SPBL-2025-01

SESPE CREEK OVERFLOW RAILROAD BRIDGE REPAIR

EXHIBIT A
GEOTECHNICAL REPORT

A Report Prepared for:

RailPros
811 Wilshire Boulevard, Suite 1820
Los Angeles, CA 90017

GEOTECHNICAL REPORT
RECONSTRUCT A PORTION OF THE SESPE CREEK OVERFLOW RAILROAD BRIDGE
CITY OF FILLMORE, CALIFORNIA

Project No. 2023-010

by

Osvaldo Berumen

Osvaldo Berumen
Staff Engineer

Ted Reinert

Ted Reinert, PE
Civil Engineer, 86311

REGISTERED PROFESSIONAL ENGINEER
EDWARD THOMAS REINERT
C 86311
CIVIL
STATE OF CALIFORNIA

Diaz•Yourman & Associates
1616 East 17th Street
Santa Ana, CA 92705-8509
(714) 245-2920

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1 INTRODUCTION

This report presents the results of the geotechnical design services performed by Diaz•Yourman & Associates (DYA) in connection with planning, design, and environmental compliance to reconstruct the Sespe Creek Overflow Railroad Bridge on the Santa Paula Branch Line services ("Project"). The geotechnical services were performed to provide professional services to Ventura County Transportation Commission (VCTC) ("Owner" and “Client”) with DYA as a subconsultant to RailPros. RailPros authorized this work on June 19, 2023, with a written contract.

The Sespe Creek Overflow Railroad Bridge (Bridge) is located at approximately Mile Post 423.44, west of Fillmore, California, as shown on the Vicinity Map,

Figure 1. In early January, heavy rain, stream flow, and debris accumulated during a series of storms and washed out three spans, or approximately 90 feet, of the Bridge. Three spans on the western end of the Bridge were destroyed and require reconstruction to restore pre-disaster design, capacity, and function to resume rail services on the Bridge. Additionally, an earthwork abutment was partially washed out and will be replaced with a concrete abutment and wingwalls.

The approximate layout of the Project improvements is shown on the Site Plan, Figure 2. Project drawings (Railpros, 2024) are presented in Appendix A.

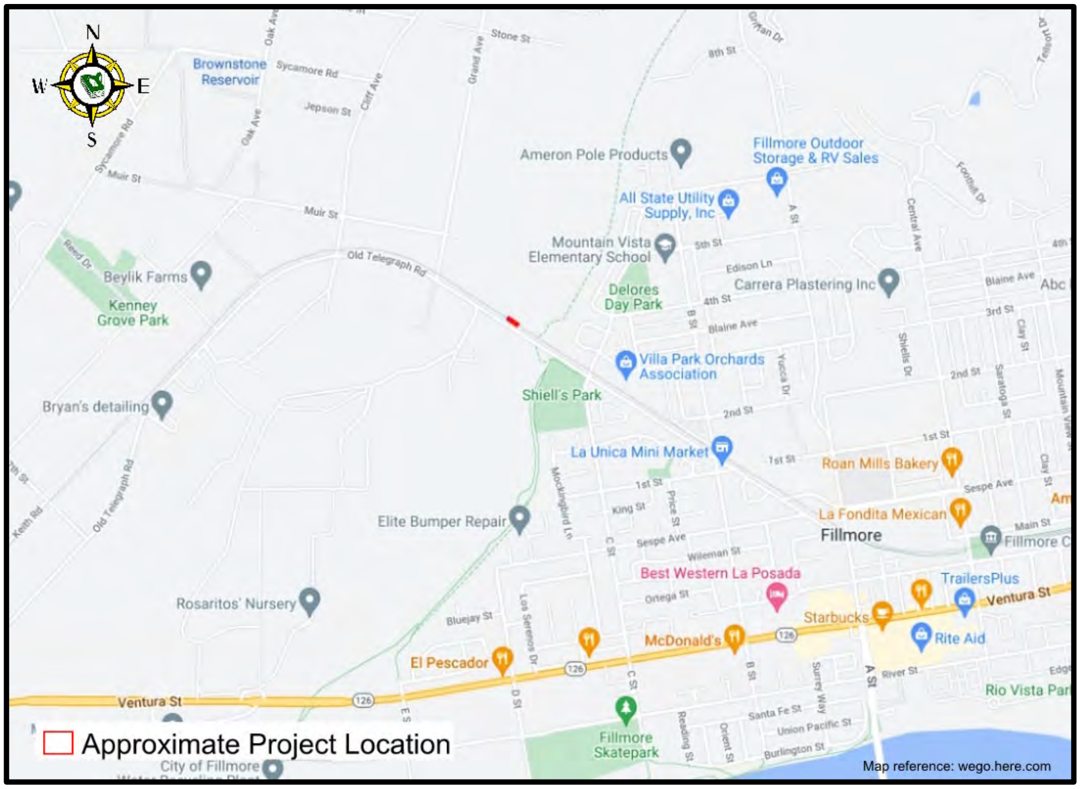

Figure 1 - VICINITY MAP

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Figure 2 - SITE PLAN

The purpose of DYA's services was to provide geotechnical input for the design of the Project. The scope of our services consisted of the following tasks:

- Reviewing existing geotechnical and geological data.
- Conducting a limited field exploration.
- Performing limited laboratory tests on selected soil samples.
- Performing engineering analyses to develop conclusions and recommendations regarding the following:
    - Subsurface conditions
    - Geologic and seismic hazards
    - Site preparation and grading
    - Foundation types and deep foundations
    - Estimated total and differential foundation settlement
    - Resistance to lateral loads
    - Lateral earth pressures
    - Soil corrosion potential
- Preparing this report.

Engineering analysis is restricted to the bents and abutment that have currently been observed to have failed. Further analyses for the existing other bridge bents and abutment were not within DYA’s scope. Our scope of services also specifically excluded any investigation needed to evaluate the presence or absence of hazardous or toxic materials at the site in the soil, surface water, or groundwater.

2 DATA REVIEW, FIELD EXPLORATION, AND LABORATORY TESTING

The information provided in this report is based on DYA's review of the available regional geologic maps, existing subsurface and groundwater data gathered in the Project vicinity, a limited field exploration, limited laboratory testing, and discussions with Project designer members. Available Caltrans logs of test borings (LOTBs) for the Old Telegraph Road Bridge (Moore and Taber, 1982), which is located adjacent to the failed Bridge, are presented in Appendix B. A list of the documents reviewed is presented in the bibliography (Section 7).

The field exploration, conducted from July 17 through July 26, 2023, consisted of drilling two borings using rotary-wash techniques, each to a depth of approximately 100 feet. The boring locations are shown on Figure 2. One boring (DYB23-02) was drilled on the shoulder of Old Telegraph Road near the location of the washed-out abutment, and the second boring (DYB23-01) was drilled within the Sespe Creek bed near the location of the washed-out bents. As the stream is active in the location of the two washed-out bents, our field exploration was limited to the vicinity of the existing abutment and remaining interior bent. Prior to drilling, the borings were marked and underground service alert (USA) was contacted in order to mark out utility locations. A geophysical survey was also performed prior to drilling to locate any further utilities. Due to the shallow groundwater conditions anticipated at the site, mud-rotary wash drilling techniques were implemented for the field exploration. Because of the difficult access conditions to the channel bottom, a track-mounted, mud rotary wash drill rig was used for the field exploration. In order for the track-mounted, mud rotary drill rig to access the boring location within the creek bed, a pathway was created using a skip loader to move aside cobbles and boulders within the creek bed. Traffic control was provided during drilling and geophysics activities on the roadway. The field exploration implemented standard penetration testing (SPT) to obtain and collect subsurface data and samples for geotechnical engineering properties. Details of the field exploration, including sampling procedures and borings, are presented in Appendix C.

Because of the restrictions to access across the channel bed, drilling deep borings using a drill rig was not possible at the failed bent locations within the three spans on the western end of the Bridge. Therefore, a seismic refraction survey was also performed across the channel bed along the western edge of the Bridge. The location(s) of these seismic refraction survey lines are shown on Figure 2. The purpose of the survey was to develop subsurface velocity profiles of the site and to characterize the subsurface soils at deeper depths (depths deeper than 20 feet) and possibly to estimate the depth to bedrock at the failed bent locations. The refraction survey seismic profiles (Atlas, 2023) are shown in Appendix D.

Soil samples collected from the borings were re-examined in the laboratory to substantiate field classifications. Selected soil samples were tested for moisture content, dry density, grain-size distribution, Atterberg limits, shear strength, and corrosion potential (pH, electrical resistivity, soluble chlorides, and soluble sulfates). The soil samples tested are identified on the boring logs. Laboratory test data are summarized on the boring logs in Appendix C and presented on individual test reports in Appendix E.

3 SITE CONDITIONS

3.1 REGIONAL GEOLOGY

The Project site lies within the east Ventura basin portion of the western Transverse Ranges named for their east-west orientation, roughly perpendicular to most of California's mountain ranges. The east Ventura Basin is generally east-west trending and contains the Santa Clara River into which Sespe Creek drains near Fillmore (

Figure 1 - Regional Geology; Bedrossian and Roffers, 2012). Sespe Creek (including the Project site) contains young wash (river) deposits (map symbol Qw) and is bordered on the west by younger (Qya) and older alluvium (Qoa), and younger alluvial fan (Qyf) deposits. East of Sespe Creek is predominantly Qyf and shale (Tsh) bedrock.

Southern California is a seismically active region with many faults, some of which are capable of producing large-scale earthquakes of approximately 7.0 to 8.0 magnitude (M) on the Richter scale. One such Holocene active fault (Figure 2 - Regional Fault Map; California Geological Survey [CGS], Fault Activity Map website, 2023a) is the San Cayetano Fault that borders the bedrock approximately 5,000 to 10,000 feet east of the Project site and approximately 12,500 feet west of the site. Such earthquakes can trigger severe ground shaking, possible surface fault rupture near the fault, and liquefaction in loose, unconsolidated soils in areas of shallow groundwater.

3.2 LOCAL GEOLOGY

The Project alignment lies within the east Ventura physiographic basin, which is part of the Transverse Ranges geomorphic province. The Santa Clara River-Sespe Creek area of the east Ventura Basin is alluviated lowland that is bound to the north by the Topatopa Mountains and on the south by the Santa Susana Mountains and by South Mountain. The Project site railroad bridge alignment area is mainly mapped as Holocene alluvial wash deposits (Qw) and young alluvium deposits (Qya; Figure 3- Project Site Geology Map).

Qw deposits, beneath the eastern three-quarters of the alignment, are composed of unconsolidated gravel and sand deposits in the active channel deposited from upstream sources in the valley which may contain loose to moderately loose sand and silty sand. Qya deposits, beneath the western one-quarter, are unconsolidated to moderately consolidated boulder, cobble, gravel, sand, and silt deposits. Logs of two test borings (LOTBs B-1 and B-2; Moore & Taber, 1982) just south of the Project alignment indicate that the Qw deposits are 5- to 10-feet thick and consist of coarse gravel, cobbles, and boulders with a medium to coarse sand matrix. LOTB B-1 encountered groundwater at a depth of approximately 40 feet indicating Qya deposits may be susceptible to liquefaction because this is a seismically active region (California Geological Survey, Earthquake Zones of Required Investigation website, 2023b). The nearby San Cayetano reverse fault is believed to be capable of at least a 7.2 magnitude earthquake (Dolan, 2009; Olsen, 2021).

The surface geology units mapped at this site are shown on Figure 3.

FIGURE 3 - GEOLOGY MAP

3.3 SURFACE CONDITIONS

At the time of our exploration, two piers of the Bridge had been washed out with a third being pushed out of plumb. The west Bridge abutment was also in the process of failure from erosion. The other intact bridge piers also had a significant buildup of tree debris which may cause significant lateral pressures in the event of another flood. The riverbed was mostly uneven, with numerous small to large boulders. The riverbed had an active stream flowing on the west edge between the west-most pier and the adjoining abutment. The roadway on Old Telegraph Road was in relatively good condition with no noticeable potholes or significant cracks.

3.4 SUBSURFACE CONDITIONS

Based on our limited field exploration, the subsurface soils were significantly difficult to drill through due to the various large-sized boulders encountered and the significant fluid loss experienced. Subsurface soils were primarily sandy gravels, clayey gravel, and silty clayey sands with gravel.

Approximately 20 feet of dense sand and silty sand were present at the abutment location. A five-foot-thick lean clay layer was present at elevation 412 to 407 at the abutment location only. The bottom of the creek bed was estimated to be at elevation 430 feet based on the North American Vertical Datum (NAVD88).

The thicknesses of the different subsurface materials at the abutment location and the channel bottom were idealized along the bridge improvement alignment are presented in Table 1 - IDEALIZED SOIL PROFILE – SESPE CREEK

Note that due to the geological depositional nature of the soils in the creek bed over time, the layers reported in Table 2 may not be present at the same thicknesses at all locations. The site is highly variable with layers of boulders, cobbles, and gravel, and those materials can be encountered at any depth.

Table 1 - IDEALIZED SOIL PROFILE – SESPE CREEK

SOIL LAYER[1,2]	ELEVATION[3] (feet)	DEPTH (feet)	TOTAL UNIT WEIGHT (pcf)	SHEAR STRENGTH		
				Total	Effective	
				S_u (psf[3])	ϕ' (degrees)	c' (psf)
Poorly-Graded Sand with Silt (SP-SM); Silty Sand (SM); ABUTMENT FILL	450 to 430	0 to 20	120	--	34	50
Poorly-Graded Sand with Silt and Gravel (SP-SM); Silty Sand with Gravel (SM); Clayey Sand with Gravel (SC); Poorly-Graded Gravel (GP); CREEK BED	430 to 412[4]	20 to 38	125	--	38	50
Silty Sand with Gravel (SM); Clayey Sand with Gravel (SC); Lean Clay with Sand and Gravel (CL)[5]	412 to 407	38 to 43	125	2,000[5]	38	50
Poorly-Graded Gravel with Silt and Sand (GP-GM); Clayey Sand with Gravel (SC); Silty Sand with Gravel (SM)	407 to 378	43 to 72	125	--	38	50
Clayey Gravel with Sand (GC); Silty, Clayey Gravel with Sand (GC-GM); Silty Sand with Gravel (SM)	378 to 330	72 to 120	125	--	38	50

Note(s):

1. Unified Soil Classification System.
2. Soils are not homogeneous and not in layers. Simplified geotechnical design profile was developed considering the proposed lightly loaded structures and subsurface conditions encountered at the site.
3. Elevation based on NAVD88.
4. Groundwater encountered at an elevation of 423 feet.
5. The 5-foot sandy lean clay layer at elevation 412 to 407 applies to the Abutment 1 location only.

- pcf = pounds per cubic foot.
- The site is highly variable with layers boulders, cobbles, and gravel, and those materials can be encountered at any depth.
- This profile can be used for both the abutments and the bents. See Note 5 for the layer that corresponds to the abutment location only.

3.5 GROUNDWATER LEVEL

Groundwater was encountered during the field exploration in Boring DYB23-01 at 7 feet bgs (elevation 423 feet) and in Boring DYB23-02 at 35 feet bgs (elevation 415 feet). The depth to the historically highest groundwater level near the Project site has been reported to range from 10 to 20 feet (CGS, 2002a). Based on information obtained from the Caltrans LOTBs (Appendix B), the groundwater level was reported at an elevation of 387 feet dating back to 1982 (see Appendix B for details of groundwater elevations encountered). Therefore, the design depth to groundwater was assumed to be at an elevation of 423 feet. Accordingly, design groundwater depth was assumed to be at 7 feet bgs within the creek bed. Note that seasonal variations in water level may occur and that the groundwater can be even closer to ground surface.

4 CONCLUSIONS AND RECOMMENDATIONS

Based on geotechnical considerations, the site is suitable for the proposed Project. The primary geotechnical considerations at the site include the large seismic ground motions, potential liquefaction of loose soils present below the historically highest groundwater levels, scour potential at the abutment locations, and heavy loading of the bridge structure.

The proposed bridge spans at the western end of the Bridge and the abutment can be supported on deep pile foundations. Design recommendations to address the primary geotechnical considerations are presented herein and were developed in accordance with the AASHTO LRFD Bridge Design Specifications (AASHTO, 2017) and the Caltrans Amendments to the AASHTO LRFD Bridge Design Specifications (Caltrans, 2019a).

4.1 SEISMIC/GEOLOGIC HAZARDS

4.1.1 Ground Motion

The site, like most of Southern California, will be subject to strong ground shaking during major earthquakes. The site is outside the Alquist-Priolo Special Study Zone (CGS, 2021) and Landslide Zone (CGS, 2002b). The nearest known active or potentially active faults are summarized in Table 2.

Table 2 - MAJOR FAULT CHARACTERIZATION IN THE PROJECT VICINITY

FAULT[1]	Distance[2] (miles)	SLIP SENSE	DIP (degrees)	DIP (direction)	M_{MAX}
San Cayetano	1.27	Thrust	42	N	7.2
Oak Ridge Connected	2.44	Reverse	53	Unspecified	7.4
Oak Ridge (Onshore)	2.44	Reverse	65	S	7.2
Santa Susana, alt 1	9.91	Reverse	55	N	6.9
Hoser, alt 1	10.39	Reverse	58	S	6.8

Note(s):

1. Based on United States Geological Survey (USGS) online Seismic Hazard Maps (USGS, 2023a).
2. Distance to nearest portion of the project.

- M_{MAX} = maximum earthquake magnitude.
- N = North, S = South

Design earthquake magnitudes ranged from 6.8 to 7.4 for the return periods (USGS, 2023a).

Seismic hazard analyses for the bridge structure consisted of development of acceleration response spectra (ARS). The American Railway Engineering and Maintenance-of-Way Association (AREMA) guidelines (AREMA, 2021) were used for the evaluation of the rail bridge structure in accordance with the SCRRA Design Criteria Manual (2021a).

Seismic hazard analyses were performed using a probabilistic approach in accordance with Chapter 9 of the AREMA manual (2021). The AREMA manual specified three ground-motion levels, which correspond to three performance criteria: serviceability, ultimate, and survivability for seismic design. Probabilistic seismic hazards were evaluated for the Project using the USGS Unified Hazards tool (USGS, 2023b). The return periods and the corresponding peak ground acceleration (PGA) values corresponding to each of the three design ground motion levels are summarized in Table 2. The horizontal acceleration coefficients and return period relationship for the proposed site are summarized in Table 3.

Table 3 - SUMMARY OF AREMA PEAK GROUND ACCELERATIONS

AREMA SEISMIC GROUND MOTION LEVEL	**PERFORMANCE CRITERIA**	**RETURN PERIODS (years)**	**PEAK GROUND ACCELERATION (PGA, g)**
1	Serviceability	95	0.19
2	Ultimate	475	0.44
3	Survivability	2,475	0.82

Note(s)

- Values presented in table are based on return periods stated in the SCRRA Design Criteria Manual (SCRRA, 2021a and AREMA, 2021).

Table 4 - AREMA SEISMIC RESPONSE COEFFICIENTS

PERIOD (seconds)	AREMA SEISMIC RESPONSE COEFFICIENT (C_m)[1,2,3]		
	95-Year Return Period[4]	475-Year Return Period[5]	2,475-Year Return Period[6]
	C_m (g)	C_m (g)	C_m (g)
0.01	0.1932	0.4390	0.8190
0.05	0.2938	0.6106	1.2178
0.10	0.4313	0.9521	1.9670
0.20	0.4313	0.9521	1.9670
0.30	0.4313	0.9521	1.9670
0.40	0.4169	0.9521	1.9670
0.50	0.3335	0.8549	1.7225
0.60	0.2780	0.7124	1.4354
0.70	0.2382	0.6107	1.2304
0.80	0.2085	0.5343	1.0766
0.90	0.1853	0.4750	0.9569
1.00	0.1668	0.4275	0.8613
1.10	0.1516	0.3886	0.7830
1.20	0.1390	0.3562	0.7177
1.30	0.1283	0.3288	0.6625
1.40	0.1191	0.3053	0.6152
1.50	0.1112	0.2850	0.5742
2.00	0.0834	0.2137	0.4306
2.50	0.0667	0.1710	0.3445
3.00	0.0556	0.1425	0.2871
3.50	0.0476	0.1221	0.2461
4.00	0.0417	0.1069	0.2153

Note(s):

1. Seismic response spectra determined in accordance with AREMA, 2021.
2. Seismic response coefficient for the mth mode, C_m, per AREMA (2021), Chapter 9, Paragraph 1.4.4.3.
3. Low period reduced response may be calculated in accordance with AREMA (2021), Chapter 9, Paragraph 1.4.4.4; seismic response coefficient above does not include this adjustment.
4. Level 1 Seismic Ground Motion (AREMA, 2021) corresponding to Earthquake return period of 95 years; Site Class D.
5. Level 2 Seismic Ground Motion (AREMA, 2021) corresponding to Earthquake return period of 475 years; Site Class D.
6. Level 3 Seismic Ground Motion (AREMA, 2021) corresponding to Earthquake return period of 2,475 years; Site Class D.

Ground motion and acceleration response spectra (ARS) were also evaluated using the USGS Unified Hazard Tool (2023b) and Caltrans Seismic Design Criteria (2019b), respectively. The Caltrans procedure considers probabilistic response spectra based on a 5% probability of exceedance in 50 years (975-year return period). Based on the results obtained from the Caltrans ARS online tool (2023) and the USGS Unified Hazard Tool (2023b), the peak ground acceleration (PGA) and earthquake modal magnitude, respectively, for the Project location are presented in Table 3. Caltrans design ARS for the Project are presented in Table 6

Table 5 - SUMMARY OF CALTRANS SEISMIC DESIGN PARAMETERS

Location	Magnitude[1]	PGA[2]
34.406311º, -118.931937º	7.15	0.72

Note(s):

1. Based on United States Geological Survey (USGS) Unified Hazard Tool (USGS, 2023b). Magnitude is based on the maximum value of the mean and modal magnitude values.
2. Based on Caltrans ARS Online Tool V3 (Caltrans, 2023).

Table 6 - CALTRANS ACCELERATION RESPONSE SPECTRUM

PERIOD (seconds)	SPECTRAL ACCELERATION (g)
0	0.72
0.1	1.33
0.2	1.73
0.3	1.79
0.5	1.53
0.75	1.33
1	1.14
2	0.56
3	0.36
4	0.26
5	0.20

Note(s):

- Based on United States Geological Survey (USGS) Unified Hazard Tool (USGS, 2023b). Magnitude is based on the maximum value of the mean and modal magnitude values.
- Based on Caltrans ARS Online Tool V3 (Caltrans, 2023).

4.1.2 Liquefaction Potential

Depth to groundwater was assumed to be at elevation 423 feet at the site. Due to the presence of dense to very dense cohesionless soils at the two bridge sites below the design groundwater level, the potential for liquefaction is considered to be low. Therefore, seismic-induced settlements at the site are anticipated to be minimal. Since the site is not located near a free-face, we judge that potential for lateral spreading is low.

4.2 EARTHWORK

Earthwork is anticipated to be required for the bridge bents and abutment. Deep excavations may be required with shoring adjacent to the roadway or other structures for the construction of the concrete abutment and wingwalls.

4.2.1 Site Preparation and Grading

Prior to the start of construction, the following should be performed:

- All utilities should be located in the field and rerouted, removed, abandoned, or protected where necessary.
- Areas to be graded should be stripped of vegetation and debris, and the material removed from the site.
- Pavement should be separated for recycling.

The upper soil should be excavated and replaced with compacted fill as shown on Figure 4. For the bottom of the excavation, the following should be performed:

- Scarified to a depth of 8 inches.
- Moisture-conditioned to at least 2% above optimum moisture content.
- Compacted to at least 95% relative compaction.[1]

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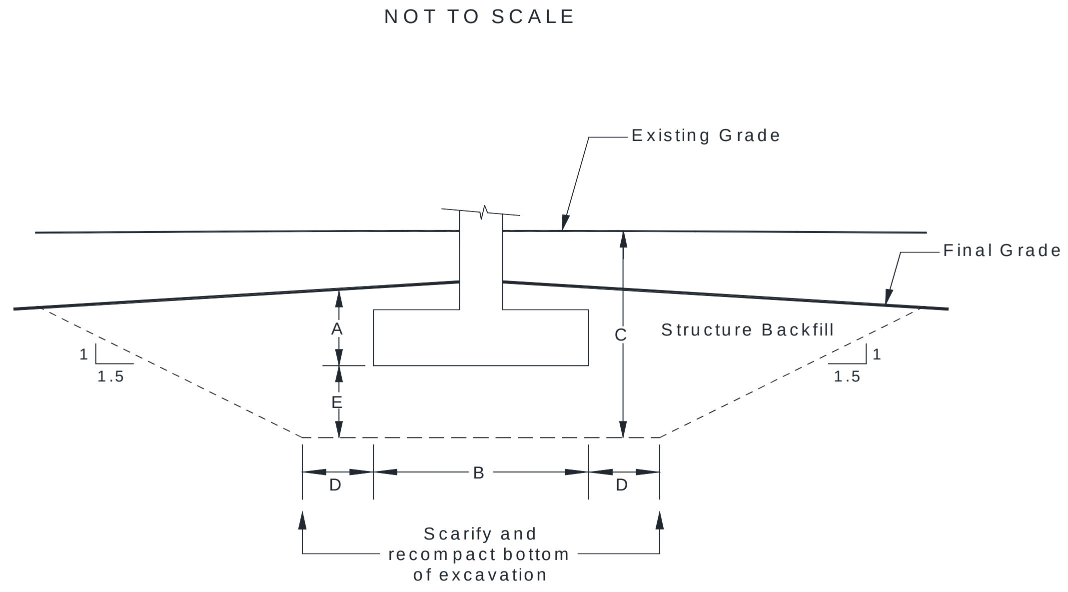
[1] Relative compaction refers to the in-place dry density of soil expressed as a percentage of the maximum dry density of the same material, as determined by ASTM International (ASTM) D1557 test method. Optimum moisture content is the moisture content corresponding to the maximum dry density, as determined by the ASTM D1557 test method.



LOCATION	MINIMUM DIMENSIONS (feet)
A. Footing Embedment Below Final Grade	2
B. Footing Width	2
C. Excavation Below Existing Grade	2
D. Excavation Beyond Footing	5
E. Compacted Soil/Fill Below Footing	2
PRESSURE (psf)	
Static (net) Allowable Bearing Capacity (FS≥3)	5,000
Maximum Static Bearing Capacity (FS≥3)[1]	5,000
Maximum Transient Bearing Capacity ((FS≥2)	7,500

Note(s):

1. The static bearing capacity can be increased by 33% to calculate the transient bearing capacity for transient loading conditions.

- FS = factor of safety.

Figure 4 - GRADING/FOUNDATION DETAILS (LIGHTLY LOADED SHALLOW FOOTINGS)

Where the soils at the bottom of the excavation preclude compaction, they should be excavated to a depth sufficient to achieve a firm and unyielding surface at the planned bottom of excavation or the base of fill. Generally, an overexcavation depth of 1 to 2 feet is sufficient. Using geogrids and/or easily compactable material such as crushed rock can reduce the depth of excavation. The geogrids and/or geotextile should satisfy the requirements of Standard Specifications for Public Works Construction ([Greenbook]; Building News, 2018, Table 213-5.2 (D) Biaxial S1.).

Fill and backfill should be compacted by:

- Placing in loose layers less than 8 inches thick.
- Moisture-conditioning to at least 2% above optimum moisture content.
- Compacting to at least 95% relative compaction.

The compacted subgrade soils should be firm, hard, and unyielding.

Concrete flatwork (i.e., hardscape, curbs, and gutters) should be underlain by a minimum of 12 inches of soil compacted to at least 95% relative compaction and at least 2% above optimum moisture content.

Materials for structure backfill should meet the criteria per SCRRA (2021b) Standard Spec 31.20.00. Recommendations provided in Caltrans specifications (Caltrans, 2018)/Greenbook (Building News, 2018)) can be used for import fill material criteria.

Generally, the upper soils encountered in the borings are not expected to meet the criteria for structure backfill per SCRRA Standard Spec 31.20.00 (SCRRA, 2021b).

Site grading may be accomplished with conventional heavy-duty construction equipment. The fill should be compacted using soil compactors as recommended by the Caterpillar Performance Handbook (2018), or equivalent. However, to avoid overstressing retaining walls when placing backfill adjacent to the retaining walls, backfill should be compacted using lightweight compaction equipment or the walls should be braced.

4.3 FOUNDATION DESIGN

4.3.1 Deep Foundations

We judge that the proposed abutments and bents for the structure replacement can be supported on pile foundations. Drilled (cast-in-drilled-hole [CIDH]) piles were considered for the design. Because of potential driving difficulties/refusals in very dense sands, potential pile-driving-induced vibration, and proximity of rail tracks, driven piles may not be feasible at this Project site. Therefore, CIDH piles were selected by the designer for foundation support for the design.

Construction of CIDH concrete piles should address potential caving/sloughing/heaving of granular soils. Based on the subsurface conditions at the site, the CIDH pile tip elevations are anticipated to be below the design groundwater elevation; therefore, wet construction methods are anticipated for CIDH pile construction. It is likely that CIDH pile construction would require a temporary casing or wet drilling method depending on the anticipated groundwater table at the time of construction. Details of CIDH pile construction considerations are discussed in Section 4.6 of this report

For the design, 6-foot-diameter and CIDH piles were selected by the designer for bent and abutment piles, respectively. Pile axial resistances of 6-foot CIDH concrete piles for the abutment and bents were evaluated using SHAFT (Ensoft, 2017) for the Strength Limit and Extreme Limit cases. The CIDH pile axial compression resistance was based on skin friction and neglecting end bearing resistance. An LRFD Strength and Extreme Limit State resistance factor of 0.7 and 1.0, respectively, were considered for skin friction resistance. Based on the AASHTO LRFD Bridge Design Specifications Section 10.8.3.6.3, for a pile group in sand the individual nominal resistance of each pile should be multiplied by an efficiency factor, η, based on pile center-to-center spacing. Based on the bent layouts, the proposed pile center-to-center spacing of the two 6-foot diameter CIDH piles placed in a single row is 18 feet, or 3 diameters (3D). Based on the abutment layout, the proposed pile center-to-center spacing of the four 6-foot diameter piles, placed in a 2 x 2 group, is 18 feet, or 3D. Therefore, pile group reduction factors of 1.0 and 0.8 were applied in the analyses for the bent and abutment pile axial resistances, respectively. Although our borings were performed only to 100 feet deep bgs, our vertical pile capacity analysis on the creek bed (bent) and abutments were performed to a depth of 120 feet by extrapolating the available soil strength parameters from 100 feet to 120 feet.

Based on discussions with the design team, the pile lateral capacity will be performed by the structural engineering team. The structural engineer will provide the recommended pile lengths from their lateral capacity analyses.

Scour is a design concern because the bridge is located within an active streambed. The calculated long-term, local, and total scour depth and the total scour elevation can be found in Table 7 and Table 8, respectively, in the Hydraulics Report for the Sespe Creel Overflow Channel Railroad Bridge prepared by GHD (GHD, 2023). Bottom-of-scour elevations were provided by Railpros (2023) in accordance with Section 3.7.5 of the Caltrans Amendments to the AASHTO Load and Resistance Factor Design (LRFD) Bridge Design Specifications (Caltrans, 2019a). The proposed bent and abutment piles should be designed for the local scour, while protecting against potential long-term degradation. Section 7 of the GHD (2023) report provides recommended scour protection countermeasures. Note that the pile cut-off elevations provided in Table 7 and Table

9 were provided by Railpros at a later date, and thus supersede the pile cut-off elevations provided in Appendix A.

The Project structural designer provided the foundation design data, factored design loads and bottom-of-scour elevations for the proposed bent and abutment piles. The foundation design data and bottom-of-scour elevations are presented in Table 7. The factored design loads are presented in Table 8, below. The foundation design recommendations table and pile data table are presented in Table 9 and Table 10, respectively. Settlement of the piles due to Service Limit loading was estimated to be less than 1 inch.

Table 7 - FOUNDATION DESIGN DATA SHEET

SUPPORT NO.	PILE TYPE	CUT-OFF ELEVATION[1] (feet)	BOTTOM-OF-SCOUR ELEVATION (FEET)			PERMISSIBLE SETTLEMENT UNDER SERVICE LOAD (inches)	NUMBER OF PILES PER SUPPORT
			STRENGTH LIMIT STATE	SERVICE LIMIT STATE	EXTREME LIMIT STATE		
Abutment 1	6-foot CIDH	420.75	423.7	411.9	435.4	1”	4
Bent 2	6-foot CIDH	425.00	412.2	406.3	422.1	1”	2
Bent 3	6-foot CIDH	429.00	414.5	406.6	422.4	1”	2

Note:

1. Provided by the structural design team (Railpros, 2023).

Table 8 - FOUNDATION FACTORED DESIGN LOADS

SUPPORT NO.	SERVICE LIMIT STATE TOTAL LOAD PER PILE (KIPS)	STRENGTH/CONSTRUCTION LIMIT STATE (kips)		EXTREME EVENT LIMIT STATE (kips)	
		COMPRESSION MAX. PER PILE	TENSION MAX. PER PILE	COMPRESSION MAX. PER PILE	TENSION MAX. PER PILE
Abutment 1	887	1,426	0	716	0
Bent 2	550	939	0	778	304
Bent 3	550	939	0	778	304

Note:

- The pile tip elevations should also be checked for lateral loading.

Table 9 - DEEP FOUNDATION DESIGN RECOMMENDATIONS

SUPPORT LOCATION	PILE TYPE	CUT-OFF ELEVATION (feet)	SERVICE-LIMIT STATE LOAD PER PILE (kips)	TOTAL PERMISSIBLE SETTLEMENT SUPPORT SETTLEMENT (inches)	REQUIRED FACTORED NOMINAL RESISTANCE PER PILE (kips)				DESIGN TIP ELEVATIONS (feet)	SPECIFIED TIP ELEVATIONS (feet)
					STRENGTH LIMIT		EXTREME EVENT			
					COMP. (ϕqs = 0.7)	TENSION (ϕqs = 0.7)	COMP. (ϕqs = 1.0)	TENSION (ϕqs = 1.0)		
Abutment 1	72” CIDH	420.75	887	1	1,426	--	716	--	322.75 (a-I) 385.75 (a-II) 372.75 (c) --^{1} (d)	322.75
Bent 2	72” CIDH	425.00	550	1	939	--	778	304	353.0 (a-I) 381.0 (a-II) 397.0 (b-II) 371.0 (c) --^{1} (d)	353.00
Bent 3	72” CIDH	429.00	550	1	939	--	778	304	355.0 (a-I) 381.0 (a-II) 397.0 (b-II) 371.0 (c) --^{1} (d)	353.00

Notes:

1. Design tip elevations for Lateral Load (d) for Bents are not required per discussion with structural engineer. Based on the lateral loads provided, it is assumed that pile tip elevation per lateral load will not control.

- Design tip elevations are controlled by: (a-I) Compression (Strength Limit), (b-I) Tension (Strength Limit), (a-II) Compression (Extreme Event), (b-II) Tension (Extreme Event), (c) Settlement, (d) Lateral Load.
- The specified tip elevation shall not be raised above the lowest design tip elevation.
- Unsuitable soil layers (i.e., scourable) that do not contribute to the design nominal resistance exist for Abutment 1 and Bents 2 and 3. Bottom-of-scour elevation varies. See Table 7 for bottom-of-scour elevations

Table 10 - PILE DATA TABLE

LOCATION	PILE TYPE	NOMINAL RESISTANCE (kips)		DESIGN TIP ELEVATION (feet)	SPECIFIED TIP ELEVATION (feet)
		COMPRESSION	TENSION		
Abutment 1	6-foot CIDH	2,037	--	322.27 (a) 372.75 (c) -- (d)	322.75
Bent 2	6-foot CIDH	1,174	304	353.0 (a) 397.0 (b) 371.0 (c) -- (d)	353.0
Bent 3	6-foot CIDH	1,174	304	355.0 (a) 397.0 (b) 371.0 (c) -- (d)	355.0

Notes :

- Design tip elevations for abutment and bents are controlled by: (a) Compression, (b) Tension, (c) Settlement, (d) Lateral Load.
- The specified tip elevation should not be raised above the lowest tip elevation.
- Design tip elevation for Lateral Load to be performed by the structural engineer.

4.4 RESISTANCE TO LATERAL LOADS AND LATERAL EARTH PRESSURES

4.4.1 Temporary Shoring

Shoring may be required if excavations for the wingwall are performed adjacent to existing railroad tracks and/or the roadway to avoid undermining the railroad tracks. The contractor should also be prepared to adjust the construction methods based on actual field conditions.

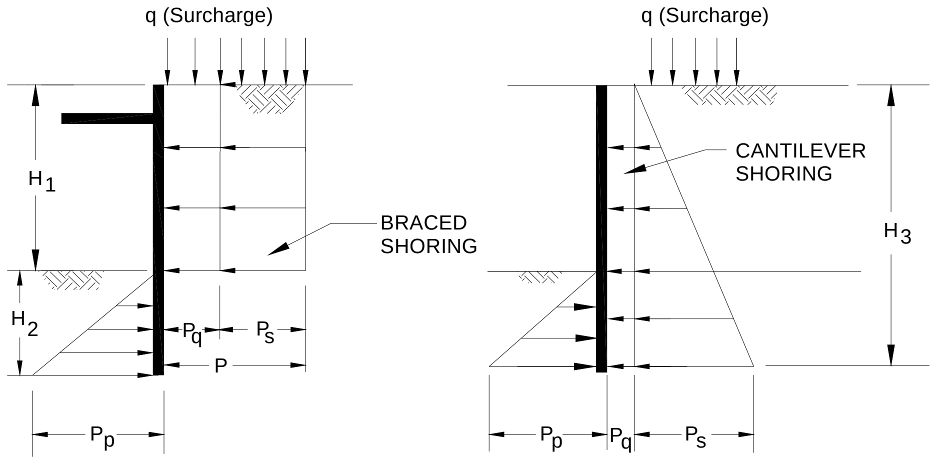
The shoring design is the responsibility of the contractor and should be designed by a registered engineer retained by the contractor. Design of the shoring system will require careful consideration of the existing adjacent improvements, utilities, and foundation systems located close to shored excavations. Shoring design should consider the possible related effects on the surrounding buildings and utilities, deflections of the shoring elements, possible effects of nearby foundation loads on the shoring, and settlements of the retained soil.

The temporary shoring design should incorporate the expected construction procedures, sequence, and loads. In particular, the stockpiling of excavated materials should be considered in design, as well as steel plates for cross traffic and the presence of heavy construction equipment or spoil piles next to the excavations.

Shoring is usually designed as either cantilever (unbraced) or braced. Cantilevered shoring is commonly constructed by either using soldier piles with lagging placed between piles or using sheet piles. If soldier piles and lagging are used, continuous lagging will be required. Difficulty in installing the lagging due to caving cohesionless soils should be anticipated. SCRRA restrictions on the use of shoring based on distance from the operating railroad tracks should be followed (SCRRA, 2021a).

For cantilever shoring, a deflection of 0.5% of the shored height (H1) is necessary to develop active earth pressure (Figure 5 for definition of H1). For braced shoring, the deflection should be less than that for cantilever shoring. We recommend that the design of temporary shoring be performed using shoring pressures equal to or greater than those shown on Figure 5 and Figure 6 and passive resistance equal to or less than that shown on Figure 5. The allowable passive soil pressure outlined on Figure 5 assumes undisturbed existing soils. The upper 1 foot of passive resistance should be neglected.

In using Figure 5, lateral pressures due to rail surcharge on temporary shoring located parallel to the rail tracks can be conservatively estimated assuming lateral coefficients of 0.3 and 0.5 for cantilever and restricted conditions, respectively, and a uniform rail surcharge load (AREMA, 2021).



	BRACED SHORING	CANTILEVER SHORING
P_p = 390 H_2 ≤4,000 psf	P = P_s+P_q = 24H_1 + 0.5q	P = P_s + P_q = 37H_3 + 0.3q
	(300 psf minimum)	(300 psf minimum)

Note(s):

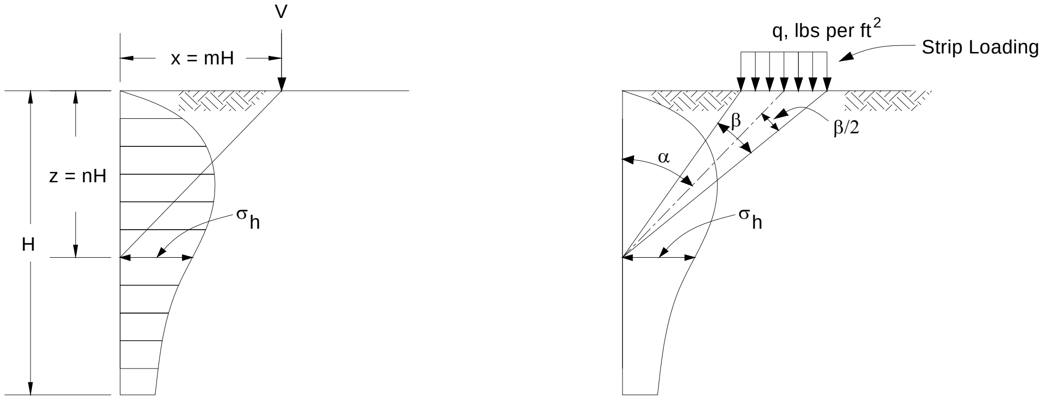
- All values of height (H) in feet and pressure (P) and surcharge (q) in psf.
- Where vehicular traffic from freeway is applicable, assume no less than a 240 psf uniform horizontal pressure.
- Where train load is applicable, use q = live load (from train) + impact load (if considered due to train derailment) per AREMA, Chapter 8, Section 2.2.3.
- Earth pressures assumed no hydrostatic pressures. Hydrostatic pressures, if anticipated, should be added to lateral earth pressures.

Figure 5 - LATERAL EARTH PRESSURES FOR TEMPORARY STRUCTURES

The shoring system and adjacent buildings should be monitored using “real time” instrumentation and optical surveys to check for the lateral and vertical movements until the permanent structure is in place. If large deflections (greater than 0.25% of the shoring height) are noted, the bracing system should be checked and strengthened as needed. If tension cracks appear in the ground surface adjacent to the shoring, the cracks should be monitored and sealed to prevent infiltration of water, and the significance of the cracks should be evaluated immediately.

The type of shoring will depend on the contractor’s means and methods. The excavations should only remain open for very short periods of time.

In addition, the contractor should strictly adhere to any requirements of SCRRA (2021a) and applicable federal and state health and safety regulations such as those of the Occupational Safety and Health Administration (OSHA, 2020). In accordance with OSHA regulations, the near-surface on-site soils are classified as Type C.



POINT LOAD	STRIP LOAD
For $m > 0.4$, $\sigma_h' = \frac{1.77V}{H^2}\frac{m^2n^2}{\left(m^2+n^2\right)^3}$ For $m \le 0.4$, $\sigma_h' = \frac{0.28V}{H^2}\frac{n^2}{\left(0.16+n^2\right)^3}$	$\sigma_h' = \frac{2q}{\pi}\left(\beta - \sin\beta\cos2\alpha\right)$

Note(s):

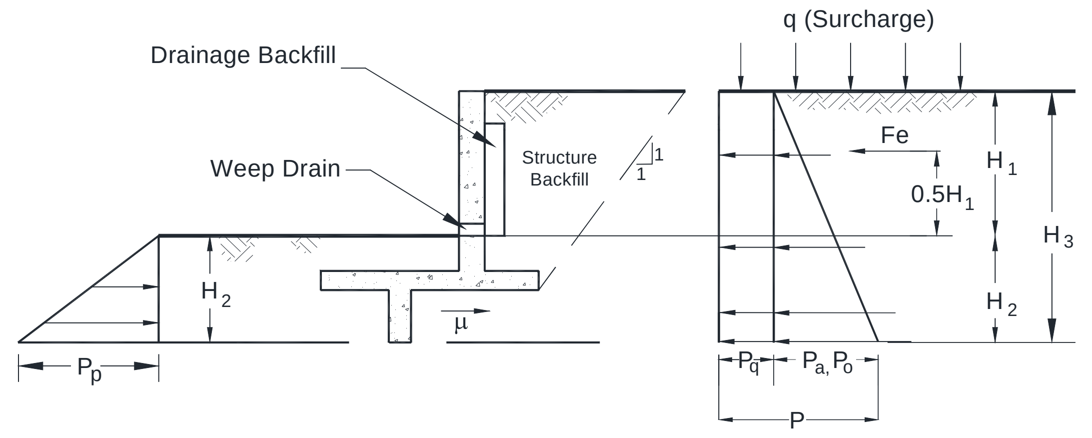
- σ'_h = horizontal stress (psf).
- V = vertical point load (pounds).
- q = vertical strip load (psf).
- H = height of wall (feet).
- α, β = angles (radians).
- m, n = dimensionless coefficients.

Figure 6 - SURCHARGE LATERAL PRESSURE DISTRIBUTION AGAINST A WALL

4.4.2 Permanent Structures

Lateral loads may be calculated per AREMA Chapter 8, Part 5, using trial wedge analysis with a soil friction angle of 32 degrees and soil density of 120 pcf. Lateral loads may also be calculated using Figure 7. Earth pressure coefficient calculations are provided in Appendix G.

The lateral resistance may be calculated using the following: 50% of passive resistance plus 50% of base friction, 100% passive resistance only, or 100% of the base friction only. Lateral loads can be resisted by an allowable passive soil pressure and base friction, as outlined on Figure 7for compacted fill, applied against below-grade walls and foundation elements.



P_p = 390 H_2 ≤4,000 psf	**CANTILEVER WALLS**	**RESTRAINED WALLS**
μ = 0.6 (nominal)	$P = P_a + P_q = 37\ H_3 + 0.3q$	$P = P_o + P_q = 56\ H_3 + 0.5q$
	INCREMENTAL SEISMIC FORCE	
	Serviceability[1]	$Fe = 4\ H_1^2$
	Ultimate[1]	$Fe = 9\ H_1^2$
	Survivability[1]	$Fe = 21\ H_1^2$
	Caltrans 975-year ARP[2]	$Fe = 17\ H_1^2$

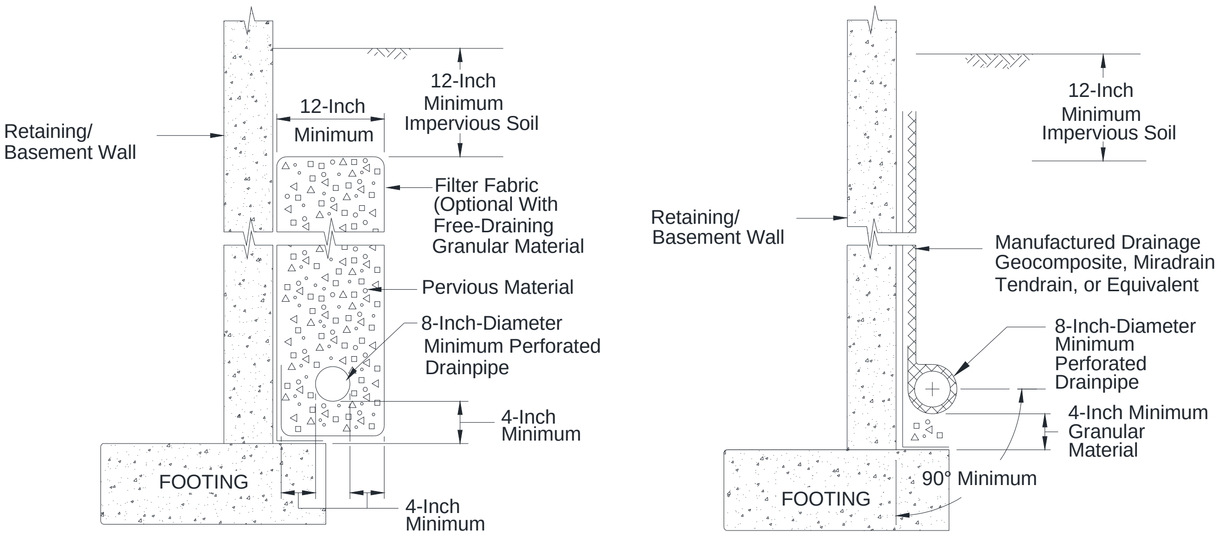
Note(s):

1. Per AREMA (2021) seismic design criteria, PGA_M = 0.193g, 0.439g, and 0.819g were used, respectively, for the Serviceability, Ultimate, and Survivability cases.
2. Per Caltrans ARS Online Tool V2 (Caltrans, 2023), PGA_M = 0.721g

- Lateral earth pressures were calculated using assumed abutment fill properties, including a unit weight of 120 pcf and a friction angle of 32 degrees.
- One-half of the PGA_M was used to calculate Fe.
- All values height (H) in feet, pressure (P) and surcharge (q) in pounds per square foot (psf), and force (F) in pounds.
- Where vehicular traffic from freeway is applicable, assume no less than a 240 psf uniform horizontal pressure.
- Where train load is applicable, use q = live load (from train) + impact load (if considered due to train derailment) per AREMA, Chapter 8, Section 2.2.3.
- P_p, P_a, and P_o are the passive, active, and at-rest earth pressures, respectively; Fe is the incremental seismic force.
- P_q is the incremental surcharge pressure; μ is the allowable friction coefficient applied to dead normal (buoyant) loads. Fe is in addition to the active and at-rest pressures. Below groundwater, in areas of potential pipeline rupture or areas of potential surface water infiltration, active and at-rest pressure should be reduced by 50% and hydrostatic pressure should be added to active and at-rest pressures. P_p should be reduced by 50% below the groundwater.
- For 2H:1V slopes above the wall, increase the active and at-rest pressures by 50%; for 1.5H:1V slope, increase the active and at-rest pressures by 100%.
- Neglect the upper 1 foot for passive pressure unless the surface is contained by a pavement or slab.

Figure 7 - LATERAL EARTH PRESSURES (PERMANENT STRUCTURES)

Retaining walls should be designed to resist lateral earth pressures with equivalent fluid pressures as illustrated on Figure 7. Lateral earth pressures are presented for walls free to rotate and restrained walls. At-rest earth pressures (restrained walls) should be used where the top of the wall is not expected to move laterally more than 0.001 H_1 (see Figure 7). The lateral earth pressures on Figure 7 are based on the structure backfill material noted in Section 4.2.1. The retaining walls should include a drain or be designed for hydrostatic pressure. See Figure 8 for typical sections of wall drains. The train surcharge pressures should be added to the lateral earth pressures on Figure 7 for the retaining wall for the total lateral pressure following the procedure discussed in Section 4.4.1. The seismic earth pressures provided on Figure 7 are based on the PGA_M based on ICC 2019 criteria discussed in Section 4.1.



MATERIAL	CALTRANS SPECIFICATIONS	GREENBOOK SPECIFICATIONS
Free-Draining Granular Material	68-2.02 (Class 2)	300-3.5.2
Geotextile Filter Fabric	88-1.02B	300-8
Perforated Pipe	68-2.02	207-13.4

Note(s):

- Drainpipe should drain to an outlet.
- Filter fabric wraps completely around perforated drainpipe and pervious materials.

Figure 8 - RETAINING WALL DRAINAGE

4.5 SOIL CORROSION POTENTIAL

One soil sample was tested for pH, soluble chloride and soluble sulfate, and soil electrical resistivity for corrosion potential. The test values are summarized in Table 11.

Analytical chemical test results indicated a value of 531.9 parts per million (ppm) soluble sulfate concentration in the near-surface soils. Based on these test results, we recommend that the concrete be designed for exposure class S1 from ACI 318 (ACI, 2011).

The corrosion potential test results are presented in Appendix E. Based on Caltrans Standards (2021) and the chemical test results, the on-site soils are classified as non-corrosive to buried metal pipes. In addition to the soil characteristics, external factors such as nearby active corrosion systems will greatly affect the need for an active corrosion protection system. The test data provided herein can be used by others to develop details of corrosion protection. Borrow soils imported to the Project site should be tested for corrosion potential.

Table 11 - CORROSION POTENTIAL

CONSTITUENT	CRITERIA FOR CORROSIVE MATERIALS	VALUE
pH	<5.5	7.2
Soluble sulfate content (ppm)[1]	>1,500	531.9
Soluble chloride content (ppm)	>500	7.9
Electrical resistivity (ohm-cm)	<1,500	1,541

Note(s):
- Caltrans Corrosion Guidelines (2021)
- ppm = parts per million.
- The lowest values for corrosive materials criteria are presented.

4.6 NOTES FOR CONSTRUCTION

The proposed CIDH piles will extend through gravel/cobble/boulder-rich alluvial dense sands. Additionally, the site is highly variable with layers of boulders, cobbles, and gravel, and those materials can be encountered at any depth. The subsurface cohesionless soils have the potential to slough, cave, and bottom heave during CIDH pile installation when subjected to vibration load from the adjacent traffic or if shallow groundwater is encountered. In addition, loss of drilling fluids was encountered during the subsurface field exploration. Therefore, “wet” construction methods and temporary casings should be considered for ease of construction and to reduce the potential for CIDH pile anomalies. The application of temporary casing may minimize loss of drilling fluid.

When “wet” construction methods are used, the integrity of concrete should be checked using downhole gamma-gamma and/or cross-hole sonic testing; PVC inspection pipes should be installed within the CIDH piles to facilitate the testing. Caltrans Standard Specifications for “Cast-in-Place Concrete Piling” should be followed. Difficult drilling conditions also should be anticipated to penetrate the very dense soils present at the site. In general, a minimum of 24 hours should be allowed between placing concrete in one pile shaft and drilling any nearby shafts or performing any other excavations within four pile diameters. It is the responsibility of the contractor to review all the pertaining boring records and LOTBs to understand the subsurface materials encountered in the borings, to select the appropriate drilling equipment, and to apply their means and methods to drill and install the CIDH piles.

Drilling and casing techniques, such as the oscillator casing method, can also be considered to help reduce construction-induced CIDH structural anomalies. Construction methods will have significant effects on the load-carrying capacity of the installed CIDH piles. Significant quality control and care must be exercised during construction including removal of temporary casing to ensure that the construction methods do not compromise the development of side friction. Selection of the CIDH pile construction contractor should be based on proven performance record on similar projects.

5 PLAN REVIEW, CONSTRUCTION OBSERVATION, AND TESTING

During construction, a Project geotechnical engineer or a qualified project QA/QC inspector (Engineer of Record) should provide field observation and testing to check that the site preparation, excavation, foundation installation, and finished grading conform to the intent of these recommendations, project plans, and specifications. This would allow the geotechnical consultant for the final design to develop supplemental recommendations as appropriate for the actual soil conditions encountered and the specific construction techniques used by the contractor.

As needed during construction, the geotechnical consultant responsible for the final design should be retained to consult on geotechnical questions, construction problems, and unanticipated site conditions.

6 LIMITATIONS

This geotechnical report has been prepared for this Project in accordance with generally accepted geotechnical engineering practices common to the local area. No other warranty, expressed or implied, is made.

The analyses and recommendations contained in this report are based on the literature review, limited field exploration, and limited laboratory testing conducted in the area. The results of the field exploration indicate subsurface conditions only at the specific locations and times, and only to the depths penetrated. They do not necessarily reflect strata variations that may exist between such locations. Although subsurface conditions have been explored as part of the exploration, we have not conducted chemical laboratory testing on samples obtained or evaluated the site with respect to the presence or potential presence of contaminated soil or groundwater conditions, mold, or methane gas.

The validity of our recommendations is based in part on assumptions about the stratigraphy. Observations during construction can help confirm such assumptions. If subsurface conditions different from those described are noted during construction, recommendations in this report must be re-evaluated. A Project geotechnical engineer or a qualified Project QA/QC inspector should be retained to observe earthwork construction in order to help confirm that the final design geotechnical assumptions and recommendations are valid or to modify them accordingly. DYA cannot assume responsibility or liability for the adequacy of recommendations if we do not observe construction.

This report is intended for use only for the Project described. In the event that any changes in the nature, design, or location of the facilities are planned, the conclusions and recommendations contained in this report should not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing by DYA. We are not responsible for any claims, damages, or liability associated with the interpretation of subsurface data or reuse of the subsurface data or engineering analyses without our express written authorization.

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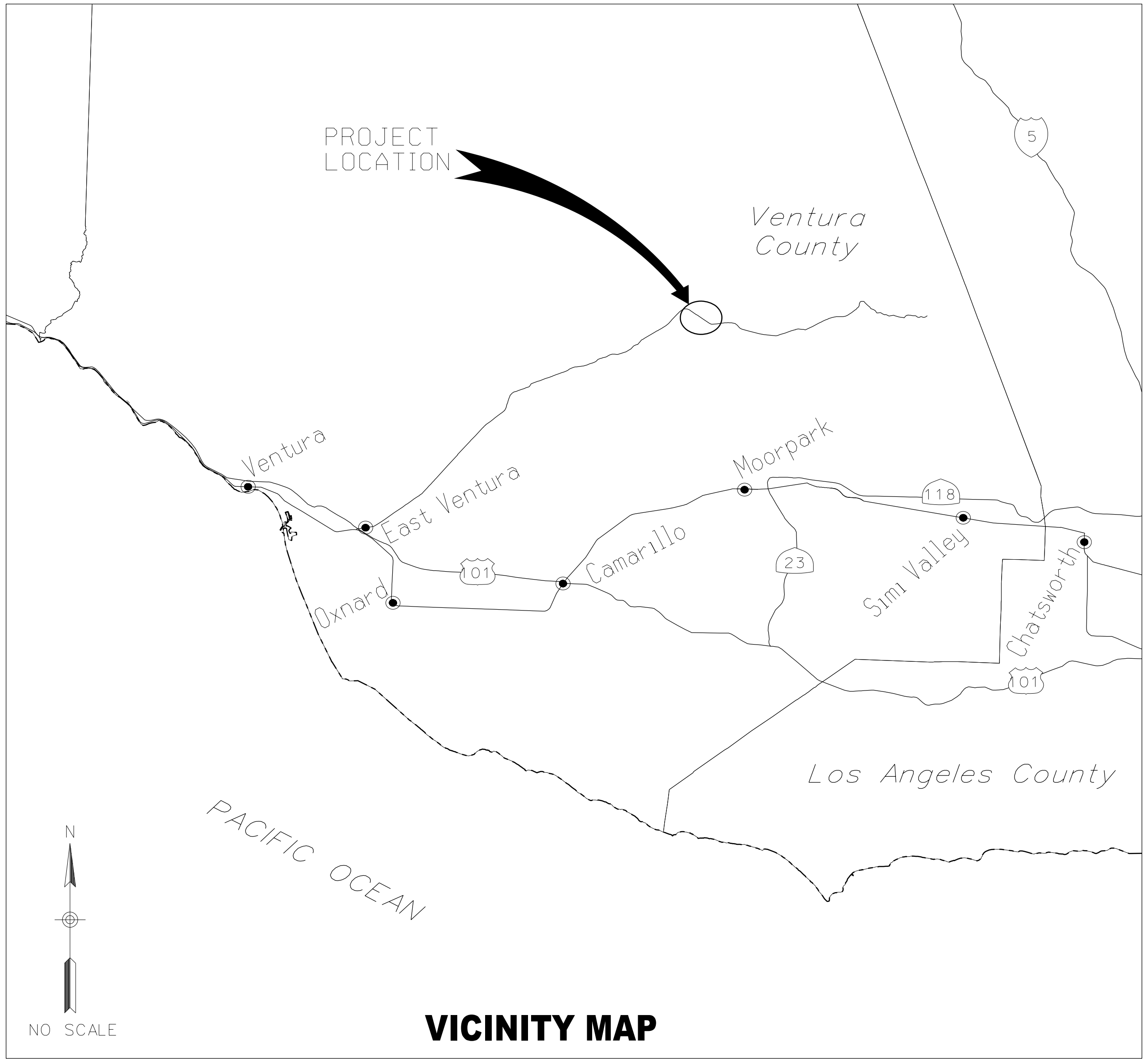
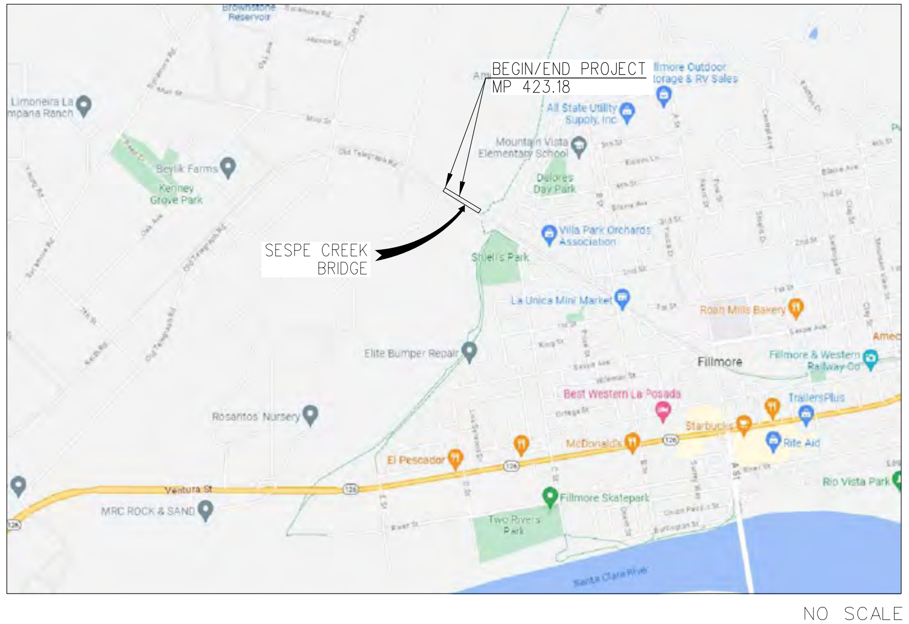
APPENDIX A -
PROJECT DRAWINGS

VENTURA COUNTY TRANSPORTATION COMMISSION
SESPE CREEK BRIDGE OVERFLOW
SANTA PAULA BRANCH LINE, FILLMORE, CA



VICINITY MAP



LOCATION MAP

JANUARY 4, 2024

100% SUBMITTAL

NOT FOR CONSTRUCTION

RAILPROS

APPROVED BY: ______________________ DATE: __________

SUBMITTED BY: ______________________ DATE: __________
JULINA CORONA, P.E.
PROJECT MANAGER, RAILPROS

VCTC

12/28/2023 USER = christian.arellano
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SHT NO.	DWG. NO.	REV. NO.	TITLE
GENERAL			
1	G-001	0	TITLE SHEET
2	G-002	0	INDEX OF DRAWINGS
3	G-003	0	STANDARD ABBREVIATIONS
4	G-004	0	STANDARD SYMBOLS
5	G-005	0	GENERAL NOTES
6	G-006	0	SURVEY CONTROL EXHIBIT
TRACK			
7	TD-001	0	TYPICAL SECTION
8	RP-001	0	TRACK PLAN AND PROFILE - STA 98+50 TO STA 110+50
9	DIV-001	0	TEMPORARY CREEK DIVERSION PLAN
STRUCTURES			
10	S-001	0	GENERAL PLAN NO. 1
11	S-002	0	GENERAL PLAN NO. 2
12	S-003	0	GENERAL NOTES AND INDEX OF DRAWINGS
13	S-004	0	STAGE CONSTRUCTION PLAN
14	S-005	0	FOUNDATION PLAN
15	S-006	0	ABUTMENT DETAILS NO. 1
16	S-007	0	ABUTMENT DETAILS NO. 2
17	S-008	0	ROCK SLOPE PROTECTION
18	S-009	0	BENT DETAILS NO. 1
19	S-010	0	BENT DETAILS NO. 2
20	S-011	0	BENT DETAILS NO. 3
21	S-012	0	GIRDER DETAILS NO. 1
22	S-013	0	GIRDER DETAILS NO. 2
23	S-014	0	HANDRAIL REPLACEMENT PLAN
24	S-015	0	HANDRAIL DETAILS
25	S-016	0	MISCELLANEOUS DETAILS NO. 1
26	S-017	0	MISCELLANEOUS DETAILS NO. 2
GEOTECHNICAL			
27	GE-001	0	LOG OF TEST BORINGS
28	GE-002	0	SOIL LEGEND 1 OF 2 - LOG OF TEST BORINGS
29	GE-003	0	SOIL LEGEND 2 OF 2 - LOG OF TEST BORINGS

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FINAL DESIGN (100%)
NOT FOR CONSTRUCTION

REV.	DATE		BY / SUB.	APP.
			CG	NO

DESIGNED BY M. WHITE
DRAWN BY J. ZIEGLER
CHECKED BY J. WNEK
APPROVED BY N. ORTEGA
DATE 1-4-2024

VENTURA COUNTY
TRANSPORTATION
COMMISSION

RAILPROS
811 WILSHIRE, SUITE 1820
LOS ANGELES, CA 90017
WWW.RAILPROS.COM
EMAIL: INFO@RAILPROS.COM
PHONE: (213)627-0044

SUBMITTED: ______________________
JULINA CORONA, P.E.
PROJECT MANAGER

SESPE CREEK BRIDGE OVERFLOW
SANTA PAULA BRANCH LINE, FILLMORE, CA

INDEX OF DRAWINGS

CONTRACT NO.
DRAWING NO. G-002
REVISION
SHEET NO. 2 OF 29
SCALE NTS

RAILROAD CONTACT

SIERRA NORTHERN RAILWAY DIVISION MANAGER	(530) 490-1446

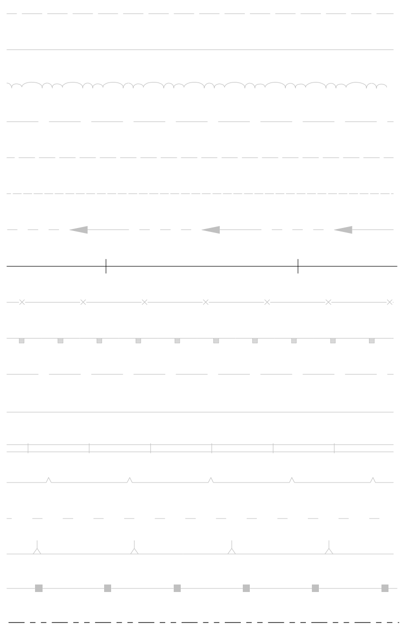
ABBREVIATIONS

ADS	ADVANCED DRAINAGE SYSTEMS
AVE	AVENUE
AT&T	AMERICAN TELEPHONE AND TELEGRAPH COMPANY
AWW	ABSOLUTE WORK WINDOW
BLVD	BOULEVARD
CI	CAST IRON
℄	CENTERLINE
CMPA	CORRUGATED METAL PIPE ARCH
CONT	CONTINUED
CP	CONTROL POINT
CPUC	CALIFORNIA PUBLIC UTILITIES COMMISSION
CWR	CONTINUOUS WELDED RAIL
Dc	DEGREE OF CURVE
θ_s	DEFLECTION ANGLE - SPIRAL
DI	DRAINAGE INLET
DOT	DEPARTMENT OF TRANSPORTATION (U.S.)
DWG	DRAWING
EA	EACH
Ea	ACTUAL SUPERELEVATION
Eu	UNBALANCED SUPERELEVATION
ELEV	ELEVATION
ES	ENGINEERING STANDARDS (SCRRA STANDARD DRAWINGS)
EG	EXISTING GROUND
EWD	EASTWARD DIRECTION
EXIST, EX, (E)	EXISTING
FL	FLOW LINE
FT	FEET, FOOT
FWY	FREEWAY
GPS	GLOBAL POSITIONING SYSTEM
HMA	HOT MIX ASPHALT
HR	HOUR
HTTO	HAND THROW TURNOUT
HDPE	HIGH DENSITY POLY ETHYLENE
HST	HOLLOW STEEL TIE
IJ	INSULATED JOINT
JCT	JUNCTION
L	LENGTH
LA	LOS ANGELES
LACMTA	LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY
LACTC	LOS ANGELES COUNTY TRANSPORTATION COMMISSION
Lc	LENGTH OF CIRCULAR CURVE
Ls	LENGTH OF SPIRAL
LF	LINEAL FOOT
LH	LEFT HAND
LLT	LAST LONG TIE
LT	LEFT
LG	LIP OF GUTTER
LWW	LIMITED WORK WINDOW
MCI	MICROWAVE COMMUNICATIONS INC.
MFS	MERCANTILE FREIGHT SERVICE
MH	MANHOLE
MIN	MINUTE
MIN	MINIMUM
MP	MILEPOST
MPH	MILES PER HOUR
MT	MAIN TRACK
NAD 83	NORTH AMERICAN DATUM OF 1983
NAD 88	NORTH AMERICAN DATUM OF 1988
NO	NUMBER
NTS	NOT TO SCALE
OH	OVERHEAD
OTM	OTHER TRACK MATERIAL
OFF	OFFSET
O.C.	ON CENTER

ABBREVIATIONS (CONT.)

