State of California
DEPARTMENT OF TRANSPORTATION

California State Transportation Agency

Memorandum

Serious drought
Help Save Water!

To: MR. DAN T. ADAMS
Branch Chief
Bridge Design Branch 10
Office of Bridge Design North/Central

Date: August 19, 2016

Attention: Tracy Sanderson

File: 05-SB-101-PM 21.6
EA: 05-1H430K
Project ID: 0516000073
San Jose Creek Br. Replacement
Br. No. 51-0163R/L

From: M. ZABOLZADEH/A. KADDOURA
Associate Materials & Research Engineers
Office of Geotechnical Design – West
Geotechnical Services
Division of Engineering Services

HOOSHMAND NIKOUI
Chief, Branch A
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RIFAAT NASHED RN
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CHRIS RISDEN CAR
Chief, Branch B
Office of Geotechnical Design – West
Geotechnical Services
Division of Engineering Services

Subject: **STRUCTURES PRELIMINARY GEOTECHNICAL REPORT FOR SAN JOSE CREEK BRIDGE REPLACEMENT**

This memo is in response to your request for preliminary foundation recommendations for Advanced Planning Study (APS) of San Jose Creek Bridge Replacement (Bridge No. 51-163R/L). This bridge is located on Route 101, PM 21.6, west of Route 217 Separation in the Town of Goleta, about 5 miles west of the City of Santa Barbara, Santa Barbara County (See Location Map).

1. SCOPE OF WORK

We reviewed geology maps, and available files for the existing bridge in the Bridge Inspection Record Information System (BIRIS).

2. PROJECT DESCRIPTION/ BACKGROUND

It is proposed to replace the existing San Jose Creek Bridge (Bridge No. 51-163R/L) with a new bridge.

Based on the available Bridge Inspection Report dated February 19, 2015, the original San Jose Creek Bridge (R) was constructed in 1961 (skewed 30 degree). The bridge structure is a continuous Reinforced Concrete (RC) slab on RC pile bents and RC diaphragm abutments with monolithic wing walls on driven fluted steel shell concrete piles. The length of the bridge is about 103 feet long and its total width is about 55 feet containing 3 lanes. The bridge was widened in 1989 by 15'-2" on the left.

Based on the available Bridge Inspection Report dated February 19, 2015, the original San Jose Creek Bridge (L) was constructed in 1946 (skewed 30 degree). The bridge structure is a continuous RC slab on RC pile bents and RC diaphragm abutments with monolithic wing walls on driven fluted steel shell concrete piles. The length of the bridge is about 93 feet long and its total width is about 58 feet containing 3 lanes. The bridge was widened in 1989 by 12'- 4.75" on the left.

3. EXCEPTION TO POLICY

There is no known exception to Department policy relating to investigation or design of the structure.

4. FIELD INVESTIGATION AND TESTING PROGRAM

A field investigation program will be conducted at Phase 0 or 1 of the project. See Section 12 below for more information.

5. LABORATORY TESTING PROGRAM

A laboratory testing program will be conducted at Phase 0 or 1 of the project. See Section 12 below for more information.

6. SITE GEOLOGY AND SUBSURFACE CONDITIONS

6.1 Topography and Drainage

The project site is located on the Goleta Coastal alluvial plain which is a structural depression. It is bordered on the north by the Santa Yenz Mountains and on the south by a narrow elevated marine terrace which separates the alluvial plain from the Pacific Ocean.

San Jose Creek begins and is fed by its watershed in the foothills of the Santa Ynez Mountains near San Marcos Pass of Highway 154, and is also fed by the Dennis Reservoir. The creek runs down through the foothills into a primarily residential section of Goleta and on into commercial district of Old Town Goleta. After this commercial section, the creek comes to an end at its

confluence with San Pedro Creek, which converges with Atascadero Creek shortly thereafter, before feeding into the Pacific Ocean.

The ground elevation at the San Jose Creek project site ranges between 34 feet (creek) to ~58 feet (deck) above sea level (see the attached sheets "widening - Foundation Plan").

6.2 Regional Geology and Seismicity

The project area is located on the Goleta Coastal alluvial plain within the contiguous Dos Pueblos Canyon, Goleta, and Santa Barbara plains. The Goleta plain is located in the western Transverse Ranges physiographic province along an east-west-trending segment of the southern California Coastline.

The coastal plain is relatively low elevation, low to moderate relief piedmont that generally slopes gently seaward from the Santa Yenz Mountains range front on the north to Santa Barbara Channel on the south. The coastal plain surface includes several mesas and hills that are geomorphic expressions of potentially active folds and partly buried oblique and reverse faults of the Santa Barbara fold and fault belt that transects the faults of the coastal plain (USGS, SI-3001).

The Santa Barbara coastal plain area is dominated by the Santa Barbara fold and fault belt and overlapping Santa Ynez Mountain uplift. The Santa Barbara belt is an east-west trending zone of potentially active folds and partly blind oblique- slip reverse and thrust faults that spans the entire coastal plain and widens northwestward into the lower southern flank of the Santa Ynez Mountains.

The project site is located at 1.27 miles south/southwest of the San Jose Fault, 1.44 miles north of the More Ranch Fault, 2.1 miles northwest of the Mission Ridge- Arroyo Parida- Santa Annie Fault, 3.56 miles north/northeast of the Pita Point Fault (lower west) and 3.7 miles north of the Red Mountain Fault.

It should be noted that a detailed seismic report dated July 26, 2016 was prepared by Hossain Salimi, Senior Materials and Research Engineer of the Office of Geotechnical Design – West.

See more details in Section 9 below.

6.3 Site Geology

The project area is entirely covered by Holocene and upper Pleistocene Alluvium and colluvium (Qac) (See the attached Geology Map – USGS, SI map 3001).

