INFORMATION HANDOUT

For Contract No. 01-0B4604
At 01-Hum-299-32.06

Identified by
Project ID 0112000129

AGREEMENTS

California Department of Industrial Relations - Mining and Tunneling Unit

Underground Classification C109-089-14T
POTENTIALLY GASSY WITH SPECIAL CONDITIONS
MANDATORY PRE-JOB CONFERENCE with the Division

MATERIALS INFORMATION

Revised Foundation Report for Willow Creek Wall (Bridge No. 04-E0034)

Naturally Occurring Asbestos Survey Summary Report

AGREEMENTS

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MANDATORY PRE-JOB CONFERENCE with the Division

STATE OF CALIFORNIA EDMUND G. BROWN, JR., Governor

DEPARTMENT OF INDUSTRIAL RELATIONS
DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
MINING AND TUNNELING UNIT
2424 Arden Way, Suite 125
Sacramento, California 95825
doshM&Tsac@dir.ca.gov

Telephone (916) 574-2540
FAX (916) 574-2542

May 22, 2014

California Department of Transportation
North Region Design R1, MS#71
1031 Butte Street
Redding, CA 96001

Attention: Sean Shepard, Project Engineer

Subject: Underground Classification No. C109-089-14T
Classification: Potentially Gassy With Special Conditions
Project: Willow Creek Wall, Shasta County

The information provided to this office relative to the above project has been reviewed. On the basis of this analysis, an Underground Classification of "Potentially Gassy With Special Conditions" has been assigned to the tunnel identified on your submittal. Please retain the original Classification for your records and deliver a true and correct copy of the Classification to the tunnel contractor for posting at the job site.

When the contractor who will be performing the work is selected, please advise them to notify this office to schedule the mandated Pre-Job Conference with the Division prior to commencing any activity associated with boring of the tunnel. A Pre-Job Request Form is enclosed.

Should you have another bore under construction that is not required to have an Underground Classification (i.e.: less than 30 inches in diameter), please contact the Mining and Tunneling Unit prior to any employee entry of such a space.

If you have any questions on this subject, please contact this office at your earliest convenience.

Sincerely,

Douglas Patterson
Senior Engineer

enc: Classification
Pre-Job Request Form

cc: sean.shepard@dot.ca.gov
jsnapp@dir.ca.gov

State of California

Department of Industrial Relations

DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
MINING AND TUNNELING UNIT

Underground Classification

C109-089-14T **CALIFORNIA DEPARTMENT OF TRANSPORTATION**

of **NORTH REGION DESIGN R1, MS#71, 1031 BUTTE ST; REDDING, CA 96001**

at **WILLOW CREEK WALL**

has been classified as ***** POTENTIALLY GASSY WITH SPECIAL CONDITIONS *****

as required by the California Labor Code § 7955.

The Division shall be notified if sufficient quantities of flammable gas or vapors have been encountered underground. Classifications are based on the California Labor Code Part 9, Tunnel Safety Orders and Mine Safety Orders.

*****SPECIAL CONDITIONS*****

1. **A Certified Gas Tester shall perform pre-entry and continuous monitoring of the underground environment to measure Oxygen and detect explosive, flammable, and toxic gasses whenever an employee is working in the underground environment.**
2. **Mechanical ventilation shall provide for continuous exhaust of fumes and air at any time an employee is working in the underground environment. The primary ventilation fans must be located outside of the underground environment and shall be reversible by a single switch near the fan location.**
3. **The Division shall be notified immediately if any Flammable Gas or Petroleum Vapor exceeds 5% of the Lower Explosive Limit.**
4. **All utilities that may be in conflict with the project shall be identified and physically located (potholed) prior to the start of project operations.**

SOIL OR ROCK CONTAINING NATURALLY OCCURING ASBESTOS

Two 30-inch-diameter 25-foot-deep drilled shafts along the north side of Route 299 located approximately 7.0 miles west of Willow Creek in Humboldt County

This classification shall be conspicuously posted at the place of employment.

Douglas Patterson, Senior Engineer

May 22, 2014

State of California
Department of Industrial Relations
Division of Occupational Safety & Health

REQUEST FOR PRE-JOB (TUNNEL)

ATTACH COPY OF CLASSIFICATION AND DIESEL PERMIT

Company Name:_____

Phone_____FAX:_____

DATE FAXED: _____

PLEASE NOTE: THE BORING CONTRACTOR SHOULD SCHEDULE THE PREJOB AS FAR IN ADVANCE AS POSSIBLE – AT LEAST 3-4 DAYS IN ADVANCE. THE DIVISION REQUIRES THE JOB TO BE SET UP WHEN THE FIELD ENGINEER ARRIVES FOR THE PREJOB. THIS MEANS THAT THE BORE PIT HAS BEEN DUG AND PROPERLY GUARDED, THE CRANE IS IN PLACE AND READY TO LIFT, THE BORING MACHINE IS IN THE PIT AND READY TO GO, AND THE CREW IS READY TO BEGIN BORING THE TUNNEL. IF THERE IS A DELAY IN SETTING UP THE JOB, THE BORING CONTRACTOR SHOULD CONTACT THE DIVISION IMMEDIATELY.

PRE-JOB REQUEST DATE & TIME: _____

ON-SITE SUPERVISOR & CELL NO.: _____

CLASSIFICATION #: _____ **DIESEL PERMIT #:** _____

BORE DIAMETER AND LENGTH: _____ _____
(Diameter) (Length)

IS BORE ENTRY ANTICIPATED? YES NO
(Circle One)

You MUST contact the Division if entry is planned, REGARDLESS of the bore diameter.

MANNER OF EXCAVATION: _____

_____

JOB-SITE LOCATION AND DIRECTIONS: _____

_____

_____

GENERAL CONTRACTOR: _____

SUBMITTED BY: _____

REVIEWED BY: _____ **DATE:** _____

☐ *Mining & Tunneling Unit, District 1*
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San Bernardino, California 92401-1442
(909) 383-6782; ***FAX: (909) 388-7132***

MATERIALS INFORMATION

Revised Foundation Report for Willow Creek Wall (Bridge No. 04-E0034)

M e m o r a n d u m

Flex your power!
Be energy efficient!

To: GUDMUND SETBERG
Chief, Design Branch 2
Office of Bridge Design - North

Attention: Henry Fang

Date: January 27, 2014

File: 01-HUM-299-PM 32.06
Structure No. TBD
01-0B4601, 0112000129
Willow Creek Wall
Soldier Pile Wall

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

Subject: Revised Foundation Report

INTRODUCTION

General

This is a revision of the Foundation Report (FR) for the Willow Creek Wall Soldier Pile Wall dated November 1, 2013. Under the recommendations of Caltrans expert on retaining walls, Anoosh Shamsabadi, the generalized material properties section has been revised.

As requested, the Office of Geotechnical Design North (OGDN) is providing this Foundation Report for the design and construction of the proposed soldier pile wall, Route 299 at PM 32.06, near the town of Willow Creek in Humboldt County (See Plate 1).

Project Description and Proposed Improvements

The project consists of constructing a soldier pile retaining wall to repair a section of the roadway at PM 32.06 that was damaged by a heavy rainfall on March 27, 2011. Part of the embankment fill under the westbound lane of the roadway was washed out leaving a large void beneath the west bound lane. If no remedial action is taken, there will be further loss of material due to erosion down the slope and eventual roadway loss. A soldier pile wall is proposed to support the new embankment in this area. Plates No. 2 and 3 provide a general summary of the extent of the proposed wall provided by the Office of Bridge Design North.

Table No. 1: Summary of Extent of Soldier Pile Wall

Wall Type	Stationing and Offset, "R1" Line (feet)			Length (feet)	Maximum Height (feet)
	Begin	End	Offset		
Soldier Pile	518+66.01	519+05.01	24 Lt	39	14

The information in Table No. 1 above is based on the Foundation Plan, dated July 1, 2013, as part of the Foundation Report Request, dated September 11, 2013, (Reference No. 13) provided by Design Branch 2 of the Office of Bridge Design – North.

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. A site investigation for the project included (see Subsurface Exploration and Laboratory Testing Program section) four exploratory borings and sample collections 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

Exploratory Borings

Our Office performed an exploratory boring subsurface investigation from September 9, 2012 to November 26, 2012. The subsurface investigation consisted of four vertical 5 inch diameter mud rotary borings (designated as RC-12-001 through RC-12-004). Equipment used for the subsurface investigation consisted of an Acker truck-mounted drill rig equipped with an automatic hammer with hammer efficiency of 74 percent (Reference No. 11). 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 No. 2 presents a summary of the borings performed.

Table No. 2: Summary of Boring Exploration

Boring Number(1)	Station (ft)	Offset from Center Line (ft)	Top Elevation (ft)	Depth (ft)	Bottom Elevation (ft)
RC-012-001	518+85	13.5 Lt	1961.2	51.5	1909.7
RC-012-002	518+55	13.0 Lt	1962.9	61.5	1901.4
RC-012-003	518+21.5	24.0 Rt	1964.6	60.0	1904.6
RC-012-004	519+40	34.0 Lt	1957.4	39.5	1917.9

Notes: (1) 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 Standard Penetration Tests (SPT). The SPT was utilized to characterize soils and decomposed rock encountered above bedrock at the proposed wall location. Representative samples were selected for subsequent laboratory testing.

Site Description

The overall project site is located in a hilly, tree-studded terrain bordering to the east with Six Rivers National Forest Administrative Boundary on State Route 299. The project area is generally rural. According to the web-based Caltrans Postmile Query Tool (Reference No. 12), the subject site is located at latitude and longitude coordinates of 40.90699^{o} North and -123.72825^{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 is approximately 26 feet wide including two-feet-wide paved shoulders. A paved pullout area exists immediately east of the wall location. Immediately adjacent to the edge of the east bound lane, there is a drainage ditch with widths varying from 2 to 10 feet. The ditch connects to a 42-inch diameter galvanized metal culvert, which crosses under the highway diagonally.

This culvert drains a perennial small creek that originates somewhere uphill, outside the Caltrans Right of Way, and flows south to north. Approximately 5 to 6 gallons per minute of water flow through the culvert continuously at the time of our field investigation. The culvert drains into pipe that runs down the slope to the Willow Creek located at the bottom of the valley.

The road at the project site and its adjacent sections had been excavated from the down slope side that faces the Willow Creek. Within the project limits, the elevations on the paved roadway vary from 1957 to 1965 feet (NAVD88) (See Plate No. 3). Most of the existing roadway within the area of the project was built by cutting into rock utilizing cut slope angles of 45° to 55° and a maximum height of about 80 feet.

The area above the project site and outside of Caltrans Right of Way shows erosional scars shaped as a large bowl due to the combined action of flowing water from the perennial creek that intersects the state route and the construction of the road slope. After the completion of the existing slope, in an attempt to re-establish the original creek gradient, water removed rock and soil material of upper areas of the road slope transporting them in the form of mud and rock flows to lower areas. These mud and rock flows have been dissected the existing slopes choking the culverts and blocking the roadway. Most of these culverts were abandoned and new ones were built to handle such debris flows. The roadway and the road slope within the project limits had to be repaired after a "slide" occurred in 1970 (See Reference No. 1). The remedial action had included the installation of a 44-inch diameter corrugated steel pipe that was subsequently replaced in 1984 for the existing 42-inch diameter welded steel pipe mentioned in the Site Description Section (See Reference No. 4).

To the immediate east, it was observed that several corrugated metal culverts have been overwhelmed by the amount of debris material transported by water along the road slope cut during a precipitation event. Currently, the creek bed along the slope cut is draped by large amount of debris material consisting of cobbles, and boulders that range from 1 foot to 3 feet in size approximately.

Regional Geology

The project site is located in the Western Jurassic Plate near the westerly edge of the Klamath Mountains Geomorphic Province of California (see Plate Nos. 5a and 5b). 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 (References No. 2 and No. 3), ultramafic rocks like those found at the project site, belonging to the Josephine ophiolate form a continuous body, a few tens to several miles wide, along the Coast Range zone of faulting. A more detailed description of the ultramafic materials found south of the project area at Horse Mountain, offered by a report by Young accompanies the mapping. The description states:

> *"The ultramafic material consists of coarse-grained bastitic peridotite in the interior of the body, passing into sheared serpentinite toward the margins. Some northwest-trending zones of sheared serpentinite pass through the interior."*

Materials similar to the above descriptions were encountered in our field investigations. No landslide feature is shown on the referenced map within or adjacent to the project

area. However, a relatively large landslide of quaternary sediments is depicted at about fourth tenths of a mile south of the project site. Based on the referenced map (Reference No. 3) the landslide has no apparent influence on the project area.

Site Geologic Conditions

Within the project limits, exposures of the ultramafic rocks were noted to be composed of serpentinized peridotite, serpentinized schist with hard serpentinized peridotite layers, and fine-grained serpentinized peridotite. 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 serpentinized peridotite rocks. 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 protruding from the ground surface and inhibiting the accumulation of vegetation, which was sparse and poorly-developed as a result. The serpentinized schist rock comprises the second group which was generally decomposed to intensely weathered and sheared, indicating that the structure and mineralogical components are inherently susceptible to weathering. The product of decomposition of the schist was typically observed to be poorly graded and rock pieces of gravel size with silt and clay.