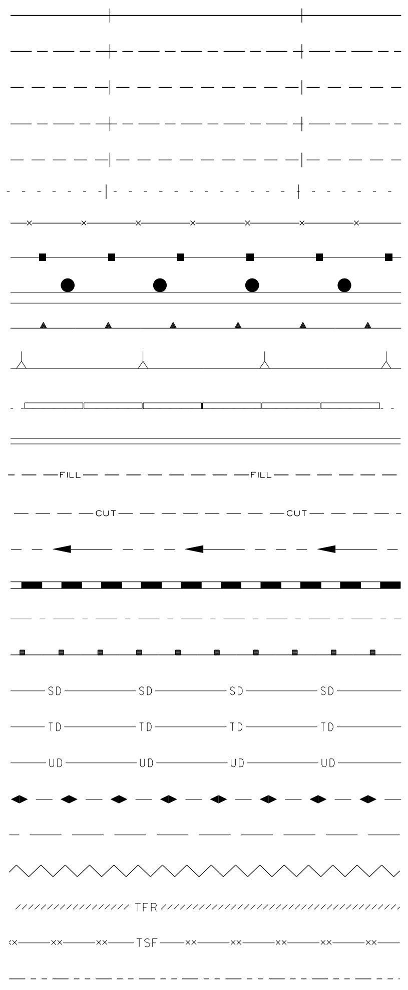
PCC	PORTLAND CEMENT CONCRETE
PED	PEDESTRIAN
PH	POT HOLE
PITO	POINT OF INTERSECTION OF TURNOUT
POB	POINT OF BEGINNING
POE	POINT OF ENDING
POTO	POWER OPERATED TURNOUT
PROP	PROPOSED
PS	POINT OF SWITCH
PI	POINT OF INTERSECTION
SPI	POINT OF INTERSECTION - SPIRAL
SC	POINT OF SPIRAL TO CIRCULAR CURVE
CS	POINT OF CIRCULAR CURVE TO SPIRAL
ST	POINT OF SPIRAL TO TANGENT
TS	POINT OF TANGENT TO SPIRAL
PT	POINT OF TANGENCY
PTC	POSITIVE TRAIN CONTROL
PVI	POINT OF VERTICAL INTERSECTION
PVT	POINT OF VERTICAL TANGENT
PVC	POINT OF VERTICAL CURVE
QWEST	QWEST ENGINEERING
R	RADIUS
RBM	RAIL BOUND MANGANESE
RR	RAILROAD
RH	RIGHT HAND
RCB	REINFORCED CONCRETE BOX
ROW, R/W	RIGHT-OF-WAY
RT	RIGHT
RWIC	RAILROAD WORKER IN CHARGE
SCRRA	SOUTHERN CALIFORNIA REGIONAL RAIL AUTHORITY
STA	STATION
ST	STREET
SD	STORM DRAIN
SUB	SUBDIVISION
SWT	SWITCH
TCE	TEMPORARY CONSTRUCTION EASEMENT
TF	TURNOUT
TO	TRACK FOOT
TOR, T/R	TOP OF RAIL
TWC	TIME WARNER CABLE
TYP	TYPICAL
UPRR	UNION PACIFIC RAILROAD
V	VELOCITY
VERT	VERTICAL
WSM	WELDED SPRING MANGANESE
WWD	WESTWARD DIRECTION
WWM	WELDED WIRE MESH
XING	CROSSING

EXISTING LINESTYLES



ASPHALT SURFACE
BUILDING
BRUSH LINE/TREE LINE
CONCRETE SURFACE
CURB
DIRT SURFACE
FLOW LINE
EXISTING TRACK
FENCE AND HANDRAILS
GUARD RAIL
GUTTER
PROPERTY LINE
RAILROAD TRACK
RETAINING WALL
ROAD STRIPING
TOP OF SLOPE
SCRRA INTERTRACK FENCE/WWM
SCRRA RIGHT-OF-WAY

PROPOSED LINESTYLES



PROPOSED TRACK
PROPOSED RESURFACE TRACK
PROPOSED SHIFT TRACK
EXISTING RESURFACE TRACK
EXISTING SHIFT TRACK
TRACK TO BE REMOVED
FENCE
SCRRA INTERTRACK FENCE/WWM
ROADWAY GUARDRAIL
RETAINING WALL / GRAVITY WALL
TOP OF SLOPE
K-RAIL
PLATFORM HANDRAIL
FILL
CUT
FLOW LINE
BLOCK WALL
CENTERLINE OF ROAD
GUARDRAIL
STORM DRAIN
TRENCH DRAIN
UNDER DRAIN
PLATFORM EDGE FENCE
LIMITS OF CONSTRUCTION BOUNDARY
CONST JOINT
FIBER ROLLS
SILT CONTROL FENCE
PROPOSED TEMPORARY CONSTRUCTION EASEMENT

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REV. DATE BY SUB. APP.

FINAL DESIGN (100%)
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INFORMATION CONFIDENTIAL:
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DESIGNED BY
M. WHITE
DRAWN BY
J. ZIEGLER
CHECKED BY
J. WNEK
APPROVED BY
N. ORTEGA
DATE
1-4-2024

VENTURA COUNTY
TRANSPORTATION
COMMISSION

RAILPROS
811 WILSHIRE, SUITE 1820
LOS ANGELES, CA 90017
WWW.RAILPROS.COM
EMAIL: INFO@RAILPROS.COM
PHONE: (213)627-0044

SUBMITTED: ______________________
JULINA CORONA, P.E.
PROJECT MANAGER

SESPE CREEK BRIDGE OVERFLOW
SANTA PAULA BRANCH LINE, FILLMORE, CA

STANDARD ABBREVIATIONS

CONTRACT NO.
DRAWING NO. G-003
REVISION
SHEET NO. 3 OF 29
SCALE NTS

GENERAL SYMBOLS

DESCRIPTION	EXISTING	PROPOSED
ATCS/PTC ANTENNA		
BILLBOARD		
BUILDING		
BUMPER		
COORDINATE	N2,800,500	
CROSSING GATE & FLASHERS		
CURVE NUMBER	C12	C12
ELECTROLIER WITH POLE		
ELECTROLIERS, DOUBLE WITH POLE		
ELECTROLIER WITHOUT POLE		
FIRE HYDRANT		
FLASHERS		
FLAG POLE		
FLARED END SECTION		
FLOW		
GRID TICK	+	+
GROUND CONTROL POINT (AERIAL)	△	△
GUY WIRE		
HEADWALL		
MANHOLE	MH	MH
NORTH ARROW		
PHOTOELECTRIC CELL	PC	PC
POLE-MOUNTED LUMINAIRE		
POT HOLE LOCATION		
POWER POLE/TELEPHONE POLE		
RAILROAD MILEPOST	XX MP 2.27	XX (XX) SG MP 59.00 OR MP 59.00 (MP 2.27)
SANITARY SEWER MANHOLE	S	S
SIGN		
RAILROAD SIGNAL		
RAILROAD CANTILEVER SIGNAL		
STATION EQUALITY	EQ	EQ
STORM DRAIN CATCH BASIN	CB	CB
STORM DRAIN DROP INLET	DI	
STORM DRAIN MANHOLE	SD	
TELEPHONE MANHOLE	T	T
THIRD PARTY PROJECTS		
TRAFFIC SIGNAL		
TRAFFIC SIGNAL WITH ARM ONLY		
TRAFFIC SIGNAL WITH ARM AND POLE		
TREE		
TREE PALM		
TREE LINE, SHRUBBERY		
TIME CLOCK	TC	TC

SWITCHES AND DERAILS

DESCRIPTION	EXISTING	PROPOSED
POINT OF SWITCH (HAND-THROW TURNOUT)		
POINT OF SWITCH (POWER-OPERATED TURNOUT)		
DERAIL SWITCH POINT	SP	SP
DERAIL POWERED SWITCH POINT		
DERAIL BI-DIRECTIONAL WITH CROWDER		
RAIL LUBRICATOR	RL	RL

SURVEY CONTROL SYMBOLS

HORIZONTAL CONTROL POINT	△
HORIZONTAL AND VERTICAL CONTROL POINT	
VERTICAL CONTROL POINT	○
BENCHMARK	

SIGNAL HOUSES, CASES, SECURITY AND UTILITY BOXES & MANHOLES

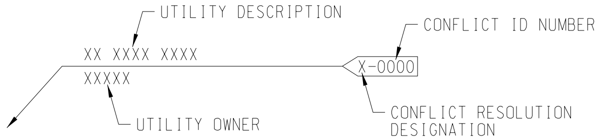
DESCRIPTION	EXISTING	PROPOSED
SIGNAL HOUSE		
10x10 SIGNAL CASE	10X10	10X10
BATTERY BOX	☐	☐
CCTV, SECURITY MANHOLE		
TELEVISION MANHOLE		
ELECTRIC MANHOLE		
WATER VALVE BOX	☐	☐
TRAFFIC CONTROL BOX		

HATCHES AND PATTERNS

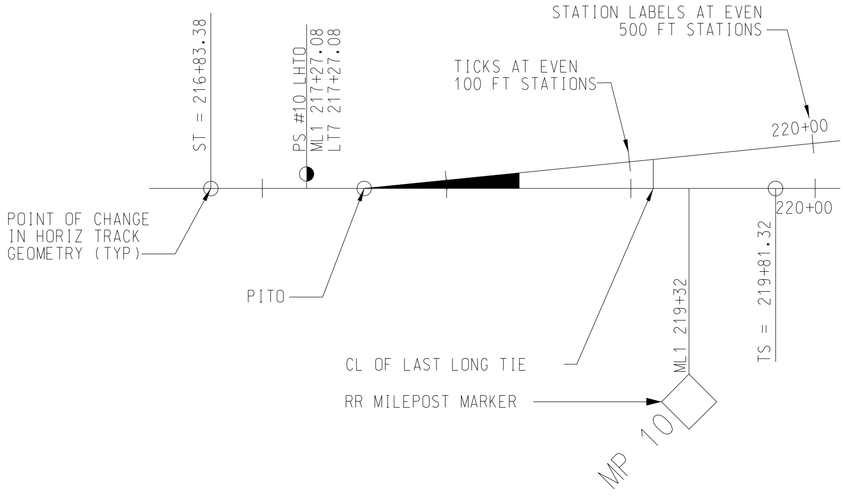
	PATTERNS
STONE/BRICK PAVING	
BALLAST	
TIMBER	
SUBGRADE, EARTH	
SUBBALLAST	
AGGREGATE BASE	
CONCRETE	
PEDESTRIAN CROSSING PANEL	
TACTILE WARNING TILES	
GRADED/LANDSCAPED AREA	
GRADE CROSSING PANELS	
HOT MIX ASPHALT CONCRETE	
SAWCUT EXISTING ASPHALT	

EXISTING TO BE REHABBED

UTILITIES LEGEND



TYPICAL ILLUSTRATION OF TRACK AND TURNOUT



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Z:\Engineering\VCTC\Sespe Creek Bridge Overflow\900 CADD\950 Drawings\Plot Drivers\PlotStamp.tbl
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DRAWN BY J. ZIEGLER
CHECKED BY J. WNEK
APPROVED BY N. ORTEGA
DATE 1-4-2024

VENTURA COUNTY
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RAILPROS
811 WILSHIRE, SUITE 1820
LOS ANGELES, CA 90017
WWW.RAILPROS.COM
EMAIL: INFO@RAILPROS.COM
PHONE: (213)627-0044

SUBMITTED: ______________
JULINA CORONA, P.E.
PROJECT MANAGER

SESPE CREEK BRIDGE OVERFLOW
SANTA PAULA BRANCH LINE, FILLMORE, CA

STANDARD SYMBOLS

CONTRACT NO.
DRAWING NO. G-004
REVISION
SHEET NO. 4 OF 29
SCALE NTS

GENERAL NOTES

1. THE CONTRACTOR SHALL COMPLY WITH ALL LOCAL, STATE, AND FEDERAL SAFETY CODES REGULATIONS, AND SPECIFICATIONS FOR THIS CONTRACT.

2. ALL CONSTRUCTION ACTIVITIES SHALL BE SCHEDULED AND COORDINATED WITH THE ENGINEER AND THE VARIOUS COMPANIES, AGENCIES, AND OTHER CONTRACTORS WHO MAY BE AFFECTED BY THIS WORK.

3. HORIZONTAL AND VERTICAL CONTROL POINTS FOR THE SITE LAYOUT ARE IDENTIFIED IN THE CONTRACT DOCUMENTS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO UTILIZE THESE CONTROL POINTS TO ASSURE THAT ALL FACILITIES INCLUDED IN PROJECT ARE CONSTRUCTED AT THE CORRECT HORIZONTAL AND VERTICAL LOCATIONS.

4. SECTION 4216/4217 OF THE GOVERNMENT CODE REQUIRES A DIG ALERT IDENTIFICATION NUMBER BE ISSUED BEFORE A "PERMIT TO EXCAVATE" IS VALID. THE CONTRACTOR SHALL CALL THE UNDERGROUND SERVICE ALERT (1-800-422-4133) TWO (2) WORKING DAYS PRIOR TO CONSTRUCTION TO OBTAIN A DIG ALERT ID NUMBER.

5. CALIFORNIA SENATE BILL 1359 (APPROVED 2006) OUTLINES PROCEDURES FOR LOCATING UTILITIES BY HAND EXCAVATION. THE CONTRACTOR SHALL BECOME FAMILIAR WITH THIS LEGISLATION AND COMPLY WITH ITS DIRECTIVE. PRIOR TO EACH CONSTRUCTION ACTIVITY WITHIN RAILROAD RIGHT-OF-WAY, THE CONTRACTOR SHALL NOTIFY RAILROAD'S SIGNAL REPRESENTATIVE.

6. SIERRA NORTHERN & VCTC ARE NOT MEMBERS OF DIG ALERT. THE CONTRACTOR SHALL CALL SIERRA NORTHERN'S 24-HOUR EMERGENCY NUMBER A MINIMUM OF FIVE DAYS PRIOR TO BEGINNING CONSTRUCTION TO MARK SIGNAL AND COMMUNICATION CABLES AND CONDUITS. TO ASSURE CABLES AND CONDUITS HAVE BEEN MARKED, NO WORK WAY PROCEED UNTIL THE CONTRACTOR HAS BEEN PROVIDED WITH WRITTEN AUTHORIZATION TO PROCEED FROM SIERRA NORTHERN. IN CASE OF SIGNAL EMERGENCIES OR GRADE CROSSING PROBLEMS, THE CONTRACTOR SHALL CALL THE 24-HOUR EMERGENCY NUMBER PROVIDED.

7. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS FOR CONFLICTS WITH EXISTING UTILITIES, SIGNAL CABLES/EQUIPMENT, FIBER OPTIC LINES, AND/OR OTHER ITEMS THAT MIGHT IMPAIR CONSTRUCTION ACTIVITIES. INCONSISTENCIES FOUND SHALL BE REPORTED TO THE ENGINEER.

8. REPAIRS TO THE DAMAGED MATERIALS OR FACILITIES INTENDED TO REMAIN IN PLACE SHALL BE MADE BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE UNLESS OTHERWISE STATED BY THE ENGINEER.

9. ALL EXCAVATED WASTE MATERIAL SHALL BE IMMEDIATELY REMOVED FROM THE SITE. ON SITE STORAGE OF EXCAVATED WASTE MATERIAL SHALL NOT BE PERMITTED AT ANY TIME.

10. DEFINITIONS:

A. TRACK OUTAGE:	TRACK WHICH IS OUT OF SERVICE FOR A GIVEN PERIOD OF TIME.
B. ACTIVE TRACK:	TRACK ON WHICH TRAINS ARE OPERATING AND INTERRUPTION OF SERVICE MAY OCCUR ONLY WITHIN AN APPROVED "WINDOW" AS DEFINED BELOW.
C. FOULED TRACK:	TRACK IS FOULED WHEN AN OBSTRUCTION IS PLACED WITHIN FOUR (4) FEET FROM THE NEAREST RAIL OF THE TRACK OR WHEN AN OVERHEAD OBSTRUCTION IS PLACED WITHIN TWENTY-TWO AND A HALF FEET (22'-6") ABOVE THE TOP OF RAIL.
D. WINDOW:	A GIVEN PERIOD OF TIME BETWEEN OPERATING TRAINS WHERE A TRACK MAY BE FOULED WITH THE STIPULATION THAT THE TRACK SHALL BE BACK IN SERVICE AT THE END OF THE GIVEN PERIOD OF TIME. A FORM OF POSITIVE PROTECTION SHALL ALSO BE REQUIRED.
E. EXCLUSIVE TRACK WINDOW / ABSOLUTE WORK WINDOW (AWW):	AN APPROVED WORK WINDOW IN WHICH NO TRAIN MOVEMENTS WILL OPERATE ON ANY TRACK WITHIN THE WINDOW LIMITS. THE CONTRACTOR MAY DISMANTLE, REMOVE, RECONSTRUCT, OR OTHERWISE OBSTRUCT TRACKS WITHIN THE LIMITS OF SUCH A WINDOW THIS WORK WAY BE PROTECTED BY TRACK OUT OF SERVICE, TRACK AND TIME LIMITS, OR BY FORM B TRACK BULLETIN.
F. LIMITED TRACK WINDOW / LIMITED WORK WINDOW (LWW):	AN APPROVED WORK WINDOW FOR SOME, BUT NOT ALL TRACKS WITHIN A GENERAL WORK AREA (E.G. ONE TRACK REMAINS FOR OPERATION OF TRAINS, OTHER TRACKS ARE AVAILABLE FOR THE CONTRACTOR'S WORK), MOVEMENT OF TRAINS OVER THE TRACK(S) OF A LIMITED TRACK WINDOW IS UNDER THE CONTROL OF THE SIERRA NORTHERN EMPLOYEE-IN CHARGE (EIC) WHO WILL NOT AUTHORIZE TRAIN MOVEMENT UNLESS AND UNTIL THE CONTRACTOR PERSONNEL AND EQUIPMENT ARE CLEAR OF THE OPERATING TRACK. THE CONTRACTOR MAY REMOVE, CONSTRUCT, OR OBSTRUCT ONLY THE TRACK DESIGNATED BY THE SSWP AND MUST ARRANGE THE WORK SO THAT TRAINS CAN OPERATE WITHOUT DELAY ON THE REMAINING TRACK(S) IN THE WORK AREA. THIS WORK MAY BE PROTECTED BY TRACK OUT OF SERVICE, TRACK AND TIME, OR BY FORM B TRACK BULLETIN.
G. WORK WINDOW:	AN APPROVED WORK WINDOW IN WHICH PASSENGER, FREIGHT AND ALL OTHER TRAINS AND ON-TRACK EQUIPMENT MOVEMENTS CAN BE PROHIBITED FROM ENTERING THE DEFINED LIMITS OF A SEGMENT OF TRACK. THE "FORM B" WORK WINDOW DOES NOT ALLOW THE CONTRACTOR TO REMOVE FROM SERVICE OR MODIFY THE TRACKS, SIGNALS. BRIDGES, STATIONS OR OTHER ELEMENTS OF THE OPERATING SYSTEM IN A MANNER, WHICH WILL DELAY OR IN ANY WAY AFFECT THE SAFE OPERATION OF THE TRAINS. THE "FORM B" WORK WINDOW ALLOWS THE CONTRACTOR THE ABILITY TO ENTER THE OPERATING ENVELOPE AND PERFORM CONSTRUCTION ACTIVITIES SUBJECT TO THE CONDITIONS ABOVE. AN EIC/FLAGMAN FROM SIERRA NORTHERN WILL EXERCISE STRICT CONTROL OVER THE CONTRACTOR'S CONSTRUCTION ACTIVITIES IN CONJUNCTION WITH ROADWAY WORKER PROTECTION REQUIREMENTS, TO ASSURE THAT THE CONTRACTOR'S ACTIVITIES DO NOT DELAY OR IMPACT TRAIN SERVICE.
H. TRACK AND TIME:	AN APPROVED WORK WINDOW IN WHICH THE SIERRA NORTHERN RAILWAY DISPATCHER WILL AUTHORIZE MEN AND EQUIPMENT TO OCCUPY A TRACK OR TRACKS WITHIN LIMITS FOR A CERTAIN TIME PERIOD. THE DISPATCHER AUTHORITY SHALL INCLUDE AUTHORITY NUMBER, TRACK DESIGNATION, LIMITS AND TIME. MOVEMENTS MAY BE MADE IN EITHER DIRECTION WITHIN THE SPECIFIED LIMITS UNTIL THE LIMITED ARE RELEASED.

11. PRIOR TO COMMENCING WORK, ALL EXISTING SITE CONDITIONS SHALL BE FIELD VERIFIED WITH THE ENGINEER TO ASCERTAIN THE LIMITS OF WORK ACTIVITIES. THE CONTRACTOR SHALL SUBMIT AND RECEIVE THE ENGINEER'S APPROVAL OF THE PROJECT SCHEDULE AND OPERATIONS PLAN. EACH ITEM OF WORK SHALL BE DESCRIBED AND ACCOUNTED FOR IN THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL REFER TO THE SPECIFICATIONS FOR FURTHER INFORMATION REGARDING SUBMITTAL REQUIREMENTS.

GENERAL NOTES (CONTNUED)

12. RAIL TRAFFIC DISRUPTIONS SHALL BE KEPT TO A MINIMUM. DISRUPTIONS IN RAIL TRAFFIC THAT MAY BE REQUIRED SHALL BE COORDINATED WITH RESIDENT ENGINEER AND SIERRA NORTHERN RAILWAY BEFOREHAND. NO SUCH WORK SHALL COMMENCE WITHOUT THE ENGINEER'S APPROVAL. WORK AFFECTING THE MOVEMENT OF TRAINS WILL BE UNDER THE AUTHORITY AND OVERALL CONTROL OF THE ENGINEER OR HIS REPRESENTATIVE.

13. THE CONTRACTOR SHALL NOT PLACE MATERIAL AND/OR EQUIPMENT WITHIN TWENTY (20) FEET OF AN ACTIVE TRACK AT ANY TIME WITHOUT PRIOR APPROVAL FROM SIERRA NORTHERN RAILWAY.

14. WALKWAYS SHALL BE PLACED AS REQUIRED BY CALIFORNIA PUBLIC UTILITIES COMMISSION GENERAL ORDER NO. 118 AND 26D AND SCRRA ENGINEERING STANDARD ES2109 FOR ALL NEW CONSTRUCTION, UNLESS OTHERWISE NOTED.

15. THE CONTRACTOR AGREES THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES , THE CONTRACTOR WILL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY, THAT THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT LIMITED TO NORMAL WORKING HOURS, AND THE CONTRACTOR FURTHER AGREES TO DEFEND, INDEMNIFY HOLD SIERRA NORTHERN, VCTC, VENTURA COUNTY AND THE DESIGN PROFESSIONAL HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT.

16. THE LOCATIONS AND DIMENSIONS SHOWN ON THE PLANS FOR EXISTING FACILITIES ARE IN ACCORDANCE WITH AVAILABLE INFORMATION WITHOUT UNCOVERING AND MEASURING. THE ENGINEER DOES NOT GUARANTEE THE ACCURACY OF THIS INFORMATION OR THAT ALL EXISTING UNDERGROUND FACILITIES ARE SHOWN.

17. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE APPLICABLE CODES, ORDINANCES, AND STANDARD SPECIFICATIONS OF ALL AGENCIES THAT HAVE THE RESPONSIBILITY OF REVIEWING PLANS AND SPECIFICATIONS FOR CONSTRUCTION OF ALL ITEMS PER THESE PLANS AND SPECIFICATIONS IN THIS LOCALITY.

18. THE CONTRACTOR SHALL OBTAIN ALL THE NECESSARY PERMITS AND PAY PERMIT FEES AS REQUIRED FOR CONSTRUCTION OF THIS PROJECT.

19. THE CONTRACTOR SHALL CLEAN UP ALL DEBRIS AND MATERIALS RESULTING FROM HIS OPERATION AND RESTORE ALL SURFACES, STRUCTURES, DITCHES, AND PROPERTY TO ITS ORIGINAL CONDITION TO THE SATISFACTION OF THE ENGINEER.

20. CONTRACTOR SHALL PROVIDE FOR THE CONTINUOUS OPERATION OF THE EXISTING FACILITY WITHOUT INTERRUPTION DURING CONSTRUCTION EXCEPT DURING EXCLUSIVE TRACK WINDOWS OUTLINED IN THE SPECIFICATIONS AND UNLESS SPECIFICALLY AUTHORIZED OTHERWISE BY SIERRA NORTHERN.

21. CONTRACTOR TO IDENTIFY DEPTH AND LOCATION OF ALL EXISTING UNDERGROUND UTILITIES. FOR LOCATION OF SIGNALS AND COMMUNICATION CONDUITS CONTACT RAILROAD SIGNAL DEPARTMENT.

22. TIMBER TIES SHALL BE SPACED AT 19 1/2 INCHES ON CENTER.

23. TEMPORARY FACILITIES CONSTRUCTED AND REMOVED BY THE CONTRACTOR TO PROVIDE FOR MAINTENANCE RAIL OPERATIONS DURING THE PHASING OF CONSTRUCTION (SUCH AS PLACEMENT OF A TEMPORARY TRACK PANEL AT THE LOCATION OF A TURNOUT TO BE CONSTRUCTED AT A FUTURE PHASE) WILL BE CONSIDERED INCIDENTAL TO OTHER ITEMS BEING CONSTRUCTED. NO SEPARATE MEASUREMENT OR PAYMENT WILL BE MADE FOR PROVIDING FOR THE CONTINUOUS OPERATION OF RAIL TRAFFIC.

24. EXISTING RAILROAD SIGNAGE (INCLUDING SPEED SIGNS) SHALL BE MAINTAINED DURING CONSTRUCTION PERIOD. ALL RAILROAD SIGNAGE SHALL BE FULLY RESTORED UPON COMPLETION OF EACH WORK PERIOD IN ACCORDANCE WITH SCRRA ENGINEERING STANDARDS. PRIOR TO CONSTRUCTION, SCRRA STANDARD PROJECT NOTICE SIGNS SHALL BE PLACED AT LOCATIONS AS DIRECTED BY THE ENGINEER. NO TRESPASSING SIGNS SHALL BE PLACED IN ACCORDANCE WITH ES5214 AND AS SHOWN ON THE DRAWINGS.

25. CONTACT SIERRA NORTHERN RAILWAY TO ARRANGE FOR FLAGGING SERVICES. FLAGGING SERVICE IS DEPENDENT ON THE EIC AVAILABILITY AND MAY REQUIRE A MINIMUM OF FIFTEEN WORKING DAYS PRIOR TO BEGINNING WORK. PRIOR NOTIFICATION OF FLAGGING SERVICES DOES NOT GUARANTEE THE AVAILABILITY OF THE EIC FOR THE PROPOSED DATE OF WORK.

26. ALL PERSONNEL TO ACCESS SPBL ROW MUST COMPLY WITH AN ACCEPTED 49 CFR PART 214 & 243 PROGRAM. CONTRACTOR TO PERFORM WORK IS RESPONSIBLE FOR ALL TESTING REQUIRED PER THEIR ACCEPTED PROGRAM. THE CONTRACTORS RWIC MUST BE CERTIFIED WITH SNR'S CONTRACTOR SAFETY CERTIFICATION. ALLOW 5 WORKING DAYS FROM THE REQUEST TO SNR FOR SAFETY TRAINING TO BE ARRANGED.

27. NO MECHANIZED EXCAVATION WITHIN 2 FEET OF FIBER LINE IS ALLOWED. QWEST, VCTC AND MFS TO BE PRESENT FOR ANY ACTIVITY WITHIN 5 FEET HORIZONTALLY OR VERTICALLY OF FIBER LINES. NO FACILITIES MAY BE ADDED CLOSER THAN 2 FEET VERTICALLY OR HORIZONTALLY TO QWEST, LACTC AND MFS'S STRUCTURES, INCLUDING THE ENCASEMENT. CONTRACTOR SHALL POTHOLE ALL FIBER LINES WITHIN THE WORK LIMITS BEFORE BEGINNING WORK IN THAT VICINITY. IF CONSTRUCTION EQUIPMENT INTENDS TO DRIVE OVER THE FIBER LINE, CONTRACTOR SHALL PLACE STEEL PLATES OVER THE FIBER LINE BEFORE CONSTRUCTION CREWS DRIVE OVER FIBER.

DESIGN CRITERIA

SCRRA DESIGN CRITERIA MANUAL, FEBRUARY 2022

FINAL DESIGN (100%)
NOT FOR CONSTRUCTION

REV. | DATE | BY | SUB. | APP.

DESIGNED BY
M. WHITE
DRAWN BY
J. ZIEGLER
CHECKED BY
J. WNEK
APPROVED BY
N. ORTEGA
DATE
1-4-2024

VENTURA COUNTY
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RAILPROS
811 WILSHIRE, SUITE 1820
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WWW.RAILPROS.COM
EMAIL: INFO@RAILPROS.COM
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SUBMITTED: ______________________
JULINA CORONA, P.E.
PROJECT MANAGER

SESPE CREEK BRIDGE OVERFLOW
SANTA PAULA BRANCH LINE, FILLMORE, CA

GENERAL NOTES

CONTRACT NO.
DRAWING NO. G-005
REVISION
SHEET NO. 5 OF 29
SCALE NTS

PROJECT CONTROL				
POINT NUMBER	NORTHING	EASTING	ELEVATION	DESCRIPTION
500	1971511.827	6280526.913	457.84'	CUT X IN CONC ON WB SIDE OF BRIDGE 27' EAST OF WEST EXPANSION JOINT
501	1971316.983	6280828.833	458.67'	CUT X IN CONC ON WB SIDE OF BRIDGE 94' WEST OF EAST EXPANSION JOINT
502	1971336.612	6280917.852	446.28'	3.5" USC&GS BRASS BM DISK STAMPED "S121B8, 1971" ON SE ABUTMENT, CONC WALKWAY
503	1971201.537	6281085.270	458.32'	MAGNAIL & SPIKE IN GROUND 5.15' FROM CONC CURBING AT GATE TO RR ABUTMENT ON SE SIDE OF RR TRX

LEGEND:

△ PROJECT CONTROL POINT

BASIS OF COORDINATES:

THE BASIS OF HORIZONTAL CONTROL IS THE NORTH AMERICAN DATUM OF 1983, 2011 ADJUSTMENT (NAD83-2011), MUTI-YEAR CORS SOLUTION 2 (MYSC2) ESTABLISHED BY USING THE SMARTNET SYSTEM OF CONTINUOUSLY OPERATING REFERENCE STATIONS (CORS).

COORDINATES ARE IN CALIFORNIA STATE PLANE COORDINATE SYSTEM, ZONE 5, EPOCH 2023.25, US SURVEY FT.

VERTICAL SURVEY CONTROL VALUES HEREON ARE BASED UPON THE NORTH AMERICAN VERTICAL DATUM OF 1988, GNSS-DERIVED BY FAST STATIC SURVEY METHODS USING GEOID18 PER CALIFORNIA PUBLIC RESOURCES CODE 8890, DEFINED AS CALIFORNIA ORTHOMETRIC HEIGHTS OF 1988 (CH88).

ALL POSITIONS ARE CALCULATED PER A FULLY CONSTRAINED LEAST SQUARES ADJUSTMENT USING STARNET V11 LEAST SQUARES ADJUSTMENT SOFTWARE.

N

30' 0' 30' 60'
GRAPHIC SCALE

$USER$
$TIME$
$DATE$
$FILE$
$PENTBLL$
$PLTDRVL$

REV.	DATE		BY/SUB.	APP.

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DESIGNED BY M. CUSICK
DRAWN BY M. CUSICK
CHECKED BY C. FESTA
APPROVED BY C. FESTA
DATE 12-28-2023

CODY J FESTA
LS9340

VENTURA COUNTY
TRANSPORTATION COMMISSION

RSE, INC.
1075 OLD COUNTY ROAD, STE. D
BELMONT, CA 94002
WWW.RSECORP.COM

SUBMITTED: ______________________
CODY FESTA, P.L.S.
SURVEY MANAGER

SESPE CREEK BRIDGE OVERFLOW
SANTA PAULA BRANCH LINE, FILLMORE, CA
SURVEY CONTROL EXHIBIT

CONTRACT NO.
DRAWING NO.
REVISION
SHEET NO. 6 OF 29
SCALE AS SHOWN

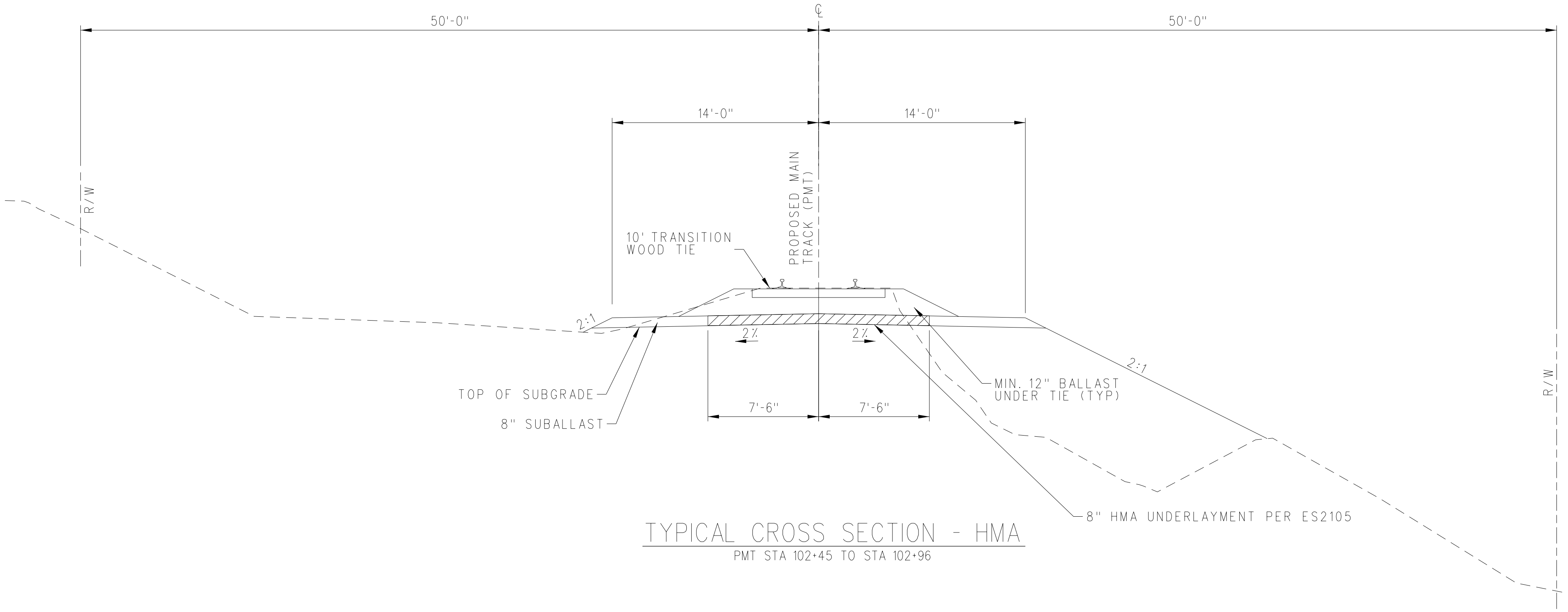
NOTES:

1) CONTRACTOR TO REMOVE AND REINSTALL TRACK FOR BRIDGE CONSTRUCTION AND HMA UNDERLAYMENT.

2) CONTRACTOR SHALL MAINTAIN A MINIMUM WALKWAY PER ES 2109 FOR ALL REINSTALLED AND RESURFACED TRACK.

3) SEE STRUCTURAL PLANS FOR PROPOSED BRIDGE.

4) CONTRACTOR TO FIELD VERIFY EXISTING HMA. IF HMA IS ENCOUNTERED, CONTRACTOR TO REMOVE EXISTING HMA PRIOR TO PROPOSED HMA INSTALLATION FOR BRIDGE APPROACH.



TYPICAL CROSS SECTION - HMA

PMT STA 102+45 TO STA 102+96

REV.	DATE	BY / SUB.	APP.

FINAL DESIGN (100%)
NOT FOR CONSTRUCTION

INFORMATION CONFIDENTIAL:

All plans, drawings, specifications, and or information furnished herewith shall remain the property of the the Southern California Regional Rail Authority and shall be held confidential; and shall not be used for any purpose not provided for in agreements with the Southern California Regional Rail Authority.

DESIGNED BY M. WHITE
DRAWN BY J. ZIEGLER
CHECKED BY J. WNEK
APPROVED BY N. ORTEGA
DATE 1-4-2024

VENTURA COUNTY
TRANSPORTATION
COMMISSION

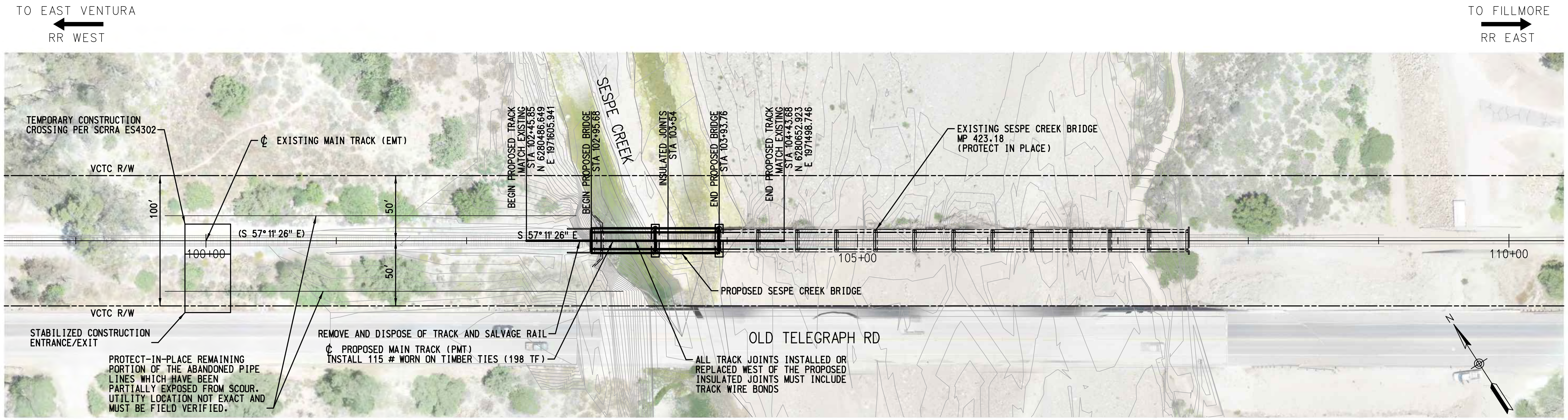
RAILPROS
811 WILSHIRE, SUITE 1820
LOS ANGELES, CA 90017
WWW.RAILPROS.COM
EMAIL: INFO@RAILPROS.COM
PHONE: (213)627-0044

SUBMITTED: ______________________
JULINA CORONA, P.E.
PROJECT MANAGER

SESPE CREEK BRIDGE OVERFLOW
SANTA PAULA BRANCH LINE, FILLMORE, CA

TYPICAL SECTION

CONTRACT NO.
DRAWING NO. TD-001
REVISION
SHEET NO. 7 OF 29
SCALE NTS



NOTES:

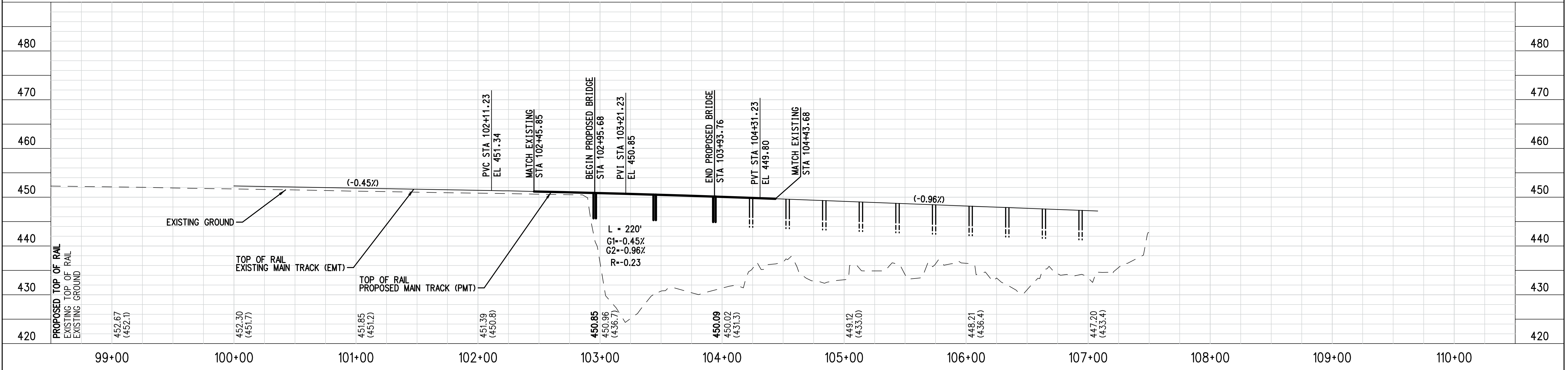
1. EXISTING RIGHT-OF-WAY IS BASED ON VCTC TRACK CHARTS
2. FINAL LOCATION OF TEMPORARY CONSTRUCTION CROSSING TO BE FIELD VERIFIED AND SUBMITTED FOR APPROVAL TO SIERRA NORTHERN RAILWAY
3. IF TEMPORARY CROSSING IS INSTALLED FOR ACCESS TO OLD TELEGRAPH RD A STABALIZED CONSTRUCTION ENTRANCE/EXIT SHALL BE CONSTRUCTED AND WILL NEED TO BE SUBMITTED FOR APPROVAL BY THE COUNTY TRANSPORTATION DEPARTMENT

LEGEND:

━━━	PROPOSED TRACK
───	EXISTING TRACK
—·—·—	EXISTING VCTC R/W

40' 0' 40' 80'
HORIZONTAL GRAPHIC SCALE

10' 0' 10' 20'
VERTICAL GRAPHIC SCALE



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REV.	DATE	BY SUB.	APP.

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DESIGNED BY
M. WHITE
DRAWN BY
J. ZIEGLER
CHECKED BY
J. WNEK
APPROVED BY
N. ORTEGA
DATE
1-4-2024

VENTURA COUNTY
TRANSPORTATION
COMMISSION

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WWW.RAILPROS.COM
EMAIL: INFO@RAILPROS.COM
PHONE: (213)627-0044

SUBMITTED: ____________
JULINA CORONA, P.E.
PROJECT MANAGER

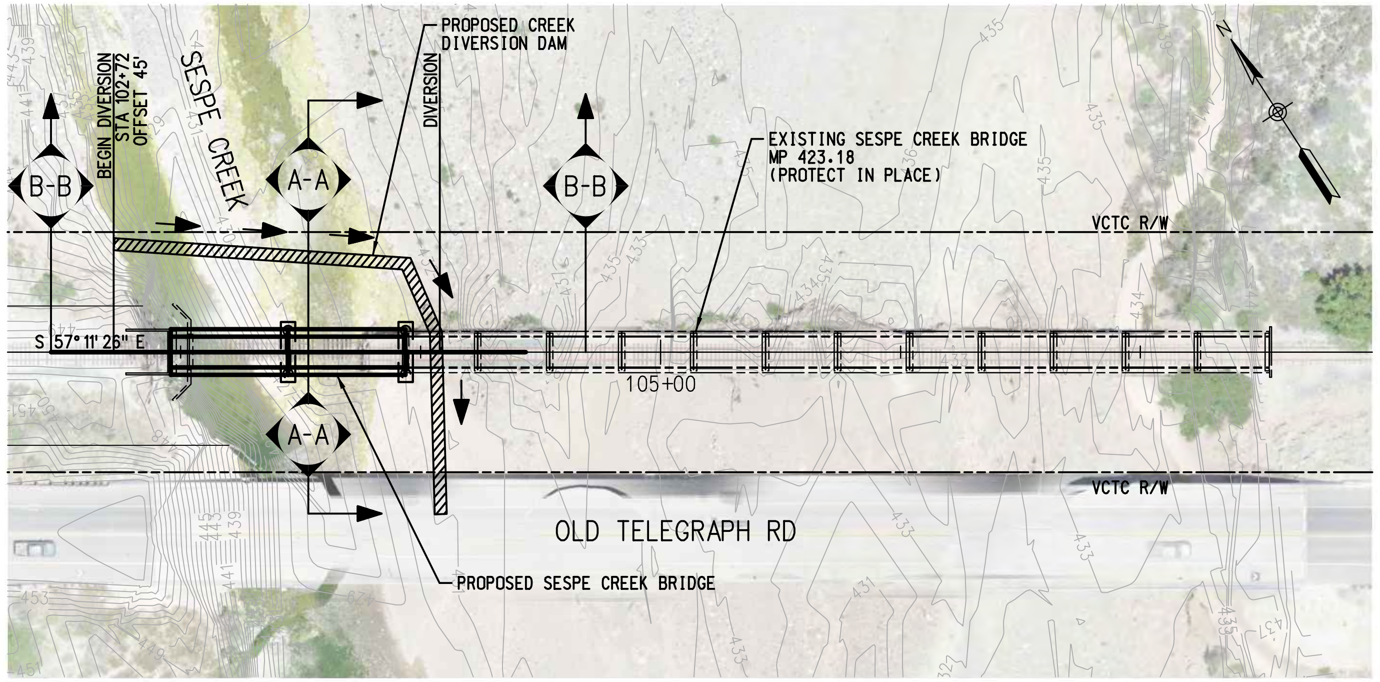
SESPE CREEK BRIDGE OVERFLOW
SANTA PAULA BRANCH LINE, FILLMORE, CA

TRACK PLAN AND PROFILE
STA 98+50 TO STA 110+50

CONTRACT NO.
DRAWING NO. RP-001
REVISION
SHEET NO. 8 OF 29
SCALE AS SHOWN

TO EAST VENTURA ← RR WEST

TO FILLMORE → RR EAST



CONSTRUCTION NOTES:

1. CONSTRUCTION OF COFFERDAM SYSTEM SHALL NOT BEGIN UNTIL ALL REQUIRED PERMITS HAVE BEEN OBTAINED - SEE SPECIFICATIONS.
2. STATIONS AND OFFSETS ARE APPROXIMATE AND SHALL BE VERIFIED IN FIELD BY ENGINEER.
3. INSTALL COFFERDAM SYSTEM AS NEEDED TO MAINTAIN POSITIVE FLOW IN THE CREEK AND DIVERT CREEK FLOW FROM THE WORK SITE ENCLOSED.
4. COFFERDAM SYSTEM SHALL BE SUBMITED TO ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION AND MUST MEET SUPPLIERS MINIMUM DIMENSIONS AND CRITERIA. PRODUCT DATA AND INSTALLATION METHODS MUST BE SUBMITTED FOR REVIEW.
5. UPON COMPLETION OF CREEK BED CONSTRUCTION OF ABUTMENT AND PIERS, COFFERDAM SYSTEM SHALL BE COMPLETELY REMOVED.
6. DIVERSION COFFERDAM SYSTEM SHALL NOT BE PLACED WHEN WATER SURFACE ELEVATION EXCEEDS EL. 431.
7. WORK SITE MUST BE CLEARED UNTIL A REMIDIAL ACTION PLAN IS DEVELOPED IF THERE IS ANTICIPATED POTENTIAL FOR THE WSE TO BE GREATER THAN EL. 431 OR IF WATER SEEPAGE OCCURS
8. COFFERDAM ENDPOINTS DOWNSTREAM AND UPSTREAM SHALL BE AS NEEDED TO PREVENT ANY FLOW TO THE WORKSITE BEING ENCLOSED INCLUDING BACKFLOW.
9. COFFERDAM DOWNSTREAM ENDPOINT SHALL TERMINATE BEYOND THE OLD TELEGRAPH RD BRIDGE AND EXTEND NO LESS THAN 130 FEET FROM THE RAILROAD BRIDGE STRUCTURE.
10. THIS PLAN IS FOR MINIMUM CRITERIA AND CONTRACTOR IS REQUIRED TO REVIEW THE REQUIREMENTS OF THE CONSTRUCTION GENERAL PERMIT FOR THIS PROJECT IF A WATER DIVERSION AND/OR COFFERDAM SYSTEM IS USED FOR CONSTRUCTION.

NOTES:

1. EXISTING RIGHT-OF-WAY IS BASED ON VCTC TRACK CHARTS
2. FINAL LOCATION OF TEMPORARY CONSTRUCTION CROSSING TO BE FIELD VERIFIED AND SUBMITTED FOR APPROVAL TO SIERRA NORTHERN RAILWAY
3. IF TEMPORARY CROSSING IS INSTALLED FOR ACCESS TO OLD TELEGRAPH RD A STABALIZED CONSTRUCTION ENTRANCE/EXIT SHALL BE CONSTRUCTED AND WILL NEED TO BE SUBMITTED FOR APPROVAL BY THE COUNTY TRANSPORTATION DEPARTMENT

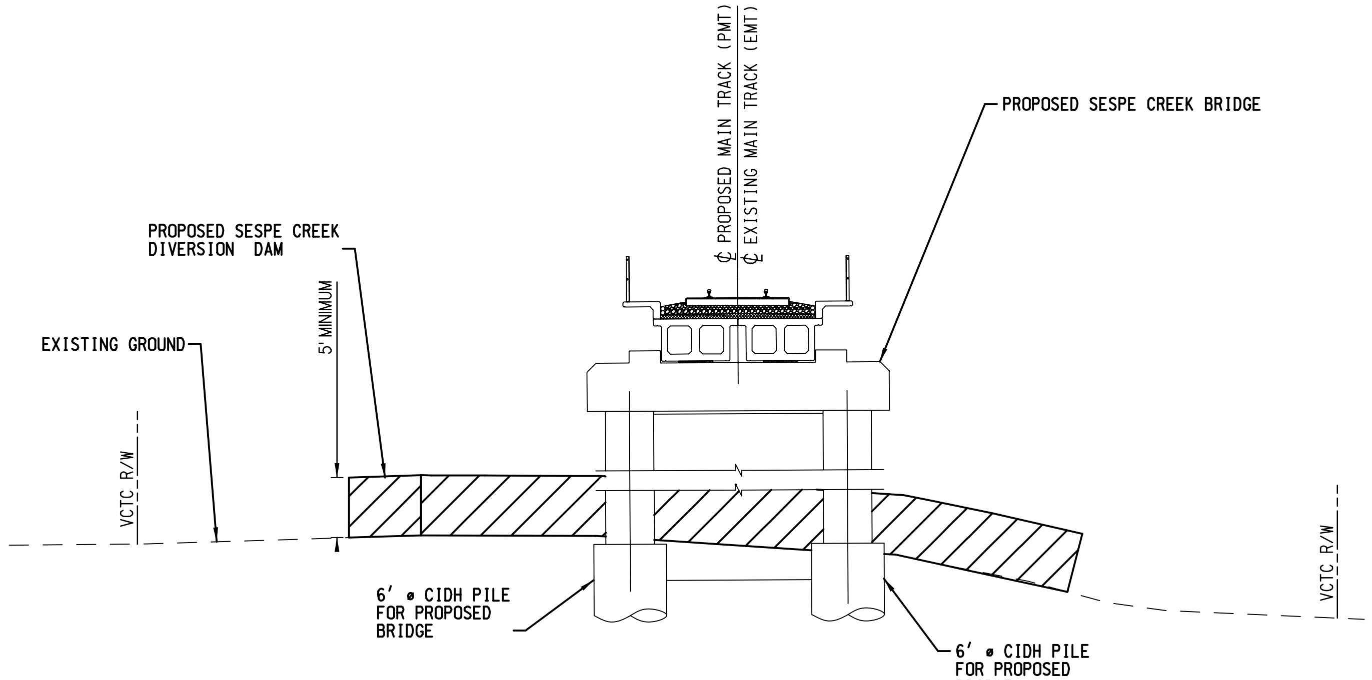
LEGEND:

━━━	PROPOSED TRACK
───	EXISTING TRACK
─ — ─	EXISTING VCTC R/W
▨	PROPOSED BARRIER
→	PROPOSED WATER DIVERSION FLOW

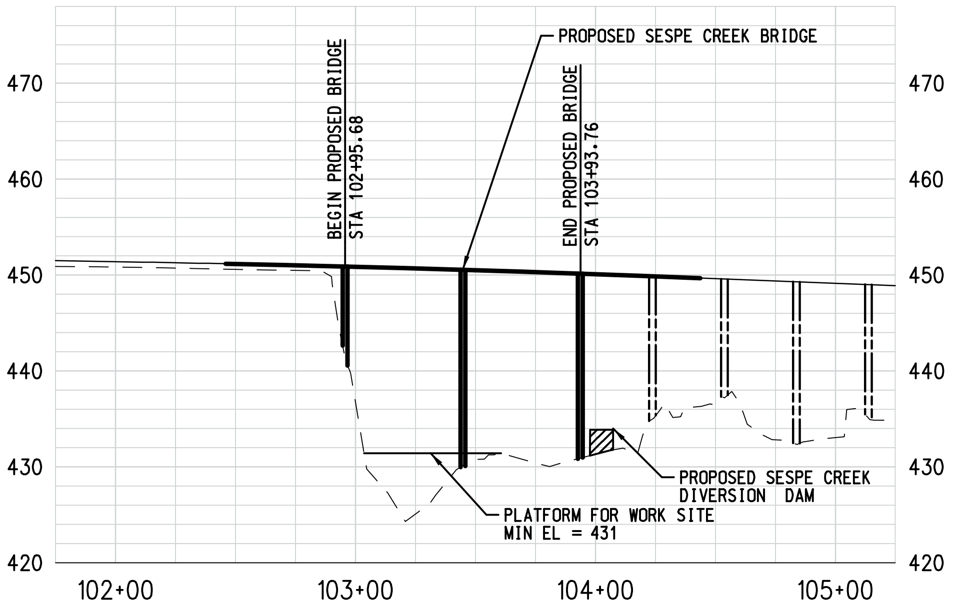
40' 0' 40' 80'
HORIZONTAL GRAPHIC SCALE

40' 0' 40' 80'
HORIZONTAL GRAPHIC SCALE

10' 0' 10' 20'
VERTICAL GRAPHIC SCALE



SECTION A-A
PMT 102+72 TO PMT 104+28
NOT TO SCALE



SECTION B-B
PROFILE PMT 101+75 TO PMT 105+25
NOT TO SCALE

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REV. DATE BY SUB. APP.

FINAL DESIGN (100%)
NOT FOR CONSTRUCTION

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DESIGNED BY A. SILVER
DRAWN BY J. ZIEGLER
CHECKED BY M. WHITE
APPROVED BY N. ORTEGA
DATE 1-4-2024

VENTURA COUNTY
TRANSPORTATION
COMMISSION

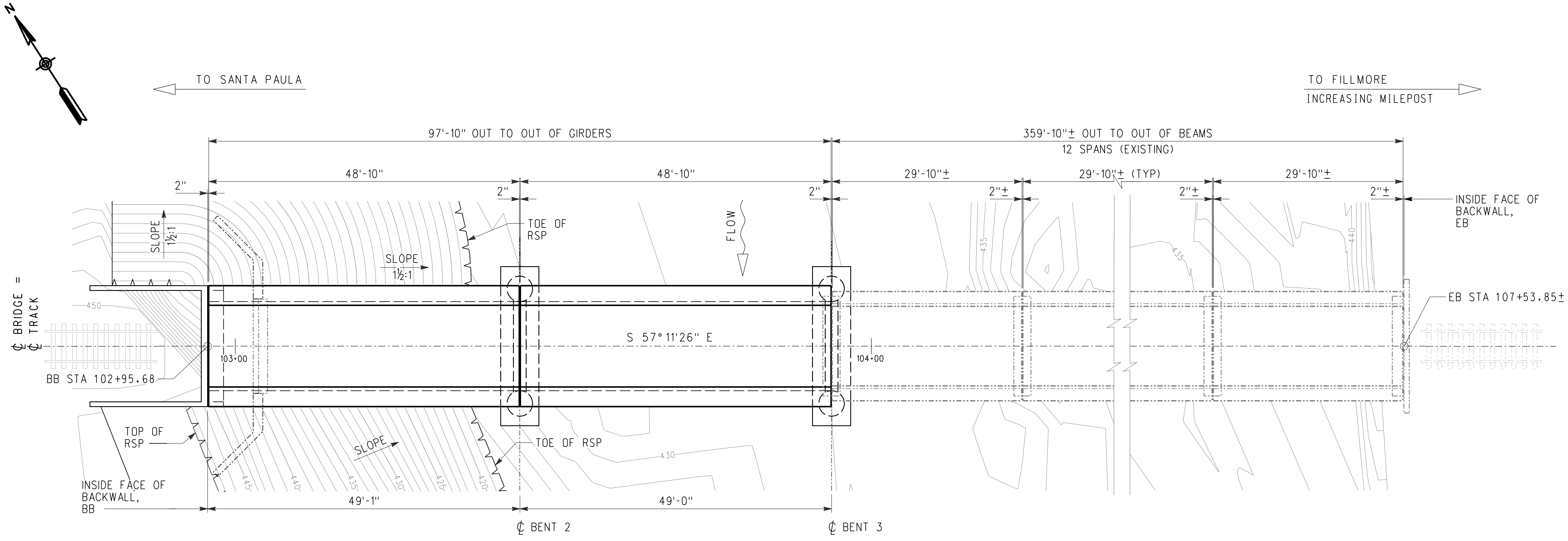
RAILPROS
811 WILSHIRE, SUITE 1820
LOS ANGELES, CA 90017
WWW.RAILPROS.COM
EMAIL: INFO@RAILPROS.COM
PHONE: (213)627-0044

SUBMITTED: ____________________
JULINA CORONA, P.E.
PROJECT MANAGER

SESPE CREEK BRIDGE OVERFLOW
SANTA PAULA BRANCH LINE, FILLMORE, CA

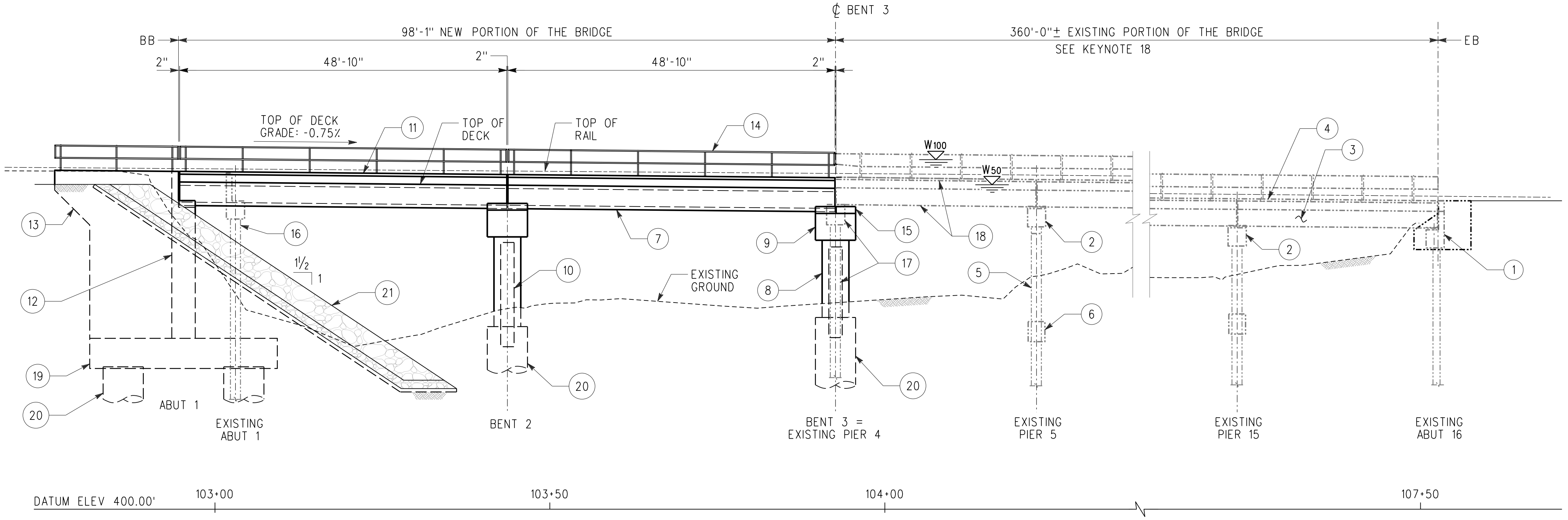
TEMPORARY CREEK DIVERSION PLAN

CONTRACT NO.
DRAWING NO. DIV-001
REVISION
SHEET NO. 9 OF 29
SCALE AS SHOWN



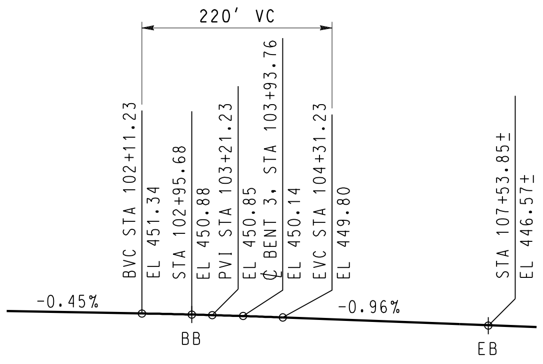
PLAN

SCALE: 1"=10'



ELEVATION

SCALE: 1"=10'



PROFILE GRADE - ℄ TRACK

NO SCALE

RAILROAD DATA

MILEPOST:	423.18
SUBDIVISION:	FILLMORE & WESTERN RAILWAY CO
DOT #:	NONE
CITY:	FILLMORE
COUNTY:	VENTURA
STATE:	CALIFORNIA
LATITUDE:	34° 24' 22.78" N
LONGITUDE:	118° 55' 55.13" W

KEYNOTES

①	EXISTING CONCRETE ABUTMENT
②	EXISTING CONCRETE BENT CAP
③	EXISTING CONCRETE GIRDER
④	EXISTING CONCRETE WALKWAY
⑤	EXISTING STEEL PILES WITH IN-FILL WALL
⑥	EXISTING CONCRETE COLLAR
⑦	PRECAST PRESTRESSED CONCRETE DOUBLE-BOX BRIDGE
⑧	CONCRETE COLUMN, 4'-0"Ø
⑨	CONCRETE BENT CAP
⑩	CONCRETE IN-FILL WALL
⑪	CONCRETE WALKWAY
⑫	CONCRETE ABUTMENT
⑬	CONCRETE WINGWALL
⑭	HANDRAIL
⑮	CATCHER BLOCK
⑯	EXISTING ABUTMENT, IN-FILL WALL & STEEL PILES TO BE REMOVED
⑰	EXISTING BENT, IN-FILL WALL & STEEL PILES TO BE REMOVED
⑱	EXIST CONC GIRDERS, RAILING AND WALKWAYS TO BE REMOVED AND RE-INSTALLED BETWEEN NEW BENT 3 AND EXIST PIERS 5
⑲	CONCRETE PILE CAP
⑳	CIDH CONCRETE PILES, 6'-0"Ø
㉑	ROCK SLOPE PROTECTION (RSP)

LEGEND

-----	INDICATES EXISTING STRUCTURE
———	INDICATES NEW STRUCTURE
W100 ▽	INDICATES 100-YEAR FLOOD LEVEL = ELEV 452.18
W50 ▽	INDICATES 50-YEAR FLOOD LEVEL = ELEV 448.45

NOTES

1. FOR TYPICAL SECTIONS, SEE "GENERAL PLAN NO. 2" SHEET.
2. SCOPE OF WORK IS TO REMOVE AND REPLACE DAMAGED STRUCTURE AND COMPONENTS. EVALUATION NOT PERFORMED ON REMAINING UNDAMAGED STRUCTURE.

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Z:\Engineering\VCTC\Sespe Creek Bridge Overflow\900 CADD\950 Drawings\S-001_General Plan 1.sht
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FINAL DESIGN (100%)
NOT FOR CONSTRUCTION

REV.	DATE	BY/SUB.	APP.

INFORMATION CONFIDENTIAL:
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DESIGNED BY H. KAZEM
DRAWN BY G. ESTEPA
CHECKED BY H. YANG
APPROVED BY M. SARWAR
DATE 12-25-2023

MUHAMMAD SARWAR
No. C68399
EXP: 09-30-25
CIVIL

VENTURA COUNTY
TRANSPORTATION
COMMISSION

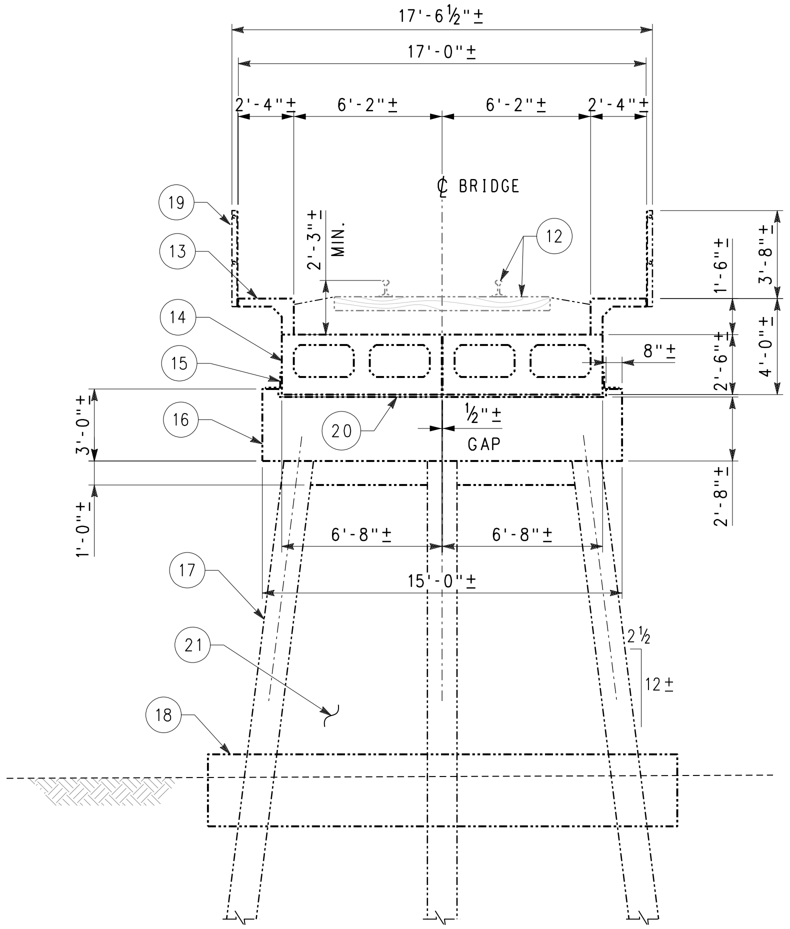
RAILPROS

SUBMITTED: ______
JULINA R. CORONA, P.E.
PROJECT MANAGER

SESPE CREEK BRIDGE OVERFLOW
SANTA PAULA BRANCH LINE, FILLMORE, CA

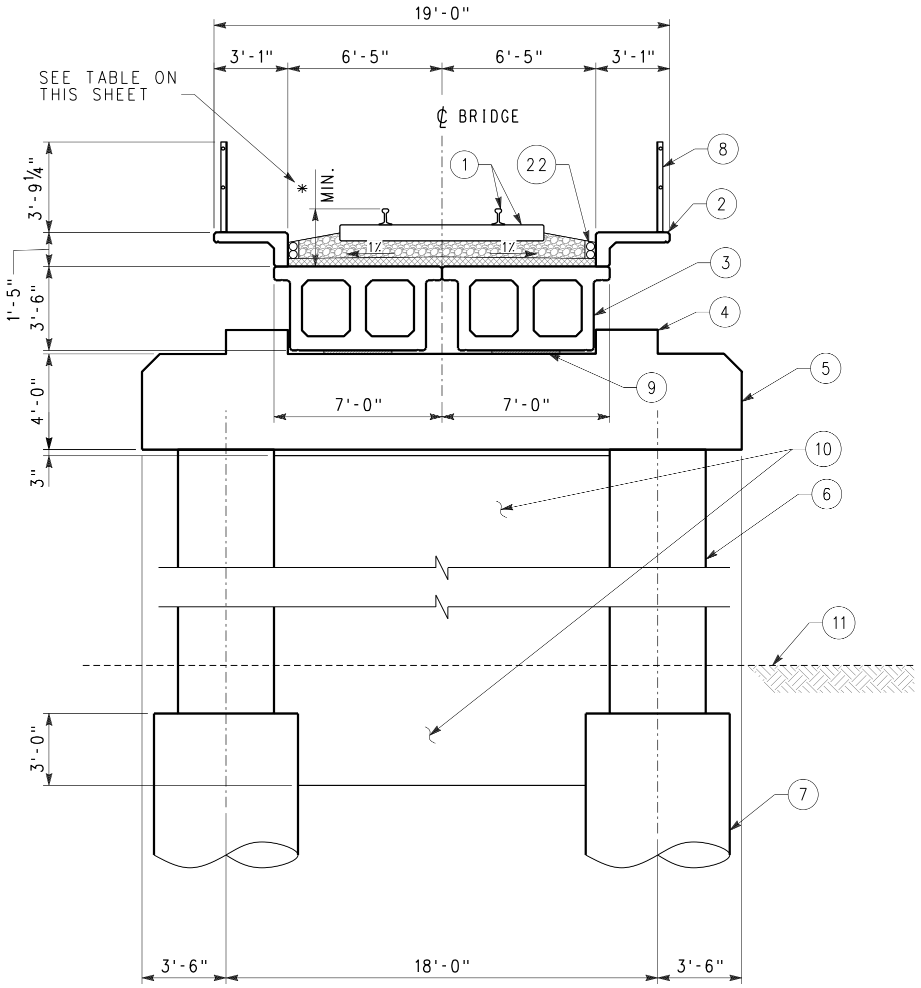
GENERAL PLAN NO. 1

CONTRACT NO.
DRAWING NO. S-001
REVISION
SHEET NO. 10 OF 29
SCALE AS SHOWN



TYPICAL SECTION – EXISTING BENTS

SCALE: ¼" = 1'-0"



TYPICAL SECTION – NEW BENTS 2 & 3

SCALE: ¼" = 1'-0"

*	DEPTH TOP/RAIL TO TOP/DECK
8" 8" 8" 4"	RAIL & TIE PLATE TIMBER TIE MINIMUM BALLAST MAXIMUM HMA AT CENTERLINE AND VARIES WITH 1% CROSS SLOPE
2'-4"	TOTAL (SEE NOTE 2)

KEYNOTES

①	RAIL AND TIMBER TIES
②	PRECAST CONCRETE BALLAST CURB & SIDEWALK
③	PRECAST PRESTRESSED CONCRETE DOUBLE BOX GIRDER
④	CONCRETE SHEAR KEY
⑤	CAST-IN-PLACE CONCRETE BENT CAP
⑥	CONCRETE COLUMN, 4'-0"Ø
⑦	CIDH CONCRETE PILE, 6'-0"Ø
⑧	HANDRAIL
⑨	BEARING PAD
⑩	CONCRETE IN-FILL WALL
⑪	EXISTING GRADE
⑫	EXISTING RAIL AND TIES
⑬	EXISTING BALLAST CURB & SIDEWALK
⑭	EXISTING PRECAST PRESTRESSED CONCRETE DOUBLE BOX GIRDER
⑮	EXISTING STEEL ANGLE
⑯	EXISTING CONCRETE BENT CAP
⑰	EXISTING STEEL PILE
⑱	EXISTING CONCRETE BRACE
⑲	EXISTING HANDRAIL
⑳	EXISTING BEARING PAD, ¾"± THK
㉑	EXISTING CONCRETE IN-FILL WALL
㉒	2~4" ID GALVANIZED METAL CONDUIT WITH CONDUIT BRACKET EACH SIDE OF BRIDGE STRUCTURE (TOTAL 4) PER SCRRA STANDRAD PLAN ES6001-05 & ES6002-14

NOTES

1. ALL EXISTING DIMENSIONS ARE APPROXIMATE AND SHALL BE FIELD MEASURED AND CONFIRMED BEFORE START OF WORK OR ORDERING MATERIALS.

2. DIMENSIONS LISTED ARE MINIMUM AND SHALL BE ADJUSTED AS NEEDED TO MAINTAIN THE EXISTING TRACK PROFILE.

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REV.	DATE		BY/SUB.	APP.

