Earth Mechanics, Inc.
Geotechnical & Earthquake Engineering

TECHNICAL MEMORANDUM

EMI PROJECT NO: 10-113

DATE: July 1, 2010

PREPARED FOR: Vinh Trinh / WKE, Inc.

PREPARED BY: S. "Raja" Pirathiviraj and Andrew Lee / Earth Mechanics, Inc. (EMI)

SUBJECT: **EB Bypass Connector (New), Bridge No. 53-XXXX**
Structure Preliminary Geotechnical Report (SPGR) for Advanced Planning Study
07-LA-60, PM R25.56
EA 07-279100

Introduction

This memorandum has been prepared to provide the necessary geotechnical information to assist the structural designers in the Advance Planning Study (APS) process for the new Eastbound (EB) Bypass Connector of the SR-57/SR-60 Confluence project. The content of this memorandum follows Caltrans Foundation Report Preparation for Bridge Foundations (Caltrans, 2009b). It includes preliminary geotechnical, seismic, and foundation recommendations for the subject structure. The recommendations provided in this memorandum are based on subsurface information contained on Log-of-Test-Borings (LOTB) sheets of the nearby structures, including Prospectors Road Undercrossing (UC) (Bridge No. 53-1873), E60-N57 Connector Overcrossing (Bridge No. 53-1873G), E60-N57 Connector UC (Bridge No. 1905), and Diamond Bar Blvd UC (Bridge No. 53-1899). An additional site-specific geotechnical investigation will be performed for this structure during the PS&E phase; therefore, the following recommendations may change when additional site-specific information becomes available.

Project Description

The new EB Bypass Connector is proposed at the northeastern end of the State Route (SR) SR-57/SR-60 Confluence in the City of Diamond Bar. The SR-57/SR-60 Confluence is a section of freeway where the SR-57 and SR-60 mainlines meet and co-exist as one mainline. SR-57 is a major north-south freeway that originates in central Orange County and extends northerly to the boundaries of the Cities of Pomona and San Dimas in Los Angeles County. SR-60 serves as a major east-west freeway that originates in the Los Angeles metropolitan area and extends through Los Angeles County into Riverside County.

The connector starts at the northbound (NB) SR-57 and EB SR-60 confluence, going over Prospectors Road, EB SR-60 on-ramp to Diamond Bar Blvd, and Diamond Bar Blvd before connecting with EB SR-60. The connector is approximately 2,500 feet long. A Site Location Map is presented in Figure 1.

Site Geology

The site is located in the northern part of the Puente Hills, a northwesterly trending range of low-elevation, rounded hills at the northern edge of the Peninsular Ranges. The site is in valley of Diamond Bar Creek between the Los Angeles basin to the west and the Upper Santa Ana River Valley on the east, and the San Gabriel Valley and Mountains on the north. Diamond Bar Valley is a small narrow valley with a flat floor ranging from about 550 feet on the west to 700 feet in elevation in the northeast. The valley is bounded by a ridge on the north that rises to about 800 feet elevation, and hills on the south that rise to about 1000 feet before descending into Tonner Canyon on the south. The project facilities are basically on the valley floor and the creek bed along the north side of the valley.

The valley floor is underlain by late- to middle-Holocene-age stream channel, alluvial basin, and alluvial fan sediments (Division of Mines and Geology, 1998; Morton and Miller, 2003). These young deposits are about 45 to 50 feet thick and overlie Miocene-age (~15 million years old) rocks of the Puente Formation.

The Puente formation consists of siltstone, sandstone, and conglomerate. Depending largely on the relative amounts of these sedimentary rock types, the unit is divided into members called the Sycamore Canyon, Yorba, Soquel, and La Vida members. The slopes of the adjacent ridge just north of the site are predominantly Yorba and Soquel members and the slopes on the south are predominantly La Vida member. In the site area, these members are predominantly siltstone and sandstone that range from soft to very hard rocks where cemented by calcium carbonate.

Geologic Hazards

Landsliding. The Puente Formation typically has abundant landslides (Tan, 1998; Morton and Miller, 2003), generally a result of low-angle, out-of-slope bedding orientation. The seismic hazard map of the San Dimas quadrangle (Division of Mines and Geology, 1998) does not identify the site as having a potential for landsliding during an earthquake. However, the materials at the site underlain by late- to middle-Holocene-age stream channel, alluvial basin, and alluvial fan sediments which may be susceptible to running or caving in temporary excavations.

Flooding. There are three dams located in the surroundings of the project area; Puddingstone dam is located about 8.5 miles to the north, Santa Fe Basin is located about 11 miles to the northwest, and Whittier Narrows Dam is located about 15 miles to the west. However, the Los Angeles County General Plan (1990) indicates that the site is not located within a potential inundation area from an earthquake-induced failure; therefore, the potential for flooding due to earthquake-induced dam failure is very low.

Ground Rupture. The valley of Diamond Bar Creek may be controlled by a fault under the axis of the valley (Tan, 1998; Morton and Miller, 2003). The northeast-southwest linearity of the valley may be due to erosion along the fractured rocks along the fault. However, this fault is only inferred and not exposed. If there is a fault, it is not known to be active. No Alquist-Priolo Earthquake Fault Zones requiring special studies are designated by the California Geological Survey (formerly the Division of Mines and Geology). Therefore, the risk for ground surface rupture is low. Potential for lateral spreading at the bridge site is very low.

Other seismic hazards such as ground motion considerations, soil liquefaction, and seismically induced ground subsidence and slope stability will be addressed in later sections.

Subsurface Conditions

According to the attached As-Built LOTB sheets of the near by structures (Attachments 1 through 4),

- Three rotary-wash borings and one penetrometer boring were performed in July 1965 for the Route 60/57 Separation (North) (Bridge No. 53-1905). This structure has been renamed as E60-N57 Connector UC (Bridge No. 53-1905),
- Four rotary-wash borings were performed in July 1965 for the Prospectors Road UC (Bridge No. 53-1873),
- Two rotary-wash borings were performed in July 1965 for the Prospectors Road UC (Bridge No. 53-1873Q/R). This structure has been renamed as E60-N57 Connector OC (Bridge No. 53-1873G), and
- Four rotary-wash borings and one penetration boring were performed in July 1965 for the Diamond Bar Blvd UC (Bridge No. 53-1899).

