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PRELIMINARY GEOTECHNICAL REPORT

STATE ROUTE 85 EXPRESS LANE PROJECT

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1 INTRODUCTION

The California Department of Transportation (Department), in cooperation with the Santa Clara Valley Transportation Authority (VTA), proposes to convert 23.7 miles of existing high-occupancy vehicle (HOV) lanes along State Route (SR) 85 to express lanes (also known as High Occupancy Toll (HOT) lanes). An additional express lane would also be added along a portion of the corridor to create a double express lane. The project, located in Santa Clara County, would include the construction of express lanes on northbound and southbound SR 85 from US 101 in southern San Jose to US 101 in Mountain View (See Figure 1 and Figure 2). The project would also include the continuation of the express lanes for 3.3 miles on US 101 in South San Jose, for a total of 27 miles.

1.1 Purpose of This Study

The purpose of this Geotechnical Assessment Report (GAR) is to document existing foundation conditions, review subsurface information, and provide potential geotechnical impacts on the project.

1.2 Project Scope of Work

The scope of work for this study includes:

- Review of available as-built bridge drawings, logs of test borings (LOTBs), laboratory test results, geologic maps, fault maps and geologic hazard maps, and other existing information
- Preparation of this GAR, which includes:
  - Development of seismic design criteria;
  - Description of site geology and evaluation of geologic hazards;
  - Assessment of subsurface conditions based on existing information;
  - Identify potential geotechnical impacts on the project;
  - Preliminary geotechnical recommendations regarding the roadway widening pavement design, new overhead sign structure foundations; and construction considerations

1.3 Project Description

1.3.1 Existing Facilities

SR 85 is a 23.7-mile long freeway that connects Mountain View to southern San Jose. SR 85 passes through Cupertino, Saratoga, Campbell, Los Gatos, San Jose's Cambrian Park, and the neighborhoods of Almaden Valley, Blossom Valley, and Santa Teresa. SR 85 also intersects with SR 237, Interstate 280, Highway 17, and SR 87. SR 85 typically has 3 lanes in each direction, including 2 mixed lanes and 1 HOV lane.

1.3.2 Proposed Project

The project would involve the conversion of existing HOV lanes to express lanes along SR 85 and a portion of US 101, and is proposed to provide congestion relief through more

efficient use of existing facilities, provide more mobility options along this corridor, and create an additional source of revenue for transportation improvements in the area. Three build alternatives have been developed; common features of all three alternatives are described in the following, followed by each alternative's unique features.

1.3.3 Build Alternatives - Common Design Features

Lane Description

The express lanes would be located adjacent to the center median, and would be created either by converting the existing HOV lane to dual use, or by adding an additional median lane to create a double express lane facility. The express lanes would include multiple intermediate access points from the adjacent mixed-flow lane to provide equal opportunity for prospective users, including carpoolers. These "access points" would consist of gaps in the striped 2-foot-wide buffer zone, allowing traffic to enter and exit the express lanes.

Lane Operation

Static and dynamic overhead signs would be installed to advise qualified HOV and SOV users as they approach an entrance point. This includes displaying the current toll rates relative to each destination and exit served by the facility. These signs would be updated as the system is managed for changing speed and traffic density measured at intervals along the express lanes. Vehicles using the facility must have transponders (similar to the current FasTrak) that would be monitored by an overhead structure installed at the beginning of the facility. The proposed express lane(s) would be separated from the existing mixed flow lanes by a striped buffer, up to two feet wide. Vehicles in the express lanes without a transponder would activate a signal that would be monitored by enforcement officers, who would observe from a distance whether the indicated vehicle is a qualified car pool (e.g., two or more passengers or is otherwise exempt).

Use of US 101/SR 85 Direct Connectors

At the south end of the project area in South San Jose, the southbound HOV direct connector from SR 85 joins the existing southbound US 101 HOV lane, and both lanes run parallel for a short distance before merging together. The proposed express lane would end on US 101 where the two HOV lanes merge together.

In the northbound direction on US 101, the proposed express lane would also coincide with the beginning of the double HOV segment allowing SOVs to use the express lanes for a short distance ahead of the direct connector. The second HOV lane continues on the HOV direct connector to northbound SR 85.

At the north end of the project area, the two existing HOV lanes on southbound US 101 split prior to the US 101/SR 85 Interchange, with one lane continuing on to southbound US 101 and the other lane proceeding on to southbound SR 85 via the direct connector. The direct connectors at this location are not proposed to be part of the SR 85 Express Lanes project and would remain as HOV-only connectors.

In the northbound direction, the express lane would terminate in advance of the direct connectors allowing enough distance for SOVs to exit the lane and merge across the mixed-flow lanes to use the mixed flow ramp from NB SR 85 to NB US 101. In the

southbound direction, the express lane would start shortly after the direct connector terminates on SR 85 allowing enough distance for SOVs entering SB SR 85 from the mixed flow ramp to merge across the mixed flow lanes to enter the express lane.

Construction Activities

The project would be constructed entirely within existing right of way, and utility impacts are not anticipated. During construction, some lane closures could be required, but full closures are not expected to be necessary.

1.3.4 Build Alternative 1 – Single Express Lane/Separate Access Points

Build Alternative 1 would include converting the existing HOV lane along both northbound and southbound SR 85 into a single-lane express lane facility, extending from US 101 in South San Jose to US 101 in Mountain View.

In the sections between US 101 in South San Jose, and SR 87 and between I-280 and US 101 in Mountain View, reduction in the width of the express lane and the inside mixed-flow lane from 12 feet to 11 feet would be required to create the 2-foot buffer. Between SR 87 to I-280, the 2-foot buffer would be created by reducing the inside shoulder width to 8 feet while maintaining 12 foot lanes. Four feet of the inside shoulder would be replaced with a full depth structural section to allow traffic to drive on 2 feet of the existing shoulder.

The 2-foot buffer zone would have designated entrance-only and exit-only openings with a transition lane to provide access into and out of the express lane facility. The additional transition lane would be approximately 1300 feet long in order to minimize impacts to both the express lane and the mainline traffic operations.

In the section between SR 87 and I-280, where the median is approximately 46 feet wide, additional pavement widening towards the median would be necessary to accommodate the transition lane at every ingress and egress location, reducing the a median width to between 24 and 35 feet. The existing thrie-beam barrier would be replaced with a concrete barrier Type 60 at these locations, as required for areas where the median width is less than 36 feet.

In the section south of SR 87, where the VTA Light Rail runs within the median, the outside of the freeway would be widened within the right of way to maintain 10-foot outside shoulders, and 12-foot lanes would be provided to accommodate the transition lane at every entrance and exit location. Where space is not available for full standard lane and shoulder widths, the express lane and express auxiliary lane widths would be reduced to 11 feet to accommodate the transition lane.

In the SR 85 section north of I-280, where the median width is approximately 22 feet, if outside widening is not feasible, the inside shoulders would be narrowed to 2 feet to accommodate a transition lane at the entrance and exit locations.

1.3.5 Build Alternative 2 – Single Express Lane/Shared Access Points

Build Alternative 2 would include converting the existing HOV lane along both northbound and southbound SR 85 into a single-lane express lane facility throughout the corridor.

The sections between US 101 in South San Jose and SR 87, and between I-280 and US 101 in Mountain View would require the reduction of the express lane width and inside mixed flow lane width to from 12 feet to 11 feet to create the 2-foot buffer. In the section from SR 87 to I-280, the 2-foot buffer would be created by reducing the inside shoulder width to 8 feet while maintaining 12-foot lanes. Four feet of the inside shoulder would be replaced with a full depth structural section to allow traffic to drive on 2 feet of the existing shoulder.

The 2-foot buffer zone would have designated combined entrance and exit openings to provide access into and out of the express lane facility.

1.3.6 Build Alternative 3 – Mixed Single and Double Express Lanes/Shared Access Points

Build Alternative 3 would include converting the existing HOV lane along both northbound and southbound SR 85 into a single-lane express lane facility between US 101 in South San Jose and SR 87, a double express lane facility between SR 87 and I-280, and a single-lane express lane facility between I-280 and US 101 in Mountain View.

In the section between SR 87 and I-280, widening into the existing median would eliminate the need to reduce the width of the left most mixed-flow lane. The 2-foot buffer zone would have designated combined entrance and exit openings to provide access into and out of the express lane facility.

In the section between SR 87 and I-280, where the median width is approximately 46 feet, pavement widening would be conducted in the median to accommodate the second express lane. The median would be paved and the existing thrie-beam barrier would be replaced with a concrete barrier Type 60.

1.3.7 No Build Alternative

The No-Build alternative assumes no modifications would be made to the current SR 85 corridor, including the continuous access HOV lane, other than routine maintenance and rehabilitation of the facility and any currently planned and programmed projects within the area.

2 GEOLOGIC SETTING

2.1 Regional Geology

The project alignment follows the western margin of the Santa Clara Valley within the San Francisco Bay block, located in the central portion of the Coast Ranges geomorphic province of California. Northwest-southeast-trending valleys and ridges characterize the

regional morphology of the Coast Ranges province. These topographic features are controlled by folds and faults that resulted from the collision of the Farallon and North American plates and subsequent predominantly strike-slip faulting along the San Andreas fault system between the Pacific and North American plates. The San Francisco Bay block is a relatively stable, aseismic block bounded by the San Andreas and Hayward faults to the west and east, respectively.

The relatively level study area is underlain predominantly by thick, unconsolidated, interbedded alluvial and fluvial deposits of clay, silt, sand and gravel (see Geologic Map, Figure 3A). Bay mud deposits are also present at the northern end of the alignment along Route 101 in the vicinity of Adobe Creek. Fluvial sand, gravel and clay deposits are present along the banks and man-made channel of Coyote Creek and along several other drainages crossed by the alignment including the Guadalupe River, Los Gatos Creek, Saratoga Creek, Stevens Creek and Adobe Creek. Bedrock is exposed near the surface in the southeastern portion of the project along Route 101. The bedrock is covered with alluvium that varies from approximately 20 to 150 feet thick at the Coyote Creek Bridge for northbound Route 101, to 300 feet thick at the Great Oaks Interchange and at Miyuki Drive. On the northeast side of Route 101, from the SR 85/ U.S. 101 Interchange to about ¼ mile north, Quaternary to Tertiary age claystone, siltstone, conglomerate and altered tuff deposits assigned to the Santa Clara Formation (Brabb and Dibblee, 1974) are overlain by Jurassic to Cretaceous rocks of the Franciscan Complex and serpentinite of unknown age. The Franciscan rocks and serpentinite have been thrust over the younger Santa Clara Formation by activity along the Coyote Creek fault, which parallels the freeway (see Figure 3A). This low-angle, northeastward dipping thrust fault is exposed in the existing highway cut. A regional and site specific discussion of faulting and seismicity is presented in Section 4.3, "Seismic and Geologic Hazards."

Geologic maps obtained from the U.S. Geological Survey (Brabb and Dibblee, 1974) and from the California Geological Survey(Jennings, 2010) indicate that the alignment of SR 85 is located entirely on unconsolidated alluvial and older alluvial deposits of Quaternary geologic age with a short section of Route 101 near Palo Alto underlain by Quaternary bay mud deposits.. The alluvial deposits were derived directly or indirectly from a wide range of rock types that comprise the Franciscan Group, which is the principal bedrock geologic unit exposed in the nearby part of the Santa Cruz Mountains west of the alignment. The most prominent gravel and cobble constituents observed in samples obtained from test pits excavated along the route were sandstone and schist. The reported distribution of the alluvial units in the vicinity of the route is delineated on Figure 3A and 3B, and descriptions of the units are presented below.

Bay mud - although not shown on Figure 3A due to the regional scale of the map, bay mud deposits have been mapped by Brabb and Dibblee (1974) along Route 101 between about San Antonio Road and the Oregon Expressway. These materials consist of soft organic silt and clay with thin silty sand interbeds.

Alluvium Deposits (Q) -Alluvium deposits, as characterized by Brabb and Dibblee (1974) consist of moderately well sorted fine sand and silt with minor gravel beds. The results of recent field observations revealed that reworked gravel and cobbles are particularly concentrated in the various stream channels that cross the route. Data presented by Helley and Brabb (1971) indicate that the natural dry density of young alluvial fan deposits is in

the range of 116± 10 pounds per cubic foot (pcf). These deposits are of Holocene geologic age.

Older Alluvium Fan Deposits (Qoa) -Older alluvium and alluvial fan deposits consist mainly of coarse sand and gravel with interbeds of silt and clay, and that they are overlapped by young alluvial deposits. They are generally of Pleistocene geologic age.

Between Almaden Expressway and Bascom Avenue, the SR 85 Corridor is underlain by thick older alluvial fan and fluvial deposits of Pliestocene age (see Geologic Map, Figure 3A). These deposits generally consist of dense to very dense sand and gravel with minor discontinuous layers and lenses of clay and silt. Fingers of overlying younger Quaternary alluvial fan deposits occur around Ross Creek and Guadalupe River. These younger deposits generally consist of stiff to hard clays with low to intermediate plasticity with interlayers of dense to very dense sand and gravel. Cobbles and possibly boulders were encountered in many of the drill holes throughout the entire alignment between depths of 5 to 60 feet below existing ground surface.

Bedrock was not encountered in any of the drill holes in this portion of the SR 85 Corridor. The alluvial deposits are reported to be about 300 feet thick at the east end of the study area near Almaden Expressway. The thickness of alluvium decreases to about 200 feet near Camden Avenue and to about 80 feet at the west end of the study area near Bascom Avenue (Rogers and Williams, 1974; California Department of Water Resources, 1975).

Geologic maps obtained from the U.S. Geological Survey (Brabb and Dibblee, 1974)) and from the California Geological Survey (Jennings, 2010)indicate that the SR 85 alignment between Bascom Avenue and Stevens Creek Boulevard is located entirely on unconsolidated alluvium of Quaternary geologic age.

2.2 Site and Surface Conditions

The project site is located in South Bay cities south of San Francisco Bay. The alignment starts from the U.S. 101/SR 85 connector in the southeast end of the project and extends to U.S. 101/SR 85 connector in the northwest end of the project, traversing cities including San Jose, Saratoga, Cupertino and Mountain View. The profile along the project alignment varies from depressed sections as much as 39 feet below surrounding development to embankments as high as 27 feet. Development at the project site includes the freeway, numerous overcrossings and undercrossings, roadway interchanges and freeway interchanges at SR 87, Highway 17, I-280, and SR 237, bridges over the Guadalupe River, and connector ramps at U.S. 101.

2.3 Subsurface Conditions

2.3.1 Previous Studies

The previous Materials Reports, Geotechnical Design Investigations and Foundation Reports provided by Caltrans, the VTA or available in our files include Table 2-1.

Table 2-1 Previous Studies

PM	Report	Author	Date
SR 85 PM 0.0/1.4	Route 85 Materials Report, Route 85/101/Bernal Road I.C. (PM 0.0) to Miyuki Drive (PM 1.4), Volume 1A, Route 85 Transportation Corridor, MSA No. 100/Contract No. 155-085, Santa Clara County, California	Terratech, Inc.	October 20, 1989
SR 85 PM 5.7/10.2	Route 85 Materials Report, Almaden Expressway I.C. (PM 5.7) to Bascom Avenue I.C. (PM 10.2), Volume 1B, Route 85 Transportation Corridor, MSA No. 100/Contract No. 155-085, Santa Clara County, California	Terratech, Inc.	October 20, 1989
SR 85 PM 10.2/17.7	Route 85 Materials Report, Volume 2A, PM 10.2/17.7, Bascom Avenue to Stevens Creek Boulevard, Project 154-085, MSA No. 102, 104, 106, Cupertino, Saratoga, Campbell, Los Gatos, and San Jose, California	Woodward-Clyde Consultants (URS Predecessor's Company)	December 11, 1989
SR 85 PM 18.7/24	Plans, including LOTBs for Homestead Road OC (37-208), Fremont Avenue UC(37-184 R/L), Stevens Creek Bridge (37-184 R/L), Stevens Creek Bridge (37-189), Route 2/114 Separation (37-204), Stevens Creek Bridge Widening (37-14), Route 114/113 Separation (37-198 R/L), Stevens Creek (NW Connector) (37-201 O/L), Stevens Creek (NW Connector) (37-200), Stevens Creek (Off Ramp) (37-199), Mountain View OH (37-207 R/L), Stevens Creek Bridge (37-197 R/L), Middlefield Road OC (37-213), Moffett Boulevard UC (37-187), Route 114/68 Separation (37-196), The Dalles POC (37-243)	Caltrans	January 14, 1966
U.S. 101 PM 48.7/51.9	Geotechnical Design and Materials Report, U.S.101 Auxiliary Lanes from Embarcadero to SR 85, Palo Alto, Mountain View, Santa Clara County, California	URS	June 10, 2010

Based on Table 2-1, geotechnical information available for a majority of the SR 85 project. The subsequent discussion about subsurface conditions is based on review of existing available data.

2.3.2 Subsurface Conditions

Embankments and approach fills are present along the entire length of U.S. 101 that border the southern beginning of the project alignment. The embankments and approach fills, which range in thickness from 4 to 25 feet, generally are composed of gravelly and sandy clay to clayey gravel quarried from the surrounding area.

Bedrock is exposed in existing cuts along the eastern foothills, south of Coyote Creek Bridge. In these cuts Santa Clara Formation claystone, siltstone, conglomerate, and altered tuff deposits are overlain by Franciscan Complex sandstone and intrusive

serpentinite. The Franciscan rocks and serpentinite have been thrust over the younger Santa Clara Formation by activity along the Coyote Creek fault, which parallels U.S. 101 and is exposed near the top of an existing cut slope. Santa Clara Formation siltstone and claystone were encountered below alluvium in borings near Coyote Creek at a depth of approximately 20 feet. According to information published by the California Geologic Survey (State Map, 2010), depth to bedrock in this study area west of Bernal Road is estimated to be approximately 300 feet below ground surface.

Native soils within the study area are alluvial and fluvial deposits consisting predominantly of soft to very stiff lean clay overlying interlayers and discontinous lenses of medium dense to very dense, silty and clayey sand and gravel, and firm to very stiff, lean clay and sandy clay.

U.S. 101 to Almaden Expressway Interchange on SR85

The upper stratum of lean clay ranges in thickness from about 20 to 36 feet and has low to intermediate plasticity. Clay in the upper several feet of this layer is generally very stiff to hard, probably as a result of desiccation. Below this surface "crust", the clay generally becomes progressively softer with depth and ranges in consistency from very stiff to soft. Below the upper lean clay, soils consist predominantly of medium dense to very dense sands and gravels interbedded with lenses or layers of firm to hard lean clay.

More specifically, subsurface conditions at the Coyote Creek Bridge site consist of approximately 10 feet of very stiff to hard clay fill underlain by 4 feet of medium dense silty sand over 6 feet of stiff to hard plastic clay. These soils are underlain by soft to medium claystone of the Santa Clara Formation between a depth of 20 and 82 feet below ground surface where drilling refusal was met in previous explorations.

At Great Oaks Interchange, the subsurface conditions below the undercrossing site consisted of 35 feet of firm to very stiff clay and stiff sandy silt overlying 45 to 50 feet of medium dense to very dense, variably clayey, variably silty sand with interbeds of clay and gravel. These soils were underlain by stiff to very stiff variably sandy clay to the maximum 101 foot depth of exploration.

Subsurface conditions at the Perimeter Road undercrossing site consist of stiff to very stiff silty clay and sandy clayey silt in the upper 15 to 20 feet overlying about 7 to 15 feet of medium dense to very dense silty sand and sandy silt. These soils are underlain by interbedded layers of stiff to very stiff clay and silt, and dense to very dense sand and gravel.

This segment of SR 85 consists of mainly raised embankment up to about 36 feet high. The proposed roadway subgrade should encounter fill material meeting Standard Specification embankment fill criteria.

Almaden Expressway Interchange to Bascom Avenue

The existing raised embankment for the Almaden Expressway Interchange and the Camden Avenue Interchange consisted of approach fills composing primarily of mixtures of sand and gravel with variable amounts of clay from the adjacent cut areas made for the1990 SR 85 construction. For example, cuts of approximately 17, 12, 12, 19 and 11 feet were made at Meridian Avenue, Camden Avenue, Leigh Avenue, Union Avenue and Bascom Road, respectively. Soil conditions presented below are based on the ground

surface prior to the SR 85 construction; therefore, the approximate depths of cuts should be taken into account regarding current subgrade conditions.

At Almaden Expressway Interchange, native soils are alluvial and fluvial deposits consisting predominantly of firm to very stiff lean clay with low to intermediate plasticity in the upper 20 to 30 feet, underlain by thick, relatively continuous layers of generally medium dense to very dense sand and gravel with occasional cobbles and boulders.

Ross Creek crosses under Camden Avenue in a double barrel 12x8 foot box culvert approximately 800 feet in length. Subsurface conditions along and adjacent to the Ross Creek box culvert consist generally of medium dense to very dense clayey sands and gravels with occasional interbeds of clay. Cobbles and possibly boulders were encountered in the general area between depths of 5 to 40 feet below ground surface.

Near the Russo Drive Pedestrian Overcrossing (a 13 feet wide and about 230 feet long P.O.C), soils encountered to a depth of 10 to 15 feet below ground surface consisted of medium dense silty gravel, and loose to medium dense, clayey sand, silty sand, overlying 30 feet of stiff to hard clay. Layers of medium dense to very dense clayey sand, and stiff to hard variably sandy clay with thin gravel interbeds were encountered between about 15 and 81 feet below ground surface.

At Meridian Avenue Overcrossing, subsurface soils consisting of interlayered stiff to hard sandy clay, and dense to very dense, clayey, gravelly sands and sandy gravels. Cobbles and possibly boulders were encountered in the area of Meridian Avenue between 10 to 30 feet below ground surface.

Dent Avenue Pedestrian Overcrossing is underlain by interlayered stiff to hard, variably sandy, variably gravelly clay; dense to very dense, variably clayey, silty sand; and dense to very dense, variably clayey, silty gravel. Cobbles were encountered in the area of Dent Avenue between 10 to 30 feet below ground surface. Sampling refusal was met in several of the drill holes in the area below a depth of about 20 to 25 feet below ground surface.

At Camden Avenue Interchange, the native soils are alluvial and fluvial deposits consisting predominantly of medium dense to very dense sand and gravel with occasional cobble layers and boulders. Minor interlayers of stiff to hard lean clay with low plasticity were also encountered.

At Leigh Avenue Overcrossing, soils consisting predominantly of dense to very dense clayey sand with gravel interbeds were encountered to a depth of 100 feet below the proposed overcrossing site. Cobbles and possible boulders were encountered at isolated locations near Leigh Avenue. Sampling refusal was met in many of the drill holes in the area below a depth of about 10 feet.

Soils at Union Avenue Interchange consist predominantly of dense to very dense, silty sand, and clayey sand with interbeds of gravel. Random beds of stiff to hard, gravelly, sandy clay were also encountered. Cobbles and possible boulders were encountered in many of the drill holes in the area of Union Avenue below a depth of about 10 feet. Sampling refusal was met in many of the drill holes in the area below a depth of about 10 feet.

At Samaritan/White Oaks Pedestrian Overcrossing, previous exploratory borings revealed a 2 to 3 foot thick cap of sandy silt and lean clay. Below this cap, dense to very dense

clayey sand with gravel interbeds was encountered. Cobbles and possibly boulders were encountered in several of the drill holes in the area of the Samaritan/White Oaks P.O.C. Sampling refusal was met in several of the drill holes in the area from the ground surface to a depth of 40 feet.

Bascom Avenue to Stevens Creek Boulevard

The soils along the route from Bascom Avenue to Stevens Creek Boulevard are older alluvial fan deposits except near Los Gatos Creek and Saratoga Creek where the alluvial deposits are younger. The soils predominantly consist of alternating layers of medium dense to very dense silty and clayey sands and gravels, and stiff to hard lean and sandy clays. There are a few zones of sandy and clayey silts which usually occur at shallow depths. The silts and clays are generally stiff to hard with low plasticity and occasionally intermediate plasticity. The sands and gravels are usually silty or clayey except for a few scattered zones of well graded clean sands and gravels.

From Bascom Avenue to Winchester Boulevard, the soils are mostly granular. Other than an occasional 4 foot thick layer of sandy silt in the upper 40 to 60 feet the soils are silty and clayey sand and silty and clayey gravels. Cuts required to accommodate the Winchester Boulevard Interchange extended to about 19 feet below original ground surface. Therefore, roadway subgrade within this segment of SR 85 is likely to encounter silty and clayey sand and silty and clayey gravels.

From Winchester Boulevard to Quito Road, the soils consist of dense to very dense clayey and silty sands and gravels and stiff to hard lean and sandy clays. Previous borings near Winchester Boulevard indicate that the soils are predominantly gravels. Between Winchester Boulevard and Smith Creek, silty and clayey sands predominate in the upper 20 to 30 feet. Near Smith Creek and Pollard Road there are more clays and clayey gravels. Between Pollard Road and San Tomas Aquinas Creek, the soils are mostly silty and clayey sands. The borings near San Tomas Aquinas and Wildcat Creeks encountered a 20 to 30 foot thick layer of clayey gravel beneath about 8 feet of surficial silt. In the vicinity of Quito Road, the upper 20 to 30 feet consist of silts, clays, silty sands and clayey sands. This layer is underlain by silty and sandy clays that are locally more than 40 feet thick. For the 1990 SR 85 construction, this segment was formed on embankment fill with heights extending to about 22 feet; therefore, the proposed roadway subgrade should encounter fill material meeting Standard Specification embankment fill criteria.

From Quito Road to Cox Avenue, previous borings revealed that soils to the west of Quito Road become more granular because this portion of the route contains the younger alluvial fan deposits associated with Saratoga Creek. Beneath an approximately 4 foot thick surface layer of firm to very stiff sandy silt are layers of dense to very dense silty sand with gravel and stiff to hard lean and sandy clays. The thickness of the silty sand with gravel layer is generally between 20 and 35 feet except from Saratoga Avenue to Saratoga Creek where there are more silts and clays. Near Cox Avenue the surficial silt layers extend to a depth of about 15 to 20 feet below ground surface. Variable depths of cuts were made along this segment for the 1990 SR 85 construction; for example, at Quito Road, Saratoga Avenue and Cox Avenue the cuts were about 22, 19, and 20 feet, respectively. Therefore, the proposed roadway surface within this segment should encounter silty sand with gravel, with possibly silts and clays near Saratoga Avenue.

From Cox Avenue to Rodeo Creek, the soils consist of silty and clayey sands, sandy and clayey silts, and lean and sandy clays. The soil layers are generally discontinuous between the borings and usually contain some gravel. The sands are usually dense to very dense and the clays and silts are stiff to hard.

Around Rodeo Creek, soils are more clayey than other portions of the route. The upper lean and sandy clay layer varies in thickness from 4 to 54 feet. These low plasticity clays are very stiff to hard and generally contain gravel. Beneath this layer is usually 5 to 25 feet of dense to very dense silty sand and/or clayey gravel. Alternating layers of similar hard clays and very dense sands are beneath this layer.

Trending northwest to Stevens Creek Boulevard, previous borings revealed that the upper 40 to 50 feet consists of predominantly medium dense to very dense silty sand with gravel. At some locations, the sand contains some thin (3 feet) layers of firm to stiff sandy silt with gravel and stiff lean clay with gravel. Below a depth of 50 feet is a layer of very stiff to hard lean clay. In the vicinity of Stevens Creek Boulevard, there are numerous layers of clayey gravel to a maximum exploratory depth of 56 feet. Cuts varying from about 18 feet at De Anza to 20 feet at Stevens Creek Boulevard were made during the 1990 SR 85 construction along this segment. Therefore, proposed roadway subgrade should encounter very stiff to hard lean clay, with occasional clayey gravel layers.

Stevens Creek Boulevard to North Shoreline Boulevard

The as-built plans for (1) old Route 114 (now SR 85) between Homestead Road and U.S. 101 and (2) old Route 68 (now U.S. 101) northward to Stierlin Road are dated 1966. A number of structures are located within this project which extends 5½ miles; the log of test borings (LOTBs) for these structures are included in these as-built plans. The subsurface conditions at each of these structures is included in the following paragraphs. Please refer to Figure 1 for location of these structures and to Appendix A for LOTBs.

At Homestead Road OC (37-208) Boring B-1 (1960) revealed dense to compact gravel to 48 feet below ground surface; a 10-foot thick interbed of dense sandy silt was encountered.

At the Dalles Pedestrian OC (37-243) Boring B-3 (1963) revealed layers of compact to very dense silty sand, silty gravel, sandy gravel and gravelly sand to terminal depth of about 28 feet.

At Fremont Avenue UC (37-184 R/L) 1959 Borings B-1 and B-3 encountered mostly layers of silty and sandy gravel and silty sand to terminal depths of about 25 feet below ground surface.

At Stevens Creek Bridge (37- 185 R/L) 1959 Borings B-2 (at abutment), B-7 and B-8 (both in creek channel) encountered layers of silty sand, silty and sandy gravel and silt to terminal depths of 25 feet (B-2), 20 feet (B-7) and 25 feet (B-8). These three borings encountered refusal. Cobbles were encountered in B-2 below a depth of 28 feet.

At Stevens Creek Bridge (37-189) 1959 Borings B-2 and B-7 (both at abutments) and B-4 (in creek channel) revealed mostly interbeds of slightly compact to very dense silty sand, gravel, coarse sand and loose silt; occasional cobbles were also encountered. Boring depths ranged from 48 to 80 feet below ground surface.

At Route Separation at El Camino Real (37-204) 1960 Borings B-1 and B-2 encountered deposits of slightly compact to very dense silt, silty sand, coarse sand, gravelly sand and gravel to terminal depths of 70 to 75 feet below ground surface. Below depths of about 70 to 75 feet, these deposits became dense to very dense.

At Stevens Creek Northwest Connector (37-201 O/L) Boring B-2 (1960) revealed alternating layers of slightly compact to very stiff silt, organic silt, very stiff silty clay, soft clay, slightly compact silty sand and dense sand to a depth of about 60 feet below ground surface. Occurring below these layers are dense to compact gravel and sand, which in turn are underlain by a layer of stiff blue clay to the terminal depth of about 80 feet below ground surface.

At Mountain View Overhead (37-207 R/L, on Evelyn Avenue) two rotary wash Borings were drilled in 1960: B-1 and B-4. In Boring B-1 granular layers consisting of mostly loose to slightly compact silty sand, clean sand, silt with sand, and some gravel lenses to the terminal depth of 75 feet below ground surface. At Boring B-4, stiff black silty clay was revealed to a depth of 18 feet below ground surface; it was underlain by very loose to slightly compact silty sand, sand and sandy silt to a depth of 68 feet. Occurring below the latter deposit is a dense to very dense layer of sand and gravel terminating at a depth of 72 feet below ground surface.

At Stevens Creek Bridge (37-197 R/L), three rotary wash borings were drilled in 1960: B-2, B-5 and B-6. Within the upper 30 feet, deposits of loose to dense silty sand and silty gravel, soft to very stiff silty clay were revealed. Below 30 feet, in general granular layers were encountered including dense silty sand, clayey gravel, sandy gravel, medium to coarse sand to the terminal depth of about 50 to 80 feet below ground surface. Occasional interbeds of soft to stiff silty clay and clay were noted.