Based on our observations of the existing road slope above the road way, the attitude of the majority of the discontinuities are favorable for the stability of the slope. Discontinuities are generally dipping into the slope and obliquely to the direction of dip of the road slope. It is assumed that the same rock conditions may occur in the slope below the road way where the proposed retaining wall will be constructed. However, there is a possibility that rock conditions in the slope below the road way may differ from those from the slope above the road way.

<u>Subsurface Conditions</u>

Results from the subsurface investigation indicate that the fill in the area within the proposed Soldier Pile wall limits is about 13 feet deep.

Based on borings performed, the near-surface materials 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 10 to 20 feet of moderately weathered to decomposed formational metamorphic bedrock consisting of serpentinized peridotite. Underlying the serpentinized peridotite to the bottom of the exploratory boring is decomposed and soft, intensely sheared serpentinized schist interlayered with thick layers of moderately weathered and hard serpentinized peridotite. A more detailed description of the materials

encountered in the borings is presented on the Logs of Test Borings (LOTBs) attached in Appendix A.

Ground Water

A static ground water table was not established when the exploratory borings were performed due to the use of mud Rotary method. A piezometer was installed in exploratory boring RC-12-003 and detected a ground water at a depth of 54.5 feet deep. During our field visits to the project site, slopes in the vicinity of the site appeared absent of seeps and springs.

It is anticipated that the ground water should not significantly affect the proposed construction. However, localized ground water condition may be encountered and should be prepared for.

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 depicts an area likely to contain Naturally Occurring Asbestos (NOA) within and immediately adjacent to the project limits. In review of available published geologic mapping (Reference Nos. 2, 3 and 7), and the aforementioned NOA mapping, the project area falls within an area of NOA or ultramafic rocks (designated as "serpentinized ultramafic rocks"). Based on the geologic conditions observed during site visits and on the results of subsurface exploration the potential for the presence of ultramafic rocks within the project area is considered likely.

Soil and Rock Laboratory Testing and Results

Laboratory tests were performed to assess corrosivity and engineering properties of the near-surface colluvial soils. 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. The Point Load Strength Index and Unconfined Compression Strength tests were performed on rock specimens per ASTM D 5731-08 and ASTM D 7012-10.

Based on the results of point load strength index testing and Unconfined Compression testing of serpentinized peridotite rock core specimens, the Uniaxial Compressive Strength of the rock materials was estimated to be as high as 3392 psi. Laboratory test results for samples collected from borings performed for Retaining Wall are shown in Appendix B.

The result of the unconfined compression testing indicated that the failure of the rock specimen achieved at the maximum stress applied followed near vertical calcite infill of a healed fracture in a stepped pattern. (See Plate B-2 in Appendix B).

It should be noted that the tested rock specimens may represent rock layers encountered within the decomposed and weak rock, and by no means do they represent the rock mass within the project limits.

Corrosion Evaluation

A composite soil sample was collected from borings RC-12-001 and RC-12-002 during the 2012 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. 6) 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 result of the laboratory tests determines that the composite sample collected at this site to be non-corrosive. Refer to Table No. 3 below for the specific test results.

Table No. 3: Corrosion Test Summary

SIC Corrosion Number	Boring Number	Sample Depth (feet)	pH	Minimum Resistivity (Ohm-cm)	Sulfate Content (ppm)	Chloride Content (ppm)
CR20120419	RC-12-001	0.0 – 5.0	8.88	6498	N/A	N/A
CR20120420	RC-12-002	0.5 – 5.0	8.75	3450	N/A	N/A

Seismicity

Based on the Caltrans ARS Online Tool (Version 2.3.06), the nearest active fault for the site is the Big Lagoon-Bald Mountain Fault (Fault ID No. 9) with MMax of 7.5. The fault is located approximately 5.8 miles west of the project site (see Plate No. 6). The closest distance to the fault rupture plane from the site is estimated to be 3.3 miles.

Based on the LOTB, a V_{S30} (the weighted shear wave velocity for the top 100 feet of foundation materials) of about 1800 feet per second is considered to be applicable to the site materials.

Based on the "Methodology for Developing Design Response Spectrum for Use in Seismic Design Recommendations, November 2012," (Reference No. 10) the design ground motion is the highest spectral acceleration as obtained by any or a combination of the following three methods for the Willow Creek Wall site:

1) State wide minimum deterministic spectrum requirements with MMax of 6.5, vertical strike-slip event with a rupture distance of 7.5 miles.
2) The nearest active fault as shown on the ARS Online Tool (Version 2.3.06).
3) The USGS 5% Probability of Exceedance in 50 years (975 years return period).

The Acceleration Response Spectrum (ARS) is determined by method 2 as stated above. The peak ground acceleration is estimated to be 0.83g.

The potential for soil liquefaction based on the foundation materials is considered to be insignificant.

The project site does not lie within the Big Lagoon-Bald Mountain fault zone and no splay from same fault crosses the study area. Therefore, the potential for surface fault rupture at the site is absent.

Slope Stability Analysis

The slope stability analyses were performed using the Slope-W software (Version 7.21) from Geo-Slope International, Ltd. Cross sections were provided by District Design and the critical cross section was selected for the stability analysis. A pseudostatic coefficient (k_h) of 0.28 was used for the pseudostatic case. The top layer (15 feet thick) is modeled as granular fill material and beneath the fill is the decomposed and weak rock mass. The minimum Factor of Safety (FS) for the slope with the proposed embankment backfill

and wall with zero embedment length are 1.82 and 1.29 for the static and pseudo-static cases, respectively

Conclusions and Recommendations

Based on field observations, subsurface investigations and engineering analyses, the proposed soldier pile wall is suitable for the site. Based on the results of the slope stability analyses results, the slope is stable independent of how deep the soldier piles needed to be for structural stability of the proposed soldier pile wall.

A simplified lateral earth pressure distributions for permanent non-gravity cantilevered wall with discrete vertical wall elements embedded in rock and retaining granular soil is recommended for the proposed wall's structural design and analysis (see Plate No. 7). For the design and analysis purposes, the soil/fill layer is 15 feet deep and below the fill is the decomposed and weak rock mass.

Table No. 4 presents the generalized material properties for design and analysis.

Table No. 4: Generalized Material Properties

Material	Properties				Lateral Earth Pressure Coefficient			
	Internal Friction Angle, ϕ (degrees)	Cohesion, c (psf)	Total Unit Weight, γ (pcf)	Rock Mass Shear Strength, S_m (psf)	Active K_a	Active K_p	Passive K_{ae}	Passive K_{pe}
Fill	32	0	120	-	0.30	-	0.50	-
Decomposed Rock	-	-	140	3000	-	-	-	-

Rock mass shear strength (S_m) value was calculated from RockLab (1.032) computer software (Reference No. 9) and successively compared with that of the Stockton Shale shown in table 3.3 of Rock Mechanics by Richard E. Goodman (Reference No. 5)

Construction Considerations

The decomposed and intensely weathered and fractured bedrock is very susceptible to disintegration under the action of drilling water, leaving an oversized excavation. Therefore, it is recommended that the use of water during the drilling for piles be avoided.

Caving conditions may be present in the fill material and decomposed bedrock. Therefore, temporary casing may be required to keep drilled pile holes open prior to placing concrete.

Difficult drilling may be expected due to the presence of hard rock layers within the soft and decomposed rock at the location of the proposed retaining wall.

The loss 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 into voids and fractures should be expected.

Any temporary construction slope proposed as part of the wall construction may be built as minimum as 1.5:1 (H:V).

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

Naturally Occurring Asbestos (NOA)

As discussed in the previous NOA section of this report, OGDN concludes that the project site is located within an area likely to contain Naturally Occurring Asbestos (NOA) for the presence of ultramafic rocks. In consideration for the 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 (Willow Creek Wall) dated 9/11/2013.*

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

A. *Revised Foundation Report for the Willow Creek Wall, dated 1/27/2014 by Caltrans Division of Engineering Services, Office of Geotechnical Design North.*

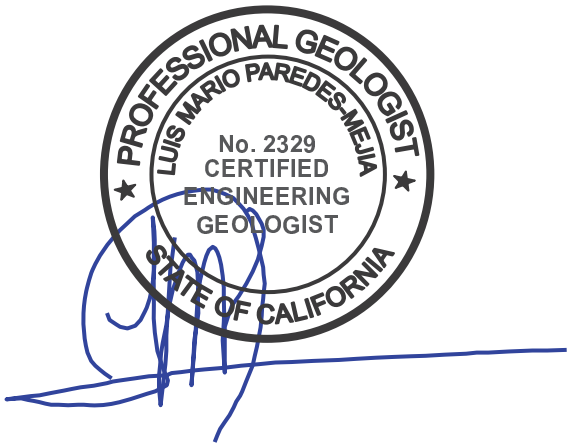
Data and Information available for inspection at the District Office:

A. None

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

A. For Boring RC-12-001 two core boxes, RC-12-002 two core boxes, RC-12-003 three core boxes, and RC-12-004 two core boxes.

If you have any questions or comments, please call Luis Paredes-Mejia at (916) 227-1047, Luke Leong at (916) 227-1081, or Thomas Song at (916) 227-1057.



LUIS M. PAREDES-MEJIA, CEG
Engineering Geologist
Office of Geotechnical Design North
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LUKE LEONG, PE
Transportation Engineer - Civil
Office of Geotechnical Design North
Branch A

e-copy: Thomas Song (Acting Senior)
Talitha Hodgson D01- Proj. Mgmt.
Structure Construction RE Pending File
DES OE, Office of PS&E
GEODOG
DME D1

ATTACHMENTS

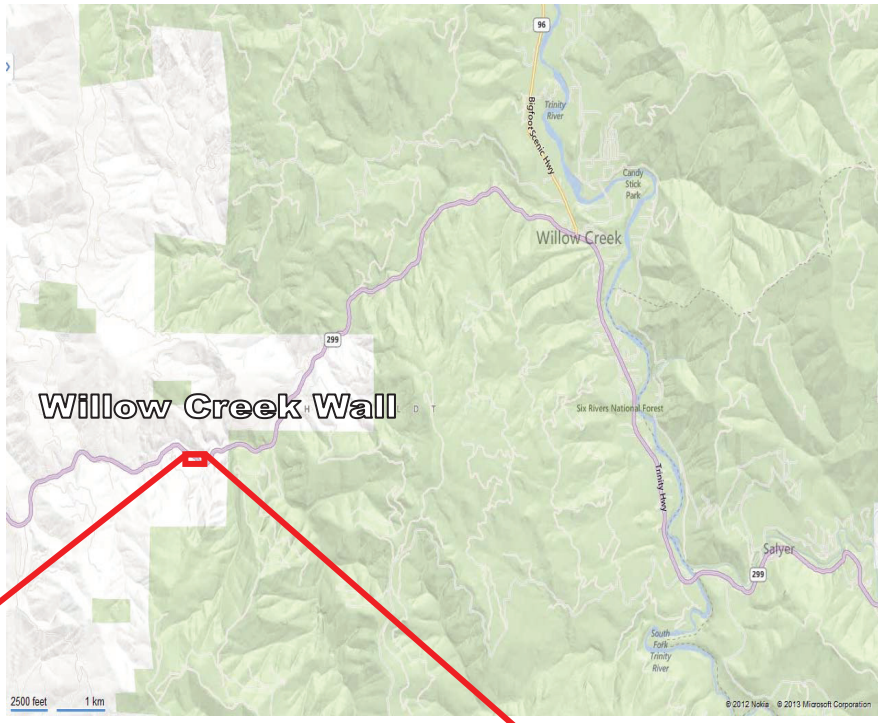
REFERENCES
Plate No. 1. Vicinity Map
Plate No. 2. Topography of Project Area
Plate No. 3. Project Site Plan
Plate No. 4. Retaining Wall No. 1 Site Plan
Plate No. 5A. Geologic Map
Plate No. 5B. Geologic Map Legend
Plate No. 6. Fault Map
Plate No. 7. Simplified Lateral Pressure Distribution – Non-gravity Cantilevered Wall

APPENDIX A: LOG OF TEST BORINGS (LOTB)
Log of Test Borings 1 To 4

APPENDIX B: LABORATORY TESTS RESULTS
Plate No. B-1. Soil Grain Size Test Results
Plate No. B-2. Unconfined Compression Test Results
Plate No. B-3. Point Load Test Results
Plate No. B-4. Corrosion Tests Results

