FOR CONTRACT NO: 02-2E3504

INFORMATION HANDOUT

PERMITS, LICENSES, AGREEMENTS, AND CERTIFICATIONS (PLAC)

PLAC - PLAC CONDITION RESPONSIBILITY (PCR) SUMMARY

PLAC - CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
NORTH COAST REGION

WDID No. 1A12168WNTR

PLAC - UNITED STATES ARMY CORPS OF ENGINEERS
NON-REPORTING NATIONWIDE 404 PERMIT

PLAC - CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE
CA DEPARTMENT OF FISH AND GAME
NOTIFICATION NO.1600-2012-0250-R1

MATERIALS INFORMATION

FOUNDATION REPORTS

Foundation Report for Retaining Wall No. 1, Enchilada Curve Improvement, dated 9/20/2012 by Caltrans Division of Engineering Services, Office of Geotechnical Design North, Branch of Geophysics and Geology.

Foundation Report for Retaining Wall No. 2, Enchilada Curve Improvement, dated 9/20/2012 by Caltrans Division of Engineering Services, Office of Geotechnical Design North, Branch of Geophysics and Geology.

Foundation Report for Retaining Wall No. 3, Enchilada Curve Improvement, dated 9/20,/2012 by Caltrans Division of Engineering Services, Office of Geotechnical Design North, Branch of Geophysics and Geology.

OPTIONAL DISPOSAL/MATERIAL SITES

ROUTE: 02- TRI - 299 - 0.4/0.9

PERMITS, LICENSES, AGREEMENTS, AND CERTIFICATIONS (PLAC)

PLAC - PLAC CONDITION RESPONSIBILITY (PCR) SUMMARY

PLAC CONDITION RESPONSIBILITY (PCR) SUMMARY

General:
This PCR Summary clarifies various PLAC requirements. Perform all work described in the PLACs on behalf of Caltrans unless otherwise stated below in Table 2. If a discrepancy exists between the PCR Summary and the PLAC, the PCR Summary governs.

Definitions:
Agency: A board, agency, or other entity that issues a PLAC
Activity: A task, event or other project element
PLAC Condition: a work activity and/or submittal required by a PLAC

Table 1 - Clarification of PLAC Requirements

PLAC Name	Section of the PLAC	PLAC Requirement
All PLACs	Applicable PLAC sections	**Submittals:** Submit to the Engineer when PLAC conditions require: 1. Communications. The Engineer will contact the agencies. 2. Records to be maintained, within 5 working days after the activity. 3. Submittals 5 days before the agencies require them. The Engineer will review and submit to the agencies.
North Coast Regional Water Quality Control Board General 401 Water Quality Certification WDID#1B12168WNTR	On Page 2	Item 8 - Biological Opinion was not required for this project.
	On Page 3	Condition 1 - Interpert "Plans and Specifications" to mean Contract Documents.
	On Page 4	Condition 6 - Last sentence. Both the Contractor and the Department "shall provide Regional Water Board staff access to the project site to document compliance with this order."

	On Page 4	Condition 7 - Meetings are required: 1. For people working on the grade 2. During active construction activities.
	On Page 5	Condition 9. - Do not use synthetic products for erosion control within waters of the US or waters of the State.
	On Page 7	Condition 20 - Provide Material Safety Data Sheets for products used in water work.
	On Page 5, 7 & 8	Condition 13, 23, 24. 1. At PM 0.5 do not work when water is present 2. At PM 0.74 no in-stream work is anticipated.
	On Page 9	Condition 26 - Para 1 Contract Plans describe this work.
California Department of Fish and Game Streambed Alteration Agreement Notification No: 1600-2012-0250-R1	Measures to Protect Fish and Wildlife Resources	Measure 1.4 - Both the Contractor and the Department will agree to allow DFG Personnel to enter the project site at any time to verify compliance with the Agreement.
	Measures to Protect Fish and Wildlife Resources	2.4 - All but sentence 3 to be performed by the Contractor.
	Measures to Protect Fish and Wildlife Resources	2.16 - Apply erosion control mix to areas shown on the plans to receive erosion control (bonded fiber matrix.).

Table 2 - Work to be Performed by the Department		
PLAC Name	**Section of the PLAC**	**PLAC Requirement**
North Coast Regional Water Quality Control Board General 401 Water Quality Certification WDID#1B12168WNTR	On Page 3 & 4	Conditions 1 through 4
	On Page 4	Condition 5, the Department provided a copy of the order in the contract.
	Conditions beginning on page 3	Condition 6 - Last sentence. Both the Contractor and the Department "shall provide Regional Water Board staff access to the project site to document compliance with this order."
	On Page 6	Condition 15 - The Department will provide the Biologist for the training.
	On Page 8	Condition 25: Bullet 1. Last Sentence "At least one post-construction inspection is required to demonstrate sufficient and effective erosion and sediment control and compliance with the Basin Plan."
	On Page 9	Condition 26 - Paragraphs 2 and 3
	On Page 9	Condition 27
	On Page 10	Condition 32 -
	On Page 10 & 11	Condition - 30, 31, 33 and 34
California Department of Fish and Game Streambed Alteration Agreement Notification No: 1600-2012-0250-R1	Measures to Protect Fish and Wildlife Resources	Measure 1.3
	Measures to Protect Fish and Wildlife Resources	Measure 1.4 - Both the Contractor and the Department will agree to allow DFG Personnel to enter the project site at any time to verify compliance with the Agreement.
	Measures to Protect Fish and Wildlife Resources	Measure 2.4: Sentence 3 The Department will replant native trees and shrubs near Drainage 1 at a ratio of 3:1.

PERMITS, LICENSES, AGREEMENTS, AND CERTIFICATIONS (PLAC)

PLAC - CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
NORTH COAST REGION

WDID No. 1A12168WNTR

March 1, 2013

In the Matter of

Water Quality Certification

for the

California Department of Transportation
Highway 299 – Whole Enchilada Safety Project
WDID No. 1A12168WNTR

APPLICANT:	California Department of Transportation
RECEIVING WATER:	Intermittent and Perennial Streams
HYDROLOGIC AREA:	Trinity River Hydrologic Unit No. 106.00
COUNTY:	Trinity
FILE NAME:	CDOT – Hwy 299, Whole Enchilada Safety Project WDID No. 1A12168WNTR

BY THE EXECUTIVE OFFICER:

1. On August 27, 2012, the North Coast Regional Water Quality Control Board (Regional Water Board) received an application from the California Department of Transportation (Caltrans), requesting Federal Clean Water Act (CWA) section 401 Water Quality Certification (Certification) for activities related to the proposed Highway 299 Whole Enchilada Safety Project (Project). The proposed Project will cause disturbances to waters of the United States (U.S.) and waters of the State within the Trinity River Hydrologic Unit No. 106.00. The Regional Water Board provided public notice of the application pursuant to title 23, California Code of Regulations, section 3858, on February 7, 2013, and posted information describing the Project on the Regional Water Board's website. No comments were received.

2. The proposed Project is located on Highway 299 from post mile (PM) 0.4 to PM 0.9 in Trinity County. The purpose of the Project is to reduce the number and severity of accidents by altering the road curvature. The scope of work includes removal of existing culverts, replacement of culverts, installation of culvert liners, replacement and or/ installation of culverts headwalls, and installation of down-drains, drain-inlets, and rock slope protection.

3. Caltrans has determined that the proposed Project will result in 230.1 feet^2 (0.005 acres) of permanent impacts and 2,494 feet^2 (0.057 acres) of temporary impacts to jurisdictional waters. Compensatory mitigation is not required because the impacts are considered *de minimis*.

4. Caltrans proposes to mitigate for direct impacts to waters of the State through on-site restoration of temporarily impacted areas. This includes revegetation of riparian areas around the intermittent streams located within the Project area.

5. Project implementation will result in an increase of approximately 0.30 acres (13,070 square feet) of impervious surface. Caltrans shall construct a compost-amended biofiltration strip to treat stormwater runoff from 0.43 acres of impervious surface. Caltrans shall construct the biofiltration strip consistent with the plans included in Attachment 1 of this Water Quality Certification.

6. The majority of the proposed Project will be conducted in summer months during low flow conditions between May 15th and October 15th. Any work performed within State waters outside of this work window shall first be subject to the acceptance of Regional Water Board staff.

7. The Project will result in less than one acre of disturbed soil area. Caltrans will utilize Best Management Practices (BMPs) to control sediment and other pollutants throughout the Project area during construction. All graded areas within the Project affected by the construction activities will be appropriately stabilized and/or replanted with appropriate native vegetation.

8. Caltrans has received authorization from the U.S. Army Corps of Engineers to perform the Project under non-reporting Nationwide Permit no. 14, *Linear Transportation Projects*, pursuant to Clean Water Act, section 404. Caltrans has a signed California Department of Fish and Wildlife 1602 Streambed Alteration Agreement. Caltrans has also obtained Biological Opinions from the U.S. Fish and Wildlife Service and the National Marine Fisheries Service.

9. Caltrans has determined that this Project is categorically exempt from California Environmental Quality Act (CEQA) review. In addition, Regional Water Board staff has determined that this Project is categorically exempt from CEQA review (Class 1 Categorical Exemption) and anticipates filing a Notice of Exemption.

10. The federal antidegradation policy requires that state water quality standards include an antidegradation policy consistent with the federal policy. The State Water Board established California's antidegradation policy in State Water Board Resolution No. 68-16. Resolution No. 68-16 incorporates the federal antidegradation policy where the federal policy applies under federal law. Resolution No. 68-16 requires that existing quality of waters be maintained unless degradation is justified based on specific findings. The Regional Water Board's Basin Plan implements, and incorporates by reference, both the State and federal antidegradation policies. This Order is consistent with applicable federal and State antidegradation policies, as it does not authorize the discharge of increased concentrations of pollutants or increased volumes of treated wastewater, and does not otherwise authorize degradation of the waters affected by this Project.

11. To ensure compliance with Basin Plan Water Quality Objectives and to protect State waters, requirements to avoid, minimize, and mitigate sediment impacts are incorporated as enforceable conditions in this Certification. In addition, Caltrans will be required to conduct surface water monitoring, sampling, and analysis in accordance with the conditions of this Certification. Additionally, storm water runoff monitoring, sampling, and analysis will be conducted as required by the State Water Resources

Control Board (SWRCB) National Pollutant Discharge Elimination System (NPDES) Permit for Storm Water Discharges from the State of California, Department of Transportation (Caltrans) Properties, Facilities and Activities Order No. 99 – 06 – DWQ. In addition, Caltrans will be required to conduct surface water monitoring, sampling, and analysis in accordance with the conditions of this Certification. The surface water data collected will be utilized to assess the adequacy of construction BMPs and any site-specific mitigation measures proposed to minimize impacts to State waters.

12. This discharge is also regulated under State Water Resources Control Board Order No. 2003-0017-DWQ, "General Waste Discharge Requirements for Dredge and Fill Discharges That Have Received State Water Quality Certification," which requires compliance with all conditions of this Certification.

Receiving Waters:	Streams Trinity River Hydrologic Unit No.106.00
Filled and/or Excavated Areas:	Permanent – streams (Waters of U.S.): 0.005 acres (230.1 feet^2)
	Temporary – riparian (Waters of State): 0.057 acres (2,494 feet^2)
Total Linear Impacts:	Permanent – streams (Waters of U.S.): 71.6 linear feet
Dredge Volume :	None
Fill Volume :	157 cubic yards
Latitude/Longitude:	04°-53'-11"N to 20"N/ 123°-35'-8"W to 40"W

Accordingly, based on its independent review of the record, the Regional Water Board certifies that the Caltrans – Highway 299 Whole Enchilada Safety Project (WDID No. 1B12168WNTR), as described in the application will comply with sections 301, 302, 303, 306 and 307 of the Clean Water Act, and with applicable provisions of state law, provided that the Caltrans complies with the following terms and conditions:

All conditions of this Order apply to Caltrans (and all its employees) and all contractors (and their employees), sub-contractors (and their employees), and any other entity or agency that performs activities or work on the Project as related to this Water Quality Certification.

1. All conditions required by this Order shall be included in the Plans and Specifications prepared by Caltrans for the Contractor. If the Plans and Specifications have been finalized prior to receipt of this Certification, Caltrans shall revise the Project Plans and Specifications to incorporate the conditions of this Order. Any enforcement action taken by the Regional Water Board for violations of this Order shall consider failure to revise the Plans and Specifications per this condition. In addition, Caltrans shall require compliance with all conditions included in this Order in the bid contract for this Project.

2. This certification action is subject to modification or revocation upon administrative or judicial review; including review and amendment pursuant to Water Code section 13330 and title 23, California Code of Regulations, section 3867.

3. This certification action is not intended and shall not be construed to apply to any discharge from any activity involving a hydroelectric facility requiring a Federal Energy Regulatory Commission (FERC) license or an amendment to a FERC license unless the pertinent certification application was filed pursuant to title 23, California Code of Regulations, section 3855, subdivision (b) and the application specifically identified that a FERC license or amendment to a FERC license for a hydroelectric facility was being sought.

4. The validity this certification is conditioned upon total payment of any fee required under title 23, California Code of Regulations, section 3833, and owed by the applicant. $944 was submitted by Caltrans on August 27, 2012.

5. Caltrans shall provide a copy of this certification and State Water Resources Control Board (SWRCB) Order No. 2003-0017-DWQ (web link referenced below) to the contractor and all subcontractors conducting the work, and require that copies remain in their possession at the work site. Caltrans shall be responsible for work conducted by its contractor or subcontractors.

6. The Regional Water Board shall be notified in writing each year and at least five working days (working days are Monday – Friday) prior to the commencement of ground disturbing activities, water diversion activities or construction activities with details regarding the construction schedule, in order to allow Regional Water Board staff to be present on-site during installation and removal activities, and to answer any public inquiries that may arise regarding the Project. Caltrans shall provide Regional Water Board staff access to the Project site to document compliance with this Order.

7. The Resident Engineer (or appropriately authorized agent) shall hold on-site water quality permit compliance meetings (similar to tailgate safety meetings) to discuss permit compliance, including instructions on how to avoid violations and procedures for reporting violations. The meetings shall be held at least every other week, before forecasted storm events, and when a new contractor or subcontractor arrives to begin work at the site. The contractors, subcontractors and their employees, as well as any inspectors or monitors assigned to the pProject, shall be present at the meetings. Caltrans shall maintain dated sign-in sheets for attendees at these meetings, and shall make them available to the Regional Water Board on request.

8. All activities and BMPs shall be implemented according to the submitted application and the conditions of this Order. BMPs for erosion, sediment, turbidity and pollutant control shall be implemented and installed at commencement of, during, and after any ground clearing activities, construction activities, or any other Project activities that could result in erosion, sediment, or other pollutant discharges to waters of the State. The BMPs shall be implemented in accordance with the Caltrans Construction Site Best Management Practice Manual (CCSBMPM) and all contractors and subcontractors shall comply with the CCSBMPM. In addition, BMPs for erosion and sediment control shall be utilized year round, regardless of season or time of year. Caltrans shall stage erosion and sediment control materials at the work site. All BMPs shall be installed properly and in accordance with the manufacturer's specifications. If the Project Resident Engineer elects to install alternative BMPs for use on the Project, Caltrans shall first submit a proposal to Regional Water Board staff for review and concurrence.

9. Caltrans shall prioritize the use of wildlife-friendly biodegradable (not photo-degradable) erosion control products wherever feasible. Caltrans shall not use or allow the use of erosion control products that contain synthetic netting for permanent erosion control (i.e. erosion control materials to be left in place for two years or after the completion date of the Project). If Caltrans finds that erosion control netting or products have entrapped or harmed wildlife, personnel shall remove the netting or product and replace it with wildlife-friendly biodegradable products. Caltrans shall not use or allow the use of erosion control products that contain synthetic materials within waters of the United States or waters of the State at any time. Caltrans shall request approval from the Regional Water Board if an exception from this requirement is needed for a specific location.

10. Herbicides and pesticides shall not be used within the Project. If Caltrans has a compelling case as to why herbicides and pesticides should be used, a proposal for their use shall first be submitted to the Executive Officer of the Regional Water Board for review and consideration. The proposal shall include a strategy for BMP implementation to prevent discharge of pesticides to State waters.

11. Work in flowing or standing surface waters, unless otherwise proposed in the Project description and approved by the Regional Water Board, is prohibited. If construction dewatering of groundwater is found to be necessary, Caltrans shall use a method of water disposal other than disposal to surface waters (such as land disposal or discharge to a sanitary sewer) or Caltrans shall apply for coverage under the Low Threat Discharge Permit or an individual National Pollutant Discharge Elimination System (NPDES) Permit and receive notification of coverage to discharge to surface waters, prior to the discharge.

12. Caltrans is prohibited from discharging waste to waters of the State, unless explicitly authorized in this Certification. No debris, soil, silt, sand, bark, slash, sawdust, rubbish, cement or concrete or concrete washings, welding slag, oil or petroleum products, or other organic or earthen material from any construction or associated activity of whatever nature, other than that authorized in this Certification, shall be allowed to enter into waters of the State. In addition, none of the materials listed above shall be placed within 150 linear feet of waters of the State or where the materials may be washed by rainfall into waters of the State.

13. If dewatering or diversion of State waters is necessary, Caltrans shall submit, subject to review and concurrence by the Regional Water Board staff, a dewatering and/or diversion plan that appropriately describe the dewatered or diverted areas and how those areas will be handled during construction. The diversion/dewatering plan shall be submitted no later than 30 days prior to conducting the proposed activity. Information submitted shall include the area or work to be diverted or dewatered and method of the proposed activity. All diversion or dewatering activities shall be designed to minimize the impact to waters of the State and maintain natural flows upstream and downstream. All dewatering or diversion structures shall be installed in a manner that does not cause sedimentation, siltation or erosion upstream or downstream. All dewatering or diversion structures shall be removed immediately upon completion of Project activities. This Certification does not authorize Caltrans to draft surface waters.

14. In-channel work shall only be conducted between May 15 and October 15. Work may be conducted outside this work window if the stream channel is dry and work is first authorized by Regional Water Board and California Department of Fish and Wildlife staff. Construction at the culvert locations shall occur only between May 15 and October 15 in order to minimize runoff during construction and to allow adequate time to restore and revegetate the site prior to onset of fall precipitation.

15. A qualified biologist shall conduct Worker Environmental Awareness Training for the construction workers prior to the start of construction activities. The awareness training shall include a brief review of the biology of the yellow-legged frog (*Rana* boylii) and guidelines that must be followed by all construction personnel to avoid take of yellow-legged frogs and to minimize potential effects on all sensitive biological resources during the construction period. The qualified biologist may appoint a biological monitor (such as the crew foreman) who would be responsible for ensuring that all crewmembers comply with the guidelines. Worker Environmental Awareness Training would be conducted for new personnel before they join construction activities. If a yellow-legged frog at any life stage is encountered, the Caltrans Construction Resident Engineer shall stop all work that could impact the frog and the California Department of Fish and Wildlife shall be notified immediately.

16. Fueling, lubrication, maintenance, storage and staging of vehicles and equipment shall be outside of waters of the U.S. and the State. Fueling, lubrication, maintenance, storage and staging of vehicles and equipment shall not result in a discharge or a threatened discharge to any waters of the State or the U.S. At no time shall Caltrans use any vehicle or equipment that leaks any substance that may impact water quality.

17. Caltrans shall implement appropriate BMPs to prevent the discharge of equipment fluids to the stream channel. The minimum requirements will include: storing hazardous materials at least 150 linear feet outside of the stream banks; checking equipment for leaks and preventing the use of equipment with leaks; and pressure washing or steam cleaning equipment to remove fluid residue on any of its surfaces prior to its entering any stream channel in a manner that does not result in a discharge to waters of the State.

18. Caltrans and their contractor are not authorized to discharge wastewater (e.g., water that has contacted uncured concrete or cement, or asphalt) to surface waters, ground waters, or land. Wastewater may only be disposed of to a sanitary waste water collection system/facility (with authorization from the facility's owner or operator) or a properly-licensed disposal or reuse facility. If Caltrans or their contractor proposes an alternate disposal method, Caltrans or their contractor shall request authorization from the Regional Water Board. Plans to reuse or recycle wastewater require written approval from Regional Water Board staff.

19. If, at any time, an unauthorized discharge to surface water (including wetlands, rivers or streams) occurs, or any water quality problem arises, the associated Project activities shall cease immediately until adequate BMPs are implemented. The Regional Water Board shall be notified promptly and in no case more than 24 hours after the unauthorized discharge or water quality problem arises.

20. Caltrans shall provide analysis and verification that placing non-hazardous waste or inert materials (which may include discarded product or recycled materials) will not result in degradation of water quality, human health, or the environment. All Project-

generated waste shall be handled, transported, and disposed in strict compliance with all applicable State and Federal laws and regulations. When operations are complete, any excess material or debris shall be removed from the work area and disposed of properly and in accordance with the Special Provisions for the Project and/or the 2006 Standard Specification 7-1.13, Disposal of Material Outside the Highway Right of Way. Within 30 days of disposing of materials off-site Caltrans shall submit to the Regional Water Board the satisfactory evidence provided to the Caltrans Engineer by the Contractor referenced in Standard Specification 7-1.13. In accordance with State and Federal laws and regulations, Caltrans is liable and responsible for the proper disposal of waste generated by this Project.

21. All imported fill material shall be clean and free of pollutants. All fill material shall be imported from a source that has the appropriate environmental clearances and permits. The reuse of low-level contaminated solids as fill on-site shall be performed in accordance with all State and Federal policies and established guidelines and must be submitted to the Regional Water Board for review and concurrence.

22. Asphalt-concrete grindings shall not be directly exposed to storm or ground waters, except asphalt-concrete grinding may be re-used and incorporated into impervious asphalt mixes.

23. In order to demonstrate compliance with receiving water limitations and water quality objectives, surface water monitoring shall be conducted. When conducting surface water monitoring Caltrans shall establish discharge, upstream (background) and downstream monitoring locations to demonstrate compliance with applicable water quality objectives. The downstream location shall be no more than 100 feet from the discharge location. Additionally,:

    A. Surface water monitoring shall be conducted whenever a Project activity is conducted within waters of the State (e.g. including but not limited to the installation, use or removal of stream diversions, pile installations, and cofferdams). Measurements and observations shall be collected from each sampling location four times daily.

    B. Surface water monitoring shall be conducted immediately when any Project activity has mobilized sediment or other pollutants resulting in a discharge and/or has the potential to alter background conditions within waters of the State (including but not limited to storm water runoff, concrete discharges, leaks, and spills.). The continuing frequency is contingent upon results of field measurements and applicable water quality objectives.

    Surface water monitoring field measurements shall be taken for pH and turbidity. In addition, visual observations of each location shall be documented daily for each established monitoring location and monitoring event and include the estimate of flow, appearance of the discharge including color, floating or suspended matter or debris, appearance of the receiving water at the point of discharge (occurrence of erosion and scouring, turbidity, solids deposition, unusual aquatic growth, etc.), and observations about the receiving water, such as the presence of aquatic life. If a Project activity has reached a steady state and is stable, then Caltrans may request a temporary reprieve from this condition from the Regional Water Board until an activity or discharge triggers the monitoring again.

24. Whenever, as a result of Project activities (in-stream work or a discharge to receiving waters), downstream measurements exceed any water quality objective 100 feet downstream of the source(s) all necessary steps shall be taken to install, repair, and/or modify BMPs to control the source(s). The frequency of surface water monitoring shall increase to hourly and shall continue until measurements demonstrate compliance with water quality objectives for each parameter listed below and measured levels are no longer increasing as a result of Project activities. In addition, the overall distance from the source(s) to the downstream extent of the exceedence of water quality objectives shall be measured.

    Monitoring results shall be reported to appropriate Regional Water Board staff by telephone within 24 hours of taking any measurements that exceed the limits detailed below (only report turbidity if it is higher than 20 NTU).

pH	<6.5 or >8.5 (any changes >0.5 units)
turbidity	20% above natural background

    Monitoring results and upstream and downstream pictures within the working and/or disturbed area and discharge location shall be taken and submitted to the appropriate Regional Water Board staff within 24 hours of the incident. All other monitoring data documenting compliance with water quality objectives shall be reported on a monthly basis and is due to the Regional Water Board by the 15th of the following month.

25. Post Storm Event Reports:

    - Once the Project has begun ground-disturbing activities, and subsequent to a qualifying rain event that exceeds 0.5-inches of precipitation, Caltrans shall inspect the Project within 24 hours and take photos of all discharge locations and disturbed areas, including all excess materials disposal areas, in order to demonstrate that erosion control and revegetation measures are present and have been installed appropriately and are functioning effectively. A brief report containing these photos, corrective actions (if necessary), and any surface water monitoring results collected pursuant to this Order or the Construction General Permit (SWRCB Order 2009-009 DWQ) shall be submitted to the Regional Water Board within 10 days after the end of the qualifying rain event. Inspections are required daily during extended rain events. Once the Project site is stable, in a steady state (channel- ground- or vegetation-disturbing activities have ceased), and has demonstrated sufficient and effective erosion and sediment control, Caltrans may request a reprieve from this condition from the Regional Water Board. At least one post-construction inspection is required to demonstrate sufficient and effective erosion and sediment control and compliance with the Basin Plan.

    - Rain events are periods of precipitation that that are separated by more than 48-hours of dry weather. Rainfall amounts may be taken from on-site rain gauges, from the nearest California Data Exchange Center station (http://cdec.water.ca.gov), or by a custom method or station approved by Regional Water Board staff.

26. Caltrans shall install a compost-amended biofiltration strip to treat stormwater from no less than 0.43 acres of impervious area. Biofiltration strip construction and compost specifications shall be consistent with the Project plans included in Attachment 1, *Biofiltration Strip and Compost Details*.

Caltrans shall maintain the strip's designed infiltration rate. Not later than June 30, 2013, Caltrans shall submit, subject to the acceptance of Regional Water Board staff, a long-term maintenance and monitoring plan detailing the measures Caltrans will employ to ensure the BMP maintains its designed infiltration rate. The plan shall describe maintenance activities, as appropriate, and provide proposals to evaluate vegetation health and test the infiltrative rate of the strip at the end of three and five years to compare with the designed infiltration rate. If Caltrans finds that the infiltration rate has significantly declined from the designed infiltration rate, the strip shall be maintained to re-establish the designed infiltration rate.

Also, Caltrans shall include a proposal to test the strip surface soil for pollutants of concern typically found in roadway runoff (e.g., metals, hydrocarbons). At a minimum, Caltrans shall test the soil for pollutants at the end of five and ten years. In lieu of sampling strip soils at this location, Caltrans may: propose a scientifically-sound study to determine the pollutant concentration in roadside biofiltration strips over time; or, provide a technical memo, subject to the acceptance of Water Board staff, that cites and discusses studies of roadway stormwater pollutant concentrations in the soil of vegetated treatment BMPs, over time. The technical memo should use available studies to explain whether soil pollutant constituents may reach concentrations that significantly degrade the topsoil (i.e., meet any hazardous criteria) and/or impact the ability of the BMP to sustain healthy vegetation.

27. Restoration actions shall be conducted in accordance with the Caltrans-prepared *On-Site Restoration and Monitoring Proposal for the Whole Enchilada Curve Improvement Project* dated December 2012 (Attachment 2, *On-Site Restoration Plan*). Restoration actions include revegetation of temporarily impacted areas. Planting and enhancement actions shall occur in the first full planting season (November to April) subsequent to the year construction is complete and erosion control is established. Caltrans shall notify Regional Water Board staff within five working days upon completion of restoration activities. As-built reports for the restoration actions are due to the Regional Water Board no later than 60 days from completion of revegetation activities. Restoration monitoring shall be conducted yearly for at least 5 years. Restoration monitoring reports shall be submitted annually to the Regional Water Board by December 31st, for years 1, 3, and 5 of the monitoring period. Caltrans may propose an alternative due date, subject to the acceptance of Regional Water Board staff.

28. Rock slope protection energy dissipation at the inlet and outlet of the new culvert at Post Mile 0.67 shall not be increased beyond the current areal extent of rock slope protection.

29. In the event of any violation or threatened violation of the conditions of this Order, the violation or threatened violation shall be subject to any remedies, penalties, process or sanctions as provided for under applicable state or federal law. For the purposes of section 401(d) of the Clean Water Act, the applicability of any state law authorizing remedies, penalties, process or sanctions for the violation or threatened violation constitutes a limitation necessary to assure compliance with the water quality standards and other pertinent requirements incorporated into this Order. In response to a suspected violation of any condition of this certification, the State Water Board may require the holder of any federal permit or license subject to this Order to furnish, under penalty of perjury, any technical or monitoring reports the State Water Board deems appropriate, provided that the burden, including costs, of the reports shall bear

a reasonable relationship to the need for the reports and the benefits to be obtained from the reports. In response to any violation of the conditions of this Order, the Regional Water Board may add to or modify the conditions of this Order as appropriate to ensure compliance.

30. The Regional Water Board may add to or modify the conditions of this Order, as appropriate, to implement any new or revised water quality standards and implementation plans adopted or approved pursuant to the Porter-Cologne Water Quality Control Act or section 303 of the Clean Water Act.

31. This Order is not transferable. In the event of any change in control of ownership of land presently owned or controlled by the Applicant, the Applicant shall notify the successor-in-interest of the existence of this Order by letter and shall forward a copy of the letter to the Regional Water Board. The successor-in-interest must send to the Regional Water Board Executive Officer a written request for transfer of this Order to discharge dredged or fill material under this Order. The request must contain the following:

    a. Requesting entity's full legal name;

    b. The state of incorporation, if a corporation;

    c. Address and phone number of contact person; and

    d. Description of any changes to the Project or confirmation that the successor-in-interest intends to implement the Project as described in this certification.

32. Except as may be modified by any preceding conditions, all certification actions are contingent on: a) the discharge being limited, and all proposed revegetation, avoidance, minimization, and mitigation measures being completed, in strict compliance with Caltrans's Project description and CEQA documentation, as approved herein, b) Caltrans shall construct the Project in accordance with the Project described in the application and the findings above, and c) compliance with all applicable water quality requirements and water quality control plans including the requirements of the Water Quality Control Plan for the North Coast Region (Basin Plan), and amendments thereto. Any change in the design or implementation of the Project that would have a significant or material effect on the findings, conclusions, or conditions of this Order must be submitted to the Executive Officer of the Regional Water Board for prior review, consideration, and written concurrence. If the Regional Water Board is not notified of a significant alteration to the Project, it will be considered a violation of this Order, and Caltrans may be subject to Regional Water Board enforcement actions.

33. The authorization of this certification for any dredge and fill activities expires on March 1, 2018. Conditions and monitoring requirements outlined in this Order are not subject to the expiration date outlined above, and remain in full effect and are enforceable.

34. Please contact our staff Environmental Specialist / Caltrans Liaison Brendan Thompson at (707) 576-2699 or Brendan.Thompson@waterboards.ca.gov if you have any questions.

Original Signed By

_____

Matthias St. John
Executive Officer

130301_CDOT_Hwy299_WholeEnchilada_401Cert

Web link:	State Water Resources Control Board Order No. 2003-0017 -DWQ, General Waste Discharge Requirements for Dredge and Fill Discharges That Have Received State Water Quality Certification can be found at: http://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2003/wqo/wqo2003-0017.pdf
Original to:	Mr. Chris Harvey, Caltrans – North Region Environmental, 1031 Butte Street, Redding CA 96001
Copies to:	Mr. Andre Benoist, Caltrans – North Region Environmental, 1031 Butte Street, Redding CA 96001
Electronic Copies to:	U.S. Army Corps of Engineers, Regulatory Functions - San Francisco District California Department of Fish and Wildlife, Northern Region, Redding

Attachment 1

Biofiltration Strip and Compost Details

WQV Infiltrated Using the Strip and Swale Infiltration Tool, v2.2

This page presents the results of infiltration with and without amendment. It also provides a summary of the inputs for reference.

PROJECT INFORMATION

Project	02-2E350 Enchilada Curves
Sub-watershed	Combined Tmt. Sheetflow from Pavement into two ar
BMP type	Strip

INPUT	**Existing**	**Proposed Design**	**Isolated NNI**	**Units**
Native or fill (underlying) HSG soil type	B	B	B	
Density of water	1	1	1	g/cm³
Bulk density	1.6	1.6	1.6	g/cm³
Specific gravity of soil particles	2.73	2.73	2.73	
Depth of incorporation, below FG	0	6	6	in
Unit basin storage volume from the Basin Sizer, where C = 1.0	1.22	1.22	1.22	in
Drawdown time used in the Basin Sizer	48	48	48	hr
Rainfall rate from the Basin Sizer "Caltrans Water Quality Flows"	0.27	0.27	0.27	in/hr
Contributing drainage area	0	18880	18880	ft²
Contributing drainage area runoff coefficient	0.9	0.9	0.9	
BMP area: strip area or swale invert area with soil amendment	0	10957	10957	ft²
Infiltration rate of native soil or fill	0.25	0.25	0.25	in/hr
Pervious area for non-amended infiltration (may be different than BMP area)	0	10957	10957	ft²
Bulk density (of amendment)	0.50	0.50	0.50	g/cm³
Specific gravity of amendment particles	0.80	0.80	0.80	
Depth of placement	0	4	4	in
Final bulk density	N/A	1.25	1.25	g/cm³
Impervious runoff volume (including WQV)	0.00	1727.52	1727.52	ft³

RESULT: Native Soil or Fill (rate-based calculation)	Existing	**Proposed Design**	Isolated NNI
Runoff coefficient for downstream BMP with no amendment	N/A	0.60	0.60
Volume of total runoff infiltrated	0.00	0.00	0.00
Portion of WQV from net new impervious that is infiltrated with native soil or fill (use for T-1, 5b)	N/A	**0%**	0%

RESULTS: Amended Soil (volume-based calculation)	Existing	**Proposed Design**	Isolated NNI
Runoff coefficient for downstream BMP after amendment	N/A	0.00	0.00
Volume of total runoff infiltrated	N/A	1727.52	1727.52
Portion of WQV from net new impervious area that is infiltrated with amended soil (use for T-1, 5d)	N/A	**100%**	100%

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
02	Tri	299	0.4/0.9		

REGISTERED CIVIL ENGINEER — DATE 10-18-12

PLANS APPROVAL DATE

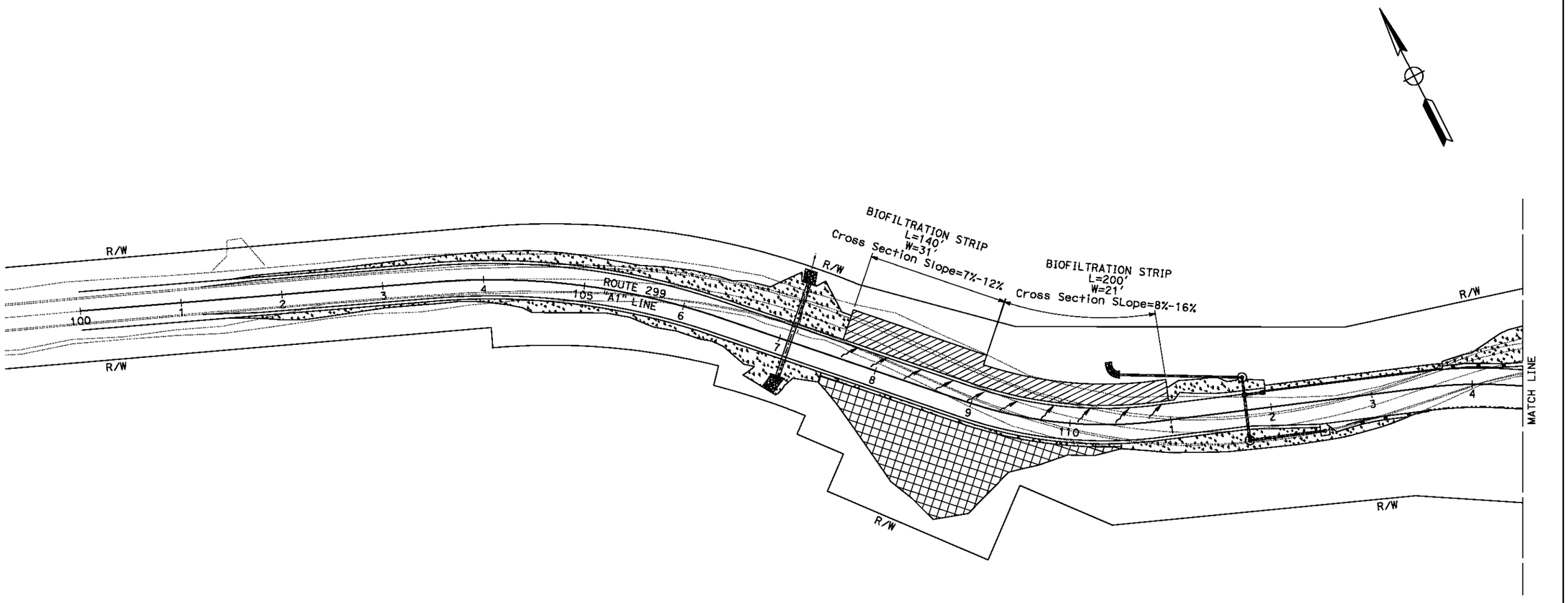
REGISTERED PROFESSIONAL ENGINEER — SHAUN ALEXANDER — No. C70833 — Exp. 06-30-13 — CIVIL — STATE OF CALIFORNIA

NOTE:

1. FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

LEGEND

- TYPE 1 EROSION CONTROL (BONDED FIBER MATRIX)
- TYPE 2 ROLLED EROSION CONTROL PRODUCT (BLANKET)
  TYPE 2 EROSION CONTROL (BONDED FIBER MATRIX)
- TYPE 3 COMPOST (INCORPORATE)
  TYPE 3 EROSION CONTROL (BONDED FIBER MATRIX)
- FLOW DIRECTION



EROSION CONTROL PLAN

SCALE: 1" = 50'

EC-1

APPROVED FOR EROSION CONTROL WORK ONLY

CALCULATED-DESIGNED BY	CHECKED BY	REVISED BY	DATE REVISED
JEFF COON	SHAUN ALEXANDER		

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION — DESIGN

FUNCTIONAL SUPERVISOR: ALBERT TRUJILLO

P:\proj2\02\2E350\design\530_PSE process\Environmental\22e350_exhibit_1.dgn

LAST REVISION 10-18-12 | DATE PLOTTED => 05-FEB-2013 | TIME PLOTTED => 14:16

BORDER LAST REVISED 7/2/2010 | USERNAME => s131190 | DGN FILE => 22e350_exhibit_1.dgn | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | UNIT 0316 | PROJECT NUMBER & PHASE 02000002111

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
02	Tri	299	0.4/0.9		

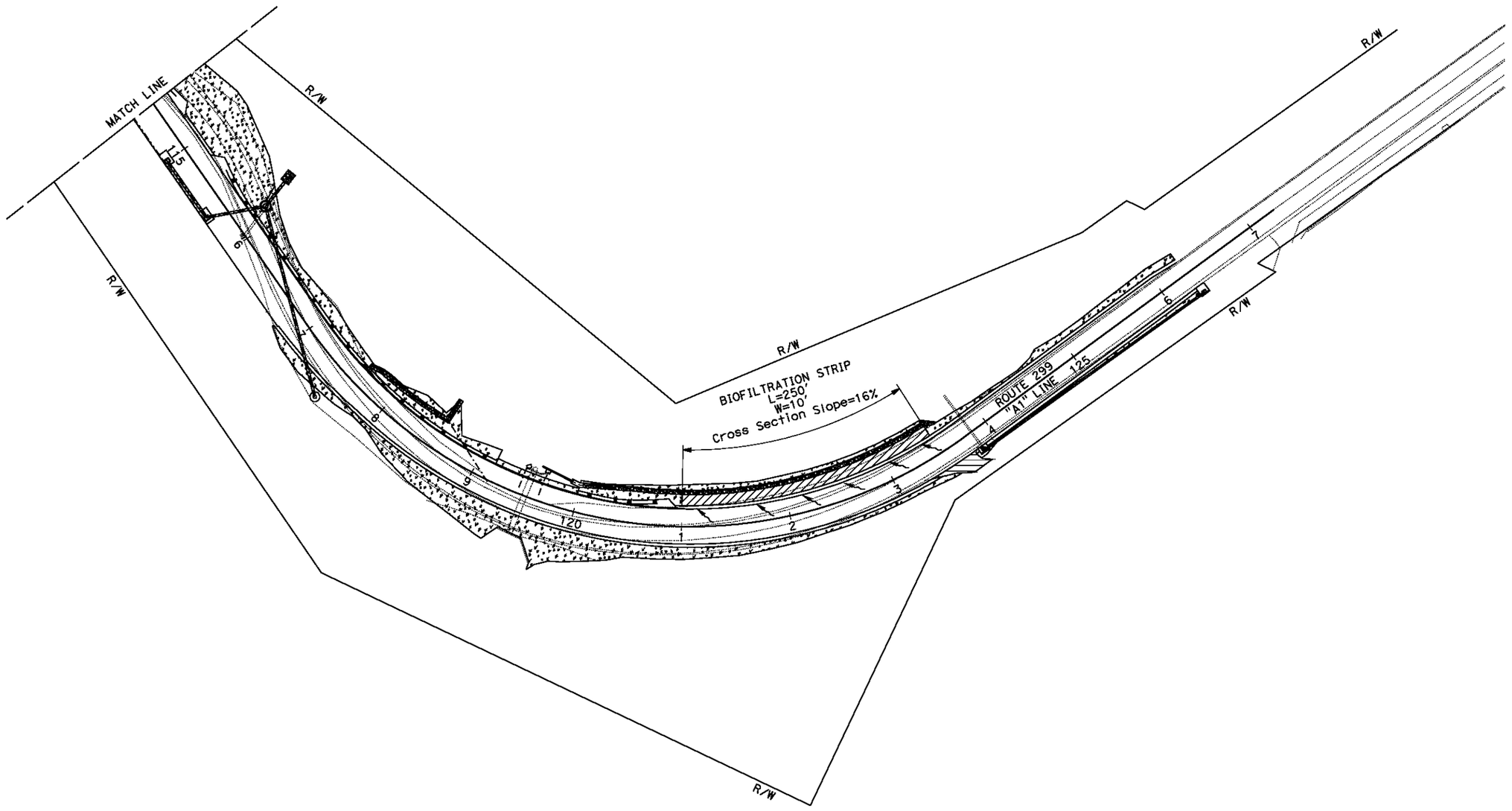
REGISTERED CIVIL ENGINEER — 10-18-12 DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — SHAUN ALEXANDER — No. C70833 — Exp. 06-30-13 — CIVIL — STATE OF CALIFORNIA

NOTE:

1. FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.



EROSION CONTROL PLAN

SCALE: 1" = 50'

EC-2

APPROVED FOR EROSION CONTROL WORK ONLY

CALCULATED-DESIGNED BY	JEFF COON	REVISED BY	
CHECKED BY	SHAUN ALEXANDER	DATE REVISED	
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION		FUNCTIONAL SUPERVISOR	
DESIGN		ALBERT TRUJILLO	

LAST REVISION 10-18-12 — DATE PLOTTED => 05-FEB-2013 — TIME PLOTTED => 14:17

P:\proj2\02\2E350\design\530_PSE process\Environmental\22e350_exhibit_2.dgn

BORDER LAST REVISED 7/2/2010 | USERNAME => s131190 | DGN FILE => 22e350_exhibit_2.dgn | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | UNIT 0316 | PROJECT NUMBER & PHASE 02000002111

10-1.__COMPOST (INCORPORATE)

GENERAL

Summary

This work includes removing and disposing of weeds and incorporating compost into the surface of compost (incorporate) areas with a slope of 4:1 (horizontal:vertical) or flatter as shown on the plans.

Comply with Section 20-3, "Erosion Control," of the Standard Specifications and these special provisions.

Apply compost when an area is ready to receive it as determined by the Engineer.

The Engineer will designate the ground location of all compost (incorporate) areas in increments of one acre or smaller by directing the placing of stakes or other suitable markers. Furnish all tools, labor, materials, and transportation required to adequately indicate the various compost (incorporate) locations.

MATERIALS

Compost

The compost producer must be fully permitted as specified under the California Department of Resources Recycling and Recovery, Local Enforcement Agencies, and any other State and Local Agencies that regulate solid waste facilities. If exempt from State permitting requirements, the composting facility must certify that it follows guidelines and procedures for production of compost meeting the environmental health standards of Title 14, California Code of Regulations, Division 7, Chapter 3.1, Article 7.

The compost producer must be a participant in the United States Composting Council's Seal of Testing Assurance program.

Compost may be derived from any single or mixture of any of the following feedstock materials:

1. Green material consisting of chipped, shredded, or ground vegetation; or clean processed recycled wood products
2. Biosolids
3. Manure
4. Mixed food waste

Compost feedstock materials such that weed seeds, pathogens and deleterious materials are reduced as specified under Title 14, California Code of Regulations, Division 7, Chapter 3.1, Article 7, Section 17868.3.

Compost must not be derived from mixed municipal solid waste and must be reasonably free of visible contaminates. Compost must not contain paint, petroleum products, pesticides or any other chemical residues harmful to animal life or plant growth. Compost must not possess objectionable odors.

Metal concentrations in compost must not exceed the maximum metal concentrations listed in Title 14, California Code of Regulations, Division 7, Chapter 3.1, Section 17868.2.

Compost must comply with the following:

Physical and Chemical Requirements

Property	Test Method	Requirement
pH	TMECC 04.11-A Elastometric pH 1:5 Slurry Method pH Units	6.0–8.0
Soluble Salts	TMECC 04.10-A Electrical Conductivity 1:5 Slurry Method dS/m (mmhos/cm)	0–10.0
Moisture Content	TMECC 03.09-A Total Solids & Moisture at 70+/- 5 deg C % Wet Weight Basis	30–60
Organic Matter Content	TMECC 05.07-A Loss-On-Ignition Organic Matter Method (LOI) % Dry Weight Basis	30–65
Maturity	TMECC 05.05-A Germination and Vigor Seed Emergence Seedling Vigor % Relative to Positive Control	 80 or Above 80 or Above
Stability	TMECC 05.08-B Carbon Dioxide Evolution Rate mg CO_2-C/g OM per day	8 or below
Particle Size	TMECC 02.02-B Sample Sieving for Aggregate Size Classification % Dry Weight Basis	Inches % Passing 3 99% 3/8 < 25% Max. Length 4 inches
Pathogen	TMECC 07.01-B Fecal Coliform Bacteria < 1000 MPN/gram dry wt.	Pass
Pathogen	TMECC 07.01-B Salmonella < 3 MPN/4 grams dry wt.	Pass
Physical Contaminants	TMECC 02.02-C Man Made Inert Removal and Classification: Plastic, Glass and Metal % > 4mm fraction	Combined Total: < 1.0
Physical Contaminants	TMECC 02.02-C Man Made Inert Removal and Classification: Sharps (Sewing needles, straight pins and hypodermic needles) % > 4mm fraction	None Detected

NOTE: TMECC refers to "Test Methods for the Examination of Composting and Compost," published by the United States Department of Agriculture and the United States Compost Council (USCC).

Before compost application, submit a copy of the compost producer's compost technical data sheet and a copy of the compost producers Seal of Testing Assurance certification. The compost technical data sheet must include:

1. Laboratory analytical test results
2. List of product ingredients

Before compost application, submit a Certificate of Compliance under Section 6-1.07, "Certificates of Compliance," of the Standard Specifications.

CONSTRUCTION

Site Preparation

Immediately prior to applying compost to compost (incorporate) areas, remove trash, debris and weeds.

Removed weeds must be disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

Application

Apply and incorporate compost in separate applications in the following sequence:

1. Apply compost to a depth of 6" inches by using specialized equipment such as a pneumatic blower or side discharge spreader.
2. You may incorporate the compost by hand; by using a backhoe, bulldozer, or grading blade to a depth between 12 and 18 inches. Do not incorporate compost to a strip 2 feet wide adjacent to the edge of pavement.
3. Following incorporation, compact the area to a relative compaction between 82 percent and 90 percent except as otherwise specified in Section 19-5, "Compaction," of the Standard Specifications.
4. Apply erosion control (Bonded Fiber Matrix) specified and paid for elsewhere in these special provisions.

MEASUREMENT AND PAYMENT

Compost (incorporate) will be measured by the square yard.

The contract price paid per square yard for compost (incorporate) includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in compost (incorporate) complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Attachment 2

On Site Restoration Plan

Caltrans On-Site Restoration and Monitoring Proposal for the Whole Enchilada Curve Improvement Project

Trinity County, State Route 299
PM 0.40/0.85
EA: 02-2E350
EFIS: 02-0000-0211

December 2012

Prepared by:

Brian Humphrey Date: 12-19-12

Brian Humphrey
Associate Environmental Planner, Coordinator/Biologist
Office of Environmental Management R-1
Caltrans District 2 North Region

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SUMMARY

This restoration plan has been prepared to compensate potential impacts to riparian habitat and jurisdictional waters of the United States (U.S.) as a result of the Whole Enchilada Curve Improvement project, located on State Route (SR) 299 between post mile 0.40 and 0.85. The proposed culvert replacement and placement of rock slope protection (RSP) at PM 0.50 is anticipated to permanently impact 71.6 linear feet of jurisdictional waters of the U.S. and remove approximately 2,494 ft² of vegetation considered to provide riparian function. Riparian vegetation anticipated to be removed consists of white alder (*Alnus rhombifolia*) and big leaf maple (*Acer macrophylum*). Douglas fir (*Pseudotsuga menziesii*), Pacific madrone (*Arbutus menziesii*), tan oak (*Lithocarpus densiflorus*), and California black oak (*Quercus kelloggii*) will also be removed, which are not considered riparian vegetation, but provide riparian function.

In an attempt to off-set both impacts to jurisdictional waters of the U.S. and riparian vegetation, Caltrans is proposing to replant a total of 89 linear feet of stream bank at PM 0.50 and 0.74. Approximately 3,128 ft² of native vegetation will be planted on-site at PM 0.50 and 0.74 to function as riparian habitat. White alders will be planted along the drainage at PM 0.50, while a combination of native species will be planted further upslope at PM 0.50 and 0.74. Planted upslope vegetation may consist of big leaf maples, Douglas firs, Pacific madrone, and California black oaks. The proposed re-vegetation efforts are anticipated to offset potential impacts to riparian and other waters of the U.S. (Table 1).

Table 1. Total Impacts and Proposed Restoration

	Other Waters of the U.S.	Riparian ft² (acre)
Impacts	71.6 linear feet	2,494 ft² (0.057 acre)
Proposed Restoration	89 linear feet * Culvert Treatments	3,128 ft² (0.072 acre)

* Proposed inlet and outlet treatments reduce erosion and minimize sediment from entering the Trinity River.

PROJECT LOCATION AND DESCRIPTION

The California Department of Transportation (Caltrans) and Federal Highway Administration (FHWA) are proposing to realign a section of SR 299 from PM 0.40 to 0.85, located west of the community of Salyer, in Trinity County. The proposed project will improve this section of highway by increasing the radius of the curves, improving the super-elevation (cross-slope) transitions of the roadway and providing 4' paved shoulders throughout the project limits. Three earth retaining structures (retaining walls) will be constructed to provide the necessary width for the required radius of curves. Five existing cross-culverts (PM 0.41, 0.50, 0.67, 0.74, and 0.83) are located within the project limits, while only three (PM 0.50, 0.67, 0.83) will require modification. Drainage work at PM 0.50 is proposed within jurisdictional waters of the U.S. This location the culvert will be replaced and extended approximately 44.3 feet upstream. In addition, RSP will also be placed at the inlet and outlet of the culvert.

ENVIRONMENTAL SETTING

This section of highway is located adjacent to the Trinity River, approximately 0.5 mile upstream of the confluence with the South Fork Trinity River. Two unnamed tributaries cross under SR 299 within the project limits at PM 0.50 and 0.74. Based on the Salyer 7.5 minute U.S.G.S.

quadrangle, the tributary at PM 0.74 is depicted as a perennial stream, while the un-named tributary at PM 0.50 does not appear on the map at all (Figure 1). The topography adjacent to the roadway is very steep with dense and mature vegetation. Due to the steepness of slopes and maturity of vegetation, the drainages are well shaded. Habitats within the project limits are most closely characterized as a mixture of "Douglas-fir" and "montane hardwood" habitats as described by the California Wildlife Habitat Relationship System. The overstory consists primarily of Douglas fir, Pacific madrone, big leaf maple, California black oak, tanoak, and canyon live oak (*Quercus chrysolepis*). Dominant understory throughout the project limits consists of Himalayan blackberry (*Rubus discolor*) and poison oak (*Toxicodendron disversilobum*).

PROJECT IMPACTS

Other Waters of the U.S.

The existing 6' x 6' concrete box culvert at PM 0.50 will be replaced with a 48" diameter plastic pipe culvert and extended 44.3' upstream, resulting in approximately 44.3' of permanent impacts to waters of the U.S. The placement of RSP will permanently impact 15.3' at the proposed inlet and approximately 12.0' at the culvert outlet. The proposed project is anticipated to permanently impact a total of 71.6' of waters of the U.S. (see Table 2).

Table 2. Waters of the U.S. Impacts

	Upstream		Downstream	Total
	Culvert	RSP	RSP	
Length (feet)	44.3 ft.	15.3 ft.	12.0 ft.	**71.6 ft.**

Riparian

The overstory vegetation adjacent to the drainage at PM 0.50 includes riparian species such as white alder and big leaf maple, as well as species not considered riparian vegetation, such as Douglas fir, Pacific madrone, tan oak, and California black oak. For the purpose of determining impacts to riparian vegetation, overstory vegetation adjacent to the drainage was considered riparian, since the adjacent vegetation does provide some form of riparian function (canopy cover, invertebrates, bank stabilization, and large woody debris).

Riparian vegetation will be impacted at PM 0.50 as a result of the proposed culvert replacement. The placement of the new culvert and RSP at the inlet will impact approximately 2,424 ft.² of riparian vegetation, including Douglas fir, Pacific madrone, big leaf maple, tanoak, and white alder, ranging in size from 2" to 23" diameter at breast height (dbh) (Figure 2). The placement of RSP at the outlet will impact approximately 70 ft.² of riparian vegetation, located outside the channel, including big leaf maple and California black oak, ranging in size from 2.5" to 8" dbh, which were considered riparian even though they were located outside the channel. Proposed construction activities will impact approximately 2,494 ft.² of riparian vegetation (see Table 3).

Table 3. Riparian Impacts

	Area	
	Square feet	**acre**
Upstream	2,424	0.0557
Downstream	70	0.0016
Total	**2,494**	**0.0573**

ON-SITE RESTORATION

Proposed Restoration of Potential Waters of the U.S.

Following construction, approximately 89' of stream channel will be planted with riparian species at PM 0.50 and 0.74 (Table 4). The proposed drainage work and placement of RSP at the culvert inlet and outlet will improve water quality within the Trinity River by reducing erosion and minimizing sediment from entering the Trinity River.

Table 4. Linear Feet of Re-vegetation

Post Mile	Linear Feet of Plantings
0.50 inlet	27 ft
0.50 outlet	29 ft
0.74 outlet	33 ft
Total	**89 ft**

Proposed Riparian Revegetation

Caltrans is proposing to replace/enhance approximately 3,128 ft² (0.072 acre) of riparian habitat on-site following construction at two locations (PM 0.50 and 0.74). These locations were chosen based on the amount of flows within the drainages, anticipated tree removal, and areas void of riparian vegetation. The drainage at PM 0.50 was selected, since riparian vegetation was being removed at this location and there were areas where the existing riparian vegetation could be enhanced. In addition, upland species will be planted upslope of the existing culvert outlet at PM 0.74, which will enhance the overall riparian canopy of the perennial stream. A Caltrans biologist will be responsible for the implementation and/or supervision of plantings.

PM 0.50 (inlet)

Approximately 1,633 ft² of riparian vegetation will be planted upslope of the proposed culvert inlet and RSP. White alders will be planted along both banks of the drainage upstream of the proposed culvert inlet for approximately 27', while big leaf maples, Douglas firs, and/or other native species will be planted further upslope.

PM 0.50 (outlet)

Approximately 822 ft² of stream bank will be planted downstream of the proposed culvert outlet and around the proposed RSP. White alders or big leaf maples will be planted along both banks of the drainage downstream of the culvert outlet for approximately 29', while California black oaks, big leaf maples, and/or other native species will be planted further upslope.

PM 0.74

Approximately 673 ft² of upslope habitat will be planted with big leaf maples, Pacific madrone, California black oaks, and/or other native species found on-site. The planting area is located

around the proposed downdrain and downslope of the proposed retaining wall structure, which is located on the east bank of the outlet.

Table 5. Summary of Areas to be Planted

Post Mile	Planting Area
0.50 inlet	1,633 ft^2
0.50 outlet	822 ft^2
0.74 outlet	673 ft^2
Total	**3,128 ft^2**

Implementation Schedule: Revegetation plantings are anticipated to take place following construction during the fall/winter of 2014. Revegetation work will be implemented either by Caltrans Biologists or contracted agency. Oversight will be provided by Caltrans if an agency is contracted to provide the implementation.

Plant Material: Plant material will be purchased from a local nursery. White alder cuttings and California black oak acorns may be collected and planted as well.

Monitoring Methods and Schedule: The planted areas will be visually inspected by the re-vegetation specialist/project biologist for a 3-5 year period. Monitoring will take into account variable precipitation and weather conditions and their effects on vegetation establishment and growth. Monitoring surveys will also record any evidence of erosion problems, as well as human and wildlife disturbances. Monitoring of each site will start the season immediately following planting.

Success Criteria: If all tree species planted achieve a minimum of 60 percent survival rate, monitoring may discontinue after 3 years. If the 60 percent survival rate has not been achieved by year 3, two more years of monitoring will be required.

Contingency Measures: If a performance criterion is not met for all or any portion of the mitigation project in any year, additional effort will be implemented to meet the criterion stated above. The reason for not meeting the criterion will be evaluated and corrected. If significant measures are needed, the planting strategy will be re-evaluated, including looking at soil conditions, hydrology, site preparation, planting techniques and materials. Caltrans will also coordinate with the permitting agencies to determine appropriate remedial actions. If significant remediation measures are needed, the maintenance and monitoring obligations will continue until met.

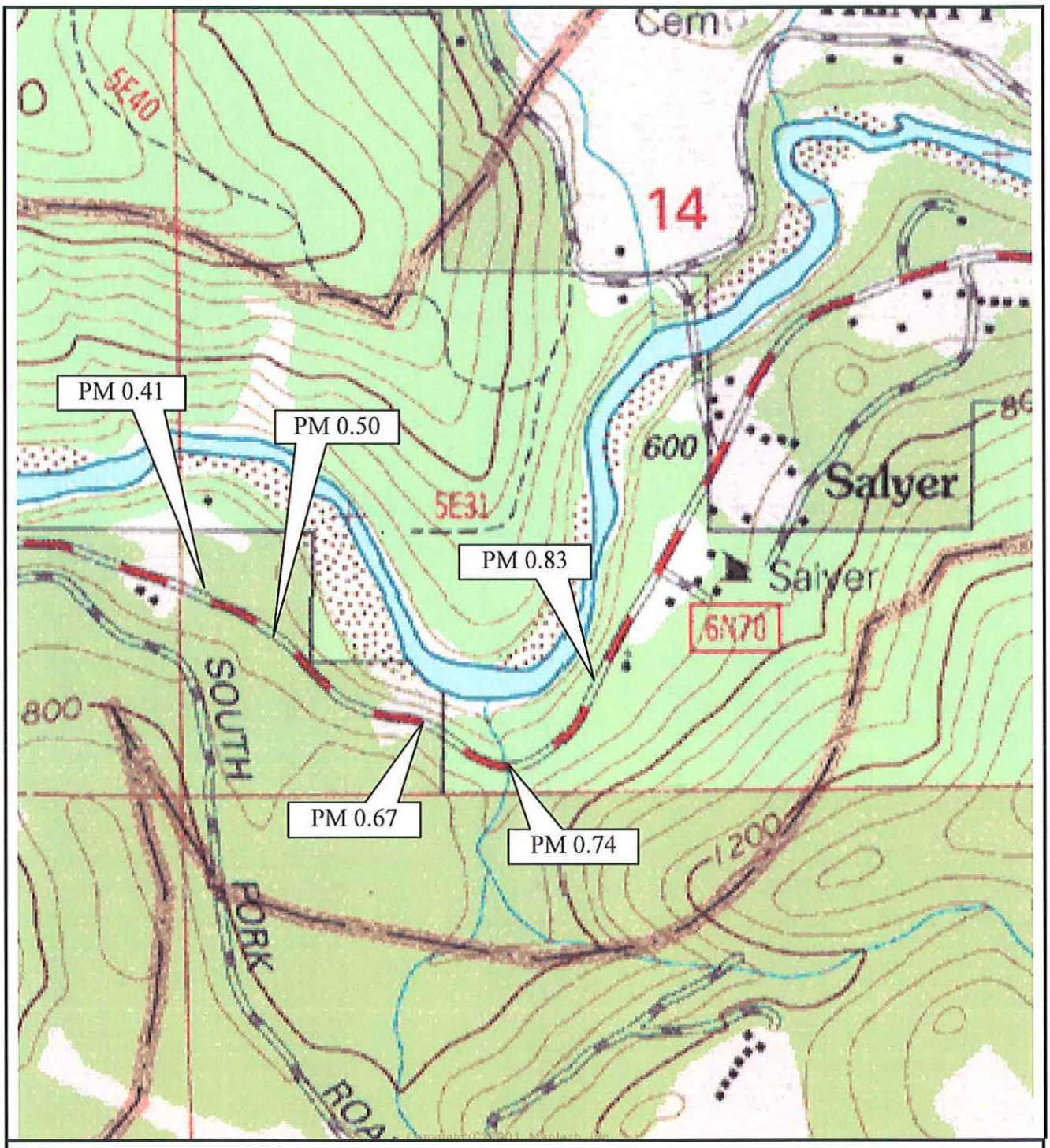


Figure 1.
U.S.G.S. Map with Drainage Locations

Caltrans	State of California Department of Transportation	
	TRI-299 – PM 0.40/0.85 EA 02-2E350	N
		Base Map: Salyer 7.5 minute U.S.G.S. quadrangles

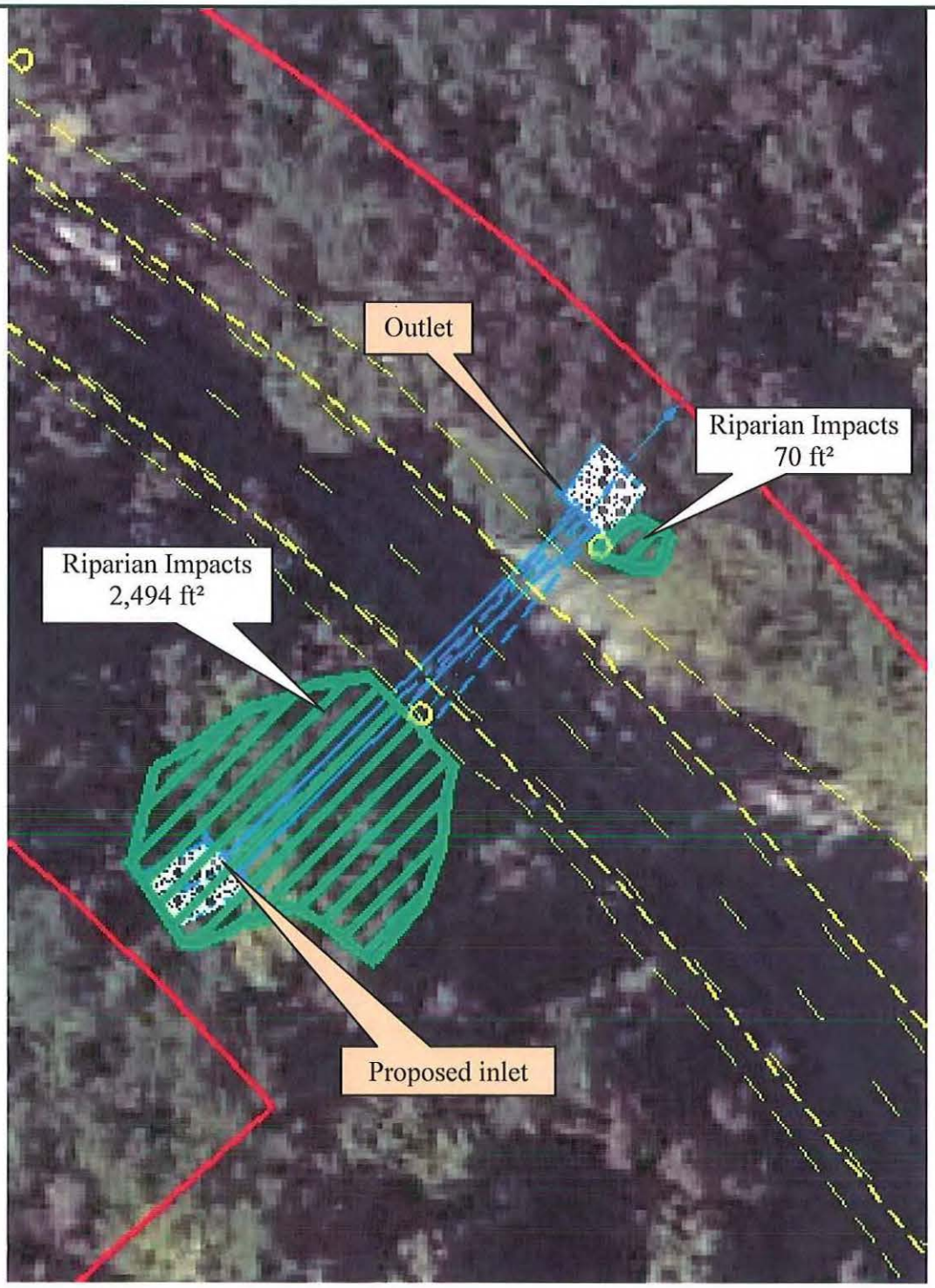
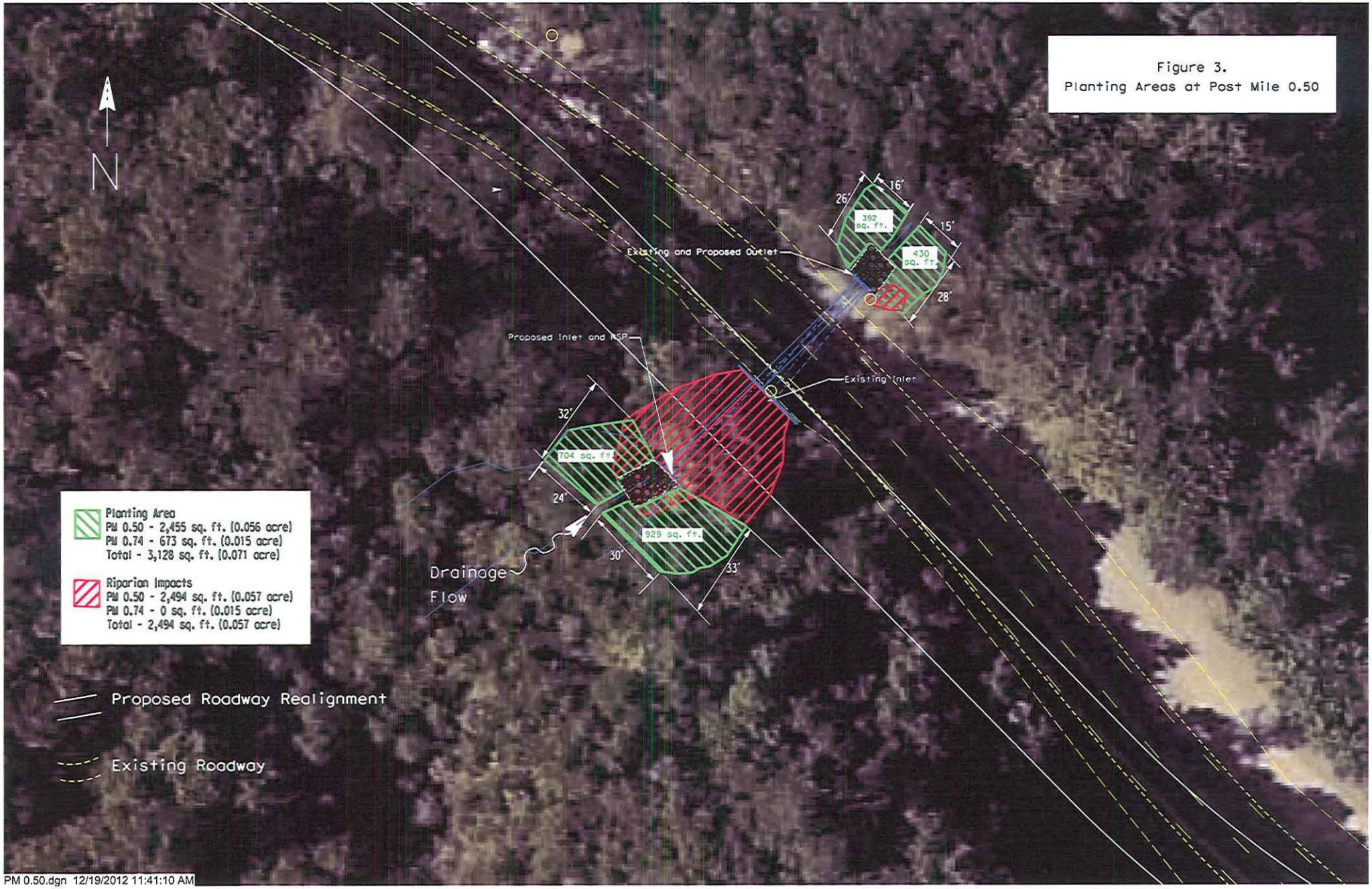


Figure 2.
Riparian Impacts at Post Mile 0.50

Caltrans	State of California Department of Transportation	Whole Enchilada Curve 02-TRI-299 PM 0.40/0.85 EA 02-2C950


N
Figure 3.
Planting Areas at Post Mile 0.50
Existing and Proposed Outlet
26'
16'
392 sq. ft.
15'
430 sq. ft.
28'
Proposed Inlet and RSP
Existing Inlet
32'
704 sq. ft.
24'
929 sq. ft.
30'
33'
Drainage Flow
Planting Area
PM 0.50 - 2,455 sq. ft. (0.056 acre)
PM 0.74 - 673 sq. ft. (0.015 acre)
Total - 3,128 sq. ft. (0.071 acre)
Riparian Impacts
PM 0.50 - 2,494 sq. ft. (0.057 acre)
PM 0.74 - 0 sq. ft. (0.015 acre)
Total - 2,494 sq. ft. (0.057 acre)
Proposed Roadway Realignment
Existing Roadway
PM 0.50.dgn 12/19/2012 11:41:10 AM

PM 0.74.dgn 12/19/2012 10:43:27 AM

PERMITS, LICENSES, AGREEMENTS, AND CERTIFICATIONS (PLAC)

PLAC - UNITED STATES ARMY CORPS OF ENGINEERS
NON-REPORTING NATIONWIDE 404 PERMIT

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT *(33 CFR 325)*	OMB APPROVAL NO. 0710-0003 EXPIRES: 31 August 2012

Public reporting burden for this collection of information is estimated to average 11 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters, Executive Services and Communications Directorate, Information Management Division and to the Office of Management and Budget, Paperwork Reduction Project (0710-0003). Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. Please DO NOT RETURN your form to either of those addresses. Completed applications must be submitted to the District Engineer having jurisdiction over the location of the proposed activity.

