

GEOTECHNICAL DESIGN REPORT

US 50, Silva Valley Parkway Interchange, Phase 1
El Dorado County, California
03-ED-50
PM 1.07/R2.40
EA 03-1E2901

Prepared by:

BLACKBURN CONSULTING
11521 Blocker Drive, Suite 110
Auburn, CA 95603
(530) 887-1494

October 2012

Prepared for:

Mark Thomas & Co., Inc.

Auburn Office:
11521 Blocker Drive, Suite 110 ▪ Auburn, CA 95603
(530) 887-1494 ▪ Fax (530) 887-1495



Modesto Office: (209) 522-6273
West Sacramento Office: (916) 375-8706

Geotechnical ▪ Construction Services ▪ Forensics

File No. 556.2
October 29, 2012

Mr. Derek Minnema
Mark Thomas & Co, Inc.
7300 Folsom Boulevard
Sacramento, CA 95826-2622

Subject: **GEOTECHNICAL DESIGN REPORT**
US 50, Silva Valley Parkway Interchange
03-ED-50, PM 1.07/R2.40, EA 03-1E2901
El Dorado County, California

Dear Mr. Minnema:

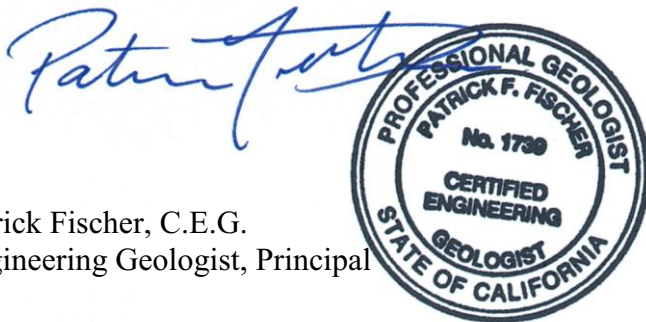
Blackburn Consulting (BCI) is pleased to submit this Geotechnical Design Report for the US 50, Silva Valley Parkway Interchange Project in El Dorado County, California. BCI prepared this report in accordance with the April 7, 2010 agreement between BCI and Mark Thomas Company (MTCO). We submitted a draft Geotechnical Design Report in October 2010 and March 2012. This report includes modifications in response to comments on the draft reports and minor updates. Report comment and response are attached in Appendix E.

Thank you for the opportunity to be part of your design team. Please call if you have questions or require additional information.

Sincerely;

BLACKBURN CONSULTING

Patrick Fischer, C.E.G.
Engineering Geologist, Principal



Rick Sowers, C.E.G., P.E.
Sr. Project Manager, Principal



“Approved as to impact on State facilities and conformance with applicable State standards and practices, and that technical oversight was performed as described in the California Department of Transportation A&E Consultant Services Manual.”

Caltrans

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US 50, Silva Valley Parkway Interchange, PM 1.07/R2.40
El Dorado County, California

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Figure 3: Geologic Map
Figure 4: Seismic Hazard Map

APPENDIX A: Log of Test Borings (Bridge Sites, Sheets 1 through 9)
Silva Valley Parkway OC
Eastbound On-Ramp at Carson Creek (Phase 2)
Westbound Off-Ramp at Carson Creek
Westbound On-Ramp UC
Eastbound Off-Ramp UC
White Rock Road Bridge
Boring and Test Pit Logs (R-10-008, T-10-101 to A-10-160)
Legend of Logs (3 sheets)

APPENDIX B: Laboratory Test Results

APPENDIX C: Seismic Refraction Profiles

APPENDIX D: Calculations

APPENDIX E: Draft Report Comment and BCI Response

1 INTRODUCTION

1.1 Purpose

BCI prepared this Geotechnical Design Report (GDR) for use in design and construction of the US 50/Silva Valley Parkway Interchange project, located in El Dorado County, California. The project extends from Post-Mile (PM) 1.07 to R2.40 with the central portion of the project at PM R1.79 (38.658° latitude/121.054° longitude). Figure 1 shows the project location.

This Geotechnical Design Report is for Phase 1 roadway improvements. BCI completed a separate Materials Report for roadway improvements, and Foundation Reports for the Silva Valley Parkway Overcrossing, westbound off-ramp bridge at Carson Creek, and the westbound on-ramp and eastbound off-ramp undercrossings at the existing Silva Valley Parkway.

This report documents subsurface geotechnical conditions, provides analysis of the anticipated site conditions as they pertain to the project described herein, and recommends geotechnical design and construction criteria for the roadway portions of the project. This report also establishes a geotechnical “baseline” to assess the existence and scope of possible changed site conditions.

1.2 Scope of Services

To prepare this report, BCI:

- Discussed the proposed improvements with Mark Thomas & Company, Inc. (MTCO)
- Reviewed the Geometric Approval Drawings and preliminary cross sections provided by MTCO
- Observed the subsurface conditions in 39 borings and 31 test pits
- Conducted three seismic refraction surveys
- Performed laboratory tests on soil and rock samples obtained from the exploration
- Performed engineering analysis and calculations to develop our conclusions and recommendations

2 EXISTING FACILITIES AND PROPOSED IMPROVEMENTS

2.1 Existing Facilities

US 50 through El Dorado County, extending east-west, is a divided freeway, constructed in 1965 and widened in 2000/02. At the time of our field exploration (2010) HOV lanes were under construction at the median in both directions. When complete, there will be four lanes in the eastbound direction (2 mixed-flow, 1 HOV lane, and 1 truck-climbing lane) and three lanes in the westbound direction (2 mixed-flow and 1 HOV lane) through the project area.

Two existing interchanges bound the project area, El Dorado Hills Boulevard/Latrobe Road to the west at PM 0.86, and Bass Lake Road to the east at PM R3.23. The proposed Silva Valley Interchange is located at PM R1.79 (see Figure 1).

Through the project site, US 50 has standard 12-ft wide lanes, 10-ft outside shoulders and a minimum of 10-ft wide inside shoulders (with HOV project completed, the shoulders range from 10 to 25-ft). On the mainline grade, east of the planned interchange, there is an eastbound truck-climbing lane on “Bass Lake Grade” to accommodate slow trucks. This truck-climbing lane terminates at the top of the grade just before the Bass Lake Road Interchange.

The existing Silva Valley Parkway is a north-south arterial that serves the El Dorado Hills community. Silva Valley Parkway currently crosses under US 50 (referred to as “Clarksville Undercrossing, Br. No. 25-0072), approximately 800 feet west of the new overcrossing, and is a 2-lane facility.

US 50 through the project site is established within various cut and fill sections. The fill slope gradients are typically about 1.5H:1V (horizontal:vertical) or flatter and vary in depth to a maximum of about 40 feet (at Carson Creek). Existing embankment fill includes rocky material (cobble and boulder size), likely derived from project cuts during original construction.

Cut-slopes along US 50 within the project typically expose variably weathered and fractured rock. The cuts are at gradients ranging from about 0.7H:1V to 1.5H:1V. Existing cut-slopes vary in height from a few feet to as much as 35 feet. As-Built plans (1965) indicate that underdrains (8-inch PMP) are present along the toe of most cut slopes.

Other than minor sloughing/erosion, we did not observe significant slope instability or erosion and the existing cut and fill slopes appear to have performed well since constructed.

2.2 Proposed Improvements

El Dorado County proposes to construct a new Silva Valley Parkway Interchange on US 50 between El Dorado Hills Blvd/Latrobe Road Interchange and Bass Lake Road Interchange primarily east of the existing Clarksville Undercrossing (Br. No. 25-0072) at Silva Valley Parkway.

According to plans and documents provided by MTCO, the overall project (Phase 1 and 2) includes the following roadway improvements:

- Partial cloverleaf interchange with loop on-ramps in the northeast and southwest quadrants and diagonal on- and off-ramps in each direction of travel on the freeway
- Continuous auxiliary lanes between El Dorado Hills Boulevard and the Silva Valley Parkway Interchange connecting the on-ramps with off-ramps
- Auxiliary lane for the eastbound diagonal on-ramp
- Auxiliary lane for the westbound diagonal off-ramp
- An overcrossing with four lanes for through traffic on the new Silva Valley Parkway in addition to deceleration lanes for the loop on-ramps and turn pockets at the intersections
- Embankment fills and culverts (new and extended) for the auxiliary lanes, ramps, and new roadway
- Retaining walls at several locations for ramp and auxiliary lane construction
- Bike and pedestrian access beneath the freeway using the existing Silva Valley Parkway
- Tong Road, north of the freeway, will be relocated to the north to provide access to the parcels in the northeast quadrant

The project will be constructed in two phases. Phase 1 construction includes the majority of interchange improvements with the exception of the eastbound diagonal on-ramp (including the bridge at Carson Creek) and the westbound loop on-ramp (with associated retaining structures). These ramps/structures will be constructed in Phase 2, which is anticipated to begin construction sometime after 2020.

Figures 2A through 2K show the general interchange improvements, stationing and reference lines, and BCI's exploration/test locations. Following is a brief description of the Phase 1 components.

2.2.1 US 50 Auxiliary Lanes (Line "A2, A3L, and A3R")

The auxiliary lane improvements will extend along the mainline A2 Line (eastbound and westbound) from approximately Station 68+00 to 92+00 (MTCO, 2010 Layout), along the A3L Line from approximately Station 120+00 to 138+00, and along the A3R Line from approximately Station 112+00 to 128+00. In general, east and westbound auxiliary lane improvements will include a 12-ft wide lane, and a 10-ft wide paved shoulder. The total length of auxiliary lane is approximately 5,400 feet.

Both cut and embankment fill are necessary for auxiliary lane widening. Cuts will be primarily into existing cut slopes that expose hard rock and will have a final slope gradient of 1:1 (horizontal to vertical) or flatter. New embankment fill will be up to 15 feet in depth and will have a final slope gradient of 2:1 or flatter. Native materials derived from the project cuts, local borrow, and imported borrow will be used for construction of embankment fills. The project will require a significant quantity of import fill.

2.2.2 Silva Valley Parkway (Line "SVP")

The Silva Valley Parkway realignment will include a new overcrossing at US 50 that will have a total width of approximately 105-ft with four lanes for through traffic, deceleration lanes for the on-ramps, and turn pockets at the intersections. Beyond the overcrossing, the lanes will taper down to four through lanes with 4 to 10-ft wide paved shoulders and a 16-ft wide median until the transition to existing roadways. Most of Silva Valley Parkway will require embankment fill with some excavation near the intersection with realigned Tong Road (on the north side of US 50). Fill slopes will have a final gradient of 2:1 (horizontal to vertical) or flatter, and cuts into rock will be at a gradient of 1:1 or flatter.

2.2.3 Ramp Alignments (Lines "W1, W3, E1 and E2")

The new on/off ramps will vary in width from approximately 24 to 36-ft with an 8-ft and 4-ft wide paved shoulder and 3-ft wide unpaved shoulders. Ramps will generally require embankment fill with depths up to 15-ft. The westbound off-ramp ("W1") and eastbound loop on-ramp ("E2") will also require some excavation into the underlying rock. Fill slopes will have final gradient of 2:1 (horizontal to vertical) or flatter, and cuts into rock will be at a gradient of 1.5:1 or flatter.

2.2.4 Old Silva Valley Parkway Tie-in (Line "C1")

Old Silva Valley Parkway lies outside of Caltrans right-of-way (ROW) and will tie-in to the new Silva Valley Parkway with two through lanes on the north and south ends. A right turn pocket will be included at the south end. Embankment fill will be required for the south tie-in with depth of fill on the order of 3 to 5 feet. Fill slopes will be at a gradient of 2:1 (horizontal to vertical) or flatter.

2.2.5 Old White Rock Road Tie-in (Line "C2")

Old White Rock Road lies outside of Caltrans ROW and will tie-in to the new White Rock Road with two through lanes and a right turn pocket. The existing road at the east end of the tie-in is a narrow, concrete roadway. Excavation into the underlying rock, up to 7 feet deep, will be required for this portion of roadway. Cut slopes will be at a gradient of 1.5:1 (horizontal to vertical) or flatter.

2.2.6 Tong Road (Line "TR")

Tong Road lies outside of Caltrans ROW and will be realigned to the north of its current location. The new road will consist of two through lanes and shoulders (approximately 2 to 4-ft wide). A concrete arch culvert is planned at the crossing of Carson Creek. The road will require several feet of embankment fill for most of the length except at the west end where excavation into the underlying rock, up to 10-ft deep, will be required. Fill slopes will be at a gradient of 2:1 (horizontal to vertical) or flatter and cut slopes at a gradient of 1.5:1 or flatter.

3 PERTINENT REPORTS AND INVESTIGATIONS

In preparing this GDR, we reviewed the following information pertinent to the project geology, geotechnical conditions, and existing facilities.

3.1 Caltrans As-Built Plans

- As-built Plans: *Construction on State Highway, In Sacramento County and El Dorado Counties between Folsom Junction and 2.2 miles east of Sacramento County Line, Contract No. 03-074024, Sheets 1/171 – 49/171, December, 1965.*
- As-built Plans: *Construction on State Highway, In El Dorado County between 2.1 miles east of Sacramento County Line and 1.3 miles east of Bass Lake Road, Contract No. 03-074054 and 03-074044, Sheets 1/69 – 29/69, September, 1966.*
- As-built Plans: *Construction on State Highway in El Dorado County from 1.0 km East of El Dorado Hills Blvd to East Placerville Rd Undercrossing, Contract No. 03-1A69U4, Sheets 1/112– 40/112, November 15, 2000.*

3.2 Consultant Reports

- Blackburn Consulting, Foundation Report, Clarksville UC (Widen), Bridge No. 25-0072 L/R), El Dorado County, California, for Quincy Engineering, September 14, 2007.
- Blackburn Consulting, Geotechnical Design Report, US 50 Phase-1 HOV Lane CMIA Project, PM 0.0 to 2.9, El Dorado County, California, for Quincy Engineering, December 14, 2007.

4 PHYSICAL SETTING

4.1 Climate

The site is within the “Low Mountain” climate region as shown on the Caltrans Pavement Climate Regions map (October 2005). Table 1 presents monthly climatic data averages (1971-2000) recorded for Lehman Ranch (closest station with available data)¹, located along Latrobe Road about eight miles south of US 50.

Table 1 - Climate Data

Data Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Avg. Total Precipitation (in)	4.03	3.24	3.21	1.81	0.47	0.26	0.38	0.41	0.61	1.92	3.70	3.13	23.16
Avg. Max. Temp. (F)	47.1	54.4	61.5	69.8	79.0	90.0	93.0	90.1	83.5	71.7	57.7	47.1	70.4
Avg. Min. Temp. (F)	21.3	25.5	31.1	36.9	45.3	54.2	62.0	61.1	52.9	40.1	28.7	21.0	40.0

Based on the above data, over 80 percent of the total annual precipitation occurs between October and March. The data also indicates that significant periods of daily temperature above 50 degrees Fahrenheit (required for paving operations) are not likely from November through March. Although freezing temperatures will occur, the duration is not considered significant to geotechnical engineering aspects (pavement, foundations, etc.).

4.2 Topography and Drainage

Existing ground elevations in the project area range from a low of approximately 600 ft above mean sea level at the west end of the project, to a high of approximately 900 ft at the east end. Overall site topography is moderately to gently sloping to the west/southwest, but this has been modified by steep cuts and fills along US 50.

Drainage is generally to the west/southwest through creeks, ditches, and sheetflow. Roadway improvements along US 50 have modified the topography and drainage. Pre-existing drainages cross beneath US 50 in a southwesterly direction, including Carson Creek near “A3R&L” Line, Station 110+50 and Bucks Ravine Creek near “A2” Line, Station 93+00.

¹ Western Regional Climate Center (WRCC) website (<http://www.wrcc.dri.edu>) from Blackburn Consulting (2007)

At the project site, the majority of US 50 is cut into native soil and rock but there are significant fills where creek and drainage crossings occur. Some of the existing fill and cut slopes will be modified for the interchange improvements. We did not observe indications of existing embankment or cut slope instability.

Site vegetation consists of a moderate to thick cover of grass and weeds, with scattered clusters of trees (primarily within drainages).

4.3 Man-made and Natural Features of Engineering and Construction Significance Outside Caltrans Right-of-Way

There are no significant features of engineering or construction significance adjacent to the project other than existing roadway, parking lot pavement (for the nearby church), overhead and underground electric, and water lines. We do not expect the project improvements (ramp embankments, overcrossing, road widening, culverts, etc.) to have a significant geotechnical impact to the adjacent parcels.

4.4 Regional Geology

The project site is located within the foothills of the Sierra Nevada Geomorphic Province of California. The Sierra Nevada has a general northwest topographic/structural trend and is on the order of 430 miles long and 40 to 80 miles wide. The mountain ranges of the Sierra Nevada were created roughly 120 to 130 million years ago when sediments as thick as 30,000 feet along with volcanic rocks were buckled and warped resulting in a series of low mountain ranges. The roots of these mountain ranges were then intruded by granitic rock.

The Sierra Nevada was tilted upward along faulting at the eastern edge. In the higher elevations, much of the younger sedimentary material and older metamorphic rock has been eroded and exposes granitic rock. The older rocks that remain are metamorphosed and are exposed in the foothills of the Sierra Nevada.

Most of El Dorado County is underlain by Mesozoic-age metavolcanic and metasedimentary rocks. Metavolcanic rock occurs at relatively shallow depths throughout the project. The metamorphic rock structure is dominated by northwest trending foliation and northwest trending faults and fault zones that mark the boundaries of major rock types.

4.5 Local Geology

Published geologic mapping by Wagner² and Busch³ shows Jurassic-age metavolcanic rock at the project site. Our site review and preliminary subsurface work confirm the presence of shallow, metavolcanic rock. We show local site geology on Figure 3 (Geologic Map).

² Wagner, D.L. et al, "Geologic Map of the Sacramento Quadrangle, California", California Geological Survey, Map No. 1A, 1981, revised 1987.

³ Busch, "Generalized Geologic Map of El Dorado County, California", June, 2001, California Geological Survey, OFR 2000-03.

Rock structure in the area has a predominant foliation with a general strike of north, 35° to 45° west, and a steep dip of 70°-90° to the north. Rock is exposed intermittently on the slopes adjacent to the new interchange. We did not observe indications of slope instability on the natural slopes in the area.

The West Bear Mountains Fault is located approximately 4,000 feet west of the central portion of the project (near Latrobe Road) with a short splay mapped approximately 1,900 feet to the east (see Figure 3). The East Bear Mountains Fault (or Rescue section) is located approximately 7 miles east of the site. Faulting is not mapped through the site and we observed no indication of active faulting in the area.

Published mapping and site review does not indicate that the project is within an ultramafic rock area (typical host rock for asbestos minerals); however, ultramafic rock and faulting are mapped nearby and naturally occurring asbestos minerals can potentially occur in this area.

Geologic mapping by Churchill⁴ shows an “area more likely to contain naturally occurring asbestos” (NOA) about one mile north of the Latrobe Road Undercrossing and also east of Bass Lake Road. The mapping shows the project area to be within an area “that probably does not contain asbestos.” Churchill discusses the possibility of serpentine occurring in faults or within fault zones, which may contain chrysotile or tremolite/actinolite asbestos. Mapping by Bruyn⁵, shows a “Quarter Mile Buffer for More Likely to Contain Asbestos or Fault Line” within the western portion of the project (roughly extending to the overcrossing location).

4.6 Regional Seismicity

Our review of published geologic mapping and site review did not reveal the presence of Late Quaternary (displacement within the last 700,000 years) or younger faults within or adjacent to the project site.

The site does not lie within or adjacent to an Alquist–Priolo Earthquake Fault Zone for fault rupture hazard (Bryant and Hart, 2007)⁶, and no known active faults are mapped with the project area. Busch (2001) shows the main trace of the West Bear Mountains Fault crossing US 50 approximately 3,100 feet west of the existing Silva Valley Parkway and a north-south trending splay associated with this fault crossing US 50 approximately 1,200 feet to the west. Jennings (1994)⁷ shows the West Bear Mountains Fault as Pre-Quaternary in age. The Caltrans Deterministic PGA Map (September 2007) does not consider this fault as an active seismic source and shows no active faults in the project area.

⁴ Churchill, et al., 2000, “Areas More Likely to Contain Natural Occurrences of Asbestos in Western El Dorado County, California”, California Geological Survey, OFR 2000-02

⁵ Bruyn, 2005, “Asbestos Review Areas, Western Slope, County of El Dorado, State of California”, El Dorado County

⁶ Fault Rupture Hazard Zones in California, Special Publication 42, Interim Revision; California Geological Survey

⁷ Fault Activity Map of California and Adjacent Areas, Geologic Map No. 6, California Division of Mines and Geology

The closest fault considered in ground motion analysis is the East Bear Mountains Fault (or Rescue section) located approximately 7 miles east of the overcrossing site. We consider the potential for fault rupture at the site to be low.

We show approximate fault locations on Figure 4, Seismic Hazard Map, which is a copy of a portion of the Caltrans Deterministic PGA Map (September 2007).

5 EXPLORATION

5.1 Drilling, Trenching, and Sampling

To characterize subsurface conditions at the site, BCI observed the drilling, excavation, and sampling of 39 borings and 31 test pits in August and September 2010. Boring depths ranged from 1 ft (auger refusal) to 51 ft below the ground surface (bgs). We excavated the test pits to depths from 2.5 to 10 ft bgs.

We completed the borings and test pits for this Geotechnical Design Report, bridge Foundation Reports, and the Materials Report. We show all boring and test pit locations on Figures 2B through 2K (including logs for Phase 2 improvement locations) and boring and test pit logs, Foundation Report Log of Test Borings (LOTB's), and the Legend of Logs in Appendix A.

The location and depth of exploration points were determined by BCI based on 1) preliminary project geometrics, 2) site access, 3) anticipated soil conditions, 4) the presence of existing fill, and 5) the proposed structures.

Our drilling sub-consultants (PC Exploration and Taber Drilling) advanced the borings using a combination of solid augers, hollow-stem augers, and coring methods. Solid augers were about 4 inches in diameter, hollow-stem augers were approximately 7 inches in diameter, and the core bit was approximately 3.8 inches in diameter (HQ). BCI obtained relatively undisturbed soil samples at various intervals using a 3-inch O.D. Modified California sampler (MCS) equipped with 2.4 inch I.D. brass liners. The drillers used an automatic, 140 lb. hammer falling approximately 30 inches to drive the samplers. We drilled and sampled rock using HQ wire-line rock coring techniques.

We sealed the MCS liners with plastic caps. We placed continuous core samples in labeled core boxes. We also obtained bulk soil samples from auger cuttings and the backhoe bucket. During drilling, we performed field strength testing with a pocket penetrometer on select cohesive and/or cemented soil samples. We note the field tests on the logs.

Our excavation contractor (Monte Ricky and Burke Backhoe) excavated the test pits with a Caterpillar 430D, rubber-tire backhoe equipped with a 24-inch wide bucket. We obtained disturbed (driven, small and large bulk) soil samples at select depth intervals from some test pits. We used plastic caps to seal and label 6-inch brass tubes retrieved from the driven samples. We placed small bulk samples into plastic bags and large bulk samples into large cloth bags, and labeled each for laboratory identification.

We located borings and pits by taping and/or pacing from existing site features. We estimate elevations based on available topographic mapping. Boring and test pit locations are not surveyed. A BCI geologist or engineer logged the borings and retrieved samples for laboratory testing.

5.2 Seismic Refraction Survey

We performed seismic refraction surveys at 3 locations within the interchange area, 1) near the south abutment of the Silva Valley Parkway Overcrossing, 2) along the eastbound auxiliary lane cut slope (near A2 Line, Station 80+40), and 3) along the westbound auxiliary lane cut slope (near A2 Line, Station 86+50).

Each line was 55 ft in length. We located the lines based on project plans and measuring from existing features. A BCI geologist led the field exercise and monitored data acquisition. We show the location of the seismic refraction survey lines on the Location Map (Figures 2C and 2E) and our interpreted seismic velocity profiles on the Seismic Profile sheets in Appendix C.

Each seismic refraction line consists of 5 shot points distributed along a collinear array of 12 geophones placed at 5-foot intervals. We use a multi-channel seismograph located at one end of the array to collect the data. We generate compressional wave energy (P-waves) at each shot point with multiple impacts of a 10-pound sledge hammer striking a steel plate on the ground surface. A Geode 24-Channel Seismograph was used to detect, digitize, and record the P-waves. We analyzed the acquired data with the computer program *SeisImager* by Geometrics, Inc.

We discuss seismic refraction results in the “Subsurface Soil and Rock Conditions” and “Rippability” sections of this report.

5.3 Geologic Mapping

BCI checked the mapped geologic conditions presented in the references during our fieldwork. Our site review and subsurface investigation confirms the presence of metavolcanic rock below a relatively thin veneer of soil throughout the project area. We also recorded rock structure exposed in our test pits, at highway cuts, and at rock outcrop throughout the site. The recorded rock structure is discussed further below.

5.4 Exploration Notes

We were able to excavate with a backhoe and auger drill to depths of 2.5 to 10 feet at most exploration locations within the site. Our test pits encountered practical refusal to the bucket excavator, generally within 6 feet of the surface. After exploration, we immediately backfilled the test pits with the excavated materials. Borings were also backfilled with soil cuttings and/or grout backfill where within roadways or where deeper cores were obtained.

6 GEOTECHNICAL TESTING

In addition to Standard Penetration Tests, field pocket penetrometer tests, and field resistivity tests, we completed the following laboratory tests on representative soil samples from exploratory borings and test pits:

- Moisture content (ASTM D2216) and unit weight (ASTM D2937)
- Plasticity Index (ASTM D4318)
- Sieve Analysis (ASTM D422)
- Direct shear (ASTM D3080)
- Unconfined Compression (ASTM D2166)
- Compaction (CTM 216)
- Resistance Value (CTM 301)
- Sulfate content (CTM 417), chloride content (CTM 422), pH (CTM 643) and resistivity testing (CTM 643)

We attach laboratory test results and a summary of results in Appendix B.

7 GEOTECHNICAL CONDITIONS

7.1 Site Geology

Based on our geologic reconnaissance and subsurface exploration, site geology is consistent with published geologic mapping and previous site exploration by others.

7.1.1 Lithology

The predominant rock-type throughout the project is metavolcanic rock, which is exposed extensively in cut slopes along the highway and road shoulders and at outcrop that occurs throughout the site. Rock outcrop and cut-slopes expose variably weathered and fractured metavolcanic rock. The rock weathering ranges from decomposed (i.e., effectively “soil-like”) to intensely weathered, with areas of slightly weathered to fresh rock. Both rock fracture and weathering decrease with depth below the ground surface.

We did not observe serpentinite or other ultramafic rock types (a host rock for NOA), or significant bands of fibrous (asbestiform) minerals within rock outcrop, slope cuts, or in our borings and test pits. As discussed above, NOA mapping by others does not show the project within an ultramafic rock area.

7.1.2 Rock Structure

Rock structure in the area has a predominant foliation generally with a strike of north, 35° to 45° west (but ranging from 20° to 60° west), and a steep dip of 70°-90° to the north. The rock has localized pervasive fracture and is also randomly fractured, generally by very short, stepped, blocky fractures. Fracture intensity varies with depth and is generally intense in the upper 10 to 15 feet and becomes moderate to slight below that depth. Fractures are generally tight to thin infilling and have a rough/wavy texture. We observed one narrow shear zone (approximately 2

to 3 feet wide) at the eastbound shoulder near A2 Line Station 82+50. This shear zone appears associated with the West Bear Mountains Fault (considered to be Pre-Quaternary in age) and has a strike of north, 60° west and a steep dip of 75° southwest.

7.1.3 Natural and Built Slope Stability

Published mapping that we reviewed does not show landslide features within the project area. Natural slopes and highway cuts do not show signs of instability (e.g., significant rockfall or slope failure). We did not observe evidence of significant geologic hazards, including landsliding, settlement, very soft soils, severe erosion, springs, etc., during our site reconnaissance. We did not observe any areas of distress (such as slumps, distortion or severe erosion) within existing embankment fill slopes within the project interval.

7.2 **Subsurface Soil and Rock Conditions**

7.2.1 General Field Exploration

We completed our exploration points along the existing highway/roadways and in areas of the proposed interchange improvements, including the structure approaches, the ramp alignments, and culvert extensions. See Figures 2B through 2K for exploration locations.

7.2.2 Exploration

In the borings and test pits, we encountered two units significant to roadway elements:

- Unit 1: This unit consists of roadway fill that overlies the native soil and rock. The fill typically consists of what appears to be a locally derived mixture of soil and rock and is generally classified as silty/sandy gravel with boulders and cobbles. In general, Unit 1 is located at embankment fill locations for the existing highway/roads and at transitions to at-grade or cut areas. Fill also occurs at:
 - the church facility located on the north side of Tong Road where it encroaches on the westbound diagonal off-ramp (approximately at W1 Line, Station 112+00 to 114+50)
 - a pipeline/roadway drainage crossing on the planned alignment of new Silva Valley Parkway (approximately SVP Line, Station 180+75 to 182+00)
 - dumped material on the new Silva Valley Parkway (approximately SVP Line, Station 180+25 to 180+75)
- Unit 2: This unit consists of native soil and rock. In general, the native soils are comprised of very stiff to hard, sandy silt/clay with gravel, and medium dense to dense silty, clayey gravel with sand and are on the order of 2 to 4 feet thick. The soils overlie variably weathered and fractured metamorphic rock, consistent with published geologic mapping. The upper portion of the rock unit is decomposed to moderately weathered, very intensely to intensely fractured, and soft (locally hard), and becomes generally less weathered and fractured and harder with depth. Unit 2 occurs throughout the site and underlies Unit 1.

Appendix A contains the boring and test pit logs that provide more specific soil and rock descriptions, blow count, and rock core data. For reference, we also include LOTB's for the proposed bridges at Silva Valley Parkway Overcrossing, Carson Creek ramp bridges, and Silva Valley Parkway ramp undercrossings.

7.2.3 Seismic Refraction Exploration

Our seismic refraction survey interpretations show that recorded velocities range from $\pm 2,000$ to 6,000 feet per second (fps) in the upper 20 ft of the subsurface. Based on our subsurface explorations and previous experience, these velocities appear consistent with the fractured metavolcanic rock and weathering near the surface.

7.3 **Water**

7.3.1 Surface Water

At the time of our field work (July/August), we observed flowing water in Carson Creek and Bucks Ravine Creek (tributary to Carson Creek located west of existing Silva Valley Parkway). In general, surface water drainage along the highway and roadways is directed along ditches to storm drain facilities and eventually into Carson Creek. The creek crossing US 50 near A2 Line, Station 93+00 (Bucks Ravine Creek) appears to be partially blocked by beaver activity between the south side of US 50 and Joerger Cutoff Road.

7.3.1.1 *Scour*

Drainages are underlain by hard rock that controls the rate of scour. At Carson Creek, hard rock is exposed in the creek bed on either side of the highway. We did not observe scour and/or significant erosion at the inlet or outlet of the US 50 box culvert at Carson Creek.

The small drainage (Bucks Ravine Creek) that crosses White Rock Road (near SVP Line 145+00) also has no significant scour that is visible (there is significant vegetative growth near highway and road crossings). Elevation survey by MTCO suggests some erosion (2 to 3 feet) in the stream channel downstream of the culvert outlet. At the crossing of the existing White Rock Road, rip-rap has been placed around the box culvert outlet.

7.3.1.2 *Erosion*

We observed only minor (less than 4 inches deep) erosion rills and gullies in the existing embankment fills and cut slopes. This appears to occur where surface water concentrates above and flows over the slope. Unlined drainage ditches and swales along the perimeter and median of US 50 do not appear significantly eroded. One location, at the eastbound cut-slope near A2 Line, Station 83+00, has an eroded gully on the slope due to minor drainage that has been allowed to drain freely over the slope.

7.3.2 Groundwater

We did not observe groundwater seepage at the surface in the project area, or within our test pits or augered borings, with the exception of perched groundwater at a depth of 8 to 9 feet (approximate elevation of 662 feet) located above weathered rock at Test Pits T-10-147 & 153 (near Bucks Ravine Creek on the north side of US 50, near A2 Line, Station 93+00).

During our subsurface exploration for the US 50 Clarksville UC (Br. No. 25-0072, median infill) project (BCI 2007), we encountered groundwater in the east abutment boring at an elevation of approximately 660 feet. Existing ground elevation at the proposed abutment locations is at approximately 670 to 690 feet.

In general, we expect that shallow groundwater and seepage can occur near the soil/rock interface (typical depths of approximately 3 to 6 feet below existing, natural grade), particularly during the winter months or extended periods of rainfall. Locally, seepage can also occur along zones of fractured or less weathered rock and daylight at the ground surface or within excavations. Groundwater and perched water levels can fluctuate due to changes in precipitation, water levels in local drainages, irrigation, pumping of wells, and other factors.

7.4 **Project Site Seismicity**

7.4.1 Ground Motions

Based on Caltrans ARS Online (V1.0.4), the closest recognized Late Quaternary or younger fault is the Bear Mountains Fault Zone (Rescue Fault section, Caltrans Fault ID No. 83, Maximum Magnitude: 6.5) located ± 7 miles east of the site. For approximate fault locations, see Figure 4.

We used the Caltrans ARS Online (web-based tool) to calculate both deterministic and probabilistic acceleration response spectra for the site based on criteria provided in Appendix B of Caltrans Seismic Design Criteria (Revision Date:9/11/09).

The deterministic spectrum is determined as the average of median response spectra calculated using ground motion prediction equations developed under the "Next Generation Attenuation" (NGA) project. These equations are applied to all faults considered to have been active in the last 700,000 years (Late Quaternary age) and that are capable of producing a moment magnitude earthquake of 6.0 or greater.

The probabilistic spectrum is obtained from the USGS (2008) National Hazard Map for 5% probability of exceedance in 50 years. Caltrans design spectrum is based on the larger of the deterministic and probabilistic spectral values. Both the deterministic and probabilistic spectra account for soil effects through incorporation of the parameter V_s30 , the average shear wave velocity in the upper 30 meters of the soil profile. For the project site, we assume a Site Class B/C with V_s30 equal to 760 meters per second (approximately 2,500 feet per second) based on the mapped ground conditions (underlain by shallow metamorphic rock).

The peak ground acceleration (PGA) at the site is approximately 0.2g based on Caltrans ARS Online and minimum deterministic levels of ground acceleration.

7.4.2 Ground Rupture

Our review of published geologic mapping and preliminary site review did not reveal the presence of Late Quaternary (displacement within the last 700,000 years) or younger faults within or immediately adjacent to the project site. The potential for ground rupture at the site is low.

7.4.3 Liquefaction

Liquefaction can occur when loose to medium dense, granular, saturated soils (generally within 50 ft of the surface) are subjected to ground shaking. Our subsurface investigation indicates that the site is underlain by shallow rock, which is not liquefiable.

8 GEOTECHNICAL ANALYSIS AND DESIGN

8.1 Cuts and Excavations

Significant cut slopes and excavations are anticipated for this project. Excavations of up to 25 feet are required for the eastbound diagonal off-ramp near the intersection with Silva Valley Parkway, and up to 15 feet for Tong Road near Silva Valley Parkway. Existing slopes along US 50, up to 35 feet in height, will be cut back approximately 10 to 15 feet (or more) to widen for auxiliary lanes. Based on the good condition/performance of existing cut slopes and the results of our field exploration, we expect the proposed slopes, cut into rock at a gradient of 1H:1V or flatter, to be stable.

Temporary slopes may be required for certain installations. Prepare all slopes and shore temporary excavations in accordance with current Cal OSHA requirements. Where the use of excavation sloping and/or shoring is required, a competent person must classify each soil deposit as Type A, Type B, or Type C in accordance with OSHA procedures. We expect most native soils to be classified as Type B, which requires a temporary slope gradient of 1:1 or flatter. Excavations in fill will require sloping or shoring for Type C soils.

8.1.1 Cut Slope Stability

Cuts will expose surficial soils and underlying rock. Surficial soils are relatively shallow (2 to 4 feet) and we expect them to have little impact on overall slope stability. Rock slope stability is commonly controlled by failure along discontinuities (planes of potential weakness) within the rock mass. To determine the potential for slope failures within the rock, we recorded pervasive discontinuities and used a computer program (Rockpack III) to evaluate the potential for failure.

Appendix D contains stereonetts generated for each cut slope location. Stereonets show the orientation of cut slopes and discontinuities (Great Circles), and a critical zone where if dip vectors or intersecting planes occur within (or close to it) suggest a possibility of failure. For review, we use a conservative discontinuity phi angle of 32 degrees. Table 2 shows the discontinuity orientations that we measured at the location of proposed slopes and likely affects on the planned slope.

Table 2 - Rock Discontinuities and Stability

General Location and Existing Condition	Proposed Cut Slope	Strike and Dip (degrees)*	Stability Condition
<p>Eastbound Auxiliary Lane, A2 Line, Station 77+00 to 89+00</p> <p>Existing north-northwest facing slope at 0.7h:1v gradient, maximum height up to approximately 35 feet.</p>	<p>Existing slope to be cut back for widening, 10 to 15 feet, at flatter (1h:1v) gradient than existing.</p>	<p>Western End N35W, 65N fol N75W, 24S fr N60W, 75S sh N25E, 70N fr Eastern End N60W, 75S sh N25E, 70N fr N40W, 75N fol</p>	<p>Stable at proposed gradient of 1:1 and flatter. No significant planes or wedges out of slope.</p> <p>Minor rockfall potential with rock diameter estimated at approximate max. = 10 inches, avg.= 4 inches.</p>
<p>Silva Valley Parkway Overcrossing, South Abutment, A3R Line, Station 104+00 to 108+00</p> <p>Existing north-northwest facing slope at 1.5h:1v gradient, maximum height up to approximately 25 feet.</p>	<p>Existing slope to be cut back for eastbound loop on-ramp at same gradient (1.5h:1v). Slope paving under bridge.</p>	<p>N19W, 88S fol N40W, 82N fol N63E, 70S fr N86W, 70S fr N30W, 85N fol N35W, 82N fol N48W, 84N fol</p>	<p>Stable at proposed gradient of 1.5h:1v and flatter. No significant planes or wedges out of slope.</p> <p>Low potential for rockfall due to slope gradient and proposed paving.</p>
<p>Westbound Auxiliary Lane, A3L Line, Station 126+00 to 134+00</p> <p>Existing southwest facing slope at approximate 1.5h:1v and flatter gradient, maximum height up to approximately 25 feet.</p>	<p>Existing slope may be cut back approximately 8 feet at a gradient of 1:1 or flatter.</p>	<p><u>Eastern End</u> N66E, 81S fr N37E, 88N fr N50W, 15S fr N60W, 17S fr N44W, 76N fol N34W, 87S fol N60W, 78N fol N70W, 9S fr <u>Western End</u> N34W, 87S fol N50W, 15S fr N60W, 16S, fr N55W, 64N fol</p>	<p>Stable at proposed gradient of up 1:1 or flatter. Some planes and minor wedge out of slope toward east end but at low angle (9 to 18 degrees) that is stable considering rough and tight fracture surfaces.</p> <p>Minor rockfall potential particularly at west end. Review following completion of cut.</p>
<p>Silva Overcrossing, North Abutment, A3L Line, Station 102+00 to 109+00</p> <p>Existing south-southeast facing slope at 1.5h:1v gradient, maximum height up to approximately 30 feet.</p>	<p>Existing slope to remain as-is for Phase 1. Will be cut back for westbound loop on-ramp at same gradient (1.5:1) during Phase 2. Tie-back wall proposed for portion of slope in Phase 2. Slope paving under bridge.</p>	<p>N40W, 83N fol N35W, 76N fol N50E, 84S fr N60E, 16S fr N38W, 84N fol N63E, 70S fr N65W, 25S fr</p>	<p>Stable at existing gradient of approximately 1.5h:1v. Some possible minor wedges out of slope on semi-continuous fracture dipping shallow to the southwest but wedges plunge at a low angle (16 to 22 degrees) that is stable considering rough and tight fracture surfaces.</p> <p>Low potential for rockfall due to slope gradient.</p>

Table 2 - Rock Discontinuities and Stability (Continued)

General Location and Existing Condition	Proposed Cut Slope	Strike and Dip (degrees)*	Stability Condition
Westbound Auxiliary Lane, A2 Line, Station 85+00 to 90+00 Existing south-southeast facing slope at 1.5h:1v gradient, maximum height up to approximately 35 feet.	Existing slope to be cut back for widening, approximately 15 feet, at 1:1 gradient.	N50E, 24S fr N60W, 80N fol N60W, 88N fol N35E, 82S fr N60W, 12S fr N40E, 84S fr N55W, 88S fol	Stable at proposed gradient of 1:1 and flatter. Minor planes and possible wedges out of slope on semi-continuous, stepped fractures but planes and wedges are at a low angle (9 to 22 degrees) that are stable considering rough and tight fracture surfaces. Minor rockfall potential with rock diameter approx. max. = 8 inches, avg. = 4-inches.

*fr = fracture, fol = foliation, sh = shear

Existing cut-slopes appear grossly stable, with areas of minor erosion and sloughing within intensely weathered portions of rock. We expect that the proposed modified cut-slopes at gradients of 1H:1V (or flatter) will also be stable. However, a Certified Engineering Geologist should observe rock excavations to evaluate the potential need to flatten (or otherwise modify) rock slopes if adverse discontinuity conditions are exposed during construction. We recommend crown ditches and slope rounding at the top of cuts to reduce slope erosion.

For slopes steeper than 1.5H:1V, consider pedestrian and vehicle safety and provide adequate barriers. Steep cut slopes (1:1) may require rockfall protection (such as fencing or adequate catchment area) in areas subject to potential damage from rolling rock. Review cut slopes upon completion to evaluate rockfall potential, scaling requirements, and mitigation methods if necessary.

Based on the performance of existing cuts and the nature of the cut rock, it appears that rockfall potential is generally low for the proposed cuts. If rock catchment area at the base of slopes is insufficient, a rockfall attenuator fence will be necessary at slopes with a 1:1 gradient and in excess of 15 feet in height. Caltrans indicates that a simple chain link fence will be adequate for this purpose and recommends the fence be placed approximately 4 feet above the toe of slope and modified so that the bottom of the fence fabric is loose and extends below the posts. This fence type will attenuate minor rockfall but allow the rock to drop through for easier removal. Most cut slope locations have adequate setback (20+ft) from traveled way such that rockfall will not be an impact. BCI can provide additional fence detail if necessary based on the final slope/catchment area configuration and exposed slope conditions.

8.1.2 Rippability

Based on the subsurface conditions observed and tested, and our experience with similar conditions, we expect that typical, heavy-duty, excavator equipment is sufficient to excavate native soil and weathered rock to anticipated footing depths for the proposed retaining structures.

Based on our review of cuts and the results of our seismic refraction survey, we present an estimate of material rippability in Table 3.

Table 3 - Rippability

Seismic Velocity (feet per second, fps)	Material Type	Estimated Rippability
≤ 3,000	Fill, colluvium and decomposed to intensely weathered rock	Rippable with heavy-duty construction equipment
3,000 to 7,000	Intensely to moderately weathered rock, with local less weathered blocks	Rippable, with local resistant blocks that may require blasting or alternative excavation methods
≥ 7,000	Slightly weathered to fresh rock	Blasting or alternative excavation methods, with local blocks rippable along natural discontinuities

Section 1-62 of the 2000 Caterpillar Performance Handbook (Edition 31) indicates rock with seismic velocities up to about 7,000 fps are rippable with a Caterpillar D9, and marginally rippable for seismic velocities between 7,000 and 9,000 fps. Based on our boring / test pit data and geologic reconnaissance, we expect the upper 10 to 15 feet of decomposed to moderately weathered rock will be rippable with a large dozer or excavator equipped with a single shank ripper.

We expect the following areas (shown on Figures 2B through 2K) will require controlled blasting or alternative excavation methods (e.g., splitting, chipping, pneumatic hammers, etc.) to facilitate excavation:

- Westbound auxiliary lane possible cut/wall excavation approximately between A3L Line, Stations 125+50 and 134+50
- Portions of the westbound auxiliary lane cut approximately between A2 Line, Stations 85+00 and 89+00, roughly below elevation 695 feet
- Portions of the eastbound on-ramp cuts at the slope between E2 Line, Stations 103+00 and 109+00, roughly below elevation 725 ft
- Isolated locations along the eastbound auxiliary lane cut between A2 Line, Stations 78+00 and 87+00
- Deeper excavations near the intersection of Silva Valley Parkway and the westbound off-ramp

Competent rock and large boulders may also be present at shallower depths at other locations within the project, which may require alternative excavation methods and/or localized controlled blasting.

Perform controlled blasting, if required and allowable, in accordance with Caltrans Standard Specifications (including Sections 7-1.10 and 19-2.03). The specifications and special provisions developed for blasting should address safety issues and avoidance of damage to existing pavement, utilities, structures and other natural and man-made features. To avoid damage to foundation rock, do not use blasting techniques to excavate rock within 100 feet (laterally) of abutment locations.

8.1.3 Soil Moisture

In general, the moisture content of the upper soils ranges from 5 to 11 percent at the time of our field exploration. Unless grading work is completed shortly after the wet season, we expect the soil to be generally dry of optimum and require moisture conditioning particularly when mixed with the underlying rock. Over optimum moisture conditions can occur when soils are excavated in low lying areas at or adjacent to creeks.

8.1.4 Grading Factors

This project is expected to require significant import material. Based on data developed for this study, the majority of proposed cuts will be rippable to approximate depths of 15 to 20 feet. We estimate that the majority of this material will break down to dimension of less than 8 inches and be suitable to use in project fills. We expect that cuts below a depth of approximately 15 feet will encounter hard rock and generate mostly oversize material, particularly at the locations listed above as requiring blasting to facilitate excavation. Oversize material (greater than 8 inches in diameter) will require disposal outside the structural fill limits and should not be included in grading factors. Local, resistant blocks of hard rock that will not readily break down may also be encountered at other locations.

For the usable fill material, we estimate an overall earthwork factor (i.e. in-place volume/re-compacted volume) ranging from 0.90 to 1.10 for materials placed at 90 to 95% relative compaction (per CTM 216). In consideration of material loss during transport and site work, potential for variability within the weathered/fractured rock, and unsuitable/oversize materials, we recommend a factor of 0.95 for purposes of construction bidding.

For oversize rock (generally expected to be excavated from depths greater than 15 feet) used as “slope protection” or stockpiled away from embankments, we estimate an earthwork factor on the order of 1.3 (bulking).

8.2 Existing Embankment Fill

Embankment fill occurs along US 50 primarily at crossings of Carson Creek and Bucks Ravine Creek box culverts. We assume that existing fill located within US 50 right-of-way is “engineered fill” placed in accordance with Caltrans “Standard Specifications.”

We observed other fill locations that we consider to be “non-structural fill” in the following areas:

- Westbound off-ramp, W1 Line Sta. 112+00 to 114+50
- Silva Valley Parkway, SVP Line Sta. 180+25 to 180+75 (dumped material)

Remove existing fill at these locations to the elevation of original grade (native ground) and replace as engineered fill in accordance with the project specifications.

8.3 Embankments

Construct embankments and place new fill in accordance with Caltrans Standard Specifications (including Section 19, "Earthwork"). Due to the presence of loose material at the toe of some slopes, we recommend excavation of a keyway (toe bench), 2 feet deep by 10 feet wide, into competent material and/or bedrock for the following locations:

- Westbound Shoulder, A2 Line, Sta. 70+00 to 76+00, and A3L Line, Sta. 135+00 to 137+50
- Eastbound Shoulder, A3R Line, Sta. 119+00 to 123+00, and 131+00 to 136+00
- Silva Valley Parkway, Southbound Shoulder, SVP Line Sta. 180+50 to 182+00

Where new fill is to be placed onto existing fill slopes or on natural slopes exceeding 5H:1V, fully bond into the existing slope by placing on discrete horizontal benches cut fully into the slope and below any loose/soft or otherwise unsuitable materials (per Section 19 of Caltrans Standard Specifications).

8.3.1 Embankment Material

Based on the proposed design (MTCO 2010), embankment fill is required for most widening and new roadways.

We expect that embankment fill will consist of rocky fill material generated from cut portions of the project, a potential borrow area in the northeast quadrant, and unidentified commercial material sources. On-site materials and material from the adjacent borrow area are suitable for use as embankment fill. Some clay soils are present above the weathered rock and will be restricted from use adjacent to retaining walls and at abutment walls as described in the Foundation Report and as controlled by the requirements for Structure Backfill. Imported material used within 4 feet of roadway subgrade elevation must have a minimum R-Value of 25.

Section 19-5 of Caltrans Standard Specifications provides compaction recommendations for placement of rocky fill.

8.3.2 Slope Stability and Erosion Control

We expect that embankment slopes constructed at gradients of 2H:1V or flatter to be grossly stable when constructed with approved on-site and imported materials and when placed in accordance with the Caltrans Standard Specifications for Earthwork.

Based on the lack of observed subsurface water in roadway borings and test pits completed for this project, BCI does not anticipate a need for subdrainage at the base of new fill slopes. However, based on actual conditions exposed during construction (such as if local springs are exposed) subdrainage may be required.

Embankment slopes and areas disrupted by grading are susceptible to erosion from surface runoff. Control overside runoff with curbs, dikes, crown-ditches, down-drains, etc. Vegetate finished slopes to reduce erosion potential. We provide additional erosion control considerations (based on recommendations from Caltrans) below:

1. During construction, slopes shall be protected during the rainy season with the following measures:
 - a. Temporary rolled erosion control product (blanket) will be used to protect soil contact by rain drops.
 - b. Slopes longer than 15 feet shall require the use of temporary fiber rolls.
 - c. Soil not covered with a temporary blanket shall be stabilized by using Temporary Erosion Control (Poly Stabilizing Fiber Matrix) - no seed required.
2. All finished slopes with exposed soil shall be left or placed into a roughened state by track walking or other means.
3. All finished slopes longer than 15 feet require fibers rolls (permanent installation).
4. Finished slopes steeper than 2H:1V shall be protected with an erosion control blanket (seed shall be placed beneath blanket prior to placement).
5. Finished slopes shall be sprayed with a Compost Blanket (Caltrans SSP, 2006 SSP No. 20-055). This measure shall also include a seed mix that contains natives to this region and that is conducive to establishing long term vegetation.
6. Placement of Compost Blanket shall occur as late into growing season as possible (approximately late September/early October) to minimize predation of erosion control seed species.

We expect on-site materials used for embankment fill to be very rocky. An amendment and/or overlay of suitable topsoil may be necessary for plant growth.

8.3.3 Settlement

Provided new embankment material is compacted in accordance with the recommendations of this report and in accordance with Caltrans Standard Specifications, we do not expect significant settlement of embankment material.

At the overcrossing and ramp bridge approaches, the foundation soils consist predominantly of 2 to 3 ft of stiff silt and moderately dense gravels over weathered rock. Based on this, we expect insignificant compression of soil and rock beneath embankments. The potential for significant long-term settlement is low and a waiting period for settlement is not required.

8.4 Retaining Walls

8.4.1 Retaining Wall 1

MTCO proposes a Type 1 (2010 Standard Plan) retaining wall along the eastbound diagonal off-ramp shoulder approximately between E1 Line, Station 91+15 to 92+54. See Figure 2D, attached, for the approximate retaining wall location.

The wall footing will be founded in native soil/weathered rock, retain new embankment fill with a slope gradient of about 2H:1V, and be setback from the edge of pavement a minimum of approximately 16 feet. Per Caltrans Standard Plans, Retaining Wall Type 1, use Case 2 (2H:1V sloping fill, variable live load surcharge) condition for wall design.

Based on the design plans by MTCO, wall height (H) will range from approximately 3'-4" to 21'-10". The following design information is provided in Revised Standard Plan (RSP) B3-1B:

	<u>Minimum</u>	<u>Maximum</u>
Design Wall Height, H	4'	22'
Foundation Width, W	6'	23'-6"
Service $q_{o,}$ (effective width, B')	0.9 ksf (4.0 ft.)	3.0 ksf (22.3 ft.)
Strength $q_{o,}$ (effective width, B')	2.2 ksf (2.2 ft.)	4.8 ksf (20.7 ft.)
Extreme $q_{o,}$ (effective width, B')	3.4 ksf (2.3 ft.)	7.6 ksf (11.8 ft.)

Footings will be founded on undisturbed (native) materials below the existing embankment fill. Our subsurface investigation at this location (T-10-111 and A-10-158) generally encountered embankment fill overlying decomposed rock (hard clay) grading down to intensely to moderately weathered, moderately fractured, metavolcanic rock. Blowcounts (N-values) we obtained in the native materials are greater than 60 with a California Modified sampler and pocket penetrometer readings are greater than 9 ksf (4.5 tsf).

Maximum bearing stress for the Strength Limit state is up to 4.8 kips per square foot (ksf). Undisturbed, native materials (weathered rock) at this location will provide more than adequate foundation support for shallow spread footings with total settlement expected to be less than 1/2-inch. Use the following maximum base of footing elevations:

- West end, wall Station 0+34 to 0+80: 669 ft
- Wall Station 0+80 to 1+00: 667 ft
- Wall Station 1+00 to 1+20: 665 ft
- East end, wall Station 1+20 to 2+10: 663 ft

The footing may be stepped up at suitable intervals.

8.4.2 Retaining Wall 2

MTCO proposes an MSE wall along the eastbound on-ramp shoulder approximately between E2 Line, Station 110+00 to 111+40. The wall will be founded in existing embankment fill and retain new embankment fill for ramp construction/widening. See Figure 2E, attached, for the retaining wall location.

MTCO indicates that total wall height (H1) will range from 14'-2" to 16'-8", and bearing stresses for the Strength condition will range from 3.93 ksf to 4.37 ksf. Loading Case 1 (level surface behind the wall face) applies. The following design information is provided in Bridge Design Aids (BDA) 3-8:

	<u>Minimum</u>	<u>Maximum</u>
Total Wall Height, H1	14'-2"	16'-8"
Total Width, BW	11'-6"	13'-6"
Service q, (effective width, B')	2.47 ksf (6.87 ft.)	2.80 ksf (8.58 ft.)
Strength q, (effective width, B')	3.93 ksf (6.92 ft.)	4.37 ksf (8.56 ft.)
Extreme q, (effective width, B')	3.35 ksf (5.08 ft.)	3.79 ksf (6.34 ft.)

The wall location is at an existing embankment fill with a slope gradient of approximately 1.5H:1V and a maximum fill height of approximately 45 feet. The fill was placed for the US 50 mainline across Carson Creek and a triple box culvert runs beneath the embankment at this point.

Our observations and subsurface investigation indicate that the fill at this location is composed of locally derived, rocky fill that consist primarily of sandy gravel with cobbles and boulders. Based on slope exposures, the lower portion of the fill appears to have a significant quantity of boulders while the upper portion appears to have a smaller quantity, which would be typical of material size grading during embankment construction.