At Middlefield Road OC (37-213) 1962 Boring B-1 revealed alternating layers of loose to dense silty sand, clayey sand and gravel, and soft to stiff clayey silt to the terminal depth of 72 feet below ground surface.

At Moffett Boulevard UC (37-187), three rotary wash borings were drilled in 1959: B-1, B-5 and B-7. Within the upper 20 to 25 feet, layers of soft to very stiff silty clay occurred. These clay deposits were underlain mostly by granular layers consisting of loose to very dense sand and gravel, silty sand, clayey sand, and silty gravel; these granular layers extended to terminal boring depths of 67 to 93 feet below ground surface.

At Route 114/68 (now SR 85/U.S. 101) Separation (37-186), three rotary wash borings were drilled in 1959: B-2, B-4 and B-6. To a depth of 30 to 35 feet below ground surface, layers of soft to stiff silty clay were encountered; interbeds of loose to compact clean sand and gravel occurred. Below a depth of about 35 feet, alternating beds of slightly compact to dense silty sand, clayey sand, clean sand and gravel occurred, as well as soft to very stiff silty clay. These deposits extended to terminal boring depths of 60 to 80 feet below ground surface.

North Shoreline Boulevard to Oregon Expressway

Along U.S. 101, alluvium was encountered in borings either beginning at the ground surface or underlying the road base and fill materials. An existing pavement section typically consisting of asphalt concrete overlying aggregate base material was

encountered in a number of borings. Pavement sections included 4 to 11 inches of asphalt concrete over 6 to 46 inches of aggregate base and aggregate subbase. Borings at creek crossings encountered fill that ranges from about 3 feet thick to as much as 9½ feet in thickness. The fill consisted of locally derived clay and sand with gravel.

The alluvium consists of complexly interbedded lean and fat clay, clayey, silty sand, and well-graded sand with silt. In general, the clay alluvium is soft to very stiff and the sand interbeds are medium dense to dense. Fine grained soils encountered at shallow depths (less than 10 feet) from southern end of Permanente Creek northward to about San Antonio Road Overcrossing are generally classified as lean clay. Fine grained soils encountered north of San Antonio Road overcrossing to the end of project at Oregon Expressway at shallow depths are mainly classified as fat clay. North of San Antonio Road overcrossing fine grained soils encountered at shallow depths are generally soft to stiff in consistency. Fine grained soils south of San Antonio Road overcrossing are generally medium to very stiff in consistency. Fine grained soils encountered between depths of 10 to 50 feet are generally classified as medium stiff to stiff lean clay and soils below depths of 50 feet are alternating layers of medium stiff to very stiff lean and fat clay.

2.3.3 Groundwater

During the 1988 explorations, groundwater was encountered from 23 to 78 feet below ground surface, corresponding to Elevation 119 feet to Elevation 196 feet.

Groundwater levels near Coyote Creek, encountered between Elevation 196 feet and Elevation 186 feet during 1988 explorations, is controlled primarily by water levels in the creek. Historic records, however, indicate groundwater levels have been as high as a few feet below ground surface.

Near Bernal Road Undercrossing, groundwater was encountered at depths of 50 to 75 feet (Elevation 157 feet to Elevation 134 feet). Historic groundwater levels for this section of the highway are as shallow as about 15 to 20 feet below ground surface.

At Perimeter Road Undercrossing, groundwater was encountered at depths of 75 feet (Elevation 119 feet) to 72 feet (Elevation 123 feet). Historic groundwater levels for this section of highway are as shallow as about 10 to 15 feet below ground surface.

Around Almaden Expressway Interchange, groundwater was not encountered within the maximum 100 foot depth of exploration at this site in the summer of 1988. Groundwater levels for this area are expected to be controlled primarily by water levels in the adjacent Guadalupe River. Historic records indicate groundwater levels in the area have been as high as about 15 feet below ground surface.

At Ross Creek, groundwater was encountered at depths of between 18 and 24 feet (Elevation 192 to 185 feet) below ground surface in 1988. Water levels measured in previously installed piezometers had risen to Elevation 194 feet to 196 feet in late October 1988. Water levels in the area are expected to closely follow water levels in the Ross Creek channel, which was dry in the summer of 1988 when subsurface exploration was performed. Historic water level measurements suggest that groundwater along and near the Ross Creek channel could be as shallow as present ground surface, or a few feet below ground surface, after periods of heavy rainfall.

At Russo Drive POC and Dent Avenue POC, groundwater was not encountered within the maximum depth of exploration (64 to 84 feet) in the summer of 1988. However, historic records indicate groundwater levels have been as high as about 20 feet below ground surface in the general area.

At Camden Avenue Interchange, groundwater was encountered at depths of 18 to 43 feet (Elevation 192 feet to 166 feet) at the time of drilling in 1988. Historic groundwater levels in the area have been as high as present ground surface, or a few feet below ground surface, after heavy rainfall.

At Leigh Avenue Overcrossing, Union Avenue Interchange, and Samaritan/White Oaks Pedestrian Overcrossing, groundwater was not encountered within the maximum 100 foot depth of exploration in the summer of 1988. Historic records indicate groundwater levels in the area have been as high as about 15 to 25 feet below ground surface.

The depth to groundwater varied from 9 feet near Los Gatos Creek to more than 76 feet near Bascom Avenue during previous exploration in 1988.

From Winchester Boulevard to Quito Road, the minimum depth to groundwater encountered during previous explorations in 1988 was about 20 feet. However, historic (1958) explorations near Pollard Road revealed that groundwater was as shallow as 1.5 feet deep.

From Quito Road to Rodeo Creek, the majority of hollow stem auger borings drilled in 1988 revealed dry conditions to maximum depth of exploration. However, the depth to the groundwater at the time of drilling in 1988 varied from 8 feet near Calabazas Creek to over 100 feet near Saratoga-Sunnyvale Road.

During the 1960 explorations north of Homestead Road, groundwater was encountered at variable depths as described below. Since rotary wash method of drilling was used in most locations, groundwater was not measured at most locations.

At Homestead Road OC (37-208), groundwater was not encountered to terminal depth of 48 feet in rotary wash Boring B-1 (1960).

At The Dalles POC (37-243), groundwater was not encountered to terminal depth of 28 feet in Boring B-3 (1963).

At Fremont Avenue UC (37-184 R/L), groundwater was not encountered to terminal depths of about 25 feet in 1959 sampler Borings B-1 and B-3.

Although groundwater was not encountered in 3 sampler borings (1959) at Stevens Creek Bridge (37-185), water level in Stevens Creek ranged from Elevation 183.7 to 184.1.

At Stevens Creek Bridge (37-189) groundwater was not encountered in rotary wash borings to terminal depths of 48 to 80 feet below ground surface.

At Route Separation at El Camino Real (37-204) groundwater was not encountered in rotary wash borings (1960) to terminal depths of 70 to 75 feet below ground surface.

At Stevens Creek Northwest Connector (37-201 O/L) groundwater was encountered in 1960 in Boring B-2 at a depth of 43 feet below ground surface (Elevation 67.3 feet).

At Mountain View Overhead (37-207 R/L) groundwater was encountered in 1960 in only Boring B-1 at a depth of 46.8 feet below ground surface (Elevation 42.5 feet).

At Stevens Creek Bridge (37-197 R/L) groundwater was not encountered in 1960 rotary wash Borings B-2, B-5 and B-6. However, groundwater was encountered in CPT B-4 at a depth of 60 feet (Elevation 12.2 feet).

At Middlefield Road OC (37-213) groundwater was not encountered in 1962 rotary wash Boring B-1. However, groundwater was encountered in CPT B-2 at a depth of 49 feet (Elevation 15.4 feet).

At Moffett Boulevard UC (37-187) groundwater was not encountered in 1959 rotary wash borings to terminal depths of 67 to 93 feet below ground surface.

At SR 85/U.S 101 Separation (37-186), groundwater was not encountered in 1959 rotary wash borings to terminal depths of 60 to 80 feet below ground surface. However, groundwater was measured in the following CPTs:

Table 2-2 Groundwater Level Measurements

CPT No.	Groundwater Depth (feet)	Groundwater Elevation (feet)
B-5	23.5	13.8
B-7	25.1	11.8
B-8	26.2	11.3

From North Shoreline Boulevard, groundwater encountered in auger borings ranged from 3 to 28 feet below ground surface. Based on a general profile, we can infer that in the northern segment of this reach where ground surface elevations are lower, the groundwater level is expected to be around Elevation 2 to 4 feet, similar to the surface water level in Matadero and Adobe Creeks. Near U.S. 101 northbound on ramp at San Anthonio, the depth of groundwater varies considerably from about Elevation 4 to 15 feet. The groundwater level is probably subject to some influence of tidal fluctuation. No groundwater springs or seeps were observed on or near the project alignment. Groundwater levels may vary considerably in the area with seasonal rainfall or with tidal cycles.

3 AS-BUILT FOUNDATION DATA

Over 30 overcrossings, undercrossings and bridges provide grade separations for SR 85 over and under city and county roadways, and rivers and creeks. Available as-built data retrieved from VTA, Caltrans, as well as URS files, are presented in Appendix A.

4 POTENTIAL GEOTECHNICAL, GEOLOGIC AND SEISMIC IMPACTS WITH PROPOSED MITIGATION MEASURES

4.1 Overhead Sign Structure Foundations

The subsurface conditions along most of the alignment consist primarily of dense sand and gravels with interbeds of stiff clays and silts, and groundwater levels at locations other

than creek crossings are generally more than 30 feet in depth. Therefore, Standard Plan foundation of a single cast-in-drilled-hole (CIDH) pile is considered feasible. The design of CIDH piles is based on granular soils above groundwater (unsubmerged). Some of the proposed locations of overhead signs could encounter groundwater within the standard plan pile depths of 25 feet. Site specific conditions should be evaluated if the standard plan assumptions are applicable.

However, at the north end of the project, between approximately El Camino Real and Oregon Expressway, layers of soft to stiff silty clay were encountered from ground surface to depths in the order of 20 to 30 feet below ground surface. Groundwater was measured in this area at depths ranging from about 3 to 28 feet. In consideration of these soft to stiff clays, a non-standard foundation for overhead signs will be required in this area, consisting of either driven piles or drilled piers.

4.2 Pavement Design Considerations

Based on review of available subsurface information and our experience with similar materials, R-values of the onsite native soils in the existing median and shoulders varies from 5 to 80. In general, new pavement for the widening in the median or shoulders should be anticipated to have a subgrade design R-value higher than 15. For the segment between Stelling Road/Regnart Creek and Rodeo Creek, west of Prospect Road, the design R-value should be expected on the order of 5.

4.3 Seismic and Geologic Hazards

4.3.1 Regional Tectonic Setting and Seismicity

The project alignment lies between known active and potentially active geologic faults. In general, earthquakes occur as a result of movement along active faults. For the purpose of activity classification, faults are generally grouped into the following categories by the California Geological Survey (Jennings and Bryant, 2010):

- Holocene: displacement has occurred within the last 10,000 to 11,000 years.
- Late Quaternary: displacement has occurred within the last 700,000 years, but evidence of Holocene activity is lacking.
- Quaternary: evidence of displacement within the last 1.6 million years, but evidence of Holocene activity is lacking.
- Pre-quaternary: no recognized evidence of displacement in the last 1.6 million years.

Generally, faults with Holocene movement are considered to be “active” while faults with late Quaternary to Quaternary movement are considered to be “potentially active”.

The Foothills fault system is a series of southwest, dipping thrust faults located along the range front of the Santa Cruz Mountains (Bürgmann et al., 1994). The Monte Vista-Shannon, Cascade and Sargent faults are the main active faults in the Foothills thrust system. The Monte Vista-Shannon fault zone is approximately 27 miles long and dips at a moderate angle to the southwest, merging with the San Andreas fault at depth. The

Cascade fault is approximately 22 miles long. The Sargent fault is approximately 35 miles long and merges with the San Andreas fault near Loma Prieta.

The closest active faults to the project alignment are the San Andreas, Silver Creek, Cascade and Monte Vista faults (Caltrans Deterministic PGA Map, 2007). The Caltrans Seismic Map (Mualchin, 1996) divides the Monte Vista fault into west and east branches. In the 2007 Caltrans Deterministic PGA Map the Monte Vista East fault has been renamed as Cascade fault. The California Geological Survey (2000) has produced maps showing Alquist-Priolo Earthquake Fault Zones along faults with known Holocene activity that pose a potential surface faulting hazard. The San Andreas fault is included as Alquist-Priolo (A-P) zoned fault, however the Monte Vista-Shannon and Cascade faults are not.

For the purpose of discussion in this section, project alignment has been divided into 3 segments. They are 1) SR 85 alignment from U.S. 101 in South San Jose to Route 17 overcrossing (segment 1), 2) SR 85 alignment from Route 17 overcrossing to Interstate 280 undercrossing (segment 2), and 3) SR 85 alignment from I-280 undercrossing to U.S. 101 in Mountain View (segment 3). Silver Creek fault is located about 1.9 miles northeast of the southern end of segment 1. Monte Vista-Shannon fault generally parallels the SR 85 alignment in segment 2 and is located about 0.3 miles southwest of segment 2. Monte Vista- Shannon fault crosses the project alignment between Winchester Boulevard and Route 17, and between Leigh Avenue and Camden Avenue intersections. The San Andreas fault generally parallel the alignment in segment 2 and is located about 4.4 miles southwest of segment 2. Cascade fault crosses the project alignment between Camden Avenue and Almaden Expressway, and also just south of West Fremont Avenue. Cascade fault is located about 1.4 miles southwest of segment 3. Figure 4 shows active faults within the site region relative to the project. The project alignment does not cross any mapped A-P zoned faults.

The following is a brief description of the nearby active faults.

4.3.2 San Andreas Fault Zone

The dominant active fault structure in this region is the San Andreas fault. The fault extends from the Gulf of California, Mexico, to Point Delgada on the Mendocino Coast in northern California, a total distance of 746 miles. The San Andreas fault accommodates the majority of the motion between the Pacific and North American plates. This fault is the largest active fault in California and is responsible for the largest known earthquake in Northern California, the 1906 **M** 7.9 San Francisco earthquake (Wallace, 1990). Movement on the San Andreas fault is right-lateral strike-slip, with a total offset of some 348 miles (Irwin, 1990). In northern California, the San Andreas fault is clearly delineated, striking northwest, approximately parallel to the vector of plate motion between the Pacific and North American plates. Over most of its length, the San Andreas fault is a relatively simple, linear fault trace. Immediately south of the Bay, however, the fault splits into a number of branch faults or splays, including the Calaveras and Hayward faults. In the Bay Area, the main trace of the San Andreas fault forms a linear depression along the Peninsula, occupied by the Crystal Springs and San Andreas Lake reservoirs. Geomorphic evidence of Holocene faulting includes fault scarps in Holocene deposits, right-laterally offset streams, shutter ridges, and closed linear depressions (Wallace,

1990). The 1906 earthquake resulted from rupture of the fault from San Juan Bautista north to Point Delgada, a distance of approximately 295 miles. The average amount of slip on the fault during this earthquake was 16.7 feet in the area to the north of the Golden Gate and 8.2 feet in the Santa Cruz Mountains (WGNCEP, 1996).

Based on differences in geomorphic expression, fault geometry, paleoseismic chronology, slip rate, seismicity, and historic fault ruptures, the San Andreas fault is divided into a number of fault segments. Each of these segments is capable of rupturing either independently or in conjunction with adjacent segments. In the Bay Area, these segments include Santa Cruz Mountains, the Peninsula, and the North Coast segments. These fault segments have calculated maximum earthquakes of **M** 7.2, 7.3, and 7.7, respectively. The North Coast segment may also be subdivided into two shorter segments with a boundary at Point Arena. These northern and southern North Coast segments are capable of generating earthquakes of M 7.5 and 7.7, respectively.

South of the Golden Gate, the fault slip rate is 0.67 $\pm$ 0.27 in/yr (Hall *et al.,* 1999). North of the Golden Gate, the slip rate increases to 0.94 $\pm$ 0.20 in/yr (Niemi and Hall, 1992). WGCEP (1999) assigns a recurrence interval of 361 years to a **M** 8.0 1906-type event on the San Andreas fault, with a 21 percent probability of a **M** 6.7 or larger earthquake on San Andreas in northern California in the time period 2000 and 2030. Recent investigations indicate that the repeat time for large earthquakes on the North Coast segment may be less than 250 years.

4.3.3 Foothills Thrust Belt (Monte Vista-Shannon and Cascade Faults)

The southwestern margin of the Santa Clara Valley is bounded by the rugged, young southern Santa Cruz Mountains. Late Cenozoic uplift of the mountains has occurred, in part, along a series of northwest-striking reverse faults, known as either the Loma Prieta domain (Aydin and Page, 1984) or Foothills thrust belt (Bürgmann *et al.*, 1994), bordering the northeastern margin of the range front. Bounded by the main trace of the San Andreas fault to the west, this sequence of southwest-dipping thrusts, associated with a restraining left bend in the San Andreas fault, has been responsible for the uplift of the Santa Cruz Mountains (Bürgmann *et al.*, 1994). These faults offset the Pliocene and Pleistocene Santa Clara Formation, and locally offset and deform overlying Quaternary sediments and geomorphic surfaces within the range-front communities of Palo Alto, Los Altos Hills, Cupertino, Saratoga, and Los Gatos, located along the southwestern margin of the Santa Clara Valley (Hitchcock and Kelson 1999; Hitchcock *et al.* 1994). The up-dip projection of the blind Loma Prieta fault, which is interpreted to have been the source of the 1989 **M** 6.9 Loma Prieta earthquake (Bürgmann *et al.*, 1994), coincides with the Foothills thrust belt.

The Monte Vista-Shannon fault is one of the primary range-front faults and probably the most extensively studied fault in the Foothills thrust belt. The exposed fault strikes northwest and places Franciscan, Miocene, Santa Clara Formation, and Pleistocene alluvium over Pleistocene and older strata. To the south, the fault merges with the Shannon fault, while at its northern end it intersects the San Andreas, via the Hermit fault, between Woodside and Redwood City. Limited exploratory trenching indicates that the Monte Vista-Shannon fault has had late Quaternary and possibly Holocene displacement. Recent geomorphic mapping by Hitchcock *et al.* (1994) shows that late Pleistocene fluvial

terraces flanking Stevens Creek are deformed. The style of late Quaternary deformation affecting these terrace surfaces is consistent with reverse faulting on the Monte Vista faults. Hitchcock and Kelson (1999) estimated an average late Pleistocene slip rate of 0.0067 ± 0.0035 in/yr for the Monte Vista-Shannon fault.

The Cascade fault traverses the coalescent alluvial-fan complex underlying the Santa Clara Valley approximately 1 to 4 miles northeast of the Santa Cruz Mountains range front. Hitchcock et al. (1994) show a strong correlation between the mapped trace of the Cascade fault and fault-related geomorphic features, including vegetation lineaments, closed depressions, linear drainages, stream profile convexities, and high-sinuosity stream reaches. These features are developed in late Pleistocene (and possibly Holocene) displacement along the Cascade fault. Between Los Altos Hills and Los Gatos, most of the major streams show longitudinal profile convexities where they cross mapped trace of the Cascade fault. In general, the crests of the convexities coincide with the zone of lineaments. These relations indicate late Pleistocene uplift along this section of the Cascade fault (Hitchcock et al., 1994). Although this provides little or no information on the sense of slip and the amount and direction of the fault dip, it is likely that the Cascade fault is a southwest dipping, northeast vergent reverse fault similar to, but perhaps having a shallower dip in the near surface than the Monte Vista-Shannon fault (Fenton and Hitchcock, 2001).

4.3.4 Silver Creek Fault Zone

The Silver Creek fault is mapped as steep, east dipping oblique reverse fault with an exposed well documented southern fault section and an inferred northern section buried beneath late Quatenary sediments of Santa Clara Valley. The southern section extends approximately 19 miles from the Anderson Reservoir, northeast of Morgan Hill, where it splays from the Coyote Creek fault to the mouth of the Silver Creek Valley, southwest of the town of Evergreen. Northern section is approximately 25 miles long beneath Santa Clara Valley, extending from Silver Creek Valley to Alameda Creek in Fremont (Fenton and Hitchcock, 2001).

4.4 Preliminary Seismic Design Criteria

4.4.1 Seismic Design Methodology

The seismic design methodology adopted for this project is based on the following current Caltrans standards:

1) Seismic Design Criteria (SDC), v 1.4, June 2006
2) Guidelines for Foundation Investigations and Reports, v 2.0, dated March 2006
3) 2007 Caltrans Deterministic PGA Map.

4.4.2 Peak Bedrock Acceleration

The active faults close to the SR 85 project alignment are the San Andreas, Monte Vista-Shannon, Cascade, and Silver Creek faults. The San Andreas, Silver Creek, Cascade, and

Monte Vista-Shannon faults are designated with Maximum Magnitude (**M_{Max}**) magnitudes of 7.9, 7.1, 6.9, and 6.7, respectively, on the 2007 Caltrans fault database.

Table 4-1
Seismic Source Parameters

Fault	Type	M_{Max}	Distance (miles)	Near Field Effects ?
Monte Vista-Shannon	reverse	6.7	0.3	N
Cascade	reverse	6.9	1.3	N
San Andreas	strike-slip	7.9	4.4	Y
Silver Creek	reverse	7.1	1.4	N

4.4.3 Site Soil Profile

Site specific investigations are required to determine the subsurface conditions and confirm the soil profile type at the proposed structures. Please see Section 4.1 entitled "Overhead Sign Structure Foundations" for these detailed recommendations. For preliminary design of the SR 85 project structures, we recommend using Soil Profile Type D based on the guidelines given in SDC Figure B.12.

We have also estimated the shear wave velocity (V_s) is about 1,000 feet per second (fps) or 305 meters per second (mps). This V_s value was input for the Caltrans ARS Online. It should be noted the V_s = 1,000 fps falls within the soil profile Type D V_s range of 600 to 1,200 fps.

4.4.4 Fault Type and Near-Field Spectral Acceleration Increases

The 2007 Caltrans fault database indicates that the controlling fault (Monte Vista-Shannon) has strike-slip displacement. Therefore, in accordance with Caltrans design procedures referenced above, an increase in design spectral accelerations is not required for fault type. However, since the project site is less than 9.5 miles (15 km) from the nearest active fault, design spectral accelerations should be modified to account for near-fault effects as shown in Table 2.

Table 4-2
Increase in Spectral Acceleration from near Fault Effects

Period (sec)	Increase in Spectral Acceleration (%)
< 0.5	0
0.5 – 1.0	0 – 20 (determined by linear interpolation)
≥1	20

At the time of this study, no bridge structures with fundamental period of vibration greater than 1.5 seconds are anticipated, and therefore no adjustments are required for long period effects.

4.4.5 Design Acceleration Response Spectrum

The preliminary design response spectrum for the site is estimated with spectral acceleration values generated using Caltrans ARS Online (2009). This method was developed by Caltrans Geo Research Group in partnership with United States Geological Survey (USGS), Pacific Earthquake Engineering Research (PEER) and California Department of Conservation. This web-based tool calculates both deterministic and probabilistic acceleration response spectra for any location in California based on criteria provided in Appendix B of Caltrans SDC.

The deterministic spectrum is determined as the average of median response spectra calculated using the Campbell-Bozorgnia (2008) and Chiou-Youngs (2008) ground motion prediction equations developed under the "Next Generation Attenuation" project coordinated through the PEER-Lifelines program. These equations are applied to all faults considered to be active in the last 750,000 years (late-Quaternary age) that are capable of producing a moment magnitude earthquake of 6.0 or greater. The probabilistic spectrum is obtained from the USGS (2008) National Hazard Map for 5% probability of exceedance in 50 years. Caltrans design spectrum is based on the larger of the deterministic and probabilistic spectral values. Both the deterministic and probabilistic spectra account for soil effects through incorporation of the parameter Vs30, the average shear wave velocity in the upper 30 meters (100 feet) of the soil profile.

The input values we selected for Caltrans ARS Online included:

- Vs30 of 1,000 fps (305 mps)
- Maximum Magnitude (M_{Max}) Magnitude 6.7 (Monte Vista -Shannon fault)
- No ARS increase for fault-type or long period structure
- ARS increase for near-field effects

The calculated spectra for both deterministic and probabilistic methods for all 3 segments as described in Section 4.3.1 are presented graphically in Figures B1, B2, and B3 (See Appendix B). Since the maximum spectral acceleration curve is the USGS 5% in 50 years hazard, these curves are presented in Figures B4, B5, and B6 as a design curves. Spectral values (from Figures B4, B5, and B6) are provided below in Tables 4-3, 4-4, and 4-5.

Table 4-3: Spectral Acceleration Values for Segment 1
(SR 85 Alignment from U.S. 101 to Route 17 Interchange)
(V_s= 305 mps, Lat. = 37.25548371, Long. = -121.85889781)

Period (seconds)	Sa (g)	Sa* (g)
0.010	0.566	0.566
0.020	0.665	0.665
0.030	0.730	0.730
0.050	0.822	0.822
0.075	0.903	0.903

Period (seconds)	Sa (g)	Sa* (g)
0.100	0.965	0.965
0.120	1.010	1.010
0.150	1.067	1.067
0.170	1.100	1.100
0.200	1.145	1.145
0.240	1.155	1.155
0.300	1.168	1.168
0.400	1.112	1.112
0.500	1.070	1.070
0.750	0.907	0.998
1.000	0.735	0.882
1.500	0.526	0.631
2.000	0.415	0.498
3.000	0.271	0.325
4.000	0.195	0.234
5.000	0.158	0.190

Table 4-4: Spectral Acceleration Values for Segment 2
(SR 85 Alignment from Route 17 to Interstate 280 Interchange)
(V_s= 305 mps, Lat. = 37.27685304, Long. = -122.00746)

Period (seconds)	Sa (g)	Sa* (g)
0.010	0.652	0.652
0.020	0.759	0.759
0.030	0.829	0.829
0.050	0.927	0.927
0.075	1.013	1.013
0.100	1.079	1.079
0.120	1.130	1.130
0.150	1.196	1.196
0.170	1.235	1.235
0.200	1.287	1.287
0.240	1.321	1.321
0.300	1.364	1.364
0.400	1.335	1.335
0.500	1.312	1.312
0.750	1.156	1.272
1.000	0.955	1.146
1.500	0.699	0.839
2.000	0.560	0.672
3.000	0.380	0.456
4.000	0.277	0.332
5.000	0.223	0.268

Table 4-5: Spectral Acceleration Values for Segment 3
(SR 85 Alignment from Interstate 280 to U.S. 101 Interchange)
(V_s= 305 mps, Lat. = 37.37816744, Long. = -122.06764877)

Period (seconds)	Sa (g)	Sa* (g)
0.010	0.571	0.571
0.020	0.668	0.668
0.030	0.732	0.732
0.050	0.822	0.822
0.075	0.901	0.901
0.100	0.962	0.962
0.120	1.008	1.008
0.150	1.066	1.066
0.170	1.101	1.101
0.200	1.148	1.148
0.240	1.166	1.166
0.300	1.190	1.190
0.400	1.147	1.147
0.500	1.114	1.114
0.750	0.962	1.059
1.000	0.793	0.952
1.500	0.580	0.696
2.000	0.464	0.557
3.000	0.313	0.376
4.000	0.228	0.273
5.000	0.184	0.221

*Modified with near-fault factors outlined in Section 4.4.4.

4.5 Surface Fault Displacement and Ground Shaking

The project site is not in the vicinity of any Alquist-Priolo Earthquake Fault Zones**.** Although the alignment crosses the Monte Vista and Cascade faults, the preponderance of available geologic data indicate the most recent episode of ground surface rupture predated Holocene time and may have been pre-late Pleistocene. The likelihood of ground surface rupture on these faults is considered low. Therefore, surface rupture due to faulting at the site is not expected to occur. However, the short distance to the San Andreas fault (4.4 miles) and other more distant active faults does create a high risk for ground shaking from fault movement. The intensity of the ground shaking is dependent upon the size of the earthquake, the distance of the epicenter from the site, the direction that the earthquake propagates along the fault, and the site geologic conditions. Section 4.3.1 entitled "Regional Tectonic Setting and Seismicity" discusses the anticipated seismic shaking from these faults.

4.6 Landslides

SR 85 and connecting segments of U.S. 101 are on relatively flat ground along the project alignment. Landsliding is not a potential hazard.

4.7 Liquefaction

Liquefaction is a phenomenon whereby sediments temporarily lose shear strength and collapse. This condition is caused by cyclic loading during earthquake shaking that generates high porewater pressures within the sediments. The soil type most susceptible to liquefaction is loose, cohesionless, granular soil below the water table and within about 50 feet of the ground surface. Liquefaction can result in loss of foundation support and settlement of overlying structures, ground subsidence and translation due to lateral spreading, lurch cracking, and differential settlement of affected deposits. Lateral spreading occurs when a layer liquefies at depth and causes horizontal movement or displacement of the overburden mass toward a free face such as a stream bank or excavation, or towards an open body of water.

In a regional study of the nine-county San Francisco Bay region for the U.S. Geological Survey, Witter et al. (2006) mapped the liquefaction susceptibility of the site soils in the project vicinity. The Association of Bay Area Governments (ABAG, 2004) has also published a liquefaction susceptibility map based on mapping in the USGS Open File Report 00-444 by Knudsen et al (2000). A copy of this map is included as Figure 5.

The map indicates the project alignment as follows:

- Moderate liquefaction susceptibility from U.S. 101/SR 85 in the southern end of the alignment to west of Almaden Expressway Interchange;
- Low liquefaction susceptibility from west of Almaden Expressway Interchange to I-280 Interchange;
- Moderate liquefaction susceptibility from I-280 Interchange to U.S. 101 in the northern end of the alignment.

High to very high liquefaction susceptibility has been mapped along short reaches of the alignment within younger fluvial deposits where larger drainages are crosses such as Coyote Creek, Guadalupe River, Los Gatos Creek, Saratoga Creek and Stevens Creek. Very high liquefaction susceptibility has also been mapped along Route 101 between San Antonio Road and Oregon Expressway where the alignment is underlain by bay mud deposits.

During final design of the project a detailed liquefaction evaluation should be completed at planned foundation locations of the overhead sign structures. The potential for lateral spreading along the project alignment is considered low, nevertheless, during final design, lateral spreading should be evaluated. The potential for cyclic densification of the unsaturated fill soils should also be evaluated.

4.8 Subsidence and Settlement

Subsidence typically occurs as a result of subsurface fluid extraction (e.g. groundwater, petroleum) or compression of soft, geologically young sediments. Groundwater extraction for high volume municipal and agricultural use has the potential to cause future ground subsidence in the region. However, we are not aware of subsidence in the area. No active petroleum wells are present within many miles of the site (California Division of Oil, Gas, and Geothermal Resources, 2001). In addition, there was no reported subsidence in the area near a groundwater extraction system installed for mitigating subsurface contamination at the former IBM site.

Settlement can occur quickly when soil is loaded by a structure or by the placement of fill on top of soil, and it can also occur gradually when soil pore pressures, increased by vertical loading, gradually dissipate over time. Since no extensive fill loads are expected for this project, the potential impact and hazards of subgrade soil settlement due to embankment loading are considered low.

