FOR CONTRACT NO.: 01-459704

INFORMATION HANDOUT

PERMITS

COUNTY OF HUMBOLDT
COASTAL DEVELOPMENT PERMIT

CITY OF TRINIDAD
COASTAL DEVELOPMENT PERMIT

ENCROACHMENT PERMITS

COUNTY OF HUMBOLDT
ENCROACHMENT PERMIT APPLICATION

CITY OF TRINIDAD
ENCROACHMENT PERMIT APPLICATION

MATERIALS INFORMATION

(***NOT A PART OF THE CONTRACT***)

FOUNDATION REPORTS FOR:
Westhaven Drive Undercrossing (Br No. 04-0056) dated April 12, 2012
Sixth Street Overcrossing (Br No. 04-0057) dated April 12, 2012
Trinidad Road Undercrossing (Br No. 04-0058) dated July 9, 2012

TRINIDAD ROAD FAULT STUDY DATED JULY 6, 2012

ROUTE: 01-HUM-101-R96.9/100.7

PLANNING DIVISION
PLANNING AND BUILDING DEPARTMENT
COUNTY OF HUMBOLDT

3015 H Street, Eureka, CA 95501
Phone (707) 445-7541 • Fax (707) 268-3792
www.co.humboldt.ca.us/planning

Applicant

Caltrans
703 B Street
Marysville, CA 95901

Owner

Agent

Notice of Appeal Period Completion

Date April 24, 2013

Assessor Parcel No. 000-000-000-000 **Apps No.** 8624

Permit CDP-13-003

Contact Beth Burks - 268-3708

Description
A Coastal Development Permit for seismic retrofit of the Westhaven Drive Undercrossing and the Sixth Street Overcrossing. The bridges have been selected for retrofit because of the type of bridge construction and the proximity to two active faults. The construction work will consist of retrofitting the bridges with shear walls, catcher blocks, and timber blocking. Concrete slope paving and sections of existing sidewalk will be removed and replaced. Concrete barrier rails will be constructed. Minor concrete will be placed under the metal beam guardrail for vegetation control. Temporary K-rail, crash cushions and drums will be used during construction. Utilities will be relocated at Westhaven Drive undercrossing prior to construction. Minor drainage work will be completed.

Decision
The project referenced above was approved by the Zoning Administrator on March 21, 2013.

Appeal Completion
The appeal period for this project has been completed and no appeal has been requested.

Effective Date
Effective date of your permit is April 24, 2013.

Expiration Date
Expiration date is April 24, 2014.

PLANNING AND BUILDING DEPARTMENT
COUNTY OF HUMBOLDT
PLANNING DIVISION

3015 H Street, Eureka, CA 95501
Phone (707) 445-7541 • Fax (707) 268-3792
www.co.humboldt.ca.us/planning

California Coastal Commission
1385 8th Street, Ste 130
Arcata, CA 95521

Notice of Final Action Taken

Date April 4, 2013 **Appealable Status** Appealable

Applicant Caltrans
Address 703 B Street
Marysville, CA 95901

Assessor Parcel No. 000-000-000-000 **Apps No.** 8624

Permit CDP-13-003

Contact Beth Burks at 268-3708

Description
A Coastal Development Permit for seismic retrofit of the Westhaven Drive Undercrossing and the Sixth Street Overcrossing. The bridges have been selected for retrofit because of the type of bridge construction and the proximity to two active faults. The construction work will consist of retrofitting the bridges with shear walls, catcher blocks, and timber blocking. Concrete slope paving and sections of existing sidewalk will be removed and replaced. Concrete barrier rails will be constructed. Minor concrete will be placed under the metal beam guardrail for vegetation control. Temporary K-rail, crash cushions and drums will be used during construction. Utilities will be relocated at Westhaven Drive undercrossing prior to construction. Minor drainage work will be completed.

Action Taken
Following a noticed public hearing the County of Humboldt Zoning Administrator approved the referenced application on March 21, 2013 .

Appeal Completion
The appeal period for this project has been completed and no appeal was received.

Effective Date
Coastal Development Permit CDP-13-003 will become effective at the end of the California Coastal Commission appeal period and will expire 12 months from the effective date.

PLANNING AND BUILDING DEPARTMENT
PLANNING DIVISION
COUNTY OF HUMBOLDT

3015 H Street, Eureka, CA 95501
Phone (707) 445-7541 • Fax (707) 268-3792

Planning Division Decision Packet

The following packet of information includes your Planning Division permit results. **Please review the enclosed permit packet carefully.** The packet contains important information such as appeal periods, permit conditions and the expiration date for your permit(s). Please take particular note of the following:

1. **Your permit is subject to one or more appeal periods.** Your permit is not effective until all appeal periods have ended. See appeals procedure information included in this packet.

2. **All permit conditions must be completed prior to the expiration date.** Your permit(s) may also include conditions from other state or local agencies. If you have questions or need assistance, please contact the specific agency or department that issued the conditions.

3. **Proof of completion is required for most permit conditions.** For efficient staff review of condition completion, please consolidate proof of completion for all conditions into one package.

4. **You are responsible for tracking the expiration date of your permit(s).** An extension process is available if you need more time.

5. **Additional federal, state or local regulatory requirements may apply to your project.** These requirements may be administered by agencies other than the Planning Division, including any mitigation monitoring. It is your responsibility to obtain all necessary approvals before starting your project.

6. **Call your assigned planner if you have any questions.** Your assigned planner's contact information is provided below.

Beth Burks, Planner
Voice: 707-268-3708
Fax: 707-268-3792
bburks@co.humboldt.ca.us

cc: ☐ Owner ☐ Agent

Conditions of Approval

APPROVAL OF THE COASTAL DEVELOPMENT PERMIT IS CONDITIONED UPON THE FOLLOWING TERMS AND REQUIREMENTS WHICH MUST BE FULFILLED BEFORE A BUILDING PERMIT MAY BE ISSUED OR USE INITATED:

Conditions of Approval:

1. All work shall between the hours of 7:30 am - 7:30 pm. All work shall comply with the Project Description on file with the Planning Division.

2. The applicant/contractor shall:

   a) conduct work and store materials in a manner which will minimize erosion and sediment transport off the job site;

   b) place erosion control measures in all disturbed areas subject to erosion, when required, at the direction of the engineer, and the County of Humboldt;

   c) place erosion control materials, including mats, straw bales, and/or silt screens, to control erosion and all silt movement in all disturbed areas subject to erosion on the project site as deemed necessary by site conditions and weather forecasts;

   d) The County shall have authority to monitor construction activities and ensure that erosion control measures are adequate for site conditions.

   e) The contractor shall comply with the County's determination of appropriate erosion control measures.

   f) All ground bared during construction shall be landscaped and/or seeded and mulched prior to October 15.

   A post-construction certification by the project engineer shall be provided to the Planning Division within 30 days of the completion of the work.

3. The applicant shall notify the California Department of Forestry and Fire Protection, local ambulance service, Humboldt County Sheriff's Office and Westhaven Volunteer Fire Department in advance of any road closures or delays associated with this project. Emergency vehicle access shall be a priority during work.

4. The applicant shall apply for and obtain an encroachment permit for traffic control and lane closures through the Humboldt County Department of Pubic Works.

5. Applicant shall submit a location map that references applicable Caltrans traffic control standard plans and erosion control standard plans that are to be used for this project. Conditions requiring a traffic control plan other than T13 will require that the applicant submit a traffic control plan as part of the encroachment permit.

6. A cultural monitor from the Trinidad Rancheria and the Yurok Tribe shall be present for any ground disturbance at both proposed locations. The applicant will need to work with each Tribe separately to secure a monitor. If the applicant and the Trinidad Rancheria or Yurok Tribe cannot agree on an acceptable monitor, the decision will be deferred to the Planning Division. A summary report from the agreed upon monitors must be submitted to the Planning Division within 30 days of the completion of the work to demonstrate compliance with this condition.

Informational Notes:

1. If cultural resources are encountered during construction activities, the contractor on site shall cease all work in the immediate area and within a 50 foot buffer of the discovery location. A qualified archaeologist as well as the appropriate Tribal Historic Preservation Officer(s) are to be contacted to evaluate the discovery and, in consultation with the applicant and lead agency, develop a treatment plan in any instance where significant impacts cannot be avoided.

   The Native American Heritage Commission (NAHC) can provide information regarding the appropriate Tribal point(s) of contact for a specific area; the NAHC can be reached at 916-653-4082. Prehistoric materials may include obsidian or chert flakes, tools, locally darkened midden soils, groundstone artifacts, shellfish or faunal remains, and human burials. If human remains are found, California Health and Safety Code 7050.5 requires that the County Coroner be contacted immediately at 707-445-7242. If the Coroner determines the remains to be Native American, the NAHC will then be contacted by the Coroner to determine appropriate treatment of the remains pursuant to PRC 5097.98. Violators shall be prosecuted in accordance with PRC Section 5097.99

   The applicant is ultimately responsible for ensuring compliance with this condition.

2. The applicant is responsible for receiving all necessary permits and/or approvals from other state and local agencies.

3. This permit shall expire and become null and void at the expiration of one (1) year after all appeal periods have lapsed (see "Effective Date"); except where construction under a valid building permit or use in reliance on the permit has commenced prior to such anniversary date. The period within which construction or use must be commenced may be extended as provided by Section 312-11.3 of the Humboldt County Code.

4. NEW DEVELOPMENT TO REQUIRE PERMIT. Any new development as defined by Section 313-139 of the Humboldt County Code (H.C.C.), shall require a Coastal Development Permit Modification or permit modification, except for Minor Deviations from the Plot Plan as provided under Section 312-11.1 of the Coastal Zoning Regulations.

FROM: CITY OF TRINIDAD, PO BOX 390, TRINIDAD, CA 95570

TO: CALIFORNIA COASTAL COMMISSION
APPLICANT
CITY ENGINEER

NOTICE OF ACTION TAKEN

LOCAL PERMIT #	2012-09
APPLICANT:	Dept. of Transportation – Caltrans, District 3 703 B Street Marysville, CA 95901
AGENT:	Adele Pommerenck, Associate Environmental Planner
AP #	NA - City and State rights-of-way
PROJECT LOCATION:	Located within State of CA and City of Trinidad Rights-of-Way at the Westhaven Drive-Hwy 101 undercrossing and immediately adjacent areas.

THE PLANNING COMMISSION TOOK FINAL ACTION FOR THE FOLLOWING PROJECT AT THEIR RESCHEDULED MEETING OF FEBRUARY 6, 2013:

Caltrans 2012-09: Grading Permit, Design Review and Coastal Development Permit to complete a seismic retrofit of the Trinidad Road (Westhaven) Undercrossing on U.S. Highway 101. Aesthetic treatments will be included on the walls of the undercrossing.

THE CITY	_____	APPROVED
	_____X_____	CONDITIONALLY APPROVED
	_____	DISAPPROVED

The final staff report, required findings, maps and any conditions placed on the project approval are attached as needed.

Planning Commission action on a Coastal Development Permit, Design Review, Conditional Use Permit or a Variance will become final 10 working days after the date that the Coastal Commission receives this "Notice of Action Taken" from the City, unless an appeal to the City Council Coastal Commission is filed within that time.

Furthermore, this project ~~is~~ ___ / **is not** _**X**_ appealable to the Coastal Commission per the City's certified LCP, but may be appealable per the requirements of Section 30603 of the Coastal Act.

TREVER PARKER
PLANNER, CITY OF TRINIDAD
DATE: February 7, 2013

CITY OF TRINIDAD
PLANNING COMMISSION

CONDITIONS OF APPROVAL COMPLIANCE CHECKLIST

Applicant: Caltrans District 3	Agent: Adele Pommerenck
Today's Date: February 7, 2013	Approval Date: February 6, 2013
Permit No.: 2011-03	Permit Type: Grading, DR, CDP
Street Address: Hwy 101 / Westhaven	APN: NA (r-o-w)

Advisement: *The City Planner has listed below all conditions of approval to be met. Some conditions of approval may be required to be met prior to approval and issuance of a building permit, or a specified phase of construction, or prior to issuance of the Certificate of Occupancy as indicated with each item listed below. All items applicable to the project must be checked off and initialed by the City Planner, Building Inspector or City Clerk.*

☐ Caltrans will submit documentation that addresses the City Engineer's comments as outlined in his letter dated January 21, 2013, to the City Engineer's satisfaction, prior to application for an encroachment permit or work commencing. *Responsibility: City Engineer to verify prior to approving encroachment permit.*

☐ Caltrans shall submit an application for an encroachment permit prior to work commencing that addresses traffic control during construction and repaving after project completion. The City Engineer shall be given an opportunity to review and approve the encroachment permit. *Responsibility: City Engineer to verify prior to approving encroachment permit.*

☐ If any unpaved areas are disturbed, they will be replanted or reseeded with native plants to provide erosion control. *Responsibility: City Engineer to verify prior to approving encroachment permit.*

☐ Applicant will employ certified cultural monitor from either the Yurok Tribe or Tsurai Ancestral Society to monitor the construction site for cultural and archeological resources. The monitor will be present during excavation or ground disturbing activities. *Responsibility: City Engineer to verify prior to approving encroachment permit.*

The signature(s) below indicate all the required conditions have been completed and complied with and the project has been given final approval.

City Engineer: _____ Date: _____

COUNTY OF HUMBOLDT

ENCROACHMENT PERMIT APPLICATION

PERMISSION IS REQUESTED TO ENCROACH ON THE COUNTY RIGHT OF WAY AS FOLLOWS: (COMPLETE ALL ITEMS, N/A IF NOT APPLICABLE)
SEE ATTACHED INSTRUCTIONS.

Attach Check and MAIL TO:
PUBLIC WORKS DEPT.
LAND USE DIVISION
3033 H STREET, ROOM 17
EUREKA, CA 95501

I *Where? When?*

(**1.**) County Road Name	(**2.**) ADDRESS OR POSTMILE	
(**3.**) Nearest Cross Street	(**4.**) PORTION OF RIGHT OF WAY ☐ Edge of Road ☐ Shoulder ☐ _____	(**5.**) TYPE OF EXISTING COUNTY ROAD ☐ Asphalt ☐ Gravel ☐ Other
(**6.**) WORK TO BE PERFORMED BY ☐OWN FORCES ☐CONTRACTOR	(**7.**) Proposed Start Date	(**8.**) Estimated Completion Date

II *Type of work* – Review of application may be delayed until required detailed plans are submitted. –

(**9**) A plot plan showing property lines, easements, access location(s), site specific details, existing and proposed slopes is required.

☐ **NEW DRIVEWAY / PRIVATE ROAD**

Note: It is County policy to require paved entrances to driveways and private roads onto paved County roads

☐ **Request County Review of CULVERT / PIPE** (18" MIN DIA) Material Type_____ Location_____

☐ **INSTALL / REPAIR UTILITY SERVICES** Type _____ Approx. length/depth _____

☐ **REPAIR / RESURFACE EXISTING** _____ **– surface type**_____

☐ **OTHER** DESCRIBE**:**

(**10**) **Description and purpose of WORK or ACTIVITY:**

☐ Check here if sketches / plans are attached showing the proposed work. ***(also provide brief description above)***

THE UNDERSIGNED AGREES AND UNDERSTANDS THAT: (1) A PERMIT IS DISCRETIONARY AND CAN BE DENIED; (2) A BOND MAY BE REQUIRED FOR NON-PAYMENT OF PRIOR OR PRESENT PERMIT FEES; (3) THE WORK OR ACTIVITY MUST BE DONE IN ACCORDANCE WITH COUNTY RULES AND REGULATIONS SUBJECT TO INSPECTION AND APPROVAL; (4) THE APPLICATION FEE IS NON-REFUNDABLE; (5) IF THE APPLICANT IS APPLYING FOR AN ENCROACHMENT PERMIT IN CONJUNCTION WITH A BUILDING PERMIT, THE REQUIREMENTS OF THE ENCROACHMENT PERMIT MUST BE COMPLETED PRIOR TO OCCUPANCY OF ANY STRUCTURE OR FINAL INSPECTION BY THE BUILDING DEPARTMENT.

III *Provide contact information, Authorized signature, Date*

(11) PROPERTY OWNERS NAME		(12) ASSESSOR'S PARCEL NUMBER(S)	
(13) ORGANIZATION OR APPLICANTS NAME		(14) PHONE ☐HOME ☐WORK ☐CELL	
(15) ARCHITECT, ENGINEER OR CONTRACTOR		(16) ARCHITECT, ENGINEER OR CONTRACTOR PHONE	
(17) APPLICANT MAILING ADDRESS (INCLUDE CITY AND ZIP CODE)		**EMAIL**	
(18) AUTHORIZED SIGNATURE	(19) PRINT OR TYPE NAME	(20) TITLE	(21) DATE

IV *Submit Fee* Permit fee – See Current County fee schedule. – Contact Public Works for project deposits.

COUNTY USE ONLY (22) NON REFUNDABLE FEE OF $_____ REQUIRED AT TIME OF APPLICATION	RECEIPT # _____

INSTRUCTIONS FOR COMPLETING THE COUNTY ENCROACHMENT PERMIT APPLICATION

Please type or print. Enter N/A where not applicable.

Items below are to assist with providing the information required.
Incomplete application may delay review process.

MAILTO:
HUMBOLDT COUNTY
PUBLIC WORKS DEPARTMENT
LAND USE DIVISION
3033 H STREET, ROOM 17
EUREKA, CA 95501
OFFICE (707)445-7205
FAX (707)445-7388

1-2: **County road name and address or postmile (if known) where work is located.**

3: **Distance and direction from nearest cross street or road to the work site.**

4: **Portion of County right of way where work will occur (paved road, shoulder, back of curb, slope, etc.).**

5: **Existing County road surface type (concrete, asphalt, gravel, etc.).**

6: **Indicate whether your own forces or a contractor will perform the work.**

7-8: **Estimated start and completion dates for the permit work.**

Where is the work to be done?