The Holocene and upper Pleistocene Alluvium and colluvium are unconsolidated to weakly consolidated silt, sand, and gravel deposits of modern drainages and piedmont alluvial fans and floodplains. The deposits are inferred to underlie much of the Goleta and Santa Barbara areas. Where exposed, alluvium is composed of poorly to moderately sorted silt, sand, and pebbles to boulder gravel that commonly occupy paleochannels. Geomorphic surfaces underlain by alluvium and colluvium commonly contain poorly to moderately developed soil profiles and exhibit weak to moderate erosional dissection. Exposed thickness of alluvial and colluvium deposits generally are less than 35ft.

6.4 Soils

Based on USDA, Web Soil Survey (websoilsurvey.nrcs.usda.gov) of Santa Barbara County, California, the project site is covered by two soil units: 21.2% Elder Sandy loam, 0 to 2 percent slopes (EaA) and 78.8% Elder-Soboba complex 2 to 9 percent slopes (Eb).

The Elder Sandy loam, 0 to 2 percent slopes soils are alluvial fans deposits consists of sandy loam. These soils are well drained soils, run-off is low, high permeability, the hazard of erosion is slight and have 8% Plasticity Index (PI).

The Elder-Soboba complex 2 to 9 percent slopes consist of two components: Elder sandy loam soil and Soboba soil. The Soboba soil consists of valley deposits, coarse textured stony and gravelly alluvium derived from sandstone. These soils contain stony loam sand and very gravelly sand. These soils are well drained soils, run-off is medium, they have high permeability, the hazard of erosion is slight and have 8% Plasticity Index (PI).

6.5 Subsurface Conditions

One borehole (B-1) was drilled in June 1985 for the bridge widening (AS-built -LOTBs attached) and four boreholes (B-1, B-2, B-4, B-7) were drilled in April 1957 for the construction of the right bridge (As-built -LOTBs attached). Based on the five borings of the As-built, the subsurface soils encountered are loose to medium dense silty sand, clayey sandy silt and fine sand to depth ranges between 25 to 30 feet (at elevation between 20 to 25 feet). Below elevation 20-25 feet, the soil encountered is dense to very dense silty sand, sandy silt, and sand.

6.6 Groundwater

The As-built Log of Test Borings (LOTBs) indicate that the groundwater elevation ranges between 29.9ft (B-3) and 38.8ft (B-2) as measured in April 1957. But more recent borings (B-1) indicate the groundwater elevation is 32.0ft (25.5'± bgs) as measured in June 1985.

6.7 Erosion

Based on USDA, Web Soil Survey (websoilsurvey.nrcs.usda.gov) of Santa Barbara County, California", both soil units covering the project area: Elder Sandy loam (EaA) and Elder-Soboba complex (Eb) are classified as having slight hazard of erosion.

6.8 Groundshaking

According to the California Geological Survey (CGS), California Seismic Safety Commission 03-02 Map (attached), the Ground Shaking Intensity of the project area is classified as "Strong" (see the attached map).

6.9 Liquefaction

Based on the As-built Log of Test Borings (LOTB's), the upper 30ft of the subsurface materials are loose and slightly dense sand and silt while the groundwater elevation is shallow (32.0). The preliminary assessment indicates liquefaction potential is minimal. A detailed liquefaction analyses will be conducted during the design phase.

7. SCOUR EVALUATION

Scour potential has not been reported to our Office. Scour evaluation should be included in the Structure Hydraulic report and be made available to our office.

8. CORROSION EVALUATION

According to the Caltrans Geotechnical Evaluation Scour Report dated September 21, 2010 (Materials file, 59-930300), the subsurface material of the project site is considered corrosive and further soil investigation is recommended.

According to the foundation data report of the San Jose Creek Bridge dated December 2, 1957 (materials file Br#51-163 & 51C-156), the subsurface materials (loose sand) from the surface to elevation 32.0 ft is corrosive.

9. PRELIMINARY SEISMIC STUDY

Preliminary Seismic Design Recommendations have been provided by Hossain Salimi 0.63g; the potentials for fault rupture and liquefaction are both minimum at this site. We plan to conduct additional boring(s) to collect more subsurface soil information (see Section 12 below) and perform more detailed liquefaction analysis. For clarification or additional information on seismic design aspects of the project, please consult with Hossain Salimi at (916) 227-7147.

10. AS-BUILT FOUNDATION DATA

Both structures are supported on precast concrete driven piles.

11. PRELIMINARY FOUNDATION RECOMMENDATIONS

Based on our preliminary investigation and review of the available information, the following foundations are feasible for the proposed San Jose Creek Bridge:

- Caltrans Standard Plan driven PCC piles. It should be noted that based on the as-built LOTB, there is a very hard layer of sand (blow count of 75) between approximate elevations +3 and -10 (depth of 53'to 65' bgs). The existing bridge PCC piles are founded on this layer. If the demand loads for the proposed bridge replacement are excessively higher than the existing bridge loads, this option may not be a viable option due to pile drivability. This will be investigated in details during full foundation investigation in design stage of the project.
- Caltrans Standard Plan driven open end steel pipe piles,
- Driven steel H piles,
- Caltrans Standard Plan 24-inch diameter or larger drilled shafts. Due to the presence of groundwater and granular soils, CIDH piling may encounter caving or anomaly issues, in which case temporary casing may be considered.

12. ADDITIONAL FIELD WORK AND LABORATORY TESTING

According to your request, four bridge alternatives are being considered (two simple spans with either Wide Flange or I Flange Girder, two span with Rectangular Girder and 3 span with CIP Slab Bridge). For new pile design and more detailed liquefaction analysis, we tentatively plan to conduct three or four rotary wash borings pending a chosen bridge alternative, one near each pier and one at each abutment of the bridge. The borings will be drilled to the depth of 100 feet.

In each boring, Standard Penetration Tests will be performed at 5-feet intervals throughout soil layers. Pocket Penetrometer tests will be conducted on soil samples showing apparent cohesion. Soil samples will be collected for laboratory tests as well.

