FOR EA.: 04-4S2704
PROJECT ID.: 0400001221

INFORMATION HANDOUT

MATERIALS INFORMATION

PRELIMINARY SITE INVESTIGATION REPORT

PERMITS

U.S. FISH AND WILDLIFE SERVICE BIOLOGICAL OPINION

ROUTE: 04-CC-24-PM 1.2, 1.4

PRELIMINARY SITE INVESTIGATION REPORT

STATE ROUTE 24 WESTBOUND SLOPE REPAIR PROJECT CONTRA COSTA COUNTY, CALIFORNIA

PREPARED FOR:
CALIFORNIA DEPARTMENT OF TRANSPORTATION
DISTRICT 4
OFFICE OF ENVIRONMENTAL ENGINEERING
111 GRAND AVENUE, MS8C
OAKLAND, CA 94612

PREPARED BY:
GEOCON CONSULTANTS, INC.
6671 BRISA STREET
LIVERMORE, CA 94550

GEOCON PROJECT NO. E8560-06-13
CALTRANS EA 04-4S2701

MARCH 2011

REPORT LIMITATIONS

This report has been prepared exclusively for the State of California Department of Transportation (Caltrans) District 4. The information contained herein is only valid as of the date of the report and will require an update to reflect additional information obtained.

This report is not a comprehensive site characterization and should not be construed as such. The findings as presented in this report are predicated on the results of the limited sampling and laboratory testing performed. In addition, the information obtained is not intended to address potential impacts related to sources other than those specified herein. Therefore, the report should be deemed conclusive with respect to only the information obtained. We make no warranty, express or implied, with respect to the content of this report or any subsequent reports, correspondence or consultation. Geocon strived to perform the services summarized herein in accordance with the local standard of care in the geographic region at the time the services were rendered.

The contents of this report reflect the views of the author who is responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the State of California or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation.

GEOCON CONSULTANTS, INC.

Lauren Vigliotti, PG
Project Geologist

Richard Day, CEG, CHG
Project Manager

CALIFORNIA DEPARTMENT OF TRANSPORTATION – DISTRICT 4
OFFICE OF ENVIRONMENTAL ENGINEERING

Reviewed By:	Recommended By:	Approved By:
Max Raafati, PE Task Order Manager	Ray Boyer, PE District Branch Chief	Allen Baradar, PE, REA District Office Chief

TABLE OF CONTENTS

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PRELIMINARY SITE INVESTIGATION REPORT

1.0 INTRODUCTION

This Preliminary Site Investigation Report for the State Route 24 (SR-24) Westbound Slope Repair project was prepared by Geocon Consultants, Inc. under California Department of Transportation (Caltrans) Contract No. 04A3578 and Task Order No. 13 (TO-13), EA 04-4S2701.

1.1 Project Description and Proposed Improvements

The project location consists of Caltrans right-of-way (ROW) along a portion of the slope adjacent to the westbound shoulder of SR-24, 0.21 mile east of the Wilder Road overcrossing near Berkeley in Contra Costa County, California. The investigation was conducted prior to excavating loose earth materials to be replaced with geosynthetic reinforcement at a 2:1 slope at the upper portion of the slope. A concrete ditch will also be constructed at the top of the embankment. erosion of soil side slopes, and undermining of the culvert and adjacent roadway. The project location is depicted on the Vicinity Map, Figure 1.

1.2 General Objectives

The purpose of the site investigation was to evaluate concentrations of California Assessment Manual (CAM) 17 metals, including aerially deposited lead (ADL), total petroleum hydrocarbons (TPH), and naturally occurring asbestos (NOA) in soil at the project location. Groundwater is not expected to be encountered during the proposed construction activities; therefore, no groundwater samples were collected.

ADL may be present at the project location primarily due to historic leaded fuel emissions from automobile exhausts. Lead poses risks related to inhalation, ingestion, and dermal contact with the material. NOA may be in soil within the project limits. If not managed, disturbance of NOA during construction activities may potentially pose an inhalation risk to the health of construction personnel.

The information obtained from this investigation will be used by Caltrans to evaluate soil disposal costs and identify health and safety concerns.

2.0 BACKGROUND

2.1 Hazardous Waste Determination Criteria

Regulatory criteria to classify a waste as California hazardous for handling and disposal purposes are contained in the CCR, Title 22, Division 4.5, Chapter 11, Article 3, §66261.24. Criteria to classify a waste as Resource, Conservation, and Recovery Act (RCRA) hazardous are contained in Chapter 40 of the Code of Federal Regulations (40 CFR), Section 261.

For waste containing metals, the waste is classified as California hazardous when: 1) the total metal content exceeds the respective Total Threshold Limit Concentration (TTLC); or 2) the soluble metal content exceeds the respective Soluble Threshold Limit Concentration (STLC) based on the standard Waste Extraction Test (WET). A waste has the potential of exceeding the STLC when the waste's total metal content is greater than or equal to ten times the respective STLC value since the WET uses a 1:10 dilution ratio. Hence, when a total metal is detected at a concentration greater than or equal to ten times the respective STLC, and assuming that 100 percent of the total metals are soluble, soluble metal analysis is required. A material is classified as RCRA hazardous, or Federal hazardous, when the soluble metal content exceeds the Federal regulatory level based on the Toxicity Characteristic Leaching Procedure (TCLP).

The above regulatory criteria are based on chemical concentrations. Wastes may also be classified as hazardous based on other criteria such as ignitability and corrosivity; however, for the purposes of this investigation, toxicity (i.e., lead concentrations) is the primary factor considered for waste classification since waste generated during the construction activities would not likely warrant testing for ignitability or other criteria. Waste that is classified as either California hazardous or RCRA hazardous requires management as a hazardous waste.

2.2 Environmental Screening Levels

The San Francisco Bay Regional Water Quality Control Board (SFRWQCB) has prepared a technical report entitled *Screening For Environmental Concerns At Sites With Contaminated Soil and Groundwater, Interim Final* (May 2008), which presents Environmental Screening Levels (ESLs) for soil, groundwater, soil gas, and surface water, to assist in evaluating sites impacted by releases of hazardous chemicals. The ESLs are conservative values for more than 100 commonly detected contaminants, which may be used to compare with environmental data collected at a site. ESLs are strictly risk assessment tools and "not regulatory clean up standards." The presence of a chemical at concentrations in excess of an ESL does not necessarily indicate that adverse impacts to human health or the environment are occurring; this simply indicates that a potential for adverse risk may exist and that additional evaluation is or "may be" warranted (SFRWQCB, 2008).

The most conservative ESL table was used for this characterization: Table A – Shallow Soil (≤3 meters below ground surface; bgs) – Groundwater is a Current or Potential Source of Drinking Water. The respective ESLs are listed at the end of Tables 3 and 4 for comparative purposes.

2.3 Naturally Occurring Asbestos

As defined in current California Air Resources Board (CARB) rules, serpentine material refers to any material that contains at least 10% serpentine, and asbestos-containing serpentine refers to serpentine materials with an asbestos content greater than 5% as determined by CARB Test Method 435 (CARB 435). The use of serpentine material for road surfacing is prohibited in California by Title 17 of the California Code of Regulations (CCR) Section 93106, Asbestos Airborne Toxic Control Measure (ATCM) for Surfacing Application (ATCM 93106), unless the material has been tested and determined to have an asbestos content of less than 0.25%. Materials found to contain asbestos of 0.25% or more are considered to be designated waste if transported offsite, requiring disposal at a landfill facility designated to accept asbestos waste. Alternatively, asbestos-containing materials may be reused onsite if buried beneath a minimum 6 inches of soil.

3.0 SCOPE OF SERVICES

The scope of services requested by Caltrans under TO-13, EA 04-4S2701 included the following:

3.1 Pre-field Activities

- Prepared a site-specific *Health and Safety Plan* to provide guidelines on the use of personal protective equipment and the health and safety procedures implemented during the field activities.
- Prepared a Workplan for the investigation activities dated March 3, 2011, which was approved by Caltrans.
- Provided a minimum of 48-hours notice to the local public utilities via Underground Service Alert prior to job site mobilization.
- Retained the services of Advanced Technology Laboratories (ATL), a Caltrans-approved and California-certified analytical laboratory, to perform the chemical analyses of soil samples.
- Retained the services of EMSL, a Caltrans-approved and California-certified analytical laboratory, to perform the asbestos analysis of soil samples.

3.2 Field Activities

The field investigation was performed on March 4, 2011, by Geocon staff. The following field activities were performed during the sampling efforts:

- Advanced six soil borings on the slope along the westbound shoulder of SR-24 using hand-auger techniques. The borings were advanced to a maximum depth of 3.0 feet.
- Collected 13 soil samples for selected analysis of CAM 17 metals, total lead, TPH, NOA, and pH.
- Transported samples to California-certified environmental laboratories for analysis under standard chain-of-custody (COC) documentation.

4.0 INVESTIGATIVE METHODS

4.1 Sampling Procedures

Soil samples were collected from six boring locations identified by the Caltrans TO Manager. Boring coordinates are presented on Table 1 and boring locations are shown on the Site Plan, Figure 2.

The soil samples for analysis of CAM 17 metals and TPH were collected in new stainless steel tubes sealed with Teflon tape and plastic end-caps. Soil samples for total lead and NOA analyses were collected into new resealable plastic bags. Sample containers were labeled and transported to Caltrans-approved, certified environmental laboratories using standard COC documentation. Soil borings were backfilled to surface with soil cuttings.

Geocon provided QA/QC procedures during the field activities. These procedures included washing the sampling equipment with a Liqui-Nox® solution followed by a double rinse with deionized water. Decontamination water was disposed of to the ground surface within Caltrans right-of-way in a manner not to create runoff, away from drain inlets or potential water bodies.

4.2 Laboratory Analyses

Laboratory analyses for CAM17 metals were performed under an expedited 48-hour turnaround-time (TAT), and the other analyses were performed under a standard seven-day TAT. Samples submitted for CAM17 metals, total lead, TPH, and pH were analyzed by ATL; samples submitted for NOA were analyzed by EMSL. The laboratory reports and COC documentation are included in Appendix A.

The soil samples were analyzed as follows:

- seven samples for total lead using Environmental Protection Agency (EPA) Test Method 6010 ICAP
- six samples for CAM 17 metals according to Title 22 CCR, EPA Test Methods 6010 ICAP and 7471A
- six samples for TPH as gasoline (TPHg) using EPA Method 8015B
- six samples for TPH as diesel (TPHd) using EPA Method 8015B
- six samples for NOA using the CARB Test Method 435
- six samples for pH using EPA Method 9045

4.3 Laboratory QA/QC

QA/QC procedures were performed for each method of analysis with specificity for each analyte listed in the test method's QA/QC. The laboratory QA/QC procedures included the following:

- One method blank for every ten samples, batch of samples or type of matrix, whichever was more frequent.
- One sample analyzed in duplicate for every ten samples, batch of samples or type of matrix, whichever was more frequent.
- One spiked sample for every ten samples, batch of samples or type of matrix; whichever was more frequent, with spike made at ten times the detection limit or at the analyte level.

Prior to submitting the samples to the laboratory, the COC documentation was reviewed for accuracy and completeness.

5.0 INVESTIGATIVE RESULTS

5.1 Subsurface Conditions

Observations during field activities indicated that surface soil at the project location generally consists of brown, loamy gravelly sand and silt. Groundwater was not encountered during the advancement of the soil borings.

5.2 Laboratory Analytical Results

The analytical results are summarized in Tables 2 through 5 and are summarized below:

- The following metals were not detected above their respective laboratory reporting limits in the samples: antimony, beryllium, mercury, molybdenum, selenium, silver, and thallium.
- Lead was reported at concentrations ranging from less than the laboratory reporting limit of 5.0 milligrams per kilogram (mg/kg) to 180 mg/kg; one sample (11-04-0) had a reported total lead concentration greater than 50 mg/kg and was further analyzed for WET lead.

- WET lead was reported in sample 11-04-0 at a concentration of 5.0 milligrams per liter (mg/l).
- Remaining CAM 17 metals were reported in the samples at concentrations below ten times their respective STLCs.
- TPHg was not detected above the laboratory reporting limit of 1.0 mg/kg.
- TPHd was detected above the laboratory reporting limit of 1.0 mg/kg in two samples at concentrations of 5.4 mg/kg and 9.6 mg/kg.
- NOA was not detected above the 0.25% target analytical sensitivity level in the samples.
- pH values ranged from 7.1 to 8.8

5.3 Laboratory Quality Assurance/Quality Control

We reviewed the QA/QC results provided with the laboratory analytical reports. The data indicate non-detect results for the method blanks. The data showed acceptable recoveries and relative percent differences (RPDs) for the samples and for the laboratory QA/QC analyses with the exception of one Matrix Spike/Matrix Spike Duplicate that was outside criteria. Based on this limited data review, no additional qualifications of the soil data are necessary, and the data are of sufficient quality for the purposes of this report.

5.4 Statistical Evaluation for Lead Detected in Soil Samples

The lead data for the Site were treated as a single sample population for statistical evaluation, which consisted of samples collected from the six borings advanced during the investigation (11-01 to 11-06).

Statistical methods were applied to the total lead data to evaluate the upper confidence limits (UCLs) of the arithmetic means of the total lead concentrations for each sampling depth. Due to the limited number of samples collected for this investigation and since excavations are likely to extend beyond a depth of 3 feet, all samples were treated as a single population, which were between the ground surface and a depth of 3 feet. The lead statistics are presented in Appendix B.

The upper one-sided 90% and 95% UCLs of the arithmetic mean are defined as the values that, when calculated repeatedly for randomly drawn subsets of site data, equal or exceed the true mean 90% and 95% of the time, respectively. Statistical confidence limits are the classical tool for addressing uncertainties of a distribution mean. The UCLs of the arithmetic mean concentration are used as the mean concentrations because it is not possible to know the true mean due to the essentially infinite number of soil samples that could be collected from a site. The UCLs therefore account for uncertainties due to limited sampling data. As data become less limited at a site, uncertainties decrease, and the UCLs move closer to the true mean.

Non-parametric bootstrap techniques were used to calculate the UCLs. For those samples in which total lead was not detected at concentrations exceeding the laboratory reporting limit, a value equal to one-half of the reporting limit was used in the UCL calculation. The bootstrap test results are included in Appendix B. The following table presents the calculated UCLs and statistics for the data set.

Site Borings - 11-01 to 11-06

SAMPLE INTERVAL (feet)	90% TOTAL LEAD UCL (mg/kg)	95% TOTAL LEAD UCL (mg/kg)	TOTAL LEAD MEAN (mg/kg)	MINIMUM VALUE (mg/kg)	MAXIMUM VALUE (mg/kg)
0 to 3.0	38.63	42.91	21.9	2.5	180

6.0 CONCLUSIONS

Waste classifications are evaluated based on the 90% UCL of the lead content for the relevant excavation depths; this has historically been considered sufficient to satisfy a good faith effort by the EPA as discussed in SW-846. Risk assessment characterization is based on the 95% UCL of the lead content in the waste for the relevant depths; this is in accordance with the Risk Assessment Guidance for Superfund (RAGS) Volume 1 Documentation for Exposure Assessment. Per Caltrans, the 90% UCLs are to be used to evaluate onsite reuse and the 95% UCLs are to be used to evaluate offsite disposal.

6.1 Lead Results

The calculated 95% total lead UCL for the lead data is 42.9 mg/kg Based on the calculated 95% UCL for the lead data, soil excavated from the project site would be classified as non-hazardous waste since the total lead 95% UCL value is less than 50 mg/kg (i.e., less than ten times the lead STLC of 5 mg/l).

6.2 CAM 17 Metals

Based on the total CAM 17 metals results, soil excavated to a depth of 3.0 feet would be classified as non-hazardous since the concentrations are less than ten times the lead STLC of 5.0 mg/l.

The CAM 17 metals concentrations in site soil were compared to ESLs (Table A, SFRWQCB, May 2008). Arsenic and vanadium were reported with concentrations greater than their respective ESL values in the soil samples collected at the site. Arsenic was detected in the samples at concentrations ranging from less than the laboratory reporting limit of 1.0 to mg/kg to 2.4 mg/kg, exceeding the residential land use ESL of 0.39 mg/kg and the commercial/industrial land use ESL of 1.6 mg/kg for shallow soil (≤3 meters; SFRWQCB, Table A). Vanadium was reported in the soil samples at concentrations between 29 mg/kg and 48 mg/kg, exceeding the residential land use ESL of 16 mg/kg for shallow soil.

Upper one-sided 95% UCLs were calculated for the full set of arsenic and vanadium concentrations. Non-parametric bootstrap techniques were used to calculate the UCLs. For those samples in which arsenic was not detected, a value equal to one-half of the detection limit was used in the UCL calculation. The UCLs were compared with the residential and commercial/industrial land use ESLs and with published background levels typically present in California soils as presented in *Background Concentrations of Trace and Major Elements in California Soils* (Kearney Foundation of Soil Science, Division of Agriculture and Natural Resources, University of California, March 1996). The bootstrap results are included in Appendix B. The calculated standard bootstrap UCLs, ESLs and published background concentrations are summarized in the table below:

Metal	95% UCL	RESIDENTIAL ESL	COMMERCIAL/ INDUSTRIAL ESL	PUBLISHED BACKGROUND MEAN[1]	PUBLISHED BACKGROUND RANGE [1]
Arsenic	1.8	0.39	1.6	3.5	0.6 to 11.0
Vanadium	42.8	16	200	112	39 to 288

Concentrations reported in milligrams per kilogram (mg/kg)

[1] Kearney Foundation of Soil Science, March 1996

The 95% UCL value for arsenic in the soil samples collected at the Site is greater than the residential and commercial/industrial land use ESLs and within the published background range. The SFRWQCB *November 2007 Update to Environmental Screening Levels (ESLs) Technical Document* states that ambient background concentrations of arsenic typically exceed risk-based screening levels. In such instances, it may be more appropriate to compare site data to regionally specific established background levels.

The 95% UCL value for vanadium in the soil samples collected at the site is greater than the residential land use ESL. However, the 95% UCL for vanadium is less than the commercial/industrial land use ESL and within the published background range.

Based on the reported arsenic and vanadium results, there may be restrictions on reuse and/or disposal options for excavated soil.

6.3 Total Petroleum Hydrocarbons

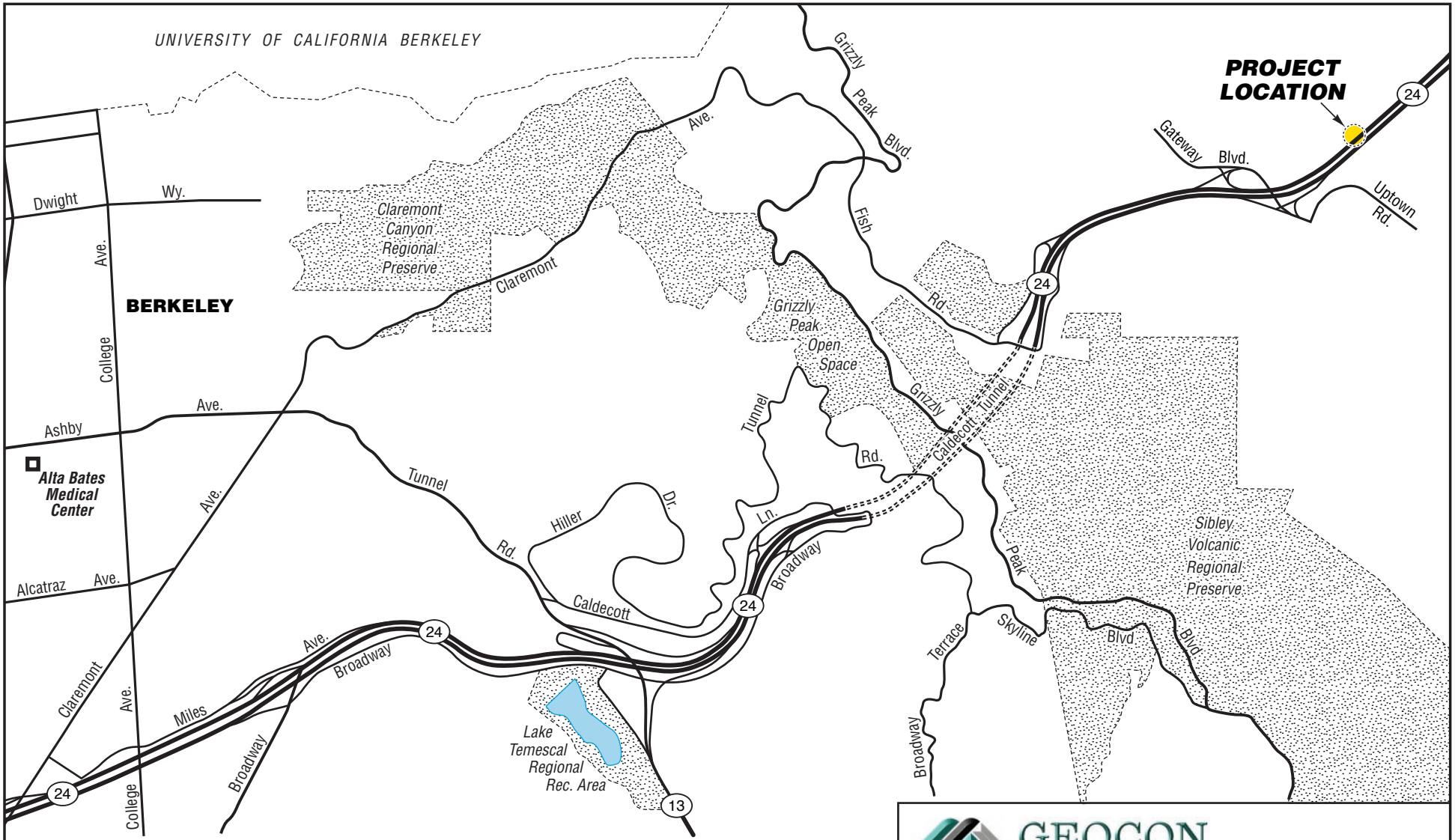
TPHg and TPHd were not reported at concentrations above their respective residential or commercial/industrial land use ESLs; therefore, there should be no restrictions on reuse options for excavated soil based on TPHg and TPHd content.

6.4 Naturally Occurring Asbestos

NOA was not detected above the target analytical sensitivity of 0.25%; therefore, there should be no restrictions on handling of excavated soil based on NOA content.

6.5 Worker Protection

The contractor(s) should prepare a project-specific health and safety plan to prevent or minimize worker exposure to metals in soil. The plan should include protocols for environmental and personnel monitoring, requirements for personal protective equipment, and other health and safety protocols and procedures for the handling of metals in soil.