The deepest boring was advanced to about elevation +630 feet. Existing grades at the borehole locations at the time of the investigation were approximately between elevations +709 and +720 feet. Meanwhile, the existing ground line along NB SR-57, and along SR-60 varies approximately between elevations +710 feet and +730 feet.

The subsurface condition in the surrounding area of the EB Bypass Connector is predominantly medium dense to dense granular materials underlain by interbedded shale and sandstone bedrock. In general, the bedrock contact along SR-60 dips down from west to east and south to north. Bedrock contact along the vicinity of the proposed EB Bypass Connector varies approximately from elevation +684 feet near Prospectors Road to elevation +648 feet near Diamond Bar Blvd.

Groundwater was encountered in the as-built borings between elevations +678 and +682 feet. Based on California Geological Survey (1998), the recorded highest historical ground water at the project site is between 15 and 20 feet below the ground surface. The average ground surface elevation in the surrounding area is about +715 feet. Therefore, a conservative historical high groundwater elevation of +700 feet could be used as the design groundwater table.

Preliminary Seismic Recommendations

To develop preliminary ARS curves in accordance with the 2009 Seismic Design Criteria (SDC) (Caltrans, 2009c and 2009d) procedures, we considered the following response spectra:

- Deterministic Criteria based on late-Quaternary faults in 2007 fault database (Caltrans, 2007a and 2007b; Shantz and Merriam, 2009);
- Probabilistic Criteria based on 5% in 50 years probability of exceedance ground motion; and
- Minimum Deterministic Spectrum based on a Mw= 6.5 strike-slip event occurring at a distance of 7.5 miles (12 km) from the site.

We used the Caltrans Deterministic Response Spectrum Spreadsheet as recommended by the 2009 SDC to develop the deterministic ARS curves. The spreadsheet uses the arithmetic average of two Next Generation Attenuation (NGA) relationships developed by Chiou-Youngs (2008) and Campbell-Bozorgnia (2008) with user-provided input parameters, including fault characteristics, site-to-fault distances and site condition parameters as presented in table below.

Controlling Fault	Fault ID	Maximum Moment Magnitude M_{max}	Site to Fault Distance R_{RUP} (miles)	Style of Fault	Fault Dip /Direction
Puente Hills Blind Thrust	240	7.3	8.5	Reverse	25° / North
Elsinore Fault Zone (Whittier Section)	241	7.6	10.0	Reverse Lateral Strike Slip	75° / Northeast

The parameter of small-strain shear wave velocity (V_S^{30}) for the upper 100 feet of subsurface materials is correlated based on the SPT blowcounts presented in the as-built LOTB sheets. The calculated V_S^{30} for this bridge site is 1,083 feet/sec. This will be updated during the PS&E phase after completion of our site-specific field investigation program.

Results obtained from the spreadsheet were then verified with the Caltrans online web tool (Caltrans, 2009a). The spreadsheet method is recommended because the online web tool, though more user-friendly, does not include updates since 2007 in its calculation database and presently is not approved to develop spectra for final design.

The probabilistic response spectrum is based on data from the 2008 United States Geological Survey (USGS, 2008a) National Seismic Hazard Map for the 5% in 50 years probability of exceedance (975-year return period) ground motion. To develop the probabilistic spectrum, the Caltrans Probabilistic Response Spectrum Spreadsheet and the USGS Interactive Deaggregation Tool (USGS, 2008b) were used. Results obtained from both the spreadsheet and deaggregation tool were then verified with the Caltrans online web tool. Again, the spreadsheet and deaggregation tool are recommended because the online web tool, though more user-friendly, does not include updates since 2007 in its calculation database.

The preliminary design ARS curve is the envelope of the above spectra. The resulting preliminary design ARS curve and the digitized coordinates are presented in Figure 2. A peak ground acceleration (PGA) of 0.59g is obtained from the preliminary design ARS curve. The design ARS curve will be updated during the PS&E phase.

Liquefaction Evaluation

Using the design groundwater elevation of +700 feet, loose to medium dense granular materials below this groundwater elevation are susceptible to liquefaction. This finding will be confirmed during the PS&E phase using site-specific soil boring data.

Seismic Settlement

Since the liquefaction potential is high at the bridge site, seismic settlement of onsite soils is anticipated. This seismic settlement may generate downdrag forces on the proposed pile foundations. Once the site-specific borings are drilled during PS&E phase, we will evaluate seismic settlement and the corresponding downdrag forces for pile capacity analysis.

Seismic Slope Stability

The project area is composed of hilly and flat terrains. Graded embankment consisting of retaining walls and fill slopes will be constructed at the approaches. These graded embankment, if properly constructed, should be stable at a gradient of 2:1 (H:V). We will evaluate slope stability during PS&E phase when layout and profile sheets are available.

Scour Evaluation

The existing structure does not cross a channel or basin that conveys water; therefore, scour potential should not be a design issue.

Corrosion Evaluation

There is no corrosion test result included with the as-built plans. Site-specific soil corrosivity must be investigated during PS&E phase in accordance with Caltrans requirements.

As-Built Foundation Data

The as-built foundation data of the nearby structures is summarized below.