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DESIGNED BY H. KAZEM
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CHECKED BY H. YANG
APPROVED BY M. SARWAR
DATE 12-25-2023

MUHAMMAD SARWAR
No. C68399
EXP: 09-30-25
CIVIL

VENTURA COUNTY
TRANSPORTATION
COMMISSION

RAILPROS

SUBMITTED: ____________
JULINA R. CORONA, P.E.
PROJECT MANAGER

SESPE CREEK BRIDGE OVERFLOW
SANTA PAULA BRANCH LINE, FILLMORE, CA

GENERAL PLAN NO. 2

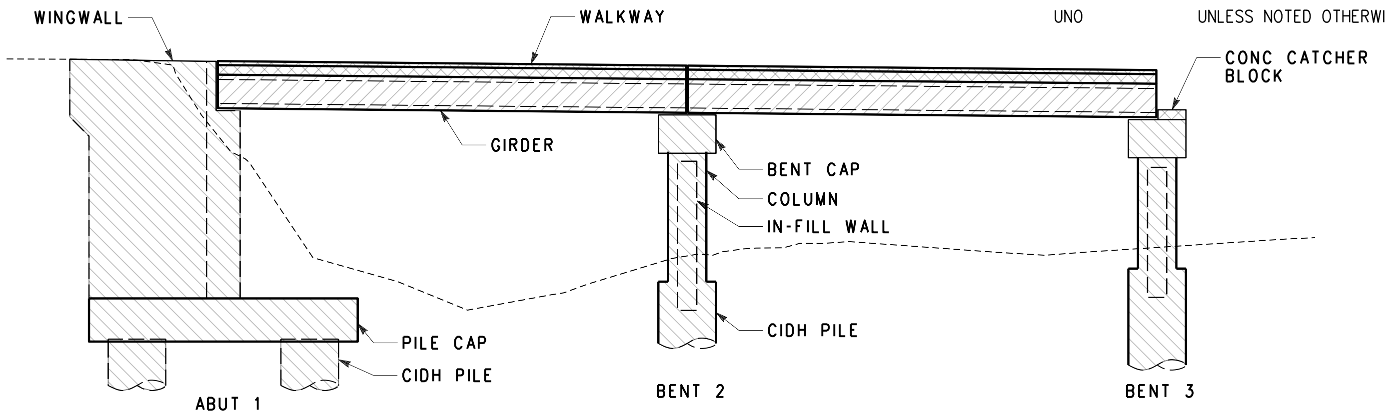
CONTRACT NO.
DRAWING NO. S-002
REVISION
SHEET NO. 11 OF 29
SCALE AS NOTED

GENERAL NOTES:

DESIGN CRITERIA:	AMERICAN RAILWAY AND MAINTENANCE-OF-WAY ASSOCIATION (AREMA), 2023 EDITION SOUTHERN CALIFORNIA REGIONAL RAILROAD AUTHORITY (SCRRA) DESIGN CRITERIA FEB, 2022
LIVE LOAD:	COOPER E-80
PROJECT SPECIFICATIONS:	SCRRA STANDARD SPECIFICATIONS MAY 2022
GEOTECHNICAL DATA:	GEOTECHNICAL REPORT RECONSTRUCT A PORTION OF THE SESPE CREEK OVERFLOW RAILROAD BRIDGE CITY OF FILLMORE, CALIFORNIA, PROJECT NO. 2023-010 DATED: OCTOBER 13, 2023, PREPARED BY: DIAZ & YOURMAN & ASSOCIATES (1616 EAST 17TH STREET, SANTA ANA, CA 92705-8509, (714) 245-2920)
LATERAL EARTH PRESSURE:	UNIT WEIGHT OF EARTH FILLING MATERIALS, γs = 120 PCF EQUIVALENT AT-REST PRESSURE COEFFICIENT, k0 = 0.47 EQUIVALENT ACTIVE PRESSURE COEFFICIENT, ka = 0.31 EQUIVALENT PASSIVE PRESSURE COEFFICIENT, kp = 3.25
SEISMIC LATERAL DATA:	AREMA LEVEL 1 Δkae, 95YR (SERVICEABILITY) = 0.07 AREMA LEVEL 2 Δkae, 475YR (ULTIMATE) = 0.15 AREMA LEVEL 3 Δkae, 2475YR (SURVIVABILITY) = 0.35 CALTRANS Δkae, 975YR = 0.28
PGA:	AREMA LEVEL 1, 95YR (SERVICEABILITY) = 0.19G AREMA LEVEL 2, 475YR (ULTIMATE) = 0.44G AREMA LEVEL 3, 2475YR (SURVIVABILITY) = 0.82G CALTRANS, 975YR = 0.72G

CONCRETE STRENGTH AND TYPE LIMITS

REINFORCED CONCRETE:	f'c = 4.0 KSI @ 28 DAYS UNLESS NOTED OTHERWISE
REINFORCING BARS:	fy = 60 KSI, ASTM A706 GRADE 60
REINFORCING BAR COUPLERS:	REINFORCING BAR MECHANICAL COUPLERS SHALL BE "SERVICE SPLICE" SELECTED FROM CALTRANS AUTHORIZED MATERIAL LIST AT "HTTPS://DOT.CA.GOV/PROGRAMS/ENGINEERING-SERVICES/AUTHORIZED-MATERIALS-LISTS"



LEGEND:

▨	STRUCTURAL PRECAST CONCRETE, (f'c = 4 KSI AT 28 DAYS)
▨	PRESTRESSED CONCRETE, SEE "GIRDER DETAILS NO. 2" SHEET
▨	STRUCTURAL CONCRETE BRIDGE, (f'c = 4 KSI AT 28 DAYS)

ABBREVIATIONS:

AREMA	AMERICAN RAILWAY ENGINEERING AND MAINTENANCE OF WAY ASSOCIATION
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
BB	BEGINNING OF BRIDGE
BC	BEGINNING OF CURVE
BOT	BOTTOM
BRG	BEARING
BVC	BEGINNING OF VERTICAL CURVE
CALTRANS	CALIFORNIA DEPARTMENT OF TRANSPORTATION
CIDH	CAST-IN-DRILLED HOLE
CIP	CAST-IN-PLACE
CLR	CLEAR, CLEARANCE
CONC	CONCRETE
EA	EACH
EB	END OF BRIDGE
EC	END OF CURVE
ELEV, EL	ELEVATION
EMBED	EMBEDMENT
EVC	END OF VERTICAL CURVE
EXIST	EXISTING
EXP JT	EXPANSION JOINT
FG	FINISHED GRADE
FT	FOOT, FEET
HMA	HOT MIXED ASPHALT
KIPS	1000 POUNDS-FORCE
KSI	1000 POUNDS-FORCE PER SQUARE INCH
LOL	LAYOUT LINE
MAX	MAXIMUM
MIN	MINIMUM
MP	MILEPOST
NA, N/A	NOT APPLICABLE
NO.	NUMBER
PC	PRECAST
PCF	POUND-FORCE PER CUBIC FOOT
PCI	POUND-FORCE PER CUBIC INCH
PS	PRESTRESSED
PVI	POINT OF VERTICAL INTERSECTION
REINF	REINFORCING
RSP	ROCK SLOPE PROTECTION
R/W, ROW	RIGHT OF WAY
RW	RETAINING WALL
RWLOL	RETAINING WALL LAYOUT LINE
SCRRA	SOUTHERN CALIFORNIA REGIONAL RAILROAD AUTHORITY
SSPWC	STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION
SYM	SYMMETRICAL
T/R, TOR	TOP OF RAIL
TOC	TOP OF CONCRETE
TOT	TOTAL
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE

INDEX OF DRAWINGS:

SHT. NO.	DWG. NO.	REV. NO.	TITLE
1	S-001		GENERAL PLAN NO. 1
2	S-002		GENERAL PLAN NO. 2
3	S-003		GENERAL NOTES AND INDEX OF DRAWINGS
4	S-004		STAGE CONSTRUTION PLAN
5	S-005		FOUNDATION PLAN
6	S-006		ABUTMENT DETAILS NO. 1
7	S-007		ABUTMENT DETAILS NO. 2
8	S-008		ROCK SLOPE PROTECTION
9	S-009		BENT DETAILS NO. 1
10	S-010		BENT DETAILS NO. 2
11	S-011		BENT DETAILS NO. 3
12	S-012		GIRDER DETAILS NO. 1
13	S-013		GIRDER DETAILS NO. 2
14	S-014		HANDRAIL REPLACEMENT PLAN
15	S-015		HANDRAIL DETAILS
16	S-016		MISCELLANEOUS DETAILS NO. 1
17	S-017		MISCELLANEOUS DETAILS NO. 2
18	LOTB-1		LOG OF TEST BORING NO. 1
19	LOTB-2		LOG OF TEST BORING NO. 2
20	LOTB-3		LOG OF TEST BORING NO. 3

CONSTRUCTION NOTE:

1. CONTRACTOR SHALL FIELD VERIFY AND CALCULATE THE SEAT ELEVATIONS FOR THE NEW ABUTMENT AND BENTS TO MAINTAIN THE TRACK PROFILE BEFORE FABRICATION OR ORDERING ANY MATERIALS.

FINAL DESIGN (100%)
NOT FOR CONSTRUCTION

REV.	DATE		BY / SUB.	APP.

DESIGNED BY H. KAZEM
DRAWN BY G. ESTEPA
CHECKED BY H. YANG
APPROVED BY M. SARWAR
DATE 12-25-2023

MUHAMMAD SARWAR
No. C68399
EXP: 09-30-25
CIVIL

VENTURA COUNTY TRANSPORTATION COMMISSION

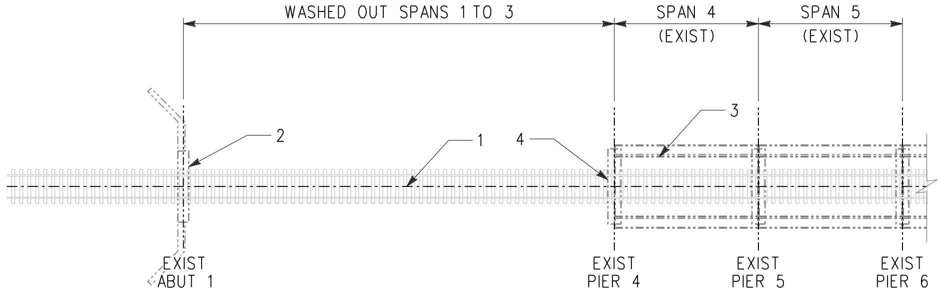
RAILPROS

SUBMITTED: ______________
JULINA R. CORONA, P.E.
PROJECT MANAGER

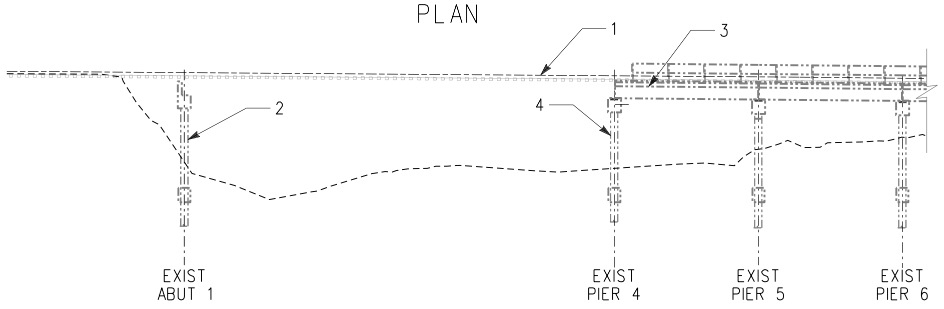
SESPE CREEK BRIDGE OVERFLOW
SANTA PAULA BRANCH LINE, FILLMORE, CA

GENERAL NOTES AND INDEX OF DRAWINGS

CONTRACT NO.
DRAWING NO. S-003
REVISION
SHEET NO. 12 OF 29
SCALE NO SCALE



PLAN

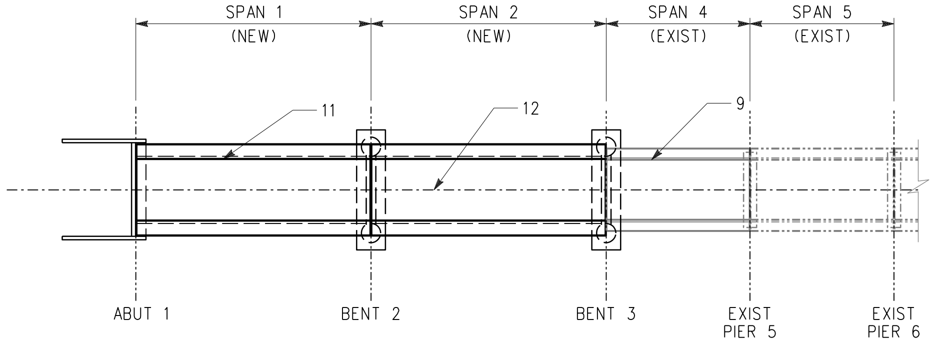


ELEVATION

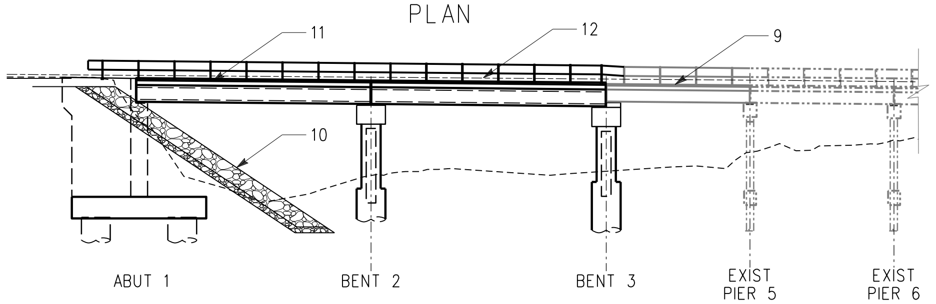
CONSTRUCTION STAGE 1

NOTES - STAGE 1:

1. REMOVE EXISTING TRACKS & TIES. CUT RAILS FROM 50 FT BEFORE ABUTMENT 1 TO MIDPOINT OF EXISTING SPAN BETWEEN EXISTING PIERS 5 AND 6
2. DEMOLISH EXISTING LEFT OVER ABUTMENT 1 AND REMOVE EXISTING STEEL PILES
3. REMOVE EXISTING CONCRETE GIRDERS & HANDRAILS IN SPAN BETWEEN EXISTING PIERS 4 AND 5. EXISTING GIRDERS TO BE REPAIRED (AS NEEDED)/REINSTALLED AT A LATER CONSTRUCTION STAGE
4. DEMOLISH EXISTING PIER 4 AND REMOVE EXISTING STEEL PILES, IN-FILL WALL & CONCRETE BRACE



PLAN

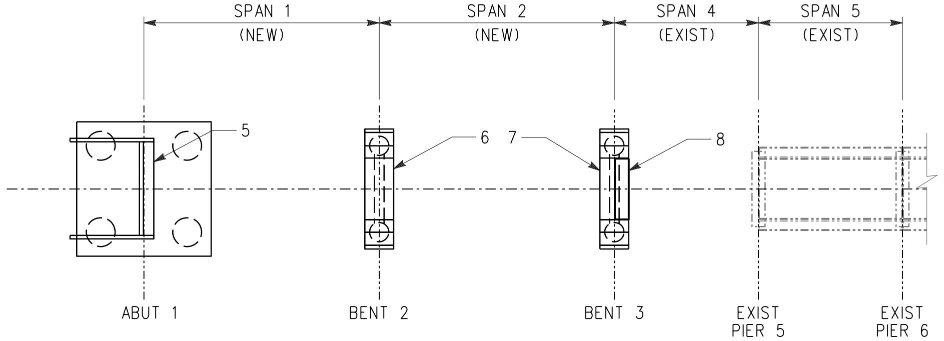


ELEVATION

CONSTRUCTION STAGE 3 - FINAL

NOTES - STAGE 3, FINAL:

9. RE-INSTALL SPAN 4 SUPERSTRUCTURE INCLUDING GIRDERS, WALKWAYS & HANDRAILS
10. BUILD ROCK SLOPE PROTECTION FOR ABUTMENT 1
11. INSTALL NEW SUPERSTRUCTURE ON SPANS 1 AND 2 INCLUDING WALKWAYS AND HANDRAILS
12. INSTALL STEEL PLATES, GIRDER RESTRAINERS, HMA, BALLAST, TRACKS & TIES



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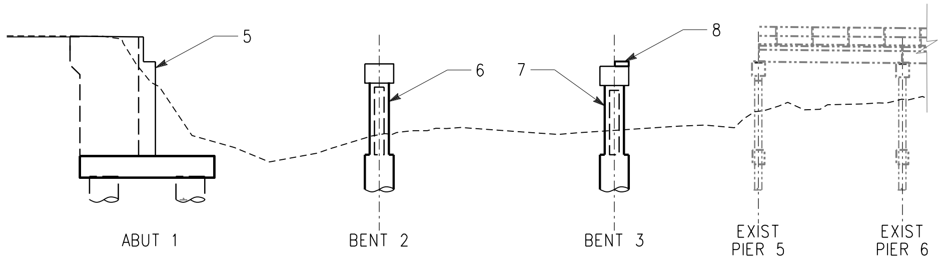

ELEVATION

CONSTRUCTION STAGE 2

NOTES - STAGE 2:

5. BUILD ABUTMENT 1 AND WINGWALLS
6. BUILD BENT 2 AND INFILL WALL
7. BUILD BENT 3 AND INFILL WALL
8. INSTALL PRECAST CONCRETE CATCHER BLOCK ON BENT 3

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FINAL DESIGN (100%)
NOT FOR CONSTRUCTION

REV. | DATE | BY | SUB. | APP.

INFORMATION CONFIDENTIAL: All plans, drawings, specifications, and or information furnished herewith shall remain the property of the Ventura County Transportation Commission and shall be held confidential and shall not be used for any purpose not provided for in agreements with the Ventura Country Transportation Commission.

DESIGNED BY H. KAZEM
DRAWN BY G. ESTEPA
CHECKED BY H. YANG
APPROVED BY M. SARWAR
DATE 12-25-2023

MUHAMMAD SARWAR
No. C68399
EXP. 09-30-25

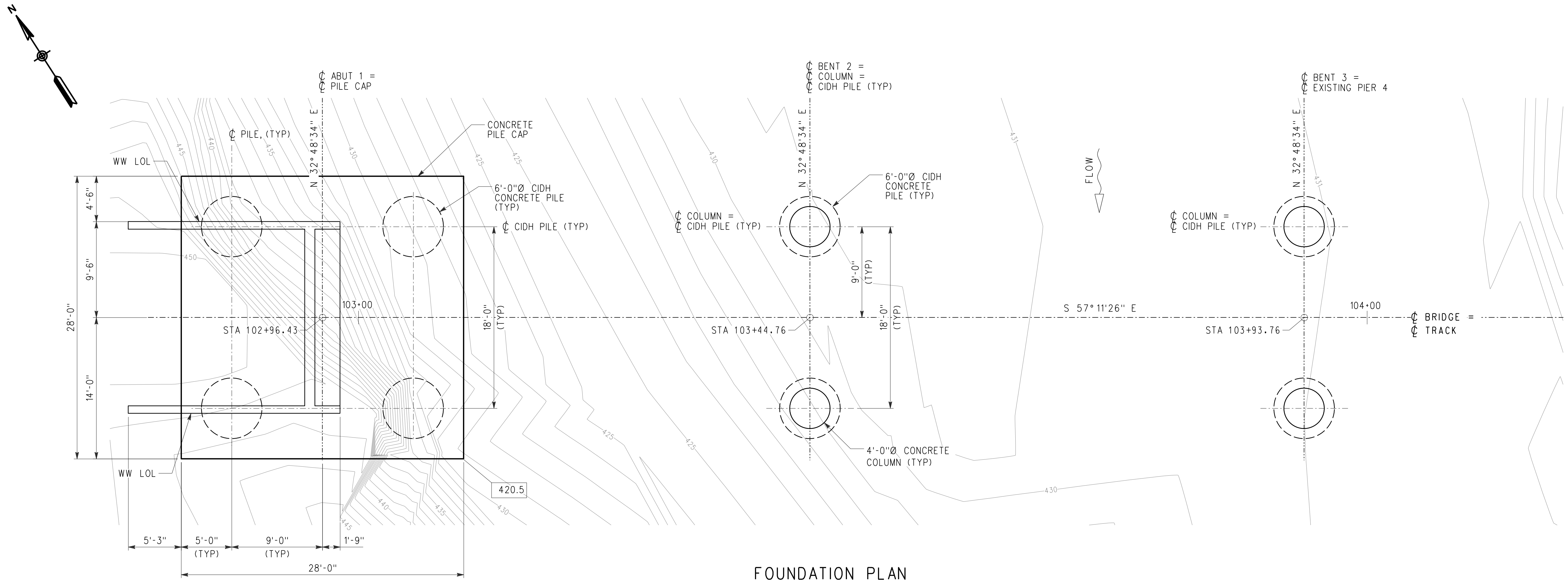
VENTURA COUNTY TRANSPORTATION COMMISSION

SUBMITTED: JULINA R. CORONA, P.E. PROJECT MANAGER

SESPE CREEK BRIDGE OVERFLOW
SANTA PAULA BRANCH LINE, FILLMORE, CA

STAGE CONSTRUCTION PLAN

CONTRACT NO.
DRAWING NO. S-004
REVISION
SHEET NO. 13 OF 29
SCALE NO SCALE



FOUNDATION PLAN

SCALE: 3/16" = 1'-0"

HYDRAULOGICAL DATA

50 YEAR FLOOD LEVEL = 448.45
100 YEAR FLOOD LEVEL = 452.18

LEGEND

—	NEW STRUCTURE
◌	72" Ø CIDH PILE
XXX.X	BOTTOM OF PILE CAP ELEVATION
◁	DIRECTION OF FLOW

NOTES

1. ONLY NEW STRUCTURE SHOWN FOR CLARITY. EXISTING STRUCTURE PORTION THAT REMAINS IN PLACE IS NOT SHOWN. SEE GENERAL PLAN AND STAGE CONSTRUCTION PLAN FOR DETAILS.

PILE DATA TABLE

LOCATION	PILE TYPE	NOMINAL RESISTANCE (kips)		PILE CUT-OFF ELEVATION (ft)	DESIGN TIP ELEVATION (ft)	SPECIFIED TIP ELEVATION (ft)	NOMINAL DRIVING RESISTANCE (kips)
		COMPRESSION	TENSION				
ABUT 1	72"Ø CIDH	716	0	420.75	(a) 322.25 (c) 378.25 (d) 355.75	322.25	N/A
BENT 2	72"Ø CIDH	778	304	425.00	(a) 350.0 (b) 392.0 (c) 364.0 (d) 355.0	350.00	N/A
BENT 3	72"Ø CIDH	778	304	429.00	(a) 354.0 (b) 396.0 (c) 368.0 (d) 359.0	354.00	N/A

NOTES:
1. DESIGN TIP ELEVATIONS ARE CONTROLLED BY: (a) COMPRESSION, (b) TENSION, (c) SETTLEMENT, AND (d) LATERAL LOAD.
2. THE SPECIFIED TIP ELEVATION FOR DRIVEN PILES MUST NOT BE RAISED ABOVE THE DESIGN TIP ELEVATIONS FOR SETTLEMENT AND LATERAL LOAD. THE SPECIFIED TIP ELEVATION FOR CIDH PILES MUST NOT BE RAISED.

BENCH MARK

POINT NUMBER	NORTHING	EASTING	ELEV (FT)	DESCRIPTION
500	1971511.827	6280526.913	457.84'	CUT X CONC ON WB SIDE OF BRIDGE 27' EAST OF WEST EXP JT
501	1971316.983	62808728.833	458.67'	CUT X CONC ON WB SIDE OF BRIDGE 94' EAST OF WEST EXP JT
502	1971336.612	6280917.852	446.28'	3.5" USC&GS BRASS BM DISK STAMPED "S12188, 1971" ON SE ABUTMENT, CONC WALKWAY
503	1971201.537	6281085.270	458.32'	MAGNAIL & SPIKE IN GROUND 5.15' FROM CONC CURBING AT GATE TO RR ABUTMENT ON SESIDE OF RR TRACK

SURVEY CONTROL: THE BASIC HORIZONTAL CONTROL IS THE NORTH AMERICAN DATUM OF 1983, 2011 ADJUSTMENT (NAD83-2011), MUTI-YEAR CORS SOLUTION 2 (MYSC2) ESTABLISHED BY USING THE SMARTNET SYSTEM OF CONTINUOUSLY OPERATING REFERENCE STATIONS (CORS).

COORDINATE ARE IN CALIFORNIA STATE PLAN COORDINATE SYSTEM, ZONE 5, EPOCH 2023.25, US SURVEY FT.

VERTICAL SURVEY CONTROL VALUES HEREON ARE BASED UPON THE NORTH AMERICAN VERICAL DATUM OF 1988, GNSS-DERIVED BY FAST STATIC SURVEY METHODS USING GEIOD18 PER CALIFORNIA PUBLIC RESOURCES CODE 8890, DEFINED AS CALIFORNIA ORTHOMETRIC HEIGHTS OF 1988 (CH88).

ALL POSITION ARE CALCULATED PER A FULLY CONSTRAINED LEAST SQUARES ADJUSTMENT USING STARNET V11 LEAST SQUARES ADJUSTMENT SOFTWARE.

REV. | DATE | BY | SUB. | APP.

FINAL DESIGN (100%)
NOT FOR CONSTRUCTION

DESIGNED BY H. KAZEM
DRAWN BY G. ESTEPA
CHECKED BY H. YANG
APPROVED BY M. SARWAR
DATE 12-25-2023

HAMID KAZEM
Hamid Kazem
No. C90676
EXP: 12-31-25

VENTURA COUNTY
TRANSPORTATION
COMMISSION

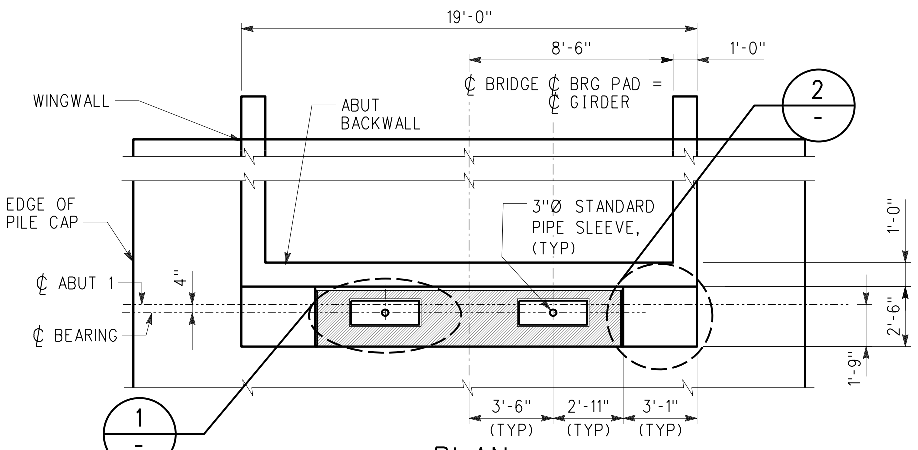
RAILPROS

SUBMITTED: ______
JULINA R. CORONA, P.E.
PROJECT MANAGER

SESPE CREEK BRIDGE OVERFLOW
SANTA PAULA BRANCH LINE, FILLMORE, CA

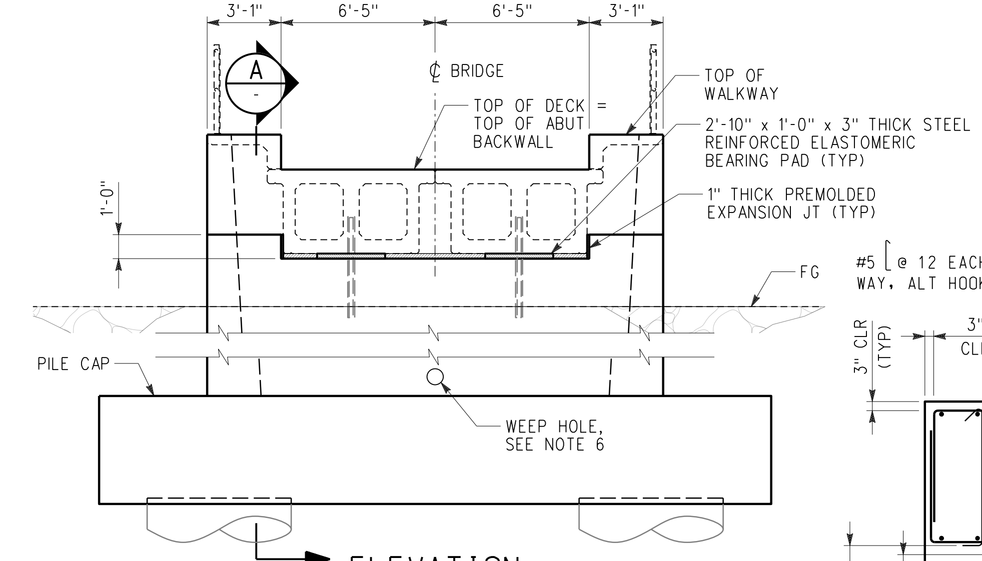
FOUNDATION PLAN

CONTRACT NO.
DRAWING NO. S-005
REVISION
SHEET NO. 14 OF 29
SCALE AS SHOWN



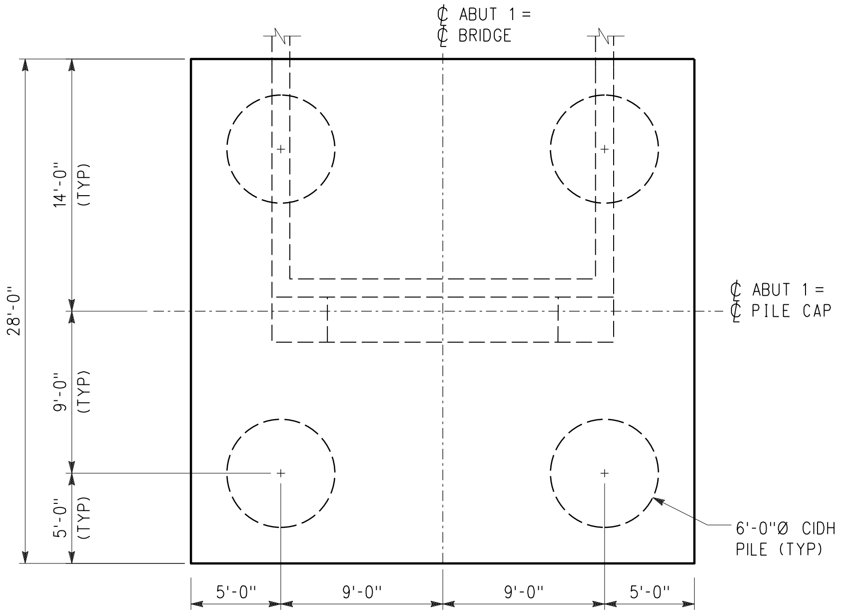
PLAN

SCALE: ¼" = 1'-0"



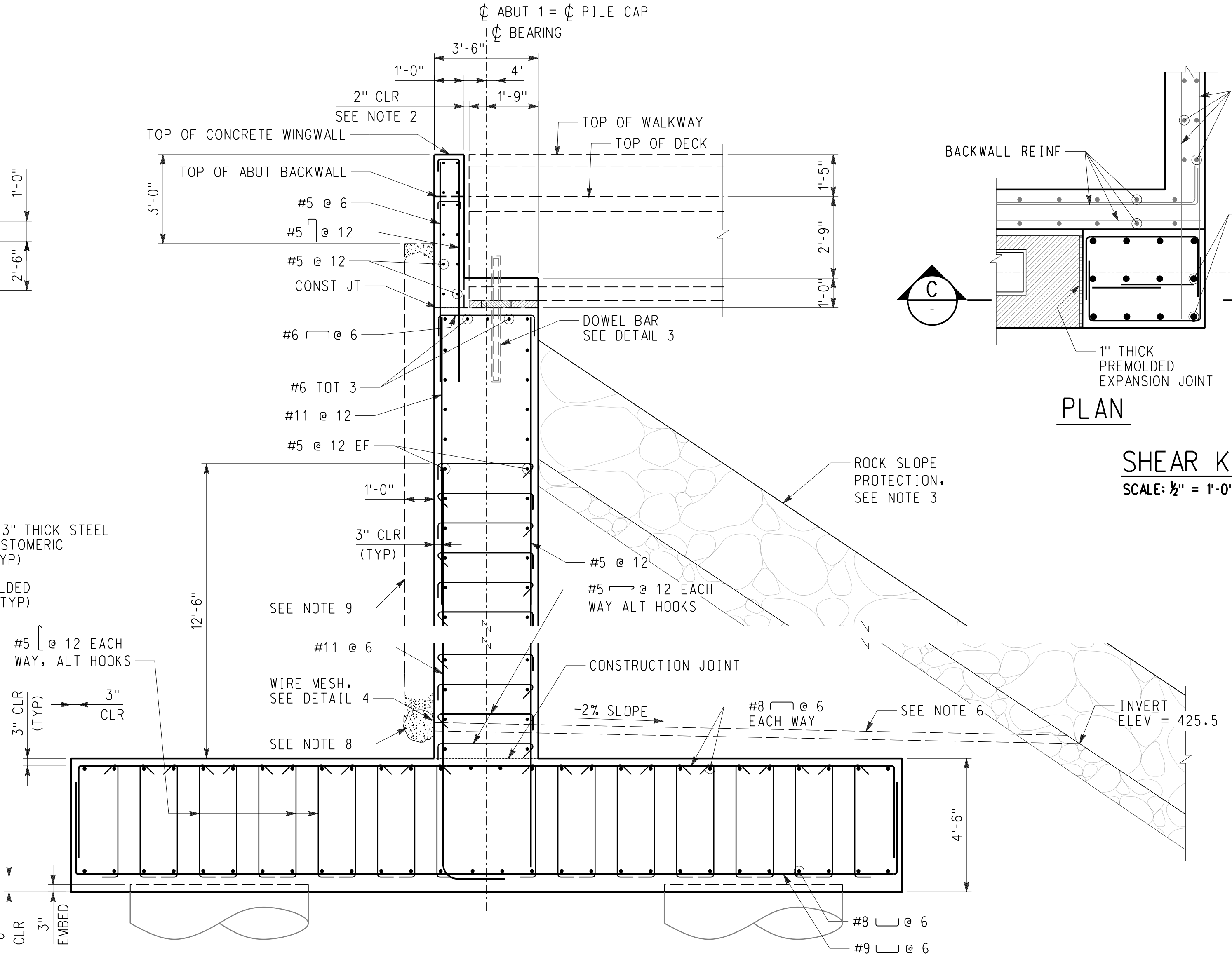
ELEVATION

SCALE: ¼" = 1'-0"



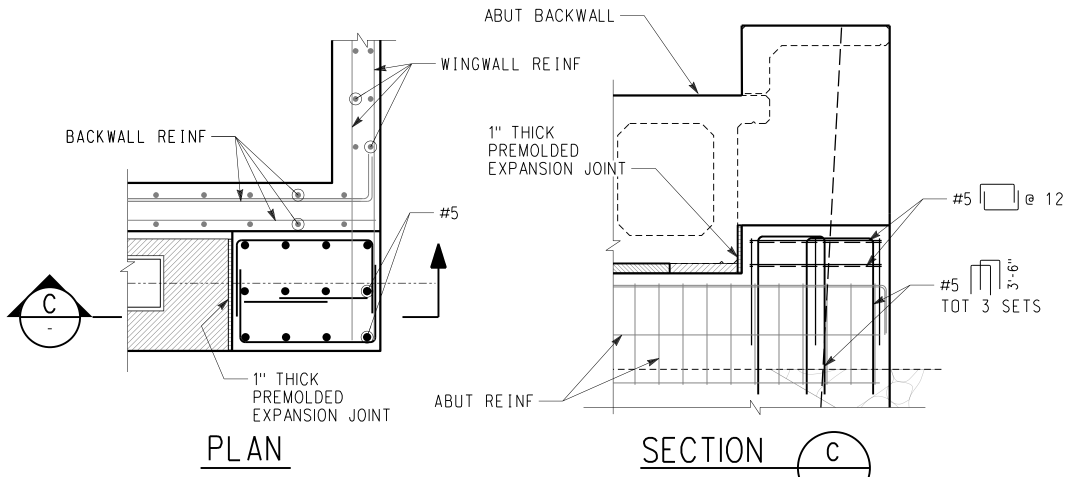
PILE LAYOUT

SCALE: 3⁄16" = 1'-0"



SECTION A

SCALE: ⅜" = 1'-0"

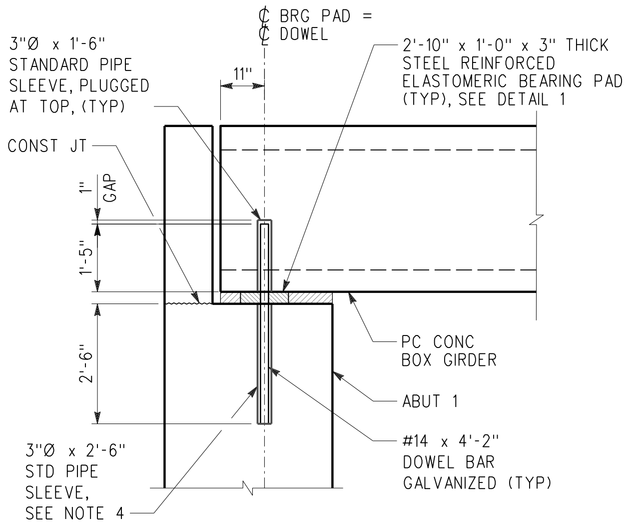


PLAN

SECTION C

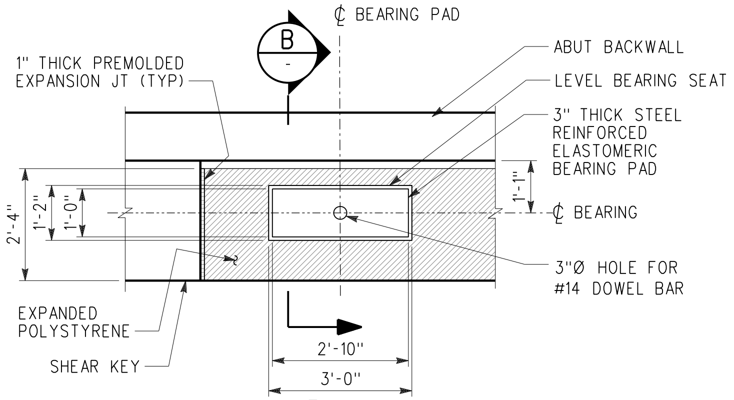
SHEAR KEY DETAILS 2

SCALE: ½" = 1'-0"



DOWEL BAR DETAIL 3

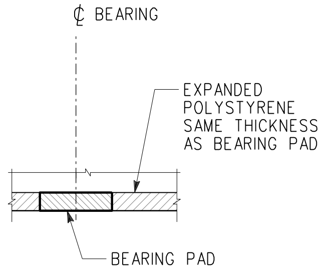
SCALE: ½" = 1'-0"



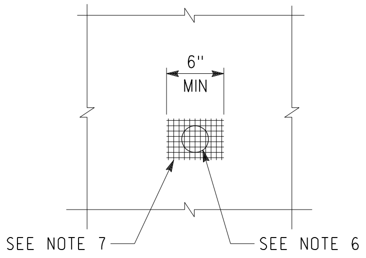
PLAN

BEARING PAD DETAIL 1

SCALE: ½" = 1'-0"



SECTION B



WIRE MESH DETAIL 4

NO SCALE

NOTES:

1. SLOPE ABUT SEAT TO DRAIN EXCEPT AS SHOWN IN BEARING PAD DETAILS
2. FOR HMA OVER THE JOINT DETAILS, SEE SCRRA STANDARD PLAN ES6001-03
3. FOR RSP DETAILS, SEE "ROCK SLOPE PROTECTION DETAILS" SHEET
4. LOWER PIPE SLEEVE TO BE FILLED WITH NON-SHRINK GROUT AFTER INSTALLATION OF #14 DOWEL BAR
5. FOR ABUTMENT PILE DETAILS, SEE "ABUTMENT DETAILS NO.2" SHEET
6. 4"Ø DRAINS AT CENTER OF ABUTMENT.
7. 6" SQUARE ALUMINUM OR GALVANIZED STEEL WIRE 1/4" MESH HARDWARE CLOTH, MINIMUM WIRE DIAMETER 0.025". ANCHOR FIRMLY TO BACKFACE.
8. ONE CUBIC FOOT PERVIOUS BACKFILL MATERIAL IN A NONWOVEN FILTER FABRIC, SECURELY TIED.
9. PERVIOUS BACKFILL MATERIAL CONTINUOUS BEHIND ABUTMENT.

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REV.	DATE		BY	SUB.	APP.

FINAL DESIGN (100%)
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CHECKED BY H. YANG
APPROVED BY M. SARWAR
DATE 12-25-2023

HAMID KAZEM
No. C90676
EXP: 12-31-25
Hamid Kazem

VENTURA COUNTY
TRANSPORTATION
COMMISSION

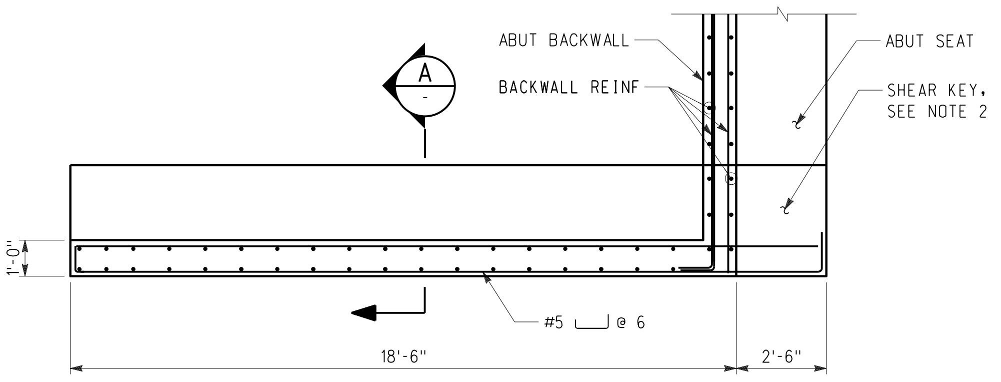
RAILPROS

SUBMITTED: ____________
JULINA R. CORONA, P.E.
PROJECT MANAGER

SESPE CREEK BRIDGE OVERFLOW
SANTA PAULA BRANCH LINE, FILLMORE, CA

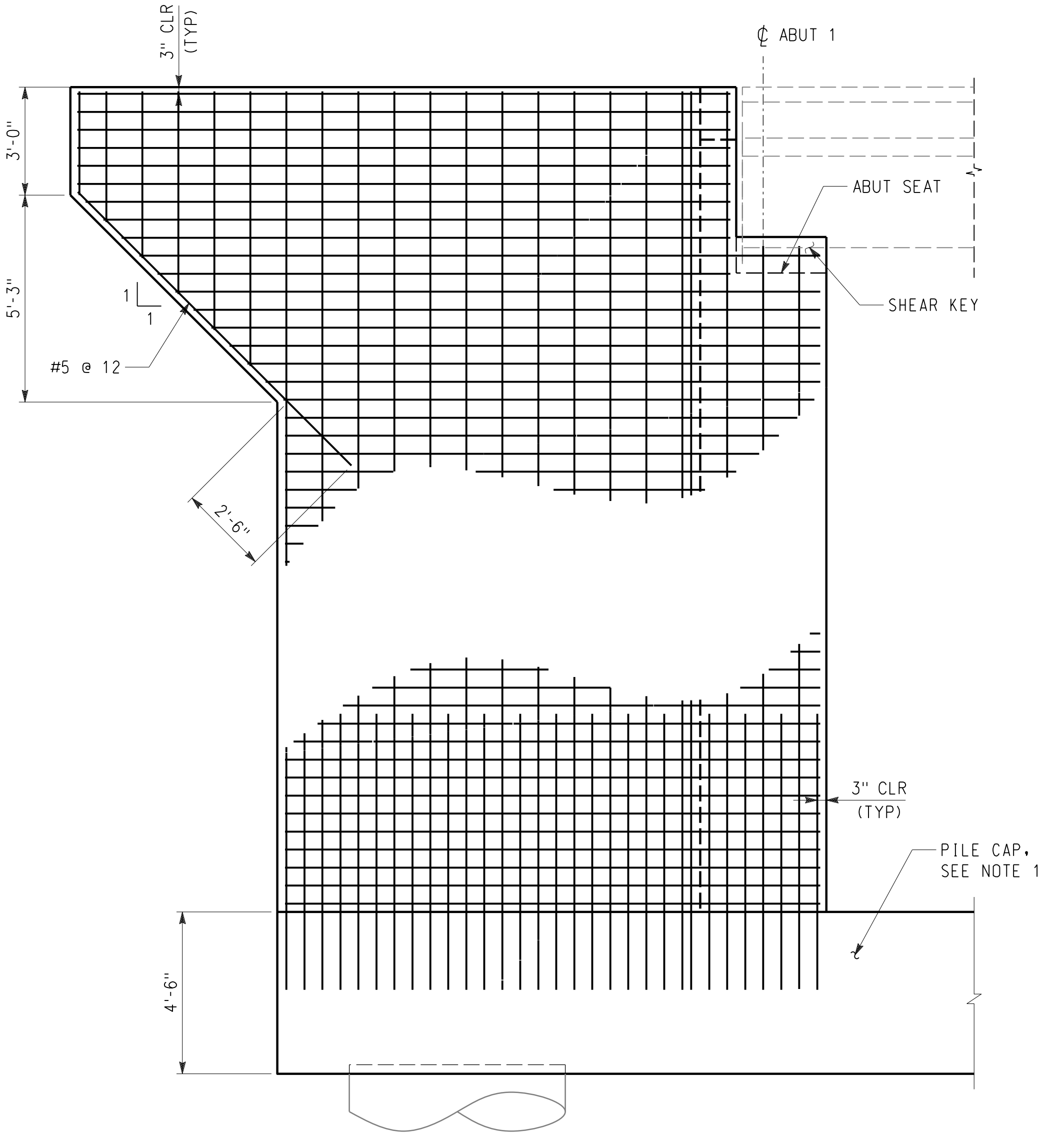
ABUTMENT DETAILS NO.1

CONTRACT NO.
DRAWING NO. S-006
REVISION
SHEET NO. 15 OF 29
SCALE AS SHOWN



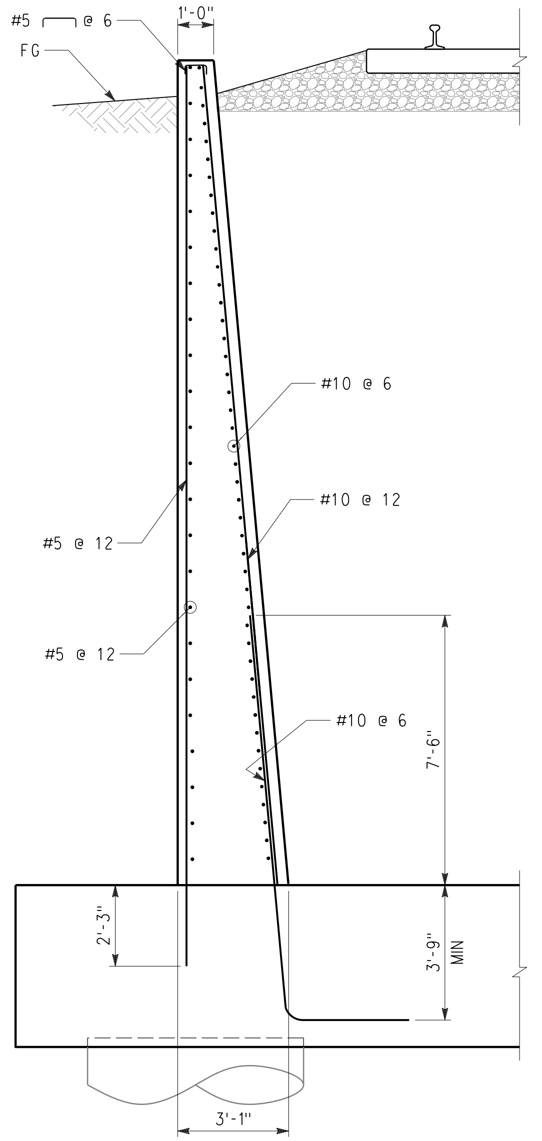
PLAN – ABUTMENT WINGWALL

SCALE: ⅜" = 1'-0"



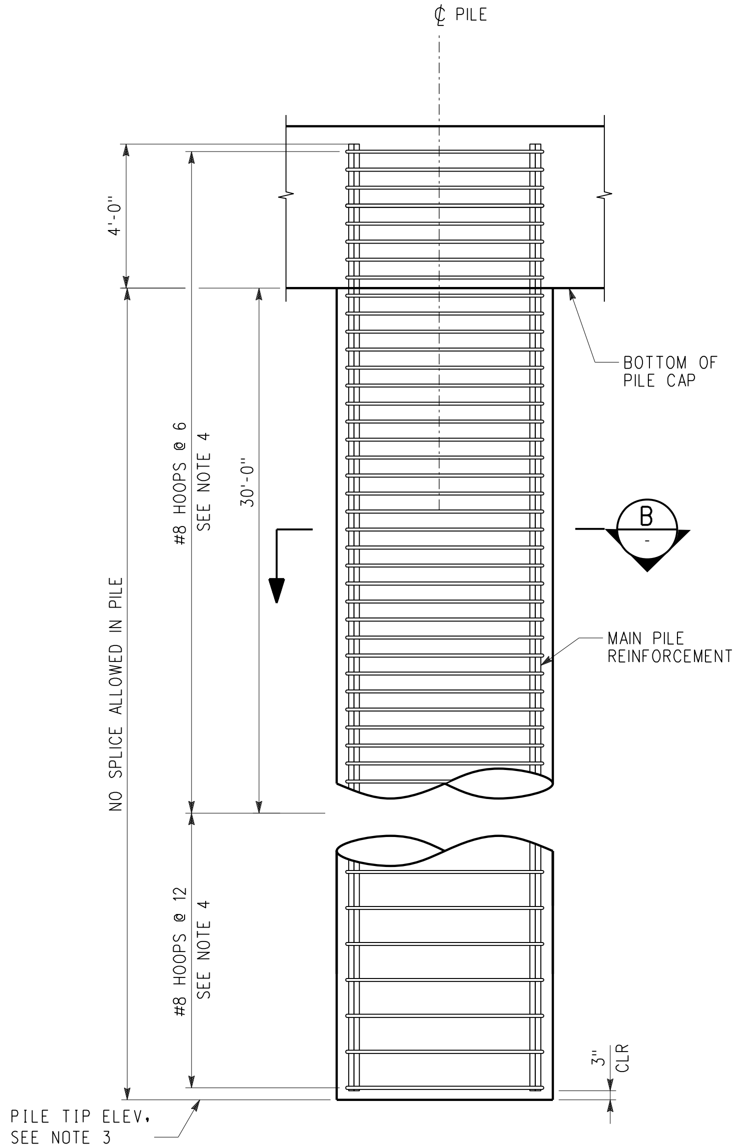
ELEVATION – ABUTMENT WINGWALL

SCALE: ⅜" = 1'-0"



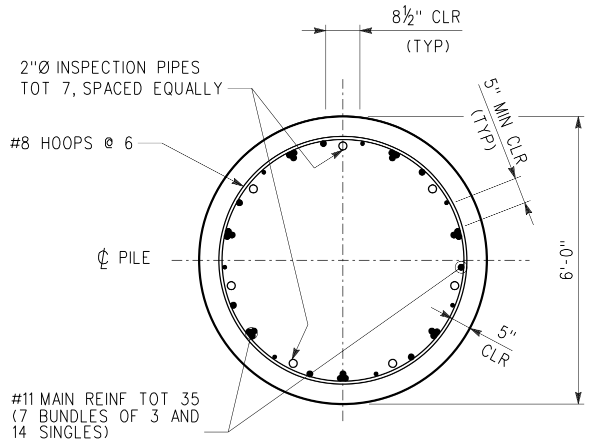
SECTION A

SCALE: ⅜" = 1'-0"



ABUTMENT PILE ELEVATION

SCALE: ⅜" = 1'-0"



SECTION B

SCALE: ½" = 1'-0"

NOTES:

1. FOR PILE CAP DIMENSIONS AND REINFORCEMENT, SEE "ABUTMENT DETAILS NO. 1"
2. FOR SHEAR KEY REINFORCEMENT, SEE "ABUTMENT DETAILS NO. 1"
3. FOR PILE TIP ELEVATION SEE "FOUNDATION PLAN" SHEET
4. ALL HOOPS ARE ULTIMATE BUTT SPLICES

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Hamid Kazem
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EXP: 12-31-25

VENTURA COUNTY
TRANSPORTATION
COMMISSION

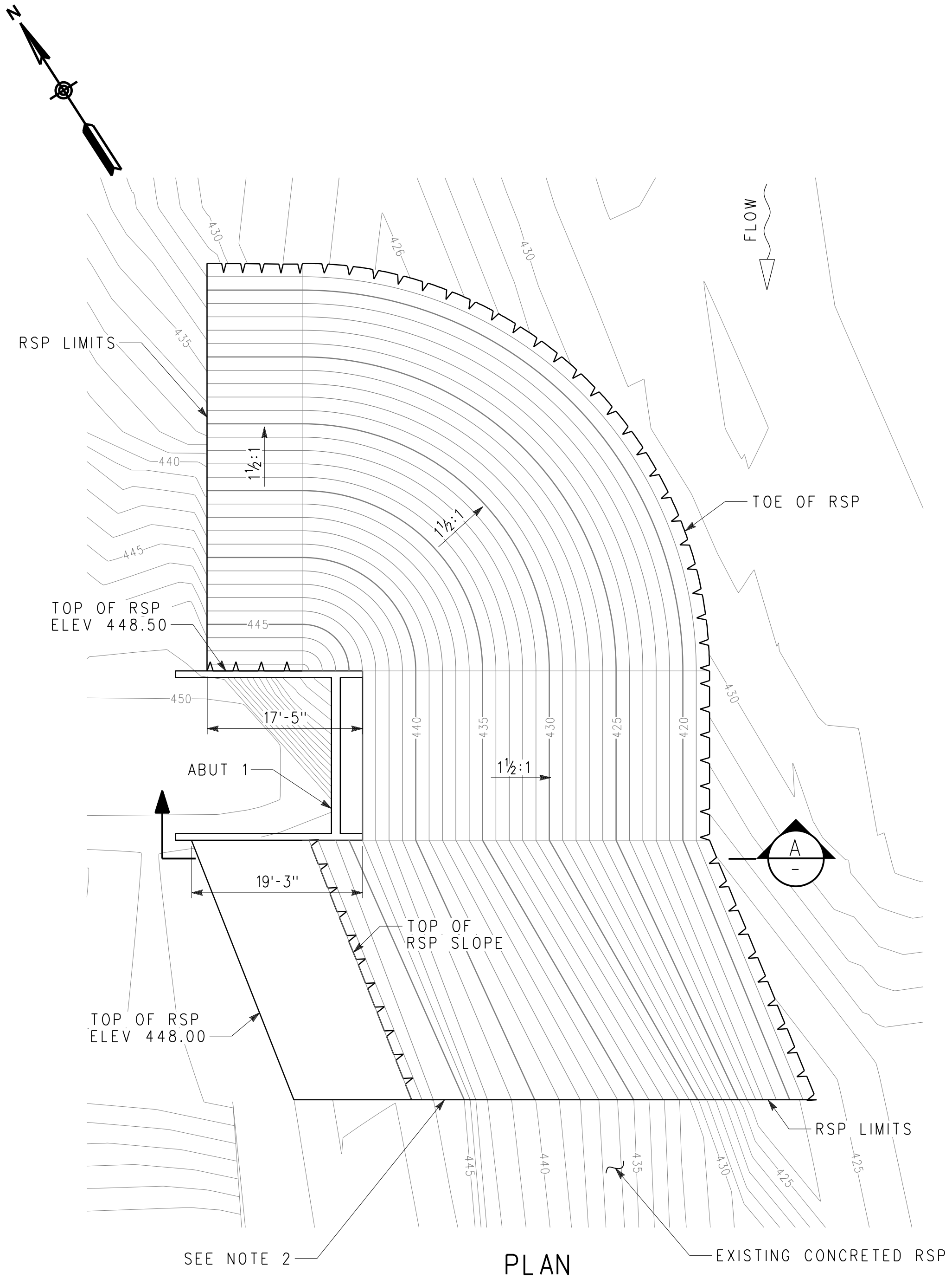
RAILPROS

SUBMITTED: ____________
JULINA R. CORONA, P.E.
PROJECT MANAGER

SESPE CREEK BRIDGE OVERFLOW
SANTA PAULA BRANCH LINE, FILLMORE, CA

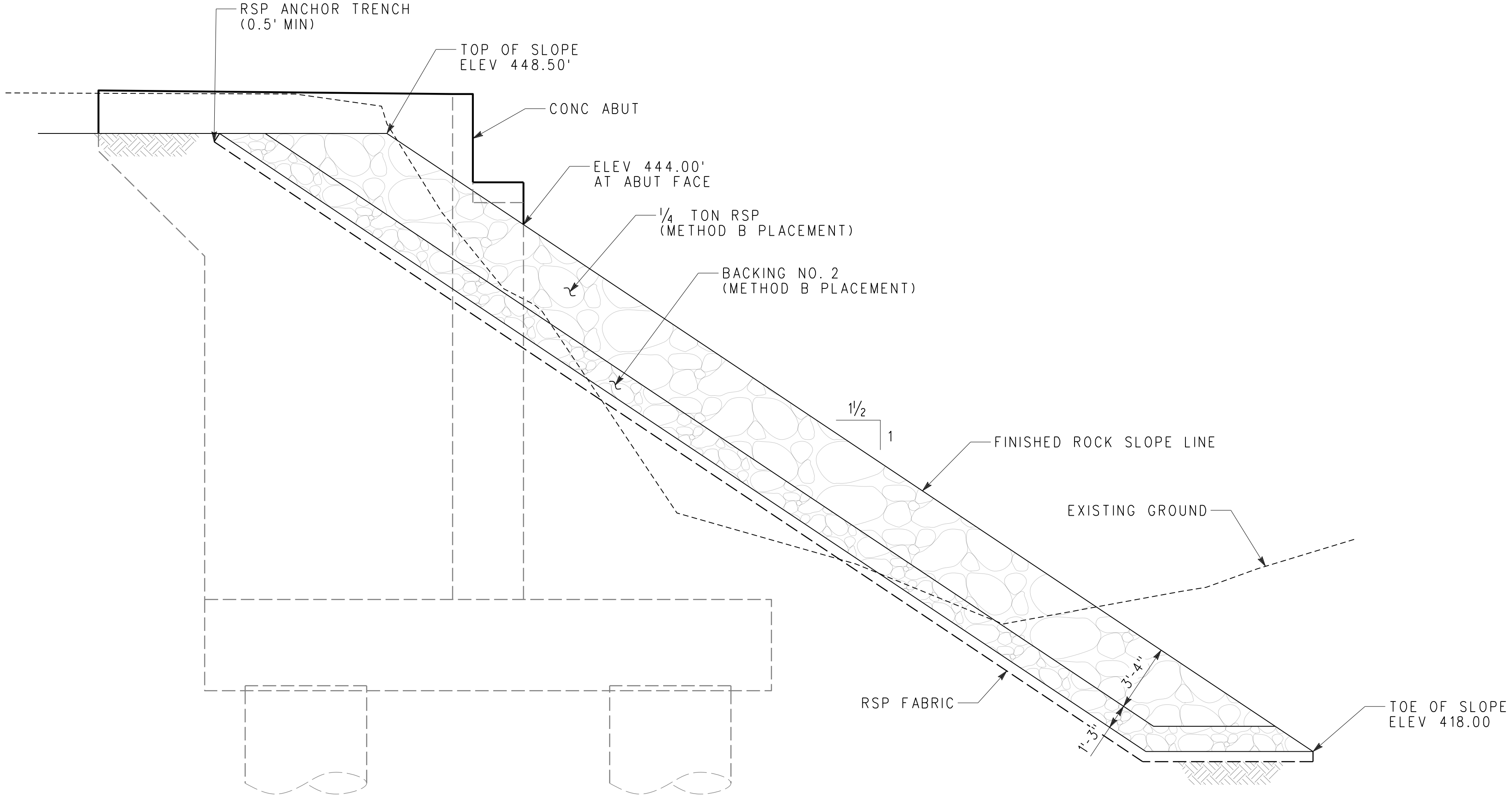
ABUTMENT DETAILS NO. 2

CONTRACT NO.
DRAWING NO. S-007
REVISION
SHEET NO. 16 OF 29
SCALE AS SHOWN



PLAN

SCALE: 1"=10'



SECTION A -

SCALE: ¼" = 1'-0"

NOTE:

1. ROCK SLOPE PROTECTION SHALL BE PER CALTRANS STANDARD SPECIFICATIONS SECTION 72.+
2. LIMITS OF REMOVAL OF EXISTING GROUTED RSP AND DETAIL OF INTERFACE WITH NEW RSP TO BE FIELD DETERMINED.

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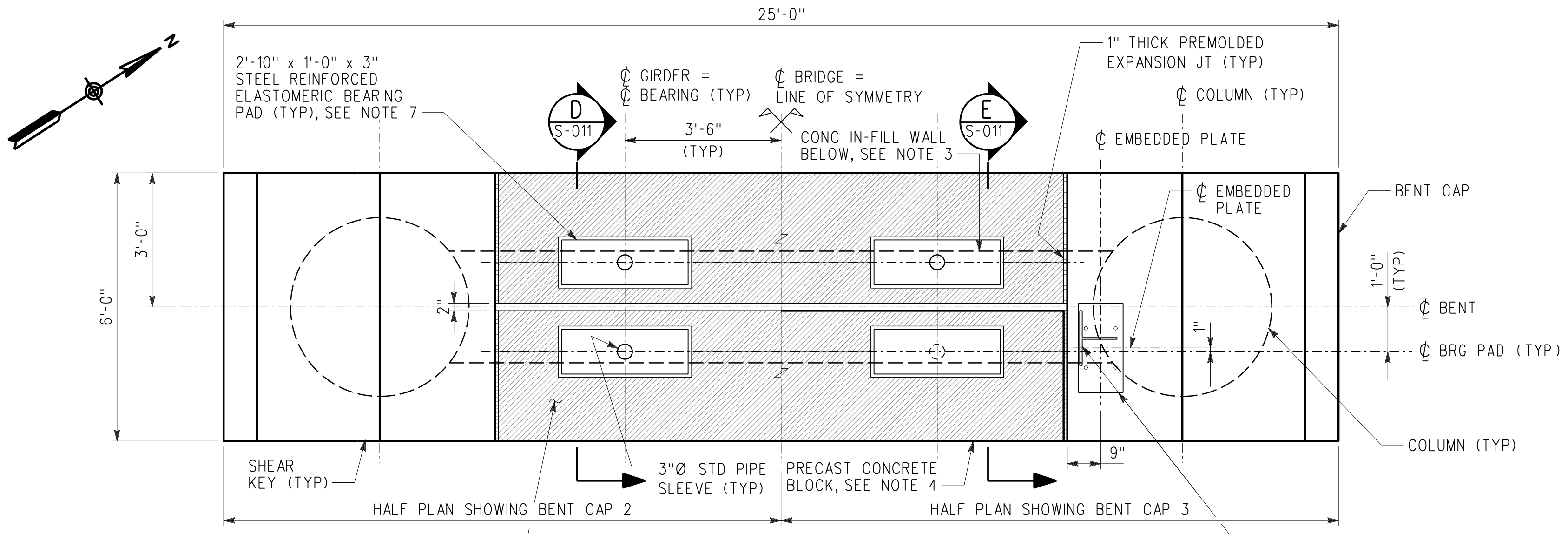
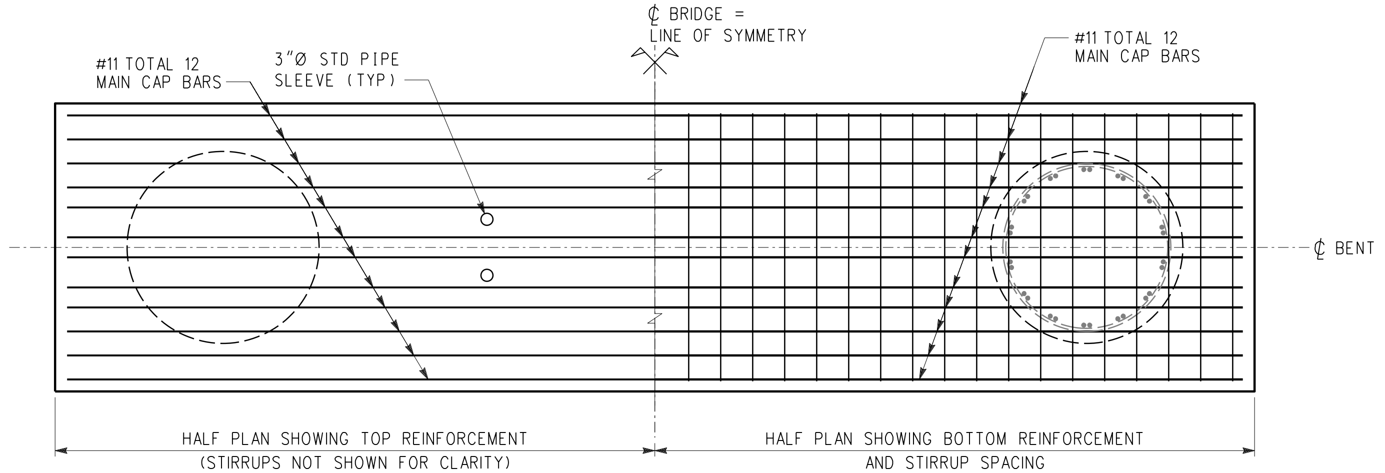
SESPE CREEK BRIDGE OVERFLOW
SANTA PAULA BRANCH LINE, FILLMORE, CA

ROCK SLOPE PROTECTION

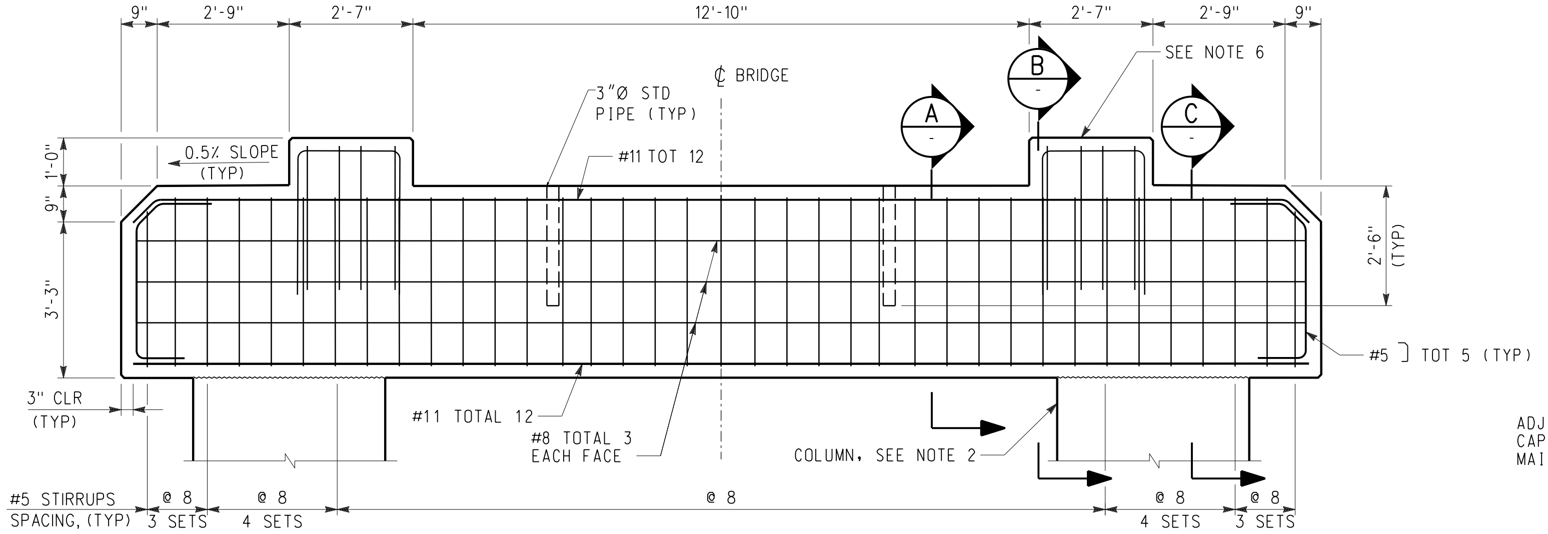
CONTRACT NO.
DRAWING NO. S-008
REVISION
SHEET NO. 17 OF 29
SCALE AS SHOWN



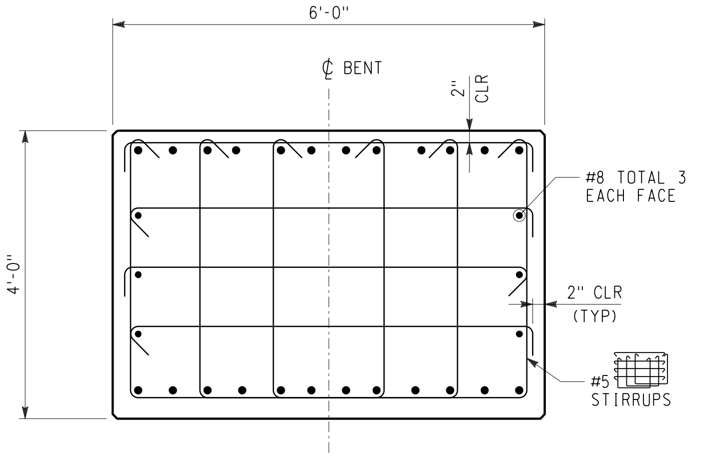
PLAN - BENT CAP
1
-
SCALE: ½" = 1'-0"



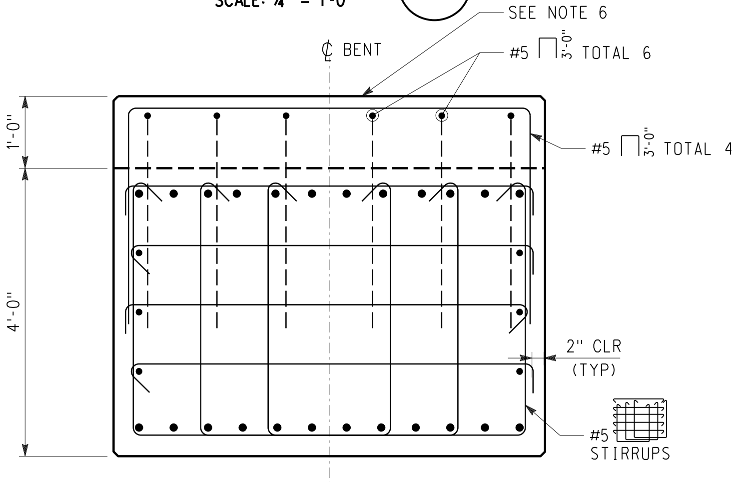
PLAN - BENT CAP REINFORCEMENT
SCALE: ½" = 1'-0"



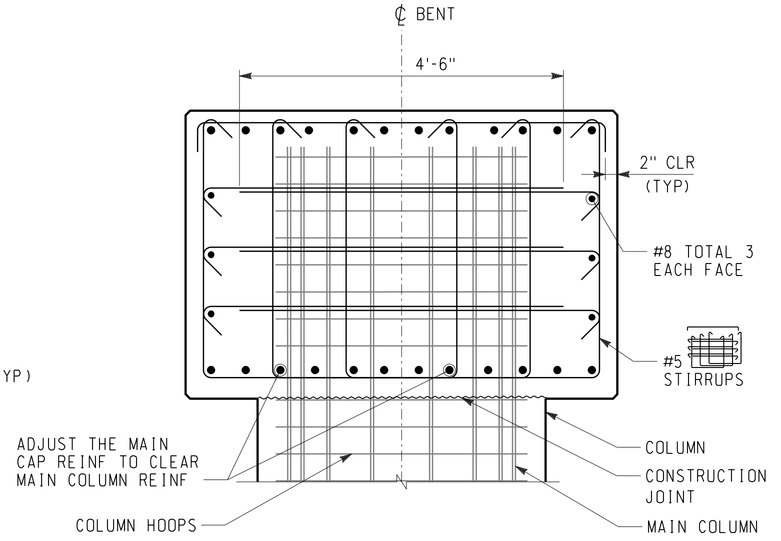
ELEVATION - BENT CAP REINFORCEMENT
SCALE: ½" = 1'-0"



SECTION A
-
SCALE: ¾" = 1'-0"



SECTION B
-
SCALE: ¾" = 1'-0"



SECTION C
-
SCALE: ¾" = 1'-0"

NOTES:

1. NO SPLICES ALLOWED IN MAIN BENT CAP REINFORCEMENT.
2. COLUMN REINFORCEMENT NOT SHOWN FOR CLARITY. FOR REINFORCEMENT, SEE "BENT DETAILS NO. 2" SHEET.
3. FOR CONCRETE IN-FILL WALL DIMENSIONS AND REINFORCEMENT, SEE "BENT DETAILS NO. 2" SHEET.
4. FOR SIZE AND REINFORCEMENT OF PRECAST CONCRETE CATCHER BLOCK, SEE "BENT DETAILS NO. 3" SHEET. AT BENT 3 UP-STATION ONLY.
5. FOR GIRDER STOP PLACEMENT DETAIL, SEE "MISCELLANEOUS DETAILS NO. 1" SHEET. FOR GIRDER STOP AND EMBED PLATE DETAILS, SEE "MISCELLANEOUS DETAILS NO. 2" SHEET.
6. EMBEDDED PLATE AND GIRDER STOP NOT SHOWN FOR CLARITY.
7. FOR BEARING PAD DETAILS, SEE SIMILAR "BEARING PAD DETAILS 1" ON "ABUTMENT DETAILS NO. 1" SHEET.