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SR-24 Westbound Slope Repair

Post Mile 1.4, Contra Costa County, California

VICINITY MAP

GEOCON Proj. No. E8560-06-13

Task Order No. 13 | March 2011 | Figure 1

Aerial Photo: Google Earth, 10/2/09

LEGEND:

11-01 ⊗ Approximate Boring Location

0 20

Scale in Feet

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SR-24 Westbound Slope Repair

Post Mile 1.4, Contra Costa County, California

SITE PLAN

GEOCON Proj. No. E8560-06-13

Task Order No. 13 | March 2011 | Figure 2

TABLE 1
Boring Coordinates
State Route 24 Westbound Slope Repair Project
Contra Costa County, California

Boring	Latitude	Longitude
11-01	37.869048	-122.194796
11-02	37.869136	-122.194773
11-03	37.896169	-122.194781
11-04	37.869130	-122.194853
11-05	37.869085	-122.194821
11-06	37.869098	-122.194731

TABLE 2
Summary of Lead and pH Results
State Route 24 Westbound Slope Repair Project
Contra Costa County, California

Sample ID	Sample Depth (feet)	Total Lead (mg/kg)	WET Lead (mg/l)	pH
11-01-0	0	3.0	---	---
11-01-1.5	1.5	<5.0	---	8.8
11-02-0	0	37	---	7.1
11-03-0	0	3.3	---	---
11-03-1.5	1.5	<5.0	---	---
11-03-3	3	<5.0	---	8.3
11-04-0	0	180	5.0	---
11-04-1.5	1.5	<5.0	---	---
11-04-3	3	5.2	---	8.4
11-05-0	0	34	---	7.1
11-06-0	0	4.0	---	---
11-06-1.5	1.5	6.2	---	---
11-06-2	2.0	<5.0	---	8.4

Notes:

mg/kg = milligrams per kilogram

mg/l = milligrams per liter

WET = Waste Extraction Test using citric acid as the extraction fluid

--- = Not analyzed

< = Analyte was not detected above the laboratory reporting limit

TABLE 3
Summary of CAM 17 Metals Results
State Route 24 Westbound Slope Repair Project
Contra Costa County, California

Sample ID	Sample Depth (ft)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
11-01-0	0	<2.0	2.4	200	<1.0	<1.0	24	17	31	3.0	<0.10	<1.0	28	<1.0	<1.0	<1.0	48	29
11-02-0	0	<2.0	2.2	100	<1.0	<1.0	21	14	26	37	<0.10	<1.0	32	<1.0	<1.0	<1.0	47	70
11-03-0	0	<2.0	1.0	110	<1.0	<1.0	18	14	18	3.3	<0.10	<1.0	31	<1.0	<1.0	<1.0	29	34
11-04-0	0	<2.0	<1.0	41	<1.0	1.1	12	17	18	180	<0.10	<1.0	26	<1.0	<1.0	<1.0	38	84
11-05-0	0	<2.0	<1.0	18	<1.0	<1.0	8.9	11	15	34	<0.10	<1.0	16	<1.0	<1.0	<1.0	34	68
11-06-0	0	<2.0	1.3	99	<1.0	<1.0	23	13	19	4.0	<0.10	<1.0	38	<1.0	<1.0	<1.0	31	34
ESLs																		
Residential Land Use		6.3	0.39	750	4.0	1.7	750	40	230	200	1.3	40	150	10	20	1.3	16	600
Comm/Ind Land Use		40	1.6	1500	8.0	7.4	750	80	230	750	10	40	150	10	40	16	200	600
Construction Exposure		310	15	2,600	98	39	1,200,000	94	310,000	750	58	3,900	260	3,900	3,900	62	770	230,000

Notes:

Results are shown in milligrams per kilogram (mg/kg).

Values listed for chromium are for Chromium III, as there is no standard for total chromium.

< = Analyte was not detected above the laboratory reporting limit.

ESLs = Environmental Screening Levels, Tables A and K-3, SFRWQCB, Revised May 2008.

TABLE 4
Summary of Total Petroleum Hydrocarbons Results
State Route 24 Westbound Slope Repair Project
Contra Costa County, California

Sample ID	Sample Depth (ft)	TPHg (mg/kg)	TPHd (mg/kg)
11-01-1.5	1.5	<1.0	<1.0
11-02-0	0.0	<1.0	5.4
11-03-1.5	1.5	---	<1.0
11-03-3	3	<1.0	---
11-04-1.5	1.5	---	<1.0
11-04-3	3.0	<1.0	---
11-05-0	0	<1.0	9.6
11-06-1.5	1.5	---	<1.0
11-06-2	2	<1.0	---
ESLs			
Residential		83	83
Commercial/Industrial		83	83
Construction Exposure		4,200	4,200

Notes:
mg/kg = milligrams per kilogram
TPHg = Total petroleum hydrocarbons as gasoline
TPHd = Total petroleum hydrocarbons as diesel
--- = Not Analyzed
< = Not detected above the stated laboratory reporting limit
ESLs = Environmental Screening Levels, Tables A and K-3, SFRWQCB, May 2008.

TABLE 5
Summary of NOA Results
State Route 24 Westbound Slope Repair Project
Contra Costa County, California

Sample ID	Sample Depth (feet)	Asbestos Content (% dry weight)
11-01-1.5	1.5	ND
11-02-1.5	1.5	ND
11-03-1.5	1.5	ND
11-04-1.5	1.5	ND
11-05-0	0	ND
11-06-1.5	1.5	ND

ND = None detected at 0.25% target analytical sensitivity.

APPENDIX A

March 18, 2011

Lauren Vigliotti/Chris Merritt
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Livermore, CA 94550
TEL: (925) 371-5900
FAX: (925) 371-5915

ELAP No.: 1838
NELAP No.: 02107CA
CSDLAC No.: 10196
ORELAP No.: CA300003

Workorder No.: 116850

RE: CALTRANS-SR 24 SLOPE REPAIR, E8560-0

Attention: Lauren Vigliotti/Chris Merritt

Enclosed are the results for sample(s) received on March 15, 2011 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

CLIENT: Geocon Consultants, Inc.
Project: CALTRANS-SR 24 SLOPE REPAIR, E8560-06
Lab Order: 116850

CASE NARRATIVE

Analytical Comments for Method 6010

Dilution was necessary for sample 116850-007A, due to sample matrix.

Analytical Comments for Method 8015 (GRO)

RPD for Matrix Spike (MS)/Matrix Spike Duplicate (MSD) is outside criteria for sample 116790-005AMSD; however, the analytical batch was validated by the Laboratory Control Sample (LCS).

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

Advanced Technology Laboratories

Date: 3/18/2011

ANALYTICAL RESULTS

LEAD BY ICP
EPA 6010B

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	116850
Project:	CALTRANS-SR 24 SLOPE REPAIR, E8560-06	**Date Received**	3/15/2011 8:14:00 AM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	SRB

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
116850-002A	11-01-1.5	ND	mg/Kg	71534	5.0	1	3/4/2011	3/15/2011
116850-005A	11-03-1.5	ND	mg/Kg	71534	5.0	1	3/4/2011	3/15/2011
116850-006A	11-03-3	ND	mg/Kg	71534	5.0	1	3/4/2011	3/15/2011
116850-008A	11-04-1.5	ND	mg/Kg	71534	5.0	1	3/4/2011	3/15/2011
116850-009A	11-04-3	5.2	mg/Kg	71534	5.0	1	3/4/2011	3/15/2011
116850-012A	11-06-1.5	6.2	mg/Kg	71534	5.0	1	3/4/2011	3/15/2011
116850-013A	11-06-2	ND	mg/Kg	71534	5.0	1	3/4/2011	3/15/2011

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

Date: 3/18/2011

ANALYTICAL RESULTS

pH
EPA 9045C

CLIENT:	Geocon Consultants, Inc.	**Lab Order:**	116850
Project:	CALTRANS-SR 24 SLOPE REPAIR, E8560-06	**Date Received**	3/15/2011 8:14:00 AM
Project No:		**Matrix:**	Soil
Analyte:	pH	**Analyst:**	CBB

Laboratory ID	Client Sample ID	Results	Units	QC Batch	PQL	DF	Date Collected	Date Analyzed
116850-002A	11-01-1.5	8.8	pH Units	R131042	0.10	1	3/4/2011	3/15/2011
116850-003A	11-02-0	7.1	pH Units	R131042	0.10	1	3/4/2011	3/15/2011
116850-006A	11-03-3	8.3	pH Units	R131042	0.10	1	3/4/2011	3/15/2011
116850-009A	11-04-3	8.4	pH Units	R131042	0.10	1	3/4/2011	3/15/2011
116850-010A	11-05-0	7.1	pH Units	R131042	0.10	1	3/4/2011	3/15/2011
116850-013A	11-06-2	8.4	pH Units	R131042	0.10	1	3/4/2011	3/15/2011

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Geocon Consultants, Inc. **Client Sample ID:** 11-01-0
Lab Order: 116850 **Collection Date:** 3/4/2011 10:00:00 AM
Project: CALTRANS-SR 24 SLOPE REPAIR, E8560 **Matrix:** SOIL
Lab ID: 116850-001A

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110315F	QC Batch: 71533			PrepDate: 3/15/2011		Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	3/15/2011 02:53 PM
Arsenic	2.4	1.0		mg/Kg	1	3/15/2011 02:53 PM
Barium	200	1.0		mg/Kg	1	3/15/2011 02:53 PM
Beryllium	ND	1.0		mg/Kg	1	3/15/2011 02:53 PM
Cadmium	ND	1.0		mg/Kg	1	3/15/2011 02:53 PM
Chromium	24	1.0		mg/Kg	1	3/15/2011 02:53 PM
Cobalt	17	1.0		mg/Kg	1	3/15/2011 02:53 PM
Copper	31	2.0		mg/Kg	1	3/15/2011 02:53 PM
Lead	3.0	1.0		mg/Kg	1	3/15/2011 02:53 PM
Molybdenum	ND	1.0		mg/Kg	1	3/15/2011 02:53 PM
Nickel	28	1.0		mg/Kg	1	3/15/2011 02:53 PM
Selenium	ND	1.0		mg/Kg	1	3/15/2011 02:53 PM
Silver	ND	1.0		mg/Kg	1	3/15/2011 02:53 PM
Thallium	ND	1.0		mg/Kg	1	3/15/2011 02:53 PM
Vanadium	48	1.0		mg/Kg	1	3/15/2011 02:53 PM
Zinc	29	1.0		mg/Kg	1	3/15/2011 02:53 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110315B	QC Batch: 71535			PrepDate: 3/15/2011		Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	3/15/2011 11:44 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	11-01-1.5
Lab Order:	116850	**Collection Date:**	3/4/2011 10:05:00 AM
Project:	CALTRANS-SR 24 SLOPE REPAIR, E8560	**Matrix:**	SOIL
Lab ID:	116850-002A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
DIESEL RANGE ORGANICS BY GC/FID						
EPA 3550B				**EPA 8015B(M)**		
RunID: GC16_110315B	QC Batch: 71538			PrepDate: 3/15/2011		Analyst: **CBR**
DRO	ND	1.0		mg/Kg	1	3/15/2011 01:40 PM
Surr: p-Terphenyl	105	30-128		%REC	1	3/15/2011 01:40 PM
GASOLINE RANGE ORGANICS BY GC/FID						
				EPA 8015B(M)		
RunID: GC2_110315A	QC Batch: E11VS118			PrepDate:		Analyst: **TP**
GRO	ND	1.0		mg/Kg	1	3/15/2011 11:50 AM
Surr: Bromofluorobenzene (FID)	109	62-153		%REC	1	3/15/2011 11:50 AM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

CLIENT: Geocon Consultants, Inc. **Client Sample ID:** 11-02-0
Lab Order: 116850 **Collection Date:** 3/4/2011 10:15:00 AM
Project: CALTRANS-SR 24 SLOPE REPAIR, E8560 **Matrix:** SOIL
Lab ID: 116850-003A

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110315F	QC Batch: 71533			PrepDate: 3/15/2011		Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	3/15/2011 02:56 PM
Arsenic	2.2	1.0		mg/Kg	1	3/15/2011 02:56 PM
Barium	100	1.0		mg/Kg	1	3/15/2011 02:56 PM
Beryllium	ND	1.0		mg/Kg	1	3/15/2011 02:56 PM
Cadmium	ND	1.0		mg/Kg	1	3/15/2011 02:56 PM
Chromium	21	1.0		mg/Kg	1	3/15/2011 02:56 PM
Cobalt	14	1.0		mg/Kg	1	3/15/2011 02:56 PM
Copper	26	2.0		mg/Kg	1	3/15/2011 02:56 PM
Lead	37	1.0		mg/Kg	1	3/15/2011 02:56 PM
Molybdenum	ND	1.0		mg/Kg	1	3/15/2011 02:56 PM
Nickel	32	1.0		mg/Kg	1	3/15/2011 02:56 PM
Selenium	ND	1.0		mg/Kg	1	3/15/2011 02:56 PM
Silver	ND	1.0		mg/Kg	1	3/15/2011 02:56 PM
Thallium	ND	1.0		mg/Kg	1	3/15/2011 02:56 PM
Vanadium	47	1.0		mg/Kg	1	3/15/2011 02:56 PM
Zinc	70	1.0		mg/Kg	1	3/15/2011 02:56 PM
DIESEL RANGE ORGANICS BY GC/FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_110315B	QC Batch: 71538			PrepDate: 3/15/2011		Analyst: **CBR**
DRO	5.4	1.0		mg/Kg	1	3/15/2011 02:51 PM
Surr: p-Terphenyl	60.1	30-128		%REC	1	3/15/2011 02:51 PM
GASOLINE RANGE ORGANICS BY GC/FID						
				EPA 8015B(M)		
RunID: GC2_110315A	QC Batch: E11VS118			PrepDate:		Analyst: **TP**
GRO	ND	1.0		mg/Kg	1	3/15/2011 12:05 PM
Surr: Bromofluorobenzene (FID)	117	62-153		%REC	1	3/15/2011 12:05 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110315B	QC Batch: 71535			PrepDate: 3/15/2011		Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	3/15/2011 11:50 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Geocon Consultants, Inc. **Client Sample ID:** 11-03-0
Lab Order: 116850 **Collection Date:** 3/4/2011 10:20:00 AM
Project: CALTRANS-SR 24 SLOPE REPAIR, E8560 **Matrix:** SOIL
Lab ID: 116850-004A

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110315F	QC Batch: 71533			PrepDate: 3/15/2011		Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	3/15/2011 02:59 PM
Arsenic	1.0	1.0		mg/Kg	1	3/15/2011 02:59 PM
Barium	110	1.0		mg/Kg	1	3/15/2011 02:59 PM
Beryllium	ND	1.0		mg/Kg	1	3/15/2011 02:59 PM
Cadmium	ND	1.0		mg/Kg	1	3/15/2011 02:59 PM
Chromium	18	1.0		mg/Kg	1	3/15/2011 02:59 PM
Cobalt	14	1.0		mg/Kg	1	3/15/2011 02:59 PM
Copper	18	2.0		mg/Kg	1	3/15/2011 02:59 PM
Lead	3.3	1.0		mg/Kg	1	3/15/2011 02:59 PM
Molybdenum	ND	1.0		mg/Kg	1	3/15/2011 02:59 PM
Nickel	31	1.0		mg/Kg	1	3/15/2011 02:59 PM
Selenium	ND	1.0		mg/Kg	1	3/15/2011 02:59 PM
Silver	ND	1.0		mg/Kg	1	3/15/2011 02:59 PM
Thallium	ND	1.0		mg/Kg	1	3/15/2011 02:59 PM
Vanadium	29	1.0		mg/Kg	1	3/15/2011 02:59 PM
Zinc	34	1.0		mg/Kg	1	3/15/2011 02:59 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110315B	QC Batch: 71535			PrepDate: 3/15/2011		Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	3/15/2011 11:52 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	11-03-1.5
Lab Order:	116850	**Collection Date:**	3/4/2011 10:25:00 AM
Project:	CALTRANS-SR 24 SLOPE REPAIR, E8560	**Matrix:**	SOIL
Lab ID:	116850-005A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
DIESEL RANGE ORGANICS BY GC/FID						
EPA 3550B				**EPA 8015B(M)**		
RunID: GC16_110315B	QC Batch: 71538			PrepDate: 3/15/2011		Analyst: **CBR**
DRO	ND	1.0		mg/Kg	1	3/15/2011 02:10 PM
Surr: p-Terphenyl	68.6	30-128		%REC	1	3/15/2011 02:10 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	11-03-3
Lab Order:	116850	**Collection Date:**	3/4/2011 10:30:00 AM
Project:	CALTRANS-SR 24 SLOPE REPAIR, E8560	**Matrix:**	SOIL
Lab ID:	116850-006A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
GASOLINE RANGE ORGANICS BY GC/FID						
		EPA 8015B(M)				
RunID: GC2_110315A	QC Batch: E11VS118			PrepDate:		Analyst: **TP**
GRO	ND	1.0		mg/Kg	1	3/15/2011 12:19 PM
Surr: Bromofluorobenzene (FID)	114	62-153		%REC	1	3/15/2011 12:19 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	11-04-0
Lab Order:	116850	**Collection Date:**	3/4/2011 10:50:00 AM
Project:	CALTRANS-SR 24 SLOPE REPAIR, E8560	**Matrix:**	SOIL
Lab ID:	116850-007A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110315F	QC Batch: 71533			PrepDate: 3/15/2011		Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	3/15/2011 03:22 PM
Arsenic	ND	1.0		mg/Kg	1	3/15/2011 03:22 PM
Barium	41	1.0		mg/Kg	1	3/15/2011 03:22 PM
Beryllium	ND	1.0		mg/Kg	1	3/15/2011 03:22 PM
Cadmium	1.1	1.0		mg/Kg	1	3/15/2011 03:22 PM
Chromium	12	1.0		mg/Kg	1	3/15/2011 03:22 PM
Cobalt	17	1.0		mg/Kg	1	3/15/2011 03:22 PM
Copper	18	2.0		mg/Kg	1	3/15/2011 03:22 PM
Lead	180	1.0		mg/Kg	1	3/15/2011 03:22 PM
Molybdenum	ND	1.0		mg/Kg	1	3/15/2011 03:22 PM
Nickel	26	1.0		mg/Kg	1	3/15/2011 03:22 PM
Selenium	ND	1.0		mg/Kg	1	3/15/2011 03:22 PM
Silver	ND	1.0		mg/Kg	1	3/15/2011 03:22 PM
Thallium	ND	1.0		mg/Kg	1	3/15/2011 03:22 PM
Vanadium	38	1.0		mg/Kg	1	3/15/2011 03:22 PM
Zinc	84	1.0		mg/Kg	1	3/15/2011 03:22 PM
ICP METALS BY STLC						
				WET/ EPA 6010B		
RunID: ICP8_110317E	QC Batch: R131162			PrepDate:		Analyst: **IL**
Lead	5.0	1.0		mg/L	20	3/17/2011 03:01 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110315B	QC Batch: 71535			PrepDate: 3/15/2011		Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	3/15/2011 11:54 AM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	11-04-1.5
Lab Order:	116850	**Collection Date:**	3/4/2011 10:45:00 AM
Project:	CALTRANS-SR 24 SLOPE REPAIR, E8560	**Matrix:**	SOIL
Lab ID:	116850-008A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
DIESEL RANGE ORGANICS BY GC/FID						
EPA 3550B				**EPA 8015B(M)**		
RunID: GC16_110315B	QC Batch: 71538			PrepDate: 3/15/2011		Analyst: **CBR**
DRO	ND	1.0		mg/Kg	1	3/15/2011 01:29 PM
Surr: p-Terphenyl	71.5	30-128		%REC	1	3/15/2011 01:29 PM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	11-04-3
Lab Order:	116850	**Collection Date:**	3/4/2011 10:40:00 AM
Project:	CALTRANS-SR 24 SLOPE REPAIR, E8560	**Matrix:**	SOIL
Lab ID:	116850-009A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
GASOLINE RANGE ORGANICS BY GC/FID						
		EPA 8015B(M)				
RunID: GC2_110315A	QC Batch: E11VS118			PrepDate:		Analyst: **TP**
GRO	ND	1.0		mg/Kg	1	3/15/2011 12:34 PM
Surr: Bromofluorobenzene (FID)	112	62-153		%REC	1	3/15/2011 12:34 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

CLIENT: Geocon Consultants, Inc. **Client Sample ID:** 11-05-0
Lab Order: 116850 **Collection Date:** 3/4/2011 11:00:00 AM
Project: CALTRANS-SR 24 SLOPE REPAIR, E8560 **Matrix:** SOIL
Lab ID: 116850-010A

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110315F	QC Batch: 71533			PrepDate: 3/15/2011		Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	3/15/2011 03:06 PM
Arsenic	ND	1.0		mg/Kg	1	3/15/2011 03:06 PM
Barium	18	1.0		mg/Kg	1	3/15/2011 03:06 PM
Beryllium	ND	1.0		mg/Kg	1	3/15/2011 03:06 PM
Cadmium	ND	1.0		mg/Kg	1	3/15/2011 03:06 PM
Chromium	8.9	1.0		mg/Kg	1	3/15/2011 03:06 PM
Cobalt	11	1.0		mg/Kg	1	3/15/2011 03:06 PM
Copper	15	2.0		mg/Kg	1	3/15/2011 03:06 PM
Lead	34	1.0		mg/Kg	1	3/15/2011 03:06 PM
Molybdenum	ND	1.0		mg/Kg	1	3/15/2011 03:06 PM
Nickel	16	1.0		mg/Kg	1	3/15/2011 03:06 PM
Selenium	ND	1.0		mg/Kg	1	3/15/2011 03:06 PM
Silver	ND	1.0		mg/Kg	1	3/15/2011 03:06 PM
Thallium	ND	1.0		mg/Kg	1	3/15/2011 03:06 PM
Vanadium	34	1.0		mg/Kg	1	3/15/2011 03:06 PM
Zinc	68	1.0		mg/Kg	1	3/15/2011 03:06 PM
DIESEL RANGE ORGANICS BY GC/FID						
	EPA 3550B			**EPA 8015B(M)**		
RunID: GC16_110315B	QC Batch: 71538			PrepDate: 3/15/2011		Analyst: **CBR**
DRO	9.6	1.0		mg/Kg	1	3/15/2011 03:02 PM
Surr: p-Terphenyl	48.0	30-128		%REC	1	3/15/2011 03:02 PM
GASOLINE RANGE ORGANICS BY GC/FID						
				EPA 8015B(M)		
RunID: GC2_110315A	QC Batch: E11VS118			PrepDate:		Analyst: **TP**
GRO	ND	1.0		mg/Kg	1	3/15/2011 12:49 PM
Surr: Bromofluorobenzene (FID)	107	62-153		%REC	1	3/15/2011 12:49 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110315B	QC Batch: 71535			PrepDate: 3/15/2011		Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	3/15/2011 11:56 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Geocon Consultants, Inc. **Client Sample ID:** 11-06-0
Lab Order: 116850 **Collection Date:** 3/4/2011 11:05:00 AM
Project: CALTRANS-SR 24 SLOPE REPAIR, E8560 **Matrix:** SOIL
Lab ID: 116850-011A