PRIVACY ACT STATEMENT

Authorities: Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research, and Sanctuaries Act, Section 103, 33 USC 1413; Regulatory Programs of the Corps of Engineers; Final Rule 33 CFR 320-332. Principal Purpose: Information provided on this form will be used in evaluating the application for a permit. Routine Uses: This Information may be shared with the Department of Justice and other federal, state, and local government agencies, and the public and may be made available as part of a public notice as required by Federal law. Submission of requested information is voluntary, however, if information is not provided the permit application cannot be evaluated nor can a permit be issued. One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETE
Non-Reporting NWP 14			

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME:	8. AUTHORIZED AGENT'S NAME AND TITLE (an agent is not required)
First - Chris Middle - Last – Harvey Company – Caltrans E-mail Address – chris.harvey@dot.ca.gov	First - Andre' Middle - Last – Benoist Company – Caltrans E-mail Address – andre.benoist@dot.ca.gov
6. APPLICANT'S ADDRESS. Address - 1031 Butte Street, MS 30 City – Redding State – CA Zip – 96001 Country – USA	9. AGENT'S ADDRESS Address - Same City – State – Zip – Country –
7. APPLICANT'S PHONE NOs. W/AREA CODE. a. Residence b. Business c. Fax 530-225-3101	10. AGENT'S PHONE NOs. W/AREA CODE a. Residence b. Business c. Fax 530-225-3302

STATEMENT OF AUTHORIZATION

11. I hereby authorize, Andre' Benoist to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

Chris Harvey — APPLICANT'S SIGNATURE

2/8/13 — DATE

NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE (see instructions)

Whole Enchilada Safety Project (02-2E350).

13. NAME OF WATERBODY, IF KNOWN (if applicable)	14. PROJECT STREET ADDRESS (if applicable)
Intermittent tributary to Trinity River.	Address
15. LOCATION OF PROJECT Latitude: °N 4 53' 11-20" Longitude: °W 123 35' 8-40"	City - State – Zip -

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (see instructions)

State Tax Parcel ID Municipality

Section – 14,15 Township – 6N Range – 5E

17. DIRECTIONS TO THE SITE

Highway 299 in Trinity County at Post Mile 0.5.

18. Nature of Activity (Description of project, include all features)

Replace a 5'x54' culvert with a 4'x98' culvert on an unnamed, intermittent stream. New headwalls and cutoff walls will be constructed, and RSP will be added to the inlet and outlet to minimize erosion.

19. Project Purpose (Describe the reason or purpose of the project, see instructions)

This is a safety improvement project. The new culvert will be placed to accommodate the new roadway.

USE BLOCKS 20-23 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge

Culvert replacement and erosion prevention.

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards:

Type Amount in Cubic Yards	Type Amount in Cubic Yards	Type Amount in Cubic Yards
Plastic Culvert. 4'x98'	Facing class RSP. 144 cu. yd.	

22. Surface Area in Acres of Wetlands or Other Waters Filled (see instructions)

Acres 274.4 sq. ft. (0.006 ac.)

Or

Liner Feet 71.6 l.f.

23. Description of Avoidance, Minimization, and Compensation (see instructions)

1. Disturbed area is minimum amount needed to complete the project. 2. Work will be completed during low/no flow conditions. 3. RSP and cutoff walls will minimize erosion.

24. Is Any Portion of the Work Already Complete? Yes ☐ No ☑ IF YES, DESCRIBE THE COMPLETED WORK

25. Addresses of Adjoining Property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody (If more than can be entered here, please attach a supplemental list).

Address –

City – State – Zip –

26. List of Other Certifications or Approvals/Denials Received from other Federal, State, or Local Agencies for Work Described in This Application.

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED
RWQCB	401 Cert.	WDID 1B12168WNTR	8/27/12	Pending	
DF&G	1600	1600-2012-0250-R1	9/10/12	Pending	

* Would include but is not restricted to zoning, building, and flood plain permits

27. Application is hereby made for a permit or permits to authorize the work described in this application. I certify that the information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

Chris Harvey — SIGNATURE OF APPLICANT
2/8/13 — DATE
[signature] — SIGNATURE OF AGENT
02/08/13 — DATE

The application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than five years or both.

Only highlighted text applies to the project. Whole Enchilada Safety Project (02-2E350).

Nationwide Permit General Conditions

1. Navigation
2. Aquatic Life Movements
3. Spawning Areas
4. Migratory Bird Breeding Areas
5. Shellfish Beds
6. Suitable Material
7. Water Supply Intakes
8. Adverse Effects From Impoundments
9. Management of Water Flows
10. Fills Within 100-Year Floodplains
11. Equipment
12. Soil Erosion and Sediment Controls
13. Removal of Temporary Fills
14. Proper Maintenance
15. Single and Complete Project
16. Wild and Scenic Rivers
17. Tribal Rights
18. Endangered Species
19. Migratory Birds and Bald and Golden Eagles
20. Historic Properties
21. Discovery of Previously Unknown Remains and Artifacts
22. Designated Critical Resource Waters
23. Mitigation
24. Safety of Impoundment Structures
25. Water Quality
26. Coastal Zone Management
27. Regional and Case-By-Case Conditions
28. Use of Multiple Nationwide Permits
29. Transfer of Nationwide Permit Verifications
30. Compliance Certification
31. Pre-Construction Notification

Note: To qualify for NWP authorization, the prospective permittee must comply with the following general conditions, as applicable, in addition to any regional or case-specific conditions imposed by the division engineer or district engineer. Prospective permittees should contact the appropriate Corps district office to determine if regional conditions have been imposed on an NWP. Prospective permittees should also contact the appropriate Corps district office to determine the status of Clean Water Act Section 401 water quality certification and/ or Coastal Zone Management Act consistency for an NWP. Every person who may wish to obtain permit authorization under one or more NWPs, or who is currently relying on an existing or prior permit authorization under one or more NWPs, has been and is on notice that all of the provisions of 33 CFR 330.1 through 330.6 apply to every NWP authorization. Note especially 33 CFR 330.5 relating to the modification, suspension, or revocation of any NWP authorization.

1. Navigation. (a) No activity may cause more than a minimal adverse effect on navigation. (b) Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States. (c) The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the

structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

2. Aquatic Life Movements. No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. All permanent and temporary crossings of waterbodies shall be suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species.

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

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

5. Shellfish Beds. No activity may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWPs 4 and 48, or is a shellfish seeding or habitat restoration activity authorized by NWP 27.

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

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

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

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

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

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

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

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

14. Proper Maintenance. Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety and compliance with applicable NWP general conditions, as well as any activity-specific conditions added by the district engineer to an NWP authorization.

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

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

17. Tribal Rights. No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

18. Endangered Species. (a) No activity is authorized under any NWP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify the critical habitat of such species. No activity is authorized under any NWP which "may affect" a listed species or critical habitat, unless Section 7 consultation addressing the effects of the proposed activity has been completed. (b) Federal agencies should follow their own procedures for complying with the requirements of the ESA. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will review the documentation and determine whether it is sufficient to address ESA compliance for the NWP activity, or whether additional ESA consultation is necessary. (c) Non-federal permittees must submit a pre-construction notification to the district engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that might affect federally listed endangered or threatened species or designated critical habitat, the pre-construction notification must include

the name(s) of the endangered or threatened species that might be affected by the proposed work or that utilize the designated critical habitat that might be affected by the proposed work. The district engineer will determine whether the proposed activity "may affect" or will have "no effect" to listed species and designated critical habitat and will notify the non- Federal applicant of the Corps' determination within 45 days of receipt of a complete pre-construction notification. In cases where the non- Federal applicant has identified listed species or critical habitat that might be affected or is in the vicinity of the project, and has so notified the Corps, the applicant shall not begin work until the Corps has provided notification the proposed activities will have "no effect" on listed species or critical habitat, or until Section 7 consultation has been completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps. (d) As a result of formal or informal consultation with the FWS or NMFS the district engineer may add species specific regional endangered species conditions to the NWPs. (e) Authorization of an activity by a NWP does not authorize the "take" of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the U.S. FWS or the NMFS, The Endangered Species Act prohibits any person subject to the jurisdiction of the United States to take a listed species, where "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The word "harm" in the definition of "take" means an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering. (f) Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the U.S. FWS and NMFS or their world wide web pages at *http://www.fws.gov/* or *http://www.fws.gov/ipac* and *http://www.noaa.gov/fisheries.html* respectively.

19. Migratory Birds and Bald and Golden Eagles. The permittee is responsible for obtaining any "take" permits required under the U.S. Fish and Wildlife Service's regulations governing compliance with the Migratory Bird Treaty Act or the Bald and Golden Eagle Protection Act. The permittee should contact the appropriate local office of the U.S. Fish and Wildlife Service to determine if such "take" permits are required for a particular activity.

20. Historic Properties. (a) In cases where the district engineer determines that the activity may affect properties listed, or eligible for listing, in the National Register of Historic Places, the activity is not authorized, until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied. (b) Federal permittees should follow their own procedures for complying with the requirements of Section 106 of the National Historic Preservation Act. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will review the documentation and determine whether it is sufficient to address section 106 compliance for the NWP activity, or whether additional section 106 consultation is necessary. (c) Non-federal permittees must submit a pre-construction notification to the district engineer if the authorized activity may have the potential to cause effects to any historic properties listed on, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties. For such activities, the preconstruction notification must state which historic properties may be affected by the proposed work or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of or potential for the presence of historic resources can be sought from the State Historic Preservation Officer or Tribal Historic Preservation Officer, as appropriate, and the National

~~Register of Historic Places (see 33 CFR 330.4(g)). When reviewing pre-construction notifications, district engineers will comply with the current procedures for addressing the requirements of Section 106 of the National Historic Preservation Act. The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigation, and field survey. Based on the information submitted and these efforts, the district engineer shall determine whether the proposed activity has the potential to cause an effect on the historic properties. Where the non-Federal applicant has identified historic properties on which the activity may have the potential to cause effects and so notified the Corps, the non-Federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects or that consultation under Section 106 of the NHPA has been completed. (d) The district engineer will notify the prospective permittee within 45 days of receipt of a complete preconstruction notification whether NHPA Section 106 consultation is required. Section 106 consultation is not required when the Corps determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR 800.3(a)). If NHPA section 106 consultation is required and will occur, the district engineer will notify the non-Federal applicant that he or she cannot begin work until Section 106 consultation is completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps. (e) Prospective permittees should be aware that section 110k of the NHPA (16 U.S.C. 470h-2(k)) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of Section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/ THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.~~

21. Discovery of Previously Unknown Remains and Artifacts. If you discover any previously unknown historic, cultural or archeological remains and artifacts while accomplishing the activity authorized by this permit, you must immediately notify the district engineer of what you have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The district engineer will initiate the Federal, Tribal and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

~~**22. Designated Critical Resource Waters**. Critical resource waters include, NOAA-managed marine sanctuaries and marine monuments, and National Estuarine Research Reserves. The district engineer may designate, after notice and opportunity for public comment, additional waters officially designated by a state as having particular environmental or ecological significance, such as outstanding national resource waters or state natural heritage sites. The district engineer may also designate additional critical resource waters after notice and opportunity for public comment. (a) Discharges of dredged or fill material into waters of the United States are not authorized by NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, 50, 51, and 52 for any activity within, or directly affecting, critical resource waters, including~~

wetlands adjacent to such waters. (b) For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, and 38, notification is required in accordance with general condition 31, for any activity proposed in the designated critical resource waters including wetlands adjacent to those waters. The district engineer may authorize activities under these NWPs only after it is determined that the impacts to the critical resource waters will be no more than minimal.

23. Mitigation. The district engineer will consider the following factors when determining appropriate and practicable mitigation necessary to ensure that adverse effects on the aquatic environment are minimal: (a) The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States to the maximum extent practicable at the project site (i.e., on site). (b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating for resource losses) will be required to the extent necessary to ensure that the adverse effects to the aquatic environment are minimal. (c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland losses that exceed 1/10 acre and require preconstruction notification, unless the district engineer determines in writing that either some other form of mitigation would be more environmentally appropriate or the adverse effects of the proposed activity are minimal, and provides a project specific waiver of this requirement. For wetland losses of 1/10 acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in minimal adverse effects on the aquatic environment. Compensatory mitigation projects provided to offset losses of aquatic resources must comply with the applicable provisions of 33 CFR part 332. (1) The prospective permittee is responsible for proposing an appropriate compensatory mitigation option if compensatory mitigation is necessary to ensure that the activity results in minimal adverse effects on the aquatic environment. (2) Since the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, wetland restoration should be the first compensatory mitigation option considered. (3) If permittee-responsible mitigation is the proposed option, the prospective permittee is responsible for submitting a mitigation plan. A conceptual or detailed mitigation plan may be used by the district engineer to make the decision on the NWP verification request, but a final mitigation plan that addresses the applicable requirements of 33 CFR 332.4(c)(2)–(14) must be approved by the district engineer before the permittee begins work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation (see 33 CFR 332.3(k)(3)). (4) If mitigation bank or in-lieu fee program credits are the proposed option, the mitigation plan only needs to address the baseline conditions at the impact site and the number of credits to be provided. (5) Compensatory mitigation requirements (e.g., resource type and amount to be provided as compensatory mitigation, site protection, ecological performance standards, monitoring requirements) may be addressed through conditions added to the NWP authorization, instead of components of a compensatory mitigation plan. (d) For losses of streams or other open waters that require pre-construction notification, the district engineer may require compensatory mitigation, such as stream rehabilitation, enhancement, or preservation, to ensure that the activity results in minimal adverse effects on the aquatic environment. (e) Compensatory mitigation will not be used to increase the acreage losses allowed by the acreage limits of the NWPs. For example, if an NWP has an acreage limit of 1/2 acre, it cannot be used to authorize any project resulting in the loss of greater than 1/2 acre of waters of the United States, even if compensatory mitigation is provided that replaces or restores some of the lost waters. However, compensatory mitigation can and should be used, as necessary, to ensure that a project already meeting the established acreage limits also satisfies the minimal impact requirement associated with the NWPs. (f) Compensatory mitigation plans for projects in or near streams or other open waters will normally include a requirement for the restoration or establishment, maintenance,

and legal protection (e.g., conservation easements) of riparian areas next to open waters. In some cases, riparian areas may be the only compensatory mitigation required. Riparian areas should consist of native species. The width of the required riparian area will address documented water quality or aquatic habitat loss concerns. Normally, the riparian area will be 25 to 50 feet wide on each side of the stream, but the district engineer may require slightly wider riparian areas to address documented water quality or habitat loss concerns. If it is not possible to establish a riparian area on both sides of a stream, or if the waterbody is a lake or coastal waters, then restoring or establishing a riparian area along a single bank or shoreline may be sufficient. Where both wetlands and open waters exist on the project site, the district engineer will determine the appropriate compensatory mitigation (e.g., riparian areas and/or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where riparian areas are determined to be the most appropriate form of compensatory mitigation, the district engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland losses. (g) Permittees may propose the use of mitigation banks, in-lieu fee programs, or separate permittee-responsible mitigation. For activities resulting in the loss of marine or estuarine resources, permittee-responsible compensatory mitigation may be environmentally preferable if there are no mitigation banks or in-lieu fee programs in the area that have marine or estuarine credits available for sale or transfer to the permittee. For permittee-responsible mitigation, the special conditions of the NWP verification must clearly indicate the party or parties responsible for the implementation and performance of the compensatory mitigation project, and, if required, its long-term management. (h) Where certain functions and services of waters of the United States are permanently adversely affected, such as the conversion of a forested or scrub-shrub wetland to a herbaceous wetland in a permanently maintained utility line right-of-way, mitigation may be required to reduce the adverse effects of the project to the minimal level.

24. Safety of Impoundment Structures. To ensure that all impoundment structures are safely designed, the district engineer may require non-Federal applicants to demonstrate that the structures comply with established state dam safety criteria or have been designed by qualified persons. The district engineer may also require documentation that the design has been independently reviewed by similarly qualified persons, and appropriate modifications made to ensure safety.

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

26. Coastal Zone Management. In coastal states where an NWP has not previously received a state coastal zone management consistency concurrence, an individual state coastal zone management consistency concurrence must be obtained, or a presumption of concurrence must occur (see 33 CFR 330.4(d)). The district engineer or a State may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements.

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

28. Use of Multiple Nationwide Permits. The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the United States authorized by the NWPs does not exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the United States for the total project cannot exceed 1/3 acre.

29. Transfer of Nationwide Permit Verifications. If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature:

> "When the structures or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this nationwide permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below."
>
> _____
> (Transferee)
>
> _____
> (Date)

30. Compliance Certification. Each permittee who receives an NWP verification letter from the Corps must provide a signed certification documenting completion of the authorized activity and any required compensatory mitigation. The success of any required permittee-responsible mitigation, including the achievement of ecological performance standards, will be addressed separately by the district engineer. The Corps will provide the permittee the certification document with the NWP verification letter. The certification document will include: (a) A statement that the authorized work was done in accordance with the NWP authorization, including any general, regional, or activity specific conditions; (b) A statement that the implementation of any required compensatory mitigation was completed in accordance with the permit conditions. If credits from a mitigation bank or in-lieu fee program are used to satisfy the compensatory mitigation requirements, the certification must include the documentation required by 33 CFR 332.3(l)(3) to confirm that the permittee secured the appropriate number and resource type of credits; and (c) The signature of the permittee certifying the completion of the work and mitigation.

31. Pre-Construction Notification (a) *Timing.* Where required by the terms of the NWP, the prospective permittee must notify the district engineer by submitting a pre-construction notification (PCN) as early as possible. The district engineer must determine if the PCN is complete within 30 calendar days of the date of receipt and, if the PCN is determined to be incomplete, notify the prospective permittee within that 30 day period to request the additional information necessary to make the PCN complete. The request must specify the information needed to make the PCN complete. As a general rule, district engineers will request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the district engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the district engineer. The prospective permittee shall not begin the activity until either: (1) He or she is notified in writing

by the district engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or (2) 45 calendar days have passed from the district engineer's receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer. However, if the permittee was required to notify the Corps pursuant to general condition 18 that listed species or critical habitat might be affected or in the vicinity of the project, or to notify the Corps pursuant to general condition 20 that the activity may have the potential to cause effects to historic properties, the permittee cannot begin the activity until receiving written notification from the Corps that there is "no effect" on listed species or "no potential to cause effects" on historic properties, or that any consultation required under Section 7 of the Endangered Species Act (see 33 CFR 330.4(f)) and/or Section 106 of the National Historic Preservation (see 33 CFR 330.4(g)) has been completed. Also, work cannot begin under NWPs 21, 49, or 50 until the permittee has received written approval from the Corps. If the proposed activity requires a written waiver to exceed specified limits of an NWP, the permittee may not begin the activity until the district engineer issues the waiver. If the district or division engineer notifies the permittee in writing that an individual permit is required within 45 calendar days of receipt of a complete PCN, the permittee cannot begin the activity until an individual permit has been obtained. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2). (b) *Contents of Pre-Construction Notification:* The PCN must be in writing and include the following information:(1) Name, address and telephone numbers of the prospective permittee; (2) Location of the proposed project; (3) A description of the proposed project; the project's purpose; direct and indirect adverse environmental effects the project would cause, including the anticipated amount of loss of water of the United States expected to result from the NWP activity, in acres, linear feet, or other appropriate unit of measure; any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity. The description should be sufficiently detailed to allow the district engineer to determine that the adverse effects of the project will be minimal and to determine the need for compensatory mitigation. Sketches should be provided when necessary to show that the activity complies with the terms of the NWP. (Sketches usually clarify the project and when provided results in a quicker decision. Sketches should contain sufficient detail to provide an illustrative description of the proposed activity (e.g., a conceptual plan), but do not need to be detailed engineering plans); (4) The PCN must include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial, intermittent, and ephemeral streams, on the project site. Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters on the project site, but there may be a delay if the Corps does the delineation, especially if the project site is large or contains many waters of the United States. Furthermore, the 45 day period will not start until the delineation has been submitted to or completed by the Corps, as appropriate; (5) If the proposed activity will result in the loss of greater than 1/10 acre of wetlands and a PCN is required, the prospective permittee must submit a statement describing how the mitigation requirement will be satisfied, or explaining why the adverse effects are minimal and why compensatory mitigation should not be required. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan. (6) If any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, for non-Federal applicants the PCN must include the name(s) of those endangered or threatened species that might be affected by the proposed work or utilize the designated critical habitat that may be affected by the proposed work. Federal applicants must provide documentation demonstrating compliance with the Endangered Species Act; and (7) For an activity that may affect a historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the National

Register of Historic Places, for non-Federal applicants the PCN must state which historic property may be affected by the proposed work or include a vicinity map indicating the location of the historic property. Federal applicants must provide documentation demonstrating compliance with Section 106 of the National Historic Preservation Act. (c) *Form of Pre-Construction Notification:* The standard individual permit application form (Form ENG 4345) may be used, but the completed application form must clearly indicate that it is a PCN and must include all of the information required in paragraphs (b)(1) through (7) of this general condition. A letter containing the required information may also be used. (d) *Agency Coordination:* (1) The district engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the project's adverse environmental effects to a minimal level. (2) For all NWP activities that require pre-construction notification and result in the loss of greater than 1/2 acre of waters of the United States, for NWP 21, 29, 39, 40, 42, 43, 44, 50, 51, and 52 activities that require pre-construction notification and will result in the loss of greater than 300 linear feet of intermittent and ephemeral stream bed, and for all NWP 48 activities that require pre-construction notification, the district engineer will immediately provide (e.g., via email, facsimile transmission, overnight mail, or other expeditious manner) a copy of the complete PCN to the appropriate Federal or state offices (U.S. FWS, state natural resource or water quality agency, EPA, State Historic Preservation Officer (SHPO) or Tribal Historic Preservation Office (THPO), and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will have 10 calendar days from the date the material is transmitted to telephone or fax the district engineer notice that they intend to provide substantive, site-specific comments. The comments must explain why the agency believes the adverse effects will be more than minimal. If so contacted by an agency, the district engineer will wait an additional 15 calendar days before making a decision on the preconstruction notification. The district engineer will fully consider agency comments received within the specified time frame concerning the proposed activity's compliance with the terms and conditions of the NWPs, including the need for mitigation to ensure the net adverse environmental effects to the aquatic environment of the proposed activity are minimal. The district engineer will provide no response to the resource agency, except as provided below. The district engineer will indicate in the administrative record associated with each pre-construction notification that the resource agencies' concerns were considered. For NWP 37, the emergency watershed protection and rehabilitation activity may proceed immediately in cases where there is an unacceptable hazard to life or a significant loss of property or economic hardship will occur. The district engineer will consider any comments received to decide whether the NWP 37 authorization should be modified, suspended, or revoked in accordance with the procedures at 33 CFR 330.5. (3) In cases of where the prospective permittee is not a Federal agency, the district engineer will provide a response to NMFS within 30 calendar days of receipt of any Essential Fish Habitat conservation recommendations, as required by Section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act. (4) Applicants are encouraged to provide the Corps with either electronic files or multiple copies of preconstruction notifications to expedite agency coordination.

None of the Regional Conditions apply to Whole Enchilada (02-2E350), but they need to stay with the application, Eng. Form 4345.

San Francisco District Regional Conditions

A. General Regional Conditions that apply to all NWPs in the ~~Sacramento,~~ San Francisco, ~~and Los Angeles~~ Districts:

1. When pre-construction notification (PCN) is required, the permittee shall notify the U.S. Army Corps of Engineers, San Francisco District (Corps) in accordance with General Condition 31 using either the South Pacific Division Preconstruction Notification (PCN) Checklist or a signed application form (ENG Form 4345) with an attachment providing information on compliance with all of the General and Regional Conditions. In addition, the PCN shall include:

    a. A written statement describing how the activity has been designed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States;

    b. Drawings, including plan and cross-section views, clearly depicting the location, size and dimensions of the proposed activity, as well as the location of delineated waters of the U.S. on the site. The drawings shall contain a title block, legend and scale, amount (in cubic yards) and area (in acres) of fill in Corps jurisdiction, including both permanent and temporary fills/structures. The ordinary high water mark or, if tidal waters, the mean high water mark and high tide line, should be shown (in feet), based on National Geodetic Vertical Datum (NGVD) or other appropriate referenced elevation. All drawings for activities located within the boundaries of the Los Angeles District shall comply with the September 15, 2010 Special Public Notice: *Map and Drawing Standards for the Los Angeles District Regulatory Division*, (available on the Los Angeles District Regulatory Division website at: www.spl.usace.army.mil/regulatory/); and

    c. Numbered and dated pre-project color photographs showing a representative sample of waters proposed to be impacted on the site, and all waters of the U.S. proposed to be avoided on and immediately adjacent to the activities site. The compass angle and position of each photograph shall be identified on the plan view drawing(s) required in subpart b of this Regional Condition.

2. The permittee shall submit a PCN, in accordance with General Condition 31, For all activities located in areas designated as Essential Fish Habitat (EFH) by the Pacific Fishery Management Council (i.e., all tidally influenced areas - Federal Register dated March 12, 2007, 72 C.F.R. 11,092, in which case the PCN shall include an EFH assessment and extent of proposed impacts to EFH. Examples of EFH habitat assessments can be found at: http://www.swr.noaa.gov/efh.htm.

3. For activities in which the Corps designates another Federal agency as the lead for compliance with Section 7 of the Endangered Species Act (ESA) of 1973 as amended, 16 U.S.C. §§ 1531-1544, Section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act (EFH), 16 U.S.C. § 1855(b)(4)(B) and/or Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended , 16 U.S.C. §§ 470-470h, the lead Federal agency shall provide all relevant documentation to the appropriate Corps demonstrating any previous consultation efforts, as it pertains to the Corps Regulatory permit area (for Section 7 and EFH compliance) and the Corps Regulatory area of potential effect (APE) (for Section 106 compliance). For activities requiring a PCN, this information shall be submitted with the PCN. If the Corps does not designate another Federal agency as the lead for ESA, EFH and/or NHPA, the Corps will initiate consultation for compliance, as appropriate.

4. For all activities in waters of the U.S. that are suitable habitat for Federally listed fish species, the permittee shall design all road crossings to ensure that the passage and/or spawning of fish is not hindered. In these areas, the permittee shall employ bridge designs that span the stream or river, including pier- or pile-supported spans, or designs that use a bottomless arch culvert with a natural stream bed unless determined to be impracticable by the Corps.

5. The permittee shall complete the construction of any compensatory mitigation required by special condition(s) of the NWP verification before or concurrent with commencement of construction of the authorized activity, except when specifically determined to be impracticable by the Corps. When mitigation involves use of a mitigation bank or in-lieu fee program, the permittee shall submit proof of payment to the Corps prior to commencement of construction of the authorized activity.

6. Any requests to waive the 300 linear foot limitation for intermittent and ephemeral streams for NWPs 21, 29, 39, 40, 42, 43, 44, 50, 51 and 52, or to waive the 500 linear foot limitation along the bank for NWP 13, must include the following:

    a. A narrative description of the stream. This should include known information on: volume and duration of flow; the approximate length, width, and depth of the waterbody and characteristics observed associated with an Ordinary High Water Mark (e.g. bed and bank, wrack line or scour marks); a description of the adjacent vegetation community and a statement regarding the wetland status of the adjacent areas (i.e. wetland, non-wetland); surrounding land use; water quality; issues related to cumulative impacts in the watershed, and; any other relevant information;

    b. An analysis of the proposed impacts to the waterbody, in accordance with General Condition 31;

    c. Measures taken to avoid and minimize losses to waters of the U.S., including other methods of constructing the proposed activity(s); and

    d. A compensatory mitigation plan describing how the unavoidable losses are proposed to be offset, in accordance with 33 CFR 332.

B. General Regional Conditions that apply to all NWPs in the San Francisco District:

1. Notification to the Corps (in accordance with General Condition No. 31) is required for any activity permitted by NWP if it will take place in waters or wetlands of the U.S. that are within the **San Francisco Bay diked baylands** (see figure 1) (undeveloped areas currently behind levees that are within the historic margin of the Bay. Diked historic baylands are those areas on the Nichols and Wright map below the 5-foot contour line, National Geodetic Vertical Datum (NGVD) (see Nichols, D.R., and N. A. Wright. 1971. Preliminary map of historic margins of marshland, San Francisco Bay, California. U.S. Geological Survey Open File Map)). The notification shall explain how avoidance and minimization of losses of waters or wetlands are taken into consideration to the maximum extent practicable (see General Condition 23).

2. Notification to the Corps (in accordance with General Condition No. 31) is required for any activity permitted by NWP if it will take place in waters or wetlands of the U.S. that are within the **Santa Rosa Plain** (see figure 2). The notification will explain how avoidance and minimization of losses of waters or wetlands are taken into consideration to the maximum extent practicable in accordance with General Condition No. 23.

3. Notification to the Corps (in accordance with General Condition No. 31), including a compensatory mitigation plan, habitat assessment, and extent of proposed project impacts

to Eelgrass Beds are required for any activity permitted by NWP if it will take place within or adjacent to **Eelgrass Beds**.

C. Regional Conditions that apply to specific NWPs in the San Francisco District:

3. MAINTENANCE:

1. To the extent practicable, excavation equipment shall work from an upland site (e.g., from the top of the bank, the road bed of the bridge, or culverted road crossing) to minimize adding fill into waters of the U.S. If it is not practicable to work from an upland site, or if working from the upland site would cause more environmental damage than working in the stream channel, the excavation equipment can be located within the stream channel but it must minimize disturbance to the channel (other than the removal of accumulated sediments or debris). As part of the notification to the Corps (in accordance with General Condition No. 31), an explanation as to the need to place excavation equipment in waters of the U.S. is required, as well as a statement of any additional necessary fill (e.g., cofferdams, access road, fill below the OHW mark for a staging area, etc.).

2. If the activity is proposed in a special aquatic site, the notification to the Corps (in accordance with General Condition No. 31) shall include an explanation of why the special aquatic site cannot be avoided, and the measures to be taken to minimize impacts to the special aquatic site.

11. TEMPORARY RECREATIONAL STRUCTURES:

1. Notification to the Corps (in accordance with General Condition No. 31) is required if any temporary structures are proposed in wetlands or vegetated shallow water areas (e.g. in eelgrass beds). The notification shall include the type of habitat and areal extent affected by the structures.

12. UTILITY LINE ACTIVITIES:

1. Excess material removed from a trench, associated with utility line construction, shall be disposed of at an upland site away from any wetlands or other waters of the U.S. so as to prevent this material from being washed into aquatic areas.

2. This NWP permit does not authorize the construction of substation facilities. Utility line substations can usually be constructed in uplands.

13. BANK STABILIZATION:

1. Notification to the Corps (in accordance with General Condition No. 31) is required for all activities stabilizing greater than 300 linear feet of channel. Where the removal of wetland vegetation (including riparian wetland trees, shrubs and other plants) or submerged, rooted, aquatic plants over a cumulative area greater than 1/10 acre or 300 linear feet is proposed, the Corps shall be notified (in accordance with General Condition No. 31). The notification shall include the type of vegetation and extent (e.g., areal dimension or number of trees) of the proposed removal. The notification shall also address the effect of the bank stabilization on the stability of the opposite side of the streambank (if it is not part of the stabilization activity), and on adjacent property upstream and downstream of the activity.

2. This permit allows excavating a toe trench in waters of the U.S., and, if necessary, to use the material for backfill behind the stabilizing structure. Excess material is to be disposed of in a manner that will have only minimal impacts to the aquatic environment. The notification to the Corps (in accordance with General Condition No. 31) shall include location of the disposal site.

3. For man-made banks, roads, or levees damaged by storms or high flows, the one cubic yard per running foot limit is counted only for that additional fill which encroaches (extends) beyond the pre-flood or pre-storm shoreline condition of the waterway. It is not counted for

the fill that would be placed to reconstruct the original dimensions of the eroded, man-made shoreline.

4. For natural berms and banks, the one cubic yard per running foot limit applies to any added armoring.

5. To the maximum extent practicable, any new or additional bank stabilization must incorporate structures or modifications beneficial to fish and wildlife (e.g., soil bioengineering or biotechnical design, root wads, large woody debris, etc.). Where these structures or modifications are not used, the applicant shall demonstrate why they were not considered practicable.

14. LINEAR TRANSPORATION PROJECTS:

1. Notification to the Corps (in accordance with General Condition No. 31) is required for all projects filling greater than 300 linear feet of channel. For projects involving greater than 300 linear feet of bank stabilization, the project proponent shall address the effect of the bank stabilization on the stability of the opposite side of the streambank (if it is not part of the stabilization activity), and on adjacent property upstream and downstream of the activity.

2. This permit does not authorize construction of new airport runways and taxiways.

3. If this NWP has been used to authorize previous project segments within the same linear transportation project, justification must be provided demonstrating that the cumulative impacts of the proposed and previously authorized project segments do not result in more than minimal impacts to the aquatic system.

4. To the maximum extent practicable, any new or additional bank stabilization required for the crossing must incorporate structures or modifications beneficial to fish and wildlife (e.g., soil bioengineering or biotechnical design, root wads, large woody debris, etc.). Where these structures or modifications are not used, the applicant shall demonstrate why they were not considered practicable. Bottomless and embedded culverts are encouraged over traditional culvert stream crossings.

23. APPROVED CATEGORICAL EXCLUSIONS:

1. Use of this NWP requires notification to the Corps (in accordance with General Condition No. 31). The notification shall include the following:

   a. A copy of the Federal Categorical Exclusion (Cat/Ex) document signed by the appropriate federal agency. If the Cat/Ex is signed by a state or local agency representative instead of by a federal agency representative, then copies of all documentation authorizing alternative agency signature shall be provided.

   b. Written description of Corps authority (e.g., Section 10 of the Rivers and Harbors Act and/or Section 404 of the Clean Water Act.);

   c. a list of conditions described in the Cat/Ex and/or attachments outlining measures that must be taken prior to, during, or after project construction to minimize impacts to the aquatic environment;

   d. a copy of the jurisdictional delineation performed by qualified specialists showing the project limits and the location (delineated boundaries) of Corps jurisdiction within the overall project limits;

   e. map(s) showing the locations of potentially permanent and temporary project impacts to areas within Corps jurisdiction;

f. a clear and concise description of all project impacts including, but not necessarily limited to:
   1. quantification and description of permanent project impacts to areas within Corps jurisdiction,
   2. quantification and description of temporary impacts to areas within Corps jurisdiction, and
   3. linear extent of Corps jurisdiction affected by the project;

g. a general description of activities covered by the Cat/Ex that do not require Corps authorization but are connected or related to the activities in Corps jurisdiction;

h. a complete description of any proposed mitigation and/or restoration including, but not necessarily limited to, locations of any proposed planting, short- and long-term maintenance, proposed monitoring, success criteria and contingency plans;

i. written justification of how the project complies with the Nationwide Permit Program including less than minimal impact to the aquatic environment and compliance with the General Conditions.

j. For Federal Highway Administration (FHWA) Cat/Ex projects, the notification should describe how activities described in the Cat/Ex meet the description of the Cat/Ex project published in the August 28,1987 Federal Register part 771.117 (a)(b)(c) and (d) (Volume 52, No. 167) or any updated version published in the Federal Register.

2. Only activities specifically described in the Cat/Ex project description will be covered by the NWP 23 authorization. If other activities not described in the Cat/Ex project description will be performed (e.g., dewatering, slope protection, etc.), these activities must receive separate NWP authorizations.

3. Notification to the Corps (in accordance with General Condition 31) must include a copy of the signed Cat/Ex document and final agency determinations regarding compliance with Section 7 of the Endangered Species Act (ESA), Essential Fish Habitat (EFH) under the Magnussen-Stevens Act, and Section 106 of the National Historic Preservation Act.

27. Aquatic Habitat Restoration, Establishment, and Enhancement Activities

1. Notification to the Corps (in accordance with General Condition 31) must include documentation of a review of project impacts to demonstrate that at the conclusion of the work that the project would result in a net increase in aquatic function. Additionally, the documentation must include a review of project impacts on adjacent properties or structures and must also discuss cumulative impacts associated with the project.

29. Residential Developments:

1. When discharge of fill results in the replacement of wetlands or waters of the U.S. with impervious surfaces, to ensure that the authorized activity does not result in more than minimal degradation of water quality (in accordance with General Condition 25), the residential development shall incorporate low impact development concepts (e.g. native landscaping, bioretention and infiltration techniques, and constructed green spaces) to the extent practicable. A description of the low impact development concepts proposed in the project shall be included with the permit application. More information including low impact development concepts and definitions is available at the following website: http://www.epa.gov/owow/NPS/lid/.

2. Use of this NWP is prohibited within the San Francisco Bay diked baylands (undeveloped areas currently behind levees that are within the historic margin of the Bay. Diked historic baylands are those areas on the Nichols and Wright map (see figure 1) below the 5-foot

contour line, National Geodetic Vertical Datum (NGVD) (see Nichols, D.R., and N. A. Wright. 1971. Preliminary map of historic margins of marshland, San Francisco Bay, California. U.S. Geological Survey Open File Map)).

33. TEMPORARY CONSTRUCTION, ACCESS, AND DEWATERING:

1. Access roads shall be designed to be the minimum width necessary and shall be designed to minimize changes to the hydraulic flow characteristics of the stream and degradation of water quality (in accordance with General Conditions 9 and 25). The following Best Management Practices (BMPs) shall be followed to the maximum extent practicable to ensure that flow and circulation patterns of waters are not impaired and adverse effects on the aquatic environment will be kept to a minimum:

   a. The road shall be properly stabilized and maintained during and following construction to prevent erosion.

   b. Construction of the road fill shall occur in a manner that minimizes the encroachment of trucks, tractors, bulldozers, or other heavy equipment within waters of the United States (including adjacent wetlands) that lie outside the lateral boundaries of the fill itself.

2. Vegetative disturbance in the waters of the U.S. shall be kept to a minimum.

3. Borrow material shall be taken from upland sources whenever feasible.

4. Stream channelization is not authorized by this NWP.

35. MAINTENANCE DREDGING OF EXISTING BASINS:

1. Use of this NWP will require notification to the Corps (in accordance with General Condition No. 31). The notification information should be provided on the Consolidated Dredging-Dredged Material Reuse/Disposal Application. This application and instructions for its completion can be found on our web site at: http://www.spn.usace.army.mil/conops/applications.html. The information must include the location of the proposed upland disposal site. A jurisdictional delineation of the proposed upland disposal site prepared in accordance with the current method required by the Corps may also be required.

2. The U.S. Coast Guard will be notified by the permittee at least 14 days before dredging commences if the activity occurs in navigable waters of the U.S. (Section 10 waters).

3. The permittee will be required to provide the following information to the Corps:
   a. Dredge Operation Plan: Submit, for approval by this office, no earlier than 60 calendar days and no later than 20 calendar days before the proposed commencement of dredging, a plan which includes the following: **Corps file number,** a copy of the dredging contract or description of the work under which the contractor will do the permitted work; name and telephone numbers of the dredging contractor's representative on site; proposed dredging start and completion dates; quantity of material to be removed; dredging design depth and typical cross section including overdepth; and date of last dredging episode and design depth. The Dredge Operational Plan shall also provide the following information: The controls being established to insure that dredging operations occur within the limits defined by the basin or channel dimensions and typical channel section.

   b. Pre-Dredge Survey: Submit no earlier than 60 calendar days and no later than 20 calendar days before commencement of dredging, a survey with accuracy to one-tenth foot that delineates and labels the following: areas to be dredged with overdepth allowances; existing depths; estimated quantities to be dredged to the design depth; and

estimated quantities for overdepth dredging. **All surveys shall be signed by the permittee to certify their accuracy. Please include the Corps file number.**

c. Solid Debris Management Plan: Submit no earlier than 60 calendar days and no later than 20 calendar days before commencement of work, a plan which describes measures to ensure that solid debris generated during any dredging operation is retained and properly disposed in areas not under Corps jurisdiction. **At a minimum, the plan shall include the following: source and expected type of debris; debris retrieval method; Corps file number; disposal method and site; schedule of disposal operations; and debris containment method to be used, if floatable debris is involved. (Please note that failure to provide all of the information requested in a, b, and c above may result in delays to your project. When your Dredge Operation Plan has been approved, you will receive a written authorization to commence with your project.)**

d. Post-Dredge Survey: Submit, **within 30 days of the last disposal activity** ("last" is defined as that activity after which no further activity occurs for 15 calendar days), a survey with accuracy to one-tenth foot that delineates and labels the areas dredged and provides the dredged depths. **Also, include the Corps file number, actual dates of dredging commencement and completion, actual quantities dredged for the project to the design depth, and actual quantities of overdepth.** The permittee shall substantiate the total quantity dredged by including calculations used to determine the volume difference (in cubic yards) between the Pre- and Post-Dredge Surveys and **explain any variation in quantities greater than 15% beyond estimated quantities or dredging deeper than is permitted (design plus overdepth allowance). All surveys shall be accomplished by a licensed surveyor and signed by the permittee to certify their accuracy.** A copy of the post dredge survey should be sent to the National Ocean Service for chart updating:

NOAA/National Ocean Service,
Nautical Data Branch
N/CS26, SSMC3, Room 7230
1315 East-West Highway
Silver Spring, Maryland 20910-3282.

e. **The permittee or dredge contractor shall inform this office when: 1) a dredge episode actually commences, 2) when dredging is suspended (suspension is when the dredge contractor leaves the dredge site for more than 48 hours for reasons other than equipment maintenance), 3) when dredging is restarted, and 4) when dredging is complete. Each notification should include the Corps file number.** Details for submitting these notifications will be provided in the verification letter (to whom and how).

39. Commercial and Institutional Developments:

1. When discharge of fill results in the replacement of wetlands or waters of the U.S. with impervious surfaces, to ensure that the authorized activity does not result in more than minimal degradation of water quality (in accordance with General Condition 25), the commercial and institutional development shall incorporate low impact development concepts (e.g. native landscaping, bioretention and infiltration techniques, and constructed green spaces) to the extent practicable. A description of the low impact development concepts proposed in the project shall be included with the permit application. More information including low impact development concepts and definitions is available at the following website: http://www.epa.gov/owow/NPS/lid/.

2. Use of this NWP is prohibited within the San Francisco Bay diked baylands (undeveloped areas currently behind levees that are within the historic margin of the Bay. Diked historic baylands are those areas on the Nichols and Wright map (see figure 1) below the 5-foot

contour line, National Geodetic Vertical Datum (NGVD) (see Nichols, D.R., and N. A. Wright. 1971. Preliminary map of historic margins of marshland, San Francisco Bay, California. U.S. Geological Survey Open File Map)).

40. AGRICULTURAL ACTIVITIES:

1. This NWP does not authorize discharge of fill into the channel of a perennial or intermittent watercourse that could impede high flows. This limitation does not apply to watercourses that flow only when there is an irregular, extraordinary flood event.

41. RESHAPING EXISTING DRAINAGE DITCHES:

1. Compensatory mitigation may be required if the Corps determines there will be a detrimental impact to aquatic habitat.

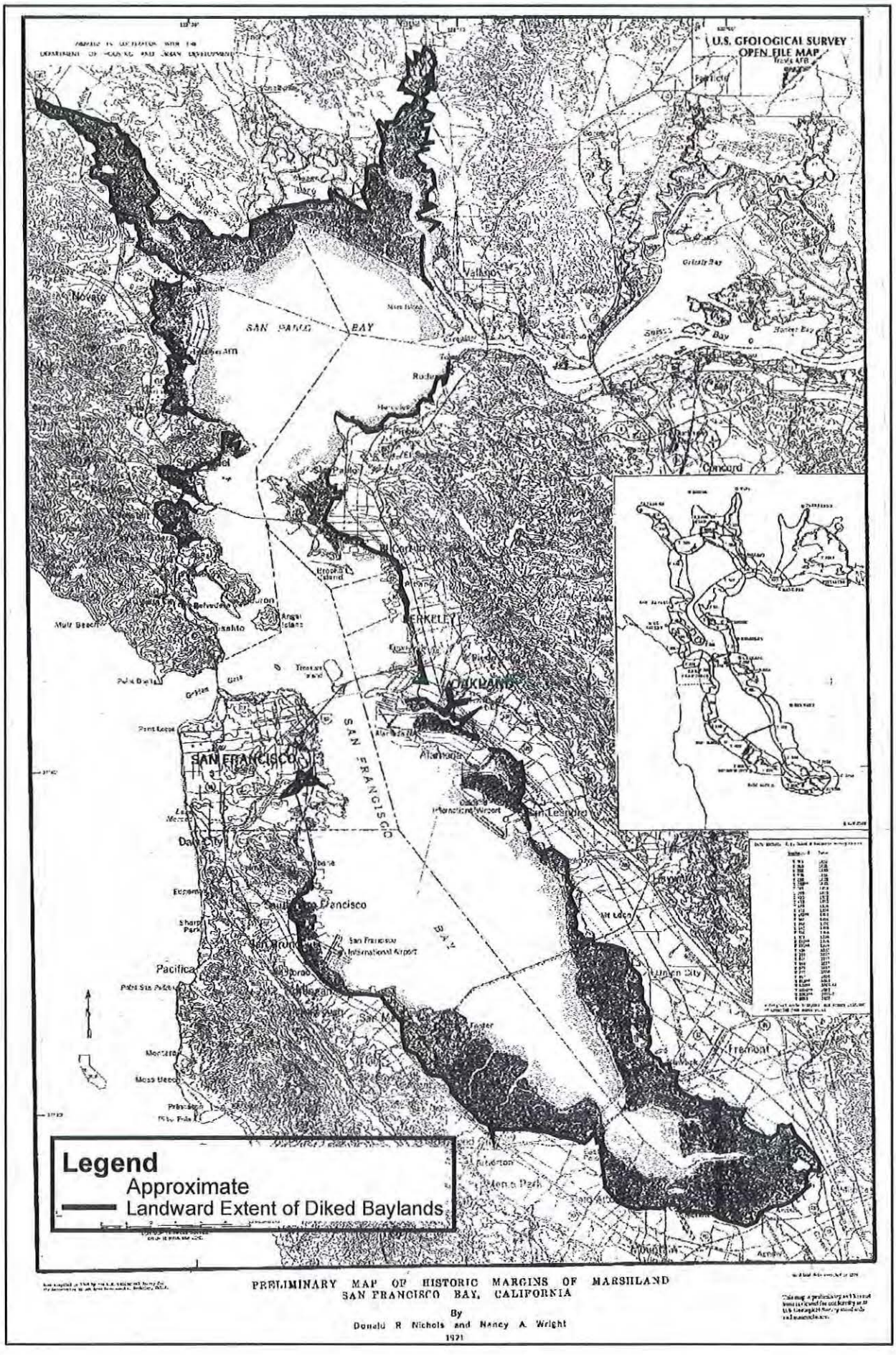
2. Notification to the Corps (in accordance with General Condition 31) is required if the applicant proposes to re-grade, discharge, install channel lining, or redeposit fill material.

3. The notification to the Corps (in accordance with General Condition 31) shall include an explanation of the project's benefit to water quality and a statement demonstrating the need for the project.

42. RECREATIONAL FACILITIES:

1. If buildings are proposed to be built in waters of the United States, including wetlands, the applicant must demonstrate that there is no on-site practicable alternative that is less environmentally damaging as defined by the Section 404(b)(1) guidelines.

Figure 1: Map of Diked Baylands



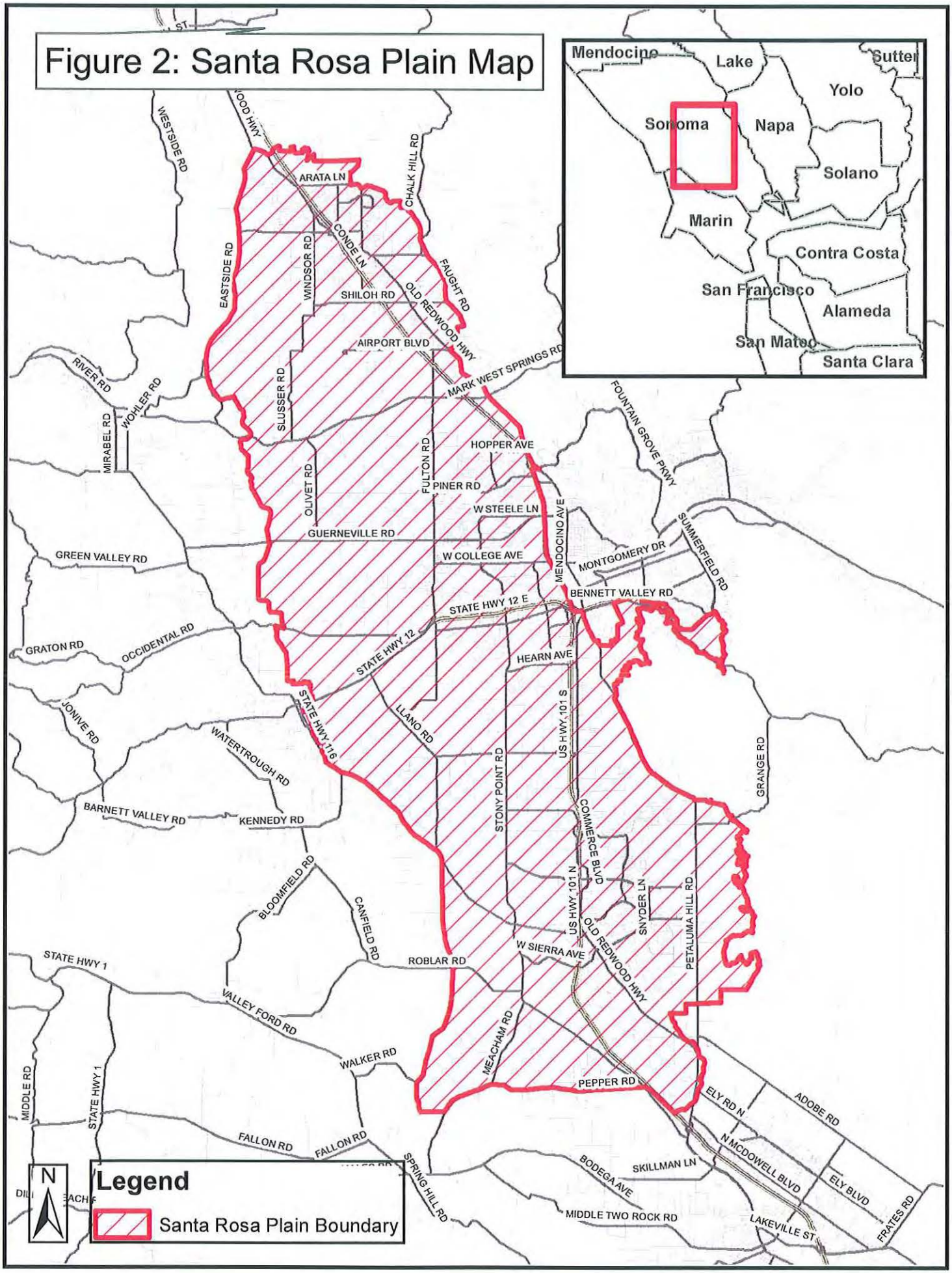


Figure 2: Santa Rosa Plain Map
Mendocino
Lake
Sutter
Yolo
Sonoma
Napa
Solano
Marin
Contra Costa
San Francisco
Alameda
San Mateo
Santa Clara
WESTSIDE RD
ARATA LN
CHALK HILL RD
CONDE LN
WINDSOR RD
EASTSIDE RD
FAUGHT RD
SHILOH RD
OLD REDWOOD HWY
AIRPORT BLVD
MARK WEST SPRINGS RD
RIVER RD
WOHLER RD
MIRABEL RD
SLUSSER RD
FOUNTAIN GROVE PKWY
HOPPER AVE
FULTON RD
PINER RD
OLIVET RD
W STEELE LN
GUERNEVILLE RD
MENDOCINO AVE
SUMMERFIELD RD
GREEN VALLEY RD
W COLLEGE AVE
MONTGOMERY DR
BENNETT VALLEY RD
STATE HWY 12 E
GRATON RD
OCCIDENTAL RD
STATE HWY 12
HEARN AVE
JONIVE RD
STATE HWY 116
LLANO RD
US HWY 101 S
GRANGE RD
WATERTROUGH RD
STONY POINT RD
BARNETT VALLEY RD
KENNEDY RD
COMMERCE BLVD
BLOOMFIELD RD
CANFIELD RD
US HWY 101 N
SNYDER LN
PETALUMA HILL RD
STATE HWY 1
ROBLAR RD
W SIERRA AVE
OLD REDWOOD HWY
VALLEY FORD RD
MEACHAM RD
WALKER RD
PEPPER RD
ELY RD N
ADOBE RD
MIDDLE RD
STATE HWY 1
FALLON RD
FALLON RD
N MCDOWELL BLVD
SKILLMAN LN
ELY BLVD
BODEGA AVE
SPRING HILL RD
MIDDLE TWO ROCK RD
LAKEVILLE ST
FRATES RD
N
Legend
Santa Rosa Plain Boundary

PERMITS, LICENSES, AGREEMENTS, AND CERTIFICATIONS (PLAC)

PLAC - CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

CA DEPARTMENT OF FISH AND GAME
NOTIFICATION NO.1600-2012-0250-R1

CALIFORNIA DEPARTMENT OF FISH AND GAME
NORTHERN REGION
601 LOCUST STREET
REDDING, CA 96001

STREAMBED ALTERATION AGREEMENT
NOTIFICATION NO. 1600-2012-0250-R1
Two unnamed tributaries to the Trinity River

CALIFORNIA DEPARTMENT OF TRANSPORTATION
THE WHOLE ENCHILADA SAFETY PROJECT

This Streambed Alteration Agreement (Agreement) is entered into between the California Department of Fish and Game (DFG) and the California Department of Transportation (Permittee) as represented by Mr. Chris Harvey.

RECITALS

WHEREAS, pursuant to Fish and Game Code (FGC) section 1602, Permittee notified DFG on September 10, 2012 that Permittee intends to complete the project described herein.

WHEREAS, pursuant to FGC section 1603, DFG has determined that the project could substantially adversely affect existing fish or wildlife resources and has included measures in the Agreement necessary to protect those resources.

WHEREAS, Permittee has reviewed the Agreement and accepts its terms and conditions, including the measures to protect fish and wildlife resources.

NOW THEREFORE, Permittee agrees to complete the project in accordance with the Agreement.

PROJECT LOCATION

The project is located along State Route 299 west of Salyer near the Humboldt and Trinity County line, between milepost 0.4 and 0.9, in the County of Trinity, State of California; Latitude 4° 53' 11—20" North, Longitude 123° 35' 8—40" West.

PROJECT DESCRIPTION

The project will improve a section of highway within the postmile limits. There are two drainages within the project boundary that are subject to permit requirements. The first drainage (Drainage 1) is at postmile 0.5 where an existing 5' X 5' X 54' culvert, will be replaced with a 4' X 4' X 98.3' culvert; remove existing headwalls at the inlet and outlet and construct new headwalls at the inlet and outlet; install rock slope protection at the

inlet (36 ft^2) and outlet (36 ft^2); The second drainage (Drainage 2) at milepost 0.74 has an existing 5' diameter culvert that will be retained, work here will include constructing an earth retaining structure at the outlet and extending a 12" down-drain down-slope into the riparian area.

PROJECT IMPACTS

Drainage 1

Inlet: The new inlet will be extended 44.3 feet upstream, converting 44.3' x 3' (132.9 sq. ft.) of waters into a culvert. A 12'x15.3' RSP pad will be placed at the inlet of the culvert. The jurisdictional limits of the RSP pad will affect 3'x15.3' (45.9 sq. ft.) of waters. In order to construct these improvements, approximately 2,424 sq. ft. of riparian area, including 6 trees, ranging from 2"-23" dbh, will be impacted.

Outlet: The new outlet will be in the same location as the existing outlet. Impacts on the outlet side will be limited to a 12'x12' RSP pad, and removal of 4 small trees ranging in size from 2.5" – 8" dbh. The jurisdictional limits of the RSP pad will affect 3'x12' (36 sq. ft.) of waters, and the tree removal will affect 70 sq. ft. of riparian area.

Total area affected: Waters = 214.8 sq. ft.; Riparian = 2,494 sq. ft.

Drainage 2

No additional impacts. All work on slope will be hand work only.

The adverse effects the project could have on the fish or wildlife resources identified above include: physical disturbance of the stream channel and adjacent riparian habitat, as well as potentially temporary adverse effects on fish and downstream benthic invertebrate communities through sediment deposition or spills of deleterious materials.

MEASURES TO PROTECT FISH AND WILDLIFE RESOURCES

1 Administrative Measures

Permittee shall meet each administrative requirement described below.

1.1 Documentation at Project Site. Permittee shall make the Agreement, any extensions and amendments to the Agreement, and all related notification materials and California Environmental Quality Act (CEQA) documents, readily available at the project site at all times and shall be presented to DFG personnel, or personnel from another state, federal, or local agency upon request.

1.2 Providing Agreement to Persons at Project Site. Permittee shall provide copies of the Agreement and any extensions and amendments to the Agreement to all persons who will be working on the project at the project site on behalf of

Permittee, including but not limited to contractors, subcontractors, inspectors, and monitors.

1.3 Notification of Conflicting Provisions. Permittee shall notify DFG if Permittee determines or learns that a provision in the Agreement might conflict with a provision imposed on the project by another local, state, or federal agency. In that event, DFG shall contact Permittee to resolve any conflict.

1.4 Project Site Entry. Permittee agrees that DFG personnel may enter the project site at any time to verify compliance with the Agreement.

2 Avoidance and Minimization Measures

To avoid or minimize adverse impacts to fish and wildlife resources identified above, Permittee shall implement each measure listed below.

PROJECT TIMING

2.1 All work on the stream banks or within the stream channel, shall be confined to the period commencing May 15, and ending October 15, of any year in which this Agreement is valid when there is little or no stream flow. If there is flow in the stream the Permittee or its contractors may construct a clear water diversion to cleanly route water around the construction area. Weather conditions should be monitored daily, if the stream has clear water diversion, and the diversion constructed should be sized to accommodate 25 year potential thunder-storm events. If weather conditions permit, and the stream remains in low flow conditions or dry, the Permittee may perform work within the stream channel or on the banks after October 15, provided a written request is made to the Department at least 5 days before the proposed work period variance. Written approval from the Department for the proposed work period variance must be received by the Permittee prior to the start or continuation of work after October 15.

2.2 If work is performed within the stream channel or on the banks after October 15, the Permittee shall do all of the following:

a. Stage erosion and sediment control materials at the work site.

b. Monitor the seventy-two (72) hour forecast from the National Weather Service.

c. When the 72-hour forecast indicates a probability of precipitation of 60% or greater, or at the onset of any precipitation, ground disturbing activities shall cease and erosion control measures shall be implemented to stabilize exposed soils and prevent the mobilization of sediment into the stream channel or adjacent wetland or riparian areas.