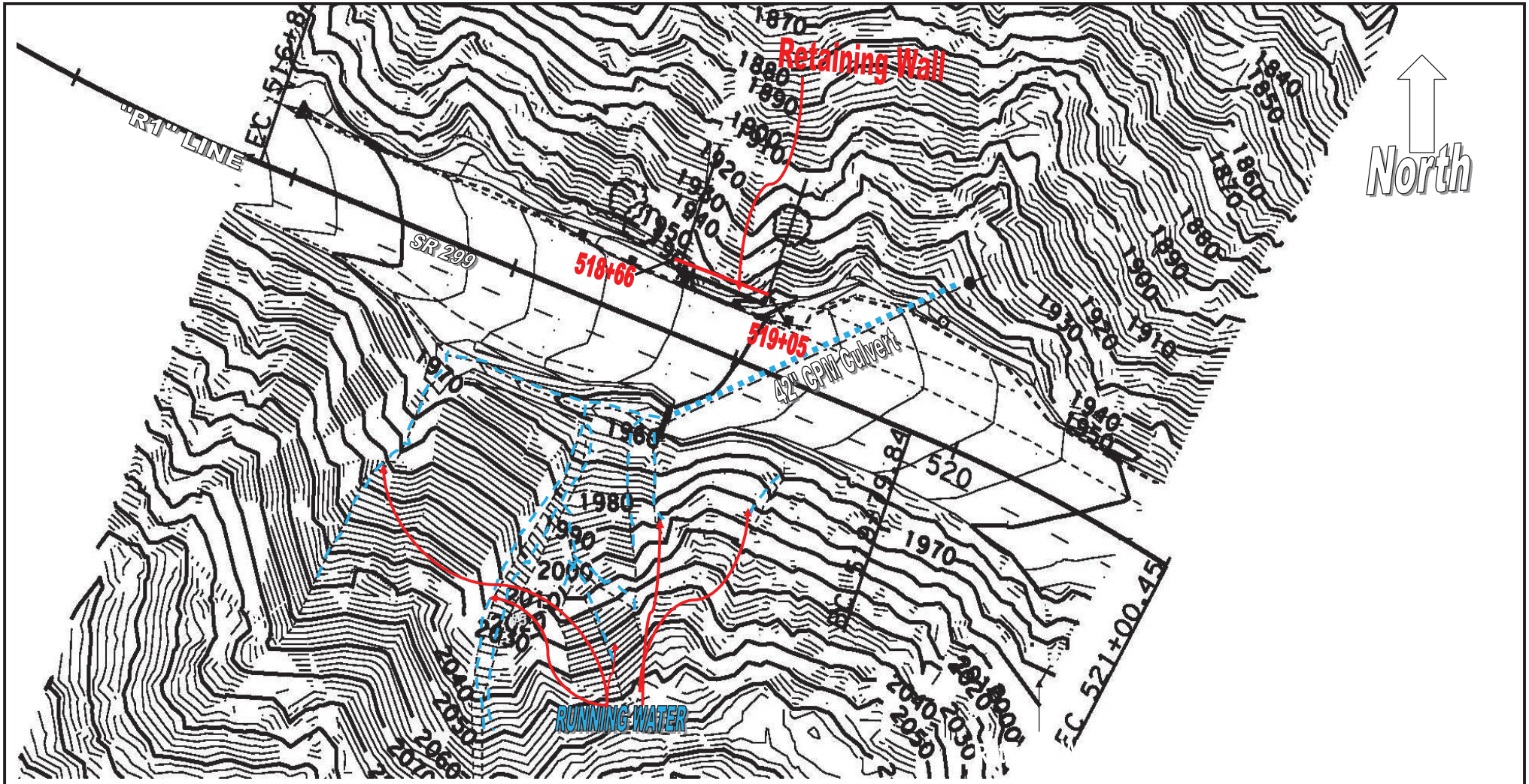
REFERENCES

1. Caltrans (1970) "Project Plan for Construction on State Highway, In Humboldt County About 6.8 Miles West of Route 96 at Willow Creek", "As Built Plans", Contract No. 01-120304 1970 Slide Removal, dated July 27, 1970.
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. Caltrans (1984) "Project Plan for Construction on State Highway in Humboldt County Near Willow Creek at 6.8 Miles West of Route 96", "As Built Plans", "Structure Excavation (Culvert) and Structure Backfill (Culvert) Under Existing Pavement", Cont 01-199284 1984 Repair Washout, dated February 21, 1984.
5. Goodman, R. E. (1989), "Introduction to Rock Mechanics", Second Edition, edited by John Wiley and Sons.
6. Caltrans (2003) "Corrosion Guidelines", Corrosion Technology Branch, Materials Engineering and Testing Services, Caltrans, Version 1.0, September 2003.
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. RockLab Version 1.032 (2011), Rock Mass Strength Analysis Using the Generalized Hoek-Brown Failure Criterion, by Rocksciences Inc., at http://www.rockscience.com/
10. Caltrans (2012) "Methodology for Developing Design Response Spectrum for Use in Seismic Design Recommendations", prepared by Division of Enginnering Services and Geotechnical Services, November 2012.
11. 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.
12. 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.
13. Caltrans (2013) "Request for Final Seismic and Geotechnical Report" prepared by Office of Bridge Design – North, Design Branch 2, dated September 11, 2013.



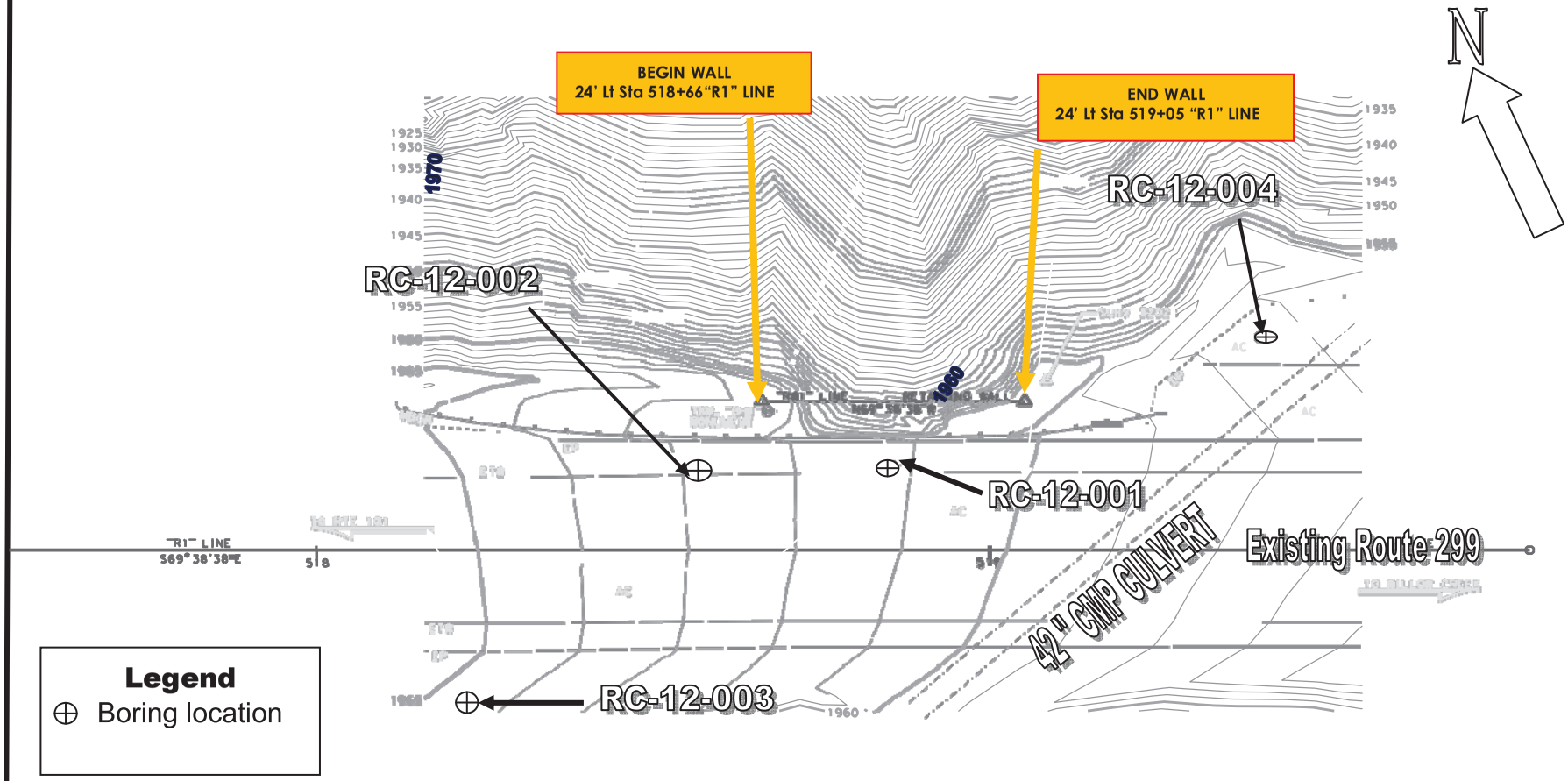
Caltrans	CALTRANS Division of Engineering Services Geotechnical Services Geotechnical Design – North	EA: 01-0B4601 Date: January 2014	**VICINITY MAP**
		01-HUM-299-PM 32.06 WILLOW CREEK WALL	Plate No. 1

Caltrans	CALTRANS Division of Engineering Services Geotechnical Services Geotechnical Design – North	EA: 01-0B4601 Date: January 2014	**Topography of Project Area**
		01-HUM-299-PM 32.06 WILLOW CREEK WALL	Plate No. 2



NO SCALE

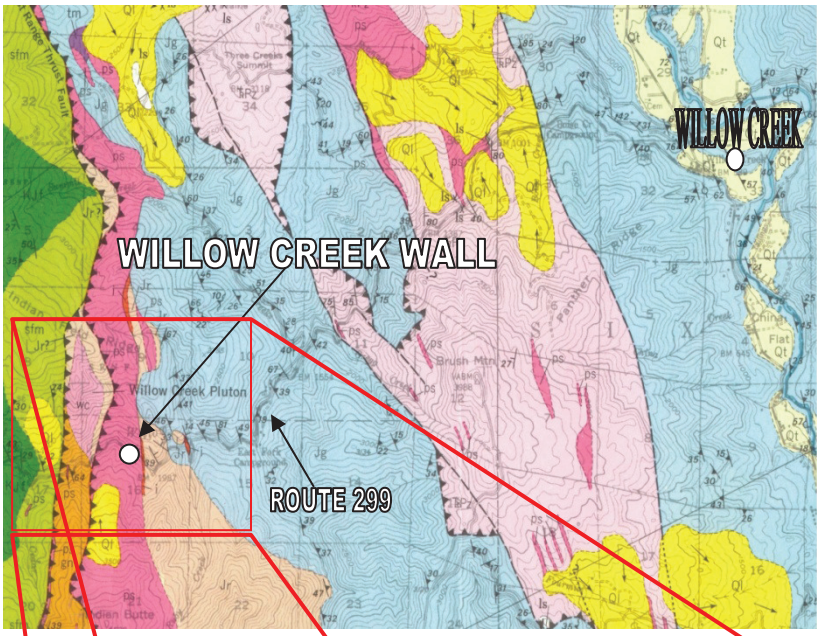
Caltrans	CALTRANS Division of Engineering Services Geotechnical Services Office of Geotechnical Design - North	EA: 01-0B4601 Date: January 2014	**SITE PLAN**
		01-HUM-299-PM 32.06 **WILLOW CREEK WALL**	Plate No. 3



NO SCALE

Caltrans	CALTRANS Division of Engineering Services Geotechnical Services Geotechnical Design – North	EA: 01-0B4601 Date: January 2014	Retaining Wall Subsurface Investigation Plan
		01-HUM-299-PM 32.06 WILLOW CREEK WALL	Plate No. 4

NO SCALE



N

See Plate 5B for Explanations

From Young, John C. (1978), Geology of the Willow Creek Quadrangle, Humboldt and Trinity Counties, California. Map Sheet 31, Scale 1:62,500.

Caltrans	CALTRANS Division of Engineering Services Geotechnical Services Geotechnical Design – North	EA: 01-0B4601 Date: January 2014	GEOLOGIC MAP
		01-HUM-299-PM 32.06 WILLOW CREEK WALL	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.

Jr

Rogue (?) Formation

Mafic to intermediate volcanic flows and tuffs, now altered to greenstones. Some agglomerates or volcanic conglomerates in upper part.

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.

PLUTONIC OR ULTRAMAFIC ROCKS

LATE JURASSIC

Ja

Ammon Ridge Pluton

Diorite with marginally more mafic or granitic zones

MIDDLE JURASSIC

Ji

Ironside Mountain Batholith

Diorite

ps

Ultramafic rocks

includes those in ŦPz

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

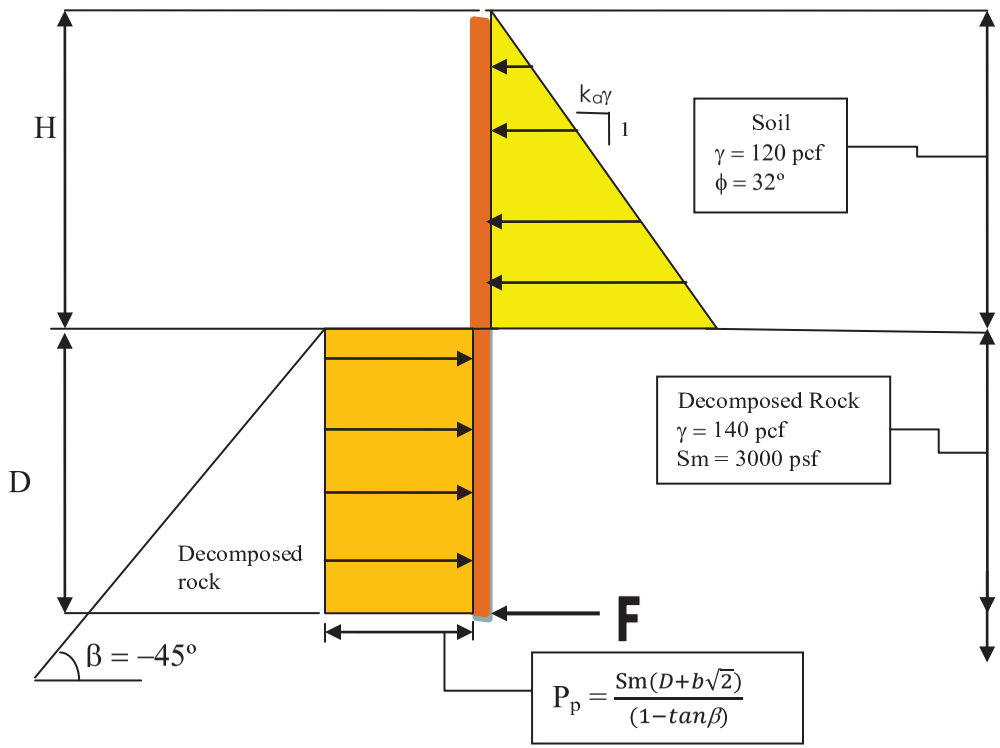
19°
TRUE NORTH
MAGNETIC NORTH
APPROXIMATE MEAN DECLINATION, 1952

CALIF
QUADRANGLE LOCATION

Caltrans	CALTRANS Division of Engineering Services Geotechnical Services Geotechnical Design – North	EA: 01-0B4601 Date: January 2014	**GEOLOGIC MAP LEGEND**
		01-HUM-299-PM 32.06 WILLOW CREEK WALL	Plate No. 5B

Caltrans	CALTRANS Division of Engineering Services Geotechnical Services Geotechnical Design – North	EA: 01-0B4601 Date: January 2014	California Seismic Hazard Map
		01-HUM-299-PM 32.06 WILLOW CREEK WALL	Plate No. 6

EMBEDMENT DEPTH IN ROCK



Notations:

P_p = Passive resistance of the rock acting on the actual width of the embedded discrete vertical wall element (KIP/FT).