Laboratory testing of soil samples may include, but not limited to:

- Corrosion tests
- Strength tests (unconfined compression)
- Index tests (unit weight, water content, gradation, Atterberg limits)
- Consolidation test if needed

If you have any questions, please contact us at (510) 286-4831/4676, Rifaat Nashed at (510)-622-1773, Hooshmand Nikoui at (510) 286-4811, or Chris Risden at (510) 622-8757.

c: TJPokrywka, CRisden, RNashed, HNikoui, Daily File
Lisa Lowerison, Project Manager
Tracy Sanderson, Project Engineer

AKaddoura/MZabolzadeh/mm

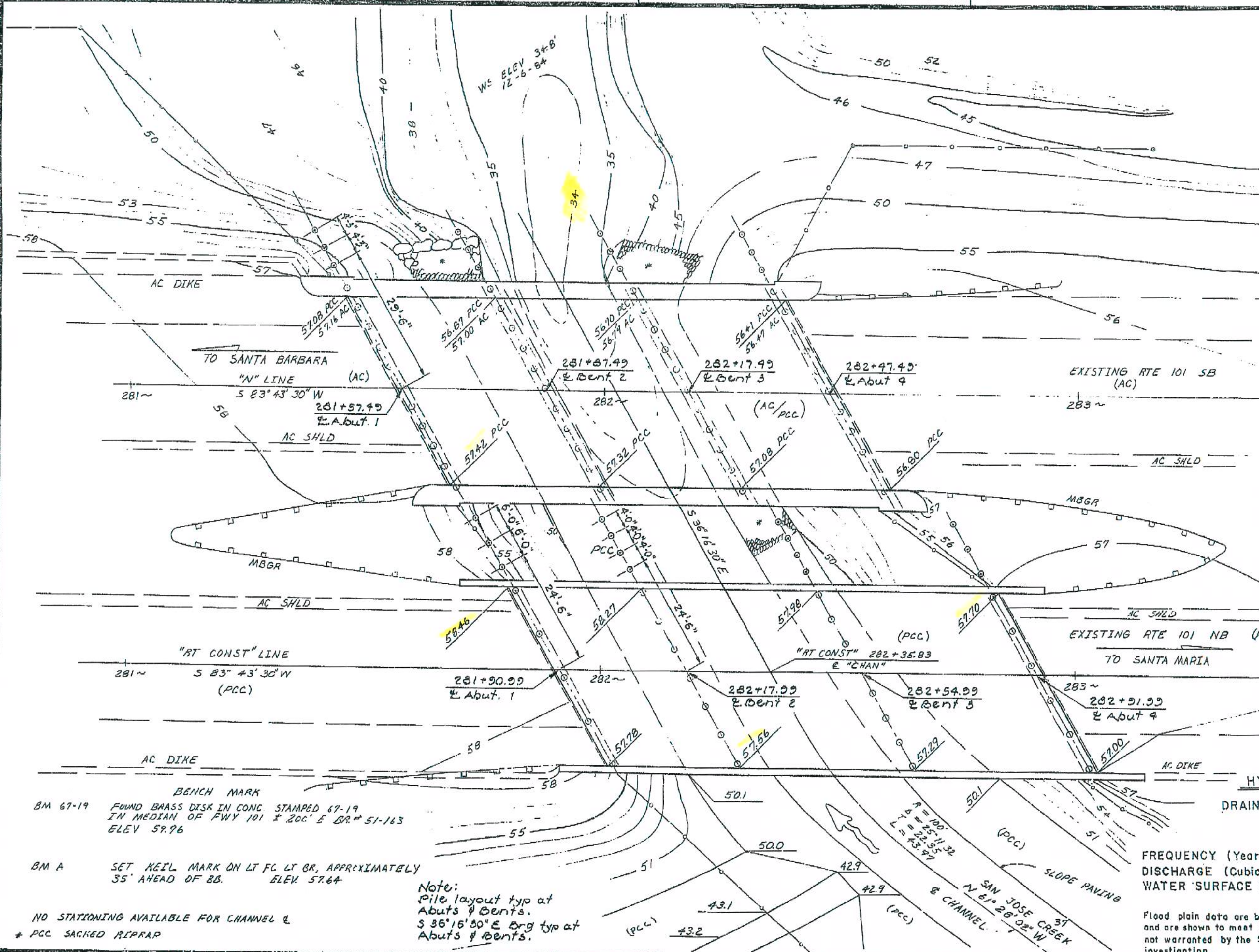
Engineering Service Center
DIVISION OF ENGINEERING SERVICES
OFFICE OF GEOTECHNICAL SERVICES
GEOTECHNICAL DESIGN BRANCH (WEST) – BRANCH B

San Jose Creek Bridge

05-SB-101 PM 21.6

ID: 0516000073 July 2016

Location Map



DIST.	COUNTY	ROUTE	POST MILES—TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
05	SB	101	12.9/25.1	292	300

DESIGN ENGINEER: Frank M. Jansen — C17514 (REGISTERED CIVIL ENGINEER NUMBER)
DATE APPROVED: March 9, 1987

NO CORRECTIONS THIS SHEET
AS BUILT
CORRECTIONS BY M.J. Nicholson
CONTRACT NO. 05-310414
2-17-89
FS 4/3/89

GENERAL NOTES
LOAD FACTOR DESIGN

DESIGN: BRIDGE DESIGN SPECIFICATIONS (1983 AASHTO with interims and revisions by Cal Trans.)

DEAD LOAD: Includes 35 psf for future wearing surface.

LIVE LOADING: HS20-44 and alternative and permit design load.

