FOUNDATION REPORT
PLACERVILLE DRIVE AT HANGTOWN CREEK BRIDGE REPLACEMENT
CITY OF PLACERVILLE, CALIFORNIA
FEDERAL-AID PROJECT NUMBER BRLS-5015 (024)
BRIDGE 25C0152

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HDR Project No. 10324503 /
HDR|WRECO Project No. P18113
October 2025

October 17, 2025

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Attention: Jeff Elmensdorp, PE
Senior Project Engineer

Subject: Foundation Report
Placerville Drive at Hangtown Creek Bridge Replacement Project
City of Placerville, California
Federal-Aid Project Number BRLS-5015 (024)
HDR Project No. 10324503 / HDR|WRECO Project No. P18113

Dear Mr. Elmensdorp:

HDR (previously HDR|WRECO) is pleased to submit our Foundation Report for the Placerville Drive at Hangtown Creek Bridge Replacement Project (Project). This report was conducted and prepared in general conformance with the scope of work prepared by HDR for the subject Project.

We would like to thank Dewberry and the City of Placerville for the opportunity to prepare this Foundation Report.

If you have any questions or wish to discuss this report in greater detail, please contact us at (916) 679-8700.

Sincerely,

HDR





David Kitzmann, PG, CEG, PE
Senior Engineering Geologist



Franklin Taber, GE
Senior Geotechnical Engineer

Distribution: Addressee, City of Placerville, P18113 file

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FOUNDATION REPORT
PLACERVILLE DRIVE AT HANGTOWN CREEK BRIDGE REPLACEMENT PROJECT
CITY OF PLACERVILLE, CALIFORNIA

1. INTRODUCTION

This Foundation Report was prepared by HDR in accordance with the California Department of Transportation's (Caltrans) *Foundation Reports for Bridges* (Caltrans, 2024a) and is intended for use by the engineers and planners involved with the Placerville Drive at Hangtown Creek Bridge Replacement Project (Project). The report includes the following contents:

- A Project summary and description of the geotechnical work performed
- A discussion of the regional and local geology as it pertains to the Project
- A summary of the identified site soils, summary of the laboratory testing results, and a Log of Test Borings (LOTB) (Taber Consultants, 2000)
- A discussion of the regional seismology and seismic design parameters for the proposed Project site in accordance with the Caltrans Acceleration Response Spectrum (ARS) Online design tool (Caltrans, 2023) and the Caltrans Seismic Design Criteria (SDC), Version 2.0 (Caltrans, 2019)
- A liquefaction evaluation of the identified site soils
- Recommendations regarding the abutment shallow foundations, the cast-in-drilled-hole (CIDH) concrete deep foundations for Piers 2 and 3, and Standard Plan Type 1 and 5 retaining walls (Caltrans, 2024b)
- Recommendations for structure fill and structural pavement sections for the reconstructed roadway approaches

2. PROJECT DESCRIPTION

The Project can be seen in relation to the surrounding road network on Figure 1, Project Location Map, and Figure 2, Project Vicinity Map, which are included in Appendix I of this report, and the Project plans, which are presented in Appendix II. The Project description was provided by Dewberry (Dewberry, 2025a). Elevations referenced within this report are based on the National Geodetic Vertical Datum of 1929 (NGVD 29), unless otherwise noted.

2.1 Introduction

The City of Placerville (City) is proposing to replace the existing Placerville Drive Bridge at Hangtown Creek (Bridge No. 25C0029). The Project, Federal Aid number BRLS-5015 (024), is located along Placerville Drive approximately 0.5 miles north of US 50, within the western portion of the City of Placerville. The general land use in the Project vicinity consists of commercial and low-density residential uses. The existing roadway at the bridge is classified as a "Minor Arterial Road" and accommodates an Average Daily Traffic (ADT) of approximately 11,000 vehicle trips per day.

The proposed Project is funded primarily by the federal-aid Highway Bridge Program (HBP) administered by the Federal Highway Administration (FHWA) through Caltrans Local Assistance. The replacement bridge would be designed to meet current applicable City, American Association of State Highway and Transportation Officials (AASHTO), and Caltrans design criteria and standards.

2.2 Existing Conditions

Constructed in 1931, the existing bridge is a single-span reinforced concrete T-girder bridge on concrete abutments founded on spread footings. The bridge is approximately 45 feet (ft) long by 24 ft wide and is within the City's right-of-way. The bridge was previously determined to be functionally obsolete due to substandard deck geometry, and there are no accommodations for bikes or pedestrians across the bridge. The existing bridge is coded as a 5 "not eligible" by Caltrans for listing on the National Register of Historic Places. The City has determined the structure has no historical significance and therefore does not qualify for special historical considerations.

The most recent Caltrans Bridge Inspection Report noted that the existing bridge has vertical cracking in the concrete girders and both abutments. An 18-inch-diameter spall exposing rebar was also observed along the northern railing at the eastern abutment.

2.3 Proposed Conditions

The proposed structure would be a three-span bridge, approximately 94 feet in length and approximately 64 feet in width and would be raised 2 to 4 feet to accommodate Caltrans hydraulic standards for 50- and 100-year flood events. The proposed width would accommodate two 12-foot travel lanes, one 14-foot center turn lane as well as barriers, bicycle lanes, and pedestrian sidewalk facilities. The superstructure will be a cast-in-place concrete slab bridge supported by concrete abutments founded on spread footings. The piers will consist of concrete pile extensions socketed into rock. The new bridge would be lengthened on the western side to position the western abutment further away from the existing curve of Hangtown Creek at the bridge.

A creek diversion system would be used to divert flow through the construction zone and dewater the area around the bridge during construction. The creek diversion system would likely consist of placing coffer dams upstream and downstream of the construction site and conveying the water from Hangtown Creek through temporary culverts. Any temporary fill associated with the dewatering system would be removed at the end of construction, returning the creek to its original condition. The temporary cofferdams and culverts would be completely removed after the removal of the existing bridge and completion of the replacement bridge.

2.4 Utilities

There are several utilities in the immediate vicinity of the Project site, including overhead, surface, and underground utilities (Dewberry, 2025a). Overhead lines run through the Project site along the northern edge of Placerville Drive.

A 20-inch-diameter sanitary sewer line, trending from the southeast to the northwest, is located on the surface under the bridge and west of the east abutment. This sewer line segment originates from the east-southeast through a vertical, west-southwest facing brick wall located approximately 110 feet southeast from the southeast corner of the bridge and runs through a 5-foot-diameter, 6-foot-high concrete cylinder with a manhole located approximately 20 feet southeast from the southeast corner of the bridge. The sewer segment under the bridge runs into the north slope above Hangtown Creek and becomes an underground line north of this location.

Underground communication and water lines are located on the south edge of the road. The water line is attached to the southern edge of the existing bridge (Dewberry, 2025a). A large steel pipe is

attached under the bridge and runs from the west abutment to the east abutment; this pipe serves as a conduit for the water line.

3. GEOTECHNICAL INVESTIGATIONS

The conclusions and recommendations contained within this report are based on a Taber Consultants (Taber) subsurface investigation conducted in January 1999 at the bridge location and borings and seismic refraction profiling performed by HDR. The HDR investigation included borings for proposed retaining walls along Placerville Drive as part of a roadway improvement project. Only the borings made by HDR near the bridge and approach retaining walls have been included in this report.

The Taber investigation was reported in *Foundation Investigation, Hangtown Creek Bridge (Widen) on Placerville Drive* (Taber Consultants, 2000). The purpose of the 1999 investigation was to provide criteria for use in design and construction of a planned bridge widening. Two logged and sampled test borings, Borings B-1 and B-2, were advanced to depths of about 21.6 and 27.6 feet, respectively. The report data are reported in metric units, which have been converted to U.S. standard units in this report, unless noted.

An earlier geotechnical investigation by Youngdahl & Associates in March 1996 is described in the Taber report. Records of this investigation were not available for review. The Taber report indicates that four test borings were conducted near the existing bridge, but descriptions of what was encountered are not provided. A Taber summary of the groundwater observations from the 1996 report is used to provide confirmation of groundwater on the eastern side of the existing bridge.

An HDR field investigation was performed in 2019 to better define the subsurface soil and rock conditions along Placerville Drive to support the associated Bicycle and Pedestrian Facilities Project. The HDR Borings R-19-002 and R-19-003 are located to support this Project. The borings were advanced on October 7, 2019, by V&W Drilling under the supervision of an HDR geologist. The borings were logged in accordance with the Caltrans *Soil and Rock Logging, Classification, and Presentation Manual* (Caltrans, 2022a). The locations of the borings are shown on Figure 3 in Appendix I.

HDR retained the services of Gasch Geophysical Services, Inc. (GGSI) to perform seismic refraction surveys (RS) along the proposed bridge abutments and retaining wall locations. The purpose of the seismic RS work was to define the characteristics of the subsurface materials and to evaluate the depth of competent bedrock in these locations. The RS work was conducted on August 4 and November 3, 2023 (GGSI, 2023).

To provide necessary data for corrosivity, additional field work was conducted by HDR on November 18, 2023, to obtain a representative surficial soil sample for corrosive potential (minimum resistivity, pH, and chloride, and sulfate content). Also, additional observations were made of the soil and rock exposures on the west bank of Hangtown Creek and at the hill base south of the existing bridge.

The Taber report with LOTB for the 1999 investigation is provided in Appendix III, and the 2019 HDR Borings R-19-002 and R-19-003 logs and the GGSI seismic RS reports are provided in Appendix IV.

4. LABORATORY TESTING PROGRAM

During the January 1999 Taber field investigation, soil and rock core samples were collected from Borings B-1 and B-2. No laboratory testing was conducted. Soil and rock characteristics were determined in the field using visual observations, core recoveries (RECs), rock quality designations (RQDs), and Standard Penetration Test (SPT) results. Also, the soil and rock observed in Boring R-19-003 during the October 2019 HDR investigation were described in the field using visual observations, RECs, and RQDs, and insufficient soil was encountered to perform laboratory testing.

Laboratory testing was performed on selected samples from Boring R-19-002.

To provide the necessary data for corrosivity screening in the vicinity of the bridge, a bulk sample was collected on November 18, 2023, from near the bridge. The sample was taken from an exposed soil cut located approximately 33 feet west of the west end of the bridge north rail and 6 feet below the top of slope. The soil sample consists of a pink brown, poorly graded sandy fine to coarse gravel with occasional angular cobbles. Details regarding the soil sample location and testing are shown in Table 1. Laboratory test results are provided in Appendix V.

Table 1. Summary of Laboratory Testing

Boring/Sample ID	Sample Location (Lat./Long.)	Sample Depth (feet)	Test	Standard (ASTM/CTM)
R-19-002	38.73351, –120.82879	5.0–6.0	Sieve Analysis	ASTM D422/CT 202
			Atterberg Limits	ASTM D4318/CT 204
		11.5–12.1	Point Load Testing	ASTM D5731
		13.5–13.9	Point Load Testing	ASTM D5731
O-23-001	38.73362, –120.82794	0–0.2	pH and Min. Resistivity	CT 643
			Sulfate	CT 417
			Chloride	C 422

Note: Lat. = latitude in decimal degrees; Long. = longitude in decimal degrees; ASTM = American Society for Testing and Materials; CTM = California Test Method

5. GEOTECHNICAL CONDITIONS

Information pertaining to the geology and subsurface conditions of the Project site is assumed based upon review of the Project 100% Submittal plans (Dewberry, 2025b), the available original bridge plans, published geologic maps, available geologic literature, available archived report files, HDR field observations, and HDR subcontracted seismic RS.

5.1 Geology

5.1.1 Regional Geology

The Project site is located within the Sierra Nevada Geomorphic Province of California (California Geological Survey [CGS], 2002). This province encompasses the Sierra Nevada Mountains and surrounding foothills. This province includes an area approximately 400 miles long bounded by the Basin and Range to the east, Cascade Ranges to the north, Great Valley to the west, and Mojave Desert to the south. The Coast Ranges and Transverse Ranges meet at the southernmost extremity of the Sierra Nevada. The Sierra Nevada is composed of a tilted fault block with a high and rugged eastern scarp and a gentle western slope that extends under the sediments of the Great Valley. Deep river canyons dissect the western slope, and the higher Sierra Nevada has been sculpted by glacial activity.

Existing fault zone systems within El Dorado County are concentrated in its western portion as the Foothill Fault Zone system, with several isolated faults in the central county area and the Lake Tahoe Basin.

5.1.2 Local Geology

Review of the Geologic Map of the Sacramento Quadrangle (California Division of Mines and Geology [CDMG], 1981) shows the underlying bedrock at the Project site is mapped as plutonic Mesozoic-age granitic rocks (Mzg). A chevron-shaped body of the Mariposa Formation (Jm) metasedimentary bedrock is shown approximately 0.5 miles to the east and west of the proposed bridge and extends to the north. The Logtown Ridge Formation (Jlr) metamorphosed extrusive igneous bedrock is mapped extending to the west and east of the Jm unit. Due to the regional scale of the mapping, smaller bodies of Jm and Jlr may exist that are not shown.

Mzg rocks are described as predominantly granite to granodiorite with a very broad date range. Jm rocks are described as a late Jurassic-age metasedimentary rock formation consisting of slate, sandstone, conglomerate, and sedimentary breccia. Jlr bedrock is described as mid-Jurassic-age metamorphosed mafic breccias, flows, and pyroclastic and volcaniclastic rocks.

The closest mapped fault is the pre-Quaternary-age, north-south trending Gillis Hill Fault[1], located approximately 1.2 miles to the east of the Cold Springs Road intersection. The closest late Quaternary-age fault is the north-south trending Bear Mountains Fault Zone, located about 5.3 miles west of the Green Valley Road intersection. Both the Gillis Hill Fault and Bear Mountains Fault Zone are part of the Foothill Fault Zone System. The Gillis Hill Fault separates the Jm formation, part of the Mother Lode Belt, from the Paleozoic-age Calaveras Complex (chert, argillite, and slate in the Placerville area) further to the east.

The Project site can be seen in relation to the published geology in the Regional Geologic Map, shown on Figure 4 in Appendix I.

5.2 Surface Conditions

Existing land uses adjacent to the Project area include vacant land and commercial and business park developments. East of the bridge, commercial properties are located north of Placerville Drive with Hangtown Creek located to the south between the bridge and a box culvert approximately 110 feet east of the bridge. Hangtown Creek flows west from the culvert. East of the culvert, commercial

[1] Gillis Hill Fault is designated as the Melones Fault Zone south of US 50.

properties are located both north and south of Placerville Drive. West of the bridge, vacant land is located south of Placerville Drive with Hangtown Creek located to the north.

Both existing underground and overhead utilities are present throughout the Project site. Underground utilities include communication, water, sewer, and electrical lines. Utility poles and electrical utility lines are located along the north edge of Placerville Drive throughout the Project area. Utility facilities are described in Section 2.4.

Based on a topographic survey of the Project area, the road elevations at the center line adjacent to the west and east ends of the bridge are 1,678 and 1,676 feet, respectively (Dewberry, 2025b). The roadway grade is relatively flat from the Project west end to the east end. West of the existing bridge, the Project area appears to have been built on a relatively flat side slope along most of its length with a north-facing embankment having a top of slope approximately 14 feet above Hangtown Creek. The flat side slope area south of Placerville Drive has been cleared of vegetation and is approximately 185 feet wide north to south. The relatively flat area extends to the east and is approximately 150 feet wide immediately west of the bridge. South of the flat area, the ground slopes up to a ridge line with a maximum elevation of over 1,920 feet. Observed rock outcrops at the base of the north-facing slope were found to consist of highly weathered granitic rock.

A retaining wall with a cemented rock face has been constructed from the north end of the west abutment wing wall and follows a curved path parallel to the stream channel with decreasing height toward the west-northwest. The west end of the retaining wall has been buried under large rock cobbles. Exposed soils were observed on the north-facing embankment above the west end of the wall; this exposed soil area was estimated to be 15 feet wide. The east end of the exposed soil slope was measured to be approximately 33 feet west of the west end of the bridge north rail and estimated to be approximately 6 feet below the top of the embankment slope. The observed soil on the slope consists of a pink brown, poorly graded sandy fine to coarse gravel with occasional angular cobbles and trace to little fines. The soil was found to be hard to excavate with hand tools.

East of the bridge, the embankment is south-facing with relatively steep slopes with rock slope protection (RSP) from the southeast end of the east abutment to a concrete box culvert located approximately 110 feet upstream. The RSP consists of large boulders with a surface mantle of concrete. Eroded sections of the embankment have been repaired with uncemented angular rock. The area between the road embankment and the box culvert is vertical and is faced with brick. A stormwater pipe and a 20-inch-diameter sanitary sewer pipe were observed to originate from the brick face. The stormwater pipe outlet to the creek is approximately 3 feet from the brick face. The sanitary sewer pipe is described in Section 2.4. Accumulating sediment, consisting of coarse sand and fine to coarse subangular gravel, was observed south and east of the east abutment. Within the creek channel with water flow, a significant portion of the sediment consists of subangular to angular cobbles with occasional submerged and subaerial silt, sand, and gravel bars downstream from the bridge.

South of and adjacent to the west abutment, large boulders have been placed on the west channel slope. Approximately 20 to 70 feet from the west abutment, numerous soil exposures and bedrock outcrops are visible on the west creek bank that have slopes up to 70 degrees. The observed soil exposures consist of a reddish brown silty to clayey sand with variable amounts of angular gravel and cobbles. This soil occurs at the top of the slope, appears to mantle the underlying bedrock, and is approximately 2 to 3 feet thick. The bedrock on the lower creek bank consists of dark gray, hard,

slightly weathered, moderately fractured, fine-grained metamorphic rock. Further upstream, the creek bank flattens with occasional bare soil slopes with mature tree growth.

5.3 Subsurface Conditions

A subsurface investigation was conducted by Taber on January 11 and 12, 1999. The investigation consisted of the advancement of two rotary wash borings that were located northwest (Boring B-1) and southwest (Boring B-2) of the existing bridge. The April 2000 Taber report with an LOTB summarized the investigation findings. In addition, HDR advanced a boring southwest of the bridge and another boring approximately 300 feet west of the bridge on October 7, 2019. The Taber LOTB and the HDR borings are summarized in Table 2. The rock type as described by Taber was not verified by petrographic analysis; it should be used as a general descriptor and cannot be relied upon to determine the actual rock type.

Table 2. Summary of Subsurface Conditions

Boring	B-1[1]	B-2[1]	R-19-002[2]	R-19-003[2]
Start/End Date	January 11, 1999	January 12, 1999	October 7, 2019	October 7, 2019
Top Hole Elevation (feet)	1,677.7	1,676.2	1,678.5	1,677.1
Unit 1 – Fill	Medium dense SANDY fine GRAVEL with silt, clay, and local cobbles	4± inches of asphaltic concrete overlying brown, medium dense SILTY and SANDY fine GRAVEL with coarse gravel and local cobbles, becoming loose below 1,666.8 feet	xx	Loose to dense, poorly graded GRAVEL with little sand, gray, dry
Bottom of Unit 1 Elevation (feet)	1,666.7	1,663.1	xx	1,675.1
Unit 2 – Decomposed Rock	xx	SILTY very fine to coarse SAND, dense to very dense, brown	Lean CLAY and CLAYEY SAND, Stiff to hard / dense to very dense, light brown to brown and white-gray	xx
Bottom of Unit 2 Elevation (feet)	xx	1,659.5	1,670.5	xx
Unit 3a – Bedrock, Low RQD	METAVOLCANIC ROCK, moderately weathered, moderately to highly fractured, REC = 77% (Average), RQD = 0% (Average)	GRANITIC ROCK, slightly and intensely weathered, intensely fractured, REC = 100% (Average), RQD = 0% (Average)	IGNEOUS ROCK, moderately to intensely weathered, intensely to moderately fractured, REC = 71% (Average), RQD = 11% (Average)	METAVOLCANIC ROCK, moderately weathered, very intensely fractured, REC = 92%, RQD = 0%
Bottom of Unit 3a Elevation (feet)	1,661.1	1,655.4	xx	xx
Unit 3b – Bedrock, High RQD	METAVOLCANIC ROCK, fresh, moderately fractured, green gray, with very thin quartz stringers, REC = 100% (Average), RQD = 84% (Low), 87% (Average), 90% (High)	GRANITIC ROCK, slightly and intensely weathered, intensely fractured, REC = 81% (Average), RQD = 20% (Low), 38% (Average), 80% (High)	xx	xx
Termination Elevation (feet)	1,656.1	1,648.7	1,660.5	1,674.1
Groundwater Elevation (feet)	1,664.8	xx	xx	xx

Note: REC = recovery; RQD = rock quality designation; xx = not encountered
[1] Borings B-1 and B-2: Foundation Investigation Report (Taber Consultants, 2000); converted from metric measurements to U.S. standard units.
[2] Borings completed by HDR.

Unit 1 – Fill

The boring logs for the Taber Borings B-1 and B-2 soils report slightly compact sandy fine gravel with clay, silt, and cobbles interpreted as fill (Taber, 2000). In Boring B-2, about the bottom 6.5 feet was found to consist of loose to dense silty sand. The Taber report states that boulder-sized material is likely to be encountered and that this material was likely abutment and/or roadway embankment fill with possible mine tailings (Taber, 2000).

The ground south of Placerville Drive and west of the Project bridge consists of a level pad separated from the road by a short cut slope. Poorly graded, subangular gravel was noted on the surface on portions of this pad during the HDR investigation. Boring R-19-003 advanced through approximately 2 feet of gravel before encountering bedrock.

Unit 2 – Decomposed Rock

Below the fill material and above the bedrock in Boring B-2 and from the surface to bedrock in Boring R-19-002, a dense to very dense or stiff to hard soil composed variably of silty sand, clayey sand, and lean clay was encountered. This soil was not observed in Boring B-1 or R-19-003. This soil may represent decomposed rock.

Unit 3 – Bedrock

Rock at the site is moderately weathered and highly to intensely fractured near the top of the unit grading to less-fractured and less-weathered rock with depth. For foundation support purposes, the rock has been divided into an upper, scourable, highly fractured subunit (Unit 3a) and a lower, scour-resistant, less fractured subunit (Unit 3b).

The upper 3.3 to 4.9 feet of bedrock in the Taber borings and all the bedrock in Borings R-19-002 and R-19-003 was described to be intensely to moderately weathered and highly to intensely fractured with an RQD of 0% in Borings B-1, B-2, and R-19-003. Boring R-19-002 had a somewhat higher RQD, averaging 11%. The bedrock in this upper layer is assigned to Unit 3a.

Less weathered and fractured rock was encountered in Borings B-1 and B-2 below Unit 3a to the maximum depth of these borings. In Boring B-1, RQD values range from 84% to 90%. In Boring B-2, RQD values range from 20% to 80%. The bedrock with these values has been assigned to Unit 3b.

It should be noted that the top of rock and top of less-fractured hard rock is likely variable across the site. The rock surface is likely sloping and may have steps along its upper surface. Fracture density likely varies across the site.

The rocks encountered in the borings generally match the descriptions of rocks in the general vicinity of the bridge. However, a body of metavolcanic rock appears to be present that is consistent with nearby units but not shown on published mapping. The location of contact is concealed by channel alluvium.

5.3.1 Gasch Geophysical Services, Inc., Refraction Surveys

Four seismic RS lines were located in the Project area: RS Lines 1, 2, 3, and 4 (GGSI, 2023).

RS Line 1 spanned a length of 130 feet and was located east of the existing bridge following the southern edge of Placerville Drive. The seismic velocities measured along this line show a moderately fast gradation from the low velocities (2,000 feet per second [ft/s]) at the surface to

moderate velocities (6,000 ft/s) at depths from approximately 3 feet on the northwest end to around 25 feet on the southeast end. The moderate velocity zone of 6,000 ft/s suggests moderately fractured rock grading to slightly fractured rock to fresh rock at velocities over 8,000 ft/s, except for the northwest end of RS Line 1. Readings from this area show the influence of the existing bridge foundation on velocity measurements and appear to indicate higher velocities than what was observed in Boring B-2.

RS Line 2 spanned a length of 80 feet and was located east of the existing bridge following the northern edge of Placerville Drive. However, the line was found to be located across a 20-inch-diameter sanitary sewer line that was not known at the time of investigation. As a result, the values from this profile are not considered accurate, and higher velocity materials at depth were not measured.

RS Line 3 spanned a length of 130 feet west to east and was located northwest of the existing bridge. Seismic velocities beneath this line grade at a moderate rate from low-moderate velocity material (2,000 ft/s) at ground surface to moderate velocities (6,000 ft/s) at approximate depths of 12.5 to 25 feet. The moderate velocity zone of 6,000 ft/s suggests moderately fractured rock grading to slightly fractured rock to fresh rock at velocities over 8,000 ft/s. This is consistent with the Boring B-1 observations where moderately weathered, moderately to highly fractured metavolcanic bedrock (Unit 3a) and fresh, moderately fractured bedrock (Unit 3b) are found below depths of 11.6 and 16.1 feet, respectively, near the east end of RS Line 3.

RS Line 4 is located on the north side of the westbound lane of Placerville Drive, west of the end of RS Line 3, and continues to near the intersection of Placerville Drive and Pierroz Road. This line is 280 feet in length and trends approximately east to west. Seismic velocities grade at a moderate rate from low-moderate velocity material (2,000 ft/s) at ground surface to moderate velocities (6,000 ft/s) at depths of approximately 15 to 24 feet. The moderate velocity zone of 6,000 ft/s suggests moderately fractured rock grading to slightly fractured rock to fresh rock at velocities over 8,000 ft/s.

6. GROUNDWATER

Groundwater encountered within the Project area occurs within fractures in metamorphic bedrock. Groundwater was reported on the west bank of the existing bridge at an approximate elevation of 1,664.8 feet in Boring B-1 (Taber Consultants, 2000). In the April 2000 foundation investigation report, Taber states that groundwater was observed during a field investigation completed by Youngdahl Consulting Group, Inc.,[2] in February 1996 on the east bank at an approximate elevation of 1,667.7 feet in Boring-13.1, reportedly located near the northeast corner of the existing bridge. The water surface elevation for Hangtown Creek at the time of the Taber field investigation (January 11–12, 1999) was approximately 1,666.2 feet.

Within fractured bedrock, the groundwater surface should mimic the topography, but with the depth to water being somewhat greater along ridges and near drainage divides and somewhat shallower at lower elevations and near drainages. Groundwater elevation in the near vicinity of the bridge can be expected to be close to the creek water surface elevation. Water can be expected to collect along the top of rock surface, and seepage within the overlying sandy soils could be significant for excavations below groundwater. Within rock, groundwater may be transmitted as seepage through discontinuities (e.g., fractures, joints) and may be heavy.

[2] Unavailable for review

7. AS-BUILT DATA

As-built data regarding the Project site are as follows:

- 1930 Plans titled "Bridge Across Hangtown Creek near Placerville – El Dorado County" by the State of California, Department of Public Works, Division of Highways, without as-built information or notations. This is included in the Bridge Inspection Records Information System (BIRIS) package provided by Dewberry (Caltrans, 2020).
- BIRIS, Division of Highway Maintenance, Bridge Inspection Reports for Bridge No. 25C0029 (Caltrans, 2020).

Copies of the available as-built information are provided in Appendix VI.

7.1 1930 Plans, Bridge Across Hangtown Creek

The design plans show the existing bridge to be a 45-foot-long, single-span reinforced concrete T-girder bridge. The bridge abutments are supported monolithic reinforced concrete wingwalls founded on 7.5-foot-wide spread footings. Both abutments have a designed skew angle of 49º 8' 00" degrees. The bridge deck is 24 feet wide and has a grade of 0.38% from west to east. The spread footings shown on the original bridge plans show the bottom of the footings to be at an elevation of 1,660 feet, but the exact depth was to be determined by the Engineer (Caltrans, 2020). The wingwalls are shown to be Caltrans "Standard Structures" reinforced concrete retaining walls, similar to Caltrans Standard Plan Type 1A retaining walls, and are shown to be approximately 15 feet tall.

According to the Taber report, the top of the west abutment footing on the upstream side of the existing bridge was observed to be at 1,660.2 feet (Taber Consultants, 2000, page 3). Since the bottom of the footings was to be located at this elevation, the as-built footings appear to be lower than what was planned in the original plans.

7.2 Caltrans Bridge Inspection Records Information System

The BIRIS package (Caltrans, 2020) includes the Bridge Inspection Reports from 7/15/2020, 07/19/2018, 07/26/2016, 07/23/2012, 07/24/2008, 10/16/2007, 07/20/2006. 04/20/2004, 03/20/2002, and 04/18/2000; Supplementary Bridge Reports from 09/23/1997, 08/23/1995, 09/16/1993, 08/16/1991, 01/20/1966, 08/23/1965, 08/26/1964, 07/31/1963, 07/10/1962, 06/29/1960, 07/17/1959, 10/03/1958, 01/31/1956, 07/26/1954, 09/22/1950; Signature Reports from 08/01/1989, 07/22/1987, and 11/08/1983; Critical Inventory Rating Report from 03/23/1982; Bridge Reports from 02/23/1982 and 08/04/1938; and Load Rating Summary Sheet from 08/27/2015.

Based on the limited channel stream bed elevations reported in the BIRIS documents, the thalweg has migrated toward the western bank with little or no change to the channel elevation.

Recent reports describe the roadway surface to consist of a 3.5-inch asphalt concrete (AC) showing a small amount of cracking that reportedly did not affect the ride over the bridge. In addition, these reports indicated only minor defects in the substructure, and slope protection is in place.

8. SCOUR DATA

The exposed intact weathered rock in the channel is considered to be scour-resistant. Overlying bedload and fills/alluvium/colluvium on the banks are considered prone to scour. Decomposed and intensely fractured rock near the top of the rock unit are considered to have some resistance to scour

and would behave like tightly packed angular cobbles if exposed to direct flow. For this report, top of scourable rock equivalent to dense angular gravel and cobbles is at an approximate elevation of 1,666.7 feet at Abutment 1 and Pier 2 and at an approximate elevation of 1,659.5 feet at Pier 3 and Abutment 4. Scour-resistant rock starts at an approximate elevation of 1,661.1 feet at Abutment 1 and Pier 2 and at an approximate elevation of 1,655.4 feet at Pier 3 and Abutment 4.

The draft Bridge Design Hydraulic Study (HDR, 2025) provides anticipated scour elevations for design of the proposed bridge, which are included in Table 3. The planned bottom of the abutment footing elevations is below the long-term scour elevations.

Table 3. Proposed Bridge Scour Data

Support No.	Long-Term (Degradation and Contraction) Scour Elevation (feet)	Short-Term (Local) Scour Depth (feet)
Abut 1	1,664.0	4.1[1]
Pier 2	1,664.0	6.9[1]
Pier 3	1,664.0	7.0
Abut 4	1,664.0	4.1

Note: [1] The total calculated scour depths are below the top of scour-resistant rock, and local scour will be limited by the presence of scour-resistant rock.
Source: HDR, 2025

9. CORROSION EVALUATION

Caltrans' Corrosion Guidelines, Version 3.2, dated May 2021 (Caltrans, 2021), state the following definition of corrosive soils:

"For structural elements, the Department considers a site to be corrosive if one or more of the following conditions exists for the representative soil and/or water samples taken at the site:

- *Chloride concentration is 500 ppm or greater,*
- *Sulfate Concentration is 1500 ppm or greater,*
- *pH is 5.5 or less."*

HDR performed laboratory testing for corrosive potential on one recovered representative soil sample for this study, and the results are presented in Table 4.

Table 4. Soil Corrosion Data

Sample	Sample Location (decimal degrees)	Depth (feet)	Minimum Resistivity (ohm-cm)	Soil pH	Chloride Content (ppm)	Sulfate Content (ppm)
O-23-001	38.7336, –120.8279	0.0–0.2	3,480	6.69	3.4	7.5

Note: ppm = parts per million

Based on the corrosive potential testing results, the collected soil sample from the location is considered noncorrosive.

10. SEISMIC INFORMATION

The Caltrans SDC, Version 2.0 (Caltrans, 2019), was adopted on September 1, 2019, and was used during type selection. Following the Caltrans SDC, Version 2.0, a seismic analysis of the Project site was performed using the Caltrans ARS Online design tool, Version 3.1.0 (Caltrans, 2023). This analysis serves to present approximate seismic design parameters and to identify potential seismic hazards such as liquefaction and lateral spreading in accordance with the updated criteria. The results of the analysis are provided in Table 5; Design Response Spectrum (ARS curve), in Appendix II; and copies of the analysis, in Appendix VII.

Table 5. Seismic Analysis

Site Location	Latitude: 38.733483º
	Longitude: –120.827719º
Assumed Site Shear Wave Velocity (V_{S30})	385 meters per second (1,263 ft/s)
Soil Profile Classification	S1
Site-Source Distance	105.5 kilometers (65.6 miles)
Peak Ground Acceleration (PGA)	0.18*g*
Peak Spectral Acceleration (PSA)	0.46*g*
Period of PSA	0.25 seconds

For seismic design of walls, a horizontal seismic coefficient equal to a third of the PGA can be used for sliding retaining walls, and that equal to half of the PGA, for nonsliding retaining walls. Site PGA is below the value used for design of Caltrans Standard Plan walls, and additional seismic analysis is not required for Standard Plan walls.

10.1 Other Seismic Hazards

The Project is located in an area of low to moderate seismic activity with no active faulting at or passing near the Project site. The site is not located in or near an Alquist-Priolo Fault Hazard Zone. Therefore, the potential for fault rupture from known active faults is considered absent. The potential for liquefaction and lateral spreading is considered insignificant due to low accelerations and presences of weathered rock at shallow depths.

11. GEOTECHNICAL RECOMMENDATIONS

The following recommendations are for the proposed Placerville Drive Bridge replacement and associated wingwalls and retaining walls as shown in the 100% Submittal drawings (Dewberry, 2025b). The following recommendations are provided in accordance with the *Load and Resistance Factor Design (LRFD) Bridge Design Specification*s (AASHTO, 2017) with California Amendments (Caltrans, 2025a). A conservative design groundwater elevation of 1668 feet was selected. All footing in rock were analyzed assuming groundwater above base of footings. All footings in soil were conservatively designed assuming that soils up to the base of footing could become saturated even if above design groundwater level.

11.1 Shallow Foundations

11.1.1 Bridge Abutments

The following foundation recommendations are based upon documented but limited subsurface observations at and around the Project site. Abutment spread footings established in intact (scour-resistant) bedrock are considered suitable for support of the proposed bridge.

It is recommended to place spread footings a minimum of 2 feet into intact decomposed to fresh bedrock below likely scour elevations. Based on these recommendations, the bottom of the abutment footing elevation of 1,658 feet at Abutment 1 and 1,653 feet at Abutment 4 meets these requirements. If the bedrock surface is found to have a slope or steps along each abutment length, the footing bottom should match the elevation change using steps not exceeding 12 inches in height and should be backfilled with plain concrete up to 4 feet thick to planned bottom of footing elevation. The Geotechnical Engineer of Record should evaluate the completed footing excavation for conformance with design assumptions and recommendations prior to placement of reinforcement steel or formwork.

Abutment foundation data, foundation loading, and design recommendations are summarized in Table 6, Table 7, and Table 8, respectively.

Table 6. Foundation Design Data

Support Location	Finished Grade Elevation (feet)	Bottom of Footing Elevation (feet)	Footing Dimensions		Permissible Settlement under Service Load (inches)
			Footing Width (B)	Footing Length (L)	
Abut 1	1,663.00	1,658.00	15’ 0”	84’ 6”	1.0
Abut 4	1,658.00	1,653.00	15’ 0”	88’ 9”	1.0
Source: Dewberry, 2025b					

Table 7. Summary of Controlling Loads

Support Location	Footing Width (B)	Footing Length (L)	Controlling Loads						
			M_x (kip-ft)	M_y (kip-ft)	V_x (kips)	V_y (kip-ft)	P_{Total} (kips)	P_{Perm} (kips)	Load Combination
Abut 1	84’ 6”	15’ 0”	9,290	N/A	N/A	1,490	4,120	1,750	Strength and Construction Limit
Abut 4	88’ 9”	15’ 0”	17,154	N/A	N/A	1,948	4,040	1,610	Strength and Construction Limit

Note: [1]Controlling load combination is the highest ratio of $q_{g,u}/q_R$ for foundations on soil, or $q_{g,max}/q_R$ for foundation on rock.
Abut = Abutment; kip-ft = kip per foot; kips = 1,000 pound-force
Source: Dewberry, 2025c

Table 8. Foundation Design Recommendations for Abutment Spread Footings

Support Location	Footing Length (L)	Footing Width (B)	Bottom of Footing Elevation (feet)	Minimum Footing Embedment Depth (feet)	Total Permissible Support Settlement (inches)	Service Limit State	Strength or Construction Limit State φ_b=0.45	Extreme Event Limit State φ_b=1.00
						Permissible Net Contacts Stress[1] (ksf)	Factored Gross Nominal Bearing Resistance[2] (ksf)	Factored Gross Nominal Bearing Resistance[2] (ksf)
Abut 1	84’ 6”	15’ 0”	1,658	2	1	33.2	15.2	N/A
Abut 4	88’ 9”	15’ 0”	1,653	2	1	45.5	15.1	N/A

Notes:
[1]For Service-I Limit State, controlling load combination is the one resulting in the highest ratio of $q_{n,u}/q_{pn}$ for foundations on soil, or $q_{g,max}/q_R$ for foundations on rock. Permissible Net Contact Stresses were calculated for controlling load combinations.
[2]For Strength, Construction, and Extreme Event Limit State, controlling load combination the highest ratio of $q_{g,u}/q_R$ for foundations on soil, or $q_{g,max}/q_R$ for foundations on rock, Factored Gross Nominal Bearing Resistances were calculated for controlling load combinations.
Abut = abutment; ksf = kips per square feet; kips = 1,000 pound-force
Source: Dewberry, 2025c

11.1.2 Retaining Walls

Four retaining walls are proposed: Retaining Walls 2, 3, 4, and 5. Retaining Wall 2 is proposed to be a combination of Caltrans Type 1 and Type 5. Retaining Wall 3 is proposed to be Caltrans Type 5, and Retaining Walls 4 and 5 are proposed to be Caltrans Type 1. All the retaining walls are planned to have a level retained zone (Case 1) configuration. Proposed wall footings near the bridge would be founded in rock and step up into overlying decomposed rock and dense soil away from the bridge. The Extreme, Strength, and Service Limit States for each of the Caltrans Type 1 and Type 5 retaining wall design heights were determined from the 100% Submittal design plans (Dewberry, 2025b) and using the available information provided on each of the Caltrans 2024 Standard Plans for Retaining Wall Types 1 and 5 (Caltrans, 2024b). Table 9 through Table 20 provide the foundation data for the Extreme, Strength, and Service Limit States for each retaining wall.

Table 9. Extreme Limit State Foundation Data for Retaining Wall 2, Type 5 (Case 1) and Type 1 (Case 1)

Start Point, " RW 2" Line Stationing	Caltrans RW Type	Length	Design Height, H (feet)	Bottom of Footing Elevation (feet)	Footing Width, W	Minimum Footing Embedment Depth [1]	Effective Footing Width for Extreme Limit State, B' (feet)	Extreme Limit State Gross Uniform Bearing Stress, $q_{g,u}$ (ksf)	Extreme Limit State Factored Bearing Resistance, q_R (ksf) φ_b (q_N)=1.00
1+10.00	5	40' 0"	4	1,673.50	6' 4"	2' 0"	0.9	7.3	15.2
1+50.00	5	184' 0"	8	1,671.00	7' 0"	2' 0"	2.1	5.6	18.1
3+34.00	5	168' 0"	6	1,674.00	6' 6"	2' 0"	1.3	6.6	16.1
5+02.00	5	24' 0"	10	1,670.83	8' 0"	2' 0"	2.8	5.5	20.6
5+26.00	1	8' 0"	14	1,667.08	9' 3"	3' 2"	6.3	3.0	31.5
5+34.00	1	8' 0"	18	1,663.08	10' 8"	3' 3"	5.3	4.9	36.1
5+42.00	1	8' 0"	22	1,659.08	12' 9"	3' 5"	6.0	6.3	36.7

Notes:
Data reference: Dewberry, 2025b; Caltrans, 2024b
[1]Type 5: (6" min. [final grade to footing/wall joint] + 1' 6" [footing thickness]) as required by Standard Plan B3-4A; Type 1: (1.5' [minimum footing cover] + F [footing thickness, varies with height]) as required by Standard Plan B3-1A.
Caltrans = California Department of Transportation; RW = retaining wall; ksf = kips (1,000 pound-force) per square foot; ' = ft = feet; " = in. = inches

Table 10. Strength Limit State Foundation Data for Retaining Wall 2, Type 5 (Case 1) and Type 1 (Case 1)

Start Point, " RW 2" Line Stationing	Caltrans RW Type	Length	Design Height, H (feet)	Bottom of Footing Elevation (feet)	Footing Width, W	Minimum Footing Embedment Depth [1]	Effective Footing Width Strength Limit State, B' (feet)	Strength Limit State Gross Uniform Bearing Stress, $q_{g,u}$ (ksf)	Strength Limit State Factored Bearing Resistance, q_R (ksf) φ_b (q_N) φ_b= 0.45
1+10.00	5	40' 0"	4	1,673.50	6' 4"	2' 0"	3.6	2.4	10.1
1+50.00	5	184' 0"	8	1,671.00	7' 0"	2' 0"	2.4	4.3	8.5
3+34.00	5	168' 0"	6	1,674.00	6' 6"	2' 0"	2.5	3.3	8.6
5+02.00	5	24' 0"	10	1,670.83	8' 0"	2' 0"	2.9	4.7	9.4
5+26.00	1	8' 0"	14	1,667.08	9' 3"	3' 2"	3.7	4.3	10.7
5+34.00	1	8' 0"	18	1,663.08	10' 8"	3' 3"	4.0	5.4	15.7
5+42.00	1	8' 0"	22	1,659.08	12' 9"	3' 5"	4.9	6.3	16.1

Notes:
Data reference: Dewberry, 2025b; Caltrans, 2024b
[1]Type 5: (6" min. [final grade to footing/wall joint] + 1' 6" [footing thickness]) as required by Standard Plan B3-4A; Type 1: (1.5 feet [minimum footing cover] + F [footing thickness, varies with height]) as required by Standard Plan B3-1A.
Caltrans = California Department of Transportation; RW = retaining wall; ksf = kips (1,000 pound-force) per square foot; ' = ft = feet; " = in. = inches

Table 11. Service Limit State Foundation Data for Retaining Wall 2, Type 5 (Case 1) and Type 1 (Case 1)

Start Point, " RW 2" Line Stationing	Caltrans RW Type	Length	Design Height, H (feet)	Bottom of Footing Elevation (feet)	Footing Width, W	Minimum Footing Embedment Depth [1]	Effective Footing Width for Service Limit State, B' (feet)	Service Limit State Net Bearing Stress (ksf)	Calculated Settlement at Net Bearing Pressure (inches)	Total Permissible Settlement (inches)
1+10.00	5	40' 0"	4	1,673.50	6' 4"	2' 0"	5.0	1.6	0.05	1
1+50.00	5	184' 0"	8	1,671.00	7' 0"	2' 0"	4.6	2.6	0.09	1
3+34.00	5	168' 0"	6	1,674.00	6' 6"	2' 0"	4.6	2.1	0.06	1
5+02.00	5	24' 0"	10	1,670.83	8' 0"	2' 0"	5.2	3.0	0.12	1
5+26.00	1	8' 0"	14	1,667.08	9' 3"	3' 2"	7.0	2.2	0.10	1
5+34.00	1	8' 0"	18	1,663.08	10' 8"	3' 3"	7.7	2.7	0.15	1
5+42.00	1	8' 0"	22	1,659.08	12' 9"	3' 5"	9.1	3.4	0.24	1

Notes:
Data reference: Dewberry, 2025b; Caltrans, 2024b
[1]Type 5: (6" min. [final grade to footing/wall joint] + 1' 6" [footing thickness]) as required by Standard Plan B3-4A; Type 1: (1.5 feet [minimum footing cover] + F [footing thickness, varies with height]) as required by Standard Plan B3-1A.
Caltrans = California Department of Transportation; RW = retaining wall; ksf = kips (1,000 pound-force) per square foot; ' = ft = feet; " = in. = inches

Table 12. Extreme Limit State Foundation Data for Retaining Wall 3, Type 5 (Case 1)

Start Point, " RW 3" Line Stationing	Length	Design Height, H (feet)	Bottom of Footing Elevation (feet)	Footing Width, W	Minimum Footing Embedment Depth [1]	Effective Footing Width for Extreme Limit State, B' (feet)	Extreme Limit State Gross Uniform Bearing Stress, $q_{g,u}$ (ksf)	Extreme Limit State Factored Bearing Resistance, q_R (ksf) φ_b (q_N)=1.00
1+18.00	32' 0"	8	1,671.00	7' 0"	2' 0"	2.1	5.6	18.5
1+50.00	52' 8"	6	1,672.00	6' 6"	2' 0"	1.3	6.6	29.9

Notes:
Data reference: Dewberry, 2025b; Caltrans, 2024b
[1](6" min. [final grade to footing/wall joint] + 1' 6" [footing thickness]) as required by the referenced Standard Plan.
RW = retaining wall; ksf = kips (1,000 pound-force) per square foot; ' = ft = feet; " = in. = inches

Table 13. Strength Limit State Foundation Data for Retaining Wall 3, Type 5 (Case 1)

Start Point, " RW 3" Line Stationing	Length	Design Height, H (feet)	Bottom of Footing Elevation (feet)	Footing Width, B	Minimum Footing Embedment Depth [1]	Effective Footing Width Strength Limit State, B' (feet)	Strength Limit State Gross Uniform Bearing Stress, $q_{g,u}$ (ksf)	Strength Limit State Factored Bearing Resistance, q_R (ksf) φ_b (q_N) φ_b= 0.45
1+18.00	32' 0"	8	1,671.00	7' 0"	2' 0"	2.4	4.3	8.7
1+50.00	52' 0"	6	1,672.00	6' 6"	2' 0"	2.5	3.3	8.7

Notes:
Data reference: Dewberry, 2025b; Caltrans, 2024b
[1](6" min. [final grade to footing/wall joint] + 1' 6" [footing thickness]) as required by the referenced Standard Plan.
RW = retaining wall; ksf = kips (1,000 pound-force) per square foot; ' = ft = feet; " = in. = inches

Table 14. Service Limit State Foundation Data for Retaining Wall 3, Type 5 (Case 1)

Start Point, " RW 3" Line Stationing	Length	Design Height, H (feet)	Bottom of Footing Elevation (feet)	Footing Width, B	Minimum Footing Embedment Depth [1]	Effective Footing Width for Service Limit State, B' (feet)	Service Limit State Net Bearing Stress (ksf)	Calculated Settlement at Net Bearing Pressure (inches)	Total Permissible Settlement (inches)
1+18.00	32' 0"	8	1,671.00	7' 0"	2' 0"	4.6	2.6	0.09	1
1+50.00	52' 0"	6	1,672.00	6' 6"	2' 0"	4.6	2.1	0.07	1

Notes:
Data reference: Dewberry, 2025b; Caltrans, 2024b
[1](6" min. [final grade to footing/wall joint] + 1' 6" [footing thickness]) as required by the referenced Standard Plan.
RW = retaining wall; ksf = kips (1,000 pound-force) per square foot; ' = ft = feet; " = in. = inches

Table 15. Extreme Limit State Foundation Data for Retaining Wall 4, Type 1 (Case 1)

Start Point, " RW 4" Line Stationing	Length	Design Height, H (feet)	Bottom of Footing Elevation (feet)	Footing Width, B	Minimum Footing Embedment Depth [1]	Effective Footing Width for Extreme Limit State, B' (feet)	Extreme Limit State Gross Uniform Bearing Stress, $q_{g,u}$ (ksf)	Extreme Limit State Factored Bearing Resistance, q_R (ksf) φ_b (q_N)=1.00
1+10.00	8' 0"	24	1,653.83	13' 9"	3' 8"	6.3	7.0	36.9
1+18.00	8' 0"	20	1,657.50	11' 8"	3' 3"	5.6	5.5	36.3
1+26.00	8' 0"	16	1,660.00	9' 9"	3' 2"	4.8	4.5	35.6
1+34.00	59' 0 3/4"	14	1,662.00	9' 3"	3' 2"	4.9	3.8	32.4

Notes:
Data reference: Dewberry, 2025b; Caltrans, 2024b
[1] (1.5 feet [minimum footing cover] + F [footing thickness, varies with height]) as required by the referenced Standard Plan.
RW = retaining wall; ksf = kips (1,000 pound-force) per square foot; ' = ft = feet; " = in. = inches

Table 16. Strength Limit State Foundation Data for Retaining Wall 4, Type 1 (Case 1)

Start Point, " RW 4" Line Stationing	Length	Design Height, H (feet)	Bottom of Footing Elevation (feet)	Footing Width, B	Minimum Footing Embedment Depth [1]	Effective Footing Width Strength Limit State, B' (feet)	Strength Limit State Gross Uniform Bearing Stress, $q_{g,u}$ (ksf)	Strength Limit State Factored Bearing Resistance, q_R (ksf) φ_b (q_N) φ_b= 0.45
1+10.00	8' 0"	24	1,653.83	13' 9"	3' 8"	5.2	7.0	16.2
1+18.00	8' 0"	20	1,657.50	11' 8"	3' 3"	4.4	5.8	15.9
1+26.00	8' 0"	16	1,660.00	9' 9"	3' 2"	3.5	5.2	15.5
1+34.00	59' 0 3/4"	14	1,662.00	9' 3"	3' 2"	3.7	4.3	14.5

Notes:
Data reference: Dewberry, 2025b; Caltrans, 2024b
[1](1.5 feet [minimum footing cover] + F [footing thickness, varies with height]) as required by the referenced Standard Plan.
RW = retaining wall; ksf = kips (1,000 pound-force) per square foot; ' = ft = feet; " = in. = inches

Table 17. Service Limit State Foundation Data for Retaining Wall 4, Type 1 (Case 1)

Start Point, " RW 4" Line Stationing	Length	Design Height, H (feet)	Bottom of Footing Elevation (feet)	Footing Width, B	Minimum Footing Embedment Depth [1]	Effective Footing Width for Service Limit State, B' (feet)	Service Limit State Net Bearing Stress (ksf)	Calculated Settlement at Net Bearing Pressure (inches)	Total Permissible Settlement (inches)
1+10.00	8' 0"	24	1,653.83	13' 9"	3' 8"	9.7	3.7	0.14	1
1+18.00	8' 0"	20	1,657.50	11' 8"	3' 3"	8.4	3.0	0.19	1
1+26.00	8' 0"	16	1,660.00	9' 9"	3' 2"	7.1	2.5	0.13	1
1+34.00	59' 0 3/4"	14	1,662.00	9' 3"	3' 2"	7.0	2.2	0.10	1

Notes:
Data reference: Dewberry, 2025b; Caltrans, 2024b
[1](1.5 feet [minimum footing cover] + F [footing thickness, varies with height]) as required by the referenced Standard Plan.
RW = retaining wall; ksf = kips (1,000 pound-force) per square foot; ' = ft = feet; " = in. = inches

Table 18. Extreme Limit State Foundation Data for Retaining Wall 5, Type 1 (Case 1)

Start Point, " RW 5" Line Stationing	Length	Design Height, H (feet)	Bottom of Footing Elevation (feet)	Footing Width, W	Minimum Footing Embedment Depth[1]	Effective Footing Width for Extreme Limit State, B' (feet)	Extreme Limit State Gross Uniform Bearing Stress, $q_{g,u}$ (ksf)	Extreme Limit State Factored Bearing Resistance, q_R (ksf) φ_b (q_N)=1.00
0+10.00	16' 0"	16	1,662.00	9' 9"	3' 2"	4.8	4.5	33.8
0+26.00	8' 0"	12	1,666.00	8' 3"	3' 0"	4.3	3.4	35.2
0+34.00	8' 0"	8	1,670.00	6' 7"	2' 10"	2.3	3.9	33.4
0+42.00	8' 0"	4	1,674.00	6' 9"	2' 10"	2.5	2.4	34.2

Notes:
Data reference: Dewberry, 2025b; Caltrans, 2024b
[1](1.5 feet [minimum footing cover] + F [footing thickness, varies with height]) as required by the referenced Standard Plan.
RW = retaining wall; ksf = kips (1,000 pound-force) per square foot; ' = ft = fee; " = in. = inches

Table 19. Strength Limit State Foundation Data for Retaining Wall 5, Type 1 (Case 1)

Start Point, " RW 5" Line Stationing	Length	Design Height, H (feet)	Bottom of Footing Elevation (feet)	Footing Width, B	Minimum Footing Embedment Depth [1]	Effective Footing Width Strength Limit State, B' (feet)	Strength Limit State Gross Uniform Bearing Stress, $q_{g,u}$ (ksf)	Strength Limit State Factored Bearing Resistance, q_R (ksf) φ_b (q_N) φ_b= 0.45
0+10.00	16' 0"	16	1,662.00	9' 9"	3' 2"	3.5	5.2	14.9
0+26.00	8' 0"	12	1,666.00	8' 3"	3' 0"	3.1	4.1	15.0
0+34.00	8' 0"	8	1,670.00	6' 7"	2' 10"	2.7	2.8	15.2
0+42.00	8' 0"	4	1,674.00	6' 9"	2' 10"	6.4	1.6	19.2

Notes:
Data reference: Dewberry, 2025b; Caltrans, 2024b
[1](1.5 feet [minimum footing cover] + F [footing thickness, varies with height]) as required by the referenced Standard Plan.
RW = retaining wall; ksf = kips (1,000 pound-force) per square foot; ' = ft = feet; " = in. = inches

Table 20. Service Limit State Foundation Data for Retaining Wall 5, Type 1 (Case 1)

Start Point, " RW 5" Line Stationing	Length	Design Height, H (feet)	Bottom of Footing Elevation (feet)	Footing Width, B	Minimum Footing Embedment Depth[1]	Effective Footing Width for Service Limit State, B' (feet)	Service Limit State Net Bearing Stress (ksf)	Calculated Settlement at Net Bearing Pressure (inches)	Total Permissible Settlement (inches)
0+10.00	16' 0"	16	1,662.00	9' 9"	3' 2"	7.1	2.5	0.12	1
0+26.00	8' 0"	12	1,666.00	8' 3"	3' 0"	6.2	2.1	0.09	1
0+34.00	8' 0"	8	1,670.00	6' 7"	2' 10"	5.4	1.4	0.04	1
0+42.00	8' 0"	4	1,674.00	6' 9"	2' 10"	6.5	0.8	0.02	1

Notes:
Data reference: Dewberry, 2025b; Caltrans, 2024b
[1](1.5 feet [minimum footing cover] + F [footing thickness, varies with height]) as required by the referenced Standard Plan.
RW = retaining wall; ksf = kips (1,000 pound-force) per square foot; ' = ft = feet; " = in. = inches

11.1.3 Abutment and Retaining Wall Lateral Earth Pressures

The proposed abutments and retaining walls shall be backfilled according to the construction techniques described in Section 19-3.03E, "Structure Backfill," of the *Standard Specifications* (Caltrans, 2024c). Backfill should be compacted to a minimum of 95 percent of the maximum dry density as determined by California Test (CT) 216 and 231 or American Society for Testing and Materials (ASTM) D1557 and D2922.

Provided that the abutments and retaining walls are backfilled with material conforming to the above requirements and provided adequate drainage, these structures can be designed using the following properties and equivalent fluid pressures for the structure backfill:

- Total unit weight of soil (γ_{tot}) = 120 pounds per cubic foot (pcf)
- Internal angle of friction (Φ) = 34 degrees
- Cohesion = 0 pounds per square foot (psf)
- Active equivalent fluid pressure = 34 pcf
- Passive equivalent fluid pressure = 350 pcf
- At-rest equivalent fluid pressure = 53 pcf

For bridge and retaining walls, the following properties and equivalent fluid pressures can be used for decomposed to weathered rock below top of footing elevations:

- Total unit weight of soil (γ_{tot}) = 130 pcf
- Buoyant unit weight of soil = 70 pcf
- Internal angle of friction (Φ) = 38 degrees
- Cohesion = 0 psf
- Active equivalent fluid pressure = 31 pcf, 16 pcf below groundwater
- Passive equivalent fluid pressure = 546 pcf, 284 pcf below groundwater
- At-rest equivalent fluid pressure = 50 pcf, 26 pcf below groundwater

The proposed Standard Plan retaining walls are all proposed to be founded in soils that exceed the minimum properties used by Caltrans for design. Use of the minimum properties listed by Caltrans is considered conservative and appropriate for this Project.

The abutments and retaining walls are considered to be yielding structures, would allow the development of active equivalent fluid pressures, and should be designed using active equivalent fluid pressures to determine the lateral soil loading on them. The earth pressure and seismic design values fall within the values used for design of the Standard Plan retaining walls, and no additional analysis is required for Standard Plan walls.

Abutment and retaining wall designs are recommended to have drainage systems similar to the one provided on the Caltrans 2024 Standard Plan B0-3, Bridge Detail 3-1 (Caltrans, 2024b). Abutments and retaining wall drains should provide positive drainage to daylight and be maintained to prevent debris clogging and buildup of hydrostatic pressure.

11.1.4 Sliding Resistance

Sliding resistance of the footings should be calculated according to Section 10.6.3.4 of the *AASHTO LRFD Bridge Design Specifications,* Customary U.S. Units (AASHTO, 2017). This method accounts for sliding resistance as a combination of shear resistance between the rock surface and foundation, as well as passive resistance of rock behind the footing. To account for each of these resistances, the following engineering parameters may be used when checking the sliding resistance of the footing:

- For footing bearing in undisturbed weathered metasedimentary rock
- Unit weight (γ) = 135 pcf
- Angle of friction (cast concrete to rock) (φ) = 35 degrees
- Passive pressure of rock on footing sides at stated footing elevation = 500 pcf
- Coefficient of shear resistance ($\varphi\tau$) = 0.8 for strength limit and 1.0 for extreme limit
- Coefficient of passive resistance (φep) = 0.5

The nominal sliding resistance between soil and foundation (Rt) should be taken as,

$$Rt = V \tan(\varphi)$$

Where:

φ = 35 degrees
V = total vertical force

The factored resistance against failure by sliding (Rr) should be taken as,

$$Rr = \varphi\tau\ Rt + \varphi ep\ Rep$$

Where:

Rt = nominal sliding resistance between soil and foundation
Rep = nominal passive resistance of rock

The passive resistance of the upper 1 foot of rock below top of footing and any rock above scour elevation should be ignored. The $\varphi\tau$ and φep factors are taken from Table 10.5.5.2.2-1 of the *AASHTO LRFD Bridge Design Specifications,* Customary U.S. Units (AASHTO, 2017) and Caltrans Bridge Design Practice 10.1 (Caltrans, 2025b).

11.2 Bridge Deep Foundations

CIDH piles are considered suitable for support of the proposed bridge, as they would limit the size of foundation supports and limit vibration and noise during construction. Driven piles are considered infeasible due to the presence of hard rock at shallow depth.

Soil parameters were provided to the structural designer to perform lateral analysis. Recommended soil properties for lateral analysis are summarized in Table 21.

Table 21. Soil Properties for Lateral Analysis

Unit Name	Elevation (feet)	Layer Thickness (feet)	Soil Model	γ (pcf)	φ (°)	k (pci)	c (psf)
Pier 2							
Unit 2	1,667.3–1,663.9	3.4	Sand (Reese)	70	32	60	0
Unit 3A	1,663.9–1,661.9	2.0	Sand (Reese)	104	38	125	0
Unit 3B	1,661.9–1,649.9	12.0	Sand (Reese)	168	46	125	0
Pier 3							
Unit 2	1,667.3–1,660.6	6.7	Sand (Reese)	70	32	60	0
Unit 3A	1,660.6–1,655.3	5.3	Sand (Reese)	104	38	125	0
Unit 3B	1,655.3–1,643.3	12.0	Sand (Reese)	168	46	125	0

Notes:
Properties are given at the approximate center of each pier.
γ: Unit Weight; φ: Phi Angle; c: cohesion; k: Modulus of Soil Reaction

Foundation data and loading for design of CIDH piles are summarized in Table 22 and Table 23. Design recommendations for piles are provided in Table 24, and the Pile Data Table for inclusion in the plans is provided in Table 25. Note that variability in the subsurface may be found, and pile tip lengths may need to be increased if weathered rock is found at a lower elevation than anticipated. Top of weathered rock should be verified during pile drilling, and the pile length, adjusted to maintain the same embedment below the top of weathered rock, which corresponds to the top of Unit 3A in Table 21. Lateral pile tip elevations were provided by Dewberry (Dewberry 2025d).

Table 22. Foundation Design Data

Support Location	Pile Type	Finished Grade Elevation (feet)	Cut-off Elevation (feet)	Pile Cap Size (feet)		Permissible Settlement under Service Load (inches)	Number of Piles per Support
				B	L		
Pier 2	30" CIDH w/ 24" CIDH (ROCK SOCKET)	1,666.00	1,664.00	N/A	N/A	1.0	8
Pier 3	30" CIDH w/ 24" CIDH (ROCK SOCKET)	1,666.00	1,664.00	N/A	N/A	1.0	8

Source: Dewberry, 2025c

Table 23. Foundation Factored Design Loads

Support Location	Service-I Limit State (kips)		Strength/Construction Limit State (Controlling Group, kips)				Extreme Event Limit State (Controlling Group, kips)			
	Total Load per Support	Permanent Load per Support	Compression		Tension		Compression		Tension	
			Per Support	Max. per Pile	Per Support	Max. per Pile	Per Support	Max. per Pile	Per Support	Max. per Pile
Pier 2	1,620	930	2,410	350	N/A	N/A	1,570	200	N/A	N/A
Pier 3	1,610	930	2,390	330	N/A	N/A	1,560	200	N/A	N/A

Source: Dewberry, 2025c

Recommendations for pile length were determined using the provided loading and soils information summarized in this report. Pile axial capacity was evaluated using the Shaft computer program published by Ensoft. Results of the analysis are summarized in Table 234.

Table 24. Foundation Design Recommendations

Support Location	Pile Type	Cut-Off Elevation (feet)	Service-I Limit State Load per Support (kips)		Total Permissible Support Settlement (inches)	Required Nominal Resistance (kips)				Design Tip Elev. (feet) [1,2]	Specified Tip Elev. (feet)
						Strength Limit		Extreme Event			
			Total	Perm.		Comp. (ϕqs = 0.7)	Tension (ϕqs = 0.7)	Comp. (ϕqs = 1.0)	Tension (ϕqs = 1.0)		
Pier 2	30" CIDH w/ 24" CIDH (ROCK SOCKET)	1,664.00	1,620	930	1	500	N/A	200	N/A	1,655 (a-1) 1,656 (a-11) 1,649 (d)	1,649
Pier 3	30" CIDH w/ 24" CIDH (ROCK SOCKET)	1,664.00	1,610	930	1	480	N/A	200	N/A	1,655 (a-1) 1,656 (a-11) 1,645 (d)	1,645

Notes:
[1]Design tip elevations are controlled by (a-I) compression (strength limit), (a-II) compression (extreme event), (d) lateral.
[2]Design tip elevation for lateral load was provided by Dewberry on October 7, 2025, Dewberry 2025d.

Table 25. Pile Data Table

Support Location	Pile Type	Nominal Resistance (kips)		Design Tip Elevation (feet)[1,2]	Specified Tip Elevation (feet)[3]
		Compression	Tension		
Pier 2	30" CIDH w/ 24" CIDH (ROCK SOCKET)	500	N/A	1,655 (a) 1,649 (b)	1,649
Pier 3	30" CIDH w/ 24" CIDH (ROCK SOCKET)	480	N/A	1,655 (a) 1,645 (b)	1,645

Notes:
[1]Design tip elevations are controlled by (a) compression and (b) lateral load.
[2]Design tip elevation for lateral load was provided by Dewberry on October 7, 2025, Dewberry 2025d.
[3]Lower pile tip is equal to the difference between encountered top of weathered rock and anticipated top of rock elevation. Expected top of weathered rock elevation is 1,663.9 feet at Pier 2 and 1,660.6 feet at Pier 3.

11.3 Approach Fills

The bridge approaches of the proposed bridge are proposed to be raised above the existing profile (Dewberry, 2025b) and be retained by the proposed Retaining Walls 2 and 3 on the north side and Retaining Wall 4 on the east side. It is anticipated that these additional fill soils will use new structure backfill. Based on the above, the embankment settlement is expected to be minor and to substantially occur during construction. Site grading, excavation, and backfill work shall be performed in accordance with Sections 17 and 19 of the *Standard Specifications* (Caltrans, 2024c).

11.3.1 Fill Material

Any imported fill or material used as structure backfill should be approved by the Geotechnical Engineer of Record, and it should meet the following requirements as per Section 19-3.02C, "Structure Backfill," of the *Standard Specifications* (Caltrans, 2024c). The material selected for structure backfill should have low expansion potential and be free of frozen soil, fat clays, root material, organic material, rock particles larger than 1 inch, large pieces of cemented soils, and other deleterious matter. In addition, some blending of soils and removal of debris may be required to achieve a uniform soil consistency.

Embankment fill should have 100 percent passing the 3-inch sieve and a minimum of 30 percent retained on the #200 sieve. Embankment fill within 30 inches of the surface should have low expansion potential. Otherwise, medium expansion potential is acceptable.

All fill material within 30 inches of the bottom of pavement sections shall have a minimum R-value of 25, have low expansion potential, and be free-draining.

Based on the borings made near the bridge, most on-site soils appear to be suitable for use as embankment fill but may require crushing, screening, or blending to meet all requirements due to rock content. Laboratory soil testing should be performed on the on-site soils to confirm adherence to the requirements shown above. If additional fill soils are to be imported to the site, we recommend that the material should be tested prior to use and consist of soils that meet the requirements shown above for structural fill and embankment fills.

11.3.2 Fill Placement and Compaction

The areas to receive new fill shall be graded level by cutting the existing soils to match the lowest elevation of the proposed cuts in the approach fill footprint. Asphaltic concrete pavement should be either completely removed or pulverized in place and compacted prior to the placement of new fill material. Where new fill is to be placed onto existing fill slopes or natural slopes exceeding 5 horizontal to 1 vertical (5H:1V), the fill should be fully bonded into the existing slope by placing it on discrete horizontal benches. These benches should be cut fully into the slope and below any loose/soft or otherwise unsuitable materials, per Section 19 of the *Standard Specifications* (Caltrans, 2024c).

Structure fill should be placed in lifts not exceeding 8 inches in uncompacted thickness, moisture-conditioned, processed as necessary, and compacted prior to the next lift. The optimum moisture content and maximum density for each soil type should be determined in accordance with CT 216 and 231 or ASTM D1557 and D2922. A compacted density of not less than 95 percent of the maximum density at or up to 2 percent over optimum moisture content (based on CT 216 and 231 or ASTM D1557 and D2922) should be obtained for structural fill materials used within the structural areas. The material should be either moistened or dried (depending on actual moisture content) and

thoroughly mixed. Mixing should be performed by reprocessing to the full depth of the lift, and the lift, compacted to achieve the minimum compaction requirement. Density readings should be taken at each lift prior to placing fill on the succeeding lift, and test locations should be distributed across the entire fill prism area.

Utility trenches should be backfilled with compacted structural fill. Special care should be taken during backfill of soils located above any existing utility lines that run underneath the site. The capacity of existing lines should be evaluated to ensure that additional stresses due to construction activities do not affect the integrity of the lines. In this regard, the contractor should be aware of the location of utility lines and take extra precautions when placing and compacting fill soils in the vicinity of utilities. It may be necessary to reduce the compaction effort, directly over the top of the utility, depending on the capacity of the existing lines to accommodate the expected compaction loads. We recommend that a representative of the Geotechnical Engineer provide continuous on-site observation and testing during excavation, subgrade preparation, and placement of structural fill to document compliance with the recommendations contained herein.

11.3.3 Expansive Material

Expansive soil (expansion index [EI] greater than or equal to 50 and sand equivalence [SE] less than or equal to 20) should not be used as fill within 5 feet of the back of the retaining walls and abutments or in any portion of the Abutment 1 and Abutment 4 front slopes.

11.3.4 Slope Geometry and Stability

New embankments constructed as described in the 100% Submittal plan drawings (Dewberry, 2025b), and with slopes equal to 2H:1V or flatter, are expected to be stable.

11.3.5 Approach Fill Settlements

Settlement of structure fill would occur as the embankments are being constructed.

11.3.6 Pavement Sections

The design R-value was set to 25 to represent a generalized sandy gravel subgrade and reasonable value for local import fill materials. These recommendations assume that native subgrade and import fills below the roadway will meet or exceed this value. Based on design information provided by R.E.Y. Engineers, Inc., via email in December 2023, the traffic index (TI) values summarized in Table 26 are to be used for the pavement design in the Project area.

Table 26. Pavement Design Parameters

Location	Design Traffic Index (TI)	Flexible/Rigid Pavement	Predicted 2040 Average Daily Traffic Counts
Placerville Drive (East of Pierroz Road, Stations 76+20 to 85+26)	8.5–9.0*	Flexible	11,256
Parking Lot Drive Aisles	N/A	Flexible	N/A
Parking Lot Stalls	N/A	Flexible	N/A
Commercial Driveways	N/A	Rigid	N/A

Source: R.E.Y. Engineers, Inc., *Pavement Design Recommendations*, received via email on December 22, 2023.
Note: *Design TIs reported by Fehr & Peers in *Placerville Drive Bicycle and Pedestrian Analysis Report,* 2019.

Recommendations for the various new pavement sections have been provided in Table 27 using the design parameters listed in Table 26. Flexible structural pavement design alternatives were determined using the Caltrans software Automated Flexible Pavement Design (May 31, 1996, Version 7.0), which uses the Gravel Equivalent (GE) Methodology. Pavement section calculations are provided in Appendix VII for each TI modeled. The pavement section recommendations assume that the pavement will be fully drained and not subject to inundation.

Pavement design and construction should conform to the hot mix asphalt (HMA), Portland cement concrete (PCC), Class 2 aggregate base, and Class 2 aggregate subbase requirements of Caltrans' *Standard Specifications* (Caltrans, 2024c). Native material or import fill used below the new pavement sections should possess an R-value equivalent to or greater than the design R-value of 25.

Exposed subgrade should be free of fat clays, organics, saturated soils, frozen soil, and other deleterious material. If these materials are present at the bottom of the pavement section elevation, they should be removed to a 6-inch depth and replaced with Class 2 aggregate base compacted to at least 95 percent as determined by CT 216 and 231 or ASTM D1557 and D2922 methods. For the proposed curb and gutter assembly, curb ramps, and barrier curbs, the existing subgrade should be prepared by ripping the upper 6 inches, moisture conditioning as required, and recompacting to at least 95 percent as determined by CT 216 and 231 or ASTM D1557 and D2922 methods. If the subgrade cannot be compacted to this requirement, it is recommended to remove the upper 6 inches of failing subgrade, replace with Class 2 aggregate base, and compact to at least 95 percent as determined by CT 216 and 231 or ASTM D1557 and D2922 methods.

Table 27. New Structural Pavement Sections

Location/Description	Design Traffic Index (TI)	Flexible/ Rigid Pavement	Portland Cement Concrete (PCC) (feet)	Pavement Design (feet)		
				Hot Mix Asphalt (HMA)	Class 2 Aggregate Base (AB2)	Section Thickness
Placerville Dr, East of Pierroz Rd. (Stations 76+20.00 to 85+26.00)	8.5 [1]	Flexible	-	0.40	1.15	1.55
	9.0 [1]		-	0.45	1.20	1.65
Parking Lot Drive Aisles [2]	6.0	Flexible	-	0.25	0.33	0.58
Parking Lot Stalls [2]	6.0	Flexible	-	0.25	0.33	0.58
Commercial Driveways (PCC) [3]	N/A	Rigid	0.50	-	0.17	0.67

Source: R.E.Y. Engineers, Inc., *Pavement Design Recommendations*, received via email on December 22, 2023, from Dewberry.
Notes:
[1] Design TIs are based on an R-value of 25 for import fill.
[2] Per Caltrans' *Highway Design Manual,* Table 613.4B (Minimum TIs for Safety Roadside Rest Areas), Truck Parking Areas, 20-year pavement design life (May 20, 2022).
[3] El Dorado County Standard Plan 103G (approved March 14, 1990), Commercial Driveway for Vertical Curb Locations. PCC to be Class B 2,500 psi strength at 28 days; Class 2 AB to be compacted to 95% of California Test 216 and 231, or American Society of Test Methods D1557 and D2922.

11.3.7 Curb, Gutter, and Sidewalks

New curbs, gutters, and sidewalks will conform to the following standards:

- Curb and gutters: Caltrans Standard Plan A87A, Curb Type A2-6 (Caltrans, 2024b)
- Curb ramps: Caltrans Standard Plans A88A (Cases C & D) and A88B (Case CH) (Caltrans, 2024b)
- Concrete barrier curbs (Type 3, unmodified and modified): El Dorado County Department of Transportation Standard Plan 104 (El Dorado County, 1990)

Exposed subgrade should be free of fat clays, organics, saturated soils, frozen soil, and other deleterious material. For the proposed curb and gutter assembly, curb ramps, and barrier curbs, the existing subgrade should be prepared by ripping the upper 6 inches, moisture conditioning as required, and recompacting to at least 95 percent as determined by CT 216 and 231 or ASTM D1557 and D2922 methods. If the subgrade cannot be compacted to this requirement, it is recommended to remove the upper 6 inches of failing subgrade, replace with Class 2 aggregate base, and compact to at least 95 percent as determined by CT 216 and 231 or ASTM D1557 and D2922 methods.

At least 2 inches of Class 2 aggregate base should be placed under the proposed curb and gutter, curb ramps, and barrier curbs. For sidewalks, at least 4 inches of Class 2 aggregate base should be placed under the sidewalk concrete. Class 2 aggregate base should conform to Section 26-1.02B of Caltrans' *Standard Specifications* (Caltrans, 2024c). Class 2 aggregate base material is recommended to be compacted to at least 95 percent as determined by CT 216 and 231 or ASTM D1557 and D2922 methods.

Sidewalk concrete is recommended to be at least 4 inches thick. Sidewalk surfaces should be graded at least 1.5 percent toward the curb and gutter (Caltrans, 2024b).

12. NOTES FOR SPECIFICATIONS

The following should be considered when developing specifications for this Project:

- Groundwater is likely to be encountered in excavations extending below creek water elevation. The contractor should be prepared to provide at a minimum creek diversion and sump pumping to lower the groundwater level to below excavation elevations.
- Cobble- and boulder-sized material may be present within existing soil and fills at the site, and the contractor should be prepared to remove oversized material.
- Contractor shall be prepared to excavate variably fractured hard rock.
- Pile drilling likely will require temporary casing to control caving in alluvial soils and decomposed rock.

13. NOTES FOR CONSTRUCTION

13.1 General

Excavation and backfill work should be performed in accordance with Section 19, "Earthwork," of Caltrans' *Standard Specifications* (Caltrans, 2024c).

The banks are armored with riprap in many locations. The site soils encountered in borings indicated significant gravel and decomposed to fresh rock. Therefore, cobble- and boulder-sized material will

need to be excavated as part of construction. Decomposed rock is likely rippable near the upper contact but grades to hard rock with depth and will become unrippable. Rock within proposed excavation depths has seismic velocities that vary from less than 5,000 ft/s to over 13,000 ft/s, and variable rock conditions should be expected. Top of hard rock elevation can be expected to be variable, and detached blocks of rock may exist. The contractor should be prepared to remove oversized material and for excavation into weathered to fresh rock.

If temporary excavations are required for construction, temporary slopes may be cut in dry soils at a maximum inclination of 1.5H:1V or be supported in accordance with California Division of Occupational Safety and Health (Cal/OSHA) recommendations for Type C soil (Cal/OSHA, 2019). Cuts below groundwater are not anticipated, but any cuts below groundwater would likely require shoring and possibly dewatering. Design and construction of excavation sloping and shoring are the responsibility of the contractor and should be performed in accordance with Cal/OSHA requirements. Temporary erosion control measures, such as a flash coating, may be required for excavations open for extended periods. It is also the contractor's responsibility to assess the actual conditions in the field at the time of construction and to make its own interpretation of the Cal/OSHA soil type for design of the excavation and trench slopes or the need for excavation shoring.

13.2 Notes for Construction (Shallow Foundations)

Completed bottom-of-footing excavations are recommended to be reviewed by the Geotechnical Engineer prior to placement of reinforcement and forms. At all support locations, the spread footings are to be founded on the weathered to fresh rock. The structural concrete is to be placed neat against the trimmed walls and undisturbed rock at the bottom of the footing excavation. Should the bottom of the footing excavation be disturbed, then the disturbed material must be removed and replaced to the bottom of footing elevation with concrete.

Rock varies from decomposed to fresh, and excavation effort is expected to be highly variable and likely will require hydraulic or pneumatic breakers, coring, or other means to complete.

Seepage into footing excavations below channel water level can be expected and could be heavy in sand and intensely fractured rock. Excavations below current channel bottom into decomposed to weathered rock can be expected to require Structure Excavation Type D. Use of dry season (May to October) construction, a creek diversion, and sump pumping upstream of the replacement bridge to an elevation below the lowest footing excavation can be expected to minimize seepage into deeper excavations. Nuisance water can be expected in all excavations and is anticipated to be controlled by sump pumping. Surface water should be directed away from these excavations.

13.3 Notes for Construction (Deep Foundations)

Initial pile excavations are recommended to be reviewed by the Geotechnical Engineer prior to placement of reinforcement. Pile excavations are likely to encounter groundwater, and wet construction techniques will likely be required. Rock varies from decomposed to fresh, and excavation effort is expected to be highly variable and likely will require coring buckets, downhole hammers, or other means to complete.

14. LIMITATIONS

This Foundation Report was performed in accordance with generally accepted geotechnical engineering principles and practices. No other warranty, expressed or implied, is made as to the conclusions and professional recommendations made in this preliminary report.

This Foundation Report is intended for use with the Placerville Drive Bridge located in the city of Placerville, California. Any proposed designs or changes to the location of the proposed new improvements, however slight, should be brought to our attention so that we may determine how they may affect our conclusions and recommendations. The conclusions and recommendations contained in this report are based upon the data relating only to this specific Project and locations discussed herein.

15. REPORT COPY LIST

This report was prepared for the City of Placerville for the design of the Placerville Drive at Hangtown Creek Bridge Replacement Project. Copies of this report have been provided to Dewberry.

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16. REFERENCES

AASHTO (American Association of State Highway and Transportation Officials), 2017. *AASHTO Load and Resistance Factor Design (LRFD) Bridge Design Specifications,* Eighth Edition. AASHTO Publication Code LRFD-8. Washington, District of Colombia. September.

California Division of Occupational Safety and Health (Cal/OSHA), 2019. Title 8 Regulations. Subchapter 4, Construction Safety Orders, Article 6 Excavations, Department of Industrial Relations. https://www.dir.ca.gov/title8/sb4a6.html.

Caltrans, 2019. Caltrans Seismic Design Criteria, Version 2.0. April.

Caltrans, 2020. Bridge Inspection Records Information System, Division of Highway Maintenance, Bridge Inspection Reports for Bridge No. 25C0029. November 23.

Caltrans, 2021. Corrosion Guidelines, Version 3.2. Division of Engineering Services, Materials Engineering and Testing Services, Corrosion Branch. May.

Caltrans, 2022a. *Soil and Rock Logging, Classification, and Presentation Manual* (2010) and Erratum Sheet, Caltrans Division of Engineering.

Caltrans, 2022b. *Highway Design Manual.*

Caltrans, 2023. Caltrans ARS Online, Version 3.1.0. Division of Research and Innovation, Caltrans GeoResearch Group. https://arsonline.dot.ca.gov/.

Caltrans, 2024a. *Foundation Reports for Bridges.* Division of Engineering Services, Geotechnical Services. July.

Caltrans, 2024b. Standard Plans, 2024 Edition.

Caltrans, 2024c. *Standard Specifications,* 2024 Edition.

Caltrans, 2025a. *California Amendments to the AASHTO LRFD BDS, Eighth Edition.* California Department of Transportation, Sacramento, California. March.

Caltrans, 2025b. Bridge Design Practice 10.1. January.

California Division of Mines and Geology (CDMG), 1981. Geologic Map of the Sacramento Quadrangle, California, 1:250,000, California Geological Survey Publications, California Division of Mines and Geology.

California Geological Survey (CGS), 2002. California Geomorphic Provinces, Note 36. Revised 2002.

Dewberry, 2023. Topographic Survey Drawing 2332.004-TP. Received via email 12/13/2023.

Dewberry, 2025a. Project Description. August 14.

Dewberry, 2025b. Project Plans for: Placerville Drive Bridge Replacement, 100% Submittal. October 3.

Dewberry, 2025c. Foundation Loading – Summary. June 19.

Dewberry, 2025d. Lateral Pile Tip Elevations – Summary. October 7.

El Dorado County, 1990. Design Standard Details, Volume V. Department of Transportation, Design Standards. January 2 – April 17.

Fehr & Peers, 2019. *Placerville Drive Bicycle and Pedestrian Analysis Report.*

Gasch Geophysical Services, Inc. (GGSI), 2023. Updated Refraction Seismic Investigation at the Placerville Drive Bridge Replacement Project Site, Placerville, El Dorado County, California. GGSI Project No. 2023-25.01. November 13.

HDR, 2025. Draft Bridge Design Hydraulic Study. August.

R.E.Y. Engineers, Inc., 2023. *Pavement Design Recommendations.* Received via email on December 22.

Taber Consultants, 2000. *Foundation Investigation, Hangtown Creek Bridge (Widen) on Placerville Drive.* Bridge No. 25C-0029. April 5.