The MSE wall is a suitable wall type for this location and the bearing capacity exceeds the strength limit loads of 3.93 and 4.37 ksf. Based on an assumed elastic modulus for the existing fill of 1,600 ksf (medium dense to dense sand/gravel), we expect total settlement to be less than 3/4-inch. Analysis results are included in Appendix D.

We checked global stability with a simple 1.5H:1V fill slope, total wall height of 17 feet, vertical embedment of 3 feet into the embankment slope, and fill strength based on a phi angle of 38 degrees and cohesion of 100 psf. This analysis resulted in a Factor of Safety greater than 1.5 for static (Spencer Method) and 1.2 for pseudostatic using a seismic coefficient of 0.1 (based on 1/2 of the peak ground acceleration value for the site). Stability analysis results are included in Appendix D.

For wall design, maintain a minimum foundation setback (horizontal clearance) of 4 feet from the face of the slope and a minimum foundation embedment depth of 2.5 feet.

Overexcavate existing embankment fill for a depth of 2 feet below the full base of the wall and replace/recompact with Class 2 baserock to obtain a uniform base for wall construction. Design the MSE wall in accordance with Caltrans Standard Plans and BDA 3-8. Shoring will be required for construction unless adequate travel width is available for excavation sloping.

Consider increased load on the culvert below the wall from the addition of wall fill. The unit weight of fill at the wall location can be assumed as 120 pcf (structure backfill).

8.5 Culvert Foundation Support

8.5.1 General Conditions

We list new culvert locations for local drainage in Table 4.

Table 4 - Planned Culvert Locations

General Location	Culvert Station Location*	Culvert Size/Type
Eastbound Diagonal Off-Ramp	E1 Line, 93+40	6ft x 7ft Concrete Box (extension)
Eastbound Loop On-Ramp	E2 Line, 102+00	18-inch APC
Westbound Diagonal On-Ramp	W3 Line, 92+93	6ft x 7ft Concrete Box (extension)
Westbound Diagonal On-Ramp	W3 Line, 100+30	24-inch APC
Westbound Mainline	A3L Line, 122+80	24-inch CSP (extension)
White Rock Road (realign)	C2 Line, 18+94	18-inch APC
White Rock Road	SVP Line, 141+10	24-inch APC
White Rock Road	SVP Line, 145+40	Quadruple 6ft x 6ft Concrete box
White Rock Road	SVP Line, 148+80	24-inch APC
Silva Valley Parkway	SVP Line, 165+00	24-inch APC
Silva Valley Parkway	SVP Line, 176+80	36-inch APC
Silva Valley Parkway	SVP Line, 181+35	48-inch CSP
Tong Road	TR Line, 14+50	18-inch APC
Tong Road	TR Line, 11+50	Concrete Arch

* Approximate Line and Station from plans by MTCO
 APC = Alternative Pipe Culvert, CSP = Corrugated Steel Pipe

Based on the current plans, we anticipate new culverts and culvert extensions will be constructed within stiff/dense surface soils and/or weathered rock. We expect that concrete structures (such as the box culvert extension and arch culvert at Tong Road) will be founded on weathered/hard rock and backfilled with local borrow material.

Shallow native soils, embankment fills (constructed in accordance with the Caltrans Standard Specifications for Earthwork), and the underlying rock are suitable for culvert placement when designed and placed in accordance with the Caltrans Highway Design Manual, Standard Plans, and Standard Specifications.

8.5.2 Box Culvert at E1 Line, Station 93+34 and W3 Line, Station 92+93 (Bucks Ravine Creek)

The area for the proposed box culvert extension at the eastbound diagonal off-ramp (Bucks Ravine Creek), E1 Line, Station 93+34 is currently submerged and inaccessible. Based on our probing adjacent to the drainage, rock exposure, and nearby test pits, we expect suitable foundation (firm weathered rock) approximately 2 feet below existing grade.

The area for the proposed box culvert extension at the westbound on-ramp (Bucks Ravine Creek), W3 Line, Station 92+93 is currently wet and inaccessible. Based on our probing adjacent to the drainage and nearby test pits, we expect suitable foundation (medium dense clayey gravel and/or firm weathered rock) within 2 feet below existing grade.

Due to the presence of soft surface soils, organics and variable shallow soils at either end of the culvert, we recommend that the existing ground surface be overexcavated to a minimum depth of 2 feet (below the existing ground surface) for the entire width of the box culvert and wing wall foundation area plus 2 feet on either side. Fill the overexcavation with Class 2 aggregate baserock compacted to a minimum of 95% relative compaction in accordance with the Caltrans Standard Specifications.

For the box culvert, MTCO indicates that the 2010 Standard Plan soil pressures do not apply (due to fill height) and that the applicable maximum soil pressures are 4.2 ksf and 5.4 ksf for Service and Strength I, respectively. With overexcavation and backfill with compacted baserock, adequate capacity is available.

8.5.3 Box Culvert at SVP Line, Station 145+40 (Bucks Ravine Creek)

At the White Rock Road crossing of Bucks Ravine, SVP Line, Station 145+40, where a quadruple 6ft x 6ft box culvert will be used, weathered rock is present at shallow depths and is exposed intermittently near the creek bed. Our test pits adjacent to this drainage encountered moderately hard rock at depths of 1 to 3.5 feet (approximate elevation 635 to 638 feet).

Preliminary plans show the culvert to be 180 feet long with a total width of approximately 28 feet. Invert elevation will be 635.05 feet at the downstream end and 635.50 feet at the upstream end. Wingwalls will be used at each end. We expect suitable foundation (weathered rock) for this culvert at the planned invert depth and allowable bearing in excess of 5 ksf is available.

8.5.4 Arch Culvert at TR Line, Station 11+50 (Carson Creek)

At the Tong Road crossing of Carson Creek, TR Line, Station 11+50, where an arch culvert is planned, hard rock is present at very shallow depths and is exposed intermittently in the creek bed. Our test pits adjacent to this drainage encountered hard rock at depths of 1 to 1.5 feet. We expect suitable foundation (hard rock) for this culvert at depths of approximately 2 feet below the current creek bottom and allowable bearing in excess of 10 ksf is available. Foundation excavation may encounter an irregular hard rock surface.

8.6 Corrosion Investigation

We completed 10 corrosivity tests on representative soil/rock samples from our borings and test pits, and conducted 4 field resistivity tests. We summarize the test results in Table 5, below, and include the laboratory test reports in Appendix B.

Table 5 - Corrosion Test Results (CTM 417, 422, 643)

Exploration/ Test Location ID	Sample No.	Sample Depth (feet)	pH	Resistivity (ohm-cm)	Chloride Content (ppm)	Sulfate Content (ppm)
R-10-004	S2	5-6.5	7.1	1,420	17	68
R-10-005	S1	0-1.5	5.6	3,220	14	36
R-10-006	S1	0-1.5	5.3	6,970	14	0.2
A-10-136	D1	2.0-5.0	7.4	2,060	24	65
T-10-107	D1	0-1.5	5.7	5,630	15	0.4
T-10-109	D1	0-2.5	6.1	3,220	14	0.8
T-10-112	D1	0-2.0	5.8	4,290	11	<0.1
T-10-120	D1	4.0-5.0	7.6	2,250	13	8
T-10-152	D1	2.0-3.0	6.4	960	29	3
T-10-153	D1	3.0-5.0	7.0	1,290	29	11
RS1*	D1	1.0-2.0	6.2	10,724	---	---
RS2*	D1	1.0-2.0	6.3	6,128	---	---
RS3*	D1	0 – 1.0	5.3	4,979	---	---
RS4*	D1	0.5-1.5	5.4	7,277	---	---

*Field resistivity (4-pin) test location and location of soil sample obtained for pH testing

Based on our testing and observations, we consider the site soils as generally non-corrosive. The maximum chloride and sulfate concentrations we obtained are 29 and 68 part per million (ppm), respectively. The soil pH ranged from 5.3 to 7.6 and the minimum resistivity ranged from 960 to 10,724 ohm-cm (most greater than 2,000 ohm-cm). In general, our tests indicate that the surface soils have a relatively low pH ranging from 5.3 to 6.1 and the underlying, weathered rock has a relatively neutral pH ranging from 7.1 to 7.6.

We expect that concrete structures (such as the box culvert extension and culvert at Tong Road) will be founded on weathered/hard rock and backfilled with local borrow material. Based on anticipated site conditions, our pH, sulfate and chloride testing, and Table 855.4 of the Caltrans Highway Design Manual (CHDM), cementitious materials must comply with Section 90-2.01C of the Caltrans Standard Specifications. However, pH values can be in the range of 5.6 to 7.0; therefore, water content restriction does apply and a maximum water-to-cementitious material ratio of 0.45 is applicable.

9 MATERIAL SOURCES

We assume that fill material will include the proposed interchange cuts and the potential borrow area in the northeast quadrant. At this time, other import material sources are not identified but will be required. The geotechnical engineer of record must approve all other borrow sources prior to transportation and placement.

BCI anticipates material generated from cut slopes will be used for fill slopes. Structural fill material should conform to gradation requirements presented in Section 19 of Caltrans Standard Specifications. From a geotechnical standpoint, oversized rock generated from cut excavations can be placed outside of structural fill slopes, near the toe of fill embankments, or within other designated spoil areas.

Commercial sources are available nearby for asphalt, Portland Cement Concrete, aggregate base, aggregate subbase and permeable materials, as required for this project. BCI must approve import material prior to placement.

10 CONSTRUCTION CONSIDERATIONS

10.1 Construction Advisories

The contractor should verify existing utility line locations and conditions. Do not stockpile excavated material or imported borrow material in these areas.

10.1.1 Naturally Occurring Asbestos

While rock containing potentially significant quantities of NOA were not observed during our site exploration, rock containing NOA could occur within the project.

Considering that there is a potential for encountering NOA and that fill placed during road construction in the 1960's could contain NOA, BCI recommends preparation of an Asbestos Hazard Mitigation Plan in compliance with provisions of El Dorado County Air Quality Management District (EDCAQMD) Rule 223-2 and California Air Resources Board requirements, as applicable.

Visually monitor rock types exposed during construction for the potential presence of asbestos material. If construction activities expose NOA, comply with the applicable provisions of EDCAQMD Rule 223-2 and the State of California Asbestos Airborne Toxic Control Measure (ATCM), CCR Title 17, Section 93105, and perform earthwork in areas containing NOA in accordance with Section 19 of the 2010 Caltrans Standard Specifications and Section 19-910 of the Standard Special Provisions. In addition, prepare a worker health and safety program in accordance with all regulatory requirements, including CAL OSHA.

10.1.2 Perched Groundwater and Over-optimum Soil Moisture

Perched groundwater may be encountered during and shortly following the rainy season within shallow soils. If perched groundwater or surface water is encountered, sump pumps may be required to facilitate construction.

Excessively wet (over-optimum) soil conditions can make proper compaction difficult or impossible. Wet soil is commonly encountered during the winter and spring months, or in excavations where groundwater or perched groundwater is encountered.

In general, wet soil can be mitigated by:

- Discing the soil during prolonged periods of dry weather
- Overexcavating and replacement with drier material
- Lime/cement treatment or stabilization using aggregate and or stabilization fabric

If wet, unstable soil is encountered, BCI can observe the conditions and provide more specific mitigation recommendations.

10.1.3 Preparation of Existing Fill Locations

Clear and grub existing fill surfaces and bench into the fill slopes in accordance with the Caltrans Standard Specifications. The geotechnical engineer of record must approve fill surfaces prior to placement of embankment fill.

Where existing slopes are steeper than 5H:1V, bench new embankment fill into the existing slope in accordance with the Caltrans Standard Specifications for Earthwork (Section 19-6).

10.1.4 Cut Slope Construction

Unanticipated conditions that require mitigation work may be encountered during cut-slope excavation. The Engineer should be notified to review the site, evaluate the nature/extent of the conditions, and determine appropriate mitigation measures. Mitigation measures might include laying the slope back, removing weak rock or adverse dipping wedges, providing rockfall protection/catchment area, or combinations thereof.

We expect the following areas will require controlled blasting or alternative excavation methods (e.g., splitting, chipping, pneumatic hammers, etc.) to facilitate excavation:

- Westbound auxiliary lane cut approximately between A3L Line, Stations 125+50 and 134+50
- Portions of the westbound auxiliary lane cut approximately between A2 Line, Stations 85+00 and 89+00, roughly below elevation 695 feet
- Portions of the eastbound on-ramp cuts at the slope between E2 Line, Stations 103+00 and 109+00, roughly below elevation 725 ft
- Isolated locations along the eastbound auxiliary lane cut between A2 Line, Stations 78+00 and 87+00
- Deeper excavations near the intersection of Silva Valley Parkway and the westbound off-ramp

Competent rock and large boulders may also be present at shallower depths at other locations within the project, which may require alternative excavation methods and/or controlled localized blasting.

Where required, perform blasting in accordance with Sections 7-1.10 and 19-2.03 of Caltrans “Standard Specifications” and Section 19-4 of the Caltrans “Standard Special Provisions.” To avoid damage to foundation rock, do not use blasting techniques to excavate rock within 100 feet (laterally) of abutment locations.

10.1.5 Removal of Loose Rock from Slopes

Excavation of slopes cut into rock will likely result in loose blocks and pieces of rock on the slope surface. Thoroughly scale all rock cut slopes following completion of the cut such that loose material is removed from the slope surface. Complete scaling either manually with hand tools or by a mechanical device designed to catch onto and pull loose rock and other debris from the slope.

10.1.6 Existing Underdrains

Original construction as-built plans (1965) show that longitudinal underdrains were constructed at the toe of cut slopes. It appears that the drains consist of 8-inch perforated metal pipe. In the eastbound direction, from A2 Line, Station 75+75 to 88+50, the underdrain includes transverse segments plus an additional longitudinal line under the travel lanes. When shoulder area is excavated, avoid damage to the underdrains and maintain outlets. When feasible, confirm satisfactory condition and continuity of drain material.

We did not identify areas that will require additional drainage. However, review subgrade conditions exposed by the new cuts for groundwater seepage and the need for additional drainage.

10.2 Construction Considerations that Influence Specifications

BCI anticipates the contractor will be required to prepare an Asbestos Compliance Plan in accordance with the Standard Special Provisions Update, and have personnel attend a safety training program in accordance with CCR, Title 8, Section 1529, (Asbestos), and Section 5192 (b)(4)(B), (Hazardous Waste Operations and Emergency Response). If encountered, NOA material left on-site must be covered with a minimum 1-foot layer of asbestos-free material.

10.3 Construction Monitoring and Instrumentation

We do not expect geotechnical instrumentation will be necessary for this project. BCI should provide specific geotechnical review during construction of cut-slopes and excavation for foundations.

Visually monitor rock exposed during construction for the potential presence of NOA. If construction activities expose NOA, comply with the applicable provisions of EDCAQMD Rule 223-2 and the State of California Asbestos Airborne Toxic Control Measure (ATCM), CCR Title 17, Section 93105, and perform earthwork in areas containing NOA in accordance with Section 19 of the 2010 Standard Specifications and Section 19-910 of the Standard Special Provisions. In addition, prepare a worker health and safety program for excavations in areas with NOA in accordance with all regulatory requirements, including CAL OSHA.

10.4 Hazardous Waste Considerations

BCI is not aware of any significant hazardous waste considerations for earthwork at the project location. BCI evaluated the potential for aerially deposited lead (ADL) impacts and presents the results under separate cover. Borrow locations must be reviewed for potential hazardous waste/materials considerations prior to use. Based on the local geologic conditions, NOA is not a significant issue at the site but should be considered as a potential impact.

10.5 Differing Site Conditions and GDR Limitations

We assume the soil and groundwater conditions encountered in our borings and test trenches are representative of the subsurface conditions across the site. Actual conditions between exploration points can be different. If differing site conditions are encountered, contact BCI immediately to provide additional recommendations.

BCI based this report on the observed site conditions and the referenced preliminary plans provided by MTCO. Use this report only for planning, design, and construction of the roadway portion of the project, as described herein.

Appendix A presents logs of borings and test pits. The lines designating the interface between soil types are approximate. The transition between material types may be abrupt or gradual. Our recommendations are based on the final logs, which represent our interpretation of the field logs, general knowledge of the site, and geological conditions.

Modern design and construction are complex, with many regulatory sources/restrictions, involved parties, construction alternatives, etc. It is common to experience changes and delays. The owner should set aside a reasonable contingency fund based on complexities and cost estimates to cover changes and delays.

BCI performed services in accordance with generally accepted geotechnical engineering principles and practices currently used in this area.

11 GEOTECHNICAL RECOMMENDATIONS AND SPECIFICATIONS

In this section, we present our recommended geotechnical specifications, and special provisions to be used in design and construction of the roadway portions of the project. If designers have questions or problems with any of these recommendations, or, if conditions are found to be different during construction, contact BCI to determine if additional fieldwork, analysis, or recommendations are required.

Where referenced below, Standard Specifications and Standard Plans refer to the 2010 California Department of Transportation (Caltrans) Standard Specifications and Caltrans Standard Plans.

11.1 Earthwork

Perform earthwork in accordance with Section 19 of the Caltrans Standard Specifications; Structure Backfill must conform to Section 19-3 and Clearing and Grubbing must be performed as described and within the limits provided in Section 16. In addition, earthwork and structural backfill shall be performed in accordance with the following special provisions. If a conflict exists between the Caltrans Standard Specifications and special provisions below, the special provisions govern.

11.1.1 Removal of Existing Fill and Slope Preparation

Due to the presence of loose material at the toe of some slopes, we recommend excavation of a keyway (toe bench), 2 feet deep by 10 feet wide, into competent material and/or bedrock for the following locations:

- Westbound Shoulder, A2 Line, Station 70+00 to 76+00, and A3L Line, Station 135+00 to 137+50
- Eastbound Shoulder, A3R Line, Station 119+00 to 123+00, and 131+00 to 136+00
- Silva Valley Parkway, Southbound Shoulder, SVP Line Station 180+50 to 182+00

BCI must approve the over-excavated fill areas prior to placement of embankment fill.

Existing fill/fill surfaces may contain large boulders which will require removal or will need to be broken down. Clear and grub existing fill surfaces and bench into the existing slopes in accordance with the Caltrans Standard Specifications. The Engineer must approve fill surfaces prior to placement of embankment fill.

11.1.2 Special Provision for Rocky Fill Compaction

For structural embankment fill construction with “rocky” fill material, use *only* Section 19-5.02, Part C; specifically, fill which exhibits a maximum of 25 percent by volume of material exceeding 0.67 feet (8 inches) in any dimension. Where embankment fills have greater than 30 percent retained on a ¾-inch sieve, place rocky fill in loose lifts no thicker than 1 foot prior to compaction. Moisture condition the matrix soil uniformly to at least 2 percent over the optimum moisture content (visual manual method) prior to compaction. Where 90 percent relative compaction is specified, compact each lift of rocky fill with a minimum of five passes of a Caterpillar (CAT) 825 padded drum compactor making overlapping passes until coverage is complete. Where 95 percent relative compaction is specified, compact each lift of rocky fill with a minimum of seven passes of a CAT 825 compactor making overlapping passes until coverage is complete.

Where trench backfill has greater than 30 percent retained on a ¾-inch sieve, place rocky trench backfill in loose lifts no thicker than 1 foot prior to compaction. Moisture condition the matrix soil uniformly to at least 2 percent over the optimum moisture content (visual manual method) prior to compaction. Where 90 percent relative compaction is specified, compact each lift of rocky backfill with a minimum of seven passes of a sheepsfoot wheel attached to CAT 235 or larger excavator. Where 95 percent relative compaction is specified, compact each lift of rocky backfill with a minimum of nine passes of a sheepsfoot wheel attached to CAT 235 or larger excavator.

Modify the performance specification as required by the project engineer based on actual equipment used and observed compaction results.

11.1.3 Special Provision for Acceptable Fill and Borrow Material

On-site soil is suitable for use as fill for the project provided it is free of concentrations of organics, debris, and meets particle size requirements of the Standard Specifications and special provisions. Unsuitable materials include surface strippings, broken concrete, and other non-native material unearthed during general grading.

Borrow material must have a minimum R-value of 25 (when used within 4 feet of roadway subgrade elevation), contain no significant concentrations of vegetation, debris, or asbestos containing rock, and meet the project particle size requirements in the special provisions above.

12 RISK MANAGEMENT

Our experience and that of our profession clearly indicates that the risks of costly design, construction, and maintenance problems can be significantly lowered by retaining the geotechnical engineer of record to provide additional services during design and construction.

For this project, BCI should be retained to:

- Review and provide comments on the civil plans and specifications prior to construction.
- Monitor construction to check and document our report assumptions. At a minimum, BCI should monitor grading, trench backfill, culvert backfill, pavement subgrade and aggregate base compaction, and retaining wall foundation excavation.
- Review proposed borrow material for suitability.
- Update this report if design changes occur, 2 years or more lapse between this report and construction, and/or site conditions have changed.

If we are not retained to perform the above applicable services, we are not responsible for any other party's interpretation of our report, and subsequent addendums, letters, and discussions.

Figures

Figure 1 – Vicinity Map

Figure 2 A – Project Map

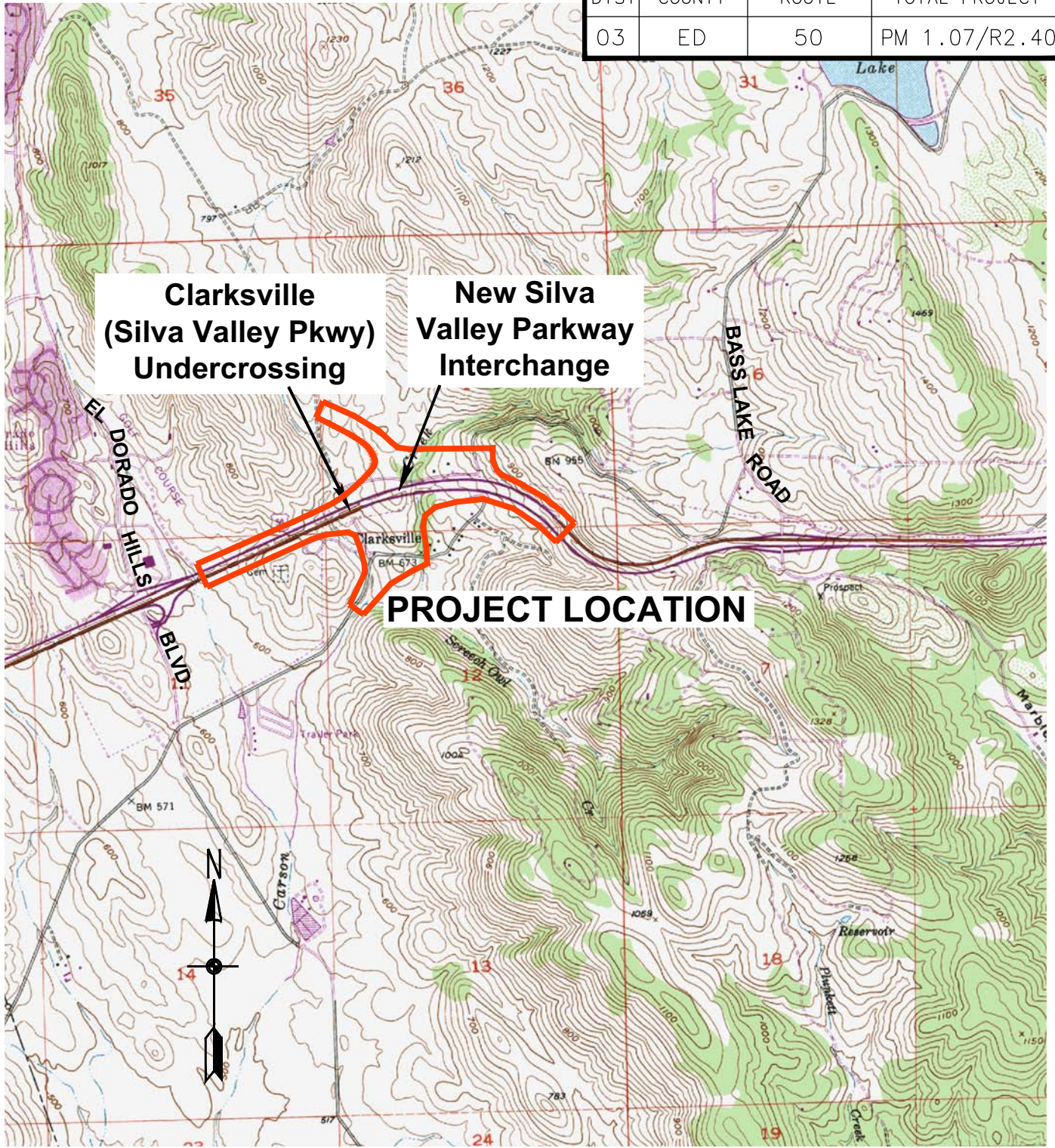
Figure 2B through 2K – Location Maps

Figure 3 – Geologic Map

Figure 4 – Seismic Hazard Map



DIST	COUNTY	ROUTE	TOTAL PROJECT
03	ED	50	PM 1.07/R2.40



Source: MAPTECH Terrain Navigator Pro, v. 7.01, USGS topographic map, 7.5 minute quadrangle, 1:24000, Clarksville 1953 (revised 1980).

SCALE: 1"=0.5 Miles

3/12/2012 556.2 SV Pkwy Mtr Report Fig 1.dwg



11521 Blocker Drive, Suite 110
 Auburn, CA 95603
 Phone: (530) 887-1494
 Fax: (530) 887-1495
 www.blackburnconsulting.com

VICINITY MAP
 Silva Valley Parkway Interchange
 EA 03-1E2901
 El Dorado County, California

File No. 556.2

October 2012

Figure 1

DIST	COUNTY	ROUTE	TOTAL PROJECT
03	ED	50	PM 1.07/R2.40



3/12/2012 556.2 SV Pkwy GDR Report Fig 2.dwg

Source: US 50/Silva Valley Pkwy Interchange
 Geometric Approval Drawing, dated May 2010 and
 February 2012 by Mark Thomas & Company, Inc.



11521 Blocker Drive, Ste 110
 Auburn, CA 95603
 Phone: (530) 887-1494
 Fax: (530) 887-1495
 www.blackburnconsulting.com

PROJECT MAP
SILVA VALLEY PARKWAY INTERCHANGE - EA 03-1E2901
 El Dorado County, California

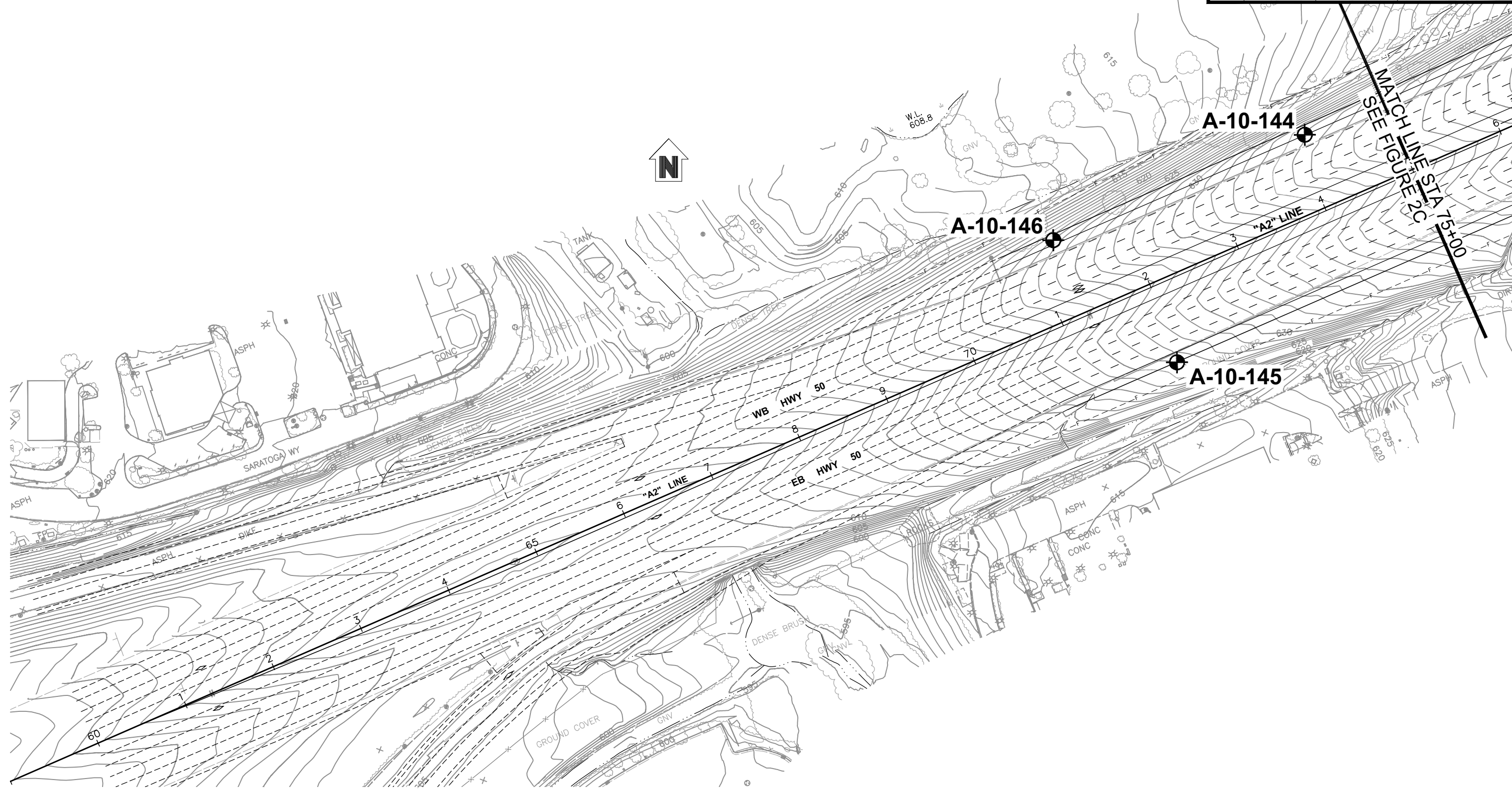
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File No. 556.2





October 2012

Figure 2A

DIST	COUNTY	ROUTE	TOTAL PROJECT
03	ED	50	PM 1.07/R2.40



LEGEND

- A-10-001**  Approximate Boring Location
- T-10-005**  Approximate Test Pit Location
-  **SR3** Seismic Refraction Line Location
-  **RS4** Field Resistivity Test Location

Source: US 50/Silva Valley Pkwy Interchange Geometric Approval Drawing, dated May 2010 and February 2012 by Mark Thomas & Company, Inc.

SCALE: 1"=100'



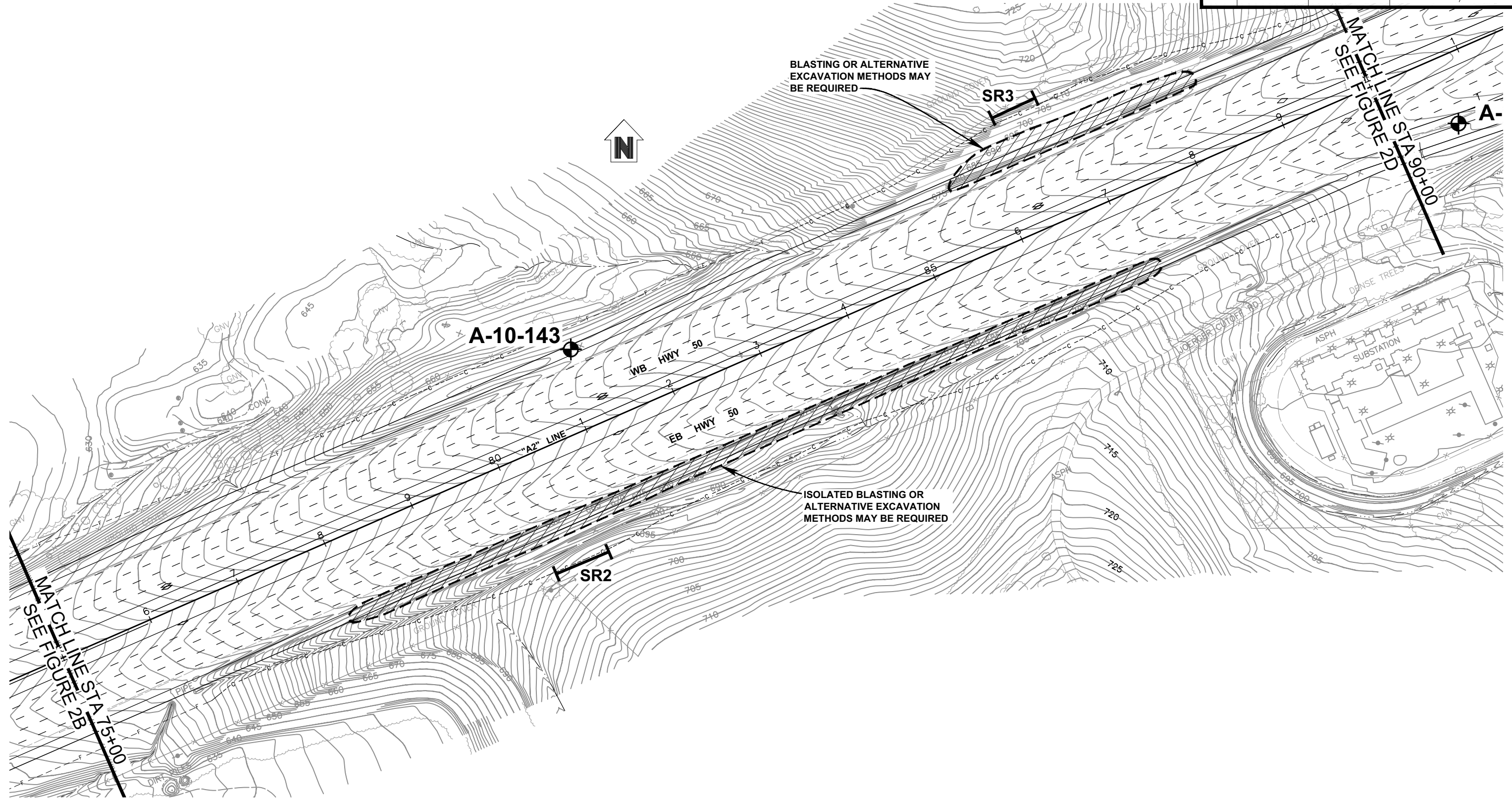
11521 Blocker Drive, Ste 110
 Auburn, CA 95603
 Phone: (530) 887-1494
 Fax: (530) 887-1495
 www.blackburnconsulting.com

LOCATION MAP
SILVA VALLEY PARKWAY INTERCHANGE - EA 03-1E2901
"A2" LINE, STA 59+00 to 75+00
 El Dorado County, California





File No. 556.2
October 2012
Figure 2B

3/12/2012 556.2 SV Pkwy GDR Report Fig 2.dwg

DIST	COUNTY	ROUTE	TOTAL PROJECT
03	ED	50	PM 1.07/R2.40



LEGEND

- A-10-001**  Approximate Boring Location
- T-10-005**  Approximate Test Pit Location
-  **SR3** Seismic Refraction Line Location
-  **RS4** Field Resistivity Test Location

Source: US 50/Silva Valley Pkwy Interchange Geometric Approval Drawing, dated May 2010 and February 2012 by Mark Thomas & Company, Inc.

SCALE: 1"=100'



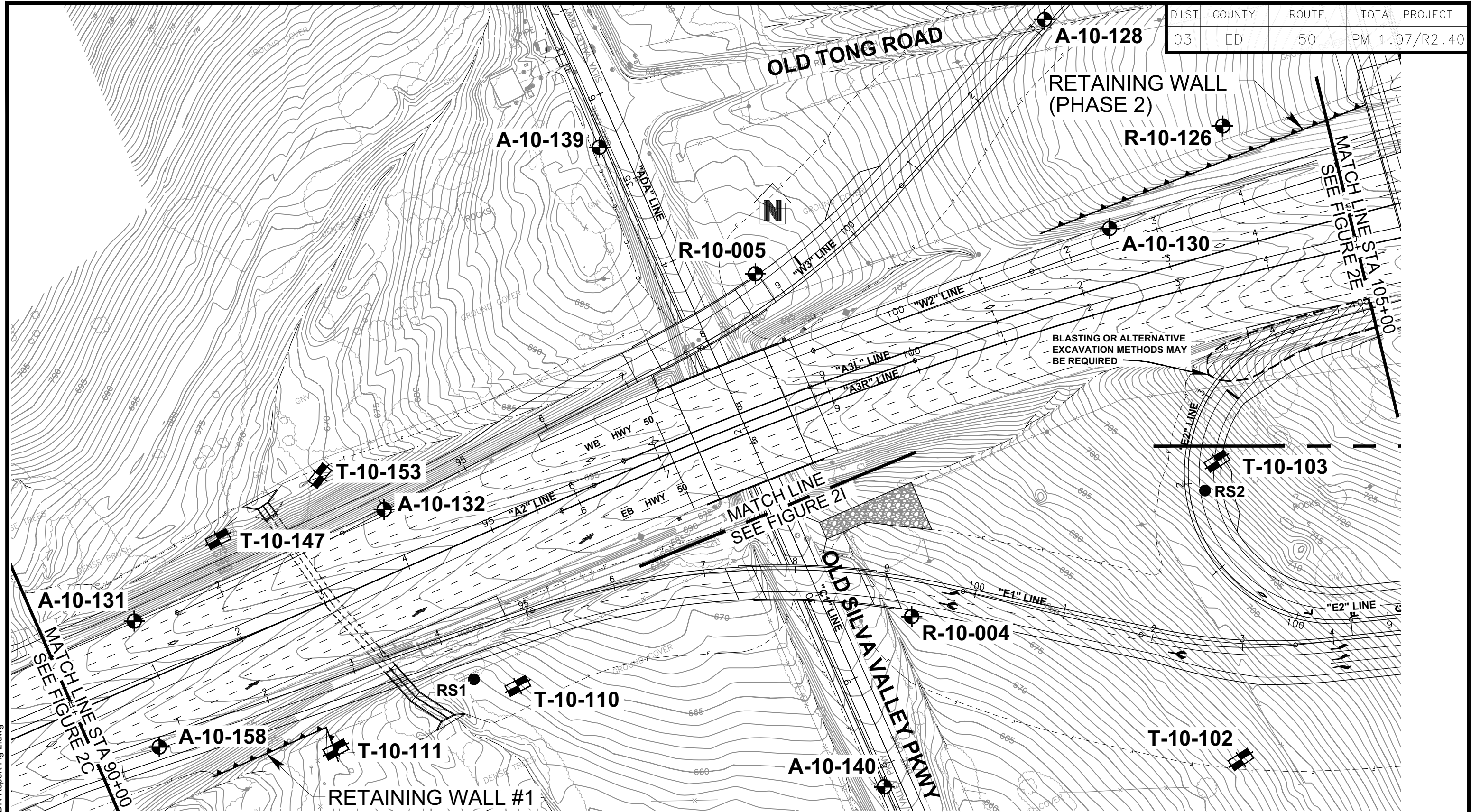
11521 Blocker Drive, Ste 110
 Auburn, CA 95603
 Phone: (530) 887-1494
 Fax: (530) 887-1495
 www.blackburnconsulting.com

LOCATION MAP
SILVA VALLEY PARKWAY INTERCHANGE - EA 03-1E2901
"A2" LINE, STA 75+00 to 90+00
El Dorado County, California

File No. 556.2
October 2012
Figure 2C

3/12/2012 556.2 SV Pkwy GDR Report Fig 2.dwg

DIST	COUNTY	ROUTE	TOTAL PROJECT
03	ED	50	PM 1.07/R2.40



BLASTING OR ALTERNATIVE EXCAVATION METHODS MAY BE REQUIRED

LEGEND

- A-10-001** Approximate Boring Location
- T-10-005** Approximate Test Pit Location
- Seismic Refraction Line Location
- SR3**
- RS4** Field Resistivity Test Location

Source: US 50/Silva Valley Pkwy Interchange Geometric Approval Drawing, dated May 2010 and February 2012 by Mark Thomas & Company, Inc.

SCALE: 1"=100'



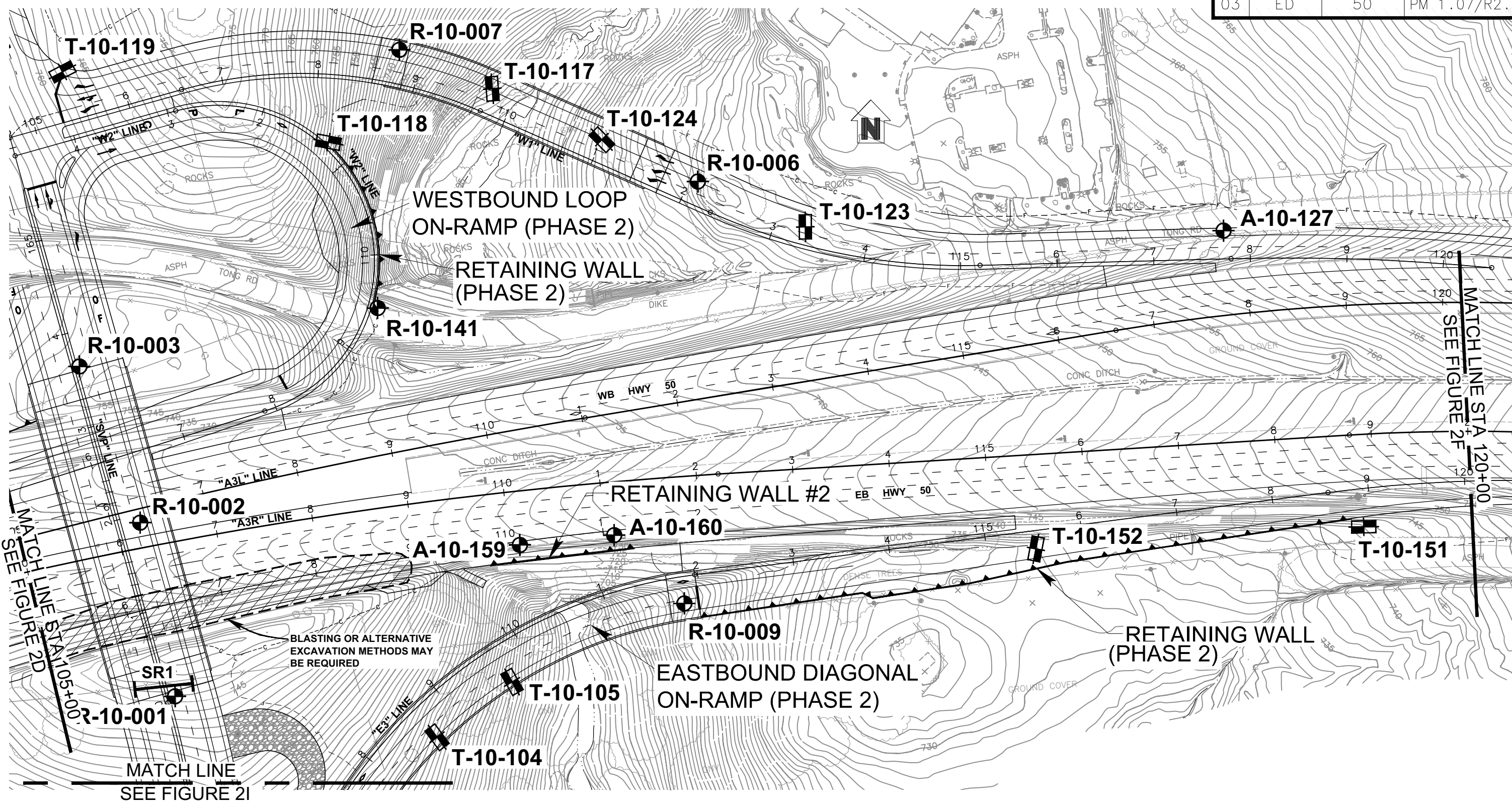
11521 Blocker Drive, Ste 110
 Auburn, CA 95603
 Phone: (530) 887-1494
 Fax: (530) 887-1495
 www.blackburnconsulting.com

LOCATION MAP
 SILVA VALLEY PARKWAY INTERCHANGE - EA 03-1E2901
 "A2", "A3L", "A3R" LINES, STA 90+00 to 105+00
 El Dorado County, California

File No. 556.2
October 2012
Figure 2D

3/12/2012 556.2 SV Pkwy GDR Report Fig 2.dwg

DIST	COUNTY	ROUTE	TOTAL PROJECT
03	ED	50	PM 1.07/R2.40



LEGEND

- A-10-001** Approximate Boring Location
- T-10-005** Approximate Test Pit Location
- Seismic Refraction Line Location
- SR3**
- RS4** Field Resistivity Test Location

Source: US 50/Silva Valley Pkwy Interchange Geometric Approval Drawing, dated May 2010 and February 2012 by Mark Thomas & Company, Inc.

SCALE: 1"=100'

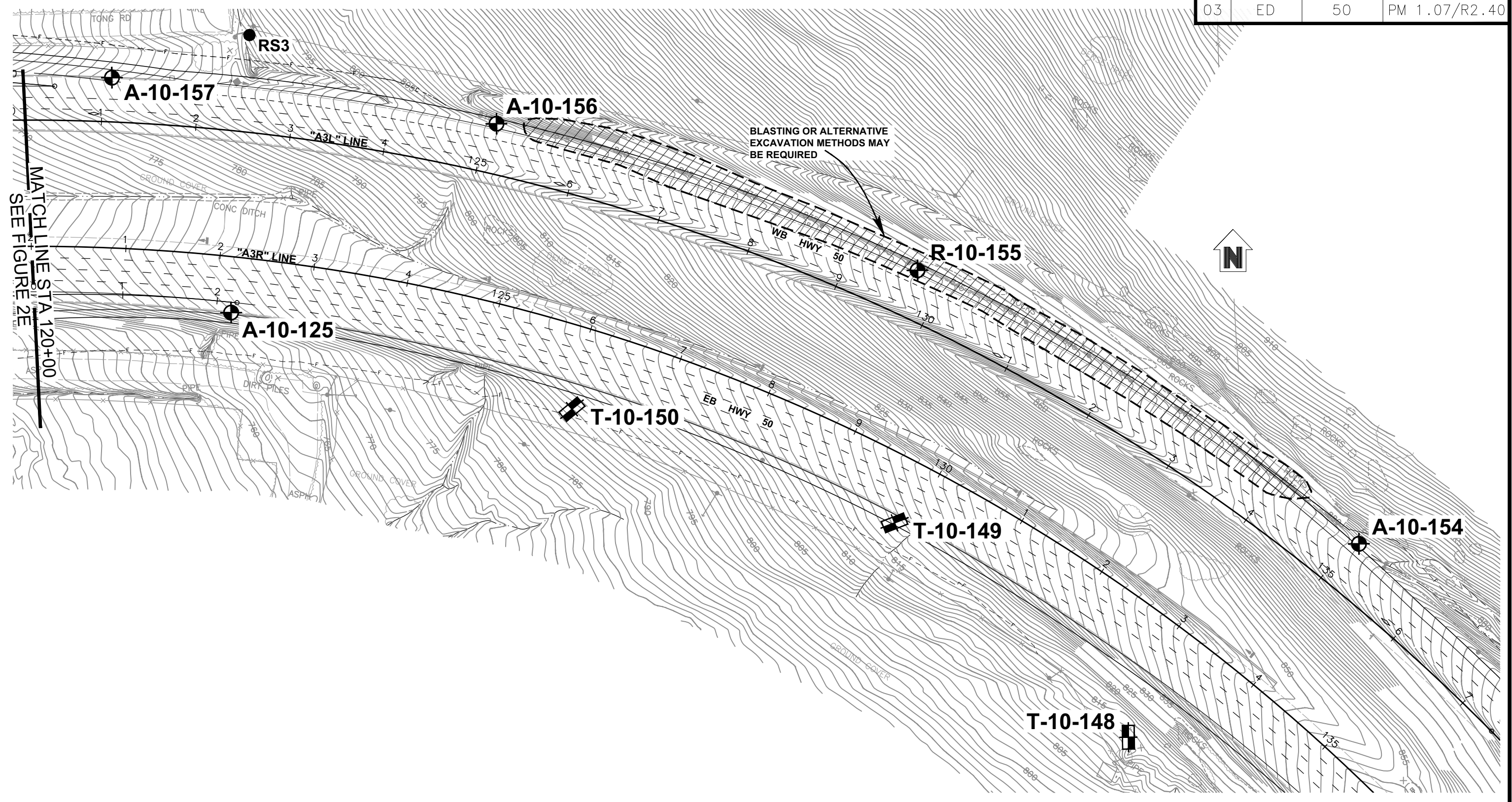
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Auburn, CA 95603
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LOCATION MAP
SILVA VALLEY PARKWAY INTERCHANGE - EA 03-1E2901
"A3L", "A3R" LINES, STA 105+00 to 120+00
 El Dorado County, California

File No. 556.2
October 2012
Figure 2E

3/12/2012 556.2 SV Pkwy GDR Report Fig 2.dwg





DIST	COUNTY	ROUTE	TOTAL PROJECT
03	ED	50	PM 1.07/R2.40



MATCHLINE STA 120+00 SEE FIGURE 2E

BLASTING OR ALTERNATIVE EXCAVATION METHODS MAY BE REQUIRED

LEGEND

- A-10-001**  Approximate Boring Location
- T-10-005**  Approximate Test Pit Location
-  **SR3** Seismic Refraction Line Location
-  **RS4** Field Resistivity Test Location

Source: US 50/Silva Valley Pkwy Interchange Geometric Approval Drawing, dated May 2010 and February 2012 by Mark Thomas & Company, Inc.

SCALE: 1"=100'

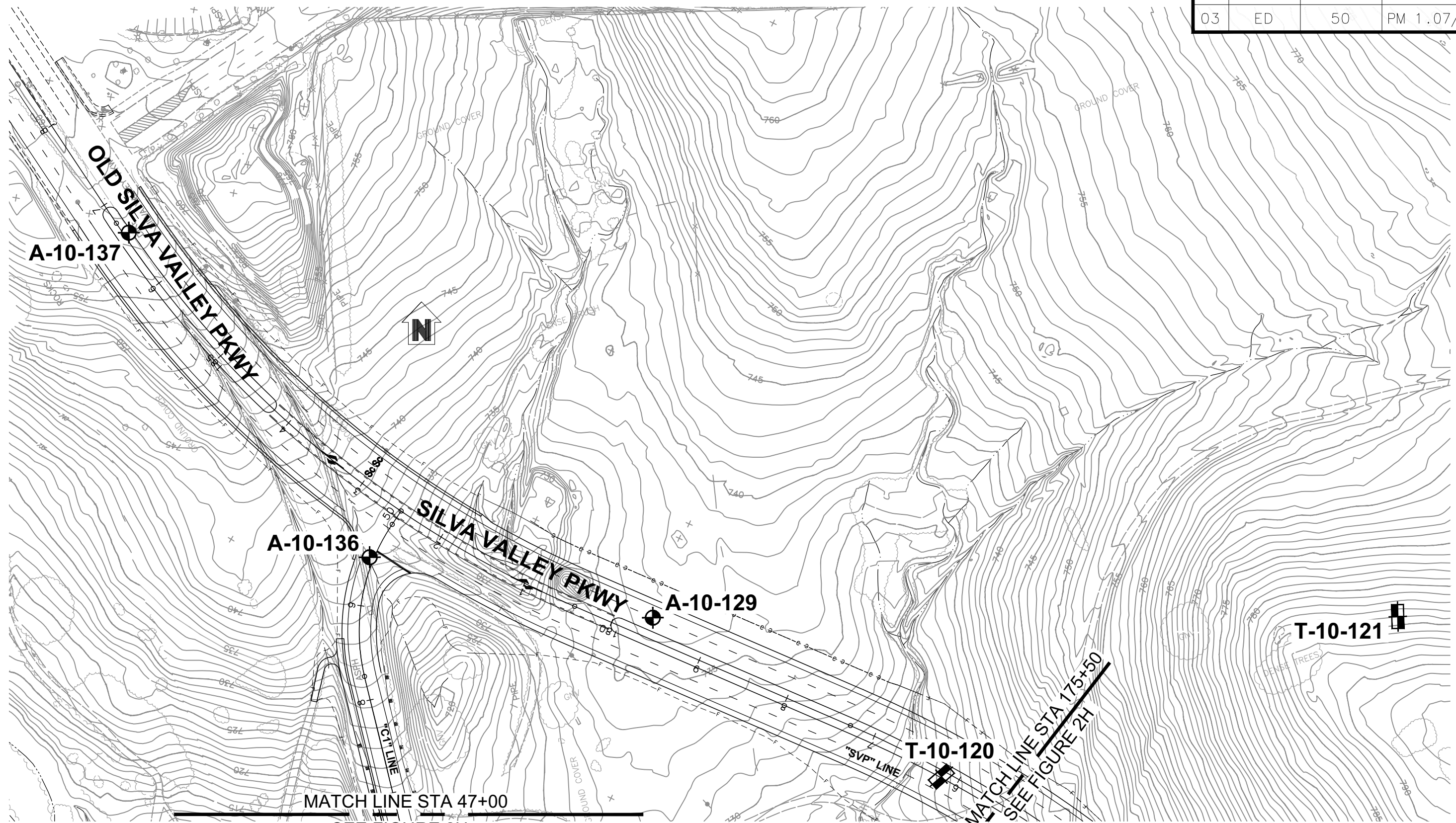


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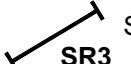

LOCATION MAP
SILVA VALLEY PARKWAY INTERCHANGE - EA 03-1E2901
"A3R", "A3L" LINE, STA 120+00 to 137+00
 El Dorado County, California

File No. 556.2
October 2012
Figure 2F

DIST	COUNTY	ROUTE	TOTAL PROJECT
03	ED	50	PM 1.07/R2.40



LEGEND

- A-10-001**  Approximate Boring Location
- T-10-005**  Approximate Test Pit Location
-  Seismic Refraction Line Location
- RS4**  Field Resistivity Test Location

MATCH LINE STA 47+00
SEE FIGURE 2H

MATCH LINE STA 175+50
SEE FIGURE 2H

Source: US 50/Silva Valley Pkwy Interchange Geometric Approval Drawing, dated May 2010 and February 2012 by Mark Thomas & Company, Inc.

