00	0	94.3	80	120				
Vanadium	53.288	1.0	50.00	0	107	80	120				
Zinc	52.499	1.0	50.00	0	105	80	120				

Sample ID: **104673-010ADUP** SampType: **DUP** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/27/2009** RunNo: **107562**
Client ID: **E10A (15')** Batch ID: **54284** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/27/2009** SeqNo: **1685374**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	2.0						0	0	20	
Arsenic	3.770	1.0						3.691	2.10	20	
Barium	28.535	1.0						31.33	9.33	20	
Beryllium	ND	1.0						0	0	20	
Cadmium	0.465	1.0						0.4463	0	20	
Chromium	36.209	1.0						36.30	0.248	20	
Cobalt	7.577	1.0						7.756	2.33	20	
Copper	14.497	2.0						13.69	5.75	20	
Lead	3.712	1.0						3.233	13.8	20	
Molybdenum	ND	1.0						0	0	20	
Nickel	44.817	1.0						44.84	0.0494	20	
Selenium	ND	1.0						0.6347	0	20	
Silver	ND	1.0						0	0	20	
Thallium	ND	1.0						0	0	20	
Vanadium	26.917	1.0						26.08	3.15	20	
Zinc	39.368	1.0						38.76	1.56	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104673
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **104673-010AMS** SampType: **MS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/27/2009** RunNo: **107562**
Client ID: **E10A (15')** Batch ID: **54284** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/27/2009** SeqNo: **1685375**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	85.327	2.0	125.0	0	68.3	25	106				
Arsenic	111.437	1.0	125.0	3.691	86.2	42	113				
Barium	146.664	1.0	125.0	31.33	92.3	19	140				
Beryllium	113.201	1.0	125.0	0	90.6	50	109				
Cadmium	108.531	1.0	125.0	0.4463	86.5	48	106				
Chromium	147.424	1.0	125.0	36.30	88.9	44	116				
Cobalt	119.002	1.0	125.0	7.756	89.0	47	107				
Copper	145.013	2.0	125.0	13.69	105	49	124				
Lead	119.521	1.0	125.0	3.233	93.0	33	120				
Molybdenum	111.339	1.0	125.0	0	89.1	46	111				
Nickel	159.970	1.0	125.0	44.84	92.1	43	111				
Selenium	107.368	1.0	125.0	0.6347	85.4	43	104				
Silver	116.958	1.0	125.0	0	93.6	53	114				
Thallium	102.038	1.0	125.0	0	81.6	41	107				
Vanadium	146.157	1.0	125.0	26.08	96.1	48	116				
Zinc	150.653	1.0	125.0	38.76	89.5	24	129				

Sample ID: **104673-010AMSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/27/2009** RunNo: **107562**
Client ID: **E10A (15')** Batch ID: **54284** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/27/2009** SeqNo: **1685376**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	82.246	2.0	125.0	0	65.8	25	106	85.33	3.68	20	
Arsenic	107.138	1.0	125.0	3.691	82.8	42	113	111.4	3.93	20	
Barium	143.777	1.0	125.0	31.33	90.0	19	140	146.7	1.99	20	
Beryllium	108.206	1.0	125.0	0	86.6	50	109	113.2	4.51	20	
Cadmium	104.192	1.0	125.0	0.4463	83.0	48	106	108.5	4.08	20	
Chromium	141.040	1.0	125.0	36.30	83.8	44	116	147.4	4.43	20	
Cobalt	114.279	1.0	125.0	7.756	85.2	47	107	119.0	4.05	20	
Copper	137.847	2.0	125.0	13.69	99.3	49	124	145.0	5.07	20	
Lead	115.161	1.0	125.0	3.233	89.5	33	120	119.5	3.72	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104673
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **104673-010AMSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/27/2009** RunNo: **107562**
Client ID: **E10A (15')** Batch ID: **54284** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/27/2009** SeqNo: **1685376**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	107.330	1.0	125.0	0	85.9	46	111	111.3	3.67	20	
Nickel	152.634	1.0	125.0	44.84	86.2	43	111	160.0	4.69	20	
Selenium	102.268	1.0	125.0	0.6347	81.3	43	104	107.4	4.87	20	
Silver	112.155	1.0	125.0	0	89.7	53	114	117.0	4.19	20	
Thallium	97.967	1.0	125.0	0	78.4	41	107	102.0	4.07	20	
Vanadium	139.340	1.0	125.0	26.08	90.6	48	116	146.2	4.78	20	
Zinc	144.527	1.0	125.0	38.76	84.6	24	129	150.7	4.15	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104673
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **MB-54285** SampType: **MBLK** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/27/2009** RunNo: **107564**
Client ID: **PBS** Batch ID: **54285** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/27/2009** SeqNo: **1685377**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	2.0									
Arsenic	ND	1.0									
Barium	ND	1.0									
Beryllium	ND	1.0									
Cadmium	0.013	1.0									
Chromium	ND	1.0									
Cobalt	ND	1.0									
Copper	ND	2.0									
Lead	ND	1.0									
Molybdenum	ND	1.0									
Nickel	ND	1.0									
Selenium	ND	1.0									
Silver	ND	1.0									
Thallium	ND	1.0									
Vanadium	ND	1.0									
Zinc	ND	1.0									

Sample ID: **LCS-54285** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/27/2009** RunNo: **107564**
Client ID: **LCSS** Batch ID: **54285** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/27/2009** SeqNo: **1685378**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	44.388	2.0	50.00	0	88.8	80	120				
Arsenic	43.020	1.0	50.00	0	86.0	80	120				
Barium	46.590	1.0	50.00	0	93.2	80	120				
Beryllium	44.706	1.0	50.00	0	89.4	80	120				
Cadmium	45.231	1.0	50.00	0.01250	90.4	80	120				
Chromium	42.288	1.0	50.00	0	84.6	80	120				
Cobalt	46.561	1.0	50.00	0	93.1	80	120				
Copper	46.095	2.0	50.00	0	92.2	80	120				
Lead	48.822	1.0	50.00	0	97.6	80	120				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Geocon Consultants, Inc.
Work Order: 104673
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **LCS-54285** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/27/2009** RunNo: **107564**
Client ID: **LCSS** Batch ID: **54285** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/27/2009** SeqNo: **1685378**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	45.640	1.0	50.00	0	91.3	80	120				
Nickel	45.314	1.0	50.00	0	90.6	80	120				
Selenium	41.626	1.0	50.00	0	83.3	80	120				
Silver	42.865	1.0	50.00	0	85.7	80	120				
Thallium	40.713	1.0	50.00	0	81.4	80	120				
Vanadium	46.652	1.0	50.00	0	93.3	80	120				
Zinc	44.957	1.0	50.00	0	89.9	80	120				

Sample ID: **104674-005ADUP** SampType: **DUP** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/27/2009** RunNo: **107564**
Client ID: **ZZZZZZ** Batch ID: **54285** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/27/2009** SeqNo: **1685389**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	2.0						0.3667	0	20	
Arsenic	5.852	1.0						1.863	103	20	R
Barium	150.650	1.0						260.1	53.3	20	R
Beryllium	ND	1.0						0	0	20	
Cadmium	0.626	1.0						0.6367	0	20	
Chromium	46.818	1.0						40.60	14.2	20	
Cobalt	11.384	1.0						14.55	24.4	20	R
Copper	32.865	2.0						52.46	45.9	20	R
Lead	7.659	1.0						3.859	66.0	20	R
Molybdenum	ND	1.0						0	0	20	
Nickel	64.178	1.0						45.17	34.8	20	R
Selenium	ND	1.0						0.4450	0	20	
Silver	ND	1.0						0	0	20	
Thallium	ND	1.0						0	0	20	
Vanadium	34.411	1.0						51.12	39.1	20	R
Zinc	50.538	1.0						46.65	8.01	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104673
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **104674-005AMS** SampType: **MS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/27/2009** RunNo: **107564**
Client ID: **ZZZZZZ** Batch ID: **54285** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/27/2009** SeqNo: **1685390**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	75.645	2.0	125.0	0.3667	60.2	25	106				
Arsenic	94.344	1.0	125.0	1.863	74.0	42	113				
Barium	246.703	1.0	125.0	260.1	-10.7	19	140				S
Beryllium	92.817	1.0	125.0	0	74.3	50	109				
Cadmium	89.557	1.0	125.0	0.6367	71.1	48	106				
Chromium	137.326	1.0	125.0	40.60	77.4	44	116				
Cobalt	105.311	1.0	125.0	14.55	72.6	47	107				
Copper	141.002	2.0	125.0	52.46	70.8	49	124				
Lead	101.918	1.0	125.0	3.859	78.4	33	120				
Molybdenum	92.881	1.0	125.0	0	74.3	46	111				
Nickel	150.478	1.0	125.0	45.17	84.2	43	111				
Selenium	88.514	1.0	125.0	0.4450	70.5	43	104				
Silver	99.091	1.0	125.0	0	79.3	53	114				
Thallium	83.454	1.0	125.0	0	66.8	41	107				
Vanadium	136.811	1.0	125.0	51.12	68.6	48	116				
Zinc	141.700	1.0	125.0	46.65	76.0	24	129				

Sample ID: **104674-005AMSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/27/2009** RunNo: **107564**
Client ID: **ZZZZZZ** Batch ID: **54285** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/27/2009** SeqNo: **1685391**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	83.818	2.0	125.0	0.3667	66.8	25	106	75.64	10.3	20	
Arsenic	103.507	1.0	125.0	1.863	81.3	42	113	94.34	9.26	20	
Barium	244.016	1.0	125.0	260.1	-12.9	19	140	246.7	1.10	20	S
Beryllium	102.269	1.0	125.0	0	81.8	50	109	92.82	9.69	20	
Cadmium	97.766	1.0	125.0	0.6367	77.7	48	106	89.56	8.76	20	
Chromium	144.108	1.0	125.0	40.60	82.8	44	116	137.3	4.82	20	
Cobalt	113.282	1.0	125.0	14.55	79.0	47	107	105.3	7.29	20	
Copper	147.670	2.0	125.0	52.46	76.2	49	124	141.0	4.62	20	
Lead	110.876	1.0	125.0	3.859	85.6	33	120	101.9	8.42	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104673
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **104674-005AMSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/27/2009** RunNo: **107564**
Client ID: **ZZZZZZ** Batch ID: **54285** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/27/2009** SeqNo: **1685391**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	102.350	1.0	125.0	0	81.9	46	111	92.88	9.70	20	
Nickel	161.463	1.0	125.0	45.17	93.0	43	111	150.5	7.04	20	
Selenium	97.086	1.0	125.0	0.4450	77.3	43	104	88.51	9.24	20	
Silver	108.142	1.0	125.0	0	86.5	53	114	99.09	8.74	20	
Thallium	92.801	1.0	125.0	0	74.2	41	107	83.45	10.6	20	
Vanadium	141.866	1.0	125.0	51.12	72.6	48	116	136.8	3.63	20	
Zinc	147.627	1.0	125.0	46.65	80.8	24	129	141.7	4.10	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104673
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 7471_S

Sample ID: **MB-54280**	SampType: **MBLK**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **3/27/2009**	RunNo: **107533**
Client ID: **PBS**	Batch ID: **54280**	TestNo: **EPA 7471A**		Analysis Date: **3/27/2009**	SeqNo: **1684866**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.10									

Sample ID: **LCS-54280**	SampType: **LCS**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **3/27/2009**	RunNo: **107533**
Client ID: **LCSS**	Batch ID: **54280**	TestNo: **EPA 7471A**		Analysis Date: **3/27/2009**	SeqNo: **1684867**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.908	0.10	0.8300	0	109	80	120				

Sample ID: **104673-010A-MS**	SampType: **MS**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **3/27/2009**	RunNo: **107533**
Client ID: **E10A (15')**	Batch ID: **54280**	TestNo: **EPA 7471A**		Analysis Date: **3/27/2009**	SeqNo: **1684868**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.899	0.10	0.8300	0	108	70	130				

Sample ID: **104673-010A-MSD**	SampType: **MSD**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **3/27/2009**	RunNo: **107533**
Client ID: **E10A (15')**	Batch ID: **54280**	TestNo: **EPA 7471A**		Analysis Date: **3/27/2009**	SeqNo: **1684869**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.909	0.10	0.8300	0	109	70	130	0.8988	1.11	20	

Sample ID: **104673-010A-DUP**	SampType: **DUP**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **3/27/2009**	RunNo: **107533**
Client ID: **E10A (15')**	Batch ID: **54280**	TestNo: **EPA 7471A**		Analysis Date: **3/27/2009**	SeqNo: **1684871**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.038	0.10						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104673
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 7471_S

Sample ID: **MB-54281**	SampType: **MBLK**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **3/27/2009**	RunNo: **107535**
Client ID: **PBS**	Batch ID: **54281**	TestNo: **EPA 7471A**		Analysis Date: **3/27/2009**	SeqNo: **1684905**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.10									

Sample ID: **LCS-54281**	SampType: **LCS**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **3/27/2009**	RunNo: **107535**
Client ID: **LCSS**	Batch ID: **54281**	TestNo: **EPA 7471A**		Analysis Date: **3/27/2009**	SeqNo: **1684906**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.878	0.10	0.8300	0	106	80	120				

Sample ID: **104674-005A-MS**	SampType: **MS**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **3/27/2009**	RunNo: **107535**
Client ID: **ZZZZZZ**	Batch ID: **54281**	TestNo: **EPA 7471A**		Analysis Date: **3/27/2009**	SeqNo: **1684907**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.963	0.10	0.8300	0.04096	111	70	130				

Sample ID: **104674-005A-MSD**	SampType: **MSD**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **3/27/2009**	RunNo: **107535**
Client ID: **ZZZZZZ**	Batch ID: **54281**	TestNo: **EPA 7471A**		Analysis Date: **3/27/2009**	SeqNo: **1684908**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.941	0.10	0.8300	0.04096	108	70	130	0.9632	2.37	20	

Sample ID: **104674-005A-DUP**	SampType: **DUP**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **3/27/2009**	RunNo: **107535**
Client ID: **ZZZZZZ**	Batch ID: **54281**	TestNo: **EPA 7471A**		Analysis Date: **3/27/2009**	SeqNo: **1684910**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.054	0.10						0.04096	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104673
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_S_DM LLSGT

Sample ID: **MB-54184**	SampType: **MBLK**	TestCode: **8015_S_DM L**	Units: **mg/Kg**	Prep Date: **3/24/2009**	RunNo: **107371**
Client ID: **PBS**	Batch ID: **54184**	TestNo: **EPA 8015B(M**	**EPA 3550B**	Analysis Date: **3/24/2009**	SeqNo: **1681900**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	ND	1.0									
ORO	ND	1.0									
Surr: p-Terphenyl	1.742		2.670		65.3	30	130				

Sample ID: **LCS-54184**	SampType: **LCS**	TestCode: **8015_S_DM L**	Units: **mg/Kg**	Prep Date: **3/24/2009**	RunNo: **107371**
Client ID: **LCSS**	Batch ID: **54184**	TestNo: **EPA 8015B(M**	**EPA 3550B**	Analysis Date: **3/24/2009**	SeqNo: **1681901**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	18.232	1.0	33.00	0	55.2	35	124				
Surr: p-Terphenyl	2.264		2.670		84.8	30	130				

Sample ID: **104673-003ADUP**	SampType: **DUP**	TestCode: **8015_S_DM L**	Units: **mg/Kg**	Prep Date: **3/24/2009**	RunNo: **107371**
Client ID: **E15A (0')**	Batch ID: **54184**	TestNo: **EPA 8015B(M**	**EPA 3550B**	Analysis Date: **3/24/2009**	SeqNo: **1681911**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	14.858	1.0						18.75	23.2	20	R
ORO	15.567	1.0						20.05	25.2	20	R
Surr: p-Terphenyl	1.525		2.670		57.1	30	130		0	0	

Sample ID: **104673-003AMS**	SampType: **MS**	TestCode: **8015_S_DM L**	Units: **mg/Kg**	Prep Date: **3/24/2009**	RunNo: **107371**
Client ID: **E15A (0')**	Batch ID: **54184**	TestNo: **EPA 8015B(M**	**EPA 3550B**	Analysis Date: **3/24/2009**	SeqNo: **1681913**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	25.760	1.0	33.00	18.75	21.2	12	125				
Surr: p-Terphenyl	1.763		2.670		66.0	30	130				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104673
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_S_DM LLSGT

Sample ID: **104673-003AMSD** SampType: **MSD** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **3/24/2009** RunNo: **107371**
Client ID: **E15A (0')** Batch ID: **54184** TestNo: **EPA 8015B(M EPA 3550B** Analysis Date: **3/24/2009** SeqNo: **1681914**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	18.948	1.0	33.00	18.75	0.594	12	125	25.76	30.5	20	SR
Surr: p-Terphenyl	1.494		2.670		56.0	30	130		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104673
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_S_DM LLSGT

Sample ID: **MB-54185**	SampType: **MBLK**	TestCode: **8015_S_DM L**	Units: **mg/Kg**	Prep Date: **3/24/2009**	RunNo: **107372**
Client ID: **PBS**	Batch ID: **54185**	TestNo: **EPA 8015B(M**	**EPA 3550B**	Analysis Date: **3/24/2009**	SeqNo: **1681915**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	ND	1.0									
ORO	ND	1.0									
Surr: p-Terphenyl	2.112		2.670		79.1	30	130				

Sample ID: **LCS-54185**	SampType: **LCS**	TestCode: **8015_S_DM L**	Units: **mg/Kg**	Prep Date: **3/24/2009**	RunNo: **107372**
Client ID: **LCSS**	Batch ID: **54185**	TestNo: **EPA 8015B(M**	**EPA 3550B**	Analysis Date: **3/24/2009**	SeqNo: **1681916**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	17.066	1.0	33.00	0	51.7	35	124				
Surr: p-Terphenyl	1.575		2.670		59.0	30	130				

Sample ID: **104673-011ADUP**	SampType: **DUP**	TestCode: **8015_S_DM L**	Units: **mg/Kg**	Prep Date: **3/24/2009**	RunNo: **107372**
Client ID: **E5A (0')**	Batch ID: **54185**	TestNo: **EPA 8015B(M**	**EPA 3550B**	Analysis Date: **3/24/2009**	SeqNo: **1681917**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	1.516	1.0						0	200	20	R
ORO	ND	1.0						0	0	20	
Surr: p-Terphenyl	2.166		2.670		81.1	30	130		0	0	

Sample ID: **104673-011AMS**	SampType: **MS**	TestCode: **8015_S_DM L**	Units: **mg/Kg**	Prep Date: **3/24/2009**	RunNo: **107372**
Client ID: **E5A (0')**	Batch ID: **54185**	TestNo: **EPA 8015B(M**	**EPA 3550B**	Analysis Date: **3/24/2009**	SeqNo: **1681918**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	17.757	1.0	33.00	0	53.8	12	125				
Surr: p-Terphenyl	1.717		2.670		64.3	30	130				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104673
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_S_DM LLSGT

Sample ID: **104673-011AMSD** SampType: **MSD** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **3/24/2009** RunNo: **107372**
Client ID: **E5A (0')** Batch ID: **54185** TestNo: **EPA 8015B(M EPA 3550B** Analysis Date: **3/24/2009** SeqNo: **1681919**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	16.471	1.0	33.00	0	49.9	12	125	17.76	7.51	20	
Surr: p-Terphenyl	1.552		2.670		58.1	30	130		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104673
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-54222** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/25/2009** RunNo: **107451**
Client ID: **PBS** Batch ID: **54222** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/25/2009** SeqNo: **1683288**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	330									
1,2-Dichlorobenzene	ND	330									
1,3-Dichlorobenzene	ND	330									
1,4-Dichlorobenzene	ND	330									
2,4,5-Trichlorophenol	ND	330									
2,4,6-Trichlorophenol	ND	330									
2,4-Dichlorophenol	ND	1600									
2,4-Dimethylphenol	ND	330									
2,4-Dinitrophenol	ND	1600									
2,4-Dinitrotoluene	ND	330									
2,6-Dinitrotoluene	ND	330									
2-Chloronaphthalene	ND	330									
2-Chlorophenol	ND	330									
2-Methylnaphthalene	ND	330									
2-Methylphenol	ND	330									
2-Nitroaniline	ND	1600									
2-Nitrophenol	ND	330									
3,3´-Dichlorobenzidine	ND	660									
3-Nitroaniline	ND	1600									
4,6-Dinitro-2-methylphenol	ND	1600									
4-Bromophenyl-phenylether	ND	330									
4-Chloro-3-methylphenol	ND	660									
4-Chloroaniline	ND	660									
4-Chlorophenyl-phenylether	ND	330									
4-Methylphenol	ND	330									
4-Nitroaniline	ND	1600									
4-Nitrophenol	ND	1600									
Acenaphthene	ND	330									
Acenaphthylene	ND	330									
Anthracene	ND	330									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104673
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-54222** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/25/2009** RunNo: **107451**
Client ID: **PBS** Batch ID: **54222** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/25/2009** SeqNo: **1683288**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzidine (M)	ND	1600									
Benzo(a)anthracene	ND	330									
Benzo(a)pyrene	ND	330									
Benzo(b)fluoranthene	ND	330									
Benzo(g,h,i)perylene	ND	330									
Benzo(k)fluoranthene	ND	330									
Benzoic acid	ND	1600									
Benzyl alcohol	ND	660									
Bis(2-chloroethoxy)methane	ND	330									
Bis(2-chloroethyl)ether	ND	330									
Bis(2-chloroisopropyl)ether	ND	330									
Bis(2-ethylhexyl)phthalate	ND	330									
Butylbenzylphthalate	ND	330									
Chrysene	ND	330									
Di-n-butylphthalate	ND	330									
Di-n-octylphthalate	ND	330									
Dibenz(a,h)anthracene	ND	330									
Dibenzofuran	ND	330									
Diethylphthalate	ND	330									
Dimethylphthalate	ND	330									
Fluoranthene	ND	330									
Fluorene	ND	330									
Hexachlorobenzene	ND	330									
Hexachlorobutadiene	ND	660									
Hexachlorocyclopentadiene	ND	660									
Hexachloroethane	ND	330									
Indeno(1,2,3-cd)pyrene	ND	330									
Isophorone	ND	330									
N-Nitrosodi-n-propylamine	ND	330									
N-Nitrosodiphenylamine	ND	330									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104673
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-54222** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/25/2009** RunNo: **107451**
Client ID: **PBS** Batch ID: **54222** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/25/2009** SeqNo: **1683288**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	330									
Nitrobenzene	ND	330									
Pentachlorophenol	ND	1600									
Phenanthrene	ND	330									
Phenol	ND	330									
Pyrene	ND	330									
Surr: 1,2-Dichlorobenzene-d4	2922.333		3330		87.8	49	103				
Surr: 2,4,6-Tribromophenol	3444.000		3330		103	47	129				
Surr: 2-Chlorophenol-d4	3099.333		3330		93.1	54	109				
Surr: 2-Fluorobiphenyl	3128.000		3330		93.9	59	108				
Surr: 2-Fluorophenol	3091.667		3330		92.8	50	111				
Surr: 4-Terphenyl-d14	4133.000		3330		124	58	135				
Surr: Nitrobenzene-d5	3080.333		3330		92.5	54	115				
Surr: Phenol-d5	3170.667		3330		95.2	58	112				

Sample ID: **LCS-54222** SampType: **LCS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/25/2009** RunNo: **107451**
Client ID: **LCSS** Batch ID: **54222** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/25/2009** SeqNo: **1683289**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	2930.333	330	3330	0	88.0	61	107				
1,4-Dichlorobenzene	2760.333	330	3330	0	82.9	56	100				
2,4-Dinitrotoluene	3352.667	330	3330	0	101	72	130				
2-Chlorophenol	3001.333	330	3330	0	90.1	64	105				
4-Chloro-3-methylphenol	3482.667	660	3330	0	105	74	125				
4-Nitrophenol	3423.000	1600	3330	0	103	77	137				
Acenaphthene	3172.667	330	3330	0	95.3	63	117				
N-Nitrosodi-n-propylamine	3139.667	330	3330	0	94.3	71	121				
Pentachlorophenol	3008.667	1600	3330	0	90.4	69	125				
Phenol	3111.667	330	3330	0	93.4	67	111				
Pyrene	3235.667	330	3330	0	97.2	60	122				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Geocon Consultants, Inc.
Work Order: 104673
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **LCS-54222** SampType: **LCS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/25/2009** RunNo: **107451**
Client ID: **LCSS** Batch ID: **54222** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/25/2009** SeqNo: **1683289**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 1,2-Dichlorobenzene-d4	2725.000		3330		81.8	49	103				
Surr: 2,4,6-Tribromophenol	3396.000		3330		102	47	129				
Surr: 2-Chlorophenol-d4	2895.667		3330		87.0	54	109				
Surr: 2-Fluorobiphenyl	3010.333		3330		90.4	59	108				
Surr: 2-Fluorophenol	2870.000		3330		86.2	50	111				
Surr: 4-Terphenyl-d14	3403.000		3330		102	58	135				
Surr: Nitrobenzene-d5	2860.000		3330		85.9	54	115				
Surr: Phenol-d5	2950.667		3330		88.6	58	112				

Sample ID: **104673-004AMS** SampType: **MS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/25/2009** RunNo: **107451**
Client ID: **E15A (5')** Batch ID: **54222** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/26/2009** SeqNo: **1683291**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	2939.667	330	3330	0	88.3	60	105				
1,4-Dichlorobenzene	2673.667	330	3330	0	80.3	50	99				
2,4-Dinitrotoluene	3097.667	330	3330	0	93.0	70	130				
2-Chlorophenol	2958.667	330	3330	0	88.8	58	107				
4-Chloro-3-methylphenol	3299.000	660	3330	0	99.1	72	124				
4-Nitrophenol	3191.333	1600	3330	0	95.8	69	139				
Acenaphthene	3079.000	330	3330	0	92.5	59	118				
N-Nitrosodi-n-propylamine	3029.333	330	3330	0	91.0	61	125				
Pentachlorophenol	2889.667	1600	3330	0	86.8	56	131				
Phenol	3065.333	330	3330	323.7	82.3	60	113				
Pyrene	2998.333	330	3330	0	90.0	51	130				
Surr: 1,2-Dichlorobenzene-d4	2720.667		3330		81.7	49	103				
Surr: 2,4,6-Tribromophenol	3268.667		3330		98.2	47	129				
Surr: 2-Chlorophenol-d4	2891.667		3330		86.8	54	109				
Surr: 2-Fluorobiphenyl	3068.333		3330		92.1	59	108				
Surr: 2-Fluorophenol	2899.000		3330		87.1	50	111				
Surr: 4-Terphenyl-d14	3338.333		3330		100	58	135				

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits
- Calculations are based on raw values
- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Geocon Consultants, Inc.
Work Order: 104673
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104673-004AMS**	SampType: **MS**	TestCode: **8270_S_FUL**	Units: **µg/Kg**	Prep Date: **3/25/2009**	RunNo: **107451**
Client ID: **E15A (5')**	Batch ID: **54222**	TestNo: **EPA 8270C**	**EPA 3550B**	Analysis Date: **3/26/2009**	SeqNo: **1683291**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	2897.000		3330		87.0	54	115				
Surr: Phenol-d5	2948.000		3330		88.5	58	112				

Sample ID: **104673-004AMSD**	SampType: **MSD**	TestCode: **8270_S_FUL**	Units: **µg/Kg**	Prep Date: **3/25/2009**	RunNo: **107451**
Client ID: **E15A (5')**	Batch ID: **54222**	TestNo: **EPA 8270C**	**EPA 3550B**	Analysis Date: **3/26/2009**	SeqNo: **1683292**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	2955.333	330	3330	0	88.7	60	105	2940	0.532	20	
1,4-Dichlorobenzene	2684.333	330	3330	0	80.6	50	99	2674	0.398	20	
2,4-Dinitrotoluene	3235.667	330	3330	0	97.2	70	130	3098	4.36	20	
2-Chlorophenol	2982.667	330	3330	0	89.6	58	107	2959	0.808	20	
4-Chloro-3-methylphenol	3332.667	660	3330	0	100	72	124	3299	1.02	20	
4-Nitrophenol	3394.000	1600	3330	0	102	69	139	3191	6.16	20	
Acenaphthene	3137.000	330	3330	0	94.2	59	118	3079	1.87	20	
N-Nitrosodi-n-propylamine	3030.000	330	3330	0	91.0	61	125	3029	0.0220	20	
Pentachlorophenol	3034.667	1600	3330	0	91.1	56	131	2890	4.90	20	
Phenol	3048.000	330	3330	323.7	81.8	60	113	3065	0.567	20	
Pyrene	3223.000	330	3330	0	96.8	51	130	2998	7.22	20	
Surr: 1,2-Dichlorobenzene-d4	2697.667		3330		81.0	49	103		0	0	
Surr: 2,4,6-Tribromophenol	3360.333		3330		101	47	129		0	0	
Surr: 2-Chlorophenol-d4	2877.333		3330		86.4	54	109		0	0	
Surr: 2-Fluorobiphenyl	3118.000		3330		93.6	59	108		0	0	
Surr: 2-Fluorophenol	2873.333		3330		86.3	50	111		0	0	
Surr: 4-Terphenyl-d14	3388.667		3330		102	58	135		0	0	
Surr: Nitrobenzene-d5	2895.000		3330		86.9	54	115		0	0	
Surr: Phenol-d5	2924.000		3330		87.8	58	112		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104673
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104673-004ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/25/2009** RunNo: **107451**
Client ID: **E15A (5')** Batch ID: **54222** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/26/2009** SeqNo: **1683363**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	330						0	0	20	
1,2-Dichlorobenzene	ND	330						0	0	20	
1,3-Dichlorobenzene	ND	330						0	0	20	
1,4-Dichlorobenzene	ND	330						0	0	20	
2,4,5-Trichlorophenol	ND	330						0	0	20	
2,4,6-Trichlorophenol	ND	330						0	0	20	
2,4-Dichlorophenol	ND	1600						0	0	20	
2,4-Dimethylphenol	ND	330						0	0	20	
2,4-Dinitrophenol	ND	1600						0	0	20	
2,4-Dinitrotoluene	ND	330						0	0	20	
2,6-Dinitrotoluene	ND	330						0	0	20	
2-Chloronaphthalene	ND	330						0	0	20	
2-Chlorophenol	ND	330						0	0	20	
2-Methylnaphthalene	ND	330						0	0	20	
2-Methylphenol	ND	330						0	0	20	
2-Nitroaniline	ND	1600						0	0	20	
2-Nitrophenol	ND	330						0	0	20	
3,3´-Dichlorobenzidine	ND	660						0	0	20	
3-Nitroaniline	ND	1600						0	0	20	
4,6-Dinitro-2-methylphenol	ND	1600						0	0	20	
4-Bromophenyl-phenylether	ND	330						0	0	20	
4-Chloro-3-methylphenol	ND	660						0	0	20	
4-Chloroaniline	ND	660						0	0	20	
4-Chlorophenyl-phenylether	ND	330						0	0	20	
4-Methylphenol	ND	330						0	0	20	
4-Nitroaniline	ND	1600						0	0	20	
4-Nitrophenol	ND	1600						0	0	20	
Acenaphthene	ND	330						0	0	20	
Acenaphthylene	ND	330						0	0	20	
Anthracene	ND	330						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104673
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104673-004ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/25/2009** RunNo: **107451**
Client ID: **E15A (5')** Batch ID: **54222** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/26/2009** SeqNo: **1683363**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzidine (M)	ND	1600						0	0	20	
Benzo(a)anthracene	ND	330						0	0	20	
Benzo(a)pyrene	ND	330						0	0	20	
Benzo(b)fluoranthene	ND	330						0	0	20	
Benzo(g,h,i)perylene	ND	330						0	0	20	
Benzo(k)fluoranthene	ND	330						0	0	20	
Benzoic acid	ND	1600						0	0	20	
Benzyl alcohol	ND	660						0	0	20	
Bis(2-chloroethoxy)methane	ND	330						0	0	20	
Bis(2-chloroethyl)ether	ND	330						0	0	20	
Bis(2-chloroisopropyl)ether	ND	330						0	0	20	
Bis(2-ethylhexyl)phthalate	ND	330						0	0	20	
Butylbenzylphthalate	ND	330						0	0	20	
Chrysene	ND	330						0	0	20	
Di-n-butylphthalate	ND	330						0	0	20	
Di-n-octylphthalate	ND	330						0	0	20	
Dibenz(a,h)anthracene	ND	330						0	0	20	
Dibenzofuran	ND	330						0	0	20	
Diethylphthalate	ND	330						0	0	20	
Dimethylphthalate	ND	330						0	0	20	
Fluoranthene	ND	330						0	0	20	
Fluorene	ND	330						0	0	20	
Hexachlorobenzene	ND	330						0	0	20	
Hexachlorobutadiene	ND	660						0	0	20	
Hexachlorocyclopentadiene	ND	660						0	0	20	
Hexachloroethane	ND	330						0	0	20	
Indeno(1,2,3-cd)pyrene	ND	330						0	0	20	
Isophorone	ND	330						0	0	20	
N-Nitrosodi-n-propylamine	ND	330						0	0	20	
N-Nitrosodiphenylamine	ND	330						0	0	20	

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits

Calculations are based on raw values

- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Geocon Consultants, Inc.
Work Order: 104673
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104673-004ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/25/2009** RunNo: **107451**
Client ID: **E15A (5')** Batch ID: **54222** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/26/2009** SeqNo: **1683363**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	330						0	0	20	
Nitrobenzene	ND	330						0	0	20	
Pentachlorophenol	ND	1600						0	0	20	
Phenanthrene	ND	330						0	0	20	
Phenol	ND	330						323.7	0	20	
Pyrene	ND	330						0	0	20	
Surr: 1,2-Dichlorobenzene-d4	2713.000		3330		81.5	49	103		0	0	
Surr: 2,4,6-Tribromophenol	3139.333		3330		94.3	47	129		0	0	
Surr: 2-Chlorophenol-d4	2928.667		3330		87.9	54	109		0	0	
Surr: 2-Fluorobiphenyl	3052.333		3330		91.7	59	108		0	0	
Surr: 2-Fluorophenol	2939.667		3330		88.3	50	111		0	0	
Surr: 4-Terphenyl-d14	3747.000		3330		113	58	135		0	0	
Surr: Nitrobenzene-d5	2853.333		3330		85.7	54	115		0	0	
Surr: Phenol-d5	2955.667		3330		88.8	58	112		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104673
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-54223** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/25/2009** RunNo: **107469**
Client ID: **PBS** Batch ID: **54223** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/25/2009** SeqNo: **1683668**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	330									
1,2-Dichlorobenzene	ND	330									
1,3-Dichlorobenzene	ND	330									
1,4-Dichlorobenzene	ND	330									
2,4,5-Trichlorophenol	ND	330									
2,4,6-Trichlorophenol	ND	330									
2,4-Dichlorophenol	ND	1600									
2,4-Dimethylphenol	ND	330									
2,4-Dinitrophenol	ND	1600									
2,4-Dinitrotoluene	ND	330									
2,6-Dinitrotoluene	ND	330									
2-Chloronaphthalene	ND	330									
2-Chlorophenol	ND	330									
2-Methylnaphthalene	ND	330									
2-Methylphenol	ND	330									
2-Nitroaniline	ND	1600									
2-Nitrophenol	ND	330									
3,3´-Dichlorobenzidine	ND	660									
3-Nitroaniline	ND	1600									
4,6-Dinitro-2-methylphenol	ND	1600									
4-Bromophenyl-phenylether	ND	330									
4-Chloro-3-methylphenol	ND	660									
4-Chloroaniline	ND	660									
4-Chlorophenyl-phenylether	ND	330									
4-Methylphenol	ND	330									
4-Nitroaniline	ND	1600									
4-Nitrophenol	ND	1600									
Acenaphthene	ND	330									
Acenaphthylene	ND	330									
Anthracene	ND	330									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104673
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-54223** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/25/2009** RunNo: **107469**
Client ID: **PBS** Batch ID: **54223** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/25/2009** SeqNo: **1683668**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzidine (M)	ND	1600									
Benzo(a)anthracene	ND	330									
Benzo(a)pyrene	ND	330									
Benzo(b)fluoranthene	ND	330									
Benzo(g,h,i)perylene	ND	330									
Benzo(k)fluoranthene	ND	330									
Benzoic acid	ND	1600									
Benzyl alcohol	ND	660									
Bis(2-chloroethoxy)methane	ND	330									
Bis(2-chloroethyl)ether	ND	330									
Bis(2-chloroisopropyl)ether	ND	330									
Bis(2-ethylhexyl)phthalate	ND	330									
Butylbenzylphthalate	ND	330									
Chrysene	ND	330									
Di-n-butylphthalate	ND	330									
Di-n-octylphthalate	ND	330									
Dibenz(a,h)anthracene	ND	330									
Dibenzofuran	ND	330									
Diethylphthalate	ND	330									
Dimethylphthalate	ND	330									
Fluoranthene	ND	330									
Fluorene	ND	330									
Hexachlorobenzene	ND	330									
Hexachlorobutadiene	ND	660									
Hexachlorocyclopentadiene	ND	660									
Hexachloroethane	ND	330									
Indeno(1,2,3-cd)pyrene	ND	330									
Isophorone	ND	330									
N-Nitrosodi-n-propylamine	ND	330									
N-Nitrosodiphenylamine	ND	330									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104673
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-54223** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/25/2009** RunNo: **107469**
Client ID: **PBS** Batch ID: **54223** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/25/2009** SeqNo: **1683668**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	330									
Nitrobenzene	ND	330									
Pentachlorophenol	ND	1600									
Phenanthrene	ND	330									
Phenol	ND	330									
Pyrene	ND	330									
Surr: 1,2-Dichlorobenzene-d4	2986.000		3330		89.7	49	103				
Surr: 2,4,6-Tribromophenol	3496.667		3330		105	47	129				
Surr: 2-Chlorophenol-d4	3215.333		3330		96.6	54	109				
Surr: 2-Fluorobiphenyl	3261.333		3330		97.9	59	108				
Surr: 2-Fluorophenol	3204.667		3330		96.2	50	111				
Surr: 4-Terphenyl-d14	4257.333		3330		128	58	135				
Surr: Nitrobenzene-d5	3139.000		3330		94.3	54	115				
Surr: Phenol-d5	3282.333		3330		98.6	58	112				

Sample ID: **LCS-54223** SampType: **LCS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/25/2009** RunNo: **107469**
Client ID: **LCSS** Batch ID: **54223** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/25/2009** SeqNo: **1683669**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	3002.000	330	3330	0	90.2	61	107				
1,4-Dichlorobenzene	2770.000	330	3330	0	83.2	56	100				
2,4-Dinitrotoluene	3375.667	330	3330	0	101	72	130				
2-Chlorophenol	3017.000	330	3330	0	90.6	64	105				
4-Chloro-3-methylphenol	3508.333	660	3330	0	105	74	125				
4-Nitrophenol	3425.000	1600	3330	0	103	77	137				
Acenaphthene	3224.667	330	3330	0	96.8	63	117				
N-Nitrosodi-n-propylamine	3159.667	330	3330	0	94.9	71	121				
Pentachlorophenol	3050.000	1600	3330	0	91.6	69	125				
Phenol	3140.333	330	3330	0	94.3	67	111				
Pyrene	3324.000	330	3330	0	99.8	60	122				

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike/Surrogate outside of limits due to matrix interference
- DO Surrogate Diluted Out

Calculations are based on raw values

CLIENT: Geocon Consultants, Inc.
Work Order: 104673
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **LCS-54223** SampType: **LCS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/25/2009** RunNo: **107469**
Client ID: **LCSS** Batch ID: **54223** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/25/2009** SeqNo: **1683669**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 1,2-Dichlorobenzene-d4	2737.333		3330		82.2	49	103				
Surr: 2,4,6-Tribromophenol	3388.667		3330		102	47	129				
Surr: 2-Chlorophenol-d4	2906.667		3330		87.3	54	109				
Surr: 2-Fluorobiphenyl	3061.667		3330		91.9	59	108				
Surr: 2-Fluorophenol	2893.667		3330		86.9	50	111				
Surr: 4-Terphenyl-d14	3484.000		3330		105	58	135				
Surr: Nitrobenzene-d5	2915.000		3330		87.5	54	115				
Surr: Phenol-d5	2977.000		3330		89.4	58	112				

Sample ID: **104673-012AMS** SampType: **MS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/25/2009** RunNo: **107469**
Client ID: **E5A (5')** Batch ID: **54223** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/26/2009** SeqNo: **1683680**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	3024.667	330	3330	0	90.8	60	105				
1,4-Dichlorobenzene	2755.000	330	3330	0	82.7	50	99				
2,4-Dinitrotoluene	3392.333	330	3330	0	102	70	130				
2-Chlorophenol	3129.333	330	3330	0	94.0	58	107				
4-Chloro-3-methylphenol	3518.000	660	3330	0	106	72	124				
4-Nitrophenol	3427.333	1600	3330	0	103	69	139				
Acenaphthene	3205.333	330	3330	0	96.3	59	118				
N-Nitrosodi-n-propylamine	3170.333	330	3330	0	95.2	61	125				
Pentachlorophenol	3084.333	1600	3330	0	92.6	56	131				
Phenol	3202.667	330	3330	0	96.2	60	113				
Pyrene	3066.000	330	3330	0	92.1	51	130				
Surr: 1,2-Dichlorobenzene-d4	2702.667		3330		81.2	49	103				
Surr: 2,4,6-Tribromophenol	3491.000		3330		105	47	129				
Surr: 2-Chlorophenol-d4	2984.000		3330		89.6	54	109				
Surr: 2-Fluorobiphenyl	3151.333		3330		94.6	59	108				
Surr: 2-Fluorophenol	2984.000		3330		89.6	50	111				
Surr: 4-Terphenyl-d14	3581.667		3330		108	58	135				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104673
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104673-012AMS** SampType: **MS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/25/2009** RunNo: **107469**
Client ID: **E5A (5')** Batch ID: **54223** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/26/2009** SeqNo: **1683680**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	2916.667		3330		87.6	54	115				
Surr: Phenol-d5	3026.667		3330		90.9	58	112				

Sample ID: **104673-012AMSD** SampType: **MSD** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/25/2009** RunNo: **107469**
Client ID: **E5A (5')** Batch ID: **54223** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/26/2009** SeqNo: **1683681**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	3075.333	330	3330	0	92.4	60	105	3025	1.66	20	
1,4-Dichlorobenzene	2791.333	330	3330	0	83.8	50	99	2755	1.31	20	
2,4-Dinitrotoluene	3363.333	330	3330	0	101	70	130	3392	0.859	20	
2-Chlorophenol	3120.000	330	3330	0	93.7	58	107	3129	0.299	20	
4-Chloro-3-methylphenol	3472.667	660	3330	0	104	72	124	3518	1.30	20	
4-Nitrophenol	3390.667	1600	3330	0	102	69	139	3427	1.08	20	
Acenaphthene	3196.000	330	3330	0	96.0	59	118	3205	0.292	20	
N-Nitrosodi-n-propylamine	3200.333	330	3330	0	96.1	61	125	3170	0.942	20	
Pentachlorophenol	3100.667	1600	3330	0	93.1	56	131	3084	0.528	20	
Phenol	3206.000	330	3330	0	96.3	60	113	3203	0.104	20	
Pyrene	3103.667	330	3330	0	93.2	51	130	3066	1.22	20	
Surr: 1,2-Dichlorobenzene-d4	2744.667		3330		82.4	49	103		0	0	
Surr: 2,4,6-Tribromophenol	3304.333		3330		99.2	47	129		0	0	
Surr: 2-Chlorophenol-d4	2978.333		3330		89.4	54	109		0	0	
Surr: 2-Fluorobiphenyl	3160.333		3330		94.9	59	108		0	0	
Surr: 2-Fluorophenol	2965.000		3330		89.0	50	111		0	0	
Surr: 4-Terphenyl-d14	3459.667		3330		104	58	135		0	0	
Surr: Nitrobenzene-d5	2911.000		3330		87.4	54	115		0	0	
Surr: Phenol-d5	3040.333		3330		91.3	58	112		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104673
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104673-012ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/25/2009** RunNo: **107469**
Client ID: **E5A (5')** Batch ID: **54223** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/26/2009** SeqNo: **1683682**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	330						0	0	20	
1,2-Dichlorobenzene	ND	330						0	0	20	
1,3-Dichlorobenzene	ND	330						0	0	20	
1,4-Dichlorobenzene	ND	330						0	0	20	
2,4,5-Trichlorophenol	ND	330						0	0	20	
2,4,6-Trichlorophenol	ND	330						0	0	20	
2,4-Dichlorophenol	ND	1600						0	0	20	
2,4-Dimethylphenol	ND	330						0	0	20	
2,4-Dinitrophenol	ND	1600						0	0	20	
2,4-Dinitrotoluene	ND	330						0	0	20	
2,6-Dinitrotoluene	ND	330						0	0	20	
2-Chloronaphthalene	ND	330						0	0	20	
2-Chlorophenol	ND	330						0	0	20	
2-Methylnaphthalene	ND	330						0	0	20	
2-Methylphenol	ND	330						0	0	20	
2-Nitroaniline	ND	1600						0	0	20	
2-Nitrophenol	ND	330						0	0	20	
3,3´-Dichlorobenzidine	ND	660						0	0	20	
3-Nitroaniline	ND	1600						0	0	20	
4,6-Dinitro-2-methylphenol	ND	1600						0	0	20	
4-Bromophenyl-phenylether	ND	330						0	0	20	
4-Chloro-3-methylphenol	ND	660						0	0	20	
4-Chloroaniline	ND	660						0	0	20	
4-Chlorophenyl-phenylether	ND	330						0	0	20	
4-Methylphenol	ND	330						0	0	20	
4-Nitroaniline	ND	1600						0	0	20	
4-Nitrophenol	ND	1600						0	0	20	
Acenaphthene	ND	330						0	0	20	
Acenaphthylene	ND	330						0	0	20	
Anthracene	ND	330						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104673
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104673-012ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/25/2009** RunNo: **107469**
Client ID: **E5A (5')** Batch ID: **54223** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/26/2009** SeqNo: **1683682**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzidine (M)	ND	1600						0	0	20	
Benzo(a)anthracene	ND	330						0	0	20	
Benzo(a)pyrene	ND	330						0	0	20	
Benzo(b)fluoranthene	ND	330						0	0	20	
Benzo(g,h,i)perylene	ND	330						0	0	20	
Benzo(k)fluoranthene	ND	330						0	0	20	
Benzoic acid	ND	1600						0	0	20	
Benzyl alcohol	ND	660						0	0	20	
Bis(2-chloroethoxy)methane	ND	330						0	0	20	
Bis(2-chloroethyl)ether	ND	330						0	0	20	
Bis(2-chloroisopropyl)ether	ND	330						0	0	20	
Bis(2-ethylhexyl)phthalate	ND	330						0	0	20	
Butylbenzylphthalate	ND	330						0	0	20	
Chrysene	ND	330						0	0	20	
Di-n-butylphthalate	ND	330						0	0	20	
Di-n-octylphthalate	ND	330						0	0	20	
Dibenz(a,h)anthracene	ND	330						0	0	20	
Dibenzofuran	ND	330						0	0	20	
Diethylphthalate	ND	330						0	0	20	
Dimethylphthalate	ND	330						0	0	20	
Fluoranthene	ND	330						0	0	20	
Fluorene	ND	330						0	0	20	
Hexachlorobenzene	ND	330						0	0	20	
Hexachlorobutadiene	ND	660						0	0	20	
Hexachlorocyclopentadiene	ND	660						0	0	20	
Hexachloroethane	ND	330						0	0	20	
Indeno(1,2,3-cd)pyrene	ND	330						0	0	20	
Isophorone	ND	330						0	0	20	
N-Nitrosodi-n-propylamine	ND	330						0	0	20	
N-Nitrosodiphenylamine	ND	330						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104673
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104673-012ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/25/2009** RunNo: **107469**
Client ID: **E5A (5')** Batch ID: **54223** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/26/2009** SeqNo: **1683682**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	330						0	0	20	
Nitrobenzene	ND	330						0	0	20	
Pentachlorophenol	ND	1600						0	0	20	
Phenanthrene	ND	330						0	0	20	
Phenol	ND	330						0	0	20	
Pyrene	ND	330						0	0	20	
Surr: 1,2-Dichlorobenzene-d4	2843.333		3330		85.4	49	103		0	0	
Surr: 2,4,6-Tribromophenol	3232.000		3330		97.1	47	129		0	0	
Surr: 2-Chlorophenol-d4	3099.333		3330		93.1	54	109		0	0	
Surr: 2-Fluorobiphenyl	3181.667		3330		95.5	59	108		0	0	
Surr: 2-Fluorophenol	3098.667		3330		93.1	50	111		0	0	
Surr: 4-Terphenyl-d14	3848.000		3330		116	58	135		0	0	
Surr: Nitrobenzene-d5	3036.667		3330		91.2	54	115		0	0	
Surr: Phenol-d5	3087.667		3330		92.7	58	112		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CHAIN OF CUSTODY RECORD

Pg 1 of 2

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#: _____
Logged By: _____ Date: 3/23/09

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: GSO

Sample Condition Upon Receipt: 3.0
1. CHILLED Y☐ N☐ 4. SEALED Y☐ N☐
2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐
3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client: Geocon Consultants, Inc. | Address: 6671 Brisa St. | TEL: (925) 371-5900
Attn: John Love | City Livermore State CA Zip Code 94550 | FAX: (925) 371-5915

Project Name: Caltrans - Dumbarton Bridge | Project #: E8435-06-18 | Sampler: (Printed Name) John Love (Signature)

Relinquished by: (Signature and Printed Name) John Love | Date: 3/20/09 | Time: 16:00 | Received by: (Signature and Printed Name) | Date: 3/21/09 | Time: 8:30
Relinquished by: (Signature and Printed Name) | Date: | Time: | Received by: (Signature and Printed Name) | Date: | Time:
Relinquished by: (Signature and Printed Name) | Date: | Time: | Received by: (Signature and Printed Name) | Date: | Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: John Love 3/20/09 (Print Name, Date)
Signature

Send Report To:
Attn: _____
Co: same as above
Address _____
City _____ State _____ Zip _____

Bill To:
Attn: _____
Co: same as above
Address _____
City _____ State _____ Zip _____

Special Instructions/Comments:
gel cleanup (8015B)

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

Circle or Add Analysis(es) Requested: 8081A (Pesticides) | 8082 (PCB) | 8260B (Volatiles) | 8270C (BNA) | 6010B (Total Metal) | 8015B (GRO) / 8020 (BTEX) | 8015B (DRO) | 8021 (BTEX) | TITLE 22 / CAM 17 (6010 / 7000) | TPHd + TPHmo w/silica gel | 5 VOCs (8270C)

SPECIFY APPROPRIATE MATRIX: SOIL | WATER | GROUND WATER | WASTEWATER

PRESERVATION

Q A / Q C: RTNE ☐ CT ☐ SWRCB ☐ Logcode ____ OTHER ____

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	TAT	Container(s): #	Type	REMARKS
	104673-1	E20AGW (0')	3/19/09	12:30	E	1	T P	
	-2	E20AGW (5')		12:31				
	-3	E15A (0')		13:27				
	-4	E15A (5')		13:29				
	-5	E15A (10')		13:35				
	-6	E15A (15')		13:40				
	-7	E10A (0')		14:08				
	-8	E10A (5')		14:11				
	-9	E10A (9')		14:20				
	-10	E10A (15')		14:30				

- TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr | B= Emergency Next workday | C= Critical 2 Workdays | D= Urgent 3 Workdays | E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=Hcl N=HNO_3 S=H_2SO_4 C=4°C Z=Zn(AC)$_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: White with report, Yellow to folder, Pink to submitter.

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#: _____
Logged By: _____ Date: 3/23/09

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: _____

Sample Condition Upon Receipt
1. CHILLED Y☐ N☐ 4. SEALED Y☐ N☐
2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐
3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client: Geocon Consultants, Inc.
Attn: John Love
Address: 6671 Brisa St.
City Livermore State CA Zip Code 94550
TEL: (925) 371-5900
FAX: (925) 371-5915

Project Name: Caltrans Dumbarton Bridge
Project #: E8435-06-18
Sampler: (Printed Name) John Love (Signature)

Relinquished by: (Signature and Printed Name) John Love Date: 3/20/09 Time: 16:00 Received by: (Signature and Printed Name) Marg Date: 3/21/09 Time: 8:30
Relinquished by: (Signature and Printed Name) Date: Time: Received by: (Signature and Printed Name) Date: Time:
Relinquished by: (Signature and Printed Name) Date: Time: Received by: (Signature and Printed Name) Date: Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
John Love 3/20/09
Print Name Date
Signature

Send Report To:
Attn: _____
Co: same as above
Address _____
City _____ State _____ Zip _____

Bill To:
Attn: _____
Co: same as above
Address _____
City _____ State _____ Zip _____

Special Instructions/Comments:
Cleanup (8015B)

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

Circle or Add Analysis(es) Requested: 8081A (Pesticides), 8082 (PCB), 8260B (Volatiles), 8270C (BNA), 6010B (Total Metal), 8015B (GRO) / 8020 (BTEX), 8015B (DRO), 8021 (BTEX), TITLE 22 / CAM 17 (6010 / 7000), TPHd + TPHmo w/silica gel cleanup, SVOCs (8270C)

SPECIFY APPROPRIATE MATRIX: SOIL, WATER, GROUND WATER, WASTEWATER

PRESERVATION

Q A / Q C: RTNE ☐ CT ☐ SWRCB ☐ Logcode ____ OTHER ____

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	TAT	Container(s): #	Type	REMARKS
	104673-11	E5A (0')	3/19/09	14:49	E	1	T P	
	-12	E5A (5')		14:51				
	-13	E5A (10')		14:57				
	-14	E5A (15')		15:02				
	-15	E5A (20')		15:15				

- TAT starts 8 a.m. following day if samples received after 3 p.m.

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Preservatives: H=Hcl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: White with report, Yellow to folder, Pink to submitter.

June 09, 2009

John Love
Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550
TEL: (925) 525-4142
FAX: (925) 371-5915

ELAP No.: 1838
NELAP No.: 02107CA
NEVADA.: CA-401
CSDLAC No.: 10196

Workorder No.: 104673

RE: Caltrans Dumbarton Bridge, E8435-06-18

Attention: John Love

Enclosed are the results for sample(s) received on March 21, 2009 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

This is an addendum report. Please incorporate with documentation previously submitted.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

CLIENT: Geocon Consultants, Inc.
Project: Caltrans Dumbarton Bridge, E8435-06-18
Lab Order: 104673

CASE NARRATIVE

Results were J-Flag. "J" is used to flag those results that are between the PQL (Practical Quantitation Limit) and the calculated MDL (Method Detection Limit). Results that are "J" Flagged are estimated values since it becomes difficult to accurately quantitate the analyte near the MDL.

Analytical Comments for Method 6010

Dilution was necessary for samples 104673-002A, 104673-004A and 104673-012A, die to sample matrix.

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E20AGW (5')
Lab Order:	104673	**Collection Date:**	3/19/2009 12:31:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104673-002A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC							
WET/ EPA 6010B							
RunID: **ICP8_090608C**	QC Batch: **R109661**				PrepDate:		Analyst: **CL**
Chromium	0.086	0.018	1.0	J	mg/L	20	6/8/2009 03:35 PM
Vanadium	0.32	0.010	1.0	J	mg/L	20	6/8/2009 03:35 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E15A (5')
Lab Order:	104673	**Collection Date:**	3/19/2009 1:29:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104673-004A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC							
WET/ EPA 6010B							
RunID: **ICP8_090608C**	QC Batch: **R109661**				PrepDate:		Analyst: **CL**
Arsenic	ND	0.088	1.0		mg/L	20	6/8/2009 03:39 PM
Chromium	0.091	0.018	1.0	J	mg/L	20	6/8/2009 03:39 PM
Nickel	0.36	0.014	1.0	J	mg/L	20	6/8/2009 03:39 PM
Vanadium	0.15	0.010	1.0	J	mg/L	20	6/8/2009 03:39 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E5A (5')
Lab Order:	104673	**Collection Date:**	3/19/2009 2:51:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104673-012A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC							
			WET/ EPA 6010B				
RunID: **ICP8_090608C**	QC Batch: **R109661**				PrepDate:		Analyst: **CL**
Arsenic	ND	0.088	1.0		mg/L	20	6/8/2009 03:42 PM
Chromium	0.067	0.018	1.0	J	mg/L	20	6/8/2009 03:42 PM
Vanadium	0.17	0.010	1.0	J	mg/L	20	6/8/2009 03:42 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT: Geocon Consultants, Inc.
Work Order: 104673
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_ST

Sample ID: **MB-55695A** SampType: **MBLK** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **PBS** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722211**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	0.050									
Chromium	ND	0.050									
Nickel	ND	0.050									
Vanadium	ND	0.050									

Sample ID: **LCS-55695** SampType: **LCS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **LCSS** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722212**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	1.000	0.050	1.000	0	100	85	115				
Chromium	0.919	0.050	1.000	0	91.9	85	115				
Nickel	1.000	0.050	1.000	0	100	85	115				
Vanadium	1.004	0.050	1.000	0	100	85	115				

Sample ID: **104787-004ADUP** SampType: **DUP** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **ZZZZZZ** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722223**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	1.0						0	0	20	
Chromium	0.068	1.0						0.1096	0	20	
Nickel	1.355	1.0						1.581	15.4	20	
Vanadium	0.204	1.0						0.2437	0	20	

Sample ID: **104787-004AMS** SampType: **MS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **ZZZZZZ** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722224**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	2.575	1.0	2.500	0	103	66	128				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104673
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_ST

Sample ID: **104787-004AMS** SampType: **MS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **ZZZZZZ** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722224**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	2.444	1.0	2.500	0.1096	93.4	77	116				
Nickel	3.828	1.0	2.500	1.581	89.9	63	125				
Vanadium	2.743	1.0	2.500	0.2437	100	79	118				

Sample ID: **MB-55695B** SampType: **MBLK** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **PBS** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722225**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	0.050									
Chromium	ND	0.050									
Nickel	ND	0.050									
Vanadium	ND	0.050									

Sample ID: **104789-008ADUP** SampType: **DUP** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **ZZZZZZ** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722236**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	1.0						0	0	20	
Chromium	0.235	1.0						0.2217	0	20	
Nickel	0.433	1.0						0.4102	0	20	
Vanadium	0.470	1.0						0.4639	0	20	

Sample ID: **104789-008AMS** SampType: **MS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **ZZZZZZ** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722237**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	2.584	1.0	2.500	0	103	66	128				
Chromium	2.649	1.0	2.500	0.2217	97.1	77	116				
Nickel	3.028	1.0	2.500	0.4102	105	63	125				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104673
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_ST

Sample ID: **104789-008AMS** SampType: **MS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **ZZZZZZ** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722237**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Vanadium	2.991	1.0	2.500	0.4639	101	79	118				

Sample ID: **104789-008AMSD** SampType: **MSD** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **ZZZZZZ** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722238**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	2.571	1.0	2.500	0	103	66	128	2.584	0.510	20	
Chromium	2.612	1.0	2.500	0.2217	95.6	77	116	2.649	1.40	20	
Nickel	2.994	1.0	2.500	0.4102	103	63	125	3.028	1.14	20	
Vanadium	2.980	1.0	2.500	0.4639	101	79	118	2.991	0.375	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

Diane Galvan

From: John Love [love@geoconinc.com]
Sent: Wednesday, June 03, 2009 10:50 AM
To: Diane Galvan
Subject: WET Request
Attachments: COC Caltrans Dumbarton Bridge.pdf

Hi Diane:

Caltrans would like to run a waste extraction test on several samples for select metals from the Dumbarton Bridge project. I've attached the COCs for the samples they wanted analyzed for STLC. Let me know if you have any questions.

Thanks Diane.

John Love
Sr. Project Geologist

Please visit our new website at http://www.geoconinc.com

GEOCON Incorporated
6671 Brisa Street
Livermore, CA 94550
Tel (925) 371-5900

GEOTECHNICAL - ENVIRONMENTAL - MATERIALS

San Diego Murrieta Burbank San Bernardino Bakersfield Sacramento Livermore Carson City Las Vegas Portland

CONFIDENTIALITY NOTICE: This e-mail may contain confidential and privileged material for the sole use of the intended recipient(s). Any review, use, distribution or disclosure by others is strictly prohibited. If you have received this communication in error, please notify the sender immediately by e-mail and delete the message and any file attachments from your computer. Thank you.

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#: _____

Logged By: _____ Date: _____

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: _____

Sample Condition Upon Receipt: 1. CHILLED Y☐ N☐ 4. SEALED Y☐ N☐ 2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐ 3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client: Geocon Consultants, Inc. Address: 6671 Brisa St. TEL: (925) 371-5900
Attn: John Love City Livermore State CA Zip Code 94550 FAX: (925) 371-5915

Project Name: Caltrans - Dumbarton Bridge Project #: E8435-06-18 Sampler: (Printed Name) John Love (Signature)

Relinquished by: (Signature and Printed Name) John Love	Date: 6/3/09	Time:	Received by: (Signature and Printed Name)	Date: Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date: Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date: Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: John Love 6/3/09 (Print Name / Date) (Signature)

Send Report To: Attn: _____ Co: same as above Address _____ City _____ State _____ Zip _____

Bill To: Attn: _____ Co: same as above Address _____ City _____ State _____ Zip _____

Special Instructions/Comments:

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

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Circle or Add Analysis(es) Requested

SPECIFY APPROPRIATE MATRIX

PRESERVATION

Q A / Q C: RTNE ☐ CT ☐ SWRCB ☐ Logcode _____ OTHER _____

ITEM	LAB USE ONLY: Batch # / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	8010B (Total Metal)	8015B (GRO) / 8020 (BTEX)	8015B (DRO)	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	V: (WET)	As: (WET)	Cr: (WET)	Pb: (WET)	Hg: (WET)	Ni: (WET)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	REMARKS
		ESA (5')	3/24/09									X		X	X				X					E	1	T P	
		ESB (0')										X				X			X								
		ESB (5')										X		X	X				X								
		E10BGW (0')										X				X			X								
		E10BGW (5')										X		X	X				X								
		E15A (5')										X		x	x			X	X								
		E20AGW (5')										X			X				X								
		~~E8GW~~ E20BGW (5')										X		x	x				X								
		WSA (5')										X		x	x			X	X								
		W10AGW (5')										X			X			X	X								

* TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

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DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter.

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#: _____

Logged By: _____ Date: _____

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: _____

Sample Condition Upon Receipt
1. CHILLED Y☐ N☐ 4. SEALED Y☐ N☐
2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐
3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client:
Attn:
Address: 6671 Brisa St.
City Livermore State CA Zip Code 94550
TEL: (925) 371-5900
FAX: (925) 371-5915

Project Name: Caltrans- Dumbarton Bridge Project #: E8435-06-18 Sampler: (Printed Name) John Love (Signature)

Relinquished by: (Signature and Printed Name) John Love	Date: 6/3/09	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
John Love 6/3/09 (Print Name / Date)
(Signature)

Send Report To:
Attn: _____
Co: same as above
Address _____
City _____ State ____ Zip ____

Bill To:
Attn: _____
Co: same as above
Address _____
City _____ State ____ Zip ____

Special Instructions/Comments:

Sample/Records - Archival & Disposal
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Circle or Add Analysis(es) Requested

SPECIFY APPROPRIATE MATRIX

PRESERVATION

Q A / Q C
RTNE ☐ CT ☐ SWRCB ☐ Logcode ____ OTHER ____

ITEM	LAB USE ONLY: Batch # / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	8010B (Total Metals)	8015B (GRO) / 8020 (BTEX)	8015B (DRO)	TITLE 22 / CAM 17 (6010 / 7000)	As (WET)	Cr (WET)	Pb (WET)	Hg (WET)	Ni (WET)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	REMARKS
		W10B (0')	3/4/01							X			X				X						E	1	T P	
		W15BGW (0')								X			X				X									
		W20AGW (5')								X			X				X									
		W20B (0')								X			X				X									
		FW1 (0')								X					X		X							T m	
		FW1 (2')								X			X				X									
		FW2 (0')								X			X				X									
		FW2 (2')								X					X		X									
		FW3 (0')								X			X				X									
		FW3 (2')								X			X				X									

• TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=Hcl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: White with report, Yellow to folder, Pink to submitter.

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#: _____

Logged By: _____ Date: _____

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: _____

Sample Condition Upon Receipt: 1. CHILLED Y☐ N☐ 4. SEALED Y☐ N☐ 2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐ 3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client: ~~Caltrans - Dumbarton Bridge~~ Geocon Consultants
Attn: John Love
Address: 6671 Brisa St.
City Livermore State CA Zip Code
TEL: (925) 371-5900
FAX: (925) 371-5915

Project Name: Caltrans - Dumbarton Bridge Project #: E8435-06-18 Sampler: (Printed Name) John Love (Signature)

Relinquished by: (Signature and Printed Name) John Love	Date: 6/3/09	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
John Love 6/3/09
Print Name Date
Signature

Send Report To:
Attn: _____
Co: same as above
Address _____
City _____ State ____ Zip ____

Bill To:
Attn: _____
Co: same as above
Address _____
City _____ State ____ Zip ____

Special Instructions/Comments:

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time
		FW4 (0')	3/2/09	
		FW4 (2')	↓	

Circle or Add Analysis(es) Requested

8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	8010B (Total Metals)	8015B (GRO) / 8020 (BTEX)	8015B (DRO)	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	VA (WET)	CC (WET)	Hg (WET)	PB (WET)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
								X	X	X	X		X				E	1	T M		
								X	X	X			X				↓	↓	↓ ↓		

SPECIFY APPROPRIATE MATRIX

QA/QC: RTNE ☐ CT ☐ SWRCB ☐ Logcode ____ OTHER ____

- TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter.

March 31, 2009

John Love
Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550

TEL: (925) 525-4142
FAX: (925) 371-5915

ELAP No.: 1838
NELAP No.: 02107CA
NEVADA.: CA-401
CSDLAC No.: 10196

Workorder No.: 104674

RE: Caltrans Dumbarton Bridge, E8435-06-18

Attention: John Love

Enclosed are the results for sample(s) received on March 21, 2009 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter and the case narrative are an integral part of this analytical report and cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Project: Caltrans Dumbarton Bridge, E8435-06-18
Lab Order: 104674

CASE NARRATIVE

Analytical Comments for Method 6010

Matrix Spike (MS) and /or Matrix Spike Duplicate (MSD) are/is outside recovery criteria for samples 104674-005AMS and 104674-005AMSD; however, the analytical batch was validated by the Laboratory Control Sample (LCS).

RPD for Duplicate (DUP) is outside criteria for sample 104674-005ADUP; however, the Laboratory Control Sample (LCS) validated the analytical batch.

Analytical Comments for Method 8015 (DRO/ORO)

Dilution was necessary for samples 104674-001A and 104674-005A, due to sample matrix.

Surrogate recovery was diluted out for samples 104674-001A and 104674-005A.

Matrix Spike (MS) and /or Matrix Spike Duplicate (MSD) are/is outside recovery criteria for sample 104675-001AMS; however, the analytical batch was validated by the Laboratory Control Sample (LCS).

RPD for Duplicate (DUP) and/or Matrix Spike (MS)/Matrix Spike Duplicate (MSD) is outside criteria for samples 104673-011ADUP, 104675-001ADUP and 104675-001AMSD; however, the Laboratory Control Sample (LCS) validated the analytical batch.

Analytical Comments for Method 8270

Dilution was necessary for samples 104674-003A, 104674-005A and 104674-006A, due to sample matrix.

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E5B (0')
Lab Order:	104674	**Collection Date:**	3/19/2009 10:38:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104674-001A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090327I	QC Batch: 54285			PrepDate: 3/27/2009	Analyst: **CL**	
Antimony	ND	2.0		mg/Kg	1	3/27/2009 08:06 PM
Arsenic	ND	1.0		mg/Kg	1	3/27/2009 08:06 PM
Barium	93	1.0		mg/Kg	1	3/27/2009 08:06 PM
Beryllium	ND	1.0		mg/Kg	1	3/27/2009 08:06 PM
Cadmium	ND	1.0		mg/Kg	1	3/27/2009 08:06 PM
Chromium	27	1.0		mg/Kg	1	3/27/2009 08:06 PM
Cobalt	7.9	1.0		mg/Kg	1	3/27/2009 08:06 PM
Copper	24	2.0		mg/Kg	1	3/27/2009 08:06 PM
Lead	61	1.0		mg/Kg	1	3/27/2009 08:06 PM
Molybdenum	ND	1.0		mg/Kg	1	3/27/2009 08:06 PM
Nickel	34	1.0		mg/Kg	1	3/27/2009 08:06 PM
Selenium	ND	1.0		mg/Kg	1	3/27/2009 08:06 PM
Silver	ND	1.0		mg/Kg	1	3/27/2009 08:06 PM
Thallium	ND	1.0		mg/Kg	1	3/27/2009 08:06 PM
Vanadium	35	1.0		mg/Kg	1	3/27/2009 08:06 PM
Zinc	78	1.0		mg/Kg	1	3/27/2009 08:06 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090324E	QC Batch: 54185			PrepDate: 3/24/2009	Analyst: **CBR**	
DRO	380	25		mg/Kg	25	3/24/2009 10:48 PM
ORO	1200	25		mg/Kg	25	3/24/2009 10:48 PM
Surr: p-Terphenyl	0	30-130	SDO	%REC	25	3/24/2009 10:48 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090327D	QC Batch: 54281			PrepDate: 3/27/2009	Analyst: **RQ**	
Mercury	ND	0.10		mg/Kg	1	3/27/2009 02:52 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090325C	QC Batch: 54223			PrepDate: 3/25/2009	Analyst: **DMP**	
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	3/26/2009 01:40 AM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	3/26/2009 01:40 AM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	3/26/2009 01:40 AM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	3/26/2009 01:40 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E5B (0')
Lab Order:	104674	**Collection Date:**	3/19/2009 10:38:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104674-001A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090325C QC Batch: 54223 PrepDate: 3/25/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	3/26/2009 01:40 AM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	3/26/2009 01:40 AM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	3/26/2009 01:40 AM
2,4-Dimethylphenol	ND	330		µg/Kg	1	3/26/2009 01:40 AM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	3/26/2009 01:40 AM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	3/26/2009 01:40 AM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	3/26/2009 01:40 AM
2-Chloronaphthalene	ND	330		µg/Kg	1	3/26/2009 01:40 AM
2-Chlorophenol	ND	330		µg/Kg	1	3/26/2009 01:40 AM
2-Methylnaphthalene	ND	330		µg/Kg	1	3/26/2009 01:40 AM
2-Methylphenol	ND	330		µg/Kg	1	3/26/2009 01:40 AM
2-Nitroaniline	ND	1600		µg/Kg	1	3/26/2009 01:40 AM
2-Nitrophenol	ND	330		µg/Kg	1	3/26/2009 01:40 AM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	3/26/2009 01:40 AM
3-Nitroaniline	ND	1600		µg/Kg	1	3/26/2009 01:40 AM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	3/26/2009 01:40 AM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	3/26/2009 01:40 AM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	3/26/2009 01:40 AM
4-Chloroaniline	ND	660		µg/Kg	1	3/26/2009 01:40 AM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	3/26/2009 01:40 AM
4-Methylphenol	ND	330		µg/Kg	1	3/26/2009 01:40 AM
4-Nitroaniline	ND	1600		µg/Kg	1	3/26/2009 01:40 AM
4-Nitrophenol	ND	1600		µg/Kg	1	3/26/2009 01:40 AM
Acenaphthene	ND	330		µg/Kg	1	3/26/2009 01:40 AM
Acenaphthylene	ND	330		µg/Kg	1	3/26/2009 01:40 AM
Anthracene	ND	330		µg/Kg	1	3/26/2009 01:40 AM
Benzidine (M)	ND	1600		µg/Kg	1	3/26/2009 01:40 AM
Benzo(a)anthracene	ND	330		µg/Kg	1	3/26/2009 01:40 AM
Benzo(a)pyrene	ND	330		µg/Kg	1	3/26/2009 01:40 AM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	3/26/2009 01:40 AM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	3/26/2009 01:40 AM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	3/26/2009 01:40 AM
Benzoic acid	ND	1600		µg/Kg	1	3/26/2009 01:40 AM
Benzyl alcohol	ND	660		µg/Kg	1	3/26/2009 01:40 AM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	3/26/2009 01:40 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E5B (0')
Lab Order:	104674	**Collection Date:**	3/19/2009 10:38:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104674-001A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090325C QC Batch: 54223 PrepDate: 3/25/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	3/26/2009 01:40 AM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	3/26/2009 01:40 AM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	3/26/2009 01:40 AM
Butylbenzylphthalate	ND	330		µg/Kg	1	3/26/2009 01:40 AM
Chrysene	ND	330		µg/Kg	1	3/26/2009 01:40 AM
Di-n-butylphthalate	ND	330		µg/Kg	1	3/26/2009 01:40 AM
Di-n-octylphthalate	ND	330		µg/Kg	1	3/26/2009 01:40 AM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	3/26/2009 01:40 AM
Dibenzofuran	ND	330		µg/Kg	1	3/26/2009 01:40 AM
Diethylphthalate	ND	330		µg/Kg	1	3/26/2009 01:40 AM
Dimethylphthalate	ND	330		µg/Kg	1	3/26/2009 01:40 AM
Fluoranthene	ND	330		µg/Kg	1	3/26/2009 01:40 AM
Fluorene	ND	330		µg/Kg	1	3/26/2009 01:40 AM
Hexachlorobenzene	ND	330		µg/Kg	1	3/26/2009 01:40 AM
Hexachlorobutadiene	ND	660		µg/Kg	1	3/26/2009 01:40 AM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	3/26/2009 01:40 AM
Hexachloroethane	ND	330		µg/Kg	1	3/26/2009 01:40 AM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	3/26/2009 01:40 AM
Isophorone	ND	330		µg/Kg	1	3/26/2009 01:40 AM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	3/26/2009 01:40 AM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	3/26/2009 01:40 AM
Naphthalene	ND	330		µg/Kg	1	3/26/2009 01:40 AM
Nitrobenzene	ND	330		µg/Kg	1	3/26/2009 01:40 AM
Pentachlorophenol	ND	1600		µg/Kg	1	3/26/2009 01:40 AM
Phenanthrene	ND	330		µg/Kg	1	3/26/2009 01:40 AM
Phenol	ND	330		µg/Kg	1	3/26/2009 01:40 AM
Pyrene	ND	330		µg/Kg	1	3/26/2009 01:40 AM
Surr: 1,2-Dichlorobenzene-d4	85.5	49-103		%REC	1	3/26/2009 01:40 AM
Surr: 2,4,6-Tribromophenol	97.2	47-129		%REC	1	3/26/2009 01:40 AM
Surr: 2-Chlorophenol-d4	93.7	54-109		%REC	1	3/26/2009 01:40 AM
Surr: 2-Fluorobiphenyl	93.0	59-108		%REC	1	3/26/2009 01:40 AM
Surr: 2-Fluorophenol	93.7	50-111		%REC	1	3/26/2009 01:40 AM
Surr: 4-Terphenyl-d14	114	58-135		%REC	1	3/26/2009 01:40 AM
Surr: Nitrobenzene-d5	92.2	54-115		%REC	1	3/26/2009 01:40 AM
Surr: Phenol-d5	95.0	58-112		%REC	1	3/26/2009 01:40 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E5B (5')
Lab Order:	104674	**Collection Date:**	3/19/2009 10:40:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104674-002A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090327I	QC Batch: 54285			PrepDate:	3/27/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	3/27/2009 08:10 PM
Arsenic	4.7	1.0		mg/Kg	1	3/27/2009 08:10 PM
Barium	97	1.0		mg/Kg	1	3/27/2009 08:10 PM
Beryllium	ND	1.0		mg/Kg	1	3/27/2009 08:10 PM
Cadmium	ND	1.0		mg/Kg	1	3/27/2009 08:10 PM
Chromium	50	1.0		mg/Kg	1	3/27/2009 08:10 PM
Cobalt	11	1.0		mg/Kg	1	3/27/2009 08:10 PM
Copper	24	2.0		mg/Kg	1	3/27/2009 08:10 PM
Lead	9.7	1.0		mg/Kg	1	3/27/2009 08:10 PM
Molybdenum	ND	1.0		mg/Kg	1	3/27/2009 08:10 PM
Nickel	76	1.0		mg/Kg	1	3/27/2009 08:10 PM
Selenium	ND	1.0		mg/Kg	1	3/27/2009 08:10 PM
Silver	ND	1.0		mg/Kg	1	3/27/2009 08:10 PM
Thallium	ND	1.0		mg/Kg	1	3/27/2009 08:10 PM
Vanadium	28	1.0		mg/Kg	1	3/27/2009 08:10 PM
Zinc	46	1.0		mg/Kg	1	3/27/2009 08:10 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090324E	QC Batch: 54185			PrepDate:	3/24/2009	Analyst: **CBR**
DRO	9.5	1.0		mg/Kg	1	3/24/2009 10:38 PM
ORO	30	1.0		mg/Kg	1	3/24/2009 10:38 PM
Surr: p-Terphenyl	81.1	30-130		%REC	1	3/24/2009 10:38 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090327D	QC Batch: 54281			PrepDate:	3/27/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	3/27/2009 02:59 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090325C	QC Batch: 54223			PrepDate:	3/25/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	3/26/2009 02:07 AM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	3/26/2009 02:07 AM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	3/26/2009 02:07 AM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	3/26/2009 02:07 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E5B (5')
Lab Order:	104674	**Collection Date:**	3/19/2009 10:40:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104674-002A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090325C QC Batch: 54223 PrepDate: 3/25/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	3/26/2009 02:07 AM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	3/26/2009 02:07 AM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	3/26/2009 02:07 AM
2,4-Dimethylphenol	ND	330		µg/Kg	1	3/26/2009 02:07 AM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	3/26/2009 02:07 AM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	3/26/2009 02:07 AM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	3/26/2009 02:07 AM
2-Chloronaphthalene	ND	330		µg/Kg	1	3/26/2009 02:07 AM
2-Chlorophenol	ND	330		µg/Kg	1	3/26/2009 02:07 AM
2-Methylnaphthalene	ND	330		µg/Kg	1	3/26/2009 02:07 AM
2-Methylphenol	ND	330		µg/Kg	1	3/26/2009 02:07 AM
2-Nitroaniline	ND	1600		µg/Kg	1	3/26/2009 02:07 AM
2-Nitrophenol	ND	330		µg/Kg	1	3/26/2009 02:07 AM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	3/26/2009 02:07 AM
3-Nitroaniline	ND	1600		µg/Kg	1	3/26/2009 02:07 AM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	3/26/2009 02:07 AM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	3/26/2009 02:07 AM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	3/26/2009 02:07 AM
4-Chloroaniline	ND	660		µg/Kg	1	3/26/2009 02:07 AM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	3/26/2009 02:07 AM
4-Methylphenol	ND	330		µg/Kg	1	3/26/2009 02:07 AM
4-Nitroaniline	ND	1600		µg/Kg	1	3/26/2009 02:07 AM
4-Nitrophenol	ND	1600		µg/Kg	1	3/26/2009 02:07 AM
Acenaphthene	ND	330		µg/Kg	1	3/26/2009 02:07 AM
Acenaphthylene	ND	330		µg/Kg	1	3/26/2009 02:07 AM
Anthracene	ND	330		µg/Kg	1	3/26/2009 02:07 AM
Benzidine (M)	ND	1600		µg/Kg	1	3/26/2009 02:07 AM
Benzo(a)anthracene	ND	330		µg/Kg	1	3/26/2009 02:07 AM
Benzo(a)pyrene	ND	330		µg/Kg	1	3/26/2009 02:07 AM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	3/26/2009 02:07 AM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	3/26/2009 02:07 AM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	3/26/2009 02:07 AM
Benzoic acid	ND	1600		µg/Kg	1	3/26/2009 02:07 AM
Benzyl alcohol	ND	660		µg/Kg	1	3/26/2009 02:07 AM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	3/26/2009 02:07 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E5B (5')
Lab Order:	104674	**Collection Date:**	3/19/2009 10:40:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104674-002A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090325C QC Batch: 54223 PrepDate: 3/25/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	3/26/2009 02:07 AM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	3/26/2009 02:07 AM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	3/26/2009 02:07 AM
Butylbenzylphthalate	ND	330		µg/Kg	1	3/26/2009 02:07 AM
Chrysene	ND	330		µg/Kg	1	3/26/2009 02:07 AM
Di-n-butylphthalate	ND	330		µg/Kg	1	3/26/2009 02:07 AM
Di-n-octylphthalate	ND	330		µg/Kg	1	3/26/2009 02:07 AM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	3/26/2009 02:07 AM
Dibenzofuran	ND	330		µg/Kg	1	3/26/2009 02:07 AM
Diethylphthalate	ND	330		µg/Kg	1	3/26/2009 02:07 AM
Dimethylphthalate	ND	330		µg/Kg	1	3/26/2009 02:07 AM
Fluoranthene	ND	330		µg/Kg	1	3/26/2009 02:07 AM
Fluorene	ND	330		µg/Kg	1	3/26/2009 02:07 AM
Hexachlorobenzene	ND	330		µg/Kg	1	3/26/2009 02:07 AM
Hexachlorobutadiene	ND	660		µg/Kg	1	3/26/2009 02:07 AM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	3/26/2009 02:07 AM
Hexachloroethane	ND	330		µg/Kg	1	3/26/2009 02:07 AM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	3/26/2009 02:07 AM
Isophorone	ND	330		µg/Kg	1	3/26/2009 02:07 AM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	3/26/2009 02:07 AM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	3/26/2009 02:07 AM
Naphthalene	ND	330		µg/Kg	1	3/26/2009 02:07 AM
Nitrobenzene	ND	330		µg/Kg	1	3/26/2009 02:07 AM
Pentachlorophenol	ND	1600		µg/Kg	1	3/26/2009 02:07 AM
Phenanthrene	ND	330		µg/Kg	1	3/26/2009 02:07 AM
Phenol	ND	330		µg/Kg	1	3/26/2009 02:07 AM
Pyrene	ND	330		µg/Kg	1	3/26/2009 02:07 AM
Surr: 1,2-Dichlorobenzene-d4	81.7	49-103		%REC	1	3/26/2009 02:07 AM
Surr: 2,4,6-Tribromophenol	99.3	47-129		%REC	1	3/26/2009 02:07 AM
Surr: 2-Chlorophenol-d4	92.2	54-109		%REC	1	3/26/2009 02:07 AM
Surr: 2-Fluorobiphenyl	92.4	59-108		%REC	1	3/26/2009 02:07 AM
Surr: 2-Fluorophenol	90.0	50-111		%REC	1	3/26/2009 02:07 AM
Surr: 4-Terphenyl-d14	115	58-135		%REC	1	3/26/2009 02:07 AM
Surr: Nitrobenzene-d5	88.5	54-115		%REC	1	3/26/2009 02:07 AM
Surr: Phenol-d5	92.8	58-112		%REC	1	3/26/2009 02:07 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E5B (10')
Lab Order:	104674	**Collection Date:**	3/19/2009 10:48:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104674-003A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B				**EPA 6010B**		
RunID: ICP8_090327I	QC Batch: 54285			PrepDate: 3/27/2009		Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	3/27/2009 08:14 PM
Arsenic	3.4	1.0		mg/Kg	1	3/27/2009 08:14 PM
Barium	26	1.0		mg/Kg	1	3/27/2009 08:14 PM
Beryllium	ND	1.0		mg/Kg	1	3/27/2009 08:14 PM
Cadmium	ND	1.0		mg/Kg	1	3/27/2009 08:14 PM
Chromium	40	1.0		mg/Kg	1	3/27/2009 08:14 PM
Cobalt	7.3	1.0		mg/Kg	1	3/27/2009 08:14 PM
Copper	15	2.0		mg/Kg	1	3/27/2009 08:14 PM
Lead	4.7	1.0		mg/Kg	1	3/27/2009 08:14 PM
Molybdenum	ND	1.0		mg/Kg	1	3/27/2009 08:14 PM
Nickel	44	1.0		mg/Kg	1	3/27/2009 08:14 PM
Selenium	ND	1.0		mg/Kg	1	3/27/2009 08:14 PM
Silver	ND	1.0		mg/Kg	1	3/27/2009 08:14 PM
Thallium	ND	1.0		mg/Kg	1	3/27/2009 08:14 PM
Vanadium	31	1.0		mg/Kg	1	3/27/2009 08:14 PM
Zinc	41	1.0		mg/Kg	1	3/27/2009 08:14 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
EPA 3550B				**EPA 8015B(M)**		
RunID: GC16_090324E	QC Batch: 54185			PrepDate: 3/24/2009		Analyst: **CBR**
DRO	2.9	1.0		mg/Kg	1	3/24/2009 10:29 PM
ORO	5.4	1.0		mg/Kg	1	3/24/2009 10:29 PM
Surr: p-Terphenyl	68.4	30-130		%REC	1	3/24/2009 10:29 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090327D	QC Batch: 54281			PrepDate: 3/27/2009		Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	3/27/2009 03:01 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 3550B				**EPA 8270C**		
RunID: MS 13_090325C	QC Batch: 54223			PrepDate: 3/25/2009		Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
1,2-Dichlorobenzene	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
1,3-Dichlorobenzene	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
1,4-Dichlorobenzene	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E5B (10')
Lab Order:	104674	**Collection Date:**	3/19/2009 10:48:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104674-003A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090325C QC Batch: 54223 PrepDate: 3/25/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
2,4,6-Trichlorophenol	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
2,4-Dichlorophenol	ND	4100		µg/Kg	2.5	3/26/2009 02:35 AM
2,4-Dimethylphenol	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
2,4-Dinitrophenol	ND	4100		µg/Kg	2.5	3/26/2009 02:35 AM
2,4-Dinitrotoluene	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
2,6-Dinitrotoluene	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
2-Chloronaphthalene	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
2-Chlorophenol	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
2-Methylnaphthalene	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
2-Methylphenol	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
2-Nitroaniline	ND	4100		µg/Kg	2.5	3/26/2009 02:35 AM
2-Nitrophenol	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
3,3´-Dichlorobenzidine	ND	1600		µg/Kg	2.5	3/26/2009 02:35 AM
3-Nitroaniline	ND	4100		µg/Kg	2.5	3/26/2009 02:35 AM
4,6-Dinitro-2-methylphenol	ND	4100		µg/Kg	2.5	3/26/2009 02:35 AM
4-Bromophenyl-phenylether	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
4-Chloro-3-methylphenol	ND	1600		µg/Kg	2.5	3/26/2009 02:35 AM
4-Chloroaniline	ND	1600		µg/Kg	2.5	3/26/2009 02:35 AM
4-Chlorophenyl-phenylether	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
4-Methylphenol	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
4-Nitroaniline	ND	4100		µg/Kg	2.5	3/26/2009 02:35 AM
4-Nitrophenol	ND	4100		µg/Kg	2.5	3/26/2009 02:35 AM
Acenaphthene	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
Acenaphthylene	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
Anthracene	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
Benzidine (M)	ND	4100		µg/Kg	2.5	3/26/2009 02:35 AM
Benzo(a)anthracene	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
Benzo(a)pyrene	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
Benzo(b)fluoranthene	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
Benzo(g,h,i)perylene	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
Benzo(k)fluoranthene	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
Benzoic acid	ND	4100		µg/Kg	2.5	3/26/2009 02:35 AM
Benzyl alcohol	ND	1600		µg/Kg	2.5	3/26/2009 02:35 AM
Bis(2-chloroethoxy)methane	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E5B (10')
Lab Order:	104674	**Collection Date:**	3/19/2009 10:48:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104674-003A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090325C QC Batch: 54223 PrepDate: 3/25/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
Bis(2-chloroisopropyl)ether	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
Bis(2-ethylhexyl)phthalate	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
Butylbenzylphthalate	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
Chrysene	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
Di-n-butylphthalate	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
Di-n-octylphthalate	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
Dibenz(a,h)anthracene	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
Dibenzofuran	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
Diethylphthalate	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
Dimethylphthalate	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
Fluoranthene	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
Fluorene	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
Hexachlorobenzene	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
Hexachlorobutadiene	ND	1600		µg/Kg	2.5	3/26/2009 02:35 AM
Hexachlorocyclopentadiene	ND	1600		µg/Kg	2.5	3/26/2009 02:35 AM
Hexachloroethane	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
Indeno(1,2,3-cd)pyrene	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
Isophorone	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
N-Nitrosodi-n-propylamine	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
N-Nitrosodiphenylamine	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
Naphthalene	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
Nitrobenzene	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
Pentachlorophenol	ND	4100		µg/Kg	2.5	3/26/2009 02:35 AM
Phenanthrene	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
Phenol	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
Pyrene	ND	820		µg/Kg	2.5	3/26/2009 02:35 AM
Surr: 1,2-Dichlorobenzene-d4	83.8	49-103		%REC	2.5	3/26/2009 02:35 AM
Surr: 2,4,6-Tribromophenol	94.6	47-129		%REC	2.5	3/26/2009 02:35 AM
Surr: 2-Chlorophenol-d4	95.7	54-109		%REC	2.5	3/26/2009 02:35 AM
Surr: 2-Fluorobiphenyl	95.4	59-108		%REC	2.5	3/26/2009 02:35 AM
Surr: 2-Fluorophenol	96.0	50-111		%REC	2.5	3/26/2009 02:35 AM
Surr: 4-Terphenyl-d14	107	58-135		%REC	2.5	3/26/2009 02:35 AM
Surr: Nitrobenzene-d5	91.1	54-115		%REC	2.5	3/26/2009 02:35 AM
Surr: Phenol-d5	97.1	58-112		%REC	2.5	3/26/2009 02:35 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E5B (15')
Lab Order:	104674	**Collection Date:**	3/19/2009 10:52:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104674-004A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090327I	QC Batch: 54285			PrepDate:	3/27/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	3/27/2009 08:17 PM
Arsenic	3.1	1.0		mg/Kg	1	3/27/2009 08:17 PM
Barium	28	1.0		mg/Kg	1	3/27/2009 08:17 PM
Beryllium	ND	1.0		mg/Kg	1	3/27/2009 08:17 PM
Cadmium	ND	1.0		mg/Kg	1	3/27/2009 08:17 PM
Chromium	34	1.0		mg/Kg	1	3/27/2009 08:17 PM
Cobalt	6.9	1.0		mg/Kg	1	3/27/2009 08:17 PM
Copper	12	2.0		mg/Kg	1	3/27/2009 08:17 PM
Lead	3.8	1.0		mg/Kg	1	3/27/2009 08:17 PM
Molybdenum	ND	1.0		mg/Kg	1	3/27/2009 08:17 PM
Nickel	40	1.0		mg/Kg	1	3/27/2009 08:17 PM
Selenium	ND	1.0		mg/Kg	1	3/27/2009 08:17 PM
Silver	ND	1.0		mg/Kg	1	3/27/2009 08:17 PM
Thallium	ND	1.0		mg/Kg	1	3/27/2009 08:17 PM
Vanadium	27	1.0		mg/Kg	1	3/27/2009 08:17 PM
Zinc	36	1.0		mg/Kg	1	3/27/2009 08:17 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090324E	QC Batch: 54185			PrepDate:	3/24/2009	Analyst: **CBR**
DRO	3.1	1.0		mg/Kg	1	3/24/2009 10:11 PM
ORO	2.6	1.0		mg/Kg	1	3/24/2009 10:11 PM
Surr: p-Terphenyl	53.4	30-130		%REC	1	3/24/2009 10:11 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090327D	QC Batch: 54281			PrepDate:	3/27/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	3/27/2009 03:03 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090325C	QC Batch: 54223			PrepDate:	3/25/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	3/26/2009 03:02 AM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	3/26/2009 03:02 AM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	3/26/2009 03:02 AM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	3/26/2009 03:02 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E5B (15')
Lab Order:	104674	**Collection Date:**	3/19/2009 10:52:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104674-004A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090325C QC Batch: 54223 PrepDate: 3/25/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	3/26/2009 03:02 AM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	3/26/2009 03:02 AM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	3/26/2009 03:02 AM
2,4-Dimethylphenol	ND	330		µg/Kg	1	3/26/2009 03:02 AM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	3/26/2009 03:02 AM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	3/26/2009 03:02 AM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	3/26/2009 03:02 AM
2-Chloronaphthalene	ND	330		µg/Kg	1	3/26/2009 03:02 AM
2-Chlorophenol	ND	330		µg/Kg	1	3/26/2009 03:02 AM
2-Methylnaphthalene	ND	330		µg/Kg	1	3/26/2009 03:02 AM
2-Methylphenol	ND	330		µg/Kg	1	3/26/2009 03:02 AM
2-Nitroaniline	ND	1600		µg/Kg	1	3/26/2009 03:02 AM
2-Nitrophenol	ND	330		µg/Kg	1	3/26/2009 03:02 AM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	3/26/2009 03:02 AM
3-Nitroaniline	ND	1600		µg/Kg	1	3/26/2009 03:02 AM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	3/26/2009 03:02 AM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	3/26/2009 03:02 AM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	3/26/2009 03:02 AM
4-Chloroaniline	ND	660		µg/Kg	1	3/26/2009 03:02 AM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	3/26/2009 03:02 AM
4-Methylphenol	ND	330		µg/Kg	1	3/26/2009 03:02 AM
4-Nitroaniline	ND	1600		µg/Kg	1	3/26/2009 03:02 AM
4-Nitrophenol	ND	1600		µg/Kg	1	3/26/2009 03:02 AM
Acenaphthene	ND	330		µg/Kg	1	3/26/2009 03:02 AM
Acenaphthylene	ND	330		µg/Kg	1	3/26/2009 03:02 AM
Anthracene	ND	330		µg/Kg	1	3/26/2009 03:02 AM
Benzidine (M)	ND	1600		µg/Kg	1	3/26/2009 03:02 AM
Benzo(a)anthracene	ND	330		µg/Kg	1	3/26/2009 03:02 AM
Benzo(a)pyrene	ND	330		µg/Kg	1	3/26/2009 03:02 AM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	3/26/2009 03:02 AM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	3/26/2009 03:02 AM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	3/26/2009 03:02 AM
Benzoic acid	ND	1600		µg/Kg	1	3/26/2009 03:02 AM
Benzyl alcohol	ND	660		µg/Kg	1	3/26/2009 03:02 AM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	3/26/2009 03:02 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E5B (15')
Lab Order:	104674	**Collection Date:**	3/19/2009 10:52:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104674-004A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090325C QC Batch: 54223 PrepDate: 3/25/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	3/26/2009 03:02 AM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	3/26/2009 03:02 AM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	3/26/2009 03:02 AM
Butylbenzylphthalate	ND	330		µg/Kg	1	3/26/2009 03:02 AM
Chrysene	ND	330		µg/Kg	1	3/26/2009 03:02 AM
Di-n-butylphthalate	ND	330		µg/Kg	1	3/26/2009 03:02 AM
Di-n-octylphthalate	ND	330		µg/Kg	1	3/26/2009 03:02 AM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	3/26/2009 03:02 AM
Dibenzofuran	ND	330		µg/Kg	1	3/26/2009 03:02 AM
Diethylphthalate	ND	330		µg/Kg	1	3/26/2009 03:02 AM
Dimethylphthalate	ND	330		µg/Kg	1	3/26/2009 03:02 AM
Fluoranthene	ND	330		µg/Kg	1	3/26/2009 03:02 AM
Fluorene	ND	330		µg/Kg	1	3/26/2009 03:02 AM
Hexachlorobenzene	ND	330		µg/Kg	1	3/26/2009 03:02 AM
Hexachlorobutadiene	ND	660		µg/Kg	1	3/26/2009 03:02 AM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	3/26/2009 03:02 AM
Hexachloroethane	ND	330		µg/Kg	1	3/26/2009 03:02 AM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	3/26/2009 03:02 AM
Isophorone	ND	330		µg/Kg	1	3/26/2009 03:02 AM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	3/26/2009 03:02 AM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	3/26/2009 03:02 AM
Naphthalene	ND	330		µg/Kg	1	3/26/2009 03:02 AM
Nitrobenzene	ND	330		µg/Kg	1	3/26/2009 03:02 AM
Pentachlorophenol	ND	1600		µg/Kg	1	3/26/2009 03:02 AM
Phenanthrene	ND	330		µg/Kg	1	3/26/2009 03:02 AM
Phenol	ND	330		µg/Kg	1	3/26/2009 03:02 AM
Pyrene	ND	330		µg/Kg	1	3/26/2009 03:02 AM
Surr: 1,2-Dichlorobenzene-d4	78.6	49-103		%REC	1	3/26/2009 03:02 AM
Surr: 2,4,6-Tribromophenol	98.7	47-129		%REC	1	3/26/2009 03:02 AM
Surr: 2-Chlorophenol-d4	88.7	54-109		%REC	1	3/26/2009 03:02 AM
Surr: 2-Fluorobiphenyl	92.6	59-108		%REC	1	3/26/2009 03:02 AM
Surr: 2-Fluorophenol	87.3	50-111		%REC	1	3/26/2009 03:02 AM
Surr: 4-Terphenyl-d14	111	58-135		%REC	1	3/26/2009 03:02 AM
Surr: Nitrobenzene-d5	89.1	54-115		%REC	1	3/26/2009 03:02 AM
Surr: Phenol-d5	92.3	58-112		%REC	1	3/26/2009 03:02 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E15B (0')
Lab Order:	104674	**Collection Date:**	3/19/2009 11:16:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104674-005A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090327I	QC Batch: 54285			PrepDate:	3/27/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	3/27/2009 08:20 PM
Arsenic	1.9	1.0		mg/Kg	1	3/27/2009 08:20 PM
Barium	260	1.0		mg/Kg	1	3/27/2009 08:20 PM
Beryllium	ND	1.0		mg/Kg	1	3/27/2009 08:20 PM
Cadmium	ND	1.0		mg/Kg	1	3/27/2009 08:20 PM
Chromium	41	1.0		mg/Kg	1	3/27/2009 08:20 PM
Cobalt	15	1.0		mg/Kg	1	3/27/2009 08:20 PM
Copper	52	2.0		mg/Kg	1	3/27/2009 08:20 PM
Lead	3.9	1.0		mg/Kg	1	3/27/2009 08:20 PM
Molybdenum	ND	1.0		mg/Kg	1	3/27/2009 08:20 PM
Nickel	45	1.0		mg/Kg	1	3/27/2009 08:20 PM
Selenium	ND	1.0		mg/Kg	1	3/27/2009 08:20 PM
Silver	ND	1.0		mg/Kg	1	3/27/2009 08:20 PM
Thallium	ND	1.0		mg/Kg	1	3/27/2009 08:20 PM
Vanadium	51	1.0		mg/Kg	1	3/27/2009 08:20 PM
Zinc	47	1.0		mg/Kg	1	3/27/2009 08:20 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090324E	QC Batch: 54185			PrepDate:	3/24/2009	Analyst: **CBR**
DRO	54	20		mg/Kg	20	3/24/2009 10:57 PM
ORO	350	20		mg/Kg	20	3/24/2009 10:57 PM
Surr: p-Terphenyl	0	30-130	SDO	%REC	20	3/24/2009 10:57 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090327D	QC Batch: 54281			PrepDate:	3/27/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	3/27/2009 02:38 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090325C	QC Batch: 54223			PrepDate:	3/25/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
1,2-Dichlorobenzene	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
1,3-Dichlorobenzene	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
1,4-Dichlorobenzene	ND	1600		µg/Kg	5	3/26/2009 03:15 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E15B (0')
Lab Order:	104674	**Collection Date:**	3/19/2009 11:16:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104674-005A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090325C QC Batch: 54223 PrepDate: 3/25/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
2,4,6-Trichlorophenol	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
2,4-Dichlorophenol	ND	8200		µg/Kg	5	3/26/2009 03:15 PM
2,4-Dimethylphenol	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
2,4-Dinitrophenol	ND	8200		µg/Kg	5	3/26/2009 03:15 PM
2,4-Dinitrotoluene	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
2,6-Dinitrotoluene	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
2-Chloronaphthalene	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
2-Chlorophenol	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
2-Methylnaphthalene	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
2-Methylphenol	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
2-Nitroaniline	ND	8200		µg/Kg	5	3/26/2009 03:15 PM
2-Nitrophenol	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
3,3´-Dichlorobenzidine	ND	3300		µg/Kg	5	3/26/2009 03:15 PM
3-Nitroaniline	ND	8200		µg/Kg	5	3/26/2009 03:15 PM
4,6-Dinitro-2-methylphenol	ND	8200		µg/Kg	5	3/26/2009 03:15 PM
4-Bromophenyl-phenylether	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
4-Chloro-3-methylphenol	ND	3300		µg/Kg	5	3/26/2009 03:15 PM
4-Chloroaniline	ND	3300		µg/Kg	5	3/26/2009 03:15 PM
4-Chlorophenyl-phenylether	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
4-Methylphenol	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
4-Nitroaniline	ND	8200		µg/Kg	5	3/26/2009 03:15 PM
4-Nitrophenol	ND	8200		µg/Kg	5	3/26/2009 03:15 PM
Acenaphthene	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
Acenaphthylene	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
Anthracene	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
Benzidine (M)	ND	8200		µg/Kg	5	3/26/2009 03:15 PM
Benzo(a)anthracene	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
Benzo(a)pyrene	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
Benzo(b)fluoranthene	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
Benzo(g,h,i)perylene	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
Benzo(k)fluoranthene	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
Benzoic acid	ND	8200		µg/Kg	5	3/26/2009 03:15 PM
Benzyl alcohol	ND	3300		µg/Kg	5	3/26/2009 03:15 PM
Bis(2-chloroethoxy)methane	ND	1600		µg/Kg	5	3/26/2009 03:15 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E15B (0')
Lab Order:	104674	**Collection Date:**	3/19/2009 11:16:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104674-005A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090325C QC Batch: 54223 PrepDate: 3/25/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
Bis(2-chloroisopropyl)ether	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
Bis(2-ethylhexyl)phthalate	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
Butylbenzylphthalate	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
Chrysene	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
Di-n-butylphthalate	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
Di-n-octylphthalate	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
Dibenz(a,h)anthracene	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
Dibenzofuran	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
Diethylphthalate	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
Dimethylphthalate	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
Fluoranthene	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
Fluorene	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
Hexachlorobenzene	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
Hexachlorobutadiene	ND	3300		µg/Kg	5	3/26/2009 03:15 PM
Hexachlorocyclopentadiene	ND	3300		µg/Kg	5	3/26/2009 03:15 PM
Hexachloroethane	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
Indeno(1,2,3-cd)pyrene	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
Isophorone	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
N-Nitrosodi-n-propylamine	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
N-Nitrosodiphenylamine	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
Naphthalene	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
Nitrobenzene	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
Pentachlorophenol	ND	8200		µg/Kg	5	3/26/2009 03:15 PM
Phenanthrene	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
Phenol	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
Pyrene	ND	1600		µg/Kg	5	3/26/2009 03:15 PM
Surr: 1,2-Dichlorobenzene-d4	73.7	49-103		%REC	5	3/26/2009 03:15 PM
Surr: 2,4,6-Tribromophenol	73.7	47-129		%REC	5	3/26/2009 03:15 PM
Surr: 2-Chlorophenol-d4	82.3	54-109		%REC	5	3/26/2009 03:15 PM
Surr: 2-Fluorobiphenyl	84.8	59-108		%REC	5	3/26/2009 03:15 PM
Surr: 2-Fluorophenol	79.6	50-111		%REC	5	3/26/2009 03:15 PM
Surr: 4-Terphenyl-d14	92.9	58-135		%REC	5	3/26/2009 03:15 PM
Surr: Nitrobenzene-d5	81.7	54-115		%REC	5	3/26/2009 03:15 PM
Surr: Phenol-d5	83.6	58-112		%REC	5	3/26/2009 03:15 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E15B (5')
Lab Order:	104674	**Collection Date:**	3/19/2009 11:19:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104674-006A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090327J	QC Batch: 54286			PrepDate:	3/27/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	3/27/2009 08:55 PM
Arsenic	1.7	1.0		mg/Kg	1	3/27/2009 08:55 PM
Barium	280	1.0		mg/Kg	1	3/27/2009 08:55 PM
Beryllium	ND	1.0		mg/Kg	1	3/27/2009 08:55 PM
Cadmium	ND	1.0		mg/Kg	1	3/27/2009 08:55 PM
Chromium	22	1.0		mg/Kg	1	3/27/2009 08:55 PM
Cobalt	11	1.0		mg/Kg	1	3/27/2009 08:55 PM
Copper	66	2.0		mg/Kg	1	3/27/2009 08:55 PM
Lead	3.7	1.0		mg/Kg	1	3/27/2009 08:55 PM
Molybdenum	ND	1.0		mg/Kg	1	3/27/2009 08:55 PM
Nickel	31	1.0		mg/Kg	1	3/27/2009 08:55 PM
Selenium	ND	1.0		mg/Kg	1	3/27/2009 08:55 PM
Silver	ND	1.0		mg/Kg	1	3/27/2009 08:55 PM
Thallium	ND	1.0		mg/Kg	1	3/27/2009 08:55 PM
Vanadium	36	1.0		mg/Kg	1	3/27/2009 08:55 PM
Zinc	40	1.0		mg/Kg	1	3/27/2009 08:55 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090327A	QC Batch: 54207			PrepDate:	3/25/2009	Analyst: **CBR**
DRO	3.0	1.0		mg/Kg	1	3/27/2009 10:06 AM
ORO	17	1.0		mg/Kg	1	3/27/2009 10:06 AM
Surr: p-Terphenyl	66.0	30-130		%REC	1	3/27/2009 10:06 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090327E	QC Batch: 54282			PrepDate:	3/27/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	3/27/2009 03:26 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090326A	QC Batch: 54259			PrepDate:	3/26/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
1,2-Dichlorobenzene	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
1,3-Dichlorobenzene	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
1,4-Dichlorobenzene	ND	9900		µg/Kg	10	3/27/2009 01:54 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E15B (5')
Lab Order:	104674	**Collection Date:**	3/19/2009 11:19:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104674-006A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090326A QC Batch: 54259 PrepDate: 3/26/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
2,4,6-Trichlorophenol	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
2,4-Dichlorophenol	ND	50000		µg/Kg	10	3/27/2009 01:54 AM
2,4-Dimethylphenol	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
2,4-Dinitrophenol	ND	50000		µg/Kg	10	3/27/2009 01:54 AM
2,4-Dinitrotoluene	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
2,6-Dinitrotoluene	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
2-Chloronaphthalene	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
2-Chlorophenol	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
2-Methylnaphthalene	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
2-Methylphenol	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
2-Nitroaniline	ND	50000		µg/Kg	10	3/27/2009 01:54 AM
2-Nitrophenol	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
3,3´-Dichlorobenzidine	ND	20000		µg/Kg	10	3/27/2009 01:54 AM
3-Nitroaniline	ND	50000		µg/Kg	10	3/27/2009 01:54 AM
4,6-Dinitro-2-methylphenol	ND	50000		µg/Kg	10	3/27/2009 01:54 AM
4-Bromophenyl-phenylether	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
4-Chloro-3-methylphenol	ND	20000		µg/Kg	10	3/27/2009 01:54 AM
4-Chloroaniline	ND	20000		µg/Kg	10	3/27/2009 01:54 AM
4-Chlorophenyl-phenylether	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
4-Methylphenol	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
4-Nitroaniline	ND	50000		µg/Kg	10	3/27/2009 01:54 AM
4-Nitrophenol	ND	50000		µg/Kg	10	3/27/2009 01:54 AM
Acenaphthene	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
Acenaphthylene	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
Anthracene	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
Benzidine (M)	ND	50000		µg/Kg	10	3/27/2009 01:54 AM
Benzo(a)anthracene	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
Benzo(a)pyrene	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
Benzo(b)fluoranthene	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
Benzo(g,h,i)perylene	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
Benzo(k)fluoranthene	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
Benzoic acid	ND	50000		µg/Kg	10	3/27/2009 01:54 AM
Benzyl alcohol	ND	20000		µg/Kg	10	3/27/2009 01:54 AM
Bis(2-chloroethoxy)methane	ND	9900		µg/Kg	10	3/27/2009 01:54 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E15B (5')
Lab Order:	104674	**Collection Date:**	3/19/2009 11:19:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104674-006A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090326A QC Batch: 54259 PrepDate: 3/26/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
Bis(2-chloroisopropyl)ether	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
Bis(2-ethylhexyl)phthalate	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
Butylbenzylphthalate	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
Chrysene	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
Di-n-butylphthalate	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
Di-n-octylphthalate	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
Dibenz(a,h)anthracene	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
Dibenzofuran	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
Diethylphthalate	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
Dimethylphthalate	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
Fluoranthene	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
Fluorene	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
Hexachlorobenzene	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
Hexachlorobutadiene	ND	20000		µg/Kg	10	3/27/2009 01:54 AM
Hexachlorocyclopentadiene	ND	20000		µg/Kg	10	3/27/2009 01:54 AM
Hexachloroethane	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
Indeno(1,2,3-cd)pyrene	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
Isophorone	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
N-Nitrosodi-n-propylamine	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
N-Nitrosodiphenylamine	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
Naphthalene	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
Nitrobenzene	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
Pentachlorophenol	ND	50000		µg/Kg	10	3/27/2009 01:54 AM
Phenanthrene	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
Phenol	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
Pyrene	ND	9900		µg/Kg	10	3/27/2009 01:54 AM
Surr: 1,2-Dichlorobenzene-d4	92.8	49-103		%REC	10	3/27/2009 01:54 AM
Surr: 2,4,6-Tribromophenol	62.5	47-129		%REC	10	3/27/2009 01:54 AM
Surr: 2-Chlorophenol-d4	88.3	54-109		%REC	10	3/27/2009 01:54 AM
Surr: 2-Fluorobiphenyl	92.2	59-108		%REC	10	3/27/2009 01:54 AM
Surr: 2-Fluorophenol	80.8	50-111		%REC	10	3/27/2009 01:54 AM
Surr: 4-Terphenyl-d14	108	58-135		%REC	10	3/27/2009 01:54 AM
Surr: Nitrobenzene-d5	83.8	54-115		%REC	10	3/27/2009 01:54 AM
Surr: Phenol-d5	85.0	58-112		%REC	10	3/27/2009 01:54 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT: Geocon Consultants, Inc. **Client Sample ID:** E15B (10')
Lab Order: 104674 **Collection Date:** 3/19/2009 11:25:00 AM
Project: Caltrans Dumbarton Bridge, E8435-06-18 **Matrix:** SOIL
Lab ID: 104674-007A

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090327J	QC Batch: 54286			PrepDate: 3/27/2009	Analyst: **CL**	
Antimony	ND	2.0		mg/Kg	1	3/27/2009 08:58 PM
Arsenic	3.1	1.0		mg/Kg	1	3/27/2009 08:58 PM
Barium	120	1.0		mg/Kg	1	3/27/2009 08:58 PM
Beryllium	ND	1.0		mg/Kg	1	3/27/2009 08:58 PM
Cadmium	ND	1.0		mg/Kg	1	3/27/2009 08:58 PM
Chromium	33	1.0		mg/Kg	1	3/27/2009 08:58 PM
Cobalt	8.5	1.0		mg/Kg	1	3/27/2009 08:58 PM
Copper	28	2.0		mg/Kg	1	3/27/2009 08:58 PM
Lead	12	1.0		mg/Kg	1	3/27/2009 08:58 PM
Molybdenum	2.7	1.0		mg/Kg	1	3/27/2009 08:58 PM
Nickel	44	1.0		mg/Kg	1	3/27/2009 08:58 PM
Selenium	1.1	1.0		mg/Kg	1	3/27/2009 08:58 PM
Silver	ND	1.0		mg/Kg	1	3/27/2009 08:58 PM
Thallium	ND	1.0		mg/Kg	1	3/27/2009 08:58 PM
Vanadium	31	1.0		mg/Kg	1	3/27/2009 08:58 PM
Zinc	43	1.0		mg/Kg	1	3/27/2009 08:58 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090327A	QC Batch: 54207			PrepDate: 3/25/2009	Analyst: **CBR**	
DRO	ND	1.0		mg/Kg	1	3/27/2009 09:56 AM
ORO	3.5	1.0		mg/Kg	1	3/27/2009 09:56 AM
Surr: p-Terphenyl	89.7	30-130		%REC	1	3/27/2009 09:56 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090327E	QC Batch: 54282			PrepDate: 3/27/2009	Analyst: **RQ**	
Mercury	ND	0.10		mg/Kg	1	3/27/2009 03:31 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090326A	QC Batch: 54259			PrepDate: 3/26/2009	Analyst: **DMP**	
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	3/26/2009 11:08 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	3/26/2009 11:08 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	3/26/2009 11:08 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	3/26/2009 11:08 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E15B (10')
Lab Order:	104674	**Collection Date:**	3/19/2009 11:25:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104674-007A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090326A QC Batch: 54259 PrepDate: 3/26/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	3/26/2009 11:08 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	3/26/2009 11:08 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	3/26/2009 11:08 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	3/26/2009 11:08 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	3/26/2009 11:08 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	3/26/2009 11:08 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	3/26/2009 11:08 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	3/26/2009 11:08 PM
2-Chlorophenol	ND	330		µg/Kg	1	3/26/2009 11:08 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	3/26/2009 11:08 PM
2-Methylphenol	ND	330		µg/Kg	1	3/26/2009 11:08 PM
2-Nitroaniline	ND	1600		µg/Kg	1	3/26/2009 11:08 PM
2-Nitrophenol	ND	330		µg/Kg	1	3/26/2009 11:08 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	3/26/2009 11:08 PM
3-Nitroaniline	ND	1600		µg/Kg	1	3/26/2009 11:08 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	3/26/2009 11:08 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	3/26/2009 11:08 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	3/26/2009 11:08 PM
4-Chloroaniline	ND	660		µg/Kg	1	3/26/2009 11:08 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	3/26/2009 11:08 PM
4-Methylphenol	ND	330		µg/Kg	1	3/26/2009 11:08 PM
4-Nitroaniline	ND	1600		µg/Kg	1	3/26/2009 11:08 PM
4-Nitrophenol	ND	1600		µg/Kg	1	3/26/2009 11:08 PM
Acenaphthene	ND	330		µg/Kg	1	3/26/2009 11:08 PM
Acenaphthylene	ND	330		µg/Kg	1	3/26/2009 11:08 PM
Anthracene	ND	330		µg/Kg	1	3/26/2009 11:08 PM
Benzidine (M)	ND	1600		µg/Kg	1	3/26/2009 11:08 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	3/26/2009 11:08 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	3/26/2009 11:08 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	3/26/2009 11:08 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	3/26/2009 11:08 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	3/26/2009 11:08 PM
Benzoic acid	ND	1600		µg/Kg	1	3/26/2009 11:08 PM
Benzyl alcohol	ND	660		µg/Kg	1	3/26/2009 11:08 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	3/26/2009 11:08 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E15B (10')
Lab Order:	104674	**Collection Date:**	3/19/2009 11:25:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104674-007A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090326A QC Batch: 54259 PrepDate: 3/26/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	3/26/2009 11:08 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	3/26/2009 11:08 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	3/26/2009 11:08 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	3/26/2009 11:08 PM
Chrysene	ND	330		µg/Kg	1	3/26/2009 11:08 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	3/26/2009 11:08 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	3/26/2009 11:08 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	3/26/2009 11:08 PM
Dibenzofuran	ND	330		µg/Kg	1	3/26/2009 11:08 PM
Diethylphthalate	ND	330		µg/Kg	1	3/26/2009 11:08 PM
Dimethylphthalate	ND	330		µg/Kg	1	3/26/2009 11:08 PM
Fluoranthene	ND	330		µg/Kg	1	3/26/2009 11:08 PM
Fluorene	ND	330		µg/Kg	1	3/26/2009 11:08 PM
Hexachlorobenzene	ND	330		µg/Kg	1	3/26/2009 11:08 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	3/26/2009 11:08 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	3/26/2009 11:08 PM
Hexachloroethane	ND	330		µg/Kg	1	3/26/2009 11:08 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	3/26/2009 11:08 PM
Isophorone	ND	330		µg/Kg	1	3/26/2009 11:08 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	3/26/2009 11:08 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	3/26/2009 11:08 PM
Naphthalene	ND	330		µg/Kg	1	3/26/2009 11:08 PM
Nitrobenzene	ND	330		µg/Kg	1	3/26/2009 11:08 PM
Pentachlorophenol	ND	1600		µg/Kg	1	3/26/2009 11:08 PM
Phenanthrene	ND	330		µg/Kg	1	3/26/2009 11:08 PM
Phenol	ND	330		µg/Kg	1	3/26/2009 11:08 PM
Pyrene	ND	330		µg/Kg	1	3/26/2009 11:08 PM
Surr: 1,2-Dichlorobenzene-d4	91.4	49-103		%REC	1	3/26/2009 11:08 PM
Surr: 2,4,6-Tribromophenol	99.5	47-129		%REC	1	3/26/2009 11:08 PM
Surr: 2-Chlorophenol-d4	97.0	54-109		%REC	1	3/26/2009 11:08 PM
Surr: 2-Fluorobiphenyl	101	59-108		%REC	1	3/26/2009 11:08 PM
Surr: 2-Fluorophenol	96.9	50-111		%REC	1	3/26/2009 11:08 PM
Surr: 4-Terphenyl-d14	121	58-135		%REC	1	3/26/2009 11:08 PM
Surr: Nitrobenzene-d5	97.9	54-115		%REC	1	3/26/2009 11:08 PM
Surr: Phenol-d5	97.0	58-112		%REC	1	3/26/2009 11:08 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT: Geocon Consultants, Inc.
Work Order: 104674
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **MB-54285** SampType: **MBLK** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/27/2009** RunNo: **107564**
Client ID: **PBS** Batch ID: **54285** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/27/2009** SeqNo: **1685377**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	2.0									
Arsenic	ND	1.0									
Barium	ND	1.0									
Beryllium	ND	1.0									
Cadmium	0.013	1.0									
Chromium	ND	1.0									
Cobalt	ND	1.0									
Copper	ND	2.0									
Lead	ND	1.0									
Molybdenum	ND	1.0									
Nickel	ND	1.0									
Selenium	ND	1.0									
Silver	ND	1.0									
Thallium	ND	1.0									
Vanadium	ND	1.0									
Zinc	ND	1.0									

Sample ID: **LCS-54285** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/27/2009** RunNo: **107564**
Client ID: **LCSS** Batch ID: **54285** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/27/2009** SeqNo: **1685378**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	44.388	2.0	50.00	0	88.8	80	120				
Arsenic	43.020	1.0	50.00	0	86.0	80	120				
Barium	46.590	1.0	50.00	0	93.2	80	120				
Beryllium	44.706	1.0	50.00	0	89.4	80	120				
Cadmium	45.231	1.0	50.00	0.01250	90.4	80	120				
Chromium	42.288	1.0	50.00	0	84.6	80	120				
Cobalt	46.561	1.0	50.00	0	93.1	80	120				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104674
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **LCS-54285** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/27/2009** RunNo: **107564**
Client ID: **LCSS** Batch ID: **54285** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/27/2009** SeqNo: **1685378**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Copper	46.095	2.0	50.00	0	92.2	80	120				
Lead	48.822	1.0	50.00	0	97.6	80	120				
Molybdenum	45.640	1.0	50.00	0	91.3	80	120				
Nickel	45.314	1.0	50.00	0	90.6	80	120				
Selenium	41.626	1.0	50.00	0	83.3	80	120				
Silver	42.865	1.0	50.00	0	85.7	80	120				
Thallium	40.713	1.0	50.00	0	81.4	80	120				
Vanadium	46.652	1.0	50.00	0	93.3	80	120				
Zinc	44.957	1.0	50.00	0	89.9	80	120				

Sample ID: **104674-005ADUP** SampType: **DUP** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/27/2009** RunNo: **107564**
Client ID: **E15B (0')** Batch ID: **54285** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/27/2009** SeqNo: **1685389**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	2.0						0.3667	0	20	
Arsenic	5.852	1.0						1.863	103	20	R
Barium	150.650	1.0						260.1	53.3	20	R
Beryllium	ND	1.0						0	0	20	
Cadmium	0.626	1.0						0.6367	0	20	
Chromium	46.818	1.0						40.60	14.2	20	
Cobalt	11.384	1.0						14.55	24.4	20	R
Copper	32.865	2.0						52.46	45.9	20	R
Lead	7.659	1.0						3.859	66.0	20	R
Molybdenum	ND	1.0						0	0	20	
Nickel	64.178	1.0						45.17	34.8	20	R
Selenium	ND	1.0						0.4450	0	20	
Silver	ND	1.0						0	0	20	
Thallium	ND	1.0						0	0	20	
Vanadium	34.411	1.0						51.12	39.1	20	R
Zinc	50.538	1.0						46.65	8.01	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104674
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **104674-005AMS** SampType: **MS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/27/2009** RunNo: **107564**
Client ID: **E15B (0')** Batch ID: **54285** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/27/2009** SeqNo: **1685390**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	75.645	2.0	125.0	0.3667	60.2	25	106				
Arsenic	94.344	1.0	125.0	1.863	74.0	42	113				
Barium	246.703	1.0	125.0	260.1	-10.7	19	140				S
Beryllium	92.817	1.0	125.0	0	74.3	50	109				
Cadmium	89.557	1.0	125.0	0.6367	71.1	48	106				
Chromium	137.326	1.0	125.0	40.60	77.4	44	116				
Cobalt	105.311	1.0	125.0	14.55	72.6	47	107				
Copper	141.002	2.0	125.0	52.46	70.8	49	124				
Lead	101.918	1.0	125.0	3.859	78.4	33	120				
Molybdenum	92.881	1.0	125.0	0	74.3	46	111				
Nickel	150.478	1.0	125.0	45.17	84.2	43	111				
Selenium	88.514	1.0	125.0	0.4450	70.5	43	104				
Silver	99.091	1.0	125.0	0	79.3	53	114				
Thallium	83.454	1.0	125.0	0	66.8	41	107				
Vanadium	136.811	1.0	125.0	51.12	68.6	48	116				
Zinc	141.700	1.0	125.0	46.65	76.0	24	129				

Sample ID: **104674-005AMSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/27/2009** RunNo: **107564**
Client ID: **E15B (0')** Batch ID: **54285** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/27/2009** SeqNo: **1685391**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	83.818	2.0	125.0	0.3667	66.8	25	106	75.64	10.3	20	
Arsenic	103.507	1.0	125.0	1.863	81.3	42	113	94.34	9.26	20	
Barium	244.016	1.0	125.0	260.1	-12.9	19	140	246.7	1.10	20	S
Beryllium	102.269	1.0	125.0	0	81.8	50	109	92.82	9.69	20	
Cadmium	97.766	1.0	125.0	0.6367	77.7	48	106	89.56	8.76	20	
Chromium	144.108	1.0	125.0	40.60	82.8	44	116	137.3	4.82	20	
Cobalt	113.282	1.0	125.0	14.55	79.0	47	107	105.3	7.29	20	
Copper	147.670	2.0	125.0	52.46	76.2	49	124	141.0	4.62	20	
Lead	110.876	1.0	125.0	3.859	85.6	33	120	101.9	8.42	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104674
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **104674-005AMSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/27/2009** RunNo: **107564**
Client ID: **E15B (0')** Batch ID: **54285** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/27/2009** SeqNo: **1685391**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	102.350	1.0	125.0	0	81.9	46	111	92.88	9.70	20	
Nickel	161.463	1.0	125.0	45.17	93.0	43	111	150.5	7.04	20	
Selenium	97.086	1.0	125.0	0.4450	77.3	43	104	88.51	9.24	20	
Silver	108.142	1.0	125.0	0	86.5	53	114	99.09	8.74	20	
Thallium	92.801	1.0	125.0	0	74.2	41	107	83.45	10.6	20	
Vanadium	141.866	1.0	125.0	51.12	72.6	48	116	136.8	3.63	20	
Zinc	147.627	1.0	125.0	46.65	80.8	24	129	141.7	4.10	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104674
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **MB-54286** SampType: **MBLK** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/27/2009** RunNo: **107565**
Client ID: **PBS** Batch ID: **54286** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/27/2009** SeqNo: **1685414**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	2.0									
Arsenic	ND	1.0									
Barium	ND	1.0									
Beryllium	ND	1.0									
Cadmium	0.012	1.0									
Chromium	ND	1.0									
Cobalt	ND	1.0									
Copper	ND	2.0									
Lead	ND	1.0									
Molybdenum	ND	1.0									
Nickel	ND	1.0									
Selenium	ND	1.0									
Silver	ND	1.0									
Thallium	ND	1.0									
Vanadium	ND	1.0									
Zinc	ND	1.0									

Sample ID: **LCS-54286** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/27/2009** RunNo: **107565**
Client ID: **LCSS** Batch ID: **54286** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/27/2009** SeqNo: **1685415**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	47.115	2.0	50.00	0	94.2	80	120				
Arsenic	45.418	1.0	50.00	0	90.8	80	120				
Barium	48.774	1.0	50.00	0	97.5	80	120				
Beryllium	47.575	1.0	50.00	0	95.1	80	120				
Cadmium	47.274	1.0	50.00	0.01177	94.5	80	120				
Chromium	44.183	1.0	50.00	0	88.4	80	120				
Cobalt	48.804	1.0	50.00	0	97.6	80	120				
Copper	48.683	2.0	50.00	0	97.4	80	120				
Lead	50.479	1.0	50.00	0	101	80	120				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104674
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **LCS-54286** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/27/2009** RunNo: **107565**
Client ID: **LCSS** Batch ID: **54286** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/27/2009** SeqNo: **1685415**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	48.177	1.0	50.00	0	96.4	80	120				
Nickel	47.165	1.0	50.00	0	94.3	80	120				
Selenium	43.369	1.0	50.00	0	86.7	80	120				
Silver	45.187	1.0	50.00	0	90.4	80	120				
Thallium	42.775	1.0	50.00	0	85.6	80	120				
Vanadium	48.912	1.0	50.00	0	97.8	80	120				
Zinc	47.021	1.0	50.00	0	94.0	80	120				

Sample ID: **104675-007ADUP** SampType: **DUP** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/27/2009** RunNo: **107565**
Client ID: **ZZZZZZ** Batch ID: **54286** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/27/2009** SeqNo: **1685425**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	2.0						0.3372	0	20	
Arsenic	3.129	1.0						3.539	12.3	20	
Barium	24.925	1.0						26.55	6.30	20	
Beryllium	ND	1.0						0	0	20	
Cadmium	0.439	1.0						0.4726	0	20	
Chromium	33.084	1.0						35.03	5.71	20	
Cobalt	6.342	1.0						6.941	9.01	20	
Copper	12.262	2.0						12.54	2.24	20	
Lead	3.135	1.0						3.440	9.28	20	
Molybdenum	ND	1.0						0	0	20	
Nickel	37.919	1.0						40.08	5.54	20	
Selenium	ND	1.0						0	0	20	
Silver	ND	1.0						0	0	20	
Thallium	ND	1.0						0	0	20	
Vanadium	26.360	1.0						27.80	5.31	20	
Zinc	35.403	1.0						36.56	3.21	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104674
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **104675-007AMS** SampType: **MS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/27/2009** RunNo: **107565**
Client ID: **ZZZZZZ** Batch ID: **54286** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/27/2009** SeqNo: **1685426**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	87.082	2.0	125.0	0.3372	69.4	25	106				
Arsenic	104.075	1.0	125.0	3.539	80.4	42	113				
Barium	129.434	1.0	125.0	26.55	82.3	19	140				
Beryllium	104.560	1.0	125.0	0	83.6	50	109				
Cadmium	100.683	1.0	125.0	0.4726	80.2	48	106				
Chromium	129.114	1.0	125.0	35.03	75.3	44	116				
Cobalt	108.787	1.0	125.0	6.941	81.5	47	107				
Copper	127.464	2.0	125.0	12.54	91.9	49	124				
Lead	109.415	1.0	125.0	3.440	84.8	33	120				
Molybdenum	104.294	1.0	125.0	0	83.4	46	111				
Nickel	137.774	1.0	125.0	40.08	78.2	43	111				
Selenium	99.589	1.0	125.0	0	79.7	43	104				
Silver	107.371	1.0	125.0	0	85.9	53	114				
Thallium	95.643	1.0	125.0	0	76.5	41	107				
Vanadium	130.484	1.0	125.0	27.80	82.1	48	116				
Zinc	133.324	1.0	125.0	36.56	77.4	24	129				

Sample ID: **104675-007AMSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/27/2009** RunNo: **107565**
Client ID: **ZZZZZZ** Batch ID: **54286** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/27/2009** SeqNo: **1685427**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	83.863	2.0	125.0	0.3372	66.8	25	106	87.08	3.77	20	
Arsenic	104.293	1.0	125.0	3.539	80.6	42	113	104.1	0.209	20	
Barium	134.846	1.0	125.0	26.55	86.6	19	140	129.4	4.10	20	
Beryllium	104.154	1.0	125.0	0	83.3	50	109	104.6	0.389	20	
Cadmium	99.941	1.0	125.0	0.4726	79.6	48	106	100.7	0.740	20	
Chromium	131.898	1.0	125.0	35.03	77.5	44	116	129.1	2.13	20	
Cobalt	108.627	1.0	125.0	6.941	81.3	47	107	108.8	0.148	20	
Copper	130.363	2.0	125.0	12.54	94.3	49	124	127.5	2.25	20	
Lead	108.622	1.0	125.0	3.440	84.1	33	120	109.4	0.727	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104674
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **104675-007AMSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/27/2009** RunNo: **107565**
Client ID: **ZZZZZZ** Batch ID: **54286** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/27/2009** SeqNo: **1685427**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	103.577	1.0	125.0	0	82.9	46	111	104.3	0.690	20	
Nickel	139.561	1.0	125.0	40.08	79.6	43	111	137.8	1.29	20	
Selenium	98.895	1.0	125.0	0	79.1	43	104	99.59	0.700	20	
Silver	108.123	1.0	125.0	0	86.5	53	114	107.4	0.698	20	
Thallium	95.132	1.0	125.0	0	76.1	41	107	95.64	0.536	20	
Vanadium	133.665	1.0	125.0	27.80	84.7	48	116	130.5	2.41	20	
Zinc	135.191	1.0	125.0	36.56	78.9	24	129	133.3	1.39	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104674
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 7471_S

Sample ID: **MB-54281**	SampType: **MBLK**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **3/27/2009**	RunNo: **107535**
Client ID: **PBS**	Batch ID: **54281**	TestNo: **EPA 7471A**		Analysis Date: **3/27/2009**	SeqNo: **1684905**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.10									

Sample ID: **LCS-54281**	SampType: **LCS**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **3/27/2009**	RunNo: **107535**
Client ID: **LCSS**	Batch ID: **54281**	TestNo: **EPA 7471A**		Analysis Date: **3/27/2009**	SeqNo: **1684906**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.878	0.10	0.8300	0	106	80	120				

Sample ID: **104674-005A-MS**	SampType: **MS**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **3/27/2009**	RunNo: **107535**
Client ID: **E15B (0')**	Batch ID: **54281**	TestNo: **EPA 7471A**		Analysis Date: **3/27/2009**	SeqNo: **1684907**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.963	0.10	0.8300	0.04096	111	70	130				

Sample ID: **104674-005A-MSD**	SampType: **MSD**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **3/27/2009**	RunNo: **107535**
Client ID: **E15B (0')**	Batch ID: **54281**	TestNo: **EPA 7471A**		Analysis Date: **3/27/2009**	SeqNo: **1684908**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.941	0.10	0.8300	0.04096	108	70	130	0.9632	2.37	20	

Sample ID: **104674-005A-DUP**	SampType: **DUP**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **3/27/2009**	RunNo: **107535**
Client ID: **E15B (0')**	Batch ID: **54281**	TestNo: **EPA 7471A**		Analysis Date: **3/27/2009**	SeqNo: **1684910**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.054	0.10						0.04096	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104674
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 7471_S

Sample ID: **MB-54282**	SampType: **MBLK**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **3/27/2009**	RunNo: **107536**
Client ID: **PBS**	Batch ID: **54282**	TestNo: **EPA 7471A**		Analysis Date: **3/27/2009**	SeqNo: **1684922**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.10									

Sample ID: **LCS-54282**	SampType: **LCS**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **3/27/2009**	RunNo: **107536**
Client ID: **LCSS**	Batch ID: **54282**	TestNo: **EPA 7471A**		Analysis Date: **3/27/2009**	SeqNo: **1684923**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.875	0.10	0.8300	0	105	80	120				

Sample ID: **104675-007A-MS**	SampType: **MS**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **3/27/2009**	RunNo: **107536**
Client ID: **ZZZZZZ**	Batch ID: **54282**	TestNo: **EPA 7471A**		Analysis Date: **3/27/2009**	SeqNo: **1684924**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.857	0.10	0.8300	0	103	70	130				

Sample ID: **104675-007A-MSD**	SampType: **MSD**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **3/27/2009**	RunNo: **107536**
Client ID: **ZZZZZZ**	Batch ID: **54282**	TestNo: **EPA 7471A**		Analysis Date: **3/27/2009**	SeqNo: **1684925**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.857	0.10	0.8300	0	103	70	130	0.8569	0.0372	20	

Sample ID: **104675-007A-DUP**	SampType: **DUP**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **3/27/2009**	RunNo: **107536**
Client ID: **ZZZZZZ**	Batch ID: **54282**	TestNo: **EPA 7471A**		Analysis Date: **3/27/2009**	SeqNo: **1684928**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.10						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104674
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_S_DM LLSGT

Sample ID: **MB-54185** SampType: **MBLK** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **3/24/2009** RunNo: **107372**
Client ID: **PBS** Batch ID: **54185** TestNo: **EPA 8015B(M** **EPA 3550B** Analysis Date: **3/24/2009** SeqNo: **1681915**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	ND	1.0									
ORO	ND	1.0									
Surr: p-Terphenyl	2.112		2.670		79.1	30	130				

Sample ID: **LCS-54185** SampType: **LCS** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **3/24/2009** RunNo: **107372**
Client ID: **LCSS** Batch ID: **54185** TestNo: **EPA 8015B(M** **EPA 3550B** Analysis Date: **3/24/2009** SeqNo: **1681916**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	17.066	1.0	33.00	0	51.7	35	124				
Surr: p-Terphenyl	1.575		2.670		59.0	30	130				

Sample ID: **104673-011ADUP** SampType: **DUP** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **3/24/2009** RunNo: **107372**
Client ID: **ZZZZZZ** Batch ID: **54185** TestNo: **EPA 8015B(M** **EPA 3550B** Analysis Date: **3/24/2009** SeqNo: **1681917**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	1.516	1.0						0	200	20	R
ORO	ND	1.0						0	0	20	
Surr: p-Terphenyl	2.166		2.670		81.1	30	130		0	0	

Sample ID: **104673-011AMS** SampType: **MS** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **3/24/2009** RunNo: **107372**
Client ID: **ZZZZZZ** Batch ID: **54185** TestNo: **EPA 8015B(M** **EPA 3550B** Analysis Date: **3/24/2009** SeqNo: **1681918**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	17.757	1.0	33.00	0	53.8	12	125				
Surr: p-Terphenyl	1.717		2.670		64.3	30	130				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104674
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_S_DM LLSGT

Sample ID: **104673-011AMSD** SampType: **MSD** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **3/24/2009** RunNo: **107372**
Client ID: **ZZZZZZ** Batch ID: **54185** TestNo: **EPA 8015B(M EPA 3550B** Analysis Date: **3/24/2009** SeqNo: **1681919**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	16.471	1.0	33.00	0	49.9	12	125	17.76	7.51	20	
Surr: p-Terphenyl	1.552		2.670		58.1	30	130		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104674
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_S_DM LLSGT

Sample ID: **MB-54207** SampType: **MBLK** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **3/25/2009** RunNo: **107514**
Client ID: **PBS** Batch ID: **54207** TestNo: **EPA 8015B(M** **EPA 3550B** Analysis Date: **3/27/2009** SeqNo: **1684519**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	ND	1.0									
ORO	ND	1.0									
Surr: p-Terphenyl	2.461		2.670		92.2	30	130				

Sample ID: **LCS-54207** SampType: **LCS** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **3/25/2009** RunNo: **107514**
Client ID: **LCSS** Batch ID: **54207** TestNo: **EPA 8015B(M** **EPA 3550B** Analysis Date: **3/27/2009** SeqNo: **1684520**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	17.226	1.0	33.00	0	52.2	35	124				
Surr: p-Terphenyl	1.944		2.670		72.8	30	130				

Sample ID: **104675-001ADUP** SampType: **DUP** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **3/25/2009** RunNo: **107514**
Client ID: **ZZZZZZ** Batch ID: **54207** TestNo: **EPA 8015B(M** **EPA 3550B** Analysis Date: **3/27/2009** SeqNo: **1684530**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	71.067	10						40.41	55.0	20	R
ORO	367.633	10						190.0	63.7	20	R
Surr: p-Terphenyl	1.033		2.670		38.7	30	130		0	0	

Sample ID: **104675-001AMS** SampType: **MS** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **3/25/2009** RunNo: **107514**
Client ID: **ZZZZZZ** Batch ID: **54207** TestNo: **EPA 8015B(M** **EPA 3550B** Analysis Date: **3/27/2009** SeqNo: **1684531**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	84.370	10	33.00	40.41	133	12	125				S
Surr: p-Terphenyl	1.380		2.670		51.7	30	130				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104674
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_S_DM LLSGT

Sample ID: **104675-001AMSD** SampType: **MSD** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **3/25/2009** RunNo: **107514**
Client ID: **ZZZZZZ** Batch ID: **54207** TestNo: **EPA 8015B(M EPA 3550B** Analysis Date: **3/27/2009** SeqNo: **1684532**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	59.333	10	33.00	40.41	57.3	12	125	84.37	34.8	20	R
Surr: p-Terphenyl	1.240		2.670		46.4	30	130		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104674
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-54223** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/25/2009** RunNo: **107469**
Client ID: **PBS** Batch ID: **54223** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/25/2009** SeqNo: **1683668**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	330									
1,2-Dichlorobenzene	ND	330									
1,3-Dichlorobenzene	ND	330									
1,4-Dichlorobenzene	ND	330									
2,4,5-Trichlorophenol	ND	330									
2,4,6-Trichlorophenol	ND	330									
2,4-Dichlorophenol	ND	1600									
2,4-Dimethylphenol	ND	330									
2,4-Dinitrophenol	ND	1600									
2,4-Dinitrotoluene	ND	330									
2,6-Dinitrotoluene	ND	330									
2-Chloronaphthalene	ND	330									
2-Chlorophenol	ND	330									
2-Methylnaphthalene	ND	330									
2-Methylphenol	ND	330									
2-Nitroaniline	ND	1600									
2-Nitrophenol	ND	330									
3,3´-Dichlorobenzidine	ND	660									
3-Nitroaniline	ND	1600									
4,6-Dinitro-2-methylphenol	ND	1600									
4-Bromophenyl-phenylether	ND	330									
4-Chloro-3-methylphenol	ND	660									
4-Chloroaniline	ND	660									
4-Chlorophenyl-phenylether	ND	330									
4-Methylphenol	ND	330									
4-Nitroaniline	ND	1600									
4-Nitrophenol	ND	1600									
Acenaphthene	ND	330									
Acenaphthylene	ND	330									
Anthracene	ND	330									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104674
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-54223** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/25/2009** RunNo: **107469**
Client ID: **PBS** Batch ID: **54223** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/25/2009** SeqNo: **1683668**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzidine (M)	ND	1600									
Benzo(a)anthracene	ND	330									
Benzo(a)pyrene	ND	330									
Benzo(b)fluoranthene	ND	330									
Benzo(g,h,i)perylene	ND	330									
Benzo(k)fluoranthene	ND	330									
Benzoic acid	ND	1600									
Benzyl alcohol	ND	660									
Bis(2-chloroethoxy)methane	ND	330									
Bis(2-chloroethyl)ether	ND	330									
Bis(2-chloroisopropyl)ether	ND	330									
Bis(2-ethylhexyl)phthalate	ND	330									
Butylbenzylphthalate	ND	330									
Chrysene	ND	330									
Di-n-butylphthalate	ND	330									
Di-n-octylphthalate	ND	330									
Dibenz(a,h)anthracene	ND	330									
Dibenzofuran	ND	330									
Diethylphthalate	ND	330									
Dimethylphthalate	ND	330									
Fluoranthene	ND	330									
Fluorene	ND	330									
Hexachlorobenzene	ND	330									
Hexachlorobutadiene	ND	660									
Hexachlorocyclopentadiene	ND	660									
Hexachloroethane	ND	330									
Indeno(1,2,3-cd)pyrene	ND	330									
Isophorone	ND	330									
N-Nitrosodi-n-propylamine	ND	330									
N-Nitrosodiphenylamine	ND	330									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-54223** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/25/2009** RunNo: **107469**
Client ID: **PBS** Batch ID: **54223** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/25/2009** SeqNo: **1683668**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	330									
Nitrobenzene	ND	330									
Pentachlorophenol	ND	1600									
Phenanthrene	ND	330									
Phenol	ND	330									
Pyrene	ND	330									
Surr: 1,2-Dichlorobenzene-d4	2986.000		3330		89.7	49	103				
Surr: 2,4,6-Tribromophenol	3496.667		3330		105	47	129				
Surr: 2-Chlorophenol-d4	3215.333		3330		96.6	54	109				
Surr: 2-Fluorobiphenyl	3261.333		3330		97.9	59	108				
Surr: 2-Fluorophenol	3204.667		3330		96.2	50	111				
Surr: 4-Terphenyl-d14	4257.333		3330		128	58	135				
Surr: Nitrobenzene-d5	3139.000		3330		94.3	54	115				
Surr: Phenol-d5	3282.333		3330		98.6	58	112				

Sample ID: **LCS-54223** SampType: **LCS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/25/2009** RunNo: **107469**
Client ID: **LCSS** Batch ID: **54223** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/25/2009** SeqNo: **1683669**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	3002.000	330	3330	0	90.2	61	107				
1,4-Dichlorobenzene	2770.000	330	3330	0	83.2	56	100				
2,4-Dinitrotoluene	3375.667	330	3330	0	101	72	130				
2-Chlorophenol	3017.000	330	3330	0	90.6	64	105				
4-Chloro-3-methylphenol	3508.333	660	3330	0	105	74	125				
4-Nitrophenol	3425.000	1600	3330	0	103	77	137				
Acenaphthene	3224.667	330	3330	0	96.8	63	117				
N-Nitrosodi-n-propylamine	3159.667	330	3330	0	94.9	71	121				
Pentachlorophenol	3050.000	1600	3330	0	91.6	69	125				
Phenol	3140.333	330	3330	0	94.3	67	111				
Pyrene	3324.000	330	3330	0	99.8	60	122				

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike/Surrogate outside of limits due to matrix interference
- DO Surrogate Diluted Out
- Calculations are based on raw values

CLIENT: Geocon Consultants, Inc.
Work Order: 104674
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **LCS-54223** SampType: **LCS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/25/2009** RunNo: **107469**
Client ID: **LCSS** Batch ID: **54223** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/25/2009** SeqNo: **1683669**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 1,2-Dichlorobenzene-d4	2737.333		3330		82.2	49	103				
Surr: 2,4,6-Tribromophenol	3388.667		3330		102	47	129				
Surr: 2-Chlorophenol-d4	2906.667		3330		87.3	54	109				
Surr: 2-Fluorobiphenyl	3061.667		3330		91.9	59	108				
Surr: 2-Fluorophenol	2893.667		3330		86.9	50	111				
Surr: 4-Terphenyl-d14	3484.000		3330		105	58	135				
Surr: Nitrobenzene-d5	2915.000		3330		87.5	54	115				
Surr: Phenol-d5	2977.000		3330		89.4	58	112				

Sample ID: **104673-012AMS** SampType: **MS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/25/2009** RunNo: **107469**
Client ID: **ZZZZZZ** Batch ID: **54223** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/26/2009** SeqNo: **1683680**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	3024.667	330	3330	0	90.8	60	105				
1,4-Dichlorobenzene	2755.000	330	3330	0	82.7	50	99				
2,4-Dinitrotoluene	3392.333	330	3330	0	102	70	130				
2-Chlorophenol	3129.333	330	3330	0	94.0	58	107				
4-Chloro-3-methylphenol	3518.000	660	3330	0	106	72	124				
4-Nitrophenol	3427.333	1600	3330	0	103	69	139				
Acenaphthene	3205.333	330	3330	0	96.3	59	118				
N-Nitrosodi-n-propylamine	3170.333	330	3330	0	95.2	61	125				
Pentachlorophenol	3084.333	1600	3330	0	92.6	56	131				
Phenol	3202.667	330	3330	0	96.2	60	113				
Pyrene	3066.000	330	3330	0	92.1	51	130				
Surr: 1,2-Dichlorobenzene-d4	2702.667		3330		81.2	49	103				
Surr: 2,4,6-Tribromophenol	3491.000		3330		105	47	129				
Surr: 2-Chlorophenol-d4	2984.000		3330		89.6	54	109				
Surr: 2-Fluorobiphenyl	3151.333		3330		94.6	59	108				
Surr: 2-Fluorophenol	2984.000		3330		89.6	50	111				
Surr: 4-Terphenyl-d14	3581.667		3330		108	58	135				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104674
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104673-012AMS**	SampType: **MS**	TestCode: **8270_S_FUL**	Units: **µg/Kg**	Prep Date: **3/25/2009**	RunNo: **107469**
Client ID: **ZZZZZZ**	Batch ID: **54223**	TestNo: **EPA 8270C**	**EPA 3550B**	Analysis Date: **3/26/2009**	SeqNo: **1683680**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	2916.667		3330		87.6	54	115				
Surr: Phenol-d5	3026.667		3330		90.9	58	112				

Sample ID: **104673-012AMSD**	SampType: **MSD**	TestCode: **8270_S_FUL**	Units: **µg/Kg**	Prep Date: **3/25/2009**	RunNo: **107469**
Client ID: **ZZZZZZ**	Batch ID: **54223**	TestNo: **EPA 8270C**	**EPA 3550B**	Analysis Date: **3/26/2009**	SeqNo: **1683681**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	3075.333	330	3330	0	92.4	60	105	3025	1.66	20	
1,4-Dichlorobenzene	2791.333	330	3330	0	83.8	50	99	2755	1.31	20	
2,4-Dinitrotoluene	3363.333	330	3330	0	101	70	130	3392	0.859	20	
2-Chlorophenol	3120.000	330	3330	0	93.7	58	107	3129	0.299	20	
4-Chloro-3-methylphenol	3472.667	660	3330	0	104	72	124	3518	1.30	20	
4-Nitrophenol	3390.667	1600	3330	0	102	69	139	3427	1.08	20	
Acenaphthene	3196.000	330	3330	0	96.0	59	118	3205	0.292	20	
N-Nitrosodi-n-propylamine	3200.333	330	3330	0	96.1	61	125	3170	0.942	20	
Pentachlorophenol	3100.667	1600	3330	0	93.1	56	131	3084	0.528	20	
Phenol	3206.000	330	3330	0	96.3	60	113	3203	0.104	20	
Pyrene	3103.667	330	3330	0	93.2	51	130	3066	1.22	20	
Surr: 1,2-Dichlorobenzene-d4	2744.667		3330		82.4	49	103		0	0	
Surr: 2,4,6-Tribromophenol	3304.333		3330		99.2	47	129		0	0	
Surr: 2-Chlorophenol-d4	2978.333		3330		89.4	54	109		0	0	
Surr: 2-Fluorobiphenyl	3160.333		3330		94.9	59	108		0	0	
Surr: 2-Fluorophenol	2965.000		3330		89.0	50	111		0	0	
Surr: 4-Terphenyl-d14	3459.667		3330		104	58	135		0	0	
Surr: Nitrobenzene-d5	2911.000		3330		87.4	54	115		0	0	
Surr: Phenol-d5	3040.333		3330		91.3	58	112		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104674
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104673-012ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/25/2009** RunNo: **107469**
Client ID: **ZZZZZZ** Batch ID: **54223** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/26/2009** SeqNo: **1683682**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	330						0	0	20	
1,2-Dichlorobenzene	ND	330						0	0	20	
1,3-Dichlorobenzene	ND	330						0	0	20	
1,4-Dichlorobenzene	ND	330						0	0	20	
2,4,5-Trichlorophenol	ND	330						0	0	20	
2,4,6-Trichlorophenol	ND	330						0	0	20	
2,4-Dichlorophenol	ND	1600						0	0	20	
2,4-Dimethylphenol	ND	330						0	0	20	
2,4-Dinitrophenol	ND	1600						0	0	20	
2,4-Dinitrotoluene	ND	330						0	0	20	
2,6-Dinitrotoluene	ND	330						0	0	20	
2-Chloronaphthalene	ND	330						0	0	20	
2-Chlorophenol	ND	330						0	0	20	
2-Methylnaphthalene	ND	330						0	0	20	
2-Methylphenol	ND	330						0	0	20	
2-Nitroaniline	ND	1600						0	0	20	
2-Nitrophenol	ND	330						0	0	20	
3,3´-Dichlorobenzidine	ND	660						0	0	20	
3-Nitroaniline	ND	1600						0	0	20	
4,6-Dinitro-2-methylphenol	ND	1600						0	0	20	
4-Bromophenyl-phenylether	ND	330						0	0	20	
4-Chloro-3-methylphenol	ND	660						0	0	20	
4-Chloroaniline	ND	660						0	0	20	
4-Chlorophenyl-phenylether	ND	330						0	0	20	
4-Methylphenol	ND	330						0	0	20	
4-Nitroaniline	ND	1600						0	0	20	
4-Nitrophenol	ND	1600						0	0	20	
Acenaphthene	ND	330						0	0	20	
Acenaphthylene	ND	330						0	0	20	
Anthracene	ND	330						0	0	20	

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits

Calculations are based on raw values

- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Geocon Consultants, Inc.
Work Order: 104674
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104673-012ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/25/2009** RunNo: **107469**
Client ID: **ZZZZZZ** Batch ID: **54223** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/26/2009** SeqNo: **1683682**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzidine (M)	ND	1600						0	0	20	
Benzo(a)anthracene	ND	330						0	0	20	
Benzo(a)pyrene	ND	330						0	0	20	
Benzo(b)fluoranthene	ND	330						0	0	20	
Benzo(g,h,i)perylene	ND	330						0	0	20	
Benzo(k)fluoranthene	ND	330						0	0	20	
Benzoic acid	ND	1600						0	0	20	
Benzyl alcohol	ND	660						0	0	20	
Bis(2-chloroethoxy)methane	ND	330						0	0	20	
Bis(2-chloroethyl)ether	ND	330						0	0	20	
Bis(2-chloroisopropyl)ether	ND	330						0	0	20	
Bis(2-ethylhexyl)phthalate	ND	330						0	0	20	
Butylbenzylphthalate	ND	330						0	0	20	
Chrysene	ND	330						0	0	20	
Di-n-butylphthalate	ND	330						0	0	20	
Di-n-octylphthalate	ND	330						0	0	20	
Dibenz(a,h)anthracene	ND	330						0	0	20	
Dibenzofuran	ND	330						0	0	20	
Diethylphthalate	ND	330						0	0	20	
Dimethylphthalate	ND	330						0	0	20	
Fluoranthene	ND	330						0	0	20	
Fluorene	ND	330						0	0	20	
Hexachlorobenzene	ND	330						0	0	20	
Hexachlorobutadiene	ND	660						0	0	20	
Hexachlorocyclopentadiene	ND	660						0	0	20	
Hexachloroethane	ND	330						0	0	20	
Indeno(1,2,3-cd)pyrene	ND	330						0	0	20	
Isophorone	ND	330						0	0	20	
N-Nitrosodi-n-propylamine	ND	330						0	0	20	
N-Nitrosodiphenylamine	ND	330						0	0	20	

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits

Calculations are based on raw values

- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Geocon Consultants, Inc.
Work Order: 104674
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104673-012ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/25/2009** RunNo: **107469**
Client ID: **ZZZZZZ** Batch ID: **54223** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/26/2009** SeqNo: **1683682**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	330						0	0	20	
Nitrobenzene	ND	330						0	0	20	
Pentachlorophenol	ND	1600						0	0	20	
Phenanthrene	ND	330						0	0	20	
Phenol	ND	330						0	0	20	
Pyrene	ND	330						0	0	20	
Surr: 1,2-Dichlorobenzene-d4	2843.333		3330		85.4	49	103		0	0	
Surr: 2,4,6-Tribromophenol	3232.000		3330		97.1	47	129		0	0	
Surr: 2-Chlorophenol-d4	3099.333		3330		93.1	54	109		0	0	
Surr: 2-Fluorobiphenyl	3181.667		3330		95.5	59	108		0	0	
Surr: 2-Fluorophenol	3098.667		3330		93.1	50	111		0	0	
Surr: 4-Terphenyl-d14	3848.000		3330		116	58	135		0	0	
Surr: Nitrobenzene-d5	3036.667		3330		91.2	54	115		0	0	
Surr: Phenol-d5	3087.667		3330		92.7	58	112		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104674
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-54259** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/26/2009** RunNo: **107496**
Client ID: **PBS** Batch ID: **54259** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/26/2009** SeqNo: **1684157**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	330									
1,2-Dichlorobenzene	ND	330									
1,3-Dichlorobenzene	ND	330									
1,4-Dichlorobenzene	ND	330									
2,4,5-Trichlorophenol	ND	330									
2,4,6-Trichlorophenol	ND	330									
2,4-Dichlorophenol	ND	1600									
2,4-Dimethylphenol	ND	330									
2,4-Dinitrophenol	ND	1600									
2,4-Dinitrotoluene	ND	330									
2,6-Dinitrotoluene	ND	330									
2-Chloronaphthalene	ND	330									
2-Chlorophenol	ND	330									
2-Methylnaphthalene	ND	330									
2-Methylphenol	ND	330									
2-Nitroaniline	ND	1600									
2-Nitrophenol	ND	330									
3,3´-Dichlorobenzidine	ND	660									
3-Nitroaniline	ND	1600									
4,6-Dinitro-2-methylphenol	ND	1600									
4-Bromophenyl-phenylether	ND	330									
4-Chloro-3-methylphenol	ND	660									
4-Chloroaniline	ND	660									
4-Chlorophenyl-phenylether	ND	330									
4-Methylphenol	ND	330									
4-Nitroaniline	ND	1600									
4-Nitrophenol	ND	1600									
Acenaphthene	ND	330									
Acenaphthylene	ND	330									
Anthracene	ND	330									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104674
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-54259** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/26/2009** RunNo: **107496**
Client ID: **PBS** Batch ID: **54259** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/26/2009** SeqNo: **1684157**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzidine (M)	ND	1600									
Benzo(a)anthracene	ND	330									
Benzo(a)pyrene	ND	330									
Benzo(b)fluoranthene	ND	330									
Benzo(g,h,i)perylene	ND	330									
Benzo(k)fluoranthene	ND	330									
Benzoic acid	ND	1600									
Benzyl alcohol	ND	660									
Bis(2-chloroethoxy)methane	ND	330									
Bis(2-chloroethyl)ether	ND	330									
Bis(2-chloroisopropyl)ether	ND	330									
Bis(2-ethylhexyl)phthalate	ND	330									
Butylbenzylphthalate	ND	330									
Chrysene	ND	330									
Di-n-butylphthalate	ND	330									
Di-n-octylphthalate	ND	330									
Dibenz(a,h)anthracene	ND	330									
Dibenzofuran	ND	330									
Diethylphthalate	ND	330									
Dimethylphthalate	ND	330									
Fluoranthene	ND	330									
Fluorene	ND	330									
Hexachlorobenzene	ND	330									
Hexachlorobutadiene	ND	660									
Hexachlorocyclopentadiene	ND	660									
Hexachloroethane	ND	330									
Indeno(1,2,3-cd)pyrene	ND	330									
Isophorone	ND	330									
N-Nitrosodi-n-propylamine	ND	330									
N-Nitrosodiphenylamine	ND	330									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104674
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-54259** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/26/2009** RunNo: **107496**
Client ID: **PBS** Batch ID: **54259** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/26/2009** SeqNo: **1684157**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	330									
Nitrobenzene	ND	330									
Pentachlorophenol	ND	1600									
Phenanthrene	ND	330									
Phenol	ND	330									
Pyrene	ND	330									
Surr: 1,2-Dichlorobenzene-d4	2937.333		3330		88.2	49	103				
Surr: 2,4,6-Tribromophenol	3342.000		3330		100	47	129				
Surr: 2-Chlorophenol-d4	3132.667		3330		94.1	54	109				
Surr: 2-Fluorobiphenyl	3155.333		3330		94.8	59	108				
Surr: 2-Fluorophenol	3104.667		3330		93.2	50	111				
Surr: 4-Terphenyl-d14	4328.000		3330		130	58	135				
Surr: Nitrobenzene-d5	3107.333		3330		93.3	54	115				
Surr: Phenol-d5	3194.667		3330		95.9	58	112				

Sample ID: **LCS-54259** SampType: **LCS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/26/2009** RunNo: **107496**
Client ID: **LCSS** Batch ID: **54259** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/26/2009** SeqNo: **1684158**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	3429.000	330	3330	0	103	61	107				
1,4-Dichlorobenzene	3033.667	330	3330	0	91.1	56	100				
2,4-Dinitrotoluene	3606.667	330	3330	0	108	72	130				
2-Chlorophenol	3370.333	330	3330	0	101	64	105				
4-Chloro-3-methylphenol	3912.333	660	3330	0	117	74	125				
4-Nitrophenol	3612.333	1600	3330	0	108	77	137				
Acenaphthene	3591.667	330	3330	0	108	63	117				
N-Nitrosodi-n-propylamine	3457.667	330	3330	0	104	71	121				
Pentachlorophenol	3126.333	1600	3330	0	93.9	69	125				
Phenol	3472.333	330	3330	0	104	67	111				
Pyrene	3509.667	330	3330	0	105	60	122				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104674
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **LCS-54259** SampType: **LCS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/26/2009** RunNo: **107496**
Client ID: **LCSS** Batch ID: **54259** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/26/2009** SeqNo: **1684158**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 1,2-Dichlorobenzene-d4	3004.333		3330		90.2	49	103				
Surr: 2,4,6-Tribromophenol	3692.000		3330		111	47	129				
Surr: 2-Chlorophenol-d4	3231.333		3330		97.0	54	109				
Surr: 2-Fluorobiphenyl	3524.333		3330		106	59	108				
Surr: 2-Fluorophenol	3207.000		3330		96.3	50	111				
Surr: 4-Terphenyl-d14	3861.667		3330		116	58	135				
Surr: Nitrobenzene-d5	3270.000		3330		98.2	54	115				
Surr: Phenol-d5	3310.667		3330		99.4	58	112				

Sample ID: **104675-003AMS** SampType: **MS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/26/2009** RunNo: **107496**
Client ID: **ZZZZZZ** Batch ID: **54259** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/26/2009** SeqNo: **1684159**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	2833.000	330	3330	0	85.1	60	105				
1,4-Dichlorobenzene	2542.667	330	3330	0	76.4	50	99				
2,4-Dinitrotoluene	3289.333	330	3330	0	98.8	70	130				
2-Chlorophenol	2954.000	330	3330	0	88.7	58	107				
4-Chloro-3-methylphenol	3426.000	660	3330	0	103	72	124				
4-Nitrophenol	3385.000	1600	3330	0	102	69	139				
Acenaphthene	3153.000	330	3330	0	94.7	59	118				
N-Nitrosodi-n-propylamine	3014.000	330	3330	0	90.5	61	125				
Pentachlorophenol	3044.333	1600	3330	0	91.4	56	131				
Phenol	3103.333	330	3330	0	93.2	60	113				
Pyrene	3137.000	330	3330	0	94.2	51	130				
Surr: 1,2-Dichlorobenzene-d4	2474.333		3330		74.3	49	103				
Surr: 2,4,6-Tribromophenol	3272.333		3330		98.3	47	129				
Surr: 2-Chlorophenol-d4	2754.333		3330		82.7	54	109				
Surr: 2-Fluorobiphenyl	2955.000		3330		88.7	59	108				
Surr: 2-Fluorophenol	2759.000		3330		82.9	50	111				
Surr: 4-Terphenyl-d14	3508.000		3330		105	58	135				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104675-003AMS** SampType: **MS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/26/2009** RunNo: **107496**
Client ID: **ZZZZZZ** Batch ID: **54259** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/26/2009** SeqNo: **1684159**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	2715.667		3330		81.6	54	115				
Surr: Phenol-d5	2891.000		3330		86.8	58	112				

Sample ID: **104675-003AMSD** SampType: **MSD** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/26/2009** RunNo: **107496**
Client ID: **ZZZZZZ** Batch ID: **54259** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/26/2009** SeqNo: **1684160**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	2860.333	330	3330	0	85.9	60	105	2833	0.960	20	
1,4-Dichlorobenzene	2605.333	330	3330	0	78.2	50	99	2543	2.43	20	
2,4-Dinitrotoluene	3104.667	330	3330	0	93.2	70	130	3289	5.78	20	
2-Chlorophenol	2953.000	330	3330	0	88.7	58	107	2954	0.0339	20	
4-Chloro-3-methylphenol	3337.000	660	3330	0	100	72	124	3426	2.63	20	
4-Nitrophenol	3094.333	1600	3330	0	92.9	69	139	3385	8.97	20	
Acenaphthene	3006.667	330	3330	0	90.3	59	118	3153	4.75	20	
N-Nitrosodi-n-propylamine	2981.667	330	3330	0	89.5	61	125	3014	1.08	20	
Pentachlorophenol	2873.333	1600	3330	0	86.3	56	131	3044	5.78	20	
Phenol	3054.000	330	3330	0	91.7	60	113	3103	1.60	20	
Pyrene	2972.000	330	3330	0	89.2	51	130	3137	5.40	20	
Surr: 1,2-Dichlorobenzene-d4	2538.333		3330		76.2	49	103		0	0	
Surr: 2,4,6-Tribromophenol	3158.000		3330		94.8	47	129		0	0	
Surr: 2-Chlorophenol-d4	2795.667		3330		84.0	54	109		0	0	
Surr: 2-Fluorobiphenyl	3015.333		3330		90.6	59	108		0	0	
Surr: 2-Fluorophenol	2785.667		3330		83.7	50	111		0	0	
Surr: 4-Terphenyl-d14	3470.333		3330		104	58	135		0	0	
Surr: Nitrobenzene-d5	2698.667		3330		81.0	54	115		0	0	
Surr: Phenol-d5	2863.667		3330		86.0	58	112		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104674
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104675-003ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/26/2009** RunNo: **107496**
Client ID: **ZZZZZZ** Batch ID: **54259** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/26/2009** SeqNo: **1684161**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	330						0	0	20	
1,2-Dichlorobenzene	ND	330						0	0	20	
1,3-Dichlorobenzene	ND	330						0	0	20	
1,4-Dichlorobenzene	ND	330						0	0	20	
2,4,5-Trichlorophenol	ND	330						0	0	20	
2,4,6-Trichlorophenol	ND	330						0	0	20	
2,4-Dichlorophenol	ND	1600						0	0	20	
2,4-Dimethylphenol	ND	330						0	0	20	
2,4-Dinitrophenol	ND	1600						0	0	20	
2,4-Dinitrotoluene	ND	330						0	0	20	
2,6-Dinitrotoluene	ND	330						0	0	20	
2-Chloronaphthalene	ND	330						0	0	20	
2-Chlorophenol	ND	330						0	0	20	
2-Methylnaphthalene	ND	330						0	0	20	
2-Methylphenol	ND	330						0	0	20	
2-Nitroaniline	ND	1600						0	0	20	
2-Nitrophenol	ND	330						0	0	20	
3,3´-Dichlorobenzidine	ND	660						0	0	20	
3-Nitroaniline	ND	1600						0	0	20	
4,6-Dinitro-2-methylphenol	ND	1600						0	0	20	
4-Bromophenyl-phenylether	ND	330						0	0	20	
4-Chloro-3-methylphenol	ND	660						0	0	20	
4-Chloroaniline	ND	660						0	0	20	
4-Chlorophenyl-phenylether	ND	330						0	0	20	
4-Methylphenol	ND	330						0	0	20	
4-Nitroaniline	ND	1600						0	0	20	
4-Nitrophenol	ND	1600						0	0	20	
Acenaphthene	ND	330						0	0	20	
Acenaphthylene	ND	330						0	0	20	
Anthracene	ND	330						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104674
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104675-003ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/26/2009** RunNo: **107496**
Client ID: **ZZZZZZ** Batch ID: **54259** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/26/2009** SeqNo: **1684161**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzidine (M)	ND	1600						0	0	20	
Benzo(a)anthracene	ND	330						0	0	20	
Benzo(a)pyrene	ND	330						0	0	20	
Benzo(b)fluoranthene	ND	330						0	0	20	
Benzo(g,h,i)perylene	ND	330						0	0	20	
Benzo(k)fluoranthene	ND	330						0	0	20	
Benzoic acid	ND	1600						0	0	20	
Benzyl alcohol	ND	660						0	0	20	
Bis(2-chloroethoxy)methane	ND	330						0	0	20	
Bis(2-chloroethyl)ether	ND	330						0	0	20	
Bis(2-chloroisopropyl)ether	ND	330						0	0	20	
Bis(2-ethylhexyl)phthalate	ND	330						0	0	20	
Butylbenzylphthalate	ND	330						0	0	20	
Chrysene	ND	330						0	0	20	
Di-n-butylphthalate	ND	330						0	0	20	
Di-n-octylphthalate	ND	330						0	0	20	
Dibenz(a,h)anthracene	ND	330						0	0	20	
Dibenzofuran	ND	330						0	0	20	
Diethylphthalate	ND	330						0	0	20	
Dimethylphthalate	ND	330						0	0	20	
Fluoranthene	ND	330						0	0	20	
Fluorene	ND	330						0	0	20	
Hexachlorobenzene	ND	330						0	0	20	
Hexachlorobutadiene	ND	660						0	0	20	
Hexachlorocyclopentadiene	ND	660						0	0	20	
Hexachloroethane	ND	330						0	0	20	
Indeno(1,2,3-cd)pyrene	ND	330						0	0	20	
Isophorone	ND	330						0	0	20	
N-Nitrosodi-n-propylamine	ND	330						0	0	20	
N-Nitrosodiphenylamine	ND	330						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104674
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104675-003ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/26/2009** RunNo: **107496**
Client ID: **ZZZZZZ** Batch ID: **54259** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/26/2009** SeqNo: **1684161**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	330						0	0	20	
Nitrobenzene	ND	330						0	0	20	
Pentachlorophenol	ND	1600						0	0	20	
Phenanthrene	ND	330						0	0	20	
Phenol	ND	330						0	0	20	
Pyrene	ND	330						0	0	20	
Surr: 1,2-Dichlorobenzene-d4	2660.000		3330		79.9	49	103		0	0	
Surr: 2,4,6-Tribromophenol	3134.000		3330		94.1	47	129		0	0	
Surr: 2-Chlorophenol-d4	2967.000		3330		89.1	54	109		0	0	
Surr: 2-Fluorobiphenyl	3028.333		3330		90.9	59	108		0	0	
Surr: 2-Fluorophenol	2967.000		3330		89.1	50	111		0	0	
Surr: 4-Terphenyl-d14	3891.333		3330		117	58	135		0	0	
Surr: Nitrobenzene-d5	2862.333		3330		86.0	54	115		0	0	
Surr: Phenol-d5	3039.000		3330		91.3	58	112		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CHAIN OF CUSTODY RECORD

Pg 1 of 1

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#: _____
Logged By: _____ Date: 3/23/09

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: GSO

Sample Condition Upon Receipt: 3.4
1. CHILLED Y☐ N☐ 4. SEALED Y☐ N☐
2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐
3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client: Geocon Consultants, Inc.
Attn: John Love
Address: 6671 Brisa St.
City Livermore State CA Zip Code 94550
TEL: (925) 371-5900
FAX: (925) 371-5915

Project Name: Caltrans - Dumbarton Bridge
Project #: E8435-06-18
Sampler: (Printed Name) John Love (Signature)

Relinquished by: (Signature and Printed Name) John Love	Date: 3/20/09	Time: 16:00	Received by: (Signature and Printed Name)	Date: 3/21/09	Time: 8:30
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
John Love 3/20/09
Print Name Date
Signature

Send Report To:
Attn: _____
Co: same as above
Address _____
City _____ State _____ Zip _____

Bill To:
Attn: _____
Co: same as above
Address _____
City _____ State _____ Zip _____

Special Instructions/Comments:
silica gel cleanup (8015B)

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	6010B (Total Metal)	8015B (GRO) / 8020 (BTEX)	8015B (DRO)	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	TPHd + TPHmo w/silica gel (8270C)	SVOCs (8270C)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	104674 1	E5B (0')	3/19/09	10:35									X	X	X	X					E	1	T P		
	2	E5B (5')		10:40									X	X	X	X									
	3	E5B (10')		10:48									X	X	X	X									
	4	E5B (15')		10:52									X	X	X	X									
	5	E15B (0')		11:16									X	X	X	X									
	6	E15B (5')		11:19									X	X	X	X									
	7	E15B (10')		11:25									X	X	X	X									

QA/QC: RTNE ☐ CT ☐ SWRCB ☐ Logcode ____ OTHER ____

- TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=Zn(AC)$_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: White with report, Yellow to folder, Pink to submitter.