Structure	Support Location	Foundation Type	Bottom of Footing Elevation (ft)	Specified Tip Elevation (ft)
Route 60/57 Separation (North) 53-1905[1]	Abut 1	Combination of 16-inch Dia. 45-ton CIDH (vertical piles), 45-ton Class I Concrete Piles (battered piles), and Spread Footings (Width = 6 to 9.9 ft)	+725.47 to +728.75	+688 to +695
	Abut 2		+725.00 to +730.12	+688 to +728
Prospectors Road UC 53-1873	Abut 1	45-ton 16-inch Dia. CIDH	+736.0 to +746.0	+695 to +704
	Bent 2		+718.0 to +727.0	+695 to +704
	Bent 3		+719.5 to +728.0	+687 to +697
	Abut 4		+739.0 to +748.5	+687 to +697
Prospectors Road UC 53-1873 Q/R[2]	Abut 1	45-ton 16-inch Dia. CIDH	+731	+685.0
	Bent 2	45-ton 16-inch Dia. CIDH	+710	+685.0
	Bent 3	Driven (Pile Type Unknown)	+711	+656.5
	Abut 4	45-ton 16-inch Dia. CIDH	+728 to +731	+685.0
Diamond Bar Blvd UC 53-1899	Abut 1 Right	45-ton Class II Concrete Piles	+730.5	+675
	Abut 1 Left		+730.5	+670
	Abut 2		+726.5	+675

Notes:
1. Name was changed to E60-N57 Connector UC. Bridge No. 53-1905.
2. Name was changed to E60-N57 Connector OC. Bridge No. 53-1873G.

Preliminary Foundation Recommendations

We recommend using a deep foundation consistent with the existing nearby structures. Based on review of the subsurface conditions, it may be prudent to use HP steel piles due to presence of competent materials that may cause early refusal of concrete piles.

Cast-in-Drilled-Hole (CIDH) concrete piles may appear to be feasible since a large majority of the foundation type of nearby bridges is CIDH piles. However, Caltrans current design criteria negate the use of end bearing for CIDH pile with diameters less than 24 inches, and limited end-bearing resistance is allowed for CIDH pile diameters greater than 24 inches. In addition, we anticipate that foundation load demands will be larger as compared to the existing bridges due to longer span lengths and higher seismic load demands for the new structure. The above conditions will result in longer and/or larger CIDH piles. As such, there is a likelihood that groundwater will be encountered during CIDH pile construction, and CIDH piles using a wet method of construction would not be the preferred foundation type.

Pile types will be further evaluated during PS&E phase of the project. For preliminary planning purposes, we recommend using HP 14x89 steel driven piles for the abutments and bents.

Settlement Period. Fill will be placed at the approaches. Due to the predominantly granular subsurface condition, immediate settlement is anticipated. However, the settlement magnitude and settlement period will need to be evaluated using site-specific soil borings and laboratory test results during the PS&E phase.

Additional Field Work and Laboratory Testing

Caltrans typically requires a geotechnical boring be advanced at each support for new structures. Due to the presence of shallow groundwater condition, we recommend using a mud-rotary drill rig for the proposed geotechnical borings. The boring depths are expected to reach 100 feet.

Samples recovered during the field investigation will be transported to the laboratory for testing. All of the soil samples will be visually classified and moisture content/density tests will be performed. Additional samples will be selected for sieve analysis, #200 wash, Atterberg, corrosion, consolidation, and direct shear tests. Other laboratory tests may be required depending upon the nature of the soils and bedrock encountered during the investigation.

Reference

Caltrans, 2009a, Caltrans ARS Online Version 1.0, http://dap3.dot.ca.gov/shake_stable/

Caltrans, 2009b, Foundation Report Preparation for Bridge Foundations, Division of Engineering Services, Geotechnical Services, December.

Caltrans, 2009c, Geotechnical Services Design Manual, Division of Engineering Services, Geotechnical Services, Version 1.0, August.

Caltrans, 2009d, Seismic Design Criteria Appendix B, Revised Date 8/12/2009.

Caltrans, 2007a, 2007 Fault Database, http://dap3.dot.ca.gov/shake_stable/references/2007_Fault_Database_81109.xls, August.

Caltrans, 2007b, Errata Report, http://dap3.dot.ca.gov/shake_stable/references/Errata_Report_81109.pdf, August.

Campbell, K., and Bozorgnia, Y., 2008, NGA ground motion model for the geometric mean horizontal component of PGA, PGV, PGD, and 5% damped linear elastic response spectra for periods ranging from 0.01 to 10 s.; Earthquake Spectra, Vol. 24, pp. 139-172.

Chiou, B., and Youngs, R., 2008, An NGA model for the average horizontal component of peak ground motion and response spectra: Earthquake Spectra, vol. 24, pp. 173-216.

Division of Mines and Geology, 1998, Seismic hazard zone report for the San Dimas 7.5-Minute quadrangle, Los Angeles County: Seismic Hazard Zone Report 032.

Los Angeles County General Plan, (1990), Technical appendix to the safety element of the Los Angeles County general plan, hazard reduction in Los Angeles county: Prepared by Leighton & Associates with Sedway Cook Associates for the Department of Regional Planning, County of Los Angeles, January.