HABITAT AND SPECIES PROTECTION

2.3 This Agreement does not authorize the take of any State threatened or endangered species. If the project could result in the "take" of a state listed threatened or endangered species, the Permittee has the responsibility to obtain from the Department, a California Endangered Species Act Permit (CESA 2081 Permit). The Department may formulate a management plan that will avoid or mitigate take. If appropriate, contact the Department CESA coordinator at (530) 225-2300.

2.4 Removal of existing vegetation shall not exceed the minimum necessary to complete operations. Woody riparian vegetation removal from the stream channel or banks at Drainage 1 is limited to the following: at the outlet four small trees ranging from 2.5—8" dbh; at the inlet to the removal of six trees ranging in size from 2—23" dbh. After construction, the Permittee will replant native trees and shrubs near Drainage 1 at a ratio of 3:1. All unpaved disturbed areas will have erosion control materials (e.g. hydroseed, mulch, certified weed-free straw) applied at rates that are effective for preventing mobilization and movement of soils.

2.5 Construction equipment and personnel shall be restricted to the limits of the work area as shown on the project plans. No construction activities or habitat disturbance is authorized beyond this area. The Permittee or its contractors, will prepare a Storm Water Pollution Prevention Plan.

2.6 Take of migratory birds will be avoided during construction activities. In no case shall active nests with eggs or young be removed during construction.

PETROLEUM, CHEMICAL AND OTHER POLLUTANTS

2.7 All construction-related materials and equipment shall be stored in designated staging areas located outside of the floodplain unless approved in writing by DFG.

2.8 Refueling and vehicle maintenance shall be performed at least 100 feet from streams or other water bodies unless approved in writing by DFG.

2.9 No equipment or machinery shall be operated within any flowing stream.

2.10 Any equipment or vehicles driven and/or operated within or adjacent to the stream channel shall be checked and maintained daily to prevent leaks of materials that, if introduced to water, could be deleterious to aquatic life, wildlife, or riparian habitat.

2.11 Stationary equipment such as motors, pumps, generators, and welders that contain deleterious materials, located adjacent to the stream channel shall be positioned over drip pans.

2.12 No debris, soil, silt, sand, bark, slash, sawdust, rubbish, cement or concrete or washings thereof, asphalt, paint or other coating material, oil or petroleum products or other organic or earthen material from any construction, or associated activity of whatever nature shall be allowed to enter into, or placed where it may be washed by rainfall or runoff into, waters of the State. When operations are completed, any excess materials or debris shall be removed from the work area. No rubbish shall be deposited within 150 feet of the high water mark of any stream or lake.

EROSION AND SEDIMENT CONTROL

2.13 The project shall at all time feature adequate erosion and sediment control devices to prevent the degradation of water quality.

2.14 Soils exposed by project operations shall be treated to prevent sediment runoff and transport. Erosion control measures shall include the proper installation and maintenance of approved Best Management Practices (BMPs) and may include applications of seed, certified weed-free straw, compost, fiber, commercial fertilizer, stabilizing emulsion and mulch, or combinations thereof.

2.15 Soils adjacent to the stream channel that are exposed by project operations shall be adequately stabilized when rainfall is reasonably expected during construction, and immediately upon completion of construction, to prevent the mobilization of such sediment into the stream channel or adjacent riparian areas. National Weather Service forecasts shall be monitored by the Permittee to determine the chance of precipitation.

2.16 Following construction, all disturbed upland areas shall be stabilized and reseeded with an erosion control mix consisting of regionally appropriate, native grass and forb species.

CONTACT INFORMATION

Any communication that Permittee or DFG submits to the other shall be in writing and any communication or documentation shall be delivered to the address below by U.S. mail, fax, or email, or to such other address as Permittee or DFG specifies by written notice to the other.

To Permittee:

Mr. Chris Harvey
c/o Mr. Andre Benoist
Department of Transportation
1031 Butte Street, MS 30
Redding, CA 96001
Fax: (530) 225-2455
Email: andre.benoist@dot.ca.gov
Chris.harvey@dot.ca.gov

To DFG:

Department of Fish and Game
Northern Region
601 Locust Street
Redding, CA 96001
Attn: Lake and Streambed Alteration Program – Richard Lis
Notification #1600-2012-0250-R1
Fax: (530) 225-2142
Email: rlis@dfg.ca.gov

LIABILITY

Permittee shall be solely liable for any violations of the Agreement, whether committed by Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents or contractors and subcontractors, to complete the project or any activity related to it that the Agreement authorizes.

This Agreement does not constitute DFG's endorsement of, or require Permittee to proceed with the project. The decision to proceed with the project is Permittee's alone.

SUSPENSION AND REVOCATION

DFG may suspend or revoke in its entirety the Agreement if it determines that Permittee or any person acting on behalf of Permittee, including its officers, employees,

representatives, agents, or contractors and subcontractors, is not in compliance with the Agreement.

Before DFG suspends or revokes the Agreement, it shall provide Permittee written notice by certified or registered mail that it intends to suspend or revoke. The notice shall state the reason(s) for the proposed suspension or revocation, provide Permittee an opportunity to correct any deficiency before DFG suspends or revokes the Agreement, and include instructions to Permittee, if necessary, including but not limited to a directive to immediately cease the specific activity or activities that caused DFG to issue the notice.

ENFORCEMENT

Nothing in the Agreement precludes DFG from pursuing an enforcement action against Permittee instead of, or in addition to, suspending or revoking the Agreement.

Nothing in the Agreement limits or otherwise affects DFG's enforcement authority or that of its enforcement personnel.

OTHER LEGAL OBLIGATIONS

This Agreement does not relieve Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, from obtaining any other permits or authorizations that might be required under other federal, state, or local laws or regulations before beginning the project or an activity related to it.

This Agreement does not relieve Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, from complying with other applicable statutes in the FGC including, but not limited to, FGC sections 2050 et seq. (threatened and endangered species), 3503 (bird nests and eggs), 3503.5 (birds of prey), 5650 (water pollution), 5652 (refuse disposal into water), 5901 (fish passage), 5937 (sufficient water for fish), and 5948 (obstruction of stream).

Nothing in the Agreement authorizes Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, to trespass.

AMENDMENT

DFG may amend the Agreement at any time during its term if DFG determines the amendment is necessary to protect an existing fish or wildlife resource.

Permittee may amend the Agreement at any time during its term, provided the amendment is mutually agreed to in writing by DFG and Permittee. To request an amendment, Permittee shall submit to DFG a completed DFG "Request to Amend Lake or Streambed Alteration" form and include with the completed form payment of the corresponding amendment fee identified in DFG's current fee schedule (see Cal. Code Regs., tit. 14, § 699.5).

TRANSFER AND ASSIGNMENT

This Agreement may not be transferred or assigned to another entity, and any purported transfer or assignment of the Agreement to another entity shall not be valid or effective, unless the transfer or assignment is requested by Permittee in writing, as specified below, and thereafter DFG approves the transfer or assignment in writing.

The transfer or assignment of the Agreement to another entity shall constitute a minor amendment, and therefore to request a transfer or assignment, Permittee shall submit to DFG a completed DFG "Request to Amend Lake or Streambed Alteration" form and include with the completed form payment of the minor amendment fee identified in DFG's current fee schedule (see Cal. Code Regs., tit. 14, § 699.5).

EXTENSIONS

In accordance with FGC section 1605(b), Permittee may request one extension of the Agreement, provided the request is made prior to the expiration of the Agreement's term. To request an extension, Permittee shall submit to DFG a completed DFG "Request to Extend Lake or Streambed Alteration" form and include with the completed form payment of the extension fee identified in DFG's current fee schedule (see Cal. Code Regs., tit. 14, § 699.5). DFG shall process the extension request in accordance with FGC 1605(b) through (e).

If Permittee fails to submit a request to extend the Agreement prior to its expiration, Permittee must submit a new notification and notification fee before beginning or continuing the project the Agreement covers (Fish & G. Code, § 1605, subd. (f)). .

EFFECTIVE DATE

The Agreement becomes effective on the date of DFG's signature, which shall be: 1) after Permittee's signature; 2) after DFG complies with all applicable requirements under the California Environmental Quality Act (CEQA); and 3) after payment of the applicable FGC section 711.4 filing fee listed at

http://www.dfg.ca.gov/habcon/ceqa/ceqa_changes.html.

TERM

This Agreement shall expire on December 31, 2016, unless it is terminated or extended before then. All provisions in the Agreement shall remain in force throughout its term. Permittee shall remain responsible for implementing any provisions specified herein to protect fish and wildlife resources after the Agreement expires or is terminated, as FGC section 1605(a) (2) requires.

AUTHORITY

If the person signing the Agreement (signatory) is doing so as a representative of Permittee, the signatory hereby acknowledges that he or she is doing so on Permittee's behalf and represents and warrants that he or she has the authority to legally bind Permittee to the provisions herein.

AUTHORIZATION

This Agreement authorizes only the project described herein. If Permittee begins or completes a project different from the project the Agreement authorizes, Permittee may be subject to civil or criminal prosecution for failing to notify DFG in accordance with FGC section 1602.

CONCURRENCE

The undersigned accepts and agrees to comply with all provisions contained herein.

FOR DEPARTMENT OF TRANSPORTATION

Chris Harvey — Date: 1/4/13

Chris Harvey
Project Manager

FOR DEPARTMENT OF FISH AND GAME

Ali Aghili — Date: 1/4/13

Ali Aghili
Habitat Conservation Senior Environmental Scientist

Prepared by: Richard Lis
Staff Environmental Scientist

MATERIALS INFORMATION

FOUNDATION REPORTS

Foundation Report for Retaining Wall No. 1, Enchilada Curve Improvement, dated 9/20/2012 by Caltrans Division of Engineering Services, Office of Geotechnical Design North, Branch of Geophysics and Geology.

M e m o r a n d u m

Flex your power!
Be energy efficient!

To: KELLY HOLDEN
Branch Chief, Structure Design, Branch 7

Attention: Wendy Hou

Date: September 20, 2012

File: 02-TRI-299-PM 0.4-0.9
Structure No. 05E0009 (PM 0.5)
02-2E3501, 02 0000 0211
Enchilada Curve Improvement
Retaining Wall No. 1
Soldier Pile Wall

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
GEOTECHNICAL SERVICES – MS 5

Subject: Foundation Report for Retaining Wall No. 1

INTRODUCTION

General

As requested, the Office of Geotechnical Design North (OGDN) is providing this Foundation Report (FR) for the design and construction of the proposed Retaining Wall No. 3, Structure Number 05E0009, of the Enchilada Curve Improvement project on Route 299 between PM 0.4 and 0.9, near the county line of Humboldt and Trinity Counties and the town of Salyer (See Plate 1). Retaining Wall No. 3 is proposed to consist of a soldier pile wall at approximately PM 0.5.

Project Description and Proposed Improvements

The project consists of realigning the existing road between PM 0.4 and 0.9 where three curves exist. The proposed realignment will eliminate one curve and improve the other two. Three retaining walls are proposed to facilitate the new alignment. According to the "Summary of Type Selection Meeting" Memo (Reference No. 13), a soldier pile wall, a soil nail wall, and a Mechanically Stabilized Embankment (MSE) wall are proposed for the three walls and designated as Retaining Wall Nos. 1, 2 and 3, respectively. Table No. 1, below, provides a general summary of the extent of the three proposed walls (See Plate No. 3). In addition to the three proposed walls, significant cutting of the slope above the roadway is proposed between "A1" Line Stations 107+75 to 110+00.

Table No. 1. Summary of Extent of Proposed Retaining Walls

Retaining Wall Number	Wall Type	Stationing and Offset, "A1" Line (feet)			Length (feet)	Maximum Height (feet)
		Begin	End	Offset		
1	Soldier Pile	111+96	113+72	16 Left	176	16.5
2	Soil Nail	113+50	116+79	20 Right	311.8	50
3	MSE	119+16.4	119+99.6	16 Left	83.2	14

Based on a "General Plan" (GP) dated June 13, 2012 (Reference No.15) provided by the Caltrans Structure Design, Office of Bridge Design North, Bridge Design Branch 7 (OBDN Branch 7), the proposed Retaining Wall No. 1 will be an 176 feet long soldier pile wall with timber lagging. The height of the timber lagging defines the design height, which will be as high as 16.5 feet for a length of approximately 64 feet in the center area of the wall. The lagging height is proposed to progressively step out to a minimum height of approximately 6 feet on the ends. The "Type Selection Recommendations" provided by OBDN Branch 7 (Reference No.14) indicate the project will be designed based on LFD/WSD methods and will utilize the 2006 Standard Plans and Specifications.

Scope of Work

The scope of work included performing a literature and historical review in an effort to obtain geological and geotechnical data pertaining to the subject site that could provide insight into the design and construction of the proposed wall facility. A site investigation for the project was implemented in two phases (see Subsurface Exploration and Laboratory Testing Program" section), and included exploratory borings, sample collection, and seismic refraction surveys to characterize the subsurface conditions. The site investigation also included geological mapping of the area which included an assessment of the general stability of existing slopes based on notable information from visible discontinuities, including fractures, joints, and bedding. Laboratory testing of selected samples was performed, followed by engineering analysis and preparation of this report summarizing our findings, conclusions and recommendations.

Subsurface Exploration and Laboratory Testing Program

Exploratory Borings

Our Office performed an exploratory boring subsurface investigation on November 3, 2010 (Phase 1), and April 13 and 17, 2012 (Phase 2). Phase 1 consisted of a vertical, 5-

inch diameter mud rotary boring (designated as RC-10-002) and Phase 2 consisted of six vertical, 5-inch diameter mud rotary borings (designated as RC-12-005 thru RC-12-010). Equipment used for both subsurface investigation phases consisted of a track-mounted CS2000 drill rig and an Acker truck-mounted drill rig. The CS2000drill rig was utilized to perform boring RC-12-005 and was equipped with an automatic hammer with a designated hammer energy ratio (ERi) of 84 percent for Standard Penetration Test (SPT) in situ testing (Reference No. 17). The Acker drill rig performed the remaining vertical borings and was equipped with an automatic hammer with a designated ERi of 74 percent. All mud rotary borings were advanced with a self-casing wire line drilling method, and were placed at the locations shown on Plate No. 4, attached. . The following table presents a summary of borings performed for the Retaining Wall No. 1.

Table No. 2: Summary of Boring Exploration

Number[(1)]	Station (ft)	Offset from "A1" Line (ft)	Top Elevation (ft)	Depth (ft)	Bottom Elevation (ft)
RC-010-002	112+46	1.5 Lt.	582.0	39.0	543.0
RC-012-005	112+00	14.0 Lt.	582.8	43.5	539.3
RC-012-006	112+75	30.0 Rt.	584.1	30.0	554.1
RC-012-007	113+54	15.0 Rt.	586.5	20.0	566.5
RC-012-008	113+53	9.0 Lt.	584.1	20.0	564.1
RC-012-009	112+85	5.0 Lt.	583.6	25.0	558.6
RC-012-010	112+20	7.0 Lt.	583.4	20.0	563.4

Notes: Borings with prefix "RC" used mud rotary wash method with continuous sampling.

Sampling was achieved by utilizing rock core barrel in all borings and intermittently performed SPTs. The SPT was utilized to characterize soils encountered above the bedrock at the location of the proposed retaining wall. Selected soil samples were bagged for subsequent laboratory testing.

Laboratory Testing

Laboratory tests were performed to assess corrosivity and engineering properties of the near-surface, colluvium soils at the site, These tests included grain size analysis (ASTM D 422), Atterberg Limits (AASHTO T89 and T90) and corrosion testing (CTM 643, CTM 471 and CTM 422). Laboratory tests were also performed to estimate the strength of the underlying bedrock materials. Rock testing included point load strength index

testing of rock specimens to estimate the Uniaxial Compressive Strength (UCS) per ASTM D 5731-08.

Seismic Refraction Survey

A seismic refraction survey was performed at the Retaining Wall No. 1 site and consisted of placing two seismic refraction lines by using an EG&G Smartseis 24-channnel seismograph with 14 Hz geophones. The energy source employed was a hammer and striker plate. A report developed by the Caltrans Geotechnical Services Geophysics and Geology Branch (Reference No. 12) which presents the results and findings of the seismic refraction survey is attached as Appendix C. Table No. 3, below, presents the location of the seismic refraction lines for the Retaining Wall No. 1 site. The locations of the seismic lines are also shown on the attached "Site Plan" (see Plate No. 4).

Table No. 3: Location Seismic Refraction Surveys

Seismic Line Number	Station "A1" Line (feet)		Offset (ft)	Trend	Length (ft)
	From	To			
2 (2010)*	112+66		5.0 Lt.	N20ºE	83.0
3 (2010)	112+00	114+16	5.0 Lt.	N65ºW	216.0

*Perpendicular to "A1" Line

FINDINGS

Site Description

The overall project site is located in hilly, tree-studded terrain within the Six Rivers National Forest Administrative Boundary. The project area is generally rural; a residence exists adjacent, south of the highway near the westerly edge of the project limits (see Plate No. 3). Numerous residences exists easterly of the project limits project in the town of Salyer. According to the web-based Caltrans Postmile Query Tool (Reference No. 16), the subject site is located at latitude and longitude coordinates of 40.88649^{o} North and 123.58779^{o} West, respectively; these coordinates are the basis for obtaining data in this report available through GIS related information sources. Within the project limits, State Route 299 is a two-lane highway paved with asphalt concrete (AC). The roadway width is approximately 27 feet wide; the westbound direction has two-feet-wide paved shoulders along with unpaved pullouts at each curve. The eastbound direction lane has an unpaved shoulder along with a one-foot-wide drainage ditch at the toe of the rock slopes.

Within in the project limits the existing roadway has been excavated from the side of a hill that faces the Trinity River. This hill is approximately 270 feet high, and extends from an elevation of 450 feet at the river, to an elevation of approximately 720 feet at the crest. The summit of the hill is narrow and gradually widens toward the east. The southern face of the hill is bound by a narrow valley carved by a creek; this valley is approximately 30 to 50 feet deep. The elevations on the paved road way vary from 595 to 574 feet (See Plate 2). Most of the existing road within the project interval was built entirely by cutting into formational rock utilizing cut slope angles that vary from 45º to 55º, and extend to a maximum height of 120 feet.

Retaining Wall No. 1 Site Description

Based on 1947 as-built plans profile grades (Reference No.1) within the proposed Soldier Pile wall limits the current Route 299 roadway was constructed by excavating as deep as 10 to 45 feet beneath the original ground at the roadway centerline. The existing cut slopes exhibited both hard and soft bedrock.

Regional Geology

The project site is located in the Western Klamath Terrane near the westerly edge of the Klamath Mountains Geomorphic Province of California. The lithologies and age relationships within the Klamath Mountains indicate repeated accretion, beginning in early to middle Paleozoic and continuing through the Mesozoic, of ophiolitic and island arc terranes, with their associated sedimentary units, to the leading western edge of the North American plate. According to published geological mapping of the area (Reference Nos. 3 and 4), sedimentary rocks belonging to the Late Jurassic Galice Formation underlay the project site (see Plate Nos. 5a and 5b) which are generally explained as gray phyllitic metagraywacke, slate, phyllitic slate. A more detailed description is offered by the report by Young which accompanies the mapping and is as follows:

> *"The Galice Formation consists of interbedded, very fine- to coarse-grained meta-graywacke. The fine-grained layers are altered to slate and phyllitic slate, while the medium- and coarse-grained beds are largely low-grade semischist."*

Materials similar to the provided descriptions were encountered in our field investigations (see below). No landslide features are shown on the referenced map within or adjacent to the project area. However, the map report states that: *"Only the larger and more obvious landslide areas are shown on the geologic map that accompanies this report."*

Site Geologic Conditions

Within the project limits, exposures of the Galice formation rock were noted to be composed of slightly schistose meta-graywacke with slate interbeds, phyllitic schist, and schist. Geologically, the site materials exhibited characteristics such that separation into two contrasting groups is apparent based on resistivity to weathering by the chemical and mineralogical components of the rocks. The first group would be comprised of the harder appearing, slightly weathered phyllitic schist and meta-graywacke/slate interbeds materials. In contrast to neighboring materials, these rocks appeared to have an inherent, weather-resistant nature that was exhibited by the local tendency of these rocks to protrude from the ground surface and inhibit the accumulation of vegetation which was sparse and poorly-developed. The schist rock comprises the second group which was generally decomposed and intensely weathered, an indicator that the structure and mineralogical components are inherently susceptible to weathering. The product of decomposition of the schist was typically observed to be silty clay which promotes areas where slopes are less steep and vegetation is better established.

Naturally Occurring Asbestos (NOA)

The Caltrans Map "Areas Likely to Contain Naturally Occurring Asbestos – District 2" (Reference No. 7) states:

> *Natural occurrences of asbestos are more likely to be encountered in, and immediately adjacent to, areas of ultramafic rocks including landslide deposits or soils originating from ultramafic rock sources.*

The referenced Caltrans map does not depict and area likely to contain Naturally Occurring Asbestos (NOA) within or immediately adjacent to, the project limits. Similarly, the United States Forest Service (USFS) mapping of NOA (Reference No. 9) indicates the project site is not in an area "more likely: to contain NOA. In review of available published geologic mapping (Reference Nos. 2 through 4), and the aforementioned NOA mapping, the nearest area of NOA or ultramafic rocks (designated as "serpentinized ultramafic rocks") is located roughly two miles westerly of the project area. Based on the geologic conditions observed during site visits and on the results of subsurface exploration (see "Subsurface Conditions", below) the potential for the presence of ultramafic rocks within the project limits is considered very low.

Subsurface Conditions

Based on borings performed immediately north of the Retaining Wall No. 1 Layout Line (RTW1 LOL), the near-surface materials in the Retaining Wall No. 1 area consist of 6 to 13 feet of fill and colluvium described as loose silty gravel and silty sand with gravel. These near-surface materials are underlain by 4 to 13 feet of loose to medium dense decomposed formational metamorphic bedrock. Underlying the decomposed bedrock are 5 to 12 feet of intensely weathered to moderately weathered, intensely fractured, soft to moderately hard phyllitic schist and schist, which are underlain by moderately weathered to fresh, intensely fractured, and hard meta-graywacke. Based on the seismic refraction survey (Reference 12), the layer of phyllitic schist and schist was imaged with a velocity of 2500 feet per second. A velocity of 6200 feet per second was determined for the meta-graywacke. In boring No. RC-12-010 moderately weathered and hard meta-graywacke is overlain by 9 feet of road fill, indicating that a ridge of hard formational rock is present at higher elevation in this area. This ridge can be observed directly across the roadway from the boring location. Therefore, the contact of formational bedrock is considered as very irregular and is anticipated to be equally irregular along the "RTW1" line. Side cast material was observed at the proposed location for Retaining Wall No. 1 and has been described as a mixture of construction debris and rounded and angular large boulders in a sandy matrix. Based on the seismic survey, Seismic Line 2, performed along that slope, the thickness of the side cast material is approximately 4 feet. A more detailed description of the materials encountered in borings is presented on the LOTBs attached in Appendix B.

<u>Groundwater</u>

The presence of a static ground water table appeared to be absent during our subsurface investigation exploration borings performed during Phase 1 and 2 (November 2010 and April 2012). However, Seismic Lines 2 and 3 (Reference 12) detected a possible saturated zone in the area of Retaining Wall 1 at a depth of 20 feet. This saturated zone is contained within the decomposed bedrock and the upper section of the bedrock. Our Office's opinion is that the saturated zone is not present within the decomposed bedrock because during the drilling investigation drilling water did not circulate at a depth greater than 20 feet and rock core at this depth did not appear to show signs of saturation with the exception of the upper 2 feet of the bedrock. Furthermore, during the field visits to the project site, slopes in the vicinity of the Retaining Wall No. 1 appeared absent of seeps and springs, even during visits performed within wet seasons of the year.

Therefore, our Office believes that the saturated zone detected by the seismic survey may be as a result of transient water.

This saturated zone may be encountered during construction at the proposed Retaining Wall Number 1 location between 20 to 25 feet of depth. It is anticipated that the saturated zone may not interfere with the construction efforts. However, precautionary measures shall be observed in case of unexpected ground water.

Laboratory Test Results

Based on the results of point load strength index testing of meta-graywacke rock core specimens, the Uniaxial Compressive Strength of the rock materials was estimated to be as high as 15,592 psi (per the methods of ASTM D 5731-08). The results of corrosion testing are presented in Table No. 5, below. Laboratory test results for samples collected from borings performed for Retaining Wall No. 1 are also presented in Appendix B, attached.

Corrosion Evaluation

A composite soil sample was collected from boring RC-10-002 during the 2010 subsurface exploration. The Office of Testing and Technology Services, Corrosive Technology Branch tested the composite sample for corrosion potential. The Caltrans Corrosion Guidelines (Reference No. 5) states that:

> "*A site is considered corrosive if one or more of the following conditions exist for the representative soil and/or water sample taken at the site: Chloride concentration is 550 ppm or greater, sulfate concentration is 2000 ppm or greater, of 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 included to define a corrosive site. 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 collected at this site was considered to be non-corrosive. Refer to Table No. 5 below for specific test results.

Table 5: Corrosion Test Summary

SIC Corrosion Number	Boring Number	Sample Depth (feet)	pH	Minimum Resistivity (Ohm-cm)	Sulfate Content (ppm)	Chloride Content (ppm)
C644095	RC-10-002	11.5 – 15.0	7.23	11270	N/A	N/A

Faulting and Seismicity

According to the report accompanying the Caltrans Deterministic PGA Map (Reference No. 10), Caltrans defines a fault as "active" if the fault known to have ruptured within the past 700,000 years (late-Quaternary to present). The Caltrans ARS Online (v.2.0) spectrum tool at http://dap3.dot.ca.gov/shake_stable/v2 /index.php indicates that the closest "active" fault to the site is the Trinidad fault which forms part of the Mad River Fault zone. This web-based tool indicates the closest distance to the Trinidad fault trace (or surface project of the top of rupture plane) is approximately 14.3 miles southwesterly of the project site (see Plate No. 6). Additionally, this fault is identified to be a "reverse" fault type which dips at 35º to the northeast and is capable of generating a Maximum Moment Magnitude (MMax) of 7.5. The closest distance to the rupture plane of this fault is indicated to be approximately 9.2 miles. According to the Alquist-Priolo Earthquake Fault Zone Maps available through United States Geological Survey (USGS) (obtained at http://www.consrv.ca.gov/cgs/rghm/ap/Pages/index.aspx) the site is not within an Alquist-Priolo Earthquake Fault Zone. No faults (active or inactive) are known to extend close to or on the project site. The closest known inactive fault to the project site is the Hennessy Ridge Fault, a thrust fault located approximately 1.9 miles southwesterly of the project site (see Plate No. 5a).

In accordance with the Caltrans Geotechnical Services Design Manual (Reference No. 11), the average small strain shear velocity for the top 100 feet at the site (V_{S30}) is estimated to be about 2,500 feet per second. Utilizing the estimated V_{S30} and the ARS Online (v.2.0) response spectrum web-based tools, Peak Ground Accelerations (PGA) of 0.33g and 0.39g were generated based on the deterministic and probabilistic methods, respectively. Based on the Caltrans Geotechnical Services Design Manual, the design PGA shall be the greater acceleration obtained by either the deterministic method or the probabilistic method, with the probabilistic method being based on the USGS 5 percent probability of exceedance in 50 years (975 years return period). Note that it can be shown that if the time interval (i.e. design life) is lengthened to 75 years, the probability of exceeding an earthquake with a return period of 975 years increases to about 8 percent.

CONCLUSIONS AND RECOMMENDATIONS

Our Office considers that soldier pile wall should provide an adequate foundation system for the Retaining Wall 1. The elevation of the top of hard bedrock at the site of the Retaining Wall 1 was obtained by the information provided by the subsurface and surface investigation. Approximate elevations of the competent bedrock are shown in the table below. Our Office recommends that the minimum pile embedment depth into competent bedrock shall be at least 10 feet.

Table No. 6: Approximate Elevations of Top of Competent Bedrock for Retaining Wall 1

Stationing RTW1 Line (feet)		Approximate Elevation of Top of Bedrock (feet)		Approximate Maximum Pile Tip Elevation (feet)	
From	To	From	To	From	To
10+40	10+60	558.0	572.0	548.0	562.0
10+60	10+95	572.0	558.0	562.0	548.0
10+95	11+30	558.0	565.0	548.0	555.0
11+30	11+95	565.0	571.0	555.0	561.0
11+95	12+17	571.0	573.0	561.0	563.0

Lateral Earth Pressures

The active and passive lateral earth pressures using and slope angle (β) of 30° below the wall and the parameters used to determine them are shown in the following table.

Table No. 7: Earth Pressures Coefficients for Retaining Walls 1.

Position with Respect to top of Bedrock Elevation (See Table 5)	Parameters			Lateral Earth Pressures	
	Internal Friction Angle, Φ (degrees)	Cohesion, c (psf)	Total Unit Weight, γ (pcf)	Active, K_a	Passive,* K_p
Above	32	0	120	0.31	1.00
Below	40	2000	158	0.21	2.30

* Based on sloping ground at below the retaining wall toe (β = -30º).

Passive earth pressure may be applied below an elevation of 2 feet below the proposed bench elevation.

In addition to the earth pressures above, lateral loading should account for a traffic surcharge load of 240 pounds per square foot at the roadway level.

External Stability

Based on Section 5 of the Bridge Design Specifications (BDS), August 2004 (Reference No. 6), a minimum factor of safety of 1.5 shall be used for the design of walls for static loads and a minimum factor of safety of 1.0 shall be used for the design of wall for seismic loads. In addition, BDS indicates that the horizontal seismic acceleration coefficient (K_h) is equal to one-third of the expected peak acceleration produced by the Maximum Credible Earthquake on bedrock at the site as defined in the Caltrans Seismic Hazard Map.

Global slope stability for Retaining Wall 1 was evaluated by using the Slope-W software (Version 7.02) from Geo-Slope International, Ltd. Based on our results Retaining Wall 1 meets the minimum factor of safeties as defined above.

Construction Considerations

Drilling for piles may be difficult because the presence of loose and hard boulders in the side cast material. Based on the line 2 of the seismic survey, the thickness of this material is approximately 4 feet; however, it may vary along the RTW1 line. Drilling in competent rock will also be difficult.

Caving conditions may be present in the side cast material or decomposed bedrock overlying competent bedrock. Therefore, casing may be required to keep borings open prior to placing grout and concrete.

Ground water may be encountered during the drilling for piles. Should ground water be encountered, placement of concrete and grout may be accomplished by using the wet method; otherwise, dewatering of the drilled holes may be required.

The absence of drill fluid circulation during most of the drilling of both exploratory borings indicates the presence of voids in the subsurface materials. Consequently, the potential for the loss of concrete and grout into voids and fractures should be expected. It is recommended that a "grout sock" be used to reduce the potential for grout loss.

A minimum embedment depth into competent bedrock shall be at least 10 feet for all the piles constructed for the Retaining Wall No. 1. Should construction not encounter sufficient bedrock to meet the minimum 10 feet embedment requirement, the excavation will be required to go deeper and the pile lengthened. If the subsurface conditions differ from those stated in this report especially those pertaining contact and competency of bedrock, this Office should be informed in order to assess the need for design changes.

Any embankment slope proposed as part of the wall construction can be built as steep as 1.5:1 (H:V)

Conventional excavation equipment such as scrapers, dozers, backhoes and excavators are sufficient to excavate known fill materials, surficial soil, decomposed bedrock and weathered bedrock, present in the Retaining Wall 1 proposed location.

Naturally Occurring Asbestos (NOA)

As discussed in the "Findings" section of this report, OGDN concludes that the project site has a very low potential for the presence of ultramafic rocks and NOA. In consideration for the potential presence of NOA materials, the North Region Hazardous Material Officer should be contacted to determine if the project has the need for Airborne Toxic Control Measures (ATCMs) during project construction.

Project Information

Caltrans SSP 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:

1. *Log of Test Borings (Enchilada Curve Improvement, Retaining Wall No. 1)*

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

A. *Foundation Report for Retaining Wall No. 1, Enchilada Curve Improvement, dated 09/20/2012 by Caltrans Division of Engineering Services, Office of Geotechnical Design North.*
B. *Refraction Seismic Survey, "Route 299 Whole Enchilada Roadway Improvement at 299-TRI PM 0.5 to 0.8" dated January 10, 2011, by Caltrans Division of Engineering Services, Branch of Geophysics and Geology.*

Data and Information available for inspection at the District Office:

A. *None*

Data and Information available for inspection at the Transportation Laboratory are:

A. *For Boring RC-12-005 three core boxes, RC-12-006 two core boxes, RC-12-007 two core boxes, RC-12-008 two core boxes, RC-12-009 one core box, RC-12-010 two core boxes, and RC-10-002 two core boxes.*

If you have any questions or comments, please call Luis Paredes-Mejia at (916) 227-1047 or Reza Mahalatti at (916) 227-1033.

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Engineering Geologist
Office of Geotechnical Design North
Branch C

e-copy: Reza Mahallati (Branch C Senior)
Al Trujillo D02- Proj. Mgmt.
Structure Construction RE Pending File
GS Corporate
DES OE, Office of PS&E
GDN File
DME D2

ATTACHMENTS

REFERENCES
Plate No. 1. Vicinity Map
Plate No. 2. Topography of Project Area
Plate No. 3. Project Site Plan
Plate No. 4. Retaining Wall No. 1 Site Plan
Plate No. 5A. Geologic Map
Plate No. 5B. Geologic Map Legend
Plate No. 6. Fault Map
APPENDIX A: LOG OF TEST BORINGS (LOTB'S)
Log of Test Borings 1 of 4 thru 4 of 4
APPENDIX B :LABORATORY TESTS RESULTS
Table No. B-1. Summary of Laboratory Test Results
Plate No. B-1. Atterberg Limits Test
Plate No. B-2. Point Load Strength Index of Rock Test Results
Plate No. B-3. Corrosion Tests Results
APPENDIX C: Refraction Seismic Survey (Reference No.12) dated 1-10-11

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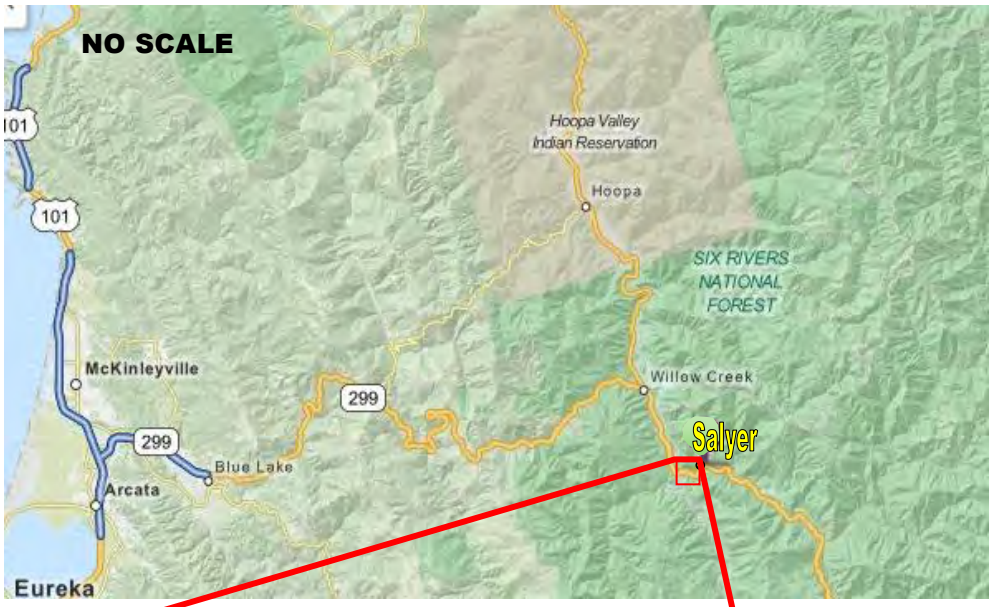
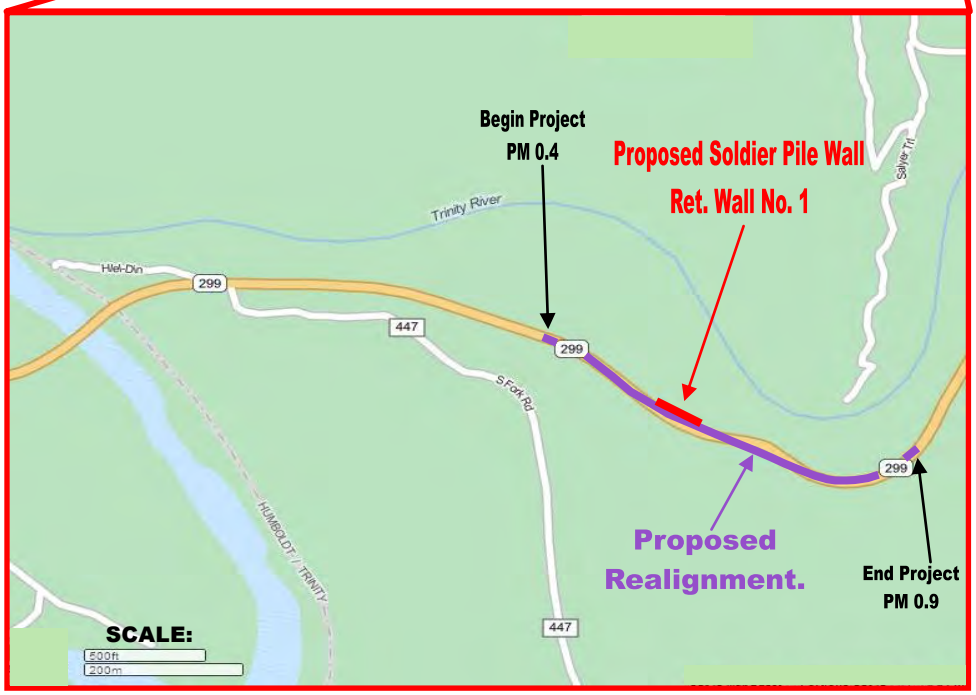
1. Caltrans (1947) "Plan and Profile of State Highway In Trinity county , between Humboldt county Line and New River Bluffs", 21 sheets, State of Calif. Dept. of Public Works, 1-TRI-20 C, As-built plans dated June 3, 1947.
2. CDMG (1977) "Geologic Map of California, Redding Sheet, - Scale 1: 250,000 (1962)", published by California Division of Mines and Geology, third printing, 1977.
3. CDMG (1978), "Geology of the Willow Creek Quadrangle. Humboldt and Trinity Counties, California", CDMG Map Sheet 31, compiled by, John C. Young, Scale 1:62,500.
4. USGS (1994) "Geologic Map of the Klamath Mountains, California and Oregon", Scale 1:500,000, published by the U. S. Geological Survey, compiled by William P. Irwin, 1994.
5. Caltrans (2003) "Corrosion Guidelines", Corrosion Technology Branch, Materials Engineering and Testing Services, Caltrans, Version 1.0, September 2003.
6. Caltrans (2004) "Section 5: Retaining Walls", Caltrans Bridge Design Specifications, August 2004.
7. Caltrans (2005) "Areas Likely to contain Naturally Occurring Asbestos – Caltrans District 2", mapping prepared by the Division of Maintenance GIS in coordination with the Division of Environmental Analysis, 2005.
8. FHWA (2007) "Earth Retaining Structures", Federal Highway Administration Publication No.: FHWA NHI-07-071, December 2007.
9. USFS (2008+) "Areas More Likely to contain Naturally Occurring Asbestos, Six Rivers National Forest", prepared by the United States Forests Service, Department of Agriculture, compiled after 10-7-08.
10. Caltrans (2009) "Development of the Caltrans Deterministic PGA Map and Caltrans ARS Online", prepared by Tom Shantz, Caltrans Division of Research and Innovation, and Martha Merriam, Caltrans Geotechnical Services, July 2009.
11. Caltrans (2009) "Geotechnical Services Design Manual", prepared by the Caltrans Division of Engineering Services, Geotechnical Services, Version 1.0, August 2009.
12. Caltrans (2011) Refraction Seismic Survey for the "Route 299 Whole Enchilada Roadway Improvement at 299-TRI PM 0.5 to 0.8", prepared by the Caltrans Division of Engineering Services, Branch of Geophysics and Geology, dated January 10, 2011.
13. Caltrans (2011) "Summary of Type Selection Meeting", Enchilada Curve Retaining Walls, 02-TRI-299-PM 0.5/0.8, Caltrans Division of Engineering Services, Office of Bridge Design North, Structure Design, Bridge Design Branch 7, dated November 30, 2011.
14. Caltrans (2011) "Type Selection Recommendations", Enchilada Curve Retaining Walls, Caltrans Division of Engineering Services, Office of Bridge Design North, Structure Design, Bridge Design 7, 02-TRI-299-PM 0.5/0.8, dated December 6, 2011.
15. Caltrans (2012) "General Plan, Enchilada Curve Improvement, Retaining Wall No. 1", prepared by Caltrans Division of Engineering Services, Structure Design, Design Branch 7, Bridge No. 05E0009, 02-2E3500, TRI-299 PM 0.5, Revision date 6-13-12.
16. Caltrans (2012) "Postmile Query Tool", based on Google Maps, provided by the Caltrans GIS Services Branch at: http://svhqgisapp1.dot.ca.gov/postmilewebclient/PostmileQueryTool.html.

REFERENCES (cont'd.)

17. Caltrans (2012) "Standard Penetration Test (SPT) Hammer Efficiencies For Caltrans Drill Rigs", Foundation Testing Branch, Caltrans Geotechnical Services, dated February 2012, from: http://www.dot.ca.gov/hq/esc/geotech/requests/logging_manual/02_12_spt_het_summary.pdf.

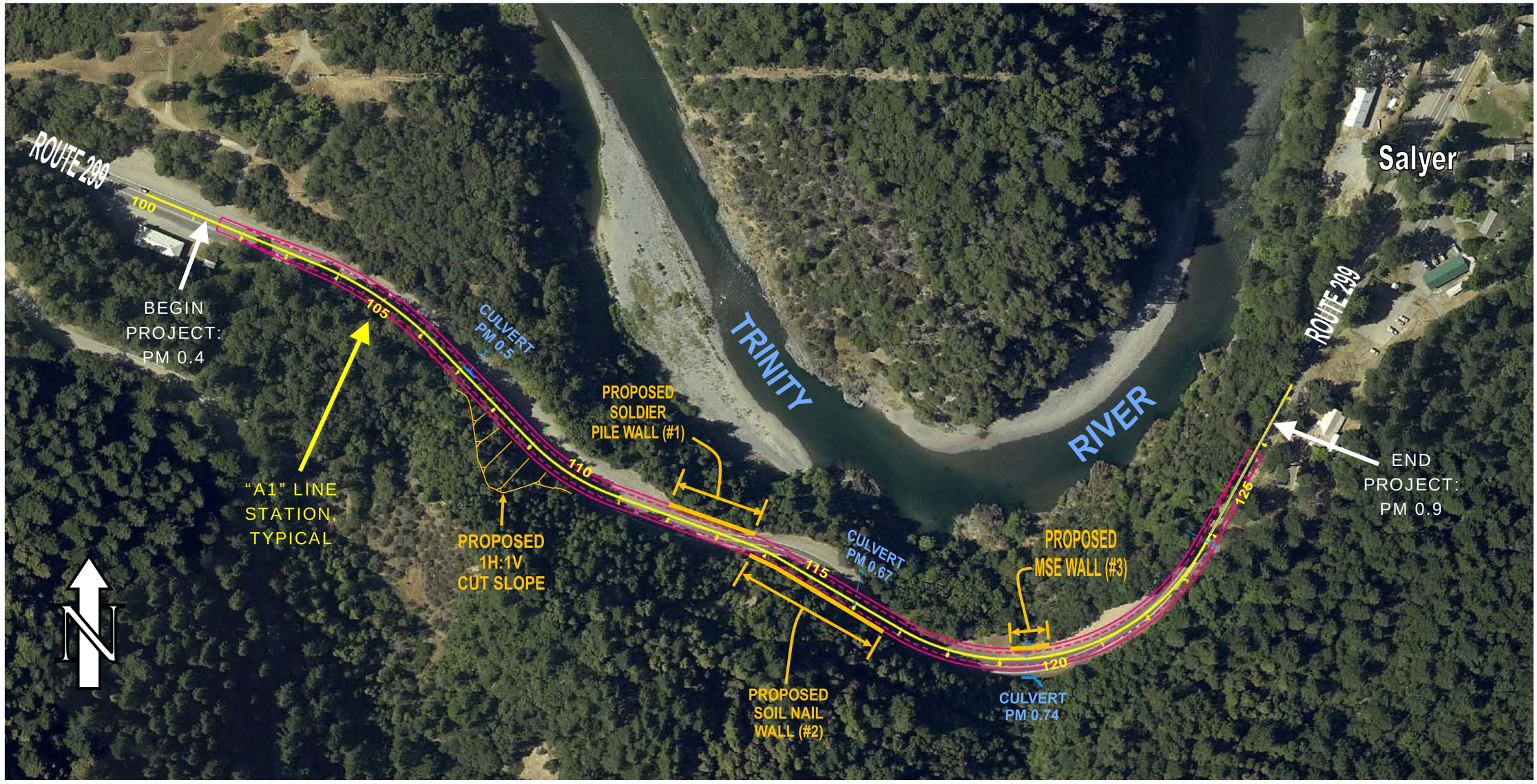
N





Caltrans	CALTRANS Division of Engineering Services Geotechnical Services Geotechnical Design – North	EA: 02-2E3501 Date: September 2012	**VICINITY MAP**
		02-TRI-299-PM 0.4/0.9 ENCHILADA CURVE IMPROVEMENT	Plate No. 1

Caltrans	CALTRANS Division of Engineering Services Geotechnical Services Geotechnical Design – North	EA: 02-2E3501 Date: September 2012	**Topography of Project Area**
		02-TRI-299-PM 0.4/0.9 ENCHILADA CURVE IMPROVEMENT	Plate No. 2



Base Map Reference: Digital Highway Inventory Photography Program (DHIPP)at http://svhqdhipp:8080/dhipp/view.html. Photo taken between 2001 and 2003.
Photo and layout provided by the Caltrans Office of Engineering Services and Design – North, Redding.

Approximate Scale: 1:2400
1 inch = 200 feet

0 200 400 feet

CALTRANS
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design - North

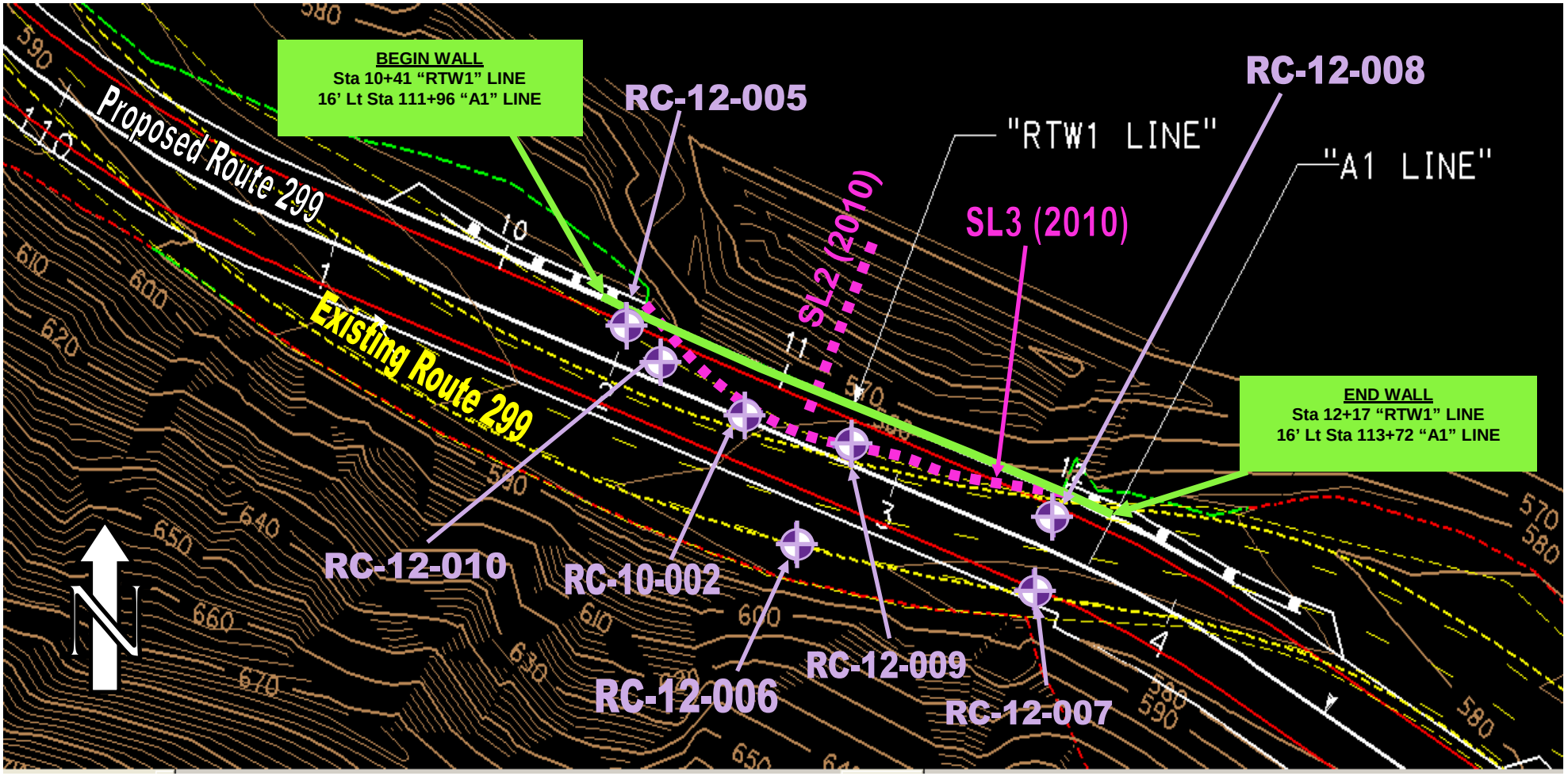
EA: 02-2E3501

Date: September 2012

PROJECT SITE PLAN

02-TRI-299-PM 0.4/0.9
ENCHILADA CURVE IMPROVEMENTS

Plate No. 3



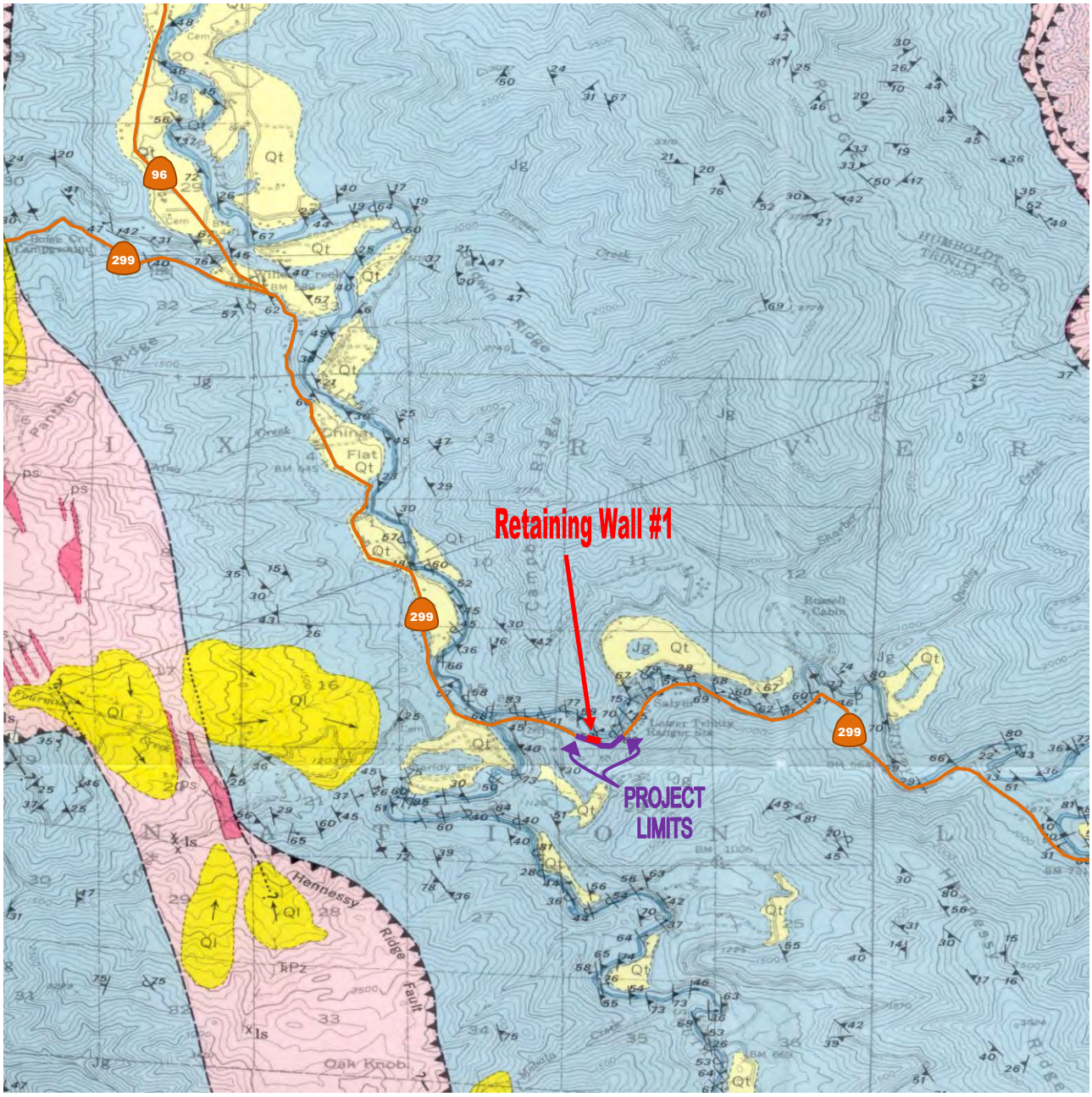
Base Plan Reference: From Microstation file "Fin-Surface_Contours.dgn" provided by Caltrans Office of Engineering Services and Design – North, Redding; elevation contour interval = 2 feet.

Legend
Approximate Boring Location
Approximate Seismic Line Location

Approximate Scale: 1:600
1 inch = 50 feet

0 50 100 feet

Caltrans	CALTRANS Division of Engineering Services Geotechnical Services Geotechnical Design – North	EA: 02-2E3501 Date: September 2012	RETAINING WALL NO. 1 SITE PLAN
		02-TRI-299-PM 0.4/0.9 ENCHILADA CURVE IMPROVEMENT	Plate No. 4



REFERENCE: "Geology of the Willow Creek Quadrangle. Humboldt and Trinity Counties, California", CDMG Map Sheet 31, compiled by, John C. Young, Scale 1:62,500.

See Plate No. 5b for explanations.

Approximate Scale: 1:62,500
1inch = 1.0 mile

0 1.0 2.0 miles

N

Caltrans	CALTRANS Division of Engineering Services Geotechnical Services Geotechnical Design – North	**EA: 02-2E3501** **Date: September 2012**	**GEOLOGIC MAP**
		02-TRI-299-PM 0.4/0.9 **ENCHILADA CURVE IMPROVEMENTS**	Plate No. 5a

EXPLANATION

SURFICIAL UNITS

QUATERNARY

Qt

Quaternary terrace gravels

Remnants at several levels along Trinity River. Older and younger terraces not distinguished.

Ql

Landslide or slump

Only the most obvious are shown on the map, but indications of widespread slope instability are common, especially in areas underlain by KJf, Jg and PzPz

SEDIMENTARY, METAMORPHIC, AND EXTRUSIVE IGNEOUS ROCKS

CRETACEOUS ?

sfm

South Fork Mountain Schist

Crinkled quartz-albite-muscovite-chlorite schist and semischist. Contains abundant quartz segregation lenses. Local blueschist and greenschist "knockers." Weathers silver-gray.

JURA-CRETACEOUS

tm

Zone of tectonic mixing

Foliated greenstone, metagraywacke, serpentinite, and diorite intermingled in the Coast Ranges thrust zone.

KJf

Franciscan rocks (melange)

Predominantly gray, dense graywacke which weathers tan to buff. Subordinate dark-gray shale, greenstone, conglomerate, and chert. The graywacke is often devoid of recognized bedding, but occasional graded bedding is visible. Individual rock units are generally of only local extent. Slopes are frequently unstable, especially those underlain by pelitic materials.

JURASSIC

Jgh

Contact Metamorphosed Galice Formation

Hornfels and fine-grained chiastolite-biotite-chlorite schists adjacent to Ammon Ridge Pluton.

Jg

Galice Formation

Gray phyllitic metagraywacke, slate, and phyllitic slate. Often weathers light silvery-gray to tan. Abundant graded bedding visible in exposures along streams. Cut by scattered thin meta-felsite dikes and sills. Areas underlain by dark slates and phyllitic slates especially subject to slope failure.

LATE PALEOZOIC TRIASSIC

PzPz

Western Paleozoic and Triassic belt of rocks (melange)

Fine-grained mafic to intermediate volcanic rocks, fine- to medium-grained graywacke, chert and siliceous argillite, lenses of serpentinite, local limestone and conglomerate, and small basic to intermediate intrusive masses. Individual rock types generally lack lithic continuity. Slopes underlain by this unit are often unstable.

WILLOW CREEK QUADRANGLE

CALIFORNIA DIVISION OF MINES & GEOLOGY

MAP SHEET 31
1978

SYMBOLS

Contact
(solid where accurately located; dashed where inferred; dotted where concealed)

Fault
(solid where accurately located; dashed where inferred; dotted where concealed)

Thrust fault
(solid where accurately located; dashed where inferred)

30 Strike and dip of beds *(facing known)*

38 Strike and dip of beds *(facing unknown)*

45 Strike and dip of overturned beds

Vertical beds

75 Strike and dip of foliation

Vertical foliation

35 Crumpled foliation with average attitude

48 Strike and dip of joints

Vertical joint

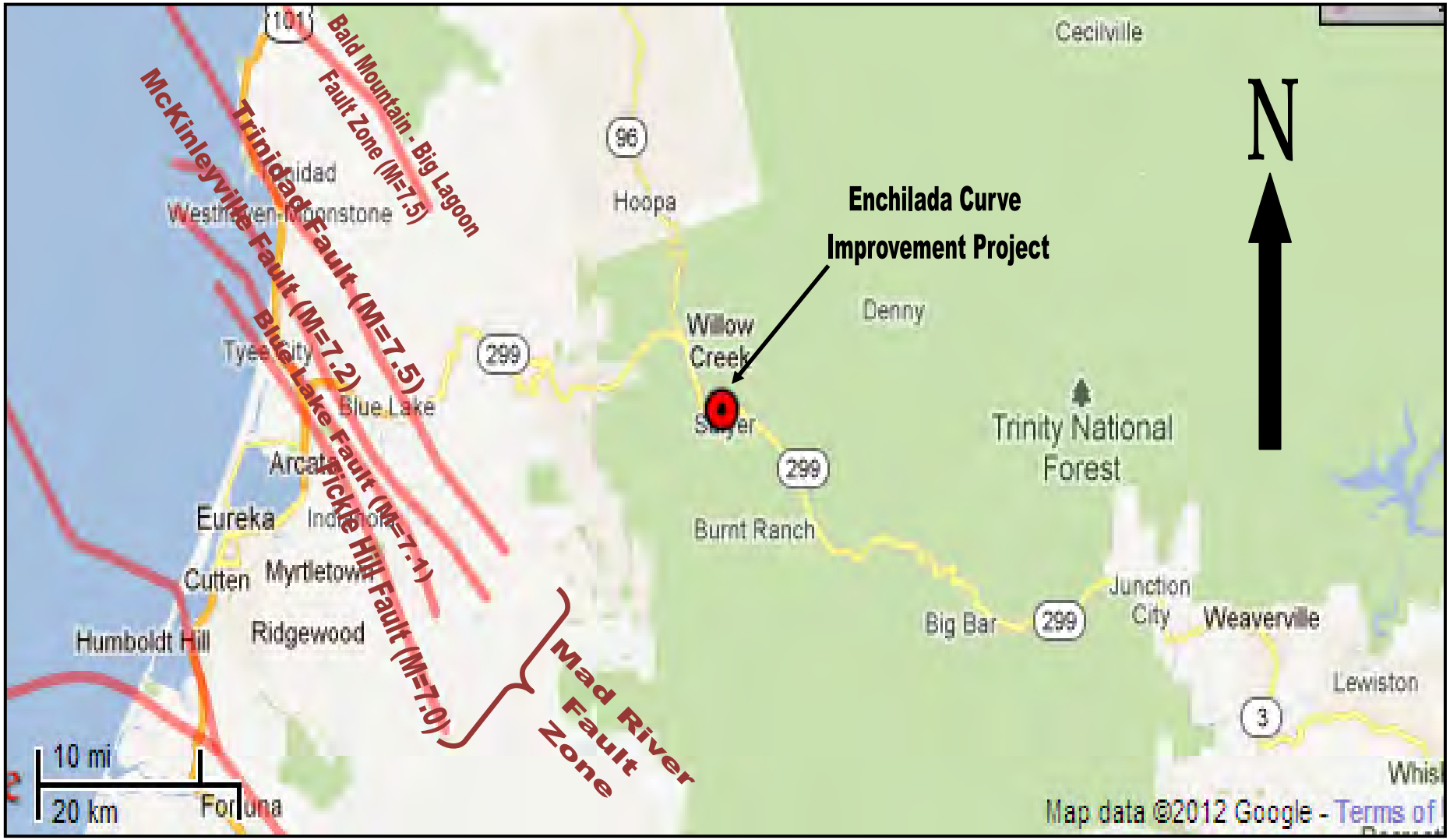
x or ls
Limestone locality

\+
Resistant knobs of variable size in South Fork Mountain Schist

APPROXIMATE MEAN DECLINATION, 1952

QUADRANGLE LOCATION

Caltrans	CALTRANS Division of Engineering Services Geotechnical Services Geotechnical Design – North	**EA: 02-2E3501** **Date: September 2012**	**GEOLOGIC MAP LEGEND**
		02-TRI-299-PM 0.4/0.9 **ENCHILADA CURVE IMPROVEMENTS**	Plate No. 5b



Base Map Reference: From Caltrans ARS Online (v2.0) at http://dap3.dot.ca.gov/shake_stable/v2/index.php

Caltrans	CALTRANS Division of Engineering Services Geotechnical Services Geotechnical Design – North	EA: 02-2E3501 Date: September 2012	**FAULT MAP**
		02-TRI-299-PM 0.4/0.9 ENCHILADA CURVE IMPROVEMENT	Plate No. 6

APPENDIX A

Log Of Test Borings

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
02	Tri	299			

CERTIFIED ENGINEERING GEOLOGIST — 7-13-12 DATE

PLANS APPROVAL DATE

Luis Paredes-Mejia No. 2329 Exp. 01-31-14 CERTIFIED ENGINEERING GEOLOGIST — PROFESSIONAL GEOLOGIST — STATE OF CALIFORNIA

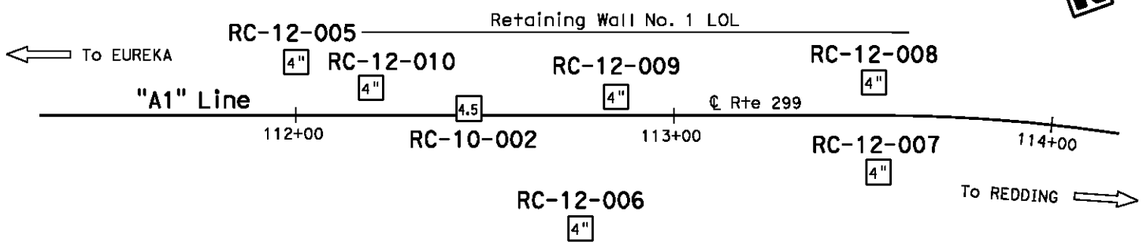
The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

This LOTB sheet was prepared in accordance with the Caltrans Soil & Rock Logging, Classification, & Presentation Manual (2010 Edition).
See 2010 Standard Plans A10F and A10G for Soil Legend, and A10H for Rock Legend.