SCALE: 1"=100'



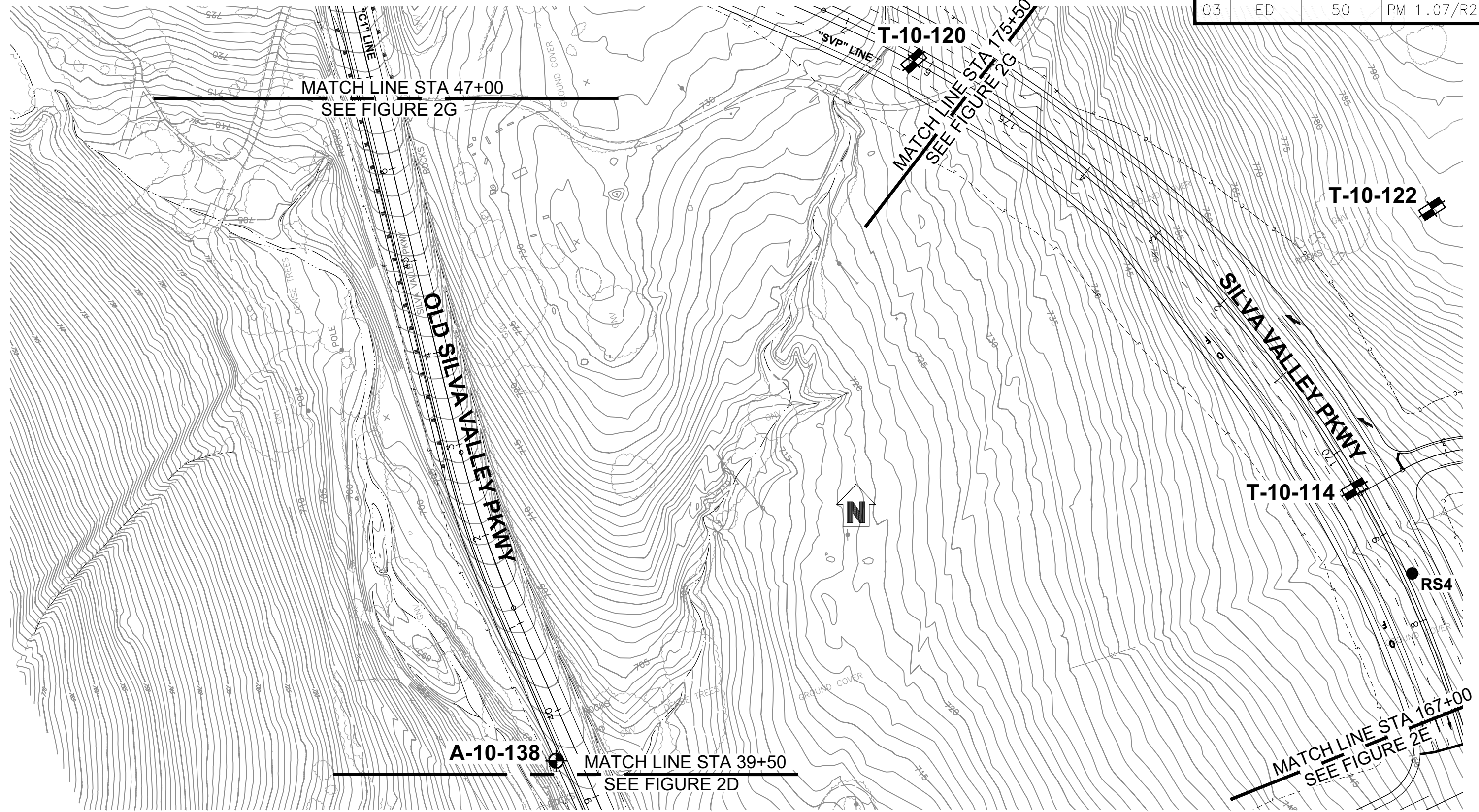
11521 Blocker Drive, Ste 110
Auburn, CA 95603
Phone: (530) 887-1494
Fax: (530) 887-1495
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LOCATION MAP
SILVA VALLEY PARKWAY INTERCHANGE - EA 03-1E2901
"C1", STA 47+00 to 50+32.54/"SVP" 175+50 to 187+50
 El Dorado County, California



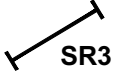

File No. 556.2
October 2012
Figure 2G

3/12/2012 556.2 SV Pkwy GDR Report Fig 2.dwg

DIST	COUNTY	ROUTE	TOTAL PROJECT
03	ED	50	PM 1.07/R2.40



LEGEND

- A-10-001**  Approximate Boring Location
- T-10-005**  Approximate Test Pit Location
-  Seismic Refraction Line Location
- SR3**
-  Field Resistivity Test Location
- RS4**

Source: US 50/Silva Valley Pkwy Interchange Geometric Approval Drawing, dated May 2010 and February 2012 by Mark Thomas & Company, Inc.

SCALE: 1"=100'



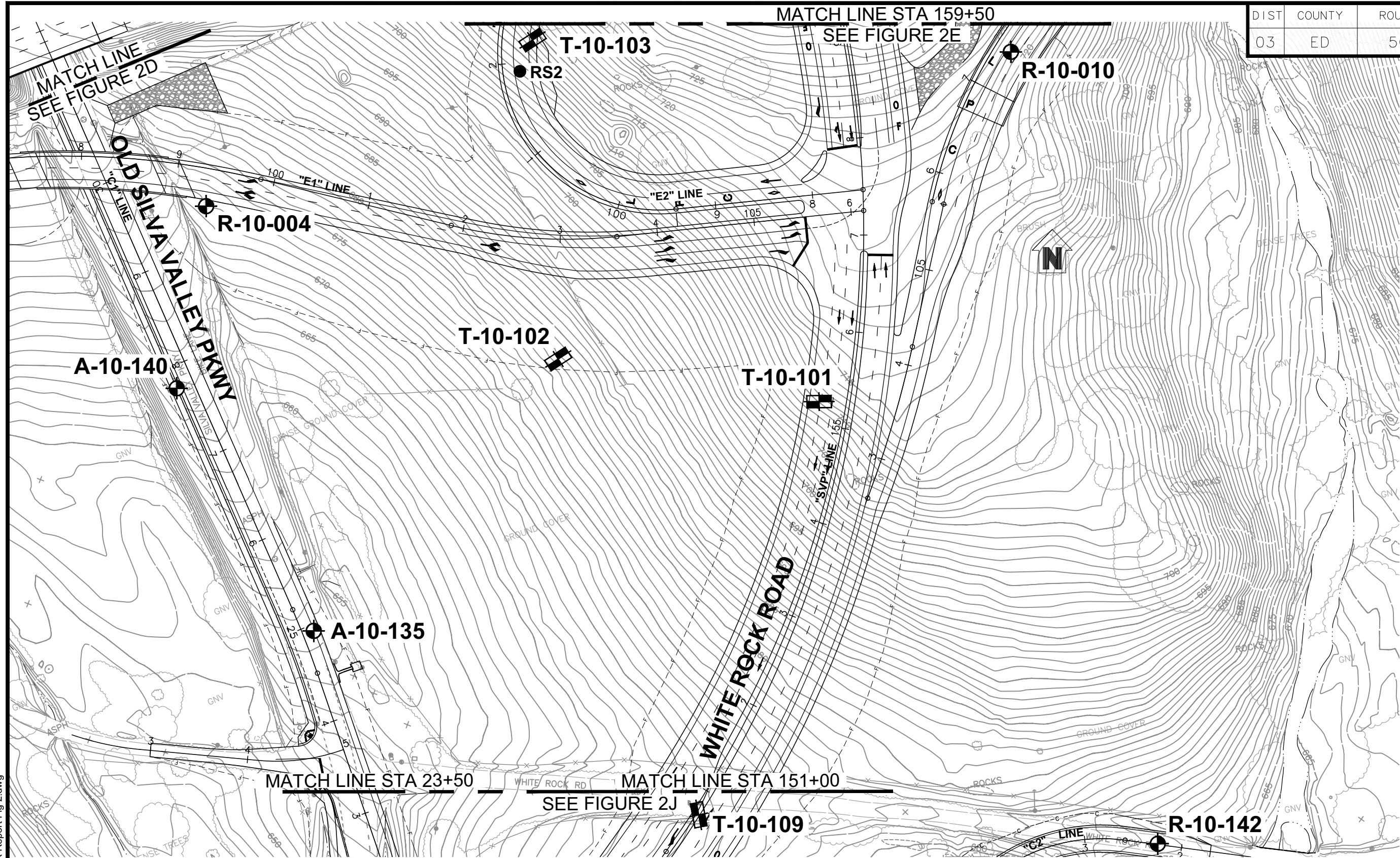
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Auburn, CA 95603
Phone: (530) 887-1494
Fax: (530) 887-1495
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LOCATION MAP
SILVA VALLEY PARKWAY INTERCHANGE - EA 03-1E2901
"C1", STA 39+50 to 47+00/"SVP" 167+00 to 175+50
 El Dorado County, California

File No. 556.2
October 2012
Figure 2H

3/12/2012 556.2 SV Pkwy GDR Report Fig 2.dwg

DIST	COUNTY	ROUTE	TOTAL PROJECT
03	ED	50	PM 1.07/R2.40



LEGEND

- A-10-001 Approximate Boring Location
- T-10-005 Approximate Test Pit Location
- SR3 Seismic Refraction Line Location
- RS4 Field Resistivity Test Location

Source: US 50/Silva Valley Pkwy Interchange Geometric Approval Drawing, dated May 2010 and February 2012 by Mark Thomas & Company, Inc.

SCALE: 1"=100'

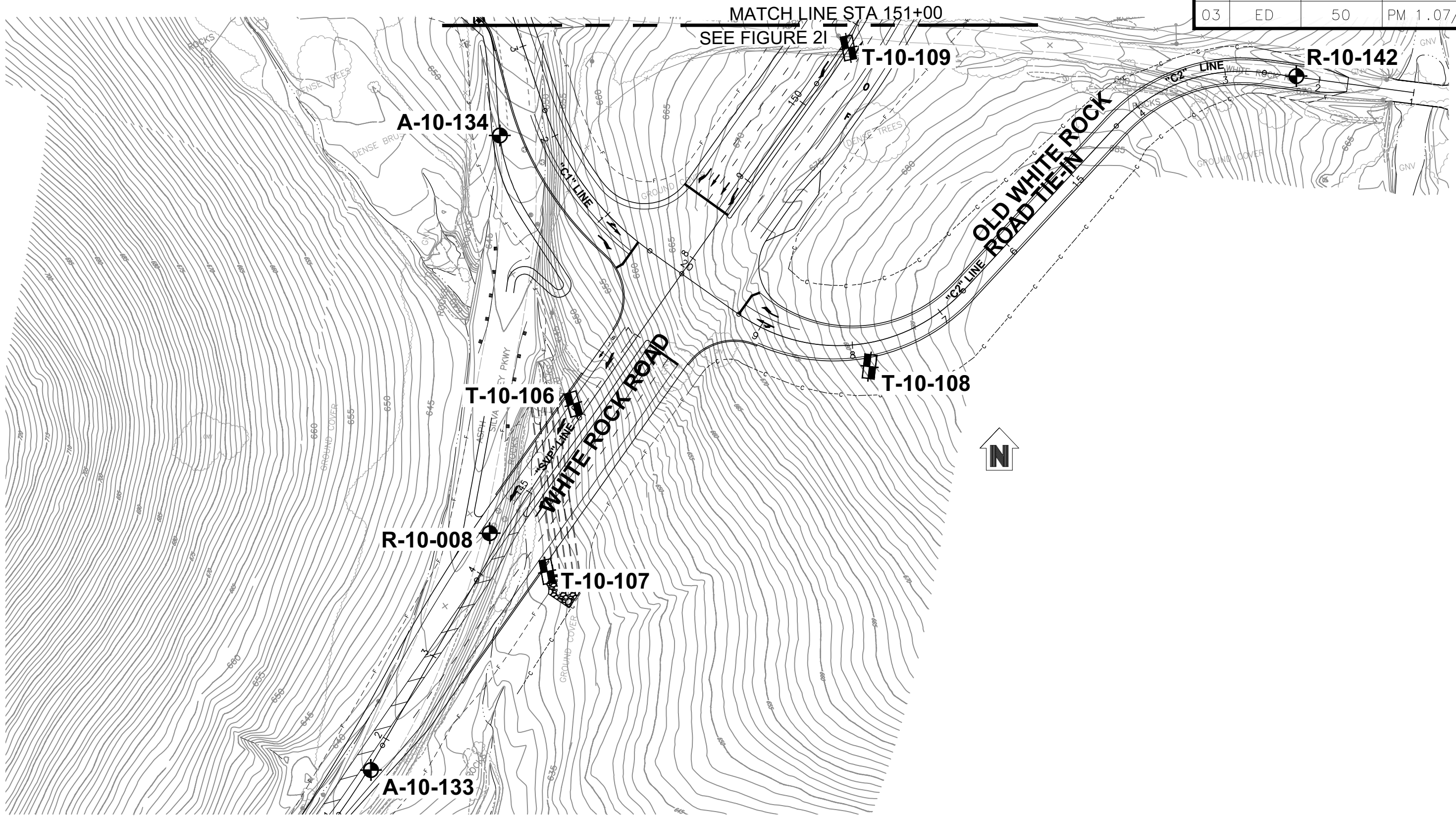
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Fax: (530) 887-1495
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LOCATION MAP
SILVA VALLEY PARKWAY INTERCHANGE - EA 03-1E2901
"C1", STA 23+50 to 31+25/"SVP" 151+00 to 159+50
El Dorado County, California



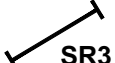

File No. 556.2
October 2012
Figure 2I

3/12/2012 556.2 SV Pkwy GDR Report Fig 2.dwg

DIST	COUNTY	ROUTE	TOTAL PROJECT
03	ED	50	PM 1.07/R2.40



LEGEND

- A-10-001**  Approximate Boring Location
- T-10-005**  Approximate Test Pit Location
-  Seismic Refraction Line Location
- SR3**
-  Field Resistivity Test Location
- RS4**

Source: US 50/Silva Valley Pkwy Interchange Geometric Approval Drawing, dated May 2010 and February 2012 by Mark Thomas & Company, Inc.

SCALE: 1"=100'



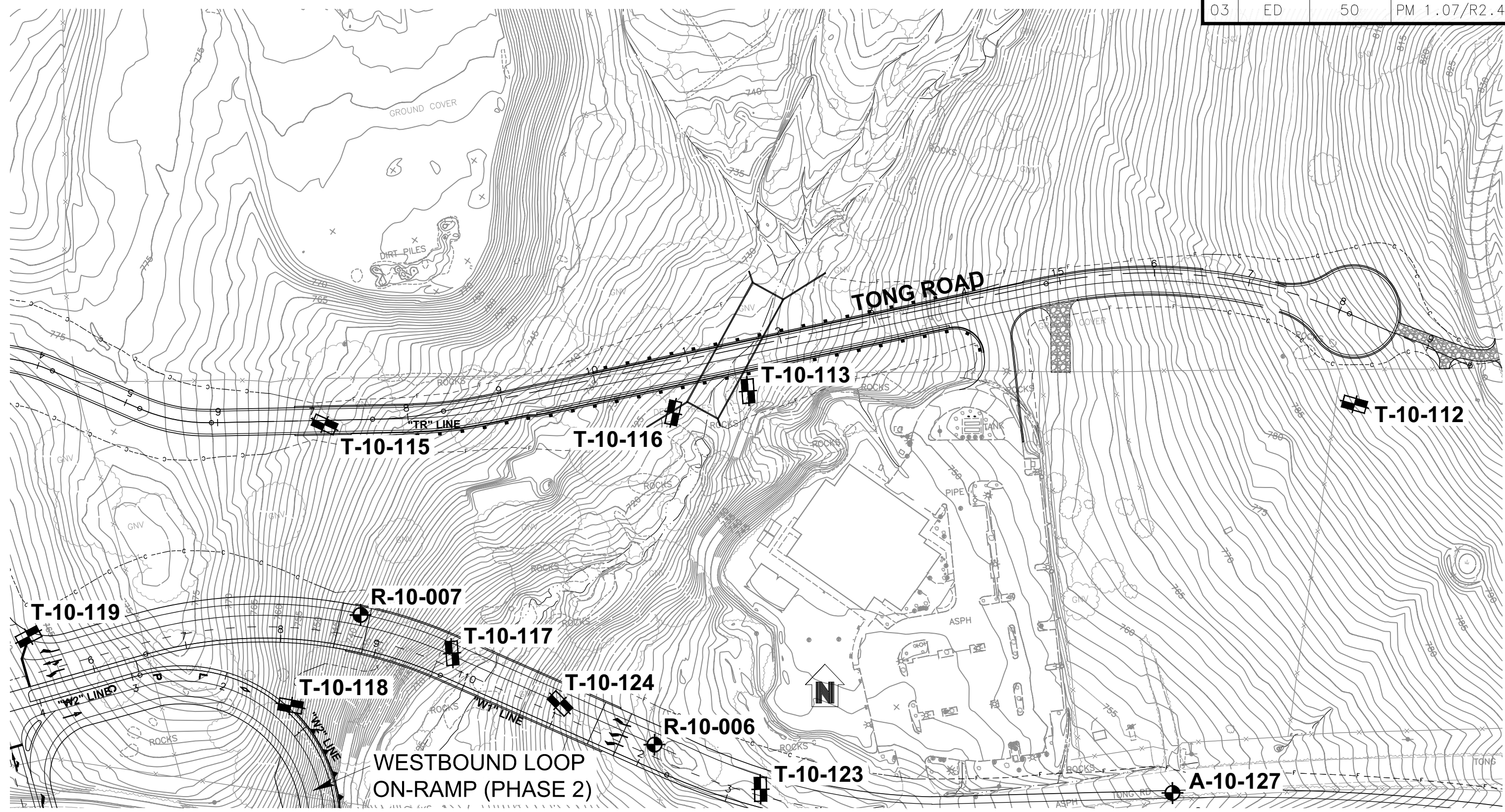
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 Auburn, CA 95603
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 Fax: (530) 887-1495
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LOCATION MAP
SILVA VALLEY PARKWAY INTERCHANGE - EA 03-1E2901
"C1", STA 20+00 to 23+50/"SVP" 141+00 to 151+00
 El Dorado County, California

File No. 556.2
 October 2012
 Figure 2J

3/12/2012 556.2 SV Pkwy GDR Report Fig 2.dwg

DIST	COUNTY	ROUTE	TOTAL PROJECT
03	ED	50	PM 1.07/R2.40



LEGEND

- A-10-001** Approximate Boring Location
- T-10-005** Approximate Test Pit Location
- SR3 Seismic Refraction Line Location
- RS4** Field Resistivity Test Location

Source: US 50/Silva Valley Pkwy Interchange Geometric Approval Drawing, dated May 2010 and February 2012 by Mark Thomas & Company, Inc.

SCALE: 1"=100'



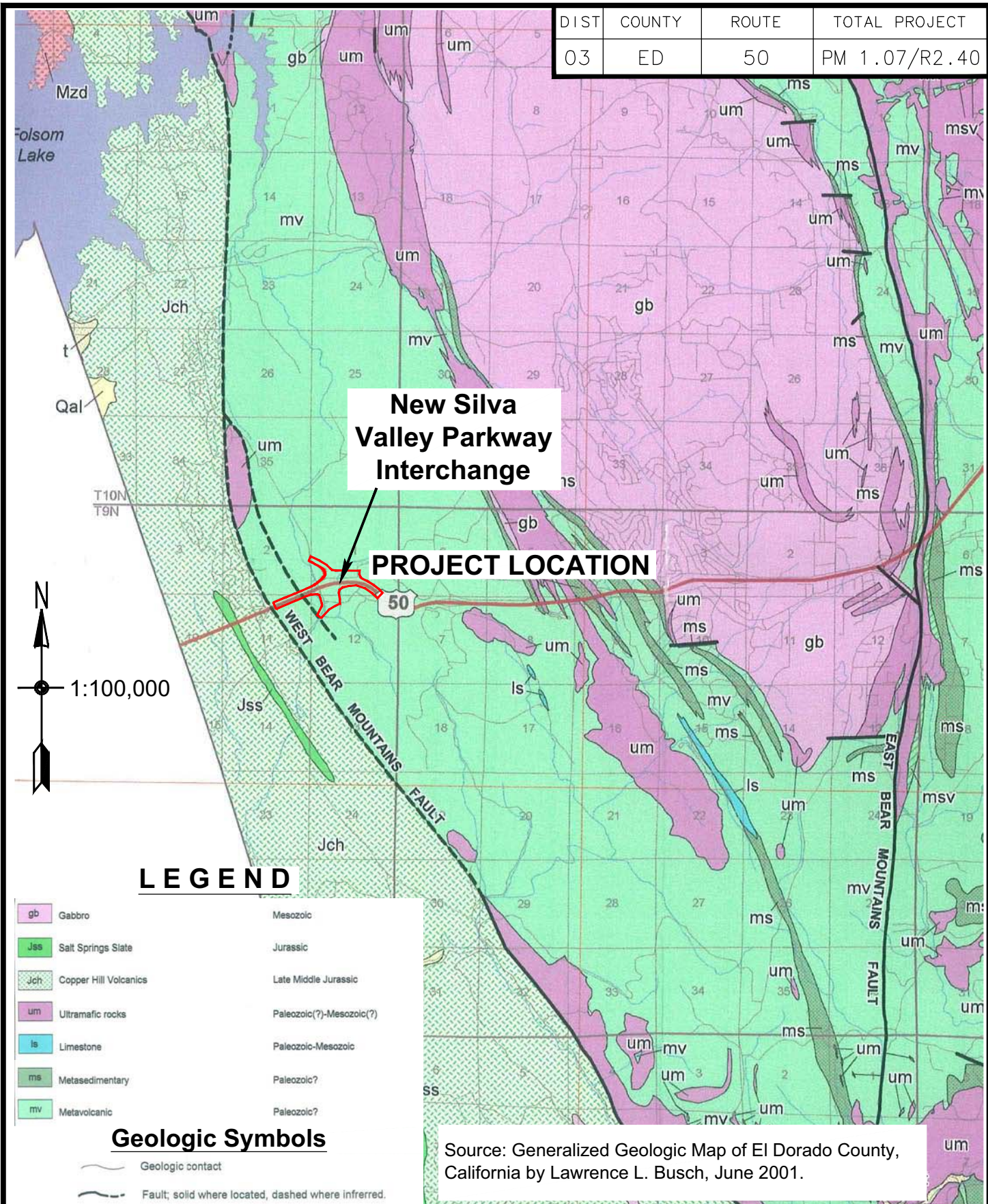
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 Fax: (530) 887-1495
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LOCATION MAP
SILVA VALLEY PARKWAY INTERCHANGE - EA 03-1E2901
TONG ROAD
 El Dorado County, California

File No. 556.2
 October 2012
 Figure 2K

3/12/2012 556.2 SV Pkwy GDR Report Fig 2.dwg

DIST	COUNTY	ROUTE	TOTAL PROJECT
03	ED	50	PM 1.07/R2.40



LEGEND

gb Gabbro	Mesozoic
Jss Salt Springs Slate	Jurassic
Jch Copper Hill Volcanics	Late Middle Jurassic
um Ultramafic rocks	Paleozoic(?)–Mesozoic(?)
Is Limestone	Paleozoic–Mesozoic
ms Metasedimentary	Paleozoic?
mv Metavolcanic	Paleozoic?

Geologic Symbols

- Geologic contact
- Fault; solid where located, dashed where inferred.

Source: Generalized Geologic Map of El Dorado County, California by Lawrence L. Busch, June 2001.

3/12/2012 556.2 SV Pkwy Mtr Report Fig 3.dwg



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Fax: (530) 887-1495
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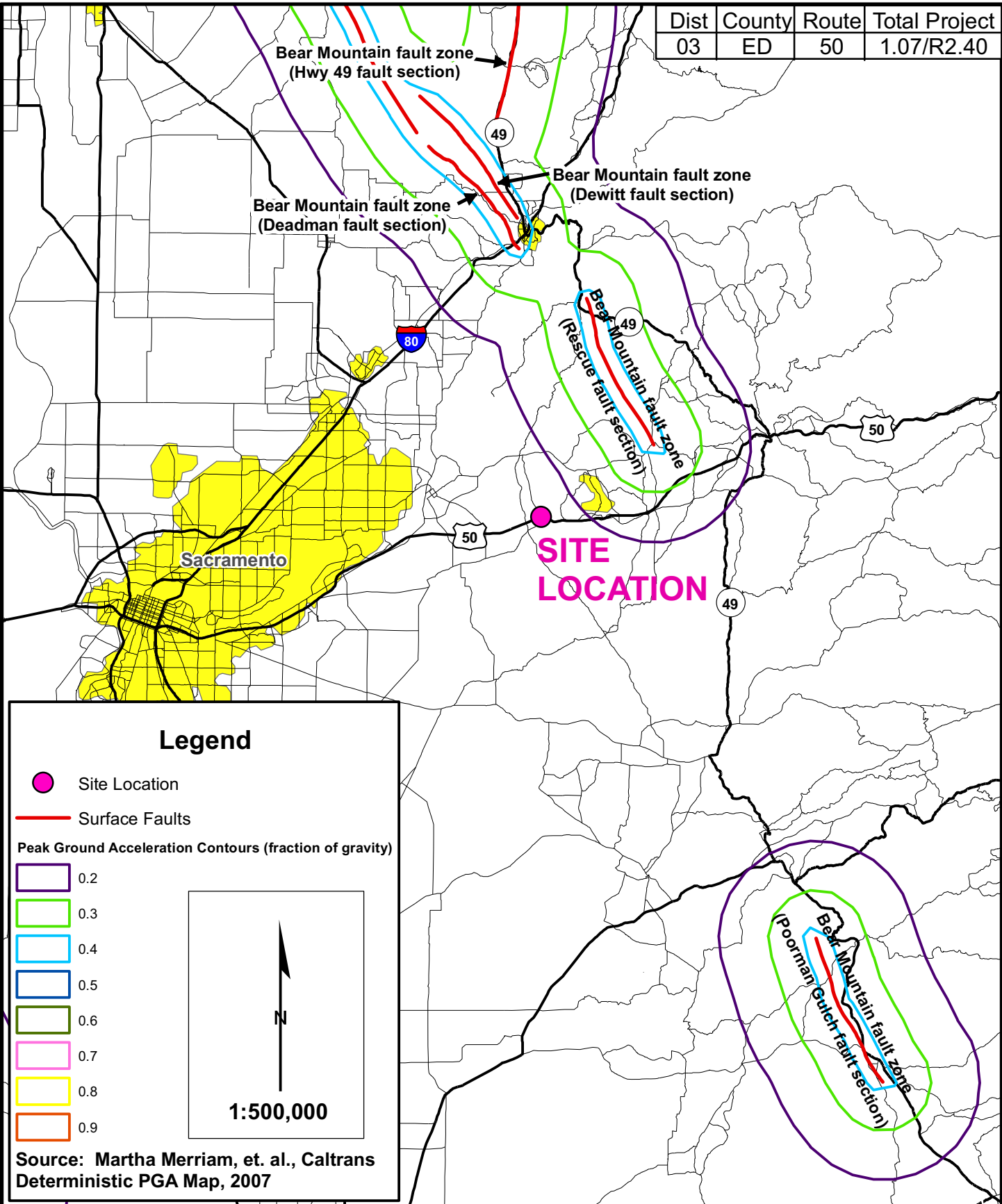
GEOLOGIC MAP
Silva Valley Parkway Interchange
EA 03-1E2901
El Dorado County, California

File No. 556.2

October 2012

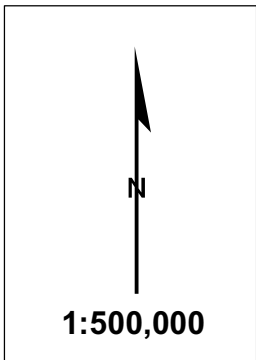
Figure 3

Dist	County	Route	Total Project
03	ED	50	1.07/R2.40



Legend

- Site Location
- Surface Faults
- Peak Ground Acceleration Contours (fraction of gravity)
 - 0.2
 - 0.3
 - 0.4
 - 0.5
 - 0.6
 - 0.7
 - 0.8
 - 0.9



Source: Martha Merriam, et. al., Caltrans Deterministic PGA Map, 2007



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SEISMIC HAZARD MAP

Silva Valley Parkway Interchange
 EA-03-1E2901
 El Dorado County, California

File No. 556.2

October 2012

Figure 4

APPENDIX A

Log of Test Borings (Bridge Sites, Sheets 1 through 9)
Silva Valley Parkway OC
Eastbound On-Ramp at Carson Creek (Phase 2)
Westbound Off-Ramp at Carson Creek
Westbound On - Ramp UC
Eastbound Off-Ramp UC
White Rock Road Bridge
Boring and Test Pit Logs (R-10-008, T-10-101 to A-10-160)
Legend of Logs (3sheets)

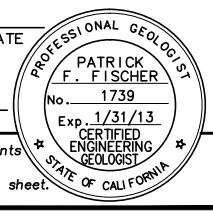


DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
03	ED	50	1.06/2.90		

CERTIFIED ENGINEERING GEOLOGIST DATE _____

PLANS APPROVAL DATE _____

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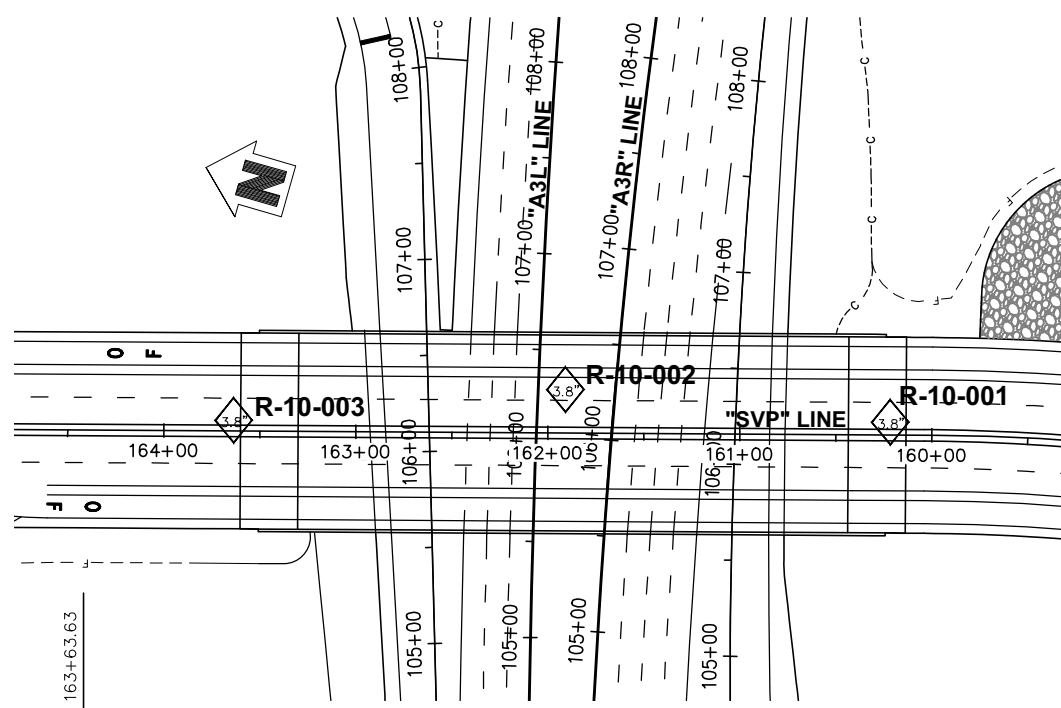
BLACKBURN CONSULTING
11521 BLOCKER DRIVE, SUITE 110
AUBURN, CA 95603 FILE No. 556.2

MARK THOMAS & CO., INC.
7300 FOLSOM BLVD STE 203
SACRAMENTO, CA 95826

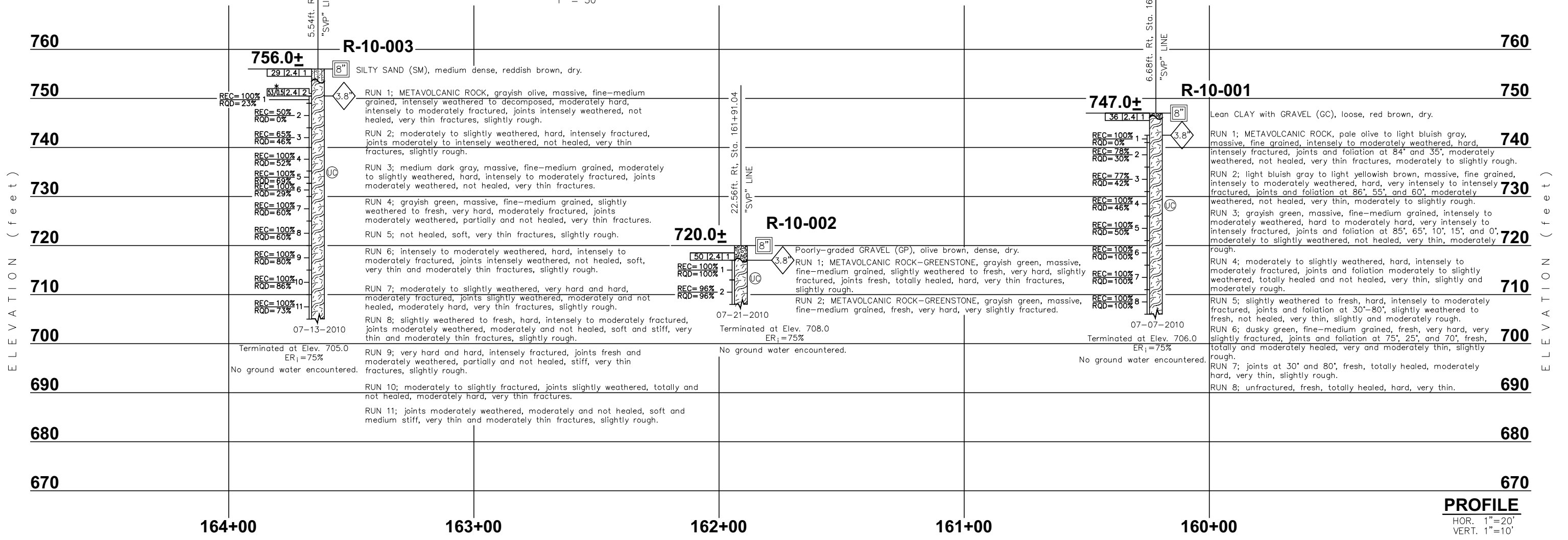
BENCHMARK
Orthometric Heights (elevations) shown are NGVD 29. Based on HPGN D CA 03 DL having an elevation of 693.55 feet.

NOTES:

- Field classification of soils was in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007). See Log of Test Borings No. 2, and 3, "Soil Legend" and 4, "Rock Legend".
- Standard Penetration tests were performed in accordance with ASTM D 1586-99 using a hammer operated with an automated drop system. Drill rods were 1 5/8-inch diameter "A"-rods; sampler was driven with brass liners.
- "2.4 inch sampler": ID=2.4 inch, OD=2.9 inch. Driven in same manner as SPT ("1.4 inch") sampler.
- Where less than the 0.5 inches of penetration is achieved, the blow count shown is for that fraction of the interval actually penetrated.
- Where indicated by an asterisk (*) the number of blows shown is for only that fraction of the initial 0.5 ft. "seating drive" interval penetrated.
- If laboratory tests are not shown as being performed, the soil descriptions presented in the LOTB are based solely on the visual practices described in the before mentioned Manual.
- The length of each sampled interval is shown graphically on the boring log.
- Consistency of soils shown in () where estimated.
- Groundwater surface (GWS) reflect the fluid level in the borings on the specified date. Groundwater surface is subject to seasonal fluctuations and may occur at higher or lower elevations depending on the conditions at any particular time.
- Electronic media for plan view provided by Mark Thomas & Co., Inc., dated 05/2010.
- Boring elevations are approximate and based on plans provided by Mark Thomas & Co., Inc.
- The "Log of Test Borings" drawing is included with plans in accordance with Section 2-1.03 of Caltrans "Standard Specifications".



PLAN
1" = 50'



PROFILE
HOR. 1"=20'
VERT. 1"=10'

2/13/2012 556.2 Silva Valley Parkway LOTB.dwg

X DESIGN OVERSIGHT	DRAWN BY	M. ROBERTSON	R. PICKARD
	CHECKED BY	R. PICKARD	DATE: July 2010

PREPARED FOR THE
STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

LANCE SCHREY
PROJECT ENGINEER

BRIDGE NO.
25-0127

POST MILE
1.8

SILVA VALLEY PARKWAY OVERCROSSING

LOG OF TEST BORINGS 1 OF 9



UNIT: PROJECT NUMBER & PHASE: X
CONTRACT NO.: X

DISREGARD PRINTS BEARING EARLIER REVISION DATES	REVISION DATES	SHEET	OF
		XX	XX

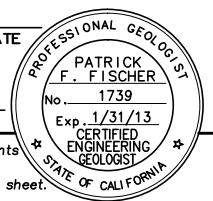
TIME PLOTTED => \$DATE USERNAME => \$USER

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
03	ED	50	1.06/2.90		

CERTIFIED ENGINEERING GEOLOGIST DATE

PLANS APPROVAL DATE

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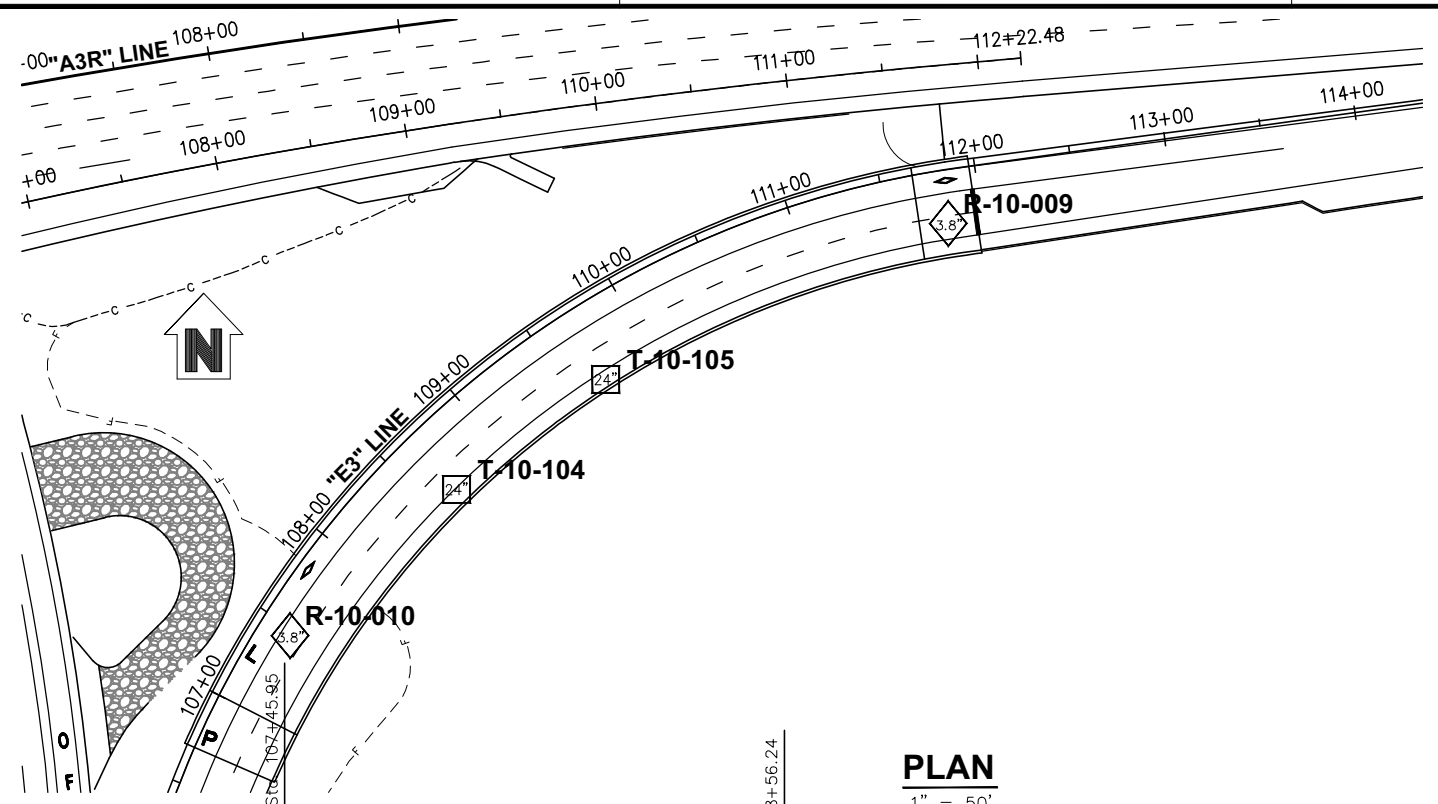
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11521 BLOCKER DRIVE, SUITE 110
AUBURN, CA 95603 FILE No. 556.2

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7300 FOLSOM BLVD STE 203
SACRAMENTO, CA 95826

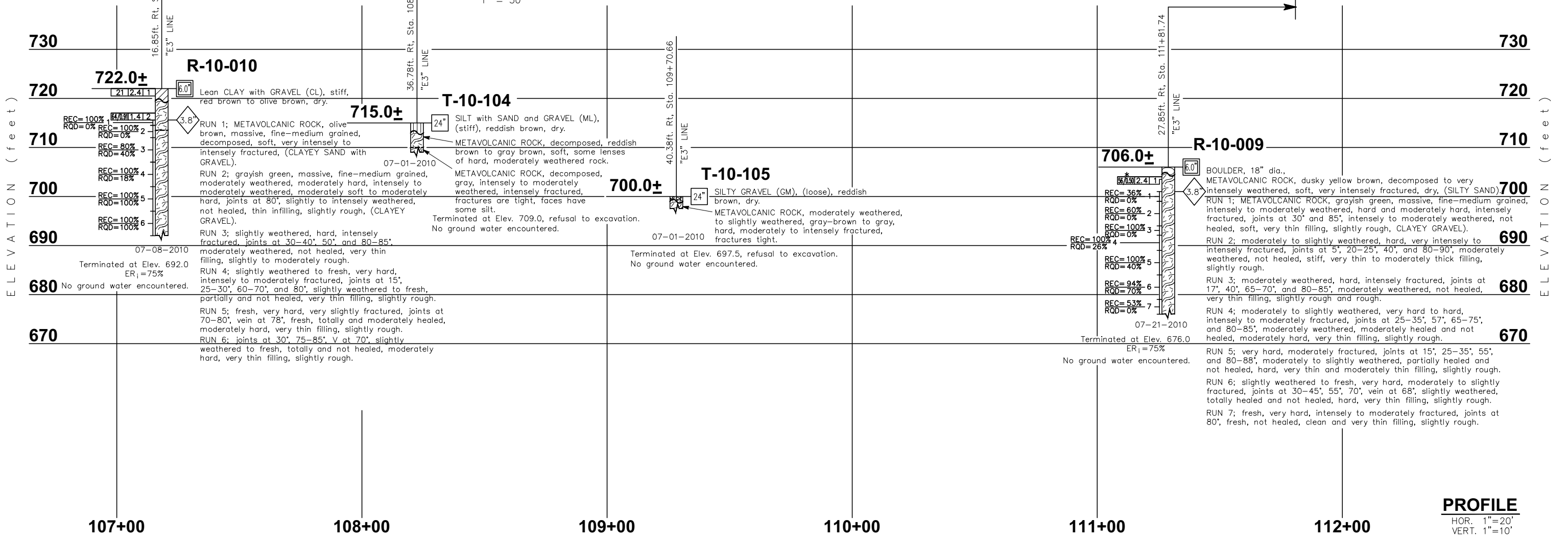
BENCHMARK
Orthometric Heights (elevations) shown are NGVD 29. Based on HPGN D CA 03 DL having an elevation of 693.55 feet.

NOTES:

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- The "Log of Test Borings" drawing is included with plans in accordance with Section 2-1.03 of Caltrans "Standard Specifications".



PLAN
1" = 50'



PROFILE
HOR. 1"=20'
VERT. 1"=10'

2/13/2012 556.2 Silva Valley EB On-Ramp Bridge LOTB.dwg

DATE PLOTTED => \$DATE USERNAME => \$USER TIME PLOTTED => \$TIME

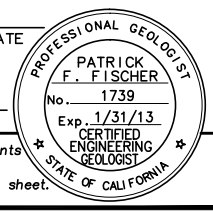
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FUNCTIONAL SUPERVISOR R. SOWERS		DRAWN BY: M. ROBERTSON		FIELD INVESTIGATION BY: R. PICKARD		PROJECT ENGINEER LANCE SCHREY		LOG OF TEST BORINGS 2 OF 9	
CHECKED BY: R. PICKARD						POST MILE X.X			
GS GEOLOGIST LOG OF TEST BORINGS SHEET (ENGLISH) (REV. 7/16/10)		ORIGINAL SCALE IN INCHES FOR REDUCED PLANS		UNIT: 0259 PROJECT NUMBER & PHASE: 0200000258		CONTRACT NO.: 71382		REVISION DATES 02/13/12	
				0 1 2 3				SHEET OF X X	

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
03	ED	50	1.06/2.90		

CERTIFIED ENGINEERING GEOLOGIST DATE _____

PLANS APPROVAL DATE _____

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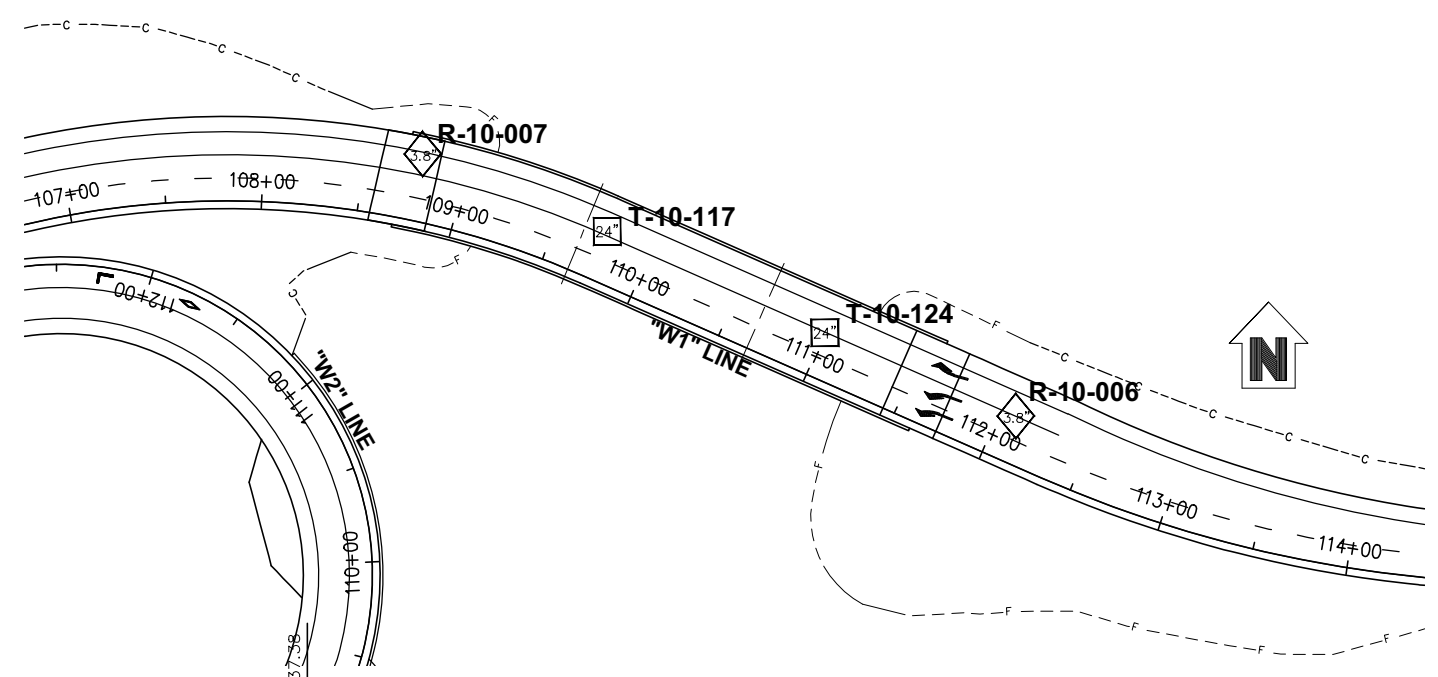
BLACKBURN CONSULTING
11521 BLOCKER DRIVE, SUITE 110
AUBURN, CA 95603 FILE No. 556.2

MARK THOMAS & CO., INC.
7300 FOLSOM BLVD STE 203
SACRAMENTO, CA 95826

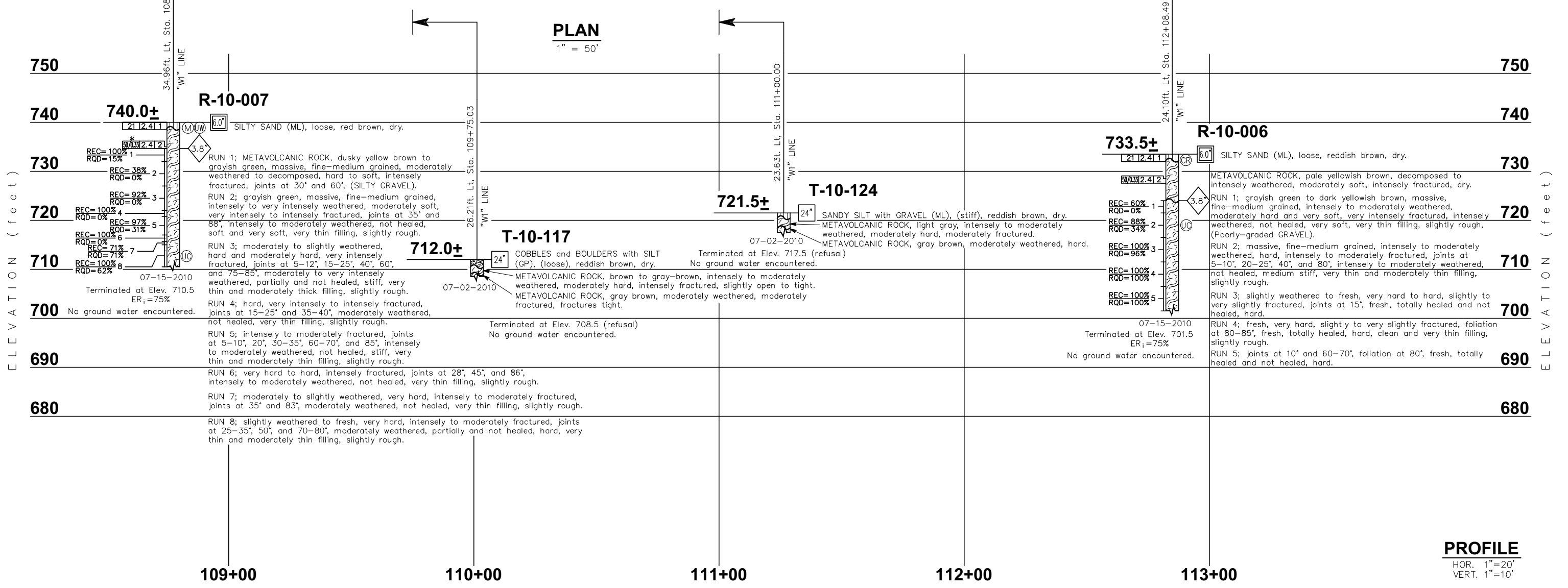
BENCHMARK
Orthometric Heights (elevations) shown are NGVD 29. Based on HPGN D CA 03 DL having an elevation of 693.55 feet.