Appendix I. Figures



N

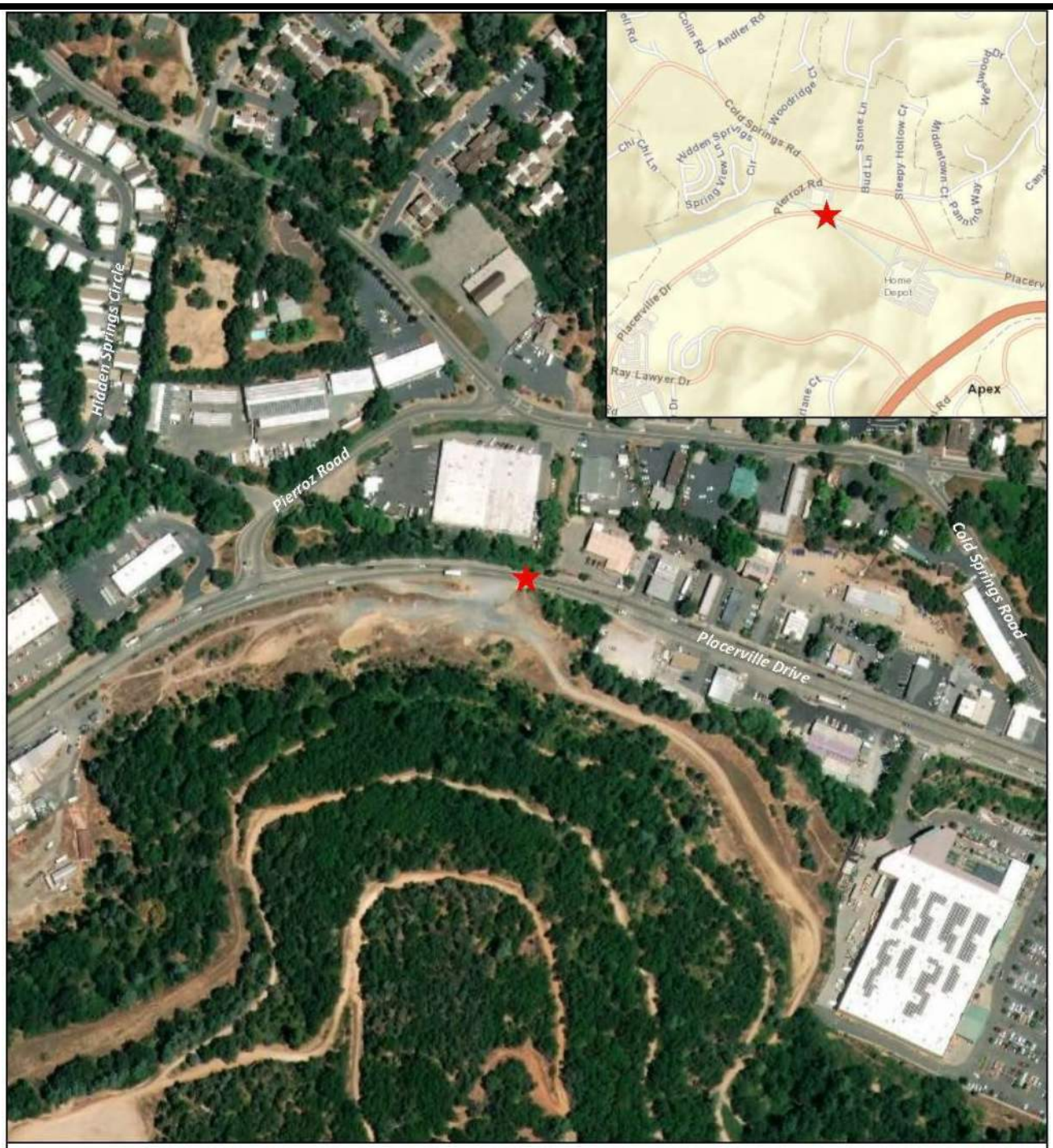
W E

S

Not to Scale

Source: Dewberry

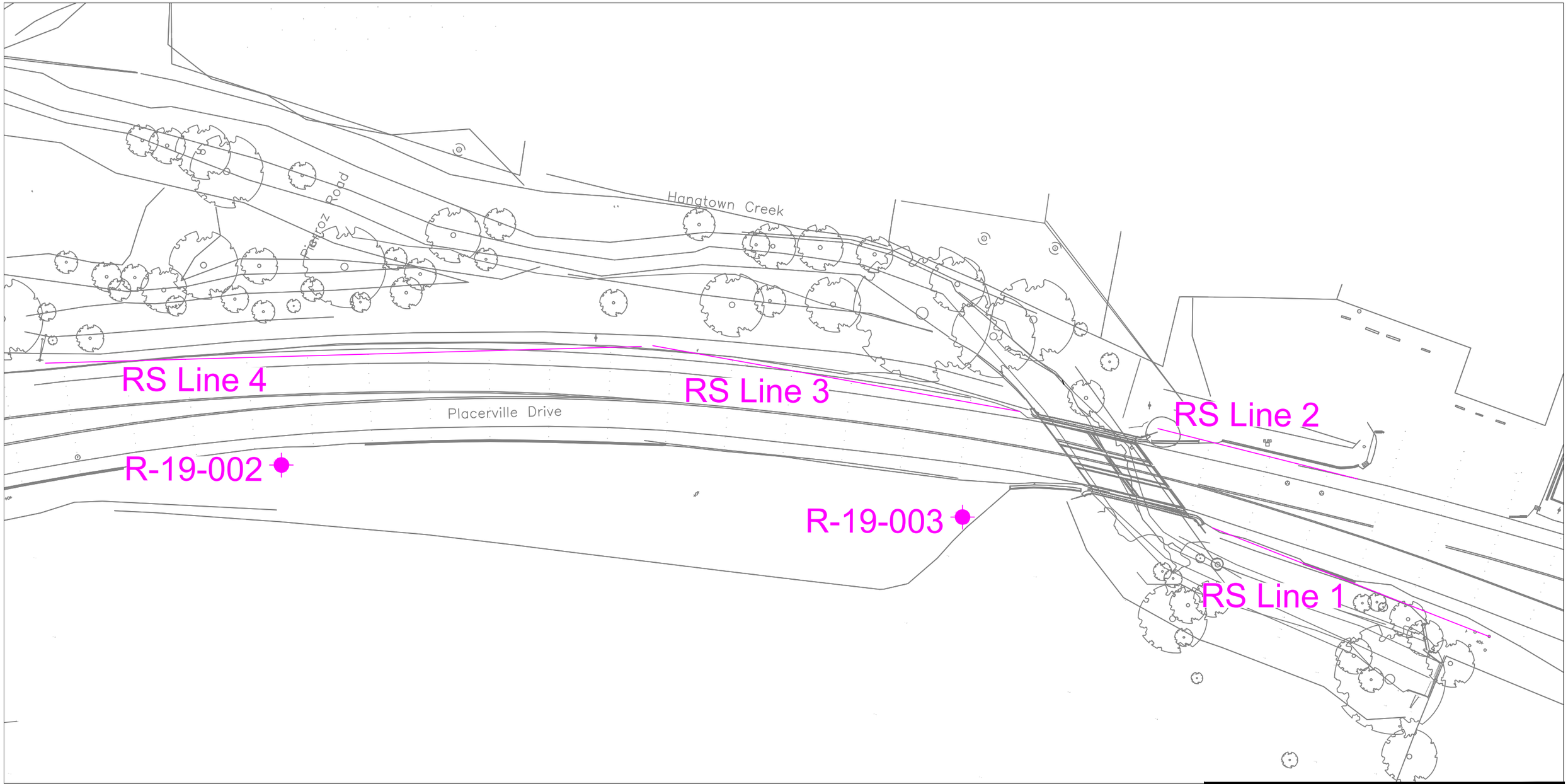
Figure 1
Project Location Map
Placerville Dr Bridge Replacement
City of Placerville, California
HDR Project No. 10324503 /
HDR|WRECO Project No. P18113



N
W E
S

Source: Dewberry

Figure 2
Project Vicinity Map
Placerville Dr Bridge Replacement
City of Placerville, California
HDR Project No. 10324503 /
HDR|WRECO Project No. P18113



LEGEND:

R-22-001 APPROXIMATE BORING LOCATION

RS LINE 4 APPROXIMATE REFRACTION SEISMIC PROFILE LOCATION

PLAN
1"=20'

0 20 ft 40 ft
SCALE

HDR | WRECO
One Capitol Mall
Suite 500
Sacramento, CA 95814

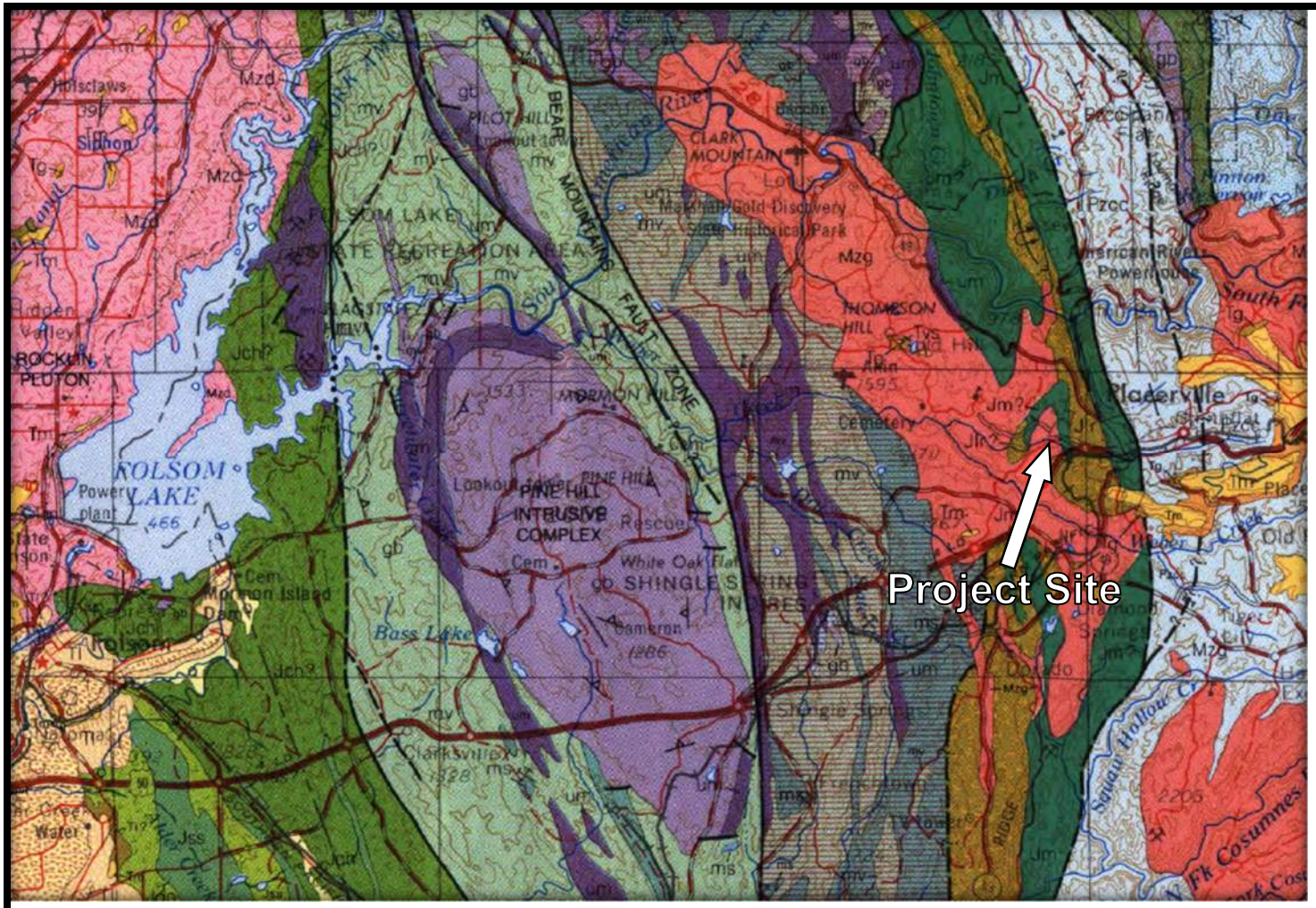
City Of Placerville

Placerville Drive Bridge Replacement

Location of Field Tests

10324503-P18113 | Figure - 3

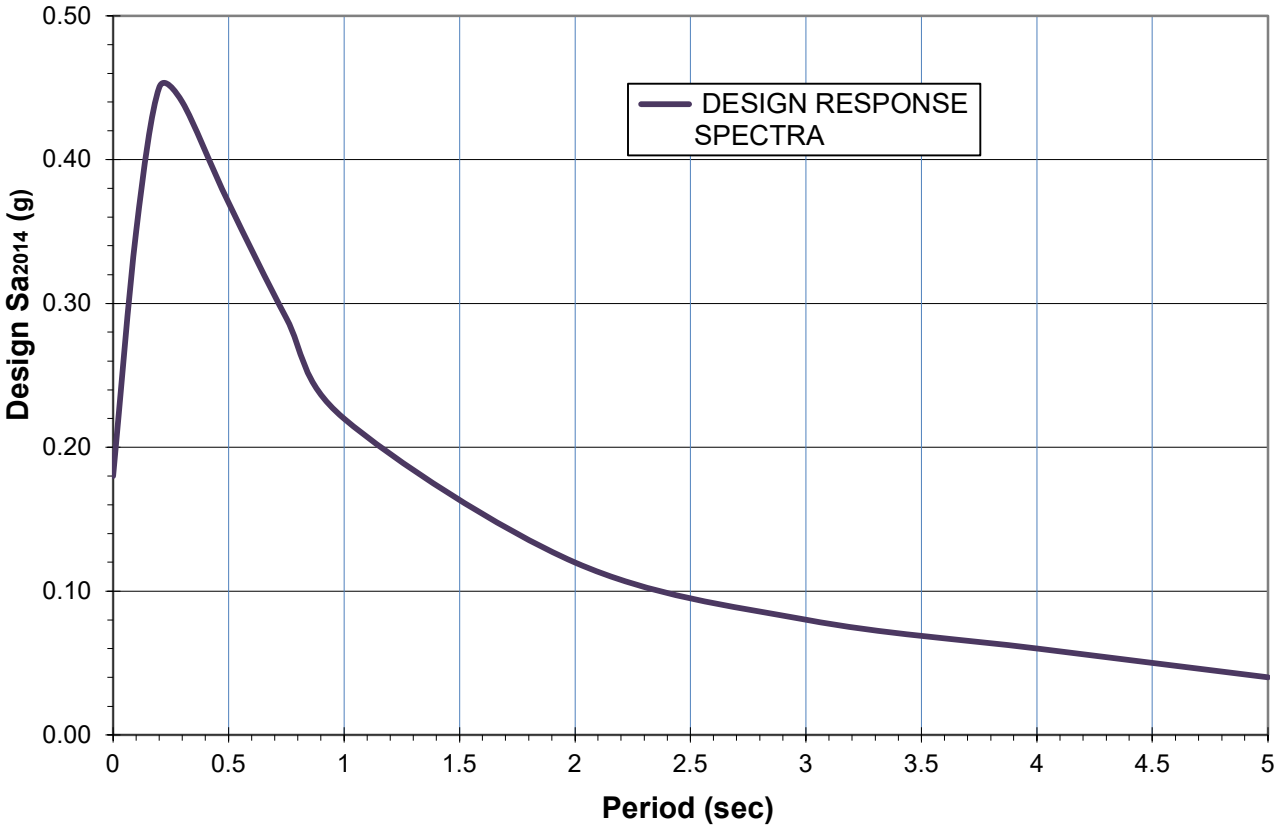
NOTE: All locations are approximate and are referenced from existing site features. Electronic media for plan view provided by Dewberry 2/28/2021



Not to Scale

Reference:
Geologic Map of the Sacramento Quadrangle: California Division of Mines and Geology, Regional Geologic Map 1A, 1:250,000, 1981.

Figure 4
Regional Geologic Map
Placerville Dr Bridge Replacement
City of Placerville, California
HDR Project No. 10324503 /
HDR|WRECO Project No. P18113



Latitude:	38.733498
Longitude:	-120.827732
Vs (m/s):	385

DESIGN RESPONSE SPECTRA	
Period (seconds)	**Design Sa_{2014} (g)**
0	0.18
0.10	0.35
0.20	0.45
0.30	0.44
0.50	0.37
0.75	0.29
1.00	0.22
2.00	0.12
3.00	0.08
4.00	0.06
5.00	0.04

For Design Engineer:

SEISMIC DESIGN: Caltrans Seismic Design Criteria (SDC), Version 2.0 dated April 2019

Deaggregation (based on 2014 hazard)

(a) mean magnitude (for PGA) = 6.41

(b) mean site-source distance (for Sa at 1s) = 105.5 km

Reference: Caltrans ARS Online, V3.1.0

Figure 5

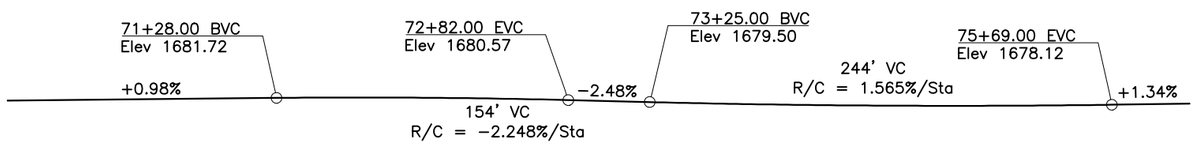
Preliminary Design Response Spectrum (ARS Curve)

Placerville Drive Bridge over Hangtown Creek

City of Placerville, California

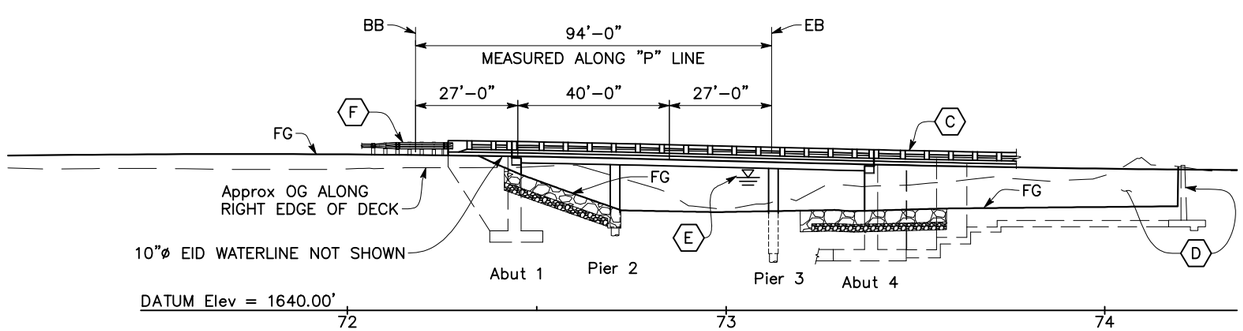
HDR Project 10324503 WRECO Project P18113

Appendix II. Project Plans



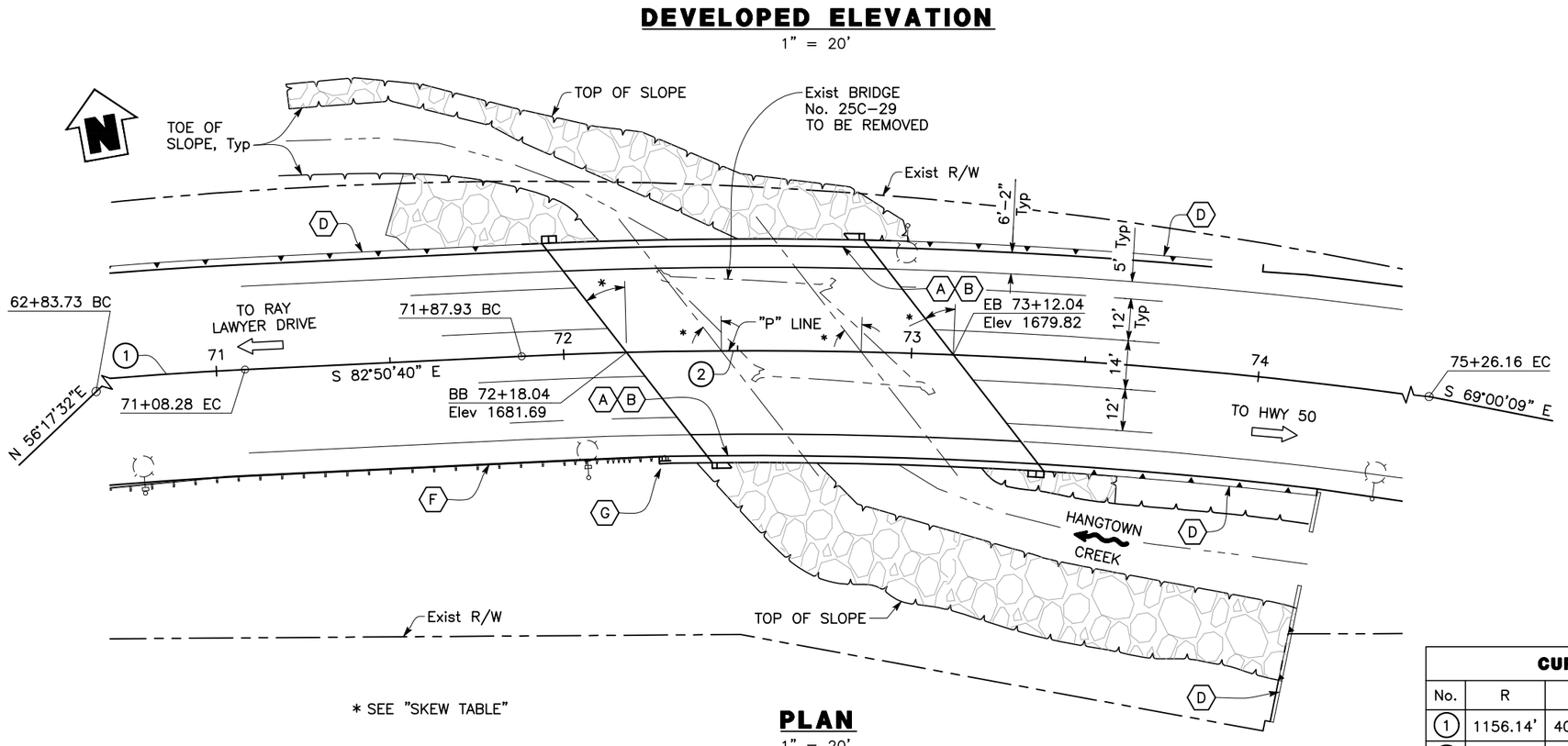
PROFILE GRADE

NO SCALE



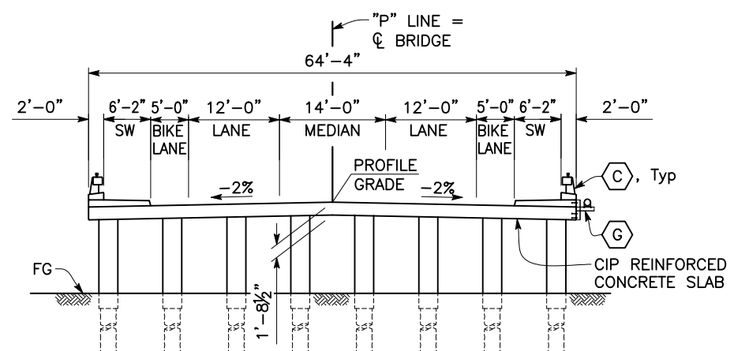
DEVELOPED ELEVATION

1" = 20'



PLAN

1" = 20'



TYPICAL SECTION

1" = 10'

KEY NOTES:

- (A) Paint "Placerville Drive Bridge"
- (B) Paint "Bridge No. XX−XXXX"
- (C) Concrete Barrier Type 85SW with Tubular Handrail
- (D) Retaining Wall
- (E) For "HYDROLOGIC/HYDRAULIC SUMMARY" see "FOUNDATION PLAN" sheet
- (F) Midwest Guardrail System, see Roadway Plans
- (G) 10" EID Waterline Support

NOTES:

1. For the location of "GENERAL NOTES" and "INDEX TO PLANS" see the "INDEX TO PLANS" sheet.

LEGEND:

- Indicates direction of water flow
- Indicates direction of traffic
- Indicates Existing Bridge
- Indicates New Structure
- Indicates Rock Slope Protection
- Indicates 100 Yr Water Surface Elevation
- Indicates Street Lighting, see Electrical Plans

CURVE DATA				
No.	R	Δ	T	L
(1)	1156.14'	40°51'47"	430.69'	824.55'
(2)	1400.00'	13°50'32"	169.94'	338.23'

SKEW TABLE	
LOCATION	SKEW
ABUTMENT 1	36°19'30"
PIER 2	37°26'29"
PIER 3	39°05'17"
ABUTMENT 4	40°10'19"

ST-1

NO.	REVISION DESCRIPTION	CHECKED BY	DATE

DRAWING SCALE
HOR. SCALE: AS SHOWN
VERT. SCALE: AS SHOWN

Dewberry
11060 WHITE ROCK ROAD SUITE 200
RANCHO CORDOVA, CA 95670

IMPROVEMENT PLANS FOR:
PLACERVILLE DRIVE BRIDGE REPLACEMENT
GENERAL PLAN
CITY OF PLACERVILLE CALIFORNIA

DRAWING INFO
DATE: 10/03/2025
DRAFTER: E. CISNEROS
DESIGNER: K. KAWAZOE
REVIEWER: R. MAY

PROJECT NO.
CIP # 41410
SHEET NO. S01 OF S35

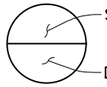
PROGRESS PLANS SUBMITTAL, NOT FOR CONSTRUCTION

U:\18028 – Placerville Dr. Bicycle–Ped and Br. Repl – CI Placerville\18028B Bridge Replacement\400 Project Design Files\430 Bridges & Structures\Plans\PD–S–GP.dwg Oct 03, 2025 – 1:08pm, eciseros

INDEX TO PLANS

SHEET NO.	TITLE
S01	GENERAL PLAN
S02	INDEX TO PLANS
S03	DECK CONTOURS
S04	FOUNDATION PLAN
S05	ABUTMENT 1 LAYOUT
S06	ABUTMENT 4 LAYOUT
S07	ABUTMENT DETAILS NO. 1
S08	ABUTMENT DETAILS NO. 2
S09	ABUTMENT DETAILS NO. 3
S10	ABUTMENT DETAILS NO. 4
S11	ABUTMENT DETAILS NO. 5
S12	ABUTMENT DETAILS NO. 6
S13	ABUTMENT DETAILS NO. 7
S14	ABUTMENT DETAILS NO. 8
S15	PIER LAYOUT
S16	PIER DETAILS NO. 1
S17	PIER DETAILS NO. 2
S18	TYPICAL SECTION
S19	SLAB DETAILS NO. 1
S20	SLAB DETAILS NO. 2
S21	SLAB DETAILS NO. 3
S22	WATERLINE SUPPORT DETAILS No. 1
S23	WATERLINE SUPPORT DETAILS No. 2
S24	CONCRETE BARRIER TYPE 85SW–DETAILS No. 1
S25	CONCRETE BARRIER TYPE 85SW–DETAILS No. 2
S26	CONCRETE BARRIER TYPE 85SW–DETAILS NO. 3
S27	CONCRETE BARRIER TYPE 85SW–DETAILS NO. 4
S28	RETAINING WALL 2 – GENERAL PLAN NO. 1
S29	RETAINING WALL 2 – GENERAL PLAN NO. 2
S30	RETAINING WALL 3 – GENERAL PLAN NO. 1
S31	RETAINING WALL 3 – GENERAL PLAN NO. 2
S32	RETAINING WALL 4 AND 5 – GENERAL PLAN NO. 1
S33	RETAINING WALL 4 AND 5 – GENERAL PLAN NO. 2
S34	RETAINING WALL 4 AND 5 DETAILS
S35	LOG OF TEST BORINGS

CALTRANS STANDARD PLANS DATED 2023



QUANTITIES

BID ITEM	QTY	UNIT
STRUCTURE EXCAVATION (BRIDGE)		CY
STRUCTURE EXCAVATION (RETAINING WALL)		CY
STRUCTURE BACKFILL (BRIDGE)		CY
STRUCTURE BACKFILL (RETAINING WALL)		CY
24" CAST–IN–DRILLED–HOLE CONCRETE PILING (ROCK SOCKET)		LF
30" CAST–IN–DRILLED–HOLE CONCRETE PILING		LF
STRUCTURAL CONCRETE, BRIDGE		CY
STRUCTURAL CONCRETE, BRIDGE (POLYMER FIBER)		CY
STRUCTURAL CONCRETE, RETAINING WALL		CY
JOINT SEAL (MR = ½")		LF
BAR REINFORCING STEEL (BRIDGE)		LB
HEADED BAR REINFORCEMENT		LB
BAR REINFORCING STEEL (EPOXY COATED)		LB
BAR REINFORCING STEEL (RETAINING WALL)		LB
CONCRETE BARRIER TYPE 85SW		LF
TUBULAR HAND RAILING		LF
MISCELLANEOUS METAL (BRIDGE)		LB

GENERAL NOTES
LOAD AND RESISTANCE FACTOR DESIGN

DESIGN: AASHTO LRFD Bridge Design Specifications, 2019 Edition with Caltrans Amendments, updated December 2023

Caltrans Standard Plans and Specifications, 2023 Edition with Revised Standard Plans, dated January 2024

Caltrans Structural Technical Policies as of January 2024

SEISMIC DESIGN: Caltrans Seismic Design Criteria (SDC), Version 2.0 dated April 2019 with Interim revisions dated October 2019.

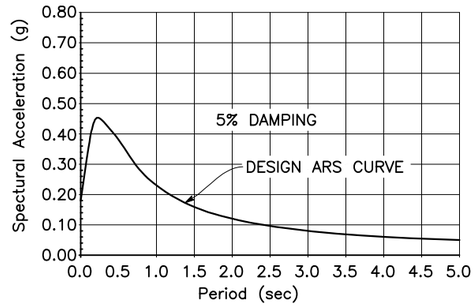
DEAD LOAD: Includes 35 psf for future wearing surface and 100 plf for El Dorado Irrigation District (EID) waterline.

LIVE LOADING: HL93 and permit design load.

SEISMIC LOADING: Soil profile: V_{s30} = 1,263 ft/s

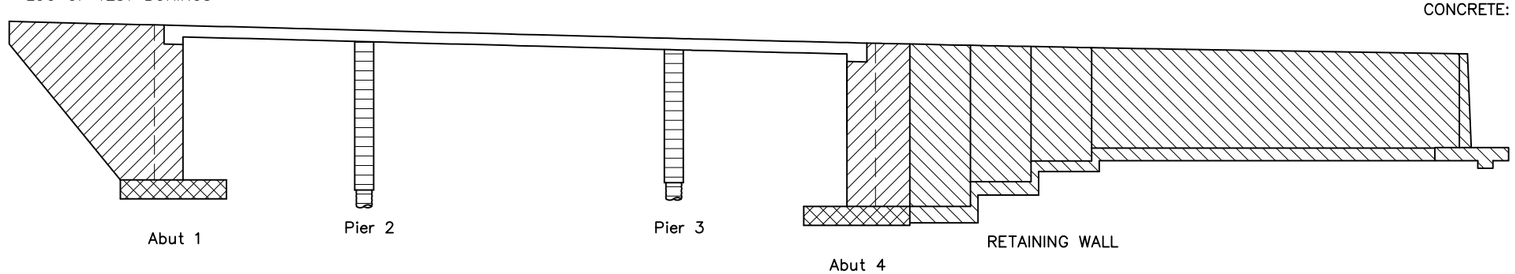
Moment Magnitude: 6.4

Peak Ground Acceleration = 0.18g



Acceleration Response Spectrum

REINFORCED CONCRETE:
fy = 60 ksi
f'c = 3.6 ksi @ 28 days UON, see "CONCRETE STRENGTH AND TYPE LIMITS"
n = 8



CONCRETE STRENGTH AND TYPE LIMITS

NO SCALE

LEGEND:

- Structural Concrete, Bridge (Polymer Fiber) (f'c = 5.0 ksi @ 28 days)
- Structural Concrete, Bridge (f'c = 4.0 ksi @ 28 days)
- Cast–In–Drilled–Hole Concrete Piling (f'c = 4.0 ksi @ 28 days)
- Structural Concrete, Bridge Footing (f'c = 3.6 ksi @ 28 days)
- Structural Concrete, Retaining Wall (f'c = 3.6 ksi @ 28 days)

ST-2

NO. | REVISION DESCRIPTION | CHECKED BY | DATE

DRAWING SCALE
HOR. SCALE: AS SHOWN
VERT. SCALE: AS SHOWN

Dewberry
11060 WHITE ROCK ROAD SUITE 200
RANCHO CORDOVA, CA 95670

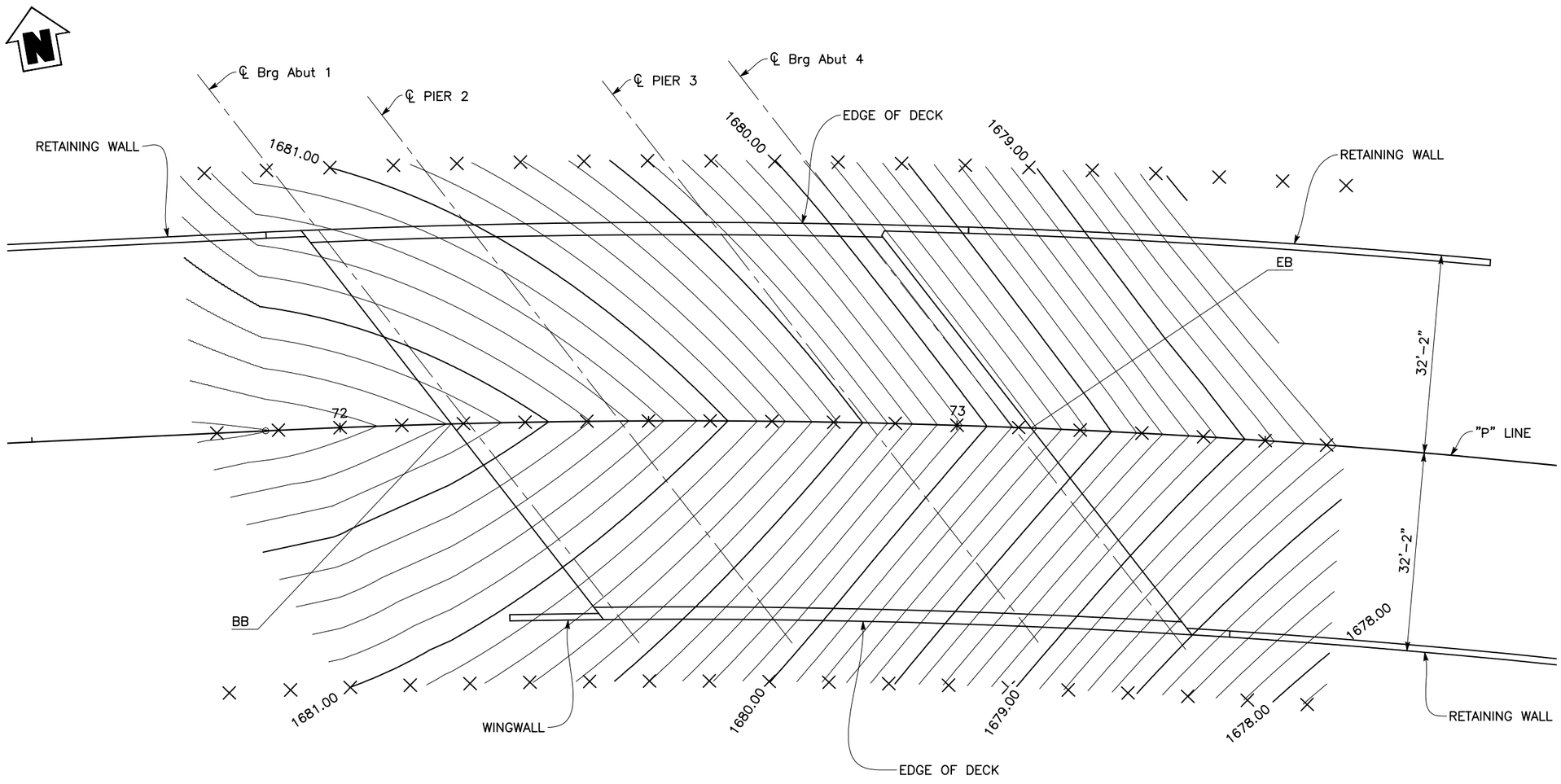
IMPROVEMENT PLANS FOR:
PLACERVILLE DRIVE BRIDGE REPLACEMENT
INDEX TO PLANS
CITY OF PLACERVILLE CALIFORNIA

DRAWING INFO
DATE: 10/03/2025
DRAFTER: E. CISNEROS
DESIGNER: K. KAWAMOTO
REVIEWER: T. ROY

PROJECT NO.
CIP # 41410
SHEET NO. S02 OF S35

PROGRESS PLANS SUBMITTAL, NOT FOR CONSTRUCTION

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PLAN

1" = 10'

NOTES:

1. Contours do not include Camber.
2. 0.1' Contour Interval.
3. × = Indicates 10' Intervals along "P" Line.

ST-3

NO.	REVISION DESCRIPTION	CHECKED BY	DATE

DRAWING SCALE
HOR. SCALE: AS SHOWN
VERT. SCALE: AS SHOWN

Dewberry
11060 WHITE ROCK ROAD SUITE 200
RANCHO CORDOVA, CA 95670

IMPROVEMENT PLANS FOR:
PLACERVILLE DRIVE BRIDGE REPLACEMENT
DECK CONTOURS
CITY OF PLACERVILLE CALIFORNIA

DRAWING INFO
DATE: 10/03/2025
DRAFTER: E. CISNEROS
DESIGNER: K. KAWAKAMI
REVIEWER: R. RUIZ

PROJECT NO.
CIP # 41410
SHEET NO. S03 OF S35

PROGRESS PLANS SUBMITTAL, NOT FOR CONSTRUCTION

U:\18028 - Placerville Dr. Bicycle-Ped and Br. Repl - Ci Placerville\18028 Bridge Replacement\400 Project Design Files\430 Bridges & Structures\Plans\PD-S-DC.dwg Oct 03, 2025 - 1:09pm, eciseneros

BENCH MARKS:

See "Roadway Plans"

SURVEY DATUM:

HORIZONTAL: NAD 83

VERTICAL: NGVD 29

PILE DATA TABLE

LOCATION	PILE TYPE	PILE CUT–OFF Elev	NOMINAL RESISTANCE (kips)		TOP OF ROCK SOCKET Elev (ft)	DESIGN TIP ELEVATIONS[1,2] (ft)	SPECIFIED TIP ELEVATIONS[2] (ft)
			COMPRESSION	TENSION			
PIER 2	30" CIDH W/ 24" CIDH (ROCK SOCKET)	1,664.0	500	N/A	1662	1655 (a) 1649 (b)	1649
PIER 3	30" CIDH W/ 24" CIDH (ROCK SOCKET)	1,664.0	480	N/A	1655	1655 (a) 1645 (b)	1643

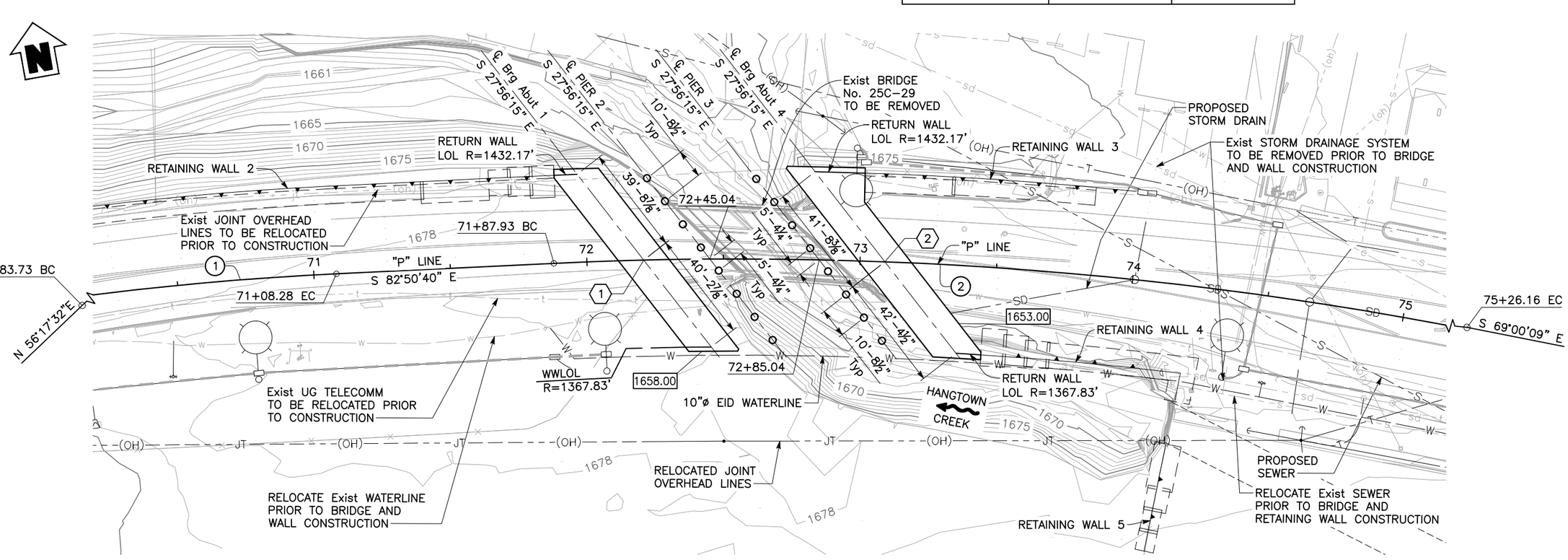
PILE NOTES:
1. Design Tip Elevation is controlled by the following demands: (a) Compression, (b) Lateral.
2. Pile tip elevation must be 12ft min below scour resistant rock elevation at pier foundations.

SPREAD FOOTING DATA TABLE

SUPPORT LOCATION	SERVICE PERMISSIBLE NET CONTACT STRESS (SETTLEMENT) (ksf)	STRENGTH/CONSTRUCTION FACTORED GROSS NOMINAL BEARING RESISTANCE $\phi_b = 0.45$ (ksf)	EXTREME EVENT FACTORED GROSS NOMINAL BEARING RESISTANCE $\phi_b = 1.00$ (ksf)
Abut 1	33.2	15.2	N/A
Abut 4	45.5	15.1	N/A

SPREAD FOOTING NOTES:
1. Provide minimum 2ft embedment into scour–resistant rock.

	NORTHING	EASTING
(1) ℄ Brg Abut 1 Sta 72+20.83	2031102.53	6896012.23
(2) ℄ Brg Abut 4 Sta 73+09.10	2031086.74	6896099.05



PLAN
1" = 20'

SCOUR DATA TABLE

Support Number	Long Term (Degradation and Contraction) Scour Elevation (ft)	Short Term (Local) Scour Depth (ft)
Abut 1 *	1,664.0	4.1[1]
PIER 2	1,664.0	6.9[1]
PIER 3	1,664.0	7.0
Abut 4 **	1,664.0	4.1

NOTES:
1. The actual scour elevation will be limited by the presence of scour resistant rock at the support location.

* Scour resistant rock = 1,662 @ Abut 1 and Pier 2
** Scour resistant rock = 1,655 @ Abut 4 and Pier 3

HYDROLOGIC SUMMARY

Drainage Area: 7.6 Square Miles

Frequency (Years)	Design Flood	Base Flood	Flood of Record
	50	100	N/A
Discharge (cubic feet per second)	2,781	3,200	N/A
Water Surface (elevation at bridge), (feet)	1674.9	1675.7	N/A

Flood plain data is based upon information available when the plans were prepared and are shown to meet federal requirements. The accuracy of said information is not warranted by the City and interested or affected parties should make their own investigations.

CURVE DATA

No.	R	Δ	T	L
(1)	1156.14'	40°51'47"	430.69'	824.55'
(2)	1400.00'	13°50'32"	169.94'	338.23'

NOTE:
PROTECT IN PLACE ALL EXISTING UTILITIES, UNLESS OTHERWISE SHOWN

LEGEND:

- Indicates Bottom of Footing Elevation
- Indicates Direction of Water Flow
- Indicates Existing Bridge
- Indicates New Structure
- Indicates 30" Dia CIDH Pile w/ 24" Dia CIDH (Rock Socket)
- Indicates Street Lighting, see Electrical Plans

ST-4

NO.	REVISION DESCRIPTION	CHECKED BY	DATE

DRAWING SCALE
HOR. SCALE: AS SHOWN
VERT. SCALE: AS SHOWN

CITY OF PLACERVILLE

Dewberry
11060 WHITE ROCK ROAD SUITE 200
RANCHO CORDOVA, CA 95670

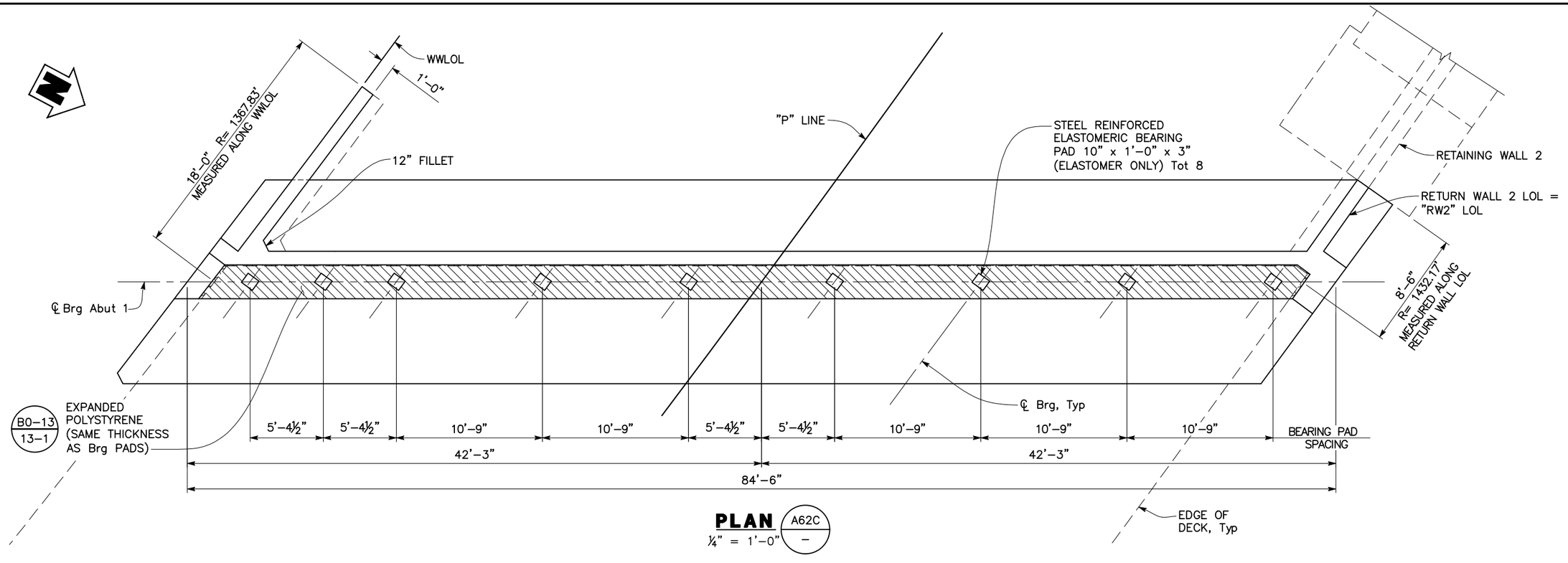
IMPROVEMENT PLANS FOR:
PLACERVILLE DRIVE BRIDGE REPLACEMENT
FOUNDATION PLAN
CITY OF PLACERVILLE CALIFORNIA

DRAWING INFO
DATE: 10/03/2025
DRAFTER: E. CONTRERAS
DESIGNER: K. KAWAKAMI
REVIEWER: R. RATH

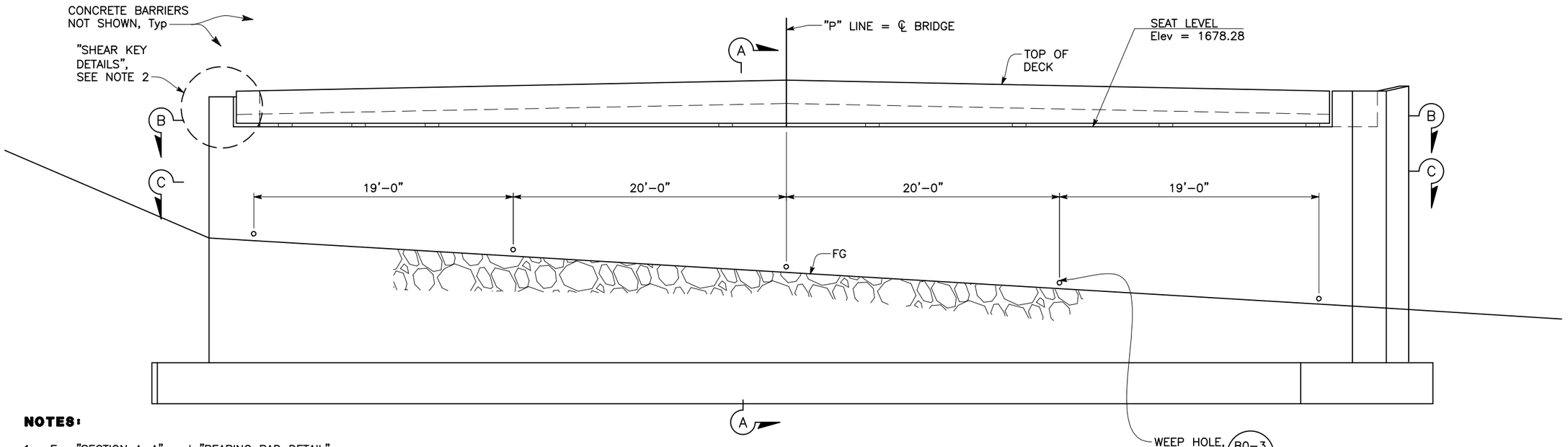
PROJECT NO.
CIP # 41410
SHEET NO. S04 OF S35

PROGRESS PLANS SUBMITTAL, NOT FOR CONSTRUCTION

U:\18028 – Placerville Dr. Bicycle–Ped and Br. Repl – Ci Placerville\18028 Bridge Replacement\400 Project Design Files\430 Bridges & Structures\Plans\PD–S–FP.dwg Oct 03, 2025 – 1:10pm, eclinaros



PLAN A62C
¼" = 1'-0"



ELEVATION
¼" = 1'-0"

NOTES:

1. For "SECTION A–A" and "BEARING PAD DETAIL" see "ABUTMENT DETAILS NO. 2" sheet.
2. For "SECTION B–B" and "SHEAR KEY DETAILS" see "ABUTMENT DETAILS NO. 3" sheet.
3. For "SECTION C–C", see "ABUTMENT DETAILS NO. 4" sheet.
4. For Waterline support details not shown, see "WATERLINE SUPPORT DETAILS" sheet.

ST-5

NO.	REVISION DESCRIPTION	CHECKED BY	DATE

DRAWING SCALE
HOR. SCALE: AS SHOWN
VERT. SCALE: AS SHOWN

Dewberry
11060 WHITE ROCK ROAD SUITE 200
RANCHO CORDOVA, CA 95670

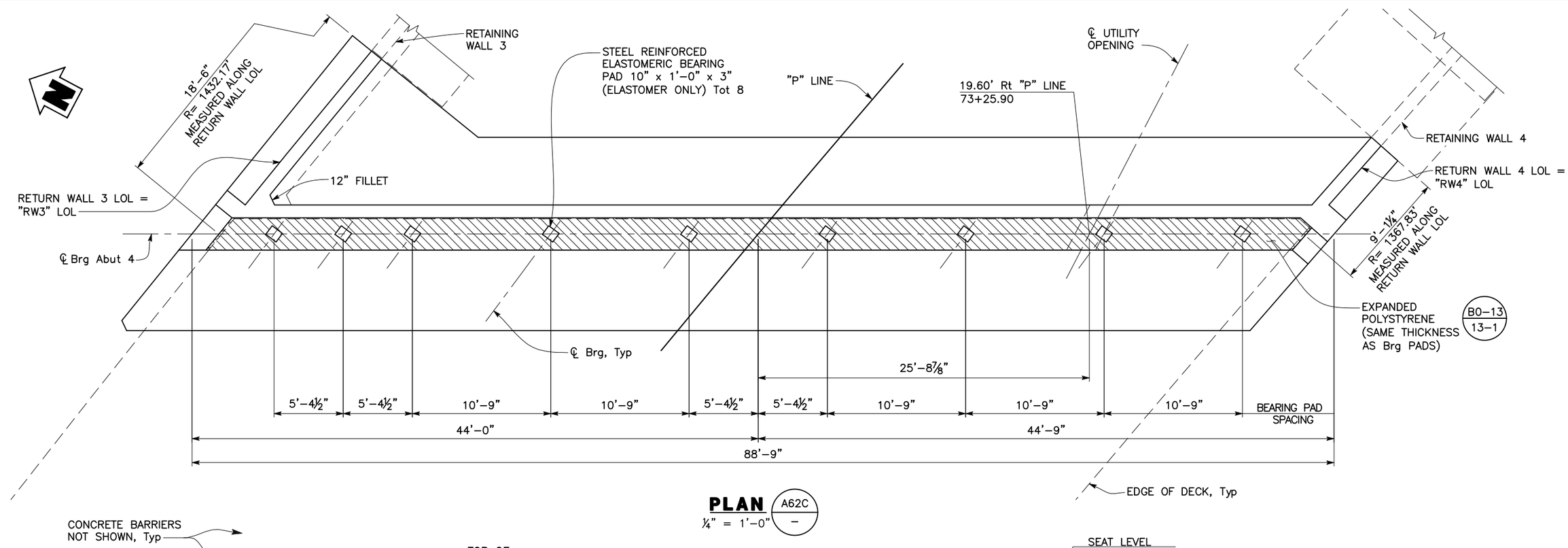
IMPROVEMENT PLANS FOR:
PLACERVILLE DRIVE BRIDGE REPLACEMENT
ABUTMENT 1 LAYOUT
CITY OF PLACERVILLE **CALIFORNIA**

DRAWING INFO
DATE: 10/03/2025
DRAFTER: E. CISNEROS
DESIGNER: K. KAWAGOE
REVIEWER: R. RUIZ

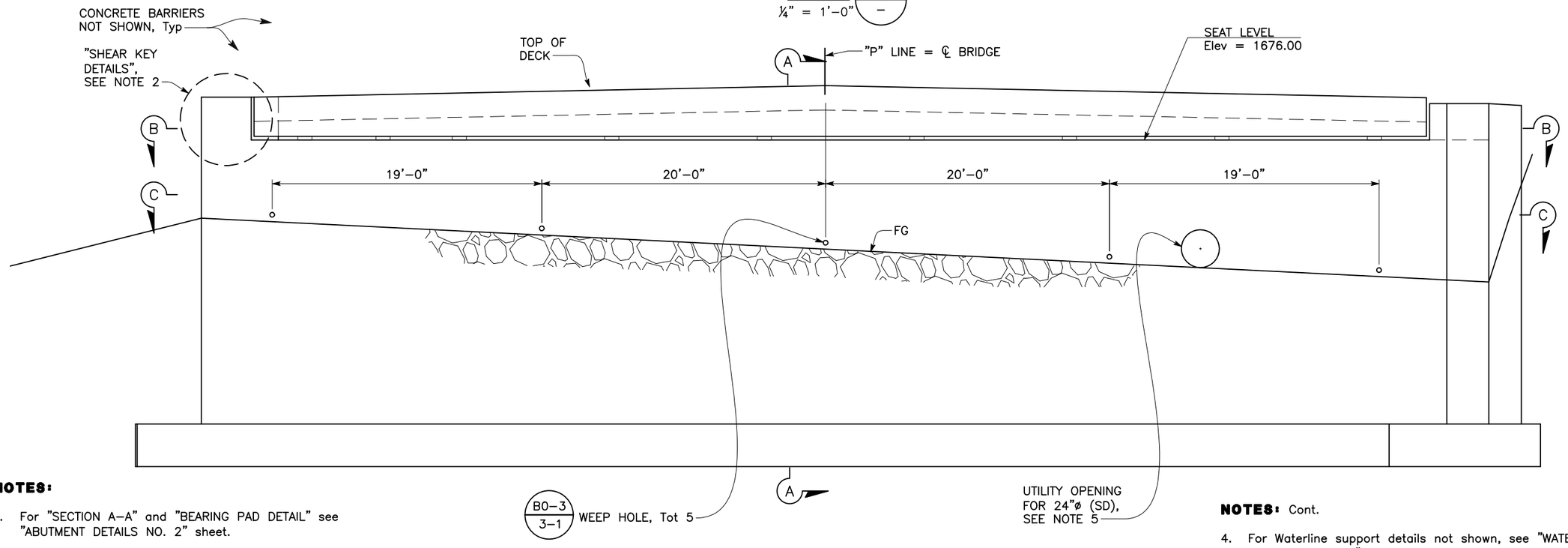
PROJECT NO.
CIP # 41410
SHEET NO. S05 OF S35

PROGRESS PLANS SUBMITTAL, NOT FOR CONSTRUCTION

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PLAN (A62C / –)
¼" = 1'–0"



ELEVATION
¼" = 1'–0"

NOTES:

1. For "SECTION A–A" and "BEARING PAD DETAIL" see "ABUTMENT DETAILS NO. 2" sheet.
2. For "SECTION B–B" and "SHEAR KEY DETAILS" see "ABUTMENT DETAILS NO. 3" sheet.
3. For "SECTION C–C", see "ABUTMENT DETAILS NO. 4" sheet.

NOTES: Cont.

4. For Waterline support details not shown, see "WATERLINE SUPPORT DETAILS" sheet.
5. For storm drain opening details, see Abutment Opening Reinforcement detail on "ABUTMENT DETAILS No. 8" sheet.

NO.	REVISION	DESCRIPTION	CHECKED BY	DATE

DRAWING SCALE
HOR. SCALE: AS SHOWN
VERT. SCALE: AS SHOWN

Dewberry
11060 WHITE ROCK ROAD SUITE 200
RANCHO CORDOVA, CA 95670

IMPROVEMENT PLANS FOR:
PLACERVILLE DRIVE BRIDGE REPLACEMENT
ABUTMENT 4 LAYOUT
CITY OF PLACERVILLE CALIFORNIA

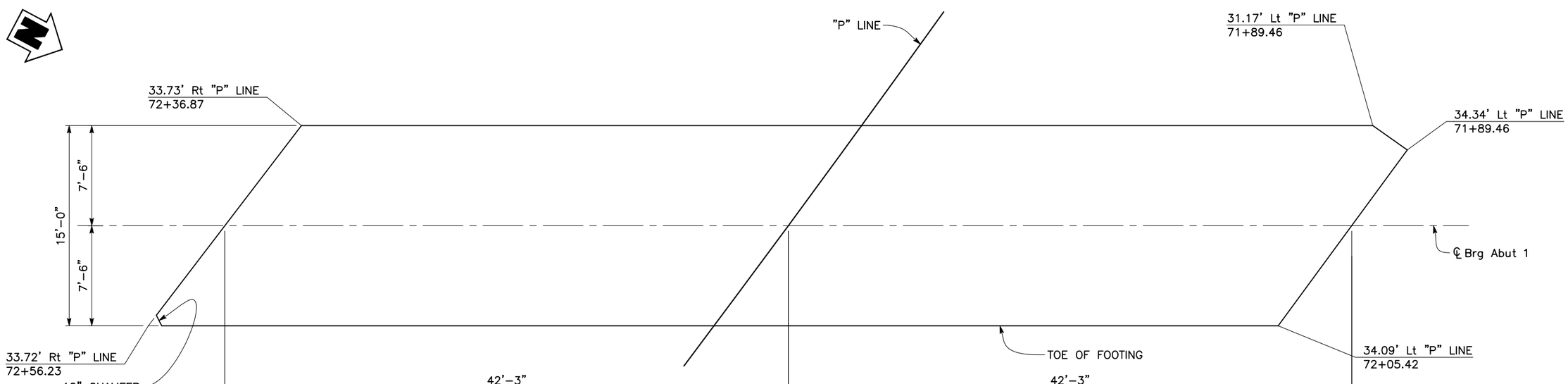
DRAWING INFO
DATE: 10/03/2025
DRAFTER: E. CISNEROS
DESIGNER: K. KAWAKAMI
REVIEWER: R. RAE

PROJECT NO.
CIP # 41410
SHEET NO. S06 OF S35

ST-6

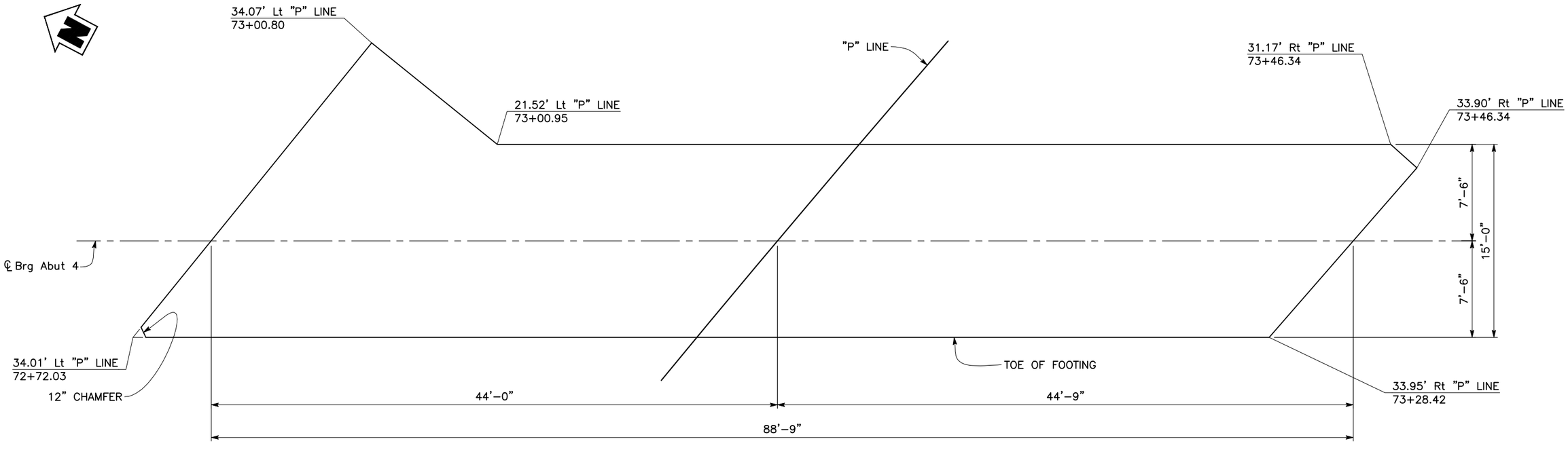
PROGRESS PLANS SUBMITTAL, NOT FOR CONSTRUCTION

U:\18028 – Placerville Dr. Bicycle–Ped and Br. Repl – CI Placerville\18028B Bridge Replacement\400 Project Design Files\430 Bridges & Structures\Plans\PD–S–AL.dwg Oct 03, 2025 – 1:10pm, ecianeros



ABUTMENT 1 FOOTING PLAN

¼" = 1'-0"



ABUTMENT 4 FOOTING PLAN

¼" = 1'-0"

NO. | REVISION DESCRIPTION | CHECKED BY | DATE

DRAWING SCALE
HOR. SCALE: AS SHOWN
VERT. SCALE: AS SHOWN

Dewberry
11060 WHITE ROCK ROAD SUITE 200
RANCHO CORDOVA, CA 95670

IMPROVEMENT PLANS FOR:
PLACERVILLE DRIVE BRIDGE REPLACEMENT

ABUTMENT DETAILS NO. 1
CITY OF PLACERVILLE CALIFORNIA

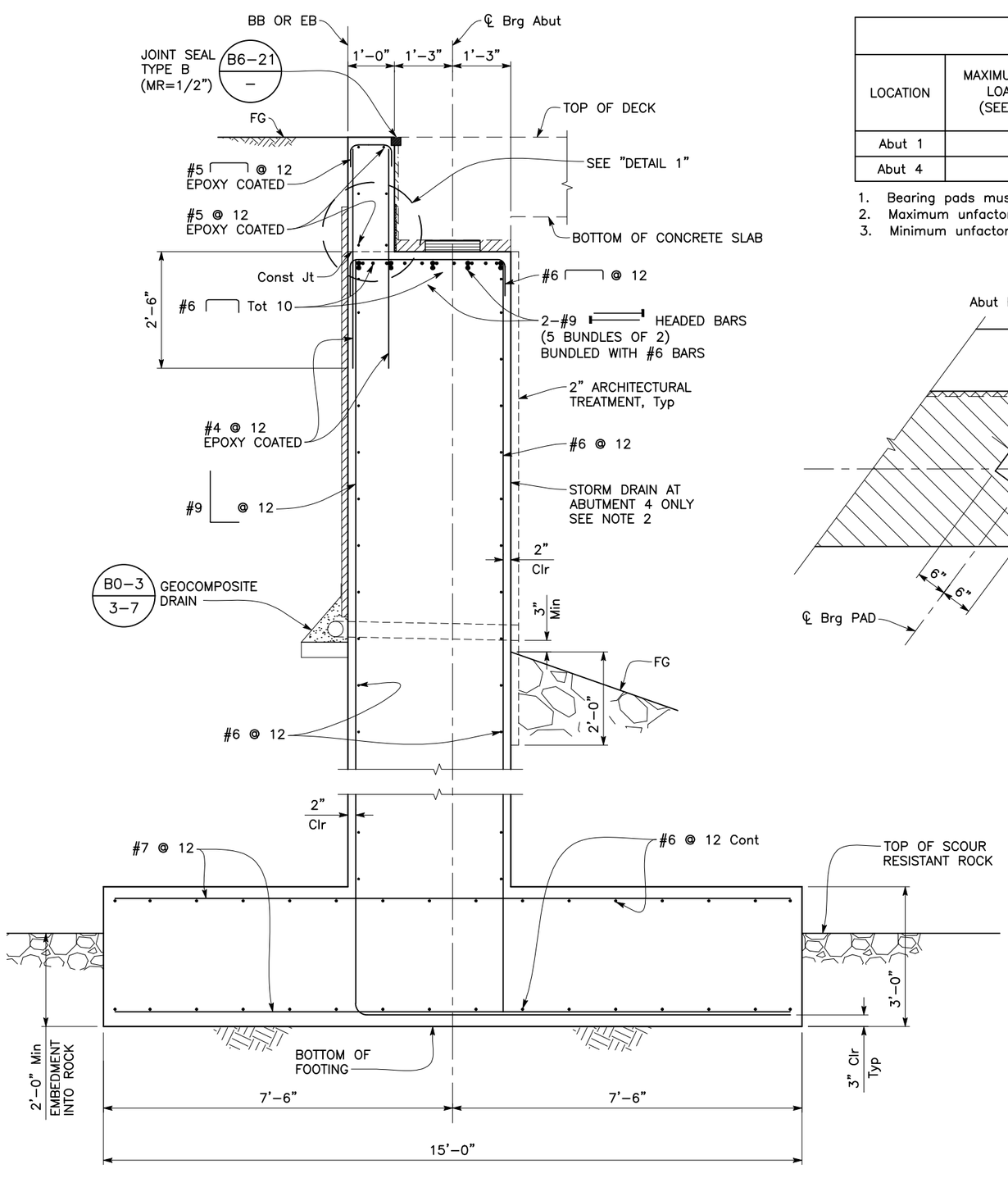
DRAWING INFO
DATE: 10/03/2025
DRAFTER: E. CISNEROS
DESIGNER: K. KAWAZOE
REVIEWER: R. ANG

PROJECT NO.
CIP # 41410
SHEET NO. S07 OF S35

ST-7

PROGRESS PLANS SUBMITTAL, NOT FOR CONSTRUCTION

U:\18028 - Placerville Dr. Bicycle-Ped and Br. Repl - CI Placerville\180288 Bridge Replacement\400 Project Design Files\430 Bridges & Structures\Plans\PD-S-AD.dwg Oct 03, 2025 - 1:10pm, eclaneros



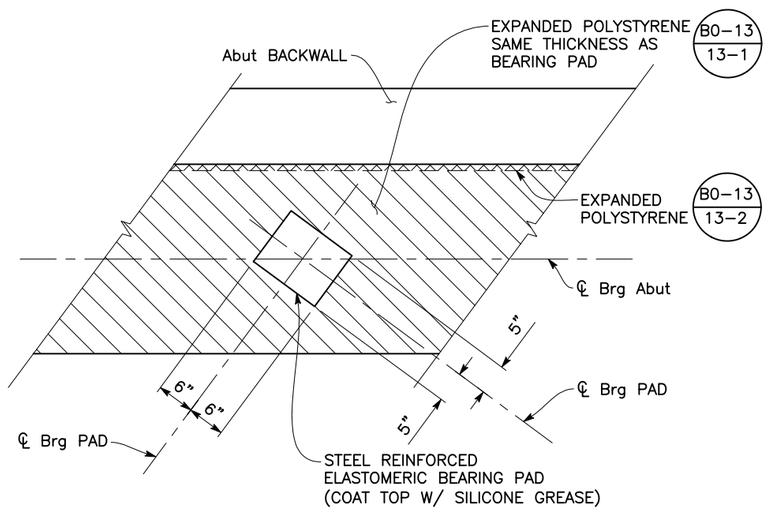
SECTION A-A

½" = 1'–0"

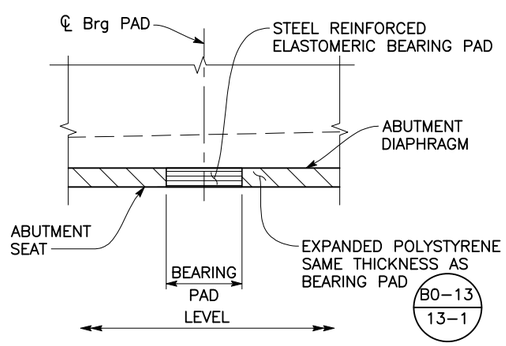
STEEL REINFORCED BEARING TABLE

LOCATION	MAXIMUM VERTICAL LOAD (kips) (SEE NOTE 2)	MAXIMUM VERTICAL LOAD (kips) (SEE NOTE 3)	MAXIMUM HORIZONTAL DISPLACEMENT (in)	B (in)	L (in)	ELASTOMER ONLY THICKNESS Tr (in)	TOTAL BEARING THICKNESS (in)	SLIDING YES/NO
Abut 1	59.3	36.5	0.38	12	10	XX	XX	YES
Abut 4	59.3	36.5	0.38	12	10	XX	XX	YES

1. Bearing pads must be set level
2. Maximum unfactored vertical load per bearing.
3. Minimum unfactored vertical load per bearing.



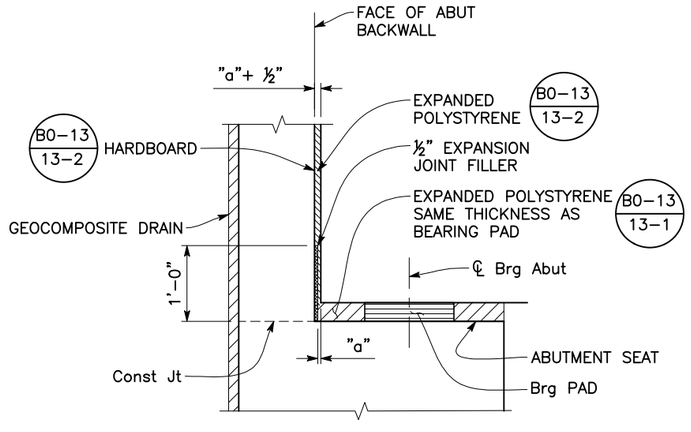
PLAN



ELEVATION

BEARING PAD DETAILS

1" = 1'–0"



FOR "a" DIMENSION, SEE B6–21 –

DETAIL 1

1" = 1'–0"

NOTES:

1. For "WEEP HOLE AND GEOCOMPOSITE DRAIN DETAIL", see "ABUTMENT DETAILS NO. 8" sheet.
2. For storm drain opening details, see Abutment Opening Reinforcement detail on "ABUTMENT DETAILS No. 8" sheet.

ST-8

NO.	REVISION DESCRIPTION	CHECKED BY	DATE

DRAWING SCALE
HOR. SCALE: AS SHOWN
VERT. SCALE: AS SHOWN

Dewberry
11060 WHITE ROCK ROAD SUITE 200
RANCHO CORDOVA, CA 95670

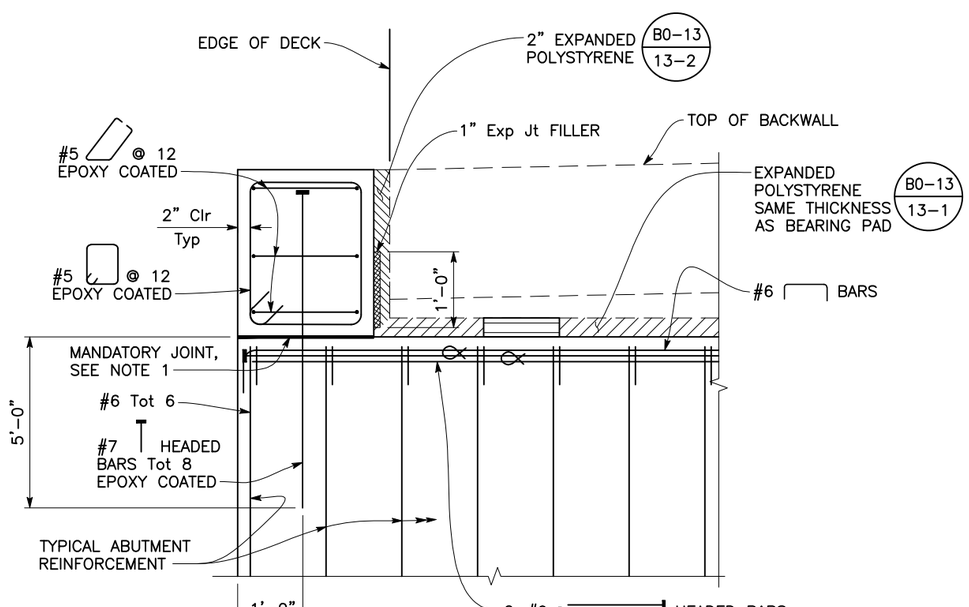
IMPROVEMENT PLANS FOR:
PLACERVILLE DRIVE BRIDGE REPLACEMENT
ABUTMENT DETAILS NO. 2
CITY OF PLACERVILLE CALIFORNIA

DRAWING INFO
DATE: 10/03/2025
DRAFTER: E. CISNEROS
DESIGNER: K. KAWAKAMI
REVIEWER: R. ROSE

PROJECT NO.
CIP # 41410
SHEET NO. S08 OF S35

PROGRESS PLANS SUBMITTAL, NOT FOR CONSTRUCTION

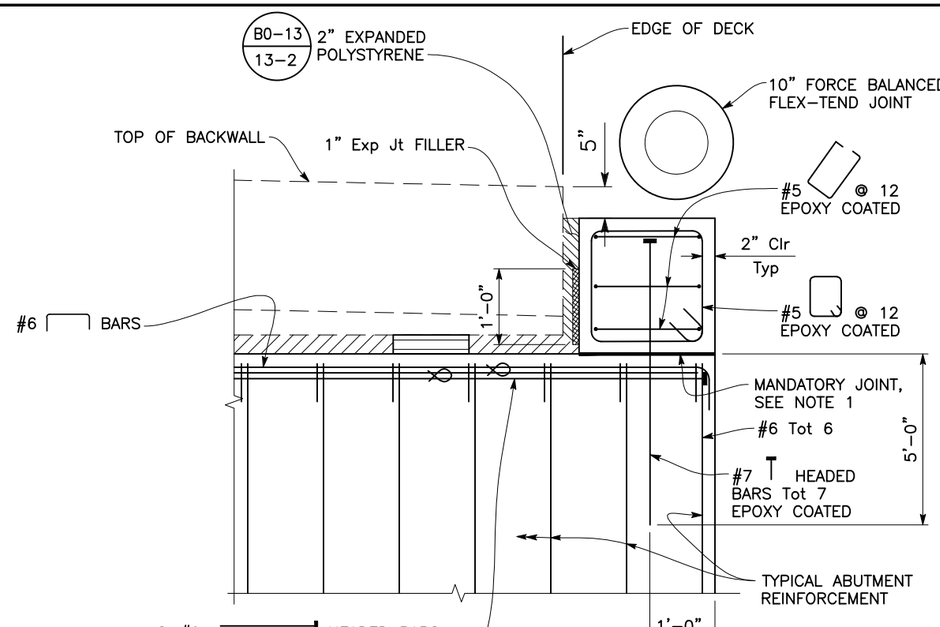
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LEFT SHEAR KEY DETAIL

1" = 1'–0"

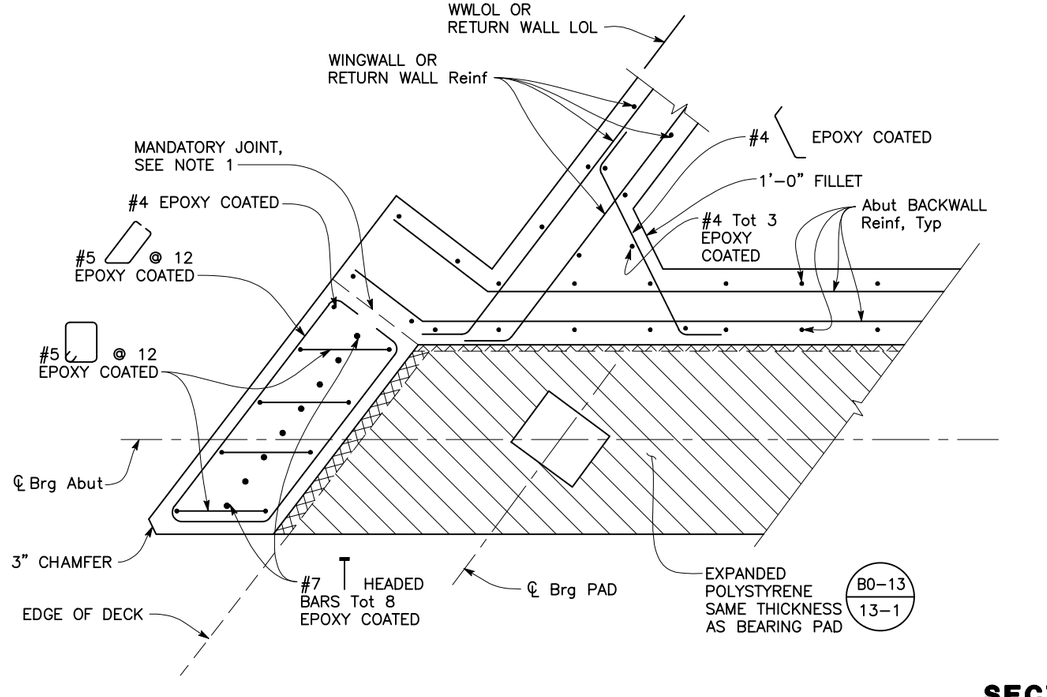
ABUTMENT 4 LEFT SHEAR KEY SHOWN, ABUTMENT 1 RIGHT SHEAR KEY SIMILAR

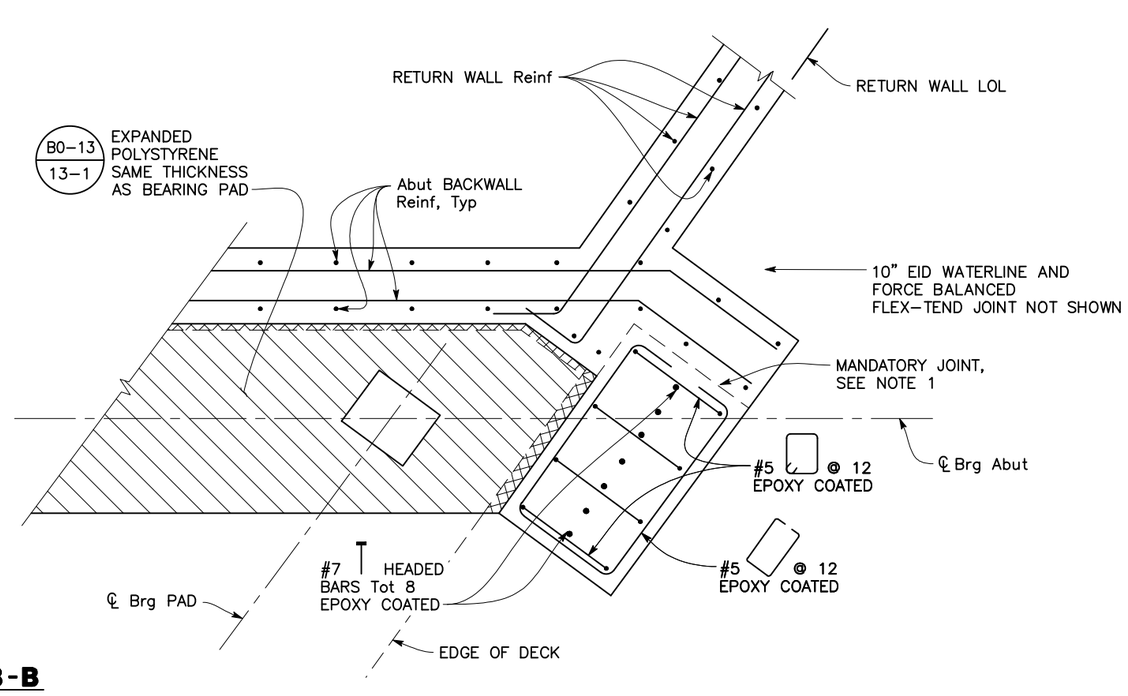


RIGHT SHEAR KEY DETAIL

1" = 1'–0"

ABUTMENT 4 RIGHT SHEAR KEY SHOWN, ABUTMENT 1 LEFT SHEAR KEY SIMILAR





SECTION B-B

1" = 1'–0"

ABUTMENT 1 SECTION B–B SHOWN, ABUTMENT 4 SECTION B–B SIMILAR

NOTES:

1. Mandatory joint surface with stem seat and backwall shall be trowel–finished smooth and lined with 15 pound construction paper.
2. For "SECTION C–C", see "ABUTMENT DETAILS NO. 4" sheet.