June 09, 2009

John Love
Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550

TEL: (925) 525-4142
FAX: (925) 371-5915

ELAP No.: 1838
NELAP No.: 02107CA
NEVADA.: CA-401
CSDLAC No.: 10196

Workorder No.: 104674

RE: Caltrans Dumbarton Bridge, E8435-06-18

Attention: John Love

Enclosed are the results for sample(s) received on March 21, 2009 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

This is an addendum report. Please incorporate with documentation previously submitted.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

CLIENT: Geocon Consultants, Inc.
Project: Caltrans Dumbarton Bridge, E8435-06-18
Lab Order: 104674

CASE NARRATIVE

Results were J-Flag. "J" is used to flag those results that are between the PQL (Practical Quantitation Limit) and the calculated MDL (Method Detection Limit). Results that are "J" Flagged are estimated values since it becomes difficult to accurately quantitate the analyte near the MDL.

Analytical Comments for Method 6010

Dilution was necessary for samples 104674-001A and 104674-002A, due to sample matrix.

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E5B (0')
Lab Order:	104674	**Collection Date:**	3/19/2009 10:38:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104674-001A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC							
			WET/ EPA 6010B				
RunID: **ICP8_090608C**	QC Batch: **R109661**				PrepDate:		Analyst: **CL**
Lead	2.5	0.042	1.0		mg/L	20	6/8/2009 03:46 PM
Vanadium	0.13	0.010	1.0	J	mg/L	20	6/8/2009 03:46 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E5B (5')
Lab Order:	104674	**Collection Date:**	3/19/2009 10:40:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104674-002A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC							
			WET/ EPA 6010B				
RunID: **ICP8_090608C**	QC Batch: **R109661**				PrepDate:		Analyst: **CL**
Arsenic	0.12	0.088	1.0	J	mg/L	20	6/8/2009 03:50 PM
Chromium	0.063	0.018	1.0	J	mg/L	20	6/8/2009 03:50 PM
Vanadium	0.15	0.010	1.0	J	mg/L	20	6/8/2009 03:50 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT: Geocon Consultants, Inc.
Work Order: 104674
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_ST

Sample ID: **MB-55695A** SampType: **MBLK** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **PBS** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722211**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	0.050									
Chromium	ND	0.050									
Lead	0.004	0.050									
Vanadium	ND	0.050									

Sample ID: **LCS-55695** SampType: **LCS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **LCSS** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722212**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	1.000	0.050	1.000	0	100	85	115				
Chromium	0.919	0.050	1.000	0	91.9	85	115				
Lead	1.021	0.050	1.000	0.003711	102	85	115				
Vanadium	1.004	0.050	1.000	0	100	85	115				

Sample ID: **104787-004ADUP** SampType: **DUP** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **ZZZZZZ** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722223**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	1.0						0	0	20	
Chromium	0.068	1.0						0.1096	0	20	
Lead	ND	1.0						0	0	20	
Vanadium	0.204	1.0						0.2437	0	20	

Sample ID: **104787-004AMS** SampType: **MS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **ZZZZZZ** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722224**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	2.575	1.0	2.500	0	103	66	128				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104674
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_ST

Sample ID: **104787-004AMS** SampType: **MS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **ZZZZZZ** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722224**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	2.444	1.0	2.500	0.1096	93.4	77	116				
Lead	2.320	1.0	2.500	0	92.8	71	121				
Vanadium	2.743	1.0	2.500	0.2437	100	79	118				

Sample ID: **MB-55695B** SampType: **MBLK** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **PBS** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722225**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	0.050									
Chromium	ND	0.050									
Lead	ND	0.050									
Vanadium	ND	0.050									

Sample ID: **104789-008ADUP** SampType: **DUP** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **ZZZZZZ** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722236**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	1.0						0	0	20	
Chromium	0.235	1.0						0.2217	0	20	
Lead	ND	1.0						0	0	20	
Vanadium	0.470	1.0						0.4639	0	20	

Sample ID: **104789-008AMS** SampType: **MS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **ZZZZZZ** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722237**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	2.584	1.0	2.500	0	103	66	128				
Chromium	2.649	1.0	2.500	0.2217	97.1	77	116				
Lead	2.522	1.0	2.500	0	101	71	121				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104674
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_ST

Sample ID: **104789-008AMS** SampType: **MS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **ZZZZZZ** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722237**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Vanadium	2.991	1.0	2.500	0.4639	101	79	118				

Sample ID: **104789-008AMSD** SampType: **MSD** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **ZZZZZZ** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722238**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	2.571	1.0	2.500	0	103	66	128	2.584	0.510	20	
Chromium	2.612	1.0	2.500	0.2217	95.6	77	116	2.649	1.40	20	
Lead	2.484	1.0	2.500	0	99.4	71	121	2.522	1.49	20	
Vanadium	2.980	1.0	2.500	0.4639	101	79	118	2.991	0.375	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

Diane Galvan

From: John Love [love@geoconinc.com]
Sent: Wednesday, June 03, 2009 10:50 AM
To: Diane Galvan
Subject: WET Request
Attachments: COC Caltrans Dumbarton Bridge.pdf

Hi Diane:

Caltrans would like to run a waste extraction test on several samples for select metals from the Dumbarton Bridge project. I've attached the COCs for the samples they wanted analyzed for STLC. Let me know if you have any questions.

Thanks Diane.

John Love
Sr. Project Geologist

Please visit our new website at http://www.geoconinc.com

GEOCON Incorporated
6671 Brisa Street
Livermore, CA 94550
Tel (925) 371-5900

GEOTECHNICAL - ENVIRONMENTAL - MATERIALS

San Diego Murrieta Burbank San Bernardino Bakersfield Sacramento Livermore Carson City Las Vegas Portland

CONFIDENTIALITY NOTICE: This e-mail may contain confidential and privileged material for the sole use of the intended recipient(s). Any review, use, distribution or disclosure by others is strictly prohibited. If you have received this communication in error, please notify the sender immediately by e-mail and delete the message and any file attachments from your computer. Thank you.

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#: _____

Logged By: _____ Date: _____

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: _____

Sample Condition Upon Receipt: 1. CHILLED Y☐ N☐ 4. SEALED Y☐ N☐ 2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐ 3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client: Geocon Consultants, Inc. Address: 6671 Brisa St. TEL: (925) 371-5900
Attn: John Love City Livermore State CA Zip Code 94550 FAX: (925) 371-5915

Project Name: Caltrans - Dumbarton Bridge Project #: E8435-06-18 Sampler: (Printed Name) John Love (Signature)

Relinquished by: (Signature and Printed Name) John Love	Date: 6/3/09	Time:	Received by: (Signature and Printed Name)	Date: Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date: Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date: Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: John Love 6/3/09 (Print Name / Date) (Signature)

Send Report To: Attn: _____ Co: same as above Address _____ City _____ State _____ Zip _____

Bill To: Attn: _____ Co: same as above Address _____ City _____ State _____ Zip _____

Special Instructions/Comments:

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

Circle or Add Analysis(es) Requested

SPECIFY APPROPRIATE MATRIX

PRESERVATION

Q A / Q C: RTNE ☐ CT ☐ SWRCB ☐ Logcode _____ OTHER _____

ITEM	LAB USE ONLY: Batch # / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	8010B (Total Metal)	8015B (GRO) / 8020 (BTEX)	8015B (DRO)	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	V: (WET)	As: (WET)	Cr: (WET)	Pb: (WET)	Hg: (WET)	Ni: (WET)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	REMARKS
		ESA (5')	3/24/09									X		X	X				X					E	1	T P	
		ESB (0')										X				X			X								
		ESB (5')										X		X	X				X								
		E10BGW (0')										X				X			X								
		E10BGW (5')										X		X	X				X								
		E15A (5')										X		x	x			X	X								
		E20AGW (5')										X			X				X								
		~~E8GW~~ E20BGW (5')										X		x	x				X								
		WSA (5')										X		x	x			X	X								
		W10AGW (5')										X			X			X	X								

* TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=Hcl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter.

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#: _____

Logged By: _____ Date: _____

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: _____

Sample Condition Upon Receipt
1. CHILLED Y☐ N☐ 4. SEALED Y☐ N☐
2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐
3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client:
Attn:
Address: 6671 Brisa St.
City Livermore State CA Zip Code 94550
TEL: (925) 371-5900
FAX: (925) 371-5915

Project Name: Caltrans- Dumbarton Bridge Project #: E8435-06-18 Sampler: (Printed Name) John Love (Signature)

Relinquished by: (Signature and Printed Name) John Love	Date: 6/3/09	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
John Love 6/3/09 (Print Name / Date)
(Signature)

Send Report To:
Attn: _____
Co: same as above
Address _____
City _____ State ____ Zip ____

Bill To:
Attn: _____
Co: same as above
Address _____
City _____ State ____ Zip ____

Special Instructions/Comments:

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
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- Records : $1.00 / ATL workorder / mo (after 1 year)

Circle or Add Analysis(es) Requested

SPECIFY APPROPRIATE MATRIX

PRESERVATION

Q A / Q C
RTNE ☐ CT ☐ SWRCB ☐ Logcode ____ OTHER ____

ITEM	LAB USE ONLY: Batch # / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	8010B (Total Metals)	8015B (GRO) / 8020 (BTEX)	8015B (DRO)	TITLE 22 / CAM 17 (6010 / 7000)	As (WET)	Cr (WET)	Pb (WET)	Hg (WET)	Ni (WET)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	REMARKS
		W10B (0')	3/4/01							X			X				X						E	1	T P	
		W15BGW (0')								X			X				X									
		W20AGW (5')								X			X				X									
		W20B (0')								X			X				X									
		FW1 (0')								X					X		X							T m	
		FW1 (2')								X			X				X									
		FW2 (0')								X			X				X									
		FW2 (2')								X					X		X									
		FW3 (0')								X			X				X									
		FW3 (2')								X			X				X									

• TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=Hcl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: White with report, Yellow to folder, Pink to submitter.

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#: _____

Logged By: _____ Date: _____

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: _____

Sample Condition Upon Receipt: 1. CHILLED Y☐ N☐ 4. SEALED Y☐ N☐ 2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐ 3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client: ~~Caltrans - Dumbarton Bridge~~ Geocon Consultants
Attn: John Love
Address: 6671 Brisa St.
City Livermore State CA Zip Code
TEL: (925) 371-5900
FAX: (925) 371-5915

Project Name: Caltrans - Dumbarton Bridge Project #: E8435-06-18 Sampler: (Printed Name) John Love (Signature)

Relinquished by: (Signature and Printed Name) John Love	Date: 6/3/09	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
John Love 6/3/09
Print Name Date
Signature

Send Report To:
Attn: _____
Co: same as above
Address _____
City _____ State ____ Zip ____

Bill To:
Attn: _____
Co: same as above
Address _____
City _____ State ____ Zip ____

Special Instructions/Comments:

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time
		FW4 (0')	3/2/09	
		FW4 (2')	↓	

Circle or Add Analysis(es) Requested

8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	8010B (Total Metals)	8015B (GRO) / 8020 (BTEX)	8015B (DRO)	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	VA (WET)	CC (WET)	Hg (WET)	PB (WET)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
								X	X	X	X		X				E	1	T M		
								X	X	X			X				↓	↓	↓ ↓		

SPECIFY APPROPRIATE MATRIX

QA/QC: RTNE ☐ CT ☐ SWRCB ☐ Logcode ____ OTHER ____

- TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter.

March 31, 2009

John Love
Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550
TEL: (925) 525-4142
FAX: (925) 371-5915

ELAP No.: 1838
NELAP No.: 02107CA
NEVADA.: CA-401
CSDLAC No.: 10196

Workorder No.: 104675

RE: Caltrans Dumbarton Bridge, E8435-06-18

Attention: John Love

Enclosed are the results for sample(s) received on March 21, 2009 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter and the case narrative are an integral part of this analytical report and cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Project: Caltrans Dumbarton Bridge, E8435-06-18
Lab Order: 104675

CASE NARRATIVE

Analytical Comments for Method 8015 (DRO/ORO)

Dilution was necessary for samples 104675-001A and 104675-005A, due to sample matrix.

Matrix Spike (MS) and /or Matrix Spike Duplicate (MSD) are/is outside recovery criteria for sample 104675-001AMS; however, the analytical batch was validated by the Laboratory Control Sample (LCS).

RPD for Duplicate (DUP) and/or Matrix Spike (MS)/Matrix Spike Duplicate (MSD) is outside criteria for samples 104675-001ADUP and 104675-001AMSD; however, the Laboratory Control Sample (LCS) validated the analytical batch.

Analytical Comments for Method 8270

Dilution was necessary for sample 104675-001A, due to sample matrix.

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E20GW (0')
Lab Order:	104675	**Collection Date:**	3/19/2009 7:58:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104675-001A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090327J	QC Batch: 54286			PrepDate:	3/27/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	3/27/2009 09:01 PM
Arsenic	ND	1.0		mg/Kg	1	3/27/2009 09:01 PM
Barium	100	1.0		mg/Kg	1	3/27/2009 09:01 PM
Beryllium	ND	1.0		mg/Kg	1	3/27/2009 09:01 PM
Cadmium	ND	1.0		mg/Kg	1	3/27/2009 09:01 PM
Chromium	33	1.0		mg/Kg	1	3/27/2009 09:01 PM
Cobalt	9.7	1.0		mg/Kg	1	3/27/2009 09:01 PM
Copper	28	2.0		mg/Kg	1	3/27/2009 09:01 PM
Lead	5.8	1.0		mg/Kg	1	3/27/2009 09:01 PM
Molybdenum	ND	1.0		mg/Kg	1	3/27/2009 09:01 PM
Nickel	39	1.0		mg/Kg	1	3/27/2009 09:01 PM
Selenium	ND	1.0		mg/Kg	1	3/27/2009 09:01 PM
Silver	ND	1.0		mg/Kg	1	3/27/2009 09:01 PM
Thallium	ND	1.0		mg/Kg	1	3/27/2009 09:01 PM
Vanadium	41	1.0		mg/Kg	1	3/27/2009 09:01 PM
Zinc	34	1.0		mg/Kg	1	3/27/2009 09:01 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090327A	QC Batch: 54207			PrepDate:	3/25/2009	Analyst: **CBR**
DRO	40	10		mg/Kg	10	3/27/2009 10:28 AM
ORO	190	10		mg/Kg	10	3/27/2009 10:28 AM
Surr: p-Terphenyl	41.9	30-130		%REC	10	3/27/2009 10:28 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090327E	QC Batch: 54282			PrepDate:	3/27/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	3/27/2009 03:33 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090326A	QC Batch: 54259			PrepDate:	3/26/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
1,2-Dichlorobenzene	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
1,3-Dichlorobenzene	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
1,4-Dichlorobenzene	ND	1600		µg/Kg	5	3/27/2009 02:21 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E20GW (0')
Lab Order:	104675	**Collection Date:**	3/19/2009 7:58:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104675-001A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090326A QC Batch: 54259 PrepDate: 3/26/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
2,4,6-Trichlorophenol	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
2,4-Dichlorophenol	ND	8200		µg/Kg	5	3/27/2009 02:21 AM
2,4-Dimethylphenol	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
2,4-Dinitrophenol	ND	8200		µg/Kg	5	3/27/2009 02:21 AM
2,4-Dinitrotoluene	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
2,6-Dinitrotoluene	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
2-Chloronaphthalene	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
2-Chlorophenol	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
2-Methylnaphthalene	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
2-Methylphenol	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
2-Nitroaniline	ND	8200		µg/Kg	5	3/27/2009 02:21 AM
2-Nitrophenol	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
3,3´-Dichlorobenzidine	ND	3300		µg/Kg	5	3/27/2009 02:21 AM
3-Nitroaniline	ND	8200		µg/Kg	5	3/27/2009 02:21 AM
4,6-Dinitro-2-methylphenol	ND	8200		µg/Kg	5	3/27/2009 02:21 AM
4-Bromophenyl-phenylether	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
4-Chloro-3-methylphenol	ND	3300		µg/Kg	5	3/27/2009 02:21 AM
4-Chloroaniline	ND	3300		µg/Kg	5	3/27/2009 02:21 AM
4-Chlorophenyl-phenylether	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
4-Methylphenol	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
4-Nitroaniline	ND	8200		µg/Kg	5	3/27/2009 02:21 AM
4-Nitrophenol	ND	8200		µg/Kg	5	3/27/2009 02:21 AM
Acenaphthene	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
Acenaphthylene	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
Anthracene	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
Benzidine (M)	ND	8200		µg/Kg	5	3/27/2009 02:21 AM
Benzo(a)anthracene	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
Benzo(a)pyrene	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
Benzo(b)fluoranthene	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
Benzo(g,h,i)perylene	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
Benzo(k)fluoranthene	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
Benzoic acid	ND	8200		µg/Kg	5	3/27/2009 02:21 AM
Benzyl alcohol	ND	3300		µg/Kg	5	3/27/2009 02:21 AM
Bis(2-chloroethoxy)methane	ND	1600		µg/Kg	5	3/27/2009 02:21 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E20GW (0')
Lab Order:	104675	**Collection Date:**	3/19/2009 7:58:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104675-001A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090326A QC Batch: 54259 PrepDate: 3/26/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
Bis(2-chloroisopropyl)ether	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
Bis(2-ethylhexyl)phthalate	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
Butylbenzylphthalate	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
Chrysene	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
Di-n-butylphthalate	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
Di-n-octylphthalate	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
Dibenz(a,h)anthracene	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
Dibenzofuran	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
Diethylphthalate	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
Dimethylphthalate	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
Fluoranthene	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
Fluorene	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
Hexachlorobenzene	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
Hexachlorobutadiene	ND	3300		µg/Kg	5	3/27/2009 02:21 AM
Hexachlorocyclopentadiene	ND	3300		µg/Kg	5	3/27/2009 02:21 AM
Hexachloroethane	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
Indeno(1,2,3-cd)pyrene	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
Isophorone	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
N-Nitrosodi-n-propylamine	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
N-Nitrosodiphenylamine	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
Naphthalene	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
Nitrobenzene	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
Pentachlorophenol	ND	8200		µg/Kg	5	3/27/2009 02:21 AM
Phenanthrene	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
Phenol	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
Pyrene	ND	1600		µg/Kg	5	3/27/2009 02:21 AM
Surr: 1,2-Dichlorobenzene-d4	71.9	49-103		%REC	5	3/27/2009 02:21 AM
Surr: 2,4,6-Tribromophenol	66.5	47-129		%REC	5	3/27/2009 02:21 AM
Surr: 2-Chlorophenol-d4	79.9	54-109		%REC	5	3/27/2009 02:21 AM
Surr: 2-Fluorobiphenyl	83.3	59-108		%REC	5	3/27/2009 02:21 AM
Surr: 2-Fluorophenol	74.9	50-111		%REC	5	3/27/2009 02:21 AM
Surr: 4-Terphenyl-d14	91.7	58-135		%REC	5	3/27/2009 02:21 AM
Surr: Nitrobenzene-d5	79.0	54-115		%REC	5	3/27/2009 02:21 AM
Surr: Phenol-d5	78.7	58-112		%REC	5	3/27/2009 02:21 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E20BGW (5')
Lab Order:	104675	**Collection Date:**	3/19/2009 8:02:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104675-002A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090327J	QC Batch: 54286			PrepDate:	3/27/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	3/27/2009 09:04 PM
Arsenic	4.7	1.0		mg/Kg	1	3/27/2009 09:04 PM
Barium	230	1.0		mg/Kg	1	3/27/2009 09:04 PM
Beryllium	ND	1.0		mg/Kg	1	3/27/2009 09:04 PM
Cadmium	ND	1.0		mg/Kg	1	3/27/2009 09:04 PM
Chromium	53	1.0		mg/Kg	1	3/27/2009 09:04 PM
Cobalt	12	1.0		mg/Kg	1	3/27/2009 09:04 PM
Copper	33	2.0		mg/Kg	1	3/27/2009 09:04 PM
Lead	5.8	1.0		mg/Kg	1	3/27/2009 09:04 PM
Molybdenum	ND	1.0		mg/Kg	1	3/27/2009 09:04 PM
Nickel	77	1.0		mg/Kg	1	3/27/2009 09:04 PM
Selenium	ND	1.0		mg/Kg	1	3/27/2009 09:04 PM
Silver	ND	1.0		mg/Kg	1	3/27/2009 09:04 PM
Thallium	ND	1.0		mg/Kg	1	3/27/2009 09:04 PM
Vanadium	36	1.0		mg/Kg	1	3/27/2009 09:04 PM
Zinc	48	1.0		mg/Kg	1	3/27/2009 09:04 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090327A	QC Batch: 54207			PrepDate:	3/25/2009	Analyst: **CBR**
DRO	1.3	1.0		mg/Kg	1	3/27/2009 09:27 AM
ORO	1.4	1.0		mg/Kg	1	3/27/2009 09:27 AM
Surr: p-Terphenyl	87.7	30-130		%REC	1	3/27/2009 09:27 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090327E	QC Batch: 54282			PrepDate:	3/27/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	3/27/2009 03:35 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090326A	QC Batch: 54259			PrepDate:	3/26/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	3/26/2009 08:49 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	3/26/2009 08:49 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	3/26/2009 08:49 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	3/26/2009 08:49 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E20BGW (5')
Lab Order:	104675	**Collection Date:**	3/19/2009 8:02:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104675-002A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090326A QC Batch: 54259 PrepDate: 3/26/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	3/26/2009 08:49 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	3/26/2009 08:49 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	3/26/2009 08:49 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	3/26/2009 08:49 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	3/26/2009 08:49 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	3/26/2009 08:49 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	3/26/2009 08:49 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	3/26/2009 08:49 PM
2-Chlorophenol	ND	330		µg/Kg	1	3/26/2009 08:49 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	3/26/2009 08:49 PM
2-Methylphenol	ND	330		µg/Kg	1	3/26/2009 08:49 PM
2-Nitroaniline	ND	1600		µg/Kg	1	3/26/2009 08:49 PM
2-Nitrophenol	ND	330		µg/Kg	1	3/26/2009 08:49 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	3/26/2009 08:49 PM
3-Nitroaniline	ND	1600		µg/Kg	1	3/26/2009 08:49 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	3/26/2009 08:49 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	3/26/2009 08:49 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	3/26/2009 08:49 PM
4-Chloroaniline	ND	660		µg/Kg	1	3/26/2009 08:49 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	3/26/2009 08:49 PM
4-Methylphenol	ND	330		µg/Kg	1	3/26/2009 08:49 PM
4-Nitroaniline	ND	1600		µg/Kg	1	3/26/2009 08:49 PM
4-Nitrophenol	ND	1600		µg/Kg	1	3/26/2009 08:49 PM
Acenaphthene	ND	330		µg/Kg	1	3/26/2009 08:49 PM
Acenaphthylene	ND	330		µg/Kg	1	3/26/2009 08:49 PM
Anthracene	ND	330		µg/Kg	1	3/26/2009 08:49 PM
Benzidine (M)	ND	1600		µg/Kg	1	3/26/2009 08:49 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	3/26/2009 08:49 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	3/26/2009 08:49 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	3/26/2009 08:49 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	3/26/2009 08:49 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	3/26/2009 08:49 PM
Benzoic acid	ND	1600		µg/Kg	1	3/26/2009 08:49 PM
Benzyl alcohol	ND	660		µg/Kg	1	3/26/2009 08:49 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	3/26/2009 08:49 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E20BGW (5')
Lab Order:	104675	**Collection Date:**	3/19/2009 8:02:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104675-002A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090326A QC Batch: 54259 PrepDate: 3/26/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	3/26/2009 08:49 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	3/26/2009 08:49 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	3/26/2009 08:49 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	3/26/2009 08:49 PM
Chrysene	ND	330		µg/Kg	1	3/26/2009 08:49 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	3/26/2009 08:49 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	3/26/2009 08:49 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	3/26/2009 08:49 PM
Dibenzofuran	ND	330		µg/Kg	1	3/26/2009 08:49 PM
Diethylphthalate	ND	330		µg/Kg	1	3/26/2009 08:49 PM
Dimethylphthalate	ND	330		µg/Kg	1	3/26/2009 08:49 PM
Fluoranthene	ND	330		µg/Kg	1	3/26/2009 08:49 PM
Fluorene	ND	330		µg/Kg	1	3/26/2009 08:49 PM
Hexachlorobenzene	ND	330		µg/Kg	1	3/26/2009 08:49 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	3/26/2009 08:49 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	3/26/2009 08:49 PM
Hexachloroethane	ND	330		µg/Kg	1	3/26/2009 08:49 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	3/26/2009 08:49 PM
Isophorone	ND	330		µg/Kg	1	3/26/2009 08:49 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	3/26/2009 08:49 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	3/26/2009 08:49 PM
Naphthalene	ND	330		µg/Kg	1	3/26/2009 08:49 PM
Nitrobenzene	ND	330		µg/Kg	1	3/26/2009 08:49 PM
Pentachlorophenol	ND	1600		µg/Kg	1	3/26/2009 08:49 PM
Phenanthrene	ND	330		µg/Kg	1	3/26/2009 08:49 PM
Phenol	ND	330		µg/Kg	1	3/26/2009 08:49 PM
Pyrene	ND	330		µg/Kg	1	3/26/2009 08:49 PM
Surr: 1,2-Dichlorobenzene-d4	79.0	49-103		%REC	1	3/26/2009 08:49 PM
Surr: 2,4,6-Tribromophenol	96.1	47-129		%REC	1	3/26/2009 08:49 PM
Surr: 2-Chlorophenol-d4	89.0	54-109		%REC	1	3/26/2009 08:49 PM
Surr: 2-Fluorobiphenyl	89.9	59-108		%REC	1	3/26/2009 08:49 PM
Surr: 2-Fluorophenol	89.3	50-111		%REC	1	3/26/2009 08:49 PM
Surr: 4-Terphenyl-d14	117	58-135		%REC	1	3/26/2009 08:49 PM
Surr: Nitrobenzene-d5	86.7	54-115		%REC	1	3/26/2009 08:49 PM
Surr: Phenol-d5	91.1	58-112		%REC	1	3/26/2009 08:49 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E20BGW (10')
Lab Order:	104675	**Collection Date:**	3/19/2009 8:10:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104675-003A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090327J	QC Batch: 54286			PrepDate:	3/27/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	3/27/2009 09:15 PM
Arsenic	4.9	1.0		mg/Kg	1	3/27/2009 09:15 PM
Barium	120	1.0		mg/Kg	1	3/27/2009 09:15 PM
Beryllium	ND	1.0		mg/Kg	1	3/27/2009 09:15 PM
Cadmium	ND	1.0		mg/Kg	1	3/27/2009 09:15 PM
Chromium	58	1.0		mg/Kg	1	3/27/2009 09:15 PM
Cobalt	11	1.0		mg/Kg	1	3/27/2009 09:15 PM
Copper	25	2.0		mg/Kg	1	3/27/2009 09:15 PM
Lead	6.3	1.0		mg/Kg	1	3/27/2009 09:15 PM
Molybdenum	ND	1.0		mg/Kg	1	3/27/2009 09:15 PM
Nickel	87	1.0		mg/Kg	1	3/27/2009 09:15 PM
Selenium	ND	1.0		mg/Kg	1	3/27/2009 09:15 PM
Silver	ND	1.0		mg/Kg	1	3/27/2009 09:15 PM
Thallium	ND	1.0		mg/Kg	1	3/27/2009 09:15 PM
Vanadium	30	1.0		mg/Kg	1	3/27/2009 09:15 PM
Zinc	50	1.0		mg/Kg	1	3/27/2009 09:15 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090327A	QC Batch: 54207			PrepDate:	3/25/2009	Analyst: **CBR**
DRO	ND	1.0		mg/Kg	1	3/27/2009 08:59 AM
ORO	ND	1.0		mg/Kg	1	3/27/2009 08:59 AM
Surr: p-Terphenyl	82.6	30-130		%REC	1	3/27/2009 08:59 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090327E	QC Batch: 54282			PrepDate:	3/27/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	3/27/2009 03:37 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090326A	QC Batch: 54259			PrepDate:	3/26/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	3/26/2009 08:22 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	3/26/2009 08:22 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	3/26/2009 08:22 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	3/26/2009 08:22 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E20BGW (10')
Lab Order:	104675	**Collection Date:**	3/19/2009 8:10:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104675-003A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090326A QC Batch: 54259 PrepDate: 3/26/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	3/26/2009 08:22 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	3/26/2009 08:22 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	3/26/2009 08:22 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	3/26/2009 08:22 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	3/26/2009 08:22 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	3/26/2009 08:22 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	3/26/2009 08:22 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	3/26/2009 08:22 PM
2-Chlorophenol	ND	330		µg/Kg	1	3/26/2009 08:22 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	3/26/2009 08:22 PM
2-Methylphenol	ND	330		µg/Kg	1	3/26/2009 08:22 PM
2-Nitroaniline	ND	1600		µg/Kg	1	3/26/2009 08:22 PM
2-Nitrophenol	ND	330		µg/Kg	1	3/26/2009 08:22 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	3/26/2009 08:22 PM
3-Nitroaniline	ND	1600		µg/Kg	1	3/26/2009 08:22 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	3/26/2009 08:22 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	3/26/2009 08:22 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	3/26/2009 08:22 PM
4-Chloroaniline	ND	660		µg/Kg	1	3/26/2009 08:22 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	3/26/2009 08:22 PM
4-Methylphenol	ND	330		µg/Kg	1	3/26/2009 08:22 PM
4-Nitroaniline	ND	1600		µg/Kg	1	3/26/2009 08:22 PM
4-Nitrophenol	ND	1600		µg/Kg	1	3/26/2009 08:22 PM
Acenaphthene	ND	330		µg/Kg	1	3/26/2009 08:22 PM
Acenaphthylene	ND	330		µg/Kg	1	3/26/2009 08:22 PM
Anthracene	ND	330		µg/Kg	1	3/26/2009 08:22 PM
Benzidine (M)	ND	1600		µg/Kg	1	3/26/2009 08:22 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	3/26/2009 08:22 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	3/26/2009 08:22 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	3/26/2009 08:22 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	3/26/2009 08:22 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	3/26/2009 08:22 PM
Benzoic acid	ND	1600		µg/Kg	1	3/26/2009 08:22 PM
Benzyl alcohol	ND	660		µg/Kg	1	3/26/2009 08:22 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	3/26/2009 08:22 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E20BGW (10')
Lab Order:	104675	**Collection Date:**	3/19/2009 8:10:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104675-003A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090326A QC Batch: 54259 PrepDate: 3/26/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	3/26/2009 08:22 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	3/26/2009 08:22 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	3/26/2009 08:22 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	3/26/2009 08:22 PM
Chrysene	ND	330		µg/Kg	1	3/26/2009 08:22 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	3/26/2009 08:22 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	3/26/2009 08:22 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	3/26/2009 08:22 PM
Dibenzofuran	ND	330		µg/Kg	1	3/26/2009 08:22 PM
Diethylphthalate	ND	330		µg/Kg	1	3/26/2009 08:22 PM
Dimethylphthalate	ND	330		µg/Kg	1	3/26/2009 08:22 PM
Fluoranthene	ND	330		µg/Kg	1	3/26/2009 08:22 PM
Fluorene	ND	330		µg/Kg	1	3/26/2009 08:22 PM
Hexachlorobenzene	ND	330		µg/Kg	1	3/26/2009 08:22 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	3/26/2009 08:22 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	3/26/2009 08:22 PM
Hexachloroethane	ND	330		µg/Kg	1	3/26/2009 08:22 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	3/26/2009 08:22 PM
Isophorone	ND	330		µg/Kg	1	3/26/2009 08:22 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	3/26/2009 08:22 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	3/26/2009 08:22 PM
Naphthalene	ND	330		µg/Kg	1	3/26/2009 08:22 PM
Nitrobenzene	ND	330		µg/Kg	1	3/26/2009 08:22 PM
Pentachlorophenol	ND	1600		µg/Kg	1	3/26/2009 08:22 PM
Phenanthrene	ND	330		µg/Kg	1	3/26/2009 08:22 PM
Phenol	ND	330		µg/Kg	1	3/26/2009 08:22 PM
Pyrene	ND	330		µg/Kg	1	3/26/2009 08:22 PM
Surr: 1,2-Dichlorobenzene-d4	74.7	49-103		%REC	1	3/26/2009 08:22 PM
Surr: 2,4,6-Tribromophenol	87.3	47-129		%REC	1	3/26/2009 08:22 PM
Surr: 2-Chlorophenol-d4	84.3	54-109		%REC	1	3/26/2009 08:22 PM
Surr: 2-Fluorobiphenyl	85.8	59-108		%REC	1	3/26/2009 08:22 PM
Surr: 2-Fluorophenol	84.5	50-111		%REC	1	3/26/2009 08:22 PM
Surr: 4-Terphenyl-d14	107	58-135		%REC	1	3/26/2009 08:22 PM
Surr: Nitrobenzene-d5	83.2	54-115		%REC	1	3/26/2009 08:22 PM
Surr: Phenol-d5	85.5	58-112		%REC	1	3/26/2009 08:22 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT: Geocon Consultants, Inc. **Client Sample ID:** E20BGW (15')
Lab Order: 104675 **Collection Date:** 3/19/2009 8:15:00 AM
Project: Caltrans Dumbarton Bridge, E8435-06-18 **Matrix:** SOIL
Lab ID: 104675-004A

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090327J	QC Batch: 54286			PrepDate:	3/27/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	3/27/2009 09:18 PM
Arsenic	4.1	1.0		mg/Kg	1	3/27/2009 09:18 PM
Barium	23	1.0		mg/Kg	1	3/27/2009 09:18 PM
Beryllium	ND	1.0		mg/Kg	1	3/27/2009 09:18 PM
Cadmium	ND	1.0		mg/Kg	1	3/27/2009 09:18 PM
Chromium	37	1.0		mg/Kg	1	3/27/2009 09:18 PM
Cobalt	6.7	1.0		mg/Kg	1	3/27/2009 09:18 PM
Copper	13	2.0		mg/Kg	1	3/27/2009 09:18 PM
Lead	4.1	1.0		mg/Kg	1	3/27/2009 09:18 PM
Molybdenum	ND	1.0		mg/Kg	1	3/27/2009 09:18 PM
Nickel	41	1.0		mg/Kg	1	3/27/2009 09:18 PM
Selenium	ND	1.0		mg/Kg	1	3/27/2009 09:18 PM
Silver	ND	1.0		mg/Kg	1	3/27/2009 09:18 PM
Thallium	ND	1.0		mg/Kg	1	3/27/2009 09:18 PM
Vanadium	30	1.0		mg/Kg	1	3/27/2009 09:18 PM
Zinc	41	1.0		mg/Kg	1	3/27/2009 09:18 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090327A	QC Batch: 54207			PrepDate:	3/25/2009	Analyst: **CBR**
DRO	1.4	1.0		mg/Kg	1	3/27/2009 09:18 AM
ORO	1.1	1.0		mg/Kg	1	3/27/2009 09:18 AM
Surr: p-Terphenyl	88.2	30-130		%REC	1	3/27/2009 09:18 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090327E	QC Batch: 54282			PrepDate:	3/27/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	3/27/2009 03:39 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090326A	QC Batch: 54259			PrepDate:	3/26/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	3/26/2009 09:17 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	3/26/2009 09:17 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	3/26/2009 09:17 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	3/26/2009 09:17 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E20BGW (15')
Lab Order:	104675	**Collection Date:**	3/19/2009 8:15:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104675-004A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090326A QC Batch: 54259 PrepDate: 3/26/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	3/26/2009 09:17 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	3/26/2009 09:17 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	3/26/2009 09:17 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	3/26/2009 09:17 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	3/26/2009 09:17 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	3/26/2009 09:17 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	3/26/2009 09:17 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	3/26/2009 09:17 PM
2-Chlorophenol	ND	330		µg/Kg	1	3/26/2009 09:17 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	3/26/2009 09:17 PM
2-Methylphenol	ND	330		µg/Kg	1	3/26/2009 09:17 PM
2-Nitroaniline	ND	1600		µg/Kg	1	3/26/2009 09:17 PM
2-Nitrophenol	ND	330		µg/Kg	1	3/26/2009 09:17 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	3/26/2009 09:17 PM
3-Nitroaniline	ND	1600		µg/Kg	1	3/26/2009 09:17 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	3/26/2009 09:17 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	3/26/2009 09:17 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	3/26/2009 09:17 PM
4-Chloroaniline	ND	660		µg/Kg	1	3/26/2009 09:17 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	3/26/2009 09:17 PM
4-Methylphenol	ND	330		µg/Kg	1	3/26/2009 09:17 PM
4-Nitroaniline	ND	1600		µg/Kg	1	3/26/2009 09:17 PM
4-Nitrophenol	ND	1600		µg/Kg	1	3/26/2009 09:17 PM
Acenaphthene	ND	330		µg/Kg	1	3/26/2009 09:17 PM
Acenaphthylene	ND	330		µg/Kg	1	3/26/2009 09:17 PM
Anthracene	ND	330		µg/Kg	1	3/26/2009 09:17 PM
Benzidine (M)	ND	1600		µg/Kg	1	3/26/2009 09:17 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	3/26/2009 09:17 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	3/26/2009 09:17 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	3/26/2009 09:17 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	3/26/2009 09:17 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	3/26/2009 09:17 PM
Benzoic acid	ND	1600		µg/Kg	1	3/26/2009 09:17 PM
Benzyl alcohol	ND	660		µg/Kg	1	3/26/2009 09:17 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	3/26/2009 09:17 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E20BGW (15')
Lab Order:	104675	**Collection Date:**	3/19/2009 8:15:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104675-004A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090326A QC Batch: 54259 PrepDate: 3/26/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	3/26/2009 09:17 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	3/26/2009 09:17 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	3/26/2009 09:17 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	3/26/2009 09:17 PM
Chrysene	ND	330		µg/Kg	1	3/26/2009 09:17 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	3/26/2009 09:17 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	3/26/2009 09:17 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	3/26/2009 09:17 PM
Dibenzofuran	ND	330		µg/Kg	1	3/26/2009 09:17 PM
Diethylphthalate	ND	330		µg/Kg	1	3/26/2009 09:17 PM
Dimethylphthalate	ND	330		µg/Kg	1	3/26/2009 09:17 PM
Fluoranthene	ND	330		µg/Kg	1	3/26/2009 09:17 PM
Fluorene	ND	330		µg/Kg	1	3/26/2009 09:17 PM
Hexachlorobenzene	ND	330		µg/Kg	1	3/26/2009 09:17 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	3/26/2009 09:17 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	3/26/2009 09:17 PM
Hexachloroethane	ND	330		µg/Kg	1	3/26/2009 09:17 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	3/26/2009 09:17 PM
Isophorone	ND	330		µg/Kg	1	3/26/2009 09:17 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	3/26/2009 09:17 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	3/26/2009 09:17 PM
Naphthalene	ND	330		µg/Kg	1	3/26/2009 09:17 PM
Nitrobenzene	ND	330		µg/Kg	1	3/26/2009 09:17 PM
Pentachlorophenol	ND	1600		µg/Kg	1	3/26/2009 09:17 PM
Phenanthrene	ND	330		µg/Kg	1	3/26/2009 09:17 PM
Phenol	ND	330		µg/Kg	1	3/26/2009 09:17 PM
Pyrene	ND	330		µg/Kg	1	3/26/2009 09:17 PM
Surr: 1,2-Dichlorobenzene-d4	73.5	49-103		%REC	1	3/26/2009 09:17 PM
Surr: 2,4,6-Tribromophenol	92.8	47-129		%REC	1	3/26/2009 09:17 PM
Surr: 2-Chlorophenol-d4	85.0	54-109		%REC	1	3/26/2009 09:17 PM
Surr: 2-Fluorobiphenyl	86.9	59-108		%REC	1	3/26/2009 09:17 PM
Surr: 2-Fluorophenol	84.2	50-111		%REC	1	3/26/2009 09:17 PM
Surr: 4-Terphenyl-d14	113	58-135		%REC	1	3/26/2009 09:17 PM
Surr: Nitrobenzene-d5	81.3	54-115		%REC	1	3/26/2009 09:17 PM
Surr: Phenol-d5	87.5	58-112		%REC	1	3/26/2009 09:17 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E10BGW (0')
Lab Order:	104675	**Collection Date:**	3/19/2009 9:40:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104675-005A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090327J	QC Batch: 54286			PrepDate:	3/27/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	3/27/2009 09:22 PM
Arsenic	1.7	1.0		mg/Kg	1	3/27/2009 09:22 PM
Barium	120	1.0		mg/Kg	1	3/27/2009 09:22 PM
Beryllium	ND	1.0		mg/Kg	1	3/27/2009 09:22 PM
Cadmium	ND	1.0		mg/Kg	1	3/27/2009 09:22 PM
Chromium	39	1.0		mg/Kg	1	3/27/2009 09:22 PM
Cobalt	12	1.0		mg/Kg	1	3/27/2009 09:22 PM
Copper	37	2.0		mg/Kg	1	3/27/2009 09:22 PM
Lead	23	1.0		mg/Kg	1	3/27/2009 09:22 PM
Molybdenum	ND	1.0		mg/Kg	1	3/27/2009 09:22 PM
Nickel	45	1.0		mg/Kg	1	3/27/2009 09:22 PM
Selenium	ND	1.0		mg/Kg	1	3/27/2009 09:22 PM
Silver	ND	1.0		mg/Kg	1	3/27/2009 09:22 PM
Thallium	ND	1.0		mg/Kg	1	3/27/2009 09:22 PM
Vanadium	43	1.0		mg/Kg	1	3/27/2009 09:22 PM
Zinc	68	1.0		mg/Kg	1	3/27/2009 09:22 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090327A	QC Batch: 54207			PrepDate:	3/25/2009	Analyst: **CBR**
DRO	26	10		mg/Kg	10	3/27/2009 10:17 AM
ORO	130	10		mg/Kg	10	3/27/2009 10:17 AM
Surr: p-Terphenyl	36.8	30-130		%REC	10	3/27/2009 10:17 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090327E	QC Batch: 54282			PrepDate:	3/27/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	3/27/2009 03:41 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090326A	QC Batch: 54259			PrepDate:	3/26/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	3/26/2009 09:45 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	3/26/2009 09:45 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	3/26/2009 09:45 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	3/26/2009 09:45 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E10BGW (0')
Lab Order:	104675	**Collection Date:**	3/19/2009 9:40:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104675-005A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090326A QC Batch: 54259 PrepDate: 3/26/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	3/26/2009 09:45 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	3/26/2009 09:45 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	3/26/2009 09:45 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	3/26/2009 09:45 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	3/26/2009 09:45 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	3/26/2009 09:45 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	3/26/2009 09:45 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	3/26/2009 09:45 PM
2-Chlorophenol	ND	330		µg/Kg	1	3/26/2009 09:45 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	3/26/2009 09:45 PM
2-Methylphenol	ND	330		µg/Kg	1	3/26/2009 09:45 PM
2-Nitroaniline	ND	1600		µg/Kg	1	3/26/2009 09:45 PM
2-Nitrophenol	ND	330		µg/Kg	1	3/26/2009 09:45 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	3/26/2009 09:45 PM
3-Nitroaniline	ND	1600		µg/Kg	1	3/26/2009 09:45 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	3/26/2009 09:45 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	3/26/2009 09:45 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	3/26/2009 09:45 PM
4-Chloroaniline	ND	660		µg/Kg	1	3/26/2009 09:45 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	3/26/2009 09:45 PM
4-Methylphenol	ND	330		µg/Kg	1	3/26/2009 09:45 PM
4-Nitroaniline	ND	1600		µg/Kg	1	3/26/2009 09:45 PM
4-Nitrophenol	ND	1600		µg/Kg	1	3/26/2009 09:45 PM
Acenaphthene	ND	330		µg/Kg	1	3/26/2009 09:45 PM
Acenaphthylene	ND	330		µg/Kg	1	3/26/2009 09:45 PM
Anthracene	ND	330		µg/Kg	1	3/26/2009 09:45 PM
Benzidine (M)	ND	1600		µg/Kg	1	3/26/2009 09:45 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	3/26/2009 09:45 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	3/26/2009 09:45 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	3/26/2009 09:45 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	3/26/2009 09:45 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	3/26/2009 09:45 PM
Benzoic acid	ND	1600		µg/Kg	1	3/26/2009 09:45 PM
Benzyl alcohol	ND	660		µg/Kg	1	3/26/2009 09:45 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	3/26/2009 09:45 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E10BGW (0')
Lab Order:	104675	**Collection Date:**	3/19/2009 9:40:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104675-005A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090326A QC Batch: 54259 PrepDate: 3/26/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	3/26/2009 09:45 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	3/26/2009 09:45 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	3/26/2009 09:45 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	3/26/2009 09:45 PM
Chrysene	ND	330		µg/Kg	1	3/26/2009 09:45 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	3/26/2009 09:45 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	3/26/2009 09:45 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	3/26/2009 09:45 PM
Dibenzofuran	ND	330		µg/Kg	1	3/26/2009 09:45 PM
Diethylphthalate	ND	330		µg/Kg	1	3/26/2009 09:45 PM
Dimethylphthalate	ND	330		µg/Kg	1	3/26/2009 09:45 PM
Fluoranthene	ND	330		µg/Kg	1	3/26/2009 09:45 PM
Fluorene	ND	330		µg/Kg	1	3/26/2009 09:45 PM
Hexachlorobenzene	ND	330		µg/Kg	1	3/26/2009 09:45 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	3/26/2009 09:45 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	3/26/2009 09:45 PM
Hexachloroethane	ND	330		µg/Kg	1	3/26/2009 09:45 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	3/26/2009 09:45 PM
Isophorone	ND	330		µg/Kg	1	3/26/2009 09:45 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	3/26/2009 09:45 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	3/26/2009 09:45 PM
Naphthalene	ND	330		µg/Kg	1	3/26/2009 09:45 PM
Nitrobenzene	ND	330		µg/Kg	1	3/26/2009 09:45 PM
Pentachlorophenol	ND	1600		µg/Kg	1	3/26/2009 09:45 PM
Phenanthrene	ND	330		µg/Kg	1	3/26/2009 09:45 PM
Phenol	ND	330		µg/Kg	1	3/26/2009 09:45 PM
Pyrene	ND	330		µg/Kg	1	3/26/2009 09:45 PM
Surr: 1,2-Dichlorobenzene-d4	63.1	49-103		%REC	1	3/26/2009 09:45 PM
Surr: 2,4,6-Tribromophenol	79.9	47-129		%REC	1	3/26/2009 09:45 PM
Surr: 2-Chlorophenol-d4	76.4	54-109		%REC	1	3/26/2009 09:45 PM
Surr: 2-Fluorobiphenyl	81.4	59-108		%REC	1	3/26/2009 09:45 PM
Surr: 2-Fluorophenol	75.2	50-111		%REC	1	3/26/2009 09:45 PM
Surr: 4-Terphenyl-d14	95.5	58-135		%REC	1	3/26/2009 09:45 PM
Surr: Nitrobenzene-d5	76.3	54-115		%REC	1	3/26/2009 09:45 PM
Surr: Phenol-d5	79.4	58-112		%REC	1	3/26/2009 09:45 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E10BGW (5')
Lab Order:	104675	**Collection Date:**	3/19/2009 9:42:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104675-006A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090327J	QC Batch: 54286			PrepDate:	3/27/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	3/27/2009 09:25 PM
Arsenic	4.8	1.0		mg/Kg	1	3/27/2009 09:25 PM
Barium	180	1.0		mg/Kg	1	3/27/2009 09:25 PM
Beryllium	ND	1.0		mg/Kg	1	3/27/2009 09:25 PM
Cadmium	ND	1.0		mg/Kg	1	3/27/2009 09:25 PM
Chromium	56	1.0		mg/Kg	1	3/27/2009 09:25 PM
Cobalt	12	1.0		mg/Kg	1	3/27/2009 09:25 PM
Copper	33	2.0		mg/Kg	1	3/27/2009 09:25 PM
Lead	6.3	1.0		mg/Kg	1	3/27/2009 09:25 PM
Molybdenum	ND	1.0		mg/Kg	1	3/27/2009 09:25 PM
Nickel	82	1.0		mg/Kg	1	3/27/2009 09:25 PM
Selenium	ND	1.0		mg/Kg	1	3/27/2009 09:25 PM
Silver	ND	1.0		mg/Kg	1	3/27/2009 09:25 PM
Thallium	ND	1.0		mg/Kg	1	3/27/2009 09:25 PM
Vanadium	36	1.0		mg/Kg	1	3/27/2009 09:25 PM
Zinc	49	1.0		mg/Kg	1	3/27/2009 09:25 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090327A	QC Batch: 54207			PrepDate:	3/25/2009	Analyst: **CBR**
DRO	ND	1.0		mg/Kg	1	3/27/2009 09:37 AM
ORO	ND	1.0		mg/Kg	1	3/27/2009 09:37 AM
Surr: p-Terphenyl	76.2	30-130		%REC	1	3/27/2009 09:37 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090327E	QC Batch: 54282			PrepDate:	3/27/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	3/27/2009 03:43 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090326A	QC Batch: 54259			PrepDate:	3/26/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	3/26/2009 10:13 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	3/26/2009 10:13 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	3/26/2009 10:13 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	3/26/2009 10:13 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E10BGW (5')
Lab Order:	104675	**Collection Date:**	3/19/2009 9:42:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104675-006A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090326A QC Batch: 54259 PrepDate: 3/26/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	3/26/2009 10:13 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	3/26/2009 10:13 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	3/26/2009 10:13 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	3/26/2009 10:13 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	3/26/2009 10:13 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	3/26/2009 10:13 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	3/26/2009 10:13 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	3/26/2009 10:13 PM
2-Chlorophenol	ND	330		µg/Kg	1	3/26/2009 10:13 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	3/26/2009 10:13 PM
2-Methylphenol	ND	330		µg/Kg	1	3/26/2009 10:13 PM
2-Nitroaniline	ND	1600		µg/Kg	1	3/26/2009 10:13 PM
2-Nitrophenol	ND	330		µg/Kg	1	3/26/2009 10:13 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	3/26/2009 10:13 PM
3-Nitroaniline	ND	1600		µg/Kg	1	3/26/2009 10:13 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	3/26/2009 10:13 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	3/26/2009 10:13 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	3/26/2009 10:13 PM
4-Chloroaniline	ND	660		µg/Kg	1	3/26/2009 10:13 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	3/26/2009 10:13 PM
4-Methylphenol	ND	330		µg/Kg	1	3/26/2009 10:13 PM
4-Nitroaniline	ND	1600		µg/Kg	1	3/26/2009 10:13 PM
4-Nitrophenol	ND	1600		µg/Kg	1	3/26/2009 10:13 PM
Acenaphthene	ND	330		µg/Kg	1	3/26/2009 10:13 PM
Acenaphthylene	ND	330		µg/Kg	1	3/26/2009 10:13 PM
Anthracene	ND	330		µg/Kg	1	3/26/2009 10:13 PM
Benzidine (M)	ND	1600		µg/Kg	1	3/26/2009 10:13 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	3/26/2009 10:13 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	3/26/2009 10:13 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	3/26/2009 10:13 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	3/26/2009 10:13 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	3/26/2009 10:13 PM
Benzoic acid	ND	1600		µg/Kg	1	3/26/2009 10:13 PM
Benzyl alcohol	ND	660		µg/Kg	1	3/26/2009 10:13 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	3/26/2009 10:13 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E10BGW (5')
Lab Order:	104675	**Collection Date:**	3/19/2009 9:42:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104675-006A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090326A QC Batch: 54259 PrepDate: 3/26/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	3/26/2009 10:13 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	3/26/2009 10:13 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	3/26/2009 10:13 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	3/26/2009 10:13 PM
Chrysene	ND	330		µg/Kg	1	3/26/2009 10:13 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	3/26/2009 10:13 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	3/26/2009 10:13 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	3/26/2009 10:13 PM
Dibenzofuran	ND	330		µg/Kg	1	3/26/2009 10:13 PM
Diethylphthalate	ND	330		µg/Kg	1	3/26/2009 10:13 PM
Dimethylphthalate	ND	330		µg/Kg	1	3/26/2009 10:13 PM
Fluoranthene	ND	330		µg/Kg	1	3/26/2009 10:13 PM
Fluorene	ND	330		µg/Kg	1	3/26/2009 10:13 PM
Hexachlorobenzene	ND	330		µg/Kg	1	3/26/2009 10:13 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	3/26/2009 10:13 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	3/26/2009 10:13 PM
Hexachloroethane	ND	330		µg/Kg	1	3/26/2009 10:13 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	3/26/2009 10:13 PM
Isophorone	ND	330		µg/Kg	1	3/26/2009 10:13 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	3/26/2009 10:13 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	3/26/2009 10:13 PM
Naphthalene	ND	330		µg/Kg	1	3/26/2009 10:13 PM
Nitrobenzene	ND	330		µg/Kg	1	3/26/2009 10:13 PM
Pentachlorophenol	ND	1600		µg/Kg	1	3/26/2009 10:13 PM
Phenanthrene	ND	330		µg/Kg	1	3/26/2009 10:13 PM
Phenol	ND	330		µg/Kg	1	3/26/2009 10:13 PM
Pyrene	ND	330		µg/Kg	1	3/26/2009 10:13 PM
Surr: 1,2-Dichlorobenzene-d4	71.2	49-103		%REC	1	3/26/2009 10:13 PM
Surr: 2,4,6-Tribromophenol	81.9	47-129		%REC	1	3/26/2009 10:13 PM
Surr: 2-Chlorophenol-d4	81.2	54-109		%REC	1	3/26/2009 10:13 PM
Surr: 2-Fluorobiphenyl	81.7	59-108		%REC	1	3/26/2009 10:13 PM
Surr: 2-Fluorophenol	81.4	50-111		%REC	1	3/26/2009 10:13 PM
Surr: 4-Terphenyl-d14	101	58-135		%REC	1	3/26/2009 10:13 PM
Surr: Nitrobenzene-d5	79.9	54-115		%REC	1	3/26/2009 10:13 PM
Surr: Phenol-d5	84.1	58-112		%REC	1	3/26/2009 10:13 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT: Geocon Consultants, Inc. **Client Sample ID:** E10BGW (15')
Lab Order: 104675 **Collection Date:** 3/19/2009 9:55:00 AM
Project: Caltrans Dumbarton Bridge, E8435-06-18 **Matrix:** SOIL
Lab ID: 104675-007A

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090327J	QC Batch: 54286			PrepDate:	3/27/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	3/27/2009 09:28 PM
Arsenic	3.5	1.0		mg/Kg	1	3/27/2009 09:28 PM
Barium	27	1.0		mg/Kg	1	3/27/2009 09:28 PM
Beryllium	ND	1.0		mg/Kg	1	3/27/2009 09:28 PM
Cadmium	ND	1.0		mg/Kg	1	3/27/2009 09:28 PM
Chromium	35	1.0		mg/Kg	1	3/27/2009 09:28 PM
Cobalt	6.9	1.0		mg/Kg	1	3/27/2009 09:28 PM
Copper	13	2.0		mg/Kg	1	3/27/2009 09:28 PM
Lead	3.4	1.0		mg/Kg	1	3/27/2009 09:28 PM
Molybdenum	ND	1.0		mg/Kg	1	3/27/2009 09:28 PM
Nickel	40	1.0		mg/Kg	1	3/27/2009 09:28 PM
Selenium	ND	1.0		mg/Kg	1	3/27/2009 09:28 PM
Silver	ND	1.0		mg/Kg	1	3/27/2009 09:28 PM
Thallium	ND	1.0		mg/Kg	1	3/27/2009 09:28 PM
Vanadium	28	1.0		mg/Kg	1	3/27/2009 09:28 PM
Zinc	37	1.0		mg/Kg	1	3/27/2009 09:28 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090327A	QC Batch: 54207			PrepDate:	3/25/2009	Analyst: **CBR**
DRO	3.6	1.0		mg/Kg	1	3/27/2009 09:46 AM
ORO	8.6	1.0		mg/Kg	1	3/27/2009 09:46 AM
Surr: p-Terphenyl	72.0	30-130		%REC	1	3/27/2009 09:46 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090327E	QC Batch: 54282			PrepDate:	3/27/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	3/27/2009 03:18 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090326A	QC Batch: 54259			PrepDate:	3/26/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	3/26/2009 11:36 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	3/26/2009 11:36 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	3/26/2009 11:36 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	3/26/2009 11:36 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E10BGW (15')
Lab Order:	104675	**Collection Date:**	3/19/2009 9:55:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104675-007A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090326A QC Batch: 54259 PrepDate: 3/26/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	3/26/2009 11:36 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	3/26/2009 11:36 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	3/26/2009 11:36 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	3/26/2009 11:36 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	3/26/2009 11:36 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	3/26/2009 11:36 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	3/26/2009 11:36 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	3/26/2009 11:36 PM
2-Chlorophenol	ND	330		µg/Kg	1	3/26/2009 11:36 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	3/26/2009 11:36 PM
2-Methylphenol	ND	330		µg/Kg	1	3/26/2009 11:36 PM
2-Nitroaniline	ND	1600		µg/Kg	1	3/26/2009 11:36 PM
2-Nitrophenol	ND	330		µg/Kg	1	3/26/2009 11:36 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	3/26/2009 11:36 PM
3-Nitroaniline	ND	1600		µg/Kg	1	3/26/2009 11:36 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	3/26/2009 11:36 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	3/26/2009 11:36 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	3/26/2009 11:36 PM
4-Chloroaniline	ND	660		µg/Kg	1	3/26/2009 11:36 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	3/26/2009 11:36 PM
4-Methylphenol	ND	330		µg/Kg	1	3/26/2009 11:36 PM
4-Nitroaniline	ND	1600		µg/Kg	1	3/26/2009 11:36 PM
4-Nitrophenol	ND	1600		µg/Kg	1	3/26/2009 11:36 PM
Acenaphthene	ND	330		µg/Kg	1	3/26/2009 11:36 PM
Acenaphthylene	ND	330		µg/Kg	1	3/26/2009 11:36 PM
Anthracene	ND	330		µg/Kg	1	3/26/2009 11:36 PM
Benzidine (M)	ND	1600		µg/Kg	1	3/26/2009 11:36 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	3/26/2009 11:36 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	3/26/2009 11:36 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	3/26/2009 11:36 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	3/26/2009 11:36 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	3/26/2009 11:36 PM
Benzoic acid	ND	1600		µg/Kg	1	3/26/2009 11:36 PM
Benzyl alcohol	ND	660		µg/Kg	1	3/26/2009 11:36 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	3/26/2009 11:36 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E10BGW (15')
Lab Order:	104675	**Collection Date:**	3/19/2009 9:55:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104675-007A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090326A QC Batch: 54259 PrepDate: 3/26/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	3/26/2009 11:36 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	3/26/2009 11:36 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	3/26/2009 11:36 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	3/26/2009 11:36 PM
Chrysene	ND	330		µg/Kg	1	3/26/2009 11:36 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	3/26/2009 11:36 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	3/26/2009 11:36 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	3/26/2009 11:36 PM
Dibenzofuran	ND	330		µg/Kg	1	3/26/2009 11:36 PM
Diethylphthalate	ND	330		µg/Kg	1	3/26/2009 11:36 PM
Dimethylphthalate	ND	330		µg/Kg	1	3/26/2009 11:36 PM
Fluoranthene	ND	330		µg/Kg	1	3/26/2009 11:36 PM
Fluorene	ND	330		µg/Kg	1	3/26/2009 11:36 PM
Hexachlorobenzene	ND	330		µg/Kg	1	3/26/2009 11:36 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	3/26/2009 11:36 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	3/26/2009 11:36 PM
Hexachloroethane	ND	330		µg/Kg	1	3/26/2009 11:36 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	3/26/2009 11:36 PM
Isophorone	ND	330		µg/Kg	1	3/26/2009 11:36 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	3/26/2009 11:36 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	3/26/2009 11:36 PM
Naphthalene	ND	330		µg/Kg	1	3/26/2009 11:36 PM
Nitrobenzene	ND	330		µg/Kg	1	3/26/2009 11:36 PM
Pentachlorophenol	ND	1600		µg/Kg	1	3/26/2009 11:36 PM
Phenanthrene	ND	330		µg/Kg	1	3/26/2009 11:36 PM
Phenol	650	330		µg/Kg	1	3/26/2009 11:36 PM
Pyrene	ND	330		µg/Kg	1	3/26/2009 11:36 PM
Surr: 1,2-Dichlorobenzene-d4	74.8	49-103		%REC	1	3/26/2009 11:36 PM
Surr: 2,4,6-Tribromophenol	88.7	47-129		%REC	1	3/26/2009 11:36 PM
Surr: 2-Chlorophenol-d4	86.8	54-109		%REC	1	3/26/2009 11:36 PM
Surr: 2-Fluorobiphenyl	87.1	59-108		%REC	1	3/26/2009 11:36 PM
Surr: 2-Fluorophenol	86.0	50-111		%REC	1	3/26/2009 11:36 PM
Surr: 4-Terphenyl-d14	110	58-135		%REC	1	3/26/2009 11:36 PM
Surr: Nitrobenzene-d5	84.0	54-115		%REC	1	3/26/2009 11:36 PM
Surr: Phenol-d5	88.7	58-112		%REC	1	3/26/2009 11:36 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT: Geocon Consultants, Inc.
Work Order: 104675
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **MB-54286** SampType: **MBLK** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/27/2009** RunNo: **107565**
Client ID: **PBS** Batch ID: **54286** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/27/2009** SeqNo: **1685414**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	2.0									
Arsenic	ND	1.0									
Barium	ND	1.0									
Beryllium	ND	1.0									
Cadmium	0.012	1.0									
Chromium	ND	1.0									
Cobalt	ND	1.0									
Copper	ND	2.0									
Lead	ND	1.0									
Molybdenum	ND	1.0									
Nickel	ND	1.0									
Selenium	ND	1.0									
Silver	ND	1.0									
Thallium	ND	1.0									
Vanadium	ND	1.0									
Zinc	ND	1.0									

Sample ID: **LCS-54286** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/27/2009** RunNo: **107565**
Client ID: **LCSS** Batch ID: **54286** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/27/2009** SeqNo: **1685415**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	47.115	2.0	50.00	0	94.2	80	120				
Arsenic	45.418	1.0	50.00	0	90.8	80	120				
Barium	48.774	1.0	50.00	0	97.5	80	120				
Beryllium	47.575	1.0	50.00	0	95.1	80	120				
Cadmium	47.274	1.0	50.00	0.01177	94.5	80	120				
Chromium	44.183	1.0	50.00	0	88.4	80	120				
Cobalt	48.804	1.0	50.00	0	97.6	80	120				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104675
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **LCS-54286** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/27/2009** RunNo: **107565**
Client ID: **LCSS** Batch ID: **54286** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/27/2009** SeqNo: **1685415**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Copper	48.683	2.0	50.00	0	97.4	80	120				
Lead	50.479	1.0	50.00	0	101	80	120				
Molybdenum	48.177	1.0	50.00	0	96.4	80	120				
Nickel	47.165	1.0	50.00	0	94.3	80	120				
Selenium	43.369	1.0	50.00	0	86.7	80	120				
Silver	45.187	1.0	50.00	0	90.4	80	120				
Thallium	42.775	1.0	50.00	0	85.6	80	120				
Vanadium	48.912	1.0	50.00	0	97.8	80	120				
Zinc	47.021	1.0	50.00	0	94.0	80	120				

Sample ID: **104675-007ADUP** SampType: **DUP** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/27/2009** RunNo: **107565**
Client ID: **E10BGW (15')** Batch ID: **54286** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/27/2009** SeqNo: **1685425**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	2.0						0.3372	0	20	
Arsenic	3.129	1.0						3.539	12.3	20	
Barium	24.925	1.0						26.55	6.30	20	
Beryllium	ND	1.0						0	0	20	
Cadmium	0.439	1.0						0.4726	0	20	
Chromium	33.084	1.0						35.03	5.71	20	
Cobalt	6.342	1.0						6.941	9.01	20	
Copper	12.262	2.0						12.54	2.24	20	
Lead	3.135	1.0						3.440	9.28	20	
Molybdenum	ND	1.0						0	0	20	
Nickel	37.919	1.0						40.08	5.54	20	
Selenium	ND	1.0						0	0	20	
Silver	ND	1.0						0	0	20	
Thallium	ND	1.0						0	0	20	
Vanadium	26.360	1.0						27.80	5.31	20	
Zinc	35.403	1.0						36.56	3.21	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104675
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **104675-007AMS** SampType: **MS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/27/2009** RunNo: **107565**
Client ID: **E10BGW (15')** Batch ID: **54286** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/27/2009** SeqNo: **1685426**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	87.082	2.0	125.0	0.3372	69.4	25	106				
Arsenic	104.075	1.0	125.0	3.539	80.4	42	113				
Barium	129.434	1.0	125.0	26.55	82.3	19	140				
Beryllium	104.560	1.0	125.0	0	83.6	50	109				
Cadmium	100.683	1.0	125.0	0.4726	80.2	48	106				
Chromium	129.114	1.0	125.0	35.03	75.3	44	116				
Cobalt	108.787	1.0	125.0	6.941	81.5	47	107				
Copper	127.464	2.0	125.0	12.54	91.9	49	124				
Lead	109.415	1.0	125.0	3.440	84.8	33	120				
Molybdenum	104.294	1.0	125.0	0	83.4	46	111				
Nickel	137.774	1.0	125.0	40.08	78.2	43	111				
Selenium	99.589	1.0	125.0	0	79.7	43	104				
Silver	107.371	1.0	125.0	0	85.9	53	114				
Thallium	95.643	1.0	125.0	0	76.5	41	107				
Vanadium	130.484	1.0	125.0	27.80	82.1	48	116				
Zinc	133.324	1.0	125.0	36.56	77.4	24	129				

Sample ID: **104675-007AMSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/27/2009** RunNo: **107565**
Client ID: **E10BGW (15')** Batch ID: **54286** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/27/2009** SeqNo: **1685427**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	83.863	2.0	125.0	0.3372	66.8	25	106	87.08	3.77	20	
Arsenic	104.293	1.0	125.0	3.539	80.6	42	113	104.1	0.209	20	
Barium	134.846	1.0	125.0	26.55	86.6	19	140	129.4	4.10	20	
Beryllium	104.154	1.0	125.0	0	83.3	50	109	104.6	0.389	20	
Cadmium	99.941	1.0	125.0	0.4726	79.6	48	106	100.7	0.740	20	
Chromium	131.898	1.0	125.0	35.03	77.5	44	116	129.1	2.13	20	
Cobalt	108.627	1.0	125.0	6.941	81.3	47	107	108.8	0.148	20	
Copper	130.363	2.0	125.0	12.54	94.3	49	124	127.5	2.25	20	
Lead	108.622	1.0	125.0	3.440	84.1	33	120	109.4	0.727	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104675
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **104675-007AMSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/27/2009** RunNo: **107565**
Client ID: **E10BGW (15')** Batch ID: **54286** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/27/2009** SeqNo: **1685427**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	103.577	1.0	125.0	0	82.9	46	111	104.3	0.690	20	
Nickel	139.561	1.0	125.0	40.08	79.6	43	111	137.8	1.29	20	
Selenium	98.895	1.0	125.0	0	79.1	43	104	99.59	0.700	20	
Silver	108.123	1.0	125.0	0	86.5	53	114	107.4	0.698	20	
Thallium	95.132	1.0	125.0	0	76.1	41	107	95.64	0.536	20	
Vanadium	133.665	1.0	125.0	27.80	84.7	48	116	130.5	2.41	20	
Zinc	135.191	1.0	125.0	36.56	78.9	24	129	133.3	1.39	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104675
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 7471_S

Sample ID: **MB-54282**	SampType: **MBLK**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **3/27/2009**	RunNo: **107536**
Client ID: **PBS**	Batch ID: **54282**	TestNo: **EPA 7471A**		Analysis Date: **3/27/2009**	SeqNo: **1684922**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.10									

Sample ID: **LCS-54282**	SampType: **LCS**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **3/27/2009**	RunNo: **107536**
Client ID: **LCSS**	Batch ID: **54282**	TestNo: **EPA 7471A**		Analysis Date: **3/27/2009**	SeqNo: **1684923**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.875	0.10	0.8300	0	105	80	120				

Sample ID: **104675-007A-MS**	SampType: **MS**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **3/27/2009**	RunNo: **107536**
Client ID: **E10BGW (15')**	Batch ID: **54282**	TestNo: **EPA 7471A**		Analysis Date: **3/27/2009**	SeqNo: **1684924**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.857	0.10	0.8300	0	103	70	130				

Sample ID: **104675-007A-MSD**	SampType: **MSD**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **3/27/2009**	RunNo: **107536**
Client ID: **E10BGW (15')**	Batch ID: **54282**	TestNo: **EPA 7471A**		Analysis Date: **3/27/2009**	SeqNo: **1684925**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.857	0.10	0.8300	0	103	70	130	0.8569	0.0372	20	

Sample ID: **104675-007A-DUP**	SampType: **DUP**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **3/27/2009**	RunNo: **107536**
Client ID: **E10BGW (15')**	Batch ID: **54282**	TestNo: **EPA 7471A**		Analysis Date: **3/27/2009**	SeqNo: **1684928**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.10						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104675
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_S_DM LLSGT

Sample ID: **MB-54207** SampType: **MBLK** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **3/25/2009** RunNo: **107514**
Client ID: **PBS** Batch ID: **54207** TestNo: **EPA 8015B(M** **EPA 3550B** Analysis Date: **3/27/2009** SeqNo: **1684519**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	ND	1.0									
ORO	ND	1.0									
Surr: p-Terphenyl	2.461		2.670		92.2	30	130				

Sample ID: **LCS-54207** SampType: **LCS** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **3/25/2009** RunNo: **107514**
Client ID: **LCSS** Batch ID: **54207** TestNo: **EPA 8015B(M** **EPA 3550B** Analysis Date: **3/27/2009** SeqNo: **1684520**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	17.226	1.0	33.00	0	52.2	35	124				
Surr: p-Terphenyl	1.944		2.670		72.8	30	130				

Sample ID: **104675-001ADUP** SampType: **DUP** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **3/25/2009** RunNo: **107514**
Client ID: **E20GW (0')** Batch ID: **54207** TestNo: **EPA 8015B(M** **EPA 3550B** Analysis Date: **3/27/2009** SeqNo: **1684530**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	71.067	10						40.41	55.0	20	R
ORO	367.633	10						190.0	63.7	20	R
Surr: p-Terphenyl	1.033		2.670		38.7	30	130		0	0	

Sample ID: **104675-001AMS** SampType: **MS** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **3/25/2009** RunNo: **107514**
Client ID: **E20GW (0')** Batch ID: **54207** TestNo: **EPA 8015B(M** **EPA 3550B** Analysis Date: **3/27/2009** SeqNo: **1684531**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	84.370	10	33.00	40.41	133	12	125				S
Surr: p-Terphenyl	1.380		2.670		51.7	30	130				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104675
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_S_DM LLSGT

Sample ID: **104675-001AMSD** SampType: **MSD** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **3/25/2009** RunNo: **107514**
Client ID: **E20GW (0')** Batch ID: **54207** TestNo: **EPA 8015B(M EPA 3550B** Analysis Date: **3/27/2009** SeqNo: **1684532**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	59.333	10	33.00	40.41	57.3	12	125	84.37	34.8	20	R
Surr: p-Terphenyl	1.240		2.670		46.4	30	130		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104675
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-54259** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/26/2009** RunNo: **107496**
Client ID: **PBS** Batch ID: **54259** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/26/2009** SeqNo: **1684157**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	330									
1,2-Dichlorobenzene	ND	330									
1,3-Dichlorobenzene	ND	330									
1,4-Dichlorobenzene	ND	330									
2,4,5-Trichlorophenol	ND	330									
2,4,6-Trichlorophenol	ND	330									
2,4-Dichlorophenol	ND	1600									
2,4-Dimethylphenol	ND	330									
2,4-Dinitrophenol	ND	1600									
2,4-Dinitrotoluene	ND	330									
2,6-Dinitrotoluene	ND	330									
2-Chloronaphthalene	ND	330									
2-Chlorophenol	ND	330									
2-Methylnaphthalene	ND	330									
2-Methylphenol	ND	330									
2-Nitroaniline	ND	1600									
2-Nitrophenol	ND	330									
3,3´-Dichlorobenzidine	ND	660									
3-Nitroaniline	ND	1600									
4,6-Dinitro-2-methylphenol	ND	1600									
4-Bromophenyl-phenylether	ND	330									
4-Chloro-3-methylphenol	ND	660									
4-Chloroaniline	ND	660									
4-Chlorophenyl-phenylether	ND	330									
4-Methylphenol	ND	330									
4-Nitroaniline	ND	1600									
4-Nitrophenol	ND	1600									
Acenaphthene	ND	330									
Acenaphthylene	ND	330									
Anthracene	ND	330									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104675
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-54259** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/26/2009** RunNo: **107496**
Client ID: **PBS** Batch ID: **54259** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/26/2009** SeqNo: **1684157**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzidine (M)	ND	1600									
Benzo(a)anthracene	ND	330									
Benzo(a)pyrene	ND	330									
Benzo(b)fluoranthene	ND	330									
Benzo(g,h,i)perylene	ND	330									
Benzo(k)fluoranthene	ND	330									
Benzoic acid	ND	1600									
Benzyl alcohol	ND	660									
Bis(2-chloroethoxy)methane	ND	330									
Bis(2-chloroethyl)ether	ND	330									
Bis(2-chloroisopropyl)ether	ND	330									
Bis(2-ethylhexyl)phthalate	ND	330									
Butylbenzylphthalate	ND	330									
Chrysene	ND	330									
Di-n-butylphthalate	ND	330									
Di-n-octylphthalate	ND	330									
Dibenz(a,h)anthracene	ND	330									
Dibenzofuran	ND	330									
Diethylphthalate	ND	330									
Dimethylphthalate	ND	330									
Fluoranthene	ND	330									
Fluorene	ND	330									
Hexachlorobenzene	ND	330									
Hexachlorobutadiene	ND	660									
Hexachlorocyclopentadiene	ND	660									
Hexachloroethane	ND	330									
Indeno(1,2,3-cd)pyrene	ND	330									
Isophorone	ND	330									
N-Nitrosodi-n-propylamine	ND	330									
N-Nitrosodiphenylamine	ND	330									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104675
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-54259** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/26/2009** RunNo: **107496**
Client ID: **PBS** Batch ID: **54259** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/26/2009** SeqNo: **1684157**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	330									
Nitrobenzene	ND	330									
Pentachlorophenol	ND	1600									
Phenanthrene	ND	330									
Phenol	ND	330									
Pyrene	ND	330									
Surr: 1,2-Dichlorobenzene-d4	2937.333		3330		88.2	49	103				
Surr: 2,4,6-Tribromophenol	3342.000		3330		100	47	129				
Surr: 2-Chlorophenol-d4	3132.667		3330		94.1	54	109				
Surr: 2-Fluorobiphenyl	3155.333		3330		94.8	59	108				
Surr: 2-Fluorophenol	3104.667		3330		93.2	50	111				
Surr: 4-Terphenyl-d14	4328.000		3330		130	58	135				
Surr: Nitrobenzene-d5	3107.333		3330		93.3	54	115				
Surr: Phenol-d5	3194.667		3330		95.9	58	112				

Sample ID: **LCS-54259** SampType: **LCS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/26/2009** RunNo: **107496**
Client ID: **LCSS** Batch ID: **54259** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/26/2009** SeqNo: **1684158**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	3429.000	330	3330	0	103	61	107				
1,4-Dichlorobenzene	3033.667	330	3330	0	91.1	56	100				
2,4-Dinitrotoluene	3606.667	330	3330	0	108	72	130				
2-Chlorophenol	3370.333	330	3330	0	101	64	105				
4-Chloro-3-methylphenol	3912.333	660	3330	0	117	74	125				
4-Nitrophenol	3612.333	1600	3330	0	108	77	137				
Acenaphthene	3591.667	330	3330	0	108	63	117				
N-Nitrosodi-n-propylamine	3457.667	330	3330	0	104	71	121				
Pentachlorophenol	3126.333	1600	3330	0	93.9	69	125				
Phenol	3472.333	330	3330	0	104	67	111				
Pyrene	3509.667	330	3330	0	105	60	122				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Geocon Consultants, Inc.
Work Order: 104675
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **LCS-54259** SampType: **LCS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/26/2009** RunNo: **107496**
Client ID: **LCSS** Batch ID: **54259** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/26/2009** SeqNo: **1684158**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 1,2-Dichlorobenzene-d4	3004.333		3330		90.2	49	103				
Surr: 2,4,6-Tribromophenol	3692.000		3330		111	47	129				
Surr: 2-Chlorophenol-d4	3231.333		3330		97.0	54	109				
Surr: 2-Fluorobiphenyl	3524.333		3330		106	59	108				
Surr: 2-Fluorophenol	3207.000		3330		96.3	50	111				
Surr: 4-Terphenyl-d14	3861.667		3330		116	58	135				
Surr: Nitrobenzene-d5	3270.000		3330		98.2	54	115				
Surr: Phenol-d5	3310.667		3330		99.4	58	112				

Sample ID: **104675-003AMS** SampType: **MS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/26/2009** RunNo: **107496**
Client ID: **E20BGW (10')** Batch ID: **54259** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/26/2009** SeqNo: **1684159**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	2833.000	330	3330	0	85.1	60	105				
1,4-Dichlorobenzene	2542.667	330	3330	0	76.4	50	99				
2,4-Dinitrotoluene	3289.333	330	3330	0	98.8	70	130				
2-Chlorophenol	2954.000	330	3330	0	88.7	58	107				
4-Chloro-3-methylphenol	3426.000	660	3330	0	103	72	124				
4-Nitrophenol	3385.000	1600	3330	0	102	69	139				
Acenaphthene	3153.000	330	3330	0	94.7	59	118				
N-Nitrosodi-n-propylamine	3014.000	330	3330	0	90.5	61	125				
Pentachlorophenol	3044.333	1600	3330	0	91.4	56	131				
Phenol	3103.333	330	3330	0	93.2	60	113				
Pyrene	3137.000	330	3330	0	94.2	51	130				
Surr: 1,2-Dichlorobenzene-d4	2474.333		3330		74.3	49	103				
Surr: 2,4,6-Tribromophenol	3272.333		3330		98.3	47	129				
Surr: 2-Chlorophenol-d4	2754.333		3330		82.7	54	109				
Surr: 2-Fluorobiphenyl	2955.000		3330		88.7	59	108				
Surr: 2-Fluorophenol	2759.000		3330		82.9	50	111				
Surr: 4-Terphenyl-d14	3508.000		3330		105	58	135				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104675
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104675-003AMS** SampType: **MS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/26/2009** RunNo: **107496**
Client ID: **E20BGW (10')** Batch ID: **54259** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/26/2009** SeqNo: **1684159**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	2715.667		3330		81.6	54	115				
Surr: Phenol-d5	2891.000		3330		86.8	58	112				

Sample ID: **104675-003AMSD** SampType: **MSD** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/26/2009** RunNo: **107496**
Client ID: **E20BGW (10')** Batch ID: **54259** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/26/2009** SeqNo: **1684160**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	2860.333	330	3330	0	85.9	60	105	2833	0.960	20	
1,4-Dichlorobenzene	2605.333	330	3330	0	78.2	50	99	2543	2.43	20	
2,4-Dinitrotoluene	3104.667	330	3330	0	93.2	70	130	3289	5.78	20	
2-Chlorophenol	2953.000	330	3330	0	88.7	58	107	2954	0.0339	20	
4-Chloro-3-methylphenol	3337.000	660	3330	0	100	72	124	3426	2.63	20	
4-Nitrophenol	3094.333	1600	3330	0	92.9	69	139	3385	8.97	20	
Acenaphthene	3006.667	330	3330	0	90.3	59	118	3153	4.75	20	
N-Nitrosodi-n-propylamine	2981.667	330	3330	0	89.5	61	125	3014	1.08	20	
Pentachlorophenol	2873.333	1600	3330	0	86.3	56	131	3044	5.78	20	
Phenol	3054.000	330	3330	0	91.7	60	113	3103	1.60	20	
Pyrene	2972.000	330	3330	0	89.2	51	130	3137	5.40	20	
Surr: 1,2-Dichlorobenzene-d4	2538.333		3330		76.2	49	103		0	0	
Surr: 2,4,6-Tribromophenol	3158.000		3330		94.8	47	129		0	0	
Surr: 2-Chlorophenol-d4	2795.667		3330		84.0	54	109		0	0	
Surr: 2-Fluorobiphenyl	3015.333		3330		90.6	59	108		0	0	
Surr: 2-Fluorophenol	2785.667		3330		83.7	50	111		0	0	
Surr: 4-Terphenyl-d14	3470.333		3330		104	58	135		0	0	
Surr: Nitrobenzene-d5	2698.667		3330		81.0	54	115		0	0	
Surr: Phenol-d5	2863.667		3330		86.0	58	112		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104675
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104675-003ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/26/2009** RunNo: **107496**
Client ID: **E20BGW (10')** Batch ID: **54259** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/26/2009** SeqNo: **1684161**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	330						0	0	20	
1,2-Dichlorobenzene	ND	330						0	0	20	
1,2-Diphenylhydrazine	ND	330						0	0	20	
1,3-Dichlorobenzene	ND	330						0	0	20	
1,4-Dichlorobenzene	ND	330						0	0	20	
1,4-Dioxane	ND	330						0	0	20	
2,4,5-Trichlorophenol	ND	330						0	0	20	
2,4,6-Trichlorophenol	ND	330						0	0	20	
2,4-Dichlorophenol	ND	1600						0	0	20	
2,4-Dimethylphenol	ND	330						0	0	20	
2,4-Dinitrophenol	ND	1600						0	0	20	
2,4-Dinitrotoluene	ND	330						0	0	20	
2,6-Dinitrotoluene	ND	330						0	0	20	
2-Chloronaphthalene	ND	330						0	0	20	
2-Chlorophenol	ND	330						0	0	20	
2-Methylnaphthalene	ND	330						0	0	20	
2-Methylphenol	ND	330						0	0	20	
2-Nitroaniline	ND	1600						0	0	20	
2-Nitrophenol	ND	330						0	0	20	
3,3´-Dichlorobenzidine	ND	660						0	0	20	
3-Nitroaniline	ND	1600						0	0	20	
4,6-Dinitro-2-methylphenol	ND	1600						0	0	20	
4-Bromophenyl-phenylether	ND	330						0	0	20	
4-Chloro-3-methylphenol	ND	660						0	0	20	
4-Chloroaniline	ND	660						0	0	20	
4-Chlorophenyl-phenylether	ND	330						0	0	20	
3/4-Methylphenol	ND	330						0	0	20	
4-Methylphenol	ND	330						0	0	20	
4-Nitroaniline	ND	1600						0	0	20	
4-Nitrophenol	ND	1600						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104675
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104675-003ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/26/2009** RunNo: **107496**
Client ID: **E20BGW (10')** Batch ID: **54259** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/26/2009** SeqNo: **1684161**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acenaphthene	ND	330						0	0	20	
Acenaphthylene	ND	330						0	0	20	
Aniline	ND	330						0	0	20	
Anthracene	ND	330						0	0	20	
Benzidine (M)	ND	1600						0	0	20	
Benzo(a)anthracene	ND	330						0	0	20	
Benzo(a)pyrene	ND	330						0	0	20	
Benzo(b)fluoranthene	ND	330						0	0	20	
Benzo(g,h,i)perylene	ND	330						0	0	20	
Benzo(k)fluoranthene	ND	330						0	0	20	
Benzoic acid	ND	1600						0	0	20	
Benzyl alcohol	ND	660						0	0	20	
Bis(2-chloroethoxy)methane	ND	330						0	0	20	
Bis(2-chloroethyl)ether	ND	330						0	0	20	
Bis(2-chloroisopropyl)ether	ND	330						0	0	20	
Bis(2-ethylhexyl)phthalate	ND	330						0	0	20	
Butylbenzylphthalate	ND	330						0	0	20	
Carbazole	ND	330						0	0	20	
Chrysene	ND	330						0	0	20	
Di-n-butylphthalate	ND	330						0	0	20	
Di-n-octylphthalate	ND	330						0	0	20	
Dibenz(a,h)anthracene	ND	330						0	0	20	
Dibenzofuran	ND	330						0	0	20	
Diethylphthalate	ND	330						0	0	20	
Dimethylphthalate	ND	330						0	0	20	
Fluoranthene	ND	330						0	0	20	
Fluorene	ND	330						0	0	20	
Hexachlorobenzene	ND	330						0	0	20	
Hexachlorobutadiene	ND	660						0	0	20	
Hexachlorocyclopentadiene	ND	660						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104675
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104675-003ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **3/26/2009** RunNo: **107496**
Client ID: **E20BGW (10')** Batch ID: **54259** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **3/26/2009** SeqNo: **1684161**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Hexachloroethane	ND	330						0	0	20	
Indeno(1,2,3-cd)pyrene	ND	330						0	0	20	
Isophorone	ND	330						0	0	20	
N-Nitrosodi-n-propylamine	ND	330						0	0	20	
N-Nitrosodimethylamine	ND	330						0	0	20	
N-Nitrosodiphenylamine	ND	330						0	0	20	
Naphthalene	ND	330						0	0	20	
Nitrobenzene	ND	330						0	0	20	
Pentachlorophenol	ND	1600						0	0	20	
Phenanthrene	ND	330						0	0	20	
Phenol	ND	330						0	0	20	
Pyrene	ND	330						0	0	20	
Pyridine	ND	1600						0	0	20	
Surr: 1,2-Dichlorobenzene-d4	2660.000		3330		79.9	49	103		0	0	
Surr: 2,4,6-Tribromophenol	3134.000		3330		94.1	47	129		0	0	
Surr: 2-Chlorophenol-d4	2967.000		3330		89.1	54	109		0	0	
Surr: 2-Fluorobiphenyl	3028.333		3330		90.9	59	108		0	0	
Surr: 2-Fluorophenol	2967.000		3330		89.1	50	111		0	0	
Surr: 4-Terphenyl-d14	3891.333		3330		117	58	135		0	0	
Surr: Nitrobenzene-d5	2862.333		3330		86.0	54	115		0	0	
Surr: Phenol-d5	3039.000		3330		91.3	58	112		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#: _____
Logged By: _____ Date: 3/23/09

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: GSO

Sample Condition Upon Receipt: 3.6
1. CHILLED Y☐ N☐ 4. SEALED Y☐ N☐
2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐
3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client: Geocon Consultants, Inc.
Attn: John Love
Address: 6671 Brisa St.
City Livermore State CA Zip Code 94550
TEL: (925) 371-5900
FAX: (925) 371-5915

Project Name: Caltrops - Dumbarton Bridge Project #: E8435-06-18 Sampler: (Printed Name) J. Love (Signature)

Relinquished by: (Signature and Printed Name) John Love	Date: 3/20/09	Time: 16:00	Received by: (Signature and Printed Name)		Date: 3/21/09	Time: 8:30
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)		Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)		Date:	Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: John Love 3/20/09 (Print Name / Date)
Signature

Send Report To:
Attn: _____
Co: same as above
Address _____
City _____ State _____ Zip _____

Bill To:
Attn: _____
Co: same as above
Address _____
City _____ State _____ Zip _____

Special Instructions/Comments: Soil cleanup (6015 B)

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	6010B (Total Metal)	8015B (GRO) / 8020 (BTEX)	8015B (DRO)	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	TPHd + TPHmo w/ silica gel (8270C)	SVOCs (8270C)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	104675-1	E20BGW (0')	3/19/09	7:58									X	X	X	X					E	1	T P		
	2	E20BGW (5')		8:02									X	X	X	X									
	3	E20BGW (10')		8:10									X	X	X	X									
	4	E20BGW (15')		8:15									X	X	X	X									
	5	E10BGW (0')		9:40									X	X	X	X									
	6	E10BGW (5')		9:42									X	X	X	X									
	7	E10BGW (15')		9:55									X	X	X	X									

QA/QC: RTNE ☐ CT ☐ SWRCB ☐ Logcode ____ OTHER ____

- TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=Zn(AC)$_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter.

June 09, 2009

John Love
Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550
TEL: (925) 525-4142
FAX: (925) 371-5915

ELAP No.: 1838
NELAP No.: 02107CA
NEVADA.: CA-401
CSDLAC No.: 10196

Workorder No.: 104675

RE: Caltrans Dumbarton Bridge, E8435-06-18

Attention: John Love

Enclosed are the results for sample(s) received on March 21, 2009 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

This is an addendum report. Please incorporate with documentation previously submitted.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

CLIENT: Geocon Consultants, Inc.
Project: Caltrans Dumbarton Bridge, E8435-06-18
Lab Order: 104675

CASE NARRATIVE

Results were J-Flag. "J" is used to flag those results that are between the PQL (Practical Quantitation Limit) and the calculated MDL (Method Detection Limit). Results that are "J" Flagged are estimated values since it becomes difficult to accurately quantitate the analyte near the MDL.

Analytical Comments for Method 6010

Dilution was necessary for samples 104675-002A, 104675-005A and 104675-006A, due to sample matrix.

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E20BGW (5')
Lab Order:	104675	**Collection Date:**	3/19/2009 8:02:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104675-002A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC							
			WET/ EPA 6010B				
RunID: **ICP8_090608C**	QC Batch: **R109661**				PrepDate:		Analyst: **CL**
Arsenic	ND	0.088	1.0		mg/L	20	6/8/2009 03:53 PM
Chromium	0.084	0.018	1.0	J	mg/L	20	6/8/2009 03:53 PM
Vanadium	0.18	0.010	1.0	J	mg/L	20	6/8/2009 03:53 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E10BGW (0')
Lab Order:	104675	**Collection Date:**	3/19/2009 9:40:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104675-005A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC							
			WET/ EPA 6010B				
RunID: **ICP8_090608C**	QC Batch: **R109661**				PrepDate:		Analyst: **CL**
Lead	0.64	0.042	1.0	J	mg/L	20	6/8/2009 03:57 PM
Vanadium	0.31	0.010	1.0	J	mg/L	20	6/8/2009 03:57 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *09-Jun-09*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	E10BGW (5')
Lab Order:	104675	**Collection Date:**	3/19/2009 9:42:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104675-006A		

ICP METALS BY STLC

WET/ EPA 6010B

RunID: **ICP8_090608C** QC Batch: **R109661** PrepDate: Analyst: **CL**

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
Arsenic	ND	0.088	1.0		mg/L	20	6/8/2009 04:01 PM
Chromium	0.10	0.018	1.0	J	mg/L	20	6/8/2009 04:01 PM
Vanadium	0.29	0.010	1.0	J	mg/L	20	6/8/2009 04:01 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT: Geocon Consultants, Inc.
Work Order: 104675
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_ST

Sample ID: **MB-55695A** SampType: **MBLK** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **PBS** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722211**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	0.050									
Chromium	ND	0.050									
Lead	0.004	0.050									
Vanadium	ND	0.050									

Sample ID: **LCS-55695** SampType: **LCS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **LCSS** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722212**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	1.000	0.050	1.000	0	100	85	115				
Chromium	0.919	0.050	1.000	0	91.9	85	115				
Lead	1.021	0.050	1.000	0.003711	102	85	115				
Vanadium	1.004	0.050	1.000	0	100	85	115				

Sample ID: **104787-004ADUP** SampType: **DUP** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **ZZZZZZ** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722223**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	1.0						0	0	20	
Chromium	0.068	1.0						0.1096	0	20	
Lead	ND	1.0						0	0	20	
Vanadium	0.204	1.0						0.2437	0	20	

Sample ID: **104787-004AMS** SampType: **MS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **ZZZZZZ** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722224**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	2.575	1.0	2.500	0	103	66	128				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104675
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_ST

Sample ID: **104787-004AMS** SampType: **MS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **ZZZZZZ** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722224**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	2.444	1.0	2.500	0.1096	93.4	77	116				
Lead	2.320	1.0	2.500	0	92.8	71	121				
Vanadium	2.743	1.0	2.500	0.2437	100	79	118				

Sample ID: **MB-55695B** SampType: **MBLK** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **PBS** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722225**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	0.050									
Chromium	ND	0.050									
Lead	ND	0.050									
Vanadium	ND	0.050									

Sample ID: **104789-008ADUP** SampType: **DUP** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **ZZZZZZ** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722236**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	1.0						0	0	20	
Chromium	0.235	1.0						0.2217	0	20	
Lead	ND	1.0						0	0	20	
Vanadium	0.470	1.0						0.4639	0	20	

Sample ID: **104789-008AMS** SampType: **MS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **ZZZZZZ** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722237**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	2.584	1.0	2.500	0	103	66	128				
Chromium	2.649	1.0	2.500	0.2217	97.1	77	116				
Lead	2.522	1.0	2.500	0	101	71	121				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104675
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_ST

Sample ID: **104789-008AMS** SampType: **MS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **ZZZZZZ** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722237**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Vanadium	2.991	1.0	2.500	0.4639	101	79	118				

Sample ID: **104789-008AMSD** SampType: **MSD** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **ZZZZZZ** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722238**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	2.571	1.0	2.500	0	103	66	128	2.584	0.510	20	
Chromium	2.612	1.0	2.500	0.2217	95.6	77	116	2.649	1.40	20	
Lead	2.484	1.0	2.500	0	99.4	71	121	2.522	1.49	20	
Vanadium	2.980	1.0	2.500	0.4639	101	79	118	2.991	0.375	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

Diane Galvan

From: John Love [love@geoconinc.com]
Sent: Wednesday, June 03, 2009 10:50 AM
To: Diane Galvan
Subject: WET Request
Attachments: COC Caltrans Dumbarton Bridge.pdf

Hi Diane:

Caltrans would like to run a waste extraction test on several samples for select metals from the Dumbarton Bridge project. I've attached the COCs for the samples they wanted analyzed for STLC. Let me know if you have any questions.

Thanks Diane.

John Love
Sr. Project Geologist

Please visit our new website at http://www.geoconinc.com

GEOCON Incorporated
6671 Brisa Street
Livermore, CA 94550
Tel (925) 371-5900

GEOTECHNICAL - ENVIRONMENTAL - MATERIALS

San Diego Murrieta Burbank San Bernardino Bakersfield Sacramento Livermore Carson City Las Vegas Portland

CONFIDENTIALITY NOTICE: This e-mail may contain confidential and privileged material for the sole use of the intended recipient(s). Any review, use, distribution or disclosure by others is strictly prohibited. If you have received this communication in error, please notify the sender immediately by e-mail and delete the message and any file attachments from your computer. Thank you.

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#: _____

Logged By: _____ Date: _____

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: _____

Sample Condition Upon Receipt: 1. CHILLED Y☐ N☐ 4. SEALED Y☐ N☐ 2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐ 3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client: Geocon Consultants, Inc. Address: 6671 Brisa St. TEL: (925) 371-5900
Attn: John Love City Livermore State CA Zip Code 94550 FAX: (925) 371-5915

Project Name: Caltrans - Dumbarton Bridge Project #: E8435-06-18 Sampler: (Printed Name) John Love (Signature)

Relinquished by: (Signature and Printed Name) John Love	Date: 6/3/09	Time:	Received by: (Signature and Printed Name)	Date: Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date: Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date: Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: John Love 6/3/09 (Print Name / Date) (Signature)

Send Report To: Attn: _____ Co: same as above Address _____ City _____ State _____ Zip _____

Bill To: Attn: _____ Co: same as above Address _____ City _____ State _____ Zip _____

Special Instructions/Comments:

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

Circle or Add Analysis(es) Requested

SPECIFY APPROPRIATE MATRIX

PRESERVATION

Q A / Q C: RTNE ☐ CT ☐ SWRCB ☐ Logcode _____ OTHER _____

ITEM	LAB USE ONLY: Batch # / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	8010B (Total Metal)	8015B (GRO) / 8020 (BTEX)	8015B (DRO)	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	V: (WET)	As: (WET)	Cr: (WET)	Pb: (WET)	Hg: (WET)	Ni: (WET)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	REMARKS
		ESA (5')	3/24/09									X		X	X				X					E	1	T P	
		ESB (0')										X				X			X								
		ESB (5')										X		X	X				X								
		E10BGW (0')										X				X			X								
		E10BGW (5')										X		X	X				X								
		E15A (5')										X		x	x			X	X								
		E20AGW (5')										X			X				X								
		~~E8GW~~ E20BGW (5')										X		x	x				X								
		WSA (5')										X		x	x			X	X								
		W10AGW (5')										X			X			X	X								

* TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=Hcl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter.

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#: _____

Logged By: _____ Date: _____

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: _____

Sample Condition Upon Receipt
1. CHILLED Y☐ N☐ 4. SEALED Y☐ N☐
2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐
3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client:
Attn:
Address: 6671 Brisa St.
City Livermore State CA Zip Code 94550
TEL: (925) 371-5900
FAX: (925) 371-5915

Project Name: Caltrans- Dumbarton Bridge Project #: E8435-06-18 Sampler: (Printed Name) John Love (Signature)

Relinquished by: (Signature and Printed Name) John Love	Date: 6/3/09	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
John Love 6/3/09 (Print Name / Date)
(Signature)

Send Report To:
Attn: _____
Co: same as above
Address _____
City _____ State ____ Zip ____

Bill To:
Attn: _____
Co: same as above
Address _____
City _____ State ____ Zip ____

Special Instructions/Comments:

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

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- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

Circle or Add Analysis(es) Requested

SPECIFY APPROPRIATE MATRIX

PRESERVATION

Q A / Q C
RTNE ☐ CT ☐ SWRCB ☐ Logcode ____ OTHER ____

ITEM	LAB USE ONLY: Batch # / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	8010B (Total Metals)	8015B (GRO) / 8020 (BTEX)	8015B (DRO)	TITLE 22 / CAM 17 (6010 / 7000)	As (WET)	Cr (WET)	Pb (WET)	Hg (WET)	Ni (WET)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	REMARKS
		W10B (0')	3/4/01							X			X				X						E	1	T P	
		W15BGW (0')								X			X				X									
		W20AGW (5')								X			X				X									
		W20B (0')								X			X				X									
		FW1 (0')								X					X		X							T m	
		FW1 (2')								X			X				X									
		FW2 (0')								X			X				X									
		FW2 (2')								X					X		X									
		FW3 (0')								X			X				X									
		FW3 (2')								X			X				X									

• TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=Hcl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: White with report, Yellow to folder, Pink to submitter.

CHAIN OF CUSTODY RECORD

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Signal Hill, CA 90755
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FOR LABORATORY USE ONLY:

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Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: _____

Sample Condition Upon Receipt: 1. CHILLED Y☐ N☐ 4. SEALED Y☐ N☐ 2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐ 3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client: ~~Caltrans - Dumbarton Bridge~~ Geocon Consultants
Attn: John Love
Address: 6671 Brisa St.
City Livermore State CA Zip Code
TEL: (925) 371-5900
FAX: (925) 371-5915

Project Name: Caltrans - Dumbarton Bridge Project #: E8435-06-18 Sampler: (Printed Name) John Love (Signature)

Relinquished by: (Signature and Printed Name) John Love	Date: 6/3/09	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
John Love 6/3/09
Print Name Date
Signature

Send Report To:
Attn: _____
Co: same as above
Address _____
City _____ State ____ Zip ____

Bill To:
Attn: _____
Co: same as above
Address _____
City _____ State ____ Zip ____

Special Instructions/Comments:

Sample/Records - Archival & Disposal
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- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time
		FW4 (0')	3/2/09	
		FW4 (2')	↓	

Circle or Add Analysis(es) Requested

8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	8010B (Total Metals)	8015B (GRO) / 8020 (BTEX)	8015B (DRO)	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	VA (WET)	CC (WET)	Hg (WET)	PB (WET)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
								X	X	X	X		X				E	1	T M		
								X	X	X			X				↓	↓	↓ ↓		

SPECIFY APPROPRIATE MATRIX

QA/QC: RTNE ☐ CT ☐ SWRCB ☐ Logcode ____ OTHER ____

- TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter.

April 07, 2009

John Love
Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550

TEL: (925) 525-4142
FAX: (925) 371-5915

ELAP No.: 1838
NELAP No.: 02107CA
NEVADA.: CA-401
CSDLAC No.: 10196

Workorder No.: 104786

RE: Caltrans Dumbarton Bridge, E8435-06-18

Attention: John Love

Enclosed are the results for sample(s) received on March 28, 2009 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter and the case narrative are an integral part of this analytical report and cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Project: Caltrans Dumbarton Bridge, E8435-06-18
Lab Order: 104786

CASE NARRATIVE

Analytical Comments for Method 6010

Matrix Spike (MS) and /or Matrix Spike Duplicate (MSD) are/is outside recovery criteria for sample 104787-004AMSD; however, the analytical batch was validated by the Laboratory Control Sample (LCS).

RPD for Duplicate (DUP) is outside criteria for samples 104767-001BDUP and 104787-004ADUP; however, the Laboratory Control Sample (LCS) validated the analytical batch.

Analytical Comments for Method 8015 (DRO/ORO)

Surrogate recovery biased low for sample 104786-001D, possibly due to matrix interferences.

Analytical Comments for Method 8270

Surrogate recovery biased high for sample 104786-009A, possibly due to matrix interferences.

Matrix Spike (MS) and /or Matrix Spike Duplicate (MSD) are/is outside recovery criteria for samples 104786-003AMS and 104787-006AMSD; however, the analytical batch was validated by the Laboratory Control Sample (LCS).

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W5BGW
Lab Order:	104786	**Collection Date:**	3/26/2009 1:05:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104786-001A		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS11_090331A QC Batch: A09VW063 PrepDate: Analyst: **SLL**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	3/31/2009 04:50 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	3/31/2009 04:50 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	3/31/2009 04:50 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	3/31/2009 04:50 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	3/31/2009 04:50 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	3/31/2009 04:50 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	3/31/2009 04:50 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	3/31/2009 04:50 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	3/31/2009 04:50 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	3/31/2009 04:50 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	3/31/2009 04:50 PM
1,2-Dibromo-3-chloropropane	ND	0.50		µg/L	1	3/31/2009 04:50 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	3/31/2009 04:50 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2009 04:50 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	3/31/2009 04:50 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	3/31/2009 04:50 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	3/31/2009 04:50 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2009 04:50 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	3/31/2009 04:50 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2009 04:50 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	3/31/2009 04:50 PM
2-Chlorotoluene	ND	0.50		µg/L	1	3/31/2009 04:50 PM
4-Chlorotoluene	ND	0.50		µg/L	1	3/31/2009 04:50 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	3/31/2009 04:50 PM
Benzene	ND	0.50		µg/L	1	3/31/2009 04:50 PM
Bromobenzene	ND	0.50		µg/L	1	3/31/2009 04:50 PM
Bromodichloromethane	ND	0.50		µg/L	1	3/31/2009 04:50 PM
Bromoform	ND	0.50		µg/L	1	3/31/2009 04:50 PM
Bromomethane	ND	0.50		µg/L	1	3/31/2009 04:50 PM
Carbon tetrachloride	ND	0.50		µg/L	1	3/31/2009 04:50 PM
Chlorobenzene	ND	0.50		µg/L	1	3/31/2009 04:50 PM
Chloroethane	ND	0.50		µg/L	1	3/31/2009 04:50 PM
Chloroform	ND	0.50		µg/L	1	3/31/2009 04:50 PM
Chloromethane	ND	0.50		µg/L	1	3/31/2009 04:50 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	3/31/2009 04:50 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W5BGW
Lab Order:	104786	**Collection Date:**	3/26/2009 1:05:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104786-001A		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS11_090331A QC Batch: A09VW063 PrepDate: Analyst: **SLL**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
cis-1,3-Dichloropropene	ND	0.50		µg/L	1	3/31/2009 04:50 PM
Dibromochloromethane	ND	0.50		µg/L	1	3/31/2009 04:50 PM
Dibromomethane	ND	0.50		µg/L	1	3/31/2009 04:50 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	3/31/2009 04:50 PM
Ethylbenzene	ND	0.50		µg/L	1	3/31/2009 04:50 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	3/31/2009 04:50 PM
Isopropylbenzene	ND	0.50		µg/L	1	3/31/2009 04:50 PM
m,p-Xylene	ND	1.0		µg/L	1	3/31/2009 04:50 PM
Methylene chloride	ND	1.0		µg/L	1	3/31/2009 04:50 PM
n-Butylbenzene	ND	0.50		µg/L	1	3/31/2009 04:50 PM
n-Propylbenzene	ND	0.50		µg/L	1	3/31/2009 04:50 PM
Naphthalene	ND	0.50		µg/L	1	3/31/2009 04:50 PM
o-Xylene	ND	0.50		µg/L	1	3/31/2009 04:50 PM
sec-Butylbenzene	ND	0.50		µg/L	1	3/31/2009 04:50 PM
Styrene	ND	0.50		µg/L	1	3/31/2009 04:50 PM
tert-Butylbenzene	ND	0.50		µg/L	1	3/31/2009 04:50 PM
Tetrachloroethene	ND	0.50		µg/L	1	3/31/2009 04:50 PM
Toluene	ND	0.50		µg/L	1	3/31/2009 04:50 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	3/31/2009 04:50 PM
Trichloroethene	ND	0.50		µg/L	1	3/31/2009 04:50 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	3/31/2009 04:50 PM
Vinyl chloride	ND	0.50		µg/L	1	3/31/2009 04:50 PM
Surr: 1,2-Dichloroethane-d4	97.6	70-130		%REC	1	3/31/2009 04:50 PM
Surr: 4-Bromofluorobenzene	93.4	70-130		%REC	1	3/31/2009 04:50 PM
Surr: Dibromofluoromethane	103	70-130		%REC	1	3/31/2009 04:50 PM
Surr: Toluene-d8	107	70-130		%REC	1	3/31/2009 04:50 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W5BGW
Lab Order:	104786	**Collection Date:**	3/26/2009 1:05:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104786-001B		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
GASOLINE RANGE ORGANICS BY GC/FID						
		EPA 8015B(M)				
RunID: GC1_090401A	QC Batch: D09VW051			PrepDate:		Analyst: **BD**
GRO	ND	0.050		mg/L	1	4/1/2009 06:35 PM
Surr: Bromofluorobenzene (FID)	89.2	71-130		%REC	1	4/1/2009 06:35 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W5BGW
Lab Order:	104786	**Collection Date:**	3/26/2009 1:05:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104786-001C		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3510C **EPA 8270C**

RunID: MS6_090331A QC Batch: 54393 PrepDate: 3/31/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,2,4-Trichlorobenzene	ND	10		µg/L	1	4/1/2009 01:07 PM
1,2-Dichlorobenzene	ND	10		µg/L	1	4/1/2009 01:07 PM
1,3-Dichlorobenzene	ND	10		µg/L	1	4/1/2009 01:07 PM
1,4-Dichlorobenzene	ND	10		µg/L	1	4/1/2009 01:07 PM
2,4,5-Trichlorophenol	ND	10		µg/L	1	4/1/2009 01:07 PM
2,4,6-Trichlorophenol	ND	10		µg/L	1	4/1/2009 01:07 PM
2,4-Dichlorophenol	ND	10		µg/L	1	4/1/2009 01:07 PM
2,4-Dimethylphenol	ND	10		µg/L	1	4/1/2009 01:07 PM
2,4-Dinitrophenol	ND	50		µg/L	1	4/1/2009 01:07 PM
2,4-Dinitrotoluene	ND	10		µg/L	1	4/1/2009 01:07 PM
2,6-Dinitrotoluene	ND	10		µg/L	1	4/1/2009 01:07 PM
2-Chloronaphthalene	ND	10		µg/L	1	4/1/2009 01:07 PM
2-Chlorophenol	ND	10		µg/L	1	4/1/2009 01:07 PM
2-Methylnaphthalene	ND	10		µg/L	1	4/1/2009 01:07 PM
2-Methylphenol	ND	10		µg/L	1	4/1/2009 01:07 PM
2-Nitroaniline	ND	50		µg/L	1	4/1/2009 01:07 PM
2-Nitrophenol	ND	10		µg/L	1	4/1/2009 01:07 PM
3,3´-Dichlorobenzidine	ND	20		µg/L	1	4/1/2009 01:07 PM
3-Nitroaniline	ND	50		µg/L	1	4/1/2009 01:07 PM
4,6-Dinitro-2-methylphenol	ND	50		µg/L	1	4/1/2009 01:07 PM
4-Bromophenyl-phenylether	ND	10		µg/L	1	4/1/2009 01:07 PM
4-Chloro-3-methylphenol	ND	50		µg/L	1	4/1/2009 01:07 PM
4-Chloroaniline	ND	20		µg/L	1	4/1/2009 01:07 PM
4-Chlorophenyl-phenylether	ND	10		µg/L	1	4/1/2009 01:07 PM
4-Methylphenol	ND	10		µg/L	1	4/1/2009 01:07 PM
4-Nitroaniline	ND	20		µg/L	1	4/1/2009 01:07 PM
4-Nitrophenol	ND	50		µg/L	1	4/1/2009 01:07 PM
Acenaphthene	ND	10		µg/L	1	4/1/2009 01:07 PM
Acenaphthylene	ND	10		µg/L	1	4/1/2009 01:07 PM
Anthracene	ND	10		µg/L	1	4/1/2009 01:07 PM
Benzidine (M)	ND	50		µg/L	1	4/1/2009 01:07 PM
Benzo(a)anthracene	ND	10		µg/L	1	4/1/2009 01:07 PM
Benzo(a)pyrene	ND	10		µg/L	1	4/1/2009 01:07 PM
Benzo(b)fluoranthene	ND	10		µg/L	1	4/1/2009 01:07 PM
Benzo(g,h,i)perylene	ND	10		µg/L	1	4/1/2009 01:07 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W5BGW
Lab Order:	104786	**Collection Date:**	3/26/2009 1:05:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104786-001C		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3510C **EPA 8270C**

RunID: MS6_090331A QC Batch: 54393 PrepDate: 3/31/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Benzo(k)fluoranthene	ND	10		µg/L	1	4/1/2009 01:07 PM
Benzoic acid	ND	50		µg/L	1	4/1/2009 01:07 PM
Benzyl alcohol	ND	20		µg/L	1	4/1/2009 01:07 PM
Bis(2-chloroethoxy)methane	ND	10		µg/L	1	4/1/2009 01:07 PM
Bis(2-chloroethyl)ether	ND	10		µg/L	1	4/1/2009 01:07 PM
Bis(2-chloroisopropyl)ether	ND	10		µg/L	1	4/1/2009 01:07 PM
Bis(2-ethylhexyl)phthalate	ND	10		µg/L	1	4/1/2009 01:07 PM
Butylbenzylphthalate	ND	10		µg/L	1	4/1/2009 01:07 PM
Chrysene	ND	10		µg/L	1	4/1/2009 01:07 PM
Di-n-butylphthalate	ND	10		µg/L	1	4/1/2009 01:07 PM
Di-n-octylphthalate	ND	10		µg/L	1	4/1/2009 01:07 PM
Dibenz(a,h)anthracene	ND	10		µg/L	1	4/1/2009 01:07 PM
Dibenzofuran	ND	10		µg/L	1	4/1/2009 01:07 PM
Diethylphthalate	ND	10		µg/L	1	4/1/2009 01:07 PM
Dimethylphthalate	ND	10		µg/L	1	4/1/2009 01:07 PM
Fluoranthene	ND	10		µg/L	1	4/1/2009 01:07 PM
Fluorene	ND	10		µg/L	1	4/1/2009 01:07 PM
Hexachlorobenzene	ND	10		µg/L	1	4/1/2009 01:07 PM
Hexachlorobutadiene	ND	20		µg/L	1	4/1/2009 01:07 PM
Hexachlorocyclopentadiene	ND	10		µg/L	1	4/1/2009 01:07 PM
Hexachloroethane	ND	10		µg/L	1	4/1/2009 01:07 PM
Indeno(1,2,3-cd)pyrene	ND	10		µg/L	1	4/1/2009 01:07 PM
Isophorone	ND	10		µg/L	1	4/1/2009 01:07 PM
N-Nitrosodi-n-propylamine	ND	10		µg/L	1	4/1/2009 01:07 PM
N-Nitrosodiphenylamine	ND	10		µg/L	1	4/1/2009 01:07 PM
Naphthalene	ND	10		µg/L	1	4/1/2009 01:07 PM
Nitrobenzene	ND	10		µg/L	1	4/1/2009 01:07 PM
Pentachlorophenol	ND	50		µg/L	1	4/1/2009 01:07 PM
Phenanthrene	ND	10		µg/L	1	4/1/2009 01:07 PM
Phenol	ND	10		µg/L	1	4/1/2009 01:07 PM
Pyrene	ND	10		µg/L	1	4/1/2009 01:07 PM
Surr: 1,2-Dichlorobenzene-d4	62.9	42-98		%REC	1	4/1/2009 01:07 PM
Surr: 2,4,6-Tribromophenol	110	60-128		%REC	1	4/1/2009 01:07 PM
Surr: 2-Chlorophenol-d4	62.7	43-102		%REC	1	4/1/2009 01:07 PM
Surr: 2-Fluorobiphenyl	82.9	50-108		%REC	1	4/1/2009 01:07 PM

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ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W5BGW
Lab Order:	104786	**Collection Date:**	3/26/2009 1:05:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104786-001C		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 3510C				**EPA 8270C**		
RunID: MS6_090331A	QC Batch: 54393			PrepDate: 3/31/2009	Analyst: **DMP**	
Surr: 2-Fluorophenol	39.1	22-69		%REC	1	4/1/2009 01:07 PM
Surr: 4-Terphenyl-d14	103	66-130		%REC	1	4/1/2009 01:07 PM
Surr: Nitrobenzene-d5	75.6	47-117		%REC	1	4/1/2009 01:07 PM
Surr: Phenol-d5	31.5	16-50		%REC	1	4/1/2009 01:07 PM

Qualifiers:

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S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W5BGW
Lab Order:	104786	**Collection Date:**	3/26/2009 1:05:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104786-001D		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
EPA 3510C				**EPA 8015B**		
RunID: GC16_090401E	QC Batch: 54441			PrepDate:	4/1/2009	Analyst: **CBR**
DRO	ND	0.062		mg/L	1	4/1/2009 11:45 PM
ORO	ND	0.062		mg/L	1	4/1/2009 11:45 PM
Surr: p-Terphenyl	29.2	35-131	S	%REC	1	4/1/2009 11:45 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W5BGW
Lab Order:	104786	**Collection Date:**	3/26/2009 1:05:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104786-001E		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3010A			**EPA 6010B**		
RunID: ICP8_090403D	QC Batch: 54486			PrepDate: 4/2/2009	Analyst: **CL**	
Antimony	ND	0.0050		mg/L	1	4/3/2009 12:44 PM
Arsenic	ND	0.010		mg/L	1	4/3/2009 12:44 PM
Barium	0.24	0.0030		mg/L	1	4/3/2009 12:44 PM
Beryllium	ND	0.0030		mg/L	1	4/3/2009 12:44 PM
Cadmium	ND	0.0030		mg/L	1	4/3/2009 12:44 PM
Chromium	ND	0.0030		mg/L	1	4/3/2009 12:44 PM
Cobalt	0.024	0.0030		mg/L	1	4/3/2009 12:44 PM
Copper	ND	0.0050		mg/L	1	4/3/2009 12:44 PM
Lead	ND	0.0050		mg/L	1	4/3/2009 12:44 PM
Molybdenum	0.0097	0.0050		mg/L	1	4/3/2009 12:44 PM
Nickel	0.062	0.0050		mg/L	1	4/3/2009 12:44 PM
Selenium	0.012	0.010		mg/L	1	4/3/2009 12:44 PM
Silver	ND	0.0030		mg/L	1	4/3/2009 12:44 PM
Thallium	ND	0.015		mg/L	1	4/3/2009 12:44 PM
Vanadium	ND	0.0030		mg/L	1	4/3/2009 12:44 PM
Zinc	0.025	0.010		mg/L	1	4/3/2009 12:44 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7470A		
RunID: AA1_090403D	QC Batch: 54480			PrepDate: 4/2/2009	Analyst: **RQ**	
Mercury	ND	0.20		µg/L	1	4/3/2009 03:20 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W5BGW
Lab Order:	104786	**Collection Date:**	3/26/2009 1:05:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104786-001F		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
TOTAL FILTERABLE RESIDUE						
		SM2540C				
RunID: WETCHEM_090401B	QC Batch: 54508			PrepDate:	4/1/2009	Analyst: **DDL**
Total Dissolved Solids (Residue, Filterable)	12000	200		mg/L	1	4/1/2009 01:00 PM

Qualifiers:

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H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W5BGW
Lab Order:	104786	**Collection Date:**	3/26/2009 1:05:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104786-001G		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
OIL & GREASE						
		EPA 1664 _HEM				
RunID: WETCHEM2_090402B	QC Batch: 54502			PrepDate:	4/2/2009	Analyst: **KXV**
Oil & Grease	ND	4.4		mg/L	1	4/2/2009

Qualifiers:

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H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W5BGW
Lab Order:	104786	**Collection Date:**	3/26/2009 1:05:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104786-001H		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
CYANIDE, TOTAL						
	SM4500-CN E					
RunID: WETCHEM3_090403B	QC Batch: 54519			PrepDate:	4/3/2009	Analyst: **MFP**
Cyanide	ND	0.010		mg/L	1	4/3/2009

Qualifiers:

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H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W5BGW
Lab Order:	104786	**Collection Date:**	3/26/2009 1:05:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104786-001I		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
SULFIDE, DISSOLVED						
		SM4500-S= D				
RunID: WETCHEM3_090401D	QC Batch: R107702			PrepDate:	4/1/2009	Analyst: **MFP**
Sulfide	ND	0.010		mg/L	1	4/1/2009

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	Trip Blank (W5BGW)
Lab Order:	104786	**Collection Date:**	3/26/2009 4:00:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104786-002A		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS11_090331A QC Batch: A09VW063 PrepDate: Analyst: **SLL**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	3/31/2009 02:53 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	3/31/2009 02:53 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	3/31/2009 02:53 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	3/31/2009 02:53 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	3/31/2009 02:53 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	3/31/2009 02:53 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	3/31/2009 02:53 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	3/31/2009 02:53 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	3/31/2009 02:53 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	3/31/2009 02:53 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	3/31/2009 02:53 PM
1,2-Dibromo-3-chloropropane	ND	0.50		µg/L	1	3/31/2009 02:53 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	3/31/2009 02:53 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2009 02:53 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	3/31/2009 02:53 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	3/31/2009 02:53 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	3/31/2009 02:53 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2009 02:53 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	3/31/2009 02:53 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2009 02:53 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	3/31/2009 02:53 PM
2-Chlorotoluene	ND	0.50		µg/L	1	3/31/2009 02:53 PM
4-Chlorotoluene	ND	0.50		µg/L	1	3/31/2009 02:53 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	3/31/2009 02:53 PM
Benzene	ND	0.50		µg/L	1	3/31/2009 02:53 PM
Bromobenzene	ND	0.50		µg/L	1	3/31/2009 02:53 PM
Bromodichloromethane	ND	0.50		µg/L	1	3/31/2009 02:53 PM
Bromoform	ND	0.50		µg/L	1	3/31/2009 02:53 PM
Bromomethane	ND	0.50		µg/L	1	3/31/2009 02:53 PM
Carbon tetrachloride	ND	0.50		µg/L	1	3/31/2009 02:53 PM
Chlorobenzene	ND	0.50		µg/L	1	3/31/2009 02:53 PM
Chloroethane	ND	0.50		µg/L	1	3/31/2009 02:53 PM
Chloroform	ND	0.50		µg/L	1	3/31/2009 02:53 PM
Chloromethane	ND	0.50		µg/L	1	3/31/2009 02:53 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	3/31/2009 02:53 PM

Qualifiers:

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	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	Trip Blank (W5BGW)
Lab Order:	104786	**Collection Date:**	3/26/2009 4:00:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104786-002A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS11_090331A	QC Batch: A09VW063			PrepDate:		Analyst: **SLL**
cis-1,3-Dichloropropene	ND	0.50		µg/L	1	3/31/2009 02:53 PM
Dibromochloromethane	ND	0.50		µg/L	1	3/31/2009 02:53 PM
Dibromomethane	ND	0.50		µg/L	1	3/31/2009 02:53 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	3/31/2009 02:53 PM
Ethylbenzene	ND	0.50		µg/L	1	3/31/2009 02:53 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	3/31/2009 02:53 PM
Isopropylbenzene	ND	0.50		µg/L	1	3/31/2009 02:53 PM
m,p-Xylene	ND	1.0		µg/L	1	3/31/2009 02:53 PM
Methylene chloride	ND	1.0		µg/L	1	3/31/2009 02:53 PM
n-Butylbenzene	ND	0.50		µg/L	1	3/31/2009 02:53 PM
n-Propylbenzene	ND	0.50		µg/L	1	3/31/2009 02:53 PM
Naphthalene	ND	0.50		µg/L	1	3/31/2009 02:53 PM
o-Xylene	ND	0.50		µg/L	1	3/31/2009 02:53 PM
sec-Butylbenzene	ND	0.50		µg/L	1	3/31/2009 02:53 PM
Styrene	ND	0.50		µg/L	1	3/31/2009 02:53 PM
tert-Butylbenzene	ND	0.50		µg/L	1	3/31/2009 02:53 PM
Tetrachloroethene	ND	0.50		µg/L	1	3/31/2009 02:53 PM
Toluene	ND	0.50		µg/L	1	3/31/2009 02:53 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	3/31/2009 02:53 PM
Trichloroethene	ND	0.50		µg/L	1	3/31/2009 02:53 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	3/31/2009 02:53 PM
Vinyl chloride	ND	0.50		µg/L	1	3/31/2009 02:53 PM
Surr: 1,2-Dichloroethane-d4	92.4	70-130		%REC	1	3/31/2009 02:53 PM
Surr: 4-Bromofluorobenzene	90.7	70-130		%REC	1	3/31/2009 02:53 PM
Surr: Dibromofluoromethane	98.6	70-130		%REC	1	3/31/2009 02:53 PM
Surr: Toluene-d8	105	70-130		%REC	1	3/31/2009 02:53 PM

Qualifiers:

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S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	Trip Blank (W5BGW)
Lab Order:	104786	**Collection Date:**	3/26/2009 4:00:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104786-002B		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
GASOLINE RANGE ORGANICS BY GC/FID						
		EPA 8015B(M)				
RunID: GC1_090330A	QC Batch: D09VW048			PrepDate:		Analyst: **BD**
GRO	ND	0.050		mg/L	1	3/30/2009 05:02 PM
Surr: Bromofluorobenzene (FID)	107	71-130		%REC	1	3/30/2009 05:02 PM

Qualifiers:

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S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W5BGW (0')
Lab Order:	104786	**Collection Date:**	3/26/2009 12:23:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104786-003A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090403I	QC Batch: 54489			PrepDate:	4/3/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	4/3/2009 06:57 PM
Arsenic	ND	1.0		mg/Kg	1	4/3/2009 06:57 PM
Barium	54	1.0		mg/Kg	1	4/3/2009 06:57 PM
Beryllium	ND	1.0		mg/Kg	1	4/3/2009 06:57 PM
Cadmium	ND	1.0		mg/Kg	1	4/3/2009 06:57 PM
Chromium	43	1.0		mg/Kg	1	4/3/2009 06:57 PM
Cobalt	18	1.0		mg/Kg	1	4/3/2009 06:57 PM
Copper	47	2.0		mg/Kg	1	4/3/2009 06:57 PM
Lead	ND	1.0		mg/Kg	1	4/3/2009 06:57 PM
Molybdenum	ND	1.0		mg/Kg	1	4/3/2009 06:57 PM
Nickel	44	1.0		mg/Kg	1	4/3/2009 06:57 PM
Selenium	ND	1.0		mg/Kg	1	4/3/2009 06:57 PM
Silver	ND	1.0		mg/Kg	1	4/3/2009 06:57 PM
Thallium	ND	1.0		mg/Kg	1	4/3/2009 06:57 PM
Vanadium	66	1.0		mg/Kg	1	4/3/2009 06:57 PM
Zinc	40	1.0		mg/Kg	1	4/3/2009 06:57 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC8_090406A	QC Batch: 54475			PrepDate:	4/2/2009	Analyst: **CBR**
DRO	11	1.0		mg/Kg	1	4/6/1909 12:04 PM
ORO	54	1.0		mg/Kg	1	4/6/1909 12:04 PM
Surr: p-Terphenyl	75.2	30-130		%REC	1	4/6/1909 12:04 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090403B	QC Batch: 54482			PrepDate:	4/2/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	4/3/2009 01:41 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS6_090401A	QC Batch: 54431			PrepDate:	4/1/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	4/1/2009 07:38 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	4/1/2009 07:38 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	4/1/2009 07:38 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	4/1/2009 07:38 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W5BGW (0')
Lab Order:	104786	**Collection Date:**	3/26/2009 12:23:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104786-003A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS6_090401A QC Batch: 54431 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	4/1/2009 07:38 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	4/1/2009 07:38 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	4/1/2009 07:38 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	4/1/2009 07:38 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	4/1/2009 07:38 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	4/1/2009 07:38 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	4/1/2009 07:38 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	4/1/2009 07:38 PM
2-Chlorophenol	ND	330		µg/Kg	1	4/1/2009 07:38 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	4/1/2009 07:38 PM
2-Methylphenol	ND	330		µg/Kg	1	4/1/2009 07:38 PM
2-Nitroaniline	ND	1600		µg/Kg	1	4/1/2009 07:38 PM
2-Nitrophenol	ND	330		µg/Kg	1	4/1/2009 07:38 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	4/1/2009 07:38 PM
3-Nitroaniline	ND	1600		µg/Kg	1	4/1/2009 07:38 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	4/1/2009 07:38 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	4/1/2009 07:38 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	4/1/2009 07:38 PM
4-Chloroaniline	ND	660		µg/Kg	1	4/1/2009 07:38 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	4/1/2009 07:38 PM
4-Methylphenol	ND	330		µg/Kg	1	4/1/2009 07:38 PM
4-Nitroaniline	ND	1600		µg/Kg	1	4/1/2009 07:38 PM
4-Nitrophenol	ND	1600		µg/Kg	1	4/1/2009 07:38 PM
Acenaphthene	ND	330		µg/Kg	1	4/1/2009 07:38 PM
Acenaphthylene	ND	330		µg/Kg	1	4/1/2009 07:38 PM
Anthracene	ND	330		µg/Kg	1	4/1/2009 07:38 PM
Benzidine (M)	ND	1600		µg/Kg	1	4/1/2009 07:38 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	4/1/2009 07:38 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	4/1/2009 07:38 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	4/1/2009 07:38 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	4/1/2009 07:38 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	4/1/2009 07:38 PM
Benzoic acid	ND	1600		µg/Kg	1	4/1/2009 07:38 PM
Benzyl alcohol	ND	660		µg/Kg	1	4/1/2009 07:38 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	4/1/2009 07:38 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W5BGW (0')
Lab Order:	104786	**Collection Date:**	3/26/2009 12:23:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104786-003A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS6_090401A QC Batch: 54431 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	4/1/2009 07:38 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	4/1/2009 07:38 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	4/1/2009 07:38 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	4/1/2009 07:38 PM
Chrysene	ND	330		µg/Kg	1	4/1/2009 07:38 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	4/1/2009 07:38 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	4/1/2009 07:38 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	4/1/2009 07:38 PM
Dibenzofuran	ND	330		µg/Kg	1	4/1/2009 07:38 PM
Diethylphthalate	ND	330		µg/Kg	1	4/1/2009 07:38 PM
Dimethylphthalate	ND	330		µg/Kg	1	4/1/2009 07:38 PM
Fluoranthene	ND	330		µg/Kg	1	4/1/2009 07:38 PM
Fluorene	ND	330		µg/Kg	1	4/1/2009 07:38 PM
Hexachlorobenzene	ND	330		µg/Kg	1	4/1/2009 07:38 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	4/1/2009 07:38 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	4/1/2009 07:38 PM
Hexachloroethane	ND	330		µg/Kg	1	4/1/2009 07:38 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	4/1/2009 07:38 PM
Isophorone	ND	330		µg/Kg	1	4/1/2009 07:38 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	4/1/2009 07:38 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	4/1/2009 07:38 PM
Naphthalene	ND	330		µg/Kg	1	4/1/2009 07:38 PM
Nitrobenzene	ND	330		µg/Kg	1	4/1/2009 07:38 PM
Pentachlorophenol	ND	1600		µg/Kg	1	4/1/2009 07:38 PM
Phenanthrene	ND	330		µg/Kg	1	4/1/2009 07:38 PM
Phenol	ND	330		µg/Kg	1	4/1/2009 07:38 PM
Pyrene	ND	330		µg/Kg	1	4/1/2009 07:38 PM
Surr: 1,2-Dichlorobenzene-d4	88.8	49-103		%REC	1	4/1/2009 07:38 PM
Surr: 2,4,6-Tribromophenol	103	47-129		%REC	1	4/1/2009 07:38 PM
Surr: 2-Chlorophenol-d4	95.2	54-109		%REC	1	4/1/2009 07:38 PM
Surr: 2-Fluorobiphenyl	99.8	59-108		%REC	1	4/1/2009 07:38 PM
Surr: 2-Fluorophenol	96.5	50-111		%REC	1	4/1/2009 07:38 PM
Surr: 4-Terphenyl-d14	120	58-135		%REC	1	4/1/2009 07:38 PM
Surr: Nitrobenzene-d5	94.5	54-115		%REC	1	4/1/2009 07:38 PM
Surr: Phenol-d5	98.9	58-112		%REC	1	4/1/2009 07:38 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W5BGW (5')
Lab Order:	104786	**Collection Date:**	3/26/2009 12:26:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104786-004A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090403I	QC Batch: 54489			PrepDate:	4/3/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	4/3/2009 07:00 PM
Arsenic	ND	1.0		mg/Kg	1	4/3/2009 07:00 PM
Barium	26	1.0		mg/Kg	1	4/3/2009 07:00 PM
Beryllium	ND	1.0		mg/Kg	1	4/3/2009 07:00 PM
Cadmium	ND	1.0		mg/Kg	1	4/3/2009 07:00 PM
Chromium	41	1.0		mg/Kg	1	4/3/2009 07:00 PM
Cobalt	12	1.0		mg/Kg	1	4/3/2009 07:00 PM
Copper	25	2.0		mg/Kg	1	4/3/2009 07:00 PM
Lead	ND	1.0		mg/Kg	1	4/3/2009 07:00 PM
Molybdenum	ND	1.0		mg/Kg	1	4/3/2009 07:00 PM
Nickel	25	1.0		mg/Kg	1	4/3/2009 07:00 PM
Selenium	ND	1.0		mg/Kg	1	4/3/2009 07:00 PM
Silver	ND	1.0		mg/Kg	1	4/3/2009 07:00 PM
Thallium	ND	1.0		mg/Kg	1	4/3/2009 07:00 PM
Vanadium	61	1.0		mg/Kg	1	4/3/2009 07:00 PM
Zinc	34	1.0		mg/Kg	1	4/3/2009 07:00 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090402D	QC Batch: 54475			PrepDate:	4/2/2009	Analyst: **CBR**
DRO	ND	1.0		mg/Kg	1	4/2/2009 11:53 PM
ORO	ND	1.0		mg/Kg	1	4/2/2009 11:53 PM
Surr: p-Terphenyl	49.4	30-130		%REC	1	4/2/2009 11:53 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090403B	QC Batch: 54482			PrepDate:	4/2/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	4/3/2009 01:43 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS6_090401A	QC Batch: 54431			PrepDate:	4/1/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	4/1/2009 08:06 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	4/1/2009 08:06 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	4/1/2009 08:06 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	4/1/2009 08:06 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W5BGW (5')
Lab Order:	104786	**Collection Date:**	3/26/2009 12:26:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104786-004A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS6_090401A QC Batch: 54431 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	4/1/2009 08:06 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	4/1/2009 08:06 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	4/1/2009 08:06 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	4/1/2009 08:06 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	4/1/2009 08:06 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	4/1/2009 08:06 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	4/1/2009 08:06 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	4/1/2009 08:06 PM
2-Chlorophenol	ND	330		µg/Kg	1	4/1/2009 08:06 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	4/1/2009 08:06 PM
2-Methylphenol	ND	330		µg/Kg	1	4/1/2009 08:06 PM
2-Nitroaniline	ND	1600		µg/Kg	1	4/1/2009 08:06 PM
2-Nitrophenol	ND	330		µg/Kg	1	4/1/2009 08:06 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	4/1/2009 08:06 PM
3-Nitroaniline	ND	1600		µg/Kg	1	4/1/2009 08:06 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	4/1/2009 08:06 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	4/1/2009 08:06 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	4/1/2009 08:06 PM
4-Chloroaniline	ND	660		µg/Kg	1	4/1/2009 08:06 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	4/1/2009 08:06 PM
4-Methylphenol	ND	330		µg/Kg	1	4/1/2009 08:06 PM
4-Nitroaniline	ND	1600		µg/Kg	1	4/1/2009 08:06 PM
4-Nitrophenol	ND	1600		µg/Kg	1	4/1/2009 08:06 PM
Acenaphthene	ND	330		µg/Kg	1	4/1/2009 08:06 PM
Acenaphthylene	ND	330		µg/Kg	1	4/1/2009 08:06 PM
Anthracene	ND	330		µg/Kg	1	4/1/2009 08:06 PM
Benzidine (M)	ND	1600		µg/Kg	1	4/1/2009 08:06 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	4/1/2009 08:06 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	4/1/2009 08:06 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	4/1/2009 08:06 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	4/1/2009 08:06 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	4/1/2009 08:06 PM
Benzoic acid	ND	1600		µg/Kg	1	4/1/2009 08:06 PM
Benzyl alcohol	ND	660		µg/Kg	1	4/1/2009 08:06 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	4/1/2009 08:06 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W5BGW (5')
Lab Order:	104786	**Collection Date:**	3/26/2009 12:26:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104786-004A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS6_090401A QC Batch: 54431 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	4/1/2009 08:06 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	4/1/2009 08:06 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	4/1/2009 08:06 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	4/1/2009 08:06 PM
Chrysene	ND	330		µg/Kg	1	4/1/2009 08:06 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	4/1/2009 08:06 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	4/1/2009 08:06 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	4/1/2009 08:06 PM
Dibenzofuran	ND	330		µg/Kg	1	4/1/2009 08:06 PM
Diethylphthalate	ND	330		µg/Kg	1	4/1/2009 08:06 PM
Dimethylphthalate	ND	330		µg/Kg	1	4/1/2009 08:06 PM
Fluoranthene	ND	330		µg/Kg	1	4/1/2009 08:06 PM
Fluorene	ND	330		µg/Kg	1	4/1/2009 08:06 PM
Hexachlorobenzene	ND	330		µg/Kg	1	4/1/2009 08:06 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	4/1/2009 08:06 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	4/1/2009 08:06 PM
Hexachloroethane	ND	330		µg/Kg	1	4/1/2009 08:06 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	4/1/2009 08:06 PM
Isophorone	ND	330		µg/Kg	1	4/1/2009 08:06 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	4/1/2009 08:06 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	4/1/2009 08:06 PM
Naphthalene	ND	330		µg/Kg	1	4/1/2009 08:06 PM
Nitrobenzene	ND	330		µg/Kg	1	4/1/2009 08:06 PM
Pentachlorophenol	ND	1600		µg/Kg	1	4/1/2009 08:06 PM
Phenanthrene	ND	330		µg/Kg	1	4/1/2009 08:06 PM
Phenol	ND	330		µg/Kg	1	4/1/2009 08:06 PM
Pyrene	ND	330		µg/Kg	1	4/1/2009 08:06 PM
Surr: 1,2-Dichlorobenzene-d4	87.9	49-103		%REC	1	4/1/2009 08:06 PM
Surr: 2,4,6-Tribromophenol	99.9	47-129		%REC	1	4/1/2009 08:06 PM
Surr: 2-Chlorophenol-d4	93.7	54-109		%REC	1	4/1/2009 08:06 PM
Surr: 2-Fluorobiphenyl	101	59-108		%REC	1	4/1/2009 08:06 PM
Surr: 2-Fluorophenol	96.4	50-111		%REC	1	4/1/2009 08:06 PM
Surr: 4-Terphenyl-d14	126	58-135		%REC	1	4/1/2009 08:06 PM
Surr: Nitrobenzene-d5	95.2	54-115		%REC	1	4/1/2009 08:06 PM
Surr: Phenol-d5	96.2	58-112		%REC	1	4/1/2009 08:06 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W5BGW (10')
Lab Order:	104786	**Collection Date:**	3/26/2009 12:35:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104786-005A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090403I	QC Batch: 54489			PrepDate:	4/3/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	4/3/2009 07:03 PM
Arsenic	5.4	1.0		mg/Kg	1	4/3/2009 07:03 PM
Barium	26	1.0		mg/Kg	1	4/3/2009 07:03 PM
Beryllium	ND	1.0		mg/Kg	1	4/3/2009 07:03 PM
Cadmium	ND	1.0		mg/Kg	1	4/3/2009 07:03 PM
Chromium	42	1.0		mg/Kg	1	4/3/2009 07:03 PM
Cobalt	7.7	1.0		mg/Kg	1	4/3/2009 07:03 PM
Copper	21	2.0		mg/Kg	1	4/3/2009 07:03 PM
Lead	10	1.0		mg/Kg	1	4/3/2009 07:03 PM
Molybdenum	ND	1.0		mg/Kg	1	4/3/2009 07:03 PM
Nickel	45	1.0		mg/Kg	1	4/3/2009 07:03 PM
Selenium	ND	1.0		mg/Kg	1	4/3/2009 07:03 PM
Silver	ND	1.0		mg/Kg	1	4/3/2009 07:03 PM
Thallium	ND	1.0		mg/Kg	1	4/3/2009 07:03 PM
Vanadium	39	1.0		mg/Kg	1	4/3/2009 07:03 PM
Zinc	46	1.0		mg/Kg	1	4/3/2009 07:03 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC8_090406A	QC Batch: 54475			PrepDate:	4/2/2009	Analyst: **CBR**
DRO	ND	1.0		mg/Kg	1	4/6/1909 11:10 AM
ORO	ND	1.0		mg/Kg	1	4/6/1909 11:10 AM
Surr: p-Terphenyl	40.8	30-130		%REC	1	4/6/1909 11:10 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090403B	QC Batch: 54482			PrepDate:	4/2/2009	Analyst: **RQ**
Mercury	0.18	0.10		mg/Kg	1	4/3/2009 01:45 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS6_090401A	QC Batch: 54431			PrepDate:	4/1/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	4/1/2009 08:33 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	4/1/2009 08:33 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	4/1/2009 08:33 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	4/1/2009 08:33 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W5BGW (10')
Lab Order:	104786	**Collection Date:**	3/26/2009 12:35:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104786-005A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS6_090401A QC Batch: 54431 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	4/1/2009 08:33 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	4/1/2009 08:33 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	4/1/2009 08:33 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	4/1/2009 08:33 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	4/1/2009 08:33 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	4/1/2009 08:33 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	4/1/2009 08:33 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	4/1/2009 08:33 PM
2-Chlorophenol	ND	330		µg/Kg	1	4/1/2009 08:33 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	4/1/2009 08:33 PM
2-Methylphenol	ND	330		µg/Kg	1	4/1/2009 08:33 PM
2-Nitroaniline	ND	1600		µg/Kg	1	4/1/2009 08:33 PM
2-Nitrophenol	ND	330		µg/Kg	1	4/1/2009 08:33 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	4/1/2009 08:33 PM
3-Nitroaniline	ND	1600		µg/Kg	1	4/1/2009 08:33 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	4/1/2009 08:33 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	4/1/2009 08:33 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	4/1/2009 08:33 PM
4-Chloroaniline	ND	660		µg/Kg	1	4/1/2009 08:33 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	4/1/2009 08:33 PM
4-Methylphenol	ND	330		µg/Kg	1	4/1/2009 08:33 PM
4-Nitroaniline	ND	1600		µg/Kg	1	4/1/2009 08:33 PM
4-Nitrophenol	ND	1600		µg/Kg	1	4/1/2009 08:33 PM
Acenaphthene	ND	330		µg/Kg	1	4/1/2009 08:33 PM
Acenaphthylene	ND	330		µg/Kg	1	4/1/2009 08:33 PM
Anthracene	ND	330		µg/Kg	1	4/1/2009 08:33 PM
Benzidine (M)	ND	1600		µg/Kg	1	4/1/2009 08:33 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	4/1/2009 08:33 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	4/1/2009 08:33 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	4/1/2009 08:33 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	4/1/2009 08:33 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	4/1/2009 08:33 PM
Benzoic acid	ND	1600		µg/Kg	1	4/1/2009 08:33 PM
Benzyl alcohol	ND	660		µg/Kg	1	4/1/2009 08:33 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	4/1/2009 08:33 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W5BGW (10')
Lab Order:	104786	**Collection Date:**	3/26/2009 12:35:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104786-005A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS6_090401A QC Batch: 54431 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	4/1/2009 08:33 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	4/1/2009 08:33 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	4/1/2009 08:33 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	4/1/2009 08:33 PM
Chrysene	ND	330		µg/Kg	1	4/1/2009 08:33 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	4/1/2009 08:33 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	4/1/2009 08:33 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	4/1/2009 08:33 PM
Dibenzofuran	ND	330		µg/Kg	1	4/1/2009 08:33 PM
Diethylphthalate	ND	330		µg/Kg	1	4/1/2009 08:33 PM
Dimethylphthalate	ND	330		µg/Kg	1	4/1/2009 08:33 PM
Fluoranthene	ND	330		µg/Kg	1	4/1/2009 08:33 PM
Fluorene	ND	330		µg/Kg	1	4/1/2009 08:33 PM
Hexachlorobenzene	ND	330		µg/Kg	1	4/1/2009 08:33 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	4/1/2009 08:33 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	4/1/2009 08:33 PM
Hexachloroethane	ND	330		µg/Kg	1	4/1/2009 08:33 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	4/1/2009 08:33 PM
Isophorone	ND	330		µg/Kg	1	4/1/2009 08:33 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	4/1/2009 08:33 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	4/1/2009 08:33 PM
Naphthalene	ND	330		µg/Kg	1	4/1/2009 08:33 PM
Nitrobenzene	ND	330		µg/Kg	1	4/1/2009 08:33 PM
Pentachlorophenol	ND	1600		µg/Kg	1	4/1/2009 08:33 PM
Phenanthrene	ND	330		µg/Kg	1	4/1/2009 08:33 PM
Phenol	ND	330		µg/Kg	1	4/1/2009 08:33 PM
Pyrene	ND	330		µg/Kg	1	4/1/2009 08:33 PM
Surr: 1,2-Dichlorobenzene-d4	88.5	49-103		%REC	1	4/1/2009 08:33 PM
Surr: 2,4,6-Tribromophenol	102	47-129		%REC	1	4/1/2009 08:33 PM
Surr: 2-Chlorophenol-d4	94.7	54-109		%REC	1	4/1/2009 08:33 PM
Surr: 2-Fluorobiphenyl	102	59-108		%REC	1	4/1/2009 08:33 PM
Surr: 2-Fluorophenol	96.3	50-111		%REC	1	4/1/2009 08:33 PM
Surr: 4-Terphenyl-d14	121	58-135		%REC	1	4/1/2009 08:33 PM
Surr: Nitrobenzene-d5	97.4	54-115		%REC	1	4/1/2009 08:33 PM
Surr: Phenol-d5	97.7	58-112		%REC	1	4/1/2009 08:33 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W5BGW (15')
Lab Order:	104786	**Collection Date:**	3/26/2009 12:48:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104786-006A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090403I	QC Batch: 54489			PrepDate:	4/3/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	4/3/2009 07:05 PM
Arsenic	2.5	1.0		mg/Kg	1	4/3/2009 07:05 PM
Barium	19	1.0		mg/Kg	1	4/3/2009 07:05 PM
Beryllium	ND	1.0		mg/Kg	1	4/3/2009 07:05 PM
Cadmium	ND	1.0		mg/Kg	1	4/3/2009 07:05 PM
Chromium	38	1.0		mg/Kg	1	4/3/2009 07:05 PM
Cobalt	6.4	1.0		mg/Kg	1	4/3/2009 07:05 PM
Copper	15	2.0		mg/Kg	1	4/3/2009 07:05 PM
Lead	5.0	1.0		mg/Kg	1	4/3/2009 07:05 PM
Molybdenum	ND	1.0		mg/Kg	1	4/3/2009 07:05 PM
Nickel	40	1.0		mg/Kg	1	4/3/2009 07:05 PM
Selenium	ND	1.0		mg/Kg	1	4/3/2009 07:05 PM
Silver	ND	1.0		mg/Kg	1	4/3/2009 07:05 PM
Thallium	ND	1.0		mg/Kg	1	4/3/2009 07:05 PM
Vanadium	32	1.0		mg/Kg	1	4/3/2009 07:05 PM
Zinc	40	1.0		mg/Kg	1	4/3/2009 07:05 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090402D	QC Batch: 54475			PrepDate:	4/2/2009	Analyst: **CBR**
DRO	ND	1.0		mg/Kg	1	4/3/2009 12:11 AM
ORO	ND	1.0		mg/Kg	1	4/3/2009 12:11 AM
Surr: p-Terphenyl	60.6	30-130		%REC	1	4/3/2009 12:11 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090403B	QC Batch: 54482			PrepDate:	4/2/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	4/3/2009 01:47 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS6_090401A	QC Batch: 54431			PrepDate:	4/1/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	4/2/2009 11:39 AM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 11:39 AM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 11:39 AM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 11:39 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W5BGW (15')
Lab Order:	104786	**Collection Date:**	3/26/2009 12:48:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104786-006A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS6_090401A QC Batch: 54431 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 11:39 AM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 11:39 AM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	4/2/2009 11:39 AM
2,4-Dimethylphenol	ND	330		µg/Kg	1	4/2/2009 11:39 AM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	4/2/2009 11:39 AM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 11:39 AM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 11:39 AM
2-Chloronaphthalene	ND	330		µg/Kg	1	4/2/2009 11:39 AM
2-Chlorophenol	ND	330		µg/Kg	1	4/2/2009 11:39 AM
2-Methylnaphthalene	ND	330		µg/Kg	1	4/2/2009 11:39 AM
2-Methylphenol	ND	330		µg/Kg	1	4/2/2009 11:39 AM
2-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 11:39 AM
2-Nitrophenol	ND	330		µg/Kg	1	4/2/2009 11:39 AM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	4/2/2009 11:39 AM
3-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 11:39 AM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	4/2/2009 11:39 AM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 11:39 AM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	4/2/2009 11:39 AM
4-Chloroaniline	ND	660		µg/Kg	1	4/2/2009 11:39 AM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 11:39 AM
4-Methylphenol	ND	330		µg/Kg	1	4/2/2009 11:39 AM
4-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 11:39 AM
4-Nitrophenol	ND	1600		µg/Kg	1	4/2/2009 11:39 AM
Acenaphthene	ND	330		µg/Kg	1	4/2/2009 11:39 AM
Acenaphthylene	ND	330		µg/Kg	1	4/2/2009 11:39 AM
Anthracene	ND	330		µg/Kg	1	4/2/2009 11:39 AM
Benzidine (M)	ND	1600		µg/Kg	1	4/2/2009 11:39 AM
Benzo(a)anthracene	ND	330		µg/Kg	1	4/2/2009 11:39 AM
Benzo(a)pyrene	ND	330		µg/Kg	1	4/2/2009 11:39 AM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	4/2/2009 11:39 AM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	4/2/2009 11:39 AM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	4/2/2009 11:39 AM
Benzoic acid	ND	1600		µg/Kg	1	4/2/2009 11:39 AM
Benzyl alcohol	ND	660		µg/Kg	1	4/2/2009 11:39 AM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	4/2/2009 11:39 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W5BGW (15')
Lab Order:	104786	**Collection Date:**	3/26/2009 12:48:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104786-006A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS6_090401A QC Batch: 54431 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	4/2/2009 11:39 AM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	4/2/2009 11:39 AM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	4/2/2009 11:39 AM
Butylbenzylphthalate	ND	330		µg/Kg	1	4/2/2009 11:39 AM
Chrysene	ND	330		µg/Kg	1	4/2/2009 11:39 AM
Di-n-butylphthalate	ND	330		µg/Kg	1	4/2/2009 11:39 AM
Di-n-octylphthalate	ND	330		µg/Kg	1	4/2/2009 11:39 AM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	4/2/2009 11:39 AM
Dibenzofuran	ND	330		µg/Kg	1	4/2/2009 11:39 AM
Diethylphthalate	ND	330		µg/Kg	1	4/2/2009 11:39 AM
Dimethylphthalate	ND	330		µg/Kg	1	4/2/2009 11:39 AM
Fluoranthene	ND	330		µg/Kg	1	4/2/2009 11:39 AM
Fluorene	ND	330		µg/Kg	1	4/2/2009 11:39 AM
Hexachlorobenzene	ND	330		µg/Kg	1	4/2/2009 11:39 AM
Hexachlorobutadiene	ND	660		µg/Kg	1	4/2/2009 11:39 AM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	4/2/2009 11:39 AM
Hexachloroethane	ND	330		µg/Kg	1	4/2/2009 11:39 AM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	4/2/2009 11:39 AM
Isophorone	ND	330		µg/Kg	1	4/2/2009 11:39 AM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	4/2/2009 11:39 AM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	4/2/2009 11:39 AM
Naphthalene	ND	330		µg/Kg	1	4/2/2009 11:39 AM
Nitrobenzene	ND	330		µg/Kg	1	4/2/2009 11:39 AM
Pentachlorophenol	ND	1600		µg/Kg	1	4/2/2009 11:39 AM
Phenanthrene	ND	330		µg/Kg	1	4/2/2009 11:39 AM
Phenol	ND	330		µg/Kg	1	4/2/2009 11:39 AM
Pyrene	ND	330		µg/Kg	1	4/2/2009 11:39 AM
Surr: 1,2-Dichlorobenzene-d4	90.8	49-103		%REC	1	4/2/2009 11:39 AM
Surr: 2,4,6-Tribromophenol	103	47-129		%REC	1	4/2/2009 11:39 AM
Surr: 2-Chlorophenol-d4	96.2	54-109		%REC	1	4/2/2009 11:39 AM
Surr: 2-Fluorobiphenyl	108	59-108		%REC	1	4/2/2009 11:39 AM
Surr: 2-Fluorophenol	96.8	50-111		%REC	1	4/2/2009 11:39 AM
Surr: 4-Terphenyl-d14	130	58-135		%REC	1	4/2/2009 11:39 AM
Surr: Nitrobenzene-d5	97.3	54-115		%REC	1	4/2/2009 11:39 AM
Surr: Phenol-d5	97.5	58-112		%REC	1	4/2/2009 11:39 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W10B (0')
Lab Order:	104786	**Collection Date:**	3/26/2009 3:14:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104786-007A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090403I	QC Batch: 54489			PrepDate:	4/3/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	4/3/2009 07:09 PM
Arsenic	ND	1.0		mg/Kg	1	4/3/2009 07:09 PM
Barium	61	1.0		mg/Kg	1	4/3/2009 07:09 PM
Beryllium	ND	1.0		mg/Kg	1	4/3/2009 07:09 PM
Cadmium	ND	1.0		mg/Kg	1	4/3/2009 07:09 PM
Chromium	47	1.0		mg/Kg	1	4/3/2009 07:09 PM
Cobalt	16	1.0		mg/Kg	1	4/3/2009 07:09 PM
Copper	43	2.0		mg/Kg	1	4/3/2009 07:09 PM
Lead	ND	1.0		mg/Kg	1	4/3/2009 07:09 PM
Molybdenum	ND	1.0		mg/Kg	1	4/3/2009 07:09 PM
Nickel	40	1.0		mg/Kg	1	4/3/2009 07:09 PM
Selenium	ND	1.0		mg/Kg	1	4/3/2009 07:09 PM
Silver	ND	1.0		mg/Kg	1	4/3/2009 07:09 PM
Thallium	ND	1.0		mg/Kg	1	4/3/2009 07:09 PM
Vanadium	51	1.0		mg/Kg	1	4/3/2009 07:09 PM
Zinc	34	1.0		mg/Kg	1	4/3/2009 07:09 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC8_090406A	QC Batch: 54475			PrepDate:	4/2/2009	Analyst: **CBR**
DRO	6.4	1.0		mg/Kg	1	4/6/1909 11:37 AM
ORO	26	1.0		mg/Kg	1	4/6/1909 11:37 AM
Surr: p-Terphenyl	73.2	30-130		%REC	1	4/6/1909 11:37 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090403B	QC Batch: 54482			PrepDate:	4/2/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	4/3/2009 01:49 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS6_090401A	QC Batch: 54431			PrepDate:	4/1/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	4/2/2009 12:35 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 12:35 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 12:35 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 12:35 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W10B (0')
Lab Order:	104786	**Collection Date:**	3/26/2009 3:14:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104786-007A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS6_090401A QC Batch: 54431 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 12:35 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 12:35 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	4/2/2009 12:35 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	4/2/2009 12:35 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	4/2/2009 12:35 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 12:35 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 12:35 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	4/2/2009 12:35 PM
2-Chlorophenol	ND	330		µg/Kg	1	4/2/2009 12:35 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	4/2/2009 12:35 PM
2-Methylphenol	ND	330		µg/Kg	1	4/2/2009 12:35 PM
2-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 12:35 PM
2-Nitrophenol	ND	330		µg/Kg	1	4/2/2009 12:35 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	4/2/2009 12:35 PM
3-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 12:35 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	4/2/2009 12:35 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 12:35 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	4/2/2009 12:35 PM
4-Chloroaniline	ND	660		µg/Kg	1	4/2/2009 12:35 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 12:35 PM
4-Methylphenol	ND	330		µg/Kg	1	4/2/2009 12:35 PM
4-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 12:35 PM
4-Nitrophenol	ND	1600		µg/Kg	1	4/2/2009 12:35 PM
Acenaphthene	ND	330		µg/Kg	1	4/2/2009 12:35 PM
Acenaphthylene	ND	330		µg/Kg	1	4/2/2009 12:35 PM
Anthracene	ND	330		µg/Kg	1	4/2/2009 12:35 PM
Benzidine (M)	ND	1600		µg/Kg	1	4/2/2009 12:35 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	4/2/2009 12:35 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	4/2/2009 12:35 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	4/2/2009 12:35 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	4/2/2009 12:35 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	4/2/2009 12:35 PM
Benzoic acid	ND	1600		µg/Kg	1	4/2/2009 12:35 PM
Benzyl alcohol	ND	660		µg/Kg	1	4/2/2009 12:35 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	4/2/2009 12:35 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W10B (0')
Lab Order:	104786	**Collection Date:**	3/26/2009 3:14:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104786-007A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS6_090401A QC Batch: 54431 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	4/2/2009 12:35 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	4/2/2009 12:35 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	4/2/2009 12:35 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	4/2/2009 12:35 PM
Chrysene	ND	330		µg/Kg	1	4/2/2009 12:35 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	4/2/2009 12:35 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	4/2/2009 12:35 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	4/2/2009 12:35 PM
Dibenzofuran	ND	330		µg/Kg	1	4/2/2009 12:35 PM
Diethylphthalate	ND	330		µg/Kg	1	4/2/2009 12:35 PM
Dimethylphthalate	ND	330		µg/Kg	1	4/2/2009 12:35 PM
Fluoranthene	ND	330		µg/Kg	1	4/2/2009 12:35 PM
Fluorene	ND	330		µg/Kg	1	4/2/2009 12:35 PM
Hexachlorobenzene	ND	330		µg/Kg	1	4/2/2009 12:35 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	4/2/2009 12:35 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	4/2/2009 12:35 PM
Hexachloroethane	ND	330		µg/Kg	1	4/2/2009 12:35 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	4/2/2009 12:35 PM
Isophorone	ND	330		µg/Kg	1	4/2/2009 12:35 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	4/2/2009 12:35 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	4/2/2009 12:35 PM
Naphthalene	ND	330		µg/Kg	1	4/2/2009 12:35 PM
Nitrobenzene	ND	330		µg/Kg	1	4/2/2009 12:35 PM
Pentachlorophenol	ND	1600		µg/Kg	1	4/2/2009 12:35 PM
Phenanthrene	ND	330		µg/Kg	1	4/2/2009 12:35 PM
Phenol	ND	330		µg/Kg	1	4/2/2009 12:35 PM
Pyrene	ND	330		µg/Kg	1	4/2/2009 12:35 PM
Surr: 1,2-Dichlorobenzene-d4	85.6	49-103		%REC	1	4/2/2009 12:35 PM
Surr: 2,4,6-Tribromophenol	94.2	47-129		%REC	1	4/2/2009 12:35 PM
Surr: 2-Chlorophenol-d4	91.0	54-109		%REC	1	4/2/2009 12:35 PM
Surr: 2-Fluorobiphenyl	106	59-108		%REC	1	4/2/2009 12:35 PM
Surr: 2-Fluorophenol	92.3	50-111		%REC	1	4/2/2009 12:35 PM
Surr: 4-Terphenyl-d14	122	58-135		%REC	1	4/2/2009 12:35 PM
Surr: Nitrobenzene-d5	94.1	54-115		%REC	1	4/2/2009 12:35 PM
Surr: Phenol-d5	92.3	58-112		%REC	1	4/2/2009 12:35 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W10B (5')
Lab Order:	104786	**Collection Date:**	3/26/2009 3:19:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104786-008A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090403I	QC Batch: 54489			PrepDate:	4/3/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	4/3/2009 07:13 PM
Arsenic	2.9	1.0		mg/Kg	1	4/3/2009 07:13 PM
Barium	100	1.0		mg/Kg	1	4/3/2009 07:13 PM
Beryllium	ND	1.0		mg/Kg	1	4/3/2009 07:13 PM
Cadmium	ND	1.0		mg/Kg	1	4/3/2009 07:13 PM
Chromium	25	1.0		mg/Kg	1	4/3/2009 07:13 PM
Cobalt	7.6	1.0		mg/Kg	1	4/3/2009 07:13 PM
Copper	19	2.0		mg/Kg	1	4/3/2009 07:13 PM
Lead	7.4	1.0		mg/Kg	1	4/3/2009 07:13 PM
Molybdenum	ND	1.0		mg/Kg	1	4/3/2009 07:13 PM
Nickel	37	1.0		mg/Kg	1	4/3/2009 07:13 PM
Selenium	ND	1.0		mg/Kg	1	4/3/2009 07:13 PM
Silver	ND	1.0		mg/Kg	1	4/3/2009 07:13 PM
Thallium	ND	1.0		mg/Kg	1	4/3/2009 07:13 PM
Vanadium	30	1.0		mg/Kg	1	4/3/2009 07:13 PM
Zinc	49	1.0		mg/Kg	1	4/3/2009 07:13 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090402D	QC Batch: 54475			PrepDate:	4/2/2009	Analyst: **CBR**
DRO	1.5	1.0		mg/Kg	1	4/3/2009 12:21 AM
ORO	ND	1.0		mg/Kg	1	4/3/2009 12:21 AM
Surr: p-Terphenyl	60.8	30-130		%REC	1	4/3/2009 12:21 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090403B	QC Batch: 54482			PrepDate:	4/2/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	4/3/2009 01:56 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS6_090401A	QC Batch: 54431			PrepDate:	4/1/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	4/2/2009 12:07 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 12:07 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 12:07 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 12:07 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W10B (5')
Lab Order:	104786	**Collection Date:**	3/26/2009 3:19:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104786-008A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS6_090401A QC Batch: 54431 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 12:07 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 12:07 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	4/2/2009 12:07 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	4/2/2009 12:07 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	4/2/2009 12:07 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 12:07 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 12:07 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	4/2/2009 12:07 PM
2-Chlorophenol	ND	330		µg/Kg	1	4/2/2009 12:07 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	4/2/2009 12:07 PM
2-Methylphenol	ND	330		µg/Kg	1	4/2/2009 12:07 PM
2-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 12:07 PM
2-Nitrophenol	ND	330		µg/Kg	1	4/2/2009 12:07 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	4/2/2009 12:07 PM
3-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 12:07 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	4/2/2009 12:07 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 12:07 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	4/2/2009 12:07 PM
4-Chloroaniline	ND	660		µg/Kg	1	4/2/2009 12:07 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 12:07 PM
4-Methylphenol	ND	330		µg/Kg	1	4/2/2009 12:07 PM
4-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 12:07 PM
4-Nitrophenol	ND	1600		µg/Kg	1	4/2/2009 12:07 PM
Acenaphthene	ND	330		µg/Kg	1	4/2/2009 12:07 PM
Acenaphthylene	ND	330		µg/Kg	1	4/2/2009 12:07 PM
Anthracene	ND	330		µg/Kg	1	4/2/2009 12:07 PM
Benzidine (M)	ND	1600		µg/Kg	1	4/2/2009 12:07 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	4/2/2009 12:07 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	4/2/2009 12:07 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	4/2/2009 12:07 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	4/2/2009 12:07 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	4/2/2009 12:07 PM
Benzoic acid	ND	1600		µg/Kg	1	4/2/2009 12:07 PM
Benzyl alcohol	ND	660		µg/Kg	1	4/2/2009 12:07 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	4/2/2009 12:07 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W10B (5')
Lab Order:	104786	**Collection Date:**	3/26/2009 3:19:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104786-008A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS6_090401A QC Batch: 54431 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	4/2/2009 12:07 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	4/2/2009 12:07 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	4/2/2009 12:07 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	4/2/2009 12:07 PM
Chrysene	ND	330		µg/Kg	1	4/2/2009 12:07 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	4/2/2009 12:07 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	4/2/2009 12:07 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	4/2/2009 12:07 PM
Dibenzofuran	ND	330		µg/Kg	1	4/2/2009 12:07 PM
Diethylphthalate	ND	330		µg/Kg	1	4/2/2009 12:07 PM
Dimethylphthalate	ND	330		µg/Kg	1	4/2/2009 12:07 PM
Fluoranthene	ND	330		µg/Kg	1	4/2/2009 12:07 PM
Fluorene	ND	330		µg/Kg	1	4/2/2009 12:07 PM
Hexachlorobenzene	ND	330		µg/Kg	1	4/2/2009 12:07 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	4/2/2009 12:07 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	4/2/2009 12:07 PM
Hexachloroethane	ND	330		µg/Kg	1	4/2/2009 12:07 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	4/2/2009 12:07 PM
Isophorone	ND	330		µg/Kg	1	4/2/2009 12:07 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	4/2/2009 12:07 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	4/2/2009 12:07 PM
Naphthalene	ND	330		µg/Kg	1	4/2/2009 12:07 PM
Nitrobenzene	ND	330		µg/Kg	1	4/2/2009 12:07 PM
Pentachlorophenol	ND	1600		µg/Kg	1	4/2/2009 12:07 PM
Phenanthrene	ND	330		µg/Kg	1	4/2/2009 12:07 PM
Phenol	ND	330		µg/Kg	1	4/2/2009 12:07 PM
Pyrene	ND	330		µg/Kg	1	4/2/2009 12:07 PM
Surr: 1,2-Dichlorobenzene-d4	87.1	49-103		%REC	1	4/2/2009 12:07 PM
Surr: 2,4,6-Tribromophenol	98.3	47-129		%REC	1	4/2/2009 12:07 PM
Surr: 2-Chlorophenol-d4	92.8	54-109		%REC	1	4/2/2009 12:07 PM
Surr: 2-Fluorobiphenyl	102	59-108		%REC	1	4/2/2009 12:07 PM
Surr: 2-Fluorophenol	92.7	50-111		%REC	1	4/2/2009 12:07 PM
Surr: 4-Terphenyl-d14	127	58-135		%REC	1	4/2/2009 12:07 PM
Surr: Nitrobenzene-d5	93.7	54-115		%REC	1	4/2/2009 12:07 PM
Surr: Phenol-d5	92.9	58-112		%REC	1	4/2/2009 12:07 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT: Geocon Consultants, Inc. **Client Sample ID:** W10B (10')
Lab Order: 104786 **Collection Date:** 3/26/2009 3:33:00 PM
Project: Caltrans Dumbarton Bridge, E8435-06-18 **Matrix:** SOIL
Lab ID: 104786-009A