REINFORCED CONCRETE: f_y = 60,000 psi
f'_c = 3,250 psi
n = 9

Transverse deck slabs (working Stress Design)
f_s = 20,000 psi
f_c = 1,200 psi
n = 10

HYDROLOGIC SUMMARY

DRAINAGE AREA: ______ square miles

	DESIGN FLOOD	BASE FLOOD	OVERTOPPING FLOOD
FREQUENCY (Years)	50	100	<1000
DISCHARGE (Cubic feet per second)	4300	4800	15,000
WATER SURFACE (Elevation at bridge)	47.5	48	57

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

PR-51163-1

PRELIMINARY INVESTIGATION SECTION
SCALE 1" = 10' | DATUM NGVD ADJ 1976 | PHOTOGRAMMETRY AS OF: | SURVEYED By RDR 12/84
ALIGNMENT TIES PR-51163-3 / As Built | FIELD CHKD By
DRAWN By AJT 1/85 | TRACED By AJT 1/85 | CHECKED By RDR 2/85

State of CALIFORNIA
DEPARTMENT OF TRANSPORTATION

STRUCTURES - DESIGN 11
C51895

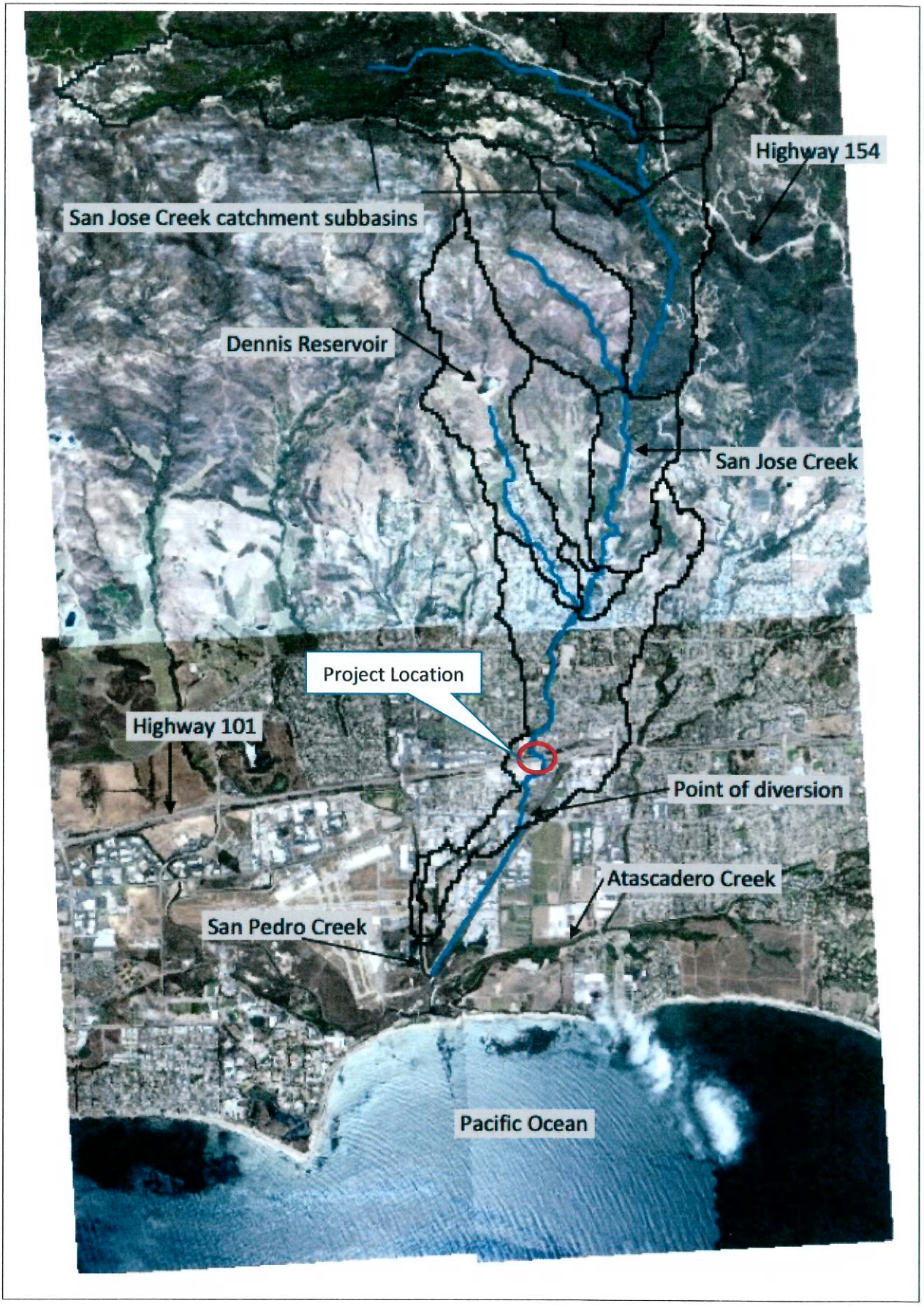
BRIDGE NO. 51-163 R/L
POST MILE 21.7

SAN JOSE CREEK BRIDGE (WIDEN)
FOUNDATION PLAN

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3
CU 05
WO 310411
Disregard prints bearing earlier revision dates
SHEET 2 OF 10

292

AS BUILT PLANS
Contract No. 05-310414
Date Completed 07-07-89
Document No.


Highway 154
San Jose Creek catchment subbasins
Dennis Reservoir
San Jose Creek
Project Location
Highway 101
Point of diversion
Atascadero Creek
San Pedro Creek
Pacific Ocean

GEOLOGIC UNITS

af - Artificial fill (Holocene)

Qa - Active channel alluvium (Holocene)

Qe - Estuarine deposits (Holocene)

Qac- Alluvium and colluvium (Holocene and upper Pleistocene)

Qc- Colluvium (Holocene and upper Pleistocene)

Qtc- Travertine and Caliche? Deposits (Holocene? and Pleistocene?
Qia- Intermediate alluvial deposits (upper Pleistocene)

Qmt- Marine terrace deposits (upper and middle Pleistocene)