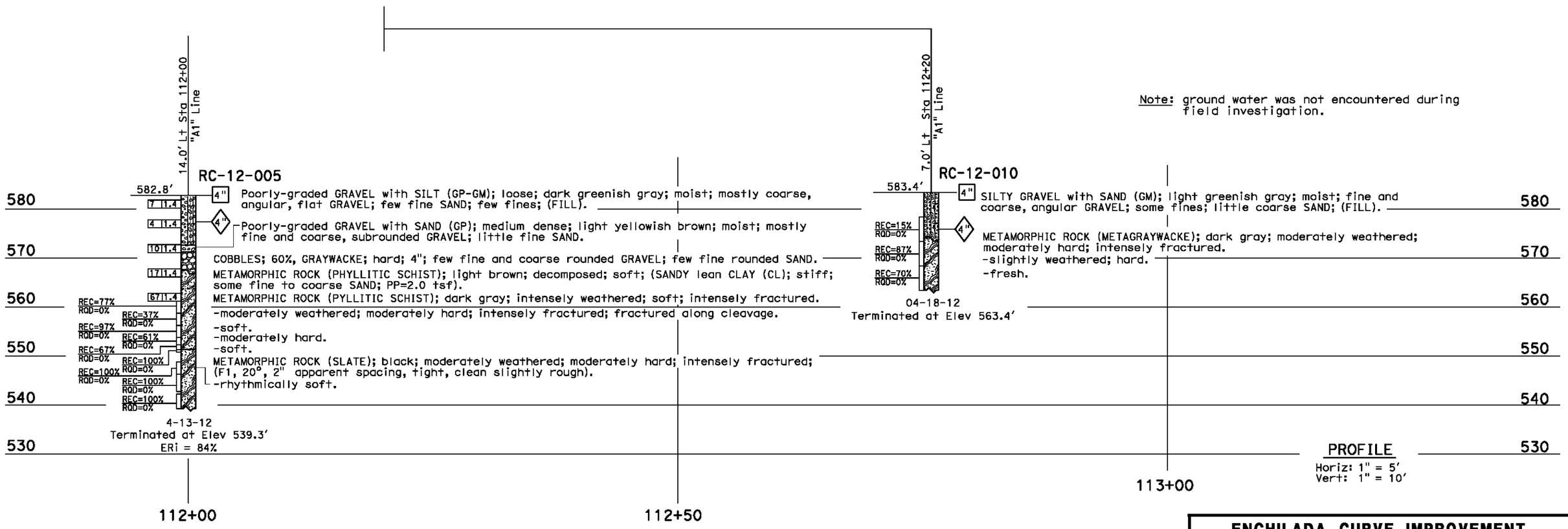
BENCH MARK

TRI 299 0.57

Fnd 2¼" CADH Brass Disk in Concrete
37.15 Ft Rt "A1" Line Rte 299
Sta 111+07.93
N 673,743.070
E 1,865,923.082
Elev= 590.31
Vertical Datum: NAVD88



PLAN
1" = 20'



Note: ground water was not encountered during field investigation.

PROFILE
Horiz: 1" = 5'
Vert: 1" = 10'

ENGINEERING SERVICES	MATERIALS AND GEOTECHNICAL SERVICES	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF ENGINEERING SERVICES STRUCTURE DESIGN	BRIDGE NO.	ENCHILADA CURVE IMPROVEMENT
FUNCTIONAL SUPERVISOR: M. Hagy	DRAWN BY: I. G-Remmen	FIELD INVESTIGATION BY: L. Paredes-Mejia	DESIGN BRANCH X	05E0009	RETAINING WALL NO. 1
	CHECKED BY: F. DeHaro			POST MILE 0.5	LOG OF TEST BORINGS 1 OF 4

OGS CIVIL LOG OF TEST BORINGS SHEET

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT: 3643
PROJECT NUMBER & PHASE: 020000002111
CONTRACT NO.: 02-2E3501

DISREGARD PRINTS BEARING EARLIER REVISION DATES →

REVISION DATES				SHEET	OF
07-09-12	07-12-12			X	X

FILE => rw1-1.dgn

USERNAME => s116982 DATE PLOTTED => 13-JUL-2012 TIME PLOTTED => 13:27

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
02	Tri	299			

7-13-12
CERTIFIED ENGINEERING GEOLOGIST DATE

PROFESSIONAL GEOLOGIST
Luis Paredes-Mejia
No. 2329
Exp. 01-31-12
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

PLANS APPROVAL DATE

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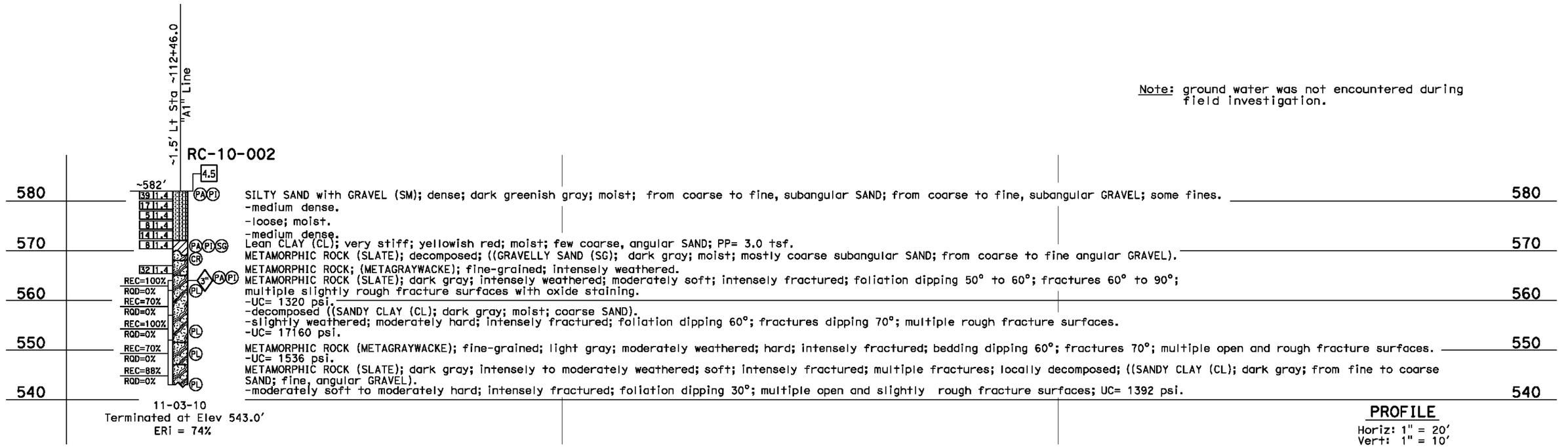
This LOTB sheet was prepared in accordance with the Caltrans Soil & Rock Logging, Classification, & Presentation Manual (2010 Edition).
See 2010 Standard Plans A10F and A10G for Soil Legend, and A10H for Rock Legend.

FOR PLAN VIEW, SEE
"LOG OF TEST BORINGS 1 OF 4"



Note: ground water was not encountered during field investigation.

PROFILE
Horiz: 1" = 20'
Vert: 1" = 10'

ENGINEERING SERVICES	MATERIALS AND GEOTECHNICAL SERVICES	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF ENGINEERING SERVICES STRUCTURE DESIGN	BRIDGE NO.	ENCHILADA CURVE IMPROVEMENT
FUNCTIONAL SUPERVISOR	DRAWN BY: F. Nguyen		DESIGN BRANCH X	05E0009	RETAINING WALL NO. 1
NAME: M. Hagy	CHECKED BY: A. Barrie	FIELD INVESTIGATION BY: L. Paredes-Mejia		POST MILE 0.5	LOG OF TEST BORINGS 2 OF 4

OGS CIVIL LOG OF TEST BORINGS SHEET

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT: 3643
PROJECT NUMBER & PHASE: 02000002111
CONTRACT NO.: 02-2E3501

DISREGARD PRINTS BEARING EARLIER REVISION DATES →

REVISION DATES				SHEET	OF
07-12-12				X	X

FILE => rw1-2.dgn

USERNAME => s116982 DATE PLOTTED => 13-JUL-2012 TIME PLOTTED => 13:27

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
02	Tri	299			

CERTIFIED ENGINEERING GEOLOGIST — 7-13-12 DATE

PLANS APPROVAL DATE

PROFESSIONAL GEOLOGIST — Luis Paredes-Mejia — No. 2329 — Exp. 01-31-14 — CERTIFIED ENGINEERING GEOLOGIST — STATE OF CALIFORNIA

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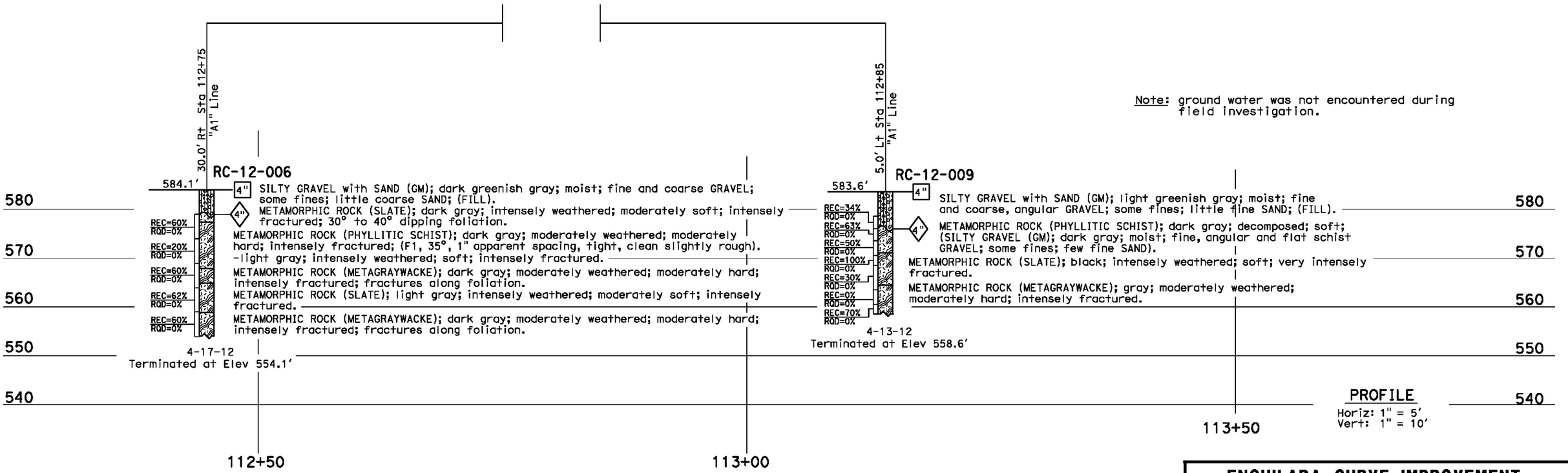
See 2010 Standard Plans A10F and A10G for Soil Legend, and A10H for Rock Legend.

FOR PLAN VIEW, SEE
"LOG OF TEST BORINGS 1 OF 4"



Note: ground water was not encountered during field investigation.

ENGINEERING SERVICES	MATERIALS AND GEOTECHNICAL SERVICES	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF ENGINEERING SERVICES STRUCTURE DESIGN	BRIDGE NO.	ENCHILADA CURVE IMPROVEMENT
FUNCTIONAL SUPERVISOR	DRAWN BY: I. G-Remmen	FIELD INVESTIGATION BY:	DESIGN BRANCH X	05E0009	RETAINING WALL NO. 1
NAME: M. Hagy	CHECKED BY: F. DeHaro	L. Paredes-Mejia		POST MILE 0.5	LOG OF TEST BORINGS 3 OF 4

OGS CIVIL LOG OF TEST BORINGS SHEET

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT: 3643
PROJECT NUMBER & PHASE: 020000002111
CONTRACT NO.: 02-2E3501

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES				SHEET	OF
07-05-12	07-12-12			X	X

FILE => rw1-3.dgn

USERNAME => s116982 DATE PLOTTED => 13-JUL-2012 TIME PLOTTED => 13:27

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
02	Tri	299			

CERTIFIED ENGINEERING GEOLOGIST — DATE 7-13-12

PROFESSIONAL GEOLOGIST — Luis Paredes-Mejia — No. 2329 — Exp. 01-31-14 — CERTIFIED ENGINEERING GEOLOGIST — STATE OF CALIFORNIA

PLANS APPROVAL DATE

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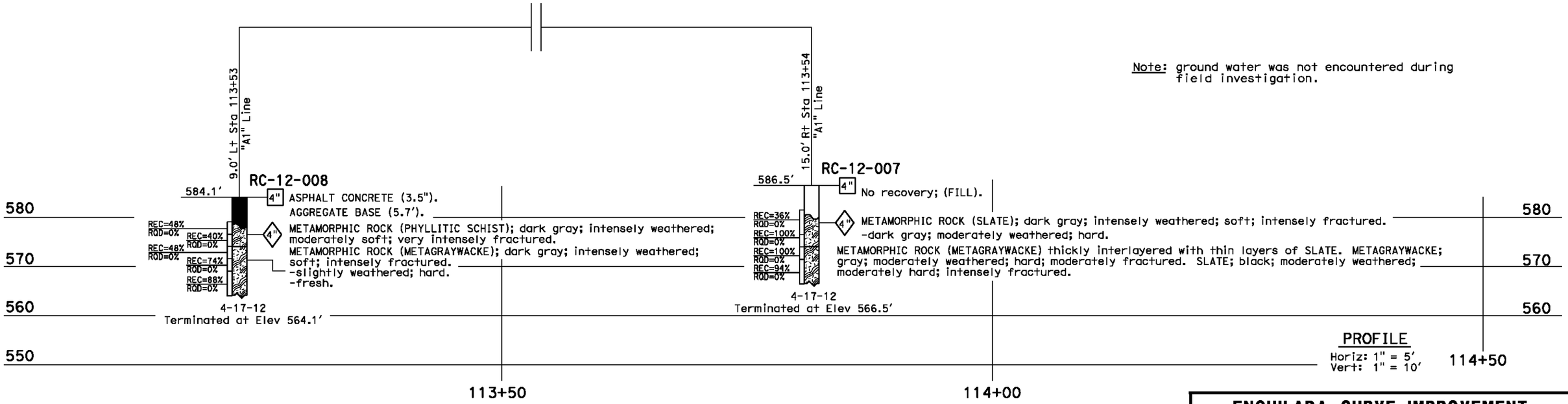
See 2010 Standard Plans A10F and A10G for Soil Legend, and A10H for Rock Legend.

FOR PLAN VIEW, SEE
"LOG OF TEST BORINGS 1 OF 4"



Note: ground water was not encountered during field investigation.

ENGINEERING SERVICES	MATERIALS AND GEOTECHNICAL SERVICES	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF ENGINEERING SERVICES STRUCTURE DESIGN	BRIDGE NO.	ENCHILADA CURVE IMPROVEMENT
FUNCTIONAL SUPERVISOR	DRAWN BY: I. G-Remmen	FIELD INVESTIGATION BY:	DESIGN BRANCH X	05E0009	RETAINING WALL NO. 1
NAME: M. Hagy	CHECKED BY: F. DeHaro	L. Paredes-Mejia		POST MILE 0.5	LOG OF TEST BORINGS 4 OF 4

OGS CIVIL LOG OF TEST BORINGS SHEET

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT: 3643
PROJECT NUMBER & PHASE: 02000002111 CONTRACT NO.: 02-2E3501

DISREGARD PRINTS BEARING EARLIER REVISION DATES →

REVISION DATES				SHEET	OF
07-09-12	07-12-12			X	X

FILE => rw1-4.dgn

USERNAME => s116982 DATE PLOTTED => 13-JUL-2012 TIME PLOTTED => 13:27

APPENDIX B

Laboratory Test Results

Enchilada Curve Improvement
Retaining Wall No. 1
Structure No. 05E0009

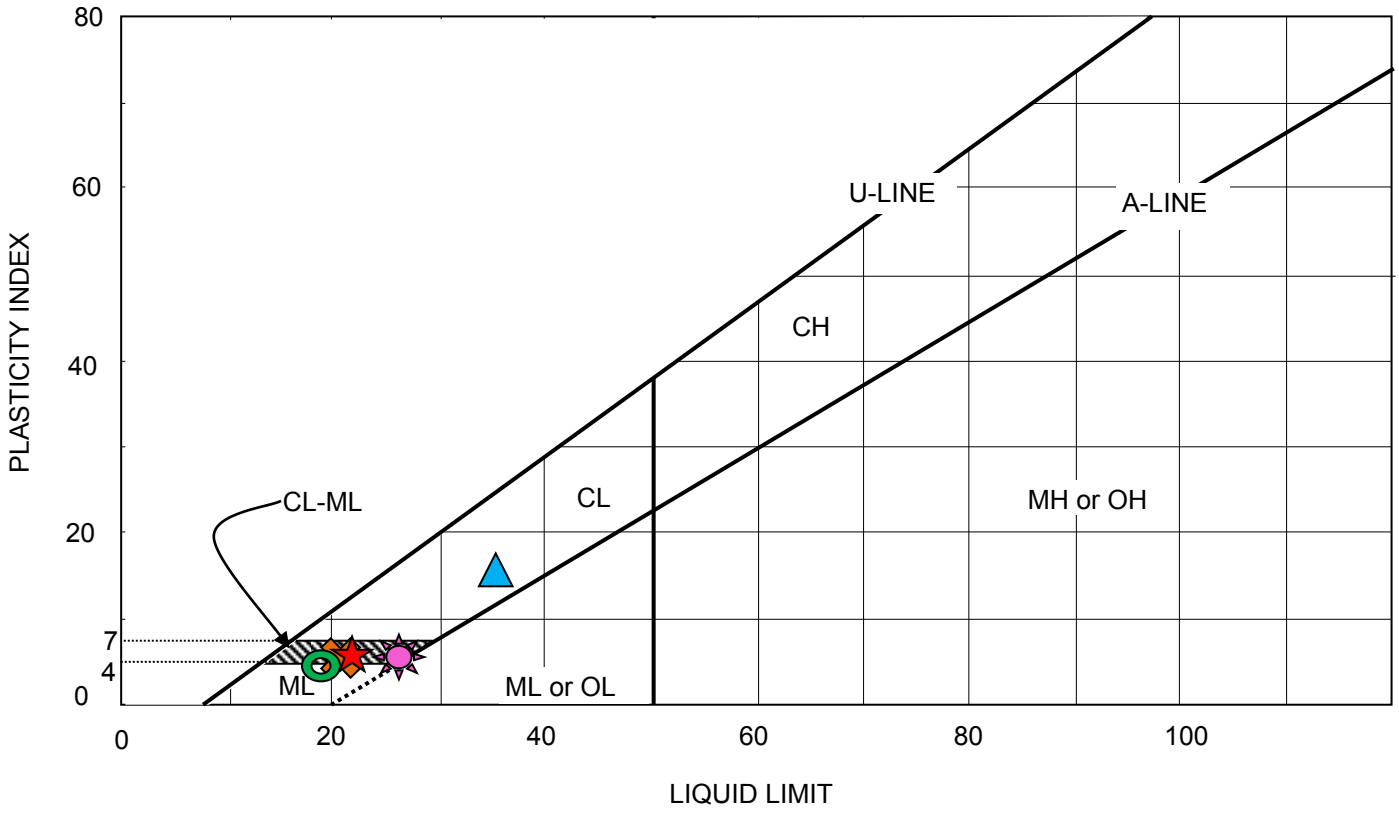
TABLE NO. B-1. SUMMARY OF LABORATORY TEST RESULTS

02-TRI-299-PM 0.4/0.9
EA: 02-2E3501

September 2012

Sample Location				Percentage Passing Through Sieve No. or Percent Particle Size Finer Than																Strength Tests			Atterb. Limits		In-Situ		G_S AASHTO D T100	Max. Lab. Density (CTM 216)		Corrosion (CTM 417, 422, 532 and 643)	
Boring No.	I.D. No.	Depth (feet) top	Depth (feet) bottom	2 ½	2	1 ½	1	3/4	1/2	3/8	4	8	16	30	50	100	200	5μ	1μ	UU (Su, tsf) ASTM (D2850-95)	UC (psi) (ASTM D7012-07C)	UCS (psi) (ASTM D5731-08)	LL	PI	γ_d (pcf)	wc (%)		γ_d (pcf)	% wc		
RC-10-002	1	0	1.5			100	93	88	81	80	65	56	48	40	33	25	20	9	3				21	5		2.2					
RC-10-002	6	10.0	11.5					100	97	96	91	87	82	78	73	68	63	36	19				35	16		10.4	2.79				
RC-10-002	7	11.5	15.0																											pH	7.23
																														R (Ohm-cm)	11270
																														Cl (ppm)	NA
																														SO_4 (ppm)	NA
RC-10-002	9	16.5	18.0						100	98	89	75	67	56	42	30	24	11	4				19	4		9.4					
RC-10-002		19.5	19.7																			1,265									
RC-10-002		27.6	27.8																			15,592									
RC-10-002		32.0	32.2																			1,397									
RC-10-002		38.3	38.5																			1,325									
RC-12-005	7	11.5	15.0	100	63	63	63	56	48	44	36	28	20	16	13	12	10	5	3				22	5		4.5					
RC-12-005	8	15.0	16.5				100	96	91	90	83	74	66	61	55	46	39	17	5				27	5		13.1					

ATTERBERG LIMITS TEST RESULTS (AASHTO T89 and T90)



SYMBOL	SAMPLE ID	SAMPLE LOCATION	LIQUID LIMIT (%)	PLASTICITY INDEX	CLASSIFICATION
	1	Boring No. RC-10-002: 0'-1.5'	21	5	CL-ML
	6	Boring No. RC-10-002: 10.0'-11.5'	35	16	CL
	9	Boring No. RC-10-002: 16.5'-18.0'	19	4	CL-ML
	7	Boring No. RC-12-005: 11.5'-15.0'	22	5	CL-ML
	8	Boring No. RC-12-005: 15.0'-16.5'	27	5	CL

CALTRANS
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design - North

Project Name:	ENCHILADA CURVE IMPROVEMENT; RETAINING WALL NO. 1
EA:	02-2E3501
D-Co-Rt-PM:	02-TRI-299-PM 0.5
Test Date:	September-2012
Plate No. B-1	

Point Load Strength Index of Rock; ASTM D 5731 - 08

Dist-EA: 02-3E3501 **Dist-Co-Rte-PM: TRI-299 PM 0.5 Structure No. 05E0009** **GL Tracking Nos.: 11-013**

Report Date: March 8, 2011

Boring I.D.	Depth (feet)		Depth (m)		Test Type	Initial Distance Between Contact Points, D (mm)	Final Distance Between Contact Points, D' (mm)	Equivalent Diameter, D_e (mm) per Section 10.1 of ASTM D 5731-08	Width, W (mm)	Length, L (mm)	Failure Load (lbs)	Uncorrected Point Load Strength Index, I_s; per EQ. #1 of ASTM D 5731-08		Size Correction Factor, F; per EQ. #4 of ASTM D 5731-08	Size Corrected Point Load Strength Index, $I_{s(50)}$; per EQ. #3 of ASTM D 5731-08		Generalized Index to Strength Conversion Factor, K, per Table 1 of ASTM D 5731-08 (approximated where appropriate)	Estimated Uniaxial Comp. Strength, S_c per EQ. #6 of ASTM D 5731-08		Remarks
	top	bottom	top	bottom								(MPa)	(PSI)		(MPa)	(PSI)		(MPa)	(PSI)	
RC-10-002	19.5	19.7	5.9	6.0	D-L	60.0	55.0	57.45		35.0	264	0.36	51.6	1.06	0.38	55	24.5	9	1,265	
RC-10-002	27.6	27.8	8.4	8.5	I-L	39.5	28.0	45.94	59.2	41.9	2,428.8	5.12	742.45	0.96	4.93	715	21	107	15,592	
RC-10-002	32	32.2	9.8	9.8	I-L	51.5	41.0	56.38	60.9	51.3	299.2	0.42	60.72	1.06	0.44	64	23	10	1,397	
RC-10-002	38.3	38.5	11.7	11.7	D-L	60.0	56.0	57.97		44.7	281.6	0.37	54.07	1.07	0.40	58	24.5	9	1,325	

NOTES:
Test Type Abbreviations: D - Diametral, A -Axial, B - Block, I - Irregular Lump.
Orientation of Load (if anisotropic): P - Perpendicular to plane of weakness, L - Parallel to plane of weakness

RC010-002
19.5-19.7'

RC010-002
27.6-27.8'

RC010-002
32.0-32.2'

RC010-002
38.3-38.5'

CALTRANS
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design - North

EA: 02-2E3501
Date: September 2012

POINT LOAD STRENGTH INDEX OF ROCK TEST RESULTS

02-TRI-299; PM 0.4/0.9; RET. WALL NO. 1
FOUNDATION REPORT

Plate No. B-2

Division of Engineering Services
Materials Engineering and Testing Services
Corrosion And Structural Concrete Field Investigation Branch
Report Date: 2/22/2011
Reported By: Lopez, Rudy

TEST SUMMARY REPORT - Soil/Water

Bridge Name:
Bridge Number:
EA No.: **02-2E3500**
EFIS No.: **0200000211**
Dist/Co/Rte/PM or KP: **02 / TRI / 299 / 0.5/0.8**

SIC Number (TL101)	Sample Location	Sample Type	Sample Depth	Minimum Resistivity[1] (ohm-cm)	pH[2]	Chloride Content[3] (ppm)	Sulfate Content[4] (ppm)
C644095	ENCHILADA CURVE	SOIL	11.5-15 FEET/BORE #R-10-002, (SAMPLE #7)	11270	7.23		

This site is not corrosive to foundation elements (see note below for MSE wall backfill).

Note: For MSE wall structure backfill material, minimum resisitivity must be 2000 ohm-cm or greater, pH must be between 5.5 and 10.0, chloride content must not be greater than 250 ppm, and sulfate content must not be greater than 500 ppm.

[1,2]CTM 643, [3]CTM 422, [4]CTM 417

APPENDIX C

Refraction Seismic Survey for the “Route 299 Whole Enchilada Roadway Improvement at 299-TRI PM 0.5 to 0.8”, prepared by the Caltrans Division of Engineering Services, Branch of Geophysics and Geology, dated January 10, 2011.

To: **Douglas Brittan**
Senior M&R Engineer
Geotechnical Design North
Division of Engineering Services

Date: January 10, 2011

File: 02-TRI_299_0.5_0.8
Project: 02-0000-0211

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
GEOTECHNICAL SERVICES-MS#5

Attention.Luis Paredes Mejia

Subject: Route 299 Whole Enchilada Roadway Improvements@TRI_299_0.5_0.8

Introduction

This memo documents the results of a refraction seismic survey to assist in the design of roadway improvements for Highway 299 between PM 05 to 08. The seismic refraction survey was employed determine the engineering characteristics of the material comprising the existing embankments above and below the existing roadway surface. This safety project involves curve corrections that require retaining walls. Three refraction profiles were employed. Figure 1 shows the locations of the seismic lines.

Results and Discussion

The results of our findings are summarized in Table 1.

Seismic lines were positioned to image existing cuts that will require additional cutting and retainment. Figure 2 is a model of Seismic Line 1. The line traversed hummocky topography interpreted as a landslide. The model indicates about 5.0 feet of rocky soil and organic humus lying over about 14.0 to 20.0 feet of unconsolidated landslide debris with a seismic velocity of about 2600 feet/sec.. The deepest refractor imaged is also quite slow (4000 ft. /sec.). This material is likely unconsolidated, unsaturated, and intensely fractured. This material is unlikely to support steep cuts and engineered retainment should be anticipated.

Seismic Line 2 was so short in length it inhibited imaging deep enough to be of much value except to verify that the slope is mainly sidecast fill and debris from above. The seismic line was short because of the proximity to the river from the roads' edge. The resulting model (figure3) identifies a shallow layer with a seismic velocity of 3000 ft/sec assumed to be the unsaturated zone above the saturated, fractured rock imaged in Line 3. Due to limited site conditions we had to use a 1.0 meter (3.28 feet) geophone spacing and the geophone spacing is a function of image

depth, therefore the model only imaged about 20% of the geophone spread of 95.0 feet or 19 feet. We cannot conclude the rock with a seismic velocity of 6200 ft./sec. exists under where seismic line 2 was located.

Seismic Line 3 imaged a refractor about 20.0 to 22.0 feet below the surface with velocity of 6200 ft./sec. The Log of Test Boring (LOTB) for Boring R-010-002 indicates hard drilling beginning about 18.0 feet below the surface.. We feel the identified refractor at 20.0 to 22.0 feet represents saturated conditions. LOTB describes decomposed greywacke and thinly laminated soft phyllite. The presence of water increases slow rock to at least 5000 ft./sec. Above the V3 refractor is unconsolidated, unsaturated landslide debris, fill, gravel, and sidecast material.

TABLE 1

Line	Layer	Average Thickness (ft.)	Average Velocity (ft/s)	Line Length(ft)	Inferred Material	Rippability
1	1	5.0	1200	144	Colluvium	ER
1	2	14.0	2200		landslide	ER
1	3	N/A	4000		thinly bedded phyllite	MD
2	1	4.0	1300	83	Sidecast	ER
2	2	10-12	3032		unconsolidated, unsaturated	ER
3	1	7.0	1200	216	Colluvium	ER
3	2	16.0	2500		unconsolidated, unsaturated	ER
3	3	N/A	6200		Saturated meta-graywacke	DR

[1] ER = Easily Ripped, MD = Moderately Difficult, DR = Difficult Ripping, NR = Not Rippable,

Ripping ability is based on unpublished Caltrans data for a Caterpillar D9G series bulldozer with a single-tooth ripper. These values are as follows:

Velocity (ft/s)	**Rippability**
<3440	Easily Ripped
3440-4920	Moderately Difficult
4920-6560	Difficult Ripping
>6560	Not Rippable

Different excavation equipment may experience different results. Penetrating efficacy of the ripping tooth is often more important in predicting ripping success than seismic velocity alone. Undetected blocks or lenses of high-velocity material may also be present within rippable zones, requiring blasting or other means of mechanical breakage for excavation.

Data Acquisition and Processing

Seismic refraction data were recorded using an EG&G Smartseis 24-channel seismograph with 14 MHz geophones. The profiles varied in length. The energy source employed was a hammer and striker plate or a downhole seismic source using 8-gauge, 500-grain black powder cartridges. Refraction data from each shot were stored in the seismograph's memory. Both profile geometry and refraction data were backed-up to paper and floppy disk upon completion of the survey.

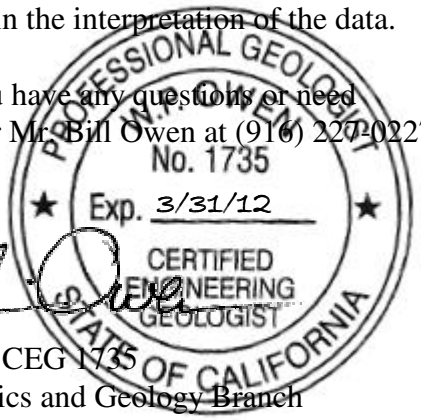
Profiles in this report are presented in terms of velocity units. A velocity unit is a three-dimensional unit, which due to its elastic properties and density, propagates seismic waves at a characteristic velocity or within a characteristic velocity range. Velocities denoted in this report and in the seismic refraction sections are expressed in feet per second. At least one velocity is present within a geological rock unit. In addition, each zone of weathering, or fracturing within that geological unit can constitute its own velocity unit. Conversely, when two rock units such as water saturated gravel and moderately weathered rock propagate seismic waves at the same velocity and are adjacent to each other, both units would be part of the same velocity unit. Lastly, discontinuous velocities might result from variation in the degree of alteration in the form of physical and chemical weathering and should be considered in the interpretation of the data.

Thank you for the opportunity to work on this project. If you have any questions or need additional assistance, please contact me at (916) 227-1307 or Mr. Bill Owen at (916) 227-0227.

Report by:

Dennison Leeds
Engineering Geologist
Geophysics and Geology Branch

Reviewed By:



William Owen, CEG 1735
Chief, Geophysics and Geology Branch

Project File.

DL/WO

02_TRI_299_0.5_0.8_2011_SEI.doc

Figure 1. Locations of the seismic lines with respect to project stationing

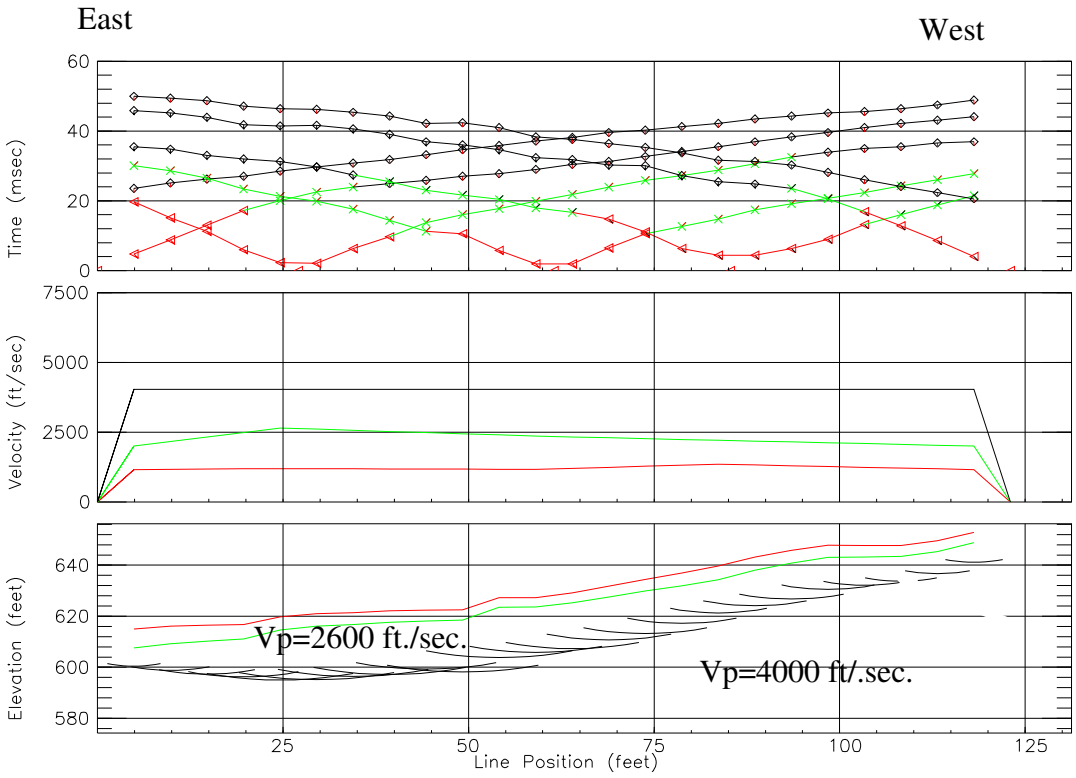


Figure 2. Travel-time curve, velocity model and depth section for Seismic Line 1. The orientation of this line is roughly parallel to the trend of horizontal boring R-010-002 at station 116+55. The roadway elevation for this boring is 586.0ft. The seismic line began above the existing embankment to allow for off-set shots. Station 0.00 feet on this profile is approximately 35.0 feet west of edge of pavement at station 116+55. The seismic line crossed the trend of boring R-010-002 @42.65 ft along the seismic line. Refractor velocity is 4000 ft/sec. Field logs describe thinly-stratified, weathered, soft phyllite at this location.

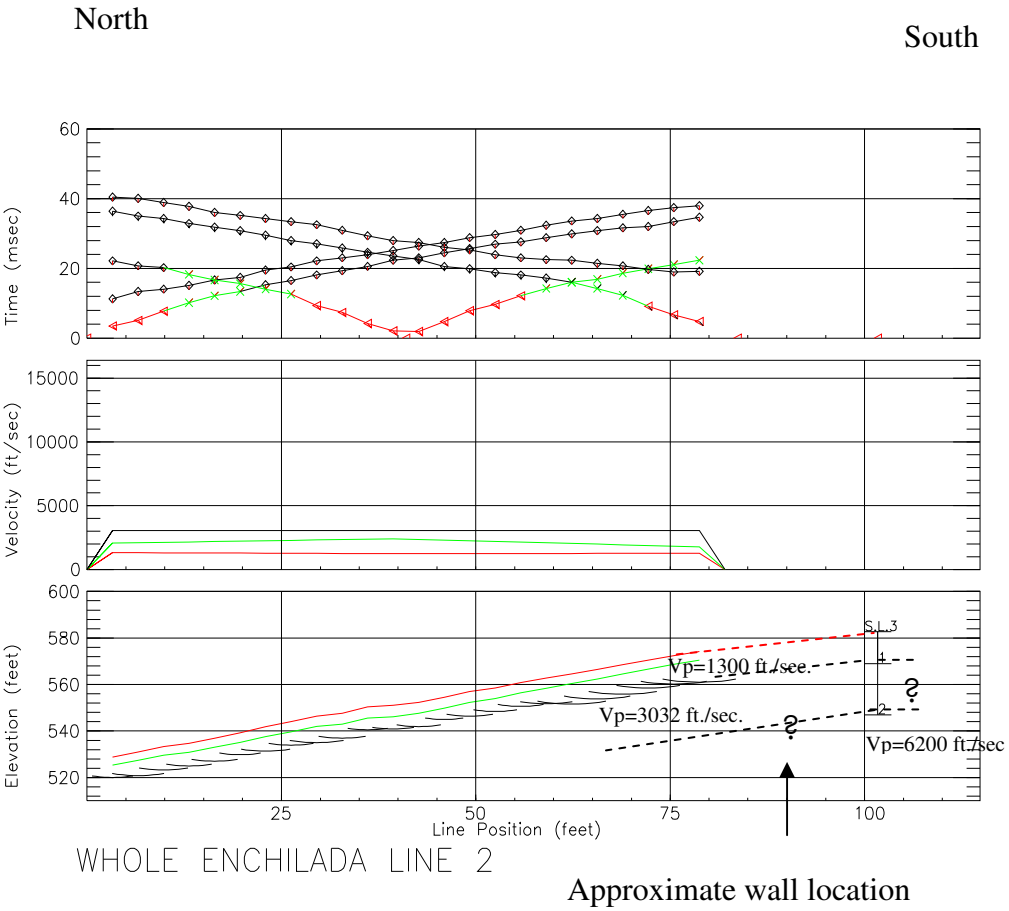


Figure 3. Travel-time curve, velocity model and depth section for Seismic Line 2. This profile trends down-dip from the edge of roadway at station 112+48 towards the river. This model indicates a two layer case. The lowermost layer has a seismic velocity of 3032ft./sec..and may be a transition from unsaturated to saturated conditions. This figure is an interpretation based on data from seismic lines 2 and 3. The proposed wall location is somewhere between the intersection seismic line 3 and seismic line 2. Seismic line 3 imaged rock with a seismic velocity of 6200 ft./sec. but seismic line 2 did not image the faster refractor. That does not mean the rock with a seismic velocity of 6200 ft./sec. is not present below seismic line 2, but the geophone spacing may have been too close to detect it.

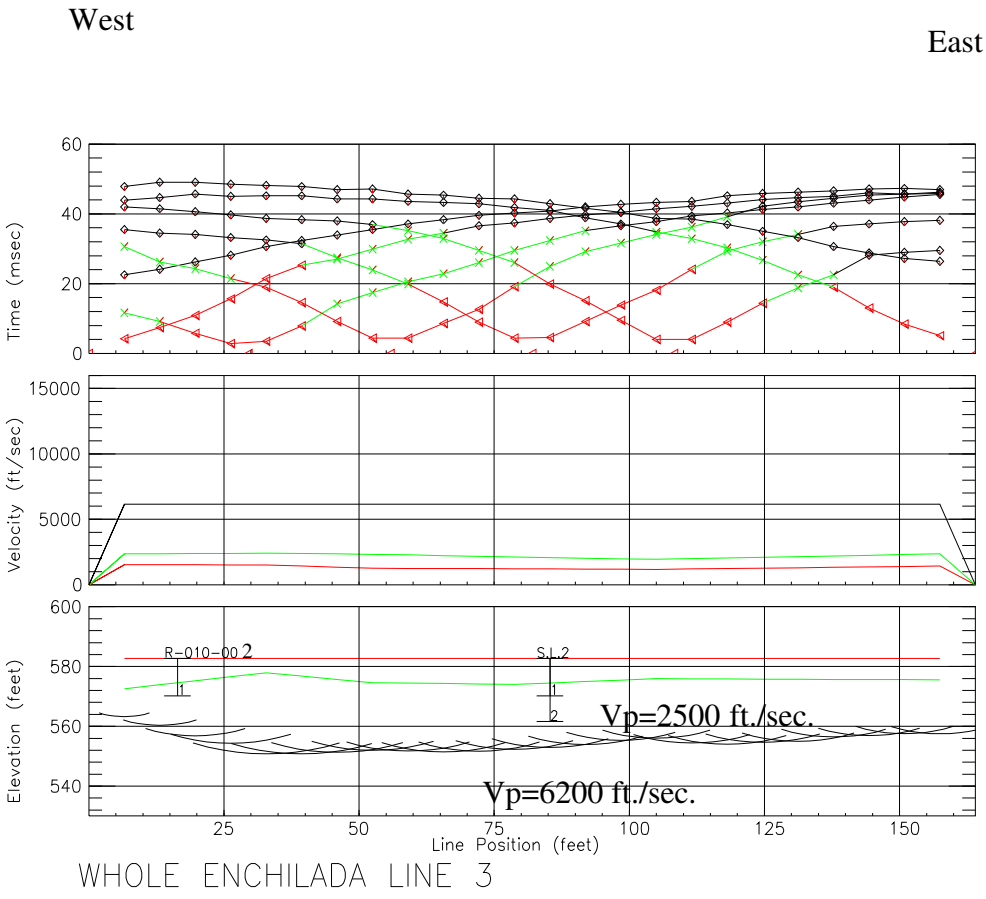


Figure 4. Travel-time curve, velocity model and depth section for seismic line 3. The seismic velocity of 6200 ft./sec. implies intensely fractured, completely weathered rock. Saturated conditions are likely. LOTB for boring R-010-002 describes thickly stratified, hard meta-graywacke at 12.5 feet below the surface. The identified V3 refractor is deeper than the LOTB indicates for boring R-010-002. It most likely represents saturated conditions.

MATERIALS INFORMATION

FOUNDATION REPORTS

Foundation Report for Retaining Wall No. 2, Enchilada Curve Improvement, dated 9/20/2012 by Caltrans Division of Engineering Services, Office of Geotechnical Design North, Branch of Geophysics and Geology.

M e m o r a n d u m

Flex your power!
Be energy efficient!

To: KELLY HOLDEN
Branch Chief, Structure Design, Branch 7

Attention: Wendy Hou

Date: September 20, 2012

File: 02-TRI-299-PM 0.4-0.9
Structure No. 05E0010(PM 0.62)
02-2E3501, 0200000211
Enchilada Curve Improvement
Retaining Wall No. 2
Soil Nail Wall

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
GEOTECHNICAL SERVICES – MS 5

Subject: Foundation Report for Retaining Wall No. 2

INTRODUCTION

General

As requested, the Office of Geotechnical Design North (OGDN) is providing this Foundation Report (FR) for the design and construction of the proposed Retaining Wall No. 2, Structure Number 05E0010, of the Enchilada Curve Improvement project on Route 299 between PM 0.4 and 0.9, near the county line of Humboldt and Trinity Counties and the town of Salyer (See Plate No. 1). Retaining Wall No. 2 is proposed to consist of a Soil Nail wall at approximately PM 0.62.

Project Description and Proposed Improvements

The project consists of realigning the existing road between PM 0.4 and 0.9 where three curves exist. The proposed realignment will eliminate one curve and improve the other two. Three retaining walls are proposed to facilitate the new alignment. According to the "Summary of Type Selection Meeting" Memo (Reference No. 12), a soldier pile wall, a soil nail wall, and a Mechanically Stabilized Embankment (MSE) wall are proposed for the three walls and designated as Retaining Wall Nos. 1, 2 and 3, respectively. Table No. 1, below, provides a general summary of the extent of the three proposed walls and Plate No. 3 shows all the proposed structures. In addition to the three proposed walls, significant cutting of the slope above the roadway is proposed between "A1" Line Stations 107+75 to 110+00.

Table 1: Summary of Configuration of Proposed Retaining Walls

Retaining Wall Number	Wall Type	Stationing and Offset ("A1 Line") (ft)			Length (ft)	Maximum Height (ft)
		Begin	End	Offset		
1	Soldier Pile	111+96	113+72	15 Left	176	18
2	Soil Nail	113+54	116+70	20 Right	311.8	50
3	MSE	119+16.4	119+99.6	16 Left	83.2	14

Based on a "General Plan" (GP) dated May 17, 2012 (Reference No. 13) provided by the Caltrans Structure Design, Office of Bridge Design North, Bridge Design Branch 7 (OBDN Branch 7), the proposed Retaining Wall No. 2 will be a Soil Nail wall extending as high as 50 feet at Station 10+50 ("RTW2" Line). The "Type Selection Recommendations" provided by OBDN Branch 7 (Reference No. 11) indicate the project will be designed based on LFD/WSD methods and will utilize the 2006 Standard Plans and Specifications.

Scope of Work

The scope of work included performing a literature and historical review in an effort to obtain geological and geotechnical data pertaining to the subject site that could provide insight into the design and construction of the proposed wall facility. A site investigation for the entire project was implemented in two phases (See Subsurface Investigation section), and included exploratory borings, sample collection, and seismic refraction surveys to characterize the subsurface conditions. The site investigation also included geological mapping of the area which included an assessment of the general stability of existing slopes based on notable information from visible discontinuities, including fractures, joints, and bedding. Laboratory testing of selected samples was performed, followed by engineering analysis and preparation of this report summarizing our findings, conclusions and recommendations

Subsurface Exploration and Laboratory Testing Program

The subsurface investigation for Retaining Wall No. 2 was performed between October 18, 2010 and November 3, 2010 (Phase 1), and April 10, 2012 and April 20, 2012 (Phase 2). Phase 1 consisted of one horizontal 3-inch diameter mud rotary boring (RC-10-001) and Phase 2 consisted of one horizontal 3-inch diameter mud rotary boring (RC-12-001). Equipment used for both subsurface investigation phases consisted of a track-mounted CS2000 drill rig. The mud rotary borings were advanced with a self-casing wire line

drilling method and were placed at the locations shown on Plate No. 4, attached. In addition to the exploratory borings, a seismic refraction survey was performed by the Geophysics and Geology Branch of the Office of Geotechnical Support during each phase. The Phase 1 seismic refraction survey consisted of a 144 feet-long seismic line (Seismic Line No. 1), and that of Phase 2 consisted of two 157.5 feet-long seismic lines (Seismic Lines WE1 and WE2) at the locations shown in Plate No. 4. The following table presents a summary of borings performed for the Retaining Wall No. 2.

Table 2: Summary of the Boring Exploration Information

Number(1)	Station (ft)	Offset from "A1" Line (ft)	Plunge and Trend(2)	Borehole Entrance Elevation (ft)	Length (ft)
RC-010-001	116+55	25.0 Rt.	0º, S80ºW	586.0	100.0
RC-012-001	115+22	13.0 Rt.	0º, S70ºW	585.0	104.0

Notes: (1) Borings with prefix "RC" used mud rotary wash method.
(2) 0º of plunge means horizontal borings.

Sampling was achieved by utilizing rock core barrel in all borings. Selected soil samples were bagged for subsequent laboratory testing.

Seismic Refraction Survey

The information for the three seismic refraction lines is presented in the table below and in Plate No. 4. A copy of the seismic refraction survey reports is included in Appendix C.

Table 3: Summary of the Seismic Refraction Survey Information

Seismic Line Number	Station ("A1" Line) (ft)		Offset (ft)	Trend	Length (ft)
	From	To			
1 (2010)	115+10	116+54	30.0 Rt.	N60ºW	144.0
WE1 (2012)*	114+80		12.0 Lt.	S30ºW	157.5
WE2 (2012)*	113+50		13.0 Rt.	S35ºW	157.5

*Perpendicular to "A1" Line

The seismic refraction survey was performed by using an EG&G Smartseis 24-channnel seismograph with 14 Hz geophones. The energy source employed was a hammer and striker plate.

Geologic Mapping

During our visits to the project area it was recognized that the area forms part of an inactive ancient landslide. Observed features that indicate landslide such as bowed trees, scarps and hummocky topography are present in most of the slopes adjacent to roadway, but they were limited to the slopes above road way. Mapping of the roadway cut slopes above the roadway was performed on August 8, 2010 to determine the current stability of the general area and the future stability after new slope and structures are built. Mapping was performed only on the areas affected by the construction. Most of exposed discontinuities including bedding, joints, and scarps were mapped. The information collected in the field was utilized for general stability in the wall area.

Laboratory Testing Program

Tests were performed to assess engineering properties of the subsurface materials. Unconfined compression testing of rock (ASTM D7012-07 Method C) was performed for representative samples, and test results are provided in Appendix B. Rock testing also included point load strength index testing of rock specimens to estimate the Uniaxial Compressive Strength (UCS) per ASTM D 5731-08. Corrosivity was assessed utilizing composite samples from borings RC-010-02 and RC-012-03 collected from Retaining Walls 1 and 3 locations.

FINDINGS

Site Description

The project site is located within the Six Rivers National Forest Administrative Boundary. According to the web-based Caltrans Post Mile Query Tool (Reference No. 15), the subject site is located at latitude and longitude coordinates of 40.88649^{o} North and 123.58779^{o} West, respectively; these coordinates are the basis for obtaining data in this report available through GIS related information sources. Within the project limits, State Route 299 is a two-lane highway paved with asphalt concrete (AC). The roadway width is approximately 27 feet wide; the westbound direction has two-feet-wide paved shoulders along with unpaved pullouts at each curve. The eastbound direction lane has an unpaved shoulder along with a one-foot-wide drainage ditch at the toe of the rock slope.

Within in the project limits the existing roadway has been excavated from the side of a hill that faces the Trinity River. This hill is approximately 270 feet high, and extends from

an elevation of 450 feet at the river, to an elevation of approximately 720 feet at the crest. The summit of the hill is narrow and gradually widens toward the east. The southern face of the hill is bound by a narrow valley carved by a creek; this valley is approximately 30 to 50 feet deep. The elevations on the paved road way vary from 595 to 574 feet (See Plate No. 2). Most of the existing road within the project interval was built entirely by cutting into formational rock and utilizing cut slope ratios that vary from 45º to 55º with maximum height of 120 feet.

While performing our work, our Office was not provided with any indication of underground utilities within the project limits by either USA inquires or ground surface posting, or other features. Overhead utilities (telephone lines) were noted bordering the southern limits of the Caltrans Right of Way.

Regional Geology

The project site is located in the Western Klamath Terrane near the westerly edge of the Klamath Mountains Geomorphic Province of California. The lithologies and age relationships within the Klamath Mountains indicate repeated accretion, beginning in early to middle Paleozoic and continuing through the Mesozoic, of ophiolitic and island arc terranes, with their associated sedimentary units, to the leading western edge of the North American plate. According to published geological mapping of the area (Reference Nos. 2 and 3), sedimentary rocks belonging to the Late Jurassic Galice Formation underlay the project site (Plate Nos. 5a and 5b) which are generally explained as gray phyllitic metagraywacke, slate, phyllitic slate. A more detailed description is offered by the report by Young which accompanies the mapping and is as follows:

> *"The Galice Formation consists of interbedded, very fine- to coarse-grained meta-graywacke. The fine-grained layers are altered to slate and phyllitic slate, while the medium- and coarse-grained beds are largely low-grade semischist."*

Materials similar to the provided descriptions were encountered in our field investigations (see below). No landslide features are shown on the referenced map within or adjacent to the project area. However, the map report states that: *"Only the larger and more obvious landslide areas are shown on the geologic map that accompanies this report."*

Site Geologic Conditions

Within the project limits, exposures of the Galice formation rock were noted to be composed of slightly schistose meta-graywacke with slate interbeds, phyllitic schist, and

schist. Geologically, the site materials exhibited characteristics such that separation into two contrasting groups is apparent based on resistivity to weathering by the chemical and mineralogical components of the rocks. The first group would be comprised of the harder appearing, slightly weathered phyllitic schist and meta-graywacke/slate interbeds materials. In contrast to neighboring materials, these rocks appeared to have an inherent, weather-resistant nature that was exhibited by the local tendency of these rocks to protrude from the ground surface and inhibit the accumulation of vegetation which was sparse and poorly-developed. The schist rock comprises the second group which was generally decomposed and intensely weathered, an indicator that the structure and mineralogical components are inherently susceptible to weathering. The product of decomposition of the schist was typically observed to be silty clay which promotes areas where slopes are less steep and vegetation is better established.

Naturally Occurring Asbestos (NOA)

The Caltrans Map "Areas Likely to Contain Naturally Occurring Asbestos – District 2" (Reference No. 6) states:

> *Natural occurrences of asbestos are more likely to be encountered in, and immediately adjacent to, areas of ultramafic rocks including landslide deposits or soils originating from ultramafic rock sources.*

The referenced Caltrans map does not depict and area likely to contain Naturally Occurring Asbestos (NOA) within or immediately adjacent to, the project limits. Similarly, the United States Forest Service (USFS) mapping of NOA (Reference No. 7) indicates the project site is not in an area "more likely: to contain NOA. In review of available published geologic mapping (Reference Nos. 1 through 3), and the aforementioned NOA mapping, the nearest area of NOA or ultramafic rocks (designated as "serpentinized ultramafic rocks") is located roughly two miles westerly of the project area. Based on the geologic conditions observed during site visits and on the results of subsurface exploration (see "Subsurface Conditions", below) the potential for the presence of ultramafic rocks within the project limits is considered very low.

Subsurface Conditions

Based on borings performed in the area of the Retaining Wall No. 2, seismic refraction surveys (References Nos. 10 and 14), and surface mapping, the site subjected to investigation is underlain by two zones of different geologic composition and, therefore, it was divided in two sections: The western section, from 13+50 to 15+00, and the

eastern section from 15+00 to 16+79. The near-surface materials at the western section consist of a thin layer of variable thickness of colluvium described as silty gravel and sand. The near-surface materials are underlain by a one to 50 feet thick layer of soft and intensely fractured slate. The resulting shear velocity assigned to this section ranges between 3000 and 4500 feet per second. Underlying the layer of soft slate is hard and intensely fractured meta-graywacke with thin slate interbeds and phyllitic schist. These rocks were imaged with a shear velocity greater than 7000 feet per second. Meta-graywacke outcrops are present as large and sounded rectangular blocks protruding from the hill and can be observed all along the western section.

The near-surface materials at the eastern section (stationing 15+00 to 16+79) consist of 20 feet-thick layer of decomposed to highly weathered and intensely fractured schist. The decomposed material is soft with hard pockets of intensely to moderately weathered rock and imaged a maximum velocity of 2600 feet per second. The decomposed material is underlain by formational metamorphic bedrock. The formational bedrock was encountered as moderately hard, weathered meta-graywacke inter-layered with thin layers of hard, moderately weathered and fresh fractured slate. The seismic refraction survey imaged the meta-graywacke rock with a velocity of 4000 feet per second. Hard and fresh bedrock was encountered by the horizontal boring RC-10-001 at 70 feet behind the slope face. The contact between bedrock and the decomposed schist can be observed between station 115+00 and 115+15 and it should be noted that this contact is highly irregular.

Drilling in the weathered material of the eastern section was generally soft and drilling water circulation was lost in most of the boring length. There was no evidence of water leaking to the surface in the area surrounding the boring, indicating with this that the material is highly permeable and raises the possibility of fairly large voids. After the horizontal boring RC-10-001 was complete and the casing was extracted, boring did not cave in for the first 75 feet. A more detailed description of the materials encountered in borings is presented on the LOTBs attached in Appendix A.

Ground Water

The presence of a static ground water table appeared to be absent during our subsurface investigation exploration borings performed in April of 2012. During the field visits to the project site, slopes in the vicinity of the Retaining Wall No. 3 appeared absent of seeps and springs, even during visits performed within wet seasons of the year.

Structure

Surface mapping of most visible discontinuities exposed along the road cuts indicate two major sets and one minor set of discontinuities within the project interval. Foliation is the most common discontinuity along the roadway cuts. The dip direction and dip of these discontinuities are represented graphically in azimuth, which is the direction of the horizontal trace of the line of dip, measured clockwise from the north. The dip direction and dip of foliation ranges between 046/50 and 064/73 with an average of 058/54. The dip direction and dip represented by the fractures and joints range between 299/46 and 156/82 with an average of 357/73. This general dip direction and dip of foliation set tends to be oblique with respect to the direction of the dip direction of 030/63 of the proposed rock cut for the Retaining Wall No. 2. Therefore, mapped discontinuities may remain stable during the construction of the proposed retaining wall.

An angle of 30º was utilized for the rock slope stability analysis based on the discontinuities characteristics observed in the rock core samples and formational rock outcrops.

Rock Slope Stability

The construction of the soil nail wall will eliminate the existing unfavorable rock conditions such as fractures along foliation planes dipping perpendicularly to the proposed slope direction and hazardous rock fall due to the presence of multiple fractures. Results from stability analysis indicate that the bearing of the line of intersection of two sets of discontinuities (50/48 and 300/50) is similar to the direction of dip of the slope face (N30ºE) and sliding could occur during construction. Therefore, our Office recommends that the soil nail wall lifts be no higher than 5 feet.

Laboratory Test Results

Unconfined compression strength testing of core samples representative of the hard meta-graywacke from the western section yielded compressive strengths as high as 2887 psi (415.7 ksf). Core samples representative of the hard meta-graywacke from the eastern section yielded compressive strengths as high as 3000 psi (432 ksf). Testing on core samples representative of the slate was not performed due to its intense fracturing and foliation. Laboratory test results for samples collected from borings performed for Retaining Wall No. 2 are also presented in Appendix B, attached.

According to the Office of Testing and Technology Services, Corrosive Technology Branch, the results of the laboratory tests determined that the composite samples from

Retaining Wall 1 and 3 locations were considered to be non-corrosive at this site (Reference No. 5). Refer to Table 4 below for specific test results.

Table No. 4: Corrosion Test Summary

Location:	Boring Number	Sample Depth (feet)	pH	Minimum Resistivity (Ohm-cm)	Sulfate Content (ppm)	Chloride Content (ppm)
STA 120+05; 16.0' Left "A1" Line	RC-12-003	0.0 to 1.5	6.81	7822	61	3
		4.0 to 5.5				
		6.0 to 7.5				
		8.0 to 9.5				
		15.0 to 16.5				
		19.3 to 19.5				
STA 112+46; 1.5' Left "A1" Line	RC-10-002	11.5 to 15.0	7.23	11270	N/A	N/A

Faulting and Seismicity

According to the report accompanying the Caltrans Deterministic PGA Map (Reference No. 8), Caltrans defines a fault as "active" if the fault known to have ruptured within the past 700,000 years (late-Quaternary to present). The Caltrans ARS Online (v.2.0) spectrum tool at http://dap3.dot.ca.gov/shake_stable/v2 /index.php indicates that the closest "active" fault to the site is the Trinidad fault which forms part of the Mad River Fault zone. This web-based tool indicates the closest distance to the Trinidad fault trace (or surface project of the top of rupture plane) is approximately 14.3 miles southwesterly of the project site (Plate No. 6). Additionally, this fault is identified to be a "reverse" fault type which dips at 35º to the northeast and is capable of generating a Maximum Moment Magnitude (MMax) of 7.5. The closest distance to the rupture plane of this fault is indicated to be approximately 9.2 miles. According to the Alquist-Priolo Earthquake Fault Zone Maps available through United States Geological Survey (USGS) (obtained at http://www.consrv.ca.gov/cgs/rghm/ ap/Pages/index.aspx) the site is not within an Alquist-Priolo Earthquake Fault Zone. No faults (active or inactive) are known to extend close to or on the project site. The closest known inactive fault to the project site is the Hennessy Ridge Fault, a thrust fault located approximately 1.9 miles southwesterly of the project site (Plate No. 5a).

In accordance with the Caltrans Geotechnical Services Design Manual (Reference No. 9), the average small strain shear velocity for the top 100 feet at the site (V_{S30}) is estimated to be about 2,500 feet per second. Utilizing the estimated V_{S30} and the ARS Online (v.2.0) response spectrum web-based tools, Peak Ground Accelerations (PGA) of 0.33g and 0.39g were generated based on the deterministic and probabilistic methods, respectively. Based on the Caltrans Geotechnical Services Design Manual, the design PGA shall be the greater acceleration obtained by either the deterministic method or the probabilistic method, with the probabilistic method being based on the USGS 5 percent probability of exceedance in 50 years (975 years return period).

Foundation Recommendations

Based on our findings, it is concluded that construction of the proposed Soil Nail Wall acceptable.

Engineering Parameters

The engineering parameters are shown in the following table

Table 5: Engineering Parameters for Retaining Wall No. 3.

Section		Average Horizontal Distance from Existing Cut Face (feet)	Rock Description	Unit Weight (pcf)	C (psf)	Phi (Degrees)
Name	Station					
Western	From 13+50 to 15+00	0 – 100	Slate and Graywacke	165	2000	40
Eastern	From 15+00 to 16+79	0 - 45	Decomposed Bedrock	135	300	35
		Past 45*	Slate and Graywacke	155	2000	40

* Encountered this material at 45 feet, it is assumed that it continues significantly from the face.

Soil Nail Wall Recommendations

The soil nail wall will be constructed with a batter of 1:12 (H:V), or the equivalent of a batter angle of 5º which was used in the design. The bottom row of soil nails will be positioned 2.3 feet above finished grade. The soil nails will be spaced 5 feet horizontally and vertically center-to-center and they will have 15 degrees of inclination from

horizontal. The soil nail wall configuration is shown in Plates Nos. 7a and 7b. Soil nail quantities are presented in the following table.

Table 6: Soil Nail Quantities

Soil Nail		
Length, (ft)	**Quantities**	
	Count*	**Drilled Length, (ft)**
40	48	1920
30	111	3330
20	142	2840
15	27	405
Total	328	8495

*It does not include verification nails.

The wall will be constructed in two zones. It is recommended that two verification soil nails and eight proof soil nails be performed at each zone and their positions and lengths are shown on Plates Nos. 7A and 7B. Four proof soil nails will be positioned in any of eight proposed proof nail locations in each section as it is shown on the same plates, and the remaining four soil nails in each section will be positioned based on the engineer's criteria.

The design pullout resistance is 3600 pounds/linear foot. The soil nail configuration was obtained utilizing the software SnailWin v3.10 (Reference No. 4) and the analysis consisted on testing 30 cross sections. The analysis of a wall cross section for each zone and their reports are included in Appendix D.

A pseudo-static analysis was performed by using one third of the peak horizontal ground acceleration of 0.42g (0.14g). Minimum factors of safety for global stability for static loads and seismic loads of 1.5 and 1.1 respectively were met utilizing the limiting criteria mentioned above.

Construction Considerations

Caving conditions may be present in the intensely fractured and decomposed schist present in the eastern section. Therefore, casing may be required to keep borings open prior to placing grout.

The absence of drill fluid circulation during most of the drilling of both exploratory borings indicates the presence of voids in the subsurface materials. The potential for the

loss of grout into voids and fractures is highly possible in the weathered rock. It is recommended that a "grout sock" be used to reduce the potential for grout loss.

For construction purposes the wall has been divided in two zones which coincide with the sections already mentioned in the Geology section. The table below shows the limits of each zone.

Table 7: Construction Zones for Retaining Wall No. 2

Zone	Stationing (ft)			
	"A1" Line		"RTW2" Line	
	Beginning	End	Beginning	End
1	113+50	15+00	18+74.18	10+23
2	15+00	116+79	10+23	11+99.15

The material in front of the proposed retaining wall from station 115+00 to 116+79 is considered rippable utilizing conventional excavation equipment. However, a wedge of hard bedrock may be encountered during the excavation for at least the first thirty feet from station 115+00.

The contact between the fresh bedrock and disturbed material is considered highly irregular in the eastern section. If fresh bedrock is encountered during the drilling of the 40 foot nails, drilling could be difficult over the whole length of the boring.

Drilling for the soil nails in the western section will be difficult because of the presence of hard layers of meta-graywacke.

Based on the plan titled "Index to Plans" for Enchilada Curve Improvement, dated May 28, 2012 (Reference No. 16), the excavation for the proposed Retaining Wall has been classified as roadway and structural excavation. The portion for roadway excavation is discussed in more detail under the Rippability Section of the Geotechnical Design Report for Enchilada Curve Improvement. The portion of the structural excavation for the retaining wall is confined to the limits of the soil nail wall structure, which is approximately 2 feet thick. This sliver cut can be excavated with conventional excavation equipment such as scrapers, dozers, backhoes. However, ridges of hard rock will be encountered during the excavation and they will require hard rock excavation methods. Hard rock excavations would include, blasting, hydraulic splitters, chemical expanders, and pneumatic hammers (hoe rams). Our Office recommends that blasting methods not be allowed to accomplish excavations for the proposed soil nail wall construction due to the anticipated close proximity of completed structure elements of the soil nail wall.

Rockfall at the proposed location of the Retaining Wall 2 can be significant if the river cobble deposits present immediately above the top of the retaining wall are disturbed during construction. The contractor should pay special attention to these deposits during construction to avoid severe rockfall occurrence during and after construction. It is recommended that this slope be monitored by the District after construction to quantify the amount and extent of the rockfall. If the District determines that these deposits are creating a rockfall problem that needs mitigation, our Office should be contacted to provide rockfall mitigation measures.

Naturally Occurring Asbestos (NOA)

As discussed in the "Findings" section of this report, OGDN concludes that the project site has a very low potential for the presence of ultramafic rocks and NOA. In consideration for the potential presence of NOA materials, the North Region Hazardous Material Officer should be contacted to determine if the project has the need for Airborne Toxic Control Measures (ATCMs) during project construction.