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP8_110315F	QC Batch: 71533			PrepDate: 3/15/2011		Analyst: **IL**
Antimony	ND	2.0		mg/Kg	1	3/15/2011 03:09 PM
Arsenic	1.3	1.0		mg/Kg	1	3/15/2011 03:09 PM
Barium	99	1.0		mg/Kg	1	3/15/2011 03:09 PM
Beryllium	ND	1.0		mg/Kg	1	3/15/2011 03:09 PM
Cadmium	ND	1.0		mg/Kg	1	3/15/2011 03:09 PM
Chromium	23	1.0		mg/Kg	1	3/15/2011 03:09 PM
Cobalt	13	1.0		mg/Kg	1	3/15/2011 03:09 PM
Copper	19	2.0		mg/Kg	1	3/15/2011 03:09 PM
Lead	4.0	1.0		mg/Kg	1	3/15/2011 03:09 PM
Molybdenum	ND	1.0		mg/Kg	1	3/15/2011 03:09 PM
Nickel	38	1.0		mg/Kg	1	3/15/2011 03:09 PM
Selenium	ND	1.0		mg/Kg	1	3/15/2011 03:09 PM
Silver	ND	1.0		mg/Kg	1	3/15/2011 03:09 PM
Thallium	ND	1.0		mg/Kg	1	3/15/2011 03:09 PM
Vanadium	31	1.0		mg/Kg	1	3/15/2011 03:09 PM
Zinc	34	1.0		mg/Kg	1	3/15/2011 03:09 PM
MERCURY BY COLD VAPOR TECHNIQUE						
				EPA 7471A		
RunID: AA1_110315B	QC Batch: 71535			PrepDate: 3/15/2011		Analyst: **VV**
Mercury	ND	0.10		mg/Kg	1	3/15/2011 11:39 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	11-06-1.5
Lab Order:	116850	**Collection Date:**	3/4/2011 11:10:00 AM
Project:	CALTRANS-SR 24 SLOPE REPAIR, E8560	**Matrix:**	SOIL
Lab ID:	116850-012A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
DIESEL RANGE ORGANICS BY GC/FID						
EPA 3550B				**EPA 8015B(M)**		
RunID: GC16_110315B	QC Batch: 71538			PrepDate: 3/15/2011		Analyst: **CBR**
DRO	ND	1.0		mg/Kg	1	3/15/2011 02:01 PM
Surr: p-Terphenyl	55.9	30-128		%REC	1	3/15/2011 02:01 PM

Qualifiers:	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	11-06-2
Lab Order:	116850	**Collection Date:**	3/4/2011 11:15:00 AM
Project:	CALTRANS-SR 24 SLOPE REPAIR, E8560	**Matrix:**	SOIL
Lab ID:	116850-013A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
GASOLINE RANGE ORGANICS BY GC/FID						
		EPA 8015B(M)				
RunID: GC2_110315A	QC Batch: E11VS118			PrepDate:		Analyst: **TP**
GRO	ND	1.0		mg/Kg	1	3/15/2011 01:03 PM
Surr: Bromofluorobenzene (FID)	115	62-153		%REC	1	3/15/2011 01:03 PM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

CLIENT: Geocon Consultants, Inc.
Work Order: 116850
Project: CALTRANS-SR 24 SLOPE REPAIR, E8560-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID	**MB-71533**	SampType:	**MBLK**	TestCode:	**6010_S**	Units:	**mg/Kg**	Prep Date:	**3/15/2011**	RunNo:	**131058**
Client ID:	**PBS**	Batch ID:	**71533**	TestNo:	**EPA 6010B**	**EPA 3050B**		Analysis Date:	**3/15/2011**	SeqNo:	**2133490**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	2.0									
Arsenic	ND	1.0									
Barium	ND	1.0									
Beryllium	ND	1.0									
Cadmium	ND	1.0									
Chromium	0.535	1.0									
Cobalt	ND	1.0									
Copper	ND	2.0									
Lead	ND	1.0									
Molybdenum	ND	1.0									
Nickel	ND	1.0									
Selenium	ND	1.0									
Silver	ND	1.0									
Thallium	ND	1.0									
Vanadium	ND	1.0									
Zinc	ND	1.0									

Sample ID	**LCS-71533**	SampType:	**LCS**	TestCode:	**6010_S**	Units:	**mg/Kg**	Prep Date:	**3/15/2011**	RunNo:	**131058**
Client ID:	**LCSS**	Batch ID:	**71533**	TestNo:	**EPA 6010B**	**EPA 3050B**		Analysis Date:	**3/15/2011**	SeqNo:	**2133491**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	49.834	2.0	50.00	0	99.7	80	120				
Arsenic	50.694	1.0	50.00	0	101	80	120				
Barium	49.558	1.0	50.00	0	99.1	80	120				
Beryllium	49.529	1.0	50.00	0	99.1	80	120				
Cadmium	51.073	1.0	50.00	0	102	80	120				
Chromium	49.583	1.0	50.00	0.5350	98.1	80	120				
Cobalt	50.818	1.0	50.00	0	102	80	120				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 116850
Project: CALTRANS-SR 24 SLOPE REPAIR, E8560-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID	LCS-71533	SampType:	LCS	TestCode:	6010_S	Units:	mg/Kg	Prep Date:	3/15/2011	RunNo:	131058
Client ID:	LCSS	Batch ID:	71533	TestNo:	EPA 6010B	EPA 3050B		Analysis Date:	3/15/2011	SeqNo:	2133491

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Copper	49.583	2.0	50.00	0	99.2	80	120				
Lead	52.723	1.0	50.00	0	105	80	120				
Molybdenum	51.386	1.0	50.00	0	103	80	120				
Nickel	51.314	1.0	50.00	0	103	80	120				
Selenium	49.057	1.0	50.00	0	98.1	80	120				
Silver	47.917	1.0	50.00	0	95.8	80	120				
Thallium	50.265	1.0	50.00	0	101	80	120				
Vanadium	50.694	1.0	50.00	0	101	80	120				
Zinc	52.724	1.0	50.00	0	105	80	120				

Sample ID	116850-011A-DUP	SampType:	DUP	TestCode:	6010_S	Units:	mg/Kg	Prep Date:	3/15/2011	RunNo:	131058
Client ID:	11-06-0	Batch ID:	71533	TestNo:	EPA 6010B	EPA 3050B		Analysis Date:	3/15/2011	SeqNo:	2133497

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	0.291	2.0						0.3871	0	20	
Arsenic	0.556	1.0						1.299	0	20	
Barium	106.790	1.0						99.37	7.20	20	
Beryllium	0.049	1.0						0.05030	0	20	
Cadmium	0.713	1.0						0.7245	0	20	
Chromium	22.207	1.0						22.84	2.80	20	
Cobalt	12.587	1.0						12.77	1.46	20	
Copper	17.790	2.0						18.92	6.15	20	
Lead	3.742	1.0						3.954	5.52	20	
Molybdenum	ND	1.0						0	0	20	
Nickel	35.174	1.0						37.63	6.75	20	
Selenium	ND	1.0						0	0	20	
Silver	ND	1.0						0	0	20	
Thallium	ND	1.0						0	0	20	
Vanadium	30.095	1.0						31.22	3.67	20	
Zinc	32.981	1.0						34.20	3.62	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 116850
Project: CALTRANS-SR 24 SLOPE REPAIR, E8560-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID **116850-011A-MS** SampType: **MS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/15/2011** RunNo: **131058**
Client ID: **11-06-0** Batch ID: **71533** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/15/2011** SeqNo: **2133498**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	82.443	2.0	125.0	0.3871	65.6	32	105				
Arsenic	91.812	1.0	125.0	1.299	72.4	49	106				
Barium	197.049	1.0	125.0	99.37	78.1	31	133				
Beryllium	95.162	1.0	125.0	0.05030	76.1	56	106				
Cadmium	90.836	1.0	125.0	0.7245	72.1	51	103				
Chromium	113.446	1.0	125.0	22.84	72.5	45	114				
Cobalt	104.371	1.0	125.0	12.77	73.3	52	106				
Copper	121.096	2.0	125.0	18.92	81.7	54	125				
Lead	97.224	1.0	125.0	3.954	74.6	34	126				
Molybdenum	91.201	1.0	125.0	0	73.0	54	106				
Nickel	128.987	1.0	125.0	37.63	73.1	45	111				
Selenium	86.237	1.0	125.0	0	69.0	47	104				
Silver	96.511	1.0	125.0	0	77.2	56	112				
Thallium	85.807	1.0	125.0	0	68.6	46	101				
Vanadium	131.800	1.0	125.0	31.22	80.5	54	114				
Zinc	124.198	1.0	125.0	34.20	72.0	28	125				

Sample ID **116850-011A-MSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/15/2011** RunNo: **131058**
Client ID: **11-06-0** Batch ID: **71533** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/15/2011** SeqNo: **2133499**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	90.416	2.0	125.0	0.3871	72.0	32	105	82.44	9.23	20	
Arsenic	98.751	1.0	125.0	1.299	78.0	49	106	91.81	7.28	20	
Barium	210.591	1.0	125.0	99.37	89.0	31	133	197.0	6.64	20	
Beryllium	100.801	1.0	125.0	0.05030	80.6	56	106	95.16	5.75	20	
Cadmium	96.203	1.0	125.0	0.7245	76.4	51	103	90.84	5.74	20	
Chromium	119.236	1.0	125.0	22.84	77.1	45	114	113.4	4.98	20	
Cobalt	110.077	1.0	125.0	12.77	77.8	52	106	104.4	5.32	20	
Copper	128.200	2.0	125.0	18.92	87.4	54	125	121.1	5.70	20	
Lead	103.922	1.0	125.0	3.954	80.0	34	126	97.22	6.66	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Geocon Consultants, Inc.
Work Order: 116850
Project: CALTRANS-SR 24 SLOPE REPAIR, E8560-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID **116850-011A-MSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **3/15/2011** RunNo: **131058**
Client ID: **11-06-0** Batch ID: **71533** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **3/15/2011** SeqNo: **2133499**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	97.569	1.0	125.0	0	78.1	54	106	91.20	6.75	20	
Nickel	137.181	1.0	125.0	37.63	79.6	45	111	129.0	6.16	20	
Selenium	92.186	1.0	125.0	0	73.7	47	104	86.24	6.67	20	
Silver	102.084	1.0	125.0	0	81.7	56	112	96.51	5.61	20	
Thallium	92.034	1.0	125.0	0	73.6	46	101	85.81	7.00	20	
Vanadium	137.573	1.0	125.0	31.22	85.1	54	114	131.8	4.29	20	
Zinc	131.583	1.0	125.0	34.20	77.9	28	125	124.2	5.77	20	

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits
- Calculations are based on raw values
- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Geocon Consultants, Inc.
Work Order: 116850
Project: CALTRANS-SR 24 SLOPE REPAIR, E8560-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID	MB-71534	SampType:	MBLK	TestCode:	6010_SPB	Units:	mg/Kg	Prep Date:	3/15/2011	RunNo:	131047
Client ID:	PBS	Batch ID:	71534	TestNo:	EPA 6010B	EPA 3050M		Analysis Date:	3/15/2011	SeqNo:	2133348

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	5.0									

Sample ID	LCS-71534	SampType:	LCS	TestCode:	6010_SPB	Units:	mg/Kg	Prep Date:	3/15/2011	RunNo:	131047
Client ID:	LCSS	Batch ID:	71534	TestNo:	EPA 6010B	EPA 3050M		Analysis Date:	3/15/2011	SeqNo:	2133349

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	254.424	5.0	250.0	0	102	80	120				

Sample ID	116850-013A-DUP	SampType:	DUP	TestCode:	6010_SPB	Units:	mg/Kg	Prep Date:	3/15/2011	RunNo:	131047
Client ID:	11-06-2	Batch ID:	71534	TestNo:	EPA 6010B	EPA 3050M		Analysis Date:	3/15/2011	SeqNo:	2133357

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	3.287	5.0						3.731	0	20	

Sample ID	116850-013A-MS	SampType:	MS	TestCode:	6010_SPB	Units:	mg/Kg	Prep Date:	3/15/2011	RunNo:	131047
Client ID:	11-06-2	Batch ID:	71534	TestNo:	EPA 6010B	EPA 3050M		Analysis Date:	3/15/2011	SeqNo:	2133358

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	174.594	5.0	250.0	3.731	68.3	34	126				

Sample ID	116850-013A-MSD	SampType:	MSD	TestCode:	6010_SPB	Units:	mg/Kg	Prep Date:	3/15/2011	RunNo:	131047
Client ID:	11-06-2	Batch ID:	71534	TestNo:	EPA 6010B	EPA 3050M		Analysis Date:	3/15/2011	SeqNo:	2133359

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	158.092	5.0	250.0	3.731	61.7	34	126	174.6	9.92	20	

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits
- Calculations are based on raw values
- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_ST

Sample ID	MB-71540	SampType:	MBLK	TestCode:	6010_ST	Units:	mg/L	Prep Date:		RunNo:	131162
Client ID:	PBS	Batch ID:	R131162	TestNo:	WET/ EPA 60			Analysis Date:	3/17/2011	SeqNo:	2135270

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	0.001	0.050									

Sample ID	MB-71540A STLC	SampType:	MBLK	TestCode:	6010_ST	Units:	mg/L	Prep Date:		RunNo:	131162
Client ID:	PBS	Batch ID:	R131162	TestNo:	WET/ EPA 60			Analysis Date:	3/17/2011	SeqNo:	2135271

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	1.0									

Sample ID	LCS-71540	SampType:	LCS	TestCode:	6010_ST	Units:	mg/L	Prep Date:		RunNo:	131162
Client ID:	LCSS	Batch ID:	R131162	TestNo:	WET/ EPA 60			Analysis Date:	3/17/2011	SeqNo:	2135272

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	1.008	0.050	1.000	0.001131	101	85	115				

Sample ID	116850-011A-DUP	SampType:	DUP	TestCode:	6010_ST	Units:	mg/L	Prep Date:		RunNo:	131162
Client ID:	11-06-0	Batch ID:	R131162	TestNo:	WET/ EPA 60			Analysis Date:	3/17/2011	SeqNo:	2135281

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	0.028	1.0						0.03518	0	20	

Sample ID	116850-011A-MS	SampType:	MS	TestCode:	6010_ST	Units:	mg/L	Prep Date:		RunNo:	131162
Client ID:	11-06-0	Batch ID:	R131162	TestNo:	WET/ EPA 60			Analysis Date:	3/17/2011	SeqNo:	2135282

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	2.319	1.0	2.500	0.03518	91.4	80	118				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 116850
Project: CALTRANS-SR 24 SLOPE REPAIR, E8560-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_ST

Sample ID **116850-011A-MSD**	SampType: **MSD**	TestCode: **6010_ST**	Units: **mg/L**	Prep Date:	RunNo: **131162**
Client ID: **11-06-0**	Batch ID: **R131162**	TestNo: **WET/ EPA 60**		Analysis Date: **3/17/2011**	SeqNo: **2135283**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	2.365	1.0	2.500	0.03518	93.2	80	118	2.319	1.95	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 116850
Project: CALTRANS-SR 24 SLOPE REPAIR, E8560-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 7471_S

Sample ID	MB-71535	SampType:	MBLK	TestCode:	7471_S	Units:	mg/Kg	Prep Date:	3/15/2011	RunNo:	131044
Client ID:	PBS	Batch ID:	71535	TestNo:	EPA 7471A			Analysis Date:	3/15/2011	SeqNo:	2133271

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.10									

Sample ID	LCS-71535	SampType:	LCS	TestCode:	7471_S	Units:	mg/Kg	Prep Date:	3/15/2011	RunNo:	131044
Client ID:	LCSS	Batch ID:	71535	TestNo:	EPA 7471A			Analysis Date:	3/15/2011	SeqNo:	2133272

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.795	0.10	0.8300	0	95.8	80	120				

Sample ID	116850-011A-MS	SampType:	MS	TestCode:	7471_S	Units:	mg/Kg	Prep Date:	3/15/2011	RunNo:	131044
Client ID:	11-06-0	Batch ID:	71535	TestNo:	EPA 7471A			Analysis Date:	3/15/2011	SeqNo:	2133273

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.847	0.10	0.8300	0	102	70	130				

Sample ID	116850-011A-MSD	SampType:	MSD	TestCode:	7471_S	Units:	mg/Kg	Prep Date:	3/15/2011	RunNo:	131044
Client ID:	11-06-0	Batch ID:	71535	TestNo:	EPA 7471A			Analysis Date:	3/15/2011	SeqNo:	2133274

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.852	0.10	0.8300	0	103	70	130	0.8475	0.531	20	

Sample ID	116850-011A-DUP	SampType:	DUP	TestCode:	7471_S	Units:	mg/Kg	Prep Date:	3/15/2011	RunNo:	131044
Client ID:	11-06-0	Batch ID:	71535	TestNo:	EPA 7471A			Analysis Date:	3/15/2011	SeqNo:	2133276

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.10						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 116850
Project: CALTRANS-SR 24 SLOPE REPAIR, E8560-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_S_DSL LL

Sample ID	MB-71538	SampType:	MBLK	TestCode:	8015_S_DSL	Units:	mg/Kg	Prep Date:	3/15/2011	RunNo:	131059
Client ID:	PBS	Batch ID:	71538	TestNo:	EPA 8015B(M	EPA 3550B		Analysis Date:	3/15/2011	SeqNo:	2133479

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	ND	1.0									
Surr: p-Terphenyl	2.765		2.670		104	30	128				

Sample ID	LCS-71538	SampType:	LCS	TestCode:	8015_S_DSL	Units:	mg/Kg	Prep Date:	3/15/2011	RunNo:	131059
Client ID:	LCSS	Batch ID:	71538	TestNo:	EPA 8015B(M	EPA 3550B		Analysis Date:	3/15/2011	SeqNo:	2133480

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	18.929	1.0	33.00	0	57.4	35	118				
Surr: p-Terphenyl	1.780		2.670		66.7	30	128				

Sample ID	116850-005ADUP	SampType:	DUP	TestCode:	8015_S_DSL	Units:	mg/Kg	Prep Date:	3/15/2011	RunNo:	131059
Client ID:	11-03-1.5	Batch ID:	71538	TestNo:	EPA 8015B(M	EPA 3550B		Analysis Date:	3/15/2011	SeqNo:	2133485

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	ND	1.0						0	0	20	
Surr: p-Terphenyl	1.535		2.670		57.5	30	128		0	0	

Sample ID	116850-005AMS	SampType:	MS	TestCode:	8015_S_DSL	Units:	mg/Kg	Prep Date:	3/15/2011	RunNo:	131059
Client ID:	11-03-1.5	Batch ID:	71538	TestNo:	EPA 8015B(M	EPA 3550B		Analysis Date:	3/15/2011	SeqNo:	2133486

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	16.070	1.0	33.00	0	48.7	25	129				
Surr: p-Terphenyl	1.779		2.670		66.6	30	128				

Sample ID	116850-005AMSD	SampType:	MSD	TestCode:	8015_S_DSL	Units:	mg/Kg	Prep Date:	3/15/2011	RunNo:	131059
Client ID:	11-03-1.5	Batch ID:	71538	TestNo:	EPA 8015B(M	EPA 3550B		Analysis Date:	3/15/2011	SeqNo:	2133487

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
DRO	17.175	1.0	33.00	0	52.0	25	129	16.07	6.65	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 116850
Project: CALTRANS-SR 24 SLOPE REPAIR, E8560-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_S_DSL LL

Sample ID **116850-005AMSD**	SampType: **MSD**	TestCode: **8015_S_DSL**	Units: **mg/Kg**	Prep Date: **3/15/2011**	RunNo: **131059**				
Client ID: **11-03-1.5**	Batch ID: **71538**	TestNo: **EPA 8015B(M**	**EPA 3550B**	Analysis Date: **3/15/2011**	SeqNo: **2133487**				

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: p-Terphenyl	1.682		2.670		63.0	30	128		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 116850
Project: CALTRANS-SR 24 SLOPE REPAIR, E8560-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_S_GAS

Sample ID **E110315LC1**	SampType: **LCS**	TestCode: **8015_S_GAS**	Units: **mg/Kg**	Prep Date:	RunNo: **131049**
Client ID: **LCSS**	Batch ID: **E11VS118**	TestNo: **EPA 8015B(M**		Analysis Date: **3/15/2011**	SeqNo: **2133379**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	4.852	1.0	5.000	0	97.0	70	130				
Surr: Bromofluorobenzene (FID)	102.997		100.0		103	62	153				

Sample ID **E110315MB1MS**	SampType: **MS**	TestCode: **8015_S_GAS**	Units: **mg/Kg**	Prep Date:	RunNo: **131049**
Client ID: **ZZZZZZ**	Batch ID: **E11VS118**	TestNo: **EPA 8015B(M**		Analysis Date: **3/15/2011**	SeqNo: **2133380**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	5.051	1.0	5.000	0	101	49	131				
Surr: Bromofluorobenzene (FID)	96.334		100.0		96.3	62	153				

Sample ID **E110315MB1MSD**	SampType: **MSD**	TestCode: **8015_S_GAS**	Units: **mg/Kg**	Prep Date:	RunNo: **131049**
Client ID: **ZZZZZZ**	Batch ID: **E11VS118**	TestNo: **EPA 8015B(M**		Analysis Date: **3/15/2011**	SeqNo: **2133381**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	5.081	1.0	5.000	0	102	49	131	5.051	0.592	20	
Surr: Bromofluorobenzene (FID)	93.753		100.0		93.8	62	153		0	0	

Sample ID **E110315MB1**	SampType: **MBLK**	TestCode: **8015_S_GAS**	Units: **mg/Kg**	Prep Date:	RunNo: **131049**
Client ID: **PBS**	Batch ID: **E11VS118**	TestNo: **EPA 8015B(M**		Analysis Date: **3/15/2011**	SeqNo: **2133382**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	ND	1.0									
Surr: Bromofluorobenzene (FID)	98.148		100.0		98.1	62	153				

Sample ID **116850-013ADUP**	SampType: **DUP**	TestCode: **8015_S_GAS**	Units: **mg/Kg**	Prep Date:	RunNo: **131049**
Client ID: **11-06-2**	Batch ID: **E11VS118**	TestNo: **EPA 8015B(M**		Analysis Date: **3/15/2011**	SeqNo: **2133389**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	ND	1.0						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 116850
Project: CALTRANS-SR 24 SLOPE REPAIR, E8560-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 8015_S_GAS

Sample ID **116850-013ADUP**	SampType: **DUP**	TestCode: **8015_S_GAS**	Units: **mg/Kg**	Prep Date:	RunNo: **131049**
Client ID: **11-06-2**	Batch ID: **E11VS118**	TestNo: **EPA 8015B(M**		Analysis Date: **3/15/2011**	SeqNo: **2133389**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Bromofluorobenzene (FID)	113.323		100.0		113	62	153		0	0	

Sample ID **116790-005AMS**	SampType: **MS**	TestCode: **8015_S_GAS**	Units: **mg/Kg**	Prep Date:	RunNo: **131049**
Client ID: **ZZZZZZ**	Batch ID: **E11VS118**	TestNo: **EPA 8015B(M**		Analysis Date: **3/15/2011**	SeqNo: **2133561**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	5.477	1.0	5.000	0	110	49	131				
Surr: Bromofluorobenzene (FID)	106.714		100.0		107	62	153				

Sample ID **116790-005AMSD**	SampType: **MSD**	TestCode: **8015_S_GAS**	Units: **mg/Kg**	Prep Date:	RunNo: **131049**
Client ID: **ZZZZZZ**	Batch ID: **E11VS118**	TestNo: **EPA 8015B(M**		Analysis Date: **3/15/2011**	SeqNo: **2133562**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
GRO	3.865	1.0	5.000	0	77.3	49	131	5.477	34.5	20	R
Surr: Bromofluorobenzene (FID)	109.075		100.0		109	62	153		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Geocon Consultants, Inc.
Work Order: 116850
Project: CALTRANS-SR 24 SLOPE REPAIR, E8560-0

ANALYTICAL QC SUMMARY REPORT

TestCode: 9045_S

Sample ID **116822-002ADUP** SampType: **DUP** TestCode: **9045_S** Units: **pH Units** Prep Date: RunNo: **131042**
Client ID: **ZZZZZZ** Batch ID: **R131042** TestNo: **EPA 9045C** Analysis Date: **3/15/2011** SeqNo: **2133264**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
pH	7.970	0.10						7.980	0.125	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CHAIN OF CUSTODY RECORD

Pg 1 of 2

ADVANCED TECHNOLOGY LABORATORIES
3275 Walnut Ave., Signal Hill, CA 90755
Tel: (562) 989-4045 • Fax: (562) 989-4040

P.O.#: _____ Quote #: _____

Logged By: _____ Date: 3/15/11

NOTE: Please include your Quote No. to ensure proper pricing of your project.