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090403I	QC Batch: 54489			PrepDate:	4/3/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	4/3/2009 07:16 PM
Arsenic	5.8	1.0		mg/Kg	1	4/3/2009 07:16 PM
Barium	20	1.0		mg/Kg	1	4/3/2009 07:16 PM
Beryllium	ND	1.0		mg/Kg	1	4/3/2009 07:16 PM
Cadmium	ND	1.0		mg/Kg	1	4/3/2009 07:16 PM
Chromium	40	1.0		mg/Kg	1	4/3/2009 07:16 PM
Cobalt	7.5	1.0		mg/Kg	1	4/3/2009 07:16 PM
Copper	15	2.0		mg/Kg	1	4/3/2009 07:16 PM
Lead	6.9	1.0		mg/Kg	1	4/3/2009 07:16 PM
Molybdenum	2.2	1.0		mg/Kg	1	4/3/2009 07:16 PM
Nickel	45	1.0		mg/Kg	1	4/3/2009 07:16 PM
Selenium	ND	1.0		mg/Kg	1	4/3/2009 07:16 PM
Silver	ND	1.0		mg/Kg	1	4/3/2009 07:16 PM
Thallium	ND	1.0		mg/Kg	1	4/3/2009 07:16 PM
Vanadium	36	1.0		mg/Kg	1	4/3/2009 07:16 PM
Zinc	44	1.0		mg/Kg	1	4/3/2009 07:16 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090402D	QC Batch: 54475			PrepDate:	4/2/2009	Analyst: **CBR**
DRO	ND	1.0		mg/Kg	1	4/3/2009 12:30 AM
ORO	ND	1.0		mg/Kg	1	4/3/2009 12:30 AM
Surr: p-Terphenyl	57.5	30-130		%REC	1	4/3/2009 12:30 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090403B	QC Batch: 54482			PrepDate:	4/2/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	4/3/2009 01:58 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS6_090401B	QC Batch: 54432			PrepDate:	4/1/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	4/3/2009 11:21 AM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	4/3/2009 11:21 AM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	4/3/2009 11:21 AM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	4/3/2009 11:21 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W10B (10')
Lab Order:	104786	**Collection Date:**	3/26/2009 3:33:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104786-009A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS6_090401B QC Batch: 54432 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	4/3/2009 11:21 AM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	4/3/2009 11:21 AM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	4/3/2009 11:21 AM
2,4-Dimethylphenol	ND	330		µg/Kg	1	4/3/2009 11:21 AM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	4/3/2009 11:21 AM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	4/3/2009 11:21 AM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	4/3/2009 11:21 AM
2-Chloronaphthalene	ND	330		µg/Kg	1	4/3/2009 11:21 AM
2-Chlorophenol	ND	330		µg/Kg	1	4/3/2009 11:21 AM
2-Methylnaphthalene	ND	330		µg/Kg	1	4/3/2009 11:21 AM
2-Methylphenol	ND	330		µg/Kg	1	4/3/2009 11:21 AM
2-Nitroaniline	ND	1600		µg/Kg	1	4/3/2009 11:21 AM
2-Nitrophenol	ND	330		µg/Kg	1	4/3/2009 11:21 AM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	4/3/2009 11:21 AM
3-Nitroaniline	ND	1600		µg/Kg	1	4/3/2009 11:21 AM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	4/3/2009 11:21 AM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	4/3/2009 11:21 AM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	4/3/2009 11:21 AM
4-Chloroaniline	ND	660		µg/Kg	1	4/3/2009 11:21 AM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	4/3/2009 11:21 AM
4-Methylphenol	ND	330		µg/Kg	1	4/3/2009 11:21 AM
4-Nitroaniline	ND	1600		µg/Kg	1	4/3/2009 11:21 AM
4-Nitrophenol	ND	1600		µg/Kg	1	4/3/2009 11:21 AM
Acenaphthene	ND	330		µg/Kg	1	4/3/2009 11:21 AM
Acenaphthylene	ND	330		µg/Kg	1	4/3/2009 11:21 AM
Anthracene	ND	330		µg/Kg	1	4/3/2009 11:21 AM
Benzidine (M)	ND	1600		µg/Kg	1	4/3/2009 11:21 AM
Benzo(a)anthracene	ND	330		µg/Kg	1	4/3/2009 11:21 AM
Benzo(a)pyrene	ND	330		µg/Kg	1	4/3/2009 11:21 AM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	4/3/2009 11:21 AM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	4/3/2009 11:21 AM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	4/3/2009 11:21 AM
Benzoic acid	ND	1600		µg/Kg	1	4/3/2009 11:21 AM
Benzyl alcohol	ND	660		µg/Kg	1	4/3/2009 11:21 AM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	4/3/2009 11:21 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W10B (10')
Lab Order:	104786	**Collection Date:**	3/26/2009 3:33:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104786-009A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS6_090401B	QC Batch: 54432			PrepDate:	4/1/2009	Analyst: **DMP**
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	4/3/2009 11:21 AM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	4/3/2009 11:21 AM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	4/3/2009 11:21 AM
Butylbenzylphthalate	ND	330		µg/Kg	1	4/3/2009 11:21 AM
Chrysene	ND	330		µg/Kg	1	4/3/2009 11:21 AM
Di-n-butylphthalate	ND	330		µg/Kg	1	4/3/2009 11:21 AM
Di-n-octylphthalate	ND	330		µg/Kg	1	4/3/2009 11:21 AM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	4/3/2009 11:21 AM
Dibenzofuran	ND	330		µg/Kg	1	4/3/2009 11:21 AM
Diethylphthalate	ND	330		µg/Kg	1	4/3/2009 11:21 AM
Dimethylphthalate	ND	330		µg/Kg	1	4/3/2009 11:21 AM
Fluoranthene	ND	330		µg/Kg	1	4/3/2009 11:21 AM
Fluorene	ND	330		µg/Kg	1	4/3/2009 11:21 AM
Hexachlorobenzene	ND	330		µg/Kg	1	4/3/2009 11:21 AM
Hexachlorobutadiene	ND	660		µg/Kg	1	4/3/2009 11:21 AM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	4/3/2009 11:21 AM
Hexachloroethane	ND	330		µg/Kg	1	4/3/2009 11:21 AM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	4/3/2009 11:21 AM
Isophorone	ND	330		µg/Kg	1	4/3/2009 11:21 AM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	4/3/2009 11:21 AM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	4/3/2009 11:21 AM
Naphthalene	ND	330		µg/Kg	1	4/3/2009 11:21 AM
Nitrobenzene	ND	330		µg/Kg	1	4/3/2009 11:21 AM
Pentachlorophenol	ND	1600		µg/Kg	1	4/3/2009 11:21 AM
Phenanthrene	ND	330		µg/Kg	1	4/3/2009 11:21 AM
Phenol	ND	330		µg/Kg	1	4/3/2009 11:21 AM
Pyrene	ND	330		µg/Kg	1	4/3/2009 11:21 AM
Surr: 1,2-Dichlorobenzene-d4	95.2	49-103		%REC	1	4/3/2009 11:21 AM
Surr: 2,4,6-Tribromophenol	112	47-129		%REC	1	4/3/2009 11:21 AM
Surr: 2-Chlorophenol-d4	102	54-109		%REC	1	4/3/2009 11:21 AM
Surr: 2-Fluorobiphenyl	113	59-108	S	%REC	1	4/3/2009 11:21 AM
Surr: 2-Fluorophenol	102	50-111		%REC	1	4/3/2009 11:21 AM
Surr: 4-Terphenyl-d14	130	58-135		%REC	1	4/3/2009 11:21 AM
Surr: Nitrobenzene-d5	106	54-115		%REC	1	4/3/2009 11:21 AM
Surr: Phenol-d5	104	58-112		%REC	1	4/3/2009 11:21 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W10B (15')
Lab Order:	104786	**Collection Date:**	3/26/2009 3:46:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104786-010A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090403I	QC Batch: 54489			PrepDate:	4/3/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	4/3/2009 07:19 PM
Arsenic	1.3	1.0		mg/Kg	1	4/3/2009 07:19 PM
Barium	15	1.0		mg/Kg	1	4/3/2009 07:19 PM
Beryllium	ND	1.0		mg/Kg	1	4/3/2009 07:19 PM
Cadmium	ND	1.0		mg/Kg	1	4/3/2009 07:19 PM
Chromium	28	1.0		mg/Kg	1	4/3/2009 07:19 PM
Cobalt	3.4	1.0		mg/Kg	1	4/3/2009 07:19 PM
Copper	9.3	2.0		mg/Kg	1	4/3/2009 07:19 PM
Lead	4.0	1.0		mg/Kg	1	4/3/2009 07:19 PM
Molybdenum	3.0	1.0		mg/Kg	1	4/3/2009 07:19 PM
Nickel	31	1.0		mg/Kg	1	4/3/2009 07:19 PM
Selenium	ND	1.0		mg/Kg	1	4/3/2009 07:19 PM
Silver	ND	1.0		mg/Kg	1	4/3/2009 07:19 PM
Thallium	ND	1.0		mg/Kg	1	4/3/2009 07:19 PM
Vanadium	26	1.0		mg/Kg	1	4/3/2009 07:19 PM
Zinc	28	1.0		mg/Kg	1	4/3/2009 07:19 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090402D	QC Batch: 54475			PrepDate:	4/2/2009	Analyst: **CBR**
DRO	ND	1.0		mg/Kg	1	4/3/2009 12:39 AM
ORO	ND	1.0		mg/Kg	1	4/3/2009 12:39 AM
Surr: p-Terphenyl	58.6	30-130		%REC	1	4/3/2009 12:39 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090403B	QC Batch: 54482			PrepDate:	4/2/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	4/3/2009 01:37 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS6_090401B	QC Batch: 54432			PrepDate:	4/1/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	4/2/2009 06:37 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 06:37 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 06:37 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 06:37 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W10B (15')
Lab Order:	104786	**Collection Date:**	3/26/2009 3:46:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104786-010A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS6_090401B QC Batch: 54432 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 06:37 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 06:37 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	4/2/2009 06:37 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	4/2/2009 06:37 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	4/2/2009 06:37 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 06:37 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 06:37 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	4/2/2009 06:37 PM
2-Chlorophenol	ND	330		µg/Kg	1	4/2/2009 06:37 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	4/2/2009 06:37 PM
2-Methylphenol	ND	330		µg/Kg	1	4/2/2009 06:37 PM
2-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 06:37 PM
2-Nitrophenol	ND	330		µg/Kg	1	4/2/2009 06:37 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	4/2/2009 06:37 PM
3-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 06:37 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	4/2/2009 06:37 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 06:37 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	4/2/2009 06:37 PM
4-Chloroaniline	ND	660		µg/Kg	1	4/2/2009 06:37 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 06:37 PM
4-Methylphenol	ND	330		µg/Kg	1	4/2/2009 06:37 PM
4-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 06:37 PM
4-Nitrophenol	ND	1600		µg/Kg	1	4/2/2009 06:37 PM
Acenaphthene	ND	330		µg/Kg	1	4/2/2009 06:37 PM
Acenaphthylene	ND	330		µg/Kg	1	4/2/2009 06:37 PM
Anthracene	ND	330		µg/Kg	1	4/2/2009 06:37 PM
Benzidine (M)	ND	1600		µg/Kg	1	4/2/2009 06:37 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	4/2/2009 06:37 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	4/2/2009 06:37 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	4/2/2009 06:37 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	4/2/2009 06:37 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	4/2/2009 06:37 PM
Benzoic acid	ND	1600		µg/Kg	1	4/2/2009 06:37 PM
Benzyl alcohol	ND	660		µg/Kg	1	4/2/2009 06:37 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	4/2/2009 06:37 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W10B (15')
Lab Order:	104786	**Collection Date:**	3/26/2009 3:46:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104786-010A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS6_090401B QC Batch: 54432 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	4/2/2009 06:37 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	4/2/2009 06:37 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	4/2/2009 06:37 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	4/2/2009 06:37 PM
Chrysene	ND	330		µg/Kg	1	4/2/2009 06:37 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	4/2/2009 06:37 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	4/2/2009 06:37 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	4/2/2009 06:37 PM
Dibenzofuran	ND	330		µg/Kg	1	4/2/2009 06:37 PM
Diethylphthalate	ND	330		µg/Kg	1	4/2/2009 06:37 PM
Dimethylphthalate	ND	330		µg/Kg	1	4/2/2009 06:37 PM
Fluoranthene	ND	330		µg/Kg	1	4/2/2009 06:37 PM
Fluorene	ND	330		µg/Kg	1	4/2/2009 06:37 PM
Hexachlorobenzene	ND	330		µg/Kg	1	4/2/2009 06:37 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	4/2/2009 06:37 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	4/2/2009 06:37 PM
Hexachloroethane	ND	330		µg/Kg	1	4/2/2009 06:37 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	4/2/2009 06:37 PM
Isophorone	ND	330		µg/Kg	1	4/2/2009 06:37 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	4/2/2009 06:37 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	4/2/2009 06:37 PM
Naphthalene	ND	330		µg/Kg	1	4/2/2009 06:37 PM
Nitrobenzene	ND	330		µg/Kg	1	4/2/2009 06:37 PM
Pentachlorophenol	ND	1600		µg/Kg	1	4/2/2009 06:37 PM
Phenanthrene	ND	330		µg/Kg	1	4/2/2009 06:37 PM
Phenol	1000	330		µg/Kg	1	4/2/2009 06:37 PM
Pyrene	ND	330		µg/Kg	1	4/2/2009 06:37 PM
Surr: 1,2-Dichlorobenzene-d4	83.3	49-103		%REC	1	4/2/2009 06:37 PM
Surr: 2,4,6-Tribromophenol	95.0	47-129		%REC	1	4/2/2009 06:37 PM
Surr: 2-Chlorophenol-d4	90.4	54-109		%REC	1	4/2/2009 06:37 PM
Surr: 2-Fluorobiphenyl	103	59-108		%REC	1	4/2/2009 06:37 PM
Surr: 2-Fluorophenol	88.3	50-111		%REC	1	4/2/2009 06:37 PM
Surr: 4-Terphenyl-d14	134	58-135		%REC	1	4/2/2009 06:37 PM
Surr: Nitrobenzene-d5	92.4	54-115		%REC	1	4/2/2009 06:37 PM
Surr: Phenol-d5	90.5	58-112		%REC	1	4/2/2009 06:37 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 160.1_2540C_W

Sample ID: **104786-001F-DUP**	SampType: **DUP**	TestCode: **160.1_2540C**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107774**
Client ID: **W5BGW**	Batch ID: **54508**	TestNo: **SM2540C**		Analysis Date: **4/1/2009**	SeqNo: **1689789**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	11620.000	200						11920	2.55	10	

Sample ID: **LCS-54508**	SampType: **LCS**	TestCode: **160.1_2540C**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107774**
Client ID: **LCSW**	Batch ID: **54508**	TestNo: **SM2540C**		Analysis Date: **4/1/2009**	SeqNo: **1689793**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	992.000	10	970.0	0	102	80	120				

Sample ID: **MB-54508**	SampType: **MBLK**	TestCode: **160.1_2540C**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107774**
Client ID: **PBW**	Batch ID: **54508**	TestNo: **SM2540C**		Analysis Date: **4/1/2009**	SeqNo: **1689794**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	ND	10									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 1664_HEM_W

Sample ID: **MB-54502**	SampType: **MBLK**	TestCode: **1664_HEM_**	Units: **mg/L**	Prep Date: **4/2/2009**	RunNo: **107772**
Client ID: **PBW**	Batch ID: **54502**	TestNo: **EPA 1664 _H**		Analysis Date: **4/2/2009**	SeqNo: **1689631**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Oil & Grease	ND	4.0									

Sample ID: **LCS-54502**	SampType: **LCS**	TestCode: **1664_HEM_**	Units: **mg/L**	Prep Date: **4/2/2009**	RunNo: **107772**
Client ID: **LCSW**	Batch ID: **54502**	TestNo: **EPA 1664 _H**		Analysis Date: **4/2/2009**	SeqNo: **1689632**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Oil & Grease	38.000	4.0	40.00	0	95.0	78	114				

Sample ID: **MB-54502-MS**	SampType: **MS**	TestCode: **1664_HEM_**	Units: **mg/L**	Prep Date: **4/2/2009**	RunNo: **107772**
Client ID: **ZZZZZZ**	Batch ID: **54502**	TestNo: **EPA 1664 _H**		Analysis Date: **4/2/2009**	SeqNo: **1689639**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Oil & Grease	37.200	4.0	40.00	0	93.0	78	114				

Sample ID: **MB-54502-MSD**	SampType: **MSD**	TestCode: **1664_HEM_**	Units: **mg/L**	Prep Date: **4/2/2009**	RunNo: **107772**
Client ID: **ZZZZZZ**	Batch ID: **54502**	TestNo: **EPA 1664 _H**		Analysis Date: **4/2/2009**	SeqNo: **1689640**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Oil & Grease	36.800	4.0	40.00	0	92.0	78	114	37.20	1.08	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 335.2_4500CNE_W

Sample ID: **104782-001BMS**	SampType: **MS**	TestCode: **335.2_4500C**	Units: **mg/L**	Prep Date: **4/3/2009**	RunNo: **107819**
Client ID: **ZZZZZZ**	Batch ID: **54519**	TestNo: **SM4500-CN E**		Analysis Date: **4/3/2009**	SeqNo: **1690560**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide	0.396	0.010	0.4000	0	99.0	80	120				

Sample ID: **104782-001BMSD**	SampType: **MSD**	TestCode: **335.2_4500C**	Units: **mg/L**	Prep Date: **4/3/2009**	RunNo: **107819**
Client ID: **ZZZZZZ**	Batch ID: **54519**	TestNo: **SM4500-CN E**		Analysis Date: **4/3/2009**	SeqNo: **1690561**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide	0.392	0.010	0.4000	0	98.0	80	120	0.3960	1.02	20	

Sample ID: **104788-001HDUP**	SampType: **DUP**	TestCode: **335.2_4500C**	Units: **mg/L**	Prep Date: **4/3/2009**	RunNo: **107819**
Client ID: **ZZZZZZ**	Batch ID: **54519**	TestNo: **SM4500-CN E**		Analysis Date: **4/3/2009**	SeqNo: **1690565**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide	ND	0.010						0	0	30	

Sample ID: **LCS-54519**	SampType: **LCS**	TestCode: **335.2_4500C**	Units: **mg/L**	Prep Date: **4/3/2009**	RunNo: **107819**
Client ID: **LCSW**	Batch ID: **54519**	TestNo: **SM4500-CN E**		Analysis Date: **4/3/2009**	SeqNo: **1690566**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide	0.377	0.010	0.4000	0	94.2	80	120				

Sample ID: **MB-54519**	SampType: **MBLK**	TestCode: **335.2_4500C**	Units: **mg/L**	Prep Date: **4/3/2009**	RunNo: **107819**
Client ID: **PBW**	Batch ID: **54519**	TestNo: **SM4500-CN E**		Analysis Date: **4/3/2009**	SeqNo: **1690567**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide	ND	0.010									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 376.2_4500S2_WD

Sample ID: **104789-001IDUP**	SampType: **DUP**	TestCode: **376.2_4500S2**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107702**
Client ID: **ZZZZZZ**	Batch ID: **R107702**	TestNo: **SM4500-S= D**		Analysis Date: **4/1/2009**	SeqNo: **1688339**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfide	0.008	0.010						0.008400	0	30	

Sample ID: **LCS-R107702**	SampType: **LCS**	TestCode: **376.2_4500S2**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107702**
Client ID: **LCSW**	Batch ID: **R107702**	TestNo: **SM4500-S= D**		Analysis Date: **4/1/2009**	SeqNo: **1688340**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfide	0.502	0.010	0.5000	0	100	80	120				

Sample ID: **MB-R107702**	SampType: **MBLK**	TestCode: **376.2_4500S2**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107702**
Client ID: **PBW**	Batch ID: **R107702**	TestNo: **SM4500-S= D**		Analysis Date: **4/1/2009**	SeqNo: **1688341**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfide	ND	0.010									

Sample ID: **MB-R107702MS**	SampType: **MS**	TestCode: **376.2_4500S2**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107702**
Client ID: **ZZZZZZ**	Batch ID: **R107702**	TestNo: **SM4500-S= D**		Analysis Date: **4/1/2009**	SeqNo: **1688342**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfide	0.495	0.010	0.5000	0	99.0	70	120				

Sample ID: **MB-R107702MSD**	SampType: **MSD**	TestCode: **376.2_4500S2**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107702**
Client ID: **ZZZZZZ**	Batch ID: **R107702**	TestNo: **SM4500-S= D**		Analysis Date: **4/1/2009**	SeqNo: **1688343**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfide	0.486	0.010	0.5000	0	97.2	70	120	0.4949	1.79	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **MB-54489** SampType: **MBLK** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **4/3/2009** RunNo: **107827**
Client ID: **PBS** Batch ID: **54489** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **4/3/2009** SeqNo: **1690657**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	2.0									
Arsenic	ND	1.0									
Barium	ND	1.0									
Beryllium	ND	1.0									
Cadmium	0.007	1.0									
Chromium	ND	1.0									
Cobalt	ND	1.0									
Copper	ND	2.0									
Lead	0.600	1.0									
Molybdenum	ND	1.0									
Nickel	0.044	1.0									
Selenium	ND	1.0									
Silver	ND	1.0									
Thallium	ND	1.0									
Vanadium	ND	1.0									
Zinc	ND	1.0									

Sample ID: **LCS-54489** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **4/3/2009** RunNo: **107827**
Client ID: **LCSS** Batch ID: **54489** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **4/3/2009** SeqNo: **1690658**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	46.067	2.0	50.00	0	92.1	80	120				
Arsenic	44.017	1.0	50.00	0	88.0	80	120				
Barium	48.459	1.0	50.00	0	96.9	80	120				
Beryllium	46.640	1.0	50.00	0	93.3	80	120				
Cadmium	46.722	1.0	50.00	0.006673	93.4	80	120				
Chromium	44.208	1.0	50.00	0	88.4	80	120				
Cobalt	48.501	1.0	50.00	0	97.0	80	120				
Copper	48.216	2.0	50.00	0	96.4	80	120				
Lead	50.551	1.0	50.00	0.6001	99.9	80	120				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **LCS-54489** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **4/3/2009** RunNo: **107827**
Client ID: **LCSS** Batch ID: **54489** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **4/3/2009** SeqNo: **1690658**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	48.251	1.0	50.00	0	96.5	80	120				
Nickel	46.717	1.0	50.00	0.04393	93.3	80	120				
Selenium	42.966	1.0	50.00	0	85.9	80	120				
Silver	47.225	1.0	50.00	0	94.4	80	120				
Thallium	41.641	1.0	50.00	0	83.3	80	120				
Vanadium	48.793	1.0	50.00	0	97.6	80	120				
Zinc	46.384	1.0	50.00	0	92.8	80	120				

Sample ID: **104787-004ADUP** SampType: **DUP** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **4/3/2009** RunNo: **107827**
Client ID: **ZZZZZZ** Batch ID: **54489** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **4/3/2009** SeqNo: **1690669**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	0.686	2.0						0	0	20	
Arsenic	2.810	1.0						3.646	25.9	20	R
Barium	109.338	1.0						116.0	5.96	20	
Beryllium	ND	1.0						0	0	20	
Cadmium	0.721	1.0						0.7563	0	20	
Chromium	90.034	1.0						101.4	11.9	20	
Cobalt	16.464	1.0						19.14	15.0	20	
Copper	25.735	2.0						29.82	14.7	20	
Lead	3.785	1.0						3.812	0.693	20	
Molybdenum	ND	1.0						0	0	20	
Nickel	101.133	1.0						137.6	30.5	20	R
Selenium	ND	1.0						0	0	20	
Silver	ND	1.0						0	0	20	
Thallium	ND	1.0						0	0	20	
Vanadium	46.085	1.0						49.63	7.41	20	
Zinc	39.288	1.0						43.05	9.13	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **104787-004AMS** SampType: **MS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **4/3/2009** RunNo: **107827**
Client ID: **ZZZZZZ** Batch ID: **54489** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **4/3/2009** SeqNo: **1690670**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	73.979	2.0	125.0	0	59.2	25	106				
Arsenic	91.391	1.0	125.0	3.646	70.2	42	113				
Barium	248.637	1.0	125.0	116.0	106	19	140				
Beryllium	93.511	1.0	125.0	0	74.8	50	109				
Cadmium	87.783	1.0	125.0	0.7563	69.6	48	106				
Chromium	185.207	1.0	125.0	101.4	67.0	44	116				
Cobalt	107.161	1.0	125.0	19.14	70.4	47	107				
Copper	144.463	2.0	125.0	29.82	91.7	49	124				
Lead	101.985	1.0	125.0	3.812	78.5	33	120				
Molybdenum	91.487	1.0	125.0	0	73.2	46	111				
Nickel	197.168	1.0	125.0	137.6	47.7	43	111				
Selenium	87.829	1.0	125.0	0	70.3	43	104				
Silver	101.545	1.0	125.0	0	81.2	53	114				
Thallium	78.200	1.0	125.0	0	62.6	41	107				
Vanadium	149.616	1.0	125.0	49.63	80.0	48	116				
Zinc	127.233	1.0	125.0	43.05	67.3	24	129				

Sample ID: **104787-004AMSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **4/3/2009** RunNo: **107827**
Client ID: **ZZZZZZ** Batch ID: **54489** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **4/3/2009** SeqNo: **1690671**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	72.783	2.0	125.0	0	58.2	25	106	73.98	1.63	20	
Arsenic	88.703	1.0	125.0	3.646	68.0	42	113	91.39	2.99	20	
Barium	210.657	1.0	125.0	116.0	75.7	19	140	248.6	16.5	20	
Beryllium	90.133	1.0	125.0	0	72.1	50	109	93.51	3.68	20	
Cadmium	85.062	1.0	125.0	0.7563	67.4	48	106	87.78	3.15	20	
Chromium	167.862	1.0	125.0	101.4	53.2	44	116	185.2	9.83	20	
Cobalt	103.912	1.0	125.0	19.14	67.8	47	107	107.2	3.08	20	
Copper	137.203	2.0	125.0	29.82	85.9	49	124	144.5	5.15	20	
Lead	97.895	1.0	125.0	3.812	75.3	33	120	102.0	4.09	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **104787-004AMSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **4/3/2009** RunNo: **107827**
Client ID: **ZZZZZZ** Batch ID: **54489** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **4/3/2009** SeqNo: **1690671**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	88.624	1.0	125.0	0	70.9	46	111	91.49	3.18	20	
Nickel	188.167	1.0	125.0	137.6	40.5	43	111	197.2	4.67	20	S
Selenium	85.534	1.0	125.0	0	68.4	43	104	87.83	2.65	20	
Silver	97.835	1.0	125.0	0	78.3	53	114	101.5	3.72	20	
Thallium	75.995	1.0	125.0	0	60.8	41	107	78.20	2.86	20	
Vanadium	141.731	1.0	125.0	49.63	73.7	48	116	149.6	5.41	20	
Zinc	120.982	1.0	125.0	43.05	62.3	24	129	127.2	5.04	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_W

Sample ID: **MB-54486** SampType: **MBLK** TestCode: **6010_W** Units: **mg/L** Prep Date: **4/2/2009** RunNo: **107800**
Client ID: **PBW** Batch ID: **54486** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **4/3/2009** SeqNo: **1690128**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	0.0050									
Arsenic	ND	0.010									
Barium	ND	0.0030									
Beryllium	ND	0.0030									
Cadmium	ND	0.0030									
Chromium	ND	0.0030									
Cobalt	ND	0.0030									
Copper	ND	0.0050									
Lead	ND	0.0050									
Molybdenum	ND	0.0050									
Nickel	ND	0.0050									
Selenium	ND	0.010									
Silver	ND	0.0030									
Thallium	ND	0.015									
Vanadium	ND	0.0030									
Zinc	0.006	0.010									

Sample ID: **LCS-54486** SampType: **LCS** TestCode: **6010_W** Units: **mg/L** Prep Date: **4/2/2009** RunNo: **107800**
Client ID: **LCSW** Batch ID: **54486** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **4/3/2009** SeqNo: **1690129**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	1.028	0.0050	1.000	0	103	85	115				
Arsenic	0.990	0.010	1.000	0	99.0	85	115				
Barium	1.042	0.0030	1.000	0	104	85	115				
Beryllium	1.028	0.0030	1.000	0	103	85	115				
Cadmium	1.021	0.0030	1.000	0	102	85	115				
Chromium	0.943	0.0030	1.000	0	94.3	85	115				
Cobalt	1.039	0.0030	1.000	0	104	85	115				
Copper	1.039	0.0050	1.000	0	104	85	115				
Lead	1.069	0.0050	1.000	0	107	85	115				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_W

Sample ID: **LCS-54486** SampType: **LCS** TestCode: **6010_W** Units: **mg/L** Prep Date: **4/2/2009** RunNo: **107800**
Client ID: **LCSW** Batch ID: **54486** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **4/3/2009** SeqNo: **1690129**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	1.014	0.0050	1.000	0	101	85	115				
Nickel	1.004	0.0050	1.000	0	100	85	115				
Selenium	0.972	0.010	1.000	0	97.2	85	115				
Silver	1.008	0.0030	1.000	0	101	85	115				
Thallium	0.918	0.015	1.000	0	91.8	85	115				
Vanadium	1.041	0.0030	1.000	0	104	85	115				
Zinc	1.040	0.010	1.000	0.006200	103	85	115				

Sample ID: **104767-001BDUP** SampType: **DUP** TestCode: **6010_W** Units: **mg/L** Prep Date: **4/2/2009** RunNo: **107800**
Client ID: **ZZZZZZ** Batch ID: **54486** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **4/3/2009** SeqNo: **1690131**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	0.0050						0	0	20	
Arsenic	ND	0.010						0	0	20	
Barium	0.008	0.0030						0.008064	3.02	20	
Beryllium	ND	0.0030						0	0	20	
Cadmium	ND	0.0030						0	0	20	
Chromium	0.002	0.0030						0.001717	0	20	
Cobalt	ND	0.0030						0	0	20	
Copper	ND	0.0050						0	0	20	
Lead	ND	0.0050						0	0	20	
Molybdenum	ND	0.0050						0	0	20	
Nickel	0.002	0.0050						0.001748	0	20	
Selenium	ND	0.010						0	0	20	
Silver	ND	0.0030						0	0	20	
Thallium	ND	0.015						0	0	20	
Vanadium	0.004	0.0030						0.004362	2.07	20	
Zinc	0.037	0.010						0.02512	37.3	20	R

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_W

Sample ID: **104804-001CMS** SampType: **MS** TestCode: **6010_W** Units: **mg/L** Prep Date: **4/2/2009** RunNo: **107800**
Client ID: **ZZZZZZ** Batch ID: **54486** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **4/3/2009** SeqNo: **1690140**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	2.475	0.0050	2.500	0	99.0	64	130				
Arsenic	2.494	0.010	2.500	0	99.8	66	128				
Barium	2.530	0.0030	2.500	0.01465	101	60	129				
Beryllium	2.516	0.0030	2.500	0	101	77	118				
Cadmium	2.531	0.0030	2.500	0	101	72	122				
Chromium	2.396	0.0030	2.500	0.008227	95.5	77	116				
Cobalt	2.545	0.0030	2.500	0.009174	101	66	124				
Copper	2.784	0.0050	2.500	0.01163	111	70	130				
Lead	2.622	0.0050	2.500	0	105	71	121				
Molybdenum	6.641	0.0050	2.500	4.151	99.6	64	129				
Nickel	2.728	0.0050	2.500	0.2206	100	63	125				
Selenium	2.530	0.010	2.500	0.005410	101	73	124				
Silver	2.615	0.0030	2.500	0	105	60	138				
Thallium	2.329	0.015	2.500	0.02336	92.2	66	125				
Vanadium	2.624	0.0030	2.500	0.04744	103	79	118				
Zinc	2.601	0.010	2.500	0.08484	101	71	120				

Sample ID: **104804-001CMSD** SampType: **MSD** TestCode: **6010_W** Units: **mg/L** Prep Date: **4/2/2009** RunNo: **107800**
Client ID: **ZZZZZZ** Batch ID: **54486** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **4/3/2009** SeqNo: **1690141**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	2.639	0.0050	2.500	0	106	64	130	2.475	6.43	20	
Arsenic	2.642	0.010	2.500	0	106	66	128	2.494	5.73	20	
Barium	2.661	0.0030	2.500	0.01465	106	60	129	2.530	5.06	20	
Beryllium	2.676	0.0030	2.500	0	107	77	118	2.516	6.17	20	
Cadmium	2.660	0.0030	2.500	0	106	72	122	2.531	4.98	20	
Chromium	2.534	0.0030	2.500	0.008227	101	77	116	2.396	5.58	20	
Cobalt	2.678	0.0030	2.500	0.009174	107	66	124	2.545	5.09	20	
Copper	2.944	0.0050	2.500	0.01163	117	70	130	2.784	5.60	20	
Lead	2.783	0.0050	2.500	0	111	71	121	2.622	5.94	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_W

Sample ID: **104804-001CMSD** SampType: **MSD** TestCode: **6010_W** Units: **mg/L** Prep Date: **4/2/2009** RunNo: **107800**
Client ID: **ZZZZZZ** Batch ID: **54486** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **4/3/2009** SeqNo: **1690141**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	6.881	0.0050	2.500	4.151	109	64	129	6.641	3.56	20	
Nickel	2.870	0.0050	2.500	0.2206	106	63	125	2.728	5.09	20	
Selenium	2.674	0.010	2.500	0.005410	107	73	124	2.530	5.56	20	
Silver	2.764	0.0030	2.500	0	111	60	138	2.615	5.57	20	
Thallium	2.468	0.015	2.500	0.02336	97.8	66	125	2.329	5.79	20	
Vanadium	2.772	0.0030	2.500	0.04744	109	79	118	2.624	5.49	20	
Zinc	2.737	0.010	2.500	0.08484	106	71	120	2.601	5.12	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 7470_W

Sample ID: **MB-54480**	SampType: **MBLK**	TestCode: **7470_W**	Units: **µg/L**	Prep Date: **4/2/2009**	RunNo: **107805**
Client ID: **PBW**	Batch ID: **54480**	TestNo: **EPA 7470A**		Analysis Date: **4/3/2009**	SeqNo: **1690209**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.20									

Sample ID: **LCS-54480**	SampType: **LCS**	TestCode: **7470_W**	Units: **µg/L**	Prep Date: **4/2/2009**	RunNo: **107805**
Client ID: **LCSW**	Batch ID: **54480**	TestNo: **EPA 7470A**		Analysis Date: **4/3/2009**	SeqNo: **1690210**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	10.464	0.20	10.00	0	105	85	115				

Sample ID: **104804-001C-MS**	SampType: **MS**	TestCode: **7470_W**	Units: **µg/L**	Prep Date: **4/2/2009**	RunNo: **107805**
Client ID: **ZZZZZZ**	Batch ID: **54480**	TestNo: **EPA 7470A**		Analysis Date: **4/3/2009**	SeqNo: **1690211**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	10.195	0.20	10.00	0	102	70	130				

Sample ID: **104804-001C-MSD**	SampType: **MSD**	TestCode: **7470_W**	Units: **µg/L**	Prep Date: **4/2/2009**	RunNo: **107805**
Client ID: **ZZZZZZ**	Batch ID: **54480**	TestNo: **EPA 7470A**		Analysis Date: **4/3/2009**	SeqNo: **1690212**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	10.244	0.20	10.00	0	102	70	130	10.20	0.473	20	

Sample ID: **104804-001C-DUP**	SampType: **DUP**	TestCode: **7470_W**	Units: **µg/L**	Prep Date: **4/2/2009**	RunNo: **107805**
Client ID: **ZZZZZZ**	Batch ID: **54480**	TestNo: **EPA 7470A**		Analysis Date: **4/3/2009**	SeqNo: **1690214**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.20						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 7471_S

Sample ID: **MB-54482**	SampType: **MBLK**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **4/2/2009**	RunNo: **107799**
Client ID: **PBS**	Batch ID: **54482**	TestNo: **EPA 7471A**		Analysis Date: **4/3/2009**	SeqNo: **1690112**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.10									

Sample ID: **LCS-54482**	SampType: **LCS**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **4/2/2009**	RunNo: **107799**
Client ID: **LCSS**	Batch ID: **54482**	TestNo: **EPA 7471A**		Analysis Date: **4/3/2009**	SeqNo: **1690113**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.765	0.10	0.8300	0	92.1	80	120				

Sample ID: **104786-010A-MS**	SampType: **MS**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **4/2/2009**	RunNo: **107799**
Client ID: **W10B (15')**	Batch ID: **54482**	TestNo: **EPA 7471A**		Analysis Date: **4/3/2009**	SeqNo: **1690114**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.621	0.10	0.8300	0	74.8	70	130				

Sample ID: **104786-010A-MSD**	SampType: **MSD**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **4/2/2009**	RunNo: **107799**
Client ID: **W10B (15')**	Batch ID: **54482**	TestNo: **EPA 7471A**		Analysis Date: **4/3/2009**	SeqNo: **1690115**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.612	0.10	0.8300	0	73.8	70	130	0.6208	1.38	20	

Sample ID: **104786-010A-DUP**	SampType: **DUP**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **4/2/2009**	RunNo: **107799**
Client ID: **W10B (15')**	Batch ID: **54482**	TestNo: **EPA 7471A**		Analysis Date: **4/3/2009**	SeqNo: **1690117**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.10						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_S_DM LLSGT

Sample ID: **MB-54475** SampType: **MBLK** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **4/2/2009** RunNo: **107798**
Client ID: **PBS** Batch ID: **54475** TestNo: **EPA 8015B(M** **EPA 3550B** Analysis Date: **4/2/2009** SeqNo: **1690097**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	ND	1.0									
ORO	ND	1.0									
Surr: p-Terphenyl	1.686		2.670		63.1	30	130				

Sample ID: **LCS-54475** SampType: **LCS** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **4/2/2009** RunNo: **107798**
Client ID: **LCSS** Batch ID: **54475** TestNo: **EPA 8015B(M** **EPA 3550B** Analysis Date: **4/2/2009** SeqNo: **1690098**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	21.011	1.0	33.00	0	63.7	35	124				
Surr: p-Terphenyl	2.039		2.670		76.4	30	130				

Sample ID: **104786-004AMS** SampType: **MS** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **4/2/2009** RunNo: **107798**
Client ID: **W5BGW (5')** Batch ID: **54475** TestNo: **EPA 8015B(M** **EPA 3550B** Analysis Date: **4/2/2009** SeqNo: **1690099**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	16.965	1.0	33.00	0	51.4	12	125				
Surr: p-Terphenyl	1.442		2.670		54.0	30	130				

Sample ID: **104786-004AMSD** SampType: **MSD** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **4/2/2009** RunNo: **107798**
Client ID: **W5BGW (5')** Batch ID: **54475** TestNo: **EPA 8015B(M** **EPA 3550B** Analysis Date: **4/2/2009** SeqNo: **1690100**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	20.397	1.0	33.00	0	61.8	12	125	16.96	18.4	20	
Surr: p-Terphenyl	1.647		2.670		61.7	30	130		0	0	

Sample ID: **104786-004ADUP** SampType: **DUP** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **4/2/2009** RunNo: **107798**
Client ID: **W5BGW (5')** Batch ID: **54475** TestNo: **EPA 8015B(M** **EPA 3550B** Analysis Date: **4/2/2009** SeqNo: **1690101**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_S_DM LLSGT

Sample ID: **104786-004ADUP** SampType: **DUP** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **4/2/2009** RunNo: **107798**
Client ID: **W5BGW (5')** Batch ID: **54475** TestNo: **EPA 8015B(M EPA 3550B** Analysis Date: **4/2/2009** SeqNo: **1690101**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	ND	1.0						0	0	20	
ORO	ND	1.0						0	0	20	
Surr: p-Terphenyl	1.329		2.670		49.8	30	130		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_W_DM_LLSGT

Sample ID: **MB-54441**	SampType: **MBLK**	TestCode: **8015_W_DM_**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107742**
Client ID: **PBW**	Batch ID: **54441**	TestNo: **EPA 8015B**	**EPA 3510C**	Analysis Date: **4/1/2009**	SeqNo: **1689309**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	ND	0.050									
ORO	ND	0.050									
Surr: p-Terphenyl	0.067		0.08000		84.3	35	131				

Sample ID: **LCS-54441**	SampType: **LCS**	TestCode: **8015_W_DM_**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107742**
Client ID: **LCSW**	Batch ID: **54441**	TestNo: **EPA 8015B**	**EPA 3510C**	Analysis Date: **4/1/2009**	SeqNo: **1689310**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	0.759	0.050	1.000	0	75.9	42	118				
Surr: p-Terphenyl	0.044		0.08000		54.9	35	131				

Sample ID: **MB-54441-MS**	SampType: **MS**	TestCode: **8015_W_DM_**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107742**
Client ID: **ZZZZZZ**	Batch ID: **54441**	TestNo: **EPA 8015B**	**EPA 3510C**	Analysis Date: **4/1/2009**	SeqNo: **1689311**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	0.755	0.050	1.000	0	75.4	42	118				
Surr: p-Terphenyl	0.046		0.08000		57.2	35	131				

Sample ID: **MB-54441-MSD**	SampType: **MSD**	TestCode: **8015_W_DM_**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107742**
Client ID: **ZZZZZZ**	Batch ID: **54441**	TestNo: **EPA 8015B**	**EPA 3510C**	Analysis Date: **4/1/2009**	SeqNo: **1689312**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	0.756	0.050	1.000	0	75.6	42	118	0.7545	0.246	20	
Surr: p-Terphenyl	0.044		0.08000		55.2	35	131		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_W_GP LL

Sample ID: **D090330LCS2** SampType: **LCS** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107628**
Client ID: **LCSW** Batch ID: **D09VW048** TestNo: **EPA 8015B(M** Analysis Date: **3/30/2009** SeqNo: **1686946**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	0.708	0.050	1.000	0	70.8	69	125				
Surr: Bromofluorobenzene (FID)	99.005		100.0		99.0	71	130				

Sample ID: **D090330MB2** SampType: **MBLK** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107628**
Client ID: **PBW** Batch ID: **D09VW048** TestNo: **EPA 8015B(M** Analysis Date: **3/30/2009** SeqNo: **1686947**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	ND	0.050									
Surr: Bromofluorobenzene (FID)	86.532		100.0		86.5	71	130				

Sample ID: **104765-002ADUP** SampType: **DUP** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107628**
Client ID: **ZZZZZZ** Batch ID: **D09VW048** TestNo: **EPA 8015B(M** Analysis Date: **3/30/2009** SeqNo: **1686949**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	ND	0.050						0	0	20	
Surr: Bromofluorobenzene (FID)	99.346		100.0		99.3	71	130		0	0	

Sample ID: **104765-001AMS** SampType: **MS** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107628**
Client ID: **ZZZZZZ** Batch ID: **D09VW048** TestNo: **EPA 8015B(M** Analysis Date: **3/30/2009** SeqNo: **1686951**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	1.016	0.050	1.000	0	102	69	125				
Surr: Bromofluorobenzene (FID)	107.152		100.0		107	71	130				

Sample ID: **104765-001AMSD** SampType: **MSD** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107628**
Client ID: **ZZZZZZ** Batch ID: **D09VW048** TestNo: **EPA 8015B(M** Analysis Date: **3/30/2009** SeqNo: **1686952**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	1.012	0.050	1.000	0	101	69	125	1.016	0.394	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_W_GP LL

Sample ID: **104765-001AMSD** SampType: **MSD** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107628**
Client ID: **ZZZZZZ** Batch ID: **D09VW048** TestNo: **EPA 8015B(M** Analysis Date: **3/30/2009** SeqNo: **1686952**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Bromofluorobenzene (FID)	105.693		100.0		106	71	130		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_W_GP LL

Sample ID: **D090401LCS2** SampType: **LCS** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107737**
Client ID: **LCSW** Batch ID: **D09VW051** TestNo: **EPA 8015B(M** Analysis Date: **4/1/2009** SeqNo: **1689088**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	0.816	0.050	1.000	0	81.6	69	125				
Surr: Bromofluorobenzene (FID)	98.382		100.0		98.4	71	130				

Sample ID: **D090401MB2MS** SampType: **MS** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107737**
Client ID: **ZZZZZZ** Batch ID: **D09VW051** TestNo: **EPA 8015B(M** Analysis Date: **4/1/2009** SeqNo: **1689089**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	0.875	0.050	1.000	0	87.5	69	125				
Surr: Bromofluorobenzene (FID)	101.250		100.0		101	71	130				

Sample ID: **D090401MB2MSD** SampType: **MSD** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107737**
Client ID: **ZZZZZZ** Batch ID: **D09VW051** TestNo: **EPA 8015B(M** Analysis Date: **4/1/2009** SeqNo: **1689090**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	0.856	0.050	1.000	0	85.6	69	125	0.8750	2.20	20	
Surr: Bromofluorobenzene (FID)	92.860		100.0		92.9	71	130		0	0	

Sample ID: **D090401MB2** SampType: **MBLK** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107737**
Client ID: **PBW** Batch ID: **D09VW051** TestNo: **EPA 8015B(M** Analysis Date: **4/1/2009** SeqNo: **1689091**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	ND	0.050									
Surr: Bromofluorobenzene (FID)	104.859		100.0		105	71	130				

Sample ID: **104788-001BDUP** SampType: **DUP** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107737**
Client ID: **ZZZZZZ** Batch ID: **D09VW051** TestNo: **EPA 8015B(M** Analysis Date: **4/1/2009** SeqNo: **1689103**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	ND	0.050						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_W_GP LL

Sample ID: **104788-001BDUP** SampType: **DUP** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107737**
Client ID: **ZZZZZZ** Batch ID: **D09VW051** TestNo: **EPA 8015B(M** Analysis Date: **4/1/2009** SeqNo: **1689103**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Bromofluorobenzene (FID)	87.074		100.0		87.1	71	130		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **A090331LCS1** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107703**
Client ID: **LCSW** Batch ID: **A09VW063** TestNo: **EPA 8260B** Analysis Date: **3/31/2009** SeqNo: **1688360**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	17.970	0.50	20.00	0	89.8	70	130				
Benzene	37.200	0.50	40.00	0	93.0	70	130				
Chlorobenzene	20.240	0.50	20.00	0	101	70	130				
MTBE	18.900	0.50	20.00	0	94.5	70	130				
Toluene	38.060	0.50	40.00	0	95.2	70	130				
Trichloroethene	18.910	0.50	20.00	0	94.6	70	130				
Surr: 1,2-Dichloroethane-d4	20.810		25.00		83.2	70	130				
Surr: 4-Bromofluorobenzene	20.760		25.00		83.0	70	130				
Surr: Dibromofluoromethane	21.490		25.00		86.0	70	130				
Surr: Toluene-d8	22.410		25.00		89.6	70	130				

Sample ID: **A090331MB2MS** SampType: **MS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107703**
Client ID: **ZZZZZZ** Batch ID: **A09VW063** TestNo: **EPA 8260B** Analysis Date: **3/31/2009** SeqNo: **1688362**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	16.320	0.50	20.00	0	81.6	70	130				
Benzene	36.480	0.50	40.00	0	91.2	70	130				
Chlorobenzene	20.180	0.50	20.00	0	101	70	130				
Toluene	37.230	0.50	40.00	0	93.1	70	130				
Trichloroethene	18.260	0.50	20.00	0	91.3	70	130				
Surr: 1,2-Dichloroethane-d4	21.070		25.00		84.3	70	130				
Surr: 4-Bromofluorobenzene	20.600		25.00		82.4	70	130				
Surr: Dibromofluoromethane	21.380		25.00		85.5	70	130				
Surr: Toluene-d8	22.260		25.00		89.0	70	130				

Sample ID: **A090331MB2MSD** SampType: **MSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107703**
Client ID: **ZZZZZZ** Batch ID: **A09VW063** TestNo: **EPA 8260B** Analysis Date: **3/31/2009** SeqNo: **1688363**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	17.050	0.50	20.00	0	85.2	70	130	16.32	4.38	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **A090331MB2MSD** SampType: **MSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107703**
Client ID: **ZZZZZZ** Batch ID: **A09VW063** TestNo: **EPA 8260B** Analysis Date: **3/31/2009** SeqNo: **1688363**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	37.260	0.50	40.00	0	93.2	70	130	36.48	2.12	20	
Chlorobenzene	20.720	0.50	20.00	0	104	70	130	20.18	2.64	20	
Toluene	38.460	0.50	40.00	0	96.2	70	130	37.23	3.25	20	
Trichloroethene	18.890	0.50	20.00	0	94.4	70	130	18.26	3.39	20	
Surr: 1,2-Dichloroethane-d4	20.460		25.00		81.8	70	130		0	20	
Surr: 4-Bromofluorobenzene	20.030		25.00		80.1	70	130		0	20	
Surr: Dibromofluoromethane	20.590		25.00		82.4	70	130		0	20	
Surr: Toluene-d8	21.490		25.00		86.0	70	130		0	20	

Sample ID: **A090331MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107703**
Client ID: **PBW** Batch ID: **A09VW063** TestNo: **EPA 8260B** Analysis Date: **3/31/2009** SeqNo: **1688364**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	0.50									
1,1,1-Trichloroethane	ND	0.50									
1,1,2,2-Tetrachloroethane	ND	0.50									
1,1,2-Trichloroethane	ND	0.50									
1,1-Dichloroethane	ND	0.50									
1,1-Dichloroethene	ND	0.50									
1,1-Dichloropropene	ND	0.50									
1,2,3-Trichlorobenzene	ND	0.50									
1,2,3-Trichloropropane	ND	0.50									
1,2,4-Trichlorobenzene	ND	0.50									
1,2,4-Trimethylbenzene	ND	0.50									
1,2-Dibromo-3-chloropropane	ND	0.50									
1,2-Dibromoethane	ND	0.50									
1,2-Dichlorobenzene	ND	0.50									
1,2-Dichloroethane	ND	0.50									
1,2-Dichloropropane	ND	0.50									
1,3,5-Trimethylbenzene	ND	0.50									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **A090331MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107703**
Client ID: **PBW** Batch ID: **A09VW063** TestNo: **EPA 8260B** Analysis Date: **3/31/2009** SeqNo: **1688364**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,3-Dichlorobenzene	ND	0.50									
1,3-Dichloropropane	ND	0.50									
1,4-Dichlorobenzene	ND	0.50									
2,2-Dichloropropane	ND	0.50									
2-Chlorotoluene	ND	0.50									
4-Chlorotoluene	ND	0.50									
4-Isopropyltoluene	ND	0.50									
Benzene	ND	0.50									
Bromobenzene	ND	0.50									
Bromodichloromethane	ND	0.50									
Bromoform	ND	0.50									
Bromomethane	ND	0.50									
Carbon tetrachloride	ND	0.50									
Chlorobenzene	ND	0.50									
Chloroethane	ND	0.50									
Chloroform	ND	0.50									
Chloromethane	ND	0.50									
cis-1,2-Dichloroethene	ND	0.50									
cis-1,3-Dichloropropene	ND	0.50									
Dibromochloromethane	ND	0.50									
Dibromomethane	ND	0.50									
Dichlorodifluoromethane	ND	0.50									
Ethylbenzene	ND	0.50									
Hexachlorobutadiene	ND	0.50									
Isopropylbenzene	ND	0.50									
m,p-Xylene	ND	1.0									
Methylene chloride	ND	1.0									
n-Butylbenzene	ND	0.50									
n-Propylbenzene	ND	0.50									
Naphthalene	ND	0.50									

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits

Calculations are based on raw values

- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **A090331MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107703**
Client ID: **PBW** Batch ID: **A09VW063** TestNo: **EPA 8260B** Analysis Date: **3/31/2009** SeqNo: **1688364**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
o-Xylene	ND	0.50									
sec-Butylbenzene	ND	0.50									
Styrene	ND	0.50									
tert-Butylbenzene	ND	0.50									
Tetrachloroethene	ND	0.50									
Toluene	ND	0.50									
trans-1,2-Dichloroethene	ND	0.50									
Trichloroethene	ND	0.50									
Trichlorofluoromethane	ND	0.50									
Vinyl chloride	ND	0.50									
Surr: 1,2-Dichloroethane-d4	21.930		25.00		87.7	70	130				
Surr: 4-Bromofluorobenzene	22.010		25.00		88.0	70	130				
Surr: Dibromofluoromethane	23.720		25.00		94.9	70	130				
Surr: Toluene-d8	25.310		25.00		101	70	130				

Sample ID: **104789-001A** SampType: **DUP** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107703**
Client ID: **ZZZZZZ** Batch ID: **A09VW063** TestNo: **EPA 8260B** Analysis Date: **3/31/2009** SeqNo: **1688379**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	0.50						0	0	20	
1,1,1-Trichloroethane	ND	0.50						0	0	20	
1,1,2,2-Tetrachloroethane	ND	0.50						0	0	20	
1,1,2-Trichloroethane	ND	0.50						0	0	20	
1,1-Dichloroethane	ND	0.50						0	0	20	
1,1-Dichloroethene	ND	0.50						0	0	20	
1,1-Dichloropropene	ND	0.50						0	0	20	
1,2,3-Trichlorobenzene	ND	0.50						0	0	20	
1,2,3-Trichloropropane	ND	0.50						0	0	20	
1,2,4-Trichlorobenzene	ND	0.50						0	0	20	
1,2,4-Trimethylbenzene	ND	0.50						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **104789-001A** SampType: **DUP** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107703**
Client ID: **ZZZZZZ** Batch ID: **A09VW063** TestNo: **EPA 8260B** Analysis Date: **3/31/2009** SeqNo: **1688379**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2-Dibromo-3-chloropropane	ND	0.50						0	0	20	
1,2-Dibromoethane	ND	0.50						0	0	20	
1,2-Dichlorobenzene	ND	0.50						0	0	20	
1,2-Dichloroethane	ND	0.50						0	0	20	
1,2-Dichloropropane	ND	0.50						0	0	20	
1,3,5-Trimethylbenzene	ND	0.50						0	0	20	
1,3-Dichlorobenzene	ND	0.50						0	0	20	
1,3-Dichloropropane	ND	0.50						0	0	20	
1,4-Dichlorobenzene	ND	0.50						0	0	20	
2,2-Dichloropropane	ND	0.50						0	0	20	
2-Chlorotoluene	ND	0.50						0	0	20	
4-Chlorotoluene	ND	0.50						0	0	20	
4-Isopropyltoluene	ND	0.50						0	0	20	
Benzene	ND	0.50						0	0	20	
Bromobenzene	ND	0.50						0	0	20	
Bromodichloromethane	ND	0.50						0	0	20	
Bromoform	ND	0.50						0	0	20	
Bromomethane	ND	0.50						0	0	20	
Carbon tetrachloride	ND	0.50						0	0	20	
Chlorobenzene	ND	0.50						0	0	20	
Chloroethane	ND	0.50						0	0	20	
Chloroform	ND	0.50						0	0	20	
Chloromethane	0.580	0.50						0.5600	3.51	20	
cis-1,2-Dichloroethene	ND	0.50						0	0	20	
cis-1,3-Dichloropropene	ND	0.50						0	0	20	
Dibromochloromethane	ND	0.50						0	0	20	
Dibromomethane	ND	0.50						0	0	20	
Dichlorodifluoromethane	ND	0.50						0	0	20	
Ethylbenzene	ND	0.50						0	0	20	
Hexachlorobutadiene	ND	0.50						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **104789-001A** SampType: **DUP** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107703**
Client ID: **ZZZZZZ** Batch ID: **A09VW063** TestNo: **EPA 8260B** Analysis Date: **3/31/2009** SeqNo: **1688379**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Isopropylbenzene	ND	0.50						0	0	20	
m,p-Xylene	ND	1.0						0	0	20	
Methylene chloride	ND	1.0						0	0	20	
n-Butylbenzene	ND	0.50						0	0	20	
n-Propylbenzene	ND	0.50						0	0	20	
Naphthalene	ND	0.50						0	0	20	
o-Xylene	ND	0.50						0	0	20	
sec-Butylbenzene	ND	0.50						0	0	20	
Styrene	ND	0.50						0	0	20	
tert-Butylbenzene	ND	0.50						0	0	20	
Tetrachloroethene	ND	0.50						0	0	20	
Toluene	ND	0.50						0	0	20	
trans-1,2-Dichloroethene	ND	0.50						0	0	20	
Trichloroethene	ND	0.50						0	0	20	
Trichlorofluoromethane	ND	0.50						0	0	20	
Vinyl chloride	ND	0.50						0	0	20	
Surr: 1,2-Dichloroethane-d4	24.130		25.00		96.5	70	130		0	0	
Surr: 4-Bromofluorobenzene	21.800		25.00		87.2	70	130		0	0	
Surr: Dibromofluoromethane	24.930		25.00		99.7	70	130		0	0	
Surr: Toluene-d8	25.260		25.00		101	70	130		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-54431** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107714**
Client ID: **PBS** Batch ID: **54431** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1688683**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	330									
1,2-Dichlorobenzene	ND	330									
1,3-Dichlorobenzene	ND	330									
1,4-Dichlorobenzene	ND	330									
2,4,5-Trichlorophenol	ND	330									
2,4,6-Trichlorophenol	ND	330									
2,4-Dichlorophenol	ND	1600									
2,4-Dimethylphenol	ND	330									
2,4-Dinitrophenol	ND	1600									
2,4-Dinitrotoluene	ND	330									
2,6-Dinitrotoluene	ND	330									
2-Chloronaphthalene	ND	330									
2-Chlorophenol	ND	330									
2-Methylnaphthalene	ND	330									
2-Methylphenol	ND	330									
2-Nitroaniline	ND	1600									
2-Nitrophenol	ND	330									
3,3´-Dichlorobenzidine	ND	660									
3-Nitroaniline	ND	1600									
4,6-Dinitro-2-methylphenol	ND	1600									
4-Bromophenyl-phenylether	ND	330									
4-Chloro-3-methylphenol	ND	660									
4-Chloroaniline	ND	660									
4-Chlorophenyl-phenylether	ND	330									
4-Methylphenol	ND	330									
4-Nitroaniline	ND	1600									
4-Nitrophenol	ND	1600									
Acenaphthene	ND	330									
Acenaphthylene	ND	330									
Anthracene	ND	330									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-54431** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107714**
Client ID: **PBS** Batch ID: **54431** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1688683**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzidine (M)	ND	1600									
Benzo(a)anthracene	ND	330									
Benzo(a)pyrene	ND	330									
Benzo(b)fluoranthene	ND	330									
Benzo(g,h,i)perylene	ND	330									
Benzo(k)fluoranthene	ND	330									
Benzoic acid	ND	1600									
Benzyl alcohol	ND	660									
Bis(2-chloroethoxy)methane	ND	330									
Bis(2-chloroethyl)ether	ND	330									
Bis(2-chloroisopropyl)ether	ND	330									
Bis(2-ethylhexyl)phthalate	ND	330									
Butylbenzylphthalate	ND	330									
Chrysene	ND	330									
Di-n-butylphthalate	ND	330									
Di-n-octylphthalate	ND	330									
Dibenz(a,h)anthracene	ND	330									
Dibenzofuran	ND	330									
Diethylphthalate	ND	330									
Dimethylphthalate	ND	330									
Fluoranthene	ND	330									
Fluorene	ND	330									
Hexachlorobenzene	ND	330									
Hexachlorobutadiene	ND	660									
Hexachlorocyclopentadiene	ND	660									
Hexachloroethane	ND	330									
Indeno(1,2,3-cd)pyrene	ND	330									
Isophorone	ND	330									
N-Nitrosodi-n-propylamine	ND	330									
N-Nitrosodiphenylamine	ND	330									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-54431** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107714**
Client ID: **PBS** Batch ID: **54431** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1688683**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	330									
Nitrobenzene	ND	330									
Pentachlorophenol	ND	1600									
Phenanthrene	ND	330									
Phenol	ND	330									
Pyrene	ND	330									
Surr: 1,2-Dichlorobenzene-d4	2927.000		3330		87.9	49	103				
Surr: 2,4,6-Tribromophenol	3146.000		3330		94.5	47	129				
Surr: 2-Chlorophenol-d4	3045.000		3330		91.4	54	109				
Surr: 2-Fluorobiphenyl	3136.333		3330		94.2	59	108				
Surr: 2-Fluorophenol	3081.667		3330		92.5	50	111				
Surr: 4-Terphenyl-d14	4006.667		3330		120	58	135				
Surr: Nitrobenzene-d5	3030.000		3330		91.0	54	115				
Surr: Phenol-d5	3086.667		3330		92.7	58	112				

Sample ID: **LCS-54431** SampType: **LCS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107714**
Client ID: **LCSS** Batch ID: **54431** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1688684**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	3264.000	330	3330	0	98.0	61	107				
1,4-Dichlorobenzene	2877.333	330	3330	0	86.4	56	100				
2,4-Dinitrotoluene	3647.667	330	3330	0	110	72	130				
2-Chlorophenol	3297.333	330	3330	0	99.0	64	105				
4-Chloro-3-methylphenol	4129.000	660	3330	0	124	74	125				
4-Nitrophenol	4302.667	1600	3330	0	129	77	137				
Acenaphthene	3663.000	330	3330	0	110	63	117				
N-Nitrosodi-n-propylamine	3576.000	330	3330	0	107	71	121				
Pentachlorophenol	3366.000	1600	3330	0	101	69	125				
Phenol	3462.000	330	3330	0	104	67	111				
Pyrene	3543.333	330	3330	0	106	60	122				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **LCS-54431** SampType: **LCS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107714**
Client ID: **LCSS** Batch ID: **54431** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1688684**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 1,2-Dichlorobenzene-d4	2820.333		3330		84.7	49	103				
Surr: 2,4,6-Tribromophenol	3688.333		3330		111	47	129				
Surr: 2-Chlorophenol-d4	3016.000		3330		90.6	54	109				
Surr: 2-Fluorobiphenyl	3454.333		3330		104	59	108				
Surr: 2-Fluorophenol	2979.000		3330		89.5	50	111				
Surr: 4-Terphenyl-d14	3531.333		3330		106	58	135				
Surr: Nitrobenzene-d5	3157.000		3330		94.8	54	115				
Surr: Phenol-d5	3202.000		3330		96.2	58	112				

Sample ID: **104786-003AMS** SampType: **MS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107714**
Client ID: **W5BGW (0')** Batch ID: **54431** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1688685**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	3200.333	330	3330	0	96.1	60	105				
1,4-Dichlorobenzene	2906.000	330	3330	0	87.3	50	99				
2,4-Dinitrotoluene	3826.667	330	3330	0	115	70	130				
2-Chlorophenol	3412.000	330	3330	0	102	58	107				
4-Chloro-3-methylphenol	4163.000	660	3330	0	125	72	124				S
4-Nitrophenol	4502.333	1600	3330	0	135	69	139				
Acenaphthene	3707.667	330	3330	0	111	59	118				
N-Nitrosodi-n-propylamine	3498.333	330	3330	0	105	61	125				
Pentachlorophenol	3556.667	1600	3330	0	107	56	131				
Phenol	3597.000	330	3330	0	108	60	113				
Pyrene	3732.000	330	3330	0	112	51	130				
Surr: 1,2-Dichlorobenzene-d4	2804.000		3330		84.2	49	103				
Surr: 2,4,6-Tribromophenol	3841.333		3330		115	47	129				
Surr: 2-Chlorophenol-d4	3131.000		3330		94.0	54	109				
Surr: 2-Fluorobiphenyl	3442.000		3330		103	59	108				
Surr: 2-Fluorophenol	3119.000		3330		93.7	50	111				
Surr: 4-Terphenyl-d14	3586.000		3330		108	58	135				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104786-003AMS** SampType: **MS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107714**
Client ID: **W5BGW (0')** Batch ID: **54431** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1688685**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	3091.333		3330		92.8	54	115				
Surr: Phenol-d5	3259.333		3330		97.9	58	112				

Sample ID: **104786-003AMSD** SampType: **MSD** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107714**
Client ID: **W5BGW (0')** Batch ID: **54431** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1688686**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	3258.667	330	3330	0	97.9	60	105	3200	1.81	20	
1,4-Dichlorobenzene	2913.000	330	3330	0	87.5	50	99	2906	0.241	20	
2,4-Dinitrotoluene	3598.000	330	3330	0	108	70	130	3827	6.16	20	
2-Chlorophenol	3382.667	330	3330	0	102	58	107	3412	0.863	20	
4-Chloro-3-methylphenol	4030.333	660	3330	0	121	72	124	4163	3.24	20	
4-Nitrophenol	4306.000	1600	3330	0	129	69	139	4502	4.46	20	
Acenaphthene	3633.000	330	3330	0	109	59	118	3708	2.03	20	
N-Nitrosodi-n-propylamine	3485.333	330	3330	0	105	61	125	3498	0.372	20	
Pentachlorophenol	3356.000	1600	3330	0	101	56	131	3557	5.81	20	
Phenol	3573.667	330	3330	0	107	60	113	3597	0.651	20	
Pyrene	3461.667	330	3330	0	104	51	130	3732	7.52	20	
Surr: 1,2-Dichlorobenzene-d4	2829.333		3330		85.0	49	103		0	0	
Surr: 2,4,6-Tribromophenol	3622.667		3330		109	47	129		0	0	
Surr: 2-Chlorophenol-d4	3088.333		3330		92.7	54	109		0	0	
Surr: 2-Fluorobiphenyl	3373.000		3330		101	59	108		0	0	
Surr: 2-Fluorophenol	3101.333		3330		93.1	50	111		0	0	
Surr: 4-Terphenyl-d14	3443.333		3330		103	58	135		0	0	
Surr: Nitrobenzene-d5	3103.667		3330		93.2	54	115		0	0	
Surr: Phenol-d5	3222.333		3330		96.8	58	112		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104786-003ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107714**
Client ID: **W5BGW (0')** Batch ID: **54431** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1688687**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	330						0	0	20	
1,2-Dichlorobenzene	ND	330						0	0	20	
1,2-Diphenylhydrazine	ND	330						0	0	20	
1,3-Dichlorobenzene	ND	330						0	0	20	
1,4-Dichlorobenzene	ND	330						0	0	20	
1,4-Dioxane	ND	330						0	0	20	
2,4,5-Trichlorophenol	ND	330						0	0	20	
2,4,6-Trichlorophenol	ND	330						0	0	20	
2,4-Dichlorophenol	ND	1600						0	0	20	
2,4-Dimethylphenol	ND	330						0	0	20	
2,4-Dinitrophenol	ND	1600						0	0	20	
2,4-Dinitrotoluene	ND	330						0	0	20	
2,6-Dinitrotoluene	ND	330						0	0	20	
2-Chloronaphthalene	ND	330						0	0	20	
2-Chlorophenol	ND	330						0	0	20	
2-Methylnaphthalene	ND	330						0	0	20	
2-Methylphenol	ND	330						0	0	20	
2-Nitroaniline	ND	1600						0	0	20	
2-Nitrophenol	ND	330						0	0	20	
3,3´-Dichlorobenzidine	ND	660						0	0	20	
3-Nitroaniline	ND	1600						0	0	20	
4,6-Dinitro-2-methylphenol	ND	1600						0	0	20	
4-Bromophenyl-phenylether	ND	330						0	0	20	
4-Chloro-3-methylphenol	ND	660						0	0	20	
4-Chloroaniline	ND	660						0	0	20	
4-Chlorophenyl-phenylether	ND	330						0	0	20	
3/4-Methylphenol	ND	330						0	0	20	
4-Methylphenol	ND	330						0	0	20	
4-Nitroaniline	ND	1600						0	0	20	
4-Nitrophenol	ND	1600						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104786-003ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107714**
Client ID: **W5BGW (0')** Batch ID: **54431** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1688687**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acenaphthene	ND	330						0	0	20	
Acenaphthylene	ND	330						0	0	20	
Aniline	ND	330						0	0	20	
Anthracene	ND	330						0	0	20	
Benzidine (M)	ND	1600						0	0	20	
Benzo(a)anthracene	ND	330						0	0	20	
Benzo(a)pyrene	ND	330						0	0	20	
Benzo(b)fluoranthene	ND	330						0	0	20	
Benzo(g,h,i)perylene	ND	330						0	0	20	
Benzo(k)fluoranthene	ND	330						0	0	20	
Benzoic acid	ND	1600						0	0	20	
Benzyl alcohol	ND	660						0	0	20	
Bis(2-chloroethoxy)methane	ND	330						0	0	20	
Bis(2-chloroethyl)ether	ND	330						0	0	20	
Bis(2-chloroisopropyl)ether	ND	330						0	0	20	
Bis(2-ethylhexyl)phthalate	ND	330						0	0	20	
Butylbenzylphthalate	ND	330						0	0	20	
Carbazole	ND	330						0	0	20	
Chrysene	ND	330						0	0	20	
Di-n-butylphthalate	ND	330						0	0	20	
Di-n-octylphthalate	ND	330						0	0	20	
Dibenz(a,h)anthracene	ND	330						0	0	20	
Dibenzofuran	ND	330						0	0	20	
Diethylphthalate	ND	330						0	0	20	
Dimethylphthalate	ND	330						0	0	20	
Fluoranthene	ND	330						0	0	20	
Fluorene	ND	330						0	0	20	
Hexachlorobenzene	ND	330						0	0	20	
Hexachlorobutadiene	ND	660						0	0	20	
Hexachlorocyclopentadiene	ND	660						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104786-003ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107714**
Client ID: **W5BGW (0')** Batch ID: **54431** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1688687**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Hexachloroethane	ND	330						0	0	20	
Indeno(1,2,3-cd)pyrene	ND	330						0	0	20	
Isophorone	ND	330						0	0	20	
N-Nitrosodi-n-propylamine	ND	330						0	0	20	
N-Nitrosodimethylamine	ND	330						0	0	20	
N-Nitrosodiphenylamine	ND	330						0	0	20	
Naphthalene	ND	330						0	0	20	
Nitrobenzene	ND	330						0	0	20	
Pentachlorophenol	ND	1600						0	0	20	
Phenanthrene	ND	330						0	0	20	
Phenol	ND	330						0	0	20	
Pyrene	ND	330						0	0	20	
Pyridine	ND	1600						0	0	20	
Surr: 1,2-Dichlorobenzene-d4	2677.333		3330		80.4	49	103		0	0	
Surr: 2,4,6-Tribromophenol	3321.000		3330		99.7	47	129		0	0	
Surr: 2-Chlorophenol-d4	2896.000		3330		87.0	54	109		0	0	
Surr: 2-Fluorobiphenyl	3102.667		3330		93.2	59	108		0	0	
Surr: 2-Fluorophenol	2950.333		3330		88.6	50	111		0	0	
Surr: 4-Terphenyl-d14	4254.667		3330		128	58	135		0	0	
Surr: Nitrobenzene-d5	2881.667		3330		86.5	54	115		0	0	
Surr: Phenol-d5	3029.000		3330		91.0	58	112		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-54432** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107715**
Client ID: **PBS** Batch ID: **54432** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1688692**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	330									
1,2-Dichlorobenzene	ND	330									
1,3-Dichlorobenzene	ND	330									
1,4-Dichlorobenzene	ND	330									
2,4,5-Trichlorophenol	ND	330									
2,4,6-Trichlorophenol	ND	330									
2,4-Dichlorophenol	ND	1600									
2,4-Dimethylphenol	ND	330									
2,4-Dinitrophenol	ND	1600									
2,4-Dinitrotoluene	ND	330									
2,6-Dinitrotoluene	ND	330									
2-Chloronaphthalene	ND	330									
2-Chlorophenol	ND	330									
2-Methylnaphthalene	ND	330									
2-Methylphenol	ND	330									
2-Nitroaniline	ND	1600									
2-Nitrophenol	ND	330									
3,3´-Dichlorobenzidine	ND	660									
3-Nitroaniline	ND	1600									
4,6-Dinitro-2-methylphenol	ND	1600									
4-Bromophenyl-phenylether	ND	330									
4-Chloro-3-methylphenol	ND	660									
4-Chloroaniline	ND	660									
4-Chlorophenyl-phenylether	ND	330									
4-Methylphenol	ND	330									
4-Nitroaniline	ND	1600									
4-Nitrophenol	ND	1600									
Acenaphthene	ND	330									
Acenaphthylene	ND	330									
Anthracene	ND	330									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-54432** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107715**
Client ID: **PBS** Batch ID: **54432** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1688692**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzidine (M)	ND	1600									
Benzo(a)anthracene	ND	330									
Benzo(a)pyrene	ND	330									
Benzo(b)fluoranthene	ND	330									
Benzo(g,h,i)perylene	ND	330									
Benzo(k)fluoranthene	ND	330									
Benzoic acid	ND	1600									
Benzyl alcohol	ND	660									
Bis(2-chloroethoxy)methane	ND	330									
Bis(2-chloroethyl)ether	ND	330									
Bis(2-chloroisopropyl)ether	ND	330									
Bis(2-ethylhexyl)phthalate	ND	330									
Butylbenzylphthalate	ND	330									
Chrysene	ND	330									
Di-n-butylphthalate	ND	330									
Di-n-octylphthalate	ND	330									
Dibenz(a,h)anthracene	ND	330									
Dibenzofuran	ND	330									
Diethylphthalate	ND	330									
Dimethylphthalate	ND	330									
Fluoranthene	ND	330									
Fluorene	ND	330									
Hexachlorobenzene	ND	330									
Hexachlorobutadiene	ND	660									
Hexachlorocyclopentadiene	ND	660									
Hexachloroethane	ND	330									
Indeno(1,2,3-cd)pyrene	ND	330									
Isophorone	ND	330									
N-Nitrosodi-n-propylamine	ND	330									
N-Nitrosodiphenylamine	ND	330									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-54432** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107715**
Client ID: **PBS** Batch ID: **54432** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1688692**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	330									
Nitrobenzene	ND	330									
Pentachlorophenol	ND	1600									
Phenanthrene	ND	330									
Phenol	ND	330									
Pyrene	ND	330									
Surr: 1,2-Dichlorobenzene-d4	2937.000		3330		88.2	49	103				
Surr: 2,4,6-Tribromophenol	3263.333		3330		98.0	47	129				
Surr: 2-Chlorophenol-d4	3053.333		3330		91.7	54	109				
Surr: 2-Fluorobiphenyl	3241.333		3330		97.3	59	108				
Surr: 2-Fluorophenol	3114.333		3330		93.5	50	111				
Surr: 4-Terphenyl-d14	4189.667		3330		126	58	135				
Surr: Nitrobenzene-d5	3134.333		3330		94.1	54	115				
Surr: Phenol-d5	3160.333		3330		94.9	58	112				

Sample ID: **LCS-54432** SampType: **LCS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107715**
Client ID: **LCSS** Batch ID: **54432** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1688693**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	3228.000	330	3330	0	96.9	61	107				
1,4-Dichlorobenzene	2879.667	330	3330	0	86.5	56	100				
2,4-Dinitrotoluene	3568.000	330	3330	0	107	72	130				
2-Chlorophenol	3269.000	330	3330	0	98.2	64	105				
4-Chloro-3-methylphenol	4122.667	660	3330	0	124	74	125				
4-Nitrophenol	4229.667	1600	3330	0	127	77	137				
Acenaphthene	3621.000	330	3330	0	109	63	117				
N-Nitrosodi-n-propylamine	3527.333	330	3330	0	106	71	121				
Pentachlorophenol	3336.333	1600	3330	0	100	69	125				
Phenol	3466.667	330	3330	0	104	67	111				
Pyrene	3484.667	330	3330	0	105	60	122				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **LCS-54432** SampType: **LCS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107715**
Client ID: **LCSS** Batch ID: **54432** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1688693**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 1,2-Dichlorobenzene-d4	2788.000		3330		83.7	49	103				
Surr: 2,4,6-Tribromophenol	3591.000		3330		108	47	129				
Surr: 2-Chlorophenol-d4	2986.000		3330		89.7	54	109				
Surr: 2-Fluorobiphenyl	3416.000		3330		103	59	108				
Surr: 2-Fluorophenol	2928.000		3330		87.9	50	111				
Surr: 4-Terphenyl-d14	3589.667		3330		108	58	135				
Surr: Nitrobenzene-d5	3160.667		3330		94.9	54	115				
Surr: Phenol-d5	3188.000		3330		95.7	58	112				

Sample ID: **104787-006AMS** SampType: **MS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107715**
Client ID: **ZZZZZZ** Batch ID: **54432** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1688694**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	3015.667	330	3330	0	90.6	60	105				
1,4-Dichlorobenzene	2643.333	330	3330	0	79.4	50	99				
2,4-Dinitrotoluene	3503.667	330	3330	0	105	70	130				
2-Chlorophenol	3233.000	330	3330	0	97.1	58	107				
4-Chloro-3-methylphenol	3920.000	660	3330	0	118	72	124				
4-Nitrophenol	4051.000	1600	3330	0	122	69	139				
Acenaphthene	3312.000	330	3330	0	99.5	59	118				
N-Nitrosodi-n-propylamine	3309.333	330	3330	0	99.4	61	125				
Pentachlorophenol	3177.000	1600	3330	0	95.4	56	131				
Phenol	3377.667	330	3330	0	101	60	113				
Pyrene	3438.333	330	3330	0	103	51	130				
Surr: 1,2-Dichlorobenzene-d4	2650.333		3330		79.6	49	103				
Surr: 2,4,6-Tribromophenol	3518.000		3330		106	47	129				
Surr: 2-Chlorophenol-d4	2979.333		3330		89.5	54	109				
Surr: 2-Fluorobiphenyl	3319.667		3330		99.7	59	108				
Surr: 2-Fluorophenol	2981.333		3330		89.5	50	111				
Surr: 4-Terphenyl-d14	3480.667		3330		105	58	135				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104787-006AMS**	SampType: **MS**	TestCode: **8270_S_FUL**	Units: **µg/Kg**	Prep Date: **4/1/2009**	RunNo: **107715**
Client ID: **ZZZZZZ**	Batch ID: **54432**	TestNo: **EPA 8270C**	**EPA 3550B**	Analysis Date: **4/1/2009**	SeqNo: **1688694**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	2966.333		3330		89.1	54	115				
Surr: Phenol-d5	3111.667		3330		93.4	58	112				

Sample ID: **104787-006AMSD**	SampType: **MSD**	TestCode: **8270_S_FUL**	Units: **µg/Kg**	Prep Date: **4/1/2009**	RunNo: **107715**
Client ID: **ZZZZZZ**	Batch ID: **54432**	TestNo: **EPA 8270C**	**EPA 3550B**	Analysis Date: **4/1/2009**	SeqNo: **1688695**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	3300.333	330	3330	0	99.1	60	105	3016	9.01	20	
1,4-Dichlorobenzene	3088.333	330	3330	0	92.7	50	99	2643	15.5	20	
2,4-Dinitrotoluene	3769.333	330	3330	0	113	70	130	3504	7.31	20	
2-Chlorophenol	3602.667	330	3330	0	108	58	107	3233	10.8	20	S
4-Chloro-3-methylphenol	4201.667	660	3330	0	126	72	124	3920	6.94	20	S
4-Nitrophenol	4315.667	1600	3330	0	130	69	139	4051	6.33	20	
Acenaphthene	3601.000	330	3330	0	108	59	118	3312	8.36	20	
N-Nitrosodi-n-propylamine	3631.667	330	3330	0	109	61	125	3309	9.29	20	
Pentachlorophenol	3409.333	1600	3330	0	102	56	131	3177	7.06	20	
Phenol	3750.333	330	3330	0	113	60	113	3378	10.5	20	
Pyrene	3672.000	330	3330	0	110	51	130	3438	6.57	20	
Surr: 1,2-Dichlorobenzene-d4	2951.667		3330		88.6	49	103		0	0	
Surr: 2,4,6-Tribromophenol	3774.333		3330		113	47	129		0	0	
Surr: 2-Chlorophenol-d4	3259.000		3330		97.9	54	109		0	0	
Surr: 2-Fluorobiphenyl	3536.667		3330		106	59	108		0	0	
Surr: 2-Fluorophenol	3291.667		3330		98.8	50	111		0	0	
Surr: 4-Terphenyl-d14	3679.667		3330		111	58	135		0	0	
Surr: Nitrobenzene-d5	3190.000		3330		95.8	54	115		0	0	
Surr: Phenol-d5	3414.000		3330		103	58	112		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104787-006ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107715**
Client ID: **ZZZZZZ** Batch ID: **54432** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1688696**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	330						0	0	20	
1,2-Dichlorobenzene	ND	330						0	0	20	
1,3-Dichlorobenzene	ND	330						0	0	20	
1,4-Dichlorobenzene	ND	330						0	0	20	
2,4,5-Trichlorophenol	ND	330						0	0	20	
2,4,6-Trichlorophenol	ND	330						0	0	20	
2,4-Dichlorophenol	ND	1600						0	0	20	
2,4-Dimethylphenol	ND	330						0	0	20	
2,4-Dinitrophenol	ND	1600						0	0	20	
2,4-Dinitrotoluene	ND	330						0	0	20	
2,6-Dinitrotoluene	ND	330						0	0	20	
2-Chloronaphthalene	ND	330						0	0	20	
2-Chlorophenol	ND	330						0	0	20	
2-Methylnaphthalene	ND	330						0	0	20	
2-Methylphenol	ND	330						0	0	20	
2-Nitroaniline	ND	1600						0	0	20	
2-Nitrophenol	ND	330						0	0	20	
3,3´-Dichlorobenzidine	ND	660						0	0	20	
3-Nitroaniline	ND	1600						0	0	20	
4,6-Dinitro-2-methylphenol	ND	1600						0	0	20	
4-Bromophenyl-phenylether	ND	330						0	0	20	
4-Chloro-3-methylphenol	ND	660						0	0	20	
4-Chloroaniline	ND	660						0	0	20	
4-Chlorophenyl-phenylether	ND	330						0	0	20	
4-Methylphenol	ND	330						0	0	20	
4-Nitroaniline	ND	1600						0	0	20	
4-Nitrophenol	ND	1600						0	0	20	
Acenaphthene	ND	330						0	0	20	
Acenaphthylene	ND	330						0	0	20	
Anthracene	ND	330						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104787-006ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107715**
Client ID: **ZZZZZZ** Batch ID: **54432** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1688696**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzidine (M)	ND	1600						0	0	20	
Benzo(a)anthracene	ND	330						0	0	20	
Benzo(a)pyrene	ND	330						0	0	20	
Benzo(b)fluoranthene	ND	330						0	0	20	
Benzo(g,h,i)perylene	ND	330						0	0	20	
Benzo(k)fluoranthene	ND	330						0	0	20	
Benzoic acid	ND	1600						0	0	20	
Benzyl alcohol	ND	660						0	0	20	
Bis(2-chloroethoxy)methane	ND	330						0	0	20	
Bis(2-chloroethyl)ether	ND	330						0	0	20	
Bis(2-chloroisopropyl)ether	ND	330						0	0	20	
Bis(2-ethylhexyl)phthalate	ND	330						0	0	20	
Butylbenzylphthalate	ND	330						0	0	20	
Chrysene	ND	330						0	0	20	
Di-n-butylphthalate	ND	330						0	0	20	
Di-n-octylphthalate	ND	330						0	0	20	
Dibenz(a,h)anthracene	ND	330						0	0	20	
Dibenzofuran	ND	330						0	0	20	
Diethylphthalate	ND	330						0	0	20	
Dimethylphthalate	ND	330						0	0	20	
Fluoranthene	ND	330						0	0	20	
Fluorene	ND	330						0	0	20	
Hexachlorobenzene	ND	330						0	0	20	
Hexachlorobutadiene	ND	660						0	0	20	
Hexachlorocyclopentadiene	ND	660						0	0	20	
Hexachloroethane	ND	330						0	0	20	
Indeno(1,2,3-cd)pyrene	ND	330						0	0	20	
Isophorone	ND	330						0	0	20	
N-Nitrosodi-n-propylamine	ND	330						0	0	20	
N-Nitrosodiphenylamine	ND	330						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104787-006ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107715**
Client ID: **ZZZZZZ** Batch ID: **54432** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1688696**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	330						0	0	20	
Nitrobenzene	ND	330						0	0	20	
Pentachlorophenol	ND	1600						0	0	20	
Phenanthrene	ND	330						0	0	20	
Phenol	ND	330						0	0	20	
Pyrene	ND	330						0	0	20	
Surr: 1,2-Dichlorobenzene-d4	2779.000		3330		83.5	49	103		0	0	
Surr: 2,4,6-Tribromophenol	3428.000		3330		103	47	129		0	0	
Surr: 2-Chlorophenol-d4	2951.000		3330		88.6	54	109		0	0	
Surr: 2-Fluorobiphenyl	3214.333		3330		96.5	59	108		0	0	
Surr: 2-Fluorophenol	3017.333		3330		90.6	50	111		0	0	
Surr: 4-Terphenyl-d14	4234.333		3330		127	58	135		0	0	
Surr: Nitrobenzene-d5	2973.667		3330		89.3	54	115		0	0	
Surr: Phenol-d5	3116.667		3330		93.6	58	112		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_W_FULL

Sample ID: **MB-54393** SampType: **MBLK** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **3/31/2009** RunNo: **107670**
Client ID: **PBW** Batch ID: **54393** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **3/31/2009** SeqNo: **1687707**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	10									
1,2-Dichlorobenzene	ND	10									
1,3-Dichlorobenzene	ND	10									
1,4-Dichlorobenzene	ND	10									
2,4,5-Trichlorophenol	ND	10									
2,4,6-Trichlorophenol	ND	10									
2,4-Dichlorophenol	ND	10									
2,4-Dimethylphenol	ND	10									
2,4-Dinitrophenol	ND	50									
2,4-Dinitrotoluene	ND	10									
2,6-Dinitrotoluene	ND	10									
2-Chloronaphthalene	ND	10									
2-Chlorophenol	ND	10									
2-Methylnaphthalene	ND	10									
2-Methylphenol	ND	10									
2-Nitroaniline	ND	50									
2-Nitrophenol	ND	10									
3,3´-Dichlorobenzidine	ND	20									
3-Nitroaniline	ND	50									
4,6-Dinitro-2-methylphenol	ND	50									
4-Bromophenyl-phenylether	ND	10									
4-Chloro-3-methylphenol	ND	50									
4-Chloroaniline	ND	20									
4-Chlorophenyl-phenylether	ND	10									
4-Methylphenol	ND	10									
4-Nitroaniline	ND	20									
4-Nitrophenol	ND	50									
Acenaphthene	ND	10									
Acenaphthylene	ND	10									
Anthracene	ND	10									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_W_FULL

Sample ID: **MB-54393** SampType: **MBLK** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **3/31/2009** RunNo: **107670**
Client ID: **PBW** Batch ID: **54393** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **3/31/2009** SeqNo: **1687707**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzidine (M)	ND	50									
Benzo(a)anthracene	ND	10									
Benzo(a)pyrene	ND	10									
Benzo(b)fluoranthene	ND	10									
Benzo(g,h,i)perylene	ND	10									
Benzo(k)fluoranthene	ND	10									
Benzoic acid	ND	50									
Benzyl alcohol	ND	20									
Bis(2-chloroethoxy)methane	ND	10									
Bis(2-chloroethyl)ether	ND	10									
Bis(2-chloroisopropyl)ether	ND	10									
Bis(2-ethylhexyl)phthalate	ND	10									
Butylbenzylphthalate	ND	10									
Chrysene	ND	10									
Di-n-butylphthalate	ND	10									
Di-n-octylphthalate	ND	10									
Dibenz(a,h)anthracene	ND	10									
Dibenzofuran	ND	10									
Diethylphthalate	ND	10									
Dimethylphthalate	ND	10									
Fluoranthene	ND	10									
Fluorene	ND	10									
Hexachlorobenzene	ND	10									
Hexachlorobutadiene	ND	20									
Hexachlorocyclopentadiene	ND	10									
Hexachloroethane	ND	10									
Indeno(1,2,3-cd)pyrene	ND	10									
Isophorone	ND	10									
N-Nitrosodi-n-propylamine	ND	10									
N-Nitrosodiphenylamine	ND	10									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_W_FULL

Sample ID: **MB-54393** SampType: **MBLK** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **3/31/2009** RunNo: **107670**
Client ID: **PBW** Batch ID: **54393** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **3/31/2009** SeqNo: **1687707**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	10									
Nitrobenzene	ND	10									
Pentachlorophenol	ND	50									
Phenanthrene	ND	10									
Phenol	ND	10									
Pyrene	ND	10									
Surr: 1,2-Dichlorobenzene-d4	69.890		100.0		69.9	42	98				
Surr: 2,4,6-Tribromophenol	87.150		100.0		87.2	60	128				
Surr: 2-Chlorophenol-d4	67.760		100.0		67.8	43	102				
Surr: 2-Fluorobiphenyl	80.010		100.0		80.0	50	108				
Surr: 2-Fluorophenol	40.450		100.0		40.5	22	69				
Surr: 4-Terphenyl-d14	110.950		100.0		111	66	130				
Surr: Nitrobenzene-d5	79.690		100.0		79.7	47	117				
Surr: Phenol-d5	27.260		100.0		27.3	16	50				

Sample ID: **LCS-54393** SampType: **LCS** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **3/31/2009** RunNo: **107670**
Client ID: **LCSW** Batch ID: **54393** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **3/31/2009** SeqNo: **1687708**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	83.600	10	100.0	0	83.6	54	110				
1,4-Dichlorobenzene	76.890	10	100.0	0	76.9	48	103				
2,4-Dinitrotoluene	107.980	10	100.0	0	108	69	136				
2-Chlorophenol	80.070	10	100.0	0	80.1	53	100				
4-Chloro-3-methylphenol	110.350	50	100.0	0	110	70	124				
4-Nitrophenol	56.450	50	100.0	0	56.5	32	69				
Acenaphthene	105.780	10	100.0	0	106	64	118				
N-Nitrosodi-n-propylamine	96.640	10	100.0	0	96.6	62	130				
Pentachlorophenol	97.190	50	100.0	0	97.2	64	130				
Phenol	32.780	10	100.0	0	32.8	25	50				
Pyrene	110.380	10	100.0	0	110	66	123				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_W_FULL

Sample ID: **LCS-54393** SampType: **LCS** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **3/31/2009** RunNo: **107670**
Client ID: **LCSW** Batch ID: **54393** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **3/31/2009** SeqNo: **1687708**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 1,2-Dichlorobenzene-d4	74.720		100.0		74.7	42	98				
Surr: 2,4,6-Tribromophenol	108.690		100.0		109	60	128				
Surr: 2-Chlorophenol-d4	72.960		100.0		73.0	43	102				
Surr: 2-Fluorobiphenyl	94.820		100.0		94.8	50	108				
Surr: 2-Fluorophenol	44.270		100.0		44.3	22	69				
Surr: 4-Terphenyl-d14	105.040		100.0		105	66	130				
Surr: Nitrobenzene-d5	85.800		100.0		85.8	47	117				
Surr: Phenol-d5	30.610		100.0		30.6	16	50				

Sample ID: **MB-54393MS** SampType: **MS** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **3/31/2009** RunNo: **107670**
Client ID: **ZZZZZZ** Batch ID: **54393** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **3/31/2009** SeqNo: **1687709**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	90.710	10	100.0	0	90.7	54	110				
1,4-Dichlorobenzene	81.780	10	100.0	0	81.8	48	103				
2,4-Dinitrotoluene	114.890	10	100.0	0	115	69	136				
2-Chlorophenol	85.440	10	100.0	0	85.4	53	100				
4-Chloro-3-methylphenol	117.450	50	100.0	0	117	70	124				
4-Nitrophenol	60.050	50	100.0	0	60.1	32	69				
Acenaphthene	111.170	10	100.0	0	111	64	118				
N-Nitrosodi-n-propylamine	102.700	10	100.0	0	103	62	130				
Pentachlorophenol	100.360	50	100.0	0	100	64	130				
Phenol	34.760	10	100.0	0	34.8	25	50				
Pyrene	113.580	10	100.0	0	114	66	123				
Surr: 1,2-Dichlorobenzene-d4	79.480		100.0		79.5	42	98				
Surr: 2,4,6-Tribromophenol	113.340		100.0		113	60	128				
Surr: 2-Chlorophenol-d4	76.960		100.0		77.0	43	102				
Surr: 2-Fluorobiphenyl	98.710		100.0		98.7	50	108				
Surr: 2-Fluorophenol	47.120		100.0		47.1	22	69				
Surr: 4-Terphenyl-d14	108.960		100.0		109	66	130				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_W_FULL

Sample ID: **MB-54393MS**	SampType: **MS**	TestCode: **8270_W_FUL**	Units: **µg/L**	Prep Date: **3/31/2009**	RunNo: **107670**
Client ID: **ZZZZZZ**	Batch ID: **54393**	TestNo: **EPA 8270C**	**EPA 3510C**	Analysis Date: **3/31/2009**	SeqNo: **1687709**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	91.500		100.0		91.5	47	117				
Surr: Phenol-d5	31.390		100.0		31.4	16	50				

Sample ID: **MB-54393MSD**	SampType: **MSD**	TestCode: **8270_W_FUL**	Units: **µg/L**	Prep Date: **3/31/2009**	RunNo: **107670**
Client ID: **ZZZZZZ**	Batch ID: **54393**	TestNo: **EPA 8270C**	**EPA 3510C**	Analysis Date: **3/31/2009**	SeqNo: **1687710**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	93.630	10	100.0	0	93.6	54	110	90.71	3.17	20	
1,4-Dichlorobenzene	85.050	10	100.0	0	85.0	48	103	81.78	3.92	20	
2,4-Dinitrotoluene	119.680	10	100.0	0	120	69	136	114.9	4.08	20	
2-Chlorophenol	87.710	10	100.0	0	87.7	53	100	85.44	2.62	20	
4-Chloro-3-methylphenol	120.070	50	100.0	0	120	70	124	117.4	2.21	20	
4-Nitrophenol	62.570	50	100.0	0	62.6	32	69	60.05	4.11	20	
Acenaphthene	115.210	10	100.0	0	115	64	118	111.2	3.57	20	
N-Nitrosodi-n-propylamine	105.590	10	100.0	0	106	62	130	102.7	2.77	20	
Pentachlorophenol	102.230	50	100.0	0	102	64	130	100.4	1.85	20	
Phenol	37.040	10	100.0	0	37.0	25	50	34.76	6.35	20	
Pyrene	116.400	10	100.0	0	116	66	123	113.6	2.45	20	
Surr: 1,2-Dichlorobenzene-d4	82.550		100.0		82.6	42	98		0	0	
Surr: 2,4,6-Tribromophenol	116.160		100.0		116	60	128		0	0	
Surr: 2-Chlorophenol-d4	80.300		100.0		80.3	43	102		0	0	
Surr: 2-Fluorobiphenyl	101.970		100.0		102	50	108		0	0	
Surr: 2-Fluorophenol	49.550		100.0		49.6	22	69		0	0	
Surr: 4-Terphenyl-d14	110.470		100.0		110	66	130		0	0	
Surr: Nitrobenzene-d5	92.710		100.0		92.7	47	117		0	0	
Surr: Phenol-d5	34.360		100.0		34.4	16	50		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#: ______
Logged By: [signature] Date: 3/28/09

Method of Transport
- Client ☐
- ATL ☐
- CA OverN ☐
- FEDEX ☐
- Other: GSO

Sample Condition Upon Receipt
1. CHILLED 2.4 Y☐ N☐
2. HEADSPACE (VOA) Y☐ N☐
3. CONTAINER INTACT Y☐ N☐
4. SEALED Y☐ N☐
5. # OF SPLS MATCH COC Y☐ N☐
6. PRESERVED Y☐ N☐

Client: Geocon Consultants
Attn: John Love
Address: 6671 Brisa St.
City: Livermore State: CA Zip Code: 94550
TEL: (925) 371-5900
FAX: (925) 371-5915

Project Name: Caltrans Dumbarton Bridge Project #: E8435-06-18 Sampler: (Printed Name) John Love (Signature) [signature]

Relinquished by: (Signature and Printed Name)	Date	Time	Received by: (Signature and Printed Name)	Date	Time
[signature] John Love	3/27/09	16:00	[signature]	3/28/09	0830

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
John Love
Print Name Date
[signature]
Signature

Send Report To:
Attn:
Co: same as above
Address
City State Zip

Bill To:
Attn:
Co: same as above
Address
City State Zip

Special Instructions/Comments: metals samples were field filtered

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

LAB USE ONLY: Batch #:

Circle or Add Analysis(es) Requested

ITEM	Lab No.	Sample I.D. / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (PAH) SVOCs	6010B (Total Metal)	8015B (GRO) [struck out]	8015B (DRO) + TPHmo w/silica gel cleanup (5015B)	8021 (BTEX)	TITLE 22 / CAM 17 (6010/7000)	TDS	Oil & Grease	Cyanide	Dissolved Cyanide	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Type	PRESERVATION	REMARKS
	104786-01	WSBGW	3/26/09	13:05			X															E	3	V G	H	
	↓	↓	↓	↓				X														↓	1	L G		
										X													2	V G	H	
											X												1	L G		
													X										1	P P	N	
														X									1	P P		
															X								1	J G	H	
																X							1	P P	O	
																	X						1	P P	O	+AlCl3
	-2	Trip Blank (WSBGW)	↓	16:00			X			X												↓	2	V G	H	

QA/QC: RTNE ☐ CT ☐ SWRCB ☐ Logcode ____ OTHER ____

• TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Preservatives: H=Hcl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#: _____

Logged By: _____ Date: 3/28/09

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: CDO

Sample Condition Upon Receipt
1. CHILLED Y☐ N☐ 4. SEALED Y☐ N☐
2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐
3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client: Geocon Consultants
Address: 6671 Boisa St.
City Livermore State CA Zip Code 94550
TEL: (925) 371-5900
FAX: (925) 371-5915
Attn: John Love
Project Name: Caltrans Dumbarton Bridge Project #: E8435-06-18 Sampler: (Printed Name) John Love (Signature)

Relinquished by: (Signature and Printed Name) John Love Date: 3/27/09 Time: 16:00 Received by: (Signature and Printed Name) Date: 3/28/09 Time: 0830
Relinquished by: (Signature and Printed Name) Date: Time: Received by: (Signature and Printed Name) Date: Time:
Relinquished by: (Signature and Printed Name) Date: Time: Received by: (Signature and Printed Name) Date: Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: John Love 3/27/09 (Print Name / Date)
Signature

Send Report To:
Attn: _____
Co: same as above
Address _____
City _____ State _____ Zip _____

Bill To:
Attn: _____
Co: same as above
Address _____
City _____ State _____ Zip _____

Special Instructions/Comments:
Storage (cleanup (50)-53)

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

Circle or Add Analysis(es) Requested: 8081A (Pesticides), 8082 (PCB), 8260B (Volatiles), 8270C (BNA), 6010B (Total Metal), 8015B (GRO) / 8020 (BTEX), 8015B (DRO), 8021 (BTEX), TITLE 22 / CAM 17 (6010 / 7000), TPHd + TPHmo w/silicage, SVOCs (8270C)

SPECIFY APPROPRIATE MATRIX: SOIL, WATER, GROUND WATER, WASTEWATER

PRESERVATION: QA/QC RTNE ☐ CT ☐ SWRCB ☐ Logcode _____ OTHER _____

ITEM	LAB USE ONLY: Batch # / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8081A	8082	8260B	8270C	6010B	8015B (GRO)/8020	8015B (DRO)	8021	TITLE 22	TPHd+TPHmo	SVOCs	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	REMARKS
	104786-3	WSBGW (0')	3/26/09	12:23									X	X	X	X				E	1	T P	
	-4	WSBGW (5')		12:26									X	X	X	X							
	-5	WSBGW (10')		12:35									X	X	X	X							
	-6	WSBGW (15')		12:48									X	X	X	X							
	-7	W10B (0')		15:14									X	X	X	X							
	-8	W10B (5')		15:19									X	X	X	X							
	-9	W10B (10')		15:33									X	X	X	X							
	-10	W10B (15')		15:46									X	X	X	X							

• TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=Hcl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

June 09, 2009

John Love
Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550

TEL: (925) 525-4142
FAX: (925) 371-5915

ELAP No.: 1838
NELAP No.: 02107CA
NEVADA.: CA-401
CSDLAC No.: 10196

Workorder No.: 104786

RE: Caltrans Dumbarton Bridge, E8435-06-18

Attention: John Love

Enclosed are the results for sample(s) received on March 28, 2009 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

This is an addendum report. Please incorporate with documentation previously submitted.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

CLIENT: Geocon Consultants, Inc.
Project: Caltrans Dumbarton Bridge, E8435-06-18
Lab Order: 104786

CASE NARRATIVE

Results were J-Flag. "J" is used to flag those results that are between the PQL (Practical Quantitation Limit) and the calculated MDL (Method Detection Limit). Results that are "J" Flagged are estimated values since it becomes difficult to accurately quantitate the analyte near the MDL.

Analytical Comments for Method 6010

Dilution was necessary for sample 104786-007A, due to sample matrix.

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W10B (0')
Lab Order:	104786	**Collection Date:**	3/26/2009 3:14:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104786-007A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC							
			WET/ EPA 6010B				
RunID: **ICP8_090608C**	QC Batch: **R109661**				PrepDate:		Analyst: **CL**
Chromium	0.13	0.018	1.0	J	mg/L	20	6/8/2009 04:04 PM
Vanadium	0.22	0.010	1.0	J	mg/L	20	6/8/2009 04:04 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_ST

Sample ID: **MB-55695A** SampType: **MBLK** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **PBS** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722211**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	ND	0.050									
Vanadium	ND	0.050									

Sample ID: **LCS-55695** SampType: **LCS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **LCSS** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722212**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	0.919	0.050	1.000	0	91.9	85	115				
Vanadium	1.004	0.050	1.000	0	100	85	115				

Sample ID: **104787-004ADUP** SampType: **DUP** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **ZZZZZZ** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722223**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	0.068	1.0						0.1096	0	20	
Vanadium	0.204	1.0						0.2437	0	20	

Sample ID: **104787-004AMS** SampType: **MS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **ZZZZZZ** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722224**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	2.444	1.0	2.500	0.1096	93.4	77	116				
Vanadium	2.743	1.0	2.500	0.2437	100	79	118				

Sample ID: **MB-55695B** SampType: **MBLK** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **PBS** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722225**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104786
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_ST

Sample ID: **MB-55695B**	SampType: **MBLK**	TestCode: **6010_ST**	Units: **mg/L**	Prep Date:	RunNo: **109661**
Client ID: **PBS**	Batch ID: **R109661**	TestNo: **WET/ EPA 60**		Analysis Date: **6/8/2009**	SeqNo: **1722225**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	ND	0.050									
Vanadium	ND	0.050									

Sample ID: **104789-008ADUP**	SampType: **DUP**	TestCode: **6010_ST**	Units: **mg/L**	Prep Date:	RunNo: **109661**
Client ID: **ZZZZZZ**	Batch ID: **R109661**	TestNo: **WET/ EPA 60**		Analysis Date: **6/8/2009**	SeqNo: **1722236**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	0.235	1.0						0.2217	0	20	
Vanadium	0.470	1.0						0.4639	0	20	

Sample ID: **104789-008AMS**	SampType: **MS**	TestCode: **6010_ST**	Units: **mg/L**	Prep Date:	RunNo: **109661**
Client ID: **ZZZZZZ**	Batch ID: **R109661**	TestNo: **WET/ EPA 60**		Analysis Date: **6/8/2009**	SeqNo: **1722237**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	2.649	1.0	2.500	0.2217	97.1	77	116				
Vanadium	2.991	1.0	2.500	0.4639	101	79	118				

Sample ID: **104789-008AMSD**	SampType: **MSD**	TestCode: **6010_ST**	Units: **mg/L**	Prep Date:	RunNo: **109661**
Client ID: **ZZZZZZ**	Batch ID: **R109661**	TestNo: **WET/ EPA 60**		Analysis Date: **6/8/2009**	SeqNo: **1722238**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	2.612	1.0	2.500	0.2217	95.6	77	116	2.649	1.40	20	
Vanadium	2.980	1.0	2.500	0.4639	101	79	118	2.991	0.375	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

Diane Galvan

From: John Love [love@geoconinc.com]
Sent: Wednesday, June 03, 2009 10:50 AM
To: Diane Galvan
Subject: WET Request
Attachments: COC Caltrans Dumbarton Bridge.pdf

Hi Diane:

Caltrans would like to run a waste extraction test on several samples for select metals from the Dumbarton Bridge project. I've attached the COCs for the samples they wanted analyzed for STLC. Let me know if you have any questions.

Thanks Diane.

John Love
Sr. Project Geologist

Please visit our new website at http://www.geoconinc.com

GEOCON Incorporated
6671 Brisa Street
Livermore, CA 94550
Tel (925) 371-5900

GEOTECHNICAL - ENVIRONMENTAL - MATERIALS

San Diego Murrieta Burbank San Bernardino Bakersfield Sacramento Livermore Carson City Las Vegas Portland

CONFIDENTIALITY NOTICE: This e-mail may contain confidential and privileged material for the sole use of the intended recipient(s). Any review, use, distribution or disclosure by others is strictly prohibited. If you have received this communication in error, please notify the sender immediately by e-mail and delete the message and any file attachments from your computer. Thank you.

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#: _____

Logged By: _____ Date: _____

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: _____

Sample Condition Upon Receipt: 1. CHILLED Y☐ N☐ 4. SEALED Y☐ N☐ 2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐ 3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client: Geocon Consultants, Inc. Address: 6671 Brisa St. TEL: (925) 371-5900
Attn: John Love City Livermore State CA Zip Code 94550 FAX: (925) 371-5915

Project Name: Caltrans - Dumbarton Bridge Project #: E8435-06-18 Sampler: (Printed Name) John Love (Signature)

Relinquished by: (Signature and Printed Name) John Love	Date: 6/3/09	Time:	Received by: (Signature and Printed Name)	Date: Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date: Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date: Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: John Love 6/3/09 (Print Name / Date) (Signature)

Send Report To: Attn: _____ Co: same as above Address _____ City _____ State _____ Zip _____

Bill To: Attn: _____ Co: same as above Address _____ City _____ State _____ Zip _____

Special Instructions/Comments:

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

Circle or Add Analysis(es) Requested

SPECIFY APPROPRIATE MATRIX

PRESERVATION

Q A / Q C: RTNE ☐ CT ☐ SWRCB ☐ Logcode _____ OTHER _____

ITEM	LAB USE ONLY: Batch # / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	8010B (Total Metal)	8015B (GRO) / 8020 (BTEX)	8015B (DRO)	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	V: (WET)	As: (WET)	Cr: (WET)	Pb: (WET)	Hg: (WET)	Ni: (WET)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	REMARKS
		ESA (5')	3/24/09									X		X	X				X					E	1	T P	
		ESB (0')										X				X			X								
		ESB (5')										X		X	X				X								
		E10BGW (0')										X				X			X								
		E10BGW (5')										X		X	X				X								
		E15A (5')										X		x	x			X	X								
		E20AGW (5')										X			X				X								
		~~E8GW~~ E20BGW (5')										X		x	x				X								
		WSA (5')										X		x	x			X	X								
		W10AGW (5')										X			X			X	X								

* TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=Hcl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter.

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#: _____

Logged By: _____ Date: _____

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: _____

Sample Condition Upon Receipt
1. CHILLED Y☐ N☐ 4. SEALED Y☐ N☐
2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐
3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client:
Attn:
Address: 6671 Brisa St.
City Livermore State CA Zip Code 94550
TEL: (925) 371-5900
FAX: (925) 371-5915

Project Name: Caltrans- Dumbarton Bridge Project #: E8435-06-18 Sampler: (Printed Name) John Love (Signature)

Relinquished by: (Signature and Printed Name) John Love	Date: 6/3/09	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
John Love 6/3/09 (Print Name / Date)
(Signature)

Send Report To:
Attn: _____
Co: same as above
Address _____
City _____ State ____ Zip ____

Bill To:
Attn: _____
Co: same as above
Address _____
City _____ State ____ Zip ____

Special Instructions/Comments:

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

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- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

Circle or Add Analysis(es) Requested

SPECIFY APPROPRIATE MATRIX

PRESERVATION

Q A / Q C
RTNE ☐ CT ☐ SWRCB ☐ Logcode ____ OTHER ____

ITEM	LAB USE ONLY: Batch # / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	8010B (Total Metals)	8015B (GRO) / 8020 (BTEX)	8015B (DRO)	TITLE 22 / CAM 17 (6010 / 7000)	As (WET)	Cr (WET)	Pb (WET)	Hg (WET)	Ni (WET)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	REMARKS
		W10B (0')	3/4/01							X			X				X						E	1	T P	
		W15BGW (0')								X			X				X									
		W20AGW (5')								X			X				X									
		W20B (0')								X			X				X									
		FW1 (0')								X					X		X							T m	
		FW1 (2')								X			X				X									
		FW2 (0')								X			X				X									
		FW2 (2')								X					X		X									
		FW3 (0')								X			X				X									
		FW3 (2')								X			X				X									

• TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=Hcl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: White with report, Yellow to folder, Pink to submitter.

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FOR LABORATORY USE ONLY:

P.O.#: _____

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Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: _____

Sample Condition Upon Receipt: 1. CHILLED Y☐ N☐ 4. SEALED Y☐ N☐ 2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐ 3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client: ~~Caltrans - Dumbarton Bridge~~ Geocon Consultants
Attn: John Love
Address: 6671 Brisa St.
City Livermore State CA Zip Code
TEL: (925) 371-5900
FAX: (925) 371-5915

Project Name: Caltrans - Dumbarton Bridge Project #: E8435-06-18 Sampler: (Printed Name) John Love (Signature)

Relinquished by: (Signature and Printed Name) John Love	Date: 6/3/09	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
John Love 6/3/09
Print Name Date
Signature

Send Report To:
Attn: _____
Co: same as above
Address _____
City _____ State ____ Zip ____

Bill To:
Attn: _____
Co: same as above
Address _____
City _____ State ____ Zip ____

Special Instructions/Comments:

Sample/Records - Archival & Disposal
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- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time
		FW4 (0')	3/2/09	
		FW4 (2')	↓	

Circle or Add Analysis(es) Requested

8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	8010B (Total Metals)	8015B (GRO) / 8020 (BTEX)	8015B (DRO)	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	VA (WET)	CC (WET)	Hg (WET)	PB (WET)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
								X	X	X	X		X				E	1	T M		
								X	X	X			X				↓	↓	↓ ↓		

SPECIFY APPROPRIATE MATRIX

QA/QC: RTNE ☐ CT ☐ SWRCB ☐ Logcode ____ OTHER ____

- TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter.

April 07, 2009

John Love
Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550

TEL: (925) 525-4142
FAX: (925) 371-5915

ELAP No.: 1838
NELAP No.: 02107CA
NEVADA.: CA-401
CSDLAC No.: 10196

Workorder No.: 104787

RE: Caltrans Dumbarton Bridge, E8435-06-18

Attention: John Love

Enclosed are the results for sample(s) received on March 28, 2009 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter and the case narrative are an integral part of this analytical report and cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

CLIENT: Geocon Consultants, Inc.
Project: Caltrans Dumbarton Bridge, E8435-06-18
Lab Order: 104787

CASE NARRATIVE

Analytical Comments for Method 6010

Dilution was necessary for sample 104787-001E, due to sample matrix.

Matrix Spike (MS) and /or Matrix Spike Duplicate (MSD) are/is outside recovery criteria for sample 104787-004AMSD; however, the analytical batch was validated by the Laboratory Control Sample (LCS).

RPD for Duplicate (DUP) is outside criteria for samples 104767-001BDUP and 104787-004ADUP; however, the Laboratory Control Sample (LCS) validated the analytical batch.

Analytical Comments for Method 8015 (DRO/ORO)

Dilution was necessary for sample 104787-007A, due to sample matrix.

Surrogate recovery was diluted out for sample 104787-007A.

RPD for Duplicate (DUP) is outside criteria 104787-005ADUP; however, the Laboratory Control Sample (LCS) validated the analytical batch.

Analytical Comments for Method 8270

Surrogate recovery biased high for sample 104787-010A, possibly due to matrix interferences.

Matrix Spike (MS) and /or Matrix Spike Duplicate (MSD) are/is outside recovery criteria for sample 104787-006AMSD; however, the analytical batch was validated by the Laboratory Control Sample (LCS).

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W10AGW
Lab Order:	104787	**Collection Date:**	3/26/2009 9:15:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104787-001A		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS11_090331A QC Batch: A09VW063 PrepDate: Analyst: **SLL**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	3/31/2009 05:09 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	3/31/2009 05:09 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	3/31/2009 05:09 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	3/31/2009 05:09 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	3/31/2009 05:09 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	3/31/2009 05:09 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	3/31/2009 05:09 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	3/31/2009 05:09 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	3/31/2009 05:09 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	3/31/2009 05:09 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	3/31/2009 05:09 PM
1,2-Dibromo-3-chloropropane	ND	0.50		µg/L	1	3/31/2009 05:09 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	3/31/2009 05:09 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2009 05:09 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	3/31/2009 05:09 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	3/31/2009 05:09 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	3/31/2009 05:09 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2009 05:09 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	3/31/2009 05:09 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2009 05:09 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	3/31/2009 05:09 PM
2-Chlorotoluene	ND	0.50		µg/L	1	3/31/2009 05:09 PM
4-Chlorotoluene	ND	0.50		µg/L	1	3/31/2009 05:09 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	3/31/2009 05:09 PM
Benzene	ND	0.50		µg/L	1	3/31/2009 05:09 PM
Bromobenzene	ND	0.50		µg/L	1	3/31/2009 05:09 PM
Bromodichloromethane	ND	0.50		µg/L	1	3/31/2009 05:09 PM
Bromoform	ND	0.50		µg/L	1	3/31/2009 05:09 PM
Bromomethane	ND	0.50		µg/L	1	3/31/2009 05:09 PM
Carbon tetrachloride	ND	0.50		µg/L	1	3/31/2009 05:09 PM
Chlorobenzene	ND	0.50		µg/L	1	3/31/2009 05:09 PM
Chloroethane	ND	0.50		µg/L	1	3/31/2009 05:09 PM
Chloroform	ND	0.50		µg/L	1	3/31/2009 05:09 PM
Chloromethane	ND	0.50		µg/L	1	3/31/2009 05:09 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	3/31/2009 05:09 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W10AGW
Lab Order:	104787	**Collection Date:**	3/26/2009 9:15:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104787-001A		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS11_090331A QC Batch: A09VW063 PrepDate: Analyst: **SLL**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
cis-1,3-Dichloropropene	ND	0.50		µg/L	1	3/31/2009 05:09 PM
Dibromochloromethane	ND	0.50		µg/L	1	3/31/2009 05:09 PM
Dibromomethane	ND	0.50		µg/L	1	3/31/2009 05:09 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	3/31/2009 05:09 PM
Ethylbenzene	ND	0.50		µg/L	1	3/31/2009 05:09 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	3/31/2009 05:09 PM
Isopropylbenzene	ND	0.50		µg/L	1	3/31/2009 05:09 PM
m,p-Xylene	ND	1.0		µg/L	1	3/31/2009 05:09 PM
Methylene chloride	ND	1.0		µg/L	1	3/31/2009 05:09 PM
n-Butylbenzene	ND	0.50		µg/L	1	3/31/2009 05:09 PM
n-Propylbenzene	ND	0.50		µg/L	1	3/31/2009 05:09 PM
Naphthalene	ND	0.50		µg/L	1	3/31/2009 05:09 PM
o-Xylene	ND	0.50		µg/L	1	3/31/2009 05:09 PM
sec-Butylbenzene	ND	0.50		µg/L	1	3/31/2009 05:09 PM
Styrene	ND	0.50		µg/L	1	3/31/2009 05:09 PM
tert-Butylbenzene	ND	0.50		µg/L	1	3/31/2009 05:09 PM
Tetrachloroethene	ND	0.50		µg/L	1	3/31/2009 05:09 PM
Toluene	ND	0.50		µg/L	1	3/31/2009 05:09 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	3/31/2009 05:09 PM
Trichloroethene	ND	0.50		µg/L	1	3/31/2009 05:09 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	3/31/2009 05:09 PM
Vinyl chloride	ND	0.50		µg/L	1	3/31/2009 05:09 PM
Surr: 1,2-Dichloroethane-d4	95.8	70-130		%REC	1	3/31/2009 05:09 PM
Surr: 4-Bromofluorobenzene	81.6	70-130		%REC	1	3/31/2009 05:09 PM
Surr: Dibromofluoromethane	99.6	70-130		%REC	1	3/31/2009 05:09 PM
Surr: Toluene-d8	101	70-130		%REC	1	3/31/2009 05:09 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W10AGW
Lab Order:	104787	**Collection Date:**	3/26/2009 9:15:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104787-001B		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
GASOLINE RANGE ORGANICS BY GC/FID						
		EPA 8015B(M)				
RunID: GC1_090401A	QC Batch: D09VW051			PrepDate:		Analyst: **BD**
GRO	ND	0.050		mg/L	1	4/1/2009 07:05 PM
Surr: Bromofluorobenzene (FID)	88.6	71-130		%REC	1	4/1/2009 07:05 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W10AGW
Lab Order:	104787	**Collection Date:**	3/26/2009 9:15:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104787-001C		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3510C **EPA 8270C**

RunID: MS6_090331A QC Batch: 54393 PrepDate: 3/31/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,2,4-Trichlorobenzene	ND	10		µg/L	1	4/1/2009 01:35 PM
1,2-Dichlorobenzene	ND	10		µg/L	1	4/1/2009 01:35 PM
1,3-Dichlorobenzene	ND	10		µg/L	1	4/1/2009 01:35 PM
1,4-Dichlorobenzene	ND	10		µg/L	1	4/1/2009 01:35 PM
2,4,5-Trichlorophenol	ND	10		µg/L	1	4/1/2009 01:35 PM
2,4,6-Trichlorophenol	ND	10		µg/L	1	4/1/2009 01:35 PM
2,4-Dichlorophenol	ND	10		µg/L	1	4/1/2009 01:35 PM
2,4-Dimethylphenol	ND	10		µg/L	1	4/1/2009 01:35 PM
2,4-Dinitrophenol	ND	50		µg/L	1	4/1/2009 01:35 PM
2,4-Dinitrotoluene	ND	10		µg/L	1	4/1/2009 01:35 PM
2,6-Dinitrotoluene	ND	10		µg/L	1	4/1/2009 01:35 PM
2-Chloronaphthalene	ND	10		µg/L	1	4/1/2009 01:35 PM
2-Chlorophenol	ND	10		µg/L	1	4/1/2009 01:35 PM
2-Methylnaphthalene	ND	10		µg/L	1	4/1/2009 01:35 PM
2-Methylphenol	ND	10		µg/L	1	4/1/2009 01:35 PM
2-Nitroaniline	ND	50		µg/L	1	4/1/2009 01:35 PM
2-Nitrophenol	ND	10		µg/L	1	4/1/2009 01:35 PM
3,3´-Dichlorobenzidine	ND	20		µg/L	1	4/1/2009 01:35 PM
3-Nitroaniline	ND	50		µg/L	1	4/1/2009 01:35 PM
4,6-Dinitro-2-methylphenol	ND	50		µg/L	1	4/1/2009 01:35 PM
4-Bromophenyl-phenylether	ND	10		µg/L	1	4/1/2009 01:35 PM
4-Chloro-3-methylphenol	ND	50		µg/L	1	4/1/2009 01:35 PM
4-Chloroaniline	ND	20		µg/L	1	4/1/2009 01:35 PM
4-Chlorophenyl-phenylether	ND	10		µg/L	1	4/1/2009 01:35 PM
4-Methylphenol	ND	10		µg/L	1	4/1/2009 01:35 PM
4-Nitroaniline	ND	20		µg/L	1	4/1/2009 01:35 PM
4-Nitrophenol	ND	50		µg/L	1	4/1/2009 01:35 PM
Acenaphthene	ND	10		µg/L	1	4/1/2009 01:35 PM
Acenaphthylene	ND	10		µg/L	1	4/1/2009 01:35 PM
Anthracene	ND	10		µg/L	1	4/1/2009 01:35 PM
Benzidine (M)	ND	50		µg/L	1	4/1/2009 01:35 PM
Benzo(a)anthracene	ND	10		µg/L	1	4/1/2009 01:35 PM
Benzo(a)pyrene	ND	10		µg/L	1	4/1/2009 01:35 PM
Benzo(b)fluoranthene	ND	10		µg/L	1	4/1/2009 01:35 PM
Benzo(g,h,i)perylene	ND	10		µg/L	1	4/1/2009 01:35 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W10AGW
Lab Order:	104787	**Collection Date:**	3/26/2009 9:15:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104787-001C		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3510C **EPA 8270C**

RunID: MS6_090331A QC Batch: 54393 PrepDate: 3/31/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Benzo(k)fluoranthene	ND	10		µg/L	1	4/1/2009 01:35 PM
Benzoic acid	ND	50		µg/L	1	4/1/2009 01:35 PM
Benzyl alcohol	ND	20		µg/L	1	4/1/2009 01:35 PM
Bis(2-chloroethoxy)methane	ND	10		µg/L	1	4/1/2009 01:35 PM
Bis(2-chloroethyl)ether	ND	10		µg/L	1	4/1/2009 01:35 PM
Bis(2-chloroisopropyl)ether	ND	10		µg/L	1	4/1/2009 01:35 PM
Bis(2-ethylhexyl)phthalate	ND	10		µg/L	1	4/1/2009 01:35 PM
Butylbenzylphthalate	ND	10		µg/L	1	4/1/2009 01:35 PM
Chrysene	ND	10		µg/L	1	4/1/2009 01:35 PM
Di-n-butylphthalate	ND	10		µg/L	1	4/1/2009 01:35 PM
Di-n-octylphthalate	ND	10		µg/L	1	4/1/2009 01:35 PM
Dibenz(a,h)anthracene	ND	10		µg/L	1	4/1/2009 01:35 PM
Dibenzofuran	ND	10		µg/L	1	4/1/2009 01:35 PM
Diethylphthalate	ND	10		µg/L	1	4/1/2009 01:35 PM
Dimethylphthalate	ND	10		µg/L	1	4/1/2009 01:35 PM
Fluoranthene	ND	10		µg/L	1	4/1/2009 01:35 PM
Fluorene	ND	10		µg/L	1	4/1/2009 01:35 PM
Hexachlorobenzene	ND	10		µg/L	1	4/1/2009 01:35 PM
Hexachlorobutadiene	ND	20		µg/L	1	4/1/2009 01:35 PM
Hexachlorocyclopentadiene	ND	10		µg/L	1	4/1/2009 01:35 PM
Hexachloroethane	ND	10		µg/L	1	4/1/2009 01:35 PM
Indeno(1,2,3-cd)pyrene	ND	10		µg/L	1	4/1/2009 01:35 PM
Isophorone	ND	10		µg/L	1	4/1/2009 01:35 PM
N-Nitrosodi-n-propylamine	ND	10		µg/L	1	4/1/2009 01:35 PM
N-Nitrosodiphenylamine	ND	10		µg/L	1	4/1/2009 01:35 PM
Naphthalene	ND	10		µg/L	1	4/1/2009 01:35 PM
Nitrobenzene	ND	10		µg/L	1	4/1/2009 01:35 PM
Pentachlorophenol	ND	50		µg/L	1	4/1/2009 01:35 PM
Phenanthrene	ND	10		µg/L	1	4/1/2009 01:35 PM
Phenol	ND	10		µg/L	1	4/1/2009 01:35 PM
Pyrene	ND	10		µg/L	1	4/1/2009 01:35 PM
Surr: 1,2-Dichlorobenzene-d4	62.7	42-98		%REC	1	4/1/2009 01:35 PM
Surr: 2,4,6-Tribromophenol	105	60-128		%REC	1	4/1/2009 01:35 PM
Surr: 2-Chlorophenol-d4	64.2	43-102		%REC	1	4/1/2009 01:35 PM
Surr: 2-Fluorobiphenyl	79.0	50-108		%REC	1	4/1/2009 01:35 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W10AGW
Lab Order:	104787	**Collection Date:**	3/26/2009 9:15:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104787-001C		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 3510C				**EPA 8270C**		
RunID: MS6_090331A	QC Batch: 54393			PrepDate: 3/31/2009	Analyst: **DMP**	
Surr: 2-Fluorophenol	43.4	22-69		%REC	1	4/1/2009 01:35 PM
Surr: 4-Terphenyl-d14	119	66-130		%REC	1	4/1/2009 01:35 PM
Surr: Nitrobenzene-d5	73.9	47-117		%REC	1	4/1/2009 01:35 PM
Surr: Phenol-d5	37.4	16-50		%REC	1	4/1/2009 01:35 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W10AGW
Lab Order:	104787	**Collection Date:**	3/26/2009 9:15:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104787-001D		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
EPA 3510C				**EPA 8015B**		
RunID: GC16_090401E	QC Batch: 54441			PrepDate:	4/1/2009	Analyst: **CBR**
DRO	ND	0.062		mg/L	1	4/1/2009 11:54 PM
ORO	ND	0.062		mg/L	1	4/1/2009 11:54 PM
Surr: p-Terphenyl	72.8	35-131		%REC	1	4/1/2009 11:54 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W10AGW
Lab Order:	104787	**Collection Date:**	3/26/2009 9:15:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104787-001E		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3010A			**EPA 6010B**		
RunID: ICP8_090403D	QC Batch: 54486			PrepDate:	4/2/2009	Analyst: **CL**
Antimony	ND	0.025		mg/L	5	4/3/2009 01:40 PM
Arsenic	ND	0.050		mg/L	5	4/3/2009 01:40 PM
Barium	0.26	0.015		mg/L	5	4/3/2009 01:40 PM
Beryllium	ND	0.015		mg/L	5	4/3/2009 01:40 PM
Cadmium	ND	0.015		mg/L	5	4/3/2009 01:40 PM
Chromium	ND	0.015		mg/L	5	4/3/2009 01:40 PM
Cobalt	0.10	0.015		mg/L	5	4/3/2009 01:40 PM
Copper	ND	0.025		mg/L	5	4/3/2009 01:40 PM
Lead	ND	0.025		mg/L	5	4/3/2009 01:40 PM
Molybdenum	ND	0.025		mg/L	5	4/3/2009 01:40 PM
Nickel	0.13	0.025		mg/L	5	4/3/2009 01:40 PM
Selenium	ND	0.050		mg/L	5	4/3/2009 01:40 PM
Silver	ND	0.015		mg/L	5	4/3/2009 01:40 PM
Thallium	ND	0.075		mg/L	5	4/3/2009 01:40 PM
Vanadium	ND	0.015		mg/L	5	4/3/2009 01:40 PM
Zinc	ND	0.050		mg/L	5	4/3/2009 01:40 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7470A		
RunID: AA1_090403D	QC Batch: 54480			PrepDate:	4/2/2009	Analyst: **RQ**
Mercury	ND	0.20		µg/L	1	4/3/2009 03:23 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W10AGW
Lab Order:	104787	**Collection Date:**	3/26/2009 9:15:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104787-001F		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
TOTAL FILTERABLE RESIDUE						
		SM2540C				
RunID: WETCHEM_090401B	QC Batch: 54508			PrepDate: 4/1/2009	Analyst: **DDL**	
Total Dissolved Solids (Residue, Filterable)	23000	200		mg/L	1	4/1/2009 01:00 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W10AGW
Lab Order:	104787	**Collection Date:**	3/26/2009 9:15:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104787-001G		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
OIL & GREASE						
		EPA 1664 _HEM				
RunID: WETCHEM2_090402B	QC Batch: 54502			PrepDate:	4/2/2009	Analyst: **KXV**
Oil & Grease	ND	4.7		mg/L	1	4/2/2009

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W10AGW
Lab Order:	104787	**Collection Date:**	3/26/2009 9:15:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104787-001H		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
CYANIDE, TOTAL						
	SM4500-CN E					
RunID: WETCHEM3_090403B	QC Batch: 54519			PrepDate:	4/3/2009	Analyst: **MFP**
Cyanide	ND	0.010		mg/L	1	4/3/2009

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W10AGW
Lab Order:	104787	**Collection Date:**	3/26/2009 9:15:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104787-001I		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
SULFIDE, DISSOLVED						
		SM4500-S= D				
RunID: WETCHEM3_090401D	QC Batch: R107702			PrepDate:	4/1/2009	Analyst: **MFP**
Sulfide	ND	0.010		mg/L	1	4/1/2009