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CHECKED BY
H. YANG
APPROVED BY
M. SARWAR
DATE
12-25-2023

HAMID KAZEM
Hamid Kazem
No. C90676
EXP: 12-31-25
CIVIL

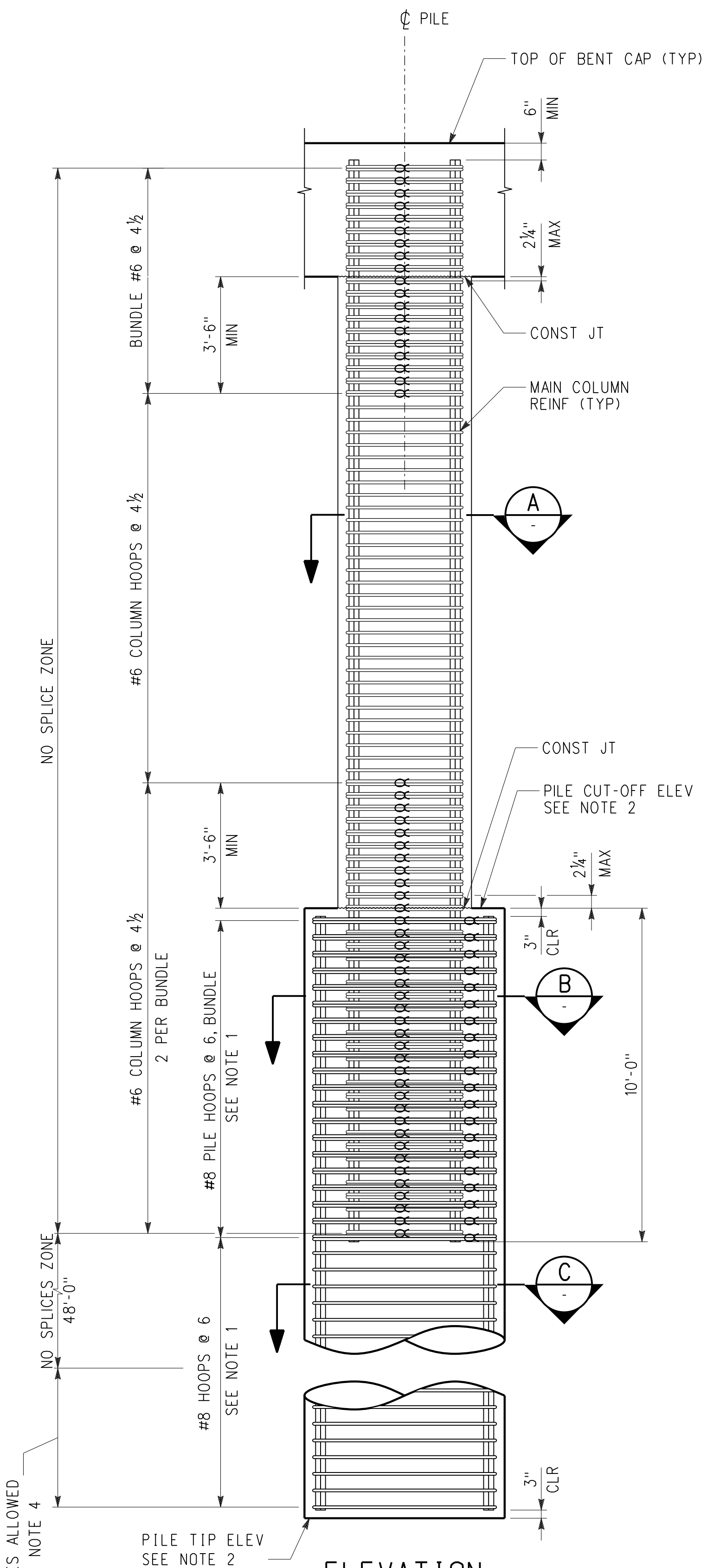
VENTURA COUNTY
TRANSPORTATION
COMMISSION

SUBMITTED: ____________
JULINA R. CORONA, P.E.
PROJECT MANAGER

SESPE CREEK BRIDGE OVERFLOW
SANTA PAULA BRANCH LINE, FILLMORE, CA

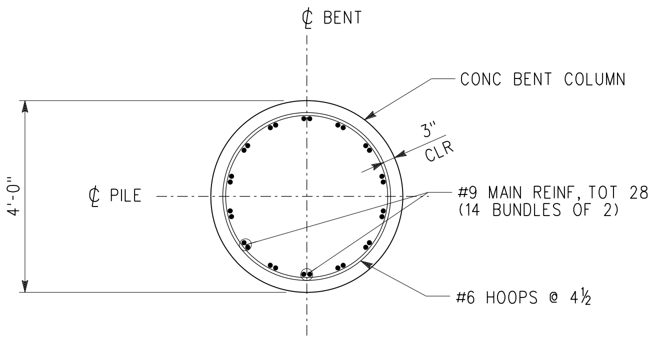
BENT DETAILS NO. 1

CONTRACT NO.
DRAWING NO.
S-009
REVISION
SHEET NO.
18 OF 29
SCALE
AS SHOWN



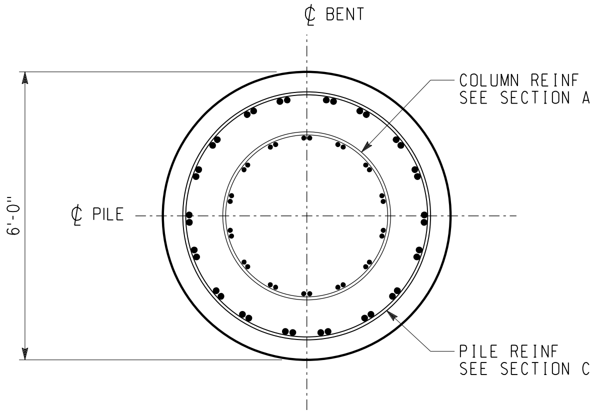
ELEVATION

SCALE: ⅜" = 1'-0"



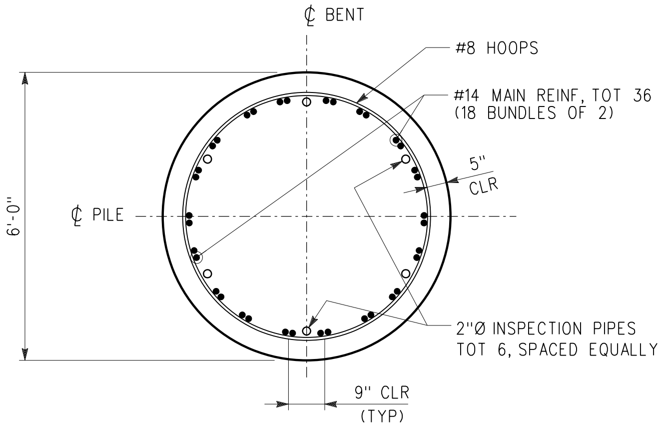
SECTION A -

SCALE: ½" = 1'-0"



SECTION B -

SCALE: ½" = 1'-0"



SECTION C -

SCALE: ½" = 1'-0"

NOTES:

1. ALL HOOPS ARE ULTIMATE BUTT SPLICES
2. FOR PILE TIP AND CUT-OFF ELEVATION, SEE PILE DATA TABLE ON "FOUNDATION PLAN" SHEET
3. NO SPLICES ALLOWED IN THE COLUMN MAIN REINFORCEMENT
4. SPLICES SHALL BE SERVICE SPLICES "MECHANICAL COUPLERS"

LEGEND

∝ INDICATES BUNDLED BARS

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Z:\Engineering\VCTC\Sespe Creek Bridge Overflow\900 CADD\950 Drawings\S-010_Bent Details 2.sht
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FINAL DESIGN (100%)
NOT FOR CONSTRUCTION

REV. | DATE | BY | SUB. | APP.

INFORMATION CONFIDENTIAL: All plans, drawings, specifications, and or information furnished herewith shall remain the property of the Ventura County Transportation Commission and shall be held confidential and shall not be used for any purpose not provided for in agreements with the Ventura Country Transportation Commission.

DESIGNED BY H. KAZEM
DRAWN BY T. KORPRASERTSUD
CHECKED BY H. YANG
APPROVED BY M. SARWAR
DATE 12-25-2023

HAMID KAZEM
No. C90676
EXP: 12-31-25
CIVIL
Hamid Kazem

VENTURA COUNTY TRANSPORTATION COMMISSION

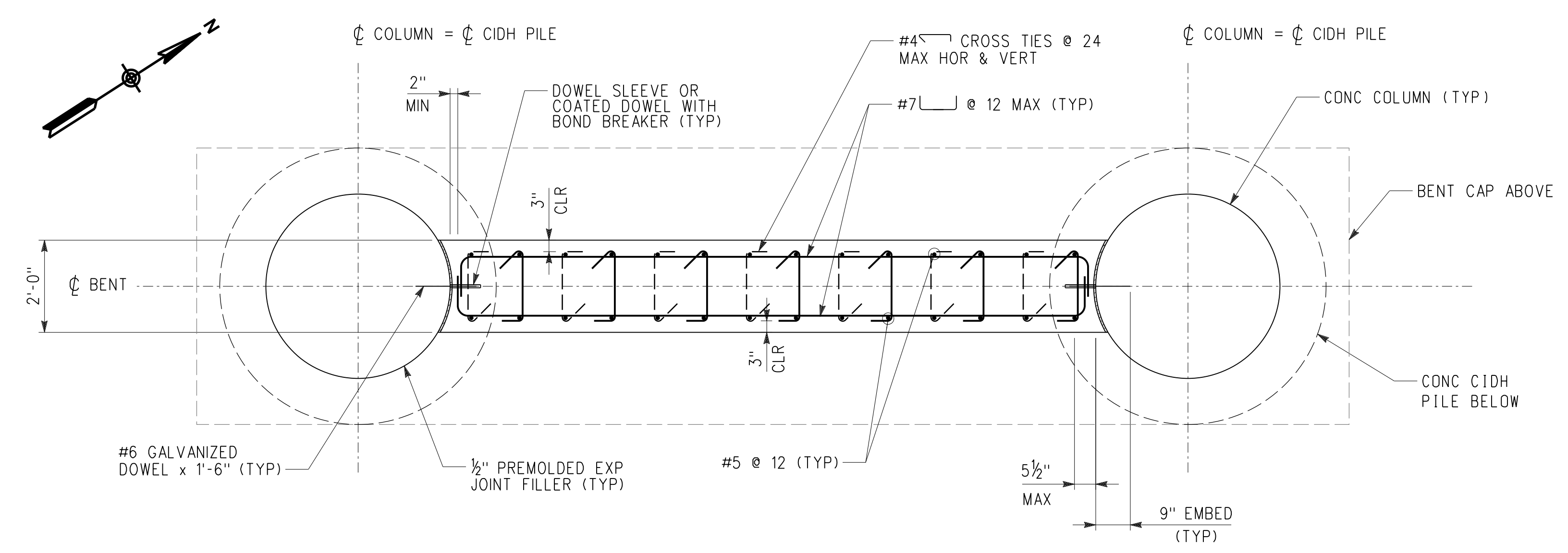
RAILPROS

SUBMITTED: JULINA R. CORONA, P.E. PROJECT MANAGER

SESPE CREEK BRIDGE OVERFLOW
SANTA PAULA BRANCH LINE, FILLMORE, CA

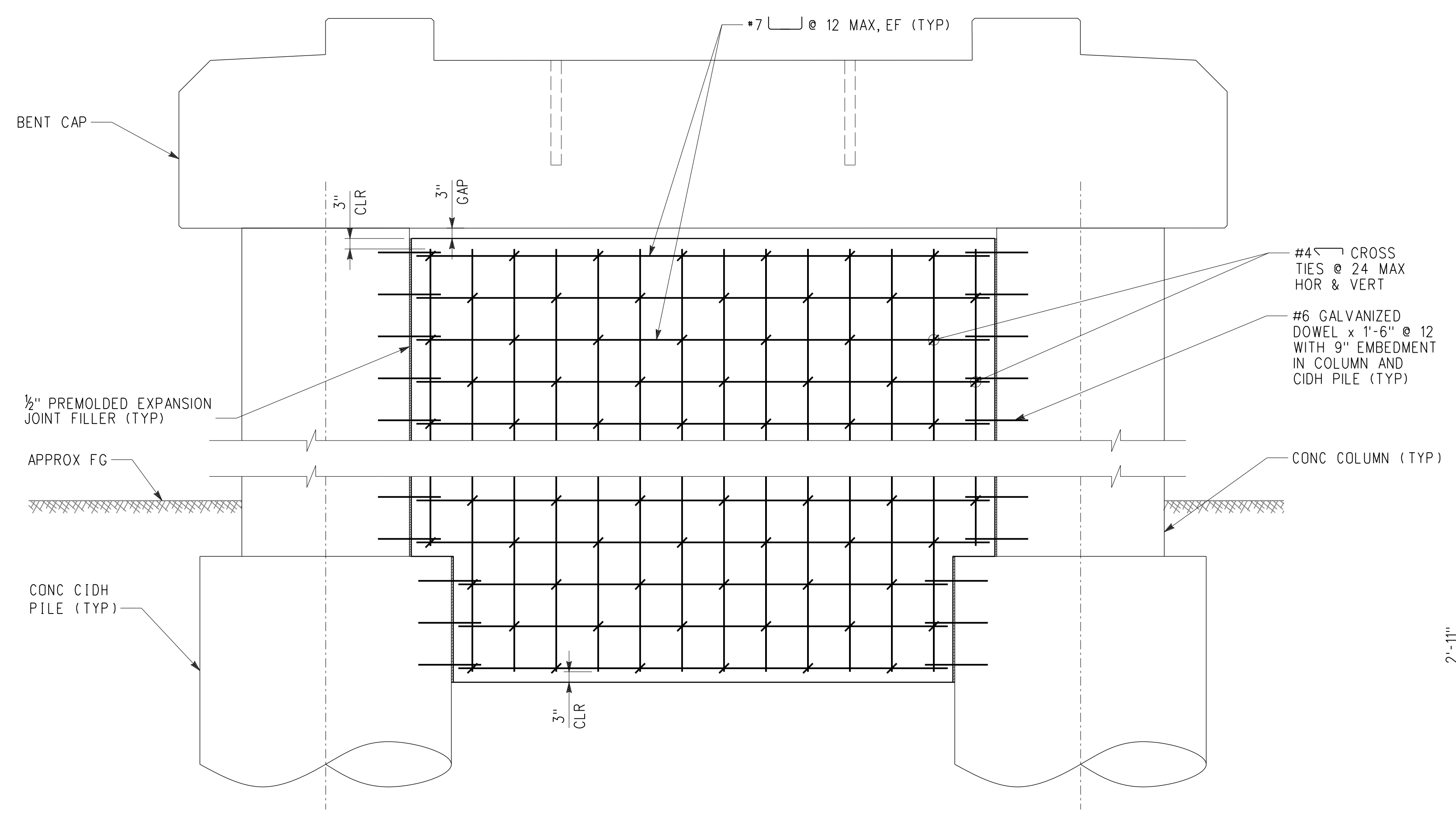
BENT DETAILS NO. 2

CONTRACT NO.
DRAWING NO. S-010
REVISION
SHEET NO. 19 OF 29
SCALE AS SHOWN



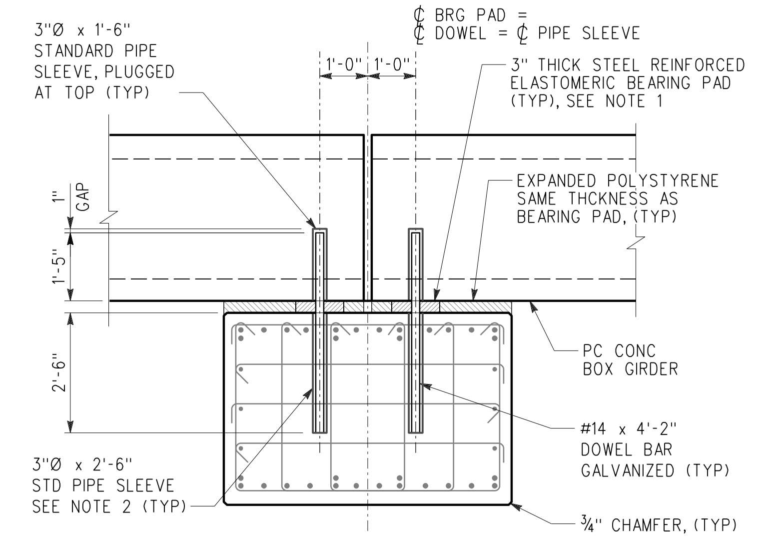
PLAN - IN-FILL WALL

SCALE: ½" = 1'-0"



ELEVATION - IN-FILL WALL

SCALE: ½" = 1'-0"

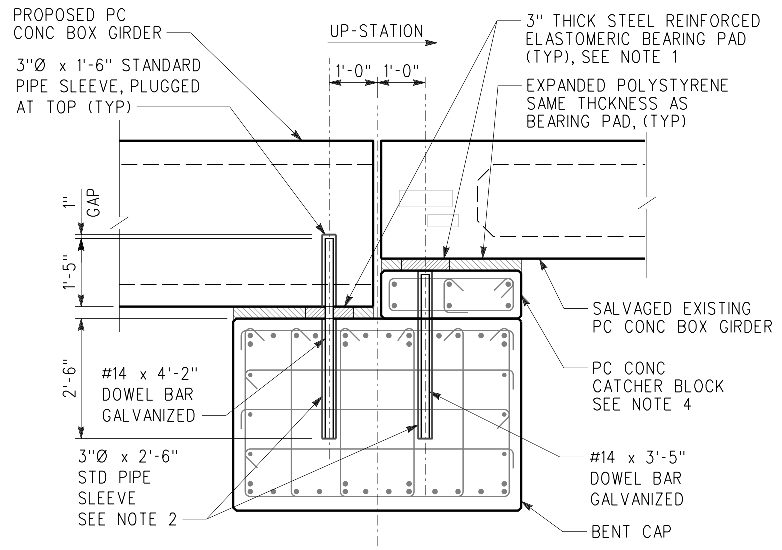


SECTION - BENT 2 CAP (D / S-009)

SCALE: ½" = 1'-0"

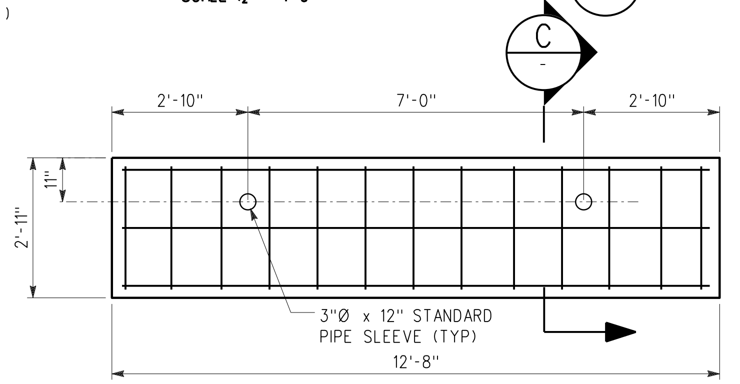
NOTES:

1. FOR BEARING PAD DETAILS, SEE DETAIL 1 ON "ABUTMENT DETAILS NO. 1" SHEET.
2. PIPE SLEEVE TO BE FILLED WITH NON-SHRINK GROUT AFTER INSTALLATION OF #14 DOWEL BAR.
3. BENT CAP REINFORCEMENT TO BE ADJUSTED AS NEEDED TO PROVIDE 1" CLEARANCE TO THE PIPE SLEEVE.
4. PROVIDE SELF-LEVELING GROUT BETWEEN BENT CAP AND CATCHER BLOCK AS NEEDED TO MAINTAIN A LEVEL SURFACE.



SECTION - BENT 3 CAP (E / S-009)

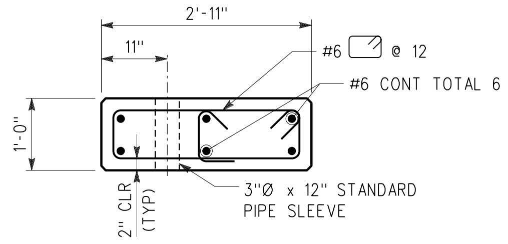
SCALE: ½" = 1'-0"



PLAN

PC CONCRETE CATCHER BLOCK DETAIL (1 / -)

SCALE: ½" = 1'-0"



SECTION (C / -)

SCALE: ¾" = 1'-0"

FINAL DESIGN (100%)
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REV.	DATE	BY	SUB.	APP.

DESIGNED BY H. KAZEM
DRAWN BY G. ESTEPA
CHECKED BY H. YANG
APPROVED BY M. SARWAR
DATE 12-25-2023

Hamid Kazem
No. C90676
EXP: 12-31-25

VENTURA COUNTY
TRANSPORTATION
COMMISSION

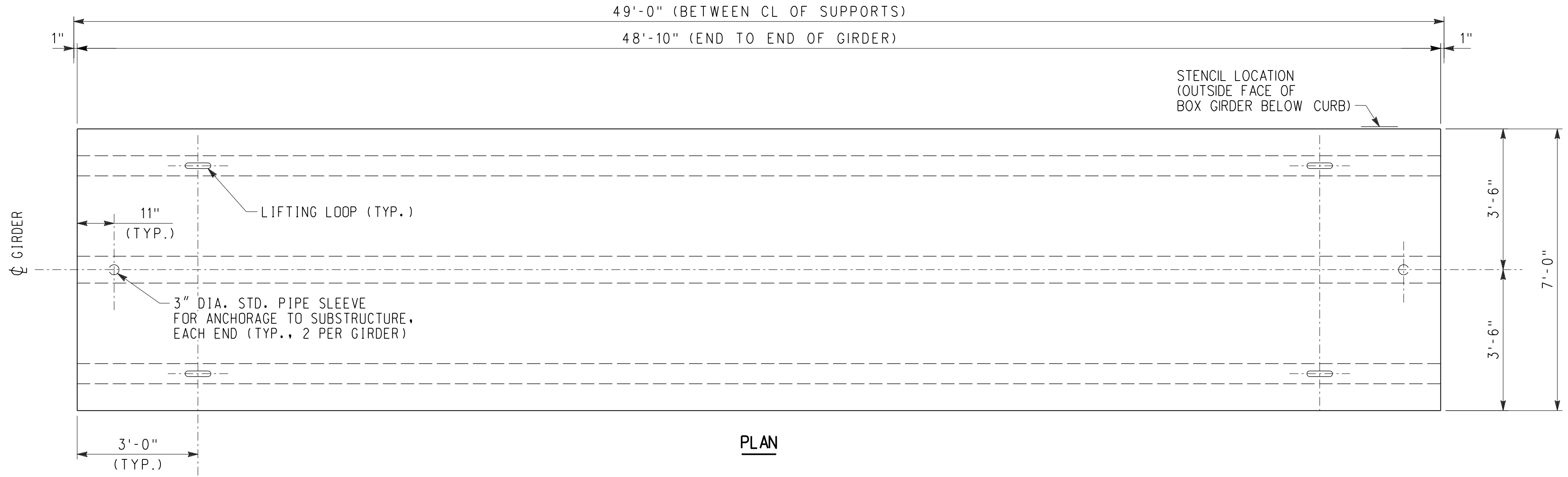
RAILPROS

SUBMITTED:
JULINA R. CORONA, P.E.
PROJECT MANAGER

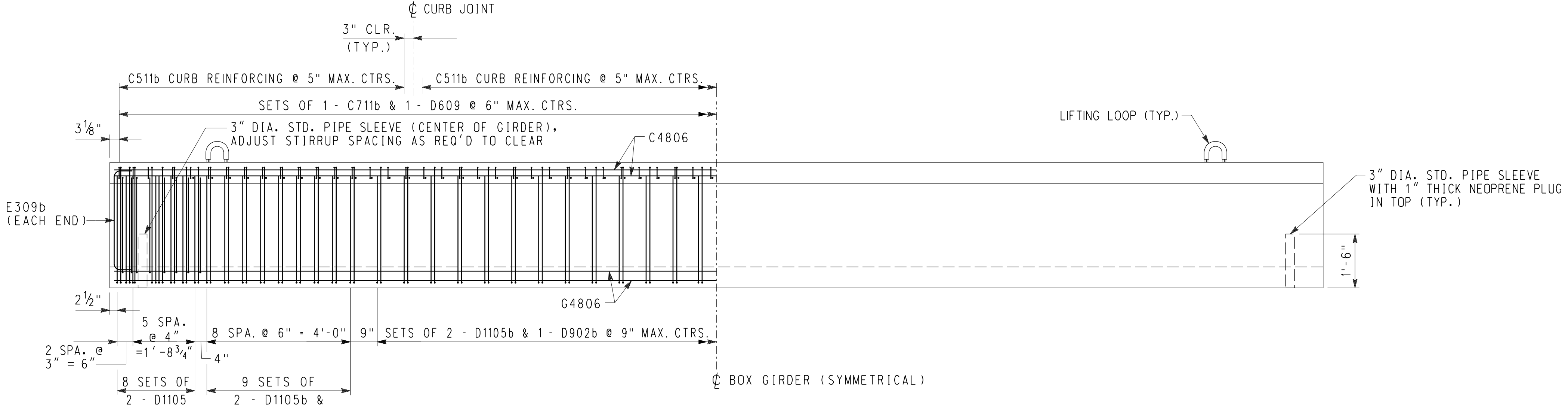
SESPE CREEK BRIDGE OVERFLOW
SANTA PAULA BRANCH LINE, FILLMORE, CA

BENT DETAILS NO. 3

CONTRACT NO.
DRAWING NO. S-011
REVISION
SHEET NO. 20 OF 29
SCALE AS SHOWN



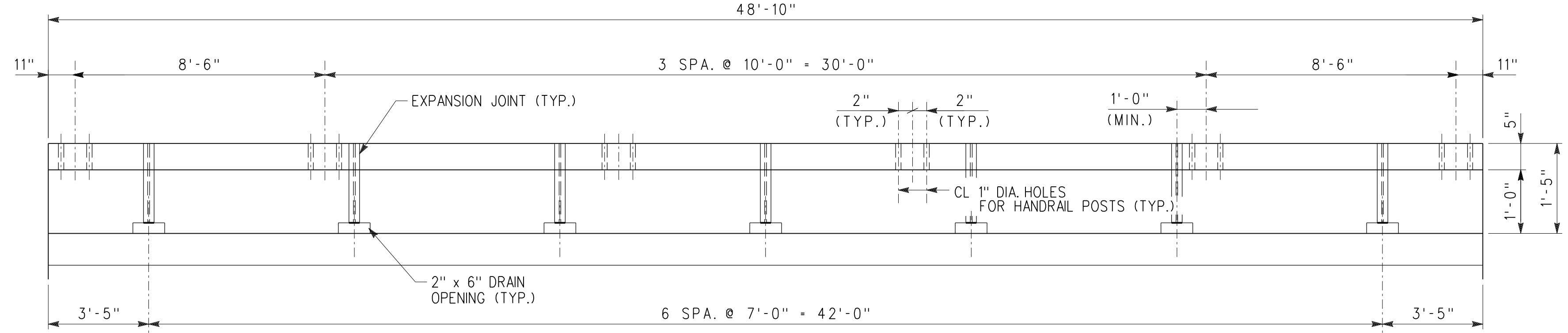
PLAN



ELEVATION

ELEVATION w/ CONVENTIONAL REINFORCING

SCALE: NONE



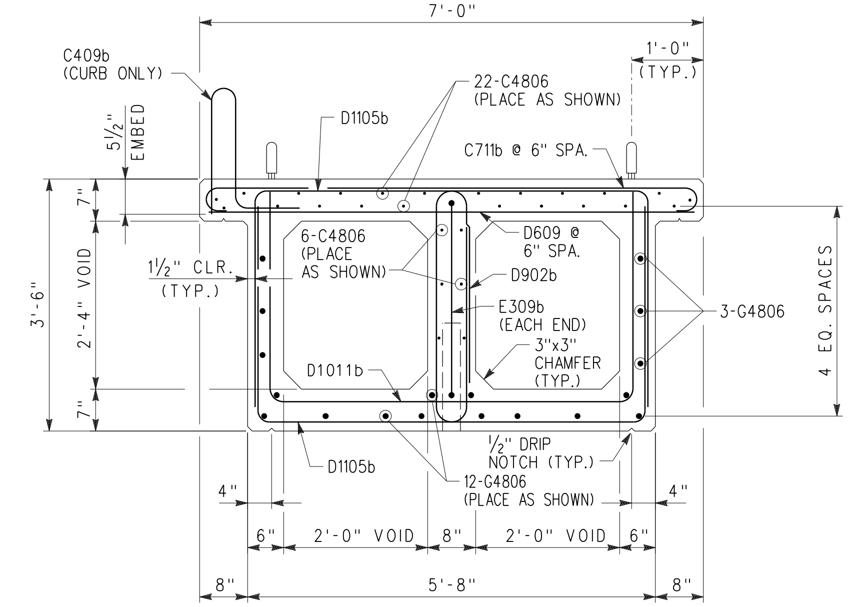
ELEVATION

BALLAST CURB AND SIDEWALK

SCALE: NONE

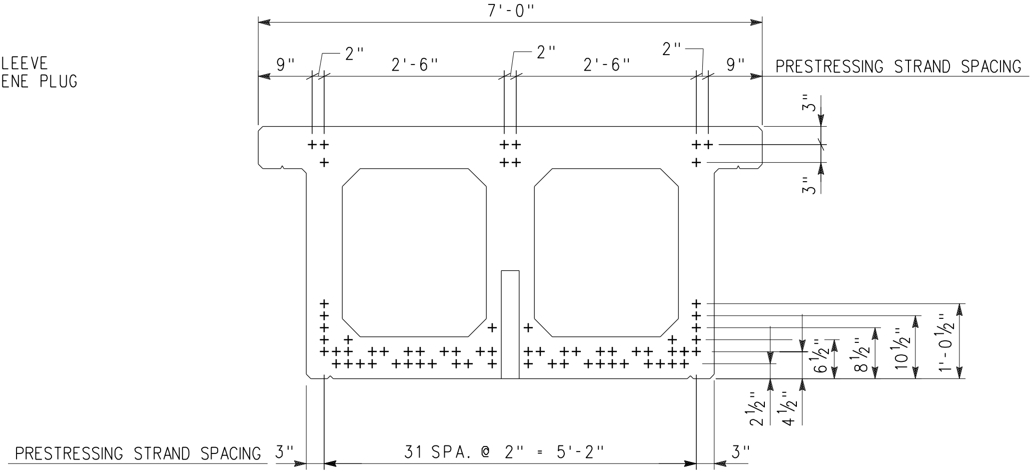
NOTE:

FOR GENERAL GIRDER NOTES AND REINFORCING SCHEDULE, SEE "GIRDER DETAILS NO. 2" SHEET.



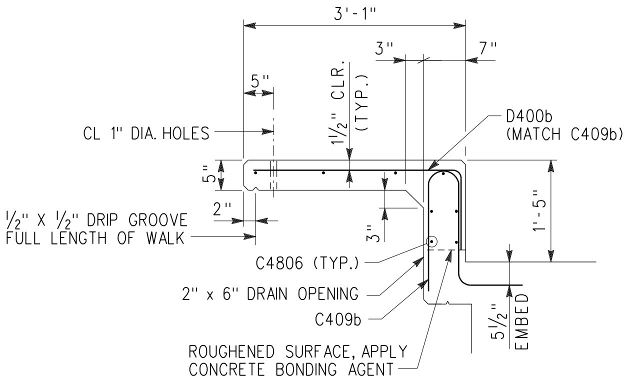
TYPICAL MILD REINFORCING SECTION

SCALE: ¾" = 1'-0"
(PRESTRESSING STRANDS NOT SHOWN FOR CLARITY)



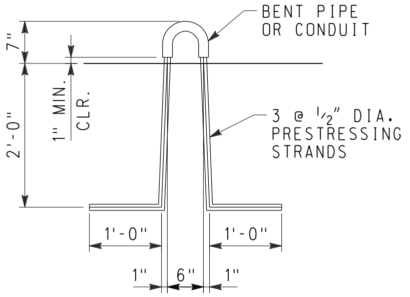
PRESTRESSING STRAND PATTERN

SCALE: ¾" = 1'-0"
+ (66 - 0.6" 270 KSI PRESTRESSING STRANDS)



CURB AND WALK DETAIL

SCALE: ¾" = 1'-0"



LIFTING LOOP DETAIL

SCALE: ¾" = 1'-0"
(FABRICATOR IS RESPONSIBLE FOR ADEQUACY OF LIFTING LOOPS, SEE NOTES ON "GIRDER DETAILS NO.2" SHEET)

REV.	DATE		BY	SUB.	APP.

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DESIGNED BY K. THOMSEN
DRAWN BY G. SMITH
CHECKED BY H. YANG
APPROVED BY M. SARWAR
DATE 12-25-2023

MUHAMMAD SARWAR
No. C68399
EXP: 09-30-25

VENTURA COUNTY TRANSPORTATION COMMISSION

RAILPROS

SUBMITTED: ____________
JULINA R. CORONA, P.E.
PROJECT MANAGER

SESPE CREEK BRIDGE OVERFLOW
SANTA PAULA BRANCH LINE, FILLMORE, CA

GIRDER DETAILS NO. 1

CONTRACT NO.
DRAWING NO. S-012
REVISION
SHEET NO. 21 OF 29
SCALE AS SHOWN

GENERAL NOTES

CONCRETE:

CONCRETE MATERIAL, PLACING AND CURING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS SPECIFIED IN SCRRA STANDARD SPECIFICATIONS AND THE CURRENT EDITION OF CHAPTER 8 OF THE AREMA MANUAL FOR RAILWAY ENGINEERING.

THE COMPRESSIVE STRENGTH OF THE CONCRETE SHALL BE 6,500 PSI AT THE TRANSFER OF THE PRESTRESSING FORCE AND 8,000 PSI AT 28 DAYS.

MINIMUM COMPRESSIVE STRENGTH OF CURB CONCRETE SHALL BE 4,000 PSI AT 28 DAYS.

AIR ENTRAINING AGENTS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS SPECIFIED IN THE CURRENT EDITION OF ASTM C260. THE TOTAL ENTRAINED AIR CONTENT SHALL BE 6% +/- 1% BY VOLUME OF THE PLASTIC CONCRETE.

CONCRETE AGGREGATE SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS SPECIFIED IN THE CURRENT EDITION OF ASTM C33. COARSE AGGREGATE SHALL BE SIZE NO. 67.

PRESTRESSING STRAND:

PRESTRESSING STRAND SHALL BE 0.6 INCH DIAMETER, SEVEN WIRE, UNCOATED, LOW RELAXATION PRESTRESSING STRAND WHICH IS IN ACCORDANCE WITH THE REQUIREMENTS SPECIFIED IN ASTM A416. THE PRESTRESSING STRAND SHALL HAVE AN ULTIMATE TENSILE STRENGTH OF 270 KSI. THE INITIAL PRESTRESS SHALL BE 43,400 LBS. PER PRESTRESSING STRAND UNLESS NOTED OTHERWISE.

PRESTRESSING STRAND SHALL BE TESTED IN ACCORDANCE WITH PCI RECOMMENDATIONS (MOUSTAFA METHOD) AND CERTIFIED BY THE FABRICATOR AS HAVING ADEQUATE BOND CHARACTERISTICS TO SATISFY THE PREDICTION EQUATIONS FOR TRANSFER AND DEVELOPMENT LENGTH GIVEN IN THE AREMA MANUAL FOR RAILWAY ENGINEERING.

AN ALTERNATE PRESTRESSING STRAND PATTERN WHICH HAS THE SAME ECCENTRICITY AS THE PATTERN SHOWN ON THIS PLAN AND IS BETTER SUITED TO THE MANUFACTURER'S FACILITIES WILL BE CONSIDERED. MANUFACTURER MUST SUBMIT PLANS AND COMPUTATIONS FOR ENGINEER'S APPROVAL PRIOR TO CASTING.

REINFORCING STEEL:

REINFORCING STEEL SHALL BE DEFORMED, PER CURRENT ASTM A615 SPECIFICATION AND MEET GRADE 60 REQUIREMENTS, EXCEPT BARS CROSSING CURB JOINT TO BE PER CURRENT ASTM A1035 SPECIFICATION. BARS REQUIRED TO MEET ASTM A1035 ARE NOTED IN THE BENDING DIAGRAMS.

FABRICATION OF REINFORCING STEEL SHALL BE PER CHAPTER 7 OF THE CRSI MANUAL OF STANDARD PRACTICE. DIMENSIONS OF BENDING DETAILS ARE OUT TO OUT OF BAR.

REINFORCING STEEL IS TO BE BLOCKED TO PROPER LOCATION AND SECURELY WIRED AGAINST DISPLACEMENT. USE PLASTIC PROTECTED REINFORCING SUPPORTS, MEETING CRSI SPECIFICATIONS CHAPTER 3, CLASS 1. TACK WELDING OF REINFORCING IS PROHIBITED. MINIMUM CONCRETE COVER ON REINFORCEMENT SHALL MEET CURRENT AREMA REQUIREMENTS.

DESIGN LOADS:

DEAD LOAD (ASSUMED - LB. PER LIN. FT. OF TRACK):

TRACK, FASTENERS, ETC.	200
BALLAST	4,065
CURB, WALK, & HANDRAIL	580
GIRDERS	3,600
TOTAL	8,445

THE FABRICATOR SHALL CAMBER THE GIRDERS AS REQUIRED TO RESULT IN A NET VERTICAL DEFLECTION OF 0" DUE TO MAXIMUM DEAD LOADS SHOWN BELOW.

DEAD LOAD (ASSUMED - LB. PER LIN. FT. OF ONE GIRDER):

TRACK, FASTENERS, ETC.	100
BALLAST	2,035
CURB, WALK, & HANDRAIL	290
GIRDERS	1,800
TOTAL	4.225

LIVE LOAD: COOPER E80

IMPACT: $\frac{225}{\sqrt{\ell}}$ % (WHERE ℓ = L - 24")

MANUFACTURE:

PRODUCTION PROCEDURES AND DIMENSIONAL TOLERANCES FOR THE MANUFACTURE OF PRECAST, PRESTRESSED GIRDERS SHALL BE IN ACCORDANCE WITH THE AREMA MANUAL FOR RAILWAY ENGINEERING AND THE PRECAST CONCRETE INSTITUTE'S CURRENT MANUAL MNL 116 FOR QUALITY CONTROL.

TOLERANCE FOR LOCATION OF LIFTING LOOPS SHALL BE +/- 1/2 ".

THE ENDS OF THE PRESTRESSING STRANDS SHALL BE RECESSED AND GROUTED TO A MINIMUM COVER OF 2" AFTER CASTING IS COMPLETE.

CURB SHALL BE CAST AFTER GIRDER IS REMOVED FROM FORM. GIRDERS SHALL BE SUPPLIED WITH CURB.

CONCRETE BONDING AGENT: REFER TO SPECIFICATIONS.

SURFACES SHALL BE FORMED IN A MANNER WHICH WILL PRODUCE A SMOOTH AND UNIFORM APPEARANCE WITHOUT RUBBING OR PLASTERING. UNLESS OTHERWISE NOTED, EXPOSED EDGES OF 90-DEGREES OR LESS ARE TO BE CHAMFERED 3/4 "x 3/4 ". UNFORMED SURFACES SHALL HAVE A SMOOTH FINISH FREE OF ALL FLOAT AND TROWEL MARKS.

THE FABRICATOR SHALL STENCIL THE FABRICATOR'S NAME, DATE OF FABRICATION, PIECE MARK, AND ACTUAL LIFTING WEIGHT AT LOCATION SHOWN.

VOID DIMENSIONS SHOWN ARE MAXIMUM AND MUST NOT BE EXCEEDED AT ANY POINT INCLUDING SPLICES OF VOID FORM.

GIRDERS SHALL BE SUPPORTED BY BLOCKING WITHIN 1'-6" OF ENDS DURING STORAGE AND TRANSPORT. STORE AND TRANSPORT GIRDERS IN LEVEL POSITIONS.

INSPECTION, LOADING, AND SECURING FOR SHIPMENT: REFER TO SPECIFICATIONS.

LIFTING LOOPS:

THE AREA AROUND LIFTING LOOPS SHALL NOT BE RECESSED. LIFTING LOOPS TO BE REMOVED IN FIELD FLUSH WITH CONCRETE SURFACE.

IF LIFTED WITH SLINGS INSTEAD OF LIFTING LOOPS, SLINGS MUST NOT BE PLACED MORE THAN 3'-0" FROM ENDS OF GIRDERS.

FABRICATOR IS RESPONSIBLE FOR DEVELOPING LIFTING LOOP ANCHORAGE DETAIL TO PROVIDE SAFETY FACTOR OF 4 ON WORKING LOAD. DETAIL SHALL BE PROOF-TESTED WITH TEST RESULTS KEPT ON FILE BY FABRICATOR AND AVAILABLE FOR INSPECTION BY THE ENGINEER.

WEIGHTS (ONE GIRDER)

NOMINAL GIRDER LENGTH (L)	NOMINAL WEIGHT *		MAX LIFTING WEIGHT **	
	WEIGHT (WITH CURB & WALK)		WEIGHT (WITH CURB & WALK)	
	LB.	TON	LB.	TON
49'	98,230	49.1	103,455	51.8

✳ Computed weights using nominal dimensions. For planning purposes only. Fabricator to determine actual lifting weight.
If scale weight not available, use maximum weights.

✳✳ Computed weights using maximum dimensions per allowable tolerances. Use for lifting weight if scale weight is not available.

REINFORCING SCHEDULE

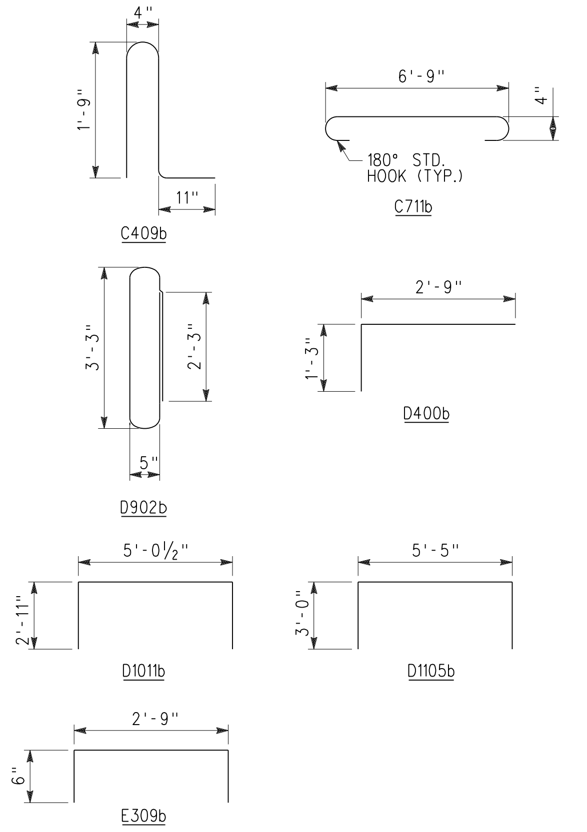
(QUANTITY PER ONE 42" DOUBLE CELL BOX GIRDER)

REQ'D	MARK	SIZE	LENGTH	SHAPE
116	C409b	#4	4'-9"	⎍
98	C711b	#4	7'-11"	⊂⊃
36	C4806	#4	48'-6"	—
116	D400b	#5	4'-0"	¬
98	D609	#5	6'-9"	—
80	D902b	#5	9'-2"	⬭
16	D1011b	#5	10'-11"	⊓
160	D1105b	#5	11'-5"	⊓
2	E309b	#6	3'-9"	⊓
18	G4806	#8	48'-6"	—

EST. WT. OF REINFORCING STEEL = 8,425 LB.

BENDING DIAGRAM

(DIMENSIONS ARE OUT TO OUT)



NOTE:

BAR DESIGNATIONS CONSIST OF BAR SIZE & LENGTH FOLLOWED BY THE LETTER "b" IF BENT. BAR SIZES ARE REPRESENTED BY THE LETTERS A THROUGH L CORRESPONDING TO BAR SIZE #2 THROUGH #18. BAR LENGTHS ARE GIVEN IN FEET AND INCHES; THE LAST TWO DIGITS ARE INCHES.

REV.	DATE	BY	SUB.	APP.

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MUHAMMAD SARWAR
No. C68399
EXP: 09-30-25
CIVIL

VENTURA COUNTY
TRANSPORTATION
COMMISSION

RAILPROS

SUBMITTED: ______________
JULINA R. CORONA, P.E.
PROJECT MANAGER

SESPE CREEK BRIDGE OVERFLOW
SANTA PAULA BRANCH LINE, FILLMORE, CA

GIRDER DETAILS NO. 2

CONTRACT NO.
DRAWING NO. S-013
REVISION
SHEET NO. 22 OF 29
SCALE AS SHOWN

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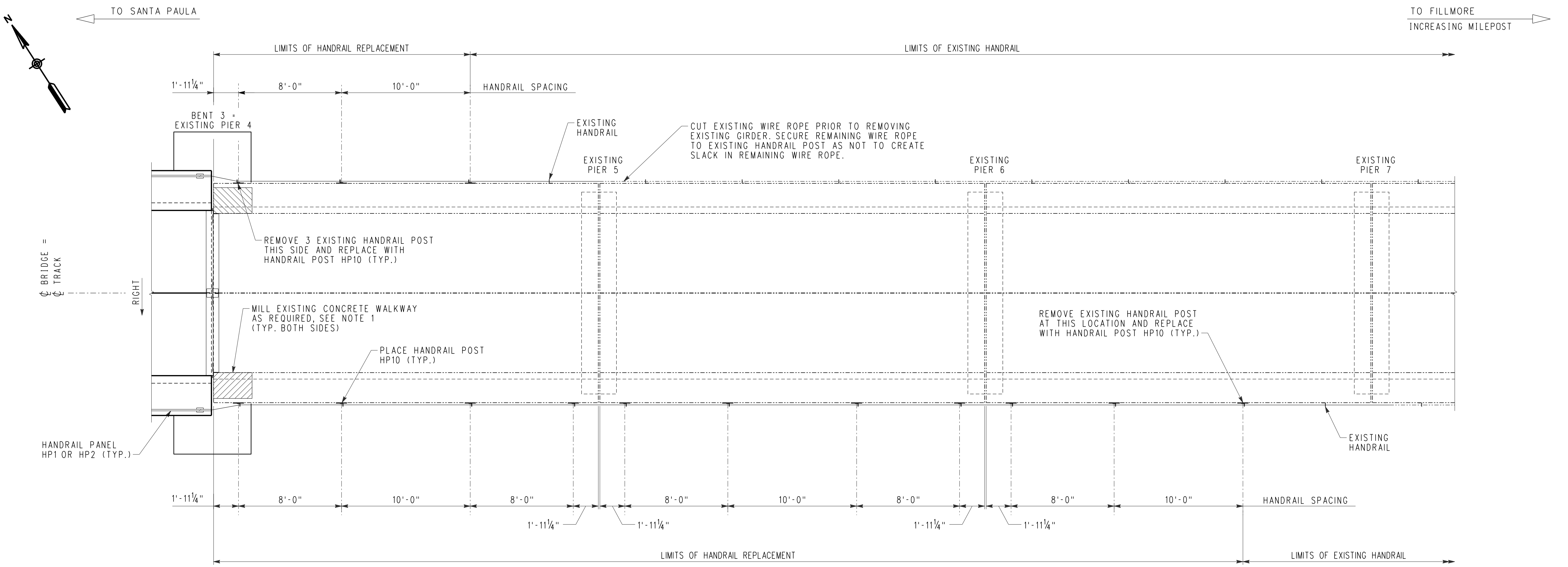
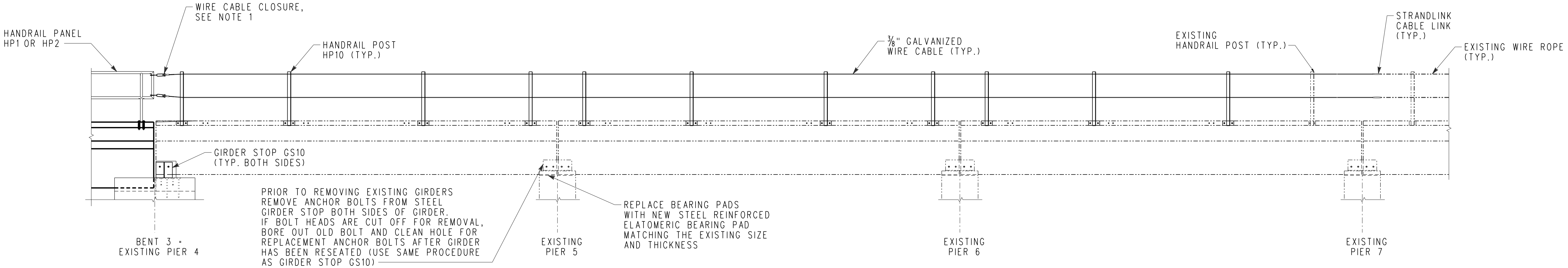


HANDRAIL REPLACEMENT PLAN

SCALE: ¼" = 1'-0"



HANDRAIL REPLACEMENT ELEVATION

SCALE: ¼" = 1'-0"

NOTE:

1. FOR INSTALLATION DETAILS, SEE "MISCELLANEOUS DETAILS NO.1" SHEET.

12/21/2023 8:31:40 AM USER = gerry.estepa
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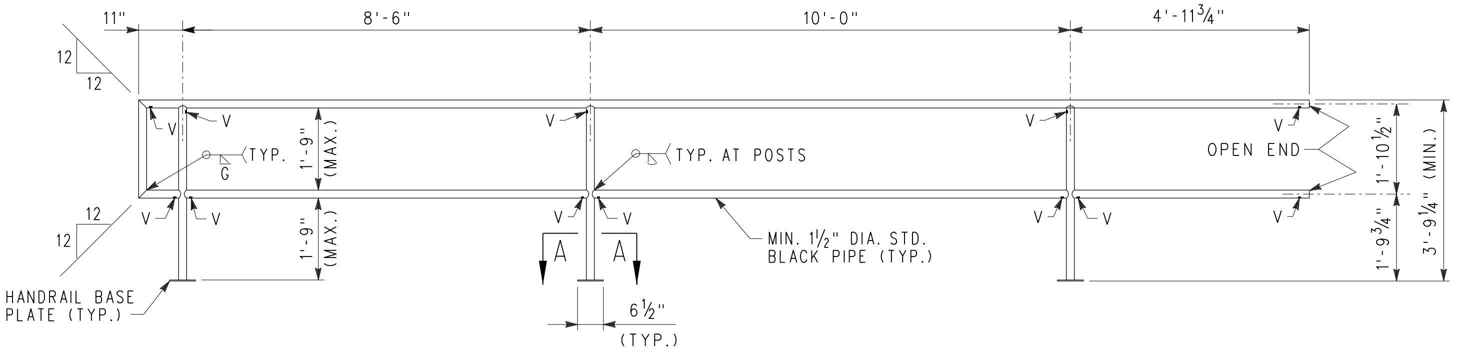
SESPE CREEK BRIDGE OVERFLOW
SANTA PAULA BRANCH LINE, FILLMORE, CA

HANDRAIL REPLACEMENT PLAN

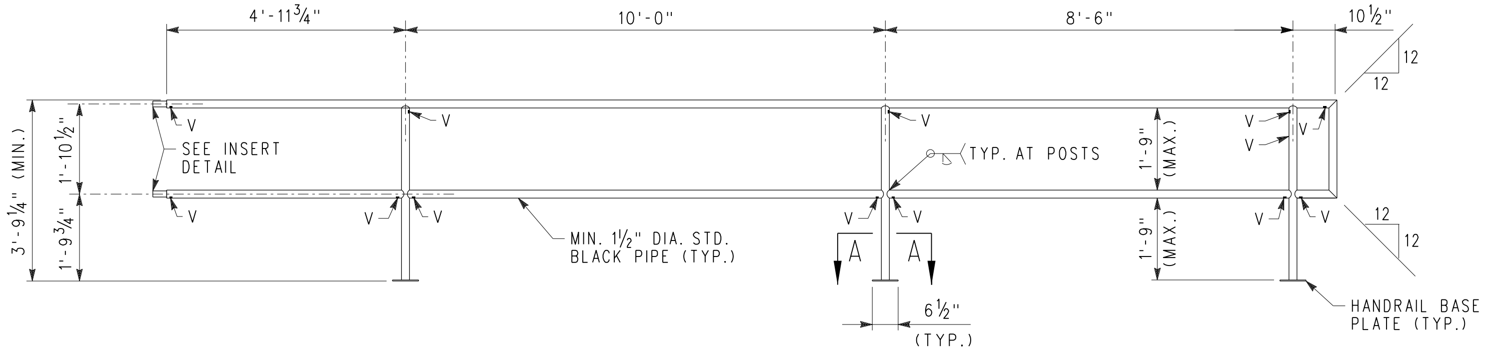
CONTRACT NO.
DRAWING NO. S-014
REVISION
SHEET NO. 23 OF 29
SCALE AS SHOWN



HANDRAIL PANEL HP1

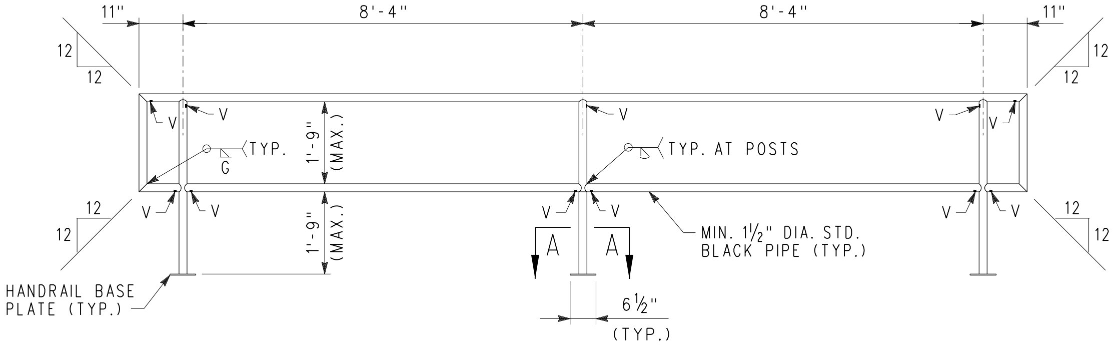
SCALE: ½" = 1'-0"
GALVANIZE AFTER FABRICATION

NOTE:
V = ⅜"ø DRILLED VENT HOLE 1"
FROM JOINT.



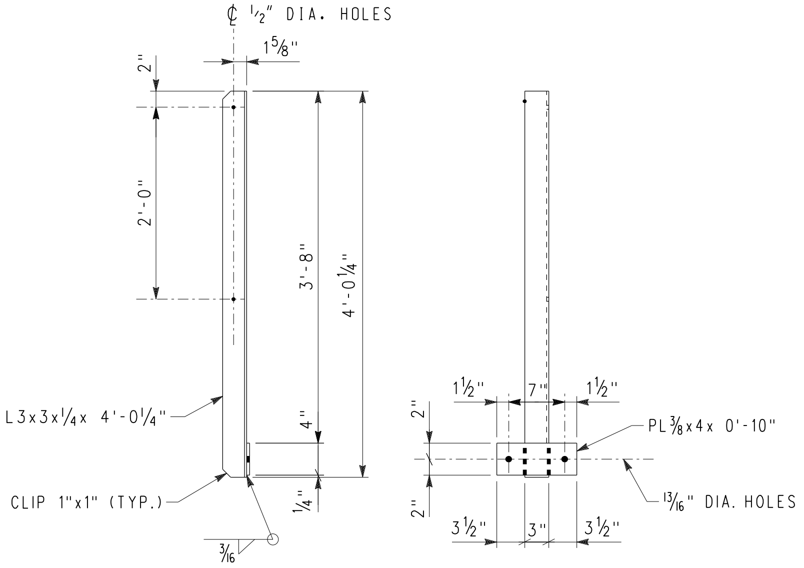
HANDRAIL PANEL HP2

SCALE: ½" = 1'-0"
GALVANIZE AFTER FABRICATION.



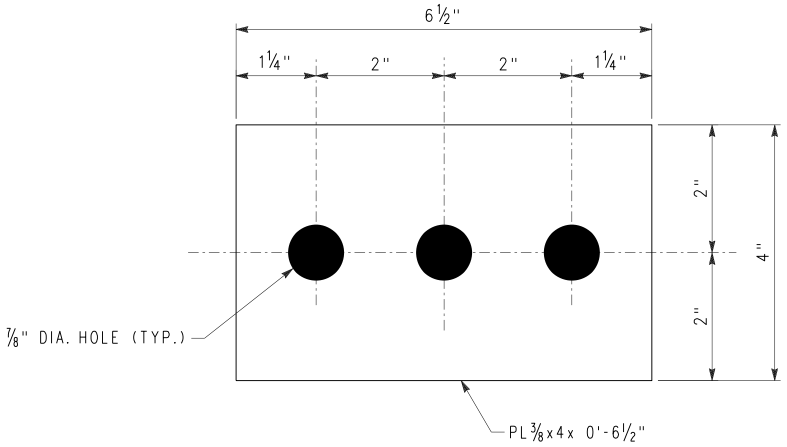
WINGWALL HANDRAIL PANEL

SCALE: ½" = 1'-0"
GALVANIZE AFTER FABRICATION.



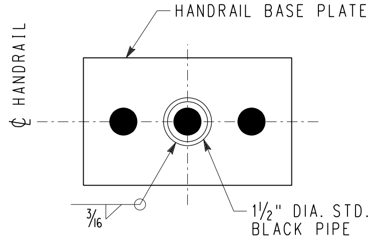
HANDRAIL POST HP10

SCALE: 1" = 1'-0"
GALVANIZE AFTER FABRICATION.

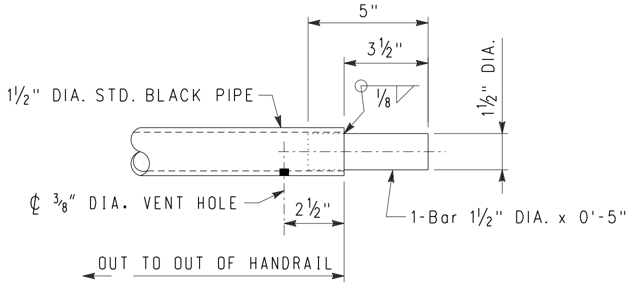


HANDRAIL BASE PLATE DETAIL

WEIGHT = 2.5 LB.



SECTION A-A



INSERT DETAIL

NOTES:

SHOP NOTES:

FABRICATION AND ARC WELDING OF STRUCTURAL STEEL AND HANDRAIL PANELS SHALL BE IN ACCORDANCE WITH CHAPTER 15, PART 3 OF THE CURRENT A.R.E.M.A. MANUAL FOR RAILWAY ENGINEERING. MIG WELDING SHALL BE USED ON HANDRAIL PANELS. OPEN HOLES: AS NOTED. SHOP PAINT: NONE.

GALVANIZING:

HANDRAIL PANELS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH THE CURRENT A.S.T.M. DESIGNATION: A123.

AFTER GALVANIZING ALL ELEMENTS SHALL BE FREE OF FINS, ABRASIONS, ROUGH OR SHARP EDGES AND OTHER SURFACE DEFECTS.

FINAL DESIGN (100%)
NOT FOR CONSTRUCTION

REV.	DATE	BY / SUB.	APP.

DESIGNED BY K. THOMSEN
DRAWN BY G. SMITH
CHECKED BY H. YANG
APPROVED BY M. SARWAR
DATE 12-25-2023

MUHAMMAD SARWAR
No. C68399
EXP: 09-30-25

VENTURA COUNTY
TRANSPORTATION
COMMISSION

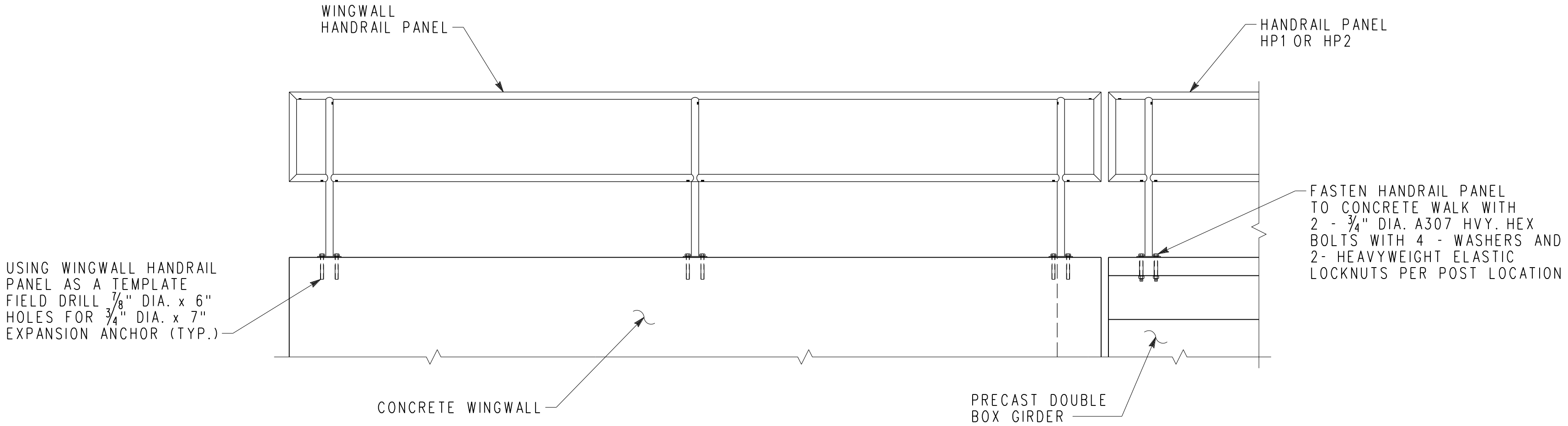
RAILPROS

SUBMITTED: JULINA R. CORONA, P.E.
PROJECT MANAGER

SESPE CREEK BRIDGE OVERFLOW
SANTA PAULA BRANCH LINE, FILLMORE, CA

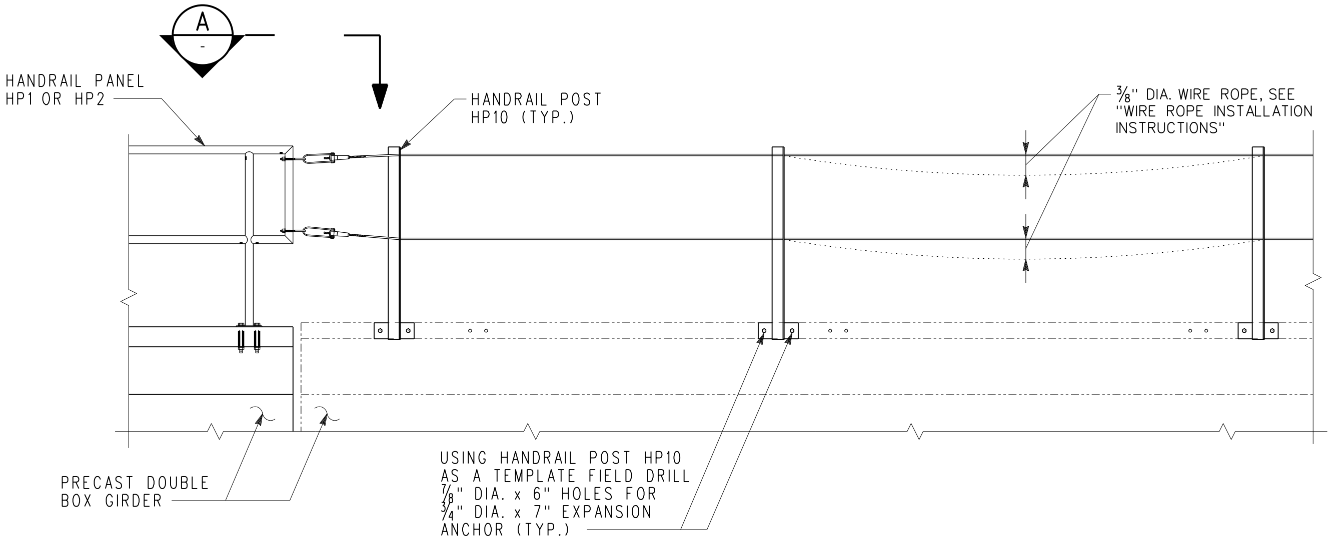
HANDRAIL DETAILS

CONTRACT NO.
DRAWING NO. S-015
REVISION
SHEET NO. 24 OF 29
SCALE AS SHOWN



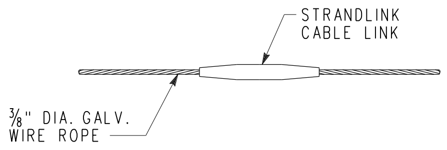
HANDRAIL PANEL INSTALLATION DETAIL

SCALE: ½" = 1'-0"



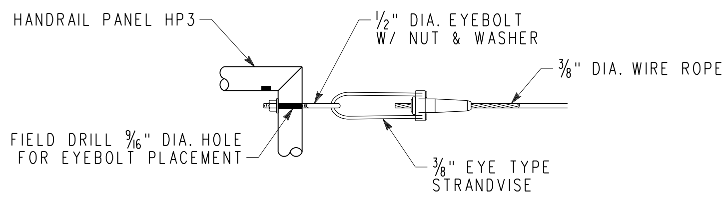
HANDRAIL POST INSTALLATION DETAIL

SCALE: ½" = 1'-0"



WIRE ROPE SPLICE DETAIL

SCALE: NONE

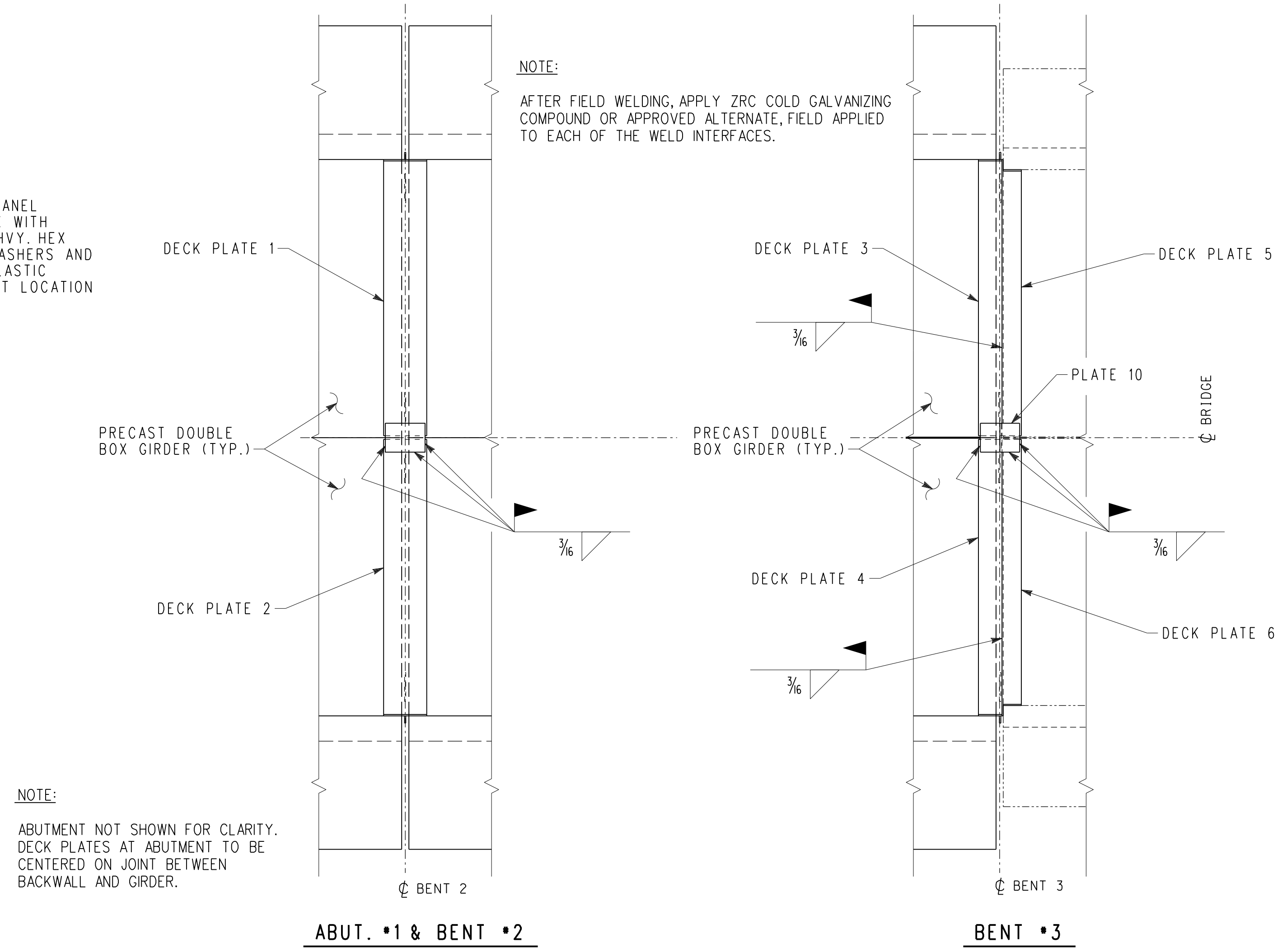


VIEW A

SCALE: 1 ½" = 1'-0"

WIRE ROPE INSTALLATION INSTRUCTIONS:

1. THREAD WIRE ROPE THROUGH ALL CLIPS AND BARREL ANCHORS AND SEAT RETAINING WEDGES ON ONE END HANDRAIL POST.
2. STRETCH WIRE ROPE, HANG A MINIMUM OF 10 LB. ON CABLE BETWEEN TWO POSTS AND REMOVE ALL SAG TO A MAXIMUM OF 2 INCHES.
3. SEAT RETAINING WEDGES AT REMAINING END HANDRAIL POST.
4. REMOVE WEIGHTS.
5. TIGHTEN CLIPS AT INTERMEDIATE POSTS.
6. CUT & REMOVE EXCESS WIRE ROPE, COAT CUT PORTIONS OF WIRE ROPE WITH COLD GALVANIZING COMPOUND.