LEGEND:

∝ Indicates Bundled Bars

ST-9

NO.	REVISION DESCRIPTION	CHECKED BY	DATE

DRAWING SCALE
HOR. SCALE: AS SHOWN
VERT. SCALE: AS SHOWN

Dewberry
11060 WHITE ROCK ROAD SUITE 200
RANCHO CORDOVA, CA 95670

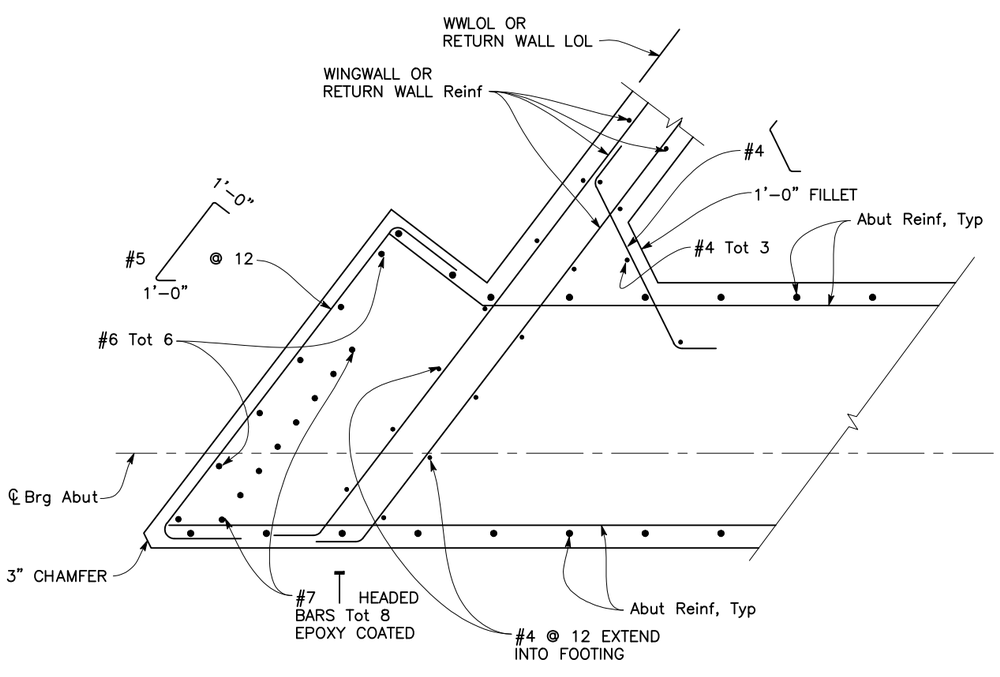
IMPROVEMENT PLANS FOR:
PLACERVILLE DRIVE BRIDGE REPLACEMENT
ABUTMENT DETAILS NO. 3
CALIFORNIA
CITY OF PLACERVILLE

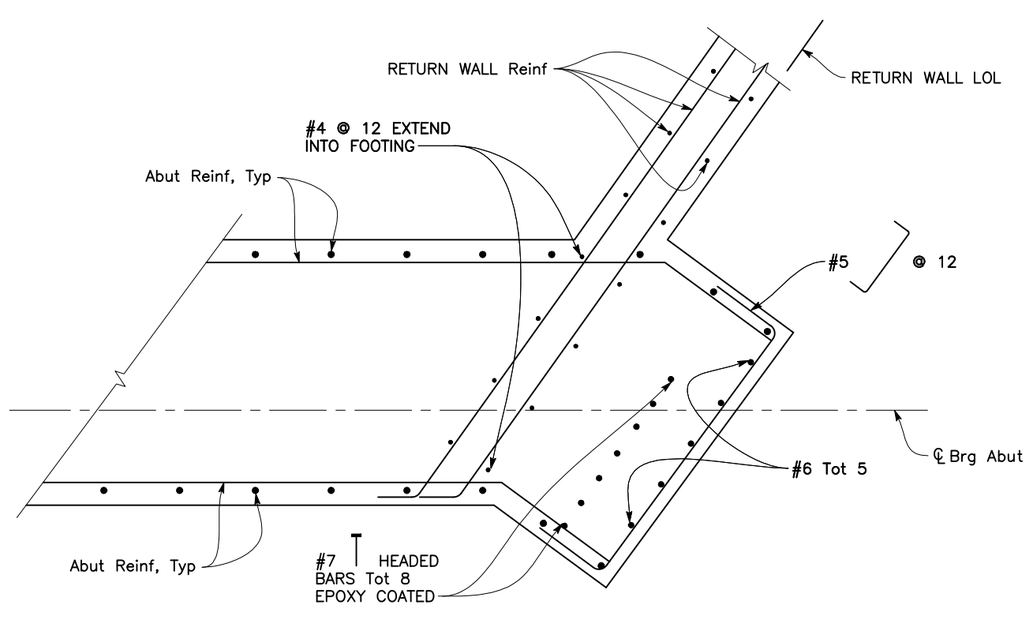
DRAWING INFO
DATE: 10/03/2025
DRAFTER: E. CISNEROS
DESIGNER: K. KAWAKAMI
REVIEWER: R. ROE

PROJECT NO.
CIP # 41410
SHEET NO. S09 OF S35

PROGRESS PLANS SUBMITTAL, NOT FOR CONSTRUCTION

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SECTION C-C

1" = 1'-0"

ABUTMENT 1 SECTION C-C SHOWN, ABUTMENT 4 SECTION C-C SIMILAR

ST-10

NO.	REVISION DESCRIPTION	CHECKED BY	DATE

DRAWING SCALE
HOR. SCALE: AS SHOWN
VERT. SCALE: AS SHOWN

Dewberry
11060 WHITE ROCK ROAD SUITE 200
RANCHO CORDOVA, CA 95670

IMPROVEMENT PLANS FOR:
PLACERVILLE DRIVE BRIDGE REPLACEMENT

ABUTMENT DETAILS NO. 4

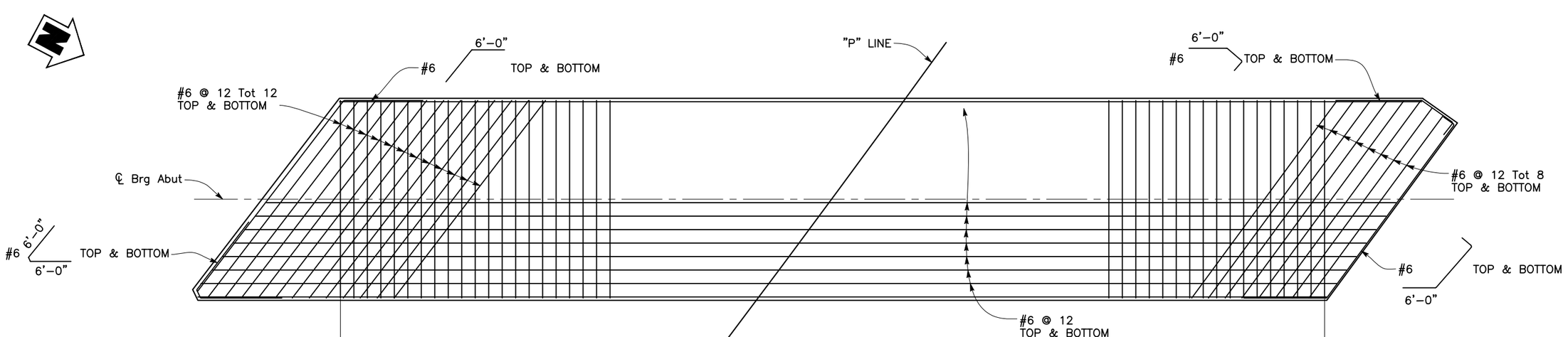
CITY OF PLACERVILLE CALIFORNIA

DRAWING INFO
DATE: 10/03/2025
DRAFTER: E. OSHEROW
DESIGNER: K. KAWAZOE
REVIEWER: E. ANG

PROJECT NO.
CIP # 41410
SHEET NO. S10 OF S35

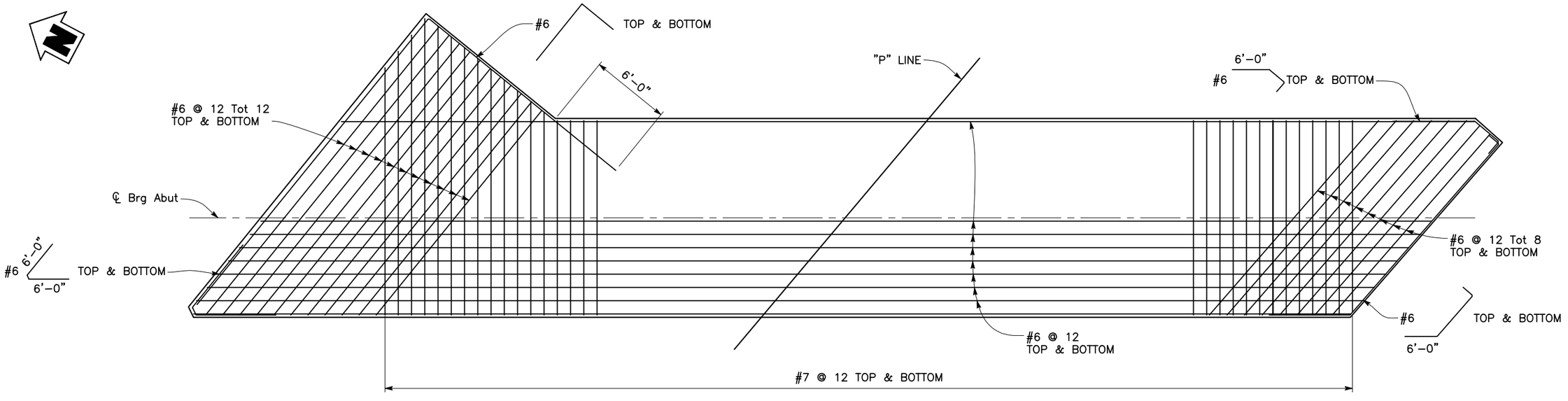
PROGRESS PLANS SUBMITTAL, NOT FOR CONSTRUCTION

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ABUTMENT 1 FOOTING REINFORCEMENT

¼" = 1'–0"



ABUTMENT 4 FOOTING REINFORCEMENT

¼" = 1'–0"

NO.	REVISION DESCRIPTION	CHECKED BY	DATE

DRAWING SCALE
HOR. SCALE: AS SHOWN
VERT. SCALE: AS SHOWN

Dewberry
11060 WHITE ROCK ROAD SUITE 200
RANCHO CORDOVA, CA 95670

IMPROVEMENT PLANS FOR:
PLACERVILLE DRIVE BRIDGE REPLACEMENT

ABUTMENT DETAILS NO. 5
CITY OF PLACERVILLE CALIFORNIA

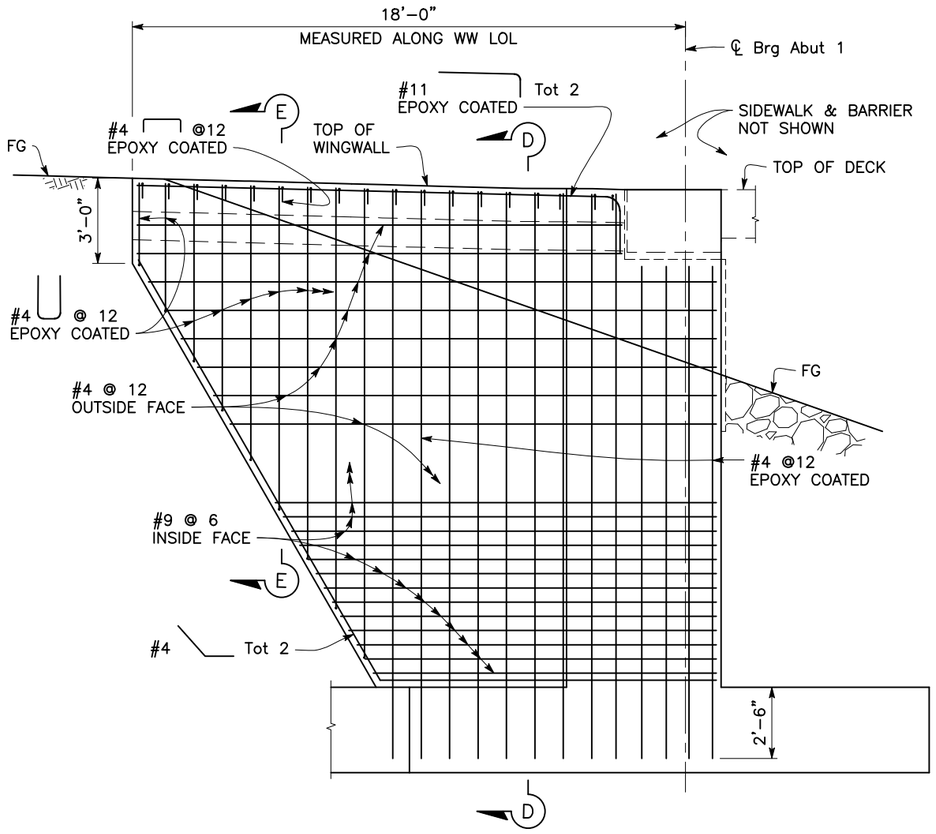
DRAWING INFO
DATE: 10/03/2025
DRAFTER: E. CISNEROS
DESIGNER: K. KAWAZOE
REVIEWER: R. ANG

PROJECT NO.
CIP # 41410
SHEET NO. S11 OF S35

ST-11

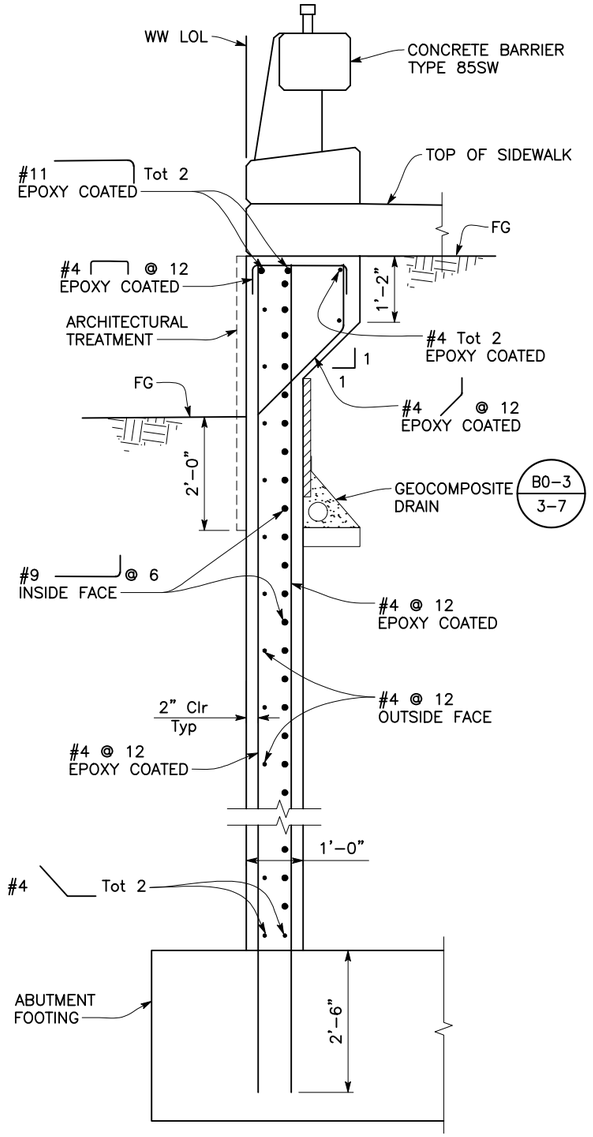
PROGRESS PLANS SUBMITTAL, NOT FOR CONSTRUCTION

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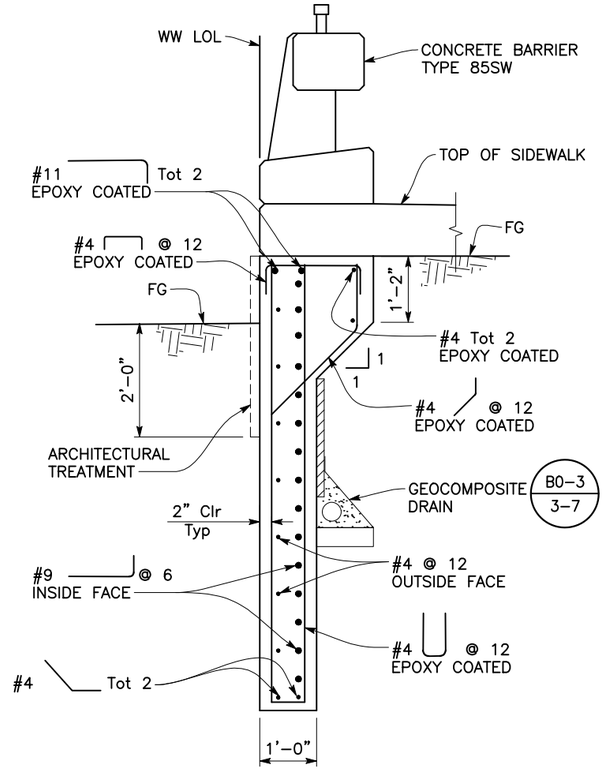
WINGWALL ELEVATION

⅜" = 1'–0"



SECTION D-D

¾" = 1'–0"



SECTION E-E

¾" = 1'–0"

NOTE:

1. For Wingwall information not shown, see "ABUTMENT 1 LAYOUT" sheet.

NO.	REVISION DESCRIPTION	CHECKED BY	DATE

DRAWING SCALE
HOR. SCALE: AS SHOWN
VERT. SCALE: AS SHOWN

Dewberry
1060 WHITE ROCK ROAD SUITE 200
RANCHO CORDOVA, CA 95670

IMPROVEMENT PLANS FOR:
PLACERVILLE DRIVE BRIDGE REPLACEMENT

ABUTMENT DETAILS NO. 6

CITY OF PLACERVILLE CALIFORNIA

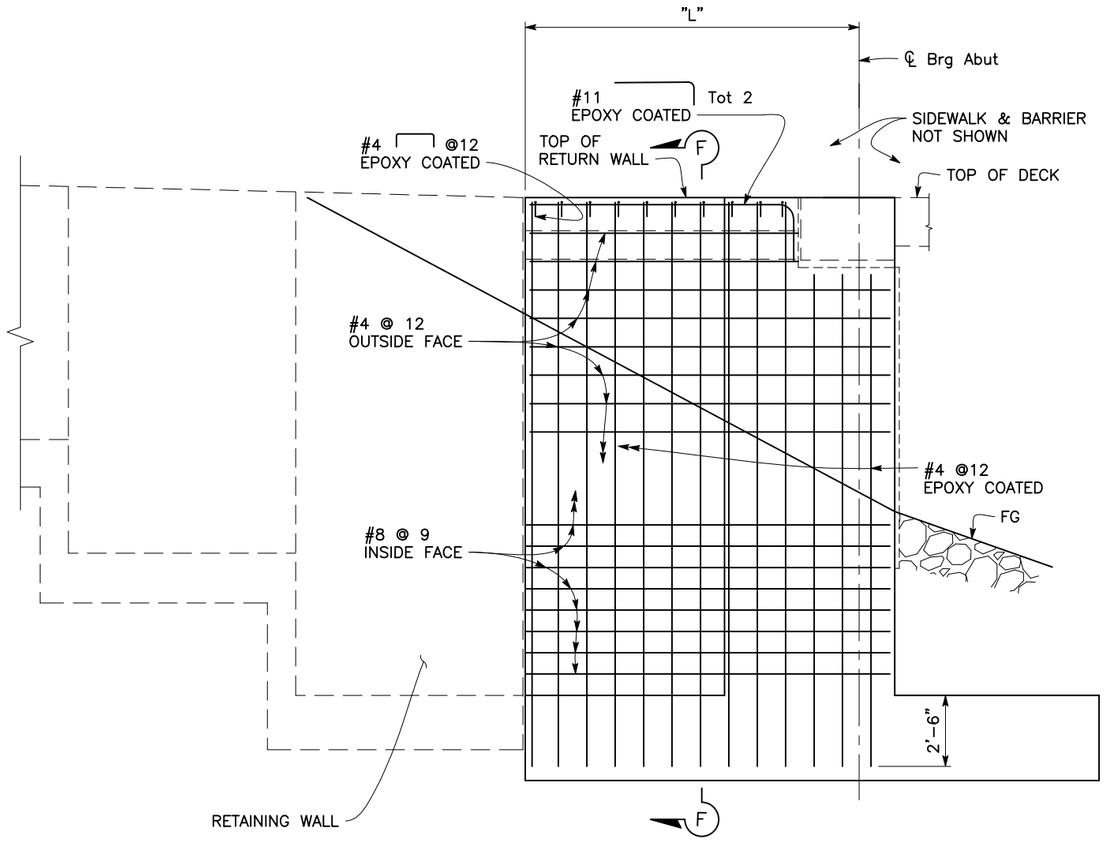
DRAWING INFO
DATE: 10/03/2025
DRAFTER: E. CASTANEDA
DESIGNER: K. KAMWAOU
REVIEWER: R. RUIZ

PROJECT NO.
CIP # 41410
SHEET NO. S12 OF S35

ST-12

PROGRESS PLANS SUBMITTAL, NOT FOR CONSTRUCTION

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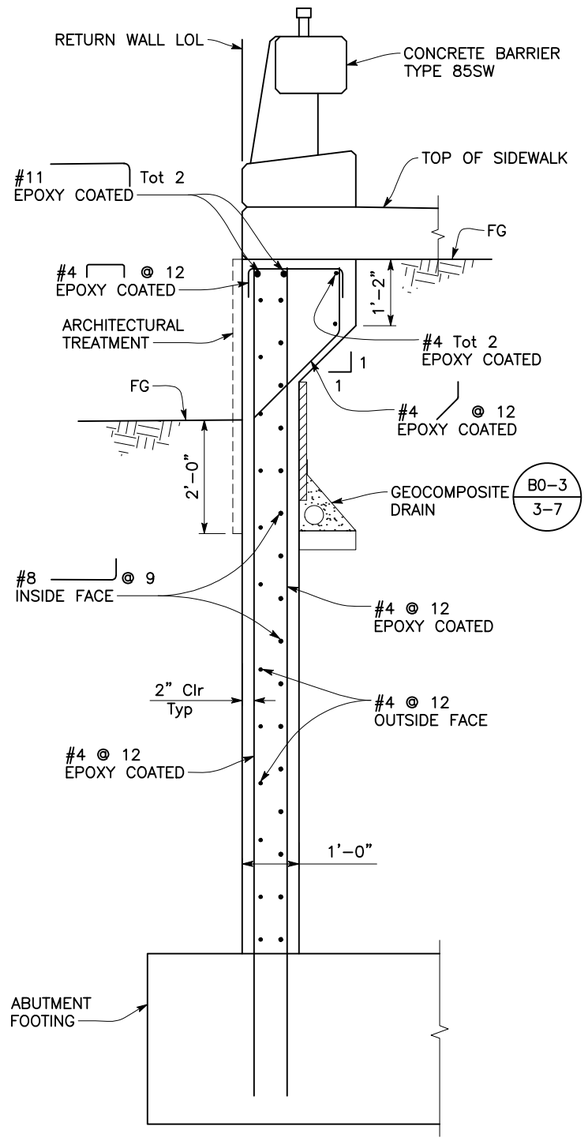


TYPICAL RETURN WALL ELEVATION

3/8" = 1'-0"

RETURN WALL 2 SHOWN, RETURN WALLS 3 & 4 SIMILAR

RETURN WALL LENGTH (MEASURED ALONG RETURN WALL LOL)	
LOCATION	L
RETURN WALL 2	8'-6"
RETURN WALL 3	18'-6"
RETURN WALL 4	9'-1¼"



SECTION F-F

¾" = 1'-0"

NOTE:

1. For Return Wall information not shown, see "ABUTMENT 1 LAYOUT" and "ABUTMENT 4 LAYOUT" sheets.

ST-13

NO. REVISION DESCRIPTION CHECKED BY DATE

DRAWING SCALE
HOR. SCALE: AS SHOWN
VERT. SCALE: AS SHOWN

CITY OF PLACERVILLE

Dewberry
11060 WHITE ROCK ROAD SUITE 200
RANCHO CORDOVA, CA 95670

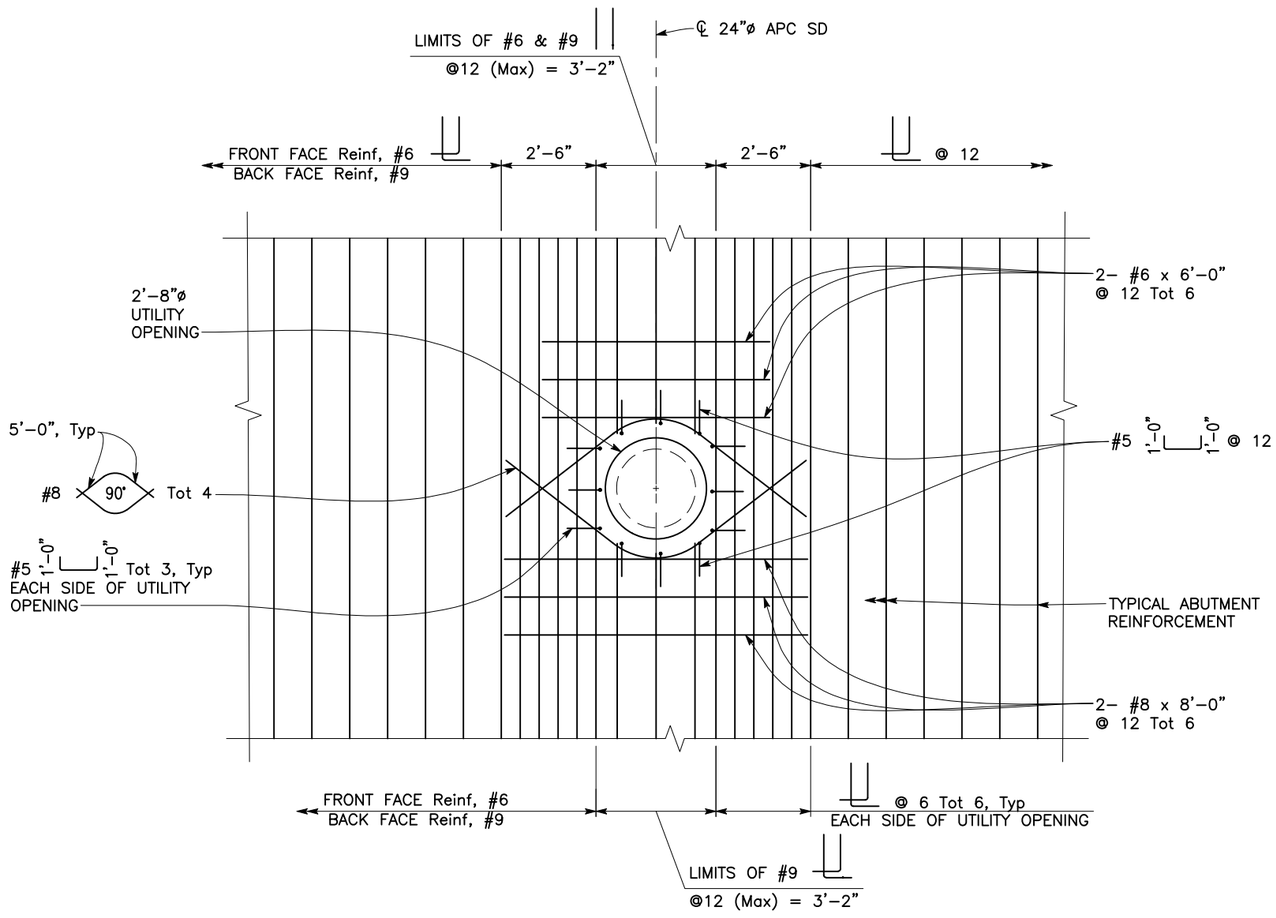
IMPROVEMENT PLANS FOR:
PLACERVILLE DRIVE BRIDGE REPLACEMENT
ABUTMENT DETAILS NO. 7
CITY OF PLACERVILLE CALIFORNIA

DRAWING INFO
DATE: 10/03/2025
DRAFTER: E. CASTANEDA
DESIGNER: K. KAMWAZI
REVIEWER: R. RUIZ

PROJECT NO.
CIP # 41410
SHEET NO. S13 OF S35

PROGRESS PLANS SUBMITTAL, NOT FOR CONSTRUCTION

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ABUTMENT OPENING REINFORCEMENT

½" = 1'-0"

ST-14

NO.	REVISION DESCRIPTION	CHECKED BY	DATE

DRAWING SCALE
HOR. SCALE: AS SHOWN
VERT. SCALE: AS SHOWN

Dewberry
11060 WHITE ROCK ROAD SUITE 200
RANCHO CORDOVA, CA 95670

IMPROVEMENT PLANS FOR:
PLACERVILLE DRIVE BRIDGE REPLACEMENT

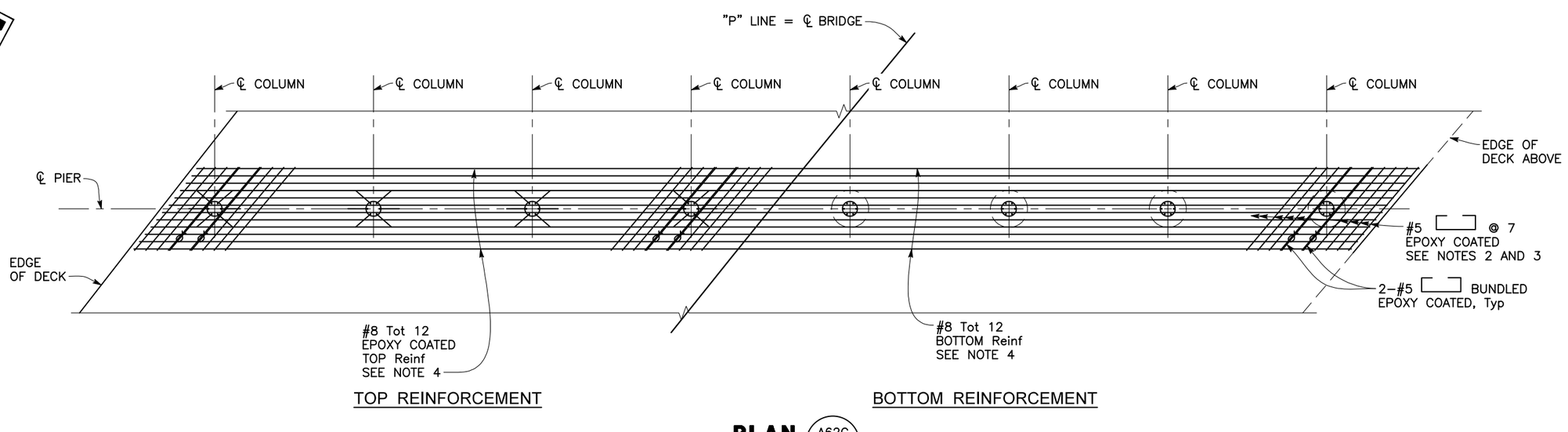
ABUTMENT DETAILS NO. 8
CITY OF PLACERVILLE CALIFORNIA

DRAWING INFO
DATE: 10/03/2025
DRAFTER: E. CISNEROS
DESIGNER: K. KAWAKAMI
REVIEWER: R. RUIZ

PROJECT NO.
CIP # 41410
SHEET NO. S14 OF S35

PROGRESS PLANS SUBMITTAL, NOT FOR CONSTRUCTION

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TOP REINFORCEMENT

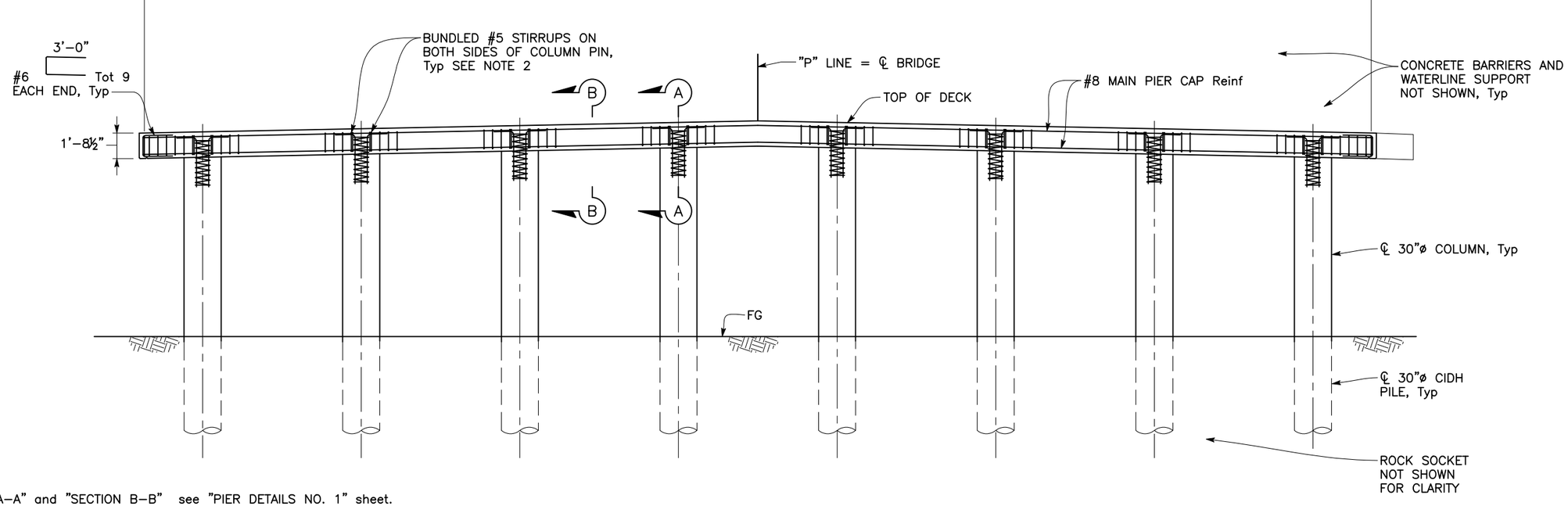
BOTTOM REINFORCEMENT

PLAN

A62C / –

¼" = 1'–0"

PIER 2 SHOWN, PIER 3 SIMILAR



ELEVATION

¼" = 1'–0"

PIER 2 SHOWN, PIER 3 SIMILAR

NOTES:

1. For "SECTION A–A" and "SECTION B–B" see "PIER DETAILS NO. 1" sheet.
2. Adjust bottom pier cap reinforcement around column pins as needed. Bundle 2–#5 stirrups on both sides of column pin, typical at all column pin locations.
3. Place stirrups parallel to ℄ Bridge.
4. No Lap splices allowed in the top and bottom pier cap reinforcement. Place main cap reinforcement parallel to ℄ Pier.

LEGEND:

⌒ Indicates Bundled Bars

ST-15

NO. REVISION DESCRIPTION | CHECKED BY | DATE

DRAWING SCALE
HOR. SCALE: AS SHOWN
VERT. SCALE: AS SHOWN

CITY OF PLACERVILLE

Dewberry
11080 WHITE ROCK ROAD SUITE 200
RANCHO CORDOVA, CA 95670

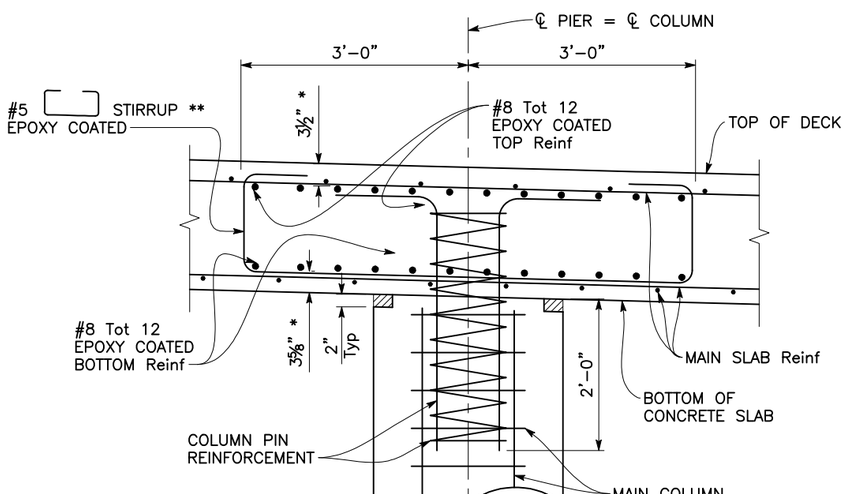
IMPROVEMENT PLANS FOR:
PLACERVILLE DRIVE BRIDGE REPLACEMENT
PIER LAYOUT
CITY OF PLACERVILLE CALIFORNIA

DRAWING INFO
DATE: 10/03/2025
DRAFTER: E. CISNEROS
DESIGNER: K. KAWAKAMI
REVIEWER: R. PATEL

PROJECT NO.
CIP # 41410
SHEET NO. S15 OF S35

PROGRESS PLANS SUBMITTAL, NOT FOR CONSTRUCTION

U:\18028 – Placerville Dr. Bicycle–Ped and Br. Repl – CI Placerville\18028 Bridge Replacement\400 Project Design Files\430 Bridges & Structures\Plans\PD–S–PL.dwg Oct 03, 2025 – 1:12pm, eclaneros

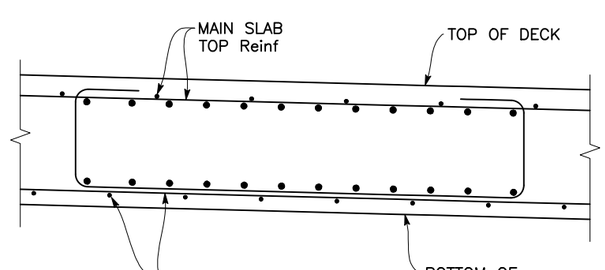


* Indicates clearance to main cap reinforcement

** See Notes 1 & 2

SECTION A-A

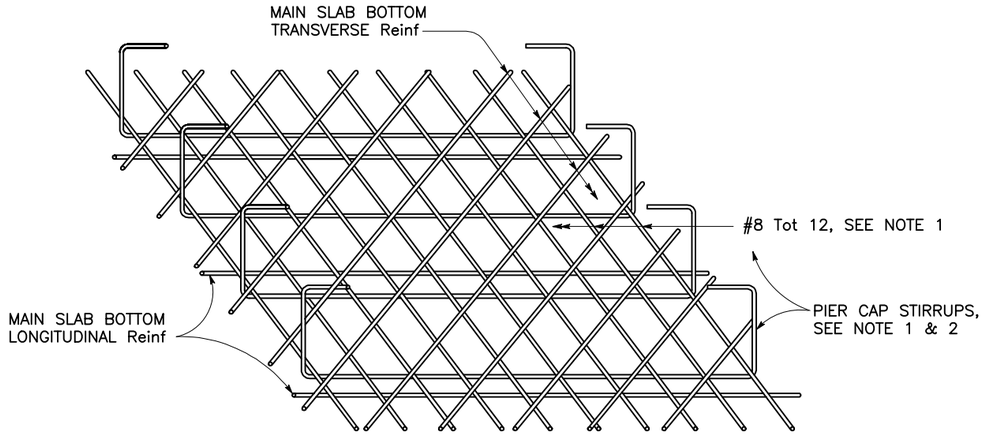
1" = 1'–0"



SECTION B-B

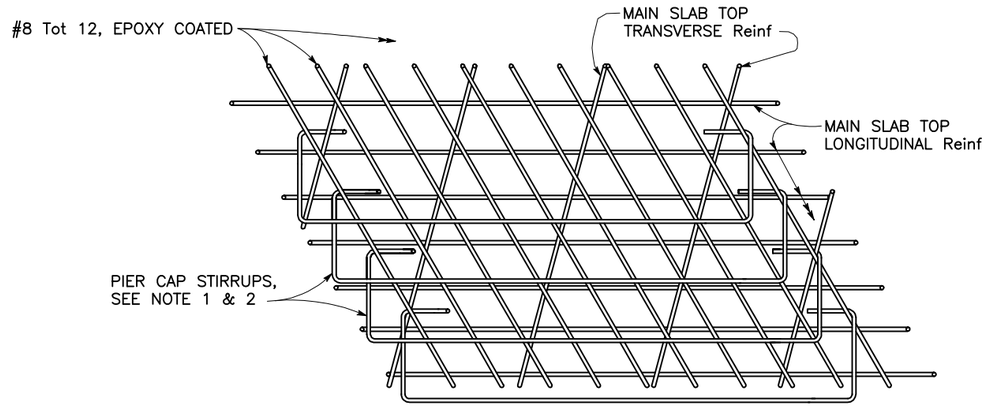
1" = 1'–0"

FOR DETAILS NOT SHOWN, SEE SECTION A–A



BOTTOM SLAB REINFORCEMENT AT PIER

1" = 1'–0"



TOP SLAB REINFORCEMENT AT PIER

1" = 1'–0"

NOTES:

1. Adjust bottom pier cap reinforcement around column pins as needed. Bundle 2–#5 stirrups on both sides of column pin, typical at all column pin locations. See "PIER LAYOUT" sheet.
2. Place stirrups parallel to ℄ Bridge.

ST-16

NO.	REVISION DESCRIPTION	CHECKED BY	DATE

DRAWING SCALE
HOR. SCALE: AS SHOWN
VERT. SCALE: AS SHOWN

Dewberry
11060 WHITE ROCK ROAD SUITE 200
RANCHO CORDOVA, CA 95670

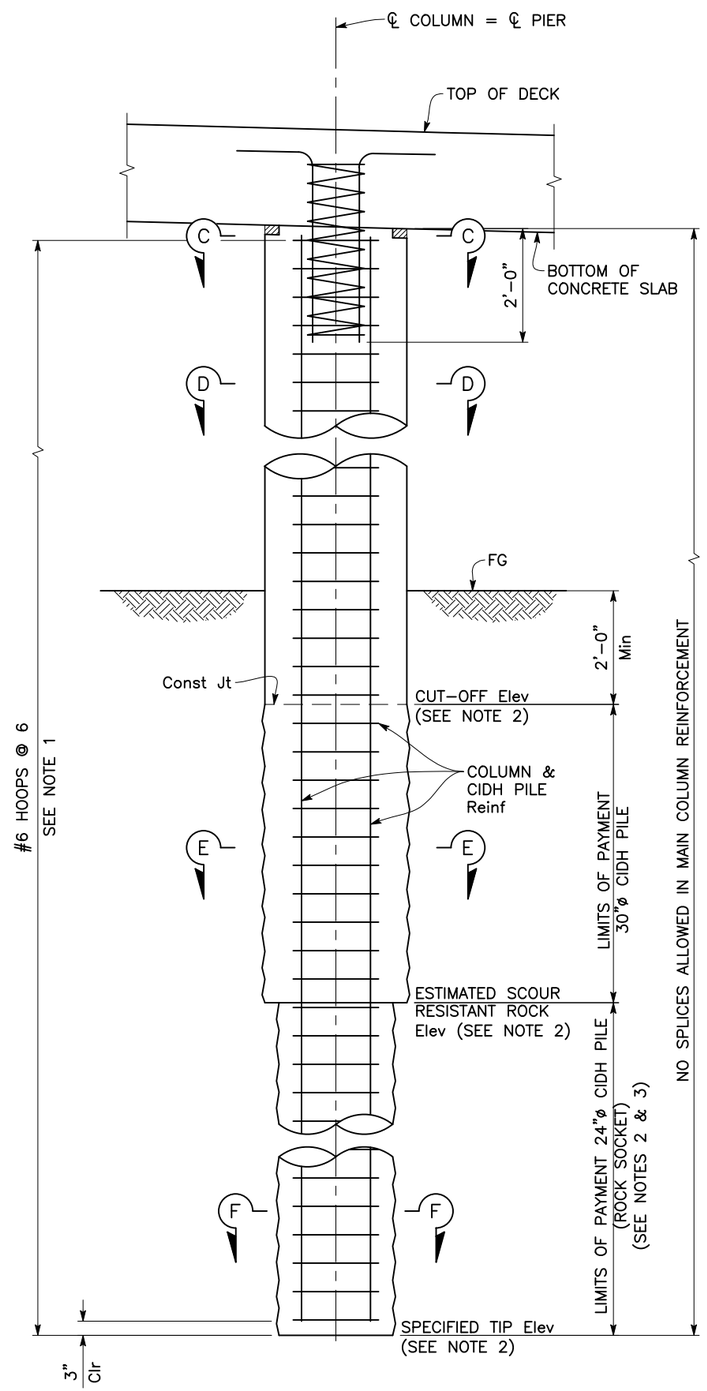
IMPROVEMENT PLANS FOR:
PLACERVILLE DRIVE BRIDGE REPLACEMENT
PIER DETAILS NO. 1
CALIFORNIA
CITY OF PLACERVILLE

DRAWING INFO
DATE: 10/03/2025
DRAFTER: E. OSHEROV
DESIGNER: K. KAWAZOE
REVIEWER: R. ANG

PROJECT NO.
CIP # 41410
SHEET NO. S16 OF S35

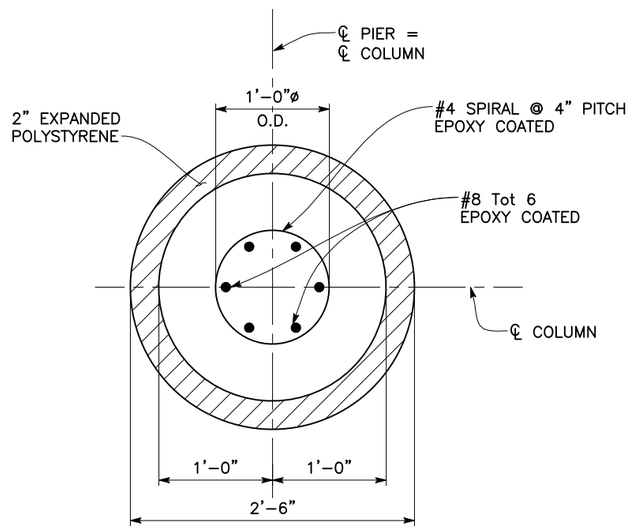
PROGRESS PLANS SUBMITTAL, NOT FOR CONSTRUCTION

U:\18028 – Placerville Dr. Bicycle–Ped and Br. Repl – CI Placerville\18028B Bridge Replacement\400 Project Design Files\430 Bridges & Structures\Plans\PD–S–PL.dwg Oct 03, 2025 – 1:12pm, eclaneros



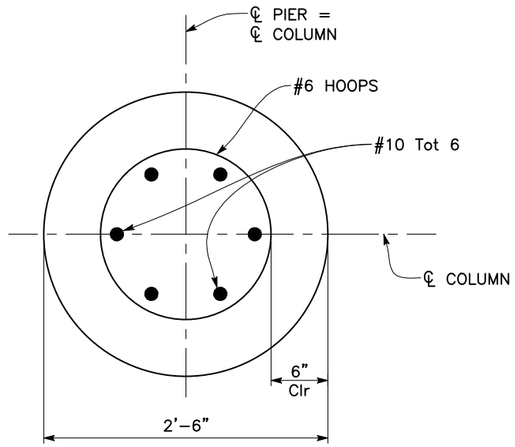
PIER COLUMN ELEVATION

¾" = 1'–0"



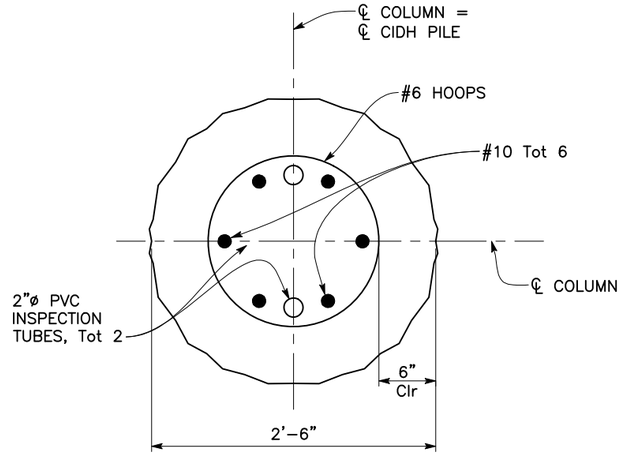
SECTION C-C

1½" = 1'–0"



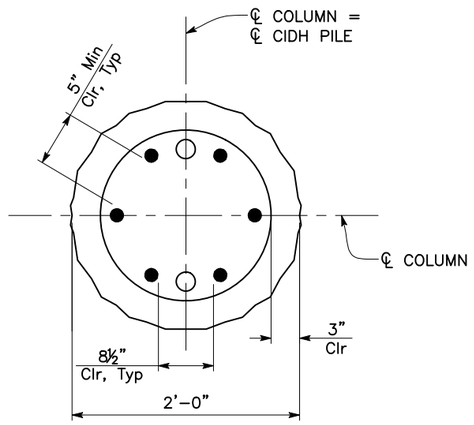
SECTION D-D

1½" = 1'–0"



SECTION E-E

1½" = 1'–0"



SECTION F-F

1½" = 1'–0"

NOTES:

1. All Hoops are ultimate butt spliced continuous.
2. For Specified Tip, Estimated Scour Resistant Rock, and Pile Cut–Off Elevations, see "PILE DATE TABLE" on "FOUNDATION PLAN" sheet.
3. Pile tip elevation must be 12 ft min below scour resistant rock elevation at pier foundations.

ST-17

NO.	REVISION DESCRIPTION	CHECKED BY	DATE

DRAWING SCALE
HOR. SCALE: AS SHOWN
VERT. SCALE: AS SHOWN

Dewberry
11060 WHITE ROCK ROAD SUITE 200
RANCHO CORDOVA, CA 95670

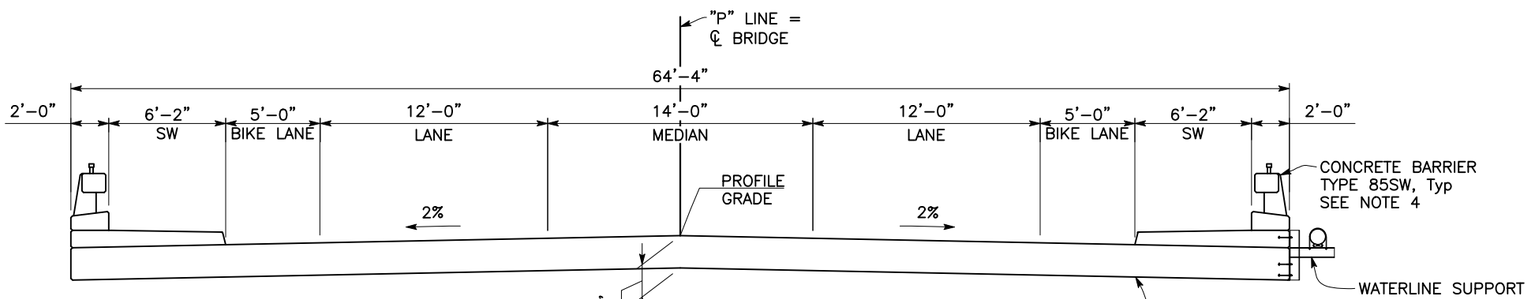
IMPROVEMENT PLANS FOR:
PLACERVILLE DRIVE BRIDGE REPLACEMENT
PIER DETAILS NO. 2
CITY OF PLACERVILLE CALIFORNIA

DRAWING INFO
DATE: 10/03/2025
DRAFTER: E. CISNEROS
DESIGNER: K.KAMMERER
REVIEWER: R. ROY

PROJECT NO.
CIP # 41410
SHEET NO. S17 OF S35

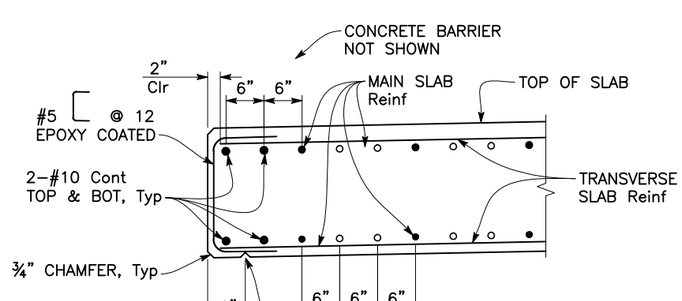
PROGRESS PLANS SUBMITTAL, NOT FOR CONSTRUCTION

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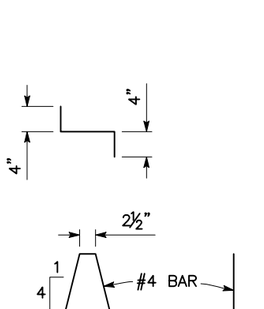
TYPICAL SECTION

¼" = 1'–0"



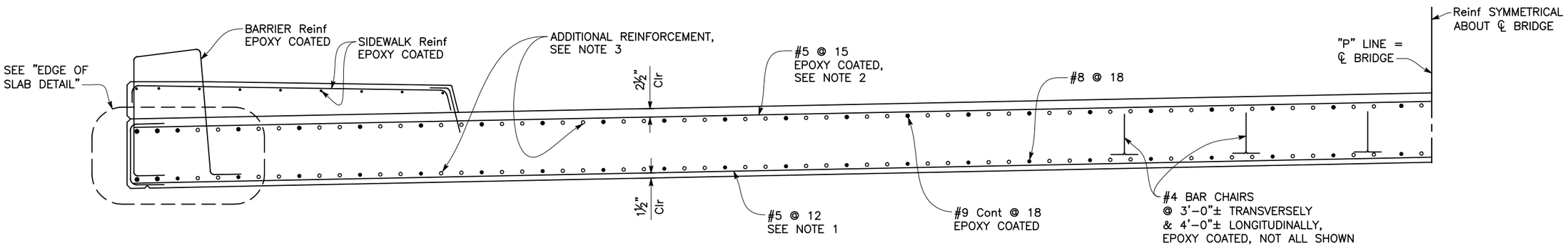
EDGE OF SLAB DETAIL

1" = 1'–0"



BAR CHAIR DETAIL

1" = 1'–0"



PART TYPICAL SECTION

¾" = 1'–0"

NOTES:

1. Transverse reinforcement must be placed perpendicular to and measured along "P" Line.
2. For additional slab reinforcement, see "SLAB DETAILS No. 1 and "SLAB DETAILS No. 2" sheets.
3. All reinforcement within the top 12" of the top of deck must be epoxy coated.
4. For Concrete Barrier Type 85SW details, see "CONCRETE BARRIER TYPE 85SW DETAILS NO. 1, NO. 2, NO. 3 and NO. 4" sheets.
5. For Waterline support details, see "WATERLINE SUPPORT DETAILS" sheet.

LEGEND:

- ∘ Indicates additional slab reinforcement

ST-18

NO.	REVISION DESCRIPTION	CHECKED BY	DATE

DRAWING SCALE
HOR. SCALE: AS SHOWN
VERT. SCALE: AS SHOWN

Dewberry
11060 WHITE ROCK ROAD SUITE 200
RANCHO CORDOVA, CA 95670

IMPROVEMENT PLANS FOR:
PLACERVILLE DRIVE BRIDGE REPLACEMENT

TYPICAL SECTION

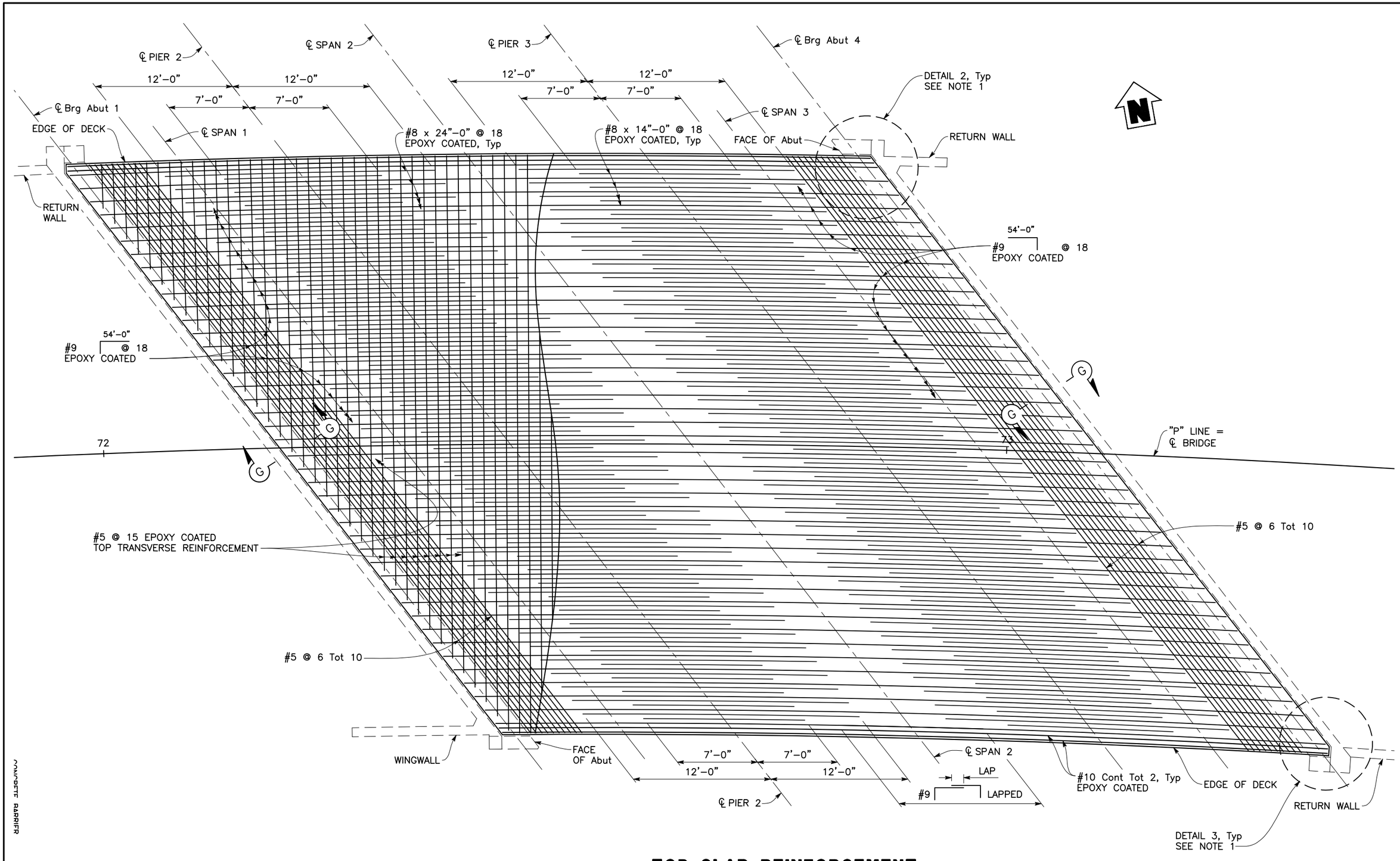
CITY OF PLACERVILLE CALIFORNIA

DRAWING INFO
DATE: 10/03/2025
DRAFTER: E. CISNEROS
DESIGNER: K. KAWAKAMI
REVIEWER: R. ROSE

PROJECT NO.
CIP # 41410
SHEET NO. S18 OF S35

PROGRESS PLANS SUBMITTAL, NOT FOR CONSTRUCTION

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TOP SLAB REINFORCEMENT

1" = 5'

NOTES:

1. For "SECTION G–G", "DETAIL 2" and "DETAIL 3", see "SLAB DETAILS No. 3" sheet.

ST-19

NO.	REVISION DESCRIPTION	CHECKED BY	DATE

DRAWING SCALE
HOR. SCALE: AS SHOWN
VERT. SCALE: AS SHOWN

CITY OF PLACERVILLE

Dewberry
11060 WHITE ROCK ROAD SUITE 200
RANCHO CORDOVA, CA 95670

IMPROVEMENT PLANS FOR:
PLACERVILLE DRIVE BRIDGE REPLACEMENT

SLAB DETAILS NO. 1

CITY OF PLACERVILLE CALIFORNIA

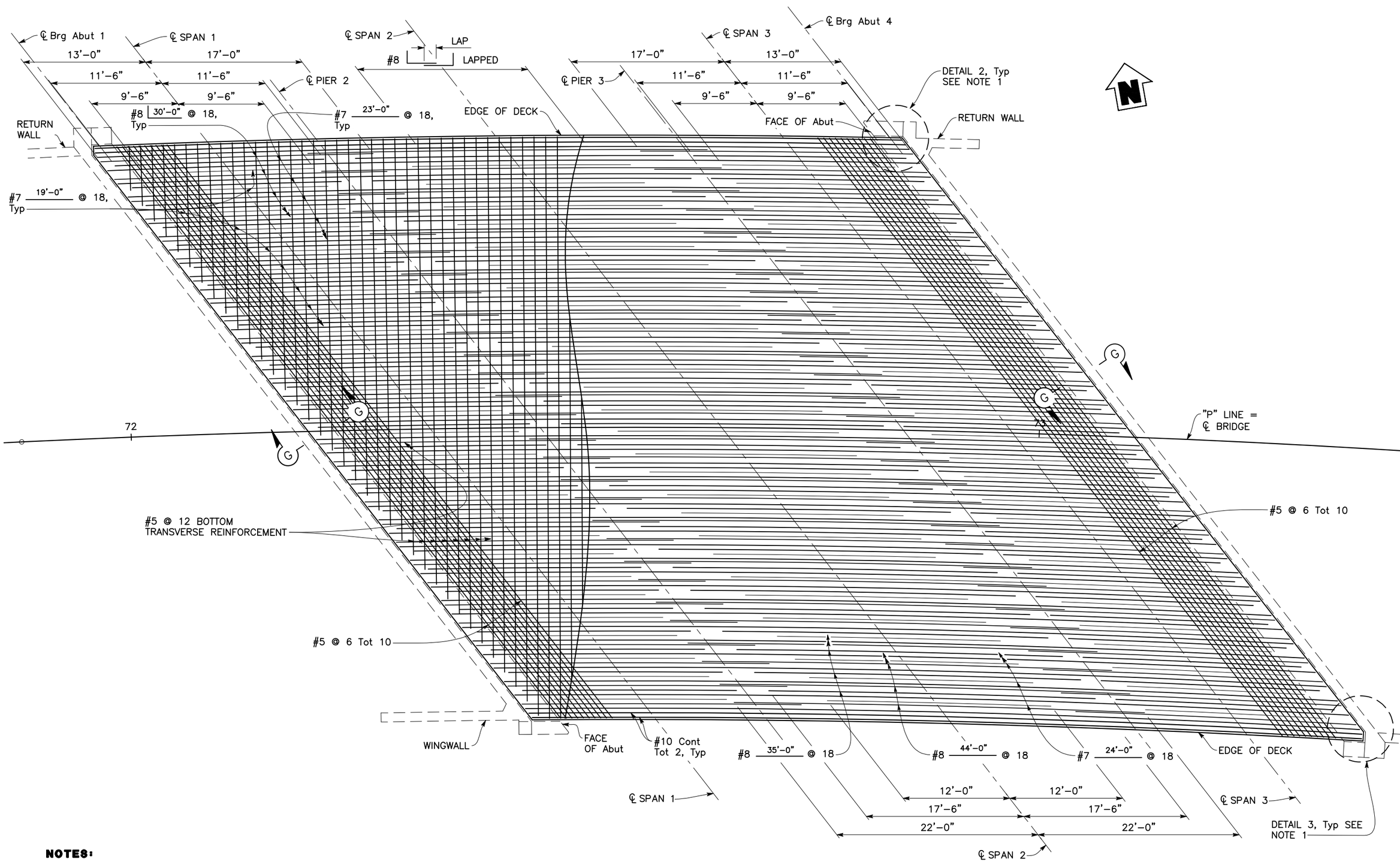
DRAWING INFO

DATE	10/03/2025
DRAFTER	E. CISNEROS
DESIGNER	K. KAWAKAMI
REVIEWER	R. RUIZ

PROJECT NO.
CIP # 41410
SHEET NO. S19 OF S35

PROGRESS PLANS SUBMITTAL, NOT FOR CONSTRUCTION

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FACE OF CONCRETE BARRIER



NOTES:

1. For "SECTION G–G", "DETAIL 2" and "DETAIL 3", see "SLAB DETAILS No. 3" sheet.

BOTTOM SLAB REINFORCEMENT

1" = 5'

ST-20

NO.	REVISION DESCRIPTION	CHECKED BY	DATE

DRAWING SCALE
HOR. SCALE: AS SHOWN
VERT. SCALE: AS SHOWN

CITY OF PLACERVILLE

Dewberry
11080 WHITE ROCK ROAD SUITE 200
RANCHO CORDOVA, CA 95670

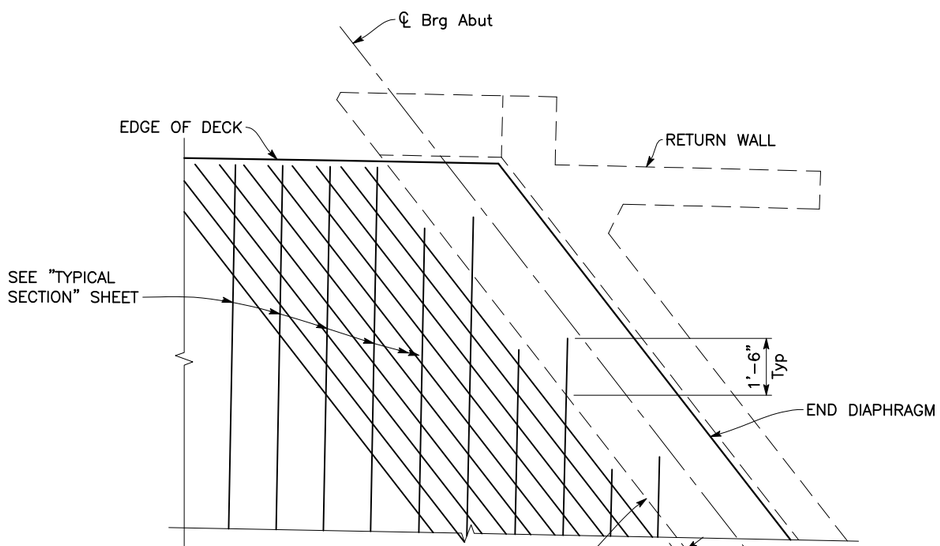
IMPROVEMENT PLANS FOR:
PLACERVILLE DRIVE BRIDGE REPLACEMENT
SLAB DETAILS NO. 2
CITY OF PLACERVILLE CALIFORNIA

DRAWING INFO
DATE: 10/3/2025
DRAFTER: E. CISNEROS
DESIGNER: K. KAWAMOTO
REVIEWER: T. NG

PROJECT NO.
CIP # 41410
SHEET NO. S20 OF S35

PROGRESS PLANS SUBMITTAL, NOT FOR CONSTRUCTION

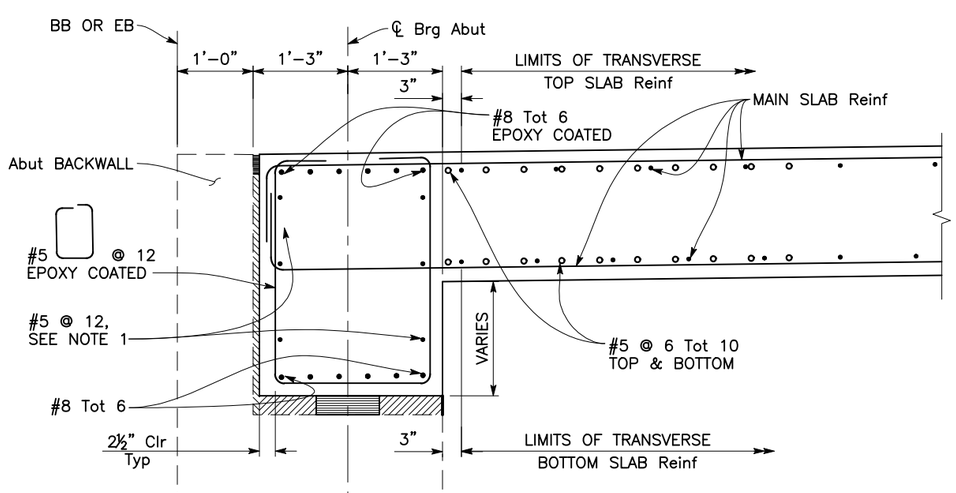
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TYPICAL ACUTE CORNER

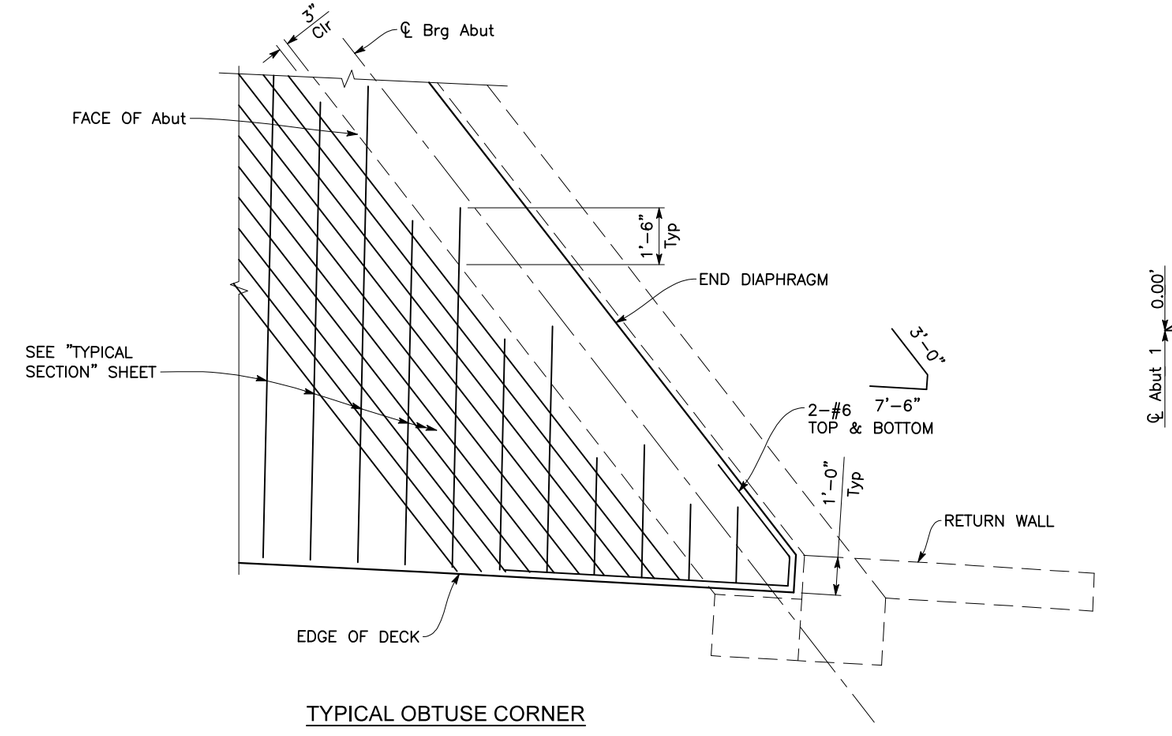
DETAIL 2

½" = 1'–0"



SECTION G-G

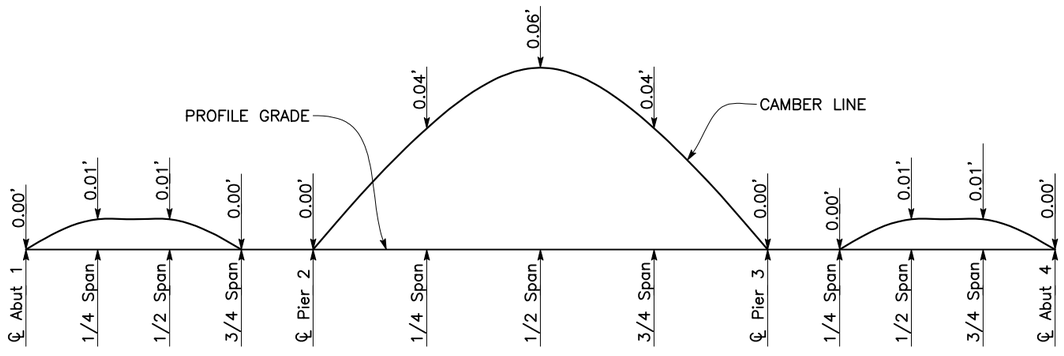
1" = 1'–0"



TYPICAL OBTUSE CORNER

DETAIL 3

½" = 1'–0"



CAMBER DIAGRAM

No Scale

NOTE:
CAMBER DIAGRAM DOES NOT INCLUDE ALLOWANCES FOR FALSEWORK SETTLEMENT

NOTES:

1. Reinforcement within 1 ft of the top of deck must be epoxy coated. All epoxy coated reinforcement must be post–fabricated.

ST-21

NO.	REVISION DESCRIPTION	CHECKED BY	DATE

DRAWING SCALE
HOR. SCALE: AS SHOWN
VERT. SCALE: AS SHOWN

Dewberry
11060 WHITE ROCK ROAD SUITE 200
RANCHO CORDOVA, CA 95670

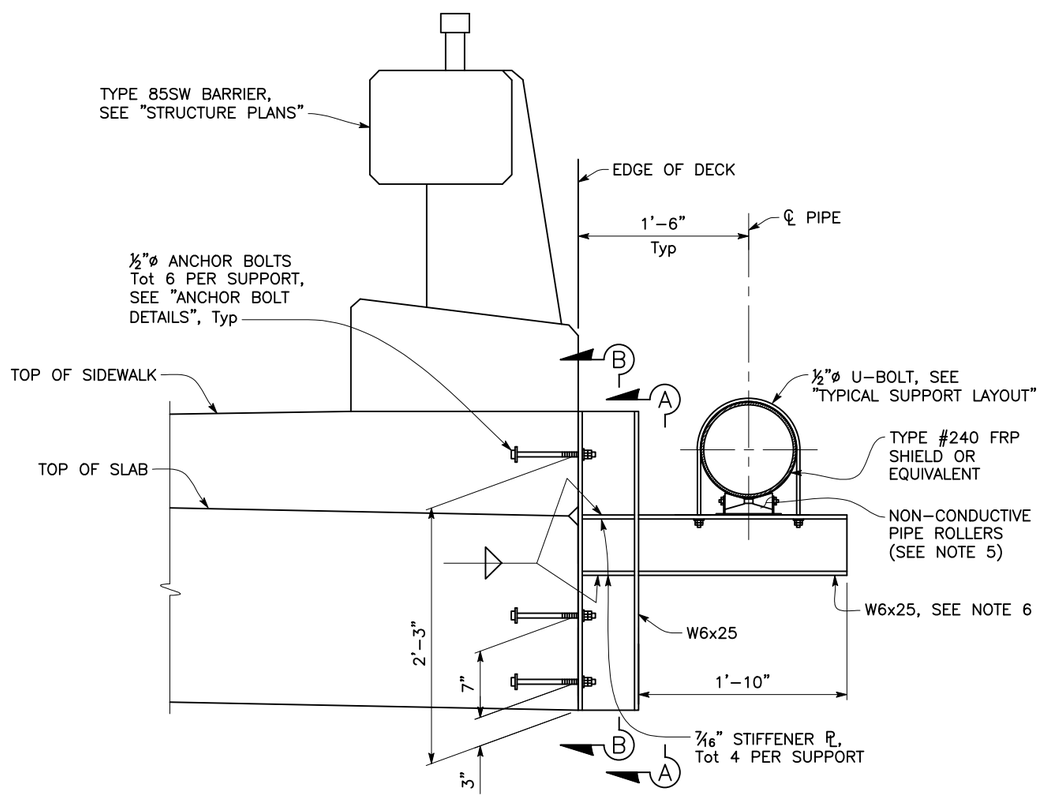
IMPROVEMENT PLANS FOR:
PLACERVILLE DRIVE BRIDGE REPLACEMENT
SLAB DETAILS NO. 3
CITY OF PLACERVILLE CALIFORNIA

DRAWING INFO
DATE: 10/03/2025
DRAFTER: E. CISNEROS
DESIGNER: K. KAWAKAMI
REVIEWER: R. ANG

PROJECT NO.
CIP # 41410
SHEET NO. S21 OF S35

PROGRESS PLANS SUBMITTAL, NOT FOR CONSTRUCTION

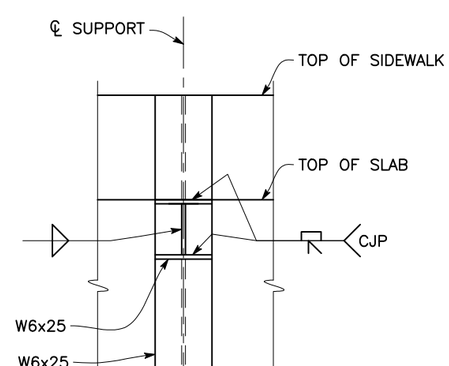
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PIPE SUPPORT (WATER SUPPLY LINE)

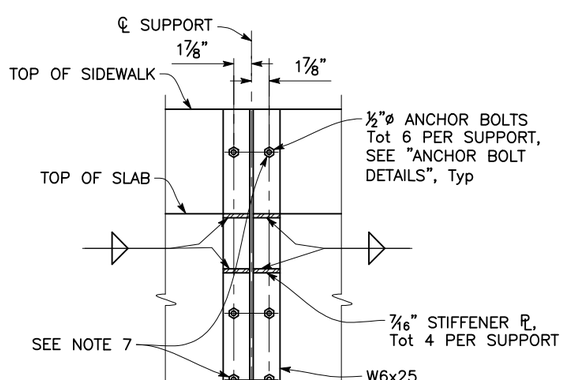
1 1/2" = 1'–0"

CONNECTION SHOWN AT BRIDGE. CONNECTIONS AT WINGWALL, RETURN WALL AND RETAINING WALLS SIMILAR.



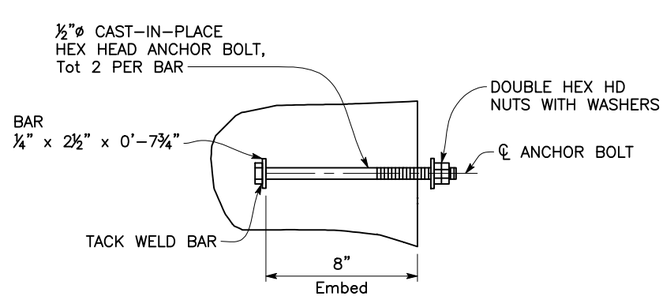
SECTION A-A

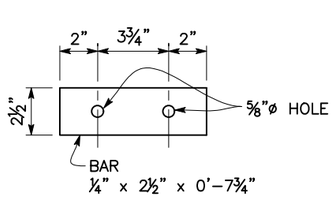
1 1/2" = 1'–0"



SECTION B-B

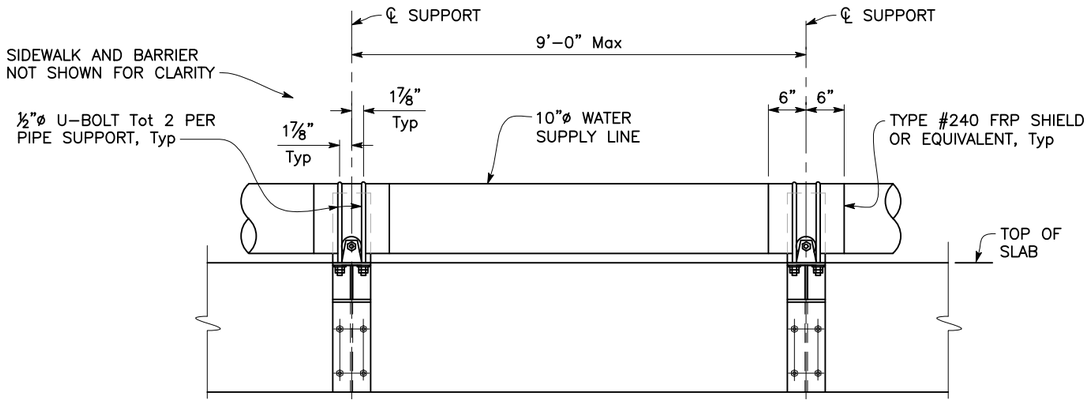
1 1/2" = 1'–0"





ANCHOR BOLT DETAILS

3" = 1'–0"



TYPICAL SUPPORT LAYOUT

1" = 1'–0"

NOTES:

1. Structural Steel Members:
   W–shape ASTM A992
   Plate & Stiffeners ASTM A36, Gr36.
2. Steel Fasteners:
   Anchor Bolts ASTM F1554 Gr36
   U–Bolts TBD
3. All steel shapes, plates, bolts, nuts and washers to be hot dipped galvanized. All field welds and damaged surfaces shall be cleaned and treated with 2 applications of zinc–rich primer.
4. Where dissimilar metals such as galvanized steel and ductile iron are to be placed against each other, provide type #240 FRP Shield or equivalent to prevent corrosion.
5. Non–conductive Pipe rollers shall be LB&A or equivalent. Roller selected should allow for vertical adjustment for in–field installation. Roller may be bolted or welded to W shape per manufacturer specifications.
6. Horizontal water supply line supports to be installed level.
7. All holes in wide flange members for cast–in–place anchor rods shall be oversized.

ST-22

NO.	REVISION DESCRIPTION	CHECKED BY	DATE

DRAWING SCALE
HOR. SCALE: AS SHOWN
VERT. SCALE: AS SHOWN

Dewberry
11060 WHITE ROCK ROAD SUITE 200
RANCHO CORDOVA, CA 95670

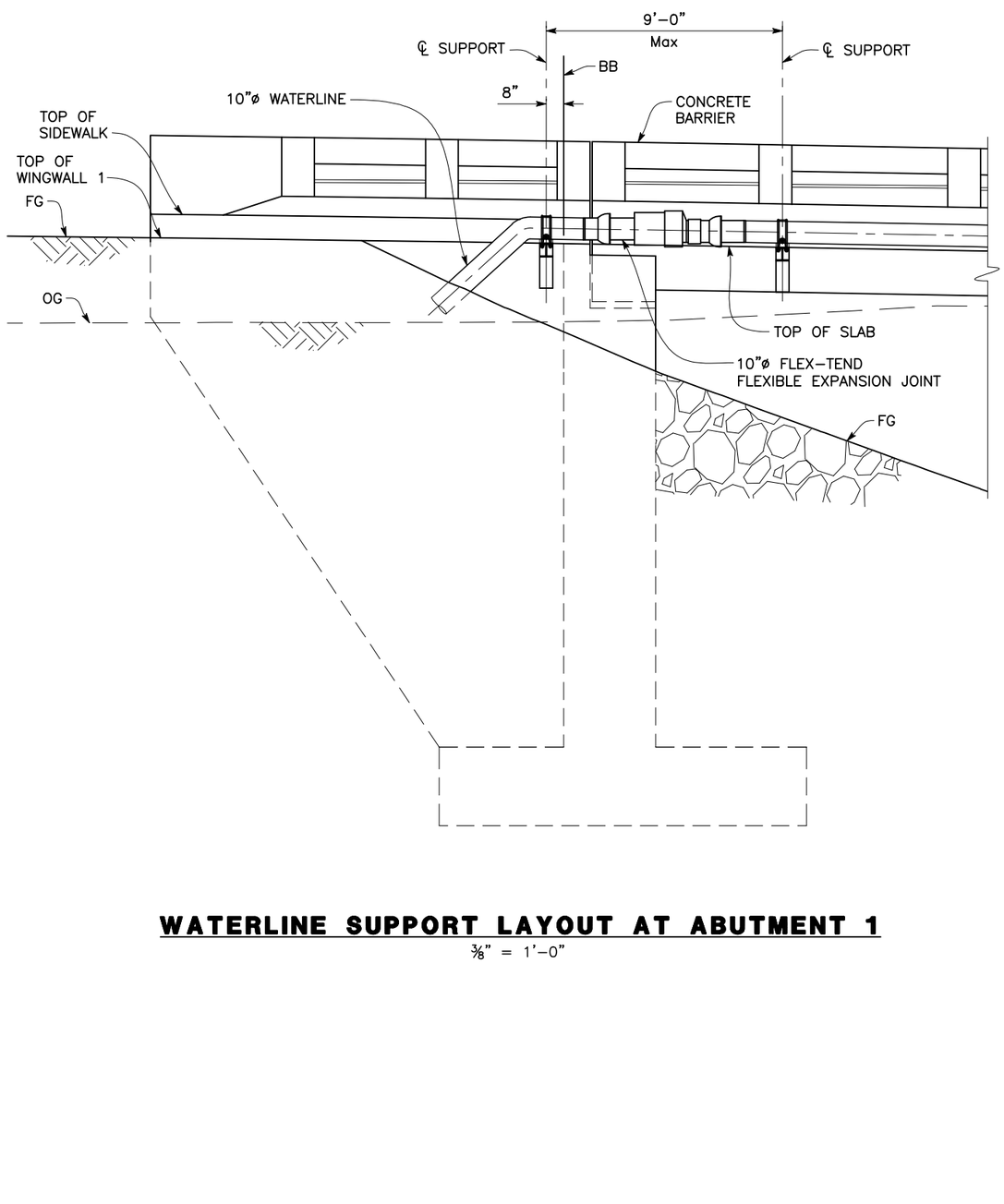
IMPROVEMENT PLANS FOR:
PLACERVILLE DRIVE BRIDGE REPLACEMENT
WATERLINE SUPPORT DETAILS NO. 1
CITY OF PLACERVILLE
CALIFORNIA

DRAWING INFO
DATE: 10/3/2025
DRAFTER: E. CISTERNAS
DESIGNER: K. KAWAKAMI
REVIEWER: R. RAZO

PROJECT NO.
CIP # 41410
SHEET NO. S22 OF S35

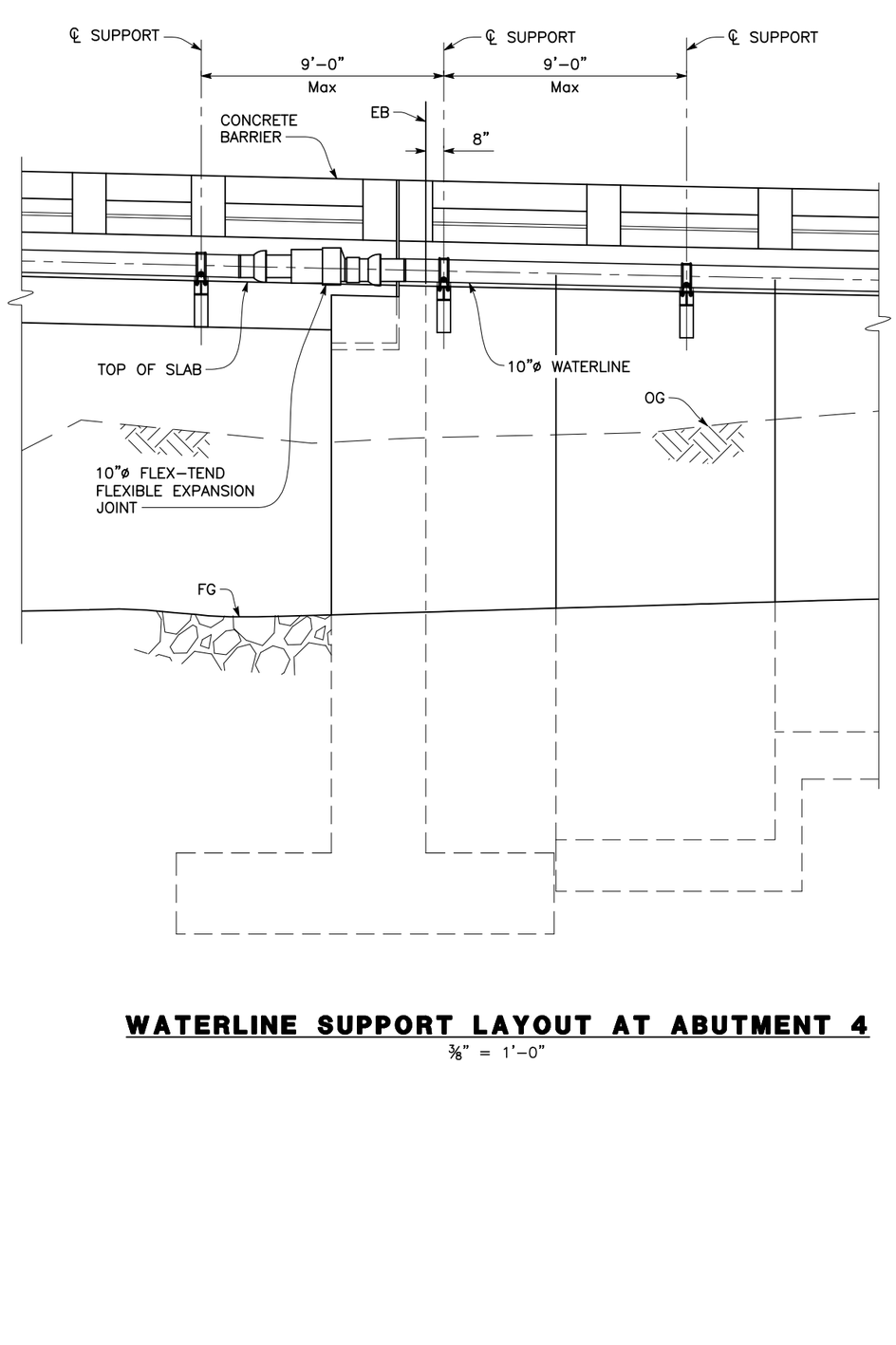
PROGRESS PLANS SUBMITTAL, NOT FOR CONSTRUCTION

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WATERLINE SUPPORT LAYOUT AT ABUTMENT 1

3/8" = 1'–0"



WATERLINE SUPPORT LAYOUT AT ABUTMENT 4

3/8" = 1'–0"

NO.	REVISION DESCRIPTION	CHECKED BY	DATE

DRAWING SCALE
HOR. SCALE: AS SHOWN
VERT. SCALE: AS SHOWN

Dewberry
11060 WHITE ROCK ROAD SUITE 200
RANCHO CORDOVA, CA 95670

IMPROVEMENT PLANS FOR:
PLACERVILLE DRIVE BRIDGE REPLACEMENT

WATERLINE SUPPORT DETAILS NO. 2
CITY OF PLACERVILLE CALIFORNIA

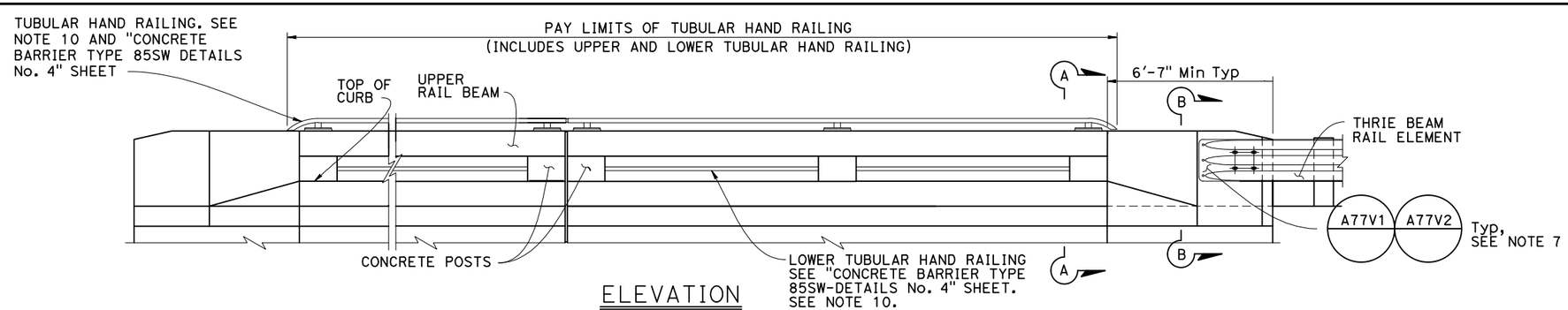
DRAWING INFO
DATE: 10/03/2025
DRAFTER: E. CISNEROS
DESIGNER: K. KAWAKAMI
REVIEWER: R. RUIZ

PROJECT NO.
CIP # 41410
SHEET NO. S23 OF S35

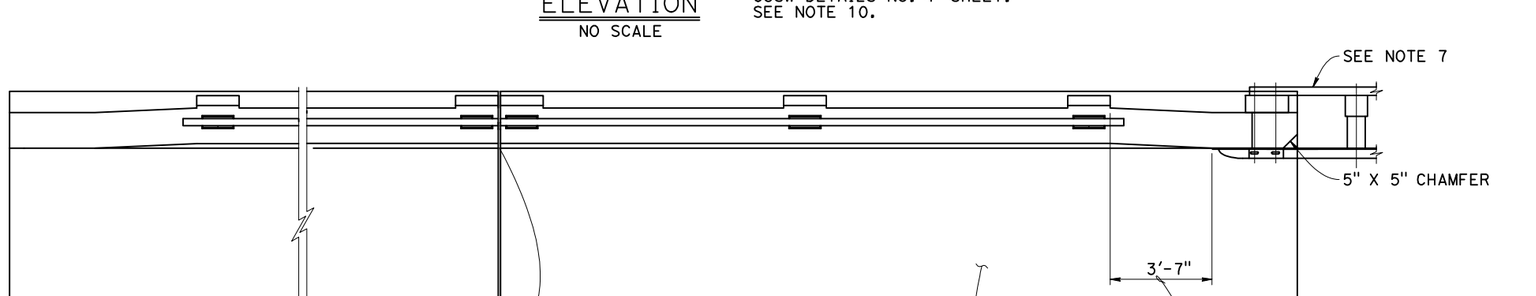
ST-23

PROGRESS PLANS SUBMITTAL, NOT FOR CONSTRUCTION

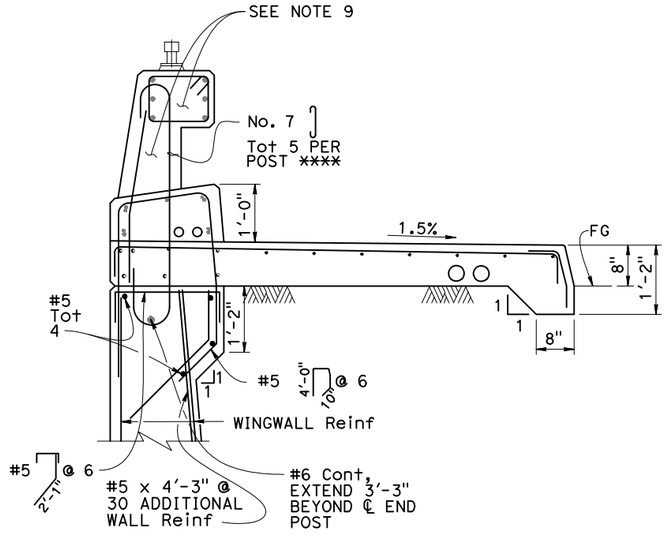
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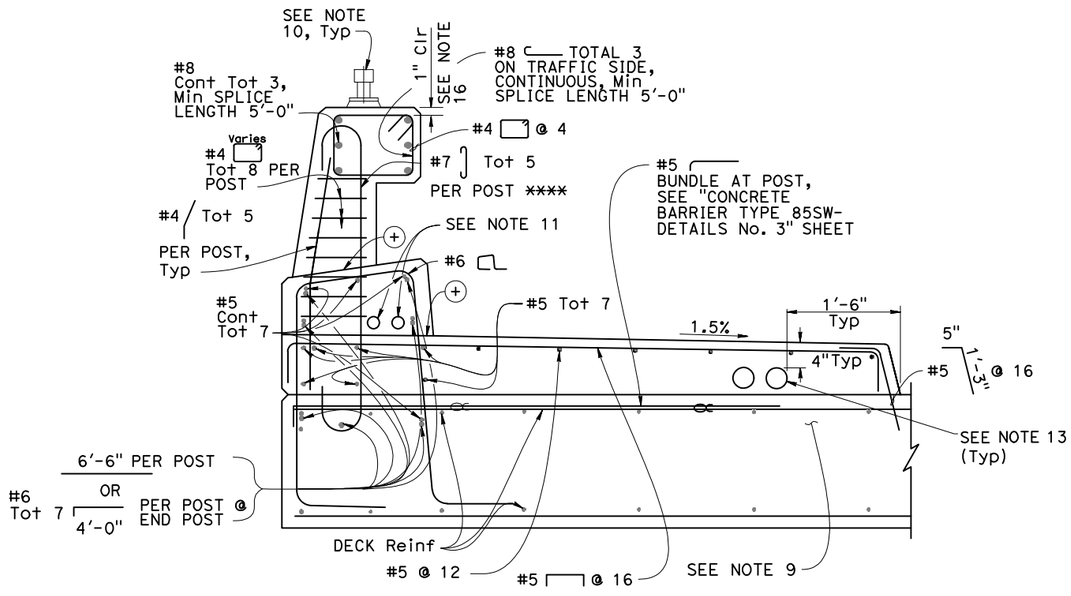
ELEVATION
NO SCALE



PLAN
NO SCALE



TYPE 85SWA
NO SCALE



TYPE 85SW ①
NO SCALE
⊕ OPTIONAL CONSTRUCTION JOINT

*** #5 BUNDLE AT POST TO EXTEND 2'-0" BEYOND BRIDGE DECK OVERHANG

**** #7 AT POST TO EXTEND 6" Min BELOW TOP OF BRIDGE DECK OR TOP OF WALL

① REVISED DETAIL

NOTES:

1. This barrier is to be used only for posted speeds of 45 MPH or less.
2. Walls are to be backfilled before the barrier is placed.
3. Longitudinal reinforcing steel to stop at all expansion joints.
4. The front face dimensions are to be constant above the finish roadway profile, but the overall height will vary with certain thicknesses of surfacing and roadway cross slopes.
5. Expansion joint to match deck joint.
6. Splicing in longitudinal rail reinforcing must be staggered.
7. For typical metal railing connection details not shown, see Standard Plans A77V1 and A77V2.
8. Chain link railing is not allowed on Type 85 Barriers.
9. For additional reinforcement details, see "CONCRETE BARRIER TYPE 85SW DETAILS No. 2" and "CONCRETE BARRIER TYPE 85SW DETAILS No. 3" sheets.
10. Upper tubular hand railing to extend to where level bench elevation along exterior face of wing wall is within 1'–0" of roadway shoulder FG.
11. The maximum number of conduits is limited to two 1 " Dia and must be placed in front half of the lower beam/curb.
12. For reinforcement not shown, see other details.
13. A minimum of two 4" round openings for future utilities and a maximum of six 4" round openings for a 6'–2" sidewalk. One 4" round opening can be added for each additional 1'–0" of sidewalk width. Utility opening must be a minimum of 6" from face of barrier parapet. Openings are to be sealed at ends and extended 8" minimum past end of sidewalk if not used. Duct forms are to be tied down. For exact number and placement of utility openings see other details. Minimum 2" clear betweew conduits.
14. For dimensions not shown, see "CONCRETE BARRIER TYPE 85SW DETAILS No. 2 and "CONCRETE BARRIER TYPE 85SW DETAILS No. 3 sheets.
15. For sections A–A and B–B, see "CONCRETE BARRIER TYPE 85SW DETAILS No. 2" sheet.
16. 1" clearance, typical for bridge rail except for 2" clearance at traffic face and back side of lower beam (curb).
17. For waterline support details not shown, see "WATERLINE SUPPORT DETAILS" sheet.