Compaction settlement, or seismic densification, occurs when loose granular soils above the water table increase in density as a result of earthquake shaking. The soil densification can result in differential settlement because of variations in soil composition, thickness, and initial density. As previously mentioned, occasional layers of loose to medium dense granular soils were encountered. These granular layers may be subject to cyclic densification during strong ground shaking, resulting in compaction settlement. An analysis of the amount and location for compaction settlement to occur should be completed during the final design and be mitigated through appropriate foundation design.

4.9 Flooding

The southeastern segment of the project alignment, east of Highway 17 Interchange, is located in "urbanized area" according to the ABAG flood hazard map (2007); i.e. outside any FEMA flood zones (Zones V, A or X500). Portions located northwest of the Highway 17 Interchange are located within Zone X500. The code X500 indentifies areas (1) inundated by 0.2% annual chance flooding, (2) inundated by 1% annual chance flooding with average depths of less than 1 foot, (3) inundated by 1% annual chance flooding with drainage areas less than 1 square mile, or (4) that are protected by levees from 1% annual chance flooding. The northern portion of the alignment along U.S. 101 (northwest of Rengstorff Avenue) is located within Zone A, a code identifies an area inundated by 1% annual chance flooding. A copy of the ABAG flood hazard map is included as Figure 6.

4.10 Erosion

Throughout the 27 miles of project alignment, we understand existing slope inclinations are in general 2 to 1 (horizontal to vertical), and in special cases 1-½ to 1. The southernmost project segment is along U.S. 101 between Metcalf Road and SR 85, where a majority of the northbound (NB) roadway is positioned in well vegetated (grasses) cuts; whereas the southbound (SB) roadway is located in both fills and well vegetated (grasses) cuts. A concrete barrier wall is located in the U.S. 101 median; the ground surface on the

west side of the median typically is well vegetated (grasses) whereas the east side is typically paved with portland cement concrete (PCC). Typically there is a differential height of several feet of the ground surface along this median wall. Since proposed express lanes are planned adjacent to the median, only a slight change of rate of erosion is expected from this new project.

Along most of SR 85, between U.S. 101 and Almaden Expressway, the roadway surface is close to original grade. Only a few retaining walls were built and these are mostly at interchanges. Since proposed express lanes are planned in median, only a slight change of rate of erosion is expected from this new project.

Continuing along SR 85 between Almaden Expressway and I 280, a majority of the roadway is located in deep cuts (20 feet or deeper) retained by concrete retaining walls. A sloped soil toe was frequently observed at the base of the retaining walls; these slopes contain numerous shrubs, with limited grass covers. The exposed slopes revealed granular materials (sands and gravels); there are no apparent signs of erosion observed on these sloped soil toes. Sound walls are common and located on top of or in back of the retaining walls. The median consists of exposed soil (no vegetation) with a metal traffic barrier down the middle. Since the cut faces are mostly exposed reinforced concrete walls, no change in erosion rates are expected for this new project.

For the segment of SR 85 from I 280 to U.S. 101, a majority of the roadway is positioned on embankment fill, with numerous sound walls near the hinge points. Where encountered, cut faces vary considerably in height and slopes appear to be well vegetated. Medians are paved along most of this segment.

The northernmost project segment is along U.S. 101 between SR 85 and Oregon Expressway. Both the NB and SB roadways in this segment are level, since they are located in relatively flat topography. Consequently, cuts and fills are small. Median is typically covered with pavement in this segment.

4.11 Corrosion

Based on a review of 1989 Materials Reports, onsite soils and embankment fill derived from depressed section excavations are considered to be non-corrosive. The corrosion test results indicate a pH value of 6.9 to 9.6, a minimum resistivity of 1,168 to over 20,000 ohm-cm (less than 7% samples tested were below 2,000 ohm-cm), a water soluable chloride content of 3.5 to 85 ppm, and a water soluable sulfate content of 4 to 200 ppm.

4.12 Climate

The climate in this area is characterized by moderate climatic conditions. This consists of mild winters, mild summers, small daily and seasonal temperature ranges and high relative humidity. Based on statistical data from the Weather Channel "www.yahoo.com", extreme temperatures would range from average low temperature of 41° F in December and January to average high temperature of 84° F in July and August in Mountain View, Cupertino, Saratoga, and San Jose, California. Average monthly precipitation varies from less than 0.1 inch to 3 inches in the months of July and January, respectively.

5 ADDITIONAL FIELD WORK AND LABORATORY TESTING

The extensive available geotechnical data along the project alignment will form the basis of the preliminary geotechnical recommendations for the foundation design of the overhead signs. However, specific site data may not be available at the subgrade of the planned widen pavements or the locations of the overhead signs; Caltrans Standard Plan overhead sign structures are to be supported on cast-in-drilled-hole (CIDH) piles of 14 to 25 feet in depth. Therefore, additional explorations should be planned to supplement the existing available subsurface data during the design phase. Based on the Express Lane System access points, we understand that there will be approximately one overhead sign per exit point and three signs per entry point. For planning purpose, at locations where no existing data are available one boring at each sign location should be conducted. In addition, pavement subgrade should be investigated using shallow borings (10 feet maximum depth) at about 1,500 feet intervals; approximately 48 borings will be needed to supplement the existing available data. The borings should be logged and sampled at selected intervals for laboratory testing. Laboratory testing should be performed on soil samples to evaluate in-situ moisture content, dry density, gradation, Atterberg limits, R-value, soil corrosivity, and consolidation characteristics. Subsurface explorations and laboratory test data will help to estimate the engineering parameters of the materials encountered.

6 LIMITATIONS

This study is intended for preliminary design purposes only. The opinions, conclusions and recommendations presented herein are based on available subsurface information developed by others. The preliminary recommendations presented in this report are based on the assumption that the soil and geologic conditions do not deviate substantially from those anticipated by the information contained in the existing logs of test borings. Available site specific exploration and analysis should be completed prior to the development of final design recommendations.

Existing facilities, utilities, soils/bedrock conditions, road/structure distress, slope distress or groundwater/seepage conditions other than those noted herein have not been considered in the preparation of this report. Locating utilities and evaluating potential utility interference is outside the scope of this report. Individuals utilizing this report should inform URS Corporation if they are aware of any additional facilities or site conditions so that their presence and impact upon the project (or vice-versa) can be properly evaluated and recommendations modified to address geotechnical issues as necessary.

Specific review and investigation for environmental issues and subsurface environmental contamination were beyond the scope of our services.

The opinions and recommendations presented in this report were developed with the standard of care commonly used by other professionals practicing at the same time, within the same locality and under the same limitations. No other warranties are included, either express or implied, as to the professional advice included in this report.

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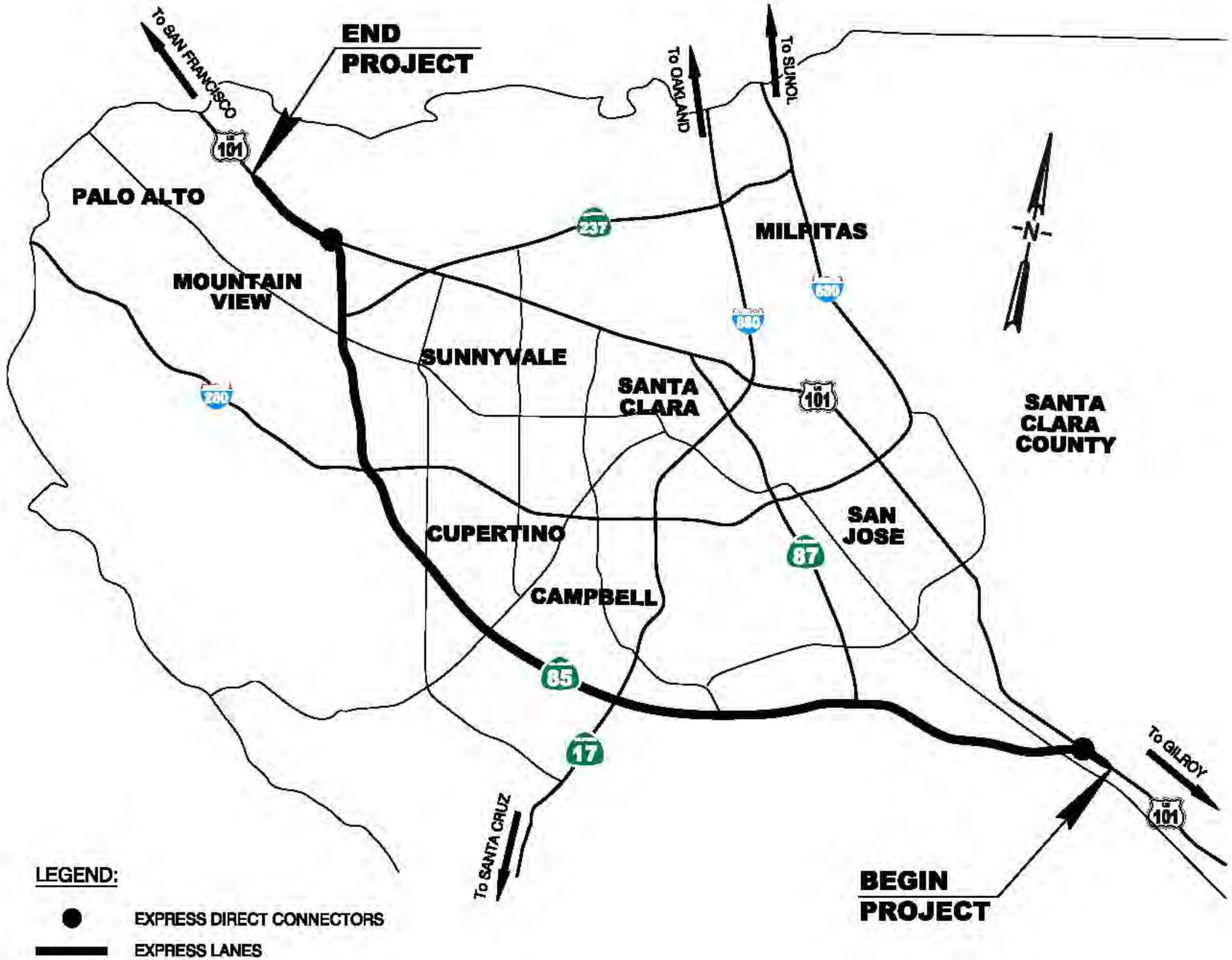
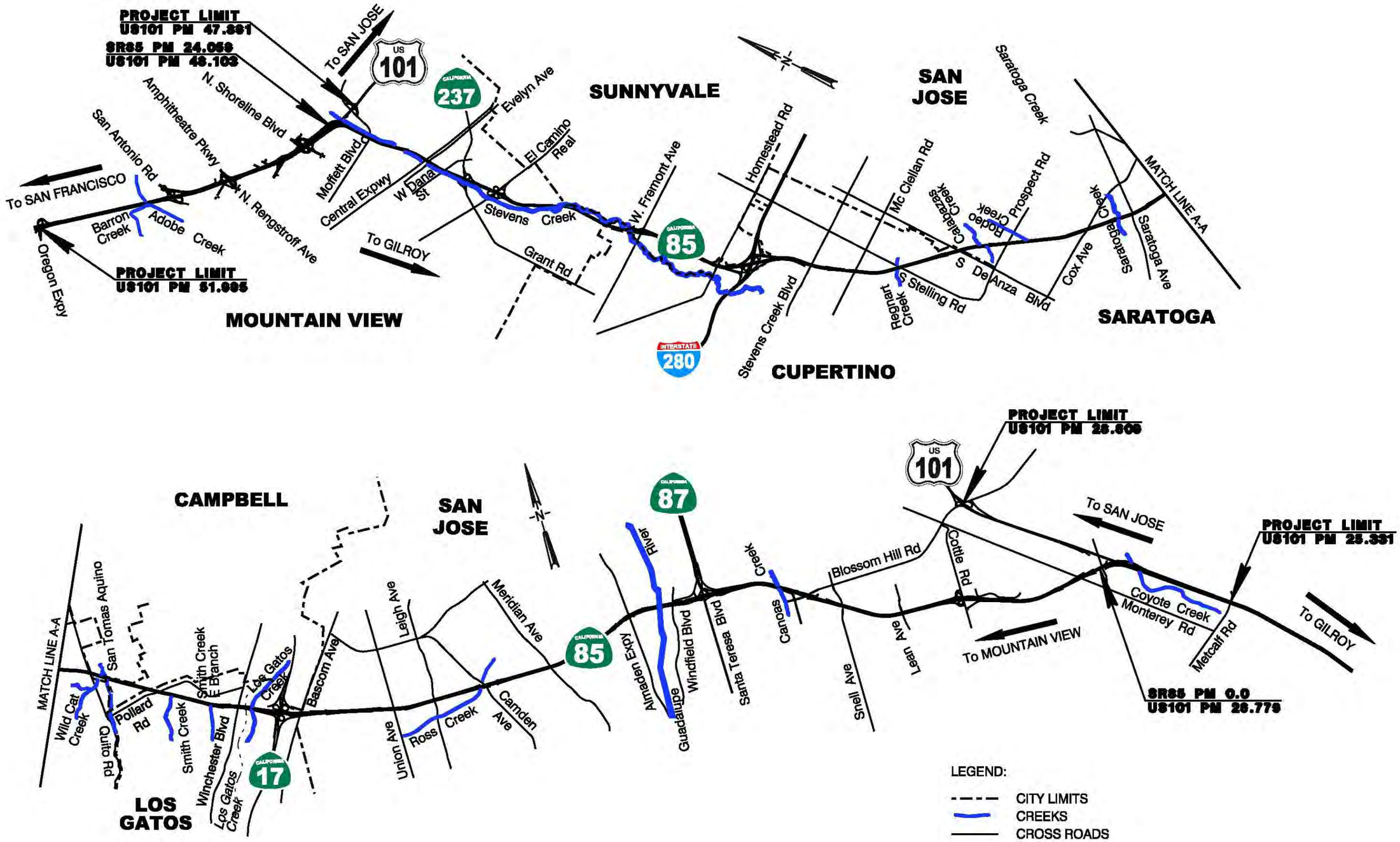


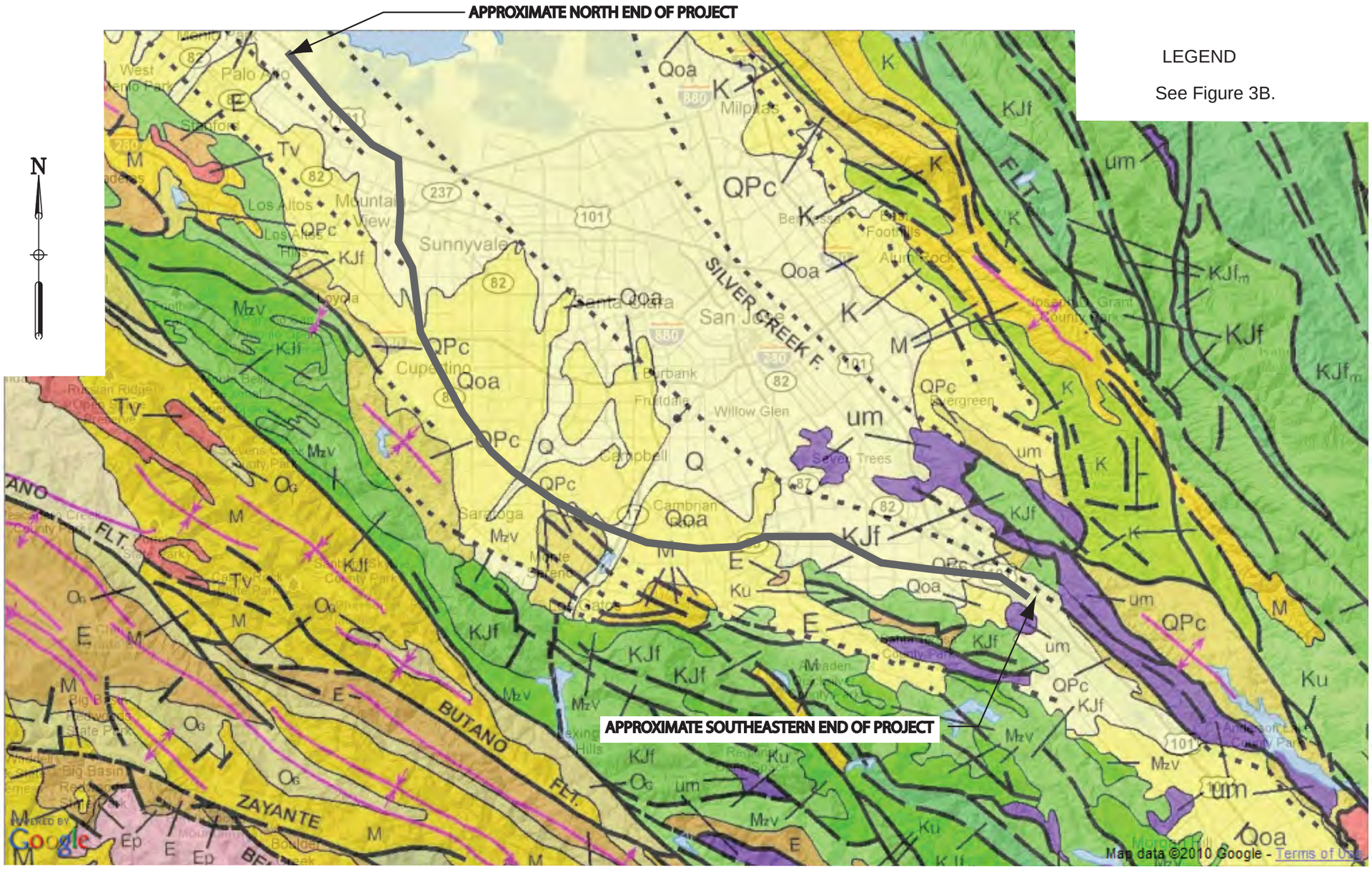
SR 85 EXPRESS LANES PROJECT
SANTA CLARA COUNTY, CA
EA 04-4A790K

FIGURE : 1
PROJECT VICINITY MAP



SR 85 EXPRESS LANES PROJECT
SANTA CLARA COUNTY, CA
EA 04-4A790K

FIGURE 2
PROJECT LOCATION MAP



LEGEND

See Figure 3B.

Source: California Geological Survey - 2010 State Geologic Map of California .

0 1 2 3 4 5 mile

URS	SR 85 HOT Santa Clara County, California Project Number: 28645170	Site and Geologic Map Santa Clara County, California	Figure 3A June 25, 2010

GEOLOGIC LEGEND

(GENERALIZED DESCRIPTION OF ROCK TYPES)

		MARINE SEDIMENTARY ROCKS	NONMARINE (CONTINENTAL) SEDIMENTARY ROCKS	VOLCANIC ROCKS	PLUTONIC ROCKS
CENOZOIC, QUATERNARY, Pleistocene - Holocene		Qs: Extensive marine and nonmarine sand deposits, generally near the coast or desert playas.	Qls: Selected large landslides, such as the Blackhawk Slide on the north side of San Gabriel Mountains; early to late Quaternary.	Qrv: Recent (Holocene) volcanic flow rocks; minor pyroclastic deposits. Qrv^p: Recent (Holocene) pyroclastic and volcanic mudflow deposits.	
		Q: Alluvium, lake, playa, and terrace deposits; unconsolidated and semi-consolidated. Mostly nonmarine, but includes marine deposits near the coast.	Qg: Glacial till and moraines. Found at high elevations mostly in the Sierra Nevada and Klamath Mountains.	Qv: Quaternary volcanic flow rocks; minor pyroclastic deposits. Qv^p: Quaternary pyroclastic and volcanic mudflow deposits.	
		Qoa: Older alluvium, lake, playa, and terrace deposits			
CENOZOIC, TERTIARY, Pliocene		P: Sandstone, siltstone, shale, and conglomerate; mostly moderately consolidated.	QPc: Pliocene and/or Pleistocene sandstone, shale, and gravel deposits; mostly loosely consolidated.		
CENOZOIC, TERTIARY, Miocene		M: Sandstone, shale, siltstone, conglomerate, and breccia; moderately to well consolidated.	Mc: Sandstone, shale, conglomerate, and fanglomerate; moderately to well consolidated.		
CENOZOIC, TERTIARY, Oligocene		@: Sandstone, shale, conglomerate; mostly well consolidated.	@c: Sandstone, shale, and conglomerate; mostly well consolidated.	Tv: Tertiary volcanic flow rocks; minor pyroclastic deposits. Tv^p: Tertiary pyroclastic and volcanic mudflow deposits.	
CENOZOIC, TERTIARY, Eocene		E: Shale, sandstone, conglomerate, minor limestone; mostly well consolidated.	Ec: Sandstone, shale, conglomerate; moderately to well consolidated.	Ti: Tertiary intrusive rocks; mostly shallow (hypabyssal) plugs and dikes.	gr^i: Cenozoic (Tertiary) granitic rocks - quartz monzonite, quartz latite, and minor monzonite, granodiorite, and granite; found in the Kingston, Panamint, Amargosa, and Greenwater Ranges in southeastern California.
CENOZOIC, TERTIARY, Paleocene		Ep: Sandstone, shale, and conglomerate; mostly well consolidated.			
			Tc: Undivided Tertiary sandstone, shale, conglomerate, breccia, and ancient lake deposits.		

		MARINE SEDIMENTARY AND METASEDIMENTARY ROCKS	MIXED ROCKS	METAVOLCANIC ROCKS	PLUTONIC ROCKS
MESOZOIC, TERTIARY CRETACEOUS		TK: Sandstone, shale, and minor conglomerate in coastal belt of northwestern California; included by some in Franciscan Complex. Previously considered Cretaceous, but now known to contain early Tertiary microfossils in places.			
MESOZOIC, CRETACEOUS		Ku: Upper Cretaceous sandstone, shale, and conglomerate.	K: Undivided Cretaceous sandstone, shale, and conglomerate; minor nonmarine rocks in Peninsular Ranges.		gr^i: Mesozoic granite, quartz monzonite, granodiorite, and quartz diorite.
MESOZOIC, CRETACEOUS		Kl: Lower Cretaceous sandstone, shale, and conglomerate.		]v: Undivided Mesozoic volcanic and metavolcanic rocks. Andesite and rhyolite flow rocks, greenstone, volcanic breccia and other pyroclastic rocks; in part strongly metamorphosed. Includes volcanic rocks of Franciscan Complex: basaltic pillow lava, diabase, greenstone, and minor	um: Ultramafic rocks, mostly serpentine. Minor peridotite, gabbro, and diabase; chiefly Mesozoic.
MESOZOIC, JURASSIC		J: Shale, sandstone, minor conglomerate, chert, slate, limestone; minor pyroclastic rocks	KJf; KJf$_m$; KJf$_s$: KJf: Franciscan Complex: Cretaceous and Jurassic sandstone with smaller amounts of shale, chert, limestone, and conglomerate. Includes Franciscan melange, except where separated - see KJf$_s$. KJf$_m$: Melange of fragmented and sheared Franciscan Complex rocks. KJf$_s$: Blueschist and semi-schist of Franciscan Complex.	gr-m: Granitic and metamorphic rocks, mostly gneiss and other metamorphic rocks injected by granitic rocks. Mesozoic to Precambrian.	gb: Gabbro and dark dioritic rocks; chiefly Mesozoic.
MESOZOIC, TRIASSIC		^: Shale, conglomerate, limestone and dolomite, sandstone, slate, hornfels, quartzite; minor pyroclastic rocks.	sch: Schists of various types; mostly Paleozoic or Mesozoic age; some Precambrian.		
PALEOZOIC, PERMIAN		Pm: Shale, conglomerate, limestone and dolomite, sandstone, slate, hornfels, quartzite; minor pyroclastic rocks.		mv: Undivided pre-Cenozoic metavolcanic rocks. Includes latite, dacite, tuff, and greenstone; commonly schistose.	gr: Undated granitic rocks.
PALEOZOIC, CARBONIFEROUS		C: Shale, sandstone, conglomerate, limestone, dolomite, chert, hornfels, marble, quartzite; in part pyroclastic rocks.	ls: Limestone, dolomite, and marble whose age is uncertain but probably Paleozoic or Mesozoic.	m: Undivided pre-Cenozoic metasedimentary and metavolcanic rocks of great variety. Mostly slate, quartzite, hornfels, chert, phyllite, mylonite, schist, gneiss, and minor marble.	gr^i: Paleozoic and Permo-Triassic granitic rocks in the San Gabriel and Klamath Mountains.
PALEOZOIC, DEVONIAN		D: Limestone and dolomite, sandstone and shale; in part tuffaceous.	| : Undivided Paleozoic metasedimentary rocks. Includes slate, sandstone, shale, chert, conglomerate, limestone, dolomite, marble, phyllite, schist, hornfels, and quartzite.	|v: Undivided Paleozoic metavolcanic rocks. Mostly flows, breccia, and tuff, including greenstone, diabase and pillow lavas; minor interbedded sedimentary rocks.	
PALEOZOIC, SILURIAN-ORDOVICIAN		SO: Sandstone, shale, conglomerate, chert, slate, quartzite, hornfels, marble, dolomite, phyllite; some greenstone.			
PALEOZOIC, CAMBRIAN		_: Sandstone, shale, limestone, dolomite, chert, quartzite, and phyllite; includes some rocks that are possibly Precambrian.			
PRECAMBRIAN		=: Conglomerate, shale, sandstone, limestone, dolomite, marble, gneiss, hornfels, and quartzite; may be Paleozoic in part.	=c: Complex of Precambrian igneous and metamorphic rocks. Mostly gneiss and schist intruded by igneous rocks; may be Mesozoic in part.		gr$^-$: Precambrian granite, syenite, anorthosite, and gabbroic rocks in the San Gabriel Mountains; also various Precambrian plutonic rocks elsewhere in southeastern California.

SYMBOLS

Geologic boundary

Fault traces, solid where well located; dashed where approximately located or inferred; and dotted where concealed by younger rocks or by lakes or bays. Fault traces are queried where continuation or existence is uncertain. Many concealed faults in the Great Valley are based on maps of selected subsurface horizons, so locations shown are approximate and may indicate structural trends only. For faults color-coded according to recency of movement, see FAULT ACTIVITY MAP OF CALIFORNIA, GEOLOGIC DATA MAP SERIES, MAP NO. 6 (2010).

Ball and bar on downthrown side (relative or apparent).

Arrows indicate direction of lateral movement (relative or apparent).

Thrust fault (barbs on upper plate), solid where well located; dashed where approximately located or inferred; and dotted where concealed by younger rocks or by lakes or bays. Fault surface generally dips less than 45 degrees, but locally may have been subsequently steepened.

Regional strike and dip of stratified rocks.

Regional strike and dip of stratified rocks (overturned).

Anticlinal fold.

Synclinal fold.

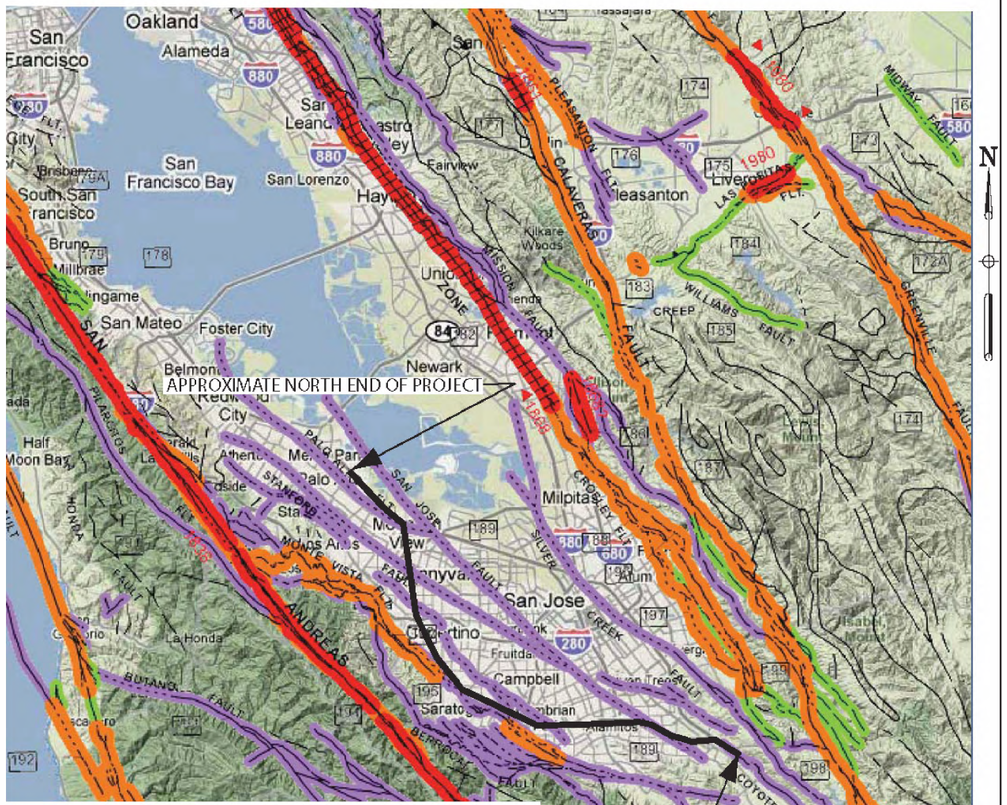
Monoclinal fold.

Dotted offshore and where concealed under alluvium in the Great Valley and elsewhere. Arrow indicates direction of plunge. Concealed folds may be confined to certain units, and their location may be approximate.

Structural discontinuity in the offshore region.

Volcano or cinder cone.

Figure 3B



Source: California Geological Survey - 2010 Fault Activity Map of California .

Geologic Time Scale			Years Before Present (Approx.)	Fault Symbol	Recency of Movement	DESCRIPTION: ON LAND	DESCRIPTION: OFFSHORE
Quaternary	Late Quaternary	Historic				Displacement during historic time (e.g. San Andreas fault 1906). Includes areas of known fault creep.	
		Holocene	200			Displacement during Holocene time.	Fault offsets seafloor sediments or strata of Holocene age.
		Pleistocene	11,700			Faults showing evidence of displacement during late Quaternary time.	Fault cuts strata of Late Pleistocene age.
	Early Quaternary		700,000			Undivided Quaternary faults - most faults in this category show evidence of dislocement during the last 1,600,000 years. possible exceptions are faults which displace rocks of undifferentiated Plio-Pleistocene age.	Fault cuts strata of Quaternary age.
Pre-Quaternary			1,600,000*			Faults without recognized Quaternary displacement or showing evidence of no displacement during Quaternary time. Not necessarily inactive.	Fault cuts strata of Pliocene or older age.
			4.5 billion (Age of Earth)				

* Quaternary now recognized as extending to 2.6 Ma (Walker and Geissman, 2009). Quaternary faults in this map were established using the previous 1.6 Ma criterion.

0 2 4 6 8 10 mile

EXPLANATION

Fault traces on land are indicated by solid lines where well located, by dashed lines where approximately located or inferred, and by dotted lines where concealed by younger rocks or by lakes or bays. Fault traces are queried where continuation or existence is uncertain. Concealed faults in the Great Valley are based on maps of selected subsurface horizons, so locations shown are approximate and may indicate structural trend only. All offshore faults based on seismic reflection profile records are shown as solid lines where well defined, dashed where inferred, queried where uncertain.