FOR LABORATORY USE ONLY:

Method of Transport: ☐ Client ☐ ATL ☐ FedEx ☐ OnTrac ☐ GSO ☐ Other: _____

18.6

Sample Condition Upon Receipt

1. CHILLED	Y ☑ N ☐	4. CUSTODY SEAL	Y ☐ N ☑
2. HEADSPACE (VOA)	Y ☐ N ☐ N/A	5. # OF SPLS MATCH COC	Y ☑ N ☐
3. CONTAINER INTACT	Y ☑ N ☐	6. PRESERVED	Y ☐ N ☑

Client: **Geocon Consultants, Inc.** Address: 6671 Brisa Street TEL: (925) 371-5900

Attn: L. NIGLIOTTI, LIVERMORE, MERRITT City Livermore State CA Zip Code 94550 FAX: (925) 371-5915

Project Name: CALTRANS - SR 24 SLOPE REPAIR Project #: E8560-06-13 Sampler: (Printed Name) CM (Signature)

Relinquished by: (Signature and Printed Name) CHRIS MERRITT Date: 3-4-11 Time: 1700 Received by: (Signature and Printed Name) Date: 3/15/11 Time: 8:14

Relinquished by: (Signature and Printed Name) Date: Time: Received by: (Signature and Printed Name) Date: Time:

Relinquished by: (Signature and Printed Name) Date: Time: Received by: (Signature and Printed Name) Date: Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
CM (Print Name) _____ (Date)
CM (Signature)

Send Report To: Attn: _____ Co: A/A Addr: _____ City: _____ State: _____ Zip: _____

Bill To: Attn: _____ Co: A/A Addr: _____ City: _____ State: _____ Zip: _____

Special Instructions/Comments:
RUN WET EXTRACTIONS SIMULTANEOUS ON 0 FOOT SAMPLES

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

Circle or Add Analysis(es) Requested

SPECIFY APPROPRIATE MATRIX

PRESERVATION

Q A / Q C: RTNE ☐ CT ☑ Legal ☐ SWRCB ☐ Logcode ____ OTHER ____

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	6010B (Total Metal)	8015B (GRO)	8021 (BTEX)	8015B (DRO)	TITLE 22 / CAM 17 (6010 / 7000)	pH	Pb	SEDIMENT	SOLID	SOIL	DRINKING WATER	GROUND WATER	WASTEWATER	STORMWATER	AQUEOUS	TAT	Container(s) #	Container(s) Type	REMARKS
	1164850-001	11-01-0	3-4-11	1000					X			X						X						48 HR			
	2	" " -1.5		1005					X	X		X	X													
	3	11-02-0		1015					X	X		X	X													
	4	11-03-0		1020								X														
	5	11-03-1.5		25						X			X													
	6	11-03-3		30					X	X		X	X													
	7	11-04-0		1050								X														
	8	-1.5		45						X			X													
	9	-3		40					X			X	X													
	10	11-05-0		1100					X	X		X														

• TAT starts 8 a.m. following day if samples received after 5 p.m.

TAT: ☐A= Overnight ≤ 24 hrs ☐B= Emergency Next workday ☐C= Critical 2 Workdays ☐D= Urgent 3 Workdays ☐E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=Hcl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

Rev. 2010-0325

DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter.

CHAIN OF CUSTODY RECORD

ADVANCED TECHNOLOGY LABORATORIES
3275 Walnut Ave., Signal Hill, CA 90755
Tel: (562) 989-4045 • Fax: (562) 989-4040

P.O.#: _____ Quote #: _____

Logged By: _____ Date: _____

NOTE: Please include your Quote No. to ensure proper pricing of your project.

FOR LABORATORY USE ONLY:

Method of Transport
☐ Client ☐ ATL
☐ FedEx ☐ OnTrac
☐ GSO
☐ Other: _____

Sample Condition Upon Receipt
1. CHILLED Y☐ N☐ 4. CUSTODY SEAL Y☐ N☐
2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐
3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client: **Geocon Consultants, Inc.** Address: 6671 Brisa Street TEL: (925) 371-5900
Attn: LIVERMORE, L.VIGLIOTTI, MERRITT City Livemore State CA Zip Code 94550 FAX: (925) 371-5915

Project Name: CALTRANS SR24 SLOPE REPAIR Project #: E8560-06-13 Sampler: (Printed Name) CM (Signature)

Relinquished by: (Signature and Printed Name) CHRIS MERRITT Date: 3-4-11 Time: 1700 Received by: (Signature and Printed Name) Date: 3/5/11 Time: 8:14

Relinquished by: (Signature and Printed Name) Date: Time: Received by: (Signature and Printed Name) Date: Time:

Relinquished by: (Signature and Printed Name) Date: Time: Received by: (Signature and Printed Name) Date: Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
CM — 3-4-11
Print Name — Date
CM
Signature

Send Report To:
Attn: A/A 1
Co:
Addr:
City: State: Zip:

Bill To:
Attn: A/A 1
Co:
Addr:
City: State: Zip:

Special Instructions/Comments:
RUN WET EXTRACTIONS ON O FOOT SAMPLES SIMULTANEOUS.

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

Circle or Add Analysis(es) Requested

SPECIFY APPROPRIATE MATRIX

PRESERVATION

Q A / Q C
RTNE ☐
CT ☒
Legal ☐
SWRCB ☐
Logcode ____
OTHER ____

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	6010B (Total Metal)	8015B (GRO) / 8021 (BTEX)	8015B (DRO)	TITLE 22 / CAM 17 (6010 / 7000)	pH	Pb	SEDIMENT	SOLID	SOIL	DRINKING WATER	GROUND WATER	WASTEWATER	STORMWATER	AQUEOUS	TAT	Container(s) #	Container(s) Type	REMARKS
	116850-11	11-06-0	3-4-11	1105						X				X			X							48 HR	1	T M C	
	/ 12	-1.5	"	1110					X				X											"	1	"	
	/ 13	-2	"	1115					X				X	X										"	1	"	

• TAT starts 8 a.m. following day if samples received after 5 p.m.

TAT: ☐A= Overnight ≤ 24 hrs ☐B= Emergency Next workday ☐C= Critical 2 Workdays ☐D= Urgent 3 Workdays ☐E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives:
H=Hcl N=HNO_3 S=H_2SO_4 C=4°C
Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter.

Diane Galvan

From: Rebecca Silva [silva@geoconinc.com]
Sent: Tuesday, March 15, 2011 11:25 AM
To: Diane Galvan
Cc: 'Rick Day'; 'Chris Merritt'
Subject: E8560-06-13

Diane - Since the samples were lost for over a week and just made it to the lab this morning, we need to run the samples on same day TAT. Please cc me and the Caltrans folks on the results per Rick's Sunday e-mail and let me know if you need anything else.

Thanks,
Rebecca

Rebecca Silva, REA | *Senior Project Scientist*
Geocon Consultants, Inc.
3160 Gold Valley Drive Suite 800, Rancho Cordova, CA 95742
Tel 916.852.9118 Fax 916.852.9132 Cell 916.508.1910
www.geoconinc.com

EMSL Analytical, Inc
2235 Polvorosa Ave , Suite 230, San Leandro, CA 94577
Phone: (510) 895-3675 Fax: (510) 895-3680 Email: milpitaslab@emsl.com

Attn: **Chris Merritt**
Geocon Consultants, Inc.
6671 Brisa Street

Livermore, CA 94550

Fax: (925) 371-5915 Phone: (925) 371-5900
Project: **E8560-06-13 / Caltrans SR 24 Slope Repair**

Customer ID: GECN21
Customer PO: E8560-06-13
Received: 03/05/11 12:00 PM
EMSL Order: 091102029

EMSL Proj: E8560-06-**
Analysis Date: 3/6/2011

Test Report: PLM Analysis of Bulk Samples for Asbestos via EPA 600/R-93/116 Method with CARB 435 Prep (Milling) Level A for 0.25% Target Analytical Sensitivity

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
11-01-1.5 *091102029-0001*		Tan Non-Fibrous Homogeneous		100.00% Non-fibrous (other)	**None Detected**
11-02-1.5 *091102029-0002*		Tan Non-Fibrous Homogeneous		100.00% Non-fibrous (other)	**None Detected**
11-03-1.5 *091102029-0003*		Tan Non-Fibrous Homogeneous		100.00% Non-fibrous (other)	**None Detected**
11-04-1.5 *091102029-0004*		Brown Non-Fibrous Homogeneous		100.00% Non-fibrous (other)	**None Detected**
11-05-0 *091102029-0005*		Tan Non-Fibrous Homogeneous		100.00% Non-fibrous (other)	**None Detected**
11-06-1.5 *091102029-0006*		Brown Non-Fibrous Homogeneous		100.00% Non-fibrous (other)	**None Detected**

Initial report from

Analyst(s)

Rui Cindy Geng (6)

Baojia Ke, Laboratory Manager
or other approved signatory

THIS IS THE LAST PAGE OF THE REPORT.

091102029

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

Asbestos Chain of Custody

EMSL Order Number (*Lab Use Only*): 091102029

EMSL ANALYTICAL, INC.
2235 POLVOROSA DR., STE. 230
SAN LEANDRO, CA 94577
PHONE: (510) 895-3675
FAX: (510) 895-3680

Company : GEOCON		**EMSL-Bill to:** ☐ Same ☐ Different If Bill to is Different note instructions in Comments** *Third Party Billing requires written authorization from third party*	
Street: 6671 BRISA ST			
City: LIVERMORE.	**State/Province:** CA	**Zip/Postal Code:** 94550	**Country:** USA
Report To (Name): LIVERMORE L. IGLIOTTI, C. MERRITT		**Fax #:** 925-371-5915	
Telephone #: 925-371-5900		**Email Address:** ON FILE	
Project Name/Number: CALTRANS SR 24 SLOPE REPAIR E8560-06-13			
Please Provide Results: ☐ Fax ■ Email	**Purchase Order:**	**U.S. State Samples Taken:** CA	

Turnaround Time (TAT) Options* – Please Check

☐ 3 Hour ☐ 6 Hour ☐ 24 Hour ■ 48 Hour ☐ 72 Hour ☐ 96 Hour ☐ 1 Week ☐ 2 Week

**For TEM Air 3 hours/6 hours, please call ahead to schedule.*There is a premium charge for 3 Hour TEM AHERA or EPA Level II TAT. You will be asked to sign an authorization form for this service. Analysis completed in accordance with EMSL's Terms and Conditions located in the Analytical Price Guide.*

PCM - Air
- ☐ NIOSH 7400
- ☐ w/ OSHA 8hr. TWA

PLM - Bulk (reporting limit)
- ☐ PLM EPA 600/R-93/116 (<1%)
- ☐ PLM EPA NOB (<1%)

Point Count
- ☐ 400 (<0.25%) ☐ 1000 (<0.1%)

Point Count w/Gravimetric
- ☐ 400 (<0.25%) ☐ 1000 (<0.1%)
- ☐ NYS 198.1 (friable in NY)
- ☐ NYS 198.6 NOB (non-friable-NY)
- ☐ NIOSH 9002 (<1%)

TEM – Air ☐ **4-4.5hr TAT** (AHERA only)
- ☐ AHERA 40 CFR, Part 763
- ☐ NIOSH 7402
- ☐ EPA Level II
- ☐ ISO 10312

TEM - Bulk
- ☐ TEM EPA NOB
- ☐ NYS NOB 198.4 (non-friable-NY)
- ☐ Chatfield SOP
- ☐ TEM Mass Analysis-EPA 600 sec. 2.5

TEM – Water: EPA 100.2
- Fibers >10µm ☐ Waste ☐ Drinking
- All Fiber Sizes ☐ Waste ☐ Drinking

TEM- Dust
- ☐ Microvac - ASTM D 5755
- ☐ Wipe - ASTM D6480
- ☐ Carpet Sonication (EPA 600/J-93/167)

Soil/Rock/Vermiculite
- ■ PLM CARB 435 - A (0.25% sensitivity)
- ☐ PLM CARB 435 - B (0.1% sensitivity)
- ☐ TEM CARB 435 - B (0.1% sensitivity)
- ☐ TEM CARB 435 - C (0.01% sensitivity)
- ☐ EPA Protocol (Semi-Quantitative)
- ☐ EPA Protocol (Quantitative)

Other:
- ☐

☐ **Check For Positive Stop – Clearly Identify Homogenous Group**

Samplers Name: **Samplers Signature:**

Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled
11-01-1.5	SOIL/ROCK		3-4-11
11-02-1.5			
11-03-1.5			
11-04-1.5			
11-05-0			
11-06-1.5			

Client Sample # (s): 11-01-1.5 TO 11-06-1.5 **Total # of Samples:** 6

Relinquished (Client): CHRIS MERRITT **Date:** 3-5-11 **Time:** 1200

Received (Lab): **Date:** 3/5/11 **Time:** 12pm D/O

Comments/Special Instructions:

APPENDIX B

APPENDIX B - METALS STATISTICS

Sample ID	Sample Depth (feet)	Total Lead (mg/kg)	Arsenic (mg/kg)	Vanadium (mg/kg)
11-01-0	0	3.0	2.4	48
11-02-0	0	37	2.2	47
11-03-0	0	3.3	1.0	29
11-04-0	0	180	2.5	38
11-05-0	0	34	2.5	34
11-06-0	0	4.0	1.3	31
11-06-2	2.0	2.5		
11-03-3	3	2.5		
11-04-3	3	5.2		
11-01-1.5	1.5	2.5		
11-03-1.5	1.5	2.5		
11-04-1.5	1.5	2.5		
11-06-1.5	1.5	6.2		

Pb	
Number of Valid Observations	13
Number of Distinct Observations	9
Minimum	2.5
Maximum	180
Mean	21.94
Median	3.3
SD	49.0
Variance	2400
Coefficient of Variation	2.233
Skewness	3.258
Mean of log data	1.851
SD of log data	1.375
90% Standard Bootstrap UCL	38.63
95% Standard Bootstrap UCL	42.91

As	
Number of Valid Observations	6
Number of Distinct Observations	5
Minimum	0.5
Maximum	2.4
Mean	1.317
Median	1.15
SD	0.823
Variance	0.678
Coefficient of Variation	0.625
Skewness	0.451
Mean of log data	0.09
SD of log data	0.688
95% Standard Bootstrap UCL	1.823

V	
Number of Valid Observations	6
Number of Distinct Observations	6
Minimum	29
Maximum	48
Mean	37.83
Median	36
SD	8.085
Variance	65.37
Coefficient of Variation	0.214
Skewness	0.429
Mean of log data	3.614
SD of log data	0.211
95% Standard Bootstrap UCL	42.8

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846

In Reply Refer To:
81420-2011-F-0415-2

JUN 29 2011

Mr. Jim Richards
Office of Biological Sciences and Permits
California Department of Transportation
P.O. Box 23660
Oakland, California 94623-0660

Subject: Biological Opinion on the Effects of the State Route 24 Storm Damage Repair Project, Contra Costa County, California (Caltrans EA 04-4S2700)

Dear Mr. Richards:

This letter responds to a letter from the California Department of Transportation (Caltrans), dated February 17, 2011, requesting initiation of formal consultation for the proposed State Route 24 (SR-24) Storm Damage Repair Project located in Contra Costa County, California. Your letter was received by the U.S. Fish and Wildlife Service (Service) on February 28, 2011. This letter represents the Service's biological opinion on the effects of the project on the California red-legged frog (*Rana draytonii*) and threatened Alameda whipsnake (*Masticophis lateralis euryxanthus*), and designated critical habitat for the Alameda whipsnake. This letter issued under the authority of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.) (Act).

The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) legislation (23 U.S.C. 327) allows the Secretary of the U.S. Department of Transportation acting through the Federal Highway Administration (FHWA) to establish a Surface Transportation Project Delivery Pilot Program, whereby a State may assume the FHWA responsibilities under the National Environmental Policy Act (NEPA) for environmental review, agency consultation and other action pertaining to the review or approval of a specific project. Caltrans assumed these responsibilities for the FHWA on July 1, 2007 through a Memorandum of Understanding (MOU) within the State of California (http://www.dot.ca.gov/ser/downloads/MOUs/nepa_delegation/sec6005mou.pdf).

This biological opinion is based on: (1) the *Contra Costa 24 Storm Damage Repair Project, Biological Assessment* dated February 2011; (2) email from Caltrans on June 2, 21, and 28, 2011, responding to the May 11, 2011, notification of data deficiency letter issued by the Service; (3) conference call between Caltrans and the Service on June 28, 2011; (4) miscellaneous correspondence and electronic mail concerning the proposed action between Caltrans and the Service; and (5) other information available to the Service.

Consultation History

February 28, 2011	The Service received a letter from Caltrans dated February 17, 2011 requesting the initiation of formal consultation. The letter accompanied a biological assessment dated February 2011.
May 11, 2011	The Service issued a letter acknowledging the request to initiate consultation and notification of data deficiencies to Caltrans. The letter indicated that the Service had not received all the necessary information to initiate formal consultation as outlined in the regulations governing interagency consultations (50 CFR §402.14).
June 2, 2011	The Service received an email from Caltrans responding to the May 11, 2011, notification of data deficiencies letter.
June 20, 2011	The Service reiterated the need for additional information via email as stated in the May 11, 2011, request. The information provided by Caltrans on June 2, 2011, did not adequately address the Service's concerns.
June 21, 2011	Caltrans responded to the Service's June 20, 2011, information request via email.
June 22, 2011	The Service notified Caltrans that the data deficiencies were not adequately addressed in their responses and the information needed to initiate formal consultation and issue a biological opinion had not been provided.
June 28, 2011	Conference call between the Service and Caltrans to discuss data deficiencies.
June 28, 2011	The Service determined that all the requested information was received and the initiation package was complete. Formal consultation was initiated on this date.
February 28, 2011 - June 29, 2011	Electronic and phone correspondence between Caltrans and the Service.

BIOLOGICAL OPINION

Description of the Proposed Action

The following is a summary of the project description, inclusive of the proposed compensation, provided by Caltrans in the February 2011 biological assessment (Caltrans 2011). Any changes to the project description or project plans not provided to Service and evaluated in the preparation of this biological opinion are subject to the requirements of reinitiation of formal consultation.

Project Description

The proposed project is located on SR-24 in Contra Costa County just west of the City of Orinda. Within the action area SR-24 runs through the Berkeley Hills in a coastal scrub/chaparral setting. It is a 10-lane access-controlled freeway with standard 12-foot lanes,

10-foot inside and outside shoulders, and concrete median barrier. Storm water damage has occurred in two locations near the Wilder Road interchange. At post mile 1.2 (Location 1) a sinkhole has developed around a 36" riser and corrugated metal pipe (CMP) drainage inlet next to the eastbound off-ramp due to water seepage through cracks in the adjacent asphalt-concrete ditch. A 54-inch CMP culvert 35 feet below the drainage inlet is also being undermined by erosional forces and requires reinforcement. At post mile 1.4 (Location 2), a saturated portion of the hillside adjacent to the westbound lanes near the off-ramp to Wilder Road is slipping towards the freeway. The purpose of the project is to reinforce the foundation of the 36-inch CMP drainage inlet and 54-inch CMP culvert at Location 1 in order to extend their useful lives and to excavate and repair the slide occurring at Location 2 in order to prevent further slippage onto SR 24 which poses a hazard to traffic as well as requiring ongoing maintenance cleanup costs.

Location 1

- Replace 15 feet of the asphalt concrete drainage ditch on both sides of the 36-inch riser and CMP drainage inlet (DI) with Portland Cement Concrete and create a 10-square-foot concrete apron around the 36-inch riser and DI.

- Inject grout around the 36-inch riser and DI to a maximum depth of 35 feet to fill existing cavities, stabilize the ground, and prevent further water seepage.

- Utilize a nearby DI for access to the 54-inch CMP culvert 35 feet below ground and pump concrete into the scoured areas underneath the 54-inch CMP culvert (a process called "invert paving"). The width of the invert paving would vary from 4 to 8 inches depending on the volume of scour beneath the culvert and would extend the entire length of the culvert to its terminus in the median of SR-24.

Location 2

- A landslide area 130-140 feet long and 50-60 feet wide next to the westbound Wilder Road off-ramp would be repaired. The slide area is approximately 0.53-acre. Approximately 720 cubic yards of existing material would be removed and the existing slope reconstructed at 2:1 using alternating layers of geosynthetic reinforcement (i.e. biodegradable plastic sheeting) and soil. There would be 2 feet of spacing between each layer of geosynthetic reinforcement and soil. The total amount of soil required to rebuild the slope is 1,820 cubic yards so, after reusing the 720 cubic yards of excavated material, 1,100 cubic yards of imported borrow would be required.

- In order to access the site, a temporary dirt road would need to be constructed from the Wilder Road off-ramp to the top of the slide. This road would be 12 feet wide and 550 feet long and would follow the contours of an existing earthen drainage ditch. The total width of the disturbance area for construction of the road would be 30 feet to enable large equipment to traverse the slope and perform tree and brush removal, grading, and contouring activities. The total area of temporary disturbance for the road construction would be approximately 0.5-acre. The road would be recontoured after construction in order for it to continue to function as a storm water drainage ditch. The ditch would terminate at an existing culvert and drainage inlet as it does now. A new concrete v-ditch would be constructed at the top of the slide area to remove water from the newly repaired slope and minimize future erosion of the slope.