NOTES:

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PLAN
1" = 50'



PROFILE
HOR. 1"=20'
VERT. 1"=10'

2/13/2012 556.2 Silva Valley WB Off-Ramp Bridge LOTB.dwg

DATE PLOTTED => \$DATE USERNAME => \$USER

X DESIGN OVERSIGHT	DRAWN BY M. ROBERTSON	R. PICKARD FIELD INVESTIGATION BY:
SIGN OFF DATE	CHECKED BY R. PICKARD	DATE: July 2010

PREPARED FOR THE
STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

LANCE SCHREY
PROJECT ENGINEER

BRIDGE NO. 25-0130K
POST MILE X.X

SILVA VALLEY WB OFF-RAMP BRIDGE
LOG OF TEST BORINGS 3 OF 9



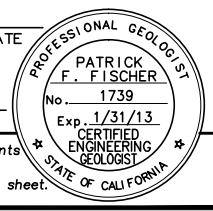
REVISION DATES	SHEET	OF
	XX	XX

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
03	ED	50	1.06/2.90		

CERTIFIED ENGINEERING GEOLOGIST DATE _____

PLANS APPROVAL DATE _____

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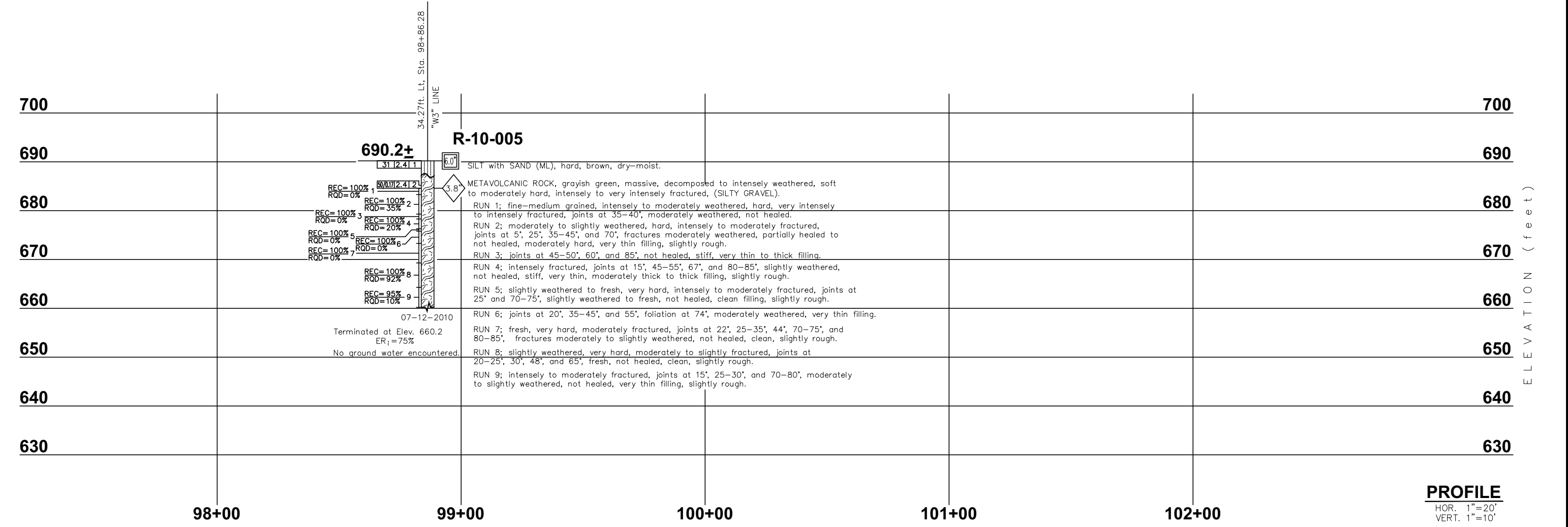
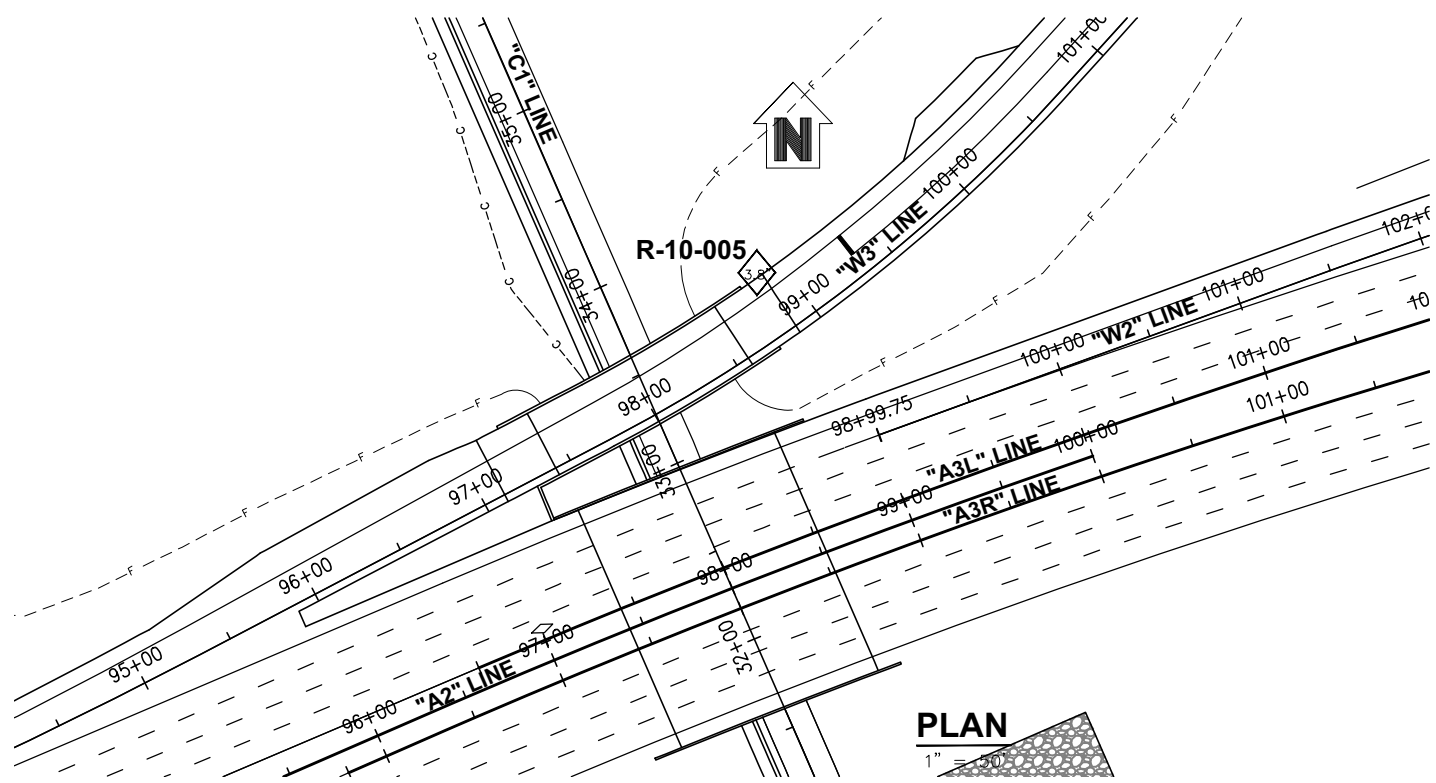
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11521 BLOCKER DRIVE, SUITE 110
AUBURN, CA 95603 FILE No. 556.2

MARK THOMAS & CO., INC.
7300 FOLSOM BLVD STE 203
SACRAMENTO, CA 95826

BENCHMARK
Orthometric Heights (elevations) shown are NGVD 29. Based on HPGN D CA 03 DL having an elevation of 693.55 feet.

NOTES:

- Field classification of soils was in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007). See Log of Test Borings No. 3, and 4, "Soil Legend" and 5, "Rock Legend".
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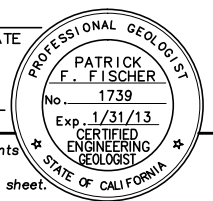
X DESIGN OVERSIGHT	DRAWN BY	M. ROBERTSON	R. PICKARD	PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	BRIDGE NO.	SILVA VALLEY WB ON-RAMP UC
	CHECKED BY	R. PICKARD	FIELD INVESTIGATION BY:		POST MILE	
SIGN OFF DATE	DATE:	July 2010			X.X	

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
03	ED	50	1.06/2.90		

CERTIFIED ENGINEERING GEOLOGIST DATE _____

PLANS APPROVAL DATE _____

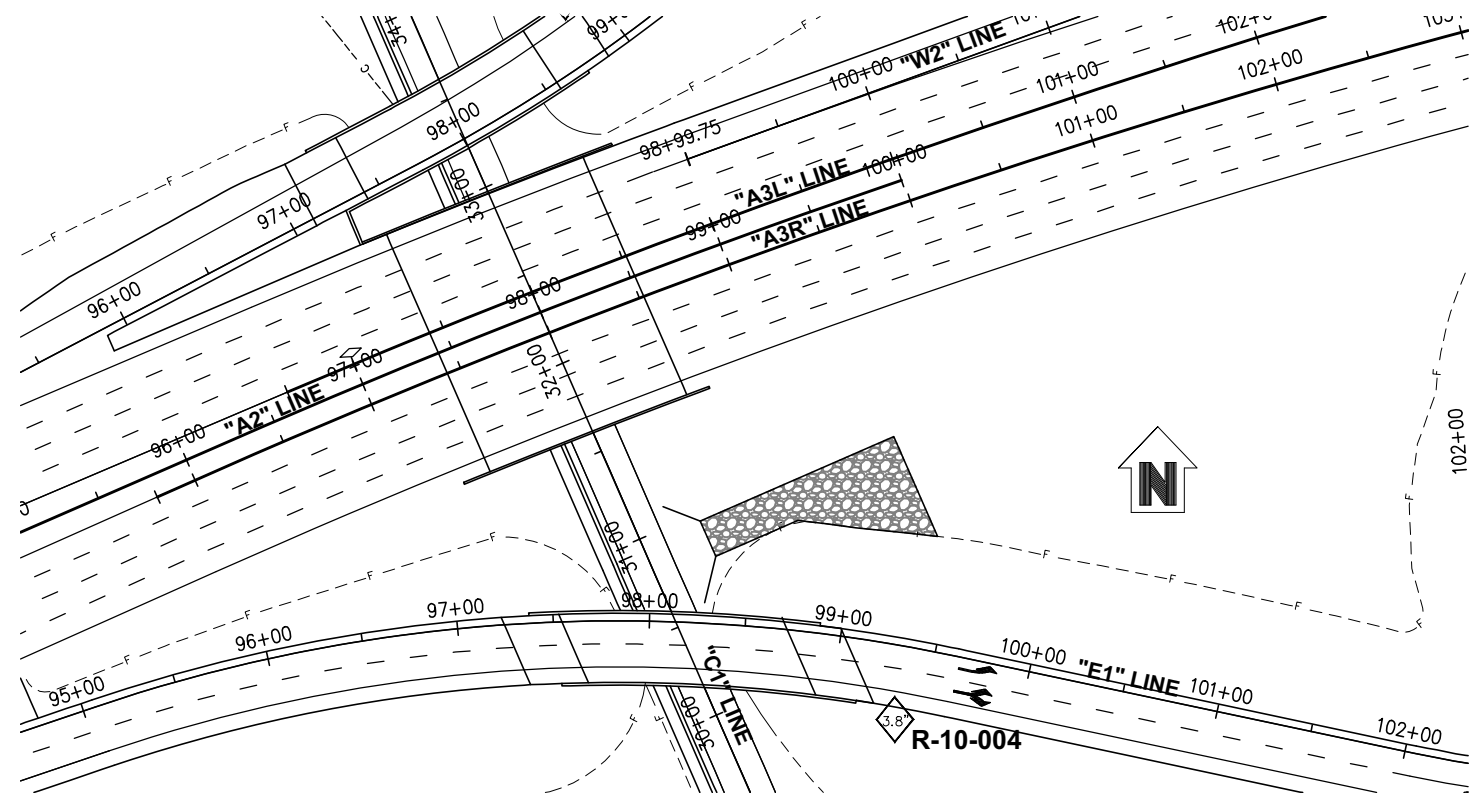
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11521 BLOCKER DRIVE, SUITE 110
AUBURN, CA 95603 FILE No. 556.2

MARK THOMAS & CO., INC.
7300 FOLSOM BLVD STE 203
SACRAMENTO, CA 95826

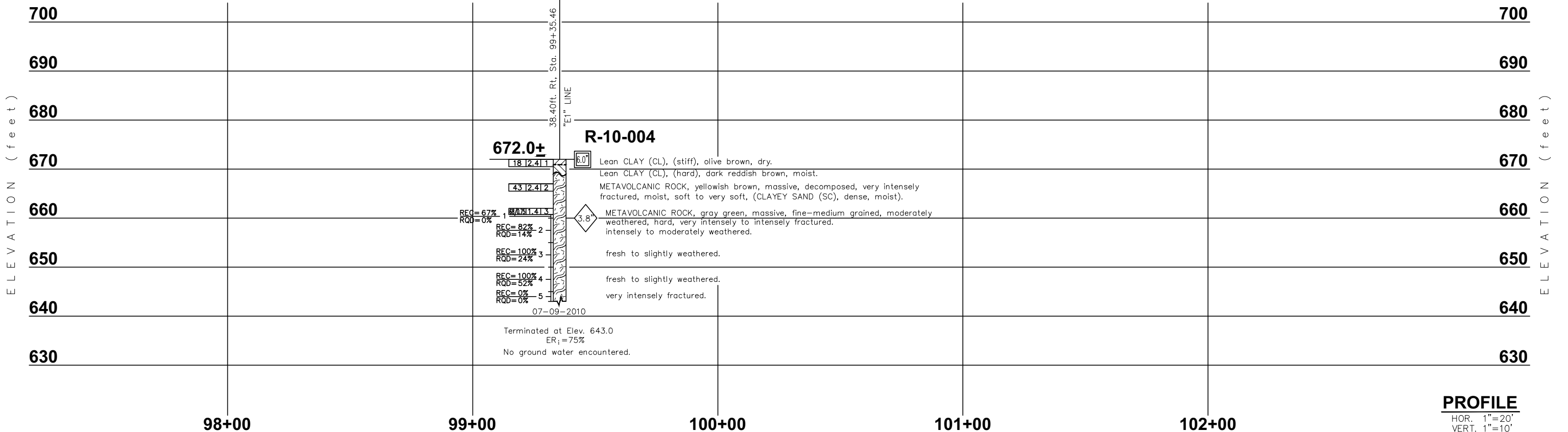
BENCHMARK
Orthometric Heights (elevations) shown are NGVD 29. Based on HPGN D CA 03 DL having an elevation of 693.55 feet.



PLAN
1" = 50'

NOTES:

- Field classification of soils was in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007). See Log of Test Borings No. 3, and 4, "Soil Legend" and 5, "Rock Legend".
- Standard Penetration tests were performed in accordance with ASTM D 1586-99 using a hammer operated with an automated drop system. Drill rods were 1 5/8-inch diameter "A"-rods; sampler was driven with brass liners.
- "2.4 inch sampler": ID=2.4 inch, OD=2.9 inch. Driven in same manner as SPT ("1.4 inch") sampler.
- Where less than the 0.5 inches of penetration is achieved, the blow count shown is for that fraction of the interval actually penetrated.
- Where indicated by an asterisk (*) the number of blows shown is for only that fraction of the initial 0.5 ft. "seating drive" interval penetrated.
- If laboratory tests are not shown as being performed, the soil descriptions presented in the LOTB are based solely on the visual practices described in the before mentioned Manual.
- The length of each sampled interval is shown graphically on the boring log.
- Consistency of soils shown in () where estimated.
- Groundwater surface (GWS) reflect the fluid level in the borings on the specified date. Groundwater surface is subject to seasonal fluctuations and may occur at higher or lower elevations depending on the conditions at any particular time.
- Electronic media for plan view provided by Mark Thomas & Co., Inc., dated 05/2010.
- Boring elevations are approximate and based on plans provided by Mark Thomas & Co., Inc.
- The "Log of Test Borings" drawing is included with plans in accordance with Section 2-1.03 of Caltrans "Standard Specifications".



PROFILE
HOR. 1"=20'
VERT. 1"=10'

2/13/2012 556.2 Silva Valley EB Off-Ramp UC LOTB.dwg

DATE PLOTTED => \$DATE USERNAME => \$USER TIME PLOTTED => \$TIME

X DESIGN OVERSIGHT	DRAWN BY	M. ROBERTSON	R. PICKARD FIELD INVESTIGATION BY:	PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	BRIDGE NO.	25-0128S	SILVA VALLEY EB OFF-RAMP UC
	CHECKED BY	R. PICKARD			DATE:	July 2010	
SIGN OFF DATE				UNIT:	0259	CONTRACT NO.:	71328
GS GEOLOGIST LOG OF TEST BORINGS SHEET (ENGLISH) (REV. 7/16/10)				ORIGINAL SCALE IN INCHES FOR REDUCED PLANS	0 1 2 3	PROJECT NUMBER & PHASE:	0300000258
				FILE =>	\$REQUEST	DISREGARD PRINTS BEARING EARLIER REVISION DATES	REVISION DATES
							SHEET OF XX XX

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
03	ED	50			

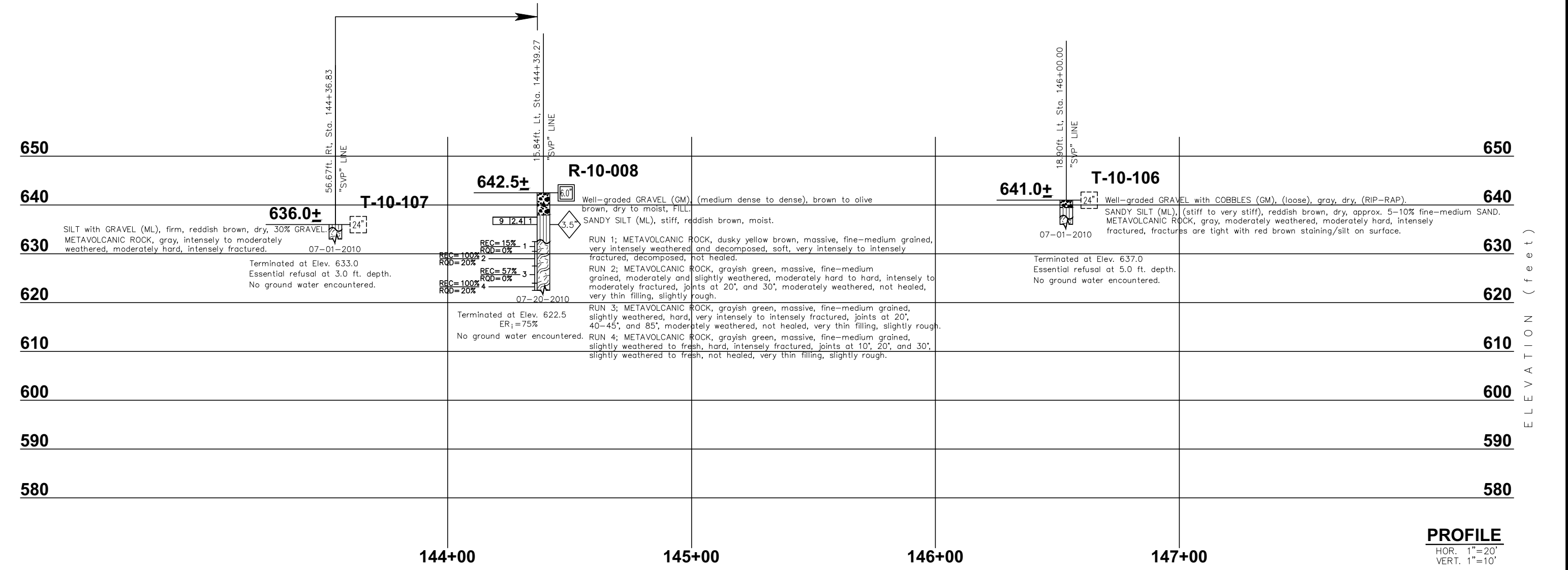
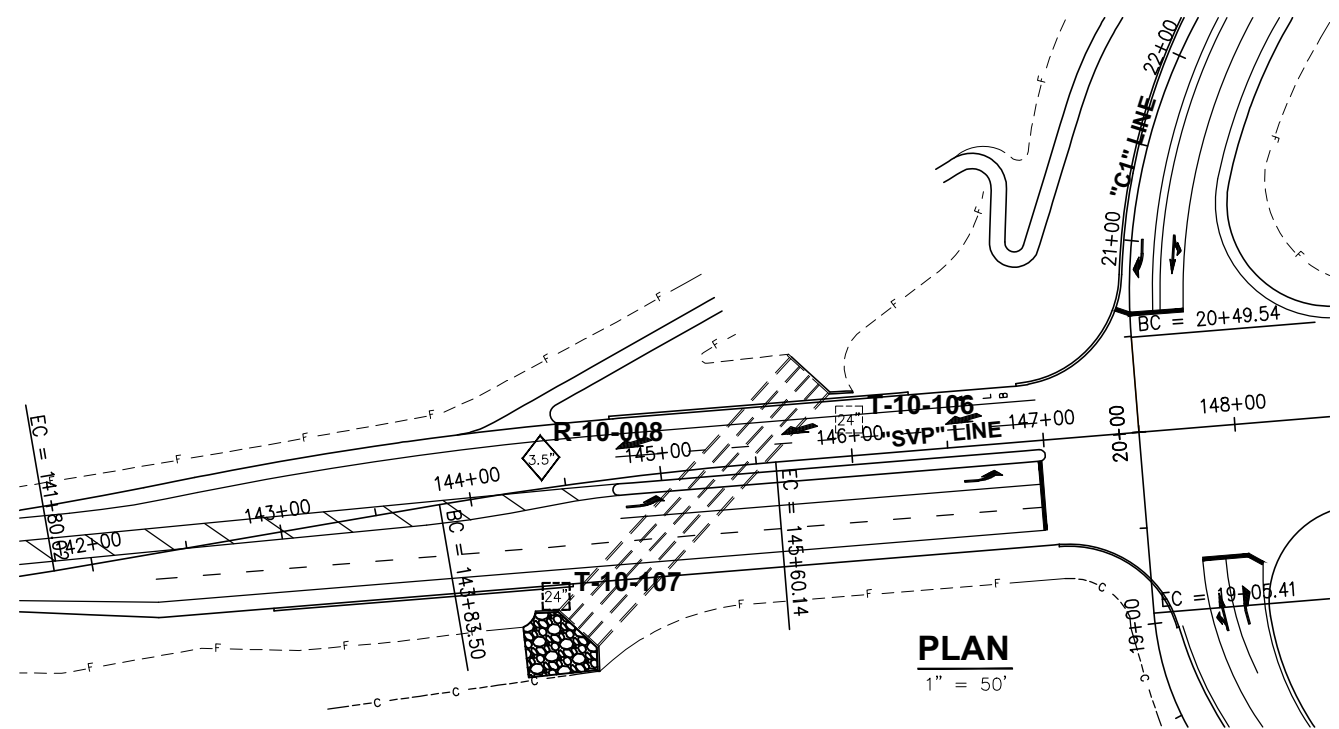
REGISTERED CIVIL ENGINEER _____ DATE _____
 PATRICK F. FISCHER
 No. 1739
 Exp. 1/31/13
 CERTIFIED ENGINEERING GEOLOGIST
 STATE OF CALIFORNIA

PLANS APPROVAL DATE _____
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 7300 FOLSOM BLVD STE 203
 SACRAMENTO, CA 95826

BENCHMARK
 Orthometric Heights (elevations) shown are NGVD 29. Based on HPGN D CA 03 DL having an elevation of 693.55 feet.

NOTES:

- Field classification of soils was in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007). See Log of Test Borings No. 2, and 3, "Soil Legend" and 4, "Rock Legend".
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- "2.4 inch sampler": ID=2.4 inch, OD=2.9 inch. Driven in same manner as SPT ("1.4 inch") sampler.
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- If laboratory tests are not shown as being performed, the soil descriptions presented in the LOTB are based solely on the visual practices described in the before mentioned Manual.
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2/13/2012 556.2 White Rock Road Bridge LOTB.dwg

DATE PLOTTED => \$DATE USERNAME => \$USER TIME PLOTTED => \$TIME

ENGINEERING SERVICES		GEOTECHNICAL SERVICES		PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION		BRIDGE NO. XX-XXXX		WHITE ROCK ROAD BRIDGE					
FUNCTIONAL SUPERVISOR R. SOWERS		DRAWN BY: M. ROBERTSON		FIELD INVESTIGATION BY: R. PICKARD		PROJECT ENGINEER						POST MILE XX.XX	
CHECKED BY: R. PICKARD										LOG OF TEST BORINGS 6 OF 9			
OGS CIVIL LOG OF TEST BORINGS SHEET		ORIGINAL SCALE IN INCHES FOR REDUCED PLANS		CU XXXXX EA 1E290		DISREGARD PRINTS BEARING EARLIER REVISION DATES		REVISION DATES (PRELIMINARY STAGE ONLY)				SHEET XX	OF XX

REFERENCE: CALTRANS SOIL & ROCK LOGGING, CLASSIFICATION, AND PRESENTATION MANUAL, (JUNE, 2007)

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
03	ED	50			

CEMENTATION	
Description	Criteria
Weak	Crumbles or breaks with handling or little finger pressure.
Moderate	Crumbles or breaks with considerable finger pressure.
Strong	Will not crumble or break with finger pressure.

CONSISTENCY OF COHESIVE SOILS				
Description	Unconfined Compressive Strength (tsf)	Pocket Penetrometer Measurement (tsf)	Torvane Measurement (tsf)	Field Approximation
Very Soft	<0.25	<0.25	<0.12	Easily penetrated several inches by fist
Soft	0.25 to 0.50	0.25 to 0.50	0.12 to 0.25	Easily penetrated several inches by thumb
Medium Stiff	0.50 to 1.0	0.50 to 1.0	0.25 to 0.50	Penetrated several inches by thumb with moderate effort
Stiff	1 to 2	1 to 2	0.50 to 1.0	Readily indented by thumb but penetrated only with great effort
Very Stiff	2 to 4	2 to 4	1.0 to 2.0	Readily indented by thumbnail
Hard	> 4.0	> 4.0	> 2.0	Indented by thumbnail with difficulty

REGISTERED CIVIL ENGINEER _____ DATE _____

PLANS APPROVAL DATE _____

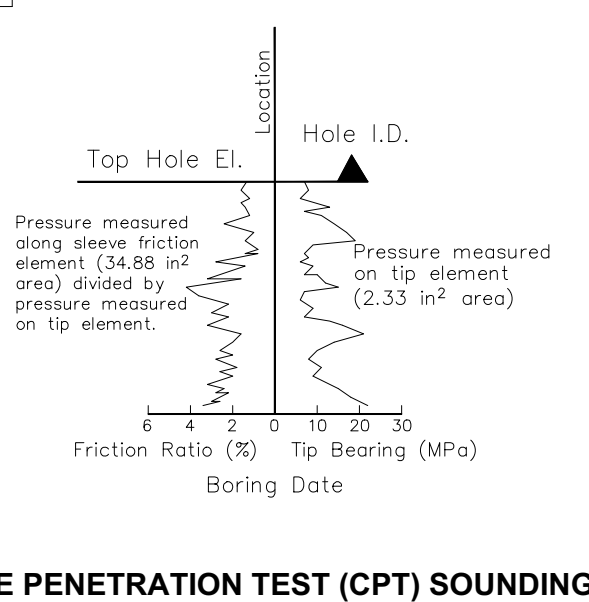
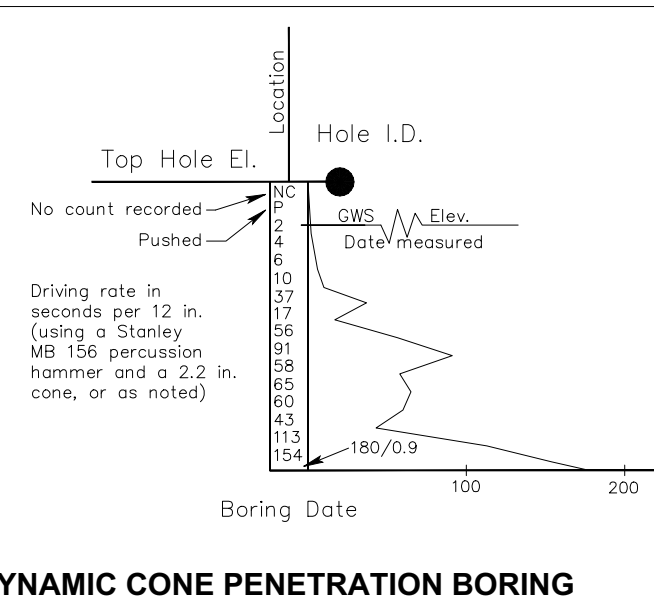
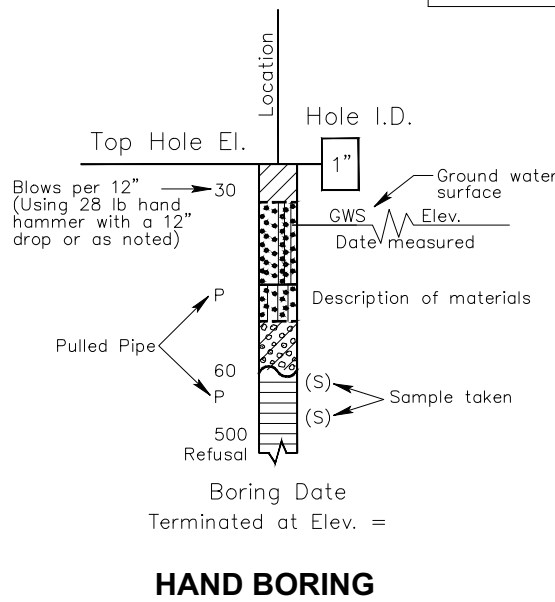
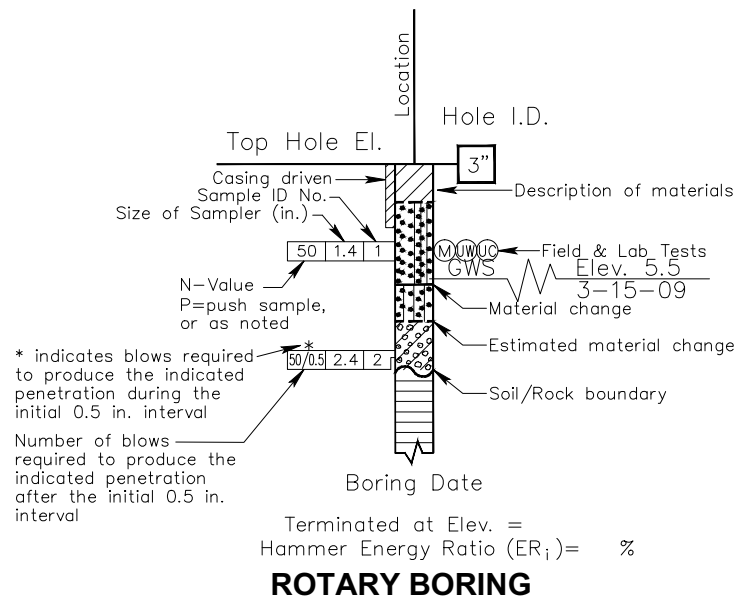
BLACKBURN CONSULTING
11521 BLOCKER DRIVE, SUITE 110
AUBURN, CA 95603 FILE No. 556.2

MARK THOMAS & CO., INC.
7300 FOLSOM BLVD STE 203
SACRAMENTO, CA 95826

BOREHOLE IDENTIFICATION		
Symbol	Hole Type	Description
	A	Auger Boring
	R	Rotary drilled boring
	P	Rotary percussion boring (air)
	R	Rotary drilled diamond core
	HD	Hand driven (1-inch soil tube)
	HA	Hand Auger
	D	Dynamic Cone Penetration Boring
	CPT	Cone Penetration Test (ASTM D 5778)
	T	Test Pit

NOTE: Size in inches.

PLASTICITY OF FINE-GRAINED SOILS	
Description	Criteria
Nonplastic	A 1/8-inch thread cannot be rolled at any water content.
Low	The thread can barely be rolled and the lump cannot be formed when drier than the plastic limit.
Medium	The thread is easy to roll and not much time is required to reach the plastic limit. The thread cannot be rerolled after reaching the plastic limit. The lump crumbles when drier than the plastic limit.
High	It takes considerable time rolling and kneading to reach the plastic limit. The thread can be rerolled several times after reaching the plastic limit. The lump can be formed without crumbling when drier than the plastic limit.



SOIL LEGEND	
SILVA VALLEY PARKWAY ALL STRUCTURES	
LOG OF TEST BORINGS 7 OF 9	

2/13/2012 556.2 White Rock Road Bridge LOTB.dwg

DATE PLOTTED => \$TIME USERNAME => \$USER

ENGINEERING SERVICES	GEOTECHNICAL SERVICES	PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	BRIDGE NO. XX-XXXX POST MILE XX.XX
DRAWN BY: M. ROBERTSON	CHECKED BY: R. PICKARD	CU XXXXX EA 1E290	DISREGARD PRINTS BEARING EARLIER REVISION DATES



REVISION DATES (PRELIMINARY STAGE ONLY)	SHEET XX	OF XX
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REFERENCE: CALTRANS SOIL & ROCK LOGGING, CLASSIFICATION, AND PRESENTATION MANUAL, (JUNE, 2007)

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
03	ED	50			

REGISTERED CIVIL ENGINEER _____ DATE _____
 PATRICK F. FISCHER
 No. 1739
 Exp. 1/31/13
 CERTIFIED ENGINEERING GEOLOGIST
 STATE OF CALIFORNIA

PLANS APPROVAL DATE _____
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 11521 BLOCKER DRIVE, SUITE 110
 AUBURN, CA 95603 FILE No. 556.2
 MARK THOMAS & CO., INC.
 7300 FOLSOM BLVD STE 203
 SACRAMENTO, CA 95826

GROUP SYMBOLS AND NAMES			
Graphic/Symbol	Group Names	Graphic/Symbol	Group Names
	Well-graded GRAVEL Well-graded GRAVEL with SAND		Lean CLAY Lean CLAY with SAND Lean CLAY with GRAVEL SANDY lean CLAY GRAVELLY lean CLAY with SAND
	Poorly-graded GRAVEL Poorly-graded GRAVEL with SAND		
	Well-graded GRAVEL with SILT Well-graded GRAVEL with SILT and SAND		SILTY CLAY SILTY CLAY with SAND SILTY CLAY with GRAVEL SANDY SILTY CLAY SANDY SILTY CLAY with GRAVEL GRAVELLY SILTY CLAY GRAVELLY SILTY CLAY with SAND
	Well-graded GRAVEL with CLAY (or SILTY CLAY) Well-graded GRAVEL with CLAY and SAND (or SILTY CLAY and SAND)		
	Poorly-graded GRAVEL with SILT Poorly-graded GRAVEL with SILT and SAND		SILT SILT with SAND SILT with GRAVEL SANDY SILT SANDY SILT with GRAVEL GRAVELLY SILT GRAVELLY SILT with SAND
	Poorly-graded GRAVEL with CLAY (or SILTY CLAY) Poorly-graded GRAVEL with CLAY and SAND (or SILTY CLAY and SAND)		
	SILTY GRAVEL SILTY GRAVEL with SAND		ORGANIC lean Clay ORGANIC lean Clay with SAND ORGANIC lean Clay with GRAVEL SANDY ORGANIC lean CLAY SANDY ORGANIC lean CLAY with GRAVEL GRAVELLY ORGANIC lean CLAY GRAVELLY ORGANIC lean CLAY with SAND
	CLAYEY GRAVEL CLAYEY GRAVEL with SAND		
	SILTY, CLAYEY GRAVEL SILTY, CLAYEY GRAVEL with SAND		ORGANIC SILT ORGANIC SILT with SAND ORGANIC SILT with GRAVEL SANDY ORGANIC SILT SANDY ORGANIC SILT with GRAVEL GRAVELLY ORGANIC SILT GRAVELLY ORGANIC SILT with SAND
	Well-graded SAND Well-graded SAND with GRAVEL		
	Poorly-graded SAND Poorly-graded SAND with GRAVEL		Fat CLAY Fat CLAY with SAND Fat CLAY with GRAVEL SANDY fat CLAY SANDY fat CLAY with GRAVEL GRAVELLY fat CLAY GRAVELLY fat CLAY with SAND
	Well-graded SAND with SILT Well-graded SAND with SILT and GRAVEL		
	Well-graded SAND with CLAY (or SILTY CLAY) Well-graded SAND with CLAY and GRAVEL (or SILTY CLAY and GRAVEL)		Elastic SILT Elastic SILT with SAND Elastic SILT with GRAVEL SANDY elastic SILT SANDY elastic SILT with GRAVEL GRAVELLY elastic SILT GRAVELLY elastic SILT with SAND
	Poorly-graded SAND with SILT Poorly-graded SAND with SILT and GRAVEL		
	Poorly-graded SAND with CLAY (or SILTY CLAY) Poorly-graded SAND with CLAY and GRAVEL (or SILTY CLAY and GRAVEL)		ORGANIC fat CLAY ORGANIC fat CLAY with SAND ORGANIC fat CLAY with GRAVEL SANDY ORGANIC fat CLAY SANDY ORGANIC fat CLAY with GRAVEL GRAVELLY ORGANIC fat CLAY GRAVELLY ORGANIC fat CLAY with SAND
	SILTY SAND SILTY SAND with GRAVEL		
	CLAYEY SAND CLAYEY SAND with GRAVEL		ORGANIC elastic SILT ORGANIC elastic SILT with SAND ORGANIC elastic SILT with GRAVEL SANDY ORGANIC elastic SILT SANDY ORGANIC elastic SILT with GRAVEL GRAVELLY ORGANIC elastic SILT GRAVELLY ORGANIC elastic SILT with SAND
	SILTY, CLAYEY SAND SILTY, CLAYEY SAND with GRAVEL		
	PEAT		ORGANIC SOIL ORGANIC SOIL with SAND ORGANIC SOIL with GRAVEL SANDY ORGANIC SOIL SANDY ORGANIC SOIL with GRAVEL GRAVELLY ORGANIC SOIL GRAVELLY ORGANIC SOIL with SAND
	COBBLES COBBLES and BOULDERS BOULDERS		

FIELD AND LABORATORY TESTING	
(C)	Consolidation (ASTM D 2435)
(CL)	Collapse Potential (ASTM D 5333)
(CP)	Compaction Curve (CTM 216)
(CR)	Corrosivity Testing (CTM 643, CTM 422, CTM 417)
(CU)	Consolidated Undrained Triaxial (ASTM D 4767)
(DS)	Direct Shear (ASTM D 3080)
(EI)	Expansion Index (ASTM D 4829)
(M)	Moisture Content (ASTM D 2216)
(OC)	Organic Content-% (ASTM D 2974)
(P)	Permeability (CTM 220)
(PA)	Particle Size Analysis (ASTM D 422)
(PI)	Plasticity Index (AASHTO T 90) Liquid Limit (AASHTO T 89)
(PL)	Point Load Index (ASTM D 5731)
(PM)	Pressure Meter
(PP)	Pocket Penetrometer
(R)	R-Value (CTM 301)
(SE)	Sand Equivalent (CTM 217)
(SG)	Specific Gravity (AASHTO T 100)
(SL)	Shrinkage Limit (ASTM D 427)
(SW)	Swell Potential (ASTM D 4546)
(TV)	Pocket Torvane
(UC)	Unconfined Compression-Soil (ASTM D 2166) Unconfined Compression-Rock (ASTM D 2938)
(UU)	Unconsolidated Undrained Triaxial (ASTM D 2850)
(UW)	Unit Weight (ASTM D 2937)
(VS)	Vane Shear (AASHTO T 223)

APPARENT DENSITY OF COHESIONLESS SOILS	
Description	SPT N ₆₀ -Value (Blows / 12 inches)
Very Loose	0 - 4
Loose	5 - 10
Medium Dense	11 - 30
Dense	31 - 50
Very Dense	> 50

MOISTURE	
Description	Criteria
Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, usually soil is below water table

PERCENT OR PROPORTION OF SOILS	
Description	Criteria
Trace	Particles are present but estimated to be less than 5%
Few	5 to 10%
Little	15 to 25%
Some	30 to 45%
Mostly	50 to 100%

PARTICLE SIZE		
Description	Size	
Boulder	> 12"	
Cobble	3" to 12"	
Gravel	Coarse	3/4" to 3"
	Fine	No. 4 to 3/4"
Sand	Coarse	No. 10 to No. 4
	Medium	No. 40 to No. 10
	Fine	No. 200 to No. 40

SOIL LEGEND

SILVA VALLEY PARKWAY ALL STRUCTURES

LOG OF TEST BORINGS 8 OF 9

2/13/2012 556.2 White Rock Road Bridge LOTB.dwg

DATE PLOTTED => \$DATE USERNAME => \$USER TIME PLOTTED => \$TIME

ENGINEERING SERVICES	GEOTECHNICAL SERVICES	PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	XX PROJECT ENGINEER	BRIDGE NO. XX-XXXX POST MILE XX.XX
DRAWN BY: M. ROBERTSON	CHECKED BY: R. PICKARD	CU XXXXX EA 1E290	DISREGARD PRINTS BEARING EARLIER REVISION DATES	

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS	0 1 2 3	REVISION DATES (PRELIMINARY STAGE ONLY)	SHEET XX OF XX
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FILE => \$REQUEST

REFERENCE: CALTRANS SOIL & ROCK LOGGING, CLASSIFICATION, AND PRESENTATION MANUAL, (JUNE, 2007)

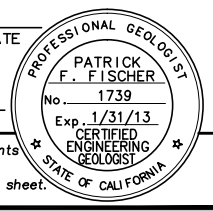
REGISTERED CIVIL ENGINEER _____ DATE _____

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11521 BLOCKER DRIVE, SUITE 110
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MARK THOMAS & CO., INC.
7300 FOLSOM BLVD STE 203
SACRAMENTO, CA 95826



PERCENT CORE RECOVERY (REC) & ROCK QUALITY DESIGNATION (RQD)

$$REC = \frac{\sum \text{Length of the recovered core pieces (inches)}}{\text{Total length of core run (inches)}} \times 100\%$$

$$RQD = \frac{\sum \text{Length of the intact core pieces } \geq 4''}{\text{Total length of core run (inches)}} \times 100\%$$

RELATIVE STRENGTH OF INTACT ROCK

Term	Uniaxial Compressive Strength (PSI)
Extremely Strong	> 30,000
Very Strong	14,500 – 30,000
Strong	7,000 – 14,500
Medium Strong	3,500 – 7,000
Weak	700 – 3,500
Very Weak	150 – 700
Extremely Weak	< 150

BEDDING SPACING

Description	Thickness / Spacing
Massive	Greater than 10 ft
Very thickly bedded	3 to 10 ft
Thickly bedded	1 to 3 ft
Moderately bedded	3–5/8" to 1 ft
Thinly bedded	1–1/4" to 3–5/8"
Very thinly bedded	3/8" to 1–1/4"
Laminated	Less than 3/8"

LEGEND OF ROCK MATERIALS

- IGNEOUS ROCK
- SEDIMENTARY ROCK
- METAMORPHIC ROCK

ROCK HARDNESS

Description	Criteria
Extremely Hard	Specimen cannot be scratched with a pocket knife or sharp pick; can only be chipped with repeated heavy hammer blows.
Very Hard	Specimen cannot be scratched with a pocket knife or sharp pick. Breaks with repeated heavy hammer blows.
Hard	Specimen can be scratched with a pocket knife or sharp pick with difficulty (heavy pressure). Heavy hammer blows required to break specimen.
Moderately Hard	Specimen can be scratched with a pocket knife or sharp pick with light or moderate pressure. Core breaks with moderate hammer pressure.
Moderately Soft	Specimen can be grooved 1/16" deep with a pocket knife or sharp pick with moderate or heavy pressure. Breaks with light hammer blow or heavy manual pressure.
Soft	Specimen can be grooved or gouged easily by a pocket knife or sharp pick with light pressure, can be scratched with fingernail. Breaks with light to moderate manual pressure.
Very Soft	Specimen can be readily indented, grooved or gouged with fingernail, or carved with a pocket knife. Breaks with light manual pressure.

WEATHERING DESCRIPTORS FOR INTACT ROCK

Description	Diagnostic features				General Characteristics	
	Chemical weathering—Discoloration and/or oxidation		Mechanical Weathering—Grain boundary conditions (disaggregation) primarily for granitics and some coarse-grained sediments	Texture and solutioning		
	Body of rock	Fracture Surfaces		Texture		Solutioning
Fresh	No discoloration, not oxidized.	No discoloration or oxidation.	No separation, intact (tight).	No change.	No solutioning.	Hammer rings when crystalline rocks are struck.
Slightly Weathered	Discoloration or oxidation is limited to surface of, or short distance from, fractures; some feldspar crystals are dull.	Minor to complete discoloration or oxidation of most surfaces.	No visible separation, intact (tight).	Preserved.	Minor leaching of some soluble minerals may be noted.	Hammer rings when crystalline rocks are struck. Body of rock not weakened.
Moderately Weathered	Discoloration or oxidation extends from fractures usually throughout; Fe–Mg minerals are "rusty", feldspar crystals are "cloudy".	All fracture surfaces are discolored or oxidized.	Partial separation of boundaries visible.	Generally preserved.	Soluble minerals may be mostly leached.	Hammer does not ring when rock is struck. Body of rock is slightly weakened.
Intensely Weathered	Discoloration or oxidation throughout; all feldspars and Fe–Mg minerals are altered to clay to some extent; or chemical alteration produces in-situ disaggregation, see grain boundary conditions.	All fracture surfaces are discolored or oxidized, surfaces friable.	Partial separation, rock is friable; in semiarid conditions granitics are disaggregated.	Texture altered by chemical disintegration (hydration, argillation).	Leaching of soluble minerals may be complete.	Dull sound when struck with hammer, usually can be broken with moderate to heavy manual pressure or by light hammer blow without reference to planes of weakness such as incipient or hair-line fractures, or veinlets. Rock is significantly weakened.
Decomposed	Discolored or oxidized throughout, but resistant minerals such as quartz may be unaltered; all feldspars and Fe–Mg minerals are completely altered to clay.		Complete separation of grain boundaries (disaggregated).	Resembles a soil, partial or complete remnant rock structure may be preserved; leaching of soluble minerals usually complete.		Can be granulated by hand. Resistant minerals such as quartz may be present as "stringers" or "dikes".

Combination descriptors (such as "slightly weathered to fresh") are used where equal distribution of both weathering characteristics is present over significant intervals or where characteristics present are "in between" the diagnostic features. However, combination descriptors should not be used where significant, identifiable zones can be delineated. Only two adjacent descriptors may be combined. "Very intensely weathered" is the combination descriptor for "intensely weathered to decomposed".

FRACTURE DENSITY

Description	Observed Fracture Density
Unfractured	No fractures.
Very slightly fractured	Lengths greater than 3 feet.
Slightly fractured	Lengths from 1 to 3 feet with few lengths less than 1 foot or greater than 3 feet.
Moderately fractured	Lengths mostly in 4" to 1 foot range with most lengths about 8"
Intensely fractured	Lengths average from 1" to 4" with scattered fragmented intervals with lengths less than 4 in.
Very intensely fractured	Mostly chips and fragments with a few scattered short core lengths.

Combination descriptors (such as "Very intensely to intensely fractured") are used where equal distribution of both fracture density characteristics is present over a significant interval or exposure, or where characteristics are "in between" the descriptor definitions. Only two adjacent descriptors may be combined.

ROCK LEGEND

SILVA VALLEY PARKWAY ALL STRUCTURES

LOG OF TEST BORINGS 9 OF 9

2/13/2012 556.2 White Rock Road Bridge LOTB.dwg

ENGINEERING SERVICES	GEOTECHNICAL SERVICES	PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	XX PROJECT ENGINEER
DRAWN BY: M. ROBERTSON	CHECKED BY: R. PICKARD	BRIDGE NO. XX-XXXX	POST MILE XX.XX
OGS CIVIL LOG OF TEST BORINGS SHEET		CU XXXXX EA 1E290	DISREGARD PRINTS BEARING EARLIER REVISION DATES



REVISION DATES (PRELIMINARY STAGE ONLY)										SHEET	OF
										XX	XX

FILE => \$REQUEST

DATE PLOTTED => \$DATE USERNAME => \$USER TIME PLOTTED => \$TIME

LOGGED BY RCP	BEGIN DATE 7-20-10	COMPLETION DATE 7-20-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID R-10-008
DRILLING CONTRACTOR PC Exploration	BOREHOLE LOCATION (Offset, Station, Line)		SURFACE ELEVATION	
DRILLING METHOD Rotary Wire-Line	DRILL RIG CME 75		BOREHOLE DIAMETER 4 in	
SAMPLER TYPE(S) AND SIZE(S) (ID) Bulk	SPT HAMMER TYPE Automatic		HAMMER EFFICIENCY, ERI 80%	
BOREHOLE BACKFILL AND COMPLETION	GROUNDWATER DURING DRILLING AFTER DRILLING (DATE)		TOTAL DEPTH OF BORING 20.0 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	0		SILTY GRAVEL (GM); medium dense; olive brown; dry to moist; fill.												
1	1			D01				100							
2	2														
3	3														
4	4														
5	5		SANDY SILT (ML); stiff; reddish brown; moist.	S02	3	9	100								
6	6				4										
7	7				5										
8	8														
9	9														
10	10		METAMORPHIC ROCK, fine-grained to medium-grained, massive, grayish green, moderately to slightly weathered, hard, intensely fractured.	Run 1				30	0						
11	11														
12	12														

(continued)

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 11521 Blocker Drive, Suite 110
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 Phone: (530) 887-1494
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REPORT TITLE BORING RECORD				HOLE ID R-10-008
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 2	

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		
12			METAMORPHIC ROCK (continued).	Run 2				100	56								
13																	
14																	
15						Run 3				63	0						
16																	
17																	
18																	
19				Run 4				100	111								
20			Bottom of borehole at 20.0 ft bgs														
21			This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.														
22																	
23																	
24																	
25																	
26																	



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 Auburn, CA 95603
 Phone: (530) 887-1494
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REPORT TITLE BORING RECORD				HOLE ID R-10-008	
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901	
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange					
BRIDGE NUMBER		PREPARED BY RCP		DATE	SHEET 2 of 2

LOGGED BY PFF	BEGIN DATE 7-1-10	COMPLETION DATE 7-1-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID T-10-101
DRILLING CONTRACTOR Monte Rickey Excavating			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION ~710.0 ft
DRILLING METHOD Backhoe			DRILL RIG CAT 430D	BOREHOLE DIAMETER
SAMPLER TYPE(S) AND SIZE(S) (ID) bucket cuttings			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERI
BOREHOLE BACKFILL AND COMPLETION Backfilled with native cuttings			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered	TOTAL DEPTH OF BORING 6.5 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			SANDY SILT (ML); reddish brown; dry to moist.												
	1				D01										
708.00	2		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, grayish brown, decomposed, moderately soft, very intensely fractured, (Silty Gravel).												
706.00	4		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, medium gray, moderately weathered, moderately hard, very intensely fractured, Predominate fracture (foliation) N35W, 75-85 N and N30E, 75-80N, fractures tight, silt filled, breaks into 4-8" in maximum dimension.												
704.00	6														
	7		Bottom of borehole at 6.5 ft bgs Essential Refusal at 6.5 ft.												
702.00	8		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
	9														
700.00	10														
	11														
	12														



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REPORT TITLE BORING RECORD				HOLE ID T-10-101
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE 8-9-10	SHEET 1 of 1	

LOGGED BY PFF	BEGIN DATE 7-1-10	COMPLETION DATE 7-1-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID T-10-102
DRILLING CONTRACTOR Monte Rickey Excavating			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION ~682.5 ft
DRILLING METHOD Backhoe			DRILL RIG CAT 430D	BOREHOLE DIAMETER
SAMPLER TYPE(S) AND SIZE(S) (ID) bucket cuttings			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERI
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered	TOTAL DEPTH OF BORING 5.0 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		SANDY SILT (ML); stiff; reddish brown; dry to moist.												
	1														
680.50	2		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, grayish brown, decomposed, moderately soft, intensely fractured, Predominate fracture (foliation) N65W, 90 and random. (Silty Gravel).									PP = 2.0			
	3														
678.50	4		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, medium gray, moderately weathered, moderately hard, intensely fractured, Rock becomes difficult to excavate, breaks into pieces 3-10" in diameter.												
	5		Bottom of borehole at 5.0 ft bgs Essential Refusal at 5.0 ft.												
676.50	6		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
	7														
674.50	8														
	9														
672.50	10														
	11														
	12														

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 Auburn, CA 95603
 Phone: (530) 887-1494
 Fax: (530) 887-1495

REPORT TITLE BORING RECORD				HOLE ID T-10-102
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 1	

LOGGED BY PFF	BEGIN DATE 7-1-10	COMPLETION DATE 7-1-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID T-10-103
DRILLING CONTRACTOR Monte Rickey Excavating			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION ~713.0 ft
DRILLING METHOD Backhoe			DRILL RIG CAT 430D	BOREHOLE DIAMETER
SAMPLER TYPE(S) AND SIZE(S) (ID) bucket cuttings			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERI
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered	TOTAL DEPTH OF BORING 3.5 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		SANDY SILT with GRAVEL (ML); stiff, yellowish brown; dry.		D01											
	1		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, grayish brown, intensely weathered, moderately hard, intensely fractured, (Silty Gravel).													
711.00	2															
	3		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, grayish brown, moderately weathered, moderately hard, intensely fractured, Predominate fracture (foliation) N35W, 85 N, mostly random, breaks up to pieces 3-10" in diameter.													
709.00	4		Bottom of borehole at 3.5 ft bgs													
	5		Essential Refusal at 3.5 ft.													
	6		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.													
707.00	7															
	8															
705.00	9															
	10															
703.00	11															
	12															

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 Auburn, CA 95603
 Phone: (530) 887-1494
 Fax: (530) 887-1495

REPORT TITLE BORING RECORD				HOLE ID T-10-103
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE 8-26-10	SHEET 1 of 1	

**Logs T-10-104 and T-10-105 on LOTB for
Eastbound On-Ramp (Phase 2)**

LOGGED BY PFF	BEGIN DATE 7-1-10	COMPLETION DATE 7-1-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID T-10-106
DRILLING CONTRACTOR Monte Rickey Excavating			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION ~642.0 ft
DRILLING METHOD Backhoe			DRILL RIG CAT 430D	BOREHOLE DIAMETER
SAMPLER TYPE(S) AND SIZE(S) (ID) bucket cuttings			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERI
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered	TOTAL DEPTH OF BORING 5.0 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		Well-graded GRAVEL with SAND (GW); gray; dry; Rip-rap on surface..													
	1		SANDY SILT (ML); reddish brown; dry.													
640.00	2											PP = 3.0				
	3															
638.00	4		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, medium gray, moderately weathered, moderately hard, intensely fractured.													
	5		Bottom of borehole at 5.0 ft bgs Essential Refusal at 5.0 ft.													
636.00	6		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.													
	7															
634.00	8															
	9															
632.00	10															
	11															
	12															

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REPORT TITLE BORING RECORD				HOLE ID T-10-106
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 1	

LOGGED BY PFF	BEGIN DATE 7-1-10	COMPLETION DATE 7-1-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID T-10-107
DRILLING CONTRACTOR Monte Rickey Excavating			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION ~636.0 ft
DRILLING METHOD Backhoe			DRILL RIG CAT 430D	BOREHOLE DIAMETER
SAMPLER TYPE(S) AND SIZE(S) (ID) bucket cuttings			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERI
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered	TOTAL DEPTH OF BORING 3.0 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		GRAVELLY SILT (ML); stiff; reddish brown; dry.		D01			100							
	1		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, medium light gray, intensely to moderately weathered, moderately hard, intensely fractured, (Silty Gravel). Predominate fracture (foliation) N80W, 85-90 S, mostly random, breaks up to pieces 2-8" in diameter.												
634.00	2														
	3		Bottom of borehole at 3.0 ft bgs												
	4		Essential Refusal at 3.0 ft.												
632.00	5		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
	6														
630.00	7														
	8														
628.00	9														
	10														
626.00	11														
	12														

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 11521 Blocker Drive, Suite 110
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 Phone: (530) 887-1494
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REPORT TITLE BORING RECORD				HOLE ID T-10-107
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 1	

LOGGED BY PFF	BEGIN DATE 7-1-10	COMPLETION DATE 7-1-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID T-10-108
DRILLING CONTRACTOR Monte Rickey Excavating			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION ~680.5 ft
DRILLING METHOD Backhoe			DRILL RIG CAT 430D	BOREHOLE DIAMETER
SAMPLER TYPE(S) AND SIZE(S) (ID) bucket cuttings			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERI
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered	TOTAL DEPTH OF BORING 3.0 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		GRAVELLY SILT (ML); stiff; reddish brown; dry.		D01			100							
	1		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, brownish gray, very intensely weathered, very soft, intensely fractured, (Silty Gravel).												
678.50	2		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, medium gray, moderately weathered, moderately hard, moderately fractured, Predominate fracture (foliation) N35W, 75-80 N.												
	3		Bottom of borehole at 3.0 ft bgs												
676.50	4		Essential Refusal at 3.0 ft.												
	5		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
674.50	6														
	7														
672.50	8														
	9														
670.50	10														
	11														
	12														


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 Auburn, CA 95603
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 Fax: (530) 887-1495

REPORT TITLE BORING RECORD				HOLE ID T-10-108
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 1	

LOGGED BY PFF	BEGIN DATE 7-1-10	COMPLETION DATE 7-1-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID T-10-109
DRILLING CONTRACTOR Monte Rickey Excavating			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION ~670.5 ft
DRILLING METHOD Backhoe			DRILL RIG CAT 430D	BOREHOLE DIAMETER
SAMPLER TYPE(S) AND SIZE(S) (ID) bucket cuttings			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERI
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered	TOTAL DEPTH OF BORING 3.0 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		SANDY SILT (ML); stiff; reddish brown; dry.		D01			120				PP = 2.5			
668.50	2		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, light olive gray, intensely weathered, moderately hard, intensely fractured, Breaks up to pieces 4" in diameter.												
	3		Bottom of borehole at 3.0 ft bgs Essential Refusal at 3.0 ft. This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
666.50	4														
	5														
664.50	6														
	7														
662.50	8														
	9														
660.50	10														
	11														
	12														