Describe location so we can find it.

9: **Provide plot plan with required details –** (property lines, easements, access location(s), site specific details, existing and proposed slopes)

Indicate whether the use of an existing driveway or private road is proposed.

If the construction of a **new** driveway or private road is proposed, indicate all that apply. **Note**: County policy requires paved entrances to driveways on paved County roads, urban development may also require curb and gutter with ADA sidewalks and ADA driveway approaches.

If the repair of an **existing** driveway or private road is proposed, indicate all that apply. **Note**: County policy requires paved entrances to driveways on paved County roads.

If excavation is proposed, provide depth, width and length.

If a culvert, pipe or conduit installation is proposed, provide type diameter and length.

All other activities proposed within a County right of way, indicate all that apply.

What do you propose to do?

10: **Describe the work or activity to be done within the County right of way. If applicable, attach specifications, calculations, maps, site plan, etc. Incomplete information may delay the review process.**

11: **Full name of record owner for subject property.**

12: **Assessor's parcel number. May be obtained from the County Assessor's office or on property tax bill.**

13: **Full name of entity, organization or individual applying for permit.**

14: **Current daytime phone number of entity, organization or individual applying for permit.**

15: **Full name of organization or individual authorized to perform work.**

16: **Current daytime phone number of person(s) listed in item 18.**

17: **County will use this address for all correspondence and permit issuance.**

18.-19: **Signature and typed or printed name of applicant or authorized agent.**

20: **Title of applicant or authorized agency signing the application.**

21: **Date the application was signed.**

22. **Required fee to be submitted at time of application.**

Who is applying?

Who is responsible?

Provide contact information.

Authorized signature.

Submit Fee.

TRINIDAD CITY HALL
P.O. Box 390
409 Trinity Street
Trinidad, CA 95570
(707) 677-3759 Fax
(707) 677-0223

Kathy Bhardwaj, Mayor
Gabriel Adams, City Clerk

ENCROACHMENT PERMIT - #_____

Applicant: **Date**:

Address: **Phone**:

Length of Permit: **Start Date**: **Finish Date**:

Type of Encroachment Activity:

a.	Sidewalk, Curb, Drop Curb	h.	Street Improvements
b.	Sanitary Sewers	i.	Alley Improvements, Use
c.	Water Mains, Services, etc.	j.	Hydrant Rental
d.	Storm Drains	k.	Subdivision Improvements
e.	Sidewalk, Street Closure	l.	Banner Permits
f.	Encroachment on Sidewalks	m.	Special Events Permits
g.	Non-City Owned Utilities	n.	Other

Location and Description of Work: (attach plans)

_____
_____
_____
_____
_____
_____

Contractor: **License No**:

Mailing Address: **Phone**:

This permit must be kept on the work site or at applicant's residence and shown to any authorized agent of the City of Trinidad on request. Required inspections shall be requested by calling 677-0223 between 8:00 AM and 2:00 PM weekdays, at least 24 hours in advance. In signing this permit, applicant and/or contractor agree to terms and conditions stated hereon and attached hereto.

_____ DATE:_____
(Signature of applicant or contractor)

FOR CITY USE ONLY – Check and route for recommendations to:

____ Police Dept. _____ _____ Fire Dept. _____ _____ Public Works_____
____ City Council _____ _____ Pl. Comm. _____ _____ Water Dept.. _____
____ City Engr. _____ _____ City Planner _____ _____ Other_____

Approved by: **Date:** **Fee:** **Date:**

Certificate of Acceptance: This certifies that the construction authorized by this permit has been inspected and found to conform to City of Trinidad Standard Specifications and the requirements of this permit.

Inspected by: **Date:**

TRINIDAD CITY HALL
P.O. Box 390
409 Trinity Street
Trinidad, CA 95570
(707) 677-0223

Kathy Bhardwaj, Mayor
Gabriel Adams, City Clerk

ENCROACHMENT PERMIT - IDEMNITY AND HOLD HARMLESS AGREEMENT

Section 12.04.090 (J) of the Trinidad Municipal Code states:

"The applicant shall indemnify and hold harmless the city, and its officers and agents, from all suits and actions of every name and description brought for, or on account of, any injuries or damages received or sustained by, any person or persons, by or from the applicant, applicant's employees or agents, in the construction of the work, or by or in consequence of any negligence in guarding the same, or for improper materials and/or methods used in construction."

My signature below acknowledges receipt of and agreement to the above indemnity and hold harmless agreement on behalf of the applicant.

_____
Signature

_____
Name (printed)

_____
Date

CITY OF TRINIDAD ENCROACHMENT PERMIT – GENERAL PROVISIONS

1) **Definition:** This permit is issued under chapter 5.5 and 6 and Division 2 of the Streets and Highways code. The term encroachment is used in this permit as defined in Chapter 6 of said code. Except as otherwise provided for public agencies and franchise holders, this permit is revocable at any time.
2) **Acceptance of Provisions:** It is understood and agreed by the Permittee that the doing of any work under this permit shall constitute acceptance of the provisions.
3) **Prior Right:** It is understood and agreed that City has prior right to the use of its rights-of-way.
4) **Notice Prior to Starting Work:** Before starting work on which an inspector is required, or whenever stated by a representative of the Engineering Division, the Permittee shall notify the City Clerk or the City Engineer, or other designated employee of the City of Trinidad. Such notice shall be given at least three (3) days in advance of the date work is to begin.
5) **Permission from Property Owners:** Whenever necessary to secure permission from abutting property owners, such authority must be secured by the Permittee prior to starting work.
6) **Permit at Work Site:** This permit shall be kept at the site of the work.
7) **Protection of Traffic:** The Permittee shall cause to be placed, erected, and maintained, all warning signals, lights, barricades, signs, and other devices or measures essential to safeguard travel by the general public over and at the site of work authorized herein.
8) **Minimum Interference with Traffic:** All work shall be planned and carried out so that there will be the least possible inconvenience to the traveling public except for the specific work permitted.
9) **Clean up Right-of-Way:** The Permittee shall, at all times, during the progress of the work, keep the road in as neat and clean a condition as is possible and upon completion of the work granted herein, shall leave the road in a thoroughly neat, clean, and usable condition.
10) **Storage of Material:** No material shall be stored within eight (8) feet from the edge of pavement or traveled way.
11) **Standards of Construction:** All work shall conform to recognized standards of construction.
12) **Borrow and Waste:** Only such borrow and waste will be permitted and within the limits asset forth on the face of this permit.
13) **Supervision:** All the work shall be done subject to the supervision of, and to the satisfaction of the City Engineer.
14) **Assignments:** Permittee must provide notice and obtain City approval of any proposed assignments to perform work under this permit.
15) **Future Moving of Installation:** It is understood by Permittee that whenever construction, reconstruction or maintenance work on the road or right-of-way may require, the installation provided for herein shall, upon request of the City Engineer, be immediately moved by, and at the sole expense of, the Permittee.
16) **Liability for Damages:** The Permittee is responsible for all liability for personal injury or property damage which may arise out of work herein permitted, or which may arise out of failure on the Permittee's part, to perform his obligations under this permit with respect to proper installation and/or maintenance. In the event any claim or such liability is made against the City of Trinidad, or any department, officer, or employee thereof, Permittee shall defend, indemnify and hold them and each of them harmless from such claim. Further, Permittee shall obtain a similar provision in its contract with any contractor to perform the work herein permitted, which indemnification and hold harmless shall include not only the Permittee but also the City of Trinidad, any department, officer or employee thereof.
17) **Making Repairs:** If the City shall so elect, repairs to paving which has been disturbed shall be made by its employees and the expense thereof shall be borne by the Permittee, who shall purchase and deliver on the road the materials necessary for said work as directed by the City Engineer. All payments to laborers, inspectors, etc., employed by the City for or on account of the work herein contemplated, shall be made by said Permittee forthwith on receipt of written statement approved by the City Engineer. The City may elect to require a deposit before starting repairs, in an amount sufficient to cover the estimated cost thereof.
18) **Care of Drainage:** If the work contemplated shall interfere with the established drainage, ample provisions shall be mad by the Permitee to provide for it as may be directed by the City Engineer.
19) **Maintenance:** The Permitee agrees to exercise reasonable care to maintain properly this encroachment and/or utility trench, and to exercise reasonable care in inspecting for and immediately repairing and making good any injury to any portion of the road which occurs as a result of the maintenance of the encroachment in the road or as a result of the work done under this permit, including any and all injury to the road which would not have occurred had such work not been done or such encroachment not placed therein. Maintenance shall include, but is not limited to, cleaning and keeping free from debris all structures included as a part of this encroachment. No assignment of maintenance responsibility may be made without approval of the City.
20) **Crossing Roadway:** Service and other small diameter pipes shall be jacked or otherwise forced underneath pavement without disturbing same. Pavement or roadway shall not be cut unless specifically permitted on the face hereof. Service pipes will not be permitted inside of culverts used as drainage structures.
21) **Depth of Pipes:** There shall be a minimum of 36 inches of cover over all pipes or conduits, unless specifically excepted by the City Engineer.
22) **Backfilling:** All excavations shall be backfilled and mechanically compacted immediately after work therein has been completed. No portion of the excavation shall be compacted by ponding or jetting. Back filling material shall comply with Section 14 of the California Department of Transportation Standard Specifications.
23) **Maintain Surface:** The Permittee shall maintain the surface over structures placed hereunder.
24) **Restoration:** All pavement, curb, gutter, sidewalk, borrow ditches, pipes, head walls, road signs, trees, shrubbery, and/or other permanent road facilities impaired by or as a result of construction operations at the construction site, or at other ground occupied by materials and/or equipment shall be restored immediately to a condition as good as or better than existed prior to the construction.
25) **Responsibility:** the City of Trinidad will not be held responsible for any damage to any underground or other facilities that have been caused during the course of the City's normal maintenance procedures. The City will not assume any responsibility, at any time, should any provisions of this permit not be complied with.
26) **Sight Visibility:** The Permittee shall maintain roadside vegetation adjacent to driveways and/or road connections to ensure adequate sight distance.

NOTE:

Provisions pertinent to your project will be specified on the Special Provisions sheet of this permit.

DO NOT START WORK UNTIL YOU RECEIVE YOUR APPROVED PERMIT.

State of California

Business, Transportation and Housing Agency

Memorandum

Flex your power!
Be energy efficient!

To: KELLY HOLDEN
Branch Chief
Office of Bridge Design-North
Division of Engineering Services
Design Branch 7

Date: April 12, 2012

File: 01-HUM-101- PM 98.1
Westhaven Drive UC
(Seismic Retrofit)
Br. No. 04-0056
EA 01-459701
(Proj. #0100020153)

Attention: Mr. Manode Kodsuntie

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
Geotechnical Services – MS 5
Office of Geotechnical Design – North

Subject: Foundation Report for Westhaven Drive Undercrossing

Introduction

Per your request dated January 5, 2012, the Office of Geotechnical Design-North (OGDN), Branch A has prepared the Foundation Report for the proposed seismic retrofit of the Westhaven Drive Undercrossing (Br. No. 04-0056) (formerly known as Moonstone Road Undercrossing) located on Route 101 at PM 98.1, in Humboldt County, California.

The following recommendations are based on a subsurface investigation completed in February 2012 along with a review of the available General Plan, Foundation Plan, existing As-Built borings and records, Bridge Inspection Reports and available geologic literature and mapping.

Elevations used in this report are based on the NAVD 88 vertical datum. The "As-Built" elevations were converted from NGVD 29 to NAVD 88 by using a conversion factor of +2.65 ft.

The following Department of Transportation, Caltrans records and resources were used during preparation of the Foundation Report:

- General Plan for the Westhaven Drive Undercrossing (Br. No. 04-0056) dated March 14, 2012.
- Foundation Plan for the Westhaven Drive Undercrossing (Br. No. 04-0056) dated March 14, 2012.

- As-Built General Plan for the Moonstone Road Undercrossing (Br. No. 04-0056) approved January 12, 1959.
- As-Built Foundation Plan for the Moonstone Road Undercrossing (Br. No. 04-0056) approved January 12, 1959.
- As-Built Abutment Details for the Moonstone Road Undercrossing (Br. No. 04-0056) approved January 12, 1959.
- As-Built Bent Details for the Moonstone Road Undercrossing (Br. No. 04-0056) approved January 12, 1959.
- As-Built Pile Details for the Moonstone Road Undercrossing (Br. No. 04-0056) approved January 12, 1959.
- As-Built Log of Test Borings for the Moonstone Road Undercrossing (Br. No. 04-0056) approved January 12, 1959.
- Bridge Inspection Report for the Westhaven Drive Undercrossing (Br. No. 04-0056) dated August 15, 2006.

Project Description

The existing bridge was built in 1960. The structure was built as a three span continuous Reinforced Concrete (RC) T-girder superstructure on open-end abutments and RC 3-column bents. Abutment 1 and Bent 2 are supported on spread footings. Bent 3 and Abutment 4 are supported on piles. According to the As-Built Abutment Details plan sheet, steel piles were used in lieu of concrete piles except for 3 concrete piles at Abutment 4. The As-Built Bent Details plan sheet indicates that 10BP-42 steel piles were used in lieu of concrete piles at Bent 3.

The proposed seismic retrofit for Westhaven Drive Undercrossing includes attaching catcher blocks to the abutment seats and constructing infill walls between the existing columns. The infill walls will be on spread footings that are intended to provide structural stability during and after the design seismic event.

The following foundation recommendations are based on a review of existing bridge "As-Built" data and a field study. Elevations used in this report are based on NAVD 88 vertical datum and horizontal coordinates are based on the NAD 83 horizontal datum, unless otherwise noted.

Field Investigation and Testing

The Office of Geotechnical Design-North conducted a subsurface investigation in February 2012 for the proposed seismic retrofit of the Westhaven Drive Undercrossing (Br. No. 04-0056).

The 2012 subsurface investigation for the Westhaven Drive Undercrossing consisted of three hand driven (wacker) borings (HD-12-001, HD-12-002 and HD-12-003). The maximum depth reached by the 2012 subsurface investigation for the Westhaven Drive Undercrossing was approximately 27 feet. Sampling was achieved in the borings by utilizing a one-inch sampler. A summary of the borings drilled during the subsurface investigation is included below in Table 1.

Table 1. The 2012 Subsurface Exploration Summary

Structure	Boring No.	Completion Date	Drilling Method	Approximate Ground Surface Elevation[(1)] (ft.)	Boring Depth (ft.)
Westhaven Drive UC	HD-12-001	2/7/12	Hand Driven (wacker)	176.2	27
Westhaven Drive UC	HD-12-002	2/7/12	Hand Driven (wacker)	178.2	25
Westhaven Drive UC	HD-12-003	2/8/12	Hand Driven (wacker)	177.7	17

1. Elevation based on NAVD88 vertical datum.

Summary of Site Geology and Subsurface Conditions

Regional Setting and Area Geology

The project site is located within the Coast Ranges geomorphic province. Based on the Geologic Map of the Weed Quadrangle, California scale 1:250,000, compiled by D. L. Wagner and G. J. Saucedo, 1987, California Geological Survey (formerly the Division of Mines and Geology) indicates the site area consists of Cretaceous Franciscan Complex (KJf) and Quaternary Marine terrace deposits (Qmt).

Subsurface Conditions

Based upon the recent field investigation and a review of the As-Built log of test borings performed in May 1957, the site is underlain by very loose to compact (medium dense-dense) silt, sand and gravel overlying very stiff clay and shale.

For subsurface data and boring locations, please refer to the Log of Test Borings sheets for detailed observations, information and conditions.

Groundwater

Groundwater was measured during the May 1957 subsurface investigation at elevation 149.4 feet (NAVD 88). No groundwater was encountered above elevation 148.9 feet (NAVD 88) during the recent February 2012 field investigation. Groundwater surface elevations are subject to seasonal fluctuations and may occur at higher or lower elevations depending on the conditions at time of construction.

Corrosion Evaluation

A composite soil sample was collected at the ground surface above Boring HD-12-001 for the Westhaven Drive UC (seismic retrofit) drilled during the 2012 subsurface investigation. The Office of Testing and Technology Services, Corrosive Technology Branch tested the composite sample for corrosive potential. The Corrosion Technology Branch considers a site to be corrosive if one or more of the following conditions exist for the representative soil or water samples collected at the site: chloride concentration is 500 ppm or greater, sulfate concentration is 2000 ppm or greater, or the pH is 5.5 or less. The minimum resistivity serves only as an indicator parameter for the possible presence of soluble salts and is not used to define a site as being corrosive. It is the practice of the Corrosion Technology Branch that if the minimum resistivity of the sample is greater than 1000 ohm-cm, the sample is considered to be non-corrosive and testing to determine the sulfate and chloride content is not performed.

The results of the laboratory tests determined that the composite sample was considered to be corrosive at this site. Refer to Table 2 for specific test results.

Table 2. Corrosion Test Summary of the Composite Sample for Westhaven Dr. UC (Seismic Retrofit) (Br. No. 04-0056)

SIC Corrosion Number	Nearby Support Location	Boring Number	Sample Depth (ft)	pH	Minimum Resistivity (Ohm-Cm)	Chloride Content (PPM)	Sulfate Content (PPM)
C837027	Bent 2	HA-12-001	4	6.08	405	869	79

Scour

There is no scour potential at the site, since the bridge does not span any water channel.