Construction Guidelines

Use of these paved areas for staging, equipment storage, vehicle parking, and other project-related activities would prevent additional ground/habitat disturbance in the action area. For imported borrow sites, the contractor would be solely responsible for the selection and environmental compliance of the selected site before construction activities begin. The following equipment is anticipated: bobcat, loader, small backhoe, long arm trencher, and haul trucks to remove excavated soil and deliver imported soil.

At Location1, a narrow cattail-lined ditch wetland and adjacent willow-riparian wetland would be designated an Environmentally Sensitive Area (ESA) with brightly colored fencing and completely avoided. At Location 2, the entire action area would be enclosed with wildlife exclusion fencing (WEF) in order to prevent California red-legged frogs and Alameda whipsnakes from entering the work area and keep workers out of sensitive habitat. All construction activities would take place within the area set up inside the fencing and all areas outside the fencing would be treated as an ESA.

Proposed Compensation

Caltrans is proposing to compensate for habitat affected by the proposed project in accordance with FHWA policies on natural habitat loss. Compensation will be provided at a ratio of 3:1 for permanent effects (Table 1). Compensation for effects to the California red-legged frog, Alameda whipsnake critical habitat, or areas temporarily affected by the proposed action was not offered by Caltrans.

Table 1: Proposed Compensation for Temporary and Permanent Effects

Species	Effects						Total Compensation (acres)
	Temporary (acres)			Permanent (acres)			
	Impact	Compensation		Impact	Compensation		
		Ratio	Need		Ratio	Need	
California red-legged frog	0.50	n/a	n/a	0.53	n/a	n/a	n/a
Alameda whipsnake	0.50	n/a	n/a	0.53	3:1	1.59	1.59
Alameda whipsnake critical habitat	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Analytical Framework for Jeopardy Determination

In accordance with policy and regulation, the jeopardy analysis in this biological opinion relies on four components: (1) *Status of the Species*; (2) *Environmental Baseline*, which evaluates California red-legged frog and Alameda whipsnake range-wide conditions, the factors responsible for that condition, and their survival and recovery needs; and evaluates the condition of these species in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of these species; (3) *Effects of the Action*, which determines the direct and indirect effects of the proposed Federal action and the effects of any interrelated or interdependent activities on these species; and (4) *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on them.

In accordance with policy and regulation, this jeopardy determination is made by evaluating the effects of the proposed Federal action in the context of the California red-legged frog and Alameda whipsnake current status, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of both the survival and recovery of these species in the wild.

The jeopardy analysis in this biological opinion places an emphasis on consideration of the range-wide survival and recovery of the California red-legged frog and Alameda whipsnake and the role of the action area in the survival and recovery of species as the context for evaluating the significance of the effects of the proposed Federal action, taken together with cumulative effects, for purposes of making the jeopardy determination.

Adverse Modification Determination

This biological opinion on the critical habitat for the Alameda whipsnake does not rely on the regulatory definition of "destruction or adverse modification" of critical habitat at 50 CFR § 402.02. Instead, we have relied upon the statutory provisions of the Act to complete the following analysis with respect to the critical habitat.

In accordance with policy and regulation, the adverse modification analysis in this biological opinion relies on four components: (1) *Status of Critical Habitat* and (2) *Environmental Baseline* of the critical habitat, which evaluates the range wide condition of designated critical habitat for the Alameda whipsnake in terms of primary constituent elements (PCEs), the factors responsible for that condition, and the intended recovery function of the critical habitat overall; and evaluates the condition of critical habitat in the action area, the factors responsible for that condition, and the recovery role of the critical habitat in the action area; (2) *Effects of the Action*, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on PCEs and how that will influence the recovery role of affected critical habitat units; and (3) *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on the PCEs and how that will influence the recovery role of affected critical habitat units.

For purposes of the adverse modification determination, the effects of the proposed Federal action on Alameda whipsnake critical habitat are evaluated in the context of the range-wide condition of the critical habitat, taking into account any cumulative effects, to determine if the critical habitat range-wide would remain functional (or would retain the current ability for the PCEs to be functionally established in areas of currently unsuitable but capable habitat) to serve its intended recovery role for the Alameda whipsnake.

The analysis in this biological opinion places an emphasis on using the intended range-wide recovery function of Alameda whipsnake critical habitat and the role of the action area relative to that intended function as the context for evaluating the significance of effects of the proposed Federal action, taken together with cumulative effects, for purposes of making the adverse modification determination.

Action Area

The action area is defined in 50 CFR § 402.02, as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." For the proposed action the Service considers the action area, comprising 25.9 acres, to encompass the

entire project footprint including all construction access, staging areas, vehicle parking, turnouts, and construction work zones as specified by Caltrans and submitted to the Service in the February 2011 biological assessment, email and phone correspondence, and described in the Project Description of this biological opinion. The action area extends from PM 1.2 to PM 1.4 and includes portions of SR-24, Wilder Road and immediately surrounding areas. Habitat within the action area is comprised of non-native annual grassland, coyote brush scrub, eucalyptus forest, and developed hardscape vegetation communities.

Status of the Species and Environmental Baseline

California Red-legged Frog

Listing Status: The California red-legged frog was listed as a threatened species on May 23, 1996 (61 FR 25813). Critical habitat was designated for this species on April 13, 2006 (71 FR 19244) and revisions to the critical habitat designation were published on March 17, 2010 (75 FR 12816). At this time, the Service recognized the taxonomic change from *Rana aurora draytonii* to *Rana draytonii* (Shaffer *et al.* 2010). A recovery plan was published for the California red-legged frog on September 12, 2002 (Service 2002a).

Description: The California red-legged frog is the largest native frog in the western United States (Wright and Wright 1949), ranging from 1.5 to 5.1 inches in length (Stebbins 2003). The abdomen and hind legs of adults are largely red, while the back is characterized by small black flecks and larger irregular dark blotches with indistinct outlines on a brown, gray, olive, or reddish background color. Dorsal spots usually have light centers (Stebbins 2003), and dorsolateral folds are prominent on the back. Larvae (tadpoles) range from 0.6 to 3.1 inches in length, and the background color of the body is dark brown and yellow with darker spots (Storer 1925).

Distribution: The historic range of the California red-legged frog extended from the vicinity of Elk Creek in Mendocino County, California, along the coast inland to the vicinity of Redding in Shasta County, California, and southward to northwestern Baja California, Mexico (Fellers 2005; Jennings and Hayes 1985; Hayes and Krempels 1986). The species was historically documented in 46 counties but the taxa now remains in 238 streams or drainages within 23 counties, representing a loss of 70 percent of its former range (Service 2002a). California red-legged frogs are still locally abundant within portions of the San Francisco Bay area and the Central California Coast. Isolated populations have been documented in the Sierra Nevada, northern Coast, and northern Transverse Ranges. The species is believed to be extirpated from the southern Transverse and Peninsular ranges, but is still present in Baja California, Mexico (CDFG 2011).

Status and Natural History: California red-legged frogs predominately inhabit permanent water sources such as streams, lakes, marshes, natural and manmade ponds, and ephemeral drainages in valley bottoms and foothills up to 4,921 feet in elevation (Jennings and Hayes 1994, Bulger et al. 2003, Stebbins 2003). However, they have also been reported to inhabit ephemeral creeks, drainages and ponds with minimal riparian and emergent vegetation. California red-legged frogs breed from November to April, although earlier breeding records have been reported in southern localities. Breeding generally occurs in still or slow-moving water often associated with emergent vegetation, such as cattails, tules or overhanging willows (Storer 1925, Hayes and Jennings 1988). Female frogs deposit egg masses on emergent vegetation so that the egg mass floats on or near the surface of the water (Hayes and Miyamoto 1984).

Habitat includes nearly any area within 1-2 miles of a breeding site that stays moist and cool through the summer including vegetated areas with coyote brush, blackberry thickets, and root masses associated with willow and California bay trees (Fellers 2005). Sheltering habitat for California red-legged frogs potentially includes all aquatic, riparian, and upland areas within the range of the species and includes any landscape feature that provide cover, such as animal burrows, boulders or rocks, organic debris such as downed trees or logs, and industrial debris. Agricultural features such as drains, watering troughs, spring boxes, abandoned sheds, or hay stacks may also be used. Incised stream channels with portions narrower and depths greater than 18 inches also may provide important summer sheltering habitat. Accessibility to sheltering habitat is essential for the survival of California red-legged frogs within a watershed, and can be a factor limiting frog population numbers and survival.

California red-legged frogs do not have a distinct breeding migration (Fellers 2005). Adults are often associated with permanent bodies of water. Some individuals remain at breeding sites year-round, while others disperse to neighboring water features. Fellers documented typical dispersal distances of less than 0.5-mile; however, a few individuals were reported to move between 1 and 2 miles (Fellers 2005). Movements are typically along riparian corridors, but some individuals, especially on rainy nights, move directly from one site to another through normally inhospitable habitats, such as heavily grazed pastures or oak-grassland savannas (Fellers 2005).

In a study of California red-legged frog terrestrial activity in a mesic area of the Santa Cruz Mountains, Bulger et al. (2003) categorized terrestrial use as migratory and non-migratory. The latter occurred from one to several days and was associated with precipitation events. Migratory movements were characterized as the movement between aquatic sites and were most often associated with breeding activities. Bulger et al. (2003) reported that non-migrating frogs typically stayed within 200 feet of aquatic habitat 90 percent of the time and were most often associated with dense vegetative cover, i.e., California blackberry, poison oak and coyote brush. Dispersing frogs in northern Santa Cruz County traveled distances from 0.25-mile to more than 2 miles without apparent regard to topography, vegetation type, or riparian corridors (Bulger et al. 2003).

In a study of California red-legged frog terrestrial activity in a xeric environment in eastern Contra Costa County, Tatarian (2008) noted that 57 percent of frogs fitted with radio transmitters in the Round Valley study area stayed at their breeding pools, whereas 43 percent moved into adjacent upland habitat or to other aquatic sites. Her study reported a peak seasonal terrestrial movement occurring in the fall months associated with the first 0.2-inch of precipitation and tapering off into spring. Upland movement activities ranged from 3 to 233 feet, averaging 80 feet, and were associated with a variety of refugia including grass thatch, crevices, cow hoof prints, ground squirrel burrows at the base of trees or rocks, logs, and industrial debris; others were associated with upland sites lacking refugia (Tatarian 2008). The majority of terrestrial movements lasted from 1 to 4 days; however, one adult female was reported to remain in upland habitat for 50 days (Tatarian 2008). Upland refugia closer to aquatic sites were used more often and were more commonly associated with areas exhibiting higher object cover, e.g., woody debris, rocks, and vegetative cover. Subterranean cover was not significantly different between occupied upland habitat and non-occupied upland habitat.

California red-legged frogs are often prolific breeders, laying their eggs during or shortly after large rainfall events in late winter and early spring (Hayes and Miyamoto 1984). Egg masses containing 2,000 to 5,000 eggs are attached to vegetation below the surface and hatch after 6 to

14 days (Storer 1925, Jennings and Hayes 1994). In coastal lagoons, the most significant mortality factor in the pre-hatching stage is water salinity (Jennings et al. 1992). Eggs exposed to salinity levels greater than 4.5 parts per thousand resulted in 100 percent mortality (Jennings and Hayes 1990). Increased siltation during the breeding season can cause asphyxiation of eggs and small larvae. Larvae undergo metamorphosis 3½ to 7 months following hatching and reach sexual maturity 2 to 3 years of age (Storer 1925; Wright and Wright 1949; Jennings and Hayes 1985, 1990, 1994). Of the various life stages, larvae probably experience the highest mortality rates, with less than 1 percent of eggs laid reaching metamorphosis (Jennings et al. 1992). California red-legged frogs may live 8 to 10 years (Jennings et al. 1992). Populations can fluctuate from year to year; favorable conditions allow the species to have extremely high rates of reproduction and thus produce large numbers of dispersing young and a concomitant increase in the number of occupied sites. In contrast, the animal may temporarily disappear from an area when conditions are stressful (e.g., during periods of drought, disease, etc.).

The diet of California red-legged frogs is highly variable and changes with the life history stage. The diet of the larvae is not well studied, but is likely similar to that of other ranid frogs, feeding on algae, diatoms, and detritus by grazing on the surface of rocks and vegetation (Fellers 2005; Kupferberg 1996a, 1996b, 1997). Hayes and Tennant (1985) analyzed the diets of California red-legged frogs from Cañada de la Gaviota in Santa Barbara County during the winter of 1981 and found invertebrates (comprising 42 taxa) to be the most common prey item consumed; however, they speculated that this was opportunistic and varied based on prey availability. They ascertained that larger frogs consumed larger prey and were recorded to have preyed on Pacific chorus frog, three-spined stickleback and, to a limited extent, California mice, which were abundant at the study site (Hayes and Tennant 1985, Fellers 2005). Although larger vertebrate prey was consumed less frequently, it represented over half of the prey mass eaten by larger frogs suggesting that such prey may play an energetically important role in their diets (Hayes and Tennant 1985). Juvenile and subadult/adult frogs varied in their feeding activity periods; juveniles fed for longer periods throughout the day and night, while subadult/adults fed nocturnally (Hayes and Tennant 1985). Juveniles were significantly less successful at capturing prey and all life history stages exhibited poor prey discrimination, feeding on several inanimate objects that moved through their field of view (Hayes and Tennant 1985).

Metapopulation and Patch Dynamics: The direction and type of habitat used by dispersing animals is especially important in fragmented environments (Forys and Humphrey 1996). Models of habitat patch geometry predict that individual animals will exit patches at more "permeable" areas (Buechner 1987; Stamps et al. 1987). A landscape corridor may increase the patch-edge permeability by extending patch habitat (La Polla and Barrett 1993), and allow individuals to move from one patch to another. The geometric and habitat features that constitute a "corridor" must be determined from the perspective of the animal (Forys and Humphrey 1996).

Because their habitats have been fragmented, many endangered and threatened species exist as metapopulations (Verboom and Apeldom 1990; Verboom et al. 1991). A metapopulation is a collection of spatially discrete subpopulations that are connected by the dispersal movements of the individuals (Levins 1970; Hanski 1991). For metapopulations of listed species, a prerequisite to recovery is determining if unoccupied habitat patches are vacant due to the attributes of the habitat patch (food, cover, and patch area) or due to patch context (distance of the patch to other patches and distance of the patch to other features). Subpopulations on patches with higher quality food and cover are more likely to persist because they can support more individuals. Large populations have less of a chance of extinction due to stochastic events

(Gilpin and Soule 1986). Similarly, small patches will support fewer individuals, increasing the rate of extinction. Patches that are near occupied patches are more likely to be recolonized when local extinction occurs and may benefit from emigration of individuals via the "rescue" effect (Hanski 1982; Gotelli 1991; Holt 1993; Fahrig and Merriam 1985). For the metapopulation to persist, the rate of patches being colonized must exceed the rate of patches going extinct (Levins 1970). If some subpopulations go extinct regardless of patch context, recovery actions should be placed on patch attributes. Patches could be managed to increase the availability of food and/or cover.

Movements and dispersal corridors likely are critical to California red-legged frog population dynamics, particularly because the animals likely currently persist as metapopulations with disjunct population centers. Movement and dispersal corridors are important for alleviating over-crowding and intraspecific competition, and also they are important for facilitating the recolonization of areas where the animal has been extirpated. Movement between population centers maintains gene flow and reduced genetic isolation. Genetically isolated populations are at greater risk of deleterious genetic effects such as inbreeding, genetic drift, and founder effects. The survival of wildlife species in fragmented habitats may ultimately depend on their ability to move among patches to access necessary resources, retain genetic diversity, and maintain reproductive capacity within populations (Hilty and Merenlender 2004; Petit et al. 1995; Buza et al. 2000).

Most metapopulation or meta-population-like models of patchy populations do not directly include the effects of dispersal mortality on population dynamics (Hanski 1994; With and Crist 1995; Lindenmayer and Possingham 1996). Based on these models, it has become a widely held notion that more vagile species have a higher tolerance to habitat loss and fragmentation than less vagile species. But models that include dispersal mortality predict exactly the opposite: more vagile species should be more vulnerable to habitat loss and fragmentation because they are more susceptible to dispersal mortality (Fahrig 1998; Casagrandi and Gatto 1999). This prediction is supported by Gibbs (1998), who examined the presence-absence of five amphibian species across a gradient of habitat loss. He found that species with low dispersal rates are better able than more vagile species to persist in landscapes with low habitat cover. Gibbs (1998) postulated that the land between habitats serves as a demographic "drain" for many amphibians. Furthermore, Bonnet et al. (1999) found that snake species that frequently make long-distance movements have higher mortality rates than do sedentary species.

Threats: Habitat loss, non-native species introduction, and urban encroachment are the primary factors that have adversely affected the California red-legged frog throughout its range. Several researchers in central California have noted the decline and eventual local disappearance of California and northern red-legged frogs in systems supporting bullfrogs (Jennings and Hayes 1990; Twedt 1993), red swamp crayfish, signal crayfish, and several species of warm water fish including sunfish, goldfish, common carp, and mosquitofish (Moyle 1976; Barry 1992; Hunt 1993; Fisher and Schaffer 1996). This has been attributed to predation, competition, and reproduction interference. Twedt (1993) documented bullfrog predation of juvenile northern red-legged frogs (*Rana aurora*), and suggested that bullfrogs could prey on subadult California red-legged frogs as well. Bullfrogs may also have a competitive advantage over California red-legged frogs. For instance, bullfrogs are larger and possess more generalized food habits (Bury and Whelan 1984). In addition, bullfrogs have an extended breeding season (Storer 1933) during which an individual female can produce as many as 20,000 eggs (Emlen 1977). Furthermore, bullfrog larvae are unpalatable to predatory fish (Kruse and Francis 1977). Bullfrogs also interfere with California red-legged frog reproduction by eating adult male California red-legged

frogs. Both California and northern red-legged frogs have been observed in amplexus (mounted on) with both male and female bullfrogs (Jennings and Hayes 1990; Twedt 1993; Jennings 1993). Thus bullfrogs are able to prey upon and out-compete California red-legged frogs, especially in sub-optimal habitat.

The urbanization of land within and adjacent to California red-legged frog habitat has also affected the species. These declines are attributed to channelization of riparian areas, enclosure of the channels by urban development that blocks dispersal, and the introduction of predatory fishes and bullfrogs. Diseases may also pose a significant threat, although the specific effects of disease on the California red-legged frog are not known. Pathogens are suspected of causing global amphibian declines (Davidson et al. 2003). Chytridiomycosis and ranaviruses are a potential threat because these diseases have been found to adversely affect other amphibians, including the listed species (Davidson et al. 2003; Lips et al. 2006). Mao et al. (1999 cited in Fellers 2005) reported northern red-legged frogs infected with an iridovirus, which was also presented in sympatric threespine sticklebacks in northwestern California. Non-native species, such as bullfrogs and non-native tiger salamanders that live within the range of the California red-legged frog have been identified as potential carriers of these diseases (Garner et al. 2006). Human activities can facilitate the spread of disease by encouraging the further introduction of non-native carriers and by acting as carriers themselves (i.e., contaminated boots, waders or fishing equipment). Human activities can also introduce stress by other means, such as habitat fragmentation, that results in the listed species being more susceptible to the effects of disease.

Negative effects to wildlife populations from roads and pavement may extend some distance from the actual road. The phenomenon can result from vehicle-related mortality, habitat degradation, noise and light pollution, and invasive exotic species. Forman and Deblinger (1998) described the area affected as the "road effect" zone. One study along a 4-lane road in Massachusetts determined that this zone extended for an average of 980 feet to either side of the road for an average total zone width of approximately 1,970 feet. However, in places they detected an effect greater than 0.6-mile from the road. The road effect zone can also be subtle. Van der Zandt et al. (1980) reported that lapwings and black-tailed godwits feeding at 1,575 to 6,560 feet from roads were disturbed by passing vehicles. The heart rate, metabolic rate and energy expenditure of female bighorn sheep increases near roads (MacArthur et al. 1979). Trombulak and Frissell (2000) described another type of "road-zone" effect due to contaminants. Heavy metal concentrations from vehicle exhaust were greatest within 66 feet of roads and elevated levels of metals in soil and plants were detected at 660 feet of roads. The "road-zone" varies with habitat type and traffic volume. Based on responses by birds, Forman (2000) estimated the road-zone along primary roads of 1,000 feet in woodlands, 1,197 feet in grasslands, and 2,657 feet in natural lands near urban areas. Along secondary roads with lower traffic volumes, the effect zone was 656 feet. The road-zone with regard to California red-legged frogs has not been adequately investigated.

The necessity of moving between multiple habitats and breeding ponds means that many amphibian species, such as the California red-legged frog are especially vulnerable to roads and well-used large paved areas in the landscape. Van Gelder (1973) and Cooke (1995) have examined the effect of roads on amphibians and found that because of their activity patterns, population structure, and preferred habitats, aquatic breeding amphibians are more vulnerable to traffic mortality than some other species. High-volume highways pose a nearly impenetrable barrier to amphibians and result in mortality to individual animals as well as significantly fragmenting habitat. Hels and Buchwald (2001) found that mortality rates for anurans on high traffic roads are higher than on low traffic roads. Vos and Chardon (1998) found a significant

negative effect of road density on the occupation probability of ponds by the moor frog (*Rana arvalis*) in the Netherlands. In addition, incidences of very large numbers of road-killed frogs are well documented (Asley and Robinson 1996), and studies have shown strong population level effects of traffic density (Carr and Fahrig 2001) and high traffic roads on these amphibians (Van Gelder 1973; Vos and Chardon 1998). Most studies regularly count road mortalities from slow moving vehicles (Hansen 1982; Rosen and Lowe 1994; Drews 1995; Mallick et al. 1998) or by foot (Munguira and Thomas 1992). These studies assume that every victim is observed, which may be true for large conspicuous mammals, but may be an incorrect assumption for small animals, such as the California red-legged frog. Amphibians appear especially vulnerable to traffic mortality because they readily attempt to cross roads, are small and slow-moving, and thus are not easily avoided by drivers (Carr and Fahrig 2001).

Status of the Species: The recovery plan for the California red-legged frog identifies eight recovery units (Service 2002a). The establishment of these recovery units is based on the determination that various regional areas of the species' range are essential to its survival and recovery. The status of the California red-legged frog was considered within the small scale recovery units as opposed to their overall range. These recovery units are delineated by major watershed boundaries as defined by U.S. Geological Survey hydrologic units and the limits of its range. The goal of the recovery plan is to protect the long-term viability of all extant populations within each recovery unit. Within each recovery unit, core areas have been delineated and represent contiguous areas of moderate to high California red-legged frog densities that are relatively free of exotic species such as bullfrogs. The goal of designating core areas is to protect metapopulations. Thus when combined with suitable dispersal habitat, will allow for the long term viability within existing populations. This management strategy will allow for the recolonization of habitats within and adjacent to core areas that are naturally subjected to periodic localized extinctions, thus assuring the long-term survival and recovery of California red-legged frogs.