Project Information

Standard Special Provision 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:

1. *Log of Test Borings (Enchilada Curve Improvement, Retaining Wall No. 2)*

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

A. *Foundations Recommendations for Enchilada Curve Improvement, Retaining Wall No. 2, dated 9/20/2012 by Caltrans Division of Engineering Services, Office of Geotechnical Design North, Branch of Geophysics and Geology.*
B. *Refraction Seismic Survey, "Route 299 Whole Enchilada Roadway Improvement at 299-TRI PM 0.5 to 0.8" dated January 10, 2011, by Caltrans Division of Engineering Services, Branch of Geophysics and Geology.*

C. Refraction Seismic Survey, "Route 299 Whole Enchilada Roadway Improvement at 299-TRI PM 0.5 to 0.8" dated March 24, 2012, by Caltrans Division of Engineering Services, Branch of Geophysics and Geology.

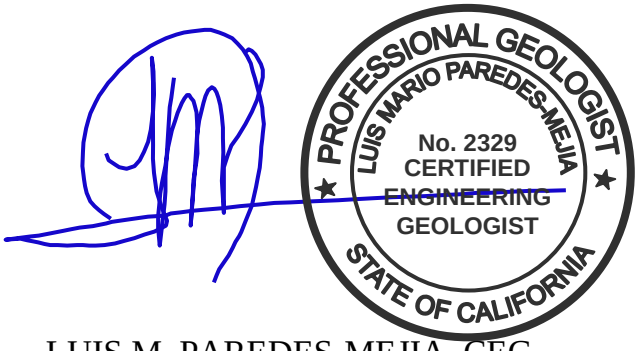
Data and Information available for inspection at the District Office:

A. None

Data and Information available for inspection at the Transportation Laboratory are:

For Boring RC-10-001 seven core boxes, and RC-12-001 eleven boxes.

If you have any questions or comments, please call Luis Paredes-Mejia at (916) 227-1047 or Reza Mahallati at (916) 227-1033.



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GS Corporate
DES OE
GDN File
DME D2 (e-copy)

ATTACHMENTS

REFERENCES

Plate No. 1. Vicinity Map
Plate No. 2. Topography of Project Area
Plate No. 3. Project Site Plan
Plate No. 4. Retaining Wall No. 2 Site Plan
Plate No. 5a. Geologic Map
Plate No. 5a. Geologic Map Legend
Plate No. 6. California Seismic Hazard Map
Plate No. 7a. Structure Plan Section 1
Plate No. 7b. Structure Plan Section 2

APPENDIX A: LOG OF TEST BORINGS (LOTB'S)

Log of Test Borings Page 1 of 2
Log of Test Borings Page 2 of 2

APPENDIX B: LABORATORY TESTS RESULTS

Table No. B-1. Summary of Laboratory Test Results
Plate No. B-1. Point Load Strength Index of Rock Test Results
Plate No. B-2. Unconfined Compression Test Results, Specimen RC-10-001-34
Plate No. B-3. Unconfined Compression Test Results, Specimen RC-12-001-8
Plate No. B-4. Unconfined Compression Test Results, Specimen RC-12-001-10
Plate No. B-5. Unconfined Compression Test Results, Specimen RC-12-001-18

APPENDIX C: SEISMIC REFRACTION SURVEYS

GGB Seismic Survey Reports dated January 10, 2011
GGB Seismic Survey Reports dated March 24. 2012

APPENDIX D: SNAILZ Cross Sections and Reports (14 pages)

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1. CDMG (1977) "Geologic Map of California, Redding Sheet, - Scale 1: 250,000 (1962)", published by California Division of Mines and Geology, third printing, 1977.
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3. USGS (1994) "Geologic Map of the Klamath Mountains, California and Oregon", Scale 1:500,000, published by the U. S. Geological Survey, compiled by William P. Irwin, 1994.
4. Caltrans (2000) "SnailWin" Version 3.1, Division of Materials and Foundations, February 2000
5. Caltrans (2003) "Corrosion Guidelines", Corrosion Technology Branch, Materials Engineering and Testing Services, Caltrans, Version 1.0, September 2003.
6. Caltrans (2005) "Areas Likely to contain Naturally Occurring Asbestos – Caltrans District 2", mapping prepared by the Division of Maintenance GIS in coordination with the Division of Environmental Analysis, 2005.
7. USFS (2008+) "Areas More Likely to contain Naturally Occurring Asbestos, Six Rivers National Forest", prepared by the United States Forests Service, Department of Agriculture, compiled after 10-7-08.
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10. Caltrans (2011) Refraction Seismic Survey for the "Route 299 Whole Enchilada Roadway Improvement at 299-TRI PM 0.5 to 0.8", prepared by the Caltrans Division of Engineering Services, Branch of Geophysics and Geology, dated January 10, 2011.
11. Caltrans (2011) "Summary of Type Selection Meeting", Enchilada Curve Retaining Walls, 02-TRI-299-PM 0.5/0.8, Caltrans Division of Engineering Services, Office of Bridge Design North, Structure Design, Bridge Design Branch 7, dated November 30, 2011.
12. Caltrans (2011) "Type Selection Recommendations", Enchilada Curve Retaining Walls, Caltrans Division of Engineering Services, Office of Bridge Design North, Structure Design, Bridge Design 7, 02-TRI-299-PM 0.5/0.8, dated December 6, 2011.
13. Caltrans (2012) "Enchilada Curve Improvement, Retaining Wall No. 2, General Plan", prepared by Caltrans Division of Engineering Services, Structure Design, Design Branch 7, dated May 17, 2012.
14. Caltrans (2012) Refraction Seismic Survey for the "Route 299 Whole Enchilada Roadway Improvement at 299-TRI PM 0.5 to 0.8", prepared by the Caltrans Division of Engineering Services, Branch of Geophysics and Geology, dated March 24, 2012.
15. Caltrans (2012) "Postmile Query Tool", based on Google Maps, provided by the Caltrans GIS Services Branch at: http://svhqgisapp1.dot.ca.gov/postmilewebclient/PostmileQueryTool.html.
16. Caltrans (2012) "Enchilada Curve Improvement, Retaining Wall No. 2, Index to Plans" prepared by Caltrans Division of Engineering Services, Structure Design, Design Branch 7, dated May 28, 2012.

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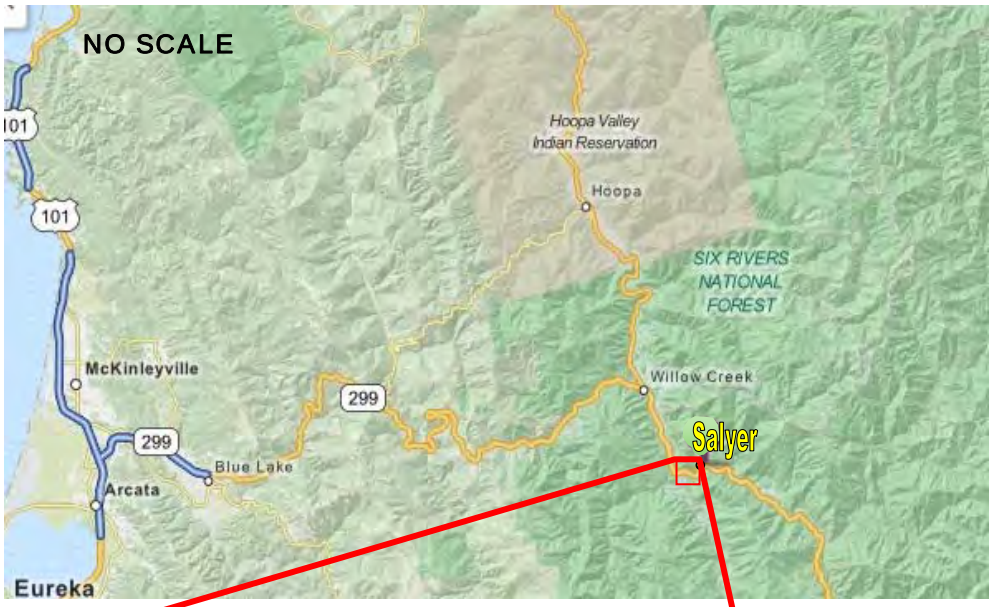
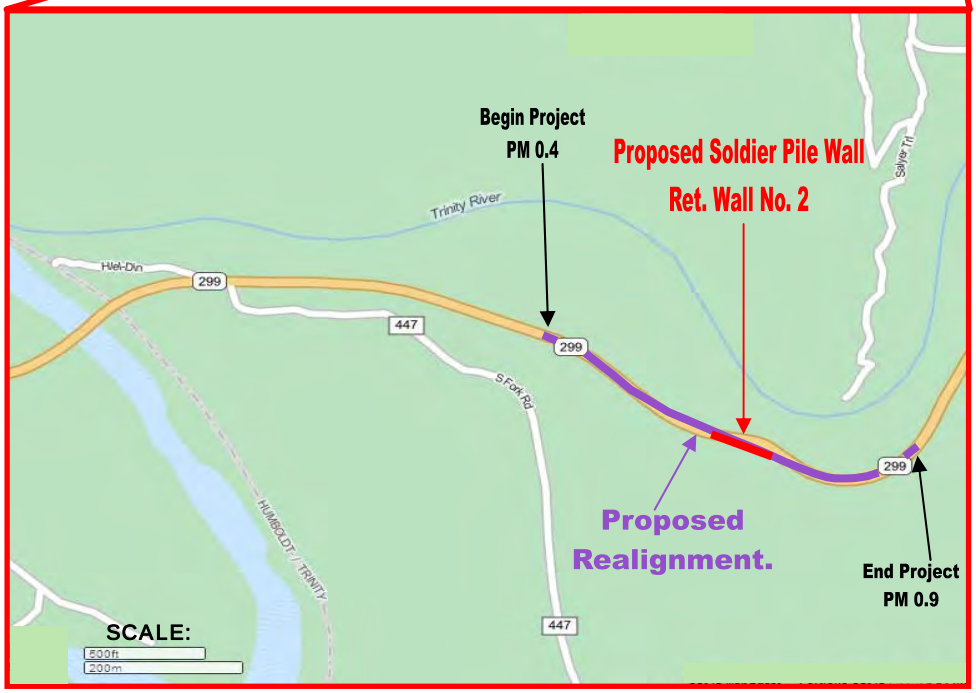
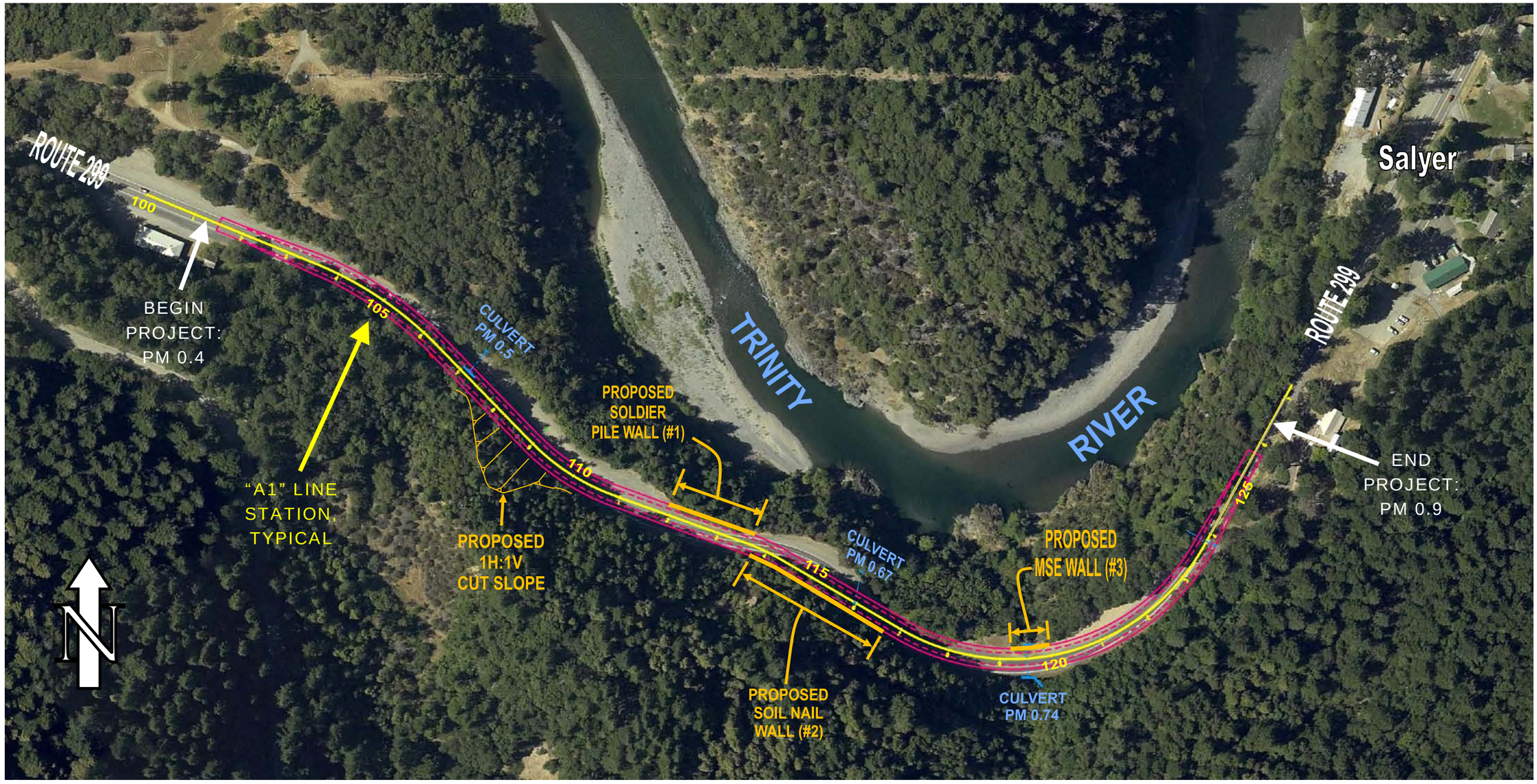




Caltrans	CALTRANS Division of Engineering Services Geotechnical Services Geotechnical Design – North	**EA: 02-2E3501** **Date: September 2012**	**VICINITY MAP**
		02-TRI-299-PM 0.4/0.9 **ENCHILADA CURVE IMPROVEMENT**	Plate No. 1

Caltrans	CALTRANS Division of Engineering Services Geotechnical Services Geotechnical Design – North	EA: 02-2E3501 Date: September 2012	**Topography of Project Area**
		02-TRI-299-PM 0.4/0.9 ENCHILADA CURVE IMPROVEMENT	Plate No. 2



Base Map Reference: Digital Highway Inventory Photography Program (DHIPP)at http://svhqdhipp:8080/dhipp/view.html. Photo taken between 2001 and 2003.
Photo and layout provided by the Caltrans Office of Engineering Services and Design – North, Redding.

Approximate Scale: 1:2400
1 inch = 200 feet

0 200 400 feet

CALTRANS
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design - North

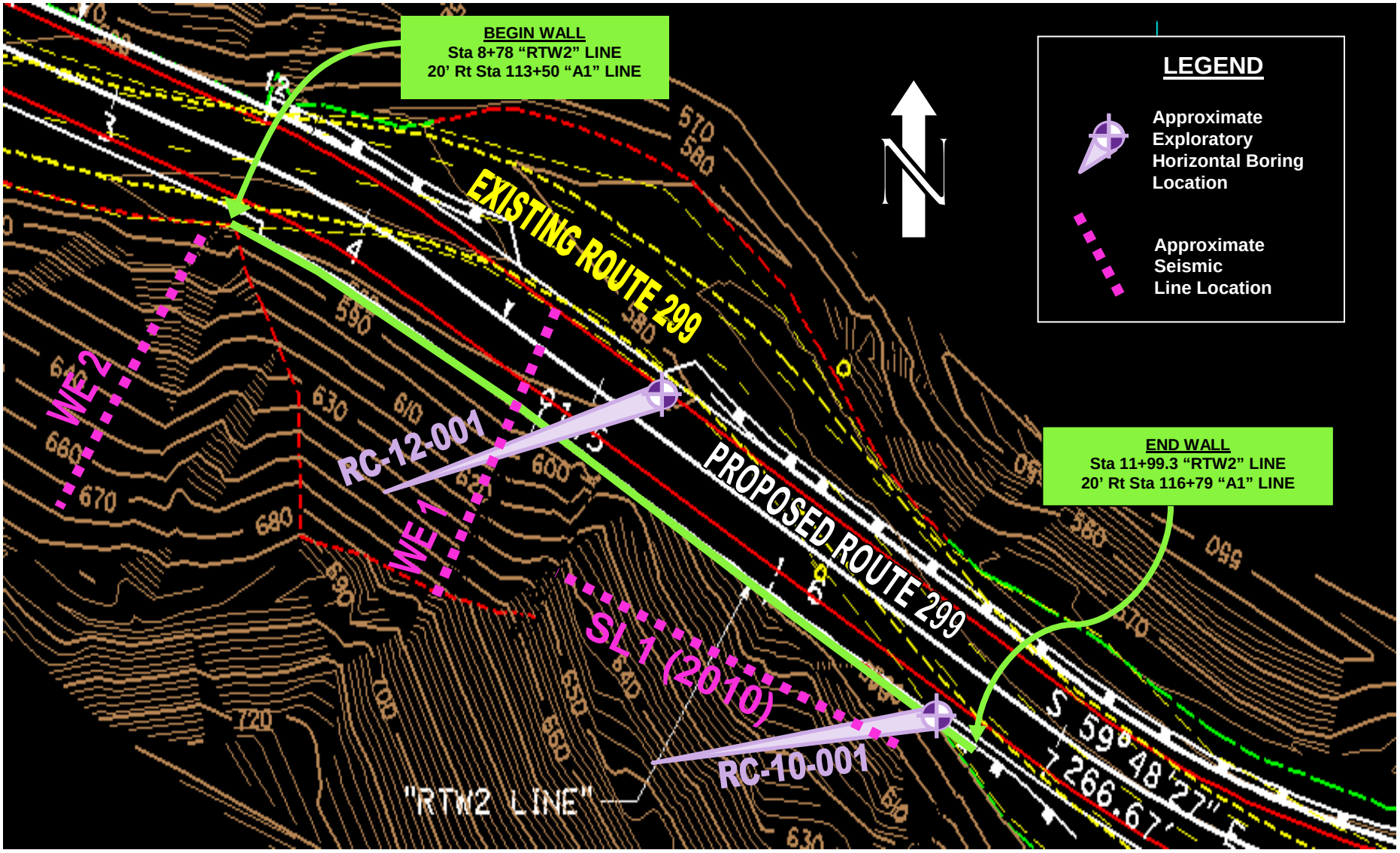
EA: 02-2E3501

Date: September 2012

PROJECT SITE PLAN

02-TRI-299-PM 0.4/0.9
ENCHILADA CURVE IMPROVEMENTS

Plate No. 3



Base Plan Reference: From Microstation file "Fin-Surface_Contours.dgn" provided by Caltrans Office of Engineering Services and Design – North, Redding; elevation contour interval = 2 feet; Surface contours left of "A1 Line" STA 113+50 to 115+10 based on former proposed cutslope design.

Approximate Scale: 1:600
1 inch = 50 feet

0 50 100 feet

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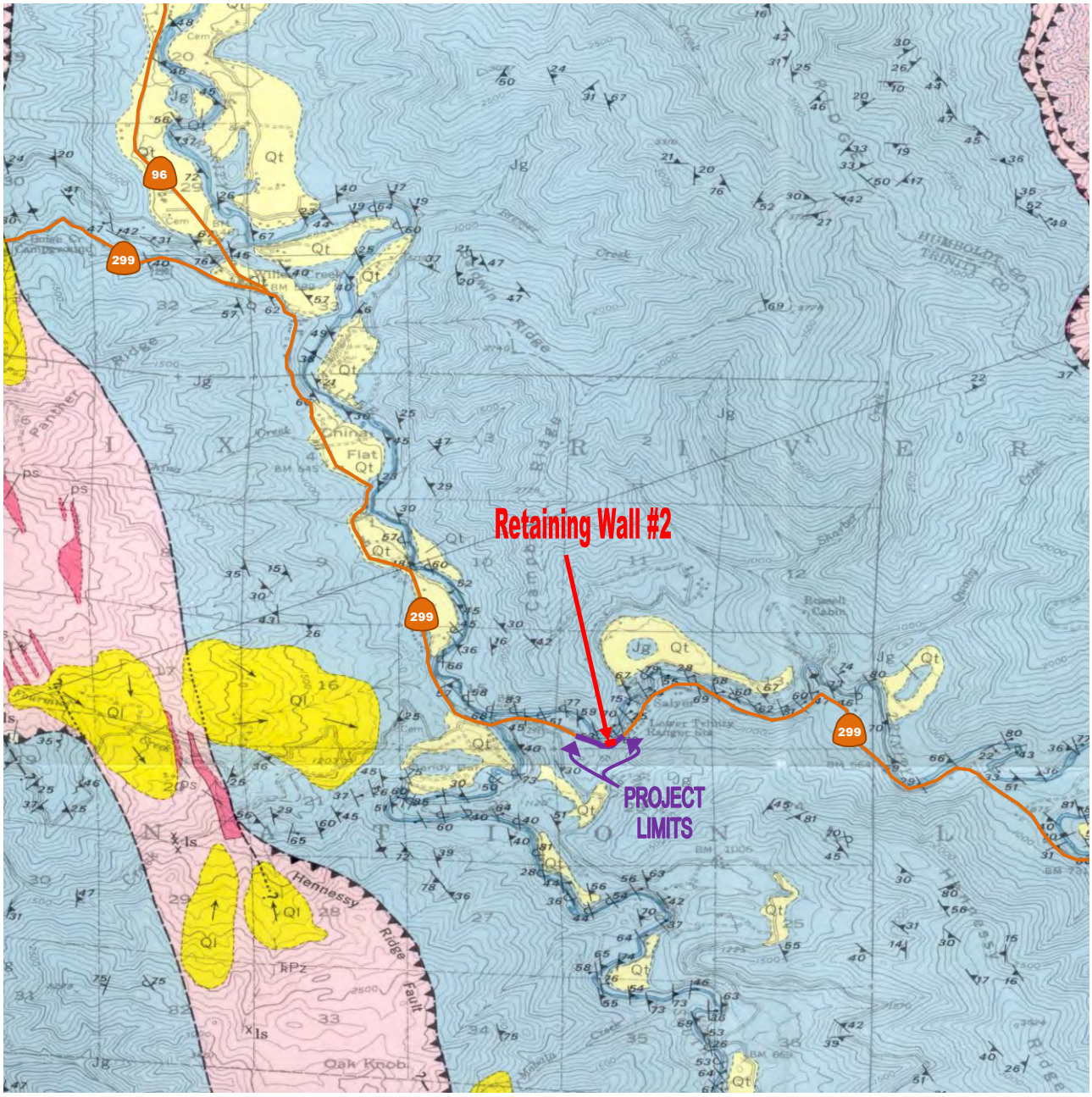
Geotechnical Design – North

EA: 02-2E3501	RETAINING WALL NO. 2 SITE PLAN
Date: September 2012	
02-TRI-299-PM 0.4/0.9 ENCHILADA CURVE IMPROVEMENT	Plate No. 4



REFERENCE: "Geology of the Willow Creek Quadrangle. Humboldt and Trinity Counties, California", CDMG Map Sheet 31, compiled by, John C. Young, Scale 1:62,500.

See Plate No. 5b for explanations.

Approximate Scale: 1:62,500
1inch = 1.0 mile

0 1.0 2.0 miles

N

Caltrans	CALTRANS Division of Engineering Services Geotechnical Services Geotechnical Design – North	**EA: 02-2E3501** **Date: September 2012**	**GEOLOGIC MAP**
		02-TRI-299-PM 0.4/0.9 **ENCHILADA CURVE IMPROVEMENTS**	Plate No. 5a

EXPLANATION

SURFICIAL UNITS

QUATERNARY

Qt

Quaternary terrace gravels

Remnants at several levels along Trinity River. Older and younger terraces not distinguished.

Ql

Landslide or slump

Only the most obvious are shown on the map, but indications of widespread slope instability are common, especially in areas underlain by KJf, Jg and PzPz

SEDIMENTARY, METAMORPHIC, AND EXTRUSIVE IGNEOUS ROCKS

CRETACEOUS ?

sfm

South Fork Mountain Schist

Crinkled quartz-albite-muscovite-chlorite schist and semischist. Contains abundant quartz segregation lenses. Local blueschist and greenschist "knockers." Weathers silver-gray.

JURA-CRETACEOUS

tm

Zone of tectonic mixing

Foliated greenstone, metagraywacke, serpentinite, and diorite intermingled in the Coast Ranges thrust zone.

KJf

Franciscan rocks (melange)

Predominantly gray, dense graywacke which weathers tan to buff. Subordinate dark-gray shale, greenstone, conglomerate, and chert. The graywacke is often devoid of recognized bedding, but occasional graded bedding is visible. Individual rock units are generally of only local extent. Slopes are frequently unstable, especially those underlain by pelitic materials.

JURASSIC

Jgh

Contact Metamorphosed Galice Formation

Hornfels and fine-grained chiastolite-biotite-chlorite schists adjacent to Ammon Ridge Pluton.

Jg

Galice Formation

Gray phyllitic metagraywacke, slate, and phyllitic slate. Often weathers light silvery-gray to tan. Abundant graded bedding visible in exposures along streams. Cut by scattered thin meta-felsite dikes and sills. Areas underlain by dark slates and phyllitic slates especially subject to slope failure.

LATE PALEOZOIC TRIASSIC

PzPz

Western Paleozoic and Triassic belt of rocks (melange)

Fine-grained mafic to intermediate volcanic rocks, fine- to medium-grained graywacke, chert and siliceous argillite, lenses of serpentinite, local limestone and conglomerate, and small basic to intermediate intrusive masses. Individual rock types generally lack lithic continuity. Slopes underlain by this unit are often unstable.

WILLOW CREEK QUADRANGLE

CALIFORNIA DIVISION OF MINES & GEOLOGY

MAP SHEET 31
1978

SYMBOLS

Contact
(solid where accurately located; dashed where inferred; dotted where concealed)

Fault
(solid where accurately located; dashed where inferred; dotted where concealed)

Thrust fault
(solid where accurately located; dashed where inferred)

30 Strike and dip of beds *(facing known)*

38 Strike and dip of beds *(facing unknown)*

45 Strike and dip of overturned beds

Vertical beds

75 Strike and dip of foliation

Vertical foliation

35 Crumpled foliation with average attitude

48 Strike and dip of joints

Vertical joint

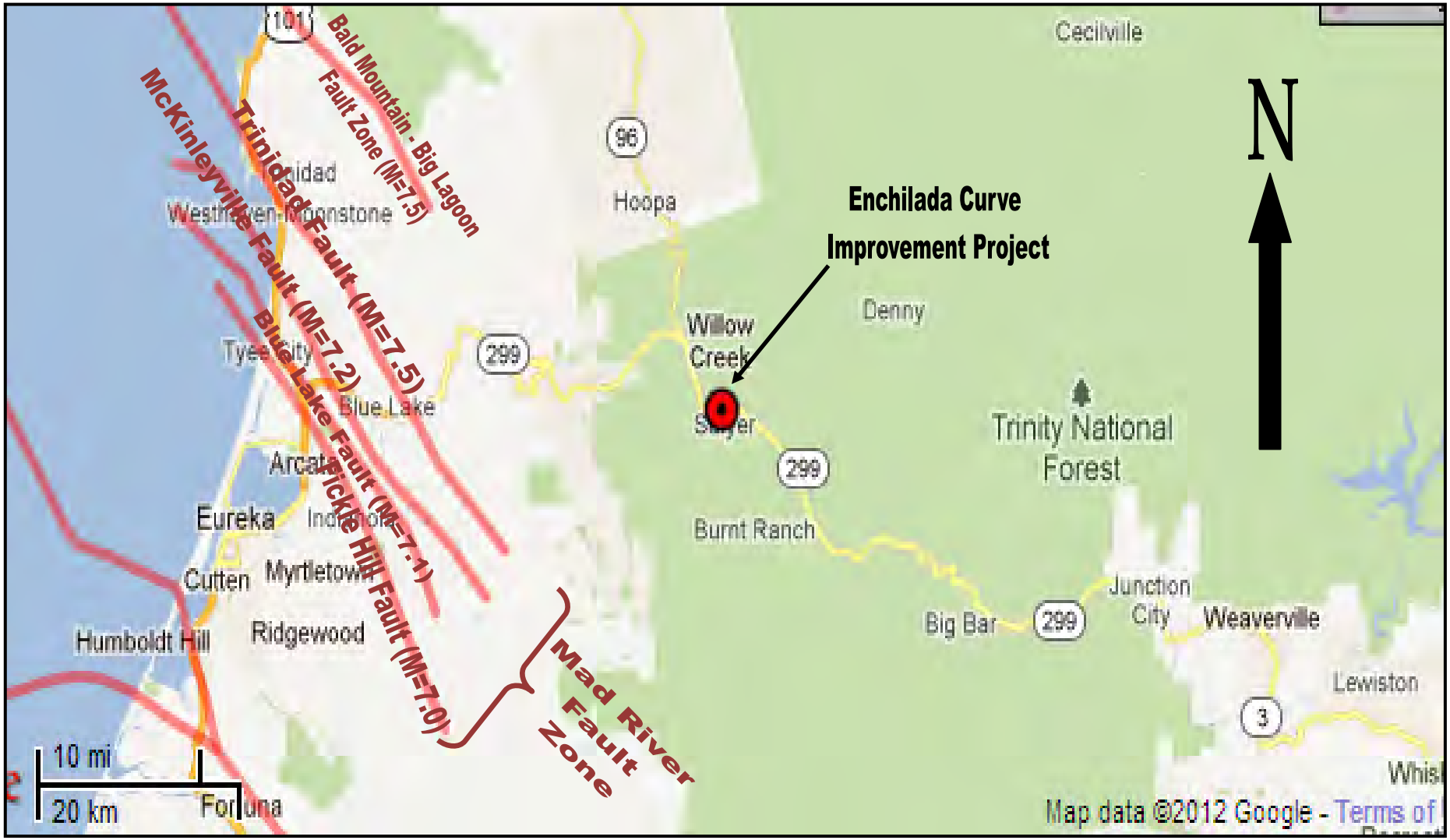
x or ls
Limestone locality

\+
Resistant knobs of variable size in South Fork Mountain Schist

APPROXIMATE MEAN DECLINATION, 1952

QUADRANGLE LOCATION

Caltrans	CALTRANS Division of Engineering Services Geotechnical Services Geotechnical Design – North	**EA: 02-2E3501** **Date: September 2012**	**GEOLOGIC MAP LEGEND**
		02-TRI-299-PM 0.4/0.9 **ENCHILADA CURVE IMPROVEMENTS**	Plate No. 5b



Base Map Reference: From Caltrans ARS Online (v2.0) at http://dap3.dot.ca.gov/shake_stable/v2/index.php

Caltrans	CALTRANS Division of Engineering Services Geotechnical Services Geotechnical Design – North	EA: 02-2E3501 Date: September 2012	**FAULT MAP**
		02-TRI-299-PM 0.4/0.9 ENCHILADA CURVE IMPROVEMENT	Plate No. 6

10+25 MATCH LINE

CROSS SECTION
XC3 (Sta 10+47.5)

OG @ TOP BATTER, 1:12

OG

FG

Proof Test Nails and Embedment Length (ft)

Verification Test Nails and Embedment Length (ft)

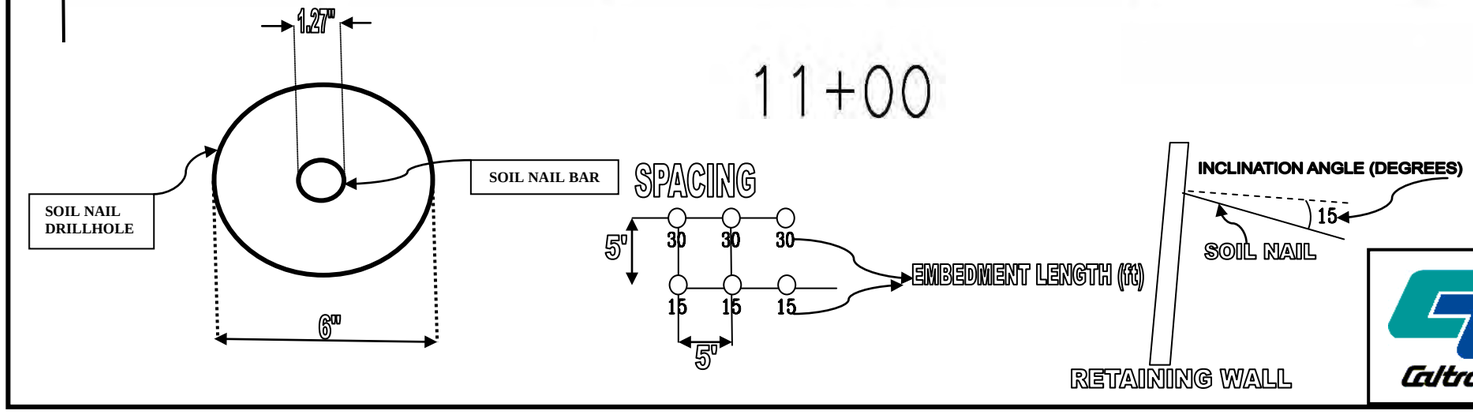
"RTW2" LINE

END WALL, Elev 579.75
"RTW2" 11+99.15
"A1" 116+79.00

630
620
610
600
590
580
570
560

11+00

12+00



Caltrans CALTRANS Division of Engineering Services Geotechnical Services Office of Geotechnical Design - North	EA: 02-2E3501 Date:September 2012	RETAINING WALL 2 STRUCTURE PLAN (ZONE 2)
	02-TRI-299-PM 0.5/0.8 ENCHILADA CURVE IMPROVEMENT	Plate No. 7B

10+25 MATCH LINE

630
620
610
600
590
580
570
560

CROSS SECTION
XC 10+07.5

● 30 Proof Test Nails and Embedment Length (ft)
★ 30 Verification Test Nails and Embedment Length (ft)

8+24.18

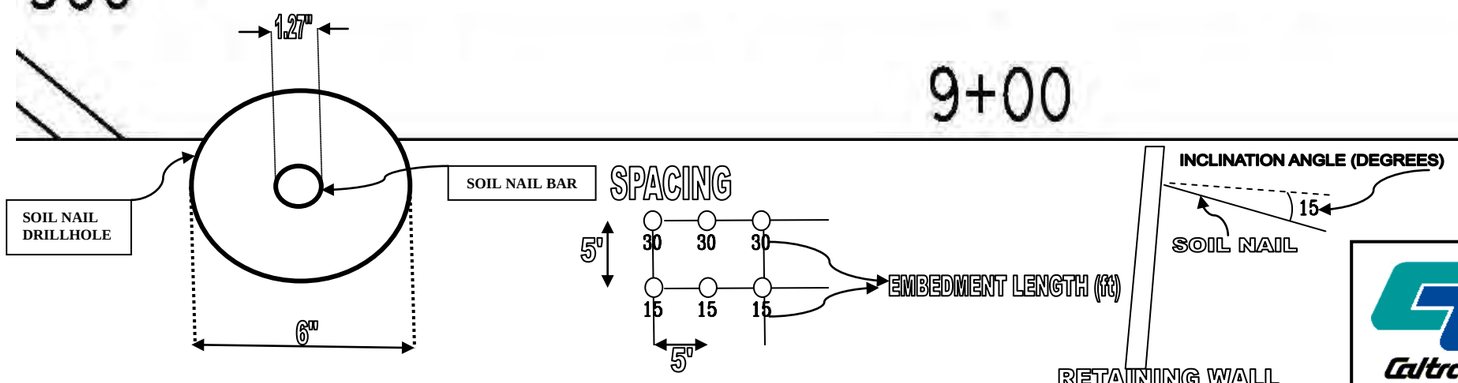
BEGIN WALL, Elev 580.81
"RTW2" 8+74.18
"A1" 113+50.00

"RTW2" LINE

9+00

10+00

10+25 MATCH LINE



CALTRANS
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Geotechnical Services
Office of Geotechnical Design - North

EA: 02-2E3501

Date: September 2012

RETAINING WALL 2 STRUCTURE PLAN (ZONE 1)

02-TRI-299-PM 0.5/0.8
ENCHILADA CURVE IMPROVEMENT

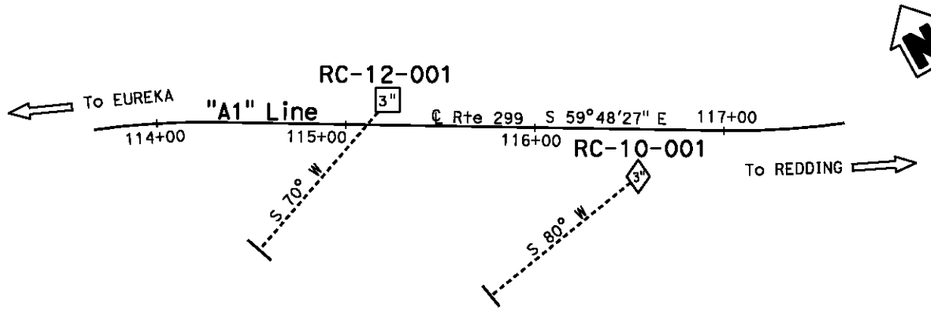
Plate No. 7A

APPENDIX A

Log of Test Borings (LOTB's)

BENCH MARK

TRI 299 0.54
Fdn 2¼" CADH Brass Disk in Concrete,
37.15' Rt "A1" Line Rte 299, Sta 111+07.93,
N 673,743.070
E 1,865,923.082
Elev 590.31
Vertical Datum: NAVD 88



PLAN
1" = 40'

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
02	Tri	299			

CERTIFIED ENGINEERING GEOLOGIST — DATE 7-13-12

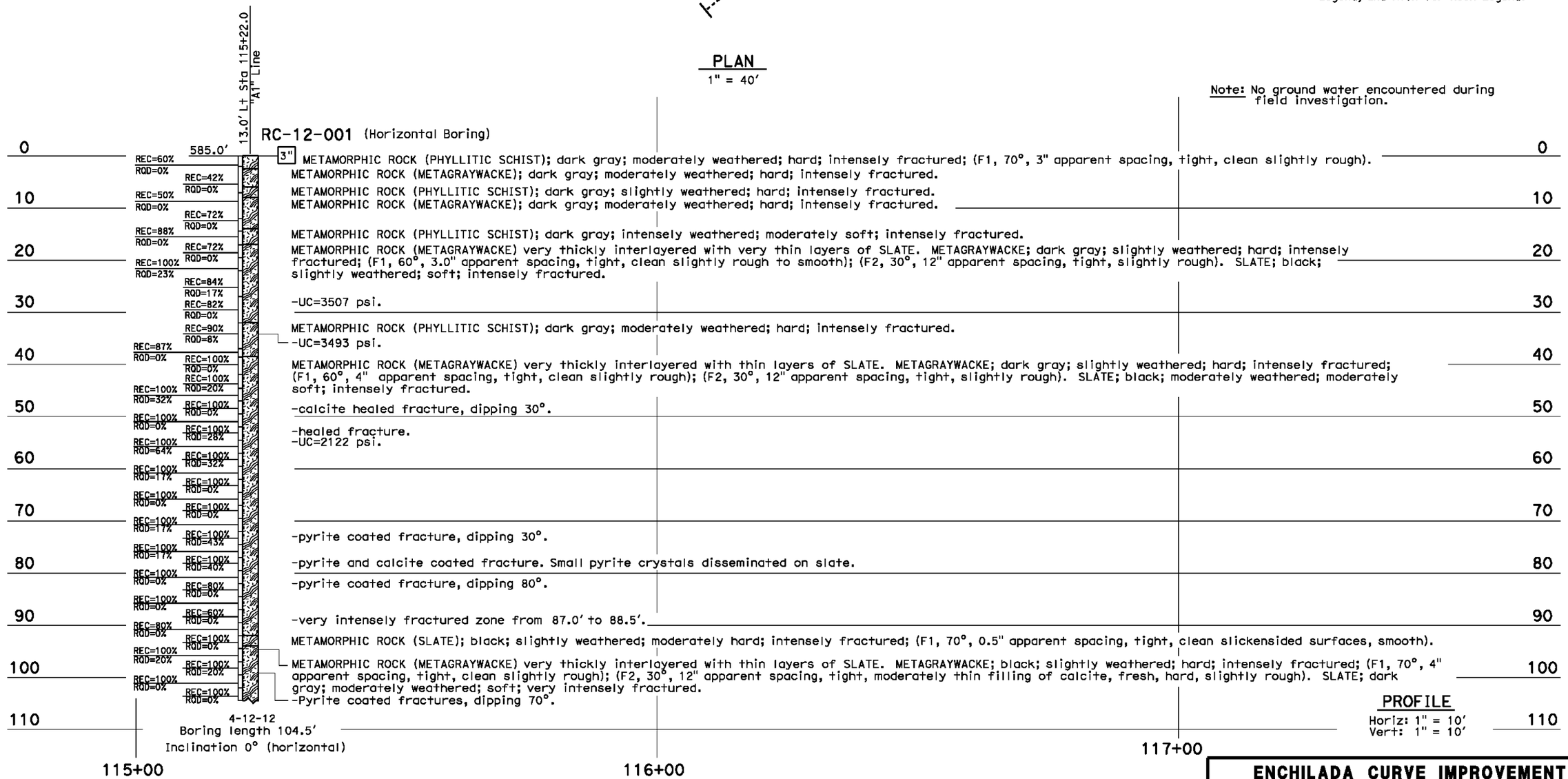
Luis Paredes-Mejia No. 2329 Exp. 1-31-14 CERTIFIED ENGINEERING GEOLOGIST — STATE OF CALIFORNIA — PROFESSIONAL GEOLOGIST

PLANS APPROVAL DATE

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

This LOTB sheet was prepared in accordance with the Caltrans Soil & Rock Logging, Classification, & Presentation Manual (2010 Edition).
See 2010 Standard Plans A10F and A10G for Soil Legend, and A10H for Rock Legend.

Note: No ground water encountered during field investigation.



PROFILE
Horiz: 1" = 10'
Vert: 1" = 10'

ENGINEERING SERVICES	MATERIALS AND GEOTECHNICAL SERVICES	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF ENGINEERING SERVICES STRUCTURE DESIGN	BRIDGE NO.	ENCHILADA CURVE IMPROVEMENT
FUNCTIONAL SUPERVISOR	DRAWN BY: W. Tang, I.G-Remmen	FIELD INVESTIGATION BY:	DESIGN BRANCH X	05E0010	RETAINING WALL NO. 2
NAME: M. Hagy	CHECKED BY: F. DeHaro	L. Paredes-Mejia		POST MILE 0.6	LOG OF TEST BORINGS 1 OF 2

OGS CIVIL LOG OF TEST BORINGS SHEET — ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT: 3643 PROJECT NUMBER & PHASE: 0200000211 CONTRACT NO.: 02-2E3501

DISREGARD PRINTS BEARING EARLIER REVISION DATES → REVISION DATES 07-11-12 07-12-12

SHEET X OF X

FILE => rw2-1of2.dgn

USERNAME => s116982 DATE PLOTTED => 13-JUL-2012 TIME PLOTTED => 13:27

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
02	Tri	299			

CERTIFIED ENGINEERING GEOLOGIST — 7-13-12 DATE

PLANS APPROVAL DATE

Luis Paredes-Mejia No. 2329 Exp. 01-31-12 CERTIFIED ENGINEERING GEOLOGIST — PROFESSIONAL GEOLOGIST — STATE OF CALIFORNIA

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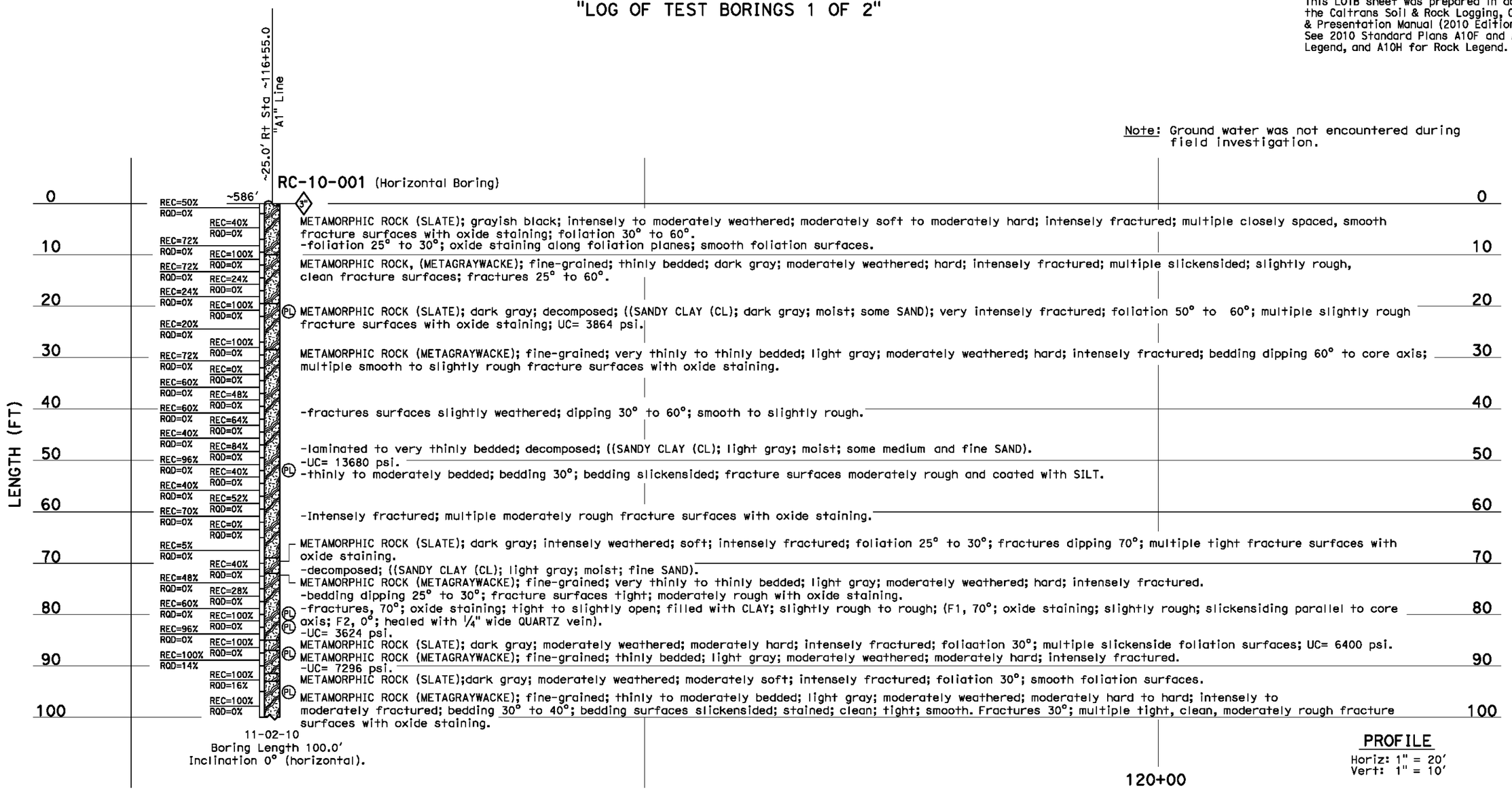
This LOTB sheet was prepared in accordance with the Caltrans Soil & Rock Logging, Classification, & Presentation Manual (2010 Edition).
See 2010 Standard Plans A10F and A10G for Soil Legend, and A10H for Rock Legend.

FOR PLAN VIEW, SEE
"LOG OF TEST BORINGS 1 OF 2"

Note: Ground water was not encountered during field investigation.



PROFILE
Horiz: 1" = 20'
Vert: 1" = 10'

ENGINEERING SERVICES	MATERIALS AND GEOTECHNICAL SERVICES	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF ENGINEERING SERVICES STRUCTURE DESIGN	BRIDGE NO.	ENCHILADA CURVE IMPROVEMENT
FUNCTIONAL SUPERVISOR	DRAWN BY: F. Nguyen		DESIGN BRANCH X	05E0010	RETAINING WALL NO. 2
NAME: M. Hagy	CHECKED BY: A. Barrie	FIELD INVESTIGATION BY: L. Paredes-Mejia		POST MILE 0.6	LOG OF TEST BORINGS 2 OF 2

OGS CIVIL LOG OF TEST BORINGS SHEET — ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT: 3643
PROJECT NUMBER & PHASE: 02000002111 — CONTRACT NO.: 02-2E3501

DISREGARD PRINTS BEARING EARLIER REVISION DATES →

REVISION DATES				SHEET	OF
07-12-12				X	X

FILE => rw2-2of2.dgn

USERNAME => s116982 DATE PLOTTED => 13-JUL-2012 TIME PLOTTED => 13:27

APPENDIX B

Laboratory Test Results

Enchilada Curve Improvement
Retaining Wall No. 2
Structure No. 05E0010

TABLE NO. B-1. SUMMARY OF LABORATORY TEST RESULTS

Sample Location				Percentage Passing Through Sieve No. or Percent Particle Size Finer Than																Strength Tests			Atterb. Limits		In-Situ		G_s AASHTO D T100	Max. Lab. Density (CTM 216)		Corrosion (CTM 417, 422, 532 and 643)	
Boring No.	I.D. No.	Depth (feet) top	Depth (feet) bottom	2 ½	2	1 ½	1	3/4	1/2	3/8	4	8	16	30	50	100	200	5μ	1μ	UU (Su, tsf) ASTM (D2850-95)	UC (psi) (ASTM D7012-07C)	UCS (psi) (ASTM D5731-08)	LL	PI	γ_d (pcf)	wc (%)		γ_d (pcf)	% wc		
RC-10-001		10.4	10.6																			21,553									
RC-10-001		19.7	19.9																			3,540									
RC-10-001		51.5	51.7																			12,851									
RC-10-001		79.8	80.0																			3,421									
RC-10-001		82.0	82.1																			5,919									
RC-10-001		86.5	86.7																			7,416									
RC-10-001		95.0	95.2																			8,610									
RC-10-001	34	93.0	93.6																		2,887				158.9	0.1					
RC-12-001	8	26.5	27.0																		3,507				169						
RC-12-001	10	34.5	35.0																		3,493				166						
RC-12-001	18	54.5	55.0																		2,122				168						

Point Load Strength Index of Rock; ASTM D 5731 - 08

Dist-EA: 02-3E3501 **Dist-Co-Rte-PM: TRI-299 PM 0.6 Structure No. 05E0010** **GL Tracking Nos.: 11-013**

Report Date: March 8, 2011

Boring I.D.	Depth (feet)		Depth (m)		Test Type	Initial Distance Between Contact Points, D (mm)	Final Distance Between Contact Points, D' (mm)	Equivalent Diameter, D_e (mm) per Section 10.1 of ASTM D 5731-08	Width, W (mm)	Length, L (mm)	Failure Load (lbs)	Uncorrected Point Load Strength Index, I_s; per EQ. #1 of ASTM D 5731-08		Size Correction Factor, F; per EQ. #4 of ASTM D 5731-08	Size Corrected Point Load Strength Index, $I_{s(50)}$; per EQ. #3 of ASTM D 5731-08		Generalized Index to Strength Conversion Factor, K, per Table 1 of ASTM D 5731-08 (approximated where appropriate)	Estimated Uniaxial Comp. Strength, s_c per EQ. #6 of ASTM D 5731-08		Remarks
	top	bottom	top	bottom								(MPa)	(PSI)		(MPa)	(PSI)		(MPa)	(PSI)	
RC-10-001	10.4	10.6	3.2	3.2	I-L	28.5	22	26.09	24	24	1,196.8	7.82	1,134.36	0.75	5.84	846	19	149	21,553	
RC-10-001	19.7	19.9	6.0	6.1	D-L	47.0	43	44.96		34	528	1.16	168.55	0.95	1.11	161	21	24	3,540	
RC-10-001	51.5	51.7	15.7	15.8	I-L	30	24	38.30	48	42	1,460.8	4.43	642.53	0.89	3.93	570	20	89	12,851	
RC-10-001	79.8	80	24.3	24.4	I-L	42.5	37	46.80	46.5	23.4	528.0	1.07	155.50	0.97	1.04	151	22	24	3,421	
RC-10-001	82	82.1	25.0	25.0	D-L	47	42	44.43		35	862	1.94	281.86	0.95	1.84	267	21	41	5,919	
RC-10-001	86.5	86.7	26.4	26.4	I-P	38.5	17	32.27	48	33	598.4	2.56	370.81	0.82	2.10	304	20	51	7,416	
RC-10-001	95	95.2	29.0	29.0	D-L	46.5	40.5	43.40		30	1,197	2.83	410.00	0.94	2.65	385	21	59	8,610	

NOTES:
Test Type Abbreviations: D - Diametral, A -Axial, B - Block, I - Irregular Lump.
Orientation of Load (if anisotropic): P - Perpendicular to plane of weakness, L - Parallel to plane of weakness

RC-10-001 10.4'-10.6'

RC-10-001 19.7'-19.9'

RC-10-001 51.5'-51.7'

RC-10-001 79.8'-80.0'

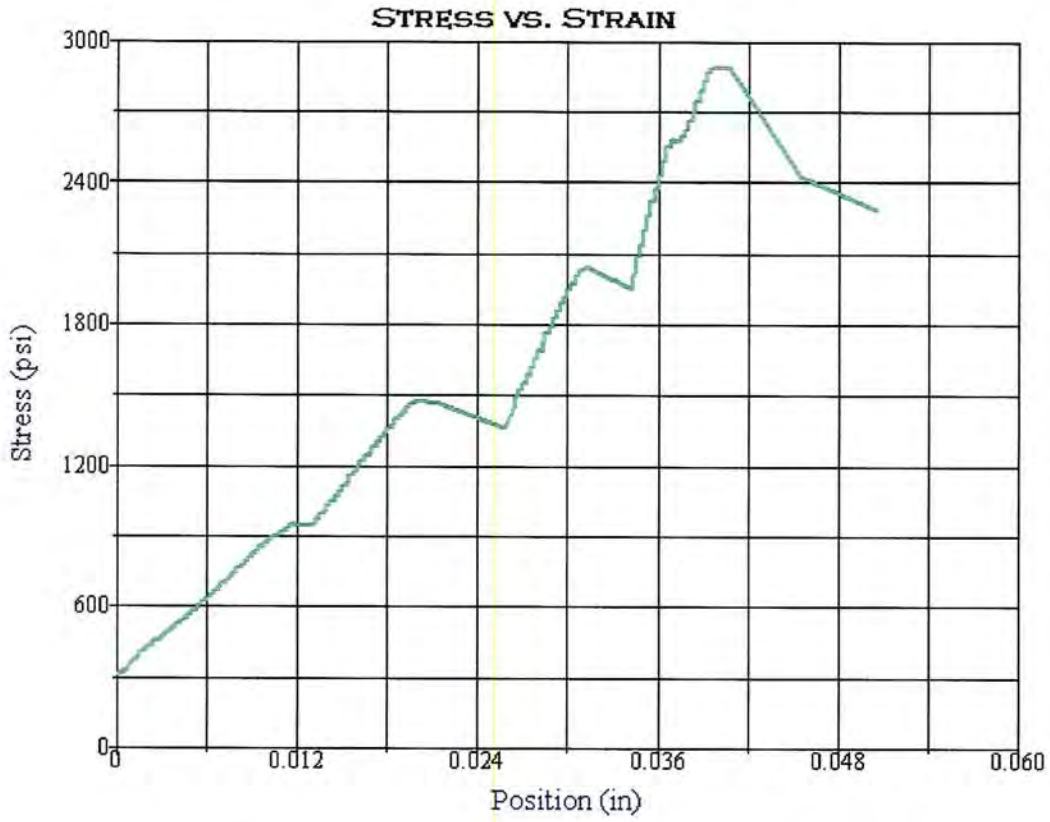
RC-10-001 82'-82.1'

RC-10-001 86.5'-86.7'

RC-10-001 95'-95.2'

CALTRANS
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design - North

EA: 02-2E3501	**POINT LOAD STRENGTH INDEX OF ROCK TEST RESULTS**
Date: September 2012	
02-TRI-299; PM 0.4/0.9; RET. WALL NO. 2 FOUNDATION REPORT	Plate No. B-1

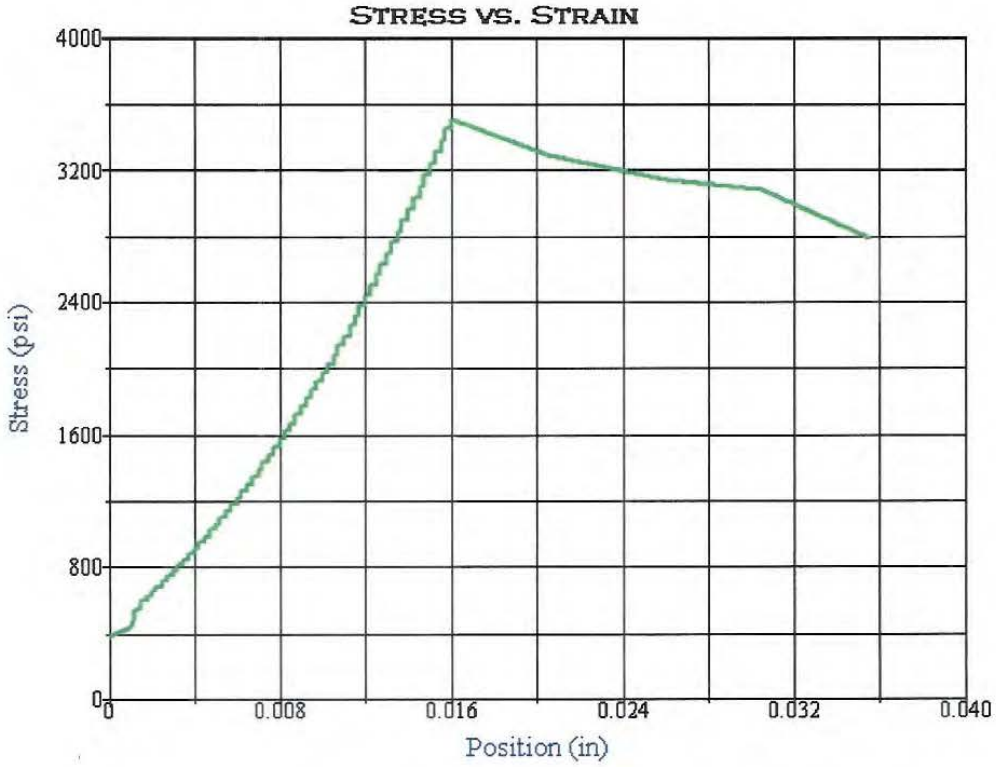


Test Summary

Counter:	862
Elapsed Time:	00:01:12
Operator:	AZM
Sample NO.:	**RC-010-001-34**
Ticket:	GL# 11-004
E.A. NUMBER:	02-2E3500
Procedure Name:	Cores test
Start Date:	1/27/2011
Start Time:	1:54:14 PM
End Date:	1/27/2011
End Time:	1:55:26 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-001

Test Results

Specimen Gage Length:	4.3000 in
Diameter:	1.8700 in
Area:	2.7465 in²
Maximum Load:	7929 lbf
Compressive Strength:	2887 psi



Test Summary

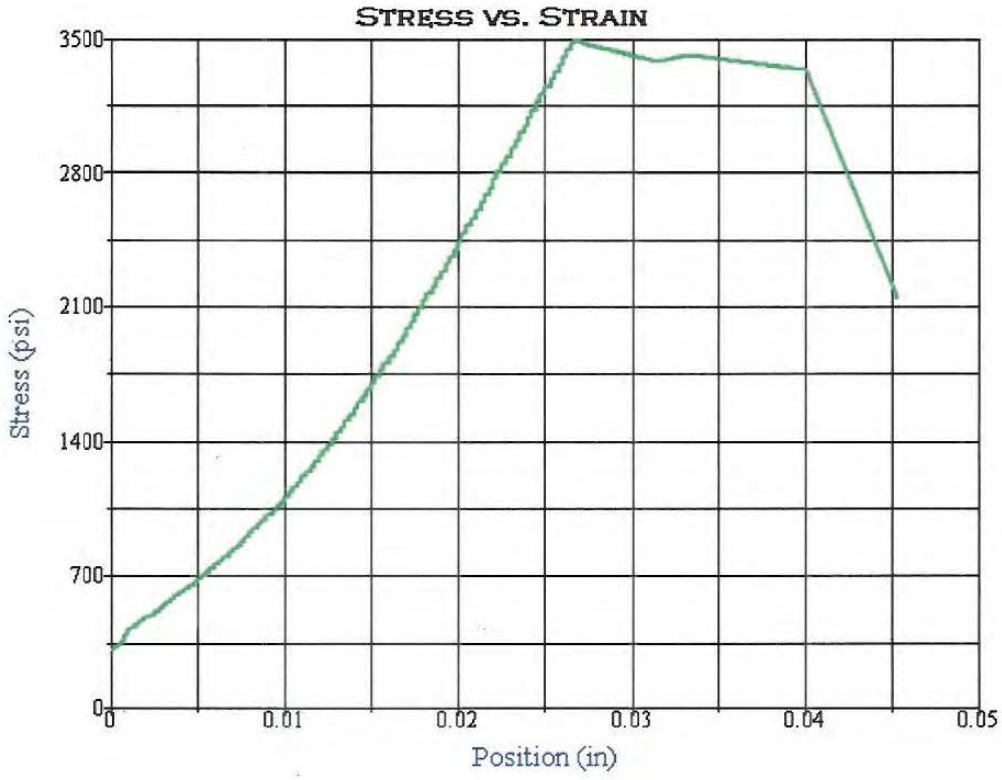
Counter:	1932
Elapsed Time:	00:01:25
Operator:	AZM
Sample:	RC12-001-R08
Resident Engineer:	
Ticket:	GL# 12-037
E.A. NUMBER:	02-2E3501
Procedure Name:	Cores test
Start Date:	5/21/2012
Start Time:	11:37:56 AM
End Date:	5/21/2012
End Time:	11:39:21 AM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q12-016

Test Results

Specimen Gage Length:	3.4600 in
Diameter:	1.8700 in
Area:	2.7465 in²
Maximum Load:	9631 lbf
Compressive Strength:	3507 psi

CALTRANS
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design - North

EA: 02-2E3501	**UNCONFINED COMPRESSION TEST RESULTS SPECIMEN RC-12-001-8**
Date: September 2012	
02-TRI-299; PM 0.4/0.9; RET. WALL NO. 2 FOUNDATION REPORT	Plate No. B-3

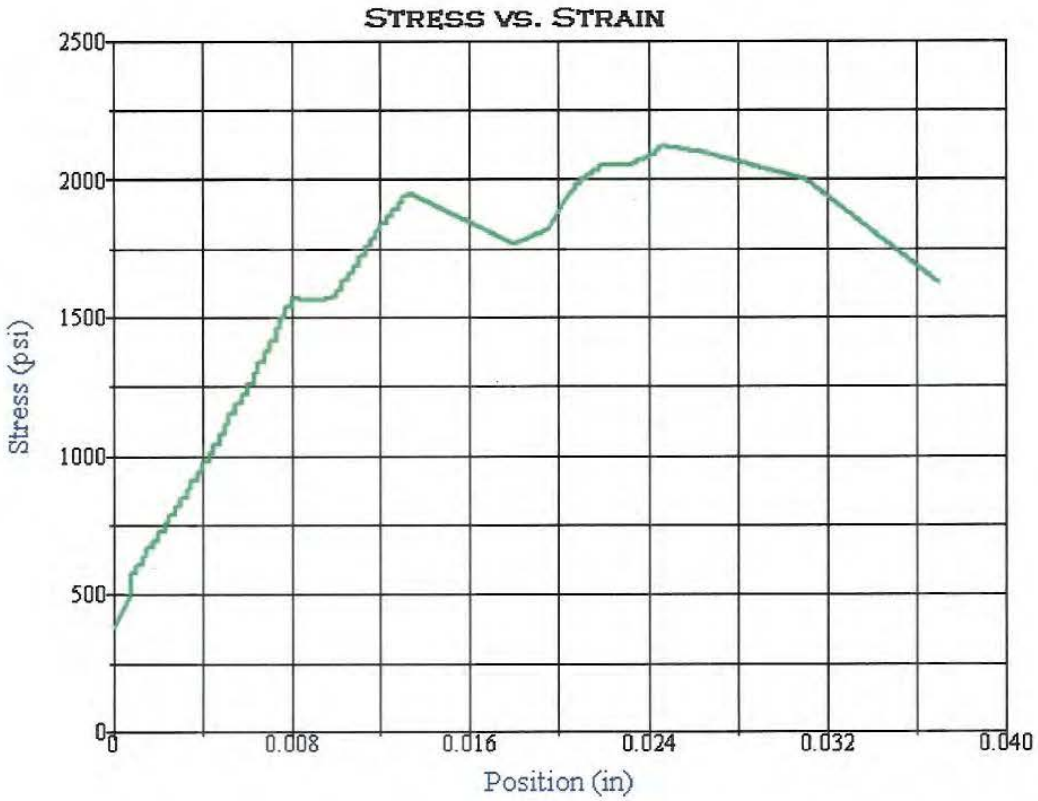


Test Summary

Counter:	1933
Elapsed Time:	00:01:30
Operator:	AZM
Sample:	RC12-001-R10
Resident Engineer:	
Ticket:	GL# 12-037
E.A. NUMBER:	02-2E3501
Procedure Name:	Cores test
Start Date:	5/21/2012
Start Time:	11:48:11 AM
End Date:	5/21/2012
End Time:	11:49:41 AM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q12-017