Seismic Recommendations

Based on the As-Built Log of Test Borings, a V_{S30} (the weighted shear wave velocity for the top 100 feet of foundation materials) of 1150 feet per second was extrapolated using the correlations formulas for the purpose of the design of the ground motion.

Based on the Caltrans Seismic Design Procedure and the ARS Online Tool Version 2.0, the Westhaven Drive UC is in the proximity of two active faults. The Mad River fault zone (Trinidad fault) (Fault ID No. 22) with Mmax of 7.5 located northeast of the bridge with a rupture distance of 0.3 mile, and the Mad River fault zone (McKinleyville fault) (Fault ID No. 31) with Mmax of 7.2 located southwest of the bridge with a rupture distance of 1.2 miles. Both faults are referred to as reverse faults.

Please note the spectral accelerations (SA) from the two aforementioned active faults and the SA produced from the probabilistic method make up the recommended Acceleration Response Spectrum (ARS) curve. So, the ARS Curve is an envelope of the deterministic and probabilistic methods. Furthermore the probabilistic method is based on USGS 5% probability of exceedance in 50 years (return period 975 years).

The design ARS curve with a peak ground acceleration of 0.89g is attached.

The potential for soil liquefaction based on the new groundwater level data is considered to be low.

A report titled "Fault Evaluation Report" by Martha Merriam dated August 8, 2011 was prepared for Westhaven Drive Undercrossing (Br. No. 04-0056) and Sixth Street Overcrossing (Br. No. 04-0057). According to this report surface rupture is unlikely to occur at these two bridges and does not need to be addressed during design.

As-Built Foundation Data

As-Built Abutment Details and Bent Details sheets for the Moonstone Road Undercrossing (Br. No. 04-0056) approved January 12, 1959 indicate that the bridge foundations consist of a combination of spread footings, steel H-piles, and concrete piles. The design load of piling for this structure is shown as 45 tons on the As-Built Foundation Plan approved January 12, 1959. A summary of the existing foundation data is presented below in Tables 3 and 4.

Table 3. As-Built Spread Footing Data for the Westhaven Undercrossing (Br. No. 04-0056)

Support Location	Design Footing Pressure[1] (tsf)	Bottom of Footing Elevation[2] (ft)
Abutment 1	3.0	184.65
Bent 2 left	3.0	167.65
Bent 2 centerline	3.0	169.65
Bent 2 right	3.0	171.65

Notes:

1. *Design Footing Pressure was obtained from Moonstone Road UC Foundation Plan approved January 12, 1959.*
2. *Bottom of Footing Elevations obtained from the Moonstone Road UC Foundation Plan and Bent Details sheets approved January 12, 1959. Elevations have been converted from NGVD29 to NAVD88.*

Table 4. As-Built Pile Data for the Westhaven Undercrossing (Br. No. 04-0056)

Support Location	Pile Type [1,3]	Design Load (Tons)	Bottom of Footing Elevation [1] (ft)	Average Pile Tip Elevation [2] (ft)
Bent 3 left	10BP-42 Steel Piles	45	164.65	132.8
Bent 3 centerline	10BP-42 Steel Piles	45	167.65	132.9
Bent 3 right	10BP-42 Steel Piles	45	170.65	135.5
Abutment 4	Driven Steel & Concrete Piles	45	192.35	138.6

Notes:

1. *Bottom of Footing Elevations and Pile Types were obtained from the Foundation Plan, Abutment Details sheet and Bent Details sheet for the Moonstone Road Undercrossing approved January 12, 1959. Elevations have been converted from NGVD29 to NAVD88.*
2. *The Average Pile Tip Elevations were obtained from the Foundation Plan for the Moonstone Road Undercrossing approved January 12, 1959. Elevations have been converted from NGVD29 to NAVD88.*
3. *The Abutment Details Sheet for the Moonstone Road Undercrossing approved January 12, 1959 indicates steel piles and 3 concrete piles were used at Abutment 4. The specific type of steel and concrete piles used at Abutment 4 are not identified on the As-Built plans. According to the Moonstone Road Undercrossing Pile Details sheet approved January 12, 1959, Cast-in-drilled-hole (CIDH) piles were not used for this project.*

Foundation Recommendations

The following foundation recommendations are based on the General Plan dated March 14, 2012, Foundation Plan dated March 14, 2012, conversations with Mr. Manode Kodsuntie from the Division of Structure Design and the subsurface investigations conducted at the site.

Spread footing foundations are recommended at the infill wall locations. The nominal bearing resistance of the soil underlying the footings was calculated using the formulation provided by the 2007 AASHTO Bridge Design Specifications. Refer to Table 5 for the Infill Wall Foundation Design Recommendations.

The settlement under the proposed design loads is anticipated to be within tolerable limits for the proposed structure.

Table 5. Infill Wall Foundation Design Recommendations for Westhaven Drive UC (Br. No. 04-0056)

Foundation Design Recommendations for Spread Footings[1,2]										
Support Location	Footing Size (ft)		Bottom of Footing Elevation (ft)	Minimum Footing Embedment Depth (ft)	Total Permissible Support Settlement (inches)	WSD (LRFD Service-I Limit State Load Combination)		LRFD		
	B	L						Service	Strength $\varphi_b = .45$	Extreme Event $\varphi_b = 1.00$
						Permissible Gross Contact Stress (ksf)	Allowable Gross Bearing Capacity (ksf)	Permissible Net Contact Stress (ksf)	Factored Gross Nominal Bearing Resistance (ksf)	Factored Gross Nominal Bearing Resistance (ksf)
Bent 2 Left	6.0	7.0	167.65	5	1	N/A	N/A	6	8.1	18
Bent 2 Center	6.0	7.0	169.65	5	1	N/A	N/A	6	8.1	18
Bent 2 Right	6.0	7.0	171.65	5	1	N/A	N/A	6	8.1	18
Bent 3 Left	6.0	8.0	164.65	5	3	N/A	N/A	4	8.1	15
Bent 3 Center	6.0	8.0	167.65	5	3	N/A	N/A	4	8.1	15
Bent 3 Right	6.0	8.0	170.65	5	3	N/A	N/A	4	8.1	15

Notes:

1) Recommendations are based on the foundation geometry and the load data provided by Structure Design in the Foundation Design Data Sheet. The footing contact area is taken as equal to the effective footing area, where applicable.

2) See MTD 4-1 for definitions and applications of the recommended design parameters.

Construction Considerations

1. The upper 6 inches of the bottom of footing excavations shall be scarified and properly compacted to at least 95% relative compaction.

Project Information

Standard Special Provisions S5-280, "Project Information," discloses to bidders and contractors a list of pertinent information available for their inspection prior to bid opening. The following is an excerpt from SSP S5-280 disclosing information originating from Geotechnical Services. Items listed to be included in the Information Handout will be provided in Acrobat (.pdf) format to the addressee(s) of this report via electronic mail.

Data and information attached with the project plans are:

A. Log of Test Borings (Westhaven Dr. UC, Br. No. 04-0056).

Data and information included in the Information Handout provided to the bidders and contractors are:

A. Foundation Report (Westhaven Dr. UC, Br. No. 04-0056) dated April 14, 2012.

The recommendations contained in this report are based on specific project information regarding design loads, foundation dimensions and structure locations provided by the OBDN, Branch 7. If any conceptual changes are made during final project design, the Office of Geotechnical Design - North, Branch A should review those changes to determine if the foundation recommendations provided in this report are still applicable. Any questions regarding the above recommendations should be directed to Tim Alderman at (916) 227-1035 or Reid Buell at (916) 227-1012, of the Office of Geotechnical Design-North, Branch A.

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Attachments: ARS Curve

cc: OGDN File
GS File Room
Reid Buell
Kim Floyd – District 1 Project Manager
Structure OE
Structure Construction R.E. Pending File – RE_Pending_File @dot.ca.gov

REFERENCES

Harden, Deborah R., 1998, California Geology, Prentice Hall, pp. 53-54

Wagner, D.L., Jennings and Saucedo, G.J., 1987, Geologic Map of the Weed Quadrangle, California, California Geological Survey (formerly the California Divisions of Mines and Geology), scale 1:250,000, 1 map.

Seismic Design Criteria (2006), California Department of Transportation, Version 1.4.

Merriam, M., 2011, "Fault Evaluation Report" for 6th Street OC/Westhaven Dr. UC, Br. No.'s 4-57/4-56 dated August 8, 2011.

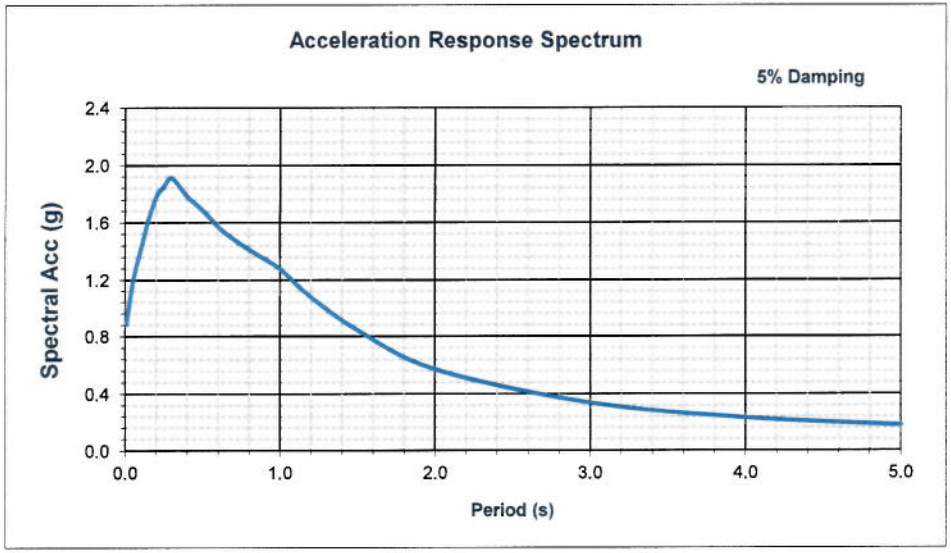
Westhaven Dr UC Bridge

Bridge No. 04-0056
EA No. 0100020153

Latitude 41.0321
Longitude -124.1102

Control **Envelope**

Period (s)	Sa(g)
0.010	0.888
0.050	1.195
0.100	1.410
0.150	1.617
0.200	1.782
0.250	1.851
0.300	1.910
0.400	1.781
0.500	1.687
0.600	1.569
0.700	1.483
0.850	1.377
1.000	1.277
1.200	1.074
1.500	0.843
2.000	0.571
3.000	0.337
4.000	0.230
5.000	0.178



Deterministic Procedure Data					
Fault	Mad River fault zone (McKinleyville fault)		R_{rup}	2.2	km
Fault ID	77		R_{jb}	0.0	km
Style	R		R_x	3.8	km
Mmax	7.2		V_{S30}	350	m/s
Dip	35	deg	$Z_{1.0}$	N/A	m
Z_{TOR}	0	km	$Z_{2.5}$	N/A	km

Deterministic Procedure Data					
Fault	Mad River fault zone (Trinidad fault)		R_{rup}	0.5	km
Fault ID	22		R_{jb}	0.5	km
Style	R		R_x	0.5	km
Mmax	7.5		V_{S30}	350	m/s
Dip	35	deg	$Z_{1.0}$	N/A	m
Z_{TOR}	0	km	$Z_{2.5}$	N/A	km

Notes

Please note the Design ARS curve is an envelope of the above active faults and the probabilitic method.
The probabilitic method is based on 5% probability of exceedance in 50 years (975 years return period).

Final

Design Response Spectrum

State of California | Business, Transportation and Housing Agency

Memorandum

Flex your power!
Be energy efficient!

To: KELLY HOLDEN
BRANCH CHIEF
Office of Bridge Design-North
Division of Engineering Services

Design Branch 7

Date: April 12, 2012

File: 01-HUM-101- PM 98.4
Sixth Street OC
(Seismic Retrofit)
Br. No. 04-0057
EA 01-459701
(Proj. 0100020153)

Attention: Mr. Manode Kodsuntie

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES Geotechnical Services – MS 5
Office of Geotechnical Design – North

Subject: Foundation Report for Sixth Street Overcrossing

Introduction

Per your request dated January 5, 2012, the Office of Geotechnical Design-North (OGD-N), Branch A has prepared the Foundation Report for the proposed seismic retrofit of the Sixth Street Overcrossing (Br. No. 04-0057) located on Route 101 at PM 98.4, in Humboldt County, California.

The following recommendations are based on a subsurface investigation completed in February 2012 along with a review of the available General Plan, Foundation Plan, existing As-Built borings and records, Bridge Inspection Reports and available geologic literature and mapping.

Elevations used in this report are based on the NAVD 88 vertical datum. The "As-Built" elevations were converted from NGVD 29 to NAVD 88 by using a conversion factor of +3.32 ft.

The following Department of Transportation, Caltrans records and resources were considered during preparation of the Foundation Report:

- General Plan for the Sixth Street Overcrossing (Br. No. 04-0057) "incomplete plan for design study" printed April 3, 2012.
- Foundation Plan for the Sixth Street Overcrossing (Br. No. 04-0057) "incomplete plan for design study" printed April 3, 2012.

- As-Built General Plan for the Sixth Street Overcrossing (Br. No. 04-0057) approved January 12, 1959.
- As-Built Foundation Plan for the Sixth Street Overcrossing (Br. No. 04-0057) approved January 12, 1959.
- As-Built Abutment No. 1 Details for the Sixth Street Overcrossing (Br. No. 04-0057) approved January 12, 1959.
- As-Built Abutment No. 4 Details for the Sixth Street Overcrossing (Br. No. 04-0057) approved January 12, 1959.
- As-Built Bent Details for the Sixth Street Overcrossing (Br. No. 04-0057) approved January 12, 1959.
- As-Built Standard Details Sheet No. 1 for the Sixth Street Overcrossing (Br. No. 04-0057) approved January 12, 1959.
- As-Built Standard Details Sheet No. 2 for the Sixth Street Overcrossing (Br. No. 04-0057) approved January 12, 1959.
- As-Built Log of Test Borings for the Sixth Street Overcrossing (Br. No. 04-0057) approved January 12, 1959.
- Bridge Inspection Report for the Sixth Street Overcrossing (Br. No. 04-0057) dated August 10, 2004.

Project Description

The existing bridge was built in 1960. The structure was built as a three span continuous Reinforced Concrete (RC) box girder (4 cells) superstructure on open-end abutments and RC 2-column bents. All supports are supported on spread footings.

The proposed seismic retrofit for Sixth Street OC includes attaching catcher blocks to the abutment seats and constructing infill walls between the existing columns. The infill walls will be on spread footings that are intended to provide structural stability during and after the design seismic event.

The following foundation recommendations are based on a review of existing bridge "As-Built" data and a field study. Elevations used in this report are based on NAVD 88 vertical datum and horizontal coordinates are based on the NAD 83 horizontal datum, unless otherwise noted.

Field Investigation and Testing

The Office of Geotechnical Design-North conducted a subsurface investigation in February 2012 for the proposed seismic retrofit of the Sixth Street Overcrossing (Br. No. 04-0057).

The 2012 subsurface investigation for the Sixth Street Overcrossing consisted of one hand auger boring (No. HA-12-001). The maximum depth reached by the 2012 subsurface investigation for Sixth Street Overcrossing was approximately 13 feet. The purpose of the hand auger boring was to collect bulk soil samples for corrosion testing and to check for groundwater. A summary of the boring drilled during the subsurface investigation is included below in Table 1.

Table 1. The 2012 Subsurface Exploration Summary

Structure	Boring No.	Completion Date	Drilling Method	Approximate Ground Surface Elevation (ft.)	Boring Depth (ft.)
6th St. OC	HA-12-001	2/8/12	Hand Auger	275	13

Summary of Site Geology and Subsurface Conditions

Regional Setting and Area Geology

The project site is located within the Coast Ranges geomorphic province. Based on the Geologic Map of the Weed Quadrangle, California scale 1:250,000, compiled by D. L. Wagner and G. J. Saucedo, 1987, California Geological Survey (formerly the Division of Mines and Geology) indicates the site area consists of Cretaceous Franciscan Complex (KJf) and Quaternary Marine terrace deposits (Qmt).

Subsurface Conditions

Based upon the recent field investigation and a review of the "As-Built" log of test borings performed in June 1957, the site is underlain by very loose sand overlying compact (medium dense-dense) to very dense sand, silty sand and gravel.

For subsurface data and boring locations, please refer to the Log of Test Borings sheets for detailed observations, information and conditions.

Groundwater

Groundwater was measured during the June 1957 subsurface investigation between elevations 274.0 and 284.9 feet (NAVD 88). No groundwater was encountered above elevation 262.0 (NAVD 88) during the recent February 2012 field investigation. Groundwater surface elevations are subject to seasonal fluctuations and may occur at higher or lower elevations depending on the conditions at time of construction.

Scour

There is no scour potential at the site, since the bridge does not span any water channel.

Corrosion Evaluation

A composite soil sample was collected from Boring HA-12-001 for the Sixth Street OC (seismic retrofit) drilled during the 2012 subsurface investigation. The Office of Testing and Technology Services, Corrosive Technology Branch tested the composite sample for corrosive potential. The Corrosion Technology Branch considers a site to be corrosive if one or more of the following conditions exist for the representative soil or water samples collected at the site: chloride concentration is 500 ppm or greater, sulfate concentration is 2000 ppm or greater, or the pH is 5.5 or less. The minimum resistivity serves only as an indicator parameter for the possible presence of soluble salts and is not used to define a site as being corrosive. It is the practice of the Corrosion Technology Branch that if the minimum resistivity of the sample is greater than 1000 ohm-cm, the sample is considered to be non-corrosive and testing to determine the sulfate and chloride content is not performed.