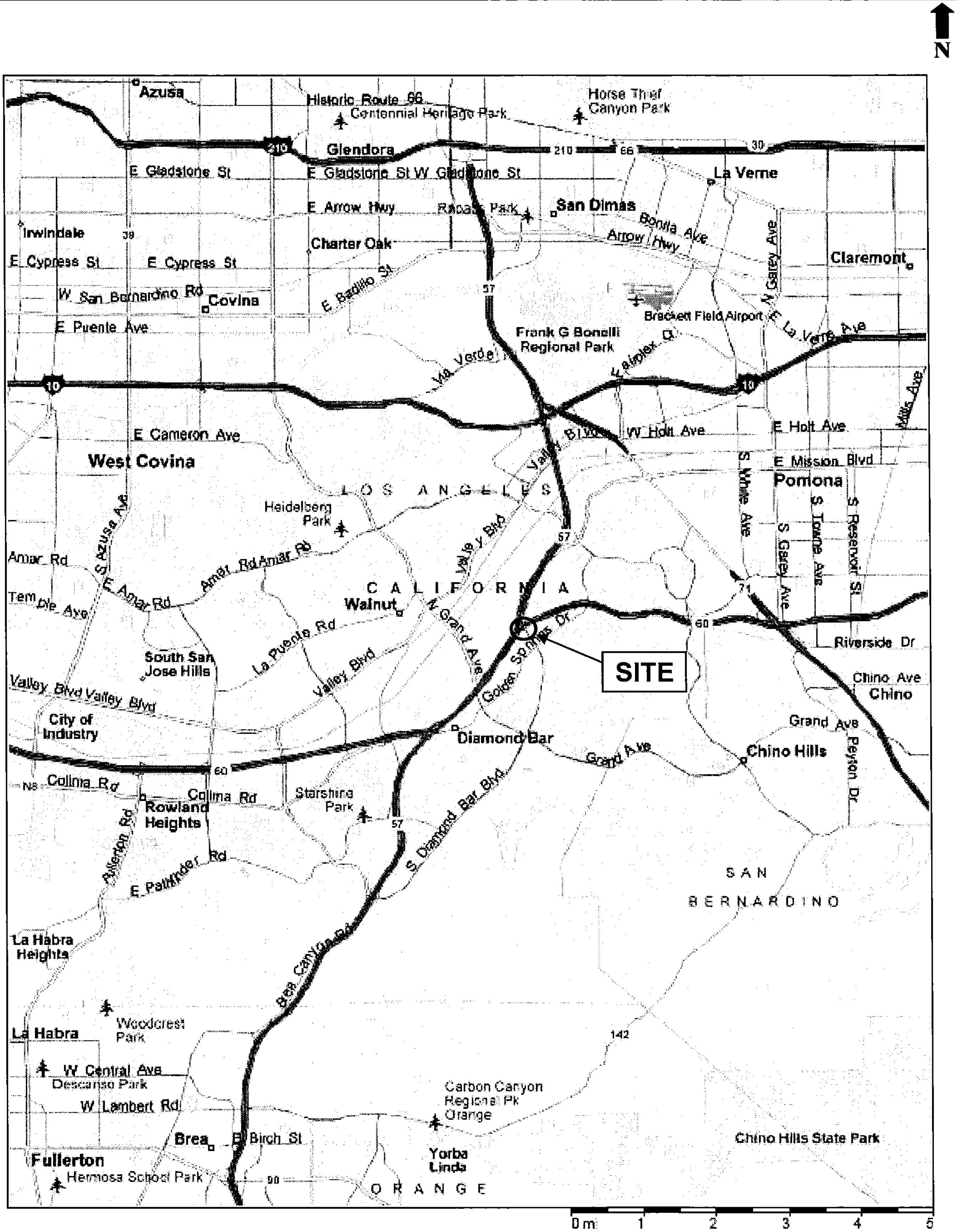
Morton, D.M., and Miller F.K., 2003, Preliminary geologic map of the San Bernardino 30' x 60' quadrangle, California: U.S. Geological Survey Open-file Report 03-293, Scale 1:100,000.

Shantz, T., Merriam, M., 2009, Development of the Caltrans Deterministic PGA Map and Caltrans ARS Online, California Department of Transportation, Sacramento, CA.

Tan, S.S., 1998, Geologic map of the San Dimas 7.5' quadrangle, Los Angeles County, California: a digital data base: Division of Mines and Geology, Open-File report 93-31.

U.S. Geological Survey (USGS), 2008a, Documentation for the 2008 Update of the United States National Seismic Hazard Maps: U.S. Geological Survey Open-File Report 2008-1128, 61p.

U.S. Geological Survey (USGS), 2008b, USGS Probabilistic Seismic Hazard Analysis, http://eqint.cr.usgs.gov/deaggint/2008/index.php.



EB Bypass Connector (New)

Earth Mechanics, Inc.