FAULT CLASSIFICATION COLOR CODE
(Indicating Recency of Movement)

Fault along which historic (last 200 years) displacement has occurred and is associated with one or more of the following:

(a) a recorded earthquake with surface rupture. (Also included are some well-defined surface breaks caused by ground shaking during earthquakes, e.g. extensive ground breakage, not on the White Wolf fault, caused by the Arvin-Tehachapi earthquake of 1952). The date of the associated earthquake is indicated. Where repeated surface ruptures on the same fault have occurred, only the date of the latest movement may be indicated, especially if earlier reports are not well documented as to location of ground breaks.

(b) fault creep slippage - slow ground displacement usually without accompanying earthquakes.

(c) displaced survey lines.

1906 1906 1838 1838

A triangle to the right or left of the date indicates termination point of observed surface displacement. Solid red triangle indicates known location of rupture termination point. Open black triangle indicates uncertain or estimated location of rupture termination point.

1951

Date bracketed by triangles indicates local fault break.

1992

No triangle by date indicates an intermediate point along fault break.

CREEP

Fault that exhibits fault creep slippage. Hachures indicate linear extent of fault creep. Annotation (creep with leader) indicates representative locations where fault creep has been observed and recorded.

1969 1965 1968

Square on fault indicates where fault creep slippage has occured that has been triggered by an earthquake on some other fault. Date of causative earthquake indicated. Squares to right and left of date indicate terminal points between which triggered creep slippage has occurred (creep either continuous or intermittent between these end points).

Holocene fault displacement (during past 11,700 years) without historic record. Geomorphic evidence for Holocene faulting includes sag ponds, scarps showing little erosion, or the following features in Holocene age deposits: offset stream courses, linear scarps, shutter ridges, and triangular faceted spurs. Recency of faulting offshore is based on the interpreted age of the youngest strata displaced by faulting.

Late Quaternary fault displacement (during past 700,000 years). Geomorphic evidence similar to that described for Holocene faults except features are less distinct. Faulting may be younger, but lack of younger overlying deposits precludes more accurate age classification.

Quaternary fault (age undifferentiated). Most faults of this category show evidence of displacement sometime during the past 1.6 million years; possible exceptions are faults which displace rocks of undifferentiated Plio-Pleistocene age. Unnumbered Quaternary faults were based on Fault Map of California, 1975. See Bulletin 201, Appendix D for source data.

Pre-Quaternary fault (older that 1.6 million years) or fault without recognized Quaternary displacement. Some faults are shown in this category because the source of mapping used was of reconnaissance nature, or was not done with the object of dating fault displacements. Faults in this category are not necessarily inactive.

ADDITIONAL FAULT SYMBOLS

Bar and ball on downthrown side (relative or apparent).

Arrows along fault indicate relative or apparent direction of lateral movement.

Arrow on fault indicates direction of dip.

Low angle fault (barbs on upper plate). Fault surface generally dips less than 45° but locally may have been subsequently steepened. On offshore faults, barbs simply indicate a reverse fault regardless of steepness of dip.

OTHER SYMBOLS

491

Numbers refer to annotations listed in the appendices of the accompanying report. Annotations include fault name, age of fault displacement, and pertinent references including Earthquake Fault Zone maps where a fault has been zoned by the Alquist-Priolo Earthquake Fault Zoning Act. This Act requires the State Geologist to delineate zones to encompass faults with Holocene displacement.

Structural discontinuity (offshore) separating differing Neogene structural domains. May indicate discontinuities between basement rocks.

Brawley Seismic Zone, a linear zone of seismicity locally up to 10 km wide associated with the releasing step between the Imperial and San Andreas faults.

URS

SR 85 Express Lanes Project
US 101 (SOUTH SAN JOSE) TO US 101 (MOUNTAIN VIEW)
FAULT ACTIVITY MAP

NOT TO SCALE
Figure 4
Nov 2010

Liquefaction Susceptibility Map

Susceptibility Level

- Very High
- High
- Moderate
- Low
- Very Low
- Major Roads
- Local Roads

Scale: 1 inch = 2.65 miles

This map is intended for planning use only and is not intended to be site-specific. Rather, it depicts the general risk within neighborhoods and the relative risk from community to community. More detailed maps are needed for site development decisions.

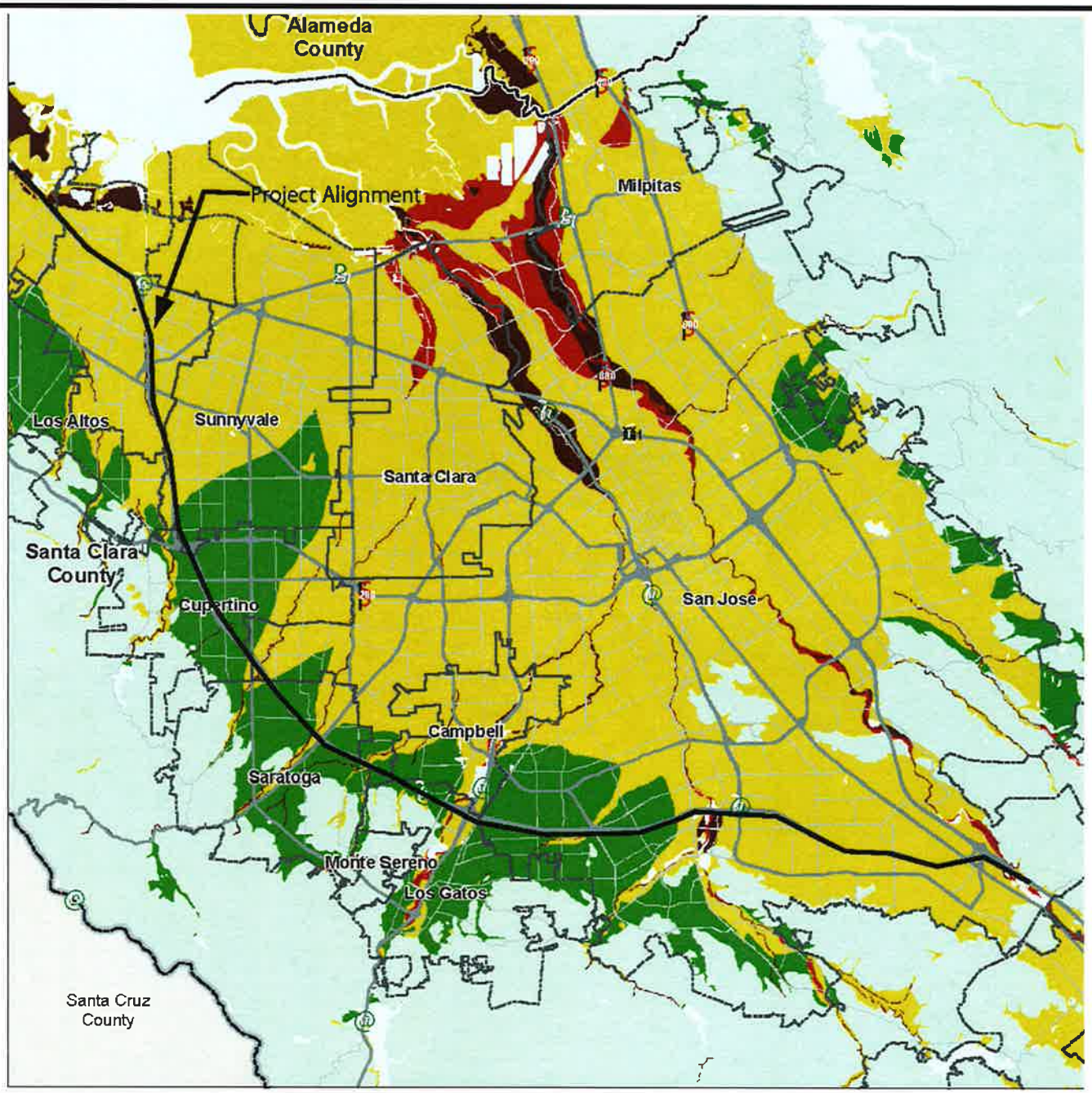
This map is available at http://quake.abag.ca.gov

Sources:
This map is based on work by William Lettis & Associates, Inc. and USGS. USGS Open-File Report 00-444, Knudsen & others, 2000 and USGS Open-File Report 2006-1037, Witter & others, 2006

For more information visit:
http://pubs.usgs.gov/of/2000/of00-444/
http://pubs.usgs.gov/of/2006/1037/

Map Prepared by the ABAG Earthquake Program. June 2009.

ABAG Geographic Information Systems



URS

SR 85 Express Lanes Project
US 101 (SOUTH SAN JOSE) TO US 101 (MOUNTAIN VIEW)
LIQUEFACTION SUSCEPTIBILITY MAP

NOT TO SCALE
Figure 5
Nov 2010

Figure-5.dgn 12/2/2010 2:00:06 PM

FEMA
Flood Hazard Areas

Flood Hazard Areas

- Zone V- (100 yr. Flood Zone)
- Zone A- (100 yr. Flood Zone)
- Zone X500- (500 yr. Flood Zone or other concerns)
- Urbanized Area

Shaded to show topographical relief

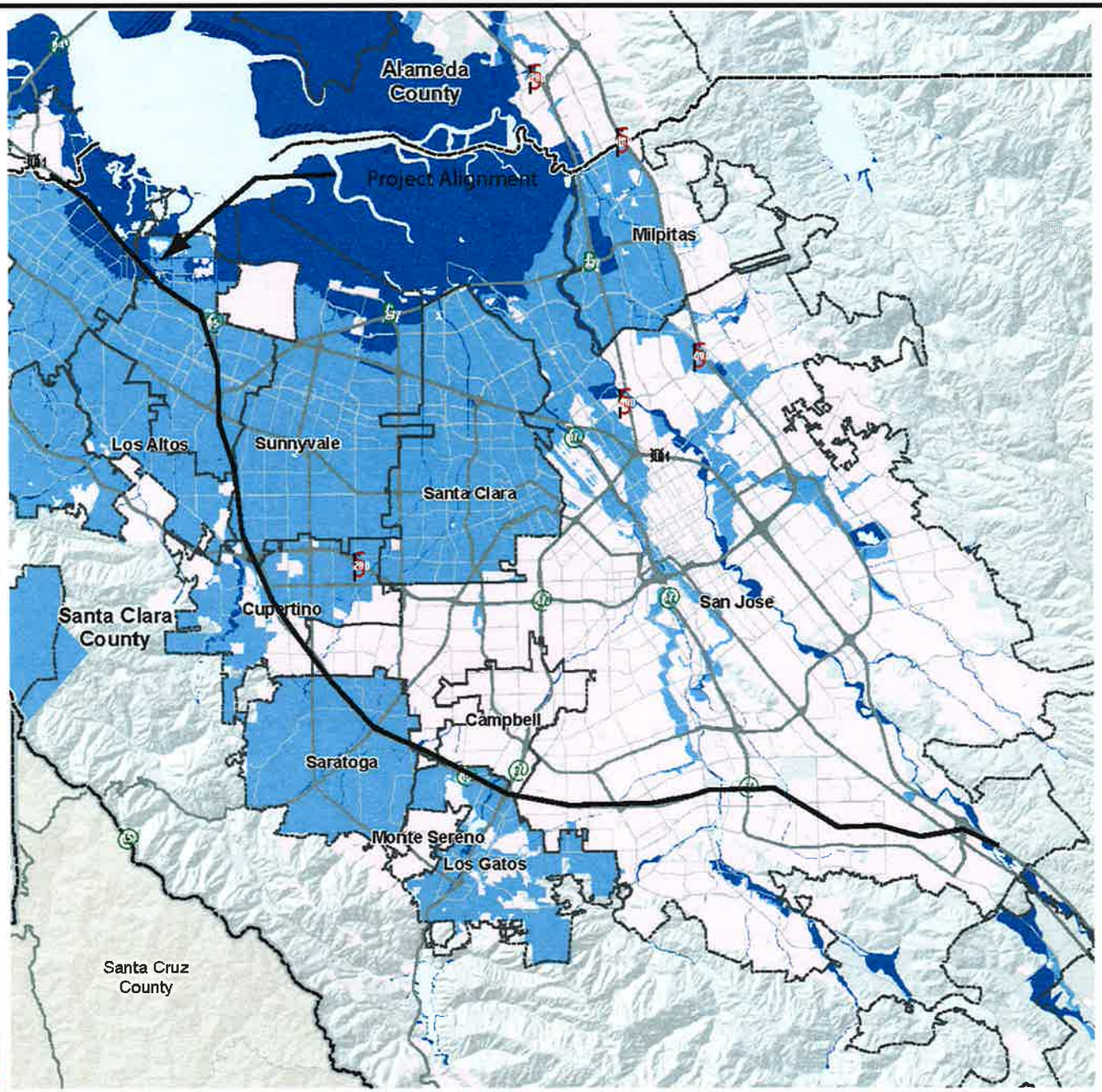
Detailed FEMA Explanation

Flood Zone	Description
Zone V	This code identifies an area inundated by 1% annual chance flooding with velocity hazard (wave action).
Zone A	This code identifies an area inundated by 1% annual chance flooding.
Zone X500	This code identifies an area inundated by 0.2% annual chance flooding; an area inundated by 1% annual chance flooding with average depths of less than 1 foot or with drainage areas less than 1 square mile; or an area protected by levees from 1% annual chance flooding.

Scale: 1 inch = 2.99 miles

Sources:
Flood Zones - FEMA Q3 (2003) and DFIRM (2008)
Base Data - TeleAtlas (2008)
The product has been designed to support planning activities.
A more detailed version of this map is available at http://quake.abag.ca.gov

ABAG Geographic Information Systems



URS

SR 85 Express Lanes Project
US 101 (SOUTH SAN JOSE) TO US 101 (MOUNTAIN VIEW)
FEMA FLOOD HAZARD AREA

NOT TO SCALE
Figure
6
Nov 2010

Figure-6.dgn 12/2/2010 1:53:35 PM

Table A-1 Avilable As-built Bridge and Structure Plans

Bridge/Street/Over- or Undercrossings	Post Miles	Bridge Number	As-built Contract Number	Date	Plan Type
Bernal Rd UC	0.18	37-547 L/R	04-437904	10/3/1994	Structures
Coyote Overhead (SR 85 over Monterey Rd, Great Oaks Blvd UC, Southern Pacific RR)	0.47	37-488 R	04-437904	12/3/1992	Structures
Perimeter Rd / Via Del Oro UC	1.11	37-489R/L	04-437384	9/25/1992	Structures
Via Del Oro O.H	1.22	37-477	04-437424	4/28/1992	Structures
Cottle Rd OC	1.97	37-438	04-437334	1/15/1992	Structures
Lean Ave OC	2.73	37-439	04-487014	7/29/1992	Structures
Snell Ave OC	3.48	37-442	04-487014	9/10/1991	Structures
Blossom Hill Rd OC	3.93	37-411	04-487014	9/11/1991	Structures
Blossom Hill Rd Pedestrian UC	4.17	37-436	04-487014	9/12/1991	Structures
Canoas Creek Bridge (North of Blossom Hill)	4.28	37-412 L/R	04-487014	7/29/1992	Structures
Cahalan Ave UC	4.5	37-440 L/R	04-487014	7/29/1992	Structures
Santa Teresa Blvd UC	5.2	37-484	04-437304	5/20/1991	Structures
Junction SR 87/85	5.22	varies	04-437904	10/3/1994	Structures
Almaden Expy UC	6.14	37-530 R/L	04-437514	12/8/1992	Structures
Russo Dr. Pedestrain OC	6.47	37-478	04-437544	2/26/1992	Structures
Meridian Ave OC	7.3	37-479	04-437544	2/26/1992	Structures
Dent Ave OC	7.5	37-480	04-437544	2/26/1992	Structures
Camden Ave UC	8.11	37-481	04-437524	10/9/1992	Structures
Leigh Ave OC	8.77	37-501	04-437754	8/30/1996	Structures
Union Ave OC	9.28	37-514	04-437754	8/30/1996	Structures
Samaritan Pl OC	9.93	37-502	04-437754	8/30/1996	Structures
S. Bascom Ave OC	10.41	37-4965	04-437454	6/28/1995	Structures
Junction SR 85/ SR 17	10.5	37-493 / 37-493S	04-437454	3/28/1995	Structures
Oka Rd UC	10.62	37-537 L/R	04-437454	6/14/1995	Structures
Los Gatos Creek Trail UC	10.82	37-491	04-437454	6/14/1995	Structures
Winchester Blvd OC	11	37-519	04-437744	10/14/1994	Structures
Pollard Rd UC	11.97	37-520	04-437745	10/15/1994	Structures
More Ave Pedestrian OC	12.39	37-523	04-437744	10/14/1994	Structures
Quito Rd OC	12.85	37-525	04-437744	10/14/1994	Structures
Saratoga Ave UC	13.68	37-499 L/R	04-437564	1/17/1995	Bridge Plans
Saratoga Creek Bridge	13.86	37-500 L/R	04-437564	1/13/1995	Bridge Plans
Cox Ave OC	14.28	37-483	04-437684	1/11/1993	Bridge Plans
Cox Ave Utility OC	14.29	37-531	04-437554	3/18/1993	Bridge Plans
Scully Ave Utility OC	14.6	37-532	04-437684	1/11/1993	Bridge Plans
Blue Hills Ped OC	14.84	37-482	04-437684	1/11/1993	Bridge Plans

Table A-1 Avilable As-built Bridge and Structure Plans

Bridge/Street/Over- or Undercrossings	Post Miles	Bridge Number	As-built Contract Number	Date	Plan Type
Prospect Rd OC	15.27	37-526	04-437764	1/23/1995	Bridge Plans
Calabazas Creek Bridge	15.54	37-527 L/R	04-437764	1/20/1995	Bridge Plans
S. De Anza Blvd OC (Saratoga-Sunnyvale Rd.)	15.87	37-528	04-437764	1/27/1994	Bridge Plans
S. Stelling Rd OC	16.6	37-388	04-437494	12/9/1992	Bridge Plans
McClellan Rd OC	17.17	37-384	04-437494	12/9/1992	Bridge Plans
Stevens Creek Blvd OC	17.7	37-229	04-437384	9/3/1991	Bridge Plans
South Connector UC (85 SB to 280 SB)	18.35	37-0230	04-0R1004	3/22/2000	Structures
South Connector UC (85 SB to 280 SB)	18.35	37-0230	04-121174	8/6/1971	Structures
South Connector UC (85 SB to 280 SB)	18.35	37-0230	04-0A4804	11/15/2007	Structures
SR 85/ I-280 Separation	18.45	37-0227	04-133274	6/8/1994	Structures
SR 85/ I-280 Separation	18.45	37-0227	04-121174	8/6/1971	Structures
SR 85/ I-280 Separation	18.45	37-0227	04-0R1004	3/21/2000	Structures
SR 85/ I-280 Separation	18.45	37-0227	04-0A4804	11/15/2007	Structures
North Connector UC (SR 85 NB to I-280 NB)	18.5	37-0232	04-0R1004	3/22/2000	Structures
North Connector UC (SR 85 NB to I-280 NB)	18.5	37-0232	04-121174	8/6/1971	Structures
North Connector UC (SR 85 NB to I-280 NB)	18.5	37-0232	04-0A4804	11/15/2007	Structures
W. Homestead Rd OC	18.86	37-208	04-121144	1/14/1966	Bridge Plans
The Dalles Ave (Pedestrian OC)	19.4	37-243	04-121144	1/14/1966	Bridge Plans
W. Fremont Ave UC	19.86	37-184 R/L	04-121144	1/14/1966	Bridge Plans
W. Fremont Ave UC	19.86	37-184 R/L	04-121144	1/14/1966	Bridge Plans
Stevens Creek Br Loc #1	20.02	37-185 R/L	04-121144	1/14/1966	Bridge Plans
Stevens Creek Br Loc #2	20.96	37-189	04-121144	1/14/1966	Bridge Plans
E. El Camino Real OC	21.75	37-204	04-121144	1/14/1966	Bridge Plans
Stevens Creek Bridge		37-14	04-121144	1/14/1966	Bridge Plans
SR 85/237	22.16	37-0198	04-0R1004	3/21/2000	Structures
SR 85/237	22.16	37-198 R/L	04-121144	1/14/1966	Bridge Plans
Central Expy UC, E. Evelyn Ave UC	22.63	37-207	04-121144	1/14/1966	Bridge Plans
Stevens Creek Trail UC	22.95	37-197	04-438204	12/19/1997	Structures
Stevens Creek Trail UC	22.95	37-197 R/L	04-121144	1/14/1966	Bridge Plans
E. Middlefield Rd OC	23.19	37-213	04-121144	1/14/1966	Bridge Plans
Moffet Blvd UC (U.S. 101)	23.44	37-187	04-140604	34918	Structures
Moffet Blvd UC (U.S. 101)	23.44	37-187	04-438204	12/19/1997	Structures
Moffet Blvd UC (SR 85)	23.44	37-187	04-121144	1/14/1966	Bridge Plans

99-62-11

U-032-1(3)

04-121144

DIST	COUNTY	ROUTE	SECTION	SHEET NO.	TOTAL SHEETS
7	CALIF.			1	391

DIST	COUNTY	ROUTE	SECTION	SHEET NO.	TOTAL SHEETS
IV	SCL	114	Cup. A. Sunn. MVW	1	395

STATE OF CALIFORNIA

DEPARTMENT OF PUBLIC WORKS

DIVISION OF HIGHWAYS

AS BUILT PLANS
Contract No. 04-121144
Date Completed 7-14-66
Document No. 4000017

PLANS FOR CONSTRUCTION ON

STATE HIGHWAY

In Santa Clara County in and near Cupertino, Sunnyvale and Mountain View
between 0.1 mile south of Homestead Road and Route 68

(being the detail plans of a portion of the route for the State highway adopted by the California Highway Commission on October 17, 1956 and declared a FREEWAY by resolution of the California Highway Commission on October 17, 1956)

NO CONSTRUCTION CHANGES

CONTRACT No. 04-121144 64-4T13C 23-F
DATE ACCEPTED: 1/14/66
AS BUILT
RESIDENT ENGINEER R.H. KELLER
REVISIONS BY ___ DATE
DELINEATED BY ___ DATE
DES. CHECKED BY ___ DATE

STATE OF CALIFORNIA KEY MAP

INDEX OF SHEETS

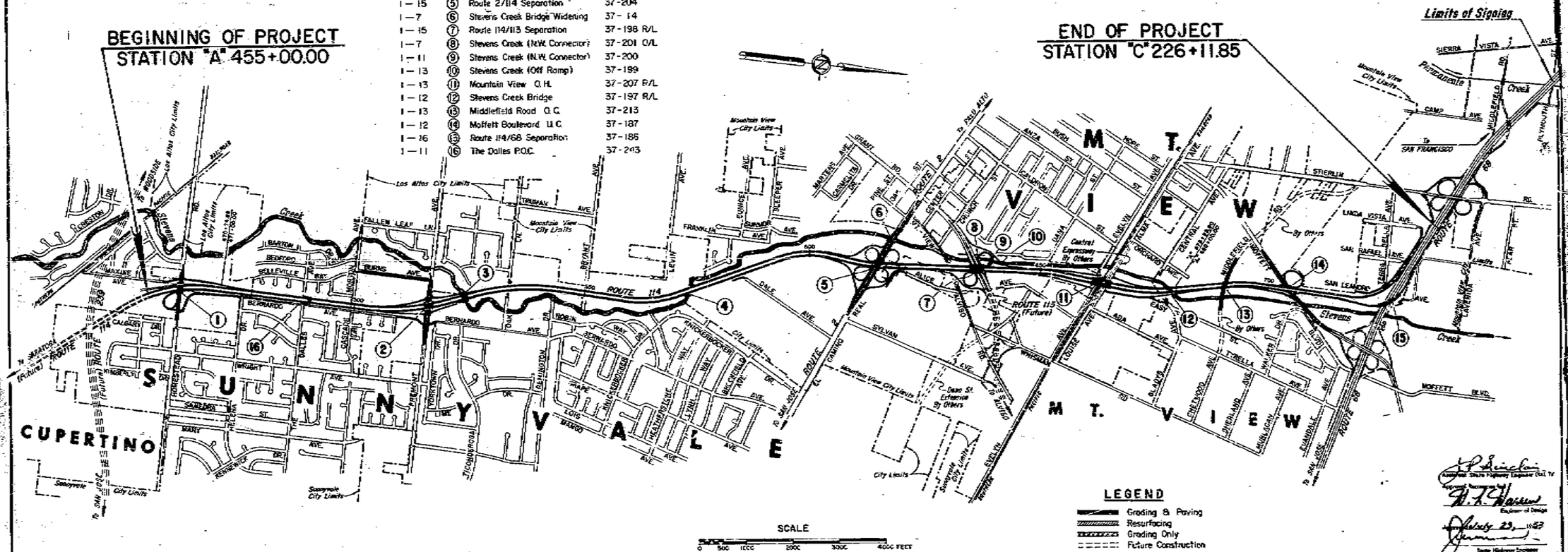
Sheet No.	1	Title Sheet
" "	2-4	Typical Cross Sections
" "	5	Paving Details
" "	6	Line and Sheet Index
" "	7-27	Existing Topography
" "	28-40	Profiles
" "	41-62	Construction Details
" "	63-65	Detours
" "	66-68	Contour Grading
" "	69-87	Drainage
" "	88	Miscellaneous Quantity Tabulations
" "	89-99	Drainage List
" "	100-113	Drainage and Utility Details
" "	114-131	Standard Plans
" "	132-167	Highway Lighting and Traffic Signals
" "	168-195	Signs
" "	1-63	Cross Sections
" "	1-5	Superelevation Charts
" "	1	Mass Diagram

STRUCTURE LIST

SHEET NO.	INDEX NO.	BRIDGE NAMES	BR. NO.
1-13	1	Homestead Road O.C.	37-208
1-12	2	Fremont Avenue U.C.	37-184 R/L
1-15	3	Stevens Creek Bridge	37-185 R/L
1-11	4	Stevens Creek Bridge	37-189
1-15	5	Route 2/114 Separation	37-204
1-7	6	Stevens Creek Bridge Widening	37-14
1-15	7	Route 114/113 Separation	37-198 R/L
1-7	8	Stevens Creek (N.W. Connector)	37-201 O/L
1-11	9	Stevens Creek (N.W. Connector)	37-200
1-13	10	Stevens Creek (Off Ramp)	37-199
1-13	11	Mountain View O.H.	37-207 R/L
1-12	12	Stevens Creek Bridge	37-197 R/L
1-13	13	Middlefield Road O.C.	37-213
1-12	14	Moffett Boulevard U.C.	37-187
1-16	15	Route 114/68 Separation	37-186
1-11	16	The Dalles P.O.C.	37-203

BEGINNING OF PROJECT
STATION "A" 455+00.00

END OF PROJECT
STATION "C" 226+11.85



Length of Project: 29,039.31 Feet = 5.50 Miles

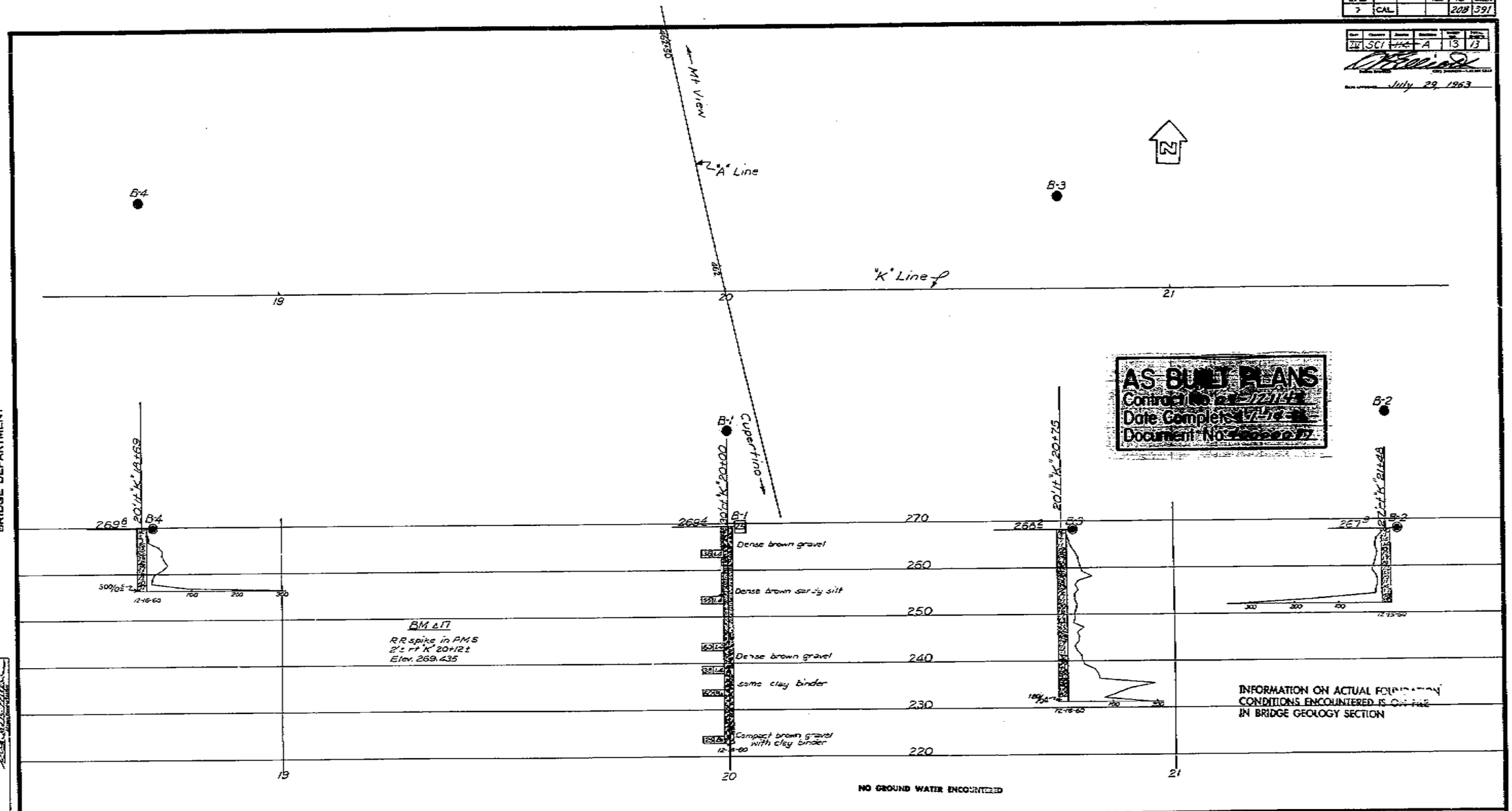
61-04T10H1211.4

FED. ROAD DIV. NO.	STATE	FUNCTIONAL SUPER.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	CAL.			208	391

DIST.	COUNTY	ROUTE	SECTION	SHEET NO.	TOTAL SHEETS
IV	SCl	HAC	A	13	13

July 29, 1963

BRIDGE DEPARTMENT



AS BUILT PLANS
Contract No. [illegible]
Date Completed [illegible]
Document No. [illegible]

FIELD ATTACHY	H. Nelson	12-60
DRAWN	A. Chang	7-61
CHECKED	H. Nelson	7-61

Approved Recommended By [illegible]

208

Classification of Material Based on Standard Grade Size Limits

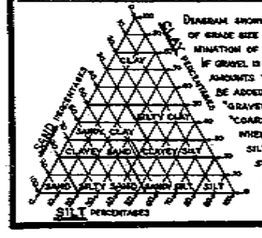


Diagram showing the basis for estimates of grade size distribution used in determination of class names.