NOTE:

AFTER FIELD WELDING, APPLY ZRC COLD GALVANIZING COMPOUND OR APPROVED ALTERNATE, FIELD APPLIED TO EACH OF THE WELD INTERFACES.

NOTE:

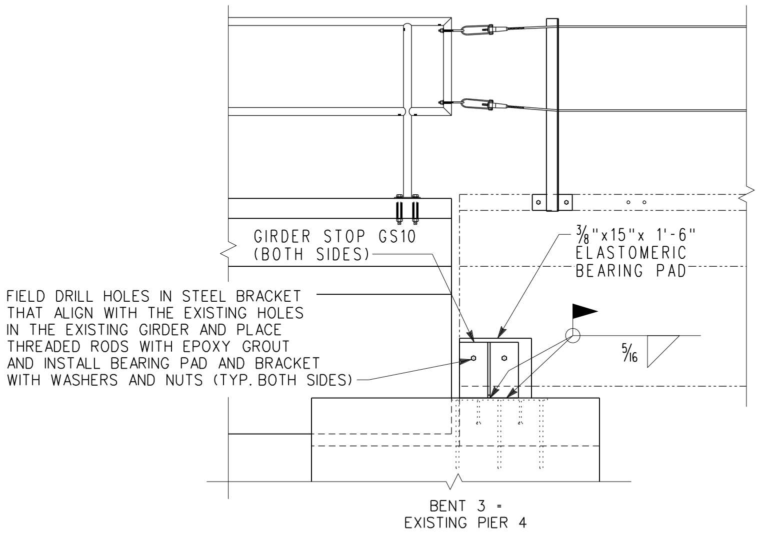
ABUTMENT NOT SHOWN FOR CLARITY. DECK PLATES AT ABUTMENT TO BE CENTERED ON JOINT BETWEEN BACKWALL AND GIRDER.

ABUT. #1 & BENT #2

BENT #3

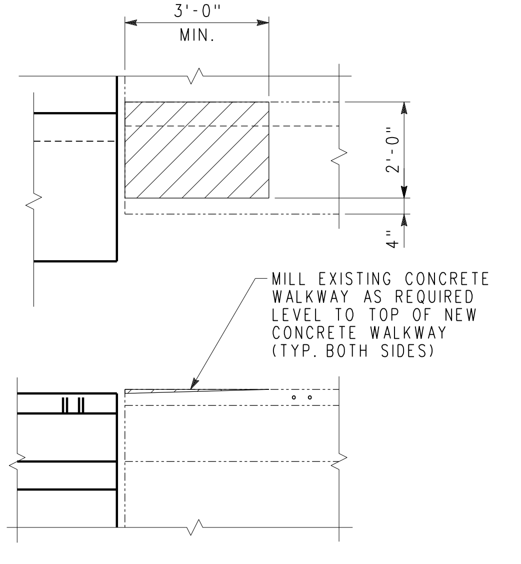
DECK PLATE WELD DETAIL

SCALE: ½" = 1'-0"



GIRDER STOP PLACEMENT DETAIL

SCALE: ½" = 1'-0"



CONCRETE WALKWAY MILLING

SCALE: ½" = 1'-0"

12/21/2023 8:31:49 AM USER = gerry.estepa
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REV.	DATE	BY	SUB.	APP.

FINAL DESIGN (100%)
NOT FOR CONSTRUCTION

INFORMATION CONFIDENTIAL: All plans, drawings, specifications, and or information furnished herewith shall remain the property of the Ventura County Transportation Commission and shall be held confidential; and shall not be used for any purpose not provided for in agreements with the Ventura Country Transportation Commission.

DESIGNED BY K. THOMSEN
DRAWN BY G. SMITH
CHECKED BY H. YANG
APPROVED BY M. SARWAR
DATE 12-25-2023

No. C68399
EXP: 09-30-25

VENTURA COUNTY
TRANSPORTATION
COMMISSION

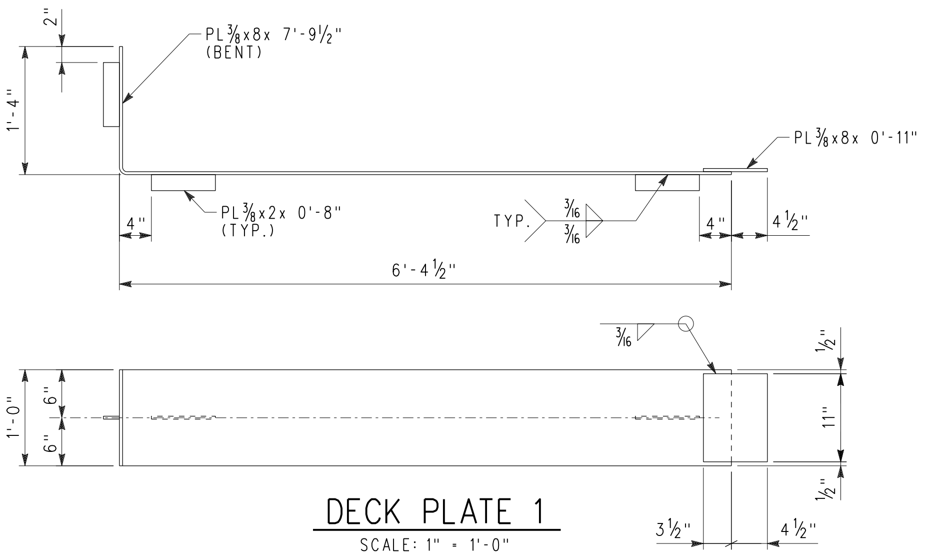
RAILPROS

SUBMITTED: ____________
JULINA R. CORONA, P.E.
PROJECT MANAGER

SESPE CREEK BRIDGE OVERFLOW
SANTA PAULA BRANCH LINE, FILLMORE, CA

MISCELLANEOUS DETAILS NO. 1

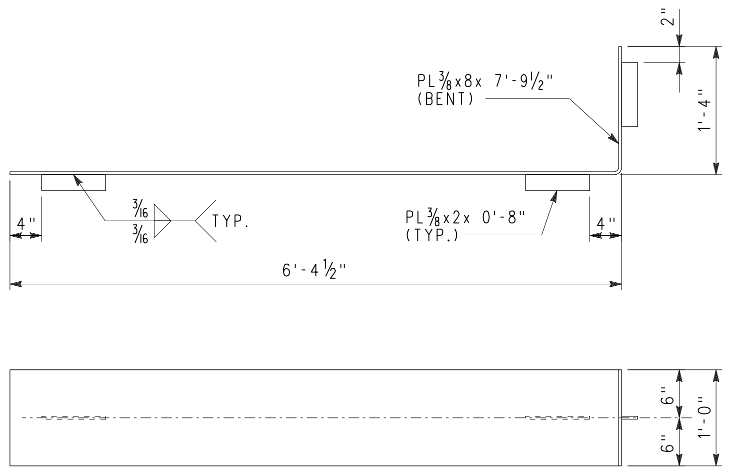
CONTRACT NO.
DRAWING NO. S-016
REVISION
SHEET NO. 25 OF 29
SCALE AS SHOWN



DECK PLATE 1

SCALE: 1" = 1'-0"

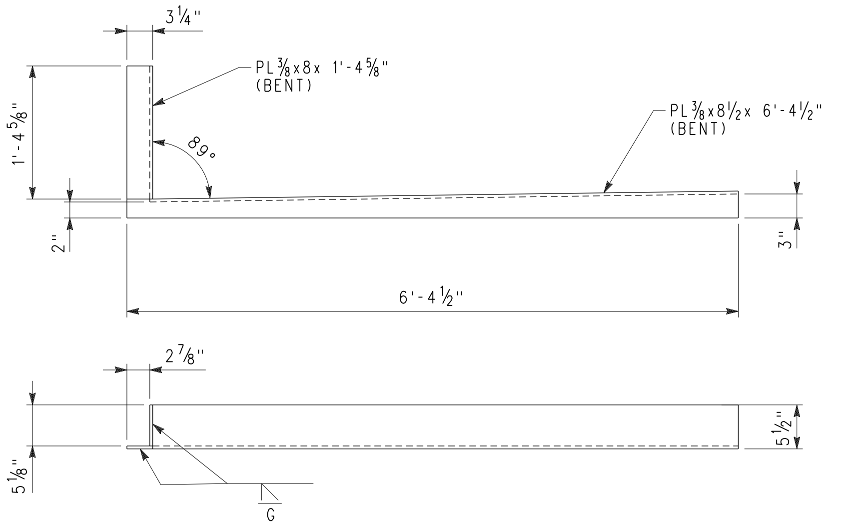
GALVANIZE AFTER FABRICATION
WEIGHT = 134 LB.



DECK PLATE 2

SCALE: 1" = 1'-0"

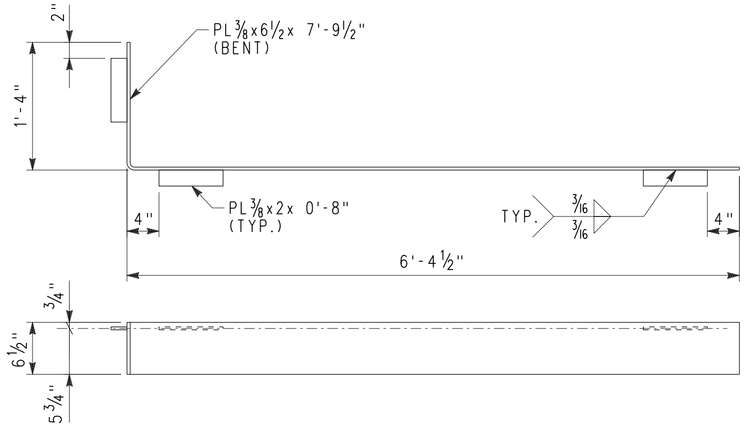
GALVANIZE AFTER FABRICATION
WEIGHT = 134 LB.



DECK PLATE 5

SCALE: 1" = 1'-0"

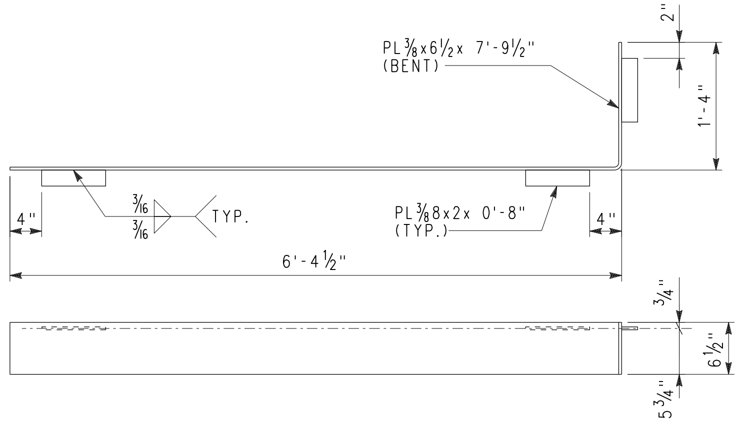
GALVANIZE AFTER FABRICATION
WEIGHT = 84 LB.



DECK PLATE 3

SCALE: 1" = 1'-0"

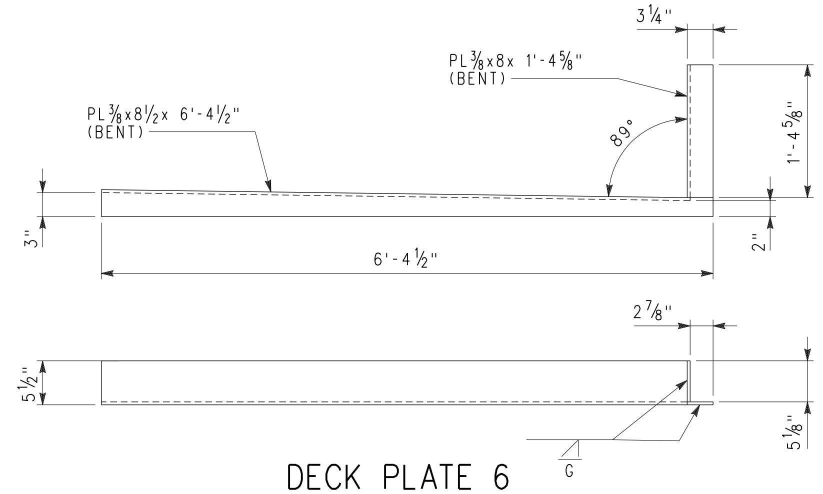
GALVANIZE AFTER FABRICATION
WEIGHT = 70 LB.



DECK PLATE 4

SCALE: 1" = 1'-0"

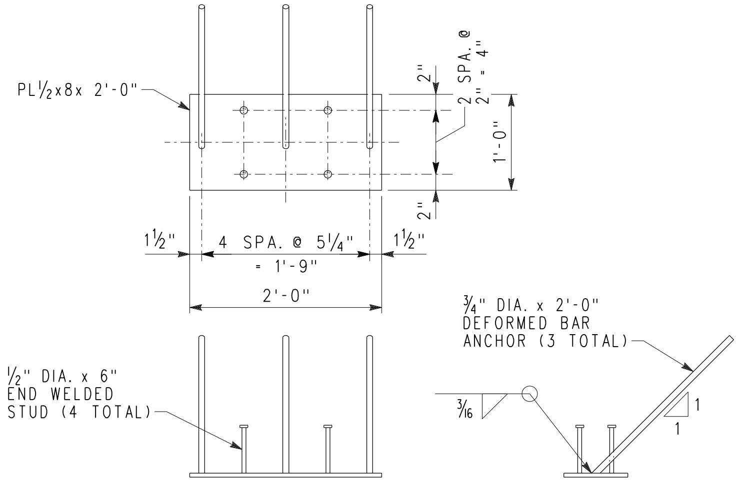
GALVANIZE AFTER FABRICATION
WEIGHT = 70 LB.



DECK PLATE 6

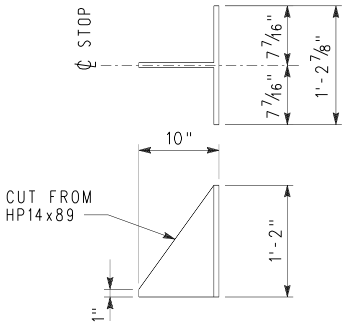
SCALE: 1" = 1'-0"

GALVANIZE AFTER FABRICATION
WEIGHT = 84 LB.



EMBED PLATE ½x8x 2'-0"

SCALE: 1" = 1'-0"



GIRDER STOP GS10

SCALE: 1" = 1'-0"

GALVANIZE AFTER FABRICATION
WEIGHT = 49 LB.

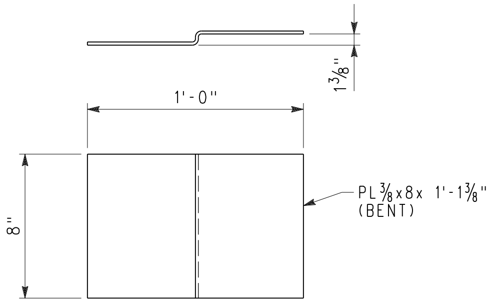


PLATE 10

SCALE: 3" = 1'-0"

GALVANIZE AFTER FABRICATION
WEIGHT = 12 LB.

RESERVED
FOR
GRAPHIC SCALE,
KEY PLAN OR LEGEND

RESERVED
FOR
SCRRA ADMIN USE

12/21/2023 8:31:53 AM USER = gerry.estepa
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FINAL DESIGN (100%)
NOT FOR CONSTRUCTION

REV.	DATE	BY/SUB.	APP.

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DESIGNED BY K. THOMSEN
DRAWN BY G. SMITH
CHECKED BY H. YANG
APPROVED BY M. SARWAR
DATE 12-25-2023

MUHAMMAD SARWAR
No. C68399
EXP: 09-30-25

VENTURA COUNTY
TRANSPORTATION
COMMISSION

SUBMITTED: ____________________
JULINA R. CORONA, P.E.
PROJECT MANAGER

SESPE CREEK BRIDGE OVERFLOW
SANTA PAULA BRANCH LINE, FILLMORE, CA

MISCELLANEOUS DETAILS NO. 2

CONTRACT NO.
DRAWING NO. S-017
REVISION
SHEET NO. 26 OF 29
SCALE AS SHOWN

REFERENCE: CALTRANS SOIL & ROCK LOGGING, CLASSIFICATION, AND PRESENTATION MANUAL (2010)

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
07	VENTURA	--	423.18	3	3

Christopher M. Diaz 12/28/23
REGISTERED GEOTECHNICAL ENGINEER DATE

REGISTERED PROFESSIONAL ENGINEER
CHRISTOPER M. DIAZ
No. 2992
EXP 6/30/25
GEOTECHNICAL
STATE OF CALIFORNIA

PLANS APPROVAL DATE

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RAILPROS
250 COMMERCE STE 200
IRVINE, CALIFORNIA 92602

DIAZ YOURMAN & ASSOC.
1616 E 17TH STREET
SANTA ANA, CALIFORNIA 92705

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

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.

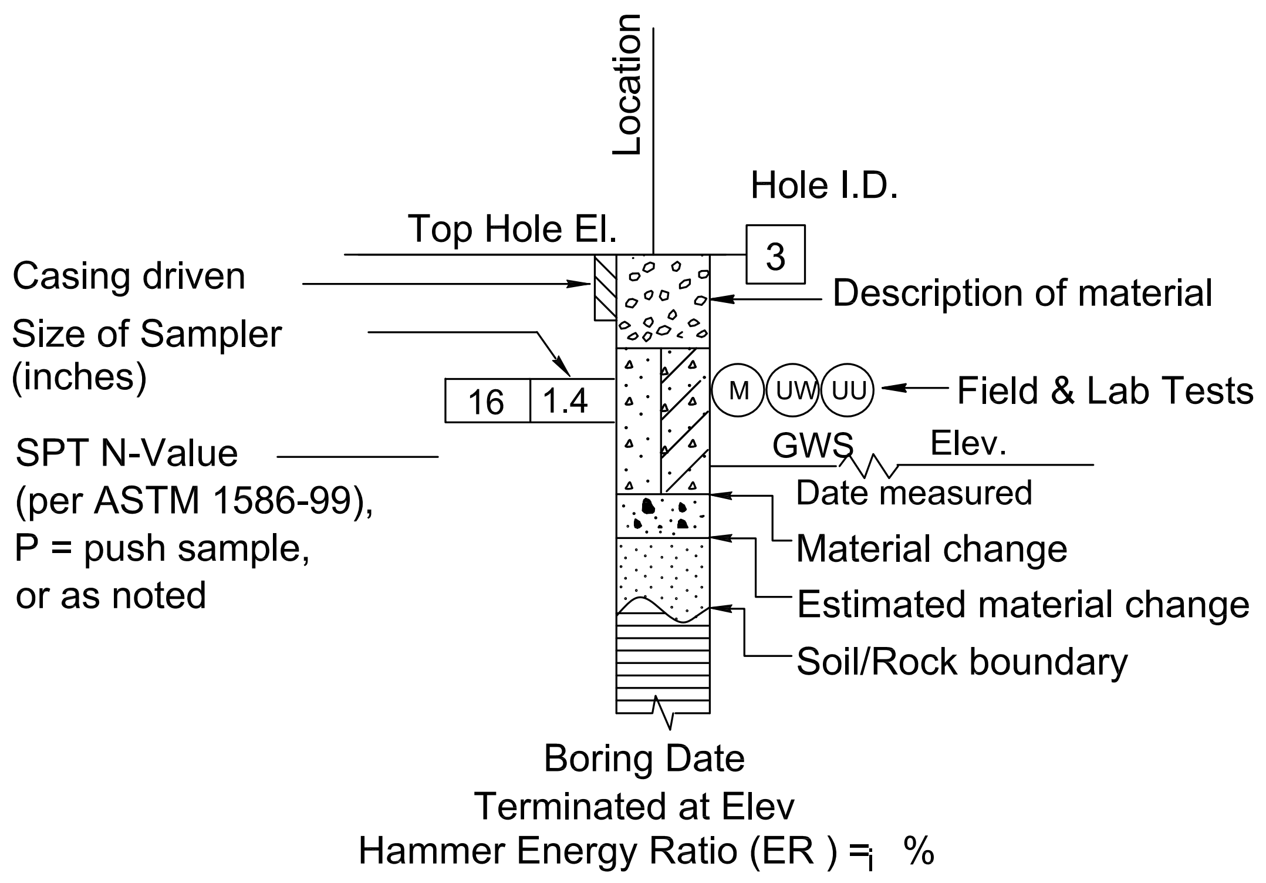
BOREHOLE IDENTIFICATION

Symbol	Hole Type	Description
Size	A	Auger Boring (hollow or solid stem bucket)
Size	R RW RC P	Rotary drilled boring (conventional) Rotary drilled with self-casing wire-line Rotary core with continuously-sampled, self-casing wire-line Rotary percussion boring (air)
Size	R	Rotary drilled diamond core
Size	HD HA	Hand driven (1-inch soil tube) Hand Auger
◎	D	Dynamic Cone Penetration Boring
▲	CPT	Cone Penetration Test (ASTM D 5778)
☐	O	Other (note on LOTB)

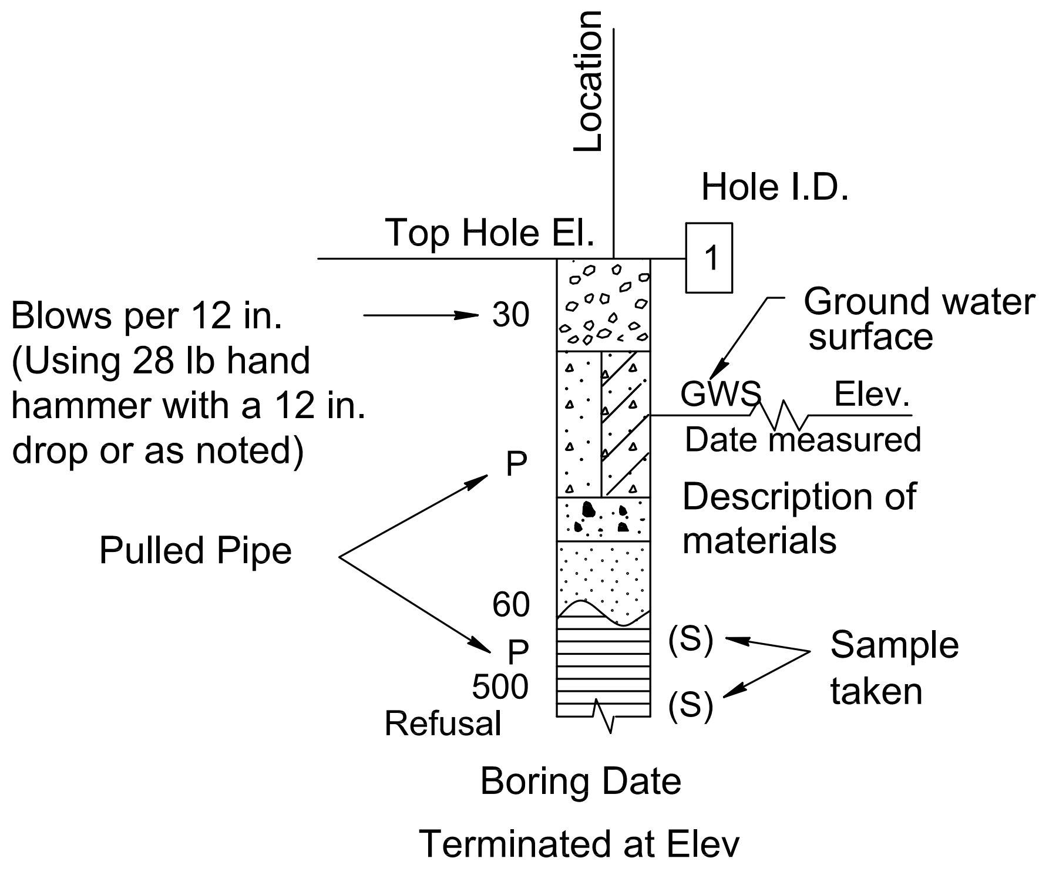
Note: Size in inches.

CONSISTENCY OF COHESIVE SOILS

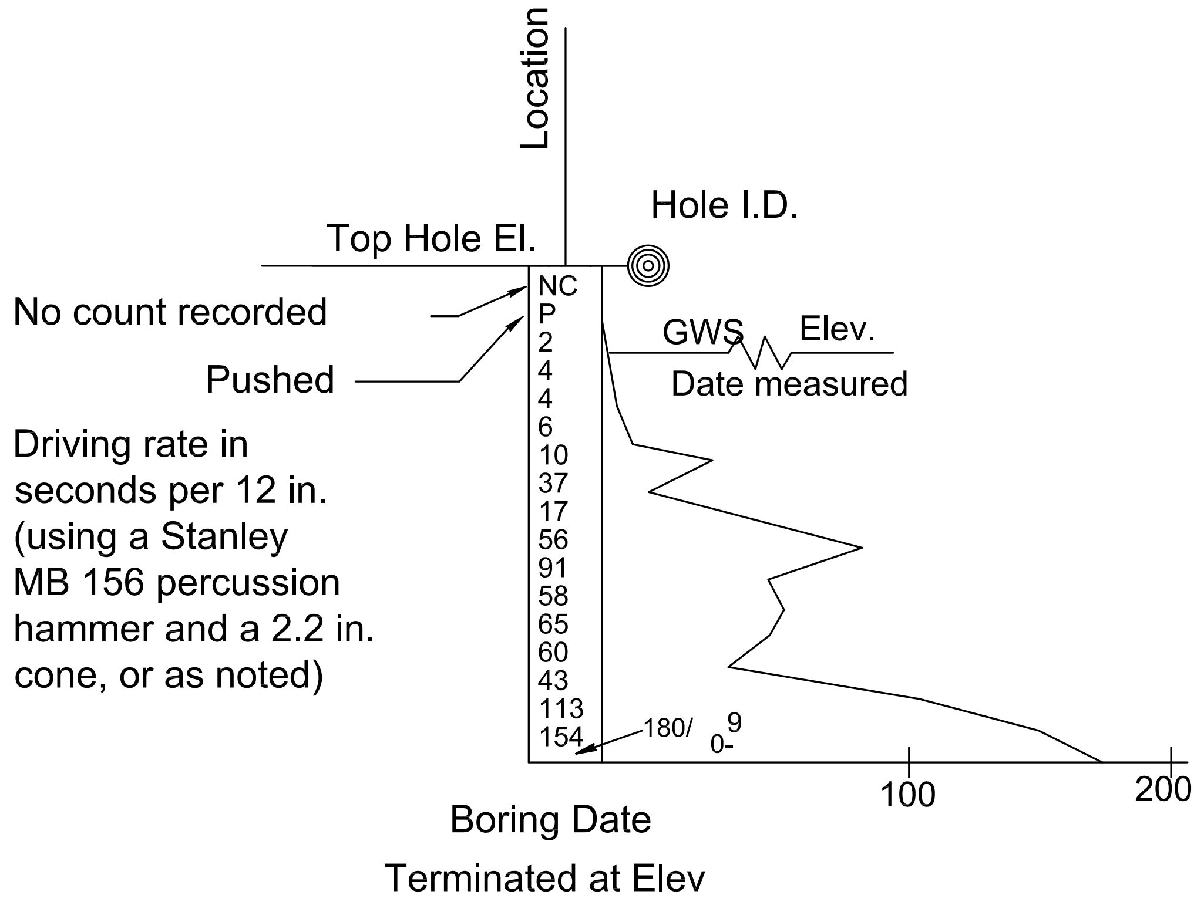
Description	Shear Strength (tsf)	Pocket Penetrometer Measurement, PP, (tsf)	Torvane Measurement, TV, (tsf)	Vane Shear Measurement, VS, (tsf)
Very Soft	Less than 0.12	Less than 0.25	Less than 0.12	Less than 0.12
Soft	0.12 - 0.25	0.25 - 0.5	0.12 - 0.25	0.12 - 0.25
Medium Stiff	0.25 - 0.5	0.5 - 1	0.25 - 0.5	0.25 - 0.5
Stiff	0.5 - 1	1 - 2	0.5 - 1	0.5 - 1
Very Stiff	1 - 2	2 - 4	1 - 2	1 - 2
Hard	Greater than 2	Greater than 4	Greater than 2	Greater than 2



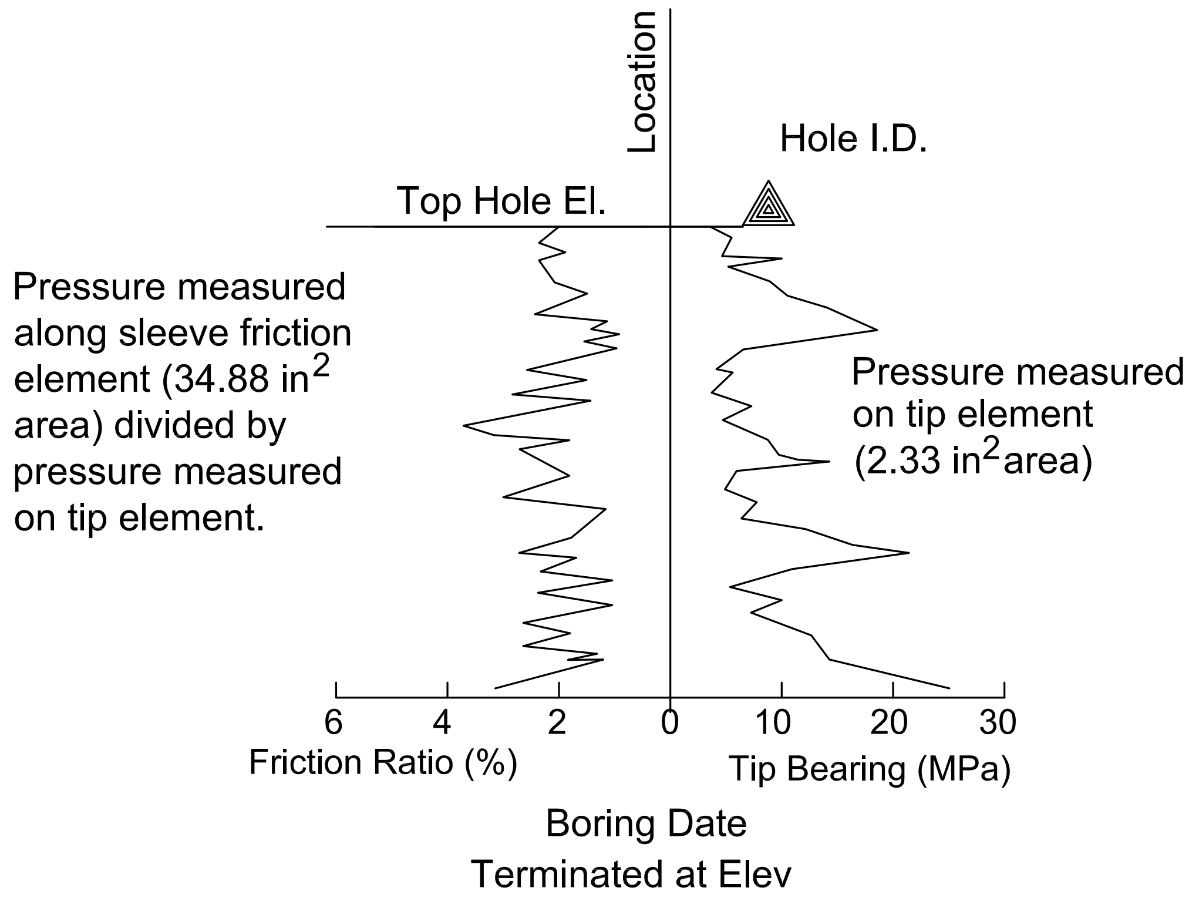
ROTARY BORING



HAND BORING



DYNAMIC CONE PENETRATION BORING



CONE PENETRATION TEST (CPT) BORING

CAMERA READY

REV. DATE BY SUB. APP.

INFORMATION CONFIDENTIAL: All plans, drawings, specifications, and or information furnished herewith shall remain the property of the the Southern California Regional Rail Authority and shall be held confidential; and shall not be used for any purpose not provided for in agreements with the Southern California Regional Rail Authority.

DESIGNED BY A. SCHOLDER
DRAWN BY A. SCHOLDER
CHECKED BY T. REINERT
APPROVED BY C. DIAZ
DATE 12-28-2023

VENTURA COUNTY
TRANSPORTATION
COMMISSION

SUBMITTED: ____________
JULINA R. CORONA, P.E.
PROJECT MANAGER

SESPE CREEK BRIDGE OVERFLOW
SANTA PAULA BRANCH LINE, FILLMORE, CA

LOG OF TEST BORINGS

CONTRACT NO.
DRAWING NO. GE-001
REVISION
SHEET NO. 27 OF 29
SCALE AS SHOWN

$USER$
$TIME$
$DATE$
$FILE$
$PENTBL$
$PLTDRV$

REFERENCE: CALTRANS SOIL & ROCK LOGGING, CLASSIFICATION, AND PRESENTATION MANUAL (2010)

GROUP SYMBOLS AND NAMES

Graphic/Symbol	Group Names
GW	Well-graded GRAVEL Well-graded GRAVEL with SAND
GP	Poorly-graded GRAVEL Poorly-graded GRAVEL with SAND
GW-GM	Well-graded GRAVEL with SILT Well-graded GRAVEL with SILT and SAND
GW-GC	Well-graded GRAVEL with CLAY (or SILTY CLAY) Well-graded GRAVEL with CLAY and SAND (or SILTY CLAY and SAND)
GP-GM	Poorly-graded GRAVEL with SILT Poorly-graded GRAVEL with SILT and SAND
GP-GC	Poorly-graded GRAVEL with CLAY (or SILTY CLAY) Poorly-graded GRAVEL with CLAY and SAND (or SILTY CLAY and SAND)
GM	SILTY GRAVEL SILTY GRAVEL with SAND
GC	CLAYEY GRAVEL CLAYEY GRAVEL with SAND
GC-GM	SILTY, CLAYEY GRAVEL SILTY, CLAYEY GRAVEL with SAND
SW	Well-graded SAND Well-graded SAND with GRAVEL
SP	Poorly-graded SAND Poorly-graded SAND with GRAVEL
SW-SM	Well-graded SAND with SILT Well-graded SAND with SILT and GRAVEL
SW-SC	Well-graded SAND with CLAY (or SILTY CLAY) Well-graded SAND with CLAY and GRAVEL (or SILTY CLAY and GRAVEL)
SP-SM	Poorly-graded SAND with SILT Poorly-graded SAND with SILT and GRAVEL
SP-SC	Poorly-graded SAND with CLAY (or SILTY CLAY) Poorly-graded SAND with CLAY and GRAVEL (or SILTY CLAY and GRAVEL)
SM	SILTY SAND SILTY SAND with GRAVEL
SC	CLAYEY SAND CLAYEY SAND with GRAVEL
SC-SM	SILTY, CLAYEY SAND SILTY, CLAYEY SAND with GRAVEL
PT	PEAT
	COBBLES COBBLES and BOULDERS BOULDERS

Graphic/Symbol	Group Names
CL	Lean CLAY Lean CLAY with SAND Lean CLAY with GRAVEL SANDY lean CLAY SANDY lean CLAY with GRAVEL GRAVELLY lean CLAY GRAVELLY lean CLAY with SAND
CL-ML	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
ML	SILT SILT with SAND SILT with GRAVEL SANDY SILT SANDY SILT with GRAVEL GRAVELLY SILT GRAVELLY SILT with SAND
OL	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
OL	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
CH	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
MH	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
OH	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
OH	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
OL/OH	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 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
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)
UU	Unconfined Compression-Soil (ASTM D 2166) Unconfined Compression-Rock (ASTM D 2938)
UU	Unconsolidated Undrained Triaxial (ASTM D 2850)
UW	Unit Weight (ASTM D 4767)

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
07	VENTURA	--	423.18	3	3

Christopher M. Diaz 12/28/23
REGISTERED GEOTECHNICAL ENGINEER DATE

REGISTERED PROFESSIONAL ENGINEER
CHRISTOPER M. DIAZ
No. 2992
EXP 6/30/25
GEOTECHNICAL
STATE OF CALIFORNIA

PLANS APPROVAL DATE

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RAILPROS
250 COMMERCE STE 200
IRVINE, CALIFORNIA 92602

DIAZ YOURMAN & ASSOC.
1616 E 17TH STREET
SANTA ANA, CALIFORNIA 92705

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

APPARENT DENSITY OF COHESIONLESS SOILS

Description	SPT N_{60} (Blows / 12 in.)
Very Loose	0 - 5
Loose	5 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	Greater than 50

MOISTURE

Description	Criteria
Dry	No discernable moisture
Moist	Moisture present, but no free water
Wet	Visible free water

PERCENT OR PROPORTION OF SOILS

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

PARTICLE SIZE

Description		Size (in.)
Boulder		Greater than 12
Cobble		3 - 12
Gravel	Coarse	3/4 - 3
	Fine	1/5 - 3/4
Sand	Coarse	1/16 - 1/5
	Medium	1/64 - 1/16
	Fine	1/300 - 1/64
Silt and Clay		Less than 1/300

$USER$
$TIME$
$DATE$
$FILEL$
$PENTBLL$
$PLTDRVL$

CAMERA READY

REV.	DATE		BY / SUB.	APP.

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DESIGNED BY A. SCHOLDER
DRAWN BY A. SCHOLDER
CHECKED BY T. REINERT
APPROVED BY C. DIAZ
DATE 12-28-2023

VENTURA COUNTY
TRANSPORTATION
COMMISSION

SUBMITTED: ____________
JULINA R. CORONA, P.E.
PROJECT MANAGER

SESPE CREEK BRIDGE OVERFLOW
SANTA PAULA BRANCH LINE, FILLMORE, CA

SOIL LEGEND 1 OF 2 - LOG OF TEST BORINGS

CONTRACT NO.
DRAWING NO. GE-002
REVISION
SHEET NO. 28 OF 29
SCALE AS SHOWN

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
07	VENTURA	--	423.18	3	3

Christopher M. Diaz
REGISTERED GEOTECHNICAL ENGINEER

12/28/23
DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
CHRISTOPER M. DIAZ
No. 2992
EXP 6/30/25
GEOTECHNICAL
STATE OF CALIFORNIA

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RAILPROS
250 COMMERCE STE 200
IRVINE, CALIFORNIA 92602

DIAZ YOURMAN & ASSOC.
1616 E 17TH STREET
SANTA ANA, CALIFORNIA 92705

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

DYB23-02

ASPHALT black; - 2 inches.

Poorly graded SAND with SILT (SP-SM); brown; moist; coarse to fine GRAVEL; coarse to fine SAND; cobbles; micaceous.

Very dense.

Difficult drilling.

SILTY, CLAYEY SAND with GRAVEL (SC-SM); dense; reddish brown; moist; coarse to fine SAND; trace coarse to fine GRAVEL; micaceous; difficult drilling.

Easy drilling.

SILTY SAND with GRAVEL (SM); medium dense; reddish brown; moist; coarse to fine GRAVEL; coarse to fine SAND; micaceous.

Very dense; difficult drilling.

No recovery.

CLAYEY SAND with GRAVEL (SC); very dense; brown; moist; coarse to fine GRAVEL; coarse to fine SAND; micaceous.

Wet.

SANDY lean CLAY (CL); stiff; light brown; wet; trace coarse to fine GRAVEL; coarse to fine SAND; micaceous.

SILTY SAND (SM); hard; reddish brown; wet; coarse to fine SAND; trace coarse to fine GRAVEL; micaceous.

Poorly graded GRAVEL with CLAY and SAND (GP-GC); very dense; brown; wet; coarse to fine GRAVEL; coarse to fine SAND; micaceous.

CLAYEY GRAVEL with SAND (GC); very dense; brown; wet; coarse to fine GRAVEL; coarse to fine SAND; micaceous.

Grades same as above.

Olive brown.

Rig chattering at 80 to 82 feet.

SILTY CLAYEY SAND WITH GRAVEL (SC-SM) very dense; very dense; brown; wet; coarse GRAVEL; coarse to fine SAND.

Poorly graded GRAVEL with SILT and SAND (GP-GM); very dense; very dense; olive brown; wet; coarse to fine GRAVEL; coarse to fine SAND.

Loss of drilling fluid; possible cobbles.

DYB23-01

Poorly graded GRAVEL with SILT and SAND (GP-GM); loose; light brown; moist; coarse to fine GRAVEL; coarse to fine SAND; loose when hand augering.

Poorly graded SAND with SILT (SP-SM); dense; olive brown; wet; coarse to fine SAND; trace coarse to fine GRAVEL; micaceous.

Poorly graded SAND with GRAVEL (GP-GM); very dense; olive brown; wet; coarse to fine GRAVEL; coarse to fine SAND; trace lean CLAY nodules; trace cobbles; micaceous.

CLAYEY SAND with GRAVEL (SC); very dense; brown; wet; coarse to fine GRAVEL; coarse to fine SAND; trace CLAY nodules; micaceous.

Well-graded GRAVEL with SILT and SAND (GW-GM); very dense; olive brown; wet; coarse to fine GRAVEL; coarse to fine SAND; micaceous; loss of drilling fluid.

Loss of drilling fluid.

Poorly graded SAND with SILT (SP-SM); very dense; brown; wet; coarse to fine SAND; trace coarse to fine GRAVEL; micaceous.

CLAYEY GRAVEL with SAND (GC); very dense; olive brown; wet; coarse to fine GRAVEL; coarse to fine SAND.

CLAYEY SAND (SC); very dense; brown; wet; coarse to fine SAND; few coarse to fine GRAVEL; micaceous; iron oxide stains.

Mottled with pale brown; no iron oxide stains.

SILTY SAND (SM); very dense; black; wet; coarse to fine SAND; trace coarse to fine GRAVEL; micaceous.

CLAYEY SAND (SC); very dense; brown; wet; coarse to fine GRAVEL; coarse to fine SAND; micacious.

Well-graded GRAVEL with SILT and SAND (GW-GM); very dense; brown; wet; coarse to fine GRAVEL; coarse to fine SAND; micaceous; iron oxide stains.

CLAYEY SAND with GRAVEL (SC); very dense; olive gray; wet; coarse to fine GRAVEL; coarse to fine SAND.

Difficult drilling and fluid loss.

Poorly graded SAND with SILT (SP-SM); very dense; olive brown; wet; fine GRAVEL; trace coarse GRAVEL; coarse to fine SAND; micaceous.

Loss of drilling fluid.

SILTY SAND (SM); very dense; olive brown; wet; coarse to fine SAND; trace coarse to fine GRAVEL.

Loss of drilling fluid.

SILTY GRAVEL with SAND (GM); very dense; pale brown; wet; coarse to fine GRAVEL; coarse to fine SAND; micaceous.

CAMERA READY

REV.	DATE	BY / SUB.	APP.

INFORMATION CONFIDENTIAL:
All plans, drawings, specifications, and or information furnished herewith shall remain the property of the the Southern California Regional Rail Authority and shall be held confidential; and shall not be used for any purpose not provided for in agreements with the Southern California Regional Rail Authority.

DESIGNED BY A. SCHOLDER
DRAWN BY A. SCHOLDER
CHECKED BY T. REINERT
APPROVED BY C. DIAZ
DATE 12-28-2023

VENTURA COUNTY
TRANSPORTATION
COMMISSION

SUBMITTED: JULINA R. CORONA, P.E.
PROJECT MANAGER

SESPE CREEK BRIDGE OVERFLOW
SANTA PAULA BRANCH LINE, FILLMORE, CA

SOIL LEGEND 2 OF 2 - LOG OF TEST BORINGS

CONTRACT NO.
DRAWING NO. GE-003
REVISION
SHEET NO. 29 OF 29
SCALE AS SHOWN

$USER$
$TIME$
$DATE$
$FILE$
$PENTBL$
$PLTDRV$

APPENDIX B -
PREVIOUS GEOTECHNICAL DATA

MOORE & TABER CONSULTING ENGINEERS AND GEOLOGISTS
2001 WESTWIND DR., SUITE 10 • BAKERSFIELD, CALIFORNIA 93301 • (805) 325-9484

OTHER OFFICES:
ANAHEIM
WEST SACRAMENTO
SANTA ROSA

GEOTECHNICAL INVESTIGATION

Old Telegraph Road Bridge
at Sespe Creek
Fillmore, California

Client

McKean Construction
P. O. Box 5051
Ventura. California 93003

Designer

Engineering Computer Corporation
555 University Avenue, Suite 175
Sacramento, California 95825

September 24, 1982

Job No. 582-106

Table of Contents

GEOTECHNICAL INVESTIGATION

Project Description

This report presents the results and recommendations of a geotechnical investigation for the proposed Old Telegraph Road Bridge at Sespe Creek in Fillmore, California. The purpose of the study was to observe the general soil conditions at the site and provide earth-related recommendations to aid in the design and construction of the bridge foundations.

Information received from the client, Engineering Computer Corporation, Ventura County Flood Control District, and the U. S. Army Corps of Engineers indicates the following:

... The proposed design provides for a four-span structure with a total length of 482 feet.

... The existing 14-span bridge, which was built in 1938, is supported on footing foundations.

... Piers 2, 3 and 4 and Abutment 5 of the new structure will be located in close proximity to supports of the existing bridge.

... The channel grade at the bridge will be established at elevation 430.

... The maximum discharge at the site during the design flood will be about 82,000 cubic feet per second, and the high water level will be at elevation 446.

... The approaches to the bridge protrude into the creek creating a channel constriction.

Site Exploration

The field study was completed in September 1982 and included two rotary wash borings drilled to depths of 50 to 60 feet. Prior to initiating the drilling, pits were excavated with a Gradall G-800 and eight-inch diameter casing was set. This procedure allowed for closer examination of the upper sediments and eliminated the need for very time consuming drilling in the very large surficial boulders.

Samples were obtained from the borings at frequent intervals by means of a 1.4-inch I.D. standard penetration sampler driven with a 140-pound hammer dropping 30 inches. This sampling technique conformed to the procedures of ASTM D 1586.

The drilling operations were performed under the direct supervision of a geotechnical engineer who logged both the borings and the initial excavations for casing installation. The boring locations, sample depths, penetration rates, and other details of the exploration are shown on the accompanying Log of Test Borings drawing. Boring elevations were obtained by level measurements using the bench mark indicated on the drawing.

The excavation to set casing for Boring 1 was widened to expose Pier 4 of the existing bridge. Measurements indicated the footing for this support was founded at approximately elevation 412.

Earth Materials

The foundation materials encountered at this site consist of coarse-grained sediments. Typically, the upper five to six feet were comprised of medium to coarse gravelly sand, cobbles, and boulders. It is estimated the boulders in this upper zone ranged to a maximum dimension of about four to five feet. The underlying soils consist of very dense fine to coarse silty sand, gravel, cobbles, and scattered boulders. At the boring locations, the maximum size of the boulders penetrated was about 2.5 feet.

The water level in Boring 1 was measured at elevation 387.4 the day after drilling. No subsequent measurements were made; therefore, it is not known if this level represented the actual groundwater level. However, it is fairly certain that the water level will vary seasonally.

Soil Testing

Earth materials were classified in the field by a careful visual examination of the samples and a continuous observation of the boring returns.

Strength characteristics of the foundation soils were evaluated by *in-situ* field tests. Relative density and bearing capacity were determined from the standard penetration tests conducted in accordance with ASTM Test Method D 1586. The penetration rates obtained in these tests are shown on the Log of Test Borings.

CONCLUSIONS AND RECOMMENDATIONS

Scour Conditions

Careful examination of pits excavated near some of the existing piers indicated recent past scour (since about 1938) has generally extended to about five to six feet with possible localized areas as deep as eight to nine feet.

Information received from the Ventura County Flood Control District indicates the velocity of the design flood flow would be about 12 feet per second. Utilizing this mean velocity and several approaches suggested by various investigators, analyses indicate potential scour depths of about four to ten feet.

Based on our observations and the results of the analytical approaches, we recommend a design scour depth of 12 feet (elevation 418). It is recommended that pile-supported pier footings be placed at a minimum depth of eight feet (elevation 422) so as to be located below the estimated depth of potential recurring scour.

Foundation Recommendations

Either spread footings or pile foundations are considered suitable means of support for the proposed structure. Due to the potential channel scour, spread footings will have to be founded deeper than normally considered practical. However, considering the coincidence of the proposed and existing support locations and the deep excavations required to remove the existing supports, deep spread footings become a feasible option. Recommendations to aid in design of footing or pile foundations are presented on the following page.

Footing Foundations - Footings founded in undisturbed native soil may be designed for an allowable bearing pressure of 4.0 T.S.F. The footings should be placed at least 20 feet below channel grade (elevation 410) or 2 feet below any disturbance resulting from removal of the existing bridge supports, whichever is deeper.

Pile Foundations - The very dense and coarse nature of earth materials will necessitate the use of minimum displacement driven piles. The estimated tip elevations for 10BP57 and 12BP53 steel H-sections designed for 70 tons per pile are presented below. These estimated tip elevations are based on the assumption that the excavations resulting from removal of the existing bridge supports are backfilled as indicated in the subsequent section entitled "Grading Recommendations."

	Estimated Tip Elevations	
	10BP57 (70 tons/pile)	12BP53 (70 tons/pile)
Piers	401	404
Abutments	405	408

The estimated pile tip elevation for abutments assumes riprap or some other form of protection encompasses the abutment and extends to the design scour elevation.

Considering the coarse and dense character of the native sediments, significant variation in the pile driving is possible and should be anticipated. All piles should have a bearing as indicated by the Engineering News Formula at final tip elevation. Driving may be terminated above the estimated tip elevation on any pile which has penetrated at least twelve (12) feet and has achieved at least two times design bearing in accordance with the Engineering News Formula. If protection encompassing the supports does not extend to the design scour elevation, the 12 feet minimum penetration should be below the scour elevation. The pile hammer should have a minimum energy of 28,000 foot-pounds per blow. The use of point reinforcement for the piles should be used to minimize damage to the pile tip.

The piling will be subject to cyclic wetting and drying and, thus, some potential exists for pile corrosion. Nominal corrosion (outer 0.063 inch of pile) for this condition has been considered in our pile recommendations. Several subsurface pipelines are located in the vicinity of the proposed structure. If cathodic protection has been or will be installed for these pipelines, protection of the bridge piling may be necessary.

Resistance of Lateral Loads

Footing Foundations - Lateral loads on spread footings may be resisted by frictional resistance and/or lateral bearing. An allowable frictional coefficient of 0.55 is considered applicable for undisturbed native soil. The allowable passive pressure of the native sediments is 400 psf/foot of depth below the design scour elevation.

Pile Foundations - The allowable lateral loads for driven steel H-sections may be obtained from the table on the following page. It is applicable to the case where loads are applied to the head of the pile and is based on a deflection of one-quarter inch at the pile head. If greater deflection can be tolerated, lateral loads can be increased directly in proportion to the deflection up to twice that shown in the table.

The data presented in the table is provided for conditions of no scour (e.g. seismic considerations) or where protection encompassing supports extend to the design scour. When considering lateral loading during

LATERAL LOADS ON STEEL H-SECTIONS

Pile Type	10BP57				12BP53			
Loading Condition	Parallel to Web		Parallel to Flange		Parallel to Web		Parallel to Flange	
Head Condition	Free	Fixed	Free	Fixed	Free	Fixed	Free	Fixed
Allowable Load 1/4" Deflection (kips)	9.2	23.5	6.0	15.2	10.0	25.4	6.6	16.7
Maximum Positive Moment (kip-feet)	2.7P*	0.5P*	2.3P*	9.8P*	2.9P*	0.5P*	2.4P*	0.6P*
Maximum Negative Moment (kip-feet)	---	3.7P*	---	2.8P*	---	4.0P*	---	3.0P*
Depth of Maximum Positive Moment (feet)	4.5	7.0	4.0	6.5	5.0	7.5	4.0	6.5
Depth of Point of Inflection (feet)	---	4.5	---	3.5	---	5.0	---	4.0
Depth of Zero Moment (feet)	11.5	11.5	12.0	12.0	12.0	12.0	12.0	11.5

*Where P is lateral load in kips

flood conditions and where protection does not extend to design scour, allowable lateral loads should be determined using the structural characteristics of the piling and the appropriate effective point of fixity indicated below.

	Elevation of Point of Fixity	
Loading Condition	Parallel to Web	Parallel to Flange
10BP57	411	412.5
12BP53	410.5	412

Grading Recommendations

If pile foundations are utilized for the bridge support, the excavations resulting from demolition of the existing structure should be properly backfilled prior to pile installation. The backfill should consist of the on-site soil free from cobbles and boulders which exceed about six inches in diameter. The material should be spread in thin layers and compacted to 90% of maximum density, as determined by Test Method No. Calif. 216. The compacted fill should extend from the base of the excavation to the base of the pile cap.

If the design employs the use of spread footings, it is recommended that the larger cobbles and boulders be used in the lower four to five feet of backfill around the supports.

With either option of foundation support, the gradation of the backfill within the top four to five feet of finish grade should be similar to or coarser than the surrounding creek sediments.

Engineering Seismology

Two possible sources of seismic activity are considered to influence the planned bridge. It is considered likely that the site will experience ground shaking from an event on the distant San Andreas Fault during the life of the bridge. Estimated site effects from a maximum probable earthquake on the San Andreas Fault would include a local bedrock acceleration equal to about 27% g.

More problematic in terms of bedrock acceleration is the seismic potential of the nearby Oak Ridge and San Cayetano Faults. Geologic relationships show the faults not to be directly related. However, both faults possess the ability to provide the same bedrock acceleration. Geologic evidence shows the faults to have been active during the Quaternary (past two million years), but have not exhibited historic movement. A tabulation of the most critical faults is given in the table below, along with estimated maximum bedrock acceleration in accordance with Schnabel and Seed, "Acceleration in Rock for Earthquakes in Western U. S.," (1969).

Fault	Distance from Site (miles)	Estimated Richter Magnitude	Peak Bedrock Acceleration (g)
San Cayetano	1.5	6.4	0.65
Oak Ridge	1.5	6.5	0.66
San Gabriel/ Sierra Madre	17.0	7.0	0.25
San Andreas	28.5	8.3	0.27

In applying the Caltrans' seismic design criteria to this bridge, the depth to "rock-like" material is estimated to be greater than 150 feet. A maximum bedrock acceleration of 0.7g is recommended for use in this design procedure.

Liquefaction Potential

Considering the relative density of the granular deposits, liquefaction at this site is considered very unlikely.

General Conclusions

This report is based on the project as described and the geotechnical data obtained from the field tests performed at the locations indicated on the Log of Test Borings drawing. The conclusions and recommendations do not reflect any variation which may occur. Our firm should be notified of any pertinent change in the project or if foundation conditions are found to differ from those described in this report, since this may require a revaluation of the recommendations.

This report has not been prepared for use by parties or projects other than those named or described above. It may not contain sufficient information for other parties or purposes. This report has been prepared in accordance with generally accepted geotechnical practices and makes no other warranties, either expressed or implied, as to the professional advice or data included in it.

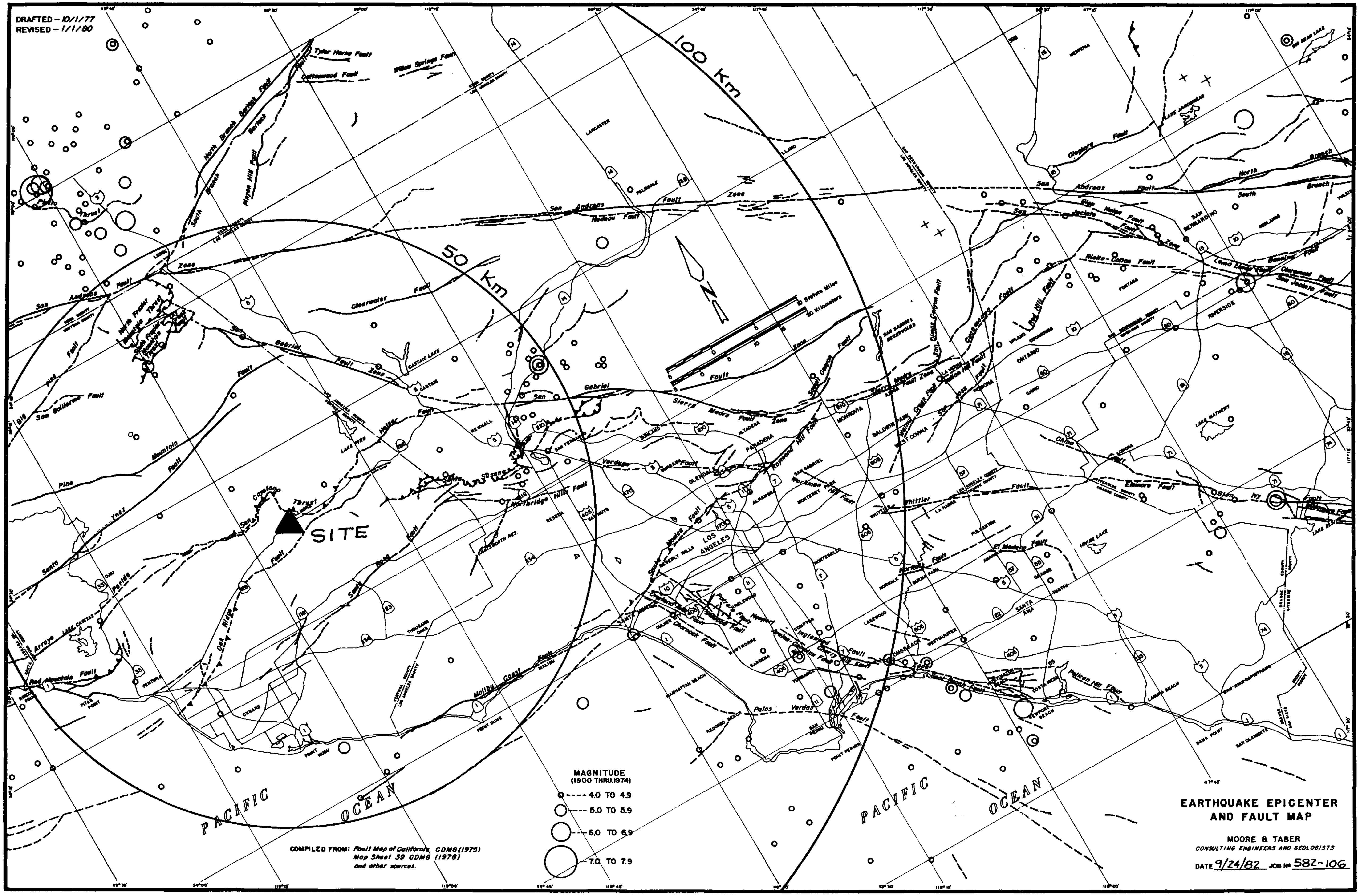
MOORE & TABER

David L Pearson
David L. Pearson
Registered Civil Engineer 23997
DLP/BJL/RFM:rb

R F Moore
Reviewed by R. F. Moore
Certified Engineering Geologist 25

Distribution: (2) McKean Construction
(6) Engineering Computer Corporation
with original Log of Test Borings drawing

APPENDIX



COMPILED FROM: *Fault Map of California CDMG (1975)*
Map Sheet 39 CDMG (1978)
and other sources.

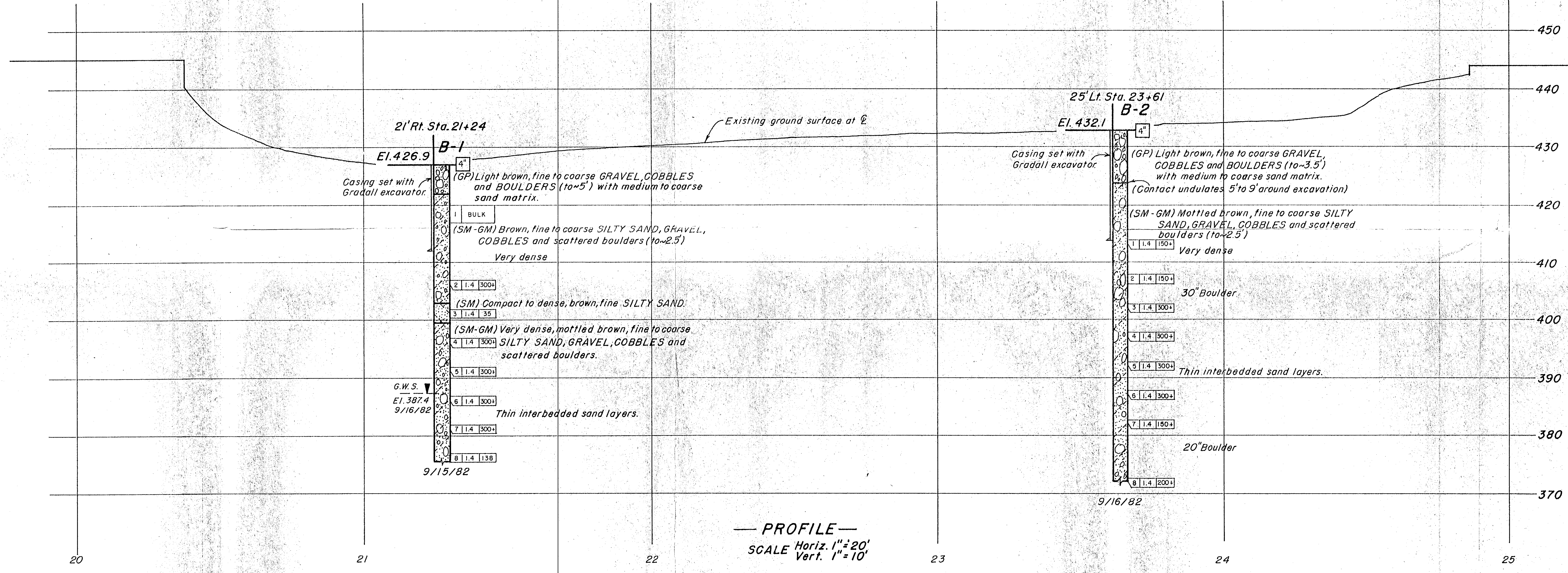
EARTHQUAKE EPICENTER
AND FAULT MAP

MOORE & TABER
CONSULTING ENGINEERS AND GEOLOGISTS

DATE 9/24/82 JOB № 582-106

— PLAN —
SCALE 1"=20'

— NOTE —
T.B.M. TEL-3 Elevation 444.36

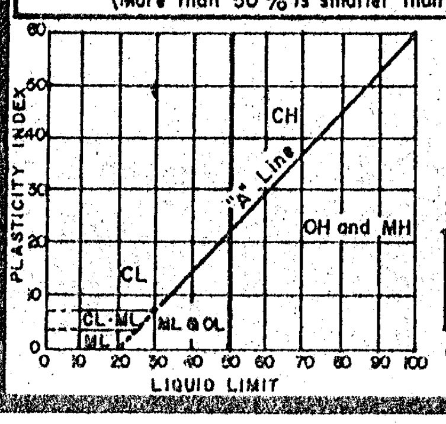


— PROFILE —
SCALE Horiz. 1"=20'
Vert. 1"=10'

LEGEND OF EARTH MATERIALS

UNIFIED SOIL CLASSIFICATION

Pt	OH	CH	MH	OL	CL	ML	SC	SM	SP	SW	GC	GM	GP	GW
Highly organic soils	Silts and clays Liquid limit greater than 50			Silts and clays Liquid limit less than 50			Sands with fines >12% fines		Clean sands <5% fines		Gravels with fines >12% fines		Clean gravels <5% fines	
							Sands - more than 50% of coarse fraction is smaller than Nº 4 sieve.				Gravels - more than 50% of coarse fraction is larger than Nº 4 sieve.			
Fine grained soils (More than 50% is smaller than Nº 200 sieve)							Coarse grained soils (More than 50% is larger than Nº 200 sieve)							



LABORATORY CLASSIFICATION CRITERIA

GW and SW - $C_u = \frac{D_{60}}{D_{10}}$ greater than 4 for GW & 6 for SW; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 & 3.

GP and SP - Clean gravel or sand not meeting requirements for GW and SW.

GM and SM - Atterberg limits below "A" line or P.I. less than 4.

GC and SC - Atterberg limits above "A" line with P.I. greater than 7.

Fines (silt or clay)	Fine sand	Medium sand	Coarse sand	Fine gravel	Coarse gravel	Cobbles	Boulders
Sieve sizes	200	40	10	4	3/4"	3"	12"

Classification of earth materials shown on this sheet is based on field inspection and should not be construed to imply laboratory analysis unless so stated.

MATERIAL SYMBOLS

- Gravel
- Sand
- Silt
- Clay
- Sandy clay or clayey sand
- Sandy silt or silty sand
- Silty clay or clayey silt
- Peat or organic matter
- Fill material
- Shale
- Sandstone
- Limestone
- Metamorphic rock
- Igneous rock

CONSISTENCY CLASSIFICATION FOR SOILS

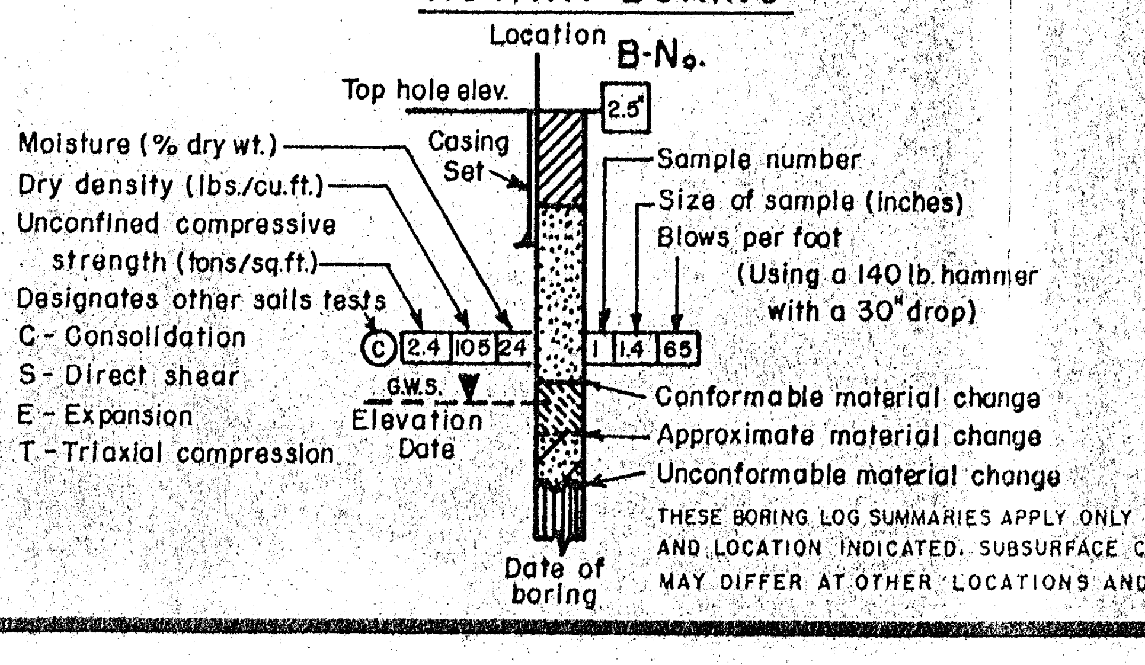
According to the Standard Penetration Test

Nº of blows	Granular	Cohesive
0 - 5	Very loose	Very soft
6 - 10	Loose	Soft
11 - 20	Semicompact	Stiff
21 - 35	Compact	Very stiff
36 - 70	Dense	Hard
>70	Very dense	Very hard

LEGEND OF BORING OPERATIONS

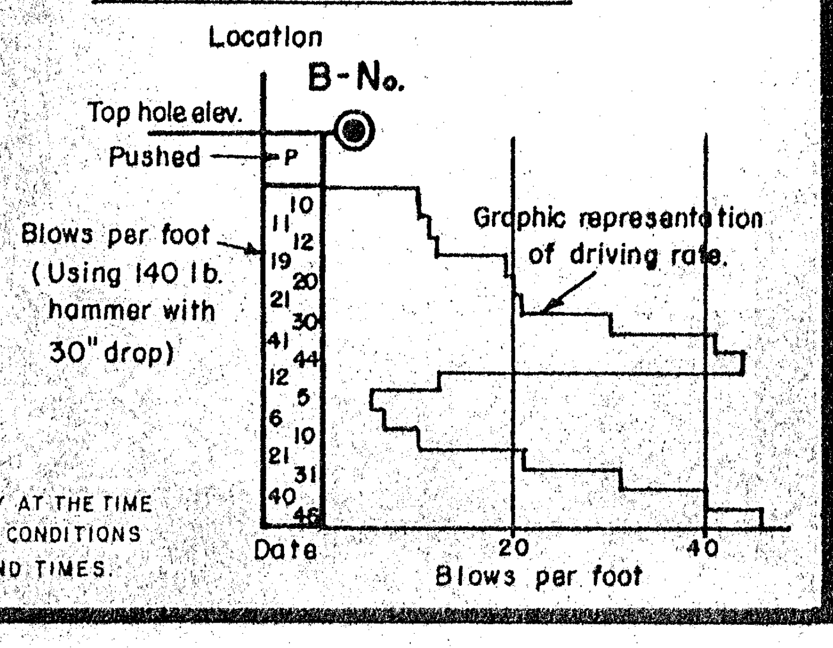
- ● Plan of any boring
- size Rotary boring
- size Diamond core boring
- size Auger boring
- size Sample boring
- size Jet boring
- Test pit
- ◉ 2 1/4" Cone penetrometer
- ◎ 2 1/2" Cone penetrometer

ROTARY BORING



THESE BORING LOG SUMMARIES APPLY ONLY AT THE TIME AND LOCATION INDICATED. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND TIMES.