NO	REVISION DESCRIPTION	CHECKED BY	DATE

DRAWING SCALE
HOR. SCALE: AS SHOWN
VERT. SCALE: AS SHOWN

Dewberry
11060 WHITE ROCK ROAD SUITE 200
RANCHO CORDOVA, CA 95670

IMPROVEMENT PLANS FOR:
PLACERVILLE DRIVE BRIDGE REPLACEMENT

CONCRETE BARRIER TYPE 85SW - DETAILS NO. 1
CITY OF PLACERVILLE CALIFORNIA

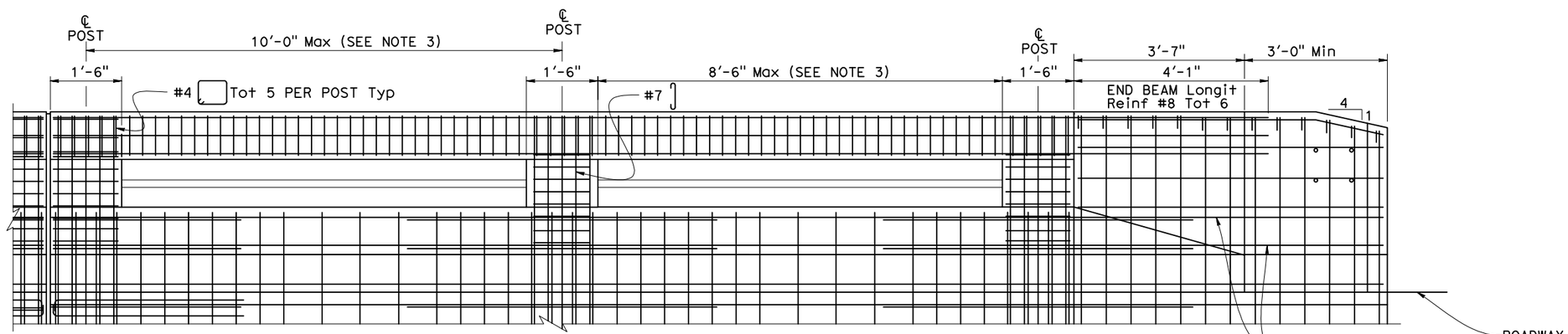
DRAWING INFO
DATE: 10/03/2025
DRAFTER: E. CONTRERAS
DESIGNER: K. KAMMANN
REVIEWER: R. RAZE

PROJECT NO.
CIP # 41410
SHEET NO. S24 OF S35

ST-24

PROGRESS PLANS SUBMITTAL, NOT FOR CONSTRUCTION

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LONGITUDINAL SECTION

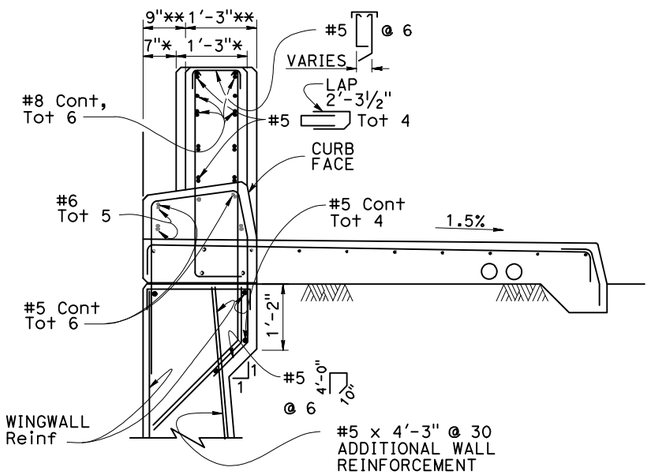
NO SCALE

Notes:

1. Deck or wingwall reinforcing not shown.
2. Upper Tubular Hand Railing not shown for clarity.

NOTES:

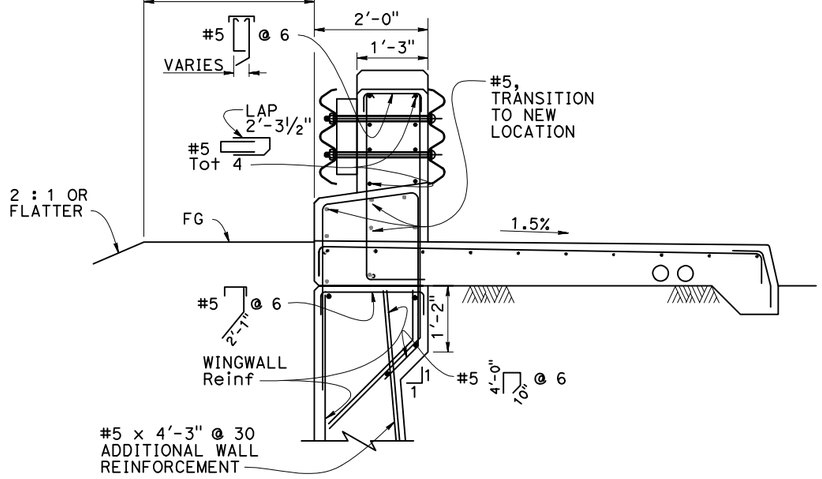
1. For Sections A–A and B–B, see "CONCRETE TYPE 85SW DETAILS No. 1" sheet.
2. Expansion joint to match deck joint.
3. Posts to be spaced equally, typically 10'–0" spacing. Post spacing may be reduced where location of expansion joints or the length of wingwalls will not accommodatethe 10'–0" spacing. Maximum see–through availability is to be strived for, where 10'–0" post spacing cannot be achieved.
4. For reinforcement not shown, see other details.
5. For locations of Section A–A and B–B, see "CONCRETE BARRIER TYPE 85SW DETAILS No. 1" sheet.
6. For waterline support details not shown, see "WATERLINE SUPPORT DETAILS" sheet.



SECTION A-A

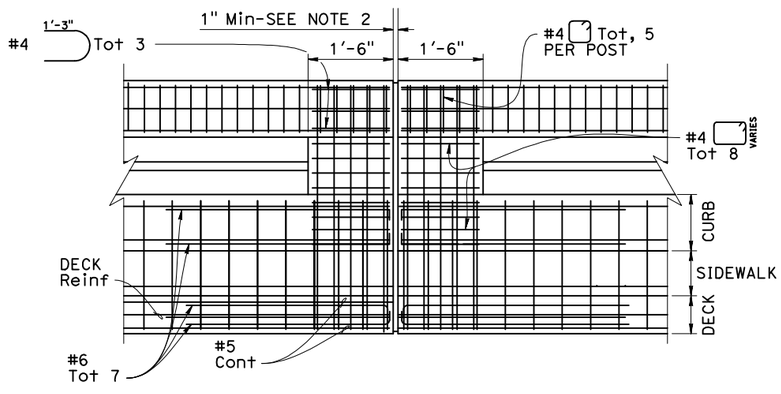
1" = 1'-0"

* BEGIN BARRIER TRANSITION
** END BARRIER TRANSITION



SECTION B-B

1" = 1'-0"



EXPANSION JOINT DETAIL

NO SCALE
SEE NOTE 4

Note: Upper Hand railing not shown for clarity.

ST-25

NO.	REVISION DESCRIPTION	CHECKED BY	DATE

DRAWING SCALE
HOR. SCALE: AS SHOWN
VERT. SCALE: AS SHOWN

Dewberry
1060 WHITE ROCK ROAD SUITE 200
RANCHO CORDOVA, CA 95670

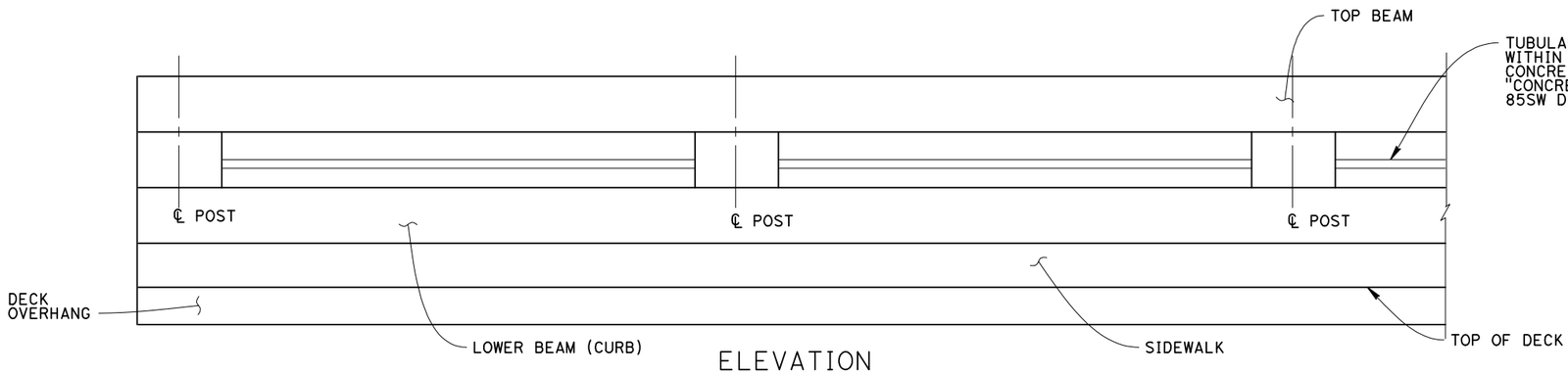
IMPROVEMENT PLANS FOR:
PLACERVILLE DRIVE BRIDGE REPLACEMENT
CONCRETE BARRIER TYPE 85SW - DETAILS NO. 2
CITY OF PLACERVILLE CALIFORNIA

DRAWING INFO
DATE: 10/02/2025
DRAFTER: E. CASTANEDA
DESIGNER: K. KAUWAKAI
REVIEWER: R. RUIZ

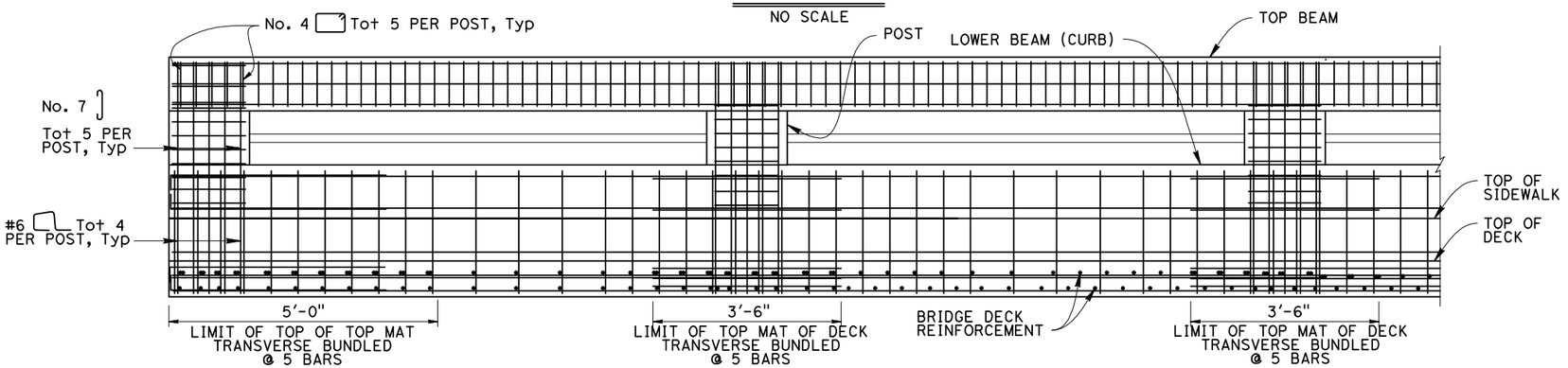
PROJECT NO.
CIP # 41410
SHEET NO. S25 OF S35

PROGRESS PLANS SUBMITTAL, NOT FOR CONSTRUCTION

U:\18028 – Placerville Dr. Bicycle–Ped and Br. Repl – CI Placerville\18028B Bridge Replacement\400 Project Design Files\430 Bridges & Structures\Plans\s16–118–2.dwg Oct 03, 2025 – 1:15pm, eclemeros

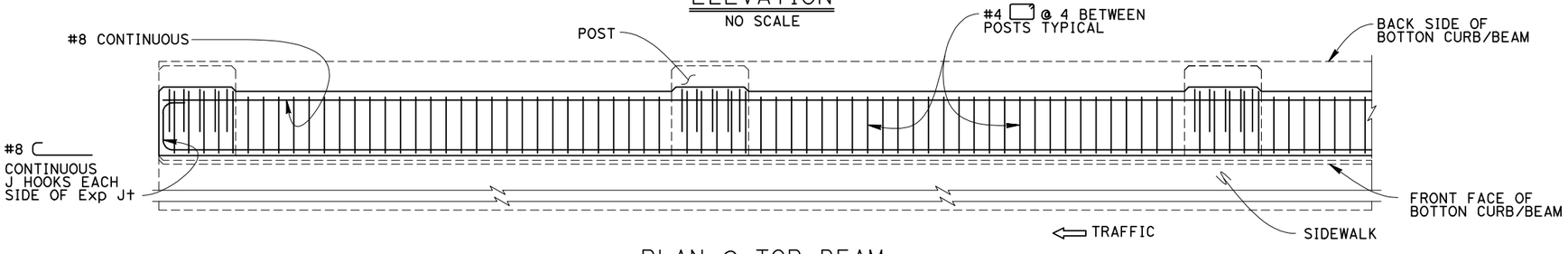


ELEVATION
NO SCALE

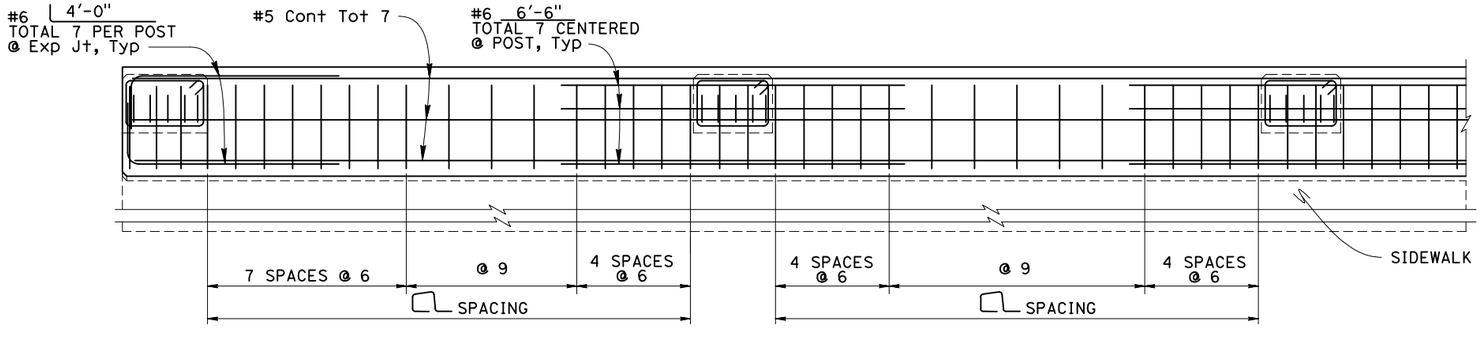


Note: Upper Hand railing not shown for clarity.

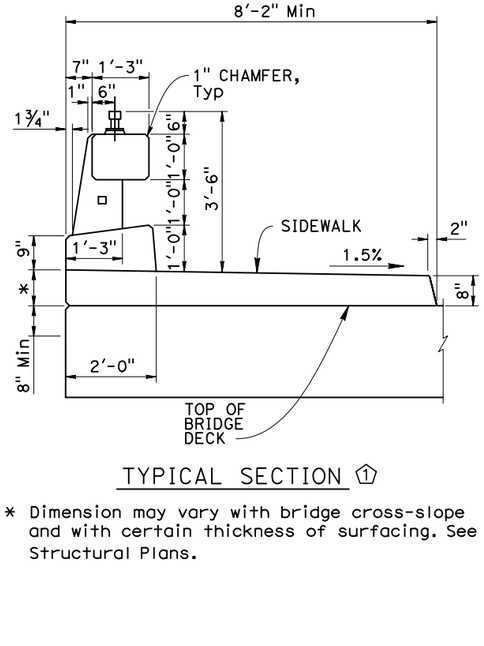
ELEVATION
NO SCALE



PLAN @ TOP BEAM
NO SCALE



PLAN @ LOWER BEAM (CURB)
NO SCALE



TYPICAL SECTION ①

* Dimension may vary with bridge cross-slope and with certain thickness of surfacing. See Structural Plans.

NOTES:

1. For waterline support details not shown, see "WATERLINE SUPPORT DETAILS" sheet.

① REVISED DETAIL

ST-26

NO	REVISION DESCRIPTION	CHECKED BY	DATE

DRAWING SCALE
HOR. SCALE: AS SHOWN
VERT. SCALE: AS SHOWN

Dewberry
11060 WHITE ROCK ROAD SUITE 200
RANCHO CORDOVA, CA 95670

IMPROVEMENT PLANS FOR:
PLACERVILLE DRIVE BRIDGE REPLACEMENT

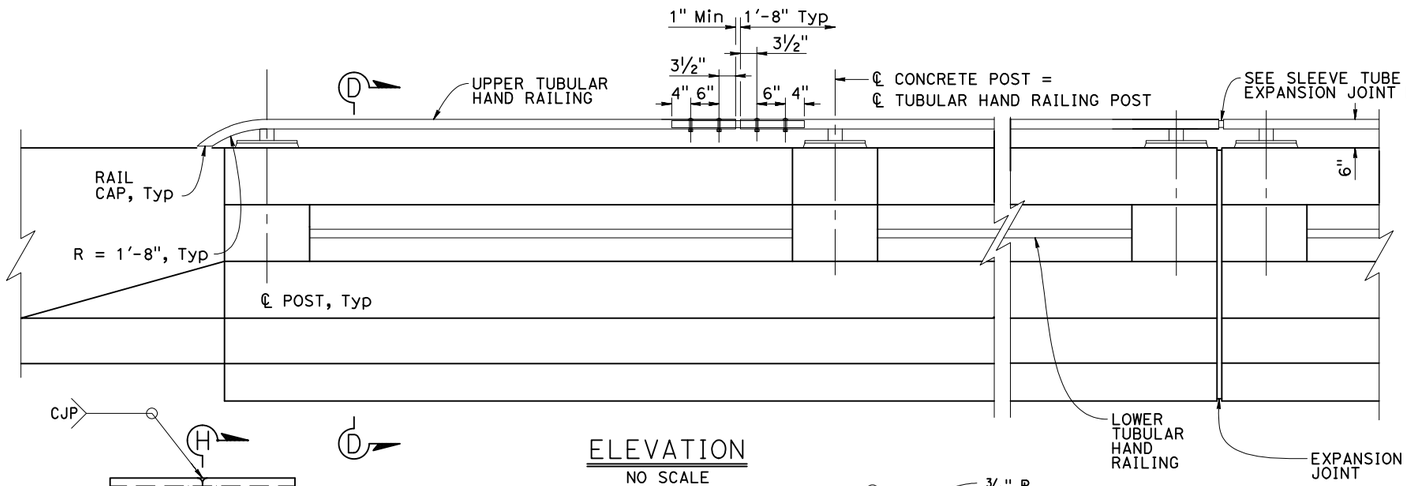
CONCRETE BARRIER TYPE 85SW - DETAILS NO. 3
CITY OF PLACERVILLE
CALIFORNIA

DRAWING INFO
DATE: 10/03/2025
DRAFTER: E. CISTERNAS
DESIGNER: K. KAWAKAMI
REVIEWER: R. RUIZ

PROJECT NO.
CIP # 41410
SHEET NO. S26 OF S35

PROGRESS PLANS SUBMITTAL, NOT FOR CONSTRUCTION

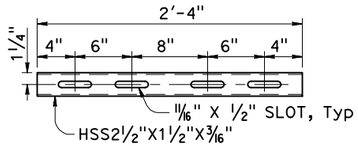
U:\18028 - Placerville Dr. Bicycle-Ped and Br. Repl - Ci Placerville\18028 Bridge Replacement\400 Project Design Files\430 Bridges & Structures\Plans\sa18-118-3.dwg Oct 03, 2025 - 1:15pm, eclemeros



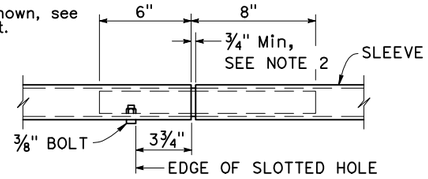
ELEVATION
NO SCALE

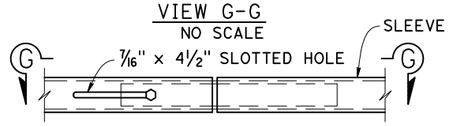
NOTES:

1. Tubular railing posts shall be normal to railing.
2. Tube splices shall be located in the tubes spanning deck or wall joints. Increase joint width in tubes to match expansion joint width and increase sleeve length accordingly.
3. Top rail tube shall be continuous over not less than two posts.
4. For waterline support details not shown, see "WATERLINE SUPPORT DETAILS" sheet.



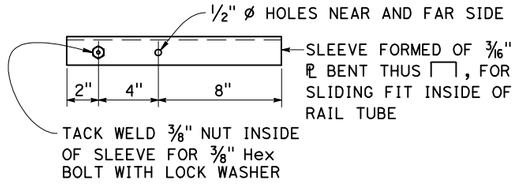
STANDARD SLEEVES DETAILS
NO SCALE



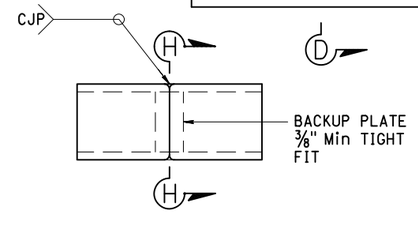


VIEW G-G
NO SCALE

VIEW F-F
NO SCALE

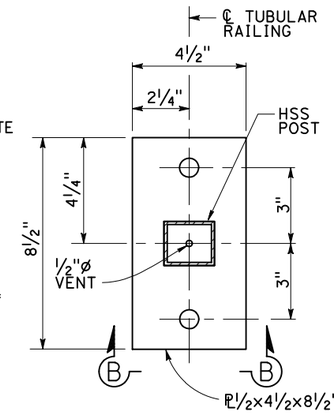


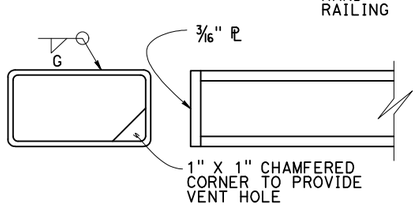
SLEEVE TUBE SPLICE AT EXPANSION JOINT DETAIL
NO SCALE

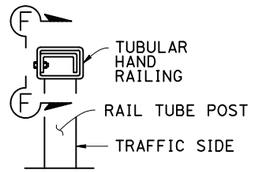


SECTION H-H

ALTERNATIVE TUBE WELDED STANDARD SPLICE
FOR SPLICES NOT AT EXPANSION JOINTS
NO SCALE

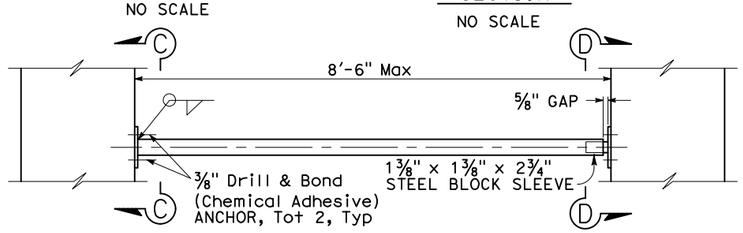




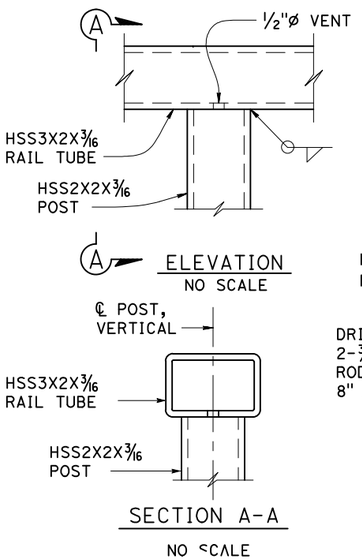


SECTION
NO SCALE

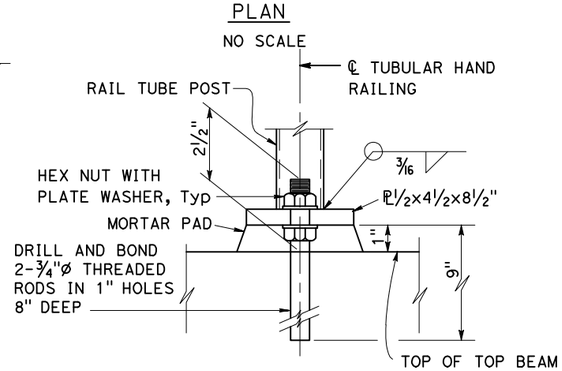
RAIL CAP
NO SCALE



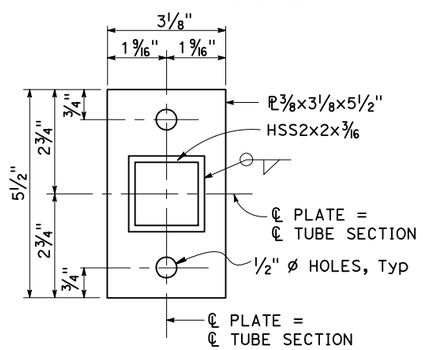
LOWER HAND RAIL DETAIL
NO SCALE



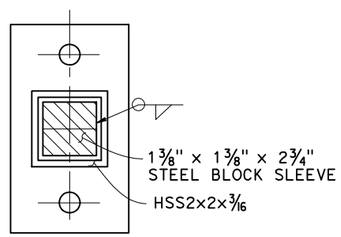
SECTION A-A
NO SCALE



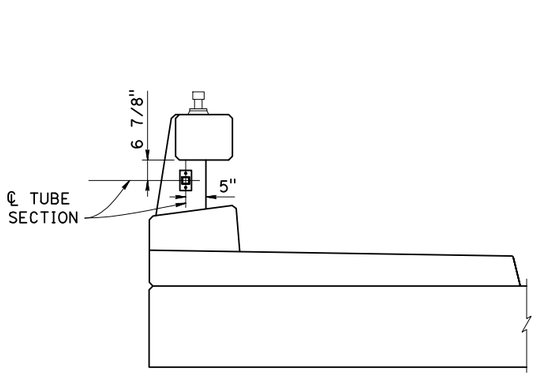
ELEVATION
SECTION B-B



SECTION C-C



SECTION D-D
See Section C-C for details not shown
NO SCALE



SECTION E-E ①
NO SCALE

TUBULAR HAND RAILING DETAILS
NO SCALE

① REVISED DETAIL

ST-27

NO	REVISION DESCRIPTION	CHECKED BY	DATE

DRAWING SCALE
HOR. SCALE: AS SHOWN
VERT. SCALE: AS SHOWN

Dewberry
11060 WHITE ROCK ROAD SUITE 200
RANCHO CORDOVA, CA 95670

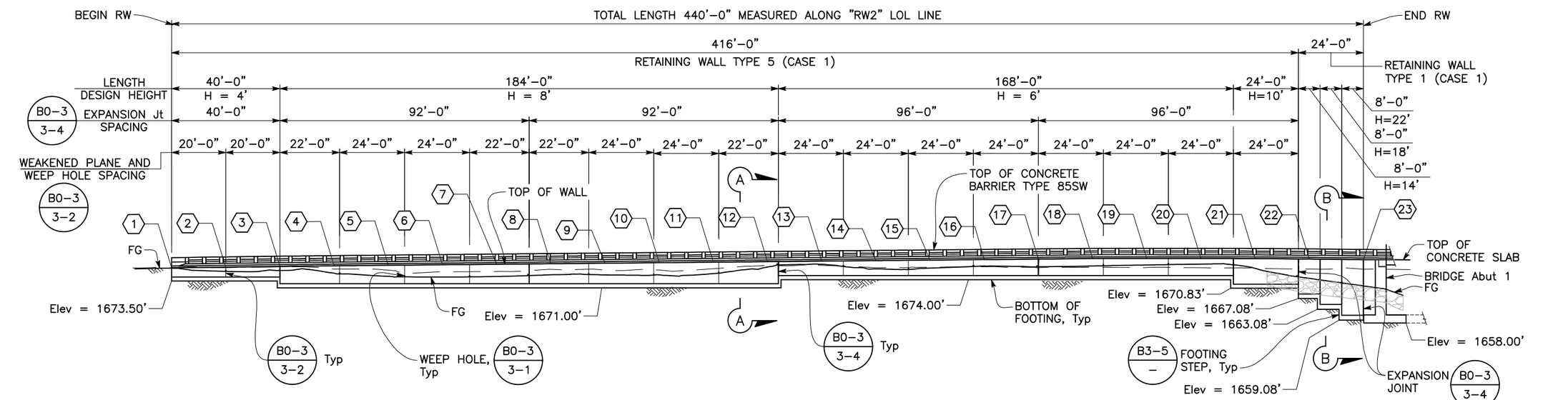
IMPROVEMENT PLANS FOR:
PLACERVILLE DRIVE BRIDGE REPLACEMENT
CONCRETE BARRIER TYPE 85SW - DETAILS NO. 4
CITY OF PLACERVILLE
CALIFORNIA

DRAWING INFO
DATE: 10/03/2025
DRAFTER: E. GONZALES
DESIGNER: K. KAWAMOTO
REVIEWER: R. RIDY

PROJECT NO.
CIP # 41410
SHEET NO. S27 OF S35

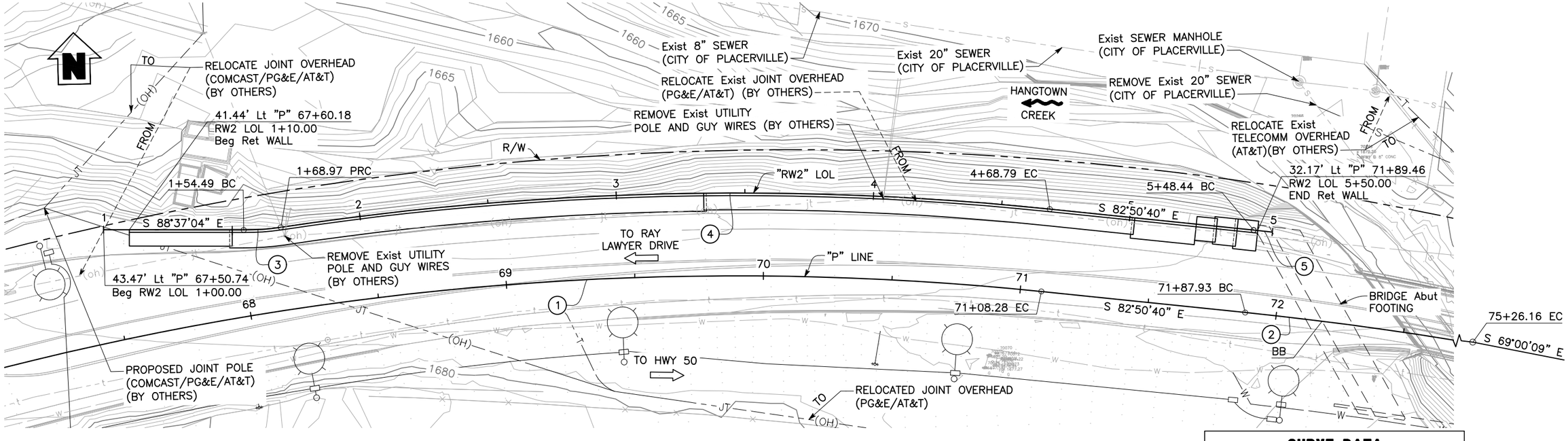
PROGRESS PLANS SUBMITTAL, NOT FOR CONSTRUCTION

U:\18028 - Placerville Dr. Bicycle-Ped and Br. Repl - CI Placerville\18028B Bridge Replacement\400 Project Design Files\430 Bridges & Structures\Plans\st16-118-4.dwg Oct 03, 2025 - 1:16pm, eclemeros



DEVELOPED MIRRORED ELEVATION

1" = 20'



PLAN A62B / – (1" = 20')

LEGEND:

- Indicates Direction of Water Flow
- Indicates New Structure
- Indicates Street Lighting, see Electrical Plans

CURVE DATA

No.	R	Δ	T	L
1	1156.14'	40°51'47"	430.69'	824.55'
2	1400.00'	13°50'32"	169.94'	338.23'
3	92.00'	9°00'58"	7.25'	14.48'
4	1188.31'	14°27'22"	150.71'	299.82'
5	1432.17'	0°17'30"	3.64'	7.29'

NOTES:

1. For "SECTION A–A" and "SECTION B–B", see "RETAINING WALL 2–GENERAL PLAN No. 2" sheet.
2. For Wall Elevations, see Wall Profile Table on "RETAINING WALL 2–GENERAL PLAN No. 2" sheet.

NO. REVISION DESCRIPTION | CHECKED BY | DATE

DRAWING SCALE
HOR. SCALE: AS SHOWN
VERT. SCALE: AS SHOWN

Dewberry
11060 WHITE ROCK ROAD SUITE 200
RANCHO CORDOVA, CA 95670

IMPROVEMENT PLANS FOR:
PLACERVILLE DRIVE BRIDGE REPLACEMENT
RETAINING WALL 2 - GENERAL PLAN NO. 1
CITY OF PLACERVILLE
CALIFORNIA

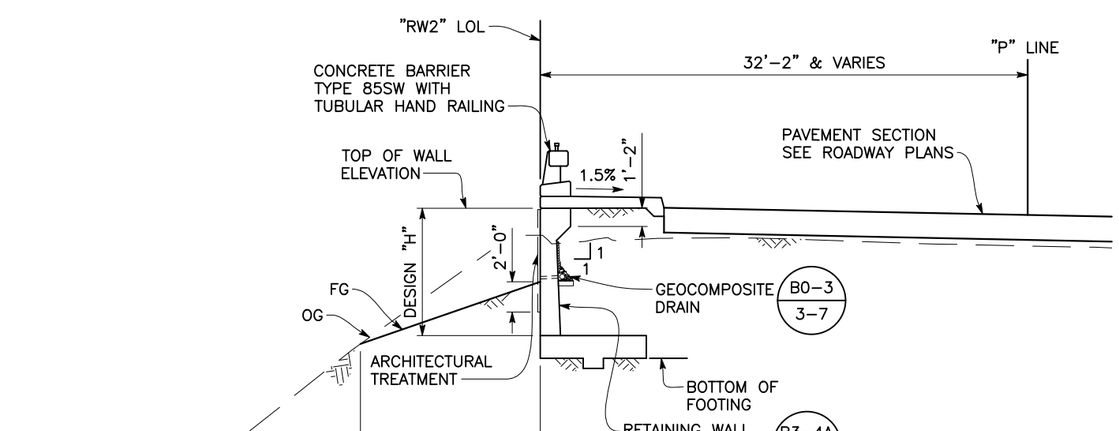
DRAWING INFO
DATE: 10/03/2025
DRAFTER: E. CISNEROS
DESIGNER: K. KAWAKAMI
REVIEWER: R. NAIK

PROJECT NO. CIP # 41410
SHEET NO. S28 OF S35

ST-28

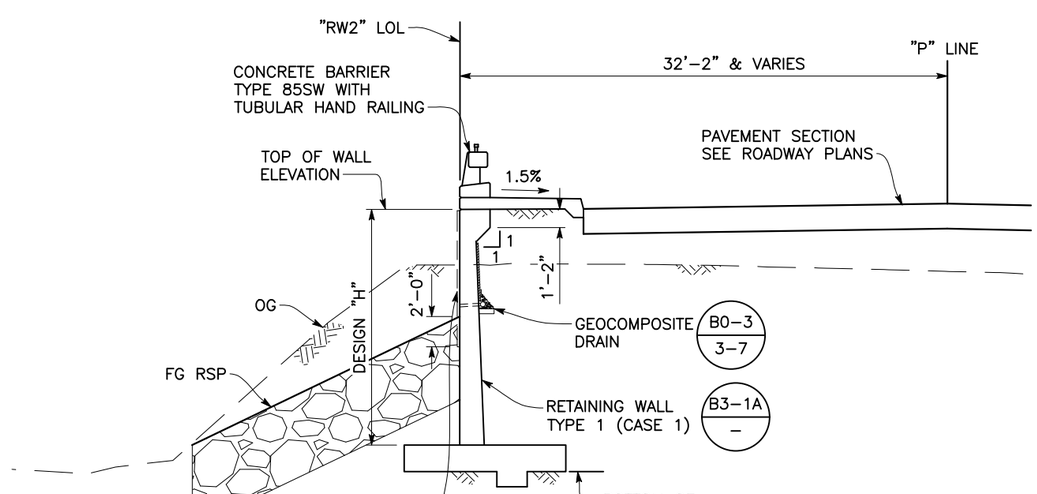
PROGRESS PLANS SUBMITTAL, NOT FOR CONSTRUCTION

U:\18028 – Placerville Dr. Bicycle–Ped and Br. Repl – CI Placerville\18028 Bridge Replacement\400 Project Design Files\430 Bridges & Structures\Plans\PD–S–RW2–GP.dwg Oct 03, 2025 – 1:19pm, eciseros



SECTION A-A

1" = 5'



SECTION B-B

1" = 5'

WALL PROFILE TABLE		
LOCATION	"RW2" LOL STATION	TOP OF WALL Elev (ft) SEE NOTE 2
1	01+10.00	1678.40
2	01+30.00	1678.66
3	01+50.00	1678.91
4	01+70.00	1679.14
5	01+90.00	1679.33
6	02+10.00	1679.52
7	02+30.00	1679.71
8	02+50.00	1679.91
9	02+70.00	1680.10
10	02+90.00	1680.29
11	03+10.00	1680.48

WALL PROFILE TABLE		
LOCATION	"RW2" LOL STATION	TOP OF WALL Elev (ft) SEE NOTE 2
12	03+30.00	1680.67
13	03+50.00	1680.86
14	03+70.00	1681.06
15	03+90.00	1681.25
16	04+10.00	1681.44
17	04+30.00	1681.63
18	04+50.00	1681.82
19	04+70.00	1681.84
20	04+90.00	1681.84
21	05+10.00	1681.78
22	05+30.00	1681.64
23	05+50.00	1681.42

NOTES:

1. For reinforcement and details not shown see "Retaining Wall Type 5 (Case 1) B3-4A / – and "Retaining Wall Type 1 (Case 1) B3-1A / – .
2. Top of wall elevations vary linearly between points identified.

NO.	REVISION DESCRIPTION	CHECKED BY	DATE

DRAWING SCALE
HOR. SCALE: AS SHOWN
VERT. SCALE: AS SHOWN

Dewberry
11060 WHITE ROCK ROAD SUITE 200
RANCHO CORDOVA, CA 95670

IMPROVEMENT PLANS FOR:
PLACERVILLE DRIVE BRIDGE REPLACEMENT

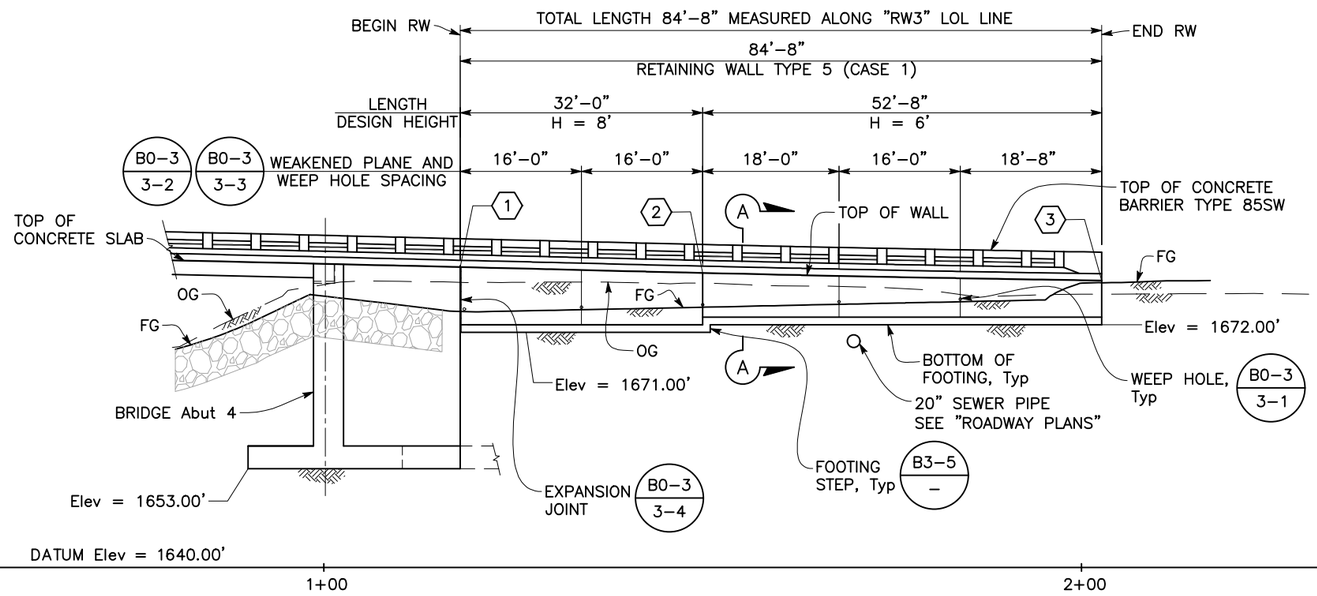
RETAINING WALL 2 - GENERAL PLAN NO. 2
CITY OF PLACERVILLE
CALIFORNIA

DRAWING INFO
DATE: 10/3/2025
DRAFTER: E. CISNEROS
DESIGNER: K. KAWAGOE
REVIEWER: R. ANG

PROJECT NO.
CIP # 41410
SHEET NO. S29 OF S35

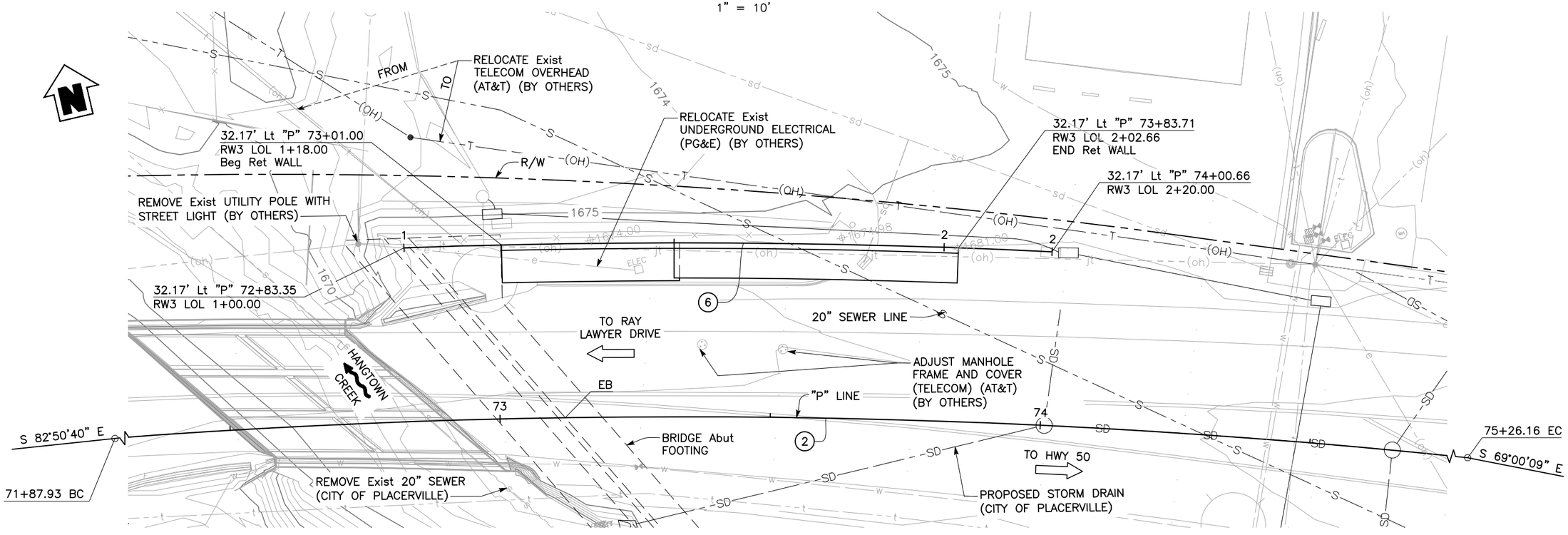
PROGRESS PLANS SUBMITTAL, NOT FOR CONSTRUCTION

U:\18028 - Placerville Dr. Bicycle-Ped and Br. Repl - CI Placerville\180288 Bridge Replacement\400 Project Design Files\430 Bridges & Structures\Plans\PD-S-RW2-GP.dwg Oct 03, 2025 - 1:19pm, eclineros



DEVELOPED MIRRORED ELEVATION

1" = 10'



PLAN A62B
1" = 10'

CURVE DATA				
No.	R	Δ	T	L
(2)	1400.00'	13°50'32"	169.94'	338.23'
(6)	1432.17'	4°48'03"	60.04'	120.00'

NOTES:

1. For "SECTION A–A", see "RETAINING WALL 3–GENERAL PLAN No. 2" sheet.
2. For Wall Elevations, see Wall Profile Table on "RETAINING WALL 3–GENERAL PLAN No. 2" sheet.

LEGEND:

- Indicates Direction of Water Flow
- Indicates New Structure
- Indicates Street Lighting, see Electrical Plans

ST-30

NO.	REVISION DESCRIPTION	CHECKED BY	DATE

DRAWING SCALE
HOR. SCALE: AS SHOWN
VERT. SCALE: AS SHOWN

CITY OF PLACERVILLE

Dewberry
11060 WHITE ROCK ROAD SUITE 200
RANCHO CORDOVA, CA 95670

IMPROVEMENT PLANS FOR:
PLACERVILLE DRIVE BRIDGE REPLACEMENT

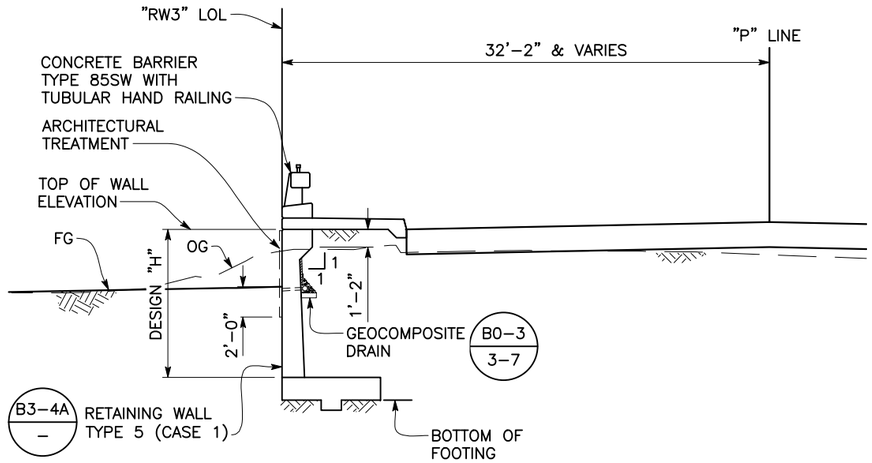
RETAINING WALL 3 - GENERAL PLAN NO. 1
CITY OF PLACERVILLE CALIFORNIA

DRAWING INFO
DATE: 10/03/2025
DRAFTER: E. CISNEROS
DESIGNER: K. KAWAKAMI
REVIEWER: R. NG

PROJECT NO.
CIP # 41410
SHEET NO. S30 OF S35

PROGRESS PLANS SUBMITTAL, NOT FOR CONSTRUCTION

U:\18028 – Placerville Dr. Bicycle–Ped and Br. Repl – CI Placerville\18028B Bridge Replacement\400 Project Design Files\430 Bridges & Structures\Plans\PD–S–RW3–GP.dwg Oct 03, 2025 – 1:17pm, eclineros



SECTION A-A

1" = 5'

WALL PROFILE TABLE		
LOCATION	"RW3" LOL STATION	TOP OF WALL Elev (ft) SEE NOTE 2
1	01+18.00	1679.62
2	01+50.00	1678.85
3	02+02.66	1677.85

NOTES:

1. For reinforcement and details not shown see "Retaining Wall Type 5 (Case 1) B3-4A / – .
2. Top of wall elevations vary linearly between points identified.

ST-31

NO. REVISION DESCRIPTION CHECKED BY DATE

DRAWING SCALE
HOR. SCALE: AS SHOWN
VERT. SCALE: AS SHOWN

Dewberry
11060 WHITE ROCK ROAD SUITE 200
RANCHO CORDOVA, CA 95670

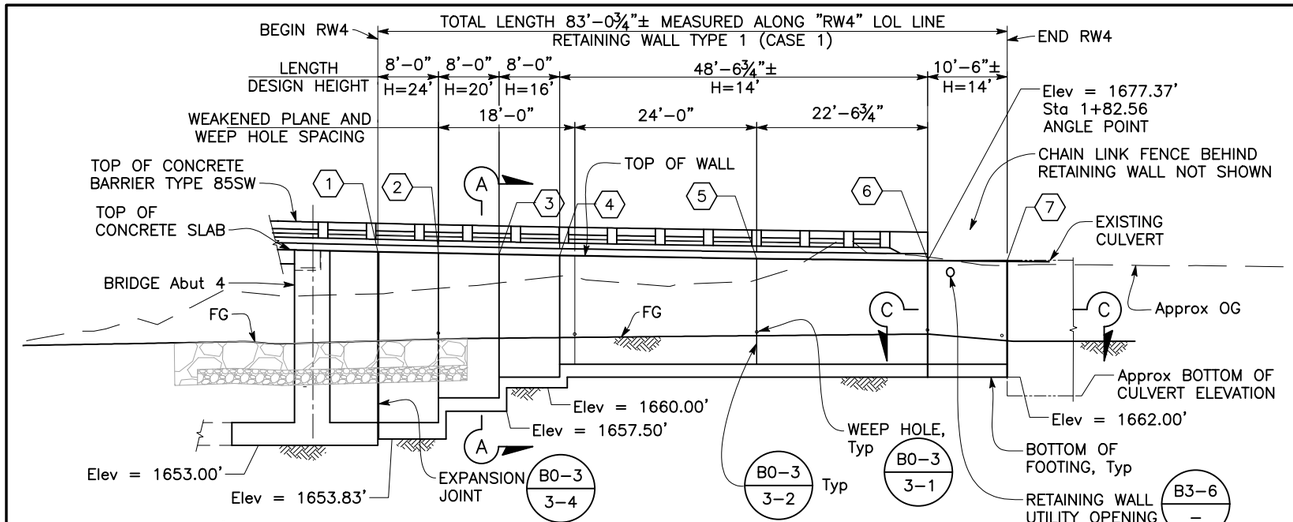
IMPROVEMENT PLANS FOR:
PLACERVILLE DRIVE BRIDGE REPLACEMENT
RETAINING WALL 3 - GENERAL PLAN NO. 2
CITY OF PLACERVILLE
CALIFORNIA

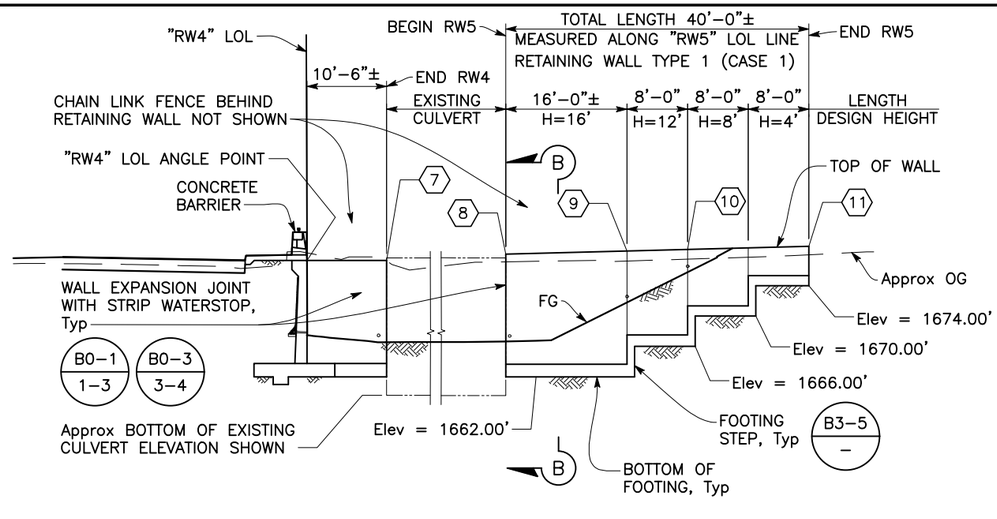
DRAWING INFO
DATE: 10/03/2025
DRAFTER: E. CISNEROS
DESIGNER: K. KAWAKAMI
REVIEWER: R. RUIZ

PROJECT NO.
CIP # 41410
SHEET NO. S31 OF S35

PROGRESS PLANS SUBMITTAL, NOT FOR CONSTRUCTION

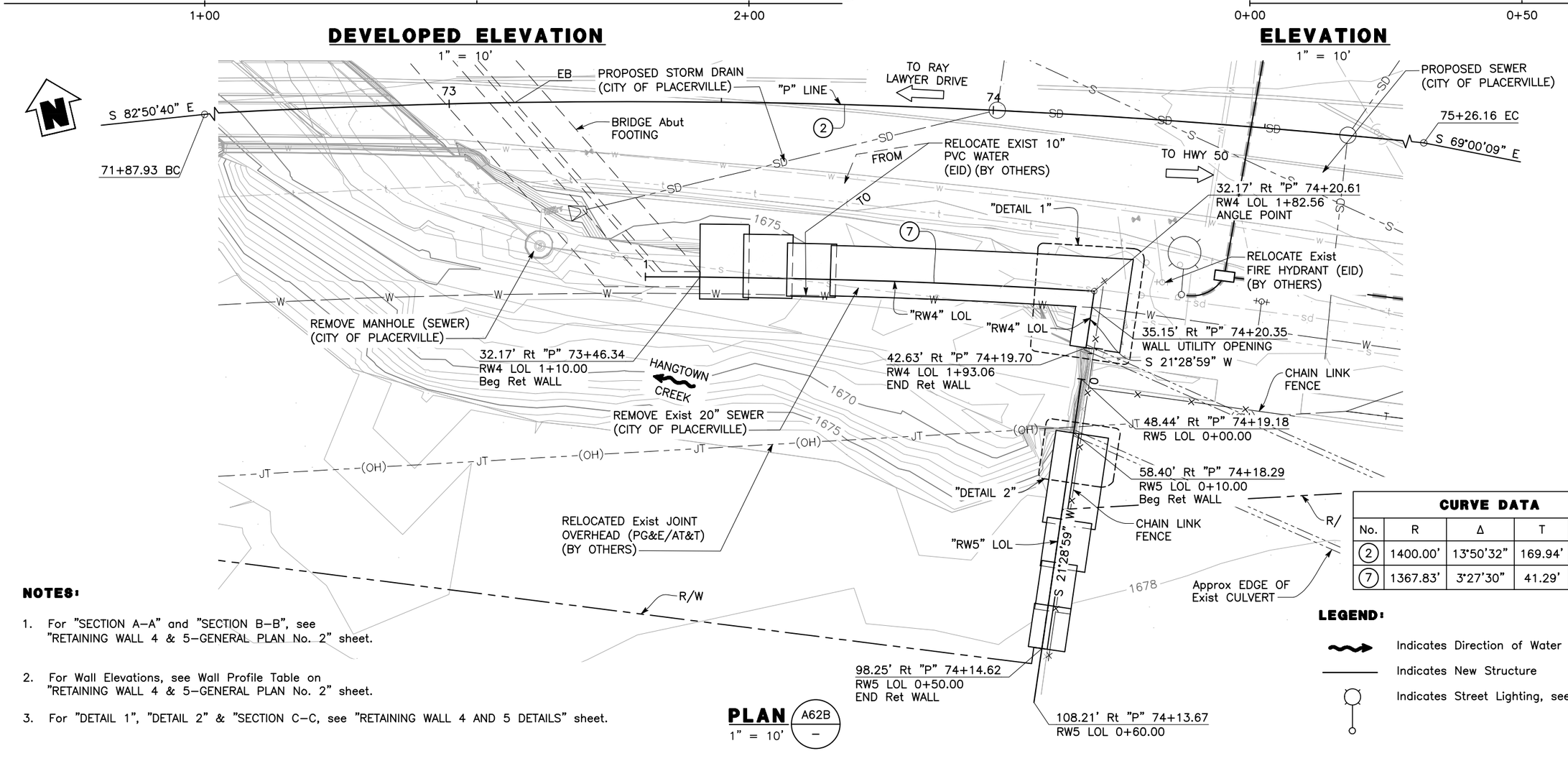
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DEVELOPED ELEVATION

ELEVATION



PLAN A62B
1" = 10'

NOTES:

1. For "SECTION A–A" and "SECTION B–B", see "RETAINING WALL 4 & 5–GENERAL PLAN No. 2" sheet.
2. For Wall Elevations, see Wall Profile Table on "RETAINING WALL 4 & 5–GENERAL PLAN No. 2" sheet.
3. For "DETAIL 1", "DETAIL 2" & "SECTION C–C, see "RETAINING WALL 4 AND 5 DETAILS" sheet.

CURVE DATA

No.	R	Δ	T	L
(2)	1400.00'	13°50'32"	169.94'	338.23'
(7)	1367.83'	3°27'30"	41.29'	82.56'

LEGEND:

- Indicates Direction of Water Flow
- Indicates New Structure
- Indicates Street Lighting, see Electrical Plans

ST-32

NO.	REVISION DESCRIPTION	CHECKED BY	DATE

DRAWING SCALE
HOR. SCALE: AS SHOWN
VERT. SCALE: AS SHOWN

CITY OF PLACERVILLE

Dewberry
11060 WHITE ROCK ROAD SUITE 200
RANCHO CORDOVA, CA 95670

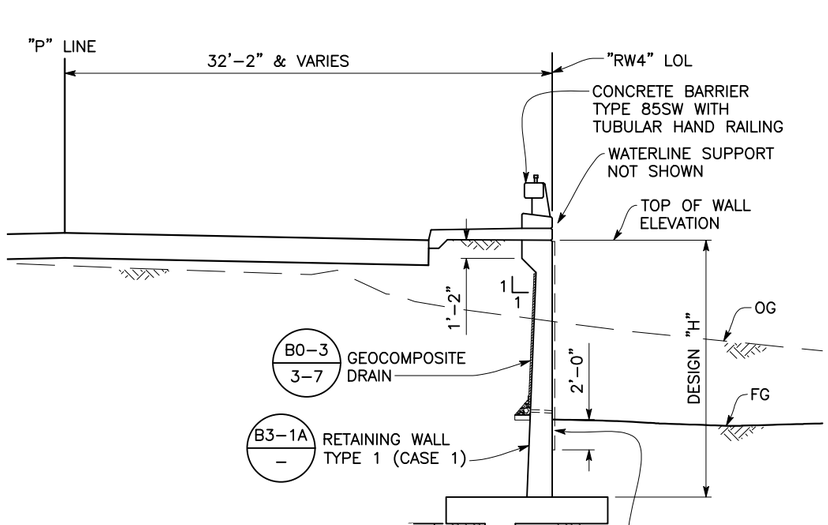
IMPROVEMENT PLANS FOR:
PLACERVILLE DRIVE BRIDGE REPLACEMENT
RETAINING WALL 4 & 5 - GENERAL PLAN NO. 1
CITY OF PLACERVILLE
CALIFORNIA

DRAWING INFO
DATE: 10/03/2025
DRAFTER: E. CHAMBERS
DESIGNER: K. KAMALOO
REVIEWER: B. BAIR

PROJECT NO.
CIP # 41410
SHEET NO. S32 OF S35

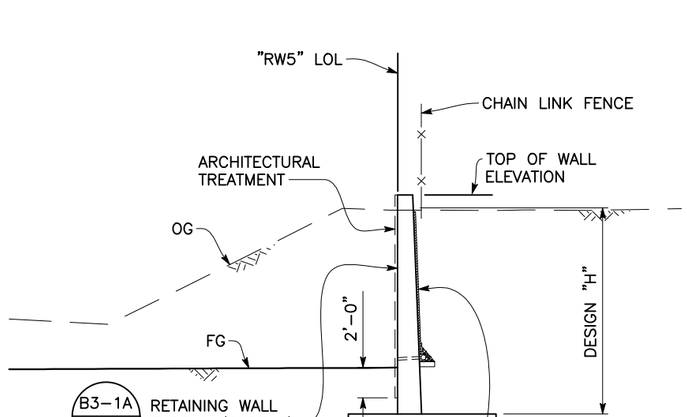
PROGRESS PLANS SUBMITTAL, NOT FOR CONSTRUCTION

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SECTION A-A

1" = 5'



SECTION B-B

1" = 5'

WALL PROFILE TABLE

LOCATION	"RW4" LOL STATION	TOP OF WALL Elev (ft) SEE NOTE 2
1	01+10.00	1678.53
2	01+18.00	1678.36
3	01+26.00	1678.20
4	01+34.00	1678.05
5	01+60.00	1677.64
6	01+82.56	1677.37
7	01+93.06	1677.38

WALL PROFILE TABLE

LOCATION	"RW5" LOL STATION	TOP OF WALL Elev (ft) SEE NOTE 2
8	0+10.00	1678.22
9	0+26.00	1678.64
10	0+34.00	1678.84
11	0+50.00	1679.26

NOTES:

1. For reinforcement and details not shown see "Retaining Wall Type 1 (Case 1) B3-1A / –.
2. Top of wall elevations vary linearly between points defined.

ST-33

NO.	REVISION DESCRIPTION	CHECKED BY	DATE

DRAWING SCALE
HOR. SCALE: AS SHOWN
VERT. SCALE: AS SHOWN

CITY OF PLACERVILLE

Dewberry
11060 WHITE ROCK ROAD SUITE 200
RANCHO CORDOVA, CA 95670

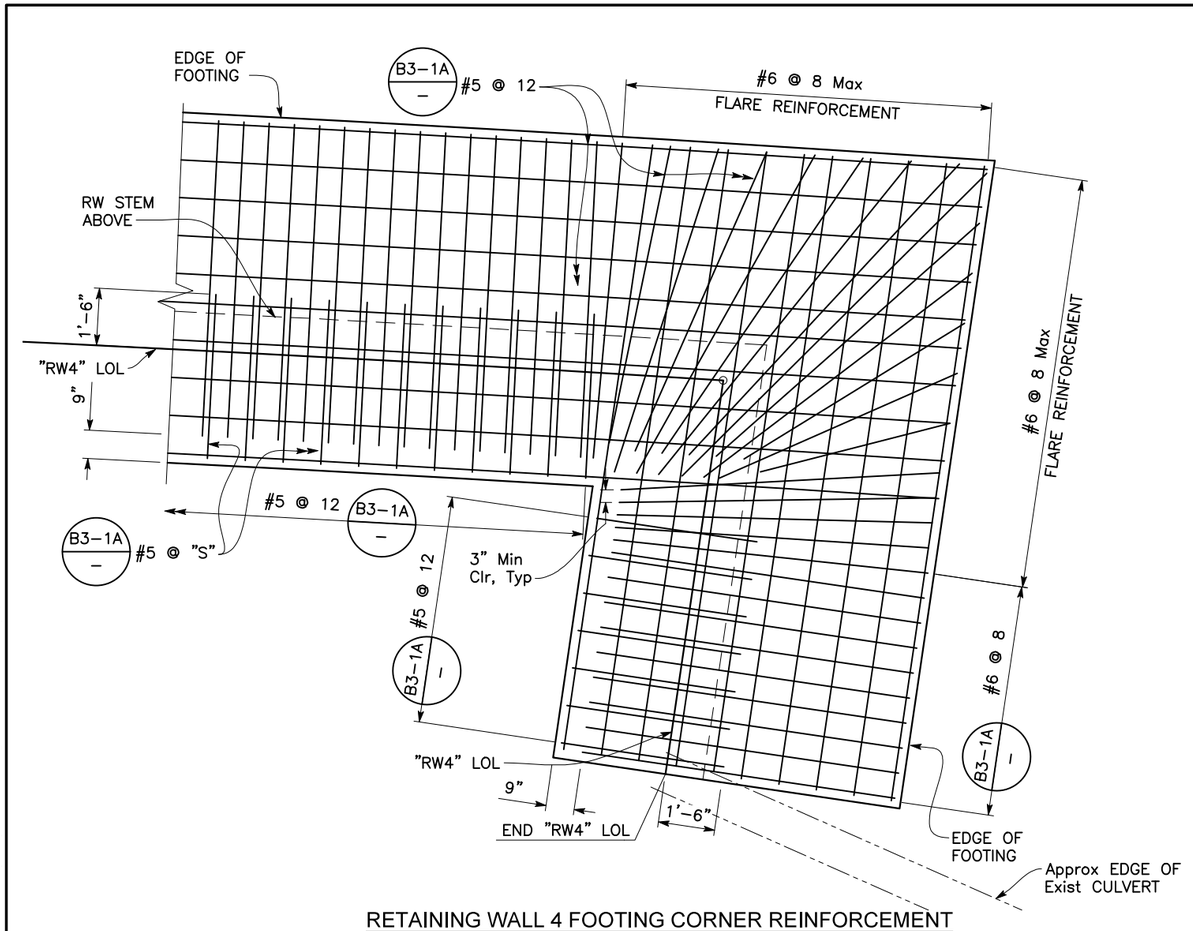
IMPROVEMENT PLANS FOR:
PLACERVILLE DRIVE BRIDGE REPLACEMENT
RETAINING WALL 4 & 5 - GENERAL PLAN NO. 2
CITY OF PLACERVILLE
CALIFORNIA

DRAWING INFO
DATE: 10/03/2025
DRAFTER: E. CISNEROS
DESIGNER: K. KAWAKAMI
REVIEWER: R. RUIZ

PROJECT NO.
CIP # 41410
SHEET NO. S33 OF S35

PROGRESS PLANS SUBMITTAL, NOT FOR CONSTRUCTION

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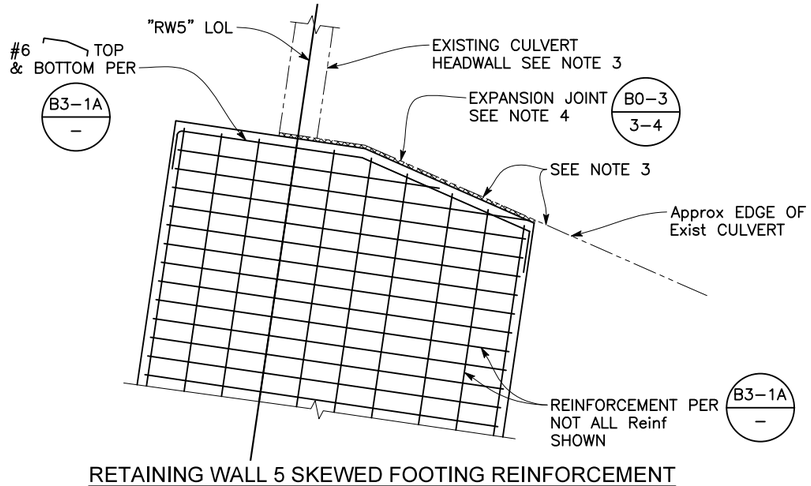


RETAINING WALL 4 FOOTING CORNER REINFORCEMENT

DETAIL 1

½" = 1'–0"

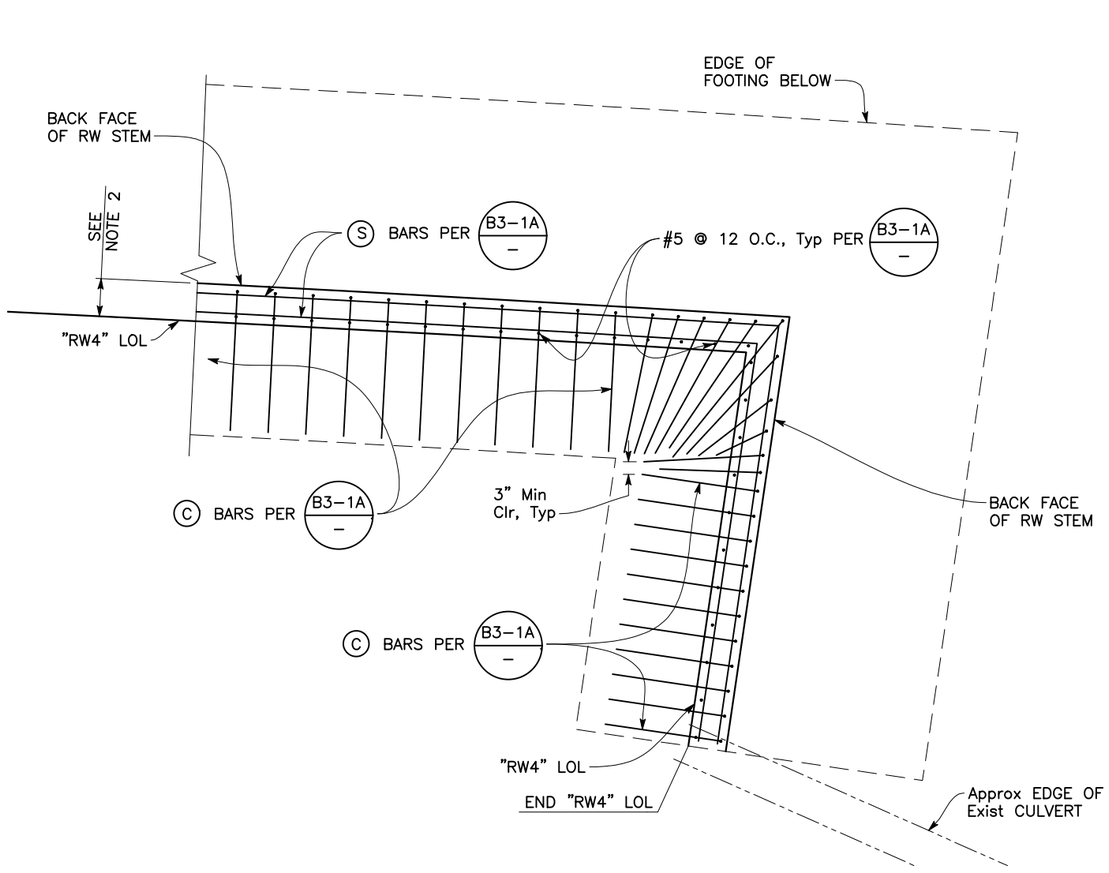
(TOP FOOTING REINFORCEMENT SHOWN. BOTTOM FOOTING REINFORCEMENT FLARE LAYOUT SIMILAR.)



RETAINING WALL 5 SKEWED FOOTING REINFORCEMENT

DETAIL 2

½" = 1'–0"



RETAINING WALL 4 STEM CORNER REINFORCEMENT

SECTION C-C

½" = 1'–0"

NOTES:

1. For reinforcement and details not shown see "Retaining Wall Type 1 (Case 1)" B3–1A.
2. Stem wall thickness varioes due to haunch and batter along wall height. Reinforcement shown is schematic and should be constructed per B3–1A.
3. Location of existing culvert is approximate. Contractor to verify location in field. Existing culvert wingwalls should be removed. Protect in place remaining culvert elements.
4. Location of existing culvert is approximate. Expansion joint should be applied at any points where retaining wall comes into contact with the existing culvert.

ST-34

NO.	REVISION DESCRIPTION	CHECKED BY	DATE

DRAWING SCALE
HOR. SCALE: AS SHOWN
VERT. SCALE: AS SHOWN

Dewberry
11060 WHITE ROCK ROAD SUITE 200
RANCHO CORDOVA, CA 95670

IMPROVEMENT PLANS FOR:
PLACERVILLE DRIVE BRIDGE REPLACEMENT

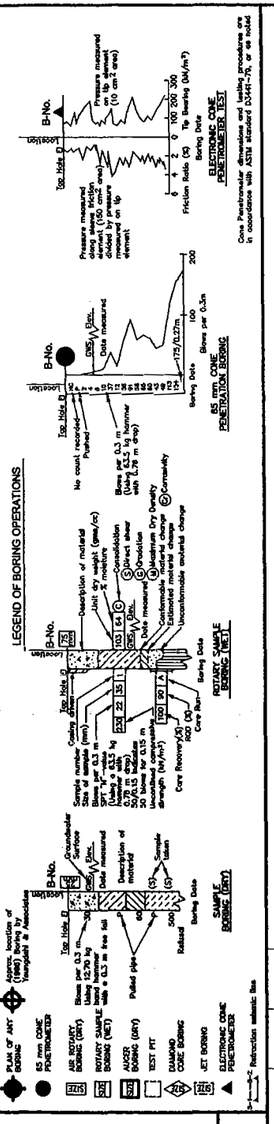
RETAINING WALL 4 AND 5 DETAILS
CITY OF PLACERVILLE CALIFORNIA

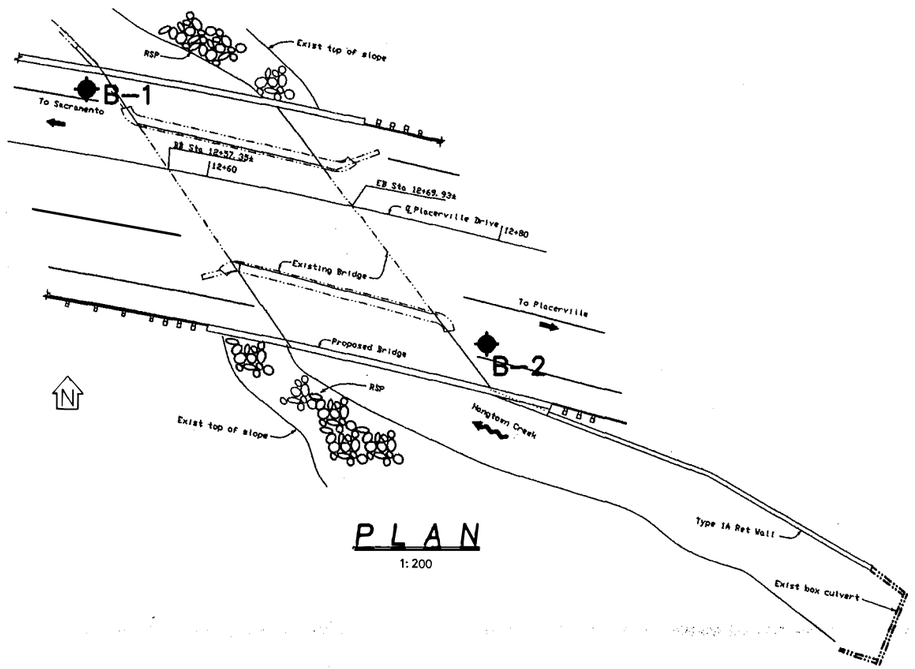
DRAWING INFO
DATE: 10/03/2025
DRAFTER: E. CONTRERAS
DESIGNER: K. KAWAKAMI
REVIEWER: R. RITZ

PROJECT NO.
CIP # 41410
SHEET NO. S34 OF S35

PROGRESS PLANS SUBMITTAL, NOT FOR CONSTRUCTION

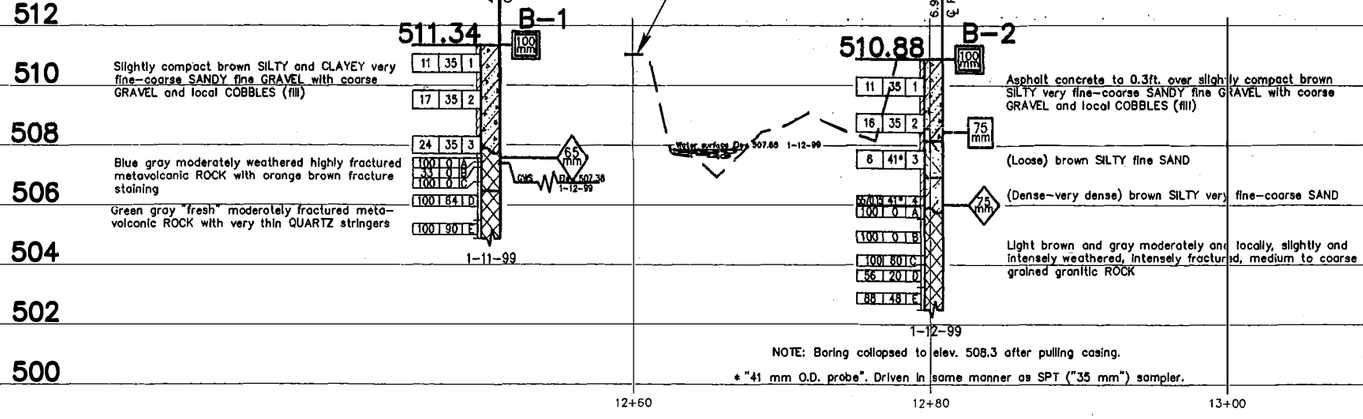
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PLAN
1: 200

Elevation Reference
Brass Disk "U.S. Coast Geodetic Survey", set in concrete on NW wingwall of existing bridge--Elev. 511.348 m per Carlton Engineering, Inc.



PROFILE
1:100 Vertical
1:200 Horizontal

NOTES

Field classification of soils was in accordance with ASTM D 2488-93 "Description and Identification of Soils (Visual-Manual Procedure)".

Consistency of soils shown in ( ) where estimated.

Rock description according to U.S. Department of Interior, Bureau of Reclamation "Engineering Geology Field Manual."

Standard Penetration tests were performed in accordance with ASTM D 1586-84 using a safety hammer operated with cat-head, rope and pully. Drill rods were 41 mm diameter "A"-rods; sampler was driven with brass liners.

Electronic media for plan view provided by Quincy Engineering.

DIST.	COUNTY	ROUTE	KP TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
03	ED	CR		S35	S35

4-5-00
REGISTERED GEOTECHNICAL ENGINEER

REGISTERED PROFESSIONAL ENGINEER FRANKLIN P. TABER No. 816 EXP. 3-31-04 GEOTECHNICAL STATE OF CALIFORNIA

PLANS APPROVAL DATE

TABER CONSULTANTS
3911 West Capitol Avenue
West Sacramento, CA 95691-2116

JOB No. 1P2/397/209 LOCATION: 39120-F7: 395N: 221W

Quincy Engineering
3247 Ramos Circle
Sacramento, CA 95827

ST-35

DESIGN OVERSIGHT	DRAWN BY	M. D. Robertson	T. A. Krause FIELD INVESTIGATOR	METRIC "ALL DIMENSIONS AND ELEVATIONS ARE IN METRIC (m)"	PREPARED FOR THE CITY OF PLACERVILLE DEPARTMENT OF PUBLIC WORKS	PROJECT ENGINEER	BRIDGE NO. 25C-29
SIGN OFF DATE	CHECKED BY	T. A. Krause	DATE January 1999				KP

PLACERVILLE DRIVE BRIDGE REPLACEMENT
LOG OF TEST BORINGS

04/05/00 1P2397209.dwg 1=1

ORIGINAL SCALE IN MILLIMETERS FOR REDUCED PLANS 0 20 40 60 80

CU EA

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES (PRELIMINARY STAGE ONLY)

SHEET S35 OF S35

Appendix III. Taber Investigation

ATTACHMENT 3

Taber
Since 1954

3911 West Capitol Avenue
West Sacramento, CA 95691-2116
(916) 371-1690
(707) 575-1568
Fax (916) 371-7265
www.taberconsultants.com

FOUNDATION INVESTIGATION

Hangtown Creek Bridge (Widen)
on Placerville Drive
Bridge No. 25C-0029

City of Placerville
Owner

Quincy Engineering
Structural Consultant

1P2/397/209
39120-F7:395N: 221W

April 2000

Taber Consultants
Engineers and Geologists

Taber
Since 1954

FOUNDATION INVESTIGATION

Hangtown Creek Bridge (Widen)
on Placerville Drive, Br. No. 25C-0029
Placerville, California

1P2/397/209

INTRODUCTION

A limited study of soils and foundation conditions has been completed at the above site in accordance with the agreement between Quincy Engineering and Taber Consultants. The purpose of this study is to provide criteria for use in design and construction of planned bridge widening at the above site. Limitations of this study are discussed in the attached "General Conditions".

This office performed a "Preliminary Geotechnical Evaluation" (1P2/397/209; dated May 8, 1998) for planning level study at this bridge site. That study was used as reference for the current study and portions have been incorporated into this report.

PROJECT DESCRIPTION

The proposed construction is shown on preliminary plans dated November 30, 1999 prepared by Quincy Engineering, Inc. The plan shows a 3.4±m widening using a reinforced concrete "T" beam span on the north (downstream) side of the bridge and a 4.7±m widening using a cast-in-place concrete box girder span on the south. The widened bridge will accommodate two traffic lanes, a Class II bike trail and a two-way center turn lane. All structure elements are expected to be supported on new (widened) concrete wall abutments.

About 27.3 m of retaining wall will be constructed along the east bank of the channel upstream from the southeast wingwall of the widened bridge to match with the wingwall of an existing box culvert. This retaining wall is indicated as 3.6±m high, tentatively a Type 1A retaining wall per Caltrans "Standard Plans".

A sewer line exposed along the channel bottom and an existing manhole structure are to be relocated prior to bridge construction. A fiber optic phone cable that crosses the channel just upstream (south) of the existing bridge is to be preserved in-

place. The precise location and elevation of fiber optic line are not known and it may pass below new footings and/or through new abutment walls.

EXISTING STRUCTURES

Information regarding the existing site and bridge structure forwarded to this office by Quincy Engineering and reviewed for this study includes:

- Structure plans (circa 1930) without "As-Built" notations for the "Bridge Across Hangtown Creek near Placerville - El Dorado County" by the State of California Department of Public Works, Division of Highways.
- Bridge maintenance inspections/reports by the State Bridge Department/Caltrans (1938 through 1993).
- "Geotechnical Engineering Study for Placerville Drive Improvements" by Youngdahl & Associates, Inc. (File No. 96020.E) dated March 1996.

No foundation report or subsurface investigation is known to have been prepared for the existing bridge–which is consistent with common practice at the time of construction. For this study, elevations from the bridge plans and from the Youngdahl report have been converted from feet to meters without other adjustments (i.e. an equivalent reference datum is assumed).

No plans or soils data have been provided for the existing box culvert. A reasonable assumption is that box culvert construction is similar to that shown on Caltrans "Standard Plans".

The existing bridge was constructed in 1931 and is the subject of an initial "Bridge Report" (maintenance inspection) dated August 4, 1938. Subsequent inspections were performed on a relatively regular basis, with data in-hand through September 16, 1993. Documented issues of geotechnical significance have included:

- The upstream (south) corner of the west abutment has been exposed since 1956, or prior, but such condition has apparently never been mitigated or otherwise considered "serious".
- The channel upstream and downstream from the bridge is often full of brush.

FIELD REVIEW

A review of the site and structure was made on January 7, 1998 by Gary D. Avey of this office. Field review confirms structure configuration in general conformance to details shown on structure plans as referenced above. No obvious structure distress was observed during field review, nor has any distress been reported in the maintenance reports.

The stream thread at this location is immediately adjacent to and eroding materials at the upstream (south) side of the west abutment. Bedload accumulates on the inside of the channel alignment, adjacent to the east abutment. Low channel grade was observed about 4.3±m below deck, exposing the top of the west abutment footing on the upstream side of the bridge. At this location, the exposed footing generally confirms footing at elev. 506.0 as shown on structure plans.

Existing stream banks are relatively steep and have experienced some local erosion under high stream flows. Boulders have been placed as slope protection on the upstream (south) edge of the west abutment.

Materials within the Hangtown Creek channel were observed to consist primarily of sand, gravel and cobbles. Intact bedrock is exposed in the channel bank near the southwest corner of the existing bridge and is expected to be present at relatively shallow depth across the balance of the site.

EXPLORATION AND TESTING

The referenced soils report indicates that Youngdahl & Associates made four test borings (Borings-12, 13, 13.1 and 14) to maximum depth 7.8±m (elev. 503.1 m) at the bridge site in March, 1996. Those borings were located near the southwest (Boring-12) and northeast (Borings-13 and -13.1) corners of the existing structure and near the east end of the retaining wall (Boring-14). Please refer to the Youngdahl report for logs of these borings.

For this study, information on the nature and distribution of subsurface materials and conditions was obtained near abutment locations by means of two logged and sampled test borings to maximum depth 8.4±m (lowest elev. 502.5 m). Borings were advanced into underlying rock by means of diamond core drilling.

Soil samples were recovered from the borings by means of a 50 mm OD "standard penetration" sampler advanced with standard 63.5 kg hammer and 0.76 m drop (per ASTM D1586) to provide a field estimate of soils consistency. Sampler penetration resistance was recorded and can be correlated to soils strength and bearing characteristics. Selected portions of standard penetration samples were retained in moisture-proof containers for reference. Recovered rock cores were stored in boxes for reference.

The borings were logged and earth materials field-classified by an engineer/ geologist as to consistency, color, gradation and texture on the bases of penetration resistance, examination of samples and observation of drill cuttings. At two locations in Boring-2, soil consistency was assessed by driving a 41-mm diameter drill rod. Where diamond coring was used to advance the borings, the recovered cores were field-classified and logged as to percent recovery and Rock Quality Designation (RQD). Groundwater observations were made in the borings during drilling operations and after completion.

Borings were located by cloth tape, referenced to existing site features as shown on the referenced site plan; elevations were referenced to datum provided by Quincy Engineering. Locations, elevations, details of borings and results of tests are shown on the attached "Log of Test Borings" drawing. T. Alan Krause was field engineer/geologist for this project.

EARTH MATERIALS AND FOUNDATION CONDITIONS

Local geology is mapped on the California Division of Mines and Geology "Geologic Map of California, Sacramento Sheet" (1:250,000; 1966) and the United

States Geological Survey "Geologic Atlas of the United States – California Placerville Quadrangle" (1893; March 1914 with corrections). Rock in the vicinity of the bridge site is mapped as 1) Upper Jurassic age marine rocks such as the Calaveras formation (slate, quartzite, limestone and mica schist), 2) Jurassic-Triassic age metavolcanic rocks such as diabase, and 3) Mesozoic age granitic rocks. Near-surface tailings, fill and/or alluvial deposits along the stream channel are not mapped on these sources.