H = Height of cantilevered wall.

F = Force at tip of embedded vertical wall elements required to provide equilibrium of horizontal forces (KIP).

Sm = Shear strength of rock mass.

D = Embedment of vertical wall elements.

b = Actual width of embedded discrete vertical wall element in plane of wall.

β = Toe slope angle.

APPENDIX A

Log-Of-Test-Borings (LOTB)

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
01	Hum	299			

CERTIFIED ENGINEERING GEOLOGIST 9-13-13

01 APPROVAL DATE

PROFESSIONAL GEOLOGIST Luis Paredes-Mejia No. 2329 Exp. 01-31-14 CERTIFIED ENGINEERING 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.

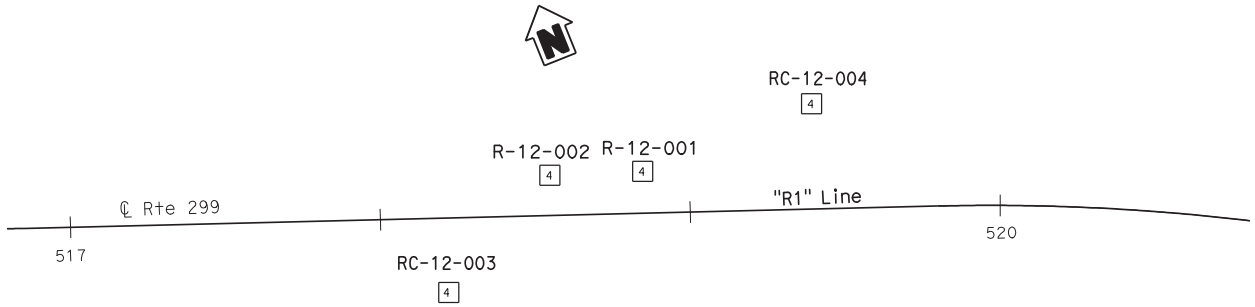
This LOTB sheet was prepared in accordance with the Caltrans Soil & Rock Logging, Classification, & Presentation Manual (2010 Edition).

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

BENCH MARK

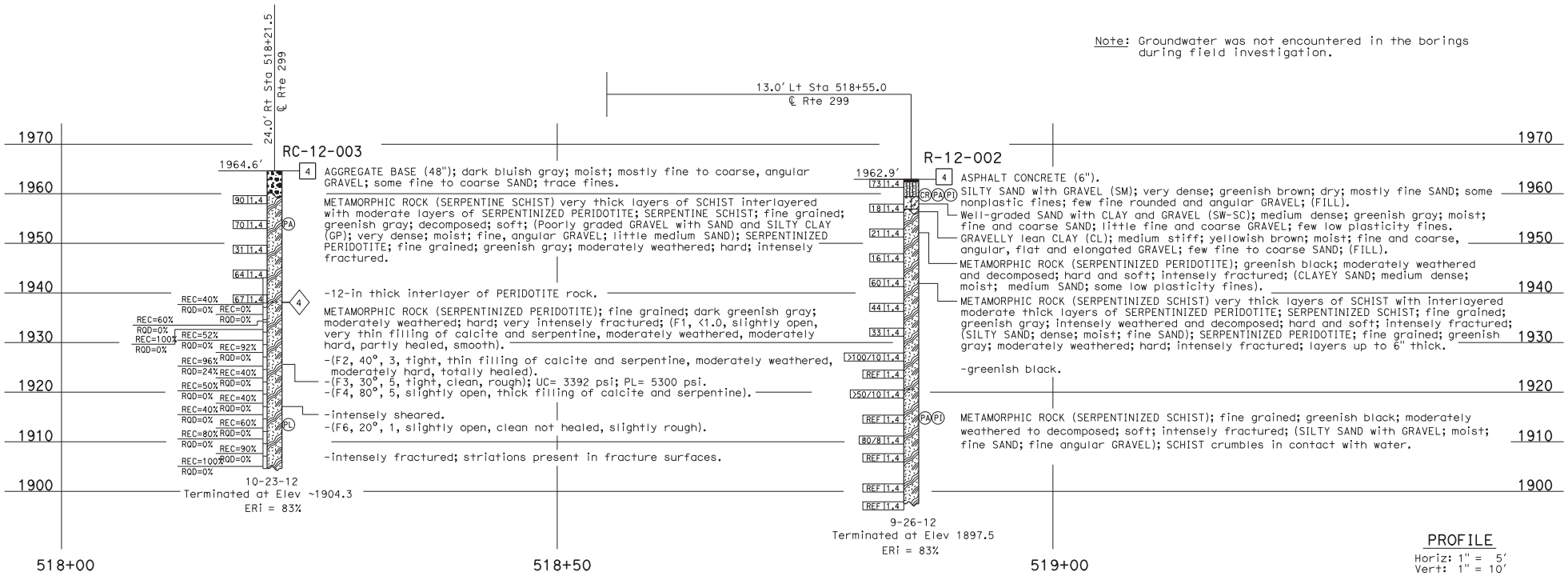
SUHV 3200
Fnd spike 34.96' Lt "R1" Line
Rte 299, Sta 517+68.12
N 2,218,429.80
E 6,084,045.76
Elev= 1968.34

SUHV 3202
Fnd spike 27.50' Lt "R1" Line
Rte 299, Sta 519+08.18
N 2,218,374.33
E 6,084,174.56
Elev= 1960.68
NAVD83



PLAN
1" = 20'

Note: Groundwater was not encountered in the borings 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 DESIGN BRANCH X	BRIDGE NO. / POST MILE 32.06	WILLOW CREEK WALL LOG OF TEST BORINGS 1 OF 2
FUNCTIONAL SUPERVISOR NAME: R. Mahallati	DRAWN BY: F. Nguyen / CHECKED BY: A. Barrie	FIELD INVESTIGATION BY: L. Paredes-Mejia, L. Leong			

OGS CIVIL LOG OF TEST BORINGS SHEET

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT: 3643
PROJECT NUMBER & PHASE: 01120001291 CONTRACT NO.: 01-0B4601

DISREGARD PRINTS BEARING EARLIER REVISION DATES 01-08-13 08-19-13 09-11-13 SHEET X OF X

FILE => willowcr1of2.dgn

USERNAME => s128444 DATE PLOTTED => 23-SEP-2013 TIME PLOTTED => 15:04

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
01	Hum	299			

9-13-13
CERTIFIED ENGINEERING GEOLOGIST

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

01 APPROVAL DATE

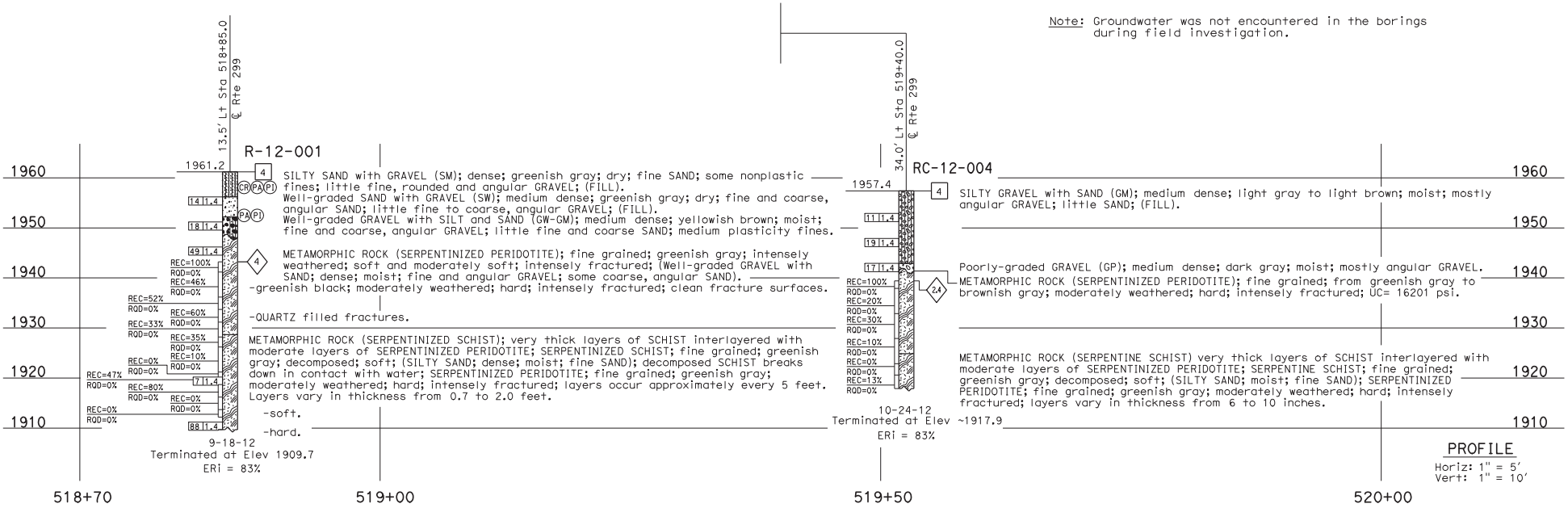
The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

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: Groundwater was not encountered in the borings 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 DESIGN BRANCH X	BRIDGE NO. / POST MILE 32.06	WILLOW CREEK WALL LOG OF TEST BORINGS 2 OF 2
FUNCTIONAL SUPERVISOR NAME: R. Mahallati	DRAWN BY: F. Nguyen / CHECKED BY: A. Barrie	FIELD INVESTIGATION BY: L. Paredes-Mejia, L. Leong			

OGS CIVIL LOG OF TEST BORINGS SHEET

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT: 3643
PROJECT NUMBER & PHASE: 01120001291
CONTRACT NO.: 01-0B4601

DISREGARD PRINTS BEARING EARLIER REVISION DATES

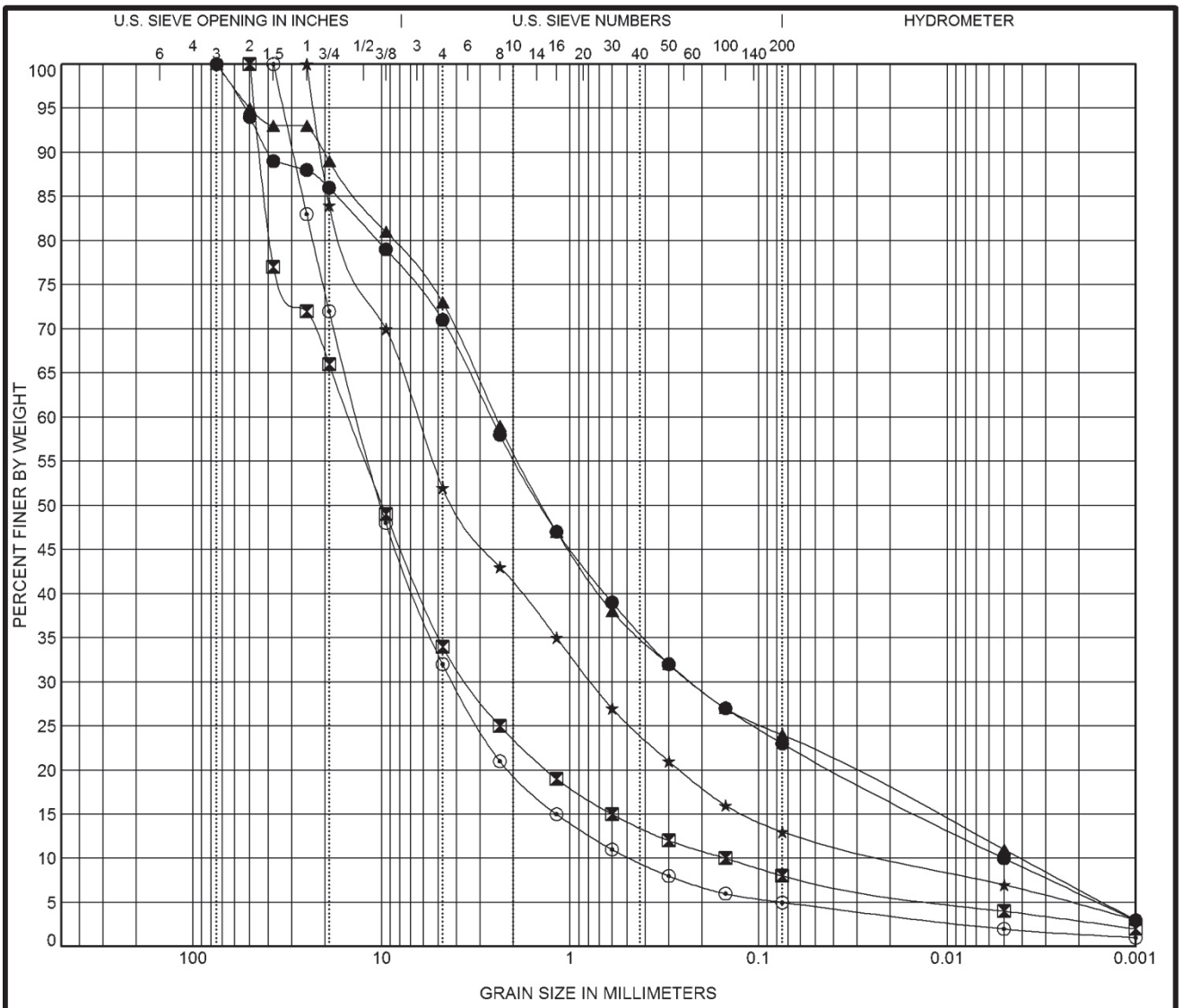
REVISION DATES: 01-08-13 08-19-13 09-11-13 | SHEET X | OF X