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	Trip Blank (W10AGW)
Lab Order:	104787	**Collection Date:**	3/26/2009 4:00:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104787-002A		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS11_090331A QC Batch: A09VW063 PrepDate: Analyst: **SLL**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	3/31/2009 03:13 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	3/31/2009 03:13 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	3/31/2009 03:13 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	3/31/2009 03:13 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	3/31/2009 03:13 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	3/31/2009 03:13 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	3/31/2009 03:13 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	3/31/2009 03:13 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	3/31/2009 03:13 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	3/31/2009 03:13 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	3/31/2009 03:13 PM
1,2-Dibromo-3-chloropropane	ND	0.50		µg/L	1	3/31/2009 03:13 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	3/31/2009 03:13 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2009 03:13 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	3/31/2009 03:13 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	3/31/2009 03:13 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	3/31/2009 03:13 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2009 03:13 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	3/31/2009 03:13 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2009 03:13 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	3/31/2009 03:13 PM
2-Chlorotoluene	ND	0.50		µg/L	1	3/31/2009 03:13 PM
4-Chlorotoluene	ND	0.50		µg/L	1	3/31/2009 03:13 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	3/31/2009 03:13 PM
Benzene	ND	0.50		µg/L	1	3/31/2009 03:13 PM
Bromobenzene	ND	0.50		µg/L	1	3/31/2009 03:13 PM
Bromodichloromethane	ND	0.50		µg/L	1	3/31/2009 03:13 PM
Bromoform	ND	0.50		µg/L	1	3/31/2009 03:13 PM
Bromomethane	ND	0.50		µg/L	1	3/31/2009 03:13 PM
Carbon tetrachloride	ND	0.50		µg/L	1	3/31/2009 03:13 PM
Chlorobenzene	ND	0.50		µg/L	1	3/31/2009 03:13 PM
Chloroethane	ND	0.50		µg/L	1	3/31/2009 03:13 PM
Chloroform	ND	0.50		µg/L	1	3/31/2009 03:13 PM
Chloromethane	ND	0.50		µg/L	1	3/31/2009 03:13 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	3/31/2009 03:13 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	Trip Blank (W10AGW)
Lab Order:	104787	**Collection Date:**	3/26/2009 4:00:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104787-002A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS11_090331A	QC Batch: A09VW063			PrepDate:		Analyst: **SLL**
cis-1,3-Dichloropropene	ND	0.50		µg/L	1	3/31/2009 03:13 PM
Dibromochloromethane	ND	0.50		µg/L	1	3/31/2009 03:13 PM
Dibromomethane	ND	0.50		µg/L	1	3/31/2009 03:13 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	3/31/2009 03:13 PM
Ethylbenzene	ND	0.50		µg/L	1	3/31/2009 03:13 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	3/31/2009 03:13 PM
Isopropylbenzene	ND	0.50		µg/L	1	3/31/2009 03:13 PM
m,p-Xylene	ND	1.0		µg/L	1	3/31/2009 03:13 PM
Methylene chloride	ND	1.0		µg/L	1	3/31/2009 03:13 PM
n-Butylbenzene	ND	0.50		µg/L	1	3/31/2009 03:13 PM
n-Propylbenzene	ND	0.50		µg/L	1	3/31/2009 03:13 PM
Naphthalene	ND	0.50		µg/L	1	3/31/2009 03:13 PM
o-Xylene	ND	0.50		µg/L	1	3/31/2009 03:13 PM
sec-Butylbenzene	ND	0.50		µg/L	1	3/31/2009 03:13 PM
Styrene	ND	0.50		µg/L	1	3/31/2009 03:13 PM
tert-Butylbenzene	ND	0.50		µg/L	1	3/31/2009 03:13 PM
Tetrachloroethene	ND	0.50		µg/L	1	3/31/2009 03:13 PM
Toluene	ND	0.50		µg/L	1	3/31/2009 03:13 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	3/31/2009 03:13 PM
Trichloroethene	ND	0.50		µg/L	1	3/31/2009 03:13 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	3/31/2009 03:13 PM
Vinyl chloride	ND	0.50		µg/L	1	3/31/2009 03:13 PM
Surr: 1,2-Dichloroethane-d4	89.0	70-130		%REC	1	3/31/2009 03:13 PM
Surr: 4-Bromofluorobenzene	88.6	70-130		%REC	1	3/31/2009 03:13 PM
Surr: Dibromofluoromethane	98.0	70-130		%REC	1	3/31/2009 03:13 PM
Surr: Toluene-d8	105	70-130		%REC	1	3/31/2009 03:13 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	Trip Blank (W10AGW)
Lab Order:	104787	**Collection Date:**	3/26/2009 4:00:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104787-002B		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
GASOLINE RANGE ORGANICS BY GC/FID						
		EPA 8015B(M)				
RunID: GC1_090330A	QC Batch: D09VW048			PrepDate:		Analyst: **BD**
GRO	ND	0.050		mg/L	1	3/30/2009 05:31 PM
Surr: Bromofluorobenzene (FID)	106	71-130		%REC	1	3/30/2009 05:31 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W10AGW (0')
Lab Order:	104787	**Collection Date:**	3/26/2009 8:15:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104787-003A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090403I	QC Batch: 54489			PrepDate:	4/3/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	4/3/2009 07:22 PM
Arsenic	ND	1.0		mg/Kg	1	4/3/2009 07:22 PM
Barium	38	1.0		mg/Kg	1	4/3/2009 07:22 PM
Beryllium	ND	1.0		mg/Kg	1	4/3/2009 07:22 PM
Cadmium	ND	1.0		mg/Kg	1	4/3/2009 07:22 PM
Chromium	46	1.0		mg/Kg	1	4/3/2009 07:22 PM
Cobalt	16	1.0		mg/Kg	1	4/3/2009 07:22 PM
Copper	42	2.0		mg/Kg	1	4/3/2009 07:22 PM
Lead	ND	1.0		mg/Kg	1	4/3/2009 07:22 PM
Molybdenum	ND	1.0		mg/Kg	1	4/3/2009 07:22 PM
Nickel	32	1.0		mg/Kg	1	4/3/2009 07:22 PM
Selenium	ND	1.0		mg/Kg	1	4/3/2009 07:22 PM
Silver	ND	1.0		mg/Kg	1	4/3/2009 07:22 PM
Thallium	ND	1.0		mg/Kg	1	4/3/2009 07:22 PM
Vanadium	56	1.0		mg/Kg	1	4/3/2009 07:22 PM
Zinc	35	1.0		mg/Kg	1	4/3/2009 07:22 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC8_090406A	QC Batch: 54475			PrepDate:	4/2/2009	Analyst: **CBR**
DRO	18	1.0		mg/Kg	1	4/6/1909 12:31 PM
ORO	65	1.0		mg/Kg	1	4/6/1909 12:31 PM
Surr: p-Terphenyl	87.8	30-130		%REC	1	4/6/1909 12:31 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090402E	QC Batch: 54466			PrepDate:	4/2/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	4/2/2009 02:11 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS6_090401B	QC Batch: 54432			PrepDate:	4/1/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	4/2/2009 02:54 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 02:54 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 02:54 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 02:54 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W10AGW (0')
Lab Order:	104787	**Collection Date:**	3/26/2009 8:15:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104787-003A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS6_090401B QC Batch: 54432 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 02:54 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 02:54 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	4/2/2009 02:54 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	4/2/2009 02:54 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	4/2/2009 02:54 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 02:54 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 02:54 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	4/2/2009 02:54 PM
2-Chlorophenol	ND	330		µg/Kg	1	4/2/2009 02:54 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	4/2/2009 02:54 PM
2-Methylphenol	ND	330		µg/Kg	1	4/2/2009 02:54 PM
2-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 02:54 PM
2-Nitrophenol	ND	330		µg/Kg	1	4/2/2009 02:54 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	4/2/2009 02:54 PM
3-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 02:54 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	4/2/2009 02:54 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 02:54 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	4/2/2009 02:54 PM
4-Chloroaniline	ND	660		µg/Kg	1	4/2/2009 02:54 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 02:54 PM
4-Methylphenol	ND	330		µg/Kg	1	4/2/2009 02:54 PM
4-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 02:54 PM
4-Nitrophenol	ND	1600		µg/Kg	1	4/2/2009 02:54 PM
Acenaphthene	ND	330		µg/Kg	1	4/2/2009 02:54 PM
Acenaphthylene	ND	330		µg/Kg	1	4/2/2009 02:54 PM
Anthracene	ND	330		µg/Kg	1	4/2/2009 02:54 PM
Benzidine (M)	ND	1600		µg/Kg	1	4/2/2009 02:54 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	4/2/2009 02:54 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	4/2/2009 02:54 PM
Benzo(b)fluoranthene	420	330		µg/Kg	1	4/2/2009 02:54 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	4/2/2009 02:54 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	4/2/2009 02:54 PM
Benzoic acid	ND	1600		µg/Kg	1	4/2/2009 02:54 PM
Benzyl alcohol	ND	660		µg/Kg	1	4/2/2009 02:54 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	4/2/2009 02:54 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W10AGW (0')
Lab Order:	104787	**Collection Date:**	3/26/2009 8:15:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104787-003A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS6_090401B QC Batch: 54432 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	4/2/2009 02:54 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	4/2/2009 02:54 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	4/2/2009 02:54 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	4/2/2009 02:54 PM
Chrysene	ND	330		µg/Kg	1	4/2/2009 02:54 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	4/2/2009 02:54 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	4/2/2009 02:54 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	4/2/2009 02:54 PM
Dibenzofuran	ND	330		µg/Kg	1	4/2/2009 02:54 PM
Diethylphthalate	ND	330		µg/Kg	1	4/2/2009 02:54 PM
Dimethylphthalate	ND	330		µg/Kg	1	4/2/2009 02:54 PM
Fluoranthene	480	330		µg/Kg	1	4/2/2009 02:54 PM
Fluorene	ND	330		µg/Kg	1	4/2/2009 02:54 PM
Hexachlorobenzene	ND	330		µg/Kg	1	4/2/2009 02:54 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	4/2/2009 02:54 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	4/2/2009 02:54 PM
Hexachloroethane	ND	330		µg/Kg	1	4/2/2009 02:54 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	4/2/2009 02:54 PM
Isophorone	ND	330		µg/Kg	1	4/2/2009 02:54 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	4/2/2009 02:54 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	4/2/2009 02:54 PM
Naphthalene	ND	330		µg/Kg	1	4/2/2009 02:54 PM
Nitrobenzene	ND	330		µg/Kg	1	4/2/2009 02:54 PM
Pentachlorophenol	ND	1600		µg/Kg	1	4/2/2009 02:54 PM
Phenanthrene	ND	330		µg/Kg	1	4/2/2009 02:54 PM
Phenol	ND	330		µg/Kg	1	4/2/2009 02:54 PM
Pyrene	410	330		µg/Kg	1	4/2/2009 02:54 PM
Surr: 1,2-Dichlorobenzene-d4	75.9	49-103		%REC	1	4/2/2009 02:54 PM
Surr: 2,4,6-Tribromophenol	87.7	47-129		%REC	1	4/2/2009 02:54 PM
Surr: 2-Chlorophenol-d4	85.8	54-109		%REC	1	4/2/2009 02:54 PM
Surr: 2-Fluorobiphenyl	97.3	59-108		%REC	1	4/2/2009 02:54 PM
Surr: 2-Fluorophenol	84.8	50-111		%REC	1	4/2/2009 02:54 PM
Surr: 4-Terphenyl-d14	107	58-135		%REC	1	4/2/2009 02:54 PM
Surr: Nitrobenzene-d5	87.1	54-115		%REC	1	4/2/2009 02:54 PM
Surr: Phenol-d5	85.6	58-112		%REC	1	4/2/2009 02:54 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W10AGW (5')
Lab Order:	104787	**Collection Date:**	3/26/2009 8:28:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104787-004A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090403I	QC Batch: 54489			PrepDate:	4/3/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	4/3/2009 07:25 PM
Arsenic	3.6	1.0		mg/Kg	1	4/3/2009 07:25 PM
Barium	120	1.0		mg/Kg	1	4/3/2009 07:25 PM
Beryllium	ND	1.0		mg/Kg	1	4/3/2009 07:25 PM
Cadmium	ND	1.0		mg/Kg	1	4/3/2009 07:25 PM
Chromium	100	1.0		mg/Kg	1	4/3/2009 07:25 PM
Cobalt	19	1.0		mg/Kg	1	4/3/2009 07:25 PM
Copper	30	2.0		mg/Kg	1	4/3/2009 07:25 PM
Lead	3.8	1.0		mg/Kg	1	4/3/2009 07:25 PM
Molybdenum	ND	1.0		mg/Kg	1	4/3/2009 07:25 PM
Nickel	140	1.0		mg/Kg	1	4/3/2009 07:25 PM
Selenium	ND	1.0		mg/Kg	1	4/3/2009 07:25 PM
Silver	ND	1.0		mg/Kg	1	4/3/2009 07:25 PM
Thallium	ND	1.0		mg/Kg	1	4/3/2009 07:25 PM
Vanadium	50	1.0		mg/Kg	1	4/3/2009 07:25 PM
Zinc	43	1.0		mg/Kg	1	4/3/2009 07:25 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090402D	QC Batch: 54475			PrepDate:	4/2/2009	Analyst: **CBR**
DRO	ND	1.0		mg/Kg	1	4/3/2009 12:48 AM
ORO	ND	1.0		mg/Kg	1	4/3/2009 12:48 AM
Surr: p-Terphenyl	61.0	30-130		%REC	1	4/3/2009 12:48 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090402E	QC Batch: 54466			PrepDate:	4/2/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	4/2/2009 02:13 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS6_090401B	QC Batch: 54432			PrepDate:	4/1/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	4/2/2009 03:22 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 03:22 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 03:22 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 03:22 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W10AGW (5')
Lab Order:	104787	**Collection Date:**	3/26/2009 8:28:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104787-004A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS6_090401B QC Batch: 54432 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 03:22 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 03:22 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	4/2/2009 03:22 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	4/2/2009 03:22 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	4/2/2009 03:22 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 03:22 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 03:22 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	4/2/2009 03:22 PM
2-Chlorophenol	ND	330		µg/Kg	1	4/2/2009 03:22 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	4/2/2009 03:22 PM
2-Methylphenol	ND	330		µg/Kg	1	4/2/2009 03:22 PM
2-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 03:22 PM
2-Nitrophenol	ND	330		µg/Kg	1	4/2/2009 03:22 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	4/2/2009 03:22 PM
3-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 03:22 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	4/2/2009 03:22 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 03:22 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	4/2/2009 03:22 PM
4-Chloroaniline	ND	660		µg/Kg	1	4/2/2009 03:22 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 03:22 PM
4-Methylphenol	ND	330		µg/Kg	1	4/2/2009 03:22 PM
4-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 03:22 PM
4-Nitrophenol	ND	1600		µg/Kg	1	4/2/2009 03:22 PM
Acenaphthene	ND	330		µg/Kg	1	4/2/2009 03:22 PM
Acenaphthylene	ND	330		µg/Kg	1	4/2/2009 03:22 PM
Anthracene	ND	330		µg/Kg	1	4/2/2009 03:22 PM
Benzidine (M)	ND	1600		µg/Kg	1	4/2/2009 03:22 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	4/2/2009 03:22 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	4/2/2009 03:22 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	4/2/2009 03:22 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	4/2/2009 03:22 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	4/2/2009 03:22 PM
Benzoic acid	ND	1600		µg/Kg	1	4/2/2009 03:22 PM
Benzyl alcohol	ND	660		µg/Kg	1	4/2/2009 03:22 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	4/2/2009 03:22 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W10AGW (5')
Lab Order:	104787	**Collection Date:**	3/26/2009 8:28:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104787-004A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS6_090401B QC Batch: 54432 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	4/2/2009 03:22 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	4/2/2009 03:22 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	4/2/2009 03:22 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	4/2/2009 03:22 PM
Chrysene	ND	330		µg/Kg	1	4/2/2009 03:22 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	4/2/2009 03:22 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	4/2/2009 03:22 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	4/2/2009 03:22 PM
Dibenzofuran	ND	330		µg/Kg	1	4/2/2009 03:22 PM
Diethylphthalate	ND	330		µg/Kg	1	4/2/2009 03:22 PM
Dimethylphthalate	ND	330		µg/Kg	1	4/2/2009 03:22 PM
Fluoranthene	ND	330		µg/Kg	1	4/2/2009 03:22 PM
Fluorene	ND	330		µg/Kg	1	4/2/2009 03:22 PM
Hexachlorobenzene	ND	330		µg/Kg	1	4/2/2009 03:22 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	4/2/2009 03:22 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	4/2/2009 03:22 PM
Hexachloroethane	ND	330		µg/Kg	1	4/2/2009 03:22 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	4/2/2009 03:22 PM
Isophorone	ND	330		µg/Kg	1	4/2/2009 03:22 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	4/2/2009 03:22 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	4/2/2009 03:22 PM
Naphthalene	ND	330		µg/Kg	1	4/2/2009 03:22 PM
Nitrobenzene	ND	330		µg/Kg	1	4/2/2009 03:22 PM
Pentachlorophenol	ND	1600		µg/Kg	1	4/2/2009 03:22 PM
Phenanthrene	ND	330		µg/Kg	1	4/2/2009 03:22 PM
Phenol	ND	330		µg/Kg	1	4/2/2009 03:22 PM
Pyrene	ND	330		µg/Kg	1	4/2/2009 03:22 PM
Surr: 1,2-Dichlorobenzene-d4	86.0	49-103		%REC	1	4/2/2009 03:22 PM
Surr: 2,4,6-Tribromophenol	94.3	47-129		%REC	1	4/2/2009 03:22 PM
Surr: 2-Chlorophenol-d4	90.7	54-109		%REC	1	4/2/2009 03:22 PM
Surr: 2-Fluorobiphenyl	101	59-108		%REC	1	4/2/2009 03:22 PM
Surr: 2-Fluorophenol	91.9	50-111		%REC	1	4/2/2009 03:22 PM
Surr: 4-Terphenyl-d14	128	58-135		%REC	1	4/2/2009 03:22 PM
Surr: Nitrobenzene-d5	93.0	54-115		%REC	1	4/2/2009 03:22 PM
Surr: Phenol-d5	91.6	58-112		%REC	1	4/2/2009 03:22 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W10AGW (10')
Lab Order:	104787	**Collection Date:**	3/26/2009 8:37:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104787-005A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090403J	QC Batch: 54490			PrepDate:	4/3/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	4/3/2009 07:57 PM
Arsenic	1.6	1.0		mg/Kg	1	4/3/2009 07:57 PM
Barium	98	1.0		mg/Kg	1	4/3/2009 07:57 PM
Beryllium	ND	1.0		mg/Kg	1	4/3/2009 07:57 PM
Cadmium	ND	1.0		mg/Kg	1	4/3/2009 07:57 PM
Chromium	50	1.0		mg/Kg	1	4/3/2009 07:57 PM
Cobalt	9.0	1.0		mg/Kg	1	4/3/2009 07:57 PM
Copper	23	2.0		mg/Kg	1	4/3/2009 07:57 PM
Lead	3.6	1.0		mg/Kg	1	4/3/2009 07:57 PM
Molybdenum	1.1	1.0		mg/Kg	1	4/3/2009 07:57 PM
Nickel	55	1.0		mg/Kg	1	4/3/2009 07:57 PM
Selenium	ND	1.0		mg/Kg	1	4/3/2009 07:57 PM
Silver	ND	1.0		mg/Kg	1	4/3/2009 07:57 PM
Thallium	ND	1.0		mg/Kg	1	4/3/2009 07:57 PM
Vanadium	33	1.0		mg/Kg	1	4/3/2009 07:57 PM
Zinc	36	1.0		mg/Kg	1	4/3/2009 07:57 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090403D	QC Batch: 54477			PrepDate:	4/2/2009	Analyst: **CBR**
DRO	2.5	1.0		mg/Kg	1	4/3/2009 10:45 AM
ORO	5.6	1.0		mg/Kg	1	4/3/2009 10:45 AM
Surr: p-Terphenyl	47.8	30-130		%REC	1	4/3/2009 10:45 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090402E	QC Batch: 54466			PrepDate:	4/2/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	4/2/2009 02:15 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS6_090401B	QC Batch: 54432			PrepDate:	4/1/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	4/2/2009 03:50 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 03:50 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 03:50 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 03:50 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W10AGW (10')
Lab Order:	104787	**Collection Date:**	3/26/2009 8:37:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104787-005A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS6_090401B QC Batch: 54432 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 03:50 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 03:50 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	4/2/2009 03:50 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	4/2/2009 03:50 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	4/2/2009 03:50 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 03:50 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 03:50 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	4/2/2009 03:50 PM
2-Chlorophenol	ND	330		µg/Kg	1	4/2/2009 03:50 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	4/2/2009 03:50 PM
2-Methylphenol	ND	330		µg/Kg	1	4/2/2009 03:50 PM
2-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 03:50 PM
2-Nitrophenol	ND	330		µg/Kg	1	4/2/2009 03:50 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	4/2/2009 03:50 PM
3-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 03:50 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	4/2/2009 03:50 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 03:50 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	4/2/2009 03:50 PM
4-Chloroaniline	ND	660		µg/Kg	1	4/2/2009 03:50 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 03:50 PM
4-Methylphenol	ND	330		µg/Kg	1	4/2/2009 03:50 PM
4-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 03:50 PM
4-Nitrophenol	ND	1600		µg/Kg	1	4/2/2009 03:50 PM
Acenaphthene	ND	330		µg/Kg	1	4/2/2009 03:50 PM
Acenaphthylene	ND	330		µg/Kg	1	4/2/2009 03:50 PM
Anthracene	ND	330		µg/Kg	1	4/2/2009 03:50 PM
Benzidine (M)	ND	1600		µg/Kg	1	4/2/2009 03:50 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	4/2/2009 03:50 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	4/2/2009 03:50 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	4/2/2009 03:50 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	4/2/2009 03:50 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	4/2/2009 03:50 PM
Benzoic acid	ND	1600		µg/Kg	1	4/2/2009 03:50 PM
Benzyl alcohol	ND	660		µg/Kg	1	4/2/2009 03:50 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	4/2/2009 03:50 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W10AGW (10')
Lab Order:	104787	**Collection Date:**	3/26/2009 8:37:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104787-005A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS6_090401B QC Batch: 54432 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	4/2/2009 03:50 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	4/2/2009 03:50 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	4/2/2009 03:50 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	4/2/2009 03:50 PM
Chrysene	ND	330		µg/Kg	1	4/2/2009 03:50 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	4/2/2009 03:50 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	4/2/2009 03:50 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	4/2/2009 03:50 PM
Dibenzofuran	ND	330		µg/Kg	1	4/2/2009 03:50 PM
Diethylphthalate	ND	330		µg/Kg	1	4/2/2009 03:50 PM
Dimethylphthalate	ND	330		µg/Kg	1	4/2/2009 03:50 PM
Fluoranthene	ND	330		µg/Kg	1	4/2/2009 03:50 PM
Fluorene	ND	330		µg/Kg	1	4/2/2009 03:50 PM
Hexachlorobenzene	ND	330		µg/Kg	1	4/2/2009 03:50 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	4/2/2009 03:50 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	4/2/2009 03:50 PM
Hexachloroethane	ND	330		µg/Kg	1	4/2/2009 03:50 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	4/2/2009 03:50 PM
Isophorone	ND	330		µg/Kg	1	4/2/2009 03:50 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	4/2/2009 03:50 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	4/2/2009 03:50 PM
Naphthalene	ND	330		µg/Kg	1	4/2/2009 03:50 PM
Nitrobenzene	ND	330		µg/Kg	1	4/2/2009 03:50 PM
Pentachlorophenol	ND	1600		µg/Kg	1	4/2/2009 03:50 PM
Phenanthrene	ND	330		µg/Kg	1	4/2/2009 03:50 PM
Phenol	ND	330		µg/Kg	1	4/2/2009 03:50 PM
Pyrene	ND	330		µg/Kg	1	4/2/2009 03:50 PM
Surr: 1,2-Dichlorobenzene-d4	84.9	49-103		%REC	1	4/2/2009 03:50 PM
Surr: 2,4,6-Tribromophenol	92.8	47-129		%REC	1	4/2/2009 03:50 PM
Surr: 2-Chlorophenol-d4	90.9	54-109		%REC	1	4/2/2009 03:50 PM
Surr: 2-Fluorobiphenyl	102	59-108		%REC	1	4/2/2009 03:50 PM
Surr: 2-Fluorophenol	91.3	50-111		%REC	1	4/2/2009 03:50 PM
Surr: 4-Terphenyl-d14	125	58-135		%REC	1	4/2/2009 03:50 PM
Surr: Nitrobenzene-d5	94.0	54-115		%REC	1	4/2/2009 03:50 PM
Surr: Phenol-d5	90.5	58-112		%REC	1	4/2/2009 03:50 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W10AGW (15')
Lab Order:	104787	**Collection Date:**	3/26/2009 8:55:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104787-006A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090403J	QC Batch: 54490			PrepDate:	4/3/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	4/3/2009 08:00 PM
Arsenic	4.5	1.0		mg/Kg	1	4/3/2009 08:00 PM
Barium	25	1.0		mg/Kg	1	4/3/2009 08:00 PM
Beryllium	ND	1.0		mg/Kg	1	4/3/2009 08:00 PM
Cadmium	ND	1.0		mg/Kg	1	4/3/2009 08:00 PM
Chromium	41	1.0		mg/Kg	1	4/3/2009 08:00 PM
Cobalt	7.6	1.0		mg/Kg	1	4/3/2009 08:00 PM
Copper	14	2.0		mg/Kg	1	4/3/2009 08:00 PM
Lead	5.1	1.0		mg/Kg	1	4/3/2009 08:00 PM
Molybdenum	1.7	1.0		mg/Kg	1	4/3/2009 08:00 PM
Nickel	47	1.0		mg/Kg	1	4/3/2009 08:00 PM
Selenium	ND	1.0		mg/Kg	1	4/3/2009 08:00 PM
Silver	ND	1.0		mg/Kg	1	4/3/2009 08:00 PM
Thallium	ND	1.0		mg/Kg	1	4/3/2009 08:00 PM
Vanadium	35	1.0		mg/Kg	1	4/3/2009 08:00 PM
Zinc	39	1.0		mg/Kg	1	4/3/2009 08:00 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090403D	QC Batch: 54477			PrepDate:	4/2/2009	Analyst: **CBR**
DRO	ND	1.0		mg/Kg	1	4/3/2009 09:42 AM
ORO	ND	1.0		mg/Kg	1	4/3/2009 09:42 AM
Surr: p-Terphenyl	34.7	30-130		%REC	1	4/3/2009 09:42 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090402E	QC Batch: 54466			PrepDate:	4/2/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	4/2/2009 02:17 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS6_090401B	QC Batch: 54432			PrepDate:	4/1/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	4/1/2009 11:21 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	4/1/2009 11:21 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	4/1/2009 11:21 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	4/1/2009 11:21 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W10AGW (15')
Lab Order:	104787	**Collection Date:**	3/26/2009 8:55:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104787-006A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS6_090401B QC Batch: 54432 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	4/1/2009 11:21 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	4/1/2009 11:21 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	4/1/2009 11:21 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	4/1/2009 11:21 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	4/1/2009 11:21 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	4/1/2009 11:21 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	4/1/2009 11:21 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	4/1/2009 11:21 PM
2-Chlorophenol	ND	330		µg/Kg	1	4/1/2009 11:21 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	4/1/2009 11:21 PM
2-Methylphenol	ND	330		µg/Kg	1	4/1/2009 11:21 PM
2-Nitroaniline	ND	1600		µg/Kg	1	4/1/2009 11:21 PM
2-Nitrophenol	ND	330		µg/Kg	1	4/1/2009 11:21 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	4/1/2009 11:21 PM
3-Nitroaniline	ND	1600		µg/Kg	1	4/1/2009 11:21 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	4/1/2009 11:21 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	4/1/2009 11:21 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	4/1/2009 11:21 PM
4-Chloroaniline	ND	660		µg/Kg	1	4/1/2009 11:21 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	4/1/2009 11:21 PM
4-Methylphenol	ND	330		µg/Kg	1	4/1/2009 11:21 PM
4-Nitroaniline	ND	1600		µg/Kg	1	4/1/2009 11:21 PM
4-Nitrophenol	ND	1600		µg/Kg	1	4/1/2009 11:21 PM
Acenaphthene	ND	330		µg/Kg	1	4/1/2009 11:21 PM
Acenaphthylene	ND	330		µg/Kg	1	4/1/2009 11:21 PM
Anthracene	ND	330		µg/Kg	1	4/1/2009 11:21 PM
Benzidine (M)	ND	1600		µg/Kg	1	4/1/2009 11:21 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	4/1/2009 11:21 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	4/1/2009 11:21 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	4/1/2009 11:21 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	4/1/2009 11:21 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	4/1/2009 11:21 PM
Benzoic acid	ND	1600		µg/Kg	1	4/1/2009 11:21 PM
Benzyl alcohol	ND	660		µg/Kg	1	4/1/2009 11:21 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	4/1/2009 11:21 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W10AGW (15')
Lab Order:	104787	**Collection Date:**	3/26/2009 8:55:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104787-006A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS6_090401B QC Batch: 54432 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	4/1/2009 11:21 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	4/1/2009 11:21 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	4/1/2009 11:21 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	4/1/2009 11:21 PM
Chrysene	ND	330		µg/Kg	1	4/1/2009 11:21 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	4/1/2009 11:21 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	4/1/2009 11:21 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	4/1/2009 11:21 PM
Dibenzofuran	ND	330		µg/Kg	1	4/1/2009 11:21 PM
Diethylphthalate	ND	330		µg/Kg	1	4/1/2009 11:21 PM
Dimethylphthalate	ND	330		µg/Kg	1	4/1/2009 11:21 PM
Fluoranthene	ND	330		µg/Kg	1	4/1/2009 11:21 PM
Fluorene	ND	330		µg/Kg	1	4/1/2009 11:21 PM
Hexachlorobenzene	ND	330		µg/Kg	1	4/1/2009 11:21 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	4/1/2009 11:21 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	4/1/2009 11:21 PM
Hexachloroethane	ND	330		µg/Kg	1	4/1/2009 11:21 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	4/1/2009 11:21 PM
Isophorone	ND	330		µg/Kg	1	4/1/2009 11:21 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	4/1/2009 11:21 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	4/1/2009 11:21 PM
Naphthalene	ND	330		µg/Kg	1	4/1/2009 11:21 PM
Nitrobenzene	ND	330		µg/Kg	1	4/1/2009 11:21 PM
Pentachlorophenol	ND	1600		µg/Kg	1	4/1/2009 11:21 PM
Phenanthrene	ND	330		µg/Kg	1	4/1/2009 11:21 PM
Phenol	ND	330		µg/Kg	1	4/1/2009 11:21 PM
Pyrene	ND	330		µg/Kg	1	4/1/2009 11:21 PM
Surr: 1,2-Dichlorobenzene-d4	87.0	49-103		%REC	1	4/1/2009 11:21 PM
Surr: 2,4,6-Tribromophenol	99.5	47-129		%REC	1	4/1/2009 11:21 PM
Surr: 2-Chlorophenol-d4	92.9	54-109		%REC	1	4/1/2009 11:21 PM
Surr: 2-Fluorobiphenyl	99.5	59-108		%REC	1	4/1/2009 11:21 PM
Surr: 2-Fluorophenol	96.6	50-111		%REC	1	4/1/2009 11:21 PM
Surr: 4-Terphenyl-d14	124	58-135		%REC	1	4/1/2009 11:21 PM
Surr: Nitrobenzene-d5	94.3	54-115		%REC	1	4/1/2009 11:21 PM
Surr: Phenol-d5	94.9	58-112		%REC	1	4/1/2009 11:21 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	FW1 (0')
Lab Order:	104787	**Collection Date:**	3/26/2009 10:40:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104787-007A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B				**EPA 6010B**		
RunID: ICP8_090403J	QC Batch: 54490			PrepDate:	4/3/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	4/3/2009 08:03 PM
Arsenic	1.7	1.0		mg/Kg	1	4/3/2009 08:03 PM
Barium	93	1.0		mg/Kg	1	4/3/2009 08:03 PM
Beryllium	ND	1.0		mg/Kg	1	4/3/2009 08:03 PM
Cadmium	ND	1.0		mg/Kg	1	4/3/2009 08:03 PM
Chromium	34	1.0		mg/Kg	1	4/3/2009 08:03 PM
Cobalt	9.6	1.0		mg/Kg	1	4/3/2009 08:03 PM
Copper	27	2.0		mg/Kg	1	4/3/2009 08:03 PM
Lead	6.7	1.0		mg/Kg	1	4/3/2009 08:03 PM
Molybdenum	ND	1.0		mg/Kg	1	4/3/2009 08:03 PM
Nickel	42	1.0		mg/Kg	1	4/3/2009 08:03 PM
Selenium	ND	1.0		mg/Kg	1	4/3/2009 08:03 PM
Silver	ND	1.0		mg/Kg	1	4/3/2009 08:03 PM
Thallium	ND	1.0		mg/Kg	1	4/3/2009 08:03 PM
Vanadium	37	1.0		mg/Kg	1	4/3/2009 08:03 PM
Zinc	41	1.0		mg/Kg	1	4/3/2009 08:03 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
EPA 3550B				**EPA 8015B(M)**		
RunID: GC16_090403D	QC Batch: 54477			PrepDate:	4/2/2009	Analyst: **CBR**
DRO	37	10		mg/Kg	10	4/3/2009 11:31 AM
ORO	230	10		mg/Kg	10	4/3/2009 11:31 AM
Surr: p-Terphenyl	0	30-130	SDO	%REC	10	4/3/2009 11:31 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090402E	QC Batch: 54466			PrepDate:	4/2/2009	Analyst: **RQ**
Mercury	0.14	0.10		mg/Kg	1	4/2/2009 02:19 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 3550B				**EPA 8270C**		
RunID: MS6_090401B	QC Batch: 54432			PrepDate:	4/1/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	4/2/2009 04:18 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 04:18 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 04:18 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 04:18 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	FW1 (0')
Lab Order:	104787	**Collection Date:**	3/26/2009 10:40:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104787-007A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS6_090401B QC Batch: 54432 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 04:18 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 04:18 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	4/2/2009 04:18 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	4/2/2009 04:18 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	4/2/2009 04:18 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 04:18 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 04:18 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	4/2/2009 04:18 PM
2-Chlorophenol	ND	330		µg/Kg	1	4/2/2009 04:18 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	4/2/2009 04:18 PM
2-Methylphenol	ND	330		µg/Kg	1	4/2/2009 04:18 PM
2-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 04:18 PM
2-Nitrophenol	ND	330		µg/Kg	1	4/2/2009 04:18 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	4/2/2009 04:18 PM
3-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 04:18 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	4/2/2009 04:18 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 04:18 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	4/2/2009 04:18 PM
4-Chloroaniline	ND	660		µg/Kg	1	4/2/2009 04:18 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 04:18 PM
4-Methylphenol	ND	330		µg/Kg	1	4/2/2009 04:18 PM
4-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 04:18 PM
4-Nitrophenol	ND	1600		µg/Kg	1	4/2/2009 04:18 PM
Acenaphthene	ND	330		µg/Kg	1	4/2/2009 04:18 PM
Acenaphthylene	ND	330		µg/Kg	1	4/2/2009 04:18 PM
Anthracene	ND	330		µg/Kg	1	4/2/2009 04:18 PM
Benzidine (M)	ND	1600		µg/Kg	1	4/2/2009 04:18 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	4/2/2009 04:18 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	4/2/2009 04:18 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	4/2/2009 04:18 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	4/2/2009 04:18 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	4/2/2009 04:18 PM
Benzoic acid	ND	1600		µg/Kg	1	4/2/2009 04:18 PM
Benzyl alcohol	ND	660		µg/Kg	1	4/2/2009 04:18 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	4/2/2009 04:18 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	FW1 (0')
Lab Order:	104787	**Collection Date:**	3/26/2009 10:40:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104787-007A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS6_090401B QC Batch: 54432 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	4/2/2009 04:18 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	4/2/2009 04:18 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	4/2/2009 04:18 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	4/2/2009 04:18 PM
Chrysene	ND	330		µg/Kg	1	4/2/2009 04:18 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	4/2/2009 04:18 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	4/2/2009 04:18 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	4/2/2009 04:18 PM
Dibenzofuran	ND	330		µg/Kg	1	4/2/2009 04:18 PM
Diethylphthalate	ND	330		µg/Kg	1	4/2/2009 04:18 PM
Dimethylphthalate	ND	330		µg/Kg	1	4/2/2009 04:18 PM
Fluoranthene	ND	330		µg/Kg	1	4/2/2009 04:18 PM
Fluorene	ND	330		µg/Kg	1	4/2/2009 04:18 PM
Hexachlorobenzene	ND	330		µg/Kg	1	4/2/2009 04:18 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	4/2/2009 04:18 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	4/2/2009 04:18 PM
Hexachloroethane	ND	330		µg/Kg	1	4/2/2009 04:18 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	4/2/2009 04:18 PM
Isophorone	ND	330		µg/Kg	1	4/2/2009 04:18 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	4/2/2009 04:18 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	4/2/2009 04:18 PM
Naphthalene	ND	330		µg/Kg	1	4/2/2009 04:18 PM
Nitrobenzene	ND	330		µg/Kg	1	4/2/2009 04:18 PM
Pentachlorophenol	ND	1600		µg/Kg	1	4/2/2009 04:18 PM
Phenanthrene	ND	330		µg/Kg	1	4/2/2009 04:18 PM
Phenol	ND	330		µg/Kg	1	4/2/2009 04:18 PM
Pyrene	ND	330		µg/Kg	1	4/2/2009 04:18 PM
Surr: 1,2-Dichlorobenzene-d4	83.2	49-103		%REC	1	4/2/2009 04:18 PM
Surr: 2,4,6-Tribromophenol	90.7	47-129		%REC	1	4/2/2009 04:18 PM
Surr: 2-Chlorophenol-d4	91.8	54-109		%REC	1	4/2/2009 04:18 PM
Surr: 2-Fluorobiphenyl	107	59-108		%REC	1	4/2/2009 04:18 PM
Surr: 2-Fluorophenol	93.0	50-111		%REC	1	4/2/2009 04:18 PM
Surr: 4-Terphenyl-d14	119	58-135		%REC	1	4/2/2009 04:18 PM
Surr: Nitrobenzene-d5	95.4	54-115		%REC	1	4/2/2009 04:18 PM
Surr: Phenol-d5	91.0	58-112		%REC	1	4/2/2009 04:18 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	FW1 (2')
Lab Order:	104787	**Collection Date:**	3/26/2009 10:50:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104787-008A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B				**EPA 6010B**		
RunID: ICP8_090403J	QC Batch: 54490			PrepDate:	4/3/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	4/3/2009 08:06 PM
Arsenic	1.9	1.0		mg/Kg	1	4/3/2009 08:06 PM
Barium	110	1.0		mg/Kg	1	4/3/2009 08:06 PM
Beryllium	ND	1.0		mg/Kg	1	4/3/2009 08:06 PM
Cadmium	ND	1.0		mg/Kg	1	4/3/2009 08:06 PM
Chromium	49	1.0		mg/Kg	1	4/3/2009 08:06 PM
Cobalt	11	1.0		mg/Kg	1	4/3/2009 08:06 PM
Copper	28	2.0		mg/Kg	1	4/3/2009 08:06 PM
Lead	4.7	1.0		mg/Kg	1	4/3/2009 08:06 PM
Molybdenum	ND	1.0		mg/Kg	1	4/3/2009 08:06 PM
Nickel	57	1.0		mg/Kg	1	4/3/2009 08:06 PM
Selenium	ND	1.0		mg/Kg	1	4/3/2009 08:06 PM
Silver	ND	1.0		mg/Kg	1	4/3/2009 08:06 PM
Thallium	ND	1.0		mg/Kg	1	4/3/2009 08:06 PM
Vanadium	43	1.0		mg/Kg	1	4/3/2009 08:06 PM
Zinc	42	1.0		mg/Kg	1	4/3/2009 08:06 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
EPA 3550B				**EPA 8015B(M)**		
RunID: GC16_090403D	QC Batch: 54477			PrepDate:	4/2/2009	Analyst: **CBR**
DRO	ND	1.0		mg/Kg	1	4/3/2009 10:18 AM
ORO	1.2	1.0		mg/Kg	1	4/3/2009 10:18 AM
Surr: p-Terphenyl	67.7	30-130		%REC	1	4/3/2009 10:18 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090402E	QC Batch: 54466			PrepDate:	4/2/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	4/2/2009 02:21 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 3550B				**EPA 8270C**		
RunID: MS6_090401B	QC Batch: 54432			PrepDate:	4/1/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	4/2/2009 04:46 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 04:46 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 04:46 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 04:46 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	FW1 (2')
Lab Order:	104787	**Collection Date:**	3/26/2009 10:50:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104787-008A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS6_090401B QC Batch: 54432 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 04:46 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 04:46 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	4/2/2009 04:46 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	4/2/2009 04:46 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	4/2/2009 04:46 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 04:46 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 04:46 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	4/2/2009 04:46 PM
2-Chlorophenol	ND	330		µg/Kg	1	4/2/2009 04:46 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	4/2/2009 04:46 PM
2-Methylphenol	ND	330		µg/Kg	1	4/2/2009 04:46 PM
2-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 04:46 PM
2-Nitrophenol	ND	330		µg/Kg	1	4/2/2009 04:46 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	4/2/2009 04:46 PM
3-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 04:46 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	4/2/2009 04:46 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 04:46 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	4/2/2009 04:46 PM
4-Chloroaniline	ND	660		µg/Kg	1	4/2/2009 04:46 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 04:46 PM
4-Methylphenol	ND	330		µg/Kg	1	4/2/2009 04:46 PM
4-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 04:46 PM
4-Nitrophenol	ND	1600		µg/Kg	1	4/2/2009 04:46 PM
Acenaphthene	ND	330		µg/Kg	1	4/2/2009 04:46 PM
Acenaphthylene	ND	330		µg/Kg	1	4/2/2009 04:46 PM
Anthracene	ND	330		µg/Kg	1	4/2/2009 04:46 PM
Benzidine (M)	ND	1600		µg/Kg	1	4/2/2009 04:46 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	4/2/2009 04:46 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	4/2/2009 04:46 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	4/2/2009 04:46 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	4/2/2009 04:46 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	4/2/2009 04:46 PM
Benzoic acid	ND	1600		µg/Kg	1	4/2/2009 04:46 PM
Benzyl alcohol	ND	660		µg/Kg	1	4/2/2009 04:46 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	4/2/2009 04:46 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	FW1 (2')
Lab Order:	104787	**Collection Date:**	3/26/2009 10:50:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104787-008A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS6_090401B QC Batch: 54432 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	4/2/2009 04:46 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	4/2/2009 04:46 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	4/2/2009 04:46 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	4/2/2009 04:46 PM
Chrysene	ND	330		µg/Kg	1	4/2/2009 04:46 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	4/2/2009 04:46 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	4/2/2009 04:46 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	4/2/2009 04:46 PM
Dibenzofuran	ND	330		µg/Kg	1	4/2/2009 04:46 PM
Diethylphthalate	ND	330		µg/Kg	1	4/2/2009 04:46 PM
Dimethylphthalate	ND	330		µg/Kg	1	4/2/2009 04:46 PM
Fluoranthene	ND	330		µg/Kg	1	4/2/2009 04:46 PM
Fluorene	ND	330		µg/Kg	1	4/2/2009 04:46 PM
Hexachlorobenzene	ND	330		µg/Kg	1	4/2/2009 04:46 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	4/2/2009 04:46 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	4/2/2009 04:46 PM
Hexachloroethane	ND	330		µg/Kg	1	4/2/2009 04:46 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	4/2/2009 04:46 PM
Isophorone	ND	330		µg/Kg	1	4/2/2009 04:46 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	4/2/2009 04:46 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	4/2/2009 04:46 PM
Naphthalene	ND	330		µg/Kg	1	4/2/2009 04:46 PM
Nitrobenzene	ND	330		µg/Kg	1	4/2/2009 04:46 PM
Pentachlorophenol	ND	1600		µg/Kg	1	4/2/2009 04:46 PM
Phenanthrene	ND	330		µg/Kg	1	4/2/2009 04:46 PM
Phenol	ND	330		µg/Kg	1	4/2/2009 04:46 PM
Pyrene	ND	330		µg/Kg	1	4/2/2009 04:46 PM
Surr: 1,2-Dichlorobenzene-d4	83.7	49-103		%REC	1	4/2/2009 04:46 PM
Surr: 2,4,6-Tribromophenol	90.9	47-129		%REC	1	4/2/2009 04:46 PM
Surr: 2-Chlorophenol-d4	88.3	54-109		%REC	1	4/2/2009 04:46 PM
Surr: 2-Fluorobiphenyl	98.8	59-108		%REC	1	4/2/2009 04:46 PM
Surr: 2-Fluorophenol	87.8	50-111		%REC	1	4/2/2009 04:46 PM
Surr: 4-Terphenyl-d14	119	58-135		%REC	1	4/2/2009 04:46 PM
Surr: Nitrobenzene-d5	89.0	54-115		%REC	1	4/2/2009 04:46 PM
Surr: Phenol-d5	88.4	58-112		%REC	1	4/2/2009 04:46 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	FW2 (0')
Lab Order:	104787	**Collection Date:**	3/26/2009 10:55:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104787-009A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B				**EPA 6010B**		
RunID: ICP8_090403J	QC Batch: 54490			PrepDate:	4/3/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	4/3/2009 08:16 PM
Arsenic	3.1	1.0		mg/Kg	1	4/3/2009 08:16 PM
Barium	88	1.0		mg/Kg	1	4/3/2009 08:16 PM
Beryllium	ND	1.0		mg/Kg	1	4/3/2009 08:16 PM
Cadmium	ND	1.0		mg/Kg	1	4/3/2009 08:16 PM
Chromium	56	1.0		mg/Kg	1	4/3/2009 08:16 PM
Cobalt	13	1.0		mg/Kg	1	4/3/2009 08:16 PM
Copper	33	2.0		mg/Kg	1	4/3/2009 08:16 PM
Lead	8.5	1.0		mg/Kg	1	4/3/2009 08:16 PM
Molybdenum	ND	1.0		mg/Kg	1	4/3/2009 08:16 PM
Nickel	68	1.0		mg/Kg	1	4/3/2009 08:16 PM
Selenium	ND	1.0		mg/Kg	1	4/3/2009 08:16 PM
Silver	ND	1.0		mg/Kg	1	4/3/2009 08:16 PM
Thallium	ND	1.0		mg/Kg	1	4/3/2009 08:16 PM
Vanadium	46	1.0		mg/Kg	1	4/3/2009 08:16 PM
Zinc	55	1.0		mg/Kg	1	4/3/2009 08:16 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
EPA 3550B				**EPA 8015B(M)**		
RunID: GC16_090403D	QC Batch: 54477			PrepDate:	4/2/2009	Analyst: **CBR**
DRO	5.9	1.0		mg/Kg	1	4/3/2009 11:22 AM
ORO	23	1.0		mg/Kg	1	4/3/2009 11:22 AM
Surr: p-Terphenyl	39.7	30-130		%REC	1	4/3/2009 11:22 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090402E	QC Batch: 54466			PrepDate:	4/2/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	4/2/2009 02:27 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 3550B				**EPA 8270C**		
RunID: MS6_090401B	QC Batch: 54432			PrepDate:	4/1/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	4/2/2009 05:14 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 05:14 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 05:14 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 05:14 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	FW2 (0')
Lab Order:	104787	**Collection Date:**	3/26/2009 10:55:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104787-009A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS6_090401B QC Batch: 54432 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 05:14 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 05:14 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	4/2/2009 05:14 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	4/2/2009 05:14 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	4/2/2009 05:14 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 05:14 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 05:14 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	4/2/2009 05:14 PM
2-Chlorophenol	ND	330		µg/Kg	1	4/2/2009 05:14 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	4/2/2009 05:14 PM
2-Methylphenol	ND	330		µg/Kg	1	4/2/2009 05:14 PM
2-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 05:14 PM
2-Nitrophenol	ND	330		µg/Kg	1	4/2/2009 05:14 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	4/2/2009 05:14 PM
3-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 05:14 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	4/2/2009 05:14 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 05:14 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	4/2/2009 05:14 PM
4-Chloroaniline	ND	660		µg/Kg	1	4/2/2009 05:14 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 05:14 PM
4-Methylphenol	ND	330		µg/Kg	1	4/2/2009 05:14 PM
4-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 05:14 PM
4-Nitrophenol	ND	1600		µg/Kg	1	4/2/2009 05:14 PM
Acenaphthene	ND	330		µg/Kg	1	4/2/2009 05:14 PM
Acenaphthylene	ND	330		µg/Kg	1	4/2/2009 05:14 PM
Anthracene	ND	330		µg/Kg	1	4/2/2009 05:14 PM
Benzidine (M)	ND	1600		µg/Kg	1	4/2/2009 05:14 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	4/2/2009 05:14 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	4/2/2009 05:14 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	4/2/2009 05:14 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	4/2/2009 05:14 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	4/2/2009 05:14 PM
Benzoic acid	ND	1600		µg/Kg	1	4/2/2009 05:14 PM
Benzyl alcohol	ND	660		µg/Kg	1	4/2/2009 05:14 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	4/2/2009 05:14 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	FW2 (0')
Lab Order:	104787	**Collection Date:**	3/26/2009 10:55:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104787-009A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS6_090401B QC Batch: 54432 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	4/2/2009 05:14 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	4/2/2009 05:14 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	4/2/2009 05:14 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	4/2/2009 05:14 PM
Chrysene	ND	330		µg/Kg	1	4/2/2009 05:14 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	4/2/2009 05:14 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	4/2/2009 05:14 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	4/2/2009 05:14 PM
Dibenzofuran	ND	330		µg/Kg	1	4/2/2009 05:14 PM
Diethylphthalate	ND	330		µg/Kg	1	4/2/2009 05:14 PM
Dimethylphthalate	ND	330		µg/Kg	1	4/2/2009 05:14 PM
Fluoranthene	ND	330		µg/Kg	1	4/2/2009 05:14 PM
Fluorene	ND	330		µg/Kg	1	4/2/2009 05:14 PM
Hexachlorobenzene	ND	330		µg/Kg	1	4/2/2009 05:14 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	4/2/2009 05:14 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	4/2/2009 05:14 PM
Hexachloroethane	ND	330		µg/Kg	1	4/2/2009 05:14 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	4/2/2009 05:14 PM
Isophorone	ND	330		µg/Kg	1	4/2/2009 05:14 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	4/2/2009 05:14 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	4/2/2009 05:14 PM
Naphthalene	ND	330		µg/Kg	1	4/2/2009 05:14 PM
Nitrobenzene	ND	330		µg/Kg	1	4/2/2009 05:14 PM
Pentachlorophenol	ND	1600		µg/Kg	1	4/2/2009 05:14 PM
Phenanthrene	ND	330		µg/Kg	1	4/2/2009 05:14 PM
Phenol	ND	330		µg/Kg	1	4/2/2009 05:14 PM
Pyrene	ND	330		µg/Kg	1	4/2/2009 05:14 PM
Surr: 1,2-Dichlorobenzene-d4	81.6	49-103		%REC	1	4/2/2009 05:14 PM
Surr: 2,4,6-Tribromophenol	93.5	47-129		%REC	1	4/2/2009 05:14 PM
Surr: 2-Chlorophenol-d4	90.3	54-109		%REC	1	4/2/2009 05:14 PM
Surr: 2-Fluorobiphenyl	102	59-108		%REC	1	4/2/2009 05:14 PM
Surr: 2-Fluorophenol	88.4	50-111		%REC	1	4/2/2009 05:14 PM
Surr: 4-Terphenyl-d14	118	58-135		%REC	1	4/2/2009 05:14 PM
Surr: Nitrobenzene-d5	93.0	54-115		%REC	1	4/2/2009 05:14 PM
Surr: Phenol-d5	89.2	58-112		%REC	1	4/2/2009 05:14 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	FW2 (2")
Lab Order:	104787	**Collection Date:**	3/26/2009 11:05:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104787-010A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B				**EPA 6010B**		
RunID: ICP8_090403J	QC Batch: 54490			PrepDate:	4/3/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	4/3/2009 08:19 PM
Arsenic	3.6	1.0		mg/Kg	1	4/3/2009 08:19 PM
Barium	160	1.0		mg/Kg	1	4/3/2009 08:19 PM
Beryllium	ND	1.0		mg/Kg	1	4/3/2009 08:19 PM
Cadmium	ND	1.0		mg/Kg	1	4/3/2009 08:19 PM
Chromium	29	1.0		mg/Kg	1	4/3/2009 08:19 PM
Cobalt	9.0	1.0		mg/Kg	1	4/3/2009 08:19 PM
Copper	19	2.0		mg/Kg	1	4/3/2009 08:19 PM
Lead	6.3	1.0		mg/Kg	1	4/3/2009 08:19 PM
Molybdenum	ND	1.0		mg/Kg	1	4/3/2009 08:19 PM
Nickel	36	1.0		mg/Kg	1	4/3/2009 08:19 PM
Selenium	ND	1.0		mg/Kg	1	4/3/2009 08:19 PM
Silver	ND	1.0		mg/Kg	1	4/3/2009 08:19 PM
Thallium	ND	1.0		mg/Kg	1	4/3/2009 08:19 PM
Vanadium	33	1.0		mg/Kg	1	4/3/2009 08:19 PM
Zinc	39	1.0		mg/Kg	1	4/3/2009 08:19 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
EPA 3550B				**EPA 8015B(M)**		
RunID: GC16_090403D	QC Batch: 54477			PrepDate:	4/2/2009	Analyst: **CBR**
DRO	ND	1.0		mg/Kg	1	4/3/2009 10:27 AM
ORO	1.6	1.0		mg/Kg	1	4/3/2009 10:27 AM
Surr: p-Terphenyl	70.1	30-130		%REC	1	4/3/2009 10:27 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090402E	QC Batch: 54466			PrepDate:	4/2/2009	Analyst: **RQ**
Mercury	0.10	0.10		mg/Kg	1	4/2/2009 02:30 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 3550B				**EPA 8270C**		
RunID: MS6_090401B	QC Batch: 54432			PrepDate:	4/1/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	4/3/2009 11:49 AM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	4/3/2009 11:49 AM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	4/3/2009 11:49 AM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	4/3/2009 11:49 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	FW2 (2")
Lab Order:	104787	**Collection Date:**	3/26/2009 11:05:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104787-010A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS6_090401B QC Batch: 54432 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	4/3/2009 11:49 AM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	4/3/2009 11:49 AM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	4/3/2009 11:49 AM
2,4-Dimethylphenol	ND	330		µg/Kg	1	4/3/2009 11:49 AM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	4/3/2009 11:49 AM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	4/3/2009 11:49 AM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	4/3/2009 11:49 AM
2-Chloronaphthalene	ND	330		µg/Kg	1	4/3/2009 11:49 AM
2-Chlorophenol	ND	330		µg/Kg	1	4/3/2009 11:49 AM
2-Methylnaphthalene	ND	330		µg/Kg	1	4/3/2009 11:49 AM
2-Methylphenol	ND	330		µg/Kg	1	4/3/2009 11:49 AM
2-Nitroaniline	ND	1600		µg/Kg	1	4/3/2009 11:49 AM
2-Nitrophenol	ND	330		µg/Kg	1	4/3/2009 11:49 AM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	4/3/2009 11:49 AM
3-Nitroaniline	ND	1600		µg/Kg	1	4/3/2009 11:49 AM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	4/3/2009 11:49 AM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	4/3/2009 11:49 AM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	4/3/2009 11:49 AM
4-Chloroaniline	ND	660		µg/Kg	1	4/3/2009 11:49 AM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	4/3/2009 11:49 AM
4-Methylphenol	ND	330		µg/Kg	1	4/3/2009 11:49 AM
4-Nitroaniline	ND	1600		µg/Kg	1	4/3/2009 11:49 AM
4-Nitrophenol	ND	1600		µg/Kg	1	4/3/2009 11:49 AM
Acenaphthene	ND	330		µg/Kg	1	4/3/2009 11:49 AM
Acenaphthylene	ND	330		µg/Kg	1	4/3/2009 11:49 AM
Anthracene	ND	330		µg/Kg	1	4/3/2009 11:49 AM
Benzidine (M)	ND	1600		µg/Kg	1	4/3/2009 11:49 AM
Benzo(a)anthracene	ND	330		µg/Kg	1	4/3/2009 11:49 AM
Benzo(a)pyrene	ND	330		µg/Kg	1	4/3/2009 11:49 AM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	4/3/2009 11:49 AM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	4/3/2009 11:49 AM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	4/3/2009 11:49 AM
Benzoic acid	ND	1600		µg/Kg	1	4/3/2009 11:49 AM
Benzyl alcohol	ND	660		µg/Kg	1	4/3/2009 11:49 AM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	4/3/2009 11:49 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	FW2 (2")
Lab Order:	104787	**Collection Date:**	3/26/2009 11:05:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104787-010A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS6_090401B QC Batch: 54432 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	4/3/2009 11:49 AM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	4/3/2009 11:49 AM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	4/3/2009 11:49 AM
Butylbenzylphthalate	ND	330		µg/Kg	1	4/3/2009 11:49 AM
Chrysene	ND	330		µg/Kg	1	4/3/2009 11:49 AM
Di-n-butylphthalate	ND	330		µg/Kg	1	4/3/2009 11:49 AM
Di-n-octylphthalate	ND	330		µg/Kg	1	4/3/2009 11:49 AM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	4/3/2009 11:49 AM
Dibenzofuran	ND	330		µg/Kg	1	4/3/2009 11:49 AM
Diethylphthalate	ND	330		µg/Kg	1	4/3/2009 11:49 AM
Dimethylphthalate	ND	330		µg/Kg	1	4/3/2009 11:49 AM
Fluoranthene	ND	330		µg/Kg	1	4/3/2009 11:49 AM
Fluorene	ND	330		µg/Kg	1	4/3/2009 11:49 AM
Hexachlorobenzene	ND	330		µg/Kg	1	4/3/2009 11:49 AM
Hexachlorobutadiene	ND	660		µg/Kg	1	4/3/2009 11:49 AM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	4/3/2009 11:49 AM
Hexachloroethane	ND	330		µg/Kg	1	4/3/2009 11:49 AM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	4/3/2009 11:49 AM
Isophorone	ND	330		µg/Kg	1	4/3/2009 11:49 AM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	4/3/2009 11:49 AM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	4/3/2009 11:49 AM
Naphthalene	ND	330		µg/Kg	1	4/3/2009 11:49 AM
Nitrobenzene	ND	330		µg/Kg	1	4/3/2009 11:49 AM
Pentachlorophenol	ND	1600		µg/Kg	1	4/3/2009 11:49 AM
Phenanthrene	ND	330		µg/Kg	1	4/3/2009 11:49 AM
Phenol	ND	330		µg/Kg	1	4/3/2009 11:49 AM
Pyrene	ND	330		µg/Kg	1	4/3/2009 11:49 AM
Surr: 1,2-Dichlorobenzene-d4	90.2	49-103		%REC	1	4/3/2009 11:49 AM
Surr: 2,4,6-Tribromophenol	116	47-129		%REC	1	4/3/2009 11:49 AM
Surr: 2-Chlorophenol-d4	97.4	54-109		%REC	1	4/3/2009 11:49 AM
Surr: 2-Fluorobiphenyl	107	59-108		%REC	1	4/3/2009 11:49 AM
Surr: 2-Fluorophenol	98.2	50-111		%REC	1	4/3/2009 11:49 AM
Surr: 4-Terphenyl-d14	142	58-135	S	%REC	1	4/3/2009 11:49 AM
Surr: Nitrobenzene-d5	101	54-115		%REC	1	4/3/2009 11:49 AM
Surr: Phenol-d5	100	58-112		%REC	1	4/3/2009 11:49 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W5A (0')
Lab Order:	104787	**Collection Date:**	3/26/2009 11:44:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104787-011A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090403J	QC Batch: 54490			PrepDate:	4/3/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	4/3/2009 08:21 PM
Arsenic	ND	1.0		mg/Kg	1	4/3/2009 08:21 PM
Barium	65	1.0		mg/Kg	1	4/3/2009 08:21 PM
Beryllium	ND	1.0		mg/Kg	1	4/3/2009 08:21 PM
Cadmium	ND	1.0		mg/Kg	1	4/3/2009 08:21 PM
Chromium	43	1.0		mg/Kg	1	4/3/2009 08:21 PM
Cobalt	16	1.0		mg/Kg	1	4/3/2009 08:21 PM
Copper	43	2.0		mg/Kg	1	4/3/2009 08:21 PM
Lead	ND	1.0		mg/Kg	1	4/3/2009 08:21 PM
Molybdenum	ND	1.0		mg/Kg	1	4/3/2009 08:21 PM
Nickel	38	1.0		mg/Kg	1	4/3/2009 08:21 PM
Selenium	ND	1.0		mg/Kg	1	4/3/2009 08:21 PM
Silver	ND	1.0		mg/Kg	1	4/3/2009 08:21 PM
Thallium	ND	1.0		mg/Kg	1	4/3/2009 08:21 PM
Vanadium	62	1.0		mg/Kg	1	4/3/2009 08:21 PM
Zinc	38	1.0		mg/Kg	1	4/3/2009 08:21 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090403D	QC Batch: 54477			PrepDate:	4/2/2009	Analyst: **CBR**
DRO	6.5	1.0		mg/Kg	1	4/3/2009 11:13 AM
ORO	13	1.0		mg/Kg	1	4/3/2009 11:13 AM
Surr: p-Terphenyl	40.0	30-130		%REC	1	4/3/2009 11:13 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090402E	QC Batch: 54466			PrepDate:	4/2/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	4/2/2009 02:32 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090401A	QC Batch: 54445			PrepDate:	4/1/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	4/1/2009 09:38 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	4/1/2009 09:38 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	4/1/2009 09:38 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	4/1/2009 09:38 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W5A (0')
Lab Order:	104787	**Collection Date:**	3/26/2009 11:44:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104787-011A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090401A QC Batch: 54445 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	4/1/2009 09:38 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	4/1/2009 09:38 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	4/1/2009 09:38 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	4/1/2009 09:38 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	4/1/2009 09:38 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	4/1/2009 09:38 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	4/1/2009 09:38 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	4/1/2009 09:38 PM
2-Chlorophenol	ND	330		µg/Kg	1	4/1/2009 09:38 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	4/1/2009 09:38 PM
2-Methylphenol	ND	330		µg/Kg	1	4/1/2009 09:38 PM
2-Nitroaniline	ND	1600		µg/Kg	1	4/1/2009 09:38 PM
2-Nitrophenol	ND	330		µg/Kg	1	4/1/2009 09:38 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	4/1/2009 09:38 PM
3-Nitroaniline	ND	1600		µg/Kg	1	4/1/2009 09:38 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	4/1/2009 09:38 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	4/1/2009 09:38 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	4/1/2009 09:38 PM
4-Chloroaniline	ND	660		µg/Kg	1	4/1/2009 09:38 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	4/1/2009 09:38 PM
4-Methylphenol	ND	330		µg/Kg	1	4/1/2009 09:38 PM
4-Nitroaniline	ND	1600		µg/Kg	1	4/1/2009 09:38 PM
4-Nitrophenol	ND	1600		µg/Kg	1	4/1/2009 09:38 PM
Acenaphthene	ND	330		µg/Kg	1	4/1/2009 09:38 PM
Acenaphthylene	ND	330		µg/Kg	1	4/1/2009 09:38 PM
Anthracene	ND	330		µg/Kg	1	4/1/2009 09:38 PM
Benzidine (M)	ND	1600		µg/Kg	1	4/1/2009 09:38 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	4/1/2009 09:38 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	4/1/2009 09:38 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	4/1/2009 09:38 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	4/1/2009 09:38 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	4/1/2009 09:38 PM
Benzoic acid	ND	1600		µg/Kg	1	4/1/2009 09:38 PM
Benzyl alcohol	ND	660		µg/Kg	1	4/1/2009 09:38 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	4/1/2009 09:38 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W5A (0')
Lab Order:	104787	**Collection Date:**	3/26/2009 11:44:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104787-011A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090401A QC Batch: 54445 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	4/1/2009 09:38 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	4/1/2009 09:38 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	4/1/2009 09:38 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	4/1/2009 09:38 PM
Chrysene	ND	330		µg/Kg	1	4/1/2009 09:38 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	4/1/2009 09:38 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	4/1/2009 09:38 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	4/1/2009 09:38 PM
Dibenzofuran	ND	330		µg/Kg	1	4/1/2009 09:38 PM
Diethylphthalate	ND	330		µg/Kg	1	4/1/2009 09:38 PM
Dimethylphthalate	ND	330		µg/Kg	1	4/1/2009 09:38 PM
Fluoranthene	ND	330		µg/Kg	1	4/1/2009 09:38 PM
Fluorene	ND	330		µg/Kg	1	4/1/2009 09:38 PM
Hexachlorobenzene	ND	330		µg/Kg	1	4/1/2009 09:38 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	4/1/2009 09:38 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	4/1/2009 09:38 PM
Hexachloroethane	ND	330		µg/Kg	1	4/1/2009 09:38 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	4/1/2009 09:38 PM
Isophorone	ND	330		µg/Kg	1	4/1/2009 09:38 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	4/1/2009 09:38 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	4/1/2009 09:38 PM
Naphthalene	ND	330		µg/Kg	1	4/1/2009 09:38 PM
Nitrobenzene	ND	330		µg/Kg	1	4/1/2009 09:38 PM
Pentachlorophenol	ND	1600		µg/Kg	1	4/1/2009 09:38 PM
Phenanthrene	ND	330		µg/Kg	1	4/1/2009 09:38 PM
Phenol	ND	330		µg/Kg	1	4/1/2009 09:38 PM
Pyrene	ND	330		µg/Kg	1	4/1/2009 09:38 PM
Surr: 1,2-Dichlorobenzene-d4	83.1	49-103		%REC	1	4/1/2009 09:38 PM
Surr: 2,4,6-Tribromophenol	95.1	47-129		%REC	1	4/1/2009 09:38 PM
Surr: 2-Chlorophenol-d4	90.9	54-109		%REC	1	4/1/2009 09:38 PM
Surr: 2-Fluorobiphenyl	91.4	59-108		%REC	1	4/1/2009 09:38 PM
Surr: 2-Fluorophenol	88.4	50-111		%REC	1	4/1/2009 09:38 PM
Surr: 4-Terphenyl-d14	110	58-135		%REC	1	4/1/2009 09:38 PM
Surr: Nitrobenzene-d5	88.6	54-115		%REC	1	4/1/2009 09:38 PM
Surr: Phenol-d5	92.4	58-112		%REC	1	4/1/2009 09:38 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W5A (5')
Lab Order:	104787	**Collection Date:**	3/26/2009 11:48:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104787-012A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B				**EPA 6010B**		
RunID: ICP8_090403J	QC Batch: 54490			PrepDate:	4/3/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	4/3/2009 08:24 PM
Arsenic	4.9	1.0		mg/Kg	1	4/3/2009 08:24 PM
Barium	44	1.0		mg/Kg	1	4/3/2009 08:24 PM
Beryllium	ND	1.0		mg/Kg	1	4/3/2009 08:24 PM
Cadmium	ND	1.0		mg/Kg	1	4/3/2009 08:24 PM
Chromium	51	1.0		mg/Kg	1	4/3/2009 08:24 PM
Cobalt	7.3	1.0		mg/Kg	1	4/3/2009 08:24 PM
Copper	17	2.0		mg/Kg	1	4/3/2009 08:24 PM
Lead	10	1.0		mg/Kg	1	4/3/2009 08:24 PM
Molybdenum	1.5	1.0		mg/Kg	1	4/3/2009 08:24 PM
Nickel	48	1.0		mg/Kg	1	4/3/2009 08:24 PM
Selenium	ND	1.0		mg/Kg	1	4/3/2009 08:24 PM
Silver	ND	1.0		mg/Kg	1	4/3/2009 08:24 PM
Thallium	ND	1.0		mg/Kg	1	4/3/2009 08:24 PM
Vanadium	41	1.0		mg/Kg	1	4/3/2009 08:24 PM
Zinc	50	1.0		mg/Kg	1	4/3/2009 08:24 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
EPA 3550B				**EPA 8015B(M)**		
RunID: GC16_090403D	QC Batch: 54477			PrepDate:	4/2/2009	Analyst: **CBR**
DRO	ND	1.0		mg/Kg	1	4/3/2009 10:09 AM
ORO	ND	1.0		mg/Kg	1	4/3/2009 10:09 AM
Surr: p-Terphenyl	68.9	30-130		%REC	1	4/3/2009 10:09 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090402E	QC Batch: 54466			PrepDate:	4/2/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	4/2/2009 02:34 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 3550B				**EPA 8270C**		
RunID: MS 13_090401A	QC Batch: 54445			PrepDate:	4/1/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	4/1/2009 08:17 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	4/1/2009 08:17 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	4/1/2009 08:17 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	4/1/2009 08:17 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W5A (5')
Lab Order:	104787	**Collection Date:**	3/26/2009 11:48:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104787-012A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090401A QC Batch: 54445 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	4/1/2009 08:17 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	4/1/2009 08:17 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	4/1/2009 08:17 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	4/1/2009 08:17 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	4/1/2009 08:17 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	4/1/2009 08:17 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	4/1/2009 08:17 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	4/1/2009 08:17 PM
2-Chlorophenol	ND	330		µg/Kg	1	4/1/2009 08:17 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	4/1/2009 08:17 PM
2-Methylphenol	ND	330		µg/Kg	1	4/1/2009 08:17 PM
2-Nitroaniline	ND	1600		µg/Kg	1	4/1/2009 08:17 PM
2-Nitrophenol	ND	330		µg/Kg	1	4/1/2009 08:17 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	4/1/2009 08:17 PM
3-Nitroaniline	ND	1600		µg/Kg	1	4/1/2009 08:17 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	4/1/2009 08:17 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	4/1/2009 08:17 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	4/1/2009 08:17 PM
4-Chloroaniline	ND	660		µg/Kg	1	4/1/2009 08:17 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	4/1/2009 08:17 PM
4-Methylphenol	ND	330		µg/Kg	1	4/1/2009 08:17 PM
4-Nitroaniline	ND	1600		µg/Kg	1	4/1/2009 08:17 PM
4-Nitrophenol	ND	1600		µg/Kg	1	4/1/2009 08:17 PM
Acenaphthene	ND	330		µg/Kg	1	4/1/2009 08:17 PM
Acenaphthylene	ND	330		µg/Kg	1	4/1/2009 08:17 PM
Anthracene	ND	330		µg/Kg	1	4/1/2009 08:17 PM
Benzidine (M)	ND	1600		µg/Kg	1	4/1/2009 08:17 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	4/1/2009 08:17 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	4/1/2009 08:17 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	4/1/2009 08:17 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	4/1/2009 08:17 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	4/1/2009 08:17 PM
Benzoic acid	ND	1600		µg/Kg	1	4/1/2009 08:17 PM
Benzyl alcohol	ND	660		µg/Kg	1	4/1/2009 08:17 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	4/1/2009 08:17 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W5A (5')
Lab Order:	104787	**Collection Date:**	3/26/2009 11:48:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104787-012A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090401A QC Batch: 54445 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	4/1/2009 08:17 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	4/1/2009 08:17 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	4/1/2009 08:17 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	4/1/2009 08:17 PM
Chrysene	ND	330		µg/Kg	1	4/1/2009 08:17 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	4/1/2009 08:17 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	4/1/2009 08:17 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	4/1/2009 08:17 PM
Dibenzofuran	ND	330		µg/Kg	1	4/1/2009 08:17 PM
Diethylphthalate	ND	330		µg/Kg	1	4/1/2009 08:17 PM
Dimethylphthalate	ND	330		µg/Kg	1	4/1/2009 08:17 PM
Fluoranthene	ND	330		µg/Kg	1	4/1/2009 08:17 PM
Fluorene	ND	330		µg/Kg	1	4/1/2009 08:17 PM
Hexachlorobenzene	ND	330		µg/Kg	1	4/1/2009 08:17 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	4/1/2009 08:17 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	4/1/2009 08:17 PM
Hexachloroethane	ND	330		µg/Kg	1	4/1/2009 08:17 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	4/1/2009 08:17 PM
Isophorone	ND	330		µg/Kg	1	4/1/2009 08:17 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	4/1/2009 08:17 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	4/1/2009 08:17 PM
Naphthalene	ND	330		µg/Kg	1	4/1/2009 08:17 PM
Nitrobenzene	ND	330		µg/Kg	1	4/1/2009 08:17 PM
Pentachlorophenol	ND	1600		µg/Kg	1	4/1/2009 08:17 PM
Phenanthrene	ND	330		µg/Kg	1	4/1/2009 08:17 PM
Phenol	ND	330		µg/Kg	1	4/1/2009 08:17 PM
Pyrene	ND	330		µg/Kg	1	4/1/2009 08:17 PM
Surr: 1,2-Dichlorobenzene-d4	85.2	49-103		%REC	1	4/1/2009 08:17 PM
Surr: 2,4,6-Tribromophenol	97.9	47-129		%REC	1	4/1/2009 08:17 PM
Surr: 2-Chlorophenol-d4	92.2	54-109		%REC	1	4/1/2009 08:17 PM
Surr: 2-Fluorobiphenyl	93.4	59-108		%REC	1	4/1/2009 08:17 PM
Surr: 2-Fluorophenol	90.8	50-111		%REC	1	4/1/2009 08:17 PM
Surr: 4-Terphenyl-d14	108	58-135		%REC	1	4/1/2009 08:17 PM
Surr: Nitrobenzene-d5	90.6	54-115		%REC	1	4/1/2009 08:17 PM
Surr: Phenol-d5	93.6	58-112		%REC	1	4/1/2009 08:17 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W5A (10')
Lab Order:	104787	**Collection Date:**	3/26/2009 11:55:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104787-013A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B				**EPA 6010B**		
RunID: ICP8_090403J	QC Batch: 54490			PrepDate:	4/3/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	4/3/2009 08:26 PM
Arsenic	3.9	1.0		mg/Kg	1	4/3/2009 08:26 PM
Barium	93	1.0		mg/Kg	1	4/3/2009 08:26 PM
Beryllium	ND	1.0		mg/Kg	1	4/3/2009 08:26 PM
Cadmium	ND	1.0		mg/Kg	1	4/3/2009 08:26 PM
Chromium	83	1.0		mg/Kg	1	4/3/2009 08:26 PM
Cobalt	16	1.0		mg/Kg	1	4/3/2009 08:26 PM
Copper	31	2.0		mg/Kg	1	4/3/2009 08:26 PM
Lead	4.5	1.0		mg/Kg	1	4/3/2009 08:26 PM
Molybdenum	ND	1.0		mg/Kg	1	4/3/2009 08:26 PM
Nickel	110	1.0		mg/Kg	1	4/3/2009 08:26 PM
Selenium	ND	1.0		mg/Kg	1	4/3/2009 08:26 PM
Silver	ND	1.0		mg/Kg	1	4/3/2009 08:26 PM
Thallium	ND	1.0		mg/Kg	1	4/3/2009 08:26 PM
Vanadium	43	1.0		mg/Kg	1	4/3/2009 08:26 PM
Zinc	40	1.0		mg/Kg	1	4/3/2009 08:26 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
EPA 3550B				**EPA 8015B(M)**		
RunID: GC16_090403D	QC Batch: 54477			PrepDate:	4/2/2009	Analyst: **CBR**
DRO	2.8	1.0		mg/Kg	1	4/3/2009 10:00 AM
ORO	2.7	1.0		mg/Kg	1	4/3/2009 10:00 AM
Surr: p-Terphenyl	35.0	30-130		%REC	1	4/3/2009 10:00 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090402E	QC Batch: 54466			PrepDate:	4/2/2009	Analyst: **RQ**
Mercury	0.11	0.10		mg/Kg	1	4/2/2009 02:36 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 3550B				**EPA 8270C**		
RunID: MS 13_090401A	QC Batch: 54445			PrepDate:	4/1/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	4/1/2009 08:44 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	4/1/2009 08:44 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	4/1/2009 08:44 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	4/1/2009 08:44 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W5A (10')
Lab Order:	104787	**Collection Date:**	3/26/2009 11:55:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104787-013A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090401A QC Batch: 54445 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	4/1/2009 08:44 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	4/1/2009 08:44 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	4/1/2009 08:44 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	4/1/2009 08:44 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	4/1/2009 08:44 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	4/1/2009 08:44 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	4/1/2009 08:44 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	4/1/2009 08:44 PM
2-Chlorophenol	ND	330		µg/Kg	1	4/1/2009 08:44 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	4/1/2009 08:44 PM
2-Methylphenol	ND	330		µg/Kg	1	4/1/2009 08:44 PM
2-Nitroaniline	ND	1600		µg/Kg	1	4/1/2009 08:44 PM
2-Nitrophenol	ND	330		µg/Kg	1	4/1/2009 08:44 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	4/1/2009 08:44 PM
3-Nitroaniline	ND	1600		µg/Kg	1	4/1/2009 08:44 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	4/1/2009 08:44 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	4/1/2009 08:44 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	4/1/2009 08:44 PM
4-Chloroaniline	ND	660		µg/Kg	1	4/1/2009 08:44 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	4/1/2009 08:44 PM
4-Methylphenol	ND	330		µg/Kg	1	4/1/2009 08:44 PM
4-Nitroaniline	ND	1600		µg/Kg	1	4/1/2009 08:44 PM
4-Nitrophenol	ND	1600		µg/Kg	1	4/1/2009 08:44 PM
Acenaphthene	ND	330		µg/Kg	1	4/1/2009 08:44 PM
Acenaphthylene	ND	330		µg/Kg	1	4/1/2009 08:44 PM
Anthracene	ND	330		µg/Kg	1	4/1/2009 08:44 PM
Benzidine (M)	ND	1600		µg/Kg	1	4/1/2009 08:44 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	4/1/2009 08:44 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	4/1/2009 08:44 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	4/1/2009 08:44 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	4/1/2009 08:44 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	4/1/2009 08:44 PM
Benzoic acid	ND	1600		µg/Kg	1	4/1/2009 08:44 PM
Benzyl alcohol	ND	660		µg/Kg	1	4/1/2009 08:44 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	4/1/2009 08:44 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W5A (10')
Lab Order:	104787	**Collection Date:**	3/26/2009 11:55:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104787-013A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090401A QC Batch: 54445 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	4/1/2009 08:44 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	4/1/2009 08:44 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	4/1/2009 08:44 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	4/1/2009 08:44 PM
Chrysene	ND	330		µg/Kg	1	4/1/2009 08:44 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	4/1/2009 08:44 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	4/1/2009 08:44 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	4/1/2009 08:44 PM
Dibenzofuran	ND	330		µg/Kg	1	4/1/2009 08:44 PM
Diethylphthalate	ND	330		µg/Kg	1	4/1/2009 08:44 PM
Dimethylphthalate	ND	330		µg/Kg	1	4/1/2009 08:44 PM
Fluoranthene	ND	330		µg/Kg	1	4/1/2009 08:44 PM
Fluorene	ND	330		µg/Kg	1	4/1/2009 08:44 PM
Hexachlorobenzene	ND	330		µg/Kg	1	4/1/2009 08:44 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	4/1/2009 08:44 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	4/1/2009 08:44 PM
Hexachloroethane	ND	330		µg/Kg	1	4/1/2009 08:44 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	4/1/2009 08:44 PM
Isophorone	ND	330		µg/Kg	1	4/1/2009 08:44 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	4/1/2009 08:44 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	4/1/2009 08:44 PM
Naphthalene	ND	330		µg/Kg	1	4/1/2009 08:44 PM
Nitrobenzene	ND	330		µg/Kg	1	4/1/2009 08:44 PM
Pentachlorophenol	ND	1600		µg/Kg	1	4/1/2009 08:44 PM
Phenanthrene	ND	330		µg/Kg	1	4/1/2009 08:44 PM
Phenol	ND	330		µg/Kg	1	4/1/2009 08:44 PM
Pyrene	ND	330		µg/Kg	1	4/1/2009 08:44 PM
Surr: 1,2-Dichlorobenzene-d4	86.1	49-103		%REC	1	4/1/2009 08:44 PM
Surr: 2,4,6-Tribromophenol	101	47-129		%REC	1	4/1/2009 08:44 PM
Surr: 2-Chlorophenol-d4	93.9	54-109		%REC	1	4/1/2009 08:44 PM
Surr: 2-Fluorobiphenyl	96.4	59-108		%REC	1	4/1/2009 08:44 PM
Surr: 2-Fluorophenol	92.8	50-111		%REC	1	4/1/2009 08:44 PM
Surr: 4-Terphenyl-d14	112	58-135		%REC	1	4/1/2009 08:44 PM
Surr: Nitrobenzene-d5	92.5	54-115		%REC	1	4/1/2009 08:44 PM
Surr: Phenol-d5	95.4	58-112		%REC	1	4/1/2009 08:44 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W5A (15')
Lab Order:	104787	**Collection Date:**	3/26/2009 12:05:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104787-014A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B				**EPA 6010B**		
RunID: ICP8_090403J	QC Batch: 54490			PrepDate:	4/3/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	4/3/2009 08:30 PM
Arsenic	2.7	1.0		mg/Kg	1	4/3/2009 08:30 PM
Barium	22	1.0		mg/Kg	1	4/3/2009 08:30 PM
Beryllium	ND	1.0		mg/Kg	1	4/3/2009 08:30 PM
Cadmium	ND	1.0		mg/Kg	1	4/3/2009 08:30 PM
Chromium	43	1.0		mg/Kg	1	4/3/2009 08:30 PM
Cobalt	7.3	1.0		mg/Kg	1	4/3/2009 08:30 PM
Copper	18	2.0		mg/Kg	1	4/3/2009 08:30 PM
Lead	5.0	1.0		mg/Kg	1	4/3/2009 08:30 PM
Molybdenum	ND	1.0		mg/Kg	1	4/3/2009 08:30 PM
Nickel	47	1.0		mg/Kg	1	4/3/2009 08:30 PM
Selenium	ND	1.0		mg/Kg	1	4/3/2009 08:30 PM
Silver	ND	1.0		mg/Kg	1	4/3/2009 08:30 PM
Thallium	ND	1.0		mg/Kg	1	4/3/2009 08:30 PM
Vanadium	34	1.0		mg/Kg	1	4/3/2009 08:30 PM
Zinc	44	1.0		mg/Kg	1	4/3/2009 08:30 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
EPA 3550B				**EPA 8015B(M)**		
RunID: GC16_090403D	QC Batch: 54477			PrepDate:	4/2/2009	Analyst: **CBR**
DRO	ND	1.0		mg/Kg	1	4/3/2009 09:51 AM
ORO	ND	1.0		mg/Kg	1	4/3/2009 09:51 AM
Surr: p-Terphenyl	51.3	30-130		%REC	1	4/3/2009 09:51 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090402E	QC Batch: 54466			PrepDate:	4/2/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	4/2/2009 02:07 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 3550B				**EPA 8270C**		
RunID: MS 13_090401A	QC Batch: 54445			PrepDate:	4/1/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	4/1/2009 09:11 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	4/1/2009 09:11 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	4/1/2009 09:11 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	4/1/2009 09:11 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W5A (15')
Lab Order:	104787	**Collection Date:**	3/26/2009 12:05:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104787-014A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090401A QC Batch: 54445 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	4/1/2009 09:11 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	4/1/2009 09:11 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	4/1/2009 09:11 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	4/1/2009 09:11 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	4/1/2009 09:11 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	4/1/2009 09:11 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	4/1/2009 09:11 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	4/1/2009 09:11 PM
2-Chlorophenol	ND	330		µg/Kg	1	4/1/2009 09:11 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	4/1/2009 09:11 PM
2-Methylphenol	ND	330		µg/Kg	1	4/1/2009 09:11 PM
2-Nitroaniline	ND	1600		µg/Kg	1	4/1/2009 09:11 PM
2-Nitrophenol	ND	330		µg/Kg	1	4/1/2009 09:11 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	4/1/2009 09:11 PM
3-Nitroaniline	ND	1600		µg/Kg	1	4/1/2009 09:11 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	4/1/2009 09:11 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	4/1/2009 09:11 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	4/1/2009 09:11 PM
4-Chloroaniline	ND	660		µg/Kg	1	4/1/2009 09:11 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	4/1/2009 09:11 PM
4-Methylphenol	ND	330		µg/Kg	1	4/1/2009 09:11 PM
4-Nitroaniline	ND	1600		µg/Kg	1	4/1/2009 09:11 PM
4-Nitrophenol	ND	1600		µg/Kg	1	4/1/2009 09:11 PM
Acenaphthene	ND	330		µg/Kg	1	4/1/2009 09:11 PM
Acenaphthylene	ND	330		µg/Kg	1	4/1/2009 09:11 PM
Anthracene	ND	330		µg/Kg	1	4/1/2009 09:11 PM
Benzidine (M)	ND	1600		µg/Kg	1	4/1/2009 09:11 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	4/1/2009 09:11 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	4/1/2009 09:11 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	4/1/2009 09:11 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	4/1/2009 09:11 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	4/1/2009 09:11 PM
Benzoic acid	ND	1600		µg/Kg	1	4/1/2009 09:11 PM
Benzyl alcohol	ND	660		µg/Kg	1	4/1/2009 09:11 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	4/1/2009 09:11 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W5A (15')
Lab Order:	104787	**Collection Date:**	3/26/2009 12:05:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104787-014A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090401A QC Batch: 54445 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	4/1/2009 09:11 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	4/1/2009 09:11 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	4/1/2009 09:11 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	4/1/2009 09:11 PM
Chrysene	ND	330		µg/Kg	1	4/1/2009 09:11 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	4/1/2009 09:11 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	4/1/2009 09:11 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	4/1/2009 09:11 PM
Dibenzofuran	ND	330		µg/Kg	1	4/1/2009 09:11 PM
Diethylphthalate	ND	330		µg/Kg	1	4/1/2009 09:11 PM
Dimethylphthalate	ND	330		µg/Kg	1	4/1/2009 09:11 PM
Fluoranthene	ND	330		µg/Kg	1	4/1/2009 09:11 PM
Fluorene	ND	330		µg/Kg	1	4/1/2009 09:11 PM
Hexachlorobenzene	ND	330		µg/Kg	1	4/1/2009 09:11 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	4/1/2009 09:11 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	4/1/2009 09:11 PM
Hexachloroethane	ND	330		µg/Kg	1	4/1/2009 09:11 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	4/1/2009 09:11 PM
Isophorone	ND	330		µg/Kg	1	4/1/2009 09:11 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	4/1/2009 09:11 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	4/1/2009 09:11 PM
Naphthalene	ND	330		µg/Kg	1	4/1/2009 09:11 PM
Nitrobenzene	ND	330		µg/Kg	1	4/1/2009 09:11 PM
Pentachlorophenol	ND	1600		µg/Kg	1	4/1/2009 09:11 PM
Phenanthrene	ND	330		µg/Kg	1	4/1/2009 09:11 PM
Phenol	ND	330		µg/Kg	1	4/1/2009 09:11 PM
Pyrene	ND	330		µg/Kg	1	4/1/2009 09:11 PM
Surr: 1,2-Dichlorobenzene-d4	83.8	49-103		%REC	1	4/1/2009 09:11 PM
Surr: 2,4,6-Tribromophenol	102	47-129		%REC	1	4/1/2009 09:11 PM
Surr: 2-Chlorophenol-d4	91.8	54-109		%REC	1	4/1/2009 09:11 PM
Surr: 2-Fluorobiphenyl	92.9	59-108		%REC	1	4/1/2009 09:11 PM
Surr: 2-Fluorophenol	90.3	50-111		%REC	1	4/1/2009 09:11 PM
Surr: 4-Terphenyl-d14	113	58-135		%REC	1	4/1/2009 09:11 PM
Surr: Nitrobenzene-d5	90.5	54-115		%REC	1	4/1/2009 09:11 PM
Surr: Phenol-d5	92.7	58-112		%REC	1	4/1/2009 09:11 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 160.1_2540C_W

Sample ID: **104786-001F-DUP**	SampType: **DUP**	TestCode: **160.1_2540C**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107774**
Client ID: **ZZZZZZ**	Batch ID: **54508**	TestNo: **SM2540C**		Analysis Date: **4/1/2009**	SeqNo: **1689789**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	11620.000	200						11920	2.55	10	

Sample ID: **LCS-54508**	SampType: **LCS**	TestCode: **160.1_2540C**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107774**
Client ID: **LCSW**	Batch ID: **54508**	TestNo: **SM2540C**		Analysis Date: **4/1/2009**	SeqNo: **1689793**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	992.000	10	970.0	0	102	80	120				

Sample ID: **MB-54508**	SampType: **MBLK**	TestCode: **160.1_2540C**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107774**
Client ID: **PBW**	Batch ID: **54508**	TestNo: **SM2540C**		Analysis Date: **4/1/2009**	SeqNo: **1689794**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	ND	10									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 1664_HEM_W

Sample ID: **MB-54502**	SampType: **MBLK**	TestCode: **1664_HEM_**	Units: **mg/L**	Prep Date: **4/2/2009**	RunNo: **107772**
Client ID: **PBW**	Batch ID: **54502**	TestNo: **EPA 1664 _H**		Analysis Date: **4/2/2009**	SeqNo: **1689631**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Oil & Grease	ND	4.0									

Sample ID: **LCS-54502**	SampType: **LCS**	TestCode: **1664_HEM_**	Units: **mg/L**	Prep Date: **4/2/2009**	RunNo: **107772**
Client ID: **LCSW**	Batch ID: **54502**	TestNo: **EPA 1664 _H**		Analysis Date: **4/2/2009**	SeqNo: **1689632**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Oil & Grease	38.000	4.0	40.00	0	95.0	78	114				

Sample ID: **MB-54502-MS**	SampType: **MS**	TestCode: **1664_HEM_**	Units: **mg/L**	Prep Date: **4/2/2009**	RunNo: **107772**
Client ID: **ZZZZZZ**	Batch ID: **54502**	TestNo: **EPA 1664 _H**		Analysis Date: **4/2/2009**	SeqNo: **1689639**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Oil & Grease	37.200	4.0	40.00	0	93.0	78	114				

Sample ID: **MB-54502-MSD**	SampType: **MSD**	TestCode: **1664_HEM_**	Units: **mg/L**	Prep Date: **4/2/2009**	RunNo: **107772**
Client ID: **ZZZZZZ**	Batch ID: **54502**	TestNo: **EPA 1664 _H**		Analysis Date: **4/2/2009**	SeqNo: **1689640**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Oil & Grease	36.800	4.0	40.00	0	92.0	78	114	37.20	1.08	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 335.2_4500CNE_W

Sample ID: **104782-001BMS**	SampType: **MS**	TestCode: **335.2_4500C**	Units: **mg/L**	Prep Date: **4/3/2009**	RunNo: **107819**
Client ID: **ZZZZZZ**	Batch ID: **54519**	TestNo: **SM4500-CN E**		Analysis Date: **4/3/2009**	SeqNo: **1690560**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide	0.396	0.010	0.4000	0	99.0	80	120				

Sample ID: **104782-001BMSD**	SampType: **MSD**	TestCode: **335.2_4500C**	Units: **mg/L**	Prep Date: **4/3/2009**	RunNo: **107819**
Client ID: **ZZZZZZ**	Batch ID: **54519**	TestNo: **SM4500-CN E**		Analysis Date: **4/3/2009**	SeqNo: **1690561**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide	0.392	0.010	0.4000	0	98.0	80	120	0.3960	1.02	20	

Sample ID: **104788-001HDUP**	SampType: **DUP**	TestCode: **335.2_4500C**	Units: **mg/L**	Prep Date: **4/3/2009**	RunNo: **107819**
Client ID: **ZZZZZZ**	Batch ID: **54519**	TestNo: **SM4500-CN E**		Analysis Date: **4/3/2009**	SeqNo: **1690565**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide	ND	0.010						0	0	30	

Sample ID: **LCS-54519**	SampType: **LCS**	TestCode: **335.2_4500C**	Units: **mg/L**	Prep Date: **4/3/2009**	RunNo: **107819**
Client ID: **LCSW**	Batch ID: **54519**	TestNo: **SM4500-CN E**		Analysis Date: **4/3/2009**	SeqNo: **1690566**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide	0.377	0.010	0.4000	0	94.2	80	120				

Sample ID: **MB-54519**	SampType: **MBLK**	TestCode: **335.2_4500C**	Units: **mg/L**	Prep Date: **4/3/2009**	RunNo: **107819**
Client ID: **PBW**	Batch ID: **54519**	TestNo: **SM4500-CN E**		Analysis Date: **4/3/2009**	SeqNo: **1690567**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide	ND	0.010									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 376.2_4500S2_WD

Sample ID: **104789-001IDUP**	SampType: **DUP**	TestCode: **376.2_4500S2**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107702**
Client ID: **ZZZZZZ**	Batch ID: **R107702**	TestNo: **SM4500-S= D**		Analysis Date: **4/1/2009**	SeqNo: **1688339**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfide	0.008	0.010						0.008400	0	30	

Sample ID: **LCS-R107702**	SampType: **LCS**	TestCode: **376.2_4500S2**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107702**
Client ID: **LCSW**	Batch ID: **R107702**	TestNo: **SM4500-S= D**		Analysis Date: **4/1/2009**	SeqNo: **1688340**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfide	0.502	0.010	0.5000	0	100	80	120				

Sample ID: **MB-R107702**	SampType: **MBLK**	TestCode: **376.2_4500S2**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107702**
Client ID: **PBW**	Batch ID: **R107702**	TestNo: **SM4500-S= D**		Analysis Date: **4/1/2009**	SeqNo: **1688341**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfide	ND	0.010									

Sample ID: **MB-R107702MS**	SampType: **MS**	TestCode: **376.2_4500S2**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107702**
Client ID: **ZZZZZZ**	Batch ID: **R107702**	TestNo: **SM4500-S= D**		Analysis Date: **4/1/2009**	SeqNo: **1688342**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfide	0.495	0.010	0.5000	0	99.0	70	120				

Sample ID: **MB-R107702MSD**	SampType: **MSD**	TestCode: **376.2_4500S2**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107702**
Client ID: **ZZZZZZ**	Batch ID: **R107702**	TestNo: **SM4500-S= D**		Analysis Date: **4/1/2009**	SeqNo: **1688343**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfide	0.486	0.010	0.5000	0	97.2	70	120	0.4949	1.79	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **MB-54489** SampType: **MBLK** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **4/3/2009** RunNo: **107827**
Client ID: **PBS** Batch ID: **54489** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **4/3/2009** SeqNo: **1690657**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	2.0									
Arsenic	ND	1.0									
Barium	ND	1.0									
Beryllium	ND	1.0									
Cadmium	0.007	1.0									
Chromium	ND	1.0									
Cobalt	ND	1.0									
Copper	ND	2.0									
Lead	0.600	1.0									
Molybdenum	ND	1.0									
Nickel	0.044	1.0									
Selenium	ND	1.0									
Silver	ND	1.0									
Thallium	ND	1.0									
Vanadium	ND	1.0									
Zinc	ND	1.0									

Sample ID: **LCS-54489** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **4/3/2009** RunNo: **107827**
Client ID: **LCSS** Batch ID: **54489** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **4/3/2009** SeqNo: **1690658**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	46.067	2.0	50.00	0	92.1	80	120				
Arsenic	44.017	1.0	50.00	0	88.0	80	120				
Barium	48.459	1.0	50.00	0	96.9	80	120				
Beryllium	46.640	1.0	50.00	0	93.3	80	120				
Cadmium	46.722	1.0	50.00	0.006673	93.4	80	120				
Chromium	44.208	1.0	50.00	0	88.4	80	120				
Cobalt	48.501	1.0	50.00	0	97.0	80	120				
Copper	48.216	2.0	50.00	0	96.4	80	120				
Lead	50.551	1.0	50.00	0.6001	99.9	80	120				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **LCS-54489** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **4/3/2009** RunNo: **107827**
Client ID: **LCSS** Batch ID: **54489** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **4/3/2009** SeqNo: **1690658**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	48.251	1.0	50.00	0	96.5	80	120				
Nickel	46.717	1.0	50.00	0.04393	93.3	80	120				
Selenium	42.966	1.0	50.00	0	85.9	80	120				
Silver	47.225	1.0	50.00	0	94.4	80	120				
Thallium	41.641	1.0	50.00	0	83.3	80	120				
Vanadium	48.793	1.0	50.00	0	97.6	80	120				
Zinc	46.384	1.0	50.00	0	92.8	80	120				

Sample ID: **104787-004ADUP** SampType: **DUP** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **4/3/2009** RunNo: **107827**
Client ID: **W10AGW (5')** Batch ID: **54489** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **4/3/2009** SeqNo: **1690669**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	0.686	2.0						0	0	20	
Arsenic	2.810	1.0						3.646	25.9	20	R
Barium	109.338	1.0						116.0	5.96	20	
Beryllium	ND	1.0						0	0	20	
Cadmium	0.721	1.0						0.7563	0	20	
Chromium	90.034	1.0						101.4	11.9	20	
Cobalt	16.464	1.0						19.14	15.0	20	
Copper	25.735	2.0						29.82	14.7	20	
Lead	3.785	1.0						3.812	0.693	20	
Molybdenum	ND	1.0						0	0	20	
Nickel	101.133	1.0						137.6	30.5	20	R
Selenium	ND	1.0						0	0	20	
Silver	ND	1.0						0	0	20	
Thallium	ND	1.0						0	0	20	
Vanadium	46.085	1.0						49.63	7.41	20	
Zinc	39.288	1.0						43.05	9.13	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **104787-004AMS** SampType: **MS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **4/3/2009** RunNo: **107827**
Client ID: **W10AGW (5')** Batch ID: **54489** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **4/3/2009** SeqNo: **1690670**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	73.979	2.0	125.0	0	59.2	25	106				
Arsenic	91.391	1.0	125.0	3.646	70.2	42	113				
Barium	248.637	1.0	125.0	116.0	106	19	140				
Beryllium	93.511	1.0	125.0	0	74.8	50	109				
Cadmium	87.783	1.0	125.0	0.7563	69.6	48	106				
Chromium	185.207	1.0	125.0	101.4	67.0	44	116				
Cobalt	107.161	1.0	125.0	19.14	70.4	47	107				
Copper	144.463	2.0	125.0	29.82	91.7	49	124				
Lead	101.985	1.0	125.0	3.812	78.5	33	120				
Molybdenum	91.487	1.0	125.0	0	73.2	46	111				
Nickel	197.168	1.0	125.0	137.6	47.7	43	111				
Selenium	87.829	1.0	125.0	0	70.3	43	104				
Silver	101.545	1.0	125.0	0	81.2	53	114				
Thallium	78.200	1.0	125.0	0	62.6	41	107				
Vanadium	149.616	1.0	125.0	49.63	80.0	48	116				
Zinc	127.233	1.0	125.0	43.05	67.3	24	129				

Sample ID: **104787-004AMSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **4/3/2009** RunNo: **107827**
Client ID: **W10AGW (5')** Batch ID: **54489** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **4/3/2009** SeqNo: **1690671**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	72.783	2.0	125.0	0	58.2	25	106	73.98	1.63	20	
Arsenic	88.703	1.0	125.0	3.646	68.0	42	113	91.39	2.99	20	
Barium	210.657	1.0	125.0	116.0	75.7	19	140	248.6	16.5	20	
Beryllium	90.133	1.0	125.0	0	72.1	50	109	93.51	3.68	20	
Cadmium	85.062	1.0	125.0	0.7563	67.4	48	106	87.78	3.15	20	
Chromium	167.862	1.0	125.0	101.4	53.2	44	116	185.2	9.83	20	
Cobalt	103.912	1.0	125.0	19.14	67.8	47	107	107.2	3.08	20	
Copper	137.203	2.0	125.0	29.82	85.9	49	124	144.5	5.15	20	
Lead	97.895	1.0	125.0	3.812	75.3	33	120	102.0	4.09	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **104787-004AMSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **4/3/2009** RunNo: **107827**
Client ID: **W10AGW (5')** Batch ID: **54489** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **4/3/2009** SeqNo: **1690671**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	88.624	1.0	125.0	0	70.9	46	111	91.49	3.18	20	
Nickel	188.167	1.0	125.0	137.6	40.5	43	111	197.2	4.67	20	S
Selenium	85.534	1.0	125.0	0	68.4	43	104	87.83	2.65	20	
Silver	97.835	1.0	125.0	0	78.3	53	114	101.5	3.72	20	
Thallium	75.995	1.0	125.0	0	60.8	41	107	78.20	2.86	20	
Vanadium	141.731	1.0	125.0	49.63	73.7	48	116	149.6	5.41	20	
Zinc	120.982	1.0	125.0	43.05	62.3	24	129	127.2	5.04	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **MB-54490** SampType: **MBLK** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **4/3/2009** RunNo: **107828**
Client ID: **PBS** Batch ID: **54490** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **4/3/2009** SeqNo: **1690672**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	2.0									
Arsenic	ND	1.0									
Barium	ND	1.0									
Beryllium	ND	1.0									
Cadmium	0.008	1.0									
Chromium	ND	1.0									
Cobalt	ND	1.0									
Copper	ND	2.0									
Lead	0.328	1.0									
Molybdenum	ND	1.0									
Nickel	0.086	1.0									
Selenium	ND	1.0									
Silver	ND	1.0									
Thallium	ND	1.0									
Vanadium	0.021	1.0									
Zinc	0.319	1.0									

Sample ID: **LCS-54490** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **4/3/2009** RunNo: **107828**
Client ID: **LCSS** Batch ID: **54490** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **4/3/2009** SeqNo: **1690673**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	45.504	2.0	50.00	0	91.0	80	120				
Arsenic	42.724	1.0	50.00	0	85.4	80	120				
Barium	48.965	1.0	50.00	0	97.9	80	120				
Beryllium	46.699	1.0	50.00	0	93.4	80	120				
Cadmium	45.722	1.0	50.00	0.007963	91.4	80	120				
Chromium	44.213	1.0	50.00	0	88.4	80	120				
Cobalt	47.865	1.0	50.00	0	95.7	80	120				
Copper	49.109	2.0	50.00	0	98.2	80	120				
Lead	50.696	1.0	50.00	0.3281	101	80	120				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **LCS-54490** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **4/3/2009** RunNo: **107828**
Client ID: **LCSS** Batch ID: **54490** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **4/3/2009** SeqNo: **1690673**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	47.145	1.0	50.00	0	94.3	80	120				
Nickel	46.173	1.0	50.00	0.08560	92.2	80	120				
Selenium	41.829	1.0	50.00	0	83.7	80	120				
Silver	47.571	1.0	50.00	0	95.1	80	120				
Thallium	41.139	1.0	50.00	0	82.3	80	120				
Vanadium	49.286	1.0	50.00	0.02101	98.5	80	120				
Zinc	46.068	1.0	50.00	0.3187	91.5	80	120				

Sample ID: **104787-014ADUP** SampType: **DUP** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **4/3/2009** RunNo: **107828**
Client ID: **W5A (15')** Batch ID: **54490** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **4/3/2009** SeqNo: **1690684**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	0.359	2.0						0.4387	0	20	
Arsenic	2.649	1.0						2.663	0.534	20	
Barium	21.154	1.0						22.21	4.85	20	
Beryllium	ND	1.0						0	0	20	
Cadmium	0.587	1.0						0.5822	0	20	
Chromium	39.372	1.0						42.53	7.72	20	
Cobalt	6.684	1.0						7.338	9.33	20	
Copper	16.069	2.0						17.53	8.70	20	
Lead	4.881	1.0						4.964	1.68	20	
Molybdenum	0.161	1.0						0.1160	0	20	
Nickel	42.568	1.0						46.51	8.85	20	
Selenium	ND	1.0						0	0	20	
Silver	ND	1.0						0	0	20	
Thallium	ND	1.0						0	0	20	
Vanadium	31.458	1.0						33.58	6.54	20	
Zinc	40.951	1.0						43.76	6.64	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **104787-014AMS** SampType: **MS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **4/3/2009** RunNo: **107828**
Client ID: **W5A (15')** Batch ID: **54490** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **4/3/2009** SeqNo: **1690685**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	70.281	2.0	125.0	0.4387	55.9	25	106				
Arsenic	97.434	1.0	125.0	2.663	75.8	42	113				
Barium	125.467	1.0	125.0	22.21	82.6	19	140				
Beryllium	101.818	1.0	125.0	0	81.5	50	109				
Cadmium	96.861	1.0	125.0	0.5822	77.0	48	106				
Chromium	140.209	1.0	125.0	42.53	78.1	44	116				
Cobalt	105.926	1.0	125.0	7.338	78.9	47	107				
Copper	132.333	2.0	125.0	17.53	91.8	49	124				
Lead	109.730	1.0	125.0	4.964	83.8	33	120				
Molybdenum	99.321	1.0	125.0	0.1160	79.4	46	111				
Nickel	145.106	1.0	125.0	46.51	78.9	43	111				
Selenium	95.484	1.0	125.0	0	76.4	43	104				
Silver	104.706	1.0	125.0	0	83.8	53	114				
Thallium	89.432	1.0	125.0	0	71.5	41	107				
Vanadium	138.696	1.0	125.0	33.58	84.1	48	116				
Zinc	141.017	1.0	125.0	43.76	77.8	24	129				

Sample ID: **104787-014AMSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **4/3/2009** RunNo: **107828**
Client ID: **W5A (15')** Batch ID: **54490** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **4/3/2009** SeqNo: **1690686**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	65.233	2.0	125.0	0.4387	51.8	25	106	70.28	7.45	20	
Arsenic	84.887	1.0	125.0	2.663	65.8	42	113	97.43	13.8	20	
Barium	109.269	1.0	125.0	22.21	69.6	19	140	125.5	13.8	20	
Beryllium	89.512	1.0	125.0	0	71.6	50	109	101.8	12.9	20	
Cadmium	85.558	1.0	125.0	0.5822	68.0	48	106	96.86	12.4	20	
Chromium	121.412	1.0	125.0	42.53	63.1	44	116	140.2	14.4	20	
Cobalt	93.356	1.0	125.0	7.338	68.8	47	107	105.9	12.6	20	
Copper	114.787	2.0	125.0	17.53	77.8	49	124	132.3	14.2	20	
Lead	97.049	1.0	125.0	4.964	73.7	33	120	109.7	12.3	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **104787-014AMSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **4/3/2009** RunNo: **107828**
Client ID: **W5A (15')** Batch ID: **54490** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **4/3/2009** SeqNo: **1690686**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	88.054	1.0	125.0	0.1160	70.4	46	111	99.32	12.0	20	
Nickel	125.714	1.0	125.0	46.51	63.4	43	111	145.1	14.3	20	
Selenium	83.088	1.0	125.0	0	66.5	43	104	95.48	13.9	20	
Silver	91.688	1.0	125.0	0	73.4	53	114	104.7	13.3	20	
Thallium	80.035	1.0	125.0	0	64.0	41	107	89.43	11.1	20	
Vanadium	121.043	1.0	125.0	33.58	70.0	48	116	138.7	13.6	20	
Zinc	122.362	1.0	125.0	43.76	62.9	24	129	141.0	14.2	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_W

Sample ID: **MB-54486** SampType: **MBLK** TestCode: **6010_W** Units: **mg/L** Prep Date: **4/2/2009** RunNo: **107800**
Client ID: **PBW** Batch ID: **54486** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **4/3/2009** SeqNo: **1690128**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	0.0050									
Arsenic	ND	0.010									
Barium	ND	0.0030									
Beryllium	ND	0.0030									
Cadmium	ND	0.0030									
Chromium	ND	0.0030									
Cobalt	ND	0.0030									
Copper	ND	0.0050									
Lead	ND	0.0050									
Molybdenum	ND	0.0050									
Nickel	ND	0.0050									
Selenium	ND	0.010									
Silver	ND	0.0030									
Thallium	ND	0.015									
Vanadium	ND	0.0030									
Zinc	0.006	0.010									

Sample ID: **LCS-54486** SampType: **LCS** TestCode: **6010_W** Units: **mg/L** Prep Date: **4/2/2009** RunNo: **107800**
Client ID: **LCSW** Batch ID: **54486** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **4/3/2009** SeqNo: **1690129**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	1.028	0.0050	1.000	0	103	85	115				
Arsenic	0.990	0.010	1.000	0	99.0	85	115				
Barium	1.042	0.0030	1.000	0	104	85	115				
Beryllium	1.028	0.0030	1.000	0	103	85	115				
Cadmium	1.021	0.0030	1.000	0	102	85	115				
Chromium	0.943	0.0030	1.000	0	94.3	85	115				
Cobalt	1.039	0.0030	1.000	0	104	85	115				
Copper	1.039	0.0050	1.000	0	104	85	115				
Lead	1.069	0.0050	1.000	0	107	85	115				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_W

Sample ID: **LCS-54486** SampType: **LCS** TestCode: **6010_W** Units: **mg/L** Prep Date: **4/2/2009** RunNo: **107800**
Client ID: **LCSW** Batch ID: **54486** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **4/3/2009** SeqNo: **1690129**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	1.014	0.0050	1.000	0	101	85	115				
Nickel	1.004	0.0050	1.000	0	100	85	115				
Selenium	0.972	0.010	1.000	0	97.2	85	115				
Silver	1.008	0.0030	1.000	0	101	85	115				
Thallium	0.918	0.015	1.000	0	91.8	85	115				
Vanadium	1.041	0.0030	1.000	0	104	85	115				
Zinc	1.040	0.010	1.000	0.006200	103	85	115				

Sample ID: **104767-001BDUP** SampType: **DUP** TestCode: **6010_W** Units: **mg/L** Prep Date: **4/2/2009** RunNo: **107800**
Client ID: **ZZZZZZ** Batch ID: **54486** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **4/3/2009** SeqNo: **1690131**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	0.0050						0	0	20	
Arsenic	ND	0.010						0	0	20	
Barium	0.008	0.0030						0.008064	3.02	20	
Beryllium	ND	0.0030						0	0	20	
Cadmium	ND	0.0030						0	0	20	
Chromium	0.002	0.0030						0.001717	0	20	
Cobalt	ND	0.0030						0	0	20	
Copper	ND	0.0050						0	0	20	
Lead	ND	0.0050						0	0	20	
Molybdenum	ND	0.0050						0	0	20	
Nickel	0.002	0.0050						0.001748	0	20	
Selenium	ND	0.010						0	0	20	
Silver	ND	0.0030						0	0	20	
Thallium	ND	0.015						0	0	20	
Vanadium	0.004	0.0030						0.004362	2.07	20	
Zinc	0.037	0.010						0.02512	37.3	20	R

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_W

Sample ID: **104804-001CMS** SampType: **MS** TestCode: **6010_W** Units: **mg/L** Prep Date: **4/2/2009** RunNo: **107800**
Client ID: **ZZZZZZ** Batch ID: **54486** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **4/3/2009** SeqNo: **1690140**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	2.475	0.0050	2.500	0	99.0	64	130				
Arsenic	2.494	0.010	2.500	0	99.8	66	128				
Barium	2.530	0.0030	2.500	0.01465	101	60	129				
Beryllium	2.516	0.0030	2.500	0	101	77	118				
Cadmium	2.531	0.0030	2.500	0	101	72	122				
Chromium	2.396	0.0030	2.500	0.008227	95.5	77	116				
Cobalt	2.545	0.0030	2.500	0.009174	101	66	124				
Copper	2.784	0.0050	2.500	0.01163	111	70	130				
Lead	2.622	0.0050	2.500	0	105	71	121				
Molybdenum	6.641	0.0050	2.500	4.151	99.6	64	129				
Nickel	2.728	0.0050	2.500	0.2206	100	63	125				
Selenium	2.530	0.010	2.500	0.005410	101	73	124				
Silver	2.615	0.0030	2.500	0	105	60	138				
Thallium	2.329	0.015	2.500	0.02336	92.2	66	125				
Vanadium	2.624	0.0030	2.500	0.04744	103	79	118				
Zinc	2.601	0.010	2.500	0.08484	101	71	120				

Sample ID: **104804-001CMSD** SampType: **MSD** TestCode: **6010_W** Units: **mg/L** Prep Date: **4/2/2009** RunNo: **107800**
Client ID: **ZZZZZZ** Batch ID: **54486** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **4/3/2009** SeqNo: **1690141**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	2.639	0.0050	2.500	0	106	64	130	2.475	6.43	20	
Arsenic	2.642	0.010	2.500	0	106	66	128	2.494	5.73	20	
Barium	2.661	0.0030	2.500	0.01465	106	60	129	2.530	5.06	20	
Beryllium	2.676	0.0030	2.500	0	107	77	118	2.516	6.17	20	
Cadmium	2.660	0.0030	2.500	0	106	72	122	2.531	4.98	20	
Chromium	2.534	0.0030	2.500	0.008227	101	77	116	2.396	5.58	20	
Cobalt	2.678	0.0030	2.500	0.009174	107	66	124	2.545	5.09	20	
Copper	2.944	0.0050	2.500	0.01163	117	70	130	2.784	5.60	20	
Lead	2.783	0.0050	2.500	0	111	71	121	2.622	5.94	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_W

Sample ID: **104804-001CMSD** SampType: **MSD** TestCode: **6010_W** Units: **mg/L** Prep Date: **4/2/2009** RunNo: **107800**
Client ID: **ZZZZZZ** Batch ID: **54486** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **4/3/2009** SeqNo: **1690141**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	6.881	0.0050	2.500	4.151	109	64	129	6.641	3.56	20	
Nickel	2.870	0.0050	2.500	0.2206	106	63	125	2.728	5.09	20	
Selenium	2.674	0.010	2.500	0.005410	107	73	124	2.530	5.56	20	
Silver	2.764	0.0030	2.500	0	111	60	138	2.615	5.57	20	
Thallium	2.468	0.015	2.500	0.02336	97.8	66	125	2.329	5.79	20	
Vanadium	2.772	0.0030	2.500	0.04744	109	79	118	2.624	5.49	20	
Zinc	2.737	0.010	2.500	0.08484	106	71	120	2.601	5.12	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 7470_W

Sample ID: **MB-54480**	SampType: **MBLK**	TestCode: **7470_W**	Units: **µg/L**	Prep Date: **4/2/2009**	RunNo: **107805**
Client ID: **PBW**	Batch ID: **54480**	TestNo: **EPA 7470A**		Analysis Date: **4/3/2009**	SeqNo: **1690209**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.20									

Sample ID: **LCS-54480**	SampType: **LCS**	TestCode: **7470_W**	Units: **µg/L**	Prep Date: **4/2/2009**	RunNo: **107805**
Client ID: **LCSW**	Batch ID: **54480**	TestNo: **EPA 7470A**		Analysis Date: **4/3/2009**	SeqNo: **1690210**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	10.464	0.20	10.00	0	105	85	115				

Sample ID: **104804-001C-MS**	SampType: **MS**	TestCode: **7470_W**	Units: **µg/L**	Prep Date: **4/2/2009**	RunNo: **107805**
Client ID: **ZZZZZZ**	Batch ID: **54480**	TestNo: **EPA 7470A**		Analysis Date: **4/3/2009**	SeqNo: **1690211**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	10.195	0.20	10.00	0	102	70	130				

Sample ID: **104804-001C-MSD**	SampType: **MSD**	TestCode: **7470_W**	Units: **µg/L**	Prep Date: **4/2/2009**	RunNo: **107805**
Client ID: **ZZZZZZ**	Batch ID: **54480**	TestNo: **EPA 7470A**		Analysis Date: **4/3/2009**	SeqNo: **1690212**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	10.244	0.20	10.00	0	102	70	130	10.20	0.473	20	

Sample ID: **104804-001C-DUP**	SampType: **DUP**	TestCode: **7470_W**	Units: **µg/L**	Prep Date: **4/2/2009**	RunNo: **107805**
Client ID: **ZZZZZZ**	Batch ID: **54480**	TestNo: **EPA 7470A**		Analysis Date: **4/3/2009**	SeqNo: **1690214**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.20						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 7471_S

Sample ID: **MB-54466** SampType: **MBLK** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **4/2/2009** RunNo: **107740**
Client ID: **PBS** Batch ID: **54466** TestNo: **EPA 7471A** Analysis Date: **4/2/2009** SeqNo: **1689249**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.10									

Sample ID: **LCS-54466** SampType: **LCS** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **4/2/2009** RunNo: **107740**
Client ID: **LCSS** Batch ID: **54466** TestNo: **EPA 7471A** Analysis Date: **4/2/2009** SeqNo: **1689250**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.892	0.10	0.8300	0	107	80	120				

Sample ID: **104787-014A-MS** SampType: **MS** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **4/2/2009** RunNo: **107740**
Client ID: **W5A (15')** Batch ID: **54466** TestNo: **EPA 7471A** Analysis Date: **4/2/2009** SeqNo: **1689251**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.883	0.10	0.8300	0.04951	100	70	130				

Sample ID: **104787-014A-MSD** SampType: **MSD** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **4/2/2009** RunNo: **107740**
Client ID: **W5A (15')** Batch ID: **54466** TestNo: **EPA 7471A** Analysis Date: **4/2/2009** SeqNo: **1689252**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.857	0.10	0.8300	0.04951	97.3	70	130	0.8827	2.91	20	

Sample ID: **104787-014A-DUP** SampType: **DUP** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **4/2/2009** RunNo: **107740**
Client ID: **W5A (15')** Batch ID: **54466** TestNo: **EPA 7471A** Analysis Date: **4/2/2009** SeqNo: **1689254**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.050	0.10						0.04951	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_S_DM LLSGT

Sample ID: **MB-54475** SampType: **MBLK** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **4/2/2009** RunNo: **107798**
Client ID: **PBS** Batch ID: **54475** TestNo: **EPA 8015B(M** **EPA 3550B** Analysis Date: **4/2/2009** SeqNo: **1690097**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	ND	1.0									
ORO	ND	1.0									
Surr: p-Terphenyl	1.686		2.670		63.1	30	130				

Sample ID: **LCS-54475** SampType: **LCS** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **4/2/2009** RunNo: **107798**
Client ID: **LCSS** Batch ID: **54475** TestNo: **EPA 8015B(M** **EPA 3550B** Analysis Date: **4/2/2009** SeqNo: **1690098**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	21.011	1.0	33.00	0	63.7	35	124				
Surr: p-Terphenyl	2.039		2.670		76.4	30	130				

Sample ID: **104786-004AMS** SampType: **MS** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **4/2/2009** RunNo: **107798**
Client ID: **ZZZZZZ** Batch ID: **54475** TestNo: **EPA 8015B(M** **EPA 3550B** Analysis Date: **4/2/2009** SeqNo: **1690099**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	16.965	1.0	33.00	0	51.4	12	125				
Surr: p-Terphenyl	1.442		2.670		54.0	30	130				

Sample ID: **104786-004AMSD** SampType: **MSD** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **4/2/2009** RunNo: **107798**
Client ID: **ZZZZZZ** Batch ID: **54475** TestNo: **EPA 8015B(M** **EPA 3550B** Analysis Date: **4/2/2009** SeqNo: **1690100**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	20.397	1.0	33.00	0	61.8	12	125	16.96	18.4	20	
Surr: p-Terphenyl	1.647		2.670		61.7	30	130		0	0	

Sample ID: **104786-004ADUP** SampType: **DUP** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **4/2/2009** RunNo: **107798**
Client ID: **ZZZZZZ** Batch ID: **54475** TestNo: **EPA 8015B(M** **EPA 3550B** Analysis Date: **4/2/2009** SeqNo: **1690101**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_S_DM LLSGT

Sample ID: **104786-004ADUP** SampType: **DUP** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **4/2/2009** RunNo: **107798**
Client ID: **ZZZZZZ** Batch ID: **54475** TestNo: **EPA 8015B(M EPA 3550B** Analysis Date: **4/2/2009** SeqNo: **1690101**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	ND	1.0						0	0	20	
ORO	ND	1.0						0	0	20	
Surr: p-Terphenyl	1.329		2.670		49.8	30	130		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_S_DM LLSGT

Sample ID: **MB-54477** SampType: **MBLK** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **4/2/2009** RunNo: **107855**
Client ID: **PBS** Batch ID: **54477** TestNo: **EPA 8015B(M** **EPA 3550B** Analysis Date: **4/3/2009** SeqNo: **1691200**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	ND	1.0									
ORO	ND	1.0									
Surr: p-Terphenyl	1.898		2.670		71.1	30	130				

Sample ID: **LCS-54477** SampType: **LCS** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **4/2/2009** RunNo: **107855**
Client ID: **LCSS** Batch ID: **54477** TestNo: **EPA 8015B(M** **EPA 3550B** Analysis Date: **4/3/2009** SeqNo: **1691201**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	19.214	1.0	33.00	0	58.2	35	124				
Surr: p-Terphenyl	1.362		2.670		51.0	30	130				

Sample ID: **104787-005ADUP** SampType: **DUP** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **4/2/2009** RunNo: **107855**
Client ID: **W10AGW (10')** Batch ID: **54477** TestNo: **EPA 8015B(M** **EPA 3550B** Analysis Date: **4/3/2009** SeqNo: **1691208**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	ND	1.0						2.471	0	20	
ORO	2.747	1.0						5.617	68.6	20	R
Surr: p-Terphenyl	1.590		2.670		59.6	30	130		0	0	

Sample ID: **104787-005AMS** SampType: **MS** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **4/2/2009** RunNo: **107855**
Client ID: **W10AGW (10')** Batch ID: **54477** TestNo: **EPA 8015B(M** **EPA 3550B** Analysis Date: **4/3/2009** SeqNo: **1691210**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	19.663	1.0	33.00	2.471	52.1	12	125				
Surr: p-Terphenyl	1.437		2.670		53.8	30	130				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_S_DM LLSGT

Sample ID: **104787-005AMSD** SampType: **MSD** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **4/2/2009** RunNo: **107855**
Client ID: **W10AGW (10')** Batch ID: **54477** TestNo: **EPA 8015B(M EPA 3550B** Analysis Date: **4/3/2009** SeqNo: **1691211**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	18.564	1.0	33.00	2.471	48.8	12	125	19.66	5.75	20	
Surr: p-Terphenyl	1.267		2.670		47.4	30	130		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_W_DM_LLSGT

Sample ID: **MB-54441**	SampType: **MBLK**	TestCode: **8015_W_DM_**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107742**
Client ID: **PBW**	Batch ID: **54441**	TestNo: **EPA 8015B**	**EPA 3510C**	Analysis Date: **4/1/2009**	SeqNo: **1689309**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	ND	0.050									
ORO	ND	0.050									
Surr: p-Terphenyl	0.067		0.08000		84.3	35	131				

Sample ID: **LCS-54441**	SampType: **LCS**	TestCode: **8015_W_DM_**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107742**
Client ID: **LCSW**	Batch ID: **54441**	TestNo: **EPA 8015B**	**EPA 3510C**	Analysis Date: **4/1/2009**	SeqNo: **1689310**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	0.759	0.050	1.000	0	75.9	42	118				
Surr: p-Terphenyl	0.044		0.08000		54.9	35	131				

Sample ID: **MB-54441-MS**	SampType: **MS**	TestCode: **8015_W_DM_**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107742**
Client ID: **ZZZZZZ**	Batch ID: **54441**	TestNo: **EPA 8015B**	**EPA 3510C**	Analysis Date: **4/1/2009**	SeqNo: **1689311**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	0.755	0.050	1.000	0	75.4	42	118				
Surr: p-Terphenyl	0.046		0.08000		57.2	35	131				

Sample ID: **MB-54441-MSD**	SampType: **MSD**	TestCode: **8015_W_DM_**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107742**
Client ID: **ZZZZZZ**	Batch ID: **54441**	TestNo: **EPA 8015B**	**EPA 3510C**	Analysis Date: **4/1/2009**	SeqNo: **1689312**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	0.756	0.050	1.000	0	75.6	42	118	0.7545	0.246	20	
Surr: p-Terphenyl	0.044		0.08000		55.2	35	131		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_W_GP LL

Sample ID: **D090330LCS2** SampType: **LCS** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107628**
Client ID: **LCSW** Batch ID: **D09VW048** TestNo: **EPA 8015B(M** Analysis Date: **3/30/2009** SeqNo: **1686946**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	0.708	0.050	1.000	0	70.8	69	125				
Surr: Bromofluorobenzene (FID)	99.005		100.0		99.0	71	130				

Sample ID: **D090330MB2** SampType: **MBLK** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107628**
Client ID: **PBW** Batch ID: **D09VW048** TestNo: **EPA 8015B(M** Analysis Date: **3/30/2009** SeqNo: **1686947**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	ND	0.050									
Surr: Bromofluorobenzene (FID)	86.532		100.0		86.5	71	130				

Sample ID: **104765-002ADUP** SampType: **DUP** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107628**
Client ID: **ZZZZZZ** Batch ID: **D09VW048** TestNo: **EPA 8015B(M** Analysis Date: **3/30/2009** SeqNo: **1686949**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	ND	0.050						0	0	20	
Surr: Bromofluorobenzene (FID)	99.346		100.0		99.3	71	130		0	0	

Sample ID: **104765-001AMS** SampType: **MS** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107628**
Client ID: **ZZZZZZ** Batch ID: **D09VW048** TestNo: **EPA 8015B(M** Analysis Date: **3/30/2009** SeqNo: **1686951**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	1.016	0.050	1.000	0	102	69	125				
Surr: Bromofluorobenzene (FID)	107.152		100.0		107	71	130				

Sample ID: **104765-001AMSD** SampType: **MSD** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107628**
Client ID: **ZZZZZZ** Batch ID: **D09VW048** TestNo: **EPA 8015B(M** Analysis Date: **3/30/2009** SeqNo: **1686952**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	1.012	0.050	1.000	0	101	69	125	1.016	0.394	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_W_GP LL

Sample ID: **104765-001AMSD** SampType: **MSD** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107628**
Client ID: **ZZZZZZ** Batch ID: **D09VW048** TestNo: **EPA 8015B(M** Analysis Date: **3/30/2009** SeqNo: **1686952**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Bromofluorobenzene (FID)	105.693		100.0		106	71	130		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_W_GP LL

Sample ID: **D090401LCS2** SampType: **LCS** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107737**
Client ID: **LCSW** Batch ID: **D09VW051** TestNo: **EPA 8015B(M** Analysis Date: **4/1/2009** SeqNo: **1689088**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	0.816	0.050	1.000	0	81.6	69	125				
Surr: Bromofluorobenzene (FID)	98.382		100.0		98.4	71	130				

Sample ID: **D090401MB2MS** SampType: **MS** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107737**
Client ID: **ZZZZZZ** Batch ID: **D09VW051** TestNo: **EPA 8015B(M** Analysis Date: **4/1/2009** SeqNo: **1689089**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	0.875	0.050	1.000	0	87.5	69	125				
Surr: Bromofluorobenzene (FID)	101.250		100.0		101	71	130				

Sample ID: **D090401MB2MSD** SampType: **MSD** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107737**
Client ID: **ZZZZZZ** Batch ID: **D09VW051** TestNo: **EPA 8015B(M** Analysis Date: **4/1/2009** SeqNo: **1689090**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	0.856	0.050	1.000	0	85.6	69	125	0.8750	2.20	20	
Surr: Bromofluorobenzene (FID)	92.860		100.0		92.9	71	130		0	0	

Sample ID: **D090401MB2** SampType: **MBLK** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107737**
Client ID: **PBW** Batch ID: **D09VW051** TestNo: **EPA 8015B(M** Analysis Date: **4/1/2009** SeqNo: **1689091**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	ND	0.050									
Surr: Bromofluorobenzene (FID)	104.859		100.0		105	71	130				

Sample ID: **104788-001BDUP** SampType: **DUP** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107737**
Client ID: **ZZZZZZ** Batch ID: **D09VW051** TestNo: **EPA 8015B(M** Analysis Date: **4/1/2009** SeqNo: **1689103**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	ND	0.050						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_W_GP LL

Sample ID: **104788-001BDUP** SampType: **DUP** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107737**
Client ID: **ZZZZZZ** Batch ID: **D09VW051** TestNo: **EPA 8015B(M** Analysis Date: **4/1/2009** SeqNo: **1689103**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Bromofluorobenzene (FID)	87.074		100.0		87.1	71	130		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **A090331LCS1** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107703**
Client ID: **LCSW** Batch ID: **A09VW063** TestNo: **EPA 8260B** Analysis Date: **3/31/2009** SeqNo: **1688360**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	17.970	0.50	20.00	0	89.8	70	130				
Benzene	37.200	0.50	40.00	0	93.0	70	130				
Chlorobenzene	20.240	0.50	20.00	0	101	70	130				
MTBE	18.900	0.50	20.00	0	94.5	70	130				
Toluene	38.060	0.50	40.00	0	95.2	70	130				
Trichloroethene	18.910	0.50	20.00	0	94.6	70	130				
Surr: 1,2-Dichloroethane-d4	20.810		25.00		83.2	70	130				
Surr: 4-Bromofluorobenzene	20.760		25.00		83.0	70	130				
Surr: Dibromofluoromethane	21.490		25.00		86.0	70	130				
Surr: Toluene-d8	22.410		25.00		89.6	70	130				

Sample ID: **A090331MB2MS** SampType: **MS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107703**
Client ID: **ZZZZZZ** Batch ID: **A09VW063** TestNo: **EPA 8260B** Analysis Date: **3/31/2009** SeqNo: **1688362**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	16.320	0.50	20.00	0	81.6	70	130				
Benzene	36.480	0.50	40.00	0	91.2	70	130				
Chlorobenzene	20.180	0.50	20.00	0	101	70	130				
Toluene	37.230	0.50	40.00	0	93.1	70	130				
Trichloroethene	18.260	0.50	20.00	0	91.3	70	130				
Surr: 1,2-Dichloroethane-d4	21.070		25.00		84.3	70	130				
Surr: 4-Bromofluorobenzene	20.600		25.00		82.4	70	130				
Surr: Dibromofluoromethane	21.380		25.00		85.5	70	130				
Surr: Toluene-d8	22.260		25.00		89.0	70	130				

Sample ID: **A090331MB2MSD** SampType: **MSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107703**
Client ID: **ZZZZZZ** Batch ID: **A09VW063** TestNo: **EPA 8260B** Analysis Date: **3/31/2009** SeqNo: **1688363**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	17.050	0.50	20.00	0	85.2	70	130	16.32	4.38	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **A090331MB2MSD** SampType: **MSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107703**
Client ID: **ZZZZZZ** Batch ID: **A09VW063** TestNo: **EPA 8260B** Analysis Date: **3/31/2009** SeqNo: **1688363**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	37.260	0.50	40.00	0	93.2	70	130	36.48	2.12	20	
Chlorobenzene	20.720	0.50	20.00	0	104	70	130	20.18	2.64	20	
Toluene	38.460	0.50	40.00	0	96.2	70	130	37.23	3.25	20	
Trichloroethene	18.890	0.50	20.00	0	94.4	70	130	18.26	3.39	20	
Surr: 1,2-Dichloroethane-d4	20.460		25.00		81.8	70	130		0	20	
Surr: 4-Bromofluorobenzene	20.030		25.00		80.1	70	130		0	20	
Surr: Dibromofluoromethane	20.590		25.00		82.4	70	130		0	20	
Surr: Toluene-d8	21.490		25.00		86.0	70	130		0	20	

Sample ID: **A090331MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107703**
Client ID: **PBW** Batch ID: **A09VW063** TestNo: **EPA 8260B** Analysis Date: **3/31/2009** SeqNo: **1688364**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	0.50									
1,1,1-Trichloroethane	ND	0.50									
1,1,2,2-Tetrachloroethane	ND	0.50									
1,1,2-Trichloroethane	ND	0.50									
1,1-Dichloroethane	ND	0.50									
1,1-Dichloroethene	ND	0.50									
1,1-Dichloropropene	ND	0.50									
1,2,3-Trichlorobenzene	ND	0.50									
1,2,3-Trichloropropane	ND	0.50									
1,2,4-Trichlorobenzene	ND	0.50									
1,2,4-Trimethylbenzene	ND	0.50									
1,2-Dibromo-3-chloropropane	ND	0.50									
1,2-Dibromoethane	ND	0.50									
1,2-Dichlorobenzene	ND	0.50									
1,2-Dichloroethane	ND	0.50									
1,2-Dichloropropane	ND	0.50									
1,3,5-Trimethylbenzene	ND	0.50									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **A090331MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107703**
Client ID: **PBW** Batch ID: **A09VW063** TestNo: **EPA 8260B** Analysis Date: **3/31/2009** SeqNo: **1688364**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,3-Dichlorobenzene	ND	0.50									
1,3-Dichloropropane	ND	0.50									
1,4-Dichlorobenzene	ND	0.50									
2,2-Dichloropropane	ND	0.50									
2-Chlorotoluene	ND	0.50									
4-Chlorotoluene	ND	0.50									
4-Isopropyltoluene	ND	0.50									
Benzene	ND	0.50									
Bromobenzene	ND	0.50									
Bromodichloromethane	ND	0.50									
Bromoform	ND	0.50									
Bromomethane	ND	0.50									
Carbon tetrachloride	ND	0.50									
Chlorobenzene	ND	0.50									
Chloroethane	ND	0.50									
Chloroform	ND	0.50									
Chloromethane	ND	0.50									
cis-1,2-Dichloroethene	ND	0.50									
cis-1,3-Dichloropropene	ND	0.50									
Dibromochloromethane	ND	0.50									
Dibromomethane	ND	0.50									
Dichlorodifluoromethane	ND	0.50									
Ethylbenzene	ND	0.50									
Hexachlorobutadiene	ND	0.50									
Isopropylbenzene	ND	0.50									
m,p-Xylene	ND	1.0									
Methylene chloride	ND	1.0									
n-Butylbenzene	ND	0.50									
n-Propylbenzene	ND	0.50									
Naphthalene	ND	0.50									

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits

Calculations are based on raw values

- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **A090331MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107703**
Client ID: **PBW** Batch ID: **A09VW063** TestNo: **EPA 8260B** Analysis Date: **3/31/2009** SeqNo: **1688364**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
o-Xylene	ND	0.50									
sec-Butylbenzene	ND	0.50									
Styrene	ND	0.50									
tert-Butylbenzene	ND	0.50									
Tetrachloroethene	ND	0.50									
Toluene	ND	0.50									
trans-1,2-Dichloroethene	ND	0.50									
Trichloroethene	ND	0.50									
Trichlorofluoromethane	ND	0.50									
Vinyl chloride	ND	0.50									
Surr: 1,2-Dichloroethane-d4	21.930		25.00		87.7	70	130				
Surr: 4-Bromofluorobenzene	22.010		25.00		88.0	70	130				
Surr: Dibromofluoromethane	23.720		25.00		94.9	70	130				
Surr: Toluene-d8	25.310		25.00		101	70	130				

Sample ID: **104789-001A** SampType: **DUP** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107703**
Client ID: **ZZZZZZ** Batch ID: **A09VW063** TestNo: **EPA 8260B** Analysis Date: **3/31/2009** SeqNo: **1688379**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	0.50						0	0	20	
1,1,1-Trichloroethane	ND	0.50						0	0	20	
1,1,2,2-Tetrachloroethane	ND	0.50						0	0	20	
1,1,2-Trichloroethane	ND	0.50						0	0	20	
1,1-Dichloroethane	ND	0.50						0	0	20	
1,1-Dichloroethene	ND	0.50						0	0	20	
1,1-Dichloropropene	ND	0.50						0	0	20	
1,2,3-Trichlorobenzene	ND	0.50						0	0	20	
1,2,3-Trichloropropane	ND	0.50						0	0	20	
1,2,4-Trichlorobenzene	ND	0.50						0	0	20	
1,2,4-Trimethylbenzene	ND	0.50						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **104789-001A** SampType: **DUP** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107703**
Client ID: **ZZZZZZ** Batch ID: **A09VW063** TestNo: **EPA 8260B** Analysis Date: **3/31/2009** SeqNo: **1688379**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2-Dibromo-3-chloropropane	ND	0.50						0	0	20	
1,2-Dibromoethane	ND	0.50						0	0	20	
1,2-Dichlorobenzene	ND	0.50						0	0	20	
1,2-Dichloroethane	ND	0.50						0	0	20	
1,2-Dichloropropane	ND	0.50						0	0	20	
1,3,5-Trimethylbenzene	ND	0.50						0	0	20	
1,3-Dichlorobenzene	ND	0.50						0	0	20	
1,3-Dichloropropane	ND	0.50						0	0	20	
1,4-Dichlorobenzene	ND	0.50						0	0	20	
2,2-Dichloropropane	ND	0.50						0	0	20	
2-Chlorotoluene	ND	0.50						0	0	20	
4-Chlorotoluene	ND	0.50						0	0	20	
4-Isopropyltoluene	ND	0.50						0	0	20	
Benzene	ND	0.50						0	0	20	
Bromobenzene	ND	0.50						0	0	20	
Bromodichloromethane	ND	0.50						0	0	20	
Bromoform	ND	0.50						0	0	20	
Bromomethane	ND	0.50						0	0	20	
Carbon tetrachloride	ND	0.50						0	0	20	
Chlorobenzene	ND	0.50						0	0	20	
Chloroethane	ND	0.50						0	0	20	
Chloroform	ND	0.50						0	0	20	
Chloromethane	0.580	0.50						0.5600	3.51	20	
cis-1,2-Dichloroethene	ND	0.50						0	0	20	
cis-1,3-Dichloropropene	ND	0.50						0	0	20	
Dibromochloromethane	ND	0.50						0	0	20	
Dibromomethane	ND	0.50						0	0	20	
Dichlorodifluoromethane	ND	0.50						0	0	20	
Ethylbenzene	ND	0.50						0	0	20	
Hexachlorobutadiene	ND	0.50						0	0	20	

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike/Surrogate outside of limits due to matrix interference
- DO Surrogate Diluted Out

Calculations are based on raw values

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **104789-001A** SampType: **DUP** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107703**
Client ID: **ZZZZZZ** Batch ID: **A09VW063** TestNo: **EPA 8260B** Analysis Date: **3/31/2009** SeqNo: **1688379**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Isopropylbenzene	ND	0.50						0	0	20	
m,p-Xylene	ND	1.0						0	0	20	
Methylene chloride	ND	1.0						0	0	20	
n-Butylbenzene	ND	0.50						0	0	20	
n-Propylbenzene	ND	0.50						0	0	20	
Naphthalene	ND	0.50						0	0	20	
o-Xylene	ND	0.50						0	0	20	
sec-Butylbenzene	ND	0.50						0	0	20	
Styrene	ND	0.50						0	0	20	
tert-Butylbenzene	ND	0.50						0	0	20	
Tetrachloroethene	ND	0.50						0	0	20	
Toluene	ND	0.50						0	0	20	
trans-1,2-Dichloroethene	ND	0.50						0	0	20	
Trichloroethene	ND	0.50						0	0	20	
Trichlorofluoromethane	ND	0.50						0	0	20	
Vinyl chloride	ND	0.50						0	0	20	
Surr: 1,2-Dichloroethane-d4	24.130		25.00		96.5	70	130		0	0	
Surr: 4-Bromofluorobenzene	21.800		25.00		87.2	70	130		0	0	
Surr: Dibromofluoromethane	24.930		25.00		99.7	70	130		0	0	
Surr: Toluene-d8	25.260		25.00		101	70	130		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-54432** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107715**
Client ID: **PBS** Batch ID: **54432** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1688692**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	330									
1,2-Dichlorobenzene	ND	330									
1,3-Dichlorobenzene	ND	330									
1,4-Dichlorobenzene	ND	330									
2,4,5-Trichlorophenol	ND	330									
2,4,6-Trichlorophenol	ND	330									
2,4-Dichlorophenol	ND	1600									
2,4-Dimethylphenol	ND	330									
2,4-Dinitrophenol	ND	1600									
2,4-Dinitrotoluene	ND	330									
2,6-Dinitrotoluene	ND	330									
2-Chloronaphthalene	ND	330									
2-Chlorophenol	ND	330									
2-Methylnaphthalene	ND	330									
2-Methylphenol	ND	330									
2-Nitroaniline	ND	1600									
2-Nitrophenol	ND	330									
3,3´-Dichlorobenzidine	ND	660									
3-Nitroaniline	ND	1600									
4,6-Dinitro-2-methylphenol	ND	1600									
4-Bromophenyl-phenylether	ND	330									
4-Chloro-3-methylphenol	ND	660									
4-Chloroaniline	ND	660									
4-Chlorophenyl-phenylether	ND	330									
4-Methylphenol	ND	330									
4-Nitroaniline	ND	1600									
4-Nitrophenol	ND	1600									
Acenaphthene	ND	330									
Acenaphthylene	ND	330									
Anthracene	ND	330									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-54432** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107715**
Client ID: **PBS** Batch ID: **54432** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1688692**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzidine (M)	ND	1600									
Benzo(a)anthracene	ND	330									
Benzo(a)pyrene	ND	330									
Benzo(b)fluoranthene	ND	330									
Benzo(g,h,i)perylene	ND	330									
Benzo(k)fluoranthene	ND	330									
Benzoic acid	ND	1600									
Benzyl alcohol	ND	660									
Bis(2-chloroethoxy)methane	ND	330									
Bis(2-chloroethyl)ether	ND	330									
Bis(2-chloroisopropyl)ether	ND	330									
Bis(2-ethylhexyl)phthalate	ND	330									
Butylbenzylphthalate	ND	330									
Chrysene	ND	330									
Di-n-butylphthalate	ND	330									
Di-n-octylphthalate	ND	330									
Dibenz(a,h)anthracene	ND	330									
Dibenzofuran	ND	330									
Diethylphthalate	ND	330									
Dimethylphthalate	ND	330									
Fluoranthene	ND	330									
Fluorene	ND	330									
Hexachlorobenzene	ND	330									
Hexachlorobutadiene	ND	660									
Hexachlorocyclopentadiene	ND	660									
Hexachloroethane	ND	330									
Indeno(1,2,3-cd)pyrene	ND	330									
Isophorone	ND	330									
N-Nitrosodi-n-propylamine	ND	330									
N-Nitrosodiphenylamine	ND	330									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-54432** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107715**
Client ID: **PBS** Batch ID: **54432** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1688692**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	330									
Nitrobenzene	ND	330									
Pentachlorophenol	ND	1600									
Phenanthrene	ND	330									
Phenol	ND	330									
Pyrene	ND	330									
Surr: 1,2-Dichlorobenzene-d4	2937.000		3330		88.2	49	103				
Surr: 2,4,6-Tribromophenol	3263.333		3330		98.0	47	129				
Surr: 2-Chlorophenol-d4	3053.333		3330		91.7	54	109				
Surr: 2-Fluorobiphenyl	3241.333		3330		97.3	59	108				
Surr: 2-Fluorophenol	3114.333		3330		93.5	50	111				
Surr: 4-Terphenyl-d14	4189.667		3330		126	58	135				
Surr: Nitrobenzene-d5	3134.333		3330		94.1	54	115				
Surr: Phenol-d5	3160.333		3330		94.9	58	112				

Sample ID: **LCS-54432** SampType: **LCS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107715**
Client ID: **LCSS** Batch ID: **54432** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1688693**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	3228.000	330	3330	0	96.9	61	107				
1,4-Dichlorobenzene	2879.667	330	3330	0	86.5	56	100				
2,4-Dinitrotoluene	3568.000	330	3330	0	107	72	130				
2-Chlorophenol	3269.000	330	3330	0	98.2	64	105				
4-Chloro-3-methylphenol	4122.667	660	3330	0	124	74	125				
4-Nitrophenol	4229.667	1600	3330	0	127	77	137				
Acenaphthene	3621.000	330	3330	0	109	63	117				
N-Nitrosodi-n-propylamine	3527.333	330	3330	0	106	71	121				
Pentachlorophenol	3336.333	1600	3330	0	100	69	125				
Phenol	3466.667	330	3330	0	104	67	111				
Pyrene	3484.667	330	3330	0	105	60	122				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **LCS-54432** SampType: **LCS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107715**
Client ID: **LCSS** Batch ID: **54432** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1688693**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 1,2-Dichlorobenzene-d4	2788.000		3330		83.7	49	103				
Surr: 2,4,6-Tribromophenol	3591.000		3330		108	47	129				
Surr: 2-Chlorophenol-d4	2986.000		3330		89.7	54	109				
Surr: 2-Fluorobiphenyl	3416.000		3330		103	59	108				
Surr: 2-Fluorophenol	2928.000		3330		87.9	50	111				
Surr: 4-Terphenyl-d14	3589.667		3330		108	58	135				
Surr: Nitrobenzene-d5	3160.667		3330		94.9	54	115				
Surr: Phenol-d5	3188.000		3330		95.7	58	112				

Sample ID: **104787-006AMS** SampType: **MS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107715**
Client ID: **W10AGW (15')** Batch ID: **54432** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1688694**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	3015.667	330	3330	0	90.6	60	105				
1,4-Dichlorobenzene	2643.333	330	3330	0	79.4	50	99				
2,4-Dinitrotoluene	3503.667	330	3330	0	105	70	130				
2-Chlorophenol	3233.000	330	3330	0	97.1	58	107				
4-Chloro-3-methylphenol	3920.000	660	3330	0	118	72	124				
4-Nitrophenol	4051.000	1600	3330	0	122	69	139				
Acenaphthene	3312.000	330	3330	0	99.5	59	118				
N-Nitrosodi-n-propylamine	3309.333	330	3330	0	99.4	61	125				
Pentachlorophenol	3177.000	1600	3330	0	95.4	56	131				
Phenol	3377.667	330	3330	0	101	60	113				
Pyrene	3438.333	330	3330	0	103	51	130				
Surr: 1,2-Dichlorobenzene-d4	2650.333		3330		79.6	49	103				
Surr: 2,4,6-Tribromophenol	3518.000		3330		106	47	129				
Surr: 2-Chlorophenol-d4	2979.333		3330		89.5	54	109				
Surr: 2-Fluorobiphenyl	3319.667		3330		99.7	59	108				
Surr: 2-Fluorophenol	2981.333		3330		89.5	50	111				
Surr: 4-Terphenyl-d14	3480.667		3330		105	58	135				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104787-006AMS**	SampType: **MS**	TestCode: **8270_S_FUL**	Units: **µg/Kg**	Prep Date: **4/1/2009**	RunNo: **107715**
Client ID: **W10AGW (15')**	Batch ID: **54432**	TestNo: **EPA 8270C**	**EPA 3550B**	Analysis Date: **4/1/2009**	SeqNo: **1688694**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	2966.333		3330		89.1	54	115				
Surr: Phenol-d5	3111.667		3330		93.4	58	112				

Sample ID: **104787-006AMSD**	SampType: **MSD**	TestCode: **8270_S_FUL**	Units: **µg/Kg**	Prep Date: **4/1/2009**	RunNo: **107715**
Client ID: **W10AGW (15')**	Batch ID: **54432**	TestNo: **EPA 8270C**	**EPA 3550B**	Analysis Date: **4/1/2009**	SeqNo: **1688695**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	3300.333	330	3330	0	99.1	60	105	3016	9.01	20	
1,4-Dichlorobenzene	3088.333	330	3330	0	92.7	50	99	2643	15.5	20	
2,4-Dinitrotoluene	3769.333	330	3330	0	113	70	130	3504	7.31	20	
2-Chlorophenol	3602.667	330	3330	0	108	58	107	3233	10.8	20	S
4-Chloro-3-methylphenol	4201.667	660	3330	0	126	72	124	3920	6.94	20	S
4-Nitrophenol	4315.667	1600	3330	0	130	69	139	4051	6.33	20	
Acenaphthene	3601.000	330	3330	0	108	59	118	3312	8.36	20	
N-Nitrosodi-n-propylamine	3631.667	330	3330	0	109	61	125	3309	9.29	20	
Pentachlorophenol	3409.333	1600	3330	0	102	56	131	3177	7.06	20	
Phenol	3750.333	330	3330	0	113	60	113	3378	10.5	20	
Pyrene	3672.000	330	3330	0	110	51	130	3438	6.57	20	
Surr: 1,2-Dichlorobenzene-d4	2951.667		3330		88.6	49	103		0	0	
Surr: 2,4,6-Tribromophenol	3774.333		3330		113	47	129		0	0	
Surr: 2-Chlorophenol-d4	3259.000		3330		97.9	54	109		0	0	
Surr: 2-Fluorobiphenyl	3536.667		3330		106	59	108		0	0	
Surr: 2-Fluorophenol	3291.667		3330		98.8	50	111		0	0	
Surr: 4-Terphenyl-d14	3679.667		3330		111	58	135		0	0	
Surr: Nitrobenzene-d5	3190.000		3330		95.8	54	115		0	0	
Surr: Phenol-d5	3414.000		3330		103	58	112		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104787-006ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107715**
Client ID: **W10AGW (15')** Batch ID: **54432** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1688696**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	330						0	0	20	
1,2-Dichlorobenzene	ND	330						0	0	20	
1,2-Diphenylhydrazine	ND	330						0	0	20	
1,3-Dichlorobenzene	ND	330						0	0	20	
1,4-Dichlorobenzene	ND	330						0	0	20	
1,4-Dioxane	ND	330						0	0	20	
2,4,5-Trichlorophenol	ND	330						0	0	20	
2,4,6-Trichlorophenol	ND	330						0	0	20	
2,4-Dichlorophenol	ND	1600						0	0	20	
2,4-Dimethylphenol	ND	330						0	0	20	
2,4-Dinitrophenol	ND	1600						0	0	20	
2,4-Dinitrotoluene	ND	330						0	0	20	
2,6-Dinitrotoluene	ND	330						0	0	20	
2-Chloronaphthalene	ND	330						0	0	20	
2-Chlorophenol	ND	330						0	0	20	
2-Methylnaphthalene	ND	330						0	0	20	
2-Methylphenol	ND	330						0	0	20	
2-Nitroaniline	ND	1600						0	0	20	
2-Nitrophenol	ND	330						0	0	20	
3,3´-Dichlorobenzidine	ND	660						0	0	20	
3-Nitroaniline	ND	1600						0	0	20	
4,6-Dinitro-2-methylphenol	ND	1600						0	0	20	
4-Bromophenyl-phenylether	ND	330						0	0	20	
4-Chloro-3-methylphenol	ND	660						0	0	20	
4-Chloroaniline	ND	660						0	0	20	
4-Chlorophenyl-phenylether	ND	330						0	0	20	
3/4-Methylphenol	ND	330						0	0	20	
4-Methylphenol	ND	330						0	0	20	
4-Nitroaniline	ND	1600						0	0	20	
4-Nitrophenol	ND	1600						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104787-006ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107715**
Client ID: **W10AGW (15')** Batch ID: **54432** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1688696**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acenaphthene	ND	330						0	0	20	
Acenaphthylene	ND	330						0	0	20	
Aniline	ND	330						0	0	20	
Anthracene	ND	330						0	0	20	
Benzidine (M)	ND	1600						0	0	20	
Benzo(a)anthracene	ND	330						0	0	20	
Benzo(a)pyrene	ND	330						0	0	20	
Benzo(b)fluoranthene	ND	330						0	0	20	
Benzo(g,h,i)perylene	ND	330						0	0	20	
Benzo(k)fluoranthene	ND	330						0	0	20	
Benzoic acid	ND	1600						0	0	20	
Benzyl alcohol	ND	660						0	0	20	
Bis(2-chloroethoxy)methane	ND	330						0	0	20	
Bis(2-chloroethyl)ether	ND	330						0	0	20	
Bis(2-chloroisopropyl)ether	ND	330						0	0	20	
Bis(2-ethylhexyl)phthalate	ND	330						0	0	20	
Butylbenzylphthalate	ND	330						0	0	20	
Carbazole	ND	330						0	0	20	
Chrysene	ND	330						0	0	20	
Di-n-butylphthalate	ND	330						0	0	20	
Di-n-octylphthalate	ND	330						0	0	20	
Dibenz(a,h)anthracene	ND	330						0	0	20	
Dibenzofuran	ND	330						0	0	20	
Diethylphthalate	ND	330						0	0	20	
Dimethylphthalate	ND	330						0	0	20	
Fluoranthene	ND	330						0	0	20	
Fluorene	ND	330						0	0	20	
Hexachlorobenzene	ND	330						0	0	20	
Hexachlorobutadiene	ND	660						0	0	20	
Hexachlorocyclopentadiene	ND	660						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104787-006ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107715**
Client ID: **W10AGW (15')** Batch ID: **54432** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1688696**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Hexachloroethane	ND	330						0	0	20	
Indeno(1,2,3-cd)pyrene	ND	330						0	0	20	
Isophorone	ND	330						0	0	20	
N-Nitrosodi-n-propylamine	ND	330						0	0	20	
N-Nitrosodimethylamine	ND	330						0	0	20	
N-Nitrosodiphenylamine	ND	330						0	0	20	
Naphthalene	ND	330						0	0	20	
Nitrobenzene	ND	330						0	0	20	
Pentachlorophenol	ND	1600						0	0	20	
Phenanthrene	ND	330						0	0	20	
Phenol	ND	330						0	0	20	
Pyrene	ND	330						0	0	20	
Pyridine	ND	1600						0	0	20	
Surr: 1,2-Dichlorobenzene-d4	2779.000		3330		83.5	49	103		0	0	
Surr: 2,4,6-Tribromophenol	3428.000		3330		103	47	129		0	0	
Surr: 2-Chlorophenol-d4	2951.000		3330		88.6	54	109		0	0	
Surr: 2-Fluorobiphenyl	3214.333		3330		96.5	59	108		0	0	
Surr: 2-Fluorophenol	3017.333		3330		90.6	50	111		0	0	
Surr: 4-Terphenyl-d14	4234.333		3330		127	58	135		0	0	
Surr: Nitrobenzene-d5	2973.667		3330		89.3	54	115		0	0	
Surr: Phenol-d5	3116.667		3330		93.6	58	112		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-54445** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107754**
Client ID: **PBS** Batch ID: **54445** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1689446**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	330									
1,2-Dichlorobenzene	ND	330									
1,3-Dichlorobenzene	ND	330									
1,4-Dichlorobenzene	ND	330									
2,4,5-Trichlorophenol	ND	330									
2,4,6-Trichlorophenol	ND	330									
2,4-Dichlorophenol	ND	1600									
2,4-Dimethylphenol	ND	330									
2,4-Dinitrophenol	ND	1600									
2,4-Dinitrotoluene	ND	330									
2,6-Dinitrotoluene	ND	330									
2-Chloronaphthalene	ND	330									
2-Chlorophenol	ND	330									
2-Methylnaphthalene	ND	330									
2-Methylphenol	ND	330									
2-Nitroaniline	ND	1600									
2-Nitrophenol	ND	330									
3,3´-Dichlorobenzidine	ND	660									
3-Nitroaniline	ND	1600									
4,6-Dinitro-2-methylphenol	ND	1600									
4-Bromophenyl-phenylether	ND	330									
4-Chloro-3-methylphenol	ND	660									
4-Chloroaniline	ND	660									
4-Chlorophenyl-phenylether	ND	330									
4-Methylphenol	ND	330									
4-Nitroaniline	ND	1600									
4-Nitrophenol	ND	1600									
Acenaphthene	ND	330									
Acenaphthylene	ND	330									
Anthracene	ND	330									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-54445** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107754**
Client ID: **PBS** Batch ID: **54445** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1689446**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzidine (M)	ND	1600									
Benzo(a)anthracene	ND	330									
Benzo(a)pyrene	ND	330									
Benzo(b)fluoranthene	ND	330									
Benzo(g,h,i)perylene	ND	330									
Benzo(k)fluoranthene	ND	330									
Benzoic acid	ND	1600									
Benzyl alcohol	ND	660									
Bis(2-chloroethoxy)methane	ND	330									
Bis(2-chloroethyl)ether	ND	330									
Bis(2-chloroisopropyl)ether	ND	330									
Bis(2-ethylhexyl)phthalate	ND	330									
Butylbenzylphthalate	ND	330									
Chrysene	ND	330									
Di-n-butylphthalate	ND	330									
Di-n-octylphthalate	ND	330									
Dibenz(a,h)anthracene	ND	330									
Dibenzofuran	ND	330									
Diethylphthalate	ND	330									
Dimethylphthalate	ND	330									
Fluoranthene	ND	330									
Fluorene	ND	330									
Hexachlorobenzene	ND	330									
Hexachlorobutadiene	ND	660									
Hexachlorocyclopentadiene	ND	660									
Hexachloroethane	ND	330									
Indeno(1,2,3-cd)pyrene	ND	330									
Isophorone	ND	330									
N-Nitrosodi-n-propylamine	ND	330									
N-Nitrosodiphenylamine	ND	330									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-54445** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107754**
Client ID: **PBS** Batch ID: **54445** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1689446**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	330									
Nitrobenzene	ND	330									
Pentachlorophenol	ND	1600									
Phenanthrene	ND	330									
Phenol	ND	330									
Pyrene	ND	330									
Surr: 1,2-Dichlorobenzene-d4	2973.000		3330		89.3	49	103				
Surr: 2,4,6-Tribromophenol	3022.667		3330		90.8	47	129				
Surr: 2-Chlorophenol-d4	3178.667		3330		95.5	54	109				
Surr: 2-Fluorobiphenyl	3239.333		3330		97.3	59	108				
Surr: 2-Fluorophenol	3089.667		3330		92.8	50	111				
Surr: 4-Terphenyl-d14	3790.333		3330		114	58	135				
Surr: Nitrobenzene-d5	3230.667		3330		97.0	54	115				
Surr: Phenol-d5	3174.333		3330		95.3	58	112				

Sample ID: **LCS-54445** SampType: **LCS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107754**
Client ID: **LCSS** Batch ID: **54445** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1689447**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	3049.000	330	3330	0	91.6	61	107				
1,4-Dichlorobenzene	2691.000	330	3330	0	80.8	56	100				
2,4-Dinitrotoluene	3422.667	330	3330	0	103	72	130				
2-Chlorophenol	3032.000	330	3330	0	91.1	64	105				
4-Chloro-3-methylphenol	3595.333	660	3330	0	108	74	125				
4-Nitrophenol	3392.000	1600	3330	0	102	77	137				
Acenaphthene	3078.333	330	3330	0	92.4	63	117				
N-Nitrosodi-n-propylamine	3275.000	330	3330	0	98.3	71	121				
Pentachlorophenol	2477.000	1600	3330	0	74.4	69	125				
Phenol	3204.333	330	3330	0	96.2	67	111				
Pyrene	3457.333	330	3330	0	104	60	122				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **LCS-54445** SampType: **LCS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107754**
Client ID: **LCSS** Batch ID: **54445** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1689447**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 1,2-Dichlorobenzene-d4	2701.667		3330		81.1	49	103				
Surr: 2,4,6-Tribromophenol	3265.000		3330		98.0	47	129				
Surr: 2-Chlorophenol-d4	2945.333		3330		88.4	54	109				
Surr: 2-Fluorobiphenyl	3221.333		3330		96.7	59	108				
Surr: 2-Fluorophenol	2799.000		3330		84.1	50	111				
Surr: 4-Terphenyl-d14	3190.000		3330		95.8	58	135				
Surr: Nitrobenzene-d5	3015.333		3330		90.6	54	115				
Surr: Phenol-d5	3030.333		3330		91.0	58	112				

Sample ID: **104787-013AMS** SampType: **MS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107754**
Client ID: **W5A (10')** Batch ID: **54445** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/2/2009** SeqNo: **1689453**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	3285.333	330	3330	0	98.7	60	105				
1,4-Dichlorobenzene	3034.000	330	3330	0	91.1	50	99				
2,4-Dinitrotoluene	3508.000	330	3330	0	105	70	130				
2-Chlorophenol	3288.667	330	3330	0	98.8	58	107				
4-Chloro-3-methylphenol	3770.000	660	3330	0	113	72	124				
4-Nitrophenol	3762.667	1600	3330	0	113	69	139				
Acenaphthene	3225.333	330	3330	0	96.9	59	118				
N-Nitrosodi-n-propylamine	3423.667	330	3330	0	103	61	125				
Pentachlorophenol	3039.667	1600	3330	0	91.3	56	131				
Phenol	3351.333	330	3330	0	101	60	113				
Pyrene	3625.333	330	3330	0	109	51	130				
Surr: 1,2-Dichlorobenzene-d4	2952.333		3330		88.7	49	103				
Surr: 2,4,6-Tribromophenol	3458.333		3330		104	47	129				
Surr: 2-Chlorophenol-d4	3153.667		3330		94.7	54	109				
Surr: 2-Fluorobiphenyl	3262.000		3330		98.0	59	108				
Surr: 2-Fluorophenol	3038.667		3330		91.3	50	111				
Surr: 4-Terphenyl-d14	3424.667		3330		103	58	135				

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits
- Calculations are based on raw values
- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104787-013AMS**	SampType: **MS**	TestCode: **8270_S_FUL**	Units: **µg/Kg**	Prep Date: **4/1/2009**	RunNo: **107754**
Client ID: **W5A (10')**	Batch ID: **54445**	TestNo: **EPA 8270C**	**EPA 3550B**	Analysis Date: **4/2/2009**	SeqNo: **1689453**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	3179.000		3330		95.5	54	115				
Surr: Phenol-d5	3145.667		3330		94.5	58	112				

Sample ID: **104787-013AMSD**	SampType: **MSD**	TestCode: **8270_S_FUL**	Units: **µg/Kg**	Prep Date: **4/1/2009**	RunNo: **107754**
Client ID: **W5A (10')**	Batch ID: **54445**	TestNo: **EPA 8270C**	**EPA 3550B**	Analysis Date: **4/2/2009**	SeqNo: **1689454**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	3128.667	330	3330	0	94.0	60	105	3285	4.89	20	
1,4-Dichlorobenzene	2842.000	330	3330	0	85.3	50	99	3034	6.54	20	
2,4-Dinitrotoluene	3372.333	330	3330	0	101	70	130	3508	3.94	20	
2-Chlorophenol	3168.333	330	3330	0	95.1	58	107	3289	3.73	20	
4-Chloro-3-methylphenol	3653.000	660	3330	0	110	72	124	3770	3.15	20	
4-Nitrophenol	3722.333	1600	3330	0	112	69	139	3763	1.08	20	
Acenaphthene	3125.000	330	3330	0	93.8	59	118	3225	3.16	20	
N-Nitrosodi-n-propylamine	3336.000	330	3330	0	100	61	125	3424	2.59	20	
Pentachlorophenol	3147.667	1600	3330	0	94.5	56	131	3040	3.49	20	
Phenol	3254.667	330	3330	0	97.7	60	113	3351	2.93	20	
Pyrene	3429.000	330	3330	0	103	51	130	3625	5.57	20	
Surr: 1,2-Dichlorobenzene-d4	2775.667		3330		83.4	49	103		0	0	
Surr: 2,4,6-Tribromophenol	3376.000		3330		101	47	129		0	0	
Surr: 2-Chlorophenol-d4	2994.000		3330		89.9	54	109		0	0	
Surr: 2-Fluorobiphenyl	3177.667		3330		95.4	59	108		0	0	
Surr: 2-Fluorophenol	2915.667		3330		87.6	50	111		0	0	
Surr: 4-Terphenyl-d14	3341.667		3330		100	58	135		0	0	
Surr: Nitrobenzene-d5	3026.000		3330		90.9	54	115		0	0	
Surr: Phenol-d5	3065.667		3330		92.1	58	112		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104787-013ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107754**
Client ID: **W5A (10')** Batch ID: **54445** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/2/2009** SeqNo: **1689455**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	330						0	0	20	
1,2-Dichlorobenzene	ND	330						0	0	20	
1,2-Diphenylhydrazine	ND	330						0	0	20	
1,3-Dichlorobenzene	ND	330						0	0	20	
1,4-Dichlorobenzene	ND	330						0	0	20	
1,4-Dioxane	ND	330						0	0	20	
2,4,5-Trichlorophenol	ND	330						0	0	20	
2,4,6-Trichlorophenol	ND	330						0	0	20	
2,4-Dichlorophenol	ND	1600						0	0	20	
2,4-Dimethylphenol	ND	330						0	0	20	
2,4-Dinitrophenol	ND	1600						0	0	20	
2,4-Dinitrotoluene	ND	330						0	0	20	
2,6-Dinitrotoluene	ND	330						0	0	20	
2-Chloronaphthalene	ND	330						0	0	20	
2-Chlorophenol	ND	330						0	0	20	
2-Methylnaphthalene	ND	330						0	0	20	
2-Methylphenol	ND	330						0	0	20	
2-Nitroaniline	ND	1600						0	0	20	
2-Nitrophenol	ND	330						0	0	20	
3,3´-Dichlorobenzidine	ND	660						0	0	20	
3-Nitroaniline	ND	1600						0	0	20	
4,6-Dinitro-2-methylphenol	ND	1600						0	0	20	
4-Bromophenyl-phenylether	ND	330						0	0	20	
4-Chloro-3-methylphenol	ND	660						0	0	20	
4-Chloroaniline	ND	660						0	0	20	
4-Chlorophenyl-phenylether	ND	330						0	0	20	
3/4-Methylphenol	ND	330						0	0	20	
4-Methylphenol	ND	330						0	0	20	
4-Nitroaniline	ND	1600						0	0	20	
4-Nitrophenol	ND	1600						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104787-013ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107754**
Client ID: **W5A (10')** Batch ID: **54445** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/2/2009** SeqNo: **1689455**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acenaphthene	ND	330						0	0	20	
Acenaphthylene	ND	330						0	0	20	
Aniline	ND	330						0	0	20	
Anthracene	ND	330						0	0	20	
Benzidine (M)	ND	1600						0	0	20	
Benzo(a)anthracene	ND	330						0	0	20	
Benzo(a)pyrene	ND	330						0	0	20	
Benzo(b)fluoranthene	ND	330						0	0	20	
Benzo(g,h,i)perylene	ND	330						0	0	20	
Benzo(k)fluoranthene	ND	330						0	0	20	
Benzoic acid	ND	1600						0	0	20	
Benzyl alcohol	ND	660						0	0	20	
Bis(2-chloroethoxy)methane	ND	330						0	0	20	
Bis(2-chloroethyl)ether	ND	330						0	0	20	
Bis(2-chloroisopropyl)ether	ND	330						0	0	20	
Bis(2-ethylhexyl)phthalate	ND	330						0	0	20	
Butylbenzylphthalate	ND	330						0	0	20	
Carbazole	ND	330						0	0	20	
Chrysene	ND	330						0	0	20	
Di-n-butylphthalate	ND	330						0	0	20	
Di-n-octylphthalate	ND	330						0	0	20	
Dibenz(a,h)anthracene	ND	330						0	0	20	
Dibenzofuran	ND	330						0	0	20	
Diethylphthalate	ND	330						0	0	20	
Dimethylphthalate	ND	330						0	0	20	
Fluoranthene	ND	330						0	0	20	
Fluorene	ND	330						0	0	20	
Hexachlorobenzene	ND	330						0	0	20	
Hexachlorobutadiene	ND	660						0	0	20	
Hexachlorocyclopentadiene	ND	660						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104787-013ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107754**
Client ID: **W5A (10')** Batch ID: **54445** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/2/2009** SeqNo: **1689455**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Hexachloroethane	ND	330						0	0	20	
Indeno(1,2,3-cd)pyrene	ND	330						0	0	20	
Isophorone	ND	330						0	0	20	
N-Nitrosodi-n-propylamine	ND	330						0	0	20	
N-Nitrosodimethylamine	ND	330						0	0	20	
N-Nitrosodiphenylamine	ND	330						0	0	20	
Naphthalene	ND	330						0	0	20	
Nitrobenzene	ND	330						0	0	20	
Pentachlorophenol	ND	1600						0	0	20	
Phenanthrene	ND	330						0	0	20	
Phenol	ND	330						0	0	20	
Pyrene	ND	330						0	0	20	
Pyridine	ND	1600						0	0	20	
Surr: 1,2-Dichlorobenzene-d4	2986.333		3330		89.7	49	103		0	0	
Surr: 2,4,6-Tribromophenol	3422.667		3330		103	47	129		0	0	
Surr: 2-Chlorophenol-d4	3198.667		3330		96.1	54	109		0	0	
Surr: 2-Fluorobiphenyl	3211.333		3330		96.4	59	108		0	0	
Surr: 2-Fluorophenol	3186.000		3330		95.7	50	111		0	0	
Surr: 4-Terphenyl-d14	3865.000		3330		116	58	135		0	0	
Surr: Nitrobenzene-d5	3175.667		3330		95.4	54	115		0	0	
Surr: Phenol-d5	3253.000		3330		97.7	58	112		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_W_FULL

Sample ID: **MB-54393** SampType: **MBLK** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **3/31/2009** RunNo: **107670**
Client ID: **PBW** Batch ID: **54393** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **3/31/2009** SeqNo: **1687707**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	10									
1,2-Dichlorobenzene	ND	10									
1,3-Dichlorobenzene	ND	10									
1,4-Dichlorobenzene	ND	10									
2,4,5-Trichlorophenol	ND	10									
2,4,6-Trichlorophenol	ND	10									
2,4-Dichlorophenol	ND	10									
2,4-Dimethylphenol	ND	10									
2,4-Dinitrophenol	ND	50									
2,4-Dinitrotoluene	ND	10									
2,6-Dinitrotoluene	ND	10									
2-Chloronaphthalene	ND	10									
2-Chlorophenol	ND	10									
2-Methylnaphthalene	ND	10									
2-Methylphenol	ND	10									
2-Nitroaniline	ND	50									
2-Nitrophenol	ND	10									
3,3´-Dichlorobenzidine	ND	20									
3-Nitroaniline	ND	50									
4,6-Dinitro-2-methylphenol	ND	50									
4-Bromophenyl-phenylether	ND	10									
4-Chloro-3-methylphenol	ND	50									
4-Chloroaniline	ND	20									
4-Chlorophenyl-phenylether	ND	10									
4-Methylphenol	ND	10									
4-Nitroaniline	ND	20									
4-Nitrophenol	ND	50									
Acenaphthene	ND	10									
Acenaphthylene	ND	10									
Anthracene	ND	10									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_W_FULL

Sample ID: **MB-54393** SampType: **MBLK** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **3/31/2009** RunNo: **107670**
Client ID: **PBW** Batch ID: **54393** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **3/31/2009** SeqNo: **1687707**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzidine (M)	ND	50									
Benzo(a)anthracene	ND	10									
Benzo(a)pyrene	ND	10									
Benzo(b)fluoranthene	ND	10									
Benzo(g,h,i)perylene	ND	10									
Benzo(k)fluoranthene	ND	10									
Benzoic acid	ND	50									
Benzyl alcohol	ND	20									
Bis(2-chloroethoxy)methane	ND	10									
Bis(2-chloroethyl)ether	ND	10									
Bis(2-chloroisopropyl)ether	ND	10									
Bis(2-ethylhexyl)phthalate	ND	10									
Butylbenzylphthalate	ND	10									
Chrysene	ND	10									
Di-n-butylphthalate	ND	10									
Di-n-octylphthalate	ND	10									
Dibenz(a,h)anthracene	ND	10									
Dibenzofuran	ND	10									
Diethylphthalate	ND	10									
Dimethylphthalate	ND	10									
Fluoranthene	ND	10									
Fluorene	ND	10									
Hexachlorobenzene	ND	10									
Hexachlorobutadiene	ND	20									
Hexachlorocyclopentadiene	ND	10									
Hexachloroethane	ND	10									
Indeno(1,2,3-cd)pyrene	ND	10									
Isophorone	ND	10									
N-Nitrosodi-n-propylamine	ND	10									
N-Nitrosodiphenylamine	ND	10									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_W_FULL

Sample ID: **MB-54393** SampType: **MBLK** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **3/31/2009** RunNo: **107670**
Client ID: **PBW** Batch ID: **54393** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **3/31/2009** SeqNo: **1687707**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	10									
Nitrobenzene	ND	10									
Pentachlorophenol	ND	50									
Phenanthrene	ND	10									
Phenol	ND	10									
Pyrene	ND	10									
Surr: 1,2-Dichlorobenzene-d4	69.890		100.0		69.9	42	98				
Surr: 2,4,6-Tribromophenol	87.150		100.0		87.2	60	128				
Surr: 2-Chlorophenol-d4	67.760		100.0		67.8	43	102				
Surr: 2-Fluorobiphenyl	80.010		100.0		80.0	50	108				
Surr: 2-Fluorophenol	40.450		100.0		40.5	22	69				
Surr: 4-Terphenyl-d14	110.950		100.0		111	66	130				
Surr: Nitrobenzene-d5	79.690		100.0		79.7	47	117				
Surr: Phenol-d5	27.260		100.0		27.3	16	50				

Sample ID: **LCS-54393** SampType: **LCS** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **3/31/2009** RunNo: **107670**
Client ID: **LCSW** Batch ID: **54393** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **3/31/2009** SeqNo: **1687708**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	83.600	10	100.0	0	83.6	54	110				
1,4-Dichlorobenzene	76.890	10	100.0	0	76.9	48	103				
2,4-Dinitrotoluene	107.980	10	100.0	0	108	69	136				
2-Chlorophenol	80.070	10	100.0	0	80.1	53	100				
4-Chloro-3-methylphenol	110.350	50	100.0	0	110	70	124				
4-Nitrophenol	56.450	50	100.0	0	56.5	32	69				
Acenaphthene	105.780	10	100.0	0	106	64	118				
N-Nitrosodi-n-propylamine	96.640	10	100.0	0	96.6	62	130				
Pentachlorophenol	97.190	50	100.0	0	97.2	64	130				
Phenol	32.780	10	100.0	0	32.8	25	50				
Pyrene	110.380	10	100.0	0	110	66	123				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_W_FULL

Sample ID: **LCS-54393** SampType: **LCS** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **3/31/2009** RunNo: **107670**
Client ID: **LCSW** Batch ID: **54393** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **3/31/2009** SeqNo: **1687708**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 1,2-Dichlorobenzene-d4	74.720		100.0		74.7	42	98				
Surr: 2,4,6-Tribromophenol	108.690		100.0		109	60	128				
Surr: 2-Chlorophenol-d4	72.960		100.0		73.0	43	102				
Surr: 2-Fluorobiphenyl	94.820		100.0		94.8	50	108				
Surr: 2-Fluorophenol	44.270		100.0		44.3	22	69				
Surr: 4-Terphenyl-d14	105.040		100.0		105	66	130				
Surr: Nitrobenzene-d5	85.800		100.0		85.8	47	117				
Surr: Phenol-d5	30.610		100.0		30.6	16	50				

Sample ID: **MB-54393MS** SampType: **MS** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **3/31/2009** RunNo: **107670**
Client ID: **ZZZZZZ** Batch ID: **54393** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **3/31/2009** SeqNo: **1687709**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	90.710	10	100.0	0	90.7	54	110				
1,4-Dichlorobenzene	81.780	10	100.0	0	81.8	48	103				
2,4-Dinitrotoluene	114.890	10	100.0	0	115	69	136				
2-Chlorophenol	85.440	10	100.0	0	85.4	53	100				
4-Chloro-3-methylphenol	117.450	50	100.0	0	117	70	124				
4-Nitrophenol	60.050	50	100.0	0	60.1	32	69				
Acenaphthene	111.170	10	100.0	0	111	64	118				
N-Nitrosodi-n-propylamine	102.700	10	100.0	0	103	62	130				
Pentachlorophenol	100.360	50	100.0	0	100	64	130				
Phenol	34.760	10	100.0	0	34.8	25	50				
Pyrene	113.580	10	100.0	0	114	66	123				
Surr: 1,2-Dichlorobenzene-d4	79.480		100.0		79.5	42	98				
Surr: 2,4,6-Tribromophenol	113.340		100.0		113	60	128				
Surr: 2-Chlorophenol-d4	76.960		100.0		77.0	43	102				
Surr: 2-Fluorobiphenyl	98.710		100.0		98.7	50	108				
Surr: 2-Fluorophenol	47.120		100.0		47.1	22	69				
Surr: 4-Terphenyl-d14	108.960		100.0		109	66	130				

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits
- Calculations are based on raw values
- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_W_FULL

Sample ID: **MB-54393MS** SampType: **MS** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **3/31/2009** RunNo: **107670**
Client ID: **ZZZZZZ** Batch ID: **54393** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **3/31/2009** SeqNo: **1687709**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	91.500		100.0		91.5	47	117				
Surr: Phenol-d5	31.390		100.0		31.4	16	50				

Sample ID: **MB-54393MSD** SampType: **MSD** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **3/31/2009** RunNo: **107670**
Client ID: **ZZZZZZ** Batch ID: **54393** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **3/31/2009** SeqNo: **1687710**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	93.630	10	100.0	0	93.6	54	110	90.71	3.17	20	
1,4-Dichlorobenzene	85.050	10	100.0	0	85.0	48	103	81.78	3.92	20	
2,4-Dinitrotoluene	119.680	10	100.0	0	120	69	136	114.9	4.08	20	
2-Chlorophenol	87.710	10	100.0	0	87.7	53	100	85.44	2.62	20	
4-Chloro-3-methylphenol	120.070	50	100.0	0	120	70	124	117.4	2.21	20	
4-Nitrophenol	62.570	50	100.0	0	62.6	32	69	60.05	4.11	20	
Acenaphthene	115.210	10	100.0	0	115	64	118	111.2	3.57	20	
N-Nitrosodi-n-propylamine	105.590	10	100.0	0	106	62	130	102.7	2.77	20	
Pentachlorophenol	102.230	50	100.0	0	102	64	130	100.4	1.85	20	
Phenol	37.040	10	100.0	0	37.0	25	50	34.76	6.35	20	
Pyrene	116.400	10	100.0	0	116	66	123	113.6	2.45	20	
Surr: 1,2-Dichlorobenzene-d4	82.550		100.0		82.6	42	98		0	0	
Surr: 2,4,6-Tribromophenol	116.160		100.0		116	60	128		0	0	
Surr: 2-Chlorophenol-d4	80.300		100.0		80.3	43	102		0	0	
Surr: 2-Fluorobiphenyl	101.970		100.0		102	50	108		0	0	
Surr: 2-Fluorophenol	49.550		100.0		49.6	22	69		0	0	
Surr: 4-Terphenyl-d14	110.470		100.0		110	66	130		0	0	
Surr: Nitrobenzene-d5	92.710		100.0		92.7	47	117		0	0	
Surr: Phenol-d5	34.360		100.0		34.4	16	50		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#: _____
Logged By: _____ Date: 3/28/09

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: GSO

Sample Condition Upon Receipt
1. CHILLED 3.8 °C Y☐ N☐ 4. SEALED Y☐ N☐
2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐
3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client: Geocon Consultants
Attn: John Love
Address: 6671 Brisa St.
City Livermore State CA Zip Code 94550
TEL: (925) 371-5900
FAX: (925) 371-5915

Project Name: Caltrans Dumbarton Bridge
Project #: E8435-06-18
Sampler: (Printed Name) John Love (Signature)

Relinquished by: (Signature and Printed Name) John Love Date: 3/27/09 Time: 16:00 Received by: (Signature and Printed Name) Date: 3/28/09 Time: 0830
Relinquished by: (Signature and Printed Name) Date: Time: Received by: (Signature and Printed Name) Date: Time:
Relinquished by: (Signature and Printed Name) Date: Time: Received by: (Signature and Printed Name) Date: Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
John Love
Print Name Date
Signature

Send Report To:
Attn: _____
Co: same as above
Address _____
City _____ State _____ Zip _____

Bill To:
Attn: _____
Co: same as above
Address _____
City _____ State _____ Zip _____

Special Instructions/Comments:
metals samples were field filtered
cancel cleanup (SG, 1-SB)

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

Circle or Add Analysis(es) Requested

SPECIFY APPROPRIATE MATRIX

QA/QC: RTNE ☐ CT ☐ SWRCB ☐ Logcode ____ OTHER ____

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (SVOCs)	6010B (Total Metal)	8015B (GRO)	8015B (DRO)	8021 (BTEX)	TITLE 22 / CAM 17 (6010/7000)	TDS	Oil & Grease	Cyanide	Dissolved Cyanide	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	104789-001	W10AGW	3/26/09	9115	X																	E	3	VG	H	
							X																1	LG		
									X														2	VG	H	
										X													1	LG		
												X											1	PP	N	
													X										1	PP		
														X									1	JG	H	
															X								1	PP	O	
																X							1	PP	O	+AlCl3
	-002	Trip Blank (W10AGW)	↓	16:00	X			X														↓	2	VG	H	

- TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=Hcl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#: _____

Logged By: _____ Date: 3/28/09

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: _____

Sample Condition Upon Receipt

1. CHILLED	Y☐ N☐	4. SEALED	Y☐ N☐
2. HEADSPACE (VOA)	Y☐ N☐	5. # OF SPLS MATCH COC	Y☐ N☐
3. CONTAINER INTACT	Y☐ N☐	6. PRESERVED	Y☐ N☐

Client: Geocon Consultants
Address: 6671 Boisa St.
TEL: (925) 371-5900
Attn: John Love
City Livermore State CA Zip Code 94550
FAX: (925) 371-5915

Project Name: Caltrans Dumbarton Bridge Project #: E8435-06-18 Sampler: (Printed Name) John Love (Signature)

Relinquished by: (Signature and Printed Name) John Love	Date: 3/27/09	Time: 16:00	Received by: (Signature and Printed Name)	Date: 3/28/09	Time: 0830
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: John Love 3/27/09 (Print Name / Date)
Signature

Send Report To:
Attn: _____
Co: same as above
Address _____
City _____ State _____ Zip _____

Bill To:
Attn: _____
Co: same as above
Address _____
City _____ State _____ Zip _____

Special Instructions/Comments:
Stockpile (cleanup soils)

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	6010B (Total Metal)	8015B (GRO) / 8020 (BTEX)	8015B (DRO)	8021 (BTEX)	TITLE 22 / CAM 17 (8010 / 7000)	TPHd + TPHmo w/silicagel cleanup	SVOCs (8270C)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	104787-3	W10AGW (0')	3/26/09	8:15									X	X	X	X					E	1	T P		
	-4	W10AGW (5')		8:28									X	X	X	X									
	-5	W10AGW (10')		8:37									X	X	X	X									
	-6	W10AGW (15')		8:55									X	X	X	X						1	T M		Stainless Steel tube
	-7	FW1 (0')		10:40									X	X	X	X									
	-8	FW1 (2')		10:50									X	X	X	X									
	-9	FW2 (0')		10:55									X	X	X	X									
	-10	FW2 (2')		14:05									X	X	X	X									

QA/QC: RTNE ☐ CT ☐ SWRCB ☐ Logcode _____ OTHER _____

• TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

CHAIN OF CUSTODY RECORD

Pg 3 of 3

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#: _____
Logged By: _____ Date: 3/27/09

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: _____

Sample Condition Upon Receipt
1. CHILLED Y☐ N☐ 4. SEALED Y☐ N☐
2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐
3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client: Geocon Consultants
Address: 6671 Brisa St.
TEL: (925) 371-5900
Attn: John Love
City Livermore State CA Zip Code 94550
FAX: (925) 371-5915
Project Name: Caltrans Dumbarton Bridge Project #: E8435-06-18 Sampler: (Printed Name) John Love (Signature)

Relinquished by: (Signature and Printed Name) John Love	Date: 3/27/09	Time: 16:00	Received by: (Signature and Printed Name)	Date: 3/28/09	Time: 0830
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
John Love 3/27/09
Print Name Date
Signature

Send Report To:
Attn: _____
Co: same as above
Address _____
City _____ State _____ Zip _____

Bill To:
Attn: _____
Co: same as above
Address _____
City _____ State _____ Zip _____

Special Instructions/Comments:
Cleanup (SOIL)

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

Circle or Add Analysis(es) Requested

SPECIFY APPROPRIATE MATRIX

PRESERVATION

Q A / Q C
RTNE ☐
CT ☐
SWRCB ☐
Logcode ____
OTHER ____

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	6010B (Total Metal)	8015B (GRO) / 8020 (BTEX)	8015B (DRO)	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	TPHd + TPHmo w/ Silica gel (3510)	SVOCs (8270C)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	104787-11	WSA (0')	3/26/09	11:44									X	X	X	X					E	1	T P		
	-12	WSA (5')		11:48									X	X	X	X									
	-13	WSA (10')		11:55									X	X	X	X									
	-14	WSA (15')	↓	12:05									X	X	X	X					↓	↓	↓ ↓		

• TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives:
H=Hcl N=HNO_3 S=H_2SO_4 C=4°C
Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

June 09, 2009

John Love
Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550
TEL: (925) 525-4142
FAX: (925) 371-5915

ELAP No.: 1838
NELAP No.: 02107CA
NEVADA.: CA-401
CSDLAC No.: 10196

Workorder No.: 104787

RE: Caltrans Dumbarton Bridge, E8435-06-18

Attention: John Love

Enclosed are the results for sample(s) received on March 28, 2009 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

This is an addendum report. Please incorporate with documentation previously submitted.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

CLIENT: Geocon Consultants, Inc.
Project: Caltrans Dumbarton Bridge, E8435-06-18
Lab Order: 104787

CASE NARRATIVE

Results were J-Flag. "J" is used to flag those results that are between the PQL (Practical Quantitation Limit) and the calculated MDL (Method Detection Limit). Results that are "J" Flagged are estimated values since it becomes difficult to accurately quantitate the analyte near the MDL.

Analytical Comments for Method 6010

Dilution was necessary for samples 104787-004A, 104787-007A, 104787-008A, 104787-009A, 104787-010A and 104787-012A, due to sample matrix.

Analytical Comments for Method 7470

Samples 104787-007A, 104787-010A, 104789-010ADUP, 104789-010AMS and 104789-010AMSD were analyzed for WET Mercury beyond hold time, per client request. Results are flagged with an "H" qualifier.

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W10AGW (5')
Lab Order:	104787	**Collection Date:**	3/26/2009 8:28:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104787-004A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC							
			WET/ EPA 6010B				
RunID: **ICP8_090608C**	QC Batch: **R109661**				PrepDate:		Analyst: **CL**
Chromium	0.11	0.018	1.0	J	mg/L	20	6/8/2009 04:08 PM
Nickel	1.6	0.014	1.0		mg/L	20	6/8/2009 04:08 PM
Vanadium	0.24	0.010	1.0	J	mg/L	20	6/8/2009 04:08 PM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	FW1 (0')
Lab Order:	104787	**Collection Date:**	3/26/2009 10:40:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104787-007A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC							
			WET/ EPA 6010B				
RunID: **ICP8_090608C**	QC Batch: **R109661**				PrepDate:		Analyst: **CL**
Vanadium	0.33	0.010	1.0	J	mg/L	20	6/8/2009 05:08 PM
MERCURY BY WET EXTRACTION							
			WET/ EPA 7470A				
RunID: **AA5_090608A**	QC Batch: **55727**				PrepDate: **6/5/2009**		Analyst: **IL**
Mercury	ND	0.23	1.0	H	µg/L	1	6/8/2009 10:34 AM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	FW1 (2')
Lab Order:	104787	**Collection Date:**	3/26/2009 10:50:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104787-008A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC							
WET/ EPA 6010B							
RunID: **ICP8_090608C**	QC Batch: **R109661**				PrepDate:		Analyst: **CL**
Chromium	0.17	0.018	1.0	J	mg/L	20	6/8/2009 05:12 PM
Vanadium	0.60	0.010	1.0	J	mg/L	20	6/8/2009 05:12 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	FW2 (0')
Lab Order:	104787	**Collection Date:**	3/26/2009 10:55:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104787-009A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC							
WET/ EPA 6010B							
RunID: **ICP8_090608C**	QC Batch: **R109661**				PrepDate:		Analyst: **CL**
Chromium	0.40	0.018	1.0	J	mg/L	20	6/8/2009 05:16 PM
Vanadium	0.47	0.010	1.0	J	mg/L	20	6/8/2009 05:16 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	FW2 (2")
Lab Order:	104787	**Collection Date:**	3/26/2009 11:05:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104787-010A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC							
			WET/ EPA 6010B				
RunID: **ICP8_090608C**	QC Batch: **R109661**				PrepDate:		Analyst: **CL**
Vanadium	0.25	0.010	1.0	J	mg/L	20	6/8/2009 05:19 PM
MERCURY BY WET EXTRACTION							
			WET/ EPA 7470A				
RunID: **AA5_090608A**	QC Batch: **55727**				PrepDate: **6/5/2009**		Analyst: **IL**
Mercury	ND	0.23	1.0	H	µg/L	1	6/8/2009 10:41 AM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W5A (5')
Lab Order:	104787	**Collection Date:**	3/26/2009 11:48:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104787-012A		

ICP METALS BY STLC

WET/ EPA 6010B

RunID: **ICP8_090608C** QC Batch: **R109661** PrepDate: Analyst: **CL**

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
Arsenic	0.34	0.088	1.0	J	mg/L	20	6/8/2009 05:23 PM
Chromium	0.38	0.018	1.0	J	mg/L	20	6/8/2009 05:23 PM
Nickel	1.0	0.014	1.0		mg/L	20	6/8/2009 05:23 PM
Vanadium	1.2	0.010	1.0		mg/L	20	6/8/2009 05:23 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_ST

Sample ID: **MB-55695A** SampType: **MBLK** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **PBS** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722211**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	0.050									
Chromium	ND	0.050									
Nickel	ND	0.050									
Vanadium	ND	0.050									

Sample ID: **LCS-55695** SampType: **LCS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **LCSS** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722212**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	1.000	0.050	1.000	0	100	85	115				
Chromium	0.919	0.050	1.000	0	91.9	85	115				
Nickel	1.000	0.050	1.000	0	100	85	115				
Vanadium	1.004	0.050	1.000	0	100	85	115				

Sample ID: **104787-004ADUP** SampType: **DUP** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **W10AGW (5')** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722223**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	1.0						0	0	20	
Chromium	0.068	1.0						0.1096	0	20	
Lead	ND	1.0						0	0	20	
Nickel	1.355	1.0						1.581	15.4	20	
Vanadium	0.204	1.0						0.2437	0	20	

Sample ID: **104787-004AMS** SampType: **MS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **W10AGW (5')** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722224**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_ST

Sample ID: **104787-004AMS** SampType: **MS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **W10AGW (5')** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722224**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	2.575	1.0	2.500	0	103	66	128				
Chromium	2.444	1.0	2.500	0.1096	93.4	77	116				
Lead	2.320	1.0	2.500	0	92.8	71	121				
Nickel	3.828	1.0	2.500	1.581	89.9	63	125				
Vanadium	2.743	1.0	2.500	0.2437	100	79	118				

Sample ID: **MB-55695B** SampType: **MBLK** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **PBS** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722225**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	0.050									
Chromium	ND	0.050									
Nickel	ND	0.050									
Vanadium	ND	0.050									

Sample ID: **104789-008ADUP** SampType: **DUP** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **ZZZZZZ** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722236**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	1.0						0	0	20	
Chromium	0.235	1.0						0.2217	0	20	
Nickel	0.433	1.0						0.4102	0	20	
Vanadium	0.470	1.0						0.4639	0	20	

Sample ID: **104789-008AMS** SampType: **MS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **ZZZZZZ** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722237**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	2.584	1.0	2.500	0	103	66	128				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_ST

Sample ID: **104789-008AMS** SampType: **MS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **ZZZZZZ** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722237**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	2.649	1.0	2.500	0.2217	97.1	77	116				
Nickel	3.028	1.0	2.500	0.4102	105	63	125				
Vanadium	2.991	1.0	2.500	0.4639	101	79	118				

Sample ID: **104789-008AMSD** SampType: **MSD** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **ZZZZZZ** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722238**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	2.571	1.0	2.500	0	103	66	128	2.584	0.510	20	
Chromium	2.612	1.0	2.500	0.2217	95.6	77	116	2.649	1.40	20	
Nickel	2.994	1.0	2.500	0.4102	103	63	125	3.028	1.14	20	
Vanadium	2.980	1.0	2.500	0.4639	101	79	118	2.991	0.375	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 7470_ST

Sample ID: **MB-55727A**	SampType: **MBLK**	TestCode: **7470_ST**	Units: **µg/L**	Prep Date: **6/5/2009**	RunNo: **109646**
Client ID: **PBS**	Batch ID: **55727**	TestNo: **WET/ EPA 74**		Analysis Date: **6/8/2009**	SeqNo: **1721974**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.20									

Sample ID: **LCS-55727**	SampType: **LCS**	TestCode: **7470_ST**	Units: **µg/L**	Prep Date: **6/5/2009**	RunNo: **109646**
Client ID: **LCSS**	Batch ID: **55727**	TestNo: **WET/ EPA 74**		Analysis Date: **6/8/2009**	SeqNo: **1721975**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	9.723	0.20	10.00	0	97.2	85	115				

Sample ID: **MB-55695B STLC**	SampType: **MBLK**	TestCode: **7470_ST**	Units: **µg/L**	Prep Date: **6/5/2009**	RunNo: **109646**
Client ID: **PBS**	Batch ID: **55727**	TestNo: **WET/ EPA 74**		Analysis Date: **6/8/2009**	SeqNo: **1721976**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	1.0									

Sample ID: **MB-55696A STLC**	SampType: **MBLK**	TestCode: **7470_ST**	Units: **µg/L**	Prep Date: **6/5/2009**	RunNo: **109646**
Client ID: **PBS**	Batch ID: **55727**	TestNo: **WET/ EPA 74**		Analysis Date: **6/8/2009**	SeqNo: **1721977**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	1.0									

Sample ID: **104789-010A-MS**	SampType: **MS**	TestCode: **7470_ST**	Units: **µg/L**	Prep Date: **6/5/2009**	RunNo: **109646**
Client ID: **ZZZZZZ**	Batch ID: **55727**	TestNo: **WET/ EPA 74**		Analysis Date: **6/8/2009**	SeqNo: **1721978**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	36.621	1.0	50.00	0	73.2	70	130				H

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104787
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 7470_ST

Sample ID: **104789-010A-MSD** SampType: **MSD** TestCode: **7470_ST** Units: **µg/L** Prep Date: **6/5/2009** RunNo: **109646**
Client ID: **ZZZZZZ** Batch ID: **55727** TestNo: **WET/ EPA 74** Analysis Date: **6/8/2009** SeqNo: **1721979**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	39.935	1.0	50.00	0	79.9	70	130	36.62	8.66	20	H

Sample ID: **104789-010A-DUP** SampType: **DUP** TestCode: **7470_ST** Units: **µg/L** Prep Date: **6/5/2009** RunNo: **109646**
Client ID: **ZZZZZZ** Batch ID: **55727** TestNo: **WET/ EPA 74** Analysis Date: **6/8/2009** SeqNo: **1721981**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	1.0						0	0	20	H

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

Diane Galvan

From: John Love [love@geoconinc.com]
Sent: Wednesday, June 03, 2009 10:50 AM
To: Diane Galvan
Subject: WET Request
Attachments: COC Caltrans Dumbarton Bridge.pdf

Hi Diane:

Caltrans would like to run a waste extraction test on several samples for select metals from the Dumbarton Bridge project. I've attached the COCs for the samples they wanted analyzed for STLC. Let me know if you have any questions.

Thanks Diane.

John Love
Sr. Project Geologist

Please visit our new website at http://www.geoconinc.com

GEOCON Incorporated
6671 Brisa Street
Livermore, CA 94550
Tel (925) 371-5900

GEOTECHNICAL - ENVIRONMENTAL - MATERIALS

San Diego Murrieta Burbank San Bernardino Bakersfield Sacramento Livermore Carson City Las Vegas Portland

CONFIDENTIALITY NOTICE: This e-mail may contain confidential and privileged material for the sole use of the intended recipient(s). Any review, use, distribution or disclosure by others is strictly prohibited. If you have received this communication in error, please notify the sender immediately by e-mail and delete the message and any file attachments from your computer. Thank you.

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#: _____

Logged By: _____ Date: _____

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: _____

Sample Condition Upon Receipt: 1. CHILLED Y☐ N☐ 4. SEALED Y☐ N☐ 2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐ 3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client: Geocon Consultants, Inc. Address: 6671 Brisa St. TEL: (925) 371-5900
Attn: John Love City Livermore State CA Zip Code 94550 FAX: (925) 371-5915

Project Name: Caltrans - Dumbarton Bridge Project #: E8435-06-18 Sampler: (Printed Name) John Love (Signature)

Relinquished by: (Signature and Printed Name) John Love	Date: 6/3/09	Time:	Received by: (Signature and Printed Name)	Date: Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date: Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date: Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: John Love 6/3/09 (Print Name / Date) (Signature)

Send Report To: Attn: _____ Co: same as above Address _____ City _____ State _____ Zip _____

Bill To: Attn: _____ Co: same as above Address _____ City _____ State _____ Zip _____

Special Instructions/Comments:

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

Circle or Add Analysis(es) Requested

SPECIFY APPROPRIATE MATRIX

PRESERVATION

Q A / Q C: RTNE ☐ CT ☐ SWRCB ☐ Logcode _____ OTHER _____

ITEM	LAB USE ONLY: Batch # / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	8010B (Total Metal)	8015B (GRO) / 8020 (BTEX)	8015B (DRO)	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	V: (WET)	As: (WET)	Cr: (WET)	Pb: (WET)	Hg: (WET)	Ni: (WET)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	REMARKS
		ESA (5')	3/24/09									X		X	X				X					E	1	T P	
		ESB (0')										X				X			X								
		ESB (5')										X		X	X				X								
		E10BGW (0')										X				X			X								
		E10BGW (5')										X		X	X				X								
		E15A (5')										X		x	x			X	X								
		E20AGW (5')										X			X				X								
		~~E8GW~~ E20BGW (5')										X		x	x				X								
		WSA (5')										X		x	x			X	X								
		W10AGW (5')										X			X			X	X								

* TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=Hcl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter.

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#: _____

Logged By: _____ Date: _____

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: _____

Sample Condition Upon Receipt
1. CHILLED Y☐ N☐ 4. SEALED Y☐ N☐
2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐
3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client:
Attn:
Address: 6671 Brisa St.
City Livermore State CA Zip Code 94550
TEL: (925) 371-5900
FAX: (925) 371-5915

Project Name: Caltrans- Dumbarton Bridge Project #: E8435-06-18 Sampler: (Printed Name) John Love (Signature)

Relinquished by: (Signature and Printed Name) John Love	Date: 6/3/09	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
John Love 6/3/09 (Print Name / Date)
(Signature)

Send Report To:
Attn: _____
Co: same as above
Address _____
City _____ State ____ Zip ____

Bill To:
Attn: _____
Co: same as above
Address _____
City _____ State ____ Zip ____

Special Instructions/Comments:

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

Circle or Add Analysis(es) Requested

SPECIFY APPROPRIATE MATRIX

PRESERVATION

Q A / Q C
RTNE ☐ CT ☐ SWRCB ☐ Logcode ____ OTHER ____

ITEM	LAB USE ONLY: Batch # / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	8010B (Total Metals)	8015B (GRO) / 8020 (BTEX)	8015B (DRO)	TITLE 22 / CAM 17 (6010 / 7000)	As (WET)	Cr (WET)	Pb (WET)	Hg (WET)	Ni (WET)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	REMARKS
		W10B (0')	3/4/01							X			X				X						E	1	T P	
		W15BGW (0')								X			X				X									
		W20AGW (5')								X			X				X									
		W20B (0')								X			X				X									
		FW1 (0')								X					X		X							T m	
		FW1 (2')								X			X				X									
		FW2 (0')								X			X				X									
		FW2 (2')								X					X		X									
		FW3 (0')								X			X				X									
		FW3 (2')								X			X				X									

• TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=Hcl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: White with report, Yellow to folder, Pink to submitter.

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#: _____

Logged By: _____ Date: _____

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: _____

Sample Condition Upon Receipt: 1. CHILLED Y☐ N☐ 4. SEALED Y☐ N☐ 2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐ 3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client: ~~Caltrans - Dumbarton Bridge~~ Geocon Consultants
Attn: John Love
Address: 6671 Brisa St.
City Livermore State CA Zip Code
TEL: (925) 371-5900
FAX: (925) 371-5915

Project Name: Caltrans - Dumbarton Bridge Project #: E8435-06-18 Sampler: (Printed Name) John Love (Signature)

Relinquished by: (Signature and Printed Name) John Love	Date: 6/3/09	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
John Love 6/3/09
Print Name Date
Signature

Send Report To:
Attn: _____
Co: same as above
Address _____
City _____ State ____ Zip ____

Bill To:
Attn: _____
Co: same as above
Address _____
City _____ State ____ Zip ____

Special Instructions/Comments:

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time
		FW4 (0')	3/2/09	
		FW4 (2')	↓	

Circle or Add Analysis(es) Requested

8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	8010B (Total Metals)	8015B (GRO) / 8020 (BTEX)	8015B (DRO)	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	VA (WET)	CC (WET)	Hg (WET)	PB (WET)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
								X	X	X	X		X				E	1	T M		
								X	X	X			X				↓	↓	↓ ↓		

SPECIFY APPROPRIATE MATRIX

QA/QC: RTNE ☐ CT ☐ SWRCB ☐ Logcode ____ OTHER ____

- TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter.

April 07, 2009

John Love
Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550

TEL: (925) 525-4142
FAX: (925) 371-5915

ELAP No.: 1838
NELAP No.: 02107CA
NEVADA.: CA-401
CSDLAC No.: 10196

Workorder No.: 104788

RE: Caltrans Dumbarton Bridge, E8435-06-18

Attention: John Love

Enclosed are the results for sample(s) received on March 28, 2009 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter and the case narrative are an integral part of this analytical report and cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Project: Caltrans Dumbarton Bridge, E8435-06-18
Lab Order: 104788

CASE NARRATIVE

Analytical Comments for Method 6010

Dilution was necessary for sample 104788-001E, due to sample matrix.

RPD for Duplicate (DUP) is outside criteria for sample 104767-001BDUP; however, the Laboratory Control Sample (LCS) validated the analytical batch.

Analytical Comments for Method 8015 (DRO/ORO)

Dilution was necessary for sample 104788-010A, due to sample matrix.

Surrogate recovery was diluted out for sample 104788-010A.

RPD for Duplicate (DUP) and/or Matrix Spike (MS)/Matrix Spike Duplicate (MSD) is outside criteria for samples 104788-003ADUP and 104788-003AMSD; however, the analytical batch was validated by the Laboratory Control Sample (LCS).

Analytical Comments for Method 8270

Dilution was necessary for sample 104788-010A, due to sample matrix.