The results of the laboratory tests determined that the composite sample was considered to be non-corrosive at this site. Refer to Table 2 for specific test results.

Table 2. Corrosion Test Summary of the Composite Sample for Sixth Street OC (Seismic Retrofit) (Br. No. 04-0057)

SIC Corrosion Number	Nearby Support Location	Boring Number	Sample Depth (ft)	pH	Minimum Resistivity (Ohm-Cm)	Chloride Content (PPM)	Sulfate Content (PPM)
C837026	Bent 2	HA-12-001	4	6.73	1610	N/A	N/A

Seismic Recommendations

Based on the As-Built Log of Test Borings, a V_{S30} (the weighted shear wave velocity for the top 100 feet of foundation materials) of 1150 feet per second was extrapolated using the correlations formulas for the purpose of the design of the ground motion.

Based on the Caltrans Seismic Design Procedure and the ARS Online Tool Version 2.0, the Sixth St. OC is in the proximity of two active faults. The Mad River fault zone (Trinidad fault) (Fault ID No. 22) with Mmax of 7.5 located northeast of the bridge with a rupture distance of 0.2 mile, and the Mad River fault zone (McKinleyville fault) (Fault ID No. 31) with Mmax of 7.2 located southwest of the bridge with a rupture distance of 1.2 miles. Both faults are referred to as reverse faults.

Please note the spectral accelerations (SA) from the two aforementioned active faults and the SA produced from the probabilistic method make up the recommended Acceleration Response Spectrum (ARS) curve. So, the ARS Curve is an envelope of the deterministic and probabilistic methods. Furthermore the probabilistic method is based on USGS 5% probability of exceedance in 50 years (return period 975 years).

The design ARS curve with a peak ground acceleration of 0.89g is attached.

The potential for soil liquefaction based on the new water level data is considered to be low.

A report titled "Fault Evaluation Report" by Martha Merriam dated August 8, 2011 was prepared for Westhaven Drive Undercrossing (Br. No. 04-0056) and Sixth Street Overcrossing (Br. No. 04-0057). According to this report surface rupture is unlikely to occur at these two bridges and does not need to be addressed during design.

As-Built Foundation Data

As-Built Abutment Details and Bent Details sheets for the Sixth Street Overcrossing (Br. No. 04-0057) approved January 12, 1959 indicate that the bridge foundations consist of spread footings at all supports. A summary of the existing foundation data is presented below in Table 3.

Table 3. As-Built Spread Footing Data for the Sixth Street Overcrossing (Br. No. 04-0057)

Support Location	Design Footing Pressure[1] (tsf)	Bottom of Footing Elevation[2] (ft)
Abutment 1	2.5	278.32
Bent 2	2.5	269.82
Bent 3	2.5	267.82
Abutment 4	2.5	294.32

Notes:

1. *Design Footing Pressure was obtained from Sixth Street OC Standard Details No. 2 sheet approved January 12, 1959.*
2. *Bottom of Footing Elevations obtained from the Sixth Street OC Foundation Plan sheet approved January 12, 1959. Elevations have been converted from NGVD29 to NAVD88.*

Foundation Recommendations

The following foundation recommendations are based on the General Plan "incomplete plan for design study" printed April 3, 2012, Foundation Plan "incomplete plan for design study" printed April 3, 2012, conversations with Mr. Manode Kodsuntie from the Division of Structure Design and the subsurface investigations conducted at the site.

Spread footing foundations are recommended at the infill wall locations. The nominal bearing resistance of the soil underlying the footings was calculated using the formulation provided by the 2007 AASHTO Bridge Design Specifications. Refer to Table 4 for the Infill Wall Foundation Design Recommendations.

Table 4. Infill Wall Foundation Design Recommendations for the Sixth Street OC (Br. No. 04-0057)

Foundation Design Recommendations for Spread Footings[1,2]										
Support Location	Footing Size (ft)		Bottom of Footing Elevation (ft)	Minimum Footing Embedment Depth (ft)	Total Permissible Support Settlement (inches)	WSD (LRFD Service-I Limit State Load Combination)		LRFD		
	B	L						Service	Strength $\varphi_b = .45$	Extreme Event $\varphi_b = 1.00$
						Permissible Gross Contact Stress (ksf)	Allowable Gross Bearing Capacity (ksf)	Permissible Net Contact Stress (ksf)	Factored Gross Nominal Bearing Resistance (ksf)	Factored Gross Nominal Bearing Resistance (ksf)
Bent 2	6.0	12	269.82	5	1	N/A	N/A	5	6.8	15
Bent 3	6.0	12	267.82	5	1	N/A	N/A	5	6.8	15

Notes:
1) Recommendations are based on the foundation geometry and the load data provided by Structure Design in the Foundation Design Data Sheet. The footing contact area is taken as equal to the effective footing area, where applicable.
2) See MTD 4-1 for definitions and applications of the recommended design parameters.

The settlement under the proposed design loads is anticipated to be within tolerable limits for the proposed structure.

Construction Considerations

1. The upper 6 inches of the bottom of footing excavations shall be scarified and properly compacted to at least 95% relative compaction

Project Information

Standard Special Provisions S5-280, "Project Information," discloses to bidders and contractors a list of pertinent information available for their inspection prior to bid opening. The following is an excerpt from SSP S5-280 disclosing information originating from Geotechnical Services. Items listed to be included in the Information Handout will be provided in Acrobat (.pdf) format to the addressee(s) of this report via electronic mail.

Data and information attached with the project plans are:

A. Log of Test Borings (Sixth Street OC, Br. No. 04-0057).

Data and information included in the Information Handout provided to the bidders and contractors are:

A. Foundation Report (Sixth Street OC, Br. No. 04-0057) dated April 12, 2012.

The recommendations contained in this report are based on specific project information regarding design loads, foundation dimensions and structure locations provided by the OBDN, Branch 7. If any conceptual changes are made during final project design, the Office of Geotechnical Design - North, Branch A should review those changes to determine if the foundation recommendations provided in this report are still applicable. Any questions regarding the above recommendations should be directed to Tim Alderman at (916) 227-1035 or Reid Buell at (916) 227-1012, of the Office of Geotechnical Design-North, Branch A.

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REFERENCES

Harden, Deborah R., 1998, California Geology, Prentice Hall, pp. 53-54

Wagner, D.L., Jennings and Saucedo, G.J., 1987, Geologic Map of the Weed Quadrangle, California, California Geological Survey (formerly the California Divisions of Mines and Geology), scale 1:250,000, 1 map.

Seismic Design Criteria (2006), California Department of Transportation, Version 1.4.

Merriam, M., 2011, "Fault Evaluation Report" for 6th Street OC/Westhaven Dr. UC, Br. No.'s 4-57/4-56 dated August 8, 2011.

Sixth Street OC

Bridge No. 04-0057

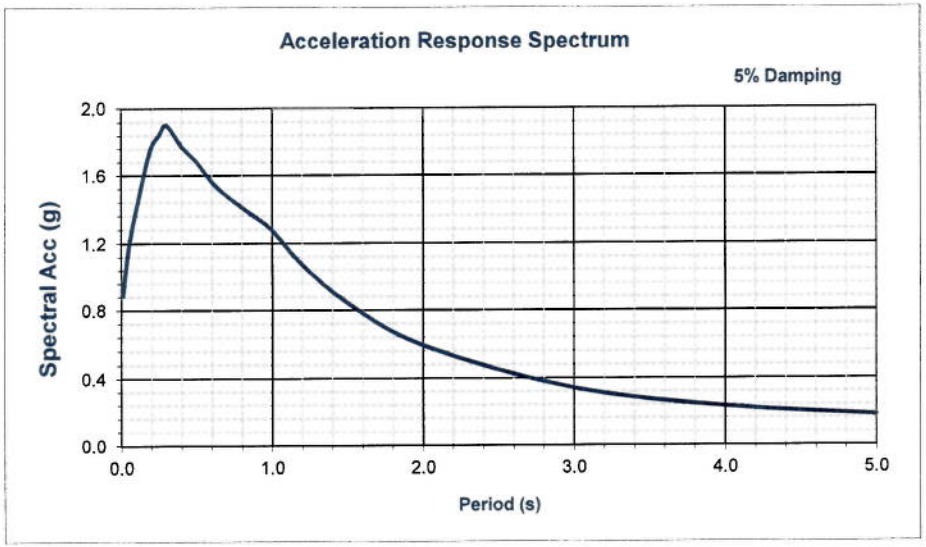
EA No. 0100020153

Latitude 41.0358

Longitude -124.1123

Control **Envelope**

Period (s)	Sa(g)
0.010	0.888
0.050	1.189
0.100	1.404
0.150	1.610
0.200	1.775
0.250	1.844
0.300	1.902
0.400	1.773
0.500	1.679
0.600	1.561
0.700	1.478
0.850	1.376
1.000	1.276
1.200	1.073
1.500	0.843
2.000	0.594
3.000	0.344
4.000	0.232
5.000	0.180



Deterministic Procedure Data					
Fault	Mad River fault zone (McKinleyville fault)		R_{rup}	2.0	km
Fault ID	77		R_{jb}	0.0	km
Style	R		R_x	3.4	km
Mmax	7.2		V_{S30}	350	m/s
Dip	35	deg	$Z_{1.0}$	N/A	m
Z_{TOR}	0	km	$Z_{2.5}$	N/A	km

Deterministic Procedure Data					
Fault	Mad River fault zone (Trinidad fault)		R_{rup}	0.3	km
Fault ID	22		R_{jb}	0.3	km
Style	R		R_x	0.3	km
Mmax	7.5		V_{S30}	350	m/s
Dip	35	deg	$Z_{1.0}$	N/A	m
Z_{TOR}	0	km	$Z_{2.5}$	N/A	km

Notes

Please note the Design ARS curve is an envelope of the above active faults and the probabilitic method.

The probabilitic method is based on 5% probability of exceedance in 50 years (975 years return period).

Preliminary

Design Response Spectrum

State of California **Business, Transportation and Housing Agency**

M e m o r a n d u m

Flex your power!
Be energy efficient!

To: KELLY HOLDEN
Branch Chief
Office of Bridge Design-North
Division of Engineering Services
Design Branch 7

Date: July 9, 2012

File: 01-HUM-101- PM 100.7
Trinidad Road UC
(Seismic Retrofit)
Br. No. 04-0058
EA 01-459701
(Proj. #0100020153)

Attention: Mr. Manode Kodsuntie

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
Geotechnical Services – MS 5
Office of Geotechnical Design – North

Subject: Foundation Report for Trinidad Road Undercrossing

Introduction

Per your request the Office of Geotechnical Design-North (OGD-N), Branch A has prepared the Foundation Report for the proposed seismic retrofit of the Trinidad Road Undercrossing (Br. No. 04-0058) located on Route 101 at PM 100.7, in Humboldt County, California.

The following recommendations are based on a field study completed in December 2011 along with a review of the available General Plan, Foundation Plan, existing As-Built borings and records, Bridge Inspection Reports and available geologic literature and mapping.

Elevations used in this report are based on the NAVD 88 vertical datum. The "As-Built" elevations were converted from NGVD 29 to NAVD 88 by using a conversion factor of +3.09 ft.

The following Department of Transportation, Caltrans records and resources were used for preparation of the Foundation Report:

- General Plan for the Trinidad Road Undercrossing (Br. No. 04-0058) dated March 29, 2012.
- Foundation Plan for the Trinidad Road Undercrossing (Br. No. 04-0058) dated March 26, 2012.

- As-Built General Plan for the Trinidad Road Undercrossing (Br. No. 04-0058) approved January 12, 1959.
- As-Built Foundation Plan for the Trinidad Road Undercrossing (Br. No. 04-0058) approved January 12, 1959.
- As-Built Abutment Details for the Trinidad Road Undercrossing (Br. No. 04-0058) approved January 12, 1959.
- As-Built Bent Details for the Trinidad Road Undercrossing (Br. No. 04-0058) approved January 12, 1959.
- As-Built Log of Test Borings for the Trinidad Road Undercrossing (Br. No. 04-0058) approved January 12, 1959.
- Bridge Inspection Report for the Trinidad Road Undercrossing (Br. No. 04-0058) dated August 15, 2006.

Project Description

The existing bridge was built in 1960. The structure was built as a three span continuous Reinforced Concrete (RC) continuous T-girder (9) superstructure with open-end RC abutments on steel piles and RC 3-column bents on spread footings. Abutment 1 and Abutment 4 are supported on piles. Bent 2 and Bent 3 are supported on spread footings.

The proposed seismic retrofit for Trinidad Road Undercrossing includes constructing infill walls between the existing columns. The infill walls will be on spread footings that are intended to provide structural stability during and after the design seismic event.

The following foundation recommendations are based on a review of existing bridge "As-Built" data and a field study. The field study consisted of a fault investigation performed in 2011 to determine the surface rupture potential of the Trinidad fault located in the vicinity of Trinidad Road UC. Elevations used in this report are based on NAVD 88 vertical datum and horizontal coordinates are based on the NAD 83 horizontal datum, unless otherwise noted.

Field Investigation and Testing

The Office of Geotechnical Design-North conducted a field study in September, October and December 2011 for the proposed seismic retrofit of the Trinidad Road Undercrossing (Br. No. 04-0058).

The 2011 field study for the Trinidad Road Undercrossing consisted of two mud rotary borings (RC-11-001 and RC-11-002) and two trenches (Trench 1 and Trench 2). The borings and trenches were excavated in order to assist in understanding the surface rupture potential at Trinidad Road UC. The maximum depth reached by the 2011 subsurface investigation for the Trinidad Road Undercrossing was approximately 20 feet. Sampling was achieved in the borings by utilizing the Standard Penetration Test (SPT) sampler. Trenching was carried out west of Trinidad Road UC at a location closest to the mapped location of the Trinidad fault to determine if a fault segment continued on trend towards the bridge. This trench (Caltrans Trench 1) was excavated along the eastern perimeter of the Trinidad Park & Ride lot during the week of October 26, 2011. Caltrans Trench 2 was subsequently excavated beneath the bridge along the southern side of Trinidad Road (aka Main St.), from the eastern extent of the bridge to approximately the southbound 101 freeway onramp. No sampling was performed in the trench excavations. A summary of the borings and trenches excavated during the subsurface investigation is included below in Table 1.

Table 1. The 2011 Subsurface Exploration Summary

Structure	Boring/Trench No.	Completion Date	Excavation Method	Hammer Type	Hammer Efficiency (%)	Approximate Ground Surface Elevation(1) (ft.)	Excavation Depth (ft.)
Trinidad Road UC	RC-11-001	9/20/11	Acker Drill Rig	Auto	80	178.5	20
Trinidad Road UC	RC-11-002	9/20/11	Acker Drill Rig	Auto	80	183	11.5
Trinidad Road UC	Trench 1	10/26/11	Backhoe	N/A	N/A	±178	8 to 15
Trinidad Road UC	Trench 2	12/14/11	Backhoe	N/A	N/A	178.5 to 183	7 to 10

1. Elevation based on NAVD88 vertical datum.

Summary of Site Geology and Subsurface Conditions

Regional Setting and Area Geology

The project site is located within the Coast Ranges geomorphic province. Based on the Geologic Map of the Weed Quadrangle, California scale 1:250,000, compiled by D. L. Wagner and G. J. Saucedo, 1987, California Geological Survey (formerly the Division of Mines and Geology) indicates the site area consists of Cretaceous Franciscan Complex (KJf) and Quaternary Marine terrace deposits.

Subsurface Conditions

Based upon review of the "As-Built" log of test borings performed in June 1957, the site is described as being underlain by very loose to compact (medium dense-dense) silt, sand and gravel overlying slightly compact (medium dense) to dense clay and shale.

The 2011 fault investigation indicated the site to be underlain by medium dense clayey silt with gravel, sand and boulders overlying mudstone, greenstone and siltstone bedrock. The mudstone bedrock encountered in Trench 2 excavated below the existing Trinidad Road UC contained cobble to boulder size clasts. According to the fault study memorandum, a large (15 ft+) boulder was encountered in Trench 2 that required the use of a jackhammer backhoe attachment to remove. For a more detailed description of the materials encountered in the 2011 fault investigation please refer to the Caltrans memorandum "Surface Rupture Potential", Trinidad Road UC, prepared by Merriam, M. and Narwold, C., dated 7-6-2012).

The boring data are shown on the LOTBs which will be forwarded when completed.

Groundwater

Groundwater was measured during the June 1957 subsurface investigation between elevations 173.79 and 201.59 feet (NAVD88). Groundwater surface elevations are subject to seasonal fluctuations and may occur at higher or lower elevations depending on the conditions at time of construction.

Water was encountered in the eastern half of Caltrans Trench 2 flowing along the base of the fill (at approximate elevation 181 ft.) during the 2011 fault investigation. Seepage into the trench resulted in standing water at the bottom of the eastern end of the excavation. The seepage may be related to local runoff or actual groundwater since groundwater was found at similar elevations in the 1957 subsurface investigation. In

addition, water was observed in June 2012 seeping out of the base of the slope paving adjacent to Abutment 1 onto the ground surface.

Corrosion Evaluation

Composite soil samples were collected from Borings RC-11-001 and RC-11-002 for the Trinidad Road UC (seismic retrofit) drilled during the 2011 field study. The Office of Testing and Technology Services, Corrosive Technology Branch tested the composite samples for corrosive potential. The Corrosion Technology Branch considers a site to be corrosive if one or more of the following conditions exist for the representative soil or water samples collected at the site: chloride concentration is 500 ppm or greater, sulfate concentration is 2000 ppm or greater, or the pH is 5.5 or less. The minimum resistivity serves only as an indicator parameter for the possible presence of soluble salts and is not used to define a site as being corrosive. It is the practice of the Corrosion Technology Branch that if the minimum resistivity of the sample is greater than 1000 ohm-cm, the sample is considered to be non-corrosive and testing to determine the sulfate and chloride content is not performed.