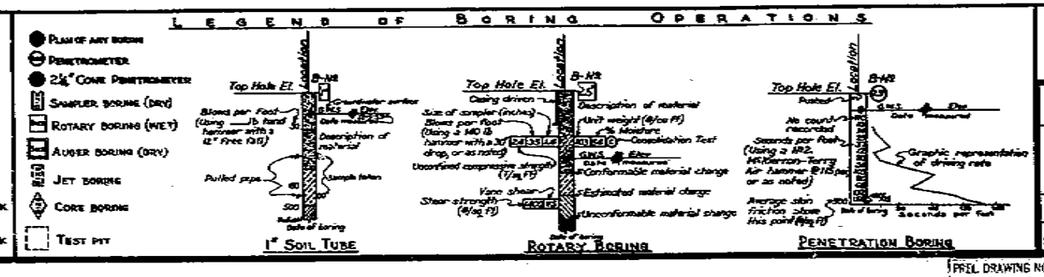
If gravel is present in appreciable amounts the term "gravelly" may be added to the class name, viz. "gravelly sand." The terms "coarse", "medium" and "fine" when used to describe sand, silt and gravel refer to standard grade size limits.

Legend of Earth Materials

- Gravel
- Sand
- Silt
- Clay
- Sandy Clay or Clayey Sand
- Sandy Silt or Silty Sand
- Silty Clay or Clayey Silt
- Peat and/or Organic Matter
- Fill Material
- Igneous Rock
- Sedimentary Rock
- Metamorphic Rock

Legend of Boring Operations

- Plan of any boring
- Penetrometer
- 2½" Core Penetrometer
- Sampler boring (dry)
- Rotary boring (wet)
- Auger boring (dry)
- Jet boring
- Core boring
- Test pit



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.

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

HOMESTEAD ROAD OVERCROSSING

LOG OF TEST BORINGS

SCALE 1" = 10'	BRIDGE 37-208	FILE	DRAWING C-37208-13

PREL. DRAWING NO. P-37208-[illegible]

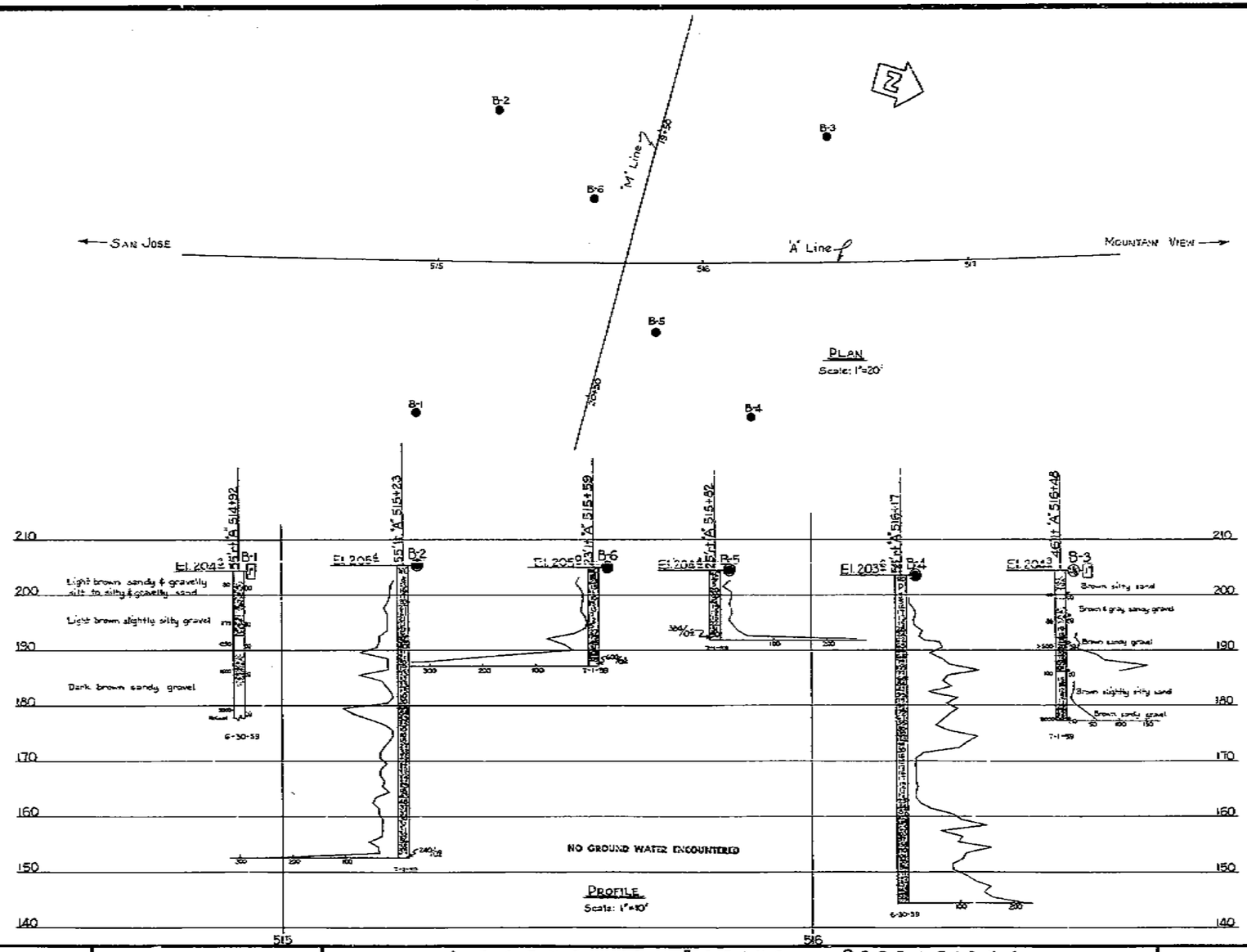
PR-37208-5282

FED. ROAD DIV. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	CAL.			220	391

DIST.	COUNTY	ROUTE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
1X	SCl		A	12	12

DATE APPROVED July 29, 1963

BRIDGE DEPARTMENT



TBM 'A'

RR spike in power pole
50'± lt 'A' 515+59±
Elev. 205.98

AS BUILT PLANS
Contract No. 04-121144
Date Completed 1-10-66
Document No. 4000077

INFORMATION ON ACTUAL FOUNDATION CONDITIONS ENCOUNTERED IS ON FILE IN BRIDGE GEOLOGY SECTION

THIS SET OF PLANS HAS BEEN CORRECTED TO CORRESPOND TO THE "AS BUILT" PLANS DATED _____, AS SUBMITTED BY RESIDENT ENGINEER
PLANS CORRECTED BY: _____ DATE: _____

FIELD STUDY	H. Nelson 12-7-59
DESIGNED	T. Wilson 10-62
CHECKED	H. Nelson 10-62

Approval Recommended by: Robert W. Crawford, Chief Bridge Engineer

CLASSIFICATION OF MATERIAL BASED ON STANDARD GRADE SIZE LIMITS

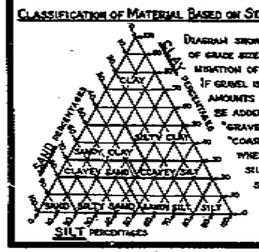


DIAGRAM SHOWING THE BASIS FOR ESTIMATES OF GRADE SIZE DISTRIBUTION USED IN DETERMINATION OF CLASS NAMES.

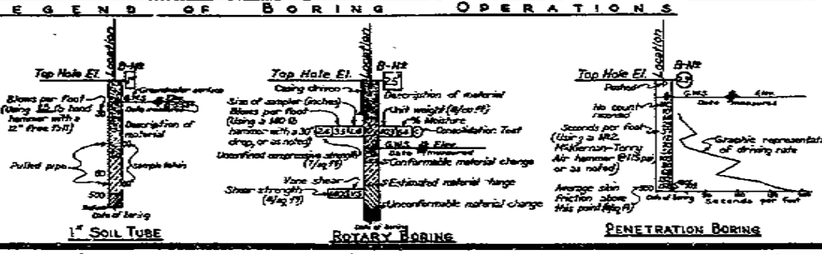
IF GRAVEL IS PRESENT IN APPRECIABLE AMOUNTS THE TERM "GRAVELLY" MAY BE ADDED TO THE CLASS NAME, VIZ. "GRAVELLY SAND." THE TERMS "COARSE", "MEDIUM" AND "FINE" WHEN USED TO DESCRIBE SAND, SILT AND GRAVEL REFER TO STANDARD GRADE SIZE LIMITS.

LEGEND OF EARTH MATERIALS

- GRAVEL
- SAND
- SILT
- CLAY
- SANDY CLAY OR CLAYEY SAND
- SANDY SILT OR SILTY SAND
- SILTY CLAY OR CLAYEY SILT
- PEAT AND/OR ORGANIC MATTER
- FILL MATERIAL
- IGNEOUS ROCK
- SEDIMENTARY ROCK
- METAMORPHIC ROCK

LEGEND OF BORING OPERATIONS

- PLAN OF ANY BORING
- PENETROMETER
- 2½" CONE PENETROMETER
- SAMPLER BORING (DRY)
- ROTARY BORING (WET)
- AUGER BORING (DRY)
- JET BORING
- CONE BORING
- TEST PIT



NOTES

The contractor's attention is directed to Section 2-1.03 of the Standard Specifications and to the Special Provisions accompanying this set of plans.

Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

FREMONT AVENUE UNDERCROSSING

LOG OF TEST BORINGS

SCALE	As shown	BRIDGE	37-154 %	FILE	E-37	DRAWING	C-6594-12

PREL. DRAWING NO. P- 6594 10 21

PR-6594-4 124

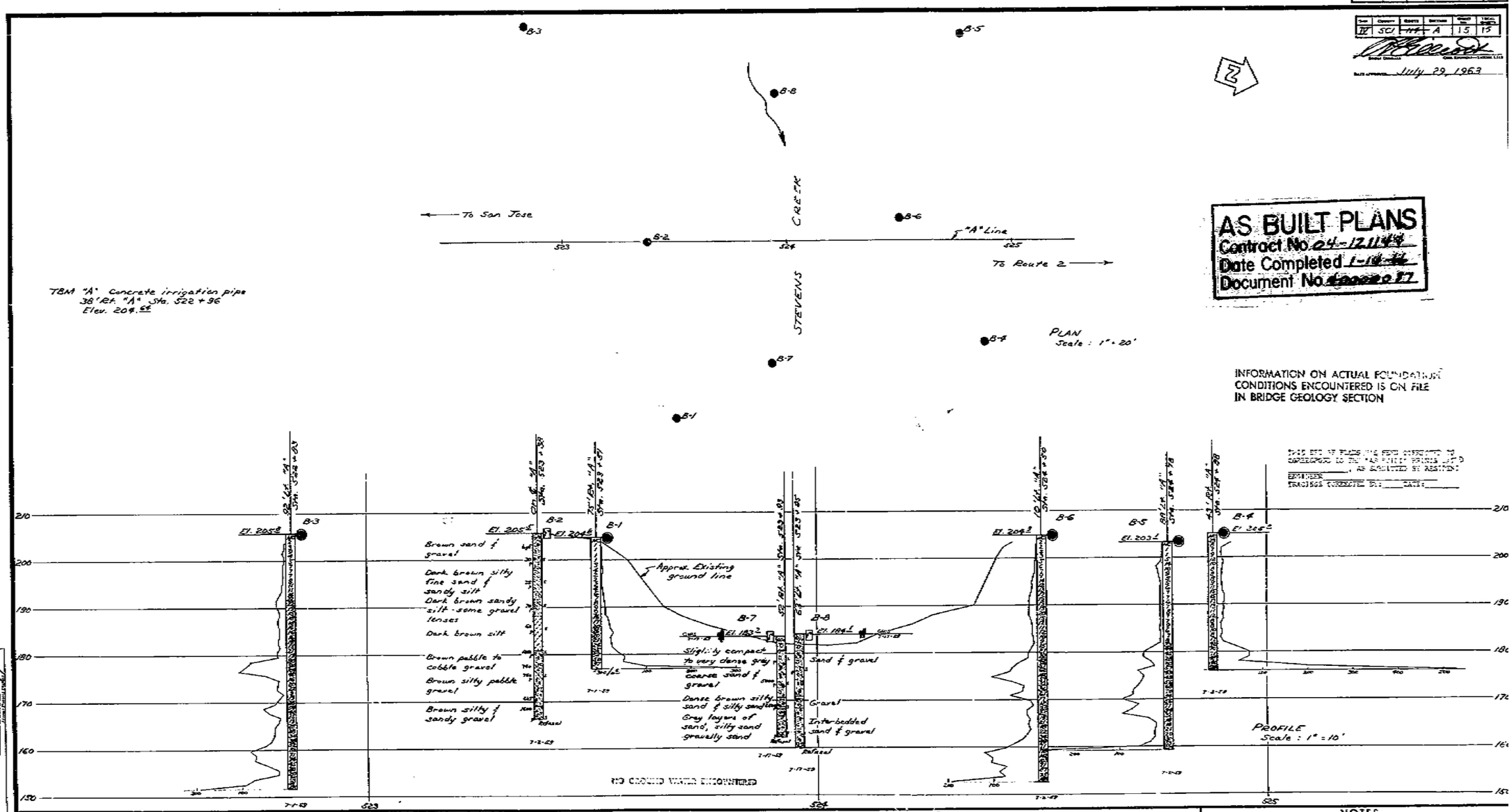
220

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	CAL.			235	391

DIST.	COUNTY	ROUTE	SECTION	SHEET NO.	TOTAL SHEETS
07	SCl	114	A	15	15

Bridge Engineer

Date approved July 29, 1963



AS BUILT PLANS
Contract No. 04-121144
Date Completed 1-18-66
Document No. 60000077

INFORMATION ON ACTUAL FOUNDATION CONDITIONS ENCOUNTERED IS ON FILE IN BRIDGE GEOLOGY SECTION

THIS SET OF PLANS HAS BEEN CORRECTED TO CORRESPOND TO THE "AS BUILT" PLANS, EXCEPTING _____, AS SUBMITTED BY RESIDENT ENGINEER.
FRACTOR'S CORRECTION NO. _____ DATE: _____

BRIDGE DEPARTMENT

FIELD STUDY	W. F. Fenton	7-28-59
DRAWN	H. M. Hawkins	7-28-59
SUBMITTED	Wm. F. Cox	10-22-59

Approval Recommended by: Wm. F. Cox, Bridge Engineer

Approved: [illegible] Bridge Engineer

CLASSIFICATION OF MATERIAL BASED ON STANDARD GRADE SIZE LIMITS

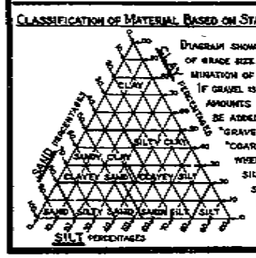


DIAGRAM SHOWING THE BASIS FOR ESTIMATES OF GRADE SIZE DISTRIBUTION USED IN DETERMINATION OF CLASS NAMES.

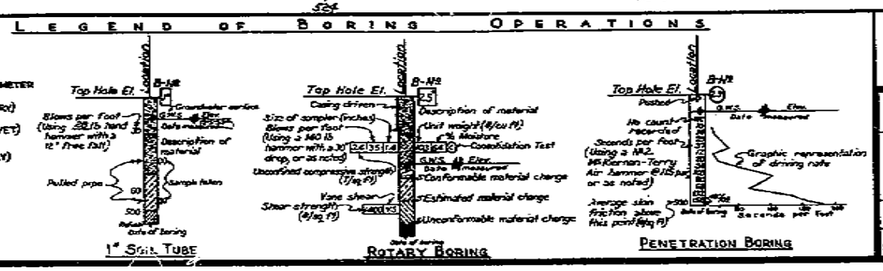
IF GRAVEL IS PRESENT IN APPRECIABLE AMOUNTS THE TERM "GRAVELLY" MAY BE ADDED TO THE CLASS NAME, VIZ. "GRAVELLY SAND." THE TERMS "COARSE," "MEDIUM" AND "FINE" WHEN USED TO DESCRIBE SAND, SILT AND GRAVEL, REFER TO STANDARD GRADE SIZE LIMITS.

LEGEND OF EARTH MATERIALS

- Gravel
- Sand
- Silt
- Clay
- Sandy Clay or Clayey Sand
- Sandy Silt or Silty Sand
- Silty Clay or Clayey Silt
- Peat and/or Organic Matter
- Fill Material
- Igneous Rock
- Sedimentary Rock
- Metamorphic Rock

LEGEND OF BORING OPERATIONS

- Plan of any boring
- Penetrometer
- 2½" Cone Penetrometer
- Sampler boring (dry)
- Rotary boring (wet)
- Auger boring (dry)
- Jet boring
- Core boring
- Test pit



NOTES

The contractor's attention is directed to Section 2-1.03 of the Standard Specifications and to the Special Provisions accompanying this set of plans.

Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

STEVENS CREEK BRIDGE

LOG OF TEST BORINGS

SCALE	BRIDGE	FILE	DRAWING
As Noted	37-185	E-37	C-6595-1

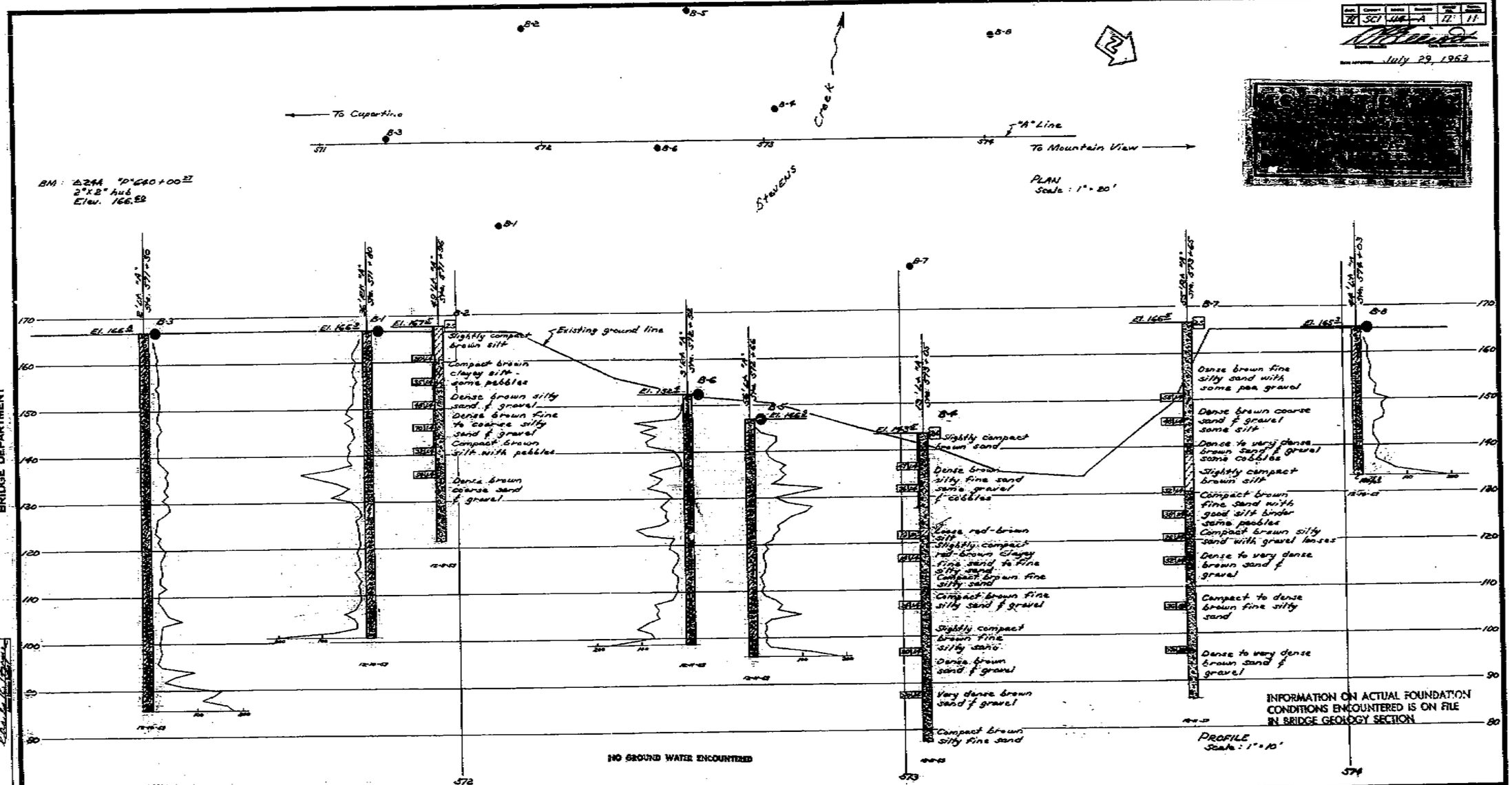
235

PR-6595
13

FED. ROAD DIST. NO.	STATE	ROUTE NO.	PROJECT NO.	SHEET NO.	TOTAL SHEETS
7	CAL.			246	391

DIST.	COUNTY	ROUTE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
7	SCl	114	A	12	11

July 29, 1963



Classification of Material Based on Standard Grade Size Limits

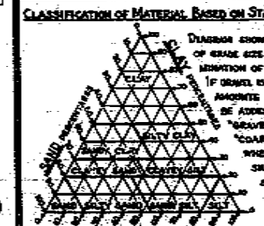


Diagram shows the basis for estimates of grade size distribution used in determination of class names.

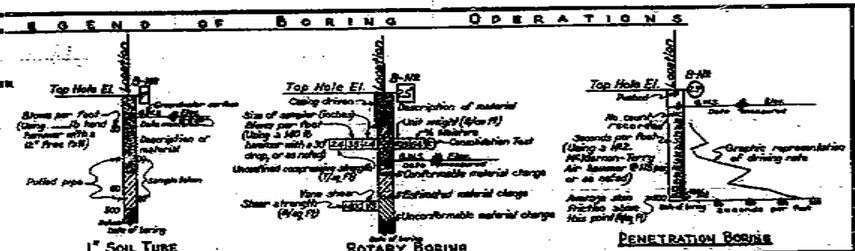
If gravel is present in appreciable amounts the term "gravelly" may be added to the class name; viz. "gravelly sand". The terms "coarse", "medium" and "fine" when used to describe sand, silt and gravel refer to standard grade size limits.

Legend of Earth Materials

- Gravel
- Sand
- Silt
- Clay
- Sandy Clay or Clayey Sand
- Sandy Silt or Silty Sand
- Silty Clay or Clayey Silt
- Peat and/or Organic Matter
- Fill Material
- Igneous Rock
- Sedimentary Rock
- Metamorphic Rock

Legend of Boring Operations

- Plan of any boring
- Penetrometer
- 2½" Core Penetrometer
- Sampler boring (dry)
- Rotary boring (wet)
- Auger boring (dry)
- Jet boring
- Core boring
- Test pit



Notes

Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

State of California
Department of Public Works
Division of Bridges

STEVENS CREEK BRIDGE

LOG OF TEST BORINGS

Scale As Noted | Bridge 37-189 | File E-39 | Drawing C 6822-11

PR-6822-4

246

178

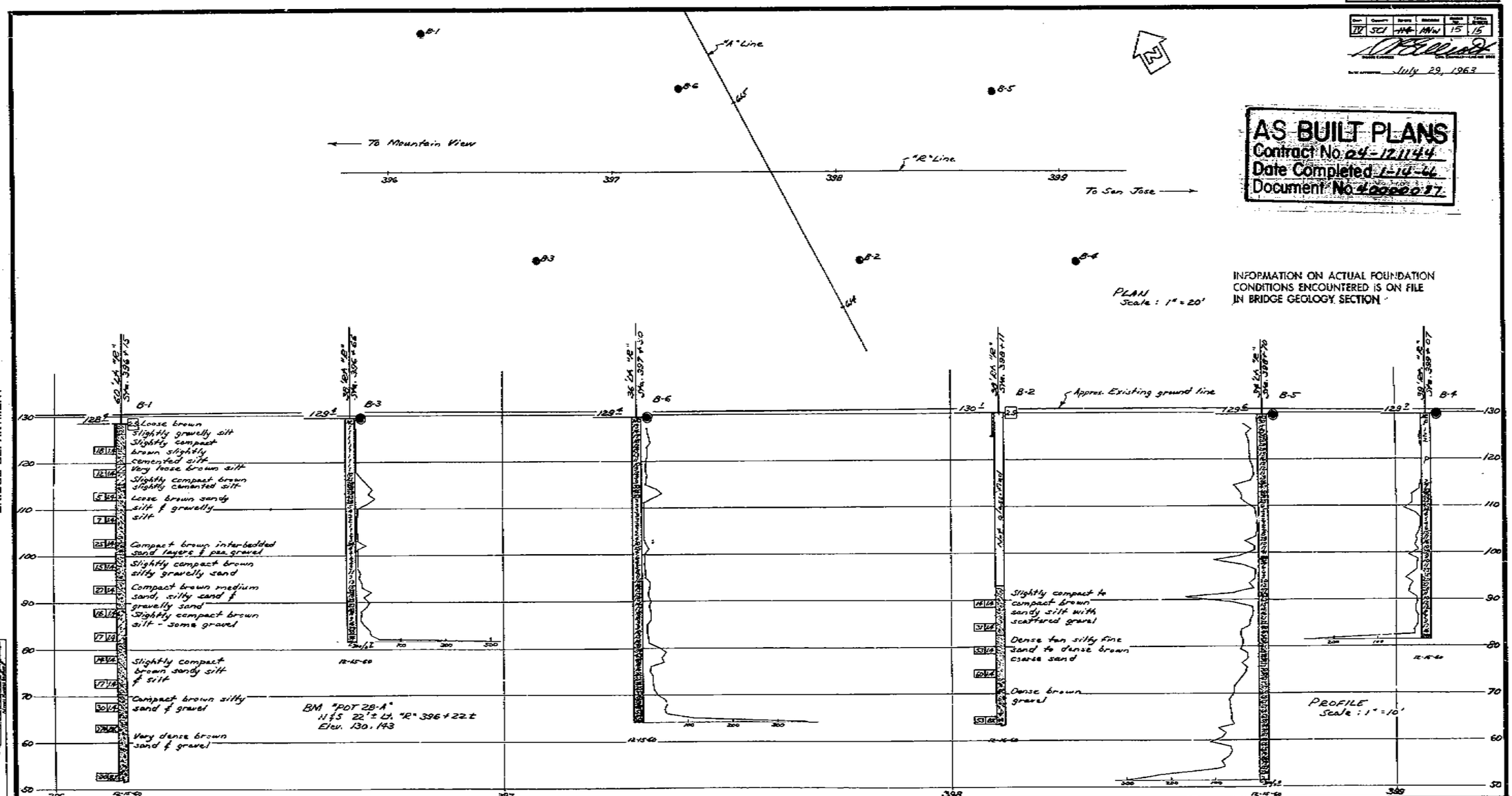
FED. ROAD DIST. NO.	STATE	FISCAL YR.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	CAL.			261	391

DIST.	COUNTY	ROUTE	SECTION	SHEET NO.	TOTAL SHEETS
IV	SCl	114	MWL	15	15

July 29, 1963

AS BUILT PLANS
Contract No. 04-121144
Date Completed 1-14-66
Document No. 4000007

BRIDGE DEPARTMENT



FIELD STUDY
DESIGNED
CHECKED

CLASSIFICATION OF MATERIAL BASED ON STANDARD GRADE SIZE LIMITS

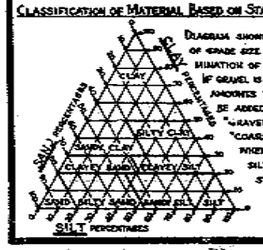


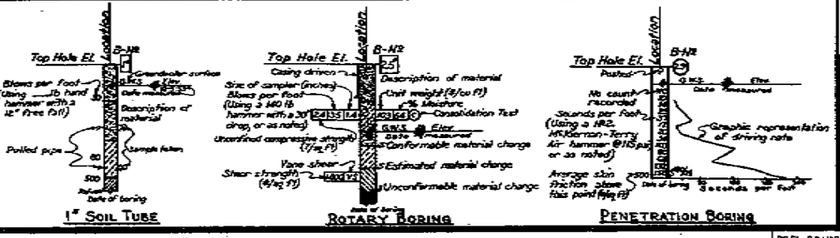
DIAGRAM SHOWING THE BASIS FOR ESTIMATES OF GRADE SIZE DISTRIBUTION USED IN DETERMINATION OF CLASS NAMES.
IF GRAVEL IS PRESENT IN APPRECIABLE AMOUNTS THE TERM "GRAVELLY" MAY BE ADDED TO THE CLASS NAME, VIZ. "GRAVELLY SAND". THE TERMS "COARSE", "MEDIUM" AND "FINE" WHEN USED TO DESCRIBE SAND, SILT AND GRAVEL REFER TO STANDARD GRADE SIZE LIMITS.

LEGEND OF EARTH MATERIALS

- Gravel
- Sand
- Silt
- Clay
- Sandy Clay or Clayey Sand
- Sandy Silt or Silty Sand
- Silty Clay or Clayey Silt
- Peat and/or Organic Matter
- Fill Material
- Igneous Rock
- Sedimentary Rock
- Metamorphic Rock

LEGEND OF BORING OPERATIONS

- Plan of any borings
- Penetrometer
- 2½" Cone Penetrometer
- Sampler boring (dry)
- Rotary boring (wet)
- Auger boring (dry)
- Jet boring
- Core boring
- Test pit



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.