FILE => willowcr2of2.dgn

USERNAME => s128444 DATE PLOTTED => 23-SEP-2013 TIME PLOTTED => 15:04

APPENDIX B

Laboratory Test Results



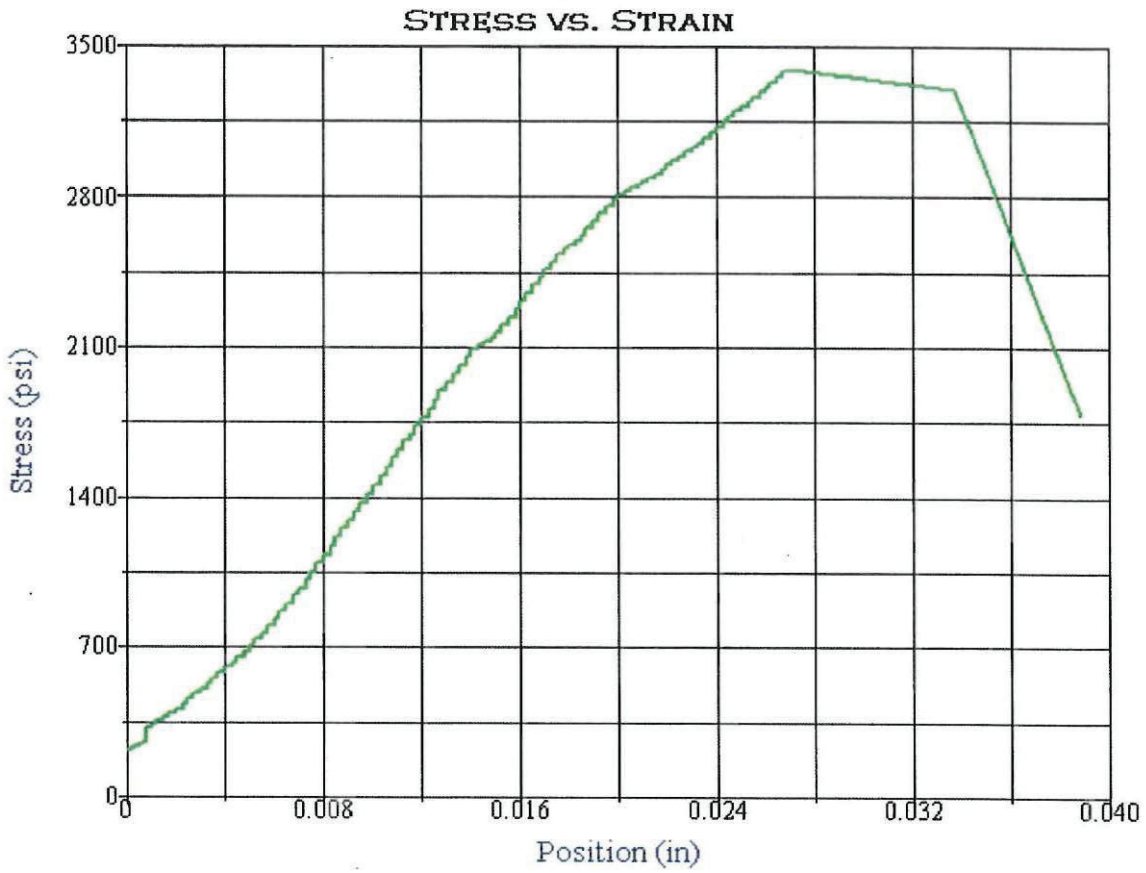
COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	RC-12-001	0.0	SILTY SAND with GRAVEL	21	15	6	3.93	525.63
⊠	RC-12-001	11.5	Well-graded GRAVEL with SAND and CLAY	34	25	9	5.43	99.18
▲	RC-12-002	2.0	SILTY SAND with GRAVEL	25	16	9	5.10	606.75
★	RC-12-002	50.0	SILTY CLAYEY GRAVEL with SAND	24	18	6	4.78	333.79
⊙	RC-12-003	10.0	Poorly-graded GRAVEL with SILTY CLAY				2.73	28.21

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	RC-12-001	0.0	75	2.628	0.227	0.005	29.0	48.0	13.0	10.0
⊠	RC-12-001	11.5	50	14.877	3.481	0.15	66.0	26.0	4.0	4.0
▲	RC-12-002	2.0	75	2.481	0.227	0.004	27.0	49.0	13.0	11.0
★	RC-12-002	50.0	25	6.464	0.773	0.019	48.0	39.0	6.0	7.0
⊙	RC-12-003	10.0	37.5	13.435	4.183	0.476	68.0	27.0	3.0	2.0

GRAIN SIZE DISTRIBUTION

Caltrans	CALTRANS Division of Engineering Services Geotechnical Services Geotechnical Design – North	EA: 01-0B4601 Date: January 2014	Soil Grain Size Test Results
		01-HUM-299-PM 32.06 WILLOW CREEK WALL	Plate No. B-1



Test Summary

Counter:	2404
Elapsed Time:	00:01:29
Operator:	AZM
Sample:	RC-12-003-15B
Resident Engineer:	
Ticket:	GL# 12-087
E.A.NUMBER:	01-0B4601
Procedure Name:	Cores test
Start Date:	2/14/2013
Start Time:	2:18:18 PM
End Date:	2/14/2013
End Time:	2:19:47 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q12-369

Test Results

Specimen Gage Length:	5.0700 in
Diameter:	2.4200 in
Area:	4.5996 in²
Maximum Load:	15603 lbf
Compressive Strength:	3392 psi

Caltrans	CALTRANS Division of Engineering Services Geotechnical Services Geotechnical Design – North	EA: 01-0B4601 Date: January 2014	**Unconfined Compression Test Results**
		01-HUM-299-PM 32.06 WILLOW CREEK WALL	Plate No. B-2

Sample ID	Test Type	Length , L (mm)	Width, W (mm)	Initial Distance Between Contact Points, D(mm)	Final Distance Between Contact Points, D'(mm)	Equivalent Diameter, De (mm)	Failure Load, P (lbs)	Uncorrected Point Load Strength Index Is (psi)	Point Load Strength Index Is (50) (psi)	Remarks
RC-12-003_15A	D-L	43		58.5	56	57.24	1012	199.3	212	
RC-12-003_21	I-L	48.5	60.5	29	18	37.24	5280	2456.76	2152	

RC-12-003_15A

RC-12-003_21

No Image Available

No Image Available

Test Type Abbreviations: D- Diametral, A - Axial, B - Block, I - Irregular Lump

Orientation of Load Direction (if anisotropic): P - Perpendicular to plane of weakness, L - Parallel to plane of weakness

Caltrans	CALTRANS Division of Engineering Services Geotechnical Services Geotechnical Design – North	**EA: 01-0B4601** **Date: January 2014**	**Point Load Test Results**
		01-HUM-299-PM 32.06 **WILLOW CREEK WALL**	Plate No. B-3

Division of Engineering Services
Materials Engineering and Testing Services
Corrosion and Structural Concrete Field Investigation Branch
Report Date: 11/9/2012
Reported by Michael Mifkovic

CORROSION TEST SUMMARY REPORT - SOIL

EA **01-0B4601**

EFIS: **0112000129**

Dist/Co/Rte/PM **01 / HUM /299/ / 32.06 PM**

CORROSION LAB #	TL101 #	BORE #	DEPTH (FT) STAR	DEPTH (FT) END	MINIMUM RESISTIVITY[1] (ohm-cm)	pH[1]	CHLORIDE CONTENT[2] (ppm)	SULFATE CONTENT[3] (ppm)	IS SAMPLE CORROSIVE?
SOIL SAMPLE FROM: WILLOW CREEK WALL									
CR20120419†	C644098	RC-12-001	0	5	6498	8.88			NO
CR20120420†	C644099	RC-12-002	0.5	5	3450	8.75			NO

This site is not corrosive to foundation elements (see note below).

†Comment: SOLDIER PILE WALL

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

CR20120419 - CR20120420

11/9/2012

Caltrans	CALTRANS Division of Engineering Services Geotechnical Services Geotechnical Design – North	**EA: 01-0B4601** **Date: January 2014**	**Corrosion Tests Results**
		01-HUM-299-PM 32.06 **WILLOW CREEK WALL**	Plate No. B-4

MATERIALS INFORMATION

Naturally Occurring Asbestos Survey Summary Report

GEOCON
CONSULTANTS, INC.
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS

Project No. S9300-01-180B
June 28, 2013

Steve Werner, Task Order Manager
California Department of Transportation – District 1
Environmental Engineering Office
1656 Union Street
Eureka, California 95501

Subject: NATURALLY OCCURRING ASBESTOS SURVEY SUMMARY REPORT
STATE ROUTE 299, POST MILE 32, WILLOW CREEK WALL
HUMBOLDT COUNTY, CALIFORNIA
CONTRACT NO. 03A1368; TASK ORDER NO. 180
EA 0B4400; EFIS 01 1200 0128

Dear Mr. Werner:

In accordance with California Department of Transportation (Caltrans) Contract No. 03A1368 and Task Order (TO) No. 180, we have performed a naturally occurring asbestos (NOA) survey for the location of a proposed retaining wall along State Route (SR) 299 in Humboldt County, California. This letter report outlines the procedures and methods employed by Geocon to complete the survey.

PROJECT LOCATION AND PROPOSED IMPROVEMENTS

The project area is located along the SR-299 right-of-way at Post Mile (PM) 32, approximately 7 miles west of Willow Creek, in Humboldt County. Caltrans plans to construct a retaining wall at the site. The approximate project location is depicted on the Vicinity Map, Figure 1, and the project area is depicted on the Site Plan, Figure 2.

PURPOSE

The purpose of the scope of services performed for TO No. 180 was to evaluate whether NOA-containing soil or rock is present at the site. The investigative results will be used by Caltrans to inform construction contractors of whether potentially NOA-containing soil and/or rock is present within the project boundaries for health, safety and disposal purposes. Accordingly, Caltrans requested an evaluation of the site based on previously collected rock cores to provide data regarding the presence of NOA-containing soil or rock within the project limits.

BACKGROUND

Construction activities proposed by Caltrans will require the disturbance of soil and rock on the project site. Geologic mapping by the California Geological Survey (CGS) depicts the site vicinity as underlain by ultramafic rock. The alteration of ultramafic rock can lead to the formation of NOA minerals. If not managed, disturbance of NOA during construction activities may potentially pose an inhalation risk to the health of construction personnel.

PROJECT SCOPE

Outlined below is a summary of the scope of services performed by Geocon under TO No. 180.

Pre-field Activities

- Reviewed geological maps and studies of the general project area for information on the potential presence of NOA.
- Reviewed Caltrans Boring Records (rock core logs) and other documents from the project area for information on the site geology and potential presence of NOA. Caltrans personnel drilled and collected the rock cores in October 2012 and prepared the rock core logs. Copies of the Caltrans Boring Records are attached.
- Retained the services of EMSL Analytical Inc. (EMSL), a Caltrans-approved and California-certified analytical laboratory, to perform the asbestos analyses of samples.

Field Activities

Rock Core Review and Sampling

John Pfeiffer, a California Certified Engineering Geologist (CEG 2372) with experience in the assessment of NOA, reviewed the rock cores at a Caltrans core storage facility in Sacramento, California, on June 18, 2013, to identify potentially NOA-containing materials and collect samples for laboratory analysis. A total of 13 samples were collected from the four cores, including seven composite samples of material obtained from a range of depths and six discrete samples of material obtained from specific (approximate) depths. The sample depths/depth intervals were chosen during core review by the Geocon Geologist based on observations and prior discussion with the Caltrans TO Manager. The approximate rock coring locations are depicted on the Site Plan, Figure 2.