The test borings encountered rock consistent with published mapping. In the west bank (Boring-1) the rock is identified as metavolcanic with upper surface at elev. 507.8 and the east bank (Boring-2) the rock is identified as granitic with upper surface at elev. 505.8. The Youngdahl borings indicate weathered rock (of unidentified type) at very similar levels in the respective banks. The rock exposure in the west bank just upstream from the bridge is also consistent with the rock encounter at Boring-1.

The upper 1-1.5±m of rock on both banks is described as moderately weathered and highly to intensely fractured. The RQD in these upper zones of the rock is close to zero. (RQD is defined as the percentage of total core run length recovered in pieces 100 mm long or longer.) Below the upper zones, the rock becomes less weathered and fractured, with RQD in the underlying 1.5-2±m ranging from 20% to 90% (average RQD equals 73% in the west bank and 38% in the east bank).

The available data is insufficient to define the contact between the two types of rock. The borings (and regional trends) suggest that contact is oriented northwesterly. Such features as shear zones, differential weathering and/or mineralization are common at rock contacts and their presence at the site cannot be precluded.

Intact rock is capable of supporting heavy, concentrated foundation loads. The upper part of the rock is potentially erodible where subject to concentrated surface flow; the fresher/lower part of the rock is expected to be scour/erosion resistant.

Overburden soils encountered in the borings behind bridge abutments are mostly comprised of slightly compact silty sandy gravel with cobbles and likely some boulder

size material (greater than 250 mm across). At the east bank, the bottom 2+m of this unit consists of loose to dense silty sand. These materials include abutment and/or roadway embankment fill (possible tailings?); the dense silty sand encountered in the east bank may represent a natural soil developed on decomposed rock. In general, these overburden soils are considered weak and are not appropriate for structure support.

The exposed bedload materials consist of sand, gravel and cobbles with some boulders and they likely extend to rock surface (say, as much as 2-3±m below existing ground). Bedload is highly susceptible to scour/erosion and such materials are not suitable for structure support.

Free groundwater was measured in the boring in the west bank (Boring-1) at elev. 507.4, slightly below channel water surface at time of field study (January 1999). In February 1996, a Youngdahl boring on the east bank (Boring-13.1) identified free groundwater surface at elev. 508.3±.

Free groundwater levels are expected to follow seasonal changes in channel water surface, particularly in overburden (soil) materials. Sand and gravel below channel water surface are expected to be saturated and to yield water freely to open excavations. Seepage within the rock is expected to be more restricted and may be concentrated along zones of relatively intense fracturing/weathering.

SITE SEISMIC CONDITIONS

In accordance with current Caltrans Division of Structures site seismicity evaluation procedures (with reference to the Caltrans "California Seismic Hazard Detail Index Map, 1996"), "peak rock acceleration" 0.52 g is assigned the site, associated with a controlling event of 6.5 magnitude on the Gillis Mountain (GMT) fault located about 2.2 km easterly. Technical data accompanying the Caltrans "California Seismic Hazard Detail Index Map, 1996" lists the Gillis Mountain fault type as "unknown". The site is

conservatively assigned ATC-32 Soil Profile Type C owing to the depth of loose overburden and the deeply weathered condition of at least the upper part of the rock.

Current Caltrans structure design practice requires certain increases in ATC-32 response curves due to fault type and/or fault proximity. At this site, fault type is not a factor, however, the proximity of the site to the seismic source will require a staged increase in ATC-32 spectral accelerations depending upon structure period.

Based on the above information, structure design is recommended to be based upon the following ATC-32 seismic criteria:

The Gillis Mountain fault: Soil Type C; Magnitude 6.5 ± 0.25; peak ground acceleration of 0.6 g; staged increase in ATC-32 spectral accelerations due to fault proximity, per below.

Structure Period	Increase in Spectral Acceleration
0-0.5 seconds	No Increase
0.5-1.0 seconds	0% to 20% Linear Increase
Over 1.0 seconds	20% Linear Increase

For the most part, the loose-semicompact granular soils that overlying rock appear to be above typical free groundwater levels and potential susceptibility to liquefaction is therefore limited. Structure foundations established in rock are not expected to be sensitive to seismically induced lateral distortion, densification and/or settlement of loose soils.

Should there be important structural and/or economic considerations associated with more closely defining the above values or other site-seismicity characteristics, further study would be required.

CONCLUSIONS AND DISCUSSION

The bridge site is considered adequately stable with structure support available for bridge widening and retaining wall by means of spread footing foundations established in rock. The use of spread footings is conditioned on the assumption that

channel bottom is stable with respect to degradation and that footings are secure from scour.

Structure support could also be achieved by means of cast-in-drilled-hole piling, although difficult installation through soils that include cobbles and boulders and "wet" conditions would be anticipated. Driven pile foundations would not achieve sufficient penetration (without pre-drilling) to be acceptable for proposed construction.

Plans show existing footings at elev. 506.0 and it appears probable that they bear in or on weathered rock. Provided that reasonable care is taken to maintain earth support during construction, existing footings are not expected to be significantly affected by adjacent excavations for new foundations or by incremental loading from structure widening.

Maintaining security of existing footings with respect to scour/erosion is a concern, particularly in light of historic exposure of footings. The proposed construction will afford an opportunity to expose and review the embedment and bearing conditions along the toe of existing footings. If needed, mitigation of scour/erosion is visualized as accomplished with a concrete "cut-off" cast in a trench excavated along the toe of existing footing(s).

It is anticipated that excavation of overburden (including materials to "boulder" size) will be feasible with typical "heavy-duty" construction excavation equipment. Excavation of "bedrock" for bridge footings is expected to be feasible with similar equipment although the use of pneumatic chippers/hammers may be required as well. Blasting is not expected to be required and should not be allowed without specific review by this office.

Construction term excavations are expected to be stable to slopes on order of 1:1 to 1v:1.5h in overburden. Shoring support is expected to be required at some locations for excavations below existing roadway. Driving steel sheet piles is likely to be difficult where boulders are present; sheets cannot be expected to achieve more than

very limited rock penetration. Soldier piles constructed in drilled holes are expected to be feasible.

Construction of foundations below channel bottom will require control of surface water and groundwater. Seepage can be anticipated from fill, tailings and/or native materials (including bedrock) at/below flow level/low channel grade. If/as acceptable, it is anticipated that seepage control could be accomplished by diking the channel, piping the flow through the site and sump pumping as necessary.

The use of rock-slope-protection (RSP) on the southwest corner of the bridge appears desirable due to historic scour and erosion problems documented at that location. Toe of rock slope protection should be established in suitably secure materials at/below projected scour level; typical RSP toe per Caltrans "Standard Plans" is expected to engage firm materials. For appropriate stability, finished slope of RSP materials should not be steeper than 1v:1.5h.

RECOMMENDATIONS

If hydraulic analysis by others indicates scour/degradation below elev. 506.7, foundation recommendations should be reviewed and modified (if/as appropriate) by this office. These recommendations are also contingent upon a representative of this office field identifying suitable bearing materials — and modifying footing levels if/as necessary — during foundation excavation.

All structure support is recommended by means of spread footing foundations penetrating intact and suitably secure bedrock as field approved by this office. Minimum rock penetration of 0.6 m at abutment footings (and at least nominal engagement of less weathered rock) is expected to be adequate for bearing and security. Based on boring data, highest uniform plan-footing grades meeting bearing materials penetration criteria are elev. 506.0 at Abutment-1 and elev. 505.0 at Abutment-2.

Such footings -- continuous and at least 1.0 m wide – may be assigned allowable design bearing pressures up to 300 kN/m^2, net at ground line. Higher bearing pressures

are available with increased rock penetration. For abutment footings established in rock, a base friction factor of at least 0.50 is considered appropriate for use in evaluation of resistance to sliding. Rock bolting is available for uplift restraint, if necessary.

All footings should be poured neat, without forming, against trimmed, intact rock materials in clean, dry excavations. Any open joints/fractures (weak "slots") exposed at footing grade should be evaluated by this office and may require treatment such as thorough cleaning and grout backfill. It is anticipated that suitable bearing materials within footing limits might vary as much as 0.5±m below indicated plan levels and may be substantially above plan footing levels at the heel.

If the fiber optic line is located at or below footing grade and is to remain below footing, the utility trench below the footing should be cleaned of all loose material and backfilled with concrete. We assume that the owner of the fiber optic line will be given the opportunity to review and approve any "sleeving" of the line below or through the footing(s). Further, the utility line should be treated as if it provides no foundation support and the footing should be designed to span twice the utility's width. Alternately, the footing could be lowered to below the utility as exposed in the field.

If/as necessary, use of plain concrete below structural footing grade -- doweled to the footing -- is considered appropriate for leveling-course in lieu of footing steps. Where penetration of rock exceeds the thickness of the footing, backfill above the footing to rock surface should be plain concrete or grout. If needed for footing security only, increased footing depth can be limited to a strip 0.5±m wide along the toe of the footing filled with plain concrete.

For the retaining wall, it is acceptable for footing penetration to be limited to at least nominal engagement of the rock with allowable bearing capacity limited to 150 kN/m^2. Additional security for this footing could be provided by placing a cast in place concrete "cut off" along the toe.

The wall footing should match bridge widening footing at elev. 505.0 on the west and (assumed) box culvert wingwall footing at elev. 506.1 on the east end. Details of the variations in rock surface are not known, but it appears reasonable to show footing elevation as stepped by 0.55±m at two evenly spaced locations along the length of the wall. We recommend that the level of bearing materials along the retaining wall and the level of existing culvert wingwall footing be evaluated by making some test pits in the channel at the time the existing sewer is being relocated.

Active soil pressures on walls may be based on the use of Structure Backfill material and assigned equivalent fluid pressure of 5.6 kN/m^2/m(36 pcf) for "active" conditions. Design loading should consider traffic loading, at minimum a surcharge equivalent to 0.6 m of soil above top of wall. For seismic conditions, inertial soil loading on retaining walls may be estimated on the basis of an inverted equivalent fluid pressure distribution (zero at base, maximum at top) calculated using 9.2 kN/m^2/m (58.5 pcf). Footing resistance to sliding may be based on friction coefficient of 0.40 times applied load.

The bridge foundations recommended above are considered appropriate for the assignment of typical service-load combination. For "load factor" design, "ultimate" bearing capacity of footings is expected to be consistent with those derived from typical Caltrans design procedures (i.e. three times allowable compressive values). Substantially greater "ultimate" capacities may be appropriate depending upon definition of foundation deflection assumed for, and type of imposed load, controlling use.

TABER CONSULTANTS

Franklin P. Taber
R.C.E. 30920
G.E. 816

REGISTERED PROFESSIONAL ENGINEER
FRANKLIN P. TABER
816
EXP. 3-31-04
GEOTECHNICAL
STATE OF CALIFORNIA

April 5, 2000

Attachments: "General Conditions"
"Log of Test Borings"

Taber
Since 1954

1P2/397/209

GENERAL CONDITIONS

The conclusions and recommendations of this study are professional opinion based upon the indicated project criteria and the limited data described herein. It is recognized there is potential for variation in subsurface conditions and that modification of conclusions and recommendations might emerge from further, more detailed study.

This report is intended only for the purpose, site location and project description indicated and assumes design and construction in accordance with Caltrans practice.

As changes in appropriate standards, site conditions and technical knowledge cannot be adequately predicted, review of recommendations by this office for use after a period of two years is a condition of this report.

A review by this office of any foundation and/or grading plans and specifications or other work product insofar as they rely upon or implement the content of this report, together with the opportunity to make supplemental recommendations as indicated therefrom is considered an integral part of this study and a condition of recommendations.

Subsequently defined construction observation procedures and/or agencies are an element of work which may affect supplementary recommendations.

Should there be significant change in the project or should soils conditions different from those described in this report be encountered during construction, this office should be notified for evaluation and supplemental recommendations as necessary or appropriate.

Opinions and recommendations apply to current site conditions and those reasonably foreseeable for the described development–which includes appropriate operation and maintenance thereof. They cannot apply to site changes occurring, made, or induced, of which this office is not aware and has not had opportunity to evaluate.

The scope of this study specifically excluded sampling and/or testing for, or evaluation of the occurrence and distribution of, hazardous substances. No opinion is intended regarding the presence or distribution of any hazardous substances at this or nearby sites.

DIST.	COUNTY	ROUTE	KP TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
03	ED	CR			

REGISTERED GEOTECHNICAL ENGINEER — 4-5-00

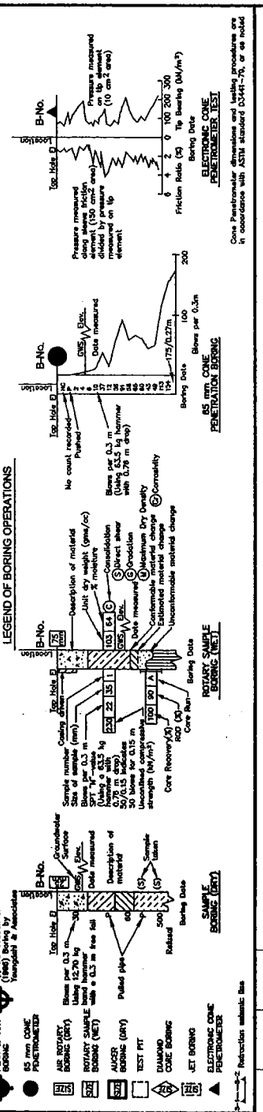
REGISTERED PROFESSIONAL ENGINEER FRANKLIN P. TABER No. 816 EXP. 3-31-04 GEOTECHNICAL STATE OF CALIFORNIA

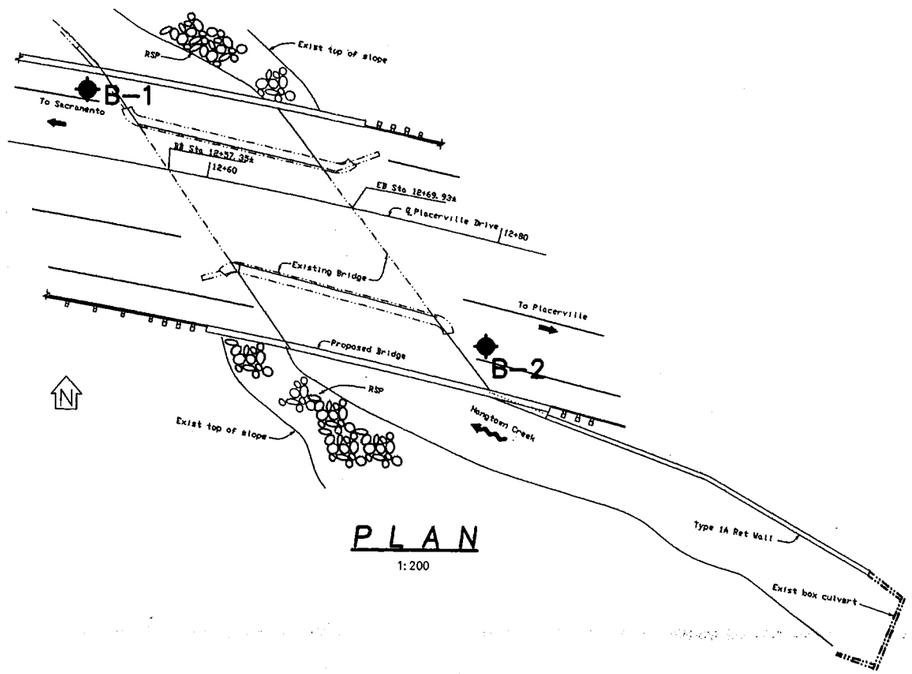
PLANS APPROVAL DATE

TABER CONSULTANTS
3911 West Capitol Avenue
West Sacramento, CA 95691-2116

JOB No. 1P2/397/209 LOCATION: 39120-F7: 395N: 221W

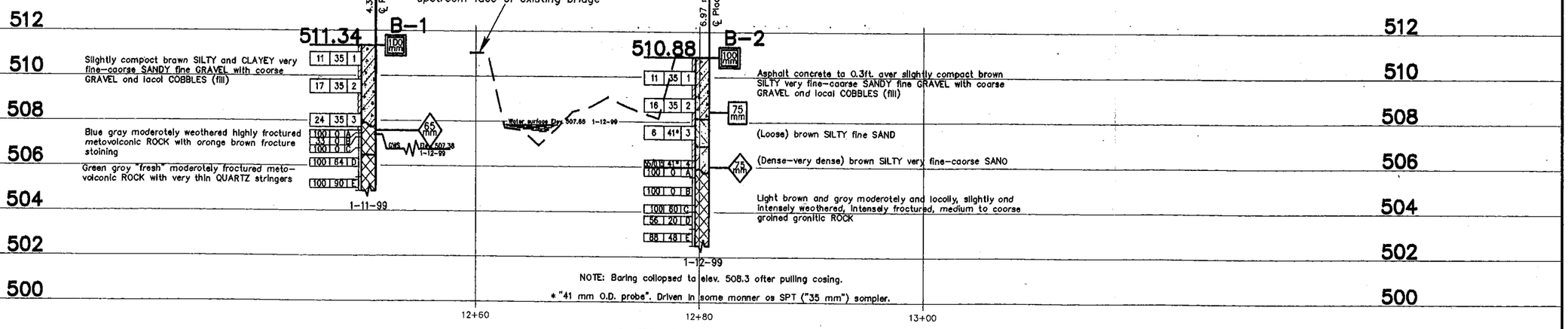
Quincy Engineering
3247 Ramos Circle
Sacramento, CA 95827





PLAN
1:200

Elevation Reference
Bross Disk "U.S. Coast Geodetic Survey", set in concrete on NW wingwall of existing bridge--Elev. 511.348 m per Carlton Engineering, Inc.



PROFILE
1:100 Vertical
1:200 Horizontal

NOTES

Field classification of soils was in accordance with ASTM D 2488-93 "Description and Identification of Soils (Visual-Manual Procedure)".

Consistency of soils shown in ( ) where estimated.

Rock description according to U.S. Department of Interior, Bureau of Reclamation "Engineering Geology Field Manual."

Standard Penetration tests were performed in accordance with ASTM D 1586-84 using a safety hammer operated with cat-head, rope and pully. Drill rods were 41 mm diameter "A"-rods; sampler was driven with brass liners.

Electronic media for plan view provided by Quincy Engineering.

DESIGN OVERSIGHT	DRAWN BY	M. D. Robertson	T. A. Krause FIELD INVESTIGATOR	METRIC "ALL DIMENSIONS AND ELEVATIONS ARE IN METRIC (m)"	PREPARED FOR THE CITY OF PLACERVILLE DEPARTMENT OF PUBLIC WORKS	PROJECT ENGINEER	BRIDGE NO. 25C-29
SIGN OFF DATE	CHECKED BY	T. A. Krause	DATE January 1999				KP

HANGTOWN CREEK BRIDGE (WIDEN)
LOG OF TEST BORINGS

04/05/00 1P2397209.dwg 1=1

ORIGINAL SCALE IN MILLIMETERS FOR REDUCED PLANS 0 20 40 60 80

CU EA

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES (PRELIMINARY STAGE ONLY) | SHEET | OF

Appendix IV. HDR Investigation

LOGGED BY	BEGIN DATE	COMPLETION DATE	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID
DB	10-7-19	10-7-19		R-19-002
DRILLING CONTRACTOR			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION
V & W Drilling				
DRILLING METHOD			DRILL RIG	BOREHOLE DIAMETER
Solid-Stem Auger			CME 55 HT	6"
SAMPLER TYPE(S) AND SIZE(S) (ID)			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERi
Bulk, SPT (1.4"), Rock Core			140 lb, 30"	84.9%
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER READINGS DURING DRILLING / AFTER DRILLING (DATE)	TOTAL DEPTH OF BORING
Neat Cement and Grout			Not Encountered	18.0 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per ft	Recovery (%)	RQD (%)	Rock Uniaxial Compressive Strength (psi)	Drilling Method	Casing Depth	Remarks
	0		Lean CLAY (CL); light brown; moist; few GRAVEL ; little SAND ; mostly medium plasticity fines ; Seemed mostly dry.		S1								Not very smooth drilling
	5		CLAYEY SAND (SC); brown to white-gray; moist; few fine GRAVEL ; mostly fine to coarse SAND ; some medium plasticity fines ; Decomposed Rock; decomposed to sand; PP=0.5 tsf.		S2	12 50/6"							
	8		METAMORPHIC ROCK (GNEISS); gray to reddish brown; intensely weathered; moderately soft to hard; intensely fractured.		A			29	0				Hard Drilling. Started Coring
	10		Same as above; hard; moderately weathered.		B			100	47				
	13		Gray to white; same as above; moderately soft to hard; fat clay was found ~14' depth. Approximately 2" layer. Clay was brown to reddish brown.		C			75	52				
	15		Gray; moderately weathered; same as above but harder rock; moderately fractured;.		D			81	42				
	18		Bottom of borehole at 18.0 ft bgs Reached Target Depth This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (2010) except as noted on the Soil or Rock Legend or below.										
	30												

WRECO
7807 Laguna Blvd., Suite 400
Elk Grove, CA 95758
(916) 513-7428

REPORT TITLE				HOLE ID
BORING RECORD				R-19-002
DIST.	COUNTY	ROUTE	POSTMILE	PROJECT NO.
03	El Dorado			P18112
PROJECT OR BRIDGE NAME				
Placerville Drive Bike and Pedestrian Facilities				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
	DB		10-21-19	1 of 1

7 BR - CUSTOM COLUMNS P18112 BORING LOGS 10212019.GPJ WRECO - NONCALTRANS.GLB 10/22/19

LOGGED BY	BEGIN DATE	COMPLETION DATE	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID
DB	**10-7-19**	**10-7-19**		**R-19-003**
DRILLING CONTRACTOR			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION
V & W Drilling				
DRILLING METHOD			DRILL RIG	BOREHOLE DIAMETER
Hollow-Stem Auger			**CME 55 HT**	**6"**
SAMPLER TYPE(S) AND SIZE(S) (ID)			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERi
Bulk, SPT (1.4"), Rock Core			**140 lb, 30"**	**84.9%**
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER READINGS DURING DRILLING AFTER DRILLING (DATE)	TOTAL DEPTH OF BORING
Neat Cement and Grout			**Not Encountered**	**3.0 ft**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per ft	Recovery (%)	RQD (%)	Rock Uniaxial Compressive Strength (psi)	Drilling Method	Casing Depth	Remarks
	0		Poorly-graded GRAVEL (GP); (loose to dense); gray; dry; little SAND ; Not native soil..										Bridge Boring Hard Drilling; lots of gravel
	1				A			92	0				
	2		METAMORPHIC ROCK; dark gray; slightly weathered; hard; very intensely fractured; Mostly the size of gravel.										Hit Refusal; Started Coring Water draining and caving issue within borehole. Stopped Coring.
	3		Bottom of borehole at 3.0 ft bgs Reached Target Depth										
	4		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (2010) except as noted on the Soil or Rock Legend or below.										
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WRECO
7807 Laguna Blvd., Suite 400
Elk Grove, CA 95758
(916) 513-7428

REPORT TITLE				HOLE ID
BORING RECORD				**R-19-003**
DIST.	COUNTY	ROUTE	POSTMILE	PROJECT NO.
03	**El Dorado**			**P18112**
PROJECT OR BRIDGE NAME				
Placerville Drive Bike and Pedestrian Facilities				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
	DB		**10-21-19**	**1 of 1**

7 BR - CUSTOM COLUMNS P18112 BORING LOGS 10212019.GPJ WRECO - NONCALTRANS.GLB 10/22/19

Updated Refraction Seismic Investigation
at the
Placerville Drive Bridge Replacement Project Site
Placerville, El Dorado County, California

GGSI Project No. 2023-25.01

Prepared by:

Gasch Geophysical Services, Inc.
Rancho Cordova, California 95742-6576

Submitted to:

Mr. David Kitzmann
HDR
7807 Laguna Blvd.
Suite 400
Elk Grove, California 95758

August, 2023

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GROUNDWATER, OIL & GAS
AND BLASTING INDUSTRIES

Since 1969

November 13, 2023

Mr. David Kitzmann
HDR
7807 Laguna Blvd, Suite 400
Elk Grove, California 95758

Re: Updated Refraction Seismic Investigation at the Placerville Drive Bridge Replacement Project Site in Placerville, El Dorado County, California. GGSI Project No. 2023-25.01

Dear Mr. Kitzmann:

At your request and authorization, Gasch Geophysical Services, Inc. (GGSI) has completed a Refraction Seismic Investigation to evaluate characteristics of the sub-surface materials at the Placerville Drive Bridge Replacement Project in Placerville, El Dorado County, California (Figure 1).

Purpose

It is our understanding that the purpose of this investigation was to utilize the refraction seismic method to provide detailed subsurface primary wave (also known as p-wave or compression wave) velocity information near the location of the bridge replacement site on Placerville Drive.

Method, Instrumentation and Software

The refraction seismic (RS) method was used to evaluate the rock velocities on site, as seismic primary-wave travel times are used to quantify the rock velocities and as a result, can determine the general competency/rippability in areas of various rock types.

The RS method measures the velocity at which a seismic wave propagates through a soil or rock medium. In this case, the primary (p-wave) or compressional seismic wave was measured. Higher seismic p-wave velocities (measured in feet per second, ft/s) indicate material of higher density, thus quantifying the competency, or strength of the soil or rock medium and providing an estimation of the rippability and/or excavatability of the sub-surface materials.

GGSI's seismic data acquisition system was a Seistronix EX-6 Explorer which is a distributed, 24-bit digital instrument with data output to electronic media for subsequent processing. Geophones were single, 10-Hz, digital grade units manufactured by OYO Geospace Corporation. Spread cables were manufactured by Pro-Seismic Services. The energy source for this project was a sixteen pound sledge hammer with a hardwire

connection for system triggering. All data were processed in house, on our data reduction and plotting workstation.

Refraction seismic data processing was carried out using Rayfract® version 4.05. This refraction seismic processing software utilizes Wavepath Eikonal Traveltime (WET) tomography, which models multiple signal propagation paths contributing to one first break (the Fresnel volume approach). Conventional ray tracing tomography is limited to the modeling of just one ray path per first break. The WET inversion method is founded upon a back-projection formula for inverting velocities from travel times computed by a finite-difference solution to the Eikonal equation (Qin, et al. 1992). An Eikonal solver is used for traveltime field computation, which models diffraction in addition to refraction and transmission of acoustic waves. As a result, the velocity anomaly imaging capability is enhanced with the WET tomographic inversion method compared to conventional ray tomography. This software is developed by Intelligent Resources, Inc. of Vancouver, British Colombia, Canada.

Data Acquisition Parameters

A total of 4 RS lines were acquired during this investigation. RS Line locations were suggested by HDR personnel and slightly adjusted in the field to allow for safe and efficient data acquisition. All RS Lines were acquired with geophone stations spaced at 10-foot intervals. Energy source points were located between every other geophone station on RS Lines 1, 3 and 4 and between every geophone station on RS Line 2, as well as off the ends of each line. RS Lines 1 and 3 were acquired with 12 active geophone stations RS Line 4 used 27 and RS Line 2 utilized 7 geophone stations, due to length constraints at this location. A total of 620 lineal feet of data were collected for this investigation. Collection of the field data were carried out on August 4th and November 3rd, 2023The field crew consisted of Professional Geophysicist Kent Gasch and Professional Engineer Josh Summers. The location of the RS lines are presented on Figure 2.

Seismic Velocities

Generally, seismic p-wave velocities less than 3,000 ft/s indicate native soil, fill material or highly weathered and/or decomposed rock, while velocities in excess of 10,000 ft/s indicate fresh (essentially non-weathered) rock. Seismic velocities between these two values typically indicate rock with varying degrees of weathering and/or fracturing. Consolidation and cementation, as well as, fracture spacing and density also affect the measured seismic velocities. Moderate velocities may indicate compacted soil, moderately weathered rock or loosely consolidated sediment such as gravel, sand and silt. Saturated sediment below the water table characteristically displays seismic velocities near or slightly above 5,000 ft/s.

Extremes in seismic velocities may range from below 1,000 ft/s to over 20,000 ft/s. Very low seismic velocities usually indicate highly weathered or poorly compacted

material, either natural or man-made. Extremely high velocities are rare in the near-surface, and only possible in certain types of rock. Rock velocities are dependent on the physical condition of the rock masses evaluated, as a result, seismic p-wave velocities are related to rock hardness, fracture density and sediment consolidation, saturation and cementation.

Findings

A color-coded seismic velocity cross-section of the subsurface has been generated for each RS line, where cool colors (blues) indicate lower seismic velocities and warm colors (reds, purple) indicate higher velocities. Color scaling of these seismic velocity sections is based on the range of seismic velocity values calculated. Velocity scaling has been normalized on all RS velocity sections.

The results of this Refraction Seismic Investigation are summarized by Figures 3 through 5. These seismic velocity sections, which were created through the inversion process, have very low error and provide a moderate to high degree of lateral definition of the seismic velocity horizons found beneath each line. The seismic velocity sections have been scaled from 1,500 ft/s to 16,000 ft/s for the velocity window and horizontal and vertical axes have been scaled to 10 feet per inch, however, RS Line 4 is scales at 20 feet per inch in the horizontal and vertical axes in order to fit media.

RS Line 1 (Figure 3)

RS Line 1 is located east of the existing bridge and south of the eastbound lane of Placerville Drive. This line is oriented approximately northwest to southeast and spans a length of 130 feet (see Figure 2). The seismic velocities measured at this location show a moderately-fast gradation from the low velocities (2,000 ft/s) at surface to moderate velocities (6,000 ft/s) at depths from surface on the northwest end to around 25 feet below ground surface (bgs) on the southeast end. The moderate velocity zone of 6,000 ft/s suggests moderately fractured rock grading to slightly fractured rock to fresh rock at velocities over 8,000 ft/s. Velocities on the northwest end of this line show the influence of the existing bridge foundation on velocity measurements.

RS Line 2 (Figure 4)

RS Line 2 is also located east of the existing bridge, but on the westbound side of Placerville Drive. This Line measures only 80 feet in length and is oriented northwest to southeast (see Figure 2). Due to site constraints, this line was too short to explore to higher velocity material.

RS Line 3 (Figure 5)

RS Line 3 is located on the west side of the existing bridge, just north of the westbound lane of Placerville Drive. This line is 130 feet in length and is oriented approximately

northwest to southeast (see Figure 2). Seismic velocities beneath this line grade at a moderate rate from low-moderate velocity material (2,000 ft/s) at ground surface to moderate velocities (6,000 ft/s) at approximate depths of 15 to 25 feet bgs. The moderate velocity zone of 6,000 ft/s suggests moderately fractured rock grading to slightly fractured rock to fresh rock at velocities over 8,000 ft/s. Velocities on the southeast end of this line again show the influence of the existing bridge foundation on velocity measurements.

RS Line 4 (Figure 6)

RS Line 4 is located on the north side of the westbound lane of Placerville Drive, west of the end of RS Line 3 and continues to near the intersection of Placerville Drive and Pierroz Road. This line is 280 feet in length and is oriented approximately east to west (see Figure 2). Seismic velocities at this location grade at a moderate rate from low-moderate velocity material (2,000 ft/s) at ground surface to moderate velocities (6,000 ft/s) at depths of approximately 15 to 24 feet bgs. The moderate velocity zone of 6,000 ft/s suggests moderately fractured rock grading to slightly fractured rock to fresh rock at velocities over 8,000 ft/s. Velocities are fairly consistent across the line with only minor undulations of the velocity contours.

Summary

This refraction seismic investigation provides a good sampling of the subsurface conditions at two of the three locations at the Placerville Drive Bridge Replacement Project Site. This investigation revealed a high degree of variation in the calculated seismic velocities of the subsurface materials, with the highest seismic velocity of greater than 15,000 ft/s measured on Line 4. Low to moderate velocity material was encountered in the near surface on all RS lines except Line 2, which was too short to measure moderate or greater seismic velocities. The low to moderate velocities suggest moderately to highly weathered/fractured rock and soil or fill. The moderate to moderate-high velocity range of 5,000 ft/s to approximately 8,000 ft/s, suggests moderately weathered/fractured rock or moderately consolidated sediment. The higher velocity horizon (8,000 ft/s and greater) suggests rock of moderate weathering and/or fractures and continues to slightly weathered and/or less fractured rock to fresh rock at depth.

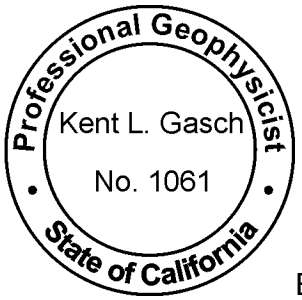
Warranty and Limitations

Gasch Geophysical Services, Inc. has performed these services in a manner which is consistent with standards of the profession. Site conditions can cause some variations of the calculated seismic velocities. Refraction seismic velocities assume that velocities increase with depth; therefore, a lower seismic velocity layer beneath a higher seismic velocity layer will not be resolved. No guarantee, with respect to the results and performance of services or products delivered for this project, is implied or expressed by Gasch Geophysical Services, Inc.

We trust that this is the information you require; however, should you have comments or questions, please contact our Rancho Cordova office at your convenience. Thank you for this opportunity to again be of service.

Sincerely,

GASCH GEOPHYSICAL SERVICES, INC.



Expires 12/31/2023

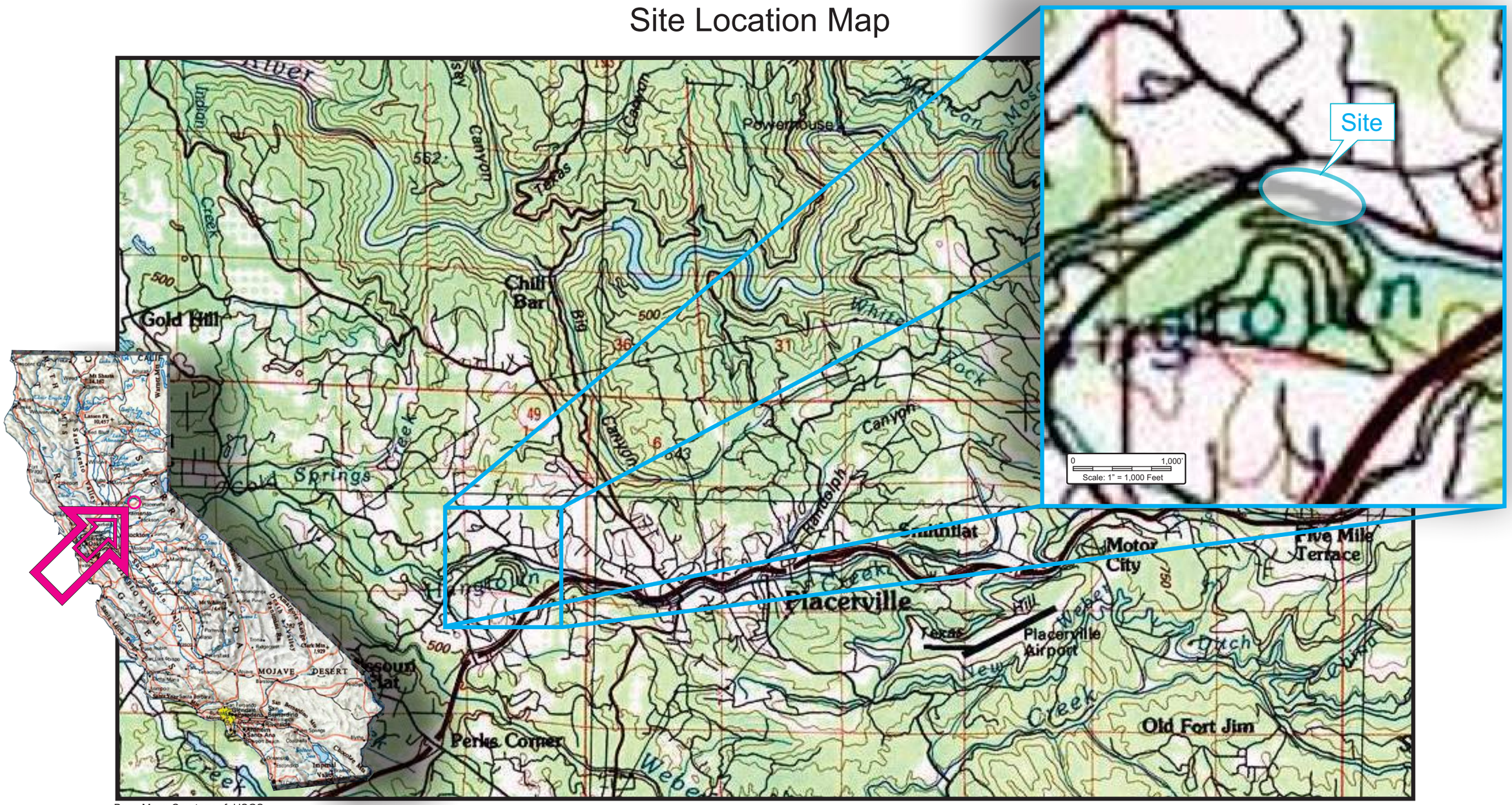
Kent L. Gasch
Professional Geophysicist #1061
Blasting Consultant



Josh R. Summers
Professional Civil Engineer No. C85240

Expires 6/30/2024

Site Location Map



Base Maps Courtesy of: USGS

Figure 1

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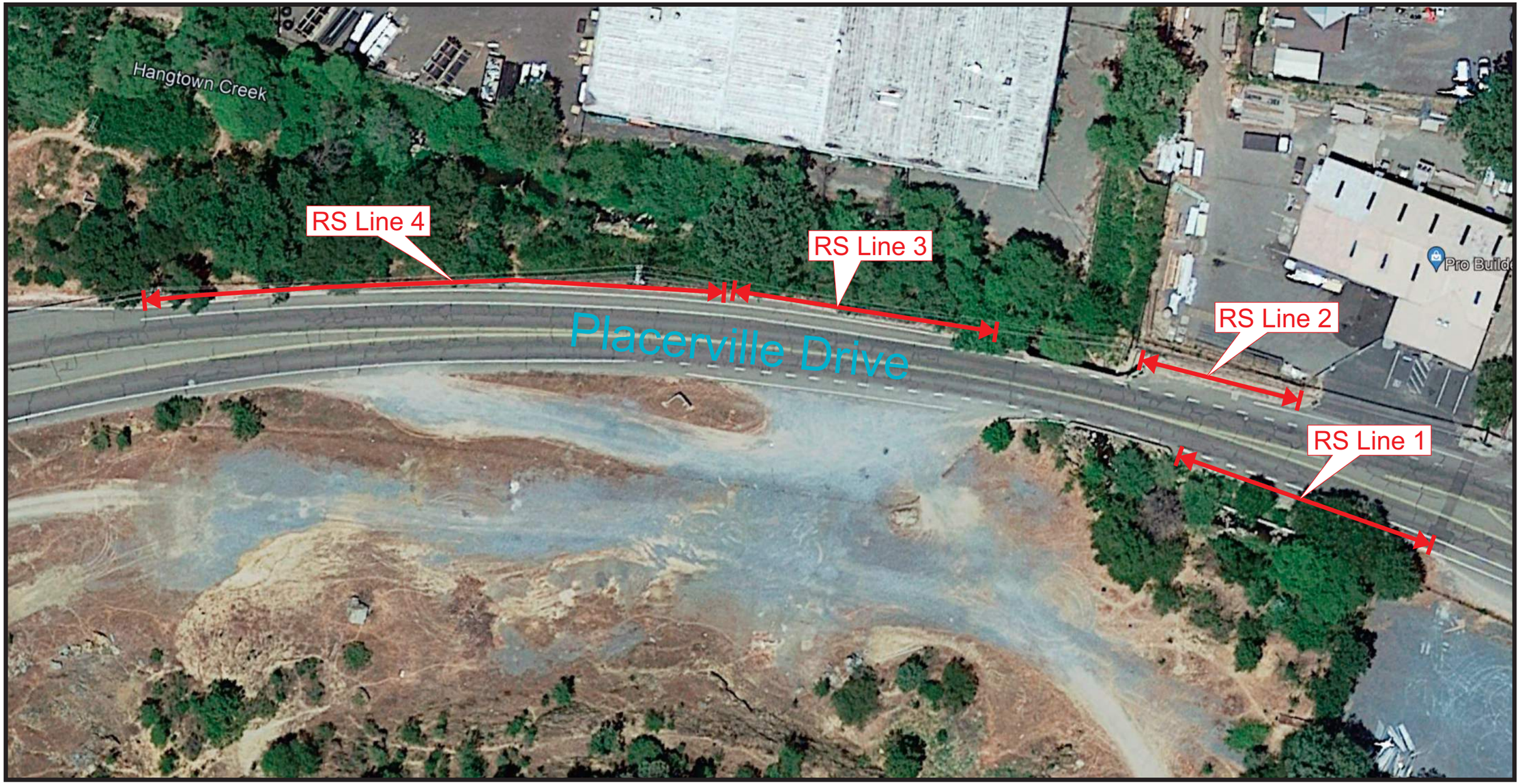
3174 Luyung Drive, Building #2
Rancho Cordova, California 95742 U.S.A.
(916) 635-8906 • FAX (916) 635-8907

Refraction Seismic Investigation:
Placerville Drive Bridge Replacement Site

Prepared for: HDR

Project Number: 2023-25.01 ***Date:*** August, 2023

RS Line Location Map



Base Map Courtesy of Google Earth Pro, dated 6/04/2021

N
W E
S

0’ 25’ 50’ 100’ 150’

Scale: 1 inch = 50 feet

Figure 2

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Refraction Seismic Investigation:
Placerville Drive Bridge Replacement Site

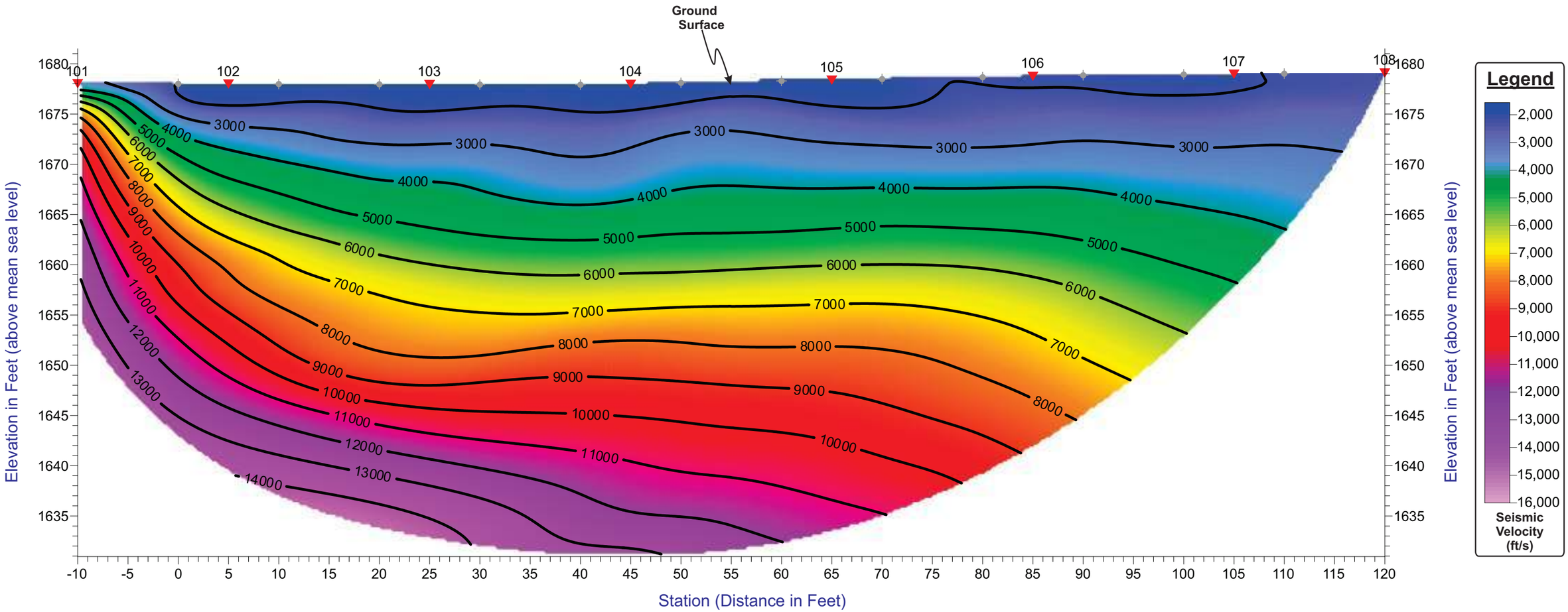
Prepared for: ***HDR***

Project Number: 2023-25.01 ***Date:*** August, 2023

Seismic Velocity Section • RS Line 1

Northwest

Southeast



Scale:
Horizontal: 1” = 10’
Vertical: 1” = 10’

Legend
Geophone Station
101 Energy Source Locations

Figure 3

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Rancho Cordova, California 95742 U.S.A.
(916) 635-8906 • FAX (916) 635-8907

Refraction Seismic Investigation:
Placerville Drive Bridge Replacement Site

Prepared for: *HDR*

Project Number: 2023-25.01 ***Date:*** August, 2023

Seismic Velocity Section • RS Line 2

Northwest

Southeast

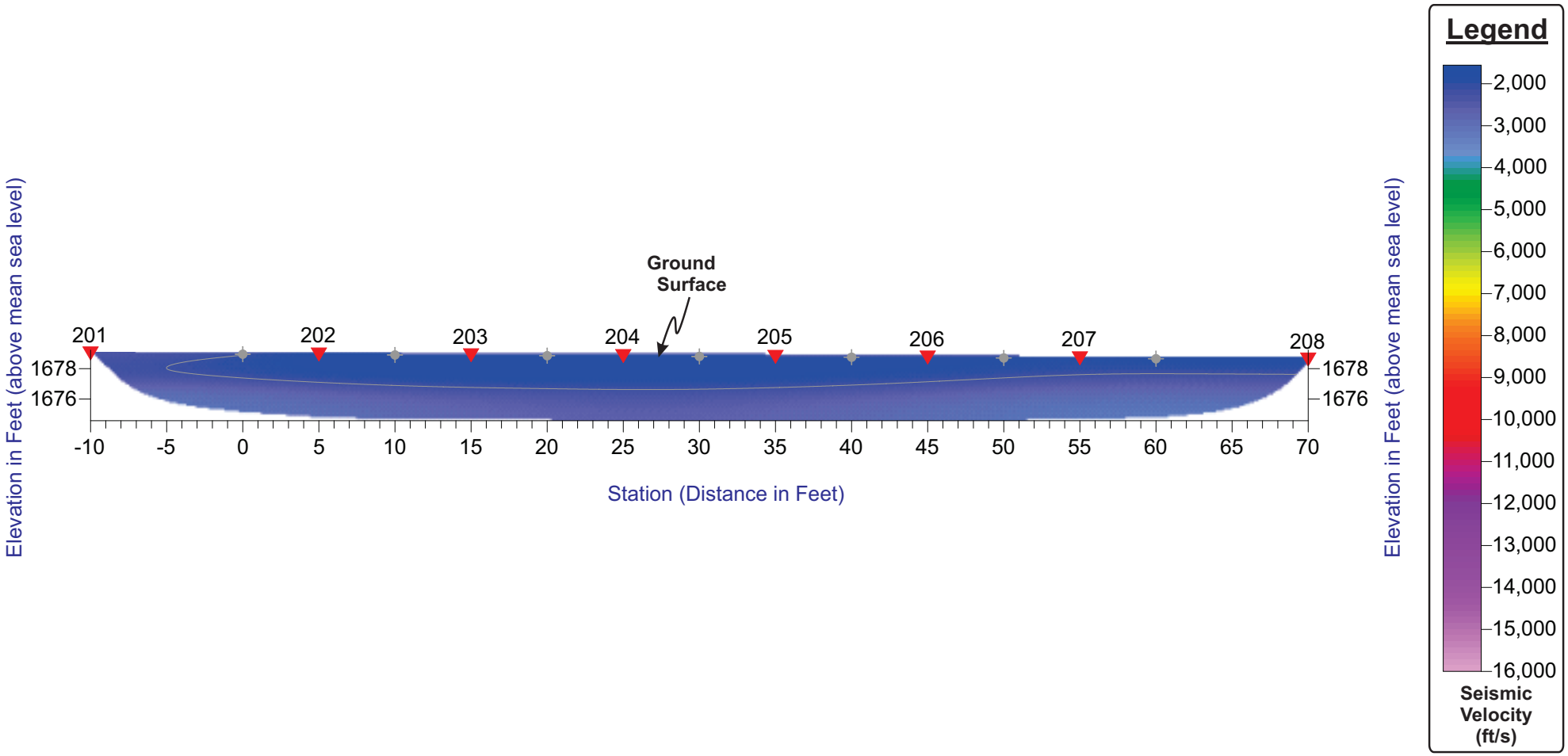


Figure 4

Scale:
Horizontal: 1” = 10’
Vertical: 1” = 10’

Legend

Geophone Station

201 Energy Source Locations

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Refraction Seismic Investigation:
Placerville Drive Bridge Replacement Site

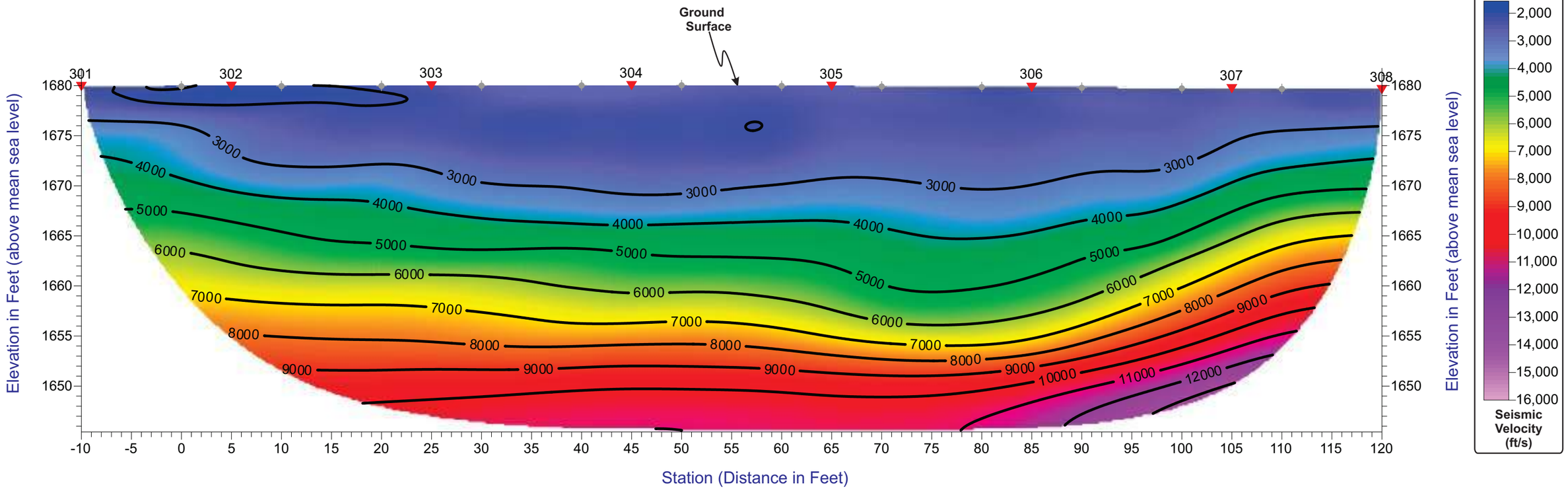
Prepared for: ***HDR***

Project Number: 2023-25.01 ***Date:*** August, 2023

Seismic Velocity Section • RS Line 3

Northwest

Southeast



Scale:
Horizontal: 1” = 10’
Vertical: 1” = 10’

Legend
Geophone Station
301 Energy Source Locations

Figure 5

GS² Consultants in Geophysics for the Engineering, Groundwater, Oil & Gas and Blasting Industries
Gasch Geophysical Services, Inc. Since 1969
www.geogasch.com
3174 Luyung Drive, Building #2
Rancho Cordova, California 95742 U.S.A.
(916) 635-8906 • FAX (916) 635-8907

Refraction Seismic Investigation:
Placerville Drive Bridge Replacement Site

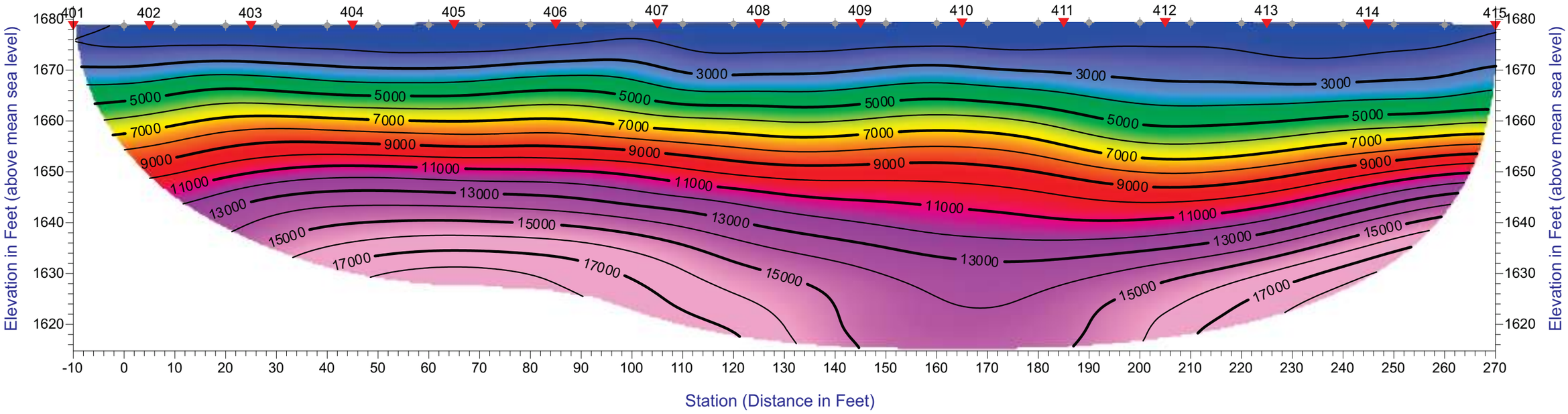
Prepared for: ***HDR***

Project Number: 2023-25.01 ***Date:*** August, 2023

Seismic Velocity Section • RS Line 4

Northwest

Southeast



Seismic Velocity Scale

Seismic Velocity (ft/s)

2,000 3,000 4,000 5,000 6,000 7,000 8,000 9,000 10,000 11,000 12,000 13,000 14,000 15,000 16,000

Scale:
Horizontal: 1” = 20’
Vertical: 1” = 20’

Legend

Geophone Station

401 Energy Source Locations

Figure 6

GSC Geophysical Services, Inc. — Consultants in Geophysics for the Engineering, Groundwater, Oil & Gas and Blasting Industries

Gasch Geophysical Services, Inc. Since 1969

www.geogasch.com

3174 Luyung Drive, Building #2
Rancho Cordova, California 95742 U.S.A.
(916) 635-8906 • FAX (916) 635-8907

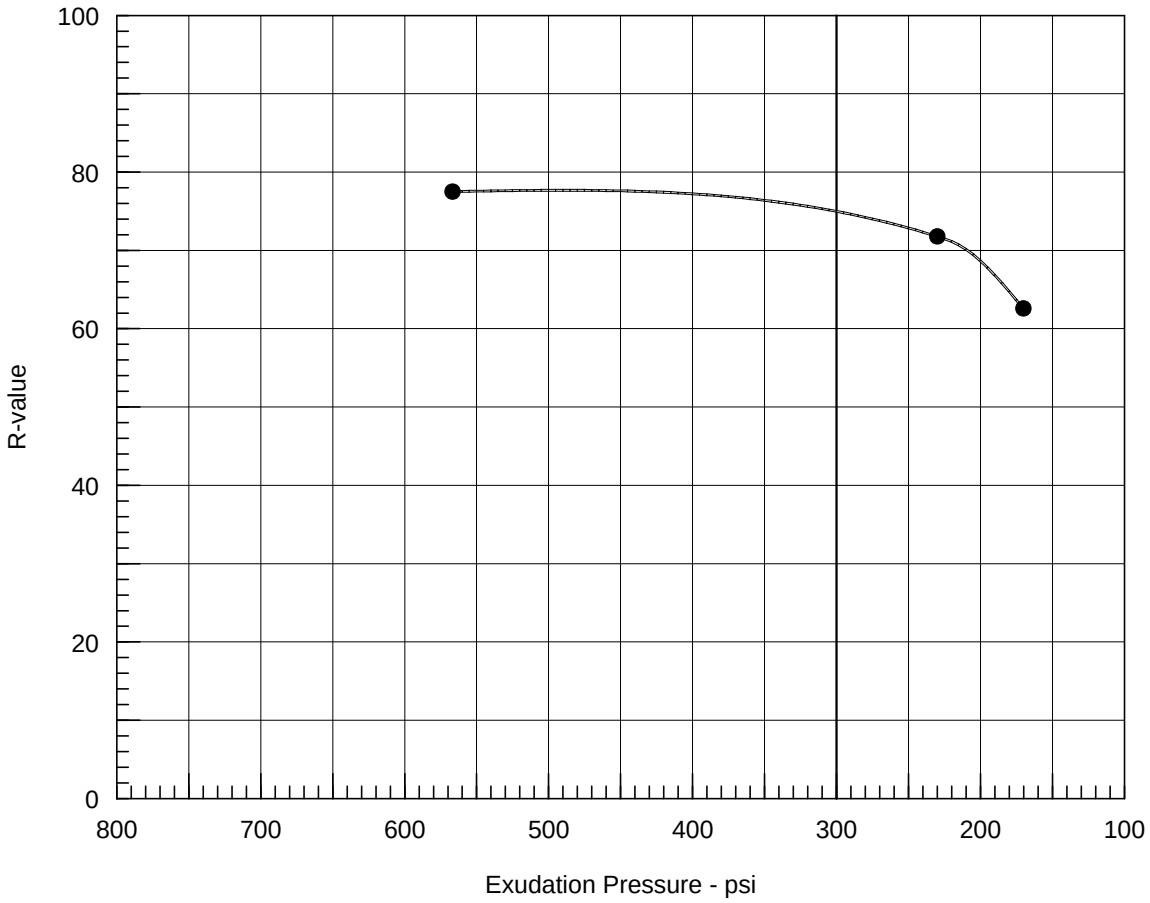
Refraction Seismic Investigation:
Placerville Drive Bridge Replacement Site

Prepared for: HDR

Project Number: 2023-25.01 ***Date:*** August, 2023

Appendix V. HDR Laboratory Testing

R-VALUE TEST REPORT



Resistance R-Value and Expansion Pressure - Cal Test 301

No.	Compact. Pressure psi	Density pcf	Moist. %	Expansion Pressure psf	Horizontal Press. psi @ 160 psi	Sample Height in.	Exud. Pressure psi	R Value	R Value Corr.
1	350	119.3	11.0	153	22	2.49	567	78	78
2	350	120.1	11.5	118	30	2.47	230	72	72
3	350	119.1	12.0	70	41	2.61	170	60	63

Test Results	Material Description
R-value at 300 psi exudation pressure = 75	CLAYEY SAND with GRAVEL, dark yellowish brown

Project No.: 3390.X
Project: WRECO Lab Testing
Source of Sample: P18112 **Depth:** 0-5'
Sample Number: HA-19-008, S1
Date: 12/10/2019

Tested by: BRL
Checked by: RBL

Remarks:
24% retained on the #4 sieve, sample batched

R-VALUE TEST REPORT

Blackburn Consulting

Figure _____

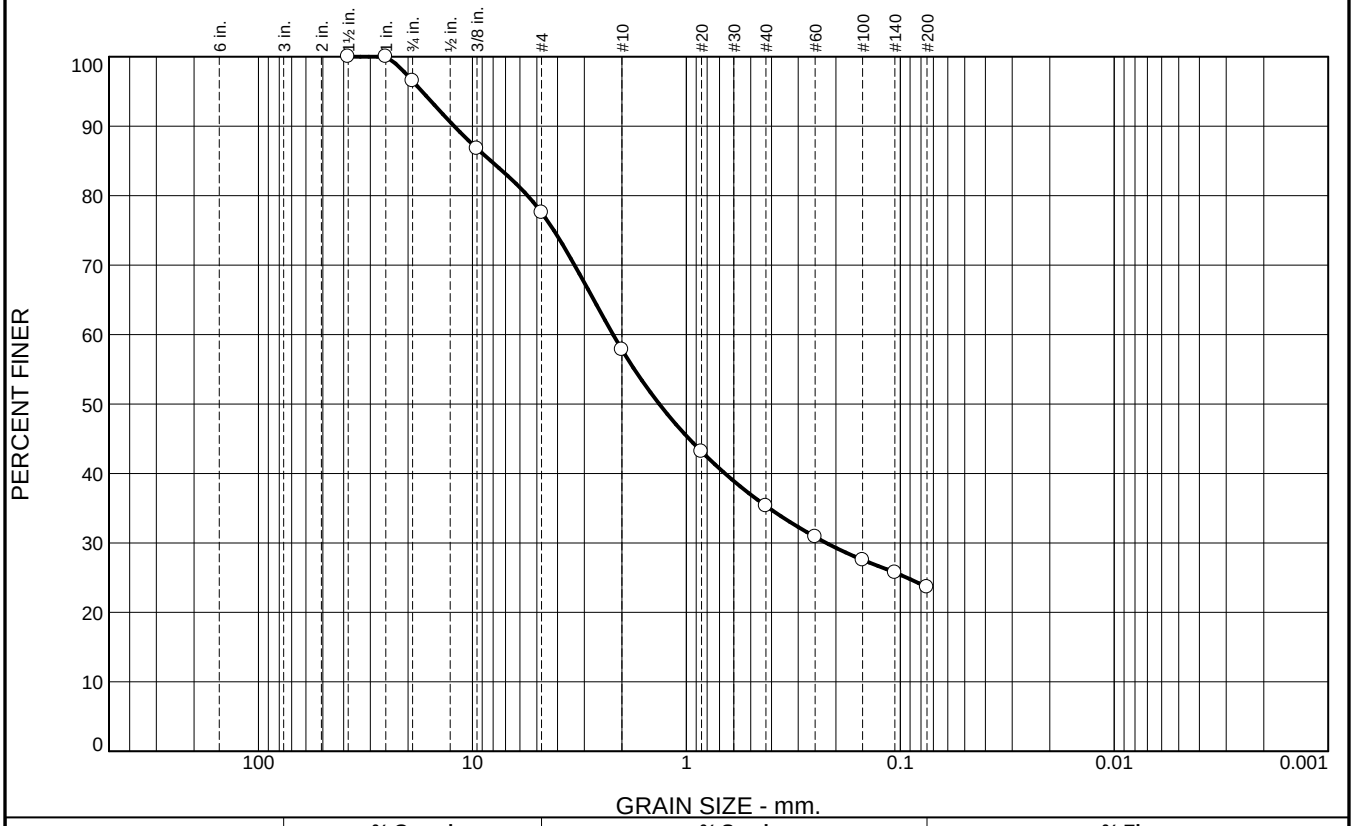
BLACKBURN CONSULTING

Project: P18112 **Date: 12/10/19** **Technician: BRL**

ASTM D 5731 Point Load Testing

Boring	Run Number	Depth (ft)	D (in)	L (in)	L/D Ratio	Maximum Pressure Reading (psi)	Load at Failure (lbf)	Core Size Correction Factor (F)	PLI (Point Load Index) (psi)	Size Corrected PLI (psi)	UCS Estimate (psi, K=24.5)	Notes
A-19-002	B	11.5	2.4	7.0	2.9	5189	7625	1.09	1324	1447	**35457**	Diametral Break
A-19-002	C	13.5	2.4	5.7	2.4	1740	2557	1.09	444	485	**11890**	Diametral Break
A-19-002	D	17.5	2.4	2.7	1.1	3858	5669	1.09	984	1076	**26362**	Diametral Break
A-19-005	A	17.0	2.4	7.0	2.9	1883	2767	1.09	480	525	**12867**	Diametral Break
A-19-005	B	25.0	2.4	3.0	1.3	1958	2877	1.09	499	546	**13379**	Diametral Break

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	3	19	20	23	11	24	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5"	100		
1"	100		
3/4"	97		
3/8"	87		
#4	78		
#10	58		
#20	43		
#40	35		
#60	31		
#100	28		
#140	26		
#200	24		

* (no specification provided)

Material Description

CLAYEY SAND with GRAVEL, yellowish brown

Atterberg Limits

PL= 18 LL= 32 PI= 14

Coefficients

D_{90}= 12.1699 D_{85}= 8.2025 D_{60}= 2.2006
D_{50}= 1.3391 D_{30}= 0.2217 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO= A-2-6(0)

Remarks

Source of Sample: P18112 **Depth:** 5'
Sample Number: A-19-002, S2 **Date:**

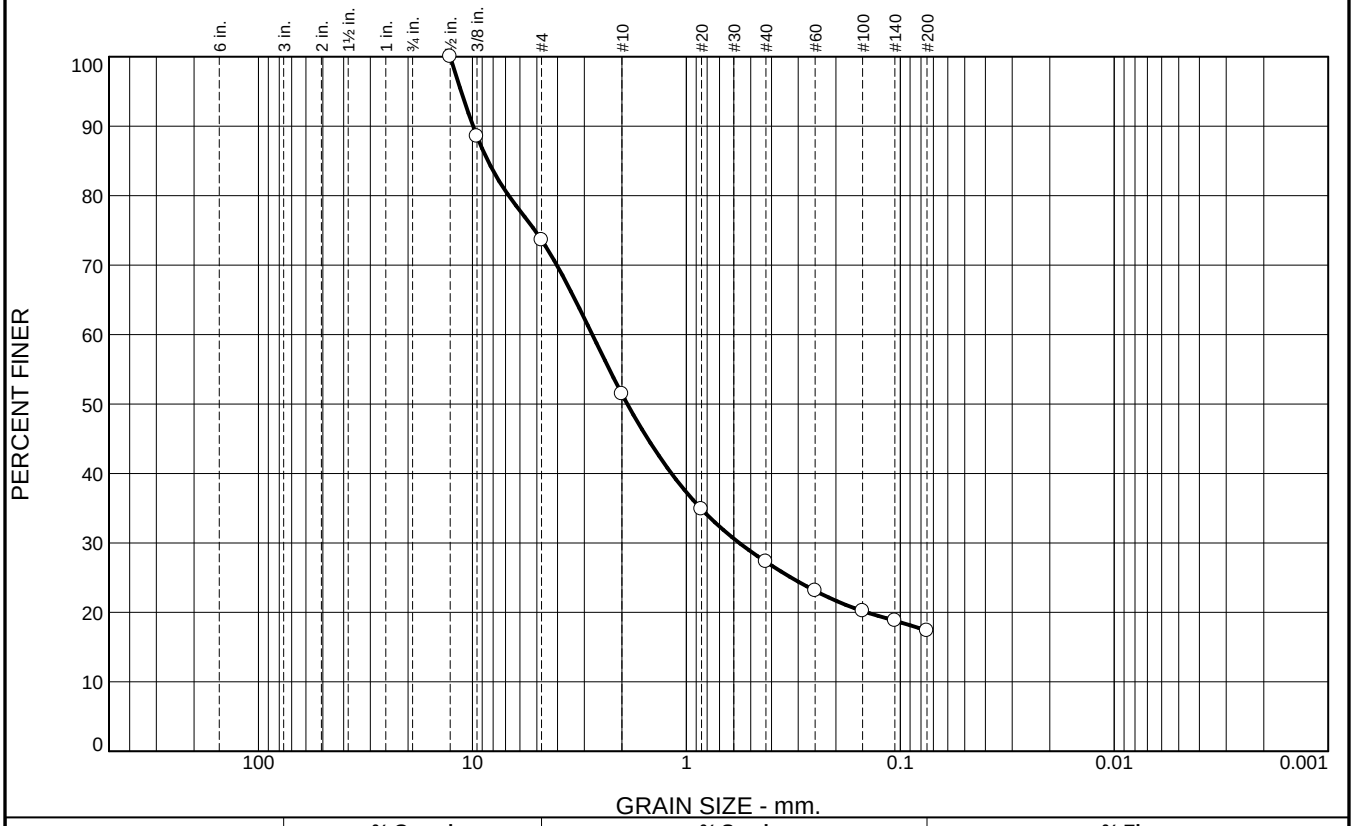
Blackburn Consulting

W. Sacramento, CA

Client: WRECO
Project: WRECO Lab Testing

Project No: 3390.X **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	26	23	24	10	17	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/2"	100		
3/8"	89		
#4	74		
#10	51		
#20	35		
#40	27		
#60	23		
#100	20		
#140	19		
#200	17		

* (no specification provided)

Material Description

SILTY SAND with GRAVEL, yellowish brown

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{90}= 9.9353 D_{85}= 8.4690 D_{60}= 2.7534
D_{50}= 1.8868 D_{30}= 0.5658 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-1-b

Remarks

Source of Sample: P18112 **Depth:** 10'
Sample Number: A-19-005, S3 **Date:**

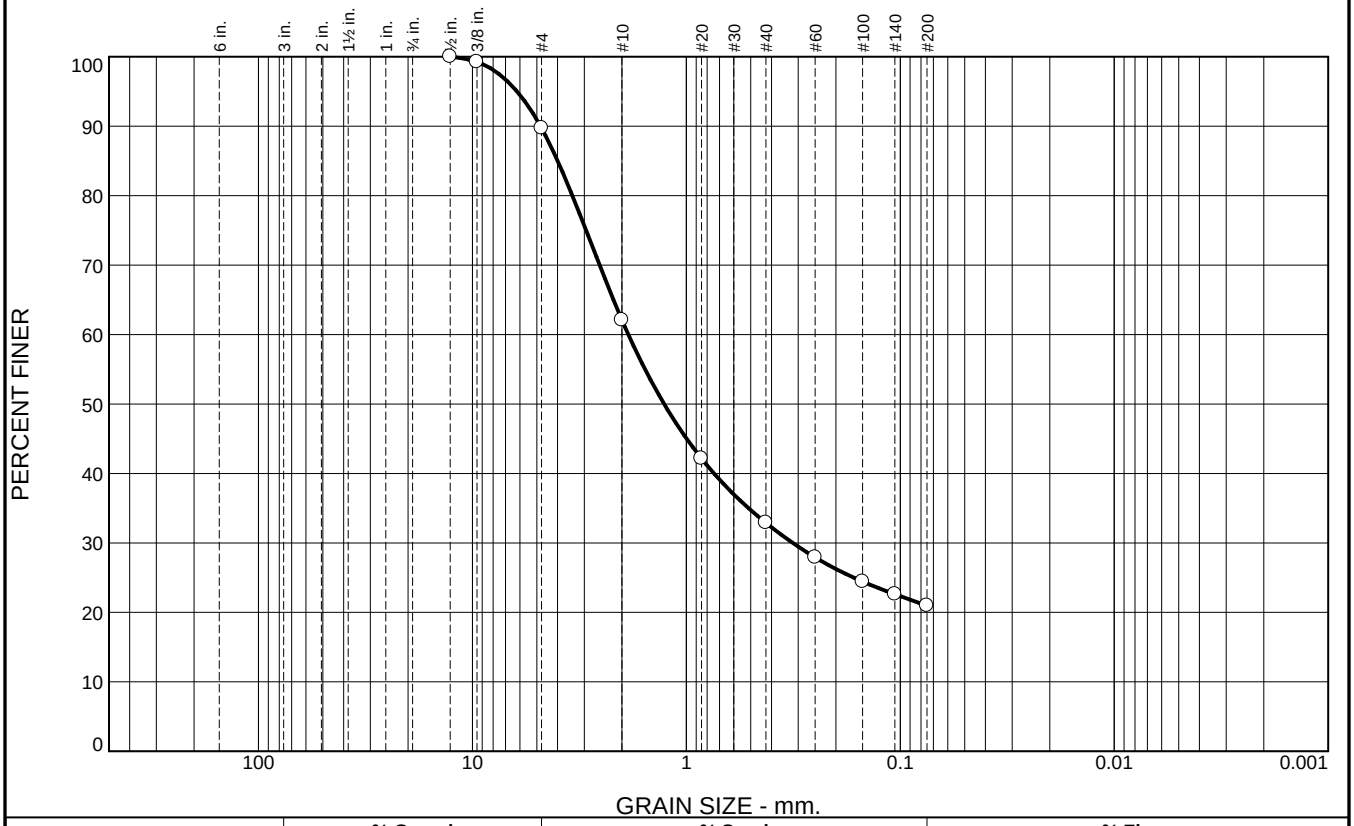
Blackburn Consulting

W. Sacramento, CA

Client: WRECO
Project: WRECO Lab Testing

Project No: 3390.X **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	10	28	29	12	21	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/2"	100		
3/8"	99		
#4	90		
#10	62		
#20	42		
#40	33		
#60	28		
#100	24		
#140	23		
#200	21		

* (no specification provided)

Material Description

SILTY SAND, yellowish brown

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{90}= 4.8069 D_{85}= 3.9981 D_{60}= 1.8670
D_{50}= 1.2703 D_{30}= 0.3184 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-1-b

Remarks

Source of Sample: P18112 **Depth:** 10'
Sample Number: A-19-006, S3 **Date:**

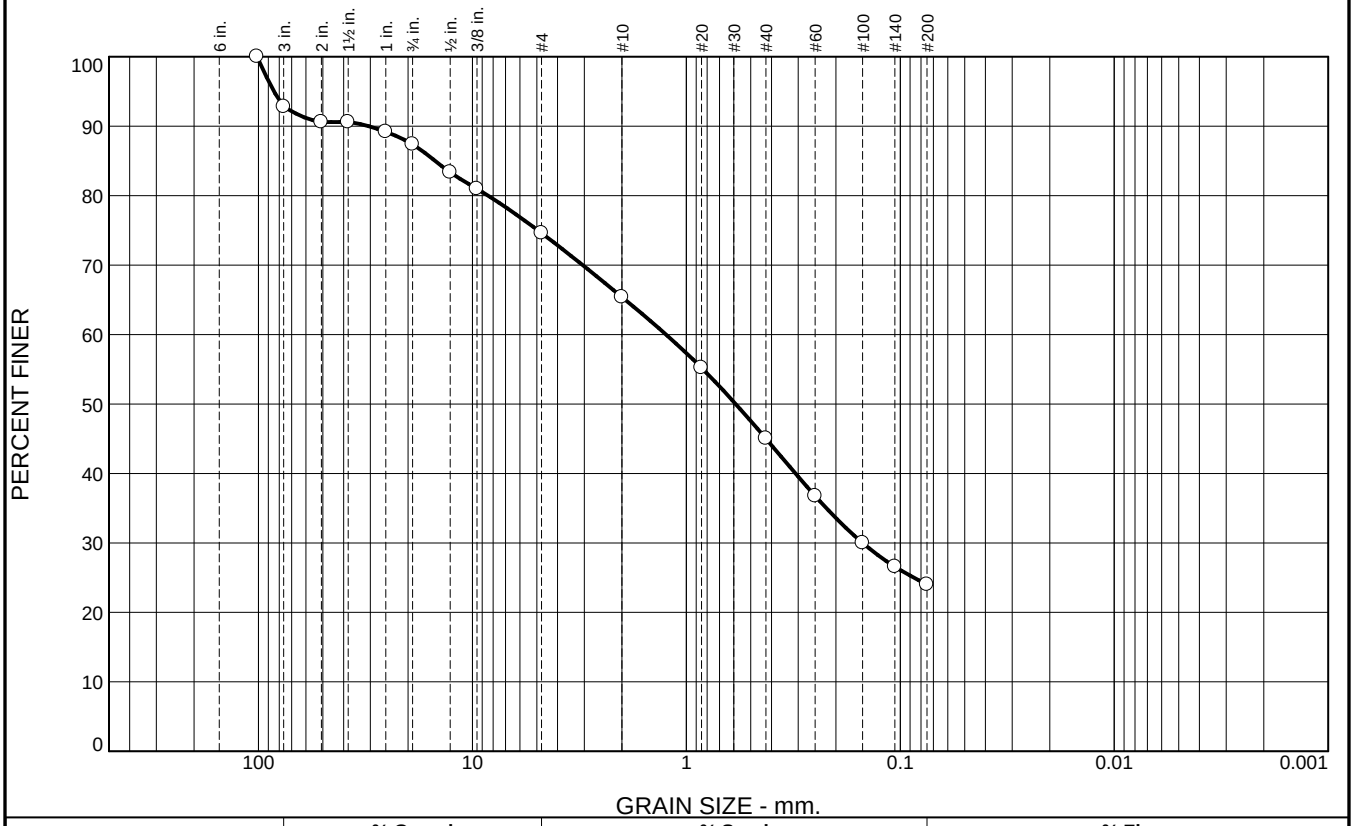
Blackburn Consulting

W. Sacramento, CA

Client: WRECO
Project: WRECO Lab Testing

Project No: 3390.X **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
7	6	12	10	20	21	24	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
4"	100		
3"	93		
2"	91		
1.5"	91		
1"	89		
3/4"	87		
1/2"	83		
3/8"	81		
#4	75		
#10	65		
#20	55		
#40	45		
#60	37		
#100	30		
#140	27		
#200	24		

* (no specification provided)

Material Description

CLAYEY SAND with GRAVEL, dark yellowish brown

Atterberg Limits

PL= 24 LL= 34 PI= 10

Coefficients

D_{90}= 30.5354 D_{85}= 14.9428 D_{60}= 1.2448
D_{50}= 0.5882 D_{30}= 0.1501 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO= A-2-4(0)

Remarks

Source of Sample: P18112 **Depth:** 0-5'
Sample Number: HA-19-008, S1 **Date:**

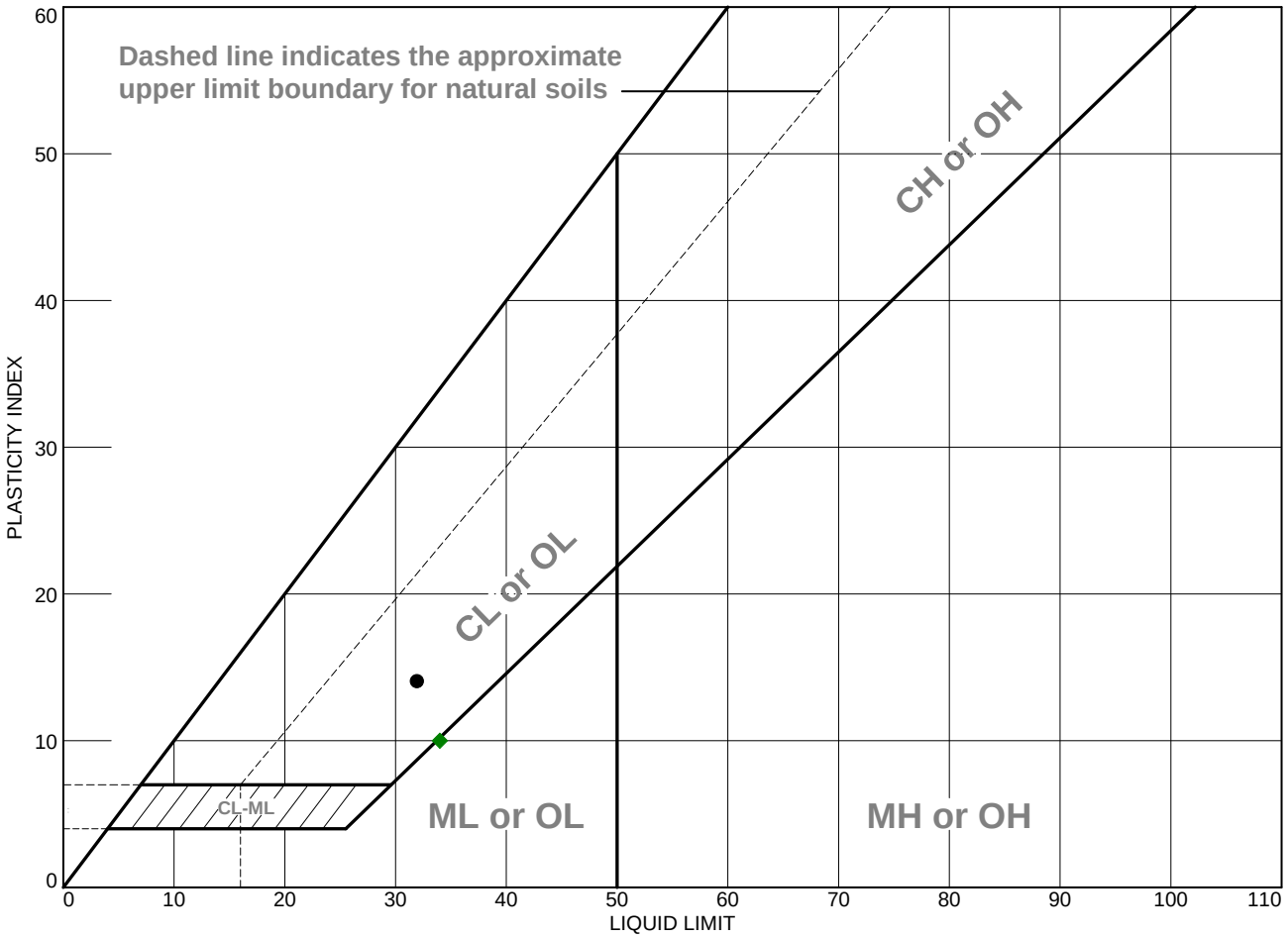
Blackburn Consulting

W. Sacramento, CA

Client: WRECO
Project: WRECO Lab Testing

Project No: 3390.X **Figure**

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	CLAYEY SAND, yellowish brown	32	18	14	35	24	SC
■	SILTY SAND with GRAVEL, yellowish brown	NP	NP	NP	27	17	SM
▲	SILTY SAND, yellowish brown	NP	NP	NP	33	21	SM
◆	CLAYEY SAND with GRAVEL, dark yellowish brown	34	24	10	45	24	SC

Project No. 3390.X **Client:** WRECO

Project: WRECO Lab Testing

●**Source of Sample:** P18112 **Depth:** 5' **Sample Number:** A-19-002, S2

■**Source:** P18112 **Depth:** 10' **Sample No.:** A-19-005, S3

▲**Source:** P18112 **Depth:** 10' **Sample No.:** A-19-006, S3

◆**Source:** P18112 **Depth:** 0-5' **Sample No.:** HA-19-008, S1

Blackburn Consulting

W. Sacramento, CA

Remarks:

Figure

Appendix VI. As-Built Data

California Department of Transportation
Division of Maintenance

Structure Maintenance and Investigations

BRIDGE

INSPECTION

RECORDS

INFORMATION

SYSTEM

The requested documents have been generated by BIRIS.

These documents are the property of the California Department of Transportation and should be handled in accordance with Deputy Directive 55 and the State Administrative Manual.

Records for “Confidential” bridges may only be released outside the Department of Transportation upon execution of a confidentiality agreement.

DEPARTMENT OF TRANSPORTATION
Structure Maintenance & Investigations

Bridge Number : 25C0029
Facility Carried: PLACERVILLE DR
Location : 0.3 MI W COLD SPRINGS RD
City : PLACERVILLE
Inspection Date : 07/15/2020

Bridge Inspection Report

Inspection Type

Routine	FC	Underwater	Special	Other
X				

STRUCTURE NAME: HANGTOWN CREEK

CONSTRUCTION INFORMATION

Year Built : 1931
Year Modified: N/A
Length (m) : 13.7
Skew (degrees): 50
No. of Joints : 0
No. of Hinges : 0

Structure Description: Single span RC T-girders (4) with an AC overlay on RC abutments (diaphragm type at Abutment 1 and seat type at Abutment 2) with monolithic wingwalls founded on spread footings.

Span Configuration : 1 @ 43 ft

SAFE LOAD CAPACITY AND RATINGS

Design Live Load: UNKNOWN
Inventory Rating: RF= 0.85 Calculation Method: (LRFR) LD & RES FACT RATING
Operating Rating: RF= 1.18 Calculation Method: (LRFR) LD & RES FACT RATING
Permit Rating : PPPPP
Posting Load : Type 3: Legal Type 3S2: Legal Type 3-3: Legal

DESCRIPTION ON STRUCTURE

Deck X-Section: 1 ft br, 0.6 ft cu, 24 ft, 0.6 ft cu, 1 ft br
Total Width: 8.4 m Net Width: 7.3 m No. of Lanes: 2 Speed: 35 mph
Min. Vertical Clearance: Unimpaired Overlay Thickness: 3.5 inches
Rail Code: 0000

DESCRIPTION UNDER STRUCTURE

Channel Description: High flow with a rocky channel bottom.

NOTICE

The bridge inspection condition assessment used for this inspection is based on the American Association of State Highway and Transportation Officials (AASHTO) Bridge Element Inspection Manual 2013 as defined in Moving Ahead for Progress in the 21st Century (MAP-21) federal law. The new element inspection methodology may result in changes to related condition and appraisal ratings on the bridge without significant physical changes at the bridge.

The element condition information contained in this report represents the current condition of the bridge based on the most recent routine and special inspections. Some of the notes presented below may be from an inspection that occurred prior to the date noted in this report. Refer to the Scope and Access section of this inspection report for a description of which portions of the bridge were inspected on this date.

INSPECTION COMMENTARY

SCOPE AND ACCESS

Six to 10 inches of clear water was flowing in the creek against Abutment 1 during this inspection. The lower portion of Abutment 1 was submerged but could be viewed through the clear water. Abutment 2 was dry. The substructure and superstructure were inspected by walking under the bridge with waders and a probe stick. The bridge deck was inspected by walking the deck. All visible elements received a complete inspection.

SAFE LOAD CAPACITY

INSPECTION COMMENTARY

A Load Rating Summary Sheet dated 08/27/2015 is on file for this structure. While this report does not include a check of that analysis, it does verify that the structural conditions observed during this inspection are consistent with those assumed in that analysis. The current rating is based on BrR 6.7.0 AASHTO computer output dated 08/27/2015.

ELEMENT INSPECTION RATINGS AND COMMENTARY

Elem No.	Defect /Prot	Defect	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4
16			**Top Flange-RC**	2	110	sq.m	110	0	0	0
	510		**Deck Wearing Surface-Asphalt**	2	100	sq.m	95	5	0	0
		3220	**Cracking-AC (WS)**	2	5		0	5	0	0

(16)
There were no significant defects noted.

(16-510-3220)
There are up to 0.25 inch wide longitudinal cracks in the AC in both lanes. The cracks are up to 10 feet in length and have been sealed with crack sealant as shown in Photo 7 from the 07/26/2016 report.

110			**Girder/Beam-RC**	2	52	m	52	0	0	0

(110)
There are hairline vertical cracks on the bottom of the girders. Refer to Photo 1 from the 07/24/2008 inspection. These cracks are 1 to 2 feet on center and less than 0.01 inch wide and are not considered a recordable defect at this time.

215			**Abutment-RC**	2	26	m	18	8	0	0
	1130		**Cracking (RC and Other)**	2	3		0	3	0	0
	1190		**Abrasion (PS Conc./RC)**	2	5		0	5	0	0

(215)
The monolithic wingwall quantity has been included in the total abutment quantity.

(215-1130)
A vertical crack is present under Girder 2 on the face of Abutment 1. The crack is up to 0.04 inch wide and 6 feet long with minor efflorescence. Refer to Photo 2.

There is a vertical crack in the face of Abutment 2 that is 0.03 inch wide and 3 feet long. A diagonal crack, 0.04 inch wide and 2 feet in length, is emanating from the corner of the right shear key at Abutment 2. Refer to Photo 3.

(215-1190)
The lower 6 inches of the right half of Abutment 1 is abraded with no loose aggregate.