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 Auburn, CA 95603
 Phone: (530) 887-1494
 Fax: (530) 887-1495

REPORT TITLE BORING RECORD				HOLE ID T-10-109
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 1	

LOGGED BY PFF	BEGIN DATE 7-1-10	COMPLETION DATE 7-1-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID T-10-110
DRILLING CONTRACTOR Monte Rickey Excavating			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION ~661.6 ft
DRILLING METHOD Backhoe			DRILL RIG CAT 430D	BOREHOLE DIAMETER
SAMPLER TYPE(S) AND SIZE(S) (ID) bucket cuttings			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERI
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered	TOTAL DEPTH OF BORING 3.0 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		SANDY SILT (ML); stiff; reddish brown; dry.												
	1														
659.60	2		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, medium gray, moderately weathered, moderately hard, intensely fractured, Predominate fracture N25-35E, 70-85 S, breaks up to pieces 2-6" in diameter.												
	3		Bottom of borehole at 3.0 ft bgs Essential Refusal at 3.0 ft.												
657.60	4		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
	5														
655.60	6														
	7														
653.60	8														
	9														
651.60	10														
	11														
	12														

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 Auburn, CA 95603
 Phone: (530) 887-1494
 Fax: (530) 887-1495

REPORT TITLE BORING RECORD				HOLE ID T-10-110
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 1	

LOGGED BY PFF	BEGIN DATE 7-1-10	COMPLETION DATE 7-1-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID T-10-111
DRILLING CONTRACTOR Monte Rickey Excavating			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION ~665.1 ft
DRILLING METHOD Backhoe			DRILL RIG CAT 430D	BOREHOLE DIAMETER
SAMPLER TYPE(S) AND SIZE(S) (ID) bucket cuttings			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERI
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered	TOTAL DEPTH OF BORING 4.0 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		Poorly graded GRAVEL with SAND (GP); loose; grayish brown; dry; (fill).												
	1														
663.10	2		SANDY SILT (ML); stiff; reddish brown; moist.												
	3		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, olive gray, moderately weathered, moderately hard to hard, moderately fractured.												
661.10	4		Bottom of borehole at 4.0 ft bgs Essential Refusal at 4.0 ft.												
	5		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
659.10	6														
	7														
657.10	8														
	9														
655.10	10														
	11														
	12														

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REPORT TITLE BORING RECORD				HOLE ID T-10-111
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 1	

LOGGED BY PFF	BEGIN DATE 7-1-10	COMPLETION DATE 7-1-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID T-10-112
DRILLING CONTRACTOR Monte Rickey Excavating			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION ~792.0 ft
DRILLING METHOD Backhoe			DRILL RIG CAT 430D	BOREHOLE DIAMETER
SAMPLER TYPE(S) AND SIZE(S) (ID) bucket cuttings			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERI
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered	TOTAL DEPTH OF BORING 3.0 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	0		SANDY SILT with GRAVEL (ML); stiff; reddish brown; dry.		D01			100				PP = 2.5			
	1		Fat CLAY (CH); stiff; greenish gray; moist.												
790.00	2		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, olive gray, moderately to slightly weathered, moderately hard to hard, intensely fractured, Predominate fracture (foliation) N30W, 85 S.									PP = 1.0			
	3		Bottom of borehole at 3.0 ft bgs												
	4		Essential Refusal at 3.0 ft.												
788.00	4		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
	5														
786.00	6														
	7														
784.00	8														
	9														
782.00	10														
	11														
	12														

5 BR - STANDARD LOGS.GPJ BCI 2010 LOG.GLB 3/15/12



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 Auburn, CA 95603
 Phone: (530) 887-1494
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REPORT TITLE BORING RECORD				HOLE ID T-10-112
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 1	

LOGGED BY PFF	BEGIN DATE 7-1-10	COMPLETION DATE 7-1-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID T-10-113
DRILLING CONTRACTOR Monte Rickey Excavating			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION ~725.0 ft
DRILLING METHOD Backhoe			DRILL RIG CAT 430D	BOREHOLE DIAMETER
SAMPLER TYPE(S) AND SIZE(S) (ID) bucket cuttings			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERI
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered	TOTAL DEPTH OF BORING 2.0 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		SILTY GRAVEL (GM); loose; reddish brown; dry; with cobbles..												
	1		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, grayish blue, moderately to slightly weathered, moderately hard to hard, intensely fractured, Predominate fracture (foliation) N35W, 85 N.												
723.00	2		Bottom of borehole at 2.0 ft bgs Essential Refusal at 2.0 ft.												
	3		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
721.00	4														
	5														
719.00	6														
	7														
717.00	8														
	9														
715.00	10														
	11														
	12														

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 Fax: (530) 887-1495

REPORT TITLE BORING RECORD				HOLE ID T-10-113
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 1	

LOGGED BY PFF	BEGIN DATE 7-2-10	COMPLETION DATE 7-2-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID T-10-114
DRILLING CONTRACTOR Monte Rickey Excavating			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION ~757.5 ft
DRILLING METHOD Backhoe			DRILL RIG CAT 430D	BOREHOLE DIAMETER
SAMPLER TYPE(S) AND SIZE(S) (ID) bucket cuttings			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERI
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered	TOTAL DEPTH OF BORING 2.8 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		SANDY SILT (ML); stiff; reddish brown; dry.		D01			100							PA, PI
	1		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, grayish brown, decomposed, soft, intensely fractured, (Sandy Clay), with clay lenses 4-6" thick.												
755.50	2		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, medium gray, intensely to moderately weathered, moderately hard, intensely fractured, Predominate fracture (foliation) N35W, 80-85N and random..												
	3		Bottom of borehole at 2.8 ft bgs Essential Refusal at 2.8 ft.												
753.50	4		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
	5														
751.50	6														
	7														
749.50	8														
	9														
747.50	10														
	11														
	12														

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REPORT TITLE BORING RECORD				HOLE ID T-10-114
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 1	

LOGGED BY PFF	BEGIN DATE 7-2-10	COMPLETION DATE 7-2-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID T-10-115
DRILLING CONTRACTOR Monte Rickey Excavating			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION ~758.0 ft
DRILLING METHOD Backhoe			DRILL RIG CAT 430D	BOREHOLE DIAMETER
SAMPLER TYPE(S) AND SIZE(S) (ID) bucket cuttings			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERI
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered	TOTAL DEPTH OF BORING 5.0 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			SANDY SILT (ML); very stiff; reddish brown; dry.												
1				D01				100							
2	756.00		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, light gray, intensely weathered, moderately soft, intensely fractured, (Silty Gravel).	S02				100		9	98	PP = 3.0			
3															
4	754.00		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, grayish brown, moderately weathered, moderately hard to hard, intensely fractured, Predominate fracture (foliation) N30W, 90.												
5			Bottom of borehole at 5.0 ft bgs Essential Refusal at 5.0 ft. This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
6	752.00														
7															
8	750.00														
9															
10	748.00														
11															
12															


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REPORT TITLE BORING RECORD				HOLE ID T-10-115
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 1	

LOGGED BY PFF	BEGIN DATE 7-2-10	COMPLETION DATE 7-2-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID T-10-116
DRILLING CONTRACTOR Monte Rickey Excavating			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION ~723.5 ft
DRILLING METHOD Backhoe			DRILL RIG CAT 430D	BOREHOLE DIAMETER
SAMPLER TYPE(S) AND SIZE(S) (ID) bucket cuttings			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERI
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered	TOTAL DEPTH OF BORING 2.5 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		SILTY GRAVEL (GM); loose; reddish brown; dry.												
	1														
721.50	2		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, grayish green, moderately weathered, hard, moderately fractured, Rock breaks out in 3-8" pieces.												
	3		Bottom of borehole at 2.5 ft bgs Essential Refusal at 2.5 ft.												
719.50	4		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
	5														
717.50	6														
	7														
715.50	8														
	9														
713.50	10														
	11														
	12														

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 Auburn, CA 95603
 Phone: (530) 887-1494
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REPORT TITLE BORING RECORD				HOLE ID T-10-116
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 1	

**Log T-10-117 on LOTB for
Westbound Off-Ramp**

LOGGED BY PFF	BEGIN DATE 7-2-10	COMPLETION DATE 7-2-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID T-10-118
DRILLING CONTRACTOR Monte Rickey Excavating			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION ~755.0 ft
DRILLING METHOD Backhoe			DRILL RIG CAT 430D	BOREHOLE DIAMETER
SAMPLER TYPE(S) AND SIZE(S) (ID) bucket cuttings			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERI
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered	TOTAL DEPTH OF BORING 6.0 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	0		SANDY SILT with GRAVEL (ML); stiff, reddish brown; dry.												
753.00	2		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, pale reddish brown, intensely to moderately weathered, moderately hard, intensely fractured, Predominant fractures (foliation) N45W, 90 (Silty Gravel).												
751.00	4		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, grayish brown, moderately weathered, hard, intensely to moderately fractured, Breaks up to pieces 2-8" in diameter, some up to 16" in length.												
749.00	6		Bottom of borehole at 6.0 ft bgs Essential Refusal at 6.0 ft.												
747.00	8		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
745.00	10														
	11														
	12														

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REPORT TITLE BORING RECORD				HOLE ID T-10-118
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 1	

LOGGED BY PFF	BEGIN DATE 7-2-10	COMPLETION DATE 7-2-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID T-10-119
DRILLING CONTRACTOR Monte Rickey Excavating			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION ~762.6 ft
DRILLING METHOD Backhoe			DRILL RIG CAT 430D	BOREHOLE DIAMETER
SAMPLER TYPE(S) AND SIZE(S) (ID) bucket cuttings			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERI
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered	TOTAL DEPTH OF BORING 2.8 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		SANDY SILT with GRAVEL (ML); stiff, reddish brown; dry.		D01			100							
	1		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, moderate reddish brown, intensely weathered, moderately hard, intensely fractured, (Silty Gravel).												
760.60	2		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, medium gray, moderately weathered, hard, intensely fractured, Predominate fractures (foliation) at N30W, 80-85 N.												
	3		Bottom of borehole at 2.8 ft bgs Essential Refusal at 2.8 ft.												
758.60	4		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
	5														
756.60	6														
	7														
754.60	8														
	9														
752.60	10														
	11														
	12														

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 11521 Blocker Drive, Suite 110
 Auburn, CA 95603
 Phone: (530) 887-1494
 Fax: (530) 887-1495

REPORT TITLE BORING RECORD				HOLE ID T-10-119
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 1	

LOGGED BY PFF	BEGIN DATE 7-2-10	COMPLETION DATE 7-2-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID T-10-120
DRILLING CONTRACTOR Monte Rickey Excavating			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION ~730.3 ft
DRILLING METHOD Backhoe			DRILL RIG CAT 430D	BOREHOLE DIAMETER
SAMPLER TYPE(S) AND SIZE(S) (ID) bucket cuttings			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERI
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered	TOTAL DEPTH OF BORING 6.5 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	0		SANDY SILTY CLAY (CL-ML); stiff to very stiff; brown; dry.												
	1				D01			100				PP = 2.0			
728.30	2											PP = 1.0			
	3														
	4		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, light olive gray, intensely to moderately weathered, soft to moderately soft, intensely fractured, (Clayey Gravel).												
726.30	4		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, light olive brown, decomposed, soft to moderately soft, intensely fractured, (Clayey Silt).		D02			100				PP = 3.0			
	5														
724.30	6														
	7		Bottom of borehole at 6.5 ft bgs Essential Refusal at 6.5 ft.												
	8		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
722.30	8														
	9														
	10														
720.30	10														
	11														
	12														

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 Auburn, CA 95603
 Phone: (530) 887-1494
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REPORT TITLE BORING RECORD				HOLE ID T-10-120
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 1	

LOGGED BY PFF	BEGIN DATE 7-2-10	COMPLETION DATE 7-2-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID T-10-121
DRILLING CONTRACTOR Monte Rickey Excavating			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION ~784.0 ft
DRILLING METHOD Backhoe			DRILL RIG CAT 430D	BOREHOLE DIAMETER
SAMPLER TYPE(S) AND SIZE(S) (ID) bucket cuttings			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERI
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered	TOTAL DEPTH OF BORING 6.5 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	0		SANDY SILT (ML); stiff, reddish brown; dry.												
	1				D01			100							PA
					S02			100		14	89				
782.00	2		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, olive gray, intensely weathered, moderately soft to moderately hard, intensely fractured.												
	3														
780.00	4														
	5														
778.00	6		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, olive gray, moderately weathered, hard, intensely fractured, Predominate fractures (foliation) N30W, 90.												
	7		Bottom of borehole at 6.5 ft bgs Essential Refusal at 6.5 ft.												
776.00	8		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
	9														
774.00	10														
	11														
	12														

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 Auburn, CA 95603
 Phone: (530) 887-1494
 Fax: (530) 887-1495

REPORT TITLE BORING RECORD				HOLE ID T-10-121
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 1	

LOGGED BY PFF	BEGIN DATE 7-2-10	COMPLETION DATE 7-2-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID T-10-122
DRILLING CONTRACTOR Monte Rickey Excavating			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION ~788.0 ft
DRILLING METHOD Backhoe			DRILL RIG CAT 430D	BOREHOLE DIAMETER
SAMPLER TYPE(S) AND SIZE(S) (ID) bucket cuttings			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERI
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered	TOTAL DEPTH OF BORING 4.5 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		SANDY SILT (ML); stiff, reddish brown; dry.		D01			100							
	1		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, light gray, intensely to moderately weathered, moderately hard to hard, intensely fractured.												
786.00	2														
	3														
784.00	4		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, olive gray, moderately weathered, hard, intensely fractured, Breaks into 2-8" pieces, up to 16" in length.												
	5		Bottom of borehole at 4.5 ft bgs Essential Refusal at 4.5 ft.												
782.00	6		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
	7														
780.00	8														
	9														
778.00	10														
	11														
	12														

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 Auburn, CA 95603
 Phone: (530) 887-1494
 Fax: (530) 887-1495

REPORT TITLE BORING RECORD				HOLE ID T-10-122
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 1	

LOGGED BY PFF	BEGIN DATE 7-2-10	COMPLETION DATE 7-2-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID T-10-123
DRILLING CONTRACTOR Monte Rickey Excavating			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION ~736.0 ft
DRILLING METHOD Backhoe			DRILL RIG CAT 430D	BOREHOLE DIAMETER
SAMPLER TYPE(S) AND SIZE(S) (ID) bucket cuttings			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERI
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered	TOTAL DEPTH OF BORING 5.5 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	0		SANDY SILT with GRAVEL (ML); very stiff to hard; reddish brown; dry.												
1	1				D01			100				PP = 4.0			
734.00	2		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, grayish green, intensely to moderately weathered, moderately hard, intensely fractured, Breaks into pieces 2-6". Becomes hard at 5 feet.												
732.00	4														
730.00	6		Bottom of borehole at 5.5 ft bgs Essential Refusal at 5.5 ft. This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
728.00	8														
726.00	10														
	11														
	12														

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 11521 Blocker Drive, Suite 110
 Auburn, CA 95603
 Phone: (530) 887-1494
 Fax: (530) 887-1495

REPORT TITLE BORING RECORD				HOLE ID T-10-123
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 1	

LOGGED BY PFF	BEGIN DATE 7-2-10	COMPLETION DATE 7-2-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID T-10-124
DRILLING CONTRACTOR Monte Rickey Excavating			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION ~722.0 ft
DRILLING METHOD Backhoe			DRILL RIG CAT 430D	BOREHOLE DIAMETER
SAMPLER TYPE(S) AND SIZE(S) (ID) bucket cuttings			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERI
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered	TOTAL DEPTH OF BORING 4.0 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		SANDY SILT with GRAVEL (ML); stiff, reddish brown; dry.												
	1		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, light gray, intensely to moderately weathered, moderately hard, moderately fractured.												
720.00	2														
	3		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, light gray, moderately weathered, hard, moderately fractured.												
718.00	4		Bottom of borehole at 4.0 ft bgs Essential Refusal at 4.0 ft. This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
	5														
716.00	6														
	7														
	8														
714.00	9														
	10														
712.00	11														
	12														

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 11521 Blocker Drive, Suite 110
 Auburn, CA 95603
 Phone: (530) 887-1494
 Fax: (530) 887-1495

REPORT TITLE BORING RECORD				HOLE ID T-10-124
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 1	

LOGGED BY RCP	BEGIN DATE 9-21-10	COMPLETION DATE 9-21-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID A-10-125
DRILLING CONTRACTOR Taber Drilling			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION ~774.0 ft
DRILLING METHOD Solid-Stem Auger			DRILL RIG CME 55	BOREHOLE DIAMETER 6 in
SAMPLER TYPE(S) AND SIZE(S) (ID) split spoon			SPT HAMMER TYPE Automatic	HAMMER EFFICIENCY, ERI 80%
BOREHOLE BACKFILL AND COMPLETION Backfilled with native cuttings			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered	TOTAL DEPTH OF BORING 3.0 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			Poorly graded GRAVEL (GP); dense; yellowish brown; dry.												
	1				D02			100							
					S01	20	44	100							
						20									
772.00	2					24									
	3		Bottom of borehole at 3.0 ft bgs												
			Essential refusal at 3.0 ft.												
770.00	4		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
	5														
768.00	6														
	7														
766.00	8														
	9														
764.00	10														
	11														
	12														

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 Auburn, CA 95603
 Phone: (530) 887-1494
 Fax: (530) 887-1495

REPORT TITLE BORING RECORD				HOLE ID A-10-125
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 1	

LOGGED BY RCP	BEGIN DATE 7-12-10	COMPLETION DATE 7-12-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID R-10-126
DRILLING CONTRACTOR PC Exploration	BOREHOLE LOCATION (Offset, Station, Line)			SURFACE ELEVATION ~739.0 ft
DRILLING METHOD Solid-Stem Auger	DRILL RIG CME75			BOREHOLE DIAMETER 4 in
SAMPLER TYPE(S) AND SIZE(S) (ID) split spoon	SPT HAMMER TYPE Automatic			HAMMER EFFICIENCY, ERI 80%
BOREHOLE BACKFILL AND COMPLETION Grout backfilled 7/13/10	GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered			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	0		SANDY SILT (ML); hard; reddish brown; dry.		S01	6	33	100				PP = >4.5			
1	1		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, dusky yellowish brown, very intensely weathered, soft to moderately soft, very intensely to intensely fractured, (Silty Gravel).			11									
2	2					22									
737.00	3														
735.00	4														
5	5				S02	11	47	100							
6	6					15									
733.00	7					32									
8	8														
731.00	9														
10	10				S03	16	76	100							
729.00	11					26									
	12					50									
					Run 1			100	0						

(continued)

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REPORT TITLE BORING RECORD				HOLE ID R-10-126
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 3	

5 BR - STANDARD LOGS.GPJ BCI 2010 LOG.GLB 3/15/12


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
725.00	12		METAMORPHIC ROCK (continued).	Run 1				100	0						
	13			Run 2				75	0						
723.00	15		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, dark greenish gray, moderately to slightly weathered, hard, intensely to moderately fractured.	Run 3				90	0						
719.00	20			Run 4				100	58						
715.00	25			Run 5				100	80						

(continued)



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REPORT TITLE BORING RECORD				HOLE ID R-10-126	
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901	
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange					
BRIDGE NUMBER		PREPARED BY RCP		DATE	SHEET 2 of 3

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
711.00	27		METAMORPHIC ROCK (continued).	Run 5				100	80						
709.00	30		Bottom of borehole at 30.0 ft bgs Terminated at 30 ft.												
707.00	32		<p>This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.</p>												
705.00	34														
703.00	36														
701.00	38														
699.00	40														



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REPORT TITLE BORING RECORD				HOLE ID R-10-126	
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901	
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange					
BRIDGE NUMBER		PREPARED BY RCP		DATE	SHEET 3 of 3

LOGGED BY RCP	BEGIN DATE 7-14-10	COMPLETION DATE 7-14-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID A-10-127
DRILLING CONTRACTOR PC Exploration	BOREHOLE LOCATION (Offset, Station, Line)		SURFACE ELEVATION ~754.8 ft	
DRILLING METHOD Solid-Stem Auger	DRILL RIG CME 75		BOREHOLE DIAMETER 6 in	
SAMPLER TYPE(S) AND SIZE(S) (ID) split spoon	SPT HAMMER TYPE Automatic		HAMMER EFFICIENCY, ERI 80%	
BOREHOLE BACKFILL AND COMPLETION Backfilled with native cuttings	GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered		TOTAL DEPTH OF BORING 5.7 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			SILTY GRAVEL (GM); dense; light olive brown; dry.		S01	13	71	100							
					D02	38		100							
						33				7	122				
752.80	2														
	3														
750.80	4		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, moderate yellowish brown, very intensely weathered, soft, intensely fractured, (Silty Gravel).												
	5				S03	40	50/2	100							
						50/2"									
748.80	6		Bottom of borehole at 5.7 ft bgs Terminated at 5.6 ft.												
	7		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
746.80	8														
	9														
744.80	10														
	11														
	12														




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REPORT TITLE BORING RECORD				HOLE ID A-10-127
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 1	

LOGGED BY RCP	BEGIN DATE 7-14-10	COMPLETION DATE 7-14-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID A-10-128
DRILLING CONTRACTOR PC Exploration			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION ~723.0 ft
DRILLING METHOD Solid-Stem Auger			DRILL RIG CME 75	BOREHOLE DIAMETER 6 in
SAMPLER TYPE(S) AND SIZE(S) (ID) split spoon			SPT HAMMER TYPE Automatic	HAMMER EFFICIENCY, ERI 80%
BOREHOLE BACKFILL AND COMPLETION Backfilled with native cuttings			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered	TOTAL DEPTH OF BORING 2.7 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			ASPHALT.												
	1		Well-graded GRAVEL (GW); (AB); METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, grayish green, moderately to slightly weathered, hard, intensely fractured.	S01	22	50/5	100			10	107				
721.00	2														
	3		Bottom of borehole at 2.7 ft bgs	S02	50/0"										
	4		Essential refusal at 2.7 ft. This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
719.00	5														
	6														
717.00	7														
	8														
715.00	9														
	10														
713.00	11														
	12														

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 Phone: (530) 887-1494
 Fax: (530) 887-1495

REPORT TITLE BORING RECORD				HOLE ID A-10-128
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 1	

LOGGED BY RCP	BEGIN DATE 7-14-10	COMPLETION DATE 7-14-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID A-10-129
DRILLING CONTRACTOR PC Exploration	BOREHOLE LOCATION (Offset, Station, Line)			SURFACE ELEVATION ~736.5 ft
DRILLING METHOD Solid-Stem Auger	DRILL RIG CME 75			BOREHOLE DIAMETER 6 in
SAMPLER TYPE(S) AND SIZE(S) (ID) split spoon	SPT HAMMER TYPE Automatic			HAMMER EFFICIENCY, ERI 80%
BOREHOLE BACKFILL AND COMPLETION Backfilled with native cuttings	GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered			TOTAL DEPTH OF BORING 5.1 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	0		SANDY SILT (ML); stiff, reddish brown; dry.		S01	7	40	100							
	1				D02	14		100							
	2		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, moderate yellowish brown, intensely weathered, soft, intensely fractured, (Silty Gravel)..			26									
734.50	2														
	3														
732.50	4														
	5														
	5		Bottom of borehole at 5.1 ft bgs		S03	50/1"	REF	100							
	6		Terminated at 5.1 ft.												
730.50	6		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
	7														
	8														
728.50	8														
	9														
	10														
726.50	10														
	11														
	12														

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 11521 Blocker Drive, Suite 110
 Auburn, CA 95603
 Phone: (530) 887-1494
 Fax: (530) 887-1495

REPORT TITLE BORING RECORD				HOLE ID A-10-129
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 1	

LOGGED BY RCP	BEGIN DATE 7-14-10	COMPLETION DATE 7-14-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID A-10-130
DRILLING CONTRACTOR PC Exploration	BOREHOLE LOCATION (Offset, Station, Line)		SURFACE ELEVATION ~712.0 ft	
DRILLING METHOD Solid-Stem Auger	DRILL RIG CME 75		BOREHOLE DIAMETER 6 in	
SAMPLER TYPE(S) AND SIZE(S) (ID) split spoon	SPT HAMMER TYPE Automatic		HAMMER EFFICIENCY, ERI 80%	
BOREHOLE BACKFILL AND COMPLETION Backfilled with native cuttings	GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered		TOTAL DEPTH OF BORING 6.3 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			SANDY SILT (ML); stiff, olive gray; dry.												
1			METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, dusky yellow, decomposed, soft, very intensely fractured, (Silty Gravel).												
710.00	2				S01	16	46	100							
						19									
						27									
708.00	4														
	5														
706.00	6				S02	18	86/9	100							
						36									
						50/3"									
	7		Bottom of borehole at 6.3 ft bgs Terminated at 6.23 ft.												
704.00	8		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
	9														
702.00	10														
	11														
	12														

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 Auburn, CA 95603
 Phone: (530) 887-1494
 Fax: (530) 887-1495

REPORT TITLE BORING RECORD				HOLE ID A-10-130
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 1	

LOGGED BY RCP	BEGIN DATE 7-19-10	COMPLETION DATE 7-19-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID A-10-131
DRILLING CONTRACTOR PC Exploration			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION ~687.5 ft
DRILLING METHOD Solid-Stem Auger			DRILL RIG CME 75	BOREHOLE DIAMETER 6 in
SAMPLER TYPE(S) AND SIZE(S) (ID) split spoon			SPT HAMMER TYPE Automatic	HAMMER EFFICIENCY, ERI 80%
BOREHOLE BACKFILL AND COMPLETION Backfilled with native cuttings			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered	TOTAL DEPTH OF BORING 2.0 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		SILTY GRAVEL (GM); dense; olive brown; dry; with cobbles and boulders.												
	1														
685.50	2		Bottom of borehole at 2.0 ft bgs Essential refusal at 2.0 ft.												
	3		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
683.50	4														
	5														
681.50	6														
	7														
679.50	8														
	9														
677.50	10														
	11														
	12														

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 Phone: (530) 887-1494
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REPORT TITLE BORING RECORD				HOLE ID A-10-131	
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901	
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange					
BRIDGE NUMBER		PREPARED BY RCP		DATE	SHEET 1 of 1

LOGGED BY RCP	BEGIN DATE 7-19-10	COMPLETION DATE 7-19-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID A-10-132
DRILLING CONTRACTOR PC Exploration			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION ~693.5 ft
DRILLING METHOD Solid-Stem Auger			DRILL RIG CME 75	BOREHOLE DIAMETER 6 in
SAMPLER TYPE(S) AND SIZE(S) (ID) split spoon			SPT HAMMER TYPE Automatic	HAMMER EFFICIENCY, ERI 80%
BOREHOLE BACKFILL AND COMPLETION Backfilled with native cuttings			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered	TOTAL DEPTH OF BORING 3.0 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		ASPHALT.												
	1		SILTY GRAVEL with SAND (GM); dense; yellowish brown; dry.		S01	6	54	100							
	2		SILTY GRAVEL (GM); dense; yellowish brown; dry; with cobbles.			32									
691.50	2					22									
	3		Bottom of borehole at 3.0 ft bgs												
	4		Essential refusal at 3.0 ft.												
689.50	4		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
	5														
687.50	6														
	7														
685.50	8														
	9														
683.50	10														
	11														
	12														

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 Phone: (530) 887-1494
 Fax: (530) 887-1495

REPORT TITLE BORING RECORD				HOLE ID A-10-132
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 1	

LOGGED BY RCP	BEGIN DATE 7-20-10	COMPLETION DATE 7-20-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID A-10-133
DRILLING CONTRACTOR PC Exploration	BOREHOLE LOCATION (Offset, Station, Line)		SURFACE ELEVATION ~640.2 ft	
DRILLING METHOD Solid-Stem Auger	DRILL RIG CME 75		BOREHOLE DIAMETER 6 in	
SAMPLER TYPE(S) AND SIZE(S) (ID) split spoon	SPT HAMMER TYPE Automatic		HAMMER EFFICIENCY, ERI 80%	
BOREHOLE BACKFILL AND COMPLETION Backfilled with native cuttings and concrete	GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered		TOTAL DEPTH OF BORING 6.5 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		ASPHALT.												
	1		Poorly graded GRAVEL with SILT and SAND (GP-GM); dense; olive brown; dry.		D02			100							
	2				S01	33	92/11	100							
638.20	2					42									
	3					50/5"				6	138				
	4		SANDY SILT (ML); stiff; reddish brown; dry.												
636.20	4														
	5				S03	16	41	100							
	6		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, dusky yellowish brown, very intensely weathered, soft, very intensely fractured, (Silty Gravel).			9									
634.20	6					32									
	7		Bottom of borehole at 6.5 ft bgs												
	8		Terminated at 6.5 ft.												
	9		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
632.20	8														
	10														
630.20	10														
	11														
	12														

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 Auburn, CA 95603
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REPORT TITLE BORING RECORD				HOLE ID A-10-133
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 1	

LOGGED BY RCP	BEGIN DATE 7-20-10	COMPLETION DATE 7-20-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID A-10-134
DRILLING CONTRACTOR PC Exploration	BOREHOLE LOCATION (Offset, Station, Line)		SURFACE ELEVATION ~647.0 ft	
DRILLING METHOD Solid-Stem Auger	DRILL RIG CME 75		BOREHOLE DIAMETER 6 in	
SAMPLER TYPE(S) AND SIZE(S) (ID) split spoon	SPT HAMMER TYPE Automatic		HAMMER EFFICIENCY, ERI 80%	
BOREHOLE BACKFILL AND COMPLETION Backfilled with native cuttings	GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered		TOTAL DEPTH OF BORING 1.0 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	0		Well-graded GRAVEL (GW); dense; yellowish brown; dry.												
1	1		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, grayish green, fresh, very hard, intensely fractured. Bottom of borehole at 1.0 ft bgs												
645.00	2		Essential refusal at 1.0 ft. This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
643.00	4														
641.00	6														
639.00	8														
637.00	10														
	11														
	12														

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Blackburn Consulting
 11521 Blocker Drive, Suite 110
 Auburn, CA 95603
 Phone: (530) 887-1494
 Fax: (530) 887-1495

REPORT TITLE BORING RECORD				HOLE ID A-10-134	
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901	
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange					
BRIDGE NUMBER		PREPARED BY RCP		DATE	SHEET 1 of 1

LOGGED BY RCP	BEGIN DATE 7-20-10	COMPLETION DATE 7-20-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID A-10-135
DRILLING CONTRACTOR PC Exploration			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION ~656.5 ft
DRILLING METHOD Solid-Stem Auger			DRILL RIG CME 75	BOREHOLE DIAMETER 6 in
SAMPLER TYPE(S) AND SIZE(S) (ID) split spoon			SPT HAMMER TYPE Automatic	HAMMER EFFICIENCY, ERI 80%
BOREHOLE BACKFILL AND COMPLETION Backfilled with native cuttings and concrete			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered	TOTAL DEPTH OF BORING 2.5 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		ASPHALT.												
	1		Poorly graded GRAVEL (GP); dense; olive brown; dry.												
	2		Poorly graded GRAVEL (GP); very dense; olive brown; dry; with cobbles.		S01	16	50/3	100							
654.50	2					50/3"									
	3		Bottom of borehole at 2.5 ft bgs Essential refusal at 2.5 ft.												
652.50	4		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
	5														
650.50	6														
	7														
648.50	8														
	9														
646.50	10														
	11														
	12														

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 Auburn, CA 95603
 Phone: (530) 887-1494
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REPORT TITLE BORING RECORD				HOLE ID A-10-135
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 1	

LOGGED BY RCP	BEGIN DATE 7-20-10	COMPLETION DATE 7-20-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID A-10-136
DRILLING CONTRACTOR PC Exploration			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION ~736.0 ft
DRILLING METHOD Solid-Stem Auger			DRILL RIG CME 75	BOREHOLE DIAMETER 6 in
SAMPLER TYPE(S) AND SIZE(S) (ID) split spoon			SPT HAMMER TYPE Automatic	HAMMER EFFICIENCY, ERI 80%
BOREHOLE BACKFILL AND COMPLETION Backfilled with native cuttings and concrete			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered	TOTAL DEPTH OF BORING 6.3 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		ASPHALT.												
	1		Poorly graded GRAVEL (GP); dense; yellowish brown; dry.		S01	19	51	100							
	2		SILTY GRAVEL (GM); dense; brown; dry to moist; (fill).			32									
734.00	2				D02	19		100		5	122				
	3		SILTY GRAVEL (GM); dense; reddish brown; dry.												
732.00	4														
	5				S03	5	80/9	100							
730.00	6		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, dusky yellowish brown, very intensely weathered, soft, intensely fractured, (Silty Gravel).			30									
	7		Bottom of borehole at 6.3 ft bgs Terminated at 6.3 ft.												
	8		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
728.00	9														
	10														
726.00	11														
	12														

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REPORT TITLE BORING RECORD				HOLE ID A-10-136
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 1	

LOGGED BY RCP	BEGIN DATE 7-20-10	COMPLETION DATE 7-20-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID A-10-137
DRILLING CONTRACTOR PC Exploration	BOREHOLE LOCATION (Offset, Station, Line)			SURFACE ELEVATION ~757.5 ft
DRILLING METHOD Solid-Stem Auger	DRILL RIG CME 75			BOREHOLE DIAMETER 6 in
SAMPLER TYPE(S) AND SIZE(S) (ID) split spoon	SPT HAMMER TYPE Automatic			HAMMER EFFICIENCY, ERI 80%
BOREHOLE BACKFILL AND COMPLETION Backfilled with native cuttings and concrete	GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered			TOTAL DEPTH OF BORING 6.5 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	0		ASPHALT.												
	1		Poorly graded GRAVEL (GP); dense; yellowish brown; dry.		S01	18	65	100							
	2		SILTY GRAVEL (GM); dense; brown; dry.			33									
755.50	2					32				19	114				
	3		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, dusky yellowish brown, very intensely weathered, soft, very intensely fractured, (Silty Gravel).		D02			100							
	4														
753.50	4														
	5				S02	5	41	100							
	6					18									
751.50	6					23									
	7		Bottom of borehole at 6.5 ft bgs Terminated at 6.5 ft.												
	8		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
749.50	8														
	9														
	10														
747.50	10														
	11														
	12														

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REPORT TITLE BORING RECORD				HOLE ID A-10-137
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 1	

LOGGED BY RCP	BEGIN DATE 7-20-10	COMPLETION DATE 7-20-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID A-10-138
DRILLING CONTRACTOR PC Exploration			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION ~697.0 ft
DRILLING METHOD Solid-Stem Auger			DRILL RIG CME 75	BOREHOLE DIAMETER 6 in
SAMPLER TYPE(S) AND SIZE(S) (ID) split spoon			SPT HAMMER TYPE Automatic	HAMMER EFFICIENCY, ERI 80%
BOREHOLE BACKFILL AND COMPLETION Backfilled with native cuttings			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered	TOTAL DEPTH OF BORING 6.5 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		Poorly graded GRAVEL (GP); dense; yellowish brown; dry.												
	1		SILTY GRAVEL (GM); dense; olive brown; dry to moist.		S01	8	42	100							
695.00	2					13									
	3					29				9	122				
693.00	4														
	5		SANDY SILT (ML); stiff; reddish brown; moist.		S02	10	26	100							
	6		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, dusky yellowish brown, very intensely weathered, soft, very intensely to intensely fractured, (Silty Sand with Gravel).			11									
691.00	6					15									
	7		Bottom of borehole at 6.5 ft bgs												
	8		Terminated at 6.5 ft.												
689.00	8		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
	9														
687.00	10														
	11														
	12														

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 Auburn, CA 95603
 Phone: (530) 887-1494
 Fax: (530) 887-1495

REPORT TITLE BORING RECORD				HOLE ID A-10-138
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 1	

LOGGED BY RCP	BEGIN DATE 7-20-10	COMPLETION DATE 7-20-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID A-10-139
DRILLING CONTRACTOR PC Exploration	BOREHOLE LOCATION (Offset, Station, Line)			SURFACE ELEVATION ~693.5 ft
DRILLING METHOD Solid-Stem Auger	DRILL RIG CME 75			BOREHOLE DIAMETER 6 in
SAMPLER TYPE(S) AND SIZE(S) (ID) split spoon	SPT HAMMER TYPE Automatic			HAMMER EFFICIENCY, ERI 80%
BOREHOLE BACKFILL AND COMPLETION Backfilled with native cuttings and concrete	GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered			TOTAL DEPTH OF BORING 3.5 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		ASPHALT.												
	1		Poorly graded GRAVEL (GP); dense; dark yellowish brown; dry.												
	1		SILTY GRAVEL (GM); dense; olive brown; moist.	S01		32		100							
	2			D02		50		100		6	132				
691.50	2														
	3		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, grayish green, moderately weathered, moderately hard, intensely fractured.	S03	50/3"	REF		100							
	4		Bottom of borehole at 3.5 ft bgs												
689.50	4		Essential refusal at 3.5 ft.												
	5		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
	6														
687.50	6														
	7														
	8														
685.50	8														
	9														
	10														
683.50	10														
	11														
	12														

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 Auburn, CA 95603
 Phone: (530) 887-1494
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REPORT TITLE BORING RECORD				HOLE ID A-10-139
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 1	

LOGGED BY RCP	BEGIN DATE 7-20-10	COMPLETION DATE 7-20-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID A-10-140
DRILLING CONTRACTOR PC Exploration	BOREHOLE LOCATION (Offset, Station, Line)		SURFACE ELEVATION ~667.0 ft	
DRILLING METHOD Solid-Stem Auger	DRILL RIG CME 75		BOREHOLE DIAMETER 6 in	
SAMPLER TYPE(S) AND SIZE(S) (ID) split spoon	SPT HAMMER TYPE Automatic		HAMMER EFFICIENCY, ERI 80%	
BOREHOLE BACKFILL AND COMPLETION Backfilled with native cuttings	GROUNDWATER DURING DRILLING READINGS		AFTER DRILLING (DATE) not encountered	TOTAL DEPTH OF BORING 5.3 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			SILTY GRAVEL (GM); dense; yellowish brown; dry.												
	1			S01	18	55	100								
				D02	29		100								
665.00	2				26					7	2				
	3														
663.00	4														
	5			S02	32	50/3	100								
					50/3"										
			Bottom of borehole at 5.3 ft bgs												
661.00	6		Essential refusal at 5.3 ft.												
	7		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
	8														
659.00	9														
	10														
657.00	11														
	12														

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 11521 Blocker Drive, Suite 110
 Auburn, CA 95603
 Phone: (530) 887-1494
 Fax: (530) 887-1495

REPORT TITLE BORING RECORD				HOLE ID A-10-140	
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901	
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange					
BRIDGE NUMBER		PREPARED BY RCP		DATE	SHEET 1 of 1

LOGGED BY RCP	BEGIN DATE 8-23-10	COMPLETION DATE 8-23-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID R-10-141
DRILLING CONTRACTOR Taber Drilling	BOREHOLE LOCATION (Offset, Station, Line)		SURFACE ELEVATION ~736.0 ft	
DRILLING METHOD Rotary Wire-Line	DRILL RIG D120		BOREHOLE DIAMETER 4 in	
SAMPLER TYPE(S) AND SIZE(S) (ID) HQ Core	SPT HAMMER TYPE Automatic		HAMMER EFFICIENCY, ERI 80%	
BOREHOLE BACKFILL AND COMPLETION Grout backfilled 8/23/10	GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered		TOTAL DEPTH OF BORING 30.2 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	0		CLAYEY GRAVEL (GC); very dense; brown; dry.												
734.00	2			S01	21	77	100								
	3				27										
					50										
732.00	4		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, dusky yellowish brown, very intensely weathered, very soft to soft, very intensely to intensely fractured, (Clayey Gravel).												
730.00	6		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, grayish green, moderately to slightly weathered, hard to very hard, intensely to moderately fractured, no circulation below 11 ft.	Run 1				100	0						
728.00	8			Run 2				100	0						
	10			Run 3				100	0						
	11			Run 4				88	0						
	12														

(continued)

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REPORT TITLE BORING RECORD				HOLE ID R-10-141
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 3	

5 BR - STANDARD LOGS.GPJ BCI 2010 LOG.GLB 3/15/12

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	
	12		METAMORPHIC ROCK (continued).		Run 4			88	0							
	13															
722.00	14					Run 5			100	47						
	15															
720.00	16					Run 6			98	37						
	17															
718.00	18															
	19															
716.00	20															
	21															
714.00	22				Run 7			100	60		186					
	23															
712.00	24															
	25															
710.00	26				Run 8			100	161							

(continued)



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 11521 Blocker Drive, Suite 110
 Auburn, CA 95603
 Phone: (530) 887-1494
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REPORT TITLE BORING RECORD				HOLE ID R-10-141	
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901	
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange					
BRIDGE NUMBER		PREPARED BY RCP		DATE	SHEET 2 of 3

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	
708.00	27			Run 8				100	161							
706.00	28															
	29															
	30															
	31			Bottom of borehole at 30.2 ft bgs Terminated at 30.2 ft.												
	32			This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
	33															
	34															
	35															
	36															
	37															
	38															
	39															
	40															



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REPORT TITLE BORING RECORD				HOLE ID R-10-141	
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901	
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange					
BRIDGE NUMBER		PREPARED BY RCP		DATE	SHEET 3 of 3

LOGGED BY RCP	BEGIN DATE 8-23-10	COMPLETION DATE 8-23-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID A-10-142
DRILLING CONTRACTOR Taber Drilling			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION ~671.5 ft
DRILLING METHOD Solid-Stem Auger			DRILL RIG D120	BOREHOLE DIAMETER 6 in
SAMPLER TYPE(S) AND SIZE(S) (ID) split spoon			SPT HAMMER TYPE Automatic	HAMMER EFFICIENCY, ERI 80%
BOREHOLE BACKFILL AND COMPLETION Backfilled with native cuttings			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered	TOTAL DEPTH OF BORING 5.1 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		SANDY SILT (ML); stiff, brown; dry.		D03			100							
	1		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, dusky yellowish brown, very intensely weathered, very soft to soft, intensely fractured, (Silty Gravel).												
669.50	2				S01	50/6"	REF	100		5	118				
	3														
667.50	4														
	5				S02	50/1"	REF	100							
	6		Bottom of borehole at 5.1 ft bgs Terminated at 5.1 ft. This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
665.50	7														
	8														
663.50	9														
	10														
661.50	11														
	12														

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 Phone: (530) 887-1494
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REPORT TITLE BORING RECORD				HOLE ID A-10-142
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 1	

LOGGED BY RCP	BEGIN DATE 8-23-10	COMPLETION DATE 8-23-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID A-10-143
DRILLING CONTRACTOR Taber Drilling	BOREHOLE LOCATION (Offset, Station, Line)		SURFACE ELEVATION ~662.5 ft	
DRILLING METHOD Solid-Stem Auger	DRILL RIG D120		BOREHOLE DIAMETER 6 in	
SAMPLER TYPE(S) AND SIZE(S) (ID) split spoon	SPT HAMMER TYPE Automatic		HAMMER EFFICIENCY, ERI 80%	
BOREHOLE BACKFILL AND COMPLETION Backfilled with native cuttings	GROUNDWATER DURING DRILLING READINGS		AFTER DRILLING (DATE) not encountered	TOTAL DEPTH OF BORING 5.0 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	0		SILTY GRAVEL (GM); loose; brown; dry.												
	1		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, dusky yellowish brown, very intensely weathered, soft, intensely fractured.	S01 D03	50/4"	REF		100 100							
660.50	2			S02	50/1"	REF		0							
	3														
658.50	4														
	5		Bottom of borehole at 5.0 ft bgs Terminated at 5.0 ft.												
656.50	6		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
	7														
654.50	8														
	9														
652.50	10														
	11														
	12														

5 BR - STANDARD LOGS.GPJ BCI 2010 LOG.GLB 3/15/12



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 11521 Blocker Drive, Suite 110
 Auburn, CA 95603
 Phone: (530) 887-1494
 Fax: (530) 887-1495

REPORT TITLE BORING RECORD				HOLE ID A-10-143
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 1	

LOGGED BY RCP	BEGIN DATE 8-23-10	COMPLETION DATE 8-23-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID A-10-144
DRILLING CONTRACTOR Taber Drilling			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION ~636.0 ft
DRILLING METHOD Solid-Stem Auger			DRILL RIG D120	BOREHOLE DIAMETER 6 in
SAMPLER TYPE(S) AND SIZE(S) (ID) split spoon			SPT HAMMER TYPE Automatic	HAMMER EFFICIENCY, ERI 80%
BOREHOLE BACKFILL AND COMPLETION Backfilled with native cuttings			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered	TOTAL DEPTH OF BORING 6.5 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	0		SILTY SAND with GRAVEL (SM); medium dense; brown; dry.													
	1				D02				100							
	2				S01	19	27	100								
634.00						15										
	3					12					5	127				
	4															
632.00																
	5															
	6			S03	7	28	100									
630.00					11											
	7				17					13	128					
	8		Bottom of borehole at 6.5 ft bgs													
	9		Terminated at 6.5 ft.													
628.00			This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.													
	10															
626.00																
	11															
	12															

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 Auburn, CA 95603
 Phone: (530) 887-1494
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REPORT TITLE BORING RECORD				HOLE ID A-10-144
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 1	

LOGGED BY RCP	BEGIN DATE 8-24-10	COMPLETION DATE 8-24-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID A-10-145
DRILLING CONTRACTOR Taber Drilling	BOREHOLE LOCATION (Offset, Station, Line)		SURFACE ELEVATION ~626.0 ft	
DRILLING METHOD Solid-Stem Auger	DRILL RIG D120		BOREHOLE DIAMETER 6 in	
SAMPLER TYPE(S) AND SIZE(S) (ID) split spoon	SPT HAMMER TYPE Automatic		HAMMER EFFICIENCY, ERI 80%	
BOREHOLE BACKFILL AND COMPLETION Backfilled with native cuttings	GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered		TOTAL DEPTH OF BORING 6.5 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			CLAYEY GRAVEL (GC); medium dense; light yellowish brown; dry.		D01			100								
1					S01	14	37	100								
2	624.00					16				7	133					
3						21										
4	622.00		CLAYEY GRAVEL with SAND (GC); medium dense; brown; dry to moist.													
5					S02	5	18	100								
6	620.00					9										
7						9				9	121					
8	618.00		Bottom of borehole at 6.5 ft bgs Terminated at 6.5 ft. This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.													
9																
10	616.00															
11																
12																

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 Auburn, CA 95603
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REPORT TITLE BORING RECORD				HOLE ID A-10-145
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 1	

LOGGED BY RCP	BEGIN DATE 8-24-10	COMPLETION DATE 8-24-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID A-10-146
DRILLING CONTRACTOR Taber Drilling			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION ~622.0 ft
DRILLING METHOD Solid-Stem Auger			DRILL RIG D120	BOREHOLE DIAMETER 6 in
SAMPLER TYPE(S) AND SIZE(S) (ID) split spoon			SPT HAMMER TYPE Automatic	HAMMER EFFICIENCY, ERI 80%
BOREHOLE BACKFILL AND COMPLETION Backfilled with native cuttings			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered	TOTAL DEPTH OF BORING 5.0 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			CLAYEY GRAVEL (GC); medium dense; brown; dry.		D02			100							
620.00	2														
	3														
618.00	4				S01	4	33	100							
						16									
						17									
	5		Bottom of borehole at 5.0 ft bgs												
	6		Terminated at 5 ft.												
616.00			This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
	7														
	8														
614.00															
	9														
	10														
612.00															
	11														
	12														

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 11521 Blocker Drive, Suite 110
 Auburn, CA 95603
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REPORT TITLE BORING RECORD				HOLE ID A-10-146
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 1	

LOGGED BY RCP	BEGIN DATE 9-13-10	COMPLETION DATE 9-13-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID T-10-147
DRILLING CONTRACTOR Burke Construction	BOREHOLE LOCATION (Offset, Station, Line)		SURFACE ELEVATION ~670.5 ft	
DRILLING METHOD Backhoe	DRILL RIG CAT 430D		BOREHOLE DIAMETER	
SAMPLER TYPE(S) AND SIZE(S) (ID) Bulk	SPT HAMMER TYPE		HAMMER EFFICIENCY, ERI	
BOREHOLE BACKFILL AND COMPLETION Backfilled with native cuttings	GROUNDWATER DURING DRILLING READINGS 9.0 ft	AFTER DRILLING (DATE) 9.0 ft on	TOTAL DEPTH OF BORING 10.0 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	0		CLAYEY GRAVEL with SAND (GC); medium dense; yellowish brown; dry.												
668.50	2														
666.50	4		CLAYEY GRAVEL (GC); stiff; brown; moist to wet.		D01			100				PP = 2.0		PI	
664.50	6														
662.50	8		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, dusky yellowish green, decomposed, very soft, very intensely to intensely fractured, (Lean Clay with Gravel).												
660.50	10		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, grayish green, intensely to moderately weathered, moderately soft to moderately hard, intensely fractured. Bottom of borehole at 10.0 ft bgs Essential refusal at 10 ft. This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
	11														
	12														

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REPORT TITLE BORING RECORD				HOLE ID T-10-147
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 1	

LOGGED BY RCP	BEGIN DATE 9-13-10	COMPLETION DATE 9-13-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID T-10-148
DRILLING CONTRACTOR Burke Construction			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION ~813.0 ft
DRILLING METHOD Backhoe			DRILL RIG CAT 430D	BOREHOLE DIAMETER
SAMPLER TYPE(S) AND SIZE(S) (ID) Bulk			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERI
BOREHOLE BACKFILL AND COMPLETION Backfilled with native cuttings			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered	TOTAL DEPTH OF BORING 5.3 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	0		SANDY lean CLAY with GRAVEL (CL); stiff; reddish brown; dry.													
811.00	2		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, dusky yellowish brown, very intensely weathered, soft to moderately soft, intensely fractured, (Clayey Gravel).		D01			100								
809.00	4															
807.00	6		Bottom of borehole at 5.3 ft bgs Essential refusal at 5.3 ft. This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.													
805.00	8															
803.00	10															
	11															
	12															

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REPORT TITLE BORING RECORD				HOLE ID T-10-148
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 1	

LOGGED BY RCP	BEGIN DATE 9-13-10	COMPLETION DATE 9-13-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID T-10-149
DRILLING CONTRACTOR Burke Construction			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION ~818.2 ft
DRILLING METHOD Backhoe			DRILL RIG CAT 430D	BOREHOLE DIAMETER
SAMPLER TYPE(S) AND SIZE(S) (ID) Bulk			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERI
BOREHOLE BACKFILL AND COMPLETION Backfilled with native cuttings			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered	TOTAL DEPTH OF BORING 8.0 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	0		SANDY fat CLAY with GRAVEL (CH); stiff, reddish brown; dry.												
1	1		Fat CLAY (CH); very stiff; olive brown; moist.												
816.20	2			D01				100							PI
3	3														
814.20	4														
5	5		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, dusky yellowish brown, very intensely weathered, soft to moderately soft, intensely fractured, (Clayey Gravel).												
812.20	6														
7	7														
810.20	8		Bottom of borehole at 8.0 ft bgs Terminated at 8 ft. This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
808.20	10														
11	11														
12	12														

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 11521 Blocker Drive, Suite 110
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REPORT TITLE BORING RECORD				HOLE ID T-10-149
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 1	

LOGGED BY RCP	BEGIN DATE 9-13-10	COMPLETION DATE 9-13-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID T-10-150
DRILLING CONTRACTOR Burke Construction			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION ~793.0 ft
DRILLING METHOD Backhoe			DRILL RIG CAT 430D	BOREHOLE DIAMETER
SAMPLER TYPE(S) AND SIZE(S) (ID)			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERI
BOREHOLE BACKFILL AND COMPLETION Backfilled with native cuttings			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered	TOTAL DEPTH OF BORING 5.0 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		SANDY lean CLAY with GRAVEL (CL); stiff; reddish brown; dry.												
	1														
791.00	2		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, dusky yellowish brown, very intensely weathered, soft to moderately soft, intensely fractured, (Silty Gravel).												
	3														
789.00	4														
	5		Bottom of borehole at 5.0 ft bgs Essential refusal at 5.0 ft.												
787.00	6		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
	7														
785.00	8														
	9														
783.00	10														
	11														
	12														

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 11521 Blocker Drive, Suite 110
 Auburn, CA 95603
 Phone: (530) 887-1494
 Fax: (530) 887-1495

REPORT TITLE BORING RECORD				HOLE ID T-10-150
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 1	

LOGGED BY RCP	BEGIN DATE 9-13-10	COMPLETION DATE 9-13-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID T-10-151
DRILLING CONTRACTOR Burke Construction			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION ~742.0 ft
DRILLING METHOD Backhoe			DRILL RIG CAT 430D	BOREHOLE DIAMETER
SAMPLER TYPE(S) AND SIZE(S) (ID) Bulk			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERI
BOREHOLE BACKFILL AND COMPLETION Backfilled with native cuttings			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered	TOTAL DEPTH OF BORING 4.5 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	0		SANDY lean CLAY with GRAVEL (CL); stiff; reddish brown; dry.												
740.00	2		Fat CLAY (CH); very stiff; yellowish brown; moist.												
738.00	4		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, dusky yellowish brown, very intensely weathered, soft to moderately soft, intensely fractured, (Silty Gravel).		D01			100							
	5		Bottom of borehole at 4.5 ft bgs Essential refusal at 4.5 ft.												
736.00	6		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
734.00	8														
732.00	10														
	11														
	12														

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REPORT TITLE BORING RECORD				HOLE ID T-10-151
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 1	

LOGGED BY RCP	BEGIN DATE 9-13-10	COMPLETION DATE 9-13-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID T-10-152
DRILLING CONTRACTOR Burke Construction			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION ~732.0 ft
DRILLING METHOD Backhoe			DRILL RIG CAT 430D	BOREHOLE DIAMETER
SAMPLER TYPE(S) AND SIZE(S) (ID) Bulk			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERI
BOREHOLE BACKFILL AND COMPLETION Backfilled with native cuttings			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered	TOTAL DEPTH OF BORING 5.3 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	0		CLAYEY SAND with GRAVEL (SC); medium dense; reddish brown; dry.												
730.00	2		Fat CLAY with SAND (CH); very stiff; yellowish brown; moist.		D01			100				PP = 2.25			
728.00	4		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, dusky yellowish brown, very intensely weathered, soft to moderately soft, intensely fractured.												
726.00	6		Bottom of borehole at 5.3 ft bgs Essential refusal at 5.3 ft. This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
724.00	8														
722.00	10														
	11														
	12														