PENETRATION TEST



MOORE & TABER
CONSULTING ENGINEERS AND GEOLOGISTS

Approved David L Pearce
REGISTERED CIVIL ENGINEER No. 23997

JOB No. 582-106

Mc KEAN CONSTRUCTION

OLD TELEGRAPH ROAD BRIDGE AT SESPE CREEK

LOG OF TEST BORINGS

Scale As Shown	Date Sept. 24, 1982	By ALS Check by DLP	Drawing

APPENDIX C -
FIELD EXPLORATION

APPENDIX C - FIELD EXPLORATION

The field exploration for the proposed project (Project) consisted of advancing 2 borings (DYB23-01 and DYB23-02) to depths of approximately 100 feet each. The approximate locations of the borings are shown on Figure 2 and Figure 3.

Prior to advancing/drilling the borings, the field exploration locations were marked in the field and Underground Service Alert (USA) was notified.

Two approximately 100 feet deep borings were drilled by Cascade Drilling, Inc. on July 17 through 26th with a track-mounted CME drill rig using rotary-wash-auger drilling techniques. Our field engineer observed the drilling operations and collected drive samples for visual examination and subsequent laboratory testing. Drive samples were collected with a 2.4-inch-inside-diameter (3.0-inch-outside-diameter) modified California split-barrel sampler lined with brass tubes and a standard split-spoon penetrometer with dimensions in accordance with ASTM International (ASTM) D3550 and D1586, respectively. Both samplers were driven with a 140-pound automatic trip hammer falling 30 inches. Field unconfined compression strengths were obtained using a pocket penetrometer.

Soils encountered in the borings were classified in general accordance with the ASTM International (ASTM D2487, which is summarized on Plate C1, and D2488). Boring logs presented on Plates C2 through C7 were prepared from visual examination of the samples, cuttings obtained during drilling operations, and results of laboratory tests.

A seismic refraction survey was performed in the vicinity of the bents and abutment of the damaged section of the bridge. The locations of these two seismic refraction survey lines are shown in Appendix D. The refraction survey seismic profiles are shown in Appendix D.

Groundwater was encountered during the field exploration to a depth of 35 feet below the ground surface at the roadway elevation and at a depth of 7 feet below the ground surface at the riverbed elevation. Borings were backfilled with bentonite cement grout.

The boring locations were identified in the field by measuring from known locations using a hand-held global positioning system (GPS) unit with a 12-foot horizontal accuracy. Boring surface elevations are based on Google Earth.

SOIL CLASSIFICATION SYSTEM-ASTM D2487

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE-GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)	▨	**GW**	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
			▨	**GP**	POORLY GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)	▨	**GM**	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
			▨	**GC**	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)	▨	**SW**	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			▨	**SP**	POORLY GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)	▨	**SM**	SILTY SANDS, SAND - SILT MIXTURES
			▨	**SC**	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE-GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50	▨	**ML**	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			▨	**CL**	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			▨	**OL**	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50	▨	**MH**	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
			▨	**CH**	INORGANIC CLAYS OF HIGH PLASTICITY
			▨	**OH**	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			▨	**PT**	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

■ "Push" Sampler

⧗ Split Barrel "Drive" Sampler With Liner

☒ Standard Penetration Test (SPT) Sampler

▯ Dual-Mass Dynamic Cone Penetration (DCP) Test

▦ Concrete/Rock Core

▽ Groundwater Surface

SPT "N" = 0.65 x modified California blows per foot

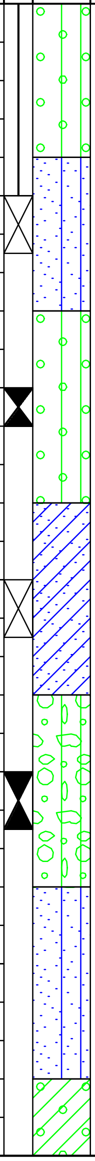
NP = Nonplastic
EI = Expansion Index Test
SG = Specific Gravity
SE = Sand Equivalent
UC = Unconfined Comp.
CD = Consol. Drained Triaxial.
CU = Consol. Undrained Triaxial.
UU = Undrained, Unconsol. Triaxial.
RV = R-Value
CA = Chemical Analysis
DS = Direct Shear
CN = Consolidation
CP = Collapse Potential
SA = Grain size; HD = Hydrometer
MD = Compaction Test
HC = Hydraulic Conductivity Test
CBR = California Bearing Ratio
[PID] Reading in ppm above background

VCTC Sespe Creek Bridge

Project No. 2023-010

PLATE
C1

BORING LOCATION:	See Figure No. 2	**ELEVATION (feet):**	430
LATITUDE:	34.40610	**LONGITUDE:**	-118.93178
DRILLING EQUIPMENT:	CME-55LCX	**DRILLING METHOD:**	Rotary Wash
BORING DIAMETER (inches):	6	**BORING DEPTH (feet):**	100.25
DATE STARTED: 7-21-23	**COMPLETED:** 7-25-23	**HAMMER TYPE:** Automatic	**EFFICIENCY:** 90.5%
DRILLING CONTRACTOR:	Cascade Drilling	**HAMMER DROP:** 30 inches	**WEIGHT:** 140 lbs
LOGGED BY: OB/JS	**CHECKED BY:** TR	**DRIVE SAMPLER DIAMETER (inches)**	**ID:** 2.4 **OD:** 3



Elevation (feet)	Depth (feet)	Blows per 6 Inches	SPT N60 Blows per Foot	Field Unc. Comp. Str. (tsf)	DESCRIPTION	Dry Density (pcf)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Percent Passing #200 Sieve	Other Tests [PID]
					POORLY GRADED GRAVEL with SILT and SAND (GP-GM): light brown; moist; loose; coarse to fine SAND; coarse to fine GRAVEL; loose when hand augering					12	
425	5	7 8 19	41		POORLY GRADED SAND with SILT (SP-SM): olive brown; wet; dense; coarse to fine SAND; trace coarse to fine GRAVEL; micaceous ▽		12			9	
420	10	36 74/6"	100		POORLY GRADED GRAVEL with SILT and SAND (GP-GM): olive brown; wet; very dense; coarse to fine SAND; coarse to fine GRAVEL; trace lean CLAY nodules; trace cobbles; micaceous					11	
415	15	15 19 18	56		CLAYEY SAND with GRAVEL (SC): brown; wet; very dense; coarse to fine SAND; coarse to fine GRAVEL; trace CLAY nodules; micaceous			23	6		
410	20	23 39 67/6"	100		WELL-GRADED GRAVEL with SILT and SAND (GW-GM): olive brown; wet; very dense; coarse to fine SAND; coarse to fine GRAVEL; micaceous; loss of drilling fluid loss of drilling fluid					9	
405	25	50/3" 50/1"	100		POORLY GRADED SAND with SILT (SP-SM): brown; wet; very dense; coarse to fine SAND; trace coarse to fine GRAVEL; micaceous					7	
					CLAYEY GRAVEL with SAND (GC): olive brown; wet; very dense; coarse to fine SAND; coarse to fine GRAVEL						

LOG OF BORING DYB23-01

Page 1 of 3

VCTC Sespe Creek Bridge
Project No. 2023-010

PLATE
C2

Library: DYLIB.GLB; Template: DYLG; Prj ID: 2023-010 VCTC SESPE CREEK.GPJ

Elevation (feet)	Depth (feet)	Sampler	Symbol	Blows per 6 Inches	SPT N60 Blows per Foot	Field Unc. Comp. Str. (tsf)	DESCRIPTION	Dry Density (pcf)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Percent Passing #200 Sieve	Other Tests [PID]
				50/4" 13/2" 50/3"	100				13			16	
							CLAYEY SAND (SC): brown; wet; very dense; coarse to fine SAND; few coarse to fine GRAVEL; micaceous; iron oxide stains						
395	35			50/6" 50/2" 50/2"	100					27	12	14	
390	40			50/3" 50/1"	100		mottled with pale brown; no iron oxide stains						
							SILTY SAND (SM): black; wet; very dense; coarse to fine SAND; trace coarse to fine GRAVEL; micaceous						
385	45			50/5" 12/1" 50/4"	100							12	
							CLAYEY SAND (SC): brown; wet; very dense; coarse to fine SAND; coarse to fine GRAVEL; micacious						
380	50	☒		17 18 18	54					24	8		
							WELL-GRADED GRAVEL with SILT and SAND (GW-GM): brown; wet; very dense; coarse to fine SAND; coarse to fine GRAVEL; micaceous; iron oxide stains						
375	55			50/3" 50/0.5"	100							11	
							CLAYEY SAND with GRAVEL (SC): olive gray; wet; very dense; coarse to fine SAND; coarse to fine GRAVEL						
370	60			50/2" 50/2"	100							22	
365	65						difficult drilling and fluid loss						
							POORLY GRADED SAND with SILT (SP-SM): olive brown; wet; very dense; coarse to fine SAND; fine GRAVEL; trace coarse GRAVEL; micaceous						

LOG OF BORING DYB23-01

VCTC Sespe Creek Bridge
Project No. 2023-010

PLATE
C3

Library: DYLIB.GLB; Template: DYLG; Prj ID: 2023-010 VCTC SESPE CREEK.GPJ

Elevation (feet)	Depth (feet)	Sampler	Symbol	Blows per 6 Inches	SPT N60 Blows per Foot	Field Unc. Comp. Str. (tsf)	DESCRIPTION	Dry Density (pcf)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Percent Passing #200 Sieve	Other Tests [PID]
				26 50/3" 50/2"	100					NP	NP	11	
355	75						loss of drilling fluid						
							SILTY SAND (SM): olive brown; wet; very dense; coarse to fine SAND; trace coarse to fine GRAVEL						
350	80			22 50/6" 50/3"	100							12	
345	85						loss of drilling fluid						
340	90			50/2" 50/1"	100				14				
335	95												
							SILTY GRAVEL with SAND (GM): pale brown; wet; very dense; coarse to fine SAND; coarse to fine GRAVEL; micaceous						
330	100			50/2" 50/1"	100		Bottom of boring at 100.25 feet bgs. Groundwater encountered at 7 feet BGS. Boring backfilled with bentonite cement grout.			NP	NP		
325	105												

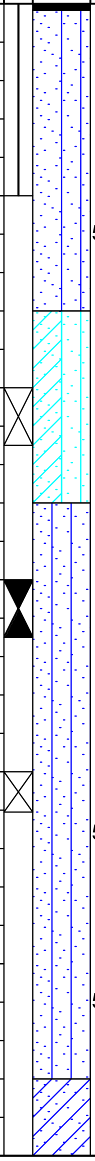
LOG OF BORING DYB23-01

Page 3 of 3

VCTC Sespe Creek Bridge
Project No. 2023-010

PLATE
C4

BORING LOCATION:	See Figure No. 2	**ELEVATION (feet):**	450
LATITUDE:	34.40631	**LONGITUDE:**	-118.93249
DRILLING EQUIPMENT:	CME-55LCX	**DRILLING METHOD:**	Rotary Wash
BORING DIAMETER (inches):	6	**BORING DEPTH (feet):**	100.66
DATE STARTED: 7-17-23	**COMPLETED:** 7-19-23	**HAMMER TYPE:** Automatic	**EFFICIENCY:** 90.5%
DRILLING CONTRACTOR:	Cascade Drilling	**HAMMER DROP:** 30 inches	**WEIGHT:** 140 lbs
LOGGED BY: OB/JS	**CHECKED BY:** TR	**DRIVE SAMPLER DIAMETER (inches)**	**ID:** 2.4 **OD:** 3



Elevation (feet)	Depth (feet)	Sampler	Symbol	Blows per 6 Inches	SPT N60 Blows per Foot	Field Unc. Comp. Str. (tsf)	DESCRIPTION	Dry Density (pcf)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Percent Passing #200 Sieve	Other Tests [PID]
							ASPHALT CONCRETE (AC): black; - 2 inches						
							POORLY GRADED SAND with SILT (SP-SM): brown; moist; coarse to fine SAND; coarse to fine GRAVEL; cobbles; micaceous						
445	5			50/3" 50/0.5"	100		very dense		3				
							difficult drilling						
							SILTY, CLAYEY SAND with GRAVEL (SC-SM): reddish brown; moist; dense; coarse to fine SAND; trace coarse to fine GRAVEL; micaceous; difficult drilling						
440	10			11 15 16	47				4			18	
							easy drilling						
							SILTY SAND with GRAVEL (SM): reddish brown; moist; medium dense; coarse to fine SAND; coarse to fine GRAVEL; micaceous						
435	15			11 10 16	26					20	5	19	
430	20			16 43 50/0.5"	100		very dense; difficult drilling		2			18	
425	25			50/2" 50/0.5"	100		no recovery						
							CLAYEY SAND with GRAVEL (SC): brown; moist; very dense; coarse to fine SAND; coarse to fine GRAVEL; micaceous						

LOG OF BORING DYB23-02

VCTC Sespe Creek Bridge
Project No. 2023-010

PLATE
C5

Elevation (feet)	Depth (feet)	Sampler	Symbol	Blows per 6 Inches	SPT N60 Blows per Foot	Field Unc. Comp. Str. (tsf)	DESCRIPTION	Dry Density (pcf)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Percent Passing #200 Sieve	Other Tests [PID]
				30 44 80/6"	100		wet					12	
415	35			50/3" 50/3" 50/1"	100		∇		15				
							SANDY LEAN CLAY (CL): light brown; wet; stiff; coarse to fine SAND; trace coarse to fine GRAVEL; micaceous						
410	40			9 6 7	20					29	12	69	
							SILTY SAND (SM): reddish brown; wet; hard; coarse to fine SAND; trace coarse to fine GRAVEL; micaceous						
405	45			12 15 90/6"	100					20	NP	48	
							POORLY GRADED GRAVEL with CLAY and SAND (GP-GC): brown; wet; very dense; coarse to fine SAND; coarse to fine GRAVEL; micaceous						
400	50			50/6" 50/0.5"	100							10	
395	55			50/4" 50/1"	100				12				
							CLAYEY GRAVEL with SAND (GC): brown; wet; very dense; coarse to fine SAND; coarse to fine GRAVEL; micaceous						
390	60			50/5" 50/0.5"	100							12	
385	65												

LOG OF BORING DYB23-02

VCTC Sespe Creek Bridge
Project No. 2023-010

Elevation (feet)	Depth (feet)	Sampler	Symbol	Blows per 6 Inches	SPT N60 Blows per Foot	Field Unc. Comp. Str. (tsf)	DESCRIPTION	Dry Density (pcf)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Percent Passing #200 Sieve	Other Tests [PID]
				50/5" 50/1" 50/5"	100		grades same as above					12	
375	**75**												
370	**80**			50/6" 50/1"	100		olive brown Rig chattering at 80 to 82 feet					13	
365	**85**						SILTY, CLAYEY SAND with GRAVEL (SC-SM): brown; wet; very dense; coarse to fine SAND; coarse GRAVEL						
360	**90**	☒		22 35 61/6"	96					21	4		
355	**95**						POORLY GRADED GRAVEL with SILT and SAND (GP-GM): olive brown; wet; very dense; coarse to fine SAND; coarse to fine GRAVEL loss of drilling fluid; possible cobbles						
350	**100**			50/6" 50/2"	100							12	
							Bottom of borings at 100.66 feet. Groundwater encountered at 35 feet bgs. Boring backfilled with bentonite cement grout. Surface temporarily patched with ASPHALT cold patch.						
345	**105**												

LOG OF BORING DYB23-02

VCTC Sespe Creek Bridge
Project No. 2023-010

APPENDIX D -
SEISMIC REFRACTION SURVEY

GEOPHYSICAL EVALUATION

CITY OF FILMORE SESPE CREEK RAILROAD

Filmore, CA

PREPARED FOR:

Diaz Yourman & Associates
1616 East 17th Street
Santa Ana, CA 92705

PREPARED BY:

Atlas Technical Consultants LLC
6280 Riverdale Street
San Diego, CA 92120

August 31, 2023

6280 Riverdale Street
San Diego, CA 92120
(877) 215-4321 | oneatlas.com

August 31, 2023

Atlas No. 10208

MR. TED REINERT, PHD, PE
DIAZ YOURMAN & ASSOCIATES
1616 EAST 17TH STREET
SANTA ANA, CA 92705

Subject: Geophysical Services
City of Filmore Sespe Creek Railroad
Filmore, California

Dear Mr. Reinert:

In accordance with your authorization, Atlas has performed a geophysical evaluation pertaining to the subject project located in Sespe Creek in Filmore, California. The purpose of our evaluation was to develop P-wave and shear-wave velocity profiles through the collection of P-wave refraction, multichannel analysis of surface waves (MASW), and refraction micrometer (ReMi) data for design and construction purposes at the subject site. Our services were conducted on July 17th and 18th, 2023. This data report presents our methodology, equipment used, analysis, and results.

We appreciate the opportunity to be of service on this project. Should you have any questions, please contact the undersigned at your convenience.

Respectfully submitted,
Atlas Technical Consultants LLC

Patrick Lehrmann

REGISTERED PROFESSIONAL GEOPHYSICIST
PATRICK F. LEHRMANN
No. 1043
Exp. 1/31/2024
STATE OF CALIFORNIA

Kyle J. Armendariz, G.I.T.
Project Geophysicist

Patrick F. Lehrmann, P.G., P.Gp.
Principal Geologist/Geophysicist

KJA:SL:PFL:ds
Distribution: ted@diazyourman.com

CONTENTS

TABLES

FIGURES

1. INTRODUCTION

In accordance with your authorization, Atlas has performed a geophysical evaluation pertaining to the subject project located in Sespe Creek in Filmore, California (Figure 1). The purpose of our evaluation was to develop P-wave and shear-wave velocity profiles through the collection of P-wave refraction, multichannel analysis of surface waves (MASW), and refraction micrometer (ReMi) data for design and construction purposes at the subject site. Our services were conducted on July 17th and 18th, 2023. This data report presents our methodology, equipment used, analysis, and results.

2. SCOPE OF SERVICES

Our scope of services included:

- Performance of two P-wave refraction (SL-1 and SL-2), two 2-dimensional (2-D) MASW (ML-1 and ML-2), and two 1-dimensional (1-D) ReMi (RL-1 and RL-2) traverses at the project site.
- Compilation and analysis of the data collected.
- Preparation of this data report presenting our results and conclusions.

3. SITE AND PROJECT DESCRIPTION

The project site was located within Sespe Creek in Filmore, California (Figure 1). SL-1, ML-1 and RL-1 were located along the same general traverses and conducted in a northeast-southwest orientation. SL-2, ML-2 and RL-2 were also located along the same general traverses and were conducted in a northwest-southeastern orientation (Figure 2). The site conditions consisted of fluvial deposits (boulders, cobbles, and sand), an actively running creek, and bridge support beams. The general location of the P-wave refraction, MASW, and ReMi traverses were selected by your office. It should be noted that due to the surficial conditions in the creek bed, limited MASW profile lengths were able to be collected.

It is our understanding that railroad bridge supports were damaged in recent rain events and the seismic line locations were centered around the damaged areas. Additionally, we acknowledge that the collected data will be used in preparation for proposed improvements at the site and the results of our evaluation may be used in the formulation of design and construction parameters for the project. Figures 2 and 3 depict the general site conditions in the vicinity of the seismic profiles.

4. STUDY METHODOLOGY

4.1 Seismic P-Wave Refraction

The seismic refraction method uses first-arrival times of refracted seismic waves to estimate the thicknesses and seismic velocities of subsurface layers. Seismic P-waves generated at the surface, using a hammer and plate, are refracted at boundaries separating materials of contrasting velocities. These refracted seismic waves are then detected by a series of surface vertical component 14-Hz geophones and recorded with a 24-channel Geometrics Geode seismograph. The travel times of the seismic P-waves are used in conjunction with the shot-to-geophone distances to obtain thickness and velocity information on the subsurface materials.

Geophones were placed at regularly spaced intervals of 10 feet for total line lengths of 250 feet for SL-1 and SL-2, including off-end shots. The general locations and lengths of the lines were determined by surface conditions, site access, depth of investigation, and you and your office. Shot points (signal-generation locations) were conducted along the lines at the ends, midpoint, and intermediate points between the ends and the midpoint.

The seismic refraction theory requires that subsurface velocities increase with depth (generalized reciprocal method (GRM) and time-intercept modeling). In classical analysis methods, a layer having a velocity lower than that of the layer above will not generally be detectable by the seismic refraction method and, therefore, could lead to errors in the depth calculations of subsequent layers. In addition, interaction with the water table (groundwater potentiometric surface)/saturated materials, lateral variations in velocity such as those caused by core stones, intrusions, boulders, lithology changes, fill materials, fractures, faults, and anisotropic materials can also result in the misinterpretation of the subsurface conditions. The application of seismic tomography methods, as was performed for this project by Atlas, produces velocity models which, in general, may not be subject to this limitation. However, even the application of seismic tomography analysis does have certain limitations regarding vertical and horizontal resolution. When a velocity anomaly target is of similar scale length to the seismic wavelet (or smaller), then diffraction behavior dominates because scattering is governing the loci of the wavefronts. For travel time analysis, a target feature must be at a scale versus its depth that is detectable relative to the scale length of the seismic wavelet we produce and receive. There is therefore a general limit to what scale of feature seismic tomography methods can detect regarding relatively small velocity anomaly features, related to both source and to medium velocities, and travel time uncertainties. In effect, some relatively smaller scale features including "thin" velocity inversion layers or voids, and some types of lateral and vertical velocity variations caused by core stones and intrusions might not be detected in our results. In general, the effective depth of evaluation for a seismic refraction traverse is approximately one-third to one-fifth of the length of the spread.

Generally, the seismic P-wave velocity of a material can be correlated to rippability (see Table 1 below), or to some degree "hardness." Table 1 is based on published information from the Caterpillar Performance Handbook (Caterpillar, 2018), as well as our experience with similar materials, and assumes that a Caterpillar D-9 dozer ripping with a single shank is used. We emphasize that the cutoffs in this classification scheme are approximate and that rock characteristic, such as fracture spacing and orientation, play a significant role in determining rock quality or rippability. The rippability of a mass is also dependent on the excavation equipment used and the skill and experience of the equipment operator.

For trenching operations, the rippability values should be scaled downward. For example, velocities as low as 3,500 feet/second may indicate difficult ripping during trenching operations. In addition, the presence of boulders, which can be troublesome in narrow trenching operations, should be anticipated.

Table 1: Rippability Classification

Seismic P-wave Velocity	Rippability
0 to 2,000 feet/second	Easy
2,000 to 4,000 feet/second	Moderate
4,000 to 5,500 feet/second	Difficult, Possible Blasting
5,500 to 7,000 feet/second	Very Difficult, Probable Blasting
Greater than 7,000 feet/second	Blasting Generally Required

It should be noted that the rippability cutoffs presented in Table 1 are slightly more conservative than those published in the Caterpillar Performance Handbook. Accordingly, the above classification scheme should be used with discretion, and contractors should not be relieved of making their own independent evaluation of the rippability of the on-site materials prior to submitting their bids.

4.2 Multichannel Analysis of Surface Waves (MASW)

Surface waves (specifically Rayleigh Waves), generated by a 20-pound hammer and HDPE plastic plate, were recorded using a 24-channel Geometrics seismograph and 24, 4.5 Hz vertical component geophones. The geophones were coupled to the ground surface using Geostuff Landstremer with geophones stationed 5 feet apart. Shots were conducted off the end of the lines. Prior to the collection of surface wave data, near and far field effects were evaluated for several shot offset distances at each traverse. The test shot results indicated that the optimum offset distance for the shot point of the MASW study was 60 feet off the end of the lines. Additionally, significant frequency contamination was experienced in several locations along the profile. Such contamination may have been attributed to lateral heterogeneities, poor geophone coupling due to surficial conditions, and/or cultural influences such as vehicle traffic. Due to this, additional processing techniques were utilized to enhance the signal to noise ratio.

Three records, one second long, were recorded at each shot location. After each shot, the shot location and geophones were moved 10 feet longitudinally along the profile direction and the line was reshot. Due to surficial conditions at the site, limited profile lengths were collected. The number of shots, spread length, and start and end stations are presented in Table 1.

Table 2: MASW Array Geometry

Line No.	No. of Shots	Total Spread Length (feet)	Profile Length/Start and End Stations (feet)
ML-1	20	305	190/(0-190)
ML-2	14	245	130/(0-130)

4.3 Refraction Micrometer (ReMi)

The passive source 1-D ReMi technique uses recorded surface waves (specifically Rayleigh waves) that are contained in background noise to develop a shear-wave velocity profile of the study area down to a depth, in this case, of approximately 100 feet below ground surface. The depth of exploration is dependent on the length of the line and the frequency content of the background noise. The results of the ReMi method are displayed as a 1-D profile which represents the average condition across the length of the line. The ReMi method does not require an increase of material velocity with depth; therefore, low-velocity zones (velocity inversions) are detectable with ReMi.

Our ReMi evaluation included the use of a 24-channel Geometrics Geode seismograph and 24 4.5 Hz vertical component geophones. The geophones were spaced 10 feet apart for a total line length of 230 feet for RL-1 and RL-2. A total of 21 records, each 32 seconds in duration, were recorded, with 15 of the files utilizing passive data collection of ambient ground vibration noise and 10 utilizing an active source generated by a 20-pound sledgehammer and a HDPE plastic strike plate. This active source data gathers included conducting hammer blows at locations on both ends of the seismic spread at approximately 30 feet off the end of the geophone array.

5. DATA ANALYSIS

5.1 Seismic P-Wave Refraction

The collected refraction data were processed and analyzed using Rayfract® Version 4.03 (Intelligent Resources Inc., 2022) which employs wave path analysis. Rayfract first provides forward modeling of refraction, transmission, and diffraction and then back-projects travel-time residuals along wave paths also known as Fresnel volumes instead of conventional analysis by rays. This increases the numerical robustness of the inversion. A smooth minimum-structure one dimensional starting velocity-depth profile model is determined automatically directly from the seismic travel-time data first arrival picks and elevation data to produce subsurface velocities by horizontally averaging via the Delta t-V method. The Delta t-V method is based on common mid-point sorted travel times and assumes multiple horizontal layers with constant interior velocity gradients (Rohdewald 2007; Gebrande 1985). Modeled seismic rays follow circular arcs inside each modeled layer. The Delta t-V starting model is then refined with 2-D Wavepath Eikonal Traveltime (WET) inversion method (Schuster, 1993). The resulting 2-D WET velocity model provides a 2-D tomographic image of the P-wave velocities which can be used to estimate subsurface geologic conditions. Both vertical and lateral velocity information is contained in the tomography model. Changes in layer velocity are generally revealed as gradients rather than discrete contacts, which typically are more representative of actual conditions.

5.2 Multichannel Analysis of Surface Waves (MASW)

The recorded MASW data were processed using SurfSeis® (Kansas Geological Survey, 2017), an MASW software program. One-dimensional shear-wave velocity (Vs) profiles were generated for each shot location which represents the average condition across the length of the geophone array. Each individual 1-D profile is spatially plotted at the center of each geophone array. A 2-D color gradient model was then created from the 1-D models using the SurfSeis® interpolation scheme. It should be emphasized that the 2-D profile represents the area between the midpoint of the first shot location and the midpoint of the last shot location.

5.3 Refraction Micrometer (ReMi)

The recorded ReMi data were processed using Surface Plus 9.1 – Advanced Surface Wave Processing Software (Geogiga Technology Corp., 2020), which uses the refraction micrometer method (Louie, 2001) and other surface wave analysis methods. The program generates phase-velocity dispersion curves for each record and provides an interactive dispersion modeling tool to provide the best fitting model. The result is a 1-D shear-wave velocity model of the site which, based on published studies, is typically 85 to 95 percent of the velocity of shear waves, and results in a relatively conservative estimate of shear wave velocity using the ReMi surface wave data and analysis method.

6. RESULTS AND CONCLUSIONS

Figures 4a and 4b present the P-wave and MASW profiles generated from our analysis of SL-1 and ML-1, and SL-2 and ML-2, respectively. Based on the results, it appears the project site is generally underlain by low-velocity material overlaying higher-velocity materials in the near-surface. The depth to higher velocity material is fairly uniform across the seismic profiles and appear to correlate well with boring information from DYB23-01 (provided by your office). Harder and higher velocity material appears to be encountered approximately 25 feet below ground surface. It should be noted that ground water was encountered approximately 8 feet below ground surface in boring DYB23-01, which may have slightly increased P-wave velocities below this depth. Typically, S-wave velocities range approximately between 0.4 to 0.6 of the velocity of the P-wave velocities depending on the soil/rock type and condition. It should also be noted that due to the surficial conditions in the creek bed, limited MASW profile lengths were able to be collected.

Additionally, two ReMi profiles (RL-1 and RL-2) were conducted at the project site to evaluate the IBC Vs100 site classification of the project site. The results of the ReMi evaluation are displayed in Table 2 and Figures 4c and 4d. The ReMi results appear to correlate well with the P-wave profiles, MASW profiles, and boring DYB23-01. It should be noted that when the 1-D ReMi surface wave velocity results (analogous to shear wave) show an IBC Vs100 velocity value that is close to the "borderline" boundary between two IBC Vs100 site classes, the project geotechnical consultant of record should be consulted regarding existing available sire information and whether obtaining additional new geotechnical evaluation data such as boreholes, surface to downhole seismic (ASTM D7400), cross hole seismic (ASTM D4428), and/or additional 1-D ReMi data collections would be advisable. The project geotechnical engineering consultant of record might wish to consider the subsurface geologic stratigraphy and structure, soil mechanics, and soil modulus, along with the initial 1-D ReMi results when assessing a "borderline" IBC Vs100 seismic site class and whether additional geophysical evaluations are needed.

Table 3: ReMi Results

Line No.	Depth (feet)	Shear Wave Velocity (feet/second)	Average Shear Wave Velocity (Vs in feet/second)	Site Class (IBC, 2019)
RL-1 (NE-SW)	0-3	360	Vs = 1,244 ft/s	C
	3-9	575		
	9-18	1102		
	18-24	1128		
	24-39	1515		
	39-52	1547		
	52-86	1625		
	86-100	1646		
RL-2 (NW-SE)	0-3	352	Vs = 1,290 ft/s	C
	3-8	588		
	8-18	1138		
	18-24	1153		
	24-39	1576		
	39-52	1635		
	52-69	1643		
	69-100	1709		

7. LIMITATIONS

The field evaluation and geophysical analyses presented in this report have been conducted in general accordance with current practice and the standard of care exercised by consultants performing similar tasks in the project area. No warranty, express or implied, is made regarding the conclusions, recommendations, and opinions presented in this report. There is no evaluation detailed enough to reveal every subsurface condition. Variations may exist and conditions not observed or described in this report may be present. Uncertainties relative to subsurface conditions can be reduced through additional subsurface exploration. Additional subsurface surveying will be performed upon request.

This document is intended to be used only in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. Atlas should be contacted if the reader requires additional information or has questions regarding the content, interpretations presented, or completeness of this document. This report is intended exclusively for use by the client. Any use or reuse of the findings, conclusions, and/or recommendations of this report by parties other than the client is undertaken at said parties' sole risk.

8. SELECTED REFERENCES

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ATLAS

City of Filmore
Sespe Creek Railroad
Fillmore, California

Project No.: 10208

Date: 09/23

Figure
1

SITE LOCATION MAP

ATLAS

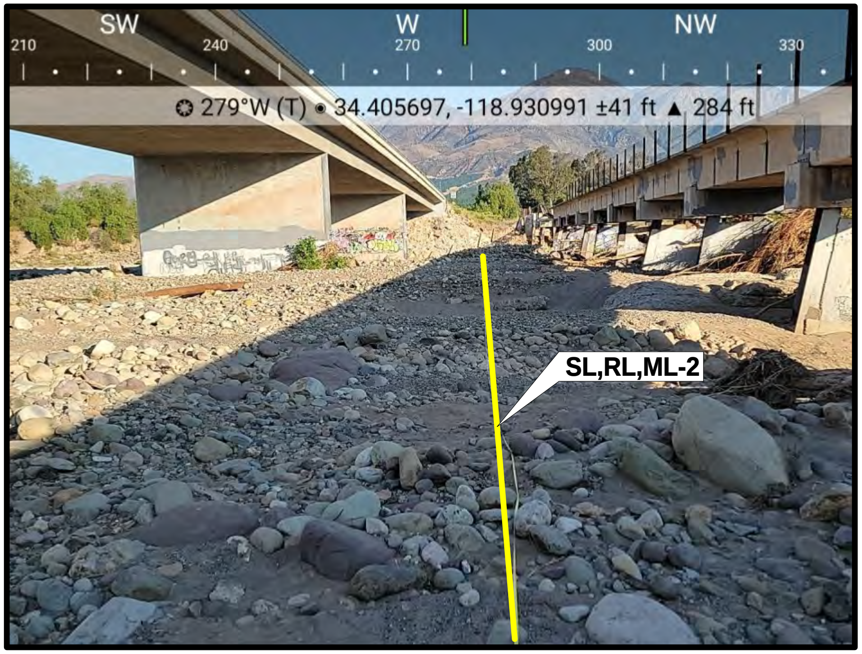
City of Filmore
Sespe Creek Railroad
Fillmore, California

Project No.: 10208

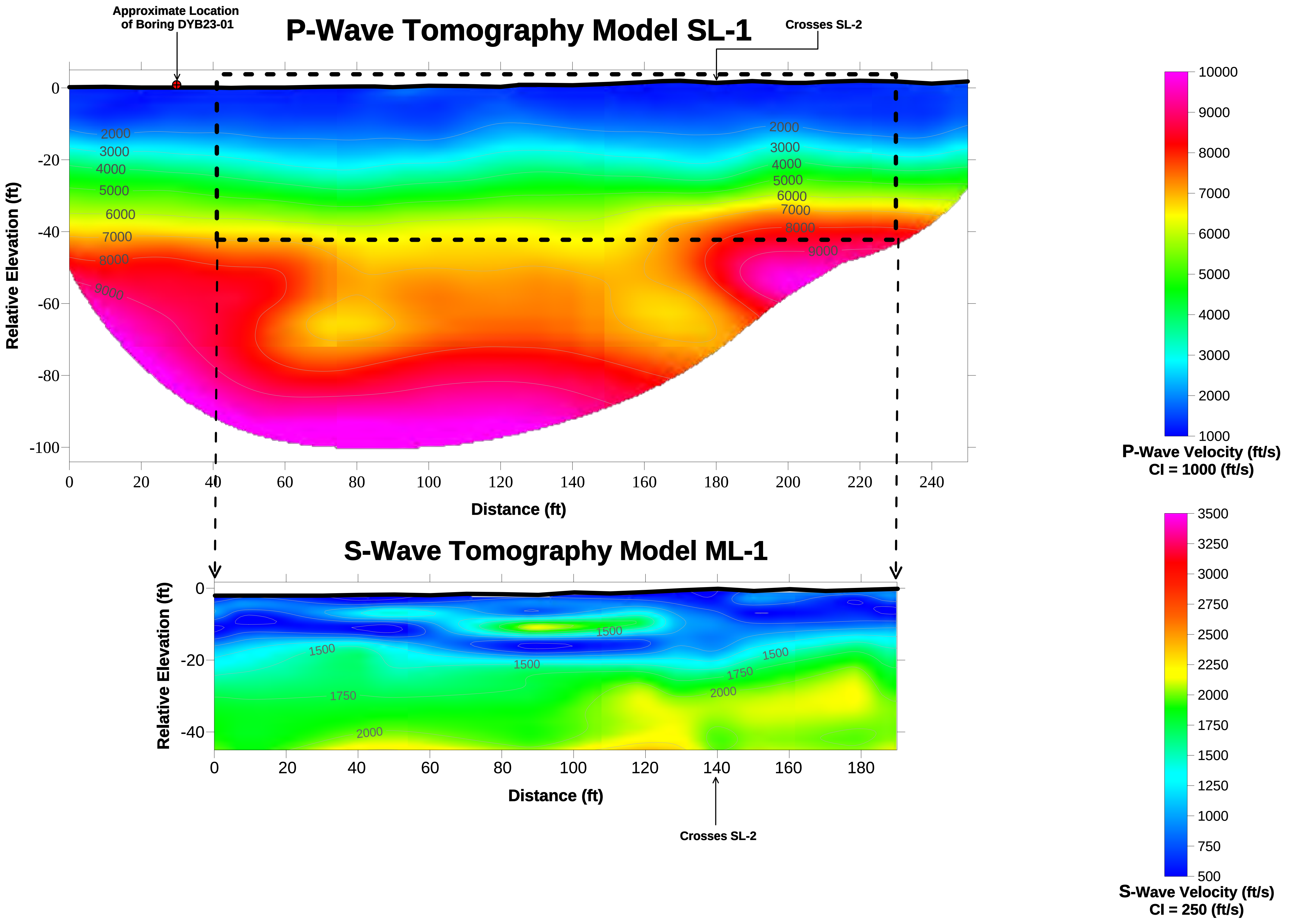
Date: 09/23

Figure
2

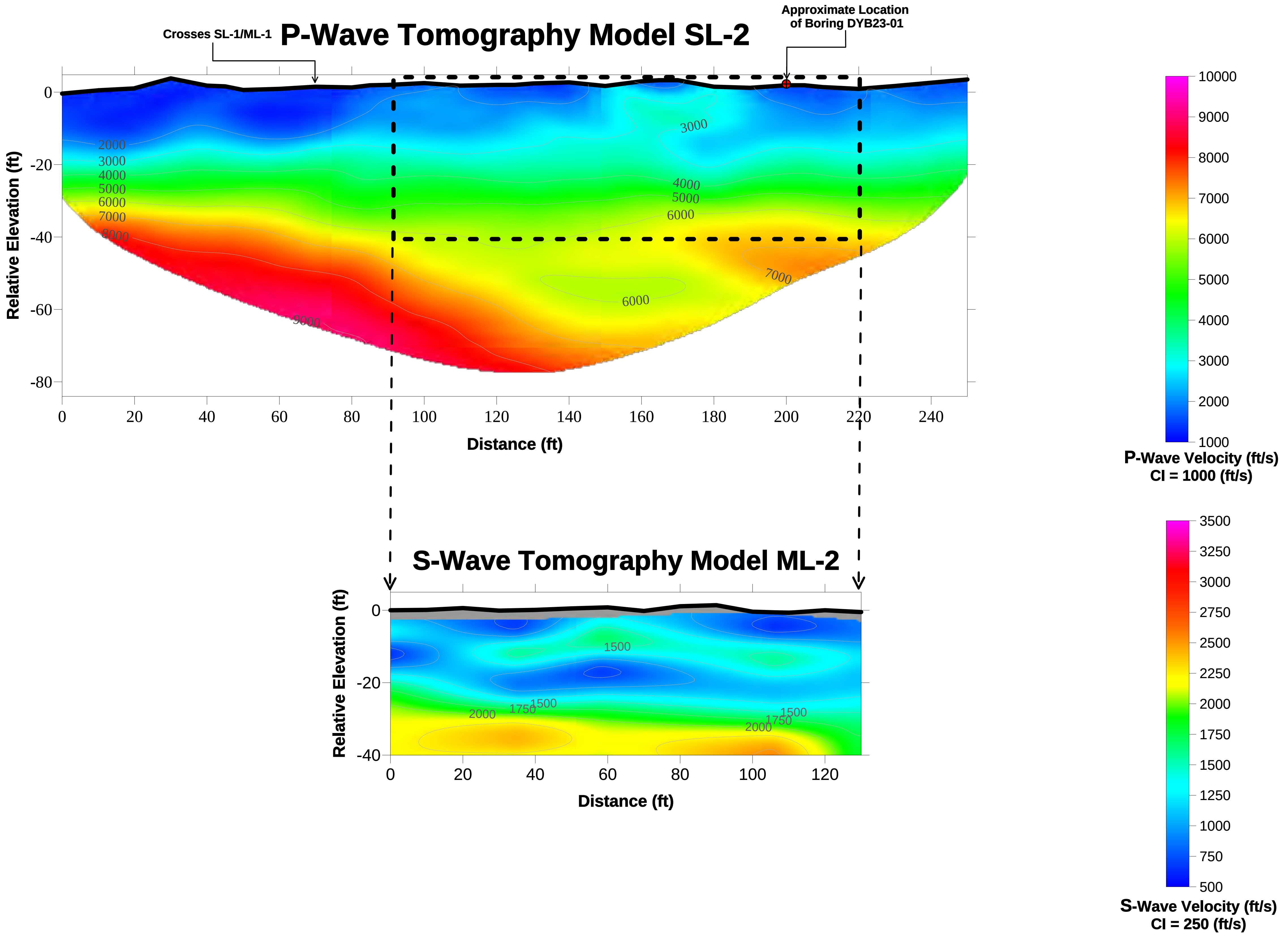
LINE LOCATION MAP



ATLAS	City of Filmore Sespe Creek Railroad Fillmore, California	Project No.: 10208 Date: 09/23	Figure 3	**SITE PHOTOGRAPHS**



	City of Filmore Sespe Creek Railroad Fillmore, California	Project No.: 10208	Figure 4a	**P-WAVE REFRACTION AND S-WAVE MASW PROFILES** **SL-1 and ML-1**
		Date: 09/23		



City of Filmore
Sespe Creek Railroad
Fillmore, California

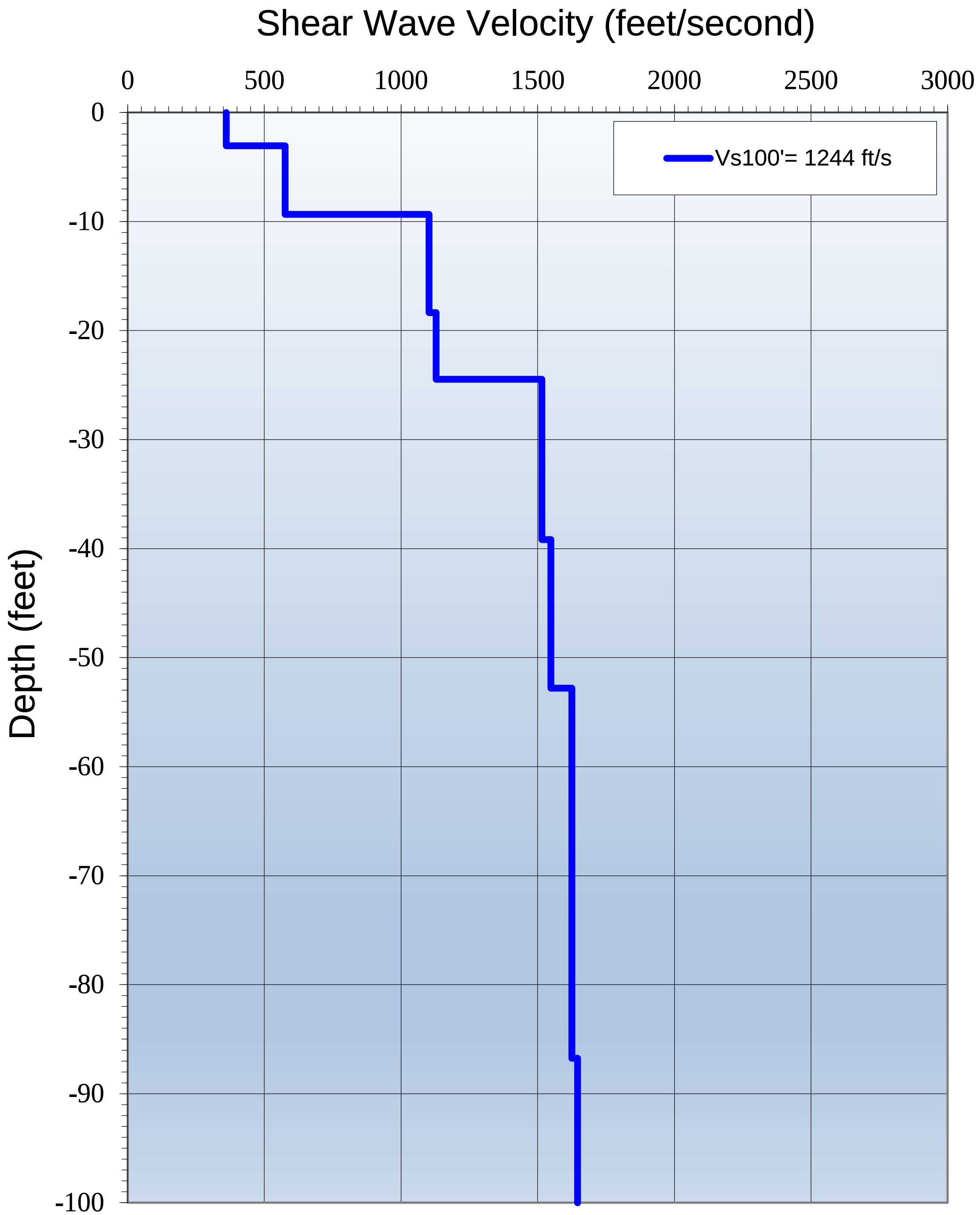
Project No.: 10208

Date: 09/23

Figure
4b

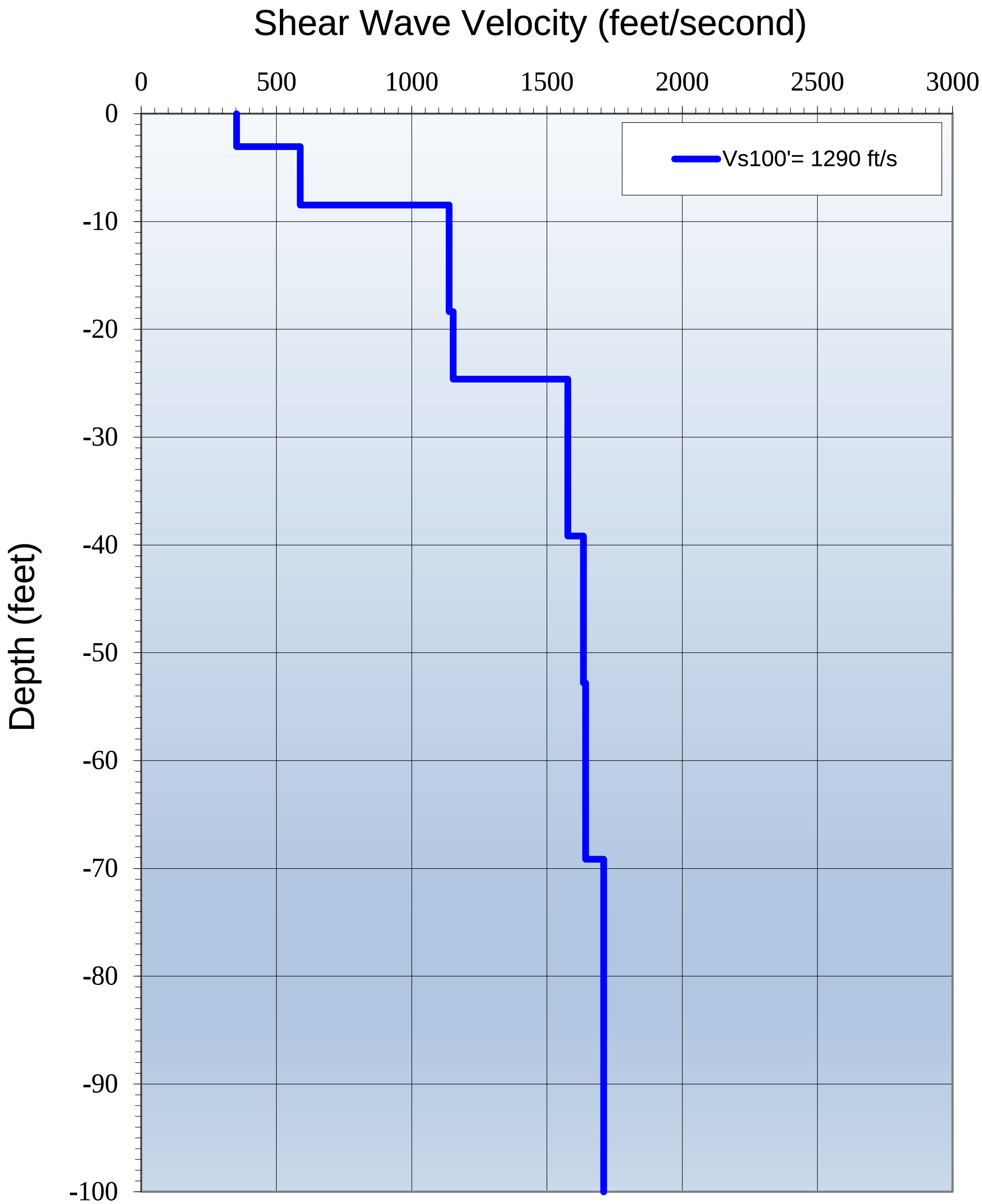
P-WAVE REFRACTION AND S-WAVE MASW PROFILES
SL-2 and ML-2

RL-1: Vs Model



ATLAS	City of Filmore Sespe Creek Railroad Fillmore, California	Project No.: 10208 Date: 09/23	Figure 4c	**REMI PROFILE** **RL-1**

RL-2: Vs Model



	City of Filmore Sespe Creek Railroad Fillmore, California	Project No.: 10208 Date: 09/23	Figure 4d	**REMI PROFILE** **RL-2**

APPENDIX E - LABORATORY TESTING

APPENDIX E - LABORATORY TESTING

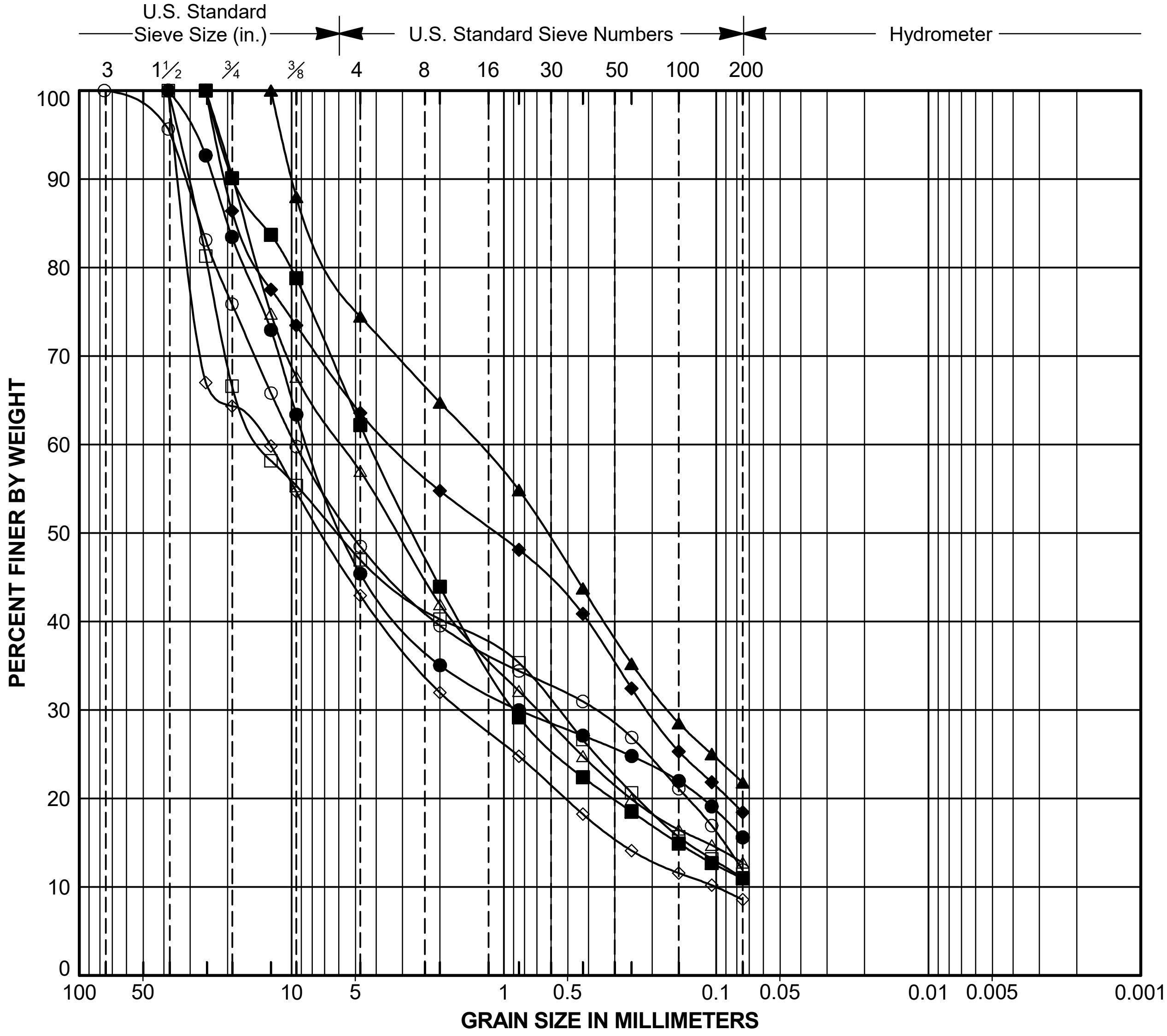
Diaz•Yourman & Associates (DYA) selected soil samples to be tested and the tests to be performed on the selected samples. Laboratory testing was performed by Hushmand Associates, Inc. Laboratory data are summarized on the boring logs in Appendix E and presented on Plates E1 through E25. A summary of the geotechnical laboratory testing is presented in Table E1.

Table E1 - LABORATORY TESTING SUMMARY

TEST NAME	PROCEDURE	PURPOSE	LOCATION
Percent Passing the No. 200 Sieve	ASTM D1140	Classification, index properties	Boring Logs
Moisture Content, Dry Density	ASTM D2216	Classification, index properties	Boring Logs
Grain-Size Distribution	ASTM D422	Classification, index properties	Plates E1 and E2
Atterberg Limits	ASTM D4318	Expansion potential, classification, index properties	Plates E3 and E4
pH	CTM 532	Corrosion potential	Plate E5
Resistivity	CTM 532	Corrosion potential	Plate E5
Soluble Sulfates	CTM 417-B	Corrosion potential	Plate E5
Soluble Chlorides	CTM 422	Corrosion potential	Plate E5

Note(s):
- ASTM = ASTM International
- CTM = Caltrans Test Method

Template: DY_SIEVE_DIAMETERS



COBBLES	GRAVEL		SAND			SILT or CLAY
	Coarse	Fine	Coarse	Medium	Fine	

Laboratory Testing by: Hushmand Associates, Incorporated

Symbol	Source	Depth (feet)	Classification	D15 (mm)	D50 (mm)	D85 (mm)	% Passing #200 Sieve	Cc	Cu
⊙	DYB23-01	0.0	POORLY GRADED GRAVEL WITH SILT AND SAND	0.09	5.22	27.00	12	0.222	145.475
□	DYB23-01	10.0	POORLY GRADED GRAVEL WITH SILT AND SAND	0.14	6.11	27.52	11	0.352	214.801
△	DYB23-01	15.0	CLAYEY SAND WITH GRAVEL (SC)	0.11	3.18	16.49	13		
◇	DYB23-01	20.0	WELL-GRADED GRAVEL WITH SILT AND SAND (G	0.28	7.21	31.69	9	1.962	125.708
●	DYB23-01	30.0	CLAYEY GRAVEL WITH SAND (GC)		5.67	20.04	16		
■	DYB23-01	55.0	WELL-GRADED GRAVEL WITH SILT AND SAND (G	0.15	2.67	13.63	11	2.973	68.494
▲	DYB23-01	60.0	CLAYEY SAND WITH GRAVEL (SC)		0.63	8.16	22		
◆	DYB23-02	20.0	SILTY SAND WITH GRAVEL (SM)		1.09	17.88	18		

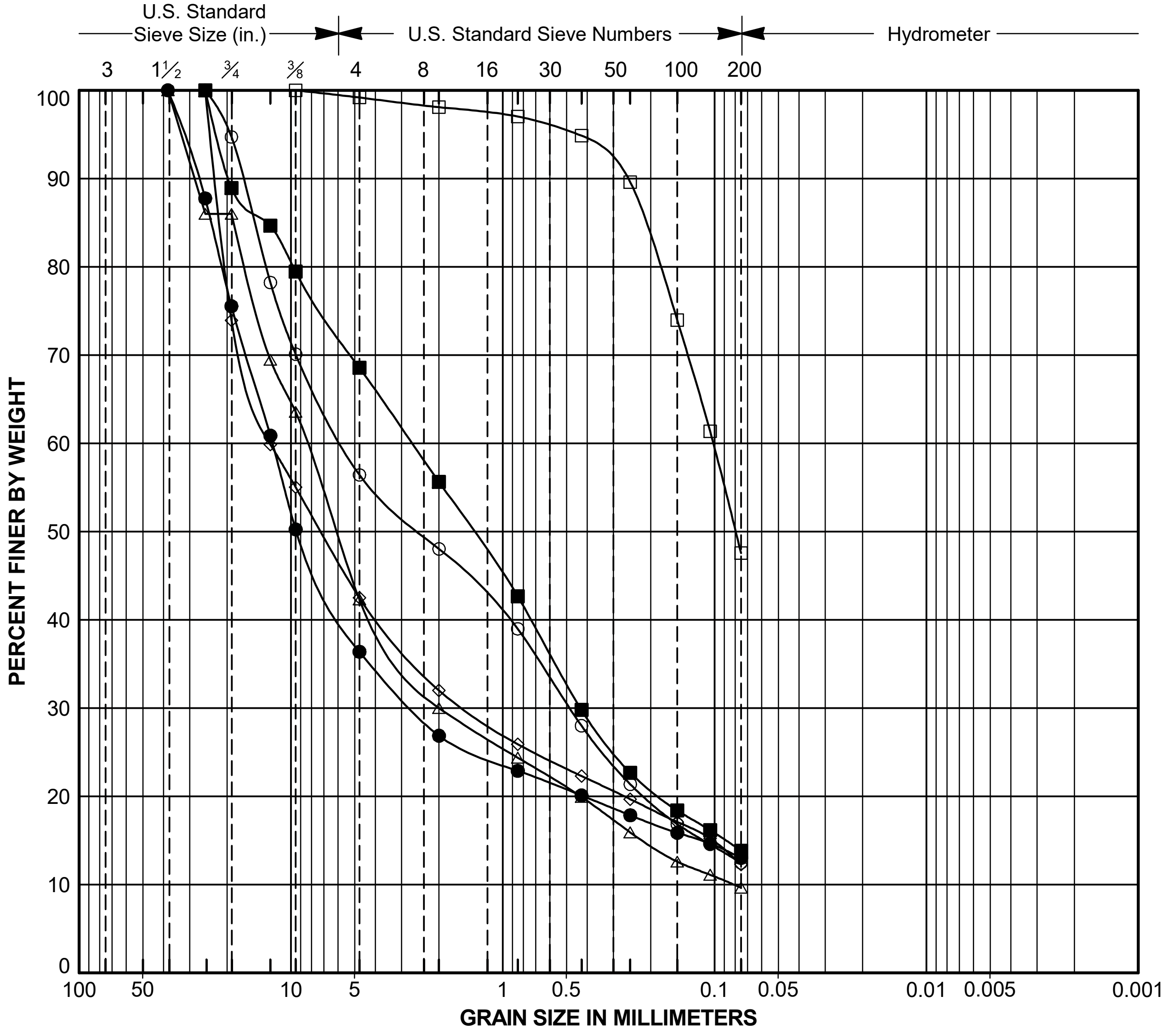
PARTICLE SIZE ANALYSIS

VCTC Sespe Creek Bridge
Project No. 2023-010

PLATE

E1

Template: DY_SIEVE_DIAMETERS



COBBLES	Coarse	Fine	Coarse	Medium	Fine	**SILT or CLAY**
	GRAVEL		**SAND**			

Laboratory Testing by: Hushmand Associates, Incorporated

Symbol	Source	Depth (feet)	Classification	D15 (mm)	D50 (mm)	D85 (mm)	% Passing #200 Sieve	Cc	Cu
⊙	DYB23-02	30.0	CLAYEY SAND WITH GRAVEL (SC)	0.11	2.45	14.88	12	0.811	112.998
□	DYB23-02	45.0	SILTY SAND (SM)		0.08	0.22	48		
△	DYB23-02	50.0	POORLY GRADED GRAVEL WITH CLAY AND SAND	0.22	6.11	18.62	10	5.807	103.895
◇	DYB23-02	60.0	CLAYEY GRAVEL WITH SAND (GC)	0.10	7.20	21.56	12	3.149	216.601
●	DYB23-02	80.0	CLAYEY GRAVEL WITH SAND (GC)	0.12	9.39	23.82	13		
■	DYB23-02	90.0	SILTY CLAYEY SAND WITH GRAVEL (SC-SM)	0.09	1.38	12.94	14		

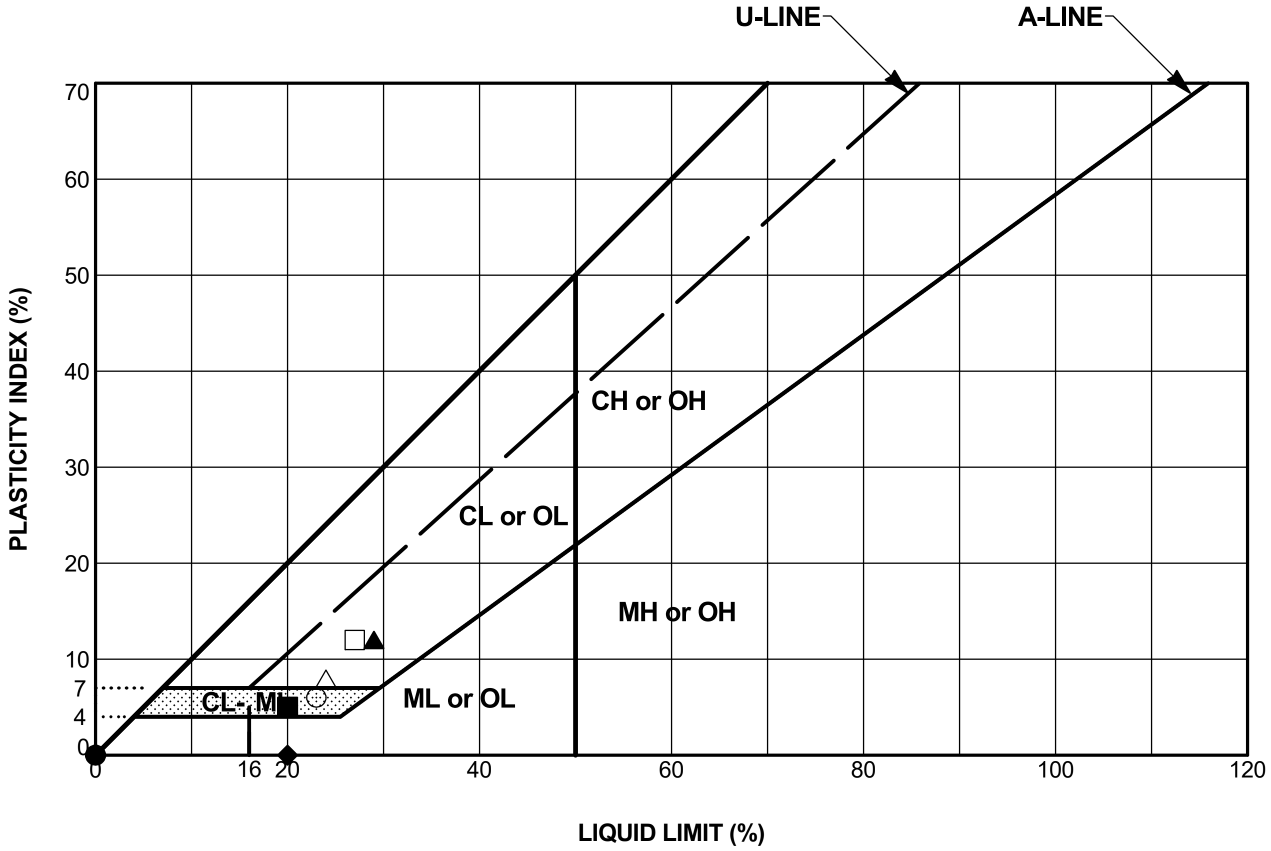
PARTICLE SIZE ANALYSIS

VCTC Sespe Creek Bridge
Project No. 2023-010

PLATE

E2

Template: DY_ATTERBERG_CHART_WIN



Laboratory Testing by: Hushmand Associates, Incorporated

Test Method: ASTM D4318

Symbol	Source	Depth (feet)	Classification	Natural M. C. (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	% Passing #200 Sieve
⊙	DYB23-01	15.0	CLAYEY SAND WITH GRAVEL (SC)		23	17	6	13
□	DYB23-01	35.0	CLAYEY SAND (SC)		27	15	12	14
△	DYB23-01	50.0	CLAYEY SAND (SC)		24	16	8	
◇	DYB23-01	70.0	POORLY GRADED SAND WITH SILT (SP-SM)		NP	NP	NP	11
●	DYB23-01	100.0	SILTY GRAVEL WITH SAND (GM)		NP	NP	NP	
■	DYB23-02	15.0	SILTY SAND WITH GRAVEL (SM)		20	15	5	19
▲	DYB23-02	40.0	SANDY LEAN CLAY (CL)		29	17	12	69
◆	DYB23-02	45.0	SILTY SAND (SM)		20	20	NP	48

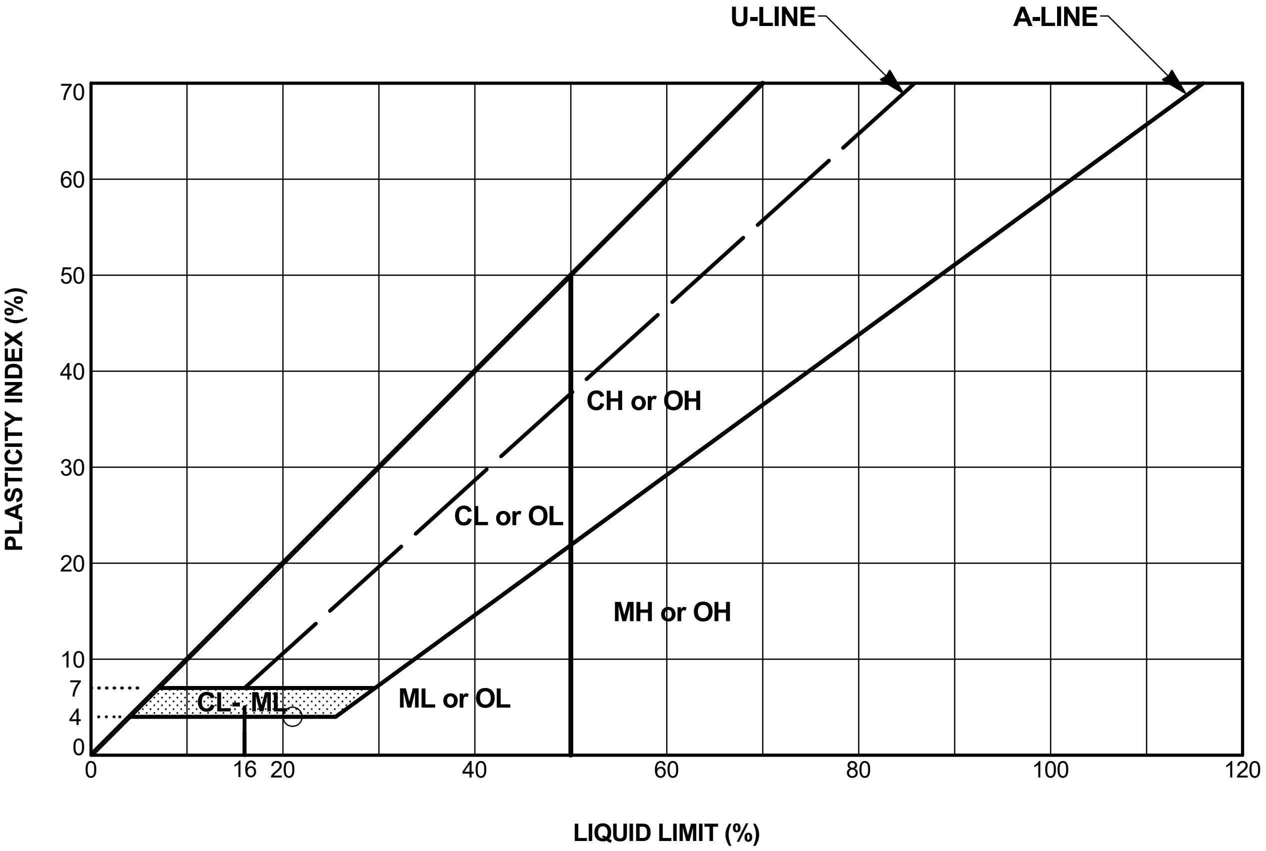
PLASTICITY CHART

VCTC Sespe Creek Bridge

Project No. 2023-010

PLATE

E3



Laboratory Testing by: Hushmand Associates, Incorporated

Test Method: ASTM D4318

Symbol	Source	Depth (feet)	Classification	Natural M. C. (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	% Passing #200 Sieve
⊙	DYB23-02	90.0	SILTY CLAYEY SAND WITH GRAVEL (SC-SM)		21	17	4	14

PLASTICITY CHART

VCTC Sespe Creek Bridge

Project No. 2023-010

PLATE

E4

Soil Analysis Lab Results

Client: HAI
Job Name: VCTC Sespe Creek Bridge
Client Job Number: DYAL-23-008 / 2023-010
Project X Job Number: S230802E
August 4, 2023

	Method	**ASTM D4327**		**ASTM D4327**		**ASTM G187**		**ASTM G51**
Bore# / Description	**Depth**	**Sulfates** SO_4^{2-}		**Chlorides** Cl^-		**Resistivity** **As Rec'd**	**Minimum**	**pH**
	(ft)	**(mg/kg)**	**(wt%)**	**(mg/kg)**	**(wt%)**	**(Ohm-cm)**	**(Ohm-cm)**	
DYB23-02 Bulk	0-5	531.9	0.0532	7.9	0.0008	16,750	1,541	7.2

Cations and Anions, except Sulfide and Bicarbonate, tested with Ion Chromatography
mg/kg = milligrams per kilogram (parts per million) of dry soil weight
ND = 0 = Not Detected | NT = Not Tested | Unk = Unknown
Chemical Analysis performed on 1:3 Soil-To-Water extract
PPM = mg/kg (soil) = mg/L (Liquid)

Note: Sometimes a bad sulfate hit is a contaminated spot. Typical fertilizers are Potassium chloride, ammonium sulfate or ammonium sulfate nitrate (ASN). So this is another reason why testing full corrosion series is good because we then have the data to see if those other ingredients are present meaning the soil sample is just fertilizer-contaminated soil. This can happen often when the soil samples collected are simply surface scoops which is why it's best to dig in a foot, throw away the top and test the deeper stuff. Dairy farms are also notorious for these items.