311			**Bearing-Moveable**	2	4	each	4	0	0	0

(311)
There were no significant defects noted.

331			**Railing-RC**	2	27	m	25	0	2	0
	1080		**Delamination/Spall/Patched Area**	2	1		0	0	1	0
	1130		**Cracking (RC and Other)**	2	1		0	0	1	0

(331-1080)
There is an 18 inch diameter by 3 inch deep spall with two exposed rebar at the top of the left rail at Abutment 2. Refer to Photo 1 from the 07/19/2018 inspection.

ELEMENT INSPECTION RATINGS AND COMMENTARY

Elem No.	Defect /Prot	Defect	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4

(331-1130)
The right rail at Abutment 1 has a 0.1 inch wide crack adjacent to the approach rail. The crack is approximately 2 feet in length as shown in Photo 1.

WORK RECOMMENDATIONS - NONE

Team Leader : Jacob M. Boulant

Report Author : Jacob M. Boulant

Inspected By : JM.Boulant/JE.Edwards



11/23/2020

Jacob M. Boulant (Registered Civil Engineer) (Date)

STRUCTURE INVENTORY AND APPRAISAL REPORT

********** IDENTIFICATION **********

(1) STATE NAME- CALIFORNIA 069
(8) STRUCTURE NUMBER **25C0029**
(5) INVENTORY ROUTE(ON/UNDER)- ON 150000000
(2) HIGHWAY AGENCY DISTRICT 03
(3) COUNTY CODE 017 (4) PLACE CODE 57540
(6) FEATURE INTERSECTED- HANGTOWN CREEK
(7) FACILITY CARRIED- PLACERVILLE DR
(9) LOCATION- 0.3 MI W COLD SPRINGS RD
(11) MILEPOINT/KILOMETERPOINT 0
(12) BASE HIGHWAY NETWORK- NOT ON NET 0
(13) LRS INVENTORY ROUTE & SUBROUTE
(16) LATITUDE 38 DEG 44 MIN 00.47 SEC
(17) LONGITUDE 120 DEG 49 MIN 39.92 SEC
(98) BORDER BRIDGE STATE CODE % SHARE %
(99) BORDER BRIDGE STRUCTURE NUMBER

******** STRUCTURE TYPE AND MATERIAL *********

(43) STRUCTURE TYPE MAIN:MATERIAL- CONCRETE
TYPE- TEE BEAM CODE 104
(44) STRUCTURE TYPE APPR:MATERIAL- OTHER/NA
TYPE- OTHER/NA CODE 000
(45) NUMBER OF SPANS IN MAIN UNIT 1
(46) NUMBER OF APPROACH SPANS 0
(107) DECK STRUCTURE TYPE- CIP CONCRETE CODE 1
(108) WEARING SURFACE / PROTECTIVE SYSTEM:
A) TYPE OF WEARING SURFACE- BITUMINOUS CODE 6
B) TYPE OF MEMBRANE- NONE CODE 0
C) TYPE OF DECK PROTECTION- NONE CODE 0

*********** AGE AND SERVICE ***********

(27) YEAR BUILT 1931
(106) YEAR RECONSTRUCTED 0000
(42) TYPE OF SERVICE: ON- HIGHWAY 1
UNDER- WATERWAY 5
(28) LANES:ON STRUCTURE 02 UNDER STRUCTURE 00
(29) AVERAGE DAILY TRAFFIC 20000
(30) YEAR OF ADT 2013 (109) TRUCK ADT 10 %
(19) BYPASS, DETOUR LENGTH 2 KM

********** GEOMETRIC DATA **********

(48) LENGTH OF MAXIMUM SPAN 13.1 M
(49) STRUCTURE LENGTH 13.7 M
(50) CURB OR SIDEWALK: LEFT 0.2 M RIGHT 0.2 M
(51) BRIDGE ROADWAY WIDTH CURB TO CURB 7.3 M
(52) DECK WIDTH OUT TO OUT 8.4 M
(32) APPROACH ROADWAY WIDTH (W/SHOULDERS) 9.1 M
(33) BRIDGE MEDIAN- NO MEDIAN 0
(34) SKEW 50 DEG (35) STRUCTURE FLARED NO
(10) INVENTORY ROUTE MIN VERT CLEAR 99.99 M
(47) INVENTORY ROUTE TOTAL HORIZ CLEAR 7.3 M
(53) MIN VERT CLEAR OVER BRIDGE RDWY 99.99 M
(54) MIN VERT UNDERCLEAR REF- NOT H/RR 0.00 M
(55) MIN LAT UNDERCLEAR RT REF- NOT H/RR 0.0 M
(56) MIN LAT UNDERCLEAR LT 0.0 M

********** NAVIGATION DATA **********

(38) NAVIGATION CONTROL- NO CONTROL CODE 0
(111) PIER PROTECTION- CODE
(39) NAVIGATION VERTICAL CLEARANCE 0.0 M
(116) VERT-LIFT BRIDGE NAV MIN VERT CLEAR M
(40) NAVIGATION HORIZONTAL CLEARANCE 0.0 M

****

SUFFICIENCY RATING = 60.4
PAINT CONDITION INDEX = N/A

********** CLASSIFICATION ********** CODE

(112) NBIS BRIDGE LENGTH- YES Y
(104) HIGHWAY SYSTEM- NOT ON NHS 0
(26) FUNCTIONAL CLASS- MINOR ARTERIAL URBAN 16
(100) DEFENSE HIGHWAY- NOT STRAHNET 0
(101) PARALLEL STRUCTURE- NONE EXISTS N
(102) DIRECTION OF TRAFFIC- 2 WAY 2
(103) TEMPORARY STRUCTURE-
(105) FED.LANDS HWY- NOT APPLICABLE 0
(110) DESIGNATED NATIONAL NETWORK - NOT ON NET 0
(20) TOLL- ON FREE ROAD 3
(21) MAINTAIN- CITY OR MUNICIPAL HIGHWAY AGENCY 04
(22) OWNER- CITY OR MUNICIPAL HIGHWAY AGENCY 04
(37) HISTORICAL SIGNIFICANCE- NOT ELIGIBLE 5

********** CONDITION ********** CODE

(58) DECK 7
(59) SUPERSTRUCTURE 7
(60) SUBSTRUCTURE 5
(61) CHANNEL & CHANNEL PROTECTION 6
(62) CULVERTS N

********* LOAD RATING AND POSTING ********* CODE

(31) DESIGN LOAD- UNKNOWN 0
(63) OPERATING RATING METHOD- (LRFR) LD & RES FA 8
(64) OPERATING RATING- RF= 1.18
(65) INVENTORY RATING METHOD- (LRFR) LD & RES FA 8
(66) INVENTORY RATING- RF= 0.85
(70) BRIDGE POSTING- EQUAL TO OR ABOVE LEGAL LOADS 5
(41) STRUCTURE OPEN, POSTED OR CLOSED- A
DESCRIPTION- OPEN, NO RESTRICTION

********** APPRAISAL ********** CODE

(67) STRUCTURAL EVALUATION 5
(68) DECK GEOMETRY 2
(69) UNDERCLEARANCES, VERTICAL & HORIZONTAL N
(71) WATER ADEQUACY 8
(72) APPROACH ROADWAY ALIGNMENT 6
(36) TRAFFIC SAFETY FEATURES 0000
(113) SCOUR CRITICAL BRIDGES 5

********** PROPOSED IMPROVEMENTS **********

(75) TYPE OF WORK- CODE
(76) LENGTH OF STRUCTURE IMPROVEMENT M
(94) BRIDGE IMPROVEMENT COST
(95) ROADWAY IMPROVEMENT COST
(96) TOTAL PROJECT COST
(97) YEAR OF IMPROVEMENT COST ESTIMATE
(114) FUTURE ADT 14344
(115) YEAR OF FUTURE ADT 2036

********** INSPECTIONS **********

(90) INSPECTION DATE 07/20 (91) FREQUENCY 24 MO
(92) CRITICAL FEATURE INSPECTION: (93) CFI DATE
A) FRACTURE CRIT DETAIL- NO MO A)
B) UNDERWATER INSP- NO MO B)
C) OTHER SPECIAL INSP- NO MO C)



Photo No. 1
Large crack in the right bridge rail at Abutment 1.



Photo No. 1
Large crack in the right bridge rail at Abutment 1.



Photo No. 2
Vertical crack in the face of Abutment 1.



Photo No. 2
Vertical crack in the face of Abutment 1.



Photo No. 3
Crack in the right shear key at Abutment 2.



Photo No. 3
Crack in the right shear key at Abutment 2.

DEPARTMENT OF TRANSPORTATION
Structure Maintenance & Investigations

Bridge Number : 25C0029
Facility Carried: PLACERVILLE DR
Location : 0.3 MI W COLD SPRINGS RD
City : PLACERVILLE
Inspection Date : 07/19/2018

Bridge Inspection Report

Inspection Type

Routine	FC	Underwater	Special	Other
X				

STRUCTURE NAME: HANGTOWN CREEK

CONSTRUCTION INFORMATION

Year Built : 1931
Year Modified: N/A
Length (m) : 13.7

Skew (degrees): 50
No. of Joints : 0
No. of Hinges : 0

Structure Description: Single span RC T-girders (4) with an AC overlay on RC abutments (diaphragm type at Abutment 1 and seat type at Abutment 2) with monolithic wingwalls founded on spread footings.

Span Configuration : 1 @ 43 ft

SAFE LOAD CAPACITY AND RATINGS

Design Live Load: UNKNOWN
Inventory Rating: RF= 0.85 Calculation Method: (LRFR) LD & RES FACT RATING
Operating Rating: RF= 1.18 Calculation Method: (LRFR) LD & RES FACT RATING
Permit Rating : PPPPP
Posting Load : Type 3: Legal Type 3S2: Legal Type 3-3: Legal

DESCRIPTION ON STRUCTURE

Deck X-Section: 1 ft br, 0.6 ft cu, 24 ft, 0.6 ft cu, 1 ft br
Total Width: 8.4 m Net Width: 7.3 m No. of Lanes: 2 Speed: 35 mph
Min. Vertical Clearance: Unimpaired Overlay Thickness: 3.5 inches
Rail Code: 0000

DESCRIPTION UNDER STRUCTURE

Channel Description: High flow with a rocky channel bottom.

NOTICE

The bridge inspection condition assessment used for this inspection is based on the American Association of State Highway and Transportation Officials (AASHTO) Bridge Element Inspection Manual 2013 as defined in Moving Ahead for Progress in the 21st Century (MAP-21) federal law. The new element inspection methodology may result in changes to related condition and appraisal ratings on the bridge without significant physical changes at the bridge.

The element condition information contained in this report represents the current condition of the bridge based on the most recent routine and special inspections. Some of the notes presented below may be from an inspection that occurred prior to the date noted in this report. Refer to the Scope and Access section of this inspection report for a description of which portions of the bridge were inspected on this date.

INSPECTION COMMENTARY

SCOPE AND ACCESS

There was 10 inches of water in the creek flowing against Abutment 1. The lower portion of Abutment 1 was submerged but still accessible with waders and a probe stick. The dry portions under the structure and the deck was inspected by walking on and under the structure. All elements received a complete inspection.

SAFE LOAD CAPACITY

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INSPECTION COMMENTARY

A Load Rating Summary Sheet dated 08/27/2015 is on file for this structure. While this report does not include a check of that analysis, it does verify that the structural conditions observed during this inspection are consistent with those assumed in that analysis. The current rating is based on BrR 6.7.0 AASHTO computer output dated 08/27/2015.

ELEMENT INSPECTION RATINGS AND COMMENTARY

Elem No.	Defect /Prot	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4
16		Top Flange-RC	2	110	sq.m	110	0	0	0
	510	Deck Wearing Surface-Asphalt	2	100	sq.m	95	5	0	0
	3220	Cracking-AC (WS)	2	5		0	5	0	0

(16)
There were no significant defects noted.

(16-510-3220)
There are up to 0.25 inch wide longitudinal cracks in the AC in both lanes. The cracks are up to 10 feet in length and have been sealed with crack sealant as shown in Photo 7 from the 07/26/2016 report.

110		Girder/Beam-RC	2	52	m	52	0	0	0

(110)
There are hairline vertical cracks on the bottom of the girders. Refer to Photo 1 from the 07/24/2008 inspection. These cracks are 1 to 2 feet on center and less than 0.01 inch wide and are not considered a recordable defect at this time.

215		Abutment-RC	2	26	m	18	8	0	0
	1130	Cracking (RC and Other)	2	3		0	3	0	0
	1190	Abrasion (PS Conc./RC)	2	5		0	5	0	0

(215)
The monolithic wingwall quantity has been included in the total abutment quantity.

(215-1130)
A vertical crack is present under Girder 2 on the face of Abutment 1. The crack is up to 0.04 inch wide and 6 feet long with minor efflorescence. Refer to Photo 3.

There is a vertical crack in the face of Abutment 2 that is 0.03 inch wide and 3 feet long. A diagonal crack, 0.04 inch wide and 2 feet in length, is emanating from the corner of the right shear key at Abutment 2.

(215-1190)
The lower 6 inches of the right half of Abutment 1 is abraded with no loose aggregate.

311		Bearing-Moveable	2	4	each	4	0	0	0

(311)
There were no significant defects noted.

331		Railing-RC	2	27	m	25	0	2	0
	1080	Delamination/Spall/Patched Area	2	1		0	0	1	0
	1130	Cracking (RC and Other)	2	1		0	0	1	0

(331-1080)
There is an 18 inch diameter by 3 inch deep spall with two exposed rebar at the top of the left rail at Abutment 2. See Photo 1.

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ELEMENT INSPECTION RATINGS AND COMMENTARY

Elem No.	Defect /Prot	Defect	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4
(331-1130)										

The right rail at Abutment 1 has a 0.1 inch wide crack adjacent to the approach rail. The crack is approximately 2 feet in length. See Photo 2.

WORK RECOMMENDATIONS - NONE

Team Leader : Justin T. Alamares

Report Author : Jacob M. Boulant

Inspected By : JM.Boulant/JT.Alamares

12/31/18

Jacob M. Boulant (Registered Civil Engineer) (Date)



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STRUCTURE INVENTORY AND APPRAISAL REPORT

********** IDENTIFICATION **********

(1) STATE NAME- CALIFORNIA 069
(8) STRUCTURE NUMBER **25C0029**
(5) INVENTORY ROUTE(ON/UNDER)- ON 150000000
(2) HIGHWAY AGENCY DISTRICT 03
(3) COUNTY CODE 017 (4) PLACE CODE 57540
(6) FEATURE INTERSECTED- HANGTOWN CREEK
(7) FACILITY CARRIED- PLACERVILLE DR
(9) LOCATION- 0.3 MI W COLD SPRINGS RD
(11) MILEPOINT/KILOMETERPOINT 0
(12) BASE HIGHWAY NETWORK- NOT ON NET 0
(13) LRS INVENTORY ROUTE & SUBROUTE
(16) LATITUDE 38 DEG 44 MIN 00.47 SEC
(17) LONGITUDE 120 DEG 49 MIN 39.92 SEC
(98) BORDER BRIDGE STATE CODE % SHARE %
(99) BORDER BRIDGE STRUCTURE NUMBER

******** STRUCTURE TYPE AND MATERIAL *********

(43) STRUCTURE TYPE MAIN:MATERIAL- CONCRETE
TYPE- TEE BEAM CODE 104
(44) STRUCTURE TYPE APPR:MATERIAL- OTHER/NA
TYPE- OTHER/NA CODE 000
(45) NUMBER OF SPANS IN MAIN UNIT 1
(46) NUMBER OF APPROACH SPANS 0
(107) DECK STRUCTURE TYPE- CIP CONCRETE CODE 1
(108) WEARING SURFACE / PROTECTIVE SYSTEM:
A) TYPE OF WEARING SURFACE- BITUMINOUS CODE 6
B) TYPE OF MEMBRANE- NONE CODE 0
C) TYPE OF DECK PROTECTION- NONE CODE 0

********** AGE AND SERVICE **********

(27) YEAR BUILT 1931
(106) YEAR RECONSTRUCTED 0000
(42) TYPE OF SERVICE: ON- HIGHWAY 1
UNDER- WATERWAY 5
(28) LANES:ON STRUCTURE 02 UNDER STRUCTURE 00
(29) AVERAGE DAILY TRAFFIC 20000
(30) YEAR OF ADT 2013 (109) TRUCK ADT 10 %
(19) BYPASS, DETOUR LENGTH 2 KM

********** GEOMETRIC DATA **********

(48) LENGTH OF MAXIMUM SPAN 13.1 M
(49) STRUCTURE LENGTH 13.7 M
(50) CURB OR SIDEWALK: LEFT 0.2 M RIGHT 0.2 M
(51) BRIDGE ROADWAY WIDTH CURB TO CURB 7.3 M
(52) DECK WIDTH OUT TO OUT 8.4 M
(32) APPROACH ROADWAY WIDTH (W/SHOULDERS) 9.1 M
(33) BRIDGE MEDIAN- NO MEDIAN 0
(34) SKEW 50 DEG (35) STRUCTURE FLARED NO
(10) INVENTORY ROUTE MIN VERT CLEAR 99.99 M
(47) INVENTORY ROUTE TOTAL HORIZ CLEAR 7.3 M
(53) MIN VERT CLEAR OVER BRIDGE RDWY 99.99 M
(54) MIN VERT UNDERCLEAR REF- NOT H/RR 0.00 M
(55) MIN LAT UNDERCLEAR RT REF- NOT H/RR 0.0 M
(56) MIN LAT UNDERCLEAR LT 0.0 M

********** NAVIGATION DATA **********

(38) NAVIGATION CONTROL- NO CONTROL CODE 0
(111) PIER PROTECTION- CODE
(39) NAVIGATION VERTICAL CLEARANCE 0.0 M
(116) VERT-LIFT BRIDGE NAV MIN VERT CLEAR M
(40) NAVIGATION HORIZONTAL CLEARANCE 0.0 M

****

SUFFICIENCY RATING = 60.4
STATUS
HEALTH INDEX 98.3
PAINT CONDITION INDEX = N/A

********** CLASSIFICATION ********** CODE

(112) NBIS BRIDGE LENGTH- YES Y
(104) HIGHWAY SYSTEM- NOT ON NHS 0
(26) FUNCTIONAL CLASS- MINOR ARTERIAL URBAN 16
(100) DEFENSE HIGHWAY- NOT STRAHNET 0
(101) PARALLEL STRUCTURE- NONE EXISTS N
(102) DIRECTION OF TRAFFIC- 2 WAY 2
(103) TEMPORARY STRUCTURE-
(105) FED.LANDS HWY- NOT APPLICABLE 0
(110) DESIGNATED NATIONAL NETWORK - NOT ON NET 0
(20) TOLL- ON FREE ROAD 3
(21) MAINTAIN- CITY OR MUNICIPAL HIGHWAY AGENCY 04
(22) OWNER- CITY OR MUNICIPAL HIGHWAY AGENCY 04
(37) HISTORICAL SIGNIFICANCE- NOT ELIGIBLE 5

********** CONDITION ********** CODE

(58) DECK 7
(59) SUPERSTRUCTURE 7
(60) SUBSTRUCTURE 5
(61) CHANNEL & CHANNEL PROTECTION 6
(62) CULVERTS N

********* LOAD RATING AND POSTING ********* CODE

(31) DESIGN LOAD- UNKNOWN 0
(63) OPERATING RATING METHOD- (LRFR) LD & RES FA 8
(64) OPERATING RATING- RF= 1.18
(65) INVENTORY RATING METHOD- (LRFR) LD & RES FA 8
(66) INVENTORY RATING- RF= 0.85
(70) BRIDGE POSTING- EQUAL TO OR ABOVE LEGAL LOADS 5
(41) STRUCTURE OPEN, POSTED OR CLOSED- A
DESCRIPTION- OPEN, NO RESTRICTION

********** APPRAISAL ********** CODE

(67) STRUCTURAL EVALUATION 5
(68) DECK GEOMETRY 2
(69) UNDERCLEARANCES, VERTICAL & HORIZONTAL N
(71) WATER ADEQUACY 8
(72) APPROACH ROADWAY ALIGNMENT 6
(36) TRAFFIC SAFETY FEATURES 0000
(113) SCOUR CRITICAL BRIDGES 5

********** PROPOSED IMPROVEMENTS **********

(75) TYPE OF WORK- CODE
(76) LENGTH OF STRUCTURE IMPROVEMENT M
(94) BRIDGE IMPROVEMENT COST
(95) ROADWAY IMPROVEMENT COST
(96) TOTAL PROJECT COST
(97) YEAR OF IMPROVEMENT COST ESTIMATE
(114) FUTURE ADT 14344
(115) YEAR OF FUTURE ADT 2036

********** INSPECTIONS **********

(90) INSPECTION DATE 07/18 (91) FREQUENCY 24 MO
(92) CRITICAL FEATURE INSPECTION: (93) CFI DATE
A) FRACTURE CRIT DETAIL- NO MO A)
B) UNDERWATER INSP- NO MO B)
C) OTHER SPECIAL INSP- NO MO C)

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Photo No. 1
Spall in left rail at Abutment 2.



Photo No. 1
Spall in left rail at Abutment 2.



Photo No. 2
Crack right rail at Abutment 1.



Photo No. 2
Crack right rail at Abutment 1.



Photo No. 3
Vertical crack under Girder 2 in Abutment 1 face.



Photo No. 3
Vertical crack under Girder 2 in Abutment 1 face.

DEPARTMENT OF TRANSPORTATION
Structure Maintenance & Investigations

Bridge Number : 25C0029
Facility Carried: PLACERVILLE DR
Location : 0.3 MI W COLD SPRINGS RD
City : PLACERVILLE
Inspection Date : 07/26/2016
Inspection Type

Bridge Inspection Report

Routine [X] FC Underwater Special Other

STRUCTURE NAME: HANGTOWN CREEK

CONSTRUCTION INFORMATION

Year Built : 1930
Year Widened: N/A
Length (m) : 13.7
Skew (degrees): 50
No. of Joints : 0
No. of Hinges : 0

Structure Description: Single span RC T-girders (4) with an AC overlay on RC abutments (diaphragm type at Abutment 1 and seat type at Abutment 2) with monolithic wingwalls founded on spread footings.

Span Configuration : 1 @ 43.00 ft

SAFE LOAD CAPACITY AND RATINGS

Design Live Load: UNKNOWN
Inventory Rating: RF= 0.85 Calculation Method: (LRFR) LD & RES FACT RATING
Operating Rating: RF= 1.18 Calculation Method: (LRFR) LD & RES FACT RATING
Permit Rating : PPPPP
Posting Load : Type 3: Legal Type 3S2: Legal Type 3-3: Legal

DESCRIPTION ON STRUCTURE

Deck X-Section: 1.00 ft br, 0.58 ft cu, 24.00 ft, 0.58 ft cu, 1.00 ft br
Total Width: 8.4 m Net Width: 7.3 m No. of Lanes: 2 Speed: 35 mph
Min. Vertical Clearance: Unimpaired AC Thickness: 3.5 Inches
Rail Code: 0000

Rail Type	Location	Length (ft)	Rail Modifications
Misc. Concrete	Right/Left	85	

DESCRIPTION UNDER STRUCTURE

Channel Description: Rocky swift flow.

NOTICE

The bridge inspection condition assessment used for this inspection is based on the American Association of State Highway and Transportation Officials (AASHTO) Bridge Element Inspection Manual 2013 as defined in Moving Ahead for Progress in the 21st Century (MAP-21) federal law. The new element inspection methodology may result in changes to related condition and appraisal ratings on the bridge without significant physical changes at the bridge.

The element condition information contained in this report represents the current condition of the bridge based on the most recent routine and special inspections. Some of the notes presented below may be from an inspection that occurred prior to the date noted in this report. Refer to the Scope and Access section of this inspection report for a description of which portions of the bridge were inspected on this date.

INSPECTION COMMENTARY

SCOPE AND ACCESS

There was 8 inches of water under the structure. A complete inspection was performed.

REVISIONS

The rail code (NBI 36) was changed from 0NNN to 0000 to reflect the current condition.

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INSPECTION COMMENTARY

The inspection frequency (NBI 91) was changed from 48 months to 24 months because the Inventory Rating (NBI 66) is less than 32 tons.

MISCELLANEOUS

Routine roadway, elevation and underside photos were taken during this inspection (see photos 1-3).

SAFE LOAD CAPACITY

A Load Rating Summary Sheet dated 8/27/2015 is on file for this structure. While this report does not include a check of that analysis, it does verify that the structural conditions observed during this inspection are consistent with those assumed in that analysis. The current rating is based on a BrR 6.7.0 AASHTO output dated 8/27/2015.

Based on this analysis, the NBI Operating and Inventory Types (Item Codes 63 and 65) have been revised from 1 (LF Load Factor) to 8 (LRFR Rating Factor). The Operating and Inventory Ratings (item codes 64 and 66) have been revised from 79.7 and 47.0 metric tons respectively to Rating Factors equaling 1.18 and 0.85 respectively utilizing the HL-93 load case. Permit ratings have been revised from PPPPP (for P5 to P13, 48-kip split-axle (24 kips/axle) truck configuration) to PPPPPP (for P5 to P15, 54-kip split-axle (27 kips/axle) truck configuration).

WATERWAY

A 10 year channel cross section was measured during this inspection. The data was compared to the data taken on 10/16/2007. This comparison yielded minor degradation (~12-18 inches) at the center of the channel. No corrective action is required.

ELEMENT INSPECTION RATINGS AND COMMENTARY

Elem No.	Defect /Prot	Defect	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4
16			**Top Flange-RC**	2	110	sq.m	110	0	0	0
	510		**Deck Wearing Surface-Asphalt**	2	100	sq.m	95	5	0	0
		3220	**Cracking-AC (WS)**	2	5		0	5	0	0
(16) There were no significant defects noted.										
(16-510-3220) There are 0.25 inch wide longitudinal cracks in the AC in both lanes (see photo 7).										
110			**Girder/Beam-RC**	2	52	m	52	0	0	0
(110) There are hairline (<0.01 inches wide) vertical cracks in the face of the girders (see photo 2, July 2012 BIR). No change to the condition state is warranted at this time.										
215			**Abutment-RC**	2	26	m	16	10	0	0
	1130		**Cracking (RC and Other)**	2	5		0	5	0	0
	1190		**Abrasion (PS Conc./RC)**	2	5		0	5	0	0
(215) The monolithic wingwall quantity has been included in the total abutment quantity.										
(215-1130) There is 0.015 inch wide horizontal crack in the left half of Abutment 2 (see photo 5). There are 12-										

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ELEMENT INSPECTION RATINGS AND COMMENTARY

Elem No.	Defect /Prot	Defect	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4
			24 inch long vertical cracks spreading out from the horizontal crack on 6-36 inch centers.							
			(215-1190) The lower 2-4 feet of the right half of Abutment is abraded with no loose aggregate (see photo 4).							
311			**Bearing-Moveable**	2	4	each	4	0	0	0
			(311) There were no significant defects noted.							
331			**Railing-RC**	2	27	m	26	0	1	0
	1080		**Delamination/Spall/Patched Area**	2	1		0	0	1	0
			(331-1080) There is an 18 inch diameter spall with two exposed rebar at the top of the left rail at Abutment 2 (see photo 6).							

WORK RECOMMENDATIONS - NONE

CHANNEL X-SECTION

Side : Upstream
Measured From : Top of south rail
X-Section Date: 07/26/2016

Location	Horiz(m)	Vert(m)	Comments
Abutment 1	0.00	4.35	
	1.90	4.60	Thalweg
	5.20	4.20	EOW
Abutment 2	13.00	3.05	

Team Leader : Justin Alamares

Report Author : Justin Alamares

Inspected By : J.Alamares/LD.Nash

10/5/16

Justin Alamares (Registered Civil Engineer) (Date)



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STRUCTURE INVENTORY AND APPRAISAL REPORT

********** IDENTIFICATION **********

(1) STATE NAME- CALIFORNIA 069
(8) STRUCTURE NUMBER **25C0029**
(5) INVENTORY ROUTE(ON/UNDER)- ON 150000000
(2) HIGHWAY AGENCY DISTRICT 03
(3) COUNTY CODE 017 (4) PLACE CODE 57540
(6) FEATURE INTERSECTED- HANGTOWN CREEK
(7) FACILITY CARRIED- PLACERVILLE DR
(9) LOCATION- 0.3 MI W COLD SPRINGS RD
(11) MILEPOINT/KILOMETERPOINT 0
(12) BASE HIGHWAY NETWORK- NOT ON NET 0
(13) LRS INVENTORY ROUTE & SUBROUTE
(16) LATITUDE 38 DEG 44 MIN 00.47 SEC
(17) LONGITUDE 120 DEG 49 MIN 39.92 SEC
(98) BORDER BRIDGE STATE CODE % SHARE %
(99) BORDER BRIDGE STRUCTURE NUMBER

******** STRUCTURE TYPE AND MATERIAL *********

(43) STRUCTURE TYPE MAIN:MATERIAL- CONCRETE
TYPE- TEE BEAM CODE 104
(44) STRUCTURE TYPE APPR:MATERIAL- OTHER/NA
TYPE- OTHER/NA CODE 000
(45) NUMBER OF SPANS IN MAIN UNIT 1
(46) NUMBER OF APPROACH SPANS 0
(107) DECK STRUCTURE TYPE- CIP CONCRETE CODE 1
(108) WEARING SURFACE / PROTECTIVE SYSTEM:
A) TYPE OF WEARING SURFACE- BITUMINOUS CODE 6
B) TYPE OF MEMBRANE- NONE CODE 0
C) TYPE OF DECK PROTECTION- NONE CODE 0

********** AGE AND SERVICE **********

(27) YEAR BUILT 1930
(106) YEAR RECONSTRUCTED 0000
(42) TYPE OF SERVICE: ON- HIGHWAY 1
UNDER- WATERWAY 5
(28) LANES:ON STRUCTURE 02 UNDER STRUCTURE 00
(29) AVERAGE DAILY TRAFFIC 20000
(30) YEAR OF ADT 2013 (109) TRUCK ADT 10 %
(19) BYPASS, DETOUR LENGTH 2 KM

********** GEOMETRIC DATA **********

(48) LENGTH OF MAXIMUM SPAN 13.1 M
(49) STRUCTURE LENGTH 13.7 M
(50) CURB OR SIDEWALK: LEFT 0.2 M RIGHT 0.2 M
(51) BRIDGE ROADWAY WIDTH CURB TO CURB 7.3 M
(52) DECK WIDTH OUT TO OUT 8.4 M
(32) APPROACH ROADWAY WIDTH (W/SHOULDERS) 9.1 M
(33) BRIDGE MEDIAN- NO MEDIAN 0
(34) SKEW 50 DEG (35) STRUCTURE FLARED NO
(10) INVENTORY ROUTE MIN VERT CLEAR 99.99 M
(47) INVENTORY ROUTE TOTAL HORIZ CLEAR 7.3 M
(53) MIN VERT CLEAR OVER BRIDGE RDWY 99.99 M
(54) MIN VERT UNDERCLEAR REF- NOT H/RR 0.00 M
(55) MIN LAT UNDERCLEAR RT REF- NOT H/RR 0.0 M
(56) MIN LAT UNDERCLEAR LT 0.0 M

********** NAVIGATION DATA **********

(38) NAVIGATION CONTROL- NO CONTROL CODE 0
(111) PIER PROTECTION- CODE
(39) NAVIGATION VERTICAL CLEARANCE 0.0 M
(116) VERT-LIFT BRIDGE NAV MIN VERT CLEAR M
(40) NAVIGATION HORIZONTAL CLEARANCE 0.0 M

****

SUFFICIENCY RATING = 60.4
STATUS
HEALTH INDEX 98.1
PAINT CONDITION INDEX = N/A

********** CLASSIFICATION ********** CODE

(112) NBIS BRIDGE LENGTH- YES Y
(104) HIGHWAY SYSTEM- NOT ON NHS 0
(26) FUNCTIONAL CLASS- MINOR ARTERIAL URBAN 16
(100) DEFENSE HIGHWAY- NOT STRAHNET 0
(101) PARALLEL STRUCTURE- NONE EXISTS N
(102) DIRECTION OF TRAFFIC- 2 WAY 2
(103) TEMPORARY STRUCTURE-
(105) FED.LANDS HWY- NOT APPLICABLE 0
(110) DESIGNATED NATIONAL NETWORK - NOT ON NET 0
(20) TOLL- ON FREE ROAD 3
(21) MAINTAIN- CITY OR MUNICIPAL HIGHWAY AGENCY 04
(22) OWNER- CITY OR MUNICIPAL HIGHWAY AGENCY 04
(37) HISTORICAL SIGNIFICANCE- NOT ELIGIBLE 5

********** CONDITION ********** CODE

(58) DECK 7
(59) SUPERSTRUCTURE 7
(60) SUBSTRUCTURE 5
(61) CHANNEL & CHANNEL PROTECTION 6
(62) CULVERTS N

********** LOAD RATING AND POSTING ********** CODE

(31) DESIGN LOAD- UNKNOWN 0
(63) OPERATING RATING METHOD- (LRFR) LD & RES FA 8
(64) OPERATING RATING- RF= 1.18
(65) INVENTORY RATING METHOD- (LRFR) LD & RES FA 8
(66) INVENTORY RATING- RF= 0.85
(70) BRIDGE POSTING- EQUAL TO OR ABOVE LEGAL LOADS 5
(41) STRUCTURE OPEN, POSTED OR CLOSED- A
DESCRIPTION- OPEN, NO RESTRICTION

********** APPRAISAL ********** CODE

(67) STRUCTURAL EVALUATION 5
(68) DECK GEOMETRY 2
(69) UNDERCLEARANCES, VERTICAL & HORIZONTAL N
(71) WATER ADEQUACY 8
(72) APPROACH ROADWAY ALIGNMENT 6
(36) TRAFFIC SAFETY FEATURES 0000
(113) SCOUR CRITICAL BRIDGES 5

********** PROPOSED IMPROVEMENTS **********

(75) TYPE OF WORK- MISC STRUCTURAL WORK CODE 38
(76) LENGTH OF STRUCTURE IMPROVEMENT 13.7 M
(94) BRIDGE IMPROVEMENT COST $115,000
(95) ROADWAY IMPROVEMENT COST $23,000
(96) TOTAL PROJECT COST $193,200
(97) YEAR OF IMPROVEMENT COST ESTIMATE 2010
(114) FUTURE ADT 14344
(115) YEAR OF FUTURE ADT 2036

********** INSPECTIONS **********

(90) INSPECTION DATE 07/16 (91) FREQUENCY 24 MO
(92) CRITICAL FEATURE INSPECTION: (93) CFI DATE
A) FRACTURE CRIT DETAIL- NO MO A)
B) UNDERWATER INSP- NO MO B)
C) OTHER SPECIAL INSP- NO MO C)

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Photo No. 1
Routine roadway looking east



Photo No. 1
Routine roadway looking east



Photo No. 2
Routine elevation view from Abutment 2 of left side of structure



Photo No. 2
Routine elevation view from Abutment 2 of left side of structure



Photo No. 3
Routine underside looking at Abutment 1



Photo No. 3
Routine underside looking at Abutment 1



Photo No. 4
Abrasion on right half of Abutment 1



Photo No. 4
Abrasion on right half of Abutment 1



Photo No. 5
Horizontal crack along Abutment 2



Photo No. 5
Horizontal crack along Abutment 2



Photo No. 6
18 inch diameter rail spall at left side of Abutment 2



Photo No. 6
18 inch diameter rail spall at left side of Abutment 2



Photo No. 7
Longitudinal cracks in AC



Photo No. 7
Longitudinal cracks in AC

Structure Maintenance & Investigations

Load Rating Summary Sheet

Bridge Number: 25C0029
Facility Carried: PLACERVILLE DR
Location: 0.3 MI W COLD SPRINGS RD
City: PLACERVILLE

Bridge Name: HANGTOWN CREEK
Structural Element Rated: All girders rated.

Rating Summary

DESIGN LOADING	Rating Factor	Critical Location: Structure	Control Element	Load Action	Location
Inventory:	0.85	Span 1	Girder	Shear (Strength)	0.60pt of Span, G2-Int Girder
Operating:	1.18	Span 1	Girder	Moment (Strength)	PM; 0.30pt of Span, G2-Int Girder

LEGAL RATING	Rating Factor	Posting U.S. Tons	Structure	Control Element	Load Action	Location
Type 3 (25T):	1.76	Legal	Span 1	Girder	Moment (Strength)	PM; 0.30pt of Span, G2-Int Girder
Type 3S2 (36T):	1.95	Legal	Span 1	Girder	Moment (Strength)	PM; 0.30pt of Span, G2-Int Girder
Type 3-3 (40T):	2.10	Legal	Span 1	Girder	Moment (Strength)	PM; 0.30pt of Span, G2-Int Girder

PERMIT RATING	Rating Factor	Permit Rating	Structure	Control Element	Load Action	Location
5 Axle Annual :	0.99	G	Span 1	Girder	Shear (Strength)	0.60pt of Span, G2-Int Girder
5 Axle Truck :	1.70	P	Span 1	Girder	Moment (Strength)	PM; 0.30pt of Span, G2-Int Girder
7 Axle Truck :	1.70	P	Span 1	Girder	Moment (Strength)	PM; 0.30pt of Span, G2-Int Girder
9 Axle Truck :	1.70	P	Span 1	Girder	Moment (Strength)	PM; 0.30pt of Span, G2-Int Girder
11 Axle Truck:	1.70	P	Span 1	Girder	Moment (Strength)	PM; 0.30pt of Span, G2-Int Girder
13 Axle Truck:	1.70	P	Span 1	Girder	Moment (Strength)	PM; 0.30pt of Span, G2-Int Girder
15 Axle Truck:	1.70	P	Span 1	Girder	Moment (Strength)	PM; 0.30pt of Span, G2-Int Girder
15 Axle Dual :	1.21	P	Span 1	Girder	Moment (Strength)	PM; 0.30pt of Span, G2-Int Girder

RELEVANT LOAD RATING INFORMATION

NOTES:

Permit RFs based on Moment are 1.01, 1.70, 1.70, 1.70, 1.70, 1.70, 1.70, 1.21 and based on Shear are 0.99, 1.74, 1.74, 1.74, 1.74, 1.74, 1.74, 1.26 for P5 Annual, P5-P15 Split and P15 Dual respectively.
This load rating is based on the existing bridge geometry and roadway configuration. Modification to the structure (such as bridge rail modification or widening) may require a new load rating.

Overlay Used In Rating: 3.5 inches AC

Rating Method: 8 LRFR Rating Factor Inventory (65); 8 LRFR Rating Factor Operating (63)

Analysis Tool Used: BrR 6.7.0 AASHTO

Rating/File Location: BrR Database

Control Rating By: Hugo Barajas Rating Date: 08/27/2015

Rating Checked By: David Simmons 8/27/15

Rating Type: Calculated

Summary Prepared By: Hugo Barajas Summary Date: 08/27/2015

REGISTERED PROFESSIONAL ENGINEER
Hugo
Barajas
No. 64575
06/30/2017
CIVIL
STATE OF CALIFORNIA

8/27/15
Hugo Barajas - Registered Engineer

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Structure Maintenance & Investigations

Load Rating Summary Sheet

Bridge Number: 25C0029
Facility Carried: PLACERVILLE DR
Location: 0.3 MI W COLD SPRINGS RD
City: PLACERVILLE

HISTORY

This bridge was built in 1930 and design live load is unknown. As-builts are available and are partially legible in BIRIS. There are no aperture cards available. This bridge had been previously load rated in 1982 by Load Factor method using moment demands from HS20 and Permit loading.

STRUCTURE DESCRIPTION

This bridge consists of 1 simple span which consists of reinforced concrete T-beam (4) with a reinforced concrete deck supported by reinforced concrete diaphragm abutments.

SCOPE OF WORK

Ratings of the superstructure girder elements were established by analyzing the structure on 8/27/15 using Load and Resistance Factor Rating (LRFR) method. The deck and substructure was not rated in this analysis. The load ratings in this summary sheet are based on these results and supersede all previous rating analyses.

The rating analysis was based on the following specifications in order of precedence:
- Memos to Load Raters (M2LR)
- AASHTO The Manual for Bridge Evaluation - 2nd Edition with 2015 Interim Revisions
- California Amendments to the AASHTO LRFD Bridge Design Specifications - 6th Edition
- AASHTO LRFD Bridge Design Specifications, 7th Edition with 2015 Interim Revisions

RATING ANALYSIS

General: All girders were load rated for shear and moment using Bridge Rating (Formerly Virtis) 6.7.0 with the AASHTO LRFR analysis engine. Section dimensions of structure were found on the as-built plans.

Assumptions: Modeling/Engineering Judgment
- Deck thickness = 9 inches
- Web width = 15 inches.

Assumptions: To Be Field Verified
- Existing structural conditions were assumed per BIR dated 07/23/2012.

Materials: Material property information was assigned per M2LR 11-1 and 11-2 and were as follows: 33 ksi for reinforcing steel and 3.0 ksi for concrete.

Dead Loads: Concrete bridge rail on both sides of the structure, a 24 inch inch steel water pipe on the right exterior girder and a 3.5 inch AC overlay were included in the analysis. No other appurtenances were considered.

Live Loads: P5 to P15, 54-kip split-axle (27 kips/axle) permit truck configuration was used in the analysis.

Rating Summary: Controlling rating factors can be found on the first page of this LRSS. All other rating factors can be found in the rating electronic archives.

REVISED LOAD RATINGS

Based on this analysis, the NBI Operating and Inventory Types (Item Codes 63 and 65) have been revised from 1 (LF Load Factor) to 8 (LRFR Rating Factor). The Operating and Inventory Ratings (item codes 64 and 66) have been revised from 79.7 and 47.0 metric tonnes respectively to Rating Factors equaling 1.18 and 0.85 respectively utilizing the HL-93 load case. Permit ratings have been revised from PPPPP (for P5 to P13, 48-kip split-axle (24 kips/axle) truck configuration) to PPPPPP (for P5 to P15, 54-kip split-axle (27 kips/axle) truck configuration).

All assumptions to be field verified listed above, along with the overall condition of the structure, must be verified where possible and documented in a routine Bridge Inspection Report for this load rating to be valid and to meet FHWA requirements.

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Structure Maintenance & Investigations

Load Rating Summary Sheet

Bridge Number: 25C0029
Facility Carried: PLACERVILLE DR
Location: 0.3 MI W COLD SPRINGS RD
City: PLACERVILLE

Bridge Name: HANGTOWN CREEK
Structural Element Rated: RC T-girders (4)

Rating Summary

DESIGN LOADING	Rating Factor	Metric Tons	Critical Location: Structure	Control Element	Load Action	Location
Inventory:	1.45	47.0	Span 1	Girder	Ultimate Moment	0.5 pt
Operating:	2.46	79.7	Span 1	Girder	Ultimate Moment	0.5 pt
LEGAL RATING		Posting U.S. Tons				
Type 3 (25T):	1.00	Legal	Span 1	Girder	Ultimate Moment	0.5 pt
Type 3S2 (36T):	1.00	Legal	Span 1	Girder	Ultimate Moment	0.5 pt
Type 3-3 (40T):	1.00	Legal	Span 1	Girder	Ultimate Moment	0.5 pt
PERMIT RATING		Permit Rating				
5 Axle Truck :	1.88	P	Span 1	Girder	Ultimate Moment	0.5 pt
7 Axle Truck :	1.88	P	Span 1	Girder	Ultimate Moment	0.5 pt
9 Axle Truck :	1.88	P	Span 1	Girder	Ultimate Moment	0.5 pt
11 Axle Truck:	1.88	P	Span 1	Girder	Ultimate Moment	0.5 pt
13 Axle Truck:	1.88	P	Span 1	Girder	Ultimate Moment	0.5 pt

RELEVANT LOAD RATING INFORMATION

NOTES:

Load rating calculations were completed by SM&I using Load Factor Method on 3/23/1982.

Overlay Used In Rating: 0.5

Rating Method: 1 LF Load Factor Inventory (65) | 1 LF Load Factor Operating (63)

Analysis Tool Used: BDS Frame Rate

Rating/File Location: BIRIS

Control Rating By: SM&I Rating Date: 03/23/1982

Rating Checked By: SM&I

Rating Type: Calculated

Summary Prepared By: Diana M. Ventura Summary Date: 12/13/2012

REGISTERED PROFESSIONAL ENGINEER
Diana M. Ventura
No. 69201
06/30/2014
CIVIL
STATE OF CALIFORNIA

10/2/13
Diana M. Ventura - Registered Engineer

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DEPARTMENT OF TRANSPORTATION
Structure Maintenance & Investigations

Bridge Number : 25C0029
Facility Carried: PLACERVILLE DR
Location : 0.3 MI W COLD SPRINGS RD
City : PLACERVILLE
Inspection Date : 07/23/2012

Bridge Inspection Report

Inspection Type

Routine	FC	Underwater	Special	Other
X				

STRUCTURE NAME: HANGTOWN CREEK

CONSTRUCTION INFORMATION

Year Built : 1930
Year Widened: N/A
Length (m) : 13.7
Skew (degrees): 50
No. of Joints : 0
No. of Hinges : 0

Structure Description: RC T-girders (4) on RC wing abutments founded on spread footings.

Span Configuration : 13.1m

SAFE LOAD CAPACITY AND RATINGS

Design Live Load: UNKNOWN
Inventory Rating: RF=1.45 =>47.0 metric tons Calculation Method: LOAD FACTOR
Operating Rating: RF=2.46 =>79.7 metric tons Calculation Method: LOAD FACTOR
Permit Rating : PPPPP
Posting Load : Type 3: Legal Type 3S2: Legal Type 3-3: Legal

DESCRIPTION ON STRUCTURE

Deck X-Section: 0.3m r, 0.18m cu, 7.3m, 0.18m cu, 0.3m r

Total Width: 8.4 m Net Width: 7.3 m No. of Lanes: 2 Speed: 35 mph

Min. Vertical Clearance: Unimpaired

Rail Code: 0NNN

Rail Type	Location	Length (ft)	Rail Modifications
Misc. Concrete	Right/Left	85	

DESCRIPTION UNDER STRUCTURE

Channel Description: Rocky swift flow.

INSPECTION COMMENTARY

SCOPE AND ACCESS
A complete inspection was done.

REVISIONS
Updated NBI Items 63 and 65 from No Rating Analysis Performed to Load Factor.

DECK AND ROADWAY
The AC on the deck is functioning and intact, with a small amount of cracking that does not affect the ride over the bridge. The thickness measured 3.5 inches at the rail, however the 6 inches previously reported is retained for a conservative value.

The following was found during the July 2006 inspection, with no significant change: the bridge rail is spalled for 18 inches by 12 inches by 3 inches deep, with exposed rusting rebar on top of the left barrier at Abutment 2.

SUPERSTRUCTURE
There is a 0.007 - 0.009 inch wide vertical crack running 6 inches long on the face of Girder 3, shown in the attached Photo 2.

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INSPECTION COMMENTARY

SUBSTRUCTURE
No defects were found in the substructure. Slope protection is in place and functioning well.

SAFE LOAD CAPACITY
The load rating for this structure is being reviewed by the SM&I Rating Branch. An updated Load Rating Summary Sheet will be archived when this review is complete. The current rating is based on the Load Factor Design Method (BDS computer output) dated 03/23/1982.

ELEMENT INSPECTION RATINGS

Elem No.	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4	St. 5
13	Concrete Deck - Unprotected w/ AC Overlay	2	110	sq.m.	110	0	0	0	0
110	Reinforced Conc Open Girder/Beam	2	52	m.	52	0	0	0	0
215	Reinforced Conc Abutment	2	26	m.	26	0	0	0	0
331	Reinforced Conc Bridge Railing	2	27	m.	27	0	0	0	0

WORK RECOMMENDATIONS - NONE

Team Leader : Diana M. Ventura

Report Author : Diana M. Ventura

Inspected By : DM.Ventura/J.Drago

9/11/13

Diana M. Ventura (Registered Civil Engineer) (Date)



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STRUCTURE INVENTORY AND APPRAISAL REPORT

********** IDENTIFICATION **********

(1) STATE NAME- CALIFORNIA 069
(8) STRUCTURE NUMBER **25C0029**
(5) INVENTORY ROUTE(ON/UNDER)- ON 150000000
(2) HIGHWAY AGENCY DISTRICT 03
(3) COUNTY CODE 017 (4) PLACE CODE 57540
(6) FEATURE INTERSECTED- HANGTOWN CREEK
(7) FACILITY CARRIED- PLACERVILLE DR
(9) LOCATION- 0.3 MI W COLD SPRINGS RD
(11) MILEPOINT/KILOMETERPOINT 0
(12) BASE HIGHWAY NETWORK- PART OF NET 1
(13) LRS INVENTORY ROUTE & SUBROUTE 000000000000
(16) LATITUDE 38 DEG 44 MIN 00 SEC
(17) LONGITUDE 120 DEG 49 MIN 39 SEC
(98) BORDER BRIDGE STATE CODE % SHARE %
(99) BORDER BRIDGE STRUCTURE NUMBER

******** STRUCTURE TYPE AND MATERIAL *********

(43) STRUCTURE TYPE MAIN:MATERIAL- CONCRETE
TYPE- TEE BEAM CODE 104
(44) STRUCTURE TYPE APPR:MATERIAL- OTHER/NA
TYPE- OTHER/NA CODE 000
(45) NUMBER OF SPANS IN MAIN UNIT 1
(46) NUMBER OF APPROACH SPANS 0
(107) DECK STRUCTURE TYPE- CIP CONCRETE CODE 1
(108) WEARING SURFACE / PROTECTIVE SYSTEM:
A) TYPE OF WEARING SURFACE- BITUMINOUS CODE 6
B) TYPE OF MEMBRANE- NONE CODE 0
C) TYPE OF DECK PROTECTION- NONE CODE 0

********** AGE AND SERVICE **********

(27) YEAR BUILT 1930
(106) YEAR RECONSTRUCTED 0000
(42) TYPE OF SERVICE: ON- HIGHWAY 1
UNDER- WATERWAY 5
(28) LANES:ON STRUCTURE 02 UNDER STRUCTURE 00
(29) AVERAGE DAILY TRAFFIC 8000
(30) YEAR OF ADT 2008 (109) TRUCK ADT 10 %
(19) BYPASS, DETOUR LENGTH 2 KM

********** GEOMETRIC DATA **********

(48) LENGTH OF MAXIMUM SPAN 13.1 M
(49) STRUCTURE LENGTH 13.7 M
(50) CURB OR SIDEWALK: LEFT 0.2 M RIGHT 0.2 M
(51) BRIDGE ROADWAY WIDTH CURB TO CURB 7.3 M
(52) DECK WIDTH OUT TO OUT 8.4 M
(32) APPROACH ROADWAY WIDTH (W/SHOULDERS) 9.1 M
(33) BRIDGE MEDIAN- NO MEDIAN 0
(34) SKEW 50 DEG (35) STRUCTURE FLARED NO
(10) INVENTORY ROUTE MIN VERT CLEAR 99.99 M
(47) INVENTORY ROUTE TOTAL HORIZ CLEAR 7.3 M
(53) MIN VERT CLEAR OVER BRIDGE RDWY 99.99 M
(54) MIN VERT UNDERCLEAR REF- NOT H/RR 0.00 M
(55) MIN LAT UNDERCLEAR RT REF- NOT H/RR 0.0 M
(56) MIN LAT UNDERCLEAR LT 0.0 M

********** NAVIGATION DATA **********

(38) NAVIGATION CONTROL- NO CONTROL CODE 0
(111) PIER PROTECTION- CODE
(39) NAVIGATION VERTICAL CLEARANCE 0.0 M
(116) VERT-LIFT BRIDGE NAV MIN VERT CLEAR M
(40) NAVIGATION HORIZONTAL CLEARANCE 0.0 M

****

SUFFICIENCY RATING = 80.0
STATUS FUNCTIONALLY OBSOLETE
HEALTH INDEX 100.0
PAINT CONDITION INDEX = N/A

********** CLASSIFICATION ********** CODE

(112) NBIS BRIDGE LENGTH- YES Y
(104) HIGHWAY SYSTEM- NOT ON NHS 0
(26) FUNCTIONAL CLASS- MINOR ARTERIAL RURAL 06
(100) DEFENSE HIGHWAY- NOT STRAHNET 0
(101) PARALLEL STRUCTURE- NONE EXISTS N
(102) DIRECTION OF TRAFFIC- 2 WAY 2
(103) TEMPORARY STRUCTURE-
(105) FED.LANDS HWY- NOT APPLICABLE 0
(110) DESIGNATED NATIONAL NETWORK - NOT ON NET 0
(20) TOLL- ON FREE ROAD 3
(21) MAINTAIN- CITY OR MUNICIPAL HIGHWAY AGENCY 04
(22) OWNER- CITY OR MUNICIPAL HIGHWAY AGENCY 04
(37) HISTORICAL SIGNIFICANCE- NOT ELIGIBLE 5

********** CONDITION ********** CODE

(58) DECK 7
(59) SUPERSTRUCTURE 7
(60) SUBSTRUCTURE 7
(61) CHANNEL & CHANNEL PROTECTION 6
(62) CULVERTS N

********* LOAD RATING AND POSTING ********* CODE

(31) DESIGN LOAD- UNKNOWN 0
(63) OPERATING RATING METHOD- LOAD FACTOR 1
(64) OPERATING RATING- 79.7
(65) INVENTORY RATING METHOD- LOAD FACTOR 1
(66) INVENTORY RATING- 47.0
(70) BRIDGE POSTING- EQUAL TO OR ABOVE LEGAL LOADS 5
(41) STRUCTURE OPEN, POSTED OR CLOSED- A
DESCRIPTION- OPEN, NO RESTRICTION

********** APPRAISAL ********** CODE

(67) STRUCTURAL EVALUATION 7
(68) DECK GEOMETRY 2
(69) UNDERCLEARANCES, VERTICAL & HORIZONTAL N
(71) WATER ADEQUACY 8
(72) APPROACH ROADWAY ALIGNMENT 6
(36) TRAFFIC SAFETY FEATURES 0NNN
(113) SCOUR CRITICAL BRIDGES 5

********** PROPOSED IMPROVEMENTS **********

(75) TYPE OF WORK- MISC STRUCTURAL WORK CODE 38
(76) LENGTH OF STRUCTURE IMPROVEMENT 13.7 M
(94) BRIDGE IMPROVEMENT COST $115,000
(95) ROADWAY IMPROVEMENT COST $23,000
(96) TOTAL PROJECT COST $193,200
(97) YEAR OF IMPROVEMENT COST ESTIMATE 2010
(114) FUTURE ADT 14344
(115) YEAR OF FUTURE ADT 2029

********** INSPECTIONS **********

(90) INSPECTION DATE 07/12 (91) FREQUENCY 48 MO
(92) CRITICAL FEATURE INSPECTION: (93) CFI DATE
A) FRACTURE CRIT DETAIL- NO MO A)
B) UNDERWATER INSP- NO MO B)
C) OTHER SPECIAL INSP- NO MO C)

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DEPARTMENT OF TRANSPORTATION
Structure Maintenance & Investigations

Bridge Number : 25C0029
Facility Carried: PLACERVILLE DR
Location : 0.3 MI W COLD SPRINGS RD
City : PLACERVILLE
Inspection Date : 07/24/2008

Bridge Inspection Report

Inspection Type

Routine	FC	Underwater	Special	Other
X				

STRUCTURE NAME: HANGTOWN CREEK

CONSTRUCTION INFORMATION

Year Built : 1930
Year Widened: N/A
Length (m) : 13.7
Skew (degrees): 50
No. of Joints : 0
No. of Hinges : 0

Structure Description: RC T-girders (4), on RC wing abutments, and on spread footings.

Span Configuration : 13.1m

LOAD CAPACITY AND RATINGS

Design Live Load: OTHER OR UNKNOWN
Inventory Rating: 47.1 metric tons Calculation Method: LOAD FACTOR
Operating Rating: 79.8 metric tons Calculation Method: LOAD FACTOR
Permit Rating : PPPPP
Posting Load : Type 3: Legal Type 3S2: Legal Type 3-3: Legal

DESCRIPTION ON STRUCTURE

Deck X-Section: 0.3m r, 0.18m cu, 7.3m, 0.18m cu, 0.3m r
Total Width: 8.4 m Net Width: 7.3 m No. of Lanes: 2
Rail Description: Concrete window. Rail Code : 0000
Min. Vertical Clearance: Unimpaired

DESCRIPTION UNDER STRUCTURE

Channel Description: Rocky swift flow.

CONDITION TEXT

REVISIONS

Updated NBI Items 63-Inventory Type and 65-Operating Type from 5-No Rating Analysis Performed to 1-Load Factor.

CONDITION OF STRUCTURE
INSPECTION ACCESS
A complete inspection was done.

DECK
The AC on the deck is functioning and intact, with a small amount of cracking that does not affect the ride over the bridge.

SUPERSTRUCTURE
There is a 0.007 - 0.009" wide vertical crack running 6 inches long on the face of Girder 3, shown in the attached photo.

The following was found during the July 2006 inspection, with no significant change: There is a spall (1' x 9" x 3" deep) on top of the left barrier at Abutment 2. There is rebar exposed but it has not rusted.

SUBSTRUCTURE
No defects were found in the substructure. Slope protection is in place and functioning well.

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CONDITION TEXT

SAFE LOAD CAPACITY
The load ratings are calculated by Load Factor design and appear on the March 23, 1982, BDS/Frames Output for this structure, indicating the inventory rating factor is 1.47, and the operating 2.45. The bridge is safe for all Purple permit loads.

MISCELLANEOUS

Abutment 1 is on the left (west) side looking downstream.

ELEMENT INSPECTION RATINGS

F#Elem	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4	St. 5
101 13	Concrete Deck - Unprotected w/ AC Overlay	2	110	sq.m.	110	0	0	0	0
101 110	Reinforced Conc Open Girder/Beam	2	52	m.	52	0	0	0	0
101 215	Reinforced Conc Abutment	2	26	m.	26	0	0	0	0
101 331	Reinforced Conc Bridge Railing	2	27	m.	27	0	0	0	0

WORK RECOMMENDATIONS

RecDate: 07/20/2006
Action : Railing-Repair
Work By: LOCAL AGENCY
Status : PROPOSED

EstCost:
StrTarget:
DistTarget:
EA:

Repair spall (1' x 9" x 3" deep) in the left barrier at Abutment 2.

Inspected By : DM.Ventura/J.Drago

Registered Civil Engineer

REGISTERED PROFESSIONAL ENGINEER
DIANA M. VENTURA
No. 69201
Exp. 06/30/10
CIVIL
STATE OF CALIFORNIA

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STRUCTURE INVENTORY AND APPRAISAL REPORT

********** IDENTIFICATION **********

(1)	STATE NAME- CALIFORNIA	069
(8)	STRUCTURE NUMBER	25C0029
(5)	INVENTORY ROUTE(ON/UNDER)- ON	1500Y8190
(2)	HIGHWAY AGENCY DISTRICT	03
(3)	COUNTY CODE 017	(4) PLACE CODE 57540
(6)	FEATURE INTERSECTED-	HANGTOWN CREEK
(7)	FACILITY CARRIED-	PLACERVILLE DR
(9)	LOCATION-	0.3 MI W COLD SPRINGS RD
(11)	MILEPOINT/KILOMETERPOINT	0
(12)	BASE HIGHWAY NETWORK- NOT ON NET	0
(13)	LRS INVENTORY ROUTE & SUBROUTE	
(16)	LATITUDE	38 DEG 44 MIN 00 SEC
(17)	LONGITUDE	120 DEG 49 MIN 39 SEC
(98)	BORDER BRIDGE STATE CODE	% SHARE %
(99)	BORDER BRIDGE STRUCTURE NUMBER	

******** STRUCTURE TYPE AND MATERIAL *********

(43)	STRUCTURE TYPE MAIN:MATERIAL-	CONCRETE
	TYPE- TEE BEAM	CODE 104
(44)	STRUCTURE TYPE APPR:MATERIAL-	
	TYPE-	CODE
(45)	NUMBER OF SPANS IN MAIN UNIT	1
(46)	NUMBER OF APPROACH SPANS	0
(107)	DECK STRUCTURE TYPE- CIP CONCRETE	CODE 1
(108)	WEARING SURFACE / PROTECTIVE SYSTEM:	
A)	TYPE OF WEARING SURFACE- BITUMINOUS	CODE 6
B)	TYPE OF MEMBRANE- NONE	CODE 0
C)	TYPE OF DECK PROTECTION- NONE	CODE 0

********** AGE AND SERVICE **********

(27)	YEAR BUILT	1930
(106)	YEAR RECONSTRUCTED	0000
(42)	TYPE OF SERVICE: ON- HIGHWAY	1
	UNDER- WATERWAY	5
(28)	LANES:ON STRUCTURE 02	UNDER STRUCTURE 00
(29)	AVERAGE DAILY TRAFFIC	8000
(30)	YEAR OF ADT 2008	(109) TRUCK ADT 10 %
(19)	BYPASS, DETOUR LENGTH	2 KM

********** GEOMETRIC DATA **********

(48)	LENGTH OF MAXIMUM SPAN	13.1 M
(49)	STRUCTURE LENGTH	13.7 M
(50)	CURB OR SIDEWALK: LEFT 0.2 M	RIGHT 0.2 M
(51)	BRIDGE ROADWAY WIDTH CURB TO CURB	7.3 M
(52)	DECK WIDTH OUT TO OUT	8.4 M
(32)	APPROACH ROADWAY WIDTH (W/SHOULDERS)	9.1 M
(33)	BRIDGE MEDIAN- NO MEDIAN	0
(34)	SKEW 50 DEG (35) STRUCTURE FLARED	NO
(10)	INVENTORY ROUTE MIN VERT CLEAR	99.99 M
(47)	INVENTORY ROUTE TOTAL HORIZ CLEAR	7.3 M
(53)	MIN VERT CLEAR OVER BRIDGE RDWY	99.99 M
(54)	MIN VERT UNDERCLEAR REF- NOT H/RR	0.00 M
(55)	MIN LAT UNDERCLEAR RT REF- NOT H/RR	0.0 M
(56)	MIN LAT UNDERCLEAR LT	0.0 M

********** NAVIGATION DATA **********

(38)	NAVIGATION CONTROL- NO CONTROL	CODE 0
(111)	PIER PROTECTION-	CODE
(39)	NAVIGATION VERTICAL CLEARANCE	0.0 M
(116)	VERT-LIFT BRIDGE NAV MIN VERT CLEAR	M
(40)	NAVIGATION HORIZONTAL CLEARANCE	0.0 M

****

SUFFICIENCY RATING =	77.0
STATUS	FUNCTIONALLY OBSOLETE
HEALTH INDEX	100.0
PAINT CONDITION INDEX =	N/A

********** CLASSIFICATION ********** CODE

(112)	NBIS BRIDGE LENGTH- YES	Y
(104)	HIGHWAY SYSTEM- NOT ON NHS	0
(26)	FUNCTIONAL CLASS- OTHER PRIN ART URBAN	14
(100)	DEFENSE HIGHWAY- NOT STRAHNET	0
(101)	PARALLEL STRUCTURE- NONE EXISTS	N
(102)	DIRECTION OF TRAFFIC- 2 WAY	2
(103)	TEMPORARY STRUCTURE-	
(105)	FED.LANDS HWY- NOT APPLICABLE	0
(110)	DESIGNATED NATIONAL NETWORK - NOT ON NET	0
(20)	TOLL- ON FREE ROAD	3
(21)	MAINTAIN- CITY OR MUNICIPAL HIGHWAY AGENCY	04
(22)	OWNER- CITY OR MUNICIPAL HIGHWAY AGENCY	04
(37)	HISTORICAL SIGNIFICANCE- NOT ELIGIBLE	5

********** CONDITION ********** CODE

(58)	DECK	7
(59)	SUPERSTRUCTURE	7
(60)	SUBSTRUCTURE	7
(61)	CHANNEL & CHANNEL PROTECTION	6
(62)	CULVERTS	N

********* LOAD RATING AND POSTING ********* CODE

(31)	DESIGN LOAD- OTHER OR UNKNOWN	0
(63)	OPERATING RATING METHOD- LOAD FACTOR	1
(64)	OPERATING RATING-	79.8
(65)	INVENTORY RATING METHOD- LOAD FACTOR	1
(66)	INVENTORY RATING-	47.1
(70)	BRIDGE POSTING- EQUAL TO OR ABOVE LEGAL LOADS	5
(41)	STRUCTURE OPEN, POSTED OR CLOSED-	A
	DESCRIPTION- OPEN, NO RESTRICTION	

********** APPRAISAL ********** CODE

(67)	STRUCTURAL EVALUATION	7
(68)	DECK GEOMETRY	2
(69)	UNDERCLEARANCES, VERTICAL & HORIZONTAL	N
(71)	WATER ADEQUACY	8
(72)	APPROACH ROADWAY ALIGNMENT	6
(36)	TRAFFIC SAFETY FEATURES	0000
(113)	SCOUR CRITICAL BRIDGES	5

********** PROPOSED IMPROVEMENTS **********

(75)	TYPE OF WORK- MISC STRUCTURAL WORK	CODE 38
(76)	LENGTH OF STRUCTURE IMPROVEMENT	13.7 M
(94)	BRIDGE IMPROVEMENT COST	$138,000
(95)	ROADWAY IMPROVEMENT COST	$14,000
(96)	TOTAL PROJECT COST	$207,000
(97)	YEAR OF IMPROVEMENT COST ESTIMATE	1999
(114)	FUTURE ADT	14344
(115)	YEAR OF FUTURE ADT	2028

********** INSPECTIONS **********

(90)	INSPECTION DATE 07/08	(91) FREQUENCY 48 MO
(92)	CRITICAL FEATURE INSPECTION:	(93) CFI DATE
A)	FRACTURE CRIT DETAIL- NO	MO A)
B)	UNDERWATER INSP- NO	MO B)
C)	OTHER SPECIAL INSP- NO	MO C)

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Photo No. 1
Vertical crack in Girder 3 gauged between 0.007 - 0.009" in size.



Photo No. 1
Location of vertical crack in Girder 3.

DEPARTMENT OF TRANSPORTATION
Structure Maintenance & Investigations

Bridge Number : 25C0029
Facility Carried: PLACERVILLE DR
Location : 0.3 MI W COLD SPRINGS RD
City : PLACERVILLE
Inspection Date : 10/16/2007

Bridge Inspection Report

Inspection Type

Routine	FC	Underwater	Special	Other
☐	☐	☐	☐	☒

STRUCTURE NAME: HANGTOWN CREEK

CONSTRUCTION INFORMATION

Year Built : 1930
Year Widened: N/A
Length (m) : 13.7
Skew (degrees): 50
No. of Joints : 0
No. of Hinges : 0

Structure Description: RC T-girders (4), on RC wing abutments, and on spread footings.

Span Configuration : 13.1m

LOAD CAPACITY AND RATINGS

Design Live Load: OTHER OR UNKNOWN
Inventory Rating: 47.1 metric tons Calculation Method: NO RATING ANALYSIS
Operating Rating: 79.8 metric tons Calculation Method: NO RATING ANALYSIS
Permit Rating : PPPPP
Posting Load : Type 3 N/A Type 3S2 N/A Type 3-3 N/A

DESCRIPTION ON STRUCTURE

Deck X-Section: 0.3m r, 0.18m cu, 7.3m, 0.18m cu, 0.3m r

Total Width: 8.4 m Net Width: 7.3 m No. of Lanes: 2
Rail Description: Concrete window. Rail Code : 0000

Min. Vertical Clearance: Unimpaired

DESCRIPTION UNDER STRUCTURE

Channel Description: Rocky swift flow.

CONDITION TEXT

HISTORY
This is a single span bridge built in 1930. A review of all existing Bridge Inspection Reports (B.I.R) reveals there is a history of Abutment 1 footing exposure but no undermining.

MISCELLANEOUS
The National Bridge Inventory Item 113 Code had been previously revised from 6 to 8 in 2000 however, no documentation was provided at that time. The purpose of this report is to assess the bridge for scour given the information available within Caltrans archives and to provide documentation regarding the 113 code.

REVISIONS
The National Bridge Inventory (NBI) Item 113 Code has been revised from 8 to 5.

SCOUR
This report addresses hydraulic issues only. The structure's scour potential has been assessed in accordance with the FHWA Technical Advisory T5140.23, "Evaluating Scour at Bridges". The NBI Item 113 Code, "Vulnerability to Scour", has been changed to 5: "Bridge Foundations determined to be stable for assessed or calculated scour conditions. Scour is determined to be within the limits of footings or piles (Example B) by assessment (i.e., bridge foundations are on rock formations that have been determined to resist scour within the service life of the bridge), by calculations or by installation of properly designed countermeasures."

This report is generated based on a hydraulic field investigation (10/16/2007). At the

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CONDITION TEXT

time of the investigation, a channel cross-section was taken (attached). No comparison of the cross-section could be made because this is the only cross-section on record for this bridge.

The channel had slow moving water at the time of the investigation. The water depth was about 1.0 ft. (0.30 m). The channel bed material consisted mainly of sand, cobbles, and some large rocks with heavy vegetation growing throughout the embankments. The channel does not have a good alignment to the bridge opening. The thalweg appears to flow towards Abutment 1.

The upstream top of Abutment 1 footing is exposed about 2.0-2.5 ft. (0.61-0.76 m) in length and about 0.58 ft. (0.18m) vertically. No undermining was observed. This portion of the footing of Abutment 1 is protected by large Rock Slope Protection (RSP) and broken concrete that appears to be in good condition. Given the amount of foundation exposure relative to the entire length of the foundation, this scour appears minor at this time. No other scour was noted at Abutment 1 and the channel appears to become well aligned after entering the upstream bridge opening.

No foundation exposure around Abutment 2. There appears to be plenty of ground cover. No scour issues were noted during the field investigation.

After a hydraulic field review, and a review of historical bridge inspection reports, a revision of the item 113 scour code is warranted at this time. However, scour currently does not pose a major threat to the integrity of the structure and this bridge is not scour critical at this time.

CHANNEL X-SECTION

Side : Upstream X-Section Date: 10/16/2007

Measured From : Top of Rail

Location	Horiz(m)	Vert(m)	Comments
Abutment 1 (West)	0.00	4.40	Face of A1
	1.75	4.85	Thalweg
	6.55	3.30	
	13.00	3.15	Face of A2

Inspected By : Hashimoto, Mike Michael J. Hashimoto

Registered Civil Engineer

REGISTERED PROFESSIONAL ENGINEER
CHARLES J. NEUCHEN
No. 054230
Exp. 12-31-07
CIVIL
STATE OF CALIFORNIA

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DEPARTMENT OF TRANSPORTATION
Structure Maintenance & Investigations

Bridge Number : 25C0029
Facility Carried: PLACERVILLE DR
Location : 0.3 MI W COLD SPRINGS RD
City : PLACERVILLE
Inspection Date : 07/20/2006

Bridge Inspection Report

Inspection Type

Routine	FC	Underwater	Special	Other
X				

STRUCTURE NAME: HANGTOWN CREEK

CONSTRUCTION INFORMATION

Year Built : 1930
Year Widened: N/A
Length (m) : 13.7
Skew (degrees): 50
No. of Joints : 0
No. of Hinges : 0

Structure Description: RC T-girders (4), on RC wing abutments, and on spread footings.

Span Configuration : 13.1m

LOAD CAPACITY AND RATINGS

Design Live Load: OTHER OR UNKNOWN
Inventory Rating: 47.1 metric tons Calculation Method: NO RATING ANALYSIS
Operating Rating: 79.8 metric tons Calculation Method: NO RATING ANALYSIS
Permit Rating : PPPPP
Posting Load : Type 3 N/A Type 3S2 N/A Type 3-3 N/A

DESCRIPTION ON STRUCTURE

Deck X-Section: 0.3m r, 0.18m cu, 7.3m, 0.18m cu, 0.3m r
Total Width: 8.4 m Net Width: 7.3 m No. of Lanes: 2
Rail Description: Concrete window. Rail Code : 0000
Min. Vertical Clearance: Unimpaired

DESCRIPTION UNDER STRUCTURE

Channel Description: Rocky swift flow.

CONDITION TEXT

WORK DONE

Rip-rap has been placed along the footing at Abutment 1.

REVISIONS

The Latitude has been revised from 38 Deg 43 Min 00 Sec to 38 Deg 44 Min 00 Sec.
The Longitude has been revised from 120 Deg 49 Min 49 Sec to 120 Deg 49 Min 39 Sec.

Utilities observed in the field were added to the Encroachments section.

CONDITION OF STRUCTURE

There is a pothole (1' x 3" x 2") in the AC approach on the west side.

There is a spall (1' x 9" x 3" deep) on top of the left barrier at Abutment 2. There is rebar exposed but it has not rusted yet. A work recommendation to have this spall repaired is included in this report.

There is a hairline vertical crack with light efflorescence on the face of Abutment 1 under Girders 2 & 3.

Concrete rip-rap has been placed against the existing rock rip-rap along the footing at Abutment 1 to prevent further erosion on the upstream side of Abutment 1. There is still

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CONDITION TEXT

1 M (3 ft) of the footing exposed but the rip-rap appears to be prevent further scour action. No undermining of the footing was observed during this investigation.

All elements were accessible and inspected.

The bridge does not have an identification marker. A work recommendation to have the bridge number placed on the right barrier at Abutment 1 is included in this report.

The stream was flowing slowly along Abutment 1 about 0.2 M (8") deep and about 3 M (10 ft) wide on the date of this investigation.

MISCELLANEOUS

This structure is currently labeled FUNCTIONALLY OBSOLETE in the NBI Status: because the current Bridge Roadway Width (Item 51) is 7.3 m (less than minimum 8.5 m), resulting in a rating of 3 or lower for Deck Geometry (Item 68).
Ref: Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges.

Abutment 1 is on the left (west) side looking downstream.

ELEMENT INSPECTION RATINGS

F#	Elem	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4	St. 5
101	13	Concrete Deck - Unprotected w/ AC Overlay	2	110	sq.m.	110	0	0	0	0
101	110	Reinforced Conc Open Girder/Beam	2	52	m.	52	0	0	0	0
101	215	Reinforced Conc Abutment	2	26	m.	26	0	0	0	0
101	331	Reinforced Conc Bridge Railing	2	27	m.	27	0	0	0	0

WORK RECOMMENDATIONS

RecDate: 07/20/2006
Action : Railing-Repair
Work By: LOCAL AGENCY
Status : PROPOSED
EstCost:
StrTarget:
DistTarget:
EA:

Repair spall (1' x 9" x 3" deep) in the left barrier at Abutment 2.

RecDate: 07/20/2006
Action : Bridge-Paint ID
Work By: LOCAL AGENCY
Status : PROPOSED
EstCost:
StrTarget:
DistTarget:
EA:

Place bridge number on the face of the right barrier at Abutment 1.

Inspected By : Colman Cronin

Registered Civil Engineer



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STRUCTURE INVENTORY AND APPRAISAL REPORT

********** IDENTIFICATION **********

(1) STATE NAME- CALIFORNIA 069
(8) STRUCTURE NUMBER **25C0029**
(5) INVENTORY ROUTE(ON/UNDER)- ON 1500Y8190
(2) HIGHWAY AGENCY DISTRICT 03
(3) COUNTY CODE 017 (4) PLACE CODE 57540
(6) FEATURE INTERSECTED- HANGTOWN CREEK
(7) FACILITY CARRIED- PLACERVILLE DR
(9) LOCATION- 0.3 MI W COLD SPRINGS RD
(11) MILEPOINT/KILOMETERPOINT 0
(12) BASE HIGHWAY NETWORK- NOT ON NET 0
(13) LRS INVENTORY ROUTE & SUBROUTE
(16) LATITUDE 38 DEG 44 MIN 00 SEC
(17) LONGITUDE 120 DEG 49 MIN 39 SEC
(98) BORDER BRIDGE STATE CODE % SHARE %
(99) BORDER BRIDGE STRUCTURE NUMBER

******** STRUCTURE TYPE AND MATERIAL *********

(43) STRUCTURE TYPE MAIN:MATERIAL- CONCRETE
TYPE- TEE BEAM CODE 104
(44) STRUCTURE TYPE APPR:MATERIAL-
TYPE- CODE
(45) NUMBER OF SPANS IN MAIN UNIT 1
(46) NUMBER OF APPROACH SPANS 0
(107) DECK STRUCTURE TYPE- CIP CONCRETE CODE 1
(108) WEARING SURFACE / PROTECTIVE SYSTEM:
A) TYPE OF WEARING SURFACE- BITUMINOUS CODE 6
B) TYPE OF MEMBRANE- NONE CODE 0
C) TYPE OF DECK PROTECTION- NONE CODE 0

********** AGE AND SERVICE **********

(27) YEAR BUILT 1930
(106) YEAR RECONSTRUCTED 0000
(42) TYPE OF SERVICE: ON- HIGHWAY 1
UNDER- WATERWAY 5
(28) LANES:ON STRUCTURE 02 UNDER STRUCTURE 00
(29) AVERAGE DAILY TRAFFIC 3000
(30) YEAR OF ADT 1981 (109) TRUCK ADT 10 %
(19) BYPASS, DETOUR LENGTH 2 KM

********** GEOMETRIC DATA **********

(48) LENGTH OF MAXIMUM SPAN 13.1 M
(49) STRUCTURE LENGTH 13.7 M
(50) CURB OR SIDEWALK: LEFT 0.2 M RIGHT 0.2 M
(51) BRIDGE ROADWAY WIDTH CURB TO CURB 7.3 M
(52) DECK WIDTH OUT TO OUT 8.4 M
(32) APPROACH ROADWAY WIDTH (W/SHOULDERS) 9.1 M
(33) BRIDGE MEDIAN- NO MEDIAN 0
(34) SKEW 50 DEG (35) STRUCTURE FLARED NO
(10) INVENTORY ROUTE MIN VERT CLEAR 99.99 M
(47) INVENTORY ROUTE TOTAL HORIZ CLEAR 7.3 M
(53) MIN VERT CLEAR OVER BRIDGE RDWY 99.99 M
(54) MIN VERT UNDERCLEAR REF- NOT H/RR 0.00 M
(55) MIN LAT UNDERCLEAR RT REF- NOT H/RR 0.0 M
(56) MIN LAT UNDERCLEAR LT 0.0 M

********** NAVIGATION DATA **********

(38) NAVIGATION CONTROL- NO CONTROL CODE 0
(111) PIER PROTECTION- CODE
(39) NAVIGATION VERTICAL CLEARANCE 0.0 M
(116) VERT-LIFT BRIDGE NAV MIN VERT CLEAR M
(40) NAVIGATION HORIZONTAL CLEARANCE 0.0 M

****

SUFFICIENCY RATING = 77.6
STATUS FUNCTIONALLY OBSOLETE
HEALTH INDEX 100.0
PAINT CONDITION INDEX = N/A

********** CLASSIFICATION ********** CODE

(112) NBIS BRIDGE LENGTH- YES Y
(104) HIGHWAY SYSTEM- NOT ON NHS 0
(26) FUNCTIONAL CLASS- OTHER PRIN ART URBAN 14
(100) DEFENSE HIGHWAY- NOT STRAHNET 0
(101) PARALLEL STRUCTURE- NONE EXISTS N
(102) DIRECTION OF TRAFFIC- 2 WAY 2
(103) TEMPORARY STRUCTURE-
(105) FED.LANDS HWY- NOT APPLICABLE 0
(110) DESIGNATED NATIONAL NETWORK - NOT ON NET 0
(20) TOLL- ON FREE ROAD 3
(21) MAINTAIN- CITY OR MUNICIPAL HIGHWAY AGENCY 04
(22) OWNER- CITY OR MUNICIPAL HIGHWAY AGENCY 04
(37) HISTORICAL SIGNIFICANCE- NOT ELIGIBLE 5

********** CONDITION ********** CODE

(58) DECK 7
(59) SUPERSTRUCTURE 7
(60) SUBSTRUCTURE 7
(61) CHANNEL & CHANNEL PROTECTION 6
(62) CULVERTS N

********* LOAD RATING AND POSTING ********* CODE

(31) DESIGN LOAD- OTHER OR UNKNOWN 0
(63) OPERATING RATING METHOD- NO RATING ANALYSIS 5
(64) OPERATING RATING- 79.8
(65) INVENTORY RATING METHOD- NO RATING ANALYSIS 5
(66) INVENTORY RATING- 47.1
(70) BRIDGE POSTING- EQUAL TO OR ABOVE LEGAL LOADS 5
(41) STRUCTURE OPEN, POSTED OR CLOSED- A
DESCRIPTION- OPEN, NO RESTRICTION

********** APPRAISAL ********** CODE

(67) STRUCTURAL EVALUATION 7
(68) DECK GEOMETRY 2
(69) UNDERCLEARANCES, VERTICAL & HORIZONTAL N
(71) WATER ADEQUACY 8
(72) APPROACH ROADWAY ALIGNMENT 6
(36) TRAFFIC SAFETY FEATURES 0000
(113) SCOUR CRITICAL BRIDGES 8

********** PROPOSED IMPROVEMENTS **********

(75) TYPE OF WORK- MISC STRUCTURAL WORK CODE 38
(76) LENGTH OF STRUCTURE IMPROVEMENT 13.7 M
(94) BRIDGE IMPROVEMENT COST $138,000
(95) ROADWAY IMPROVEMENT COST $14,000
(96) TOTAL PROJECT COST $207,000
(97) YEAR OF IMPROVEMENT COST ESTIMATE 1999
(114) FUTURE ADT 13600
(115) YEAR OF FUTURE ADT 2012

********** INSPECTIONS **********

(90) INSPECTION DATE 07/06 (91) FREQUENCY 48 MO
(92) CRITICAL FEATURE INSPECTION: (93) CFI DATE
A) FRACTURE CRIT DETAIL- NO MO A)
B) UNDERWATER INSP- NO MO B)
C) OTHER SPECIAL INSP- NO MO C)

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Photo No. 1
View of the bridge deck looking upstation (East).



Photo No. 1
View of the upstream (right) side of the bridge.

DEPARTMENT OF TRANSPORTATION
Structure Maintenance & Investigations

Bridge Number : 25C0029
Facility Carried: PLACERVILLE DR
Location : 0.3 MI W COLD SPRINGS RD
City : PLACERVILLE
Inspection Date : 04/20/2004

Bridge Inspection Report

Inspection Type

Routine	Group A	Underwater	Special	Other
X				

STRUCTURE NAME: HANGTOWN CREEK

CONSTRUCTION INFORMATION

Year Built : 1930
Year Widened: N/A
Length (m) : 13.7
Skew (degrees): 50
No. of Joints : 0
No. of Hinges : 0

Structure Description: RC T-girders (4), on RC wing abutments, and on spread footings.

Span Configuration : 13.1m

LOAD CAPACITY AND RATINGS

Design Live Load: OTHER OR UNKNOWN
Inventory Rating: 47.1 metric tons Calculation Method: NO RATING ANALYSIS
Operating Rating: 79.8 metric tons Calculation Method: NO RATING ANALYSIS
Permit Rating : PPPPP
Posting Load : Type 3 N/A Type 3S2 N/A Type 3-3 N/A

DESCRIPTION ON STRUCTURE

Deck X-Section: 0.3m r, 0.18m cu, 7.3m, 0.18m cu, 0.3m r
Total Width: 8.4 m Net Width: 7.3 m No. of Lanes: 2
Rail Description: Concrete window. Rail Code : 0000
Min. Vertical Clearance: Unimpaired

DESCRIPTION UNDER STRUCTURE

Channel Description: Rocky swift flow.

CONDITION TEXT

CONDITION OF STRUCTURE

The Abutment 1 footing is exposed up to 0.4 m at the upstream corner. Concrete riprap has been placed at the southwest corner of Abutment 1 since the previous investigation. The route of the stream is directed toward the southwest wingwall and the rock is absorbing the main flow and redirecting it along Abutment 1. The rock appears to be protecting the wingwall and embankment more than the footing itself. There was approximately 1 m of water flowing against Abutment 1 from the upstream corner to the middle of the structure. All elements were accessible and inspected. No undermining of the footing was observed during this investigation.