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REPORT TITLE BORING RECORD				HOLE ID T-10-152
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 1	

LOGGED BY RCP	BEGIN DATE 9-13-10	COMPLETION DATE 9-13-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID T-10-153
DRILLING CONTRACTOR Burke Construction			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION ~669.0 ft
DRILLING METHOD Backhoe			DRILL RIG CAT 430D	BOREHOLE DIAMETER
SAMPLER TYPE(S) AND SIZE(S) (ID) Bulk			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERI
BOREHOLE BACKFILL AND COMPLETION Backfilled with native cuttings			GROUNDWATER DURING DRILLING READINGS 8.5 ft	AFTER DRILLING (DATE) 8.5 ft on
				TOTAL DEPTH OF BORING 9.0 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	0		CLAYEY GRAVEL (GC); medium dense; yellowish brown; dry.													
667.00	2		Lean CLAY (CL); very stiff; olive gray; moist; (decomposed rock).		D01			100				PP = 2.0				PI
665.00	4		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, grayish green, very intensely weathered, hard to very hard, intensely to moderately fractured, (Clayey Gravel).													
663.00	6		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, grayish green, moderately to slightly weathered, hard to very hard, intensely to moderately fractured.													
661.00	8		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, grayish green, moderately to slightly weathered, hard to very hard, intensely to moderately fractured.													
	9		Bottom of borehole at 9.0 ft bgs Essential refusal at 9.0 ft.													
659.00	10		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.													
	11															
	12															

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REPORT TITLE BORING RECORD				HOLE ID T-10-153
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 1	

LOGGED BY RCP	BEGIN DATE 9-14-10	COMPLETION DATE 9-14-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID A-10-154
DRILLING CONTRACTOR Taber Drilling			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION ~879.0 ft
DRILLING METHOD Solid-Stem Auger			DRILL RIG CME 55	BOREHOLE DIAMETER 6 in
SAMPLER TYPE(S) AND SIZE(S) (ID) split spoon			SPT HAMMER TYPE Automatic	HAMMER EFFICIENCY, ERI 80%
BOREHOLE BACKFILL AND COMPLETION Backfilled with native cuttings			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered	TOTAL DEPTH OF BORING 0.9 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	0		SILTY GRAVEL (GM); loose; reddish brown; dry.												
	1		Bottom of borehole at 0.9 ft bgs												
	2		Essential auger refusal at 0.9 ft.												
877.00	2		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
	3														
875.00	4														
	5														
873.00	6														
	7														
871.00	8														
	9														
869.00	10														
	11														
	12														

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 Fax: (530) 887-1495

REPORT TITLE BORING RECORD				HOLE ID A-10-154	
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901	
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange					
BRIDGE NUMBER		PREPARED BY RCP		DATE	SHEET 1 of 1

LOGGED BY RCP	BEGIN DATE 9-14-10	COMPLETION DATE 9-14-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID R-10-155
DRILLING CONTRACTOR Taber Drilling			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION ~841.0 ft
DRILLING METHOD Rotary Wire-Line			DRILL RIG CME 55	BOREHOLE DIAMETER 3 in
SAMPLER TYPE(S) AND SIZE(S) (ID) NX Core			SPT HAMMER TYPE Automatic	HAMMER EFFICIENCY, ERI 80%
BOREHOLE BACKFILL AND COMPLETION Backfilled with native cuttings			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered	TOTAL DEPTH OF BORING 7.5 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			SILTY GRAVEL (GM); medium dense; reddish brown; dry.												
	1				S01	27	60	100							
						19									
						41									
839.00	2														
			METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, grayish green, moderately weathered, hard to very hard, intensely fractured.		Run 1			66	12						
	3														
837.00	4														
	5														
835.00	6														
	7										167				
			Bottom of borehole at 7.5 ft bgs												
833.00	8		Terminated at 7 ft.												
	9		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
	10														
831.00															
	11														
	12														

5 BR - STANDARD LOGS.GPJ BCI 2010 LOG.GLB 3/15/12



Blackburn Consulting
 11521 Blocker Drive, Suite 110
 Auburn, CA 95603
 Phone: (530) 887-1494
 Fax: (530) 887-1495

REPORT TITLE BORING RECORD				HOLE ID R-10-155
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 1	

LOGGED BY RCP	BEGIN DATE 9-14-10	COMPLETION DATE 9-14-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID A-10-156
DRILLING CONTRACTOR Taber Drilling			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION ~809.0 ft
DRILLING METHOD Solid-Stem Auger			DRILL RIG CME 55	BOREHOLE DIAMETER 6 in
SAMPLER TYPE(S) AND SIZE(S) (ID) split spoon			SPT HAMMER TYPE Automatic	HAMMER EFFICIENCY, ERI 80%
BOREHOLE BACKFILL AND COMPLETION Backfilled with native cuttings			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered	TOTAL DEPTH OF BORING 10.1 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			SILTY GRAVEL (GM); loose; reddish brown; dry.												
	1			S01	6	58/8	100								
				D01	8		100								
						50/2"									
807.00	2		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, dusky yellowish brown, intensely weathered, soft, intensely fractured, (Sandy Silt).												
	3														
805.00	4														
	5			S02	50/2"	REF	100								
	6														
803.00	7														
	8														
801.00	9														
	10														
799.00	10		Bottom of borehole at 10.1 ft bgs	S03	50/1"	REF	100								
	11		Terminated at 10.1 ft.												
			This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
	12														

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 Auburn, CA 95603
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REPORT TITLE BORING RECORD				HOLE ID A-10-156
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 1	

LOGGED BY RCP	BEGIN DATE 9-14-10	COMPLETION DATE 9-14-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID A-10-157
DRILLING CONTRACTOR Taber Drilling	BOREHOLE LOCATION (Offset, Station, Line)		SURFACE ELEVATION ~780.5 ft	
DRILLING METHOD Solid-Stem Auger	DRILL RIG CME 55		BOREHOLE DIAMETER 6 in	
SAMPLER TYPE(S) AND SIZE(S) (ID) split spoon	SPT HAMMER TYPE Automatic		HAMMER EFFICIENCY, ERI 80%	
BOREHOLE BACKFILL AND COMPLETION Backfilled with native cuttings	GROUNDWATER DURING DRILLING READINGS		AFTER DRILLING (DATE) not encountered	TOTAL DEPTH OF BORING 5.4 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	0		SILTY GRAVEL (GM); dense; olive brown; dry; fill.												
	1			S01	24	54	100								
				D01	25		100								
					29										
778.50	2		SANDY lean CLAY with GRAVEL (CL); stiff; olive brown; dry; fill.												
	3														
776.50	4														
	5			S02	50/5"	REF	100								
	6		Bottom of borehole at 5.4 ft bgs Terminated at 5.4 ft.												
774.50	7		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
	8														
772.50	9														
	10														
770.50	11														
	12														

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REPORT TITLE BORING RECORD				HOLE ID A-10-157	
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901	
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange					
BRIDGE NUMBER		PREPARED BY RCP		DATE	SHEET 1 of 1

LOGGED BY RCP	BEGIN DATE 9-21-10	COMPLETION DATE 9-21-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID A-10-158
DRILLING CONTRACTOR Taber Drilling			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION ~686.0 ft
DRILLING METHOD Solid-Stem Auger			DRILL RIG CME 55	BOREHOLE DIAMETER 6 in
SAMPLER TYPE(S) AND SIZE(S) (ID) split spoon			SPT HAMMER TYPE Automatic	HAMMER EFFICIENCY, ERI 80%
BOREHOLE BACKFILL AND COMPLETION Backfilled with native cuttings			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered	TOTAL DEPTH OF BORING 21.5 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	0		SILTY GRAVEL (GM); dense; light yellowish brown; dry; fill.												
	1				D01			100							
684.00	2				S02	20	71	100							
	3					37									
	4					34									
682.00	5		CLAYEY GRAVEL (GC); dense; brown; moist; fill.												
	6				S03	15	81	100							
680.00	7					47									
	8					34									
678.00	9														
	10				S04	10	13	100							
676.00	11					6									
	12					7									

(continued)

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 Auburn, CA 95603
 Phone: (530) 887-1494
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REPORT TITLE BORING RECORD				HOLE ID A-10-158
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 1 of 2	

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
	12		CLAYEY GRAVEL (GC) (continued).		D01			100							
	13		Lean CLAY (CL); hard; light yellowish brown; moist.												
672.00	14														
	15				S05	15	62	100				PP = >4.5			
	16					27									
670.00	16					35									
	17														
668.00	18														
	19		METAMORPHIC ROCK, Metavolcanic, fine-grained to medium-grained, massive, dusky yellowish brown, decomposed, very soft to soft, intensely fractured, (Lean Clay).												
666.00	20				S06	15	63	100				PP = >4.5			
	21					25									
	21					38									
	22		Bottom of borehole at 21.5 ft bgs Terminated at 21.5 ft. This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
664.00	22														
	23														
662.00	24														
	25														
660.00	26														

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REPORT TITLE BORING RECORD				HOLE ID A-10-158
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange				
BRIDGE NUMBER	PREPARED BY RCP	DATE	SHEET 2 of 2	

LOGGED BY RCP	BEGIN DATE 9-21-10	COMPLETION DATE 9-21-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID A-10-159
DRILLING CONTRACTOR Taber Drilling	BOREHOLE LOCATION (Offset, Station, Line)		SURFACE ELEVATION ~731.0 ft	
DRILLING METHOD Solid-Stem Auger	DRILL RIG CME 55		BOREHOLE DIAMETER 6 in	
SAMPLER TYPE(S) AND SIZE(S) (ID) split spoon	SPT HAMMER TYPE Automatic		HAMMER EFFICIENCY, ERI 80%	
BOREHOLE BACKFILL AND COMPLETION Backfilled with native cuttings	GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered		TOTAL DEPTH OF BORING 3.5 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			Well-graded GRAVEL (GW); dense; brown; dry; fill.												
729.00	2			S01	28	75/12	80								
					25										
					50/5.5"										
727.00	4		Bottom of borehole at 3.5 ft bgs Essential auger refusal at 3.5 ft.												
			This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
725.00	6														
723.00	8														
721.00	10														
	11														
	12														

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REPORT TITLE BORING RECORD				HOLE ID A-10-159	
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901	
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange					
BRIDGE NUMBER		PREPARED BY RCP		DATE	SHEET 1 of 1

LOGGED BY RCP	BEGIN DATE 9-21-10	COMPLETION DATE 9-21-10	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID A-10-160
DRILLING CONTRACTOR Taber Drilling			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION ~734.0 ft
DRILLING METHOD Solid-Stem Auger			DRILL RIG CME 55	BOREHOLE DIAMETER 6 in
SAMPLER TYPE(S) AND SIZE(S) (ID)			SPT HAMMER TYPE Automatic	HAMMER EFFICIENCY, ERI 80%
BOREHOLE BACKFILL AND COMPLETION Backfilled with native cuttings			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS not encountered	TOTAL DEPTH OF BORING 1.4 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	0		Poorly graded GRAVEL (GP); dense; brown; dry; fill.												
1	1														
732.00	2		Bottom of borehole at 1.4 ft bgs Essential auger refusal at 1.4 ft.												
3	3		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (June 2007) except as noted on the Soil or Rock Legend or below.												
730.00	4														
5	5														
728.00	6														
7	7														
726.00	8														
9	9														
724.00	10														
11	11														
12	12														

5 BR - STANDARD LOGS.GPJ BCI 2010 LOG.GLB 3/15/12



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 11521 Blocker Drive, Suite 110
 Auburn, CA 95603
 Phone: (530) 887-1494
 Fax: (530) 887-1495

REPORT TITLE BORING RECORD				HOLE ID A-10-160	
DIST. 03	COUNTY ED	ROUTE 50	POSTMILE 1.1/R2.4	EA 03-1E2901	
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange					
BRIDGE NUMBER		PREPARED BY RCP		DATE	SHEET 1 of 1

GROUP SYMBOLS AND NAMES

Graphic / Symbol	Group Names	Graphic / Symbol	Group Names
	Well-graded GRAVEL		Lean CLAY
	Well-graded GRAVEL with SAND		Lean CLAY with SAND
	Poorly graded GRAVEL		Lean CLAY with GRAVEL
	Poorly graded GRAVEL with SAND		SANDY lean CLAY
	Well-graded GRAVEL with SILT		SANDY lean CLAY with GRAVEL
	Well-graded GRAVEL with SILT and SAND		GRAVELLY lean CLAY
	Well-graded GRAVEL with CLAY (or SILTY CLAY)		GRAVELLY lean CLAY with SAND
	Well-graded GRAVEL with CLAY and SAND (or SILTY CLAY and SAND)		SILTY CLAY
	Poorly graded GRAVEL with SILT		SILTY CLAY with SAND
	Poorly graded GRAVEL with SILT and SAND		SILTY CLAY with GRAVEL
	Poorly graded GRAVEL with CLAY (or SILTY CLAY)		SANDY SILTY CLAY
	Poorly graded GRAVEL with CLAY and SAND (or SILTY CLAY and SAND)		SANDY SILTY CLAY with GRAVEL
	SILTY GRAVEL		GRAVELLY SILTY CLAY
	SILTY GRAVEL with SAND		GRAVELLY SILTY CLAY with SAND
	CLAYEY GRAVEL		ORGANIC lean CLAY
	CLAYEY GRAVEL with SAND		ORGANIC lean CLAY with SAND
	SILTY, CLAYEY GRAVEL		SANDY ORGANIC lean CLAY
	SILTY, CLAYEY GRAVEL with SAND		SANDY ORGANIC lean CLAY with GRAVEL
	Well-graded SAND		GRAVELLY ORGANIC lean CLAY
	Well-graded SAND with GRAVEL		GRAVELLY ORGANIC lean CLAY with SAND
	Poorly graded SAND		Fat CLAY
	Poorly graded SAND with GRAVEL		Fat CLAY with SAND
	Well-graded SAND with SILT		Fat CLAY with GRAVEL
	Well-graded SAND with SILT and GRAVEL		SANDY fat CLAY
	Well-graded SAND with CLAY (or SILTY CLAY)		SANDY fat CLAY with GRAVEL
	Well-graded SAND with CLAY and GRAVEL (or SILTY CLAY and GRAVEL)		GRAVELLY fat CLAY
	Poorly graded SAND with SILT		GRAVELLY fat CLAY with SAND
	Poorly graded SAND with SILT and GRAVEL		Elastic SILT
	Poorly graded SAND with CLAY (or SILTY CLAY)		Elastic SILT with SAND
	Poorly graded SAND with CLAY and GRAVEL (or SILTY CLAY and GRAVEL)		Elastic SILT with GRAVEL
	SILTY SAND		SANDY elastic SILT
	SILTY SAND with GRAVEL		SANDY elastic SILT with GRAVEL
	CLAYEY SAND		GRAVELLY elastic SILT
	CLAYEY SAND with GRAVEL		GRAVELLY elastic SILT with SAND
	SILTY, CLAYEY SAND		ORGANIC fat CLAY
	SILTY, CLAYEY SAND with GRAVEL		ORGANIC fat CLAY with SAND
	PEAT		ORGANIC fat CLAY with GRAVEL
	COBBLES		SANDY ORGANIC fat CLAY
	COBBLES		GRAVELLY ORGANIC fat CLAY
	COBBLES and BOULDERS		GRAVELLY ORGANIC fat CLAY with SAND
	BOULDERS		ORGANIC SOIL
			ORGANIC SOIL with SAND
			ORGANIC SOIL with GRAVEL
			SANDY ORGANIC SOIL
			SANDY ORGANIC SOIL with GRAVEL
			GRAVELLY ORGANIC SOIL
			GRAVELLY ORGANIC SOIL with SAND

FIELD AND LABORATORY TESTS

- C** Consolidation (ASTM D 2435-04)
- CL** Collapse Potential (ASTM D 5333-03)
- CP** Compaction Curve (CTM 216 - 06)
- CR** Corrosion, Sulfates, Chlorides (CTM 643 - 99; CTM 417 - 06; CTM 422 - 06)
- CU** Consolidated Undrained Triaxial (ASTM D 4767-02)
- DS** Direct Shear (ASTM D 3080-04)
- EI** Expansion Index (ASTM D 4829-03)
- M** Moisture Content (ASTM D 2216-05)
- OC** Organic Content (ASTM D 2974-07)
- P** Permeability (CTM 220 - 05)
- PA** Particle Size Analysis (ASTM D 422-63 [2002])
- PI** Liquid Limit, Plastic Limit, Plasticity Index (AASHTO T 89-02, AASHTO T 90-00)
- PL** Point Load Index (ASTM D 5731-05)
- PM** Pressure Meter
- PP** Pocket Penetrometer
- R** R-Value (CTM 301 - 00)
- SE** Sand Equivalent (CTM 217 - 99)
- SG** Specific Gravity (AASHTO T 100-06)
- SL** Shrinkage Limit (ASTM D 427-04)
- SW** Swell Potential (ASTM D 4546-03)
- TV** Pocket Torvane
- UC** Unconfined Compression - Soil (ASTM D 2166-06)
- UU** Unconfined Compression - Rock (ASTM D 2938-95)
- UW** Unit Weight (ASTM D 4767-04)
- VS** Vane Shear (AASHTO T 223-96 [2004])

SAMPLER GRAPHIC SYMBOLS

- Standard Penetration Test (SPT)
- 2.5" Split Spoon Sampler
- 2" Split Spoon Sampler
- Shelby Tube
- Piston Sampler
- NX Rock Core
- HQ Rock Core
- Bulk Sample
- Other (see remarks)

DRILLING METHOD SYMBOLS

- Auger Drilling
- Rotary Drilling
- Dynamic Cone or Hand Driven
- Diamond Core

WATER LEVEL SYMBOLS

- First Water Level Reading (during drilling)
- Static Water Level Reading (short-term)
- Static Water Level Reading (long-term)



Blackburn Consulting
 11521 Blocker Drive, Suite 110
 Auburn, CA 95603
 Phone: (530) 887-1494
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BORING RECORD LEGEND

COUNTY El Dorado	ROUTE 50	POSTMILE 1.1/R2.4
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange		
PREPARED BY RCP	DATE	SHEET 1 of 3

CONSISTENCY OF COHESIVE SOILS				
Descriptor	Unconfined Compressive Strength (tsf)	Pocket Penetrometer (tsf)	Torvane (tsf)	Field Approximation
Very Soft	< 0.25	< 0.25	< 0.12	Easily penetrated several inches by fist
Soft	0.25 - 0.50	0.25 - 0.50	0.12 - 0.25	Easily penetrated several inches by thumb
Medium Stiff	0.50 - 1.0	0.50 - 1.0	0.25 - 0.50	Can be penetrated several inches by thumb with moderate effort
Stiff	1.0 - 2.0	1.0 - 2.0	0.50 - 1.0	Readily indented by thumb but penetrated only with great effort
Very Stiff	2.0 - 4.0	2.0 - 4.0	1.0 - 2.0	Readily indented by thumbnail
Hard	> 4.0	> 4.0	> 2.0	Indented by thumbnail with difficulty

APPARENT DENSITY OF COHESIONLESS SOILS	
Descriptor	SPT N ₆₀ - Value (blows / foot)
Very Loose	0 - 4
Loose	5 - 10
Medium Dense	11 - 30
Dense	31 - 50
Very Dense	> 50

MOISTURE	
Descriptor	Criteria
Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, usually soil is below water table

PERCENT OR PROPORTION OF SOILS	
Descriptor	Criteria
Trace	Particles are present but estimated to be less than 5%
Few	5 to 10%
Little	15 to 25%
Some	30 to 45%
Mostly	50 to 100%

SOIL PARTICLE SIZE		
Descriptor	Size	
Boulder	> 12 inches	
Cobble	3 to 12 inches	
Gravel	Coarse	3/4 inch to 3 inches
	Fine	No. 4 Sieve to 3/4 inch
Sand	Coarse	No. 10 Sieve to No. 4 Sieve
	Medium	No. 40 Sieve to No. 10 Sieve
	Fine	No. 200 Sieve to No. 40 Sieve
Silt and Clay	Passing No. 200 Sieve	

PLASTICITY OF FINE-GRAINED SOILS	
Descriptor	Criteria
Nonplastic	A 1/8-inch thread cannot be rolled at any water content.
Low	The thread can barely be rolled, and the lump cannot be formed when drier than the plastic limit.
Medium	The thread is easy to roll, and not much time is required to reach the plastic limit; it cannot be rerolled after reaching the plastic limit. The lump crumbles when drier than the plastic limit.
High	It takes considerable time rolling and kneading to reach the plastic limit. The thread can be rerolled several times after reaching the plastic limit. The lump can be formed without crumbling when drier than the plastic limit.

CEMENTATION	
Descriptor	Criteria
Weak	Crumbles or breaks with handling or little finger pressure.
Moderate	Crumbles or breaks with considerable finger pressure.
Strong	Will not crumble or break with finger pressure.



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BORING RECORD LEGEND

COUNTY El Dorado	ROUTE 50	POSTMILE 1.1/R2.4
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange		
PREPARED BY RCP	DATE	SHEET 2 of 3

ROCK GRAPHIC SYMBOLS



IGNEOUS ROCK



SEDIMENTARY ROCK



METAMORPHIC ROCK

BEDDING SPACING

Descriptor	Thickness or Spacing
Massive	> 10 ft
Very thickly bedded	3 to 10 ft
Thickly bedded	1 to 3 ft
Moderately bedded	3-5/8 inches to 1 ft
Thinly bedded	1-1/4 to 3-5/8 inches
Very thinly bedded	3/8 inch to 1-1/4 inches
Laminated	< 3/8 inch

WEATHERING DESCRIPTORS FOR INTACT ROCK

Descriptor	Diagnostic Features					General Characteristics
	Chemical Weathering-Discoloration-Oxidation		Mechanical Weathering and Grain Boundary Conditions	Texture and Solutioning		
	Body of Rock	Fracture Surfaces		Texture	Solutioning	
Fresh	No discoloration, not oxidized	No discoloration or oxidation	No separation, intact (tight)	No change	No solutioning	Hammer rings when crystalline rocks are struck.
Slightly Weathered	Discoloration or oxidation is limited to surface of, or short distance from, fractures; some feldspar crystals are dull	Minor to complete discoloration or oxidation of most surfaces	No visible separation, intact (tight)	Preserved	Minor leaching of some soluble minerals may be noted	Hammer rings when crystalline rocks are struck. Body of rock not weakened.
Moderately Weathered	Discoloration or oxidation extends from fractures usually throughout; Fe-Mg minerals are "rusty"; feldspar crystals are "cloudy"	All fracture surfaces are discolored or oxidized	Partial separation of boundaries visible	Generally preserved	Soluble minerals may be mostly leached	Hammer does not ring when rock is struck. Body of rock is slightly weakened.
Intensely Weathered	Discoloration or oxidation throughout; all feldspars and Fe-Mg minerals are altered to clay to some extent; or chemical alteration produces in situ disaggregation (refer to grain boundary conditions)	All fracture surfaces are discolored or oxidized; surfaces are friable	Partial separation, rock is friable; in semi-arid conditions, granitics are disaggregated	Altered by chemical disintegration such as via hydration or argillation	Leaching of soluble minerals may be complete	Dull sound when struck with hammer; usually can be broken with moderate to heavy manual pressure or by light hammer blow without reference to planes of weakness such as incipient or hairline fractures or veinlets. Rock is significantly weakened.
Decomposed	Discolored or oxidized throughout, but resistant minerals such as quartz may be unaltered; all feldspars and Fe-Mg minerals are completely altered to clay		Complete separation of grain boundaries (disaggregated)	Resembles a soil; partial or complete remnant rock structure may be preserved; leaching of soluble minerals usually complete		Can be granulated by hand. Resistant minerals such as quartz may be present as "stringers" or "dikes".

Note: Combination descriptors (such as "slightly weathered to fresh") are used where equal distribution of both weathering characteristics is present over significant intervals or where characteristics present are "in between" the diagnostic feature. However, combination descriptors should not be used where significant identifiable zones can be delineated. Only two adjacent descriptors shall be combined. "Very intensely weathered" is the combination descriptor for "decomposed to intensely weathered".

RELATIVE STRENGTH OF INTACT ROCK

Descriptor	Uniaxial Compressive Strength (psi)
Extremely Strong	> 30,000
Very Strong	14,500 - 30,000
Strong	7,000 - 14,500
Medium Strong	3,500 - 7,000
Weak	700 - 3,500
Very Weak	150 - 700
Extremely Weak	< 150

ROCK HARDNESS

Descriptor	Criteria
Extremely Hard	Specimen cannot be scratched with pocket knife or sharp pick; can only be chipped with repeated heavy hammer blows
Very hard	Specimen cannot be scratched with pocket knife or sharp pick; breaks with repeated heavy hammer blows
Hard	Specimen can be scratched with pocket knife or sharp pick with heavy pressure; heavy hammer blows required to break specimen
Moderately Hard	Specimen can be scratched with pocket knife or sharp pick with light or moderate pressure; breaks with moderate hammer blows
Moderately Soft	Specimen can be grooved 1/6 in. with pocket knife or sharp pick with moderate or heavy pressure; breaks with light hammer blow or heavy hand pressure
Soft	Specimen can be grooved or gouged with pocket knife or sharp pick with light pressure, breaks with light to moderate hand pressure
Very Soft	Specimen can be readily indented, grooved, or gouged with fingernail, or carved with pocket knife; breaks with light hand pressure

CORE RECOVERY CALCULATION (%)

$$\frac{\sum \text{Length of the recovered core pieces (in.)}}{\text{Total length of core run (in.)}} \times 100$$

RQD CALCULATION (%)

$$\frac{\sum \text{Length of intact core pieces} > 4 \text{ in.}}{\text{Total length of core run (in.)}} \times 100$$

FRACTURE DENSITY

Descriptor	Criteria
Unfractured	No fractures
Very Slightly Fractured	Lengths greater 3 ft
Slightly Fractured	Lengths from 1 to 3 ft, few lengths outside that range
Moderately Fractured	Lengths mostly in range of 4 in. to 1 ft, with most lengths about 8 in.
Intensely Fractured	Lengths average from 1 in. to 4 in. with scattered fragmented intervals with lengths less than 4 in.
Very Intensely Fractured	Mostly chips and fragments with few scattered short core lengths



Blackburn Consulting
 11521 Blocker Drive, Suite 110
 Auburn, CA 95603
 Phone: (530) 887-1494
 Fax: (530) 887-1495

BORING RECORD LEGEND

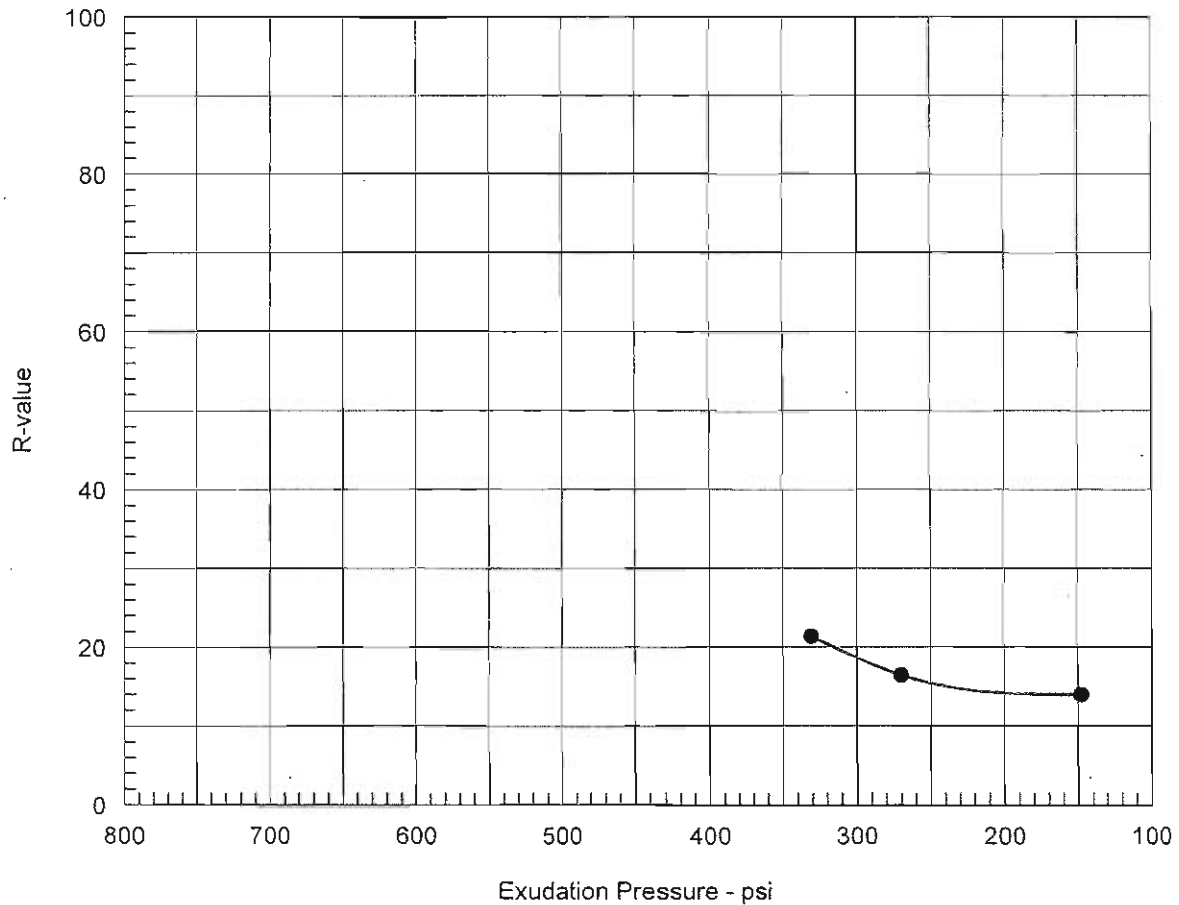
COUNTY El Dorado	ROUTE 50	POSTMILE 1.1/R2.4
PROJECT OR BRIDGE NAME Silva Valley Parkway Interchange		
PREPARED BY RCP	DATE	SHEET 3 of 3

Appendix B

Laboratory Test Results



R-VALUE TEST REPORT

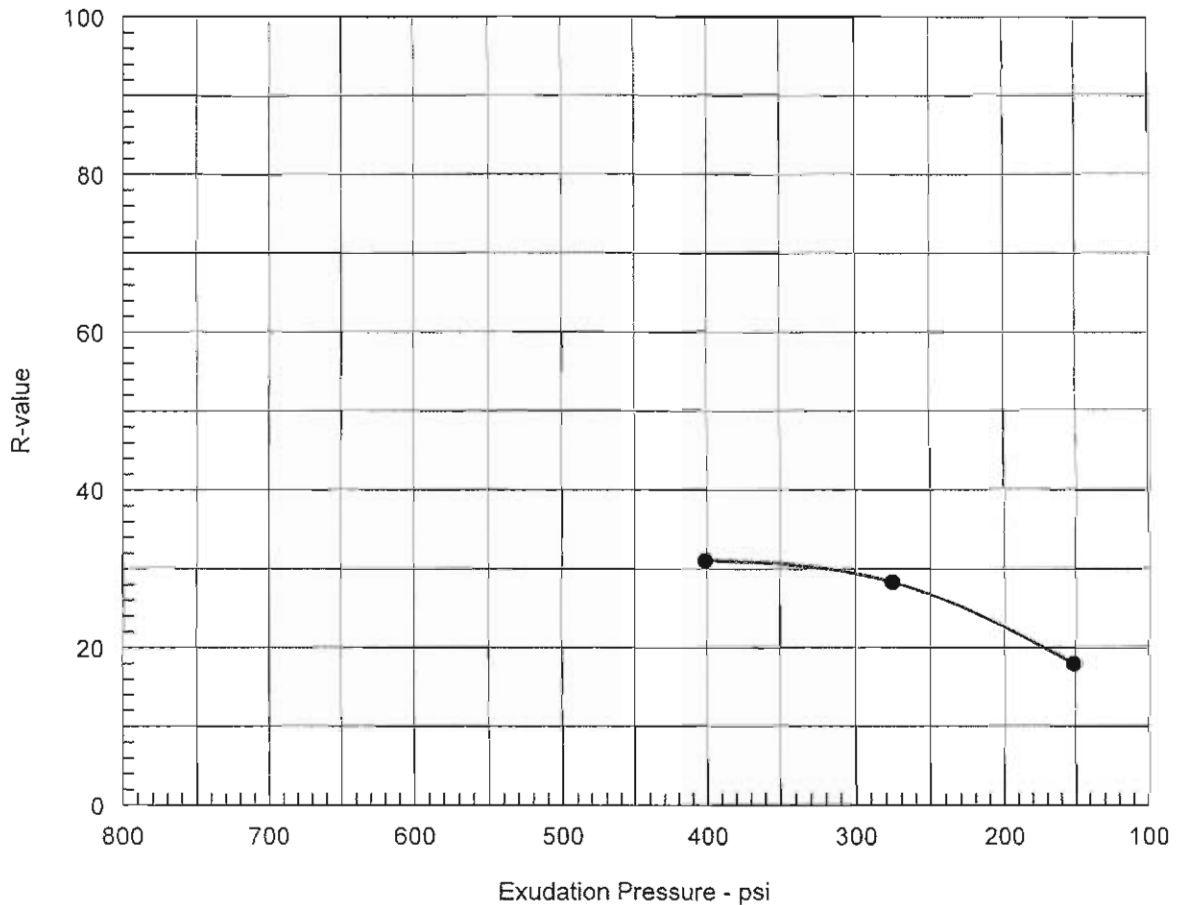


Resistance R-Value and Expansion Pressure - Cal Test 301

No.	Compact. Pressure psi	Density pcf	Moist. %	Expansion Pressure psi	Horizontal Press. psi @ 160 psi	Sample Height in.	Exud. Pressure psi	R Value	R Value Corr.
1	173	119.6	14.9	0.42	108	2.60	331	20	21
2	142	119.0	15.5	0.36	109	2.44	270	17	16
3	112	116.3	16.6	0.06	117	2.64	148	13	14

Test Results	Material Description
R-value at 300 psi exudation pressure = 19	CLAYEY SILT with SAND, dark yellowish brown (decomposed metavolcanic rock)
Project No.: 556.2 Project: Silva Valley Parkway Interchange Project Source of Sample: A-10-129 Depth: 0.5-5.0' Sample Number: D2 Date: 9/24/2010	Tested by: MDR Checked by: RBL Remarks: 8.9% retained on No. 4 sieve.
R-VALUE TEST REPORT Blackburn Consulting	

R-VALUE TEST REPORT

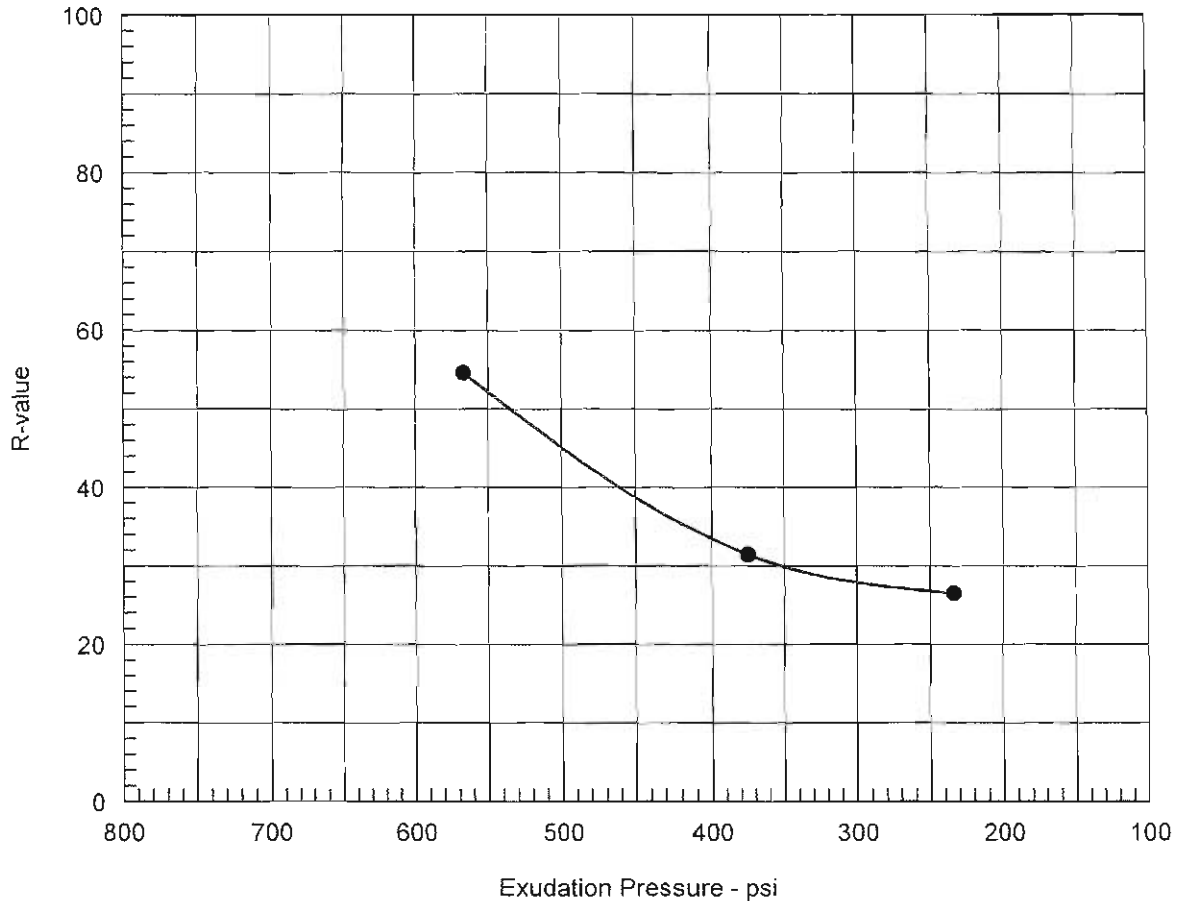


Resistance R-Value and Expansion Pressure - Cal Test 301

No.	Compact. Pressure psi	Density pcf	Moist. %	Expansion Pressure psi	Horizontal Press. psi @ 160 psi	Sample Height in.	Exud. Pressure psi	R Value	R Value Corr.
1	320	121.6	14.1	0.82	96	2.61	401	29	31
2	263	119.3	15.2	0.55	97	2.56	275	27	28
3	163	116.5	16.1	0.36	111	2.52	151	18	18

Test Results	Material Description
R-value at 300 psi exudation pressure = 29	SILT with SAND and some GRAVEL, yellowish brown (decomposed metavolcanic rock)
Project No.: 556.2 Project: Silva Valley Parkway Interchange Project Source of Sample: A-10-137 Depth: 2.25-5.0' Sample Number: D1 Date: 9/24/2010	Tested by: MDR Checked by: RBL Remarks: 12.8% retained on No. 4 sieve.
R-VALUE TEST REPORT Blackburn Consulting	

R-VALUE TEST REPORT

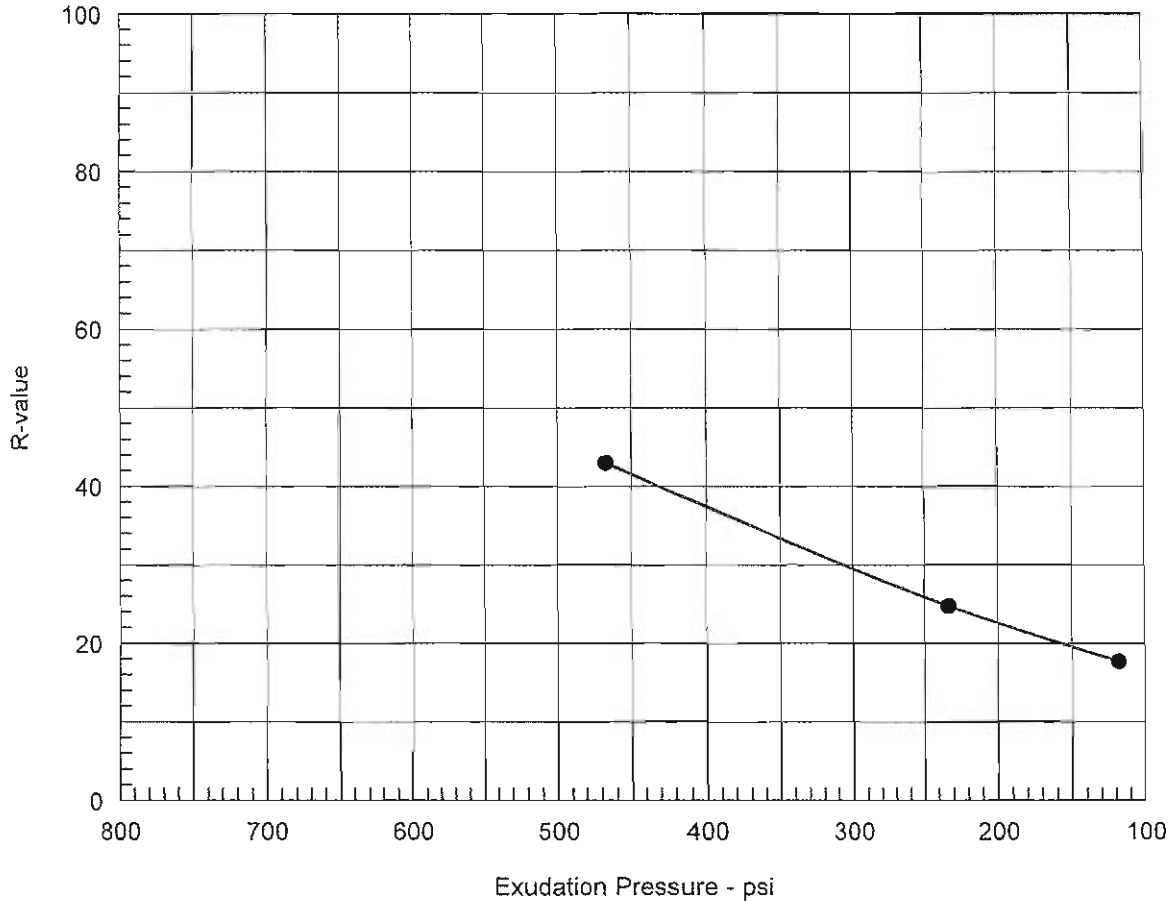


Resistance R-Value and Expansion Pressure - Cal Test 301

No.	Compact. Pressure psi	Density pcf	Moist. %	Expansion Pressure psi	Horizontal Press. psi @ 160 psi	Sample Height in.	Exud. Pressure psi	R Value	R Value Corr.
1	350	138.3	9.4	0.00	53	2.31	567	59	55
2	224	136.0	10.2	0.00	91	2.47	375	31	31
3	81	133.0	11.1	0.00	98	2.52	234	26	26

Test Results	Material Description
R-value at 300 psi exudation pressure = 28	SANDY, SILTY CLAY with GRAVEL, yellowish brown, (decomposed metavolcanic rock)
Project No.: 556.2 Project: Silva Valley Parkway Interchange Project Source of Sample: A-10-144 Depth: 0.5-5.0' Sample Number: D1 Date: 9/10/2010	Tested by: BKR Checked by: MDR Remarks: 25.3% retained on No. 4 sieve.
R-VALUE TEST REPORT Blackburn Consulting	Figure _____

R-VALUE TEST REPORT

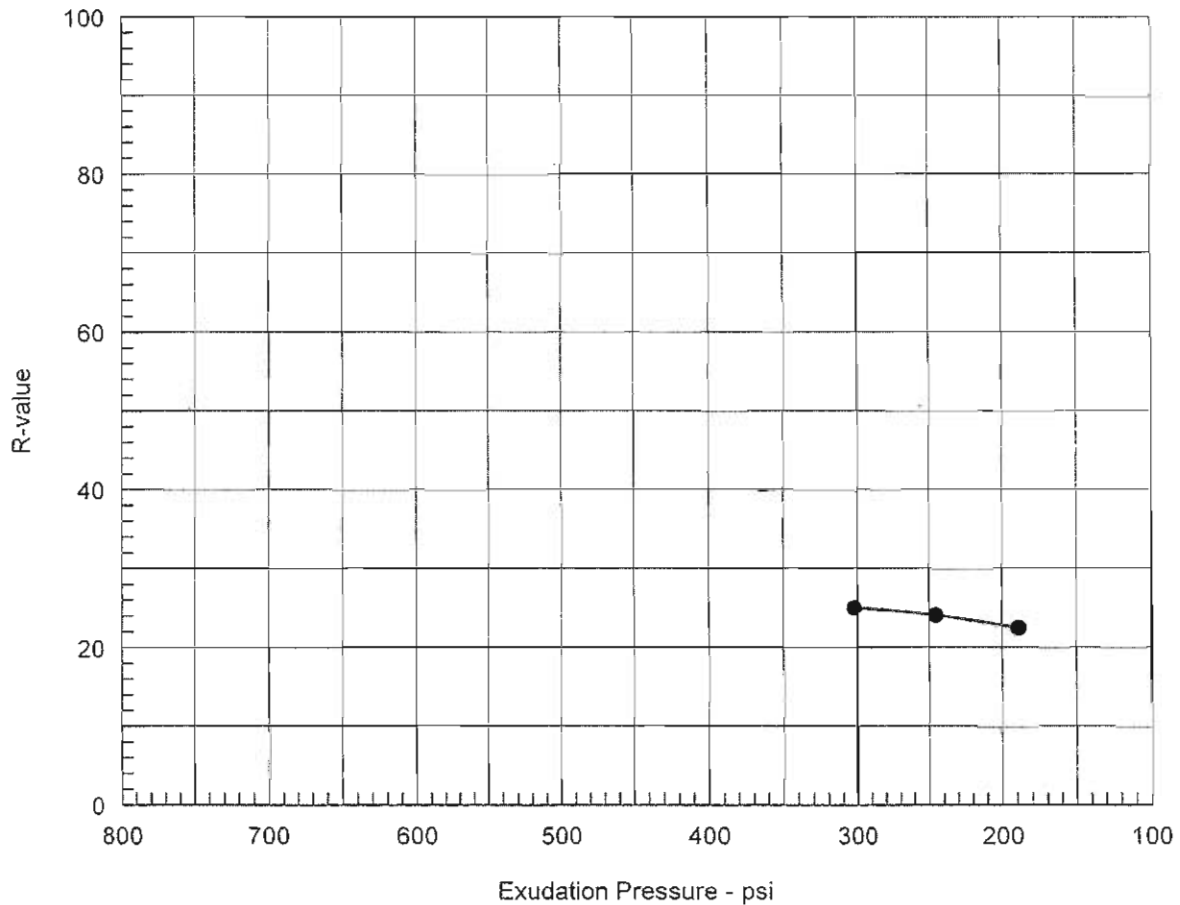


Resistance R-Value and Expansion Pressure - Cal Test 301

No.	Compact. Pressure psi	Density pcf	Moist. %	Expansion Pressure psi	Horizontal Press. psi @ 160 psi	Sample Height in.	Exud. Pressure psi	R Value	R Value Corr.
1	244	136.1	9.6	0.00	70	2.42	467	45	43
2	102	129.6	11.3	0.00	101	2.53	233	25	25
3	61	126.0	13.1	0.00	111	2.46	118	18	18

Test Results	Material Description
R-value at 300 psi exudation pressure = 29	SANDY, SILTY CLAY with GRAVEL, yellowish brown, (decomposed metavolcanic rock)
Project No.: 556.2 Project: Silva Valley Parkway Interchange Project Source of Sample: A-10-145 Depth: 0.5-5.0' Sample Number: D1 Date: 9/10/2010	Tested by: BKR Checked by: MDR Remarks:
R-VALUE TEST REPORT Blackburn Consulting	Figure _____

R-VALUE TEST REPORT

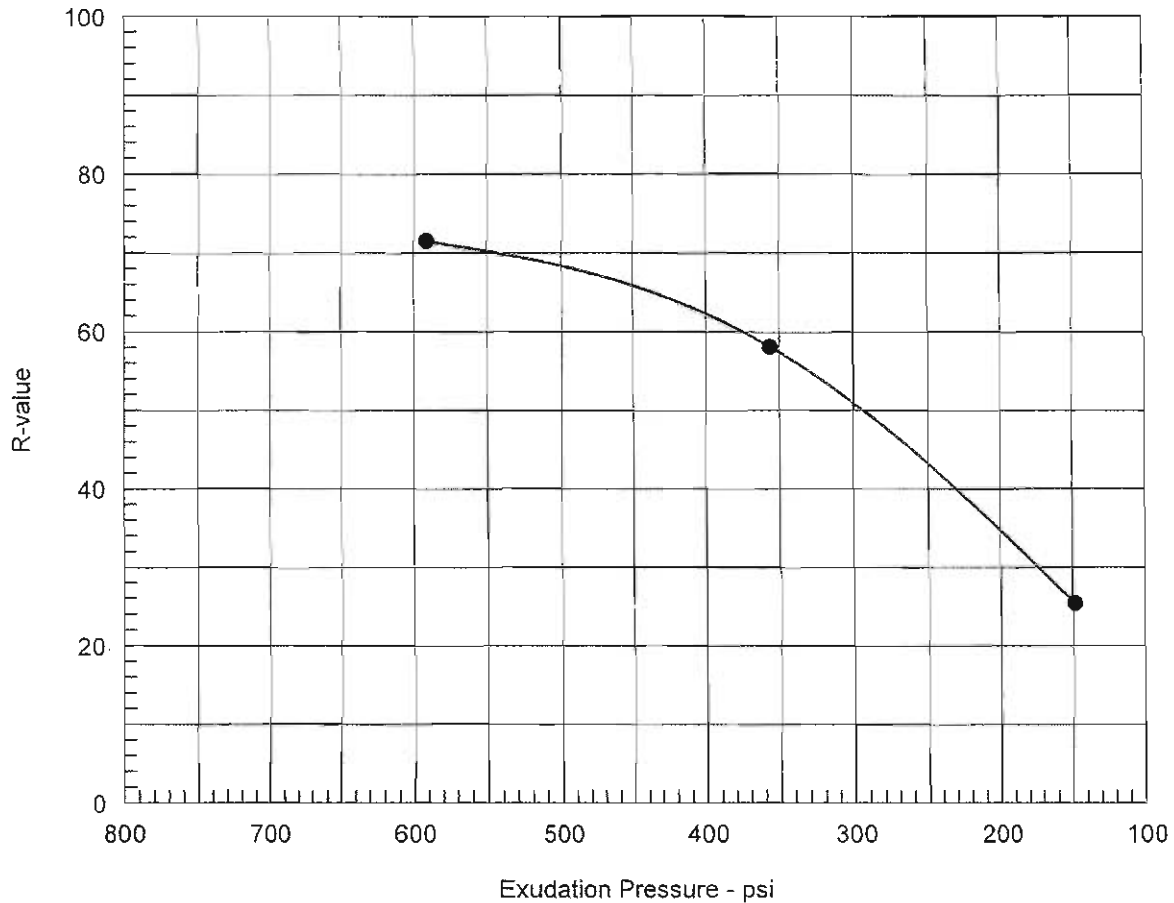


Resistance R-Value and Expansion Pressure - Cal Test 301

No.	Compact. Pressure psi	Density pcf	Moist. %	Expansion Pressure psi	Horizontal Press. psi @ 160 psi	Sample Height in.	Exud. Pressure psi	R Value	R Value Corr.
1	350	123.7	13.2	0.24	99	2.55	302	25	25
2	263	119.5	13.9	0.12	103	2.67	245	22	24
3	234	120.1	14.6	0.09	106	2.67	189	20	22

Test Results	Material Description
R-value at 300 psi exudation pressure = 25	SANDY SILT, olive brown (decomposed metavolcanic rock)
Project No.: 556.2 Project: Silva Valley Parkway Interchange Project Source of Sample: A-10-156 Depth: 0.5-8.0' Sample Number: D2 Date: 9/24/2010	Tested by: MDR Checked by: RBL Remarks:
R-VALUE TEST REPORT Blackburn Consulting	

R-VALUE TEST REPORT



Resistance R-Value and Expansion Pressure - Cal Test 301

No.	Compact. Pressure psi	Density pcf	Moist. %	Expansion Pressure psi	Horizontal Press. psi @ 160 psi	Sample Height in.	Exud. Pressure psi	R Value	R Value Corr.
1	350	127.8	11.3	0.00	30	2.55	591	71	71
2	224	126.8	12.1	0.00	47	2.53	356	58	58
3	102	123.3	13.8	0.00	94	2.51	148	25	25

Test Results	Material Description
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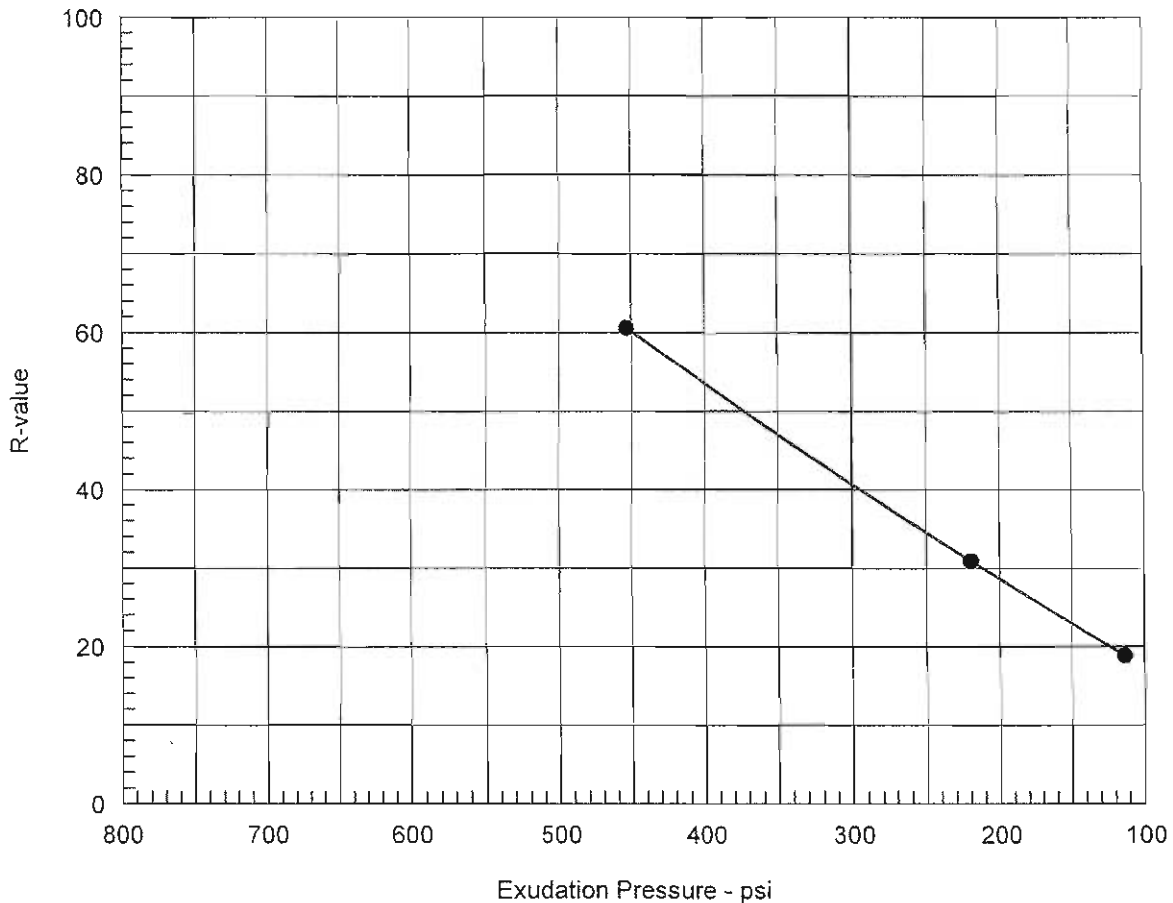
R-value at 300 psi exudation pressure = 51

SILTY, CLAYEY GRAVEL with SAND, dusky red, (decomposed metavolcanic rock)

Project No.: 556.2
Project: Silva Valley Parkway Interchange Project
Source of Sample: T-103 **Depth:** 0-2.0'
Sample Number: D1
Date: 9/10/2010

Tested by: BKR
Checked by: MDR
Remarks:
 70.3% retained on No. 4 sieve.