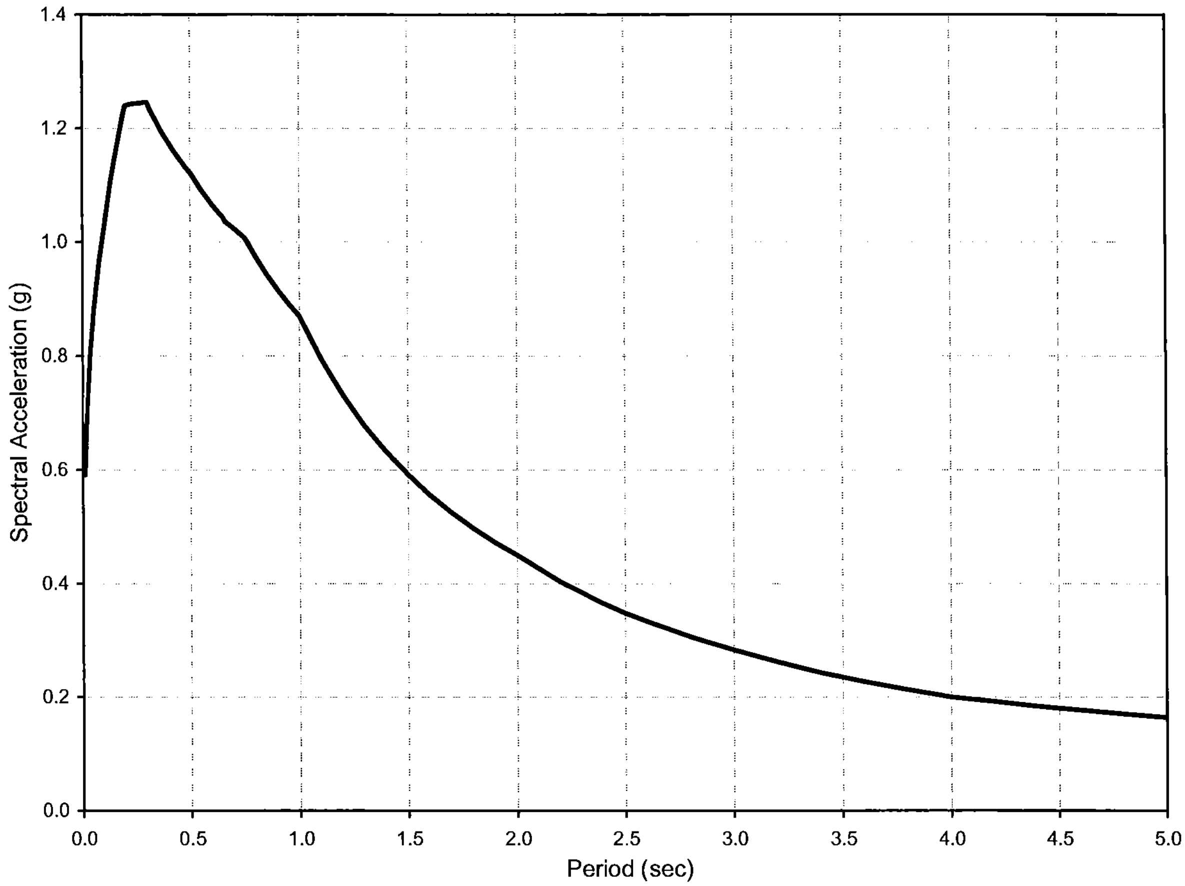
Geotechnical and Earthquake Engineering

SITE LOCATION MAP

Figure 1

Project No. 10-113

Date: 06-01-10



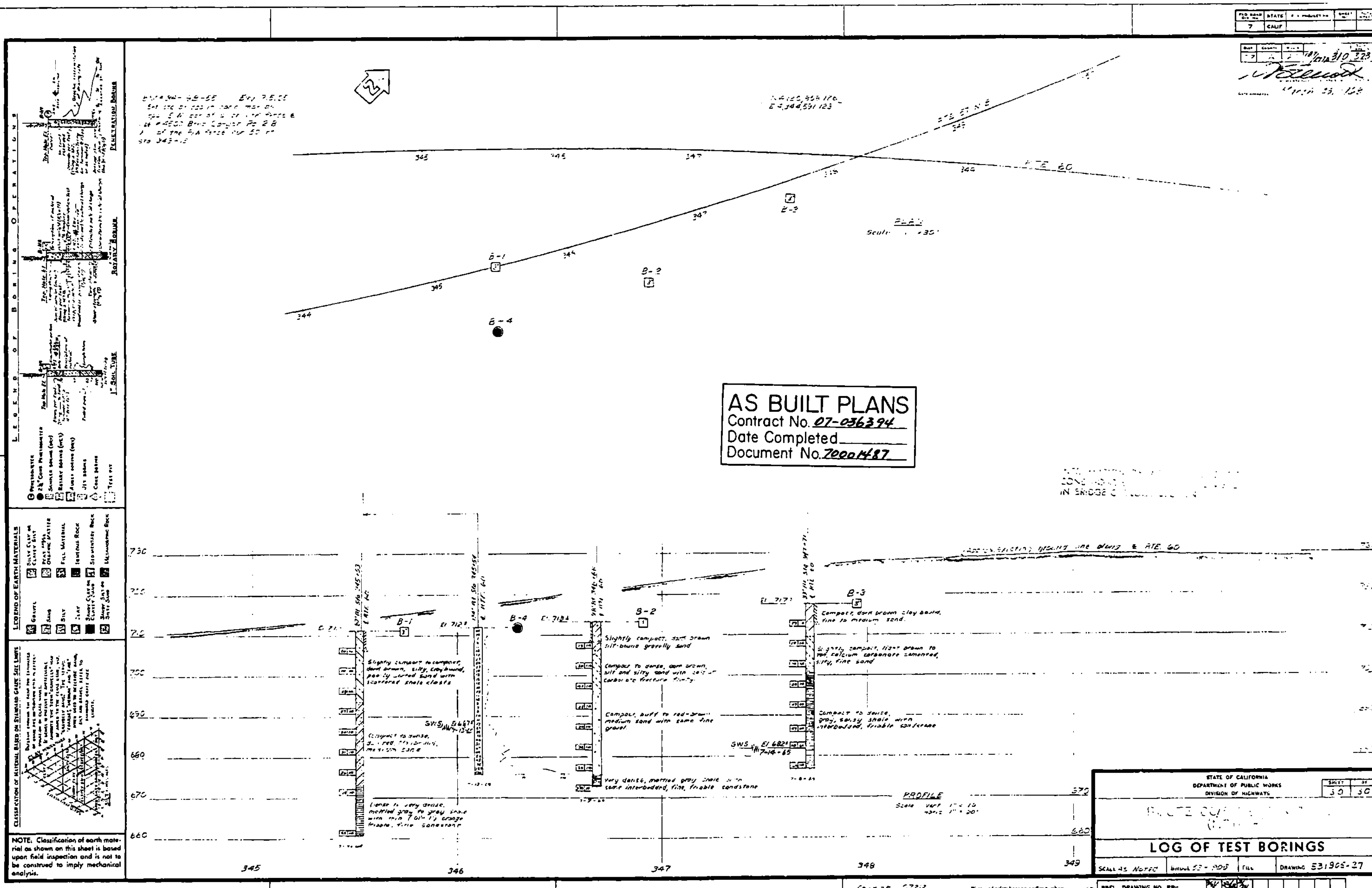
Latitude = 34.0218 °
Longiture = -117.8128 °
Small Strain Shear Wave Velocity V_{s30} = 1083 ft/s

Spectral Coordinates	
Period (sec)	Acc. (g)
0.010	0.591
0.100	1.021
0.200	1.240
0.300	1.246
0.500	1.122
1.000	0.870
2.000	0.450
3.000	0.283
4.000	0.200
5.000	0.164

Earth Mechanics, Inc. Geotechnical and Earthquake Engineering	**EB Bypass Connector (New)**	**Preliminary Design ARS Curve**
	Project: 10-113 Date: 05/27/10	**Figure 2**