The results of the laboratory tests determined that the composite samples were considered to be non-corrosive at this site. Refer to Table 2 for specific test results.

Table 2. Corrosion Test Summary of the Composite Samples for Trinidad Road UC (Seismic Retrofit) (Br. No. 04-0058)

SIC Corrosion Number	Nearby Support Location	Boring Number	Sample Depth (ft)	pH	Minimum Resistivity (Ohm-Cm)	Chloride Content (PPM)	Sulfate Content (PPM)
C837028	Bent 2	RC-11-001	4.5	7.57	952	3	946
C837029	Bent 2	RC-11-002	10	8.64	2350	N/A	N/A

Scour

There is no scour potential at the site, since the bridge does not span any water channel.

Seismic Recommendations

Based on the As-Built Log of Test Borings, a V_{S30} (the weighted shear wave velocity for the top 100 feet of foundation materials) of 1150 feet per second was extrapolated using the correlations formulas for the purpose of the design of the ground motion.

Based on the Caltrans Seismic Design Procedure and the ARS Online Tool Version 2.0, the Trinidad Road UC is in the proximity of two active faults. The Mad River fault zone (Trinidad fault) (Fault ID No. 22) with Mmax of 7.5 located northeast of the bridge with a rupture distance of 0.0 mile, and the Mad River fault zone (McKinleyville fault) (Fault ID No. 31) with Mmax of 7.2 located southwest of the bridge with a rupture distance of 1.3 miles. Both faults are referred to as reverse faults.

Please note the spectral accelerations (SA) from the two aforementioned active faults and the SA produced from the probabilistic method make up the recommended Acceleration Response Spectrum (ARS) curve. So, the ARS Curve is an envelope of the deterministic and probabilistic methods. Furthermore the probabilistic method is based on USGS 5% probability of exceedance in 50 years (return period 975 years).

The design ARS curve with a peak ground acceleration of 0.92g is attached.

According to the memorandum "Surface Rupture Potential", Trinidad Road UC (2012) by Merriam, M. and Narwold C., fault displacements recommended for design may be considered negligible. Note that because of limitations in plotting fault traces, ARS Online depicts this bridge as lying west of the Trinidad fault (and on the foot wall of the fault). According to the fault investigation report, the bridge lies east of or over the fault, on the hanging wall. Higher levels of ground motion are expected at sites on the hanging wall of a fault. These effects are included in development of the design response spectrum.

As-Built Foundation Data

As-Built Abutment Details and Bent Details sheets for the Trinidad Road Undercrossing (Br. No. 04-0058) approved January 12, 1959 indicate that the bridge foundations consist of a combination of spread footings and steel H-piles. The design load of piling for this structure is shown as 45 tons on the As-Built Foundation Plan approved January 12, 1959. A summary of the existing foundation data is presented below in Tables 3 and 4.

Table 3
As-Built Spread Footing Data for the Trinidad Road UC (Br. No. 04-0058)

Support Location	Design Footing Pressure[(1)] (tsf)	Bottom of Footing Elevation[(2)] (ft)
Bent 2 left	3.0	168.1
Bent 2 center	3.0	173.1
Bent 2 right	3.0	178.1
Bent 3 left	3.0	170.8
Bent 3 center	3.0	173.1
Bent 3 right	3.0	176.1

Notes:

1. *Allowable Design Footing Pressure was obtained from Trinidad Road UC Foundation Plan approved January 12, 1959.*
2. *Bottom of Footing Elevations obtained from the Trinidad Road UC General Plan and Bent Details sheets approved January 12, 1959. Elevations have been converted from NGVD29 to NAVD88.*

Table 4
As-Built Pile Data for the Trinidad Road UC (Br. No. 04-0058)

Support Location	Pile Type [(1)]	Design Load (Tons)	Average Pile Tip Elevation [(1)] (ft)
Abutment 1	10BP-42 Steel Piles	45	163.6
Abutment 4	10BP-42 Steel Piles	45	165.9

Notes:

1. *The Pile Type and Average Pile Tip Elevations were obtained from the General Plan sheet for the Trinidad Road Undercrossing approved January 12, 1959. Elevations have been converted from NGVD29 to NAVD88.*

Foundation Recommendations

The following foundation recommendations are based on the General Plan dated March 29, 2012, Foundation Plan dated March 26, 2012, conversations with Mr. Manode Kodsuntie from the Division of Structure Design and the subsurface investigations conducted at the site.

Spread footing foundations are recommended at the infill wall locations. The nominal bearing resistance of the soil underlying the footings was calculated using the formulation provided by the 2007 AASHTO Bridge Design Specifications. Refer to Table 5 for the Infill Wall Foundation Design Recommendations.

Table 5
Infill Wall Foundation Design Recommendations for Trinidad Road UC (Br. No. 04-0058)

Foundation Design Recommendations for Spread Footings[1,2]										
Support Location	Footing Size (ft)		Bottom of Footing Elevation (ft)	Minimum Footing Embedment Depth (ft)	Total Permissible Support Settlement (inches)	WSD (LRFD Service-I Limit State Load Combination)		LRFD		
	B	L						Service	Strength φ_b = .45	Extreme Event φ_b = 1.00
						Permissible Gross Contact Stress (ksf)	Allowable Gross Bearing Capacity (ksf)	Permissible Net Contact Stress (ksf)	Factored Gross Nominal Bearing Resistance (ksf)	Factored Gross Nominal Bearing Resistance (ksf)
Bent 2 Left	6.0	8.0	168.09	6	2	N/A	N/A	6	8.1	18
Bent 2 Center	6.0	8.0	173.09	6	1	N/A	N/A	6	8.1	18
Bent 2 Right	6.0	8.0	178.09	6	1	N/A	N/A	6	8.1	18
Bent 3 Left	6.0	8.0	170.79	6	2	N/A	N/A	6	8.1	18
Bent 3 Center	6.0	8.0	173.09	6	1	N/A	N/A	6	8.1	18
Bent 3 Right	6.0	8.0	176.09	6	1	N/A	N/A	6	8.1	18

Notes:
1) Recommendations are based on the foundation geometry and the load data provided by Structure Design in the Foundation Design Data Sheet. The footing contact area is taken as equal to the effective footing area, where applicable.
2) See MTD 4-1 for definitions and applications of the recommended design parameters.

The settlement under the proposed design loads is anticipated to be within tolerable limits for the proposed structure.

Construction Considerations

1. During the subsurface investigation, cobbles and boulders up to 15 feet were encountered. Boulders with similar dimensions may be encountered during excavation for foundations and should be anticipated by the contractor. The presence of boulders larger than 15 feet cannot be precluded.

2. Water was encountered during the field investigation and should be anticipated during excavation and construction of the foundations for the proposed infill walls. Groundwater surface elevations are subject to seasonal fluctuations and may occur at higher or lower elevations depending on the conditions at any particular time.

Project Information

Standard Special Provisions S5-280, "Project Information," discloses to bidders and contractors a list of pertinent information available for their inspection prior to bid opening. The following is an excerpt from SSP S5-280 disclosing information originating from Geotechnical Services. Items listed to be included in the Information Handout will be provided in Acrobat (.pdf) format to the addressee(s) of this report via electronic mail.

Data and information attached with the project plans are:

A. Log of Test Borings (Trinidad Road UC, Br. No. 04-0058).

Data and information included in the Information Handout provided to the bidders and contractors are:

A. Foundation Report (Trinidad Road UC, Br. No. 04-0058) dated July 9, 2012.

The recommendations contained in this report are based on specific project information regarding design loads, foundation dimensions and structure locations provided by the OBDN, Branch 7. If any conceptual changes are made during final project design, the Office of Geotechnical Design - North, Branch A should review those changes to determine if the foundation recommendations provided in this report are still applicable. Any questions regarding the above recommendations should be directed to Tim Alderman at (916) 227-1035 or Reid Buell at (916) 227-1012, of the Office of Geotechnical Design-North, Branch A.

Report by:

Supervised by:

REGISTERED GEOLOGIST
REID L. BUELL
No. 1481
Exp. 4/30/13
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

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Engineering Geologist
Office of Geotechnical Design-North

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REGISTERED PROFESSIONAL ENGINEER
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Exp. 9/30/12
CIVIL
STATE OF CALIFORNIA

REZA MAHALLATI
Senior Materials & Research Engineer
Office of Geotechnical Design-North

Attachments: ARS Curve

c: OGDN File
GS File Room
Reid Buell
Kim Floyd – District 1 Project Manager
Structure OE
Structure Construction R.E. Pending File – RE_Pending_File @dot.ca.gov

REFERENCES

Harden, Deborah R., 1998, California Geology, Prentice Hall, pp. 53-54

Wagner, D.L., Jennings and Saucedo, G.J., 1987, Geologic Map of the Weed Quadrangle, California, California Geological Survey (formerly the California Divisions of Mines and Geology), scale 1:250,000, 1 map.

Merriam, M. and Narwold C., 2012, Surface Rupture Potential, Trinidad Road UC, memorandum to Manode Kodsuntie dated July 6, 2012.

Seismic Design Criteria (2006), California Department of Transportation, Version 1.4.

Trinidad Road UC

Bridge No. 04-0058

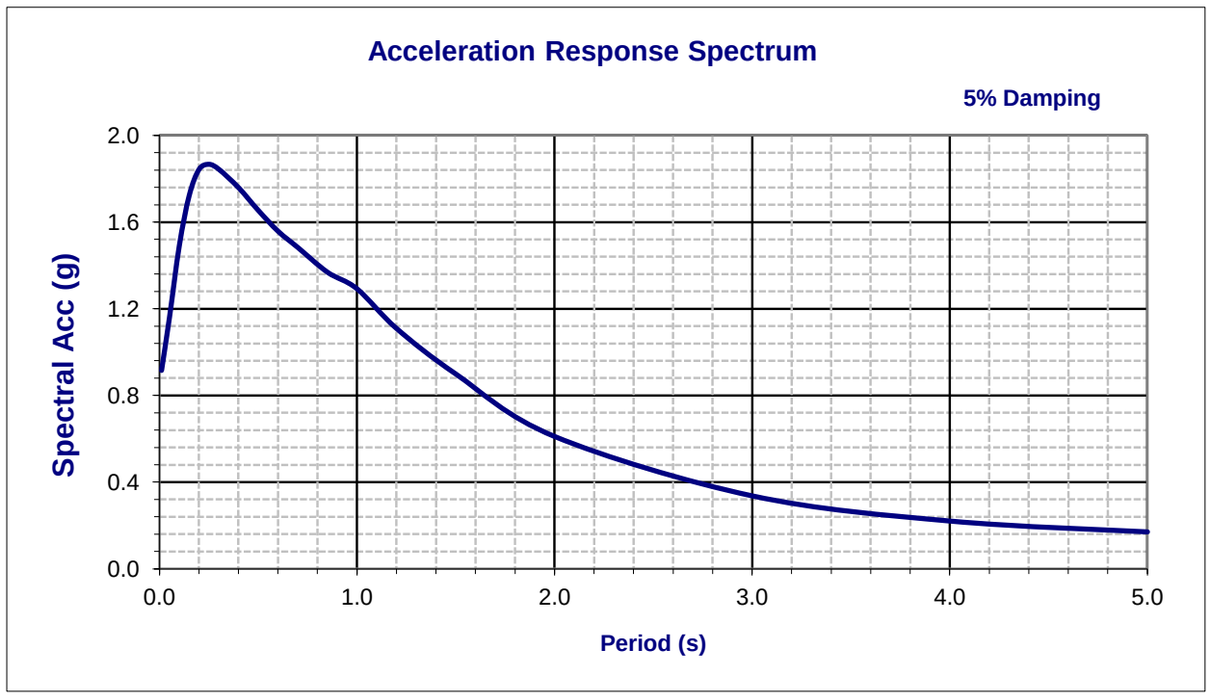
EA No. 0100020153

Latitude 41.0621

Longitude -124.1394

Control **Envelope**

Period (s)	Sa(g)
0.010	0.915
0.050	1.159
0.100	1.491
0.150	1.722
0.200	1.843
0.250	1.866
0.300	1.843
0.400	1.758
0.500	1.653
0.600	1.557
0.700	1.482
0.850	1.368
1.000	1.291
1.200	1.108
1.500	0.898
2.000	0.610
3.000	0.336
4.000	0.220
5.000	0.170



Deterministic Procedure Data					
Fault	Mad River fault zone (McKinleyville fault)		R_{rup}	2.20	km
Fault ID	31		R_{jb}	0.00	km
Style	R		R_x	3.80	km
Mmax	7.2		V_{S30}	380	m/s
Dip	35	deg	$Z_{1.0}$	N/A	m
Z_{TOR}	0	km	$Z_{2.5}$	N/A	km

Deterministic Procedure Data					
Fault	Mad River fault zone (Trinidad fault)		R_{rup}	0.0	km
Fault ID	22		R_{jb}	0.0	km
Style	R		R_x	0.0	km
Mmax	7.5		V_{S30}	380	m/s
Dip	35	deg	$Z_{1.0}$	N/A	m
Z_{TOR}	0	km	$Z_{2.5}$	N/A	km

Notes

Please note the Design ARS curve is an envelope of the above active faults.

Final

Design Response Spectrum

State of California
DEPARTMENT OF TRANSPORTATION

M e m o r a n d u m

Business, Transportation and Housing Agency

Flex your power!
Be energy efficient!

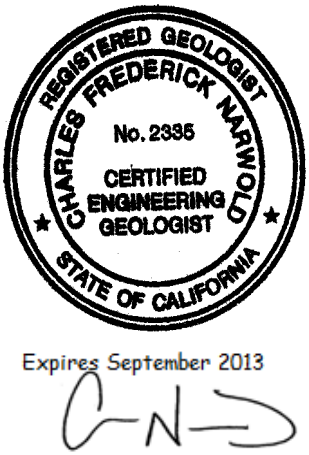
To: MANODE KODSUNTIE
SENIOR BRIDGE ENGINEER
STRUCTURE DESIGN NORTH

Date: July 6, 2012

File: 01-HUM-101 PM 100.7
EFIS ID: 0100020153
Br. No. 04-0058
Seismic Retrofit

From: MARTHA MERRIAM
ENGINEERING GEOLOGIST
GEOTECHNICAL SUPPORT

CHARLIE NARWOLD
SR. ENGR. GEOLOGIST
OGDN BRANCH B



Subject: **Surface Rupture Potential**

Summary

Surface rupture does not need to be further addressed at Trinidad Road UC. Although a site-specific fault investigation did not provide definitive proof that an active fault does not underlie this bridge, evidence from this investigation and from previous studies used in a probabilistic fault displacement analysis (PFDHA) results in an estimate of only a few inches of vertical separation, based on a 975 year return period. Use of a PFDHA value is permissible per MTD 20-8.

Note that because of limitations in plotting fault traces, ARS Online depicts this bridge as lying west of the Trinidad fault (and on the foot wall of the fault). However, the bridge lies east of or over the fault on the hanging wall as shown in Figures 1 and 2. Higher

levels of ground motion are expected at sites on the hanging wall of a fault. These effects should be included in development of the design response spectrum.

Background

The Trinidad fault is part of the Mad River fault zone, and is a reverse, 35 degree northeast dipping Holocene-age fault with an expected **M**Max of 7.5 (2008 USGS Fault Parameter Database). The Trinidad fault consists of an offshore segment as well as an onshore segment which is located near Trinidad Rd UC (Figure 1). The total length of the active fault is 88 km with top of rupture at 0 km and bottom of rupture at 13.2 km (USGS 2008).

The Trinidad fault is shown on maps as trending near or beneath Trinidad Rd UC (Smith, 1980; Busch, 1988). The fault was first identified in the 1970s by Rust (1982) and further studied during licensing of the Humboldt Bay Power Plant (HBPP). In 1982 the fault was zoned by CGS. Trinidad Rd UC is located within the regulatory Earthquake Fault Zone (EFZ) drawn for the Trinidad fault (Figure 2). Per MTD 20-8, Caltrans requires fault rupture potential to be addressed near Holocene-active faults. Therefore the potential for surface rupture was investigated at this site.

In a preliminary foundation and seismic recommendations report, Alderman (2008) indicated that if no further work was undertaken, the bridge should be designed for 8.0 to 9.8 feet of dip-slip displacement during events with recurrence intervals of 6,000 to 8,000 years, based on previous work conducted for HBPP (Coppersmith, 1980). The 1959 LOTBs show evidence permissive of active faulting beneath the bridge (i.e., a nearly 30 ft difference in ground water elevation from south to north, soil-like conditions beneath identified rock, an increase in fractured material to the south nearer the mapped fault trace, etc.). Air photos indicate a ridge that could have been associated with thrust faulting was likely removed during freeway construction. The 1959 Foundation Plan and an apparent “pile tip elevation” map included in the 1959 LOTBs also are suggestive of an east-west trending scarp that curves southwest at its eastern end towards the southern abutment of the bridge.

Numerous trenches have been excavated in the vicinity of the Trinidad UC to address faulting (Figure 3). Results of these investigations are presented in Table 1 on page 7 of this report.