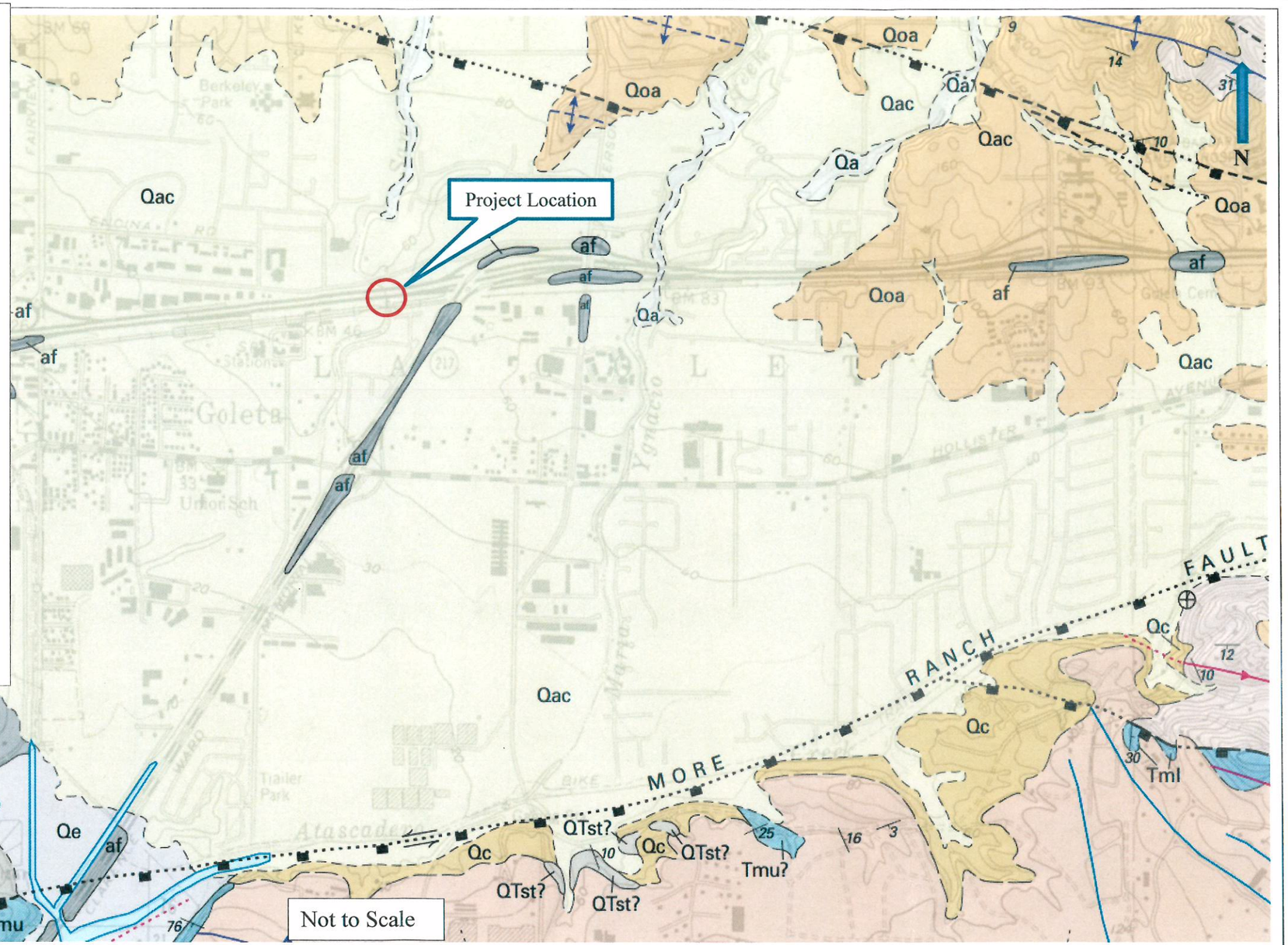
Qsb- Santa Barbara Formation (middle and lower Pleistocene)

Unnamed Sedimentary rocks east of Goleta Pier (Pleistocene and Pliocene

QTst- Siltstone unit (lower Pleistocene and upper Pliocene)

Tmu- Upper siliceous unit (upper Miocene)

Tml- Lower calcareous unit (middle and lower Miocene).



Source:
USGS, 2009, Scientific Investigation Map - 3001

Caltrans

Engineering Service Center
DIVISION OF ENGINEERING SERVICES
OFFICE OF GEOTECHNICAL SERVICES
GEOTECHNICAL DESIGN BRANCH (WEST) – BRANCH B