R-VALUE TEST REPORT

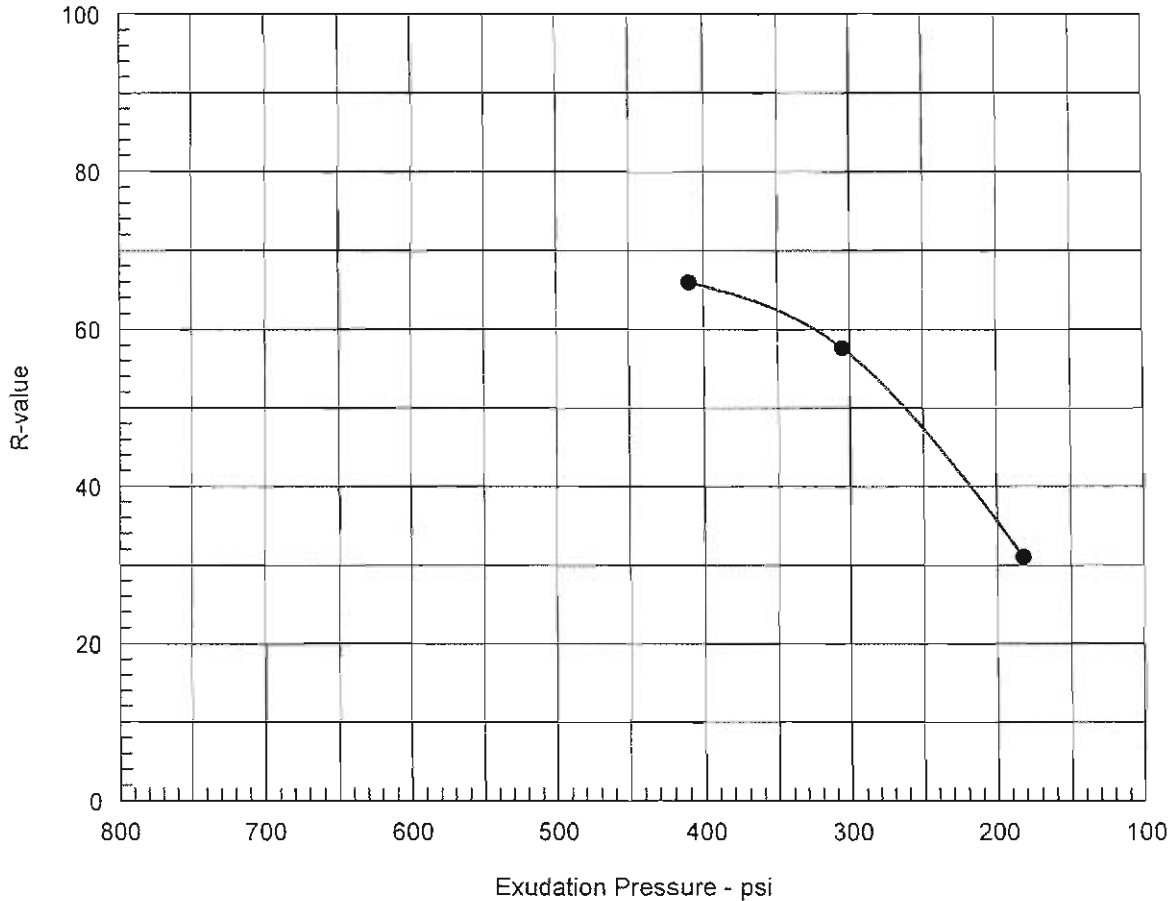


Resistance R-Value and Expansion Pressure - Cal Test 301

No.	Compact. Pressure psi	Density pcf	Moist. %	Expansion Pressure psi	Horizontal Press. psi @ 160 psi	Sample Height in.	Exud. Pressure psi	R Value	R Value Corr.
1	350	189.5	10.7	0.00	43	2.45	453	61	61
2	203	129.6	12.4	0.00	87	2.50	220	31	31
3	61	126.3	13.7	0.00	108	2.54	113	19	19

Test Results	Material Description
R-value at 300 psi exudation pressure = 41	SILTY, CLAYEY SAND with GRAVEL, red, (decomposed metavolcanic rock)
Project No.: 556.2 Project: Silva Valley Parkway Interchange Project Source of Sample: T-108 Depth: 0-2.5' Sample Number: D1 Date: 9/10/2010	Tested by: BKR Checked by: MDR Remarks: 49.8% retained on No. 4 sieve.
R-VALUE TEST REPORT Blackburn Consulting	Figure _____

R-VALUE TEST REPORT

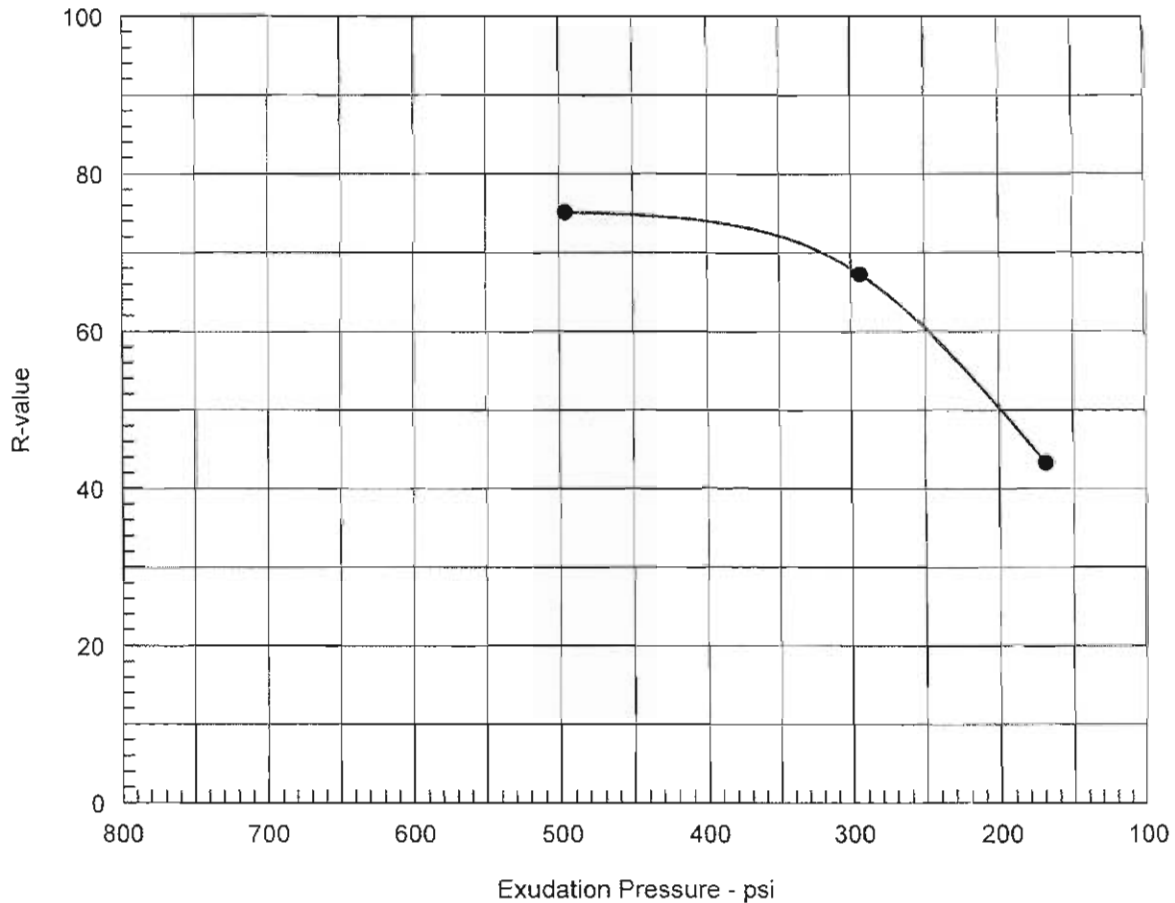


Resistance R-Value and Expansion Pressure - Cal Test 301

No.	Compact. Pressure psi	Density pcf	Moist. %	Expansion Pressure psi	Horizontal Press. psi @ 160 psi	Sample Height in.	Exud. Pressure psi	R Value	R Value Corr.
1	350	129.2	11.1	0.00	35	2.53	410	66	66
2	350	127.9	12.0	0.00	50	2.65	305	54	58
3	142	124.7	13.3	0.00	87	2.60	182	29	31

Test Results	Material Description
R-value at 300 psi exudation pressure = 57	SILTY, CLAYEY SAND with GRAVEL, red, (decomposed metavolcanic rock)
Project No.: 556.2 Project: Silva Valley Parkway Interchange Project Source of Sample: T-119 Depth: 0-2.5' Sample Number: D1 Date: 9/10/2010	Tested by: BKR Checked by: MDR Remarks: 28.6% retained on No. 4 sieve.
R-VALUE TEST REPORT Blackburn Consulting	Figure _____

R-VALUE TEST REPORT



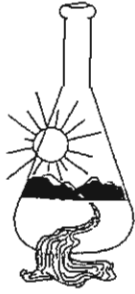
Resistance R-Value and Expansion Pressure - Cal Test 301

No.	Compact. Pressure psi	Density pcf	Moist. %	Expansion Pressure psi	Horizontal Press. psi @ 160 psi	Sample Height in.	Exud. Pressure psi	R Value	R Value Corr.
1	350	118.5	14.5	0.00	25	2.50	496	75	75
2	282	117.2	15.4	0.00	34	2.50	294	67	67
3	224	115.9	16.2	0.00	64	2.60	169	41	43

Test Results	Material Description
--------------	----------------------

<p>R-value at 300 psi exudation pressure = 68</p>	<p>SILTY, CLAYEY SAND with GRAVEL, dusky red (decomposed metavolcanic rock)</p>
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<p>Project No.: 556.2 Project: Silva Valley Parkway Interchange Project Source of Sample: T-122 Depth: 0-3.5' Sample Number: D1 Date: 9/10/2010</p>	<p>Tested by: BKR Checked by: MDR Remarks: 42.9% retained on No. 4 sieve.</p>
--	---



Sunland Analytical

11353 Pyrites Way, Suite 4
Rancho Cordova, CA 95670
(916) 852-8557

Date Reported 09/17/2010
Date Submitted 09/14/2010

To: Ken Colburn
Blackburn Consulting
11521 Blocker Dr. Ste. 110
Auburn, CA 95603

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager

The reported analysis was requested for the following location:
Location : SILVA VLY PKWY INTER Site ID : R-10-004-S2B.
Thank you for your business.

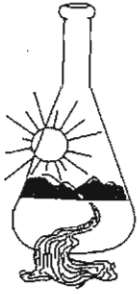
* For future reference to this analysis please use SUN # 58852-119538.

EVALUATION FOR SOIL CORROSION

Soil pH	7.08		
Minimum Resistivity	1.42	ohm-cm (x1000)	
Chloride	17.0 ppm	00.00170	%
Sulfate	67.5 ppm	00.00675	%

METHODS

pH and Min.Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422



Sunland Analytical

11353 Pyrites Way, Suite 4
Rancho Cordova, CA 95670
(916) 852-8557

Date Reported 09/17/2010
Date Submitted 09/14/2010

To: Ken Colburn
Blackburn Consulting
11521 Blocker Dr. Ste. 110
Auburn, CA 95603

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager

The reported analysis was requested for the following location:
Location : SILVA VLY PKWY INTER Site ID : R-10-005-S1B.
Thank you for your business.

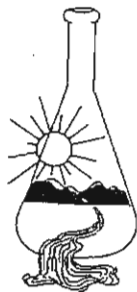
* For future reference to this analysis please use SUN # 58852-119539.

EVALUATION FOR SOIL CORROSION

Soil pH	5.63		
Minimum Resistivity	3.22	ohm-cm (x1000)	
Chloride	13.6 ppm	00.00136	%
Sulfate	35.5 ppm	00.00355	%

METHODS

pH and Min. Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422



Sunland Analytical

11353 Pyrites Way, Suite 4
Rancho Cordova, CA 95670
(916) 852-8557

Date Reported 09/17/2010
Date Submitted 09/14/2010

To: Ken Colburn
Blackburn Consulting
11521 Blocker Dr. Ste. 110
Auburn, CA 95603

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager

The reported analysis was requested for the following location:
Location : SILVA VLY PKWY INTER Site ID : R10-006-S1B.
Thank you for your business.

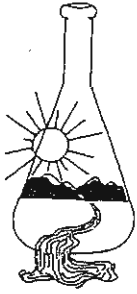
* For future reference to this analysis please use SUN # 58852-119540.

EVALUATION FOR SOIL CORROSION

Soil pH	5.30		
Minimum Resistivity	6.97	ohm-cm (x1000)	
Chloride	14.0 ppm	00.00140	%
Sulfate	0.2 ppm	00.00002	%

METHODS

pH and Min.Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422



Sunland Analytical

11353 Pyrites Way, Suite 4
Rancho Cordova, CA 95670
(916) 852-8557

Date Reported 09/17/2010
Date Submitted 09/14/2010

To: Ken Colburn
Blackburn Consulting
11521 Blocker Dr. Ste. 110
Auburn, CA 95603

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager

The reported analysis was requested for the following location:
Location : SILVA VLY PKWY INTER Site ID : A-10-136-D1.
Thank you for your business.

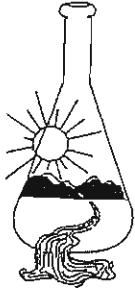
* For future reference to this analysis please use SUN # 58852-119541.

EVALUATION FOR SOIL CORROSION

Soil pH	7.37		
Minimum Resistivity	2.06	ohm-cm (x1000)	
Chloride	24.3 ppm	00.00243	%
Sulfate	65.2 ppm	00.00652	%

METHODS

pH and Min.Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422



Sunland Analytical

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Rancho Cordova, CA 95670
(916) 852-8557

Date Reported 09/17/2010
Date Submitted 09/14/2010

To: Ken Colburn
Blackburn Consulting
11521 Blocker Dr. Ste. 110
Auburn, CA 95603

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager

The reported analysis was requested for the following location:
Location : SILVA VLY PKWY INTER Site ID : T-10-107-D1.
Thank you for your business.

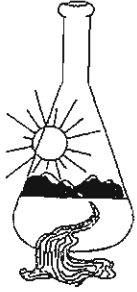
* For future reference to this analysis please use SUN # 58852-119542.

EVALUATION FOR SOIL CORROSION

Soil pH	5.71		
Minimum Resistivity	5.63	ohm-cm (x1000)	
Chloride	15.0 ppm	00.00150	%
Sulfate	0.4 ppm	00.00004	%

METHODS

pH and Min.Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422



Sunland Analytical

11353 Pyrites Way, Suite 4
Rancho Cordova, CA 95670
(916) 852-8557

Date Reported 09/17/2010
Date Submitted 09/14/2010

To: Ken Colburn
Blackburn Consulting
11521 Blocker Dr. Ste. 110
Auburn, CA 95603

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager

The reported analysis was requested for the following location:
Location : SILVA VLY PKWY INTER Site ID : T-10-109-D1.
Thank you for your business.

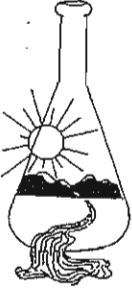
* For future reference to this analysis please use SUN # 58852-119543.

EVALUATION FOR SOIL CORROSION

Soil pH	6.11		
Minimum Resistivity	3.22	ohm-cm (x1000)	
Chloride	13.8 ppm	00.00138	%
Sulfate	0.8 ppm	00.00008	%

METHODS

pH and Min. Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422



Sunland Analytical

11353 Pyrites Way, Suite 4
Rancho Cordova, CA 95670
(916) 852-8557

Date Reported 09/17/2010
Date Submitted 09/14/2010

To: Ken Colburn
Blackburn Consulting
11521 Blocker Dr. Ste. 110
Auburn, CA 95603

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager

The reported analysis was requested for the following location:
Location : SILVA VLY PKWY INTER Site ID : T-10-112-D1.
Thank you for your business.

* For future reference to this analysis please use SUN # 58852-119544.

EVALUATION FOR SOIL CORROSION

Soil pH	5.80		
Minimum Resistivity	4.29	ohm-cm (x1000)	
Chloride	10.5 ppm	00.00105	%
Sulfate	< .1		

METHODS

pH and Min.Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422



567 West Shaw Avenue Suite B
Fresno CA 93704
P 559.497.2880
F 559.497.2886
www.bskassociates.com

VIA US MAIL

September 15, 2010

Mr. Ken Colburn
Blackburn Consulting
11521 Blocker Drive, Suite 110
Auburn, CA 95603

BSK Job G1008510F
BSK SAMPLE ID: F10-498

SUBJECT: Laboratory Testing Results
PO 10050 – Silva Parkway Interchange
Sample Date: 7/2/2010

Dear Mr. Colburn:

BSK has performed testing on a soil sample shipped to our laboratory identified as follows:

T-120 / D2 @ 4' - 5'

Testing was performed in accordance with Caltrans Test Methods and consisted of Minimum Resistivity and pH (Caltrans Test Method 643), Sulfate Content (Caltrans Test Method 417), and Chloride Content (Caltrans Test Method 422). The results are tabulated below and the test reports are enclosed.

Sample ID	Minimum Resistivity, Ohm-cm @ 15.5°C	pH	Sulfate, mg/kg	Chloride, mg/kg
T-120 / D2 @ 4' - 5'	2,250	7.6 @ 21.2°C	7.8	13

BSK appreciates the opportunity to be of service to Blackburn Consulting and looks forward to being of service to you in the future. Please call with any questions you may have @ 559-497-2870.

Respectfully,
BSK Associates

Nathan M. Shwiyhat, P.E.
Project Engineer

Enclosures: Minimum Resistivity Test Report
Analytical Report

Distribution: Client (1 original, 1 E-Copy)
BSK File

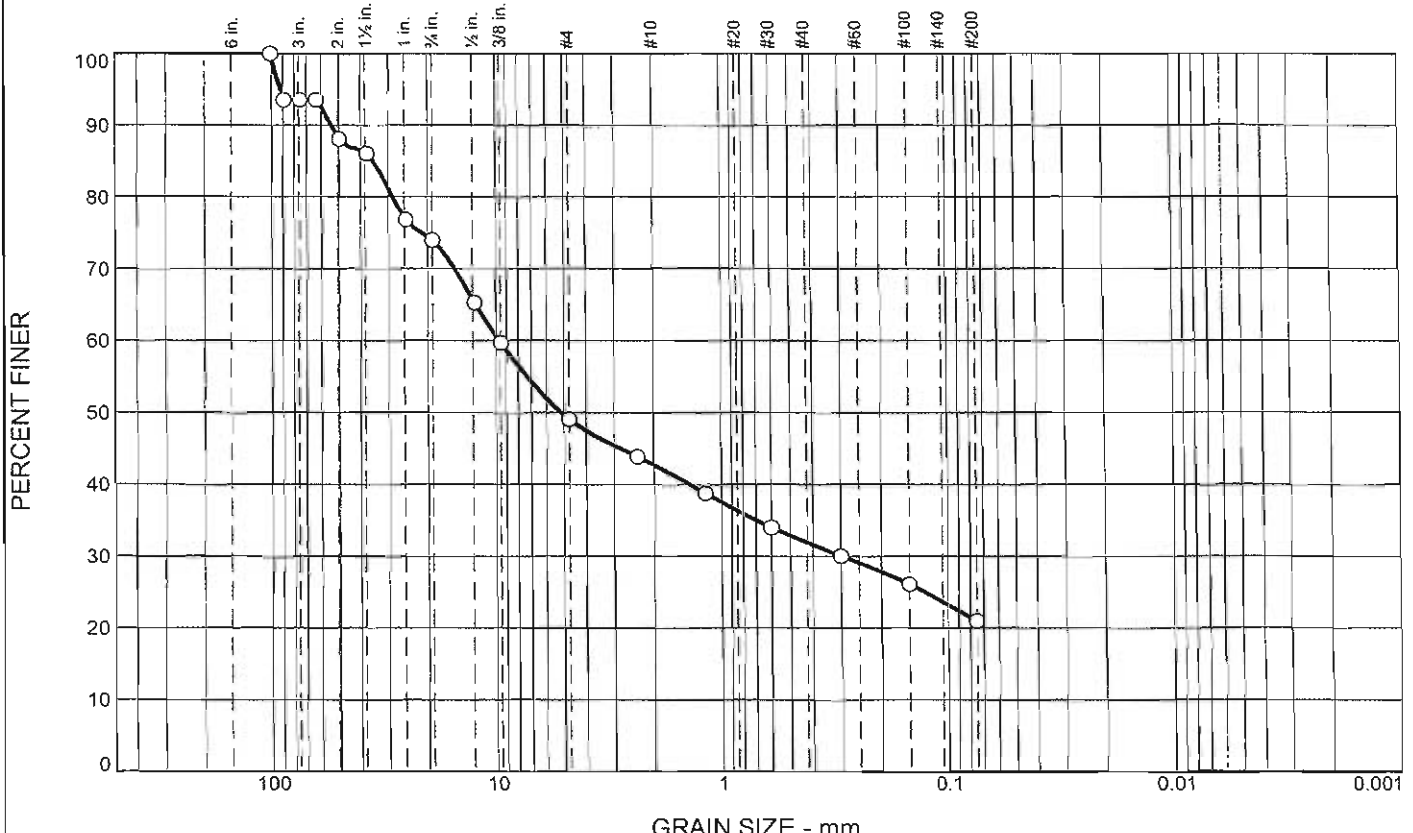


Project Name: Silva Valley Parkway IC
 BCI File No: 556.2
Field Resistivity Test Locations

**pH Measurement of Soil
 CTM 643**

Sample No:	1	2	3	4		
Sample Location:	RS-1	RS-2	RS-3	RS-4		
Soil Type:	ML	ML	ML/SM	SM		
Date:	9/27	9/27	9/27	9/27		
Temperature (°F) 77 ± 2 (25°C ±1)	25.0	24.2	24.5	24.5		
Required Amount of Dry Soil (g)	30.0	30.0	30.0	30.0		
Measured Amount of Dry Soil (g)	30.0	30.0	30.0	30.0		
Distilled Water (mL)	30.0	30.0	30.0	30.0		
Stand Time (start) minimum 1 hr.	8:30 AM	8:30 AM	8:30 AM	8:30 AM		
Stand Time (finish)	10:12 AM	10:15 AM	10:18 AM	10:20 AM		
pH Reading (0.00)	6.15	6.30	5.26	5.35		

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
6.5	19.5	24.9	6.4	10.8	10.9	21.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
4.0"	100.0		
3.5"	93.5		
3.0"	93.5		
2.5"	93.5		
2.0"	88.1		
1.5"	86.0		
1.0"	76.8		
3/4"	74.0		
1/2"	65.3		
3/8"	59.7		
#4	49.1		
#8	43.8		
#16	38.7		
#30	34.0		
#50	30.0		
#100	26.1		
#200	21.0		

Soil Description

Metavolcanic Rock, yellowish brown, decomposed (SILTY GRAVEL with SAND)

Atterberg Limits

PL= LL= PI= NP

Coefficients

D₉₀= 54.3331 D₈₅= 35.1133 D₆₀= 9.6739
D₅₀= 5.1541 D₃₀= 0.3002 D₁₅=
D₁₀= C_u= C_c=

Classification

USCS= GM AASHTO=

Remarks

1 Piece retained on 3.5" sieve. Sample was hand shaken for entire sieve analysis.

(no specification provided)

Source of Sample: T-121 Depth: N/A
Sample Number: D2

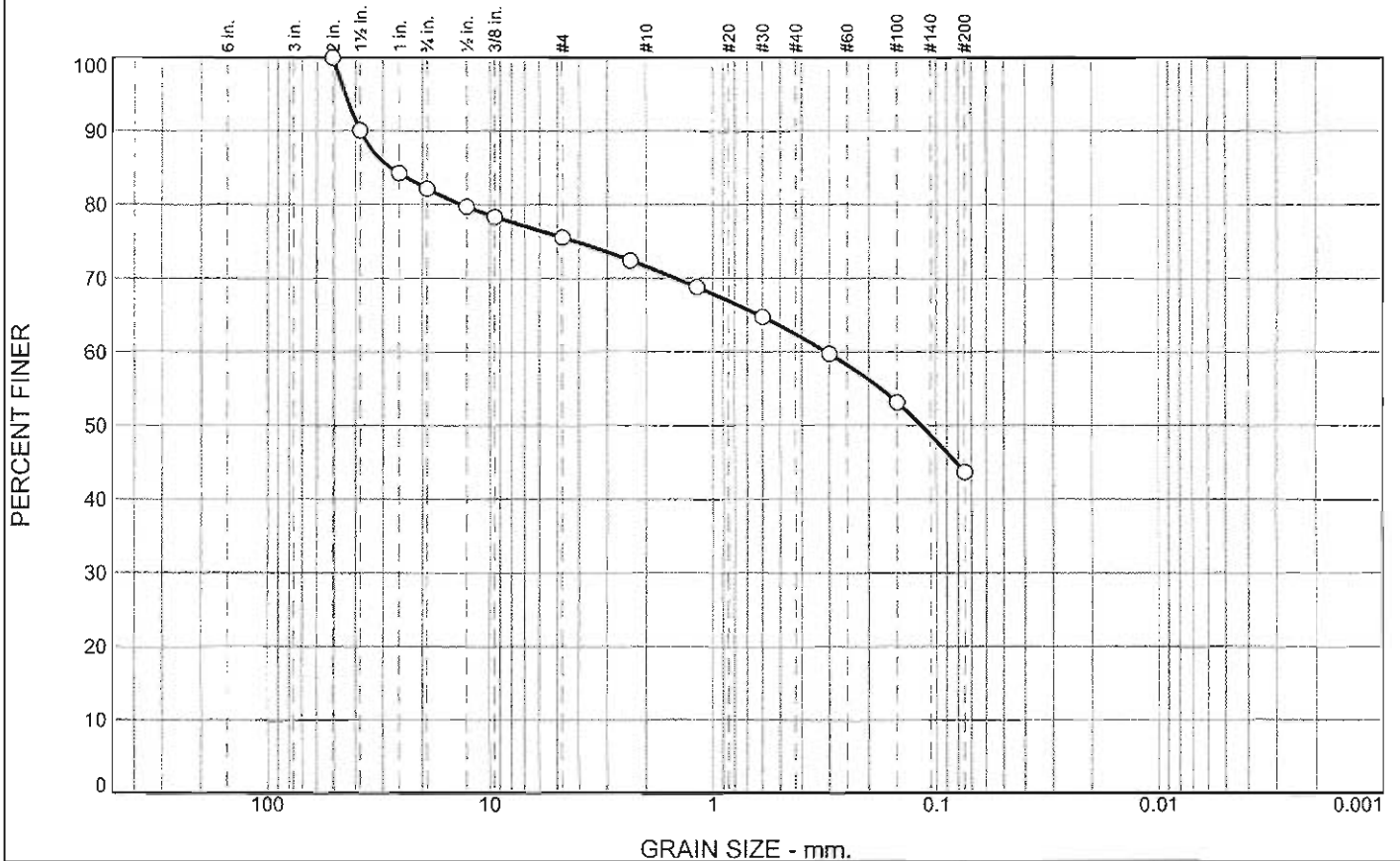
Date: 9-14-10

<p>Blackburn Consulting</p> <p>W. Sacramento, CA</p>	<p>Client: Mark Thomas & Company, Inc.</p> <p>Project: Silva Valley Parkway Interchange Project</p> <p>Project No: 556.2</p> <p style="text-align: right;">Figure</p>
--	---

Tested By: MAR

Checked By: MDR

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	17.8	6.6	4.0	9.2	18.7	43.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
2"	100.0		
1.5"	90.1		
1"	84.3		
3/4"	82.2		
1/2"	79.7		
3/8"	78.3		
#4	75.6		
#8	72.4		
#16	68.8		
#30	64.7		
#50	59.7		
#100	53.2		
#200	43.7		

Material Description

Reddish Brown Silty Clayey SAND with Gravel

Atterberg Limits

PL= 20 LL= 24 PI= 4

Coefficients

D₉₀= 37.9937 D₈₅= 27.6331 D₆₀= 0.3104
D₅₀= 0.1168 D₃₀= D₁₅=
D₁₀= C_u= C_c=

Classification

USCS= SC-SM AASHTO= A-4(0)

Remarks

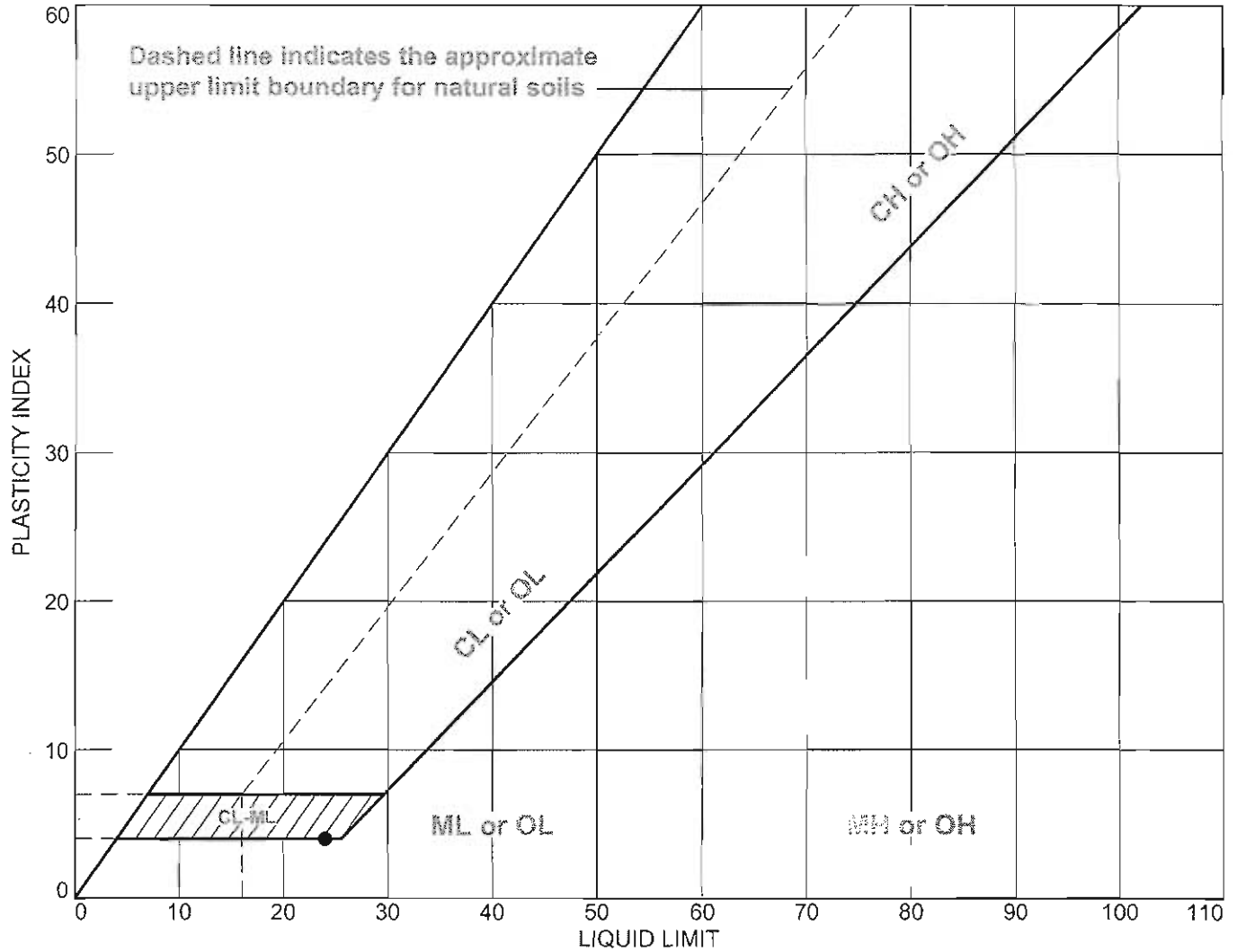
* (no specification provided)

Sample Number: TP-10-114-D1 Depth: 0.0-2.0 Date: 9-17-2010

Blackburn Consulting Auburn, CA	Client: MTCo Project: Silva Parkway Interchange Project No: 556.2
Figure	

Tested By: KLC Checked By: KLC

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
•		TP-10-114-D1	0.0-2.0		20	24	4	SC-SM

Blackburn Consulting

Auburn, CA

Client: MTCo

Project: Silva Parkway Interchange

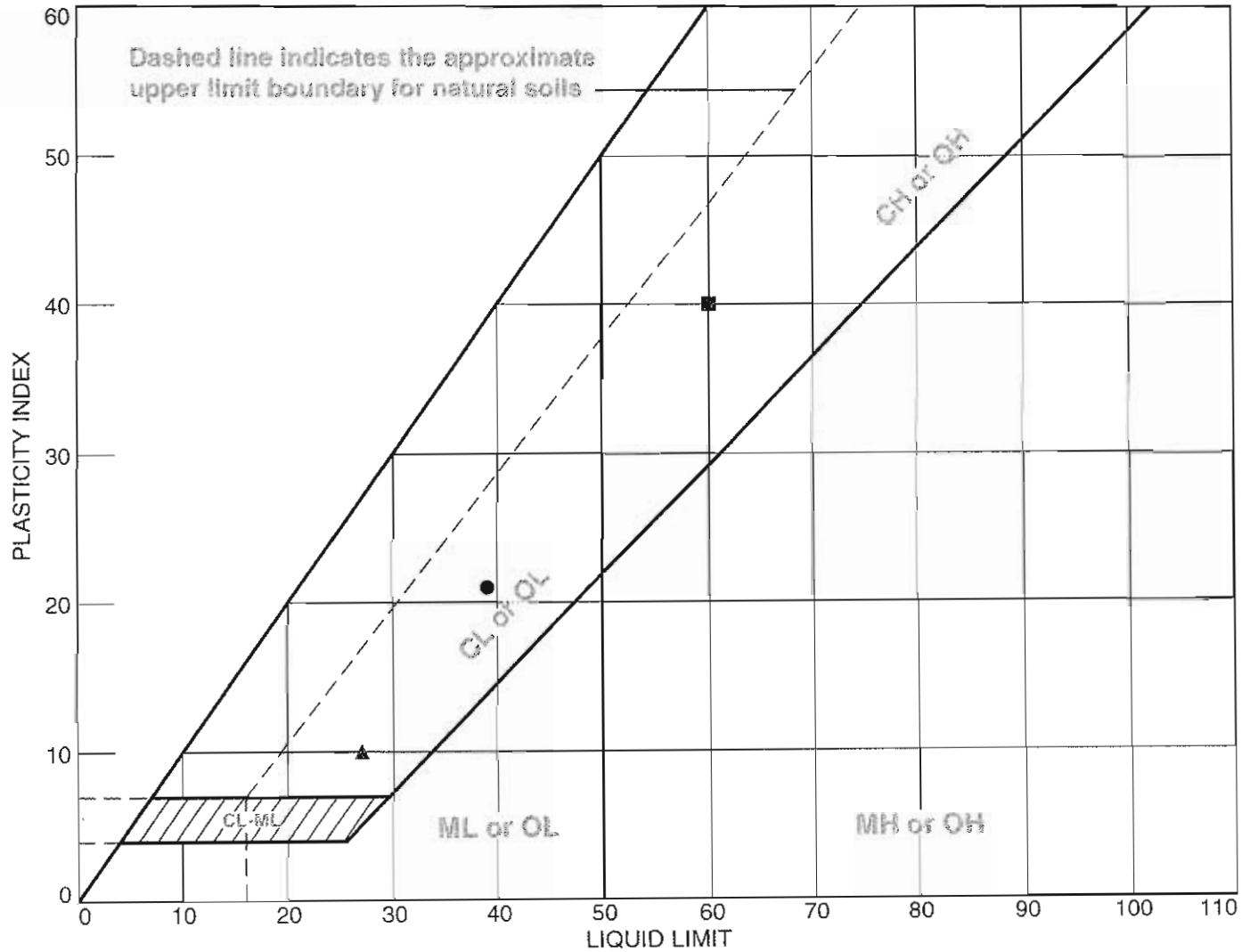
Project No.: 556.2

Figure

Tested By: KLC

Checked By: KLC

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●		T-10-153-D1	1.5'-6.0'		18	39	21	
■		T-10-149-D1	1.5'-4.0'		20	60	40	
▲		T-10-147-D1	3.0'-7.0'		17	27	10	

Blackburn Consulting
Auburn, CA

Client: MTCo
Project: Silva Parkway Interchange
Project No.: 556.2

Figure

Tested By: KLC

Checked By: KLC



Project Name: Silva Valley Parkway

Date: 9/10/10

Project No: 556.2

Tested by: _____

Boring/Sample No.: T-121-D2

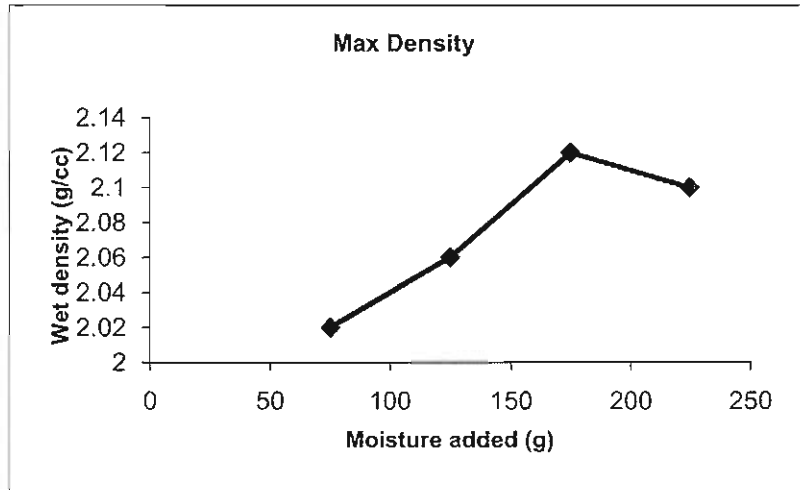
Depth / Location: N/A

Sample Description: Metavolcanic Rock, yellowish brown, decomposed
(SILTY GRAVEL with SAND)

IMPACT TEST DATA					SAND VOLUME DATA	
Initial Wet Weight of Sample (g)	2300				Initial Sand wt (g)	N/A
Specimen Number	1	2	3	4	Residue wt (g)	N/A
Water Adjustment (g)	75	125	175	225	Sand used	
Tamper Reading	10.8	10.6	10.3	10.4	Cone Correction (g)	
Wet Density (g/cc)	2.02	2.06	2.12	2.1	Sand in hole (g)	
					Sand Density (g/cc)	
					Volume of Hole	
					Wet Density (g/cc)	

Rock Correction

Total Sample (g)	16597.5
+3/4" in Air (g)	4611.5
+3/4" in Water (g)	2696.5
+3/4" Volume (cc)	1915.0
% +3/4"	27.8
% -3/4"	72.2
Density +3/4" (g/cc)	2.408
% +3/4" / Den. +3/4"	11.77
% -3/4" / Den. -3/4"	34.06
SUM	45.84
Adj. density (g/cc)	2.18



MOISTURE ADJUSTMENT FOR AGGREGATE BASE PAY QUANTITY

Inplace Wet		Test Spec Wet	
Inplace dry		Test Spec Dry	
Inplace Water		Test Spec Water	
Inplace % Water		Test Spec % Water	

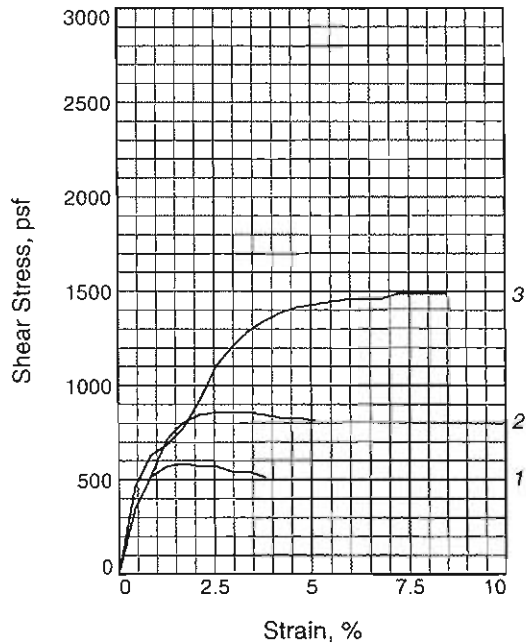
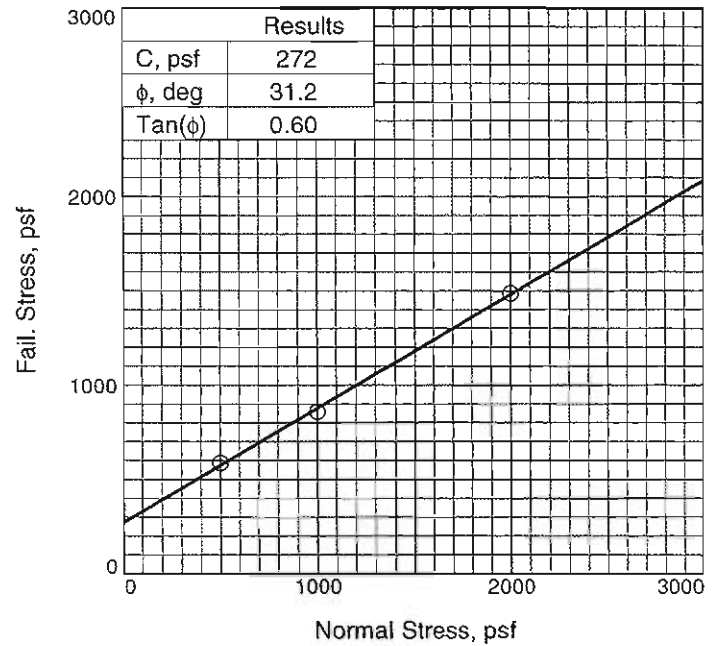
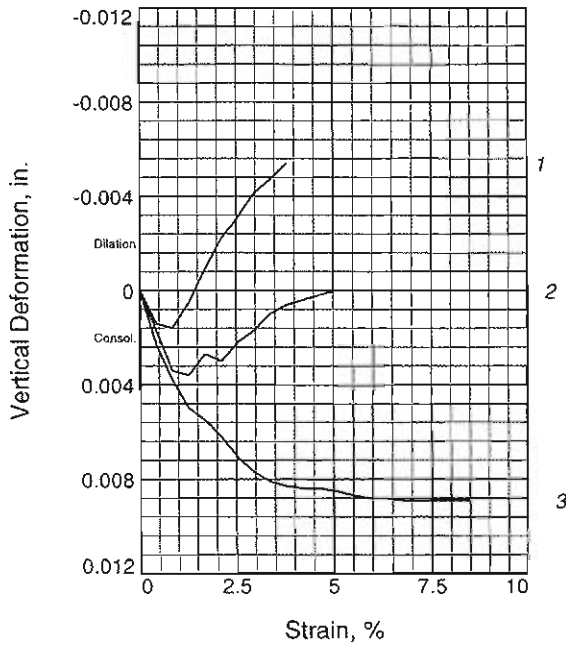
%+3/4 Adjustment
0.98

Dry Density Calculation

Tare #	0	Max Wet Density (g/cc)	2.18
Tare wt (g)	0	Max Dry Density (g/cc)	
Tare + wet (g)	0	Max Wet Density (pcf)	136.2
Tare + dry (g)	0	Max Dry Density (pcf)	
% Moisture			

%+3/4 Adjustment	
20	1.00
21-25	0.99
26-30	0.98
31-35	0.97
36-40	0.96
41-45	0.95
46-50	0.94

Remarks: _____



Sample No.	1	2	3	
Initial	Water Content, %	15.1	15.4	16.0
	Dry Density, pcf	109.7	109.6	108.9
	Saturation, %	75.9	77.1	78.7
	Void Ratio	0.5370	0.5383	0.5474
	Diameter, in.	2.36	2.36	2.36
	Height, in.	0.94	0.94	0.94
At Test	Water Content, %	19.1	18.8	18.5
	Dry Density, pcf	111.1	111.7	112.5
	Saturation, %	100.0	100.0	100.0
	Void Ratio	0.5167	0.5088	0.4986
	Diameter, in.	2.36	2.36	2.36
	Height, in.	0.93	0.93	0.92
Normal Stress, psf	500	1000	2000	
Fail. Stress, psf	586	858	1487	
Strain, %	1.7	2.5	7.2	
Ult. Stress, psf				
Strain, %				
Strain rate, in./min.	0.10	0.10	0.10	

Sample Type: Remolded
Description: Dusky Red, Silty Clayey SAND with Gravel (decomposed rock)
Assumed Specific Gravity= 2.70
Remarks: Remolded to 126 pcf wet density

Client: MTCO
Project: Silva Parkway Interchange
Sample Number: TP-10-122-D1 **Depth:** 0.0'-3.5'
Proj. No.: 556.2 **Date Sampled:**

DIRECT SHEAR TEST REPORT

Blackburn Consulting

Figure _____

Auburn Office:

11521 Blocker Drive, Suite 110 • Auburn, CA 95603
(530) 887-1494 • Fax (530) 887-1495



Modesto Office: (209) 522-6273
West Sacramento Office: (916) 375-8706

Rock Core Compression Test

(ASTM D7012)

BCI File No.: 556.2

Project Name: Silva Valley Interchange

Specimen	Depth (ft)	FINAL TRIM LENGTH (in.)	Trim Length (in.)	ORIGINAL LENGTH	DIAMETER (in.)	AREA (in. ²)	TOTAL LOAD (lbs.)	COMP STRENGTH (psi)	U/D RATIO	CORR. FACTOR	CORR. COMP. STRENGTH (psi)
R10-001	18.25-18.9	5.13	5.14	7.50	2.440	4.68	148980	31,860	2.10	1.01462	32330
R10-002	5.4-6.5	5.44	5.44	13.00	2.399	4.52	101660	22,490	2.27	1.0225991	23000
R10-003	20.0-20.65	5.36	5.36	7.75	2.400	4.52	69805	15,430	2.23	1.0210302	15750
R10-005	9.25-10.15	5.50	5.56	10.80	2.397	4.51	25585	5,670	2.29	1.0238017	5800
R10-006	13.0-14.25	5.50	5.50	15.00	2.395	4.51	25560	5,670	2.30	1.0238863	5810
R10-007	28.0-29.0	5.38	5.44	12.00	2.401	4.53	81265	17,950	2.24	1.0212764	18330
R10-008	14.5-15.2	5.13	5.19	8.50	2.410	4.56	50835	11,140	2.13	1.0158533	11320
R10-009	21.25-22.5	5.50	5.50	10.80	2.396	4.51	117550	26,070	2.30	1.023844	26690
R10-010	16.0-16.5	5.31	5.18	7.30	2.392	4.49	55995	12,460	2.22	1.0204035	12710
R10-126	21.73-22.65	5.38	5.44	10.80	2.397	4.51	99210	21,990	2.24	1.0214487	22460

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 (530) 887-1494 • Fax (530) 887-1495



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Rock Core Compression Test

(ASTM D7012)

BCI File No.: 556.2
 Project Name: Silva Valley Parkway

Specimen	Depth (ft)	FINAL TRIM LENGTH (in.)	Trim Length (in.)	ORIGINAL LENGTH (in.)	DIAMETER (in.)	AREA (in. ²)	TOTAL LOAD (lbs.)	COMP STRENGTH (psi)	L/D RATIO	CORR FACTOR	CORR COMP. STRENGTH H (psi)	DRY CORE WEIGHT (grams)	WET CORE WEIGHT	UNIT WEIGHT (pcf)
R10-141 Run 6	22.1-22.5	5.070	5.080	10.750	2.397	4.51	37765	8,370	2.12	1.015272	8500	1116	1116	186
R10-155 Run 1	7.25-7.50	3.090	3.130	3.630	1.765	2.45	12050	4,930	1.75	*	4930	331	331	167

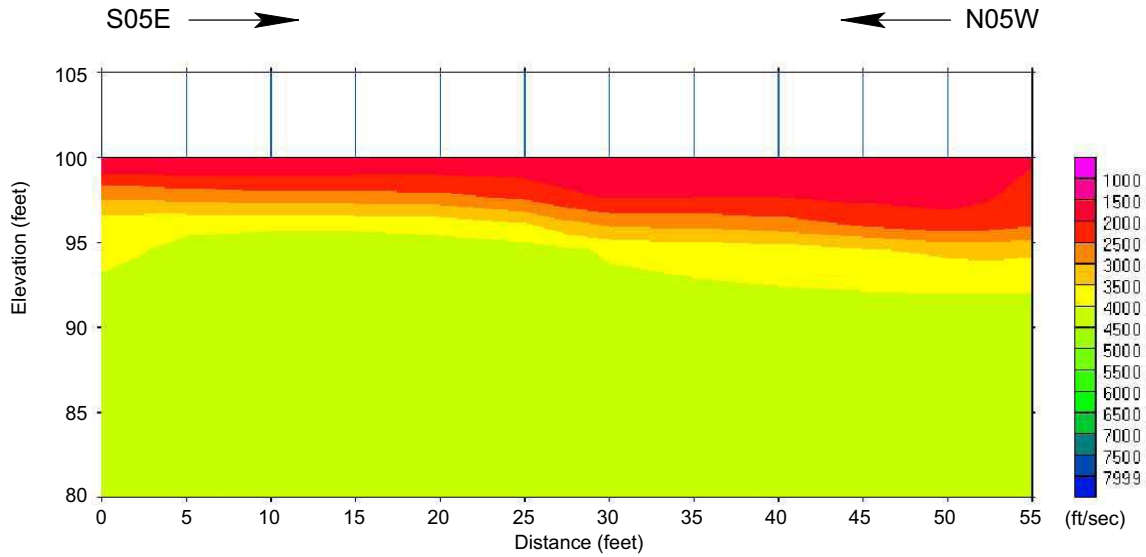
* L/D ratio does not conform to ASTM standards

Appendix C

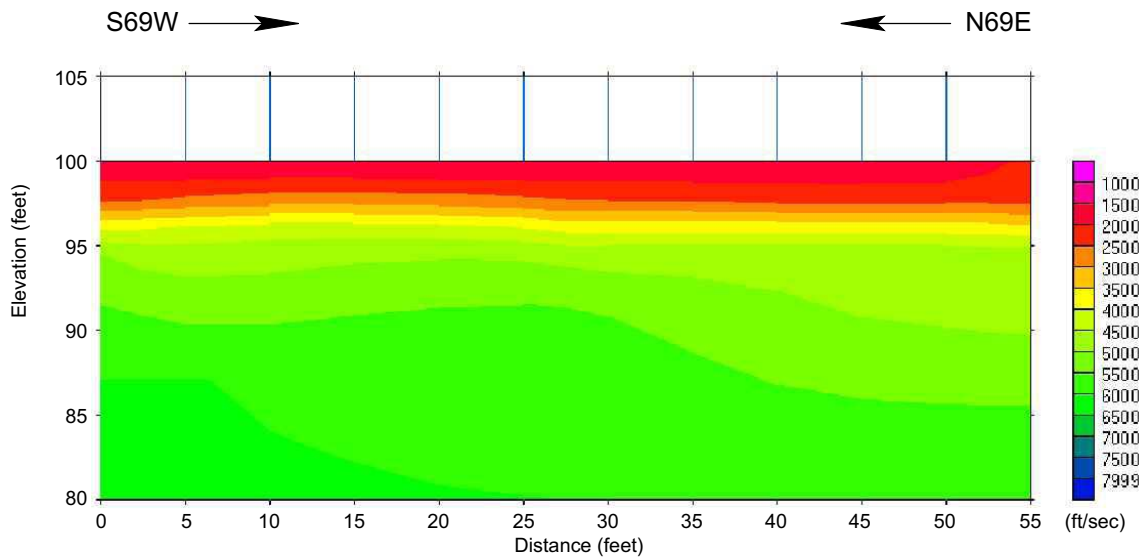
Seismic Refraction Profiles



SR1



SR2



3/16/2012 556.2 Silva Valley Parkway Seismic-Appendix C.dwg



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 Auburn, CA 95603
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 Fax: (530) 887-1495
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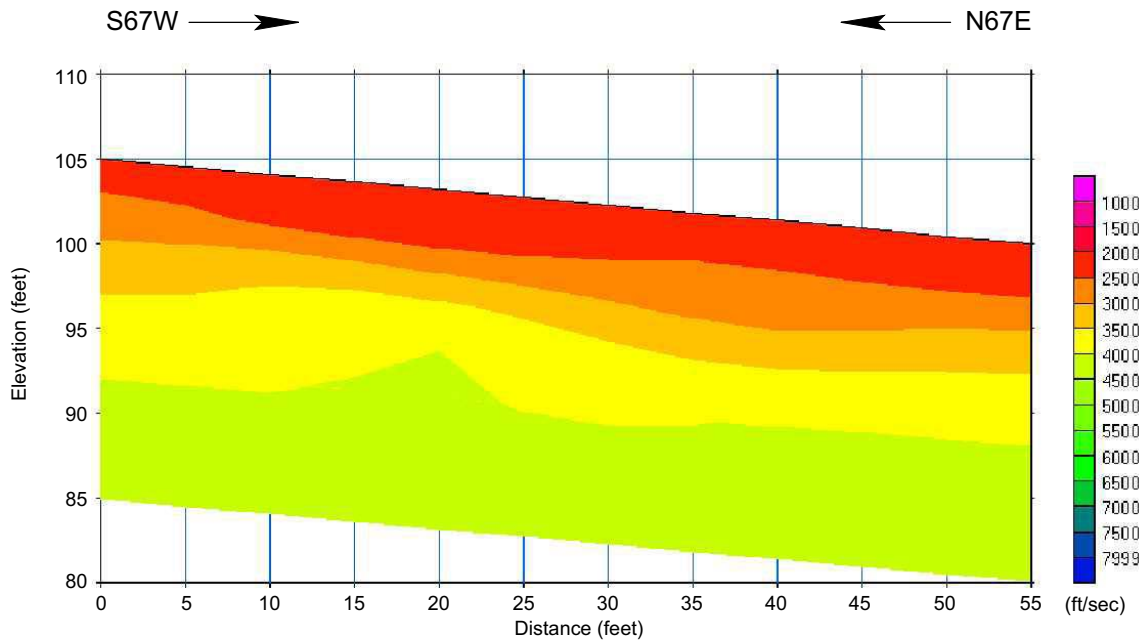
SEISMIC PROFILES
 Silva Valley Parkway Interchange
 EA 03-1E2901
 El Dorado County, California