Caltrans 2011 Fault Investigation

Per MTD 20-10 (revised), we followed CGS Note 49 during our investigation. Two trenches were excavated and logged to evaluate surface rupture potential at Trinidad Rd UC (Figure 3). Trenching was carried out west of Trinidad Rd UC at a location closest to the mapped location of the Trinidad fault to determine if a fault segment continued on trend towards the bridge. This trench (Caltrans Trench 1) was excavated along the eastern perimeter of the Trinidad Park & Ride lot during the week of October 26, 2011. Evidence for faulting was encountered in the trench warranting a second trench to determine if the fault zone exists beneath the bridge. Caltrans Trench 2 was subsequently excavated beneath the bridge along the southern side of Trinidad Road (aka Main St) from the eastern extent of the bridge to approximately the southbound 101 freeway onramp. Both trench locations have had recent surficial materials removed during road construction in the 1950s.

The trenches were excavated using a rubber tired backhoe, were shored and were covered at night with chain link fencing. At the end of the project the trenches were backfilled using the excavated material and compacted using a sheepsfoot attachment. Field visitors to the investigation included Roy Bibbens, Jim Morris, and Manode Kodsuntie, all from Caltrans, Harvey Kelsey and Mark Hemphill-Haley (Humboldt State University), and consultant Dave Simpson (SHN). All visitors participated in safety meetings before entering the work area. Work was done by Charlie Narwold, Dan Vann, Dawn McGuire, and Reagan Newman (OGDN) and Martha Merriam of Geotechnical Support.

Caltrans Trench 1 (Western trench, in the Park & Ride)

Caltrans Trench 1 was 190 feet long and 3 feet wide, and ranged in depth from 8 to 15 feet (Figure 4). The trench was oriented N45W at an angle of about 10-20 degrees to the mapped trace of the Trinidad fault. The log for Caltrans Trench 1 is attached (Note: only the southern 90 feet of the log is included for there was no evidence for faulting observed between Station 0 and Station 100). The trench exposed late-Quaternary-age marine terrace deposits (85,000± years old) of the Patricks Point terrace overlain by 12,000-18,000 year old aeolian deposits at the northern end of the trench (Station 0 to Station 135). Any Holocene-age or younger deposits that existed at the southern end of the trench were probably removed during original bridge construction.

Bedding exposed in the southern portion of the trench consisted mainly of alternating layers of medium and fine sand a few inches thick. The strike and dip of the bedding

measured near Station 170 is N20W dipping approximately 5 degrees southwest. An apparent 100 foot wide zone (reflecting an actual fault zone width of 20-40 feet when corrected for strike) of north-dipping thrust faults and folded beds was observed within the marine terrace deposits between approximately Station 90 and Station 190. The maximum apparent vertical offset due to faulting is on the order of ½ ft (Figure 5). The strike of the thrust fault at Station 137 is N70W with an apparent dip of 30 degrees to the northeast. A prominent synclinal fold near Station 132 vertically displaces a distinct sand layer approximately 1.8 feet over a horizontal distance of 4 feet. The orientation of the fold hinge at Station 137 is due north. The faulting and folding observed in the trench is interpreted to be deformation within the hanging wall of the Trinidad fault which is further to the west. No evidence for a major through-going fault was observed in Caltrans Trench 1.

Caltrans Trench 2 (beneath Trinidad Rd UC)

Caltrans Trench 2 was 127 feet long and 3 feet wide, and ranged in depth from 7 to 10 feet (Figures 6 and 7). The trench was oriented N55E at an angle of about 60 to 90 degrees to the mapped trace of the Trinidad fault. The log for Trench 2 is attached. The upper two feet of the trench consisted of AC and roadway fill in sharp contact with underlying native materials. Based on a review of aerial photos and the 1959 LOTBs, a significant portion of original ground was removed during construction of Trinidad UC.

Possible groundwater was encountered in the eastern half of the trench flowing along the base of the fill. Seepage into the trench resulted in standing water at the bottom of the excavation between Station 0 and Station 5. Seepage into the trench was mainly from the east and south consistent with the slope of the ground surface adjacent to the trench. The seepage may be related to local runoff or actual groundwater, since groundwater was found at similar elevations in the 1959 borings.

From Station 0 to approximately Station 69, Caltrans Trench 2 exposed very intensely weathered to decomposed Franciscan melange characterized by a pervasively sheared black mudstone/clay matrix with clasts ranging in size from cobble-to-boulder. Near Station 10, a greenstone boulder 5-10 ft+ in diameter was encountered in possible fault contact (eastern edge) with the mélange matrix as evidenced by a steeply dipping gouge zone ½ to one foot thick adjacent to the boulder (Figure 8).
At approximately Station 69, the Franciscan mélange is in contact with the base of the overlying marine terrace deposits. The strike and dip of the contact between the mélange

and marine terrace deposits is approximately N20W dipping 50 degrees northeast. On the south wall of the trench the Franciscan mélange was slickensided and appeared to be in fault contact with a thin layer of fat clay overlain by coarse sand and gravel interpreted to be the base of the marine terrace deposits. The possible fault contact was only observed in the southern wall and could be an old feature in the Franciscan melange.

Near the base of the marine terrace deposits a large (15 ft+) sandstone boulder was encountered between approximately Station 70 and Station 87 that required use of a jackhammer backhoe attachment to excavate in order to expose the contact between the boulder and adjacent deposits.

From approximately Station 87 to 127 the trench exposed Quaternary-age marine terrace deposits similar to those encountered in Caltrans Trench 1. More fine grained sedimentary deposits prevailed suggesting a less active depositional environment with infrequent layering of discrete medium-grained one to four inch thick sand beds within fine-grained sedimentary materials. The strike and dip of the bedding observed in the terrace deposits was approximately N70W dipping between 32 and 40 degrees southwest. The dip of the contact between the mélange and marine terrace deposits and bedding within the terrace deposits is interpreted to be the result of folding in the hanging wall of the Trinidad fault and that the contact and bedding were initially near-horizontal. Small thrust faults were observed ~~at~~ between Stations 90-100 in the Quaternary-age deposits; the fault at Station 91with a measured strike of N35W and an apparent dip of 60 degrees had three inches of down-dip displacement the most observed in the Quaternary-age deposits.

Discussion of Faulting Observed.

Numerous thrust faults were observed in the marine terrace deposits in the southern portion of Caltrans Trench 1 and the western portion of Caltrans Trench 2. Frequency of these small faults was lower in Trench 2. These small faults trend mainly northwest in agreement with the trend of the known trace of the Trinidad fault. Displacement of the marine terrace deposits indicates that the faulting and folding occurred during the last 85,000+ years. Faults dip both sympathetic and antithetic to the main fault trace as commonly observed in trenches on hanging walls of faults within the Mad River fault zone and other northeast dipping thrust faults along the northern Coast of California.

Two possible faults were observed in the Franciscan mélange in Caltrans Trench 2; a steeply dipping ½ to one foot thick gouge zone near Station 10 and a slickensided surface in the Franciscan mélange in contact with a thin layer of clay near Station 69. These features likely formed during an earlier tectonic regime (pre-Quaternary). The strike of the gouge zone was approximately N70W similar to the strike of the faults observed in the marine terrace deposits. However, due to the pervasively sheared nature of the mélange, locally it can be indistinguishable from fault gouge. The slickensided surface in the Franciscan mélange, although characteristic of a fault, could not be traced across the trench.

Furthermore, the Trinidad fault is mapped to the west of the undercrossing and as turning westerly south of the undercrossing. Two trenches located to the west of Patricks Point Drive (Figure 3. Busch, 1988) record evidence of more displacement, with the least amount of displacement observed in the trench nearest to Caltrans Trench 1. More faulting was observed in Caltrans Trench 1 than in Caltrans Trench 2; this too suggests that faulting is diminishing to the east and that the two possible faults observed beneath the bridge in the Franciscan melange are probably not active. However, because younger materials were removed from the site during bridge construction we cannot conclusively state that these features are not related to recent faulting. To more conclusively demonstrate inactivity of fault(s) in the eastern end of Caltrans Trench 2, trenching could be carried out parallel to Trench 2 but where native soils still exist (not likely to be easily found within the Caltrans right-of-way).

Evaluation of Surface Rupture Potential at Trinidad Rd UC

As concluded above, major offset occurring beneath this bridge is unlikely based on the probable antiquity of fault-related features beneath the bridge and the apparent decrease in the amount of displacement to the east. However, we cannot conclude surface rupture will not occur here.

Current Caltrans policy regarding surface fault rupture is as follows:
The larger of the average deterministically-derived and the probabilistically-derived (with 5% in 50 years probability of exceedence) predicted fault offset, or a site-specific predicted offset obtained from a field investigation should be used…When the deterministically derived predicted fault offset is much larger than the probabilistically derived predicted fault offset, a risk assessment study is recommended to justify the potentially large cost. In such cases the engineer can ask the Office of Earthquake

Engineering (OEE) or the Structures Design Oversight Representative (SDOR) for a reassessment of the predicted offset as described in MTD20-11. (MTD 20-8)

We performed DFDH and PFDH analyses to further evaluate surface rupture (see discussions below). Previous work and the 2011 Caltrans fault investigation provided values used for these analyses. Evaluation for fault rupture displacement included application of accepted fault displacement empirical relationships as well as a review of recent trenching work performed on this fault. Since fault displacement has been shown to be highly characteristic (Hecker and Abrahamson 2004) and the Wells and Coppersmith (1994) regression for reverse faults is weak, it was important to include any trench measurements obtained along the fault. "Site-specific" values are considered to be from trenches within a km or two of a site. Displacements estimated using the two different methods are listed below. Please see Figure 3 for site locations.

Table 1. Observed net (down-dip) displacement values.

Site (north to south)	Total net displacement per event
Anderson Ranch	9.8 ft
WCC T2a	2.6 to 6.2 ft (est.)
WCC T2c	2.6-6.2 ft (est)
Busch 1	5.5 ft (total 7.6 ft)
Busch 2	2.1 ft (total 7.6 ft)
Caltrans Trench 1	2 ft (sum of smaller displacements, est.)
Caltrans Trench 2	<1 ft observed

*Note: Anderson Ranch and Woodward-Clyde Consultants (WCC) sites are further to the northwest and are not shown on Figure 3.

Deterministic Fault Displacement Hazard Analysis

Based on the Wells and Coppersmith (1994) equation for displacement, a fault length of 88 km and a fault width of 23 km (13.2 km depth and a 35 degree dip), expected dip slip displacement on this reverse fault is 1.75 m (a little less than 6 ft) during a single event. Based on the results of previous trenching, expected displacement during a single event could be as much as 9-1/2 feet. This value is likely a maximum although there is no statement made in the report indicating if the value is an average or maximum (Coppersmith, 1980). Elsewhere along the fault, displacements are 2 to 8 feet (Table 1). Nearest the bridge west of Patricks Point Drive two traces were encountered and trenches

cross the traces revealed 5.5 ft on the western trace and 2.1 ft on the eastern trace. The eastern trace likely corresponds to the trace encountered in Caltrans trenches 1 and 2 and agrees with the limited extent of faulting encountered in these two trenches. We recommend using four feet net displacement as a deterministic value for design. This displacement corresponds to about 2.3 ft of vertical and 3.3 ft of horizontal displacement.

Probabilistic Fault Displacement Hazard Analysis

A PFDHA uses the estimated slip rate of a fault in addition to fault length and down-dip width. CGS geologist Tim Dawson is currently compiling slip rates for use in UCERF 3, and noted that a rate of 0.7mm was determined by WCC based on offshore information. McCrory (1996) determined a value of 2.1 to 2.3 mm/yr based on uplift of the entire Trinidad Head area and that value is therefore a regional one. The value for the displacement on the onshore Trinidad fault only is about 0.4 mm/yr (value used in UCERF 2) and is the value used here. Using 0.4mm/yr we arrive at less than 2 ft for 10,000 years. Although we cannot directly compute offset associated with an event with a 975 year return period (Caltrans criterion), a reasonable value would be on the order of a few inches.

Conclusions

Expected displacements on the Trinidad fault beneath Trinidad Rd UC are shown in Table 2 below. We contacted Mark Yashinsky (OEE) per MTD 20-8 who gave us permission to utilize the probabilistic value rather than the deterministic value (M. Yashinsky p.c., May 25, 2012). Displacements recommended for design (probabilistic values) are in **bold** and may be considered negligible.

Table 2. Displacement values.

Method	Return Period	Net displacement on 35 degree NE dipping fault	Vertical displacement	Horizontal displacement
Deterministic	n/a	4 ft	2.3 ft	3.3 ft
Largest observed (maximum?)	6000-8000 yrs	9-1/2 ft	5-1/2 ft	7-3/4 ft
Probabilistic (slip rate = 0.4 mm/yr)	**975 yrs**	**A few inches**	**Inches**	**inches**

If you have questions or require further assistance please contact Martha Merriam (916-316-3925) or Charlie Narwold (707-445-6036).

Attachments:

Trench 1 Log
Trench 2 Log South Wall
Trench 2 Log North Wall

cc: Tim Alderman
Reid Buell
Roy Bibbens
Gem-Yeu Ma
Reza Mahallati
Mark Yashinsky

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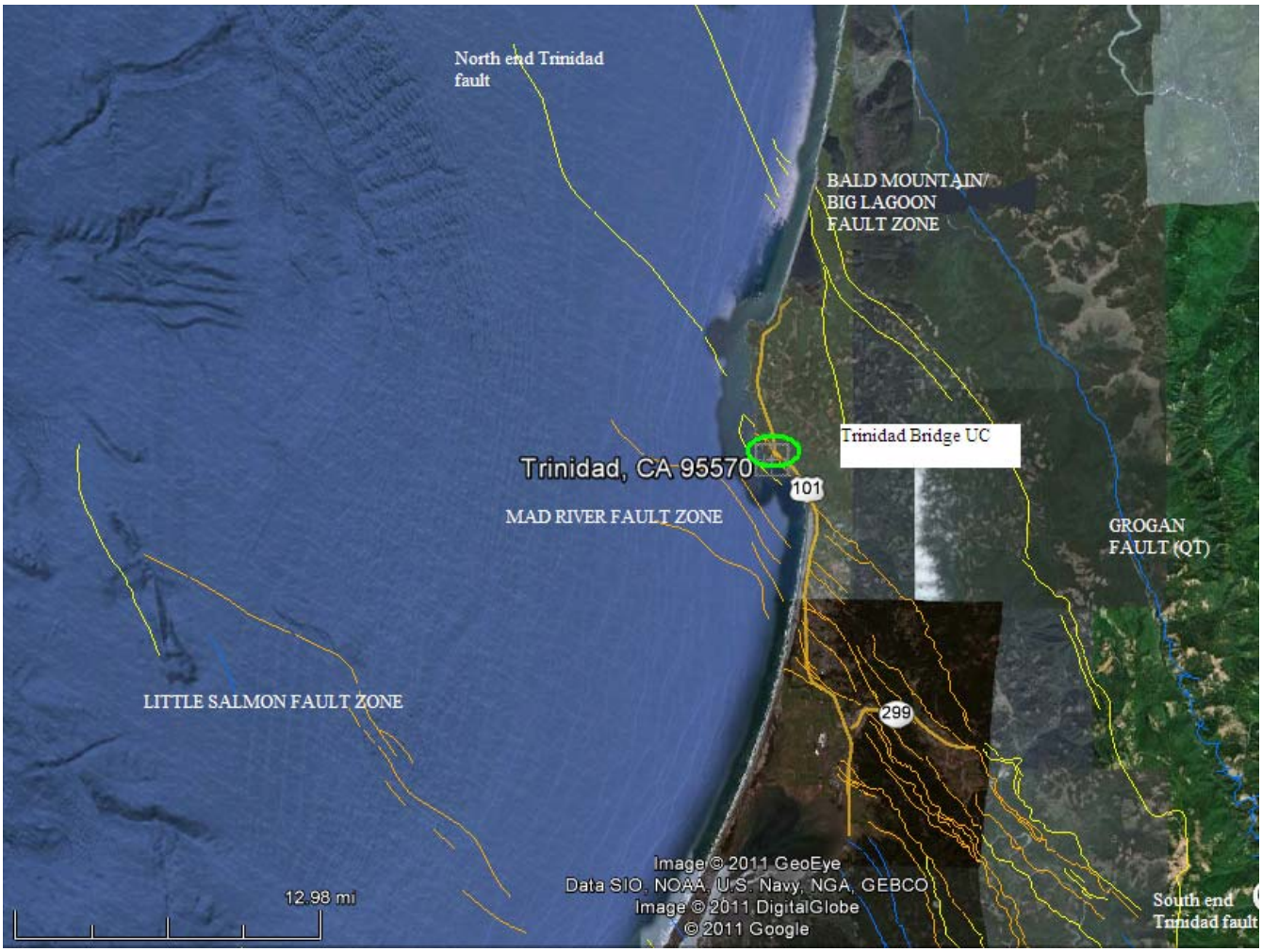


Figure 1. Location map. Trinidad Road UC is located in a region characterized by compression caused by the intersection of three tectonic plates farther offshore and to the south of the bridge location (Google Earth and 2010 USGS fault data)