GEOLOGY MAP

05- SB - 101 EFIS 0516000073

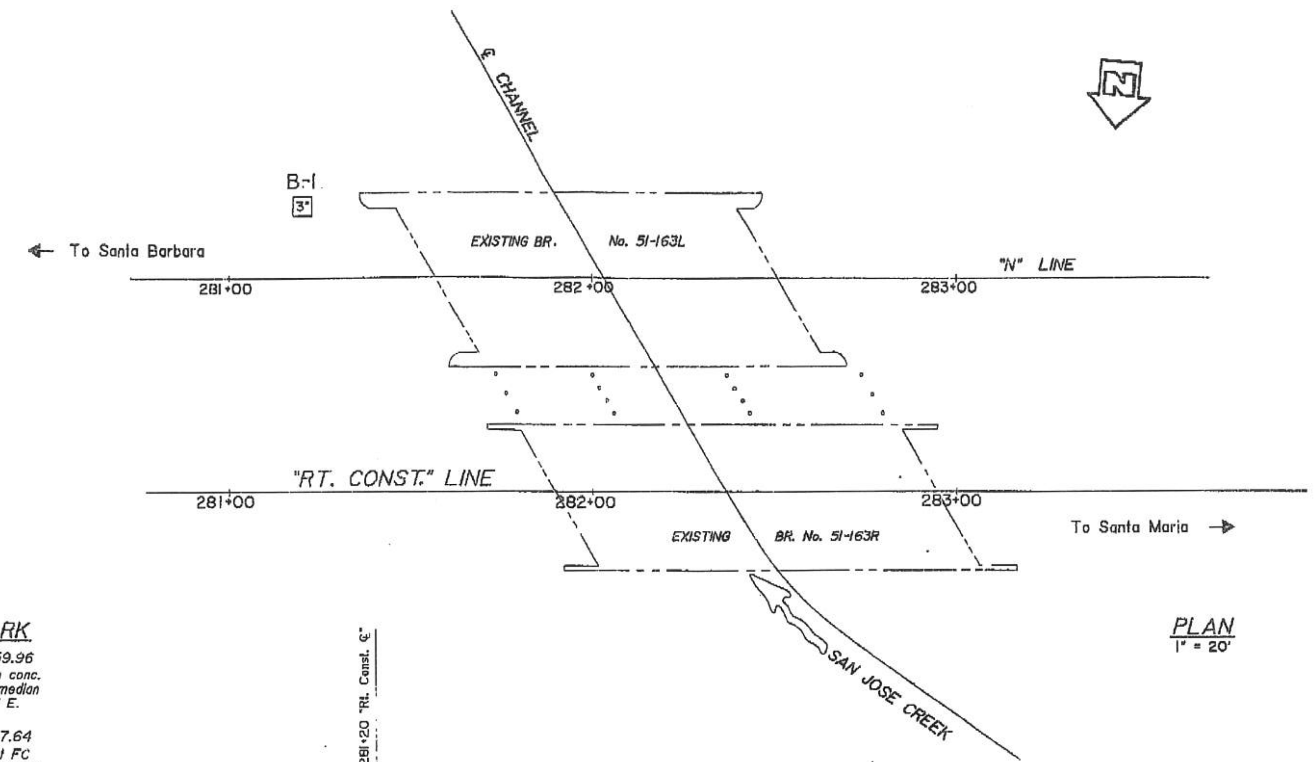
PM 21.6 July 2016

San Jose Creek Bridge

DIST.	COUNTY	ROUTE	POST MILES—TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
05	SB	101	12.9/25.1	299	300

Robert W. Reynolds #165 — Engineering Geologist / Certified Engineering Geologist

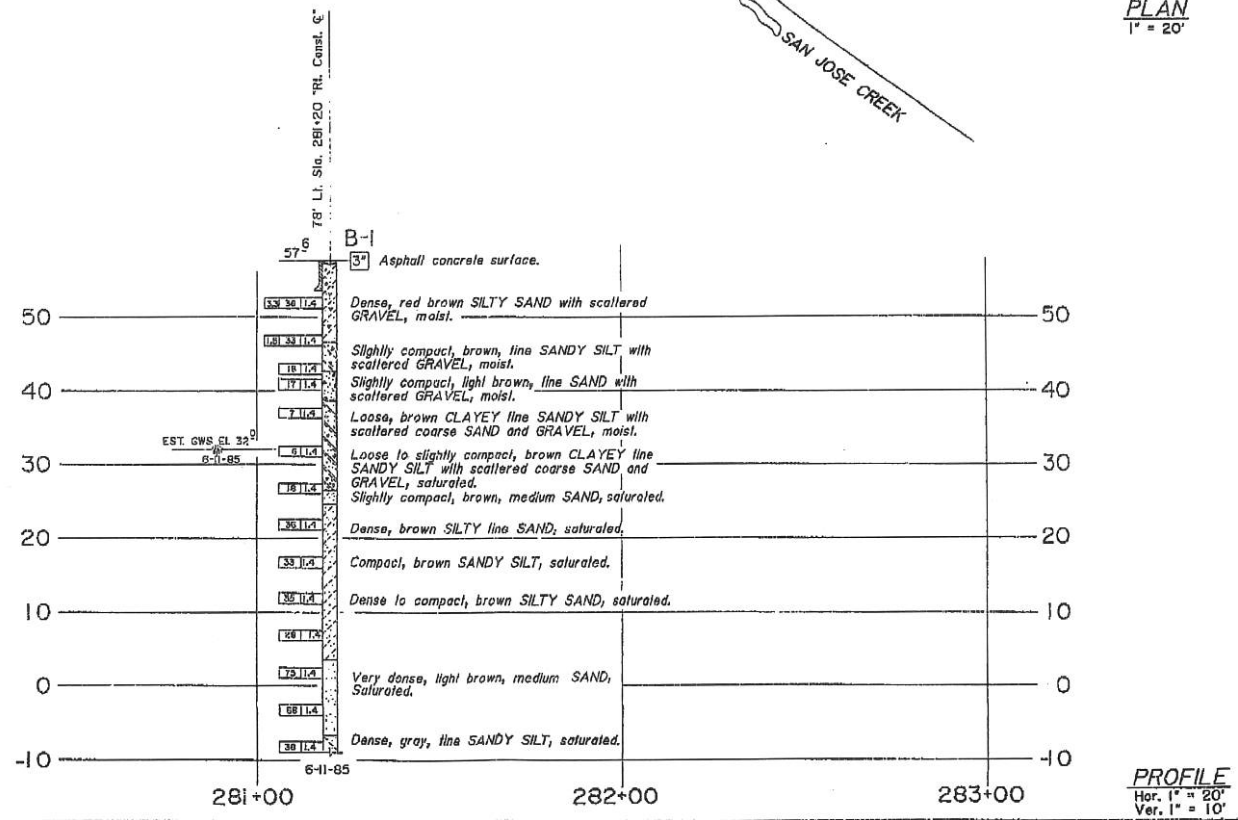
Date approved: March 9, 1987



BENCH MARK

BM 67-19 — Elev. 59.96
Found brass disk in conc. stamped 67-19 in median of Fwy. 101 ±200' E. Br. 51-163

BM — Elev. 57.64
Set keil mark on Lt FC Lt Br., approximately 35' ahead of BB.