Environmental Baseline

The action area is located within the San Pablo Creek Watershed and the South and East San Francisco Bay Recovery Unit (Service 2002a). The conservation needs for the nearby East San Francisco Bay Core Area, which are included herein based on its proximity to the action area and can therefore be applied to California red-legged frogs immediately outside of the core area, are to: (1) protect existing populations; (2) control non-native predators; (3) increase connectivity between populations; (4) reduce erosion; (5) implement guidelines for recreation activities to reduce impacts; (6) implement forest practice guidelines; and (7) reduce impacts of urbanization. According to the biological assessment (Caltrans 2011), the project is located within the known range of the California red-legged frog. Caltrans staff conducted two site visits on August 6, 2009 and January 13, 2011, to evaluate habitat suitability within the action area. No California red-legged frogs were observed during these site visits; however, focused California red-legged frog surveys were not conducted in support of this proposed action. The California Natural Diversity Database (CNDDB) reports five occurrences within a five-mile radius of the action area (CDFG 2011). The nearest occurrence (#226) is located 0.8-mile to the southeast comprising two adults within a culvert outlet pool below a siltation pond and tributary to Brookside Creek in 1997 (CDFG 2011). Recently, a California red-legged frog was observed during construction activities at the Montanera Housing Project in Gateway Valley, adjacent to the Gateway Boulevard east off-ramp area of the Caldecott Tunnel project in the summer of 2006.

Several hydrologic features are present within the action area; two of which provide suitable California red-legged frog foraging, dispersal and refuge habitat, particularly during the wet season. These comprise a seasonal drainage ditch dominated by broadleaf cattail (*Typha latifolia*) adjacent to the drainage inlet at Location 1, and a willow-scrub wetland dominated by shining willow (*Salix lucida* ssp. *lasiandra*) located adjacent to the proposed staging area east of Location 1 (Caltrans 2011). As evaluated by Caltrans (2011), these wetland features lack sufficient standing water, cover and food resources to support breeding; however, California red-legged frogs may forage, disperse or seek refuge in these area, particularly during the wet season. Siesta Valley Creek flows eastward along SR-24 toward its confluence with San Pablo Creek near Camino Pablo in the City of Orinda; however, the reach of creek that passes through the action area is undergrounded and does not provide functional habitat for California red-legged frogs. Numerous other earthen stormwater drainage features run through the eucalyptus grove near Location 2 that convey water into the stormwater drains along SR-24 during rain events; otherwise these features do not exhibit a defined bed, bank or other aquatic characteristics.

The nearest potential breeding habitat is located in natural portions of Siesta Valley Creek approximately 0.2-mile to the northwest, two ponds 0.6-mile to the southwest and San Pablo Creek 1.0-mile to the northeast. Breeding has not been reported from these locations; however, this may be a function of a lack of survey effort and not an indication of species absence from these locations. If California red-legged frogs were to breed at these sites, they could reasonably disperse into or through the action area, since this is within the maximum dispersal range of the species. Based on studies that indicate California red-legged frogs occasionally move (e.g., migrate or disperse) with little regard to topography or habitat type, all upland habitat between these sites is considered suitable upland and dispersal habitat inclusive of the entire action area. Although SR-24 presents a significant barrier to overland movement to California red-legged frogs, underpasses and riparian corridors such as San Pablo Creek provide a means for California red-legged frogs to disperse to habitats north or south of SR-24. No other barriers exist that would prevent California red-legged frogs from reaching the action area from the nearest reported occurrences or other areas of potential breeding habitat. Upland habitat within the action area comprises non-native annual grassland and northern coyote brush scrub. Based on the presence of wetlands within the action area, it is reasonable to conclude that California red-legged frogs may also use upland habitats within the action area.

Based on reported occurrences less than 0.8-mile from the project footprint, connectivity to occupied habitats to the north and southeast, and the presence of non-breeding aquatic, upland and dispersal habitat within the action area, the Service has determined there is a reasonable potential for California red-legged frogs to inhabit or disperse through the action area

Alameda Whipsnake

Listing Status: The Alameda whipsnake was federally listed as a threatened species on December 5, 1997 (62 FR 64306). A draft recovery plan was published in November 2002 (Service 2002b).

Description: The Alameda whipsnake is described as a slender, fast-moving, diurnal snake with a narrow neck and a relatively broad head with large eyes. The dorsal surface is colored sooty black with a distinct yellow-orange stripe down each side. The anterior portion of the ventral surface is orange-rufus colored, the midsection is cream colored, while the posterior and tail are pinkish. Adults range in length from 3 to 4 feet. The Alameda whipsnake is one of two subspecies of the California whipsnake (*Masticophis lateralis*). The Alameda whipsnake

(*M. l. euryxanthus*) is distinguished from the chaparral whipsnake (*M. l. lateralis*) by its sooty black dorsum, by wider lateral yellow-orange stripes, lack of a dark line across the rostral, uninterrupted light stripe between the rostral and eye, and virtual absence of spotting on the venter of the head and neck.

Distribution: Riemer (1954) described the Alameda whipsnake subspecies based on eight morphological differences (all color characters) observed between six specimens of *Masticophis lateralis* collected near the City of Berkeley, the City of Alamo, Somersville (Black Diamond Mines Regional Preserve), and near Mount Diablo in Alameda and Contra Costa counties, California and specimens collected throughout the rest of the range of the species, with possible intergrades (snakes exhibiting phenotypic characteristics of both subspecies) in southern Alameda County. None of the eight morphological differences used by Reimer (1954) to describe the Alameda whipsnake are diagnostic; that is, each of the eight morphological characters used to describe *M. l. euryxanthus* as a subspecies have been observed in *M. l. lateralis* specimens far removed from the San Francisco East Bay. In addition, interpreting some of the eight characters is ambiguous; for instance, distinguishing characteristic number three in Reimer (1954) states, "A light stripe between nostril and eye usually not interrupted by dark vertical lines along the margins of the loreal," characteristic number four states, "The lack, usually, of a dark line across the rostral, representing a connection between the supralabial stripes," and characteristic number seven, "A sooty black dorsal color. Melanistic individuals are, however, not uncommon throughout the range of the species." However, throughout much of Alameda and Contra Costa counties *M. lateralis* specimens exhibit five or more of the eight characters, particularly within the East Bay Hills (K. Swaim personnel communication 2011). There are no definitive geographic boundaries to the south that separate the Alameda whipsnake phenotype from the chaparral whipsnake phenotype. Rather, there appears to be a transition zone in southern and eastern Alameda, northern Santa Clara, and southwestern San Joaquin counties; whereby each of the eight phenotypic characteristics have been found to occur less frequently in specimens as one moves away from the East Bay Hills.

The current understanding of the Alameda whipsnake range suggests it is slightly larger than the ranges depicted by Reimer (1954) and Jennings (1983). The range of the Alameda whipsnake and phenotypic-intergrade specimens includes mosaics of chaparral, coastal scrub, and adjacent vegetation types throughout Contra Costa County, most of Alameda County, and small portions of northern Santa Clara and western San Joaquin counties. This range can be subdivided into five populations that correspond to relatively contiguous mosaics of chaparral and coastal scrub, grassland, oak woodland/savanna, and riparian vegetation types that are fragmented by urban development, transportation corridors, and a lack of coastal scrub and chaparral vegetation within the Tri-Valley. In addition to the Mount Diablo Area and northern Hamilton Range (for our purposes, the Hamilton Range refers to the portion of the Diablo Range south of Tri-Valley, north of Pacheco Pass, west of San Joaquin Valley, and east of Coyote Valley and San Francisco Bay) populations, three of the five populations are located within the East Bay Hills (for our purposes, the East Bay Hills refers to the area south of the Carquinez Strait, north of Sunol Valley, east of the San Francisco Bay, and west of Interstate Highway 680). The East Bay Hills are divided into thirds by two major east-west highways; California State Route 24 separates the northern from the central population and Interstate 580 separates the southern from the central population. Based on this, the draft recovery plan (Service 2002b) established draft recovery units (units 1 thru 5) to correspond to each of the five populations. In addition, two draft recovery units (units 6 and 7) were established to correspond to corridors that best provide habitat linkage between the five populations.

Life History: Adult Alameda whipsnakes have a bimodal seasonal activity pattern, with peaks during the spring mating season and a smaller peak during late summer and early fall (Swaim 1994). They generally retreat into winter hibernacula (the location chosen for hibernation) in November and emerge in March; however, short, above-ground activity such as basking in the immediate vicinity of the hibernaculum may occur during this time (Swaim 1994). Courtship and mating occur from late March through mid-June. During this time, males have been found to move throughout their home range and females have been found to remain at or near their hibernacula until mating is complete. One female was observed copulating with more than one male during a mating season, but the extent to which females mate with multiple males (polyandry) is unknown (Swaim 1994). Suspected egg-laying sites for two females in the Berkeley Hills in Alameda County were located in patches of grassland, within 10 to 20 feet of coastal scrub, and were also found within areas of low density scattered scrub intermixed with grassland. Three individuals monitored for nearly an entire activity season appeared to maintain stable home ranges (Swaim 1994). Movements of these individuals were multi-directional and individuals returned to specific areas and retreat sites after long intervals of non-use. Alameda whipsnakes have been found to have one or more core area (areas of concentrated use) within their home range, with large areas of the home range receiving little use.

Sperm is stored by the male over winter in the epididymides and vas deferens (Goldberg 1975). Copulation commences soon after emergence from winter hibernacula (Swaim 1994). Females begin yolk deposition in mid-April (Goldberg 1975), and intervals of 47, 50, and 55 days have been recorded between dates of first known mating and first egg laid (Hammerson 1978). Average clutch size was found to be 7.21 (range 6 to 11, n = 19), with a significant correlation between body size and clutch size (Goldberg 1975). Incubation lasts about 3 months and young appear in late summer and fall. Hatchlings have been observed or captured above ground from August through November (Hammerson 1978, Swaim 1994). Prey items have been detected in the stomachs of captured hatchlings during this period, indicating feeding may occur prior to winter hibernation (Swaim 1994). California whipsnakes (*Masticophis lateralis*) reach maturity in 2 to 3 years, with adults growing to nearly 5 feet. Based on a study of captive California whipsnakes, they may live for 8 years (Jennings 1994).

The Alameda whipsnake is a slender, fast-moving, diurnal snake with a broad head, large eyes, and slender neck. When hunting, it commonly moves with its head held high and occasionally moves it from side to side. Prey is seized with great speed, pinioned under loops of the body, and engulfed without constriction. The Alameda whipsnake is semi-arboreal and can escape into or hunt within shrubs or trees. They also seek shelter in rock piles or outcrops in small mammal burrows (Stebbins 2003, Swaim 1994) and in cracks that form in the ground as it dries (Swaim 1994). In a study of the thermal responses of Alameda whipsnakes held in captivity in an outdoor enclosure in Hayward, California, Hammerson (1979) found that these snakes maintained a relatively high active body temperature during the day, 91.4 to 93.4 degrees Fahrenheit (mean value, n = 4), compared to most other snake species. Shine (1980) hypothesized that the morphological and behavioral characteristics of diurnal and terrestrial activity, slender body form, long-tail, large eyes, high body temperature, and oviparity (egg laying) are adaptations that facilitate the pursuit and capture of fast-moving diurnal prey, usually lizards.

Lizards, especially the western fence lizard (*Sceloporus occidentalis*), appear to be important prey items (Stebbins 2003, Swaim 1994, H. Greene personnel communication 1998), although other prey items including frogs, snakes, small birds, small mammals, and insects have been reported to be eaten by California whipsnakes (Stebbins 2003). The western fence lizard is often

semi-terrestrial, occupying rocks, fallen trees or limbs, or man-made sites such as woodpiles, rock walls, houses, and wooden fence posts, but it is also semi-arboreal in many parts of its range. Western skinks (*Eumeces skiltonianus*) and alligator lizards (*Elgaria* spps.), other lizard species in the range of the Alameda whipsnake, exhibited defense techniques that allowed for escape from whipsnake in experimental enclosures (Swaim 1994).

In a dietary study of captive hatchling Alameda whipsnakes, hatchlings consistently consumed lizard prey, the only other items consumed during the study were a single Pacific treefrog (*Pseudacris regilla*) and a single slender salamander (*Batrachoseps attenuatus*); all other trials with amphibians, sharp-tailed snakes, newborn mice, and insects presented as potential prey resulted in various non-feeding responses (Swaim 1994). Stomach contents of field-captured Alameda whipsnakes were exclusively lizards and included western fence lizards and western skink (Swaim 1994). Stomach contents of museum specimens were almost exclusively lizards (H. Greene personnel communication 1998). However, despite widespread abundance of western fence lizards (abundant at 21 of 22 study sites), their occurrence alone did appear to account for the presence of Alameda whipsnakes (Swaim 1994). Several of the sites where Alameda whipsnakes were not captured had the highest abundance of western fence lizards during the study. Although considered a lizard specialist, an Alameda whipsnake was observed consuming a lesser goldfinch (*Carduelis psaltria*) 16.4 feet above the ground in a coast live oak at Mount Diablo State Park (Shafer and Hein 2005).

Habitat Requirements: Alameda whipsnakes are typically associated with small to large patches of chaparral or coastal scrub vegetation, interspersed with other native vegetation types and rock lands (areas containing large percentage of rocks, rocky features, and/or rock-bearing soil types). Based on a radio telemetry study of five Alameda whipsnakes (3 males and 2 females) at Tilden Regional Park and a single male at Moller Ranch near the City of Pleasanton, Swaim (1994) found home ranges were centered around coastal scrub vegetation; however, Alameda whipsnakes were also observed using adjacent vegetation types, including grassland, oak savanna, and oak-bay woodland up to 500 feet from coastal scrub and chaparral. In that study, male home ranges varied from 4.7 to 21.5 acres (n = 4), and showed a high degree of spatial overlap and female home ranges (n = 2) averaged 8.4 acres. Swaim (1994) documented use of all slope aspects and brush community canopy closures by Alameda whipsnakes. However, Swaim (1994) found core areas (areas of concentrated use) to be on south- , southwest- , southeast-, east- or northeast-facing slopes at both Tilden Regional Park and Moller Ranch. Alameda whipsnakes usually had more than one core area, separated by more northerly aspects. Northerly aspects were used on a regular basis to move between core areas (Swaim 1994). The near exclusive use of southerly aspects for everything except movement at Tilden Regional Park is likely accentuated by its relatively cool and fog influenced climate, compared to sites outside the fog belt and farther away from the San Francisco Bay. At Moller Ranch, which is relatively warmer than Tilden Regional Park, the radio-marked Alameda whipsnake used level ground and east-facing slopes (Swaim 1994). Selection for southerly and easterly aspects is likely related not only to consistently warmer temperatures; it also is related to the availability of morning sun which promotes emergence earlier in the day and maximizes the activity period for foraging, mate finding and digestion. Eleven of 12 study sites without Alameda whipsnake captures contained mostly closed canopy coyote brush; however, 11 of the 12 study sites without Alameda whipsnake captures also lacked rock outcrops (Swaim 1994).

Chaparral and coastal scrub vegetation serve as the center of home ranges, provide for concealment from predators, and foraging opportunities. Core areas have been found to center around patches of coastal scrub or chaparral as small 0.5-acre embedded within a mosaic of other

dominant vegetation types. Although Swaim (1994) found this species remained within approximately 500 feet of coastal scrub and chaparral vegetation, many verified and measurable observations have been made beyond 500 feet from these vegetation types (Swaim 2003). Alvarez et al. (2005) compiled free-ranging Alameda whipsnake occurrence records and reported that 37 of 119 records were greater than 100 meters (330 feet) from and in a variety of vegetation types other than chaparral or coastal scrub, including annual grassland (n = 17), mixed evergreen forest (n = 1), oak savannah (n = 1), oak woodland (n = 12), and riparian (n = 6). Alvarez et al. (2005) also found that 27 of the 37 occurrence records were greater than 660 feet from the nearest patch of coastal scrub or chaparral, with the farthest being 4.5 miles.

Often times found embedded within coastal scrub and chaparral core areas and in adjacent vegetation types used by Alameda whipsnakes are rock outcrops or talus. Small rodent burrows are important retreats, and brush piles and deep soil crevices can also serve as important habitat features (Swaim 1994). These habitat features are essential for normal behaviors such as breeding, reproduction, and foraging, because they provide refuge from predators, egg-laying sites, thermal cover, shelter, winter hibernacula, and increased numbers of foraging opportunities (Swaim 1994).

Threats: Urban development has fragmented the originally continuous range of the Alameda whipsnake into five primary populations. These populations include (1) Sobrante Ridge, Tilden/Wildcat Regional Parks to the Briones Hills, in Contra Costa County (Tilden-Briones population); (2) Oakland Hills, Anthony Chabot area to Las Trampas Ridge, in Contra Costa County (Oakland-Las Trampas population); (3) Hayward Hills, Palomares area to Pleasanton Ridge, in Alameda County (Hayward-Pleasanton Ridge population); (4) Mount Diablo vicinity and the Black Hills, in Contra Costa County (Mount Diablo-Black Hills population); and (5) Wauhab Ridge, Del Valle area to the Cedar Mountain Ridge, in (Sunol-Cedar Mountain population). However, additional, yet undiscovered populations may also exit.

Fragmentation of habitat throughout the range of the Alameda whipsnake, presently allows for little or no genetic exchange to occur between the five corps populations. Interchange between Alameda whipsnakes in the Tilden-Briones, Oakland-Las Trampas, and Hayward-Pleasanton Ridge populations depends on dispersal over the Caldecott Tunnel in Contra Costa County and under the Highway 580 in Alameda County at the Eden Canyon interchange, the Dublin Boulevard undercrossing, or where San Lorenzo Creek passes under the highway. Interchange between the Hayward-Pleasanton Ridge and Sunol-Cedar Mountain populations depends on dispersal along Alameda Creek in Alameda County and crossing under I-680 where the creek passes under the highway, or crossing under the highway at Scott's Corner along Vallecitos Creek, or where two unnamed tributaries to Arroyo de la Laguna cross under I-680 north of Scott's Corner. The Mount Diablo-Black Hills population has no path for dispersal to any of the other populations.

The past and ongoing fragmentation of Alameda whipsnake habitat makes some populations of this species more vulnerable to extinction. Habitat patches with high ratios of edge to interior are known to provide less value for some species than round or square patches provide (Jimerson and Hoover 1991; Saunders et al. 1991). In fragmented habitats, species most prone to extinction are those that depend on native vegetation, require combinations of different habitat types, require large territories, and exist at low densities (Saunders et al. 1991). Alameda whipsnakes have been shown to be associated with native Diablan sage scrub, to forage in adjacent grasslands, and to migrate long distances along riparian corridors and over upland habitat. Few individuals have been captured during trapping studies conducted over thousands

of trap days, indicating that Alameda whipsnakes may be sparse even in suitable habitat (Swaim 1994). These factors may combine to cause Alameda whipsnakes to be vulnerable to extinction in small habitat patches resulting from habitat fragmentation.

Chaparral and coastal scrub ecosystems are comprised of plant species that are most often shade intolerant. Non-native trees, specifically blue gum eucalyptus, Monterey pine, and Monterey cypress, were planted by the millions between 1880 and 1920 in the East Bay Hills to replace harvested coast redwoods and for potential future lumber profits that were never realized. Shrub-form non-native invasive species, such as French broom, are also capable of colonizing disturbed coastal scrub and chaparral in Alameda and Contra Costa Counties. The ability of non-native trees and shrubs to colonize chaparral, coastal scrub, and grassland ecosystems has led to inhibited growth of native plants, vegetation type conversion, changes in microclimates and soil chemistry, increased sediment mobilization, increased fuel loads, and an overall reduction in habitat quality and quantity of core habitat and peripheral dispersal and foraging habitat. For example, radiotelemetry data indicate that Alameda whipsnakes tend to avoid dense stands of eucalyptus (Swaim 1994). Non-native invasive plant species represent a substantial threat to the habitat of the Alameda whipsnake.

When the Alameda whipsnake was listed, succession of coastal scrub or chaparral to other native vegetation types was not cited as threat to the species. Succession of core Alameda whipsnake habitat, from coastal scrub and chaparral to other native vegetation types, is occurring. It is hypothesized this succession is due to the removal of disturbance regimes. This threat is greatest on more mesic sites where fire and grazing have been removed, primarily sites within the fog belt in the East Bay Hills. However, the rate of succession and the possibility of a net loss in coastal scrub or chaparral that has or is likely to occur are unknown at this time. Mosaics of grassland, oak woodland, coastal scrub, and chaparral, in some locations, have been reported to correlate with geological substrate (Cole 1980) and soil characteristics (Harison et al. 1971). However, Callaway and Davis (1993) found each of these vegetation types represented abundantly on most soil depths, slope aspects, and all geological substrates. Cyclical changes between chaparral, oak woodland, grassland, and coastal scrub do occur. The interactions between variables responsible for vegetation type conversion and the rate of conversion are complex and site specific. Callaway and Davis (1993) found that transition rate and direction varied with substrate and topographic position, indicating fire, grazing, and the physical environment interacted to determine direction and rate of transition. They also found that grazing may slow the rates at which community types may replace each other, but, unlike fire, grazing does not appear to alter the direction of succession. Scheidlinger and Zedler (1980) also documented relatively high transition rates for grassland conversion to shrubland, shrubland conversion to oak woodland, and oak woodland to grassland. Variation in transition on different substrates suggests that only portions of the vegetation on the landscape may be dynamic, with some patches in certain combinations of environment and disturbance that change rapidly, and other patches that remain static as edaphic or topographic climax communities. As a generalization, in the absence of disturbance and on sites with environmental factors that allow for transition from one vegetation type to another, grasslands tend to transition to coastal scrub, coastal scrub to chaparral or oak woodland, chaparral to oak woodland, and oak woodland to grassland (Callaway and Davis 1993). Although stands of coastal scrub and chaparral are succeeding to other vegetation types, it is also true that grasslands are succeeding to coastal scrub in the San Francisco East Bay. The effect of succession represents a moderate threat to the Alameda whipsnake and warrants further research.

At the time of listing we determined excessive livestock grazing or in appropriate grazing regimes represented a threat to the species. Because Alameda whipsnakes forage in grasslands between stands of scrub, livestock grazing that significantly reduces or eliminates plant cover in these grasslands could lead to an increased loss of Alameda whipsnakes and their prey to predation (Service 1997). However, we also indicated that livestock grazing, if appropriately managed, could benefit the Alameda whipsnake. At this time, incompatible grazing practices, such as overgrazing or bulldozing and burning to prepare lands for grazing, that results in significant and long-term losses of scrub vegetation or a loss of hiding cover represent a moderate threat to the species. Overgrazing may also negatively affect Alameda whipsnakes by damaging the rodent burrows these snakes use for cover. Grazing animals can also act as vectors for non-native invasive plant species and increase the invasive abilities of non-native plants through the removal of native vegetation and ground disturbance. However, through appropriate timing and stocking levels, grazing can be used to target and control some non-native invasive plant species.