ATTACHMENT 1

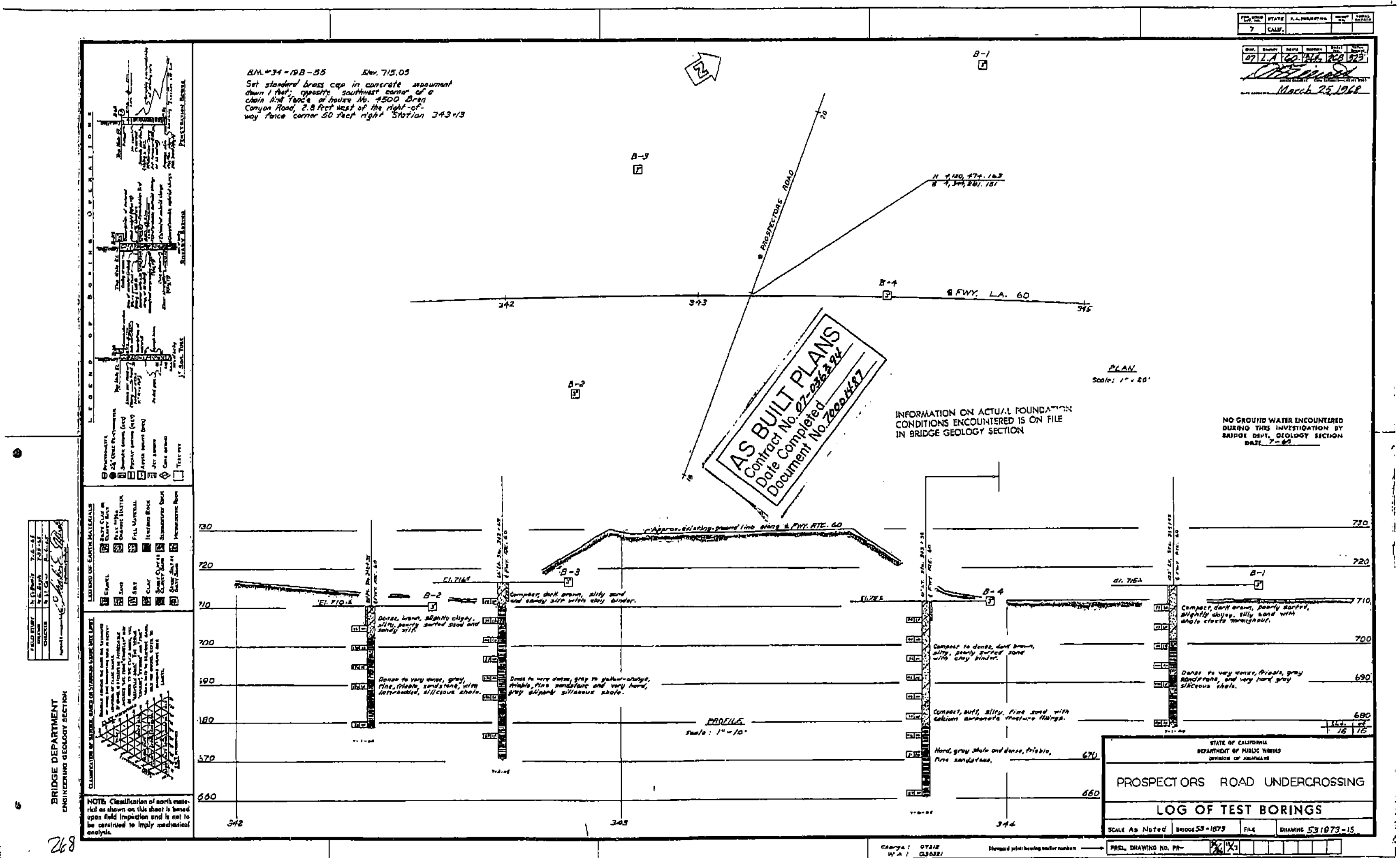
Log-Of-Test-Boring (LOTB) Sheet
Existing Route 60/57 Separation (North), Bridge No. 53-1905
(Renamed as E60-N57 Connector UC, Bridge No. 53-1905)



AS BUILT PLANS
Contract No. 07-036394
Date Completed
Document No. 70001487
PLAN
PROFILE
B-1
B-2
B-3
B-4
RTE 60
Slightly compact, dark brown silt-bound gravelly sand
Compact to dense, dark brown, silt and silty sand with ... of carbonate fracture filling
Compact, buff to red-brown medium sand with some fine gravel
Very dense, mottled gray shale with some interbedded, fine, friable sandstone
Compact, dark brown clay bound, fine to medium sand
Compact to dense, gray, sandy shale with interbedded, friable sandstone
STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS
LOG OF TEST BORINGS
DRAWING 531905-27
PREL. DRAWING NO. PR-
LEGEND OF BORING OPERATIONS
LEGEND OF EARTH MATERIALS
CLASSIFICATION OF MATERIAL BASED ON STANDARD GAGE SIZE LIMITS
NOTE. Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.
BRIDGE DEPARTMENT
ENGINEERING GEOLOGY SECTION