ELEMENT INSPECTION RATINGS

F #	Elem No.	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4	St. 5
01	13	Concrete Deck - Unprotected w/ AC Overlay	2	110	sq.m.	110	0	0	0	0
01	110	Reinforced Conc Open Girder/Beam	2	52	m.	52	0	0	0	0
01	215	Reinforced Conc Abutment	2	26	m.	26	0	0	0	0
01	331	Reinforced Conc Bridge Railing	2	27	m.	27	0	0	0	0

WORK RECOMMENDATIONS

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WORK RECOMMENDATIONS

RecDate: 08/16/1991 EstCost: Protect the Abutment 1 footing from scour.
Action : Sub-Scour Mitiga StrTarget: 2 YEARS
Work By: LOCAL AGENCY DistTarget:
Status : PROPOSED EA:

Inspected By : Patrick Piacentini

Registered Civil Engineer

REGISTERED PROFESSIONAL ENGINEER
PATRICK N PIACENTINI
63438
EXP. 9/06
CIVIL
STATE OF CALIFORNIA

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STRUCTURE INVENTORY AND APPRAISAL REPORT

********** IDENTIFICATION **********

(1) STATE NAME- CALIFORNIA 069
(8) STRUCTURE NUMBER **25C0029**
(5) INVENTORY ROUTE(ON/UNDER)- ON 1500Y8190
(2) HIGHWAY AGENCY DISTRICT 03
(3) COUNTY CODE 017 (4) PLACE CODE 57540
(6) FEATURE INTERSECTED- HANGTOWN CREEK
(7) FACILITY CARRIED- PLACERVILLE DR
(9) LOCATION- 0.3 MI W COLD SPRINGS RD
(11) MILEPOINT/KILOMETERPOINT 0
(12) BASE HIGHWAY NETWORK- NOT ON NET 0
(13) LRS INVENTORY ROUTE & SUBROUTE
(16) LATITUDE 38 DEG 43 MIN 00 SEC
(17) LONGITUDE 120 DEG 49 MIN 40 SEC
(98) BORDER BRIDGE STATE CODE % SHARE %
(99) BORDER BRIDGE STRUCTURE NUMBER

******** STRUCTURE TYPE AND MATERIAL *********

(43) STRUCTURE TYPE MAIN:MATERIAL- CONCRETE
TYPE- TEE BEAM CODE 104
(44) STRUCTURE TYPE APPR:MATERIAL- NOT APPLICABLE
TYPE- NOT APPLICABLE CODE
(45) NUMBER OF SPANS IN MAIN UNIT 1
(46) NUMBER OF APPROACH SPANS 0
(107) DECK STRUCTURE TYPE- CIP CONCRETE CODE 1
(108) WEARING SURFACE / PROTECTIVE SYSTEM:
A) TYPE OF WEARING SURFACE- BITUMINOUS CODE 6
B) TYPE OF MEMBRANE- NONE CODE 0
C) TYPE OF DECK PROTECTION- NONE CODE 0

********** AGE AND SERVICE **********

(27) YEAR BUILT 1930
(106) YEAR RECONSTRUCTED 0000
(42) TYPE OF SERVICE: ON- HIGHWAY 1
UNDER- WATERWAY 5
(28) LANES:ON STRUCTURE 02 UNDER STRUCTURE 00
(29) AVERAGE DAILY TRAFFIC 3000
(30) YEAR OF ADT 1981 (109) TRUCK ADT 10 %
(19) BYPASS, DETOUR LENGTH 2 KM

********** GEOMETRIC DATA **********

(48) LENGTH OF MAXIMUM SPAN 13.1 M
(49) STRUCTURE LENGTH 13.7 M
(50) CURB OR SIDEWALK: LEFT 0.2 M RIGHT 0.2 M
(51) BRIDGE ROADWAY WIDTH CURB TO CURB 7.3 M
(52) DECK WIDTH OUT TO OUT 8.4 M
(32) APPROACH ROADWAY WIDTH (W/SHOULDERS) 9.1 M
(33) BRIDGE MEDIAN- NO MEDIAN 0
(34) SKEW 50 DEG (35) STRUCTURE FLARED NO
(10) INVENTORY ROUTE MIN VERT CLEAR 99.99 M
(47) INVENTORY ROUTE TOTAL HORIZ CLEAR 7.3 M
(53) MIN VERT CLEAR OVER BRIDGE RDWY 99.99 M
(54) MIN VERT UNDERCLEAR REF- NOT H/RR 0.00 M
(55) MIN LAT UNDERCLEAR RT REF- NOT H/RR 0.0 M
(56) MIN LAT UNDERCLEAR LT 0.0 M

********** NAVIGATION DATA **********

(38) NAVIGATION CONTROL- NO CONTROL CODE 0
(111) PIER PROTECTION- NOT REQUIRED CODE 1
(39) NAVIGATION VERTICAL CLEARANCE 0.0 M
(116) VERT-LIFT BRIDGE NAV MIN VERT CLEAR M
(40) NAVIGATION HORIZONTAL CLEARANCE 0.0 M

****

SUFFICIENCY RATING = 77.6
STATUS FUNCTIONALLY OBSOLETE
HEALTH INDEX = 100.0
PAINT CONDITION INDEX = N/A

********** CLASSIFICATION ********** CODE

(112) NBIS BRIDGE LENGTH- YES Y
(104) HIGHWAY SYSTEM- NOT ON NHS 0
(26) FUNCTIONAL CLASS- OTHER PRIN ART URBAN 14
(100) DEFENSE HIGHWAY- NOT STRAHNET 0
(101) PARALLEL STRUCTURE- NONE EXISTS N
(102) DIRECTION OF TRAFFIC- 2 WAY 2
(103) TEMPORARY STRUCTURE-
(105) FED.LANDS HWY- NOT APPLICABLE 0
(110) DESIGNATED NATIONAL NETWORK - NOT ON NET 0
(20) TOLL- ON FREE ROAD 3
(21) MAINTAIN- CITY OR MUNICIPAL HIGHWAY AGENCY 04
(22) OWNER- CITY OR MUNICIPAL HIGHWAY AGENCY 04
(37) HISTORICAL SIGNIFICANCE- NOT ELIGIBLE 5

********** CONDITION ********** CODE

(58) DECK 7
(59) SUPERSTRUCTURE 7
(60) SUBSTRUCTURE 7
(61) CHANNEL & CHANNEL PROTECTION 6
(62) CULVERTS N

******** LOAD RATING AND POSTING ********* CODE

(31) DESIGN LOAD- OTHER OR UNKNOWN 0
(63) OPERATING RATING METHOD- NO RATING ANALYSIS 5
(64) OPERATING RATING- 79.8
(65) INVENTORY RATING METHOD- NO RATING ANALYSIS 5
(66) INVENTORY RATING- 47.1
(70) BRIDGE POSTING- EQUAL TO OR ABOVE LEGAL LOADS 5
(41) STRUCTURE OPEN, POSTED OR CLOSED- A
DESCRIPTION- OPEN, NO RESTRICTION

********** APPRAISAL ********** CODE

(67) STRUCTURAL EVALUATION 7
(68) DECK GEOMETRY 2
(69) UNDERCLEARANCES, VERTICAL & HORIZONTAL N
(71) WATER ADEQUACY 8
(72) APPROACH ROADWAY ALIGNMENT 6
(36) TRAFFIC SAFETY FEATURES 0000
(113) SCOUR CRITICAL BRIDGES 8

********** PROPOSED IMPROVEMENTS **********

(75) TYPE OF WORK- MISC STRUCTURAL WORK CODE 38
(76) LENGTH OF STRUCTURE IMPROVEMENT 13.7 M
(94) BRIDGE IMPROVEMENT COST $138,000
(95) ROADWAY IMPROVEMENT COST $14,000
(96) TOTAL PROJECT COST $207,000
(97) YEAR OF IMPROVEMENT COST ESTIMATE 1999
(114) FUTURE ADT 13600
(115) YEAR OF FUTURE ADT 2012

********** INSPECTIONS **********

(90) INSPECTION DATE 04/04(91) FREQUENCY 24 MO
(92) CRITICAL FEATURE INSPECTION: (93) CFI DATE
A) FRACTURE CRIT DETAIL- NO MO A)
B) UNDERWATER INSP- NO MO B)
C) OTHER SPECIAL INSP- NO MO C)

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DEPARTMENT OF TRANSPORTATION
Structure Maintenance & Investigations

Bridge Number : **25C0029**
Facility Carried: **PLACERVILLE DR**
Location : **0.3 MI W COLD SPRINGS RD**
City : **PLACERVILLE**
Inspection Date : **20-MAR-02**

Inspection Type

Routine	Group A	Underwater	Special	Other
X				

Bridge Inspection Report

Name : HANGTOWN CREEK

CONSTRUCTION INFORMATION

Year Built : 1930
Year Widened : N/A
Length (m) : 13.7

Skew (degrees): 50
No. of Joints : 0
No. of Hinges : 0

Description of Structure : RC T-girders (4), on RC wing abutments, and on spread footings.

Span Configuration : 13.1m

LOAD CAPACITY AND RATINGS

Design Live Load : OTHER OR UNKNOWN
Inventory Rating : 47.1 metric tons — Calculation Method : LOAD FACTOR
Operating Rating : 79.8 metric tons — Calculation Method : LOAD FACTOR
Permit Rating : PPPPP
Posting Load : Type 3 N/A english tons Type 3S2 N/A english tons Type 3-3 N/A english tons

DESCRIPTION ON STRUCTURE

Bridge width : 0.3m r, 0.18m cu, 7.3m, 0.18m cu, 0.3m r
Total Width : 8.4 m — Net Width : 7.30 m — No. of Lanes : 2
Rail Description : Concrete window. — Rail Code : 0000
Min. Vertical Clearance : Unimpaired

DESCRIPTION UNDER STRUCTURE

Channel Description : Rocky swift flow.

CONDITION OF STRUCTURE

The Abutment 1 footing is exposed up to 0.4 m at the upstream corner. This has increased by 0.2 m since the previous investigation. Concrete riprap has been placed at the southwest corner of Abutment 1 since the previous investigation. The route of the stream is directed toward the southwest wingwall and the rock is absorbing the main flow and redirecting it along Abutment 1. The rock appears to be protecting the wingwall and embankment more than the footing itself. There was approximately 1 m of water flowing against Abutment 1 from the upstream corner to the middle of the structure. All elements were accessible and inspected. No undermining of the footing was observed during this investigation.

A stream section was taken during this investigation. There were no previous stream sections on record to compare with.

The K-rail placed at the southwest approach has been damaged by vehicle impact. There were short reinforcing steel bars exposed and pointing toward traffic during this investigation.

This structure currently has the status FUNCTIONALLY OBSOLETE. The status is influenced by the following: The current ADT is 3000 and the deck width is 7.3 m (less than the minimum of 7.9 m). As a result, the Deck Geometry (Item 68) appraisal rating is 2. An appraisal rating of 3 or less will cause the structure status to become FUNCTIONALLY OBSOLETE.

ELEMENT LEVEL INSPECTION RATINGS

F#	Elem No.	Element Description	Env	Total Quantity	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4	St. 5
01	13	Concrete Deck - Unprotected w/ AC Overlay	2	110	sq.m.	110	0	0	0	0
01	110	Reinforced Conc Open Girder/Beam	2	52	m.	52	0	0	0	0
01	215	Reinforced Conc Abutment	2	26	m.	26	0	0	0	0
01	331	Reinforced Conc Bridge Railing	2	27	m.	27	0	0	0	0

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Bridge No.: 25C0029 Location: 0.3 MI W COLD SPRINGS RD Inspection Date: 20-MAR-02

WORK RECOMMENDATIONS

The stream flow is directed toward the southwest corner of Abutment 1. The upstream portion of the footing is exposed 0.4 m which is 0.2 m more than the previous investigation reported. Although the footing was not undermined during this investigation, protect the footing from addtional scour at Abutment 1.

Item#	Rec. Date	Work By	Work Id.	Prog. Method	Cost
1	16-AUG-1991	City Agency	40029X91228X		

Inspected By : John M. O'Sullivan

Registered Civil Engineer

REGISTERED PROFESSIONAL ENGINEER
JOHN M. O'SULLIVAN
No. 50372
Exp. 6/30/05
CIVIL
STATE OF CALIFORNIA

CC : SJaques, Hydraulics

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Bridge No.: 25C0029 Location: 0.3 MI W COLD SPRINGS RD Inspection Date: 20-MAR-02

STRUCTURE INVENTORY AND APPRAISAL REPORT

```
********** IDENTIFICATION **********
(1) STATE NAME - CALIFORNIA                                   069
(8) STRUCTURE NUMBER                                      25C0029
(5) INVENTORY ROUTE(ON/UNDER) - ON                    1 50 0Y8190
(2) HIGHWAY AGENCY DISTRICT                                    03
(3) COUNTY CODE 017          (4) PLACE CODE               57540
(6) FEATURE INTERSECTED - HANGTOWN CREEK
(7) FACILITY CARRIED - PLACERVILLE DR
(9) LOCATION - 0.3 MI W COLD SPRINGS RD
(11) MILEPOINT/KILOMETERPOINT                                  0
(12) BASE HIGHWAY NETWORK - NOT ON NET                         0
(13) LRS INVENTORY ROUTE & SUBROUTE
(16) LATITUDE                          38 DEG 43 MIN 00 SEC
(17) LONGITUDE                        120 DEG 49 MIN 40 SEC
(98) BORDER BRIDGE STATE CODE              % SHARE          %
(99) BORDER BRIDGE STRUCTURE NUMBER

********** STRUCTURE TYPE AND MATERIAL **********
(43) STRUCTURE TYPE MAIN: MATERIAL - CONCRETE
          TYPE - TEE BEAM                      CODE    1 04
(44) STRUCTURE TYPE APPR: MATERIAL - OTHER
          TYPE - OTHER                         CODE    000
(45) NUMBER OF SPANS IN MAIN UNIT                          1
(46) NUMBER OF APPROACH SPANS                              0
(107) DECK STRUCTURE TYPE  CIP CONCRETE               CODE 1
(108) WEARING SURFACE / PROTECTIVE SYSTEM:
   A) TYPE OF WEARING SURFACE - BITUMINOUS            CODE 6
   B) TYPE OF MEMBRANE - NONE                         CODE 0
   C) TYPE OF DECK PROTECTION - NONE                  CODE 0

********** AGE AND SERVICE **********
(27) YEAR BUILT                                         1930
(106) YEAR RECONSTRUCTED                                0000
(42) TYPE OF SERVICE: ON - HIGHWAY                         1
          UNDER - WATERWAY                                 5
(28) LANES: ON STRUCTURE 02          UNDER STRUCTURE
(29) AVERAGE DAILY TRAFFIC                              3000
(30) YEAR OF ADT     1998          (109) TRUCK ADT      10%
(19) BYPASS, DETOUR LENGTH                           2 KM

********** GEOMETRIC DATA **********
(48) LENGTH OF MAXIMUM SPAN                         13.1 M
(49) STRUCTURE LENGTH                               13.7 M
(50) CURB OR SIDEWALK: LEFT      .2 M     RIGHT      .2 M
(51) BRIDGE ROADWAY WIDTH CURB TO CURB               7.3 M
(52) DECK WIDTH OUT TO OUT                           8.4 M
(32) APPROACH ROADWAY WIDTH (W/SHOULDERS)            9.1 M
(33) BRIDGE MEDIAN - NO MEDIAN                         0
(34) SKEW      50 DEG     (35) STRUCTURE FLARED       NO
(10) INVENTORY ROUTE MIN VERT CLEAR                 99.99 M
(47) INVENTORY ROUTE TOTAL HORIZ CLEAR               7.3 M
(53) MIN VERT CLEAR OVER BRIDGE RDWY                99.99 M
(54) MIN VERT UNDERCLEAR REF - NOT H/RR              0 M
(55) MIN LAT UNDERCLEAR RT REF - NOT H/RR           99.9 M
(56) MIN LAT UNDERCLEAR LT                           0 M

********** NAVIGATION DATA **********
(38) NAVIGATION CONTROL - NO CONTROL                CODE 0
(111) PIER PROTECTION - NOT REQUIRED                CODE 1
(39) NAVIGATION VERTICAL CLEARANCE                   0 M
(116) VERT-LIFT BRIDGE NAV MIN VERT CLEAR              M
(40) NAVIGATION HORIZONTAL CLEARANCE                 0
```

```
**********
SUFFICIENCY RATING = 77.6
STATUS = FUNCTIONALLY OBSOLETE
HEALTH INDEX = 100
********** CLASSIFICATION ********** CODE
(112) NBIS BRIDGE LENGTH - YES                           Y
(104) HIGHWAY SYSTEM - NOT ON NHS                        0
(26) FUNCTIONAL CLASS - OTHER PRIN ART URBAN            14
(100) DEFENSE HIGHWAY - NOT STRAHNET                     0
(101) PARALLEL STRUCTURE - NONE EXISTS                   N
(102) DIRECTION OF TRAFFIC - 2 WAY                       2
(103) TEMPORARY STRUCTURE -
(105) FEDERAL LANDS HIGHWAY -
(110) DESIGNATED NATIONAL NETWORK - NOT ON NET           0
(20) TOLL - ON FREE ROAD                                 3
(21) MAINTAIN - CITY OR MUNICIPAL HIGHWAY AGENCY         4
(22) OWNER - CITY OR MUNICIPAL HIGHWAY AGENCY            4
(37) HISTORICAL SIGNIFICANCE - NOT ELIGIBLE              5

********** CONDITION ********** CODE
(58) DECK                                                7
(59) SUPERSTRUCTURE                                      7
(60) SUBSTRUCTURE                                        7
(61) CHANNEL & CHANNEL PROTECTION                        6
(62) CULVERTS                                            N

********** LOAD RATING AND POSTING ********** CODE
(31) DESIGN LOAD - OTHER OR UNKNOWN                      0
(63) OPERATING RATING METHOD - LOAD FACTOR               1
(64) OPERATING RATING -                                79.8
(65) INVENTORY RATING METHOD - LOAD FACTOR               1
(66) INVENTORY RATING -                                47.1
(70) BRIDGE POSTING - Equal to or above legal loads      5
(41) STRUCTURE OPEN, POSTED OR CLOSED -                  A
        DESCRIPTION - OPEN, NO RESTRICTION

********** APPRAISAL ********** CODE
(67) STRUCTURAL EVALUATION                               7
(68) DECK GEOMETRY                                       2
(69) UNDERCLEARANCES, VERTICAL & HORIZONTAL              N
(71) WATER ADEQUACY                                      8
(72) APPROACH ROADWAY ALIGNMENT                          6
(36) TRAFFIC SAFETY FEATURES                          0000
(113) SCOUR CRITICAL BRIDGES                             8

********** PROPOSED IMPROVEMENTS **********
(75) TYPE OF WORK - MISC STRUCTURAL WORK          CODE   38
(76) LENGTH OF STRUCTURE IMPROVEMENT                13.7 M
(94) BRIDGE IMPROVEMENT COST                      $138,000
(95) ROADWAY IMPROVEMENT COST                      $14,000
(96) TOTAL PROJECT COST                           $207,000
(97) YEAR OF IMPROVEMENT COST ESTIMATE                1999
(114) FUTURE ADT                                     13600
(115) YEAR OF FUTURE ADT                              2012

********** INSPECTIONS **********
(90) INSPECTION DATE  03/02      (91) FREQUENCY  24 MO
(92) CRITICAL FEATURE INSPECTION:          (93) CFI DATE
   A) FRACTURE CRIT DETAIL -  NO    -1 MO  A)
   B) UNDERWATER INSP -       NO    -1 MO  B)
   C) OTHER SPECIAL INSP -    NO    -1 MO  C)
```

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DEPARTMENT OF TRANSPORTATION
Structure Maintenance & Investigations

Bridge Number : **25C0029**
Facility Carried: **PLACERVILLE DR**
Location : **0.3 MI W COLD SPRINGS RD**
City : **PLACERVILLE**
Inspection Date : **18-APR-00**

Inspection Type

Routine	Group A	Underwater	Special	Other
X				

Bridge Inspection Report

Name : HANGTOWN CREEK

CONSTRUCTION INFORMATION

Year Built : 1930
Year Widened : N/A
Length (m) : 13.7

Skew (degrees): 50
No. of Joints : 0
No. of Hinges : 0

Description of Structure : RC T-girders (4), on RC wing abutments, and on spread footings.

Span Configuration : 13.1m

LOAD CAPACITY AND RATINGS

Design Live Load : OTHER OR UNKNOWN
Inventory Rating : 47.1 metric tons — Calculation Method : LOAD FACTOR
Operating Rating : 79.8 metric tons — Calculation Method : LOAD FACTOR
Permit Rating : PPPPP
Posting Load : Type 3 N/A english tons Type 3S2 N/A english tons Type 3-3 N/A english tons

DESCRIPTION ON STRUCTURE

Bridge width : 0.3m r, 0.18m cu, 7.3m, 0.18m cu, 0.3m r

Total Width : 8.4 m — Net Width : 7.30 m — No. of Lanes : 2
Rail Description : Concrete window. — Rail Code : 0000
Min. Vertical Clearance : Unimpaired

DESCRIPTION UNDER STRUCTURE

Channel Description : Rocky swift flow.

CONDITION OF STRUCTURE

The footing is still exposed up to 0.15 meter at the upstream corner at Abutment 1. This condition has been noted since 8/16/91 investigation.

There is an abundance of plant growth encroaching along the south side of the structure.

Otherwise, the rest of this structure remains primarily in the same condition as noted in previous investigation.

ELEMENT LEVEL INSPECTION RATINGS

F#	Elem No.	Element Description	Env	Total Quantity	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4	St. 5
01	13	Concrete Deck - Unprotected w/ AC Overlay	2	110	sq.m.	110	0	0	0	0
01	110	Reinforced Conc Open Girder/Beam	2	52	m.	52	0	0	0	0
01	215	Reinforced Conc Abutment	2	26	m.	26	0	0	0	0
01	331	Reinforced Conc Bridge Railing	2	27	m.	27	0	0	0	0

WORK RECOMMENDATIONS

Protect the footing at Abutment 1.

Item#	Rec. Date	Work By	Work Id.	Prog. Method	Cost
1	16-AUG-1991	City Agency	40029X91228X		

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Bridge No.: 25C0029 Location: 0.3 MI W COLD SPRINGS RD Inspection Date: 18-APR-00

Cut back plant growth along the south side of the structure.

Item#	Rec. Date	Work By	Work Id.	Prog. Method	Cost
2	18-APR-2000	City Agency	40029X00109X		

Inspected By : Beau Trinh

Registered Civil Engineer



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Bridge No.: 25C0029 Location: 0.3 MI W COLD SPRINGS RD Inspection Date: 18-APR-00

STRUCTURE INVENTORY AND APPRAISAL REPORT

IDENTIFICATION

(1)	STATE NAME - CALIFORNIA	069
(8)	STRUCTURE NUMBER	25C0029
(5)	INVENTORY ROUTE(ON/UNDER) - ON	1 50 0Y8190
(2)	HIGHWAY AGENCY DISTRICT	03
(3)	COUNTY CODE 017 (4) PLACE CODE	57540
(6)	FEATURE INTERSECTED - HANGTOWN CREEK	
(7)	FACILITY CARRIED - PLACERVILLE DR	
(9)	LOCATION - 0.3 MI W COLD SPRINGS RD	
(11)	MILEPOINT/KILOMETERPOINT	0
(12)	BASE HIGHWAY NETWORK - NOT ON NET	0
(13)	LRS INVENTORY ROUTE & SUBROUTE	
(16)	LATITUDE	38 DEG 44 MIN 00 SEC
(17)	LONGITUDE	120 DEG 49 MIN 36 SEC
(98)	BORDER BRIDGE STATE CODE % SHARE	%
(99)	BORDER BRIDGE STRUCTURE NUMBER	

STRUCTURE TYPE AND MATERIAL

(43)	STRUCTURE TYPE MAIN: MATERIAL - CONCRETE	
	TYPE - TEE BEAM	CODE 1 04
(44)	STRUCTURE TYPE APPR: MATERIAL - OTHER	
	TYPE - OTHER	CODE 000
(45)	NUMBER OF SPANS IN MAIN UNIT	1
(46)	NUMBER OF APPROACH SPANS	0
(107)	DECK STRUCTURE TYPE CIP CONCRETE	CODE 1
(108)	WEARING SURFACE / PROTECTIVE SYSTEM:	
	A) TYPE OF WEARING SURFACE - BITUMINOUS	CODE 6
	B) TYPE OF MEMBRANE - NONE	CODE 0
	C) TYPE OF DECK PROTECTION - NONE	CODE 0

AGE AND SERVICE

(27)	YEAR BUILT	1930
(106)	YEAR RECONSTRUCTED	0000
(42)	TYPE OF SERVICE: ON - HIGHWAY	1
	UNDER - WATERWAY	5
(28)	LANES: ON STRUCTURE 02 UNDER STRUCTURE	
(29)	AVERAGE DAILY TRAFFIC	3000
(30)	YEAR OF ADT 1998 (109) TRUCK ADT	10%
(19)	BYPASS, DETOUR LENGTH	2 KM

GEOMETRIC DATA

(48)	LENGTH OF MAXIMUM SPAN	13.1 M
(49)	STRUCTURE LENGTH	13.7 M
(50)	CURB OR SIDEWALK: LEFT .2 M RIGHT	.2 M
(51)	BRIDGE ROADWAY WIDTH CURB TO CURB	7.3 M
(52)	DECK WIDTH OUT TO OUT	8.4 M
(32)	APPROACH ROADWAY WIDTH (W/SHOULDERS)	9.1 M
(33)	BRIDGE MEDIAN - NO MEDIAN	0
(34)	SKEW 50 DEG (35) STRUCTURE FLARED	NO
(10)	INVENTORY ROUTE MIN VERT CLEAR	99.99 M
(47)	INVENTORY ROUTE TOTAL HORIZ CLEAR	7.3 M
(53)	MIN VERT CLEAR OVER BRIDGE RDWY	99.99 M
(54)	MIN VERT UNDERCLEAR REF - NOT H/RR	0 M
(55)	MIN LAT UNDERCLEAR RT REF - NOT H/RR	99.9 M
(56)	MIN LAT UNDERCLEAR LT	0 M

NAVIGATION DATA

(38)	NAVIGATION CONTROL - NO CONTROL	CODE 0
(111)	PIER PROTECTION - NOT REQUIRED	CODE 1
(39)	NAVIGATION VERTICAL CLEARANCE	0 M
(116)	VERT-LIFT BRIDGE NAV MIN VERT CLEAR	M
(40)	NAVIGATION HORIZONTAL CLEARANCE	0

SUFFICIENCY RATING = 77.6

STATUS = FUNCTIONALLY OBSOLETE

HEALTH INDEX = 100

CLASSIFICATION

		CODE
(112)	NBIS BRIDGE LENGTH - YES	Y
(104)	HIGHWAY SYSTEM - NOT ON NHS	0
(26)	FUNCTIONAL CLASS - OTHER PRIN ART URBAN	14
(100)	DEFENSE HIGHWAY - NOT STRAHNET	0
(101)	PARALLEL STRUCTURE - NONE EXISTS	N
(102)	DIRECTION OF TRAFFIC - 2 WAY	2
(103)	TEMPORARY STRUCTURE -	
(105)	FEDERAL LANDS HIGHWAY -	
(110)	DESIGNATED NATIONAL NETWORK - NOT ON NET	0
(20)	TOLL - ON FREE ROAD	3
(21)	MAINTAIN - CITY OR MUNICIPAL HIGHWAY AGENCY	4
(22)	OWNER - CITY OR MUNICIPAL HIGHWAY AGENCY	4
(37)	HISTORICAL SIGNIFICANCE - NOT ELIGIBLE	5

CONDITION

		CODE
(58)	DECK	7
(59)	SUPERSTRUCTURE	7
(60)	SUBSTRUCTURE	7
(61)	CHANNEL & CHANNEL PROTECTION	6
(62)	CULVERTS	N

LOAD RATING AND POSTING

		CODE
(31)	DESIGN LOAD - OTHER OR UNKNOWN	0
(63)	OPERATING RATING METHOD - LOAD FACTOR	1
(64)	OPERATING RATING -	79.8
(65)	INVENTORY RATING METHOD - LOAD FACTOR	1
(66)	INVENTORY RATING -	47.1
(70)	BRIDGE POSTING - Equal to or above legal loads	5
(41)	STRUCTURE OPEN, POSTED OR CLOSED	A
	DESCRIPTION - OPEN, NO RESTRICTION	

APPRAISAL

		CODE
(67)	STRUCTURAL EVALUATION	7
(68)	DECK GEOMETRY	2
(69)	UNDERCLEARANCES, VERTICAL & HORIZONTAL	N
(71)	WATER ADEQUACY	8
(72)	APPROACH ROADWAY ALIGNMENT	6
(36)	TRAFFIC SAFETY FEATURES	0000
(113)	SCOUR CRITICAL BRIDGES	8

PROPOSED IMPROVEMENTS

(75)	TYPE OF WORK - MISC STRUCTURAL WORK	CODE 38
(76)	LENGTH OF STRUCTURE IMPROVEMENT	13.7 M
(94)	BRIDGE IMPROVEMENT COST	$138,000
(95)	ROADWAY IMPROVEMENT COST	$14,000
(96)	TOTAL PROJECT COST	$207,000
(97)	YEAR OF IMPROVEMENT COST ESTIMATE	1999
(114)	FUTURE ADT	13600
(115)	YEAR OF FUTURE ADT	2012

INSPECTIONS

(90) INSPECTION DATE 04/00 (91) FREQUENCY 24 MO

(92) CRITICAL FEATURE INSPECTION: (93) CFI DATE

A)	FRACTURE CRIT DETAIL - NO	-1 MO	A)
B)	UNDERWATER INSP - NO	-1 MO	B)
C)	OTHER SPECIAL INSP - NO	-1 MO	C)

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

Bridge No. 25C-0029

SUPPLEMENTARY BRIDGE REPORT

DS-M19(REV.1-90)

Location 03-ED-FAU Y819-Plcr
Dist.,Co.,Rte.,PM,City

Date of Investigation 9/23/97

Name HANGTOWN CREEK (On Placerville Drive, 0.3 mile West of Cold Springs Road)

RATINGS:

[71] **Waterway Adequacy** 8 [61] **Channel & Channel Protection** 6 [72] **Approach Rdwy Align.** 6

TYPE OF INVESTIGATION/REPORT

Biennial	X	**Group A**		**Other**	
Damage		**Underwater**		**Office**	

WORK NOT DONE
The footing at Abutment 1 has not been protected.

WORK DONE
The plant growth along the south side of the structure has been cut back.

CONDITION OF STRUCTURE
There has been no significant change in the condition of this structure since the previous investigation.

WORK RECOMMENDED
Complete the "WORK NOT DONE" mentioned above.

Eric E. Akana
Registered Civil Engineer

EEA:zbt



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********** STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION **********

E L E M E N T L E V E L I N S P E C T I O N - (E L I)

BRIDGE NUMBER	FRAME	INSPECTION DATE
2 5 C 0 0 2 9	0 1	~~0 8 2 3 9~~ 5 09 23 97
1 8	9	11 16

INFORMATION ONLY - NOT FOR UPDATE

SCOUR CRITICAL..... NO
GROUP A INVESTIGATION..... NO
FRACTURE CRITICAL..... NO
ELIGIBLE FOR RAIL UPGRADE.. NO
UNDERWATER INVESTIGATION... NO

DISTRICT 03
COUNTY ED
ROUTE
POSTMILE
NAME

DEL	ELE #	ELEMENT DESCRIPTION	ENV	TOTAL QUANTITY	UNITS	QUANT CONDITION STATE 1	QUANT CONDITION STATE 2	QUANT CONDITION STATE 3	QUANT CONDITION STATE 4	QUANT CONDITION STATE 5
	1 3	CONCRETE DECK - UNPROTECTED W/ AC OVERLAY		1	EA	1				
	1 1 0	REINFORCED CONCRETE OPEN GIRDER		5 2	M	5 2				
	2 1 5	REINFORCED CONCRETE ABUTMENT		2 6	M	2 6				
	3 3 1	CONCRETE BRIDGE RAILING		2 7	M	2 7				

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

Bridge No. 25C-0029

SUPPLEMENTARY BRIDGE REPORT

DS-M19(REV.1-90)

Location 03-ED-FAU Y819-Plcr
Dist.,Co.,Rte.,PM,City

Date of Investigation 8/23/95

Name HANGTOWN CREEK (On Placerville Drive, 0.3 mile West of Cold Springs Road)

RATINGS:

[71] **Waterway Adequacy** 8 [61] **Channel & Channel Protection** 6 [72] **Approach Rdwy Align.** 6

TYPE OF INVESTIGATION/REPORT

Biennial	X	**Group A**		**Other**	
Damage		**Underwater**		**Office**	

WORK NOT DONE
The footing at Abutment 1 has not been protected.

The plant growth along the south side of the structure has not been cut back.

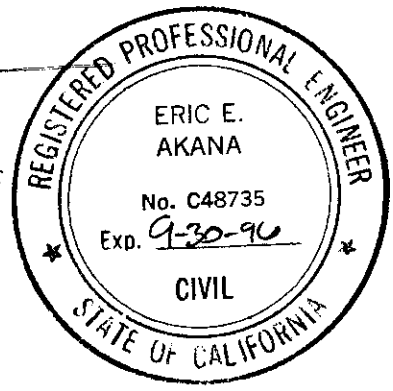
CONDITION OF STRUCTURE
There has been no significant change in the condition of this structure since the previous investigation.

WORK RECOMMENDED
Complete the work previously recommended as noted above.

PONTIS INSPECTION
A PONTIS inspection form for this investigation is attached.

Eric E. Akana
Registered Civil Engineer

EEA/zbt



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STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION (ATTACHMENT A)

PONTIS DATA FORM - PIA

BRIDGE NUMBER	FRAME	INSPECTION DATE
25C0029	01	091693 (08/13/95)
1 8	9	11 16

INFORMATION ONLY - NOT FOR UPDATE

SCOUR CRITICAL	NO
CATEGORY A	NO
FRACTURE CRITICAL	NO
ELIGIBLE FOR RAIL UPGRADE	NO
UNDERWATER INSPECTION	NO

DISTRICT 03
COUNTY ED
ROUTE
POSTMILE
NAME

DEL	ELE #	ELEMENT DESCRIPTION	ENV	TOTAL QUANTITY	UNITS	QUANT CONDITION STATE 1	QUANT CONDITION STATE 2	QUANT CONDITION STATE 3	QUANT CONDITION STATE 4	QUANT CONDITION STATE 5
	10	REINFORCED CONCRETE OPEN GIRDER		52	M	52 (52)				
	51	CONCRETE ABUTMENT		26	M	26 (26)				
	102	CONCRETE BRIDGE RAILING		27	M	27 (27)				
	113	CONCRETE DECK - UNPROTECTED W/ AC OVERLAY		1	EA	1 (1)				

18 19 22 23 28 33 38 43 48

9-5-95

08/31/95 05B TAKAKO FUJIOKA

BY: E AKONA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

SUPPLEMENTARY BRIDGE REPORT
DS-M19(REV.1-90)

Bridge No. 25C-0029

Location 03-ED-FAU Y819-Plcr
Dist.,Co.,Rte.,PM,City

Date of Investigation September 16, 1993

Name HANGTOWN CREEK (On Placerville Drive, 0.3 mile West of Cold Springs Road)

RATINGS:

[71] **Waterway Adequacy** 8 [61] **Channel & Channel Protection** 6 [72] **Approach Rdwy Align.** 6

TYPE OF INVESTIGATION/REPORT

Biennial	X	**Group A**		**Other**	
Damage		**Underwater**		**Office**	

WORK NOT DONE

1. The footing at Abutment 1 has not been protected.

CONDITION OF STRUCTURE

The south side of the structure had an abundance of plant growth.

This structure remains in the same condition as noted in previous reports.

WORK RECOMMENDED

1. Complete the work previously recommended as noted above.

2. The plant growth along the south side of the structure should be cleared away for ease of inspection.

MSCL

PONTIS INSPECTION

A PONTIS inspection form for this investigation is attached.

Takako Fujioka
Takako Fujioka
Registered Civil Engineer

REGISTERED PROFESSIONAL ENGINEER
TAKAKO FUJIOKA
NO. 47296
EXP.12/31/95
CIVIL
STATE OF CALIFORNIA

TF/pfa

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STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

PONTIS DATA FORM - PIA

(ATTACHMENT A)

BRIDGE NUMBER	FRAME	INSPECTION DATE
25C0029	01	09/16/93
1 8	9	11 16

INFORMATION ONLY - NOT FOR UPDATE

SCOUR CRITICAL	NO
CATEGORY A	NO
FRACTURE CRITICAL	NO
ELIGIBLE FOR RAIL UPGRADE	NO
UNDERWATER INSPECTION	NO

DISTRICT 03
COUNTY ED
ROUTE
POSTMILE
NAME Hangtown Creek

DEL	ELE #	ELEMENT DESCRIPTION	ENV	TOTAL QUANTITY	UNITS	QUANT CONDITION STATE 1	QUANT CONDITION STATE 2	QUANT CONDITION STATE 3	QUANT CONDITION STATE 4	QUANT CONDITION STATE 5
	10	REINFORCED CONCRETE OPEN GIRDER		.172	LF	172				
	51	CONCRETE ABUTMENT		85	LF	85				
	102	CONCRETE BRIDGE RAILING		~~170~~ 90	LF	90				
	113	CONCRETE DECK - UNPROTECTED W/ AC OVERLAY		1	EA	1				

3-ED-FAU Y819 # 25C-29

HANGTOWN CREEK



ROADWAY VIEW LOOKING WEST ON PLACERVILLE DRIVE
9-16-93.3
TF-23



SIDEVIEW LOOKING SOUTH
9-16-93.2
TF-23

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

SUPPLEMENTARY BRIDGE REPORT
DS-M19(REV.1-90)

Bridge No. 25C-0029

Location 03-ED-FAU Y819-Plcr
Dist., Co., Rte., PM, City

Date of Investigation 8/16/91

Name HANGTOWN CREEK (Placerville Dr.)

RATINGS:

58 **Deck** 6 59 **Superstructure** 6 60 **Substructure** 6 71 **Waterway Adequacy** 8
61 **Channel & Channel Protection** 6 62 **Culvert** N 72 **Approach Rdwy Align.** 3

CODES:

21 **Custodian** [04] 22 **Owner** [04] 26 **Functional Classification:** **Deck** [14] **Under** [NA]
41 **Str Open, Posted or Closed** [A] 107 **Deck Type** [1] 108 **Wearing Surface/Prot Sys** [600]
Max Col/Pier Ht. [NA] 111 **Pier/Abut. Prot.** [NA]
55 **Min Lat Underclr on Rt.** [NA] 54 **Min Vert Underclr** [NA] 112 **NBIS Bridge Length** [Y]

DATA:

51 **Bridge Width (NET)** 24.0' 109 **Average Daily Trucks (% of ADT):** **Deck** 10 **Under** NA
114 **Future ADT: Deck** 13,600 **Under** NA 115 **Yr. of Future ADT: Deck** 2012 **Under** NA
Number of Intermediate Joints: @ Hinges 0 **@ Bents** 0

TYPE OF INVESTIGATION/REPORT

Biennial	X	**Category A**		**Other**	
Damage		**Underwater**		**Office**	

CONDITION OF STRUCTURE

The top and 6" of the side of the footing at the upstream corner of Abutment 1 is exposed and should be protected.

There are large transverse cracks in the AC surface on the deck at the abutment joints, and there are some minor delaminations and pattern cracks on the AC surface throughout the deck.

This structure is in fair condition.

WORK RECOMMENDED

1. Protect the footing at Abutment 1. SUBL

Erol C. Kaslan
Registered Civil Engineer

REGISTERED PROFESSIONAL ENGINEER
Erol C. Kaslan
No. 45862
Exp. 12/31/94
CIVIL
STATE OF CALIFORNIA

ECK/cgc-28991

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

SIGNATURE REPORT

DS-M59 (REV. 10/76)

Bridge No. 25C-29

Name HANGTOWN CREEK

3-ED-FAU Y819-Pl[illegible]
Dist - Co - Rte - PM - City

On the date shown, the engineer investigated the structure and found no significant changes.

Date	Signature	Prev. Rec. Work Done	Prev. Rec. Work Not Done	Remarks
11-8-83	R W Bunza			
7-22-87	W. Fo[illegible]			
8-1-89	Vernon Banks			Top Ftg @ A-1R exposed 6" No. U.M.

REGISTERED PROFESSIONAL ENGINEER
W Fo[illegible]
14024
No. [illegible]
Exp. 3-31-[illegible]
CIVIL
STATE OF CALIFORNIA

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DIST	ROUTE	COUNTY	STRU. NO	POSTMILE	RATING WIDTH-FT	STRU TYPE	YR ORIG CONST	
03	FAU--	25 C	0029	.	027.5	CG	30	MAR. 23, 1982

INFLUENCE LINE FOR CRITICAL INVENTORY RATING POINT SPAN 1 10TH POINT 5

MEM NO	LEFT	.1	.2	.3	.4	.5	.6	.7	.8	.9	RIGHT
1	0.0	2.150	4.300	6.450	8.600	10.750	8.600	6.450	4.300	2.150	0.0

THE CRITICAL OPERATING RATING POINT IS THE SAME AS THE CRITICAL INVENTORY RATING POINT

THE CRITICAL PURPLE RATING POINT IS THE SAME AS THE CRITICAL INVENTORY RATING POINT

2 HANGTOWN CR ON PLACERVILLE RD
3 RATED FULL WIDTH
4 0.5" AC BY BURGAN

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DIST	ROUTE	COUNTY	STRU. NO	POSTMILE	RATING WIDTH-FT	STRU TYPE	YR ORIG CONST
03	FAU--	25 C	0029	.	027.5	CG	30

MAR. 23, 1982

	RATING FACTOR	PT	SPAN	ULT MOM CAP TOP IN COM	ULT MOM CAP BOT IN COM	POS HS20 MOMENT	NEG HS20 MOMENT	POS PURP MOMENT	NEG PURP MOMENT	DEAD LOAD MOMENT	SECONDARY MOMENT
INV	1.47	5	1	7241.7	0.0	1467.9	0.0	1907.7	0.0	1977.5	0.0
OPER	2.45	5	1	7241.7	0.0	1467.9	0.0	1907.7	0.0	1977.5	0.0
PURP	1.88	5	1	7241.7	0.0	1467.9	0.0	1907.7	0.0	1977.5	0.0

THE NUMBER OF AXLES ON THE TRUCK THAT CAUSES THE PURPLE RATING FACTOR IS N.7
FC = 1.40 FY = 33.

IF THE REPORTED ULTIMATE MOMENT CAPACITY IS 0, IT WAS DETERMINED NOT TO BE CRITICAL

2 HANGTOWN CR ON PLACERVILLE RD
5 RATED FULL WIDTH
4 0.5" AC BY BURGAN

Inventory = HS 29.4/LF
Operating = HS 49.0/LF
Permit = PPPP

25C-29
3-ED-FAU Y819-Plcr

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
BRIDGE REPORT
DS-M58 (REV. 4/80)

REVISED ORIGINAL REPORT

Bridge No. 25C-29

Other No.

P.U.C. No.

Location 03-ED-FAU Y819-Plcr
Dist - Co - Rte - PM - City

Date of Investigation February 23, 1982

Name HANGTOWN CREEK (On Placerville Dr, 0.3-mi W. of Cold Springs Rd)

Lat. 38° 44.0' Long. 120° 49.6'

STRUCTURAL DATA AND HISTORY

Year Built 1930 By State Contract No.

Date of Revisions

Designed by: B.D. ☐ State Plans Avail. @ DOT

Description: RC T-girders (4), on RC wing abutments, and on spread footings.

Spans 1 @ 43', c/c

Length 45' Skew 50° left Design LL Unknown

Ratings: Inventory HS29/LF Operating HS49/LF Permit PPPPP

DESCRIPTION – ON STRUCTURE

Bridge Width 1.0'r-0.6'cu-24.0'-0.6'cu-1.0'r

Total Width 27.5' Lanes 2 Tracks None

Median None Rail Type conc. window (0000)

Vert. Clearance over deck Unimpaired Appr. Rdwy. Width 30' (TW=24')

Wearing Surface 0.5'AC Deck Seal None

Alignment On 1200' radius curve

DESCRIPTION – UNDER STRUCTURE

Roadway Section None

Clearances: Vert. Horiz.; Lt. Rt.

Lanes Tracks Pumpplant: None ☐ See Br. No.

Facilities Crossed Creek

cc:

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DESCRIPTION – HYDRAULICS

Channel: Rocky; swift flow

Navigable: Yes [ ] No [X] Clearances: Vert. ..... Horiz. .....

MAINTENANCE

Custodian: City of Placerville Owner: City

ORIGINAL CONDITION RATING		ORIGINAL APPRAISAL	
Deck	5	Overall	6
Superstructure	6	Deck Geometry	4
Substructure & Pipes	6	Underclearances Vert.	N
Channel & Channel Protection	5	Horiz.	N
Retaining Walls	N	Safe Load Capacity	9
Approach Rdwy. Alignment	5	Waterway Adequacy	7
Estimated Remaining Life	30	Approach Rdwy. Alignment	5

Widenable? Yes [X] No [ ] Conditional [ ]

Average Daily Traffic & Year 3000 (1981)

Bypass Detour Length 1 mile

Action Required: Yes [ ] No [X]

Posting Required: None [X] Load [ ] Speed [ ]

Seismic Retrofit – Need not be considered.

HISTORY

This bridge was maintained by the State from 1930 to 1965. It was prone to scour at the upstream corner of the west abutment.

SIGNS AND EXISTING POSTING

There are no signs on the approaches. There is no existing Director's Order.

CONDITION OF STRUCTURE

The structure is in fair condition.

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DS-M18 (REV. 6/75)

BRIDGE NO.	25C-29
SHEET 2	DATE February 23, 1982

LOAD CAPACITY

A stress analysis indicated that the bridge is capable of sustaining legal truck loads and also the State's permit loads.

The ratings shown in this report are applicable only as long as this structure remains in the same condition as it was during this investigation.

R W Burgan

R.W. Burgan, P.E.
C.E. 9268

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03-ED-FAU-Y819 # 25C-29

HANGTOWN CREEK



VIEW LOOKING WEST ALONG PLACERVILLE DRIVE



VIEW LOOKING SOUTHEAST UPSTREAM

FORM BD-25

BRIDGE NO. ~~25-06~~ 25C-29

Sheet 1

SUPPLEMENTARY BRIDGE REPORT

Date of Report January 20, 1966

Name HANGTOWN CREEK 03-ED-~~50~~ Co, Rt

Location 17.2 Miles East of Sacramento County Line Dist.-Co. Rt. Post Mile ---

Reference is made to the original bridge report dated August 4, 1938, and to the subsequent reports.

STATUS

This structure is on a section of roadway which has been superseded by new alignment. This portion of highway including the bridge was relinquished to the County effective March 9, 1964. As this structure is no longer on State Highway, a "C" number is being assigned to the bridge.

RECOMMENDATIONS

Drop this structure from the bridge list. Bridge No. 25C-29 has been assigned to this structure. The records should be changed accordingly and the reports, etc., should be transferred from the file of State Highway bridges to the file of City and County bridges.

H. C. Johnson

HCJ:km
cc: District 03(2)
Maint. Dept.

EST. 6130. 52242-998 (500) 8-65 10M OSP

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FORM BD-25

BRIDGE No. ~~25-06~~ 25C-29

Sheet 1

SUPPLEMENTARY BRIDGE REPORT

Date of Investigation August 23, 1965

Name HANGTOWN CREEK 03-ED-~~50~~ 6.82

Dist.-Co. Rt.

Location 17.2 miles east of Sacramento County line Post Mile -

Reference is made to the original bridge report dated August 4, 1938 and to subsequent supplementary reports.

CONDITION OF STRUCTURE

The scour at Abutment 1 remains in about the same condition as previously reported.

Otherwise, the structure is in generally good condition.

RECOMMENDATIONS

None.

H. C. Johnson

By R. G. Davis

R. G. Davis

RGD gm
cc Dist 03(2)
Maint. Dept.

EST. 5194. 43236-800 3-66 10M OSP

ClibPDF - www.fastio.com

FORM BD-25

BRIDGE No ~~25-06~~ 25C-29

Sheet 1

SUPPLEMENTARY BRIDGE REPORT

Date of Investigation June 29, 1960

III-ED-~~11-C~~ Co. Rd.

Name HANGTOWN CREEK Dist.-Co.-Rte.-Sec.

Location 17.2 miles east of Sacramento County line.

Reference is made to the original Bridge Report dated August 4, 1938, and to subsequent supplementary reports.

WORK DONE

The surfacing has been patched over the timber buffer at abutment 1.

The brush has been cleared out at the bridge site.

CONDITION OF STRUCTURE

The scour at abutment 1 remains in about the same condition as previously reported. It is not serious.

Considerable dirt has collected in the deck gutters; this should be removed.

Otherwise the structure is in generally good condition.

RECOMMENDATIONS

Clean the dirt from the gutters.

Estimated cost: Less than $50.00

H. C. Johnson

by A M Peters Jr.

A. M. Peters Jr.

AMP nf
cc District III (2)
Maintenance Dept.

Investigated 6/13/61 By HCJ

Changes Noted Gutters OK This date. Right rail cracked adjacent to end post @ Abut. 1 where hit by traffic; not serious. O.N.C.

(over)

SEE SUPPLEMENTARY REPORT OF_____

EST. 3163. 10354 12-59 10,500 ② SPO

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Investigated 7/10/62 By HCJ

Changes Noted None.

Investigated 7/31/63 By AMP

Changes Noted Encroachment:
20"± steel pipe placed
under Bay on concrete
footings, adjacent to
Abut. 2, ONC.

Investigated 8/26/64 By PK

Changes Noted nc

Co. Rd.
III-ED-~~11-C~~

25C-29
Br. #~~25-06~~

HANGTOWN CREEK

25C-29
1-31-56-1
25-06



Roadway view looking ahead Easterly.

25C-29
1-31-56-2
25-06



Rt. sideview lookkng Northerly.

FORM BD-25

BRIDGE NO. ~~25-06~~ 25C-29

Sheet 1

SUPPLEMENTARY BRIDGE REPORT

Date of Investigation January 31, 1956

Name HANGTOWN CREEK

III-ED-~~11-C~~ C-R2
Dist.-Co.-Rt.-Sec.

Location ~~15.7~~ 17.2 miles east of Sacramento County Line

HIGH WATER ELEVATION:

Surface of high water during floods of December-January, 1955-56 was approximately to the upstream (right) girder soffit.

CONDITION OF STRUCTURE:

Flow in the stream is directed against the upstream corner of abutment 1, and gradual scour of the stream bed has occurred at that location in the past. Inspection of July, 1954 noted that the top of the footing at abutment 1 on right side was exposed.

Flow in the stream during this inspection prevented a close estimate of scour at abutment 1, but it appears that depth of scour has increased by recent high water. Indications are, however, that this condition is not serious.

The structure is in good condition throughout.

RECOMMENDATIONS:

None.

Charles Cordero

Charles Cordero

cc: District III (2)
Maintenance Dept.

Investigated 4-26-57 by CC

Next Inve. 4-58

Changes Noted: Now there is much scour at the right corner of abut 1,

SEE SUPPLEMENTARY REPORT OF

EST. 4876, 29084 1-56 SM SPO

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Investigated 10-3-58 By W@H

Changes Noted Slight scour at left side of abut #1. Bristles growing on right side of bridge. Rec-Cut brushes and right of way line & Treat with ground sterilizer. Est-Less than $5

Investigated 7/17/59 By HCJ

Changes Noted Few bare spots in surfacing over buffer @ about #1 Should be patched. Dense growth of weeds upstream & downstream channel No structural change.

SUPPLEMENTARY BRIDGE REPORT

Date of Investigation September 22, 1950

Name HANGTOWN CREEK III-ED-~~11-C~~ Co.Rt. 17.2
Dist.-Co.-Rt.-Sec.

Location ~~17.7~~ miles east of Sacramento County line

Refer to the original report dated August 4, 1938.

CONDITION OF STRUCTURE

Members of the Bridge Department have examined the bridge regularly since 1938. No change in condition was observed during this period. End posts were painted in 1945 and 1949.

Structurally the bridge remains in good condition. No traffic scars were noted on curb or rail, and the bridge number was recently stenciled on end posts.

The channel on both sides is choked with brush and stream flow strikes the right corner of abutment 1. The east paving notch buffer is decayed, causing a rough and unstable surfacing at the bridge approach.

RECOMMENDATIONS

1. Clear brush in the channel between R/W lines.

2. Remove the timber buffer at the east paving notch and fill this cavity with suitable material.

Investigated 1/29/53 by CC

Next Inve... 1/54

Changes ... Slight scour @ Rt. Abt. 1
Some brush in channel

Finance by Replacements: $75
Next Investigation: September, 1951.

T. W. Rodgers

DONE 2-7-51
W.O. 51-3R9
COST 86.48

cc: District III (2)
Maintenance Department

SEE SUPPLEMENTARY REPORT OF

ClibPDF - www.fastio.com

Investigated 7-26-54 by CC

Next investigation 7-55

Changes noted Channel cleared,
Slight erosion at top of footing
upstream - otherwise no change -
in good condition -

Bridge No. 26-06 25C-29

Sheet 1a

Name Hangtown Creek Location III-ED-11-e Co. Rd.

DIST.-CO.-RT.-SEC.

Summary of Construction, Maintenance and Alteration Work

CONT. OR W.O. NO.	DATE	DESCRIPTION	W.O. AMOUNT	FINAL COST
51-3K9	Sept. 1950	Work as recommended in Bridge Report dated 9-22-50		$ 86.48

FORM BD 27

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III-ED-~~11-C~~ Co. Rd

25 C-29

~~25-06~~

HANGTOWN CREEK





Submitted with Report of AUG 4 1939

Bridge No. ~~25-06~~ 25C-29

Sheet 1

BRIDGE ALTERED

BRIDGE REPORT

SEE REVISED

ORIGINAL REPORT

Date of Investigation Aug. 4, 1938

General Description

Name HANGTOWN CREEK III-ED-~~11-C~~ Co. Rd. 5
Dist.-Co.-Rt.-Sec.

Location ~~20.5~~ 17.5 miles east of Sacramento County Line.

Description RC (4) girder span with RC deck on RC wing abutments.

Approximate skew 50° Lt.

Spans 1 @ 42.0'c/c.

Total length 45'

Roadway width 24.1' between concrete curbs. Sidewalks None.

Alignment Good. Final line. Long radius curve right.

Width Good.

Standard of design Division of Highways H-15 design loading.

Waterway Sufficient. Velocity medium. Bedrock and boulder channel.. HWM 12/37 = 2.8' below bottom of girders.

Vertical clearance --- under --- (See diagram)

History

Date built 1930 By Division of Highways Contract No. 23EC5 (?).

Designed by Division of Highways-Bridge Dept. (R.H.Twaddle).

Plans Complete and field checked in Bridge Dept. files.

Remarks

NO ENCROACHMENTS 6-29-60 AMP

cc: District III. (2).
Maintenance Dept.

58023 5-38 8M. Est. 4303.
STATE PRINTING OFFICE

ClibPDF - www.fastio.com

CLEAR HEIGHT:

Average clear height about 7.1'.

CONDITION OF STRUCTURE:-

The structure is in good condition throughout and the concrete appears to be of good quality.

There are a few minor cracks but these are unimportant.

SUMMARY:-

The structure is safe for full legal loads. Designed for H-15 design loading using normal design stresses.

The remaining economic service life is about 35 years.

RECOMMENDATIONS:-

No work is recommended at this time.

Next Inspection: Aug. 1943.

Fred Barnes

W. C. Fischer

Investigated 6-40 By FRB
Next Investigation 6-41
Changes Noted None

Investigated 8/41 By RJI-
Next Investigation 8/42
Changes Noted None

Investigated 10/10/43 By JLB
Next Investigation 10/44
Changes Noted None. No fences.

Investigated 9-15-42 By JLB
Next Investigation 10/43
Changes Noted None.

Investigated 12-5-47 By OMM
Next Investigation 10-48
Changes Noted None. OK.

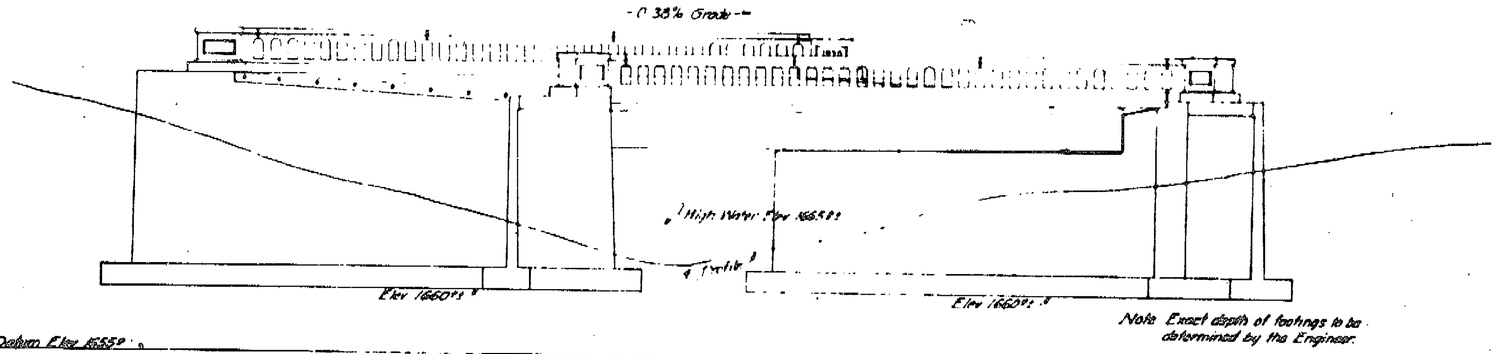
Investigated 10-18-44 By JLB
Next Investigation 10-45
Changes Noted None. OK.

Investigated 11-4-49 By JWR
Next investigation 11-50
Changes Noted E.P.s & appr. rail just painted & gutters cleaned. J Bridge O.C.

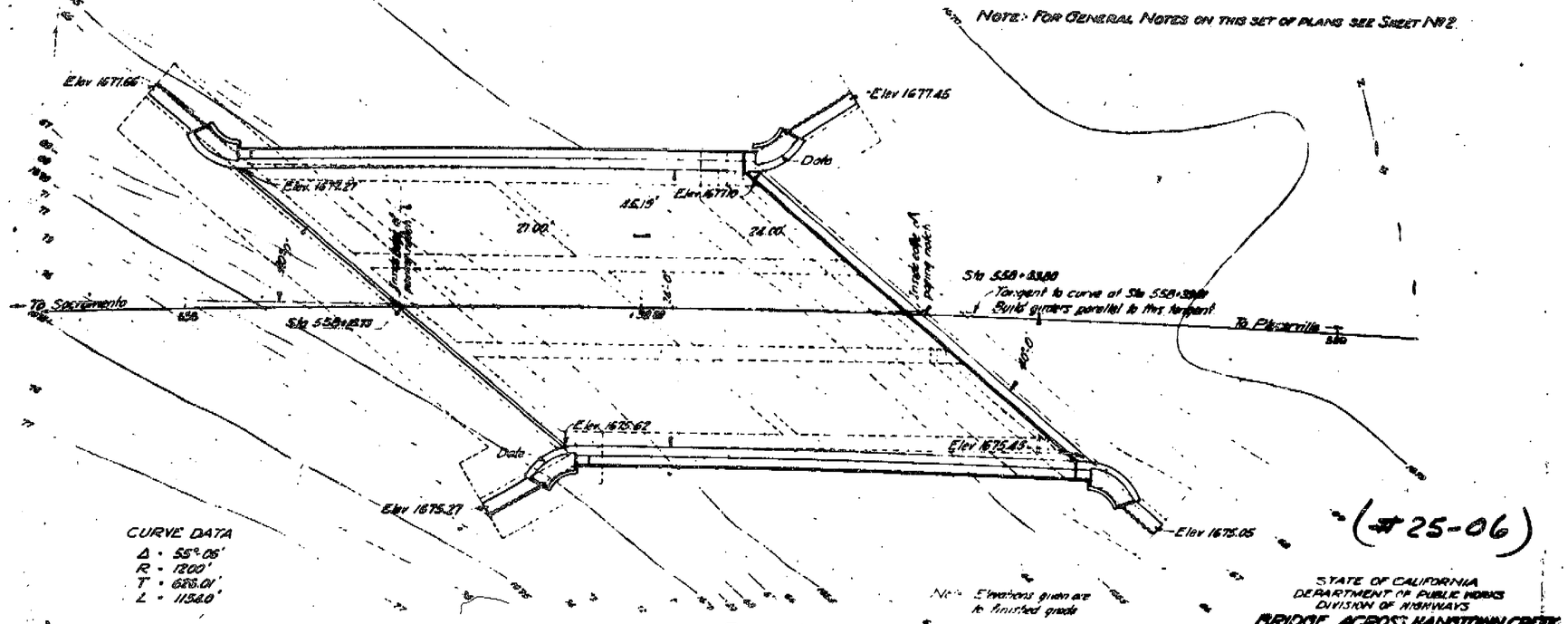
Investigated 10-45 By OMM
Next Investigation 10-46
Changes Noted End posts painted

Investigated 10-10-46 By OMM
Next Investigation 10-47
Changes Noted None.

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ELEVATION



PLAN

NOTE: FOR GENERAL NOTES ON THIS SET OF PLANS SEE SHEET No 2.

(#25-06)

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

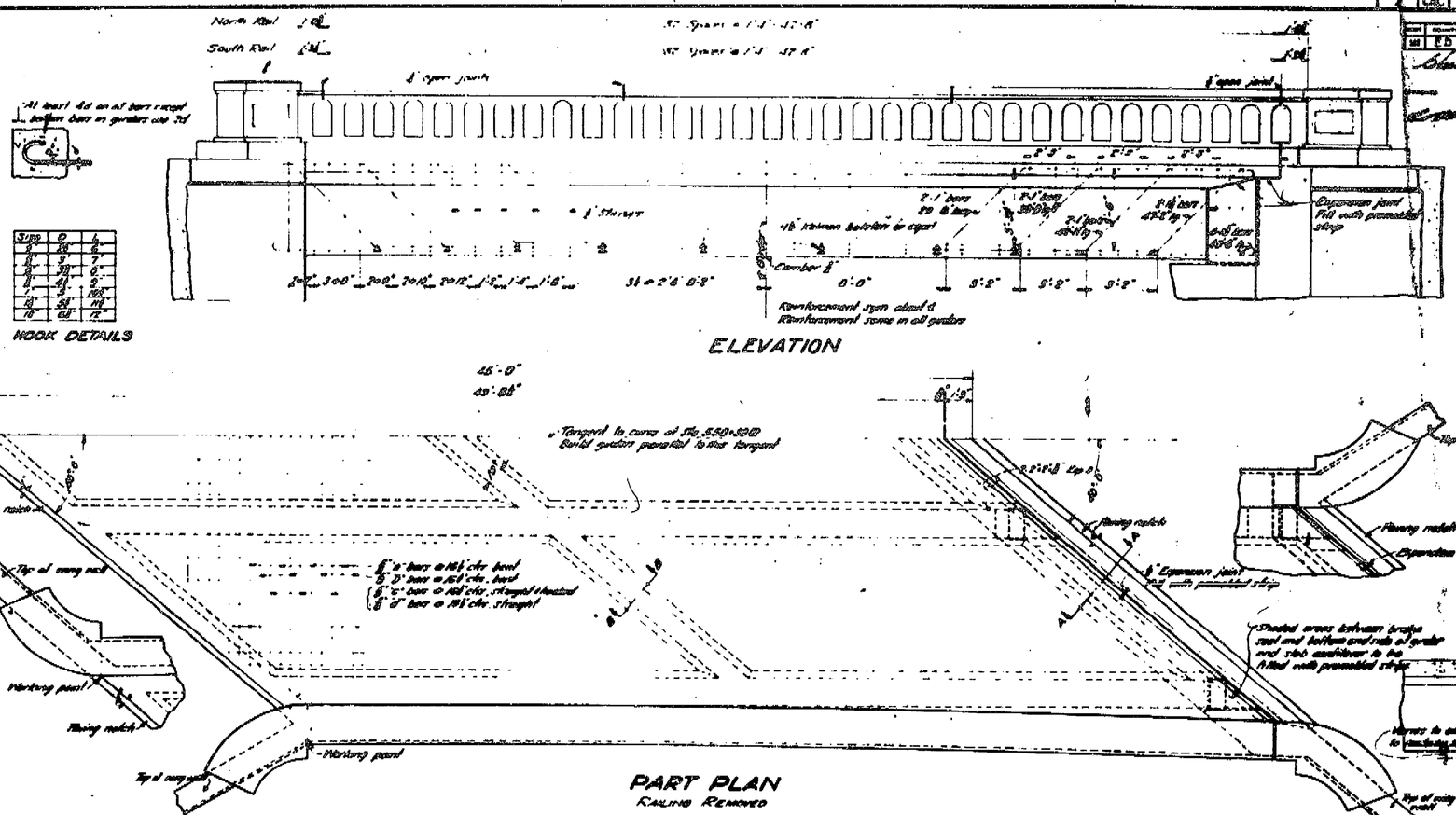
BRIDGE ACROSS KANOTOWN CREEK
NEAR PLACERVILLE - EL DORADO COUNTY

GENERAL PLAN

Scale 1"=5'

75/1

V-13-8



(# 25-06)

BRIDGE ACROSS HANGTOWN CREEK
NEAR PLACERVILLE - EL DORADO COUNTY
SUPERSTRUCTURE DETAILS
SCALE 1"=1'-0"

V-13-8

VIEW A-A

VIEW C-C

VIEW B-B

VIEW D-D

TYPICAL SECTION WING WALL

SECTION WEST ABUTMENT

SECTION EAST ABUTMENT

WEST ABUTMENT

PLAN

EAST ABUTMENT

PART ELEVATION

SECTION A-A

SECTION B-B

PART PLAN

RAILING DETAILS
Scale: 1"=1'-0"

EXPANSION ANGLE DETAILS

TOP PLATE

ASSEMBLY

MIDDLE PLATE

BOTTOM PLATE

EXPANSION PLATES
Cast Bronze - 4 Sets Required
Scale 1"=1'-0"

EXPANSION JOINT
Scale 1"=1'-0"

STEP #1

STEP #2

PLACING EXPANSION ANGLES

1930

DATE

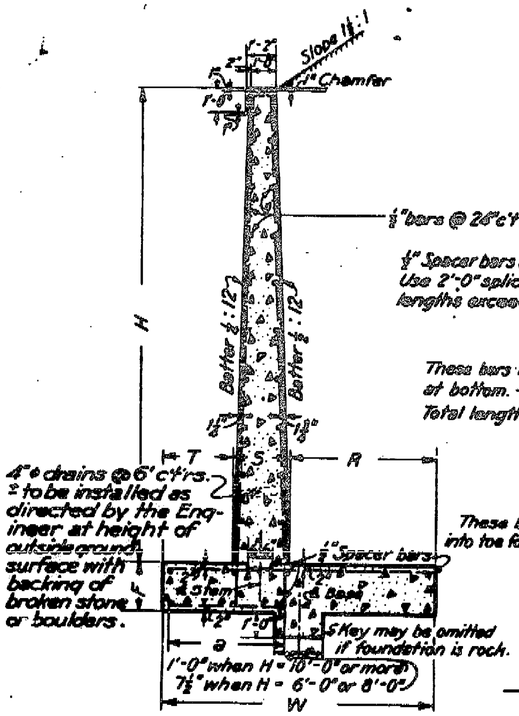
(#25-06)

BRIDGE ACROSS HANGTOWN CREEK
NEAR PLACERVILLE - EL DORADO COUNTY
ABUTMENTS & MISC. DETAILS
SCALE 1"=1'-0" EXCEPT AS NOTED.

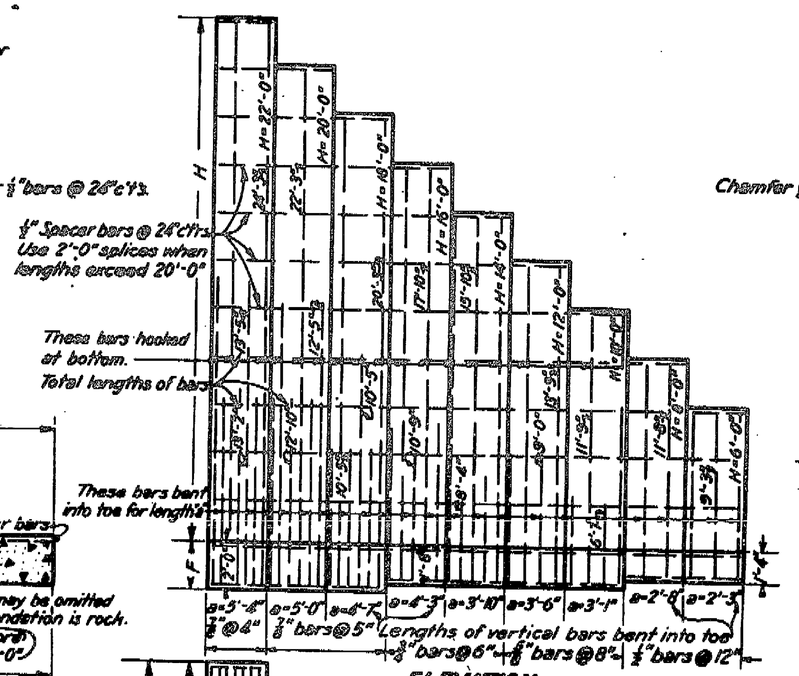
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V-13-8

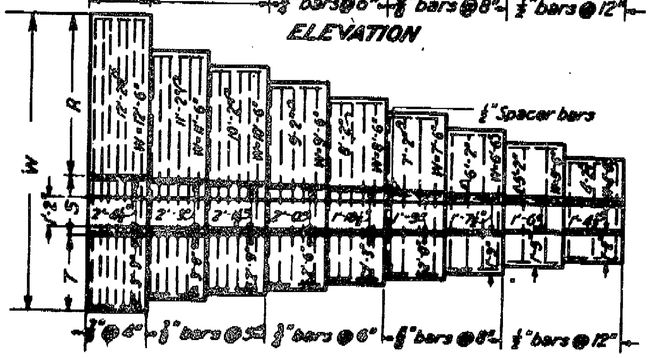
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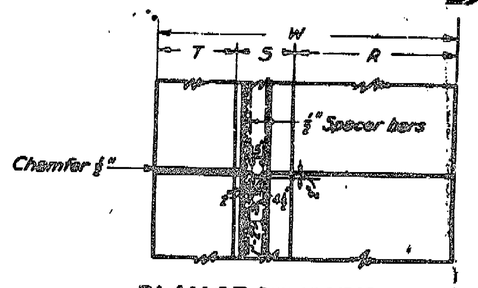
SECTION



ELEVATION

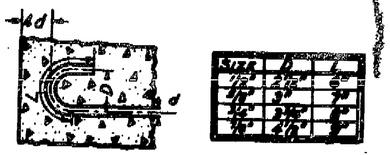


PLAN



PLAN OF EXPANSION JOINT

Extend throughout height of wall. Construct at 30'-0" c'trs. Paint all joints with asphalt.



HOOK DETAILS

NOTE

When the wall rests on a rock foundation "W" can be decreased to 0.4(H+F+2') making all the reduction in "R" with "T" and "S" unchanged, and all bars in inside face of vertical wall must be bent into toe for length "a".
Wall is designed for two foot surcharge.
When top of wall slopes, run 2-f" bars along top embedded 2 inches.

(#25-06)

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

STANDARD STRUCTURES V-13-8

REINFORCED CONCRETE RETAINING WALLS

SCALE :- f"=1'

2502

V

1525

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Appendix VII. Calculation Package

Shear Wave Velocity (Vs)

Project: **Placerville Drive Bridge Replacement Project**
Job No: **P18113**
Date: **11/10/2023**
Boring: **B-1 (Taber Consultants)**

B-1 (Taber Consultants)
Placerville Drive Bridge Replacement Project

Hammer Energy (ER): 60 %

Sample Number	Depth (feet)	Depth to Bottom of Layer (feet)	Layer Thickness (feet)	Sample D_i (inches)	Soil Type	Undrained Shear Strength S_u (psf)	Rock *	Material Age **	Field N (bpf)	N_{SPT} (bpf) ***	N_{60}	σ'_v (ksf)	σ'_v (kPa)	d Layer Thickness in upper 30 m (m)	Granular Soil: Vs Gravel (m/sec)	Granular Soil: Vs SAND (m/sec)	Granular Soil: Vs SILT (m/sec)	Cohesive Soil: Vs Cohesive[1] (m/sec)	Cohesive Soil: Vs Cohesive[2] (m/sec)	Sedimentary Rock Vs (m/sec)	Profile Vs (m/sec)	Profile D/Vs (sec)
1	1.0	5.0	5.0	1.4	GC-GM			Q	11	11	11	0.14	6.56	1.52	217	80					80	0.019
2	5.0	10.0	5.0	1.4	GC-GM			Q	17	17	17	0.69	32.80	1.52	283	128					128	0.012
3	10.0	11.5	1.5	1.4	GC-GM			Q	24	24	24	1.37	65.60	0.46	326	163					163	0.003
A	11.6	12.0	0.5	2.5	GW		rock		200	153	153	1.59	76.16	0.15	455					542	542	0.000
B	12.0	12.6	0.6	2.5	GW		rock		200	153	153	1.65	79.05	0.18	457					542	542	0.000
C	12.6	14.2	1.6	2.5	GW		rock		200	153	153	1.74	83.39	0.49	460					542	542	0.001
D	14.2	18.5	4.3	2.5	GW		rock		200	153	153	1.98	94.73	1.31	467					542	542	0.002
E	18.5	100.0	81.5	2.5	GW		rock		200	153	153	2.71	129.93	24.36	485					542	542	0.045

Shear Wave Velocity (Vs)

Project: **Placerville Drive Bridge Replacement Project**
Job No: **P18113**
Date: **11/10/2023**
Boring: **B-2 (Taber Consultants, January 12, 1999)**

B-2 (Taber Consultants, January 12, 1999)
Placerville Drive Bridge Replacement Project

Hammer Energy (ER): 60 %

Sample Number	Depth (feet)	Depth to Bottom of Layer (feet)	Layer Thickness (feet)	Sample D_i (inches)	Soil Type	Undrained Shear Strength S_u (psf)	Rock *	Material Age **	Field N (bpf)	N_{SPT} (bpf) ***	N_{60}	σ'_v (ksf)	σ'_v (kPa)	d Layer Thickness in upper 30 m (m)	Granular Soil: Vs Gravel (m/sec)	Granular Soil: Vs SAND (m/sec)	Granular Soil: Vs SILT (m/sec)	Cohesive Soil: Vs Cohesive[1] (m/sec)	Cohesive Soil: Vs Cohesive[2] (m/sec)	Sedimentary Rock Vs (m/sec)	Profile Vs (m/sec)	Profile D/Vs (sec)
1	2.0	6.0	6.0	1.4	GC-GM			Q	11	11	11	0.27	13.12	1.83	235	94					94	0.019
2	6.0	10.0	4.0	1.4	GC-GM			Q	16	16	16	0.82	39.36	1.22	286	132					132	0.009
3	10.0	15.0	5.0	1.4	SM			Q	8	8	8	1.37	65.60	1.52	271	127					127	0.012
4	15.0	16.7	1.7	1.4	SM		rock		100	100	100	1.98	94.56	0.52	434					474	474	0.001
A	16.7	17.6	0.9	2.5	GW		rock		200	153	153	2.21	105.71	0.27	473					542	542	0.001
B	17.6	17.6	0.0	2.5	GW		rock		200	153	153	2.34	112.09	0.00	476					542	542	0.000
C	21.4	22.4	4.8	2.5	GW		rock		200	153	153	2.90	139.02	1.46	489					542	542	0.003
D	22.4	25.1	2.7	2.5	GW		rock		200	153	153	3.05	146.11	0.82	492					542	542	0.002
E	25.1	100.0	74.9	2.5	GW		rock		200	153	153	3.45	165.24	22.35	499					542	542	0.041
														30.00							393	0.088

* Enter "rock" for Tertiary Age (<70 million years) Sedimentary Rocks. Alternatively, their "Tertiary Sand/Clay" correlation may be used.
** Estimate the age of the soil material as "Q" for Quaternary, "H" for Holocene, or "P" for Pleistocene
*** Corrected for sample diameter

Shear Wave Velocity for Upper 30 m (V_{S30})

Vs_{30} = [1.45 - (0.015*d)]*Vs(d)

d (m)	30.00
Vs(d) (m/sec)	342
V_{S30} (m/sec)	**393**

Soil Profile Type

'C' (360 m/s < Vs < 760 m/s)

Shear Wave Velocity Correlations

Gravel: $Vs = 53(N_{60})^{0.19}(\sigma'_{vo})^{0.18}$ for Holocene; $Vs = 115(N_{60})^{0.17}(\sigma'_{vo})^{0.12}$ for Pleistocene
Sand: $Vs = 30(ASF)(N_{60})^{0.23}(\sigma'_{vo})^{0.23}$ where ASF = dimensionless age scaling factor; 1.0 for Quaternary, 0.9 for Holocene, 1.
Silt: Vs = Same as Cohesive[2]
Cohesive[1]: $Vs = 203(S_u/P_a)^{0.475} \leq 310$ m/sec, valid for range of 100 to 310 m/sec
Cohesive[2]: $Vs = 26(ASF)(N_{60})^{0.17}(\sigma'_{vo})^{0.32}$ where ASF = dimensionless age scaling factor; 1.0 for Quaternary, 0.88 for Holocene,
Young Sedimentary Rock (Tertiary Deposits): $Vs = 109(N_{60})^{0.319} \leq 560$/m/sec
P_a = Atmospheric Pressure = 2116.2 psf

Notes: 1) The calculated Vs value assumes that no significant changes in the subsurface will occur to the extrapolated depth of 100 feet.
2) In the absence of in-situ measurements, limit Vs_{30} to 760 m/sec for competent rock in California.
3) The shear wave velocity (Vs) for SAND and SILT based on SPT correlations are valid where $N_{60} \leq 100$ and $\sigma'_v \leq 506$ kPa.
4) Undrained Shear Strength (S_u) based on 0.5(Pocket Penetrometer) in psf.

Reference: Caltrans "Methodology for Developing Design Response Spectrum for Use in Seismic Design Recommendations", Appendix A, pgs 15-18, November 2012.

ARS Online V3.1.0

Using the tool: Specify latitude and longitude in decimal degrees in the input boxes below. Alternatively, **Google Maps** can be used to find the site location. Specify the time-averaged shear-wave velocity in the upper 30m (Vs30) in the input box. After submitting the data, the USGS 2014 hazard data for a 975-year return period will be reported along with adjustment factors required by Caltrans Seismic Design Criteria (SDC) V2.0.

Latitude: 38.733483 **Longitude:** -120.827719 **Vs30 (m/s):** 385 Submit

Caltrans Design Spectrum (5% damping)

Period(s)	Sa_{2014}(g)	$Basin_{2014}$	Near Fault Amp	Design Sa_{2014}(g)
PGA	0.18	1	1	0.18
0.10	0.35	1	1	0.35
0.20	0.45	1	1	0.45
0.30	0.44	1	1	0.44
0.50	0.37	1	1	0.37
0.75	0.29	1	1	0.29
1.0	0.22	1	1	0.22
2.0	0.12	1	1	0.12
3.0	0.08	1	1	0.08
4.0	0.06	1	1	0.06
5.0	0.04	1	1	0.04

Copy table

Deaggregation (based on 2014 hazard)

Mean moment magnitude (for PGA)	6.41
Mean site-source distance, km (for Sa at 1s)	105.5

CalFP-Web **v3.DD001.3** **User:** Megan Walls **Report Time Stamp:** Tuesday, March 30, 2021, 1:54 PM
Project: Placerville Drive Bridge Replacement
Description: Placerville Drive Bridge Replacement
Trial: TI = 6, R = 25
Description: TI = 6, R = 25

Results of the Caltrans Empirical Design Check Applied to the Current Structure

Minimum and Maximum Thickness Checks

No problems with minimum/maximum thickness checks;

Structural Adequacy Checks

Error: Gravel Equivalent Provided above Layer 2 (AB): 0.58 is less than required: 0.62;
Warning: Gravel Equivalent Provided above Layer 3 (SG): 1.46 is more than required: 1.44;

CalFP Design Alternatives

Design	HMA	AB	SG	AC GF	Res GE	TtlThick	Cost/mi	MsgsText
1	0.25	0.80	2.00	2.31	0.02	3.05	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
2	0.30	0.70	2.00	2.31	0.02	3.00	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
3	0.35	0.55	2.00	2.31	-0.02	2.90	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
4	0.40	0.45	2.00	2.31	-0.02	2.85	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
5	0.45	0.35	2.00	2.31	-0.01	2.80	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
6	0.50	0.35	2.00	2.31	0.10	2.85	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
7	0.55	0.35	2.00	2.34	0.23	2.90	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
8	0.60	0.35	2.00	2.41	0.39	2.95	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed

CalFP-Web **v3.DD001.3** **User:** Megan Walls **Report Time Stamp:** Tuesday, March 30, 2021, 1:56 PM
Project: Placerville Drive Bridge Replacement
Description: Placerville Drive Bridge Replacement
Trial: TI = 6.5, R = 25
Description: TI = 6.5, R = 25

Results of the Caltrans Empirical Design Check Applied to the Current Structure

Minimum and Maximum Thickness Checks
No problems with minimum/maximum thickness checks;

Structural Adequacy Checks
Warning: Gravel Equivalent Provided above Layer 2 (AB): 0.67 is more than required: 0.66;
Error: Gravel Equivalent Provided above Layer 3 (SG): 1.55 is less than required: 1.56;

CalFP Design Alternatives

Design	HMA	AB	SG	AC GF	Res GE	TtlThick	Cost/mi	MsgsText
1	0.30	0.80	2.00	2.22	-0.01	3.10	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
2	0.35	0.70	2.00	2.22	-0.01	3.05	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
3	0.40	0.60	2.00	2.22	-0.01	3.00	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
4	0.45	0.50	2.00	2.22	-0.01	2.95	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
5	0.50	0.40	2.00	2.22	-0.01	2.90	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
6	0.55	0.35	2.00	2.25	0.06	2.90	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
7	0.60	0.35	2.00	2.32	0.21	2.95	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
8	0.65	0.35	2.00	2.38	0.37	3.00	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed

CalFP-Web v3.DD001.3 **User:** Megan Walls **Report Time Stamp:** Tuesday, March 30, 2021, 1:57 PM
Project: Placerville Drive Bridge Replacement
Description: Placerville Drive Bridge Replacement
Trial: TI = 7, R = 25
Description: TI = 7, R = 25

Results of the Caltrans Empirical Design Check Applied to the Current Structure

Minimum and Maximum Thickness Checks

No problems with minimum/maximum thickness checks;

Structural Adequacy Checks

Error: Gravel Equivalent Provided above Layer 2 (AB): 0.64 is less than required: 0.69;

CalFP Design Alternatives

Design	HMA	AB	SG	AC GF	Res GE	TtlThick	Cost/mi	MsgsText
1	0.30	0.95	2.00	2.14	0.01	3.25	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
2	0.35	0.85	2.00	2.14	0.01	3.20	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
3	0.40	0.75	2.00	2.14	0.00	3.15	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
4	0.45	0.65	2.00	2.14	0.00	3.10	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
5	0.50	0.55	2.00	2.14	0.00	3.05	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
6	0.55	0.45	2.00	2.17	0.01	3.00	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
7	0.60	0.35	2.00	2.23	0.04	2.95	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
8	0.65	0.35	2.00	2.29	0.19	3.00	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
9	0.70	0.35	2.00	2.35	0.35	3.05	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed

CalFP-Web **v3.DD001.3** **User:** Megan Walls **Report Time Stamp:** Tuesday, March 30, 2021, 1:58 PM
Project: Placerville Drive Bridge Replacement
Description: Placerville Drive Bridge Replacement
Trial: TI = 7.5, R = 25
Description: TI = 7.5, R = 25

Results of the Caltrans Empirical Design Check Applied to the Current Structure

Minimum and Maximum Thickness Checks

No problems with minimum/maximum thickness checks;

Structural Adequacy Checks

Warning: Gravel Equivalent Provided above Layer 3 (SG): 1.82 is more than required: 1.80;

CalFP Design Alternatives

Design	HMA	AB	SG	AC GF	Res GE	TtlThick	Cost/mi	MsgsText
1	0.35	1.00	2.00	2.07	0.02	3.35	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
2	0.40	0.90	2.00	2.07	0.02	3.30	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
3	0.45	0.80	2.00	2.07	0.01	3.25	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
4	0.50	0.70	2.00	2.07	0.01	3.20	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
5	0.55	0.60	2.00	2.09	0.01	3.15	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
6	0.60	0.45	2.00	2.16	-0.01	3.05	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
7	0.65	0.35	2.00	2.21	0.02	3.00	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
8	0.70	0.35	2.00	2.27	0.17	3.05	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
9	0.75	0.35	2.00	2.32	0.33	3.10	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
10	0.80	0.35	2.00	2.37	0.48	3.15	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed

CalFP-Web **v3.DD001.3** **User:** Megan Walls **Report Time Stamp:** Tuesday, March 30, 2021, 2:12 PM
Project: Placerville Drive Bridge Replacement
Description: Placerville Drive Bridge Replacement
Trial: TI = 8, R = 25
Description: TI = 8, R = 25

Results of the Caltrans Empirical Design Check Applied to the Current Structure

Minimum and Maximum Thickness Checks
No problems with minimum/maximum thickness checks;

Structural Adequacy Checks
Warning: Gravel Equivalent Provided above Layer 2 (AB): 0.80 is more than required: 0.76;
Error: Gravel Equivalent Provided above Layer 3 (SG): 1.90 is less than required: 1.92;

CalFP Design Alternatives

Design	HMA	AB	SG	AC GF	Res GE	TtlThick	Cost/mi	MsgsText
1	0.40	1.00	2.00	2.00	-0.02	3.40	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
2	0.45	0.95	2.00	2.00	0.03	3.40	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
3	0.50	0.85	2.00	2.00	0.02	3.35	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
4	0.55	0.75	2.00	2.03	0.02	3.30	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
5	0.60	0.60	2.00	2.09	-0.01	3.20	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
6	0.65	0.50	2.00	2.14	0.02	3.15	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
7	0.70	0.35	2.00	2.20	0.00	3.05	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
8	0.75	0.35	2.00	2.25	0.15	3.10	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
9	0.80	0.35	2.00	2.30	0.30	3.15	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
10	0.85	0.35	2.00	2.34	0.46	3.20	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed

CalFP-Web **v3.DD001.3** **User:** Megan Walls **Report Time Stamp:** Tuesday, March 30, 2021, 2:13 PM
Project: Placerville Drive Bridge Replacement
Description: Placerville Drive Bridge Replacement
Trial: TI = 8.5, R = 25
Description: TI = 8.5, R = 25

Results of the Caltrans Empirical Design Check Applied to the Current Structure

Minimum and Maximum Thickness Checks

No problems with minimum/maximum thickness checks;

Structural Adequacy Checks

Error: Gravel Equivalent Provided above Layer 2 (AB): 0.78 is less than required: 0.80;

CalFP Design Alternatives

Design	HMA	AB	SG	AC GF	Res GE	TtlThick	Cost/mi	MsgsText
1	0.40	1.15	2.00	1.94	0.00	3.55	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
2	0.45	1.05	2.00	1.94	-0.01	3.50	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
3	0.50	0.95	2.00	1.94	-0.02	3.45	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
4	0.55	0.85	2.00	1.97	-0.02	3.40	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
5	0.60	0.75	2.00	2.03	0.00	3.35	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
6	0.65	0.65	2.00	2.08	0.03	3.30	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
7	0.70	0.50	2.00	2.13	0.00	3.20	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
8	0.75	0.35	2.00	2.18	-0.02	3.10	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
9	0.80	0.35	2.00	2.23	0.13	3.15	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
10	0.85	0.35	2.00	2.27	0.28	3.20	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
11	0.90	0.35	2.00	2.32	0.43	3.25	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed

CalFP-Web **v3.DD001.3** **User:** Megan Walls **Report Time Stamp:** Tuesday, March 30, 2021, 2:14 PM
Project: Placerville Drive Bridge Replacement
Description: Placerville Drive Bridge Replacement
Trial: TI = 9, R = 25
Description: TI = 9, R = 25

Results of the Caltrans Empirical Design Check Applied to the Current Structure

Minimum and Maximum Thickness Checks
No problems with minimum/maximum thickness checks;

Structural Adequacy Checks
Warning: Gravel Equivalent Provided above Layer 2 (AB): 0.85 is more than required: 0.83;
Warning: Gravel Equivalent Provided above Layer 3 (SG): 2.17 is more than required: 2.16;

CalFP Design Alternatives

Design	HMA	AB	SG	AC GF	Res GE	TtlThick	Cost/mi	MsgsText
1	0.45	1.20	2.00	1.89	0.01	3.65	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
2	0.50	1.10	2.00	1.89	0.00	3.60	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
3	0.55	1.00	2.00	1.91	-0.01	3.55	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
4	0.60	0.90	2.00	1.97	0.01	3.50	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
5	0.65	0.75	2.00	2.02	-0.02	3.40	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
6	0.70	0.65	2.00	2.07	0.01	3.35	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
7	0.75	0.50	2.00	2.12	-0.02	3.25	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
8	0.80	0.40	2.00	2.17	0.01	3.20	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
9	0.85	0.35	2.00	2.21	0.10	3.20	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
10	0.90	0.35	2.00	2.25	0.25	3.25	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
11	0.95	0.35	2.00	2.29	0.40	3.30	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed

CalFP-Web v3.DD001.3 **User:** Megan Walls **Report Time Stamp:** Tuesday, March 30, 2021, 2:15 PM
Project: Placerville Drive Bridge Replacement
Description: Placerville Drive Bridge Replacement
Trial: TI = 9.5, R = 25
Description: TI = 9.5, R = 25

Results of the Caltrans Empirical Design Check Applied to the Current Structure

Minimum and Maximum Thickness Checks
No problems with minimum/maximum thickness checks;

Structural Adequacy Checks
Error: Gravel Equivalent Provided above Layer 2 (AB): 0.83 is less than required: 0.87;
Error: Gravel Equivalent Provided above Layer 3 (SG): 2.26 is less than required: 2.28;

CalFP Design Alternatives

Design	HMA	AB	SG	AC GF	Res GE	TtlThick	Cost/mi	MsgsText
1	0.45	1.30	2.00	1.84	-0.02	3.75	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
2	0.50	1.25	2.00	1.84	0.01	3.75	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
3	0.55	1.15	2.00	1.86	0.01	3.70	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
4	0.60	1.05	2.00	1.92	0.02	3.65	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
5	0.65	0.90	2.00	1.97	-0.01	3.55	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
6	0.70	0.80	2.00	2.02	0.01	3.50	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
7	0.75	0.65	2.00	2.06	-0.02	3.40	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
8	0.80	0.55	2.00	2.11	0.01	3.35	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
9	0.85	0.40	2.00	2.15	-0.01	3.25	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
10	0.90	0.35	2.00	2.19	0.08	3.25	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
11	0.95	0.35	2.00	2.23	0.23	3.30	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
12	1.00	0.35	2.00	2.27	0.38	3.35	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed

CalFP-Web v3.DD001.3 **User:** Megan Walls **Report Time Stamp:** Tuesday, March 30, 2021, 2:16 PM
Project: Placerville Drive Bridge Replacement
Description: Placerville Drive Bridge Replacement
Trial: TI = 10, R = 25
Description: TI = 10, R = 25

Results of the Caltrans Empirical Design Check Applied to the Current Structure

Minimum and Maximum Thickness Checks

No problems with minimum/maximum thickness checks;

Structural Adequacy Checks

Error: Gravel Equivalent Provided above Layer 3 (SG): 2.38 is less than required: 2.40;

CalFP Design Alternatives

Design	HMA	AB	SG	AC GF	Res GE	TtlThick	Cost/mi	MsgsText
1	0.50	1.35	2.00	1.79	-0.02	3.85	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
2	0.55	1.25	2.00	1.81	-0.03	3.80	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
3	0.60	1.15	2.00	1.87	-0.01	3.75	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
4	0.65	1.05	2.00	1.92	0.00	3.70	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
5	0.70	0.95	2.00	1.97	0.02	3.65	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
6	0.75	0.80	2.00	2.01	-0.01	3.55	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
7	0.80	0.70	2.00	2.05	0.01	3.50	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
8	0.85	0.55	2.00	2.10	-0.01	3.40	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
9	0.90	0.45	2.00	2.14	0.02	3.35	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
10	0.95	0.35	2.00	2.18	0.05	3.30	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
11	1.00	0.35	2.00	2.21	0.20	3.35	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
12	1.05	0.35	2.00	2.25	0.35	3.40	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed
13	1.10	0.35	2.00	2.29	0.50	3.45	0	Warning: Layer 3 (SG, 2.00 ft) may be thicker than allowed

For spreadfootings with vertical loads and soils above footing bottom that are not as competent as soils below footing.
AASHTO Bridge Design Specifications 8th Edition
Section 10.6.3.1.2

	Initials		
Calc by	JO	12-May	2025
Checked	DK	21-Aug	2025

Yellow = Input

Foundation Soil Properties:

Unit Weight of Soil	130
Internal Angle of Friction	16.8
Cohesion	2500
Nc	12.3
Nq	4.8
Nγ	3.5
Depth of Embedment (Df)	2
Groundwater Depth Below Footing (Dw)	0

D_w	C_{wq}	$C_{w\gamma}$
0.0	0.5	0.5
D_f	1.0	0.5
$>1.5B + D_f$	1.0	1.0

Dw = depth of highest groundwater below footing.
Choose heights Dw for each load case

Table 10.6.3.1.2a-1—Bearing Capacity Factors N_c (Prandtl, 1921), N_q (Reissner, 1924), and N_γ (Vesic, 1975)

ϕ_f	N_c	N_q	N_γ	ϕ_f	N_c	N_q	N_γ
0	5.14	1.0	0.0	23	18.1	8.7	8.2
1	5.4	1.1	0.1	24	19.3	9.6	9.4
2	5.6	1.2	0.2	25	20.7	10.7	10.9
3	5.9	1.3	0.2	26	22.3	11.9	12.5
4	6.2	1.4	0.3	27	23.9	13.2	14.5
5	6.5	1.6	0.5	28	25.8	14.7	16.7
6	6.8	1.7	0.6	29	27.9	16.4	19.3
7	7.2	1.9	0.7	30	30.1	18.4	22.4
8	7.5	2.1	0.9	31	32.7	20.6	26.0
9	7.9	2.3	1.0	32	35.5	23.2	30.2
10	8.4	2.5	1.2	33	38.6	26.1	35.2
11	8.8	2.7	1.4	34	42.2	29.4	41.1
12	9.3	3.0	1.7	35	46.1	33.3	48.0
13	9.8	3.3	2.0	36	50.6	37.8	56.3
14	10.4	3.6	2.3	37	55.6	42.9	66.2
15	11.0	3.9	2.7	38	61.4	48.9	78.0
16	11.6	4.3	3.1	39	67.9	56.0	92.3
17	12.3	4.8	3.5	40	75.3	64.2	109.4
18	13.1	5.3	4.1	41	83.9	73.9	130.2
19	13.9	5.8	4.7	42	93.7	85.4	155.6
20	14.8	6.4	5.4	43	105.1	99.0	186.5
21	15.8	7.1	6.2	44	118.4	115.3	224.6
22	16.9	7.8	7.1	45	133.9	134.9	271.8

Pick Cohesive or Noncohesive and Loading State

																		Cohesive			Noncohesive		
	Effective Footing Size	Effective Footing Length		Cohesive					Noncohesive									Stength (qr)	Extreme (qn)	Gross Nominal Bearing Resistance	Stength (qr)	Extreme (qn)	Gross Nominal Bearing Resistance
Support / Wall	B'	L'	L'/B' Ratio	Sc	Sγ	Sq	Ncm	Nqm	Nγm	Sc	Sγ	Sq	Ncm	Nqm	Nγm	Cwq	Cwγ	ksf	ksf	ksf	ksf	ksf	ksf
A1	12.65	84.5	6.7	1.029941	1	1	12.66827	4.8	3.5	1.058421	0.940118	1.045189	13.01858	5.016909	3.290414	0.5	0.5	15.2	33.7	33.7	14.6	32.5	32.5
A4	11.99	88.75	7.4	1.02702	1	1	12.63234	4.8	3.5	1.052721	0.945961	1.040781	12.94847	4.995746	3.310862	0.5	0.5	15.1	33.6	33.6	14.6	32.4	32.4
R2 Extreme																							
	5.3	8	1.5	1.1325	1	1	13.92975	4.8	3.5	1.258537	0.735	1.199981	15.48	5.759907	2.5725	0.5	0.5	16.2	36.1	36.1	17.4	38.7	38.7
	6	8	1.3	1.15	1	1	14.145	4.8	3.5	1.292683	0.7	1.226393	15.9	5.886687	2.45	0.5	0.5	16.5	36.7	36.7	17.9	39.8	39.8
R2 Strength																							
	4	8	2.0	1.1	1	1	13.53	4.8	3.5	1.195122	0.8	1.150929	14.7	5.524458	2.8	0.5	0.5	15.7	34.9	34.9	16.5	36.8	36.8
	4.9	8	1.6	1.1225	1	1	13.80675	4.8	3.5	1.239024	0.755	1.184888	15.24	5.687461	2.6425	0.5	0.5	16.1	35.7	35.7	17.1	38.1	38.1
R4 Extreme	6.3	8	1.3	1.1575	1	1	14.23725	4.8	3.5	1.307317	0.685	1.237713	16.08	5.941021	2.3975	0.5	0.5	16.6	36.9	36.9	18.1	40.2	40.2
	5.6	8	1.4	1.14	1	1	14.022	4.8	3.5	1.273171	0.72	1.2113	15.66	5.814241	2.52	0.5	0.5	16.3	36.3	36.3	17.6	39.2	39.2
	4.8	8	1.7	1.12	1	1	13.776	4.8	3.5	1.234146	0.76	1.181114	15.18	5.669349	2.66	0.5	0.5	16.0	35.6	35.6	17.1	38.0	38.0
	4.9	59	12.0	1.01661	1	1	12.50431	4.8	3.5	1.03241	0.96678	1.02507	12.69864	4.920334	3.383729	0.5	0.5	14.6	32.4	32.4	14.3	31.7	31.7
R4 Strength	5.2	8	1.5	1.13	1	1	13.899	4.8	3.5	1.253659	0.74	1.196207	15.42	5.741795	2.59	0.5	0.5	16.2	36.0	36.0	17.3	38.6	38.6
	4.4	8	1.8	1.11	1	1	13.653	4.8	3.5	1.214634	0.78	1.166022	14.94	5.596904	2.73	0.5	0.5	15.9	35.3	35.3	16.8	37.4	37.4
	3.5	8	2.3	1.0875	1	1	13.37625	4.8	3.5	1.170732	0.825	1.132063	14.4	5.433901	2.8875	0.5	0.5	15.5	34.5	34.5	16.2	36.0	36.0
	3.7	59	15.9	1.012542	1	1	12.45427	4.8	3.5	1.024473	0.974915	1.01893	12.60102	4.890864	3.412203	0.5	0.5	14.5	32.2	32.2	14.2	31.5	31.5
R5 Extreme	4.8	16	3.3	1.06	1	1	13.038	4.8	3.5	1.117073	0.88	1.090557	13.74	5.234675	3.08	0.5	0.5	15.2	33.8	33.8	15.5	34.4	34.4
	4.3	8	1.9	1.1075	1	1	13.62225	4.8	3.5	1.209756	0.785	1.162248	14.88	5.578792	2.7475	0.5	0.5	15.8	35.2	35.2	16.7	37.2	37.2
	2.3	8	3.5	1.0575	1	1	13.00725	4.8	3.5	1.112195	0.885	1.086784	13.68	5.216563	3.0975	1	0.5	15.3	34.0	34.0	15.4	34.2	34.2
	2.5	8	3.2	1.0625	1	1	13.06875	4.8	3.5	1.121951	0.875	1.09433	13.8	5.252786	3.0625	1	0.5	15.4	34.2	34.2	15.5	34.5	34.5
R5 Strength	3.5	16	4.6	1.04375	1	1	12.83813	4.8	3.5	1.085366	0.9125	1.066031	13.35	5.11695	3.19375	0.5	0.5	14.9	33.1	33.1	15.0	33.4	33.4
	3.1	12	3.9	1.051667	1	1	12.9355	4.8	3.5	1.100813	0.896667	1.07798	13.54	5.174303	3.138333	0.5	0.5	15.0	33.3	33.3	15.2	33.9	33.9
	2.7	8	3.0	1.0675	1	1	13.13025	4.8	3.5	1.131707	0.865	1.101877	13.92	5.289009	3.0275	1	0.5	15.5	34.4	34.4	15.7	34.8	34.8
	6.4	4	0.6	1.32	1	1	16.236	4.8	3.5	1.62439	0.36	1.482972	19.98	7.118265	1.26	1	0.5	19.2	42.6	42.6	22.5	50.0	50.0

For spreadfootings with vertical loads and soils above footing bottom that are not as competent as soils below footing.
AASHTO Bridge Design Specifications 8th Edition
Section 10.6.3.1.2

Yellow = Input

Foundation Soil Properties:

Unit Weight of Soil	130
Internal Angle of Friction	38
Cohesion	0
Nc	61.4
Nq	48.9
Nγ	78
Depth of Embedment (Df)	2
Groundwater Depth Below Footing (Dw)	0

D_w	C_{wq}	$C_{w\gamma}$
0.0	0.5	0.5
D_f	1.0	0.5
$>1.5B + D_f$	1.0	1.0

Dw = depth of highest groundwater below footing. Choose worst case value.