Test Results

Specimen Gage Length:	3.1800 in
Diameter:	1.8700 in
Area:	2.7465 in²
Maximum Load:	9594 lbf
Compressive Strength:	3493 psi



Test Summary

Counter:	1934
Elapsed Time:	00:00:45
Operator:	AZM
Sample:	RC12-001-R18
Resident Engineer:	
Ticket:	GL# 12-037
E.A.NUMBER:	02-2E3501
Procedure Name:	Cores test
Start Date:	5/21/2012
Start Time:	11:57:32 AM
End Date:	5/21/2012
End Time:	11:58:17 AM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q12-018

Test Results

Specimen Gage Length:	4.2800 in
Diameter:	1.8700 in
Area:	2.7465 in²
Maximum Load:	5829 lbf
Compressive Strength:	2122 psi

Point Load Strength Index of Rock; ASTM D 5731 - 08

Dist-EA: 02-3E3501 **Dist-Co-Rte-PM: TRI-299 PM 0.6 Structure No. 05E0010** **GL Tracking Nos.: 11-013**

Report Date: March 8, 2011

Boring I.D.	Depth (feet)		Depth (m)		Test Type	Initial Distance Between Contact Points, D (mm)	Final Distance Between Contact Points, D' (mm)	Equivalent Diameter, D_e (mm) per Section 10.1 of ASTM D 5731-08	Width, W (mm)	Length, L (mm)	Failure Load (lbs)	Uncorrected Point Load Strength Index, I_s; per EQ. #1 of ASTM D 5731-08		Size Correction Factor, F; per EQ. #4 of ASTM D 5731-08	Size Corrected Point Load Strength Index, $I_{s(50)}$; per EQ. #3 of ASTM D 5731-08		Generalized Index to Strength Conversion Factor, K, per Table 1 of ASTM D 5731-08 (approximated where appropriate)	Estimated Uniaxial Comp. Strength, s_c per EQ. #6 of ASTM D 5731-08		Remarks
	top	bottom	top	bottom								(MPa)	(PSI)		(MPa)	(PSI)		(MPa)	(PSI)	
RC-10-001	10.4	10.6	3.2	3.2	I-L	28.5	22	26.09	24	24	1,196.8	7.82	1,134.36	0.75	5.84	846	19	149	21,553	
RC-10-001	19.7	19.9	6.0	6.1	D-L	47.0	43	44.96		34	528	1.16	168.55	0.95	1.11	161	21	24	3,540	
RC-10-001	51.5	51.7	15.7	15.8	I-L	30	24	38.30	48	42	1,460.8	4.43	642.53	0.89	3.93	570	20	89	12,851	
RC-10-001	79.8	80	24.3	24.4	I-L	42.5	37	46.80	46.5	23.4	528.0	1.07	155.50	0.97	1.04	151	22	24	3,421	
RC-10-001	82	82.1	25.0	25.0	D-L	47	42	44.43		35	862	1.94	281.86	0.95	1.84	267	21	41	5,919	
RC-10-001	86.5	86.7	26.4	26.4	I-P	38.5	17	32.27	48	33	598.4	2.56	370.81	0.82	2.10	304	20	51	7,416	
RC-10-001	95	95.2	29.0	29.0	D-L	46.5	40.5	43.40		30	1,197	2.83	410.00	0.94	2.65	385	21	59	8,610	

NOTES:
Test Type Abbreviations: D - Diametral, A -Axial, B - Block, I - Irregular Lump.
Orientation of Load (if anisotropic): P - Perpendicular to plane of weakness, L - Parallel to plane of weakness

RC-10-001 10.4'-10.6'

RC-10-001 19.7'-19.9'

RC-10-001 51.5'-51.7'

RC-10-001 79.8'-80.0'

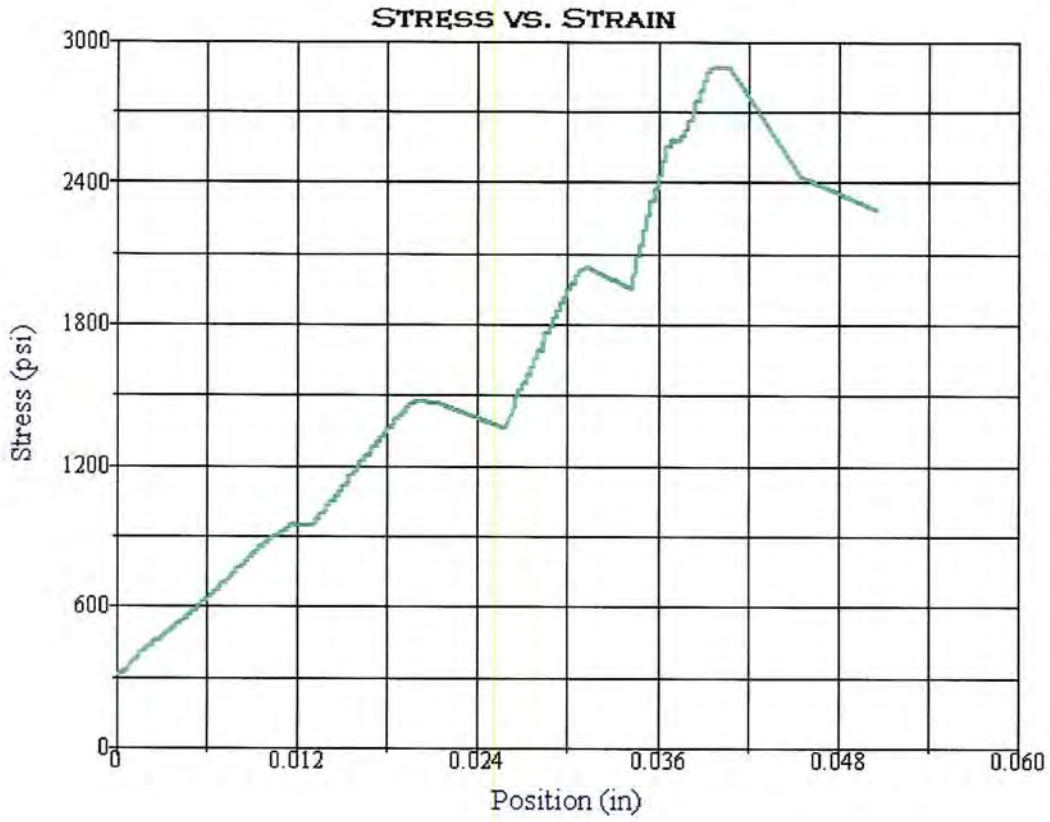
RC-10-001 82'-82.1'

RC-10-001 86.5'-86.7'

RC-10-001 95'-95.2'

CALTRANS
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design - North

EA: 02-2E3501	**POINT LOAD STRENGTH INDEX OF ROCK TEST RESULTS**
Date: September 2012	
02-TRI-299; PM 0.4/0.9; RET. WALL NO. 2 FOUNDATION REPORT	Plate No. B-1

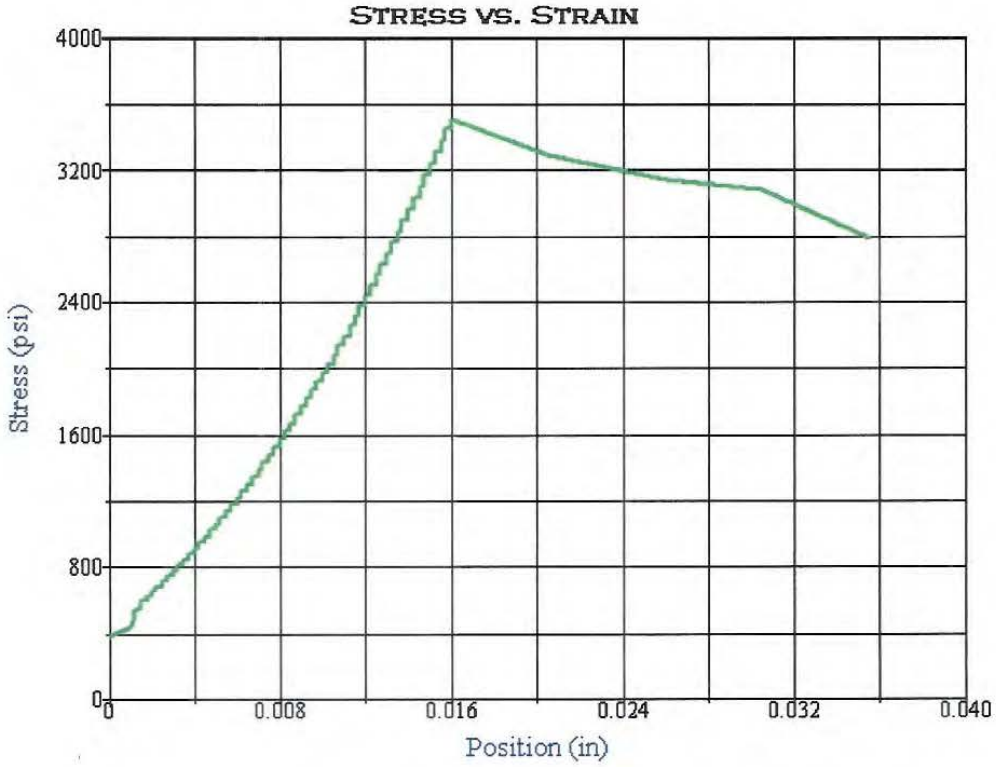


Test Summary

Counter:	862
Elapsed Time:	00:01:12
Operator:	AZM
Sample NO.:	**RC-010-001-34**
Ticket:	GL# 11-004
E.A. NUMBER:	02-2E3500
Procedure Name:	Cores test
Start Date:	1/27/2011
Start Time:	1:54:14 PM
End Date:	1/27/2011
End Time:	1:55:26 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-001

Test Results

Specimen Gage Length:	4.3000 in
Diameter:	1.8700 in
Area:	2.7465 in²
Maximum Load:	7929 lbf
Compressive Strength:	2887 psi



Test Summary

Counter:	1932
Elapsed Time:	00:01:25
Operator:	AZM
Sample:	RC12-001-R08
Resident Engineer:	
Ticket:	GL# 12-037
E.A. NUMBER:	02-2E3501
Procedure Name:	Cores test
Start Date:	5/21/2012
Start Time:	11:37:56 AM
End Date:	5/21/2012
End Time:	11:39:21 AM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q12-016

Test Results

Specimen Gage Length:	3.4600 in
Diameter:	1.8700 in
Area:	2.7465 in²
Maximum Load:	9631 lbf
Compressive Strength:	3507 psi

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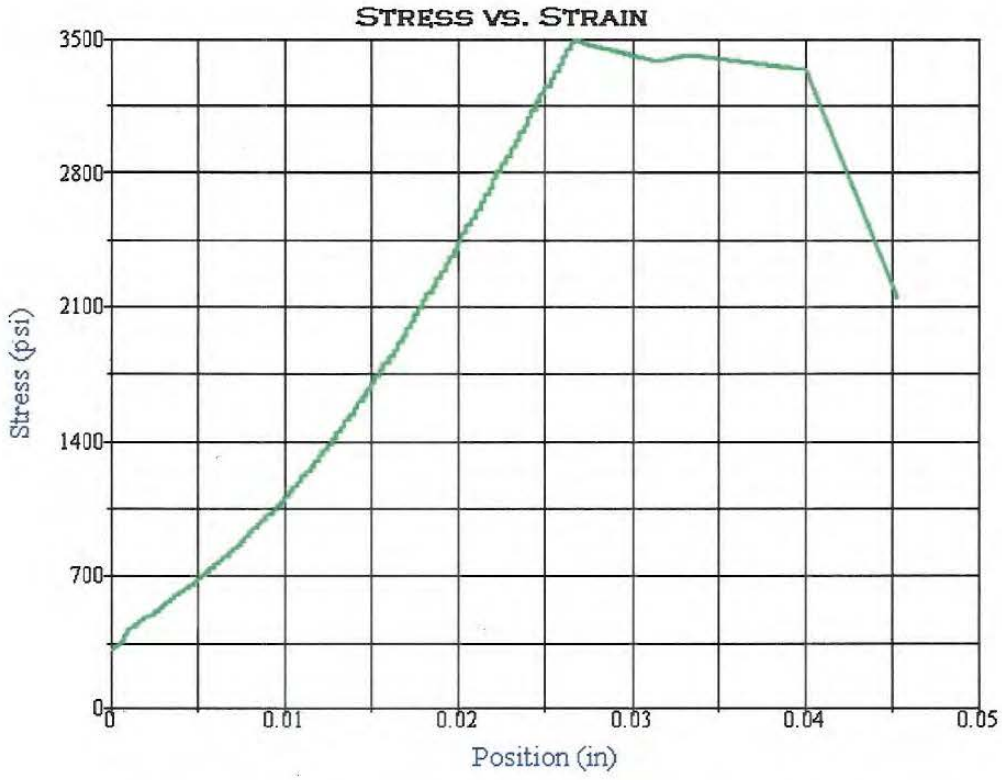
Geotechnical Services
Office of Geotechnical Design - North

EA: 02-2E3501	**UNCONFINED COMPRESSION TEST RESULTS SPECIMEN RC-12-001-8**
Date: September 2012	
02-TRI-299; PM 0.4/0.9; RET. WALL NO. 2 FOUNDATION REPORT	Plate No. B-3

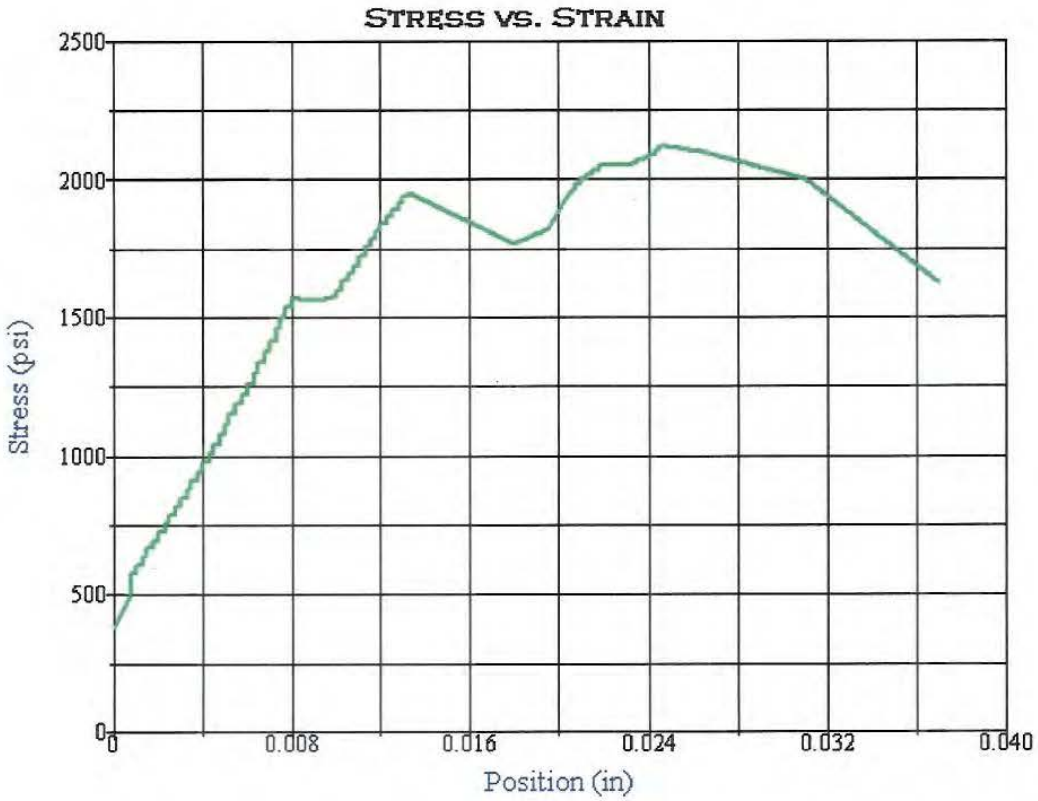


Test Summary

Counter:	1933
Elapsed Time:	00:01:30
Operator:	AZM
Sample:	RC12-001-R10
Resident Engineer:	
Ticket:	GL# 12-037
E.A. NUMBER:	02-2E3501
Procedure Name:	Cores test
Start Date:	5/21/2012
Start Time:	11:48:11 AM
End Date:	5/21/2012
End Time:	11:49:41 AM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q12-017

Test Results

Specimen Gage Length:	3.1800 in
Diameter:	1.8700 in
Area:	2.7465 in²
Maximum Load:	9594 lbf
Compressive Strength:	3493 psi



Test Summary

Counter:	1934
Elapsed Time:	00:00:45
Operator:	AZM
Sample:	RC12-001-R18
Resident Engineer:	
Ticket:	GL# 12-037
E.A.NUMBER:	02-2E3501
Procedure Name:	Cores test
Start Date:	5/21/2012
Start Time:	11:57:32 AM
End Date:	5/21/2012
End Time:	11:58:17 AM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q12-018

Test Results

Specimen Gage Length:	4.2800 in
Diameter:	1.8700 in
Area:	2.7465 in²
Maximum Load:	5829 lbf
Compressive Strength:	2122 psi

APPENDIX C

Seismic Refraction Surveys

To: **Douglas Brittan**
Senior M&R Engineer
Geotechnical Design North
Division of Engineering Services

Date: January 10, 2011

File: 02-TRI_299_0.5_0.8
Project: 02-0000-0211

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
GEOTECHNICAL SERVICES-MS#5

Attention.Luis Paredes Mejia

Subject: Route 299 Whole Enchilada Roadway Improvements@TRI_299_0.5_0.8

Introduction

This memo documents the results of a refraction seismic survey to assist in the design of roadway improvements for Highway 299 between PM 05 to 08. The seismic refraction survey was employed determine the engineering characteristics of the material comprising the existing embankments above and below the existing roadway surface. This safety project involves curve corrections that require retaining walls. Three refraction profiles were employed. Figure 1 shows the locations of the seismic lines.

Results and Discussion

The results of our findings are summarized in Table 1.

Seismic lines were positioned to image existing cuts that will require additional cutting and retainment. Figure 2 is a model of Seismic Line 1. The line traversed hummocky topography interpreted as a landslide. The model indicates about 5.0 feet of rocky soil and organic humus lying over about 14.0 to 20.0 feet of unconsolidated landslide debris with a seismic velocity of about 2600 feet/sec.. The deepest refractor imaged is also quite slow (4000 ft. /sec.). This material is likely unconsolidated, unsaturated, and intensely fractured. This material is unlikely to support steep cuts and engineered retainment should be anticipated.

Seismic Line 2 was so short in length it inhibited imaging deep enough to be of much value except to verify that the slope is mainly sidecast fill and debris from above. The seismic line was short because of the proximity to the river from the roads' edge. The resulting model (figure3) identifies a shallow layer with a seismic velocity of 3000 ft/sec assumed to be the unsaturated zone above the saturated, fractured rock imaged in Line 3. Due to limited site conditions we had to use a 1.0 meter (3.28 feet) geophone spacing and the geophone spacing is a function of image

depth, therefore the model only imaged about 20% of the geophone spread of 95.0 feet or 19 feet. We cannot conclude the rock with a seismic velocity of 6200 ft./sec. exists under where seismic line 2 was located.

Seismic Line 3 imaged a refractor about 20.0 to 22.0 feet below the surface with velocity of 6200 ft./sec. The Log of Test Boring (LOTB) for Boring R-010-002 indicates hard drilling beginning about 18.0 feet below the surface.. We feel the identified refractor at 20.0 to 22.0 feet represents saturated conditions. LOTB describes decomposed greywacke and thinly laminated soft phyllite. The presence of water increases slow rock to at least 5000 ft./sec. Above the V3 refractor is unconsolidated, unsaturated landslide debris, fill, gravel, and sidecast material.

TABLE 1

Line	Layer	Average Thickness (ft.)	Average Velocity (ft/s)	Line Length(ft)	Inferred Material	Rippability
1	1	5.0	1200	144	Colluvium	ER
1	2	14.0	2200		landslide	ER
1	3	N/A	4000		thinly bedded phyllite	MD
2	1	4.0	1300	83	Sidecast	ER
2	2	10-12	3032		unconsolidated, unsaturated	ER
3	1	7.0	1200	216	Colluvium	ER
3	2	16.0	2500		unconsolidated, unsaturated	ER
3	3	N/A	6200		Saturated meta-graywacke	DR

[1] ER = Easily Ripped, MD = Moderately Difficult, DR = Difficult Ripping, NR = Not Rippable,

Ripping ability is based on unpublished Caltrans data for a Caterpillar D9G series bulldozer with a single-tooth ripper. These values are as follows:

Velocity (ft/s)	**Rippability**
<3440	Easily Ripped
3440-4920	Moderately Difficult
4920-6560	Difficult Ripping
>6560	Not Rippable

Different excavation equipment may experience different results. Penetrating efficacy of the ripping tooth is often more important in predicting ripping success than seismic velocity alone. Undetected blocks or lenses of high-velocity material may also be present within rippable zones, requiring blasting or other means of mechanical breakage for excavation.

Data Acquisition and Processing

Seismic refraction data were recorded using an EG&G Smartseis 24-channel seismograph with 14 MHz geophones. The profiles varied in length. The energy source employed was a hammer and striker plate or a downhole seismic source using 8-gauge, 500-grain black powder cartridges. Refraction data from each shot were stored in the seismograph's memory. Both profile geometry and refraction data were backed-up to paper and floppy disk upon completion of the survey.

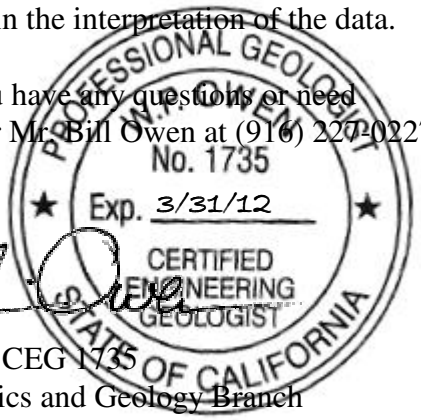
Profiles in this report are presented in terms of velocity units. A velocity unit is a three-dimensional unit, which due to its elastic properties and density, propagates seismic waves at a characteristic velocity or within a characteristic velocity range. Velocities denoted in this report and in the seismic refraction sections are expressed in feet per second. At least one velocity is present within a geological rock unit. In addition, each zone of weathering, or fracturing within that geological unit can constitute its own velocity unit. Conversely, when two rock units such as water saturated gravel and moderately weathered rock propagate seismic waves at the same velocity and are adjacent to each other, both units would be part of the same velocity unit. Lastly, discontinuous velocities might result from variation in the degree of alteration in the form of physical and chemical weathering and should be considered in the interpretation of the data.

Thank you for the opportunity to work on this project. If you have any questions or need additional assistance, please contact me at (916) 227-1307 or Mr. Bill Owen at (916) 227-0227.

Report by:

Dennison Leeds
Engineering Geologist
Geophysics and Geology Branch

Reviewed By:



William Owen, CEG 1735
Chief, Geophysics and Geology Branch

Project File.

DL/WO

02_TRI_299_0.5_0.8_2011_SEI.doc

Figure 1. Locations of the seismic lines with respect to project stationing

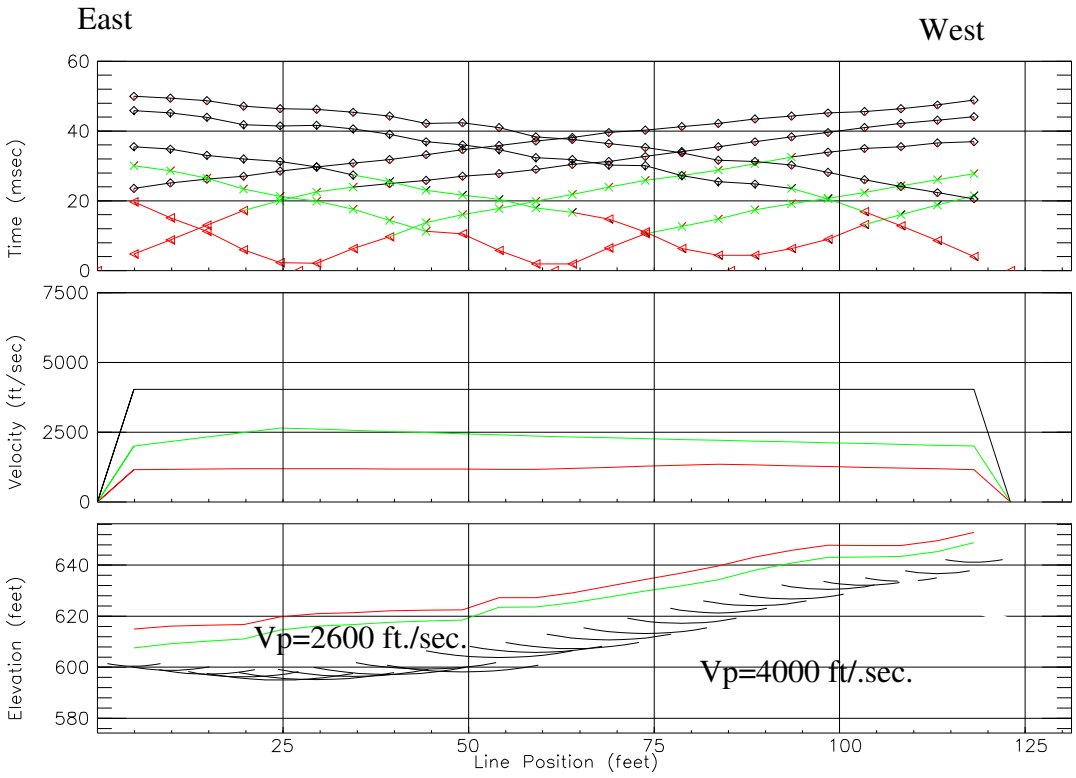


Figure 2. Travel-time curve, velocity model and depth section for Seismic Line 1. The orientation of this line is roughly parallel to the trend of horizontal boring R-010-002 at station 116+55. The roadway elevation for this boring is 586.0ft. The seismic line began above the existing embankment to allow for off-set shots. Station 0.00 feet on this profile is approximately 35.0 feet west of edge of pavement at station 116+55. The seismic line crossed the trend of boring R-010-002 @42.65 ft along the seismic line. Refractor velocity is 4000 ft/sec. Field logs describe thinly-stratified, weathered, soft phyllite at this location.

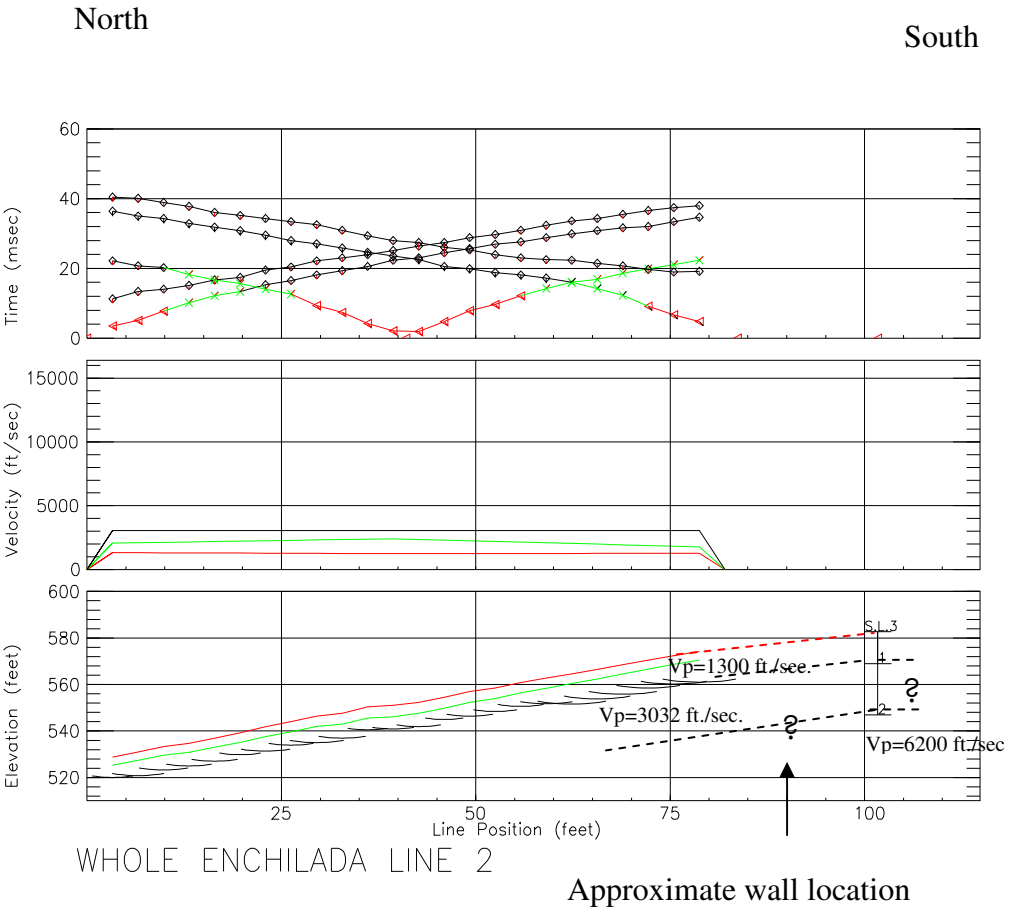


Figure 3. Travel-time curve, velocity model and depth section for Seismic Line 2. This profile trends down-dip from the edge of roadway at station 112+48 towards the river. This model indicates a two layer case. The lowermost layer has a seismic velocity of 3032ft./sec..and may be a transition from unsaturated to saturated conditions. This figure is an interpretation based on data from seismic lines 2 and 3. The proposed wall location is somewhere between the intersection seismic line 3 and seismic line 2. Seismic line 3 imaged rock with a seismic velocity of 6200 ft./sec. but seismic line 2 did not image the faster refractor. That does not mean the rock with a seismic velocity of 6200 ft./sec. is not present below seismic line 2, but the geophone spacing may have been too close to detect it.

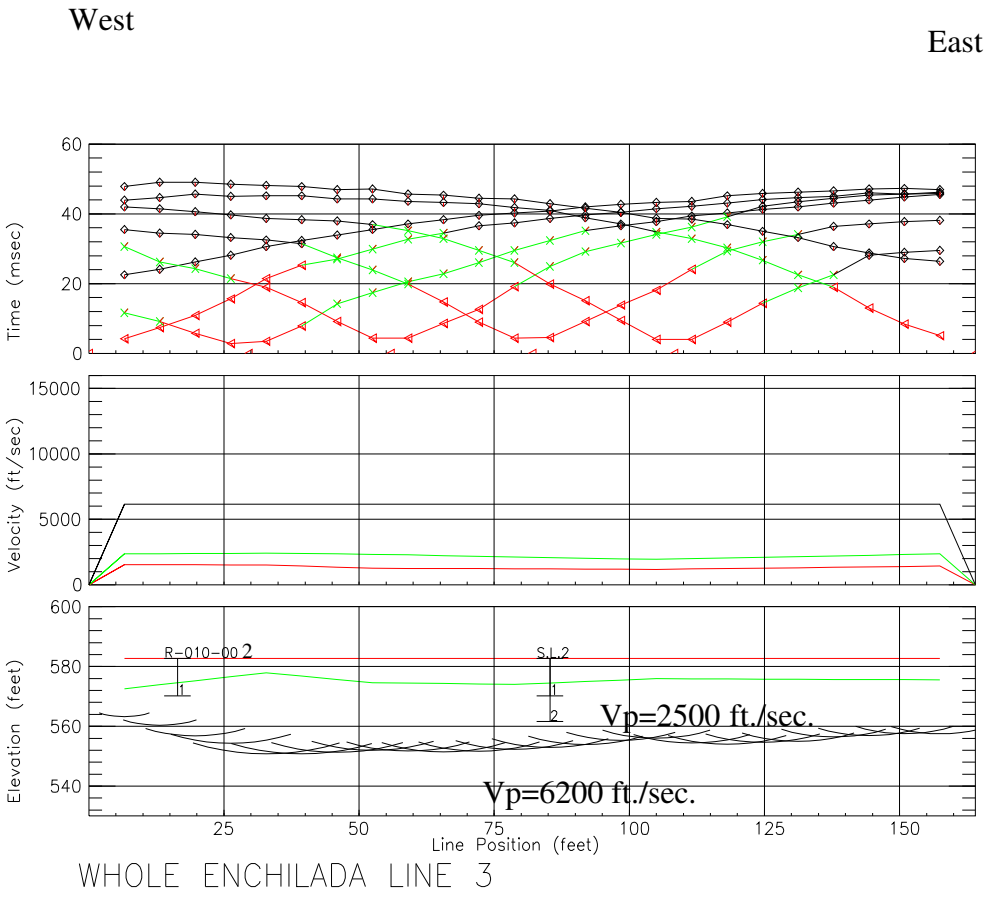


Figure 4. Travel-time curve, velocity model and depth section for seismic line 3. The seismic velocity of 6200 ft./sec. implies intensely fractured, completely weathered rock. Saturated conditions are likely. LOTB for boring R-010-002 describes thickly stratified, hard meta-graywacke at 12.5 feet below the surface. The identified V3 refractor is deeper than the LOTB indicates for boring R-010-002. It most likely represents saturated conditions.

State of California
DEPARTMENT OF TRANSPORTATION

Business, Transportation and Housing Agency

M e m o r a n d u m

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To: **Douglas Brittan**
Senior M&R Engineer
Geotechnical Design North
Division of Engineering Services

Date: March 24, 2012

File: 02-TRI_299_0.5_0.8
Project: 02-0000-0211

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
GEOTECHNICAL SERVICES-MS#5

Attention.Luis Paredes Mejia

Subject: Route 299 Whole Enchilada Roadway Improvements@TRI_299_0.5_0.8

Introduction

This memo documents the results of a refraction seismic survey to assist in the design of roadway improvements for Highway 299 between PM 0.5 to 0.8. The seismic refraction survey was employed determine the engineering characteristics of the material comprising the existing embankments above the roadway. This safety project involves curve corrections that require retaining walls and grading. Four refraction profiles were employed in this second phase of the investigation. Figure 1 shows the locations of the 4 seismic lines surveyed during the investigation on March 5-9, 2012.

Results and Discussion

The results of our findings are summarized in Table 1.

Seismic lines were positioned to image existing cuts as requested by the project geologist. Line WE1 is a steep seismic line that begins perpendicular to station 114+80. The line traversed a rocky outcrop comprised of soil, talus, and blocky phyllite (see plate 1). The model indicates soil and talus (V1 and V2) up to 20 feet thick over rock (measured perpendicular to the ground slope. V3 is phyllite with a seismic velocity of 7545 ft./s.

Seismic Line WE2 is another steep seismic line beginning perpendicular to station 113+50. This line traversed rock, soil and colluvium similar to seismic line 1. Plate 2 shows the profile for this seismic line. The model indicates colluvium, (V1 and V2) up to 30 feet thick over rock (as measured perpendicular to the ground slope. V3 is phyllite with a measured velocity of 7125 ft./s.

Seismic Line WE3was located at station 109+50 and was also fairly steep. This line terminated at the toe of a scarp at the top of the ridge. It traversed a slope comprised of talus and some developed soil horizons. This seismic line was only 118 feet long due to limited space. Plate 3 shows the profile. The model indicates soil and colluvium, (V1) 9 to 12 feet thick lying over a second colluvium layer (V2) of unknown thickness. Site conditions limited profile geometry at this location and the seismic line was too short to image V3. Thus, thickness of V2 cannot be determined in this profile. Although this seismic line failed to image V3, bedrock was observed in outcrop just above existing road grade (592 ft).

Seismic Line WE4 was located above the road and positioned on contour to cross WE 3. It traversed hummocky terrain and part of the scarp mentioned above. This seismic line was 246 feet long. Plate 4 shows the profile. It begins about 60 feet right of station 108+50 and ends about 70 feet right of station110+10. The model indicates colluvium (V1 and V2) up to 62 feet thick. The bedrock refractor (V3) is well defined in this profile. Its measured seismic velocity is about 12000 ft/s. The profile indicates the bedrock elevation is between about 599 and 612 feet.

TABLE 1

Line	Layer	Average Thickness (ft.)	Velocity Range (ft/s)	Line Length(ft)	Inferred Material	Rippability
1	1	.5-10	1148-1968	157	Colluvium	ER
1	2	50	2956-4500	157	Landslide Debris	MD
1	3	N/A	7545	157	Phyllite	NR
2	1	.5-5	1148-1968	157	Colluvium	ER
2	2	35	2956-4500	157	Landslide Debris	MD
2	3	N/A	7125	157	Phyllite	NR
3	1	10-12	1148-1968	119	Colluvium	ER
3	2	N/A	2956-4500	119	Landslide Debris	MD
4	1	12	1148-1968	240	Colluvium	ER
4	2	55	2956-4500	240	Landslide Debris	MD
4	3	N/A	12138	240	Unknown	NR

[1] ER = Easily Ripped, MD = Moderately Difficult, DR = Difficult Ripping, NR = Not Rippable,

Ripping ability is based on unpublished Caltrans data for a Caterpillar D9G series bulldozer with a single-tooth ripper. These values are as follows:

Velocity (ft/s)	**Rippability**
<3440	Easily Ripped
3440-4920	Moderately Difficult
4920-6560	Difficult Ripping
>6560	Not Rippable

Different excavation equipment may experience different results. Penetrating efficacy of the ripping tooth is often more important in predicting ripping success than seismic velocity alone.

Undetected blocks or lenses of high-velocity material may also be present within rippable zones, requiring blasting or other means of mechanical breakage for excavation.

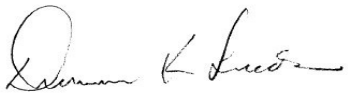
Data Acquisition and Processing

Seismic refraction data were recorded using an EG&G Smartseis 24-channel seismograph with 14 MHz geophones. The profiles varied in length. The energy source employed was a hammer and striker plate or a downhole seismic source using 8-gauge, 500-grain black powder cartridges. Refraction data from each shot were stored in the seismograph's memory. Both profile geometry and refraction data were backed-up to paper and floppy disk upon completion of the survey.

Profiles in this report are presented in terms of velocity units. A velocity unit is a three-dimensional unit, which due to its elastic properties and density, propagates seismic waves at a characteristic velocity or within a characteristic velocity range. Velocities denoted in this report and in the seismic refraction sections are expressed in feet per second. At least one velocity is present within a geological rock unit. In addition, each zone of weathering, or fracturing within that geological unit can constitute its own velocity unit. Conversely, when two rock units such as water saturated gravel and moderately weathered rock propagate seismic waves at the same velocity and are adjacent to each other, both units would be part of the same velocity unit. Lastly, discontinuous velocities might result from variation in the degree of alteration in the form of physical and chemical weathering and should be considered in the interpretation of the data.

Thank you for the opportunity to work on this project. If you have any questions or need additional assistance, please contact me at (916) 227-1307 or Mr. Bill Owen at (916) 227-0227.

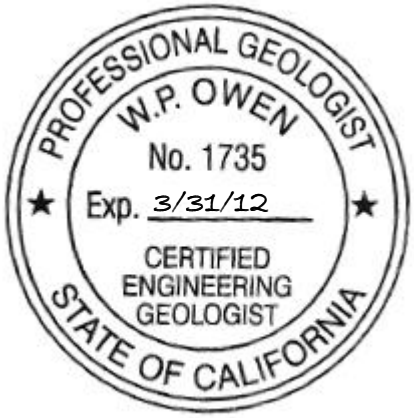
Report by:



Dennison Leeds
Engineering Geologist
Geophysics and Geology Branch

Reviewed By:

William Owen, CEG 1735
Chief, Geophysics and Geology Branch



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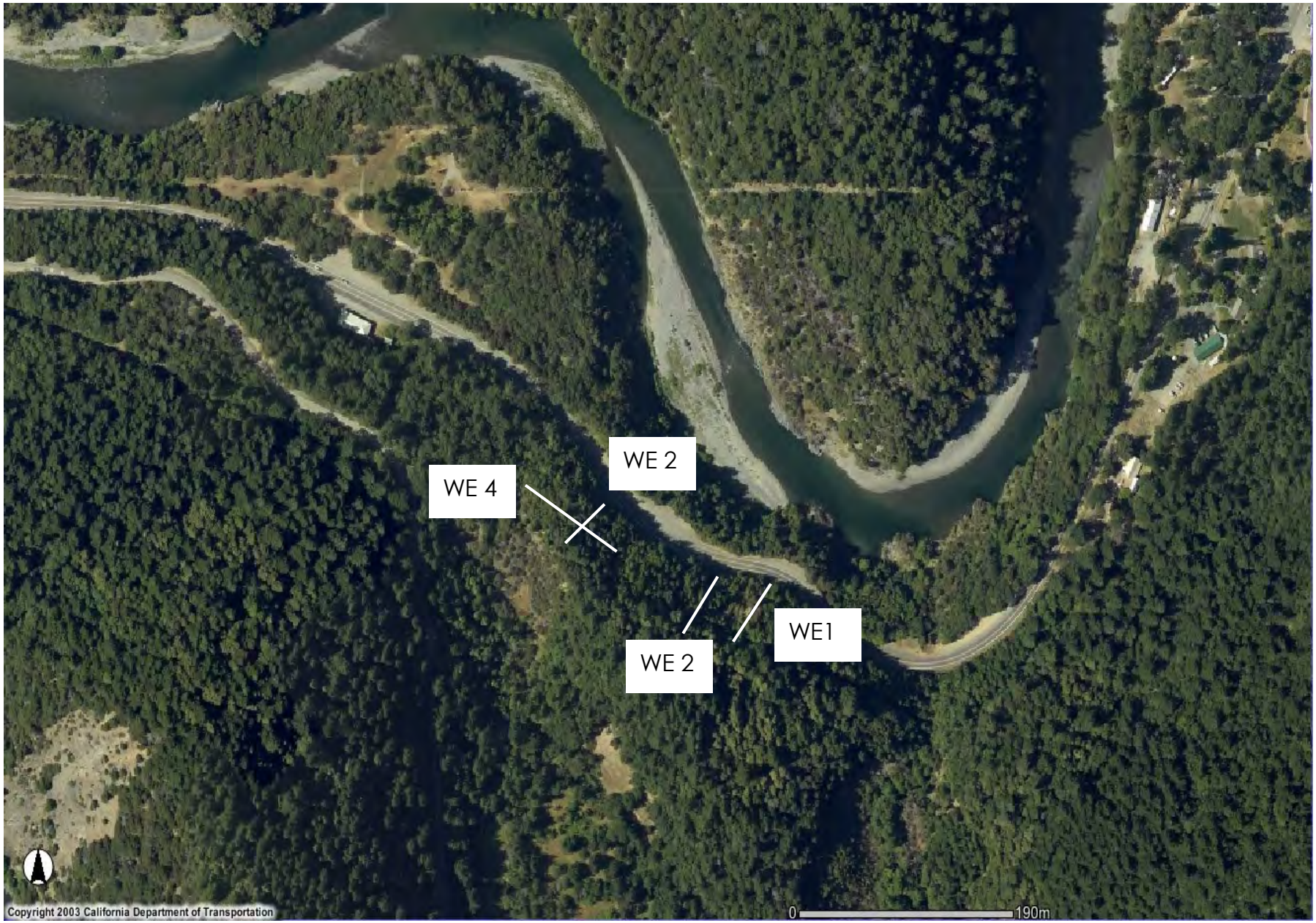
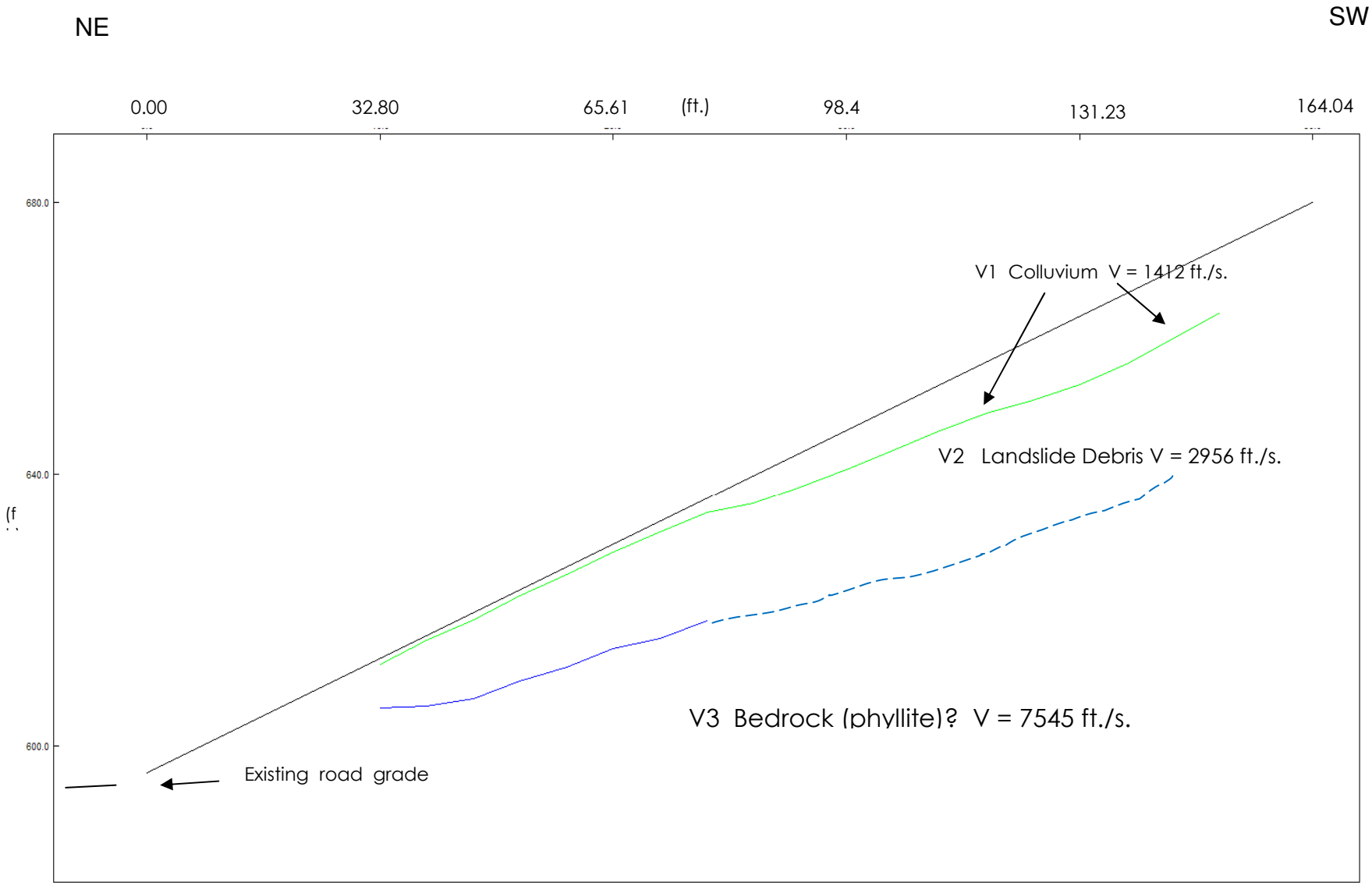
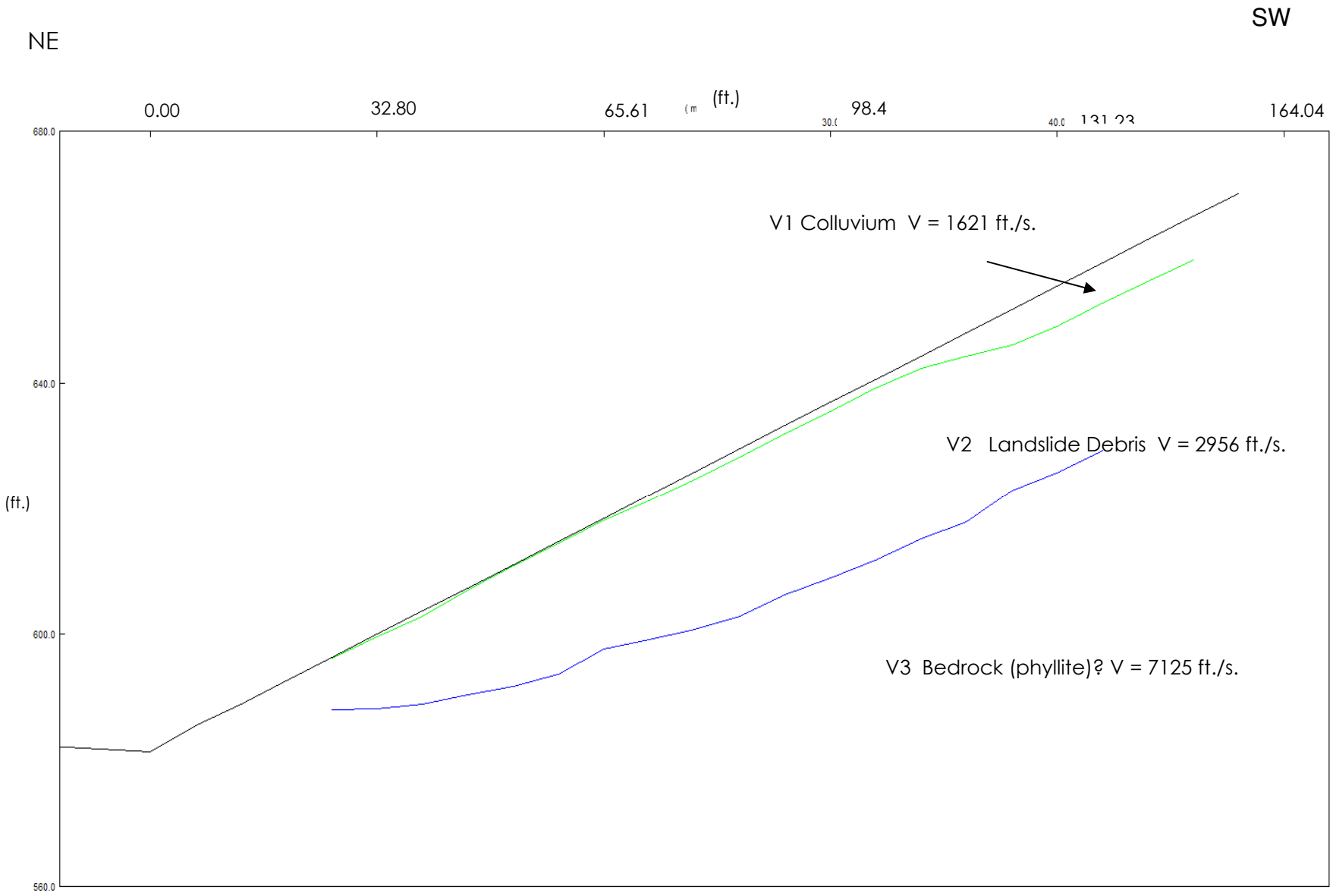


Caltrans	Division of Engineering Services Geotechnical Services Office of Geotechnical Design - North	EA 02-3E3501	Location Map	Plate No. 1
		ID 02-0000-0211	02-TRI-299 PM 0.67	



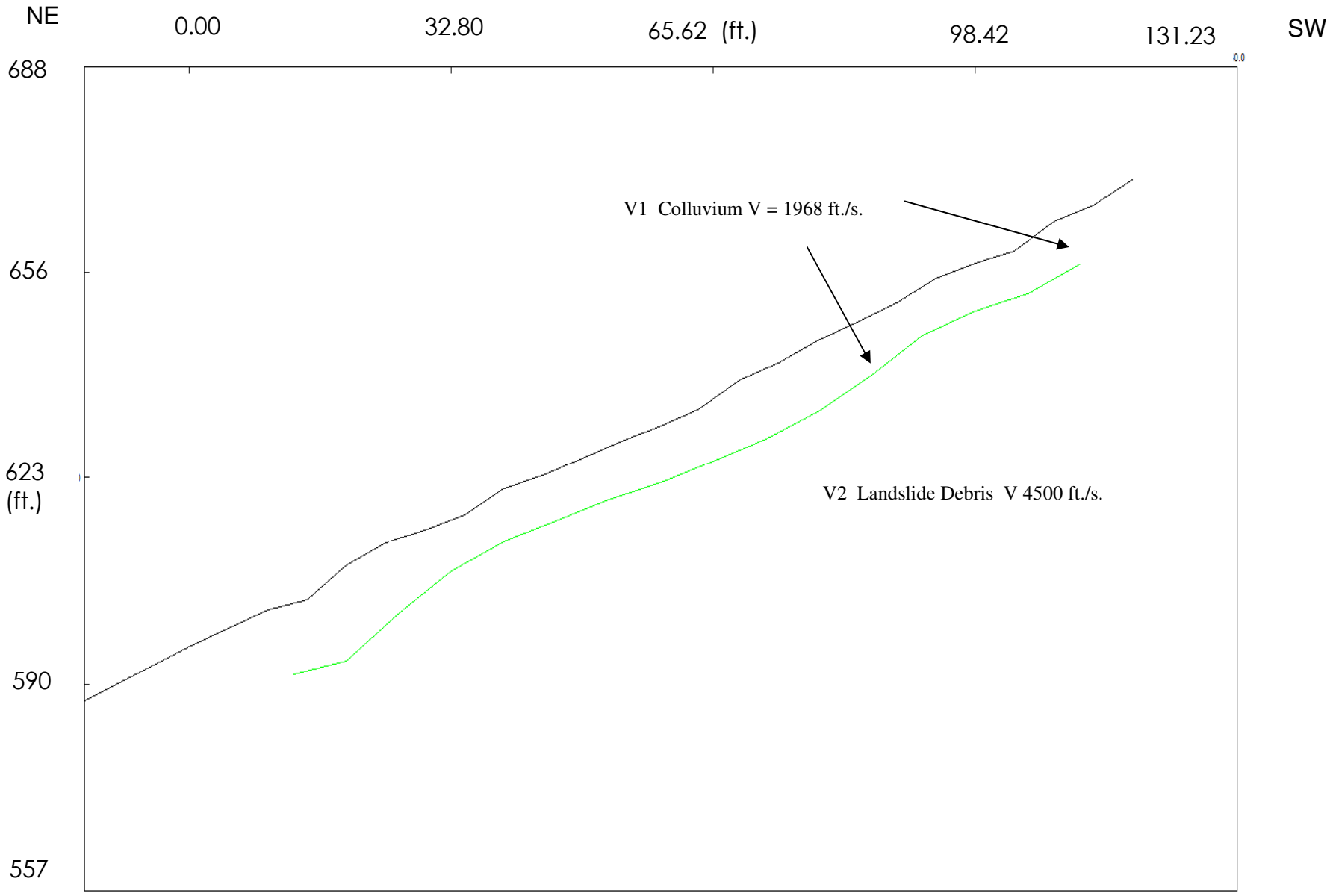
Note: Profile for Seismic Line 1 (WE1) located at station 114+80. Ground surface has been extrapolated between known elevations. Profile shows assumed ground surface (black line), and each imaged refractor (V). V1 is Colluvium (soil and talus) with a seismic velocity of 1412 ft/s. V1 is up to 10 feet thick. V2 is Landslide Debris with a seismic velocity of 2956 ft/s. V2 may be as thick as 20 feet measured parallel to ground surface. V3 is phyllite with a seismic velocity of 7545 ft/s. Dashed blue line represents the extrapolation of the top of the bedrock profile. Existing road grade at this station is 582.97 feet.

Caltrans	**Division of Engineering Services** **Geotechnical Services** **Office of Geotechnical Design - North**	**EA 02-3E3501**	**Seismic Line WE1 Profile**	**Plate No. 2**
		ID 02-0000-	**02-TRI-299 PM 0.67**	



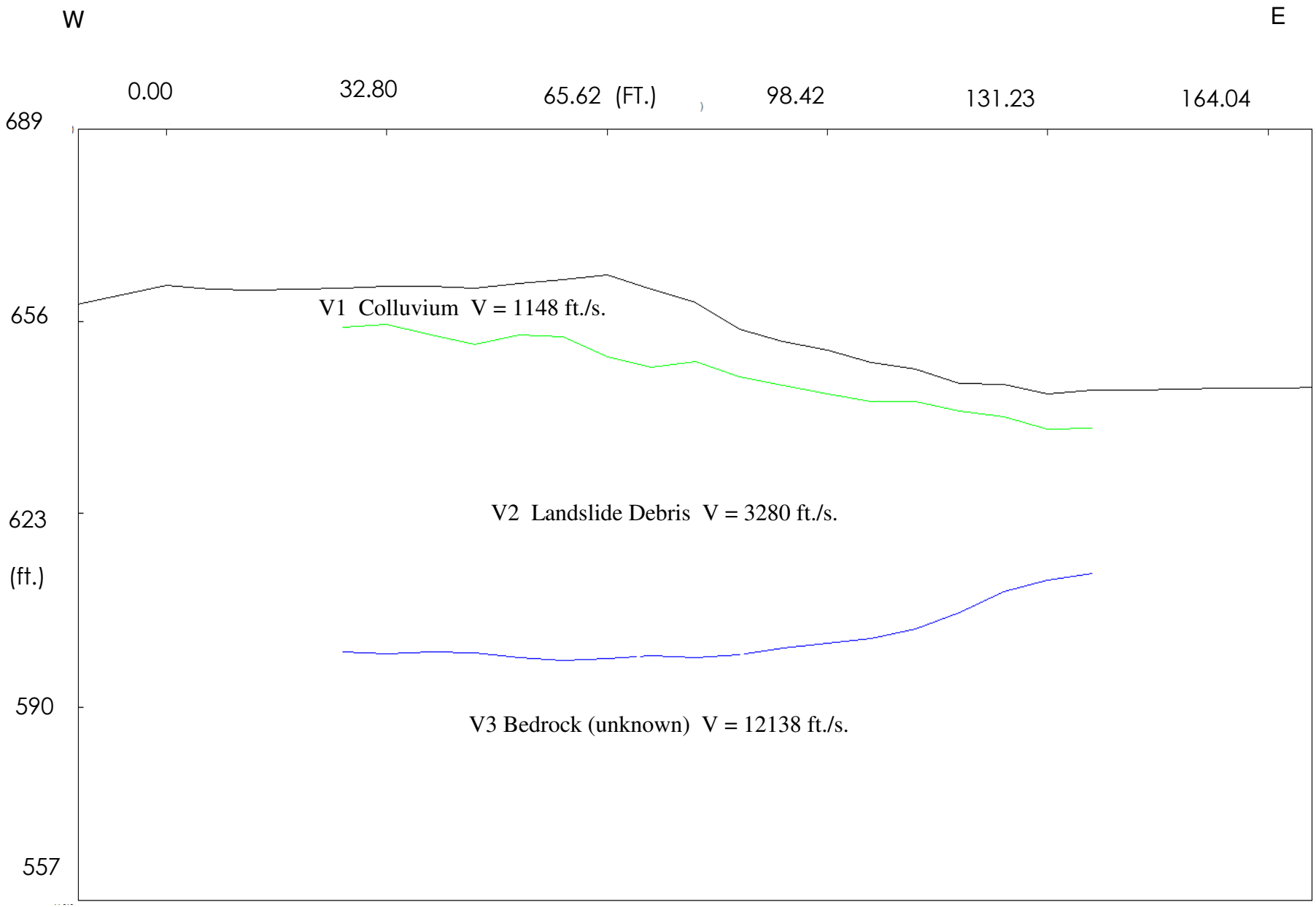
Note: Profile for Seismic Line 2 (WE2) located at station 113+50. Ground surface has been extrapolated between known elevations. Profile shows the assumed ground surface (black line), and each imaged refractor (V). V1 is Colluvium (soil and talus) with a seismic velocity of 1621.6 ft/s. V2 is Landslide Debris with a seismic velocity of 3997.3 ft./s. V2 may be as thick as 30 feet measured parallel to ground surface. V3 is Phyllite with a measured seismic velocity of 7125 ft./s.

Caltrans	**Division of Engineering Services** **Geotechnical Services** **Office of Geotechnical Design - North**	**EA 02-3E3501** **ID 02-0000-0211**	**Seismic Line WE2 Profile** **02-TRI-299 PM 0.67**	**Plate No. 3**



Note: Depth Section and Velocity Graph for Seismic Line 3. Seismic line 3 was 119 feet long. It began at station 109+50. This profile shows the ground surface, and each imaged refractor (V). V1 refractor is about 14 feet thick. It is soil and talus labeled colluvium.V1 measured seismic velocity is 1968 ft./s. Below the colluvium is layer V2, interpreted as moist landslide debris. This profile did not image bedrock so the thickness of the landslide debris would be unknown. However Seismic Line 4 which crossed Seismic Line 3 did image the bedrock refractor (see plate 5). Existing road grade at this station is 592.0 feet. Bedrock is visible in the road cut at this location.

Caltrans	**Division of Engineering Services** **Geotechnical Services** **Office of Geotechnical Design - North**	**EA 02-3E3501** **ID 02-0000-0211**	**Seismic Line WE3 Profile** **02-TRI-299 PM 0.67**	**Plate No. 4**

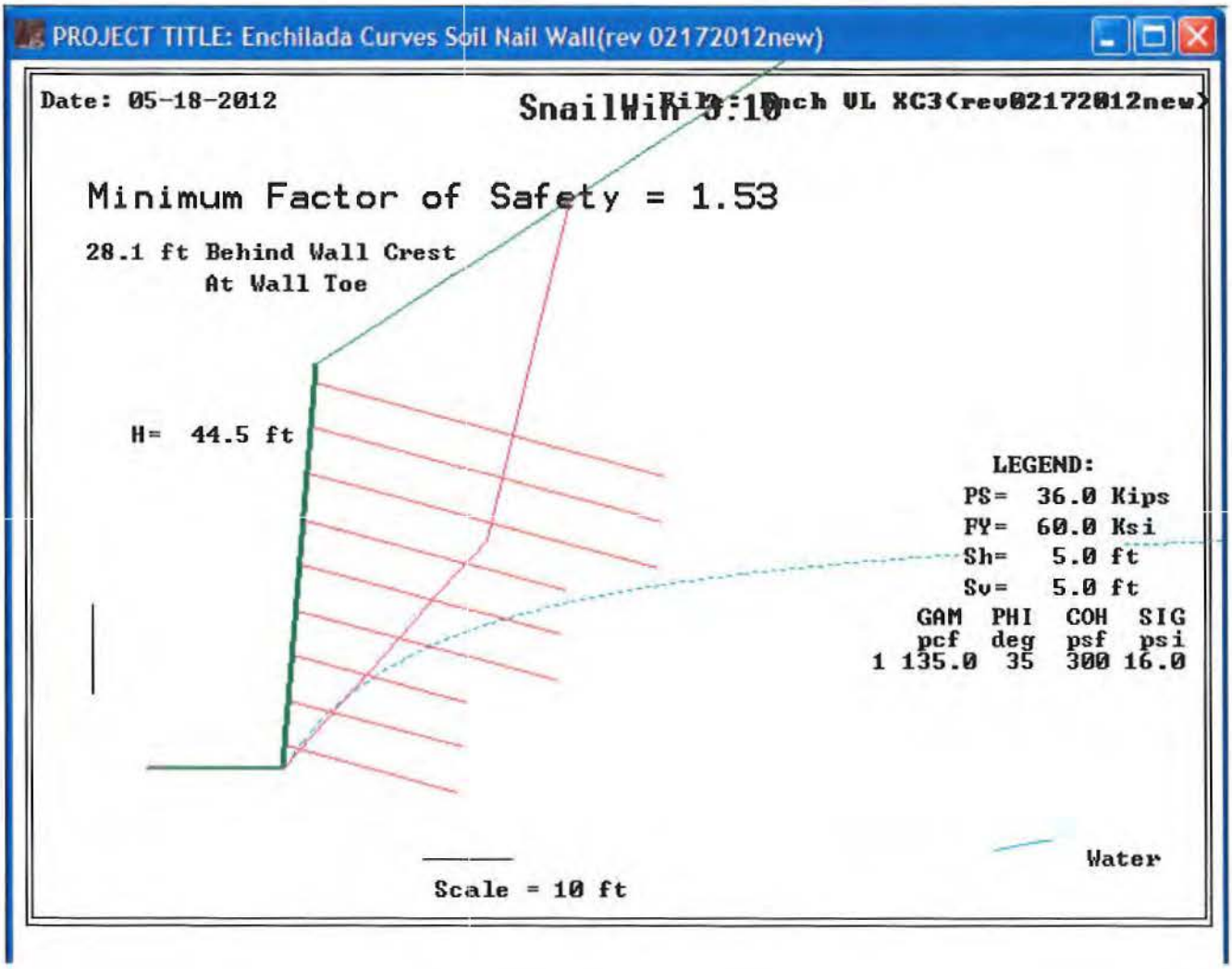


Note: Depth Section for Seismic Line WE4. Profile shows ground surface and each imaged refractor (V). V1 is Colluvium (soil and talus) about 12.30 feet with a seismic velocity of 1148 ft/s. V2 is landslide debris up to 55.77 feet thick. The bedrock refractor,V3 is at elevation 598.74 feet with a seismic velocity of 12138 ft/s. Road grade elevation at ground station 125 feet is 591.73 feet. The bedrock refractor appears to shallow to the east.