One additional sample (RC-12-002-0.5 to 2.0) was subsequently obtained from Caltrans on June 20, 2013, and submitted to EMSL for laboratory analysis. Based on review of the Boring Record for boring RC-12-002, that sample was collected from fill material that was encountered above the bedrock at the site.

Quality Assurance/Quality Control Procedures

Quality assurance/quality control procedures were performed during our review and sampling of the rock cores at the Caltrans core storage facility. Each rock core sample for NOA analysis was collected directly from the rock core storage box using new disposable gloves and placed into a resealable plastic bag. Each sample bag was marked with a unique sample identification number, the TO number, and the date the sample was collected. The samples were delivered to EMSL for asbestos analysis under chain-of-custody (COC) protocol. The remaining rock core material was left in the rock core storage boxes at the Caltrans core storage facility.

Laboratory Analyses

The soil/rock samples were submitted to EMSL Analytical, Inc., for asbestos fiber analysis by California Air Resources Board (CARB) Method 435 using polarized light microscopy (PLM). The CARB 435 preparation includes milling the sample to a minus 200-mesh size, which also homogenizes the sample. The analytical sensitivity of the PLM analysis was 0.25% by area. The samples were analyzed on a one-week turnaround time.

OBSERVATIONS AND INVESTIGATIVE RESULTS

Site Geology

We reviewed *Geology of the Willow Creek 15' Quadrangle, Humboldt and Trinity Counties, California* (California Division of Mines and Geology, Map Sheet 31, Scale 1:62,500, 1978) for information on the geology of the site. The geologic unit underlying the site vicinity is mapped as ultramafic rock.

John Pfeiffer performed the geologic review of the preserved rock cores. The observed geology of the cores was generally consistent with that described on the Caltrans Boring Records and depicted on the referenced geologic map. The preserved rock core material appeared to consist predominantly of greenish gray to greenish black, decomposed to moderately weathered serpentine and serpentinized ultramafic rock (peridotite) that was sheared and intensely fractured. We did not observe visually obvious asbestiform minerals in the preserved rock cores or fill material sample. However, the observed materials are indicative of a geologic environment conducive to the formation of NOA.

Asbestos Analytical Results

A total of six samples were analyzed by EMSL for asbestos by PLM using the CARB 435 method. One of the samples (RC-12-002-0.5 to 2.0) was reported to contain chrysotile asbestos at an area percentage of 0.75%. The other five samples were reported to contain chrysotile asbestos at less than 0.25% by PLM. A summary of asbestos analytical results is presented on Table 1. Copies of the laboratory reports and COC documentation are attached to this report.

CONCLUSIONS AND RECOMMENDATIONS

The geology of the observed rock core material is consistent with the mapped geology of the site, consisting of weathered serpentine and serpentinized ultramafic rock (peridotite), which are considered likely to contain NOA. The five analyzed samples of bedrock material from the site were reported to contain chrysotile asbestos below the regulatory threshold of 0.25%, and the sample of fill material from location RC-12-002 was reported to contain chrysotile asbestos at 0.75%.

Based on the presence of ultramafic rock and the potential for NOA at the site, Caltrans requires that the contractor(s) prepare and implement an Asbestos Dust Mitigation Plan (ADMP) that describes measures that will be taken to control the potential release of asbestos-containing dust as a result of construction excavation activities at the site. Asbestos dust control activities to be implemented shall be in compliance with the following:

- California Code of Regulations (CCR) §93105 – Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, and Surface Mining Operations (ATCM 93105);
- CCR §93106 – Asbestos Airborne Toxic Control Measure for Surfacing Applications (ATCM 93106); and
- North Coast Unified Air Quality Management District guidelines.

Asbestos Worker Protection

Caltrans requires that the contractor(s) prepare a project-specific Asbestos Compliance Plan (CCR Title 8, §1529, the "Asbestos in Construction" standard) to minimize potential worker exposure to asbestos-containing materials at the project area. The plan should include protocols for environmental and personnel monitoring, requirements for personal protective equipment, and other health and safety protocols and procedures for the handling of asbestos-containing soil.

Construction/maintenance activities involving potentially asbestos-containing materials may fall under regulatory jurisdiction of the California Division of the Occupational Safety and Health Administration (Cal-OSHA) under CCR Title 8 §5208. Mitigation measures during construction/maintenance activities should be utilized to minimize potential releases of NOA to air (dust control) and surface waters (stormwater discharge).

Currently, regulatory exposure limits and health hazard data are not available for NOA in soils. Federal regulations governing asbestos define it as the asbestiform variety of the amphibole minerals actinolite, amosite, anthophyllite, crocidolite, and tremolite, and the asbestiform variety of serpentine, chrysotile. Asbestos fibers occurring in industrial materials are considered by the National Institute for Occupational Safety and Health as potential occupational carcinogens. Prudence is recommended, therefore, in dealing with soils potentially containing NOA. Engineering controls, such as wet methods for dust suppression, should be utilized to minimize aerial dispersion of NOA fibers in planned work areas during excavation and construction activities. Under Title 8 §5208 of the CCR, disturbance of asbestos-containing materials requires wet working methods and possible respiratory protection and air monitoring. The CARB has established protocols outlined in Title 17, §93105 for the implementation of worker health, safety and monitoring plans for excavation, grading and transport of NOA-containing soils. The excavation contractor should consult Title 17, §93105 and contact Cal-OSHA to establish the appropriate regulatory protocol and actions necessary for excavation and/or disturbance of asbestos-containing soils.

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

Please contact us if you have any questions concerning the contents of this report or if we may be of further service.

Sincerely,

GEOCON CONSULTANTS, INC.

PROFESSIONAL GEOLOGIST
JOHN C. PFEIFFER
No. 2372
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

John C. Pfeiffer, PG, CEG
Senior Geologist

John E. Juhrend, PE, CEG
Principal/Senior Engineer

(2 + 2 on CD) Addressee

Attachments: Figure 1, Vicinity Map
Figure 2, Site Plan
Table 1, Summary of NOA Analytical Results
Caltrans Boring Records (Rock Core Logs for RC-12-001 through RC-12-004)
Laboratory Reports and Chain-of-custody Documentation

0 5
Scale in Miles

GEOCON
CONSULTANTS, INC.
3160 GOLD VALLEY DR – SUITE 800 – RANCHO CORDOVA, CA 95742
PHONE 916.852.9118 – FAX 916.852.9132

Willow Creek Wall		
State Route 299, Post Mile 32, Humboldt County, California	**VICINITY MAP**	
GEOCON Proj. No. S9300-01-180B		
Task Order No. 180	June 2013	Figure 1

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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.

ROBERT NIXON No. C691 Exp. 06-30 CIVIL

Note: Adapted from Caltrans Preliminary Environmental Study Limits drawing dated 11/14/12

LEGEND:

RC-12-001 ⊗ Approximate Rock Coring Location

0 100
Scale in Feet

GEOCON CONSULTANTS, INC.
3160 GOLD VALLEY DR – SUITE 800 – RANCHO CORDOVA, CA 95742
PHONE 916.852.9118 – FAX 916.852.9132

Willow Creek Wall

State Route 299, Post Mile 32, Humboldt County, California

SITE PLAN

GEOCON Proj. No. S9300-01-180B

Task Order No. 180 | June 2013 | Figure 2

TABLE 1
SUMMARY OF NOA ANALYTICAL RESULTS
CALTRANS TASK ORDER NO. 180, EA 0B4400, EFIS 01 1200 0128
STATE ROUTE 299, POST MILE 32
HUMBOLDT COUNTY, CALIFORNIA

SAMPLE I.D.	SAMPLE DATE	ANALYTICAL METHOD	ASBESTOS %	ASBESTOS TYPE
RC-12-001-20 to 51.5	6/18/2013	PLM	<0.25	Chrysotile
RC-12-002-16.5 to 66.5	6/18/2013	PLM	<0.25	Chrysotile
RC-12-002-0.5 to 2.0	6/20/2013	PLM	0.75	Chrysotile
RC-12-003-39	6/18/2013	PLM	<0.25	Chrysotile
RC-12-003-26.5 to 52.5	6/18/2013	PLM	<0.25	Chrysotile
RC-12-004-16 to 28	6/18/2013	PLM	<0.25	Chrysotile
RC-12-004-29	6/18/2013	PLM	<0.25	Chrysotile

Notes: PLM = Polarized Light Microscopy
NOA = Naturally occurring asbestos

LOGGED BY	BEGIN DATE	COMPLETION DATE	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID
Luis Paredes	10-9-12	10-10-12	40° 54' 24.78" / 123° 43' 39.93" NAD83	RC-12-001
DRILLING CONTRACTOR: Caltrans			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION: ~1961.2 ft MLLW
DRILLING METHOD: Rotary Wire-Line			DRILL RIG: Acker AD2	BOREHOLE DIAMETER: 4 in
SAMPLER TYPE(S) AND SIZE(S) (ID): SPT and core barrel			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERi: 83%
BOREHOLE BACKFILL AND COMPLETION: Abandoned with bentonite chips and grout cement.			GROUNDWATER READINGS: DURING DRILLING / AFTER DRILLING (DATE)	TOTAL DEPTH OF BORING: 51.5 ft

ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	0	SILTY SAND (SM); medium dense; greenish gray; dry; some nonplastic fines; mostly fine SAND ; some nonplastic fines ; (FILL).		1										CR, PA, PI
1959.19	2													
1957.19	4													
	5	Well-graded SAND with GRAVEL (SW); medium dense; greenish gray; dry; mostly fine to coarse, angular SAND; few fine to coarse, angular GRAVEL; (FILL).		2	15 9 5	14								
1955.19	6													
	7			3										
1953.19	8													
	9	CLAYEY GRAVEL with SAND (GC); medium dense; yellowish brown; moist; mostly fine to coarse, angular GRAVEL; some medium plasticity fines; few fine to coarse, angular SAND; Composition of gravel fragments is peridotite.; (FILL).												
1951.19	10			4	10 10 8	18								
1949.19	12			5										PA, PI
	13	METAMORPHIC ROCK (SERPENTINIZED PERIDOTITE); greenish gray; intensely weathered; soft to moderately soft; intensely fractured; (Well-graded GRAVEL with SAND; dense; moist; mostly fine, angular GRAVEL; some coarse, angular SAND).		6										
1947.19	14													
	15			7	15 27 22	49								
1945.19	16													
	17			8										
1943.19	18			9			135	0						
	19	- greenish black; moderately weathered; hard; intensely fractured; clean fractures.												
1941.19	20			10			46	0						
	21													
1939.19	22													
	23													
1937.19	24													
	25													

(continued)

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Office of Geotechnical Design - North

REPORT TITLE				HOLE ID
BORING RECORD				RC-12-001
DIST. 01	COUNTY HUM	ROUTE 299	POSTMILE R32.1/R32.1	PROJECT ID 0112000129
PROJECT OR BRIDGE NAME: Willow Creek Wall				
BRIDGE NUMBER	PREPARED BY: Luis Paredes		DATE	SHEET 1 of 2

5 BR - STANDARD 01HUM299PM32.06 WILLOW CK WALL.GPJ DRAFT CALTRANS LIBRARY OCT 2011.GLB 6/13/13

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	25		METAMORPHIC ROCK (Serpentinized Peridotite) *(continued)*.		11			52	0						
1935.19	26														
	27														
1933.19	28				12			60	0						
	29		- quartz filled fractures.												
1931.19	30				13			33	0						
	31														
1929.19	32														
	33		METAMORPHIC ROCK (SERPENTINIZED SCHIST) very thickly interlayered with thick layers of SERPENTINIZED PERIDOTITE; SERPENTINIZED SCHIST; greenish gray; decomposed; soft; (SILTY SAND; dense; moist; mostly fine SAND; some nonplastic fines); decomposed schist breaks down with water; SERPENTINIZED PERIDOTITE; greenish gray; moderately weathered; hard; intensely fractured; interbeds approximately every 5 feet. Layer thickness varies from 0.7 to 2.0 feet..		14			35	0						
1927.19	34														
	35				15			10	0						
1925.19	36														
	37														
1923.19	38														
	39														
1921.19	40				16			0	0						
	41		- soft.		16A	3 3 4	7	47	0						
1919.19	42														
	43				17			80	0						
1917.19	44														
	45				18			0	0						
1915.19	46														
	47														
1913.19	48				19			0	0						
	49														
1911.19	50		- hard.		20	21 41 47	88	87	0						
	51														
1909.19	52		Bottom of borehole at 51.5 ft bgs												
	53														
1907.19	54		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (2010) except as noted on the Soil or Rock Legend or below.												
	55														

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-12-001**
DIST. **01**	COUNTY **HUM**	ROUTE **299**	POSTMILE **R32.1/R32.1**	PROJECT ID **0112000129**
PROJECT OR BRIDGE NAME **Willow Creek Wall**				
BRIDGE NUMBER	PREPARED BY **Luis Paredes**		DATE	SHEET **2 of 2**