We defined the threats of loss and fragmentation of habitat as a result of road and trail construction at the time we listed the Alameda whipsnake (62 FR 64306). Roads can impede gene flow and recolonization. Networks of roads and trails can fragment habitat, reduce patch size, and increase the ratio of edge to interior. Road variables that potentially affect wildlife, both directly and indirectly, include size, substrate, age, accessibility, and density (Andrews et al. 2008). The potential environmental effects of roads on wildlife include pollutants, noise, light, invasive species, and human access (Andrews et al. 2008). In addition, snakes are particularly vulnerable to motor vehicle mortality associated with roads due to their propensity to thermoregulate on road surfaces and intentional killing by humans when observed on road surfaces. Road placement within the surrounding landscape is possibly the most important factor determining the severity of road impacts because it influences roadkill locations and the rate of mortality.

Although the presence of hiking and biking trails do not result in motor vehicle associated mortality of Alameda whipsnakes, heavily trafficked and high density hiking and bicycling trails can result in harassment or harm by causing snakes to flee and hide when humans are present, thus reducing the overall quality and quantity of habitat. Alameda whipsnakes can also be killed or injured from collisions with cyclists.

In addition to the general effects of roads on the Alameda whipsnake, off-highway vehicles (OHV) continually damage and destroy large patches of habitat and generate high levels of noise that can cause animals to change their behavior (Beauchamp et al. 1998) or result in hearing damage (Brattstrom and Bondello 1983). An approximately 5,000 acre OHV park, Carnegie State Vehicular Recreation Area, is located in eastern Alameda and western San Joaquin counties, within draft recovery unit 5. Alameda whipsnakes are known to inhabit this OHV park. Although this area is no longer susceptible to urban development, Alameda whipsnakes are likely killed, injured, harmed, and harassed as a result of OHV activities at the site. The continual effects of OHV activities could act as a sink and thus represent a threat to the Alameda whipsnake.

Global climate change increases the frequency of extreme weather events, such as heat waves, droughts, and storms (Intergovernmental Panel on Climate Change 2007). Extreme events, in turn, may cause mass mortality of individuals and significantly contribute to determining which species will remain or occur in natural habitats. As the global climate warms, terrestrial habitats are moving northward and upward, but in the future, range contractions are more likely than

simple northward or upslope shifts. Since climate change threatens to disrupt annual weather patterns, it may result in a loss of habitats and/or prey. Where populations are isolated, a changing climate may result in local extinction, with range shifts precluded by lack of habitat.

Status of the Species: The East Bay Hills include Alameda whipsnake draft recovery units 1, 2, 3, 6, and 7 and Critical Habitat Units 1, 2, 3, and 6. In addition to the fragmentation caused by transportation corridors, the East Bay Hills have experienced substantial losses of coastal scrub and chaparral vegetation from urban development that expanded into these vegetation types from lower elevation valleys and coastal cities. In effect, the East Bay Hills are virtually surrounded by urban development and major transportation corridors. The historic loss of habitat, encroaching urban development pressures from virtually all sides, and the highly fragmented state of the East Bay Hills were major factors leading to the listing of the Alameda whipsnake. Development pressure along much of the western-flank of the East Bay Hills has been reduced through the exhaustion of developable land in conjunction with the establishment of East Bay Regional Park District (EBRPD) parks, East Bay Municipal Utility District (EBMUD) watersheds, and other public lands. However, much of the East Bay Hills remain vulnerable to development. Development pressure in the East Bay Hills is often at the periphery and not from within, except along transportation routes (i.e., California State Routes 24 and 4 and Interstate Highway 580).

Over two thirds of draft recovery unit 1 is currently not susceptible to urban development due to ownership by EBRPD, EBMUD, Muir Heritage Land Trust, University of California, Berkeley, City of Pinole, and U.S. National Park Service. These lands are relatively contiguous and provide expansive mosaics of chaparral and coastal scrub vegetation, grasslands, oak woodlands, and oak savannah. However, the northeastern quarter of this unit, adjacent to the City of Martinez, and numerous undeveloped parcels along the northwestern and southeastern border remain unprotected and will likely experience some degree of urban development in the foreseeable future if not preserved.

Draft recovery unit 6, designated to provide a habitat linkage between draft recovery units 1 and 2, currently provides an approximately 0.4 mile wide corridor over State Route 24 at the Caldecott Tunnel. However, a moderate amount of development has occurred on the western side of the unit, near the narrowest portion of corridor. Approximately half of the corridor remains in private ownership and is vulnerable to development. An Alameda whipsnake was observed approximately 500 feet from the narrowest portion of the corridor in 2007 and seven additional occurrences have been recorded in draft recovery unit 6 (CNDDB 2011), suggesting the corridor actively facilitates gene flow between draft recovery units 1 and 2. Aside from draft recovery unit 6, no other habitat linkages exist between draft recovery units 1 and 2. Loss of connectivity between the northern and southern portions of draft recovery unit 6 represents a substantial threat to the species in the East Bay Hills.

A little over one-third of draft recovery unit 2 and almost the entirety of the western border of this unit is in public ownership. However, significant development pressure continues from the north, southwest, and east. Although the amount and extent of coastal scrub and chaparral habitat is lowest in the southwestern portion of the unit, there are important patches that may act as "stepping stones" between draft recovery units 2 and 3. The northern portion of the unit contains large blocks of high quality Alameda whipsnake habitat, but is highly fragmented from urbanization and the long-term ability of the Alameda whipsnake to occupy these fragments is questionable. For example, despite thorough trapping efforts, no Alameda whipsnakes were captured at Lafayette Reservoir Recreational Area, a 927 acre parcel owned by EBMUD with

approximately 202 acres of coastal scrub vegetation almost entirely surrounded by urban development (Swaim 2000). Separating the southern border of draft recovery unit 2 and the northern border of draft recovery unit 3 is Interstate Highway 580. Few, if any, highway crossings across Interstate Highway 580 exist and development pressures associated with cities along this major transportation corridor are high. It is likely significant development will occur along the southern boundary of this unit, if not protected, further decreasing the already hindered dispersal potential between draft recovery units 2 and 3.

Approximately one third of draft recovery unit 3 is owned by EBRPD. However, very few of these EBRPD-owned parcels are contiguous, nor are they located adjacent to urban development; thus; they, provide little protection from development pressures associated with adjacent urban areas and transportation corridors. Large scale development along Niles Canyon Road, the southern boundary of this unit, is unlikely at this time, due to the steepness of the hillsides and associated costs of development. However, small scale development is a current threat and future large scale development may become economically feasible upon the exhaustion of other lands.

Draft recovery unit 7 was designated to provide habitat linkage between recovery draft recovery units 3 and 5, across Interstate Highway 680. More than three quarters of this unit is in public ownership; San Francisco Public Utilities Commission is the largest landowner and EBRPD owns several parcels in the western portion of the unit. Coastal scrub and chaparral vegetation is primarily concentrated along the northern border of the unit; just south of Niles Canyon Road. Habitat fragmentation in draft recovery unit 7 is primarily concentrated around Sunol Valley. Sunol Valley has been fragmented by Interstate Highway 680, the development of a golf course, a quarry, a commercial nursery, and urban development. Despite the development and corresponding fragmentation in Sunol Valley, the Alameda Creek riparian corridor, which runs under Niles Canyon Road, through Sunol Valley, and under Interstate Highway 680, is arguably the shortest link between patches of coastal scrub and chaparral vegetation in draft recovery units 3 and 5 and most likely to facilitate successful dispersal between the two units. Further development in this area represents a substantial threat to gene flow between the populations in the East Bay Hills and populations in the northern Hamilton Range.

Environmental Baseline

The action area is located within the Caldecott Tunnel Corridor Recovery Unit (Unit 6), which connects the Tilden-Briones and the Oakland-Las Trampas populations (Service 2002b). This unit is bisected by SR-24 and is an important link between Recovery Unit 1 to the north and Recovery Unit 2 to the south. This corridor includes open space lands owned by the University of California, Berkeley; Lawrence Berkeley National Laboratory (within the University lands); East Bay Regional Park District's Claremont Canyon Regional Park, Sibley Volcanic Preserve, and Huckleberry Botanic Preserve; and East Bay Municipal Utility District's Siesta Valley Watershed and Gateway Watershed. However, private lands in the Caldecott Tunnel area provide essential connectivity within this Recovery Unit. The recovery plan recommends landowners within Unit 6 implement plans to address human activity impacts including the encroachment of native plants into chaparral/scrub habitats, increased predation, and fuels management. The recovery plan states that the Federal Highway Administration and Caltrans should participate in a region-wide planning process to address the cumulative effects of their highway projects.

According to the biological assessment (Caltrans 2011), the project is located within the known range of the Alameda whipsnake. Caltrans staff conducted two site visits on August 6, 2009 and January 13, 2011, to evaluate habitat suitability within the action area. No Alameda whipsnakes

were observed during these site visits; however, focused Alameda whipsnake surveys were not conducted in support of this proposed action. On November 5, 2007, a Caltrans biologist observed and photographed an individual Alameda whipsnake 0.6-mile west of the action area within the proposed construction area of the soil nail wall east of the Fish Ranch Road Offramp Eastbound on SR-24 project (Service File No.: 81420-2008-F-0291). The CNDDB (CDFG 2011) identifies 21 reported occurrences within five miles of the action area. Three of which are less than one-mile from the action area and north of SR-24, which date from 1990 to 2001 as reported from direct observation, roadkill and trapping studies. South of SR-24 three occurrences have been reported within 2.5 miles of the action area dating from 1990 to 2006 (CDFG 2011). No barriers exist between these occurrences and the action area and a suitable mosaic of habitat types are present between locations; therefore, it is reasonable that Alameda whipsnakes could move into the action area from the locations of these occurrences. Suitable habitat is present with the action area within the non-native annual grassland and coyote brush scrub.

Based on the documented observation of this species less than one-mile from the action area, connectivity to occupied habitats to the north and south of SR-24, occurrence of suitable non-native annual grassland and coyote brush scrub habitat within the action area, and the biology and ecology of the species, the Service has determined there is a reasonable potential for Alameda whipsnakes to inhabit, forage, seek refuge or disperse through the action area.

Alameda Whipsnake Critical Habitat

Critical habitat is defined in Section 3 of the Act as: (1) The specific areas within the geographical area occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features (a) essential to the conservation of the species and (b) that may require special management considerations or protection; and (2) specific areas outside the geographical area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species. In determining which areas to designate as critical habitat, the Service considers those physical and biological features that are essential to a species' conservation and that may require special management considerations or protection (50 CFR 424.12(b)). The Service is required to list the known primary constituent elements together with the critical habitat description. Such physical and biological features include, but are not limited to, the following:

1. Space for individual and population growth, and for normal behavior;
2. Food, water, air, light, minerals, or other nutritional or physiological requirements;
3. Cover or shelter;
4. Sites for breeding, reproduction, rearing of offspring, or dispersal; and
5. Generally, habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of a species.

Critical habitat was designated for this species on October 3, 2000 (65 FR 58933). The final rule was vacated and remanded on May 9, 2003, and was re-proposed on October 18, 2005 (70 FR 60608). A final rule on revised critical habitat was issued on October 2, 2006 (71 FR 58176) and designates approximately154,834 acres within 6 critical habitat units in Alameda, Contra Costa, Santa Clara, and San Joaquin Counties, California.

The primary constituent elements for the Alameda whipsnake are based on our current knowledge of the life history, biology, and ecology of the species and the relationship of its essential life history functions to its habitat, we have determined that the Alameda whipsnake requires the following primary constituent elements: (1) Scrub/shrub communities with a mosaic of open and closed canopy; (2) Woodland or annual grassland plant communities contiguous to lands containing PCE 1; and (3) Lands containing rock outcrops, talus, and small mammal burrows within or adjacent to PCE 1 and or PCE 2.

1. *Primary Constituent Element 1*: Scrub/shrub communities with a mosaic of open and closed canopy. Scrub/shrub vegetation dominated by low-to medium-stature woody shrubs with a mosaic of open and closed canopy as characterized by the chamise, chamise-eastwood manzanita, chaparral whitethorn, and interior live oak shrub vegetation series as identified in the *Manual of California Vegetation* (Sawyer and Keeler-Wolf 1995), *A Guide to Wildlife Habitats of California* (Mayer and Laudenslayer 1988), and *California Wildlife Habitat Relationship System* (CDFG 1998); occurring at elevations from sea level to approximately 3,850 feet. Such scrub/shrub vegetation within these series forms a pattern of open and closed canopy used by the Alameda whipsnake for shelter from predators; temperature regulation, because it provides sunny and shady locations; prey-viewing opportunities; and nesting habitat and substrate. These features contribute to support a prey base consisting of western fence lizards and other prey species such as skinks, frogs, snakes, and birds.

2. *Primary Constituent Element 2*: Woodland or annual grassland plant communities contiguous to lands containing PCE 1. Elements of PCE 2 comprise woodland or annual grassland vegetation series comprised of one or more of the following: blue oak, coast live oak, California bay, California buckeye, and California annual grassland vegetation series as identified in the *Manual of California Vegetation* (Sawyer and Keeler-Wolf 1995), *A Guide to Wildlife Habitats of California* (Mayer and Laudenslayer 1988), and *California Wildlife Habitat Relationship System* (CDFG 1998). This mosaic of vegetation is essential to the conservation of the Alameda whipsnake because it supports a prey base consisting of western fence lizards and other prey species such as skinks, frogs, snakes, and birds, and provides opportunities for: (1) foraging by allowing snakes to come in contact with and visualize, track, and capture prey (especially western fence lizards along with other prey such as skinks, frogs, birds); (2) short and long distance dispersal within, between, or to adjacent areas containing essential features (i.e., PCE 1 or PCE 3); and (3) contact with other Alameda whipsnakes for mating and reproduction.

3. *Primary Constituent Element 3*: Lands containing rock outcrops, talus, and small mammal burrows within or adjacent to PCE 1 and or PCE 2. These areas are essential to the conservation of the Alameda whipsnake because they are used for retreats (shelter), hibernacula, foraging, and dispersal, and provide additional prey population support functions.

With the designation of critical habitat, the Service intends to conserve the physical and biological features that are essential to the conservation of the species, through the identification of the appropriate quantity and spatial arrangement of the primary constituent elements sufficient to support the life-history functions of the species. Because not all life-history functions require all the primary constituent elements, not all areas designated as critical habitat will contain all the primary constituent elements. Please refer to 71 FR 58176 for additional information on Alameda whipsnake critical habitat.

Environmental Baseline

Location 2 and the eastern half of the access road off of westbound SR-24 are located within designated critical habitat, Caldecott Tunnel Unit (Unit 6). Location 1 and the proposed southern staging area are located outside of designated critical habitat. This unit comprises approximately 4,151 acres; the portion within the action area and subject to ground disturbance totals approximately 6.55 acres, which represents approximately one-hundredth of one percent of the total unit acreage. This unit is essential to the conservation of the species because it provides connectivity between units 1 and 2. Critical habitat within the action area contains only PCE 2 (woodland or annual grassland plant communities contiguous to lands containing PCE 1). The portion of the 6.55 acres of critical habitat within the action area subject to ground disturbance is 0.53-acre and comprises the entire slide area to be repaired.

Effects of the Action

California Red-legged Frog

The proposed action will likely adversely affect the threatened California red-legged frog by harming or harassing adults and dispersing juveniles inhabiting or transiting areas of suitable non-breeding aquatic and upland foraging and refugia, and dispersal habitat; temporarily disrupting normal behaviors; and/or temporarily altering and removing areas of suitable habitat. The project as proposed in the biological assessment (Caltrans 2011) and in the project description of this biological opinion encompasses an area of 25.9 acres, and would result in the permanent removal of 0.53-acre of upland and dispersal habitat; and temporary disturbance to 0.50-acre of upland and dispersal habitat.

The Service defines temporary and permanent effects as areas denuded, manipulated, or otherwise modified from their pre-project conditions, thereby removing one or more essential components of a listed species' habitat as a result of project activities that include, but are not limited to, construction, staging, storage, lay down, vehicle access, parking, etc. Temporary effects are limited to no more than two consecutive seasons and at a minimum, are fully restored to baseline habitat values or better within one year following initial disturbance. Permanent effects are not temporally limited and include all effects not fulfilling the criteria for temporary effects. Areas subject to ongoing operations and maintenance also are considered permanent.

Project effects will be minimized by Caltrans by reducing the project footprint to the minimum area necessary to complete project and avoiding the wetland features within the action area. Aspects of the proposed action most likely to affect the California red-legged frog are confined to the construction phase. Spatial and temporal loss of habitat will result from the removal and/or disturbance of vegetation within the project footprint comprising upland and dispersal habitat adjacent to SR-24. Construction noise, vibration, and increased human activity during the construction phase of the project may interfere with normal behaviors – feeding, sheltering, daily/seasonal movement/dispersal, and other essential frog behaviors – resulting in avoidance of areas that have suitable habitat but intolerable levels of disturbance. Caltrans proposes to minimize these effects by locating construction staging, storage and parking areas outside of sensitive habitat; clearly marking construction work boundaries with high-visibility ESA fencing; performing worker environmental training for all on-site construction personnel; conducting preconstruction surveys and environmental monitoring during revegetation removal and construction activities within or adjacent to suitable California red-legged frog habitat;

minimizing the spread of invasive species; and revegetating all unpaved areas disturbed by project activities with native vegetation characteristic of the habitats within the action area.

There is a risk of California red-legged frogs becoming injured or killed by construction activities due to vegetation removal, operation of construction equipment, trampling, and general construction activities. Preconstruction surveys and biological monitoring will minimize the risk of injury or mortality; however, capturing and handling frogs may result in inadvertent injury during handling, containment, and transport if relocation is determined to be necessary during project construction. Caltrans proposes to minimize these effects by using qualified Service-approved biologists, limiting the duration of handling, and relocating frogs to suitable nearby habitat in accordance with Service guidance.

The amount of take resulting from construction activities and the removal of habitat will be partially minimized by installing wildlife exclusion fencing to deter California red-legged frogs from wandering onto the construction site; educating workers about their presence, their habitat, identification, regulatory laws, and avoidance and minimization measures; and requiring a Service-approved biologist to be present to monitor project activities during construction.

Alameda Whipsnake

The proposed action will likely adversely affect the threatened Alameda whipsnake by harming or harassing adults and subadults inhabiting, foraging, seeking refuge or dispersing through the action area; temporarily disrupting normal behaviors; and/or temporarily altering and removing areas of suitable habitat. The project as proposed in the biological assessment (Caltrans 2011) and in the project description of this biological opinion encompasses an area of 25.9 acres, and would result in the permanent removal of 0.53-acre and temporary disturbance to 0.50-acre of suitable Alameda whipsnake habitat.

The Service defines temporary and permanent effects as areas denuded, manipulated, or otherwise modified from their pre-project conditions, thereby removing one or more essential components of a listed species' habitat as a result of project activities that include, but are not limited to, construction, staging, storage, lay down, vehicle access, parking, etc. Temporary effects are limited to no more than two consecutive seasons and at a minimum, are fully restored to baseline habitat values or better within one year following initial disturbance. Permanent effects are not temporally limited and include all effects not fulfilling the criteria for temporary effects. Areas subject to ongoing operations and maintenance also are considered permanent.

Project effects will be minimized by Caltrans by reducing the project footprint to the minimum area necessary to complete project and avoiding adjacent scrub/shrub habitats and areas supporting ground squirrel colonies, i.e. extensive burrow networks that provide good refugia habitat for Alameda whipsnakes. Aspects of the proposed action most likely to affect the Alameda whipsnake are confined to the construction phase. Spatial and temporal loss of habitat will result from the removal and/or disturbance of vegetation within Location 2. Construction noise, vibration, and increased human activity during the construction phase of the project may interfere with normal behaviors – finding prey, sheltering, thermoregulation, daily/seasonal movement/dispersal, and other essential snake behaviors – resulting in avoidance of areas that have suitable habitat but intolerable levels of disturbance. Caltrans proposes to minimize these effects by locating construction staging, storage and parking areas outside of sensitive habitat; clearly marking construction work boundaries with high-visibility ESA fencing; installing and maintaining WEF throughout the project duration; performing worker environmental training for all on-site construction personnel; conducting preconstruction surveys and environmental

monitoring during revegetation removal and construction activities within or adjacent to suitable Alameda whipsnake habitat; minimizing the spread of invasive species; and revegetating all unpaved areas disturbed by project activities with native vegetation characteristic of the habitats within the action area.

There is a risk of Alameda whipsnakes becoming injured or killed by construction activities due to vegetation removal, operation of construction equipment, trampling, and general construction activities. The amount of take resulting from construction activities and the removal of habitat will be partially minimized by installing wildlife exclusion fencing to deter Alameda whipsnakes from wandering onto the construction site; educating workers about their presence, their habitat, identification, regulatory laws, and avoidance and minimization measures; conducting preconstruction surveys; and requiring a Service-approved biologist to be present to monitor project activities during construction.

Alameda Whipsnake Critical Habitat

The proposed action will not result in the permanent removal or conversion of habitat; however it will result in the temporal loss of 0.53-acre of habitat (PCE 2) within the slide repair area (Location 2), which may take several seasons to revert to suitable habitat with ecologically functioning PCE's. For these reasons, the effects to this location are considered permanent, i.e. Alameda whipsnakes are unlikely to use this area due to a temporal decrease, absence or availability of prey, refugia, hibernacula or dispersal habitat characteristics. All permanent effects to critical habitat are confined to Location 2 on the north side of SR-24. Caltrans has minimized effects to critical habitat by incorporating design modifications that avoid or minimize disturbance or loss of designated critical habitat containing PCE's. The permanent effects to 0.53-acre supporting PCE 2 will not appreciably diminish the overall value or function of Caldecott Tunnel Unit (Unit 6), since the area will repair a slide area and will ultimately repair damage to habitat, thereby preventing further slide activity in this area.

Cumulative Effects

Cumulative effects include the effects of future State, Tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

The Service is not aware of any projects currently planned for the area surrounding the proposed action that have not been evaluated separately under the authority of the Act. However, numerous activities within this urbanized setting that could negatively affect California red-legged frogs in and near the action area as a result of private or public sector actions that may occur without consultation with or authorization by the Service.