File No. 556.2

October 2012

Appendix C

SR3



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Auburn, CA 95603
Phone: (530) 887-1494
Fax: (530) 887-1495
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SEISMIC PROFILES
Silva Valley Parkway Interchange
EA 03-1E2901
El Dorado County, California

File No. 556.2

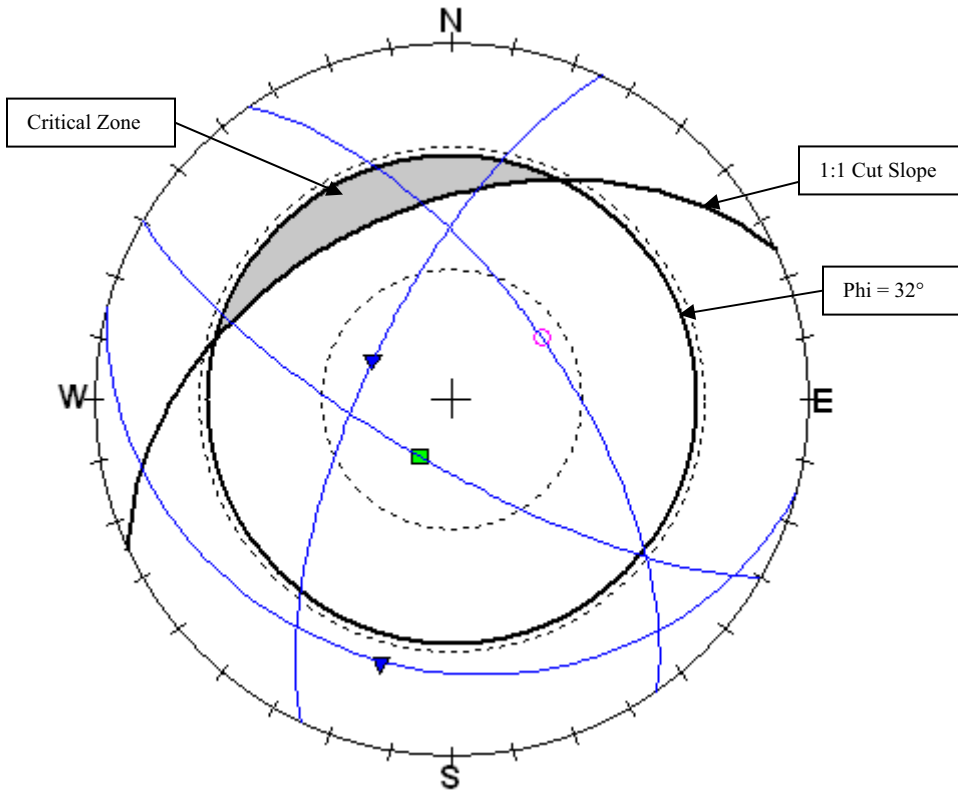
October 2012

Appendix C

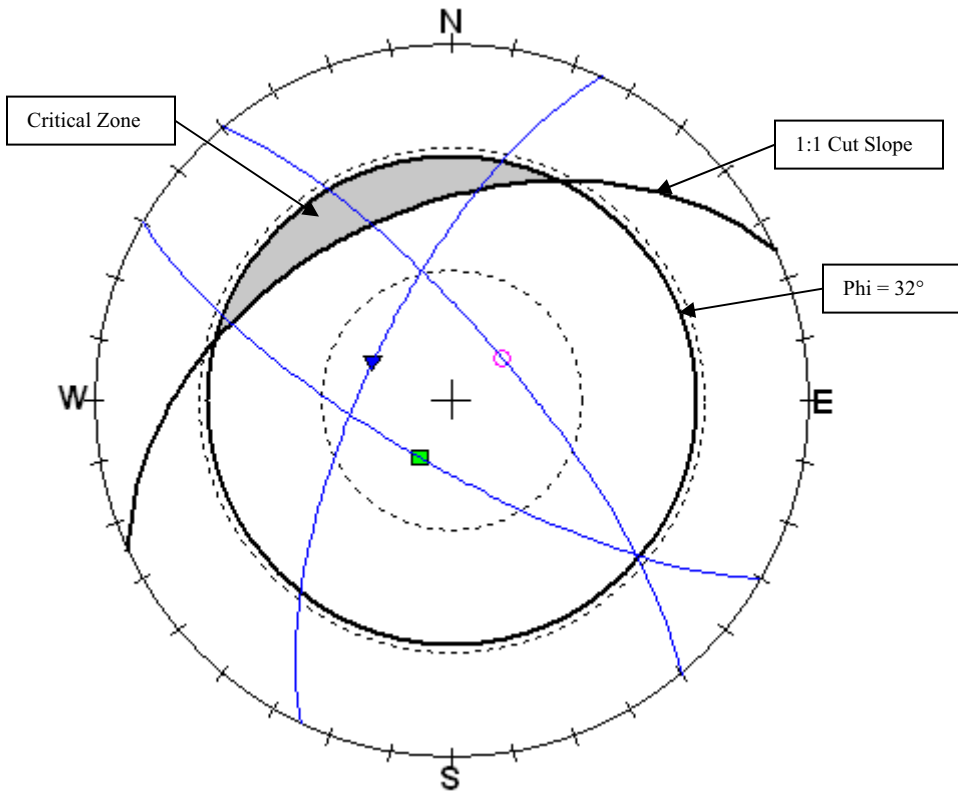
Appendix D

Calculations

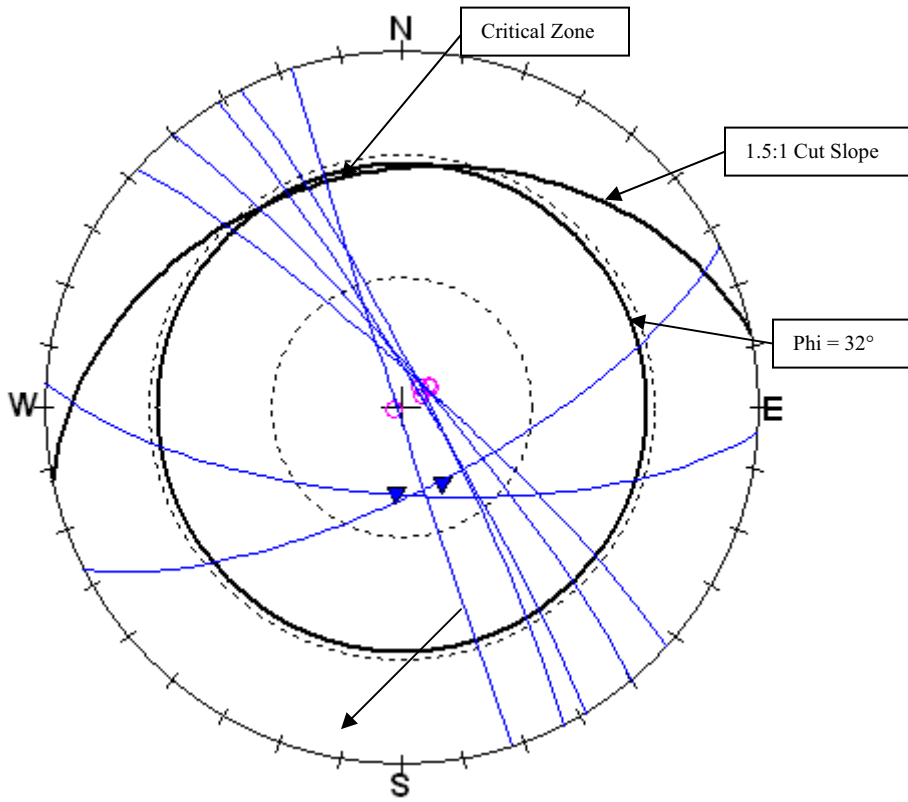




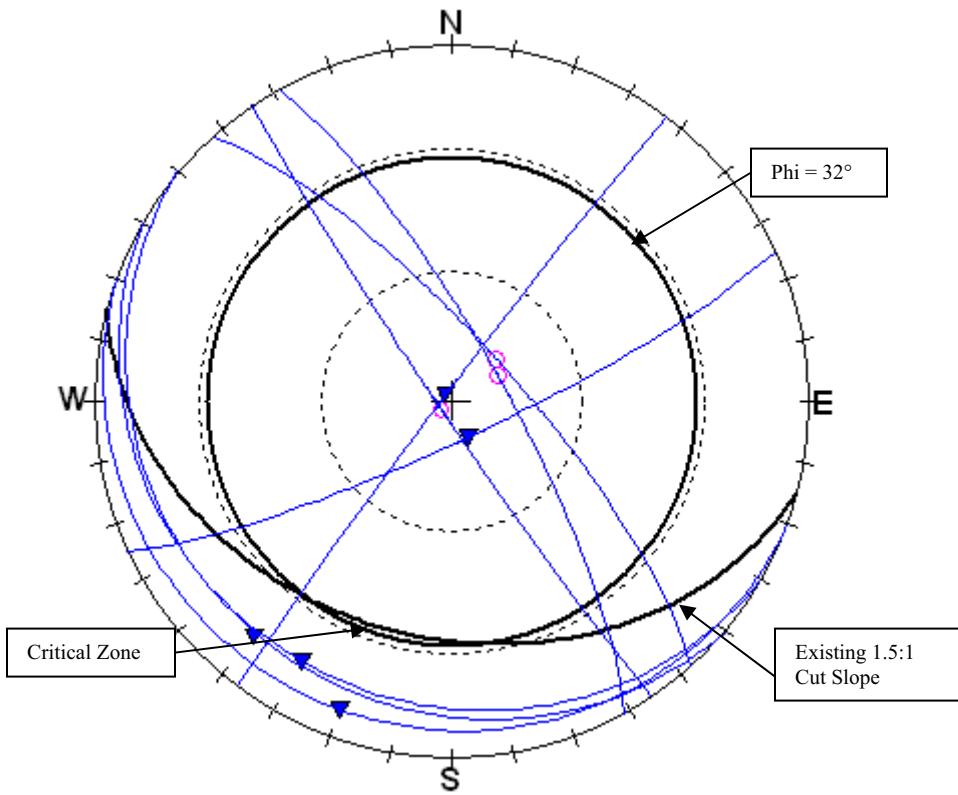
Stereonet Plot of Discontinuities, Eastbound Auxiliary Lane, 1:1 Cut
A2 Line 77+00 – 89+00, Western End



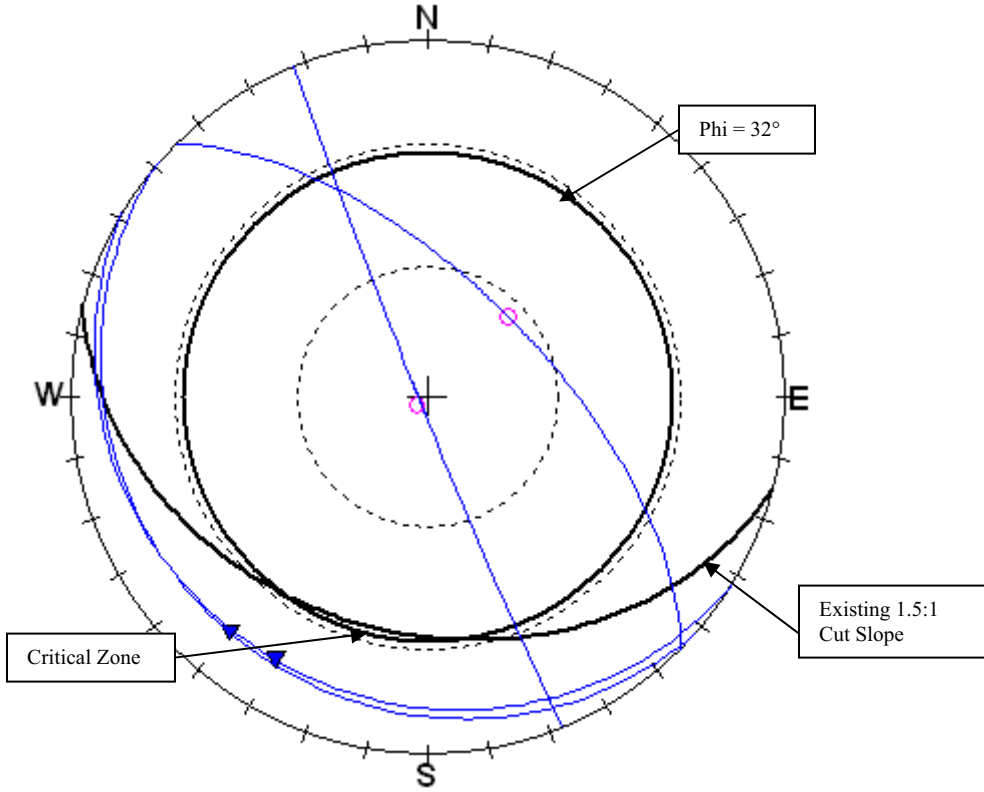
Stereonet Plot of Discontinuities, Eastbound Auxiliary Lane, 1:1 Cut
A2 Line 77+00 – 89+00, Eastern End



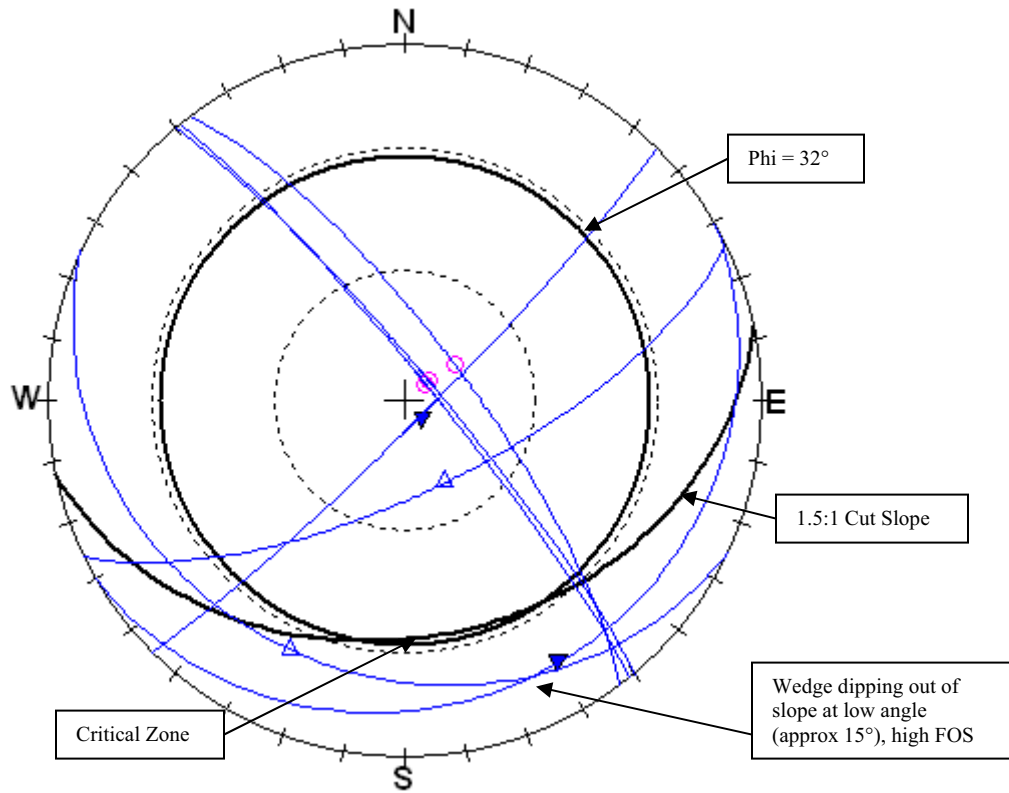
Stereonet Plot of Discontinuities, Silva Valley Parkway OC, 1.5:1 Cut At South Abutment (approximately A3R Line, 104+00 to 108+00)



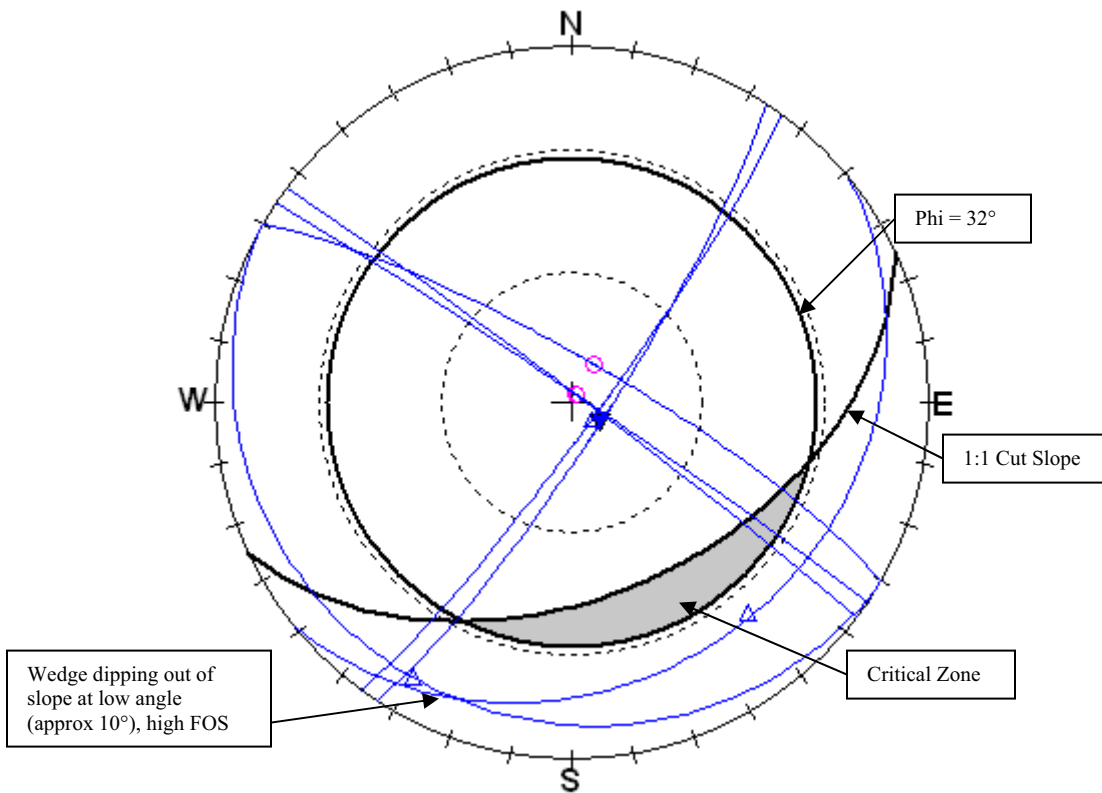
Stereonet Plot of Discontinuities, Westbound Auxiliary Lane Cut/Wall Approximately A3L Line 126+00 to 134+00, East End



Stereonet Plot of Discontinuities, Westbound Auxiliary Lane Cut/Wall Approximately A3L Line 126+00 to 134+00, West End



Stereonet Plot of Discontinuities, Silva Valley Parkway OC, 1.5:1 Cut At North Abutment (approximately A3L Line, 103+00 to 108+00)



Stereonet Plot of Discontinuities, Westbound Auxiliary Lane 1:1 Cut, Approximately A2 Line, Station 85+00 to 89+00

NOMINAL BEARING RESISTANCE -- STRENGTH LIMIT STATE (AASHTO Bridge Design Specifications)

Date: 10/1/2012
 Project: Silva Valley Parkway Interchange
 BCI No: 556.2

Support: **Retaining Wall No 1**
 Boring: T-10-111 and A-10-158
 Base of Footing: Varies at 663 to 669 ft

Equation: $q_n = cN_{cm} + \gamma D_f N_{qm} C_{wq} + 0.5 \gamma B N_{\gamma m} C_{w\gamma}$

in which:

$N_{cm} = N_c s_c i_c$

$N_{qm} = N_q s_q d_q i_q$

$N_{\gamma m} = N_\gamma s_\gamma i_\gamma$

D_w	C_{wq}	$C_{w\gamma}$
0	0.5	0.5
D_f	1.0	0.5
$>1.5B+D_f$	1.0	1.0

where:

- q_n = nominal bearing resistance
- c = cohesion (psf)
- B = footing width (feet)
- γ = total (moist) unit weight of soil (pcf)
- D_f = footing embedment depth (feet)
- $N_c, N_q, \text{ and } N_\gamma$ = bearing capacity factors
- $C_{wq} \text{ \& } C_{w\gamma}$ = correction factors for location of ground water
- $s_c, s_\gamma, \text{ and } s_q$ = footing shape correction factors
- d_q = correction factor to account for shearing resistance in material above bearing level
- $i_c, i_\gamma, \text{ and } i_q$ = load inclination factors
- D_w = depth to ground water taken from the ground surface (feet)

Input Parameters

γ =	125 (pcf)	d_q =	1.0	Bottom Footing Elevation (feet):	661.5
ϕ =	25 (degrees) *	i_c =	1.0	Finished Grade (feet):	665.0
c =	800 (psf) *	i_γ =	1.0	Ground Water Elevation (feet):	655.0
D_f =	3.5 (feet)	i_q =	1.0		
D_w =	10 (feet)	Resistance Factor (ϕ_b) =	0.50		

Solve for Nominal Bearing Resistance										Strength Limit State				
Case	Effective Footing Dimensions (feet)		C_{wq}	$C_{w\gamma}$	s_c	s_γ	s_q	Nominal Bearing Resistance			Factored Nominal Bearing Resistance			
	B'	L'						(psf)	(ksf)	(tsf)	(psf)	(ksf)	(tsf)	
Case 1	(feet)													
1	2.0	20.0	1.00	1.00	1.00	1.00	1.00	22600	22.60	11.3	11300	11.30	5.6	
2	6.0	20.0	1.00	0.86	1.15	0.88	1.14	27542	27.54	13.8	13771	13.77	6.9	
3	8.0	20.0	1.00	0.77	1.21	0.84	1.19	29043	29.04	14.5	14522	14.52	7.3	
4	10.0	20.0	1.00	0.72	1.26	0.80	1.23	30490	30.49	15.2	15245	15.24	7.6	
5	12.0	20.0	1.00	0.68	1.31	0.76	1.28	31882	31.88	15.9	15941	15.94	8.0	
6	14.0	20.0	1.00	0.65	1.36	0.72	1.33	33220	33.22	16.6	16610	16.61	8.3	
7	18.0	20.0	1.00	0.62	1.46	0.64	1.42	35732	35.73	17.9	17866	17.87	8.9	
8	21.0	20.0	1.00	0.60	1.54	0.58	1.49	37473	37.47	18.7	18737	18.74	9.4	
Case 2														
1														
2														
3														
4														
5														
6														
7														
8														

Bearing Capacity Factors

$N_c = 20.72$
 $N_q = 10.66$
 $N_\gamma = 10.88$

Shape Correction Factors

ϕ	s_c	s_γ	s_q
$\phi = 0$	$1 + (B/5L)$	1.0	1.0
$\phi > 0$	$1 + (B/L)(N_q/N_c)$	$1 - 0.4(B/L)$	$1 + (B/L)\tan\phi$

Note: If $L > 5B$, then $s_c, s_\gamma, \text{ and } s_q = 1.0$ (Geotechnical Engineering Circular No. 6, FHWA-SA-02-054, pgs 55-56)

* Conservative value of phi and c assumed based on field conditions

MSE WALL – CALCULATIONS FOR BEARING

Wall Design Information

The MSE wall will be designed to Caltrans 2010 Standard details/specifications. Bridge Design Aids (BDA), 3-8, Attachment 2, October 2011 is used for design reference. MTCO indicates that total wall height (H1, foundation to roadway level) will range from 14'-2" to 16'-8". Bearing stress for the Strength condition will range from 3.93 ksf to 4.37 ksf. The following design information is provided in BDA 3-8:

H1 (H, face height)	14'-2" (12'-6")	16'-8" (15'-0")
BW (L, reinf. length)	11'-6" (10'-0")	13'-6" (12'-0")
Service q, B'(effect. width)	2.47 ksf, 6.87 ft.	2.80 ksf, 8.58 ft.
Strength q, B'(effect. width)	3.93 ksf, 6.92 ft.	4.37 ksf, 8.56 ft.
Extreme q, B'(effect. width)	3.35 ksf, 5.08 ft.	3.79 ksf, 6.34 ft.

The MSE wall will be located on existing embankment fill for US 50. The fill consists of locally derived, coarse, rocky fill (silty/sandy gravel with cobbles). The embankment slope has a gradient of approximately 1.5H:1V. Minimum embedment depth is 2.5 feet with a minimum clearance of 4 feet from foundation face to slope.

Assumed embankment material properties:

- Moist unit weight (γ) = 140 pcf, use 130 pcf in bearing calculation
- Phi (Φ) angle = 44° (from Figure 10.4.6.2.4-1, AASHTO LRFD BDS), use 38° for evaluation
- Cohesion = 100 psf (for some fines and shear through weathered rock pieces)
- Groundwater is well below foundation elevation

Bearing Resistance (references are AASHTO LRFD BDS with California Amendments)

The factored resistance is:

$$qR = \phi b q_n \text{ (10.6.3.1.1-1)}$$

Where:

ϕb = resistance factor (specified in Table 11.5.6-1 for MSE Wall) = 0.65 at strength limit
 q_n = nominal bearing resistance (ksf)

For footings on a slope: $q_n = cN_{cm} + 0.5\gamma B N_{\gamma m} C_w$ (10.6.3.1.2a-1 and 10.6.3.1.2c)

Where:

c = cohesion = ~ 100 psf, γ = unit weight = ~ 130 pcf
 B = effective footing width = B' = see above wall design information
 N_{cm} = 5 (based on Figure 10.6.3.1.2c-1 "Modified Bearing Capacity Factors for Footing in Cohesive Soils and on or adjacent to Sloping Ground")
 $N_{\gamma m}$ = 15 (based on reduced Φ angle of 38°, and Figure 10.6.3.1.2c-2 "Modified Bearing Capacity Factors for Footing in Cohesionless Soils and on or adjacent to Sloping Ground")
 C_w = 1.0 (groundwater depth > 1.5B + footing depth)

MSE WALL – CALCULATIONS FOR BEARING (continued)

Capacity at Strength Limit

For $B' = 6.92$ ft

$$q_n = 100 \text{ psf} (5) + 0.5 (130 \text{ pcf}) (6.92 \text{ ft}) (15) (1.0) = 7,247 \text{ psf}$$

$$q_R = 0.65 (7,247 \text{ psf}) = 4,711 \text{ psf} = \underline{4.71 \text{ ksf}}$$

For $B' = 8.56$ ft

$$q_n = 100 \text{ psf} (5) + 0.5 (130 \text{ pcf}) (8.56 \text{ ft}) (15) (1.0) = 8,846 \text{ psf}$$

$$q_R = 0.65 (8,846 \text{ psf}) = 5,750 \text{ psf} = \underline{5.75 \text{ ksf}}$$

Capacity at Extreme Limit

For $B' = 5.08$ ft

$$q_n = 100 \text{ psf} (5) + 0.5 (130 \text{ pcf}) (5.08 \text{ ft}) (15) (1.0) = 5,443 \text{ psf}$$

$$q_R = 1.0 (5,443 \text{ psf}) = 5,443 \text{ psf} = \underline{5.44 \text{ ksf}}$$

For $B' = 6.34$ ft

$$q_n = 100 \text{ psf} (5) + 0.5 (130 \text{ pcf}) (6.34 \text{ ft}) (15) (1.0) = 6,682 \text{ psf}$$

$$q_R = 1.0 (6,682 \text{ psf}) = 6,682 \text{ psf} = \underline{6.68 \text{ ksf}}$$

The Factored Resistance at the strength and extreme limit is adequate for design loads indicated above

Project: Silva Valley Parkway IC
 BCI No.: 556.2
 Date: 5/8/2012
 By: PFF

Location: MSE Wall at E3 110+00, H1 = 14' 2"

FOOTING UNFACTORED VERTICAL LOAD BASED ON ELASTIC SETTLEMENT

Settlement (in.)	0.62
Footing Length (ft.)	150
Footing Width (ft.)	6.92
A, Footing Area (sq. ft)	1038
Square Root A	32.218007
Es (ksf)	1600
v, Poisson's Ratio	0.3
β_z (shape and rigidity factor)	1.41
Qo (unfactored vertical pressure-ksf)	3.98
Qo (kPa)	190

TABLE 4.4.7.2.2B Elastic Shape and Rigidity Factors EPRI (1983)

L/B	β_z Flexible (average)	β_z Rigid
Circular	1.04	1.13
1	1.06	1.08
2	1.09	1.10
3	1.13	1.15
5	1.22	1.24
10	1.41	1.41

TABLE 4.4.7.2.2A Elastic Constants of Various Soils Modified after U.S. Department of the Navy (1982) and Bowles (1982)

Typical Range of Values			Estimating Es From Es From N ⁽¹⁾	
Soil Type	Young's Modulus, Es (ksf)	Poisson's Ratio, v (dim)	Soil Type	Es (ksf)
Clay:				
Soft sensitive	50-300	0.4-0.5 (undrained)	Silts, sandy silts, slightly cohesive mixtures	8N ₁ ⁽²⁾
Medium stiff to stiff	300-1,000		Clean fine to medium sands and slightly silty sands	14N ₁
Very stiff	1,000-2,000		Coarse sands and sands with little gravel	20N ₁
			Sandy gravel and gravels	24N ₁
Loess	300-1,200	0.1-0.3		
Silt	40-400	0.3-0.35		
Fine sand:			Estimating Es From su ⁽³⁾	
Loose	160-240	0.25	Soft sensitive clay	400su-1,000su
Medium dense	240-400		Medium stiff to stiff clay	1,500su-2,400su
Dense	400-600		Very stiff clay	3,000su-4,000su
Sand:			Estimating Es From qc ⁽⁴⁾	
Loose	200-600	0.2-0.35		
Medium dense	600-1,000	0.3-0.4	Sandy soils	4qc
Dense	1,000-1,600			
Gravel:				
Loose	600-1,600	0.2-0.35		
Medium dense	1,600-2,000	0.3-0.4		
Dense	2,000-4,000			

⁽¹⁾N = Standard Penetration Test (SPT) resistance.
⁽²⁾N₁ = SPT corrected for depth.
⁽³⁾su = Undrained shear strength (ksf).
⁽⁴⁾qc = Cone penetration resistance (ksf).

Note: Tables from Caltrans Bridge Design Specifications (BDS), November 2003; Unfactored vertical pressure calculated using Equation 4.4.7.2.2-1 of the BDS.

$$S_e = \frac{Q_o}{E_s} (1 - v^2) \sqrt{A} \beta_z \quad (4.4.7.2.2-1)$$

Project: Silva Valley Parkway IC
 BCI No.: 556.2
 Date: 5/8/2012
 By: PFF

Location: MSE Wall at E3 110+00, H1 = 16' 8"

FOOTING UNFACTORED VERTICAL LOAD BASED ON ELASTIC SETTLEMENT

Settlement (in.)	0.76
Footing Length (ft.)	150
Footing Width (ft.)	8.56
A, Footing Area (sq. ft)	1284
Square Root A	35.832946
Es (ksf)	1600
v, Poisson's Ratio	0.3
βz (shape and rigidity factor)	1.41
Qo (unfactored vertical pressure-ksf)	4.38
Qo (kPa)	210

TABLE 4.4.7.2.2B Elastic Shape and Rigidity Factors EPRI (1983)

L/B	βz Flexible (average)	βz Rigid
Circular	1.04	1.13
1	1.06	1.08
2	1.09	1.10
3	1.13	1.15
5	1.22	1.24
10	1.41	1.41

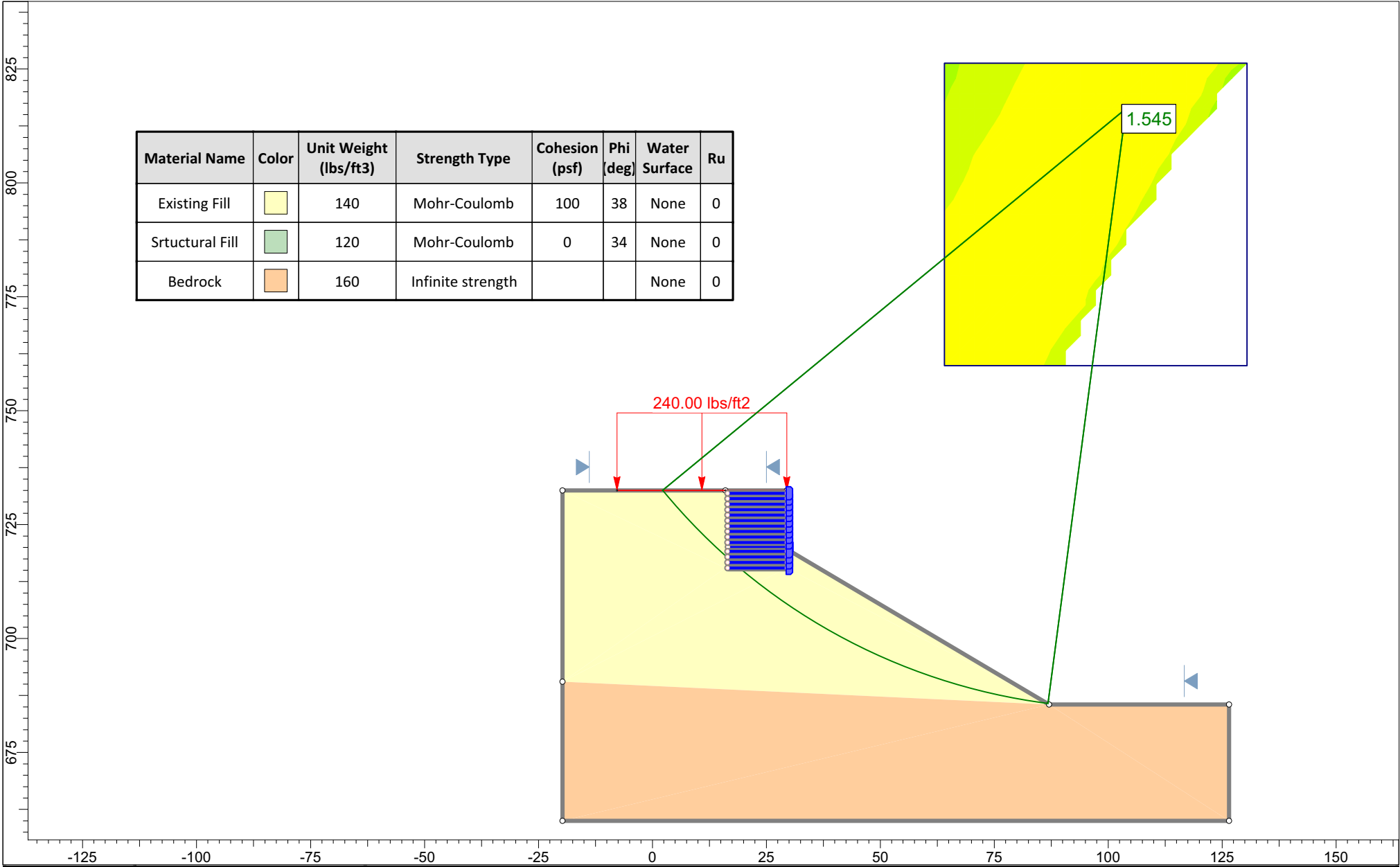
TABLE 4.4.7.2.2A Elastic Constants of Various Soils Modified after U.S. Department of the Navy (1982) and Bowles (1982)

Typical Range of Values			Estimating Es From Es From N ⁽¹⁾	
Soil Type	Young's Modulus, Es (ksf)	Poisson's Ratio, v (dim)	Soil Type	Es (ksf)
Clay:				
Soft sensitive	50-300	0.4-0.5 (undrained)	Silts, sandy silts, slightly cohesive mixtures	8N ₁ ⁽²⁾
Medium stiff to stiff	300-1,000		Clean fine to medium sands and slightly silty sands	14N ₁
Very stiff	1,000-2,000		Coarse sands and sands with little gravel	20N ₁
			Sandy gravel and gravels	24N ₁
Loess	300-1,200	0.1-0.3		
Silt	40-400	0.3-0.35		
Fine sand:			Estimating Es From su ⁽³⁾	
Loose	160-240	0.25	Soft sensitive clay	400su-1,000su
Medium dense	240-400		Medium stiff to stiff clay	1,500su-2,400su
Dense	400-600		Very stiff clay	3,000su-4,000su
Sand:			Estimating Es From qc ⁽⁴⁾	
Loose	200-600	0.2-0.35		
Medium dense	600-1,000	0.3-0.4		
Dense	1,000-1,600			
Gravel:				
Loose	600-1,600	0.2-0.35	Sandy soils	4qc
Medium dense	1,600-2,000	0.3-0.4		
Dense	2,000-4,000			

⁽¹⁾N = Standard Penetration Test (SPT) resistance.
⁽²⁾N₁ = SPT corrected for depth.
⁽³⁾su = Undrained shear strength (ksf).
⁽⁴⁾qc = Cone penetration resistance (ksf).

Note: Tables from Caltrans Bridge Design Specifications (BDS), November 2003; Unfactored vertical pressure calculated using Equation 4.4.7.2.2-1 of the BDS.

$$S_e = \frac{Q_o}{E_s} (1 - v^2) \sqrt{A} \beta_z \quad (4.4.7.2.2-1)$$

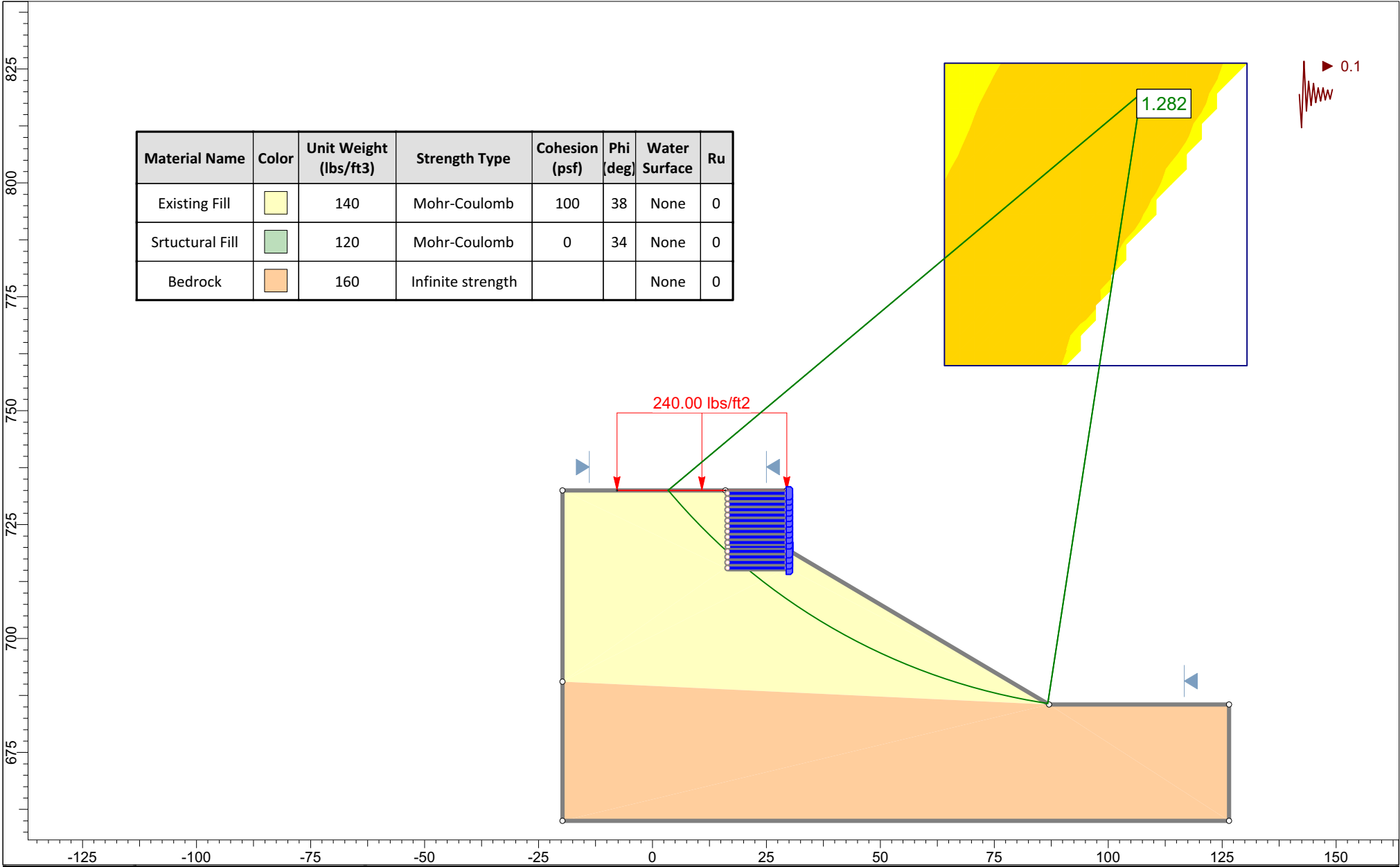


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Ru
Existing Fill		140	Mohr-Coulomb	100	38	None	0
Srtuctural Fill		120	Mohr-Coulomb	0	34	None	0
Bedrock		160	Infinite strength			None	0



11521 Blocker Drive, Suite 110
 Auburn, CA 95603
 Phone: (530) 887-1494
 Fax: (530) 887-1495
 www.blackburnconsulting.com

<i>Project</i>		SLIDE - An Interactive Slope Stability Program	
<i>Analysis Description</i>		MSE Wall at E2 Line, Sta 110+00	
<i>Drawn By</i>	PFF	<i>Company</i>	BCI
<i>Date</i>	5/8/2012	<i>File Name</i>	MSE Wall Seismic.slim



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Ru
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<i>Project</i>		SLIDE - An Interactive Slope Stability Program	
<i>Analysis Description</i>		MSE Wall at E2 Line, Sta 110+00	
<i>Drawn By</i>	PFF	<i>Company</i>	BCI
<i>Date</i>	5/8/2012	<i>File Name</i>	MSE Wall Seismic.slim

Appendix E

Report Comment and BCI Response



Office of Special Funded Projects Comment & Response Form

(Revised 08/2011)

General Project Information (OSFP Liaison to complete)		Review Phase (OSFP Liaison to complete)		Reviewer Information (Reviewer to complete)	
Dist EA:	03-1E2901	<input type="checkbox"/>	PSR/PDS (Review No. 1)	Reviewer Name:	Eric Fredrickson
Proj ID (Phase):	03 0000 0258	<input type="checkbox"/>	APS/PSR (Review No.)	Functional Unit:	OSFP
Dist-Co-Rte	03-ED-50	<input type="checkbox"/>	APS/PR (Review No.)	Cost Center:	
Project Name:	Silva Valley Pkwy I/C	<input type="checkbox"/>	Type Selection	Phone Number:	
OSFP Liaison:	Eric Fredrickson	<input type="checkbox"/>	65% PS&E Unchecked Details	e-mail:	
Phone:	916-227-8916	<input checked="" type="checkbox"/>	PS&E (Review No. 1)	Date of Review:	6-4-12
E-mail:	eric_fredrickson@dot.ca.gov	<input type="checkbox"/>	Construction	Structure Name*:	Silva Valley Pkwy OC (and var)
		<input type="checkbox"/>	Other:	Br No*:	25-0127 (& var)
(*Use if necessary to when comment sheets are by individual structure)					
Consultant Information (to be filled in by Consultant)					
Consultant Structure Lead (First and Last Name)		Consultant Firm		Response Date	
		MTCO / Blackburn Consulting			
		Phone Number		E-mail	

#	Doc. (See Note 1)	Page, Section, or SSP	GEOTECHNICAL DESIGN REPORT (March 2012) Review Comments	Consultant Responses	✓
1	GDR	8.4.1	Update section to reflect the Revised Standard Plan retaining wall Type 1 (2010). Verify Load Case, foundation pressure, footing dimensions, etc.	Update and verification is included in the report	✓
2		8.5.2	Need to acknowledge that the Bucks Ravine Box Culvert will be widened at both ends ("E1" Line and "W3" Line). Do same recommendations apply to upstream end of culvert? Verify that LRFD loadings / capacities were considered.	Acknowledgement, discussion, and verification is included in the report	✓
3		11	Revise 2 nd paragraph to reference Caltrans 2010 Standard Plans and Standard Specifications for this project.	Revision is included in the report	✓
4		General	Verify 'blasting' / 'no blasting' requirements around structure foundations.	Requirements were discussed with MTCO and Caltrans personnel. Recommendations are included in the report.	✓

Note 1: Abbreviations for Typical Documents (if Abbr. is not below, type in the document type)					
P=Structure Plans	SP=Special Provisions	FR=Foundation Rpt	DC=Design Calcs	TS=Type Sel. Report	QCC=Quant. Check Calcs
RP=Road Plans	E=Estimate	H=Hydraulics Rpt	CC=Check Calcs	QC=Quant. Calcs	

✓ = Comment Resolved
(for Reviewer's use)

Submittal Data (Reviewer to complete)

Project ID: 03 0000 0258

Reviewer: EDF

Str Name*:

Date of Review:

Functional Unit:

Br No*:

*=if applicable

#	Doc. (See Note 1)	Page, Section, or SSP	Review Comments	Consultant Responses	✓
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Note 1: Abbreviations for Typical Documents (if Abbr. is not below, type in the document type)					
P=Structure Plans	SP=Special Provisions	FR=Foundation Rpt	DC=Design Calcs	TS=Type Sel. Report	QCC=Quant. Check Calcs
RP=Road Plans	E=Estimate	H=Hydraulics Rpt	CC=Check Calcs	QC=Quant. Calcs	

✓ = Comment Resolved
(for Reviewer's use)

**Silva Valley Parkway Interchange
95% Comment Matrix
El Dorado County**

Code: A: Will Incorporate, B: MTCO to Evaluate, C: Will Not Incorporate, D: Agency to Evaluate, E: Caltrans to Evaluate, F: Will Incorporate Later, G: No Action Required

#	Reviewer	Sheet Name	Description	Response/Action	Code	Resp. By	Ver. By
4	CG	GDR Page 17	Name of specific equipment "Caterpillar D9" may have to be removed.	We have incorporated your comment			
5	CG	GDR Page 21	Be consistent with unit, either "tsf" or "ksf".	We have incorporated your comment			
6	CG	GDR Page 25	Typo, replace EDAQMD with EDCAQMD	We have incorporated your comment			
7	CG	GDR Page 25	Typo, replace ACTM with ATCM	We have incorporated your comment			
8	CG	GDR Page 25	Specs shall meet 2010 version.	We have incorporated your comment			
9	CG	GDR Page 28	Delete "We do not warranty our services"	We have incorporated your comment			

#	PAGE	COMMENTS	RESPONSE	RESOLVED
1	pages 15 -16 Draft Geotech Report	Table 2 The line and stationing for the Silva Valley Overcrossing does not match the line and stationing used on the plans. Westbound Auxiliary Lane "A3L" Line should be "A2".	BCI Response - Reference to Silva Valley Overcrossing is a general location only. Stationing is referenced to the appropriate line. We understand that the station line reference to A3 rather than A2 is correct. No changes to GDR text.	
2	page 18 - Draft Geotech Report	Does the Environmental document allow blasting? OE and Construction requests to review the Supplement to the Environmental Document before it is circulated to the public for comment.	BCI Response - the discussion is provided in case blasting is used. MTCO will provide guidance on use of blasting. No changes to GDR text.	
3	page 18 - Draft Geotech Report	Section 8.2 "We observed other fill locations that we consider to be "non-structural fill" in the following areas: Westbound off-ramp, W1 Line Sta. 112+00 to 114+50 Tong Road, TR Line Sta. 111+75 to 114+50 Silva Valley Parkway, SVP Sta. 180+25 to 180+75 (dumped material) Remove existing fill at these locations to the elevation of original grade (native ground) and replace as engineered fill in accordance with the project specifications." The Plans and specs do not show this fill removal. Also the Tong Road stationing in the report does not match the stationing used in the Plans.	BCI Response - MTCO will address Plan and Specification requirements. The Tong Road alignment has been changed since our draft report and this section is modified appropriately.	
4	page 19 - Draft Geotech Report & Typical Sections	8.3 Embankments "Construct embankments and place new fill in accordance with Caltrans "Standard Specifications" (including Section 19, "Earthwork"). Due to the presence of loose material at the toe of some slopes, we recommend excavation of a keyway (toe bench), 2 feet deep by 10 feet wide, into competent material and/or bedrock for the following locations: Westbound Shoulder, A2 Line, Sta. 70+00 to 76+00, and A3L Line, Sta. 135+00 to 137+50 Eastbound Shoulder, A3R Line, Sta. 119+00 to 123+00, and 131+00 to 136+00 Silva Valley Parkway, Southbound Shoulder, SVP Line Sta. 180+50 to 182+00" X-2 implies that the toe key occurs between "A2" STA 80+75 and "A2" 83+75 but the Geotech report does not require it in this range. X-6 does not show any toe rock for the SVP line.	BCI Response - BCI did not recommend removal at the "A2" STA 80+75 and "A2" 83+75 location but it appears that MTCO did for uniformity. No change to the GDR text.	

#	PAGE	COMMENTS	RESPONSE	RESOLVED
5	page 19 - Draft Geotech Report	Section 8.3.1 states "We expect that embankment fill will consist of rocky fill material generated from cut portions of the project, a potential borrow area in the northeast quadrant, and unidentified commercial material sources." Neither the plans nor the specs show this borrow area.	BCI Response - This area was identified early in the project as a potential location to obtain borrow materials. No change to the GDR text.	
6	page 20 - Draft Geotech Report	The Plans did not include erosion control sheets. The erosion control considerations listed in the geotech report do not match the provisions of the Erosion Control (Type D) special provisions provided in the 65% specs.	BCI Response - The erosion control considerations provided are based on recommendations from Caltrans. MTCO will provide design specifications as appropriate. No change to the GDR text.	
7	pages 25-26 Draft Geotech report	The Geotech Report recommends preparation of an Asbestos Hazard Mitigation Plan (i.e. Asbestos Dust Mitigation Plan [ADMP]), but the specs (Dust Control spec) and the Engineers Estimate (bid items for Dust Control and for Prepare ADMP) do not address this.	BCI Response - No change to the GDR text.	
8	page 28 - Draft Geotech report	10.4 Hazardous Waste Considerations "An evaluation of potential aerially deposited lead (ADL) impacts is in progress." What is the status of this evaluation?	BCI Response - ADL has been addressed in accordance with Caltrans' requirements. Final status is pending review by Caltrans. Text is modified to read "BCI evaluated the potential for aerially deposited lead (ADL) impacts and presents the results under separate cover."	
9	General	Will BCI be retained for consultation during construction? If so, will DOT engage them directly or through the design consultant?	MTCO to respond	
10	X-1, L-2	General- L2 shows sawcut at new ETW; typical sections shows sawcut 9' off existing ETW. Why are do some structural sections have only 0.90' of AB while others have 1.85' of AB?	BCI Response - The variable thickness of AB in the structural sections is due to subgrade with different Resistance Values (R-Value) used in design. Section thicknesses with 0.90' of AB are generally cut locations underlain by rock; sections with 1.85' of AB are generally fill, existing fill, and/or weaker soil locations.	
11	X-2, L-1, L-2	General- L-1 & L-2 show sawcut at new ETW; typical sections shows sawcut 9' off existing ETW. Why are do some structural sections have only 0.90' of AB while others have 1.85' of AB? 3. WB US-50 "A2" STA 69+11.05 to "A2" STA 78+25 and "A2" STA 80+75 to "A2" STA 83+75 - The 60' dimension from the HP to the RW line is not supported by what is shown on layout sheet. This typical section shows a bioswale, but for the range of STA 80+75 to 83+75 there is none. The Draft Geotech report recommends toe key between STA 70+00 and STA 76+00, but this typical implies it occurs throughout the ranges shown- the layout sheets do not provide any clarification.	MTCO to respond	

#	PAGE	COMMENTS	RESPONSE	RESOLVED
12	X-3	<p>1. EB US 50 STA "A3R" 112+22.48 to A3R 128+25.82 - Toe ditch shown in this section should also be shown on drainage plans. Draft Geotech Report indicates toe key applies between STA 119+00 and 123+00, but typical section implies toe key applies through out the range- layout sheets provide no clarification.</p> <p>2. WB US 50 - STA "A3L" 120+50 to "A3L" 124+55 and STA "A3L" 135+13.52 to STA "A3L" 137+42.64 - The 15' min dimension shown from the toe of slope to the RW and from toe of slope to HP does not work with the HP to RW dimensions of 35'-48'. Where 0' apply between ES and sawcut? The Draft Geotech Report recommends a toe key between STA 135+00 and 137+50, but this typical section implies the toe key applies throughout the range- layout sheet provides no clarification.</p>	MTCo to respond	
13	X-6, C-18	<p>Silva Valley Pkwy/White Road Typical Section-</p> <p>3. This typical begins at STA "SVP" 121+04.74, but the work starts at STA 138+76.95 and this typical section is not representative of the work to be done between STA 138+76.95 and BB. Draft Geotech Report recommends toe key for southbound shoulder from STA 180+50 to 182+00.</p>	MTCo to respond	
14	WB Off Ramp Ret Wall	<p>Sheets 1 of 5 and 5 of 5 - General Plan No.1 and Retaining Wall Type 7 H=4'-11'- Draft Geotech Report has max height as 7'. This retaining wall is founded in rock, but the design parameters shown are for soil.</p>	MTCo to respond	