5 BR - STANDARD 01HUM299PM32.06 WILLOW CK WALL.GPJ DRAFT CALTRANS LIBRARY OCT 2011.GLB 6/13/13

LOGGED BY	BEGIN DATE	COMPLETION DATE	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID
Luis Paredes	10-10-12	10-16-12	40° 54' 24.82" / 123° 43' 40.12" NAD83	RC-12-002
DRILLING CONTRACTOR: Caltrans			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION: ~1962.9 ft MLLW
DRILLING METHOD: Rotary Wire-Line			DRILL RIG: Acker AD2	BOREHOLE DIAMETER: 4 in
SAMPLER TYPE(S) AND SIZE(S) (ID): SPT			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERi: 83%
BOREHOLE BACKFILL AND COMPLETION: Abandoned with bentonite chips and grout cement.			GROUNDWATER READINGS: DURING DRILLING / AFTER DRILLING (DATE)	TOTAL DEPTH OF BORING: 65.4 ft

ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	0	ASPHALT CONCRETE (6).												
	1	SILTY SAND with GRAVEL (SM); very dense; greenish brown; dry; mostly fine SAND; some nonplastic fines; few fine, rounded to angular GRAVEL; (FILL).		1	30 36 >50 (2")									
1960.86	2			2										CR, PA, PI
	3													
1958.86	4	Well-graded SAND with CLAY and GRAVEL (SW-SC/SW-SC); medium dense; greenish gray; moist; mostly fine to coarse SAND; some fine to coarse GRAVEL; little low plasticity fines.												
	5			3	13 10 8	18								
1956.86	6	GRAVELLY lean CLAY (CL); yellowish brown; moist; some low plasticity fines; some fine to coarse, angular, flat and elongated GRAVEL; few fine to coarse SAND; (FILL).												
	7			4										Schist crumbles with water and it makes the recovery very difficult. Schist had to be sampled by SPT method.
1954.86	8	METAMORPHIC ROCK (SERPENTINIZED PERIDOTITE); greenish black; moderately weathered to decomposed; hard to soft; intensely fractured; (CLAYEY SAND; medium dense; moist; mostly medium SAND; some low plasticity fines).												
	9													
1952.86	10			5	12 8 13	21								
	11													
1950.86	12			6										
	13													
1948.86	14													
	15			7	14 9 7	16	0							
1946.86	16													
	17			8			29							
1944.86	18	METAMORPHIC ROCK (SERPENTINIZED SCHIST) very thickly interlayered with thick layers of SERPENTINIZED PERIDOTITE; SERPENTINIZED SCHIST; greenish gray; intensely weathered to Decomposed; hard to soft; intensely fractured; (SILTY SAND; dense; moist; mostly fine SAND; some nonplastic fines); SERPENTINIZED PERIDOTITE; greenish gray; moderately weathered; hard; intensely fractured.												
	19													
1942.86	20			9	8 16 44	60	93							
	21													
1940.86	22	- greenish black; moderately weathered; hard; intensely fractured; Aproximately 6 inches thick peridotite rock layer.		10			46							
	23													
1938.86	24													
	25													

(continued)

Department of Transportation
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Geotechnical Services
Office of Geotechnical Design - North

REPORT TITLE				HOLE ID
BORING RECORD				RC-12-002
DIST. 01	COUNTY HUM	ROUTE 299	POSTMILE R32.1/R32.1	PROJECT ID 0112000129
PROJECT OR BRIDGE NAME: Willow Creek Wall				
BRIDGE NUMBER	PREPARED BY Luis Paredes		DATE	SHEET 1 of 3

5 BR - STANDARD 01HUM299PM32.06 WILLOW CK WALL.GPJ DRAFT CALTRANS LIBRARY OCT 2011.GLB 6/13/13

ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	Remarks
	25	- Aproximately 6 inches thick peridotite rock layer.	11	23 32 12	44	60	
1936.86	26	METAMORPHIC ROCK (Serpentinized Schist) *(continued)*.	12			17	
	27	- Aproximately 6 inches thick peridotite rock layer.					
1934.86	28						
	29						
1932.86	30		13	16 13 20	33	60	
	31						
1930.86	32	- Aproximately 6 inches thick peridotite rock layer.	14			17	
	33						
1928.86	34						
	35		15	20 50 >50 (4")			
1926.86	36						
	37	- Aproximately 6 inches thick peridotite rock layer.	16			9	
1924.86	38						
	39						
1922.86	40	METAMORPHIC ROCK (SERPENTIZED SCHIST); greenish black; moderately weathered to decomposed; soft; intensely fractured; (SILTY SAND; very dense; moist; mostly fine SAND; some low plasticity fines); Schist crumbles in the presence of water.	17	>50(4")		40	
	41						
1920.86	42		18			40	
	43		19	50 >50 (1")		50	
1918.86	44		20			30	
	45		21	>50(5.5")		47	
1916.86	46						
	47		22			0	
1914.86	48						
	49						
1912.86	50		23	16 30 >50(2")		93	PA, PI
	51						
1910.86	52		24			0	
	53						
1908.86	54						
	55						

(continued)

Sample Location | Material Graphics | RQD (%) | Moisture Content (%) | Dry Unit Weight (pcf) | Shear Strength (tsf) | Drilling Method | Casing Depth

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Office of Geotechnical Design - North

REPORT TITLE				HOLE ID
BORING RECORD				**RC-12-002**
DIST. **01**	COUNTY **HUM**	ROUTE **299**	POSTMILE **R32.1/R32.1**	PROJECT ID **0112000129**
PROJECT OR BRIDGE NAME **Willow Creek Wall**				
BRIDGE NUMBER	PREPARED BY **Luis Paredes**		DATE	SHEET **2 of 3**

5 BR - STANDARD 01HUM299PM32.06 WILLOW CK WALL.GPJ DRAFT CALTRANS LIBRARY OCT 2011.GLB 6/13/13

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	55		METAMORPHIC ROCK (Serpentized Schist) *(continued)*.		25	>50(4.5")		73							
1906.86	56														
	57				26										
1904.86	58														
	59														
1902.86	60				27	>50(4.5")		0							
	61														
1900.86	62				28										
	63														
1898.86	64														
	65				29	>50(4.5")		27							
1896.86	66		Bottom of borehole at 65.4 ft bgs												
	67														
1894.86	68														
	69														
1892.86	70														
	71														
1890.86	72														
	73														
1888.86	74														
	75														
1886.86	76														
	77														
1884.86	78														
	79														
1882.86	80														
	81														
1880.86	82														
	83														
1878.86	84														
	85														

This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (2010) except as noted on the Soil or Rock Legend or below.

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Office of Geotechnical Design - North

REPORT TITLE				HOLE ID
BORING RECORD				**RC-12-002**
DIST. **01**	COUNTY **HUM**	ROUTE **299**	POSTMILE **R32.1/R32.1**	PROJECT ID **0112000129**
PROJECT OR BRIDGE NAME **Willow Creek Wall**				
BRIDGE NUMBER	PREPARED BY **Luis Paredes**		DATE	SHEET **3 of 3**

5 BR - STANDARD 01HUM299PM32.06 WILLOW CK WALL.GPJ DRAFT CALTRANS LIBRARY OCT 2011.GLB 6/13/13

LOGGED BY	BEGIN DATE	COMPLETION DATE	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID
Luis Paredes	10-17-12	10-23-12	40° 54' 24.65" / 123° 43' 40.2" NAD83	RC-12-003
DRILLING CONTRACTOR: Caltrans			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION: ~1964.6 ft MLLW
DRILLING METHOD: Rotary Wire-Line			DRILL RIG: Acker AD2	BOREHOLE DIAMETER: 4 in
SAMPLER TYPE(S) AND SIZE(S) (ID): SPT and core barrel			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERi: 83%
BOREHOLE BACKFILL AND COMPLETION: Abandoned with bentonite chips and grout cement.			GROUNDWATER DURING DRILLING READINGS: AFTER DRILLING (DATE): 54.5 ft on12-6-12 11:00AM	TOTAL DEPTH OF BORING: 30.0 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	0		AGGREGATE BASE (42); dark bluish gray; moist; mostly fine to coarse, angular GRAVEL; some fine to coarse SAND; trace fines.		0										
	1														
1962.63	2														
	3														
1960.63	4														
	5		METAMORPHIC ROCK (SERPENTINE SCHIST) very thickly interlayered with thin layers of SERPENTINIZED PERIDOTITE; SERPENTINE SCHIST; greenish gray; decomposed; soft; (Poorly graded GRAVEL with SAND; very dense; moist; mostly fine, angular GRAVEL; some medium SAND); SERPENTINIZED PERIDOTITE; greenish gray; moderately weathered; hard; intensely fractured.		1	50 45 45	90							
1958.63	6														
	7				2										
1956.63	8														
	9														
1954.63	10				3	20 30 40	70								PA
	11														
1952.63	12				4										
	13														
1950.63	14														
	15				5	15 16 15	31								
1948.63	16														
	17				5A			0							
1946.63	18														
	19														
1944.63	20				6	12 28 36	64								
	21														
1942.63	22				7										
	23														
1940.63	24		- 12-in thick interlayer of peridotite rock.												
	25														

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				RC-12-003
DIST. 01	COUNTY HUM	ROUTE 299	POSTMILE R32.1/R32.1	PROJECT ID 0112000129
PROJECT OR BRIDGE NAME: Willow Creek Wall				
BRIDGE NUMBER	PREPARED BY: Luis Paredes		DATE	SHEET 1 of 3

5 BR - STANDARD 01HUM299PM32.06 WILLOW CK WALL.GPJ DRAFT CALTRANS LIBRARY OCT 2011.GLB 6/13/13

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	25		METAMORPHIC ROCK (SERPENTINE SCHIST) *(continued)*.		8	27 37 30	67								
1938.63	26														
	27				9			40	0						
1936.63	28				10			0	0						
	29														
1934.63	30				11			60	0						
	31				12			100	0						
1932.63	32		METAMORPHIC ROCK (SERPENTINIZED PERIDOTITE); dark greenish gray; moderately weathered; hard; very intensely fractured; (F1, <1.0, slightly open, very thin filling of calcite and serpentine, moderately weathered, moderately hard, partly healed, smooth).												
	33				13			52	0						
1930.63	34														
	35				14			92	0						
1928.63	36														
	37														
1926.63	38		(F2, 40°, 3, tight, thin filling of calcite and serpentine, moderately weathered, moderately hard, totally healed).		15			96	0						PL
	39		(F3, 30°, 5, tight, clean not healed, rough).												
1924.63	40				16			40	24						
	41														
1922.63	42														
	43				17			50	0						
1920.63	44		(F4, 80°, 5, slightly open, thick filling of calcite and serpentine, moderately weathered, moderately hard, moderately healed, slightly rough).												
	45				18			40	0						
1918.63	46														
	47		- Intensely sheared..												
1916.63	48				19			96	0						
	49														
1914.63	50				20			60	0						
	51		(F6, 20°, 1, slightly open, clean not healed, slightly rough).												
1912.63	52														
	53				21			80	0						
1910.63	54														PL
	55														

(continued)

Department of Transportation
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design - North

REPORT TITLE				HOLE ID
BORING RECORD				**RC-12-003**
DIST. **01**	COUNTY **HUM**	ROUTE **299**	POSTMILE **R32.1/R32.1**	PROJECT ID **0112000129**
PROJECT OR BRIDGE NAME **Willow Creek Wall**				
BRIDGE NUMBER	PREPARED BY **Luis Paredes**		DATE	SHEET **2 of 3**

5 BR - STANDARD 01HUM299PM32.06 WILLOW CK WALL.GPJ DRAFT CALTRANS LIBRARY OCT 2011.GLB 6/13/13

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	55		METAMORPHIC ROCK (SERPENTINIZED PERIDOTITE) *(continued)*.		22			90	0						
1908.63	56														
	57		- intensely fractured; Striations present in fracture surfaces..												
1906.63	58				23			100	0						
	59														
1904.63	60		Bottom of borehole at 60.0 ft bgs												
	61		Piezometer installed.												
1902.63	62		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (2010) except as noted on the Soil or Rock Legend or below.												
	63														
1900.63	64														
	65														
1898.63	66														
	67														
1896.63	68														
	69														
1894.63	70														
	71														
1892.63	72														
	73														
1890.63	74														
	75														
1888.63	76														
	77														
1886.63	78														
	79														
1884.63	80														
	81														
1882.63	82														
	83														
1880.63	84														
	85														

Department of Transportation
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design - North

REPORT TITLE				HOLE ID
BORING RECORD				**RC-12-003**
DIST. **01**	COUNTY **HUM**	ROUTE **299**	POSTMILE **R32.1/R32.1**	PROJECT ID **0112000129**
PROJECT OR BRIDGE NAME **Willow Creek Wall**				
BRIDGE NUMBER	PREPARED BY **Luis Paredes**		DATE	SHEET **3 of 3**

5 BR - STANDARD 01HUM299PM32.06 WILLOW CK WALL.GPJ DRAFT CALTRANS LIBRARY OCT 2011.GLB 6/13/13

LOGGED BY	BEGIN DATE	COMPLETION DATE	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID
Luke Leong	10-24-12	10-24-12	40° 54' 24.77" / 123° 43' 39.38" NAD83	RC-12-004
DRILLING CONTRACTOR: Caltrans			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION: ~1957.4 ft MLLW
DRILLING METHOD: Rotary Wire-Line			DRILL RIG: Acker AD2	BOREHOLE DIAMETER: 4 in
SAMPLER TYPE(S) AND SIZE(S) (ID): SPT and core barrel			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERi: 83%
BOREHOLE BACKFILL AND COMPLETION: Abandoned with bentonite chips and grout cement.			GROUNDWATER READINGS: DURING DRILLING / AFTER DRILLING (DATE)	TOTAL DEPTH OF BORING: 39.5 ft

ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	0	SILTY GRAVEL with SAND (GM); medium dense; light gray to light brown; moist; mostly angular GRAVEL; few SAND; (Fill).		1										
	1													
1955.39	2													
	3													
1953.39	4													
	5			2	4 5 6	11								
1951.39	6			3										
	7													
1949.39	8													
	9													
1947.39	10			4	10 10 9	19								
	11			5										
1945.39	12													
	13													
1943.39	14													
	15	Poorly graded GRAVEL (GP); medium dense; dark gray; moist; mostly angular GRAVEL.		6	10 8 9	17								
1941.39	16	METAMORPHIC ROCK (SERPENTINIZED PERIDOTITE); greenish gray to brownish gray; moderately weathered; hard; intensely fractured; Recovered as coarse to fine gravel..		7										
1939.39	18			8			0	0						
	19													
1937.39	20	- Ground by drill bit resulting in fine to coarse sand and fine to coarse, hard and moderately weathered gravel..		9			20	0						
	21													
1935.39	22													
	23													
1933.39	24	- moderately weathered; intensely fractured.												
	25			10			30	0						

(continued)

Department of Transportation
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design - North

REPORT TITLE				HOLE ID
BORING RECORD				RC-12-004
DIST. 01	COUNTY HUM	ROUTE 299	POSTMILE R32.1/R32.1	PROJECT ID 0112000129
PROJECT OR BRIDGE NAME: Willow Creek Wall				
BRIDGE NUMBER	PREPARED BY: Luis Paredes		DATE	SHEET 1 of 2

5 BR - STANDARD 01HUM299PM32.06 WILLOW CK WALL.GPJ DRAFT CALTRANS LIBRARY OCT 2011.GLB 6/13/13

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	25		METAMORPHIC ROCK (Serpentinized Peridotite) *(continued)*.		10			30	0						
1931.39	26														
	27														
1929.39	28														
	29														
1927.39	30		METAMORPHIC ROCK (SERPENTINE SCHIST) very thickly interlayered with moderate layers of SERPENTINIZED PERIDOTITE; SERPENTINE SCHIST; greenish gray; decomposed; soft; (SILTY SAND; loose; moist; mostly fine SAND; some nonplastic fines); SERPENTINIZED PERIDOTITE; greenish gray; moderately weathered; hard; intensely fractured; Layer 6 to 10 inches thick.		11			10	0						
	31														
1925.39	32														
	33														
1923.39	34														
	35				12			0	0						
1921.39	36														
	37				13			13	0						
1919.39	38														
	39														
1917.39	40		Bottom of borehole at 39.5 ft bgs												
	41														
1915.39	42		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (2010) except as noted on the Soil or Rock Legend or below.												
	43														
1913.39	44														
	45														
1911.39	46														
	47														
1909.39	48														
	49														
1907.39	50														
	51														
1905.39	52														
	53														
1903.39	54														
	55														

Department of Transportation
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design - North

REPORT TITLE				HOLE ID
BORING RECORD				**RC-12-004**
DIST. **01**	COUNTY **HUM**	ROUTE **299**	POSTMILE **R32.1/R32.1**	PROJECT ID **0112000129**
PROJECT OR BRIDGE NAME **Willow Creek Wall**				
BRIDGE NUMBER	PREPARED BY **Luis Paredes**		DATE	SHEET **2 of 2**

5 BR - STANDARD 01HUM299PM32.06 WILLOW CK WALL.GPJ DRAFT CALTRANS LIBRARY OCT 2011.GLB 6/13/13

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

EMSL Order:	091309788
CustomerID:	GECN80
CustomerPO:	S9300-06-180B
ProjectID:	

Attn: **John Pfeiffer**
Geocon Consultants, Inc.
3160 Gold Valley Drive
Suite 800
Rancho Cordova, CA 95742

Phone:	(916) 852-9118
Fax:	(916) 852-9132
Received:	06/20/13 9:00 AM
Analysis Date:	6/26/2013
Collected:	6/18/2013

Project: **S9300-06-180B / WILLOW CREEK WALL**

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

Sample	Description	Appearance	Non-Asbestos % Fibrous	Non-Asbestos % Non-Fibrous	Asbestos % Type
RC-12-001-20 TO 51.5 *091309788-0001*		Gray Non-Fibrous Homogeneous		100.00% Non-fibrous (other)	**<0.25% Chrysotile**
RC-12-001-18.5 *091309788-0002*	HOLD	Gray	HOLD		**Not Analyzed**
RC-12-001-51 *091309788-0003*	HOLD	Gray	HOLD		**Not Analyzed**
RC-12-002-36 *091309788-0004*	HOLD	Gray	HOLD		**Not Analyzed**
RC-12-002-16.5 TO 66.5 *091309788-0005*		Gray Non-Fibrous Homogeneous		100.00% Non-fibrous (other)	**<0.25% Chrysotile**
RC-12-003-39 *091309788-0006*		Gray Non-Fibrous Homogeneous		100.00% Non-fibrous (other)	**<0.25% Chrysotile**

Analyst(s)
Adam C. Fink (6)

Baojia Ke, Laboratory Manager
or other approved signatory

This report relates only to the samples listed above and may not be reproduced except in full, without EMSL's written approval. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. EMSL is not responsible for sample collection activities or method limitations. Some samples may contain asbestos fibers below the resolution limit of PLM. EMSL recommends that samples reported as none detected or less than the limit of detection undergo additional analysis via TEM.Samples received in good condition unless otherwise noted.
Samples analyzed by EMSL Analytical, Inc San Leandro, CA

Initial report from 06/26/2013 21:37:26

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

EMSL Order:	091309788
CustomerID:	GECN80
CustomerPO:	S9300-06-180B
ProjectID:	

Attn: **John Pfeiffer**
Geocon Consultants, Inc.
3160 Gold Valley Drive
Suite 800
Rancho Cordova, CA 95742

Phone:	(916) 852-9118
Fax:	(916) 852-9132
Received:	06/20/13 9:00 AM
Analysis Date:	6/26/2013
Collected:	6/18/2013

Project: **S9300-06-180B / WILLOW CREEK WALL**

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

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
RC-12-003-26.5 TO 52.5 *091309788-0007*		Gray Non-Fibrous Homogeneous		100.00% Non-fibrous (other)	**<0.25% Chrysotile**
RC-12-003-53 *091309788-0008*	HOLD	Gray	HOLD		**Not Analyzed**
RC-12-004-16 TO 28 *091309788-0009*		Gray Non-Fibrous Homogeneous		100.00% Non-fibrous (other)	**<0.25% Chrysotile**
RC-12-004-29 *091309788-0010*		Gray Non-Fibrous Homogeneous		100.00% Non-fibrous (other)	**<0.25% Chrysotile**

Analyst(s)
Adam C. Fink (6)

Baojia Ke, Laboratory Manager
or other approved signatory

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Samples analyzed by EMSL Analytical, Inc San Leandro, CA

Initial report from 06/26/2013 21:37:26

THIS IS THE LAST PAGE OF THE REPORT.

#091309788

Asbestos Lab Services Chain of Custody

EMSL Order Number(*Lab Use Only*):

EMSL ANALYTICAL, INC.
San Leandro CA
Suite 230
2235 Polvorosa Ave
San Leandro, CA 94577
PHONE: (510) 895-3675
FAX: (510) 895-3680

Company: Geocon Consultants, Inc.	**EMSL-Bill to:** ☑ Same ☐ Different If Bill to is Different note instructions in Comments** *Third Party Billing requires written authorization from third party*
Street: 3160 Gold Valley Drive, Suite 800	
City/State/Zip: Rancho Cordova, CA 95742	
Report To (Name): John Pfeiffer	**Fax:**
Telephone: 916-852-9118	**Email Address:** pfeiffer@geoconinc.com
Project Name/Number: Willow Creek Wall / 59300-06-180 B	
Please Provide Results: Email **Purchase Order:**	**State Samples Taken:** CA

Turnaround Time (TAT) Options* – Please Check

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

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

PCM - Air ☐ Check if samples are from NY
- ☐ NIOSH 7400
- ☐ w/ OSHA 8hr. TWA

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

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

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

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

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

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

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

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

Other:
- ☐

☐ **Check For Positive Stop – Clearly Identify Homogenous Group** | **Filter Pore Size (Air Samples):** ☐ 0.8µm ☐ 0.45µm

Samplers Name: John Pfeiffer **Samplers Signature:** John Pfeiffer

Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled
RC-12-001-20 to 30	Analyze lab composite "RC-12-001-20 to 51.5"		6/18/13
RC-12-001-33 to 51.5			
RC-12-001-18.5	HOLD		
RC-12-001-51	HOLD		
RC-12-002-36	HOLD		
RC-12-002-16.5 to 41.5	Analyze lab composite "RC-12-002-16.5 to 66.5"		
RC-12-002-43.5 to 66.5			
RC-12-003-39	HOLD		

Client Sample # (s): **Total # of Samples:**

Relinquished (Client): John Pfeiffer **Date:** 6/19/13 **Time:** 1600

Received (Lab): [illegible] **Date:** 6/20/13 **Time:** 8:9am FX

Comments/Special Instructions: BILLING PER CALTRANS CONTRACT 03A1368

Controlled Document – Asbestos Lab Services COC – A1.0 – 11/23/2009

59300-06-180B #091309788

Willow Creek Wall

EMSL ANALYTICAL, INC.

Asbestos Lab Services Chain of Custody

EMSL Order Number*(Lab Use Only)*:

San Leandro, CA
Suite 230
2235 Polvorosa Ave
San Leandro, CA 94577
PHONE: (510) 895-3675
FAX: (510) 895-3680

Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled
RC-12-003-26.5 to 40	Analyze lab composite "RC-12-003-26.5 to 52.5"		6/18/13
RC-12-003-40 to 52.5			
RC-12-003-53	HOLD		
RC-12-004-16 to 28	ANALYZE		
RC-12-004-29	ANALYZE		

Comments/Special Instructions:
BILLING PER CALTRANS CONTRACT 03A1368

Controlled Document – Asbestos Lab Services COC – A1.0 – 11/23/2009

Page 2 of 2 Pages

Kathy 6/20/13
9:00am FX

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

EMSL Order:	091309809
CustomerID:	GECN80
CustomerPO:	S9300-06-180B
ProjectID:	

Attn: **John Pfeiffer**
Geocon Consultants, Inc.
3160 Gold Valley Drive
Suite 800
Rancho Cordova, CA 95742

Phone:	(916) 852-9118
Fax:	(916) 852-9132
Received:	06/21/13 9:00 AM
Analysis Date:	6/26/2013
Collected:	6/20/2013

Project: **59300-06-180B / WILLOW CREEK WALL**

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

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
RC-12-002-0.5 TO 2.0 *091309809-0001*		Brown Non-Fibrous Homogeneous		99.25% Non-fibrous (other)	**0.75% Chrysotile**

Analyst(s)
Matthew Batongbacal (1)

Baojia Ke, Laboratory Manager
or other approved signatory

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Samples analyzed by EMSL Analytical, Inc San Leandro, CA

Initial report from 06/26/2013 15:23:59

THIS IS THE LAST PAGE OF THE REPORT.

091309809

#091309809

Asbestos Lab Services Chain of Custody

EMSL Order Number *(Lab Use Only)*:

EMSL ANALYTICAL, INC.
San Leandro, CA
Suite 230
2235 Polvorosa Ave
San Leandro, CA 94577
PHONE: (510) 895-3675
FAX: (510) 895-3680

Company: Geocon Consultants, Inc.
Street: 3160 Gold Valley Drive, Suite 800
City/State/Zip: Rancho Cordova, CA 95742
Report To (Name): John Pfeiffer
Telephone: 916-852-9118
Fax:
Email Address: pfeiffer@geoconinc.com
EMSL-Bill to: ☑ Same ☐ Different
If Bill to is Different note instructions in Comments**
Third Party Billing requires written authorization from third party
Project Name/Number: Willow Creek Wall / 59300-06-1801B
Please Provide Results: Email
Purchase Order:
State Samples Taken: CA

Turnaround Time (TAT) Options* – Please Check

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

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

PCM - Air ☐ Check if samples are from NY
☐ NIOSH 7400
☐ w/ OSHA 8hr. TWA

PLM - Bulk (reporting limit)
☐ PLM EPA 600/R-93/116 (<1%)
☐ PLM EPA NOB (<1%)
Point Count
☐ 400 (<0.25%) ☐ 1000 (<0.1%)
Point Count w/Gravimetric
☐ 400 (<0.25%) ☐ 1000 (<0.1%)
☐ NYS 198.1 (friable in NY)
☐ NYS 198.6 NOB (non-friable-NY)
☐ NIOSH 9002 (<1%)

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

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

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

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

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

Other:
☐

☐ **Check For Positive Stop – Clearly Identify Homogenous Group**
Filter Pore Size (Air Samples): ☐ 0.8µm ☐ 0.45µm

Samplers Name: John Pfeiffer
Samplers Signature: John Pfeiffer

Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled
BC-12-002	0.5 to 2.0	—	6/20/13

Client Sample # (s):
Total # of Samples:
Relinquished (Client): John Pfeiffer **Date:** 6/20/13 **Time:** 1600
Received (Lab): **Date:** 6/21/13 **Time:** 9:00

Comments/Special Instructions:
BILLING PER CALTRANS CONTRACT 03A1368