AS BUILT PLANS
Contract No. 05-310414
Date Completed 01-07-89
Document No. ____

NO CORRECTIONS THIS SHEET
M.J. Nicholson
05-310414
2-17-89
KS 4/3/89

LEGEND OF BORING OPERATIONS

LEGEND OF EARTH MATERIALS

CONSISTENCY CLASSIFICATION FOR SOILS

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.

UNIFIED SOIL CLASSIFICATION SYSTEM

GEOTECHNICAL BRANCH - TRANSPORTATION LABORATORY

DRAWN BY	IRMA HOWELL 8/85		39499		27/ 858
CHECKED BY		PROJECT ENGINEER		ENGINEERING GEOLOGIST	C.E.G. NO.

State of CALIFORNIA
DEPARTMENT OF TRANSPORTATION

STRUCTURES - DESIGN 11
C31895 — PROJECT ENGINEER / REGISTERED CIVIL ENGINEER NO.

BRIDGE NO. 51-163R/L
POST MILE 21.6

SAN JOSE CREEK BRIDGE (WIDEN)
LOG OF TEST BORINGS 1

CU 05
WO 310410

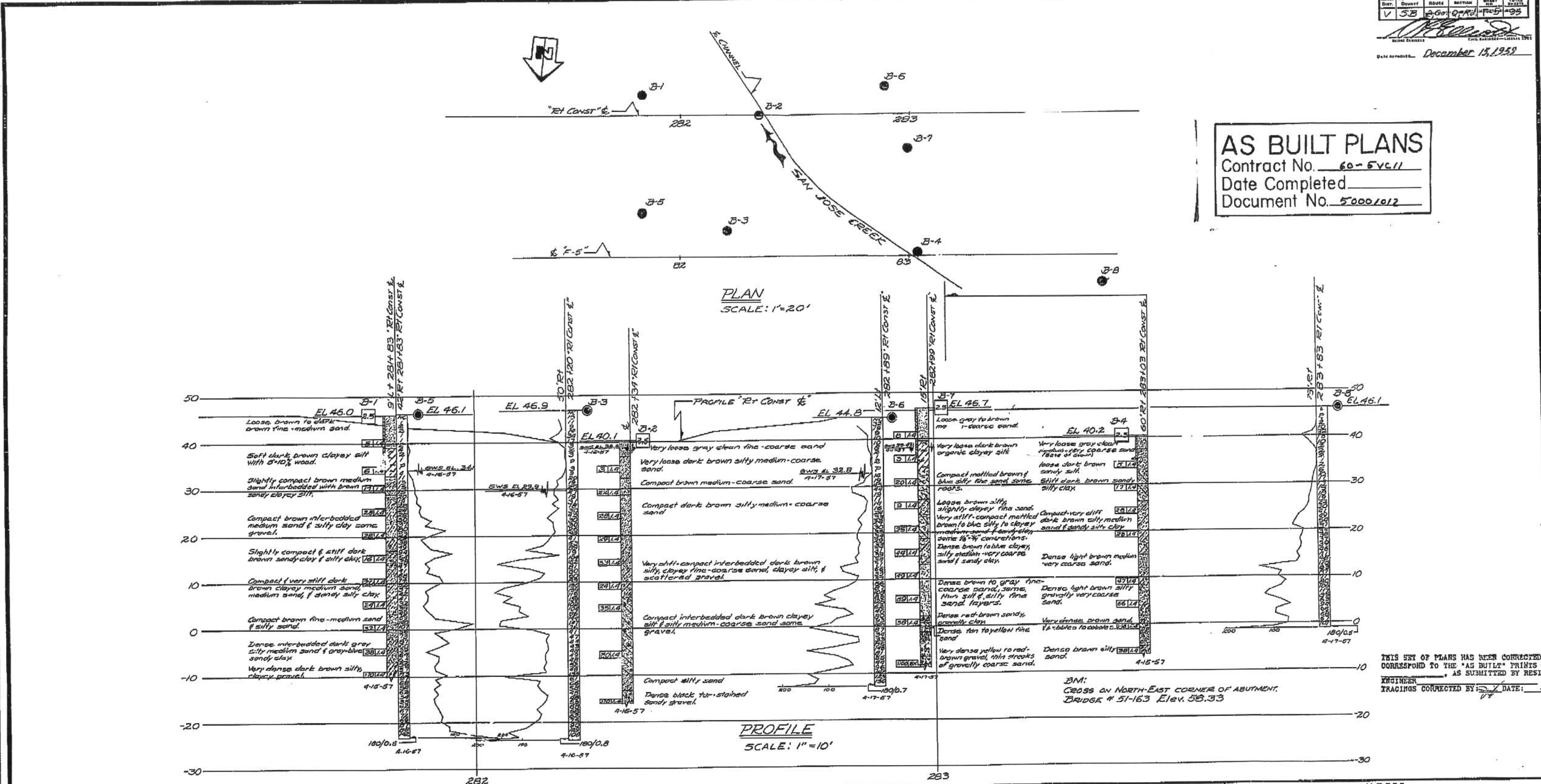
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