Caltrans Division of Engineering Services Geotechnical Services Office of Geotechnical Design - North	EA 02-3E3501 ID 02-0000-0211	**Seismic Line WE4 Profile** 02-TRI-299 PM 0.67	Plate No. 5

APPENDIX D

SNAILZ Cross Sections and Reports


PROJECT TITLE: Enchilada Curves Soil Nail Wall(rev 02172012new)
Date: 05-18-2012
SnailWin 3.10
Minimum Factor of Safety = 1.53
28.1 ft Behind Wall Crest
At Wall Toe
H= 44.5 ft
LEGEND:
PS= 36.0 Kips
FY= 60.0 Ksi
Sh= 5.0 ft
Sv= 5.0 ft
GAM PHI COH SIG
pcf deg psf psi
1 135.0 35 300 16.0
Water
Scale = 10 ft

```
**************************************************
*    CALIFORNIA DEPARTMENT OF TRANSPORTATION     *
*         ENGINEERING SERVICE CENTER             *
*     DIVISION OF MATERIALS AND FOUNDATIONS      *
*   Office of Roadway Geotechnical Engineering   *
*    Date: 05-18-2012          Time: 18:01:27    *
**************************************************
```

Project Identification - Enchilada Curves Soil Nail Wall(rev 02172012new)

--------- WALL GEOMETRY ---------

Vertical Wall Height = 44.5 ft
Wall Batter = 5.0 degree

	Angle (Deg)	Length (Feet)
First Slope from Wallcrest. =	33.0	150.0
Second Slope from 1st slope. =	0.0	0.0
Third Slope from 2nd slope. =	0.0	0.0
Fourth Slope from 3rd slope. =	0.0	0.0
Fifth Slope from 3rd slope. =	0.0	0.0
Sixth Slope from 3rd slope. =	0.0	0.0
Seventh Slope Angle. =	0.0	

--------- SLOPE BELOW THE WALL ---------

There is NO SLOPE BELOW THE TOE of the wall

--------- SURCHARGE ---------

There is NO SURCHARGE imposed on the system.

--------- OPTION #1 ---------

Ultimate Punching shear, Bond & Yield Stress are used.

--------- SOIL PARAMETERS ---------

Soil Layer	Unit Weight (Pcf)	Friction Angle (Degree)	Cohesion Intercept (Psf)	Bond* Stress (Psi)	Coordinates of Boundary XS1 (ft)	YS1 (ft)	XS2 (ft)	YS2 (ft)
1	135.0	35.0	300.0	16.0	0.0	0.0	0.0	0.0

* Ultimate bond Stress values also depend on BSF (Bond Stress Factor.)

--------- WATER SURFACE ---------

The Water Table is defined by three coordinate points.

X(1)-Coordinate = 0.00 ft Y(1)-Coordinate = 0.00 ft
X(2)-Coordinate = 20.00 ft Y(2)-Coordinate = 15.00 ft
X(3)-Coordinate = 40.00 ft Y(3)-Coordinate = 20.00 ft

--------- SEARCH LIMIT ---------

The Search Limit is from 0.0 to 32.0 ft

You have chosen NOT TO LIMIT the search of failure planes to specific nodes.

--------- REINFORCEMENT PARAMETERS ---------

Number of Reinforcement Levels = 9
Horizontal Spacing = 5.0 ft
Yield Stress of Reinforcement = 60.0 ksi
Diameter of Grouted Hole = 6.0 in
Punching Shear = 36.0 kips

---------- (Varying Reinforcement Parameters) ---------

Level	Length (ft)	Inclination (degrees)	Vertical Spacing (ft)	Bar Diameter (in)	Bond Stress Factor
1	40.0	15.0	2.0	1.27	1.00
2	40.0	15.0	5.0	1.27	1.00
3	40.0	15.0	5.0	1.27	1.00
4	30.0	15.0	5.0	1.27	1.00
5	30.0	15.0	5.0	1.27	1.00
6	30.0	15.0	5.0	1.27	1.00
7	20.0	15.0	5.0	1.27	1.00
8	20.0	15.0	5.0	1.27	1.00
9	20.0	15.0	5.0	1.27	1.00

	MINIMUM SAFETY FACTOR	DISTANCE BEHIND WALL TOE (ft)	LOWER FAILURE PLANE ANGLE (deg)	LOWER FAILURE PLANE LENGTH (ft)	UPPER FAILURE PLANE ANGLE (deg)	UPPER FAILURE PLANE LENGTH (ft)
Toe	2.875	6.7	70.1	19.7	89.9	27.8

Reinf. Stress at Level
1 = 12.964 Ksi (Punching Shear controls..)
2 = 13.412 ksi (Punching Shear controls..)
3 = 13.860 ksi (Punching Shear controls..)
4 = 14.309 ksi (Punching Shear controls..)
5 = 14.757 ksi (Punching Shear controls..)
6 = 14.386 ksi (Punching Shear controls..)
7 = 13.100 ksi (Punching Shear controls..)
8 = 11.814 ksi (Punching Shear controls..)
9 = 10.527 ksi (Punching Shear controls..)

	MINIMUM SAFETY FACTOR	DISTANCE BEHIND WALL TOE (ft)	LOWER FAILURE PLANE ANGLE (deg)	LOWER FAILURE PLANE LENGTH (ft)	UPPER FAILURE PLANE ANGLE (deg)	UPPER FAILURE PLANE LENGTH (ft)
NODE 2	2.302	9.5	78.8	49.1	89.9	0.0

Reinf. Stress at Level
1 = 18.055 Ksi (Punching Shear controls..)
2 = 17.383 ksi (Punching Shear controls..)
3 = 16.711 ksi (Punching Shear controls..)
4 = 16.040 ksi (Punching Shear controls..)
5 = 15.368 ksi (Punching Shear controls..)
6 = 14.696 ksi (Punching Shear controls..)
7 = 14.024 ksi (Punching Shear controls..)
8 = 13.352 ksi (Punching Shear controls..)
9 = 12.681 ksi (Punching Shear controls..)

	MINIMUM SAFETY FACTOR	DISTANCE BEHIND WALL TOE (ft)	LOWER FAILURE PLANE ANGLE (deg)	LOWER FAILURE PLANE LENGTH (ft)	UPPER FAILURE PLANE ANGLE (deg)	UPPER FAILURE PLANE LENGTH (ft)
NODE 3	2.050	12.3	76.1	51.5	89.9	0.0

Reinf. Stress at Level
1 = 23.014 Ksi (Punching Shear controls..)
2 = 21.937 ksi (Punching Shear controls..)
3 = 20.861 ksi (Punching Shear controls..)
4 = 19.784 ksi (Punching Shear controls..)
5 = 18.707 ksi (Punching Shear controls..)
6 = 17.630 ksi (Punching Shear controls..)
7 = 16.554 ksi (Punching Shear controls..)
8 = 15.477 ksi (Punching Shear controls..)
9 = 14.400 ksi (Punching Shear controls..)

	MINIMUM SAFETY FACTOR	DISTANCE BEHIND WALL TOE (ft)	LOWER FAILURE PLANE ANGLE (deg)	LOWER FAILURE PLANE LENGTH (ft)	UPPER FAILURE PLANE ANGLE (deg)	UPPER FAILURE PLANE LENGTH (ft)
NODE 4	1.919	15.1	73.7	54.0	89.9	0.0

Reinf. Stress at Level
1 = 27.238 Ksi (Punching Shear controls..)
2 = 25.776 ksi (Punching Shear controls..)
3 = 24.313 ksi (Punching Shear controls..)
4 = 22.850 ksi (Punching Shear controls..)
5 = 21.388 ksi (Punching Shear controls..)
6 = 19.925 ksi (Punching Shear controls..)
7 = 18.462 ksi (Punching Shear controls..)
8 = 17.000 ksi (Punching Shear controls..)
9 = 15.537 ksi (Punching Shear controls..)

	MINIMUM SAFETY FACTOR	DISTANCE BEHIND WALL TOE (ft)	LOWER FAILURE PLANE ANGLE (deg)	LOWER FAILURE PLANE LENGTH (ft)	UPPER FAILURE PLANE ANGLE (deg)	UPPER FAILURE PLANE LENGTH (ft)
NODE 5	1.842	17.9	71.5	56.5	89.9	0.0

Reinf. Stress at Level
1 = 30.916 Ksi (Punching Shear controls..)
2 = 29.095 ksi (Punching Shear controls..)
3 = 27.273 ksi (Punching Shear controls..)
4 = 25.451 ksi (Punching Shear controls..)
5 = 23.630 ksi (Punching Shear controls..)
6 = 21.808 ksi (Punching Shear controls..)
7 = 19.986 ksi (Punching Shear controls..)
8 = 18.165 ksi (Punching Shear controls..)
9 = 16.343 ksi (Punching Shear controls..)

	MINIMUM SAFETY FACTOR	DISTANCE BEHIND WALL TOE (ft)	LOWER FAILURE PLANE ANGLE (deg)	LOWER FAILURE PLANE LENGTH (ft)	UPPER FAILURE PLANE ANGLE (deg)	UPPER FAILURE PLANE LENGTH (ft)
NODE 6	1.748	20.8	53.2	13.9	74.3	46.1

Reinf. Stress at Level
1 = 34.322 Ksi (Yield Stress controls.)
2 = 34.322 Ksi (Yield Stress controls.)
3 = 34.306 ksi (Punching Shear controls..)
4 = 32.500 Ksi (Pullout controls...)
5 = 31.265 ksi (Punching Shear controls..)
6 = 29.744 ksi (Punching Shear controls..)
7 = 21.039 Ksi (Pullout controls...)
8 = 23.245 ksi (Punching Shear controls..)
9 = 18.586 ksi (Punching Shear controls..)

MINIMUM SAFETY FACTOR	DISTANCE BEHIND WALL TOE (ft)	LOWER FAILURE PLANE ANGLE (deg)	LOWER FAILURE PLANE LENGTH (ft)	UPPER FAILURE PLANE ANGLE (deg)	UPPER FAILURE PLANE LENGTH (ft)
NODE 7					
1.698	23.6	50.5	14.8	72.8	48.0

Reinf. Stress at Level
1 = 35.330 Ksi (Yield Stress controls.)
2 = 35.330 Ksi (Yield Stress controls.)
3 = 35.330 Ksi (Yield Stress controls.)
4 = 31.209 Ksi (Pullout controls...)
5 = 32.987 Ksi (Pullout controls...)
6 = 32.436 ksi (Punching Shear controls..)
7 = 20.527 Ksi (Pullout controls...)
8 = 24.605 ksi (Punching Shear controls..)
9 = 19.358 ksi (Punching Shear controls..)

MINIMUM SAFETY FACTOR	DISTANCE BEHIND WALL TOE (ft)	LOWER FAILURE PLANE ANGLE (deg)	LOWER FAILURE PLANE LENGTH (ft)	UPPER FAILURE PLANE ANGLE (deg)	UPPER FAILURE PLANE LENGTH (ft)
NODE 8					
1.649	26.4	41.9	17.7	74.4	49.1

Reinf. Stress at Level
1 = 36.393 Ksi (Yield Stress controls.)
2 = 36.393 Ksi (Yield Stress controls.)
3 = 36.393 Ksi (Yield Stress controls.)
4 = 26.685 Ksi (Pullout controls...)
5 = 28.283 Ksi (Pullout controls...)
6 = 29.881 Ksi (Pullout controls...)
7 = 16.905 Ksi (Pullout controls...)
8 = 24.006 Ksi (Pullout controls...)
9 = 20.788 ksi (Punching Shear controls..)

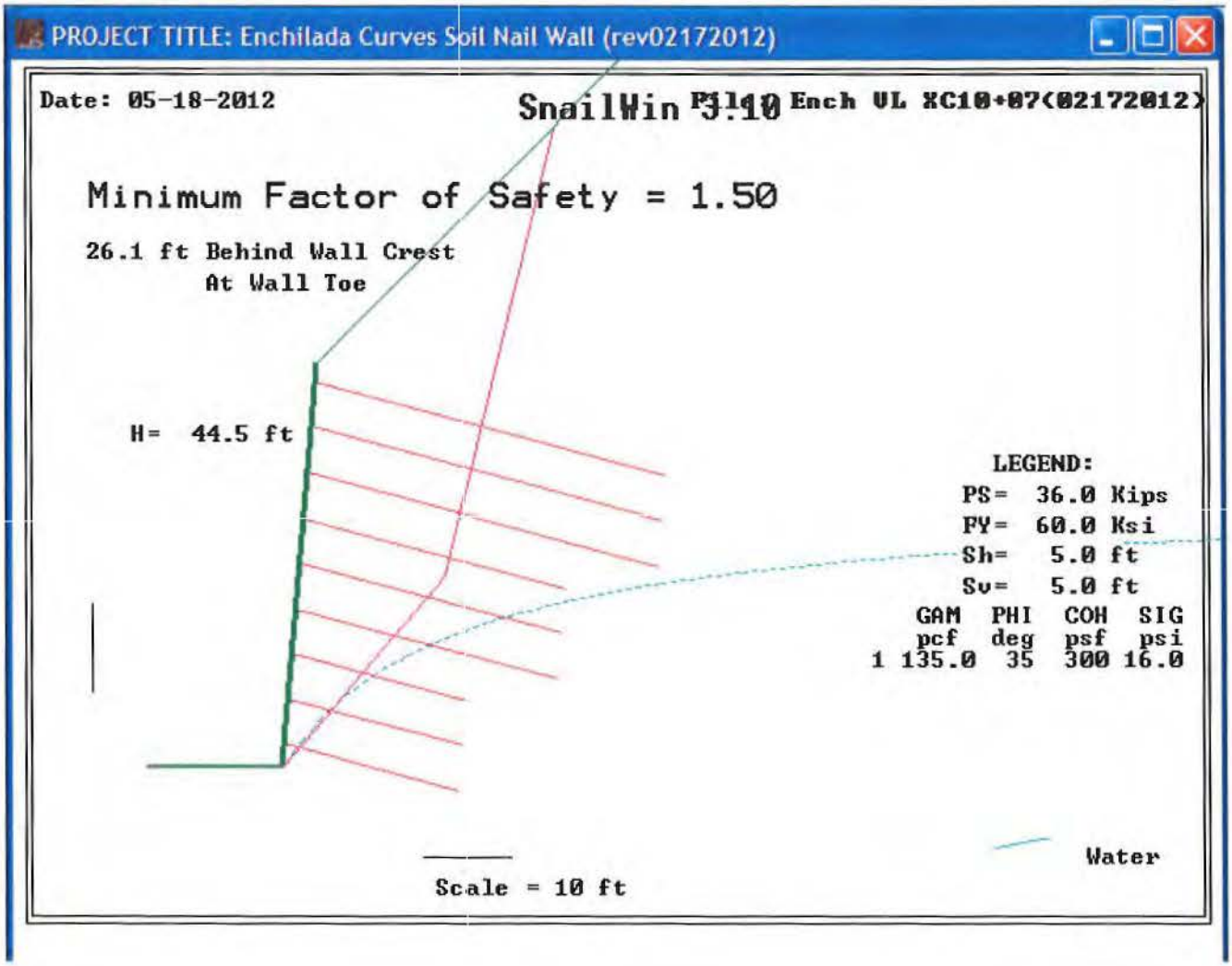
MINIMUM SAFETY FACTOR	DISTANCE BEHIND WALL TOE (ft)	LOWER FAILURE PLANE ANGLE (deg)	LOWER FAILURE PLANE LENGTH (ft)	UPPER FAILURE PLANE ANGLE (deg)	UPPER FAILURE PLANE LENGTH (ft)
NODE 9					
1.601	29.2	54.3	30.0	72.3	38.4

Reinf. Stress at Level
1 = 37.485 Ksi (Yield Stress controls.)
2 = 37.485 Ksi (Yield Stress controls.)
3 = 37.485 Ksi (Yield Stress controls.)
4 = 26.654 Ksi (Pullout controls...)
5 = 31.543 Ksi (Pullout controls...)
6 = 34.869 ksi (Punching Shear controls..)
7 = 23.474 Ksi (Pullout controls...)
8 = 25.089 ksi (Punching Shear controls..)
9 = 20.200 ksi (Punching Shear controls..)

	MINIMUM SAFETY FACTOR	DISTANCE BEHIND WALL TOE (ft)	LOWER FAILURE PLANE ANGLE (deg)	LOWER FAILURE PLANE LENGTH (ft)	UPPER FAILURE PLANE ANGLE (deg)	UPPER FAILURE PLANE LENGTH (ft)
NODE10						
	1.535	32.0	48.3	33.6	75.7	38.9

Reinf. Stress at Level 1 = 32.757 Ksi (Pullout controls...)
2 = 34.268 Ksi (Pullout controls...)
3 = 35.779 Ksi (Pullout controls...)
4 = 21.419 Ksi (Pullout controls...)
5 = 27.679 Ksi (Pullout controls...)
6 = 33.938 Ksi (Pullout controls...)
7 = 21.582 Ksi (Pullout controls...)
8 = 27.841 Ksi (Pullout controls...)
9 = 21.647 ksi (Punching Shear controls..)

****
* For Factor of Safety = 1.0 *
* Maximum Average Reinforcement Working Force: *
* 16.025 Kips/level *
****


PROJECT TITLE: Enchilada Curves Soil Nail Wall (rev02172012)
Date: 05-18-2012
SnailWin 3.10 Ench UL XC10+07(02172012)
Minimum Factor of Safety = 1.50
26.1 ft Behind Wall Crest
At Wall Toe
H= 44.5 ft
LEGEND:
PS= 36.0 Kips
PY= 60.0 Ksi
Sh= 5.0 ft
Sv= 5.0 ft
GAM PHI COH SIG
pcf deg psf psi
1 135.0 35 300 16.0
Water
Scale = 10 ft

```
**************************************************
*    CALIFORNIA DEPARTMENT OF TRANSPORTATION     *
*          ENGINEERING SERVICE CENTER            *
*     DIVISION OF MATERIALS AND FOUNDATIONS      *
*   Office of Roadway Geotechnical Engineering   *
*    Date: 05-18-2012          Time: 18:04:46    *
**************************************************
```

Project Identification - Enchilada Curves Soil Nail Wall (rev02172012)

--------- WALL GEOMETRY ---------

Vertical Wall Height	=	44.5 ft	
Wall Batter	=	5.0 degree	
		Angle (Deg)	Length (Feet)
First Slope from Wallcrest.	=	45.0	150.0
Second Slope from 1st slope.	=	0.0	0.0
Third Slope from 2nd slope.	=	0.0	0.0
Fourth Slope from 3rd slope.	=	0.0	0.0
Fifth Slope from 3rd slope.	=	0.0	0.0
Sixth Slope from 3rd slope.	=	0.0	0.0
Seventh Slope Angle.	=	0.0	

--------- SLOPE BELOW THE WALL ---------

There is NO SLOPE BELOW THE TOE of the wall

--------- SURCHARGE ---------

There is NO SURCHARGE imposed on the system.

--------- OPTION #1 ---------

Ultimate Punching shear, Bond & Yield Stress are used.

--------- SOIL PARAMETERS ---------

Soil Layer	Unit Weight (Pcf)	Friction Angle (Degree)	Cohesion Intercept (Psf)	Bond* Stress (Psi)	Coordinates of Boundary XS1 (ft)	YS1 (ft)	XS2 (ft)	YS2 (ft)
1	135.0	35.0	300.0	16.0	0.0	0.0	0.0	0.0

* Ultimate bond Stress values also depend on BSF (Bond Stress Factor.)

--------- WATER SURFACE ---------

The Water Table is defined by three coordinate points.

X(1)-Coordinate = 0.00 ft Y(1)-Coordinate = 0.00 ft
X(2)-Coordinate = 20.00 ft Y(2)-Coordinate = 15.00 ft
X(3)-Coordinate = 40.00 ft Y(3)-Coordinate = 20.00 ft

--------- SEARCH LIMIT ---------

The Search Limit is from 3.7 to 30.0 ft

You have chosen NOT TO LIMIT the search of failure planes to specific nodes.

--------- REINFORCEMENT PARAMETERS ---------

Number of Reinforcement Levels = 9
Horizontal Spacing = 5.0 ft
Yield Stress of Reinforcement = 60.0 ksi
Diameter of Grouted Hole = 6.0 in
Punching Shear = 36.0 kips

---------- (Varying Reinforcement Parameters) ---------

Level	Length (ft)	Inclination (degrees)	Vertical Spacing (ft)	Bar Diameter (in)	Bond Stress Factor
1	40.0	15.0	2.0	1.27	1.00
2	40.0	15.0	5.0	1.27	1.00
3	40.0	15.0	5.0	1.27	1.00
4	30.0	15.0	5.0	1.27	1.00
5	30.0	15.0	5.0	1.27	1.00
6	30.0	15.0	5.0	1.27	1.00
7	20.0	15.0	5.0	1.27	1.00
8	20.0	15.0	5.0	1.27	1.00
9	20.0	15.0	5.0	1.27	1.00

	MINIMUM SAFETY FACTOR	DISTANCE BEHIND WALL TOE (ft)	LOWER FAILURE PLANE ANGLE (deg)	LOWER FAILURE PLANE LENGTH (ft)	UPPER FAILURE PLANE ANGLE (deg)	UPPER FAILURE PLANE LENGTH (ft)
Toe	2.872	6.5	71.0	19.9	89.9	28.3

Reinf. Stress at Level
1 = 12.772 Ksi (Punching Shear controls..)
2 = 13.221 ksi (Punching Shear controls..)
3 = 13.669 ksi (Punching Shear controls..)
4 = 14.118 ksi (Punching Shear controls..)
5 = 14.567 ksi (Punching Shear controls..)
6 = 14.145 ksi (Punching Shear controls..)
7 = 12.931 ksi (Punching Shear controls..)
8 = 11.717 ksi (Punching Shear controls..)
9 = 10.502 ksi (Punching Shear controls..)

	MINIMUM SAFETY FACTOR	DISTANCE BEHIND WALL TOE (ft)	LOWER FAILURE PLANE ANGLE (deg)	LOWER FAILURE PLANE LENGTH (ft)	UPPER FAILURE PLANE ANGLE (deg)	UPPER FAILURE PLANE LENGTH (ft)
NODE 2	2.599	9.1	65.4	21.9	89.9	29.8

Reinf. Stress at Level
1 = 17.084 Ksi (Punching Shear controls..)
2 = 17.579 ksi (Punching Shear controls..)
3 = 18.075 ksi (Punching Shear controls..)
4 = 18.571 ksi (Punching Shear controls..)
5 = 19.067 ksi (Punching Shear controls..)
6 = 17.511 ksi (Punching Shear controls..)
7 = 15.632 ksi (Punching Shear controls..)
8 = 13.753 ksi (Punching Shear controls..)
9 = 11.874 ksi (Punching Shear controls..)

	MINIMUM SAFETY FACTOR	DISTANCE BEHIND WALL TOE (ft)	LOWER FAILURE PLANE ANGLE (deg)	LOWER FAILURE PLANE LENGTH (ft)	UPPER FAILURE PLANE ANGLE (deg)	UPPER FAILURE PLANE LENGTH (ft)
NODE 3	2.100	11.7	77.4	53.6	89.9	0.0

Reinf. Stress at Level
1 = 21.249 Ksi (Punching Shear controls..)
2 = 20.341 ksi (Punching Shear controls..)
3 = 19.434 ksi (Punching Shear controls..)
4 = 18.526 ksi (Punching Shear controls..)
5 = 17.619 ksi (Punching Shear controls..)
6 = 16.711 ksi (Punching Shear controls..)
7 = 15.804 ksi (Punching Shear controls..)
8 = 14.897 ksi (Punching Shear controls..)
9 = 13.989 ksi (Punching Shear controls..)

	MINIMUM SAFETY FACTOR	DISTANCE BEHIND WALL TOE (ft)	LOWER FAILURE PLANE ANGLE (deg)	LOWER FAILURE PLANE LENGTH (ft)	UPPER FAILURE PLANE ANGLE (deg)	UPPER FAILURE PLANE LENGTH (ft)
NODE 4	1.941	14.3	75.4	56.8	89.9	0.0

Reinf. Stress at Level
1 = 25.141 Ksi (Punching Shear controls..)
2 = 23.906 ksi (Punching Shear controls..)
3 = 22.671 ksi (Punching Shear controls..)
4 = 21.435 ksi (Punching Shear controls..)
5 = 20.200 ksi (Punching Shear controls..)
6 = 18.965 ksi (Punching Shear controls..)
7 = 17.730 ksi (Punching Shear controls..)
8 = 16.495 ksi (Punching Shear controls..)
9 = 15.260 ksi (Punching Shear controls..)

	MINIMUM SAFETY FACTOR	DISTANCE BEHIND WALL TOE (ft)	LOWER FAILURE PLANE ANGLE (deg)	LOWER FAILURE PLANE LENGTH (ft)	UPPER FAILURE PLANE ANGLE (deg)	UPPER FAILURE PLANE LENGTH (ft)
NODE 5	1.839	16.9	73.6	60.0	89.9	0.0

Reinf. Stress at Level
1 = 28.564 Ksi (Punching Shear controls..)
2 = 27.021 ksi (Punching Shear controls..)
3 = 25.479 ksi (Punching Shear controls..)
4 = 23.936 ksi (Punching Shear controls..)
5 = 22.394 ksi (Punching Shear controls..)
6 = 20.851 ksi (Punching Shear controls..)
7 = 19.309 ksi (Punching Shear controls..)
8 = 17.766 ksi (Punching Shear controls..)
9 = 16.224 ksi (Punching Shear controls..)

	MINIMUM SAFETY FACTOR	DISTANCE BEHIND WALL TOE (ft)	LOWER FAILURE PLANE ANGLE (deg)	LOWER FAILURE PLANE LENGTH (ft)	UPPER FAILURE PLANE ANGLE (deg)	UPPER FAILURE PLANE LENGTH (ft)
NODE 6	1.723	19.6	69.2	38.6	76.3	24.8

Reinf. Stress at Level
1 = 34.819 Ksi (Yield Stress controls.)
2 = 33.538 ksi (Punching Shear controls..)
3 = 31.265 ksi (Punching Shear controls..)
4 = 28.993 ksi (Punching Shear controls..)
5 = 26.720 ksi (Punching Shear controls..)
6 = 24.447 ksi (Punching Shear controls..)
7 = 22.174 ksi (Punching Shear controls..)
8 = 19.901 ksi (Punching Shear controls..)
9 = 17.628 ksi (Punching Shear controls..)

	MINIMUM SAFETY FACTOR	DISTANCE BEHIND WALL TOE (ft)	LOWER FAILURE PLANE ANGLE (deg)	LOWER FAILURE PLANE LENGTH (ft)	UPPER FAILURE PLANE ANGLE (deg)	UPPER FAILURE PLANE LENGTH (ft)
NODE 7	1.651	22.2	54.8	15.4	75.2	52.0

Reinf. Stress at Level
1 = 36.348 Ksi (Yield Stress controls.)
2 = 36.348 Ksi (Yield Stress controls.)
3 = 36.132 ksi (Punching Shear controls..)
4 = 34.490 Ksi (Pullout controls...)
5 = 33.165 ksi (Punching Shear controls..)
6 = 31.681 ksi (Punching Shear controls..)
7 = 22.961 Ksi (Pullout controls...)
8 = 24.208 ksi (Punching Shear controls..)
9 = 19.547 ksi (Punching Shear controls..)

	MINIMUM SAFETY FACTOR	DISTANCE BEHIND WALL TOE (ft)	LOWER FAILURE PLANE ANGLE (deg)	LOWER FAILURE PLANE LENGTH (ft)	UPPER FAILURE PLANE ANGLE (deg)	UPPER FAILURE PLANE LENGTH (ft)
NODE 8	1.592	24.8	46.5	18.0	76.7	53.8

Reinf. Stress at Level
1 = 37.700 Ksi (Yield Stress controls.)
2 = 37.700 Ksi (Yield Stress controls.)
3 = 37.700 Ksi (Yield Stress controls.)
4 = 30.437 Ksi (Pullout controls...)
5 = 31.743 Ksi (Pullout controls...)
6 = 33.048 Ksi (Pullout controls...)
7 = 19.970 Ksi (Pullout controls...)
8 = 26.343 Ksi (Pullout controls...)
9 = 21.043 ksi (Punching Shear controls..)

	MINIMUM SAFETY FACTOR	DISTANCE BEHIND WALL TOE (ft)	LOWER FAILURE PLANE ANGLE (deg)	LOWER FAILURE PLANE LENGTH (ft)	UPPER FAILURE PLANE ANGLE (deg)	UPPER FAILURE PLANE LENGTH (ft)
NODE 9	1.538	27.4	44.8	19.3	75.9	56.1

Reinf. Stress at Level
1 = 39.018 Ksi (Yield Stress controls.)
2 = 39.018 Ksi (Yield Stress controls.)
3 = 39.018 Ksi (Yield Stress controls.)
4 = 29.090 Ksi (Pullout controls...)
5 = 30.570 Ksi (Pullout controls...)
6 = 32.050 Ksi (Pullout controls...)
7 = 19.747 Ksi (Pullout controls...)
8 = 26.711 Ksi (Pullout controls...)
9 = 21.963 ksi (Punching Shear controls..)

MINIMUM SAFETY FACTOR	DISTANCE BEHIND WALL TOE (ft)	LOWER FAILURE PLANE ANGLE (deg)	LOWER FAILURE PLANE LENGTH (ft)	UPPER FAILURE PLANE ANGLE (deg)	UPPER FAILURE PLANE LENGTH (ft)
NODE10					
1.496	30.0	49.6	27.8	76.4	50.9

Reinf. Stress at Level 1 = 40.116 Ksi (Yield Stress controls.)
2 = 40.116 Ksi (Yield Stress controls.)
3 = 40.116 Ksi (Yield Stress controls.)
4 = 25.502 Ksi (Pullout controls...)
5 = 29.678 Ksi (Pullout controls...)
6 = 35.817 Ksi (Pullout controls...)
7 = 22.855 Ksi (Pullout controls...)
8 = 28.210 ksi (Punching Shear controls..)
9 = 22.070 ksi (Punching Shear controls..)

****
* For Factor of Safety = 1.0 *
* Maximum Average Reinforcement Working Force: *
* 18.342 Kips/level *
****

MATERIALS INFORMATION

FOUNDATION REPORTS

Foundation Report for Retaining Wall No. 3, Enchilada Curve Improvement, dated 9/20,/2012 by Caltrans Division of Engineering Services, Office of Geotechnical Design North, Branch of Geophysics and Geology.

M e m o r a n d u m

Flex your power!
Be energy efficient!

To: KELLY HOLDEN
Branch Chief, Structure Design, Branch 7

Date: September 20, 2012

File: 02-TRI-299-PM 0.4-0.9
Structure No. 05E0011 (PM 0.8)
02-2E3501, 02 0000 0211
Enchilada Curve Improvement
Retaining Wall No. 3
MSE Wall

Attention: Wendy Hou

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
GEOTECHNICAL SERVICES – MS 5

Subject: Foundation Report for Retaining Wall No. 3

INTRODUCTION

General

As requested, the Office of Geotechnical Design North (OGDN) is providing this Foundation Report (FR) for the design and construction of the proposed Retaining Wall No. 3, Structure Number 05E0011, of the Enchilada Curve Improvement project on Route 299 between PM 0.4 and 0.9, near the county line of Humboldt and Trinity Counties and the town of Salyer (See Plate 1). Retaining Wall No. 3 is proposed to consist of a Mechanically Stabilized Embankment wall at approximately PM 0.8.

Project Description and Proposed Improvements

The project consists of realigning the existing road between PM 0.4 and 0.9 where three curves exist. The proposed realignment will eliminate one curve and improve the other two. Three retaining walls are proposed to facilitate the new alignment. According to the "Summary of Type Selection Meeting" Memo (Reference No. 19), a soldier pile wall, a soil nail wall, and a Mechanically Stabilized Embankment (MSE) wall are proposed for the three walls and designated as Retaining Wall Nos. 1, 2 and 3, respectively. Table No. 1, below, provides a general summary of the extent of the three proposed walls. In addition to the three proposed walls, significant cutting of the slope above the roadway is proposed between "A1" Line Stations 107+75 to 110+00.

Table No. 1. Summary of Extent of Proposed Retaining Walls

Retaining Wall Number	Wall Type	Stationing and Offset, "A1" Line (feet)			Length (feet)	Maximum Height (feet)
		Begin	End	Offset		
1	Soldier Pile	111+96	113+72	15 Left	176	18
2	Soil Nail	113+50	116+79	20 Right	329	45
3	MSE	119+16.4	119+99.6	16 Left	83.2	13.5

Based on the "Structure Plan" (Reference No. 26) provided by the Caltrans Structure Design, Office of Bridge Design North, Bridge Design Branch 7 (OBDN Branch 7), the proposed Retaining Wall No. 3 will be a MSE wall extending as high as 13 feet and 6 inches at the center area, and will progressively step out to a height of roughly 5 feet on the ends. The Structure Plan indicates the wall will be founded atop an existing, roughly 5 feet wide arched, masonry culvert which transects the proposed wall alignment near the midpoint. The "General Plan" (Reference No. 25), provided by OBDN Branch 7, indicates the wall will include a concrete barrier slab at the top of the wall. The General Plan (GP) calls-out welded wire mats as the MSE wall soil reinforcement, along with a geomembrane layer near the top to act as an impervious membrane for the purpose of isolating wire mats from infiltrating corrosive roadway deicing salts and chemicals, per Bridge Design Specifications (BDS) Article 5.9.3.7. The "Type Selection Recommendations" provided by OBDN Branch 7 (Reference No. 20) indicate the project will be designed based on LFD/WSD methods and will utilize the 2006 Standard Plans and Specifications.

Scope of Work

General

The scope of work included performing a literature and historical review in an effort to obtain geological and geotechnical data pertaining to the subject site that could provide insight into the design and construction of the proposed wall facility. The site investigation for Retaining Wall No. 3 included exploratory borings and sample collection to characterize the subsurface conditions. The site investigation also included geological mapping of the area and an assessment of the general stability of existing slopes based on notable information from visible discontinuities, including fractures, joints, and bedding. Laboratory testing of selected samples was performed, followed by

engineering analysis and preparation of this report summarizing our findings, conclusions and recommendations.

MSE Wall Standardized Design

OGDN understand that the MSE wall design scope will follow the "standardized" design presented in the Caltrans Bridge Design Aids (BDA) Section 3-8 "Mechanically Stabilized Embankment" (March 2009), which is noted to be LFD method of design. Based on the Retaining Wall No. 3 GP, "Loading Case 1" of BDA 3-8 is being utilized which consist of a 240 PSF surcharge load directly atop the wall. OBDN Branch 7 has communicated that the wall design height ("H") will be stepped to H=15 feet per BDA 3-8, Table 1; hence, a minimum base width of the wall (defined as the width of the "reinforced soil" zone) will be 11 feet. OBDN Branch 7 has also communicated that, for simplicity, a minimum base width of 11 feet will be utilized throughout the entire MSE wall, with the exception of the top reinforcement layer, which will extend to a length of at least 16 feet to accommodate impact loading from the proposed traffic barrier (per BDS Article 5.9.3.8.2).

Per the current Caltrans Memo To Designers (MTD) 5-20, OGDN this standardized design approach will limit the MSE wall geotechnical evaluation to external stability of the MSE wall coherent gravity mass, but specifically to evaluation of the following design components:

(1) the allowable foundation soil bearing capacity at the wall base elevation,
(2) the minimum wall base width to meet global stability requirements, and
(3) the applicability of wall design using Standard Detail XS Sheets (see Reference No. 13) to the site; Specifically, addressing the acceptance of the standardized design soil parameters provided in the XS sheets General Notes; Per MTD 5-20, this acceptance assures adequate base width and toe cover is met for standardized design criteria regarding the maximum eccentricity of the resultant force acting on the base of the wall, and overturning and sliding related to external stability.

BDA 3-8 states the following:

> *"Seismic design for MSE should include conventional pseudo-static loading during global stability analyses. Internal seismic loading is not utilized in MSE design."*

In accordance with BDS Article 5.2.2.3, the proposed wall will be analyzed for seismic loads utilizing limit equilibrium methods (LEM) of analysis in regards to stability of a

"slope" (designated as "overall stability"). Our analysis utilizes the pseudo-static approach and software that discretizes a potential sliding mass into vertical slices. Our scope of work does not include a pseudo-static analysis that analyzes seismic forces in regards to the application of the Mononobe-Okabe seismic thrust (with allowances for wall deformation) as detailed by FHWA Publication No. FHWA NHI-00-043 (Reference No. 5) for sliding stability, eccentricity and bearing capacity.

OGDN understands that utilization of the standardized design presented in BDA 3-8, along with adopting the applicable Caltrans Standard Details, Special Provisions and Specifications for MSE wall construction, assures MSE wall "internal" stability design requirements are met as presented in BDS Article 5.9.3. Table No. 2, below, summarizes the minimum criteria for external stability of MSE walls provided in BDS. Table No. 3 provides the assumed soil parameters for the Caltrans MSE standardized wall design.

The project proposes to found the wall adjacent to sloping ground; Therefore, FHWA guidelines (Reference Nos. 5 and 17) and BDS 5.9.2.4 indicate overall stability analyses should include investigating the potential for "compound" failure surfaces (i.e. failure surfaces which pass through both unreinforced and reinforced zones). This type of investigation would require employing computer software that directly incorporates reinforcement layers as discrete elements. OGDN considers an initial assessment of compound failure to be beyond our scope of analysis for this project, and per FHWA, the vendor would typically assess compound failure in final design.

Table No. 2. Summary of MSE Wall External Stability Requirements

Failure Mode	Stability Criteria	BDS Reference	Method of Verification
Sliding	$FS_{SL} \geq 1.5$	5.9.2	Per MTD 5-20; Acceptance of standardized design soil parameters (see Table No. 3) presented in BDS 5.9.2 and BSD XS Sheet xs13-020-2e.
Overturning	$FS_{OT} \geq 2.0$	5.9.2	
Eccentricity of the Resultant Force Acting on the Base of Wall	$e_{max} \leq L/6$ L = soil reinforcement length	5.9.2	
Bearing Capacity	$FS \geq 2.0$	5.9.2	BDS Article 4.4.7.1 (Nov. 2003)
Overall Stability	$FS_{static} \geq 1.3$ $FS_{seismic} \geq 1.0$	5.9.2.4 & 5.2.2.3	Limit Equilibrium Method of Analysis for "slope"

Table No. 3. Design Soil Parameters for the Caltrans Standard MSE Wall

Internal Design	Reinforced Soil Mass	$\phi = 34^o$	γ =120 pcf	BDS Article 5.9.3; BSD xs13-020-2e
External Design	Backfill or Retained Soil	$\phi = 34^o$	γ =120 pcf	BDS Article 5.9.2; BSD xs13-020-2e
	Foundation Soil	$\phi = 30^o$	NA*	

*NA = Not Applicable; Standard design only addresses sliding stability for foundation soil considerations.

Subsurface Exploration and Laboratory Testing Program

The subsurface investigation for Retaining Wall No. 3 was performed during April 10 through 13, 2012 and consisted of placing two vertical, 5-inch diameter, mud rotary borings designated as "RC-12-003" and "RC-12-004". Equipment used for this subsurface investigation consisted of an Acker truck-mounted drill-rig equipped with an automatic hammer with a designated hammer energy ratio (ER_i) of 74 percent for Standard Penetration Test (SPT) in situ testing (Reference No. 24). Both mud rotary borings were advanced utilizing a self-casing, wire line, drilling method and were placed at the locations shown on Plate No. 4, attached. The following table presents a summary of borings performed for the Retaining Wall No. 3.

Table No. 4: Summary of Boring Exploration

Number[(1)]	Station (ft)	Offset from "A1" Line (ft)	Top Elevation (ft)	Depth (ft)	Bottom Elevation (ft)
RC-012-003	120+05	16.0 Lt.	580.9	40.0	540.9
RC-012-004	119+00	30.0 Lt.	579.0	30.0	549.0

Notes: Borings with prefix "RC" used mud rotary wash method with continuous sampling.

Sampling was achieved by utilizing rock core barrel in all borings and intermittently performed SPTs. The SPT was utilized to characterize soils encountered above the bedrock at the location of the proposed retaining wall. Selected soil samples were bagged for subsequent laboratory testing. Laboratory tests were performed to assess corrosivity and engineering properties of the near-surface, colluvium materials at the site. The tests performed included grain size analysis (ASTM D 422), Atterberg Limits (AASHTO T89 and T90), unconfined compression testing of rock (ASTM D7012-07 Method C), and corrosion testing (CTM 643, CTM 471 and CTM 422).

FINDINGS

Overall Project Site Description

The overall project site is located in hilly, tree-studded terrain within the Six Rivers National Forest Administrative Boundary. The project area is generally rural; a residence exists adjacent, south of the highway near the westerly edge of the project limits (see Plate No. 4). Numerous residences exists easterly of the project limits project in the town of Salyer. According to the web-based Caltrans Postmile Query Tool (Reference No. 22), the subject site is located at latitude and longitude coordinates of 40.88649^{o} North and 123.58779^{o} West, respectively; these coordinates are the basis for obtaining data in this report available through GIS related information sources. Within the project limits, State Route 299 is a two-lane highway paved with asphalt concrete (AC). The roadway width is approximately 27 feet wide; the westbound direction has two-feet-wide paved shoulders along with unpaved pullouts at each curve. The eastbound direction lane has an unpaved shoulder along with a one-foot-wide drainage ditch at the toe of the rock slopes.

Within in the project limits the existing roadway has been excavated from the side of a hill that faces the Trinity River. This hill is approximately 270 feet high, and extends from an elevation of 450 feet at the river, to an elevation of approximately 720 feet at the crest. The summit of the hill is narrow and gradually widens toward the east. The southern face of the hill is bound by a narrow valley carved by a creek; this valley is approximately 30 to 50 feet deep. The elevations on the paved road way vary from 595 to 574 feet (See Plate 2). Most of the existing road within the project interval was built entirely by cutting into formational rock utilizing cut slope angles that vary from 45º to 55º, and extend to a maximum height of 120 feet.

Retaining Wall No. 3 Site Description

The site of the proposed MSE wall transects a cross culvert located at PM 0.74. Based on 1947 as-built plans profile grades (Reference No. 1), within the proposed MSE wall limits the current Route 299 roadway was constructed by excavating as deep as roughly 5 to 20 feet beneath the original ground at the roadway centerline. On the northerly side of the highway, opposite of the proposed MSE wall area, cuts slopes as high as 30 to 40 feet were noted which exhibited hard bedrock exposures.

While performing our work our Office was not provided with any indication of underground utilities within the project limits by either USA inquires or ground surface posting, or other features. Overhead utilities (telephone lines) were noted bordering the

southern limits of the Caltrans Right of Way. As mentioned, the proposed MSE wall site is underlain by a Caltrans culvert facility.

Regional Geology

The project site is located in the Western Klamath Terrane near the westerly edge of the Klamath Mountains Geomorphic Province of California. The lithologies and age relationships within the Klamath Mountains indicate repeated accretion, beginning in early to middle Paleozoic and continuing through the Mesozoic, of ophiolitic and island arc terranes, with their associated sedimentary units, to the leading western edge of the North American plate. According to published geological mapping of the area (Reference Nos. 3 and 4), sedimentary rocks belonging to the Late Jurassic Galice Formation underlay the project site (see Plate Nos. 5a and 5b) which are generally explained as gray phyllitic metagraywacke, slate, phyllitic slate. A more detailed description is offered by the report by Young which accompanies the mapping and is as follows:

> *"The Galice Formation consists of interbedded, very fine- to coarse-grained meta-graywacke. The fine-grained layers are altered to slate and phyllitic slate, while the medium- and coarse-grained beds are largely low-grade semischist."*

Materials similar to the provided descriptions were encountered in our field investigations (see below). No landslide features are shown on the referenced map within or adjacent to the project area. However, the map report states that: *"Only the larger and more obvious landslide areas are shown on the geologic map that accompanies this report."*

Site Geologic Conditions

Within the project limits, exposures of the Galice formation rock were noted to be composed of slightly schistose meta-graywacke with slate interbeds, phyllitic schist, and schist. Geologically, the site materials exhibited characteristics such that separation into two contrasting groups is apparent based on resistivity to weathering by the chemical and mineralogical components of the rocks. The first group would be comprised of the harder appearing, slightly weathered phyllitic schist and meta-graywacke/slate interbeds materials. In contrast to neighboring materials, these rocks appeared to have an inherent, weather-resistant nature that was exhibited by the local tendency of these rocks to protrude from the ground surface and inhibit the accumulation of vegetation which was sparse and poorly-developed. The schist rock comprises the second group which was generally decomposed and intensely weathered, an indicator that the structure and

mineralogical components are inherently susceptible to weathering. The product of decomposition of the schist was typically observed to be silty clay which promotes areas where slopes are less steep and vegetation is better established. Measurement of the direction of the foliation within the surface exposed rock materials was approximated at 70º to the northeast with an angle of inclination of 70º with respect to the horizontal.

Naturally Occurring Asbestos (NOA)

The Caltrans Map "Areas Likely to Contain Naturally Occurring Asbestos – District 2" (Reference No. 12) states:

> *Natural occurrences of asbestos are more likely to be encountered in, and immediately adjacent to, areas of ultramafic rocks including landslide deposits or soils originating from ultramafic rock sources.*

The referenced Caltrans map does not depict and area likely to contain Naturally Occurring Asbestos (NOA) within or immediately adjacent to, the project limits. Similarly, the United States Forest Service (USFS) mapping of NOA (Reference No. 12) indicates the project site is not in an area "more likely: to contain NOA. In review of available published geologic mapping (Reference Nos. 2 through 4), and the aforementioned NOA mapping, the nearest area of NOA or ultramafic rocks (designated as "serpentinized ultramafic rocks") is located roughly two miles westerly of the project area. Based on the geologic conditions observed during site visits and on the results of subsurface exploration (see "Subsurface Conditions", below) the potential for the presence of ultramafic rocks within the project limits is considered very low.

Subsurface Conditions

Based on borings performed near the Retaining Wall No. 3 Layout Line (RTW3 LOL), the near-surface materials in the Retaining Wall No. 3 area consist of 5 to 12 feet of fill and colluvium described as very loose sandy silt, and medium dense to very dense silty gravel and sand. These near-surface materials are underlain by formational metamorphic bedrock The formational bedrock was encountered as hard, fractured, slightly weathered to fresh metagraywacke, inter-layered with hard, moderately weathered and fresh fractured, slate. In Boring No. RC-12-003, a 5 feet thick layer of very soft, intensely fractured, decomposed phyllitic schist was encountered immediately underlying the near-surface fill and colluvium materials. The elevation of the top of formational bedrock was approximately 574feet in Boring RC-12-004, and approximately 569 feet in Boring No.

RC-12-003. A more detailed description of the materials encountered in borings is presented on the LOTBs attached in Appendix B.

Groundwater

The presence of a static ground water table appeared to be absent during our subsurface investigation exploration borings performed in April of 2012. During the field visits to the project site, slopes in the vicinity of the Retaining Wall No. 3 appeared absent of seeps and springs, even during visits performed within wet seasons of the year.

Laboratory Test Results

Unconfined compression strength testing of core samples representative of the hard meta-graywacke rock yielded compressive strengths as high as 4,312 psi. The results of corrosion testing are presented in Table No. 5, below. Laboratory test results for samples collected from borings performed for Retaining Wall No. 3 are also presented in Appendix B, attached.

Table No. 5: Corrosion Test Summary

Location:	Boring Number	Sample Depth (feet)	pH	Minimum Resistivity (Ohm-cm)	Sulfate Content (ppm)	Chloride Content (ppm)
STA 120+05; 16.0' Left "A1" Line	RC-10-003	0.0 to 1.5	6.81	7822	61	3
		4.0 to 5.5				
		6.0 to 7.5				
		8.0 to 9.5				
		15.0 to 16.5				
		19.3 to 19.5				

Faulting and Seismicity

According to the report accompanying the Caltrans Deterministic PGA Map (Reference No. 15), Caltrans defines a fault as "active" if the fault known to have ruptured within the past 700,000 years (late-Quaternary to present). The Caltrans ARS Online (v.2.0) spectrum tool at http://dap3.dot.ca.gov/shake_stable/v2 /index.php indicates that the closest "active" fault to the site is the Trinidad fault which forms part of the Mad River Fault zone. This web-based tool indicates the closest distance to the Trinidad fault trace (or surface project of the top of rupture plane) is approximately 14.3 miles southwesterly of the project site (see Plate No. 6). Additionally, this fault is identified to be a "reverse" fault type which dips at 35º to the northeast and is capable of generating a Maximum Moment Magnitude (MMax) of 7.5. The closest distance to the rupture plane of this fault is indicated to be approximately 9.2 miles. According to the Alquist-Priolo Earthquake Fault Zone Maps available through United States Geological Survey or "USGS" (obtained at http://www.consrv.ca.gov/cgs/rghm/ ap/Pages/index.aspx) the site is not within an Alquist-Priolo Earthquake Fault Zone. No faults (active or inactive) are known to extend close to or on the project site. The closest known inactive fault to the project site is the Hennessy Ridge Fault, a thrust fault located approximately 1.9 miles southwesterly of the project site (see Plate No. 5a).

In accordance with the Caltrans Geotechnical Services Design Manual (Reference No. 16), the average small strain shear velocity for the top 100 feet at the site (V_{S30}) is estimated to be about 2,500 feet per second. Utilizing the estimated V_{S30} and the ARS Online (v.2.0) response spectrum web-based tools, Peak Ground Accelerations (PGA) of 0.33g and 0.39g were generated based on the deterministic and probabilistic methods, respectively. Based on the Caltrans Geotechnical Services Design Manual, the design PGA shall be the greater acceleration obtained by either the deterministic method or the probabilistic method, with the probabilistic method being based on the USGS 5 percent probability of exceedance in 50 years (975 years return period).

CONCLUSIONS AND RECOMMENDATIONS

Based on our findings, it is concluded that construction of the proposed MSE wall "standardized" design per Caltrans BDA Section 3-8 and associated BSD XS-Sheets (see "Scope of Work" section, above) is acceptable. The foundation materials below the base of the wall are anticipated to meet or exceed the $\phi = 30^o$ minimum requirement of Table No. 3, above. Structure backfill and native materials anticipated to be present behind the wall on completion of wall construction are acceptable for meeting the design requirements of $\phi = 34^o$ and $\gamma = 120$ pcf for "backfill" and/or "retained soil" of Table No. 3. Therefore, the application of the BDA standardized wall design should meet the external stability requirements for sliding, overturning, and eccentricity presented in Table No. 2 above.

Bearing Capacity

Utilizing topographical data provided on the "Foundation Plan", Retaining Wall No. 3, Sheet 4 of 15 (revision date 4-11-12), an effective slope inclination, β, of no steeper than 35 degrees was assigned for evaluation of the MSE wall bearing capacity in accordance with BDS 4.4.7.1.1.4. Based on a factor of safety of 2, an equivalent uniform bearing pressure as high as 3.0 ksf is allowed provided the MSE wall has an "effective base width", B', (per BDS 5.9.2.3) of no less than 5 feet. Accordingly, all base widths provided for the reinforced section on BDA page 3-8.5 (2002) for Loading Condition "1", and for wall heights of 14 feet and less, are acceptable.

Settlement

Based on the design MSE wall foundation pressures provided in BDA 3-8 for wall heights of 14 feet and less, it is estimated that post-construction total settlement at the base of the wall will not exceed about 1 inch, and differential settlement is not expected to exceed ½ inch for a distance of 40 feet. Based on the proposed heights of the MSE wall, significant differential settlement between the reinforced soil zone of the wall and facing elements is not expected to occur.

Overall Stability

For concurrence with the recommendations presented for "Bearing Capacity", above, overall stability was analyzed for the shortest reinforced section base widths provided for Loading Condition "1" on page 3-8.5 for wall heights of 14 feet and less. The provided topographic data was incorporated into the analysis. The results of stability analyses utilizing Slope/W software (Version 7.19, Geo-Slope International, Ltd.) indicates that

the required minimum factor of safety for overall stability (Per Table No. 2) of 1.3 and 1.0 for static and seismic loading, respectively, have been met. In accordance with BDS 5.2.2.3, a horizontal seismic acceleration coefficient (k_h) of 0.13 (one-third of the PGA) was applied for seismic overall stability; Correspondingly, the vertical seismic coefficient (k_v) was assigned to equal zero. The results of the static overall stability analysis for the wall section of greatest height (14 feet) and steepest toe slope ($\beta \simeq 35^o$) are presented on Plate No. 7, attached.

Fill Materials/Structural Backfill

Embankments constructed of native materials as part of the Retaining Wall No. 3 construction can be sloped as steep as s 1.5H:1V.

According to the 2003 Caltrans Corrosion Guidelines (Reference No. 6) Caltrans Standard Special Provision (SSP) 19-600 requires that structure backfill material for an MSE structure meet the following corrosion related requirements:

- Minimum resistivity must be greater than 2,000 ohm-cm, CTM 643
- Chloride concentration must be less than 500 ppm, CTM 422
- Sulfate concentration must be less than 250 ppm, CTM 417
- pH must be between 5.5 and 10.0, CTM 643

Based on the results of corrosion analyses (see Table No. 5, “Findings” section), in accordance with the 2003 Caltrans Corrosion Guidelines, the site materials could be considered non-corrosive to both the metallic soil reinforcement as well as the reinforced concrete retaining wall. In addition to specifying non-corrosive soil, the metallic soil reinforcement must be galvanized in accordance with the Department's standard galvanizing requirements (2006 Standard Specification 75-1.05).

It is anticipated that rocky native materials derived from excavations in the project limits will not be acceptable to meet the gradation requirements for “structure backfill” for earth retaining structures with soil reinforcement per Caltrans SSP 19-600. Furthermore, non-rocky soils derived from native colluvium and weathered bedrock will also not likely meet the gradation requirements without screening and other processing methods. Hence, importation of select granular materials may be required for structure backfill proposed in the soil reinforcement matrix of the MSE wall.

Construction Considerations

Excavation and Ripping Ability

Based on as-built information and observed surface conditions (see "Retaining Wall No. 3 Site Description" section), and on subsurface conditions encountered in exploratory borings at the Retaining Wall No. 3 site, it is anticipated that excavation of moderately hard to hard bedrock materials will be required to achieve subgrade for the proposed MSE wall construction. Although the site subsurface exploration encountered significant fracturing within the bedrock, reports by the Caltrans Geotechnical Services Geophysics and Geology Branch (GGB) for seismic refraction surveys performed at the Retaining Wall No. 2 site (Reference Nos. 18 and 21) indicate that, locally, the fractured bedrock materials can exhibit seismic velocities that could be characteristic of materials that are considered of "moderately difficult" ripping ability to "not rippable" with a Caterpillar D9G tractor. However, the depth of the "not rippable" materials was indicated to be, on average, greater than 35 feet; hence, the materials anticipated to be present in proposed excavation limits for Retaining Wall No. 3 will likely not fall within the "not rippable" classification.

Naturally Occurring Asbestos (NOA)

As discussed in the "Findings" section of this report, OGDN concludes that the project site has a very low potential for the presence of ultramafic rocks and NOA. In consideration for the potential presence of NOA materials, the North Region Hazardous Material Officer should be contacted to determine if the project has the need for Airborne Toxic Control Measures (ATCMs) during project construction.

Project Information

Caltrans SSP 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:

1. *Log of Test Borings (Enchilada Curve Improvement, Retaining Wall No. 3)*

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

A. *Foundation Report for Retaining Wall No. 3, Structure No. 05E0011, Enchilada Curve Improvement, dated September 20, 2012 by Caltrans Division of Engineering Services, Office of Geotechnical Design North.*
B. *Refraction Seismic Survey, "Route 299 Whole Enchilada Roadway Improvement at 299-TRI PM 0.5 to 0.8" dated January 10, 2011, by Caltrans Division of Engineering Services, Branch of Geophysics and Geology.*
C. *Refraction Seismic Survey, "Route 299 Whole Enchilada Roadway Improvement at 299-TRI PM 0.5 to 0.8" dated March 24, 2012, by Caltrans Division of Engineering Services, Branch of Geophysics and Geology.*

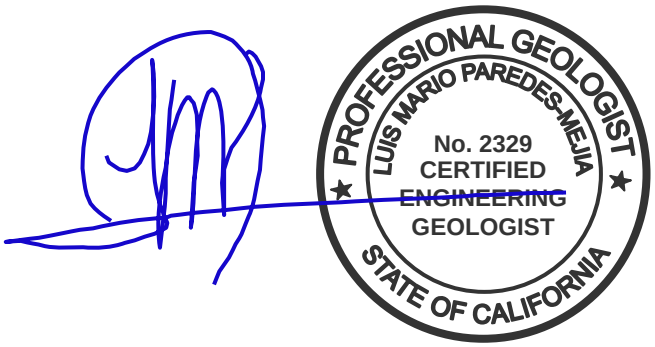
Data and Information available for inspection at the District Office:

A. *None*

Data and Information available for inspection at the Transportation Laboratory are:

A. *For Boring RC-12-003 (two core boxes), and RC-12-004(three core boxes).*

If you have any questions or comments, please call Luis Paredes-Mejia at (916) 227-1047 or Mark Hagy at (916) 227-1077.



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GS Corporate
DES OE, Office of PS&E
GDN File
DME D2

ATTACHMENTS

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Plate No. 2. Topography of Project Area
Plate No. 3. Project Site Plan
Plate No. 4. Retaining Wall No. 3 Site Plan
Plate No. 5A. Geologic Map
Plate No. 5B. Geologic Map Legend
Plate No. 6. Fault Map
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Plate No. B-3. Unconfined Compression Test Results, Specimen RC-12-004-02
Plate No. B-4. Corrosion Tests Results

REFERENCES

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3. CDMG (1978), “Geology of the Willow Creek Quadrangle. Humboldt and Trinity Counties, California”, CDMG Map Sheet 31, compiled by, John C. Young, Scale 1:62,500.
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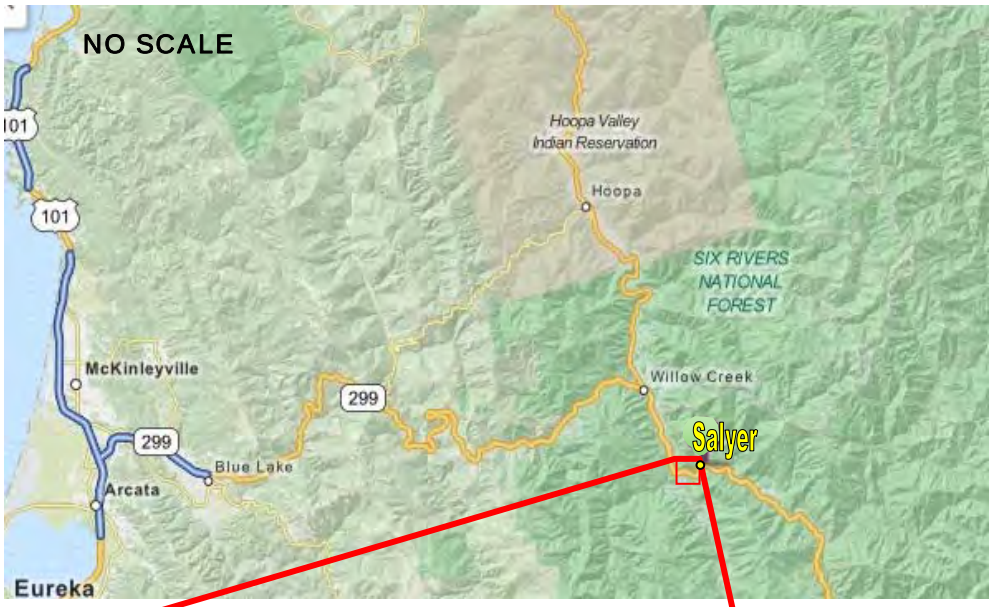
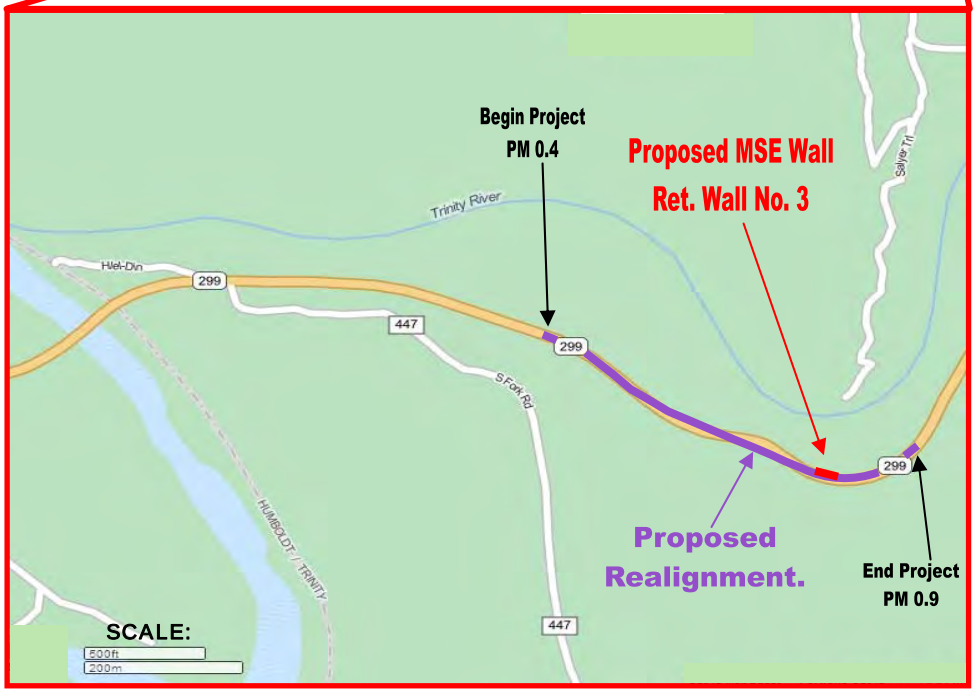
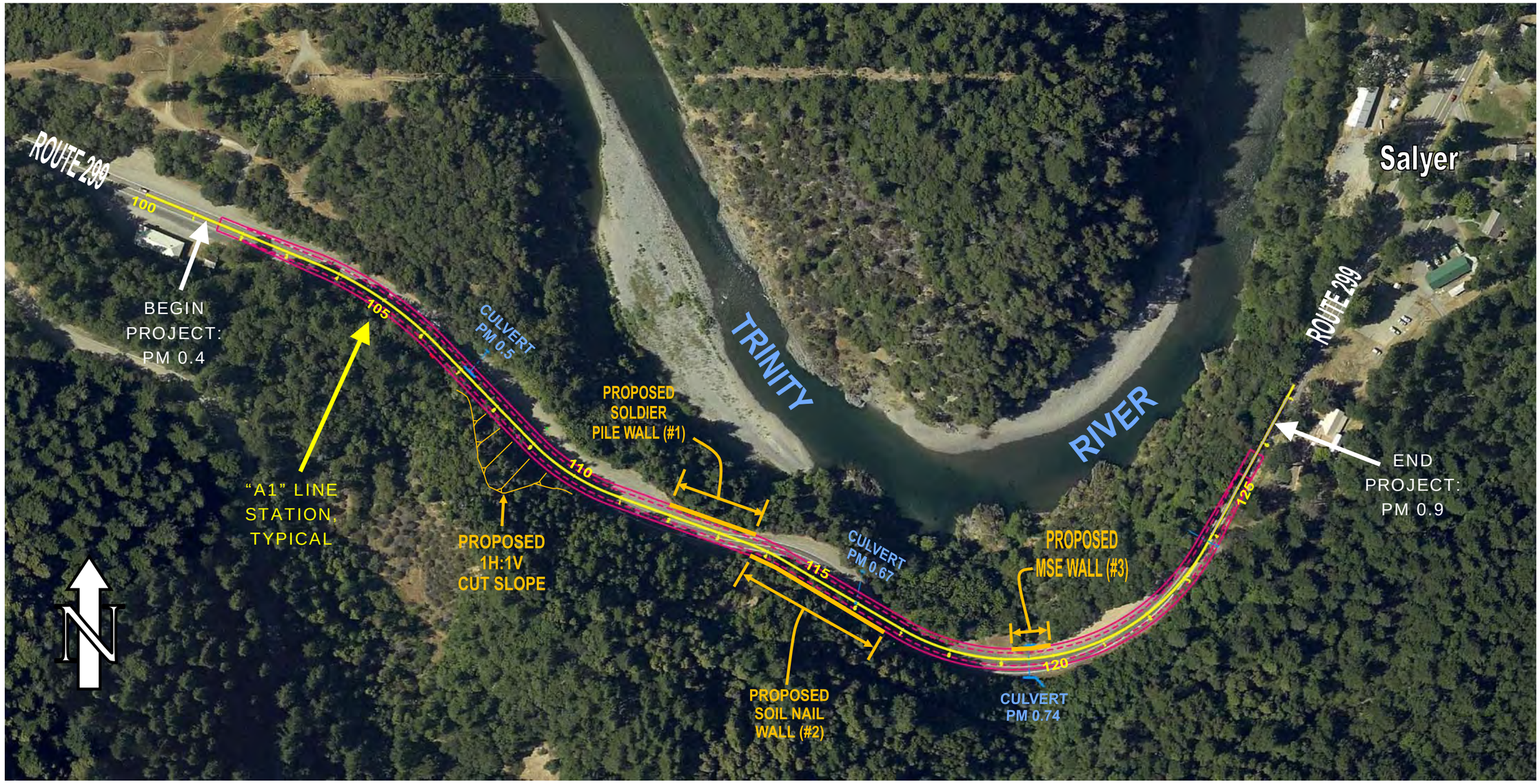
N





Caltrans	CALTRANS Division of Engineering Services Geotechnical Services Geotechnical Design – North	**EA: 02-2E3501** **Date: September 2012**	**VICINITY MAP**
		02-TRI-299-PM 0.4/0.9 **ENCHILADA CURVE IMPROVEMENT**	Plate No. 1

Caltrans	CALTRANS Division of Engineering Services Geotechnical Services Geotechnical Design – North	EA: 02-2E3501 Date: September 2012	**Topography of Project Area**
		02-TRI-299-PM 0.4/0.9 ENCHILADA CURVE IMPROVEMENT	Plate No. 2



Base Map Reference: Digital Highway Inventory Photography Program (DHIPP)at http://svhqdhipp:8080/dhipp/view.html. Photo taken between 2001 and 2003.
Photo and layout provided by the Caltrans Office of Engineering Services and Design – North, Redding.