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

ROUTE 2/114 SEPARATION

LOG OF TEST BORINGS

SCALE	BRIDGE	FILE	DRAWING
As Noted	37-204		C-37204-15

PREL. DRAWING NO. P-37204-15

PR-37204-4

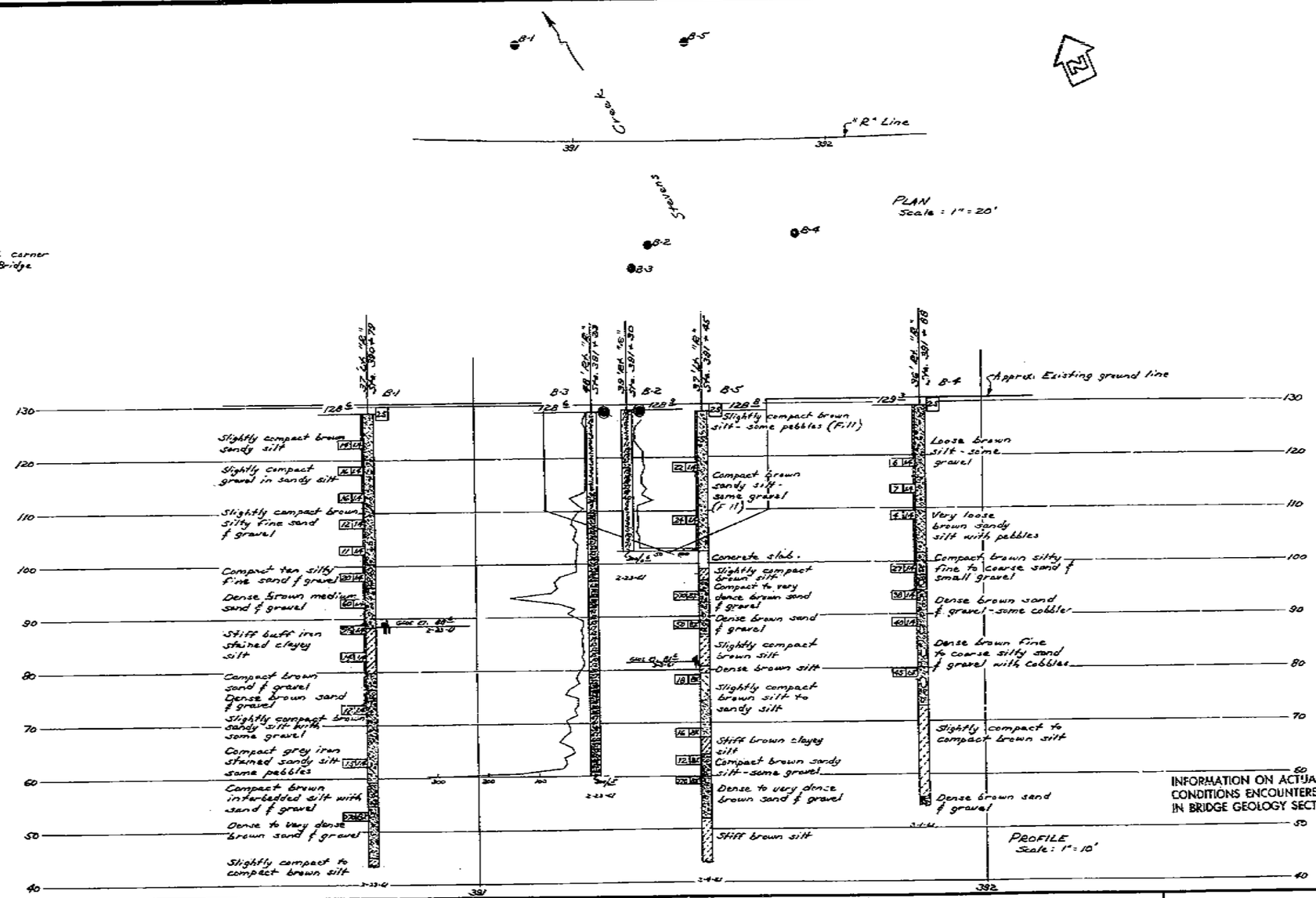
261

256

FED. ROAD DIV. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	CAL.			268	391

Dist.	County	Route	Section	Sheet No.	Total Sheets
12	SCl	82	MVW	7	7

Date Completed July 29, 1963



INFORMATION ON ACTUAL FOUNDATION CONDITIONS ENCOUNTERED IS ON FILE IN BRIDGE GEOLOGY SECTION

AS BUILT PLANS
Contract No. 24-721144
Date Completed 7-11-64
Document No. 1062477

BRIDGE DEPARTMENT

FIELD STUDY
DESIGNED
CHECKED

Classification of Material Based on Standard Grade Size Limits

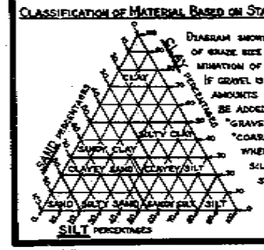


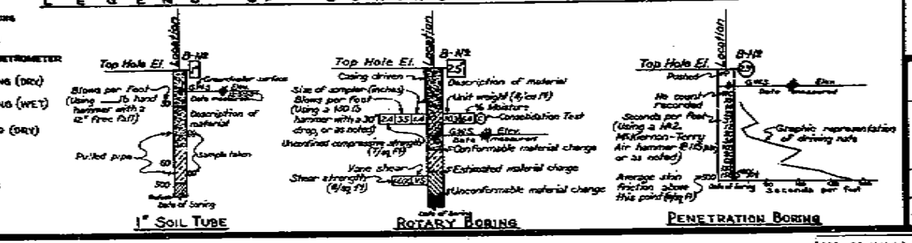
Diagram showing the basis for estimates of grade size distribution used in determination of class names. If gravel is present in appreciable amounts the term "gravelly" may be added to the class name, viz. "gravelly sand". The terms "coarse", "medium" and "fine" when used to describe sand, silt and gravel refer to standard grade size limits.

Legend of Earth Materials

- Gravel
- Sand
- Silt
- Clay
- Sandy Clay or Clayey Sand
- Sandy Silt or Silty Sand
- Silty Clay or Clayey Silt
- Peat and/or Organic Matter
- Fill Material
- Igneous Rock
- Sedimentary Rock
- Metamorphic Rock

Legend of Boring Operations

- Plan of any boring
- Penetrometer
- 2½" Core Penetrometer
- Sampler boring (dry)
- Rotary boring (wet)
- Auger boring (dry)
- Jet boring
- Core boring
- Test pit



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.

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

STEVENS CREEK BRIDGE WIDENING

LOG OF TEST BORINGS

Scale	Bridge	File	Drawing
As Noted	37-14		C-3714-7

PREL. DRAWING No. P-3714-8

PR-3714-2

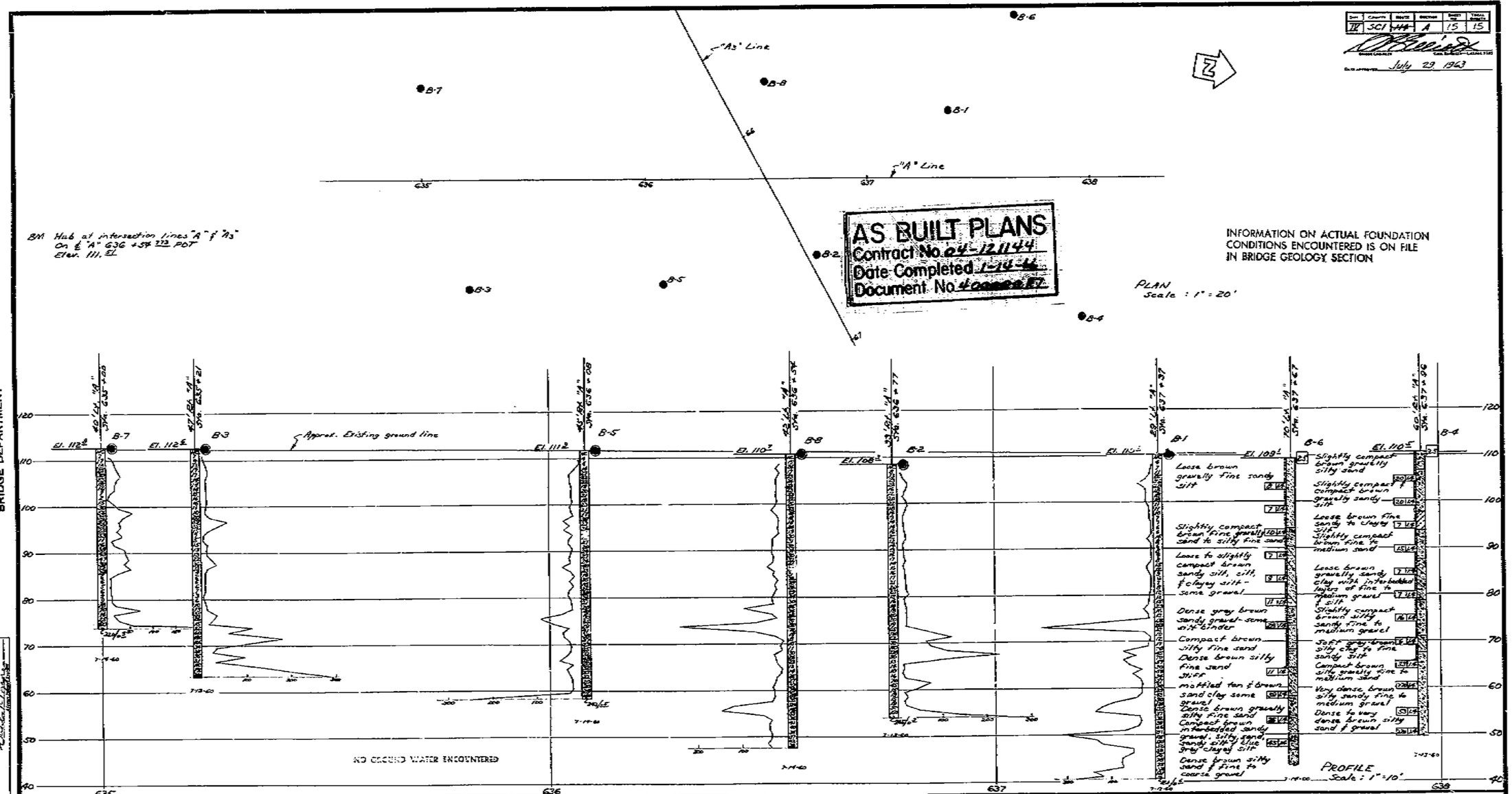
268

112

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	CAL.			283	391

DIST.	COUNTY	ROUTE	BRIDGE NO.	SHEET NO.	TOTAL SHEETS
7	SCl	114	A	15	15

July 29, 1963

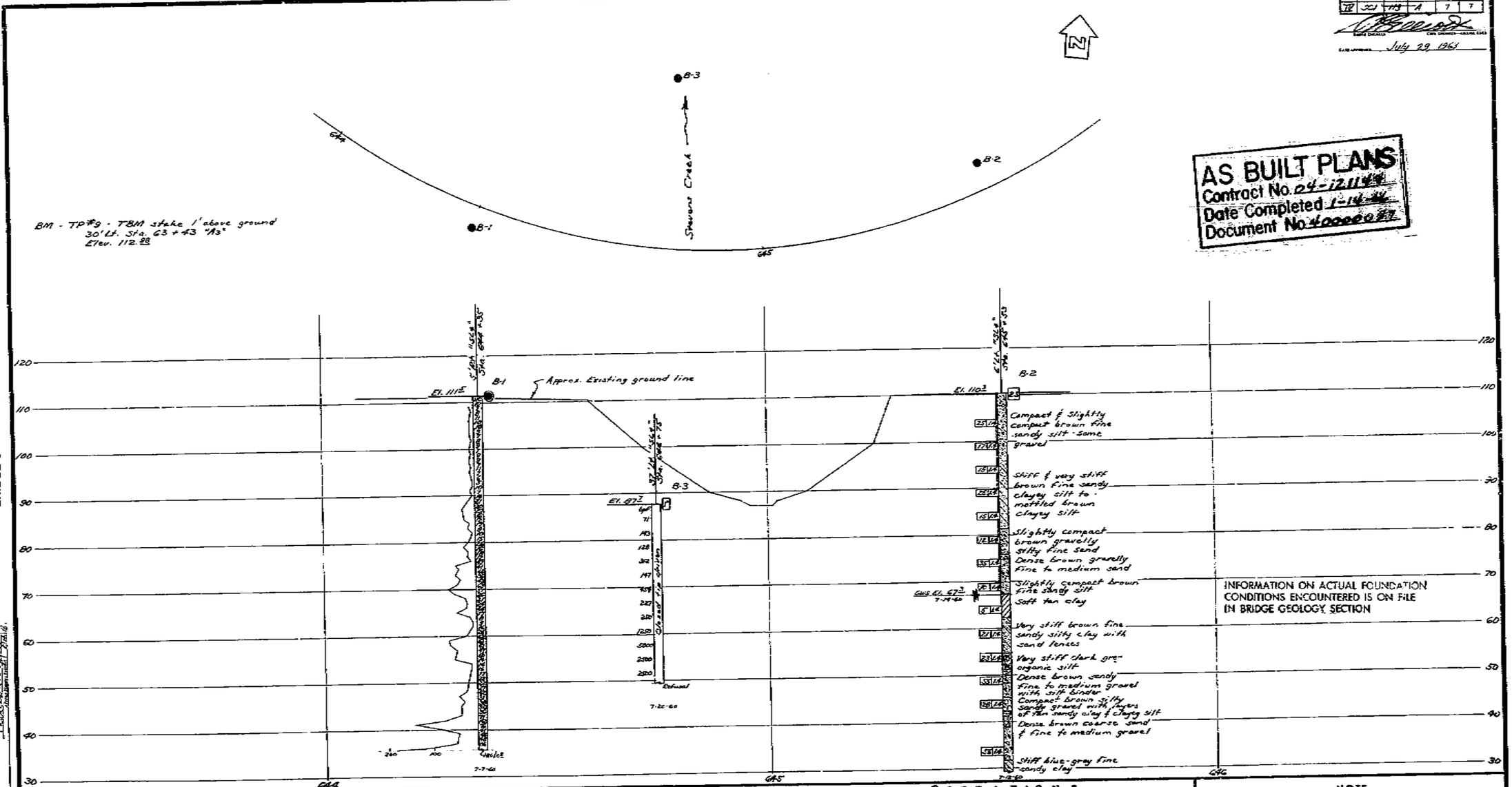


FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	CAL.			290	391

DIST.	COUNTY	ROUTE	BRIDGE NO.	SHEET NO.	TOTAL SHEETS
7	SCl	119	A	7	7

July 29 1961

AS BUILT PLANS
Contract No. 04-121144
Date Completed 1-14-66
Document No. 400000 87



BRIDGE DEPARTMENT

FIELD STUDY	H. G. Miller	
DRAWN	H. M. Beasley	8-25-60
CHECKED	H. C. McNiller	8-60

Report Recommended by [signature]

Classification of Material Based on Standard Grade Size Limits

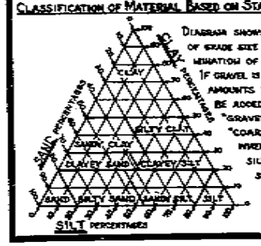


Diagram showing the basis for estimates of grade size distribution used in determination of class names.

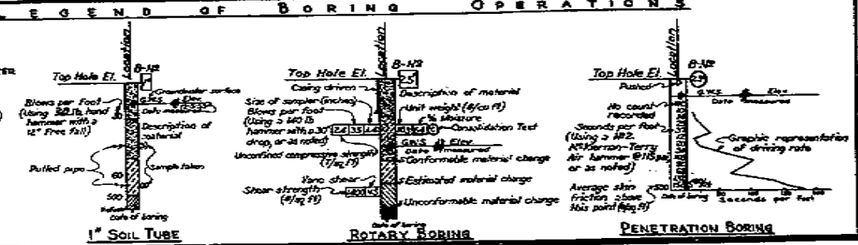
If gravel is present in appreciable amounts the term "gravelly" may be added to the class name, viz. "gravelly sand". The terms "coarse", "medium" and "fine" when used to describe sand, silt and gravel refer to standard grade size limits.

Legend of Earth Materials

- Gravel
- Sand
- Silt
- Clay
- Sandy Clay or Clayey Sand
- Sandy Silt or Silty Sand
- Silty Clay or Clayey Silt
- Peat and/or Organic Matter
- Fill Material
- Igneous Rock
- Sedimentary Rock
- Metamorphic Rock

Legend of Boring Operations

- Plan of any boring
- Penetrometer
- 2¼" Core Penetrometer
- Sampler boring (dry)
- Rotary boring (wet)
- Auger boring (dry)
- Jet boring
- Core boring
- Test pit



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.

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

STEVENS CREEK
NORTH WEST CONNECTOR

LOG OF TEST BORINGS

SCALE	BRIDGE	FILE	DRAWING
1" = 10'	37-201 ½		C-37201-7

PR-7082-3

FREL. DRAWING NO. P-37201

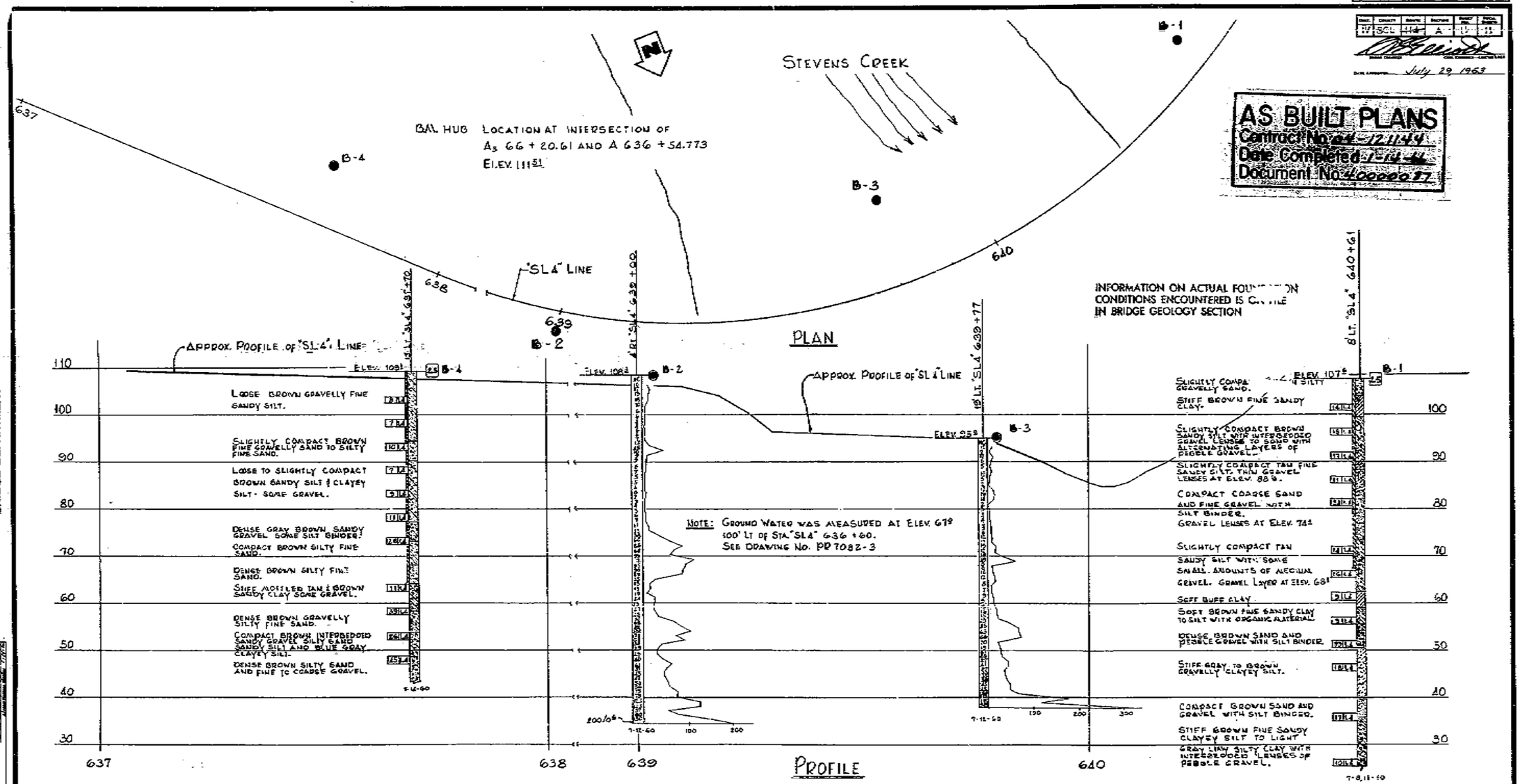
290

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	CAL.			301	391

DIST.	COUNTY	ROUTE	SECTION	SHEET NO.	TOTAL SHEETS
7	SCL	114	A	11	11

DATE APPROVED July 29 1963

AS BUILT PLANS
Contract No. 04-121144
Date Completed 1-14-66
Document No. 40000077



BRIDGE DEPARTMENT

FIELD STUDY	
DESIGNED	W. G. ANDLER
CHECKED	L. CLAUSEN
APPROVED	

Approval Recommended by: [signature]

CLASSIFICATION OF MATERIAL BASED ON STANDARD GRADE SIZE LIMITS

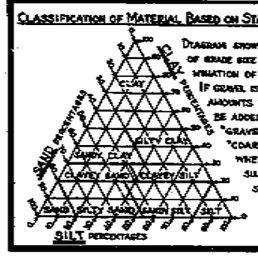


DIAGRAM SHOWING THE BASIS FOR ESTIMATES OF GRADE SIZE DISTRIBUTION USED IN DETERMINATION OF CLASS NAMES.

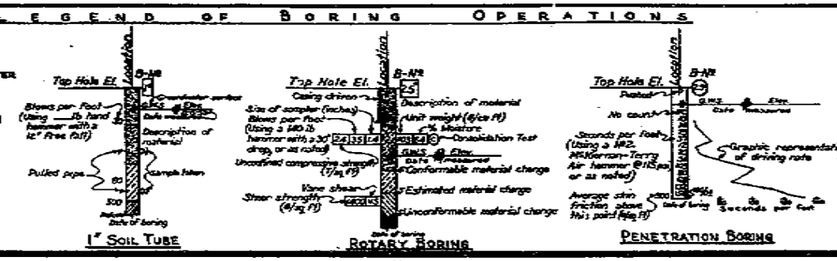
IF GRAVEL IS PRESENT IN APPRECIABLE AMOUNTS THE TERM "GRAVELLY" MAY BE ADDED TO THE CLASS NAME, VIZ. "GRAVELLY SAND." THE TERMS "COARSE", "MEDIUM" AND "FINE" WHEN USED TO DESCRIBE SAND, SILT AND GRAVEL REFER TO STANDARD GRADE SIZE LIMITS.

LEGEND OF EARTH MATERIALS

- GRAVEL
- SAND
- SILT
- CLAY
- SANDY CLAY OR CLAYEY SAND
- SANDY SILT OR SILTY SAND
- SILTY CLAY OR CLAYEY SILT
- PEAT AND/OR ORGANIC MATTER
- FILL MATERIAL
- IGNEOUS ROCK
- SEDIMENTARY ROCK
- METAMORPHIC ROCK

LEGEND OF BORING OPERATIONS

- PLAN OF ANY BORING
- PENETROMETER
- 2½" CONE PENETROMETER
- SAMPLER BORING (DRY)
- ROTARY BORING (WET)
- AUGER BORING (DRY)
- JET BORING
- CORE BORING
- TEST PIT



NOTES

The contractor's attention is directed to Section 2, Article (c) of the Standard Specifications and to the Special Provisions accompanying this set of plans.

Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

STEVENS CREEK N.W. CONNECTOR

LOG OF TEST BORINGS

SCALE 1" = 10'	BRIDGE 37-200	FILE	DRAWING C-37200-11

PREL. DRAWING NO. P-37200-11

PR 7081-2 234

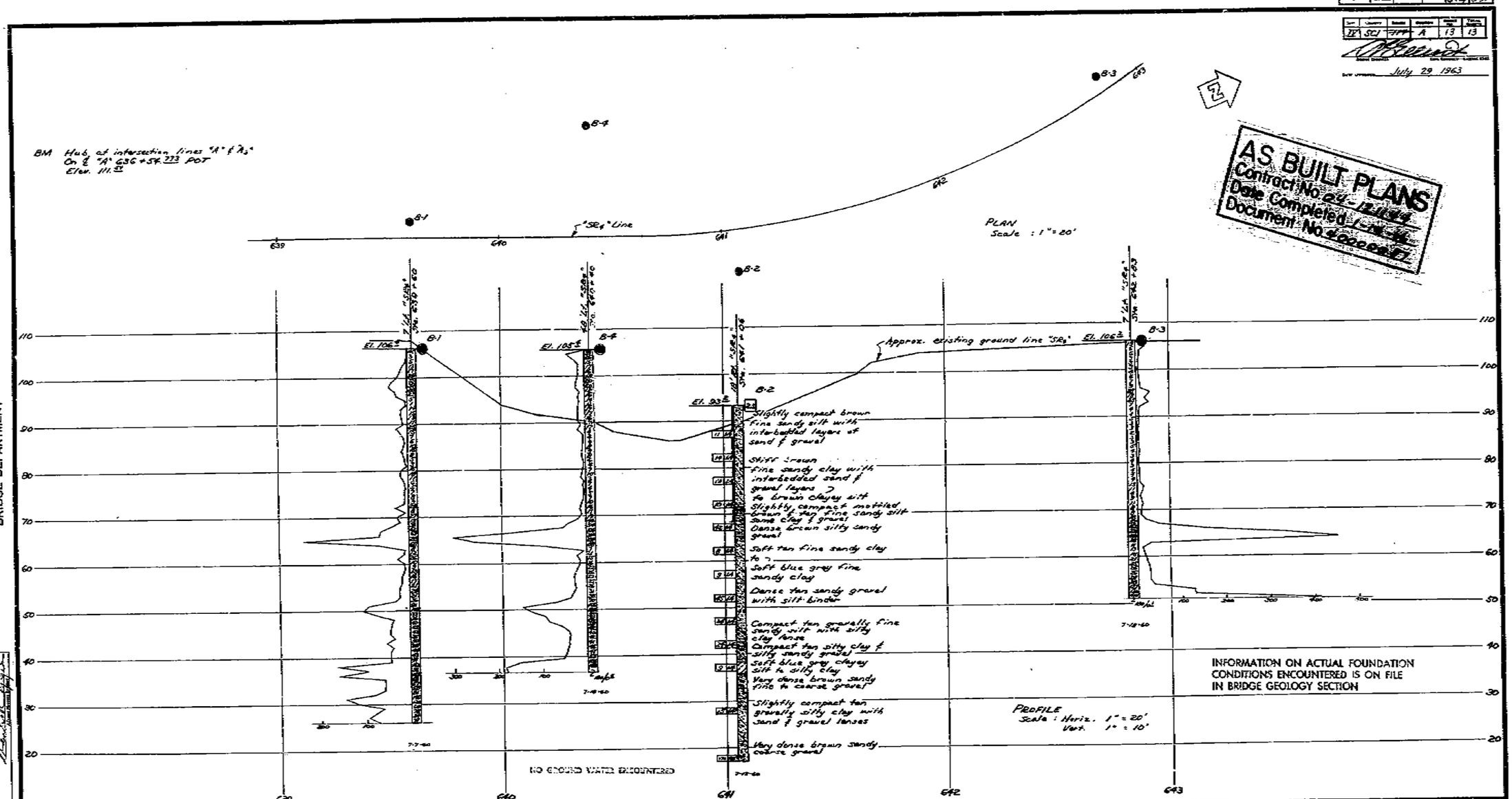
301

FED. AID PROJ. NO.	STATE	FISCAL YR.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	CAL.			314	391

DIST.	COUNTY	ROUTE	PREFIX	SHEET NO.	TOTAL SHEETS
IV	SCl	17	A	13	13

DATE APPROVED July 29 1963

BRIDGE DEPARTMENT



AS BUILT PLANS
Contract No. 04-12194
Date Completed 1-14-66
Document No. 400000-87

FIELD STUDY — G. McMillan
DRAWN — N. McFarlane
CHECKED — R. Scott
Approval Recommended by — Soil Mechanics Engineer; Bridge Design Engineer; Bridge Construction Engineer; Bridge Maintenance Engineer; Bridge Design Engineer

Classification of Material Based on Standard Grade Size Limits

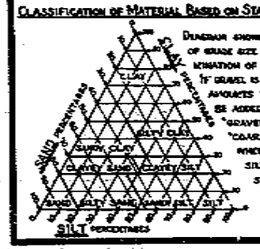


Diagram showing the basis for estimates of grade size distribution used in determination of class names.

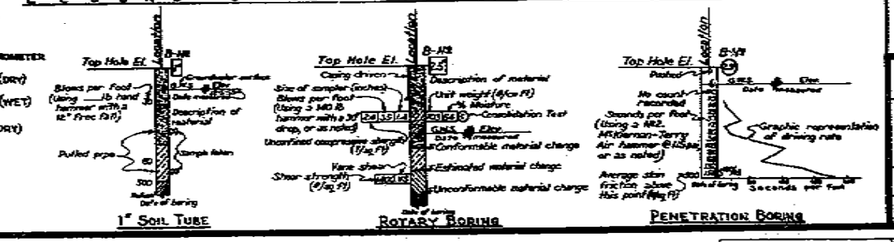
If gravel is present in appreciable amounts the term "gravelly" may be added to the class name, viz. "gravelly sand." The terms "coarse," "medium" and "fine" when used to describe sand, silt and gravel, refer to standard grade size limits.

Legend of Earth Materials

- Gravel
- Sand
- Silt
- Clay
- Sandy Clay or Clayey Sand
- Sandy Silt or Silty Sand
- Silty Clay or Clayey Silt
- Peat and/or Organic Matter
- Fill Material
- Igneous Rock
- Sedimentary Rock
- Metamorphic Rock

Legend of Boring Operations

- Plan of any boring
- Penetrometer
- 2½" Cone Penetrometer
- Sampler boring (dry)
- Rotary boring (wet)
- Auger boring (dry)
- Jet boring
- Core boring
- Test pit



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.

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

STEVENS CREEK (OFF RAMP)

LOG OF TEST BORINGS

SCALE	BRIDGE	FILE	DRAWING
As Noted	37-199		C-37199-13

PREL. DRAWING NO. P-37199-13

314

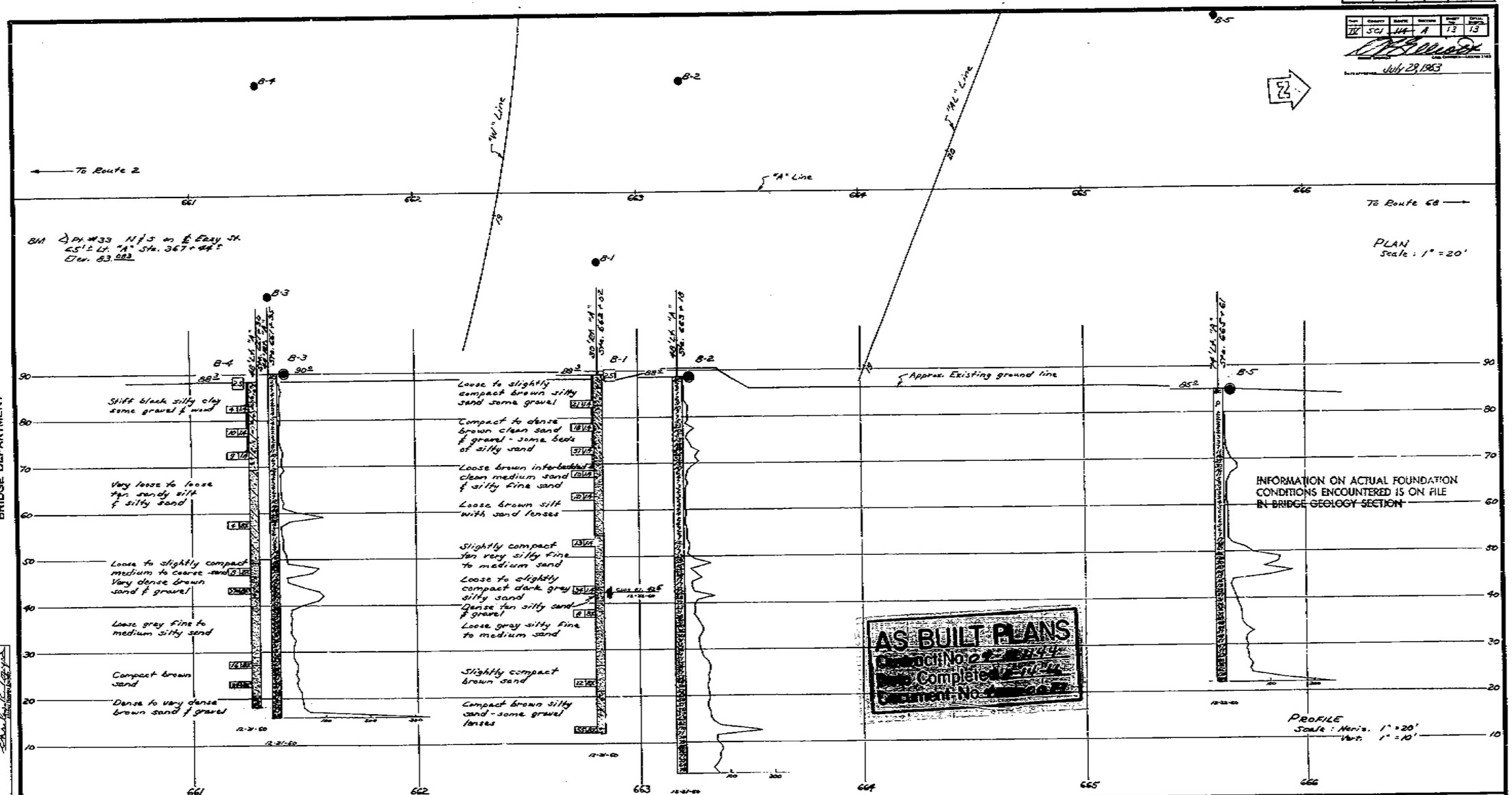
PR-7080-2

FED. ROAD DIST. NO.	STATE	FISCAL YR.	TOTAL PROJ.	SHEET NO.	TOTAL SHEETS
7	CAL.			327	391

Dist.	County	Route	Section	Sheet No.	Total Sheets
VII	SCl	114	A	13	13

Submitted July 28, 1963

BRIDGE DEPARTMENT



Classification of Material Based on Standard Grade Size Limits

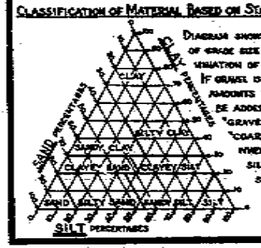


Diagram showing the basis for estimates of grade size distribution used in determination of class names.