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W15BGW
Lab Order:	104788	**Collection Date:**	3/26/2009 2:10:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104788-001A		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS11_090331A QC Batch: A09VW063 PrepDate: Analyst: **SLL**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	3/31/2009 05:29 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	3/31/2009 05:29 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	3/31/2009 05:29 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	3/31/2009 05:29 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	3/31/2009 05:29 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	3/31/2009 05:29 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	3/31/2009 05:29 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	3/31/2009 05:29 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	3/31/2009 05:29 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	3/31/2009 05:29 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	3/31/2009 05:29 PM
1,2-Dibromo-3-chloropropane	ND	0.50		µg/L	1	3/31/2009 05:29 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	3/31/2009 05:29 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2009 05:29 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	3/31/2009 05:29 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	3/31/2009 05:29 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	3/31/2009 05:29 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2009 05:29 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	3/31/2009 05:29 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2009 05:29 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	3/31/2009 05:29 PM
2-Chlorotoluene	ND	0.50		µg/L	1	3/31/2009 05:29 PM
4-Chlorotoluene	ND	0.50		µg/L	1	3/31/2009 05:29 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	3/31/2009 05:29 PM
Benzene	ND	0.50		µg/L	1	3/31/2009 05:29 PM
Bromobenzene	ND	0.50		µg/L	1	3/31/2009 05:29 PM
Bromodichloromethane	ND	0.50		µg/L	1	3/31/2009 05:29 PM
Bromoform	ND	0.50		µg/L	1	3/31/2009 05:29 PM
Bromomethane	ND	0.50		µg/L	1	3/31/2009 05:29 PM
Carbon tetrachloride	ND	0.50		µg/L	1	3/31/2009 05:29 PM
Chlorobenzene	ND	0.50		µg/L	1	3/31/2009 05:29 PM
Chloroethane	ND	0.50		µg/L	1	3/31/2009 05:29 PM
Chloroform	ND	0.50		µg/L	1	3/31/2009 05:29 PM
Chloromethane	ND	0.50		µg/L	1	3/31/2009 05:29 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	3/31/2009 05:29 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W15BGW
Lab Order:	104788	**Collection Date:**	3/26/2009 2:10:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104788-001A		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS11_090331A QC Batch: A09VW063 PrepDate: Analyst: **SLL**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
cis-1,3-Dichloropropene	ND	0.50		µg/L	1	3/31/2009 05:29 PM
Dibromochloromethane	ND	0.50		µg/L	1	3/31/2009 05:29 PM
Dibromomethane	ND	0.50		µg/L	1	3/31/2009 05:29 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	3/31/2009 05:29 PM
Ethylbenzene	ND	0.50		µg/L	1	3/31/2009 05:29 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	3/31/2009 05:29 PM
Isopropylbenzene	ND	0.50		µg/L	1	3/31/2009 05:29 PM
m,p-Xylene	ND	1.0		µg/L	1	3/31/2009 05:29 PM
Methylene chloride	ND	1.0		µg/L	1	3/31/2009 05:29 PM
n-Butylbenzene	ND	0.50		µg/L	1	3/31/2009 05:29 PM
n-Propylbenzene	ND	0.50		µg/L	1	3/31/2009 05:29 PM
Naphthalene	ND	0.50		µg/L	1	3/31/2009 05:29 PM
o-Xylene	ND	0.50		µg/L	1	3/31/2009 05:29 PM
sec-Butylbenzene	ND	0.50		µg/L	1	3/31/2009 05:29 PM
Styrene	ND	0.50		µg/L	1	3/31/2009 05:29 PM
tert-Butylbenzene	ND	0.50		µg/L	1	3/31/2009 05:29 PM
Tetrachloroethene	ND	0.50		µg/L	1	3/31/2009 05:29 PM
Toluene	ND	0.50		µg/L	1	3/31/2009 05:29 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	3/31/2009 05:29 PM
Trichloroethene	ND	0.50		µg/L	1	3/31/2009 05:29 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	3/31/2009 05:29 PM
Vinyl chloride	ND	0.50		µg/L	1	3/31/2009 05:29 PM
Surr: 1,2-Dichloroethane-d4	89.8	70-130		%REC	1	3/31/2009 05:29 PM
Surr: 4-Bromofluorobenzene	83.0	70-130		%REC	1	3/31/2009 05:29 PM
Surr: Dibromofluoromethane	93.6	70-130		%REC	1	3/31/2009 05:29 PM
Surr: Toluene-d8	97.0	70-130		%REC	1	3/31/2009 05:29 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W15BGW
Lab Order:	104788	**Collection Date:**	3/26/2009 2:10:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104788-001B		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
GASOLINE RANGE ORGANICS BY GC/FID						
		EPA 8015B(M)				
RunID: GC1_090401A	QC Batch: D09VW051			PrepDate:		Analyst: **BD**
GRO	ND	0.050		mg/L	1	4/1/2009 10:00 PM
Surr: Bromofluorobenzene (FID)	87.3	71-130		%REC	1	4/1/2009 10:00 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W15BGW
Lab Order:	104788	**Collection Date:**	3/26/2009 2:10:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104788-001C		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3510C **EPA 8270C**

RunID: MS6_090331A QC Batch: 54393 PrepDate: 3/31/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,2,4-Trichlorobenzene	ND	10		µg/L	1	4/1/2009 03:56 PM
1,2-Dichlorobenzene	ND	10		µg/L	1	4/1/2009 03:56 PM
1,3-Dichlorobenzene	ND	10		µg/L	1	4/1/2009 03:56 PM
1,4-Dichlorobenzene	ND	10		µg/L	1	4/1/2009 03:56 PM
2,4,5-Trichlorophenol	ND	10		µg/L	1	4/1/2009 03:56 PM
2,4,6-Trichlorophenol	ND	10		µg/L	1	4/1/2009 03:56 PM
2,4-Dichlorophenol	ND	10		µg/L	1	4/1/2009 03:56 PM
2,4-Dimethylphenol	ND	10		µg/L	1	4/1/2009 03:56 PM
2,4-Dinitrophenol	ND	50		µg/L	1	4/1/2009 03:56 PM
2,4-Dinitrotoluene	ND	10		µg/L	1	4/1/2009 03:56 PM
2,6-Dinitrotoluene	ND	10		µg/L	1	4/1/2009 03:56 PM
2-Chloronaphthalene	ND	10		µg/L	1	4/1/2009 03:56 PM
2-Chlorophenol	ND	10		µg/L	1	4/1/2009 03:56 PM
2-Methylnaphthalene	ND	10		µg/L	1	4/1/2009 03:56 PM
2-Methylphenol	ND	10		µg/L	1	4/1/2009 03:56 PM
2-Nitroaniline	ND	50		µg/L	1	4/1/2009 03:56 PM
2-Nitrophenol	ND	10		µg/L	1	4/1/2009 03:56 PM
3,3´-Dichlorobenzidine	ND	20		µg/L	1	4/1/2009 03:56 PM
3-Nitroaniline	ND	50		µg/L	1	4/1/2009 03:56 PM
4,6-Dinitro-2-methylphenol	ND	50		µg/L	1	4/1/2009 03:56 PM
4-Bromophenyl-phenylether	ND	10		µg/L	1	4/1/2009 03:56 PM
4-Chloro-3-methylphenol	ND	50		µg/L	1	4/1/2009 03:56 PM
4-Chloroaniline	ND	20		µg/L	1	4/1/2009 03:56 PM
4-Chlorophenyl-phenylether	ND	10		µg/L	1	4/1/2009 03:56 PM
4-Methylphenol	ND	10		µg/L	1	4/1/2009 03:56 PM
4-Nitroaniline	ND	20		µg/L	1	4/1/2009 03:56 PM
4-Nitrophenol	ND	50		µg/L	1	4/1/2009 03:56 PM
Acenaphthene	ND	10		µg/L	1	4/1/2009 03:56 PM
Acenaphthylene	ND	10		µg/L	1	4/1/2009 03:56 PM
Anthracene	ND	10		µg/L	1	4/1/2009 03:56 PM
Benzidine (M)	ND	50		µg/L	1	4/1/2009 03:56 PM
Benzo(a)anthracene	ND	10		µg/L	1	4/1/2009 03:56 PM
Benzo(a)pyrene	ND	10		µg/L	1	4/1/2009 03:56 PM
Benzo(b)fluoranthene	ND	10		µg/L	1	4/1/2009 03:56 PM
Benzo(g,h,i)perylene	ND	10		µg/L	1	4/1/2009 03:56 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W15BGW
Lab Order:	104788	**Collection Date:**	3/26/2009 2:10:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104788-001C		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3510C **EPA 8270C**

RunID: MS6_090331A QC Batch: 54393 PrepDate: 3/31/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Benzo(k)fluoranthene	ND	10		µg/L	1	4/1/2009 03:56 PM
Benzoic acid	ND	50		µg/L	1	4/1/2009 03:56 PM
Benzyl alcohol	ND	20		µg/L	1	4/1/2009 03:56 PM
Bis(2-chloroethoxy)methane	ND	10		µg/L	1	4/1/2009 03:56 PM
Bis(2-chloroethyl)ether	ND	10		µg/L	1	4/1/2009 03:56 PM
Bis(2-chloroisopropyl)ether	ND	10		µg/L	1	4/1/2009 03:56 PM
Bis(2-ethylhexyl)phthalate	ND	10		µg/L	1	4/1/2009 03:56 PM
Butylbenzylphthalate	ND	10		µg/L	1	4/1/2009 03:56 PM
Chrysene	ND	10		µg/L	1	4/1/2009 03:56 PM
Di-n-butylphthalate	ND	10		µg/L	1	4/1/2009 03:56 PM
Di-n-octylphthalate	ND	10		µg/L	1	4/1/2009 03:56 PM
Dibenz(a,h)anthracene	ND	10		µg/L	1	4/1/2009 03:56 PM
Dibenzofuran	ND	10		µg/L	1	4/1/2009 03:56 PM
Diethylphthalate	ND	10		µg/L	1	4/1/2009 03:56 PM
Dimethylphthalate	ND	10		µg/L	1	4/1/2009 03:56 PM
Fluoranthene	ND	10		µg/L	1	4/1/2009 03:56 PM
Fluorene	ND	10		µg/L	1	4/1/2009 03:56 PM
Hexachlorobenzene	ND	10		µg/L	1	4/1/2009 03:56 PM
Hexachlorobutadiene	ND	20		µg/L	1	4/1/2009 03:56 PM
Hexachlorocyclopentadiene	ND	10		µg/L	1	4/1/2009 03:56 PM
Hexachloroethane	ND	10		µg/L	1	4/1/2009 03:56 PM
Indeno(1,2,3-cd)pyrene	ND	10		µg/L	1	4/1/2009 03:56 PM
Isophorone	ND	10		µg/L	1	4/1/2009 03:56 PM
N-Nitrosodi-n-propylamine	ND	10		µg/L	1	4/1/2009 03:56 PM
N-Nitrosodiphenylamine	ND	10		µg/L	1	4/1/2009 03:56 PM
Naphthalene	ND	10		µg/L	1	4/1/2009 03:56 PM
Nitrobenzene	ND	10		µg/L	1	4/1/2009 03:56 PM
Pentachlorophenol	ND	50		µg/L	1	4/1/2009 03:56 PM
Phenanthrene	ND	10		µg/L	1	4/1/2009 03:56 PM
Phenol	ND	10		µg/L	1	4/1/2009 03:56 PM
Pyrene	ND	10		µg/L	1	4/1/2009 03:56 PM
Surr: 1,2-Dichlorobenzene-d4	64.8	42-98		%REC	1	4/1/2009 03:56 PM
Surr: 2,4,6-Tribromophenol	110	60-128		%REC	1	4/1/2009 03:56 PM
Surr: 2-Chlorophenol-d4	67.8	43-102		%REC	1	4/1/2009 03:56 PM
Surr: 2-Fluorobiphenyl	94.7	50-108		%REC	1	4/1/2009 03:56 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W15BGW
Lab Order:	104788	**Collection Date:**	3/26/2009 2:10:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104788-001C		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 3510C				**EPA 8270C**		
RunID: MS6_090331A	QC Batch: 54393			PrepDate: 3/31/2009	Analyst: **DMP**	
Surr: 2-Fluorophenol	42.3	22-69		%REC	1	4/1/2009 03:56 PM
Surr: 4-Terphenyl-d14	121	66-130		%REC	1	4/1/2009 03:56 PM
Surr: Nitrobenzene-d5	76.7	47-117		%REC	1	4/1/2009 03:56 PM
Surr: Phenol-d5	31.6	16-50		%REC	1	4/1/2009 03:56 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W15BGW
Lab Order:	104788	**Collection Date:**	3/26/2009 2:10:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104788-001D		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
EPA 3510C				**EPA 8015B**		
RunID: GC16_090401E	QC Batch: 54441			PrepDate:	4/1/2009	Analyst: **CBR**
DRO	ND	0.062		mg/L	1	4/2/2009 12:03 AM
ORO	ND	0.062		mg/L	1	4/2/2009 12:03 AM
Surr: p-Terphenyl	59.0	35-131		%REC	1	4/2/2009 12:03 AM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W15BGW
Lab Order:	104788	**Collection Date:**	3/26/2009 2:10:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104788-001E		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3010A			**EPA 6010B**		
RunID: ICP8_090403D	QC Batch: 54486			PrepDate:	4/2/2009	Analyst: **CL**
Antimony	ND	0.025		mg/L	5	4/3/2009 01:43 PM
Arsenic	ND	0.050		mg/L	5	4/3/2009 01:43 PM
Barium	0.16	0.015		mg/L	5	4/3/2009 01:43 PM
Beryllium	ND	0.015		mg/L	5	4/3/2009 01:43 PM
Cadmium	ND	0.015		mg/L	5	4/3/2009 01:43 PM
Chromium	ND	0.015		mg/L	5	4/3/2009 01:43 PM
Cobalt	0.070	0.015		mg/L	5	4/3/2009 01:43 PM
Copper	ND	0.025		mg/L	5	4/3/2009 01:43 PM
Lead	ND	0.025		mg/L	5	4/3/2009 01:43 PM
Molybdenum	ND	0.025		mg/L	5	4/3/2009 01:43 PM
Nickel	0.22	0.025		mg/L	5	4/3/2009 01:43 PM
Selenium	ND	0.050		mg/L	5	4/3/2009 01:43 PM
Silver	ND	0.015		mg/L	5	4/3/2009 01:43 PM
Thallium	ND	0.075		mg/L	5	4/3/2009 01:43 PM
Vanadium	ND	0.015		mg/L	5	4/3/2009 01:43 PM
Zinc	0.45	0.050		mg/L	5	4/3/2009 01:43 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7470A		
RunID: AA1_090403D	QC Batch: 54480			PrepDate:	4/2/2009	Analyst: **RQ**
Mercury	ND	0.20		µg/L	1	4/3/2009 03:25 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W15BGW
Lab Order:	104788	**Collection Date:**	3/26/2009 2:10:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104788-001F		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
TOTAL FILTERABLE RESIDUE						
		SM2540C				
RunID: WETCHEM_090401B	QC Batch: 54508			PrepDate:	4/1/2009	Analyst: **DDL**
Total Dissolved Solids (Residue, Filterable)	20000	200		mg/L	1	4/1/2009 01:00 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W15BGW
Lab Order:	104788	**Collection Date:**	3/26/2009 2:10:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104788-001G		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
OIL & GREASE						
		EPA 1664 _HEM				
RunID: WETCHEM2_090402B	QC Batch: 54502			PrepDate:	4/2/2009	Analyst: **KXV**
Oil & Grease	ND	4.4		mg/L	1	4/2/2009

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W15BGW
Lab Order:	104788	**Collection Date:**	3/26/2009 2:10:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104788-001H		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
CYANIDE, TOTAL						
	SM4500-CN E					
RunID: WETCHEM3_090403B	QC Batch: 54519			PrepDate:	4/3/2009	Analyst: **MFP**
Cyanide	ND	0.010		mg/L	1	4/3/2009

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W15BGW
Lab Order:	104788	**Collection Date:**	3/26/2009 2:10:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104788-001I		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
SULFIDE, DISSOLVED						
		SM4500-S= D				
RunID: WETCHEM3_090401D	QC Batch: R107702			PrepDate:	4/1/2009	Analyst: **MFP**
Sulfide	ND	0.010		mg/L	1	4/1/2009

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	Trip Blank (W15BGW)
Lab Order:	104788	**Collection Date:**	3/26/2009 4:00:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104788-002A		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS11_090331A QC Batch: A09VW063 PrepDate: Analyst: **SLL**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	3/31/2009 03:32 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	3/31/2009 03:32 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	3/31/2009 03:32 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	3/31/2009 03:32 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	3/31/2009 03:32 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	3/31/2009 03:32 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	3/31/2009 03:32 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	3/31/2009 03:32 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	3/31/2009 03:32 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	3/31/2009 03:32 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	3/31/2009 03:32 PM
1,2-Dibromo-3-chloropropane	ND	0.50		µg/L	1	3/31/2009 03:32 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	3/31/2009 03:32 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2009 03:32 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	3/31/2009 03:32 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	3/31/2009 03:32 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	3/31/2009 03:32 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2009 03:32 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	3/31/2009 03:32 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2009 03:32 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	3/31/2009 03:32 PM
2-Chlorotoluene	ND	0.50		µg/L	1	3/31/2009 03:32 PM
4-Chlorotoluene	ND	0.50		µg/L	1	3/31/2009 03:32 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	3/31/2009 03:32 PM
Benzene	ND	0.50		µg/L	1	3/31/2009 03:32 PM
Bromobenzene	ND	0.50		µg/L	1	3/31/2009 03:32 PM
Bromodichloromethane	ND	0.50		µg/L	1	3/31/2009 03:32 PM
Bromoform	ND	0.50		µg/L	1	3/31/2009 03:32 PM
Bromomethane	ND	0.50		µg/L	1	3/31/2009 03:32 PM
Carbon tetrachloride	ND	0.50		µg/L	1	3/31/2009 03:32 PM
Chlorobenzene	ND	0.50		µg/L	1	3/31/2009 03:32 PM
Chloroethane	ND	0.50		µg/L	1	3/31/2009 03:32 PM
Chloroform	ND	0.50		µg/L	1	3/31/2009 03:32 PM
Chloromethane	ND	0.50		µg/L	1	3/31/2009 03:32 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	3/31/2009 03:32 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	Trip Blank (W15BGW)
Lab Order:	104788	**Collection Date:**	3/26/2009 4:00:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104788-002A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS11_090331A	QC Batch: A09VW063			PrepDate:		Analyst: **SLL**
cis-1,3-Dichloropropene	ND	0.50		µg/L	1	3/31/2009 03:32 PM
Dibromochloromethane	ND	0.50		µg/L	1	3/31/2009 03:32 PM
Dibromomethane	ND	0.50		µg/L	1	3/31/2009 03:32 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	3/31/2009 03:32 PM
Ethylbenzene	ND	0.50		µg/L	1	3/31/2009 03:32 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	3/31/2009 03:32 PM
Isopropylbenzene	ND	0.50		µg/L	1	3/31/2009 03:32 PM
m,p-Xylene	ND	1.0		µg/L	1	3/31/2009 03:32 PM
Methylene chloride	ND	1.0		µg/L	1	3/31/2009 03:32 PM
n-Butylbenzene	ND	0.50		µg/L	1	3/31/2009 03:32 PM
n-Propylbenzene	ND	0.50		µg/L	1	3/31/2009 03:32 PM
Naphthalene	ND	0.50		µg/L	1	3/31/2009 03:32 PM
o-Xylene	ND	0.50		µg/L	1	3/31/2009 03:32 PM
sec-Butylbenzene	ND	0.50		µg/L	1	3/31/2009 03:32 PM
Styrene	ND	0.50		µg/L	1	3/31/2009 03:32 PM
tert-Butylbenzene	ND	0.50		µg/L	1	3/31/2009 03:32 PM
Tetrachloroethene	ND	0.50		µg/L	1	3/31/2009 03:32 PM
Toluene	ND	0.50		µg/L	1	3/31/2009 03:32 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	3/31/2009 03:32 PM
Trichloroethene	ND	0.50		µg/L	1	3/31/2009 03:32 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	3/31/2009 03:32 PM
Vinyl chloride	ND	0.50		µg/L	1	3/31/2009 03:32 PM
Surr: 1,2-Dichloroethane-d4	90.8	70-130		%REC	1	3/31/2009 03:32 PM
Surr: 4-Bromofluorobenzene	89.9	70-130		%REC	1	3/31/2009 03:32 PM
Surr: Dibromofluoromethane	97.3	70-130		%REC	1	3/31/2009 03:32 PM
Surr: Toluene-d8	104	70-130		%REC	1	3/31/2009 03:32 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	Trip Blank (W15BGW)
Lab Order:	104788	**Collection Date:**	3/26/2009 4:00:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104788-002B		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
GASOLINE RANGE ORGANICS BY GC/FID						
		EPA 8015B(M)				
RunID: GC1_090330A	QC Batch: D09VW048			PrepDate:		Analyst: **BD**
GRO	ND	0.050		mg/L	1	3/30/2009 06:01 PM
Surr: Bromofluorobenzene (FID)	106	71-130		%REC	1	3/30/2009 06:01 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Geocon Consultants, Inc. **Client Sample ID:** W15A (0')
Lab Order: 104788 **Collection Date:** 3/26/2009 11:00:00 AM
Project: Caltrans Dumbarton Bridge, E8435-06-18 **Matrix:** SOIL
Lab ID: 104788-003A

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090406C	QC Batch: 54531			PrepDate:	4/4/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	4/6/2009 04:27 PM
Arsenic	ND	1.0		mg/Kg	1	4/6/2009 04:27 PM
Barium	69	1.0		mg/Kg	1	4/6/2009 04:27 PM
Beryllium	ND	1.0		mg/Kg	1	4/6/2009 04:27 PM
Cadmium	ND	1.0		mg/Kg	1	4/6/2009 04:27 PM
Chromium	40	1.0		mg/Kg	1	4/6/2009 04:27 PM
Cobalt	17	1.0		mg/Kg	1	4/6/2009 04:27 PM
Copper	46	2.0		mg/Kg	1	4/6/2009 04:27 PM
Lead	ND	1.0		mg/Kg	1	4/6/2009 04:27 PM
Molybdenum	ND	1.0		mg/Kg	1	4/6/2009 04:27 PM
Nickel	34	1.0		mg/Kg	1	4/6/2009 04:27 PM
Selenium	3.2	1.0		mg/Kg	1	4/6/2009 04:27 PM
Silver	ND	1.0		mg/Kg	1	4/6/2009 04:27 PM
Thallium	ND	1.0		mg/Kg	1	4/6/2009 04:27 PM
Vanadium	60	1.0		mg/Kg	1	4/6/2009 04:27 PM
Zinc	44	1.0		mg/Kg	1	4/6/2009 04:27 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090402C	QC Batch: 54478			PrepDate:	4/2/2009	Analyst: **CBR**
DRO	ND	1.0		mg/Kg	1	4/2/2009 08:38 PM
ORO	ND	1.0		mg/Kg	1	4/2/2009 08:38 PM
Surr: p-Terphenyl	70.1	30-130		%REC	1	4/2/2009 08:38 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090402B	QC Batch: 54457			PrepDate:	4/1/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	4/2/2009 09:39 AM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090401A	QC Batch: 54445			PrepDate:	4/1/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	4/2/2009 12:33 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 12:33 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 12:33 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 12:33 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W15A (0')
Lab Order:	104788	**Collection Date:**	3/26/2009 11:00:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104788-003A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090401A QC Batch: 54445 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 12:33 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 12:33 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	4/2/2009 12:33 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	4/2/2009 12:33 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	4/2/2009 12:33 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 12:33 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 12:33 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	4/2/2009 12:33 PM
2-Chlorophenol	ND	330		µg/Kg	1	4/2/2009 12:33 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	4/2/2009 12:33 PM
2-Methylphenol	ND	330		µg/Kg	1	4/2/2009 12:33 PM
2-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 12:33 PM
2-Nitrophenol	ND	330		µg/Kg	1	4/2/2009 12:33 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	4/2/2009 12:33 PM
3-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 12:33 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	4/2/2009 12:33 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 12:33 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	4/2/2009 12:33 PM
4-Chloroaniline	ND	660		µg/Kg	1	4/2/2009 12:33 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 12:33 PM
4-Methylphenol	ND	330		µg/Kg	1	4/2/2009 12:33 PM
4-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 12:33 PM
4-Nitrophenol	ND	1600		µg/Kg	1	4/2/2009 12:33 PM
Acenaphthene	ND	330		µg/Kg	1	4/2/2009 12:33 PM
Acenaphthylene	ND	330		µg/Kg	1	4/2/2009 12:33 PM
Anthracene	ND	330		µg/Kg	1	4/2/2009 12:33 PM
Benzidine (M)	ND	1600		µg/Kg	1	4/2/2009 12:33 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	4/2/2009 12:33 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	4/2/2009 12:33 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	4/2/2009 12:33 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	4/2/2009 12:33 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	4/2/2009 12:33 PM
Benzoic acid	ND	1600		µg/Kg	1	4/2/2009 12:33 PM
Benzyl alcohol	ND	660		µg/Kg	1	4/2/2009 12:33 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	4/2/2009 12:33 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W15A (0')
Lab Order:	104788	**Collection Date:**	3/26/2009 11:00:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104788-003A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090401A QC Batch: 54445 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	4/2/2009 12:33 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	4/2/2009 12:33 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	4/2/2009 12:33 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	4/2/2009 12:33 PM
Chrysene	ND	330		µg/Kg	1	4/2/2009 12:33 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	4/2/2009 12:33 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	4/2/2009 12:33 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	4/2/2009 12:33 PM
Dibenzofuran	ND	330		µg/Kg	1	4/2/2009 12:33 PM
Diethylphthalate	ND	330		µg/Kg	1	4/2/2009 12:33 PM
Dimethylphthalate	ND	330		µg/Kg	1	4/2/2009 12:33 PM
Fluoranthene	ND	330		µg/Kg	1	4/2/2009 12:33 PM
Fluorene	ND	330		µg/Kg	1	4/2/2009 12:33 PM
Hexachlorobenzene	ND	330		µg/Kg	1	4/2/2009 12:33 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	4/2/2009 12:33 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	4/2/2009 12:33 PM
Hexachloroethane	ND	330		µg/Kg	1	4/2/2009 12:33 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	4/2/2009 12:33 PM
Isophorone	ND	330		µg/Kg	1	4/2/2009 12:33 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	4/2/2009 12:33 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	4/2/2009 12:33 PM
Naphthalene	ND	330		µg/Kg	1	4/2/2009 12:33 PM
Nitrobenzene	ND	330		µg/Kg	1	4/2/2009 12:33 PM
Pentachlorophenol	ND	1600		µg/Kg	1	4/2/2009 12:33 PM
Phenanthrene	ND	330		µg/Kg	1	4/2/2009 12:33 PM
Phenol	ND	330		µg/Kg	1	4/2/2009 12:33 PM
Pyrene	ND	330		µg/Kg	1	4/2/2009 12:33 PM
Surr: 1,2-Dichlorobenzene-d4	95.8	49-103		%REC	1	4/2/2009 12:33 PM
Surr: 2,4,6-Tribromophenol	105	47-129		%REC	1	4/2/2009 12:33 PM
Surr: 2-Chlorophenol-d4	102	54-109		%REC	1	4/2/2009 12:33 PM
Surr: 2-Fluorobiphenyl	100	59-108		%REC	1	4/2/2009 12:33 PM
Surr: 2-Fluorophenol	99.6	50-111		%REC	1	4/2/2009 12:33 PM
Surr: 4-Terphenyl-d14	119	58-135		%REC	1	4/2/2009 12:33 PM
Surr: Nitrobenzene-d5	98.0	54-115		%REC	1	4/2/2009 12:33 PM
Surr: Phenol-d5	102	58-112		%REC	1	4/2/2009 12:33 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W15A (5')
Lab Order:	104788	**Collection Date:**	3/26/2009 11:05:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104788-004A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090406C	QC Batch: 54531			PrepDate:	4/4/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	4/6/2009 04:31 PM
Arsenic	12	1.0		mg/Kg	1	4/6/2009 04:31 PM
Barium	98	1.0		mg/Kg	1	4/6/2009 04:31 PM
Beryllium	ND	1.0		mg/Kg	1	4/6/2009 04:31 PM
Cadmium	ND	1.0		mg/Kg	1	4/6/2009 04:31 PM
Chromium	26	1.0		mg/Kg	1	4/6/2009 04:31 PM
Cobalt	11	1.0		mg/Kg	1	4/6/2009 04:31 PM
Copper	36	2.0		mg/Kg	1	4/6/2009 04:31 PM
Lead	1.7	1.0		mg/Kg	1	4/6/2009 04:31 PM
Molybdenum	1.8	1.0		mg/Kg	1	4/6/2009 04:31 PM
Nickel	27	1.0		mg/Kg	1	4/6/2009 04:31 PM
Selenium	1.9	1.0		mg/Kg	1	4/6/2009 04:31 PM
Silver	ND	1.0		mg/Kg	1	4/6/2009 04:31 PM
Thallium	ND	1.0		mg/Kg	1	4/6/2009 04:31 PM
Vanadium	50	1.0		mg/Kg	1	4/6/2009 04:31 PM
Zinc	36	1.0		mg/Kg	1	4/6/2009 04:31 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090402C	QC Batch: 54478			PrepDate:	4/2/2009	Analyst: **CBR**
DRO	ND	1.0		mg/Kg	1	4/2/2009 08:56 PM
ORO	1.7	1.0		mg/Kg	1	4/2/2009 08:56 PM
Surr: p-Terphenyl	52.8	30-130		%REC	1	4/2/2009 08:56 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090402B	QC Batch: 54457			PrepDate:	4/1/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	4/2/2009 09:41 AM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090401A	QC Batch: 54445			PrepDate:	4/1/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	4/2/2009 01:00 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 01:00 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 01:00 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 01:00 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W15A (5')
Lab Order:	104788	**Collection Date:**	3/26/2009 11:05:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104788-004A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090401A QC Batch: 54445 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 01:00 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 01:00 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	4/2/2009 01:00 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	4/2/2009 01:00 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	4/2/2009 01:00 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 01:00 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 01:00 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	4/2/2009 01:00 PM
2-Chlorophenol	ND	330		µg/Kg	1	4/2/2009 01:00 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	4/2/2009 01:00 PM
2-Methylphenol	ND	330		µg/Kg	1	4/2/2009 01:00 PM
2-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 01:00 PM
2-Nitrophenol	ND	330		µg/Kg	1	4/2/2009 01:00 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	4/2/2009 01:00 PM
3-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 01:00 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	4/2/2009 01:00 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 01:00 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	4/2/2009 01:00 PM
4-Chloroaniline	ND	660		µg/Kg	1	4/2/2009 01:00 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 01:00 PM
4-Methylphenol	ND	330		µg/Kg	1	4/2/2009 01:00 PM
4-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 01:00 PM
4-Nitrophenol	ND	1600		µg/Kg	1	4/2/2009 01:00 PM
Acenaphthene	ND	330		µg/Kg	1	4/2/2009 01:00 PM
Acenaphthylene	ND	330		µg/Kg	1	4/2/2009 01:00 PM
Anthracene	ND	330		µg/Kg	1	4/2/2009 01:00 PM
Benzidine (M)	ND	1600		µg/Kg	1	4/2/2009 01:00 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	4/2/2009 01:00 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	4/2/2009 01:00 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	4/2/2009 01:00 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	4/2/2009 01:00 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	4/2/2009 01:00 PM
Benzoic acid	ND	1600		µg/Kg	1	4/2/2009 01:00 PM
Benzyl alcohol	ND	660		µg/Kg	1	4/2/2009 01:00 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	4/2/2009 01:00 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W15A (5')
Lab Order:	104788	**Collection Date:**	3/26/2009 11:05:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104788-004A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090401A QC Batch: 54445 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	4/2/2009 01:00 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	4/2/2009 01:00 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	4/2/2009 01:00 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	4/2/2009 01:00 PM
Chrysene	ND	330		µg/Kg	1	4/2/2009 01:00 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	4/2/2009 01:00 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	4/2/2009 01:00 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	4/2/2009 01:00 PM
Dibenzofuran	ND	330		µg/Kg	1	4/2/2009 01:00 PM
Diethylphthalate	ND	330		µg/Kg	1	4/2/2009 01:00 PM
Dimethylphthalate	ND	330		µg/Kg	1	4/2/2009 01:00 PM
Fluoranthene	ND	330		µg/Kg	1	4/2/2009 01:00 PM
Fluorene	ND	330		µg/Kg	1	4/2/2009 01:00 PM
Hexachlorobenzene	ND	330		µg/Kg	1	4/2/2009 01:00 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	4/2/2009 01:00 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	4/2/2009 01:00 PM
Hexachloroethane	ND	330		µg/Kg	1	4/2/2009 01:00 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	4/2/2009 01:00 PM
Isophorone	ND	330		µg/Kg	1	4/2/2009 01:00 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	4/2/2009 01:00 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	4/2/2009 01:00 PM
Naphthalene	ND	330		µg/Kg	1	4/2/2009 01:00 PM
Nitrobenzene	ND	330		µg/Kg	1	4/2/2009 01:00 PM
Pentachlorophenol	ND	1600		µg/Kg	1	4/2/2009 01:00 PM
Phenanthrene	ND	330		µg/Kg	1	4/2/2009 01:00 PM
Phenol	ND	330		µg/Kg	1	4/2/2009 01:00 PM
Pyrene	ND	330		µg/Kg	1	4/2/2009 01:00 PM
Surr: 1,2-Dichlorobenzene-d4	89.7	49-103		%REC	1	4/2/2009 01:00 PM
Surr: 2,4,6-Tribromophenol	103	47-129		%REC	1	4/2/2009 01:00 PM
Surr: 2-Chlorophenol-d4	96.4	54-109		%REC	1	4/2/2009 01:00 PM
Surr: 2-Fluorobiphenyl	98.5	59-108		%REC	1	4/2/2009 01:00 PM
Surr: 2-Fluorophenol	93.9	50-111		%REC	1	4/2/2009 01:00 PM
Surr: 4-Terphenyl-d14	119	58-135		%REC	1	4/2/2009 01:00 PM
Surr: Nitrobenzene-d5	95.8	54-115		%REC	1	4/2/2009 01:00 PM
Surr: Phenol-d5	95.5	58-112		%REC	1	4/2/2009 01:00 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W15A (10')
Lab Order:	104788	**Collection Date:**	3/26/2009 11:20:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104788-005A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B				**EPA 6010B**		
RunID: ICP8_090406C	QC Batch: 54531			PrepDate:	4/4/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	4/6/2009 04:35 PM
Arsenic	5.6	1.0		mg/Kg	1	4/6/2009 04:35 PM
Barium	68	1.0		mg/Kg	1	4/6/2009 04:35 PM
Beryllium	ND	1.0		mg/Kg	1	4/6/2009 04:35 PM
Cadmium	ND	1.0		mg/Kg	1	4/6/2009 04:35 PM
Chromium	47	1.0		mg/Kg	1	4/6/2009 04:35 PM
Cobalt	10	1.0		mg/Kg	1	4/6/2009 04:35 PM
Copper	24	2.0		mg/Kg	1	4/6/2009 04:35 PM
Lead	22	1.0		mg/Kg	1	4/6/2009 04:35 PM
Molybdenum	ND	1.0		mg/Kg	1	4/6/2009 04:35 PM
Nickel	59	1.0		mg/Kg	1	4/6/2009 04:35 PM
Selenium	2.1	1.0		mg/Kg	1	4/6/2009 04:35 PM
Silver	ND	1.0		mg/Kg	1	4/6/2009 04:35 PM
Thallium	ND	1.0		mg/Kg	1	4/6/2009 04:35 PM
Vanadium	38	1.0		mg/Kg	1	4/6/2009 04:35 PM
Zinc	66	1.0		mg/Kg	1	4/6/2009 04:35 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
EPA 3550B				**EPA 8015B(M)**		
RunID: GC16_090402C	QC Batch: 54478			PrepDate:	4/2/2009	Analyst: **CBR**
DRO	2.8	1.0		mg/Kg	1	4/2/2009 08:47 PM
ORO	2.4	1.0		mg/Kg	1	4/2/2009 08:47 PM
Surr: p-Terphenyl	58.8	30-130		%REC	1	4/2/2009 08:47 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090402B	QC Batch: 54457			PrepDate:	4/1/2009	Analyst: **RQ**
Mercury	0.22	0.10		mg/Kg	1	4/2/2009 09:43 AM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 3550B				**EPA 8270C**		
RunID: MS 13_090401A	QC Batch: 54445			PrepDate:	4/1/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	4/2/2009 01:28 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 01:28 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 01:28 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 01:28 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W15A (10')
Lab Order:	104788	**Collection Date:**	3/26/2009 11:20:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104788-005A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090401A QC Batch: 54445 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 01:28 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 01:28 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	4/2/2009 01:28 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	4/2/2009 01:28 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	4/2/2009 01:28 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 01:28 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 01:28 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	4/2/2009 01:28 PM
2-Chlorophenol	ND	330		µg/Kg	1	4/2/2009 01:28 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	4/2/2009 01:28 PM
2-Methylphenol	ND	330		µg/Kg	1	4/2/2009 01:28 PM
2-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 01:28 PM
2-Nitrophenol	ND	330		µg/Kg	1	4/2/2009 01:28 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	4/2/2009 01:28 PM
3-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 01:28 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	4/2/2009 01:28 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 01:28 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	4/2/2009 01:28 PM
4-Chloroaniline	ND	660		µg/Kg	1	4/2/2009 01:28 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 01:28 PM
4-Methylphenol	ND	330		µg/Kg	1	4/2/2009 01:28 PM
4-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 01:28 PM
4-Nitrophenol	ND	1600		µg/Kg	1	4/2/2009 01:28 PM
Acenaphthene	ND	330		µg/Kg	1	4/2/2009 01:28 PM
Acenaphthylene	ND	330		µg/Kg	1	4/2/2009 01:28 PM
Anthracene	ND	330		µg/Kg	1	4/2/2009 01:28 PM
Benzidine (M)	ND	1600		µg/Kg	1	4/2/2009 01:28 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	4/2/2009 01:28 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	4/2/2009 01:28 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	4/2/2009 01:28 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	4/2/2009 01:28 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	4/2/2009 01:28 PM
Benzoic acid	ND	1600		µg/Kg	1	4/2/2009 01:28 PM
Benzyl alcohol	ND	660		µg/Kg	1	4/2/2009 01:28 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	4/2/2009 01:28 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W15A (10')
Lab Order:	104788	**Collection Date:**	3/26/2009 11:20:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104788-005A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090401A QC Batch: 54445 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	4/2/2009 01:28 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	4/2/2009 01:28 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	4/2/2009 01:28 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	4/2/2009 01:28 PM
Chrysene	ND	330		µg/Kg	1	4/2/2009 01:28 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	4/2/2009 01:28 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	4/2/2009 01:28 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	4/2/2009 01:28 PM
Dibenzofuran	ND	330		µg/Kg	1	4/2/2009 01:28 PM
Diethylphthalate	ND	330		µg/Kg	1	4/2/2009 01:28 PM
Dimethylphthalate	ND	330		µg/Kg	1	4/2/2009 01:28 PM
Fluoranthene	ND	330		µg/Kg	1	4/2/2009 01:28 PM
Fluorene	ND	330		µg/Kg	1	4/2/2009 01:28 PM
Hexachlorobenzene	ND	330		µg/Kg	1	4/2/2009 01:28 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	4/2/2009 01:28 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	4/2/2009 01:28 PM
Hexachloroethane	ND	330		µg/Kg	1	4/2/2009 01:28 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	4/2/2009 01:28 PM
Isophorone	ND	330		µg/Kg	1	4/2/2009 01:28 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	4/2/2009 01:28 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	4/2/2009 01:28 PM
Naphthalene	ND	330		µg/Kg	1	4/2/2009 01:28 PM
Nitrobenzene	ND	330		µg/Kg	1	4/2/2009 01:28 PM
Pentachlorophenol	ND	1600		µg/Kg	1	4/2/2009 01:28 PM
Phenanthrene	ND	330		µg/Kg	1	4/2/2009 01:28 PM
Phenol	ND	330		µg/Kg	1	4/2/2009 01:28 PM
Pyrene	ND	330		µg/Kg	1	4/2/2009 01:28 PM
Surr: 1,2-Dichlorobenzene-d4	90.1	49-103		%REC	1	4/2/2009 01:28 PM
Surr: 2,4,6-Tribromophenol	103	47-129		%REC	1	4/2/2009 01:28 PM
Surr: 2-Chlorophenol-d4	97.5	54-109		%REC	1	4/2/2009 01:28 PM
Surr: 2-Fluorobiphenyl	97.5	59-108		%REC	1	4/2/2009 01:28 PM
Surr: 2-Fluorophenol	96.4	50-111		%REC	1	4/2/2009 01:28 PM
Surr: 4-Terphenyl-d14	121	58-135		%REC	1	4/2/2009 01:28 PM
Surr: Nitrobenzene-d5	97.1	54-115		%REC	1	4/2/2009 01:28 PM
Surr: Phenol-d5	98.2	58-112		%REC	1	4/2/2009 01:28 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W15A (15')
Lab Order:	104788	**Collection Date:**	3/26/2009 11:30:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104788-006A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B				**EPA 6010B**		
RunID: ICP8_090406C	QC Batch: 54531			PrepDate:	4/4/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	4/6/2009 04:46 PM
Arsenic	2.9	1.0		mg/Kg	1	4/6/2009 04:46 PM
Barium	15	1.0		mg/Kg	1	4/6/2009 04:46 PM
Beryllium	ND	1.0		mg/Kg	1	4/6/2009 04:46 PM
Cadmium	ND	1.0		mg/Kg	1	4/6/2009 04:46 PM
Chromium	23	1.0		mg/Kg	1	4/6/2009 04:46 PM
Cobalt	2.7	1.0		mg/Kg	1	4/6/2009 04:46 PM
Copper	8.9	2.0		mg/Kg	1	4/6/2009 04:46 PM
Lead	2.8	1.0		mg/Kg	1	4/6/2009 04:46 PM
Molybdenum	2.8	1.0		mg/Kg	1	4/6/2009 04:46 PM
Nickel	27	1.0		mg/Kg	1	4/6/2009 04:46 PM
Selenium	1.1	1.0		mg/Kg	1	4/6/2009 04:46 PM
Silver	ND	1.0		mg/Kg	1	4/6/2009 04:46 PM
Thallium	ND	1.0		mg/Kg	1	4/6/2009 04:46 PM
Vanadium	26	1.0		mg/Kg	1	4/6/2009 04:46 PM
Zinc	23	1.0		mg/Kg	1	4/6/2009 04:46 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
EPA 3550B				**EPA 8015B(M)**		
RunID: GC16_090402C	QC Batch: 54478			PrepDate:	4/2/2009	Analyst: **CBR**
DRO	ND	1.0		mg/Kg	1	4/2/2009 07:54 PM
ORO	ND	1.0		mg/Kg	1	4/2/2009 07:54 PM
Surr: p-Terphenyl	54.7	30-130		%REC	1	4/2/2009 07:54 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090402B	QC Batch: 54457			PrepDate:	4/1/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	4/2/2009 09:45 AM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 3550B				**EPA 8270C**		
RunID: MS 13_090401A	QC Batch: 54445			PrepDate:	4/1/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	4/2/2009 01:56 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 01:56 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 01:56 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 01:56 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W15A (15')
Lab Order:	104788	**Collection Date:**	3/26/2009 11:30:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104788-006A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090401A QC Batch: 54445 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 01:56 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 01:56 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	4/2/2009 01:56 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	4/2/2009 01:56 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	4/2/2009 01:56 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 01:56 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 01:56 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	4/2/2009 01:56 PM
2-Chlorophenol	ND	330		µg/Kg	1	4/2/2009 01:56 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	4/2/2009 01:56 PM
2-Methylphenol	ND	330		µg/Kg	1	4/2/2009 01:56 PM
2-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 01:56 PM
2-Nitrophenol	ND	330		µg/Kg	1	4/2/2009 01:56 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	4/2/2009 01:56 PM
3-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 01:56 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	4/2/2009 01:56 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 01:56 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	4/2/2009 01:56 PM
4-Chloroaniline	ND	660		µg/Kg	1	4/2/2009 01:56 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 01:56 PM
4-Methylphenol	ND	330		µg/Kg	1	4/2/2009 01:56 PM
4-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 01:56 PM
4-Nitrophenol	ND	1600		µg/Kg	1	4/2/2009 01:56 PM
Acenaphthene	ND	330		µg/Kg	1	4/2/2009 01:56 PM
Acenaphthylene	ND	330		µg/Kg	1	4/2/2009 01:56 PM
Anthracene	ND	330		µg/Kg	1	4/2/2009 01:56 PM
Benzidine (M)	ND	1600		µg/Kg	1	4/2/2009 01:56 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	4/2/2009 01:56 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	4/2/2009 01:56 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	4/2/2009 01:56 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	4/2/2009 01:56 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	4/2/2009 01:56 PM
Benzoic acid	ND	1600		µg/Kg	1	4/2/2009 01:56 PM
Benzyl alcohol	ND	660		µg/Kg	1	4/2/2009 01:56 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	4/2/2009 01:56 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W15A (15')
Lab Order:	104788	**Collection Date:**	3/26/2009 11:30:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104788-006A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090401A QC Batch: 54445 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	4/2/2009 01:56 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	4/2/2009 01:56 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	4/2/2009 01:56 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	4/2/2009 01:56 PM
Chrysene	ND	330		µg/Kg	1	4/2/2009 01:56 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	4/2/2009 01:56 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	4/2/2009 01:56 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	4/2/2009 01:56 PM
Dibenzofuran	ND	330		µg/Kg	1	4/2/2009 01:56 PM
Diethylphthalate	ND	330		µg/Kg	1	4/2/2009 01:56 PM
Dimethylphthalate	ND	330		µg/Kg	1	4/2/2009 01:56 PM
Fluoranthene	ND	330		µg/Kg	1	4/2/2009 01:56 PM
Fluorene	ND	330		µg/Kg	1	4/2/2009 01:56 PM
Hexachlorobenzene	ND	330		µg/Kg	1	4/2/2009 01:56 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	4/2/2009 01:56 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	4/2/2009 01:56 PM
Hexachloroethane	ND	330		µg/Kg	1	4/2/2009 01:56 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	4/2/2009 01:56 PM
Isophorone	ND	330		µg/Kg	1	4/2/2009 01:56 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	4/2/2009 01:56 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	4/2/2009 01:56 PM
Naphthalene	ND	330		µg/Kg	1	4/2/2009 01:56 PM
Nitrobenzene	ND	330		µg/Kg	1	4/2/2009 01:56 PM
Pentachlorophenol	ND	1600		µg/Kg	1	4/2/2009 01:56 PM
Phenanthrene	ND	330		µg/Kg	1	4/2/2009 01:56 PM
Phenol	ND	330		µg/Kg	1	4/2/2009 01:56 PM
Pyrene	ND	330		µg/Kg	1	4/2/2009 01:56 PM
Surr: 1,2-Dichlorobenzene-d4	88.0	49-103		%REC	1	4/2/2009 01:56 PM
Surr: 2,4,6-Tribromophenol	103	47-129		%REC	1	4/2/2009 01:56 PM
Surr: 2-Chlorophenol-d4	95.2	54-109		%REC	1	4/2/2009 01:56 PM
Surr: 2-Fluorobiphenyl	96.6	59-108		%REC	1	4/2/2009 01:56 PM
Surr: 2-Fluorophenol	93.6	50-111		%REC	1	4/2/2009 01:56 PM
Surr: 4-Terphenyl-d14	119	58-135		%REC	1	4/2/2009 01:56 PM
Surr: Nitrobenzene-d5	94.2	54-115		%REC	1	4/2/2009 01:56 PM
Surr: Phenol-d5	95.1	58-112		%REC	1	4/2/2009 01:56 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W20B (0')
Lab Order:	104788	**Collection Date:**	3/26/2009 2:34:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104788-007A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090406C	QC Batch: 54531			PrepDate:	4/4/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	4/6/2009 04:50 PM
Arsenic	ND	1.0		mg/Kg	1	4/6/2009 04:50 PM
Barium	66	1.0		mg/Kg	1	4/6/2009 04:50 PM
Beryllium	ND	1.0		mg/Kg	1	4/6/2009 04:50 PM
Cadmium	ND	1.0		mg/Kg	1	4/6/2009 04:50 PM
Chromium	48	1.0		mg/Kg	1	4/6/2009 04:50 PM
Cobalt	17	1.0		mg/Kg	1	4/6/2009 04:50 PM
Copper	43	2.0		mg/Kg	1	4/6/2009 04:50 PM
Lead	ND	1.0		mg/Kg	1	4/6/2009 04:50 PM
Molybdenum	ND	1.0		mg/Kg	1	4/6/2009 04:50 PM
Nickel	42	1.0		mg/Kg	1	4/6/2009 04:50 PM
Selenium	1.6	1.0		mg/Kg	1	4/6/2009 04:50 PM
Silver	ND	1.0		mg/Kg	1	4/6/2009 04:50 PM
Thallium	ND	1.0		mg/Kg	1	4/6/2009 04:50 PM
Vanadium	44	1.0		mg/Kg	1	4/6/2009 04:50 PM
Zinc	34	1.0		mg/Kg	1	4/6/2009 04:50 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090402C	QC Batch: 54478			PrepDate:	4/2/2009	Analyst: **CBR**
DRO	5.2	1.0		mg/Kg	1	4/2/2009 09:15 PM
ORO	18	1.0		mg/Kg	1	4/2/2009 09:15 PM
Surr: p-Terphenyl	62.4	30-130		%REC	1	4/2/2009 09:15 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090402B	QC Batch: 54457			PrepDate:	4/1/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	4/2/2009 09:48 AM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090401A	QC Batch: 54445			PrepDate:	4/1/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	4/2/2009 02:23 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 02:23 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 02:23 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 02:23 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W20B (0')
Lab Order:	104788	**Collection Date:**	3/26/2009 2:34:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104788-007A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090401A QC Batch: 54445 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 02:23 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 02:23 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	4/2/2009 02:23 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	4/2/2009 02:23 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	4/2/2009 02:23 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 02:23 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 02:23 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	4/2/2009 02:23 PM
2-Chlorophenol	ND	330		µg/Kg	1	4/2/2009 02:23 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	4/2/2009 02:23 PM
2-Methylphenol	ND	330		µg/Kg	1	4/2/2009 02:23 PM
2-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 02:23 PM
2-Nitrophenol	ND	330		µg/Kg	1	4/2/2009 02:23 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	4/2/2009 02:23 PM
3-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 02:23 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	4/2/2009 02:23 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 02:23 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	4/2/2009 02:23 PM
4-Chloroaniline	ND	660		µg/Kg	1	4/2/2009 02:23 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 02:23 PM
4-Methylphenol	ND	330		µg/Kg	1	4/2/2009 02:23 PM
4-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 02:23 PM
4-Nitrophenol	ND	1600		µg/Kg	1	4/2/2009 02:23 PM
Acenaphthene	ND	330		µg/Kg	1	4/2/2009 02:23 PM
Acenaphthylene	ND	330		µg/Kg	1	4/2/2009 02:23 PM
Anthracene	ND	330		µg/Kg	1	4/2/2009 02:23 PM
Benzidine (M)	ND	1600		µg/Kg	1	4/2/2009 02:23 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	4/2/2009 02:23 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	4/2/2009 02:23 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	4/2/2009 02:23 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	4/2/2009 02:23 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	4/2/2009 02:23 PM
Benzoic acid	ND	1600		µg/Kg	1	4/2/2009 02:23 PM
Benzyl alcohol	ND	660		µg/Kg	1	4/2/2009 02:23 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	4/2/2009 02:23 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W20B (0')
Lab Order:	104788	**Collection Date:**	3/26/2009 2:34:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104788-007A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090401A QC Batch: 54445 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	4/2/2009 02:23 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	4/2/2009 02:23 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	4/2/2009 02:23 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	4/2/2009 02:23 PM
Chrysene	ND	330		µg/Kg	1	4/2/2009 02:23 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	4/2/2009 02:23 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	4/2/2009 02:23 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	4/2/2009 02:23 PM
Dibenzofuran	ND	330		µg/Kg	1	4/2/2009 02:23 PM
Diethylphthalate	ND	330		µg/Kg	1	4/2/2009 02:23 PM
Dimethylphthalate	ND	330		µg/Kg	1	4/2/2009 02:23 PM
Fluoranthene	ND	330		µg/Kg	1	4/2/2009 02:23 PM
Fluorene	ND	330		µg/Kg	1	4/2/2009 02:23 PM
Hexachlorobenzene	ND	330		µg/Kg	1	4/2/2009 02:23 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	4/2/2009 02:23 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	4/2/2009 02:23 PM
Hexachloroethane	ND	330		µg/Kg	1	4/2/2009 02:23 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	4/2/2009 02:23 PM
Isophorone	ND	330		µg/Kg	1	4/2/2009 02:23 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	4/2/2009 02:23 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	4/2/2009 02:23 PM
Naphthalene	ND	330		µg/Kg	1	4/2/2009 02:23 PM
Nitrobenzene	ND	330		µg/Kg	1	4/2/2009 02:23 PM
Pentachlorophenol	ND	1600		µg/Kg	1	4/2/2009 02:23 PM
Phenanthrene	ND	330		µg/Kg	1	4/2/2009 02:23 PM
Phenol	ND	330		µg/Kg	1	4/2/2009 02:23 PM
Pyrene	ND	330		µg/Kg	1	4/2/2009 02:23 PM
Surr: 1,2-Dichlorobenzene-d4	87.4	49-103		%REC	1	4/2/2009 02:23 PM
Surr: 2,4,6-Tribromophenol	98.1	47-129		%REC	1	4/2/2009 02:23 PM
Surr: 2-Chlorophenol-d4	95.6	54-109		%REC	1	4/2/2009 02:23 PM
Surr: 2-Fluorobiphenyl	96.9	59-108		%REC	1	4/2/2009 02:23 PM
Surr: 2-Fluorophenol	93.4	50-111		%REC	1	4/2/2009 02:23 PM
Surr: 4-Terphenyl-d14	116	58-135		%REC	1	4/2/2009 02:23 PM
Surr: Nitrobenzene-d5	94.8	54-115		%REC	1	4/2/2009 02:23 PM
Surr: Phenol-d5	94.2	58-112		%REC	1	4/2/2009 02:23 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W20B (10')
Lab Order:	104788	**Collection Date:**	3/26/2009 2:48:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104788-008A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B				**EPA 6010B**		
RunID: ICP8_090406C	QC Batch: 54531			PrepDate:	4/4/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	4/6/2009 04:53 PM
Arsenic	3.3	1.0		mg/Kg	1	4/6/2009 04:53 PM
Barium	20	1.0		mg/Kg	1	4/6/2009 04:53 PM
Beryllium	ND	1.0		mg/Kg	1	4/6/2009 04:53 PM
Cadmium	ND	1.0		mg/Kg	1	4/6/2009 04:53 PM
Chromium	42	1.0		mg/Kg	1	4/6/2009 04:53 PM
Cobalt	7.9	1.0		mg/Kg	1	4/6/2009 04:53 PM
Copper	18	2.0		mg/Kg	1	4/6/2009 04:53 PM
Lead	4.8	1.0		mg/Kg	1	4/6/2009 04:53 PM
Molybdenum	ND	1.0		mg/Kg	1	4/6/2009 04:53 PM
Nickel	48	1.0		mg/Kg	1	4/6/2009 04:53 PM
Selenium	1.8	1.0		mg/Kg	1	4/6/2009 04:53 PM
Silver	ND	1.0		mg/Kg	1	4/6/2009 04:53 PM
Thallium	ND	1.0		mg/Kg	1	4/6/2009 04:53 PM
Vanadium	33	1.0		mg/Kg	1	4/6/2009 04:53 PM
Zinc	45	1.0		mg/Kg	1	4/6/2009 04:53 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
EPA 3550B				**EPA 8015B(M)**		
RunID: GC16_090402C	QC Batch: 54478			PrepDate:	4/2/2009	Analyst: **CBR**
DRO	ND	1.0		mg/Kg	1	4/2/2009 08:03 PM
ORO	ND	1.0		mg/Kg	1	4/2/2009 08:03 PM
Surr: p-Terphenyl	46.9	30-130		%REC	1	4/2/2009 08:03 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090402B	QC Batch: 54457			PrepDate:	4/1/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	4/2/2009 09:50 AM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 3550B				**EPA 8270C**		
RunID: MS 13_090401A	QC Batch: 54445			PrepDate:	4/1/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	4/2/2009 02:51 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 02:51 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 02:51 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 02:51 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W20B (10')
Lab Order:	104788	**Collection Date:**	3/26/2009 2:48:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104788-008A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090401A QC Batch: 54445 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 02:51 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 02:51 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	4/2/2009 02:51 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	4/2/2009 02:51 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	4/2/2009 02:51 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 02:51 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 02:51 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	4/2/2009 02:51 PM
2-Chlorophenol	ND	330		µg/Kg	1	4/2/2009 02:51 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	4/2/2009 02:51 PM
2-Methylphenol	ND	330		µg/Kg	1	4/2/2009 02:51 PM
2-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 02:51 PM
2-Nitrophenol	ND	330		µg/Kg	1	4/2/2009 02:51 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	4/2/2009 02:51 PM
3-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 02:51 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	4/2/2009 02:51 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 02:51 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	4/2/2009 02:51 PM
4-Chloroaniline	ND	660		µg/Kg	1	4/2/2009 02:51 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 02:51 PM
4-Methylphenol	ND	330		µg/Kg	1	4/2/2009 02:51 PM
4-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 02:51 PM
4-Nitrophenol	ND	1600		µg/Kg	1	4/2/2009 02:51 PM
Acenaphthene	ND	330		µg/Kg	1	4/2/2009 02:51 PM
Acenaphthylene	ND	330		µg/Kg	1	4/2/2009 02:51 PM
Anthracene	ND	330		µg/Kg	1	4/2/2009 02:51 PM
Benzidine (M)	ND	1600		µg/Kg	1	4/2/2009 02:51 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	4/2/2009 02:51 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	4/2/2009 02:51 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	4/2/2009 02:51 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	4/2/2009 02:51 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	4/2/2009 02:51 PM
Benzoic acid	ND	1600		µg/Kg	1	4/2/2009 02:51 PM
Benzyl alcohol	ND	660		µg/Kg	1	4/2/2009 02:51 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	4/2/2009 02:51 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W20B (10')
Lab Order:	104788	**Collection Date:**	3/26/2009 2:48:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104788-008A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090401A QC Batch: 54445 PrepDate: 4/1/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	4/2/2009 02:51 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	4/2/2009 02:51 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	4/2/2009 02:51 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	4/2/2009 02:51 PM
Chrysene	ND	330		µg/Kg	1	4/2/2009 02:51 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	4/2/2009 02:51 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	4/2/2009 02:51 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	4/2/2009 02:51 PM
Dibenzofuran	ND	330		µg/Kg	1	4/2/2009 02:51 PM
Diethylphthalate	ND	330		µg/Kg	1	4/2/2009 02:51 PM
Dimethylphthalate	ND	330		µg/Kg	1	4/2/2009 02:51 PM
Fluoranthene	ND	330		µg/Kg	1	4/2/2009 02:51 PM
Fluorene	ND	330		µg/Kg	1	4/2/2009 02:51 PM
Hexachlorobenzene	ND	330		µg/Kg	1	4/2/2009 02:51 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	4/2/2009 02:51 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	4/2/2009 02:51 PM
Hexachloroethane	ND	330		µg/Kg	1	4/2/2009 02:51 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	4/2/2009 02:51 PM
Isophorone	ND	330		µg/Kg	1	4/2/2009 02:51 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	4/2/2009 02:51 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	4/2/2009 02:51 PM
Naphthalene	ND	330		µg/Kg	1	4/2/2009 02:51 PM
Nitrobenzene	ND	330		µg/Kg	1	4/2/2009 02:51 PM
Pentachlorophenol	ND	1600		µg/Kg	1	4/2/2009 02:51 PM
Phenanthrene	ND	330		µg/Kg	1	4/2/2009 02:51 PM
Phenol	ND	330		µg/Kg	1	4/2/2009 02:51 PM
Pyrene	ND	330		µg/Kg	1	4/2/2009 02:51 PM
Surr: 1,2-Dichlorobenzene-d4	91.8	49-103		%REC	1	4/2/2009 02:51 PM
Surr: 2,4,6-Tribromophenol	106	47-129		%REC	1	4/2/2009 02:51 PM
Surr: 2-Chlorophenol-d4	98.5	54-109		%REC	1	4/2/2009 02:51 PM
Surr: 2-Fluorobiphenyl	100	59-108		%REC	1	4/2/2009 02:51 PM
Surr: 2-Fluorophenol	96.4	50-111		%REC	1	4/2/2009 02:51 PM
Surr: 4-Terphenyl-d14	125	58-135		%REC	1	4/2/2009 02:51 PM
Surr: Nitrobenzene-d5	99.2	54-115		%REC	1	4/2/2009 02:51 PM
Surr: Phenol-d5	97.6	58-112		%REC	1	4/2/2009 02:51 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W20B (15')
Lab Order:	104788	**Collection Date:**	3/26/2009 2:59:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104788-009A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090406C	QC Batch: 54531			PrepDate:	4/4/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	4/6/2009 04:56 PM
Arsenic	4.4	1.0		mg/Kg	1	4/6/2009 04:56 PM
Barium	16	1.0		mg/Kg	1	4/6/2009 04:56 PM
Beryllium	ND	1.0		mg/Kg	1	4/6/2009 04:56 PM
Cadmium	ND	1.0		mg/Kg	1	4/6/2009 04:56 PM
Chromium	35	1.0		mg/Kg	1	4/6/2009 04:56 PM
Cobalt	5.0	1.0		mg/Kg	1	4/6/2009 04:56 PM
Copper	9.9	2.0		mg/Kg	1	4/6/2009 04:56 PM
Lead	6.6	1.0		mg/Kg	1	4/6/2009 04:56 PM
Molybdenum	ND	1.0		mg/Kg	1	4/6/2009 04:56 PM
Nickel	38	1.0		mg/Kg	1	4/6/2009 04:56 PM
Selenium	1.5	1.0		mg/Kg	1	4/6/2009 04:56 PM
Silver	ND	1.0		mg/Kg	1	4/6/2009 04:56 PM
Thallium	ND	1.0		mg/Kg	1	4/6/2009 04:56 PM
Vanadium	29	1.0		mg/Kg	1	4/6/2009 04:56 PM
Zinc	37	1.0		mg/Kg	1	4/6/2009 04:56 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090402C	QC Batch: 54478			PrepDate:	4/2/2009	Analyst: **CBR**
DRO	1.3	1.0		mg/Kg	1	4/2/2009 08:12 PM
ORO	ND	1.0		mg/Kg	1	4/2/2009 08:12 PM
Surr: p-Terphenyl	49.0	30-130		%REC	1	4/2/2009 08:12 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090402B	QC Batch: 54457			PrepDate:	4/1/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	4/2/2009 09:52 AM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090402A	QC Batch: 54470			PrepDate:	4/2/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	4/2/2009 06:49 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 06:49 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 06:49 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 06:49 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W20B (15')
Lab Order:	104788	**Collection Date:**	3/26/2009 2:59:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104788-009A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090402A QC Batch: 54470 PrepDate: 4/2/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 06:49 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 06:49 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	4/2/2009 06:49 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	4/2/2009 06:49 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	4/2/2009 06:49 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 06:49 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 06:49 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	4/2/2009 06:49 PM
2-Chlorophenol	ND	330		µg/Kg	1	4/2/2009 06:49 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	4/2/2009 06:49 PM
2-Methylphenol	ND	330		µg/Kg	1	4/2/2009 06:49 PM
2-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 06:49 PM
2-Nitrophenol	ND	330		µg/Kg	1	4/2/2009 06:49 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	4/2/2009 06:49 PM
3-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 06:49 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	4/2/2009 06:49 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 06:49 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	4/2/2009 06:49 PM
4-Chloroaniline	ND	660		µg/Kg	1	4/2/2009 06:49 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 06:49 PM
4-Methylphenol	ND	330		µg/Kg	1	4/2/2009 06:49 PM
4-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 06:49 PM
4-Nitrophenol	ND	1600		µg/Kg	1	4/2/2009 06:49 PM
Acenaphthene	ND	330		µg/Kg	1	4/2/2009 06:49 PM
Acenaphthylene	ND	330		µg/Kg	1	4/2/2009 06:49 PM
Anthracene	ND	330		µg/Kg	1	4/2/2009 06:49 PM
Benzidine (M)	ND	1600		µg/Kg	1	4/2/2009 06:49 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	4/2/2009 06:49 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	4/2/2009 06:49 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	4/2/2009 06:49 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	4/2/2009 06:49 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	4/2/2009 06:49 PM
Benzoic acid	ND	1600		µg/Kg	1	4/2/2009 06:49 PM
Benzyl alcohol	ND	660		µg/Kg	1	4/2/2009 06:49 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	4/2/2009 06:49 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W20B (15')
Lab Order:	104788	**Collection Date:**	3/26/2009 2:59:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104788-009A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090402A QC Batch: 54470 PrepDate: 4/2/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	4/2/2009 06:49 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	4/2/2009 06:49 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	4/2/2009 06:49 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	4/2/2009 06:49 PM
Chrysene	ND	330		µg/Kg	1	4/2/2009 06:49 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	4/2/2009 06:49 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	4/2/2009 06:49 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	4/2/2009 06:49 PM
Dibenzofuran	ND	330		µg/Kg	1	4/2/2009 06:49 PM
Diethylphthalate	ND	330		µg/Kg	1	4/2/2009 06:49 PM
Dimethylphthalate	ND	330		µg/Kg	1	4/2/2009 06:49 PM
Fluoranthene	ND	330		µg/Kg	1	4/2/2009 06:49 PM
Fluorene	ND	330		µg/Kg	1	4/2/2009 06:49 PM
Hexachlorobenzene	ND	330		µg/Kg	1	4/2/2009 06:49 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	4/2/2009 06:49 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	4/2/2009 06:49 PM
Hexachloroethane	ND	330		µg/Kg	1	4/2/2009 06:49 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	4/2/2009 06:49 PM
Isophorone	ND	330		µg/Kg	1	4/2/2009 06:49 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	4/2/2009 06:49 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	4/2/2009 06:49 PM
Naphthalene	ND	330		µg/Kg	1	4/2/2009 06:49 PM
Nitrobenzene	ND	330		µg/Kg	1	4/2/2009 06:49 PM
Pentachlorophenol	ND	1600		µg/Kg	1	4/2/2009 06:49 PM
Phenanthrene	ND	330		µg/Kg	1	4/2/2009 06:49 PM
Phenol	ND	330		µg/Kg	1	4/2/2009 06:49 PM
Pyrene	ND	330		µg/Kg	1	4/2/2009 06:49 PM
Surr: 1,2-Dichlorobenzene-d4	92.2	49-103		%REC	1	4/2/2009 06:49 PM
Surr: 2,4,6-Tribromophenol	105	47-129		%REC	1	4/2/2009 06:49 PM
Surr: 2-Chlorophenol-d4	100	54-109		%REC	1	4/2/2009 06:49 PM
Surr: 2-Fluorobiphenyl	103	59-108		%REC	1	4/2/2009 06:49 PM
Surr: 2-Fluorophenol	99.5	50-111		%REC	1	4/2/2009 06:49 PM
Surr: 4-Terphenyl-d14	126	58-135		%REC	1	4/2/2009 06:49 PM
Surr: Nitrobenzene-d5	101	54-115		%REC	1	4/2/2009 06:49 PM
Surr: Phenol-d5	100	58-112		%REC	1	4/2/2009 06:49 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W15BGW (0')
Lab Order:	104788	**Collection Date:**	3/26/2009 1:15:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104788-010A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B		**EPA 6010B**				
RunID: ICP8_090406C	QC Batch: 54531			PrepDate:	4/4/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	4/6/2009 04:59 PM
Arsenic	ND	1.0		mg/Kg	1	4/6/2009 04:59 PM
Barium	100	1.0		mg/Kg	1	4/6/2009 04:59 PM
Beryllium	ND	1.0		mg/Kg	1	4/6/2009 04:59 PM
Cadmium	ND	1.0		mg/Kg	1	4/6/2009 04:59 PM
Chromium	46	1.0		mg/Kg	1	4/6/2009 04:59 PM
Cobalt	17	1.0		mg/Kg	1	4/6/2009 04:59 PM
Copper	47	2.0		mg/Kg	1	4/6/2009 04:59 PM
Lead	ND	1.0		mg/Kg	1	4/6/2009 04:59 PM
Molybdenum	ND	1.0		mg/Kg	1	4/6/2009 04:59 PM
Nickel	40	1.0		mg/Kg	1	4/6/2009 04:59 PM
Selenium	1.9	1.0		mg/Kg	1	4/6/2009 04:59 PM
Silver	ND	1.0		mg/Kg	1	4/6/2009 04:59 PM
Thallium	ND	1.0		mg/Kg	1	4/6/2009 04:59 PM
Vanadium	37	1.0		mg/Kg	1	4/6/2009 04:59 PM
Zinc	34	1.0		mg/Kg	1	4/6/2009 04:59 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
EPA 3550B		**EPA 8015B(M)**				
RunID: GC16_090402C	QC Batch: 54478			PrepDate:	4/2/2009	Analyst: **CBR**
DRO	11	10		mg/Kg	10	4/2/2009 09:24 PM
ORO	76	10		mg/Kg	10	4/2/2009 09:24 PM
Surr: p-Terphenyl	0	30-130	SDO	%REC	10	4/2/2009 09:24 PM
MERCURY BY COLD VAPOR TECHNIQUE						
EPA 7471A						
RunID: AA1_090402B	QC Batch: 54457			PrepDate:	4/1/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	4/2/2009 09:54 AM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 3550B		**EPA 8270C**				
RunID: MS 13_090402A	QC Batch: 54470			PrepDate:	4/2/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM
1,2-Dichlorobenzene	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM
1,3-Dichlorobenzene	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM
1,4-Dichlorobenzene	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W15BGW (0')
Lab Order:	104788	**Collection Date:**	3/26/2009 1:15:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104788-010A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090402A QC Batch: 54470 PrepDate: 4/2/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM
2,4,6-Trichlorophenol	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM
2,4-Dichlorophenol	ND	4100		µg/Kg	2.5	4/2/2009 07:16 PM
2,4-Dimethylphenol	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM
2,4-Dinitrophenol	ND	4100		µg/Kg	2.5	4/2/2009 07:16 PM
2,4-Dinitrotoluene	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM
2,6-Dinitrotoluene	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM
2-Chloronaphthalene	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM
2-Chlorophenol	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM
2-Methylnaphthalene	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM
2-Methylphenol	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM
2-Nitroaniline	ND	4100		µg/Kg	2.5	4/2/2009 07:16 PM
2-Nitrophenol	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM
3,3´-Dichlorobenzidine	ND	1600		µg/Kg	2.5	4/2/2009 07:16 PM
3-Nitroaniline	ND	4100		µg/Kg	2.5	4/2/2009 07:16 PM
4,6-Dinitro-2-methylphenol	ND	4100		µg/Kg	2.5	4/2/2009 07:16 PM
4-Bromophenyl-phenylether	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM
4-Chloro-3-methylphenol	ND	1600		µg/Kg	2.5	4/2/2009 07:16 PM
4-Chloroaniline	ND	1600		µg/Kg	2.5	4/2/2009 07:16 PM
4-Chlorophenyl-phenylether	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM
4-Methylphenol	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM
4-Nitroaniline	ND	4100		µg/Kg	2.5	4/2/2009 07:16 PM
4-Nitrophenol	ND	4100		µg/Kg	2.5	4/2/2009 07:16 PM
Acenaphthene	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM
Acenaphthylene	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM
Anthracene	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM
Benzidine (M)	ND	4100		µg/Kg	2.5	4/2/2009 07:16 PM
Benzo(a)anthracene	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM
Benzo(a)pyrene	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM
Benzo(b)fluoranthene	870	820		µg/Kg	2.5	4/2/2009 07:16 PM
Benzo(g,h,i)perylene	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM
Benzo(k)fluoranthene	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM
Benzoic acid	ND	4100		µg/Kg	2.5	4/2/2009 07:16 PM
Benzyl alcohol	ND	1600		µg/Kg	2.5	4/2/2009 07:16 PM
Bis(2-chloroethoxy)methane	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W15BGW (0')
Lab Order:	104788	**Collection Date:**	3/26/2009 1:15:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104788-010A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090402A QC Batch: 54470 PrepDate: 4/2/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM
Bis(2-chloroisopropyl)ether	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM
Bis(2-ethylhexyl)phthalate	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM
Butylbenzylphthalate	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM
Chrysene	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM
Di-n-butylphthalate	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM
Di-n-octylphthalate	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM
Dibenz(a,h)anthracene	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM
Dibenzofuran	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM
Diethylphthalate	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM
Dimethylphthalate	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM
Fluoranthene	990	820		µg/Kg	2.5	4/2/2009 07:16 PM
Fluorene	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM
Hexachlorobenzene	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM
Hexachlorobutadiene	ND	1600		µg/Kg	2.5	4/2/2009 07:16 PM
Hexachlorocyclopentadiene	ND	1600		µg/Kg	2.5	4/2/2009 07:16 PM
Hexachloroethane	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM
Indeno(1,2,3-cd)pyrene	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM
Isophorone	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM
N-Nitrosodi-n-propylamine	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM
N-Nitrosodiphenylamine	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM
Naphthalene	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM
Nitrobenzene	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM
Pentachlorophenol	ND	4100		µg/Kg	2.5	4/2/2009 07:16 PM
Phenanthrene	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM
Phenol	ND	820		µg/Kg	2.5	4/2/2009 07:16 PM
Pyrene	860	820		µg/Kg	2.5	4/2/2009 07:16 PM
Surr: 1,2-Dichlorobenzene-d4	91.6	49-103		%REC	2.5	4/2/2009 07:16 PM
Surr: 2,4,6-Tribromophenol	92.4	47-129		%REC	2.5	4/2/2009 07:16 PM
Surr: 2-Chlorophenol-d4	98.3	54-109		%REC	2.5	4/2/2009 07:16 PM
Surr: 2-Fluorobiphenyl	105	59-108		%REC	2.5	4/2/2009 07:16 PM
Surr: 2-Fluorophenol	96.8	50-111		%REC	2.5	4/2/2009 07:16 PM
Surr: 4-Terphenyl-d14	116	58-135		%REC	2.5	4/2/2009 07:16 PM
Surr: Nitrobenzene-d5	99.5	54-115		%REC	2.5	4/2/2009 07:16 PM
Surr: Phenol-d5	96.9	58-112		%REC	2.5	4/2/2009 07:16 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT: Geocon Consultants, Inc. **Client Sample ID:** W15BGW (10')
Lab Order: 104788 **Collection Date:** 3/26/2009 1:30:00 PM
Project: Caltrans Dumbarton Bridge, E8435-06-18 **Matrix:** SOIL
Lab ID: 104788-011A

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090406C	QC Batch: 54531			PrepDate:	4/4/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	4/6/2009 05:03 PM
Arsenic	3.5	1.0		mg/Kg	1	4/6/2009 05:03 PM
Barium	16	1.0		mg/Kg	1	4/6/2009 05:03 PM
Beryllium	ND	1.0		mg/Kg	1	4/6/2009 05:03 PM
Cadmium	ND	1.0		mg/Kg	1	4/6/2009 05:03 PM
Chromium	28	1.0		mg/Kg	1	4/6/2009 05:03 PM
Cobalt	13	1.0		mg/Kg	1	4/6/2009 05:03 PM
Copper	11	2.0		mg/Kg	1	4/6/2009 05:03 PM
Lead	4.0	1.0		mg/Kg	1	4/6/2009 05:03 PM
Molybdenum	2.7	1.0		mg/Kg	1	4/6/2009 05:03 PM
Nickel	44	1.0		mg/Kg	1	4/6/2009 05:03 PM
Selenium	1.3	1.0		mg/Kg	1	4/6/2009 05:03 PM
Silver	ND	1.0		mg/Kg	1	4/6/2009 05:03 PM
Thallium	ND	1.0		mg/Kg	1	4/6/2009 05:03 PM
Vanadium	28	1.0		mg/Kg	1	4/6/2009 05:03 PM
Zinc	30	1.0		mg/Kg	1	4/6/2009 05:03 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090402C	QC Batch: 54478			PrepDate:	4/2/2009	Analyst: **CBR**
DRO	ND	1.0		mg/Kg	1	4/2/2009 08:29 PM
ORO	ND	1.0		mg/Kg	1	4/2/2009 08:29 PM
Surr: p-Terphenyl	50.3	30-130		%REC	1	4/2/2009 08:29 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090402B	QC Batch: 54457			PrepDate:	4/1/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	4/2/2009 09:56 AM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090402A	QC Batch: 54470			PrepDate:	4/2/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	4/2/2009 07:44 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 07:44 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 07:44 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 07:44 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W15BGW (10')
Lab Order:	104788	**Collection Date:**	3/26/2009 1:30:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104788-011A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090402A QC Batch: 54470 PrepDate: 4/2/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 07:44 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 07:44 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	4/2/2009 07:44 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	4/2/2009 07:44 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	4/2/2009 07:44 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 07:44 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 07:44 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	4/2/2009 07:44 PM
2-Chlorophenol	ND	330		µg/Kg	1	4/2/2009 07:44 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	4/2/2009 07:44 PM
2-Methylphenol	ND	330		µg/Kg	1	4/2/2009 07:44 PM
2-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 07:44 PM
2-Nitrophenol	ND	330		µg/Kg	1	4/2/2009 07:44 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	4/2/2009 07:44 PM
3-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 07:44 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	4/2/2009 07:44 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 07:44 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	4/2/2009 07:44 PM
4-Chloroaniline	ND	660		µg/Kg	1	4/2/2009 07:44 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 07:44 PM
4-Methylphenol	1000	330		µg/Kg	1	4/2/2009 07:44 PM
4-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 07:44 PM
4-Nitrophenol	ND	1600		µg/Kg	1	4/2/2009 07:44 PM
Acenaphthene	ND	330		µg/Kg	1	4/2/2009 07:44 PM
Acenaphthylene	ND	330		µg/Kg	1	4/2/2009 07:44 PM
Anthracene	ND	330		µg/Kg	1	4/2/2009 07:44 PM
Benzidine (M)	ND	1600		µg/Kg	1	4/2/2009 07:44 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	4/2/2009 07:44 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	4/2/2009 07:44 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	4/2/2009 07:44 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	4/2/2009 07:44 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	4/2/2009 07:44 PM
Benzoic acid	ND	1600		µg/Kg	1	4/2/2009 07:44 PM
Benzyl alcohol	ND	660		µg/Kg	1	4/2/2009 07:44 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	4/2/2009 07:44 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W15BGW (10')
Lab Order:	104788	**Collection Date:**	3/26/2009 1:30:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104788-011A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090402A QC Batch: 54470 PrepDate: 4/2/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	4/2/2009 07:44 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	4/2/2009 07:44 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	4/2/2009 07:44 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	4/2/2009 07:44 PM
Chrysene	ND	330		µg/Kg	1	4/2/2009 07:44 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	4/2/2009 07:44 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	4/2/2009 07:44 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	4/2/2009 07:44 PM
Dibenzofuran	ND	330		µg/Kg	1	4/2/2009 07:44 PM
Diethylphthalate	ND	330		µg/Kg	1	4/2/2009 07:44 PM
Dimethylphthalate	ND	330		µg/Kg	1	4/2/2009 07:44 PM
Fluoranthene	ND	330		µg/Kg	1	4/2/2009 07:44 PM
Fluorene	ND	330		µg/Kg	1	4/2/2009 07:44 PM
Hexachlorobenzene	ND	330		µg/Kg	1	4/2/2009 07:44 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	4/2/2009 07:44 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	4/2/2009 07:44 PM
Hexachloroethane	ND	330		µg/Kg	1	4/2/2009 07:44 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	4/2/2009 07:44 PM
Isophorone	ND	330		µg/Kg	1	4/2/2009 07:44 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	4/2/2009 07:44 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	4/2/2009 07:44 PM
Naphthalene	ND	330		µg/Kg	1	4/2/2009 07:44 PM
Nitrobenzene	ND	330		µg/Kg	1	4/2/2009 07:44 PM
Pentachlorophenol	ND	1600		µg/Kg	1	4/2/2009 07:44 PM
Phenanthrene	ND	330		µg/Kg	1	4/2/2009 07:44 PM
Phenol	ND	330		µg/Kg	1	4/2/2009 07:44 PM
Pyrene	ND	330		µg/Kg	1	4/2/2009 07:44 PM
Surr: 1,2-Dichlorobenzene-d4	81.9	49-103		%REC	1	4/2/2009 07:44 PM
Surr: 2,4,6-Tribromophenol	96.2	47-129		%REC	1	4/2/2009 07:44 PM
Surr: 2-Chlorophenol-d4	91.2	54-109		%REC	1	4/2/2009 07:44 PM
Surr: 2-Fluorobiphenyl	94.7	59-108		%REC	1	4/2/2009 07:44 PM
Surr: 2-Fluorophenol	88.8	50-111		%REC	1	4/2/2009 07:44 PM
Surr: 4-Terphenyl-d14	122	58-135		%REC	1	4/2/2009 07:44 PM
Surr: Nitrobenzene-d5	90.3	54-115		%REC	1	4/2/2009 07:44 PM
Surr: Phenol-d5	91.1	58-112		%REC	1	4/2/2009 07:44 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W15BGW (15')
Lab Order:	104788	**Collection Date:**	3/26/2009 1:51:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104788-012A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B				**EPA 6010B**		
RunID: ICP8_090406C	QC Batch: 54531			PrepDate:	4/4/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	4/6/2009 05:07 PM
Arsenic	3.4	1.0		mg/Kg	1	4/6/2009 05:07 PM
Barium	18	1.0		mg/Kg	1	4/6/2009 05:07 PM
Beryllium	ND	1.0		mg/Kg	1	4/6/2009 05:07 PM
Cadmium	ND	1.0		mg/Kg	1	4/6/2009 05:07 PM
Chromium	35	1.0		mg/Kg	1	4/6/2009 05:07 PM
Cobalt	6.4	1.0		mg/Kg	1	4/6/2009 05:07 PM
Copper	16	2.0		mg/Kg	1	4/6/2009 05:07 PM
Lead	4.0	1.0		mg/Kg	1	4/6/2009 05:07 PM
Molybdenum	ND	1.0		mg/Kg	1	4/6/2009 05:07 PM
Nickel	39	1.0		mg/Kg	1	4/6/2009 05:07 PM
Selenium	1.6	1.0		mg/Kg	1	4/6/2009 05:07 PM
Silver	ND	1.0		mg/Kg	1	4/6/2009 05:07 PM
Thallium	ND	1.0		mg/Kg	1	4/6/2009 05:07 PM
Vanadium	28	1.0		mg/Kg	1	4/6/2009 05:07 PM
Zinc	39	1.0		mg/Kg	1	4/6/2009 05:07 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
EPA 3550B				**EPA 8015B(M)**		
RunID: GC16_090402C	QC Batch: 54478			PrepDate:	4/2/2009	Analyst: **CBR**
DRO	ND	1.0		mg/Kg	1	4/2/2009 08:20 PM
ORO	ND	1.0		mg/Kg	1	4/2/2009 08:20 PM
Surr: p-Terphenyl	41.9	30-130		%REC	1	4/2/2009 08:20 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090402B	QC Batch: 54457			PrepDate:	4/1/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	4/2/2009 09:30 AM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 3550B				**EPA 8270C**		
RunID: MS 13_090402A	QC Batch: 54470			PrepDate:	4/2/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	4/2/2009 06:21 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 06:21 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 06:21 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 06:21 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W15BGW (15')
Lab Order:	104788	**Collection Date:**	3/26/2009 1:51:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104788-012A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090402A QC Batch: 54470 PrepDate: 4/2/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 06:21 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 06:21 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	4/2/2009 06:21 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	4/2/2009 06:21 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	4/2/2009 06:21 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 06:21 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 06:21 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	4/2/2009 06:21 PM
2-Chlorophenol	ND	330		µg/Kg	1	4/2/2009 06:21 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	4/2/2009 06:21 PM
2-Methylphenol	ND	330		µg/Kg	1	4/2/2009 06:21 PM
2-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 06:21 PM
2-Nitrophenol	ND	330		µg/Kg	1	4/2/2009 06:21 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	4/2/2009 06:21 PM
3-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 06:21 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	4/2/2009 06:21 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 06:21 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	4/2/2009 06:21 PM
4-Chloroaniline	ND	660		µg/Kg	1	4/2/2009 06:21 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 06:21 PM
4-Methylphenol	ND	330		µg/Kg	1	4/2/2009 06:21 PM
4-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 06:21 PM
4-Nitrophenol	ND	1600		µg/Kg	1	4/2/2009 06:21 PM
Acenaphthene	ND	330		µg/Kg	1	4/2/2009 06:21 PM
Acenaphthylene	ND	330		µg/Kg	1	4/2/2009 06:21 PM
Anthracene	ND	330		µg/Kg	1	4/2/2009 06:21 PM
Benzidine (M)	ND	1600		µg/Kg	1	4/2/2009 06:21 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	4/2/2009 06:21 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	4/2/2009 06:21 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	4/2/2009 06:21 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	4/2/2009 06:21 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	4/2/2009 06:21 PM
Benzoic acid	ND	1600		µg/Kg	1	4/2/2009 06:21 PM
Benzyl alcohol	ND	660		µg/Kg	1	4/2/2009 06:21 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	4/2/2009 06:21 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W15BGW (15')
Lab Order:	104788	**Collection Date:**	3/26/2009 1:51:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104788-012A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090402A QC Batch: 54470 PrepDate: 4/2/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	4/2/2009 06:21 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	4/2/2009 06:21 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	4/2/2009 06:21 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	4/2/2009 06:21 PM
Chrysene	ND	330		µg/Kg	1	4/2/2009 06:21 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	4/2/2009 06:21 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	4/2/2009 06:21 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	4/2/2009 06:21 PM
Dibenzofuran	ND	330		µg/Kg	1	4/2/2009 06:21 PM
Diethylphthalate	ND	330		µg/Kg	1	4/2/2009 06:21 PM
Dimethylphthalate	ND	330		µg/Kg	1	4/2/2009 06:21 PM
Fluoranthene	ND	330		µg/Kg	1	4/2/2009 06:21 PM
Fluorene	ND	330		µg/Kg	1	4/2/2009 06:21 PM
Hexachlorobenzene	ND	330		µg/Kg	1	4/2/2009 06:21 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	4/2/2009 06:21 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	4/2/2009 06:21 PM
Hexachloroethane	ND	330		µg/Kg	1	4/2/2009 06:21 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	4/2/2009 06:21 PM
Isophorone	ND	330		µg/Kg	1	4/2/2009 06:21 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	4/2/2009 06:21 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	4/2/2009 06:21 PM
Naphthalene	ND	330		µg/Kg	1	4/2/2009 06:21 PM
Nitrobenzene	ND	330		µg/Kg	1	4/2/2009 06:21 PM
Pentachlorophenol	ND	1600		µg/Kg	1	4/2/2009 06:21 PM
Phenanthrene	ND	330		µg/Kg	1	4/2/2009 06:21 PM
Phenol	ND	330		µg/Kg	1	4/2/2009 06:21 PM
Pyrene	ND	330		µg/Kg	1	4/2/2009 06:21 PM
Surr: 1,2-Dichlorobenzene-d4	92.5	49-103		%REC	1	4/2/2009 06:21 PM
Surr: 2,4,6-Tribromophenol	105	47-129		%REC	1	4/2/2009 06:21 PM
Surr: 2-Chlorophenol-d4	101	54-109		%REC	1	4/2/2009 06:21 PM
Surr: 2-Fluorobiphenyl	103	59-108		%REC	1	4/2/2009 06:21 PM
Surr: 2-Fluorophenol	97.8	50-111		%REC	1	4/2/2009 06:21 PM
Surr: 4-Terphenyl-d14	129	58-135		%REC	1	4/2/2009 06:21 PM
Surr: Nitrobenzene-d5	101	54-115		%REC	1	4/2/2009 06:21 PM
Surr: Phenol-d5	99.6	58-112		%REC	1	4/2/2009 06:21 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 160.1_2540C_W

Sample ID: **104786-001F-DUP**	SampType: **DUP**	TestCode: **160.1_2540C**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107774**
Client ID: **ZZZZZZ**	Batch ID: **54508**	TestNo: **SM2540C**		Analysis Date: **4/1/2009**	SeqNo: **1689789**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	11620.000	200						11920	2.55	10	

Sample ID: **LCS-54508**	SampType: **LCS**	TestCode: **160.1_2540C**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107774**
Client ID: **LCSW**	Batch ID: **54508**	TestNo: **SM2540C**		Analysis Date: **4/1/2009**	SeqNo: **1689793**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	992.000	10	970.0	0	102	80	120				

Sample ID: **MB-54508**	SampType: **MBLK**	TestCode: **160.1_2540C**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107774**
Client ID: **PBW**	Batch ID: **54508**	TestNo: **SM2540C**		Analysis Date: **4/1/2009**	SeqNo: **1689794**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	ND	10									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 1664_HEM_W

Sample ID: **MB-54502**	SampType: **MBLK**	TestCode: **1664_HEM_**	Units: **mg/L**	Prep Date: **4/2/2009**	RunNo: **107772**
Client ID: **PBW**	Batch ID: **54502**	TestNo: **EPA 1664 _H**		Analysis Date: **4/2/2009**	SeqNo: **1689631**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Oil & Grease	ND	4.0									

Sample ID: **LCS-54502**	SampType: **LCS**	TestCode: **1664_HEM_**	Units: **mg/L**	Prep Date: **4/2/2009**	RunNo: **107772**
Client ID: **LCSW**	Batch ID: **54502**	TestNo: **EPA 1664 _H**		Analysis Date: **4/2/2009**	SeqNo: **1689632**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Oil & Grease	38.000	4.0	40.00	0	95.0	78	114				

Sample ID: **MB-54502-MS**	SampType: **MS**	TestCode: **1664_HEM_**	Units: **mg/L**	Prep Date: **4/2/2009**	RunNo: **107772**
Client ID: **ZZZZZZ**	Batch ID: **54502**	TestNo: **EPA 1664 _H**		Analysis Date: **4/2/2009**	SeqNo: **1689639**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Oil & Grease	37.200	4.0	40.00	0	93.0	78	114				

Sample ID: **MB-54502-MSD**	SampType: **MSD**	TestCode: **1664_HEM_**	Units: **mg/L**	Prep Date: **4/2/2009**	RunNo: **107772**
Client ID: **ZZZZZZ**	Batch ID: **54502**	TestNo: **EPA 1664 _H**		Analysis Date: **4/2/2009**	SeqNo: **1689640**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Oil & Grease	36.800	4.0	40.00	0	92.0	78	114	37.20	1.08	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 335.2_4500CNE_W

Sample ID: **104782-001BMS**	SampType: **MS**	TestCode: **335.2_4500C**	Units: **mg/L**	Prep Date: **4/3/2009**	RunNo: **107819**
Client ID: **ZZZZZZ**	Batch ID: **54519**	TestNo: **SM4500-CN E**		Analysis Date: **4/3/2009**	SeqNo: **1690560**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide	0.396	0.010	0.4000	0	99.0	80	120				

Sample ID: **104782-001BMSD**	SampType: **MSD**	TestCode: **335.2_4500C**	Units: **mg/L**	Prep Date: **4/3/2009**	RunNo: **107819**
Client ID: **ZZZZZZ**	Batch ID: **54519**	TestNo: **SM4500-CN E**		Analysis Date: **4/3/2009**	SeqNo: **1690561**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide	0.392	0.010	0.4000	0	98.0	80	120	0.3960	1.02	20	

Sample ID: **104788-001HDUP**	SampType: **DUP**	TestCode: **335.2_4500C**	Units: **mg/L**	Prep Date: **4/3/2009**	RunNo: **107819**
Client ID: **W15BGW**	Batch ID: **54519**	TestNo: **SM4500-CN E**		Analysis Date: **4/3/2009**	SeqNo: **1690565**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide	ND	0.010						0	0	30	

Sample ID: **LCS-54519**	SampType: **LCS**	TestCode: **335.2_4500C**	Units: **mg/L**	Prep Date: **4/3/2009**	RunNo: **107819**
Client ID: **LCSW**	Batch ID: **54519**	TestNo: **SM4500-CN E**		Analysis Date: **4/3/2009**	SeqNo: **1690566**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide	0.377	0.010	0.4000	0	94.2	80	120				

Sample ID: **MB-54519**	SampType: **MBLK**	TestCode: **335.2_4500C**	Units: **mg/L**	Prep Date: **4/3/2009**	RunNo: **107819**
Client ID: **PBW**	Batch ID: **54519**	TestNo: **SM4500-CN E**		Analysis Date: **4/3/2009**	SeqNo: **1690567**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide	ND	0.010									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 376.2_4500S2_WD

Sample ID: **104789-001IDUP**	SampType: **DUP**	TestCode: **376.2_4500S2**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107702**
Client ID: **ZZZZZZ**	Batch ID: **R107702**	TestNo: **SM4500-S= D**		Analysis Date: **4/1/2009**	SeqNo: **1688339**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfide	0.008	0.010						0.008400	0	30	

Sample ID: **LCS-R107702**	SampType: **LCS**	TestCode: **376.2_4500S2**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107702**
Client ID: **LCSW**	Batch ID: **R107702**	TestNo: **SM4500-S= D**		Analysis Date: **4/1/2009**	SeqNo: **1688340**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfide	0.502	0.010	0.5000	0	100	80	120				

Sample ID: **MB-R107702**	SampType: **MBLK**	TestCode: **376.2_4500S2**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107702**
Client ID: **PBW**	Batch ID: **R107702**	TestNo: **SM4500-S= D**		Analysis Date: **4/1/2009**	SeqNo: **1688341**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfide	ND	0.010									

Sample ID: **MB-R107702MS**	SampType: **MS**	TestCode: **376.2_4500S2**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107702**
Client ID: **ZZZZZZ**	Batch ID: **R107702**	TestNo: **SM4500-S= D**		Analysis Date: **4/1/2009**	SeqNo: **1688342**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfide	0.495	0.010	0.5000	0	99.0	70	120				

Sample ID: **MB-R107702MSD**	SampType: **MSD**	TestCode: **376.2_4500S2**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107702**
Client ID: **ZZZZZZ**	Batch ID: **R107702**	TestNo: **SM4500-S= D**		Analysis Date: **4/1/2009**	SeqNo: **1688343**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfide	0.486	0.010	0.5000	0	97.2	70	120	0.4949	1.79	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **MB-54531**	SampType: **MBLK**	TestCode: **6010_S**	Units: **mg/Kg**	Prep Date: **4/4/2009**	RunNo: **107884**
Client ID: **PBS**	Batch ID: **54531**	TestNo: **EPA 6010B**	**EPA 3050B**	Analysis Date: **4/6/2009**	SeqNo: **1691695**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	2.0									
Arsenic	ND	1.0									
Barium	ND	1.0									
Beryllium	ND	1.0									
Cadmium	ND	1.0									
Chromium	ND	1.0									
Cobalt	ND	1.0									
Copper	ND	2.0									
Lead	ND	1.0									
Molybdenum	ND	1.0									
Nickel	ND	1.0									
Selenium	ND	1.0									
Silver	ND	1.0									
Thallium	ND	1.0									
Vanadium	ND	1.0									
Zinc	ND	1.0									

Sample ID: **LCS-54531**	SampType: **LCS**	TestCode: **6010_S**	Units: **mg/Kg**	Prep Date: **4/4/2009**	RunNo: **107884**
Client ID: **LCSS**	Batch ID: **54531**	TestNo: **EPA 6010B**	**EPA 3050B**	Analysis Date: **4/6/2009**	SeqNo: **1691696**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	47.529	2.0	50.00	0	95.1	80	120				
Arsenic	46.252	1.0	50.00	0	92.5	80	120				
Barium	49.440	1.0	50.00	0	98.9	80	120				
Beryllium	48.151	1.0	50.00	0	96.3	80	120				
Cadmium	47.692	1.0	50.00	0	95.4	80	120				
Chromium	45.133	1.0	50.00	0	90.3	80	120				
Cobalt	49.196	1.0	50.00	0	98.4	80	120				
Copper	49.209	2.0	50.00	0	98.4	80	120				
Lead	48.429	1.0	50.00	0	96.9	80	120				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **LCS-54531** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **4/4/2009** RunNo: **107884**
Client ID: **LCSS** Batch ID: **54531** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **4/6/2009** SeqNo: **1691696**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	50.256	1.0	50.00	0	101	80	120				
Nickel	46.866	1.0	50.00	0	93.7	80	120				
Selenium	44.491	1.0	50.00	0	89.0	80	120				
Silver	47.807	1.0	50.00	0	95.6	80	120				
Thallium	43.018	1.0	50.00	0	86.0	80	120				
Vanadium	49.983	1.0	50.00	0	100	80	120				
Zinc	46.632	1.0	50.00	0	93.3	80	120				

Sample ID: **104788-012ADUP** SampType: **DUP** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **4/3/2009** RunNo: **107884**
Client ID: **W15BGW (15')** Batch ID: **54531** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **4/6/2009** SeqNo: **1691707**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	2.0						0	0	20	
Arsenic	3.193	1.0						3.366	5.27	20	
Barium	18.559	1.0						17.73	4.59	20	
Beryllium	ND	1.0						0	0	20	
Cadmium	0.570	1.0						0.5833	0	20	
Chromium	36.454	1.0						34.90	4.37	20	
Cobalt	6.383	1.0						6.414	0.498	20	
Copper	16.094	2.0						15.61	3.03	20	
Lead	4.132	1.0						3.995	3.39	20	
Molybdenum	0.338	1.0						0.4329	0	20	
Nickel	40.208	1.0						39.49	1.81	20	
Selenium	1.383	1.0						1.570	12.7	20	
Silver	ND	1.0						0	0	20	
Thallium	ND	1.0						0	0	20	
Vanadium	29.285	1.0						28.36	3.19	20	
Zinc	40.026	1.0						38.52	3.83	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **104788-012AMS** SampType: **MS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **4/3/2009** RunNo: **107884**
Client ID: **W15BGW (15')** Batch ID: **54531** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **4/6/2009** SeqNo: **1691708**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	74.722	2.0	125.0	0	59.8	25	106				
Arsenic	105.895	1.0	125.0	3.366	82.0	42	113				
Barium	121.709	1.0	125.0	17.73	83.2	19	140				
Beryllium	102.497	1.0	125.0	0	82.0	50	109				
Cadmium	99.421	1.0	125.0	0.5833	79.1	48	106				
Chromium	132.253	1.0	125.0	34.90	77.9	44	116				
Cobalt	106.647	1.0	125.0	6.414	80.2	47	107				
Copper	127.547	2.0	125.0	15.61	89.5	49	124				
Lead	103.200	1.0	125.0	3.995	79.4	33	120				
Molybdenum	102.404	1.0	125.0	0.4329	81.6	46	111				
Nickel	136.957	1.0	125.0	39.49	78.0	43	111				
Selenium	104.027	1.0	125.0	1.570	82.0	43	104				
Silver	104.331	1.0	125.0	0	83.5	53	114				
Thallium	90.736	1.0	125.0	0	72.6	41	107				
Vanadium	134.087	1.0	125.0	28.36	84.6	48	116				
Zinc	135.417	1.0	125.0	38.52	77.5	24	129				

Sample ID: **104788-012AMSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **4/3/2009** RunNo: **107884**
Client ID: **W15BGW (15')** Batch ID: **54531** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **4/6/2009** SeqNo: **1691709**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	68.957	2.0	125.0	0	55.2	25	106	74.72	8.02	20	
Arsenic	108.735	1.0	125.0	3.366	84.3	42	113	105.9	2.65	20	
Barium	126.977	1.0	125.0	17.73	87.4	19	140	121.7	4.24	20	
Beryllium	105.221	1.0	125.0	0	84.2	50	109	102.5	2.62	20	
Cadmium	101.632	1.0	125.0	0.5833	80.8	48	106	99.42	2.20	20	
Chromium	141.149	1.0	125.0	34.90	85.0	44	116	132.3	6.51	20	
Cobalt	109.130	1.0	125.0	6.414	82.2	47	107	106.6	2.30	20	
Copper	133.489	2.0	125.0	15.61	94.3	49	124	127.5	4.55	20	
Lead	105.647	1.0	125.0	3.995	81.3	33	120	103.2	2.34	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **104788-012AMSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **4/3/2009** RunNo: **107884**
Client ID: **W15BGW (15')** Batch ID: **54531** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **4/6/2009** SeqNo: **1691709**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	104.174	1.0	125.0	0.4329	83.0	46	111	102.4	1.71	20	
Nickel	144.528	1.0	125.0	39.49	84.0	43	111	137.0	5.38	20	
Selenium	106.830	1.0	125.0	1.570	84.2	43	104	104.0	2.66	20	
Silver	107.741	1.0	125.0	0	86.2	53	114	104.3	3.22	20	
Thallium	92.177	1.0	125.0	0	73.7	41	107	90.74	1.58	20	
Vanadium	142.586	1.0	125.0	28.36	91.4	48	116	134.1	6.14	20	
Zinc	144.515	1.0	125.0	38.52	84.8	24	129	135.4	6.50	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_W

Sample ID: **MB-54486** SampType: **MBLK** TestCode: **6010_W** Units: **mg/L** Prep Date: **4/2/2009** RunNo: **107800**
Client ID: **PBW** Batch ID: **54486** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **4/3/2009** SeqNo: **1690128**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	0.0050									
Arsenic	ND	0.010									
Barium	ND	0.0030									
Beryllium	ND	0.0030									
Cadmium	ND	0.0030									
Chromium	ND	0.0030									
Cobalt	ND	0.0030									
Copper	ND	0.0050									
Lead	ND	0.0050									
Molybdenum	ND	0.0050									
Nickel	ND	0.0050									
Selenium	ND	0.010									
Silver	ND	0.0030									
Thallium	ND	0.015									
Vanadium	ND	0.0030									
Zinc	0.006	0.010									

Sample ID: **LCS-54486** SampType: **LCS** TestCode: **6010_W** Units: **mg/L** Prep Date: **4/2/2009** RunNo: **107800**
Client ID: **LCSW** Batch ID: **54486** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **4/3/2009** SeqNo: **1690129**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	1.028	0.0050	1.000	0	103	85	115				
Arsenic	0.990	0.010	1.000	0	99.0	85	115				
Barium	1.042	0.0030	1.000	0	104	85	115				
Beryllium	1.028	0.0030	1.000	0	103	85	115				
Cadmium	1.021	0.0030	1.000	0	102	85	115				
Chromium	0.943	0.0030	1.000	0	94.3	85	115				
Cobalt	1.039	0.0030	1.000	0	104	85	115				
Copper	1.039	0.0050	1.000	0	104	85	115				
Lead	1.069	0.0050	1.000	0	107	85	115				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_W

Sample ID: **LCS-54486** SampType: **LCS** TestCode: **6010_W** Units: **mg/L** Prep Date: **4/2/2009** RunNo: **107800**
Client ID: **LCSW** Batch ID: **54486** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **4/3/2009** SeqNo: **1690129**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	1.014	0.0050	1.000	0	101	85	115				
Nickel	1.004	0.0050	1.000	0	100	85	115				
Selenium	0.972	0.010	1.000	0	97.2	85	115				
Silver	1.008	0.0030	1.000	0	101	85	115				
Thallium	0.918	0.015	1.000	0	91.8	85	115				
Vanadium	1.041	0.0030	1.000	0	104	85	115				
Zinc	1.040	0.010	1.000	0.006200	103	85	115				

Sample ID: **104767-001BDUP** SampType: **DUP** TestCode: **6010_W** Units: **mg/L** Prep Date: **4/2/2009** RunNo: **107800**
Client ID: **ZZZZZZ** Batch ID: **54486** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **4/3/2009** SeqNo: **1690131**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	0.0050						0	0	20	
Arsenic	ND	0.010						0	0	20	
Barium	0.008	0.0030						0.008064	3.02	20	
Beryllium	ND	0.0030						0	0	20	
Cadmium	ND	0.0030						0	0	20	
Chromium	0.002	0.0030						0.001717	0	20	
Cobalt	ND	0.0030						0	0	20	
Copper	ND	0.0050						0	0	20	
Lead	ND	0.0050						0	0	20	
Molybdenum	ND	0.0050						0	0	20	
Nickel	0.002	0.0050						0.001748	0	20	
Selenium	ND	0.010						0	0	20	
Silver	ND	0.0030						0	0	20	
Thallium	ND	0.015						0	0	20	
Vanadium	0.004	0.0030						0.004362	2.07	20	
Zinc	0.037	0.010						0.02512	37.3	20	R

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_W

Sample ID: **104804-001CMS** SampType: **MS** TestCode: **6010_W** Units: **mg/L** Prep Date: **4/2/2009** RunNo: **107800**
Client ID: **ZZZZZZ** Batch ID: **54486** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **4/3/2009** SeqNo: **1690140**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	2.475	0.0050	2.500	0	99.0	64	130				
Arsenic	2.494	0.010	2.500	0	99.8	66	128				
Barium	2.530	0.0030	2.500	0.01465	101	60	129				
Beryllium	2.516	0.0030	2.500	0	101	77	118				
Cadmium	2.531	0.0030	2.500	0	101	72	122				
Chromium	2.396	0.0030	2.500	0.008227	95.5	77	116				
Cobalt	2.545	0.0030	2.500	0.009174	101	66	124				
Copper	2.784	0.0050	2.500	0.01163	111	70	130				
Lead	2.622	0.0050	2.500	0	105	71	121				
Molybdenum	6.641	0.0050	2.500	4.151	99.6	64	129				
Nickel	2.728	0.0050	2.500	0.2206	100	63	125				
Selenium	2.530	0.010	2.500	0.005410	101	73	124				
Silver	2.615	0.0030	2.500	0	105	60	138				
Thallium	2.329	0.015	2.500	0.02336	92.2	66	125				
Vanadium	2.624	0.0030	2.500	0.04744	103	79	118				
Zinc	2.601	0.010	2.500	0.08484	101	71	120				

Sample ID: **104804-001CMSD** SampType: **MSD** TestCode: **6010_W** Units: **mg/L** Prep Date: **4/2/2009** RunNo: **107800**
Client ID: **ZZZZZZ** Batch ID: **54486** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **4/3/2009** SeqNo: **1690141**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	2.639	0.0050	2.500	0	106	64	130	2.475	6.43	20	
Arsenic	2.642	0.010	2.500	0	106	66	128	2.494	5.73	20	
Barium	2.661	0.0030	2.500	0.01465	106	60	129	2.530	5.06	20	
Beryllium	2.676	0.0030	2.500	0	107	77	118	2.516	6.17	20	
Cadmium	2.660	0.0030	2.500	0	106	72	122	2.531	4.98	20	
Chromium	2.534	0.0030	2.500	0.008227	101	77	116	2.396	5.58	20	
Cobalt	2.678	0.0030	2.500	0.009174	107	66	124	2.545	5.09	20	
Copper	2.944	0.0050	2.500	0.01163	117	70	130	2.784	5.60	20	
Lead	2.783	0.0050	2.500	0	111	71	121	2.622	5.94	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_W

Sample ID: **104804-001CMSD** SampType: **MSD** TestCode: **6010_W** Units: **mg/L** Prep Date: **4/2/2009** RunNo: **107800**
Client ID: **ZZZZZZ** Batch ID: **54486** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **4/3/2009** SeqNo: **1690141**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	6.881	0.0050	2.500	4.151	109	64	129	6.641	3.56	20	
Nickel	2.870	0.0050	2.500	0.2206	106	63	125	2.728	5.09	20	
Selenium	2.674	0.010	2.500	0.005410	107	73	124	2.530	5.56	20	
Silver	2.764	0.0030	2.500	0	111	60	138	2.615	5.57	20	
Thallium	2.468	0.015	2.500	0.02336	97.8	66	125	2.329	5.79	20	
Vanadium	2.772	0.0030	2.500	0.04744	109	79	118	2.624	5.49	20	
Zinc	2.737	0.010	2.500	0.08484	106	71	120	2.601	5.12	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 7470_W

Sample ID: **MB-54480**	SampType: **MBLK**	TestCode: **7470_W**	Units: **µg/L**	Prep Date: **4/2/2009**	RunNo: **107805**
Client ID: **PBW**	Batch ID: **54480**	TestNo: **EPA 7470A**		Analysis Date: **4/3/2009**	SeqNo: **1690209**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.20									

Sample ID: **LCS-54480**	SampType: **LCS**	TestCode: **7470_W**	Units: **µg/L**	Prep Date: **4/2/2009**	RunNo: **107805**
Client ID: **LCSW**	Batch ID: **54480**	TestNo: **EPA 7470A**		Analysis Date: **4/3/2009**	SeqNo: **1690210**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	10.464	0.20	10.00	0	105	85	115				

Sample ID: **104804-001C-MS**	SampType: **MS**	TestCode: **7470_W**	Units: **µg/L**	Prep Date: **4/2/2009**	RunNo: **107805**
Client ID: **ZZZZZZ**	Batch ID: **54480**	TestNo: **EPA 7470A**		Analysis Date: **4/3/2009**	SeqNo: **1690211**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	10.195	0.20	10.00	0	102	70	130				

Sample ID: **104804-001C-MSD**	SampType: **MSD**	TestCode: **7470_W**	Units: **µg/L**	Prep Date: **4/2/2009**	RunNo: **107805**
Client ID: **ZZZZZZ**	Batch ID: **54480**	TestNo: **EPA 7470A**		Analysis Date: **4/3/2009**	SeqNo: **1690212**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	10.244	0.20	10.00	0	102	70	130	10.20	0.473	20	

Sample ID: **104804-001C-DUP**	SampType: **DUP**	TestCode: **7470_W**	Units: **µg/L**	Prep Date: **4/2/2009**	RunNo: **107805**
Client ID: **ZZZZZZ**	Batch ID: **54480**	TestNo: **EPA 7470A**		Analysis Date: **4/3/2009**	SeqNo: **1690214**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.20						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 7471_S

Sample ID: **MB-54457**	SampType: **MBLK**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **4/1/2009**	RunNo: **107711**
Client ID: **PBS**	Batch ID: **54457**	TestNo: **EPA 7471A**		Analysis Date: **4/2/2009**	SeqNo: **1688557**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.10									

Sample ID: **LCS-54457**	SampType: **LCS**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **4/1/2009**	RunNo: **107711**
Client ID: **LCSS**	Batch ID: **54457**	TestNo: **EPA 7471A**		Analysis Date: **4/2/2009**	SeqNo: **1688558**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.840	0.10	0.8300	0	101	80	120				

Sample ID: **104788-012A-MS**	SampType: **MS**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **4/1/2009**	RunNo: **107711**
Client ID: **W15BGW (15')**	Batch ID: **54457**	TestNo: **EPA 7471A**		Analysis Date: **4/2/2009**	SeqNo: **1688559**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.830	0.10	0.8300	0	100	70	130				

Sample ID: **104788-012A-MSD**	SampType: **MSD**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **4/1/2009**	RunNo: **107711**
Client ID: **W15BGW (15')**	Batch ID: **54457**	TestNo: **EPA 7471A**		Analysis Date: **4/2/2009**	SeqNo: **1688560**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.816	0.10	0.8300	0	98.4	70	130	0.8303	1.70	20	

Sample ID: **104788-012A-DUP**	SampType: **DUP**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **4/1/2009**	RunNo: **107711**
Client ID: **W15BGW (15')**	Batch ID: **54457**	TestNo: **EPA 7471A**		Analysis Date: **4/2/2009**	SeqNo: **1688562**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.10						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_S_DM LLSGT

Sample ID: **MB-54478**	SampType: **MBLK**	TestCode: **8015_S_DM L**	Units: **mg/Kg**	Prep Date: **4/2/2009**	RunNo: **107785**
Client ID: **PBS**	Batch ID: **54478**	TestNo: **EPA 8015B(M**	**EPA 3550B**	Analysis Date: **4/2/2009**	SeqNo: **1689920**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	ND	1.0									
ORO	ND	1.0									
Surr: p-Terphenyl	1.782		2.670		66.8	30	130				

Sample ID: **LCS-54478**	SampType: **LCS**	TestCode: **8015_S_DM L**	Units: **mg/Kg**	Prep Date: **4/2/2009**	RunNo: **107785**
Client ID: **LCSS**	Batch ID: **54478**	TestNo: **EPA 8015B(M**	**EPA 3550B**	Analysis Date: **4/2/2009**	SeqNo: **1689921**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	12.839	1.0	33.00	0	38.9	35	124				
Surr: p-Terphenyl	1.335		2.670		50.0	30	130				

Sample ID: **104788-003ADUP**	SampType: **DUP**	TestCode: **8015_S_DM L**	Units: **mg/Kg**	Prep Date: **4/2/2009**	RunNo: **107785**
Client ID: **W15A (0')**	Batch ID: **54478**	TestNo: **EPA 8015B(M**	**EPA 3550B**	Analysis Date: **4/2/2009**	SeqNo: **1689930**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	ND	1.0						0	0	20	
ORO	1.544	1.0						0	200	20	R
Surr: p-Terphenyl	1.474		2.670		55.2	30	130		0	0	

Sample ID: **104788-003AMS**	SampType: **MS**	TestCode: **8015_S_DM L**	Units: **mg/Kg**	Prep Date: **4/2/2009**	RunNo: **107785**
Client ID: **W15A (0')**	Batch ID: **54478**	TestNo: **EPA 8015B(M**	**EPA 3550B**	Analysis Date: **4/2/2009**	SeqNo: **1689933**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	14.554	1.0	33.00	0	44.1	12	125				
Surr: p-Terphenyl	1.229		2.670		46.0	30	130				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_S_DM LLSGT

Sample ID: **104788-003AMSD** SampType: **MSD** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **4/2/2009** RunNo: **107785**
Client ID: **W15A (0')** Batch ID: **54478** TestNo: **EPA 8015B(M EPA 3550B** Analysis Date: **4/2/2009** SeqNo: **1689934**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	18.716	1.0	33.00	0	56.7	12	125	14.55	25.0	20	R
Surr: p-Terphenyl	1.092		2.670		40.9	30	130		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_W_DM_LLSGT

Sample ID: **MB-54441**	SampType: **MBLK**	TestCode: **8015_W_DM_**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107742**
Client ID: **PBW**	Batch ID: **54441**	TestNo: **EPA 8015B**	**EPA 3510C**	Analysis Date: **4/1/2009**	SeqNo: **1689309**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	ND	0.050									
ORO	ND	0.050									
Surr: p-Terphenyl	0.067		0.08000		84.3	35	131				

Sample ID: **LCS-54441**	SampType: **LCS**	TestCode: **8015_W_DM_**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107742**
Client ID: **LCSW**	Batch ID: **54441**	TestNo: **EPA 8015B**	**EPA 3510C**	Analysis Date: **4/1/2009**	SeqNo: **1689310**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	0.759	0.050	1.000	0	75.9	42	118				
Surr: p-Terphenyl	0.044		0.08000		54.9	35	131				

Sample ID: **MB-54441-MS**	SampType: **MS**	TestCode: **8015_W_DM_**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107742**
Client ID: **ZZZZZZ**	Batch ID: **54441**	TestNo: **EPA 8015B**	**EPA 3510C**	Analysis Date: **4/1/2009**	SeqNo: **1689311**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	0.755	0.050	1.000	0	75.4	42	118				
Surr: p-Terphenyl	0.046		0.08000		57.2	35	131				

Sample ID: **MB-54441-MSD**	SampType: **MSD**	TestCode: **8015_W_DM_**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107742**
Client ID: **ZZZZZZ**	Batch ID: **54441**	TestNo: **EPA 8015B**	**EPA 3510C**	Analysis Date: **4/1/2009**	SeqNo: **1689312**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	0.756	0.050	1.000	0	75.6	42	118	0.7545	0.246	20	
Surr: p-Terphenyl	0.044		0.08000		55.2	35	131		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_W_GP LL

Sample ID: **D090330LCS2** SampType: **LCS** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107628**
Client ID: **LCSW** Batch ID: **D09VW048** TestNo: **EPA 8015B(M** Analysis Date: **3/30/2009** SeqNo: **1686946**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	0.708	0.050	1.000	0	70.8	69	125				
Surr: Bromofluorobenzene (FID)	99.005		100.0		99.0	71	130				

Sample ID: **D090330MB2** SampType: **MBLK** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107628**
Client ID: **PBW** Batch ID: **D09VW048** TestNo: **EPA 8015B(M** Analysis Date: **3/30/2009** SeqNo: **1686947**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	ND	0.050									
Surr: Bromofluorobenzene (FID)	86.532		100.0		86.5	71	130				

Sample ID: **104765-002ADUP** SampType: **DUP** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107628**
Client ID: **ZZZZZZ** Batch ID: **D09VW048** TestNo: **EPA 8015B(M** Analysis Date: **3/30/2009** SeqNo: **1686949**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	ND	0.050						0	0	20	
Surr: Bromofluorobenzene (FID)	99.346		100.0		99.3	71	130		0	0	

Sample ID: **104765-001AMS** SampType: **MS** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107628**
Client ID: **ZZZZZZ** Batch ID: **D09VW048** TestNo: **EPA 8015B(M** Analysis Date: **3/30/2009** SeqNo: **1686951**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	1.016	0.050	1.000	0	102	69	125				
Surr: Bromofluorobenzene (FID)	107.152		100.0		107	71	130				

Sample ID: **104765-001AMSD** SampType: **MSD** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107628**
Client ID: **ZZZZZZ** Batch ID: **D09VW048** TestNo: **EPA 8015B(M** Analysis Date: **3/30/2009** SeqNo: **1686952**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	1.012	0.050	1.000	0	101	69	125	1.016	0.394	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_W_GP LL

Sample ID: **104765-001AMSD** SampType: **MSD** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107628**
Client ID: **ZZZZZZ** Batch ID: **D09VW048** TestNo: **EPA 8015B(M** Analysis Date: **3/30/2009** SeqNo: **1686952**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Bromofluorobenzene (FID)	105.693		100.0		106	71	130		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_W_GP LL

Sample ID: **D090401LCS2** SampType: **LCS** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107737**
Client ID: **LCSW** Batch ID: **D09VW051** TestNo: **EPA 8015B(M** Analysis Date: **4/1/2009** SeqNo: **1689088**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	0.816	0.050	1.000	0	81.6	69	125				
Surr: Bromofluorobenzene (FID)	98.382		100.0		98.4	71	130				

Sample ID: **D090401MB2MS** SampType: **MS** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107737**
Client ID: **ZZZZZZ** Batch ID: **D09VW051** TestNo: **EPA 8015B(M** Analysis Date: **4/1/2009** SeqNo: **1689089**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	0.875	0.050	1.000	0	87.5	69	125				
Surr: Bromofluorobenzene (FID)	101.250		100.0		101	71	130				

Sample ID: **D090401MB2MSD** SampType: **MSD** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107737**
Client ID: **ZZZZZZ** Batch ID: **D09VW051** TestNo: **EPA 8015B(M** Analysis Date: **4/1/2009** SeqNo: **1689090**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	0.856	0.050	1.000	0	85.6	69	125	0.8750	2.20	20	
Surr: Bromofluorobenzene (FID)	92.860		100.0		92.9	71	130		0	0	

Sample ID: **D090401MB2** SampType: **MBLK** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107737**
Client ID: **PBW** Batch ID: **D09VW051** TestNo: **EPA 8015B(M** Analysis Date: **4/1/2009** SeqNo: **1689091**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	ND	0.050									
Surr: Bromofluorobenzene (FID)	104.859		100.0		105	71	130				

Sample ID: **104788-001BDUP** SampType: **DUP** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107737**
Client ID: **W15BGW** Batch ID: **D09VW051** TestNo: **EPA 8015B(M** Analysis Date: **4/1/2009** SeqNo: **1689103**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	ND	0.050						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_W_GP LL

Sample ID: **104788-001BDUP** SampType: **DUP** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107737**
Client ID: **W15BGW** Batch ID: **D09VW051** TestNo: **EPA 8015B(M** Analysis Date: **4/1/2009** SeqNo: **1689103**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Bromofluorobenzene (FID)	87.074		100.0		87.1	71	130		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **A090331LCS1** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107703**
Client ID: **LCSW** Batch ID: **A09VW063** TestNo: **EPA 8260B** Analysis Date: **3/31/2009** SeqNo: **1688360**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	17.970	0.50	20.00	0	89.8	70	130				
Benzene	37.200	0.50	40.00	0	93.0	70	130				
Chlorobenzene	20.240	0.50	20.00	0	101	70	130				
MTBE	18.900	0.50	20.00	0	94.5	70	130				
Toluene	38.060	0.50	40.00	0	95.2	70	130				
Trichloroethene	18.910	0.50	20.00	0	94.6	70	130				
Surr: 1,2-Dichloroethane-d4	20.810		25.00		83.2	70	130				
Surr: 4-Bromofluorobenzene	20.760		25.00		83.0	70	130				
Surr: Dibromofluoromethane	21.490		25.00		86.0	70	130				
Surr: Toluene-d8	22.410		25.00		89.6	70	130				

Sample ID: **A090331MB2MS** SampType: **MS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107703**
Client ID: **ZZZZZZ** Batch ID: **A09VW063** TestNo: **EPA 8260B** Analysis Date: **3/31/2009** SeqNo: **1688362**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	16.320	0.50	20.00	0	81.6	70	130				
Benzene	36.480	0.50	40.00	0	91.2	70	130				
Chlorobenzene	20.180	0.50	20.00	0	101	70	130				
Toluene	37.230	0.50	40.00	0	93.1	70	130				
Trichloroethene	18.260	0.50	20.00	0	91.3	70	130				
Surr: 1,2-Dichloroethane-d4	21.070		25.00		84.3	70	130				
Surr: 4-Bromofluorobenzene	20.600		25.00		82.4	70	130				
Surr: Dibromofluoromethane	21.380		25.00		85.5	70	130				
Surr: Toluene-d8	22.260		25.00		89.0	70	130				

Sample ID: **A090331MB2MSD** SampType: **MSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107703**
Client ID: **ZZZZZZ** Batch ID: **A09VW063** TestNo: **EPA 8260B** Analysis Date: **3/31/2009** SeqNo: **1688363**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	17.050	0.50	20.00	0	85.2	70	130	16.32	4.38	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **A090331MB2MSD** SampType: **MSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107703**
Client ID: **ZZZZZZ** Batch ID: **A09VW063** TestNo: **EPA 8260B** Analysis Date: **3/31/2009** SeqNo: **1688363**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	37.260	0.50	40.00	0	93.2	70	130	36.48	2.12	20	
Chlorobenzene	20.720	0.50	20.00	0	104	70	130	20.18	2.64	20	
Toluene	38.460	0.50	40.00	0	96.2	70	130	37.23	3.25	20	
Trichloroethene	18.890	0.50	20.00	0	94.4	70	130	18.26	3.39	20	
Surr: 1,2-Dichloroethane-d4	20.460		25.00		81.8	70	130		0	20	
Surr: 4-Bromofluorobenzene	20.030		25.00		80.1	70	130		0	20	
Surr: Dibromofluoromethane	20.590		25.00		82.4	70	130		0	20	
Surr: Toluene-d8	21.490		25.00		86.0	70	130		0	20	

Sample ID: **A090331MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107703**
Client ID: **PBW** Batch ID: **A09VW063** TestNo: **EPA 8260B** Analysis Date: **3/31/2009** SeqNo: **1688364**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	0.50									
1,1,1-Trichloroethane	ND	0.50									
1,1,2,2-Tetrachloroethane	ND	0.50									
1,1,2-Trichloroethane	ND	0.50									
1,1-Dichloroethane	ND	0.50									
1,1-Dichloroethene	ND	0.50									
1,1-Dichloropropene	ND	0.50									
1,2,3-Trichlorobenzene	ND	0.50									
1,2,3-Trichloropropane	ND	0.50									
1,2,4-Trichlorobenzene	ND	0.50									
1,2,4-Trimethylbenzene	ND	0.50									
1,2-Dibromo-3-chloropropane	ND	0.50									
1,2-Dibromoethane	ND	0.50									
1,2-Dichlorobenzene	ND	0.50									
1,2-Dichloroethane	ND	0.50									
1,2-Dichloropropane	ND	0.50									
1,3,5-Trimethylbenzene	ND	0.50									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **A090331MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107703**
Client ID: **PBW** Batch ID: **A09VW063** TestNo: **EPA 8260B** Analysis Date: **3/31/2009** SeqNo: **1688364**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,3-Dichlorobenzene	ND	0.50									
1,3-Dichloropropane	ND	0.50									
1,4-Dichlorobenzene	ND	0.50									
2,2-Dichloropropane	ND	0.50									
2-Chlorotoluene	ND	0.50									
4-Chlorotoluene	ND	0.50									
4-Isopropyltoluene	ND	0.50									
Benzene	ND	0.50									
Bromobenzene	ND	0.50									
Bromodichloromethane	ND	0.50									
Bromoform	ND	0.50									
Bromomethane	ND	0.50									
Carbon tetrachloride	ND	0.50									
Chlorobenzene	ND	0.50									
Chloroethane	ND	0.50									
Chloroform	ND	0.50									
Chloromethane	ND	0.50									
cis-1,2-Dichloroethene	ND	0.50									
cis-1,3-Dichloropropene	ND	0.50									
Dibromochloromethane	ND	0.50									
Dibromomethane	ND	0.50									
Dichlorodifluoromethane	ND	0.50									
Ethylbenzene	ND	0.50									
Hexachlorobutadiene	ND	0.50									
Isopropylbenzene	ND	0.50									
m,p-Xylene	ND	1.0									
Methylene chloride	ND	1.0									
n-Butylbenzene	ND	0.50									
n-Propylbenzene	ND	0.50									
Naphthalene	ND	0.50									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **A090331MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107703**
Client ID: **PBW** Batch ID: **A09VW063** TestNo: **EPA 8260B** Analysis Date: **3/31/2009** SeqNo: **1688364**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
o-Xylene	ND	0.50									
sec-Butylbenzene	ND	0.50									
Styrene	ND	0.50									
tert-Butylbenzene	ND	0.50									
Tetrachloroethene	ND	0.50									
Toluene	ND	0.50									
trans-1,2-Dichloroethene	ND	0.50									
Trichloroethene	ND	0.50									
Trichlorofluoromethane	ND	0.50									
Vinyl chloride	ND	0.50									
Surr: 1,2-Dichloroethane-d4	21.930		25.00		87.7	70	130				
Surr: 4-Bromofluorobenzene	22.010		25.00		88.0	70	130				
Surr: Dibromofluoromethane	23.720		25.00		94.9	70	130				
Surr: Toluene-d8	25.310		25.00		101	70	130				

Sample ID: **104789-001A** SampType: **DUP** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107703**
Client ID: **ZZZZZZ** Batch ID: **A09VW063** TestNo: **EPA 8260B** Analysis Date: **3/31/2009** SeqNo: **1688379**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	0.50						0	0	20	
1,1,1-Trichloroethane	ND	0.50						0	0	20	
1,1,2,2-Tetrachloroethane	ND	0.50						0	0	20	
1,1,2-Trichloroethane	ND	0.50						0	0	20	
1,1-Dichloroethane	ND	0.50						0	0	20	
1,1-Dichloroethene	ND	0.50						0	0	20	
1,1-Dichloropropene	ND	0.50						0	0	20	
1,2,3-Trichlorobenzene	ND	0.50						0	0	20	
1,2,3-Trichloropropane	ND	0.50						0	0	20	
1,2,4-Trichlorobenzene	ND	0.50						0	0	20	
1,2,4-Trimethylbenzene	ND	0.50						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **104789-001A** SampType: **DUP** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107703**
Client ID: **ZZZZZZ** Batch ID: **A09VW063** TestNo: **EPA 8260B** Analysis Date: **3/31/2009** SeqNo: **1688379**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2-Dibromo-3-chloropropane	ND	0.50						0	0	20	
1,2-Dibromoethane	ND	0.50						0	0	20	
1,2-Dichlorobenzene	ND	0.50						0	0	20	
1,2-Dichloroethane	ND	0.50						0	0	20	
1,2-Dichloropropane	ND	0.50						0	0	20	
1,3,5-Trimethylbenzene	ND	0.50						0	0	20	
1,3-Dichlorobenzene	ND	0.50						0	0	20	
1,3-Dichloropropane	ND	0.50						0	0	20	
1,4-Dichlorobenzene	ND	0.50						0	0	20	
2,2-Dichloropropane	ND	0.50						0	0	20	
2-Chlorotoluene	ND	0.50						0	0	20	
4-Chlorotoluene	ND	0.50						0	0	20	
4-Isopropyltoluene	ND	0.50						0	0	20	
Benzene	ND	0.50						0	0	20	
Bromobenzene	ND	0.50						0	0	20	
Bromodichloromethane	ND	0.50						0	0	20	
Bromoform	ND	0.50						0	0	20	
Bromomethane	ND	0.50						0	0	20	
Carbon tetrachloride	ND	0.50						0	0	20	
Chlorobenzene	ND	0.50						0	0	20	
Chloroethane	ND	0.50						0	0	20	
Chloroform	ND	0.50						0	0	20	
Chloromethane	0.580	0.50						0.5600	3.51	20	
cis-1,2-Dichloroethene	ND	0.50						0	0	20	
cis-1,3-Dichloropropene	ND	0.50						0	0	20	
Dibromochloromethane	ND	0.50						0	0	20	
Dibromomethane	ND	0.50						0	0	20	
Dichlorodifluoromethane	ND	0.50						0	0	20	
Ethylbenzene	ND	0.50						0	0	20	
Hexachlorobutadiene	ND	0.50						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **104789-001A** SampType: **DUP** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107703**
Client ID: **ZZZZZZ** Batch ID: **A09VW063** TestNo: **EPA 8260B** Analysis Date: **3/31/2009** SeqNo: **1688379**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Isopropylbenzene	ND	0.50						0	0	20	
m,p-Xylene	ND	1.0						0	0	20	
Methylene chloride	ND	1.0						0	0	20	
n-Butylbenzene	ND	0.50						0	0	20	
n-Propylbenzene	ND	0.50						0	0	20	
Naphthalene	ND	0.50						0	0	20	
o-Xylene	ND	0.50						0	0	20	
sec-Butylbenzene	ND	0.50						0	0	20	
Styrene	ND	0.50						0	0	20	
tert-Butylbenzene	ND	0.50						0	0	20	
Tetrachloroethene	ND	0.50						0	0	20	
Toluene	ND	0.50						0	0	20	
trans-1,2-Dichloroethene	ND	0.50						0	0	20	
Trichloroethene	ND	0.50						0	0	20	
Trichlorofluoromethane	ND	0.50						0	0	20	
Vinyl chloride	ND	0.50						0	0	20	
Surr: 1,2-Dichloroethane-d4	24.130		25.00		96.5	70	130		0	0	
Surr: 4-Bromofluorobenzene	21.800		25.00		87.2	70	130		0	0	
Surr: Dibromofluoromethane	24.930		25.00		99.7	70	130		0	0	
Surr: Toluene-d8	25.260		25.00		101	70	130		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-54445** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107754**
Client ID: **PBS** Batch ID: **54445** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1689446**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	330									
1,2-Dichlorobenzene	ND	330									
1,3-Dichlorobenzene	ND	330									
1,4-Dichlorobenzene	ND	330									
2,4,5-Trichlorophenol	ND	330									
2,4,6-Trichlorophenol	ND	330									
2,4-Dichlorophenol	ND	1600									
2,4-Dimethylphenol	ND	330									
2,4-Dinitrophenol	ND	1600									
2,4-Dinitrotoluene	ND	330									
2,6-Dinitrotoluene	ND	330									
2-Chloronaphthalene	ND	330									
2-Chlorophenol	ND	330									
2-Methylnaphthalene	ND	330									
2-Methylphenol	ND	330									
2-Nitroaniline	ND	1600									
2-Nitrophenol	ND	330									
3,3´-Dichlorobenzidine	ND	660									
3-Nitroaniline	ND	1600									
4,6-Dinitro-2-methylphenol	ND	1600									
4-Bromophenyl-phenylether	ND	330									
4-Chloro-3-methylphenol	ND	660									
4-Chloroaniline	ND	660									
4-Chlorophenyl-phenylether	ND	330									
4-Methylphenol	ND	330									
4-Nitroaniline	ND	1600									
4-Nitrophenol	ND	1600									
Acenaphthene	ND	330									
Acenaphthylene	ND	330									
Anthracene	ND	330									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-54445** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107754**
Client ID: **PBS** Batch ID: **54445** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1689446**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzidine (M)	ND	1600									
Benzo(a)anthracene	ND	330									
Benzo(a)pyrene	ND	330									
Benzo(b)fluoranthene	ND	330									
Benzo(g,h,i)perylene	ND	330									
Benzo(k)fluoranthene	ND	330									
Benzoic acid	ND	1600									
Benzyl alcohol	ND	660									
Bis(2-chloroethoxy)methane	ND	330									
Bis(2-chloroethyl)ether	ND	330									
Bis(2-chloroisopropyl)ether	ND	330									
Bis(2-ethylhexyl)phthalate	ND	330									
Butylbenzylphthalate	ND	330									
Chrysene	ND	330									
Di-n-butylphthalate	ND	330									
Di-n-octylphthalate	ND	330									
Dibenz(a,h)anthracene	ND	330									
Dibenzofuran	ND	330									
Diethylphthalate	ND	330									
Dimethylphthalate	ND	330									
Fluoranthene	ND	330									
Fluorene	ND	330									
Hexachlorobenzene	ND	330									
Hexachlorobutadiene	ND	660									
Hexachlorocyclopentadiene	ND	660									
Hexachloroethane	ND	330									
Indeno(1,2,3-cd)pyrene	ND	330									
Isophorone	ND	330									
N-Nitrosodi-n-propylamine	ND	330									
N-Nitrosodiphenylamine	ND	330									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-54445**	SampType: **MBLK**	TestCode: **8270_S_FUL**	Units: **µg/Kg**	Prep Date: **4/1/2009**	RunNo: **107754**
Client ID: **PBS**	Batch ID: **54445**	TestNo: **EPA 8270C**	**EPA 3550B**	Analysis Date: **4/1/2009**	SeqNo: **1689446**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	330									
Nitrobenzene	ND	330									
Pentachlorophenol	ND	1600									
Phenanthrene	ND	330									
Phenol	ND	330									
Pyrene	ND	330									
Surr: 1,2-Dichlorobenzene-d4	2973.000		3330		89.3	49	103				
Surr: 2,4,6-Tribromophenol	3022.667		3330		90.8	47	129				
Surr: 2-Chlorophenol-d4	3178.667		3330		95.5	54	109				
Surr: 2-Fluorobiphenyl	3239.333		3330		97.3	59	108				
Surr: 2-Fluorophenol	3089.667		3330		92.8	50	111				
Surr: 4-Terphenyl-d14	3790.333		3330		114	58	135				
Surr: Nitrobenzene-d5	3230.667		3330		97.0	54	115				
Surr: Phenol-d5	3174.333		3330		95.3	58	112				

Sample ID: **LCS-54445**	SampType: **LCS**	TestCode: **8270_S_FUL**	Units: **µg/Kg**	Prep Date: **4/1/2009**	RunNo: **107754**
Client ID: **LCSS**	Batch ID: **54445**	TestNo: **EPA 8270C**	**EPA 3550B**	Analysis Date: **4/1/2009**	SeqNo: **1689447**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	3049.000	330	3330	0	91.6	61	107				
1,4-Dichlorobenzene	2691.000	330	3330	0	80.8	56	100				
2,4-Dinitrotoluene	3422.667	330	3330	0	103	72	130				
2-Chlorophenol	3032.000	330	3330	0	91.1	64	105				
4-Chloro-3-methylphenol	3595.333	660	3330	0	108	74	125				
4-Nitrophenol	3392.000	1600	3330	0	102	77	137				
Acenaphthene	3078.333	330	3330	0	92.4	63	117				
N-Nitrosodi-n-propylamine	3275.000	330	3330	0	98.3	71	121				
Pentachlorophenol	2477.000	1600	3330	0	74.4	69	125				
Phenol	3204.333	330	3330	0	96.2	67	111				
Pyrene	3457.333	330	3330	0	104	60	122				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **LCS-54445** SampType: **LCS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107754**
Client ID: **LCSS** Batch ID: **54445** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/1/2009** SeqNo: **1689447**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 1,2-Dichlorobenzene-d4	2701.667		3330		81.1	49	103				
Surr: 2,4,6-Tribromophenol	3265.000		3330		98.0	47	129				
Surr: 2-Chlorophenol-d4	2945.333		3330		88.4	54	109				
Surr: 2-Fluorobiphenyl	3221.333		3330		96.7	59	108				
Surr: 2-Fluorophenol	2799.000		3330		84.1	50	111				
Surr: 4-Terphenyl-d14	3190.000		3330		95.8	58	135				
Surr: Nitrobenzene-d5	3015.333		3330		90.6	54	115				
Surr: Phenol-d5	3030.333		3330		91.0	58	112				

Sample ID: **104787-013AMS** SampType: **MS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107754**
Client ID: **ZZZZZZ** Batch ID: **54445** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/2/2009** SeqNo: **1689453**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	3285.333	330	3330	0	98.7	60	105				
1,4-Dichlorobenzene	3034.000	330	3330	0	91.1	50	99				
2,4-Dinitrotoluene	3508.000	330	3330	0	105	70	130				
2-Chlorophenol	3288.667	330	3330	0	98.8	58	107				
4-Chloro-3-methylphenol	3770.000	660	3330	0	113	72	124				
4-Nitrophenol	3762.667	1600	3330	0	113	69	139				
Acenaphthene	3225.333	330	3330	0	96.9	59	118				
N-Nitrosodi-n-propylamine	3423.667	330	3330	0	103	61	125				
Pentachlorophenol	3039.667	1600	3330	0	91.3	56	131				
Phenol	3351.333	330	3330	0	101	60	113				
Pyrene	3625.333	330	3330	0	109	51	130				
Surr: 1,2-Dichlorobenzene-d4	2952.333		3330		88.7	49	103				
Surr: 2,4,6-Tribromophenol	3458.333		3330		104	47	129				
Surr: 2-Chlorophenol-d4	3153.667		3330		94.7	54	109				
Surr: 2-Fluorobiphenyl	3262.000		3330		98.0	59	108				
Surr: 2-Fluorophenol	3038.667		3330		91.3	50	111				
Surr: 4-Terphenyl-d14	3424.667		3330		103	58	135				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104787-013AMS**	SampType: **MS**	TestCode: **8270_S_FUL**	Units: **µg/Kg**	Prep Date: **4/1/2009**	RunNo: **107754**
Client ID: **ZZZZZZ**	Batch ID: **54445**	TestNo: **EPA 8270C**	**EPA 3550B**	Analysis Date: **4/2/2009**	SeqNo: **1689453**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	3179.000		3330		95.5	54	115				
Surr: Phenol-d5	3145.667		3330		94.5	58	112				

Sample ID: **104787-013AMSD**	SampType: **MSD**	TestCode: **8270_S_FUL**	Units: **µg/Kg**	Prep Date: **4/1/2009**	RunNo: **107754**
Client ID: **ZZZZZZ**	Batch ID: **54445**	TestNo: **EPA 8270C**	**EPA 3550B**	Analysis Date: **4/2/2009**	SeqNo: **1689454**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	3128.667	330	3330	0	94.0	60	105	3285	4.89	20	
1,4-Dichlorobenzene	2842.000	330	3330	0	85.3	50	99	3034	6.54	20	
2,4-Dinitrotoluene	3372.333	330	3330	0	101	70	130	3508	3.94	20	
2-Chlorophenol	3168.333	330	3330	0	95.1	58	107	3289	3.73	20	
4-Chloro-3-methylphenol	3653.000	660	3330	0	110	72	124	3770	3.15	20	
4-Nitrophenol	3722.333	1600	3330	0	112	69	139	3763	1.08	20	
Acenaphthene	3125.000	330	3330	0	93.8	59	118	3225	3.16	20	
N-Nitrosodi-n-propylamine	3336.000	330	3330	0	100	61	125	3424	2.59	20	
Pentachlorophenol	3147.667	1600	3330	0	94.5	56	131	3040	3.49	20	
Phenol	3254.667	330	3330	0	97.7	60	113	3351	2.93	20	
Pyrene	3429.000	330	3330	0	103	51	130	3625	5.57	20	
Surr: 1,2-Dichlorobenzene-d4	2775.667		3330		83.4	49	103		0	0	
Surr: 2,4,6-Tribromophenol	3376.000		3330		101	47	129		0	0	
Surr: 2-Chlorophenol-d4	2994.000		3330		89.9	54	109		0	0	
Surr: 2-Fluorobiphenyl	3177.667		3330		95.4	59	108		0	0	
Surr: 2-Fluorophenol	2915.667		3330		87.6	50	111		0	0	
Surr: 4-Terphenyl-d14	3341.667		3330		100	58	135		0	0	
Surr: Nitrobenzene-d5	3026.000		3330		90.9	54	115		0	0	
Surr: Phenol-d5	3065.667		3330		92.1	58	112		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104787-013ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107754**
Client ID: **ZZZZZZ** Batch ID: **54445** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/2/2009** SeqNo: **1689455**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	330						0	0	20	
1,2-Dichlorobenzene	ND	330						0	0	20	
1,3-Dichlorobenzene	ND	330						0	0	20	
1,4-Dichlorobenzene	ND	330						0	0	20	
2,4,5-Trichlorophenol	ND	330						0	0	20	
2,4,6-Trichlorophenol	ND	330						0	0	20	
2,4-Dichlorophenol	ND	1600						0	0	20	
2,4-Dimethylphenol	ND	330						0	0	20	
2,4-Dinitrophenol	ND	1600						0	0	20	
2,4-Dinitrotoluene	ND	330						0	0	20	
2,6-Dinitrotoluene	ND	330						0	0	20	
2-Chloronaphthalene	ND	330						0	0	20	
2-Chlorophenol	ND	330						0	0	20	
2-Methylnaphthalene	ND	330						0	0	20	
2-Methylphenol	ND	330						0	0	20	
2-Nitroaniline	ND	1600						0	0	20	
2-Nitrophenol	ND	330						0	0	20	
3,3´-Dichlorobenzidine	ND	660						0	0	20	
3-Nitroaniline	ND	1600						0	0	20	
4,6-Dinitro-2-methylphenol	ND	1600						0	0	20	
4-Bromophenyl-phenylether	ND	330						0	0	20	
4-Chloro-3-methylphenol	ND	660						0	0	20	
4-Chloroaniline	ND	660						0	0	20	
4-Chlorophenyl-phenylether	ND	330						0	0	20	
4-Methylphenol	ND	330						0	0	20	
4-Nitroaniline	ND	1600						0	0	20	
4-Nitrophenol	ND	1600						0	0	20	
Acenaphthene	ND	330						0	0	20	
Acenaphthylene	ND	330						0	0	20	
Anthracene	ND	330						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104787-013ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107754**
Client ID: **ZZZZZZ** Batch ID: **54445** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/2/2009** SeqNo: **1689455**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzidine (M)	ND	1600						0	0	20	
Benzo(a)anthracene	ND	330						0	0	20	
Benzo(a)pyrene	ND	330						0	0	20	
Benzo(b)fluoranthene	ND	330						0	0	20	
Benzo(g,h,i)perylene	ND	330						0	0	20	
Benzo(k)fluoranthene	ND	330						0	0	20	
Benzoic acid	ND	1600						0	0	20	
Benzyl alcohol	ND	660						0	0	20	
Bis(2-chloroethoxy)methane	ND	330						0	0	20	
Bis(2-chloroethyl)ether	ND	330						0	0	20	
Bis(2-chloroisopropyl)ether	ND	330						0	0	20	
Bis(2-ethylhexyl)phthalate	ND	330						0	0	20	
Butylbenzylphthalate	ND	330						0	0	20	
Chrysene	ND	330						0	0	20	
Di-n-butylphthalate	ND	330						0	0	20	
Di-n-octylphthalate	ND	330						0	0	20	
Dibenz(a,h)anthracene	ND	330						0	0	20	
Dibenzofuran	ND	330						0	0	20	
Diethylphthalate	ND	330						0	0	20	
Dimethylphthalate	ND	330						0	0	20	
Fluoranthene	ND	330						0	0	20	
Fluorene	ND	330						0	0	20	
Hexachlorobenzene	ND	330						0	0	20	
Hexachlorobutadiene	ND	660						0	0	20	
Hexachlorocyclopentadiene	ND	660						0	0	20	
Hexachloroethane	ND	330						0	0	20	
Indeno(1,2,3-cd)pyrene	ND	330						0	0	20	
Isophorone	ND	330						0	0	20	
N-Nitrosodi-n-propylamine	ND	330						0	0	20	
N-Nitrosodiphenylamine	ND	330						0	0	20	

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits

Calculations are based on raw values

- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104787-013ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/1/2009** RunNo: **107754**
Client ID: **ZZZZZZ** Batch ID: **54445** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/2/2009** SeqNo: **1689455**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	330						0	0	20	
Nitrobenzene	ND	330						0	0	20	
Pentachlorophenol	ND	1600						0	0	20	
Phenanthrene	ND	330						0	0	20	
Phenol	ND	330						0	0	20	
Pyrene	ND	330						0	0	20	
Surr: 1,2-Dichlorobenzene-d4	2986.333		3330		89.7	49	103		0	0	
Surr: 2,4,6-Tribromophenol	3422.667		3330		103	47	129		0	0	
Surr: 2-Chlorophenol-d4	3198.667		3330		96.1	54	109		0	0	
Surr: 2-Fluorobiphenyl	3211.333		3330		96.4	59	108		0	0	
Surr: 2-Fluorophenol	3186.000		3330		95.7	50	111		0	0	
Surr: 4-Terphenyl-d14	3865.000		3330		116	58	135		0	0	
Surr: Nitrobenzene-d5	3175.667		3330		95.4	54	115		0	0	
Surr: Phenol-d5	3253.000		3330		97.7	58	112		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-54470** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/2/2009** RunNo: **107778**
Client ID: **PBS** Batch ID: **54470** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/2/2009** SeqNo: **1689850**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	330									
1,2-Dichlorobenzene	ND	330									
1,3-Dichlorobenzene	ND	330									
1,4-Dichlorobenzene	ND	330									
2,4,5-Trichlorophenol	ND	330									
2,4,6-Trichlorophenol	ND	330									
2,4-Dichlorophenol	ND	1600									
2,4-Dimethylphenol	ND	330									
2,4-Dinitrophenol	ND	1600									
2,4-Dinitrotoluene	ND	330									
2,6-Dinitrotoluene	ND	330									
2-Chloronaphthalene	ND	330									
2-Chlorophenol	ND	330									
2-Methylnaphthalene	ND	330									
2-Methylphenol	ND	330									
2-Nitroaniline	ND	1600									
2-Nitrophenol	ND	330									
3,3´-Dichlorobenzidine	ND	660									
3-Nitroaniline	ND	1600									
4,6-Dinitro-2-methylphenol	ND	1600									
4-Bromophenyl-phenylether	ND	330									
4-Chloro-3-methylphenol	ND	660									
4-Chloroaniline	ND	660									
4-Chlorophenyl-phenylether	ND	330									
4-Methylphenol	ND	330									
4-Nitroaniline	ND	1600									
4-Nitrophenol	ND	1600									
Acenaphthene	ND	330									
Acenaphthylene	ND	330									
Anthracene	ND	330									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-54470** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/2/2009** RunNo: **107778**
Client ID: **PBS** Batch ID: **54470** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/2/2009** SeqNo: **1689850**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzidine (M)	ND	1600									
Benzo(a)anthracene	ND	330									
Benzo(a)pyrene	ND	330									
Benzo(b)fluoranthene	ND	330									
Benzo(g,h,i)perylene	ND	330									
Benzo(k)fluoranthene	ND	330									
Benzoic acid	ND	1600									
Benzyl alcohol	ND	660									
Bis(2-chloroethoxy)methane	ND	330									
Bis(2-chloroethyl)ether	ND	330									
Bis(2-chloroisopropyl)ether	ND	330									
Bis(2-ethylhexyl)phthalate	ND	330									
Butylbenzylphthalate	ND	330									
Chrysene	ND	330									
Di-n-butylphthalate	ND	330									
Di-n-octylphthalate	ND	330									
Dibenz(a,h)anthracene	ND	330									
Dibenzofuran	ND	330									
Diethylphthalate	ND	330									
Dimethylphthalate	ND	330									
Fluoranthene	ND	330									
Fluorene	ND	330									
Hexachlorobenzene	ND	330									
Hexachlorobutadiene	ND	660									
Hexachlorocyclopentadiene	ND	660									
Hexachloroethane	ND	330									
Indeno(1,2,3-cd)pyrene	ND	330									
Isophorone	ND	330									
N-Nitrosodi-n-propylamine	ND	330									
N-Nitrosodiphenylamine	ND	330									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-54470** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/2/2009** RunNo: **107778**
Client ID: **PBS** Batch ID: **54470** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/2/2009** SeqNo: **1689850**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	330									
Nitrobenzene	ND	330									
Pentachlorophenol	ND	1600									
Phenanthrene	ND	330									
Phenol	ND	330									
Pyrene	ND	330									
Surr: 1,2-Dichlorobenzene-d4	2816.000		3330		84.6	49	103				
Surr: 2,4,6-Tribromophenol	3138.667		3330		94.3	47	129				
Surr: 2-Chlorophenol-d4	2940.667		3330		88.3	54	109				
Surr: 2-Fluorobiphenyl	3007.333		3330		90.3	59	108				
Surr: 2-Fluorophenol	2893.667		3330		86.9	50	111				
Surr: 4-Terphenyl-d14	4108.000		3330		123	58	135				
Surr: Nitrobenzene-d5	2954.667		3330		88.7	54	115				
Surr: Phenol-d5	2944.333		3330		88.4	58	112				

Sample ID: **LCS-54470** SampType: **LCS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/2/2009** RunNo: **107778**
Client ID: **LCSS** Batch ID: **54470** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/2/2009** SeqNo: **1689851**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	3005.333	330	3330	0	90.3	61	107				
1,4-Dichlorobenzene	2762.667	330	3330	0	83.0	56	100				
2,4-Dinitrotoluene	3409.000	330	3330	0	102	72	130				
2-Chlorophenol	2942.333	330	3330	0	88.4	64	105				
4-Chloro-3-methylphenol	3580.667	660	3330	0	108	74	125				
4-Nitrophenol	3412.000	1600	3330	0	102	77	137				
Acenaphthene	3135.000	330	3330	0	94.1	63	117				
N-Nitrosodi-n-propylamine	3141.333	330	3330	0	94.3	71	121				
Pentachlorophenol	2719.333	1600	3330	0	81.7	69	125				
Phenol	3031.667	330	3330	0	91.0	67	111				
Pyrene	3399.000	330	3330	0	102	60	122				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **LCS-54470** SampType: **LCS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/2/2009** RunNo: **107778**
Client ID: **LCSS** Batch ID: **54470** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/2/2009** SeqNo: **1689851**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 1,2-Dichlorobenzene-d4	2728.000		3330		81.9	49	103				
Surr: 2,4,6-Tribromophenol	3281.000		3330		98.5	47	129				
Surr: 2-Chlorophenol-d4	2841.000		3330		85.3	54	109				
Surr: 2-Fluorobiphenyl	3153.333		3330		94.7	59	108				
Surr: 2-Fluorophenol	2778.333		3330		83.4	50	111				
Surr: 4-Terphenyl-d14	3567.000		3330		107	58	135				
Surr: Nitrobenzene-d5	2912.333		3330		87.5	54	115				
Surr: Phenol-d5	2891.000		3330		86.8	58	112				

Sample ID: **104788-012AMS** SampType: **MS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/2/2009** RunNo: **107778**
Client ID: **W15BGW (15')** Batch ID: **54470** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/2/2009** SeqNo: **1689852**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	2869.667	330	3330	0	86.2	60	105				
1,4-Dichlorobenzene	2589.667	330	3330	0	77.8	50	99				
2,4-Dinitrotoluene	3317.667	330	3330	0	99.6	70	130				
2-Chlorophenol	2871.667	330	3330	0	86.2	58	107				
4-Chloro-3-methylphenol	3491.667	660	3330	0	105	72	124				
4-Nitrophenol	3305.667	1600	3330	0	99.3	69	139				
Acenaphthene	2994.667	330	3330	0	89.9	59	118				
N-Nitrosodi-n-propylamine	3080.000	330	3330	0	92.5	61	125				
Pentachlorophenol	2711.000	1600	3330	0	81.4	56	131				
Phenol	2969.667	330	3330	0	89.2	60	113				
Pyrene	3308.667	330	3330	0	99.4	51	130				
Surr: 1,2-Dichlorobenzene-d4	2502.667		3330		75.2	49	103				
Surr: 2,4,6-Tribromophenol	3175.333		3330		95.4	47	129				
Surr: 2-Chlorophenol-d4	2652.333		3330		79.6	54	109				
Surr: 2-Fluorobiphenyl	2956.333		3330		88.8	59	108				
Surr: 2-Fluorophenol	2533.333		3330		76.1	50	111				
Surr: 4-Terphenyl-d14	3435.333		3330		103	58	135				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104788-012AMS** SampType: **MS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/2/2009** RunNo: **107778**
Client ID: **W15BGW (15')** Batch ID: **54470** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/2/2009** SeqNo: **1689852**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	2700.667		3330		81.1	54	115				
Surr: Phenol-d5	2731.667		3330		82.0	58	112				

Sample ID: **104788-012AMSD** SampType: **MSD** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/2/2009** RunNo: **107778**
Client ID: **W15BGW (15')** Batch ID: **54470** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/2/2009** SeqNo: **1689853**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	3144.000	330	3330	0	94.4	60	105	2870	9.12	20	
1,4-Dichlorobenzene	2921.667	330	3330	0	87.7	50	99	2590	12.0	20	
2,4-Dinitrotoluene	3553.000	330	3330	0	107	70	130	3318	6.85	20	
2-Chlorophenol	3100.667	330	3330	0	93.1	58	107	2872	7.67	20	
4-Chloro-3-methylphenol	3712.000	660	3330	0	111	72	124	3492	6.12	20	
4-Nitrophenol	3471.667	1600	3330	0	104	69	139	3306	4.90	20	
Acenaphthene	3213.333	330	3330	0	96.5	59	118	2995	7.04	20	
N-Nitrosodi-n-propylamine	3301.000	330	3330	0	99.1	61	125	3080	6.93	20	
Pentachlorophenol	2819.000	1600	3330	0	84.7	56	131	2711	3.91	20	
Phenol	3166.333	330	3330	0	95.1	60	113	2970	6.41	20	
Pyrene	3491.000	330	3330	0	105	51	130	3309	5.36	20	
Surr: 1,2-Dichlorobenzene-d4	2790.667		3330		83.8	49	103		0	0	
Surr: 2,4,6-Tribromophenol	3365.000		3330		101	47	129		0	0	
Surr: 2-Chlorophenol-d4	2931.000		3330		88.0	54	109		0	0	
Surr: 2-Fluorobiphenyl	3219.333		3330		96.7	59	108		0	0	
Surr: 2-Fluorophenol	2799.667		3330		84.1	50	111		0	0	
Surr: 4-Terphenyl-d14	3618.000		3330		109	58	135		0	0	
Surr: Nitrobenzene-d5	2959.667		3330		88.9	54	115		0	0	
Surr: Phenol-d5	2952.333		3330		88.7	58	112		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104788-012ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/2/2009** RunNo: **107778**
Client ID: **W15BGW (15')** Batch ID: **54470** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/2/2009** SeqNo: **1689854**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	330						0	0	20	
1,2-Dichlorobenzene	ND	330						0	0	20	
1,2-Diphenylhydrazine	ND	330						0	0	20	
1,3-Dichlorobenzene	ND	330						0	0	20	
1,4-Dichlorobenzene	ND	330						0	0	20	
1,4-Dioxane	ND	330						0	0	20	
2,4,5-Trichlorophenol	ND	330						0	0	20	
2,4,6-Trichlorophenol	ND	330						0	0	20	
2,4-Dichlorophenol	ND	1600						0	0	20	
2,4-Dimethylphenol	ND	330						0	0	20	
2,4-Dinitrophenol	ND	1600						0	0	20	
2,4-Dinitrotoluene	ND	330						0	0	20	
2,6-Dinitrotoluene	ND	330						0	0	20	
2-Chloronaphthalene	ND	330						0	0	20	
2-Chlorophenol	ND	330						0	0	20	
2-Methylnaphthalene	ND	330						0	0	20	
2-Methylphenol	ND	330						0	0	20	
2-Nitroaniline	ND	1600						0	0	20	
2-Nitrophenol	ND	330						0	0	20	
3,3´-Dichlorobenzidine	ND	660						0	0	20	
3-Nitroaniline	ND	1600						0	0	20	
4,6-Dinitro-2-methylphenol	ND	1600						0	0	20	
4-Bromophenyl-phenylether	ND	330						0	0	20	
4-Chloro-3-methylphenol	ND	660						0	0	20	
4-Chloroaniline	ND	660						0	0	20	
4-Chlorophenyl-phenylether	ND	330						0	0	20	
3/4-Methylphenol	ND	330						0	0	20	
4-Methylphenol	ND	330						0	0	20	
4-Nitroaniline	ND	1600						0	0	20	
4-Nitrophenol	ND	1600						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104788-012ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/2/2009** RunNo: **107778**
Client ID: **W15BGW (15')** Batch ID: **54470** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/2/2009** SeqNo: **1689854**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acenaphthene	ND	330						0	0	20	
Acenaphthylene	ND	330						0	0	20	
Aniline	ND	330						0	0	20	
Anthracene	ND	330						0	0	20	
Benzidine (M)	ND	1600						0	0	20	
Benzo(a)anthracene	ND	330						0	0	20	
Benzo(a)pyrene	ND	330						0	0	20	
Benzo(b)fluoranthene	ND	330						0	0	20	
Benzo(g,h,i)perylene	ND	330						0	0	20	
Benzo(k)fluoranthene	ND	330						0	0	20	
Benzoic acid	ND	1600						0	0	20	
Benzyl alcohol	ND	660						0	0	20	
Bis(2-chloroethoxy)methane	ND	330						0	0	20	
Bis(2-chloroethyl)ether	ND	330						0	0	20	
Bis(2-chloroisopropyl)ether	ND	330						0	0	20	
Bis(2-ethylhexyl)phthalate	ND	330						0	0	20	
Butylbenzylphthalate	ND	330						0	0	20	
Carbazole	ND	330						0	0	20	
Chrysene	ND	330						0	0	20	
Di-n-butylphthalate	ND	330						0	0	20	
Di-n-octylphthalate	ND	330						0	0	20	
Dibenz(a,h)anthracene	ND	330						0	0	20	
Dibenzofuran	ND	330						0	0	20	
Diethylphthalate	ND	330						0	0	20	
Dimethylphthalate	ND	330						0	0	20	
Fluoranthene	ND	330						0	0	20	
Fluorene	ND	330						0	0	20	
Hexachlorobenzene	ND	330						0	0	20	
Hexachlorobutadiene	ND	660						0	0	20	
Hexachlorocyclopentadiene	ND	660						0	0	20	

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike/Surrogate outside of limits due to matrix interference
- DO Surrogate Diluted Out

Calculations are based on raw values

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104788-012ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/2/2009** RunNo: **107778**
Client ID: **W15BGW (15')** Batch ID: **54470** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/2/2009** SeqNo: **1689854**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Hexachloroethane	ND	330						0	0	20	
Indeno(1,2,3-cd)pyrene	ND	330						0	0	20	
Isophorone	ND	330						0	0	20	
N-Nitrosodi-n-propylamine	ND	330						0	0	20	
N-Nitrosodimethylamine	ND	330						0	0	20	
N-Nitrosodiphenylamine	ND	330						0	0	20	
Naphthalene	ND	330						0	0	20	
Nitrobenzene	ND	330						0	0	20	
Pentachlorophenol	ND	1600						0	0	20	
Phenanthrene	ND	330						0	0	20	
Phenol	ND	330						0	0	20	
Pyrene	ND	330						0	0	20	
Pyridine	ND	1600						0	0	20	
Surr: 1,2-Dichlorobenzene-d4	2865.667		3330		86.1	49	103		0	0	
Surr: 2,4,6-Tribromophenol	3452.000		3330		104	47	129		0	0	
Surr: 2-Chlorophenol-d4	3098.667		3330		93.1	54	109		0	0	
Surr: 2-Fluorobiphenyl	3228.333		3330		96.9	59	108		0	0	
Surr: 2-Fluorophenol	3072.667		3330		92.3	50	111		0	0	
Surr: 4-Terphenyl-d14	4313.000		3330		130	58	135		0	0	
Surr: Nitrobenzene-d5	3090.000		3330		92.8	54	115		0	0	
Surr: Phenol-d5	3151.000		3330		94.6	58	112		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_W_FULL

Sample ID: **MB-54393** SampType: **MBLK** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **3/31/2009** RunNo: **107670**
Client ID: **PBW** Batch ID: **54393** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **3/31/2009** SeqNo: **1687707**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	10									
1,2-Dichlorobenzene	ND	10									
1,3-Dichlorobenzene	ND	10									
1,4-Dichlorobenzene	ND	10									
2,4,5-Trichlorophenol	ND	10									
2,4,6-Trichlorophenol	ND	10									
2,4-Dichlorophenol	ND	10									
2,4-Dimethylphenol	ND	10									
2,4-Dinitrophenol	ND	50									
2,4-Dinitrotoluene	ND	10									
2,6-Dinitrotoluene	ND	10									
2-Chloronaphthalene	ND	10									
2-Chlorophenol	ND	10									
2-Methylnaphthalene	ND	10									
2-Methylphenol	ND	10									
2-Nitroaniline	ND	50									
2-Nitrophenol	ND	10									
3,3´-Dichlorobenzidine	ND	20									
3-Nitroaniline	ND	50									
4,6-Dinitro-2-methylphenol	ND	50									
4-Bromophenyl-phenylether	ND	10									
4-Chloro-3-methylphenol	ND	50									
4-Chloroaniline	ND	20									
4-Chlorophenyl-phenylether	ND	10									
4-Methylphenol	ND	10									
4-Nitroaniline	ND	20									
4-Nitrophenol	ND	50									
Acenaphthene	ND	10									
Acenaphthylene	ND	10									
Anthracene	ND	10									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_W_FULL

Sample ID: **MB-54393** SampType: **MBLK** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **3/31/2009** RunNo: **107670**
Client ID: **PBW** Batch ID: **54393** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **3/31/2009** SeqNo: **1687707**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzidine (M)	ND	50									
Benzo(a)anthracene	ND	10									
Benzo(a)pyrene	ND	10									
Benzo(b)fluoranthene	ND	10									
Benzo(g,h,i)perylene	ND	10									
Benzo(k)fluoranthene	ND	10									
Benzoic acid	ND	50									
Benzyl alcohol	ND	20									
Bis(2-chloroethoxy)methane	ND	10									
Bis(2-chloroethyl)ether	ND	10									
Bis(2-chloroisopropyl)ether	ND	10									
Bis(2-ethylhexyl)phthalate	ND	10									
Butylbenzylphthalate	ND	10									
Chrysene	ND	10									
Di-n-butylphthalate	ND	10									
Di-n-octylphthalate	ND	10									
Dibenz(a,h)anthracene	ND	10									
Dibenzofuran	ND	10									
Diethylphthalate	ND	10									
Dimethylphthalate	ND	10									
Fluoranthene	ND	10									
Fluorene	ND	10									
Hexachlorobenzene	ND	10									
Hexachlorobutadiene	ND	20									
Hexachlorocyclopentadiene	ND	10									
Hexachloroethane	ND	10									
Indeno(1,2,3-cd)pyrene	ND	10									
Isophorone	ND	10									
N-Nitrosodi-n-propylamine	ND	10									
N-Nitrosodiphenylamine	ND	10									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_W_FULL

Sample ID: **MB-54393**	SampType: **MBLK**	TestCode: **8270_W_FUL**	Units: **µg/L**	Prep Date: **3/31/2009**	RunNo: **107670**
Client ID: **PBW**	Batch ID: **54393**	TestNo: **EPA 8270C**	**EPA 3510C**	Analysis Date: **3/31/2009**	SeqNo: **1687707**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	10									
Nitrobenzene	ND	10									
Pentachlorophenol	ND	50									
Phenanthrene	ND	10									
Phenol	ND	10									
Pyrene	ND	10									
Surr: 1,2-Dichlorobenzene-d4	69.890		100.0		69.9	42	98				
Surr: 2,4,6-Tribromophenol	87.150		100.0		87.2	60	128				
Surr: 2-Chlorophenol-d4	67.760		100.0		67.8	43	102				
Surr: 2-Fluorobiphenyl	80.010		100.0		80.0	50	108				
Surr: 2-Fluorophenol	40.450		100.0		40.5	22	69				
Surr: 4-Terphenyl-d14	110.950		100.0		111	66	130				
Surr: Nitrobenzene-d5	79.690		100.0		79.7	47	117				
Surr: Phenol-d5	27.260		100.0		27.3	16	50				

Sample ID: **LCS-54393**	SampType: **LCS**	TestCode: **8270_W_FUL**	Units: **µg/L**	Prep Date: **3/31/2009**	RunNo: **107670**
Client ID: **LCSW**	Batch ID: **54393**	TestNo: **EPA 8270C**	**EPA 3510C**	Analysis Date: **3/31/2009**	SeqNo: **1687708**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	83.600	10	100.0	0	83.6	54	110				
1,4-Dichlorobenzene	76.890	10	100.0	0	76.9	48	103				
2,4-Dinitrotoluene	107.980	10	100.0	0	108	69	136				
2-Chlorophenol	80.070	10	100.0	0	80.1	53	100				
4-Chloro-3-methylphenol	110.350	50	100.0	0	110	70	124				
4-Nitrophenol	56.450	50	100.0	0	56.5	32	69				
Acenaphthene	105.780	10	100.0	0	106	64	118				
N-Nitrosodi-n-propylamine	96.640	10	100.0	0	96.6	62	130				
Pentachlorophenol	97.190	50	100.0	0	97.2	64	130				
Phenol	32.780	10	100.0	0	32.8	25	50				
Pyrene	110.380	10	100.0	0	110	66	123				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_W_FULL

Sample ID: **LCS-54393** SampType: **LCS** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **3/31/2009** RunNo: **107670**
Client ID: **LCSW** Batch ID: **54393** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **3/31/2009** SeqNo: **1687708**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 1,2-Dichlorobenzene-d4	74.720		100.0		74.7	42	98				
Surr: 2,4,6-Tribromophenol	108.690		100.0		109	60	128				
Surr: 2-Chlorophenol-d4	72.960		100.0		73.0	43	102				
Surr: 2-Fluorobiphenyl	94.820		100.0		94.8	50	108				
Surr: 2-Fluorophenol	44.270		100.0		44.3	22	69				
Surr: 4-Terphenyl-d14	105.040		100.0		105	66	130				
Surr: Nitrobenzene-d5	85.800		100.0		85.8	47	117				
Surr: Phenol-d5	30.610		100.0		30.6	16	50				

Sample ID: **MB-54393MS** SampType: **MS** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **3/31/2009** RunNo: **107670**
Client ID: **ZZZZZZ** Batch ID: **54393** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **3/31/2009** SeqNo: **1687709**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	90.710	10	100.0	0	90.7	54	110				
1,4-Dichlorobenzene	81.780	10	100.0	0	81.8	48	103				
2,4-Dinitrotoluene	114.890	10	100.0	0	115	69	136				
2-Chlorophenol	85.440	10	100.0	0	85.4	53	100				
4-Chloro-3-methylphenol	117.450	50	100.0	0	117	70	124				
4-Nitrophenol	60.050	50	100.0	0	60.1	32	69				
Acenaphthene	111.170	10	100.0	0	111	64	118				
N-Nitrosodi-n-propylamine	102.700	10	100.0	0	103	62	130				
Pentachlorophenol	100.360	50	100.0	0	100	64	130				
Phenol	34.760	10	100.0	0	34.8	25	50				
Pyrene	113.580	10	100.0	0	114	66	123				
Surr: 1,2-Dichlorobenzene-d4	79.480		100.0		79.5	42	98				
Surr: 2,4,6-Tribromophenol	113.340		100.0		113	60	128				
Surr: 2-Chlorophenol-d4	76.960		100.0		77.0	43	102				
Surr: 2-Fluorobiphenyl	98.710		100.0		98.7	50	108				
Surr: 2-Fluorophenol	47.120		100.0		47.1	22	69				
Surr: 4-Terphenyl-d14	108.960		100.0		109	66	130				

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits
- Calculations are based on raw values
- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_W_FULL

Sample ID: **MB-54393MS**	SampType: **MS**	TestCode: **8270_W_FUL**	Units: **µg/L**	Prep Date: **3/31/2009**	RunNo: **107670**
Client ID: **ZZZZZZ**	Batch ID: **54393**	TestNo: **EPA 8270C**	**EPA 3510C**	Analysis Date: **3/31/2009**	SeqNo: **1687709**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	91.500		100.0		91.5	47	117				
Surr: Phenol-d5	31.390		100.0		31.4	16	50				

Sample ID: **MB-54393MSD**	SampType: **MSD**	TestCode: **8270_W_FUL**	Units: **µg/L**	Prep Date: **3/31/2009**	RunNo: **107670**
Client ID: **ZZZZZZ**	Batch ID: **54393**	TestNo: **EPA 8270C**	**EPA 3510C**	Analysis Date: **3/31/2009**	SeqNo: **1687710**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	93.630	10	100.0	0	93.6	54	110	90.71	3.17	20	
1,4-Dichlorobenzene	85.050	10	100.0	0	85.0	48	103	81.78	3.92	20	
2,4-Dinitrotoluene	119.680	10	100.0	0	120	69	136	114.9	4.08	20	
2-Chlorophenol	87.710	10	100.0	0	87.7	53	100	85.44	2.62	20	
4-Chloro-3-methylphenol	120.070	50	100.0	0	120	70	124	117.4	2.21	20	
4-Nitrophenol	62.570	50	100.0	0	62.6	32	69	60.05	4.11	20	
Acenaphthene	115.210	10	100.0	0	115	64	118	111.2	3.57	20	
N-Nitrosodi-n-propylamine	105.590	10	100.0	0	106	62	130	102.7	2.77	20	
Pentachlorophenol	102.230	50	100.0	0	102	64	130	100.4	1.85	20	
Phenol	37.040	10	100.0	0	37.0	25	50	34.76	6.35	20	
Pyrene	116.400	10	100.0	0	116	66	123	113.6	2.45	20	
Surr: 1,2-Dichlorobenzene-d4	82.550		100.0		82.6	42	98		0	0	
Surr: 2,4,6-Tribromophenol	116.160		100.0		116	60	128		0	0	
Surr: 2-Chlorophenol-d4	80.300		100.0		80.3	43	102		0	0	
Surr: 2-Fluorobiphenyl	101.970		100.0		102	50	108		0	0	
Surr: 2-Fluorophenol	49.550		100.0		49.6	22	69		0	0	
Surr: 4-Terphenyl-d14	110.470		100.0		110	66	130		0	0	
Surr: Nitrobenzene-d5	92.710		100.0		92.7	47	117		0	0	
Surr: Phenol-d5	34.360		100.0		34.4	16	50		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CHAIN OF CUSTODY RECORD

Pg 1 of 3

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#: _____

Logged By: _____ Date: 3/28/09

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: CSO

Sample Condition Upon Receipt
1. CHILLED 2.2 Y☐ N☐ 4. SEALED Y☐ N☐
2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐
3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client: Geocon Consultants
Attn: John Love
Address: 6671 Brisa St.
City Livermore State CA Zip Code 94550
TEL: (925) 371-5900
FAX: (925) 371-5915

Project Name: Caltrans Dumbarton Bridge Project #: E8435-06-18 Sampler: (Printed Name) John Love (Signature)

Relinquished by: (Signature and Printed Name) John Love Date: 3/27/09 Time: 16:00 Received by: (Signature and Printed Name) Date: 3/28/09 Time: 0830
Relinquished by: (Signature and Printed Name) Date: Time: Received by: (Signature and Printed Name) Date: Time:
Relinquished by: (Signature and Printed Name) Date: Time: Received by: (Signature and Printed Name) Date: Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: John Love
Print Name _____ Date
Signature

Send Report To:
Attn: _____
Co: same as above
Address _____
City _____ State _____ Zip _____

Bill To:
Attn: _____
Co: same as above
Address _____
City _____ State _____ Zip _____

Special Instructions/Comments:
metals samples were Field Filtered
(8015B gel cleanup)

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

Circle or Add Analysis(es) Requested

SPECIFY APPROPRIATE MATRIX

PRESERVATION

Q A / Q C
RTNE ☐
CT ☐
SWRCB ☐
Logcode _____
OTHER _____

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8250B (Volatiles)	8270C (SVOCs)	6010B (Total Metal)	8015B (GRO)	8015B (DRO) + TPHms w/silica gel cleanup	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	TDS	O&G	Cyanide	Dissolved Cyanide	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	104788-01	W15BGW	3/26/09	14:10		X																E	3	VG	H	
							X																1	LG		
									X														2	VG	H	
										X													1	LG		
											X												1	PP	N	
												X											1	PP		
													X										1	JG	H	
														X									1	PP	O	
															X								1	PP	O	+AlCl3
	2	Trip Blank		16:00		X			X													↓	2	VG	H	

- TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives:
H=HCl N=HNO_3 S=H_2SO_4 C=4°C
Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#: _____

Logged By: _____ Date: 3/27/09

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: CSS

Sample Condition Upon Receipt
1. CHILLED 2.2 Y☐ N☐ 4. SEALED Y☐ N☐
2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐
3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client: Geocon Consultants
Address: 6671 Boisa St.
TEL: (925) 371-5900
Attn: John Love
City Livermore State CA Zip Code 94550
FAX: (925) 371-5915
Project Name: Caltrans Dumbarton Bridge Project #: E8435-06-18 Sampler: (Printed Name) John Love (Signature)

Relinquished by: (Signature and Printed Name) John Love Date: 3/27/09 Time: 16:00 Received by: (Signature and Printed Name) Date: 3/28/09 Time: 0830
Relinquished by: (Signature and Printed Name) Date: Time: Received by: (Signature and Printed Name) Date: Time:
Relinquished by: (Signature and Printed Name) Date: Time: Received by: (Signature and Printed Name) Date: Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
John Love 3/27/09
Print Name Date
Signature

Send Report To:
Attn: _____
Co: same as above
Address _____
City _____ State _____ Zip _____

Bill To:
Attn: _____
Co: same as above
Address _____
City _____ State _____ Zip _____

Special Instructions/Comments:
Lineage (cleanup (5015,8))

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

Circle or Add Analysis(es) Requested: 8081A (Pesticides), 8082 (PCB), 8260B (Volatiles), 8270C (BNA), 6010B (Total Metal), 8015B (GRO) / 8020 (BTEX), 8015B (DRO), 8021 (BTEX), TITLE 22 / CAM 17 (6010 / 7000), TPH & TPHmo w/ SGC, SVOCs (8270C)

SPECIFY APPROPRIATE MATRIX: SOIL, WATER, GROUND WATER, WASTEWATER

PRESERVATION

Q A / Q C: RTNE ☐ CT ☐ SWRCB ☐ Logcode ____ OTHER ____

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	TAT	Container(s): #	Type	REMARKS
	104782 - 3	W15A (0')	3/26/09	11:00	E	1	T P	
	- 4	W15A (5')		11:05				
	- 5	W15A (10')		11:20				
	- 6	W15A (15')		11:30				
	- 7	W20B (0')		14:34				
	- 8	W20B (10')		14:48				
	- 9	W20B (15')		14:59				

• TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#: _____

Logged By: _____ Date: 3/27/09

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: _____

Sample Condition Upon Receipt
1. CHILLED Y☐ N☐ 4. SEALED Y☐ N☐
2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐
3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client: Geocon Consultants
Address: 6671 Brisa St.
TEL: (925) 371-5900
Attn: John Love
City Livermore State CA Zip Code 94550
FAX: (925) 371-5915
Project Name: Caltrans Dumbarton Bridge Project #: E8435-06-18 Sampler: (Printed Name) John Love (Signature)

Relinquished by: (Signature and Printed Name) John Love	Date: 3/27/09	Time: 16:00	Received by: (Signature and Printed Name)	Date: 3/27/09	Time: 0830
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
John Love 3/27/09
Print Name Date
Signature

Send Report To:
Attn: _____
Co: same as above
Address _____
City _____ State _____ Zip _____

Bill To:
Attn: _____
Co: same as above
Address _____
City _____ State _____ Zip _____

Special Instructions/Comments:
Gauge cleanup (soils)

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

Circle or Add Analysis(es) Requested: 8081A (Pesticides); 8082 (PCB); 8260B (Volatiles); 8270C (BNA); 8010B (Total Metal); 8015B (GRO) / 8020 (BTEX); 8015B (DRO); 8021 (BTEX); TITLE 22 / CAM 17 (6010 / 7000); TPHd + TPHmo w/ Silica gel cleanup (SW3630C); SVOCs (SW8270C)

SPECIFY APPROPRIATE MATRIX: SOIL; WATER; GROUND WATER; WASTEWATER

PRESERVATION

QA/QC: RTNE ☐ CT ☐ SWRCB ☐ Logcode _____ OTHER _____

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	TAT	Container(s): #	Type	REMARKS
	10478 -10	W15BGW (0')	3/26/09	13:15	E	1	T P	
	" -11	W15BGW (10')		13:30				
	" -12	W15BGW (15')		13:51				

- TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr; B= Emergency Next workday; C= Critical 2 Workdays; D= Urgent 3 Workdays; E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=Hcl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

June 09, 2009

John Love
Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550
TEL: (925) 525-4142
FAX: (925) 371-5915

ELAP No.: 1838
NELAP No.: 02107CA
NEVADA.: CA-401
CSDLAC No.: 10196

Workorder No.: 104788

RE: Caltrans Dumbarton Bridge, E8435-06-18

Attention: John Love

Enclosed are the results for sample(s) received on March 28, 2009 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

This is an addendum report. Please incorporate with documentation previously submitted.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

CLIENT: Geocon Consultants, Inc.
Project: Caltrans Dumbarton Bridge, E8435-06-18
Lab Order: 104788

CASE NARRATIVE

Results were J-Flag. "J" is used to flag those results that are between the PQL (Practical Quantitation Limit) and the calculated MDL (Method Detection Limit). Results that are "J" Flagged are estimated values since it becomes difficult to accurately quantitate the analyte near the MDL.