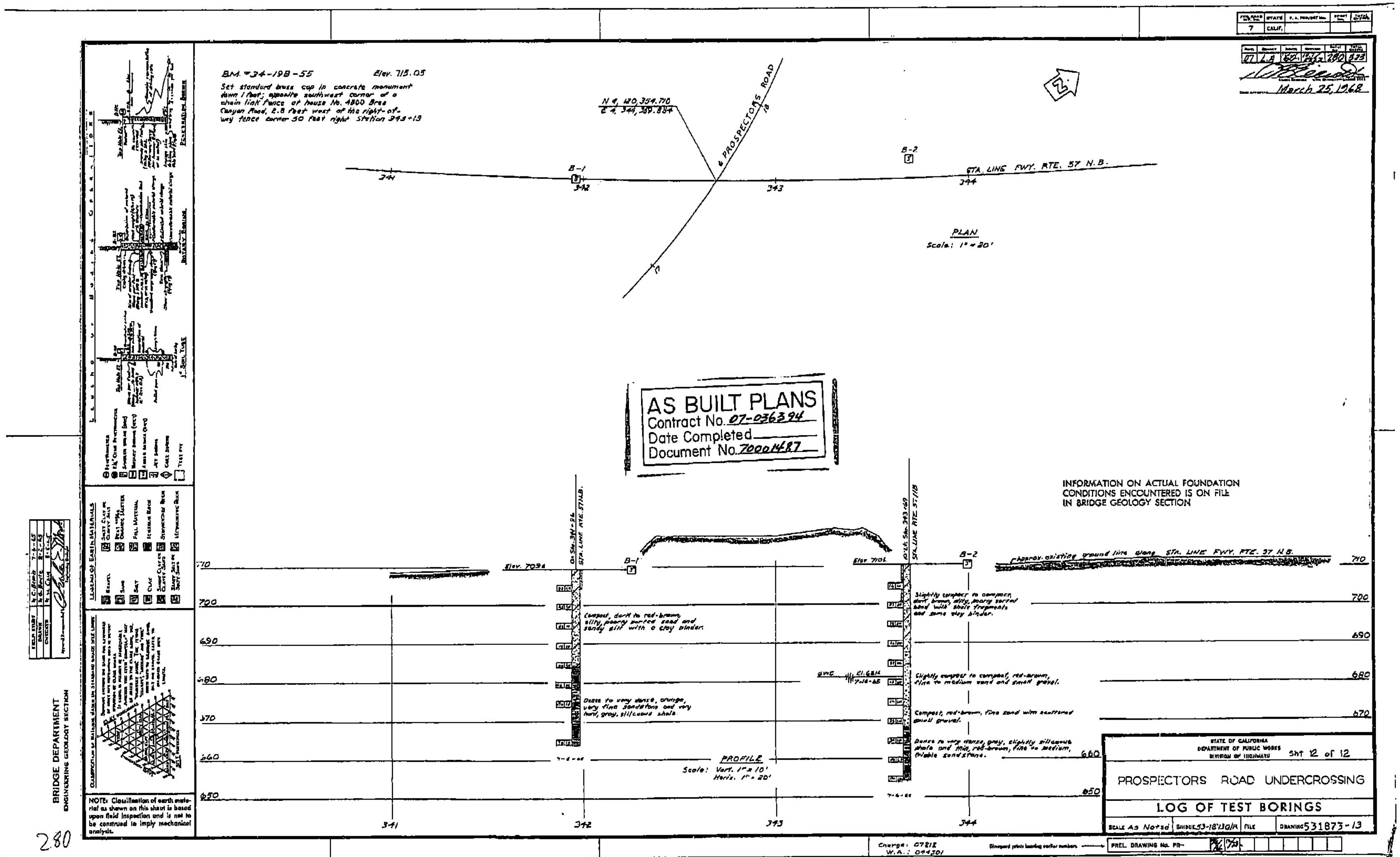
ATTACHMENT 2

Log-Of-Test-Boring (LOTB) Sheet
Existing Prospectors Road UC, Bridge No. 53-1873


B.M. #34-19B-55 Elev. 715.05
Set standard brass cap in concrete monument down 1 foot; opposite southwest corner of a chain link fence at house No. 4500 Bren Canyon Road, 2.8 feet west of the right-of-way fence corner 50 feet right Station 343+13
PROSPECTORS ROAD
FWY. L.A. 60
B-1
B-2
B-3
B-4
PLAN
Scale: 1" = 20'
AS BUILT PLANS
Contract No. 07-036394
Date Completed
Document No. 70001487
INFORMATION ON ACTUAL FOUNDATION CONDITIONS ENCOUNTERED IS ON FILE IN BRIDGE GEOLOGY SECTION
NO GROUND WATER ENCOUNTERED DURING THIS INVESTIGATION BY BRIDGE DEPT. GEOLOGY SECTION
Approx. existing ground line along FWY. RTE. 60
PROFILE
Scale: 1" = 10'
Dense, brown, slightly clayey, silty, poorly sorted sand and sandy silt.
Dense to very dense, gray, fine, friable, sandstone, with interbedded, siliceous shale.
Compact, dark brown, silty sand and sandy silt with clay binder.
Dense to very dense, gray to yellow-orange, friable, fine sandstone and very hard, gray slightly siliceous shale.
Compact to dense, dark brown, silty, poorly sorted sand with clay binder.
Compact, buff, silty, fine sand with calcium carbonate fracture fillings.
Hard, gray shale and dense, friable, fine sandstone.
Compact, dark brown, poorly sorted, slightly clayey, silty sand with shale clasts throughout.
Dense to very dense, friable, gray sandstone, and very hard gray siliceous shale.
LEGEND OF BORING OPERATIONS
LEGEND OF EARTH MATERIALS
NOTE: Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.
BRIDGE DEPARTMENT
ENGINEERING GEOLOGY SECTION
March 25, 1968
STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS
PROSPECTORS ROAD UNDERCROSSING
LOG OF TEST BORINGS
SCALE As Noted
BRIDGE 53-1873
DRAWING 531873-15
268