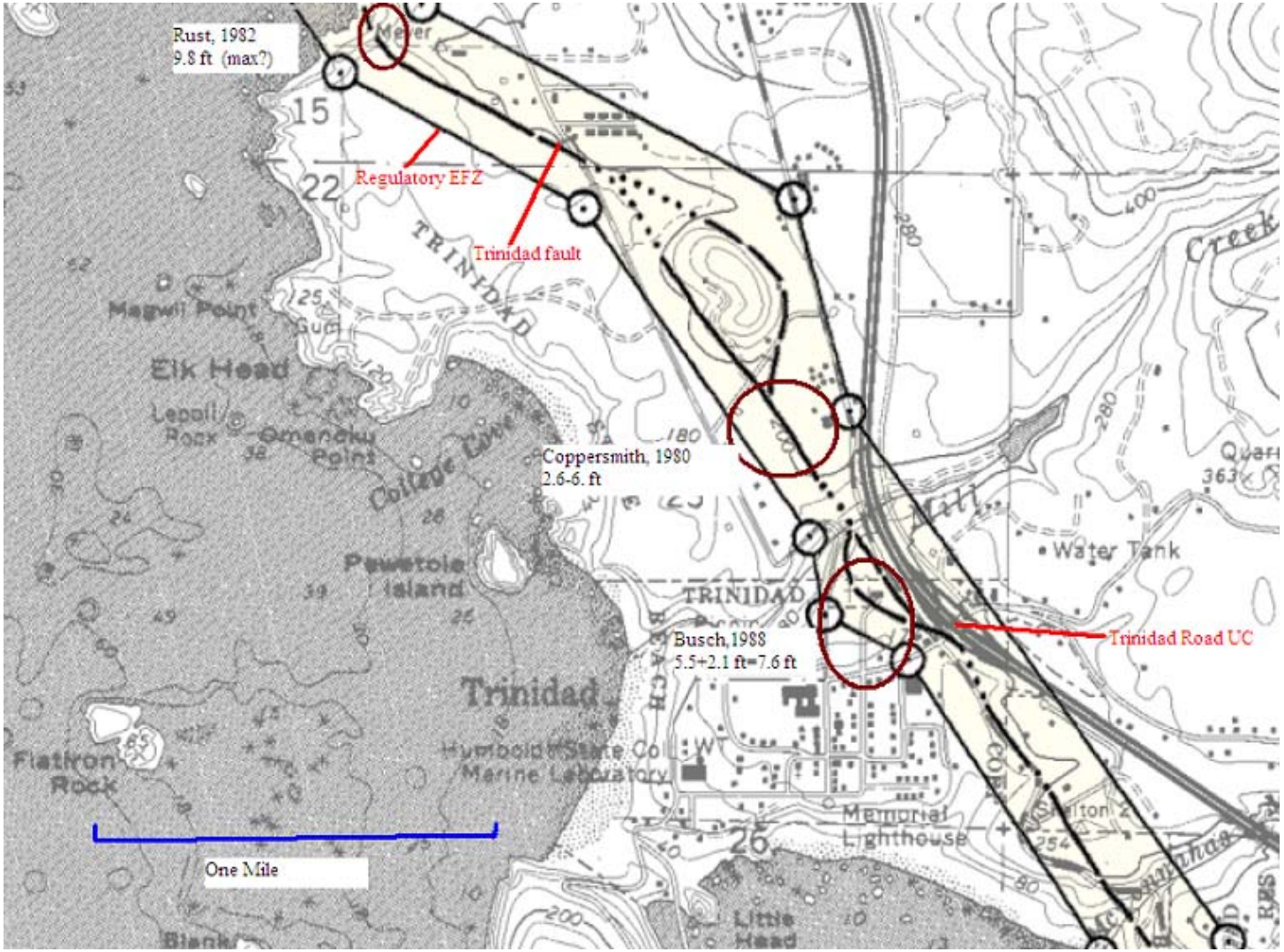


Figure 2. Trinidad Road UC lies within CGS Earthquake Fault Zone, Trinidad Quad (1983). Brown circles denote areas of previous work and measured dip-slip displacement.

Figure 3. Trench locations, including those from previous investigations. Numbers are dip-slip displacement observed in trench.

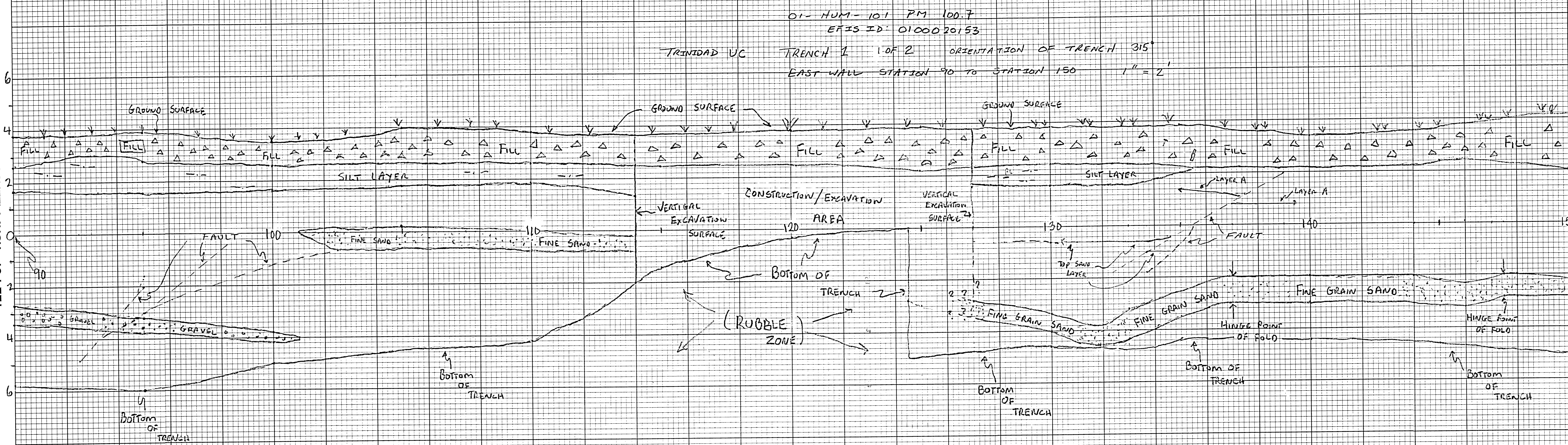
Figure 4. Caltrans Trench 1 location, looking southeasterly.

Figure 5. Example of small thrust faults encountered in Caltrans Trench 1. East trench wall, scale is inches.

Figure 6. Caltrans Trench 2 looking easterly.

Figure 7. Caltrans Trench 2 looking westerly.

Figure 8. Steeply dipping gouge zone in Franciscan melange at east end of Caltrans Trench 2. North trench wall.



CROSS SECTIONS
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DIST.	COUNTY	ROUTE	POST MILES

DCR-OE-96 (REV. 12/76)

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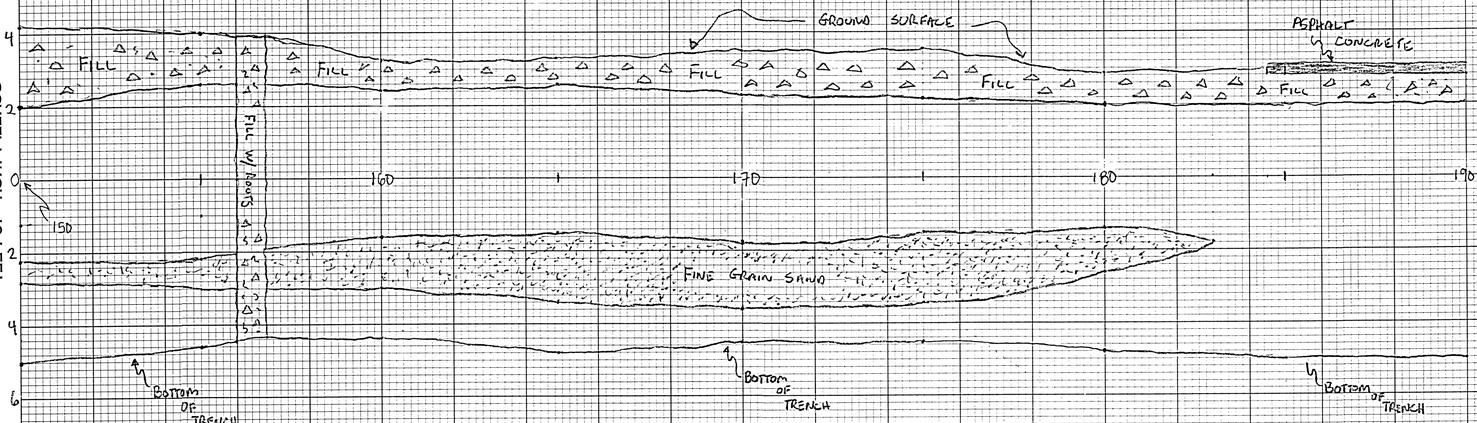
TRINIDAD UC TRENCH 1 2 OF 2 ORIENTATION OF TRENCH 315°

EAST WALL STATION 150 TO 190 1" = 2'



CROSS SECTIONS

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CROSS SECTIONS
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ELEVATION
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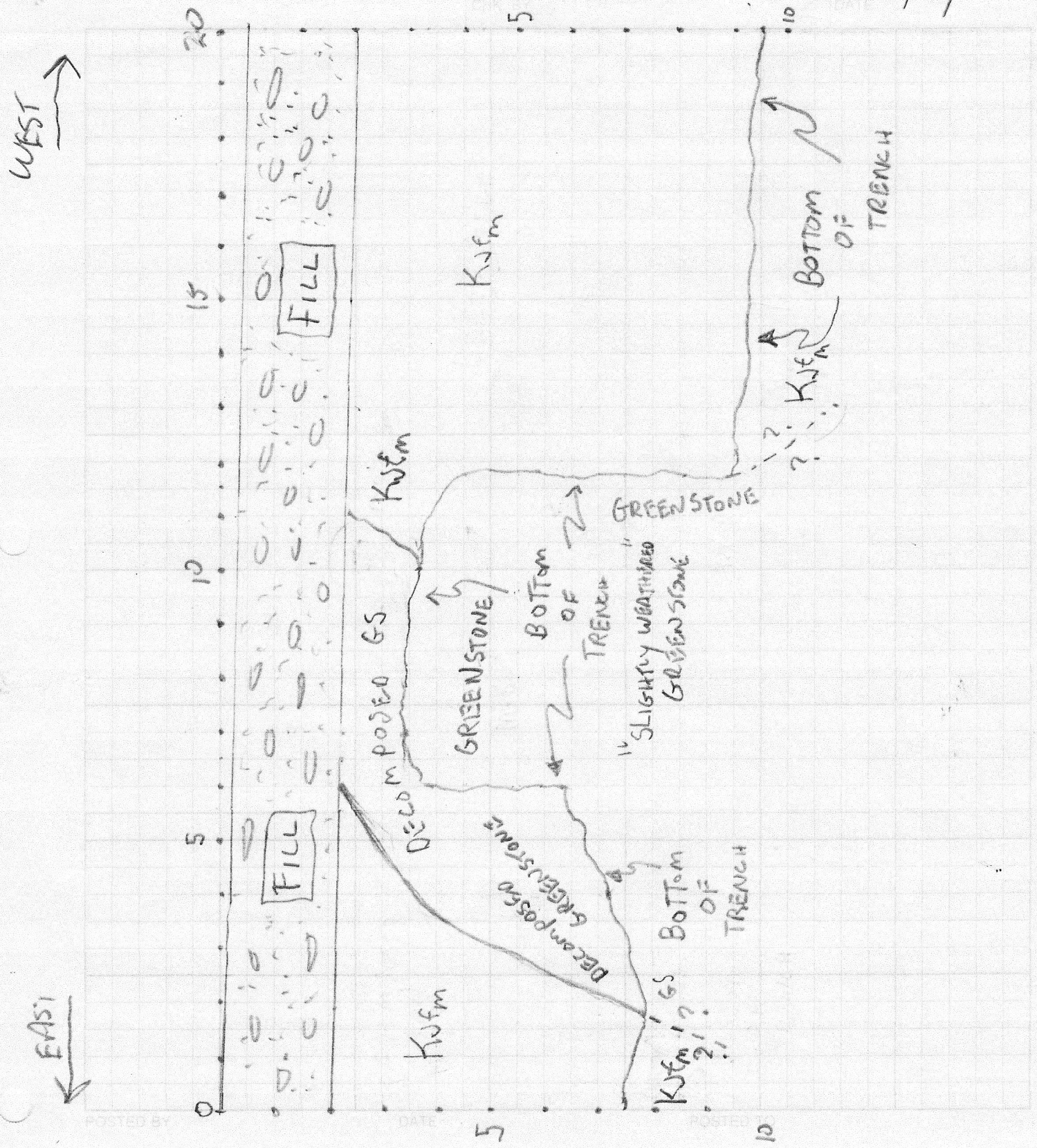

STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION

QUANTITY CALCULATIONS

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SHEET 2 OF 7

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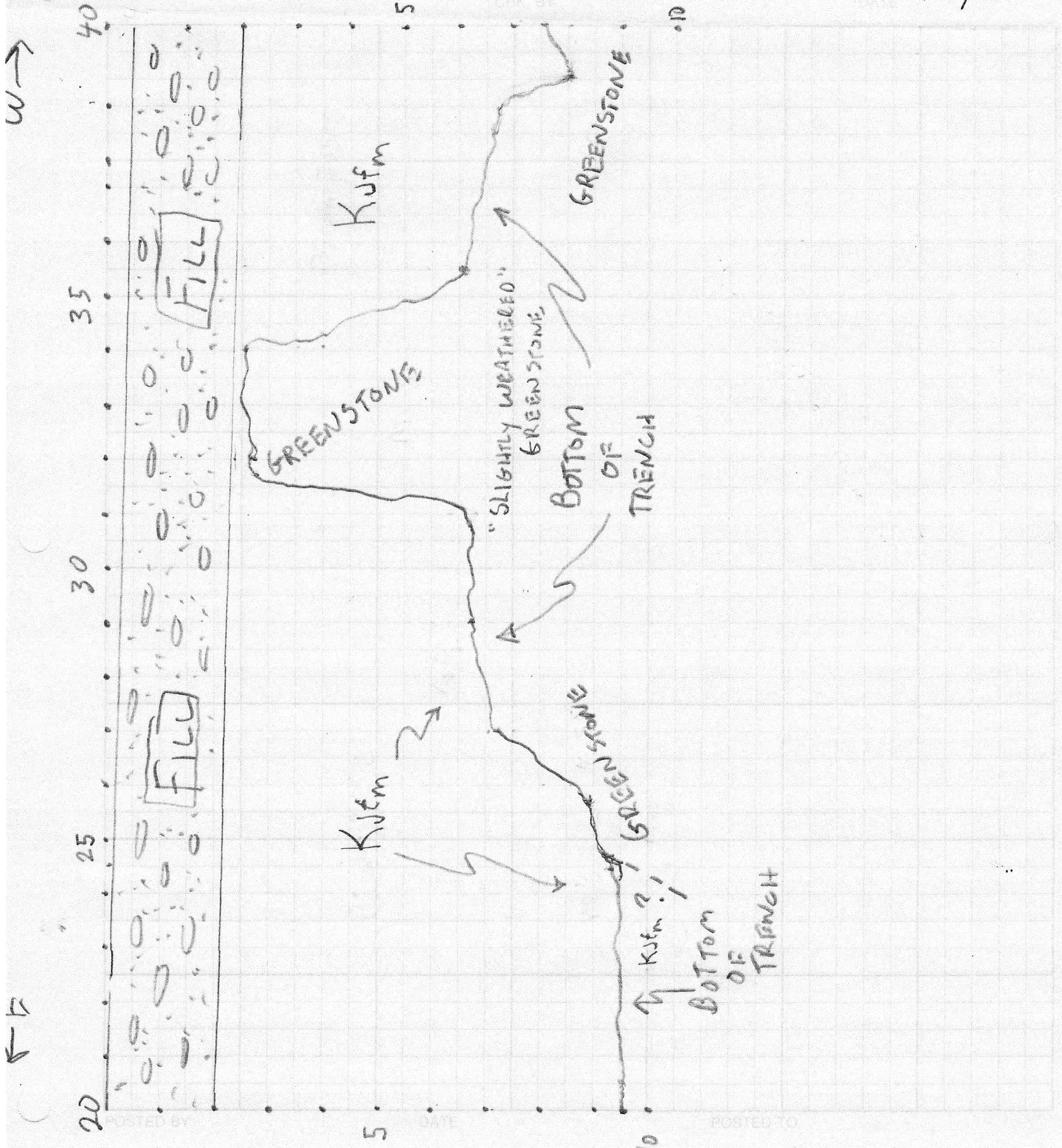