Analytical Comments for Method 6010

Dilution was necessary for samples 104788-007A and 104788-010A, due to sample matrix.

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W20B (0')
Lab Order:	104788	**Collection Date:**	3/26/2009 2:34:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104788-007A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC							
WET/ EPA 6010B							
RunID: **ICP8_090608C**	QC Batch: **R109661**				PrepDate:		Analyst: **CL**
Chromium	0.11	0.018	1.0	J	mg/L	20	6/8/2009 05:26 PM
Vanadium	0.18	0.010	1.0	J	mg/L	20	6/8/2009 05:26 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W15BGW (0')
Lab Order:	104788	**Collection Date:**	3/26/2009 1:15:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104788-010A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC							
WET/ EPA 6010B							
RunID: **ICP8_090608C**	QC Batch: **R109661**				PrepDate:		Analyst: **CL**
Chromium	0.11	0.018	1.0	J	mg/L	20	6/8/2009 05:30 PM
Vanadium	0.15	0.010	1.0	J	mg/L	20	6/8/2009 05:30 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_ST

Sample ID: **MB-55695A** SampType: **MBLK** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **PBS** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722211**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	ND	0.050									
Vanadium	ND	0.050									

Sample ID: **LCS-55695** SampType: **LCS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **LCSS** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722212**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	0.919	0.050	1.000	0	91.9	85	115				
Vanadium	1.004	0.050	1.000	0	100	85	115				

Sample ID: **104787-004ADUP** SampType: **DUP** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **ZZZZZZ** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722223**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	0.068	1.0						0.1096	0	20	
Vanadium	0.204	1.0						0.2437	0	20	

Sample ID: **104787-004AMS** SampType: **MS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **ZZZZZZ** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722224**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	2.444	1.0	2.500	0.1096	93.4	77	116				
Vanadium	2.743	1.0	2.500	0.2437	100	79	118				

Sample ID: **MB-55695B** SampType: **MBLK** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **PBS** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722225**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104788
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_ST

Sample ID: **MB-55695B** SampType: **MBLK** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **PBS** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722225**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	ND	0.050									
Vanadium	ND	0.050									

Sample ID: **104789-008ADUP** SampType: **DUP** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **ZZZZZZ** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722236**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	0.235	1.0						0.2217	0	20	
Vanadium	0.470	1.0						0.4639	0	20	

Sample ID: **104789-008AMS** SampType: **MS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **ZZZZZZ** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722237**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	2.649	1.0	2.500	0.2217	97.1	77	116				
Vanadium	2.991	1.0	2.500	0.4639	101	79	118				

Sample ID: **104789-008AMSD** SampType: **MSD** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **109661**
Client ID: **ZZZZZZ** Batch ID: **R109661** TestNo: **WET/ EPA 60** Analysis Date: **6/8/2009** SeqNo: **1722238**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	2.612	1.0	2.500	0.2217	95.6	77	116	2.649	1.40	20	
Vanadium	2.980	1.0	2.500	0.4639	101	79	118	2.991	0.375	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

Diane Galvan

From: John Love [love@geoconinc.com]
Sent: Wednesday, June 03, 2009 10:50 AM
To: Diane Galvan
Subject: WET Request
Attachments: COC Caltrans Dumbarton Bridge.pdf

Hi Diane:

Caltrans would like to run a waste extraction test on several samples for select metals from the Dumbarton Bridge project. I've attached the COCs for the samples they wanted analyzed for STLC. Let me know if you have any questions.

Thanks Diane.

John Love
Sr. Project Geologist

Please visit our new website at http://www.geoconinc.com

GEOCON Incorporated
6671 Brisa Street
Livermore, CA 94550
Tel (925) 371-5900

GEOTECHNICAL - ENVIRONMENTAL - MATERIALS

San Diego Murrieta Burbank San Bernardino Bakersfield Sacramento Livermore Carson City Las Vegas Portland

CONFIDENTIALITY NOTICE: This e-mail may contain confidential and privileged material for the sole use of the intended recipient(s). Any review, use, distribution or disclosure by others is strictly prohibited. If you have received this communication in error, please notify the sender immediately by e-mail and delete the message and any file attachments from your computer. Thank you.

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#: _____

Logged By: _____ Date: _____

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: _____

Sample Condition Upon Receipt: 1. CHILLED Y☐ N☐ 4. SEALED Y☐ N☐ 2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐ 3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client: Geocon Consultants, Inc. Address: 6671 Brisa St. TEL: (925) 371-5900
Attn: John Love City Livermore State CA Zip Code 94550 FAX: (925) 371-5915

Project Name: Caltrans - Dumbarton Bridge Project #: E8435-06-18 Sampler: (Printed Name) John Love (Signature)

Relinquished by: (Signature and Printed Name) John Love	Date: 6/3/09	Time:	Received by: (Signature and Printed Name)	Date: Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date: Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date: Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: John Love 6/3/09 (Print Name / Date) (Signature)

Send Report To: Attn: _____ Co: same as above Address _____ City _____ State _____ Zip _____

Bill To: Attn: _____ Co: same as above Address _____ City _____ State _____ Zip _____

Special Instructions/Comments:

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

Circle or Add Analysis(es) Requested

SPECIFY APPROPRIATE MATRIX

PRESERVATION

Q A / Q C: RTNE ☐ CT ☐ SWRCB ☐ Logcode _____ OTHER _____

ITEM	LAB USE ONLY: Batch # / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	8010B (Total Metal)	8015B (GRO) / 8020 (BTEX)	8015B (DRO)	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	V: (WET)	As: (WET)	Cr: (WET)	Pb: (WET)	Hg: (WET)	Ni: (WET)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	REMARKS
		ESA (5')	3/24/09									X		X	X				X					E	1	T P	
		ESB (0')										X				X			X								
		ESB (5')										X		X	X				X								
		E10BGW (0')										X				X			X								
		E10BGW (5')										X		X	X				X								
		E15A (5')										X		x	x			X	X								
		E20AGW (5')										X			X				X								
		~~E8GW~~ E20BGW (5')										X		x	x				X								
		WSA (5')										X		x	x			X	X								
		W10AGW (5')										X			X			X	X								

* TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=Hcl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter.

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#: _____

Logged By: _____ Date: _____

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: _____

Sample Condition Upon Receipt
1. CHILLED Y☐ N☐ 4. SEALED Y☐ N☐
2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐
3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client:
Attn:
Address: 6671 Brisa St.
City Livermore State CA Zip Code 94550
TEL: (925) 371-5900
FAX: (925) 371-5915

Project Name: Caltrans- Dumbarton Bridge Project #: E8435-06-18 Sampler: (Printed Name) John Love (Signature)

Relinquished by: (Signature and Printed Name) John Love	Date: 6/3/09	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
John Love 6/3/09 (Print Name / Date)
(Signature)

Send Report To:
Attn: _____
Co: same as above
Address _____
City _____ State ____ Zip ____

Bill To:
Attn: _____
Co: same as above
Address _____
City _____ State ____ Zip ____

Special Instructions/Comments:

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

Circle or Add Analysis(es) Requested

SPECIFY APPROPRIATE MATRIX

PRESERVATION

Q A / Q C
RTNE ☐ CT ☐ SWRCB ☐ Logcode ____ OTHER ____

ITEM	LAB USE ONLY: Batch # / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	8010B (Total Metals)	8015B (GRO) / 8020 (BTEX)	8015B (DRO)	TITLE 22 / CAM 17 (6010 / 7000)	As (WET)	Cr (WET)	Pb (WET)	Hg (WET)	Ni (WET)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	REMARKS
		W10B (0')	3/4/01							X			X				X						E	1	T P	
		W15BGW (0')								X			X				X									
		W20AGW (5')								X			X				X									
		W20B (0')								X			X				X									
		FW1 (0')								X					X		X							T m	
		FW1 (2')								X			X				X									
		FW2 (0')								X			X				X									
		FW2 (2')								X					X		X									
		FW3 (0')								X			X				X									
		FW3 (2')								X			X				X									

• TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=Hcl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: White with report, Yellow to folder, Pink to submitter.

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
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Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#: _____

Logged By: _____ Date: _____

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: _____

Sample Condition Upon Receipt: 1. CHILLED Y☐ N☐ 4. SEALED Y☐ N☐ 2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐ 3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client: ~~Caltrans - Dumbarton Bridge~~ Geocon Consultants
Attn: John Love
Address: 6671 Brisa St.
City Livermore State CA Zip Code
TEL: (925) 371-5900
FAX: (925) 371-5915

Project Name: Caltrans - Dumbarton Bridge Project #: E8435-06-18 Sampler: (Printed Name) John Love (Signature)

Relinquished by: (Signature and Printed Name) John Love	Date: 6/3/09	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
John Love 6/3/09
Print Name Date
Signature

Send Report To:
Attn: _____
Co: same as above
Address _____
City _____ State ____ Zip ____

Bill To:
Attn: _____
Co: same as above
Address _____
City _____ State ____ Zip ____

Special Instructions/Comments:

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time
		FW4 (0')	3/2/09	
		FW4 (2')	↓	

Circle or Add Analysis(es) Requested

8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	8010B (Total Metals)	8015B (GRO) / 8020 (BTEX)	8015B (DRO)	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	VA (WET)	CC (WET)	Hg (WET)	PB (WET)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
								X	X	X	X		X				E	1	T M		
								X	X	X			X				↓	↓	↓ ↓		

SPECIFY APPROPRIATE MATRIX

QA/QC: RTNE ☐ CT ☐ SWRCB ☐ Logcode ____ OTHER ____

- TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter.

April 07, 2009

John Love
Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550
TEL: (925) 525-4142
FAX: (925) 371-5915

ELAP No.: 1838
NELAP No.: 02107CA
NEVADA.: CA-401
CSDLAC No.: 10196

Workorder No.: 104789

RE: Caltrans Dumbarton Bridge, E8435-06-18

Attention: John Love

Enclosed are the results for sample(s) received on March 28, 2009 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter and the case narrative are an integral part of this analytical report and cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CASE NARRATIVE

Analytical Comments for Method SM4500-CN E

Dilution was necessary for sample 104789-001H, due to sample matrix.

Analytical Comments for Method 6010

Dilution was necessary for sample 104789-001E, due to sample matrix.

RPD for Duplicate (DUP) is outside criteria for samples 104767-001BDUP, 104789-012ADUP and 104789-012AMSD; however, the Laboratory Control Sample (LCS) validated the analytical batch.

Analytical Comments for Method 8015 (DRO/ORO)

Dilution was necessary for samples 104789-007A and 104789-011A, due to sample matrix.

Surrogate recovery was diluted out for samples 104789-007A and 104789-011A.

RPD for Duplicate (DUP) is outside criteria for sample 104789-012ADUP; however, the analytical batch was validated by the Laboratory Control Sample (LCS).

Analytical Comments for Method 8270

Dilution was necessary for samples 104789-007A and 104789-011A, due to sample matrix.

Surrogate recovery biased high for sample 104789-006A, possibly due to matrix interferences.

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W20AGW
Lab Order:	104789	**Collection Date:**	3/26/2009 10:45:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104789-001A		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS11_090331A QC Batch: A09VW063 PrepDate: Analyst: **SLL**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	3/31/2009 04:11 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	3/31/2009 04:11 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	3/31/2009 04:11 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	3/31/2009 04:11 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	3/31/2009 04:11 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	3/31/2009 04:11 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	3/31/2009 04:11 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	3/31/2009 04:11 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	3/31/2009 04:11 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	3/31/2009 04:11 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	3/31/2009 04:11 PM
1,2-Dibromo-3-chloropropane	ND	0.50		µg/L	1	3/31/2009 04:11 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	3/31/2009 04:11 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2009 04:11 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	3/31/2009 04:11 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	3/31/2009 04:11 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	3/31/2009 04:11 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2009 04:11 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	3/31/2009 04:11 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2009 04:11 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	3/31/2009 04:11 PM
2-Chlorotoluene	ND	0.50		µg/L	1	3/31/2009 04:11 PM
4-Chlorotoluene	ND	0.50		µg/L	1	3/31/2009 04:11 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	3/31/2009 04:11 PM
Benzene	ND	0.50		µg/L	1	3/31/2009 04:11 PM
Bromobenzene	ND	0.50		µg/L	1	3/31/2009 04:11 PM
Bromodichloromethane	ND	0.50		µg/L	1	3/31/2009 04:11 PM
Bromoform	ND	0.50		µg/L	1	3/31/2009 04:11 PM
Bromomethane	ND	0.50		µg/L	1	3/31/2009 04:11 PM
Carbon tetrachloride	ND	0.50		µg/L	1	3/31/2009 04:11 PM
Chlorobenzene	ND	0.50		µg/L	1	3/31/2009 04:11 PM
Chloroethane	ND	0.50		µg/L	1	3/31/2009 04:11 PM
Chloroform	ND	0.50		µg/L	1	3/31/2009 04:11 PM
Chloromethane	0.56	0.50		µg/L	1	3/31/2009 04:11 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	3/31/2009 04:11 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W20AGW
Lab Order:	104789	**Collection Date:**	3/26/2009 10:45:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104789-001A		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS11_090331A QC Batch: A09VW063 PrepDate: Analyst: **SLL**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
cis-1,3-Dichloropropene	ND	0.50		µg/L	1	3/31/2009 04:11 PM
Dibromochloromethane	ND	0.50		µg/L	1	3/31/2009 04:11 PM
Dibromomethane	ND	0.50		µg/L	1	3/31/2009 04:11 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	3/31/2009 04:11 PM
Ethylbenzene	ND	0.50		µg/L	1	3/31/2009 04:11 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	3/31/2009 04:11 PM
Isopropylbenzene	ND	0.50		µg/L	1	3/31/2009 04:11 PM
m,p-Xylene	ND	1.0		µg/L	1	3/31/2009 04:11 PM
Methylene chloride	ND	1.0		µg/L	1	3/31/2009 04:11 PM
n-Butylbenzene	ND	0.50		µg/L	1	3/31/2009 04:11 PM
n-Propylbenzene	ND	0.50		µg/L	1	3/31/2009 04:11 PM
Naphthalene	ND	0.50		µg/L	1	3/31/2009 04:11 PM
o-Xylene	ND	0.50		µg/L	1	3/31/2009 04:11 PM
sec-Butylbenzene	ND	0.50		µg/L	1	3/31/2009 04:11 PM
Styrene	ND	0.50		µg/L	1	3/31/2009 04:11 PM
tert-Butylbenzene	ND	0.50		µg/L	1	3/31/2009 04:11 PM
Tetrachloroethene	ND	0.50		µg/L	1	3/31/2009 04:11 PM
Toluene	ND	0.50		µg/L	1	3/31/2009 04:11 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	3/31/2009 04:11 PM
Trichloroethene	ND	0.50		µg/L	1	3/31/2009 04:11 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	3/31/2009 04:11 PM
Vinyl chloride	ND	0.50		µg/L	1	3/31/2009 04:11 PM
Surr: 1,2-Dichloroethane-d4	97.8	70-130		%REC	1	3/31/2009 04:11 PM
Surr: 4-Bromofluorobenzene	89.6	70-130		%REC	1	3/31/2009 04:11 PM
Surr: Dibromofluoromethane	99.8	70-130		%REC	1	3/31/2009 04:11 PM
Surr: Toluene-d8	107	70-130		%REC	1	3/31/2009 04:11 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W20AGW
Lab Order:	104789	**Collection Date:**	3/26/2009 10:45:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104789-001B		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
GASOLINE RANGE ORGANICS BY GC/FID						
		EPA 8015B(M)				
RunID: GC1_090403A	QC Batch: D09VW053			PrepDate:		Analyst: **BD**
GRO	ND	0.050		mg/L	1	4/3/2009 01:48 PM
Surr: Bromofluorobenzene (FID)	86.4	71-130		%REC	1	4/3/2009 01:48 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W20AGW
Lab Order:	104789	**Collection Date:**	3/26/2009 10:45:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104789-001C		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3510C **EPA 8270C**

RunID: MS6_090331A QC Batch: 54393 PrepDate: 3/31/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,2,4-Trichlorobenzene	ND	10		µg/L	1	4/1/2009 04:23 PM
1,2-Dichlorobenzene	ND	10		µg/L	1	4/1/2009 04:23 PM
1,3-Dichlorobenzene	ND	10		µg/L	1	4/1/2009 04:23 PM
1,4-Dichlorobenzene	ND	10		µg/L	1	4/1/2009 04:23 PM
2,4,5-Trichlorophenol	ND	10		µg/L	1	4/1/2009 04:23 PM
2,4,6-Trichlorophenol	ND	10		µg/L	1	4/1/2009 04:23 PM
2,4-Dichlorophenol	ND	10		µg/L	1	4/1/2009 04:23 PM
2,4-Dimethylphenol	ND	10		µg/L	1	4/1/2009 04:23 PM
2,4-Dinitrophenol	ND	50		µg/L	1	4/1/2009 04:23 PM
2,4-Dinitrotoluene	ND	10		µg/L	1	4/1/2009 04:23 PM
2,6-Dinitrotoluene	ND	10		µg/L	1	4/1/2009 04:23 PM
2-Chloronaphthalene	ND	10		µg/L	1	4/1/2009 04:23 PM
2-Chlorophenol	ND	10		µg/L	1	4/1/2009 04:23 PM
2-Methylnaphthalene	ND	10		µg/L	1	4/1/2009 04:23 PM
2-Methylphenol	ND	10		µg/L	1	4/1/2009 04:23 PM
2-Nitroaniline	ND	50		µg/L	1	4/1/2009 04:23 PM
2-Nitrophenol	ND	10		µg/L	1	4/1/2009 04:23 PM
3,3´-Dichlorobenzidine	ND	20		µg/L	1	4/1/2009 04:23 PM
3-Nitroaniline	ND	50		µg/L	1	4/1/2009 04:23 PM
4,6-Dinitro-2-methylphenol	ND	50		µg/L	1	4/1/2009 04:23 PM
4-Bromophenyl-phenylether	ND	10		µg/L	1	4/1/2009 04:23 PM
4-Chloro-3-methylphenol	ND	50		µg/L	1	4/1/2009 04:23 PM
4-Chloroaniline	ND	20		µg/L	1	4/1/2009 04:23 PM
4-Chlorophenyl-phenylether	ND	10		µg/L	1	4/1/2009 04:23 PM
4-Methylphenol	ND	10		µg/L	1	4/1/2009 04:23 PM
4-Nitroaniline	ND	20		µg/L	1	4/1/2009 04:23 PM
4-Nitrophenol	ND	50		µg/L	1	4/1/2009 04:23 PM
Acenaphthene	ND	10		µg/L	1	4/1/2009 04:23 PM
Acenaphthylene	ND	10		µg/L	1	4/1/2009 04:23 PM
Anthracene	ND	10		µg/L	1	4/1/2009 04:23 PM
Benzidine (M)	ND	50		µg/L	1	4/1/2009 04:23 PM
Benzo(a)anthracene	ND	10		µg/L	1	4/1/2009 04:23 PM
Benzo(a)pyrene	ND	10		µg/L	1	4/1/2009 04:23 PM
Benzo(b)fluoranthene	ND	10		µg/L	1	4/1/2009 04:23 PM
Benzo(g,h,i)perylene	ND	10		µg/L	1	4/1/2009 04:23 PM

Qualifiers:

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ND	Not Detected at the Reporting Limit
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	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W20AGW
Lab Order:	104789	**Collection Date:**	3/26/2009 10:45:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104789-001C		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3510C **EPA 8270C**

RunID: MS6_090331A QC Batch: 54393 PrepDate: 3/31/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Benzo(k)fluoranthene	ND	10		µg/L	1	4/1/2009 04:23 PM
Benzoic acid	ND	50		µg/L	1	4/1/2009 04:23 PM
Benzyl alcohol	ND	20		µg/L	1	4/1/2009 04:23 PM
Bis(2-chloroethoxy)methane	ND	10		µg/L	1	4/1/2009 04:23 PM
Bis(2-chloroethyl)ether	ND	10		µg/L	1	4/1/2009 04:23 PM
Bis(2-chloroisopropyl)ether	ND	10		µg/L	1	4/1/2009 04:23 PM
Bis(2-ethylhexyl)phthalate	ND	10		µg/L	1	4/1/2009 04:23 PM
Butylbenzylphthalate	ND	10		µg/L	1	4/1/2009 04:23 PM
Chrysene	ND	10		µg/L	1	4/1/2009 04:23 PM
Di-n-butylphthalate	ND	10		µg/L	1	4/1/2009 04:23 PM
Di-n-octylphthalate	ND	10		µg/L	1	4/1/2009 04:23 PM
Dibenz(a,h)anthracene	ND	10		µg/L	1	4/1/2009 04:23 PM
Dibenzofuran	ND	10		µg/L	1	4/1/2009 04:23 PM
Diethylphthalate	ND	10		µg/L	1	4/1/2009 04:23 PM
Dimethylphthalate	ND	10		µg/L	1	4/1/2009 04:23 PM
Fluoranthene	ND	10		µg/L	1	4/1/2009 04:23 PM
Fluorene	ND	10		µg/L	1	4/1/2009 04:23 PM
Hexachlorobenzene	ND	10		µg/L	1	4/1/2009 04:23 PM
Hexachlorobutadiene	ND	20		µg/L	1	4/1/2009 04:23 PM
Hexachlorocyclopentadiene	ND	10		µg/L	1	4/1/2009 04:23 PM
Hexachloroethane	ND	10		µg/L	1	4/1/2009 04:23 PM
Indeno(1,2,3-cd)pyrene	ND	10		µg/L	1	4/1/2009 04:23 PM
Isophorone	ND	10		µg/L	1	4/1/2009 04:23 PM
N-Nitrosodi-n-propylamine	ND	10		µg/L	1	4/1/2009 04:23 PM
N-Nitrosodiphenylamine	ND	10		µg/L	1	4/1/2009 04:23 PM
Naphthalene	ND	10		µg/L	1	4/1/2009 04:23 PM
Nitrobenzene	ND	10		µg/L	1	4/1/2009 04:23 PM
Pentachlorophenol	ND	50		µg/L	1	4/1/2009 04:23 PM
Phenanthrene	ND	10		µg/L	1	4/1/2009 04:23 PM
Phenol	ND	10		µg/L	1	4/1/2009 04:23 PM
Pyrene	ND	10		µg/L	1	4/1/2009 04:23 PM
Surr: 1,2-Dichlorobenzene-d4	46.2	42-98		%REC	1	4/1/2009 04:23 PM
Surr: 2,4,6-Tribromophenol	87.9	60-128		%REC	1	4/1/2009 04:23 PM
Surr: 2-Chlorophenol-d4	50.3	43-102		%REC	1	4/1/2009 04:23 PM
Surr: 2-Fluorobiphenyl	72.9	50-108		%REC	1	4/1/2009 04:23 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W20AGW
Lab Order:	104789	**Collection Date:**	3/26/2009 10:45:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104789-001C		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 3510C				**EPA 8270C**		
RunID: MS6_090331A	QC Batch: 54393			PrepDate: 3/31/2009	Analyst: **DMP**	
Surr: 2-Fluorophenol	37.4	22-69		%REC	1	4/1/2009 04:23 PM
Surr: 4-Terphenyl-d14	97.6	66-130		%REC	1	4/1/2009 04:23 PM
Surr: Nitrobenzene-d5	59.5	47-117		%REC	1	4/1/2009 04:23 PM
Surr: Phenol-d5	32.1	16-50		%REC	1	4/1/2009 04:23 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W20AGW
Lab Order:	104789	**Collection Date:**	3/26/2009 10:45:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104789-001D		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
EPA 3510C				**EPA 8015B**		
RunID: GC16_090401E	QC Batch: 54441			PrepDate:	4/1/2009	Analyst: **CBR**
DRO	ND	0.12		mg/L	1	4/2/2009 12:12 AM
ORO	ND	0.12		mg/L	1	4/2/2009 12:12 AM
Surr: p-Terphenyl	61.7	35-131		%REC	1	4/2/2009 12:12 AM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W20AGW
Lab Order:	104789	**Collection Date:**	3/26/2009 10:45:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104789-001E		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3010A			**EPA 6010B**		
RunID: ICP8_090403D	QC Batch: 54486			PrepDate:	4/2/2009	Analyst: **CL**
Antimony	ND	0.025		mg/L	5	4/3/2009 01:47 PM
Arsenic	ND	0.050		mg/L	5	4/3/2009 01:47 PM
Barium	0.10	0.015		mg/L	5	4/3/2009 01:47 PM
Beryllium	ND	0.015		mg/L	5	4/3/2009 01:47 PM
Cadmium	ND	0.015		mg/L	5	4/3/2009 01:47 PM
Chromium	ND	0.015		mg/L	5	4/3/2009 01:47 PM
Cobalt	ND	0.015		mg/L	5	4/3/2009 01:47 PM
Copper	ND	0.025		mg/L	5	4/3/2009 01:47 PM
Lead	ND	0.025		mg/L	5	4/3/2009 01:47 PM
Molybdenum	ND	0.025		mg/L	5	4/3/2009 01:47 PM
Nickel	0.037	0.025		mg/L	5	4/3/2009 01:47 PM
Selenium	ND	0.050		mg/L	5	4/3/2009 01:47 PM
Silver	ND	0.015		mg/L	5	4/3/2009 01:47 PM
Thallium	ND	0.075		mg/L	5	4/3/2009 01:47 PM
Vanadium	ND	0.015		mg/L	5	4/3/2009 01:47 PM
Zinc	0.058	0.050		mg/L	5	4/3/2009 01:47 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7470A		
RunID: AA1_090403D	QC Batch: 54480			PrepDate:	4/2/2009	Analyst: **RQ**
Mercury	ND	0.20		µg/L	1	4/3/2009 03:32 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W20AGW
Lab Order:	104789	**Collection Date:**	3/26/2009 10:45:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104789-001F		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
TOTAL FILTERABLE RESIDUE						
		SM2540C				
RunID: WETCHEM_090401B	QC Batch: 54508			PrepDate:	4/1/2009	Analyst: **DDL**
Total Dissolved Solids (Residue, Filterable)	17000	200		mg/L	1	4/1/2009 01:00 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W20AGW
Lab Order:	104789	**Collection Date:**	3/26/2009 10:45:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104789-001G		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
OIL & GREASE						
		EPA 1664 _HEM				
RunID: WETCHEM2_090402B	QC Batch: 54502			PrepDate:	4/2/2009	Analyst: **KXV**
Oil & Grease	ND	4.6		mg/L	1	4/2/2009

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W20AGW
Lab Order:	104789	**Collection Date:**	3/26/2009 10:45:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104789-001H		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
CYANIDE, TOTAL						
	SM4500-CN E					
RunID: WETCHEM3_090403B	QC Batch: 54519			PrepDate:	4/3/2009	Analyst: **MFP**
Cyanide	ND	0.040		mg/L	2	4/3/2009

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W20AGW
Lab Order:	104789	**Collection Date:**	3/26/2009 10:45:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104789-001I		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
SULFIDE, DISSOLVED						
		SM4500-S= D				
RunID: WETCHEM3_090401D	QC Batch: R107702			PrepDate:	4/1/2009	Analyst: **MFP**
Sulfide	ND	0.010		mg/L	1	4/1/2009

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	Trip Blank (W20AGW)
Lab Order:	104789	**Collection Date:**	3/26/2009 4:00:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104789-002A		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS11_090331A QC Batch: A09VW063 PrepDate: Analyst: **SLL**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	3/31/2009 03:51 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	3/31/2009 03:51 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	3/31/2009 03:51 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	3/31/2009 03:51 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	3/31/2009 03:51 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	3/31/2009 03:51 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	3/31/2009 03:51 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	3/31/2009 03:51 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	3/31/2009 03:51 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	3/31/2009 03:51 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	3/31/2009 03:51 PM
1,2-Dibromo-3-chloropropane	ND	0.50		µg/L	1	3/31/2009 03:51 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	3/31/2009 03:51 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2009 03:51 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	3/31/2009 03:51 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	3/31/2009 03:51 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	3/31/2009 03:51 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2009 03:51 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	3/31/2009 03:51 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2009 03:51 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	3/31/2009 03:51 PM
2-Chlorotoluene	ND	0.50		µg/L	1	3/31/2009 03:51 PM
4-Chlorotoluene	ND	0.50		µg/L	1	3/31/2009 03:51 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	3/31/2009 03:51 PM
Benzene	ND	0.50		µg/L	1	3/31/2009 03:51 PM
Bromobenzene	ND	0.50		µg/L	1	3/31/2009 03:51 PM
Bromodichloromethane	ND	0.50		µg/L	1	3/31/2009 03:51 PM
Bromoform	ND	0.50		µg/L	1	3/31/2009 03:51 PM
Bromomethane	ND	0.50		µg/L	1	3/31/2009 03:51 PM
Carbon tetrachloride	ND	0.50		µg/L	1	3/31/2009 03:51 PM
Chlorobenzene	ND	0.50		µg/L	1	3/31/2009 03:51 PM
Chloroethane	ND	0.50		µg/L	1	3/31/2009 03:51 PM
Chloroform	ND	0.50		µg/L	1	3/31/2009 03:51 PM
Chloromethane	ND	0.50		µg/L	1	3/31/2009 03:51 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	3/31/2009 03:51 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	Trip Blank (W20AGW)
Lab Order:	104789	**Collection Date:**	3/26/2009 4:00:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104789-002A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS11_090331A	QC Batch: A09VW063			PrepDate:		Analyst: **SLL**
cis-1,3-Dichloropropene	ND	0.50		µg/L	1	3/31/2009 03:51 PM
Dibromochloromethane	ND	0.50		µg/L	1	3/31/2009 03:51 PM
Dibromomethane	ND	0.50		µg/L	1	3/31/2009 03:51 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	3/31/2009 03:51 PM
Ethylbenzene	ND	0.50		µg/L	1	3/31/2009 03:51 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	3/31/2009 03:51 PM
Isopropylbenzene	ND	0.50		µg/L	1	3/31/2009 03:51 PM
m,p-Xylene	ND	1.0		µg/L	1	3/31/2009 03:51 PM
Methylene chloride	ND	1.0		µg/L	1	3/31/2009 03:51 PM
n-Butylbenzene	ND	0.50		µg/L	1	3/31/2009 03:51 PM
n-Propylbenzene	ND	0.50		µg/L	1	3/31/2009 03:51 PM
Naphthalene	ND	0.50		µg/L	1	3/31/2009 03:51 PM
o-Xylene	ND	0.50		µg/L	1	3/31/2009 03:51 PM
sec-Butylbenzene	ND	0.50		µg/L	1	3/31/2009 03:51 PM
Styrene	ND	0.50		µg/L	1	3/31/2009 03:51 PM
tert-Butylbenzene	ND	0.50		µg/L	1	3/31/2009 03:51 PM
Tetrachloroethene	ND	0.50		µg/L	1	3/31/2009 03:51 PM
Toluene	ND	0.50		µg/L	1	3/31/2009 03:51 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	3/31/2009 03:51 PM
Trichloroethene	ND	0.50		µg/L	1	3/31/2009 03:51 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	3/31/2009 03:51 PM
Vinyl chloride	ND	0.50		µg/L	1	3/31/2009 03:51 PM
Surr: 1,2-Dichloroethane-d4	92.0	70-130		%REC	1	3/31/2009 03:51 PM
Surr: 4-Bromofluorobenzene	94.0	70-130		%REC	1	3/31/2009 03:51 PM
Surr: Dibromofluoromethane	101	70-130		%REC	1	3/31/2009 03:51 PM
Surr: Toluene-d8	108	70-130		%REC	1	3/31/2009 03:51 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	Trip Blank (W20AGW)
Lab Order:	104789	**Collection Date:**	3/26/2009 4:00:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	104789-002B		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
GASOLINE RANGE ORGANICS BY GC/FID						
		EPA 8015B(M)				
RunID: GC1_090330A	QC Batch: D09VW048			PrepDate:		Analyst: **BD**
GRO	ND	0.050		mg/L	1	3/30/2009 06:31 PM
Surr: Bromofluorobenzene (FID)	108	71-130		%REC	1	3/30/2009 06:31 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W20AGW (0')
Lab Order:	104789	**Collection Date:**	3/26/2009 9:35:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104789-003A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B				**EPA 6010B**		
RunID: ICP8_090406D	QC Batch: 54532			PrepDate:	4/4/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	4/6/2009 05:40 PM
Arsenic	ND	1.0		mg/Kg	1	4/6/2009 05:40 PM
Barium	46	1.0		mg/Kg	1	4/6/2009 05:40 PM
Beryllium	ND	1.0		mg/Kg	1	4/6/2009 05:40 PM
Cadmium	ND	1.0		mg/Kg	1	4/6/2009 05:40 PM
Chromium	32	1.0		mg/Kg	1	4/6/2009 05:40 PM
Cobalt	14	1.0		mg/Kg	1	4/6/2009 05:40 PM
Copper	31	2.0		mg/Kg	1	4/6/2009 05:40 PM
Lead	ND	1.0		mg/Kg	1	4/6/2009 05:40 PM
Molybdenum	ND	1.0		mg/Kg	1	4/6/2009 05:40 PM
Nickel	26	1.0		mg/Kg	1	4/6/2009 05:40 PM
Selenium	2.6	1.0		mg/Kg	1	4/6/2009 05:40 PM
Silver	ND	1.0		mg/Kg	1	4/6/2009 05:40 PM
Thallium	ND	1.0		mg/Kg	1	4/6/2009 05:40 PM
Vanadium	54	1.0		mg/Kg	1	4/6/2009 05:40 PM
Zinc	41	1.0		mg/Kg	1	4/6/2009 05:40 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
EPA 3550B				**EPA 8015B(M)**		
RunID: GC16_090406A	QC Batch: 54479			PrepDate:	4/2/2009	Analyst: **CBR**
DRO	2.9	1.0		mg/Kg	1	4/6/2009 10:58 AM
ORO	2.9	1.0		mg/Kg	1	4/6/2009 10:58 AM
Surr: p-Terphenyl	84.7	30-130		%REC	1	4/6/2009 10:58 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090402D	QC Batch: 54465			PrepDate:	4/2/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	4/2/2009 01:26 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 3550B				**EPA 8270C**		
RunID: MS 13_090402B	QC Batch: 54471			PrepDate:	4/2/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	4/2/2009 10:55 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 10:55 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 10:55 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 10:55 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W20AGW (0')
Lab Order:	104789	**Collection Date:**	3/26/2009 9:35:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104789-003A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090402B QC Batch: 54471 PrepDate: 4/2/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 10:55 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 10:55 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	4/2/2009 10:55 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	4/2/2009 10:55 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	4/2/2009 10:55 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 10:55 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 10:55 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	4/2/2009 10:55 PM
2-Chlorophenol	ND	330		µg/Kg	1	4/2/2009 10:55 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	4/2/2009 10:55 PM
2-Methylphenol	ND	330		µg/Kg	1	4/2/2009 10:55 PM
2-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 10:55 PM
2-Nitrophenol	ND	330		µg/Kg	1	4/2/2009 10:55 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	4/2/2009 10:55 PM
3-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 10:55 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	4/2/2009 10:55 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 10:55 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	4/2/2009 10:55 PM
4-Chloroaniline	ND	660		µg/Kg	1	4/2/2009 10:55 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 10:55 PM
4-Methylphenol	ND	330		µg/Kg	1	4/2/2009 10:55 PM
4-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 10:55 PM
4-Nitrophenol	ND	1600		µg/Kg	1	4/2/2009 10:55 PM
Acenaphthene	ND	330		µg/Kg	1	4/2/2009 10:55 PM
Acenaphthylene	ND	330		µg/Kg	1	4/2/2009 10:55 PM
Anthracene	ND	330		µg/Kg	1	4/2/2009 10:55 PM
Benzidine (M)	ND	1600		µg/Kg	1	4/2/2009 10:55 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	4/2/2009 10:55 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	4/2/2009 10:55 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	4/2/2009 10:55 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	4/2/2009 10:55 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	4/2/2009 10:55 PM
Benzoic acid	ND	1600		µg/Kg	1	4/2/2009 10:55 PM
Benzyl alcohol	ND	660		µg/Kg	1	4/2/2009 10:55 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	4/2/2009 10:55 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W20AGW (0')
Lab Order:	104789	**Collection Date:**	3/26/2009 9:35:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104789-003A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090402B QC Batch: 54471 PrepDate: 4/2/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	4/2/2009 10:55 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	4/2/2009 10:55 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	4/2/2009 10:55 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	4/2/2009 10:55 PM
Chrysene	ND	330		µg/Kg	1	4/2/2009 10:55 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	4/2/2009 10:55 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	4/2/2009 10:55 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	4/2/2009 10:55 PM
Dibenzofuran	ND	330		µg/Kg	1	4/2/2009 10:55 PM
Diethylphthalate	ND	330		µg/Kg	1	4/2/2009 10:55 PM
Dimethylphthalate	ND	330		µg/Kg	1	4/2/2009 10:55 PM
Fluoranthene	ND	330		µg/Kg	1	4/2/2009 10:55 PM
Fluorene	ND	330		µg/Kg	1	4/2/2009 10:55 PM
Hexachlorobenzene	ND	330		µg/Kg	1	4/2/2009 10:55 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	4/2/2009 10:55 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	4/2/2009 10:55 PM
Hexachloroethane	ND	330		µg/Kg	1	4/2/2009 10:55 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	4/2/2009 10:55 PM
Isophorone	ND	330		µg/Kg	1	4/2/2009 10:55 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	4/2/2009 10:55 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	4/2/2009 10:55 PM
Naphthalene	ND	330		µg/Kg	1	4/2/2009 10:55 PM
Nitrobenzene	ND	330		µg/Kg	1	4/2/2009 10:55 PM
Pentachlorophenol	ND	1600		µg/Kg	1	4/2/2009 10:55 PM
Phenanthrene	ND	330		µg/Kg	1	4/2/2009 10:55 PM
Phenol	ND	330		µg/Kg	1	4/2/2009 10:55 PM
Pyrene	ND	330		µg/Kg	1	4/2/2009 10:55 PM
Surr: 1,2-Dichlorobenzene-d4	81.7	49-103		%REC	1	4/2/2009 10:55 PM
Surr: 2,4,6-Tribromophenol	94.0	47-129		%REC	1	4/2/2009 10:55 PM
Surr: 2-Chlorophenol-d4	89.1	54-109		%REC	1	4/2/2009 10:55 PM
Surr: 2-Fluorobiphenyl	93.3	59-108		%REC	1	4/2/2009 10:55 PM
Surr: 2-Fluorophenol	88.3	50-111		%REC	1	4/2/2009 10:55 PM
Surr: 4-Terphenyl-d14	124	58-135		%REC	1	4/2/2009 10:55 PM
Surr: Nitrobenzene-d5	88.9	54-115		%REC	1	4/2/2009 10:55 PM
Surr: Phenol-d5	89.5	58-112		%REC	1	4/2/2009 10:55 PM

Qualifiers:

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E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W20AGW (5')
Lab Order:	104789	**Collection Date:**	3/26/2009 9:43:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104789-004A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090406D	QC Batch: 54532			PrepDate:	4/4/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	4/6/2009 05:42 PM
Arsenic	ND	1.0		mg/Kg	1	4/6/2009 05:42 PM
Barium	79	1.0		mg/Kg	1	4/6/2009 05:42 PM
Beryllium	ND	1.0		mg/Kg	1	4/6/2009 05:42 PM
Cadmium	ND	1.0		mg/Kg	1	4/6/2009 05:42 PM
Chromium	49	1.0		mg/Kg	1	4/6/2009 05:42 PM
Cobalt	17	1.0		mg/Kg	1	4/6/2009 05:42 PM
Copper	45	2.0		mg/Kg	1	4/6/2009 05:42 PM
Lead	3.8	1.0		mg/Kg	1	4/6/2009 05:42 PM
Molybdenum	ND	1.0		mg/Kg	1	4/6/2009 05:42 PM
Nickel	36	1.0		mg/Kg	1	4/6/2009 05:42 PM
Selenium	2.2	1.0		mg/Kg	1	4/6/2009 05:42 PM
Silver	ND	1.0		mg/Kg	1	4/6/2009 05:42 PM
Thallium	ND	1.0		mg/Kg	1	4/6/2009 05:42 PM
Vanadium	52	1.0		mg/Kg	1	4/6/2009 05:42 PM
Zinc	38	1.0		mg/Kg	1	4/6/2009 05:42 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090406A	QC Batch: 54479			PrepDate:	4/2/2009	Analyst: **CBR**
DRO	4.1	1.0		mg/Kg	1	4/6/2009 10:14 AM
ORO	2.5	1.0		mg/Kg	1	4/6/2009 10:14 AM
Surr: p-Terphenyl	86.6	30-130		%REC	1	4/6/2009 10:14 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090402D	QC Batch: 54465			PrepDate:	4/2/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	4/2/2009 01:29 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090402B	QC Batch: 54471			PrepDate:	4/2/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	4/2/2009 10:28 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 10:28 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 10:28 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 10:28 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W20AGW (5')
Lab Order:	104789	**Collection Date:**	3/26/2009 9:43:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104789-004A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090402B QC Batch: 54471 PrepDate: 4/2/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 10:28 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 10:28 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	4/2/2009 10:28 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	4/2/2009 10:28 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	4/2/2009 10:28 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 10:28 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 10:28 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	4/2/2009 10:28 PM
2-Chlorophenol	ND	330		µg/Kg	1	4/2/2009 10:28 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	4/2/2009 10:28 PM
2-Methylphenol	ND	330		µg/Kg	1	4/2/2009 10:28 PM
2-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 10:28 PM
2-Nitrophenol	ND	330		µg/Kg	1	4/2/2009 10:28 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	4/2/2009 10:28 PM
3-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 10:28 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	4/2/2009 10:28 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 10:28 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	4/2/2009 10:28 PM
4-Chloroaniline	ND	660		µg/Kg	1	4/2/2009 10:28 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 10:28 PM
4-Methylphenol	ND	330		µg/Kg	1	4/2/2009 10:28 PM
4-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 10:28 PM
4-Nitrophenol	ND	1600		µg/Kg	1	4/2/2009 10:28 PM
Acenaphthene	ND	330		µg/Kg	1	4/2/2009 10:28 PM
Acenaphthylene	ND	330		µg/Kg	1	4/2/2009 10:28 PM
Anthracene	ND	330		µg/Kg	1	4/2/2009 10:28 PM
Benzidine (M)	ND	1600		µg/Kg	1	4/2/2009 10:28 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	4/2/2009 10:28 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	4/2/2009 10:28 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	4/2/2009 10:28 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	4/2/2009 10:28 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	4/2/2009 10:28 PM
Benzoic acid	ND	1600		µg/Kg	1	4/2/2009 10:28 PM
Benzyl alcohol	ND	660		µg/Kg	1	4/2/2009 10:28 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	4/2/2009 10:28 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W20AGW (5')
Lab Order:	104789	**Collection Date:**	3/26/2009 9:43:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104789-004A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090402B QC Batch: 54471 PrepDate: 4/2/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	4/2/2009 10:28 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	4/2/2009 10:28 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	4/2/2009 10:28 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	4/2/2009 10:28 PM
Chrysene	ND	330		µg/Kg	1	4/2/2009 10:28 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	4/2/2009 10:28 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	4/2/2009 10:28 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	4/2/2009 10:28 PM
Dibenzofuran	ND	330		µg/Kg	1	4/2/2009 10:28 PM
Diethylphthalate	ND	330		µg/Kg	1	4/2/2009 10:28 PM
Dimethylphthalate	ND	330		µg/Kg	1	4/2/2009 10:28 PM
Fluoranthene	ND	330		µg/Kg	1	4/2/2009 10:28 PM
Fluorene	ND	330		µg/Kg	1	4/2/2009 10:28 PM
Hexachlorobenzene	ND	330		µg/Kg	1	4/2/2009 10:28 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	4/2/2009 10:28 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	4/2/2009 10:28 PM
Hexachloroethane	ND	330		µg/Kg	1	4/2/2009 10:28 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	4/2/2009 10:28 PM
Isophorone	ND	330		µg/Kg	1	4/2/2009 10:28 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	4/2/2009 10:28 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	4/2/2009 10:28 PM
Naphthalene	ND	330		µg/Kg	1	4/2/2009 10:28 PM
Nitrobenzene	ND	330		µg/Kg	1	4/2/2009 10:28 PM
Pentachlorophenol	ND	1600		µg/Kg	1	4/2/2009 10:28 PM
Phenanthrene	ND	330		µg/Kg	1	4/2/2009 10:28 PM
Phenol	ND	330		µg/Kg	1	4/2/2009 10:28 PM
Pyrene	ND	330		µg/Kg	1	4/2/2009 10:28 PM
Surr: 1,2-Dichlorobenzene-d4	85.0	49-103		%REC	1	4/2/2009 10:28 PM
Surr: 2,4,6-Tribromophenol	93.5	47-129		%REC	1	4/2/2009 10:28 PM
Surr: 2-Chlorophenol-d4	90.4	54-109		%REC	1	4/2/2009 10:28 PM
Surr: 2-Fluorobiphenyl	93.8	59-108		%REC	1	4/2/2009 10:28 PM
Surr: 2-Fluorophenol	89.3	50-111		%REC	1	4/2/2009 10:28 PM
Surr: 4-Terphenyl-d14	119	58-135		%REC	1	4/2/2009 10:28 PM
Surr: Nitrobenzene-d5	90.2	54-115		%REC	1	4/2/2009 10:28 PM
Surr: Phenol-d5	90.8	58-112		%REC	1	4/2/2009 10:28 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W20AGW (10')
Lab Order:	104789	**Collection Date:**	3/26/2009 9:50:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104789-005A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090406D	QC Batch: 54532			PrepDate:	4/4/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	4/7/2009 08:58 AM
Arsenic	5.1	1.0		mg/Kg	1	4/7/2009 08:58 AM
Barium	35	1.0		mg/Kg	1	4/7/2009 08:58 AM
Beryllium	ND	1.0		mg/Kg	1	4/7/2009 08:58 AM
Cadmium	ND	1.0		mg/Kg	1	4/7/2009 08:58 AM
Chromium	44	1.0		mg/Kg	1	4/7/2009 08:58 AM
Cobalt	9.2	1.0		mg/Kg	1	4/7/2009 08:58 AM
Copper	26	2.0		mg/Kg	1	4/7/2009 08:58 AM
Lead	18	1.0		mg/Kg	1	4/7/2009 08:58 AM
Molybdenum	ND	1.0		mg/Kg	1	4/7/2009 08:58 AM
Nickel	51	1.0		mg/Kg	1	4/7/2009 08:58 AM
Selenium	1.2	1.0		mg/Kg	1	4/7/2009 08:58 AM
Silver	ND	1.0		mg/Kg	1	4/7/2009 08:58 AM
Thallium	ND	1.0		mg/Kg	1	4/7/2009 08:58 AM
Vanadium	38	1.0		mg/Kg	1	4/7/2009 08:58 AM
Zinc	65	1.0		mg/Kg	1	4/7/2009 08:58 AM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090406A	QC Batch: 54479			PrepDate:	4/2/2009	Analyst: **CBR**
DRO	2.8	1.0		mg/Kg	1	4/6/2009 10:40 AM
ORO	2.1	1.0		mg/Kg	1	4/6/2009 10:40 AM
Surr: p-Terphenyl	49.4	30-130		%REC	1	4/6/2009 10:40 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090402D	QC Batch: 54465			PrepDate:	4/2/2009	Analyst: **RQ**
Mercury	0.33	0.10		mg/Kg	1	4/2/2009 01:31 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090402B	QC Batch: 54471			PrepDate:	4/2/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	4/2/2009 11:23 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 11:23 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 11:23 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 11:23 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W20AGW (10')
Lab Order:	104789	**Collection Date:**	3/26/2009 9:50:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104789-005A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090402B QC Batch: 54471 PrepDate: 4/2/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 11:23 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 11:23 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	4/2/2009 11:23 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	4/2/2009 11:23 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	4/2/2009 11:23 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 11:23 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 11:23 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	4/2/2009 11:23 PM
2-Chlorophenol	ND	330		µg/Kg	1	4/2/2009 11:23 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	4/2/2009 11:23 PM
2-Methylphenol	ND	330		µg/Kg	1	4/2/2009 11:23 PM
2-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 11:23 PM
2-Nitrophenol	ND	330		µg/Kg	1	4/2/2009 11:23 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	4/2/2009 11:23 PM
3-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 11:23 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	4/2/2009 11:23 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 11:23 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	4/2/2009 11:23 PM
4-Chloroaniline	ND	660		µg/Kg	1	4/2/2009 11:23 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 11:23 PM
4-Methylphenol	ND	330		µg/Kg	1	4/2/2009 11:23 PM
4-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 11:23 PM
4-Nitrophenol	ND	1600		µg/Kg	1	4/2/2009 11:23 PM
Acenaphthene	ND	330		µg/Kg	1	4/2/2009 11:23 PM
Acenaphthylene	ND	330		µg/Kg	1	4/2/2009 11:23 PM
Anthracene	ND	330		µg/Kg	1	4/2/2009 11:23 PM
Benzidine (M)	ND	1600		µg/Kg	1	4/2/2009 11:23 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	4/2/2009 11:23 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	4/2/2009 11:23 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	4/2/2009 11:23 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	4/2/2009 11:23 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	4/2/2009 11:23 PM
Benzoic acid	ND	1600		µg/Kg	1	4/2/2009 11:23 PM
Benzyl alcohol	ND	660		µg/Kg	1	4/2/2009 11:23 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	4/2/2009 11:23 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W20AGW (10')
Lab Order:	104789	**Collection Date:**	3/26/2009 9:50:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104789-005A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090402B QC Batch: 54471 PrepDate: 4/2/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	4/2/2009 11:23 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	4/2/2009 11:23 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	4/2/2009 11:23 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	4/2/2009 11:23 PM
Chrysene	ND	330		µg/Kg	1	4/2/2009 11:23 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	4/2/2009 11:23 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	4/2/2009 11:23 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	4/2/2009 11:23 PM
Dibenzofuran	ND	330		µg/Kg	1	4/2/2009 11:23 PM
Diethylphthalate	ND	330		µg/Kg	1	4/2/2009 11:23 PM
Dimethylphthalate	ND	330		µg/Kg	1	4/2/2009 11:23 PM
Fluoranthene	ND	330		µg/Kg	1	4/2/2009 11:23 PM
Fluorene	ND	330		µg/Kg	1	4/2/2009 11:23 PM
Hexachlorobenzene	ND	330		µg/Kg	1	4/2/2009 11:23 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	4/2/2009 11:23 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	4/2/2009 11:23 PM
Hexachloroethane	ND	330		µg/Kg	1	4/2/2009 11:23 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	4/2/2009 11:23 PM
Isophorone	ND	330		µg/Kg	1	4/2/2009 11:23 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	4/2/2009 11:23 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	4/2/2009 11:23 PM
Naphthalene	ND	330		µg/Kg	1	4/2/2009 11:23 PM
Nitrobenzene	ND	330		µg/Kg	1	4/2/2009 11:23 PM
Pentachlorophenol	ND	1600		µg/Kg	1	4/2/2009 11:23 PM
Phenanthrene	ND	330		µg/Kg	1	4/2/2009 11:23 PM
Phenol	ND	330		µg/Kg	1	4/2/2009 11:23 PM
Pyrene	ND	330		µg/Kg	1	4/2/2009 11:23 PM
Surr: 1,2-Dichlorobenzene-d4	89.8	49-103		%REC	1	4/2/2009 11:23 PM
Surr: 2,4,6-Tribromophenol	102	47-129		%REC	1	4/2/2009 11:23 PM
Surr: 2-Chlorophenol-d4	98.0	54-109		%REC	1	4/2/2009 11:23 PM
Surr: 2-Fluorobiphenyl	99.1	59-108		%REC	1	4/2/2009 11:23 PM
Surr: 2-Fluorophenol	96.8	50-111		%REC	1	4/2/2009 11:23 PM
Surr: 4-Terphenyl-d14	131	58-135		%REC	1	4/2/2009 11:23 PM
Surr: Nitrobenzene-d5	95.6	54-115		%REC	1	4/2/2009 11:23 PM
Surr: Phenol-d5	97.9	58-112		%REC	1	4/2/2009 11:23 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W20AGW (15')
Lab Order:	104789	**Collection Date:**	3/26/2009 10:15:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104789-006A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B				**EPA 6010B**		
RunID: ICP8_090406D	QC Batch: 54532			PrepDate:	4/4/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	4/7/2009 10:22 AM
Arsenic	5.1	1.0		mg/Kg	1	4/7/2009 10:22 AM
Barium	34	1.0		mg/Kg	1	4/7/2009 10:22 AM
Beryllium	ND	1.0		mg/Kg	1	4/7/2009 10:22 AM
Cadmium	ND	1.0		mg/Kg	1	4/7/2009 10:22 AM
Chromium	42	1.0		mg/Kg	1	4/7/2009 10:22 AM
Cobalt	10	1.0		mg/Kg	1	4/7/2009 10:22 AM
Copper	26	2.0		mg/Kg	1	4/7/2009 10:22 AM
Lead	11	1.0		mg/Kg	1	4/7/2009 10:22 AM
Molybdenum	ND	1.0		mg/Kg	1	4/7/2009 10:22 AM
Nickel	50	1.0		mg/Kg	1	4/7/2009 10:22 AM
Selenium	ND	1.0		mg/Kg	1	4/7/2009 10:22 AM
Silver	ND	1.0		mg/Kg	1	4/7/2009 10:22 AM
Thallium	ND	1.0		mg/Kg	1	4/7/2009 10:22 AM
Vanadium	36	1.0		mg/Kg	1	4/7/2009 10:22 AM
Zinc	47	1.0		mg/Kg	1	4/7/2009 10:22 AM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
EPA 3550B				**EPA 8015B(M)**		
RunID: GC16_090406A	QC Batch: 54479			PrepDate:	4/2/2009	Analyst: **CBR**
DRO	1.0	1.0		mg/Kg	1	4/6/2009 10:49 AM
ORO	1.0	1.0		mg/Kg	1	4/6/2009 10:49 AM
Surr: p-Terphenyl	80.4	30-130		%REC	1	4/6/2009 10:49 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090402D	QC Batch: 54465			PrepDate:	4/2/2009	Analyst: **RQ**
Mercury	0.21	0.10		mg/Kg	1	4/2/2009 01:37 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 3550B				**EPA 8270C**		
RunID: MS 13_090402B	QC Batch: 54471			PrepDate:	4/2/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	4/2/2009 11:50 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 11:50 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 11:50 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	4/2/2009 11:50 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W20AGW (15')
Lab Order:	104789	**Collection Date:**	3/26/2009 10:15:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104789-006A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090402B QC Batch: 54471 PrepDate: 4/2/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 11:50 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	4/2/2009 11:50 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	4/2/2009 11:50 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	4/2/2009 11:50 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	4/2/2009 11:50 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 11:50 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	4/2/2009 11:50 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	4/2/2009 11:50 PM
2-Chlorophenol	ND	330		µg/Kg	1	4/2/2009 11:50 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	4/2/2009 11:50 PM
2-Methylphenol	ND	330		µg/Kg	1	4/2/2009 11:50 PM
2-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 11:50 PM
2-Nitrophenol	ND	330		µg/Kg	1	4/2/2009 11:50 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	4/2/2009 11:50 PM
3-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 11:50 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	4/2/2009 11:50 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 11:50 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	4/2/2009 11:50 PM
4-Chloroaniline	ND	660		µg/Kg	1	4/2/2009 11:50 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	4/2/2009 11:50 PM
4-Methylphenol	ND	330		µg/Kg	1	4/2/2009 11:50 PM
4-Nitroaniline	ND	1600		µg/Kg	1	4/2/2009 11:50 PM
4-Nitrophenol	ND	1600		µg/Kg	1	4/2/2009 11:50 PM
Acenaphthene	ND	330		µg/Kg	1	4/2/2009 11:50 PM
Acenaphthylene	ND	330		µg/Kg	1	4/2/2009 11:50 PM
Anthracene	ND	330		µg/Kg	1	4/2/2009 11:50 PM
Benzidine (M)	ND	1600		µg/Kg	1	4/2/2009 11:50 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	4/2/2009 11:50 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	4/2/2009 11:50 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	4/2/2009 11:50 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	4/2/2009 11:50 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	4/2/2009 11:50 PM
Benzoic acid	ND	1600		µg/Kg	1	4/2/2009 11:50 PM
Benzyl alcohol	ND	660		µg/Kg	1	4/2/2009 11:50 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	4/2/2009 11:50 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	W20AGW (15')
Lab Order:	104789	**Collection Date:**	3/26/2009 10:15:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104789-006A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090402B QC Batch: 54471 PrepDate: 4/2/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	4/2/2009 11:50 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	4/2/2009 11:50 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	4/2/2009 11:50 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	4/2/2009 11:50 PM
Chrysene	ND	330		µg/Kg	1	4/2/2009 11:50 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	4/2/2009 11:50 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	4/2/2009 11:50 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	4/2/2009 11:50 PM
Dibenzofuran	ND	330		µg/Kg	1	4/2/2009 11:50 PM
Diethylphthalate	ND	330		µg/Kg	1	4/2/2009 11:50 PM
Dimethylphthalate	ND	330		µg/Kg	1	4/2/2009 11:50 PM
Fluoranthene	ND	330		µg/Kg	1	4/2/2009 11:50 PM
Fluorene	ND	330		µg/Kg	1	4/2/2009 11:50 PM
Hexachlorobenzene	ND	330		µg/Kg	1	4/2/2009 11:50 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	4/2/2009 11:50 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	4/2/2009 11:50 PM
Hexachloroethane	ND	330		µg/Kg	1	4/2/2009 11:50 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	4/2/2009 11:50 PM
Isophorone	ND	330		µg/Kg	1	4/2/2009 11:50 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	4/2/2009 11:50 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	4/2/2009 11:50 PM
Naphthalene	ND	330		µg/Kg	1	4/2/2009 11:50 PM
Nitrobenzene	ND	330		µg/Kg	1	4/2/2009 11:50 PM
Pentachlorophenol	ND	1600		µg/Kg	1	4/2/2009 11:50 PM
Phenanthrene	ND	330		µg/Kg	1	4/2/2009 11:50 PM
Phenol	ND	330		µg/Kg	1	4/2/2009 11:50 PM
Pyrene	ND	330		µg/Kg	1	4/2/2009 11:50 PM
Surr: 1,2-Dichlorobenzene-d4	94.2	49-103		%REC	1	4/2/2009 11:50 PM
Surr: 2,4,6-Tribromophenol	104	47-129		%REC	1	4/2/2009 11:50 PM
Surr: 2-Chlorophenol-d4	102	54-109		%REC	1	4/2/2009 11:50 PM
Surr: 2-Fluorobiphenyl	105	59-108		%REC	1	4/2/2009 11:50 PM
Surr: 2-Fluorophenol	100	50-111		%REC	1	4/2/2009 11:50 PM
Surr: 4-Terphenyl-d14	138	58-135	S	%REC	1	4/2/2009 11:50 PM
Surr: Nitrobenzene-d5	101	54-115		%REC	1	4/2/2009 11:50 PM
Surr: Phenol-d5	101	58-112		%REC	1	4/2/2009 11:50 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	FW3 (0')
Lab Order:	104789	**Collection Date:**	3/26/2009 11:15:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104789-007A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B / **EPA 6010B**						
RunID: ICP8_090406D	QC Batch: 54532				PrepDate: 4/4/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	4/7/2009 10:25 AM
Arsenic	2.1	1.0		mg/Kg	1	4/7/2009 10:25 AM
Barium	110	1.0		mg/Kg	1	4/7/2009 10:25 AM
Beryllium	ND	1.0		mg/Kg	1	4/7/2009 10:25 AM
Cadmium	ND	1.0		mg/Kg	1	4/7/2009 10:25 AM
Chromium	45	1.0		mg/Kg	1	4/7/2009 10:25 AM
Cobalt	11	1.0		mg/Kg	1	4/7/2009 10:25 AM
Copper	32	2.0		mg/Kg	1	4/7/2009 10:25 AM
Lead	16	1.0		mg/Kg	1	4/7/2009 10:25 AM
Molybdenum	ND	1.0		mg/Kg	1	4/7/2009 10:25 AM
Nickel	49	1.0		mg/Kg	1	4/7/2009 10:25 AM
Selenium	1.4	1.0		mg/Kg	1	4/7/2009 10:25 AM
Silver	ND	1.0		mg/Kg	1	4/7/2009 10:25 AM
Thallium	ND	1.0		mg/Kg	1	4/7/2009 10:25 AM
Vanadium	41	1.0		mg/Kg	1	4/7/2009 10:25 AM
Zinc	64	1.0		mg/Kg	1	4/7/2009 10:25 AM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
EPA 3550B / **EPA 8015B(M)**						
RunID: GC16_090406A	QC Batch: 54479				PrepDate: 4/2/2009	Analyst: **CBR**
DRO	11	5.0		mg/Kg	5	4/6/2009 12:03 PM
ORO	58	5.0		mg/Kg	5	4/6/2009 12:03 PM
Surr: p-Terphenyl	0	30-130	SDO	%REC	5	4/6/2009 12:03 PM
MERCURY BY COLD VAPOR TECHNIQUE						
EPA 7471A						
RunID: AA1_090402D	QC Batch: 54465				PrepDate: 4/2/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	4/2/2009 01:39 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 3550B / **EPA 8270C**						
RunID: MS 13_090402B	QC Batch: 54471				PrepDate: 4/2/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
1,2-Dichlorobenzene	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
1,3-Dichlorobenzene	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
1,4-Dichlorobenzene	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	FW3 (0')
Lab Order:	104789	**Collection Date:**	3/26/2009 11:15:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104789-007A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090402B QC Batch: 54471 PrepDate: 4/2/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
2,4,6-Trichlorophenol	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
2,4-Dichlorophenol	ND	4100		µg/Kg	2.5	4/3/2009 12:18 AM
2,4-Dimethylphenol	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
2,4-Dinitrophenol	ND	4100		µg/Kg	2.5	4/3/2009 12:18 AM
2,4-Dinitrotoluene	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
2,6-Dinitrotoluene	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
2-Chloronaphthalene	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
2-Chlorophenol	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
2-Methylnaphthalene	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
2-Methylphenol	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
2-Nitroaniline	ND	4100		µg/Kg	2.5	4/3/2009 12:18 AM
2-Nitrophenol	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
3,3´-Dichlorobenzidine	ND	1600		µg/Kg	2.5	4/3/2009 12:18 AM
3-Nitroaniline	ND	4100		µg/Kg	2.5	4/3/2009 12:18 AM
4,6-Dinitro-2-methylphenol	ND	4100		µg/Kg	2.5	4/3/2009 12:18 AM
4-Bromophenyl-phenylether	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
4-Chloro-3-methylphenol	ND	1600		µg/Kg	2.5	4/3/2009 12:18 AM
4-Chloroaniline	ND	1600		µg/Kg	2.5	4/3/2009 12:18 AM
4-Chlorophenyl-phenylether	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
4-Methylphenol	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
4-Nitroaniline	ND	4100		µg/Kg	2.5	4/3/2009 12:18 AM
4-Nitrophenol	ND	4100		µg/Kg	2.5	4/3/2009 12:18 AM
Acenaphthene	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
Acenaphthylene	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
Anthracene	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
Benzidine (M)	ND	4100		µg/Kg	2.5	4/3/2009 12:18 AM
Benzo(a)anthracene	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
Benzo(a)pyrene	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
Benzo(b)fluoranthene	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
Benzo(g,h,i)perylene	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
Benzo(k)fluoranthene	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
Benzoic acid	ND	4100		µg/Kg	2.5	4/3/2009 12:18 AM
Benzyl alcohol	ND	1600		µg/Kg	2.5	4/3/2009 12:18 AM
Bis(2-chloroethoxy)methane	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	FW3 (0')
Lab Order:	104789	**Collection Date:**	3/26/2009 11:15:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104789-007A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090402B QC Batch: 54471 PrepDate: 4/2/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
Bis(2-chloroisopropyl)ether	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
Bis(2-ethylhexyl)phthalate	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
Butylbenzylphthalate	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
Chrysene	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
Di-n-butylphthalate	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
Di-n-octylphthalate	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
Dibenz(a,h)anthracene	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
Dibenzofuran	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
Diethylphthalate	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
Dimethylphthalate	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
Fluoranthene	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
Fluorene	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
Hexachlorobenzene	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
Hexachlorobutadiene	ND	1600		µg/Kg	2.5	4/3/2009 12:18 AM
Hexachlorocyclopentadiene	ND	1600		µg/Kg	2.5	4/3/2009 12:18 AM
Hexachloroethane	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
Indeno(1,2,3-cd)pyrene	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
Isophorone	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
N-Nitrosodi-n-propylamine	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
N-Nitrosodiphenylamine	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
Naphthalene	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
Nitrobenzene	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
Pentachlorophenol	ND	4100		µg/Kg	2.5	4/3/2009 12:18 AM
Phenanthrene	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
Phenol	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
Pyrene	ND	820		µg/Kg	2.5	4/3/2009 12:18 AM
Surr: 1,2-Dichlorobenzene-d4	64.5	49-103		%REC	2.5	4/3/2009 12:18 AM
Surr: 2,4,6-Tribromophenol	67.3	47-129		%REC	2.5	4/3/2009 12:18 AM
Surr: 2-Chlorophenol-d4	72.7	54-109		%REC	2.5	4/3/2009 12:18 AM
Surr: 2-Fluorobiphenyl	77.6	59-108		%REC	2.5	4/3/2009 12:18 AM
Surr: 2-Fluorophenol	71.2	50-111		%REC	2.5	4/3/2009 12:18 AM
Surr: 4-Terphenyl-d14	90.4	58-135		%REC	2.5	4/3/2009 12:18 AM
Surr: Nitrobenzene-d5	73.5	54-115		%REC	2.5	4/3/2009 12:18 AM
Surr: Phenol-d5	70.4	58-112		%REC	2.5	4/3/2009 12:18 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	FW3 (2')
Lab Order:	104789	**Collection Date:**	3/26/2009 11:20:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104789-008A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090406D	QC Batch: 54532			PrepDate:	4/4/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	4/7/2009 10:28 AM
Arsenic	3.9	1.0		mg/Kg	1	4/7/2009 10:28 AM
Barium	150	1.0		mg/Kg	1	4/7/2009 10:28 AM
Beryllium	ND	1.0		mg/Kg	1	4/7/2009 10:28 AM
Cadmium	ND	1.0		mg/Kg	1	4/7/2009 10:28 AM
Chromium	66	1.0		mg/Kg	1	4/7/2009 10:28 AM
Cobalt	16	1.0		mg/Kg	1	4/7/2009 10:28 AM
Copper	34	2.0		mg/Kg	1	4/7/2009 10:28 AM
Lead	6.3	1.0		mg/Kg	1	4/7/2009 10:28 AM
Molybdenum	ND	1.0		mg/Kg	1	4/7/2009 10:28 AM
Nickel	81	1.0		mg/Kg	1	4/7/2009 10:28 AM
Selenium	1.2	1.0		mg/Kg	1	4/7/2009 10:28 AM
Silver	ND	1.0		mg/Kg	1	4/7/2009 10:28 AM
Thallium	ND	1.0		mg/Kg	1	4/7/2009 10:28 AM
Vanadium	47	1.0		mg/Kg	1	4/7/2009 10:28 AM
Zinc	50	1.0		mg/Kg	1	4/7/2009 10:28 AM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090406A	QC Batch: 54479			PrepDate:	4/2/2009	Analyst: **CBR**
DRO	1.4	1.0		mg/Kg	1	4/6/2009 10:22 AM
ORO	1.7	1.0		mg/Kg	1	4/6/2009 10:22 AM
Surr: p-Terphenyl	69.6	30-130		%REC	1	4/6/2009 10:22 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090402D	QC Batch: 54465			PrepDate:	4/2/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	4/2/2009 01:41 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090402B	QC Batch: 54471			PrepDate:	4/2/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	4/3/2009 12:45 AM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	4/3/2009 12:45 AM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	4/3/2009 12:45 AM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	4/3/2009 12:45 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	FW3 (2')
Lab Order:	104789	**Collection Date:**	3/26/2009 11:20:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104789-008A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090402B QC Batch: 54471 PrepDate: 4/2/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	4/3/2009 12:45 AM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	4/3/2009 12:45 AM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	4/3/2009 12:45 AM
2,4-Dimethylphenol	ND	330		µg/Kg	1	4/3/2009 12:45 AM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	4/3/2009 12:45 AM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	4/3/2009 12:45 AM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	4/3/2009 12:45 AM
2-Chloronaphthalene	ND	330		µg/Kg	1	4/3/2009 12:45 AM
2-Chlorophenol	ND	330		µg/Kg	1	4/3/2009 12:45 AM
2-Methylnaphthalene	ND	330		µg/Kg	1	4/3/2009 12:45 AM
2-Methylphenol	ND	330		µg/Kg	1	4/3/2009 12:45 AM
2-Nitroaniline	ND	1600		µg/Kg	1	4/3/2009 12:45 AM
2-Nitrophenol	ND	330		µg/Kg	1	4/3/2009 12:45 AM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	4/3/2009 12:45 AM
3-Nitroaniline	ND	1600		µg/Kg	1	4/3/2009 12:45 AM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	4/3/2009 12:45 AM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	4/3/2009 12:45 AM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	4/3/2009 12:45 AM
4-Chloroaniline	ND	660		µg/Kg	1	4/3/2009 12:45 AM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	4/3/2009 12:45 AM
4-Methylphenol	ND	330		µg/Kg	1	4/3/2009 12:45 AM
4-Nitroaniline	ND	1600		µg/Kg	1	4/3/2009 12:45 AM
4-Nitrophenol	ND	1600		µg/Kg	1	4/3/2009 12:45 AM
Acenaphthene	ND	330		µg/Kg	1	4/3/2009 12:45 AM
Acenaphthylene	ND	330		µg/Kg	1	4/3/2009 12:45 AM
Anthracene	ND	330		µg/Kg	1	4/3/2009 12:45 AM
Benzidine (M)	ND	1600		µg/Kg	1	4/3/2009 12:45 AM
Benzo(a)anthracene	ND	330		µg/Kg	1	4/3/2009 12:45 AM
Benzo(a)pyrene	ND	330		µg/Kg	1	4/3/2009 12:45 AM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	4/3/2009 12:45 AM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	4/3/2009 12:45 AM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	4/3/2009 12:45 AM
Benzoic acid	ND	1600		µg/Kg	1	4/3/2009 12:45 AM
Benzyl alcohol	ND	660		µg/Kg	1	4/3/2009 12:45 AM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	4/3/2009 12:45 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	FW3 (2')
Lab Order:	104789	**Collection Date:**	3/26/2009 11:20:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104789-008A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090402B QC Batch: 54471 PrepDate: 4/2/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	4/3/2009 12:45 AM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	4/3/2009 12:45 AM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	4/3/2009 12:45 AM
Butylbenzylphthalate	ND	330		µg/Kg	1	4/3/2009 12:45 AM
Chrysene	ND	330		µg/Kg	1	4/3/2009 12:45 AM
Di-n-butylphthalate	ND	330		µg/Kg	1	4/3/2009 12:45 AM
Di-n-octylphthalate	ND	330		µg/Kg	1	4/3/2009 12:45 AM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	4/3/2009 12:45 AM
Dibenzofuran	ND	330		µg/Kg	1	4/3/2009 12:45 AM
Diethylphthalate	ND	330		µg/Kg	1	4/3/2009 12:45 AM
Dimethylphthalate	ND	330		µg/Kg	1	4/3/2009 12:45 AM
Fluoranthene	ND	330		µg/Kg	1	4/3/2009 12:45 AM
Fluorene	ND	330		µg/Kg	1	4/3/2009 12:45 AM
Hexachlorobenzene	ND	330		µg/Kg	1	4/3/2009 12:45 AM
Hexachlorobutadiene	ND	660		µg/Kg	1	4/3/2009 12:45 AM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	4/3/2009 12:45 AM
Hexachloroethane	ND	330		µg/Kg	1	4/3/2009 12:45 AM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	4/3/2009 12:45 AM
Isophorone	ND	330		µg/Kg	1	4/3/2009 12:45 AM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	4/3/2009 12:45 AM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	4/3/2009 12:45 AM
Naphthalene	ND	330		µg/Kg	1	4/3/2009 12:45 AM
Nitrobenzene	ND	330		µg/Kg	1	4/3/2009 12:45 AM
Pentachlorophenol	ND	1600		µg/Kg	1	4/3/2009 12:45 AM
Phenanthrene	ND	330		µg/Kg	1	4/3/2009 12:45 AM
Phenol	ND	330		µg/Kg	1	4/3/2009 12:45 AM
Pyrene	ND	330		µg/Kg	1	4/3/2009 12:45 AM
Surr: 1,2-Dichlorobenzene-d4	83.5	49-103		%REC	1	4/3/2009 12:45 AM
Surr: 2,4,6-Tribromophenol	94.3	47-129		%REC	1	4/3/2009 12:45 AM
Surr: 2-Chlorophenol-d4	91.5	54-109		%REC	1	4/3/2009 12:45 AM
Surr: 2-Fluorobiphenyl	94.8	59-108		%REC	1	4/3/2009 12:45 AM
Surr: 2-Fluorophenol	89.3	50-111		%REC	1	4/3/2009 12:45 AM
Surr: 4-Terphenyl-d14	132	58-135		%REC	1	4/3/2009 12:45 AM
Surr: Nitrobenzene-d5	90.8	54-115		%REC	1	4/3/2009 12:45 AM
Surr: Phenol-d5	92.3	58-112		%REC	1	4/3/2009 12:45 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	FW4 (0')
Lab Order:	104789	**Collection Date:**	3/26/2009 11:25:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104789-009A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090406D	QC Batch: 54532			PrepDate:	4/4/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	4/7/2009 10:31 AM
Arsenic	3.0	1.0		mg/Kg	1	4/7/2009 10:31 AM
Barium	94	1.0		mg/Kg	1	4/7/2009 10:31 AM
Beryllium	ND	1.0		mg/Kg	1	4/7/2009 10:31 AM
Cadmium	ND	1.0		mg/Kg	1	4/7/2009 10:31 AM
Chromium	290	1.0		mg/Kg	1	4/7/2009 10:31 AM
Cobalt	14	1.0		mg/Kg	1	4/7/2009 10:31 AM
Copper	44	2.0		mg/Kg	1	4/7/2009 10:31 AM
Lead	23	1.0		mg/Kg	1	4/7/2009 10:31 AM
Molybdenum	ND	1.0		mg/Kg	1	4/7/2009 10:31 AM
Nickel	76	1.0		mg/Kg	1	4/7/2009 10:31 AM
Selenium	1.9	1.0		mg/Kg	1	4/7/2009 10:31 AM
Silver	ND	1.0		mg/Kg	1	4/7/2009 10:31 AM
Thallium	ND	1.0		mg/Kg	1	4/7/2009 10:31 AM
Vanadium	44	1.0		mg/Kg	1	4/7/2009 10:31 AM
Zinc	3100	2.0		mg/Kg	2	4/7/2009 11:23 AM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090406A	QC Batch: 54479			PrepDate:	4/2/2009	Analyst: **CBR**
DRO	2.2	1.0		mg/Kg	1	4/6/2009 11:07 AM
ORO	7.3	1.0		mg/Kg	1	4/6/2009 11:07 AM
Surr: p-Terphenyl	54.5	30-130		%REC	1	4/6/2009 11:07 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090402D	QC Batch: 54465			PrepDate:	4/2/2009	Analyst: **RQ**
Mercury	0.13	0.10		mg/Kg	1	4/2/2009 01:43 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090402B	QC Batch: 54471			PrepDate:	4/2/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	4/3/2009 01:12 AM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	4/3/2009 01:12 AM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	4/3/2009 01:12 AM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	4/3/2009 01:12 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	FW4 (0')
Lab Order:	104789	**Collection Date:**	3/26/2009 11:25:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104789-009A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090402B QC Batch: 54471 PrepDate: 4/2/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	4/3/2009 01:12 AM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	4/3/2009 01:12 AM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	4/3/2009 01:12 AM
2,4-Dimethylphenol	ND	330		µg/Kg	1	4/3/2009 01:12 AM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	4/3/2009 01:12 AM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	4/3/2009 01:12 AM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	4/3/2009 01:12 AM
2-Chloronaphthalene	ND	330		µg/Kg	1	4/3/2009 01:12 AM
2-Chlorophenol	ND	330		µg/Kg	1	4/3/2009 01:12 AM
2-Methylnaphthalene	ND	330		µg/Kg	1	4/3/2009 01:12 AM
2-Methylphenol	ND	330		µg/Kg	1	4/3/2009 01:12 AM
2-Nitroaniline	ND	1600		µg/Kg	1	4/3/2009 01:12 AM
2-Nitrophenol	ND	330		µg/Kg	1	4/3/2009 01:12 AM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	4/3/2009 01:12 AM
3-Nitroaniline	ND	1600		µg/Kg	1	4/3/2009 01:12 AM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	4/3/2009 01:12 AM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	4/3/2009 01:12 AM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	4/3/2009 01:12 AM
4-Chloroaniline	ND	660		µg/Kg	1	4/3/2009 01:12 AM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	4/3/2009 01:12 AM
4-Methylphenol	ND	330		µg/Kg	1	4/3/2009 01:12 AM
4-Nitroaniline	ND	1600		µg/Kg	1	4/3/2009 01:12 AM
4-Nitrophenol	ND	1600		µg/Kg	1	4/3/2009 01:12 AM
Acenaphthene	ND	330		µg/Kg	1	4/3/2009 01:12 AM
Acenaphthylene	ND	330		µg/Kg	1	4/3/2009 01:12 AM
Anthracene	ND	330		µg/Kg	1	4/3/2009 01:12 AM
Benzidine (M)	ND	1600		µg/Kg	1	4/3/2009 01:12 AM
Benzo(a)anthracene	ND	330		µg/Kg	1	4/3/2009 01:12 AM
Benzo(a)pyrene	ND	330		µg/Kg	1	4/3/2009 01:12 AM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	4/3/2009 01:12 AM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	4/3/2009 01:12 AM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	4/3/2009 01:12 AM
Benzoic acid	ND	1600		µg/Kg	1	4/3/2009 01:12 AM
Benzyl alcohol	ND	660		µg/Kg	1	4/3/2009 01:12 AM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	4/3/2009 01:12 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	FW4 (0')
Lab Order:	104789	**Collection Date:**	3/26/2009 11:25:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104789-009A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090402B QC Batch: 54471 PrepDate: 4/2/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	4/3/2009 01:12 AM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	4/3/2009 01:12 AM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	4/3/2009 01:12 AM
Butylbenzylphthalate	ND	330		µg/Kg	1	4/3/2009 01:12 AM
Chrysene	ND	330		µg/Kg	1	4/3/2009 01:12 AM
Di-n-butylphthalate	ND	330		µg/Kg	1	4/3/2009 01:12 AM
Di-n-octylphthalate	ND	330		µg/Kg	1	4/3/2009 01:12 AM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	4/3/2009 01:12 AM
Dibenzofuran	ND	330		µg/Kg	1	4/3/2009 01:12 AM
Diethylphthalate	ND	330		µg/Kg	1	4/3/2009 01:12 AM
Dimethylphthalate	ND	330		µg/Kg	1	4/3/2009 01:12 AM
Fluoranthene	ND	330		µg/Kg	1	4/3/2009 01:12 AM
Fluorene	ND	330		µg/Kg	1	4/3/2009 01:12 AM
Hexachlorobenzene	ND	330		µg/Kg	1	4/3/2009 01:12 AM
Hexachlorobutadiene	ND	660		µg/Kg	1	4/3/2009 01:12 AM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	4/3/2009 01:12 AM
Hexachloroethane	ND	330		µg/Kg	1	4/3/2009 01:12 AM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	4/3/2009 01:12 AM
Isophorone	ND	330		µg/Kg	1	4/3/2009 01:12 AM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	4/3/2009 01:12 AM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	4/3/2009 01:12 AM
Naphthalene	ND	330		µg/Kg	1	4/3/2009 01:12 AM
Nitrobenzene	ND	330		µg/Kg	1	4/3/2009 01:12 AM
Pentachlorophenol	ND	1600		µg/Kg	1	4/3/2009 01:12 AM
Phenanthrene	ND	330		µg/Kg	1	4/3/2009 01:12 AM
Phenol	ND	330		µg/Kg	1	4/3/2009 01:12 AM
Pyrene	ND	330		µg/Kg	1	4/3/2009 01:12 AM
Surr: 1,2-Dichlorobenzene-d4	79.5	49-103		%REC	1	4/3/2009 01:12 AM
Surr: 2,4,6-Tribromophenol	87.5	47-129		%REC	1	4/3/2009 01:12 AM
Surr: 2-Chlorophenol-d4	89.4	54-109		%REC	1	4/3/2009 01:12 AM
Surr: 2-Fluorobiphenyl	92.3	59-108		%REC	1	4/3/2009 01:12 AM
Surr: 2-Fluorophenol	87.0	50-111		%REC	1	4/3/2009 01:12 AM
Surr: 4-Terphenyl-d14	118	58-135		%REC	1	4/3/2009 01:12 AM
Surr: Nitrobenzene-d5	87.7	54-115		%REC	1	4/3/2009 01:12 AM
Surr: Phenol-d5	89.2	58-112		%REC	1	4/3/2009 01:12 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	FW4 (2')
Lab Order:	104789	**Collection Date:**	3/26/2009 11:35:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104789-010A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090406D	QC Batch: 54532			PrepDate:	4/4/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	4/7/2009 10:35 AM
Arsenic	3.5	1.0		mg/Kg	1	4/7/2009 10:35 AM
Barium	140	1.0		mg/Kg	1	4/7/2009 10:35 AM
Beryllium	ND	1.0		mg/Kg	1	4/7/2009 10:35 AM
Cadmium	ND	1.0		mg/Kg	1	4/7/2009 10:35 AM
Chromium	55	1.0		mg/Kg	1	4/7/2009 10:35 AM
Cobalt	13	1.0		mg/Kg	1	4/7/2009 10:35 AM
Copper	33	2.0		mg/Kg	1	4/7/2009 10:35 AM
Lead	4.6	1.0		mg/Kg	1	4/7/2009 10:35 AM
Molybdenum	ND	1.0		mg/Kg	1	4/7/2009 10:35 AM
Nickel	67	1.0		mg/Kg	1	4/7/2009 10:35 AM
Selenium	1.0	1.0		mg/Kg	1	4/7/2009 10:35 AM
Silver	ND	1.0		mg/Kg	1	4/7/2009 10:35 AM
Thallium	ND	1.0		mg/Kg	1	4/7/2009 10:35 AM
Vanadium	46	1.0		mg/Kg	1	4/7/2009 10:35 AM
Zinc	49	1.0		mg/Kg	1	4/7/2009 10:35 AM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_090406A	QC Batch: 54479			PrepDate:	4/2/2009	Analyst: **CBR**
DRO	ND	1.0		mg/Kg	1	4/6/2009 10:31 AM
ORO	ND	1.0		mg/Kg	1	4/6/2009 10:31 AM
Surr: p-Terphenyl	66.9	30-130		%REC	1	4/6/2009 10:31 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090402D	QC Batch: 54465			PrepDate:	4/2/2009	Analyst: **RQ**
Mercury	0.11	0.10		mg/Kg	1	4/2/2009 01:45 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090402B	QC Batch: 54471			PrepDate:	4/2/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	4/3/2009 01:40 AM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	4/3/2009 01:40 AM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	4/3/2009 01:40 AM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	4/3/2009 01:40 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	FW4 (2')
Lab Order:	104789	**Collection Date:**	3/26/2009 11:35:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104789-010A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090402B QC Batch: 54471 PrepDate: 4/2/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	4/3/2009 01:40 AM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	4/3/2009 01:40 AM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	4/3/2009 01:40 AM
2,4-Dimethylphenol	ND	330		µg/Kg	1	4/3/2009 01:40 AM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	4/3/2009 01:40 AM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	4/3/2009 01:40 AM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	4/3/2009 01:40 AM
2-Chloronaphthalene	ND	330		µg/Kg	1	4/3/2009 01:40 AM
2-Chlorophenol	ND	330		µg/Kg	1	4/3/2009 01:40 AM
2-Methylnaphthalene	ND	330		µg/Kg	1	4/3/2009 01:40 AM
2-Methylphenol	ND	330		µg/Kg	1	4/3/2009 01:40 AM
2-Nitroaniline	ND	1600		µg/Kg	1	4/3/2009 01:40 AM
2-Nitrophenol	ND	330		µg/Kg	1	4/3/2009 01:40 AM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	4/3/2009 01:40 AM
3-Nitroaniline	ND	1600		µg/Kg	1	4/3/2009 01:40 AM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	4/3/2009 01:40 AM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	4/3/2009 01:40 AM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	4/3/2009 01:40 AM
4-Chloroaniline	ND	660		µg/Kg	1	4/3/2009 01:40 AM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	4/3/2009 01:40 AM
4-Methylphenol	ND	330		µg/Kg	1	4/3/2009 01:40 AM
4-Nitroaniline	ND	1600		µg/Kg	1	4/3/2009 01:40 AM
4-Nitrophenol	ND	1600		µg/Kg	1	4/3/2009 01:40 AM
Acenaphthene	ND	330		µg/Kg	1	4/3/2009 01:40 AM
Acenaphthylene	ND	330		µg/Kg	1	4/3/2009 01:40 AM
Anthracene	ND	330		µg/Kg	1	4/3/2009 01:40 AM
Benzidine (M)	ND	1600		µg/Kg	1	4/3/2009 01:40 AM
Benzo(a)anthracene	ND	330		µg/Kg	1	4/3/2009 01:40 AM
Benzo(a)pyrene	ND	330		µg/Kg	1	4/3/2009 01:40 AM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	4/3/2009 01:40 AM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	4/3/2009 01:40 AM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	4/3/2009 01:40 AM
Benzoic acid	ND	1600		µg/Kg	1	4/3/2009 01:40 AM
Benzyl alcohol	ND	660		µg/Kg	1	4/3/2009 01:40 AM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	4/3/2009 01:40 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	FW4 (2')
Lab Order:	104789	**Collection Date:**	3/26/2009 11:35:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104789-010A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090402B QC Batch: 54471 PrepDate: 4/2/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	4/3/2009 01:40 AM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	4/3/2009 01:40 AM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	4/3/2009 01:40 AM
Butylbenzylphthalate	ND	330		µg/Kg	1	4/3/2009 01:40 AM
Chrysene	ND	330		µg/Kg	1	4/3/2009 01:40 AM
Di-n-butylphthalate	ND	330		µg/Kg	1	4/3/2009 01:40 AM
Di-n-octylphthalate	ND	330		µg/Kg	1	4/3/2009 01:40 AM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	4/3/2009 01:40 AM
Dibenzofuran	ND	330		µg/Kg	1	4/3/2009 01:40 AM
Diethylphthalate	ND	330		µg/Kg	1	4/3/2009 01:40 AM
Dimethylphthalate	ND	330		µg/Kg	1	4/3/2009 01:40 AM
Fluoranthene	ND	330		µg/Kg	1	4/3/2009 01:40 AM
Fluorene	ND	330		µg/Kg	1	4/3/2009 01:40 AM
Hexachlorobenzene	ND	330		µg/Kg	1	4/3/2009 01:40 AM
Hexachlorobutadiene	ND	660		µg/Kg	1	4/3/2009 01:40 AM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	4/3/2009 01:40 AM
Hexachloroethane	ND	330		µg/Kg	1	4/3/2009 01:40 AM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	4/3/2009 01:40 AM
Isophorone	ND	330		µg/Kg	1	4/3/2009 01:40 AM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	4/3/2009 01:40 AM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	4/3/2009 01:40 AM
Naphthalene	ND	330		µg/Kg	1	4/3/2009 01:40 AM
Nitrobenzene	ND	330		µg/Kg	1	4/3/2009 01:40 AM
Pentachlorophenol	ND	1600		µg/Kg	1	4/3/2009 01:40 AM
Phenanthrene	ND	330		µg/Kg	1	4/3/2009 01:40 AM
Phenol	ND	330		µg/Kg	1	4/3/2009 01:40 AM
Pyrene	ND	330		µg/Kg	1	4/3/2009 01:40 AM
Surr: 1,2-Dichlorobenzene-d4	86.2	49-103		%REC	1	4/3/2009 01:40 AM
Surr: 2,4,6-Tribromophenol	91.4	47-129		%REC	1	4/3/2009 01:40 AM
Surr: 2-Chlorophenol-d4	92.7	54-109		%REC	1	4/3/2009 01:40 AM
Surr: 2-Fluorobiphenyl	95.9	59-108		%REC	1	4/3/2009 01:40 AM
Surr: 2-Fluorophenol	91.7	50-111		%REC	1	4/3/2009 01:40 AM
Surr: 4-Terphenyl-d14	125	58-135		%REC	1	4/3/2009 01:40 AM
Surr: Nitrobenzene-d5	91.6	54-115		%REC	1	4/3/2009 01:40 AM
Surr: Phenol-d5	92.6	58-112		%REC	1	4/3/2009 01:40 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	FW5 (0')
Lab Order:	104789	**Collection Date:**	3/26/2009 11:45:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104789-011A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B		**EPA 6010B**				
RunID: ICP8_090406D	QC Batch: 54532			PrepDate:	4/4/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	4/7/2009 10:37 AM
Arsenic	1.1	1.0		mg/Kg	1	4/7/2009 10:37 AM
Barium	170	1.0		mg/Kg	1	4/7/2009 10:37 AM
Beryllium	ND	1.0		mg/Kg	1	4/7/2009 10:37 AM
Cadmium	ND	1.0		mg/Kg	1	4/7/2009 10:37 AM
Chromium	18	1.0		mg/Kg	1	4/7/2009 10:37 AM
Cobalt	5.9	1.0		mg/Kg	1	4/7/2009 10:37 AM
Copper	20	2.0		mg/Kg	1	4/7/2009 10:37 AM
Lead	10	1.0		mg/Kg	1	4/7/2009 10:37 AM
Molybdenum	ND	1.0		mg/Kg	1	4/7/2009 10:37 AM
Nickel	26	1.0		mg/Kg	1	4/7/2009 10:37 AM
Selenium	ND	1.0		mg/Kg	1	4/7/2009 10:37 AM
Silver	ND	1.0		mg/Kg	1	4/7/2009 10:37 AM
Thallium	ND	1.0		mg/Kg	1	4/7/2009 10:37 AM
Vanadium	37	1.0		mg/Kg	1	4/7/2009 10:37 AM
Zinc	35	1.0		mg/Kg	1	4/7/2009 10:37 AM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
EPA 3550B		**EPA 8015B(M)**				
RunID: GC16_090406A	QC Batch: 54479			PrepDate:	4/2/2009	Analyst: **CBR**
DRO	280	40		mg/Kg	20	4/6/2009 11:54 AM
ORO	1000	40		mg/Kg	20	4/6/2009 11:54 AM
Surr: p-Terphenyl	0	30-130	SDO	%REC	20	4/6/2009 11:54 AM
MERCURY BY COLD VAPOR TECHNIQUE						
EPA 7471A						
RunID: AA1_090402D	QC Batch: 54465			PrepDate:	4/2/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	4/2/2009 01:48 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 3550B		**EPA 8270C**				
RunID: MS 13_090402B	QC Batch: 54471			PrepDate:	4/2/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
1,2-Dichlorobenzene	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
1,3-Dichlorobenzene	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
1,4-Dichlorobenzene	ND	8200		µg/Kg	5	4/3/2009 02:07 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	FW5 (0')
Lab Order:	104789	**Collection Date:**	3/26/2009 11:45:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104789-011A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090402B QC Batch: 54471 PrepDate: 4/2/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
2,4,6-Trichlorophenol	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
2,4-Dichlorophenol	ND	41000		µg/Kg	5	4/3/2009 02:07 AM
2,4-Dimethylphenol	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
2,4-Dinitrophenol	ND	41000		µg/Kg	5	4/3/2009 02:07 AM
2,4-Dinitrotoluene	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
2,6-Dinitrotoluene	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
2-Chloronaphthalene	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
2-Chlorophenol	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
2-Methylnaphthalene	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
2-Methylphenol	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
2-Nitroaniline	ND	41000		µg/Kg	5	4/3/2009 02:07 AM
2-Nitrophenol	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
3,3´-Dichlorobenzidine	ND	16000		µg/Kg	5	4/3/2009 02:07 AM
3-Nitroaniline	ND	41000		µg/Kg	5	4/3/2009 02:07 AM
4,6-Dinitro-2-methylphenol	ND	41000		µg/Kg	5	4/3/2009 02:07 AM
4-Bromophenyl-phenylether	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
4-Chloro-3-methylphenol	ND	16000		µg/Kg	5	4/3/2009 02:07 AM
4-Chloroaniline	ND	16000		µg/Kg	5	4/3/2009 02:07 AM
4-Chlorophenyl-phenylether	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
4-Methylphenol	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
4-Nitroaniline	ND	41000		µg/Kg	5	4/3/2009 02:07 AM
4-Nitrophenol	ND	41000		µg/Kg	5	4/3/2009 02:07 AM
Acenaphthene	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
Acenaphthylene	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
Anthracene	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
Benzidine (M)	ND	41000		µg/Kg	5	4/3/2009 02:07 AM
Benzo(a)anthracene	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
Benzo(a)pyrene	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
Benzo(b)fluoranthene	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
Benzo(g,h,i)perylene	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
Benzo(k)fluoranthene	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
Benzoic acid	ND	41000		µg/Kg	5	4/3/2009 02:07 AM
Benzyl alcohol	ND	16000		µg/Kg	5	4/3/2009 02:07 AM
Bis(2-chloroethoxy)methane	ND	8200		µg/Kg	5	4/3/2009 02:07 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	FW5 (0')
Lab Order:	104789	**Collection Date:**	3/26/2009 11:45:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104789-011A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090402B QC Batch: 54471 PrepDate: 4/2/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
Bis(2-chloroisopropyl)ether	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
Bis(2-ethylhexyl)phthalate	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
Butylbenzylphthalate	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
Chrysene	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
Di-n-butylphthalate	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
Di-n-octylphthalate	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
Dibenz(a,h)anthracene	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
Dibenzofuran	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
Diethylphthalate	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
Dimethylphthalate	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
Fluoranthene	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
Fluorene	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
Hexachlorobenzene	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
Hexachlorobutadiene	ND	16000		µg/Kg	5	4/3/2009 02:07 AM
Hexachlorocyclopentadiene	ND	16000		µg/Kg	5	4/3/2009 02:07 AM
Hexachloroethane	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
Indeno(1,2,3-cd)pyrene	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
Isophorone	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
N-Nitrosodi-n-propylamine	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
N-Nitrosodiphenylamine	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
Naphthalene	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
Nitrobenzene	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
Pentachlorophenol	ND	41000		µg/Kg	5	4/3/2009 02:07 AM
Phenanthrene	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
Phenol	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
Pyrene	ND	8200		µg/Kg	5	4/3/2009 02:07 AM
Surr: 1,2-Dichlorobenzene-d4	81.3	49-103		%REC	5	4/3/2009 02:07 AM
Surr: 2,4,6-Tribromophenol	63.3	47-129		%REC	5	4/3/2009 02:07 AM
Surr: 2-Chlorophenol-d4	87.3	54-109		%REC	5	4/3/2009 02:07 AM
Surr: 2-Fluorobiphenyl	89.3	59-108		%REC	5	4/3/2009 02:07 AM
Surr: 2-Fluorophenol	76.8	50-111		%REC	5	4/3/2009 02:07 AM
Surr: 4-Terphenyl-d14	101	58-135		%REC	5	4/3/2009 02:07 AM
Surr: Nitrobenzene-d5	82.8	54-115		%REC	5	4/3/2009 02:07 AM
Surr: Phenol-d5	76.6	58-112		%REC	5	4/3/2009 02:07 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	FW5 (2')
Lab Order:	104789	**Collection Date:**	3/26/2009 11:55:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104789-012A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B				**EPA 6010B**		
RunID: ICP8_090406D	QC Batch: 54532			PrepDate:	4/4/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	4/7/2009 10:42 AM
Arsenic	ND	1.0		mg/Kg	1	4/7/2009 10:42 AM
Barium	100	1.0		mg/Kg	1	4/7/2009 10:42 AM
Beryllium	ND	1.0		mg/Kg	1	4/7/2009 10:42 AM
Cadmium	ND	1.0		mg/Kg	1	4/7/2009 10:42 AM
Chromium	36	1.0		mg/Kg	1	4/7/2009 10:42 AM
Cobalt	14	1.0		mg/Kg	1	4/7/2009 10:42 AM
Copper	37	2.0		mg/Kg	1	4/7/2009 10:42 AM
Lead	3.4	1.0		mg/Kg	1	4/7/2009 10:42 AM
Molybdenum	ND	1.0		mg/Kg	1	4/7/2009 10:42 AM
Nickel	34	1.0		mg/Kg	1	4/7/2009 10:42 AM
Selenium	1.7	1.0		mg/Kg	1	4/7/2009 10:42 AM
Silver	ND	1.0		mg/Kg	1	4/7/2009 10:42 AM
Thallium	ND	1.0		mg/Kg	1	4/7/2009 10:42 AM
Vanadium	58	1.0		mg/Kg	1	4/7/2009 10:42 AM
Zinc	41	1.0		mg/Kg	1	4/7/2009 10:42 AM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
EPA 3550B				**EPA 8015B(M)**		
RunID: GC16_090406A	QC Batch: 54479			PrepDate:	4/2/2009	Analyst: **CBR**
DRO	5.7	1.0		mg/Kg	1	4/6/2009 11:16 AM
ORO	17	1.0		mg/Kg	1	4/6/2009 11:16 AM
Surr: p-Terphenyl	88.8	30-130		%REC	1	4/6/2009 11:16 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_090402D	QC Batch: 54465			PrepDate:	4/2/2009	Analyst: **RQ**
Mercury	ND	0.10		mg/Kg	1	4/2/2009 01:22 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 3550B				**EPA 8270C**		
RunID: MS 13_090402B	QC Batch: 54471			PrepDate:	4/2/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	4/3/2009 02:35 AM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	4/3/2009 02:35 AM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	4/3/2009 02:35 AM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	4/3/2009 02:35 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	FW5 (2')
Lab Order:	104789	**Collection Date:**	3/26/2009 11:55:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104789-012A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090402B QC Batch: 54471 PrepDate: 4/2/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	4/3/2009 02:35 AM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	4/3/2009 02:35 AM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	4/3/2009 02:35 AM
2,4-Dimethylphenol	ND	330		µg/Kg	1	4/3/2009 02:35 AM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	4/3/2009 02:35 AM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	4/3/2009 02:35 AM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	4/3/2009 02:35 AM
2-Chloronaphthalene	ND	330		µg/Kg	1	4/3/2009 02:35 AM
2-Chlorophenol	ND	330		µg/Kg	1	4/3/2009 02:35 AM
2-Methylnaphthalene	ND	330		µg/Kg	1	4/3/2009 02:35 AM
2-Methylphenol	ND	330		µg/Kg	1	4/3/2009 02:35 AM
2-Nitroaniline	ND	1600		µg/Kg	1	4/3/2009 02:35 AM
2-Nitrophenol	ND	330		µg/Kg	1	4/3/2009 02:35 AM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	4/3/2009 02:35 AM
3-Nitroaniline	ND	1600		µg/Kg	1	4/3/2009 02:35 AM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	4/3/2009 02:35 AM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	4/3/2009 02:35 AM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	4/3/2009 02:35 AM
4-Chloroaniline	ND	660		µg/Kg	1	4/3/2009 02:35 AM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	4/3/2009 02:35 AM
4-Methylphenol	ND	330		µg/Kg	1	4/3/2009 02:35 AM
4-Nitroaniline	ND	1600		µg/Kg	1	4/3/2009 02:35 AM
4-Nitrophenol	ND	1600		µg/Kg	1	4/3/2009 02:35 AM
Acenaphthene	ND	330		µg/Kg	1	4/3/2009 02:35 AM
Acenaphthylene	ND	330		µg/Kg	1	4/3/2009 02:35 AM
Anthracene	ND	330		µg/Kg	1	4/3/2009 02:35 AM
Benzidine (M)	ND	1600		µg/Kg	1	4/3/2009 02:35 AM
Benzo(a)anthracene	ND	330		µg/Kg	1	4/3/2009 02:35 AM
Benzo(a)pyrene	ND	330		µg/Kg	1	4/3/2009 02:35 AM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	4/3/2009 02:35 AM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	4/3/2009 02:35 AM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	4/3/2009 02:35 AM
Benzoic acid	ND	1600		µg/Kg	1	4/3/2009 02:35 AM
Benzyl alcohol	ND	660		µg/Kg	1	4/3/2009 02:35 AM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	4/3/2009 02:35 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	FW5 (2')
Lab Order:	104789	**Collection Date:**	3/26/2009 11:55:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	104789-012A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090402B QC Batch: 54471 PrepDate: 4/2/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	4/3/2009 02:35 AM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	4/3/2009 02:35 AM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	4/3/2009 02:35 AM
Butylbenzylphthalate	ND	330		µg/Kg	1	4/3/2009 02:35 AM
Chrysene	ND	330		µg/Kg	1	4/3/2009 02:35 AM
Di-n-butylphthalate	ND	330		µg/Kg	1	4/3/2009 02:35 AM
Di-n-octylphthalate	ND	330		µg/Kg	1	4/3/2009 02:35 AM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	4/3/2009 02:35 AM
Dibenzofuran	ND	330		µg/Kg	1	4/3/2009 02:35 AM
Diethylphthalate	ND	330		µg/Kg	1	4/3/2009 02:35 AM
Dimethylphthalate	ND	330		µg/Kg	1	4/3/2009 02:35 AM
Fluoranthene	ND	330		µg/Kg	1	4/3/2009 02:35 AM
Fluorene	ND	330		µg/Kg	1	4/3/2009 02:35 AM
Hexachlorobenzene	ND	330		µg/Kg	1	4/3/2009 02:35 AM
Hexachlorobutadiene	ND	660		µg/Kg	1	4/3/2009 02:35 AM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	4/3/2009 02:35 AM
Hexachloroethane	ND	330		µg/Kg	1	4/3/2009 02:35 AM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	4/3/2009 02:35 AM
Isophorone	ND	330		µg/Kg	1	4/3/2009 02:35 AM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	4/3/2009 02:35 AM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	4/3/2009 02:35 AM
Naphthalene	ND	330		µg/Kg	1	4/3/2009 02:35 AM
Nitrobenzene	ND	330		µg/Kg	1	4/3/2009 02:35 AM
Pentachlorophenol	ND	1600		µg/Kg	1	4/3/2009 02:35 AM
Phenanthrene	ND	330		µg/Kg	1	4/3/2009 02:35 AM
Phenol	ND	330		µg/Kg	1	4/3/2009 02:35 AM
Pyrene	ND	330		µg/Kg	1	4/3/2009 02:35 AM
Surr: 1,2-Dichlorobenzene-d4	81.3	49-103		%REC	1	4/3/2009 02:35 AM
Surr: 2,4,6-Tribromophenol	92.2	47-129		%REC	1	4/3/2009 02:35 AM
Surr: 2-Chlorophenol-d4	89.9	54-109		%REC	1	4/3/2009 02:35 AM
Surr: 2-Fluorobiphenyl	94.5	59-108		%REC	1	4/3/2009 02:35 AM
Surr: 2-Fluorophenol	87.4	50-111		%REC	1	4/3/2009 02:35 AM
Surr: 4-Terphenyl-d14	119	58-135		%REC	1	4/3/2009 02:35 AM
Surr: Nitrobenzene-d5	89.2	54-115		%REC	1	4/3/2009 02:35 AM
Surr: Phenol-d5	88.8	58-112		%REC	1	4/3/2009 02:35 AM

Qualifiers:

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S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 160.1_2540C_W

Sample ID: **104786-001F-DUP**	SampType: **DUP**	TestCode: **160.1_2540C**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107774**
Client ID: **ZZZZZZ**	Batch ID: **54508**	TestNo: **SM2540C**		Analysis Date: **4/1/2009**	SeqNo: **1689789**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	11620.000	200						11920	2.55	10	

Sample ID: **LCS-54508**	SampType: **LCS**	TestCode: **160.1_2540C**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107774**
Client ID: **LCSW**	Batch ID: **54508**	TestNo: **SM2540C**		Analysis Date: **4/1/2009**	SeqNo: **1689793**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	992.000	10	970.0	0	102	80	120				

Sample ID: **MB-54508**	SampType: **MBLK**	TestCode: **160.1_2540C**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107774**
Client ID: **PBW**	Batch ID: **54508**	TestNo: **SM2540C**		Analysis Date: **4/1/2009**	SeqNo: **1689794**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	ND	10									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 1664_HEM_W

Sample ID: **MB-54502**	SampType: **MBLK**	TestCode: **1664_HEM_**	Units: **mg/L**	Prep Date: **4/2/2009**	RunNo: **107772**
Client ID: **PBW**	Batch ID: **54502**	TestNo: **EPA 1664 _H**		Analysis Date: **4/2/2009**	SeqNo: **1689631**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Oil & Grease	ND	4.0									

Sample ID: **LCS-54502**	SampType: **LCS**	TestCode: **1664_HEM_**	Units: **mg/L**	Prep Date: **4/2/2009**	RunNo: **107772**
Client ID: **LCSW**	Batch ID: **54502**	TestNo: **EPA 1664 _H**		Analysis Date: **4/2/2009**	SeqNo: **1689632**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Oil & Grease	38.000	4.0	40.00	0	95.0	78	114				

Sample ID: **MB-54502-MS**	SampType: **MS**	TestCode: **1664_HEM_**	Units: **mg/L**	Prep Date: **4/2/2009**	RunNo: **107772**
Client ID: **ZZZZZZ**	Batch ID: **54502**	TestNo: **EPA 1664 _H**		Analysis Date: **4/2/2009**	SeqNo: **1689639**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Oil & Grease	37.200	4.0	40.00	0	93.0	78	114				

Sample ID: **MB-54502-MSD**	SampType: **MSD**	TestCode: **1664_HEM_**	Units: **mg/L**	Prep Date: **4/2/2009**	RunNo: **107772**
Client ID: **ZZZZZZ**	Batch ID: **54502**	TestNo: **EPA 1664 _H**		Analysis Date: **4/2/2009**	SeqNo: **1689640**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Oil & Grease	36.800	4.0	40.00	0	92.0	78	114	37.20	1.08	20	

Qualifiers:

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ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 335.2_4500CNE_W

Sample ID: **104782-001BMS**	SampType: **MS**	TestCode: **335.2_4500C**	Units: **mg/L**	Prep Date: **4/3/2009**	RunNo: **107819**
Client ID: **ZZZZZZ**	Batch ID: **54519**	TestNo: **SM4500-CN E**		Analysis Date: **4/3/2009**	SeqNo: **1690560**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide	0.396	0.010	0.4000	0	99.0	80	120				

Sample ID: **104782-001BMSD**	SampType: **MSD**	TestCode: **335.2_4500C**	Units: **mg/L**	Prep Date: **4/3/2009**	RunNo: **107819**
Client ID: **ZZZZZZ**	Batch ID: **54519**	TestNo: **SM4500-CN E**		Analysis Date: **4/3/2009**	SeqNo: **1690561**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide	0.392	0.010	0.4000	0	98.0	80	120	0.3960	1.02	20	

Sample ID: **104788-001HDUP**	SampType: **DUP**	TestCode: **335.2_4500C**	Units: **mg/L**	Prep Date: **4/3/2009**	RunNo: **107819**
Client ID: **ZZZZZZ**	Batch ID: **54519**	TestNo: **SM4500-CN E**		Analysis Date: **4/3/2009**	SeqNo: **1690565**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide	ND	0.010						0	0	30	

Sample ID: **LCS-54519**	SampType: **LCS**	TestCode: **335.2_4500C**	Units: **mg/L**	Prep Date: **4/3/2009**	RunNo: **107819**
Client ID: **LCSW**	Batch ID: **54519**	TestNo: **SM4500-CN E**		Analysis Date: **4/3/2009**	SeqNo: **1690566**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide	0.377	0.010	0.4000	0	94.2	80	120				

Sample ID: **MB-54519**	SampType: **MBLK**	TestCode: **335.2_4500C**	Units: **mg/L**	Prep Date: **4/3/2009**	RunNo: **107819**
Client ID: **PBW**	Batch ID: **54519**	TestNo: **SM4500-CN E**		Analysis Date: **4/3/2009**	SeqNo: **1690567**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cyanide	ND	0.010									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 376.2_4500S2_WD

Sample ID: **104789-001IDUP**	SampType: **DUP**	TestCode: **376.2_4500S2**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107702**
Client ID: **W20AGW**	Batch ID: **R107702**	TestNo: **SM4500-S= D**		Analysis Date: **4/1/2009**	SeqNo: **1688339**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfide	0.008	0.010						0.008400	0	30	

Sample ID: **LCS-R107702**	SampType: **LCS**	TestCode: **376.2_4500S2**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107702**
Client ID: **LCSW**	Batch ID: **R107702**	TestNo: **SM4500-S= D**		Analysis Date: **4/1/2009**	SeqNo: **1688340**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfide	0.502	0.010	0.5000	0	100	80	120				

Sample ID: **MB-R107702**	SampType: **MBLK**	TestCode: **376.2_4500S2**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107702**
Client ID: **PBW**	Batch ID: **R107702**	TestNo: **SM4500-S= D**		Analysis Date: **4/1/2009**	SeqNo: **1688341**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfide	ND	0.010									

Sample ID: **MB-R107702MS**	SampType: **MS**	TestCode: **376.2_4500S2**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107702**
Client ID: **ZZZZZZ**	Batch ID: **R107702**	TestNo: **SM4500-S= D**		Analysis Date: **4/1/2009**	SeqNo: **1688342**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfide	0.495	0.010	0.5000	0	99.0	70	120				

Sample ID: **MB-R107702MSD**	SampType: **MSD**	TestCode: **376.2_4500S2**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107702**
Client ID: **ZZZZZZ**	Batch ID: **R107702**	TestNo: **SM4500-S= D**		Analysis Date: **4/1/2009**	SeqNo: **1688343**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfide	0.486	0.010	0.5000	0	97.2	70	120	0.4949	1.79	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **MB-54532** SampType: **MBLK** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **4/4/2009** RunNo: **107885**
Client ID: **PBS** Batch ID: **54532** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **4/6/2009** SeqNo: **1691710**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	2.0									
Arsenic	ND	1.0									
Barium	ND	1.0									
Beryllium	ND	1.0									
Cadmium	ND	1.0									
Chromium	ND	1.0									
Cobalt	ND	1.0									
Copper	ND	2.0									
Lead	ND	1.0									
Molybdenum	ND	1.0									
Nickel	ND	1.0									
Selenium	ND	1.0									
Silver	ND	1.0									
Thallium	ND	1.0									
Vanadium	ND	1.0									
Zinc	ND	1.0									

Sample ID: **LCS-54532** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **4/4/2009** RunNo: **107885**
Client ID: **LCSS** Batch ID: **54532** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **4/6/2009** SeqNo: **1691711**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	48.799	2.0	50.00	0	97.6	80	120				
Arsenic	47.959	1.0	50.00	0	95.9	80	120				
Barium	51.130	1.0	50.00	0	102	80	120				
Beryllium	49.621	1.0	50.00	0	99.2	80	120				
Cadmium	49.818	1.0	50.00	0	99.6	80	120				
Chromium	46.411	1.0	50.00	0	92.8	80	120				
Cobalt	51.010	1.0	50.00	0	102	80	120				
Copper	50.158	2.0	50.00	0	100	80	120				
Lead	50.220	1.0	50.00	0	100	80	120				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **LCS-54532** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **4/4/2009** RunNo: **107885**
Client ID: **LCSS** Batch ID: **54532** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **4/6/2009** SeqNo: **1691711**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	51.429	1.0	50.00	0	103	80	120				
Nickel	48.537	1.0	50.00	0	97.1	80	120				
Selenium	46.129	1.0	50.00	0	92.3	80	120				
Silver	48.449	1.0	50.00	0	96.9	80	120				
Thallium	44.141	1.0	50.00	0	88.3	80	120				
Vanadium	51.337	1.0	50.00	0	103	80	120				
Zinc	48.986	1.0	50.00	0	98.0	80	120				

Sample ID: **104789-012ADUP** SampType: **DUP** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **4/4/2009** RunNo: **107885**
Client ID: **FW5 (2')** Batch ID: **54532** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **4/7/2009** SeqNo: **1691722**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	2.0						0.4027	0	20	
Arsenic	ND	1.0						0	0	20	
Barium	97.764	1.0						100.5	2.79	20	
Beryllium	ND	1.0						0	0	20	
Cadmium	0.662	1.0						0.7343	0	20	
Chromium	29.922	1.0						35.57	17.3	20	
Cobalt	12.278	1.0						14.11	13.9	20	
Copper	31.982	2.0						37.46	15.8	20	
Lead	3.436	1.0						3.424	0.333	20	
Molybdenum	ND	1.0						0	0	20	
Nickel	28.841	1.0						34.10	16.7	20	
Selenium	1.350	1.0						1.745	25.5	20	R
Silver	ND	1.0						0	0	20	
Thallium	ND	1.0						0	0	20	
Vanadium	51.548	1.0						57.61	11.1	20	
Zinc	36.098	1.0						41.50	13.9	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **104789-012AMS** SampType: **MS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **4/4/2009** RunNo: **107885**
Client ID: **FW5 (2')** Batch ID: **54532** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **4/7/2009** SeqNo: **1691723**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	75.778	2.0	125.0	0.4027	60.3	25	106				
Arsenic	93.410	1.0	125.0	0	74.7	42	113				
Barium	191.654	1.0	125.0	100.5	72.9	19	140				
Beryllium	90.995	1.0	125.0	0	72.8	50	109				
Cadmium	87.484	1.0	125.0	0.7343	69.4	48	106				
Chromium	120.891	1.0	125.0	35.57	68.3	44	116				
Cobalt	102.219	1.0	125.0	14.11	70.5	47	107				
Copper	181.875	2.0	125.0	37.46	116	49	124				
Lead	90.881	1.0	125.0	3.424	70.0	33	120				
Molybdenum	93.233	1.0	125.0	0	74.6	46	111				
Nickel	118.487	1.0	125.0	34.10	67.5	43	111				
Selenium	92.069	1.0	125.0	1.745	72.3	43	104				
Silver	100.503	1.0	125.0	0	80.4	53	114				
Thallium	79.318	1.0	125.0	0	63.5	41	107				
Vanadium	158.638	1.0	125.0	57.61	80.8	48	116				
Zinc	128.183	1.0	125.0	41.50	69.3	24	129				

Sample ID: **104789-012AMSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **4/4/2009** RunNo: **107885**
Client ID: **FW5 (2')** Batch ID: **54532** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **4/7/2009** SeqNo: **1691724**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	70.503	2.0	125.0	0.4027	56.1	25	106	75.78	7.21	20	
Arsenic	88.052	1.0	125.0	0	70.4	42	113	93.41	5.91	20	
Barium	187.557	1.0	125.0	100.5	69.6	19	140	191.7	2.16	20	
Beryllium	86.532	1.0	125.0	0	69.2	50	109	90.99	5.03	20	
Cadmium	83.214	1.0	125.0	0.7343	66.0	48	106	87.48	5.00	20	
Chromium	120.178	1.0	125.0	35.57	67.7	44	116	120.9	0.592	20	
Cobalt	97.823	1.0	125.0	14.11	67.0	47	107	102.2	4.40	20	
Copper	142.340	2.0	125.0	37.46	83.9	49	124	181.9	24.4	20	R
Lead	86.683	1.0	125.0	3.424	66.6	33	120	90.88	4.73	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **104789-012AMSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **4/4/2009** RunNo: **107885**
Client ID: **FW5 (2')** Batch ID: **54532** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **4/7/2009** SeqNo: **1691724**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	88.007	1.0	125.0	0	70.4	46	111	93.23	5.77	20	
Nickel	114.920	1.0	125.0	34.10	64.7	43	111	118.5	3.06	20	
Selenium	86.624	1.0	125.0	1.745	67.9	43	104	92.07	6.09	20	
Silver	94.777	1.0	125.0	0	75.8	53	114	100.5	5.86	20	
Thallium	76.458	1.0	125.0	0	61.2	41	107	79.32	3.67	20	
Vanadium	155.788	1.0	125.0	57.61	78.5	48	116	158.6	1.81	20	
Zinc	123.603	1.0	125.0	41.50	65.7	24	129	128.2	3.64	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_W

Sample ID: **MB-54486** SampType: **MBLK** TestCode: **6010_W** Units: **mg/L** Prep Date: **4/2/2009** RunNo: **107800**
Client ID: **PBW** Batch ID: **54486** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **4/3/2009** SeqNo: **1690128**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	0.0050									
Arsenic	ND	0.010									
Barium	ND	0.0030									
Beryllium	ND	0.0030									
Cadmium	ND	0.0030									
Chromium	ND	0.0030									
Cobalt	ND	0.0030									
Copper	ND	0.0050									
Lead	ND	0.0050									
Molybdenum	ND	0.0050									
Nickel	ND	0.0050									
Selenium	ND	0.010									
Silver	ND	0.0030									
Thallium	ND	0.015									
Vanadium	ND	0.0030									
Zinc	0.006	0.010									

Sample ID: **LCS-54486** SampType: **LCS** TestCode: **6010_W** Units: **mg/L** Prep Date: **4/2/2009** RunNo: **107800**
Client ID: **LCSW** Batch ID: **54486** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **4/3/2009** SeqNo: **1690129**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	1.028	0.0050	1.000	0	103	85	115				
Arsenic	0.990	0.010	1.000	0	99.0	85	115				
Barium	1.042	0.0030	1.000	0	104	85	115				
Beryllium	1.028	0.0030	1.000	0	103	85	115				
Cadmium	1.021	0.0030	1.000	0	102	85	115				
Chromium	0.943	0.0030	1.000	0	94.3	85	115				
Cobalt	1.039	0.0030	1.000	0	104	85	115				
Copper	1.039	0.0050	1.000	0	104	85	115				
Lead	1.069	0.0050	1.000	0	107	85	115				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_W

Sample ID: **LCS-54486** SampType: **LCS** TestCode: **6010_W** Units: **mg/L** Prep Date: **4/2/2009** RunNo: **107800**
Client ID: **LCSW** Batch ID: **54486** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **4/3/2009** SeqNo: **1690129**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	1.014	0.0050	1.000	0	101	85	115				
Nickel	1.004	0.0050	1.000	0	100	85	115				
Selenium	0.972	0.010	1.000	0	97.2	85	115				
Silver	1.008	0.0030	1.000	0	101	85	115				
Thallium	0.918	0.015	1.000	0	91.8	85	115				
Vanadium	1.041	0.0030	1.000	0	104	85	115				
Zinc	1.040	0.010	1.000	0.006200	103	85	115				

Sample ID: **104767-001BDUP** SampType: **DUP** TestCode: **6010_W** Units: **mg/L** Prep Date: **4/2/2009** RunNo: **107800**
Client ID: **ZZZZZZ** Batch ID: **54486** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **4/3/2009** SeqNo: **1690131**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	0.0050						0	0	20	
Arsenic	ND	0.010						0	0	20	
Barium	0.008	0.0030						0.008064	3.02	20	
Beryllium	ND	0.0030						0	0	20	
Cadmium	ND	0.0030						0	0	20	
Chromium	0.002	0.0030						0.001717	0	20	
Cobalt	ND	0.0030						0	0	20	
Copper	ND	0.0050						0	0	20	
Lead	ND	0.0050						0	0	20	
Molybdenum	ND	0.0050						0	0	20	
Nickel	0.002	0.0050						0.001748	0	20	
Selenium	ND	0.010						0	0	20	
Silver	ND	0.0030						0	0	20	
Thallium	ND	0.015						0	0	20	
Vanadium	0.004	0.0030						0.004362	2.07	20	
Zinc	0.037	0.010						0.02512	37.3	20	R

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_W

Sample ID: **104804-001CMS** SampType: **MS** TestCode: **6010_W** Units: **mg/L** Prep Date: **4/2/2009** RunNo: **107800**
Client ID: **ZZZZZZ** Batch ID: **54486** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **4/3/2009** SeqNo: **1690140**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	2.475	0.0050	2.500	0	99.0	64	130				
Arsenic	2.494	0.010	2.500	0	99.8	66	128				
Barium	2.530	0.0030	2.500	0.01465	101	60	129				
Beryllium	2.516	0.0030	2.500	0	101	77	118				
Cadmium	2.531	0.0030	2.500	0	101	72	122				
Chromium	2.396	0.0030	2.500	0.008227	95.5	77	116				
Cobalt	2.545	0.0030	2.500	0.009174	101	66	124				
Copper	2.784	0.0050	2.500	0.01163	111	70	130				
Lead	2.622	0.0050	2.500	0	105	71	121				
Molybdenum	6.641	0.0050	2.500	4.151	99.6	64	129				
Nickel	2.728	0.0050	2.500	0.2206	100	63	125				
Selenium	2.530	0.010	2.500	0.005410	101	73	124				
Silver	2.615	0.0030	2.500	0	105	60	138				
Thallium	2.329	0.015	2.500	0.02336	92.2	66	125				
Vanadium	2.624	0.0030	2.500	0.04744	103	79	118				
Zinc	2.601	0.010	2.500	0.08484	101	71	120				

Sample ID: **104804-001CMSD** SampType: **MSD** TestCode: **6010_W** Units: **mg/L** Prep Date: **4/2/2009** RunNo: **107800**
Client ID: **ZZZZZZ** Batch ID: **54486** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **4/3/2009** SeqNo: **1690141**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	2.639	0.0050	2.500	0	106	64	130	2.475	6.43	20	
Arsenic	2.642	0.010	2.500	0	106	66	128	2.494	5.73	20	
Barium	2.661	0.0030	2.500	0.01465	106	60	129	2.530	5.06	20	
Beryllium	2.676	0.0030	2.500	0	107	77	118	2.516	6.17	20	
Cadmium	2.660	0.0030	2.500	0	106	72	122	2.531	4.98	20	
Chromium	2.534	0.0030	2.500	0.008227	101	77	116	2.396	5.58	20	
Cobalt	2.678	0.0030	2.500	0.009174	107	66	124	2.545	5.09	20	
Copper	2.944	0.0050	2.500	0.01163	117	70	130	2.784	5.60	20	
Lead	2.783	0.0050	2.500	0	111	71	121	2.622	5.94	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_W

Sample ID: **104804-001CMSD** SampType: **MSD** TestCode: **6010_W** Units: **mg/L** Prep Date: **4/2/2009** RunNo: **107800**
Client ID: **ZZZZZZ** Batch ID: **54486** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **4/3/2009** SeqNo: **1690141**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	6.881	0.0050	2.500	4.151	109	64	129	6.641	3.56	20	
Nickel	2.870	0.0050	2.500	0.2206	106	63	125	2.728	5.09	20	
Selenium	2.674	0.010	2.500	0.005410	107	73	124	2.530	5.56	20	
Silver	2.764	0.0030	2.500	0	111	60	138	2.615	5.57	20	
Thallium	2.468	0.015	2.500	0.02336	97.8	66	125	2.329	5.79	20	
Vanadium	2.772	0.0030	2.500	0.04744	109	79	118	2.624	5.49	20	
Zinc	2.737	0.010	2.500	0.08484	106	71	120	2.601	5.12	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 7470_W

Sample ID: **MB-54480**	SampType: **MBLK**	TestCode: **7470_W**	Units: **µg/L**	Prep Date: **4/2/2009**	RunNo: **107805**
Client ID: **PBW**	Batch ID: **54480**	TestNo: **EPA 7470A**		Analysis Date: **4/3/2009**	SeqNo: **1690209**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.20									

Sample ID: **LCS-54480**	SampType: **LCS**	TestCode: **7470_W**	Units: **µg/L**	Prep Date: **4/2/2009**	RunNo: **107805**
Client ID: **LCSW**	Batch ID: **54480**	TestNo: **EPA 7470A**		Analysis Date: **4/3/2009**	SeqNo: **1690210**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	10.464	0.20	10.00	0	105	85	115				

Sample ID: **104804-001C-MS**	SampType: **MS**	TestCode: **7470_W**	Units: **µg/L**	Prep Date: **4/2/2009**	RunNo: **107805**
Client ID: **ZZZZZZ**	Batch ID: **54480**	TestNo: **EPA 7470A**		Analysis Date: **4/3/2009**	SeqNo: **1690211**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	10.195	0.20	10.00	0	102	70	130				

Sample ID: **104804-001C-MSD**	SampType: **MSD**	TestCode: **7470_W**	Units: **µg/L**	Prep Date: **4/2/2009**	RunNo: **107805**
Client ID: **ZZZZZZ**	Batch ID: **54480**	TestNo: **EPA 7470A**		Analysis Date: **4/3/2009**	SeqNo: **1690212**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	10.244	0.20	10.00	0	102	70	130	10.20	0.473	20	

Sample ID: **104804-001C-DUP**	SampType: **DUP**	TestCode: **7470_W**	Units: **µg/L**	Prep Date: **4/2/2009**	RunNo: **107805**
Client ID: **ZZZZZZ**	Batch ID: **54480**	TestNo: **EPA 7470A**		Analysis Date: **4/3/2009**	SeqNo: **1690214**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.20						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 7471_S

Sample ID: **MB-54465**	SampType: **MBLK**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **4/2/2009**	RunNo: **107734**
Client ID: **PBS**	Batch ID: **54465**	TestNo: **EPA 7471A**		Analysis Date: **4/2/2009**	SeqNo: **1689065**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.10									

Sample ID: **LCS-54465**	SampType: **LCS**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **4/2/2009**	RunNo: **107734**
Client ID: **LCSS**	Batch ID: **54465**	TestNo: **EPA 7471A**		Analysis Date: **4/2/2009**	SeqNo: **1689066**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.836	0.10	0.8300	0	101	80	120				

Sample ID: **104789-012A-MS**	SampType: **MS**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **4/2/2009**	RunNo: **107734**
Client ID: **FW5 (2')**	Batch ID: **54465**	TestNo: **EPA 7471A**		Analysis Date: **4/2/2009**	SeqNo: **1689067**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.921	0.10	0.8300	0.04535	105	70	130				

Sample ID: **104789-012A-MSD**	SampType: **MSD**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **4/2/2009**	RunNo: **107734**
Client ID: **FW5 (2')**	Batch ID: **54465**	TestNo: **EPA 7471A**		Analysis Date: **4/2/2009**	SeqNo: **1689068**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.944	0.10	0.8300	0.04535	108	70	130	0.9205	2.57	20	

Sample ID: **104789-012A-DUP**	SampType: **DUP**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **4/2/2009**	RunNo: **107734**
Client ID: **FW5 (2')**	Batch ID: **54465**	TestNo: **EPA 7471A**		Analysis Date: **4/2/2009**	SeqNo: **1689070**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.044	0.10						0.04535	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_S_DM LLSGT

Sample ID: **MB-54479**	SampType: **MBLK**	TestCode: **8015_S_DM L**	Units: **mg/Kg**	Prep Date: **4/2/2009**	RunNo: **107849**
Client ID: **PBS**	Batch ID: **54479**	TestNo: **EPA 8015B(M**	**EPA 3550B**	Analysis Date: **4/6/2009**	SeqNo: **1691081**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	ND	1.0									
ORO	ND	1.0									
Surr: p-Terphenyl	2.717		2.670		102	30	130				

Sample ID: **LCS-54479**	SampType: **LCS**	TestCode: **8015_S_DM L**	Units: **mg/Kg**	Prep Date: **4/2/2009**	RunNo: **107849**
Client ID: **LCSS**	Batch ID: **54479**	TestNo: **EPA 8015B(M**	**EPA 3550B**	Analysis Date: **4/6/2009**	SeqNo: **1691082**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	19.914	1.0	33.00	0	60.3	35	124				
Surr: p-Terphenyl	1.787		2.670		66.9	30	130				

Sample ID: **104789-012AMS**	SampType: **MS**	TestCode: **8015_S_DM L**	Units: **mg/Kg**	Prep Date: **4/2/2009**	RunNo: **107849**
Client ID: **FW5 (2')**	Batch ID: **54479**	TestNo: **EPA 8015B(M**	**EPA 3550B**	Analysis Date: **4/6/2009**	SeqNo: **1691091**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	30.810	1.0	33.00	5.725	76.0	12	125				
Surr: p-Terphenyl	2.081		2.670		77.9	30	130				

Sample ID: **104789-012AMSD**	SampType: **MSD**	TestCode: **8015_S_DM L**	Units: **mg/Kg**	Prep Date: **4/2/2009**	RunNo: **107849**
Client ID: **FW5 (2')**	Batch ID: **54479**	TestNo: **EPA 8015B(M**	**EPA 3550B**	Analysis Date: **4/6/2009**	SeqNo: **1691092**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	29.624	1.0	33.00	5.725	72.4	12	125	30.81	3.93	20	
Surr: p-Terphenyl	2.055		2.670		77.0	30	130		0	0	

Sample ID: **104789-012ADUP**	SampType: **DUP**	TestCode: **8015_S_DM L**	Units: **mg/Kg**	Prep Date: **4/2/2009**	RunNo: **107849**
Client ID: **FW5 (2')**	Batch ID: **54479**	TestNo: **EPA 8015B(M**	**EPA 3550B**	Analysis Date: **4/6/2009**	SeqNo: **1691093**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_S_DM LLSGT

Sample ID: **104789-012ADUP** SampType: **DUP** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **4/2/2009** RunNo: **107849**
Client ID: **FW5 (2')** Batch ID: **54479** TestNo: **EPA 8015B(M EPA 3550B** Analysis Date: **4/6/2009** SeqNo: **1691093**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	10.163	1.0						5.725	55.9	20	R
ORO	27.423	1.0						16.99	47.0	20	R
Surr: p-Terphenyl	1.936		2.670		72.5	30	130		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_W_DM_LLSGT

Sample ID: **MB-54441**	SampType: **MBLK**	TestCode: **8015_W_DM_**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107742**
Client ID: **PBW**	Batch ID: **54441**	TestNo: **EPA 8015B**	**EPA 3510C**	Analysis Date: **4/1/2009**	SeqNo: **1689309**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	ND	0.050									
ORO	ND	0.050									
Surr: p-Terphenyl	0.067		0.08000		84.3	35	131				

Sample ID: **LCS-54441**	SampType: **LCS**	TestCode: **8015_W_DM_**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107742**
Client ID: **LCSW**	Batch ID: **54441**	TestNo: **EPA 8015B**	**EPA 3510C**	Analysis Date: **4/1/2009**	SeqNo: **1689310**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	0.759	0.050	1.000	0	75.9	42	118				
Surr: p-Terphenyl	0.044		0.08000		54.9	35	131				

Sample ID: **MB-54441-MS**	SampType: **MS**	TestCode: **8015_W_DM_**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107742**
Client ID: **ZZZZZZ**	Batch ID: **54441**	TestNo: **EPA 8015B**	**EPA 3510C**	Analysis Date: **4/1/2009**	SeqNo: **1689311**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	0.755	0.050	1.000	0	75.4	42	118				
Surr: p-Terphenyl	0.046		0.08000		57.2	35	131				

Sample ID: **MB-54441-MSD**	SampType: **MSD**	TestCode: **8015_W_DM_**	Units: **mg/L**	Prep Date: **4/1/2009**	RunNo: **107742**
Client ID: **ZZZZZZ**	Batch ID: **54441**	TestNo: **EPA 8015B**	**EPA 3510C**	Analysis Date: **4/1/2009**	SeqNo: **1689312**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	0.756	0.050	1.000	0	75.6	42	118	0.7545	0.246	20	
Surr: p-Terphenyl	0.044		0.08000		55.2	35	131		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_W_GP LL

Sample ID: **D090330LCS2** SampType: **LCS** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107628**
Client ID: **LCSW** Batch ID: **D09VW048** TestNo: **EPA 8015B(M** Analysis Date: **3/30/2009** SeqNo: **1686946**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	0.708	0.050	1.000	0	70.8	69	125				
Surr: Bromofluorobenzene (FID)	99.005		100.0		99.0	71	130				

Sample ID: **D090330MB2** SampType: **MBLK** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107628**
Client ID: **PBW** Batch ID: **D09VW048** TestNo: **EPA 8015B(M** Analysis Date: **3/30/2009** SeqNo: **1686947**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	ND	0.050									
Surr: Bromofluorobenzene (FID)	86.532		100.0		86.5	71	130				

Sample ID: **104765-002ADUP** SampType: **DUP** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107628**
Client ID: **ZZZZZZ** Batch ID: **D09VW048** TestNo: **EPA 8015B(M** Analysis Date: **3/30/2009** SeqNo: **1686949**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	ND	0.050						0	0	20	
Surr: Bromofluorobenzene (FID)	99.346		100.0		99.3	71	130		0	0	

Sample ID: **104765-001AMS** SampType: **MS** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107628**
Client ID: **ZZZZZZ** Batch ID: **D09VW048** TestNo: **EPA 8015B(M** Analysis Date: **3/30/2009** SeqNo: **1686951**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	1.016	0.050	1.000	0	102	69	125				
Surr: Bromofluorobenzene (FID)	107.152		100.0		107	71	130				

Sample ID: **104765-001AMSD** SampType: **MSD** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107628**
Client ID: **ZZZZZZ** Batch ID: **D09VW048** TestNo: **EPA 8015B(M** Analysis Date: **3/30/2009** SeqNo: **1686952**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	1.012	0.050	1.000	0	101	69	125	1.016	0.394	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_W_GP LL

Sample ID: **104765-001AMSD** SampType: **MSD** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107628**
Client ID: **ZZZZZZ** Batch ID: **D09VW048** TestNo: **EPA 8015B(M** Analysis Date: **3/30/2009** SeqNo: **1686952**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Bromofluorobenzene (FID)	105.693		100.0		106	71	130		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_W_GP LL

Sample ID: **D090403LCS2** SampType: **LCS** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107841**
Client ID: **LCSW** Batch ID: **D09VW053** TestNo: **EPA 8015B(M** Analysis Date: **4/3/2009** SeqNo: **1690891**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	0.759	0.050	1.000	0	75.9	69	125				
Surr: Bromofluorobenzene (FID)	100.182		100.0		100	71	130				

Sample ID: **D090403MB2MS** SampType: **MS** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107841**
Client ID: **ZZZZZZ** Batch ID: **D09VW053** TestNo: **EPA 8015B(M** Analysis Date: **4/3/2009** SeqNo: **1690892**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	0.831	0.050	1.000	0	83.1	69	125				
Surr: Bromofluorobenzene (FID)	96.926		100.0		96.9	71	130				

Sample ID: **D090403MB2MSD** SampType: **MSD** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107841**
Client ID: **ZZZZZZ** Batch ID: **D09VW053** TestNo: **EPA 8015B(M** Analysis Date: **4/3/2009** SeqNo: **1690893**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	0.730	0.050	1.000	0	73.0	69	125	0.8310	12.9	20	
Surr: Bromofluorobenzene (FID)	97.379		100.0		97.4	71	130		0	0	

Sample ID: **D090403MB2** SampType: **MBLK** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107841**
Client ID: **PBW** Batch ID: **D09VW053** TestNo: **EPA 8015B(M** Analysis Date: **4/3/2009** SeqNo: **1690894**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	ND	0.050									
Surr: Bromofluorobenzene (FID)	80.808		100.0		80.8	71	130				

Sample ID: **104866-006BDUP** SampType: **DUP** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107841**
Client ID: **ZZZZZZ** Batch ID: **D09VW053** TestNo: **EPA 8015B(M** Analysis Date: **4/3/2009** SeqNo: **1690896**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	ND	0.050						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_W_GP LL

Sample ID: **104866-006BDUP** SampType: **DUP** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **107841**
Client ID: **ZZZZZZ** Batch ID: **D09VW053** TestNo: **EPA 8015B(M** Analysis Date: **4/3/2009** SeqNo: **1690896**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Bromofluorobenzene (FID)	98.201		100.0		98.2	71	130		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **A090331LCS1** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107703**
Client ID: **LCSW** Batch ID: **A09VW063** TestNo: **EPA 8260B** Analysis Date: **3/31/2009** SeqNo: **1688360**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	17.970	0.50	20.00	0	89.8	70	130				
Benzene	37.200	0.50	40.00	0	93.0	70	130				
Chlorobenzene	20.240	0.50	20.00	0	101	70	130				
MTBE	18.900	0.50	20.00	0	94.5	70	130				
Toluene	38.060	0.50	40.00	0	95.2	70	130				
Trichloroethene	18.910	0.50	20.00	0	94.6	70	130				
Surr: 1,2-Dichloroethane-d4	20.810		25.00		83.2	70	130				
Surr: 4-Bromofluorobenzene	20.760		25.00		83.0	70	130				
Surr: Dibromofluoromethane	21.490		25.00		86.0	70	130				
Surr: Toluene-d8	22.410		25.00		89.6	70	130				

Sample ID: **A090331MB2MS** SampType: **MS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107703**
Client ID: **ZZZZZZ** Batch ID: **A09VW063** TestNo: **EPA 8260B** Analysis Date: **3/31/2009** SeqNo: **1688362**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	16.320	0.50	20.00	0	81.6	70	130				
Benzene	36.480	0.50	40.00	0	91.2	70	130				
Chlorobenzene	20.180	0.50	20.00	0	101	70	130				
Toluene	37.230	0.50	40.00	0	93.1	70	130				
Trichloroethene	18.260	0.50	20.00	0	91.3	70	130				
Surr: 1,2-Dichloroethane-d4	21.070		25.00		84.3	70	130				
Surr: 4-Bromofluorobenzene	20.600		25.00		82.4	70	130				
Surr: Dibromofluoromethane	21.380		25.00		85.5	70	130				
Surr: Toluene-d8	22.260		25.00		89.0	70	130				

Sample ID: **A090331MB2MSD** SampType: **MSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107703**
Client ID: **ZZZZZZ** Batch ID: **A09VW063** TestNo: **EPA 8260B** Analysis Date: **3/31/2009** SeqNo: **1688363**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	17.050	0.50	20.00	0	85.2	70	130	16.32	4.38	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **A090331MB2MSD** SampType: **MSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107703**
Client ID: **ZZZZZZ** Batch ID: **A09VW063** TestNo: **EPA 8260B** Analysis Date: **3/31/2009** SeqNo: **1688363**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	37.260	0.50	40.00	0	93.2	70	130	36.48	2.12	20	
Chlorobenzene	20.720	0.50	20.00	0	104	70	130	20.18	2.64	20	
Toluene	38.460	0.50	40.00	0	96.2	70	130	37.23	3.25	20	
Trichloroethene	18.890	0.50	20.00	0	94.4	70	130	18.26	3.39	20	
Surr: 1,2-Dichloroethane-d4	20.460		25.00		81.8	70	130		0	20	
Surr: 4-Bromofluorobenzene	20.030		25.00		80.1	70	130		0	20	
Surr: Dibromofluoromethane	20.590		25.00		82.4	70	130		0	20	
Surr: Toluene-d8	21.490		25.00		86.0	70	130		0	20	

Sample ID: **A090331MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107703**
Client ID: **PBW** Batch ID: **A09VW063** TestNo: **EPA 8260B** Analysis Date: **3/31/2009** SeqNo: **1688364**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	0.50									
1,1,1-Trichloroethane	ND	0.50									
1,1,2,2-Tetrachloroethane	ND	0.50									
1,1,2-Trichloroethane	ND	0.50									
1,1-Dichloroethane	ND	0.50									
1,1-Dichloroethene	ND	0.50									
1,1-Dichloropropene	ND	0.50									
1,2,3-Trichlorobenzene	ND	0.50									
1,2,3-Trichloropropane	ND	0.50									
1,2,4-Trichlorobenzene	ND	0.50									
1,2,4-Trimethylbenzene	ND	0.50									
1,2-Dibromo-3-chloropropane	ND	0.50									
1,2-Dibromoethane	ND	0.50									
1,2-Dichlorobenzene	ND	0.50									
1,2-Dichloroethane	ND	0.50									
1,2-Dichloropropane	ND	0.50									
1,3,5-Trimethylbenzene	ND	0.50									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **A090331MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107703**
Client ID: **PBW** Batch ID: **A09VW063** TestNo: **EPA 8260B** Analysis Date: **3/31/2009** SeqNo: **1688364**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,3-Dichlorobenzene	ND	0.50									
1,3-Dichloropropane	ND	0.50									
1,4-Dichlorobenzene	ND	0.50									
2,2-Dichloropropane	ND	0.50									
2-Chlorotoluene	ND	0.50									
4-Chlorotoluene	ND	0.50									
4-Isopropyltoluene	ND	0.50									
Benzene	ND	0.50									
Bromobenzene	ND	0.50									
Bromodichloromethane	ND	0.50									
Bromoform	ND	0.50									
Bromomethane	ND	0.50									
Carbon tetrachloride	ND	0.50									
Chlorobenzene	ND	0.50									
Chloroethane	ND	0.50									
Chloroform	ND	0.50									
Chloromethane	ND	0.50									
cis-1,2-Dichloroethene	ND	0.50									
cis-1,3-Dichloropropene	ND	0.50									
Dibromochloromethane	ND	0.50									
Dibromomethane	ND	0.50									
Dichlorodifluoromethane	ND	0.50									
Ethylbenzene	ND	0.50									
Hexachlorobutadiene	ND	0.50									
Isopropylbenzene	ND	0.50									
m,p-Xylene	ND	1.0									
Methylene chloride	ND	1.0									
n-Butylbenzene	ND	0.50									
n-Propylbenzene	ND	0.50									
Naphthalene	ND	0.50									

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits

Calculations are based on raw values

- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **A090331MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107703**
Client ID: **PBW** Batch ID: **A09VW063** TestNo: **EPA 8260B** Analysis Date: **3/31/2009** SeqNo: **1688364**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
o-Xylene	ND	0.50									
sec-Butylbenzene	ND	0.50									
Styrene	ND	0.50									
tert-Butylbenzene	ND	0.50									
Tetrachloroethene	ND	0.50									
Toluene	ND	0.50									
trans-1,2-Dichloroethene	ND	0.50									
Trichloroethene	ND	0.50									
Trichlorofluoromethane	ND	0.50									
Vinyl chloride	ND	0.50									
Surr: 1,2-Dichloroethane-d4	21.930		25.00		87.7	70	130				
Surr: 4-Bromofluorobenzene	22.010		25.00		88.0	70	130				
Surr: Dibromofluoromethane	23.720		25.00		94.9	70	130				
Surr: Toluene-d8	25.310		25.00		101	70	130				

Sample ID: **104789-001A** SampType: **DUP** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107703**
Client ID: **W20AGW** Batch ID: **A09VW063** TestNo: **EPA 8260B** Analysis Date: **3/31/2009** SeqNo: **1688379**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	0.50						0	0	20	
1,1,1-Trichloroethane	ND	0.50						0	0	20	
1,1,2,2-Tetrachloroethane	ND	0.50						0	0	20	
1,1,2-Trichloroethane	ND	0.50						0	0	20	
1,1-Dichloroethane	ND	0.50						0	0	20	
1,1-Dichloroethene	ND	0.50						0	0	20	
1,1-Dichloropropene	ND	0.50						0	0	20	
1,2,3-Trichlorobenzene	ND	0.50						0	0	20	
1,2,3-Trichloropropane	ND	0.50						0	0	20	
1,2,4-Trichlorobenzene	ND	0.50						0	0	20	
1,2,4-Trimethylbenzene	ND	0.50						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **104789-001A** SampType: **DUP** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107703**
Client ID: **W20AGW** Batch ID: **A09VW063** TestNo: **EPA 8260B** Analysis Date: **3/31/2009** SeqNo: **1688379**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2-Dibromo-3-chloropropane	ND	0.50						0	0	20	
1,2-Dibromoethane	ND	0.50						0	0	20	
1,2-Dichlorobenzene	ND	0.50						0	0	20	
1,2-Dichloroethane	ND	0.50						0	0	20	
1,2-Dichloropropane	ND	0.50						0	0	20	
1,3,5-Trimethylbenzene	ND	0.50						0	0	20	
1,3-Dichlorobenzene	ND	0.50						0	0	20	
1,3-Dichloropropane	ND	0.50						0	0	20	
1,4-Dichlorobenzene	ND	0.50						0	0	20	
2,2-Dichloropropane	ND	0.50						0	0	20	
2-Butanone	ND	10						0	0	20	
2-Chloroethyl vinyl ether	ND	0.50						0	0	20	
2-Chlorotoluene	ND	0.50						0	0	20	
2-Hexanone	ND	10						0	0	20	
4-Chlorotoluene	ND	0.50						0	0	20	
4-Isopropyltoluene	ND	0.50						0	0	20	
4-Methyl-2-pentanone	ND	10						0	0	20	
Acetone	ND	10						0	0	20	
Acrolein	ND	10						0	0	20	
Acrylonitrile	ND	10						0	0	20	
Benzene	ND	0.50						0	0	20	
Bromobenzene	ND	0.50						0	0	20	
Bromochloromethane	ND	0.50						0	0	20	
Bromodichloromethane	ND	0.50						0	0	20	
Bromoform	ND	0.50						0	0	20	
Bromomethane	ND	0.50						0	0	20	
Carbon disulfide	ND	2.0						0	0	20	
Carbon tetrachloride	ND	0.50						0	0	20	
Chlorobenzene	ND	0.50						0	0	20	
Chloroethane	ND	0.50						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **104789-001A** SampType: **DUP** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107703**
Client ID: **W20AGW** Batch ID: **A09VW063** TestNo: **EPA 8260B** Analysis Date: **3/31/2009** SeqNo: **1688379**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloroform	ND	0.50						0	0	20	
Chloromethane	0.580	0.50						0.5600	3.51	20	
cis-1,2-Dichloroethene	ND	0.50						0	0	20	
cis-1,3-Dichloropropene	ND	0.50						0	0	20	
Cyclohexanone	ND	50						0	0	20	
Di-isopropyl ether	ND	0.50						0	0	0	
Dibromochloromethane	ND	0.50						0	0	20	
Dibromomethane	ND	0.50						0	0	20	
Dichlorodifluoromethane	ND	0.50						0	0	20	
Ethyl Acetate	ND	10						0	0	20	
Ethyl Ether	ND	10						0	0	20	
Ethyl tert-butyl ether	ND	0.50						0	0	0	
Ethylbenzene	ND	0.50						0	0	20	
Freon-113	ND	0.50						0	0	20	
Hexachlorobutadiene	ND	0.50						0	0	20	
Iodomethane	ND	0.50						0	0	20	
Isopropylbenzene	ND	0.50						0	0	20	
m,p-Xylene	ND	1.0						0	0	20	
Methylene chloride	ND	1.0						0	0	20	
MTBE	ND	0.50						0	0	20	
n-Butylbenzene	ND	0.50						0	0	20	
n-Propylbenzene	ND	0.50						0	0	20	
Naphthalene	ND	0.50						0	0	20	
o-Xylene	ND	0.50						0	0	20	
sec-Butylbenzene	ND	0.50						0	0	20	
Styrene	ND	0.50						0	0	20	
Tert-amyl methyl ether	ND	0.50						0	0	0	
Tert-Butanol	ND	10						0	0	0	
tert-Butylbenzene	ND	0.50						0	0	20	
Tetrachloroethene	ND	0.50						0	0	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **104789-001A** SampType: **DUP** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **107703**
Client ID: **W20AGW** Batch ID: **A09VW063** TestNo: **EPA 8260B** Analysis Date: **3/31/2009** SeqNo: **1688379**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Toluene	ND	0.50						0	0	20	
trans-1,2-Dichloroethene	ND	0.50						0	0	20	
trans-1,3-Dichloropropene	ND	0.50						0	0	20	
Trichloroethene	ND	0.50						0	0	20	
Trichlorofluoromethane	ND	0.50						0	0	20	
Vinyl acetate	ND	10						0	0	20	
Vinyl chloride	ND	0.50						0	0	20	
Xylenes, Total	ND	1.5						0	0	0	
Surr: 1,2-Dichloroethane-d4	24.130		25.00		96.5	70	130		0	0	
Surr: 4-Bromofluorobenzene	21.800		25.00		87.2	70	130		0	0	
Surr: Dibromofluoromethane	24.930		25.00		99.7	70	130		0	0	
Surr: Toluene-d8	25.260		25.00		101	70	130		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-54471** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/2/2009** RunNo: **107780**
Client ID: **PBS** Batch ID: **54471** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/2/2009** SeqNo: **1689860**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	330									
1,2-Dichlorobenzene	ND	330									
1,3-Dichlorobenzene	ND	330									
1,4-Dichlorobenzene	ND	330									
2,4,5-Trichlorophenol	ND	330									
2,4,6-Trichlorophenol	ND	330									
2,4-Dichlorophenol	ND	1600									
2,4-Dimethylphenol	ND	330									
2,4-Dinitrophenol	ND	1600									
2,4-Dinitrotoluene	ND	330									
2,6-Dinitrotoluene	ND	330									
2-Chloronaphthalene	ND	330									
2-Chlorophenol	ND	330									
2-Methylnaphthalene	ND	330									
2-Methylphenol	ND	330									
2-Nitroaniline	ND	1600									
2-Nitrophenol	ND	330									
3,3´-Dichlorobenzidine	ND	660									
3-Nitroaniline	ND	1600									
4,6-Dinitro-2-methylphenol	ND	1600									
4-Bromophenyl-phenylether	ND	330									
4-Chloro-3-methylphenol	ND	660									
4-Chloroaniline	ND	660									
4-Chlorophenyl-phenylether	ND	330									
4-Methylphenol	ND	330									
4-Nitroaniline	ND	1600									
4-Nitrophenol	ND	1600									
Acenaphthene	ND	330									
Acenaphthylene	ND	330									
Anthracene	ND	330									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-54471** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/2/2009** RunNo: **107780**
Client ID: **PBS** Batch ID: **54471** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/2/2009** SeqNo: **1689860**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzidine (M)	ND	1600									
Benzo(a)anthracene	ND	330									
Benzo(a)pyrene	ND	330									
Benzo(b)fluoranthene	ND	330									
Benzo(g,h,i)perylene	ND	330									
Benzo(k)fluoranthene	ND	330									
Benzoic acid	ND	1600									
Benzyl alcohol	ND	660									
Bis(2-chloroethoxy)methane	ND	330									
Bis(2-chloroethyl)ether	ND	330									
Bis(2-chloroisopropyl)ether	ND	330									
Bis(2-ethylhexyl)phthalate	ND	330									
Butylbenzylphthalate	ND	330									
Chrysene	ND	330									
Di-n-butylphthalate	ND	330									
Di-n-octylphthalate	ND	330									
Dibenz(a,h)anthracene	ND	330									
Dibenzofuran	ND	330									
Diethylphthalate	ND	330									
Dimethylphthalate	ND	330									
Fluoranthene	ND	330									
Fluorene	ND	330									
Hexachlorobenzene	ND	330									
Hexachlorobutadiene	ND	660									
Hexachlorocyclopentadiene	ND	660									
Hexachloroethane	ND	330									
Indeno(1,2,3-cd)pyrene	ND	330									
Isophorone	ND	330									
N-Nitrosodi-n-propylamine	ND	330									
N-Nitrosodiphenylamine	ND	330									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-54471** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/2/2009** RunNo: **107780**
Client ID: **PBS** Batch ID: **54471** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/2/2009** SeqNo: **1689860**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	330									
Nitrobenzene	ND	330									
Pentachlorophenol	ND	1600									
Phenanthrene	ND	330									
Phenol	ND	330									
Pyrene	ND	330									
Surr: 1,2-Dichlorobenzene-d4	2842.000		3330		85.3	49	103				
Surr: 2,4,6-Tribromophenol	3280.333		3330		98.5	47	129				
Surr: 2-Chlorophenol-d4	2994.667		3330		89.9	54	109				
Surr: 2-Fluorobiphenyl	3061.667		3330		91.9	59	108				
Surr: 2-Fluorophenol	2946.667		3330		88.5	50	111				
Surr: 4-Terphenyl-d14	4331.333		3330		130	58	135				
Surr: Nitrobenzene-d5	2985.000		3330		89.6	54	115				
Surr: Phenol-d5	2975.667		3330		89.4	58	112				

Sample ID: **LCS-54471** SampType: **LCS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/2/2009** RunNo: **107780**
Client ID: **LCSS** Batch ID: **54471** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/2/2009** SeqNo: **1689861**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	3032.667	330	3330	0	91.1	61	107				
1,4-Dichlorobenzene	2813.333	330	3330	0	84.5	56	100				
2,4-Dinitrotoluene	3480.333	330	3330	0	105	72	130				
2-Chlorophenol	3014.667	330	3330	0	90.5	64	105				
4-Chloro-3-methylphenol	3577.333	660	3330	0	107	74	125				
4-Nitrophenol	3311.667	1600	3330	0	99.4	77	137				
Acenaphthene	3076.667	330	3330	0	92.4	63	117				
N-Nitrosodi-n-propylamine	3226.000	330	3330	0	96.9	71	121				
Pentachlorophenol	2642.000	1600	3330	0	79.3	69	125				
Phenol	3106.667	330	3330	0	93.3	67	111				
Pyrene	3272.667	330	3330	0	98.3	60	122				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **LCS-54471** SampType: **LCS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/2/2009** RunNo: **107780**
Client ID: **LCSS** Batch ID: **54471** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/2/2009** SeqNo: **1689861**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 1,2-Dichlorobenzene-d4	2727.000		3330		81.9	49	103				
Surr: 2,4,6-Tribromophenol	3346.333		3330		100	47	129				
Surr: 2-Chlorophenol-d4	2879.333		3330		86.5	54	109				
Surr: 2-Fluorobiphenyl	3233.667		3330		97.1	59	108				
Surr: 2-Fluorophenol	2818.667		3330		84.6	50	111				
Surr: 4-Terphenyl-d14	3751.667		3330		113	58	135				
Surr: Nitrobenzene-d5	2945.000		3330		88.4	54	115				
Surr: Phenol-d5	2932.333		3330		88.1	58	112				

Sample ID: **104789-004AMS** SampType: **MS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/2/2009** RunNo: **107780**
Client ID: **W20AGW (5')** Batch ID: **54471** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/2/2009** SeqNo: **1689862**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	3326.333	330	3330	0	99.9	60	105				
1,4-Dichlorobenzene	3011.667	330	3330	0	90.4	50	99				
2,4-Dinitrotoluene	3591.000	330	3330	0	108	70	130				
2-Chlorophenol	3352.333	330	3330	0	101	58	107				
4-Chloro-3-methylphenol	3906.333	660	3330	0	117	72	124				
4-Nitrophenol	3511.000	1600	3330	0	105	69	139				
Acenaphthene	3301.333	330	3330	0	99.1	59	118				
N-Nitrosodi-n-propylamine	3500.667	330	3330	0	105	61	125				
Pentachlorophenol	2834.333	1600	3330	0	85.1	56	131				
Phenol	3439.667	330	3330	0	103	60	113				
Pyrene	3406.000	330	3330	0	102	51	130				
Surr: 1,2-Dichlorobenzene-d4	2949.000		3330		88.6	49	103				
Surr: 2,4,6-Tribromophenol	3570.667		3330		107	47	129				
Surr: 2-Chlorophenol-d4	3207.000		3330		96.3	54	109				
Surr: 2-Fluorobiphenyl	3451.333		3330		104	59	108				
Surr: 2-Fluorophenol	3129.667		3330		94.0	50	111				
Surr: 4-Terphenyl-d14	3943.333		3330		118	58	135				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104789-004AMS** SampType: **MS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/2/2009** RunNo: **107780**
Client ID: **W20AGW (5')** Batch ID: **54471** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/2/2009** SeqNo: **1689862**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	3185.000		3330		95.6	54	115				
Surr: Phenol-d5	3301.333		3330		99.1	58	112				

Sample ID: **104789-004AMSD** SampType: **MSD** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/2/2009** RunNo: **107780**
Client ID: **W20AGW (5')** Batch ID: **54471** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/2/2009** SeqNo: **1689863**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	3098.333	330	3330	0	93.0	60	105	3326	7.10	20	
1,4-Dichlorobenzene	2827.333	330	3330	0	84.9	50	99	3012	6.31	20	
2,4-Dinitrotoluene	3442.000	330	3330	0	103	70	130	3591	4.24	20	
2-Chlorophenol	3122.667	330	3330	0	93.8	58	107	3352	7.09	20	
4-Chloro-3-methylphenol	3584.000	660	3330	0	108	72	124	3906	8.61	20	
4-Nitrophenol	3465.000	1600	3330	0	104	69	139	3511	1.32	20	
Acenaphthene	3116.333	330	3330	0	93.6	59	118	3301	5.77	20	
N-Nitrosodi-n-propylamine	3282.000	330	3330	0	98.6	61	125	3501	6.45	20	
Pentachlorophenol	2723.000	1600	3330	0	81.8	56	131	2834	4.01	20	
Phenol	3226.667	330	3330	0	96.9	60	113	3440	6.39	20	
Pyrene	3296.333	330	3330	0	99.0	51	130	3406	3.27	20	
Surr: 1,2-Dichlorobenzene-d4	2775.333		3330		83.3	49	103		0	0	
Surr: 2,4,6-Tribromophenol	3315.333		3330		99.6	47	129		0	0	
Surr: 2-Chlorophenol-d4	2987.000		3330		89.7	54	109		0	0	
Surr: 2-Fluorobiphenyl	3196.667		3330		96.0	59	108		0	0	
Surr: 2-Fluorophenol	2913.333		3330		87.5	50	111		0	0	
Surr: 4-Terphenyl-d14	3652.333		3330		110	58	135		0	0	
Surr: Nitrobenzene-d5	2956.667		3330		88.8	54	115		0	0	
Surr: Phenol-d5	3038.667		3330		91.3	58	112		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104789-004ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/2/2009** RunNo: **107780**
Client ID: **W20AGW (5')** Batch ID: **54471** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/2/2009** SeqNo: **1689864**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	330						0	0	20	
1,2-Dichlorobenzene	ND	330						0	0	20	
1,2-Diphenylhydrazine	ND	330						0	0	20	
1,3-Dichlorobenzene	ND	330						0	0	20	
1,4-Dichlorobenzene	ND	330						0	0	20	
1,4-Dioxane	ND	330						0	0	20	
2,4,5-Trichlorophenol	ND	330						0	0	20	
2,4,6-Trichlorophenol	ND	330						0	0	20	
2,4-Dichlorophenol	ND	1600						0	0	20	
2,4-Dimethylphenol	ND	330						0	0	20	
2,4-Dinitrophenol	ND	1600						0	0	20	
2,4-Dinitrotoluene	ND	330						0	0	20	
2,6-Dinitrotoluene	ND	330						0	0	20	
2-Chloronaphthalene	ND	330						0	0	20	
2-Chlorophenol	ND	330						0	0	20	
2-Methylnaphthalene	ND	330						0	0	20	
2-Methylphenol	ND	330						0	0	20	
2-Nitroaniline	ND	1600						0	0	20	
2-Nitrophenol	ND	330						0	0	20	
3,3´-Dichlorobenzidine	ND	660						0	0	20	
3-Nitroaniline	ND	1600						0	0	20	
4,6-Dinitro-2-methylphenol	ND	1600						0	0	20	
4-Bromophenyl-phenylether	ND	330						0	0	20	
4-Chloro-3-methylphenol	ND	660						0	0	20	
4-Chloroaniline	ND	660						0	0	20	
4-Chlorophenyl-phenylether	ND	330						0	0	20	
3/4-Methylphenol	ND	330						0	0	20	
4-Methylphenol	ND	330						0	0	20	
4-Nitroaniline	ND	1600						0	0	20	
4-Nitrophenol	ND	1600						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104789-004ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/2/2009** RunNo: **107780**
Client ID: **W20AGW (5')** Batch ID: **54471** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/2/2009** SeqNo: **1689864**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acenaphthene	ND	330						0	0	20	
Acenaphthylene	ND	330						0	0	20	
Aniline	ND	330						0	0	20	
Anthracene	ND	330						0	0	20	
Benzidine (M)	ND	1600						0	0	20	
Benzo(a)anthracene	ND	330						0	0	20	
Benzo(a)pyrene	ND	330						0	0	20	
Benzo(b)fluoranthene	ND	330						0	0	20	
Benzo(g,h,i)perylene	ND	330						0	0	20	
Benzo(k)fluoranthene	ND	330						0	0	20	
Benzoic acid	ND	1600						0	0	20	
Benzyl alcohol	ND	660						0	0	20	
Bis(2-chloroethoxy)methane	ND	330						0	0	20	
Bis(2-chloroethyl)ether	ND	330						0	0	20	
Bis(2-chloroisopropyl)ether	ND	330						0	0	20	
Bis(2-ethylhexyl)phthalate	ND	330						0	0	20	
Butylbenzylphthalate	ND	330						0	0	20	
Carbazole	ND	330						0	0	20	
Chrysene	ND	330						0	0	20	
Di-n-butylphthalate	ND	330						0	0	20	
Di-n-octylphthalate	ND	330						0	0	20	
Dibenz(a,h)anthracene	ND	330						0	0	20	
Dibenzofuran	ND	330						0	0	20	
Diethylphthalate	ND	330						0	0	20	
Dimethylphthalate	ND	330						0	0	20	
Fluoranthene	ND	330						0	0	20	
Fluorene	ND	330						0	0	20	
Hexachlorobenzene	ND	330						0	0	20	
Hexachlorobutadiene	ND	660						0	0	20	
Hexachlorocyclopentadiene	ND	660						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **104789-004ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **4/2/2009** RunNo: **107780**
Client ID: **W20AGW (5')** Batch ID: **54471** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **4/2/2009** SeqNo: **1689864**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Hexachloroethane	ND	330						0	0	20	
Indeno(1,2,3-cd)pyrene	ND	330						0	0	20	
Isophorone	ND	330						0	0	20	
N-Nitrosodi-n-propylamine	ND	330						0	0	20	
N-Nitrosodimethylamine	ND	330						0	0	20	
N-Nitrosodiphenylamine	ND	330						0	0	20	
Naphthalene	ND	330						0	0	20	
Nitrobenzene	ND	330						0	0	20	
Pentachlorophenol	ND	1600						0	0	20	
Phenanthrene	ND	330						0	0	20	
Phenol	ND	330						0	0	20	
Pyrene	ND	330						0	0	20	
Pyridine	ND	1600						0	0	20	
Surr: 1,2-Dichlorobenzene-d4	2881.333		3330		86.5	49	103		0	0	
Surr: 2,4,6-Tribromophenol	3280.667		3330		98.5	47	129		0	0	
Surr: 2-Chlorophenol-d4	3137.000		3330		94.2	54	109		0	0	
Surr: 2-Fluorobiphenyl	3270.667		3330		98.2	59	108		0	0	
Surr: 2-Fluorophenol	3063.667		3330		92.0	50	111		0	0	
Surr: 4-Terphenyl-d14	4300.333		3330		129	58	135		0	0	
Surr: Nitrobenzene-d5	3040.000		3330		91.3	54	115		0	0	
Surr: Phenol-d5	3127.667		3330		93.9	58	112		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_W_FULL

Sample ID: **MB-54393** SampType: **MBLK** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **3/31/2009** RunNo: **107670**
Client ID: **PBW** Batch ID: **54393** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **3/31/2009** SeqNo: **1687707**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	10									
1,2-Dichlorobenzene	ND	10									
1,3-Dichlorobenzene	ND	10									
1,4-Dichlorobenzene	ND	10									
2,4,5-Trichlorophenol	ND	10									
2,4,6-Trichlorophenol	ND	10									
2,4-Dichlorophenol	ND	10									
2,4-Dimethylphenol	ND	10									
2,4-Dinitrophenol	ND	50									
2,4-Dinitrotoluene	ND	10									
2,6-Dinitrotoluene	ND	10									
2-Chloronaphthalene	ND	10									
2-Chlorophenol	ND	10									
2-Methylnaphthalene	ND	10									
2-Methylphenol	ND	10									
2-Nitroaniline	ND	50									
2-Nitrophenol	ND	10									
3,3´-Dichlorobenzidine	ND	20									
3-Nitroaniline	ND	50									
4,6-Dinitro-2-methylphenol	ND	50									
4-Bromophenyl-phenylether	ND	10									
4-Chloro-3-methylphenol	ND	50									
4-Chloroaniline	ND	20									
4-Chlorophenyl-phenylether	ND	10									
4-Methylphenol	ND	10									
4-Nitroaniline	ND	20									
4-Nitrophenol	ND	50									
Acenaphthene	ND	10									
Acenaphthylene	ND	10									
Anthracene	ND	10									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_W_FULL

Sample ID: **MB-54393** SampType: **MBLK** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **3/31/2009** RunNo: **107670**
Client ID: **PBW** Batch ID: **54393** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **3/31/2009** SeqNo: **1687707**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzidine (M)	ND	50									
Benzo(a)anthracene	ND	10									
Benzo(a)pyrene	ND	10									
Benzo(b)fluoranthene	ND	10									
Benzo(g,h,i)perylene	ND	10									
Benzo(k)fluoranthene	ND	10									
Benzoic acid	ND	50									
Benzyl alcohol	ND	20									
Bis(2-chloroethoxy)methane	ND	10									
Bis(2-chloroethyl)ether	ND	10									
Bis(2-chloroisopropyl)ether	ND	10									
Bis(2-ethylhexyl)phthalate	ND	10									
Butylbenzylphthalate	ND	10									
Chrysene	ND	10									
Di-n-butylphthalate	ND	10									
Di-n-octylphthalate	ND	10									
Dibenz(a,h)anthracene	ND	10									
Dibenzofuran	ND	10									
Diethylphthalate	ND	10									
Dimethylphthalate	ND	10									
Fluoranthene	ND	10									
Fluorene	ND	10									
Hexachlorobenzene	ND	10									
Hexachlorobutadiene	ND	20									
Hexachlorocyclopentadiene	ND	10									
Hexachloroethane	ND	10									
Indeno(1,2,3-cd)pyrene	ND	10									
Isophorone	ND	10									
N-Nitrosodi-n-propylamine	ND	10									
N-Nitrosodiphenylamine	ND	10									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_W_FULL

Sample ID: **MB-54393** SampType: **MBLK** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **3/31/2009** RunNo: **107670**
Client ID: **PBW** Batch ID: **54393** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **3/31/2009** SeqNo: **1687707**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	10									
Nitrobenzene	ND	10									
Pentachlorophenol	ND	50									
Phenanthrene	ND	10									
Phenol	ND	10									
Pyrene	ND	10									
Surr: 1,2-Dichlorobenzene-d4	69.890		100.0		69.9	42	98				
Surr: 2,4,6-Tribromophenol	87.150		100.0		87.2	60	128				
Surr: 2-Chlorophenol-d4	67.760		100.0		67.8	43	102				
Surr: 2-Fluorobiphenyl	80.010		100.0		80.0	50	108				
Surr: 2-Fluorophenol	40.450		100.0		40.5	22	69				
Surr: 4-Terphenyl-d14	110.950		100.0		111	66	130				
Surr: Nitrobenzene-d5	79.690		100.0		79.7	47	117				
Surr: Phenol-d5	27.260		100.0		27.3	16	50				

Sample ID: **LCS-54393** SampType: **LCS** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **3/31/2009** RunNo: **107670**
Client ID: **LCSW** Batch ID: **54393** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **3/31/2009** SeqNo: **1687708**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	83.600	10	100.0	0	83.6	54	110				
1,4-Dichlorobenzene	76.890	10	100.0	0	76.9	48	103				
2,4-Dinitrotoluene	107.980	10	100.0	0	108	69	136				
2-Chlorophenol	80.070	10	100.0	0	80.1	53	100				
4-Chloro-3-methylphenol	110.350	50	100.0	0	110	70	124				
4-Nitrophenol	56.450	50	100.0	0	56.5	32	69				
Acenaphthene	105.780	10	100.0	0	106	64	118				
N-Nitrosodi-n-propylamine	96.640	10	100.0	0	96.6	62	130				
Pentachlorophenol	97.190	50	100.0	0	97.2	64	130				
Phenol	32.780	10	100.0	0	32.8	25	50				
Pyrene	110.380	10	100.0	0	110	66	123				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_W_FULL

Sample ID: **LCS-54393** SampType: **LCS** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **3/31/2009** RunNo: **107670**
Client ID: **LCSW** Batch ID: **54393** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **3/31/2009** SeqNo: **1687708**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 1,2-Dichlorobenzene-d4	74.720		100.0		74.7	42	98				
Surr: 2,4,6-Tribromophenol	108.690		100.0		109	60	128				
Surr: 2-Chlorophenol-d4	72.960		100.0		73.0	43	102				
Surr: 2-Fluorobiphenyl	94.820		100.0		94.8	50	108				
Surr: 2-Fluorophenol	44.270		100.0		44.3	22	69				
Surr: 4-Terphenyl-d14	105.040		100.0		105	66	130				
Surr: Nitrobenzene-d5	85.800		100.0		85.8	47	117				
Surr: Phenol-d5	30.610		100.0		30.6	16	50				

Sample ID: **MB-54393MS** SampType: **MS** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **3/31/2009** RunNo: **107670**
Client ID: **ZZZZZZ** Batch ID: **54393** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **3/31/2009** SeqNo: **1687709**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	90.710	10	100.0	0	90.7	54	110				
1,4-Dichlorobenzene	81.780	10	100.0	0	81.8	48	103				
2,4-Dinitrotoluene	114.890	10	100.0	0	115	69	136				
2-Chlorophenol	85.440	10	100.0	0	85.4	53	100				
4-Chloro-3-methylphenol	117.450	50	100.0	0	117	70	124				
4-Nitrophenol	60.050	50	100.0	0	60.1	32	69				
Acenaphthene	111.170	10	100.0	0	111	64	118				
N-Nitrosodi-n-propylamine	102.700	10	100.0	0	103	62	130				
Pentachlorophenol	100.360	50	100.0	0	100	64	130				
Phenol	34.760	10	100.0	0	34.8	25	50				
Pyrene	113.580	10	100.0	0	114	66	123				
Surr: 1,2-Dichlorobenzene-d4	79.480		100.0		79.5	42	98				
Surr: 2,4,6-Tribromophenol	113.340		100.0		113	60	128				
Surr: 2-Chlorophenol-d4	76.960		100.0		77.0	43	102				
Surr: 2-Fluorobiphenyl	98.710		100.0		98.7	50	108				
Surr: 2-Fluorophenol	47.120		100.0		47.1	22	69				
Surr: 4-Terphenyl-d14	108.960		100.0		109	66	130				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 104789
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_W_FULL

Sample ID: **MB-54393MS**	SampType: **MS**	TestCode: **8270_W_FUL**	Units: **µg/L**	Prep Date: **3/31/2009**	RunNo: **107670**
Client ID: **ZZZZZZ**	Batch ID: **54393**	TestNo: **EPA 8270C**	**EPA 3510C**	Analysis Date: **3/31/2009**	SeqNo: **1687709**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	91.500		100.0		91.5	47	117				
Surr: Phenol-d5	31.390		100.0		31.4	16	50				

Sample ID: **MB-54393MSD**	SampType: **MSD**	TestCode: **8270_W_FUL**	Units: **µg/L**	Prep Date: **3/31/2009**	RunNo: **107670**
Client ID: **ZZZZZZ**	Batch ID: **54393**	TestNo: **EPA 8270C**	**EPA 3510C**	Analysis Date: **3/31/2009**	SeqNo: **1687710**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	93.630	10	100.0	0	93.6	54	110	90.71	3.17	20	
1,4-Dichlorobenzene	85.050	10	100.0	0	85.0	48	103	81.78	3.92	20	
2,4-Dinitrotoluene	119.680	10	100.0	0	120	69	136	114.9	4.08	20	
2-Chlorophenol	87.710	10	100.0	0	87.7	53	100	85.44	2.62	20	
4-Chloro-3-methylphenol	120.070	50	100.0	0	120	70	124	117.4	2.21	20	
4-Nitrophenol	62.570	50	100.0	0	62.6	32	69	60.05	4.11	20	
Acenaphthene	115.210	10	100.0	0	115	64	118	111.2	3.57	20	
N-Nitrosodi-n-propylamine	105.590	10	100.0	0	106	62	130	102.7	2.77	20	
Pentachlorophenol	102.230	50	100.0	0	102	64	130	100.4	1.85	20	
Phenol	37.040	10	100.0	0	37.0	25	50	34.76	6.35	20	
Pyrene	116.400	10	100.0	0	116	66	123	113.6	2.45	20	
Surr: 1,2-Dichlorobenzene-d4	82.550		100.0		82.6	42	98		0	0	
Surr: 2,4,6-Tribromophenol	116.160		100.0		116	60	128		0	0	
Surr: 2-Chlorophenol-d4	80.300		100.0		80.3	43	102		0	0	
Surr: 2-Fluorobiphenyl	101.970		100.0		102	50	108		0	0	
Surr: 2-Fluorophenol	49.550		100.0		49.6	22	69		0	0	
Surr: 4-Terphenyl-d14	110.470		100.0		110	66	130		0	0	
Surr: Nitrobenzene-d5	92.710		100.0		92.7	47	117		0	0	
Surr: Phenol-d5	34.360		100.0		34.4	16	50		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CHAIN OF CUSTODY RECORD

Pg 1 of 2

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4040 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#: _____
Logged By: _____ Date: 3/28/09

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: GSO

Sample Condition Upon Receipt
1. CHILLED (12°C) Y☑ N☐ 4. SEALED Y☐ N☐
2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐
3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client: Geocon Consultants
Attn: John Love
Address: 6671 Brisa St.
City Livermore State CA Zip Code 94550
TEL: (925) 371-5900
FAX: (925) 371-5915

Project Name: Caltrans Dumbarton Bridge Project #: E8435-06-18 Sampler: (Printed Name) John Love (Signature)

Relinquished by: (Signature and Printed Name) John Love	Date: 3/27/09	Time: 16:00	Received by: (Signature and Printed Name)	Date: 3/28/09	Time: 0830
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
John Love (Print Name) _____ (Date)
(Signature)

Send Report To:
Attn: _____
Co: same as above
Address _____
City _____ State _____ Zip _____

Bill To:
Attn: _____
Co: same as above
Address _____
City _____ State _____ Zip _____

Special Instructions/Comments:
metals samples were Field filtered
(Gel cleanup (8015B))

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

Circle or Add Analysis(es) Requested

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (SVOCs)	6010B (Total Metal)	8015B (GRO) & TPHmo w/ Silica gel cleanup	8015B (DRO) & TPHmo w/ Silica gel cleanup	8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	TDS	O&G	Cyanide	Dissolved Cyanide	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	104789-01	W20AGW	3/26/09	10:45	X																	E	3	V G	H	
						X																	1	L G		
							X																2	V G	H	
								X															1	L G		
												X											1	P P	N	
													X										1	P P		
														X									1	J G	H	
															X								1	P P	O	
																X							1	P P	O	+AlCl3
	-2	Trip Blank (W20AGW)		16:00	X			X															2	V G	H	

QA/QC: RTNE ☐ CT ☐ SWRCB ☐ Logcode ____ OTHER ____

- TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#: _____

Logged By: _____ Date: 3/27/09

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: GSO

Sample Condition Upon Receipt
1. CHILLED 1.2 Y☑ N☐ 4. SEALED Y☐ N☐
2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐
3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client: Geocon Consultants
Address: 6671 Brisa St.
TEL: (925) 371-5900
Attn: John Love
City Livermore State CA Zip Code 94550
FAX: (925) 371-5915
Project Name: Caltrans Dumbarton Bridge Project #: E8435-06-18 Sampler: (Printed Name) John Love (Signature)

Relinquished by: (Signature and Printed Name)	John Love	Date: 3/27/09	Time: 16:00	Received by: (Signature and Printed Name)		Date: 3/28/09	Time: 0830
Relinquished by: (Signature and Printed Name)		Date:	Time:	Received by: (Signature and Printed Name)		Date:	Time:
Relinquished by: (Signature and Printed Name)		Date:	Time:	Received by: (Signature and Printed Name)		Date:	Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
John Love 3/27/09
Print Name Date
Signature

Send Report To:
Attn: _____
Co: same as above
Address _____
City _____ State _____ Zip _____

Bill To:
Attn: _____
Co: same as above
Address _____
City _____ State _____ Zip _____

Special Instructions/Comments:
Gravel (cleanup (SOILS))

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

Circle or Add Analysis(es) Requested: 8081A (Pesticides) | 8082 (PCB) | 8260B (Volatiles) | 8270C (BNA) | 8010B (Total Metal) | 8015B (GRO) / 8020 (BTEX) | 8015B (DRO) | 8021 (BTEX) | TITLE 22 / CAM 17 (6010 / 7000) | TPHd + TPHmo (w/ Si gel cleanup) | SVOCs (8270C)

SPECIFY APPROPRIATE MATRIX: SOIL | WATER | GROUND WATER | WASTEWATER

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	TAT	Container(s): #	Type	PRESERVATION	REMARKS
	14784 - 3	W20AGW (0')	3/26/09	9:35	E	1	T P		
	4	W20AGW (5')		9:43					
	5	W20AGW (10')		9:50					
	6	W20AGW (15')		10:15					
	7	FW3 (0')		11:15		1	T M		Stainless steel tube
	8	FW3 (2')		11:20					
	9	FW4 (0')		11:25					
	10	FW4 (2')		11:35					
	11	FW5 (0')		11:45					
	12	FW5 (2')		11:55					

QA / QC: RTNE ☐ CT ☐ SWRCB ☐ Logcode ____ OTHER ____

• TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=Hcl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

June 19, 2009

John Love
Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550

TEL: (925) 525-4142
FAX: (925) 371-5915

ELAP No.: 1838
NELAP No.: 02107CA
NEVADA.: CA-401
CSDLAC No.: 10196

Workorder No.: 105905

RE: Caltrans Dumbarton Bridge, E8435-06-18

Attention: John Love

Enclosed are the results for sample(s) received on June 12, 2009 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter and the case narrative are an integral part of this analytical report and cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

CLIENT: Geocon Consultants, Inc.
Project: Caltrans Dumbarton Bridge, E8435-06-18
Lab Order: 105905

CASE NARRATIVE

Analytical Comments for Method 6010

Matrix Spike (MS) and /or Matrix Spike Duplicate (MSD) are/is outside recovery criteria for sample 105905-013BMS; however, the analytical batch was validated by the Laboratory Control Sample (LCS).