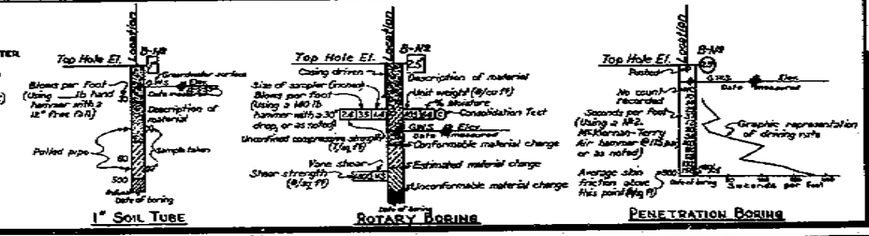
If gravel is present in appreciable amounts the term "gravelly" may be added to the class name, viz. "gravelly sand". The terms "coarse", "medium" and "fine" when used to describe sand, silt and gravel refer to standard grade size limits.

Legend of Earth Materials

- Gravel
- Sand
- Silt
- Clay
- Sandy Clay or Clayey Sand
- Sandy Silt or Silty Sand
- Silty Clay or Clayey Silt
- Peat and/or Organic Matter
- Fill Material
- Igneous Rock
- Sedimentary Rock
- Metamorphic Rock

Legend of Boring Operations

- Plan of any boring
- Penetrometer
- 2½" Cone Penetrometer
- Sampler Boring (Dry)
- Rotary Boring (Wet)
- Auger Boring (Dry)
- Jet Boring
- Core Boring
- Test Pit



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.

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

MOUNTAIN VIEW O.H.

LOG OF TEST BORINGS

Scale: As Noted | Bridge 37-207 | File | Drawing C-37207-13

PRE. DRAWING NO. P-37207-

PR-37207-4

327

269

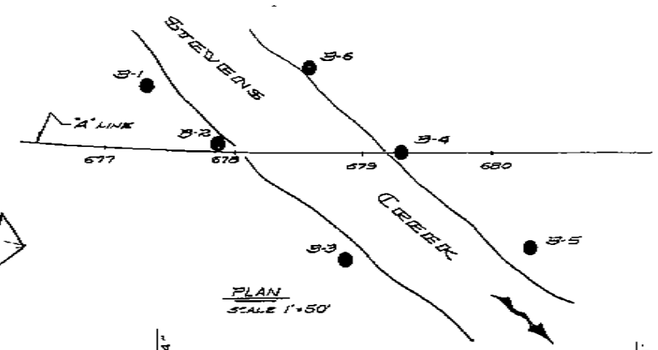
FED. ROAD DIV. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	CAL.			339	391

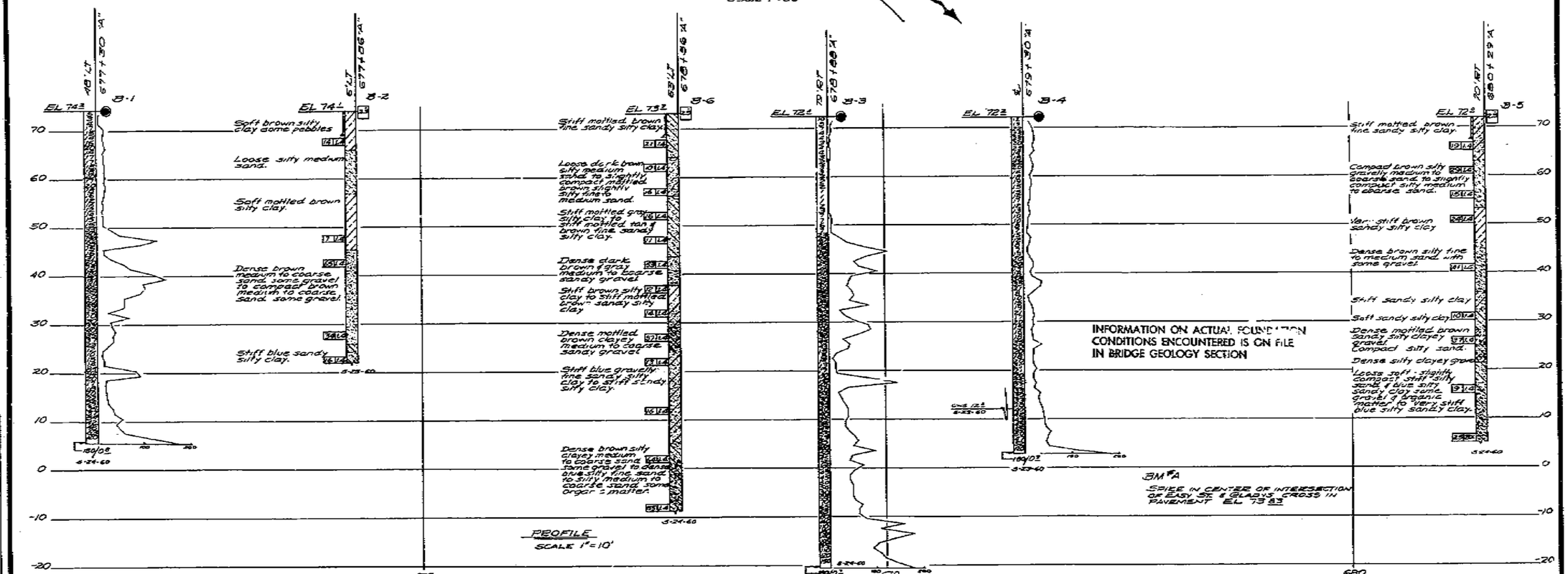
DIST.	COUNTY	ROUTE	SECTION	SHEET NO.	TOTAL SHEETS
11	SCL	[illegible]	[illegible]	12	12

July 29, 1963

BRIDGE DEPARTMENT

AS BUILT PLANS
Contract No. [illegible]
Date Completed [illegible]
Document No. [illegible]





FIELD STUDY
DRAWN
CHECKED
Approved Recommended by

Classification of Material Based on Standard Grade Size Limits

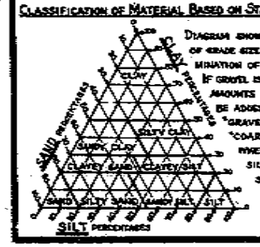


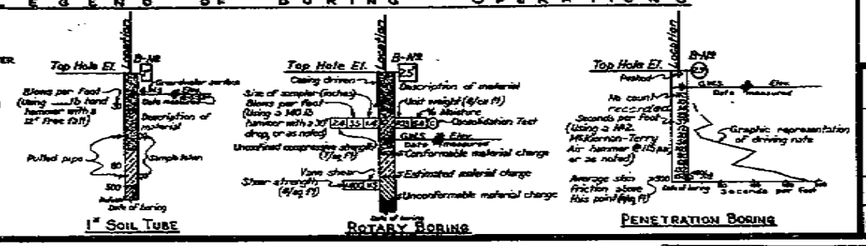
Diagram showing the bars for estimates of grade size distribution used in determination of class names. If gravel is present in appreciable amounts the term "gravelly" may be added to the class name, viz. "gravelly sand." The terms "coarse", "medium" and "fine" when used to describe sand, silt and gravel, refer to standard grade size limits.

Legend of Earth Materials

- Gravel
- Sand
- Silt
- Clay
- Sandy Clay or Clayey Sand
- Sandy Silt or Silty Sand
- Silty Clay or Clayey Silt
- Peat and/or Organic Matter
- Fill Material
- Igneous Rock
- Sedimentary Rock
- Metamorphic Rock

Legend of Boring Operations

- Plan of any boring
- Penetrometer
- 2½" Core Penetrometer
- Sampler boring (dry)
- Rotary boring (wet)
- Auger boring (dry)
- Jet boring
- Core boring
- Test pit



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.

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

STEVENS CREEK

LOG OF TEST BORINGS

SCALE	BRIDGE	FILE	DRAWING
As Shown	37-197 R		C-37197-12

339

PREL. DRAWING NO. P-37197-H

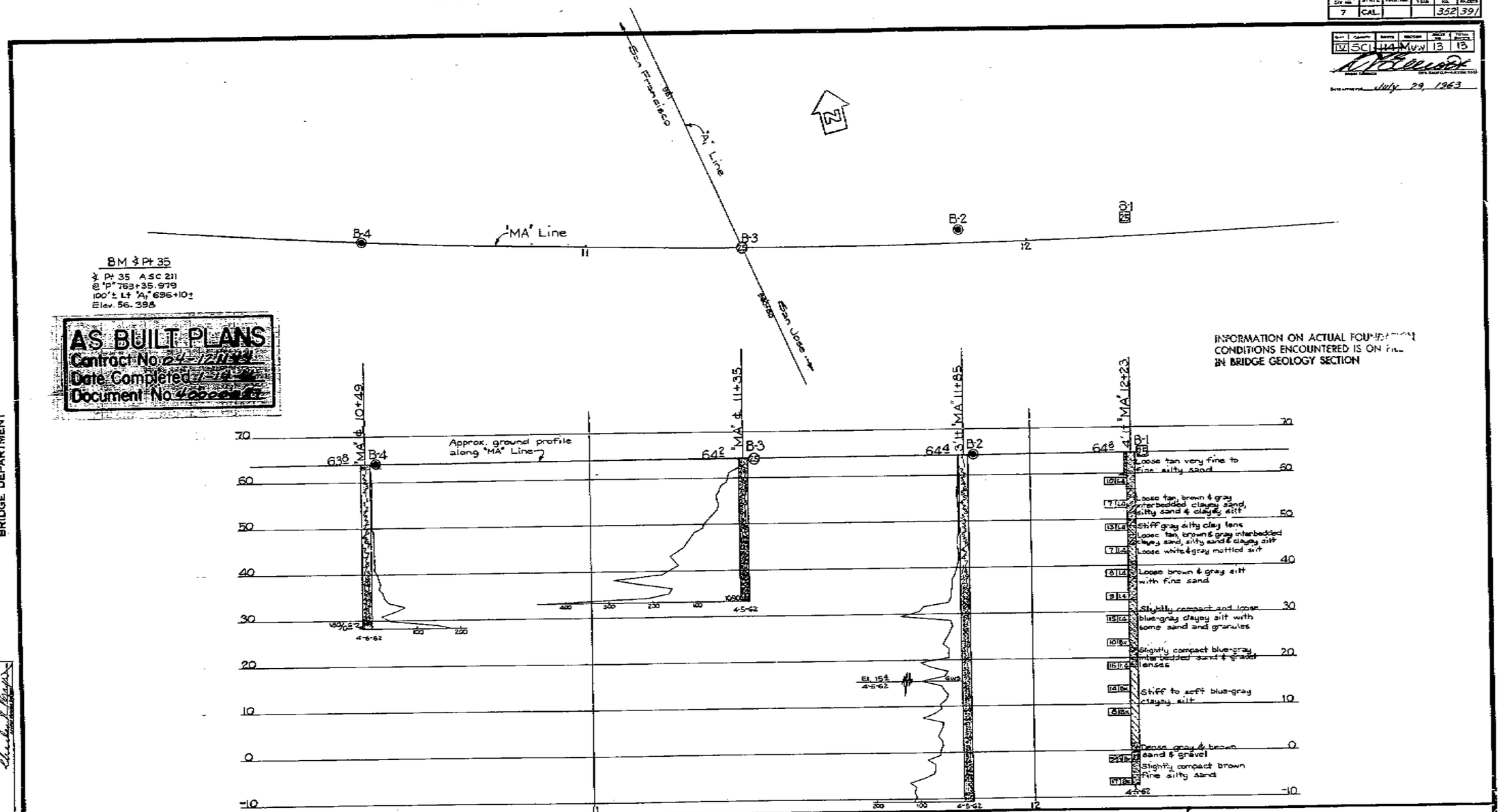
PR 7041-5 190

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	CAL.			352	391

DIST.	COUNTY	ROUTE	SECTION	PROJ. NO.	TOTAL SHEETS
IV	SCl	114	MVW	13	13

Date approved July 29, 1963

BRIDGE DEPARTMENT



FIELD STUDY H. Dwell 4-62
DRAWN H. Dwell 4-62
CHECKED H. Goldschmidt 4-62
Approved Recommended: T. F. Sommers
Chief Engineer

Classification of Material Based on Standard Grade Size Limits

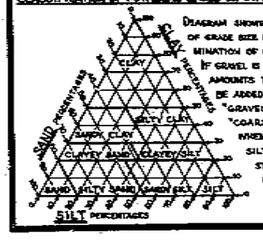


Diagram showing the basis for estimates of grade size distribution used in determination of class names.

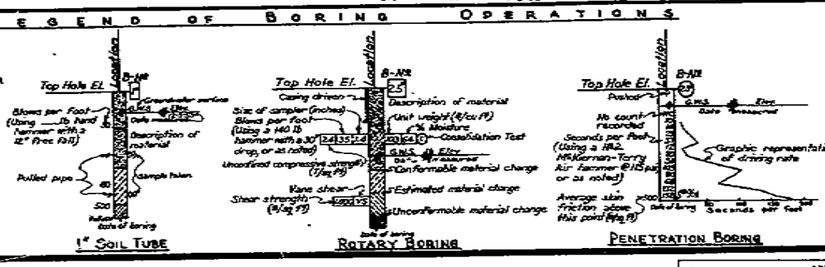
If gravel is present in appreciable amounts the term "gravelly" may be added to the class name, viz. "gravelly sand". The terms "coarse", "medium" and "fine" when used to describe sand, silt and gravel refer to standard grade size limits.

Legend of Earth Materials

- Gravel
- Sand
- Silt
- Clay
- Sandy Clay or Clayey Sand
- Sandy Silt or Silty Sand
- Silty Clay or Clayey Silt
- Peat and/or Organic Matter
- Fill Material
- Igneous Rock
- Sedimentary Rock
- Metamorphic Rock

Legend of Boring Operations

- Penetrometer
- 2½" Cone Penetrometer
- Sampler Boring (Dry)
- Rotary Boring (Wet)
- Auger Boring (Dry)
- Jet Boring
- Core Boring
- Test Pit



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.

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

MIDDLEFIELD ROAD OVERCROSSING

LOG OF TEST BORINGS

SCALE 1" = 10'	BRIDGE 37-213	FILE	DRAWING C-37213-13

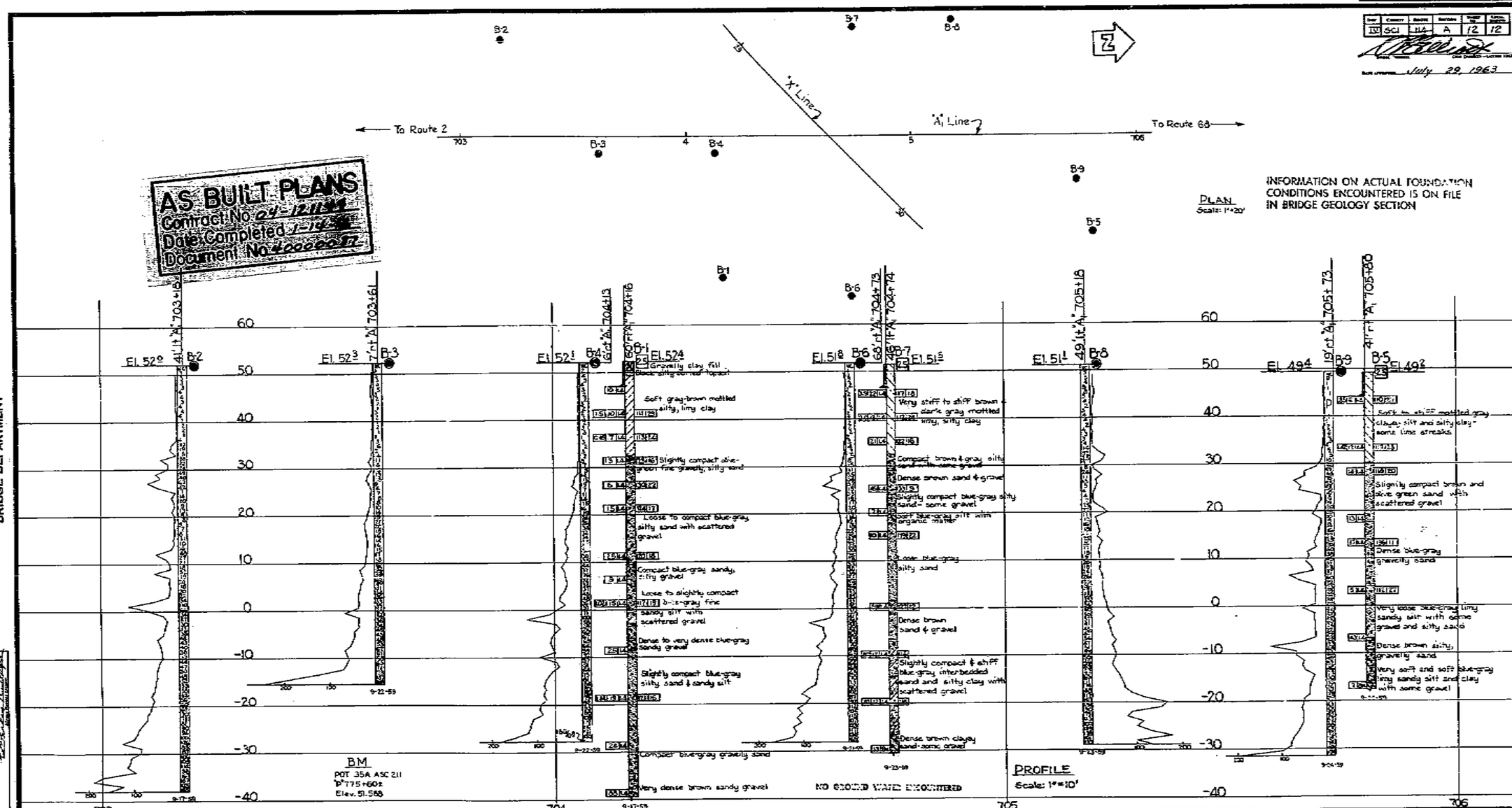
PRL DRAWING NO. P-37213-11

PR-37213-5 295

352

DIST.	COUNTY	ROUTE	SECTION	SHEET NO.	TOTAL SHEETS
10	SCl	114	A	12	12

July 29, 1963



FIELD STUDY: H. Dasch 8-55; H. Dabb 11-59
DRAWN: H. Dabb 11-59
CHECKED: H. Dabb 11-59

Approved & Recommended by: Geologist, Bridge Department

Approved & Recommended by: Engineer of Bridge Design

Approved & Recommended by: Engineer of Bridge Maintenance

Classification of Material Based on Standard Grade Size Limits

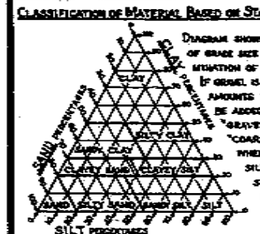


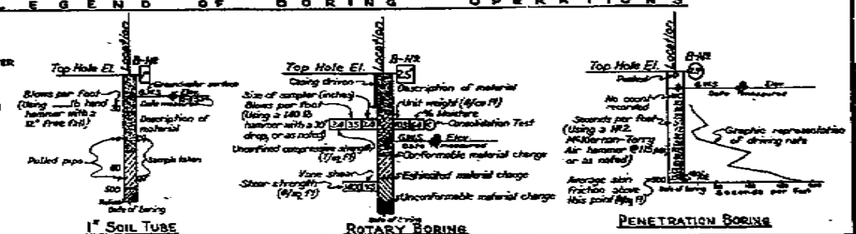
Diagram showing the basis for estimates of grade size distribution used in determination of class names. If gravel is present in appreciable amounts the term "gravelly" may be added to the class name, viz. "gravelly sand". The terms "coarse", "medium" and "fine" when used to describe sand, silt and gravel, refer to standard grade size limits.

Legend of Earth Materials

- Gravel
- Sand
- Silt
- Clay
- Sandy Clay or Clayey Sand
- Sandy Silt or Silty Sand
- Silty Clay or Clayey Silt
- Peat and/or Organic Matter
- Fill Material
- Igneous Rock
- Sedimentary Rock
- Metamorphic Rock

Legend of Boring Operations

- Plan of any boring
- Penetrometer
- 2½" Core Penetrometer
- Sampler boring (dry)
- Rotary boring (wet)
- Auger boring (dry)
- Jet boring
- Core boring
- Test pit



NOTES

[redacted]

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STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

MOFFETT BLVD. UNDERCROSSING

LOG OF TEST BORINGS

SCALE	As shown	BRIDGE	37-187	FILE	E-37	DRAWING	E-6701-12

PRELIM. DRAWING NO. P. 6701 | K | 29 | 1.5

PR-6701-3

167

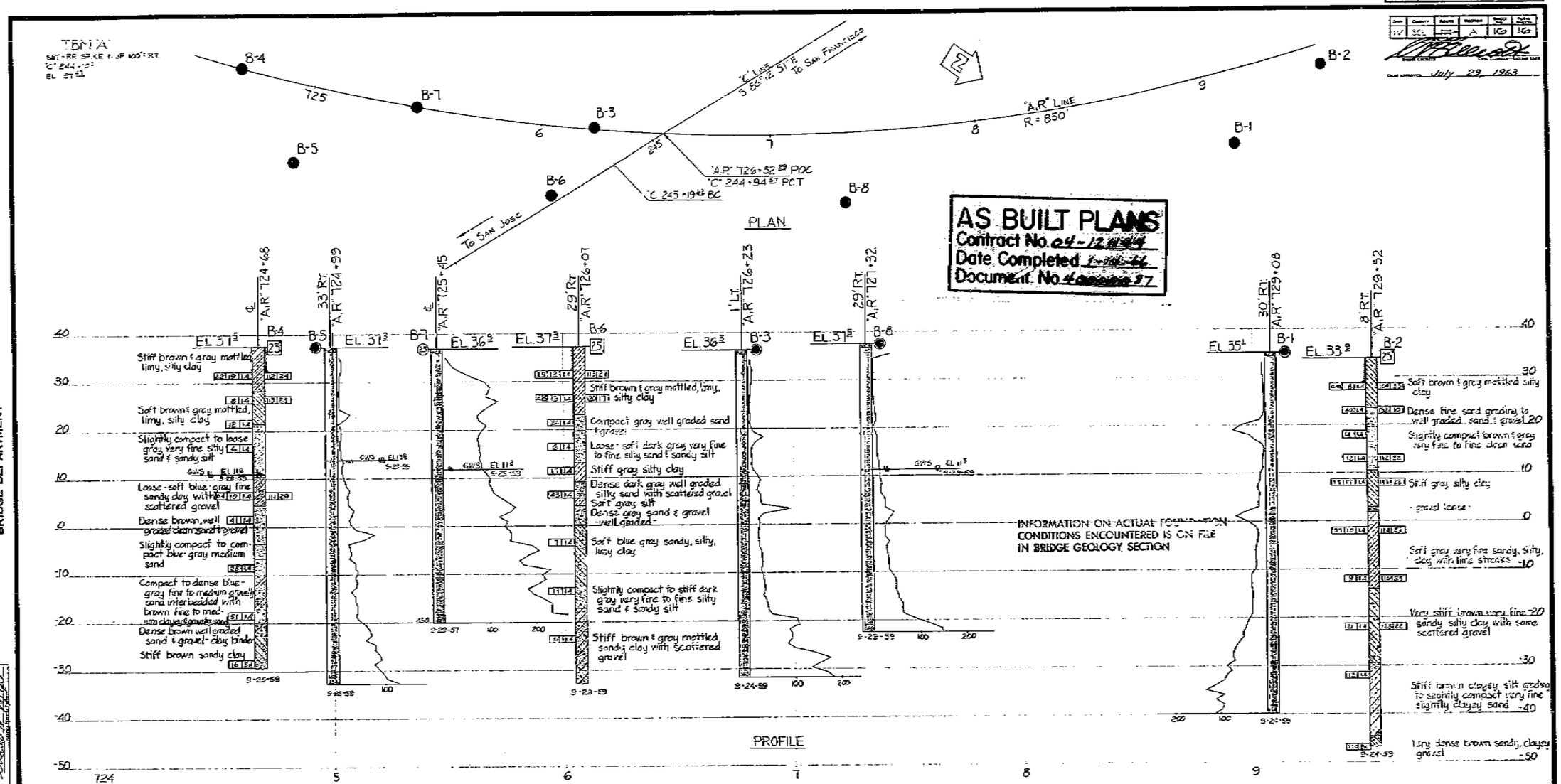
364

FED. ROAD DIST. NO.	STATE	FEDL. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	CAL.			380	391

DIST.	COUNTY	ROUTE	POSTMILE	PROJECT ID	PROJECT ID
07	SCL	280	A	160	160

July 29, 1963

BRIDGE DEPARTMENT



FIELD STUDY BY	J. HILL	9-59
DRAWN BY	G. SAGE	12-59
CHECKED	J. PELL	12-59

Lloyd L. Brownlee
Chief Bridge Engineer

Classification of Material Based on Standard Grade Size Limits

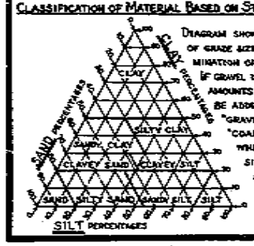


Diagram showing the basis for estimates of grade size distribution used in determination of class names.

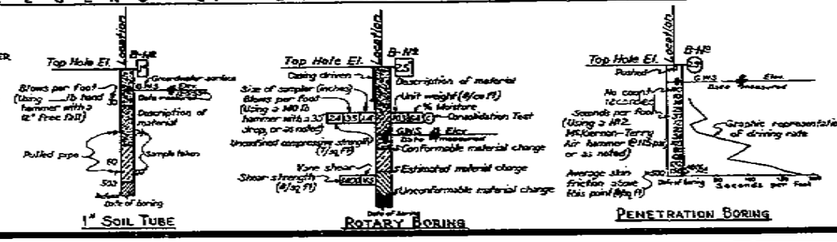
If gravel is present in appreciable amounts the term "gravelly" may be added to the class name, viz. "gravelly sand". The terms "coarse", "medium" and "fine" when used to describe sand, silt and gravel refer to standard grade size limits.