REVISION NO.	DATE	REVISION DESCRIPTION
Draft V1	10/13/2023	Preliminary Draft for Internal Review – 90% Design
Draft V2	10/26/2023	Draft for Agency Review – 90% Design
V2a	3/24/2025	Finalized Version

QUALITY CONTROL REVIEWER

Saroj P Weeraratne, PhD, PE, GE
Principal Engineer

DIAZ • YOURMAN
& ASSOCIATES
Geotechnical Services

MEMORANDUM

Date:	March 24, 2025	Project No:	2023-010.01
To:	Ms. Julina Corona, PE Railpros	From:	Ted Reinert, PE
cc:	Ms. Janet Yeung		

Subject: Rock Slope Protection at Abutment 1 – Addendum 1
Reconstruction of a Portion of the Sespe Creek Overflow Bridge
City of Fillmore, California

Diaz•Yourman & Associates (DYA) has prepared this addendum memorandum in response to a request from the Ventura County Transportation Commission (VCTC) and Railpros regarding the stability of the western abutment (Abutment 1) of the Sespe Creek Overflow Bridge (Bridge) that will be undergoing temporary Rock Slope Protection measures until a more permanent erosion countermeasure is installed. DYA previously provided recommendations for the subject project in our report titled *Geotechnical Report, Reconstruct A Portion of the Sespe Creek Overflow Railroad Bridge, City of Fillmore, California*, *dated October 26, 2023* (Report; DYA, 2023). The conclusions and recommendations provided in DYA's Report remain applicable unless modified herein.

This memo was prepared based on the following:

- Emails received from the Railpros project design team between February 14 to February 17, 2025.
- Project drawings prepared by Railpros (2024).
- DYA's previous geotechnical design services on the subject project, which were summarized in our report dated October 26, 2023 (Report, DYA, 2023).
- Our discussions with Railpros.
- Our experience and engineering judgement.

As described in DYA's Report, The Bridge and its western abutment (Abutment 1) were damaged during the January – March 2023 storm season, causing degradation of the abutment and a partial collapse of the Bridge. In our Report, DYA provided pile foundation recommendations to support a reconstructed Abutment 1. However, subsequent heavy storm events beginning in January 2024 have further degraded the slope around Abutment 1 and the adjacent Old Telegraph Road Bridge, necessitating emergency repairs to the slope to prevent further erosion from future storms. The temporary rock slope protection will be removed and reinstalled with the Bridge construction to return the Bridge into an operational condition, preventing a further erosion of the abutment while additional countermeasures are developed to protect the channel bank upstream of the railroad bridge, as shown on the project plans (Railpros, 2024) presented in Attachment 1.

https://diazyourman.sharepoint.com/sites/Projects/Shared Documents/2023/2023-010 VCTC Sespe Creek Rail Bridge/Report/Geotechnical Report/Addendum 1 - RSP Slope Stability/2023-010.01 Memo - Addendum 1 v1a.docx

1616 EAST 17th STREET, SANTA ANA, CALIFORNIA 92705-8509 (714) 245-2920 Fax: (714) 245-2950

SPBL-2025-01
SESPE CREEK OVERFLOW RAILROAD BRIDGE REPAIR
DATE ISSUED: 04/04/2025

As requested by Railpros, DYA has evaluated the stability of the proposed RSP-stabilized slopes parallel and perpendicular to the northern Bridge abutment.

DATA REVIEW AND SUBSURFACE CONDITIONS

To characterize the subsurface conditions at and near the location of the Task C1A improvements, DYA reviewed geotechnical data provided in our Report and others (DYA, 2023). Relevant excerpts from the referenced Report, which primarily consist of boring logs and laboratory test results, are presented in Attachment 2. Also presented in Attachment 2 is the site plan from DYA's report. DYA has reviewed and concurs with the geotechnical data presented in Attachment 2 and accepts responsibility for its use in our analysis.

The idealized subsurface profile used to perform our slope stability analysis are summarized in Table 1. Note that the subsurface profile in Table 1 is reflective of the site conditions within the immediate vicinity of the subject slopes located at Abutment 1 only.

Table 1 - IDEALIZED SOIL PROFILE – SESPE CREEK ABUTMENT 1

SOIL LAYER^{1,2}	ELEVATION^3 (feet)	DEPTH (feet)	TOTAL UNIT WEIGHT (pcf)	SHEAR STRENGTH		
				Total	Effective	
				S_u (psf^3)	φ' (degrees)	c' (psf)
Poorly-Graded Sand with Silt (SP-SM); Silty Sand (SM); ABUTMENT FILL	450 to 430	0 to 20	120	--	34	50
Poorly-Graded Sand with Silt and Gravel (SP-SM); Silty Sand with Gravel (SM); Clayey Sand with Gravel (SC); Poorly-Graded Gravel (GP); CREEK BED	430 to 412^4	20 to 38	125	--	38	50
Silty Sand with Gravel (SM); Clayey Sand with Gravel (SC); Lean Clay with Sand and Gravel (CL)^5	412 to 407	38 to 43	125	2,000	--	--
Poorly-Graded Gravel with Silt and Sand (GP-GM); Clayey Sand with Gravel (SC); Silty Sand with Gravel (SM)	407 to 378	43 to 72	125	--	38	50
Clayey Gravel with Sand (GC); Silty, Clayey Gravel with Sand (GC-GM); Silty Sand with Gravel (SM)	378 to 330	72 to 120	125	--	38	50

Note(s):

1. Unified Soil Classification System.
2. Soils are not homogeneous and not in layers. Simplified geotechnical design profile was developed considering the proposed lightly loaded structures and subsurface conditions encountered at the site.
3. Elevation based on NAVD88.
4. Groundwater encountered at an elevation of 423 feet.

- pcf = pounds per cubic foot.
- The site is highly variable with layers boulders, cobbles, and gravel, and those materials can be encountered at any depth.
- This profile can be used for both the abutments and the bents. See Note 5 for the layer that corresponds to the abutment location only.

SLOPE STABILITY

Based on the drawings provided by Railpros (2024) the proposed RSP-protected slopes will be constructed on the Abutment 1 face as well as along the northern portion of the Abutment 1 embankment, parallel to the railroad tracks. Based on our discussions and our review of the Railpros (2024) drawings, the proposed RSP-protected slopes will be approximately 30 feet high, with a slope of 1.5:1 horizontal:vertical (H:V) slope. Two wingwalls will be placed at Abutment 1, and compacted structural backfill will be placed in between the wingwalls prior to RSP placement. For the portion of the RSP-protected slope perpendicular to the railroad tracks, we assumed that no wingwall would be present, therefore no compacted fill would be placed underneath the RSP-protected slope. Slope stability analyses were performed to evaluate the global stability of the slope at Abutment 1 with the wingwall present, as well as along the portion of the Abutment 1 perpendicular to the track (i.e., without the wingwall present).

The slope stability analyses consisted of evaluating the proposed slope under static conditions using the computer program SLIDE2 (Rocscience, 2024). The soil parameters in Table 1 were used as the basis for our analysis. The analysis was performed for the most critical section using the Spencer method. The results indicated that the calculated factor of safety (FS) for the most critical slope section was greater than 1.5 for the static case for the RSP-protected slopes both parallel to and perpendicular to the railroad tracks. The slope stability analysis outputs are presented for reference in Attachment 3.

We appreciate the opportunity to continue to provide our services to you on this project. Please call if you have any questions.

Sincerely,

DIAZ•YOURMAN & ASSOCIATES

Ted Reinert
Civil Engineer 86311

TR:kc

Attachment 1: Project Plans

Attachment 2: Previous Geotechnical Data

Attachment 3: Slope Stability Calculations

REFERENCES

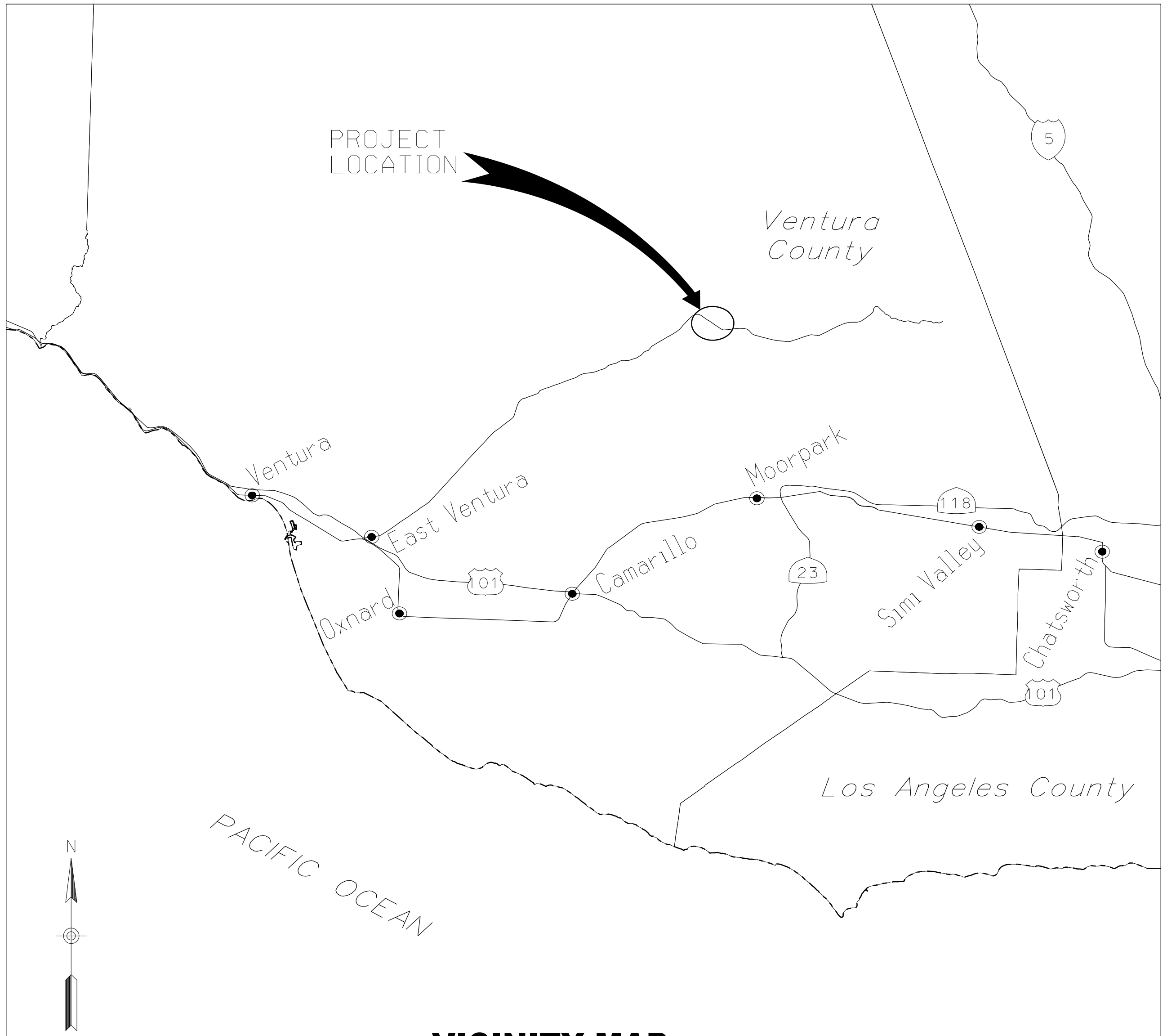
Diaz•Yourman & Associates, 2023, Geotechnical Report, Reconstruct A Portion of the Sespe Creek Overflow Railroad Bridge, City of Fillmore, California, October 26, 2023 (Finalized March 24, 2025).

Railpros, 2024, Ventura County Transportation Commission, Sespe Creek Bridge Overflow, Santa Paula Branch Line, Fillmore, CA, 100% Submittal Project Drawings, dated January 4, 2024.

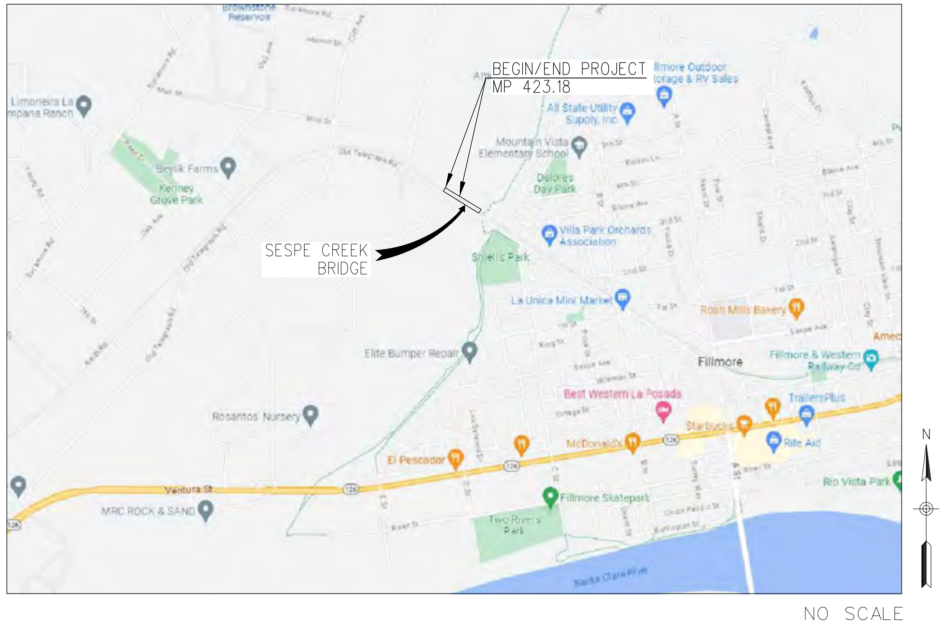
Rocscience, 2024, SLIDE 2 computer program, version 9.010, Accessed March 2025.

ATTACHMENT 1

VENTURA COUNTY TRANSPORTATION COMMISSION
SESPE CREEK BRIDGE OVERFLOW
SANTA PAULA BRANCH LINE, FILLMORE, CA



VICINITY MAP



LOCATION MAP

JANUARY 4, 2024

100% SUBMITTAL

NOT FOR CONSTRUCTION

RAILPROS

APPROVED BY: ____________________ DATE: __________

SUBMITTED BY: ____________________ DATE: __________
JULINA CORONA, P.E.
PROJECT MANAGER, RAILPROS

VCTC

12/28/2023 USER = christian.arellano
Z:\Engineering\VCTC\Sespe Creek Bridge Overflow\900 CADD\950 Drawings\Track\VCTC_SCB_G-001.dgn
Z:\Engineering\VCTC\Sespe Creek Bridge Overflow\900 CADD\950 Drawings\Plot Drivers\PlotStamp.tbl
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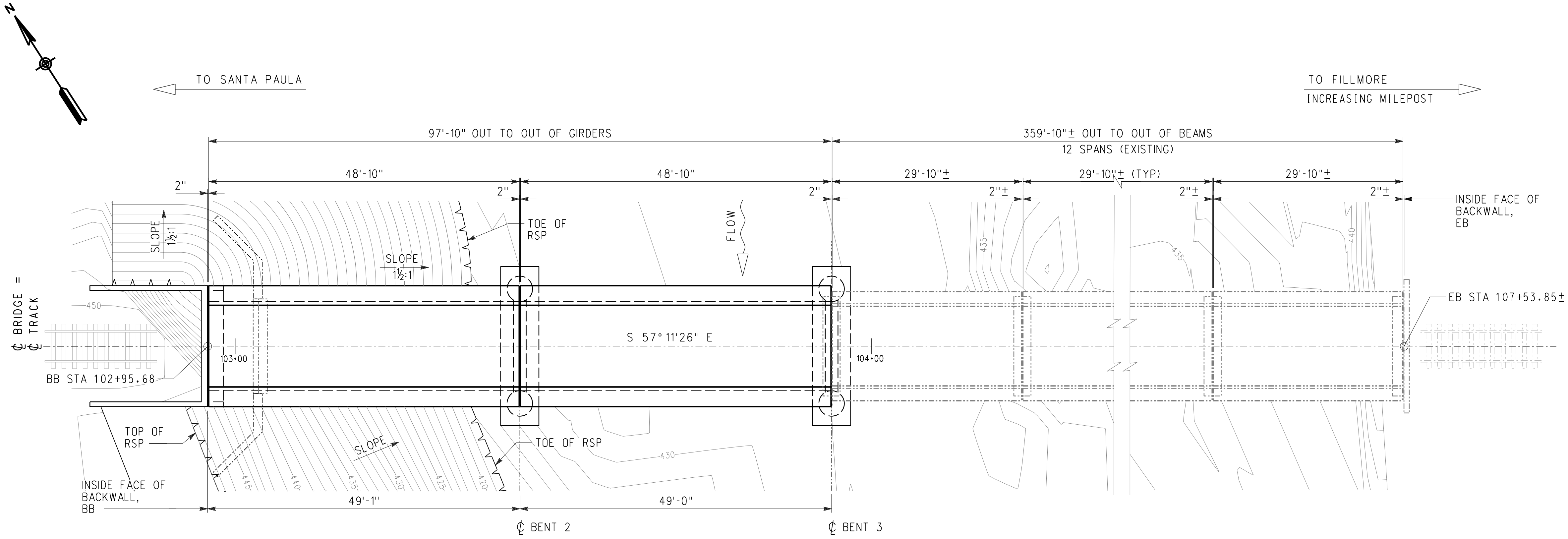
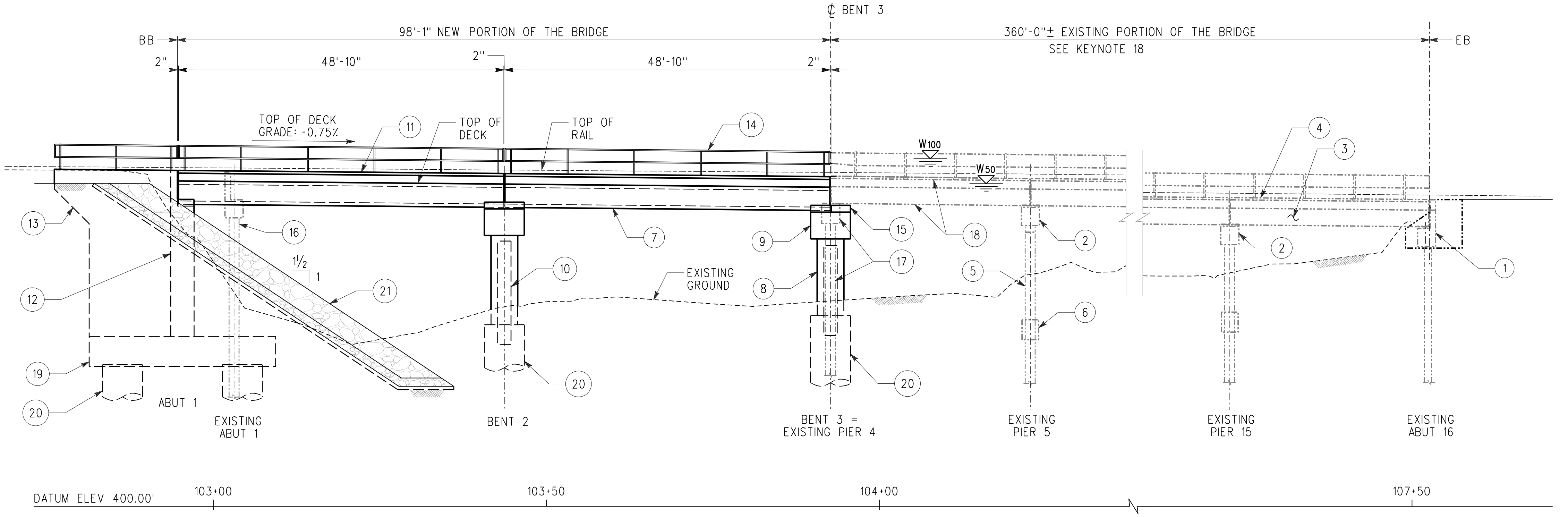


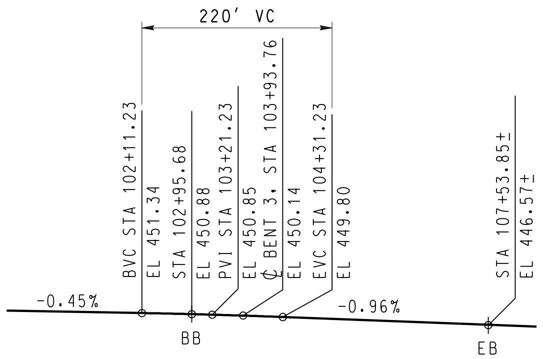
PLAN

SCALE: 1"=10'



ELEVATION

SCALE: 1"=10'



PROFILE GRADE - ℄ TRACK

NO SCALE

RAILROAD DATA

MILEPOST:	423.18
SUBDIVISION:	FILLMORE & WESTERN RAILWAY CO
DOT #:	NONE
CITY:	FILLMORE
COUNTY:	VENTURA
STATE:	CALIFORNIA
LATITUDE:	34° 24' 22.78" N
LONGITUDE:	118° 55' 55.13" W

KEYNOTES

①	EXISTING CONCRETE ABUTMENT
②	EXISTING CONCRETE BENT CAP
③	EXISTING CONCRETE GIRDER
④	EXISTING CONCRETE WALKWAY
⑤	EXISTING STEEL PILES WITH IN-FILL WALL
⑥	EXISTING CONCRETE COLLAR
⑦	PRECAST PRESTRESSED CONCRETE DOUBLE-BOX BRIDGE
⑧	CONCRETE COLUMN, 4'-0"Ø
⑨	CONCRETE BENT CAP
⑩	CONCRETE IN-FILL WALL
⑪	CONCRETE WALKWAY
⑫	CONCRETE ABUTMENT
⑬	CONCRETE WINGWALL
⑭	HANDRAIL
⑮	CATCHER BLOCK
⑯	EXISTING ABUTMENT, IN-FILL WALL & STEEL PILES TO BE REMOVED
⑰	EXISTING BENT, IN-FILL WALL & STEEL PILES TO BE REMOVED
⑱	EXIST CONC GIRDERS, RAILING AND WALKWAYS TO BE REMOVED AND RE-INSTALLED BETWEEN NEW BENT 3 AND EXIST PIERS 5
⑲	CONCRETE PILE CAP
⑳	CIDH CONCRETE PILES, 6'-0"Ø
㉑	ROCK SLOPE PROTECTION (RSP)

LEGEND

-·-·-·-	INDICATES EXISTING STRUCTURE
———	INDICATES NEW STRUCTURE
W100	INDICATES 100-YEAR FLOOD LEVEL = ELEV 452.18
W50	INDICATES 50-YEAR FLOOD LEVEL = ELEV 448.45

NOTES

1. FOR TYPICAL SECTIONS, SEE "GENERAL PLAN NO. 2" SHEET.
2. SCOPE OF WORK IS TO REMOVE AND REPLACE DAMAGED STRUCTURE AND COMPONENTS. EVALUATION NOT PERFORMED ON REMAINING UNDAMAGED STRUCTURE.

12/21/2023 8:30:41 AM USER = gerry.estepa
Z:\Engineering\VCTC\Sespe Creek Bridge Overflow\900 CADD\950 Drawings\S-001_GeneralPlan 1.sht
Y:\Microstation\CADD Standard (All Agency)\MetroLink-SCRRA\WorkSpace\Standards\Tables\Pen\PlotStamp-HalfSize.tbl
Y:\Microstation Connect\Configuration\WorkSpaces\SCRRA-Structures\Standards\Pltcfg\pdf_11x17.pltcfg

FINAL DESIGN (100%)
NOT FOR CONSTRUCTION

REV.	DATE	BY / SUB.	APP.

INFORMATION CONFIDENTIAL:
All plans, drawings, specifications, and or information furnished herewith shall remain the property of the Ventura County Transportation Commission and shall be held confidential; and shall not be used for any purpose not provided for in agreements with the Ventura Country Transportation Commission.

DESIGNED BY H. KAZEM
DRAWN BY G. ESTEPA
CHECKED BY H. YANG
APPROVED BY M. SARWAR
DATE 12-25-2023

MUHAMMAD SARWAR
No. C68399
EXP: 09-30-25

VENTURA COUNTY
TRANSPORTATION
COMMISSION

RAILPROS

SUBMITTED: ____________
JULINA R. CORONA, P.E.
PROJECT MANAGER

SESPE CREEK BRIDGE OVERFLOW
SANTA PAULA BRANCH LINE, FILLMORE, CA

GENERAL PLAN NO. 1

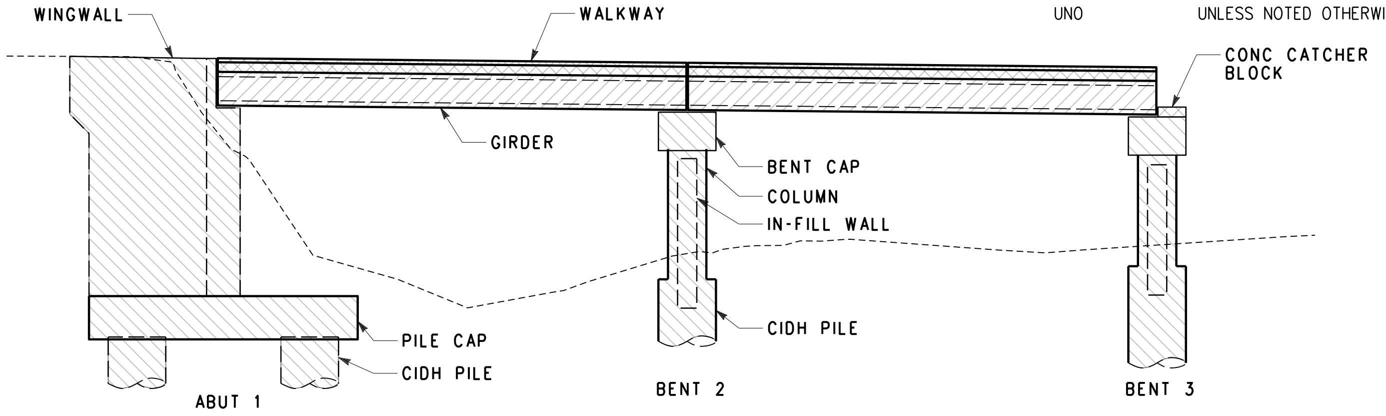
CONTRACT NO.
DRAWING NO. S-001
REVISION
SHEET NO. 10 OF 29
SCALE AS SHOWN

GENERAL NOTES:

DESIGN CRITERIA:	AMERICAN RAILWAY AND MAINTENANCE-OF-WAY ASSOCIATION (AREMA), 2023 EDITION SOUTHERN CALIFORNIA REGIONAL RAILROAD AUTHORITY (SCRRA) DESIGN CRITERIA FEB, 2022
LIVE LOAD:	COOPER E-80
PROJECT SPECIFICATIONS:	SCRRA STANDARD SPECIFICATIONS MAY 2022
GEOTECHNICAL DATA:	GEOTECHNICAL REPORT RECONSTRUCT A PORTION OF THE SESPE CREEK OVERFLOW RAILROAD BRIDGE CITY OF FILLMORE, CALIFORNIA, PROJECT NO. 2023-010 DATED: OCTOBER 13, 2023, PREPARED BY: DIAZ & YOURMAN & ASSOCIATES (1616 EAST 17TH STREET, SANTA ANA, CA 92705-8509, (714) 245-2920)
LATERAL EARTH PRESSURE:	UNIT WEIGHT OF EARTH FILLING MATERIALS, γs = 120 PCF EQUIVALENT AT-REST PRESSURE COEFFICIENT, k0 = 0.47 EQUIVALENT ACTIVE PRESSURE COEFFICIENT, ka = 0.31 EQUIVALENT PASSIVE PRESSURE COEFFICIENT, kp = 3.25
SEISMIC LATERAL DATA:	AREMA LEVEL 1 Δkae, 95YR (SERVICEABILITY) = 0.07 AREMA LEVEL 2 Δkae, 475YR (ULTIMATE) = 0.15 AREMA LEVEL 3 Δkae, 2475YR (SURVIVABILITY) = 0.35 CALTRANS Δkae, 975YR = 0.28
PGA:	AREMA LEVEL 1, 95YR (SERVICEABILITY) = 0.19G AREMA LEVEL 2, 475YR (ULTIMATE) = 0.44G AREMA LEVEL 3, 2475YR (SURVIVABILITY) = 0.82G CALTRANS, 975YR = 0.72G

CONCRETE STRENGTH AND TYPE LIMITS

REINFORCED CONCRETE:	f'c = 4.0 KSI @ 28 DAYS UNLESS NOTED OTHERWISE
REINFORCING BARS:	fy = 60 KSI, ASTM A706 GRADE 60
REINFORCING BAR COUPLERS:	REINFORCING BAR MECHANICAL COUPLERS SHALL BE "SERVICE SPLICE" SELECTED FROM CALTRANS AUTHORIZED MATERIAL LIST AT "HTTPS://DOT.CA.GOV/PROGRAMS/ENGINEERING-SERVICES/AUTHORIZED-MATERIALS-LISTS"



LEGEND:

▨ STRUCTURAL PRECAST CONCRETE, (f'c = 4 KSI AT 28 DAYS)

▨ PRESTRESSED CONCRETE, SEE "GIRDER DETAILS NO. 2" SHEET

▨ STRUCTURAL CONCRETE BRIDGE, (f'c = 4 KSI AT 28 DAYS)

ABBREVIATIONS:

AREMA	AMERICAN RAILWAY ENGINEERING AND MAINTENANCE OF WAY ASSOCIATION
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
BB	BEGINNING OF BRIDGE
BC	BEGINNING OF CURVE
BOT	BOTTOM
BRG	BEARING
BVC	BEGINNING OF VERTICAL CURVE
CALTRANS	CALIFORNIA DEPARTMENT OF TRANSPORTATION
CIDH	CAST-IN-DRILLED HOLE
CIP	CAST-IN-PLACE
CLR	CLEAR, CLEARANCE
CONC	CONCRETE
EA	EACH
EB	END OF BRIDGE
EC	END OF CURVE
ELEV, EL	ELEVATION
EMBED	EMBEDMENT
EVC	END OF VERTICAL CURVE
EXIST	EXISTING
EXP JT	EXPANSION JOINT
FG	FINISHED GRADE
FT	FOOT, FEET
HMA	HOT MIXED ASPHALT
KIPS	1000 POUNDS-FORCE
KSI	1000 POUNDS-FORCE PER SQUARE INCH
LOL	LAYOUT LINE
MAX	MAXIMUM
MIN	MINIMUM
MP	MILEPOST
NA, N/A	NOT APPLICABLE
NO.	NUMBER
PC	PRECAST
PCF	POUND-FORCE PER CUBIC FOOT
PCI	POUND-FORCE PER CUBIC INCH
PS	PRESTRESSED
PVI	POINT OF VERTICAL INTERSECTION
REINF	REINFORCING
RSP	ROCK SLOPE PROTECTION
R/W, ROW	RIGHT OF WAY
RW	RETAINING WALL
RWLOL	RETAINING WALL LAYOUT LINE
SCRRA	SOUTHERN CALIFORNIA REGIONAL RAILROAD AUTHORITY
SSPWC	STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION
SYM	SYMMETRICAL
T/R, TOR	TOP OF RAIL
TOC	TOP OF CONCRETE
TOT	TOTAL
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE

INDEX OF DRAWINGS:

CONSTRUCTION NOTE:

1. CONTRACTOR SHALL FIELD VERIFY AND CALCULATE THE SEAT ELEVATIONS FOR THE NEW ABUTMENT AND BENTS TO MAINTAIN THE TRACK PROFILE BEFORE FABRICATION OR ORDERING ANY MATERIALS.

12/21/2023 8:30:47 AM USER = gerry.estepa
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REV.	DATE		BY / SUB.	APP.

FINAL DESIGN (100%)
NOT FOR CONSTRUCTION

DESIGNED BY H. KAZEM
DRAWN BY G. ESTEPA
CHECKED BY H. YANG
APPROVED BY M. SARWAR
DATE 12-25-2023

No. C68399
EXP: 09-30-25

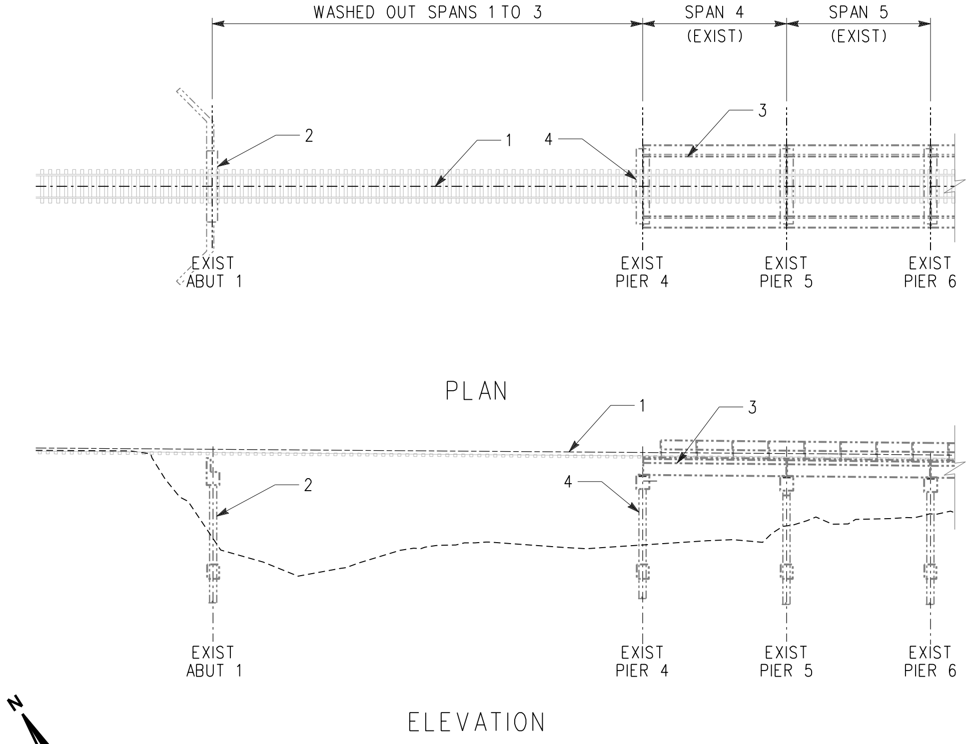
VENTURA COUNTY
TRANSPORTATION
COMMISSION

SUBMITTED: ______
JULINA R. CORONA, P.E.
PROJECT MANAGER

SESPE CREEK BRIDGE OVERFLOW
SANTA PAULA BRANCH LINE, FILLMORE, CA

GENERAL NOTES AND INDEX OF DRAWINGS

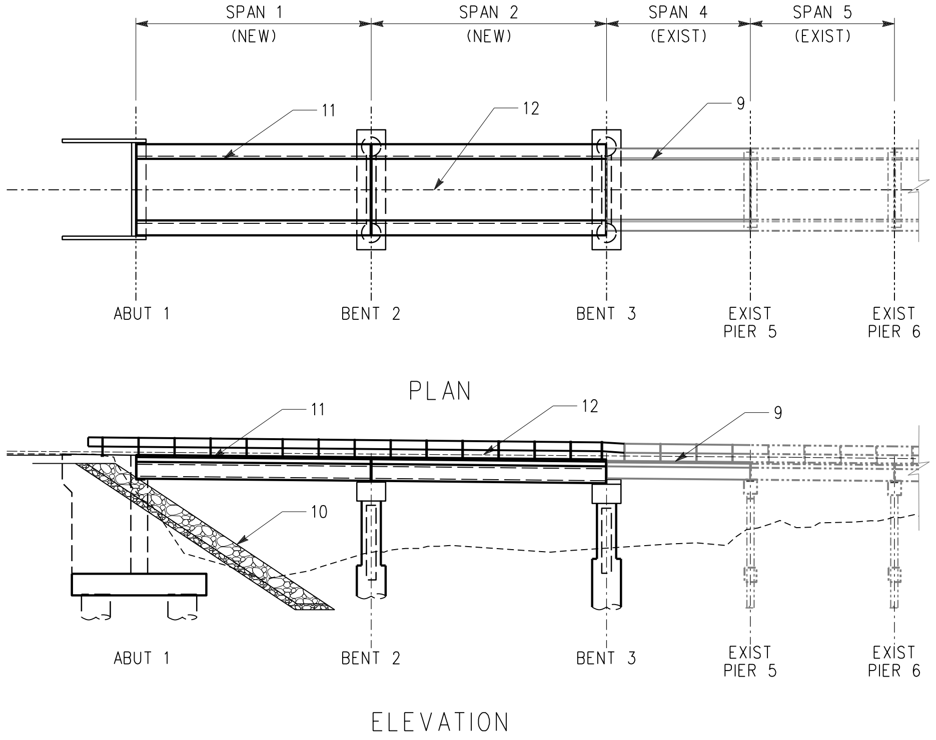
CONTRACT NO.
DRAWING NO. S-003
REVISION
SHEET NO. 12 OF 29
SCALE NO SCALE



CONSTRUCTION STAGE 1

NOTES - STAGE 1:

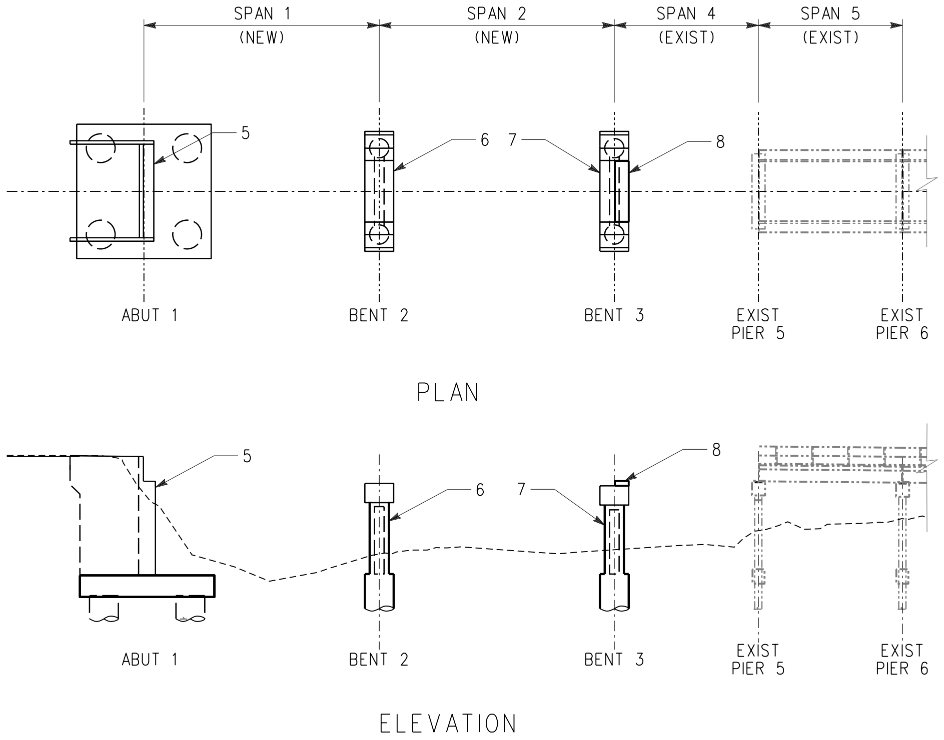
1. REMOVE EXISTING TRACKS & TIES. CUT RAILS FROM 50 FT BEFORE ABUTMENT 1 TO MIDPOINT OF EXISTING SPAN BETWEEN EXISTING PIERS 5 AND 6
2. DEMOLISH EXISTING LEFT OVER ABUTMENT 1 AND REMOVE EXISTING STEEL PILES
3. REMOVE EXISTING CONCRETE GIRDERS & HANDRAILS IN SPAN BETWEEN EXISTING PIERS 4 AND 5. EXISTING GIRDERS TO BE REPAIRED (AS NEEDED)/REINSTALLED AT A LATER CONSTRUCTION STAGE
4. DEMOLISH EXISTING PIER 4 AND REMOVE EXISTING STEEL PILES, IN-FILL WALL & CONCRETE BRACE



CONSTRUCTION STAGE 3 - FINAL

NOTES - STAGE 3, FINAL:

9. RE-INSTALL SPAN 4 SUPERSTRUCTURE INCLUDING GIRDERS, WALKWAYS & HANDRAILS
10. BUILD ROCK SLOPE PROTECTION FOR ABUTMENT 1
11. INSTALL NEW SUPERSTRUCTURE ON SPANS 1 AND 2 INCLUDING WALKWAYS AND HANDRAILS
12. INSTALL STEEL PLATES, GIRDER RESTRAINERS, HMA, BALLAST, TRACKS & TIES



CONSTRUCTION STAGE 2

NOTES - STAGE 2:

5. BUILD ABUTMENT 1 AND WINGWALLS
6. BUILD BENT 2 AND INFILL WALL
7. BUILD BENT 3 AND INFILL WALL
8. INSTALL PRECAST CONCRETE CATCHER BLOCK ON BENT 3

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REV. | DATE | BY/SUB. | APP.

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DESIGNED BY H. KAZEM
DRAWN BY G. ESTEPA
CHECKED BY H. YANG
APPROVED BY M. SARWAR
DATE 12-25-2023

MUHAMMAD SARWAR
No. C68399
EXP: 09-30-25

VENTURA COUNTY
TRANSPORTATION
COMMISSION

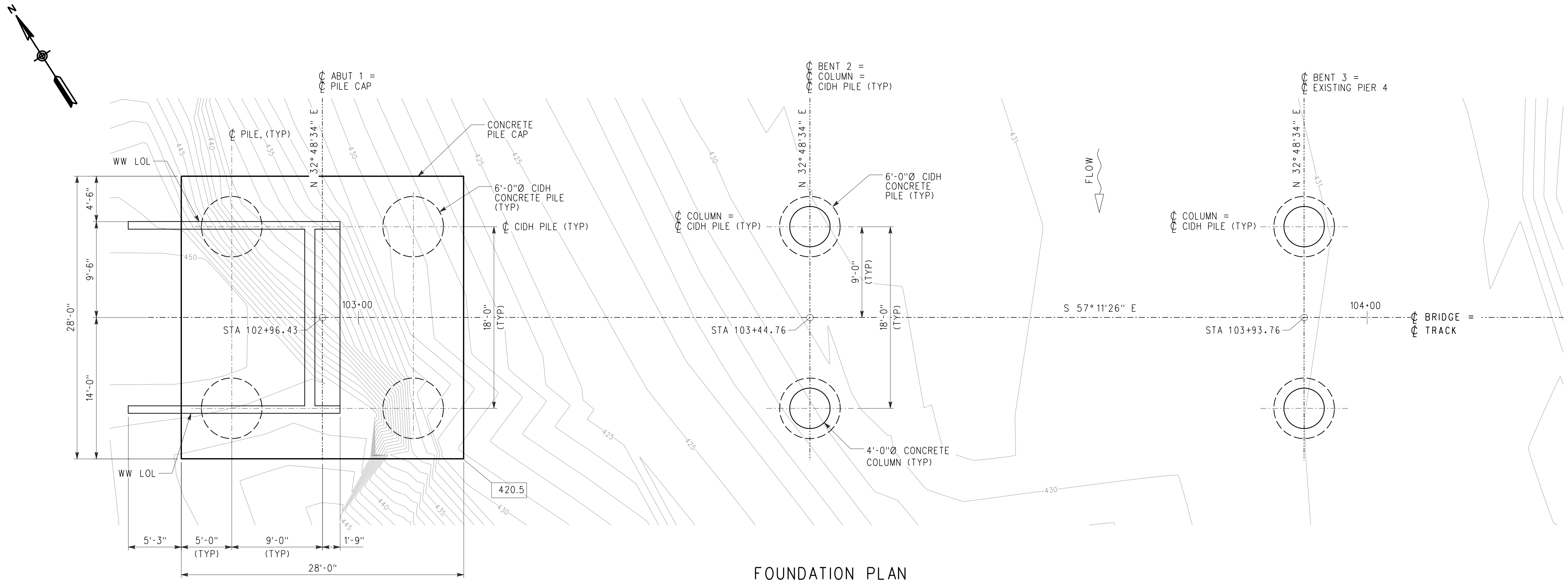
RAILPROS

SUBMITTED: ____________
JULINA R. CORONA, P.E.
PROJECT MANAGER

SESPE CREEK BRIDGE OVERFLOW
SANTA PAULA BRANCH LINE, FILLMORE, CA

STAGE CONSTRUCTION PLAN

CONTRACT NO.
DRAWING NO. S-004
REVISION
SHEET NO. 13 OF 29
SCALE NO SCALE



FOUNDATION PLAN

SCALE: 3⁄16" = 1'-0"

HYDRAULOGICAL DATA

50 YEAR FLOOD LEVEL = 448.45
100 YEAR FLOOD LEVEL = 452.18

PILE DATA TABLE

LOCATION	PILE TYPE	NOMINAL RESISTANCE (kips)		PILE CUT-OFF ELEVATION (ft)	DESIGN TIP ELEVATION (ft)	SPECIFIED TIP ELEVATION (ft)	NOMINAL DRIVING RESISTANCE (kips)
		COMPRESSION	TENSION				
ABUT 1	72"Ø CIDH	716	0	420.75	(a) 322.25 (c) 378.25 (d) 355.75	322.25	N/A
BENT 2	72"Ø CIDH	778	304	425.00	(a) 350.0 (b) 392.0 (c) 364.0 (d) 355.0	350.00	N/A
BENT 3	72"Ø CIDH	778	304	429.00	(a) 354.0 (b) 396.0 (c) 368.0 (d) 359.0	354.00	N/A

NOTES:
1. DESIGN TIP ELEVATIONS ARE CONTROLLED BY: (a) COMPRESSION, (b) TENSION, (c) SETTLEMENT, AND (d) LATERAL LOAD.
2. THE SPECIFIED TIP ELEVATION FOR DRIVEN PILES MUST NOT BE RAISED ABOVE THE DESIGN TIP ELEVATIONS FOR SETTLEMENT AND LATERAL LOAD. THE SPECIFIED TIP ELEVATION FOR CIDH PILES MUST NOT BE RAISED.

BENCH MARK

POINT NUMBER	NORTHING	EASTING	ELEV (FT)	DESCRIPTION
500	1971511.827	6280526.913	457.84'	CUT X CONC ON WB SIDE OF BRIDGE 27' EAST OF WEST EXP JT
501	1971316.983	62808728.833	458.67'	CUT X CONC ON WB SIDE OF BRIDGE 94' EAST OF WEST EXP JT
502	1971336.612	6280917.852	446.28'	3.5" USC&GS BRASS BM DISK STAMPED "S12188, 1971" ON SE ABUTMENT, CONC WALKWAY
503	1971201.537	6281085.270	458.32'	MAGNAIL & SPIKE IN GROUND 5.15' FROM CONC CURBING AT GATE TO RR ABUTMENT ON SESIDE OF RR TRACK

SURVEY CONTROL: THE BASIC HORIZONTAL CONTROL IS THE NORTH AMERICAN DATUM OF 1983, 2011 ADJUSTMENT (NAD83-2011), MUTI-YEAR CORS SOLUTION 2 (MYSC2) ESTABLISHED BY USING THE SMARTNET SYSTEM OF CONTINUOUSLY OPERATING REFERENCE STATIONS (CORS).

COORDINATE ARE IN CALIFORNIA STATE PLAN COORDINATE SYSTEM, ZONE 5, EPOCH 2023.25, US SURVEY FT.

VERTICAL SURVEY CONTROL VALUES HEREON ARE BASED UPON THE NORTH AMERICAN VERICAL DATUM OF 1988, GNSS-DERIVED BY FAST STATIC SURVEY METHODS USING GEIOD18 PER CALIFORNIA PUBLIC RESOURCES CODE 8890, DEFINED AS CALIFORNIA ORTHOMETRIC HEIGHTS OF 1988 (CH88).

ALL POSITION ARE CALCULATED PER A FULLY CONSTRAINED LEAST SQUARES ADJUSTMENT USING STARNET V11 LEAST SQUARES ADJUSTMENT SOFTWARE.

LEGEND

──	NEW STRUCTURE
◯	72" Ø CIDH PILE
XXX.X	BOTTOM OF PILE CAP ELEVATION
◁∼	DIRECTION OF FLOW

NOTES

1. ONLY NEW STRUCTURE SHOWN FOR CLARITY. EXISTING STRUCTURE PORTION THAT REMAINS IN PLACE IS NOT SHOWN. SEE GENERAL PLAN AND STAGE CONSTRUCTION PLAN FOR DETAILS.

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CHECKED BY H. YANG
APPROVED BY M. SARWAR
DATE 12-25-2023

HAMID KAZEM
No. C90676
EXP: 12-31-25
Hamid Kazem

VENTURA COUNTY
TRANSPORTATION
COMMISSION

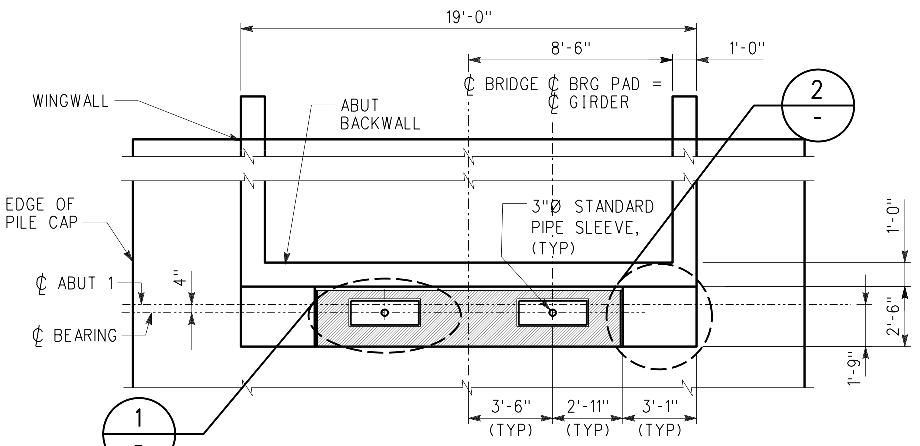
RAILPROS

SUBMITTED: ______________
JULINA R. CORONA, P.E.
PROJECT MANAGER

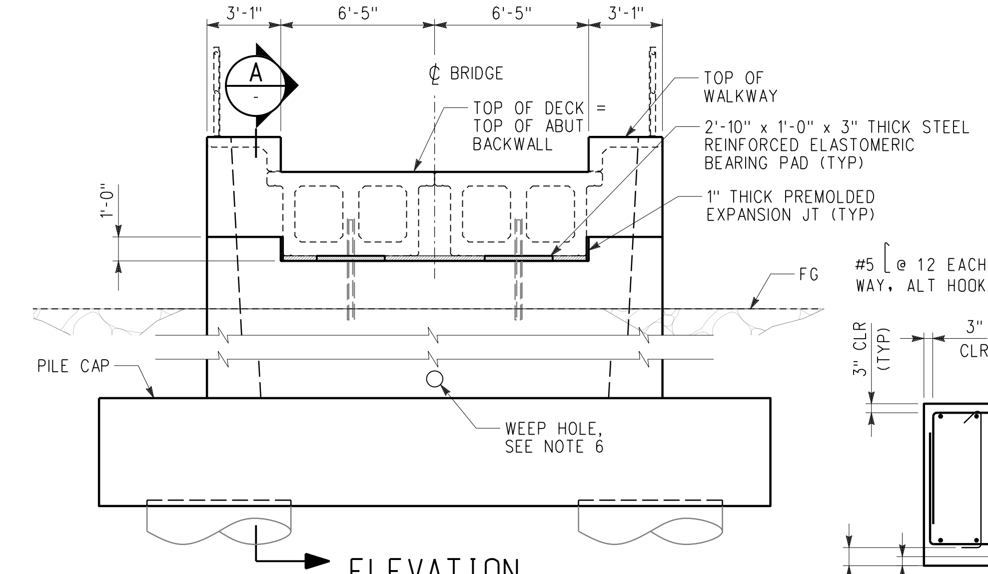
SESPE CREEK BRIDGE OVERFLOW
SANTA PAULA BRANCH LINE, FILLMORE, CA

FOUNDATION PLAN

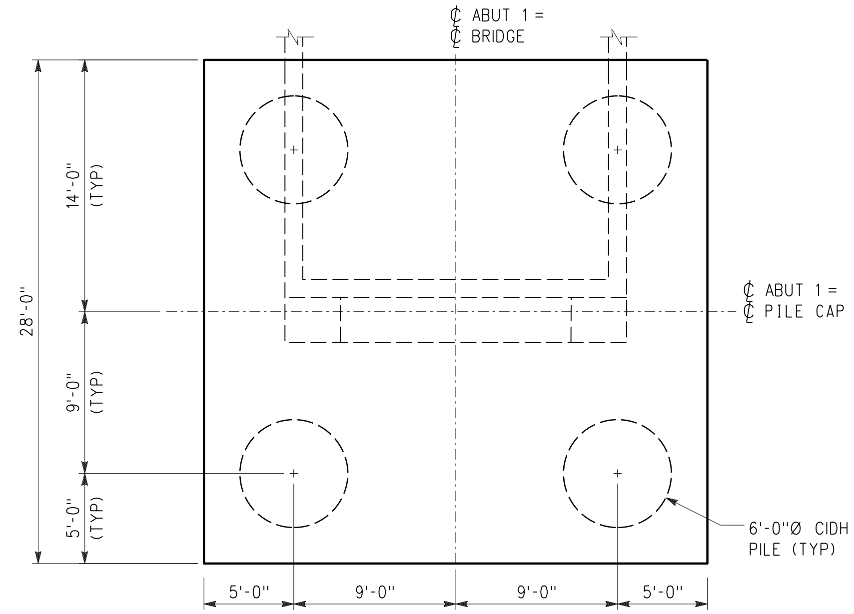
CONTRACT NO.
DRAWING NO. S-005
REVISION
SHEET NO. 14 OF 29
SCALE AS SHOWN



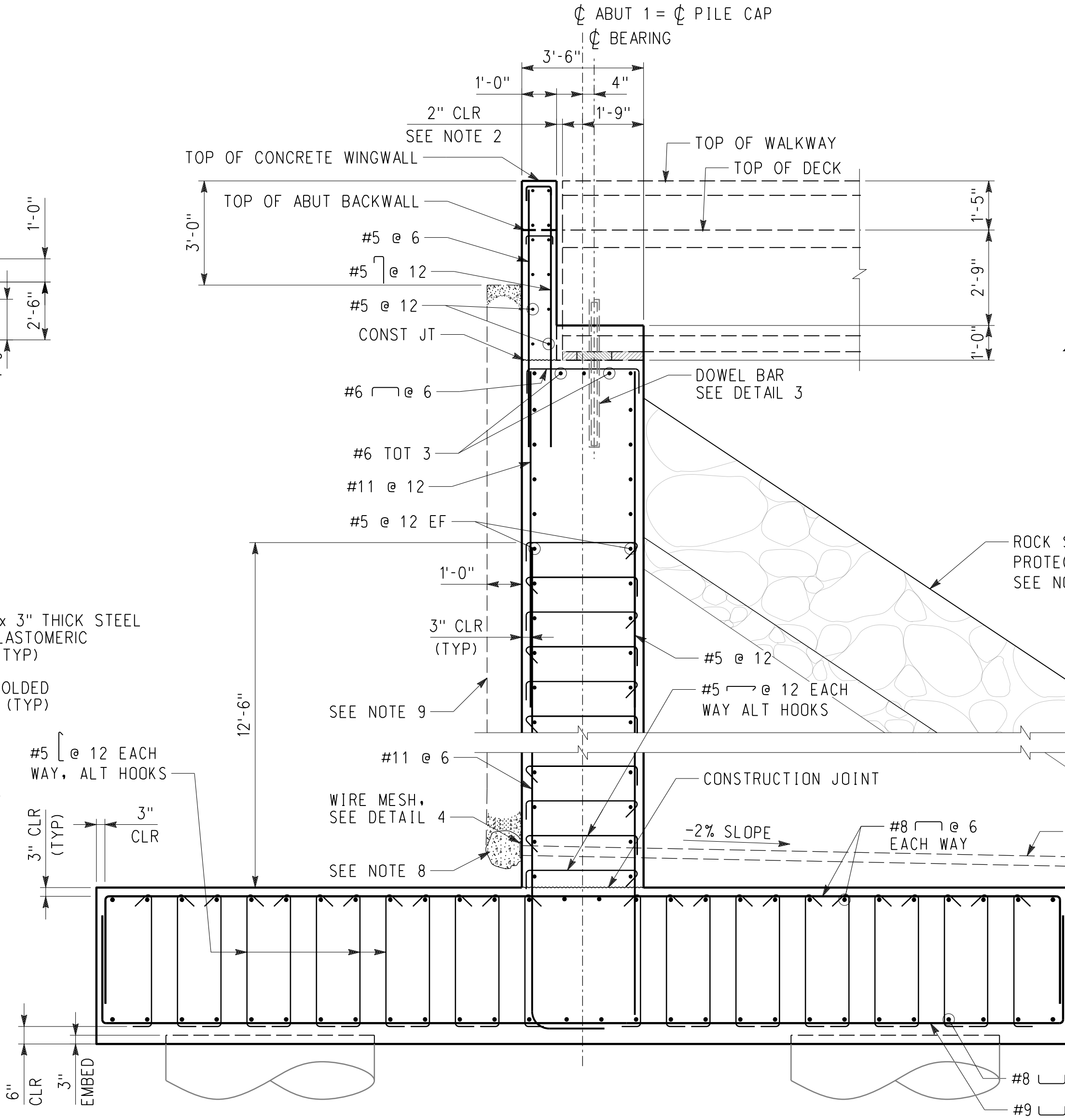
PLAN
SCALE: ¼" = 1'-0"



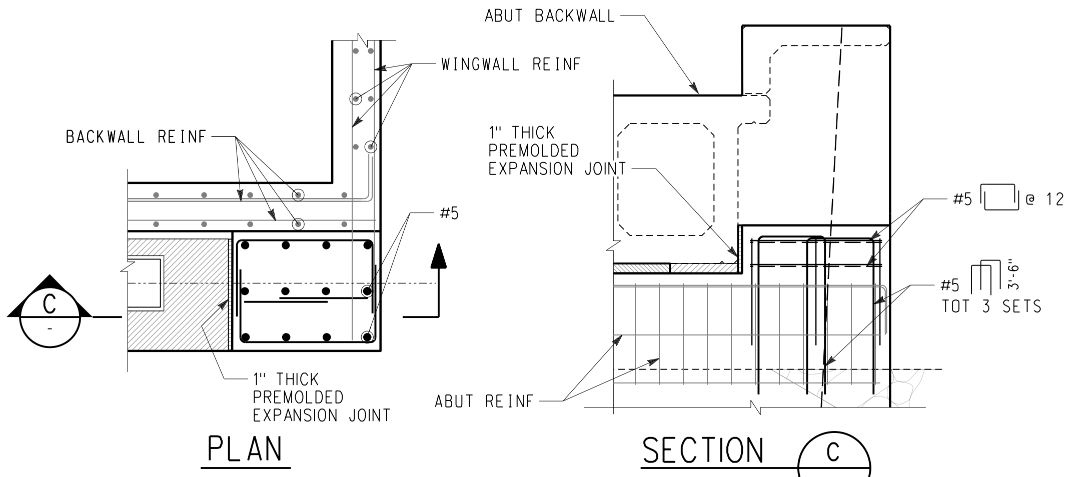
ELEVATION
SCALE: ¼" = 1'-0"



PILE LAYOUT
SCALE: 3⁄16" = 1'-0"



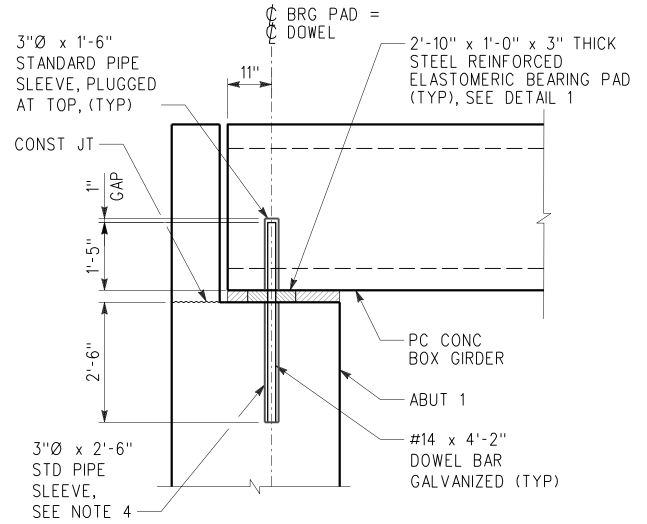
SECTION A
SCALE: ⅜" = 1'-0"



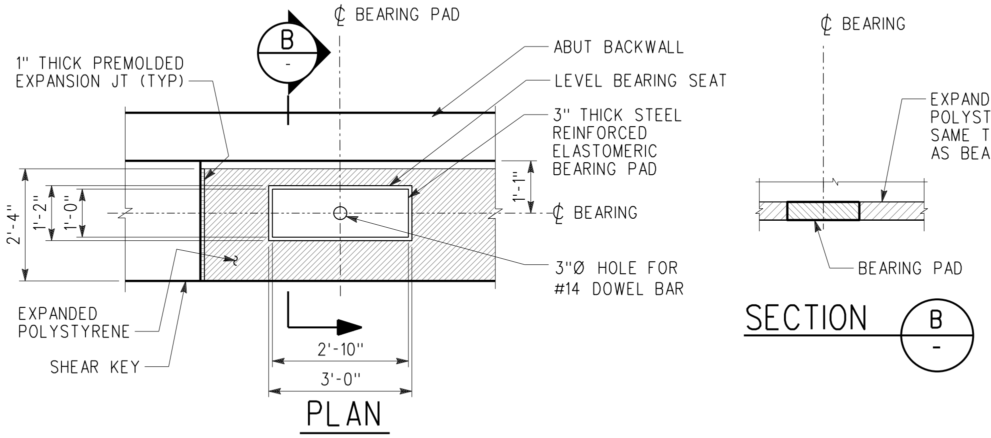
PLAN

SECTION C

SHEAR KEY DETAILS 2
SCALE: ½" = 1'-0"



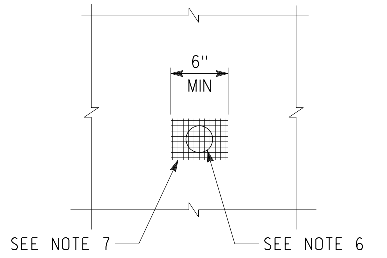
DOWEL BAR DETAIL 3
SCALE: ½" = 1'-0"



PLAN

SECTION B

BEARING PAD DETAIL 1
SCALE: ½" = 1'-0"



WIRE MESH DETAIL 4
NO SCALE

NOTES:

1. SLOPE ABUT SEAT TO DRAIN EXCEPT AS SHOWN IN BEARING PAD DETAILS
2. FOR HMA OVER THE JOINT DETAILS, SEE SCRRA STANDARD PLAN ES6001-03
3. FOR RSP DETAILS, SEE "ROCK SLOPE PROTECTION DETAILS" SHEET
4. LOWER PIPE SLEEVE TO BE FILLED WITH NON-SHRINK GROUT AFTER INSTALLATION OF #14 DOWEL BAR
5. FOR ABUTMENT PILE DETAILS, SEE "ABUTMENT DETAILS NO.2" SHEET
6. 4"Ø DRAINS AT CENTER OF ABUTMENT.
7. 6" SQUARE ALUMINUM OR GALVANIZED STEEL WIRE 1/4" MESH HARDWARE CLOTH, MINIMUM WIRE DIAMETER 0.025". ANCHOR FIRMLY TO BACKFACE.
8. ONE CUBIC FOOT PERVIOUS BACKFILL MATERIAL IN A NONWOVEN FILTER FABRIC, SECURELY TIED.
9. PERVIOUS BACKFILL MATERIAL CONTINUOUS BEHIND ABUTMENT.

REV.	DATE	BY	SUB.	APP.