RPD for Duplicate (DUP and/or Matrix Spike (MS)/Matrix Spike Duplicate (MSD) is outside criteria for samples 105905-011ADUP, 105905-013BDUP and 105905-013BMSD; however, the analytical batch was validated by the Laboratory Control Sample (LCS).

Analytical Comments for Method 8015 (DRO/ORO)

Dilution was necessary for samples 105905-004A and 105905-007A, due to sample matrix.

Surrogate recovery was diluted out for samples 105905-004A, 105905-004AMS, 105905-004AMSD, 105905-007A, 105905-007ADUP, 105905-007AMS, 105905-007AMSD and 105905-008A

Matrix Spike (MS) and /or Matrix Spike Duplicate (MSD) are/is outside recovery criteria for samples 105905-007AMS and 105905-007AMSD; however, the analytical batch was validated by the Laboratory Control Sample (LCS).

RPD for Duplicate (DUP) is outside criteria for samples 105905-001ADUP and 105905-007ADUP; however, the Laboratory Control Sample (LCS) validated the analytical batch.

Analytical Comments for Method 8270

Dilution was necessary for samples 105905-004A, 105905-007A and 105905-008A, due to sample matrix.

Matrix Spike (MS) and /or Matrix Spike Duplicate (MSD) are/is outside recovery criteria for sample 105905-001AMSD; however, the analytical batch was validated by the Laboratory Control Sample (LCS).

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT: Geocon Consultants, Inc. **Client Sample ID:** PP3 (0')
Lab Order: 105905 **Collection Date:** 6/11/2009 9:45:00 AM
Project: Caltrans Dumbarton Bridge, E8435-06-18 **Matrix:** SOIL
Lab ID: 105905-001A

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090618B	QC Batch: 55967			PrepDate:	6/17/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	6/18/2009 12:14 PM
Arsenic	5.7	1.0		mg/Kg	1	6/18/2009 12:14 PM
Barium	110	1.0		mg/Kg	1	6/18/2009 12:14 PM
Beryllium	ND	1.0		mg/Kg	1	6/18/2009 12:14 PM
Cadmium	ND	1.0		mg/Kg	1	6/18/2009 12:14 PM
Chromium	52	1.0		mg/Kg	1	6/18/2009 12:14 PM
Cobalt	12	1.0		mg/Kg	1	6/18/2009 12:14 PM
Copper	30	2.0		mg/Kg	1	6/18/2009 12:14 PM
Lead	12	1.0		mg/Kg	1	6/18/2009 12:14 PM
Molybdenum	ND	1.0		mg/Kg	1	6/18/2009 12:14 PM
Nickel	63	1.0		mg/Kg	1	6/18/2009 12:14 PM
Selenium	ND	1.0		mg/Kg	1	6/18/2009 12:14 PM
Silver	ND	1.0		mg/Kg	1	6/18/2009 12:14 PM
Thallium	ND	1.0		mg/Kg	1	6/18/2009 12:14 PM
Vanadium	44	1.0		mg/Kg	1	6/18/2009 12:14 PM
Zinc	56	1.0		mg/Kg	1	6/18/2009 12:14 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC8_BACK_090618A	QC Batch: 55984			PrepDate:	6/17/2009	Analyst: **SMH**
DRO	ND	1.0		mg/Kg	1	6/18/2009 05:53 PM
ORO	2.2	1.0		mg/Kg	1	6/18/2009 05:53 PM
Surr: p-Terphenyl	70.8	30-130		%REC	1	6/18/2009 05:53 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA5_090617C	QC Batch: 55965			PrepDate:	6/17/2009	Analyst: **IL**
Mercury	0.25	0.10		mg/Kg	1	6/17/2009 03:50 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090615A	QC Batch: 55905			PrepDate:	6/15/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	6/15/2009 06:44 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	6/15/2009 06:44 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	6/15/2009 06:44 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	6/15/2009 06:44 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	PP3 (0')
Lab Order:	105905	**Collection Date:**	6/11/2009 9:45:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	105905-001A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090615A QC Batch: 55905 PrepDate: 6/15/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	6/15/2009 06:44 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	6/15/2009 06:44 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	6/15/2009 06:44 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	6/15/2009 06:44 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	6/15/2009 06:44 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	6/15/2009 06:44 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	6/15/2009 06:44 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	6/15/2009 06:44 PM
2-Chlorophenol	ND	330		µg/Kg	1	6/15/2009 06:44 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	6/15/2009 06:44 PM
2-Methylphenol	ND	330		µg/Kg	1	6/15/2009 06:44 PM
2-Nitroaniline	ND	1600		µg/Kg	1	6/15/2009 06:44 PM
2-Nitrophenol	ND	330		µg/Kg	1	6/15/2009 06:44 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	6/15/2009 06:44 PM
3-Nitroaniline	ND	1600		µg/Kg	1	6/15/2009 06:44 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	6/15/2009 06:44 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	6/15/2009 06:44 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	6/15/2009 06:44 PM
4-Chloroaniline	ND	660		µg/Kg	1	6/15/2009 06:44 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	6/15/2009 06:44 PM
4-Methylphenol	ND	330		µg/Kg	1	6/15/2009 06:44 PM
4-Nitroaniline	ND	1600		µg/Kg	1	6/15/2009 06:44 PM
4-Nitrophenol	ND	1600		µg/Kg	1	6/15/2009 06:44 PM
Acenaphthene	ND	330		µg/Kg	1	6/15/2009 06:44 PM
Acenaphthylene	ND	330		µg/Kg	1	6/15/2009 06:44 PM
Anthracene	ND	330		µg/Kg	1	6/15/2009 06:44 PM
Benzidine (M)	ND	1600		µg/Kg	1	6/15/2009 06:44 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	6/15/2009 06:44 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	6/15/2009 06:44 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	6/15/2009 06:44 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	6/15/2009 06:44 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	6/15/2009 06:44 PM
Benzoic acid	ND	1600		µg/Kg	1	6/15/2009 06:44 PM
Benzyl alcohol	ND	660		µg/Kg	1	6/15/2009 06:44 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	6/15/2009 06:44 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	PP3 (0')
Lab Order:	105905	**Collection Date:**	6/11/2009 9:45:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	105905-001A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090615A QC Batch: 55905 PrepDate: 6/15/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	6/15/2009 06:44 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	6/15/2009 06:44 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	6/15/2009 06:44 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	6/15/2009 06:44 PM
Chrysene	ND	330		µg/Kg	1	6/15/2009 06:44 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	6/15/2009 06:44 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	6/15/2009 06:44 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	6/15/2009 06:44 PM
Dibenzofuran	ND	330		µg/Kg	1	6/15/2009 06:44 PM
Diethylphthalate	ND	330		µg/Kg	1	6/15/2009 06:44 PM
Dimethylphthalate	ND	330		µg/Kg	1	6/15/2009 06:44 PM
Fluoranthene	ND	330		µg/Kg	1	6/15/2009 06:44 PM
Fluorene	ND	330		µg/Kg	1	6/15/2009 06:44 PM
Hexachlorobenzene	ND	330		µg/Kg	1	6/15/2009 06:44 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	6/15/2009 06:44 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	6/15/2009 06:44 PM
Hexachloroethane	ND	330		µg/Kg	1	6/15/2009 06:44 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	6/15/2009 06:44 PM
Isophorone	ND	330		µg/Kg	1	6/15/2009 06:44 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	6/15/2009 06:44 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	6/15/2009 06:44 PM
Naphthalene	ND	330		µg/Kg	1	6/15/2009 06:44 PM
Nitrobenzene	ND	330		µg/Kg	1	6/15/2009 06:44 PM
Pentachlorophenol	ND	1600		µg/Kg	1	6/15/2009 06:44 PM
Phenanthrene	ND	330		µg/Kg	1	6/15/2009 06:44 PM
Phenol	ND	330		µg/Kg	1	6/15/2009 06:44 PM
Pyrene	ND	330		µg/Kg	1	6/15/2009 06:44 PM
Surr: 1,2-Dichlorobenzene-d4	74.9	49-103		%REC	1	6/15/2009 06:44 PM
Surr: 2,4,6-Tribromophenol	109	47-129		%REC	1	6/15/2009 06:44 PM
Surr: 2-Chlorophenol-d4	83.6	54-109		%REC	1	6/15/2009 06:44 PM
Surr: 2-Fluorobiphenyl	87.5	59-108		%REC	1	6/15/2009 06:44 PM
Surr: 2-Fluorophenol	77.9	50-111		%REC	1	6/15/2009 06:44 PM
Surr: 4-Terphenyl-d14	101	58-135		%REC	1	6/15/2009 06:44 PM
Surr: Nitrobenzene-d5	89.2	54-115		%REC	1	6/15/2009 06:44 PM
Surr: Phenol-d5	86.6	58-112		%REC	1	6/15/2009 06:44 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT: Geocon Consultants, Inc. **Client Sample ID:** PP3 (5')
Lab Order: 105905 **Collection Date:** 6/11/2009 9:50:00 AM
Project: Caltrans Dumbarton Bridge, E8435-06-18 **Matrix:** SOIL
Lab ID: 105905-002A

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090618B	QC Batch: 55967			PrepDate: 6/17/2009	Analyst: **CL**	
Antimony	ND	2.0		mg/Kg	1	6/18/2009 12:25 PM
Arsenic	3.8	1.0		mg/Kg	1	6/18/2009 12:25 PM
Barium	68	1.0		mg/Kg	1	6/18/2009 12:25 PM
Beryllium	ND	1.0		mg/Kg	1	6/18/2009 12:25 PM
Cadmium	ND	1.0		mg/Kg	1	6/18/2009 12:25 PM
Chromium	43	1.0		mg/Kg	1	6/18/2009 12:25 PM
Cobalt	7.6	1.0		mg/Kg	1	6/18/2009 12:25 PM
Copper	21	2.0		mg/Kg	1	6/18/2009 12:25 PM
Lead	9.0	1.0		mg/Kg	1	6/18/2009 12:25 PM
Molybdenum	ND	1.0		mg/Kg	1	6/18/2009 12:25 PM
Nickel	42	1.0		mg/Kg	1	6/18/2009 12:25 PM
Selenium	ND	1.0		mg/Kg	1	6/18/2009 12:25 PM
Silver	ND	1.0		mg/Kg	1	6/18/2009 12:25 PM
Thallium	ND	1.0		mg/Kg	1	6/18/2009 12:25 PM
Vanadium	37	1.0		mg/Kg	1	6/18/2009 12:25 PM
Zinc	46	1.0		mg/Kg	1	6/18/2009 12:25 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC8_BACK_090618A	QC Batch: 55984			PrepDate: 6/17/2009	Analyst: **SMH**	
DRO	ND	1.0		mg/Kg	1	6/18/2009 06:49 PM
ORO	2.3	1.0		mg/Kg	1	6/18/2009 06:49 PM
Surr: p-Terphenyl	56.8	30-130		%REC	1	6/18/2009 06:49 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA5_090617C	QC Batch: 55965			PrepDate: 6/17/2009	Analyst: **IL**	
Mercury	ND	0.10		mg/Kg	1	6/17/2009 03:52 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090615A	QC Batch: 55905			PrepDate: 6/15/2009	Analyst: **DMP**	
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	6/16/2009 08:37 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	6/16/2009 08:37 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	6/16/2009 08:37 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	6/16/2009 08:37 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	PP3 (5')
Lab Order:	105905	**Collection Date:**	6/11/2009 9:50:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	105905-002A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090615A QC Batch: 55905 PrepDate: 6/15/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	6/16/2009 08:37 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	6/16/2009 08:37 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	6/16/2009 08:37 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	6/16/2009 08:37 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	6/16/2009 08:37 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	6/16/2009 08:37 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	6/16/2009 08:37 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	6/16/2009 08:37 PM
2-Chlorophenol	ND	330		µg/Kg	1	6/16/2009 08:37 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	6/16/2009 08:37 PM
2-Methylphenol	ND	330		µg/Kg	1	6/16/2009 08:37 PM
2-Nitroaniline	ND	1600		µg/Kg	1	6/16/2009 08:37 PM
2-Nitrophenol	ND	330		µg/Kg	1	6/16/2009 08:37 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	6/16/2009 08:37 PM
3-Nitroaniline	ND	1600		µg/Kg	1	6/16/2009 08:37 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	6/16/2009 08:37 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	6/16/2009 08:37 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	6/16/2009 08:37 PM
4-Chloroaniline	ND	660		µg/Kg	1	6/16/2009 08:37 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	6/16/2009 08:37 PM
4-Methylphenol	ND	330		µg/Kg	1	6/16/2009 08:37 PM
4-Nitroaniline	ND	1600		µg/Kg	1	6/16/2009 08:37 PM
4-Nitrophenol	ND	1600		µg/Kg	1	6/16/2009 08:37 PM
Acenaphthene	ND	330		µg/Kg	1	6/16/2009 08:37 PM
Acenaphthylene	ND	330		µg/Kg	1	6/16/2009 08:37 PM
Anthracene	ND	330		µg/Kg	1	6/16/2009 08:37 PM
Benzidine (M)	ND	1600		µg/Kg	1	6/16/2009 08:37 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	6/16/2009 08:37 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	6/16/2009 08:37 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	6/16/2009 08:37 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	6/16/2009 08:37 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	6/16/2009 08:37 PM
Benzoic acid	ND	1600		µg/Kg	1	6/16/2009 08:37 PM
Benzyl alcohol	ND	660		µg/Kg	1	6/16/2009 08:37 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	6/16/2009 08:37 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	PP3 (5')
Lab Order:	105905	**Collection Date:**	6/11/2009 9:50:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	105905-002A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090615A QC Batch: 55905 PrepDate: 6/15/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	6/16/2009 08:37 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	6/16/2009 08:37 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	6/16/2009 08:37 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	6/16/2009 08:37 PM
Chrysene	ND	330		µg/Kg	1	6/16/2009 08:37 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	6/16/2009 08:37 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	6/16/2009 08:37 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	6/16/2009 08:37 PM
Dibenzofuran	ND	330		µg/Kg	1	6/16/2009 08:37 PM
Diethylphthalate	ND	330		µg/Kg	1	6/16/2009 08:37 PM
Dimethylphthalate	ND	330		µg/Kg	1	6/16/2009 08:37 PM
Fluoranthene	ND	330		µg/Kg	1	6/16/2009 08:37 PM
Fluorene	ND	330		µg/Kg	1	6/16/2009 08:37 PM
Hexachlorobenzene	ND	330		µg/Kg	1	6/16/2009 08:37 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	6/16/2009 08:37 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	6/16/2009 08:37 PM
Hexachloroethane	ND	330		µg/Kg	1	6/16/2009 08:37 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	6/16/2009 08:37 PM
Isophorone	ND	330		µg/Kg	1	6/16/2009 08:37 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	6/16/2009 08:37 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	6/16/2009 08:37 PM
Naphthalene	ND	330		µg/Kg	1	6/16/2009 08:37 PM
Nitrobenzene	ND	330		µg/Kg	1	6/16/2009 08:37 PM
Pentachlorophenol	ND	1600		µg/Kg	1	6/16/2009 08:37 PM
Phenanthrene	ND	330		µg/Kg	1	6/16/2009 08:37 PM
Phenol	ND	330		µg/Kg	1	6/16/2009 08:37 PM
Pyrene	ND	330		µg/Kg	1	6/16/2009 08:37 PM
Surr: 1,2-Dichlorobenzene-d4	70.5	49-103		%REC	1	6/16/2009 08:37 PM
Surr: 2,4,6-Tribromophenol	93.7	47-129		%REC	1	6/16/2009 08:37 PM
Surr: 2-Chlorophenol-d4	81.3	54-109		%REC	1	6/16/2009 08:37 PM
Surr: 2-Fluorobiphenyl	85.9	59-108		%REC	1	6/16/2009 08:37 PM
Surr: 2-Fluorophenol	76.0	50-111		%REC	1	6/16/2009 08:37 PM
Surr: 4-Terphenyl-d14	95.4	58-135		%REC	1	6/16/2009 08:37 PM
Surr: Nitrobenzene-d5	81.9	54-115		%REC	1	6/16/2009 08:37 PM
Surr: Phenol-d5	85.0	58-112		%REC	1	6/16/2009 08:37 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT: Geocon Consultants, Inc. **Client Sample ID:** PP3 (10')
Lab Order: 105905 **Collection Date:** 6/11/2009 9:55:00 AM
Project: Caltrans Dumbarton Bridge, E8435-06-18 **Matrix:** SOIL
Lab ID: 105905-003A

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090618B	QC Batch: 55967			PrepDate: 6/17/2009	Analyst: **CL**	
Antimony	ND	2.0		mg/Kg	1	6/18/2009 12:28 PM
Arsenic	3.0	1.0		mg/Kg	1	6/18/2009 12:28 PM
Barium	23	1.0		mg/Kg	1	6/18/2009 12:28 PM
Beryllium	ND	1.0		mg/Kg	1	6/18/2009 12:28 PM
Cadmium	ND	1.0		mg/Kg	1	6/18/2009 12:28 PM
Chromium	39	1.0		mg/Kg	1	6/18/2009 12:28 PM
Cobalt	6.6	1.0		mg/Kg	1	6/18/2009 12:28 PM
Copper	20	2.0		mg/Kg	1	6/18/2009 12:28 PM
Lead	13	1.0		mg/Kg	1	6/18/2009 12:28 PM
Molybdenum	ND	1.0		mg/Kg	1	6/18/2009 12:28 PM
Nickel	40	1.0		mg/Kg	1	6/18/2009 12:28 PM
Selenium	ND	1.0		mg/Kg	1	6/18/2009 12:28 PM
Silver	ND	1.0		mg/Kg	1	6/18/2009 12:28 PM
Thallium	ND	1.0		mg/Kg	1	6/18/2009 12:28 PM
Vanadium	36	1.0		mg/Kg	1	6/18/2009 12:28 PM
Zinc	53	1.0		mg/Kg	1	6/18/2009 12:28 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC8_BACK_090618A	QC Batch: 55984			PrepDate: 6/17/2009	Analyst: **SMH**	
DRO	ND	1.0		mg/Kg	1	6/18/2009 07:16 PM
ORO	ND	1.0		mg/Kg	1	6/18/2009 07:16 PM
Surr: p-Terphenyl	66.2	30-130		%REC	1	6/18/2009 07:16 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA5_090617C	QC Batch: 55965			PrepDate: 6/17/2009	Analyst: **IL**	
Mercury	0.26	0.10		mg/Kg	1	6/17/2009 03:54 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090616B	QC Batch: 55929			PrepDate: 6/15/2009	Analyst: **DMP**	
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	6/16/2009 10:58 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	6/16/2009 10:58 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	6/16/2009 10:58 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	6/16/2009 10:58 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	PP3 (10')
Lab Order:	105905	**Collection Date:**	6/11/2009 9:55:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	105905-003A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090616B QC Batch: 55929 PrepDate: 6/15/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	6/16/2009 10:58 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	6/16/2009 10:58 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	6/16/2009 10:58 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	6/16/2009 10:58 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	6/16/2009 10:58 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	6/16/2009 10:58 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	6/16/2009 10:58 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	6/16/2009 10:58 PM
2-Chlorophenol	ND	330		µg/Kg	1	6/16/2009 10:58 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	6/16/2009 10:58 PM
2-Methylphenol	ND	330		µg/Kg	1	6/16/2009 10:58 PM
2-Nitroaniline	ND	1600		µg/Kg	1	6/16/2009 10:58 PM
2-Nitrophenol	ND	330		µg/Kg	1	6/16/2009 10:58 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	6/16/2009 10:58 PM
3-Nitroaniline	ND	1600		µg/Kg	1	6/16/2009 10:58 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	6/16/2009 10:58 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	6/16/2009 10:58 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	6/16/2009 10:58 PM
4-Chloroaniline	ND	660		µg/Kg	1	6/16/2009 10:58 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	6/16/2009 10:58 PM
4-Methylphenol	ND	330		µg/Kg	1	6/16/2009 10:58 PM
4-Nitroaniline	ND	1600		µg/Kg	1	6/16/2009 10:58 PM
4-Nitrophenol	ND	1600		µg/Kg	1	6/16/2009 10:58 PM
Acenaphthene	ND	330		µg/Kg	1	6/16/2009 10:58 PM
Acenaphthylene	ND	330		µg/Kg	1	6/16/2009 10:58 PM
Anthracene	ND	330		µg/Kg	1	6/16/2009 10:58 PM
Benzidine (M)	ND	1600		µg/Kg	1	6/16/2009 10:58 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	6/16/2009 10:58 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	6/16/2009 10:58 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	6/16/2009 10:58 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	6/16/2009 10:58 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	6/16/2009 10:58 PM
Benzoic acid	ND	1600		µg/Kg	1	6/16/2009 10:58 PM
Benzyl alcohol	ND	660		µg/Kg	1	6/16/2009 10:58 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	6/16/2009 10:58 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	PP3 (10')
Lab Order:	105905	**Collection Date:**	6/11/2009 9:55:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	105905-003A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090616B QC Batch: 55929 PrepDate: 6/15/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	6/16/2009 10:58 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	6/16/2009 10:58 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	6/16/2009 10:58 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	6/16/2009 10:58 PM
Chrysene	ND	330		µg/Kg	1	6/16/2009 10:58 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	6/16/2009 10:58 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	6/16/2009 10:58 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	6/16/2009 10:58 PM
Dibenzofuran	ND	330		µg/Kg	1	6/16/2009 10:58 PM
Diethylphthalate	ND	330		µg/Kg	1	6/16/2009 10:58 PM
Dimethylphthalate	ND	330		µg/Kg	1	6/16/2009 10:58 PM
Fluoranthene	ND	330		µg/Kg	1	6/16/2009 10:58 PM
Fluorene	ND	330		µg/Kg	1	6/16/2009 10:58 PM
Hexachlorobenzene	ND	330		µg/Kg	1	6/16/2009 10:58 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	6/16/2009 10:58 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	6/16/2009 10:58 PM
Hexachloroethane	ND	330		µg/Kg	1	6/16/2009 10:58 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	6/16/2009 10:58 PM
Isophorone	ND	330		µg/Kg	1	6/16/2009 10:58 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	6/16/2009 10:58 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	6/16/2009 10:58 PM
Naphthalene	ND	330		µg/Kg	1	6/16/2009 10:58 PM
Nitrobenzene	ND	330		µg/Kg	1	6/16/2009 10:58 PM
Pentachlorophenol	ND	1600		µg/Kg	1	6/16/2009 10:58 PM
Phenanthrene	ND	330		µg/Kg	1	6/16/2009 10:58 PM
Phenol	ND	330		µg/Kg	1	6/16/2009 10:58 PM
Pyrene	ND	330		µg/Kg	1	6/16/2009 10:58 PM
Surr: 1,2-Dichlorobenzene-d4	72.2	49-103		%REC	1	6/16/2009 10:58 PM
Surr: 2,4,6-Tribromophenol	86.5	47-129		%REC	1	6/16/2009 10:58 PM
Surr: 2-Chlorophenol-d4	80.2	54-109		%REC	1	6/16/2009 10:58 PM
Surr: 2-Fluorobiphenyl	76.0	59-108		%REC	1	6/16/2009 10:58 PM
Surr: 2-Fluorophenol	78.5	50-111		%REC	1	6/16/2009 10:58 PM
Surr: 4-Terphenyl-d14	94.6	58-135		%REC	1	6/16/2009 10:58 PM
Surr: Nitrobenzene-d5	79.0	54-115		%REC	1	6/16/2009 10:58 PM
Surr: Phenol-d5	81.7	58-112		%REC	1	6/16/2009 10:58 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	PP1 (0')
Lab Order:	105905	**Collection Date:**	6/11/2009 10:05:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	105905-004A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
EPA 3050B				**EPA 6010B**		
RunID: ICP8_090618B	QC Batch: 55967			PrepDate:	6/17/2009	Analyst: **CL**
Antimony	ND	2.0		mg/Kg	1	6/18/2009 12:31 PM
Arsenic	2.6	1.0		mg/Kg	1	6/18/2009 12:31 PM
Barium	120	1.0		mg/Kg	1	6/18/2009 12:31 PM
Beryllium	ND	1.0		mg/Kg	1	6/18/2009 12:31 PM
Cadmium	ND	1.0		mg/Kg	1	6/18/2009 12:31 PM
Chromium	54	1.0		mg/Kg	1	6/18/2009 12:31 PM
Cobalt	13	1.0		mg/Kg	1	6/18/2009 12:31 PM
Copper	32	2.0		mg/Kg	1	6/18/2009 12:31 PM
Lead	7.4	1.0		mg/Kg	1	6/18/2009 12:31 PM
Molybdenum	ND	1.0		mg/Kg	1	6/18/2009 12:31 PM
Nickel	65	1.0		mg/Kg	1	6/18/2009 12:31 PM
Selenium	ND	1.0		mg/Kg	1	6/18/2009 12:31 PM
Silver	ND	1.0		mg/Kg	1	6/18/2009 12:31 PM
Thallium	ND	1.0		mg/Kg	1	6/18/2009 12:31 PM
Vanadium	47	1.0		mg/Kg	1	6/18/2009 12:31 PM
Zinc	48	1.0		mg/Kg	1	6/18/2009 12:31 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
EPA 3550B				**EPA 8015B(M)**		
RunID: GC8_BACK_090618A	QC Batch: 55984			PrepDate:	6/17/2009	Analyst: **SMH**
DRO	72	10		mg/Kg	10	6/18/2009 11:20 PM
ORO	300	10		mg/Kg	10	6/18/2009 11:20 PM
Surr: p-Terphenyl	0	30-130	SDO	%REC	10	6/18/2009 11:20 PM
MERCURY BY COLD VAPOR TECHNIQUE						
EPA 7471A						
RunID: AA5_090617C	QC Batch: 55965			PrepDate:	6/17/2009	Analyst: **IL**
Mercury	0.16	0.10		mg/Kg	1	6/17/2009 04:00 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 3550B				**EPA 8270C**		
RunID: MS 13_090616B	QC Batch: 55929			PrepDate:	6/15/2009	Analyst: **DMP**
1,2,4-Trichlorobenzene	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
1,2-Dichlorobenzene	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
1,3-Dichlorobenzene	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
1,4-Dichlorobenzene	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	PP1 (0')
Lab Order:	105905	**Collection Date:**	6/11/2009 10:05:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	105905-004A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090616B QC Batch: 55929 PrepDate: 6/15/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
2,4,6-Trichlorophenol	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
2,4-Dichlorophenol	ND	4100		µg/Kg	2.5	6/17/2009 01:49 AM
2,4-Dimethylphenol	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
2,4-Dinitrophenol	ND	4100		µg/Kg	2.5	6/17/2009 01:49 AM
2,4-Dinitrotoluene	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
2,6-Dinitrotoluene	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
2-Chloronaphthalene	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
2-Chlorophenol	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
2-Methylnaphthalene	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
2-Methylphenol	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
2-Nitroaniline	ND	4100		µg/Kg	2.5	6/17/2009 01:49 AM
2-Nitrophenol	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
3,3´-Dichlorobenzidine	ND	1600		µg/Kg	2.5	6/17/2009 01:49 AM
3-Nitroaniline	ND	4100		µg/Kg	2.5	6/17/2009 01:49 AM
4,6-Dinitro-2-methylphenol	ND	4100		µg/Kg	2.5	6/17/2009 01:49 AM
4-Bromophenyl-phenylether	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
4-Chloro-3-methylphenol	ND	1600		µg/Kg	2.5	6/17/2009 01:49 AM
4-Chloroaniline	ND	1600		µg/Kg	2.5	6/17/2009 01:49 AM
4-Chlorophenyl-phenylether	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
4-Methylphenol	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
4-Nitroaniline	ND	4100		µg/Kg	2.5	6/17/2009 01:49 AM
4-Nitrophenol	ND	4100		µg/Kg	2.5	6/17/2009 01:49 AM
Acenaphthene	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
Acenaphthylene	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
Anthracene	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
Benzidine (M)	ND	4100		µg/Kg	2.5	6/17/2009 01:49 AM
Benzo(a)anthracene	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
Benzo(a)pyrene	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
Benzo(b)fluoranthene	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
Benzo(g,h,i)perylene	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
Benzo(k)fluoranthene	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
Benzoic acid	ND	4100		µg/Kg	2.5	6/17/2009 01:49 AM
Benzyl alcohol	ND	1600		µg/Kg	2.5	6/17/2009 01:49 AM
Bis(2-chloroethoxy)methane	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	PP1 (0')
Lab Order:	105905	**Collection Date:**	6/11/2009 10:05:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	105905-004A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090616B QC Batch: 55929 PrepDate: 6/15/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
Bis(2-chloroisopropyl)ether	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
Bis(2-ethylhexyl)phthalate	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
Butylbenzylphthalate	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
Chrysene	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
Di-n-butylphthalate	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
Di-n-octylphthalate	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
Dibenz(a,h)anthracene	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
Dibenzofuran	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
Diethylphthalate	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
Dimethylphthalate	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
Fluoranthene	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
Fluorene	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
Hexachlorobenzene	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
Hexachlorobutadiene	ND	1600		µg/Kg	2.5	6/17/2009 01:49 AM
Hexachlorocyclopentadiene	ND	1600		µg/Kg	2.5	6/17/2009 01:49 AM
Hexachloroethane	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
Indeno(1,2,3-cd)pyrene	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
Isophorone	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
N-Nitrosodi-n-propylamine	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
N-Nitrosodiphenylamine	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
Naphthalene	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
Nitrobenzene	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
Pentachlorophenol	ND	4100		µg/Kg	2.5	6/17/2009 01:49 AM
Phenanthrene	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
Phenol	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
Pyrene	ND	820		µg/Kg	2.5	6/17/2009 01:49 AM
Surr: 1,2-Dichlorobenzene-d4	74.0	49-103		%REC	2.5	6/17/2009 01:49 AM
Surr: 2,4,6-Tribromophenol	85.1	47-129		%REC	2.5	6/17/2009 01:49 AM
Surr: 2-Chlorophenol-d4	82.4	54-109		%REC	2.5	6/17/2009 01:49 AM
Surr: 2-Fluorobiphenyl	85.3	59-108		%REC	2.5	6/17/2009 01:49 AM
Surr: 2-Fluorophenol	82.4	50-111		%REC	2.5	6/17/2009 01:49 AM
Surr: 4-Terphenyl-d14	90.9	58-135		%REC	2.5	6/17/2009 01:49 AM
Surr: Nitrobenzene-d5	82.7	54-115		%REC	2.5	6/17/2009 01:49 AM
Surr: Phenol-d5	84.6	58-112		%REC	2.5	6/17/2009 01:49 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Geocon Consultants, Inc. **Client Sample ID:** PP1 (5')
Lab Order: 105905 **Collection Date:** 6/11/2009 10:10:00 AM
Project: Caltrans Dumbarton Bridge, E8435-06-18 **Matrix:** SOIL
Lab ID: 105905-005A

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090618B	QC Batch: 55967			PrepDate: 6/17/2009	Analyst: **CL**	
Antimony	ND	2.0		mg/Kg	1	6/18/2009 12:34 PM
Arsenic	3.4	1.0		mg/Kg	1	6/18/2009 12:34 PM
Barium	26	1.0		mg/Kg	1	6/18/2009 12:34 PM
Beryllium	ND	1.0		mg/Kg	1	6/18/2009 12:34 PM
Cadmium	ND	1.0		mg/Kg	1	6/18/2009 12:34 PM
Chromium	42	1.0		mg/Kg	1	6/18/2009 12:34 PM
Cobalt	5.0	1.0		mg/Kg	1	6/18/2009 12:34 PM
Copper	18	2.0		mg/Kg	1	6/18/2009 12:34 PM
Lead	6.7	1.0		mg/Kg	1	6/18/2009 12:34 PM
Molybdenum	ND	1.0		mg/Kg	1	6/18/2009 12:34 PM
Nickel	39	1.0		mg/Kg	1	6/18/2009 12:34 PM
Selenium	ND	1.0		mg/Kg	1	6/18/2009 12:34 PM
Silver	ND	1.0		mg/Kg	1	6/18/2009 12:34 PM
Thallium	ND	1.0		mg/Kg	1	6/18/2009 12:34 PM
Vanadium	36	1.0		mg/Kg	1	6/18/2009 12:34 PM
Zinc	46	1.0		mg/Kg	1	6/18/2009 12:34 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC8_BACK_090618A	QC Batch: 55984			PrepDate: 6/17/2009	Analyst: **SMH**	
DRO	ND	1.0		mg/Kg	1	6/18/2009 07:43 PM
ORO	2.2	1.0		mg/Kg	1	6/18/2009 07:43 PM
Surr: p-Terphenyl	62.8	30-130		%REC	1	6/18/2009 07:43 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA5_090617C	QC Batch: 55965			PrepDate: 6/17/2009	Analyst: **IL**	
Mercury	0.18	0.10		mg/Kg	1	6/17/2009 04:02 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090616B	QC Batch: 55929			PrepDate: 6/15/2009	Analyst: **DMP**	
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	6/16/2009 11:27 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	6/16/2009 11:27 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	6/16/2009 11:27 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	6/16/2009 11:27 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	PP1 (5')
Lab Order:	105905	**Collection Date:**	6/11/2009 10:10:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	105905-005A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090616B QC Batch: 55929 PrepDate: 6/15/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	6/16/2009 11:27 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	6/16/2009 11:27 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	6/16/2009 11:27 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	6/16/2009 11:27 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	6/16/2009 11:27 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	6/16/2009 11:27 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	6/16/2009 11:27 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	6/16/2009 11:27 PM
2-Chlorophenol	ND	330		µg/Kg	1	6/16/2009 11:27 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	6/16/2009 11:27 PM
2-Methylphenol	ND	330		µg/Kg	1	6/16/2009 11:27 PM
2-Nitroaniline	ND	1600		µg/Kg	1	6/16/2009 11:27 PM
2-Nitrophenol	ND	330		µg/Kg	1	6/16/2009 11:27 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	6/16/2009 11:27 PM
3-Nitroaniline	ND	1600		µg/Kg	1	6/16/2009 11:27 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	6/16/2009 11:27 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	6/16/2009 11:27 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	6/16/2009 11:27 PM
4-Chloroaniline	ND	660		µg/Kg	1	6/16/2009 11:27 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	6/16/2009 11:27 PM
4-Methylphenol	ND	330		µg/Kg	1	6/16/2009 11:27 PM
4-Nitroaniline	ND	1600		µg/Kg	1	6/16/2009 11:27 PM
4-Nitrophenol	ND	1600		µg/Kg	1	6/16/2009 11:27 PM
Acenaphthene	ND	330		µg/Kg	1	6/16/2009 11:27 PM
Acenaphthylene	ND	330		µg/Kg	1	6/16/2009 11:27 PM
Anthracene	ND	330		µg/Kg	1	6/16/2009 11:27 PM
Benzidine (M)	ND	1600		µg/Kg	1	6/16/2009 11:27 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	6/16/2009 11:27 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	6/16/2009 11:27 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	6/16/2009 11:27 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	6/16/2009 11:27 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	6/16/2009 11:27 PM
Benzoic acid	ND	1600		µg/Kg	1	6/16/2009 11:27 PM
Benzyl alcohol	ND	660		µg/Kg	1	6/16/2009 11:27 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	6/16/2009 11:27 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	PP1 (5')
Lab Order:	105905	**Collection Date:**	6/11/2009 10:10:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	105905-005A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090616B QC Batch: 55929 PrepDate: 6/15/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	6/16/2009 11:27 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	6/16/2009 11:27 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	6/16/2009 11:27 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	6/16/2009 11:27 PM
Chrysene	ND	330		µg/Kg	1	6/16/2009 11:27 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	6/16/2009 11:27 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	6/16/2009 11:27 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	6/16/2009 11:27 PM
Dibenzofuran	ND	330		µg/Kg	1	6/16/2009 11:27 PM
Diethylphthalate	ND	330		µg/Kg	1	6/16/2009 11:27 PM
Dimethylphthalate	ND	330		µg/Kg	1	6/16/2009 11:27 PM
Fluoranthene	ND	330		µg/Kg	1	6/16/2009 11:27 PM
Fluorene	ND	330		µg/Kg	1	6/16/2009 11:27 PM
Hexachlorobenzene	ND	330		µg/Kg	1	6/16/2009 11:27 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	6/16/2009 11:27 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	6/16/2009 11:27 PM
Hexachloroethane	ND	330		µg/Kg	1	6/16/2009 11:27 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	6/16/2009 11:27 PM
Isophorone	ND	330		µg/Kg	1	6/16/2009 11:27 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	6/16/2009 11:27 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	6/16/2009 11:27 PM
Naphthalene	ND	330		µg/Kg	1	6/16/2009 11:27 PM
Nitrobenzene	ND	330		µg/Kg	1	6/16/2009 11:27 PM
Pentachlorophenol	ND	1600		µg/Kg	1	6/16/2009 11:27 PM
Phenanthrene	ND	330		µg/Kg	1	6/16/2009 11:27 PM
Phenol	ND	330		µg/Kg	1	6/16/2009 11:27 PM
Pyrene	ND	330		µg/Kg	1	6/16/2009 11:27 PM
Surr: 1,2-Dichlorobenzene-d4	70.4	49-103		%REC	1	6/16/2009 11:27 PM
Surr: 2,4,6-Tribromophenol	92.6	47-129		%REC	1	6/16/2009 11:27 PM
Surr: 2-Chlorophenol-d4	80.1	54-109		%REC	1	6/16/2009 11:27 PM
Surr: 2-Fluorobiphenyl	81.0	59-108		%REC	1	6/16/2009 11:27 PM
Surr: 2-Fluorophenol	77.6	50-111		%REC	1	6/16/2009 11:27 PM
Surr: 4-Terphenyl-d14	95.6	58-135		%REC	1	6/16/2009 11:27 PM
Surr: Nitrobenzene-d5	80.2	54-115		%REC	1	6/16/2009 11:27 PM
Surr: Phenol-d5	82.6	58-112		%REC	1	6/16/2009 11:27 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT: Geocon Consultants, Inc. **Client Sample ID:** PP1 (10')
Lab Order: 105905 **Collection Date:** 6/11/2009 10:15:00 AM
Project: Caltrans Dumbarton Bridge, E8435-06-18 **Matrix:** SOIL
Lab ID: 105905-006A

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090618B	QC Batch: 55967			PrepDate: 6/17/2009	Analyst: **CL**	
Antimony	ND	2.0		mg/Kg	1	6/18/2009 12:37 PM
Arsenic	3.2	1.0		mg/Kg	1	6/18/2009 12:37 PM
Barium	18	1.0		mg/Kg	1	6/18/2009 12:37 PM
Beryllium	ND	1.0		mg/Kg	1	6/18/2009 12:37 PM
Cadmium	ND	1.0		mg/Kg	1	6/18/2009 12:37 PM
Chromium	36	1.0		mg/Kg	1	6/18/2009 12:37 PM
Cobalt	6.2	1.0		mg/Kg	1	6/18/2009 12:37 PM
Copper	13	2.0		mg/Kg	1	6/18/2009 12:37 PM
Lead	4.4	1.0		mg/Kg	1	6/18/2009 12:37 PM
Molybdenum	1.3	1.0		mg/Kg	1	6/18/2009 12:37 PM
Nickel	40	1.0		mg/Kg	1	6/18/2009 12:37 PM
Selenium	ND	1.0		mg/Kg	1	6/18/2009 12:37 PM
Silver	ND	1.0		mg/Kg	1	6/18/2009 12:37 PM
Thallium	ND	1.0		mg/Kg	1	6/18/2009 12:37 PM
Vanadium	30	1.0		mg/Kg	1	6/18/2009 12:37 PM
Zinc	40	1.0		mg/Kg	1	6/18/2009 12:37 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC8_BACK_090618A	QC Batch: 55984			PrepDate: 6/17/2009	Analyst: **SMH**	
DRO	ND	1.0		mg/Kg	1	6/18/2009 08:10 PM
ORO	ND	1.0		mg/Kg	1	6/18/2009 08:10 PM
Surr: p-Terphenyl	62.1	30-130		%REC	1	6/18/2009 08:10 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA5_090617C	QC Batch: 55965			PrepDate: 6/17/2009	Analyst: **IL**	
Mercury	ND	0.10		mg/Kg	1	6/17/2009 04:04 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090616B	QC Batch: 55929			PrepDate: 6/15/2009	Analyst: **DMP**	
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	6/17/2009 12:24 AM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	6/17/2009 12:24 AM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	6/17/2009 12:24 AM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	6/17/2009 12:24 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	PP1 (10')
Lab Order:	105905	**Collection Date:**	6/11/2009 10:15:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	105905-006A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090616B QC Batch: 55929 PrepDate: 6/15/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	6/17/2009 12:24 AM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	6/17/2009 12:24 AM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	6/17/2009 12:24 AM
2,4-Dimethylphenol	ND	330		µg/Kg	1	6/17/2009 12:24 AM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	6/17/2009 12:24 AM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	6/17/2009 12:24 AM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	6/17/2009 12:24 AM
2-Chloronaphthalene	ND	330		µg/Kg	1	6/17/2009 12:24 AM
2-Chlorophenol	ND	330		µg/Kg	1	6/17/2009 12:24 AM
2-Methylnaphthalene	ND	330		µg/Kg	1	6/17/2009 12:24 AM
2-Methylphenol	ND	330		µg/Kg	1	6/17/2009 12:24 AM
2-Nitroaniline	ND	1600		µg/Kg	1	6/17/2009 12:24 AM
2-Nitrophenol	ND	330		µg/Kg	1	6/17/2009 12:24 AM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	6/17/2009 12:24 AM
3-Nitroaniline	ND	1600		µg/Kg	1	6/17/2009 12:24 AM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	6/17/2009 12:24 AM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	6/17/2009 12:24 AM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	6/17/2009 12:24 AM
4-Chloroaniline	ND	660		µg/Kg	1	6/17/2009 12:24 AM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	6/17/2009 12:24 AM
4-Methylphenol	ND	330		µg/Kg	1	6/17/2009 12:24 AM
4-Nitroaniline	ND	1600		µg/Kg	1	6/17/2009 12:24 AM
4-Nitrophenol	ND	1600		µg/Kg	1	6/17/2009 12:24 AM
Acenaphthene	ND	330		µg/Kg	1	6/17/2009 12:24 AM
Acenaphthylene	ND	330		µg/Kg	1	6/17/2009 12:24 AM
Anthracene	ND	330		µg/Kg	1	6/17/2009 12:24 AM
Benzidine (M)	ND	1600		µg/Kg	1	6/17/2009 12:24 AM
Benzo(a)anthracene	ND	330		µg/Kg	1	6/17/2009 12:24 AM
Benzo(a)pyrene	ND	330		µg/Kg	1	6/17/2009 12:24 AM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	6/17/2009 12:24 AM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	6/17/2009 12:24 AM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	6/17/2009 12:24 AM
Benzoic acid	ND	1600		µg/Kg	1	6/17/2009 12:24 AM
Benzyl alcohol	ND	660		µg/Kg	1	6/17/2009 12:24 AM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	6/17/2009 12:24 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	PP1 (10')
Lab Order:	105905	**Collection Date:**	6/11/2009 10:15:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	105905-006A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090616B QC Batch: 55929 PrepDate: 6/15/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	6/17/2009 12:24 AM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	6/17/2009 12:24 AM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	6/17/2009 12:24 AM
Butylbenzylphthalate	ND	330		µg/Kg	1	6/17/2009 12:24 AM
Chrysene	ND	330		µg/Kg	1	6/17/2009 12:24 AM
Di-n-butylphthalate	ND	330		µg/Kg	1	6/17/2009 12:24 AM
Di-n-octylphthalate	ND	330		µg/Kg	1	6/17/2009 12:24 AM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	6/17/2009 12:24 AM
Dibenzofuran	ND	330		µg/Kg	1	6/17/2009 12:24 AM
Diethylphthalate	ND	330		µg/Kg	1	6/17/2009 12:24 AM
Dimethylphthalate	ND	330		µg/Kg	1	6/17/2009 12:24 AM
Fluoranthene	ND	330		µg/Kg	1	6/17/2009 12:24 AM
Fluorene	ND	330		µg/Kg	1	6/17/2009 12:24 AM
Hexachlorobenzene	ND	330		µg/Kg	1	6/17/2009 12:24 AM
Hexachlorobutadiene	ND	660		µg/Kg	1	6/17/2009 12:24 AM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	6/17/2009 12:24 AM
Hexachloroethane	ND	330		µg/Kg	1	6/17/2009 12:24 AM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	6/17/2009 12:24 AM
Isophorone	ND	330		µg/Kg	1	6/17/2009 12:24 AM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	6/17/2009 12:24 AM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	6/17/2009 12:24 AM
Naphthalene	ND	330		µg/Kg	1	6/17/2009 12:24 AM
Nitrobenzene	ND	330		µg/Kg	1	6/17/2009 12:24 AM
Pentachlorophenol	ND	1600		µg/Kg	1	6/17/2009 12:24 AM
Phenanthrene	ND	330		µg/Kg	1	6/17/2009 12:24 AM
Phenol	ND	330		µg/Kg	1	6/17/2009 12:24 AM
Pyrene	ND	330		µg/Kg	1	6/17/2009 12:24 AM
Surr: 1,2-Dichlorobenzene-d4	78.2	49-103		%REC	1	6/17/2009 12:24 AM
Surr: 2,4,6-Tribromophenol	94.8	47-129		%REC	1	6/17/2009 12:24 AM
Surr: 2-Chlorophenol-d4	87.0	54-109		%REC	1	6/17/2009 12:24 AM
Surr: 2-Fluorobiphenyl	82.7	59-108		%REC	1	6/17/2009 12:24 AM
Surr: 2-Fluorophenol	86.7	50-111		%REC	1	6/17/2009 12:24 AM
Surr: 4-Terphenyl-d14	98.4	58-135		%REC	1	6/17/2009 12:24 AM
Surr: Nitrobenzene-d5	86.5	54-115		%REC	1	6/17/2009 12:24 AM
Surr: Phenol-d5	89.5	58-112		%REC	1	6/17/2009 12:24 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	PP2 (0')
Lab Order:	105905	**Collection Date:**	6/11/2009 10:30:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	105905-007A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090618B	QC Batch: 55967			PrepDate: 6/17/2009	Analyst: **CL**	
Antimony	ND	2.0		mg/Kg	1	6/18/2009 12:40 PM
Arsenic	2.3	1.0		mg/Kg	1	6/18/2009 12:40 PM
Barium	160	1.0		mg/Kg	1	6/18/2009 12:40 PM
Beryllium	ND	1.0		mg/Kg	1	6/18/2009 12:40 PM
Cadmium	ND	1.0		mg/Kg	1	6/18/2009 12:40 PM
Chromium	38	1.0		mg/Kg	1	6/18/2009 12:40 PM
Cobalt	9.5	1.0		mg/Kg	1	6/18/2009 12:40 PM
Copper	38	2.0		mg/Kg	1	6/18/2009 12:40 PM
Lead	33	1.0		mg/Kg	1	6/18/2009 12:40 PM
Molybdenum	ND	1.0		mg/Kg	1	6/18/2009 12:40 PM
Nickel	42	1.0		mg/Kg	1	6/18/2009 12:40 PM
Selenium	ND	1.0		mg/Kg	1	6/18/2009 12:40 PM
Silver	ND	1.0		mg/Kg	1	6/18/2009 12:40 PM
Thallium	ND	1.0		mg/Kg	1	6/18/2009 12:40 PM
Vanadium	43	1.0		mg/Kg	1	6/18/2009 12:40 PM
Zinc	51	1.0		mg/Kg	1	6/18/2009 12:40 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC8_BACK_090616G	QC Batch: 55988			PrepDate: 6/17/2009	Analyst: **SMH**	
DRO	450	40		mg/Kg	20	6/18/2009 05:19 AM
ORO	1800	40		mg/Kg	20	6/18/2009 05:19 AM
Surr: p-Terphenyl	0	30-130	SDO	%REC	20	6/18/2009 05:19 AM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA5_090617C	QC Batch: 55965			PrepDate: 6/17/2009	Analyst: **IL**	
Mercury	ND	0.10		mg/Kg	1	6/17/2009 04:06 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090616B	QC Batch: 55929			PrepDate: 6/15/2009	Analyst: **DMP**	
1,2,4-Trichlorobenzene	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
1,2-Dichlorobenzene	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
1,3-Dichlorobenzene	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
1,4-Dichlorobenzene	ND	16000		µg/Kg	10	6/17/2009 02:46 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	PP2 (0')
Lab Order:	105905	**Collection Date:**	6/11/2009 10:30:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	105905-007A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090616B QC Batch: 55929 PrepDate: 6/15/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
2,4,6-Trichlorophenol	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
2,4-Dichlorophenol	ND	82000		µg/Kg	10	6/17/2009 02:46 AM
2,4-Dimethylphenol	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
2,4-Dinitrophenol	ND	82000		µg/Kg	10	6/17/2009 02:46 AM
2,4-Dinitrotoluene	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
2,6-Dinitrotoluene	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
2-Chloronaphthalene	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
2-Chlorophenol	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
2-Methylnaphthalene	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
2-Methylphenol	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
2-Nitroaniline	ND	82000		µg/Kg	10	6/17/2009 02:46 AM
2-Nitrophenol	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
3,3´-Dichlorobenzidine	ND	33000		µg/Kg	10	6/17/2009 02:46 AM
3-Nitroaniline	ND	82000		µg/Kg	10	6/17/2009 02:46 AM
4,6-Dinitro-2-methylphenol	ND	82000		µg/Kg	10	6/17/2009 02:46 AM
4-Bromophenyl-phenylether	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
4-Chloro-3-methylphenol	ND	33000		µg/Kg	10	6/17/2009 02:46 AM
4-Chloroaniline	ND	33000		µg/Kg	10	6/17/2009 02:46 AM
4-Chlorophenyl-phenylether	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
4-Methylphenol	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
4-Nitroaniline	ND	82000		µg/Kg	10	6/17/2009 02:46 AM
4-Nitrophenol	ND	82000		µg/Kg	10	6/17/2009 02:46 AM
Acenaphthene	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
Acenaphthylene	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
Anthracene	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
Benzidine (M)	ND	82000		µg/Kg	10	6/17/2009 02:46 AM
Benzo(a)anthracene	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
Benzo(a)pyrene	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
Benzo(b)fluoranthene	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
Benzo(g,h,i)perylene	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
Benzo(k)fluoranthene	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
Benzoic acid	ND	82000		µg/Kg	10	6/17/2009 02:46 AM
Benzyl alcohol	ND	33000		µg/Kg	10	6/17/2009 02:46 AM
Bis(2-chloroethoxy)methane	ND	16000		µg/Kg	10	6/17/2009 02:46 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	PP2 (0')
Lab Order:	105905	**Collection Date:**	6/11/2009 10:30:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	105905-007A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090616B QC Batch: 55929 PrepDate: 6/15/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
Bis(2-chloroisopropyl)ether	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
Bis(2-ethylhexyl)phthalate	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
Butylbenzylphthalate	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
Chrysene	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
Di-n-butylphthalate	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
Di-n-octylphthalate	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
Dibenz(a,h)anthracene	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
Dibenzofuran	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
Diethylphthalate	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
Dimethylphthalate	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
Fluoranthene	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
Fluorene	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
Hexachlorobenzene	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
Hexachlorobutadiene	ND	33000		µg/Kg	10	6/17/2009 02:46 AM
Hexachlorocyclopentadiene	ND	33000		µg/Kg	10	6/17/2009 02:46 AM
Hexachloroethane	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
Indeno(1,2,3-cd)pyrene	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
Isophorone	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
N-Nitrosodi-n-propylamine	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
N-Nitrosodiphenylamine	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
Naphthalene	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
Nitrobenzene	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
Pentachlorophenol	ND	82000		µg/Kg	10	6/17/2009 02:46 AM
Phenanthrene	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
Phenol	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
Pyrene	ND	16000		µg/Kg	10	6/17/2009 02:46 AM
Surr: 1,2-Dichlorobenzene-d4	94.1	49-103		%REC	10	6/17/2009 02:46 AM
Surr: 2,4,6-Tribromophenol	94.1	47-129		%REC	10	6/17/2009 02:46 AM
Surr: 2-Chlorophenol-d4	97.6	54-109		%REC	10	6/17/2009 02:46 AM
Surr: 2-Fluorobiphenyl	104	59-108		%REC	10	6/17/2009 02:46 AM
Surr: 2-Fluorophenol	97.6	50-111		%REC	10	6/17/2009 02:46 AM
Surr: 4-Terphenyl-d14	115	58-135		%REC	10	6/17/2009 02:46 AM
Surr: Nitrobenzene-d5	94.6	54-115		%REC	10	6/17/2009 02:46 AM
Surr: Phenol-d5	103	58-112		%REC	10	6/17/2009 02:46 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT: Geocon Consultants, Inc. **Client Sample ID:** PP2 (5')
Lab Order: 105905 **Collection Date:** 6/11/2009 10:35:00 AM
Project: Caltrans Dumbarton Bridge, E8435-06-18 **Matrix:** SOIL
Lab ID: 105905-008A

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090618B	QC Batch: 55967			PrepDate: 6/17/2009	Analyst: **CL**	
Antimony	ND	2.0		mg/Kg	1	6/18/2009 12:43 PM
Arsenic	2.0	1.0		mg/Kg	1	6/18/2009 12:43 PM
Barium	130	1.0		mg/Kg	1	6/18/2009 12:43 PM
Beryllium	ND	1.0		mg/Kg	1	6/18/2009 12:43 PM
Cadmium	ND	1.0		mg/Kg	1	6/18/2009 12:43 PM
Chromium	41	1.0		mg/Kg	1	6/18/2009 12:43 PM
Cobalt	12	1.0		mg/Kg	1	6/18/2009 12:43 PM
Copper	29	2.0		mg/Kg	1	6/18/2009 12:43 PM
Lead	11	1.0		mg/Kg	1	6/18/2009 12:43 PM
Molybdenum	ND	1.0		mg/Kg	1	6/18/2009 12:43 PM
Nickel	52	1.0		mg/Kg	1	6/18/2009 12:43 PM
Selenium	ND	1.0		mg/Kg	1	6/18/2009 12:43 PM
Silver	ND	1.0		mg/Kg	1	6/18/2009 12:43 PM
Thallium	ND	1.0		mg/Kg	1	6/18/2009 12:43 PM
Vanadium	44	1.0		mg/Kg	1	6/18/2009 12:43 PM
Zinc	45	1.0		mg/Kg	1	6/18/2009 12:43 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC8_BACK_090618A	QC Batch: 55984			PrepDate: 6/17/2009	Analyst: **SMH**	
DRO	14	1.0		mg/Kg	1	6/18/2009 09:58 PM
ORO	50	1.0		mg/Kg	1	6/18/2009 09:58 PM
Surr: p-Terphenyl	45.0	30-130		%REC	1	6/18/2009 09:58 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA5_090617C	QC Batch: 55965			PrepDate: 6/17/2009	Analyst: **IL**	
Mercury	0.19	0.10		mg/Kg	1	6/17/2009 04:08 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090616B	QC Batch: 55929			PrepDate: 6/15/2009	Analyst: **DMP**	
1,2,4-Trichlorobenzene	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
1,2-Dichlorobenzene	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
1,3-Dichlorobenzene	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
1,4-Dichlorobenzene	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	PP2 (5')
Lab Order:	105905	**Collection Date:**	6/11/2009 10:35:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	105905-008A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090616B QC Batch: 55929 PrepDate: 6/15/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
2,4,6-Trichlorophenol	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
2,4-Dichlorophenol	ND	4100		µg/Kg	2.5	6/17/2009 02:17 AM
2,4-Dimethylphenol	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
2,4-Dinitrophenol	ND	4100		µg/Kg	2.5	6/17/2009 02:17 AM
2,4-Dinitrotoluene	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
2,6-Dinitrotoluene	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
2-Chloronaphthalene	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
2-Chlorophenol	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
2-Methylnaphthalene	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
2-Methylphenol	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
2-Nitroaniline	ND	4100		µg/Kg	2.5	6/17/2009 02:17 AM
2-Nitrophenol	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
3,3´-Dichlorobenzidine	ND	1600		µg/Kg	2.5	6/17/2009 02:17 AM
3-Nitroaniline	ND	4100		µg/Kg	2.5	6/17/2009 02:17 AM
4,6-Dinitro-2-methylphenol	ND	4100		µg/Kg	2.5	6/17/2009 02:17 AM
4-Bromophenyl-phenylether	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
4-Chloro-3-methylphenol	ND	1600		µg/Kg	2.5	6/17/2009 02:17 AM
4-Chloroaniline	ND	1600		µg/Kg	2.5	6/17/2009 02:17 AM
4-Chlorophenyl-phenylether	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
4-Methylphenol	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
4-Nitroaniline	ND	4100		µg/Kg	2.5	6/17/2009 02:17 AM
4-Nitrophenol	ND	4100		µg/Kg	2.5	6/17/2009 02:17 AM
Acenaphthene	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
Acenaphthylene	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
Anthracene	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
Benzidine (M)	ND	4100		µg/Kg	2.5	6/17/2009 02:17 AM
Benzo(a)anthracene	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
Benzo(a)pyrene	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
Benzo(b)fluoranthene	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
Benzo(g,h,i)perylene	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
Benzo(k)fluoranthene	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
Benzoic acid	ND	4100		µg/Kg	2.5	6/17/2009 02:17 AM
Benzyl alcohol	ND	1600		µg/Kg	2.5	6/17/2009 02:17 AM
Bis(2-chloroethoxy)methane	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	PP2 (5')
Lab Order:	105905	**Collection Date:**	6/11/2009 10:35:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	105905-008A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090616B QC Batch: 55929 PrepDate: 6/15/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
Bis(2-chloroisopropyl)ether	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
Bis(2-ethylhexyl)phthalate	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
Butylbenzylphthalate	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
Chrysene	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
Di-n-butylphthalate	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
Di-n-octylphthalate	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
Dibenz(a,h)anthracene	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
Dibenzofuran	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
Diethylphthalate	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
Dimethylphthalate	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
Fluoranthene	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
Fluorene	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
Hexachlorobenzene	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
Hexachlorobutadiene	ND	1600		µg/Kg	2.5	6/17/2009 02:17 AM
Hexachlorocyclopentadiene	ND	1600		µg/Kg	2.5	6/17/2009 02:17 AM
Hexachloroethane	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
Indeno(1,2,3-cd)pyrene	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
Isophorone	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
N-Nitrosodi-n-propylamine	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
N-Nitrosodiphenylamine	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
Naphthalene	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
Nitrobenzene	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
Pentachlorophenol	ND	4100		µg/Kg	2.5	6/17/2009 02:17 AM
Phenanthrene	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
Phenol	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
Pyrene	ND	820		µg/Kg	2.5	6/17/2009 02:17 AM
Surr: 1,2-Dichlorobenzene-d4	76.0	49-103		%REC	2.5	6/17/2009 02:17 AM
Surr: 2,4,6-Tribromophenol	89.1	47-129		%REC	2.5	6/17/2009 02:17 AM
Surr: 2-Chlorophenol-d4	86.8	54-109		%REC	2.5	6/17/2009 02:17 AM
Surr: 2-Fluorobiphenyl	87.0	59-108		%REC	2.5	6/17/2009 02:17 AM
Surr: 2-Fluorophenol	85.1	50-111		%REC	2.5	6/17/2009 02:17 AM
Surr: 4-Terphenyl-d14	92.2	58-135		%REC	2.5	6/17/2009 02:17 AM
Surr: Nitrobenzene-d5	85.4	54-115		%REC	2.5	6/17/2009 02:17 AM
Surr: Phenol-d5	90.5	58-112		%REC	2.5	6/17/2009 02:17 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Geocon Consultants, Inc. **Client Sample ID:** PP2 (10')
Lab Order: 105905 **Collection Date:** 6/11/2009 10:40:00 AM
Project: Caltrans Dumbarton Bridge, E8435-06-18 **Matrix:** SOIL
Lab ID: 105905-009A

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090618B	QC Batch: 55967			PrepDate: 6/17/2009	Analyst: **CL**	
Antimony	ND	2.0		mg/Kg	1	6/18/2009 12:46 PM
Arsenic	5.2	1.0		mg/Kg	1	6/18/2009 12:46 PM
Barium	19	1.0		mg/Kg	1	6/18/2009 12:46 PM
Beryllium	ND	1.0		mg/Kg	1	6/18/2009 12:46 PM
Cadmium	ND	1.0		mg/Kg	1	6/18/2009 12:46 PM
Chromium	31	1.0		mg/Kg	1	6/18/2009 12:46 PM
Cobalt	6.5	1.0		mg/Kg	1	6/18/2009 12:46 PM
Copper	20	2.0		mg/Kg	1	6/18/2009 12:46 PM
Lead	9.2	1.0		mg/Kg	1	6/18/2009 12:46 PM
Molybdenum	ND	1.0		mg/Kg	1	6/18/2009 12:46 PM
Nickel	36	1.0		mg/Kg	1	6/18/2009 12:46 PM
Selenium	ND	1.0		mg/Kg	1	6/18/2009 12:46 PM
Silver	ND	1.0		mg/Kg	1	6/18/2009 12:46 PM
Thallium	ND	1.0		mg/Kg	1	6/18/2009 12:46 PM
Vanadium	29	1.0		mg/Kg	1	6/18/2009 12:46 PM
Zinc	42	1.0		mg/Kg	1	6/18/2009 12:46 PM
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC8_BACK_090618A	QC Batch: 55984			PrepDate: 6/17/2009	Analyst: **SMH**	
DRO	ND	1.0		mg/Kg	1	6/18/2009 08:37 PM
ORO	1.6	1.0		mg/Kg	1	6/18/2009 08:37 PM
Surr: p-Terphenyl	72.0	30-130		%REC	1	6/18/2009 08:37 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA5_090617C	QC Batch: 55965			PrepDate: 6/17/2009	Analyst: **IL**	
Mercury	0.22	0.10		mg/Kg	1	6/17/2009 04:10 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
	EPA 3550B			**EPA 8270C**		
RunID: MS 13_090616B	QC Batch: 55929			PrepDate: 6/15/2009	Analyst: **DMP**	
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	6/16/2009 11:55 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	6/16/2009 11:55 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	6/16/2009 11:55 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	6/16/2009 11:55 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	PP2 (10')
Lab Order:	105905	**Collection Date:**	6/11/2009 10:40:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	105905-009A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090616B QC Batch: 55929 PrepDate: 6/15/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	6/16/2009 11:55 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	6/16/2009 11:55 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	6/16/2009 11:55 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	6/16/2009 11:55 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	6/16/2009 11:55 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	6/16/2009 11:55 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	6/16/2009 11:55 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	6/16/2009 11:55 PM
2-Chlorophenol	ND	330		µg/Kg	1	6/16/2009 11:55 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	6/16/2009 11:55 PM
2-Methylphenol	ND	330		µg/Kg	1	6/16/2009 11:55 PM
2-Nitroaniline	ND	1600		µg/Kg	1	6/16/2009 11:55 PM
2-Nitrophenol	ND	330		µg/Kg	1	6/16/2009 11:55 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	6/16/2009 11:55 PM
3-Nitroaniline	ND	1600		µg/Kg	1	6/16/2009 11:55 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	6/16/2009 11:55 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	6/16/2009 11:55 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	6/16/2009 11:55 PM
4-Chloroaniline	ND	660		µg/Kg	1	6/16/2009 11:55 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	6/16/2009 11:55 PM
4-Methylphenol	ND	330		µg/Kg	1	6/16/2009 11:55 PM
4-Nitroaniline	ND	1600		µg/Kg	1	6/16/2009 11:55 PM
4-Nitrophenol	ND	1600		µg/Kg	1	6/16/2009 11:55 PM
Acenaphthene	ND	330		µg/Kg	1	6/16/2009 11:55 PM
Acenaphthylene	ND	330		µg/Kg	1	6/16/2009 11:55 PM
Anthracene	ND	330		µg/Kg	1	6/16/2009 11:55 PM
Benzidine (M)	ND	1600		µg/Kg	1	6/16/2009 11:55 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	6/16/2009 11:55 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	6/16/2009 11:55 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	6/16/2009 11:55 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	6/16/2009 11:55 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	6/16/2009 11:55 PM
Benzoic acid	ND	1600		µg/Kg	1	6/16/2009 11:55 PM
Benzyl alcohol	ND	660		µg/Kg	1	6/16/2009 11:55 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	6/16/2009 11:55 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	PP2 (10')
Lab Order:	105905	**Collection Date:**	6/11/2009 10:40:00 AM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	105905-009A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090616B QC Batch: 55929 PrepDate: 6/15/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	6/16/2009 11:55 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	6/16/2009 11:55 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	6/16/2009 11:55 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	6/16/2009 11:55 PM
Chrysene	ND	330		µg/Kg	1	6/16/2009 11:55 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	6/16/2009 11:55 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	6/16/2009 11:55 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	6/16/2009 11:55 PM
Dibenzofuran	ND	330		µg/Kg	1	6/16/2009 11:55 PM
Diethylphthalate	ND	330		µg/Kg	1	6/16/2009 11:55 PM
Dimethylphthalate	ND	330		µg/Kg	1	6/16/2009 11:55 PM
Fluoranthene	ND	330		µg/Kg	1	6/16/2009 11:55 PM
Fluorene	ND	330		µg/Kg	1	6/16/2009 11:55 PM
Hexachlorobenzene	ND	330		µg/Kg	1	6/16/2009 11:55 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	6/16/2009 11:55 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	6/16/2009 11:55 PM
Hexachloroethane	ND	330		µg/Kg	1	6/16/2009 11:55 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	6/16/2009 11:55 PM
Isophorone	ND	330		µg/Kg	1	6/16/2009 11:55 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	6/16/2009 11:55 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	6/16/2009 11:55 PM
Naphthalene	ND	330		µg/Kg	1	6/16/2009 11:55 PM
Nitrobenzene	ND	330		µg/Kg	1	6/16/2009 11:55 PM
Pentachlorophenol	ND	1600		µg/Kg	1	6/16/2009 11:55 PM
Phenanthrene	ND	330		µg/Kg	1	6/16/2009 11:55 PM
Phenol	ND	330		µg/Kg	1	6/16/2009 11:55 PM
Pyrene	ND	330		µg/Kg	1	6/16/2009 11:55 PM
Surr: 1,2-Dichlorobenzene-d4	78.2	49-103		%REC	1	6/16/2009 11:55 PM
Surr: 2,4,6-Tribromophenol	94.2	47-129		%REC	1	6/16/2009 11:55 PM
Surr: 2-Chlorophenol-d4	85.7	54-109		%REC	1	6/16/2009 11:55 PM
Surr: 2-Fluorobiphenyl	83.1	59-108		%REC	1	6/16/2009 11:55 PM
Surr: 2-Fluorophenol	85.1	50-111		%REC	1	6/16/2009 11:55 PM
Surr: 4-Terphenyl-d14	99.2	58-135		%REC	1	6/16/2009 11:55 PM
Surr: Nitrobenzene-d5	87.0	54-115		%REC	1	6/16/2009 11:55 PM
Surr: Phenol-d5	86.8	58-112		%REC	1	6/16/2009 11:55 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	PP2 GW
Lab Order:	105905	**Collection Date:**	6/11/2009 1:45:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	105905-010A		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS11_090616A QC Batch: A09VW121 PrepDate: Analyst: **SLL**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	6/16/2009 10:21 AM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	6/16/2009 10:21 AM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	6/16/2009 10:21 AM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	6/16/2009 10:21 AM
1,1-Dichloroethane	ND	0.50		µg/L	1	6/16/2009 10:21 AM
1,1-Dichloroethene	ND	0.50		µg/L	1	6/16/2009 10:21 AM
1,1-Dichloropropene	ND	0.50		µg/L	1	6/16/2009 10:21 AM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	6/16/2009 10:21 AM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	6/16/2009 10:21 AM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	6/16/2009 10:21 AM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	6/16/2009 10:21 AM
1,2-Dibromo-3-chloropropane	ND	0.50		µg/L	1	6/16/2009 10:21 AM
1,2-Dibromoethane	ND	0.50		µg/L	1	6/16/2009 10:21 AM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	6/16/2009 10:21 AM
1,2-Dichloroethane	ND	0.50		µg/L	1	6/16/2009 10:21 AM
1,2-Dichloropropane	ND	0.50		µg/L	1	6/16/2009 10:21 AM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	6/16/2009 10:21 AM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	6/16/2009 10:21 AM
1,3-Dichloropropane	ND	0.50		µg/L	1	6/16/2009 10:21 AM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	6/16/2009 10:21 AM
2,2-Dichloropropane	ND	0.50		µg/L	1	6/16/2009 10:21 AM
2-Chlorotoluene	ND	0.50		µg/L	1	6/16/2009 10:21 AM
4-Chlorotoluene	ND	0.50		µg/L	1	6/16/2009 10:21 AM
4-Isopropyltoluene	ND	0.50		µg/L	1	6/16/2009 10:21 AM
Benzene	ND	0.50		µg/L	1	6/16/2009 10:21 AM
Bromobenzene	ND	0.50		µg/L	1	6/16/2009 10:21 AM
Bromodichloromethane	ND	0.50		µg/L	1	6/16/2009 10:21 AM
Bromoform	ND	0.50		µg/L	1	6/16/2009 10:21 AM
Bromomethane	ND	0.50		µg/L	1	6/16/2009 10:21 AM
Carbon tetrachloride	ND	0.50		µg/L	1	6/16/2009 10:21 AM
Chlorobenzene	ND	0.50		µg/L	1	6/16/2009 10:21 AM
Chloroethane	ND	0.50		µg/L	1	6/16/2009 10:21 AM
Chloroform	ND	0.50		µg/L	1	6/16/2009 10:21 AM
Chloromethane	ND	0.50		µg/L	1	6/16/2009 10:21 AM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	6/16/2009 10:21 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	PP2 GW
Lab Order:	105905	**Collection Date:**	6/11/2009 1:45:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	105905-010A		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS11_090616A QC Batch: A09VW121 PrepDate: Analyst: **SLL**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
cis-1,3-Dichloropropene	ND	0.50		µg/L	1	6/16/2009 10:21 AM
Dibromochloromethane	ND	0.50		µg/L	1	6/16/2009 10:21 AM
Dibromomethane	ND	0.50		µg/L	1	6/16/2009 10:21 AM
Dichlorodifluoromethane	ND	0.50		µg/L	1	6/16/2009 10:21 AM
Ethylbenzene	ND	0.50		µg/L	1	6/16/2009 10:21 AM
Hexachlorobutadiene	ND	0.50		µg/L	1	6/16/2009 10:21 AM
Isopropylbenzene	ND	0.50		µg/L	1	6/16/2009 10:21 AM
m,p-Xylene	ND	1.0		µg/L	1	6/16/2009 10:21 AM
Methylene chloride	ND	1.0		µg/L	1	6/16/2009 10:21 AM
n-Butylbenzene	ND	0.50		µg/L	1	6/16/2009 10:21 AM
n-Propylbenzene	ND	0.50		µg/L	1	6/16/2009 10:21 AM
Naphthalene	ND	0.50		µg/L	1	6/16/2009 10:21 AM
o-Xylene	ND	0.50		µg/L	1	6/16/2009 10:21 AM
sec-Butylbenzene	ND	0.50		µg/L	1	6/16/2009 10:21 AM
Styrene	ND	0.50		µg/L	1	6/16/2009 10:21 AM
tert-Butylbenzene	ND	0.50		µg/L	1	6/16/2009 10:21 AM
Tetrachloroethene	ND	0.50		µg/L	1	6/16/2009 10:21 AM
Toluene	ND	0.50		µg/L	1	6/16/2009 10:21 AM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	6/16/2009 10:21 AM
Trichloroethene	ND	0.50		µg/L	1	6/16/2009 10:21 AM
Trichlorofluoromethane	ND	0.50		µg/L	1	6/16/2009 10:21 AM
Vinyl chloride	ND	0.50		µg/L	1	6/16/2009 10:21 AM
Surr: 1,2-Dichloroethane-d4	95.7	70-130		%REC	1	6/16/2009 10:21 AM
Surr: 4-Bromofluorobenzene	102	70-130		%REC	1	6/16/2009 10:21 AM
Surr: Dibromofluoromethane	99.5	70-130		%REC	1	6/16/2009 10:21 AM
Surr: Toluene-d8	103	70-130		%REC	1	6/16/2009 10:21 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	PP2 GW
Lab Order:	105905	**Collection Date:**	6/11/2009 1:45:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	105905-010B		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
GASOLINE RANGE ORGANICS BY GC/FID						
		EPA 8015B(M)				
RunID: GC1_090617A	QC Batch: D09VW102			PrepDate:		Analyst: **BD**
GRO	ND	0.050		mg/L	1	6/17/2009 02:52 PM
Surr: Bromofluorobenzene (FID)	101	71-130		%REC	1	6/17/2009 02:52 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	PP2 GW
Lab Order:	105905	**Collection Date:**	6/11/2009 1:45:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	105905-010C		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
EPA 3510C				**EPA 8015B**		
RunID: GC8_090616C	QC Batch: 55926			PrepDate: 6/15/2009		Analyst: **SMH**
DRO	0.054	0.050		mg/L	1	6/17/2009 06:53 PM
ORO	0.074	0.050		mg/L	1	6/17/2009 06:53 PM
Surr: p-Terphenyl	78.4	35-131		%REC	1	6/17/2009 06:53 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	PP2 GW
Lab Order:	105905	**Collection Date:**	6/11/2009 1:45:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	105905-010D		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3510C **EPA 8270C**

RunID: MS6_090617B QC Batch: 55930 PrepDate: 6/16/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,2,4-Trichlorobenzene	ND	10		µg/L	1	6/17/2009 06:04 PM
1,2-Dichlorobenzene	ND	10		µg/L	1	6/17/2009 06:04 PM
1,3-Dichlorobenzene	ND	10		µg/L	1	6/17/2009 06:04 PM
1,4-Dichlorobenzene	ND	10		µg/L	1	6/17/2009 06:04 PM
2,4,5-Trichlorophenol	ND	10		µg/L	1	6/17/2009 06:04 PM
2,4,6-Trichlorophenol	ND	10		µg/L	1	6/17/2009 06:04 PM
2,4-Dichlorophenol	ND	10		µg/L	1	6/17/2009 06:04 PM
2,4-Dimethylphenol	ND	10		µg/L	1	6/17/2009 06:04 PM
2,4-Dinitrophenol	ND	50		µg/L	1	6/17/2009 06:04 PM
2,4-Dinitrotoluene	ND	10		µg/L	1	6/17/2009 06:04 PM
2,6-Dinitrotoluene	ND	10		µg/L	1	6/17/2009 06:04 PM
2-Chloronaphthalene	ND	10		µg/L	1	6/17/2009 06:04 PM
2-Chlorophenol	ND	10		µg/L	1	6/17/2009 06:04 PM
2-Methylnaphthalene	ND	10		µg/L	1	6/17/2009 06:04 PM
2-Methylphenol	ND	10		µg/L	1	6/17/2009 06:04 PM
2-Nitroaniline	ND	50		µg/L	1	6/17/2009 06:04 PM
2-Nitrophenol	ND	10		µg/L	1	6/17/2009 06:04 PM
3,3´-Dichlorobenzidine	ND	20		µg/L	1	6/17/2009 06:04 PM
3-Nitroaniline	ND	50		µg/L	1	6/17/2009 06:04 PM
4,6-Dinitro-2-methylphenol	ND	50		µg/L	1	6/17/2009 06:04 PM
4-Bromophenyl-phenylether	ND	10		µg/L	1	6/17/2009 06:04 PM
4-Chloro-3-methylphenol	ND	50		µg/L	1	6/17/2009 06:04 PM
4-Chloroaniline	ND	20		µg/L	1	6/17/2009 06:04 PM
4-Chlorophenyl-phenylether	ND	10		µg/L	1	6/17/2009 06:04 PM
4-Methylphenol	ND	10		µg/L	1	6/17/2009 06:04 PM
4-Nitroaniline	ND	20		µg/L	1	6/17/2009 06:04 PM
4-Nitrophenol	ND	50		µg/L	1	6/17/2009 06:04 PM
Acenaphthene	ND	10		µg/L	1	6/17/2009 06:04 PM
Acenaphthylene	ND	10		µg/L	1	6/17/2009 06:04 PM
Anthracene	ND	10		µg/L	1	6/17/2009 06:04 PM
Benzidine (M)	ND	50		µg/L	1	6/17/2009 06:04 PM
Benzo(a)anthracene	ND	10		µg/L	1	6/17/2009 06:04 PM
Benzo(a)pyrene	ND	10		µg/L	1	6/17/2009 06:04 PM
Benzo(b)fluoranthene	ND	10		µg/L	1	6/17/2009 06:04 PM
Benzo(g,h,i)perylene	ND	10		µg/L	1	6/17/2009 06:04 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	PP2 GW
Lab Order:	105905	**Collection Date:**	6/11/2009 1:45:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	105905-010D		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3510C **EPA 8270C**

RunID: MS6_090617B QC Batch: 55930 PrepDate: 6/16/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Benzo(k)fluoranthene	ND	10		µg/L	1	6/17/2009 06:04 PM
Benzoic acid	ND	50		µg/L	1	6/17/2009 06:04 PM
Benzyl alcohol	ND	20		µg/L	1	6/17/2009 06:04 PM
Bis(2-chloroethoxy)methane	ND	10		µg/L	1	6/17/2009 06:04 PM
Bis(2-chloroethyl)ether	ND	10		µg/L	1	6/17/2009 06:04 PM
Bis(2-chloroisopropyl)ether	ND	10		µg/L	1	6/17/2009 06:04 PM
Bis(2-ethylhexyl)phthalate	ND	10		µg/L	1	6/17/2009 06:04 PM
Butylbenzylphthalate	ND	10		µg/L	1	6/17/2009 06:04 PM
Chrysene	ND	10		µg/L	1	6/17/2009 06:04 PM
Di-n-butylphthalate	ND	10		µg/L	1	6/17/2009 06:04 PM
Di-n-octylphthalate	ND	10		µg/L	1	6/17/2009 06:04 PM
Dibenz(a,h)anthracene	ND	10		µg/L	1	6/17/2009 06:04 PM
Dibenzofuran	ND	10		µg/L	1	6/17/2009 06:04 PM
Diethylphthalate	ND	10		µg/L	1	6/17/2009 06:04 PM
Dimethylphthalate	ND	10		µg/L	1	6/17/2009 06:04 PM
Fluoranthene	ND	10		µg/L	1	6/17/2009 06:04 PM
Fluorene	ND	10		µg/L	1	6/17/2009 06:04 PM
Hexachlorobenzene	ND	10		µg/L	1	6/17/2009 06:04 PM
Hexachlorobutadiene	ND	20		µg/L	1	6/17/2009 06:04 PM
Hexachlorocyclopentadiene	ND	10		µg/L	1	6/17/2009 06:04 PM
Hexachloroethane	ND	10		µg/L	1	6/17/2009 06:04 PM
Indeno(1,2,3-cd)pyrene	ND	10		µg/L	1	6/17/2009 06:04 PM
Isophorone	ND	10		µg/L	1	6/17/2009 06:04 PM
N-Nitrosodi-n-propylamine	ND	10		µg/L	1	6/17/2009 06:04 PM
N-Nitrosodiphenylamine	ND	10		µg/L	1	6/17/2009 06:04 PM
Naphthalene	ND	10		µg/L	1	6/17/2009 06:04 PM
Nitrobenzene	ND	10		µg/L	1	6/17/2009 06:04 PM
Pentachlorophenol	ND	50		µg/L	1	6/17/2009 06:04 PM
Phenanthrene	ND	10		µg/L	1	6/17/2009 06:04 PM
Phenol	ND	10		µg/L	1	6/17/2009 06:04 PM
Pyrene	ND	10		µg/L	1	6/17/2009 06:04 PM
Surr: 1,2-Dichlorobenzene-d4	61.7	42-98		%REC	1	6/17/2009 06:04 PM
Surr: 2,4,6-Tribromophenol	85.9	60-128		%REC	1	6/17/2009 06:04 PM
Surr: 2-Chlorophenol-d4	67.1	43-102		%REC	1	6/17/2009 06:04 PM
Surr: 2-Fluorobiphenyl	75.2	50-108		%REC	1	6/17/2009 06:04 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	PP2 GW
Lab Order:	105905	**Collection Date:**	6/11/2009 1:45:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	105905-010D		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 3510C				**EPA 8270C**		
RunID: MS6_090617B	QC Batch: 55930			PrepDate: 6/16/2009	Analyst: **DMP**	
Surr: 2-Fluorophenol	45.5	22-69		%REC	1	6/17/2009 06:04 PM
Surr: 4-Terphenyl-d14	86.2	66-130		%REC	1	6/17/2009 06:04 PM
Surr: Nitrobenzene-d5	73.6	47-117		%REC	1	6/17/2009 06:04 PM
Surr: Phenol-d5	36.1	16-50		%REC	1	6/17/2009 06:04 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	FW4A (0')
Lab Order:	105905	**Collection Date:**	6/11/2009 12:20:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	105905-011A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090618B	QC Batch: 55967			PrepDate: 6/17/2009	Analyst: **CL**	
Antimony	ND	2.0		mg/Kg	1	6/18/2009 12:49 PM
Arsenic	4.7	1.0		mg/Kg	1	6/18/2009 12:49 PM
Barium	100	1.0		mg/Kg	1	6/18/2009 12:49 PM
Beryllium	ND	1.0		mg/Kg	1	6/18/2009 12:49 PM
Cadmium	ND	1.0		mg/Kg	1	6/18/2009 12:49 PM
Chromium	88	1.0		mg/Kg	1	6/18/2009 12:49 PM
Cobalt	21	1.0		mg/Kg	1	6/18/2009 12:49 PM
Copper	37	2.0		mg/Kg	1	6/18/2009 12:49 PM
Lead	6.0	1.0		mg/Kg	1	6/18/2009 12:49 PM
Molybdenum	ND	1.0		mg/Kg	1	6/18/2009 12:49 PM
Nickel	76	1.0		mg/Kg	1	6/18/2009 12:49 PM
Selenium	ND	1.0		mg/Kg	1	6/18/2009 12:49 PM
Silver	ND	1.0		mg/Kg	1	6/18/2009 12:49 PM
Thallium	ND	1.0		mg/Kg	1	6/18/2009 12:49 PM
Vanadium	44	1.0		mg/Kg	1	6/18/2009 12:49 PM
Zinc	53	1.0		mg/Kg	1	6/18/2009 12:49 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA5_090617C	QC Batch: 55965			PrepDate: 6/17/2009	Analyst: **IL**	
Mercury	0.19	0.10		mg/Kg	1	6/17/2009 03:46 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	SS-1
Lab Order:	105905	**Collection Date:**	6/11/2009 12:30:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	105905-012A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
EPA 3550B				**EPA 8015B(M)**		
RunID: GC8_BACK_090618A	QC Batch: 55984			PrepDate: 6/17/2009	Analyst: **SMH**	
DRO	1.5	1.0		mg/Kg	1	6/18/2009 09:04 PM
ORO	5.6	1.0		mg/Kg	1	6/18/2009 09:04 PM
Surr: p-Terphenyl	55.5	30-130		%REC	1	6/18/2009 09:04 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 3550B				**EPA 8270C**		
RunID: MS 13_090616B	QC Batch: 55929			PrepDate: 6/15/2009	Analyst: **DMP**	
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	6/17/2009 12:52 AM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	6/17/2009 12:52 AM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	6/17/2009 12:52 AM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	6/17/2009 12:52 AM
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	6/17/2009 12:52 AM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	6/17/2009 12:52 AM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	6/17/2009 12:52 AM
2,4-Dimethylphenol	ND	330		µg/Kg	1	6/17/2009 12:52 AM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	6/17/2009 12:52 AM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	6/17/2009 12:52 AM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	6/17/2009 12:52 AM
2-Chloronaphthalene	ND	330		µg/Kg	1	6/17/2009 12:52 AM
2-Chlorophenol	ND	330		µg/Kg	1	6/17/2009 12:52 AM
2-Methylnaphthalene	ND	330		µg/Kg	1	6/17/2009 12:52 AM
2-Methylphenol	ND	330		µg/Kg	1	6/17/2009 12:52 AM
2-Nitroaniline	ND	1600		µg/Kg	1	6/17/2009 12:52 AM
2-Nitrophenol	ND	330		µg/Kg	1	6/17/2009 12:52 AM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	6/17/2009 12:52 AM
3-Nitroaniline	ND	1600		µg/Kg	1	6/17/2009 12:52 AM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	6/17/2009 12:52 AM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	6/17/2009 12:52 AM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	6/17/2009 12:52 AM
4-Chloroaniline	ND	660		µg/Kg	1	6/17/2009 12:52 AM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	6/17/2009 12:52 AM
4-Methylphenol	ND	330		µg/Kg	1	6/17/2009 12:52 AM
4-Nitroaniline	ND	1600		µg/Kg	1	6/17/2009 12:52 AM
4-Nitrophenol	ND	1600		µg/Kg	1	6/17/2009 12:52 AM
Acenaphthene	ND	330		µg/Kg	1	6/17/2009 12:52 AM
Acenaphthylene	ND	330		µg/Kg	1	6/17/2009 12:52 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	SS-1
Lab Order:	105905	**Collection Date:**	6/11/2009 12:30:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	105905-012A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090616B QC Batch: 55929 PrepDate: 6/15/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Anthracene	ND	330		µg/Kg	1	6/17/2009 12:52 AM
Benzidine (M)	ND	1600		µg/Kg	1	6/17/2009 12:52 AM
Benzo(a)anthracene	ND	330		µg/Kg	1	6/17/2009 12:52 AM
Benzo(a)pyrene	ND	330		µg/Kg	1	6/17/2009 12:52 AM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	6/17/2009 12:52 AM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	6/17/2009 12:52 AM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	6/17/2009 12:52 AM
Benzoic acid	ND	1600		µg/Kg	1	6/17/2009 12:52 AM
Benzyl alcohol	ND	660		µg/Kg	1	6/17/2009 12:52 AM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	6/17/2009 12:52 AM
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	6/17/2009 12:52 AM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	6/17/2009 12:52 AM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	6/17/2009 12:52 AM
Butylbenzylphthalate	ND	330		µg/Kg	1	6/17/2009 12:52 AM
Chrysene	ND	330		µg/Kg	1	6/17/2009 12:52 AM
Di-n-butylphthalate	ND	330		µg/Kg	1	6/17/2009 12:52 AM
Di-n-octylphthalate	ND	330		µg/Kg	1	6/17/2009 12:52 AM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	6/17/2009 12:52 AM
Dibenzofuran	ND	330		µg/Kg	1	6/17/2009 12:52 AM
Diethylphthalate	ND	330		µg/Kg	1	6/17/2009 12:52 AM
Dimethylphthalate	ND	330		µg/Kg	1	6/17/2009 12:52 AM
Fluoranthene	ND	330		µg/Kg	1	6/17/2009 12:52 AM
Fluorene	ND	330		µg/Kg	1	6/17/2009 12:52 AM
Hexachlorobenzene	ND	330		µg/Kg	1	6/17/2009 12:52 AM
Hexachlorobutadiene	ND	660		µg/Kg	1	6/17/2009 12:52 AM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	6/17/2009 12:52 AM
Hexachloroethane	ND	330		µg/Kg	1	6/17/2009 12:52 AM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	6/17/2009 12:52 AM
Isophorone	ND	330		µg/Kg	1	6/17/2009 12:52 AM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	6/17/2009 12:52 AM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	6/17/2009 12:52 AM
Naphthalene	ND	330		µg/Kg	1	6/17/2009 12:52 AM
Nitrobenzene	ND	330		µg/Kg	1	6/17/2009 12:52 AM
Pentachlorophenol	ND	1600		µg/Kg	1	6/17/2009 12:52 AM
Phenanthrene	ND	330		µg/Kg	1	6/17/2009 12:52 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	SS-1
Lab Order:	105905	**Collection Date:**	6/11/2009 12:30:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	105905-012A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 3550B				**EPA 8270C**		
RunID: MS 13_090616B	QC Batch: 55929			PrepDate: 6/15/2009	Analyst: **DMP**	
Phenol	ND	330		µg/Kg	1	6/17/2009 12:52 AM
Pyrene	ND	330		µg/Kg	1	6/17/2009 12:52 AM
Surr: 1,2-Dichlorobenzene-d4	76.7	49-103		%REC	1	6/17/2009 12:52 AM
Surr: 2,4,6-Tribromophenol	93.5	47-129		%REC	1	6/17/2009 12:52 AM
Surr: 2-Chlorophenol-d4	85.2	54-109		%REC	1	6/17/2009 12:52 AM
Surr: 2-Fluorobiphenyl	82.0	59-108		%REC	1	6/17/2009 12:52 AM
Surr: 2-Fluorophenol	84.7	50-111		%REC	1	6/17/2009 12:52 AM
Surr: 4-Terphenyl-d14	97.3	58-135		%REC	1	6/17/2009 12:52 AM
Surr: Nitrobenzene-d5	84.2	54-115		%REC	1	6/17/2009 12:52 AM
Surr: Phenol-d5	88.0	58-112		%REC	1	6/17/2009 12:52 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	SS-1
Lab Order:	105905	**Collection Date:**	6/11/2009 12:30:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	105905-012B		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090618D	QC Batch: 55968			PrepDate: 6/17/2009	Analyst: **CL**	
Antimony	ND	2.0		mg/Kg	1	6/18/2009 02:12 PM
Arsenic	1.2	1.0		mg/Kg	1	6/18/2009 02:12 PM
Barium	57	1.0		mg/Kg	1	6/18/2009 02:12 PM
Beryllium	ND	1.0		mg/Kg	1	6/18/2009 02:12 PM
Cadmium	ND	1.0		mg/Kg	1	6/18/2009 02:12 PM
Chromium	160	1.0		mg/Kg	1	6/18/2009 02:12 PM
Cobalt	21	1.0		mg/Kg	1	6/18/2009 02:12 PM
Copper	49	2.0		mg/Kg	1	6/18/2009 02:12 PM
Lead	ND	1.0		mg/Kg	1	6/18/2009 02:12 PM
Molybdenum	ND	1.0		mg/Kg	1	6/18/2009 02:12 PM
Nickel	260	1.0		mg/Kg	1	6/18/2009 02:12 PM
Selenium	ND	1.0		mg/Kg	1	6/18/2009 02:12 PM
Silver	ND	1.0		mg/Kg	1	6/18/2009 02:12 PM
Thallium	ND	1.0		mg/Kg	1	6/18/2009 02:12 PM
Vanadium	41	1.0		mg/Kg	1	6/18/2009 02:12 PM
Zinc	31	1.0		mg/Kg	1	6/18/2009 02:12 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA5_090617D	QC Batch: 55966			PrepDate: 6/17/2009	Analyst: **IL**	
Mercury	0.10	0.10		mg/Kg	1	6/17/2009 04:52 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	SS-2
Lab Order:	105905	**Collection Date:**	6/11/2009 12:35:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	105905-013A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
SILICA GEL CLEANUP DRO AND ORO BY GC-FID						
EPA 3550B				**EPA 8015B(M)**		
RunID: GC8_BACK_090618A	QC Batch: 55984			PrepDate: 6/17/2009	Analyst: **SMH**	
DRO	1.4	1.0		mg/Kg	1	6/18/2009 09:31 PM
ORO	5.6	1.0		mg/Kg	1	6/18/2009 09:31 PM
Surr: p-Terphenyl	59.4	30-130		%REC	1	6/18/2009 09:31 PM
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 3550B				**EPA 8270C**		
RunID: MS 13_090616B	QC Batch: 55929			PrepDate: 6/15/2009	Analyst: **DMP**	
1,2,4-Trichlorobenzene	ND	330		µg/Kg	1	6/17/2009 12:01 PM
1,2-Dichlorobenzene	ND	330		µg/Kg	1	6/17/2009 12:01 PM
1,3-Dichlorobenzene	ND	330		µg/Kg	1	6/17/2009 12:01 PM
1,4-Dichlorobenzene	ND	330		µg/Kg	1	6/17/2009 12:01 PM
2,4,5-Trichlorophenol	ND	330		µg/Kg	1	6/17/2009 12:01 PM
2,4,6-Trichlorophenol	ND	330		µg/Kg	1	6/17/2009 12:01 PM
2,4-Dichlorophenol	ND	1600		µg/Kg	1	6/17/2009 12:01 PM
2,4-Dimethylphenol	ND	330		µg/Kg	1	6/17/2009 12:01 PM
2,4-Dinitrophenol	ND	1600		µg/Kg	1	6/17/2009 12:01 PM
2,4-Dinitrotoluene	ND	330		µg/Kg	1	6/17/2009 12:01 PM
2,6-Dinitrotoluene	ND	330		µg/Kg	1	6/17/2009 12:01 PM
2-Chloronaphthalene	ND	330		µg/Kg	1	6/17/2009 12:01 PM
2-Chlorophenol	ND	330		µg/Kg	1	6/17/2009 12:01 PM
2-Methylnaphthalene	ND	330		µg/Kg	1	6/17/2009 12:01 PM
2-Methylphenol	ND	330		µg/Kg	1	6/17/2009 12:01 PM
2-Nitroaniline	ND	1600		µg/Kg	1	6/17/2009 12:01 PM
2-Nitrophenol	ND	330		µg/Kg	1	6/17/2009 12:01 PM
3,3´-Dichlorobenzidine	ND	660		µg/Kg	1	6/17/2009 12:01 PM
3-Nitroaniline	ND	1600		µg/Kg	1	6/17/2009 12:01 PM
4,6-Dinitro-2-methylphenol	ND	1600		µg/Kg	1	6/17/2009 12:01 PM
4-Bromophenyl-phenylether	ND	330		µg/Kg	1	6/17/2009 12:01 PM
4-Chloro-3-methylphenol	ND	660		µg/Kg	1	6/17/2009 12:01 PM
4-Chloroaniline	ND	660		µg/Kg	1	6/17/2009 12:01 PM
4-Chlorophenyl-phenylether	ND	330		µg/Kg	1	6/17/2009 12:01 PM
4-Methylphenol	ND	330		µg/Kg	1	6/17/2009 12:01 PM
4-Nitroaniline	ND	1600		µg/Kg	1	6/17/2009 12:01 PM
4-Nitrophenol	ND	1600		µg/Kg	1	6/17/2009 12:01 PM
Acenaphthene	ND	330		µg/Kg	1	6/17/2009 12:01 PM
Acenaphthylene	ND	330		µg/Kg	1	6/17/2009 12:01 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	SS-2
Lab Order:	105905	**Collection Date:**	6/11/2009 12:35:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	105905-013A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: MS 13_090616B QC Batch: 55929 PrepDate: 6/15/2009 Analyst: **DMP**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Anthracene	ND	330		µg/Kg	1	6/17/2009 12:01 PM
Benzidine (M)	ND	1600		µg/Kg	1	6/17/2009 12:01 PM
Benzo(a)anthracene	ND	330		µg/Kg	1	6/17/2009 12:01 PM
Benzo(a)pyrene	ND	330		µg/Kg	1	6/17/2009 12:01 PM
Benzo(b)fluoranthene	ND	330		µg/Kg	1	6/17/2009 12:01 PM
Benzo(g,h,i)perylene	ND	330		µg/Kg	1	6/17/2009 12:01 PM
Benzo(k)fluoranthene	ND	330		µg/Kg	1	6/17/2009 12:01 PM
Benzoic acid	ND	1600		µg/Kg	1	6/17/2009 12:01 PM
Benzyl alcohol	ND	660		µg/Kg	1	6/17/2009 12:01 PM
Bis(2-chloroethoxy)methane	ND	330		µg/Kg	1	6/17/2009 12:01 PM
Bis(2-chloroethyl)ether	ND	330		µg/Kg	1	6/17/2009 12:01 PM
Bis(2-chloroisopropyl)ether	ND	330		µg/Kg	1	6/17/2009 12:01 PM
Bis(2-ethylhexyl)phthalate	ND	330		µg/Kg	1	6/17/2009 12:01 PM
Butylbenzylphthalate	ND	330		µg/Kg	1	6/17/2009 12:01 PM
Chrysene	ND	330		µg/Kg	1	6/17/2009 12:01 PM
Di-n-butylphthalate	ND	330		µg/Kg	1	6/17/2009 12:01 PM
Di-n-octylphthalate	ND	330		µg/Kg	1	6/17/2009 12:01 PM
Dibenz(a,h)anthracene	ND	330		µg/Kg	1	6/17/2009 12:01 PM
Dibenzofuran	ND	330		µg/Kg	1	6/17/2009 12:01 PM
Diethylphthalate	ND	330		µg/Kg	1	6/17/2009 12:01 PM
Dimethylphthalate	ND	330		µg/Kg	1	6/17/2009 12:01 PM
Fluoranthene	ND	330		µg/Kg	1	6/17/2009 12:01 PM
Fluorene	ND	330		µg/Kg	1	6/17/2009 12:01 PM
Hexachlorobenzene	ND	330		µg/Kg	1	6/17/2009 12:01 PM
Hexachlorobutadiene	ND	660		µg/Kg	1	6/17/2009 12:01 PM
Hexachlorocyclopentadiene	ND	660		µg/Kg	1	6/17/2009 12:01 PM
Hexachloroethane	ND	330		µg/Kg	1	6/17/2009 12:01 PM
Indeno(1,2,3-cd)pyrene	ND	330		µg/Kg	1	6/17/2009 12:01 PM
Isophorone	ND	330		µg/Kg	1	6/17/2009 12:01 PM
N-Nitrosodi-n-propylamine	ND	330		µg/Kg	1	6/17/2009 12:01 PM
N-Nitrosodiphenylamine	ND	330		µg/Kg	1	6/17/2009 12:01 PM
Naphthalene	ND	330		µg/Kg	1	6/17/2009 12:01 PM
Nitrobenzene	ND	330		µg/Kg	1	6/17/2009 12:01 PM
Pentachlorophenol	ND	1600		µg/Kg	1	6/17/2009 12:01 PM
Phenanthrene	ND	330		µg/Kg	1	6/17/2009 12:01 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	SS-2
Lab Order:	105905	**Collection Date:**	6/11/2009 12:35:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	105905-013A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 3550B				**EPA 8270C**		
RunID: MS 13_090616B	QC Batch: 55929			PrepDate: 6/15/2009	Analyst: **DMP**	
Phenol	ND	330		µg/Kg	1	6/17/2009 12:01 PM
Pyrene	ND	330		µg/Kg	1	6/17/2009 12:01 PM
Surr: 1,2-Dichlorobenzene-d4	68.3	49-103		%REC	1	6/17/2009 12:01 PM
Surr: 2,4,6-Tribromophenol	86.2	47-129		%REC	1	6/17/2009 12:01 PM
Surr: 2-Chlorophenol-d4	77.5	54-109		%REC	1	6/17/2009 12:01 PM
Surr: 2-Fluorobiphenyl	78.8	59-108		%REC	1	6/17/2009 12:01 PM
Surr: 2-Fluorophenol	75.3	50-111		%REC	1	6/17/2009 12:01 PM
Surr: 4-Terphenyl-d14	88.5	58-135		%REC	1	6/17/2009 12:01 PM
Surr: Nitrobenzene-d5	77.4	54-115		%REC	1	6/17/2009 12:01 PM
Surr: Phenol-d5	79.7	58-112		%REC	1	6/17/2009 12:01 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	SS-2
Lab Order:	105905	**Collection Date:**	6/11/2009 12:35:00 PM
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	SOIL
Lab ID:	105905-013B		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_090618D	QC Batch: 55968			PrepDate: 6/17/2009	Analyst: **CL**	
Antimony	ND	2.0		mg/Kg	1	6/18/2009 02:15 PM
Arsenic	1.2	1.0		mg/Kg	1	6/18/2009 02:15 PM
Barium	42	1.0		mg/Kg	1	6/18/2009 02:15 PM
Beryllium	ND	1.0		mg/Kg	1	6/18/2009 02:15 PM
Cadmium	ND	1.0		mg/Kg	1	6/18/2009 02:15 PM
Chromium	200	1.0		mg/Kg	1	6/18/2009 02:15 PM
Cobalt	22	1.0		mg/Kg	1	6/18/2009 02:15 PM
Copper	24	2.0		mg/Kg	1	6/18/2009 02:15 PM
Lead	4.8	1.0		mg/Kg	1	6/18/2009 02:15 PM
Molybdenum	ND	1.0		mg/Kg	1	6/18/2009 02:15 PM
Nickel	280	1.0		mg/Kg	1	6/18/2009 02:15 PM
Selenium	ND	1.0		mg/Kg	1	6/18/2009 02:15 PM
Silver	ND	1.0		mg/Kg	1	6/18/2009 02:15 PM
Thallium	ND	1.0		mg/Kg	1	6/18/2009 02:15 PM
Vanadium	41	1.0		mg/Kg	1	6/18/2009 02:15 PM
Zinc	40	1.0		mg/Kg	1	6/18/2009 02:15 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA5_090617D	QC Batch: 55966			PrepDate: 6/17/2009	Analyst: **IL**	
Mercury	0.12	0.10		mg/Kg	1	6/17/2009 04:44 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	Trip Blank
Lab Order:	105905	**Collection Date:**	6/11/2009
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	105905-014A		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS11_090616A QC Batch: A09VW121 PrepDate: Analyst: **SLL**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	6/16/2009 10:01 AM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	6/16/2009 10:01 AM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	6/16/2009 10:01 AM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	6/16/2009 10:01 AM
1,1-Dichloroethane	ND	0.50		µg/L	1	6/16/2009 10:01 AM
1,1-Dichloroethene	ND	0.50		µg/L	1	6/16/2009 10:01 AM
1,1-Dichloropropene	ND	0.50		µg/L	1	6/16/2009 10:01 AM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	6/16/2009 10:01 AM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	6/16/2009 10:01 AM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	6/16/2009 10:01 AM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	6/16/2009 10:01 AM
1,2-Dibromo-3-chloropropane	ND	0.50		µg/L	1	6/16/2009 10:01 AM
1,2-Dibromoethane	ND	0.50		µg/L	1	6/16/2009 10:01 AM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	6/16/2009 10:01 AM
1,2-Dichloroethane	ND	0.50		µg/L	1	6/16/2009 10:01 AM
1,2-Dichloropropane	ND	0.50		µg/L	1	6/16/2009 10:01 AM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	6/16/2009 10:01 AM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	6/16/2009 10:01 AM
1,3-Dichloropropane	ND	0.50		µg/L	1	6/16/2009 10:01 AM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	6/16/2009 10:01 AM
2,2-Dichloropropane	ND	0.50		µg/L	1	6/16/2009 10:01 AM
2-Chlorotoluene	ND	0.50		µg/L	1	6/16/2009 10:01 AM
4-Chlorotoluene	ND	0.50		µg/L	1	6/16/2009 10:01 AM
4-Isopropyltoluene	ND	0.50		µg/L	1	6/16/2009 10:01 AM
Benzene	ND	0.50		µg/L	1	6/16/2009 10:01 AM
Bromobenzene	ND	0.50		µg/L	1	6/16/2009 10:01 AM
Bromodichloromethane	ND	0.50		µg/L	1	6/16/2009 10:01 AM
Bromoform	ND	0.50		µg/L	1	6/16/2009 10:01 AM
Bromomethane	ND	0.50		µg/L	1	6/16/2009 10:01 AM
Carbon tetrachloride	ND	0.50		µg/L	1	6/16/2009 10:01 AM
Chlorobenzene	ND	0.50		µg/L	1	6/16/2009 10:01 AM
Chloroethane	ND	0.50		µg/L	1	6/16/2009 10:01 AM
Chloroform	ND	0.50		µg/L	1	6/16/2009 10:01 AM
Chloromethane	ND	0.50		µg/L	1	6/16/2009 10:01 AM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	6/16/2009 10:01 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	Trip Blank
Lab Order:	105905	**Collection Date:**	6/11/2009
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	105905-014A		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS11_090616A QC Batch: A09VW121 PrepDate: Analyst: **SLL**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
cis-1,3-Dichloropropene	ND	0.50		µg/L	1	6/16/2009 10:01 AM
Dibromochloromethane	ND	0.50		µg/L	1	6/16/2009 10:01 AM
Dibromomethane	ND	0.50		µg/L	1	6/16/2009 10:01 AM
Dichlorodifluoromethane	ND	0.50		µg/L	1	6/16/2009 10:01 AM
Ethylbenzene	ND	0.50		µg/L	1	6/16/2009 10:01 AM
Hexachlorobutadiene	ND	0.50		µg/L	1	6/16/2009 10:01 AM
Isopropylbenzene	ND	0.50		µg/L	1	6/16/2009 10:01 AM
m,p-Xylene	ND	1.0		µg/L	1	6/16/2009 10:01 AM
Methylene chloride	ND	1.0		µg/L	1	6/16/2009 10:01 AM
n-Butylbenzene	ND	0.50		µg/L	1	6/16/2009 10:01 AM
n-Propylbenzene	ND	0.50		µg/L	1	6/16/2009 10:01 AM
Naphthalene	ND	0.50		µg/L	1	6/16/2009 10:01 AM
o-Xylene	ND	0.50		µg/L	1	6/16/2009 10:01 AM
sec-Butylbenzene	ND	0.50		µg/L	1	6/16/2009 10:01 AM
Styrene	ND	0.50		µg/L	1	6/16/2009 10:01 AM
tert-Butylbenzene	ND	0.50		µg/L	1	6/16/2009 10:01 AM
Tetrachloroethene	ND	0.50		µg/L	1	6/16/2009 10:01 AM
Toluene	ND	0.50		µg/L	1	6/16/2009 10:01 AM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	6/16/2009 10:01 AM
Trichloroethene	ND	0.50		µg/L	1	6/16/2009 10:01 AM
Trichlorofluoromethane	ND	0.50		µg/L	1	6/16/2009 10:01 AM
Vinyl chloride	ND	0.50		µg/L	1	6/16/2009 10:01 AM
Surr: 1,2-Dichloroethane-d4	88.2	70-130		%REC	1	6/16/2009 10:01 AM
Surr: 4-Bromofluorobenzene	99.4	70-130		%REC	1	6/16/2009 10:01 AM
Surr: Dibromofluoromethane	97.2	70-130		%REC	1	6/16/2009 10:01 AM
Surr: Toluene-d8	103	70-130		%REC	1	6/16/2009 10:01 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	Trip Blank
Lab Order:	105905	**Collection Date:**	6/11/2009
Project:	Caltrans Dumbarton Bridge, E8435-06-18	**Matrix:**	WATER
Lab ID:	105905-014B		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
GASOLINE RANGE ORGANICS BY GC/FID						
		EPA 8015B(M)				
RunID: GC6_090615A	QC Batch: I09VW092			PrepDate:		Analyst: **BD**
GRO	ND	0.050		mg/L	1	6/15/2009 05:27 PM
Surr: Bromofluorobenzene (FID)	111	71-130		%REC	1	6/15/2009 05:27 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **MB-55967** SampType: **MBLK** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **6/17/2009** RunNo: **110019**
Client ID: **PBS** Batch ID: **55967** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **6/18/2009** SeqNo: **1728131**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	2.0									
Arsenic	ND	1.0									
Barium	ND	1.0									
Beryllium	ND	1.0									
Cadmium	0.016	1.0									
Chromium	ND	1.0									
Cobalt	ND	1.0									
Copper	ND	2.0									
Lead	ND	1.0									
Molybdenum	ND	1.0									
Nickel	0.040	1.0									
Selenium	ND	1.0									
Silver	ND	1.0									
Thallium	ND	1.0									
Vanadium	0.041	1.0									
Zinc	ND	1.0									

Sample ID: **LCS-55967** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **6/17/2009** RunNo: **110019**
Client ID: **LCSS** Batch ID: **55967** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **6/18/2009** SeqNo: **1728132**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	48.837	2.0	50.00	0	97.7	80	120				
Arsenic	48.862	1.0	50.00	0	97.7	80	120				
Barium	51.607	1.0	50.00	0	103	80	120				
Beryllium	49.708	1.0	50.00	0	99.4	80	120				
Cadmium	49.967	1.0	50.00	0.01591	99.9	80	120				
Chromium	47.227	1.0	50.00	0	94.5	80	120				
Cobalt	51.839	1.0	50.00	0	104	80	120				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **LCS-55967** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **6/17/2009** RunNo: **110019**
Client ID: **LCSS** Batch ID: **55967** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **6/18/2009** SeqNo: **1728132**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Copper	51.297	2.0	50.00	0	103	80	120				
Lead	49.878	1.0	50.00	0	99.8	80	120				
Molybdenum	52.239	1.0	50.00	0	104	80	120				
Nickel	49.565	1.0	50.00	0.03996	99.1	80	120				
Selenium	46.100	1.0	50.00	0	92.2	80	120				
Silver	48.014	1.0	50.00	0	96.0	80	120				
Thallium	44.594	1.0	50.00	0	89.2	80	120				
Vanadium	51.598	1.0	50.00	0.04144	103	80	120				
Zinc	49.476	1.0	50.00	0	99.0	80	120				

Sample ID: **105905-011ADUP** SampType: **DUP** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **6/17/2009** RunNo: **110019**
Client ID: **FW4A (0')** Batch ID: **55967** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **6/18/2009** SeqNo: **1728143**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	2.0						0	0	20	
Arsenic	4.026	1.0						4.704	15.5	20	
Barium	80.229	1.0						100.3	22.2	20	R
Beryllium	ND	1.0						0	0	20	
Cadmium	0.608	1.0						0.6466	0	20	
Chromium	55.443	1.0						87.57	44.9	20	R
Cobalt	13.321	1.0						20.66	43.2	20	R
Copper	33.736	2.0						37.45	10.4	20	
Lead	5.598	1.0						6.009	7.08	20	
Molybdenum	ND	1.0						0	0	20	
Nickel	68.734	1.0						76.32	10.5	20	
Selenium	ND	1.0						0	0	20	
Silver	ND	1.0						0	0	20	
Thallium	ND	1.0						0	0	20	
Vanadium	42.040	1.0						44.42	5.50	20	
Zinc	50.123	1.0						52.57	4.77	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **105905-011AMS** SampType: **MS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **6/17/2009** RunNo: **110019**
Client ID: **FW4A (0')** Batch ID: **55967** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **6/18/2009** SeqNo: **1728144**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	76.530	2.0	125.0	0	61.2	25	106				
Arsenic	99.846	1.0	125.0	4.704	76.1	42	113				
Barium	178.141	1.0	125.0	100.3	62.3	19	140				
Beryllium	96.094	1.0	125.0	0	76.9	50	109				
Cadmium	93.490	1.0	125.0	0.6466	74.3	48	106				
Chromium	155.833	1.0	125.0	87.57	54.6	44	116				
Cobalt	107.676	1.0	125.0	20.66	69.6	47	107				
Copper	142.716	2.0	125.0	37.45	84.2	49	124				
Lead	96.474	1.0	125.0	6.009	72.4	33	120				
Molybdenum	95.019	1.0	125.0	0	76.0	46	111				
Nickel	164.757	1.0	125.0	76.32	70.7	43	111				
Selenium	91.845	1.0	125.0	0	73.5	43	104				
Silver	98.125	1.0	125.0	0	78.5	53	114				
Thallium	82.651	1.0	125.0	0	66.1	41	107				
Vanadium	147.449	1.0	125.0	44.42	82.4	48	116				
Zinc	146.121	1.0	125.0	52.57	74.8	24	129				

Sample ID: **105905-011AMSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **6/17/2009** RunNo: **110019**
Client ID: **FW4A (0')** Batch ID: **55967** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **6/18/2009** SeqNo: **1728145**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	73.975	2.0	125.0	0	59.2	25	106	76.53	3.40	20	
Arsenic	98.120	1.0	125.0	4.704	74.7	42	113	99.85	1.74	20	
Barium	174.420	1.0	125.0	100.3	59.3	19	140	178.1	2.11	20	
Beryllium	95.930	1.0	125.0	0	76.7	50	109	96.09	0.170	20	
Cadmium	92.198	1.0	125.0	0.6466	73.2	48	106	93.49	1.39	20	
Chromium	149.732	1.0	125.0	87.57	49.7	44	116	155.8	3.99	20	
Cobalt	105.961	1.0	125.0	20.66	68.2	47	107	107.7	1.61	20	
Copper	145.312	2.0	125.0	37.45	86.3	49	124	142.7	1.80	20	
Lead	95.069	1.0	125.0	6.009	71.2	33	120	96.47	1.47	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **105905-011AMSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **6/17/2009** RunNo: **110019**
Client ID: **FW4A (0')** Batch ID: **55967** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **6/18/2009** SeqNo: **1728145**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	94.618	1.0	125.0	0	75.7	46	111	95.02	0.423	20	
Nickel	163.115	1.0	125.0	76.32	69.4	43	111	164.8	1.00	20	
Selenium	89.366	1.0	125.0	0	71.5	43	104	91.85	2.74	20	
Silver	97.099	1.0	125.0	0	77.7	53	114	98.13	1.05	20	
Thallium	81.916	1.0	125.0	0	65.5	41	107	82.65	0.893	20	
Vanadium	142.060	1.0	125.0	44.42	78.1	48	116	147.4	3.72	20	
Zinc	142.370	1.0	125.0	52.57	71.8	24	129	146.1	2.60	20	

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits
- Calculations are based on raw values
- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **LCS-55968** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **6/17/2009** RunNo: **110021**
Client ID: **LCSS** Batch ID: **55968** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **6/18/2009** SeqNo: **1728194**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	46.711	2.0	50.00	0	93.4	80	120				
Arsenic	47.108	1.0	50.00	0	94.2	80	120				
Barium	48.712	1.0	50.00	0	97.4	80	120				
Beryllium	47.557	1.0	50.00	0	95.1	80	120				
Cadmium	47.594	1.0	50.00	0	95.2	80	120				
Chromium	44.691	1.0	50.00	0	89.4	80	120				
Cobalt	49.217	1.0	50.00	0	98.4	80	120				
Copper	47.994	2.0	50.00	0	96.0	80	120				
Lead	47.094	1.0	50.00	0	94.2	80	120				
Molybdenum	49.718	1.0	50.00	0	99.4	80	120				
Nickel	47.019	1.0	50.00	0	94.0	80	120				
Selenium	44.019	1.0	50.00	0	88.0	80	120				
Silver	45.126	1.0	50.00	0	90.3	80	120				
Thallium	42.528	1.0	50.00	0	85.1	80	120				
Vanadium	48.696	1.0	50.00	0	97.4	80	120				
Zinc	47.116	1.0	50.00	0	94.2	80	120				

Sample ID: **105905-013BDUP** SampType: **DUP** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **6/17/2009** RunNo: **110021**
Client ID: **SS-2** Batch ID: **55968** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **6/18/2009** SeqNo: **1728197**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	2.0						0	0	20	
Arsenic	1.311	1.0						1.210	8.05	20	
Barium	64.583	1.0						42.36	41.6	20	R
Beryllium	ND	1.0						0	0	20	
Cadmium	0.600	1.0						0.6086	0	20	
Chromium	160.566	1.0						197.0	20.4	20	R
Cobalt	18.992	1.0						21.73	13.5	20	
Copper	27.833	2.0						24.05	14.6	20	
Lead	62.634	1.0						4.800	172	20	R

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **105905-013BDUP** SampType: **DUP** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **6/17/2009** RunNo: **110021**
Client ID: **SS-2** Batch ID: **55968** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **6/18/2009** SeqNo: **1728197**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	ND	1.0						0	0	20	
Nickel	245.710	1.0						282.7	14.0	20	
Selenium	ND	1.0						0	0	20	
Silver	ND	1.0						0	0	20	
Thallium	ND	1.0						0	0	20	
Vanadium	40.958	1.0						41.09	0.320	20	
Zinc	37.604	1.0						39.90	5.94	20	

Sample ID: **105905-013BMS** SampType: **MS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **6/17/2009** RunNo: **110021**
Client ID: **SS-2** Batch ID: **55968** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **6/18/2009** SeqNo: **1728198**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	79.991	2.0	125.0	0	64.0	25	106				
Arsenic	108.570	1.0	125.0	1.210	85.9	42	113				
Barium	144.481	1.0	125.0	42.36	81.7	19	140				
Beryllium	103.490	1.0	125.0	0	82.8	50	109				
Cadmium	92.845	1.0	125.0	0.6086	73.8	48	106				
Chromium	251.052	1.0	125.0	197.0	43.2	44	116				S
Cobalt	111.635	1.0	125.0	21.73	71.9	47	107				
Copper	143.389	2.0	125.0	24.05	95.5	49	124				
Lead	111.997	1.0	125.0	4.800	85.8	33	120				
Molybdenum	102.240	1.0	125.0	0	81.8	46	111				
Nickel	322.415	1.0	125.0	282.7	31.8	43	111				S
Selenium	101.647	1.0	125.0	0	81.3	43	104				
Silver	111.257	1.0	125.0	0	89.0	53	114				
Thallium	82.556	1.0	125.0	0	66.0	41	107				
Vanadium	149.454	1.0	125.0	41.09	86.7	48	116				
Zinc	130.613	1.0	125.0	39.90	72.6	24	129				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **105905-013BMSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **6/17/2009** RunNo: **110021**
Client ID: **SS-2** Batch ID: **55968** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **6/18/2009** SeqNo: **1728199**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	70.643	2.0	125.0	0	56.5	25	106	79.99	12.4	20	
Arsenic	106.003	1.0	125.0	1.210	83.8	42	113	108.6	2.39	20	
Barium	164.822	1.0	125.0	42.36	98.0	19	140	144.5	13.2	20	
Beryllium	98.761	1.0	125.0	0	79.0	50	109	103.5	4.68	20	
Cadmium	90.836	1.0	125.0	0.6086	72.2	48	106	92.84	2.19	20	
Chromium	294.090	1.0	125.0	197.0	77.6	44	116	251.1	15.8	20	
Cobalt	112.385	1.0	125.0	21.73	72.5	47	107	111.6	0.669	20	
Copper	145.148	2.0	125.0	24.05	96.9	49	124	143.4	1.22	20	
Lead	139.228	1.0	125.0	4.800	108	33	120	112.0	21.7	20	R
Molybdenum	98.788	1.0	125.0	0	79.0	46	111	102.2	3.43	20	
Nickel	376.587	1.0	125.0	282.7	75.1	43	111	322.4	15.5	20	
Selenium	99.365	1.0	125.0	0	79.5	43	104	101.6	2.27	20	
Silver	107.281	1.0	125.0	0	85.8	53	114	111.3	3.64	20	
Thallium	80.768	1.0	125.0	0	64.6	41	107	82.56	2.19	20	
Vanadium	148.295	1.0	125.0	41.09	85.8	48	116	149.5	0.779	20	
Zinc	160.780	1.0	125.0	39.90	96.7	24	129	130.6	20.7	20	R

Sample ID: **MB-55968** SampType: **MBLK** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **6/17/2009** RunNo: **110021**
Client ID: **PBS** Batch ID: **55968** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **6/18/2009** SeqNo: **1728200**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	2.0									
Arsenic	ND	1.0									
Barium	ND	1.0									
Beryllium	ND	1.0									
Cadmium	ND	1.0									
Chromium	ND	1.0									
Cobalt	ND	1.0									
Copper	ND	2.0									
Lead	ND	1.0									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **MB-55968** SampType: **MBLK** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **6/17/2009** RunNo: **110021**
Client ID: **PBS** Batch ID: **55968** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **6/18/2009** SeqNo: **1728200**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	ND	1.0									
Nickel	ND	1.0									
Selenium	ND	1.0									
Silver	ND	1.0									
Thallium	ND	1.0									
Vanadium	ND	1.0									
Zinc	ND	1.0									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 7471_S

Sample ID: **MB-55965**	SampType: **MBLK**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **6/17/2009**	RunNo: **109978**
Client ID: **PBS**	Batch ID: **55965**	TestNo: **EPA 7471A**		Analysis Date: **6/17/2009**	SeqNo: **1727087**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.10									

Sample ID: **LCS-55965**	SampType: **LCS**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **6/17/2009**	RunNo: **109978**
Client ID: **LCSS**	Batch ID: **55965**	TestNo: **EPA 7471A**		Analysis Date: **6/17/2009**	SeqNo: **1727088**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.905	0.10	0.8300	0	109	80	120				

Sample ID: **105905-011A-MS**	SampType: **MS**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **6/17/2009**	RunNo: **109978**
Client ID: **FW4A (0')**	Batch ID: **55965**	TestNo: **EPA 7471A**		Analysis Date: **6/17/2009**	SeqNo: **1727089**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	1.222	0.10	0.8300	0.1855	125	70	130				

Sample ID: **105905-011A-MSD**	SampType: **MSD**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **6/17/2009**	RunNo: **109978**
Client ID: **FW4A (0')**	Batch ID: **55965**	TestNo: **EPA 7471A**		Analysis Date: **6/17/2009**	SeqNo: **1727090**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	1.176	0.10	0.8300	0.1855	119	70	130	1.222	3.84	20	

Sample ID: **105905-011A**	SampType: **DUP**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **6/17/2009**	RunNo: **109978**
Client ID: **FW4A (0')**	Batch ID: **55965**	TestNo: **EPA 7471A**		Analysis Date: **6/17/2009**	SeqNo: **1727092**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.169	0.10						0.1855	9.45	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 7471_S

Sample ID: **MB-55966**	SampType: **MBLK**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **6/17/2009**	RunNo: **109985**
Client ID: **PBS**	Batch ID: **55966**	TestNo: **EPA 7471A**		Analysis Date: **6/17/2009**	SeqNo: **1727257**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.10									

Sample ID: **LCS-55966**	SampType: **LCS**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **6/17/2009**	RunNo: **109985**
Client ID: **LCSS**	Batch ID: **55966**	TestNo: **EPA 7471A**		Analysis Date: **6/17/2009**	SeqNo: **1727258**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.857	0.10	0.8300	0	103	80	120				

Sample ID: **105905-013B-MS**	SampType: **MS**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **6/17/2009**	RunNo: **109985**
Client ID: **SS-2**	Batch ID: **55966**	TestNo: **EPA 7471A**		Analysis Date: **6/17/2009**	SeqNo: **1727259**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	1.062	0.10	0.8300	0.1209	113	70	130				

Sample ID: **105905-013B-MSD**	SampType: **MSD**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **6/17/2009**	RunNo: **109985**
Client ID: **SS-2**	Batch ID: **55966**	TestNo: **EPA 7471A**		Analysis Date: **6/17/2009**	SeqNo: **1727260**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	1.065	0.10	0.8300	0.1209	114	70	130	1.062	0.231	20	

Sample ID: **105905-013B**	SampType: **DUP**	TestCode: **7471_S**	Units: **mg/Kg**	Prep Date: **6/17/2009**	RunNo: **109985**
Client ID: **SS-2**	Batch ID: **55966**	TestNo: **EPA 7471A**		Analysis Date: **6/17/2009**	SeqNo: **1727262**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.107	0.10						0.1209	12.1	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_S_DM LLSGT

Sample ID: **MB-55984** SampType: **MBLK** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **6/17/2009** RunNo: **110052**
Client ID: **PBS** Batch ID: **55984** TestNo: **EPA 8015B(M** **EPA 3550B** Analysis Date: **6/18/2009** SeqNo: **1728682**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	ND	1.0									
ORO	ND	1.0									
Surr: p-Terphenyl	1.978		2.670		74.1	30	130				

Sample ID: **LCS-55984** SampType: **LCS** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **6/17/2009** RunNo: **110052**
Client ID: **LCSS** Batch ID: **55984** TestNo: **EPA 8015B(M** **EPA 3550B** Analysis Date: **6/18/2009** SeqNo: **1728683**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	27.545	1.0	33.00	0	83.5	35	124				
Surr: p-Terphenyl	1.981		2.670		74.2	30	130				

Sample ID: **105905-001ADUP** SampType: **DUP** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **6/17/2009** RunNo: **110052**
Client ID: **PP3 (0')** Batch ID: **55984** TestNo: **EPA 8015B(M** **EPA 3550B** Analysis Date: **6/18/2009** SeqNo: **1728685**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	1.265	1.0						0	200	20	R
ORO	3.587	1.0						2.224	46.9	20	R
Surr: p-Terphenyl	2.017		2.670		75.5	30	130		0	0	

Sample ID: **105905-004AMS** SampType: **MS** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **6/17/2009** RunNo: **110052**
Client ID: **PP1 (0')** Batch ID: **55984** TestNo: **EPA 8015B(M** **EPA 3550B** Analysis Date: **6/18/2009** SeqNo: **1728694**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	103.935	10	33.00	71.89	97.1	12	125				
Surr: p-Terphenyl	0		2.670		0	30	130				SDO

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_S_DM LLSGT

Sample ID: **105905-004AMSD** SampType: **MSD** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **6/17/2009** RunNo: **110052**
Client ID: **PP1 (0')** Batch ID: **55984** TestNo: **EPA 8015B(M EPA 3550B** Analysis Date: **6/18/2009** SeqNo: **1728695**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	110.970	10	33.00	71.89	118	12	125	103.9	6.55	20	
Surr: p-Terphenyl	0		2.670		0	30	130		0	0	SDO

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_S_DM LLSGT

Sample ID: **MB-55988**	SampType: **MBLK**	TestCode: **8015_S_DM L**	Units: **mg/Kg**	Prep Date: **6/17/2009**	RunNo: **110015**
Client ID: **PBS**	Batch ID: **55988**	TestNo: **EPA 8015B(M**	**EPA 3550B**	Analysis Date: **6/18/2009**	SeqNo: **1728079**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	ND	1.0									
ORO	ND	1.0									
Surr: p-Terphenyl	1.865		2.670		69.8	30	130				

Sample ID: **LCS-55988**	SampType: **LCS**	TestCode: **8015_S_DM L**	Units: **mg/Kg**	Prep Date: **6/17/2009**	RunNo: **110015**
Client ID: **LCSS**	Batch ID: **55988**	TestNo: **EPA 8015B(M**	**EPA 3550B**	Analysis Date: **6/18/2009**	SeqNo: **1728080**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	32.263	1.0	33.00	0	97.8	35	124				
Surr: p-Terphenyl	2.120		2.670		79.4	30	130				

Sample ID: **105905-007AMS**	SampType: **MS**	TestCode: **8015_S_DM L**	Units: **mg/Kg**	Prep Date: **6/17/2009**	RunNo: **110015**
Client ID: **PP2 (0')**	Batch ID: **55988**	TestNo: **EPA 8015B(M**	**EPA 3550B**	Analysis Date: **6/18/2009**	SeqNo: **1728081**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	382.840	40	33.00	453.1	-213	12	125				S
Surr: p-Terphenyl	0		2.670		0	30	130				SDO

Sample ID: **105905-007AMSD**	SampType: **MSD**	TestCode: **8015_S_DM L**	Units: **mg/Kg**	Prep Date: **6/17/2009**	RunNo: **110015**
Client ID: **PP2 (0')**	Batch ID: **55988**	TestNo: **EPA 8015B(M**	**EPA 3550B**	Analysis Date: **6/18/2009**	SeqNo: **1728082**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	431.721	40	33.00	453.1	-64.8	12	125	382.8	12.0	20	S
Surr: p-Terphenyl	0		2.670		0	30	130		0	0	SDO

Sample ID: **105905-007ADUP**	SampType: **DUP**	TestCode: **8015_S_DM L**	Units: **mg/Kg**	Prep Date: **6/17/2009**	RunNo: **110015**
Client ID: **PP2 (0')**	Batch ID: **55988**	TestNo: **EPA 8015B(M**	**EPA 3550B**	Analysis Date: **6/18/2009**	SeqNo: **1728084**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_S_DM LLSGT

Sample ID: **105905-007ADUP** SampType: **DUP** TestCode: **8015_S_DM L** Units: **mg/Kg** Prep Date: **6/17/2009** RunNo: **110015**
Client ID: **PP2 (0')** Batch ID: **55988** TestNo: **EPA 8015B(M EPA 3550B** Analysis Date: **6/18/2009** SeqNo: **1728084**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	238.505	40						453.1	62.1	20	R
ORO	955.303	40						1818	62.2	20	R
Surr: p-Terphenyl	0		2.670		0	30	130		0	0	SDO

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_W_DM_LLSGT

Sample ID: **MB-55926**	SampType: **MBLK**	TestCode: **8015_W_DM_**	Units: **mg/L**	Prep Date: **6/15/2009**	RunNo: **109977**
Client ID: **PBW**	Batch ID: **55926**	TestNo: **EPA 8015B**	**EPA 3510C**	Analysis Date: **6/17/2009**	SeqNo: **1728226**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	ND	0.050									
ORO	ND	0.050									
Surr: p-Terphenyl	0.038		0.08000		47.5	35	131				

Sample ID: **LCS-55926**	SampType: **LCS**	TestCode: **8015_W_DM_**	Units: **mg/L**	Prep Date: **6/15/2009**	RunNo: **109977**
Client ID: **LCSW**	Batch ID: **55926**	TestNo: **EPA 8015B**	**EPA 3510C**	Analysis Date: **6/17/2009**	SeqNo: **1728227**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	1.084	0.050	1.000	0	108	42	118				
Surr: p-Terphenyl	0.039		0.08000		48.5	35	131				

Sample ID: **MB-55926MS**	SampType: **MS**	TestCode: **8015_W_DM_**	Units: **mg/L**	Prep Date: **6/15/2009**	RunNo: **109977**
Client ID: **ZZZZZZ**	Batch ID: **55926**	TestNo: **EPA 8015B**	**EPA 3510C**	Analysis Date: **6/17/2009**	SeqNo: **1728228**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	1.156	0.050	1.000	0	116	42	118				
Surr: p-Terphenyl	0.038		0.08000		48.0	35	131				

Sample ID: **MB-55926MSD**	SampType: **MSD**	TestCode: **8015_W_DM_**	Units: **mg/L**	Prep Date: **6/15/2009**	RunNo: **109977**
Client ID: **ZZZZZZ**	Batch ID: **55926**	TestNo: **EPA 8015B**	**EPA 3510C**	Analysis Date: **6/17/2009**	SeqNo: **1728229**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	1.171	0.050	1.000	0	117	42	118	1.156	1.30	20	
Surr: p-Terphenyl	0.046		0.08000		57.9	35	131		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_W_GP LL

Sample ID: **090617LCS2**	SampType: **LCS**	TestCode: **8015_W_GP**	Units: **mg/L**	Prep Date:	RunNo: **110003**
Client ID: **LCSW**	Batch ID: **D09VW102**	TestNo: **EPA 8015B(M**		Analysis Date: **6/17/2009**	SeqNo: **1727770**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	0.948	0.050	1.000	0	94.8	69	125				
Surr: Bromofluorobenzene (FID)	99.896		100.0		99.9	71	130				

Sample ID: **090617MB2MS**	SampType: **MS**	TestCode: **8015_W_GP**	Units: **mg/L**	Prep Date:	RunNo: **110003**
Client ID: **ZZZZZZ**	Batch ID: **D09VW102**	TestNo: **EPA 8015B(M**		Analysis Date: **6/17/2009**	SeqNo: **1727771**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	0.972	0.050	1.000	0	97.2	69	125				
Surr: Bromofluorobenzene (FID)	101.023		100.0		101	71	130				

Sample ID: **090617MB2MSD**	SampType: **MSD**	TestCode: **8015_W_GP**	Units: **mg/L**	Prep Date:	RunNo: **110003**
Client ID: **ZZZZZZ**	Batch ID: **D09VW102**	TestNo: **EPA 8015B(M**		Analysis Date: **6/17/2009**	SeqNo: **1727772**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	0.931	0.050	1.000	0	93.1	69	125	0.9720	4.31	20	
Surr: Bromofluorobenzene (FID)	100.517		100.0		101	71	130		0	0	

Sample ID: **090617MB2**	SampType: **MBLK**	TestCode: **8015_W_GP**	Units: **mg/L**	Prep Date:	RunNo: **110003**
Client ID: **PBW**	Batch ID: **D09VW102**	TestNo: **EPA 8015B(M**		Analysis Date: **6/17/2009**	SeqNo: **1727773**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	ND	0.050									
Surr: Bromofluorobenzene (FID)	86.720		100.0		86.7	71	130				

Sample ID: **105905-010BDUP**	SampType: **DUP**	TestCode: **8015_W_GP**	Units: **mg/L**	Prep Date:	RunNo: **110003**
Client ID: **PP2 GW**	Batch ID: **D09VW102**	TestNo: **EPA 8015B(M**		Analysis Date: **6/17/2009**	SeqNo: **1727775**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	ND	0.050						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_W_GP LL

Sample ID: **105905-010BDUP** SampType: **DUP** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **110003**
Client ID: **PP2 GW** Batch ID: **D09VW102** TestNo: **EPA 8015B(M** Analysis Date: **6/17/2009** SeqNo: **1727775**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Bromofluorobenzene (FID)	88.665		100.0		88.7	71	130		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_W_GP LL

Sample ID: **090615LCS4** SampType: **LCS** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **109887**
Client ID: **LCSW** Batch ID: **I09VW092** TestNo: **EPA 8015B(M** Analysis Date: **6/15/2009** SeqNo: **1725541**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	0.864	0.050	1.000	0	86.4	69	125				
Surr: Bromofluorobenzene (FID)	101.492		100.0		101	71	130				

Sample ID: **090615MB3MS** SampType: **MS** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **109887**
Client ID: **ZZZZZZ** Batch ID: **I09VW092** TestNo: **EPA 8015B(M** Analysis Date: **6/15/2009** SeqNo: **1725542**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	0.948	0.050	1.000	0	94.8	69	125				
Surr: Bromofluorobenzene (FID)	102.525		100.0		103	71	130				

Sample ID: **090615MB3MSD** SampType: **MSD** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **109887**
Client ID: **ZZZZZZ** Batch ID: **I09VW092** TestNo: **EPA 8015B(M** Analysis Date: **6/15/2009** SeqNo: **1725543**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	1.058	0.050	1.000	0	106	69	125	0.9480	11.0	20	
Surr: Bromofluorobenzene (FID)	103.297		100.0		103	71	130		0	0	

Sample ID: **090615MB3** SampType: **MBLK** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **109887**
Client ID: **PBW** Batch ID: **I09VW092** TestNo: **EPA 8015B(M** Analysis Date: **6/15/2009** SeqNo: **1725544**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	ND	0.050									
Surr: Bromofluorobenzene (FID)	96.419		100.0		96.4	71	130				

Sample ID: **105924-002BDUP** SampType: **DUP** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **109887**
Client ID: **ZZZZZZ** Batch ID: **I09VW092** TestNo: **EPA 8015B(M** Analysis Date: **6/15/2009** SeqNo: **1725547**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	ND	0.050						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_W_GP LL

Sample ID: **105924-002BDUP** SampType: **DUP** TestCode: **8015_W_GP** Units: **mg/L** Prep Date: RunNo: **109887**
Client ID: **ZZZZZZ** Batch ID: **I09VW092** TestNo: **EPA 8015B(M** Analysis Date: **6/15/2009** SeqNo: **1725547**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Bromofluorobenzene (FID)	101.535		100.0		102	71	130		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **A090616LCS1** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **109941**
Client ID: **LCSW** Batch ID: **A09VW121** TestNo: **EPA 8260B** Analysis Date: **6/16/2009** SeqNo: **1726406**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	19.380	0.50	20.00	0	96.9	70	130				
Benzene	38.410	0.50	40.00	0	96.0	70	130				
Chlorobenzene	21.080	0.50	20.00	0	105	70	130				
MTBE	19.530	0.50	20.00	0	97.6	70	130				
Toluene	40.130	0.50	40.00	0	100	70	130				
Trichloroethene	18.900	0.50	20.00	0	94.5	70	130				
Surr: 1,2-Dichloroethane-d4	22.790		25.00		91.2	70	130				
Surr: 4-Bromofluorobenzene	26.120		25.00		104	70	130				
Surr: Dibromofluoromethane	24.480		25.00		97.9	70	130				
Surr: Toluene-d8	25.920		25.00		104	70	130				

Sample ID: **A090616MB2MS** SampType: **MS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **109941**
Client ID: **ZZZZZZ** Batch ID: **A09VW121** TestNo: **EPA 8260B** Analysis Date: **6/16/2009** SeqNo: **1726407**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	16.430	0.50	20.00	0	82.2	70	130				
Benzene	37.550	0.50	40.00	0	93.9	70	130				
Chlorobenzene	20.830	0.50	20.00	0	104	70	130				
Toluene	39.100	0.50	40.00	0	97.8	70	130				
Trichloroethene	17.780	0.50	20.00	0	88.9	70	130				
Surr: 1,2-Dichloroethane-d4	22.710		25.00		90.8	70	130				
Surr: 4-Bromofluorobenzene	26.210		25.00		105	70	130				
Surr: Dibromofluoromethane	24.510		25.00		98.0	70	130				
Surr: Toluene-d8	25.950		25.00		104	70	130				

Sample ID: **A090616MB2MSD** SampType: **MSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **109941**
Client ID: **ZZZZZZ** Batch ID: **A09VW121** TestNo: **EPA 8260B** Analysis Date: **6/16/2009** SeqNo: **1726408**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	19.660	0.50	20.00	0	98.3	70	130	16.43	17.9	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **A090616MB2MSD** SampType: **MSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **109941**
Client ID: **ZZZZZZ** Batch ID: **A09VW121** TestNo: **EPA 8260B** Analysis Date: **6/16/2009** SeqNo: **1726408**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	37.660	0.50	40.00	0	94.2	70	130	37.55	0.293	20	
Chlorobenzene	20.500	0.50	20.00	0	103	70	130	20.83	1.60	20	
Toluene	39.390	0.50	40.00	0	98.5	70	130	39.10	0.739	20	
Trichloroethene	18.570	0.50	20.00	0	92.8	70	130	17.78	4.35	20	
Surr: 1,2-Dichloroethane-d4	22.810		25.00		91.2	70	130		0	20	
Surr: 4-Bromofluorobenzene	26.270		25.00		105	70	130		0	20	
Surr: Dibromofluoromethane	24.380		25.00		97.5	70	130		0	20	
Surr: Toluene-d8	26.030		25.00		104	70	130		0	20	

Sample ID: **A090616MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **109941**
Client ID: **PBW** Batch ID: **A09VW121** TestNo: **EPA 8260B** Analysis Date: **6/16/2009** SeqNo: **1726409**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	0.50									
1,1,1-Trichloroethane	ND	0.50									
1,1,2,2-Tetrachloroethane	ND	0.50									
1,1,2-Trichloroethane	ND	0.50									
1,1-Dichloroethane	ND	0.50									
1,1-Dichloroethene	ND	0.50									
1,1-Dichloropropene	ND	0.50									
1,2,3-Trichlorobenzene	ND	0.50									
1,2,3-Trichloropropane	ND	0.50									
1,2,4-Trichlorobenzene	ND	0.50									
1,2,4-Trimethylbenzene	ND	0.50									
1,2-Dibromo-3-chloropropane	ND	0.50									
1,2-Dibromoethane	ND	0.50									
1,2-Dichlorobenzene	ND	0.50									
1,2-Dichloroethane	ND	0.50									
1,2-Dichloropropane	ND	0.50									
1,3,5-Trimethylbenzene	ND	0.50									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **A090616MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **109941**
Client ID: **PBW** Batch ID: **A09VW121** TestNo: **EPA 8260B** Analysis Date: **6/16/2009** SeqNo: **1726409**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,3-Dichlorobenzene	ND	0.50									
1,3-Dichloropropane	ND	0.50									
1,4-Dichlorobenzene	ND	0.50									
2,2-Dichloropropane	ND	0.50									
2-Chlorotoluene	ND	0.50									
4-Chlorotoluene	ND	0.50									
4-Isopropyltoluene	ND	0.50									
Benzene	ND	0.50									
Bromobenzene	ND	0.50									
Bromodichloromethane	ND	0.50									
Bromoform	ND	0.50									
Bromomethane	ND	0.50									
Carbon tetrachloride	ND	0.50									
Chlorobenzene	ND	0.50									
Chloroethane	ND	0.50									
Chloroform	ND	0.50									
Chloromethane	ND	0.50									
cis-1,2-Dichloroethene	ND	0.50									
cis-1,3-Dichloropropene	ND	0.50									
Dibromochloromethane	ND	0.50									
Dibromomethane	ND	0.50									
Dichlorodifluoromethane	ND	0.50									
Ethylbenzene	ND	0.50									
Hexachlorobutadiene	ND	0.50									
Isopropylbenzene	ND	0.50									
m,p-Xylene	ND	1.0									
Methylene chloride	ND	1.0									
n-Butylbenzene	ND	0.50									
n-Propylbenzene	ND	0.50									
Naphthalene	ND	0.50									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **A090616MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **109941**
Client ID: **PBW** Batch ID: **A09VW121** TestNo: **EPA 8260B** Analysis Date: **6/16/2009** SeqNo: **1726409**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
o-Xylene	ND	0.50									
sec-Butylbenzene	ND	0.50									
Styrene	ND	0.50									
tert-Butylbenzene	ND	0.50									
Tetrachloroethene	ND	0.50									
Toluene	ND	0.50									
trans-1,2-Dichloroethene	ND	0.50									
Trichloroethene	ND	0.50									
Trichlorofluoromethane	ND	0.50									
Vinyl chloride	ND	0.50									
Surr: 1,2-Dichloroethane-d4	21.940		25.00		87.8	70	130				
Surr: 4-Bromofluorobenzene	25.140		25.00		101	70	130				
Surr: Dibromofluoromethane	24.640		25.00		98.6	70	130				
Surr: Toluene-d8	25.750		25.00		103	70	130				

Sample ID: **105905-010A** SampType: **DUP** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **109941**
Client ID: **PP2 GW** Batch ID: **A09VW121** TestNo: **EPA 8260B** Analysis Date: **6/16/2009** SeqNo: **1726412**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	0.50						0	0	20	
1,1,1-Trichloroethane	ND	0.50						0	0	20	
1,1,2,2-Tetrachloroethane	ND	0.50						0	0	20	
1,1,2-Trichloroethane	ND	0.50						0	0	20	
1,1-Dichloroethane	ND	0.50						0	0	20	
1,1-Dichloroethene	ND	0.50						0	0	20	
1,1-Dichloropropene	ND	0.50						0	0	20	
1,2,3-Trichlorobenzene	ND	0.50						0	0	20	
1,2,3-Trichloropropane	ND	0.50						0	0	20	
1,2,4-Trichlorobenzene	ND	0.50						0	0	20	
1,2,4-Trimethylbenzene	ND	0.50						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **105905-010A** SampType: **DUP** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **109941**
Client ID: **PP2 GW** Batch ID: **A09VW121** TestNo: **EPA 8260B** Analysis Date: **6/16/2009** SeqNo: **1726412**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2-Dibromo-3-chloropropane	ND	0.50						0	0	20	
1,2-Dibromoethane	ND	0.50						0	0	20	
1,2-Dichlorobenzene	ND	0.50						0	0	20	
1,2-Dichloroethane	ND	0.50						0	0	20	
1,2-Dichloropropane	ND	0.50						0	0	20	
1,3,5-Trimethylbenzene	ND	0.50						0	0	20	
1,3-Dichlorobenzene	ND	0.50						0	0	20	
1,3-Dichloropropane	ND	0.50						0	0	20	
1,4-Dichlorobenzene	ND	0.50						0	0	20	
2,2-Dichloropropane	ND	0.50						0	0	20	
2-Chlorotoluene	ND	0.50						0	0	20	
4-Chlorotoluene	ND	0.50						0	0	20	
4-Isopropyltoluene	ND	0.50						0	0	20	
Benzene	ND	0.50						0	0	20	
Bromobenzene	ND	0.50						0	0	20	
Bromodichloromethane	ND	0.50						0	0	20	
Bromoform	ND	0.50						0	0	20	
Bromomethane	ND	0.50						0	0	20	
Carbon tetrachloride	ND	0.50						0	0	20	
Chlorobenzene	ND	0.50						0	0	20	
Chloroethane	ND	0.50						0	0	20	
Chloroform	ND	0.50						0	0	20	
Chloromethane	ND	0.50						0	0	20	
cis-1,2-Dichloroethene	ND	0.50						0	0	20	
cis-1,3-Dichloropropene	ND	0.50						0	0	20	
Dibromochloromethane	ND	0.50						0	0	20	
Dibromomethane	ND	0.50						0	0	20	
Dichlorodifluoromethane	ND	0.50						0	0	20	
Ethylbenzene	ND	0.50						0	0	20	
Hexachlorobutadiene	ND	0.50						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **105905-010A** SampType: **DUP** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **109941**
Client ID: **PP2 GW** Batch ID: **A09VW121** TestNo: **EPA 8260B** Analysis Date: **6/16/2009** SeqNo: **1726412**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Isopropylbenzene	ND	0.50						0	0	20	
m,p-Xylene	ND	1.0						0	0	20	
Methylene chloride	ND	1.0						0	0	20	
n-Butylbenzene	ND	0.50						0	0	20	
n-Propylbenzene	ND	0.50						0	0	20	
Naphthalene	ND	0.50						0	0	20	
o-Xylene	ND	0.50						0	0	20	
sec-Butylbenzene	ND	0.50						0	0	20	
Styrene	ND	0.50						0	0	20	
tert-Butylbenzene	ND	0.50						0	0	20	
Tetrachloroethene	ND	0.50						0	0	20	
Toluene	ND	0.50						0	0	20	
trans-1,2-Dichloroethene	ND	0.50						0	0	20	
Trichloroethene	ND	0.50						0	0	20	
Trichlorofluoromethane	ND	0.50						0	0	20	
Vinyl chloride	ND	0.50						0	0	20	
Surr: 1,2-Dichloroethane-d4	27.170		25.00		109	70	130		0	0	
Surr: 4-Bromofluorobenzene	26.140		25.00		105	70	130		0	0	
Surr: Dibromofluoromethane	25.280		25.00		101	70	130		0	0	
Surr: Toluene-d8	25.810		25.00		103	70	130		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-55905** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **6/15/2009** RunNo: **109894**
Client ID: **PBS** Batch ID: **55905** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **6/15/2009** SeqNo: **1725604**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	330									
1,2-Dichlorobenzene	ND	330									
1,3-Dichlorobenzene	ND	330									
1,4-Dichlorobenzene	ND	330									
2,4,5-Trichlorophenol	ND	330									
2,4,6-Trichlorophenol	ND	330									
2,4-Dichlorophenol	ND	1600									
2,4-Dimethylphenol	ND	330									
2,4-Dinitrophenol	ND	1600									
2,4-Dinitrotoluene	ND	330									
2,6-Dinitrotoluene	ND	330									
2-Chloronaphthalene	ND	330									
2-Chlorophenol	ND	330									
2-Methylnaphthalene	ND	330									
2-Methylphenol	ND	330									
2-Nitroaniline	ND	1600									
2-Nitrophenol	ND	330									
3,3´-Dichlorobenzidine	ND	660									
3-Nitroaniline	ND	1600									
4,6-Dinitro-2-methylphenol	ND	1600									
4-Bromophenyl-phenylether	ND	330									
4-Chloro-3-methylphenol	ND	660									
4-Chloroaniline	ND	660									
4-Chlorophenyl-phenylether	ND	330									
4-Methylphenol	ND	330									
4-Nitroaniline	ND	1600									
4-Nitrophenol	ND	1600									
Acenaphthene	ND	330									
Acenaphthylene	ND	330									
Anthracene	ND	330									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-55905** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **6/15/2009** RunNo: **109894**
Client ID: **PBS** Batch ID: **55905** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **6/15/2009** SeqNo: **1725604**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzidine (M)	ND	1600									
Benzo(a)anthracene	ND	330									
Benzo(a)pyrene	ND	330									
Benzo(b)fluoranthene	ND	330									
Benzo(g,h,i)perylene	ND	330									
Benzo(k)fluoranthene	ND	330									
Benzoic acid	ND	1600									
Benzyl alcohol	ND	660									
Bis(2-chloroethoxy)methane	ND	330									
Bis(2-chloroethyl)ether	ND	330									
Bis(2-chloroisopropyl)ether	ND	330									
Bis(2-ethylhexyl)phthalate	ND	330									
Butylbenzylphthalate	ND	330									
Chrysene	ND	330									
Di-n-butylphthalate	ND	330									
Di-n-octylphthalate	ND	330									
Dibenz(a,h)anthracene	ND	330									
Dibenzofuran	ND	330									
Diethylphthalate	ND	330									
Dimethylphthalate	ND	330									
Fluoranthene	ND	330									
Fluorene	ND	330									
Hexachlorobenzene	ND	330									
Hexachlorobutadiene	ND	660									
Hexachlorocyclopentadiene	ND	660									
Hexachloroethane	ND	330									
Indeno(1,2,3-cd)pyrene	ND	330									
Isophorone	ND	330									
N-Nitrosodi-n-propylamine	ND	330									
N-Nitrosodiphenylamine	ND	330									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-55905** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **6/15/2009** RunNo: **109894**
Client ID: **PBS** Batch ID: **55905** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **6/15/2009** SeqNo: **1725604**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	330									
Nitrobenzene	ND	330									
Pentachlorophenol	ND	1600									
Phenanthrene	ND	330									
Phenol	ND	330									
Pyrene	ND	330									
Surr: 1,2-Dichlorobenzene-d4	2696.333		3330		81.0	49	103				
Surr: 2,4,6-Tribromophenol	3340.333		3330		100	47	129				
Surr: 2-Chlorophenol-d4	2844.000		3330		85.4	54	109				
Surr: 2-Fluorobiphenyl	2760.000		3330		82.9	59	108				
Surr: 2-Fluorophenol	2778.333		3330		83.4	50	111				
Surr: 4-Terphenyl-d14	3449.000		3330		104	58	135				
Surr: Nitrobenzene-d5	2991.000		3330		89.8	54	115				
Surr: Phenol-d5	2905.667		3330		87.3	58	112				

Sample ID: **LCS-55905** SampType: **LCS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **6/15/2009** RunNo: **109894**
Client ID: **LCSS** Batch ID: **55905** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **6/15/2009** SeqNo: **1725605**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	2970.000	330	3330	0	89.2	61	107				
1,4-Dichlorobenzene	2700.667	330	3330	0	81.1	56	100				
2,4-Dinitrotoluene	3746.000	330	3330	0	112	72	130				
2-Chlorophenol	2932.667	330	3330	0	88.1	64	105				
4-Chloro-3-methylphenol	3576.667	660	3330	0	107	74	125				
4-Nitrophenol	3690.667	1600	3330	0	111	77	137				
Acenaphthene	3021.333	330	3330	0	90.7	63	117				
N-Nitrosodi-n-propylamine	3092.000	330	3330	0	92.9	71	121				
Pentachlorophenol	4076.333	1600	3330	0	122	69	125				
Phenol	3028.000	330	3330	0	90.9	67	111				
Pyrene	3332.333	330	3330	0	100	60	122				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **LCS-55905** SampType: **LCS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **6/15/2009** RunNo: **109894**
Client ID: **LCSS** Batch ID: **55905** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **6/15/2009** SeqNo: **1725605**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 1,2-Dichlorobenzene-d4	2607.667		3330		78.3	49	103				
Surr: 2,4,6-Tribromophenol	3797.667		3330		114	47	129				
Surr: 2-Chlorophenol-d4	2798.333		3330		84.0	54	109				
Surr: 2-Fluorobiphenyl	2897.000		3330		87.0	59	108				
Surr: 2-Fluorophenol	2723.000		3330		81.8	50	111				
Surr: 4-Terphenyl-d14	3431.333		3330		103	58	135				
Surr: Nitrobenzene-d5	2955.000		3330		88.7	54	115				
Surr: Phenol-d5	2853.333		3330		85.7	58	112				

Sample ID: **105905-001AMS** SampType: **MS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **6/15/2009** RunNo: **109894**
Client ID: **PP3 (0')** Batch ID: **55905** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **6/15/2009** SeqNo: **1725606**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	3045.000	330	3330	0	91.4	60	105				
1,4-Dichlorobenzene	2805.333	330	3330	0	84.2	50	99				
2,4-Dinitrotoluene	3725.000	330	3330	0	112	70	130				
2-Chlorophenol	3050.667	330	3330	0	91.6	58	107				
4-Chloro-3-methylphenol	3573.667	660	3330	0	107	72	124				
4-Nitrophenol	3675.667	1600	3330	0	110	69	139				
Acenaphthene	3087.000	330	3330	0	92.7	59	118				
N-Nitrosodi-n-propylamine	3085.333	330	3330	0	92.7	61	125				
Pentachlorophenol	4108.000	1600	3330	0	123	56	131				
Phenol	3112.000	330	3330	0	93.5	60	113				
Pyrene	3301.667	330	3330	0	99.1	51	130				
Surr: 1,2-Dichlorobenzene-d4	2708.000		3330		81.3	49	103				
Surr: 2,4,6-Tribromophenol	3749.000		3330		113	47	129				
Surr: 2-Chlorophenol-d4	2866.667		3330		86.1	54	109				
Surr: 2-Fluorobiphenyl	2929.333		3330		88.0	59	108				
Surr: 2-Fluorophenol	2782.000		3330		83.5	50	111				
Surr: 4-Terphenyl-d14	3426.667		3330		103	58	135				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **105905-001AMS** SampType: **MS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **6/15/2009** RunNo: **109894**
Client ID: **PP3 (0')** Batch ID: **55905** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **6/15/2009** SeqNo: **1725606**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	2986.667		3330		89.7	54	115				
Surr: Phenol-d5	2895.333		3330		86.9	58	112				