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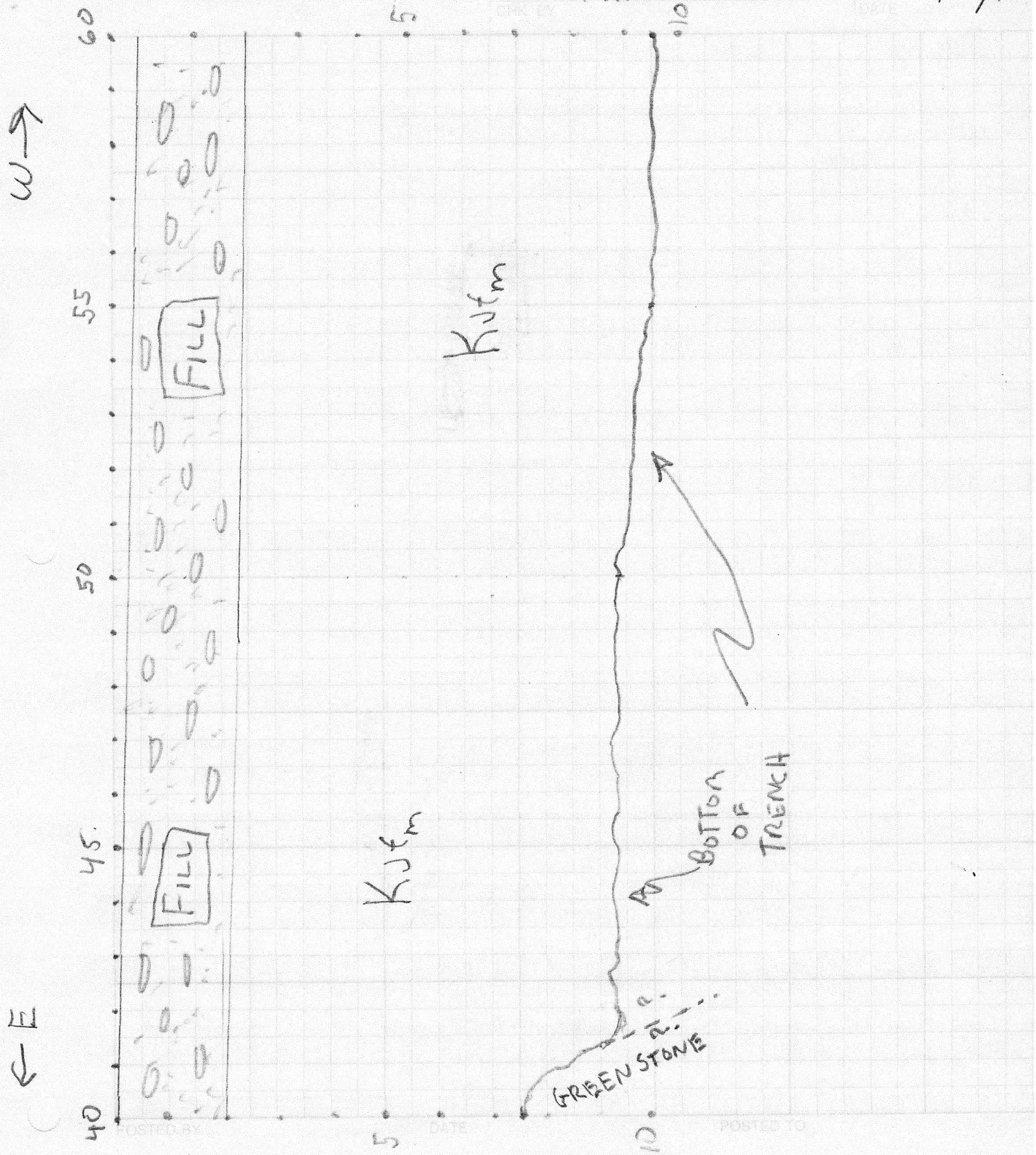
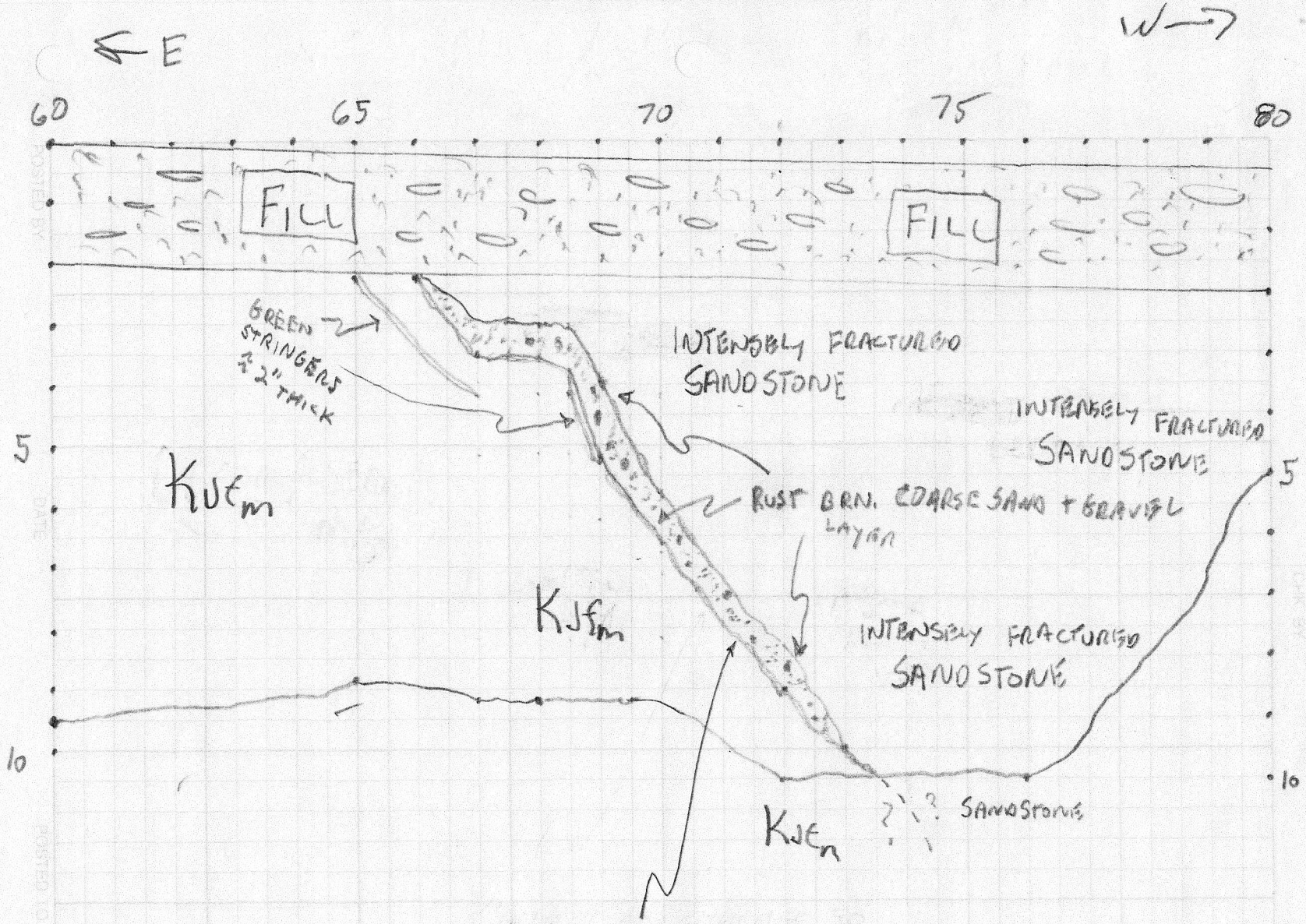
SOUTH WALL





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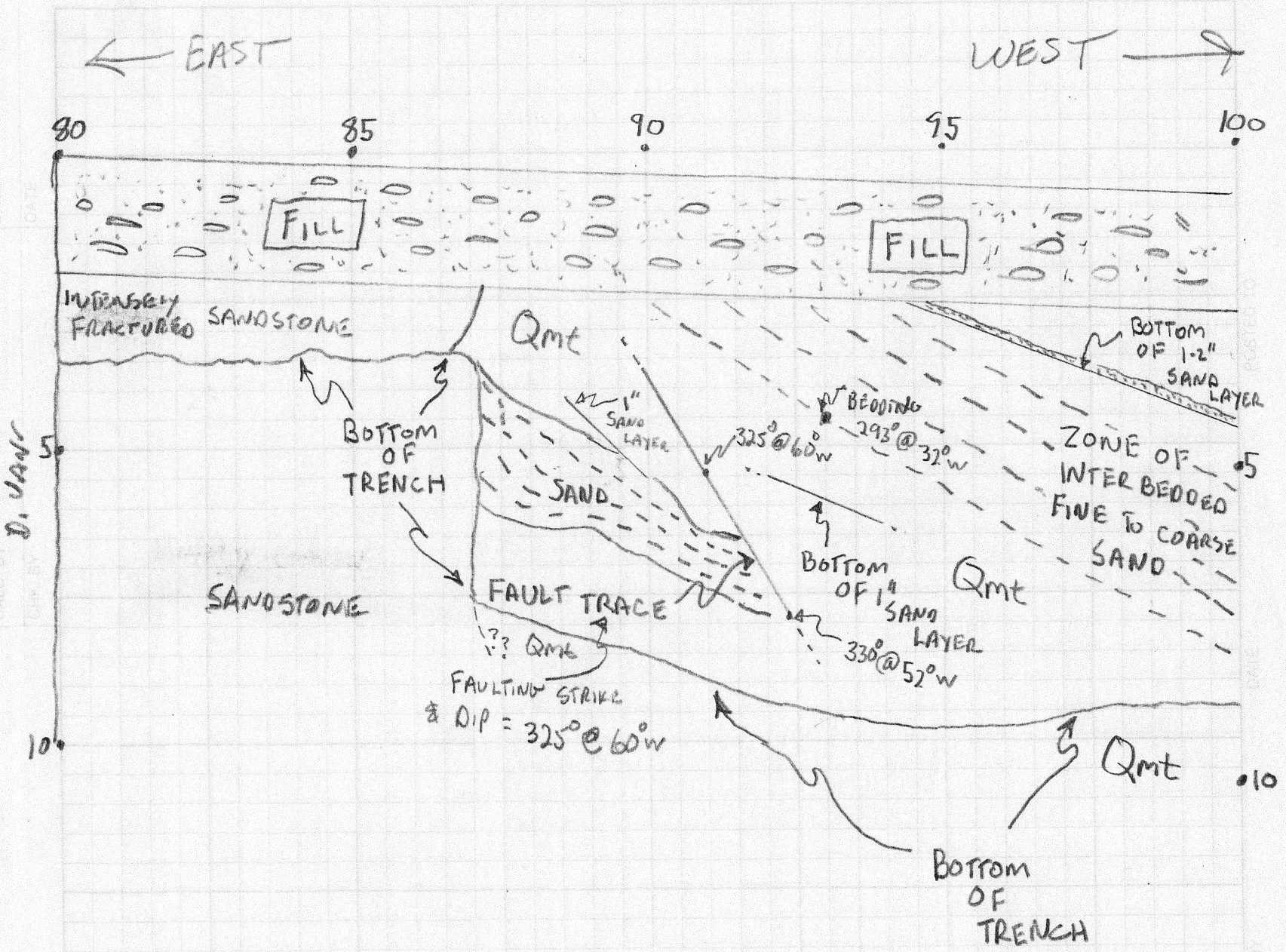

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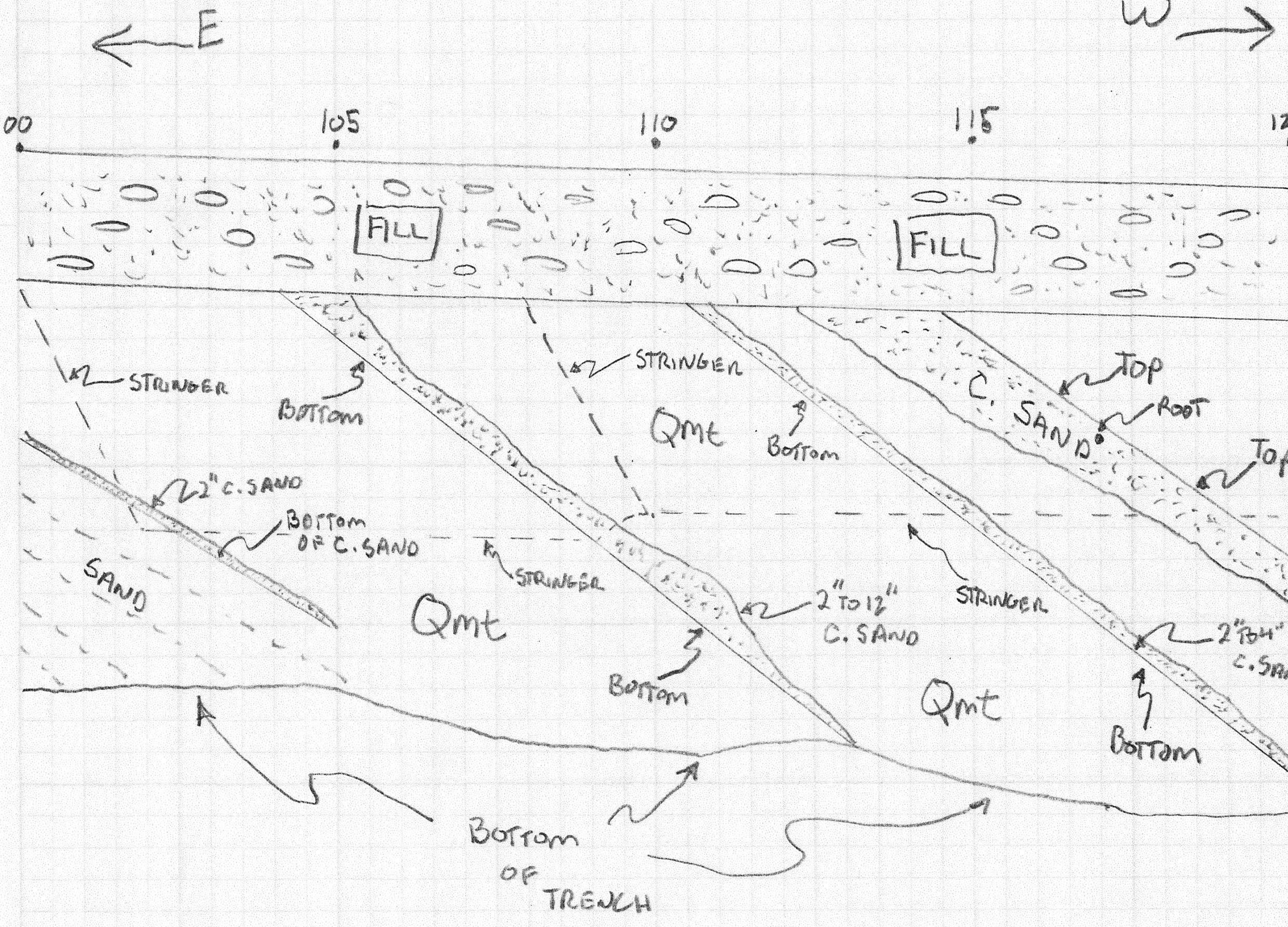
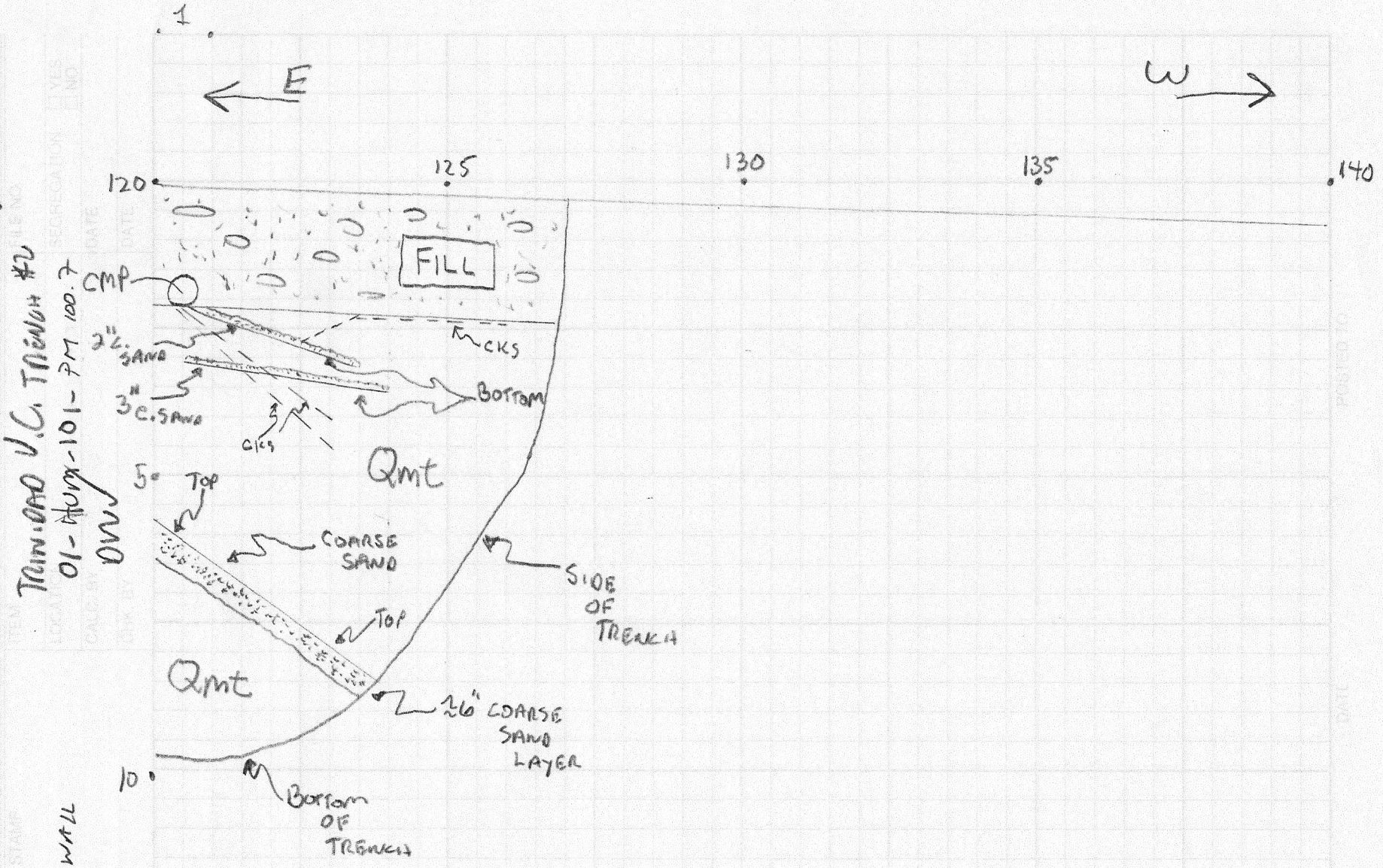
SOUTH WALL

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Bottom OF TRENCH
SOUTH WALL
TRINIDAD V.C. TRENCH #2
01-HUM-101-PM 100.7
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III

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NORTH WALL
LOOKING NORTH
(NORMAL VIEW)

TRINIDAD D.C. TRENCH #2
01-HUM-101-100
D. VANN

12/14/11