Approximate Scale: 1:2400
1 inch = 200 feet

0 200 400 feet

CALTRANS
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design - North

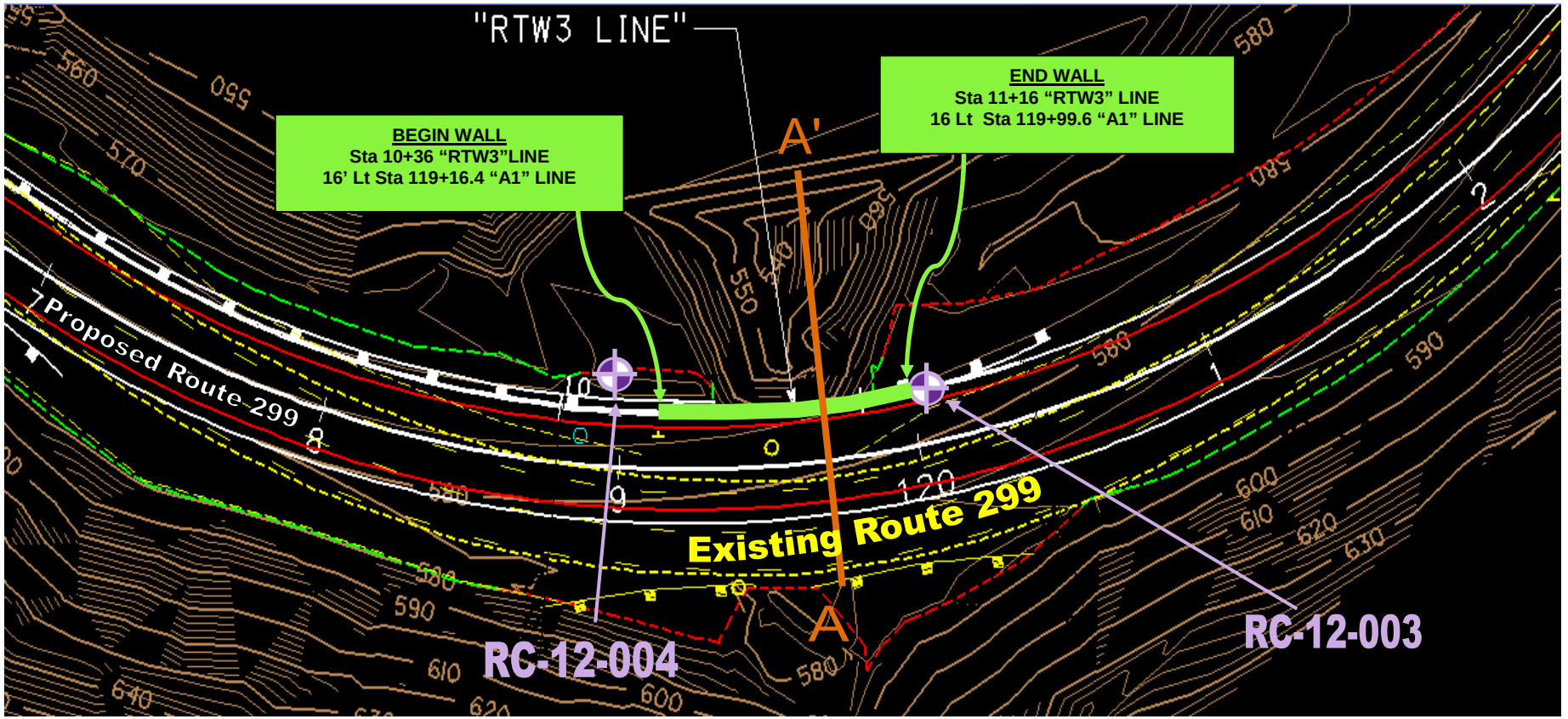
EA: 02-2E3501

Date: September 2012

PROJECT SITE PLAN

02-TRI-299-PM 0.4/0.9
ENCHILADA CURVE IMPROVEMENTS

Plate No. 3



NOTES:

(1) Base plan from Microstation file "Fin-Surface_Contours.dgn" provided by Caltrans Office of Engineering Services and Design – North, Redding; elevations in feet.

(2) See Plate No. 8 for X-Section A-A'.

Approximate Scale: 1:600
1 inch = 50 feet

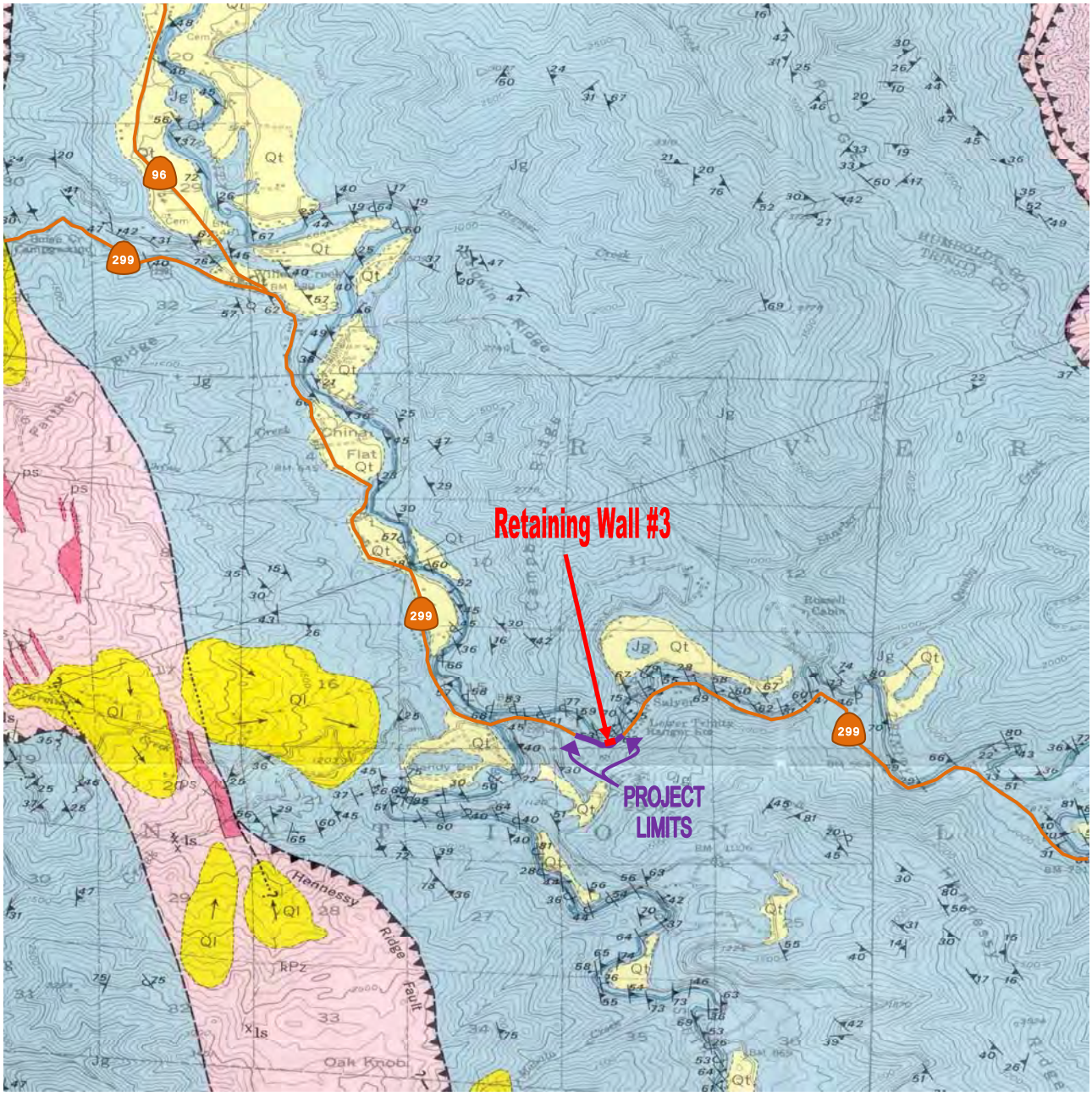
0 50 100 feet

Legend

Approximate Boring Location

N

Caltrans	CALTRANS Division of Engineering Services Geotechnical Services Geotechnical Design – North	EA: 02-2E3501 Date: September 2012	RETAINING WALL NO. 3 SITE PLAN
		02-TRI-299-PM 0.4/0.9 ENCHILADA CURVE IMPROVEMENT	Plate No. 4



REFERENCE: "Geology of the Willow Creek Quadrangle. Humboldt and Trinity Counties, California", CDMG Map Sheet 31, compiled by, John C. Young, Scale 1:62,500.

See Plate No. 5b for explanations.

Approximate Scale: 1:62,500
1inch = 1.0 mile

0 1.0 2.0 miles

N

Caltrans	CALTRANS Division of Engineering Services Geotechnical Services Geotechnical Design – North	**EA: 02-2E3501** **Date: September 2012**	**GEOLOGIC MAP**
		02-TRI-299-PM 0.4/0.9 **ENCHILADA CURVE IMPROVEMENTS**	Plate No. 5a

EXPLANATION

SURFICIAL UNITS

QUATERNARY

Qt

Quaternary terrace gravels

Remnants at several levels along Trinity River. Older and younger terraces not distinguished.

Ql

Landslide or slump

Only the most obvious are shown on the map, but indications of widespread slope instability are common, especially in areas underlain by KJf, Jg *and* ŦPz

SEDIMENTARY, METAMORPHIC, AND EXTRUSIVE IGNEOUS ROCKS

CRETACEOUS ?

sfm

South Fork Mountain Schist

Crinkled quartz-albite-muscovite-chlorite schist and semischist. Contains abundant quartz segregation lenses. Local blueschist and greenschist "knockers." Weathers silver-gray.

tm

Zone of tectonic mixing

Foliated greenstone, metagraywacke, serpentinite, and diorite intermingled in the Coast Ranges thrust zone.

JURA-CRETACEOUS

KJf

Franciscan rocks (melange)

Predominantly gray, dense graywacke which weathers tan to buff. Subordinate dark-gray shale, greenstone, conglomerate, and chert. The graywacke is often devoid of recognized bedding, but occasional graded bedding is visible. Individual rock units are generally of only local extent. Slopes are frequently unstable, especially those underlain by pelitic materials.

JURASSIC

Jgh

Contact Metamorphosed Galice Formation

Hornfels and fine-grained chiastolite-biotite-chlorite schists adjacent to Ammon Ridge Pluton.

Jg

Galice Formation

Gray phyllitic metagraywacke, slate, and phyllitic slate. Often weathers light silvery-gray to tan. Abundant graded bedding visible in exposures along streams. Cut by scattered thin meta-felsite dikes and sills. Areas underlain by dark slates and phyllitic slates especially subject to slope failure.

LATE PALEOZOIC TRIASSIC

ŦPz

Western Paleozoic and Triassic belt of rocks (melange)

Fine-grained mafic to intermediate volcanic rocks, fine- to medium-grained graywacke, chert and siliceous argillite, lenses of serpentinite, local limestone and conglomerate, and small basic to intermediate intrusive masses. Individual rock types generally lack lithic continuity. Slopes underlain by this unit are often unstable.

WILLOW CREEK QUADRANGLE

CALIFORNIA DIVISION OF MINES & GEOLOGY

MAP SHEET 31
1978

SYMBOLS

Contact
(solid where accurately located; dashed where inferred; dotted where concealed)

Fault
(solid where accurately located; dashed where inferred; dotted where concealed)

Thrust fault
(solid where accurately located, dashed where inferred)

30 Strike and dip of beds *(facing known)*

35 Strike and dip of beds *(facing unknown)*

45 Strike and dip of overturned beds

Vertical beds

25 Strike and dip of foliation

Vertical foliation

35 Crumpled foliation with average attitude

45 Strike and dip of joints

Vertical joint

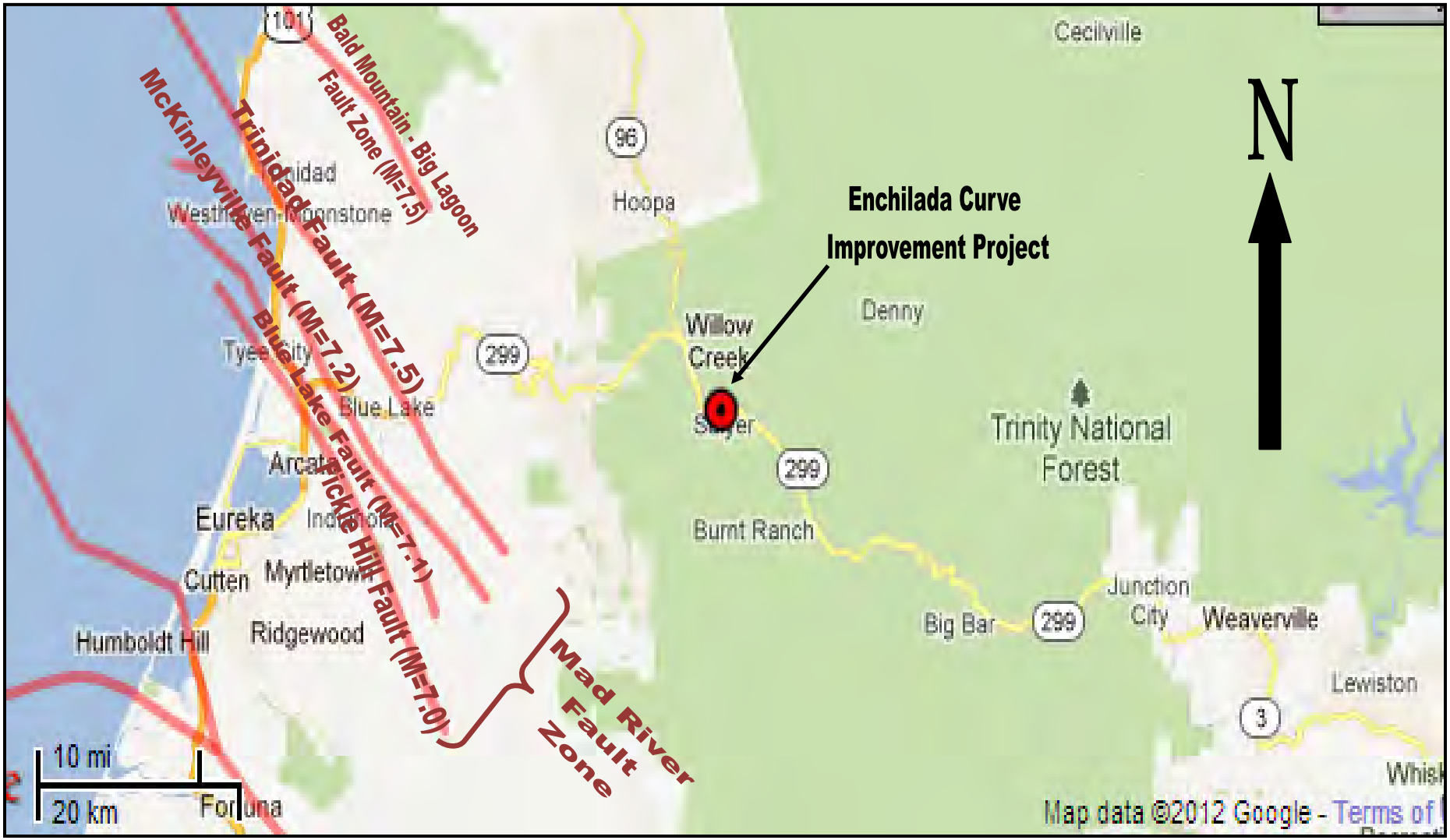
x or ls
Limestone locality

\+
Resistant knobs of variable size in South Fork Mountain Schist

19°
TRUE NORTH
MAGNETIC NORTH
APPROXIMATE MEAN DECLINATION, 1952

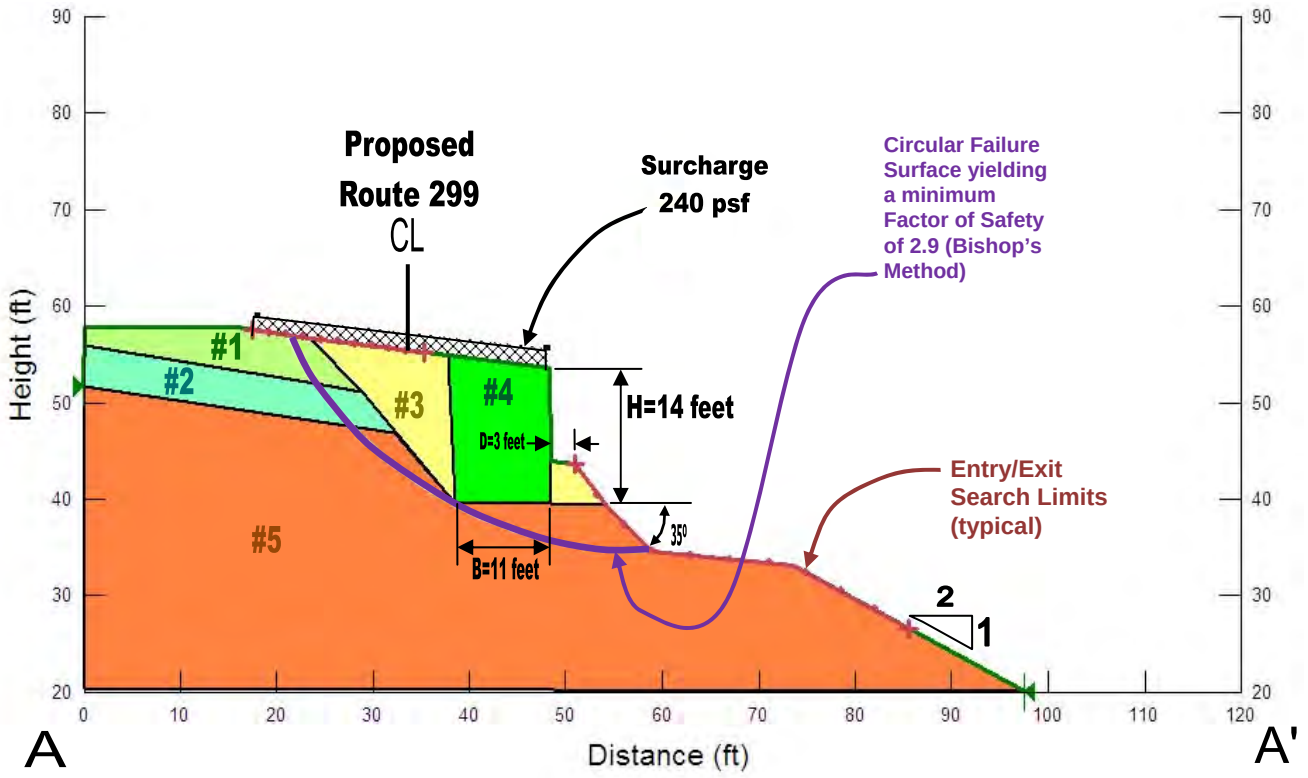
CALIF
QUADRANGLE LOCATION

Caltrans	CALTRANS Division of Engineering Services Geotechnical Services Geotechnical Design – North	**EA: 02-2E3501** **Date: September 2012**	**GEOLOGIC MAP LEGEND**
		02-TRI-299-PM 0.4/0.9 **ENCHILADA CURVE IMPROVEMENTS**	Plate No. 5b



Base Map Reference: From Caltrans ARS Online (v2.0) at http://dap3.dot.ca.gov/shake_stable/v2/index.php

Caltrans	CALTRANS Division of Engineering Services Geotechnical Services Geotechnical Design – North	EA: 02-2E3501 Date: September 2012	FAULT MAP
		02-TRI-299-PM 0.4/0.9 ENCHILADA CURVE IMPROVEMENT	Plate No. 6



#1:Fill and Colluvium:
γ = 130 pcf
c = 500 psf
ϕ = 35°

#2: Decomposed Bedrock
γ = 115 pcf
c = 0
ϕ = 30°

#3: Backfill:
γ= 120 pcf
c = 0
ϕ = 34°

#4:Reinforced Section:
γ= 120 pcf
Impenetrable

#5: Bedrock
γ = 170 pcf
c = 2000 psf
ϕ = 40°

Note: Topography based on topographic contours provided on "Foundation Plan", Retaining Wall No. 3, dated 4-11-12.

Approximate Scale: 1" = 20 feet (vertical = horizontal)

0 20 40 feet

CALTRANS
Division of Engineering Services
Geotechnical Services
Geotechnical Design – North

EA: 02-2E3501	**OVERALL STABILITY RESULTS X-SECTION A-A' (STA 10+90 "RTW3" LINE)**
Date: September 2012	
02-TRI-299-PM 0.4/0.9 ENCHILADA CURVE IMPROVEMENT	Plate No. 7

APPENDIX A

Log Of Test Borings

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
02	Tri	299			

CERTIFIED ENGINEERING GEOLOGIST — 7-13-12 DATE

PROFESSIONAL GEOLOGIST — Luis Paredes-Mejia — No. 2329 — Exp. 01-31-14 — CERTIFIED ENGINEERING GEOLOGIST — STATE OF CALIFORNIA

PLANS APPROVAL DATE

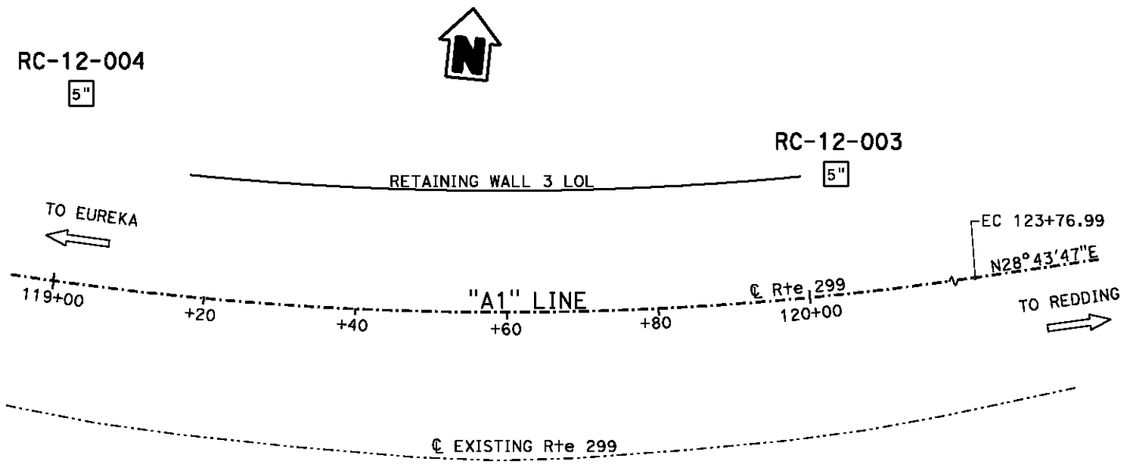
The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

This LOTB sheet was prepared in accordance with the Caltrans Soil & Rock Logging, Classification, & Presentation Manual (2010 Edition).
See 2010 Standard Plans A10F and A10G for Soil Legend, and A10H for Rock Legend.

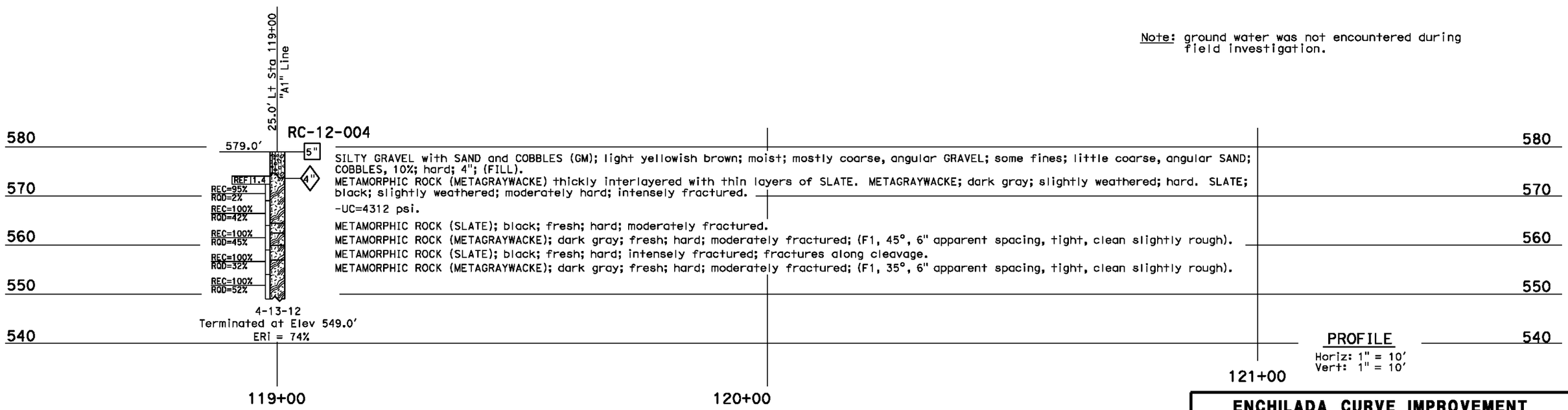
BENCH MARK

TRI 299 0.54

Fnd 2¼" CADH Brass Disk in Concrete
37.15 Ft Rt "A1" Line Rte 299
Sta 111+07.93
N 673,743.070
E 1,865,923.082
Elev= 590.31
Vertical Datum: NAVD88



PLAN
1" = 10'



SILTY GRAVEL with SAND and COBBLES (GM); light yellowish brown; moist; mostly coarse, angular GRAVEL; some fines; little coarse, angular SAND; COBBLES, 10%; hard; 4"; (FILL).
METAMORPHIC ROCK (METAGRAYWACKE) thickly interlayered with thin layers of SLATE. METAGRAYWACKE; dark gray; slightly weathered; hard. SLATE; black; slightly weathered; moderately hard; intensely fractured.
-UC=4312 psi.
METAMORPHIC ROCK (SLATE); black; fresh; hard; moderately fractured.
METAMORPHIC ROCK (METAGRAYWACKE); dark gray; fresh; hard; moderately fractured; (F1, 45°, 6" apparent spacing, tight, clean slightly rough).
METAMORPHIC ROCK (SLATE); black; fresh; hard; intensely fractured; fractures along cleavage.
METAMORPHIC ROCK (METAGRAYWACKE); dark gray; fresh; hard; moderately fractured; (F1, 35°, 6" apparent spacing, tight, clean slightly rough).

Note: ground water was not encountered during field investigation.

PROFILE
Horiz: 1" = 10'
Vert: 1" = 10'

ENGINEERING SERVICES	MATERIALS AND GEOTECHNICAL SERVICES	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF ENGINEERING SERVICES STRUCTURE DESIGN	BRIDGE NO.	ENCHILADA CURVE IMPROVEMENT
FUNCTIONAL SUPERVISOR: M. Hagy	DRAWN BY: I. G-Remmen; CHECKED BY: F. DeHaro	FIELD INVESTIGATION BY: L. Paredes-Mejia	DESIGN BRANCH X	05E0011	RETAINING WALL NO. 3
				POST MILE 0.8	LOG OF TEST BORINGS 1 OF 2

OGS CIVIL LOG OF TEST BORINGS SHEET

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT: 3643
PROJECT NUMBER & PHASE: 02000002111 CONTRACT NO.: 02-2E3501

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES				SHEET	OF
07-11-12	07-12-12			X	X

FILE => rw3-1.dgn

USERNAME => s116982 DATE PLOTTED => 13-JUL-2012 TIME PLOTTED => 13:28

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
02	Tri	299			

CERTIFIED ENGINEERING GEOLOGIST — 7-13-12 DATE

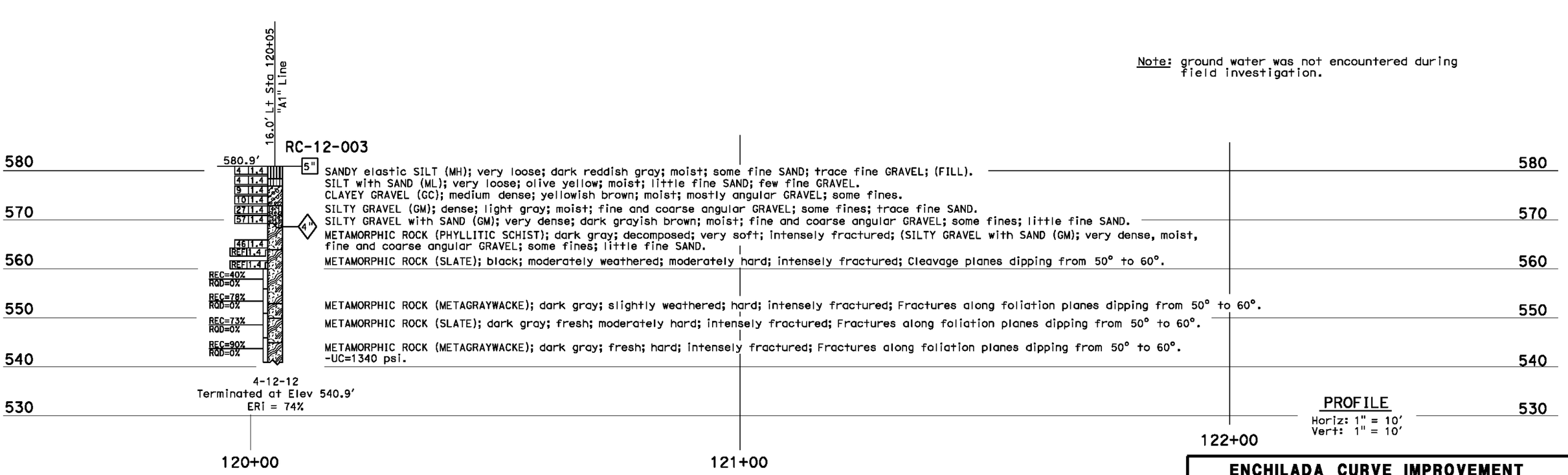
PROFESSIONAL GEOLOGIST — Luis M. Paredes-Mejia — No. 2329 — Exp. 1-31-14 — CERTIFIED ENGINEERING GEOLOGIST — STATE OF CALIFORNIA

PLANS APPROVAL DATE

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

This LOTB sheet was prepared in accordance with the Caltrans Soil & Rock Logging, Classification, & Presentation Manual (2010 Edition).
See 2010 Standard Plans A10F and A10G for Soil Legend, and A10H for Rock Legend.

FOR PLAN VIEW, SEE
"LOG OF TEST BORINGS 1 OF 2"



Note: ground water was not encountered during field investigation.

PROFILE
Horiz: 1" = 10'
Vert: 1" = 10'

ENGINEERING SERVICES	MATERIALS AND GEOTECHNICAL SERVICES	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF ENGINEERING SERVICES STRUCTURE DESIGN	BRIDGE NO.	ENCHILADA CURVE IMPROVEMENT
FUNCTIONAL SUPERVISOR: M. Hagy	DRAWN BY: I. G-Remmen; CHECKED BY: F. DeHaro	FIELD INVESTIGATION BY: L. Paredes-Mejia	DESIGN BRANCH X	05E0011	RETAINING WALL NO. 3
				POST MILE 0.8	LOG OF TEST BORINGS 2 OF 2

OGS CIVIL LOG OF TEST BORINGS SHEET

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT: 3643
PROJECT NUMBER & PHASE: 02000002111
CONTRACT NO.: 02-2E3501

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES				SHEET	OF
07-12-12	07-12-12			X	X

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USERNAME => s116982 DATE PLOTTED => 13-JUL-2012 TIME PLOTTED => 13:28

APPENDIX B

Laboratory Test Results

Enchilada Curve Improvement
Retaining Wall No. 3
Bridge No. 05E0011

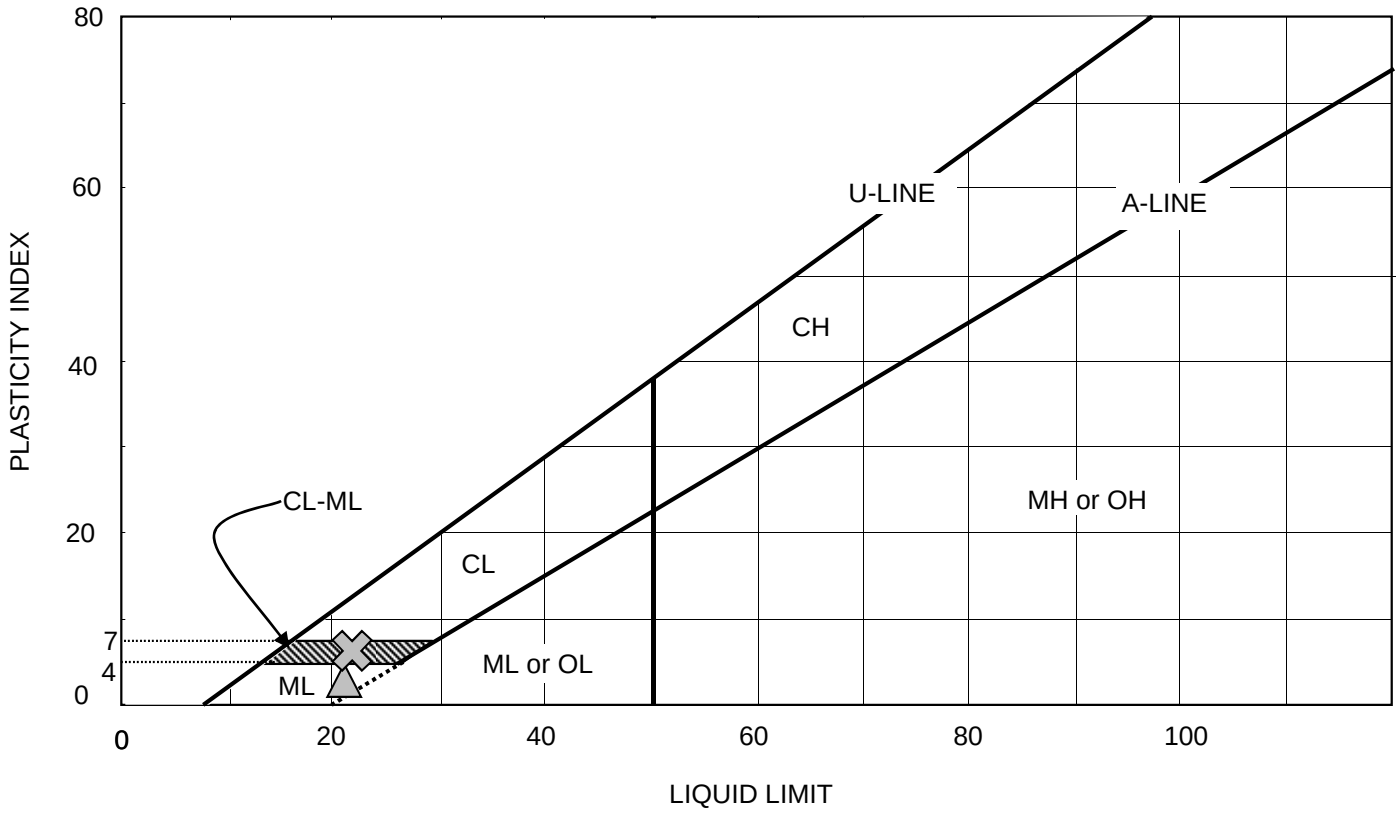
TABLE NO. B-1. SUMMARY OF LABORATORY TEST RESULTS

02-TRI-299-PM 0.4/0.9
EA: 02-2E3501

September 2012

Sample Location				Percentage Passing Through Sieve No. or Percent Particle Size Finer Than														Strength Tests			Atterb. Limits		In-Situ		Max. Lab. Density (CTM 216)		Corrosion (CTM 417, 422, 532 and 643)	
Boring No.	I.D. No.	Depth (feet) top	Depth (feet) bottom	1 ½	1	3/4	1/2	3/8	4	8	16	30	50	100	200	5µ	1µ	UU (Su, tsf) ASTM (D2850-95)	UC (psi) (ASTM D7012-07C)	UCS (psi) (ASTM D5731-08)	LL	PI	γ_d (pcf)	wc (%)	γ_d (pcf)	% wc		
RC-12-003	2	2.0	3.5	100	92	87	80	78	66	57	50	43	35	27	23	10	4				22	6		8.9				
RC-12-003	6	10.0	11.5		100	98	92	88	81	76	69	58	45	32	24	9	4				21	2		12.2				
RC-12-003	12	36.5	37.0																1,340				170					
RC-12-004	2	11.0	11.5																4,312				168					
RC-12-003	1	0.0	1.5	**SAMPLES COMPOSITED**																							pH	6.81
	3	4.0	5.5																									
	4	6.0	7.5																								R (Ohm-cm)	7822
	5	8.0	9.5																								Cl (ppm)	3
	7	15.0	16.5																									
	8	19.3	19.5																								SO_4 (ppm)	61

ATTERBERG LIMITS TEST RESULTS (AASHTO T89 and T90)

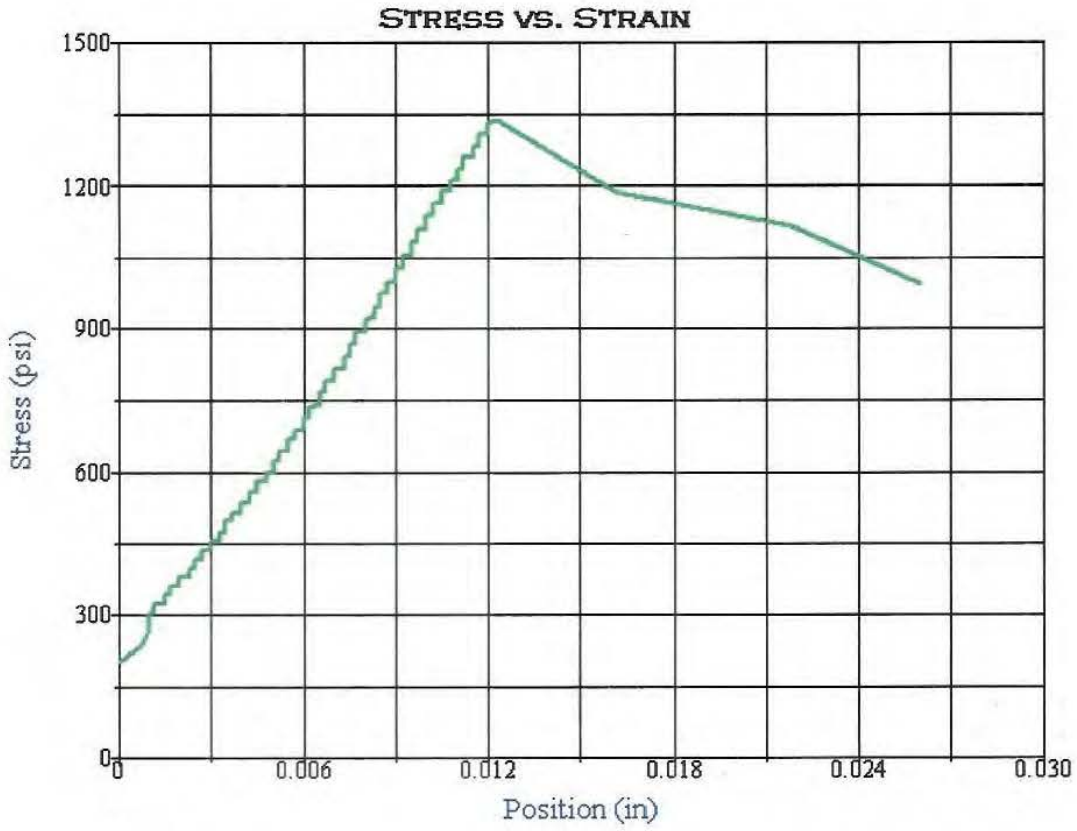


SYMBOL	SAMPLE ID	SAMPLE LOCATION	LIQUID LIMIT (%)	PLASTICITY INDEX	CLASSIFICATION
✖	2	Boring No. RC-12-003: 2'-3.5'	22	6	CL-ML
△	6	Boring No. RC-12-003: 10'-11.5'	21	2	ML

CALTRANS
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design - North

Project Name:	ENCHILADA CURVE IMPROVEMENT; RETAINING WALL NO. 3
EA:	02-2E3501
D-Co-Rt-PM:	02-TRI-299-PM 0.4/0.9
Test Date:	September-2012
Plate No. B-1	

D1K00YB11938 4:18:25 PM 5/21/2012



Test Summary

Counter:	1938
Elapsed Time:	00:00:31
Operator:	AZM
Sample:	RC12-003-R12
Resident Engineer:	
Ticket:	GL# 12-037
E.A.NUMBER:	02-2E3501
Procedure Name:	Cores test
Start Date:	5/21/2012
Start Time:	4:15:41 PM
End Date:	5/21/2012
End Time:	4:16:12 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q12-024

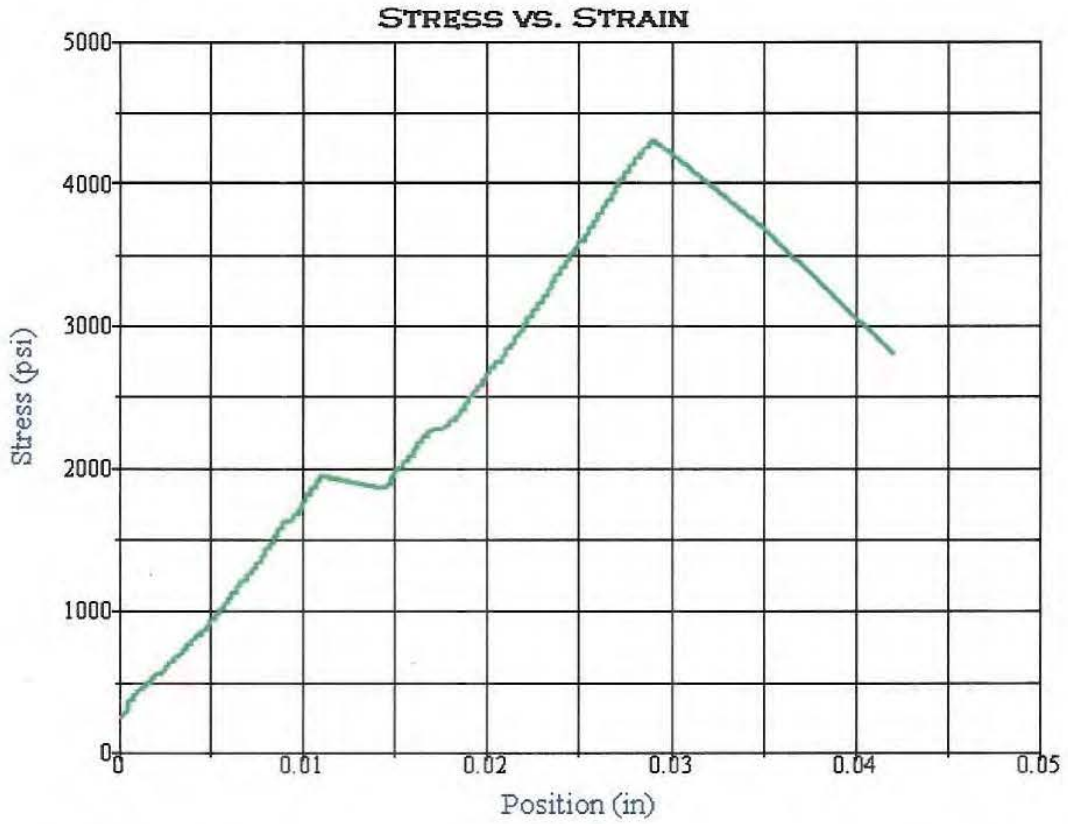
Test Results

Specimen Gage Length:	4.3000 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	6011 lbf
Compressive Strength:	1340 psi

CALTRANS
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design - North

EA: 02-2E3501	**UNCONFINED COMPRESSION TEST RESULTS SPECIMEN RC-12-003-12**
Date: September 2012	
02-TRI-299; PM 0.4/0.9; RET. WALL NO. 3 FOUNDATION REPORT	Plate No. B-2

D1K00YB11939 4:27:34 PM 5/21/2012



Test Summary

Counter:	1939
Elapsed Time:	00:01:53
Operator:	AZM
Sample:	RC12-004-R02
Resident Engineer:	
Ticket:	GL# 12-037
E.A. NUMBER:	02-2E3501
Procedure Name:	Cores test
Start Date:	5/21/2012
Start Time:	4:22:11 PM
End Date:	5/21/2012
End Time:	4:24:04 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q12-025

Test Results

Specimen Gage Length:	4.5900 in
Diameter:	2.4100 in
Area:	4.5617 in²
Maximum Load:	19671 lbf
Compressive Strength:	4312 psi

CALTRANS
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design - North

EA: 02-2E3501	**UNCONFINED COMPRESSION TEST RESULTS SPECIMEN RC-12-004-02**
Date: September 2012	
02-TRI-299; PM 0.4/0.9; RET. WALL NO. 3 FOUNDATION REPORT	Plate No. B-3

Results sent to: LUIS PARADES-MEJIA

Division of Engineering Services
Materials Engineering and Testing Services
Corrosion and Structural Concrete Field Investigation Branch
Report Date: 9/5/2012
Reported by Michael Mifkovic

TEST SUMMARY REPORT - SOIL

EA **02-2E3501**

EFIS: **0200000211**

Dist/Co/Rte/PM: **02 / TRI /299/ / 0.5-0.8 PM**

CORROSION LAB #	TL101 #	BORE #	DEPTH (FT) START	DEPTH (FT) END	MINIMUM RESISTIVITY[1] (ohm-cm)	pH[1]	CHLORIDE CONTENT[2] (ppm)	SULFATE CONTENT[3] (ppm)	IS SAMPLE CORROSIVE?
SOIL SAMPLE FROM: EASTERN EMBANKMENT									
CR20120339	C644097	RC-12-003	0	20	7822	6.81	3	61	NO

This site is not corrosive to foundation elements (see note below).

†NOTE: MSE WALL #3

Note: For structural elements, the Department considers a site corrosive if one or more of the following conditions exist: pH is 5.5 or less, chloride concentration is 500 ppm or greater, sulfate concentration is 2000 ppm or greater. MSE backfill shall conform to the requirements of section 47-2.02C Structure Backfill in the 2010 Standard Specifications.

[1]CTM 643, [2]CTM 422, [3]CTM 417

CR20120339 - CR20120339

9/5/2012

MATERIALS INFORMATION

OPTIONAL DISPOSAL/MATERIAL SITES

INFORMATIONAL HANDOUT

FOR CONSTRUCTION CONTRACT
IN TRINITY COUNTY NEAR SALYER
FROM 0.7 MILE TO 0.2 MILE WEST
OF CAMPBELL RIDGE ROAD

TRI-299-0.4/0.9
ENCHILADA CURVE IMPROVEMENT

OPTIONAL DISPOSAL SITE
TRI-299-Post Mile 12.5

Note: The records from which this compilation was made may be inspected in the District Office at 1656 Union Street, Eureka, CA 95501 or Contact the Disposal Site Coordinator, Johnathon Jackson, (707) 445-6479, e-mail: Johnathon_Jackson@dot.ca.gov

Facts stated herein are as known to the State of California, Caltrans, and are to be verified by the Contractor as per Section 6-2 of the Standard Specifications.

Table of Contents

General Provisions

This site is provided by Caltrans, at the option of the contractor, for the disposal of excess materials generated at the Whole Enchilada Project. Existing facilities at the disposal site shall be preserved from damage by the Contractor.

Cooperation with Others

- This site may also be used by Caltrans Maintenance
- Caltrans and Humboldt County plan to crush material before and during the early phases of the project. If the contractor needs to dispose material during this period the East end of the disposal site will be available. Once the contractor is in need of moving massive amounts of roadway excavation both Caltrans and the County will move out of the way. During construction contact District 1 Maintenance Supt. Weldon Hailey at (707) 464-4868.

Buried man-made objects may exist within areas designated for excavation.

- The State assumes no liability for damage to Contractor's equipment. No compensation will be made to the contractor for the handling of non-hazardous man-made objects.
- Hazardous materials will be the responsibility of the State upon notification to the State Engineer.

Tree Removal

- Tree removal must comply with the requirements set in the special provision for the main contract.
- Tree's DBH smaller than 10" and is not marked with blue paint is considered non-merchantable by the Forest Service. These non-merchantable conifers and hardwoods should be placed at the disposal area or the wide turn at the intersection of SR 299 and the Underwood Mountain Road for utilization as firewood by the public.

The only material to be disposed at this site is earthen rock aggregate from project. Asphalt concrete grindings and rubble from project is to become property of the contractor or disposed of at a proper waste facility. Portland Cement Concrete rubble from project is to become property of the contractor or disposed of at a proper waste facility.

Placement of disposed material

- Disposal material shall be place to engineer's line and grades (See attached site map).
- Materials shall be compacted to the extent that it will firmly support rubber tired equipment, and there is no visible evidence of further consolidation of the material being compacted.
- The finished surface shall be uniformly graded and slopes cat-tracked.
- Construction Storm Water Best Management Practices shall apply to this site.
- Final Erosion Control on newly finished slopes shall be **Erosion Control (Bonded Fiber Matrix),** the same as those for the project.
- The top surface of the site must be capped clean material that does not contain asbestos. Recommend using existing rocky material found within the disposal site.

INDEX OF PLANS

SHEET No.	DESCRIPTION
1	TITLE AND LOCATION MAP
2	TYPICAL CROSS SECTION
3	LAYOUT

STATE OF CALIFORNIA

DEPARTMENT OF TRANSPORTATION

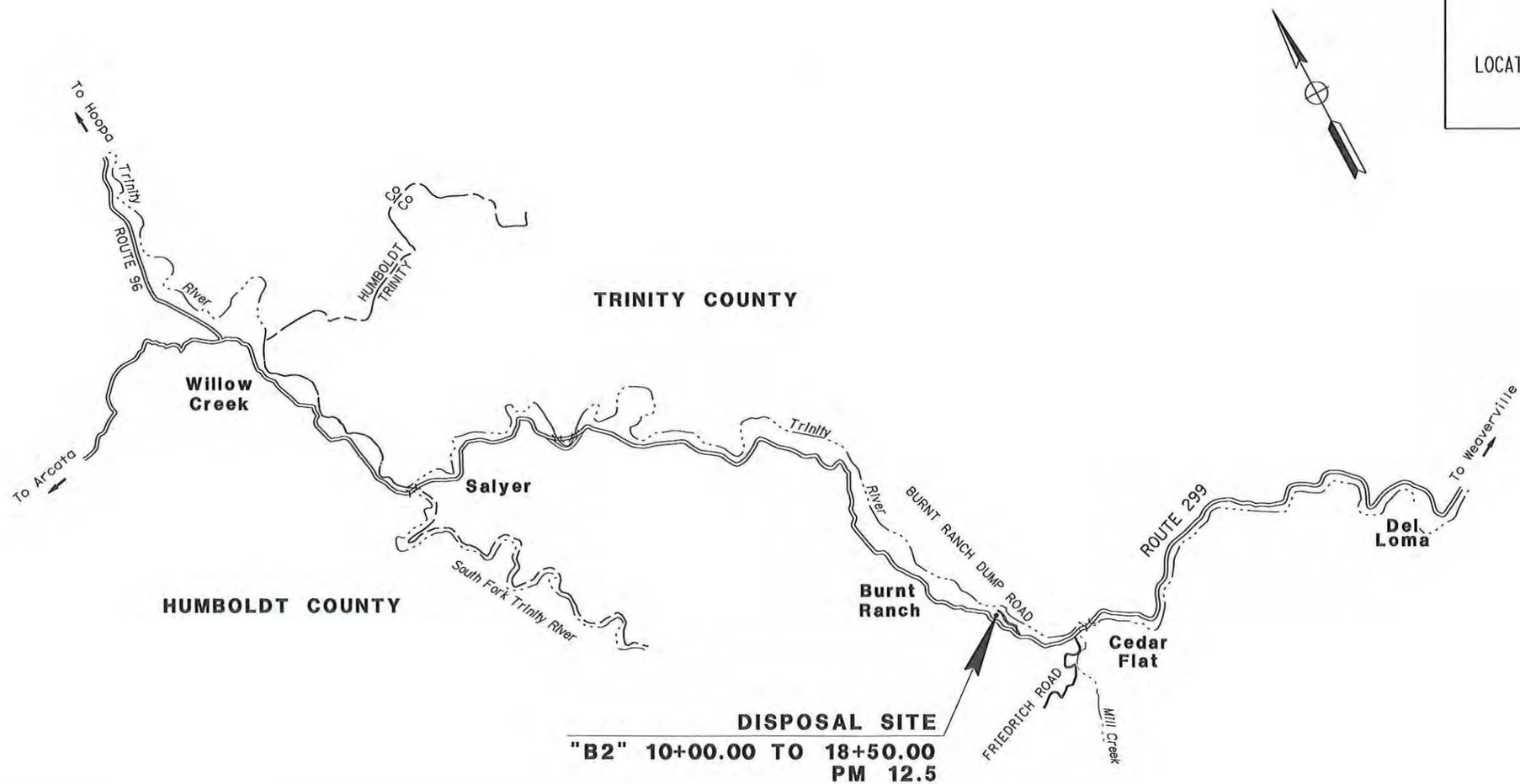
PROJECT PLANS FOR CONSTRUCTION ON

STATE HIGHWAY

OPTIONAL DISPOSAL SITE

TO BE SUPPLEMENTED BY STANDARD PLANS DATED MAY 2006

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
02	Tri	299	12.5	1	3



NO SCALE

10-30-12
PROJECT ENGINEER DATE
REGISTERED CIVIL ENGINEER

REGISTERED PROFESSIONAL ENGINEER
SHAUN ALEXANDER
No. 70833
Exp. 6-30-13
CIVIL
STATE OF CALIFORNIA

PLANS APPROVAL DATE

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF ELECTRONIC COPIES OF THIS PLAN SHEET.

DESIGN ENGINEER: SHAUN ALEXANDER
PROJECT MANAGER: CHRIS HARVEY

CONTRACT No. 02-2E3504

CU 03 242 | EA 2E3501

LAST REVISION 10-30-12
DATE PLOTTED => 01-NOV-2012
TIME PLOTTED => 09:43

BORDER LAST REVISED 3/1/2007 | CALTRANS WEB SITE IS HTTP://WWW.DOT.CA.GOV/ | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | USERNAME => s131190 DGN FILE => 02-2E350_Title_Disposal.dgn

\\S102cadam02\proj2\02\2E350\design\500_Design\Disposal site\disposal_files\Burnt Ranch\Transfers\tc_disposal\02-2E350_Title_Disposal.dgn

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
02	Tri	299	12.5		

PS&E REVIEW 08-27-12
REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
SHAUN ALEXANDER
No. C70833
Exp. 06-30-13
CIVIL
STATE OF CALIFORNIA

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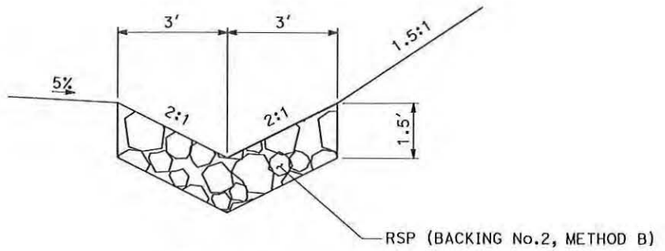
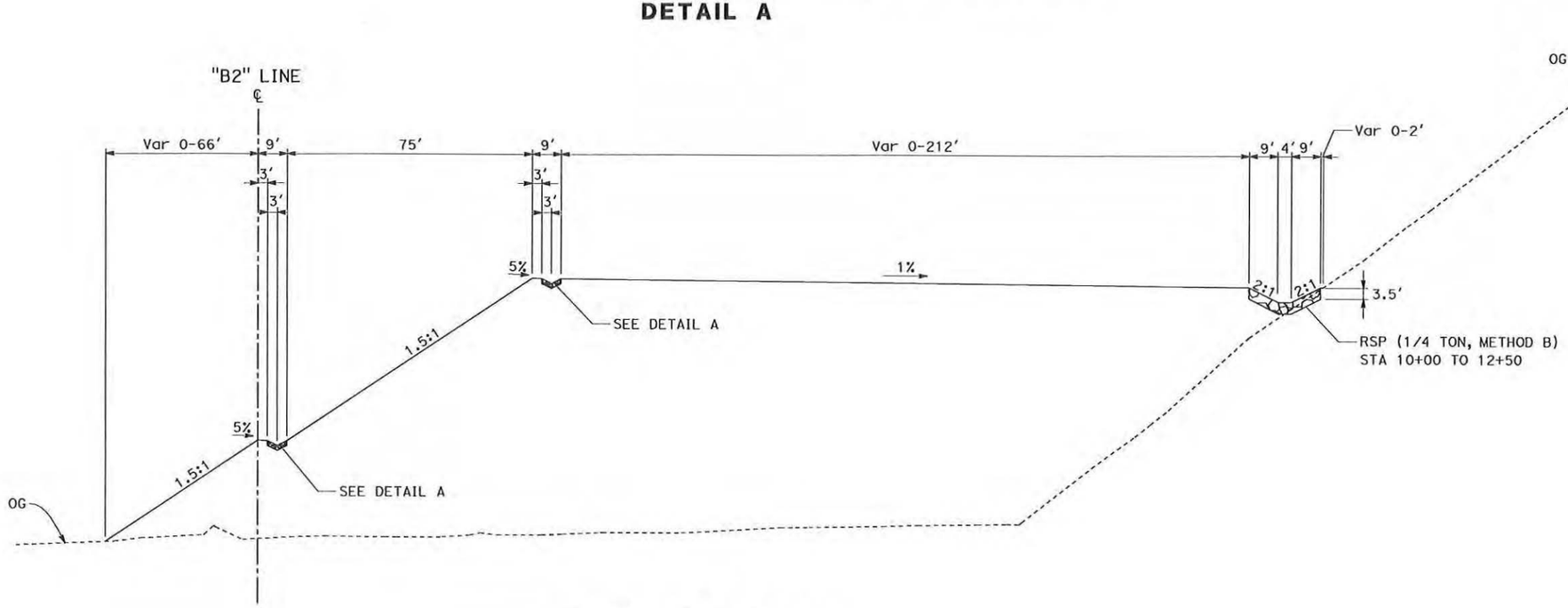


DETAIL A



"B2" 10+00.00 TO 18+50.00

TYPICAL CROSS SECTION

NO SCALE

X-1

\\S1502caddm02\proj2\02\2E350\design\500_Design\Disposal site\disposal_files\Burnt Ranch\TransferSta_disposal\02-2E350_Typ_xsect_Disposal.dgn

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION	DESIGN
FUNCTIONAL SUPERVISOR	ALBERT TRUJILLO
CALCULATED-DESIGNED BY	SOCORRO URENA
CHECKED BY	SHAUN ALEXANDER

REVISED BY	DATE REVISED

LAST REVISION 08-27-12 | DATE PLOTTED => 01-NOV-2012 | TIME PLOTTED => 10:00

BORDER LAST REVISED 7/2/2010 | USERNAME => s131190 | DGN FILE => 02-2E350_Typ_xsect_Disposal.dgn | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | UNIT 0316 | PROJECT NUMBER & PHASE 02000002111

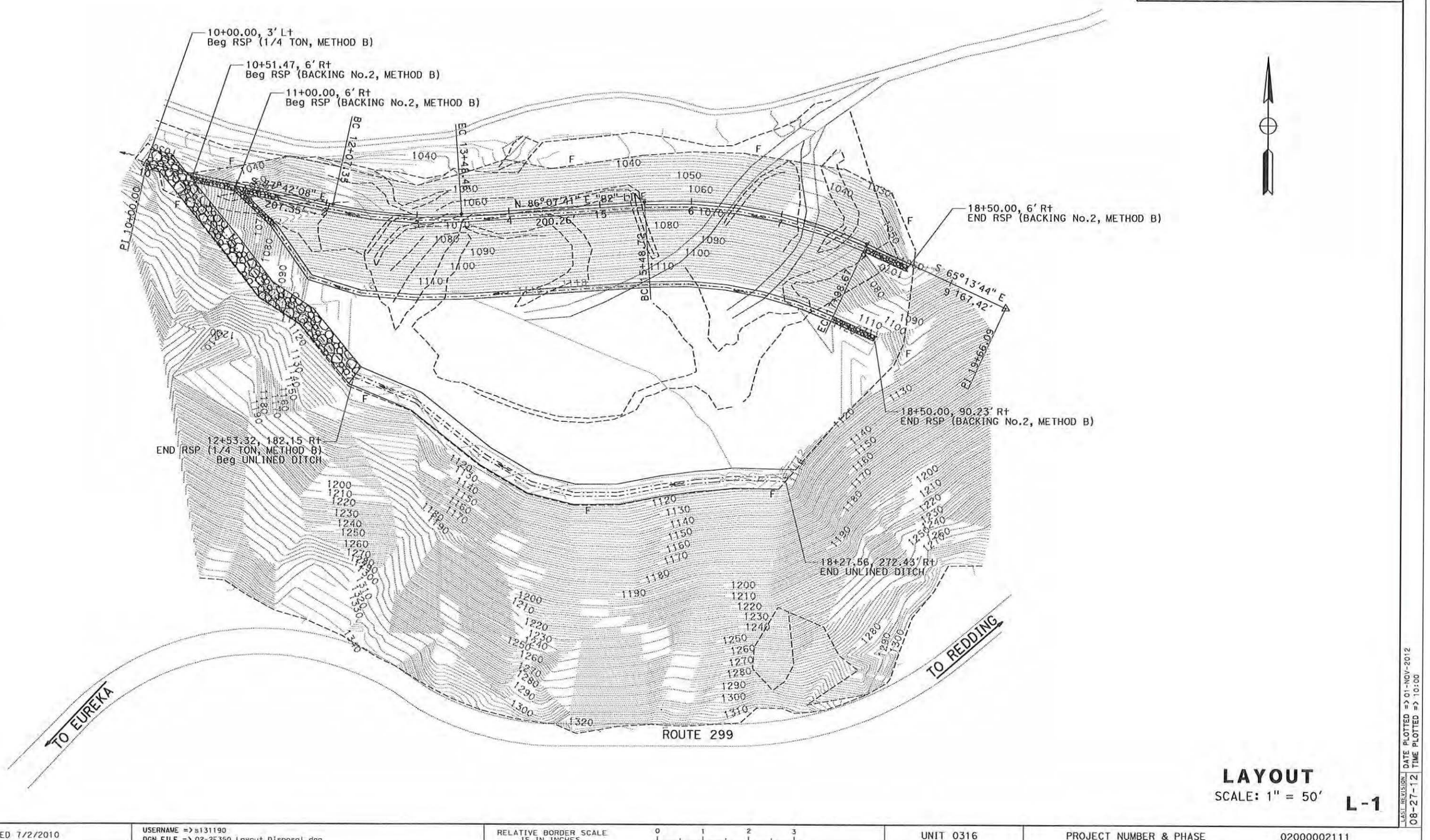
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
02	Tri	299	12.5		

PS&E REVIEW 08-27-12
REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — SHAUN ALEXANDER — No. C70833 — Exp. 06-30-13 — CIVIL — STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.



LAYOUT
SCALE: 1" = 50'

L-1

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION	SOCORRO URENA	SHAUN ALEXANDER	
Caltrans DESIGN	CALCULATED-DESIGNED BY	CHECKED BY	REVISED BY / DATE REVISED
FUNCTIONAL SUPERVISOR: ALBERT TRUJILLO			

LAST REVISION: DATE PLOTTED => 01-NOV-2012
08-27-12 TIME PLOTTED => 10:00

\\S102eddm02\proj2\02\2E350\design\500_Design\01disposal site\disposal_files\Burnt Ranch\TransferSta_disposal.dgn

BORDER LAST REVISED 7/2/2010 | USERNAME => s131190 | DGN FILE => 02-2E350_Layout_Disposal.dgn | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | UNIT 0316 | PROJECT NUMBER & PHASE 02000002111