The global average temperature has risen by approximately 0.6 degrees Celsius during the 20th Century (International Panel on Climate Change 2001, 2007; Adger et al 2007). There is an international scientific consensus that most of the warming observed has been caused by human activities (International Panel on Climate Change 2001, 2007; Adger *et al.* 2007), and that it is "very likely" that it is largely due to manmade emissions of carbon dioxide and other greenhouse gases (Adger *et al.* 2007). Ongoing climate change (Anonymous 2007; Inkley *et al.* 2004; Adger *et al.* 2007; Kanter 2007) likely imperils several listed species including the California red-legged frog, San Francisco garter snake and the resources necessary for their survival. Since

climate change threatens to disrupt annual weather patterns, it may result in a loss of their habitats and/or prey, and/or increased numbers of their predators, parasites, and diseases. Where populations are isolated, a changing climate may result in local extinction, with range shifts precluded by lack of habitat.

Conclusion

After reviewing the current status of the California red-legged frog and Alameda whipsnake; the environmental baseline for the action area; the effects of the proposed SR-24 Storm Damage Repair Project and the cumulative effects; it is the Service's biological opinion that the project, as proposed, is not likely to jeopardize the continued existence of these species.

After reviewing the current status of designated critical habitat for the Alameda whipsnake, the environmental baseline for the critical habitat, effects of the proposed action, and cumulative effects, the Service finds that the project, as proposed, is not likely to destroy or adversely modify critical habitat for the Alameda whipsnake based upon the statutory provisions of the Act. The local effects resulting from the proposed action will not result in the inability of range-wide critical habitat to remain functional or serve its intended recovery role for this species based on the location of effected critical habitat along an existing roadway and minimal permanent loss of habitat.

INCIDENTAL TAKE STATEMENT

Section 9(a)(1) of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened fish and wildlife species without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Harm is defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by impairing behavioral patterns including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with this Incidental Take Statement.

The measures described below are non-discretionary, and must be implemented by Caltrans so that they become binding conditions of any grant or permit issued to Caltrans, as appropriate, in order for the exemption in section 7(o)(2) to apply. Caltrans has a continuing duty to regulate the activity covered by this incidental take statement. If Caltrans (1) fails to require its contractors to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

Amount or Extent of Take

The Service anticipates that incidental take of California red-legged frogs and Alameda whipsnakes will be difficult to detect due to their cryptic nature and wariness of humans. Losses of these species may also be difficult to quantify due to a lack of baseline survey data and

seasonal/annual fluctuations in their numbers due to environmental or human-caused disturbances. There is a risk of harm, harassment, injury and mortality as a result of the proposed construction activities, permanent and temporary loss/degradation of suitable habitat, and capture and relocation efforts; therefore, the Service is authorizing take incidental to the proposed action as (1) the injury and mortality of no more than two adult, subadult or juvenile California red-legged frogs or Alameda whipsnakes; (2) the harm and harassment of all California red-legged frogs and Alameda whipsnakes; and (3) the capture and relocation of all California red-legged frogs within the 25.9-acre action area. Incidental take of eggs or larval California red-legged frogs is not anticipated, since the project will not affect breeding habitat for this species. The Service anticipates that the proposed action may result in take of juvenile, subadult and adult life history stages as a result of habitat loss/degradation, construction-related disturbance, or the capture and relocation of California red-legged frogs. Upon implementation of the following Reasonable and Prudent Measure incidental take associated with the SR-24 Storm Damage Repair Project will become exempt from the prohibitions described under section 9 of the Act. No other forms of take are exempted under this opinion.

Effect of the Take

The Service has determined that this level of anticipated take is not likely to result in jeopardy to the California red-legged frog and Alameda whipsnake, and is not likely to jeopardize the continued existence of these species. Designated Alameda whipsnake critical habitat will not be adversely modified or destroyed and the proposed action will not diminish the value of the critical habitat, or prevent the critical habitat from sustaining its role in the conservation and recovery of the species.

Reasonable and Prudent Measure

The following reasonable and prudent measure is necessary and appropriate to minimize the effect of the proposed action on the California red-legged frog and Alameda whipsnake:

1. Harm, harassment, injury, capture, handling and mortality to the California red-legged frog and Alameda whipsnake shall be minimized by fully implementing the Conservation Measures in this biological opinion and adhering to the minimization measures described below in the Terms and Conditions.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, Caltrans shall ensure compliance with the following terms and conditions, which implement the reasonable and prudent measures described above.

2. The following Terms and Conditions implement Reasonable and Prudent Measure one (1):

    a. Compliance with Biological Opinion. Caltrans shall require all contractors to comply with the Act in the performance of the action and shall perform the action as outlined in the Project Description of this biological opinion as provided by Caltrans in the biological assessment dated February 2011, email and phone correspondence with Caltrans, and all other supporting documentation submitted to the Service in support of the action. Caltrans shall include language in their

contracts that expressly requires contractors and subcontractors to work within the boundaries of the project footprint identified in this biological opinion, including vehicle parking, vehicle parking, staging, batch plants, storage yards and access roads. Changes to the Project Description or performance of work outside the scope of the Project Description are subject to the requirements of reinitiation of formal consultation as described herein.

b. Enforcement. Caltrans shall ensure the Resident Engineer or their designee shall have full authority to implement and enforce all Conservation Measures and Terms and Conditions of this biological opinion. The Resident Engineer or their designee shall maintain a copy of this biological opinion onsite whenever construction is in progress. Their name(s) and telephone number(s) shall be provided to the Service at least thirty (30) calendar days prior to ground-breaking at the project.

c. Biological Monitor Approval. The qualifications of the Service-approved biologist(s) shall be presented to the Service for review and written approval at least thirty (30) calendar days prior to ground-breaking at the project site. The Service-approved biologist(s) shall keep a copy of this biological opinion in their possession when onsite. Through the Resident Engineer or their designee, the Service-approved biologist(s) shall be given the authority to communicate verbally, telephone, email or hardcopy with Caltrans personnel, contractors or any other person(s) at the project site or otherwise associated with the project. Through the Resident Engineer or their designee, the Service-approved biologist(s) shall have the authority to stop project activities if he/she determines any of the Conservation Measures or Terms and Conditions of this biological opinion is not being fulfilled. If the Service-approved biologist(s) exercises this authority, the Service shall be notified by telephone and email within 24 hours. The Service contact is Coast-Bay Branch Chief Endangered Species Program, Sacramento Fish and Wildlife Office at telephone (916) 414-6600.

d. Biological Monitoring Records. The Service-approved biologist(s) shall maintain monitoring records that include: (1) the beginning and ending time of each day's monitoring effort; (2) a statement identifying the listed species encountered, including the time and location of the observation; (3) the time the specimen was identified and by whom and its condition; and (4) a description of any actions taken. The Service-approved biologist shall maintain complete records in their possession while conducting monitoring activities and shall immediately surrender records to the Service, CDFG, and/or their designated agents upon request. All monitoring records shall be provided to the Service upon completion of the monitoring work.

e. Agency Access to the Project. If verbally requested through the Resident Engineer or their designee, before, during, or upon completion of ground breaking and construction activities, Caltrans shall ensure the Service and/or their designated agents can immediately and without delay, access and inspect the project site for compliance with the Project Description, Conservation Measures, and Terms and Conditions of this biological opinion.

f. Wildlife Exclusion Fencing. Prior to the start of construction, WEF shall be installed along the entire perimeter of locations 1 and 2, the access road to Location 2, and the proposed staging areas. The type of fencing materials, installation specifications, and monitoring and repair criteria shall be approved by the Service prior to start of construction. Caltrans shall include the WEF specifications on the final project plans. Caltrans shall include the WEF specifications including installation and maintenance criteria in the bid solicitation package special provisions. The WEF shall remain in place throughout the duration of the project and shall be regularly inspected and fully maintained. Repairs to the WEF shall be made within 24 hours of discovery. Upon project completion the WEF shall be completely removed, the area cleaned of debris and trash, and area returned to original condition or better.

g. Environmentally Sensitive Area Fencing. Prior to the start of construction, ESAs – defined as areas containing sensitive habitats adjacent to or within construction work areas for which physical disturbance is not allowed – will be clearly delineated using high visibility orange fencing. Construction work areas include the active construction site and all areas providing support for the proposed action including areas used for vehicle parking, equipment and material storage and staging, access roads, etc. The ESA fencing will remain in place throughout the duration of the proposed action, while construction activities are ongoing, and will be regularly inspected and fully maintained at all times. The final project plans will depict all locations where ESA fencing will be installed and will provide installation specifications. The bid solicitation package special provisions will clearly describe acceptable fencing material and prohibited construction-related activities including vehicle operation, material and equipment storage, access roads and other surface-disturbing activities within ESAs. In addition, hydrological features (i.e., topographic depressions, drainage ditches, culverts, etc.) outside of the project footprint will not be manipulated (i.e., re-routed, dredged, filled, graded, etc.). This will avoid potential effects to wetlands and waters outside of the project footprint that are hydrologically connected to aquatic features within the project footprint.

h. Environmental Awareness Training. Before the onset of construction activities, a qualified biologist will conduct an education program for all construction personnel. At a minimum the training will include a description of California red-legged frogs, Alameda whipsnakes and other listed species, migratory birds and their habitats; the occurrence of these species within the action area; an explanation of the status of these species and protection under the Act; the measures to be implemented to conserve listed species and their habitats as they relate to the work site; and boundaries within which construction may occur. A fact sheet conveying this information will be prepared and distributed to all construction crews and Project personnel entering the Project footprint. Upon completion of the program, personnel will sign a form stating that they attended the program and understand all the avoidance and minimization measures and implications under the Act.

i. Best Management Practices (BMP). Storm Water Pollution Prevention Plans (SWPPP) and erosion control BMPs will be developed and implemented to minimize any wind or water-related erosion and will be in compliance with the

requirements of the Regional Water Quality Control Board. The SWPPP will provide guidance for design staff to include provisions in construction contracts for measures to protect sensitive areas and prevent and minimize stormwater and non-stormwater discharges. Protective measures will include, at a minimum:

i. No discharge of pollutants from vehicle and equipment cleaning is allowed into any storm drains or water courses.

ii. Vehicle and equipment fueling and maintenance operations must be at least 50 feet away from watercourses, except at established commercial gas stations or established vehicle maintenance facility.

iii. Concrete wastes are collected in washouts and water from curing operations is collected and disposed. Neither will be allowed into watercourses.

iv. Spill containment kits will be maintained onsite at all times during construction operations and/or staging or fueling of equipment.

v. Dust control measures will include use of water trucks and dust palliatives to control dust in excavation-and-fill areas, covering temporary access road entrances and exits with rock (rocking), and covering of temporary stockpiles when weather conditions require.

vi. Coir rolls or straw wattles that do not contain plastic or synthetic mono-filament netting will be installed along or at the base of slopes during construction to capture sediment.

vii. Protection of graded areas from erosion using a combination of silt fences, fiber rolls, etc. along toes of slopes or along edges of designated staging areas, and erosion control netting (such as jute or coir) as appropriate on sloped areas. No erosion control materials that use plastic or synthetic mono-filament netting will be used.

viii. Permanent erosion control measures such as bio-filtration strips and swales to receive storm water discharges from the highway, or other impervious surfaces will be incorporated to the maximum extent practicable.

j. Construction Site Management Practices. The following site restrictions will be implemented to avoid or minimize effects on listed species and their habitats:

i. A speed limit of 15 miles per hour (mph) in the project footprint in unpaved areas will be enforced to reduce dust and excessive soil disturbance.

ii. Construction access, staging, storage, and parking areas, will be located within the project Caltrans ROW outside of any designated ESA or outside of the Caltrans ROW in areas environmentally cleared by the contractor. Access routes and the number and size of staging and work areas will be limited to the minimum necessary to construct the proposed project. Routes and boundaries of roadwork will be clearly marked prior to initiating construction or grading.

iii. To the maximum extent practicable, any borrow material will be certified to be non-toxic and weed free.

iv. All food and food-related trash items will be enclosed in sealed trash containers and properly disposed of off-site.

v. No pets from project personnel will be allowed anywhere in the action area during construction.

vi. No firearms will be allowed on the project site except for those carried by authorized security personnel, or local, State or Federal law enforcement officials.

vii. A Spill Response Plan will be prepared. Hazardous materials such as fuels, oils, solvents, etc. will be stored in sealable containers in a designated location that is at least 50 feet from hydrologic features.

viii. All equipment will be properly maintained and free of leaks. Servicing of vehicles and construction equipment including fueling, cleaning, and maintenance will occur at least 50 feet from any hydrologic features unless it is an existing gas station.

k. Vegetation Removal. Vegetation shall only be cleared and grubbed within the project footprint and shall only be cleared where necessary. In temporarily disturbed areas, vegetation shall be cut above the soil level to minimize erosion and allow plants that reproduce vegetatively to resprout after construction. A Service-approved biologist shall be present onsite during all vegetation clearing and grubbing activities to monitor for California red-legged frogs and Alameda whipsnakes. Prior to vegetation removal, the Service-approved biologist shall thoroughly survey the area for California red-legged frogs and Alameda whipsnakes. All clearing and grubbing of vegetated areas shall be conducted under the supervision of the Service-approved biologist. All cleared vegetation shall be properly disposed of off-site to prevent attracting animals to the project site. After project completion, all temporarily affected areas shall be returned to grade, protected with proper erosion control materials, and revegetated with native species appropriate for the region and habitat communities on site.

l. Reduce Spread of Invasive Species. To reduce the spread of invasive nonnative plant species and minimize the potential decrease of palatable vegetation for wildlife species, Caltrans will comply with Executive Order 13112. This order is provided to prevent the introduction of invasive species and provide for their control in order to minimize the economic, ecological, and human health impacts. In the event that high- or medium-priority noxious weeds, as defined by the California Department of Food and Agriculture or the California Invasive Plant Council, are disturbed or removed during construction-related activities, the contractor will contain the plant material associated with these noxious weeds and dispose of it in a manner that will not promote the spread of the species. The contractor will be responsible for obtaining all permits, licenses and environmental clearances for properly disposing of materials. Areas subject to noxious weed removal or disturbance will be replanted with fast-growing native grasses or a native erosion control seed mixture. If seeding is not possible, the area should be covered to the extent practicable with heavy black plastic solarization material until the end of the Project.

m. Replant, Reseed, and Restore Disturbed Areas. All slopes or unpaved areas temporarily affected by the proposed action will be restored to natural conditions. Slopes and bare ground will be reseeded with native grasses and shrubs characteristic of the floristic region and local habitats to stabilize soils and prevent erosion. Where disturbance includes the removal of trees or plants, native species will be replanted.

California Red-Legged Frogs and Alameda Whipsnakes

n. Proper Use of Erosion Control Devices. To prevent California red-legged frogs and Alameda whipsnakes from becoming entangled, trapped or injured, erosion control materials that use plastic or synthetic mono-filament netting will not be used within the action area. This includes products that use photodegradable or biodegradable synthetic netting, which can take several months to decompose. Acceptable materials include natural fibers such as jute, coconut, twine or other similar fibers.

o. Preconstruction Surveys. Preconstruction surveys shall be conducted by a Service-approved biologist immediately prior to the initiation of any ground disturbing activities and vegetation clearing that may result in take of California red-legged frogs or Alameda whipsnakes. All suitable aquatic and upland habitat including refugia habitat such as dense vegetation, small woody debris, refuse, burrows, etc., shall be thoroughly inspected. If a California red-legged frog(s) or Alameda whipsnake(s) is observed, the Service-approved biologist shall implement the species observation and handling protocol outlined below.

p. Avoidance of Entrapment. To prevent inadvertent entrapment of animals during construction, all excavated, steep-walled holes or trenches more than 1-foot deep will be covered at the close of each working day by plywood or similar materials, or provided with one or more escape ramps constructed of earth fill or wooden planks. Before such holes or trenches are filled they must be thoroughly inspected for trapped animals. All replacement pipes, culverts, or similar structures stored in the action area overnight will be inspected before they are subsequently moved, capped and/or buried. If at any time a listed species is discovered, the Resident Engineer and Service-approved biologist will be immediately informed.

q. Biological Monitoring. A Service-approved biologist shall be onsite during all activities that may result in take of California red-legged frogs or Alameda whipsnakes. Through communication with the Resident Engineer or their designee, the Service-approved biologist shall have the authority to stop work to avoid take of listed species and shall advise the Resident Engineer or designee on how to proceed accordingly. The Service-approved biologist shall conduct clearance surveys at the beginning of each day and regularly throughout the workday when construction activities are occurring that may result in take of California red-legged frogs and Alameda whipsnakes.

r. Protocol for Species Observation and Handling. If California red-legged frogs or Alameda whipsnake are encountered in the action area, work within 50 feet of the animal will cease immediately and the Resident Engineer and Service-approved

biologist will be notified. Based on the professional judgment of the Service-approved biologist, if project activities can be conducted without harming or injuring the animal(s), it may be left at the location of discovery and monitored by the Service-approved biologist while activities continue. All Project personnel will be notified of the finding and at no time shall work occur within 50 feet of the animal(s) without a biological monitor present. Alameda whipsnakes within the action area should not be captured or handled without authorization from the Service/CDFG, and should be monitored until it leaves the action area on its own accord. If it is determined by the Service-approved biologist that relocating the California red-legged frog(s) is necessary, the following steps will be followed:

i. Prior to handling and relocating California red-legged frogs, the Service-approved biologist will take precautions to prevent introduction of amphibian diseases in accordance with the *Revised Guidance on Site Assessments and Field Surveys for the California Red-Legged Frog* (Service 2005). Disinfecting equipment and clothing is especially important when biologists are coming to the action area to handle amphibians after working in other aquatic habitats.

ii. California red-legged frogs will be captured by hand, dipnet or other Service-approved methodology, transported by hand, dipnet or temporary holding container, and released as soon as practicable the same day of capture. Handling of California red-legged frogs will be minimized to the maximum extent practicable. Holding/transporting containers and dipnets will be thoroughly cleaned and disinfected prior to transporting to the action area and will be rinsed with freshwater onsite immediately prior to usage unless doing so would result in the injury or death of the animal(s) due to the time delay.

iii. California red-legged frogs will be relocated to the nearest suitable habitat outside of the Project footprint where actions will not result in injury or mortality, and released on the same side of SR-24 where discovered. The individual(s) will be released within suitable habitat in the Caltrans right-of-way or in nearby wetland habitat and the Service will be notified within 24 hours. Transporting California red-legged frogs to a location other than the location described herein will require written authorization of the Service.

Reporting Requirements

Proof of environmental training shall be provided to the Endangered Species Program, Sacramento Fish and Wildlife Office, 2800 Cottage Way, Room W-2605, Sacramento, California 95825-1846. Observations of California red-legged frogs or any listed or rare species should be reported to the CNDDB within thirty (30) calendar days of the observation.

Injured California red-legged frogs or Alameda whipsnakes must be cared for by a licensed veterinarian or other qualified person, such as the Service-approved biologist. Dead animals shall be placed in a zip-lock® plastic storage bag with a piece of paper indicating the date, time, location and name of the person who found it. The bag shall be placed in a freezer located in a secure location until instructions are received from the Service regarding the disposition of the

specimen or until the Service takes custody of the specimen. The Service must be notified within 24 hours of the discovery of death or injury resulting from project-related activities or is observed at the project site. Notification shall include the date, time, and location of the incident or finding of a dead or injured animal clearly indicated on a USGS 7.5-minute quadrangle and other maps at a finer scale, as requested by the Service, and any other pertinent information. The Service contacts are Branch Chief, Endangered Species Program, Sacramento Fish and Wildlife Office at (916) 414-6600, and Resident Agent-in-Charge of the Service's Law Enforcement Division at (916) 414-6660.

Caltrans shall submit a post-construction compliance report prepared by the on-site biologist to the Sacramento Fish and Wildlife Office within sixty (60) calendar days of the date of the completion of construction activity. This report shall detail: (1) dates that construction occurred; (2) pertinent information concerning the success of the project in meeting compensation and other conservation measures; (3) an explanation of failure to meet such measures, if any; (4) known project effects on the California red-legged frog and Alameda whipsnake, if any; (5) incidental take of these species, if any; (6) documentation of employee/contractor environmental education; and (7) other pertinent information.

Caltrans shall report to the Service any information about take or suspected take of listed wildlife species not authorized by this biological opinion. Caltrans must notify the Service via electronic mail and telephone within twenty-four (24) hours of receiving such information. Notification must include the date, time, location of the incident or of the finding of a dead or injured animal, and photographs of the specific animal. The individual animal shall be preserved, as stated above, and held in a secure location until instructions are received from the Service regarding the disposition of the specimen or the Service takes custody of the specimen.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of listed species and critical habitat. Conservation recommendations are discretionary measures to further minimize the effects to listed species and critical habitat. They also serve as suggestions of how action agencies can assist species conservation in furtherance of their responsibilities under section 7(a)(1) of the Act, or recommend studies improving an understanding of a species' biology or ecology. Wherever possible, conservation recommendations should be tied to tasks identified in recovery plans. The Service is providing the following conservation recommendations:

1. Caltrans should assist the Service in implementing recovery actions identified in the Recovery Plan for the California Red-legged Frog (Service 2002a).
2. Caltrans should assist the Service in implementing recovery actions identified in the Draft Recovery Plan for Chaparral and Scrub Community Species East of San Francisco Bay, California (Service 2002b).
3. Caltrans should consider participating in the planning for a regional habitat conservation plan for the California red-legged frog, Alameda whipsnake, and other listed and sensitive species.
4. Caltrans should consider establishing functioning preservation and creation conservation banking systems to further the conservation of the California red-legged frog, Alameda whipsnake, and other listed and sensitive species. Such banking systems also could

possibly be utilized for other required compensation (i.e., seasonal wetlands, riparian habitats, etc.) where appropriate.

5. Sightings of any listed or sensitive animal species should be reported to the California Natural Diversity Database of the California Department of Fish and Game. A copy of the reporting form and a topographic map clearly marked with the location the animals were observed also should be provided to the Service.

6. Caltrans should incorporate culverts, tunnels, or bridges on highways and other roadways that allow safe passage by California red-legged frog, Alameda whipsnake, or other listed and sensitive species.

7. Caltrans should include photographs, plans, and other information in their biological assessments if they incorporate "wildlife friendly" crossings into their projects.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed and/or proposed species or their habitats, the Service requests notification of the implementation of these recommendations.

REINITIATION--CLOSING STATEMENT

This concludes formal consultation on the proposed SR-24 Storm Damage Repair Project located in Contra Costa County, California. As provided in 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion, including work outside of the project footprint analyzed in this opinion and including vehicle parking, staging, lay down areas, and access roads; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion including use of vehicle parking, staging, lay down areas, and access roads; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where take exceeds what was anticipated in this biological opinion, Caltrans will no longer be exempt from the prohibitions of section 9 until such time that Caltrans reinitiates formal consultation and consultation is completed.

If you have questions concerning this opinion on proposed SR-24 Storm Damage Repair Project located in Contra Costa County, California, please contact Jerry Roe or Ryan Olah at the letterhead address or at (916) 414-6600.

Sincerely,

for Susan K. Moore
Field Supervisor

cc:
Marcia Grefsrud, California Department of Fish and Game, Yountville, California
Liam Davis, California Department of Fish and Game, Yountville, California

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