Legend of Earth Materials

- Gravel
- Sand
- Silt
- Clay
- Sandy Clay or Clayey Sand
- Sandy Silt or Silty Sand
- Silty Clay or Clayey Silt
- Peat and/or Organic Matter
- Fill Material
- Igneous Rock
- Sedimentary Rock
- Metamorphic Rock

Legend of Boring Operations

- Plan of any boring
- Penetrometer
- 2½" Cone Penetrometer
- Sampler boring (dry)
- Rotary boring (wet)
- Auger boring (dry)
- Jet boring
- Core boring
- Test pit



NOTES

[redacted]

Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

ROUTE ~~114/68~~ SEPARATION

LOG OF TEST BORINGS

SCALE PLAN 1" = 20' PROFILE 1" = 10'	BRIDGE 57-155	FILE 2-7	DRAWING C-37186-16

FIELD DRAWING NO. 2-37186-136

380

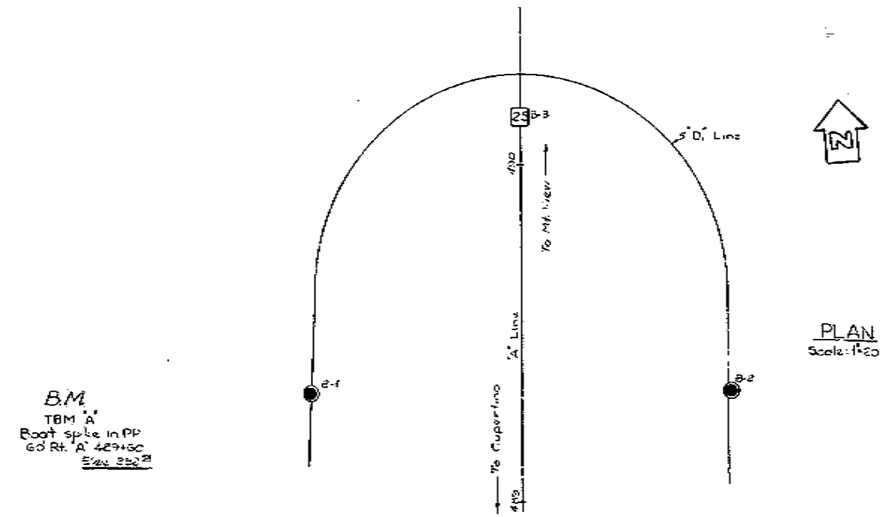
155

FED. ROAD DIV. NO.	STATE	PROJ. NO.	FUNCTIONAL YEAR	SHEET NO.	TOTAL SHEETS
7	CAL.			391	391

DIST.	COUNTY	ROUTE	SECTION	SHEET NO.	TOTAL SHEETS
17	SCL	114	Surv	11	11

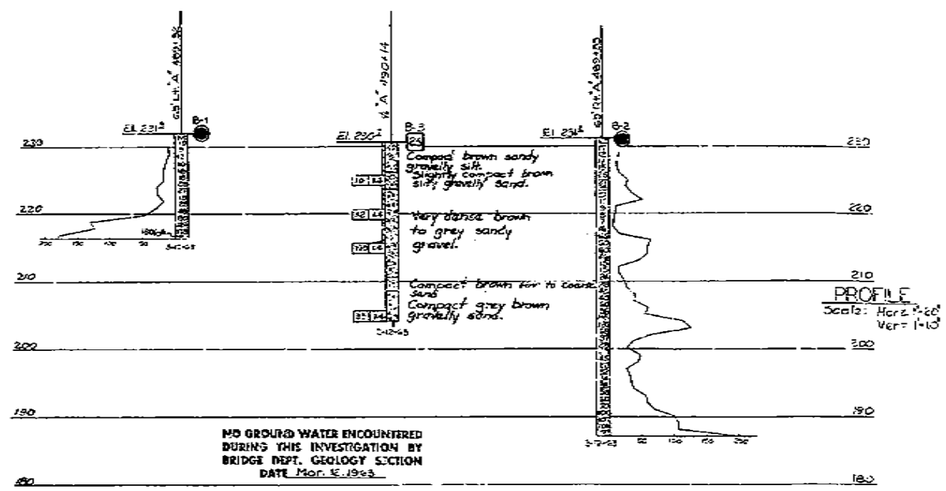
July 29, 1963

BRIDGE DEPARTMENT



PLAN
Scale: 1"=20'

B.M.
TBM 'A'
Boat spike in PP
60' Rt. 'A' 429+60
Elev. 352.28



PROFILE
Scale: Horz. 1"=20'
Vert. 1"=10'

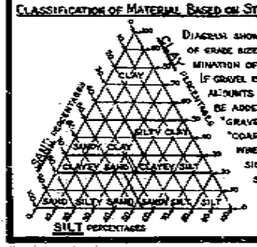
NO GROUND WATER ENCOUNTERED DURING THIS INVESTIGATION BY BRIDGE DEPT. GEOLOGY SECTION
DATE Mar. 12, 1963

INFORMATION ON ACTUAL FOUNDATION CONDITIONS ENCOUNTERED IS ON FILE IN BRIDGE GEOLOGY SECTION

AS BUILT PLANS
Contract No. 04-12114
Date Completed 7-14-66
Document No. 4000027

FIELD ENTRY			
DRAWN	1) Initial	J.C.B.	
	2) Completion	J.C.B.	
CHECKED	1) P.E. Schroeder	4-63	
	2)		

Approval Recommended by [signature] Planning Engineer



CLASSIFICATION OF MATERIAL BASED ON STANDARD GRADE SIZE LIMITS

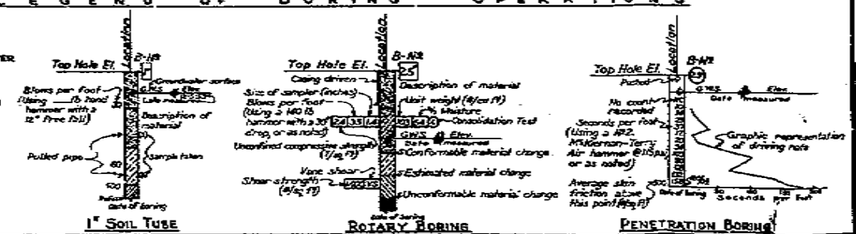
DIAGRAM SHOWING THE BASIS FOR ESTIMATES OF GRADE SIZE DISTRIBUTION USED IN DETERMINATION OF CLASS NAMES. IF GRAVEL IS PRESENT OR APPRECIABLE AMOUNTS THE TERM "GRAVELLY" MAY BE ADDED TO THE CLASS NAME, VIZ. "GRAVELLY SAND". THE TERMS "COARSE", "MEDIUM" AND "FINE" WHEN USED TO DESCRIBE SAND, SILT AND GRAVEL, REFER TO STANDARD GRADE SIZE LIMITS.

LEGEND OF EARTH MATERIALS

- Gravel
- Sand
- Silt
- Clay
- Sandy Clay or Clayey Sand
- Sandy Silt or Silty Sand
- Silty Clay or Clayey Silt
- Peat and/or Organic Matter
- Fill Material
- Igneous Rock
- Sedimentary Rock
- Metamorphic Rock

LEGEND OF BORING OPERATIONS

- Penetrometer
- 2½" Core Penetrometer
- Sampler Boring (Dry)
- Rotary Boring (Wet)
- Auger Boring (Dry)
- Jet Boring
- Core Boring
- Test Pit



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.

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

THE DALLES PEDESTRIAN OVERCROSSING

LOG OF TEST BORINGS

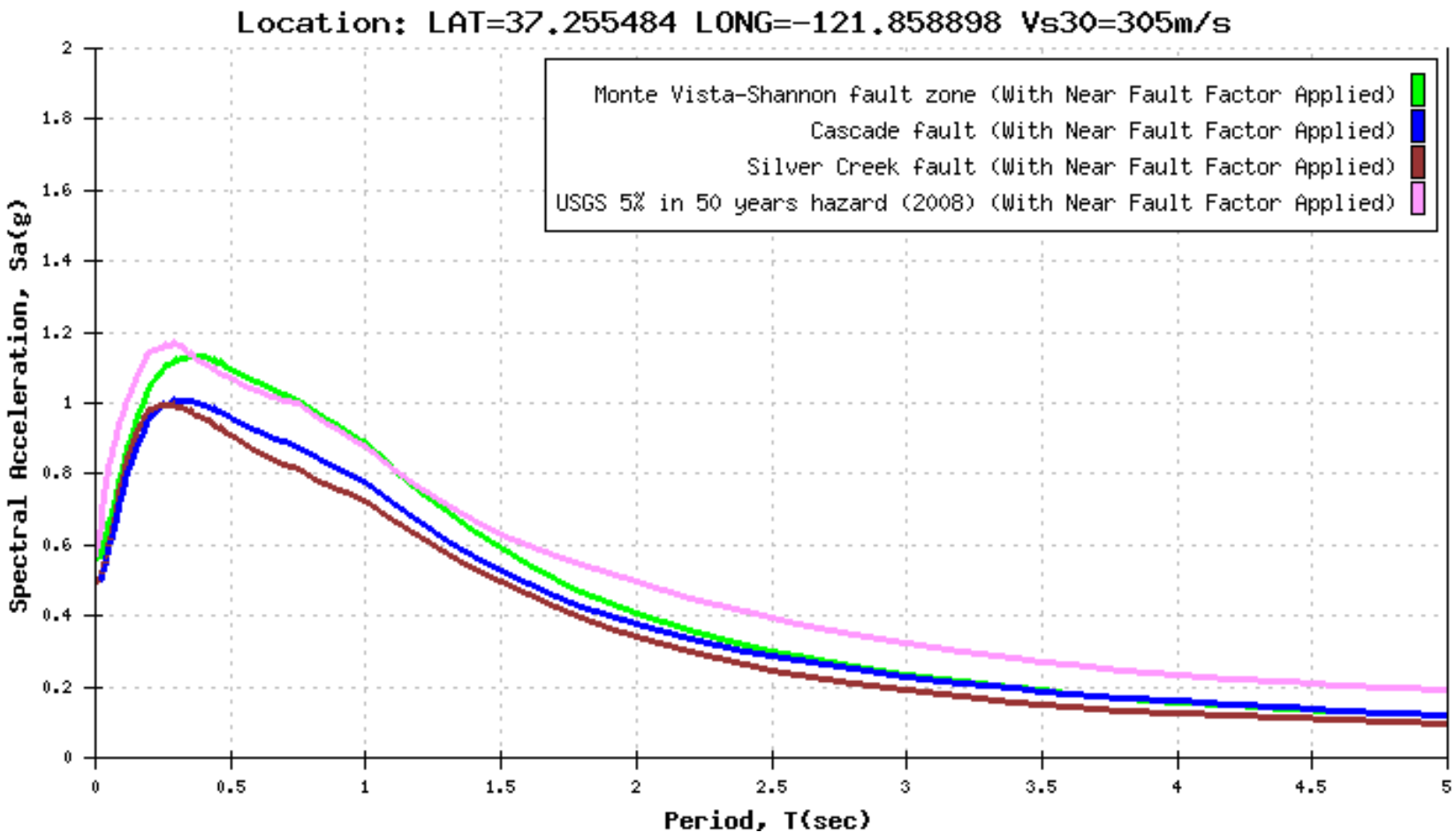
SCALE As shown	BRIDGE 37-243	FILE	DRAWING G37243-11

FILE DRAWING NO. B-37243-1 1/4/63

PR-37243-2

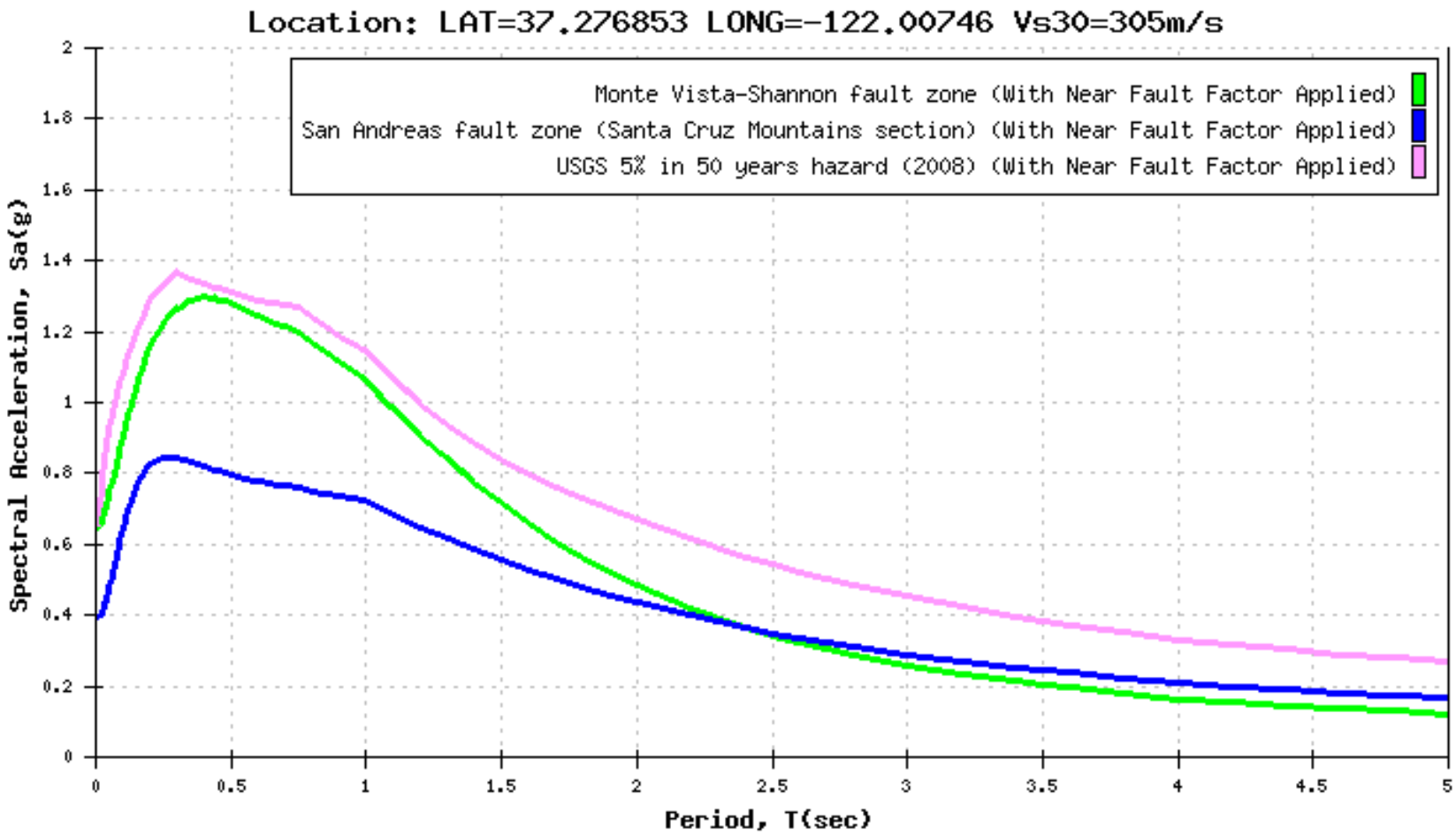
391

328



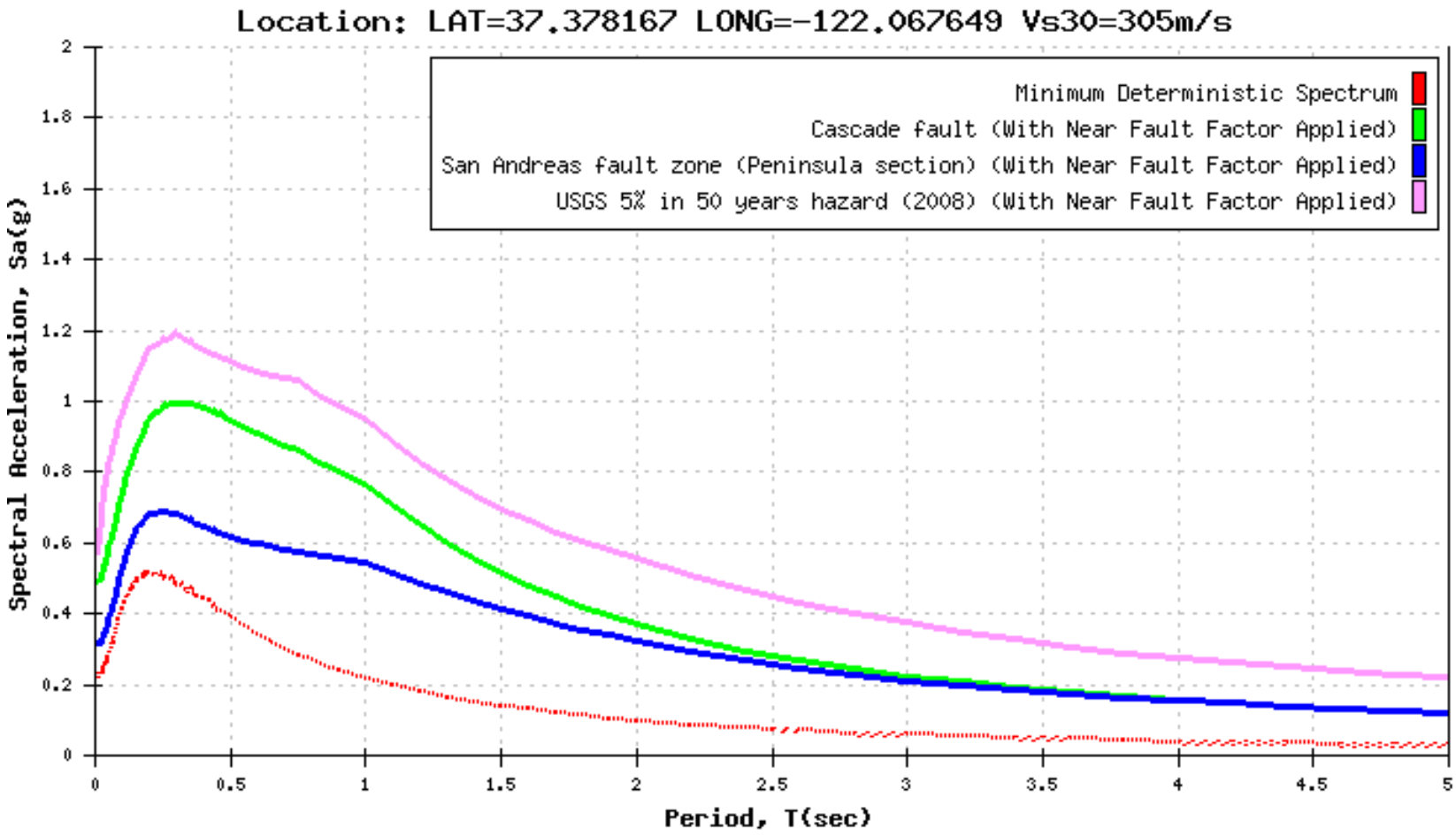
Reference: Caltrans ARS Online (2009)

URS 55 South Market Street, Suite 1500 San Jose, CA 95113 PHONE: (408) 297-9585 FAX: (408) 297-6962	PROJECT No 28645170	CALCULATED BY M. Thummaluru	**SR 85 Express Lanes Project** **Segment 1** **(SR 85 Alignment from US 101 to Route 17)** **Calculated Spectra**	**FIGURE** **B1**
	Date June, 2010	Bridge No. N/A		



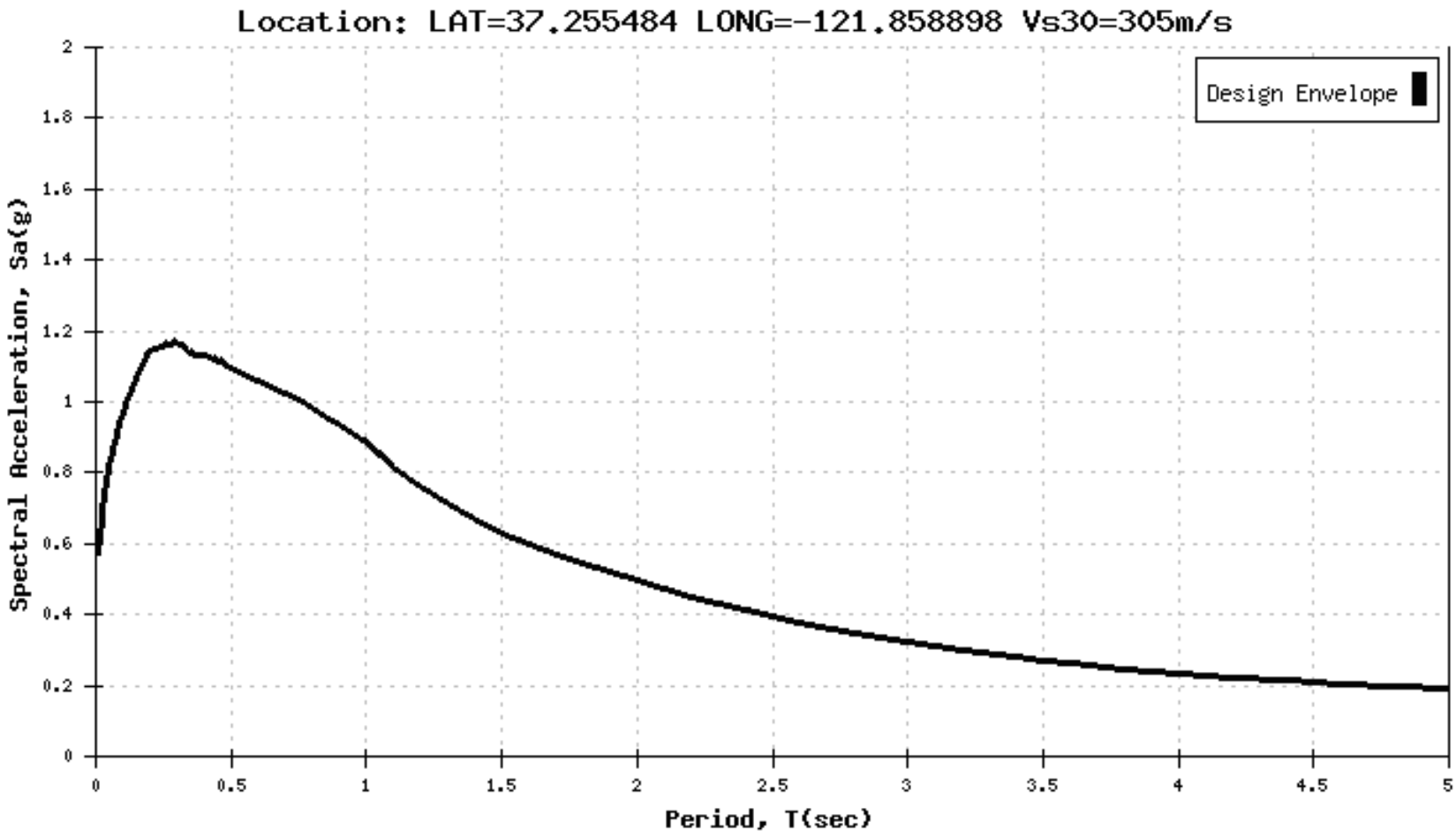
Reference: Caltrans ARS Online (2009)

URS 55 South Market Street, Suite 1500 San Jose, CA 95113 PHONE: (408) 297-9585 FAX: (408) 297-6962	PROJECT No 28645170	CALCULATED BY M. Thummaluru	**SR 85 Express Lanes Project** **Segment 2** **(SR 85 Alignment from Route 17 to Interstate 280)** **Calculated Spectra**	**FIGURE** **B2**
	Date June, 2010	Bridge No. N/A		



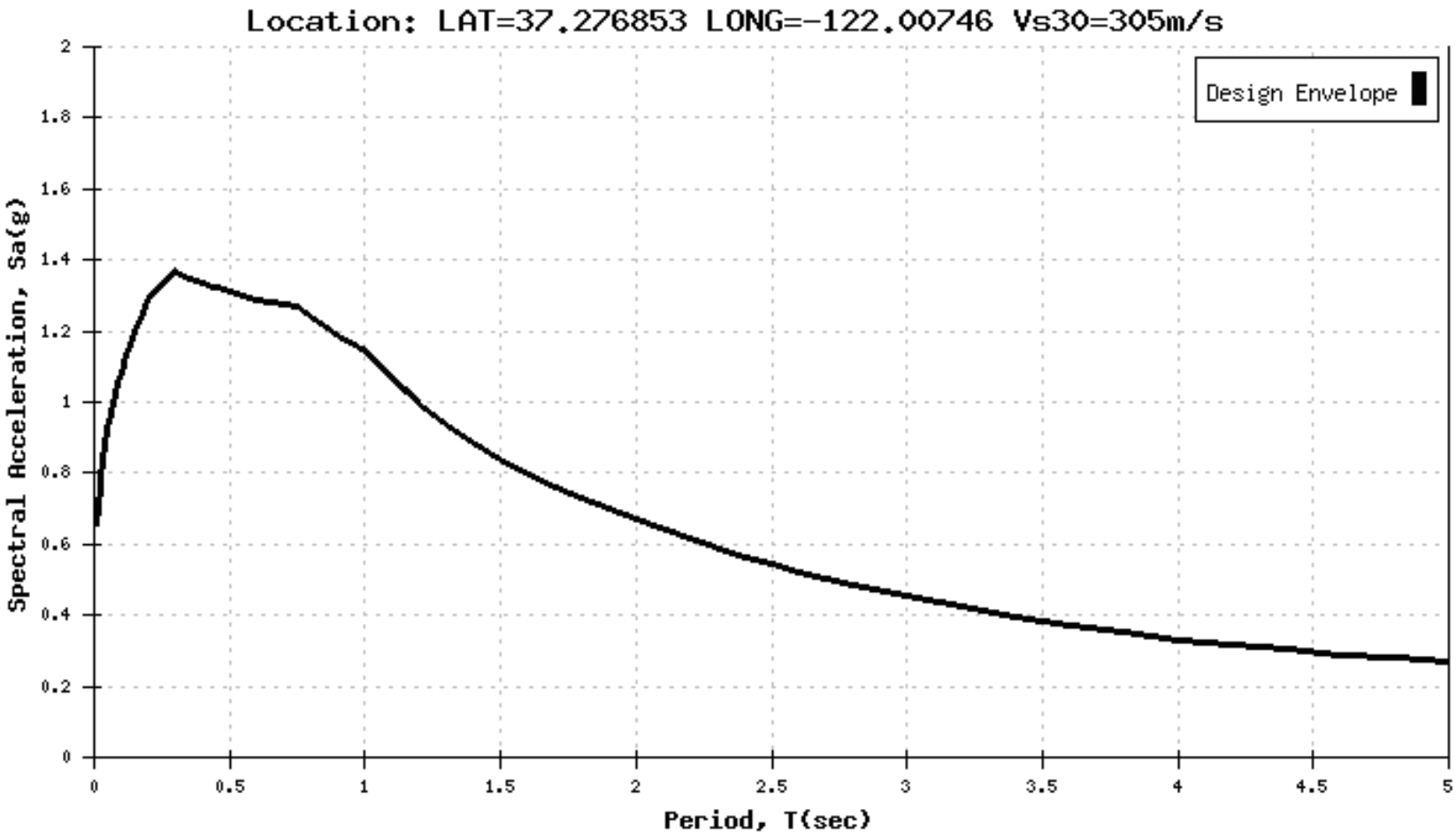
Reference: Caltrans ARS Online (2009)

URS 55 South Market Street, Suite 1500 San Jose, CA 95113 PHONE: (408) 297-9585 FAX: (408) 297-6962	PROJECT No 28645170	CALCULATED BY M. Thummaluru	**SR 85 Express Lanes Project** **Segment 3** **(SR 85 Alignment from Interstate 280 to US 101)** **Calculated Spectra**	**FIGURE** **B3**
	Date June, 2010	Bridge No. N/A		



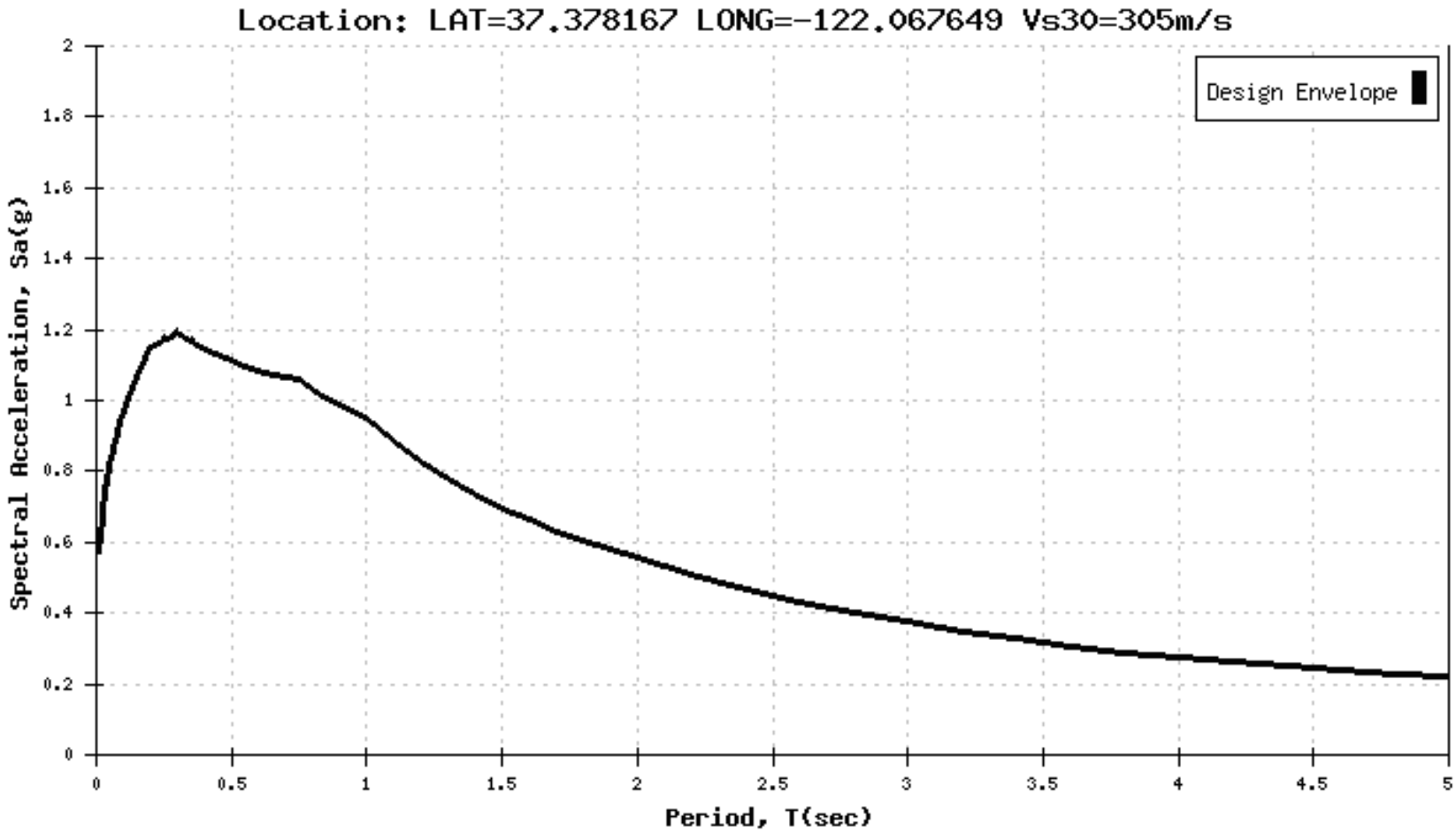
Reference: Caltrans ARS Online (2009)

URS 55 South Market Street, Suite 1500 San Jose, CA 95113 PHONE: (408) 297-9585 FAX: (408) 297-6962	PROJECT No 28645170	CALCULATED BY M. Thummaluru	**SR 85 Express Lanes Project** **Segment 1** **(SR 85 Alignment from US 101 to Route 17)** **Design Spectra**	**FIGURE** **B4**
	Date June, 2010	Bridge No. N/A		



Reference: Caltrans ARS Online (2009)

URS 55 South Market Street, Suite 1500 San Jose, CA 95113 PHONE: (408) 297-9585 FAX: (408) 297-6962	PROJECT No 28645170	CALCULATED BY M. Thummaluru	**SR 85 Express Lanes Project** **Segment 2** **(SR 85 Alignment from Route 17 to Interstate 280)** **Design Spectra**	**FIGURE** **B5**
	Date June, 2010	Bridge No. N/A		



Reference: Caltrans ARS Online (2009)

URS 55 South Market Street, Suite 1500 San Jose, CA 95113 PHONE: (408) 297-9585 FAX: (408) 297-6962	PROJECT No 28645170	CALCULATED BY M. Thummaluru	**SR 85 Express Lanes Project** **Segment 3** **(SR 85 Alignment from Interstate 280 to US 101)** **Design Spectra**	**FIGURE** **B6**
	Date June, 2010	Bridge No. N/A		

Reviewed By:			Date:	March 18, 2011	
COMMENT/RESPONSE MATRIX					
Title: **State Route 85 Express Lane Project**		Submittal: **Preliminary Geotechnical Report**			
CODE: A-Will Comply; B-Consultant to Evaluate; C-Will Not Incorporate; D-Agency to Evaluate; E-No Action Required					
		SPECIAL PROVISIONS COMMENTS			
No.	**Page No.**	**Review Comments**	**Design Responses**	**Proposed Action:**	**Final Action:**
CT D4		Matthew Gaffney**,** Engineering Geologist, Office of Geotechnical Design – West, Geotechnical Services, Division of Engineering Services			
1	General	The title of the report is "…*Draft Geotechnical Assessment Report…*" this is not a Caltrans report title. Correct title to a Caltrans recognized report title, such as Preliminary Geotechnical Report, so we can identify the report that is to be reviewed and use the appropriate guidelines.	Will comply.	**A**	
2	General	If this is a Preliminary Geotechnical Report we have the following comments: Erosion is not mentioned in the report. Please note the performance of existing cuts, fill and natural slopes, and degree and compass orientation of rilling, if any.	Will add discussion on erosion.	**A**	
3	Section 4.9	In Section 4.9 Flooding, it mentions "…*Portions located northwest of the Highway 17 Interchange are located within Zone X500…*" where as this is true it neglects to mention that the northern most portion of the site is located in "...*Zone V/Zone A (100 yr. Flood Zone)…*" as shown on Figure 6. Please make appropriate corrections and impact it may have on the project.	Will revise.	**A**	