Table 10.6.3.1.2a-1—Bearing Capacity Factors N_c (Prandtl, 1921), N_q (Reissner, 1924), and N_γ (Vesic, 1975)

ϕ_f	N_c	N_q	N_γ	ϕ_f	N_c	N_q	N_γ
0	5.14	1.0	0.0	23	18.1	8.7	8.2
1	5.4	1.1	0.1	24	19.3	9.6	9.4
2	5.6	1.2	0.2	25	20.7	10.7	10.9
3	5.9	1.3	0.2	26	22.3	11.9	12.5
4	6.2	1.4	0.3	27	23.9	13.2	14.5
5	6.5	1.6	0.5	28	25.8	14.7	16.7
6	6.8	1.7	0.6	29	27.9	16.4	19.3
7	7.2	1.9	0.7	30	30.1	18.4	22.4
8	7.5	2.1	0.9	31	32.7	20.6	26.0
9	7.9	2.3	1.0	32	35.5	23.2	30.2
10	8.4	2.5	1.2	33	38.6	26.1	35.2
11	8.8	2.7	1.4	34	42.2	29.4	41.1
12	9.3	3.0	1.7	35	46.1	33.3	48.0
13	9.8	3.3	2.0	36	50.6	37.8	56.3
14	10.4	3.6	2.3	37	55.6	42.9	66.2
15	11.0	3.9	2.7	38	61.4	48.9	78.0
16	11.6	4.3	3.1	39	67.9	56.0	92.3
17	12.3	4.8	3.5	40	75.3	64.2	109.4
18	13.1	5.3	4.1	41	83.9	73.9	130.2
19	13.9	5.8	4.7	42	93.7	85.4	155.6
20	14.8	6.4	5.4	43	105.1	99.0	186.5
21	15.8	7.1	6.2	44	118.4	115.3	224.6
22	16.9	7.8	7.1	45	133.9	134.9	271.8

Soil

				Cohesive						Noncohesive								Cohesive			Noncohesive		
																		Stength (qr)	Extreme (qn)	Gross Nominal Bearing Resistance	Stength (qr)	Extreme (qn)	Gross Nominal Bearing Resistance
Support / Wall	B'	L'	L'/B' Ratio	Sc	Sγ	Sq	Ncm	Nqm	Nγm	Sc	Sγ	Sq	Ncm	Nqm	Nγm	Cwq	Cwγ	ksf	ksf	ksf	ksf	ksf	ksf
R2 Ex	0.9	40	44.4	1.0045		1	1	61.6763	48.9	78	1.017919	0.991	1.017574	62.50025	49.75939	77.298	1	0.5	6.7	15.0	15.0	6.8	15.2	15.2
	2.1	184	87.6	1.002283		1	1	61.54015	48.9	78	1.00909	0.995435	1.008915	61.9581	49.33592	77.64391	1	0.5	8.1	18.0	18.0	8.2	18.1	18.1
	1.3	168	129.2	1.001548		1	1	61.49502	48.9	78	1.006163	0.996905	1.006044	61.77839	49.19556	77.75857	1	0.5	7.2	16.0	16.0	7.2	16.1	16.1
	2.8	24	8.6	1.023333		1	1	62.83267	48.9	78	1.092915	0.953333	1.091126	67.105	53.35609	74.36	1	0.5	8.9	19.8	19.8	9.3	20.6	20.6
	6.3	8	1.3	1.1575		1	1	71.0705	48.9	78	1.627178	0.685	1.615104	99.90875	78.97857	53.43	0.5	0.5	10.0	22.3	22.3	14.2	31.5	31.5
strength	3.6	40	11.1	1.018		1	1	62.5052	48.9	78	1.071678	0.964	1.070298	65.801	52.33755	75.192	1	0.5	9.8	21.8	21.8	10.1	22.4	22.4
	2.4	184	76.7	1.002609		1	1	61.56017	48.9	78	1.010388	0.994783	1.010188	62.03783	49.3982	77.59304	1	0.5	8.5	18.8	18.8	8.5	18.9	18.9
	2.5	168	67.2	1.002976		1	1	61.58274	48.9	78	1.011851	0.994048	1.011623	62.12768	49.46838	77.53571	1	0.5	8.6	19.1	19.1	8.6	19.2	19.2
	2.9	24	8.3	1.024167		1	1	62.88383	48.9	78	1.096234	0.951667	1.094381	67.30875	53.51523	74.23	1	0.5	9.0	20.1	20.1	9.4	20.9	20.9
	3.7	14	3.8	1.052857		1	1	64.64543	48.9	78	1.210482	0.894286	1.206429	74.32357	58.9944	69.75429	0.5	0.5	7.1	15.7	15.7	10.7	23.7	23.7
R3 Ex	2.1	32	15.2	1.013125		1	1	62.20588	48.9	78	1.052265	0.97375	1.051259	64.60906	51.40655	75.9525	1	0.5	8.1	18.0	18.0	8.3	18.5	18.5
	6.6	52.7	8.0	1.025047		1	1	62.93791	48.9	78	1.099741	0.949905	1.097821	67.5241	53.68344	74.0926	1	0.5	13.3	29.4	29.4	13.4	29.9	29.9
Strength	2.4	32	13.3	1.015		1	1	62.321	48.9	78	1.059731	0.97	1.058581	65.0675	51.76463	75.66	1	0.5	8.5	18.8	18.8	8.7	19.4	19.4
	2.5	53.7	21.5	1.009311		1	1	61.97169	48.9	78	1.037077	0.981378	1.036363	63.67654	50.67817	76.54749	1	0.5	8.6	19.1	19.1	8.7	19.4	19.4

CLIENT:City Placerville
Placerville Road Bridge Replacement
PROJECT NO.: P18113
TITLE: Settlement Footing in Rock

STRUCTURE NO.: Abut 1

COMPUTED BY: FPT
DATE: 07/28/2025
CHECKED BY: DAK
DATE: 8/21/25
PAGE:1 of1

SETTLEMENT OF STRIP FOOTINGS ON GRANULAR SOILS

(SCHMERTMANN, FHWA-TS-78-209, PGS 49-54)

EQUATIONS: Izp max = 0.5 + 0.1*(DELTA P / SIGMA V')^0.5 ; DELTA P = P - Po'

B, FOOTING WIDTH (FT.)	P, LOAD (KSF)	DEPTH TO FOOTING BASE (FT.)	Po ' (KSF)	DELTA P (KSF)	B (FT.)	SIGMA V ' (KSF)	Izp (MAX)
			(VALUES FOR Po' AND SIGMA V ' COMPUTED BELOW)				
12.93	33.2	2.0	0.14	33.06	12.93	1.045	1.062

NOTE: STRATA DEPTH START AT GROUND SURFACE AND EXTEND TO D + 4B
ONE STRATA BREAK AT WATER TABLE, USE BOUYANT UNIT WEIGHTS BELOW WATER TABLE

WATER TABLE DEPTH (FT.)	STRATA DEPTH FROM (FT.)	STRATA DEPTH TO (FT.)	UNIT WEIGHT (KCF)	P ZERO DEPTH (FT.)	P ZERO (KSF)	Izp DEPTH (FT.)	SIGMA V (KSF)
0	0	8	0.070	2	0.140	14.93	0.560
0	8	32	0.070		0.000		0.485

INFLUENCE VALUES & BOUNDARY CONDITIONS:
2 FT = D, FIRST LAYER MUST START AT DEPTH D
14.93 FT = D+B, ONE LAYER BOUNDARY MUST OCCUR AT Izp @ D+B
53.72 FT = D+4B, BOTTOM OF LAST LAYER MUST END AT D + 4B

LAYER DEPTH FROM (FT.)	LAYER DEPTH TO (FT.)	LAYER THICKNESS (FT.)	LAYER MID-THICK DEPTH, FT	E (KSF)	Iz	Iz*D/Es
-	-	-	-	-	-	-
2	14.93	12.93	8.465	17500	0.631	0.00047
14.93	53.72	38.79	34.325	17500	0.531	0.00118
SUMMATION, Iz*D/Es =						0.00164

SETTLEMENT COMPUTATION:

EQUATIONS:
C1 = 1.0-0.5*(P zero/DELTA P)
C2 = 1.0+0.2*LOG(TIME,YRS/0.1)
S = DELTA P*C1*C2*(SUM(Iz*D/Es)

DELTA P	C1	TIME (YRS)	C2	Iz*D/Es	SETTLEMENT (FT.)	SETTLEMENT (IN.)	½ SETTLEMENT* (IN.)
33.06	1.00	50	1.54	0.0016	0.0835	1.00	0.50

* If such pre-loading has occurred (i.e. rock), tentatively use ½ the above predicted settlement as probably still conservative.
(SCHMERTMANN, FHWA-TS-78-209, PGS 49-54)

CLIENT:City Placerville
Placerville Road Bridge Replacement
PROJECT NO.: P15055
TITLE: Settlement Footing in Rock

STRUCTURE NO.: Abut 4

COMPUTED BY: FPT
DATE: 07/28/2025
CHECKED BY: DAK
DATE: 8/21/25
PAGE:1 of1

SETTLEMENT OF STRIP FOOTINGS ON GRANULAR SOILS

(SCHMERTMANN, FHWA-TS-78-209, PGS 49-54)

EQUATIONS: Izp max = 0.5 + 0.1*(DELTA P / SIGMA V')^0.5 ; DELTA P = P - Po'

B, FOOTING WIDTH (FT.)	P, LOAD (KSF)	DEPTH TO FOOTING BASE (FT.)	Po ' (KSF)	DELTA P (KSF)	B (FT.)	SIGMA V ' (KSF)	Izp (MAX)
			(VALUES FOR Po' AND SIGMA V ' COMPUTED BELOW)				
7.67	45.5	2.0	0.14	45.36	7.67	0.677	1.319

NOTE: STRATA DEPTH START AT GROUND SURFACE AND EXTEND TO D + 4B
ONE STRATA BREAK AT WATER TABLE, USE BOUYANT UNIT WEIGHTS BELOW WATER TABLE

WATER TABLE DEPTH (FT.)	STRATA DEPTH FROM (FT.)	STRATA DEPTH TO (FT.)	UNIT WEIGHT (KCF)	P ZERO DEPTH (FT.)	P ZERO (KSF)	Izp DEPTH (FT.)	SIGMA V (KSF)
0	0	8	0.070	2	0.140	9.67	0.560
0	8	32	0.070		0.000		0.117

INFLUENCE VALUES & BOUNDARY CONDITIONS:
2 FT = D, FIRST LAYER MUST START AT DEPTH D
9.67 FT = D+B, ONE LAYER BOUNDARY MUST OCCUR AT Izp @ D+B
32.68 FT = D+4B, BOTTOM OF LAST LAYER MUST END AT D + 4B

LAYER DEPTH FROM (FT.)	LAYER DEPTH TO (FT.)	LAYER THICKNESS (FT.)	LAYER MID-THICK DEPTH, FT	E (KSF)	Iz	Iz*D/Es
-	-	-	-	-	-	-
2	9.67	7.67	5.835	17500	0.759	0.00033
9.67	32.68	23.01	21.175	17500	0.659	0.00087
SUMMATION, Iz*D/Es =						0.00120

SETTLEMENT COMPUTATION:

EQUATIONS:
C1 = 1.0-0.5*(P zero/DELTA P)
C2 = 1.0+0.2*LOG(TIME,YRS/0.1)
S = DELTA P*C1*C2*(SUM(Iz*D/Es)

DELTA P	C1	TIME (YRS)	C2	Iz*D/Es	SETTLEMENT (FT.)	SETTLEMENT (IN.)	½ SETTLEMENT* (IN.)
45.36	1.00	50	1.54	0.0012	0.0837	**1.00**	**0.50**

* If such pre-loading has occurred (i.e. rock), tentatively use ½ the above predicted settlement as probably still conservative.
(SCHMERTMANN, FHWA-TS-78-209, PGS 49-54)

CLIENT:City Placerville
Placerville Drive Retraining Wall
PROJECT NO.: 18113

STRUCTURE NO.: RW 2 S1

COMPUTED BY: FPT
DATE: 7/27/2025
CHECKED BY: DAK
DATE: 8/22/2025
PAGE:2 of

SETTLEMENT OF STRIP FOOTINGS ON GRANULAR SOILS

(SCHMERTMANN, FHWA-TS-78-209, PGS 49-54)

EQUATIONS: Izp max = 0.5 + 0.1*(DELTA P / SIGMA V')^0.5 ; DELTA P = P - Po'

B, FOOTING WIDTH (FT.)	P, LOAD (KSF)	DEPTH TO FOOTING BASE (FT.)	Po ' (KSF)	DELTA P (KSF)	B (FT.)	SIGMA V ' (KSF)	Izp (MAX)
			(VALUES FOR Po' AND SIGMA V ' COMPUTED BELOW)				
5	1.6	2.0	0.25	1.35	5	0.875	0.624

NOTE: STRATA DEPTH START AT GROUND SURFACE AND EXTEND TO D + 4B
ONE STRATA BREAK AT WATER TABLE, USE BOUYANT UNIT WEIGHTS BELOW WATER TABLE

	STRATA DEPTH		UNIT	P ZERO	P ZERO	Izp	SIGMA V
	FROM	TO	WEIGHT	DEPTH		DEPTH	
	(FT.)	(FT.)	(KCF)	(FT.)	(KSF)	(FT.)	(KSF)
	0	8.5	0.125	2	0.250	7	0.875
	8.5	32	0.070		0.000		0.000

INFLUENCE VALUES & BOUNDARY CONDITIONS:
2 FT = D, FIRST LAYER MUST START AT DEPTH D
7 FT = D+B, ONE LAYER BOUNDARY MUST OCCUR AT Izp @ D+B
22 FT = D+4B, BOTTOM OF LAST LAYER MUST END AT D + 4B

LAYER DEPTH		LAYER	LAYER	E	Iz	Iz*D/Es
FROM	TO	THICKNESS	MID-THICK			
(FT.)	(FT.)	(FT.)	DEPTH, FT	(KSF)		
-	-	-	-	-	-	-
2	7	5	4.5	3162	0.412	0.00065
7	22	15	14.5	3162	0.312	0.00148
SUMMATION, Iz*D/Es =						0.00213

SETTLEMENT COMPUTATION: EQUATIONS:
C1 = 1.0-0.5*(P zero/DELTA P)
C2 = 1.0+0.2*LOG(TIME,YRS/0.1)
S = DELTA P*C1*C2*(SUM(Iz*D/Es)

DELTA P	C1	TIME (YRS)	C2	Iz*D/Es	SETTLEMENT (FT.)	SETTLEMENT (IN.)	½ SETTLEMENT* (IN.)
1.35	0.91	50	1.54	0.0021	0.0040	**0.05**	**0.02**

* If such pre-loading has occurred (i.e. rock), tentatively use ½ the above predicted settlement as probably still conservative.
(SCHMERTMANN, FHWA-TS-78-209, PGS 49-54)

CLIENT:City Placerville
Placerville Drive Retraining Wall
PROJECT NO.: 18113

STRUCTURE NO.: RW 2 S2

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SETTLEMENT OF STRIP FOOTINGS ON GRANULAR SOILS

(SCHMERTMANN, FHWA-TS-78-209, PGS 49-54)

EQUATIONS: Izp max = 0.5 + 0.1*(DELTA P / SIGMA V')^0.5 ; DELTA P = P - Po'

B, FOOTING WIDTH (FT.)	P, LOAD (KSF)	DEPTH TO FOOTING BASE (FT.)	Po ' (KSF)	DELTA P (KSF)	B (FT.)	SIGMA V ' (KSF)	Izp (MAX)
			(VALUES FOR Po' AND SIGMA V ' COMPUTED BELOW)				
4.6	2.6	2.0	0.25	2.35	4.6	0.792	0.672

NOTE: STRATA DEPTH START AT GROUND SURFACE AND EXTEND TO D + 4B
ONE STRATA BREAK AT WATER TABLE, USE BOUYANT UNIT WEIGHTS BELOW WATER TABLE

STRATA DEPTH FROM (FT.)	STRATA DEPTH TO (FT.)	UNIT WEIGHT (KCF)	P ZERO DEPTH (FT.)	P ZERO (KSF)	Izp DEPTH (FT.)	SIGMA V (KSF)
0	6	0.125	2	0.250	6.6	0.750
6	75	0.070		0.000		0.042

INFLUENCE VALUES & BOUNDARY CONDITIONS:
2 FT = D, FIRST LAYER MUST START AT DEPTH D
6.6 FT = D+B, ONE LAYER BOUNDARY MUST OCCUR AT Izp @ D+B
20.4 FT = D+4B, BOTTOM OF LAST LAYER MUST END AT D + 4B

LAYER DEPTH FROM (FT.)	LAYER DEPTH TO (FT.)	LAYER THICKNESS (FT.)	LAYER MID-THICK DEPTH, FT	E (KSF)	Iz	Iz*D/Es
2	6.6	4.6	4.3	3162	0.436	0.00063
6.6	20.4	13.8	13.5	3162	0.336	0.00147
SUMMATION, Iz*D/Es =						0.00210

SETTLEMENT COMPUTATION: EQUATIONS:
C1 = 1.0-0.5*(P zero/DELTA P)
C2 = 1.0+0.2*LOG(TIME,YRS/0.1)
S = DELTA P*C1*C2*(SUM(Iz*D/Es)

DELTA P	C1	TIME (YRS)	C2	Iz*D/Es	SETTLEMENT (FT.)	SETTLEMENT (IN.)	½ SETTLEMENT* (IN.)
2.35	0.95	50	1.54	0.0021	0.0072	**0.09**	**0.04**

* If such pre-loading has occurred (i.e. rock), tentatively use ½ the above predicted settlement as probably still conservative.
(SCHMERTMANN, FHWA-TS-78-209, PGS 49-54)

CLIENT:City Placerville
Placerville Drive Retraining Wall
PROJECT NO.: 18113

STRUCTURE NO.: RW 2 S3

COMPUTED BY: FPT
DATE: 7/27/2025
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DATE: 8/22/2025

SETTLEMENT OF STRIP FOOTINGS ON GRANULAR SOILS

(SCHMERTMANN, FHWA-TS-78-209, PGS 49-54)

EQUATIONS: Izp max = 0.5 + 0.1*(DELTA P / SIGMA V')^0.5 ; DELTA P = P - Po'

B, FOOTING WIDTH (FT.)	P, LOAD (KSF)	DEPTH TO FOOTING BASE (FT.)	Po ' (KSF)	DELTA P (KSF)	B (FT.)	SIGMA V ' (KSF)	Izp (MAX)
			(VALUES FOR Po' AND SIGMA V ' COMPUTED BELOW)				
4.6	2.1	2.0	0.25	1.85	4.6	0.825	0.650

NOTE: STRATA DEPTH START AT GROUND SURFACE AND EXTEND TO D + 4B
ONE STRATA BREAK AT WATER TABLE, USE BOUYANT UNIT WEIGHTS BELOW WATER TABLE

STRATA DEPTH FROM (FT.)	STRATA DEPTH TO (FT.)	UNIT WEIGHT (KCF)	P ZERO DEPTH (FT.)	P ZERO (KSF)	Izp DEPTH (FT.)	SIGMA V (KSF)
0	9	0.125	2	0.250	6.6	0.825
9	32	0.070		0.000		0.000

INFLUENCE VALUES & BOUNDARY CONDITIONS:
2 FT = D, FIRST LAYER MUST START AT DEPTH D
6.6 FT = D+B, ONE LAYER BOUNDARY MUST OCCUR AT Izp @ D+B
20.4 FT = D+4B, BOTTOM OF LAST LAYER MUST END AT D + 4B

LAYER DEPTH FROM (FT.)	LAYER DEPTH TO (FT.)	LAYER THICKNESS (FT.)	LAYER MID-THICK DEPTH, FT	E (KSF)	Iz	Iz*D/Es
2	6.6	4.6	4.3	3162	0.425	0.00062
6.6	20.4	13.8	13.5	3162	0.325	0.00142
SUMMATION, Iz*D/Es =						0.00204

SETTLEMENT COMPUTATION: EQUATIONS:
C1 = 1.0-0.5*(P zero/DELTA P)
C2 = 1.0+0.2*LOG(TIME,YRS/0.1)
S = DELTA P*C1*C2*(SUM(Iz*D/Es)

DELTA P	C1	TIME (YRS)	C2	Iz*D/Es	SETTLEMENT (FT.)	SETTLEMENT (IN.)	½ SETTLEMENT* (IN.)
1.85	0.93	50	1.54	0.0020	0.0054	**0.06**	**0.03**

* If such pre-loading has occurred (i.e. rock), tentatively use ½ the above predicted settlement as probably still conservative.
(SCHMERTMANN, FHWA-TS-78-209, PGS 49-54)

CLIENT:City Placerville
Placerville Drive Retraining Wall
PROJECT NO.: 18113

STRUCTURE NO.: RW 2 S4

COMPUTED BY: FPT
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CHECKED BY: _____
DATE: _____

SETTLEMENT OF STRIP FOOTINGS ON GRANULAR SOILS

(SCHMERTMANN, FHWA-TS-78-209, PGS 49-54)

EQUATIONS: Izp max = 0.5 + 0.1*(DELTA P / SIGMA V')^0.5 ; DELTA P = P - Po'

B, FOOTING WIDTH (FT.)	P, LOAD (KSF)	DEPTH TO FOOTING BASE (FT.)	Po ' (KSF)	DELTA P (KSF)	B (FT.)	SIGMA V ' (KSF)	Izp (MAX)
			(VALUES FOR Po' AND SIGMA V ' COMPUTED BELOW)				
5.2	3.0	2.0	0.25	2.75	5.2	0.823	0.683

NOTE: STRATA DEPTH START AT GROUND SURFACE AND EXTEND TO D + 4B
ONE STRATA BREAK AT WATER TABLE, USE BOUYANT UNIT WEIGHTS BELOW WATER TABLE

	STRATA DEPTH		UNIT	P ZERO	P ZERO	Izp	SIGMA V
	FROM	TO	WEIGHT	DEPTH		DEPTH	
	(FT.)	(FT.)	(KCF)	(FT.)	(KSF)	(FT.)	(KSF)
	0	5.8	0.125	2	0.250	7.2	0.725
	5.8	75	0.070		0.000		0.098

INFLUENCE VALUES & BOUNDARY CONDITIONS:
2 FT = D, FIRST LAYER MUST START AT DEPTH D
7.2 FT = D+B, ONE LAYER BOUNDARY MUST OCCUR AT Izp @ D+B
22.8 FT = D+4B, BOTTOM OF LAST LAYER MUST END AT D + 4B

LAYER DEPTH		LAYER	LAYER	E	Iz	Iz*D/Es
FROM	TO	THICKNESS	MID-THICK			
(FT.)	(FT.)	(FT.)	DEPTH, FT	(KSF)		
-	-	-	-	-	-	-
2	7.2	5.2	4.6	3162	0.441	0.00073
7.2	22.8	15.6	15	3162	0.341	0.00168
SUMMATION, Iz*D/Es =						0.00241

SETTLEMENT COMPUTATION: EQUATIONS:
C1 = 1.0-0.5*(P zero/DELTA P)
C2 = 1.0+0.2*LOG(TIME,YRS/0.1)
S = DELTA P*C1*C2*(SUM(Iz*D/Es)

DELTA P	C1	TIME (YRS)	C2	Iz*D/Es	SETTLEMENT (FT.)	SETTLEMENT (IN.)	½ SETTLEMENT* (IN.)
2.75	0.95	50	1.54	0.0024	0.0097	**0.12**	**0.06**

* If such pre-loading has occurred (i.e. rock), tentatively use ½ the above predicted settlement as probably still conservative.
(SCHMERTMANN, FHWA-TS-78-209, PGS 49-54)

CLIENT:City Placerville
Placerville Drive Retraining Wall
PROJECT NO.: 18113

STRUCTURE NO.: RW 2 S5

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SETTLEMENT OF STRIP FOOTINGS ON GRANULAR SOILS

(SCHMERTMANN, FHWA-TS-78-209, PGS 49-54)

EQUATIONS: Izp max = 0.5 + 0.1*(DELTA P / SIGMA V')^0.5 ; DELTA P = P - Po'

B, FOOTING WIDTH (FT.)	P, LOAD (KSF)	DEPTH TO FOOTING BASE (FT.)	Po ' (KSF)	DELTA P (KSF)	B (FT.)	SIGMA V ' (KSF)	Izp (MAX)
			(VALUES FOR Po' AND SIGMA V ' COMPUTED BELOW)				
7	2.2	3.2	0.334	1.866	7	0.824	0.650

NOTE: STRATA DEPTH START AT GROUND SURFACE AND EXTEND TO D + 4B
ONE STRATA BREAK AT WATER TABLE, USE BOUYANT UNIT WEIGHTS BELOW WATER TABLE

	STRATA DEPTH		UNIT	P ZERO	P ZERO	Izp	SIGMA V
	FROM	TO	WEIGHT	DEPTH		DEPTH	
	(FT.)	(FT.)	(KCF)	(FT.)	(KSF)	(FT.)	(KSF)
	0	2	0.125	3.2	0.250	10.2	0.250
	2	50	0.070		0.084		0.574

INFLUENCE VALUES & BOUNDARY CONDITIONS:

3.2 FT = D, FIRST LAYER MUST START AT DEPTH D
10.2 FT = D+B, ONE LAYER BOUNDARY MUST OCCUR AT Izp @ D+B
31.2 FT = D+4B, BOTTOM OF LAST LAYER MUST END AT D + 4B

LAYER DEPTH		LAYER	LAYER	E	Iz	Iz*D/Es
FROM	TO	THICKNESS	MID-THICK			
(FT.)	(FT.)	(FT.)	DEPTH, FT	(KSF)		
-	-	-	-	-	-	-
3.2	10.2	7	6.7	3162	0.425	0.00094
10.2	31.2	21	20.7	3162	0.325	0.00216
SUMMATION, Iz*D/Es =						0.00310

SETTLEMENT COMPUTATION:

EQUATIONS:

C1 = 1.0-0.5*(P zero/DELTA P)
C2 = 1.0+0.2*LOG(TIME,YRS/0.1)
S = DELTA P*C1*C2*(SUM(Iz*D/Es)

DELTA P	C1	TIME (YRS)	C2	Iz*D/Es	SETTLEMENT (FT.)	SETTLEMENT (IN.)	½ SETTLEMENT* (IN.)
1.866	0.91	50	1.54	0.0031	0.0081	**0.10**	**0.05**

* If such pre-loading has occurred (i.e. rock), tentatively use ½ the above predicted settlement as probably still conservative.
(SCHMERTMANN, FHWA-TS-78-209, PGS 49-54)

CLIENT:City Placerville
Placerville Drive Retraining Wall
PROJECT NO.: 18113

STRUCTURE NO.: RW 2 S6

COMPUTED BY: FPT
DATE: 7/27/2025
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DATE: 8/22/2025

SETTLEMENT OF STRIP FOOTINGS ON GRANULAR SOILS

(SCHMERTMANN, FHWA-TS-78-209, PGS 49-54)

EQUATIONS: Izp max = 0.5 + 0.1*(DELTA P / SIGMA V')^0.5 ; DELTA P = P - Po'

B, FOOTING WIDTH (FT.)	P, LOAD (KSF)	DEPTH TO FOOTING BASE (FT.)	Po ' (KSF)	DELTA P (KSF)	B (FT.)	SIGMA V ' (KSF)	Izp (MAX)
			(VALUES FOR Po' AND SIGMA V ' COMPUTED BELOW)				
7.7	2.7	3.3	0.2275	2.4725	7.7	0.767	0.680

NOTE: STRATA DEPTH START AT GROUND SURFACE AND EXTEND TO D + 4B
ONE STRATA BREAK AT WATER TABLE, USE BOUYANT UNIT WEIGHTS BELOW WATER TABLE

	STRATA DEPTH		UNIT	P ZERO	P ZERO	Izp	SIGMA V
	FROM	TO	WEIGHT	DEPTH		DEPTH	
	(FT.)	(FT.)	(KCF)	(FT.)	(KSF)	(FT.)	(KSF)
	0	1	0.070	3.25	0.070	10.95	0.070
	1	32	0.070		0.158		0.697

INFLUENCE VALUES & BOUNDARY CONDITIONS:
3.25 FT = D, FIRST LAYER MUST START AT DEPTH D
10.95 FT = D+B, ONE LAYER BOUNDARY MUST OCCUR AT Izp @ D+B
34.05 FT = D+4B, BOTTOM OF LAST LAYER MUST END AT D + 4B

LAYER DEPTH		LAYER	LAYER	E	Iz	Iz*D/Es
FROM	TO	THICKNESS	MID-THICK			
(FT.)	(FT.)	(FT.)	DEPTH, FT	(KSF)		
-	-	-	-	-	-	-
3.25	10.95	7.7	7.1	3162	0.440	0.00107
10.95	34.05	23.1	22.5	3162	0.340	0.00248
SUMMATION, Iz*D/Es =						0.00355

SETTLEMENT COMPUTATION: EQUATIONS:
C1 = 1.0-0.5*(P zero/DELTA P)
C2 = 1.0+0.2*LOG(TIME,YRS/0.1)
S = DELTA P*C1*C2*(SUM(Iz*D/Es)

DELTA P	C1	TIME (YRS)	C2	Iz*D/Es	SETTLEMENT (FT.)	SETTLEMENT (IN.)	½ SETTLEMENT* (IN.)
2.4725	0.95	50	1.54	0.0036	0.0129	**0.15**	**0.08**

* If such pre-loading has occurred (i.e. rock), tentatively use ½ the above predicted settlement as probably still conservative.
(SCHMERTMANN, FHWA-TS-78-209, PGS 49-54)

CLIENT:City Placerville
Placerville Drive Retraining Wall
PROJECT NO.: 18113

STRUCTURE NO.: RW 2 S7

COMPUTED BY: FPT
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DATE: 8/22/2025

SETTLEMENT OF STRIP FOOTINGS ON GRANULAR SOILS

(SCHMERTMANN, FHWA-TS-78-209, PGS 49-54)

EQUATIONS: Izp max = 0.5 + 0.1*(DELTA P / SIGMA V')^0.5 ; DELTA P = P - Po'

B, FOOTING WIDTH (FT.)	P, LOAD (KSF)	DEPTH TO FOOTING BASE (FT.)	Po ' (KSF)	DELTA P (KSF)	B (FT.)	SIGMA V ' (KSF)	Izp (MAX)
			(VALUES FOR Po' AND SIGMA V ' COMPUTED BELOW)				
9.1	3.4	3.3	0.2275	3.1725	9.1	0.865	0.692

NOTE: STRATA DEPTH START AT GROUND SURFACE AND EXTEND TO D + 4B
ONE STRATA BREAK AT WATER TABLE, USE BOUYANT UNIT WEIGHTS BELOW WATER TABLE

	STRATA DEPTH FROM (FT.)	STRATA DEPTH TO (FT.)	UNIT WEIGHT (KCF)	P ZERO DEPTH (FT.)	P ZERO (KSF)	Izp DEPTH (FT.)	SIGMA V (KSF)
	0	1	0.070	3.25	0.070	12.35	0.070
	1	75	0.070		0.158		0.795

INFLUENCE VALUES & BOUNDARY CONDITIONS:
3.25 FT = D, FIRST LAYER MUST START AT DEPTH D
12.35 FT = D+B, ONE LAYER BOUNDARY MUST OCCUR AT Izp @ D+B
39.65 FT = D+4B, BOTTOM OF LAST LAYER MUST END AT D + 4B

LAYER DEPTH FROM (FT.)	LAYER DEPTH TO (FT.)	LAYER THICKNESS (FT.)	LAYER MID-THICK DEPTH, FT	E (KSF)	Iz	Iz*D/Es
-	-	-	-	-	-	-
3.25	12.35	9.1	7.8	3162	0.446	0.00128
12.35	39.65	27.3	26	3162	0.346	0.00299
SUMMATION, Iz*D/Es =						0.00427

SETTLEMENT COMPUTATION:

EQUATIONS:
C1 = 1.0-0.5*(P zero/DELTA P)
C2 = 1.0+0.2*LOG(TIME,YRS/0.1)
S = DELTA P*C1*C2*(SUM(Iz*D/Es)

DELTA P	C1	TIME (YRS)	C2	Iz*D/Es	SETTLEMENT (FT.)	SETTLEMENT (IN.)	½ SETTLEMENT* (IN.)
3.1725	0.96	50	1.54	0.0043	0.0201	**0.24**	**0.12**

* If such pre-loading has occurred (i.e. rock), tentatively use ½ the above predicted settlement as probably still conservative.
(SCHMERTMANN, FHWA-TS-78-209, PGS 49-54)

CLIENT:City Placerville
Placerville Drive Retraining Wall
PROJECT NO.: 18113

STRUCTURE NO.: RW 3 S1

COMPUTED BY: FPT
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SETTLEMENT OF STRIP FOOTINGS ON GRANULAR SOILS

(SCHMERTMANN, FHWA-TS-78-209, PGS 49-54)

EQUATIONS: Izp max = 0.5 + 0.1*(DELTA P / SIGMA V')^0.5 ; DELTA P = P - Po'

B, FOOTING WIDTH (FT.)	P, LOAD (KSF)	DEPTH TO FOOTING BASE (FT.)	Po ' (KSF)	DELTA P (KSF)	B (FT.)	SIGMA V ' (KSF)	Izp (MAX)
			(VALUES FOR Po' AND SIGMA V ' COMPUTED BELOW)				
4.6	2.6	2.0	0.25	2.35	4.6	0.792	0.672

NOTE: STRATA DEPTH START AT GROUND SURFACE AND EXTEND TO D + 4B
ONE STRATA BREAK AT WATER TABLE, USE BOUYANT UNIT WEIGHTS BELOW WATER TABLE

	STRATA DEPTH		UNIT	P ZERO	P ZERO	Izp	SIGMA V
	FROM	TO	WEIGHT	DEPTH		DEPTH	
	(FT.)	(FT.)	(KCF)	(FT.)	(KSF)	(FT.)	(KSF)
	0	6	0.125	2	0.250	6.6	0.750
	6	32	0.070		0.000		0.042

INFLUENCE VALUES & BOUNDARY CONDITIONS:
2 FT = D, FIRST LAYER MUST START AT DEPTH D
6.6 FT = D+B, ONE LAYER BOUNDARY MUST OCCUR AT Izp @ D+B
20.4 FT = D+4B, BOTTOM OF LAST LAYER MUST END AT D + 4B

LAYER DEPTH		LAYER	LAYER	E	Iz	Iz*D/Es
FROM	TO	THICKNESS	MID-THICK			
(FT.)	(FT.)	(FT.)	DEPTH, FT	(KSF)		
-	-	-	-	-	-	-
2	6.6	4.6	4.3	3162	0.436	0.00063
6.6	20.4	13.8	13.5	3162	0.336	0.00147
SUMMATION, Iz*D/Es =						0.00210

SETTLEMENT COMPUTATION:

EQUATIONS:
C1 = 1.0-0.5*(P zero/DELTA P)
C2 = 1.0+0.2*LOG(TIME,YRS/0.1)
S = DELTA P*C1*C2*(SUM(Iz*D/Es)

DELTA P	C1	TIME (YRS)	C2	Iz*D/Es	SETTLEMENT (FT.)	SETTLEMENT (IN.)	½ SETTLEMENT* (IN.)
2.35	0.95	50	1.54	0.0021	0.0072	**0.09**	**0.04**

* If such pre-loading has occurred (i.e. rock), tentatively use ½ the above predicted settlement as probably still conservative.
(SCHMERTMANN, FHWA-TS-78-209, PGS 49-54)

CLIENT:City Placerville
Placerville Drive Retraining Wall
PROJECT NO.: 18113

STRUCTURE NO.: RW 3 S2

COMPUTED BY: FPT
DATE: 7/27/2025
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DATE: 8/22/2025

SETTLEMENT OF STRIP FOOTINGS ON GRANULAR SOILS

(SCHMERTMANN, FHWA-TS-78-209, PGS 49-54)

EQUATIONS: Izp max = 0.5 + 0.1*(DELTA P / SIGMA V')^0.5 ; DELTA P = P - Po'

B, FOOTING WIDTH (FT.)	P, LOAD (KSF)	DEPTH TO FOOTING BASE (FT.)	Po ' (KSF)	DELTA P (KSF)	B (FT.)	SIGMA V ' (KSF)	Izp (MAX)
			(VALUES FOR Po' AND SIGMA V ' COMPUTED BELOW)				
4.6	2.1	2.0	0.25	1.85	4.6	0.792	0.653

NOTE: STRATA DEPTH START AT GROUND SURFACE AND EXTEND TO D + 4B
ONE STRATA BREAK AT WATER TABLE, USE BOUYANT UNIT WEIGHTS BELOW WATER TABLE

	STRATA DEPTH FROM (FT.)	STRATA DEPTH TO (FT.)	UNIT WEIGHT (KCF)	P ZERO DEPTH (FT.)	P ZERO (KSF)	Izp DEPTH (FT.)	SIGMA V (KSF)
	0	6	0.125	2	0.250	6.6	0.750
	6	75	0.070		0.000		0.042

INFLUENCE VALUES & BOUNDARY CONDITIONS:
2 FT = D, FIRST LAYER MUST START AT DEPTH D
6.6 FT = D+B, ONE LAYER BOUNDARY MUST OCCUR AT Izp @ D+B
20.4 FT = D+4B, BOTTOM OF LAST LAYER MUST END AT D + 4B

LAYER DEPTH FROM (FT.)	LAYER DEPTH TO (FT.)	LAYER THICKNESS (FT.)	LAYER MID-THICK DEPTH, FT	E (KSF)	Iz	Iz*D/Es
-	-	-	-	-	-	-
2	6.6	4.6	4.3	3162	0.426	0.00062
6.6	20.4	13.8	13.5	3162	0.326	0.00142
SUMMATION, Iz*D/Es =						0.00204

SETTLEMENT COMPUTATION: EQUATIONS:
C1 = 1.0-0.5*(P zero/DELTA P)
C2 = 1.0+0.2*LOG(TIME,YRS/0.1)
S = DELTA P*C1*C2*(SUM(Iz*D/Es)

DELTA P	C1	TIME (YRS)	C2	Iz*D/Es	SETTLEMENT (FT.)	SETTLEMENT (IN.)	½ SETTLEMENT* (IN.)
1.85	0.93	50	1.54	0.0020	0.0054	**0.07**	**0.03**

* If such pre-loading has occurred (i.e. rock), tentatively use ½ the above predicted settlement as probably still conservative.
(SCHMERTMANN, FHWA-TS-78-209, PGS 49-54)

CLIENT:City Placerville
Placerville Drive Retraining Wall
PROJECT NO.: 18113

STRUCTURE NO.: RW 4 S1

COMPUTED BY: FPT
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SETTLEMENT OF STRIP FOOTINGS ON GRANULAR SOILS

(SCHMERTMANN, FHWA-TS-78-209, PGS 49-54)

EQUATIONS: Izp max = 0.5 + 0.1*(DELTA P / SIGMA V')^0.5 ; DELTA P = P - Po'

B, FOOTING WIDTH (FT.)	P, LOAD (KSF)	DEPTH TO FOOTING BASE (FT.)	Po ' (KSF)	DELTA P (KSF)	B (FT.)	SIGMA V ' (KSF)	Izp (MAX)
			(VALUES FOR Po' AND SIGMA V ' COMPUTED BELOW)				
9.7	3.7	3.8	0.2625	3.4375	9.7	0.942	0.691

NOTE: STRATA DEPTH START AT GROUND SURFACE AND EXTEND TO D + 4B
ONE STRATA BREAK AT WATER TABLE, USE BOUYANT UNIT WEIGHTS BELOW WATER TABLE

	STRATA DEPTH FROM (FT.)	STRATA DEPTH TO (FT.)	UNIT WEIGHT (KCF)	P ZERO DEPTH (FT.)	P ZERO (KSF)	Izp DEPTH (FT.)	SIGMA V (KSF)
	0	1	0.070	3.75	0.070	13.45	0.070
	1	50	0.070		0.193		0.872

INFLUENCE VALUES & BOUNDARY CONDITIONS:
3.75 FT = D, FIRST LAYER MUST START AT DEPTH D
13.45 FT = D+B, ONE LAYER BOUNDARY MUST OCCUR AT Izp @ D+B
42.55 FT = D+4B, BOTTOM OF LAST LAYER MUST END AT D + 4B

LAYER DEPTH FROM (FT.)	LAYER DEPTH TO (FT.)	LAYER THICKNESS (FT.)	LAYER MID-THICK DEPTH, FT	E (KSF)	Iz	Iz*D/Es
-	-	-	-	-	-	-
3.75	13.45	9.7	8.6	3162	0.446	0.00137
13.45	42.55	29.1	28	3162	0.346	0.00318
SUMMATION, Iz*D/Es =						0.00455

SETTLEMENT COMPUTATION: EQUATIONS:
C1 = 1.0-0.5*(P zero/DELTA P)
C2 = 1.0+0.2*LOG(TIME,YRS/0.1)
S = DELTA P*C1*C2*(SUM(Iz*D/Es)

DELTA P	C1	TIME (YRS)	C2	Iz*D/Es	SETTLEMENT (FT.)	SETTLEMENT (IN.)	½ SETTLEMENT* (IN.)
3.4375	0.96	50	1.54	0.0045	0.0231	**0.28**	**0.14**

* If such pre-loading has occurred (i.e. rock), tentatively use ½ the above predicted settlement as probably still conservative.
(SCHMERTMANN, FHWA-TS-78-209, PGS 49-54)

CLIENT:City Placerville
Placerville Drive Retraining Wall
PROJECT NO.: 18113

STRUCTURE NO.: RW 4 S2

COMPUTED BY: FPT
DATE: 7/27/2025
CHECKED BY: DAK
DATE: 8/22/2025

SETTLEMENT OF STRIP FOOTINGS ON GRANULAR SOILS

(SCHMERTMANN, FHWA-TS-78-209, PGS 49-54)

EQUATIONS: Izp max = 0.5 + 0.1*(DELTA P / SIGMA V')^0.5 ; DELTA P = P - Po'

B, FOOTING WIDTH (FT.)	P, LOAD (KSF)	DEPTH TO FOOTING BASE (FT.)	Po ' (KSF)	DELTA P (KSF)	B (FT.)	SIGMA V ' (KSF)	Izp (MAX)
			(VALUES FOR Po' AND SIGMA V ' COMPUTED BELOW)				
8.4	3.0	3.9	0.273	2.727	8.4	0.861	0.678

NOTE: STRATA DEPTH START AT GROUND SURFACE AND EXTEND TO D + 4B
ONE STRATA BREAK AT WATER TABLE, USE BOUYANT UNIT WEIGHTS BELOW WATER TABLE

STRATA DEPTH FROM (FT.)	STRATA DEPTH TO (FT.)	UNIT WEIGHT (KCF)	P ZERO DEPTH (FT.)	P ZERO (KSF)	Izp DEPTH (FT.)	SIGMA V (KSF)
0	1	0.070	3.9	0.070	12.3	0.070
1	50	0.070		0.203		0.791

INFLUENCE VALUES & BOUNDARY CONDITIONS:
3.9 FT = D, FIRST LAYER MUST START AT DEPTH D
12.3 FT = D+B, ONE LAYER BOUNDARY MUST OCCUR AT Izp @ D+B
37.5 FT = D+4B, BOTTOM OF LAST LAYER MUST END AT D + 4B

LAYER DEPTH FROM (FT.)	LAYER DEPTH TO (FT.)	LAYER THICKNESS (FT.)	LAYER MID-THICK DEPTH, FT	E (KSF)	Iz	Iz*D/Es
-	-	-	-	-	-	-
3.9	12.3	8.4	8.1	3162	0.439	0.00117
12.3	37.5	25.2	24.9	3162	0.339	0.00270
SUMMATION, Iz*D/Es =						0.00387

SETTLEMENT COMPUTATION:

EQUATIONS:
C1 = 1.0-0.5*(P zero/DELTA P)
C2 = 1.0+0.2*LOG(TIME,YRS/0.1)
S = DELTA P*C1*C2*(SUM(Iz*D/Es)

DELTA P	C1	TIME (YRS)	C2	Iz*D/Es	SETTLEMENT (FT.)	SETTLEMENT (IN.)	½ SETTLEMENT* (IN.)
2.727	0.95	50	1.54	0.0039	0.0154	**0.19**	**0.09**

* If such pre-loading has occurred (i.e. rock), tentatively use ½ the above predicted settlement as probably still conservative.
(SCHMERTMANN, FHWA-TS-78-209, PGS 49-54)

CLIENT:City Placerville
Placerville Drive Retraining Wall
PROJECT NO.: 18113

STRUCTURE NO.: RW 4 S3

COMPUTED BY: FPT
DATE: 7/27/2025
CHECKED BY: DAK
DATE: 8/22/2025

SETTLEMENT OF STRIP FOOTINGS ON GRANULAR SOILS

(SCHMERTMANN, FHWA-TS-78-209, PGS 49-54)

EQUATIONS: Izp max = 0.5 + 0.1*(DELTA P / SIGMA V')^0.5 ; DELTA P = P - Po'

B, FOOTING WIDTH (FT.)	P, LOAD (KSF)	DEPTH TO FOOTING BASE (FT.)	Po ' (KSF)	DELTA P (KSF)	B (FT.)	SIGMA V ' (KSF)	Izp (MAX)
			(VALUES FOR Po' AND SIGMA V ' COMPUTED BELOW)				
7.1	2.5	3.8	0.266	2.234	7.1	0.763	0.671

NOTE: STRATA DEPTH START AT GROUND SURFACE AND EXTEND TO D + 4B
ONE STRATA BREAK AT WATER TABLE, USE BOUYANT UNIT WEIGHTS BELOW WATER TABLE

	STRATA DEPTH FROM (FT.)	STRATA DEPTH TO (FT.)	UNIT WEIGHT (KCF)	P ZERO DEPTH (FT.)	P ZERO (KSF)	Izp DEPTH (FT.)	SIGMA V (KSF)
	0	1	0.070	3.8	0.070	10.9	0.070
	1	50	0.070		0.196		0.693

INFLUENCE VALUES & BOUNDARY CONDITIONS:
3.8 FT = D, FIRST LAYER MUST START AT DEPTH D
10.9 FT = D+B, ONE LAYER BOUNDARY MUST OCCUR AT Izp @ D+B
32.2 FT = D+4B, BOTTOM OF LAST LAYER MUST END AT D + 4B

LAYER DEPTH FROM (FT.)	LAYER DEPTH TO (FT.)	LAYER THICKNESS (FT.)	LAYER MID-THICK DEPTH, FT	E (KSF)	Iz	Iz*D/Es
-	-	-	-	-	-	-
3.8	10.9	7.1	7.35	3162	0.436	0.00098
10.9	32.2	21.3	21.55	3162	0.336	0.00226
SUMMATION, Iz*D/Es =						0.00324

SETTLEMENT COMPUTATION:

EQUATIONS:
C1 = 1.0-0.5*(P zero/DELTA P)
C2 = 1.0+0.2*LOG(TIME,YRS/0.1)
S = DELTA P*C1*C2*(SUM(Iz*D/Es)

DELTA P	C1	TIME (YRS)	C2	Iz*D/Es	SETTLEMENT (FT.)	SETTLEMENT (IN.)	½ SETTLEMENT* (IN.)
2.234	0.94	50	1.54	0.0032	0.0105	**0.13**	**0.06**

* If such pre-loading has occurred (i.e. rock), tentatively use ½ the above predicted settlement as probably still conservative.
(SCHMERTMANN, FHWA-TS-78-209, PGS 49-54)

CLIENT:City Placerville
Placerville Drive Retraining Wall
PROJECT NO.: 18113

STRUCTURE NO.: RW 4 S4

COMPUTED BY: FPT
DATE: 7/27/2025
CHECKED BY: DAK
DATE: 8/22/2025

SETTLEMENT OF STRIP FOOTINGS ON GRANULAR SOILS

(SCHMERTMANN, FHWA-TS-78-209, PGS 49-54)

EQUATIONS: Izp max = 0.5 + 0.1*(DELTA P / SIGMA V')^0.5 ; DELTA P = P - Po'

B, FOOTING WIDTH (FT.)	P, LOAD (KSF)	DEPTH TO FOOTING BASE (FT.)	Po ' (KSF)	DELTA P (KSF)	B (FT.)	SIGMA V ' (KSF)	Izp (MAX)
			(VALUES FOR Po' AND SIGMA V ' COMPUTED BELOW)				
7	2.2	3.8	0.266	1.934	7	0.756	0.660

NOTE: STRATA DEPTH START AT GROUND SURFACE AND EXTEND TO D + 4B
ONE STRATA BREAK AT WATER TABLE, USE BOUYANT UNIT WEIGHTS BELOW WATER TABLE

	STRATA DEPTH		UNIT	P ZERO	P ZERO	Izp	SIGMA V
	FROM	TO	WEIGHT	DEPTH		DEPTH	
	(FT.)	(FT.)	(KCF)	(FT.)	(KSF)	(FT.)	(KSF)
	0	1	0.070	3.8	0.070	10.8	0.070
	1	50	0.070		0.196		0.686

INFLUENCE VALUES & BOUNDARY CONDITIONS:
3.8 FT = D, FIRST LAYER MUST START AT DEPTH D
10.8 FT = D+B, ONE LAYER BOUNDARY MUST OCCUR AT Izp @ D+B
31.8 FT = D+4B, BOTTOM OF LAST LAYER MUST END AT D + 4B

LAYER DEPTH		LAYER	LAYER	E	Iz	Iz*D/Es
FROM	TO	THICKNESS	MID-THICK			
(FT.)	(FT.)	(FT.)	DEPTH, FT	(KSF)		
-	-	-	-	-	-	-
3.8	10.8	7	7.3	3162	0.430	0.00095
10.8	31.8	21	21.3	3162	0.330	0.00219
SUMMATION, Iz*D/Es =						0.00314

SETTLEMENT COMPUTATION: **EQUATIONS:**

C1 = 1.0-0.5*(P zero/DELTA P)
C2 = 1.0+0.2*LOG(TIME,YRS/0.1)
S = DELTA P*C1*C2*(SUM(Iz*D/Es)

DELTA P	C1	TIME (YRS)	C2	Iz*D/Es	SETTLEMENT (FT.)	SETTLEMENT (IN.)	½ SETTLEMENT* (IN.)
1.934	0.93	50	1.54	0.0031	0.0087	**0.10**	**0.05**

* If such pre-loading has occurred (i.e. rock), tentatively use ½ the above predicted settlement as probably still conservative.
(SCHMERTMANN, FHWA-TS-78-209, PGS 49-54)

CLIENT:City Placerville
Placerville Drive Retraining Wall
PROJECT NO.: 18113

STRUCTURE NO.: RW 5 S4

COMPUTED BY: FPT
DATE: 7/27/2025
CHECKED BY: DAK
DATE: 8/22/2025

SETTLEMENT OF STRIP FOOTINGS ON GRANULAR SOILS

(SCHMERTMANN, FHWA-TS-78-209, PGS 49-54)

EQUATIONS: Izp max = 0.5 + 0.1*(DELTA P / SIGMA V')^0.5 ; DELTA P = P - Po'

B, FOOTING WIDTH (FT.)	P, LOAD (KSF)	DEPTH TO FOOTING BASE (FT.)	Po ' (KSF)	DELTA P (KSF)	B (FT.)	SIGMA V ' (KSF)	Izp (MAX)
			(VALUES FOR Po' AND SIGMA V ' COMPUTED BELOW)				
6.5	0.8	2.0	0.25	0.55	6.5	1.063	0.572

NOTE: STRATA DEPTH START AT GROUND SURFACE AND EXTEND TO D + 4B
ONE STRATA BREAK AT WATER TABLE, USE BOUYANT UNIT WEIGHTS BELOW WATER TABLE

	STRATA DEPTH		UNIT	P ZERO	P ZERO	Izp	SIGMA V
	FROM	TO	WEIGHT	DEPTH		DEPTH	
	(FT.)	(FT.)	(KCF)	(FT.)	(KSF)	(FT.)	(KSF)
	0	9	0.125	2	0.250	8.5	1.063
	9	50	0.070		0.000		0.000

INFLUENCE VALUES & BOUNDARY CONDITIONS:
2 FT = D, FIRST LAYER MUST START AT DEPTH D
8.5 FT = D+B, ONE LAYER BOUNDARY MUST OCCUR AT Izp @ D+B
28 FT = D+4B, BOTTOM OF LAST LAYER MUST END AT D + 4B

LAYER DEPTH		LAYER	LAYER	E	Iz	Iz*D/Es
FROM	TO	THICKNESS	MID-THICK			
(FT.)	(FT.)	(FT.)	DEPTH, FT	(KSF)		
-	-	-	-	-	-	-
2	8.5	6.5	5.25	3162	0.386	0.00079
8.5	28	19.5	18.25	3162	0.286	0.00176
SUMMATION, Iz*D/Es =						0.00256

SETTLEMENT COMPUTATION: EQUATIONS:
C1 = 1.0-0.5*(P zero/DELTA P)
C2 = 1.0+0.2*LOG(TIME,YRS/0.1)
S = DELTA P*C1*C2*(SUM(Iz*D/Es)

DELTA P	C1	TIME (YRS)	C2	Iz*D/Es	SETTLEMENT (FT.)	SETTLEMENT (IN.)	½ SETTLEMENT* (IN.)
0.55	0.77	50	1.54	0.0026	0.0017	**0.02**	**0.01**

* If such pre-loading has occurred (i.e. rock), tentatively use ½ the above predicted settlement as probably still conservative.
(SCHMERTMANN, FHWA-TS-78-209, PGS 49-54)

CLIENT:City Placerville
Placerville Drive Retraining Wall
PROJECT NO.: 18113

STRUCTURE NO.: RW 5 S3

COMPUTED BY: FPT
DATE: 7/27/2025
CHECKED BY: DAK
DATE: 8/22/2025

SETTLEMENT OF STRIP FOOTINGS ON GRANULAR SOILS

(SCHMERTMANN, FHWA-TS-78-209, PGS 49-54)

EQUATIONS: Izp max = 0.5 + 0.1*(DELTA P / SIGMA V')^0.5 ; DELTA P = P - Po'

B, FOOTING WIDTH (FT.)	P, LOAD (KSF)	DEPTH TO FOOTING BASE (FT.)	Po ' (KSF)	DELTA P (KSF)	B (FT.)	SIGMA V ' (KSF)	Izp (MAX)
			(VALUES FOR Po' AND SIGMA V ' COMPUTED BELOW)				
5.4	1.4	2.0	0.25	1.15	5.4	0.793	0.620

NOTE: STRATA DEPTH START AT GROUND SURFACE AND EXTEND TO D + 4B
ONE STRATA BREAK AT WATER TABLE, USE BOUYANT UNIT WEIGHTS BELOW WATER TABLE

STRATA DEPTH FROM (FT.)	STRATA DEPTH TO (FT.)	UNIT WEIGHT (KCF)	P ZERO DEPTH (FT.)	P ZERO (KSF)	Izp DEPTH (FT.)	SIGMA V (KSF)
0	5	0.125	2	0.250	7.4	0.625
5	50	0.070		0.000		0.168

INFLUENCE VALUES & BOUNDARY CONDITIONS:
2 FT = D, FIRST LAYER MUST START AT DEPTH D
7.4 FT = D+B, ONE LAYER BOUNDARY MUST OCCUR AT Izp @ D+B
23.6 FT = D+4B, BOTTOM OF LAST LAYER MUST END AT D + 4B

LAYER DEPTH FROM (FT.)	LAYER DEPTH TO (FT.)	LAYER THICKNESS (FT.)	LAYER MID-THICK DEPTH, FT	E (KSF)	Iz	Iz*D/Es
2	7.4	5.4	4.7	3162	0.410	0.00070
7.4	23.6	16.2	15.5	3162	0.310	0.00159
SUMMATION, Iz*D/Es =						0.00229

SETTLEMENT COMPUTATION: EQUATIONS:
C1 = 1.0-0.5*(P zero/DELTA P)
C2 = 1.0+0.2*LOG(TIME,YRS/0.1)
S = DELTA P*C1*C2*(SUM(Iz*D/Es)

DELTA P	C1	TIME (YRS)	C2	Iz*D/Es	SETTLEMENT (FT.)	SETTLEMENT (IN.)	½ SETTLEMENT* (IN.)
1.15	0.89	50	1.54	0.0023	0.0036	**0.04**	**0.02**

* If such pre-loading has occurred (i.e. rock), tentatively use ½ the above predicted settlement as probably still conservative.
(SCHMERTMANN, FHWA-TS-78-209, PGS 49-54)

CLIENT:City Placerville
Placerville Drive Retraining Wall
PROJECT NO.: 18113

STRUCTURE NO.: RW 5 S2

COMPUTED BY: FPT
DATE: 7/27/2025
CHECKED BY: DAK
DATE: 8/22/2025

SETTLEMENT OF STRIP FOOTINGS ON GRANULAR SOILS

(SCHMERTMANN, FHWA-TS-78-209, PGS 49-54)

EQUATIONS: Izp max = 0.5 + 0.1*(DELTA P / SIGMA V')^0.5 ; DELTA P = P - Po'

B, FOOTING WIDTH (FT.)	P, LOAD (KSF)	DEPTH TO FOOTING BASE (FT.)	Po ' (KSF)	DELTA P (KSF)	B (FT.)	SIGMA V ' (KSF)	Izp (MAX)
			(VALUES FOR Po' AND SIGMA V ' COMPUTED BELOW)				
6.2	2.1	3.0	0.265	1.835	6.2	0.699	0.662

NOTE: STRATA DEPTH START AT GROUND SURFACE AND EXTEND TO D + 4B
ONE STRATA BREAK AT WATER TABLE, USE BOUYANT UNIT WEIGHTS BELOW WATER TABLE

STRATA DEPTH FROM (FT.)	STRATA DEPTH TO (FT.)	UNIT WEIGHT (KCF)	P ZERO DEPTH (FT.)	P ZERO (KSF)	Izp DEPTH (FT.)	SIGMA V (KSF)
0	1	0.125	3	0.125	9.2	0.125
1	50	0.070		0.140		0.574

INFLUENCE VALUES & BOUNDARY CONDITIONS:
3 FT = D, FIRST LAYER MUST START AT DEPTH D
9.2 FT = D+B, ONE LAYER BOUNDARY MUST OCCUR AT Izp @ D+B
27.8 FT = D+4B, BOTTOM OF LAST LAYER MUST END AT D + 4B

LAYER DEPTH FROM (FT.)	LAYER DEPTH TO (FT.)	LAYER THICKNESS (FT.)	LAYER MID-THICK DEPTH, FT	E (KSF)	Iz	Iz*D/Es
-	-	-	-	-	-	-
3	9.2	6.2	6.1	3162	0.431	0.00085
9.2	27.8	18.6	18.5	3162	0.331	0.00195
SUMMATION, Iz*D/Es =						0.00279

SETTLEMENT COMPUTATION:

EQUATIONS:
C1 = 1.0-0.5*(P zero/DELTA P)
C2 = 1.0+0.2*LOG(TIME,YRS/0.1)
S = DELTA P*C1*C2*(SUM(Iz*D/Es)

DELTA P	C1	TIME (YRS)	C2	Iz*D/Es	SETTLEMENT (FT.)	SETTLEMENT (IN.)	½ SETTLEMENT* (IN.)
1.835	0.93	50	1.54	0.0028	0.0073	**0.09**	**0.04**

* If such pre-loading has occurred (i.e. rock), tentatively use ½ the above predicted settlement as probably still conservative.
(SCHMERTMANN, FHWA-TS-78-209, PGS 49-54)

CLIENT:City Placerville
Placerville Drive Retraining Wall
PROJECT NO.: 18113

STRUCTURE NO.: RW 5 S1

COMPUTED BY: FPT
DATE:
CHECKED BY: DAK
DATE: 8/22/2025

SETTLEMENT OF STRIP FOOTINGS ON GRANULAR SOILS

(SCHMERTMANN, FHWA-TS-78-209, PGS 49-54)

EQUATIONS: Izp max = 0.5 + 0.1*(DELTA P / SIGMA V')^0.5 ; DELTA P = P - Po'

B, FOOTING WIDTH (FT.)	P, LOAD (KSF)	DEPTH TO FOOTING BASE (FT.)	Po ' (KSF)	DELTA P (KSF)	B (FT.)	SIGMA V ' (KSF)	Izp (MAX)
			(VALUES FOR Po' AND SIGMA V ' COMPUTED BELOW)				
7.1	2.5	3.8	0.266	2.234	7.1	0.763	0.671

NOTE: STRATA DEPTH START AT GROUND SURFACE AND EXTEND TO D + 4B
ONE STRATA BREAK AT WATER TABLE, USE BOUYANT UNIT WEIGHTS BELOW WATER TABLE

	STRATA DEPTH FROM (FT.)	STRATA DEPTH TO (FT.)	UNIT WEIGHT (KCF)	P ZERO DEPTH (FT.)	P ZERO (KSF)	Izp DEPTH (FT.)	SIGMA V (KSF)
	0	1	0.070	3.8	0.070	10.9	0.070
	1	50	0.070		0.196		0.693

INFLUENCE VALUES & BOUNDARY CONDITIONS:
3.8 FT = D, FIRST LAYER MUST START AT DEPTH D
10.9 FT = D+B, ONE LAYER BOUNDARY MUST OCCUR AT Izp @ D+B
32.2 FT = D+4B, BOTTOM OF LAST LAYER MUST END AT D + 4B

LAYER DEPTH FROM (FT.)	LAYER DEPTH TO (FT.)	LAYER THICKNESS (FT.)	LAYER MID-THICK DEPTH, FT	E (KSF)	Iz	Iz*D/Es
-	-	-	-	-	-	-
3.8	9.2	5.4	6.5	3162	0.379	0.00065
9.2	27.8	18.6	18.5	3162	0.432	0.00254
SUMMATION, Iz*D/Es =						0.00319

SETTLEMENT COMPUTATION: EQUATIONS:
C1 = 1.0-0.5*(P zero/DELTA P)
C2 = 1.0+0.2*LOG(TIME,YRS/0.1)
S = DELTA P*C1*C2*(SUM(Iz*D/Es)

DELTA P	C1	TIME (YRS)	C2	Iz*D/Es	SETTLEMENT (FT.)	SETTLEMENT (IN.)	½ SETTLEMENT* (IN.)
2.234	0.94	50	1.54	0.0032	0.0103	**0.12**	**0.06**

* If such pre-loading has occurred (i.e. rock), tentatively use ½ the above predicted settlement as probably still conservative.
(SCHMERTMANN, FHWA-TS-78-209, PGS 49-54)

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                      SHAFT for Windows, Version 2023.9.01

                       Serial Number :  226375637

                    VERTICALLY LOADED DRILLED SHAFT ANALYSIS
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     ==========================================================================


     Path to file locations      : Y:\Projects\Y2018\P18113 Placerville Dr Bridge
Replace\Calculations\Geotech\CIDH\
     Name of input data file     : Bent 2 and 3 24 in CIDH strength gravel March
2024.sf9d
     Name of output file         : Bent 2 and 3 24 in CIDH strength gravel March
2024.sf9o
     Name of plot output file    : Bent 2 and 3 24 in CIDH strength gravel March
2024.sf9p
     Name of runtime file        : Bent 2 and 3 24 in CIDH strength gravel March
2024.sf9r


     ---------------------------------------------------------------------------
                          Time and Date of Analysis
     ---------------------------------------------------------------------------

               Date:  March 06, 2024     Time:  15:36:22

     Bents 2 & 3 LRFD 24" CIDH cut off el. 1664.0


     PROPOSED DEPTH =      20.0 FT
     ----------------


     NUMBER OF LAYERS =    1
     ------------------


     WATER TABLE DEPTH =       0.0 FT.
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     SOIL INFORMATION
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```

LAYER NO 1----DECOMPOSED ROCK

AT THE TOP

ELASTIC MODULUS OF GRAVEL, LB/SQ IN	= 0.000E+00
POISSION RATIO OF GRAVEL	= 2.000E-01
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 7.000E+01
SOIL UNIT WEIGHT, LB/CU FT	= 1.300E+02
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 1.000E+10
DEPTH, FT	= 0.000E+00

AT THE BOTTOM

ELASTIC MODULUS OF GRAVEL, LB/SQ IN	= 0.000E+00
POISSION RATIO OF GRAVEL	= 2.000E-01
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 7.000E+01
SOIL UNIT WEIGHT, LB/CU FT	= 1.300E+02
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 1.000E+10
DEPTH, FT	= 3.000E+01

LRFD RESISTANCE FACTOR (SIDE FRICTION)	= 7.000E-01
LRFD RESISTANCE FACTOR (TIP RESISTANCE)	= 1.000E-04

INPUT DRILLED SHAFT INFORMATION

MINIMUM SHAFT DIAMETER	= 2.000	FT.
MAXIMUM SHAFT DIAMETER	= 2.000	FT.
RATIO BASE/SHAFT DIAMETER	= 0.000	FT.
ANGLE OF BELL	= 0.000	DEG.
IGNORED TOP PORTION	= 5.000	FT.
IGNORED BOTTOM PORTION	= 0.000	FT.
ELASTIC MODULUS, Ec	= 3.600E+06	LB/SQ IN

COMPUTATION RESULTS

- CASE ANALYZED : 1
  VARIATION LENGTH : 1
  VARIATION DIAMETER : 1

DRILLED SHAFT INFORMATION

 DIAMETER OF STEM = 2.000 FT.
 DIAMETER OF BASE = 2.000 FT.
 END OF STEM TO BASE = 0.000 FT.
 ANGLE OF BELL = 0.000 DEG.
 IGNORED TOP PORTION = 5.000 FT.
 IGNORED BOTTOM PORTION = 0.000 FT.
 AREA OF ONE PERCENT STEEL = 4.524 SQ.IN.
 ELASTIC MODULUS, Ec = 3.600E+06 LB/SQ IN
 VOLUME OF UNDERREAM = 0.000 CU.YDS.
 SHAFT LENGTH = 20.000 FT.

PREDICTED RESULTS

QS = ULTIMATE SIDE RESISTANCE;
QB = ULTIMATE BASE RESISTANCE;
WT = WEIGHT OF DRILLED SHAFT (UPLIFT CAPACITY ONLY);
QU = TOTAL ULTIMATE RESISTANCE;
LRFD QS = TOTAL SIDE FRICTION USING LRFD RESISTANCE FACTOR
TO THE ULTIMATE SIDE RESISTANCE;
LRFD QB = TOTAL BASE BEARING USING LRFD RESISTANCE FACTOR
TO THE ULTIMATE BASE RESISTANCE
LRFD QU = TOTAL CAPACITY WITH LRFD RESISTANCE FACTOR.

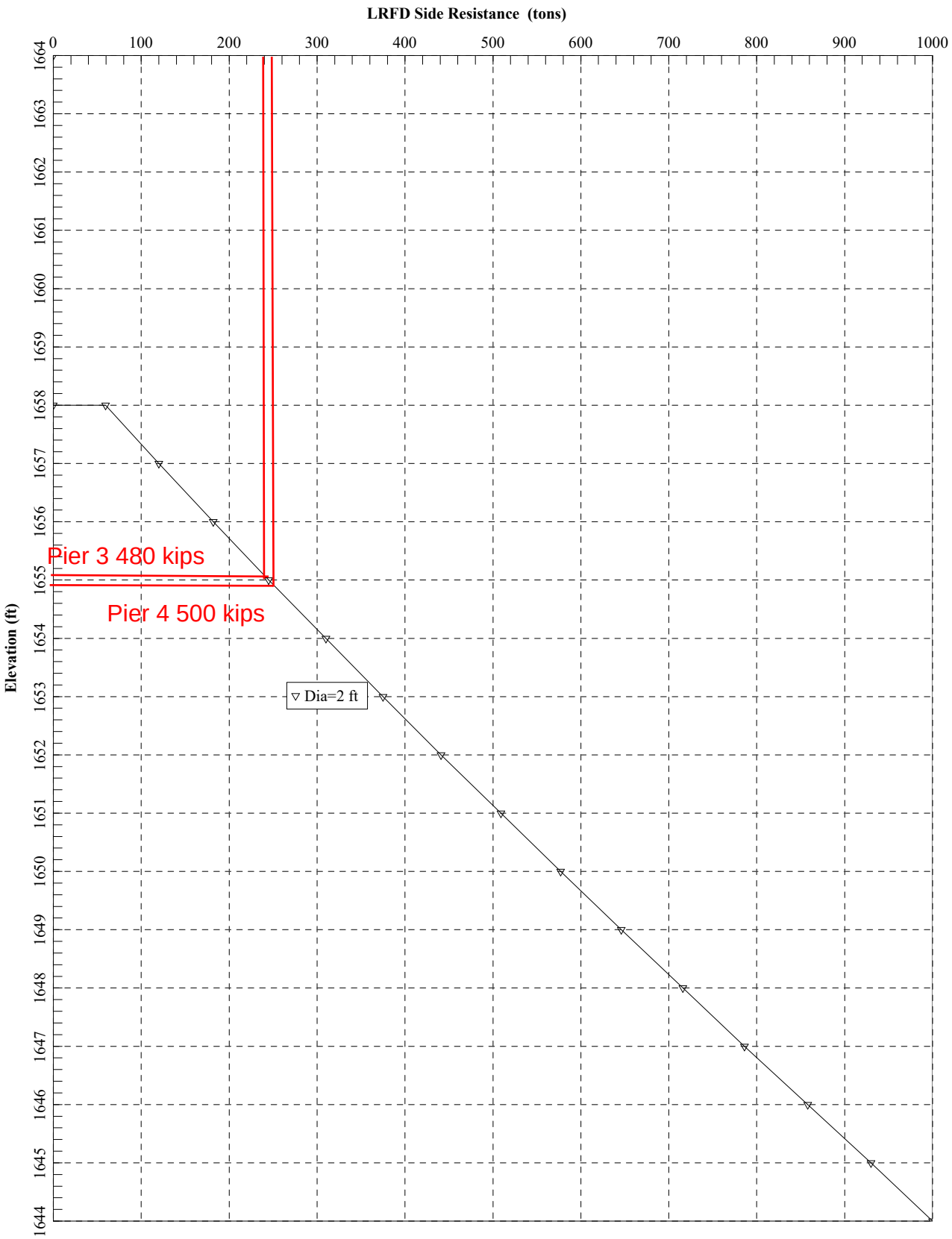
LENGTH (FT)	VOLUME (CU.YDS)	QS (TONS)	QB (TONS)	QU (TONS)	LRFD QS (TONS)	LRFD QB (TONS)	LRFD QU (TONS)
6.0	0.70	84.85	6796.83	6881.68	59.39	0.68	60.07
7.0	0.81	171.68	6959.14	7130.81	120.17	0.70	120.87
8.0	0.93	260.32	7111.20	7371.51	182.22	0.71	182.93
9.0	1.05	350.63	7254.69	7605.32	245.44	0.73	246.17
10.0	1.16	442.51	7390.89	7833.39	309.75	0.74	310.49
11.0	1.28	535.85	7520.81	8056.66	375.10	0.75	375.85
12.0	1.40	630.59	7645.27	8275.86	441.41	0.76	442.18
13.0	1.51	726.66	7764.93	8491.59	508.66	0.78	509.44
14.0	1.63	824.01	7880.35	8704.35	576.80	0.79	577.59
15.0	1.75	922.57	7991.97	8914.54	645.80	0.80	646.60
16.0	1.86	1022.32	8100.20	9122.52	715.62	0.81	716.43
17.0	1.98	1123.21	8205.36	9328.57	786.24	0.82	787.07
18.0	2.09	1225.20	8307.74	9532.94	857.64	0.83	858.47

19.0	2.21	1328.26	8407.59	9735.86	929.79	0.84	930.63
20.0	2.33	1432.38	8505.13	9937.50	1002.66	0.85	1003.51

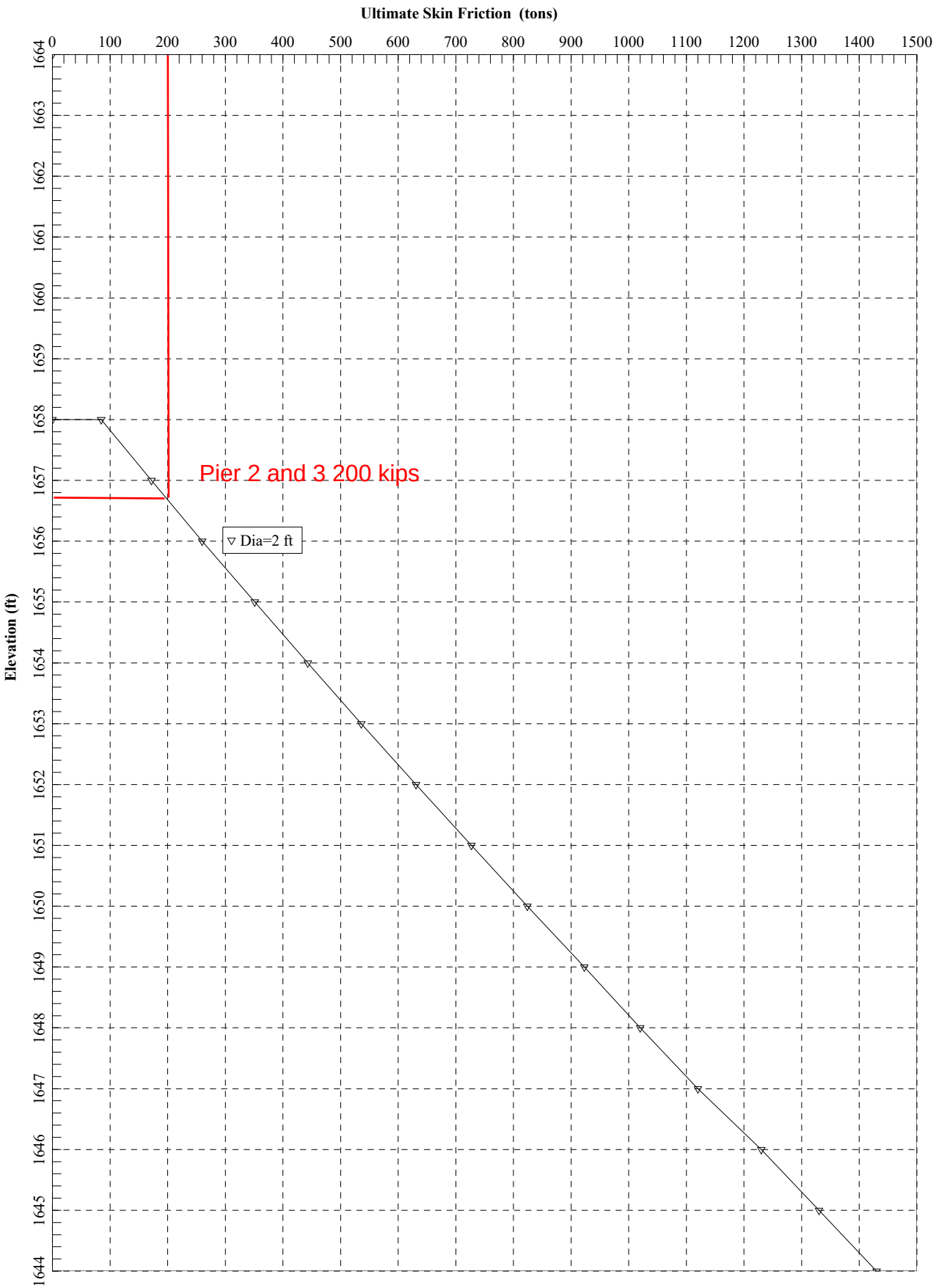
AXIAL LOAD VS SETTLEMENT CURVES

LOAD SETTLEMENT RELATIONSHIP

TOP LOAD TONS	TOP MOVEMENT IN.
1.5599E+02	1.6977E-02
3.1197E+02	3.3953E-02
4.6796E+02	5.0930E-02
6.2395E+02	6.7907E-02
7.7993E+02	8.4883E-02
9.3592E+02	1.0186E-01
1.0919E+03	1.1884E-01
1.2479E+03	1.3581E-01
1.4039E+03	1.5279E-01
1.5599E+03	1.6977E-01
3.8092E+03	3.1599E+00
6.0586E+03	6.1501E+00
8.3079E+03	9.1402E+00
1.0557E+04	1.2130E+01
1.0557E+04	1.4556E+01



Piles 2 and 3 24 in socket top elev. 1664.0


Ultimate Skin Friction (tons)
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
Elevation (ft)
1664
1663
1662
1661
1660
1659
1658
1657
1656
1655
1654
1653
1652
1651
1650
1649
1648
1647
1646
1645
1644
Pier 2 and 3 200 kips
▽ Dia=2 ft