ATTACHMENT 3

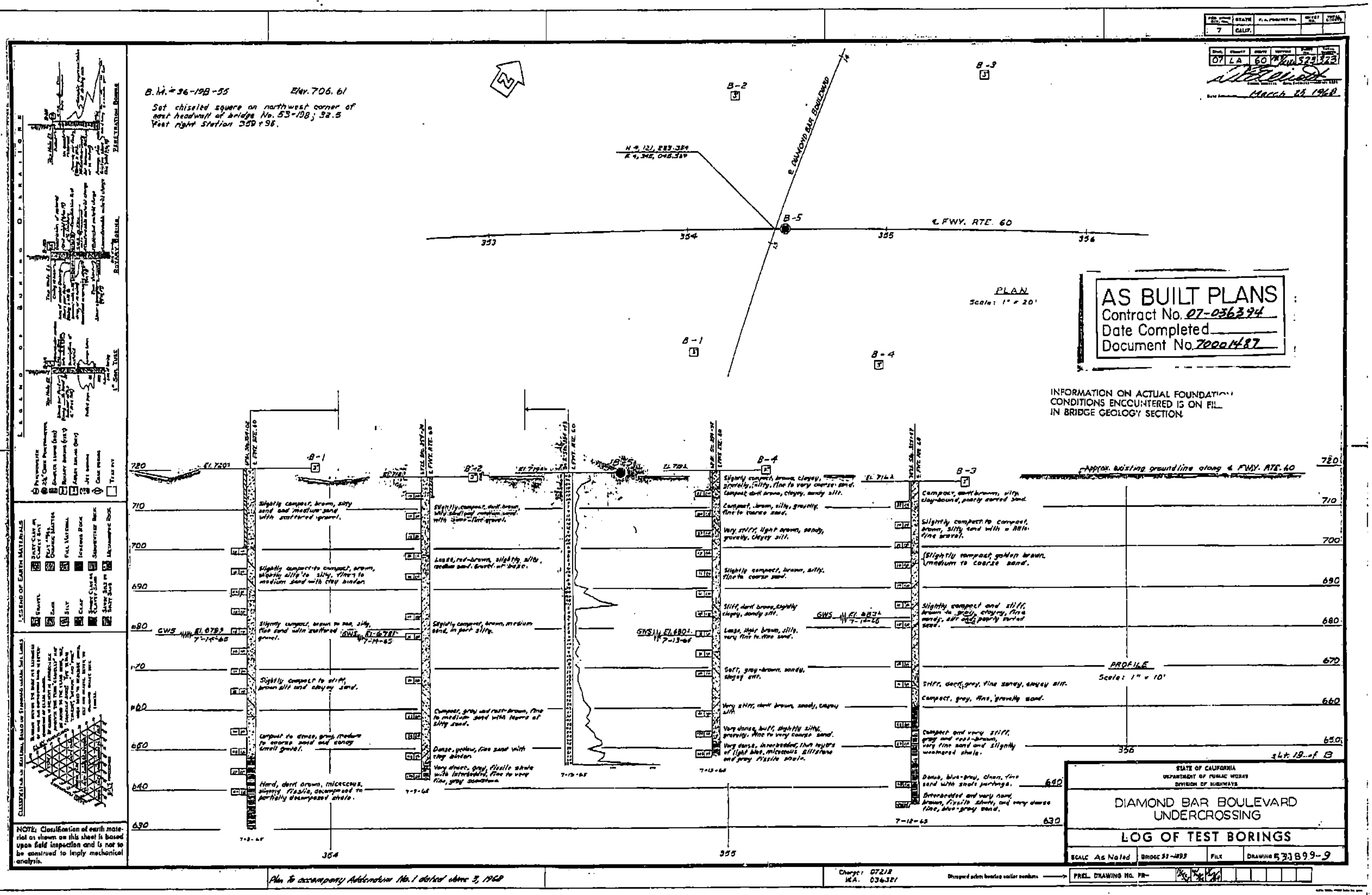
Log-Of-Test-Boring (LOTB) Sheet
Existing Prospectors Road UC, Bridge No. 53-1873 Q/R
(Renamed as E60-N57 Connector OC, Bridge No. 53-1873G)


BM #34-198-55 Elev. 715.05
Set standard brass cap in concrete monument down 1 foot; opposite southwest corner of a chain link fence at house No. 4800 Brea Canyon Road, 2.8 feet west of the right-of-way fence corner 50 feet right Station 343+13
N ¢ 120,354.710
E ¢ 344,309.884
¢ PROSPECTORS ROAD
B-1
B-2
STA. LINE FWY. RTE. 57 N.B.
PLAN
Scale: 1" = 20'
AS BUILT PLANS
Contract No. 07-036394
Date Completed
Document No. 70001487
INFORMATION ON ACTUAL FOUNDATION CONDITIONS ENCOUNTERED IS ON FILE IN BRIDGE GEOLOGY SECTION
Elev. 709.4
Elev. 710.6
Approx. existing ground line along STA. LINE FWY. RTE. 57 N.B.
Compact, dark to red-brown, silty, poorly sorted sand and sandy silt with a clay binder.
Dense to very dense, orange, very fine sandstone and very hard, gray, siliceous shale
Slightly compact to compact, dark brown, silty, poorly sorted sand with shale fragments and some clay binder.
Slightly compact to compact, red-brown, fine to medium sand and small gravel.
Compact, red-brown, fine sand with scattered small gravel.
Dense to very dense, gray, slightly siliceous shale and thin, red-brown, fine to medium, friable sandstone.
PROFILE
Scale: Vert. 1" = 10'
Horiz. 1" = 20'
341
342
343
344
STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS
Sht 12 of 12
PROSPECTORS ROAD UNDERCROSSING
LOG OF TEST BORINGS
SCALE As Noted
DRAWING 531873-13
March 25, 1968
Charge: 07812
W.A.: 094501
BRIDGE DEPARTMENT
ENGINEERING GEOLOGY SECTION
NOTE: Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

280

ATTACHMENT 4

Log-Of-Test-Boring (LOTB) Sheet
Existing Diamond Bar Blvd, Bridge No. 53-1899



AS BUILT PLANS
Contract No. 07-036394
Date Completed
Document No. 70001487
INFORMATION ON ACTUAL FOUNDATION CONDITIONS ENCOUNTERED IS ON FILE IN BRIDGE GEOLOGY SECTION
B.M. # 36-198-55 Elev. 706.61
Set chiseled square on northwest corner of east headwall of bridge No. 53-198; 32.5 Feet right Station 359+96.
PLAN
Scale: 1" = 20'
PROFILE
Scale: 1" = 10'
℄ FWY. RTE. 60
℄ DIAMOND BAR BOULEVARD
B-1
B-2
B-3
B-4
B-5
353
354
355
356
720
710
700
690
680
670
660
650
640
630
GWS
Approx. existing groundline along ℄ FWY. RTE. 60
LEGEND OF EARTH MATERIALS
LEGEND OF BORING OPERATIONS
NOTE: Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.
BRIDGE DEPARTMENT
ENGINEERING-GEOLOGY SECTION
STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS
DIAMOND BAR BOULEVARD UNDERCROSSING
LOG OF TEST BORINGS
SCALE As Noted
BRIDGE 53-1893
DRAWING 53B899-9
Plan to accompany Addendum No. 1 dated [illegible] 1968
Charge: 07218
W.A. 036321
March 25, 1968
07 LA 60
sht. 19 of 13
323