FINAL DESIGN (100%)
NOT FOR CONSTRUCTION

DESIGNED BY H. KAZEM
DRAWN BY G. ESTEPA
CHECKED BY H. YANG
APPROVED BY M. SARWAR
DATE 12-25-2023

HAMID KAZEM
Hamid Kazem
No. C90676
EXP: 12-31-25
CIVIL

VENTURA COUNTY
TRANSPORTATION
COMMISSION

RAILPROS

SUBMITTED:
JULINA R. CORONA, P.E.
PROJECT MANAGER

SESPE CREEK BRIDGE OVERFLOW
SANTA PAULA BRANCH LINE, FILLMORE, CA

ABUTMENT DETAILS NO.1

CONTRACT NO.
DRAWING NO. S-006
REVISION
SHEET NO. 15 OF 29
SCALE AS SHOWN

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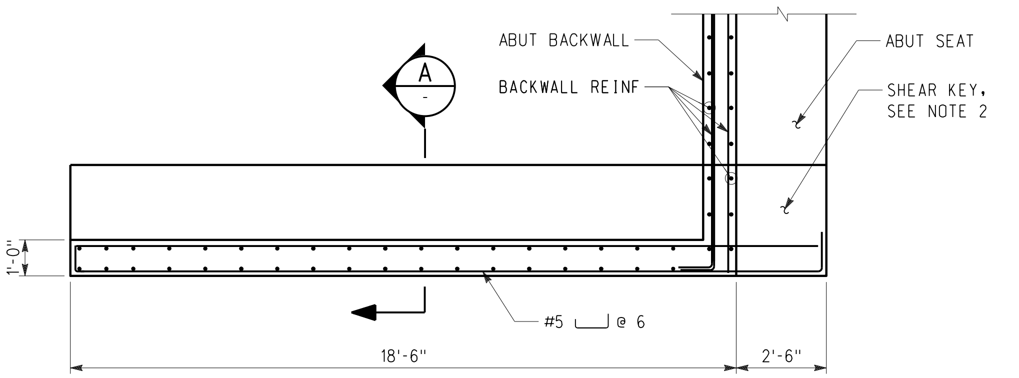
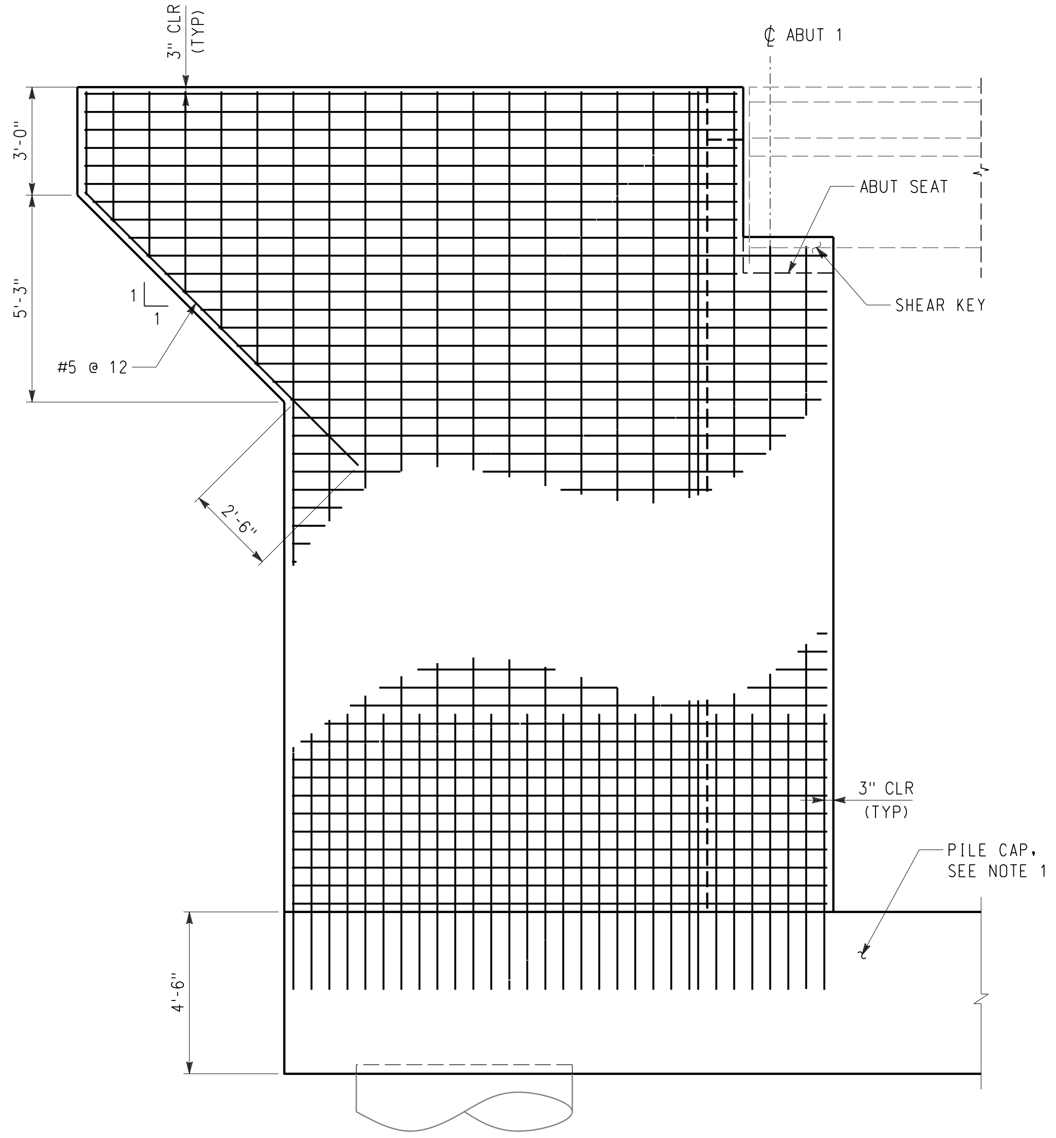


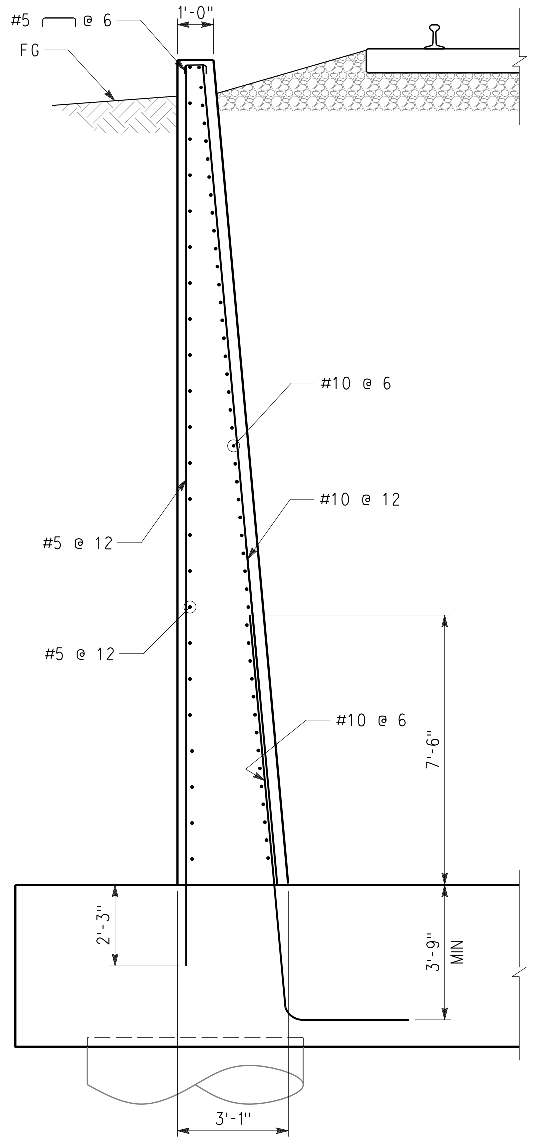
PLAN – ABUTMENT WINGWALL

SCALE: ⅜" = 1'-0"



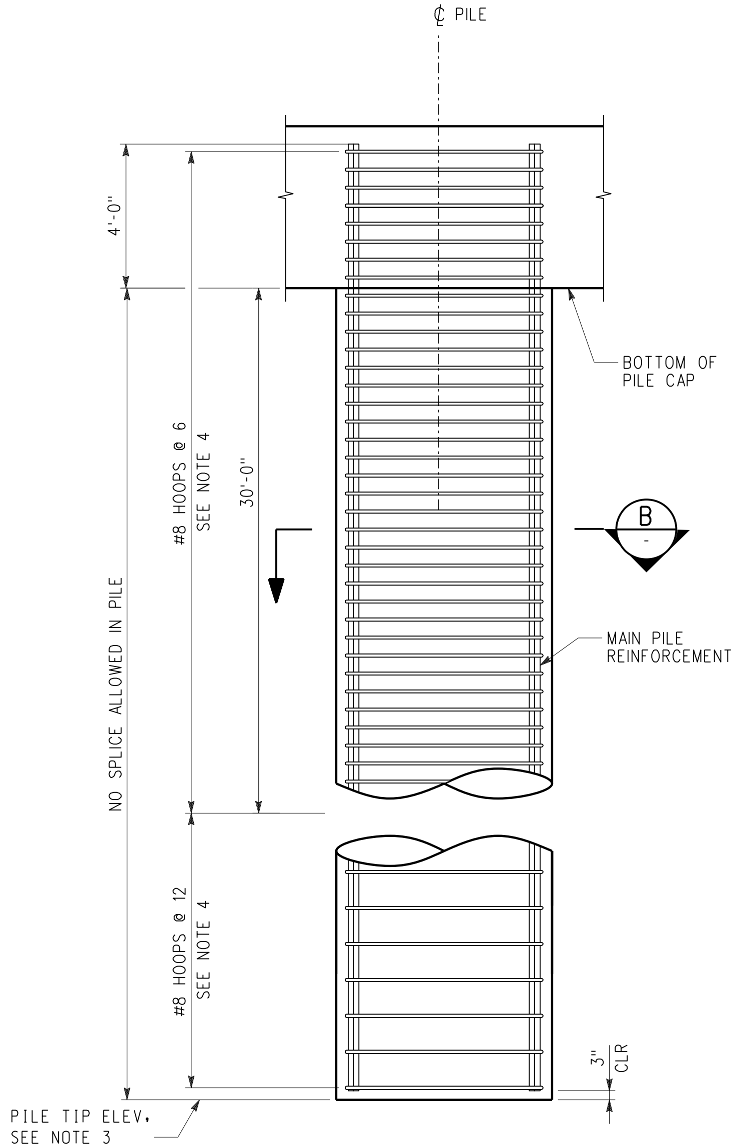
ELEVATION – ABUTMENT WINGWALL

SCALE: ⅜" = 1'-0"



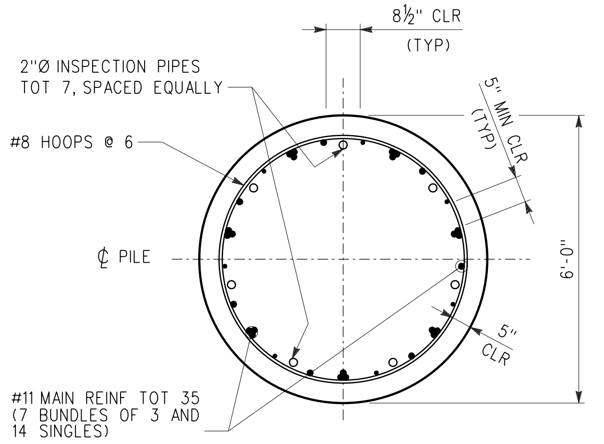
SECTION A
-

SCALE: ⅜" = 1'-0"



ABUTMENT PILE ELEVATION

SCALE: ⅜" = 1'-0"



SECTION B
-

SCALE: ½" = 1'-0"

NOTES:

1. FOR PILE CAP DIMENSIONS AND REINFORCEMENT, SEE "ABUTMENT DETAILS NO. 1"
2. FOR SHEAR KEY REINFORCEMENT, SEE "ABUTMENT DETAILS NO. 1"
3. FOR PILE TIP ELEVATION SEE "FOUNDATION PLAN" SHEET
4. ALL HOOPS ARE ULTIMATE BUTT SPLICES

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Hamid Kazem
No. C90676
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VENTURA COUNTY
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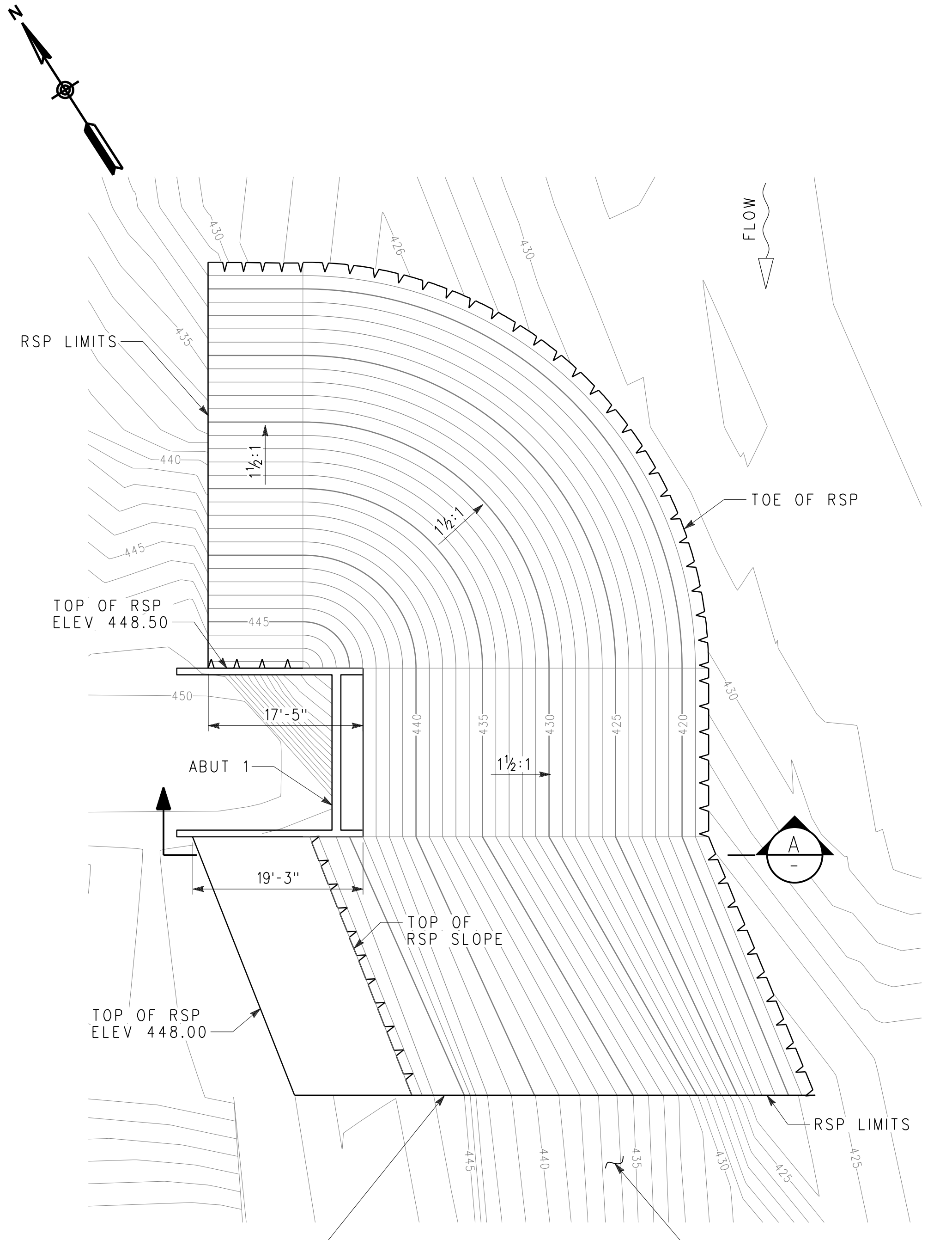
RAILPROS

SUBMITTED: ____________
JULINA R. CORONA, P.E.
PROJECT MANAGER

SESPE CREEK BRIDGE OVERFLOW
SANTA PAULA BRANCH LINE, FILLMORE, CA

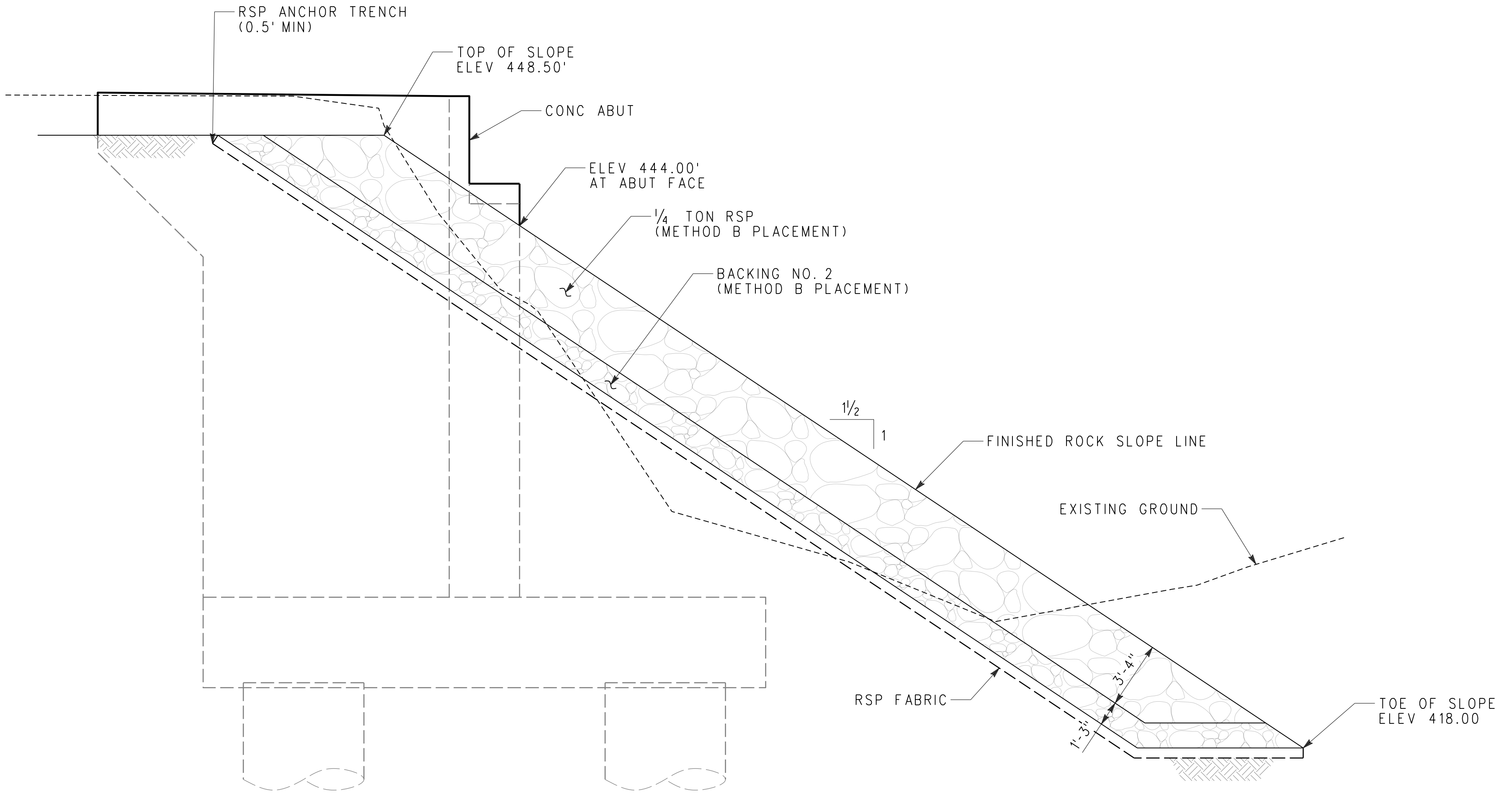
ABUTMENT DETAILS NO. 2

CONTRACT NO.
DRAWING NO. S-007
REVISION
SHEET NO. 16 OF 29
SCALE AS SHOWN



PLAN

SCALE: 1"=10'



SECTION A

SCALE: ¼" = 1'-0"

NOTE:

1. ROCK SLOPE PROTECTION SHALL BE PER CALTRANS STANDARD SPECIFICATIONS SECTION 72.+
2. LIMITS OF REMOVAL OF EXISTING GROUTED RSP AND DETAIL OF INTERFACE WITH NEW RSP TO BE FIELD DETERMINED.

12/21/2023 8:31:13 AM USER = gerry.estepa
Z:\Engineering\VCTC\Sespe Creek Bridge Overflow\900 CADD\950 Drawings\S-008_Rock Slope Protection.sht
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DATE 12-25-2023

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Exp. 09-30-25

VENTURA COUNTY
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SUBMITTED:
JULINA R. CORONA, P.E.
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SESPE CREEK BRIDGE OVERFLOW
SANTA PAULA BRANCH LINE, FILLMORE, CA

ROCK SLOPE PROTECTION

CONTRACT NO.
DRAWING NO. S-008
REVISION
SHEET NO. 17 OF 29
SCALE AS SHOWN

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
07	VENTURA	--	423.18	3	3

Christopher M. Diaz 3/24/25
REGISTERED GEOTECHNICAL ENGINEER DATE

REGISTERED PROFESSIONAL ENGINEER
CHRISTOPER M. DIAZ
No. 2992
EXP 6/30/25
GEOTECHNICAL
STATE OF CALIFORNIA

PLANS APPROVAL DATE

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

RAILPROS
250 COMMERCE STE 200
IRVINE, CALIFORNIA 92602

DIAZ YOURMAN & ASSOC.
1616 E 17TH STREET
SANTA ANA, CALIFORNIA 92705

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

REFERENCE: CALTRANS SOIL & ROCK LOGGING, CLASSIFICATION, AND PRESENTATION MANUAL (2010)

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.

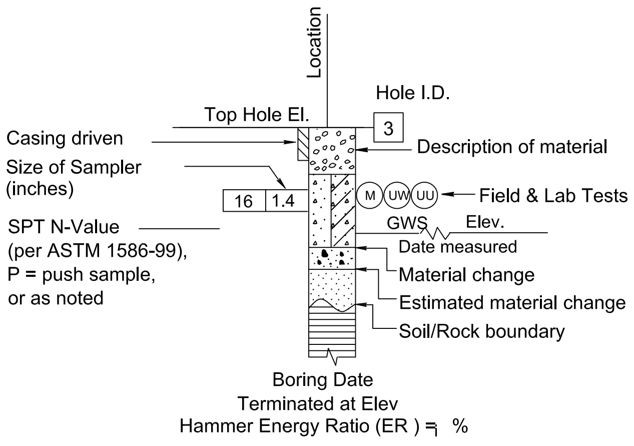
BOREHOLE IDENTIFICATION

Symbol	Hole Type	Description
Size	A	Auger Boring (hollow or solid stem bucket)
Size	R RW RC P	Rotary drilled boring (conventional) Rotary drilled with self-casing wire-line Rotary core with continuously-sampled, self-casing wire-line Rotary percussion boring (air)
Size	R	Rotary drilled diamond core
Size	HD HA	Hand driven (1-inch soil tube) Hand Auger
◎	D	Dynamic Cone Penetration Boring
▲	CPT	Cone Penetration Test (ASTM D 5778)
☐	O	Other (note on LOTB)

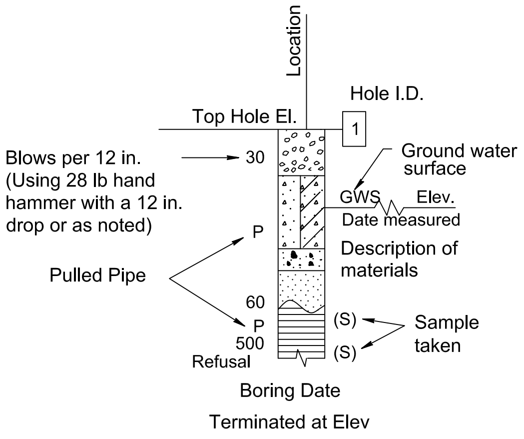
Note: Size in inches.

CONSISTENCY OF COHESIVE SOILS

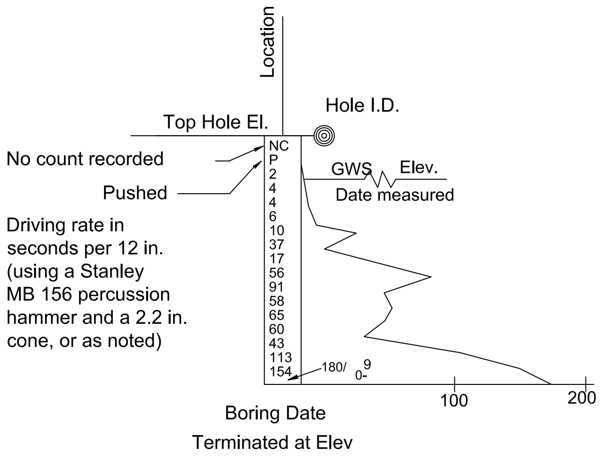
Description	Shear Strength (tsf)	Pocket Penetrometer Measurement, PP, (tsf)	Torvane Measurement, TV, (tsf)	Vane Shear Measurement, VS, (tsf)
Very Soft	Less than 0.12	Less than 0.25	Less than 0.12	Less than 0.12
Soft	0.12 - 0.25	0.25 - 0.5	0.12 - 0.25	0.12 - 0.25
Medium Stiff	0.25 - 0.5	0.5 - 1	0.25 - 0.5	0.25 - 0.5
Stiff	0.5 - 1	1 - 2	0.5 - 1	0.5 - 1
Very Stiff	1 - 2	2 - 4	1 - 2	1 - 2
Hard	Greater than 2	Greater than 4	Greater than 2	Greater than 2



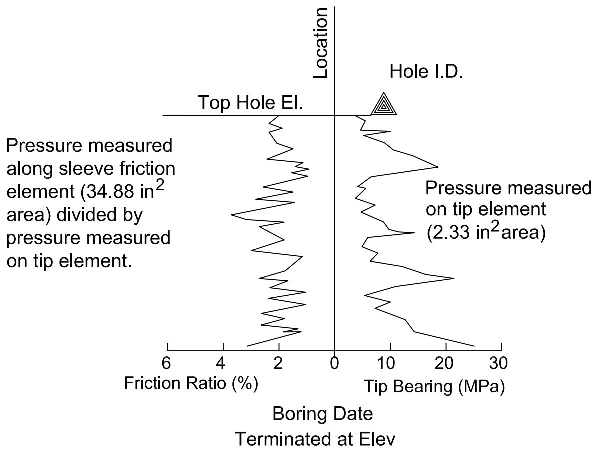
ROTARY BORING



HAND BORING



DYNAMIC CONE PENETRATION BORING



CONE PENETRATION TEST (CPT) BORING

CAMERA READY

REV.	DATE	BY / SUB.	APP.

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DESIGNED BY A. SCHOLDER
DRAWN BY A. SCHOLDER
CHECKED BY T. REINERT
APPROVED BY C. DIAZ
DATE 12-28-2023

VENTURA COUNTY
TRANSPORTATION
COMMISSION

SUBMITTED: ______________________
JULINA R. CORONA, P.E.
PROJECT MANAGER

SESPE CREEK OVERFLOW BRIDGE REPAIR
ON THE SANTA PAULA BRANCH LINE, FILLMORE, CA
LOG OF TEST BORINGS

CONTRACT NO.
DRAWING NO. GE-001
REVISION
SHEET NO. 27 OF 30
SCALE AS SHOWN

$USER$
$TIME$
$DATE$
$FILEL$
$PENTBLL$
$PLTDRVL$

REFERENCE: CALTRANS SOIL & ROCK LOGGING, CLASSIFICATION, AND PRESENTATION MANUAL (2010)

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
07	VENTURA	--	423.18	3	3

Christopher M. Diaz
REGISTERED GEOTECHNICAL ENGINEER
3/24/25
DATE

No. 2992
EXP 6/30/25

PLANS APPROVAL DATE

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GROUP SYMBOLS AND NAMES

Graphic/Symbol	Group Names
GW	Well-graded GRAVEL Well-graded GRAVEL with SAND
GP	Poorly-graded GRAVEL Poorly-graded GRAVEL with SAND
GW-GM	Well-graded GRAVEL with SILT Well-graded GRAVEL with SILT and SAND
GW-GC	Well-graded GRAVEL with CLAY (or SILTY CLAY) Well-graded GRAVEL with CLAY and SAND (or SILTY CLAY and SAND)
GP-GM	Poorly-graded GRAVEL with SILT Poorly-graded GRAVEL with SILT and SAND
GP-GC	Poorly-graded GRAVEL with CLAY (or SILTY CLAY) Poorly-graded GRAVEL with CLAY and SAND (or SILTY CLAY and SAND)
GM	SILTY GRAVEL SILTY GRAVEL with SAND
GC	CLAYEY GRAVEL CLAYEY GRAVEL with SAND
GC-GM	SILTY, CLAYEY GRAVEL SILTY, CLAYEY GRAVEL with SAND
SW	Well-graded SAND Well-graded SAND with GRAVEL
SP	Poorly-graded SAND Poorly-graded SAND with GRAVEL
SW-SM	Well-graded SAND with SILT Well-graded SAND with SILT and GRAVEL
SW-SC	Well-graded SAND with CLAY (or SILTY CLAY) Well-graded SAND with CLAY and GRAVEL (or SILTY CLAY and GRAVEL)
SP-SM	Poorly-graded SAND with SILT Poorly-graded SAND with SILT and GRAVEL
SP-SC	Poorly-graded SAND with CLAY (or SILTY CLAY) Poorly-graded SAND with CLAY and GRAVEL (or SILTY CLAY and GRAVEL)
SM	SILTY SAND SILTY SAND with GRAVEL
SC	CLAYEY SAND CLAYEY SAND with GRAVEL
SC-SM	SILTY, CLAYEY SAND SILTY, CLAYEY SAND with GRAVEL
PT	PEAT
	COBBLES COBBLES and BOULDERS BOULDERS

Graphic/Symbol	Group Names
CL	Lean CLAY Lean CLAY with SAND Lean CLAY with GRAVEL SANDY lean CLAY SANDY lean CLAY with GRAVEL GRAVELLY lean CLAY GRAVELLY lean CLAY with SAND
CL-ML	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
ML	SILT SILT with SAND SILT with GRAVEL SANDY SILT SANDY SILT with GRAVEL GRAVELLY SILT GRAVELLY SILT with SAND
OL	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
OL	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
CH	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
MH	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
OH	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
OH	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
OL/OH	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 TESTING

Ⓒ	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)
Ⓜ	Moisture Content (ASTM D 2216)
(OC)	Organic Content-% (ASTM D 2974)
Ⓟ	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
Ⓡ	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)
(UU)	Unconfined Compression-Soil (ASTM D 2166) Unconfined Compression-Rock (ASTM D 2938)
(UU)	Unconsolidated Undrained Triaxial (ASTM D 2850)
(UW)	Unit Weight (ASTM D 4767)

APPARENT DENSITY OF COHESIONLESS SOILS

Description	SPT N_{60} (Blows / 12 in.)
Very Loose	0 - 5
Loose	5 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	Greater than 50

MOISTURE

Description	Criteria
Dry	No discernable moisture
Moist	Moisture present, but no free water
Wet	Visible free water

PERCENT OR PROPORTION OF SOILS

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

PARTICLE SIZE

Description		Size (in.)
Boulder		Greater than 12
Cobble		3 - 12
Gravel	Coarse	3/4 - 3
	Fine	1/5 - 3/4
Sand	Coarse	1/16 - 1/5
	Medium	1/64 - 1/16
	Fine	1/300 - 1/64
Silt and Clay		Less than 1/300

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$TIME$
$DATE$
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$PLTDRVL$

CAMERA READY

REV. DATE BY/SUB. APP.

DESIGNED BY A. SCHOLDER
DRAWN BY A. SCHOLDER
CHECKED BY T. REINERT
APPROVED BY C. DIAZ
DATE 12-28-2023

VENTURA COUNTY
TRANSPORTATION
COMMISSION

SUBMITTED: ____________________
JULINA R. CORONA, P.E.
PROJECT MANAGER

SESPE CREEK OVERFLOW BRIDGE REPAIR
ON THE SANTA PAULA BRANCH LINE, FILLMORE, CA
SOIL LEGEND 1 OF 2 - LOG OF TEST BORINGS

CONTRACT NO.
DRAWING NO. GE-002
REVISION
SHEET NO. 28 OF 30
SCALE AS SHOWN

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
07	VENTURA	--	423.18	3	3

Christopher M. Diaz
REGISTERED GEOTECHNICAL ENGINEER

3/24/25
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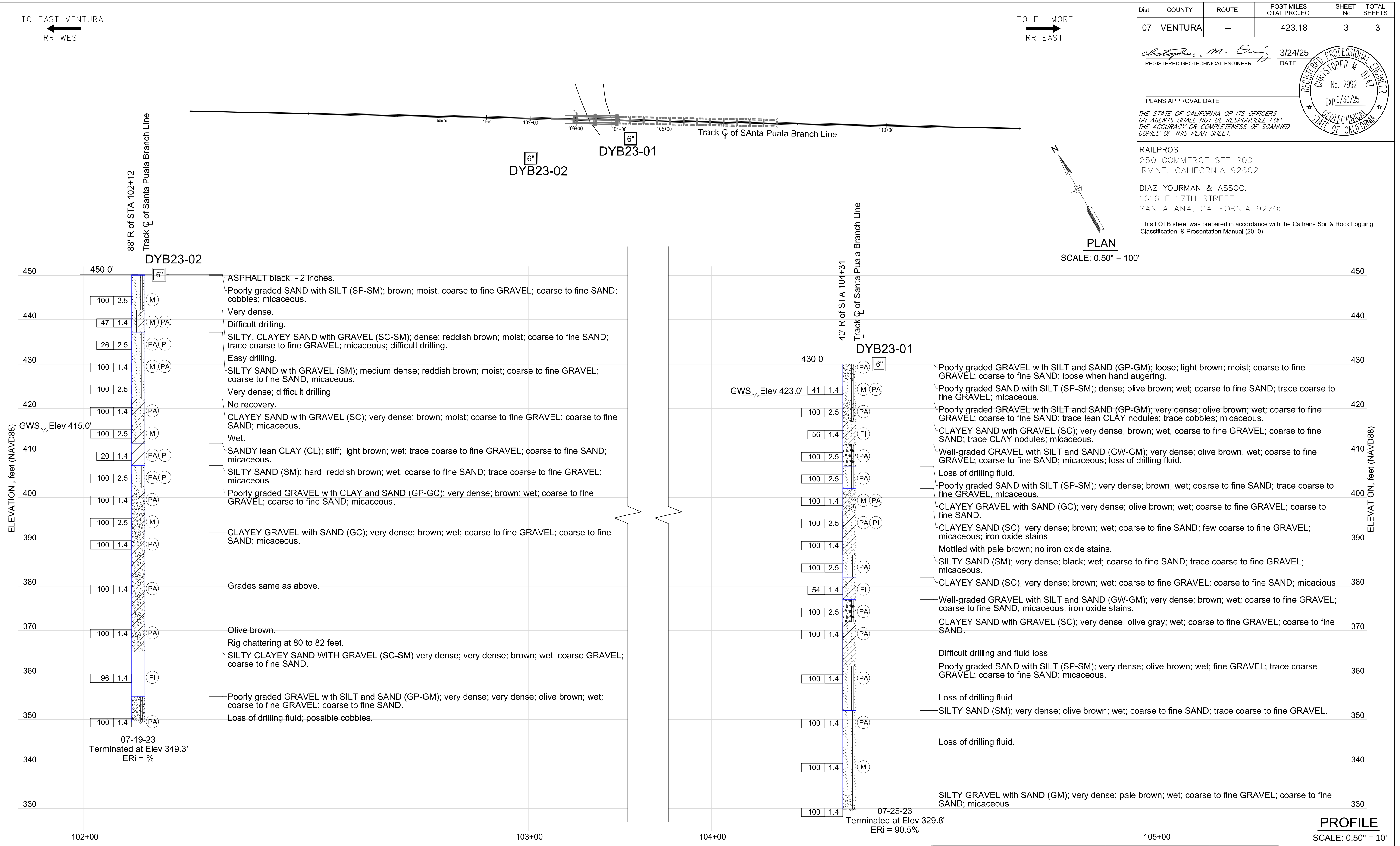

DYB23-02

ASPHALT black; - 2 inches.

Poorly graded SAND with SILT (SP-SM); brown; moist; coarse to fine GRAVEL; coarse to fine SAND; cobbles; micaceous.

Very dense.

Difficult drilling.

SILTY, CLAYEY SAND with GRAVEL (SC-SM); dense; reddish brown; moist; coarse to fine SAND; trace coarse to fine GRAVEL; micaceous; difficult drilling.

Easy drilling.

SILTY SAND with GRAVEL (SM); medium dense; reddish brown; moist; coarse to fine GRAVEL; coarse to fine SAND; micaceous.

Very dense; difficult drilling.

No recovery.

CLAYEY SAND with GRAVEL (SC); very dense; brown; moist; coarse to fine GRAVEL; coarse to fine SAND; micaceous.

Wet.

SANDY lean CLAY (CL); stiff; light brown; wet; trace coarse to fine GRAVEL; coarse to fine SAND; micaceous.

SILTY SAND (SM); hard; reddish brown; wet; coarse to fine SAND; trace coarse to fine GRAVEL; micaceous.

Poorly graded GRAVEL with CLAY and SAND (GP-GC); very dense; brown; wet; coarse to fine GRAVEL; coarse to fine SAND; micaceous.

CLAYEY GRAVEL with SAND (GC); very dense; brown; wet; coarse to fine GRAVEL; coarse to fine SAND; micaceous.

Grades same as above.

Olive brown.

Rig chattering at 80 to 82 feet.

SILTY CLAYEY SAND WITH GRAVEL (SC-SM) very dense; very dense; brown; wet; coarse GRAVEL; coarse to fine SAND.

Poorly graded GRAVEL with SILT and SAND (GP-GM); very dense; very dense; olive brown; wet; coarse to fine GRAVEL; coarse to fine SAND.

Loss of drilling fluid; possible cobbles.

DYB23-01

Poorly graded GRAVEL with SILT and SAND (GP-GM); loose; light brown; moist; coarse to fine GRAVEL; coarse to fine SAND; loose when hand augering.

Poorly graded SAND with SILT (SP-SM); dense; olive brown; wet; coarse to fine SAND; trace coarse to fine GRAVEL; micaceous.

Poorly graded GRAVEL with SILT and SAND (GP-GM); very dense; olive brown; wet; coarse to fine GRAVEL; coarse to fine SAND; trace lean CLAY nodules; trace cobbles; micaceous.

CLAYEY SAND with GRAVEL (SC); very dense; brown; wet; coarse to fine GRAVEL; coarse to fine SAND; trace CLAY nodules; micaceous.

Well-graded GRAVEL with SILT and SAND (GW-GM); very dense; olive brown; wet; coarse to fine GRAVEL; coarse to fine SAND; micaceous; loss of drilling fluid.

Loss of drilling fluid.

Poorly graded SAND with SILT (SP-SM); very dense; brown; wet; coarse to fine SAND; trace coarse to fine GRAVEL; micaceous.

CLAYEY GRAVEL with SAND (GC); very dense; olive brown; wet; coarse to fine GRAVEL; coarse to fine SAND.

CLAYEY SAND (SC); very dense; brown; wet; coarse to fine SAND; few coarse to fine GRAVEL; micaceous; iron oxide stains.

Mottled with pale brown; no iron oxide stains.

SILTY SAND (SM); very dense; black; wet; coarse to fine SAND; trace coarse to fine GRAVEL; micaceous.

CLAYEY SAND (SC); very dense; brown; wet; coarse to fine GRAVEL; coarse to fine SAND; micacious.

Well-graded GRAVEL with SILT and SAND (GW-GM); very dense; brown; wet; coarse to fine GRAVEL; coarse to fine SAND; micaceous; iron oxide stains.

CLAYEY SAND with GRAVEL (SC); very dense; olive gray; wet; coarse to fine GRAVEL; coarse to fine SAND.

Difficult drilling and fluid loss.

Poorly graded SAND with SILT (SP-SM); very dense; olive brown; wet; fine GRAVEL; trace coarse GRAVEL; coarse to fine SAND; micaceous.

Loss of drilling fluid.

SILTY SAND (SM); very dense; olive brown; wet; coarse to fine SAND; trace coarse to fine GRAVEL.

Loss of drilling fluid.

SILTY GRAVEL with SAND (GM); very dense; pale brown; wet; coarse to fine GRAVEL; coarse to fine SAND; micaceous.

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SUBMITTED: JULINA R. CORONA, P.E.
PROJECT MANAGER

SESPE CREEK OVERFLOW BRIDGE REPAIR
ON THE SANTA PAULA BRANCH LINE, FILLMORE, CA
SOIL LEGEND 2 OF 2 - LOG OF TEST BORINGS

CONTRACT NO.
DRAWING NO. GE-003
REVISION
SHEET NO. 29 OF 30
SCALE AS SHOWN

ATTACHMENT 2

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Path: C:\Users\ashley\diazyourman.com\Projects - Documents\2023\2023-010 VCTC Sespe Creek Rail Bridge\Figures\PRO\InitialPlan.aprx

Figure 2 - SITE PLAN

SOIL CLASSIFICATION SYSTEM-ASTM D2487

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE-GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)	○	**GW**	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
			○	**GP**	POORLY GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)	▥	**GM**	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
			▨	**GC**	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)	⁘	**SW**	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			░	**SP**	POORLY GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)	▥	**SM**	SILTY SANDS, SAND - SILT MIXTURES
			▨	**SC**	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE-GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50	▥	**ML**	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			▨	**CL**	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			▤	**OL**	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50	▮	**MH**	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
			▨	**CH**	INORGANIC CLAYS OF HIGH PLASTICITY
			▨	**OH**	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			▩	**PT**	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

■ "Push" Sampler

⧗ Split Barrel "Drive" Sampler With Liner

⊠ Standard Penetration Test (SPT) Sampler

▯ Dual-Mass Dynamic Cone Penetration (DCP) Test

▩ Concrete/Rock Core

▽ Groundwater Surface

SPT "N" = 0.65 x modified California blows per foot

NP = Nonplastic
EI = Expansion Index Test
SG = Specific Gravity
SE = Sand Equivalent
UC = Unconfined Comp.
CD = Consol. Drained Triaxial.
CU = Consol. Undrained Triaxial.
UU = Undrained, Unconsol. Triaxial.
RV = R-Value
CA = Chemical Analysis
DS = Direct Shear
CN = Consolidation
CP = Collapse Potential
SA = Grain size; HD = Hydrometer
MD = Compaction Test
HC = Hydraulic Conductivity Test
CBR = California Bearing Ratio
[PID] Reading in ppm above background

VCTC Sespe Creek Bridge

Project No. 2023-010

PLATE
C1

Library: DYLIB.GLB; Template: DYLG; Prj ID: 2023-010 VCTC SESPE CREEK.GPJ

BORING LOCATION:	See Figure No. 2	**ELEVATION (feet):**	430
LATITUDE:	34.40610	**LONGITUDE:**	-118.93178
DRILLING EQUIPMENT:	CME-55LCX	**DRILLING METHOD:**	Rotary Wash
BORING DIAMETER (inches):	6	**BORING DEPTH (feet):**	100.25
DATE STARTED: 7-21-23	**COMPLETED:** 7-25-23	**HAMMER TYPE:** Automatic	**EFFICIENCY:** 90.5%
DRILLING CONTRACTOR:	Cascade Drilling	**HAMMER DROP:** 30 inches	**WEIGHT:** 140 lbs
LOGGED BY: OB/JS	**CHECKED BY:** TR	**DRIVE SAMPLER DIAMETER (inches)**	**ID:** 2.4 **OD:** 3

Elevation (feet)	Depth (feet)	Sampler	Symbol	Blows per 6 Inches	SPT N60 Blows per Foot	Field Unc. Comp. Str. (tsf)	DESCRIPTION	Dry Density (pcf)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Percent Passing #200 Sieve	Other Tests [PID]
							POORLY GRADED GRAVEL with SILT and SAND (GP-GM): light brown; moist; loose; coarse to fine SAND; coarse to fine GRAVEL; loose when hand augering					12	
425	5	⊠		7 8 19	41		POORLY GRADED SAND with SILT (SP-SM): olive brown; wet; dense; coarse to fine SAND; trace coarse to fine GRAVEL; micaceous ∇		12			9	
420	10	⧗		36 74/6"	100		POORLY GRADED GRAVEL with SILT and SAND (GP-GM): olive brown; wet; very dense; coarse to fine SAND; coarse to fine GRAVEL; trace lean CLAY nodules; trace cobbles; micaceous					11	
415	15	⊠		15 19 18	56		CLAYEY SAND with GRAVEL (SC): brown; wet; very dense; coarse to fine SAND; coarse to fine GRAVEL; trace CLAY nodules; micaceous			23	6		
410	20	⧗		23 39 67/6"	100		WELL-GRADED GRAVEL with SILT and SAND (GW-GM): olive brown; wet; very dense; coarse to fine SAND; coarse to fine GRAVEL; micaceous; loss of drilling fluid loss of drilling fluid					9	
405	25			50/3" 50/1"	100		POORLY GRADED SAND with SILT (SP-SM): brown; wet; very dense; coarse to fine SAND; trace coarse to fine GRAVEL; micaceous					7	
							CLAYEY GRAVEL with SAND (GC): olive brown; wet; very dense; coarse to fine SAND; coarse to fine GRAVEL						

LOG OF BORING DYB23-01

Page 1 of 3

VCTC Sespe Creek Bridge
Project No. 2023-010

PLATE
C2

Library: DYLIB.GLB; Template: DYLG; Prj ID: 2023-010 VCTC SESPE CREEK.GPJ

Elevation (feet)	Depth (feet)	Sampler	Symbol	Blows per 6 Inches	SPT N60 Blows per Foot	Field Unc. Comp. Str. (tsf)	DESCRIPTION	Dry Density (pcf)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Percent Passing #200 Sieve	Other Tests [PID]
				50/4" 13/2" 50/3"	100				13			16	
							CLAYEY SAND (SC): brown; wet; very dense; coarse to fine SAND; few coarse to fine GRAVEL; micaceous; iron oxide stains						
395	35			50/6" 50/2" 50/2"	100					27	12	14	
390	40			50/3" 50/1"	100		mottled with pale brown; no iron oxide stains						
							SILTY SAND (SM): black; wet; very dense; coarse to fine SAND; trace coarse to fine GRAVEL; micaceous						
385	45			50/5" 12/1" 50/4"	100							12	
							CLAYEY SAND (SC): brown; wet; very dense; coarse to fine SAND; coarse to fine GRAVEL; micacious						
380	50	☒		17 18 18	54					24	8		
							WELL-GRADED GRAVEL with SILT and SAND (GW-GM): brown; wet; very dense; coarse to fine SAND; coarse to fine GRAVEL; micaceous; iron oxide stains						
375	55			50/3" 50/0.5"	100							11	
							CLAYEY SAND with GRAVEL (SC): olive gray; wet; very dense; coarse to fine SAND; coarse to fine GRAVEL						
370	60			50/2" 50/2"	100							22	
365	65						difficult drilling and fluid loss						
							POORLY GRADED SAND with SILT (SP-SM): olive brown; wet; very dense; coarse to fine SAND; fine GRAVEL; trace coarse GRAVEL; micaceous						

LOG OF BORING DYB23-01

Page 2 of 3

VCTC Sespe Creek Bridge
Project No. 2023-010

PLATE
C3

Library: DYLIB.GLB; Template: DYLG; Prj ID: 2023-010 VCTC SESPE CREEK.GPJ

Elevation (feet)	Depth (feet)	Sampler	Symbol	Blows per 6 Inches	SPT N60 Blows per Foot	Field Unc. Comp. Str. (tsf)	DESCRIPTION	Dry Density (pcf)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Percent Passing #200 Sieve	Other Tests [PID]
				26 50/3" 50/2"	100					NP	NP	11	
355	**75**						loss of drilling fluid						
							SILTY SAND (SM): olive brown; wet; very dense; coarse to fine SAND; trace coarse to fine GRAVEL						
350	**80**			22 50/6" 50/3"	100							12	
345	**85**						loss of drilling fluid						
340	**90**			50/2" 50/1"	100				14				
335	**95**												
							SILTY GRAVEL with SAND (GM): pale brown; wet; very dense; coarse to fine SAND; coarse to fine GRAVEL; micaceous						
330	**100**			50/2" 50/1"	100		Bottom of boring at 100.25 feet bgs. Groundwater encountered at 7 feet BGS. Boring backfilled with bentonite cement grout.			NP	NP		
325	**105**												

LOG OF BORING DYB23-01

Page 3 of 3

VCTC Sespe Creek Bridge
Project No. 2023-010

PLATE
C4

Library: DYLIB.GLB; Template: DYLG; Prj ID: 2023-010 VCTC SESPE CREEK.GPJ

BORING LOCATION: See Figure No. 2		**ELEVATION (feet):** 450	
LATITUDE: 34.40631		**LONGITUDE:** -118.93249	
DRILLING EQUIPMENT: CME-55LCX		**DRILLING METHOD:** Rotary Wash	
BORING DIAMETER (inches): 6		**BORING DEPTH (feet):** 100.66	
DATE STARTED: 7-17-23	**COMPLETED:** 7-19-23	**HAMMER TYPE:** Automatic	**EFFICIENCY:** 90.5%
DRILLING CONTRACTOR: Cascade Drilling		**HAMMER DROP:** 30 inches	**WEIGHT:** 140 lbs
LOGGED BY: OB/JS	**CHECKED BY:** TR	**DRIVE SAMPLER DIAMETER (inches)**	**ID:** 2.4 **OD:** 3

Elevation (feet)	Depth (feet)	Sampler	Symbol	Blows per 6 Inches	SPT N60 Blows per Foot	Field Unc. Comp. Str. (tsf)	DESCRIPTION	Dry Density (pcf)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Percent Passing #200 Sieve	Other Tests [PID]
							ASPHALT CONCRETE (AC): black; - 2 inches						
							POORLY GRADED SAND with SILT (SP-SM): brown; moist; coarse to fine SAND; coarse to fine GRAVEL; cobbles; micaceous						
445	5			50/3" 50/0.5"	100		very dense		3				
							difficult drilling						
							SILTY, CLAYEY SAND with GRAVEL (SC-SM): reddish brown; moist; dense; coarse to fine SAND; trace coarse to fine GRAVEL; micaceous; difficult drilling						
440	10	☒		11 15 16	47				4			18	
							easy drilling						
							SILTY SAND with GRAVEL (SM): reddish brown; moist; medium dense; coarse to fine SAND; coarse to fine GRAVEL; micaceous						
435	15	⧗		11 10 16	26					20	5	19	
430	20	☒		16 43 50/0.5"	100		very dense; difficult drilling		2			18	
425	25			50/2" 50/0.5"	100		no recovery						
							CLAYEY SAND with GRAVEL (SC): brown; moist; very dense; coarse to fine SAND; coarse to fine GRAVEL; micaceous						

LOG OF BORING DYB23-02

Page 1 of 3

VCTC Sespe Creek Bridge
Project No. 2023-010

PLATE
C5

Elevation (feet)	Depth (feet)	Sampler	Symbol	Blows per 6 Inches	SPT N60 Blows per Foot	Field Unc. Comp. Str. (tsf)	DESCRIPTION	Dry Density (pcf)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Percent Passing #200 Sieve	Other Tests [PID]
				30 44 80/6"	100		wet					12	
415	35			50/3" 50/3" 50/1"	100		▽		15				
							SANDY LEAN CLAY (CL): light brown; wet; stiff; coarse to fine SAND; trace coarse to fine GRAVEL; micaceous						
410	40			9 6 7	20					29	12	69	
							SILTY SAND (SM): reddish brown; wet; hard; coarse to fine SAND; trace coarse to fine GRAVEL; micaceous						
405	45			12 15 90/6"	100					20	NP	48	
							POORLY GRADED GRAVEL with CLAY and SAND (GP-GC): brown; wet; very dense; coarse to fine SAND; coarse to fine GRAVEL; micaceous						
400	50			50/6" 50/0.5"	100							10	
395	55			50/4" 50/1"	100				12				
							CLAYEY GRAVEL with SAND (GC): brown; wet; very dense; coarse to fine SAND; coarse to fine GRAVEL; micaceous						
390	60			50/5" 50/0.5"	100							12	
385	65												

LOG OF BORING DYB23-02

VCTC Sespe Creek Bridge
Project No. 2023-010

PLATE
C6

Elevation (feet)	Depth (feet)	Sampler	Symbol	Blows per 6 Inches	SPT N60 Blows per Foot	Field Unc. Comp. Str. (tsf)	DESCRIPTION	Dry Density (pcf)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Percent Passing #200 Sieve	Other Tests [PID]
				50/5" 50/1" 50/5"	100		grades same as above					12	
375	75												
370	80			50/6" 50/1"	100		olive brown Rig chattering at 80 to 82 feet					13	
365	85						SILTY, CLAYEY SAND with GRAVEL (SC-SM): brown; wet; very dense; coarse to fine SAND; coarse GRAVEL						
360	90	☒		22 35 61/6"	96					21	4		
355	95						POORLY GRADED GRAVEL with SILT and SAND (GP-GM): olive brown; wet; very dense; coarse to fine SAND; coarse to fine GRAVEL loss of drilling fluid; possible cobbles						
350	100			50/6" 50/2"	100							12	
							Bottom of borings at 100.66 feet. Groundwater encountered at 35 feet bgs. Boring backfilled with bentonite cement grout. Surface temporarily patched with ASPHALT cold patch.						
345	105												

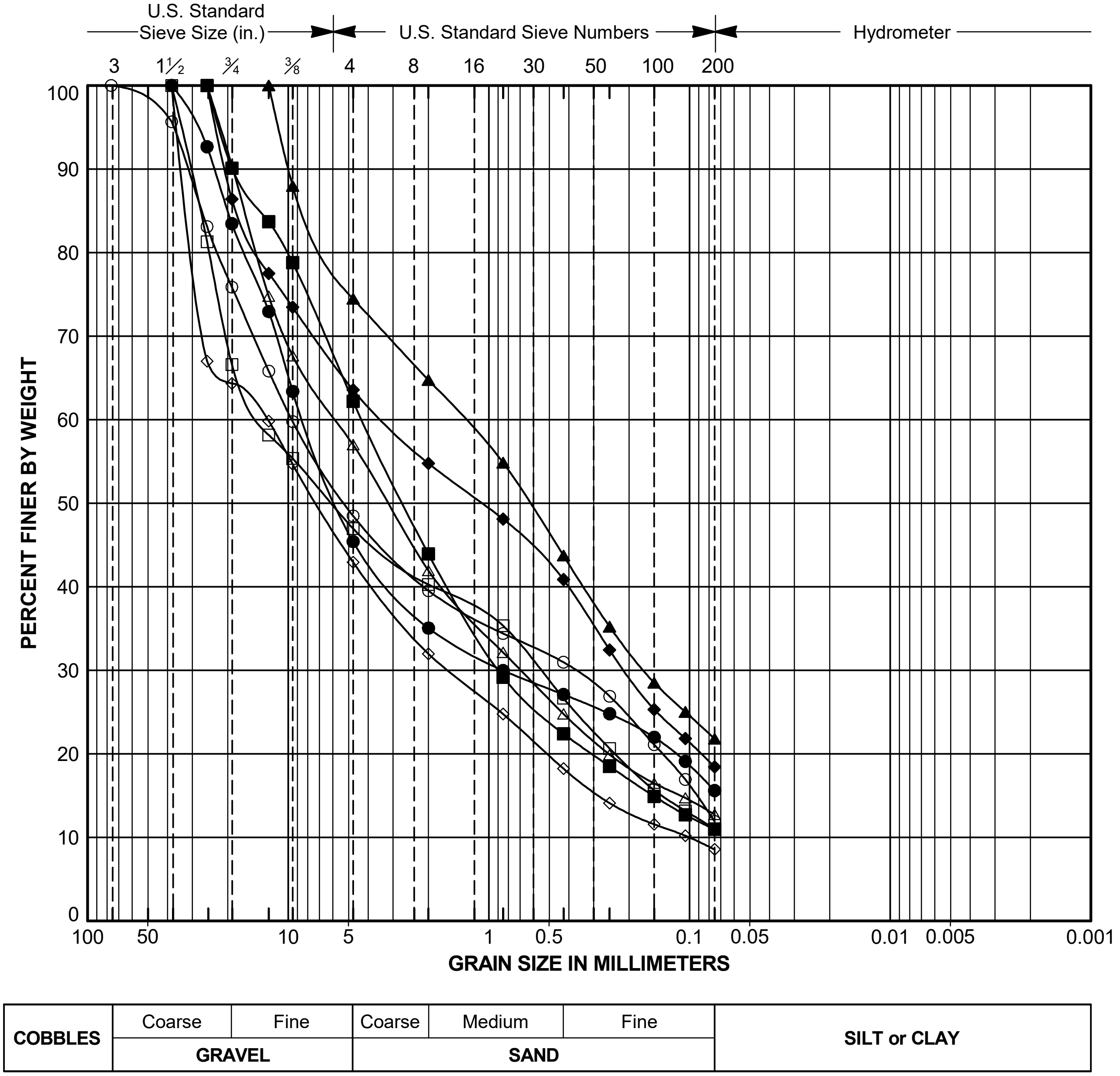
LOG OF BORING DYB23-02

Page 3 of 3

VCTC Sespe Creek Bridge
Project No. 2023-010

PLATE
C7

Template: DY_SIEVE_DIAMETERS



Laboratory Testing by: Hushmand Associates, Incorporated

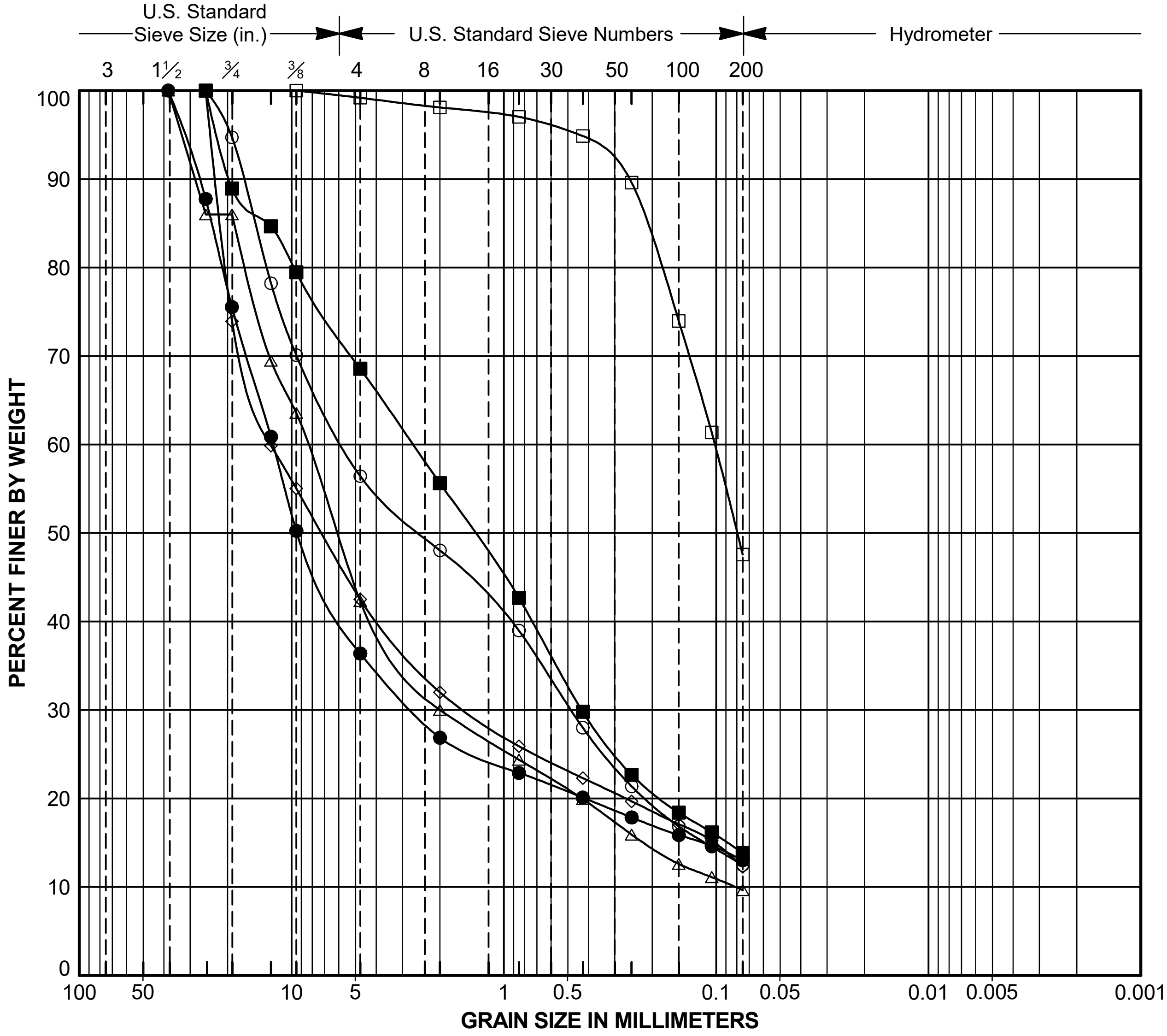
Symbol	Source	Depth (feet)	Classification	D15 (mm)	D50 (mm)	D85 (mm)	% Passing #200 Sieve	Cc	Cu
⊙	DYB23-01	0.0	POORLY GRADED GRAVEL WITH SILT AND SAND	0.09	5.22	27.00	12	0.222	145.475
□	DYB23-01	10.0	POORLY GRADED GRAVEL WITH SILT AND SAND	0.14	6.11	27.52	11	0.352	214.801
△	DYB23-01	15.0	CLAYEY SAND WITH GRAVEL (SC)	0.11	3.18	16.49	13		
◇	DYB23-01	20.0	WELL-GRADED GRAVEL WITH SILT AND SAND (G	0.28	7.21	31.69	9	1.962	125.708
●	DYB23-01	30.0	CLAYEY GRAVEL WITH SAND (GC)		5.67	20.04	16		
■	DYB23-01	55.0	WELL-GRADED GRAVEL WITH SILT AND SAND (G	0.15	2.67	13.63	11	2.973	68.494
▲	DYB23-01	60.0	CLAYEY SAND WITH GRAVEL (SC)		0.63	8.16	22		
◆	DYB23-02	20.0	SILTY SAND WITH GRAVEL (SM)		1.09	17.88	18		

PARTICLE SIZE ANALYSIS

VCTC Sespe Creek Bridge
Project No. 2023-010

PLATE
E1

Template: DY_SIEVE_DIAMETERS



COBBLES	Coarse	Fine	Coarse	Medium	Fine	SILT or CLAY
	GRAVEL		SAND			

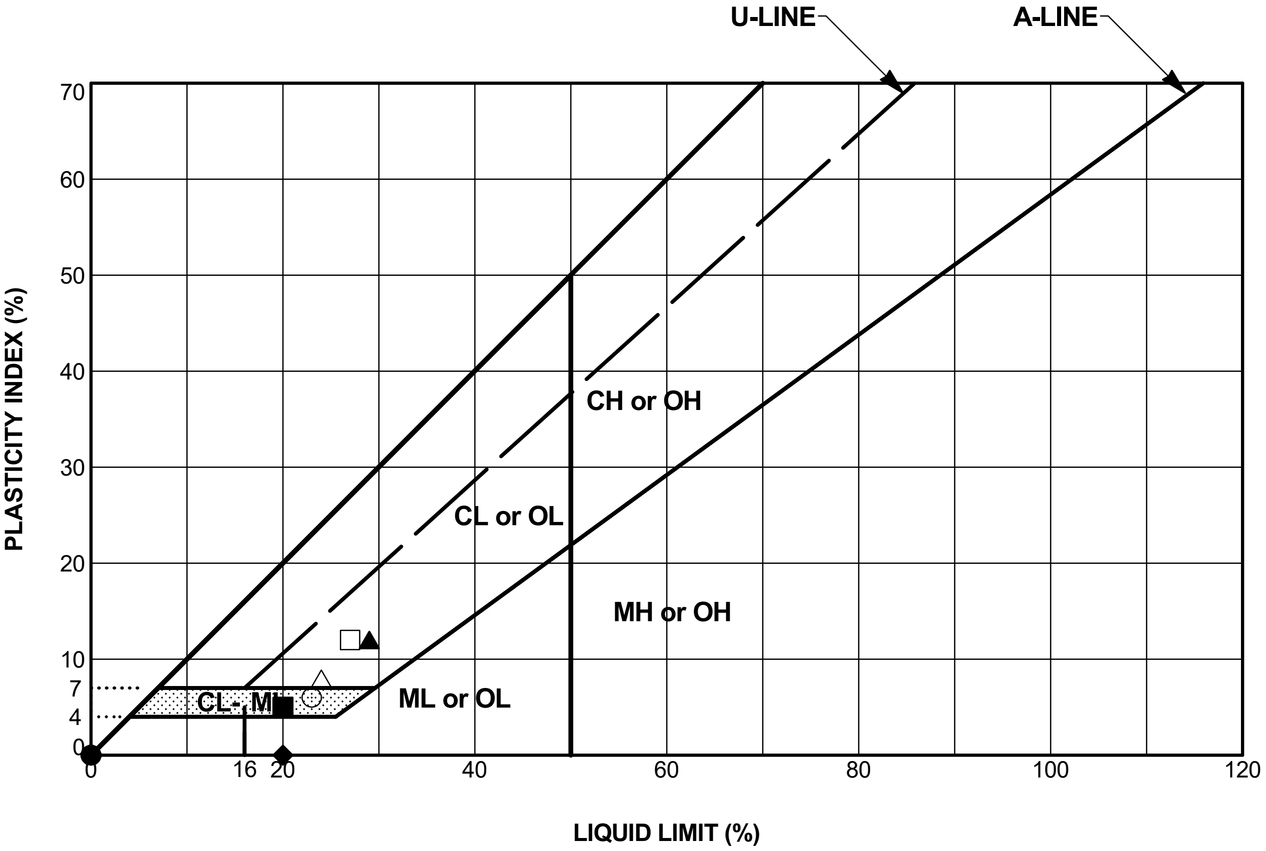
Laboratory Testing by: Hushmand Associates, Incorporated

Symbol	Source	Depth (feet)	Classification	D15 (mm)	D50 (mm)	D85 (mm)	% Passing #200 Sieve	Cc	Cu
⊙	DYB23-02	30.0	CLAYEY SAND WITH GRAVEL (SC)	0.11	2.45	14.88	12	0.811	112.998
☐	DYB23-02	45.0	SILTY SAND (SM)		0.08	0.22	48		
△	DYB23-02	50.0	POORLY GRADED GRAVEL WITH CLAY AND SAND	0.22	6.11	18.62	10	5.807	103.895
◇	DYB23-02	60.0	CLAYEY GRAVEL WITH SAND (GC)	0.10	7.20	21.56	12	3.149	216.601
●	DYB23-02	80.0	CLAYEY GRAVEL WITH SAND (GC)	0.12	9.39	23.82	13		
■	DYB23-02	90.0	SILTY CLAYEY SAND WITH GRAVEL (SC-SM)	0.09	1.38	12.94	14		

PARTICLE SIZE ANALYSIS

VCTC Sespe Creek Bridge
Project No. 2023-010

PLATE
E2



Laboratory Testing by: Hushmand Associates, Incorporated

Test Method: ASTM D4318

Symbol	Source	Depth (feet)	Classification	Natural M. C. (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	% Passing #200 Sieve
⊙	DYB23-01	15.0	CLAYEY SAND WITH GRAVEL (SC)		23	17	6	13
□	DYB23-01	35.0	CLAYEY SAND (SC)		27	15	12	14
△	DYB23-01	50.0	CLAYEY SAND (SC)		24	16	8	
◇	DYB23-01	70.0	POORLY GRADED SAND WITH SILT (SP-SM)		NP	NP	NP	11
●	DYB23-01	100.0	SILTY GRAVEL WITH SAND (GM)		NP	NP	NP	
■	DYB23-02	15.0	SILTY SAND WITH GRAVEL (SM)		20	15	5	19
▲	DYB23-02	40.0	SANDY LEAN CLAY (CL)		29	17	12	69
◆	DYB23-02	45.0	SILTY SAND (SM)		20	20	NP	48

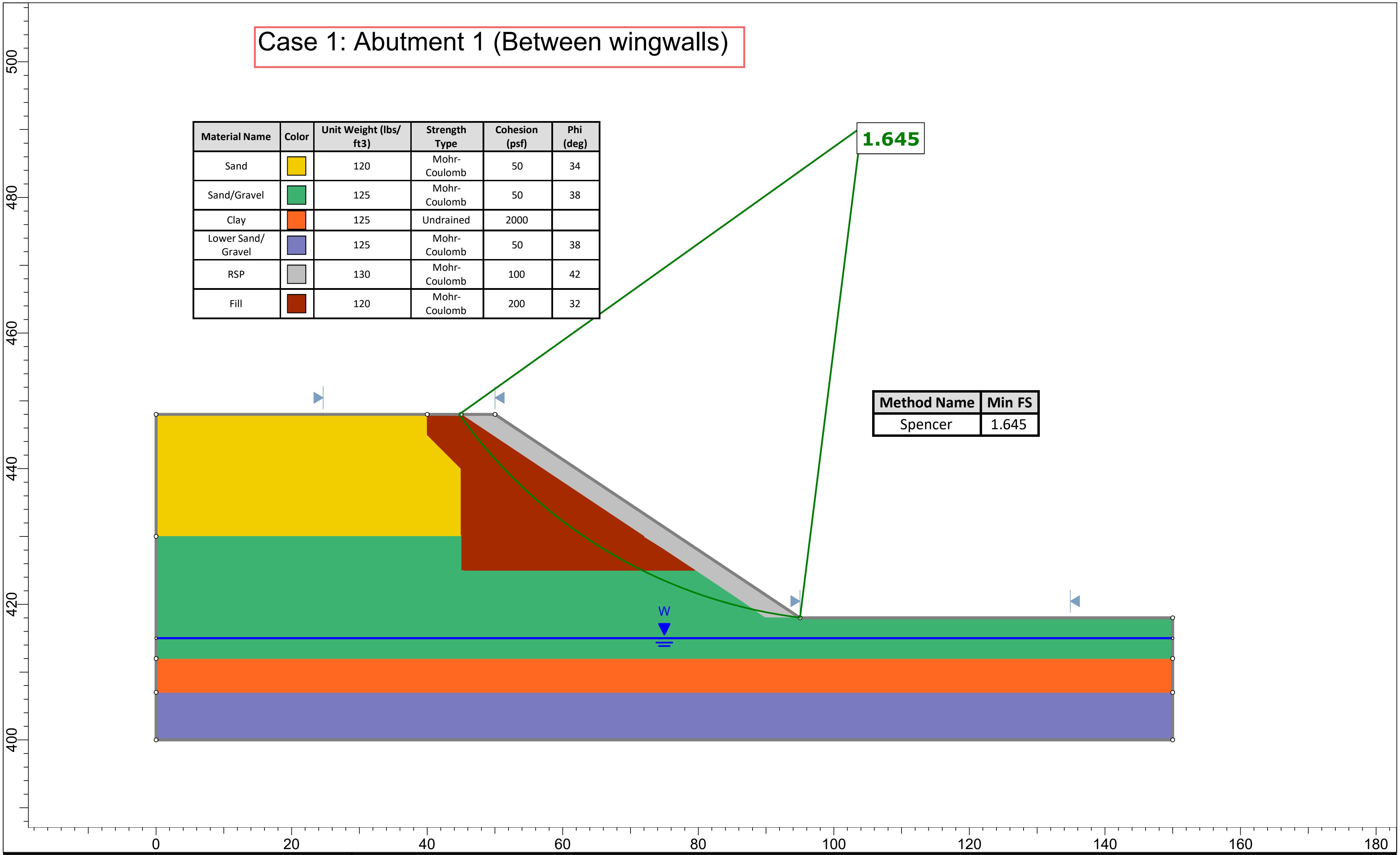
PLASTICITY CHART

VCTC Sespe Creek Bridge

Project No. 2023-010

ATTACHMENT 3

Case 1: Abutment 1 (Between wingwalls)



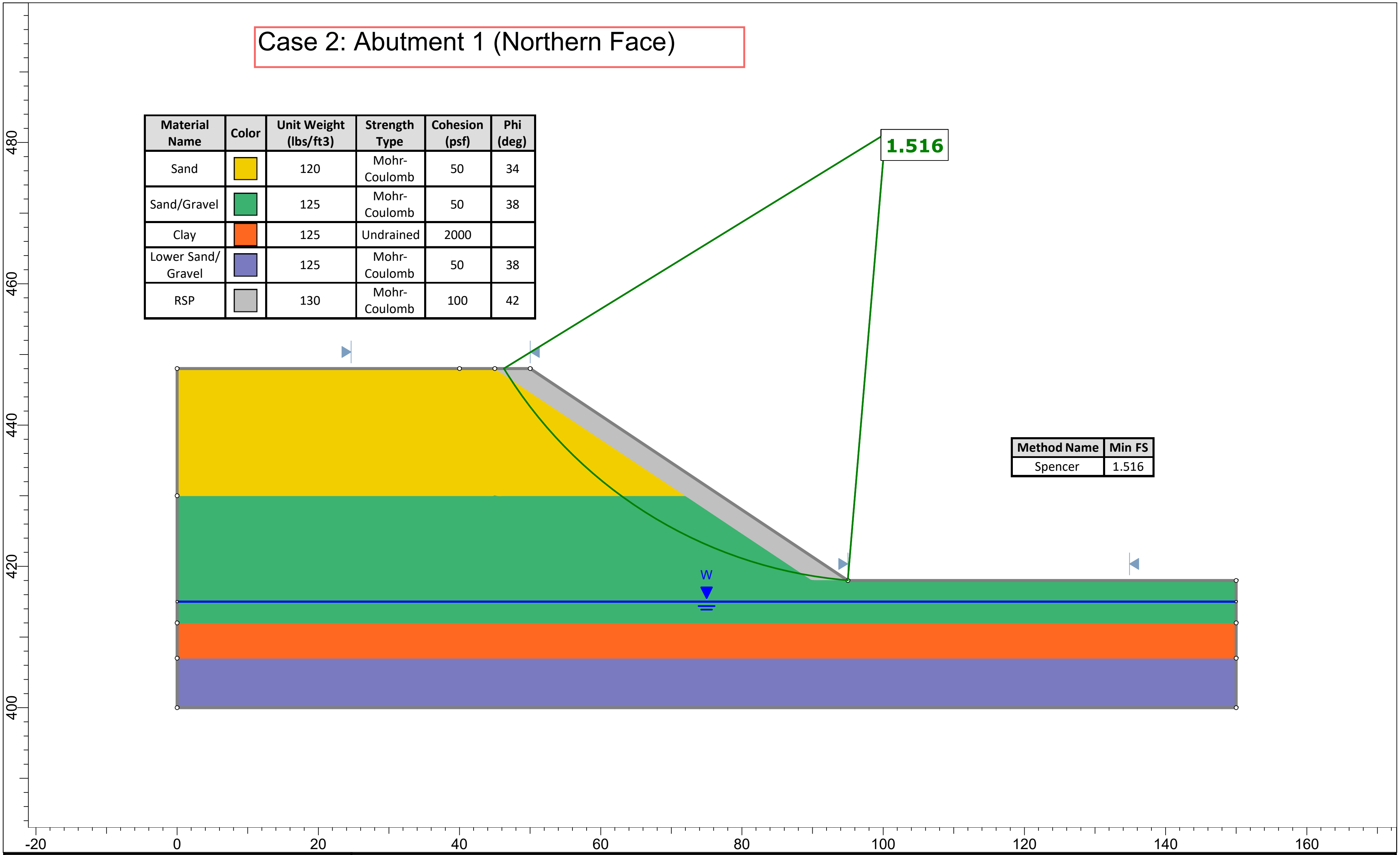
Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Sand	🟨	120	Mohr-Coulomb	50	34
Sand/Gravel	🟩	125	Mohr-Coulomb	50	38
Clay	🟧	125	Undrained	2000	
Lower Sand/ Gravel	🟪	125	Mohr-Coulomb	50	38
RSP	⬜	130	Mohr-Coulomb	100	42
Fill	🟥	120	Mohr-Coulomb	200	32

Method Name	Min FS
Spencer	1.645

Project	2023-010.01 - VCTC Sespe Creek RSP		
Group	Group 1	*Scenario*	Master Scenario
Drawn By	TR	*Company*	DYA
Date	3/11/2025, 2:27:51 PM	*File Name*	Parallel Section.slmd

SLIDEINTERPRET 9.010

Case 2: Abutment 1 (Northern Face)



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Sand	🟨	120	Mohr-Coulomb	50	34
Sand/Gravel	🟩	125	Mohr-Coulomb	50	38
Clay	🟧	125	Undrained	2000	
Lower Sand/ Gravel	🟪	125	Mohr-Coulomb	50	38
RSP	⬜	130	Mohr-Coulomb	100	42

Method Name	Min FS
Spencer	1.516

rocscience

SLIDEINTERPRET 9.010

Project	2023-010.01 - VCTC Sespe Creek RSP

Group	Group 1	*Scenario*	Master Scenario
Drawn By	TR	*Company*	DYA
Date	3/11/2025, 2:27:51 PM	*File Name*	Transverse Section (1).slmd