Sample ID: **105905-001AMSD** SampType: **MSD** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **6/15/2009** RunNo: **109894**
Client ID: **PP3 (0')** Batch ID: **55905** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **6/15/2009** SeqNo: **1725607**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	3293.667	330	3330	0	98.9	60	105	3045	7.85	20	
1,4-Dichlorobenzene	3051.667	330	3330	0	91.6	50	99	2805	8.41	20	
2,4-Dinitrotoluene	3951.000	330	3330	0	119	70	130	3725	5.89	20	
2-Chlorophenol	3311.333	330	3330	0	99.4	58	107	3051	8.19	20	
4-Chloro-3-methylphenol	3796.333	660	3330	0	114	72	124	3574	6.04	20	
4-Nitrophenol	3960.667	1600	3330	0	119	69	139	3676	7.46	20	
Acenaphthene	3258.667	330	3330	0	97.9	59	118	3087	5.41	20	
N-Nitrosodi-n-propylamine	3335.000	330	3330	0	100	61	125	3085	7.78	20	
Pentachlorophenol	4396.000	1600	3330	0	132	56	131	4108	6.77	20	S
Phenol	3352.333	330	3330	0	101	60	113	3112	7.44	20	
Pyrene	3475.333	330	3330	0	104	51	130	3302	5.13	20	
Surr: 1,2-Dichlorobenzene-d4	2915.000		3330		87.5	49	103		0	0	
Surr: 2,4,6-Tribromophenol	3949.000		3330		119	47	129		0	0	
Surr: 2-Chlorophenol-d4	3112.000		3330		93.5	54	109		0	0	
Surr: 2-Fluorobiphenyl	3097.333		3330		93.0	59	108		0	0	
Surr: 2-Fluorophenol	3017.000		3330		90.6	50	111		0	0	
Surr: 4-Terphenyl-d14	3598.000		3330		108	58	135		0	0	
Surr: Nitrobenzene-d5	3260.667		3330		97.9	54	115		0	0	
Surr: Phenol-d5	3127.000		3330		93.9	58	112		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **105905-001ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **6/15/2009** RunNo: **109894**
Client ID: **PP3 (0')** Batch ID: **55905** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **6/15/2009** SeqNo: **1725609**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	330						0	0	20	
1,2-Dichlorobenzene	ND	330						0	0	20	
1,2-Diphenylhydrazine	ND	330						0	0	20	
1,3-Dichlorobenzene	ND	330						0	0	20	
1,4-Dichlorobenzene	ND	330						0	0	20	
1,4-Dioxane	ND	330						0	0	20	
2,4,5-Trichlorophenol	ND	330						0	0	20	
2,4,6-Trichlorophenol	ND	330						0	0	20	
2,4-Dichlorophenol	ND	1600						0	0	20	
2,4-Dimethylphenol	ND	330						0	0	20	
2,4-Dinitrophenol	ND	1600						0	0	20	
2,4-Dinitrotoluene	ND	330						0	0	20	
2,6-Dinitrotoluene	ND	330						0	0	20	
2-Chloronaphthalene	ND	330						0	0	20	
2-Chlorophenol	ND	330						0	0	20	
2-Methylnaphthalene	ND	330						0	0	20	
2-Methylphenol	ND	330						0	0	20	
2-Nitroaniline	ND	1600						0	0	20	
2-Nitrophenol	ND	330						0	0	20	
3,3´-Dichlorobenzidine	ND	660						0	0	20	
3-Nitroaniline	ND	1600						0	0	20	
4,6-Dinitro-2-methylphenol	ND	1600						0	0	20	
4-Bromophenyl-phenylether	ND	330						0	0	20	
4-Chloro-3-methylphenol	ND	660						0	0	20	
4-Chloroaniline	ND	660						0	0	20	
4-Chlorophenyl-phenylether	ND	330						0	0	20	
3/4-Methylphenol	ND	330						0	0	20	
4-Methylphenol	ND	330						0	0	20	
4-Nitroaniline	ND	1600						0	0	20	
4-Nitrophenol	ND	1600						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **105905-001ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **6/15/2009** RunNo: **109894**
Client ID: **PP3 (0')** Batch ID: **55905** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **6/15/2009** SeqNo: **1725609**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acenaphthene	ND	330						0	0	20	
Acenaphthylene	ND	330						0	0	20	
Aniline	ND	330						0	0	20	
Anthracene	ND	330						0	0	20	
Benzidine (M)	ND	1600						0	0	20	
Benzo(a)anthracene	ND	330						0	0	20	
Benzo(a)pyrene	ND	330						0	0	20	
Benzo(b)fluoranthene	ND	330						0	0	20	
Benzo(g,h,i)perylene	ND	330						0	0	20	
Benzo(k)fluoranthene	ND	330						0	0	20	
Benzoic acid	ND	1600						0	0	20	
Benzyl alcohol	ND	660						0	0	20	
Bis(2-chloroethoxy)methane	ND	330						0	0	20	
Bis(2-chloroethyl)ether	ND	330						0	0	20	
Bis(2-chloroisopropyl)ether	ND	330						0	0	20	
Bis(2-ethylhexyl)phthalate	ND	330						0	0	20	
Butylbenzylphthalate	ND	330						0	0	20	
Carbazole	ND	330						0	0	20	
Chrysene	ND	330						0	0	20	
Di-n-butylphthalate	ND	330						0	0	20	
Di-n-octylphthalate	ND	330						0	0	20	
Dibenz(a,h)anthracene	ND	330						0	0	20	
Dibenzofuran	ND	330						0	0	20	
Diethylphthalate	ND	330						0	0	20	
Dimethylphthalate	ND	330						0	0	20	
Fluoranthene	ND	330						0	0	20	
Fluorene	ND	330						0	0	20	
Hexachlorobenzene	ND	330						0	0	20	
Hexachlorobutadiene	ND	660						0	0	20	
Hexachlorocyclopentadiene	ND	660						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **105905-001ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **6/15/2009** RunNo: **109894**
Client ID: **PP3 (0')** Batch ID: **55905** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **6/15/2009** SeqNo: **1725609**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Hexachloroethane	ND	330						0	0	20	
Indeno(1,2,3-cd)pyrene	ND	330						0	0	20	
Isophorone	ND	330						0	0	20	
N-Nitrosodi-n-propylamine	ND	330						0	0	20	
N-Nitrosodimethylamine	ND	330						0	0	20	
N-Nitrosodiphenylamine	ND	330						0	0	20	
Naphthalene	ND	330						0	0	20	
Nitrobenzene	ND	330						0	0	20	
Pentachlorophenol	ND	1600						0	0	20	
Phenanthrene	ND	330						0	0	20	
Phenol	ND	330						0	0	20	
Pyrene	ND	330						0	0	20	
Pyridine	ND	1600						0	0	20	
Surr: 1,2-Dichlorobenzene-d4	3014.333		3330		90.5	49	103		0	0	
Surr: 2,4,6-Tribromophenol	3899.000		3330		117	47	129		0	0	
Surr: 2-Chlorophenol-d4	3250.333		3330		97.6	54	109		0	0	
Surr: 2-Fluorobiphenyl	3065.000		3330		92.0	59	108		0	0	
Surr: 2-Fluorophenol	3138.333		3330		94.2	50	111		0	0	
Surr: 4-Terphenyl-d14	3535.667		3330		106	58	135		0	0	
Surr: Nitrobenzene-d5	3425.667		3330		103	54	115		0	0	
Surr: Phenol-d5	3258.000		3330		97.8	58	112		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-55929** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **6/15/2009** RunNo: **109935**
Client ID: **PBS** Batch ID: **55929** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **6/16/2009** SeqNo: **1726295**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	330									
1,2-Dichlorobenzene	ND	330									
1,3-Dichlorobenzene	ND	330									
1,4-Dichlorobenzene	ND	330									
2,4,5-Trichlorophenol	ND	330									
2,4,6-Trichlorophenol	ND	330									
2,4-Dichlorophenol	ND	1600									
2,4-Dimethylphenol	ND	330									
2,4-Dinitrophenol	ND	1600									
2,4-Dinitrotoluene	ND	330									
2,6-Dinitrotoluene	ND	330									
2-Chloronaphthalene	ND	330									
2-Chlorophenol	ND	330									
2-Methylnaphthalene	ND	330									
2-Methylphenol	ND	330									
2-Nitroaniline	ND	1600									
2-Nitrophenol	ND	330									
3,3´-Dichlorobenzidine	ND	660									
3-Nitroaniline	ND	1600									
4,6-Dinitro-2-methylphenol	ND	1600									
4-Bromophenyl-phenylether	ND	330									
4-Chloro-3-methylphenol	ND	660									
4-Chloroaniline	ND	660									
4-Chlorophenyl-phenylether	ND	330									
4-Methylphenol	ND	330									
4-Nitroaniline	ND	1600									
4-Nitrophenol	ND	1600									
Acenaphthene	ND	330									
Acenaphthylene	ND	330									
Anthracene	ND	330									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-55929** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **6/15/2009** RunNo: **109935**
Client ID: **PBS** Batch ID: **55929** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **6/16/2009** SeqNo: **1726295**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzidine (M)	ND	1600									
Benzo(a)anthracene	ND	330									
Benzo(a)pyrene	ND	330									
Benzo(b)fluoranthene	ND	330									
Benzo(g,h,i)perylene	ND	330									
Benzo(k)fluoranthene	ND	330									
Benzoic acid	ND	1600									
Benzyl alcohol	ND	660									
Bis(2-chloroethoxy)methane	ND	330									
Bis(2-chloroethyl)ether	ND	330									
Bis(2-chloroisopropyl)ether	ND	330									
Bis(2-ethylhexyl)phthalate	ND	330									
Butylbenzylphthalate	ND	330									
Chrysene	ND	330									
Di-n-butylphthalate	ND	330									
Di-n-octylphthalate	ND	330									
Dibenz(a,h)anthracene	ND	330									
Dibenzofuran	ND	330									
Diethylphthalate	ND	330									
Dimethylphthalate	ND	330									
Fluoranthene	ND	330									
Fluorene	ND	330									
Hexachlorobenzene	ND	330									
Hexachlorobutadiene	ND	660									
Hexachlorocyclopentadiene	ND	660									
Hexachloroethane	ND	330									
Indeno(1,2,3-cd)pyrene	ND	330									
Isophorone	ND	330									
N-Nitrosodi-n-propylamine	ND	330									
N-Nitrosodiphenylamine	ND	330									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **MB-55929** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **6/15/2009** RunNo: **109935**
Client ID: **PBS** Batch ID: **55929** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **6/16/2009** SeqNo: **1726295**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	330									
Nitrobenzene	ND	330									
Pentachlorophenol	ND	1600									
Phenanthrene	ND	330									
Phenol	ND	330									
Pyrene	ND	330									
Surr: 1,2-Dichlorobenzene-d4	2690.667		3330		80.8	49	103				
Surr: 2,4,6-Tribromophenol	2908.667		3330		87.3	47	129				
Surr: 2-Chlorophenol-d4	2846.333		3330		85.5	54	109				
Surr: 2-Fluorobiphenyl	2833.333		3330		85.1	59	108				
Surr: 2-Fluorophenol	2806.667		3330		84.3	50	111				
Surr: 4-Terphenyl-d14	3346.000		3330		100	58	135				
Surr: Nitrobenzene-d5	2836.667		3330		85.2	54	115				
Surr: Phenol-d5	2883.000		3330		86.6	58	112				

Sample ID: **LCS-55929** SampType: **LCS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **6/15/2009** RunNo: **109935**
Client ID: **LCSS** Batch ID: **55929** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **6/16/2009** SeqNo: **1726296**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	2906.333	330	3330	0	87.3	61	107				
1,4-Dichlorobenzene	2688.667	330	3330	0	80.7	56	100				
2,4-Dinitrotoluene	3341.000	330	3330	0	100	72	130				
2-Chlorophenol	2759.333	330	3330	0	82.9	64	105				
4-Chloro-3-methylphenol	3172.000	660	3330	0	95.3	74	125				
4-Nitrophenol	3231.333	1600	3330	0	97.0	77	137				
Acenaphthene	3025.000	330	3330	0	90.8	63	117				
N-Nitrosodi-n-propylamine	3073.667	330	3330	0	92.3	71	121				
Pentachlorophenol	3188.000	1600	3330	0	95.7	69	125				
Phenol	2851.333	330	3330	0	85.6	67	111				
Pyrene	3145.000	330	3330	0	94.4	60	122				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

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CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **LCS-55929** SampType: **LCS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **6/15/2009** RunNo: **109935**
Client ID: **LCSS** Batch ID: **55929** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **6/16/2009** SeqNo: **1726296**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 1,2-Dichlorobenzene-d4	2635.333		3330		79.1	49	103				
Surr: 2,4,6-Tribromophenol	3360.667		3330		101	47	129				
Surr: 2-Chlorophenol-d4	2769.333		3330		83.2	54	109				
Surr: 2-Fluorobiphenyl	2897.000		3330		87.0	59	108				
Surr: 2-Fluorophenol	2663.000		3330		80.0	50	111				
Surr: 4-Terphenyl-d14	3309.000		3330		99.4	58	135				
Surr: Nitrobenzene-d5	2745.667		3330		82.5	54	115				
Surr: Phenol-d5	2812.000		3330		84.4	58	112				

Sample ID: **105919-006AMS** SampType: **MS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **6/15/2009** RunNo: **109935**
Client ID: **ZZZZZZ** Batch ID: **55929** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **6/16/2009** SeqNo: **1726297**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	3042.333	330	3330	0	91.4	60	105				
1,4-Dichlorobenzene	2732.000	330	3330	0	82.0	50	99				
2,4-Dinitrotoluene	3334.667	330	3330	0	100	70	130				
2-Chlorophenol	2874.667	330	3330	0	86.3	58	107				
4-Chloro-3-methylphenol	3209.333	660	3330	0	96.4	72	124				
4-Nitrophenol	3110.667	1600	3330	0	93.4	69	139				
Acenaphthene	3042.000	330	3330	0	91.4	59	118				
N-Nitrosodi-n-propylamine	3087.667	330	3330	0	92.7	61	125				
Pentachlorophenol	3114.333	1600	3330	0	93.5	56	131				
Phenol	2920.000	330	3330	0	87.7	60	113				
Pyrene	3062.667	330	3330	0	92.0	51	130				
Surr: 1,2-Dichlorobenzene-d4	2697.667		3330		81.0	49	103				
Surr: 2,4,6-Tribromophenol	3324.333		3330		99.8	47	129				
Surr: 2-Chlorophenol-d4	2864.000		3330		86.0	54	109				
Surr: 2-Fluorobiphenyl	2892.333		3330		86.9	59	108				
Surr: 2-Fluorophenol	2805.667		3330		84.3	50	111				
Surr: 4-Terphenyl-d14	3238.000		3330		97.2	58	135				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **105919-006AMS** SampType: **MS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **6/15/2009** RunNo: **109935**
Client ID: **ZZZZZZ** Batch ID: **55929** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **6/16/2009** SeqNo: **1726297**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	2807.333		3330		84.3	54	115				
Surr: Phenol-d5	2861.333		3330		85.9	58	112				

Sample ID: **105919-006AMSD** SampType: **MSD** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **6/15/2009** RunNo: **109935**
Client ID: **ZZZZZZ** Batch ID: **55929** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **6/16/2009** SeqNo: **1726298**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	3199.333	330	3330	0	96.1	60	105	3042	5.03	20	
1,4-Dichlorobenzene	2894.667	330	3330	0	86.9	50	99	2732	5.78	20	
2,4-Dinitrotoluene	3572.333	330	3330	0	107	70	130	3335	6.88	20	
2-Chlorophenol	3001.333	330	3330	0	90.1	58	107	2875	4.31	20	
4-Chloro-3-methylphenol	3364.667	660	3330	0	101	72	124	3209	4.73	20	
4-Nitrophenol	3207.000	1600	3330	0	96.3	69	139	3111	3.05	20	
Acenaphthene	3259.667	330	3330	0	97.9	59	118	3042	6.91	20	
N-Nitrosodi-n-propylamine	3211.667	330	3330	0	96.4	61	125	3088	3.94	20	
Pentachlorophenol	3341.333	1600	3330	0	100	56	131	3114	7.03	20	
Phenol	3049.000	330	3330	0	91.6	60	113	2920	4.32	20	
Pyrene	3324.333	330	3330	0	99.8	51	130	3063	8.19	20	
Surr: 1,2-Dichlorobenzene-d4	2788.667		3330		83.7	49	103		0	0	
Surr: 2,4,6-Tribromophenol	3554.667		3330		107	47	129		0	0	
Surr: 2-Chlorophenol-d4	2997.000		3330		90.0	54	109		0	0	
Surr: 2-Fluorobiphenyl	3048.333		3330		91.5	59	108		0	0	
Surr: 2-Fluorophenol	2903.667		3330		87.2	50	111		0	0	
Surr: 4-Terphenyl-d14	3391.000		3330		102	58	135		0	0	
Surr: Nitrobenzene-d5	2941.333		3330		88.3	54	115		0	0	
Surr: Phenol-d5	2978.667		3330		89.4	58	112		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **105919-004ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **6/15/2009** RunNo: **109935**
Client ID: **ZZZZZZ** Batch ID: **55929** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **6/16/2009** SeqNo: **1726301**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	330						0	0	20	
1,2-Dichlorobenzene	ND	330						0	0	20	
1,3-Dichlorobenzene	ND	330						0	0	20	
1,4-Dichlorobenzene	ND	330						0	0	20	
2,4,5-Trichlorophenol	ND	330						0	0	20	
2,4,6-Trichlorophenol	ND	330						0	0	20	
2,4-Dichlorophenol	ND	1600						0	0	20	
2,4-Dimethylphenol	ND	330						0	0	20	
2,4-Dinitrophenol	ND	1600						0	0	20	
2,4-Dinitrotoluene	ND	330						0	0	20	
2,6-Dinitrotoluene	ND	330						0	0	20	
2-Chloronaphthalene	ND	330						0	0	20	
2-Chlorophenol	ND	330						0	0	20	
2-Methylnaphthalene	ND	330						0	0	20	
2-Methylphenol	ND	330						0	0	20	
2-Nitroaniline	ND	1600						0	0	20	
2-Nitrophenol	ND	330						0	0	20	
3,3´-Dichlorobenzidine	ND	660						0	0	20	
3-Nitroaniline	ND	1600						0	0	20	
4,6-Dinitro-2-methylphenol	ND	1600						0	0	20	
4-Bromophenyl-phenylether	ND	330						0	0	20	
4-Chloro-3-methylphenol	ND	660						0	0	20	
4-Chloroaniline	ND	660						0	0	20	
4-Chlorophenyl-phenylether	ND	330						0	0	20	
4-Methylphenol	ND	330						0	0	20	
4-Nitroaniline	ND	1600						0	0	20	
4-Nitrophenol	ND	1600						0	0	20	
Acenaphthene	ND	330						0	0	20	
Acenaphthylene	ND	330						0	0	20	
Anthracene	ND	330						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **105919-004ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **6/15/2009** RunNo: **109935**
Client ID: **ZZZZZZ** Batch ID: **55929** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **6/16/2009** SeqNo: **1726301**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzidine (M)	ND	1600						0	0	20	
Benzo(a)anthracene	ND	330						0	0	20	
Benzo(a)pyrene	ND	330						0	0	20	
Benzo(b)fluoranthene	ND	330						0	0	20	
Benzo(g,h,i)perylene	ND	330						0	0	20	
Benzo(k)fluoranthene	ND	330						0	0	20	
Benzoic acid	ND	1600						0	0	20	
Benzyl alcohol	ND	660						0	0	20	
Bis(2-chloroethoxy)methane	ND	330						0	0	20	
Bis(2-chloroethyl)ether	ND	330						0	0	20	
Bis(2-chloroisopropyl)ether	ND	330						0	0	20	
Bis(2-ethylhexyl)phthalate	ND	330						0	0	20	
Butylbenzylphthalate	ND	330						0	0	20	
Chrysene	ND	330						0	0	20	
Di-n-butylphthalate	ND	330						0	0	20	
Di-n-octylphthalate	ND	330						0	0	20	
Dibenz(a,h)anthracene	ND	330						0	0	20	
Dibenzofuran	ND	330						0	0	20	
Diethylphthalate	ND	330						0	0	20	
Dimethylphthalate	ND	330						0	0	20	
Fluoranthene	ND	330						0	0	20	
Fluorene	ND	330						0	0	20	
Hexachlorobenzene	ND	330						0	0	20	
Hexachlorobutadiene	ND	660						0	0	20	
Hexachlorocyclopentadiene	ND	660						0	0	20	
Hexachloroethane	ND	330						0	0	20	
Indeno(1,2,3-cd)pyrene	ND	330						0	0	20	
Isophorone	ND	330						0	0	20	
N-Nitrosodi-n-propylamine	ND	330						0	0	20	
N-Nitrosodiphenylamine	ND	330						0	0	20	

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits

Calculations are based on raw values

- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_S_FULL

Sample ID: **105919-004ADUP** SampType: **DUP** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **6/15/2009** RunNo: **109935**
Client ID: **ZZZZZZ** Batch ID: **55929** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **6/16/2009** SeqNo: **1726301**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	330						0	0	20	
Nitrobenzene	ND	330						0	0	20	
Pentachlorophenol	ND	1600						0	0	20	
Phenanthrene	ND	330						0	0	20	
Phenol	ND	330						0	0	20	
Pyrene	ND	330						0	0	20	
Surr: 1,2-Dichlorobenzene-d4	2737.000		3330		82.2	49	103		0	0	
Surr: 2,4,6-Tribromophenol	2931.000		3330		88.0	47	129		0	0	
Surr: 2-Chlorophenol-d4	2978.667		3330		89.4	54	109		0	0	
Surr: 2-Fluorobiphenyl	2929.667		3330		88.0	59	108		0	0	
Surr: 2-Fluorophenol	2917.000		3330		87.6	50	111		0	0	
Surr: 4-Terphenyl-d14	3564.667		3330		107	58	135		0	0	
Surr: Nitrobenzene-d5	2932.333		3330		88.1	54	115		0	0	
Surr: Phenol-d5	3016.333		3330		90.6	58	112		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_W_FULL

Sample ID: **MB-55930** SampType: **MBLK** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **6/16/2009** RunNo: **109999**
Client ID: **PBW** Batch ID: **55930** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **6/17/2009** SeqNo: **1727699**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	10									
1,2-Dichlorobenzene	ND	10									
1,3-Dichlorobenzene	ND	10									
1,4-Dichlorobenzene	ND	10									
2,4,5-Trichlorophenol	ND	10									
2,4,6-Trichlorophenol	ND	10									
2,4-Dichlorophenol	ND	10									
2,4-Dimethylphenol	ND	10									
2,4-Dinitrophenol	ND	50									
2,4-Dinitrotoluene	ND	10									
2,6-Dinitrotoluene	ND	10									
2-Chloronaphthalene	ND	10									
2-Chlorophenol	ND	10									
2-Methylnaphthalene	ND	10									
2-Methylphenol	ND	10									
2-Nitroaniline	ND	50									
2-Nitrophenol	ND	10									
3,3´-Dichlorobenzidine	ND	20									
3-Nitroaniline	ND	50									
4,6-Dinitro-2-methylphenol	ND	50									
4-Bromophenyl-phenylether	ND	10									
4-Chloro-3-methylphenol	ND	50									
4-Chloroaniline	ND	20									
4-Chlorophenyl-phenylether	ND	10									
4-Methylphenol	ND	10									
4-Nitroaniline	ND	20									
4-Nitrophenol	ND	50									
Acenaphthene	ND	10									
Acenaphthylene	ND	10									
Anthracene	ND	10									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_W_FULL

Sample ID: **MB-55930** SampType: **MBLK** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **6/16/2009** RunNo: **109999**
Client ID: **PBW** Batch ID: **55930** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **6/17/2009** SeqNo: **1727699**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzidine (M)	ND	50									
Benzo(a)anthracene	ND	10									
Benzo(a)pyrene	ND	10									
Benzo(b)fluoranthene	ND	10									
Benzo(g,h,i)perylene	ND	10									
Benzo(k)fluoranthene	ND	10									
Benzoic acid	ND	50									
Benzyl alcohol	ND	20									
Bis(2-chloroethoxy)methane	ND	10									
Bis(2-chloroethyl)ether	ND	10									
Bis(2-chloroisopropyl)ether	ND	10									
Bis(2-ethylhexyl)phthalate	ND	10									
Butylbenzylphthalate	ND	10									
Chrysene	ND	10									
Di-n-butylphthalate	ND	10									
Di-n-octylphthalate	ND	10									
Dibenz(a,h)anthracene	ND	10									
Dibenzofuran	ND	10									
Diethylphthalate	ND	10									
Dimethylphthalate	ND	10									
Fluoranthene	ND	10									
Fluorene	ND	10									
Hexachlorobenzene	ND	10									
Hexachlorobutadiene	ND	20									
Hexachlorocyclopentadiene	ND	10									
Hexachloroethane	ND	10									
Indeno(1,2,3-cd)pyrene	ND	10									
Isophorone	ND	10									
N-Nitrosodi-n-propylamine	ND	10									
N-Nitrosodiphenylamine	ND	10									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_W_FULL

Sample ID: **MB-55930** SampType: **MBLK** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **6/16/2009** RunNo: **109999**
Client ID: **PBW** Batch ID: **55930** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **6/17/2009** SeqNo: **1727699**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	10									
Nitrobenzene	ND	10									
Pentachlorophenol	ND	50									
Phenanthrene	ND	10									
Phenol	ND	10									
Pyrene	ND	10									
Surr: 1,2-Dichlorobenzene-d4	72.820		100.0		72.8	42	98				
Surr: 2,4,6-Tribromophenol	93.210		100.0		93.2	60	128				
Surr: 2-Chlorophenol-d4	72.760		100.0		72.8	43	102				
Surr: 2-Fluorobiphenyl	79.300		100.0		79.3	50	108				
Surr: 2-Fluorophenol	46.100		100.0		46.1	22	69				
Surr: 4-Terphenyl-d14	98.890		100.0		98.9	66	130				
Surr: Nitrobenzene-d5	80.350		100.0		80.4	47	117				
Surr: Phenol-d5	32.710		100.0		32.7	16	50				

Sample ID: **LCS-55930** SampType: **LCS** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **6/16/2009** RunNo: **109999**
Client ID: **LCSW** Batch ID: **55930** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **6/17/2009** SeqNo: **1727700**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	80.740	10	100.0	0	80.7	54	110				
1,4-Dichlorobenzene	71.960	10	100.0	0	72.0	48	103				
2,4-Dinitrotoluene	100.130	10	100.0	0	100	69	136				
2-Chlorophenol	72.120	10	100.0	0	72.1	53	100				
4-Chloro-3-methylphenol	91.070	50	100.0	0	91.1	70	124				
4-Nitrophenol	44.890	50	100.0	0	44.9	32	69				
Acenaphthene	88.680	10	100.0	0	88.7	64	118				
N-Nitrosodi-n-propylamine	89.330	10	100.0	0	89.3	62	130				
Pentachlorophenol	93.770	50	100.0	0	93.8	64	130				
Phenol	34.080	10	100.0	0	34.1	25	50				
Pyrene	94.210	10	100.0	0	94.2	66	123				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_W_FULL

Sample ID: **LCS-55930** SampType: **LCS** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **6/16/2009** RunNo: **109999**
Client ID: **LCSW** Batch ID: **55930** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **6/17/2009** SeqNo: **1727700**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 1,2-Dichlorobenzene-d4	66.890		100.0		66.9	42	98				
Surr: 2,4,6-Tribromophenol	98.010		100.0		98.0	60	128				
Surr: 2-Chlorophenol-d4	70.180		100.0		70.2	43	102				
Surr: 2-Fluorobiphenyl	79.400		100.0		79.4	50	108				
Surr: 2-Fluorophenol	42.870		100.0		42.9	22	69				
Surr: 4-Terphenyl-d14	92.300		100.0		92.3	66	130				
Surr: Nitrobenzene-d5	76.280		100.0		76.3	47	117				
Surr: Phenol-d5	31.520		100.0		31.5	16	50				

Sample ID: **105903-025AMS** SampType: **MS** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **6/16/2009** RunNo: **109999**
Client ID: **ZZZZZZ** Batch ID: **55930** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **6/17/2009** SeqNo: **1727701**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	80.120	10	100.0	0	80.1	54	110				
1,4-Dichlorobenzene	72.720	10	100.0	0	72.7	48	103				
2,4-Dinitrotoluene	107.200	10	100.0	0	107	69	136				
2-Chlorophenol	71.320	10	100.0	0	71.3	53	100				
4-Chloro-3-methylphenol	91.030	50	100.0	0	91.0	70	124				
4-Nitrophenol	45.090	50	100.0	0	45.1	32	69				
Acenaphthene	89.330	10	100.0	0	89.3	64	118				
N-Nitrosodi-n-propylamine	86.350	10	100.0	0	86.4	62	130				
Pentachlorophenol	102.580	50	100.0	0	103	64	130				
Phenol	32.000	10	100.0	0	32.0	25	50				
Pyrene	100.470	10	100.0	0	100	66	123				
Surr: 1,2-Dichlorobenzene-d4	67.890		100.0		67.9	42	98				
Surr: 2,4,6-Tribromophenol	103.470		100.0		103	60	128				
Surr: 2-Chlorophenol-d4	68.940		100.0		68.9	43	102				
Surr: 2-Fluorobiphenyl	77.460		100.0		77.5	50	108				
Surr: 2-Fluorophenol	41.590		100.0		41.6	22	69				
Surr: 4-Terphenyl-d14	98.310		100.0		98.3	66	130				

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike/Surrogate outside of limits due to matrix interference
- DO Surrogate Diluted Out

Calculations are based on raw values

CLIENT: Geocon Consultants, Inc.
Work Order: 105905
Project: Caltrans Dumbarton Bridge, E8435-06-18

ANALYTICAL QC SUMMARY REPORT

TestCode: 8270_W_FULL

Sample ID: **105903-025AMS** SampType: **MS** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **6/16/2009** RunNo: **109999**
Client ID: **ZZZZZZ** Batch ID: **55930** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **6/17/2009** SeqNo: **1727701**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	76.010		100.0		76.0	47	117				
Surr: Phenol-d5	29.250		100.0		29.2	16	50				

Sample ID: **105903-025AMSD** SampType: **MSD** TestCode: **8270_W_FUL** Units: **µg/L** Prep Date: **6/16/2009** RunNo: **109999**
Client ID: **ZZZZZZ** Batch ID: **55930** TestNo: **EPA 8270C** **EPA 3510C** Analysis Date: **6/17/2009** SeqNo: **1727702**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	78.790	10	100.0	0	78.8	54	110	80.12	1.67	20	
1,4-Dichlorobenzene	72.070	10	100.0	0	72.1	48	103	72.72	0.898	20	
2,4-Dinitrotoluene	108.710	10	100.0	0	109	69	136	107.2	1.40	20	
2-Chlorophenol	71.330	10	100.0	0	71.3	53	100	71.32	0.0140	20	
4-Chloro-3-methylphenol	89.770	50	100.0	0	89.8	70	124	91.03	1.39	20	
4-Nitrophenol	46.420	50	100.0	0	46.4	32	69	45.09	0	20	
Acenaphthene	89.090	10	100.0	0	89.1	64	118	89.33	0.269	20	
N-Nitrosodi-n-propylamine	86.090	10	100.0	0	86.1	62	130	86.35	0.302	20	
Pentachlorophenol	101.390	50	100.0	0	101	64	130	102.6	1.17	20	
Phenol	31.910	10	100.0	0	31.9	25	50	32.00	0.282	20	
Pyrene	101.070	10	100.0	0	101	66	123	100.5	0.595	20	
Surr: 1,2-Dichlorobenzene-d4	68.060		100.0		68.1	42	98		0	0	
Surr: 2,4,6-Tribromophenol	104.300		100.0		104	60	128		0	0	
Surr: 2-Chlorophenol-d4	69.440		100.0		69.4	43	102		0	0	
Surr: 2-Fluorobiphenyl	78.010		100.0		78.0	50	108		0	0	
Surr: 2-Fluorophenol	42.030		100.0		42.0	22	69		0	0	
Surr: 4-Terphenyl-d14	93.510		100.0		93.5	66	130		0	0	
Surr: Nitrobenzene-d5	75.740		100.0		75.7	47	117		0	0	
Surr: Phenol-d5	30.030		100.0		30.0	16	50		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#: _____

Logged By: _____ Date: 06/12/09

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: GSO

Sample Condition Upon Receipt
1. CHILLED 3.9 Y ☑ N ☐ 4. SEALED Y ☐ N ☑
2. HEADSPACE (VOA) Y ☐ N ☐ 5. # OF SPLS MATCH COC Y ☐ N ☐
3. CONTAINER INTACT Y ☑ N ☐ 6. PRESERVED Y ☑ N ☐

Client: Geocon Consultants
Attn: John Love
Address: 6671 Brisa St.
City Livermore State CA Zip Code 94550
TEL: (925) 371-5900
FAX: (925) 371-5915

Project Name: Caltrans Dumbarton Bridge
Project #: E8435-06-18
Sampler: (Printed Name) John Love (Signature)

Relinquished by: (Signature and Printed Name) John Love	Date: 6/11/09	Time: 16:30	Received by: (Signature and Printed Name)		Date: 6/12/09	Time: 9:15
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)		Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)		Date:	Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
John Love 6/11/09
Print Name Date
Signature

Send Report To:
Attn: _____
Co: same as above
Address _____
City _____ State _____ Zip _____

Bill To:
Attn: _____
Co: same as above
Address _____
City _____ State _____ Zip _____

Special Instructions/Comments:
soil cleanup

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

Circle or Add Analysis(es) Requested: 8081A (Pesticides) | 8082 (PCB) | 8260B (Volatiles) | 8270C (BNA) | 6010B (Total Metal) | 8015B (GRO) / 8020 (BTEX) | 8015B (DRO) | 8021 (BTEX) | TITLE 22 / CAM 17 (6010 / 7000) | TPHd+TPHmo w/silica gel (5270) | 5VOCs (8270)

SPECIFY APPROPRIATE MATRIX: SOIL | WATER | GROUND WATER | WASTEWATER

PRESERVATION

Q A / Q C: RTNE ☐ CT ☐ SWRCB ☐ Logcode ____ OTHER ____

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	TITLE 22 / CAM 17	TPHd+TPHmo w/silica gel	5VOCs (8270)	SOIL	TAT	Container(s) #	Container(s) Type	REMARKS
	105905-001	PP3 (0')	6/11/09	9:45	X	X	X	X	E	1	T P	
	002	PP3 (5')		9:50	X	X	X	X		1		
	003	PP3 (10')		9:55	X	X	X	X		1		
	004	PP1 (0')		10:05	X	X	X	X		1		
	005	PP1 (5')		10:10	X	X	X	X		1		
	006	PP1 (10')		10:15	X	X	X	X		1		
	007	PP2 (0')		10:30	X	X	X	X		1		
	008	PP2 (5')		10:35	X	X	X	X		1		
	009	PP2 (10')		10:40	X	X	X	X		1		

- TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=Hcl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter.

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#: _____
Logged By: _____ Date: 6/12/09

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other: _____

Sample Condition Upon Receipt
1. CHILLED Y☐ N☐ 4. SEALED Y☐ N☐
2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐
3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client: Geocon Consultants
Attn: John Love
Address: 6671 Brisa St.
City Livermore State CA Zip Code 94550
TEL: (925) 371-5900
FAX: (925) 371-5915

Project Name: Caltrans Dumbarton Bridge Project #: E8435-06-18 Sampler: (Printed Name) (Signature)

Relinquished by: (Signature and Printed Name) John Love	Date: 6/11/09	Time: 16:30	Received by: (Signature and Printed Name)		Date: 6/12/09	Time: 915
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)		Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)		Date:	Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
John Love 6/11/09
Print Name Date
Signature

Send Report To:
Attn: _____
Co: same as above
Address _____
City _____ State _____ Zip _____

Bill To:
Attn: _____
Co: same as above
Address _____
City _____ State _____ Zip _____

Special Instructions/Comments:
Target cleanup

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

Circle or Add Analysis(es) Requested: 8081A (Pesticides); 8082 (PCB); 8260B (Volatiles); 8270C (BNA) SVOCs; 6010B (Total Metal); 8015B (GRO) + 8020 (BTEX) + TPH mo w/silica gel; 8015B (DRO); 8021 (BTEX); TITLE 22 / CAM 17 (6010 / 7000)

SPECIFY APPROPRIATE MATRIX: SOIL; WATER; GROUND WATER; WASTEWATER

PRESERVATION

Q A / Q C: RTNE ☐ CT ☐ SWRCB ☐ Logcode ____ OTHER ____

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	TAT	Container(s): #	Type	PRESERVATION	REMARKS
	105905-040	PP2GW	6/11/09	13:45	E	2	VG	H	
	~~041~~					2	VG	H	
	~~042~~					1	LG		
	~~043~~					1	LG		
	105905-044	011 FW4A (0')	6/11/09	12:20	E	1	JG		
	~~045~~	012 SS-1		12:30		2	JG		
	~~046~~	013 SS-2		12:35		2	JG		
	~~047~~	014 Trip Blank	6/11/09		E	4	VG	H	

- TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr; B= Emergency Next workday; C= Critical 2 Workdays; D= Urgent 3 Workdays; E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter.

Diane Galvan

From: Christine
Sent: Monday, June 15, 2009 11:28 PM
To: John Love
Cc: Carmen Aguila; Diane Galvan
Subject: RE: Clarification for Project Caltrans Dumbarton Bridge, E8435-06-18

From: John Love [mailto:love@geoconinc.com]
Sent: Mon 6/15/2009 8:34 AM
To: Christine
Subject: RE: Clarification for Project Caltrans Dumbarton Bridge, E8435-06-18

Hi Christine:

Sorry for the mix up. The sample collected at 10:15 would be sample PP-1 10'.

Go ahead and analyze the trip blanks anyway. Also, if you could send us a new box of trip blanks that would be greatly appreciated.

Thanks.

John Love

From: Christine [mailto:christine@atlglobal.com]
Sent: Friday, June 12, 2009 1:53 PM
To: love@geoconinc.com
Cc: Carmen Aguila; Diane Galvan; bing@atlglobal.com; Edric Caballero; Ed Caballero
Subject: Clarification for Project Caltrans Dumbarton Bridge, E8435-06-18

Dear John,

We received your samples for project "Caltrans Dumbarton Bridge, E8435-06-18" this morning. If you can help me clarify the following the issues will be greatly appreciated.

1. We are missing sample PP1 (10') collected on 06/11/09 10:15am, however, we received two samples for PP3 (10'), one was collected at 9:55 as indicated in the COC, one was collected at 10:15am.

2. There is headspace greater than 5-6mm in all four VOA vials for the trip blank. Would you like us to proceed the analyses as indicated in the COC for these samples?

Should you have any questions, please feel free to e-mail me or contact me anytime at 562-989-4045 ext 236. I look forward to hearing from you soon.

Kind Regards,

Christine Caballero
Sample Control Department
Advanced Technology Laboratories

APPENDIX D

PROJECT NO. **E8435-06-018**

BORING NO. E10A

DATE DRILLED 3/19/09 WATER LEVEL (ATD) 3.0'

EQUIPMENT GEOPROBE DRILLER GREGG DRILLING

DEPTH IN FEET	PENETRAT. RESIST. BLOWS/FT.	SAMPLE NO.	LITHOLOGY	SOIL DESCRIPTION	SOIL (USCS)	HEADSPACE (PPM)
1				**FILL** Sand, silt, clay, gravel		
2						
3				▼		
4				Firm, moist, brown, fine to medium Sandy CLAY, some rounded gravel, low plasticity, no odor	CL	
5						
6						
7				Soft, very moist, dark gray, Silty CLAY (BAY MUD), sticky, hydrogen sulfide odor	CL	
8						
9						
10						
11						
12				- off gasing observed in borehold between 12'-16'		
13						
14						
15						
16				BORING TERMINATED AT 16 FEET		

Figure 10, Log of Boring E10A, page 1 of 1

ENV_NO_WELL E8415-06-62 BORING LOGS.GPJ 06/09/09

BORING ELEVATION:	ENGINEER/GEOLOGIST: **JOHN LOVE**

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **E8435-06-018**

BORING NO. E10BGW

DATE DRILLED 3/19/09 WATER LEVEL (ATD) 6.0'

EQUIPMENT GEOPROBE DRILLER GREGG DRILLING

DEPTH IN FEET	PENETRAT. RESIST. BLOWS/FT.	SAMPLE NO.	LITHOLOGY	SOIL DESCRIPTION	SOIL (USCS)	HEADSPACE (PPM)
1				TOP SOIL		
2				Soft, moist, brown, Sandy CLAY, some gravel, low plasticity, no odor	CL	
3				▼		
4						
5						
6				Soft, saturated, brown, Clayey GRAVEL and Gravelly CLAY, low plasticity, no odor	GC/CL	
7						
8				- no recovery (8'-12')		
9						
10						
11						
12				Soft, very moist, brown, Silty CLAY (BAY MUD), low plasticity, sticky, hydrogen sulfide odor	CL	
13						
14						
15				- gray		
16				BORING TERMINATED AT 16 FEET		

Figure 14, Log of Boring E10BGW, page 1 of 1

ENV_NO_WELL E8415-06-62 BORING LOGS.GPJ 06/09/09

BORING ELEVATION:	ENGINEER/GEOLOGIST: **JOHN LOVE**

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **E8435-06-018**

BORING NO. E15A

DATE DRILLED 3/19/09 WATER LEVEL (ATD) 13.0'

EQUIPMENT GEOPROBE DRILLER GREGG DRILLING

DEPTH IN FEET	PENETRAT. RESIST. BLOWS/FT.	SAMPLE NO.	LITHOLOGY	SOIL DESCRIPTION	SOIL (USCS)	HEADSPACE (PPM)
1				**FILL** Sand, silt, clay, gravel		
2						
3						
4						
5				Firm, moist, brown, fine to coarse Sandy CLAY, low plasticity, no odor	CL	
6						
7						
8						
9				Soft, very moist, dark gray, Silty CLAY (BAY MUD), sticky,	CL	
10				▼ hydrogen sulfide odor		
11						
12						
13				- first groundwater encountered at 13'		
14						
15						
16				BORING TERMINATED AT 16 FEET		

Figure 11, Log of Boring E15A, page 1 of 1

ENV_NO_WELL E8415-06-62 BORING LOGS.GPJ 06/09/09

BORING ELEVATION:

ENGINEER/GEOLOGIST: **JOHN LOVE**

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **E8435-06-018**

BORING NO. E15B

DATE DRILLED 3/19/09 WATER LEVEL (ATD) 6.0'

EQUIPMENT GEOPROBE DRILLER GREGG DRILLING

DEPTH IN FEET	PENETRAT. RESIST. BLOWS/FT.	SAMPLE NO.	LITHOLOGY	SOIL DESCRIPTION	SOIL (USCS)	HEADSPACE (PPM)
1				**3 INCHES ASPHALT**		
				FILL Sand, silt, clay, gravel		
2						
3				▼		
4						
5						
6				- no recovery, appears to be clayey gravel, saturated (6'-8')		
7						
8				Soft, saturated, brown, Clayey GRAVEL, low plasticity, no odor	GC	
9				Soft, very moist, dark gray, Silty CLAY (BAY MUD), low plasticity, sticky, hydrogen sulfide odor	CL	
10						
11						
12				- no recovery, appears to be loose sand (12'-16')		
13						
14						
15						
16				BORING TERMINATED AT 16 FEET		

Figure 15, Log of Boring E15B, page 1 of 1

ENV_NO_WELL E8415-06-62 BORING LOGS.GPJ 06/09/09

BORING ELEVATION:	ENGINEER/GEOLOGIST: **JOHN LOVE**

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **E8435-06-018**

DEPTH IN FEET	PENETRAT. RESIST. BLOWS/FT.	SAMPLE NO.	LITHOLOGY	**BORING NO. E20AGW** DATE DRILLED 3/19/09 WATER LEVEL (ATD) 2.0' EQUIPMENT GEOPROBE DRILLER GREGG DRILLING	SOIL (USCS)	HEADSPACE (PPM)
				SOIL DESCRIPTION		
1				**FILL** Sand, silt, clay, gravel		
2				▼ - saturated		
3						
4						
5						
6				- no recovery (6'-8')		
7						
8				- no recovery (8'-12')		
9						
10						
11						
12				- no recovery (12'-16')		
13						
14						
15						
16				BORING TERMINATED AT 16 FEET		

Figure 12, Log of Boring E20AGW, page 1 of 1

ENV_NO_WELL E8415-06-62 BORING LOGS.GPJ 06/09/09

BORING ELEVATION:	ENGINEER/GEOLOGIST: **JOHN LOVE**

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **E8435-06-018**

BORING NO. E20BGW

DATE DRILLED 3/19/09 WATER LEVEL (ATD) 13.0'

EQUIPMENT GEOPROBE DRILLER GREGG DRILLING

DEPTH IN FEET	PENETRAT. RESIST. BLOWS/FT.	SAMPLE NO.	LITHOLOGY	SOIL DESCRIPTION	SOIL (USCS)	HEADSPACE (PPM)
1				**3 INCHES ASPHALT**		
2				**FILL**		
3				Sand, silt, clay, gravel		
4				▼		
5						
6						
7				Firm, moist, brown with gray mottles, Silty CLAY, low plasticity, no odor	CL	
8						
9				- grades into sandy clay		
10						
11						
12						
13				Soft, moist to saturated, dark gray, Silty and Sandy CLAY (BAY MUD), slight hydrogen sulfide odor	CL	
14						
15						
16				BORING TERMINATED AT 16 FEET		

Figure 16, Log of Boring E20BGW, page 1 of 1

ENV_NO_WELL E8415-06-62 BORING LOGS.GPJ 06/09/09

BORING ELEVATION:	ENGINEER/GEOLOGIST: **JOHN LOVE**

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **E8435-06-018**

BORING NO. E5A

DATE DRILLED 3/19/09 WATER LEVEL (ATD) _____

EQUIPMENT GEOPROBE DRILLER GREGG DRILLING

DEPTH IN FEET	PENETRAT. RESIST. BLOWS/FT.	SAMPLE NO.	LITHOLOGY	SOIL DESCRIPTION	SOIL (USCS)	HEADSPACE (PPM)
1				**FILL** Sand, silt, clay, gravel		
2						
3						
4						
5						
6				Firm, moist, reddish brown to brown, Sandy CLAY, some gravel, low to medium plasticity, no odor	CL	
7						
8						
9				Soft, very moist, dark gray, Silty CLAY (BAY MUD), sticky, hydrogen sulfide odor	CL	
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20				BORING TERMINATED AT 20 FEET		

Figure 9, Log of Boring E5A, page 1 of 1

ENV_NO_WELL E8415-06-62 BORING LOGS.GPJ 06/09/09

BORING ELEVATION:

ENGINEER/GEOLOGIST: **JOHN LOVE**

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **E8435-06-018**

DEPTH IN FEET	PENETRAT. RESIST. BLOWS/FT.	SAMPLE NO.	LITHOLOGY	**BORING NO. E5B** DATE DRILLED 3/19/09 WATER LEVEL (ATD) 9.0' EQUIPMENT GEOPROBE DRILLER GREGG DRILLING	SOIL (USCS)	HEADSPACE (PPM)
				SOIL DESCRIPTION		
1				TOP SOIL		
2				Firm, moist, brown, Sandy SILT, no to slight plasticity, no odor	ML	
3						
4				▼		
5						
6				- poor recovery, appears to be gravelly (6'-8')		
7						
8				Firm, saturated, Sandy GRAVEL, no odor	GW	
9				Soft, very moist, dark gray, Silty CLAY (BAY MUD), low plasticity, hydrogen sulfide odor	CL	
10						
11						
12						
13						
14						
15						
16				BORING TERMINATED AT 16 FEET		

Figure 13, Log of Boring E5B, page 1 of 1

ENV_NO_WELL E8415-06-62 BORING LOGS.GPJ 06/09/09

BORING ELEVATION:	ENGINEER/GEOLOGIST: **JOHN LOVE**

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **E8435-06-018**

BORING NO. W10AGW

DATE DRILLED 3/26/2009 WATER LEVEL (ATD) 3.0'

EQUIPMENT GEOPROBE DRILLER GEOCON

DEPTH IN FEET	PENETRAT. RESIST. BLOWS/FT.	SAMPLE NO.	LITHOLOGY	SOIL DESCRIPTION	SOIL (USCS)	HEADSPACE (PPM)
1				**3 INCHES ASPHALT**		
				BASE MATERIAL		
3				Firm to stiff, moist, blueish green and brown, Gravelly CLAY and Clayey GRAVEL, low plasticity	CL/GC	
9				- first groundwater encountered at 9'		
14				Soft, moist, dark gray, Silty CLAY (BAY MUD), sticky, hydrogen sulfide odor	CL	
15				BORING TERMINATED AT 15 FEET		

Figure 2, Log of Boring W10AGW, page 1 of 1

ENV_NO_WELL E8415-06-62 BORING LOGS.GPJ 06/09/09

BORING ELEVATION:	ENGINEER/GEOLOGIST: **JOHN LOVE**

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **E8435-06-018**

BORING NO. W10B

DATE DRILLED 3/26/2009 WATER LEVEL (ATD) 3.0'

EQUIPMENT GEOPROBE DRILLER GEOCON

DEPTH IN FEET	PENETRAT. RESIST. BLOWS/FT.	SAMPLE NO.	LITHOLOGY	SOIL DESCRIPTION	SOIL (USCS)	HEADSPACE (PPM)
1				**3 INCHES ASPHALT**		
2				**BASE MATERIAL - FILL**		
3				▼		
4						
5						
6						
7				Soft, very moist, dark gray, Silty CLAY (BAY MUD), sticky, hydrogen sulfide odor	CL	
8						
9				- first grounndwater encountered at 9'		
10						
11						
12						
13						
14						
15				BORING TERMINATED AT 15 FEET		

Figure 6, Log of Boring W10B, page 1 of 1

ENV_NO_WELL E8415-06-62 BORING LOGS.GPJ 06/09/09

BORING ELEVATION:

ENGINEER/GEOLOGIST: **JOHN LOVE**

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **E8435-06-018**

BORING NO. W15A

DATE DRILLED 3/26/09 WATER LEVEL (ATD) 3.0'

EQUIPMENT GEOPROBE DRILLER GEOCON

DEPTH IN FEET	PENETRAT. RESIST. BLOWS/FT.	SAMPLE NO.	LITHOLOGY	SOIL DESCRIPTION	SOIL (USCS)	HEADSPACE (PPM)
1				**3 INCHES ASPHALT**		
2				**BASE MATERIAL**		
3				Firm to stiff, moist, blueish green and brown, Gravelly CLAY and Clayey GRAVEL, low plasticity, no odor	CL/GC	
4						
5						
6						
7						
8						
9				Soft, moist, dark gray, Silty CLAY (BAY MUD), low to medium plasticity, hydrogen sulfide odor	CL	
10						
11						
12						
13						
14						
15				BORING TERMINATED AT 15 FEET		

Figure 3, Log of Boring W15A, page 1 of 1

ENV_NO_WELL E8415-06-62 BORING LOGS.GPJ 06/09/09

BORING ELEVATION:

ENGINEER/GEOLOGIST: **JOHN LOVE**

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **E8435-06-018**

BORING NO. W15BGW

DATE DRILLED 3/26/2009 WATER LEVEL (ATD) 4.0'

EQUIPMENT GEOPROBE DRILLER GEOCON

DEPTH IN FEET	PENETRAT. RESIST. BLOWS/FT.	SAMPLE NO.	LITHOLOGY	SOIL DESCRIPTION	SOIL (USCS)	HEADSPACE (PPM)
1				**3 INCHES ASPHALT**		
2				**BASE MATERIAL**		
3						
4				- no recovery (4'-8')		
5						
6						
7						
8				Soft, very moist, blueish green with brown, Silty CLAY (BAY MUD), sticky, hydrogen sulfide odor	CL	
9						
10						
11						
12						
13						
14						
15				BORING TERMINATED AT 15 FEET		

Figure 7, Log of Boring W15BGW, page 1 of 1

ENV_NO_WELL E8415-06-62 BORING LOGS.GPJ 06/09/09

BORING ELEVATION:

ENGINEER/GEOLOGIST: **JOHN LOVE**

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **E8435-06-018**

BORING NO. W20AGW

DATE DRILLED 3/19/09 WATER LEVEL (ATD) 3.0'

EQUIPMENT GEOPROBE DRILLER GREGG DRILLING

DEPTH IN FEET	PENETRAT. RESIST. BLOWS/FT.	SAMPLE NO.	LITHOLOGY	SOIL DESCRIPTION	SOIL (USCS)	HEADSPACE (PPM)
1				**3 INCHES ASPHALT**		
2				**BASE MATERIAL**		
3				reddish brown, Gravelly fill		
4						
5				- first groundwater encountered at 5'		
6						
7						
8						
9						
10				Soft, moist to very moist, dark greenish gray, Silty CLAY (BAY MUD), sticky, hydrogen sulfide odor	CL	
11						
12						
13						
14						
15				BORING TERMINATED AT 15 FEET		

Figure 4, Log of Boring W20AGW, page 1 of 1

ENV_NO_WELL E8415-06-62 BORING LOGS.GPJ 06/09/09

BORING ELEVATION:

ENGINEER/GEOLOGIST: **JOHN LOVE**

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **E8435-06-018**

BORING NO. W20B

DATE DRILLED 3/26/2009 WATER LEVEL (ATD) 3.0'

EQUIPMENT GEOPROBE DRILLER GEOCON

DEPTH IN FEET	PENETRAT. RESIST. BLOWS/FT.	SAMPLE NO.	LITHOLOGY	SOIL DESCRIPTION	SOIL (USCS)	HEADSPACE (PPM)
1				**3 INCHES ASPHALT**		
2				**BASE MATERIAL**		
3				- sand, possible utility backfill		
4				- no recovery (4'-8')		
5						
6						
7						
8				Soft, very moist, dark gray, Silty CLAY (BAY MUD), sticky, hydrogen sulfide odor	CL	
9				- first groundwater encountered at 9'		
10						
11						
12						
13						
14						
15				BORING TERMINATED AT 15 FEET		

Figure 8, Log of Boring W20B, page 1 of 1

ENV_NO_WELL E8415-06-62 BORING LOGS.GPJ 06/09/09

BORING ELEVATION:

ENGINEER/GEOLOGIST: **JOHN LOVE**

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **E8435-06-018**

BORING NO. W5A

DATE DRILLED 3/26/2009 WATER LEVEL (ATD) 3.0'

EQUIPMENT GEOPROBE DRILLER GEOCON

DEPTH IN FEET	PENETRAT. RESIST. BLOWS/FT.	SAMPLE NO.	LITHOLOGY	SOIL DESCRIPTION	SOIL (USCS)	HEADSPACE (PPM)
1				**3 INCHES ASPHALT**		
2				**BASE MATERIAL**		
3				Firm to stiff, moist, blueish green and brown, Gravelly CLAY and Clayey GRAVEL, low plasticity, no odor	CL/GC	
4						
5						
6						
7						
8						
9				- first groundwater encountered at 9'		
10						
11				Soft, moist, dark greenish gray, Silty CLAY (BAY MUD), sticky, hydrogen sulfide odor	CL	
12						
13						
14						
15				BORING TERMINATED AT 15 FEET		

Figure 1, Log of Boring W5A, page 1 of 1

ENV_NO_WELL E8415-06-62 BORING LOGS.GPJ 06/09/09

BORING ELEVATION:

ENGINEER/GEOLOGIST: **JOHN LOVE**

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **E8435-06-018**

BORING NO. W5BGW

DATE DRILLED 3/26/2009 WATER LEVEL (ATD) 4.0'

EQUIPMENT GEOPROBE DRILLER GEOCON

DEPTH IN FEET	PENETRAT. RESIST. BLOWS/FT.	SAMPLE NO.	LITHOLOGY	SOIL DESCRIPTION	SOIL (USCS)	HEADSPACE (PPM)
1				**3 INCHES ASPHALT**		
2				**BASE MATERIAL**		
3				Firm to stiff, moist, blueish green and brown, Gravelly CLAY	CL/GC	
4				▼ and Clayey GRAVEL, low plasticity, no odor		
5						
6						
7						
8						
9				- first groundwater encountered at 9'		
10						
11				Soft, very moist, dark greenish gray, Silty CLAY (BAY MUD),	CL	
12				sticky, hydrogen sulfide odor		
13						
14						
15				BORING TERMINATED AT 15 FEET		

Figure 5, Log of Boring W5BGW, page 1 of 1

ENV_NO_WELL E8415-06-62 BORING LOGS.GPJ 06/09/09

BORING ELEVATION:

ENGINEER/GEOLOGIST: **JOHN LOVE**

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **E8435-06-18 Dumbarton Bridge**

BORING NO. PP1

DATE DRILLED 6/11/2009 WATER LEVEL (ATD) _____

EQUIPMENT Geoprobe DRILLER Geocon

DEPTH IN FEET	PENETRAT. RESIST. BLOWS/FT.	SAMPLE NO.	LITHOLOGY	SOIL DESCRIPTION	SOIL (USCS)	HEADSPACE (PPM)
1				Stiff, moist, yellowish brown, fine to medium Gravelly CLAY / Clayey GRAVEL, low to medium plasticity	CL/GC	
2						
3				- shell framents		
4						
5				Stiff, dark gray, Silty CLAY, medium plasticity, H2S odor	CL	
6						
7						
8						
9						
10				BORING TERMINATED AT 10 FEET		

Figure 1, Log of Boring PP1, page 1 of 1

ENV_NO_WELL DUMBARTON BORING LOGS.GPJ 08/06/09

BORING ELEVATION:

ENGINEER/GEOLOGIST: **John Love**

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **E8435-06-18 Dumbarton Bridge**

BORING NO. PP2GW

DATE DRILLED 6/11/2009 WATER LEVEL (ATD) 8.0'

EQUIPMENT Geoprobe DRILLER Geocon

DEPTH IN FEET	PENETRAT. RESIST. BLOWS/FT.	SAMPLE NO.	LITHOLOGY	SOIL DESCRIPTION	SOIL (USCS)	HEADSPACE (PPM)
1				Firm, moist, brown to bluish green, fine Gravelly CLAY / fine to coarse Sandy GRAVEL, low plasticity	CL/GM	
2						
3				- saturated		
4						
5				Soft, moist, dark gray to bluish green, Silty CLAY, slight H2S odor	CL	
6						
7						
8				▼		
9						
10				BORING TERMINATED AT 10 FEET		

Figure 2, Log of Boring PP2GW, page 1 of 1

ENV_NO_WELL DUMBARTON BORING LOGS.GPJ 08/06/09

BORING ELEVATION:

ENGINEER/GEOLOGIST: **John Love**

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **E8435-06-18 Dumbarton Bridge**

DEPTH IN FEET	PENETRAT. RESIST. BLOWS/FT.	SAMPLE NO.	LITHOLOGY	**BORING NO. PP3** DATE DRILLED 6/11/2009 WATER LEVEL (ATD) _____ EQUIPMENT Geoprobe DRILLER Geocon	SOIL (USCS)	HEADSPACE (PPM)
				SOIL DESCRIPTION		
1				Firm, moist, dark brown, fine Gravelly CLAY with fine to coarse sand and shell fragments, low plasticity	CL	
2						
3						
4						
5				Interbedded SAND and SHELL fragments		
6						
7						
8				**BAY MUD** Soft, saturated, dark gray, sticky, low plasticity, H2S odor		
9						
10				BORING TERMINATED AT 10 FEET		

Figure 3, Log of Boring PP3, page 1 of 1

ENV_NO_WELL DUMBARTON BORING LOGS.GPJ 08/06/09

BORING ELEVATION:	ENGINEER/GEOLOGIST: **John Love**

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

18. PURCHASE AND PRICE AGREEMENT

Earthquake Protection Systems, Inc.
451 Azuar Drive, Bldg. 759, Mare Island, Vallejo, California 94592
Tel: (707) 644-5993 Fax: (707) 644-5995

February 5, 2010

PURCHASE AGREEMENT FOR THE SUPPLY OF

FRICTION PENDULUM BEARINGS

FOR DUMBARTON BRIDGE RETROFIT PROJECT

Total Pages in Purchase Agreement: 7

Earthquake Protection Systems ("EPS") agrees to supply, and the below named Contractor awarded the construction contract ("Contractor" and "Buyer") agrees to purchase Friction Pendulum Bearings and other products and services provided for herein (the "Bearings") in accordance with the provisions and terms stated in this agreement (the "Agreement"). The Bearings are sold and purchased in conformance with the Contract Special Provisions Section 10-1 Furnish Seismic Isolation bearings, and as show on plan sheets "Isolation Bearing, Details No. 1" and "Isolation Bearing, Details No. 3", and the terms and conditions as stated herein. This offer by EPS to supply bearings shall remain in effect through February 5, 2011, and is contingent upon receipt by EPS of the signed acceptance of this Agreement, without modifications, no later than February 5, 2011.

SCOPE OF WORK

EPS shall manufacture, test and supply 96 Friction Pendulum Bearings as specified in the Special Provisions in accordance with this Purchase Agreement. Any structure connection plates above or below the bearings, connecting bolts, shim plates, sole plates, and grout are the responsibility of the Buyer.

Buyer is responsible for pick up the Bearings from the EPS facility.

The bearing system, manufacturing details, materials, methods, and procedures are those of Earthquake Protection Systems. The bearings will be manufactured and tested in accordance with EPS's ISO 9001:2000 Quality Control System for the Design and Manufacture of Seismic Isolation Bearings, as Certified by the Orion Register. Bearing testing will be performed in accordance with Testing Program specified in the Bearing Specifications. Testing will be performed for 100% of the Production bearings, with test results and bearing properties provided to Buyer.

After testing, assembly, and packaging is complete, Buyer will pick up the bearings from the EPS facility. EPS will package the bearings for shipment and unloading by crane/fork trucks.

The EPS Scope Of Work under this agreement includes the design of the bearings to satisfy the capacities, properties and performance as specified herein. The bearing design included herein has been pre approved by CALTRANS. Prototype manufacturing and testing work of the bearings for the Antioch Bridge Retrofit project has been completed by EPS and approved by CALTRANS. Buyer hereby approves and accepts the bearing design work by EPS as satisfactory and complete for the Buyer's requirements and use.

EPS's scope of work includes the bearing manufacture, testing, and manufacturer's support during the construction phase, as specified herein. The manufacturer's support included is that normally provided by EPS staff performing its work at the EPS facility. Any non-customary support services, and support that requires EPS to work away from the EPS facility, will be paid for as additional services per the attached Schedule of Standard Charges. EPS shall be notified three weeks in advance for any required site visits. Access to the bearings, handling, assistance and labor as required to complete the inspections, are to be provided by Buyer or the Owner.

EPS's role under this Agreement is that of a supplier of the Bearings as specified herein, including the manufacturer's support specified. EPS is not a contractor, subcontractor, engineer, or consultant for the design and construction of the project. EPS's scope of work and responsibilities do not include bearing installation, or any work or requirements specified under construction documents or plans. EPS's scope of work and responsibilities do not include those services normally provided by a contractor or design engineer.

The Buyer, or Buyer's consultants, are responsible for the overall facility, structural and seismic design, and seismic performance of the structure, bearings, facility, and contents. Buyer is responsible to implement the appropriate bearing connection details, and structure strengths, as required to adequately accomidate all structure, enviormental, and seismic loadings. Buyer is responsible for compliance with all code and government requirements pertaining to the use of the Bearings.

For any additions or changes in scope of work, sizes of bearings or delivery schedule, or technical support services, the Total Price, corresponding payment breakdowns, and delivery schedule shall be adjusted accordingly following the attached Schedule of Standard Charges.

SCHEDULE OF PRICES

Bearing are being sold at the unit bearing prices are listed in the attached Special Provisions, plus other applicable charges as specified herein. The unit prices are Freight On Board (FOB), EPS facility CA. Buyer agrees to pay to EPS all applicable sales and use taxes, custom duties, and other taxes and charges levied by government entities as a result of the sale and use of the Bearings.

The Total Price for the 96 bearings listed in the Special provisions is $8,619,072.00, plus applicable sales taxes and other charges per this Agreement.

PAYMENT SCHEDULE

Payments shall be received by EPS, as invoiced, for the items below:

1) 10% of the Total Price, upon execution of the Purcahse Agreement

2) 50% of the Total Price, pro-rated upon completion of machining of concave, slider, and housing

3) 30% of the Total Price pro-rated upon completion of testing

4) 10% of the Total Price pro-rated upon acceptance of assembled bearings

PAYMENT TERMS

All payments shall be electronically deposited to EPS's account specified below on or before the due date.

Citibank NA, 111 Wall Street, New York, NY 1005
Citibank ABA# 021000089
For Credit to Charles Schwab & Co. Act# 4055-3953
For Further Credit to Earthquake Protection Systems Act# 3173-7878

Payments shall be received by EPS Net 30 days from the date of Invoice, with no retention. Payments past due shall bear late payment charges at the rate of two percent (2%) per month, for each month or fraction thereof for which a payment is more than five days late.

READY TO SHIP SCHEDULE AND DELIVERY:

Bearings will be ready to ship, on or before, 2 bearings/week starting 50 weeks from the date of receipt by EPS of Payment Item 1, and the signed and fully execution of Purchase Agreement without modifications.

The schedule for the bearing ready to ship dates will be extended one day for each day a payment to EPS is late. Bearings will not be shipped until all applicable payments for that bearing have been received by EPS.

Bearings will be tested, assembled and stored at EPS for up to 24 months, or until picked up by Buyer.

Bearings will be packaged for loading and unloading by forklifts. EPS will load bearings on flatbed trucks at the request of Buyer. EPS is not responsible for shipping or delay in shipping and its impact on the project.

The ready to ship dates are based on the terms and conditions as specified in this Agreement. These dates shall be extended for any delays to EPS's work resulting from the Buyer or Owner's actions, including any requirements, conditions or terms which differ from those stated in this agreement, or delays in approval of submittals, or work performed, or late payments from Buyer.

In the event EPS is late in meeting the bearings ready to ship dates, damages claimed against EPS shall not exceed 2% of the unit bearing prices for each week that a bearing is shipped late, up to a maximum delay charge of 10% of the Total Price or actual damages incurred by the Buyer, whichever of these is less.

EXCLUSIONS

Jobsite labor of any kind, including, but not limited to unloading, handling, storing and installation or removal of the bearing assemblies for any reason what so ever including any warranty repairs or replacement of bearings, bearing parts, or installation hardware.

Repair of paint damage or misalignment of bearings, caused by installation or shipping. The Buyer shall be responsible to repair all paint damage and accidental mis-alignments with technical support provided by EPS.

Responsibility for engineering or structure designs or details by others. The Buyer or Owner's consultants are solely responsible for the structure design, and the proper incorporation and use into that design of the bearings supplied herein.

Supply or performance bonds provided by EPS.

Any applicable sales taxes, shipping cost, use taxes, custom charges, import duties, or tariffs. Buyer to provide EPS with copy of resale certificate where applicable.

Any item not specifically included in the scope of work as defined in this Purchase Agreement.

WORK STOPPAGE

If the Purchase or portion thereof is canceled by Buyer for reasons not directly and primarily caused by EPS's failure to perform under this Agreement, or stopped by Buyer for more than 6 months, or payments due to EPS are more than 6 months late, the Buyer shall be responsible to immediately pay EPS for all work in progress on a pro-rated percentage of completion basis, based on the schedule of values in the Payment Schedules herein, and also compensate EPS for any termination and delay costs, and any costs to re-start work if later directed to do so. If the Purchase or portion thereof is canceled by Buyer, or stopped for more than 12 months, or payments due to EPS are more than 12 months late, the work in progress shall be considered abandoned and the title and ownership of all parts and work in progress shall automatically transfer to EPS, and Buyer shall receive a credit equal to the scrap value for all parts and materials previously paid for by Buyer.

LIMMITATION OF LIABILITY

ANY DAMAGES CLAIMED AGAINST EPS FOR FAILURE TO PERFORM SHALL BE LIMMITED TO AN AMOUNT EQUAL TO THE TOTAL PRICE AS SPECIFIED HEREIN. ANY AND ALL DAMAGES CLAIMED AGAINST EPS FOR NEGLIGENCE, OR ANY DEFECTIVE PRODUCTS OR SERVICES, OR ANY OTHER REASON WHATSOEVER NOT OTHERWISE LIMMITED HEREIN, SHALL BE LIMMITED TO A MAXIMUM OF THE TOTAL PRICE AS SPECIFIED HEREIN. UNDER NO CIRCUMSTANCES SHALL EPS BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY NATURE WHATSOEVER INCLUDING WITHOUT LIMITATION, LOST PROFIT OR REVENUE, WHETHER OR NOT SUCH CLAIMS ARE BASED IN CONTRACT OR TORT OR UPON ANY OTHER LEGAL THEORY.

ENTIRE AGREEMENT, ASSIGNMENT, GOVERNING DOCUMENT AND LAW

This Agreement contains the entire agreement among the parties pertaining to the subject matter contained in it and supersedes any and all prior oral or written discussions, negotiations, agreements, representations and understandings. Should this Agreement or the products or services provided hereunder be named in any purchase order issued by the Buyer, the provisions of this Agreement shall be the sole provisions applicable to the products or services provided hereunder. Should the products or services provided hereunder be sold or assigned by the Buyer to a third party, the Buyer assumes sole responsibility to transfer all provisions and limitations of this Agreement and Warranty to said third party, and Buyer agrees to indemnify, defend and hold Seller harmless from any claims by said third party which extend beyond the responsibilities and liabilities of the Seller as specified under this Agreement. The laws of the State of California will govern this Agreement. The applicable courts located in the City of Vallejo or the County of Solano shall have exclusive jurisdiction over any dispute concerning this Agreement or the products or services provided hereunder. In the event that any legal action arises out of this Agreement or the products or services provided hereunder, the prevailing party shall be entitled to recover from the other its reasonable attorney's fees and costs of suit.

ACCEPTANCE

The Buyer and Seller named below accept this Agreement for the purchase of the bearings and services specified herein. Signed acceptance of this Agreement may be transmitted by electronic file, facsimile, or signed paper original, any form of which when executed by each party named below, shall constitute a complete contract, and the entire agreement between the parties.

Buyer: Contractor Company Name:	Seller: EARTHQUAKE PROTECTION SYSTEMS, Inc. Vallejo, California
_____	
Authorized Representative	Authorized Representative
Signature: _____	Signature:
Name: _____	Name: Victor Zayas
Title: _____	Title: President
Date: _____	Date: February 5, 2010

Earthquake Protection Systems, Inc.
451 Azuar Drive, Bldg. 759, Mare Island, Vallejo, California 94592
Tel: (707) 644-5993 Fax: (707) 644-5995

8/8/08

WARRANTY TERMS

Earthquake Protection Systems ("EPS") warrants the Friction Pendulum bearings ("Bearings") against defects in materials and workmanship under the normal use and service for which they were designed for the full period of 36 months from the date the bearings are ready to ship. This warranty is limited to correcting defects in materials and workmanship, which materially affect the Bearing's ability to perform its intended function in accordance with the Bearing Specifications provided herein. For any Bearing determined to be outside the warranted performance, EPS shall, at its sole expense and option, either recondition or replace the Bearing or components to be within the Bearing Property Specifications for new bearings.

For any bearing warranty work, Owner or Buyer shall be responsible for Bearing removal, reinstallation, and freight to and from EPS's facility, including all associated costs of these items. For any Bearing found to be within the warranted performance, Owner or Buyer shall be responsible for all related costs incurred by EPS including testing, inspection, freight, handling, repair, and reconditioning.

This warranty does not cover cosmetic defects or changes, paint chipping or peeling, damage caused by installation or construction, fire or accidental damage, abuse, neglect, overloads, or failure of Contractor, Buyer or Owner to install and maintain Bearings according to EPS recommended procedures. Any obligation under this warranty terminates if the Bearings are modified or directly exposed to fire. In such instances, Owner may reactivate the warranty by hiring EPS to inspect all Bearings and for Owner to pay EPS to recondition or replace any Bearing that is deemed required. In no case shall the warranty period be extended beyond the period listed above, whether or not a Bearing is replaced or reconditioned by EPS.

DISCLAIMER OF WARRANTIES

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED, IMPLIED, WRITTEN, OR ORAL, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OR MERCHANTABILITY OR FITNESS AND IS PROVIDED IN LIEU OF ALL OBLIGATIONS AND LIABILITIES OF SELLER WITH RESPECT TO DEFECTS IN MATERIALS OR WORKMANSHIP. THE RIGHTS AND REMEDIES CONTAINED IN THIS WARRANTY CONSTITUTE THE OWNER'S, CONTRACTOR'S, OR BUYER'S SOLE RECOURSE TO EPS FOR COSTS AND EXPENSES TO CURE DEFECTS IN THE BEARINGS. THIS WARRANTY EXCLUDES AND WAIVES ANY RIGHT TO BUYER TO CONSEQUENTIAL OR INCIDENTAL DAMAGES.

Earthquake Protection Systems, Inc.
451 Azuar Drive, Bldg. 759, Mare Island, Vallejo, California 94592
Tel: (707) 644-5993 Fax: (707) 644-5995

September 2009

Schedule of Standard Charges

The following charges shall apply for all services or materials requested by Buyer and provided by EPS that are beyond those in the specified EPS Scope of Work as specified herein.

Rates for In-House Engineering Support, Shop Labor and Services are as follows:

Principal Engineer	$300/hour
Senior Engineer	$255/hour
QC Admin + Support Documentation	$150/hour
Shop Supervisor	$200/hour
Senior Technician	$175/hour
Machinist	$150/hour
Shop Laborer	$100/hour

Overtime work is charged at 30% above the specified standard rates. Charges for materials, tooling, and outsourced services will be at cost plus 50% overhead charges.

Inspection and services provided away from EPS facilities will be at the above rates plus reimbursement for travel time and cost of travel, including airfare, car rental, hotel, meals etc.

Review of customer requested technical requirements, specifications, evaluations, delivery schedule changes, or purchase terms and conditions, shall be at the above rates, plus costs of legal review and outsourced service charges.

Testing rates are charged per each day the equipment is occupied by the test operation. Rates for Testing Equipment Use and Operation, including test labor and data reporting, are as follows:

Real Time, 15 million lbs. Capacity Test System	$10,000/day
Low-Speed, 2 million lbs. Capacity Test System	$4,000/day

Extendeed Warranties of up to 50 years are available when specified and purchased with the original executed Purchase Agreement. Extended warranties are charged at 1% of the Total Price for each additional year the warranty is extended. Extended warranties are charged at 1% of the Total Price for each additional year the warranty is extended.

Charges for accelerating the ready-to-ship dates shall be a two-percent increase in bearing price for each percent reduction in the ready-to-ship schedule. Charges for storing bearings shall be 0.5% of the bearing prices for each month bearings are stored beyond 3 months after the ready-to-ship dates.

Earthquake Protection Systems, Inc.
451 Azuar Drive, Bldg. 759, Mare Island, Vallejo, California 94592
Tel: (707) 644-5993 Fax: (707) 644-5995

February 5, 2010

Mr. Steve Margaris
Specifications Manager
State of California, Department of Transportation
Division of Engineering Services – MS#9-2/2H
P.O. Box 168041
Sacramento, CA 95816-8041

RE: Guaranteed Prices for Friction Pendulum Bearings for Contract No. 04-1A5221, Dumbarton Bridge Seismic Retrofit.

Dear Mr. Margaris:

Inasmuch as it is deemed advisable by the State Department of Transportation to require the use of Friction Pendulum bearings supplied by Earthquake Protection Systems, Inc., on the contract stated above, to be constructed under contract awarded pursuant to competitive bidding, the undersigned,

Earthquake Protection Systems, Inc.
451 Azuar Drive, Bld. 759. Mare Island
Vallejo, CA 94592
Tel: 707 644 5993
Fax: 707 644 5995
Contact Stanley Low

A manufacturer and supplier of Friction Pendulum bearings that meet the requirements of the California Department of Transportation contract plans and specifications, hereby agrees to sell said bearings to the Contractor awarded the above referenced State Highway contract, at the guaranteed unit prices of:

96 Bearings, Type 1 @ $89,782.00 each

Guaranteed Total Bearing Price (96 bearings) = $ 8,619,072.00

The guaranteed prices are offered for bearings meeting the requirements of the Contract Special Provisions Section 10-1 Furnish Seismic Isolation Bearing, and as show on contract plan sheets "Isolation Bearing, Details No. 1" and "Isolation Bearing, Details No. 3", and are offered for bearings purchased under the attached Purchase Agreement dated February 5, 2010, and the terms and conditions therein.

Sincerely Yours,

Victor Zayas,
President EPS

19. STORM WATER DATA REPORT

Dist-County-Route: 04-SM/ALA-84

Post Mile (Kilometer Post) Limits:
29.0-30.15/0.0-1.2

Project Type: Retrofit Dumbarton Bridge

EA: 1A5221

RU: 253

Program Identification: BATA

Phase: ☐PID ☐PA/ED ☒PS&E

Regional Water Quality Control Board(s): Region 2, San Francisco Bay

Is the project required to consider incorporating Treatment BMPs? ☐Yes ☒No

If yes, can Treatment BMPs be incorporated into the project? ☐Yes ☐No

If No, a Technical Data Report must be submitted to the RWQCB at least 60 days prior to PS&E Submittal. List submittal date: _____

Total Disturbed Soil Area: 0.5 acre

Estimated Construction Start Date: 6/1/2010 Construction Completion Date: 12/1/2012

Notification of Construction (NOC) Date to be submitted: One month prior to construction date 5/1/2010

Notification of ADL reuse (if Yes, provide date) ☐Yes Date: _____ ☒No

Separate Dewatering Permit (if Yes, permit number) ☐Yes Permit #: _____ ☒No

This Report has been prepared under the direction of the following Licensed Person. The Licensed Person attests to the technical information contained herein and the data upon which recommendations, conclusions, and decisions are based. Professional Engineer or Landscape Architect stamp required at PS&E.

S M Syed 7-13-09

[Humayon Syed], *Registered Project Engineer/Landscape Architect* Date

I have reviewed the storm water quality design issues and find this report to be complete, current, and accurate:

7/14/09

[Mo Pazooki], *Project Manager* Date

Robert W. Braga 7/14/09

[Bob Braga], *Designated Maintenance Representative* Date

James Smith (for David Yam) 7/16/09

[David Yam], *Designated Landscape Architect Representative* Date

Kamran Nakhjiri 07/15/09

[Kamran Nakhjiri], *District/Regional SW Coordinator or Designee* Date

STORM WATER DATA INFORMATION

1. Project Description

The Dumbarton Bridge connects Route 84 between the cities of Newark in Alameda County and East Palo Alto in San Mateo County. It spans 8,600 feet and has three lanes in each direction with separate bike/pedestrian lane. The bridge comprised of five main structures; the main channel structure, two approach structure at each end of main crossing, and trestle structure at the end of each approach structure.

- This bridge retrofit project consists of the following major activities:
  1. CIDH (Cast In Drilled Hole) piles will be driven along the land approaches and a beam will be constructed along the top of the CIDH piles to support the superstructure.
  2. Retrofitting of east and west approaches in shallow water will be done at pile cap and column connection to the superstructure.
  3. All work within deep water in the main channel piers and superstructures will be done using barges.
  4. Retrofitting of the structure in shallow water will be done by building temporary trestle to access the piers. The temporary trestles will consist of a set of two piles of 3 feet in diameter at 50 feet spacing. On the east approach, the existing old bridge will remain in use as a fishing pier. A temporary trestle will be constructed between this pier and the bridge. On the west approach the existing old fishing pier will be reconstructed to be used as a temporary trestle to access piers in shallow water.
  5. A temporary concrete barrier /retaining wall will be installed on the west end of the bridge at Ravonswood pier to prevent water from flooding the parking lot during high tides.
- The total disturbed soil area in this project is 0.5 acre.
- The existing impervious total surface area is 4.8 acres and no additional impervious area is expected.
- This project is within San Mateo and Alameda County Urban MS4 area.

2. Define Site Data and Storm Water Quality Design Issues (refer to Checklists SW-1, SW-2, and SW-3)

- The project site is relatively flat, major portion covers the Lower & South San Francisco Bay. The Ravenswood and Dewark Sloughs on San Mateo and Alameda side respectively are within the vicinity. South Bay salt ponds also comprise the area.
- The receiving water body for the project is the San Francisco Bay, Lower and South portion with hydrologic sub-area # 205.10, which is directly below the Dumbarton bridge.
- The San Francisco Bay, Lower and South portion is on EPA's 2006 303(d) list of impairments. Pollutants of concern include Diazinon, Chlordane, DDT, Dieldrin, Dioxin Compound, Exotic Species, Furan Compound, Mercury, PCBs, PCBs (dioxin-like), and Selenium.
- A 401 certification is required in this project.
- There are no high risk areas within the project limits.
- The project is located in a Mediterranean climate characterized by warm dry summers and mild wet winters. The rainy season is October 15 to April 15. Average annual rainfall is 13.2 inches.
- Local agency requirements/concerns will be determined on the next project phase.
- Local land use within the project limits consist mainly of publicly owned conservation lands.
- The project does not involve reuse of soil containing Aerially Deposited Lead (ADL).
- There is no area outside of the Caltrans right-of-way that will be included in the project (

3. Regional Water Quality Control Board Agreements

- There are no agreements with the San Francisco RWQCB at this time. TBD on the next project phase.

4. Describe Proposed Design Pollution Prevention BMPs to be used on the Project.

Downstream Effects Related to Potentially Increased Flow, Checklist DPP-1, Parts 1 and 2

- This bridge retrofit project has no potential to increase volume of downstream flow.

Slope/Surface Protection Systems, Checklist DPP-1, Parts 1 and 3

- This project will construct a berm for the Pump house that will receive soil stabilization measure of hydroseed.

Concentrated Flow Conveyance Systems, Checklist DPP-1, Parts 1 and 4

- There will be no additional or modification of Concentrated Flow Conveyance Systems for this project.

Preservation of Existing Vegetation, Checklist DPP-1, Parts 1 and 5

- Most if not all the activities on this project will be done within marine environment, encountering existing vegetation would be minimal. This project will preserve existing vegetation to the maximum extent practicable and will minimize disturbed areas.
- There are two identified Environmentally Sensitive Areas (ESA) to be impacted during the construction. The first location is at the west end of the bridge where a temporary trestle will begin. The second location is on the Alameda end of the bridge where another temporary trestle will be built next to the existing fishing pier. These areas will be protected using ESA guidelines, details and delineation on plans will be done during PS&E.

5. Describe Proposed Permanent Treatment BMPs to be used on the Project

This project is exempted from consideration of Treatment BMPs. There is no additional immpervious or reworked areas.

6. Describe Proposed Temporary Construction Site BMPs to be used on Project

This project requires preparation and implementation of a Storm Water Pollution Prevention Plan (SWPPP) since construction activities are directly over a water body.

- The following Construction Site BMPs will be designated as separate bid items that will be utilized for the construction contract based on proposed construction activities, their sequence, materials used for construction and the pollutants of concern which may be created:

  Temporary Drainage Inlet Protection minimizes the amount of sediment entering storm drains.

  Temporary Check Dam is a sediment control practice that will be used in areas of concentrated flows to slow runoff and allow sediment to fall out of suspension.

  Temporary Silt Fence reduces the amount of sediment leaving slopes by filtering sheet runoff.

  Temporary Concrete Washout Facility prevents pollution by limiting the washout of concrete waste and waste water to a specific location.

  Temporary Construction Entrance, this tracking control practice will limit the deposition of sediment from mud and dirt onto paved public roads by construction vehicles.

  Street Sweeping minimizes the amount of debris and sediments on the roadway from entering storm drain systems.

  Non-Storm Water Construction Site Management: This are source control BMPs that prevent pollution by limiting or reducing potential pollutants at their source before they come in contact with storm water. The following is a list of non-storm water management BMPs applicable to this project;

Non-Storm Water Construction Site Management: This are source control BMPs that prevent pollution by limiting or reducing potential pollutants at their source before they come in contact with storm water. The following is a list of non-storm water management BMPs applicable to this project;

NS-1 Water Conservation Practices

NS-2 Dewatering Operations

NS-3 Paving and Grinding Operations

NS-5 Clean Water Diversion

NS-6 Illicit Connection/Illegal Discharge Detection and Reporting

NS-8 Vehicle and Equipment Cleaning

NS-9 Vehicle and Equipment Fueling

NS-10 vehicle and Equipment Maintenance

NS-11 Pile Driving Operations

NS-12 Concrete Curing

NS-13 Material and Equipment Use Over Water

NS-14 Concrete Finishing

NS-15 Structure Demolition/Removal Over or Adjacent to Water

- Construction Site BMPs incorporated as a lump sum will be determined at PS&E .
- Concurrence from Construction Environmental Engineering on the Construction Site BMPs will be obtained by the Design Project Engineer.
- The estimate of quantities and costs for Construction Site BMPs as a part of the Storm Water BMP Cost Summary will be done at PS&E.

7. Maintenance BMPs (Drain Inlet Stenciling)

Drainage Inlet Stenciling will be implemented on areas accessible to pedestrian or bicycle traffic.

ATTACHMENTS

A. Vicinity Map
B. Evaluation Documentation Form (EDF)
C. Cost Estimate

INDEX OF PLANS

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

PROJECT PLANS FOR CONSTRUCTION ON STATE HIGHWAY

IN SAN MATEO AND ALAMEDA COUNTIES IN MENLO PARK AND FREMONT FROM 0.3 MILE WEST TO 0.5 MILE EAST OF DUMBARTON BRIDGE

TO BE SUPPLEMENTED BY STANDARD PLANS DATED MAY 2006

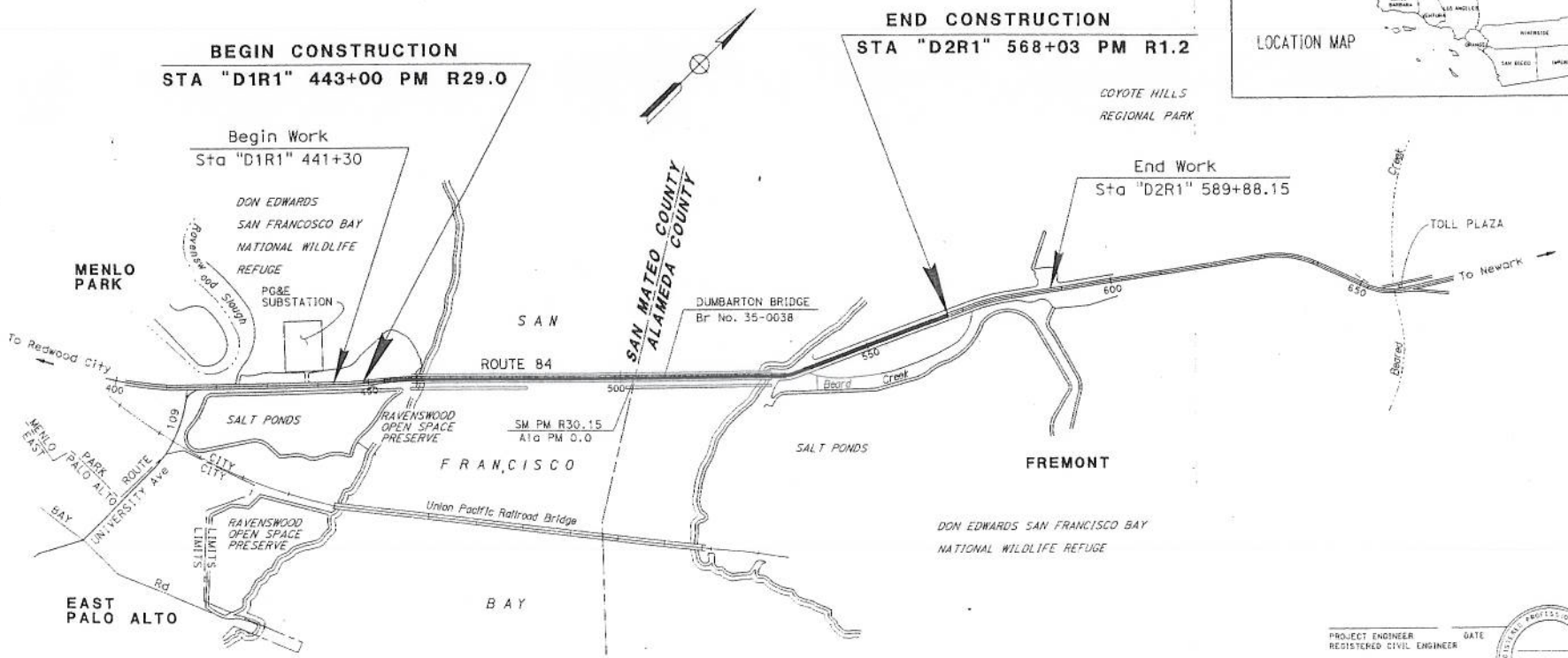
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SM, Ala	84	R29.0-R30.2/ R0.0-R1.2		

BEGIN CONSTRUCTION
STA "D1R1" 443+00 PM R29.0

Begin Work
Sta "D1R1" 441+30

END CONSTRUCTION
STA "D2R1" 568+03 PM R1.2

End Work
Sta "D2R1" 589+88.15



NO SCALE

95% PS&E

June 24, 2009

PROJECT ENGINEER — DATE
REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

DESIGN ENGINEER: HAMAYUN SYED
PROJECT MANAGER: MO PAZOOKI

THE CONTRACTOR SHALL POSSESS THE CLASS (OR CLASSES) OF LICENSE AS SPECIFIED IN THE "NOTICE TO BIDDERS."

CONTRACT No. 04-1A5224

DATE PLOTTED => 23-JUN-2009
TIME PLOTTED => 10:01
(06-19-09)

BORDER LAST REVISED 8/1/2008 | CALTRANS WEB SITE IS: HTTP://WWW.DOT.CA.GOV/ | RELATIVE BORDER SCALE IS IN INCHES | USERNAME => S113182 | DGN FILE => 41052200001.dgn | OU 04253 | EA 1A5221

DATE: 6-24-09

See Figure 4-1, Project Evaluation Process for Consideration of Permanent Treatment BMPS EA: 1A5220

NO.	CRITERIA	YES	NO	SUPPLEMENTAL INFORMATION FOR EVALUATION
1.	Begin Project Evaluation regarding requirement for consideration of Treatment BMPs	☒		Go to 2
2.	Is this an emergency project?	☐	☒	If **Yes**, go to 11. If **No**, continue to 3.
3.	Have TMDLs OR OTHER Pollution Control Requirements been established for surface waters within the project limits?	☒	☐	If **Yes**, contact the District/Regional NPDES coordinator to discuss the Department's obligations under the TMDL (if Applicable) or Pollution Control Requirements, go to 10 or 4 (as determined by the NPDES Coordinator). _____ *(Dist./Reg. SW Coordinator initials)* If **No**, continue to 4.
4.	Is the project within an urban MS4?	☒	☐	If **Yes**, continue to 5. *(San Mateo & Alameda County)* If **No**, go to 11.
5.	Is the project directly or indirectly discharging to surface waters?	☒	☐	If **Yes**, continue to 6. If **No**, go to 11.
6.	Is this a new facility or major reconstruction?	☒	☐	If **Yes**, continue to 8. If **No**, go to 7.
7.	Will there be a change in line/grade or hydraulic capacity?	☐	☒	If **Yes**, continue to 8. If **No**, go to 11.
8.	Does the project result in a net increase of one acre or more of new impervious surface?	☐	☒	If **Yes**, continue to 10. If **No**, go to 9. *(Net Increase New Impervious Surface)*
9.	Is the project part of a Common Plan of Development?	☐	☒	If **Yes**, continue to 10. If **No**, go to 11.
10.	Project is required to consider approved Treatment BMPs.	☐	See Sections 2.4 and either Section 5.5 or 6.5 for BMP Evaluation and Selection Process. Complete Checklist T-1 in this Appendix E.	
11.	Project is not required to consider Treatment BMPs. _____*(Dist./Reg. SW Coord. Initials)* _____*(Project Engineer Initials)* _____ *(Date)*	☒	Document for Project Files by completing this form, and attaching it to the SWDR.	

DATE: 6-24-09

Project Evaluation Process for the Consideration of Construction Site BMPs

EA: 1A5220

NO.	CRITERIA	YES	NO	SUPPLEMENTAL INFORMATION
1.	Will construction of the project result in areas of disturbed soil as defined by the Project Planning and Design Guide (PPDG)?	☒	☐	If **Yes**, Construction Site BMPs for Soil Stabilization (SS) will be required. Complete CS-1, Part 1. Continue to 2. If **No**, Continue to 3.
2.	Is there a potential for disturbed soil areas within the project to discharge to storm drain inlets, drainage ditches, areas outside the right of way, etc?	☐	☒	If **Yes**, Construction Site BMPs for Sediment Control (SC) will be required. Complete CS-1, Part 2. Continue to 3.
3.	Is there a potential for sediment or construction related materials and wastes to be tracked offsite and deposited on private or public paved roads by construction vehicles and equipment?	☒	☐	If **Yes**, Construction Site BMPs for Tracking Control (TC) will be required. Complete CS-1, Part 3. Continue to 4.
4.	Is there a potential for wind to transport soil and dust offsite during the period of construction?	☒	☐	If **Yes**, Construction Site BMPs for Wind Erosion Control (WE) will be required. Complete CS-1, Part 4. Continue to 5.
5.	Is dewatering anticipated or will construction activities occur within or adjacent to a live channel or stream?	☒	☐	If **Yes**, Construction Site BMPs for Non-Storm Water Management (NS) will be required. Complete CS-1, Part 5. Continue to 6.
6.	Will construction include saw-cutting, grinding, drilling, concrete or mortar mixing, hydro-demolition, blasting, sandblasting, painting, paving, or other activities that produce residues?	☒	☐	If **Yes**, Construction Site BMPs for Non-Storm Water Management (NS) will be required. Complete CS-1, Part 5. Continue to 7.
7.	Are stockpiles of soil, construction related materials, and/or wastes anticipated?	☒	☐	If **Yes**, Construction Site BMPs for Waste Management and Materials Pollution Control (WM) will be required. Complete CS-1, Part 6. Continue to 8.
8.	Is there a potential for construction related materials and wastes to have direct contact with precipitation; storm water run-on, or stormwater runoff; be dispersed by wind; be dumped and/or spilled into storm drain systems?	☒	☐	If **Yes**, Construction Site BMPs for Waste Management and Materials Pollution Control (WM) will be required. Complete CS-1, Part 6. Continue to 9.
9.	End of checklist.	☒	Document for Project Files by completing this form, and attaching it to the SWDR.	

PE to initialize after concurrence with Construction (PS&E only) *Date*

Checklist SW-1, Site Data Sources

Prepared by: Khaliq Taheri Date: 3-18-09 District-Co-Route: 04-SM/ALA-84

PM (KP): PM 29.0-30.15/0.0-1.2 EA: 1A5220

RWQCB: San Francisco Bay Region 2

Information for the following data categories should be obtained, reviewed and referenced as necessary throughout the project planning phase. Collect any available documents pertaining to the category and list them and reference your data source. For specific examples of documents within these categories, refer to Section 5.5 of this document. Example categories have been listed below; add additional categories, as needed. Summarize pertinent information in Section 2 of the SWDR.

DATA CATEGORY/SOURCES	Date
Topographic	
• USGS quad maps	1991,1993
•	
•	
Hydraulic	
•	
•	
•	
Soils	
•	
•	
•	
Climatic	
• Dist-4 Office of Hydraulics	June 2008
•	
•	
Water Quality	
•	
•	
•	
Other Data Categories	
• Dist-4 Office of Water Quality	May 2008
•	
•	
•	
•	
•	

Checklist SW-2, Storm Water Quality Issues Summary

Prepared by: Khaliq Taheri Date: 3-18-09 District-Co-Route: 04-SM/ALA-84
PM (KP): PM 29.0-30.15/0.0-1.2 EA: 1A5220
RWQCB: San Francisco Bay Region 2

The following questions provide a guide to collecting critical information relevant to project stormwater quality issues. Complete responses to applicable questions, consulting other Caltrans functional units (Environmental, Landscape Architecture, Maintenance, etc.) and the District/Regional Storm Water Coordinator as necessary. Summarize pertinent responses in Section 2 of the SWDR.

1. Determine the receiving waters that may be affected by the project throughout the project life cycle (i.e., construction, maintenance and operation).	☒Complete	☐NA
2. For the project limits, list the 303(d) impaired receiving water bodies and their constituents of concern.	☒Complete	☐NA
3. Determine if there are any municipal or domestic water supply reservoirs or groundwater percolation facilities within the project limits. Consider appropriate spill contamination and spill prevention control measures for these new areas.	☒Complete	☐NA
4. Determine the RWQCB special requirements, including TMDLs, effluent limits, etc.	☐Complete	☒NA
5. Determine regulatory agencies seasonal construction and construction exclusion dates or restrictions required by federal, state, or local agencies.	☒Complete	☐NA
6. Determine if a 401 certification will be required.	☒Complete	☐NA
7. List rainy season dates.	☒Complete	☐NA
8. Determine the general climate of the project area. Identify annual rainfall and rainfall intensity curves.	☒Complete	☐NA
9. If considering Treatment BMPs, determine the soil classification, permeability, erodibility, and depth to groundwater.	☐Complete	☒NA
10. Determine contaminated or hazardous soils within the project area.	☐Complete	☒NA
11. Determine the total disturbed soil area of the project.	☒Complete	☐NA
12. Describe the topography of the project site.	☒Complete	☐NA
13. List any areas outside of the Caltrans right-of-way that will be included in the project (e.g. contractor's staging yard, work from barges, easements for staging, etc.).	☐Complete	☒NA
14. Determine if additional right-of-way acquisition or easements and right-of-entry will be required for design, construction and maintenance of BMPs. If so, how much?	☐Complete	☒NA
15. Determine if a right-of-way certification is required.	☒Complete	☐NA
16. Determine the estimated unit costs for right-of-way should it be needed for Treatment BMPs, stabilized conveyance systems, lay-back slopes, or interception ditches.	☐Complete	☒NA
17. Determine if project area has any slope stabilization concerns.	☐Complete	☒NA
18. Describe the local land use within the project area and adjacent areas.	☒Complete	☐NA
19. Evaluate the presence of dry weather flow.	☐Complete	☒NA

Checklist SW-3, Measures for Avoiding or Reducing Potential Storm Water Impacts

Prepared by: Khaliq Taheri Date: 3-18-09 District-Co-Route: 04-SM/ALA-84

PM (KP): PM 29.0-30.15/0.0-1.2 EA: 1A5220

RWQCB: San Francisco Bay Region 2

The PE must confer with other functional units, such as Landscape Architecture, Hydraulics, Environmental, Materials, Construction and Maintenance, as needed to assess these issues. Summarize pertinent responses in Section 2 of the SWDR.

Options for avoiding or reducing potential impacts during project planning include the following:

1.	Can the project be relocated or realigned to avoid/reduce impacts to receiving waters or to increase the preservation of critical (or problematic) areas such as floodplains, steep slopes, wetlands, and areas with erosive or unstable soil conditions?	☐Yes	☒No	☐NA
2.	Can structures and bridges be designed or located to reduce work in live streams and minimize construction impacts?	☐Yes	☒No	☐NA
3.	Can any of the following methods be utilized to minimize erosion from slopes:			
	a. Disturbing existing slopes only when necessary?	☐Yes	☐No	☒NA
	b. Minimizing cut and fill areas to reduce slope lengths?	☐Yes	☐No	☒NA
	c. Incorporating retaining walls to reduce steepness of slopes or to shorten slopes?	☐Yes	☐No	☒NA
	d. Acquiring right-of-way easements (such as grading easements) to reduce steepness of slopes?	☐Yes	☐No	☒NA
	e. Avoiding soils or formations that will be particularly difficult to re-stabilize?	☐Yes	☐No	☒NA
	f. Providing cut and fill slopes flat enough to allow re-vegetation and limit erosion to pre-construction rates?	☐Yes	☐No	☒NA
	g. Providing benches or terraces on high cut and fill slopes to reduce concentration of flows?	☐Yes	☐No	☒NA
	h. Rounding and shaping slopes to reduce concentrated flow?	☐Yes	☐No	☒NA
	i. Collecting concentrated flows in stabilized drains and channels?	☐Yes	☐No	☒NA
4.	Does the project design allow for the ease of maintaining all BMPs?	☒Yes	☐No	
5.	Can the project be scheduled or phased to minimize soil-disturbing work during the rainy season?	☒Yes	☐No	
6.	Can permanent storm water pollution controls such as paved slopes, vegetated slopes, basins, and conveyance systems be installed early in the construction process to provide additional protection and to possibly utilize them in addressing construction storm water impacts?	☐Yes	☐No	☒NA

Construction Site BMPs
Checklist CS-1, Part 1

Prepared by: Laurie Smith Date: 6-22-09 District-Co-Route: 04-SM/ALA-84

PM (KP): PM 29.0-30.15/0.0-1.2 EA: 1A5220

RWQCB: San Francisco Bay Region 2

Soil Stabilization

General Parameters

1. How many rainy seasons are anticipated between beginning and end of construction? — 3

2. What is the total disturbed soil area for the project? (ac) — 0.5 ac

   (a) How much of the project DSA consists of slopes 1V:4H or flatter? (ac) — none

   (b) How much of the project DSA consists of 1V:4H < slopes < 1V:2H? (ac) — none

   (c) How much of the project DSA consists of slopes 1V:2H and steeper? (ac) — none

   (d) How much of the project DSA consists of slopes with slope lengths longer than 20 ft? (ac) — none

3. What rainfall area does the project lie within? (Refer to Table 2-1 of the Construction Site Best Management Practices Manual) — Area 2

4. Review the required combination of temporary soil stabilization and temporary sediment controls and barriers for area, slope inclinations, rainy and non-rainy season, and active and non-active disturbed soil areas. (Refer to Tables 2-2, and 2-3 of the Construction Site Best Management Practices Manual for Rainfall Area requirements.) — ☒ Complete

Scheduling (SS-1)

5. Does the project have a duration of more than one rainy season and have disturbed soil area in excess of 25 acres? — ☐ Yes ☒ No

   (a) Include multiple mobilizations (Move-in/Move-out) as a separate contract bid line item to implement permanent erosion control or revegetation work on slopes that are substantially complete. (Estimate at least 6 mobilizations for each additional rainy season. Designated Construction Representative may suggest an alternate number of mobilizations.) — ☐ Complete

   (b) Edit Order of Work specifications for permanent erosion control or revegetation work to be implemented on slopes that are substantially complete. — ☐ Complete

(c) Edit permanent erosion control or revegetation specifications to require seeding and planting work to be performed when optimal. ☒ Complete

Preservation of Existing Vegetation (SS-2)

6. Do Environmentally Sensitive Areas (ESAs) exist within or adjacent to the project limits? (Verify the completion of DPP-1, Part 5) ☒Yes ☐No

   (a) Verify the protection of ESAs through delineation on all project plans. ☒ Complete

   (b) Protect from clearing and grubbing and other construction disturbance by enclosing the ESA perimeter with high visibility plastic fence or other BMP. ☒ Complete

7. Are there areas of existing vegetation (mature trees, native vegetation, landscape planting, etc.) that need not be disturbed by project construction? Will areas designated for proposed treatment BMPs need protection (infiltration characteristics, vegetative cover, etc.)? (Coordinate with District Environmental and Construction to determine limits of work necessary to preserve existing vegetation to the maximum extent practicable.) ☒Yes ☐No

   (a) Designate as outside of limits of work (or designate as ESAs) and show on all project plans. ☒ Complete

   (b) Protect with high visibility plastic fence or other BMP. ☒ Complete

8. If yes for 6, 7, or both, then designate ESA fencing as a separate contract bid line item, *if not already incorporated as part of design pollution prevention work (See DPP-1, Part 5).* ☒ Complete

Slope Protection

9. Provide a soil stabilization BMP(s) appropriate for the DSA, slope steepness, slope length, and soil erodibility. (Consult with District/Regional Landscape Architect.)

   (a) Select SS-3 (Hydraulic Mulch), SS-4 (Hydroseeding), SS-5 (Soil Binders), SS-6 (Straw Mulch), SS-7 (Geotextiles, RECPs, etc.), SS-8 (Wood Mulching), other BMPs or a combination to cover the DSA throughout the project's rainy season. ☒ Complete

   (b) Increase the quantities by 25% for each additional rainy season. (Designated Construction Representative may suggest an alternate increase.) ☒ Complete

   (c) Designate as a separate contract bid line item. ☒ Complete

Slope Interrupter Devices

10. Provide slope interrupter devices for all slopes with slope lengths equal to or greater than of 20 ft in length. (Consult with District/Regional Landscape Architect and Designated Construction Representative.)

    (a) Select SC-5 (Fiber Rolls) or other BMPs to protect slopes throughout the project's rainy season. ☐ Complete

    (b) For slope inclination of 1V:4H and flatter, SC-5 (Fiber Rolls) or other BMPs shall be placed along the contour and spaced 20 ft on center. ☐ Complete

    (c) For slope inclination between 1V:4H and 1V:2H, SC-5 (Fiber Rolls) or other BMPs shall be placed along the contour and spaced 15 ft on center. ☐ Complete

    (d) For slope inclination of 1V:2H and greater, SC-5 (Fiber Rolls) or other BMPs shall be placed along the contour and spaced 10 ft on center. ☐ Complete

    (e) Increase the quantities by 25% for each additional rainy season. (Designated Construction Representative may suggest alternate increase.) ☐ Complete

    (f) Designate as a separate contract bid line item. ☐ Complete

Channelized Flow

11. Identify locations within the project site where concentrated flow from stormwater runoff can erode areas of soil disturbance. Identify locations of concentrated flow that enters the site from outside of the right-of-way (off-site run-on). ☐ Complete

    (a) Utilize SS-7 (Geotextiles, RECPs, etc.), SS-9 (Earth Dikes/Swales, Ditches), SS-10 (Outlet Protection/Velocity Dissipation), SS-11 (Slope Drains), SC-4 (Check Dams), or other BMPs to convey concentrated flows in a non-erosive manner. ☐ Complete

    (b) Designate as a separate contract bid line item. ☐ Complete

Construction Site BMPs
Checklist CS-1, Part 2

Prepared by: Noel Aquino Date: 6-09-08 District-Co-Route: 04-SM/ALA-84

PM (KP): PM 29.0-30.15/0.0-1.2 EA: 1A520

RWQCB: San Francisco Bay Region 2

Sediment Control

Perimeter Controls - Run-off Control

1. Is there a potential for sediment laden sheet and concentrated flows to discharge offsite from runoff cleared and grubbed areas, below cut slopes, embankment slopes, etc.? ☒Yes ☐No

   (a) Select linear sediment barrier such as SC-1 (Silt Fence), SC-5 (Fiber Rolls), SC-6 (Gravel Bag Berm), SC-8 (Sand Bag Barrier), SC-9 (Straw Bale Barrier), or a combination to protect wetlands, water courses, roads (paved and unpaved), construction activities, and adjacent properties. (Coordinate with District Construction for selection and preference of linear sediment barrier BMPs.) ☒ Complete

   (b) Increase the quantities by 25% for each additional rainy season. (Designated Construction Representative may suggest an alternate increase.) ☒ Complete

   (c) Designate as a separate contract bid line item. ☒ Complete

Perimeter Controls - Run-on Control

2. Do locations exist where sheet flow upslope of the project site and where concentrated flow upstream of the project site may contact DSA and construction activities? ☐Yes ☒No

   (a) Utilize linear sediment barriers such as SS-9 (Earth Dike/Drainage Swales and Lined Ditches), SC-5 (Fiber Rolls), SC-6 (Gravel Bag Berm), SC-8 (Sand Bag Barrier), SC-9 (Straw Bale Barrier), or other BMPs to convey flows through and/or around the project site. (Coordinate with District Construction for selection and preference of perimeter control BMPs.) ☐ Complete

   (b) Designate as a separate contract bid line item. ☐ Complete

Storm Drain Inlets

3. Do existing or proposed drainage inlets exist within the project limits? ☒Yes ☐No

   (a) Select SC-10 (Storm Drain Inlet Protection) to protect municipal storm drain systems or receiving waters wetlands at each drainage inlet. (Coordinate with District Construction for selection and preference of inlet protection BMPs.) ☒ Complete

   (b) Designate as a separate contract bid line item. ☒ Complete

4. Can existing or proposed drainage inlets utilize an excavated sediment trap as described in SC-10 (Storm Drain Inlet Protection- Type 2)? ☒Yes ☐No

   (a) Include with other types of SC-10 (Storm Drain Inlet Protection). ☒ Complete

Sediment/Desilting Basin (SC-2)

5. Does the project lie within a Rainfall Area where the required combination of temporary soil stabilization and sediment control BMPs includes desilting basins? (Refer to Tables 2-1, 2-2, and 2-3 of the Construction Site Best Management Practices Manual for Rainfall Area requirements.) ☐Yes ☐No

   (a) Consider feasibility for desilting basin allowing for available right-of-way within the project limits, topography, soil type, disturbed soil area within the watershed, and climate conditions. Document if the inclusion of sediment/desilting basins is infeasible. ☐ Complete

   (b) If feasible, design desilting basin(s) per the guidance in SC-2 Sediment/ Desilting Basins of the Construction Site BMP Manual to maximize capture of sediment-laden runoff. ☐ Complete

   Designate as a separate contract bid item. ☐ Complete

6. Will the project benefit from the early implementation of proposed permanent Treatment BMPs? (Coordinate with District Construction.) ☐Yes ☐No

   (a) Edit Order of Work specifications for permanent treatment BMP work to be implemented in a manner that will allow its use as a construction site BMP. ☐ Complete

Sediment Trap (SC-3)

7. Can sediment traps be located to collect channelized runoff from disturbed soil areas prior to discharge? ☐Yes ☐No

   (a) Design sediment traps in accordance with the Construction Site BMP Manual. ☐ Complete

   (b) Designate as a separate contract bid line item. ☐ Complete

Construction Site BMPs
Checklist CS-1, Part 3

Prepared by: Khaliq Taheri Date: 3-17-09 District-Co-Route: 04-SM/ALA-84

PM (KP): PM 29.0-30.15/0.0-1.2 EA: 1A5220

RWQCB: San Francisco Bay Region 2

Tracking Controls

Stabilized Construction Entrance/Exit (TC-1)

1. Are there points of entrance and exit from the project site to paved roads where mud and dirt could be transported offsite by construction equipment? (Coordinate with District Construction for selection and preference of tracking control BMPs.) ☒Yes ☐No

   (a) Identify and designate these entrance/exit points as stabilized construction entrances (TC-1). ☒Complete

   (b) Designate as a separate contract bid line item. ☒ Complete

Tire/Wheel Wash (TC-3)

1. Are site conditions anticipated that would require additional or modified tracking controls such as entrance/outlet tire wash? (Coordinate with District Construction.) ☐Yes ☒No

   Designate as a separate contract bid line item. ☐ Complete

Stabilized Construction Roadway (TC-2)

3. Are temporary access roads necessary to access remote construction activity locations or to transport materials and equipment? (In addition to controlling dust and sediment tracking, access roads limit impact to sensitive areas by limiting ingress, and provide enhanced bearing capacity.) (Coordinate with District Construction.) ☐Yes ☒No

   (a) Designate these temporary access roads as stabilized construction roadways (TC-2). ☐ Complete

   (b) Designate as a separate contract bid line item. ☐ Complete

Street Sweeping and Vacuuming (SC-7)

1. Is there a potential for tracked sediment or construction related residues to be transported offsite and deposited on public or private roads? (Coordinate with District Construction for preference of including street sweeping and vacuuming with tracking control BMPs.) ☒Yes ☐No

   Designate as a separate contract bid line item. ☒ Complete

Construction Site BMPs
Checklist CS-1, Part 4

Prepared by: Khaliq Taheri Date: 3-17-09 District-Co-Route: 04-SM/ALA-84

PM (KP): PM 29.0-30.15/0.0-1.2 EA: 1A5220

RWQCB: San Francisco Bay Region 2

Wind Erosion Controls

Wind Erosion Control (WE-1)

1. Is the project located in an area where standard dust control practices in accordance with Standard Specifications, Section 10: Dust Control, are anticipated to be inadequate during construction to prevent the transport of dust offsite by wind? *(Note: Dust control by water truck application is paid for through the various items of work. Dust palliative, if it is included, is paid for as a separate item.)* ☐ Yes ☒ No

   (a) Select SS-3 (Hydraulic Mulch), SS-4 (Hydroseeding), SS-5 (Soil Binders), SS-7 (Geotextiles, Plastic Covers, & Erosion Control Blankets/Mats), SS-8 (Wood Mulching) or a combination to cover the DSA subject to wind erosion year-round, especially when significant wind and dry conditions are anticipated during project construction. (Coordinate with District Construction for selection and preference of wind erosion control BMPs.) ☐ Complete

   (b) Designate as a separate contract bid line item. ☐ Complete

Construction Site BMPs
Checklist CS-1, Part 5

Prepared by: Khaliq Taheri Date: 3-17-09 District-Co-Route: 04-SM/ALA-84

PM (KP): PM 29.0-30.15/0.0-1.2 EA: 1A5220

RWQCB: San Francisco Bay Region 2

Non-Storm Water Management

Temporary Stream Crossing (NS-4) & *Clear Water Diversion* (NS-5)

1. Will construction activities occur within a waterbody or watercourse such as a lake, wetland, or stream? (Coordinate with District Construction for selection and preference for stream crossing and clear water diversion BMPs.) ☐Yes ☒No

   (a) Select from types offered in NS-4 (Temporary Stream Crossing) to provide access through watercourses consistent with permits and agreements.[1] ☐ Complete

   (b) Select from types offered in NS-5 (Clear Water Diversion) to divert watercourse consistent with permits and agreements.[1] ☐ Complete

   (c) Designate as a separate contract bid line item(s). ☐ Complete

Other Non-Storm Water Management BMPs

2. Are construction activities anticipated that will generate wastes or residues with the potential to discharge pollutants? ☒Yes ☐No

   (a) Identify potential pollutants associated with the anticipated construction activity and select the corresponding BMP such as NS-1 (Water Conservation Practices), NS-2 (Dewatering Operations), NS-3 (Paving and Grinding Operations), NS-7 (Potable Water/Irrigation), NS-8 (Vehicle and Equipment Cleaning), NS-9 (Vehicle and Equipment Fueling), NS-10 (Vehicle and Equipment Maintenance), NS-11 (Pile Driving Operations), NS-12 (Concrete Curing), NS-13 (Material and Equipment Use Over Water), NS-14 (Concrete Finishing), and NS-15 (Structure Demolition/Removal Over or Adjacent to Water).[1] ☒ Complete

   (b) Verify that costs for non-storm water management BMPs are identified in the contract documents. Designate BMP as a separate contract bid line item if the requirements in Construction Site Management (SSP 07-346) are anticipated to be inadequate or if requested by Construction. ☒ Complete

1. Coordinate with District Environmental for consistency with US Army Corps of Engineers 404 permit and Dept. of Fish and Game 1601 Streambed alteration Agreements.

Design Pollution Prevention BMPs
Checklist DPP-1, Part 1

Prepared by: Khaliq Taheri Date: 3-17-09 District-Co-Route: 04-SM/ALA-84

PM (KP): PM 29.0-30.15/0.0-1.2 EA: 1A5220

RWQCB: San Francisco Bay Region 2

Consideration of Design Pollution Prevention BMPs

1. Consideration of Downstream Effects Related to Potentially Increased Flow [to streams or channels]?

(a) Will project increase velocity or volume of downstream flow?	☐Yes	☐No	☒NA
(b) Will the project discharge to unlined channels?	☐Yes	☐No	☒NA
(c) Will project increase potential sediment load of downstream flow?	☐Yes	☐No	☒NA
(d) Will project encroach, cross, realign, or cause other hydraulic changes to a stream that may affect downstream channel stability?	☐Yes	☐No	☒NA

If Yes was answered to any of the above questions, consider ***Downstream Effects Related to Potentially Increased Flow***, complete the DPP-1, Part 2 checklist.

2. Slope/Surface Protection Systems

(a) Will project create new slopes or modify existing slopes?	☐Yes	☒No	☐NA

If Yes was answered to the above question, consider ***Slope/Surface Protection Systems***, complete the DPP-1, Part 3 checklist.

3. Concentrated Flow Conveyance Systems

(a) Will the project create or modify ditches, dikes, berms, or swales?	☐Yes	☒No	☐NA
(b) Will project create new slopes or modify existing slopes?	☐Yes	☒No	☐NA
(c) Will it be necessary to direct or intercept surface runoff?	☐Yes	☒No	☐NA
(d) Will cross drains be modified?	☐Yes	☐No	☒NA

If Yes was answered to any of the above questions, consider ***Concentrated Flow Conveyance Systems***; complete the DPP-1, Part 4 checklist.

4. Preservation of Existing Vegetation

a) It is the goal of the Storm Water Program to maximize the protection of desirable existing vegetation to provide erosion and sediment control benefits on all projects. ☒Complete

Consider ***Preservation of Existing Vegetation***, complete the DPP-1, Part 5 checklist.

Design Pollution Prevention BMPs
Checklist DPP-1, Part 5

Prepared by: Khaliq Taheri Date: 3-17-09 District-Co-Route: 04-SM/ALA-84

PM (KP): PM 29.0-30.15/0.0-1.2 EA: 1A5220

RWQCB: San Francisco Bay Region 2

Preservation of Existing Vegetation

1. Review Preservation of Property, Standard Specifications 16.1.01 and 16-1.02 (Clearing and Grubbing) to reduce clearing and grubbing and maximize preservation of existing vegetation. ☒Complete

2. Has all vegetation to be retained been coordinated with Environmental, and identified and defined in the contract plans? ☒Yes ☐No

3. Have steps been taken to minimize disturbed areas, such as locating temporary roadways to avoid stands of trees and shrubs and to follow existing contours to reduce cutting and filling? ☒Complete

4. Have impacts to preserved vegetation been considered while work is occurring in disturbed areas? ☒Yes ☐No

5. Are all areas to be preserved delineated on the plans? ☒Yes ☐No

20. NON STORM WATER INFORMATION PACKAGE

TABLE OF CONTENTS

CONTRACT NO. 04-1A5224

1. ESTIMATE RATE OF SEEPAGE

2. DEWATERING LOCATION PLANS

3. LIST OF PUBLICLY OWNED TREATMENT WORKS (POTW) FOR DISPOSAL OF CONTAMINATED GROUND WATER

4. SAN MATEO / ALAMEDA COUNTY -POTW SERVICE AREA

1. ESTIMATE RATE OF SEEPAGE

HYDRAULIC CONDUCTIVITY ESTIMATE

Below is a summary of the approximate hydraulic conductivity range for the project area:

Unified Soil Classification	Hydraulic Conductivity Range, gpd/ft2 (m/sec)
Silty Sand with Gravel to Poorly Graded Sand with Silt and Gravel (SP/GP-SM)	1000 to 6000 ($5x10^{-4}$ to 3 10^{-3})
Bay Mud	2 $x10^{-4}$ to 0.2 ($1x10^{-10}$ to $1x10^{-7}$)

FLOW RATE

Our estimate of the seepage rate (flow rate) is for a trench about 6 ft. deep, 4 ft. wide and groundwater 3 ft below existing ground surface. We estimate the flow rate to vary from 0.8 gallon/min/ft^2 to 5 gallon/min/ft^2 of cross-sectional area of excavation below the groundwater table.

2. DEWATERING LOCATION PLANS

FOR COMPLETE RIGHT OF WAY AND ACCURATE ACCESS DATA, SEE RIGHT OF WAY RECORD MAPS AT DISTRICT OFFICE.

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SM,Alc	84	R29.0/R30.2, R0.0/R1.2		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

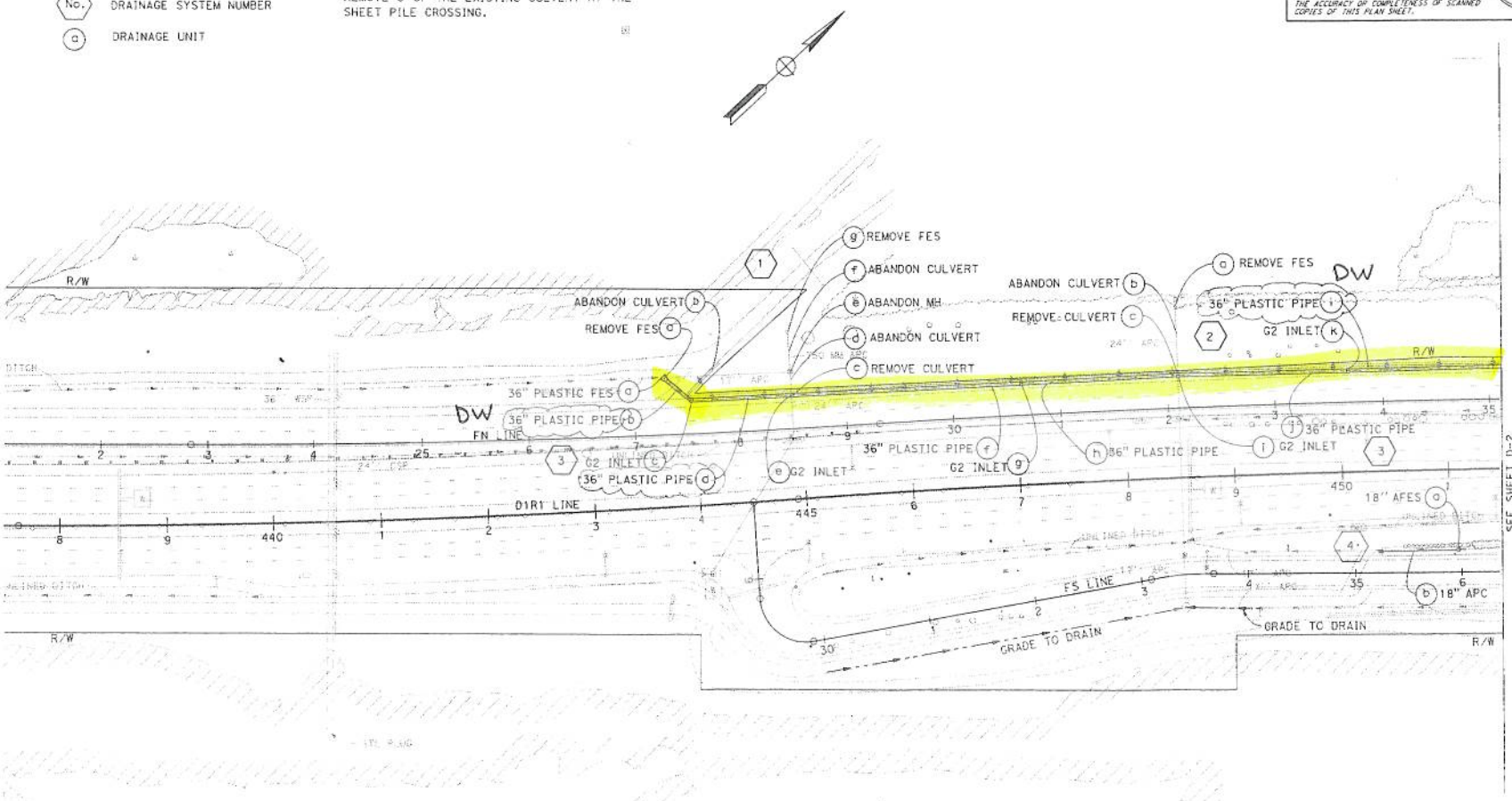
LEGEND:

(No.) DRAINAGE SYSTEM NUMBER

(a) DRAINAGE UNIT

NOTE:

REMOVE 5' OF THE EXISTING CULVERT AT THE SHEET PILE CROSSING.



NOTE:
CLOUDED AREA IS DEWATERING LOCATIONS "DW"

DRAINAGE PLAN

SCALE: 1" = 50'

THIS PLAN ACCURATE FOR DRAINAGE WORK ONLY

D-1

REVISED BY	DATE REVISED
A	A

CALCULATED/DESIGNED BY: A
CHECKED BY: A

FUNCTIONAL SUPERVISOR: SID K. PAWAR

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans DESIGN

DATE PLOTTED => 18-MAY-2009

USERNAME => (USER)
DGN FILE => (FILENAME)

CL 04253 EA 1A8221

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SM,Ala	84	R29.0/R30.2, R0.0/R1.2		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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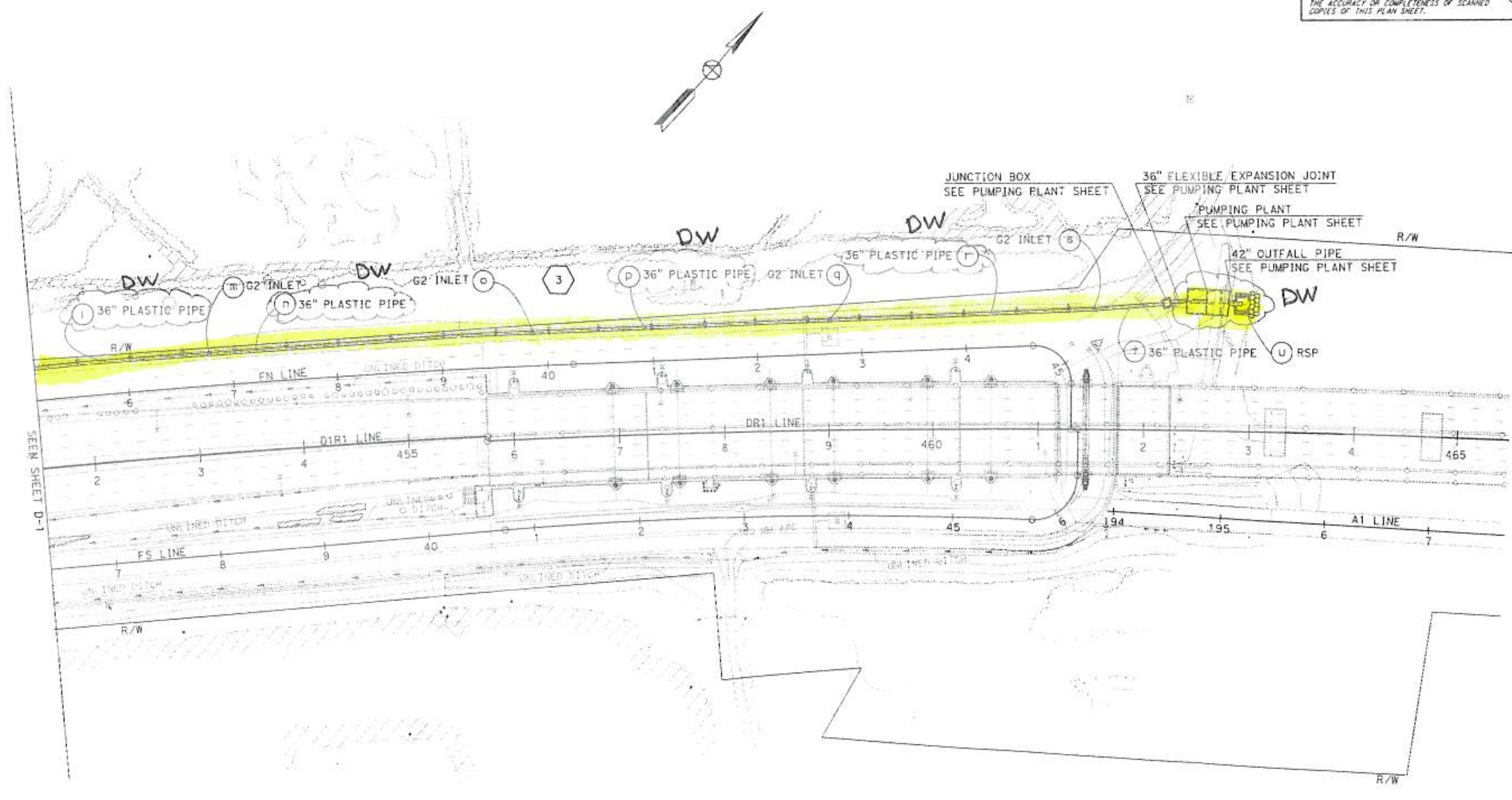
REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

FOR COMPLETE RIGHT OF WAY AND ACCURATE ACCESS DATA, SEE RIGHT OF WAY RECORD MAPS AT DISTRICT OFFICE.



NOTE:
CLOUDED AREA IS DEWATERING LOCATIONS "DW"

DRAINAGE PLAN

SCALE: 1" = 50'

D-2

THIS PLAN ACCURATE FOR DRAINAGE WORK ONLY

CU 04253 EA 1A5221

FOR NOTES, ABBREVIATIONS & /OR LEGEND, SEE SHEET

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION	FUNCTIONAL SUPERVISOR	CALCULATED-DESIGNED BY	A	REVISED BY	A
Caltrans DESIGN	SID K. PAWAR	CHECKED BY	A	DATE REVISED	A

LAST REVISION | DATE PLOTTED => 18-MAY-2009

FOR COMPLETE RIGHT OF WAY AND ACCURATE ACCESS DATA, SEE RIGHT OF WAY RECORD MAPS AT DISTRICT OFFICE.

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SM,Ala	84	R29.0/R30.2, R0.0/R1.2		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

	REVISED BY	DATE REVISED
	A	A
	A	A

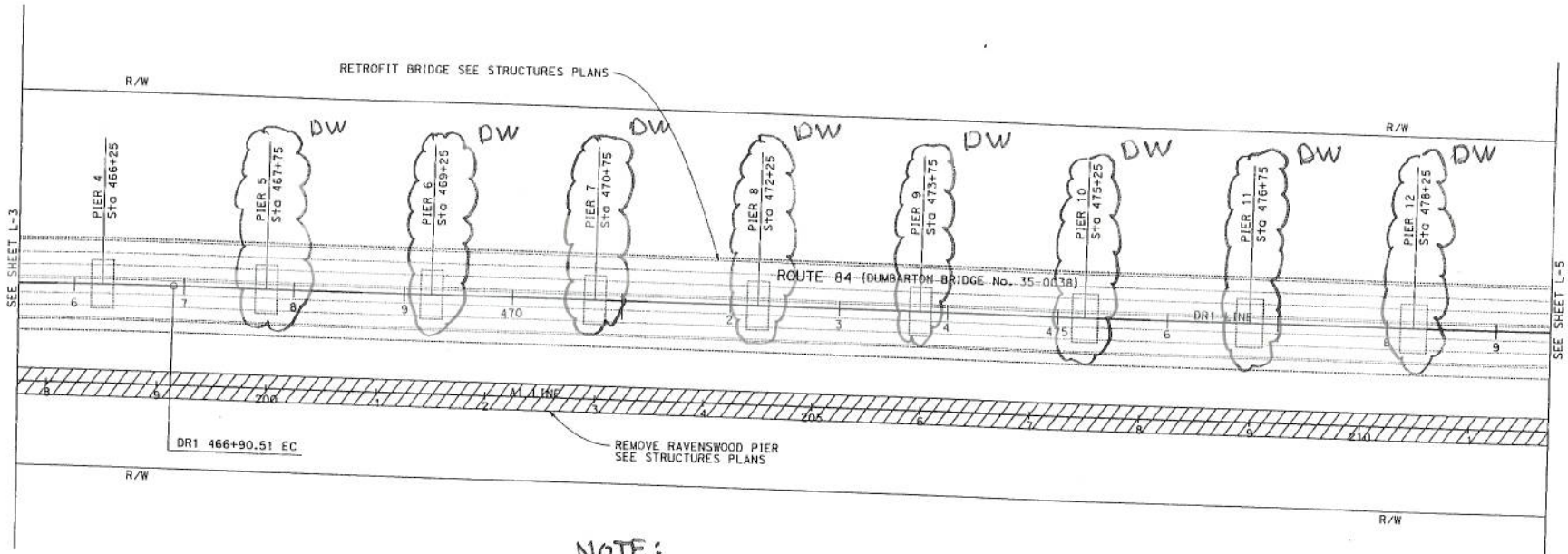
CALCULATED-DESIGNED BY

CHECKED BY

FUNCTIONAL SUPERVISOR: SID K. PAWAR

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

DESIGN



NOTE:
CLOUDED AREA IS DEWATERING LOCATIONS "DW"

X 6,898,800 Y 2,009,500

X 6,898,500 Y 2,009,000

X 6,898,800 Y 2,009,500

FOR NOTES, ABBREVIATIONS &/OR LEGEND, SEE SHEET L-1

LAYOUT

SCALE: 1'' = 50'

L-4

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => s110182
DGN FILE => 41c522ea004.dgn

CU 04253

EA 1A5221

REVISION DATE PLOTTED => 23-JAN-2009
TIME PLOTTED => 10:06

FOR COMPLETE RIGHT OF WAY AND ACCURATE ACCESS DATA, SEE RIGHT OF WAY RECORD MAPS AT DISTRICT OFFICE.

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SM, Ala	84	R29.0/R30.2, R0.0/R1.2		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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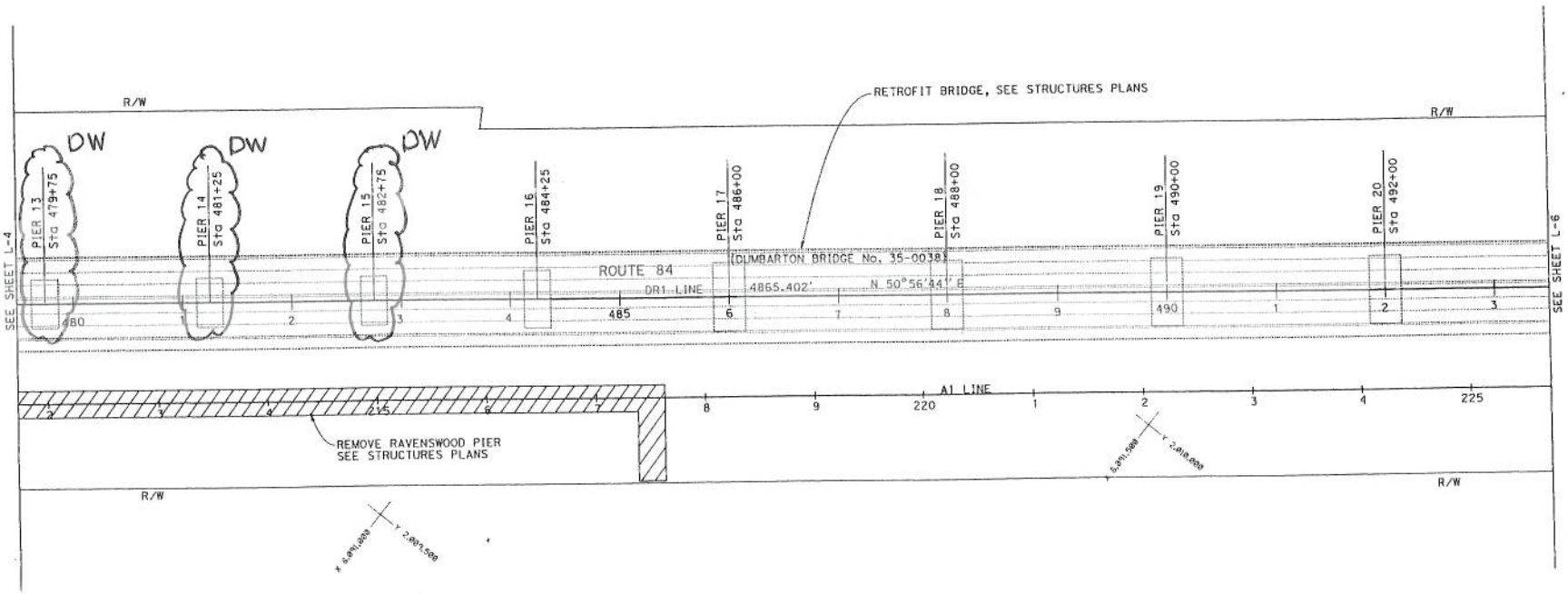
REGISTERED PROFESSIONAL ENGINEER No. EXP. CIVIL STATE OF CALIFORNIA



NOTE:
CLOUDED AREA IS DEWATERING LOCATIONS "DW"

LAYOUT
SCALE: 1" = 50'

L-5

FOR NOTES, ABBREVIATIONS &/OR LEGEND, SEE SHEET L-1

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
DESIGN
FUNCTIONAL SUPERVISOR: SID K. PAWAR
CALCULATED-DESIGNED BY: A
CHECKED BY: A
REVISED BY: A
DATE REVISED: A

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => s110182
DGN FILE => 41a522ea005.dgn

CU 04253 EA 1A5221

LAST REVISION DATE PLOTTED => 23-JUN-2009
09-10-09 TIME PLOTTED => 07:49

FOR COMPLETE RIGHT OF WAY AND ACCURATE ACCESS DATA, SEE RIGHT OF WAY RECORD MAPS AT DISTRICT OFFICE.

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SM,Alo	84	R29.0/R30.2, R0.0/R1.2		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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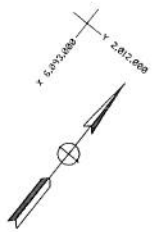
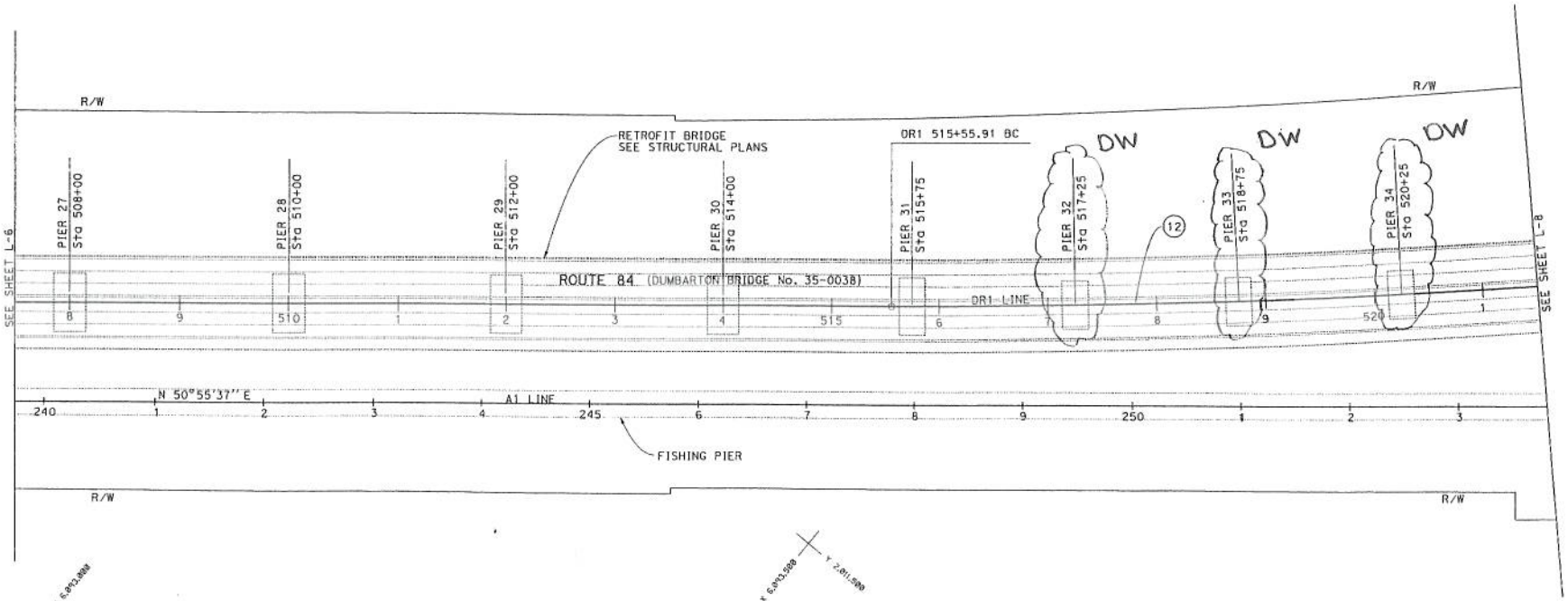
REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA





CURVE DATA

No.	R	Δ	T	L	N-COORDINATE	E-COORDINATE
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NOTE:
CLOUDED AREA IS DEWATERING LOCATIONS "DW"

FOR NOTES, ABBREVIATIONS &/OR LEGEND, SEE SHEET L-1

LAYOUT
SCALE: 1" = 50'

L-7

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans DESIGN
FUNCTIONAL SUPERVISOR: SID K. PAWAR
CALCULATED-DESIGNED BY
CHECKED BY
REVISED BY A
DATE REVISED A

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => s110182

CU 04253

EA 1A5221

LAST REVISION DATE PLOTTED => 23-JAN-2009
09-10-09 TIME PLOTTED => 07:51

FOR COMPLETE RIGHT OF WAY AND ACCURATE ACCESS DATA, SEE RIGHT OF WAY RECORD MAPS AT DISTRICT OFFICE.

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SM,Ala	84	R29.0/R30.2, R0.0/R1.2		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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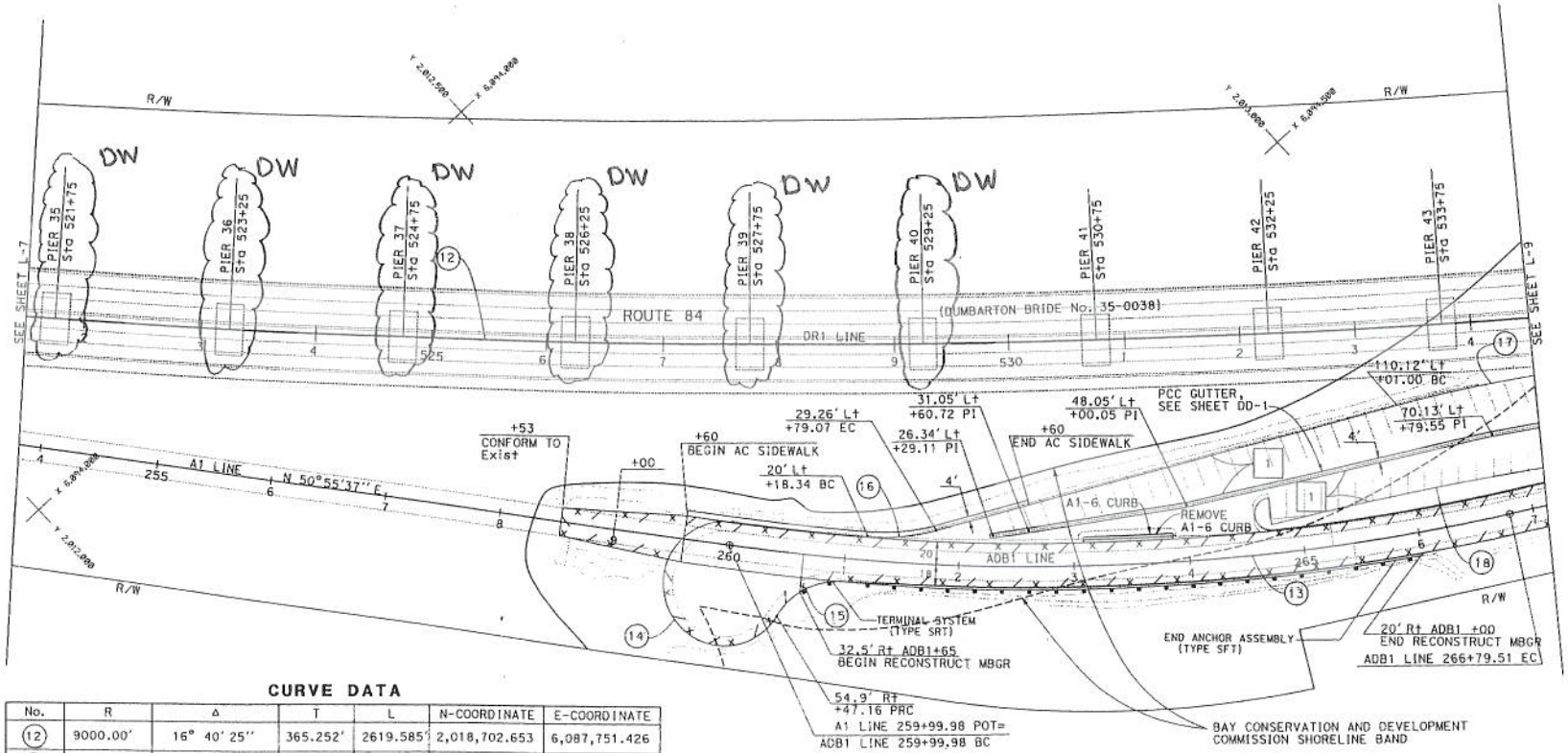
REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA



CURVE DATA

No.	R	Δ	T	L	N-COORDINATE	E-COORDINATE
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(13)	1900'	20° 29' 30"		679.53'		
(14)	53'	246° 18' 47"		227.85'		
(15)	62'	63° 16' 02"		68.46'		
(16)	180'	19° 23' 59"		60.95'		
(17)	1150'	10° 21' 16"		207.83'		
(18)	3000'	06° 28' 27"		338.99'		

NOTE:
CLOUDED AREA IS DEWATERING LOCATIONS "DW"

FOR NOTES, ABBREVIATIONS &/OR LEGEND, SEE SHEET L-1

LAYOUT
SCALE: 1" = 50'

L-8

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
DESIGN
FUNCTIONAL SUPERVISOR: SID K. PAWAR
CALCULATED-DESIGNED BY
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REVISED BY | A | A | A
DATE REVISED | A | A | A

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

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DGN FILE => A1a532e0008.dgn

CU 04253

EA 1A5221

LAST REVISED: DATE PLOTTED => 23-JUN-2009
06-16-09 TIME PLOTTED => 07:51

3. LIST OF PUBLICLY OWNED TREATMENT WORKS (POTW) FOR DISPOSAL OF CONTAMINATED GROUND WATER

San Mateo County POTW

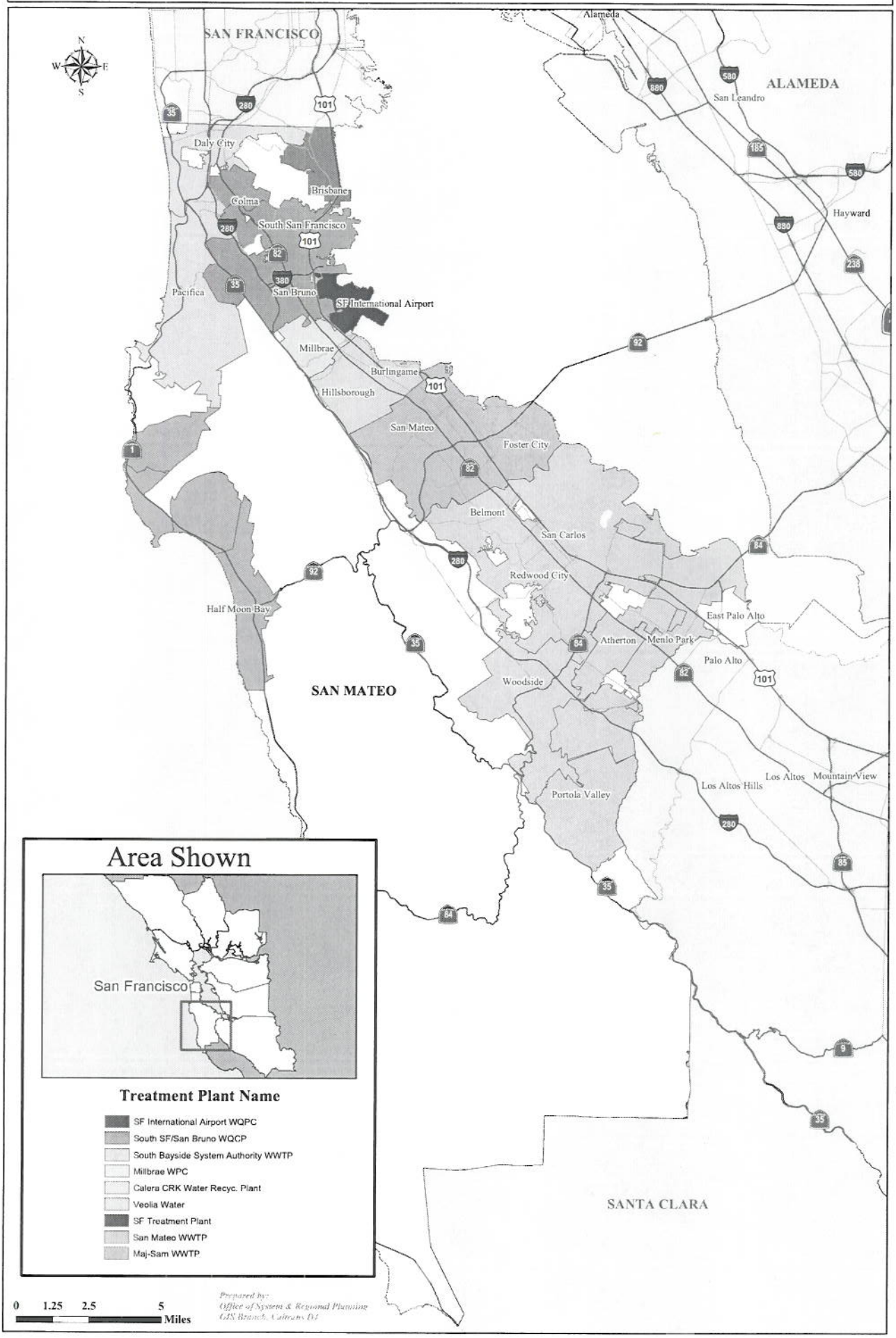
City Discharger	Treatment Plant Name	Permit No.	Current Order No.	WDR Discharger Name	Discharger Contact Name	Contact Phone No.
San Francisco International Airport	San Francisco International Airport WQCP	CA0038318	01-145	San Francisco International Airport WQCP	Sam Mehta	650-821-7841
San Mateo	San Mateo Waste Water Treatment Plant (formerly San Mateo WQCP)	CA0037541	01-071	San Mateo WQCP	Kacey Karmendy	650-522-7388
South S.F.	South S.F./San Bruno WQCP	CA0038130	97-086	City of South San Francisco	Dave Castagnola; Terry White	650-829-3844; 650-877-8551
San Bruno				City of San Bruno	Scott Munns	650-616-7066
Colma				Colma City	Ellen Ellsworth	650-757-8888
Millbrae	Millbrae WPC	CA0037532	01-143	Millbrae WPC	Thomas Colletti	650-259-2381
Pacifica	Calera CRK Water Recycling Plant	CA0038776	99-066	Calera CRK Water Recycling Plant	Dave Gromm	650-738-4663
Burlingame	Veolia Water [formerly Burlingame WWTP]	CA0037788	02-027	Burlingame WWTP	Phil Scott,	650-558-7673; 650-558-7679
Hillsborough				Town of Hillsborough	David Bishop	650-375-7411

Alameda POTW

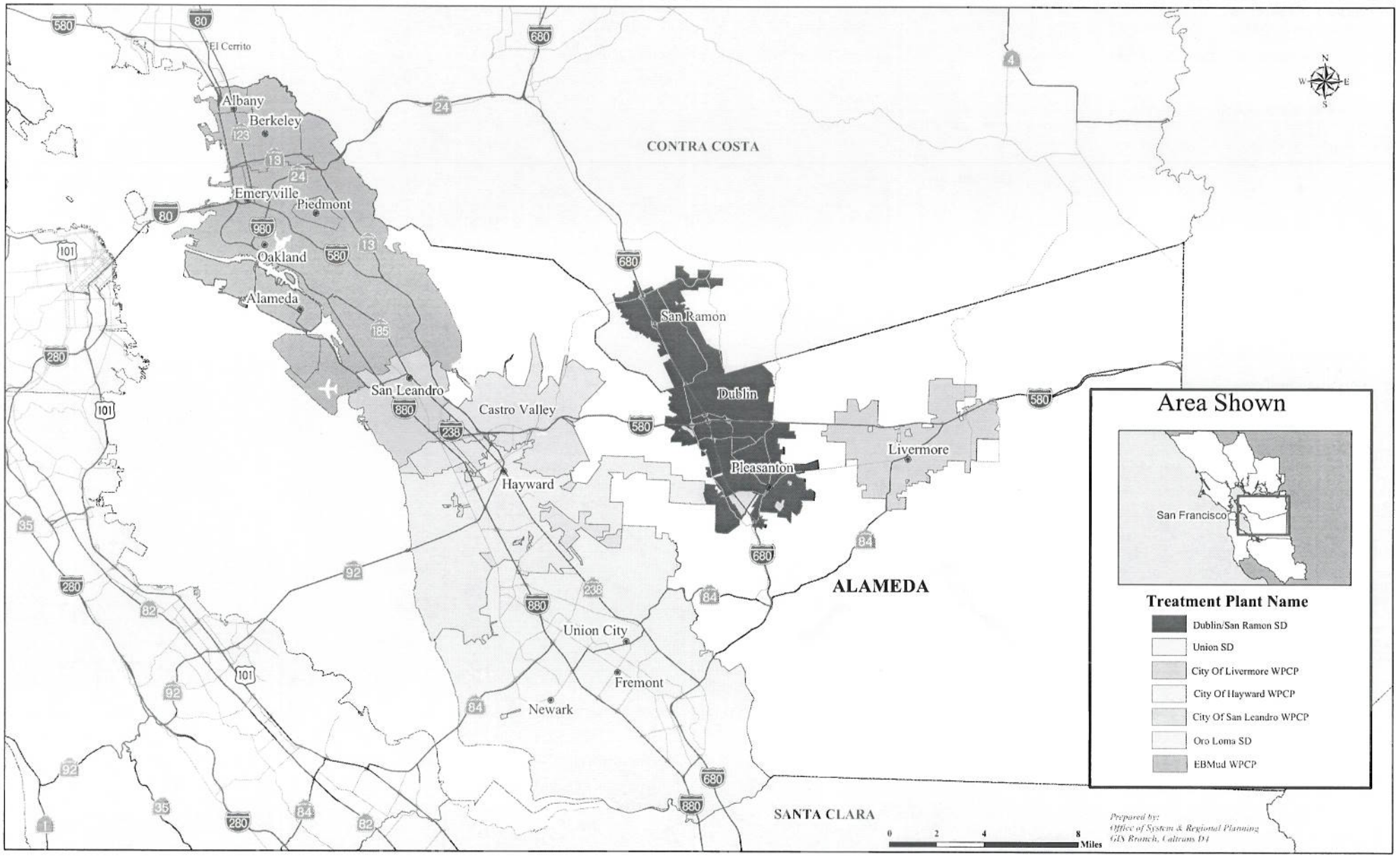
	City Discharger	Treatment Plant Name	WDR Discharger Name	Discharger Contact Name	Contact Phone No.	Contact Email	Mail Address	Ct Contact for Groundwater & De-Watering Discharges	Service Area of the POTW
6	Dublin	Dublin San Ramon Service District	Dublin San Ramon SD	Bob Anderson/ Levi Fuller	925-875-2360, cell 925-570-8757; 925-846-0568, ext. 119	anderson@dsrsd.com; fuller@dsrsd.com	DSRSD, 7051 Dublin Blvd., Dublin, CA 94568	Call Env. Compliance Officer Eric Kuefner @ 925-875-2335 "case-by-case situation -prefer not during storms" Testing required,$385 for annual permit, per million gal fee, etc.	Dublin, San Ramon, & Pleasanton
7	Pleasanton		City of Pleasanton	Richard Lagomarsino; Daniel Smith	925-931-5538; 925-931-5509	rlagomarsino@ci.pleasanton.ca.us; dsmith@ci.pleasanton.ca.us	Richard Lagomarsino, Lead Utility Operator and Daniel Smith, Utility Superintendent, 3333 Busch Road, Pleasanton, CA 94588	Same as Dublin-San Ramon SD - see line #A- 7	Same as Dublin-San Ramon SD - see line #A- 7
8	Union City	Union SD	Union SD	Roger Ham	510-477-7540	roger_ham@unionsanitary.com	Roger Ham, Collection Service Manager, Uniion Sanitary District, 5072 Benson Road, Union City, CA 94587	Best contact is Von Henry @ 510-477-7637. UCSD would consider if there are no other options available, ie. If non-contaminated using the storm drain is "ok"	Services: Fremont (including Niles), Union City, & Newark
9	Livermore	City of Livermore WPCP	City of Livermore	Darren Greenwood	925-960-8100	dggreenwood@ci.livermore.ca.us	Darren Greenwood, Water Resources Manager, 101 West Jacklondon Blv., Livermore, CA 94551	Call Env. Source Control's - Alex Paredes 925-960-8144 : "requires testing, then annual G.W discharge Permit of $250, and $6,750 PMG's of discharge" - Will mail packet	City of Livermore, the Ruby Hills Development of Pleasanton, and the Veteran's Hospital of unincorporated Alameda County.
10	Hayward	City of Hayward WPCP	City of Hayward	Alex Ameri	510-583-4720	alexa@ci.hayward.ca.us	Alex Ameri, Deputy Director/Utilities, Dept. of Public Works, 777 B Street, Hayward, CA 94541-5007	Call Ms. Dije Ndreu @ 510-881-7960 They will accept discharge with test results. Permit fee is $470 plus per gallon fee. See email of 6/22/04 has all info	Per Alex Ameri: 90% of the city of Hayward is served by this sewer system - the other 10% (the North end, north of "A" St.) is serviced by Ora Loma Sanitation
11	San Leandro	San Leandro WPCP	City of San Leandro	Dean Wilson	510-577-6030	dwilson@ci.san-leandro.ca.us	Dean Wilson, Water Pollution Control Plant Manager, 3000 David St., San Leandro, CA 94577	Contact: John Camp in Env.Services @ 510-577-6029. "Haven't accepted in the past…prefers Baker tanks for sediment, then discharge to storm drain" There is a special Discharge Permit, includes $2.40 per 100 cu.ft. Would consider proposals.	Plant phone # is 510-577-3434 - they only do "the city boundaries of San Leandro - not the unincorporated areas - its sort of a Zig-Zag kind of thing..." They do have their boundaries on GIS - call Mike Hamer at 577-3339
12	San Lorenzo	Oro Loma SD	Oro Loma S.D.	Michael C. Cameron	510-481-6969	mcameron@oroloma.org	Michael Cameron, General Manager, Oro Loma Sanitary District, 2600 Grant Avenue, San Lorenzo, CA 94580	Best contact: Jeff Carson 510-481-6971. Fee, permit, plan, testing, possible treatment required. Potential problems are large sediments and amounts. May only allow discharge between 2 and 4 A.M. Service area is 40% of both Hayward and San Leandro, San Lorenzo, and some unincorporated Alameda County	Call Bill Halstead @ 510-481-6963 - he has base maps and shape files which he will make available on CD or pdf. Service area is all of San Lorenzo, parts of San Leandro, Hayward, and Castro Valley, and parts of unincorporated Alameda County. "Ora Loma is a 'district' and not subject to city boundaries..."
13	Castro Valley		Castro Valley S.D.	Roland Williams	510-537-0757	roland@cvsan.org	Roland William, General Manager, Castro Valley Sanitary District, 21040 Marshall Street, Castro Valley, CA 94546-6098	Same as Oro Loma SD - see line # A-12	Same as Oro Loma SD - see line # A-12
14	Oakland	EBMUD WPCP	EBMUD	Maura A. Bonnarens; Jannifer Smith	510-287-1141; 510-287-0509	mbonnare@ebmud.com; jsmith@ebmud.com	David R. Williams, P.O. Box 2055 (MS#702), Oakland, CA 94623-1055	Web site: www.ebmud.com or call 510-287-1651 "for determination of your permitting needs" Best contact Gail Tupper at 510-287-1608 Permit is 13 pages long (costs $650) - "every situation is different/special…"	Cities of: Alameda, Albany, Berkeley, El Cerrito, Emeryville, Kensington, Oakland, and the Stege Sanitary section of Richmond.
15	Alameda		City of Alameda	Wali Waziri	510-749-5853	wwaziri@ci.alameda.ca.us	Mat Naclerio, Director of Public Works, City of Alameda, Alameda Point, Building 1, 950 West Mall Square, Room 110, Alameda, CA 94501	Same as EBMUD WPCP - see line # A-14	Part of EBMUD see # A -14
16	Albany		City of Albany	Ann Chaney	510-528-5768	achaney@albanyca.org	Ann Chaney, Director of Community Development and Environmental Resources, City of Albany-City Hall, 1000 San Pablo Ave, Albany, CA 94706	Same as EBMUD WPCP - see line # A-14	Part of EBMUD see # A -14
17	Berkeley		City of Berkeley	Henry Yee	510-981-6303	hyee@ci.berkeley.ca.us	Rene Cardinaux, Public Works Director, City of Berkeley, 2180 Milvia St., Berkeley, CA 94704	Same as EBMUD WPCP - see line # A-14	Part of EBMUD see # A -14
18	Emeryville		City of Emeryville	Maurice Kaufman	510-596-4334	mkaufman@ci.emeryville.ca.us	Hank Van Dyke, City Engineer, City of Emeryville, 1333 Park Ave., Emeryville, CA 94608	Same as EBMUD WPCP - see line # A -14	Part of EBMUD see # A -14
19	Oakland		City of Oakland	Fuad Sweiss; Allen Law	510-238-6607 (LR); 238-6939(AL)	fssweiss@oaklandnet.com; atlaw@oaklandnet.com	Michael Neary, Engineering Division Manager, Cit of Oakland, 250 Frank Ogawa Plaza, Suite 4314, Oakland, CA 94612	Same as EBMUD WPCP - see line #A -14	Part of EBMUD see # A -14
20	Piedmont		City of Piedmont	Larry Rosenberg	510-420-3050	lrosenberg@ci.piedmont.ca.us	Larry Rosenberg, Director of Public Works, City of Piedmont, 120 Vista Ave., Piedmont, CA 94611	Same as EBMUD WPCP - see line # A -14	Part of EBMUD see # A -14

4. SAN MATEO / ALAMEDA COUNTY -POTW SERVICE AREA

San Mateo County - POTW Service Areas



Alameda County - POTW Service Areas



21. BMP FOR PILE REMOVAL

Handout on Best Management Practices for Pile Removal

1. Remove piles and sheet piles using vibratory extraction whenever possible.

2. Remove piles slowly.

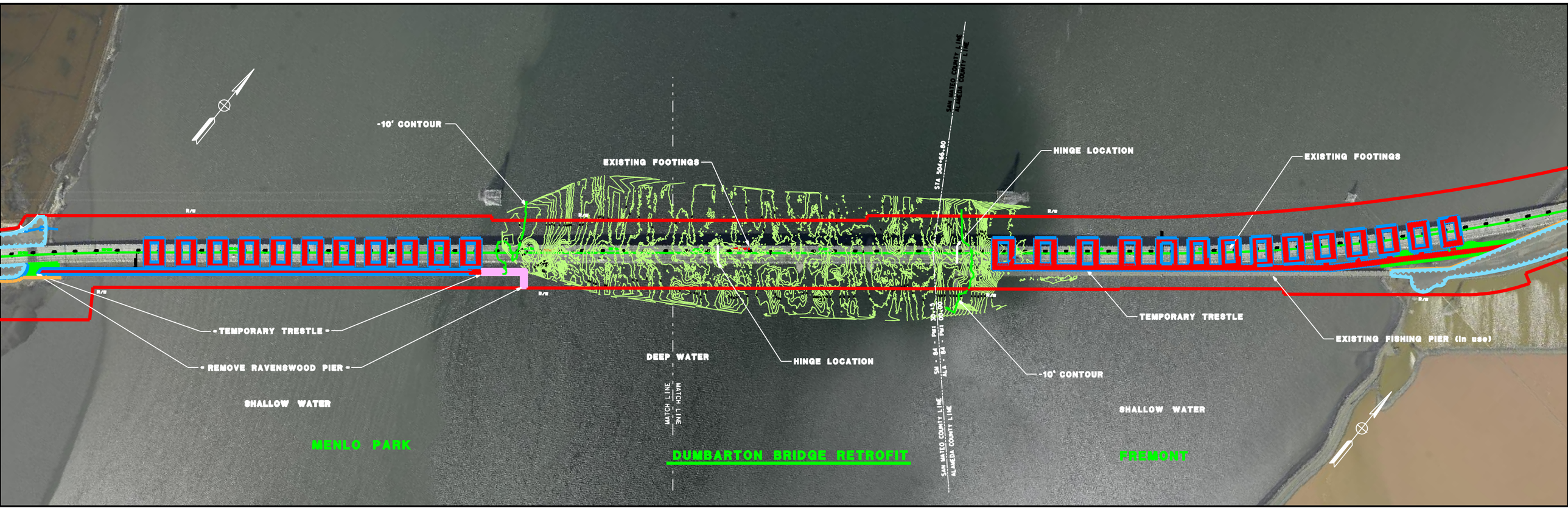
3. Break the bond between the pile and sediment before beginning removal.

4. Do not remove adhering sediment from the pile while it is over water.

5. Place removed piles in a containment vessel to capture sediment and debris

6. When cutting off piles below the mudline, cut off the pile during the lowest practical tide condition and slack water.

22. NEW TRESTLE LOCATION


-10' CONTOUR
EXISTING FOOTINGS
HINGE LOCATION
EXISTING FOOTINGS
SAN MATEO COUNTY LINE
ALAMEDA COUNTY LINE
STA 304+66.80
R/W
TEMPORARY TRESTLE
REMOVE RAVENSWOOD PIER
SHALLOW WATER
DEEP WATER
HINGE LOCATION
MATCH LINE
MATCH LINE
-10' CONTOUR
TEMPORARY TRESTLE
EXISTING FISHING PIER (in use)
SHALLOW WATER
MENLO PARK
DUMBARTON BRIDGE RETROFIT
FREMONT

23. CONDITION TYP

TYPICAL CONDITIONS IMPOSED BY THE COAST GUARD DURING BRIDGE PROJECTS
(This is not an approval to perform work)

The Coast Guard (USCG), Bridge Office must be provided with the contractors proposed method of construction, via the bridge owner, at least 30 days prior to beginning to allow proper review and coordination prior to official Coast Guard approval. Once approved, we will provide appropriate notices to the mariners concerning work schedules and location of equipment.

a. The work shall be performed such that waterway traffic and navigational clearances are not affected and the navigable depths are not impaired.

b. All flame-producing, spark-producing, welding or other hazardous operations shall be halted while vessels are passing through the bridge.

c. Nothing may interfere with proper display of required bridge navigational lighting or other navigational signals and bridge markings.

d. If temporary obstructions to navigation such as containment or floating equipment become necessary, the proposal for such obstruction shall be provided to the Eleventh Coast Guard District Bridge Office at least 30 days in advance for review and approval.

e. Floating equipment located in the channel shall move when requested for safe passage of waterway traffic. A good quality marine radio shall be present at the jobsite and properly employed to facilitate reliable communications between the contractor and approaching waterway traffic. The marine radio installed on the bridge, work tug or safety boat is considered adequate for this purpose.

f. Floating equipment shall not be located in the channel unless actively engaged in working on the bridge. When not working, floating equipment shall be located in approved anchorages or mooring areas outside the navigation channel.

g. The bridge owner must provide anchor plans for USCG review and approval.

h. Moored or stationary obstructions, including scaffolding, barges, falsework, etc., shall be lighted at night with steady burning red lights, visible at 2,000 yards from approaching vessels. The USCG Bridge Office will provide details of location and color of lighting when the contractors' proposal is reviewed.

i. Proposals to close the waterway will require USCG Captain of the Port authorization. At least 30 days advance notice is required to allow proper review and approval with the USCG Captain of the Port and waterway users.

j. Nothing may fall from the bridge or be deposited into the water. If anything is accidentally dropped into the water, immediate action shall be taken to remove it, and the waterway shall be cleared to the satisfaction of the Corps of Engineers.

k. The Federal Water Pollution Control Act prohibits the discharge of oil, including oil based paints, into the navigable waters of the United States. In the event of discharge the responsible party shall immediately take action to halt the discharge and notify the National Response Center, U.S. Coast Guard by calling (800) 424-8802. Failure to report such discharge may result in substantial fines, imprisonment or both. The responsible party will be responsible for clean up costs, if any.

l. The bridge owner must establish and maintain an adequate communications plan with the designated USCG Vessel Traffic Service. Initial contact may be established with the USCG Bridge Office by telephone at (510) 437-3515. (Actual telephone numbers will be provided in the official USCG letter of approval.

m. When performing hazardous operations in or over the channel, the bridge owner shall provide boats and flagmen as necessary, to stop vessels from entering the work zone.

n. Additional conditions may be imposed depending upon the specific project and the proposed work.