Disregard prints bearing earlier revision dates

SHEET 1 OF 10

299

AS BUILT PLANS
Contract No. 60-5VC11
Date Completed
Document No. 50001012



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

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

1" SOIL TUBE — ROTARY BORING — PENETRATION BORING

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

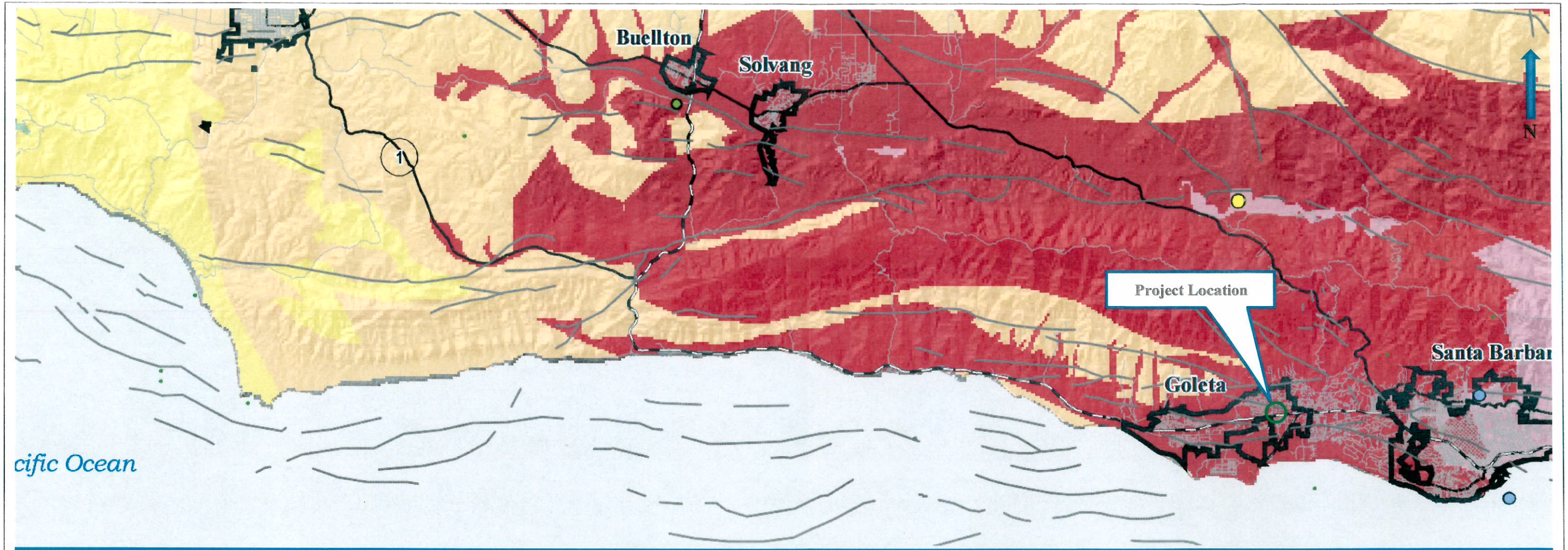
BRIDGES ACROSS SAN JOSE CREEK

LOG OF TEST BORINGS

SCALE As Shown | BRIDGE 51-163R, 51C-156 | FILE | DRAWING C-1806-5

PREL. DRAWING NO. P-1806

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF PUBLIC WORKS.
DATE ______ SIGNATURE ______ TITLE ______



Legend

- County Boundary
- US Route
- State Route
- Road
- Hydrology
- Fault Lines

August 2004

Source:

These regions are near major, active faults and will on average experience stronger earthquake shaking more frequently. This intense shaking can damage even strong, modern buildings.

Increasing intensity

These regions are distant from known, active faults and will experience lower levels of shaking less frequently. In most earthquakes, only weaker, masonry buildings would be damaged. However, very infrequent earthquakes could still cause strong shaking here.

Earthquake Epicenters
Magnitude

- 0 - 4.9
- 5 - 5.1
- 5.1 - 5.3
- 5.3 - 5.5
- 5.5 - 5.8
- 5.8 - 6
- 6 - 6.4
- 6.4 - 6.8
- 6.8 - 7.2
- 7.2 - 7.6

Data Sources:

Earthquake Shaking Potential for California, California Seismic Safety Commission 03-02, California Geological Survey, Governor's Office of Emergency Services, and United States Geological Survey, 2003.

Digital database of faults from the Fault Activity Map of California and Adjacent Areas, California Geological Survey, 2000, 1994.

Source:
Earthquake Shaking Potential for California, California Seismic Safety Commission 03-02, California Geological Survey, Governor's Office of Emergency Services, and United States Geological Survey, 2003.

Caltrans

Engineering Service Center
DIVISION OF ENGINEERING SERVICES
OFFICE OF GEOTECHNICAL SERVICES
GEOTECHNICAL DESIGN BRANCH (WEST) – BRANCH B

Groundshaking MAP

05- SB - 101 EFIS 0516000073

PM 21.6 July 2016

San Jose Creek Bridge

State of California — Business, Transportation and Housing Agency

Memorandum

Flex your power!
Be energy efficient!

To: MR. KEVIN FLORA
Senior State Scour Evaluations
Office of Specialty Investigations
Office of Structure Maintenance & Investigation
Division of Maintenance

Attention: Mr. Yihwin Huang

Date: September 21, 2010

File: 05-SB-101-PM 21.62
59-930300
San Jose Creek Bridge
Bridge No. 51-0163L

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
GEOTECHNICAL SERVICES – MS 5
OFFICE OF GEOTECHNICAL SUPPORT

Subject: Geotechnical Evaluation for Scour Critical Program

This memorandum is in response to the December 14, 2009 e-mail request from the Office of Structure Maintenance and Investigations for geotechnical assessment of San Jose Creek Bridge (Br. No. 51-0163L). This report provides information on the Left Bridge only and does not include any evaluation on the Right Bridge. The following assessment is based on:

- Review of various Bridge Inspection Reports.
- BIRIS As Built Plans and Logs of Test Borings (LOTB) for the nearest Bridge, the San Jose Creek Bridge, Bridge No. 51-0163R and the 51-0163L Widening.

Site Geology and Subsurface Information

Based on the information reviewed from the As-built data, two field investigations were conducted at the site: in August 1957 for the construction of the Right Bridge, and 1985 for the Bridge Widening Project. The Log of Test Borings (LOTB) shows that the geology at the site is composed of thin alluvial material. The alluvium consists of loose to medium dense silty sand, clayey sandy silt and fine sand to about elevation 25.0 ft. Below elevation 25.0 ft the alluvial material is composed dense to very dense silty sand, sandy silt, and sand. This material is considered scourable.

As-Built Foundation Information

The bridge was constructed in 1946 and consists of a three span continuous reinforced concrete slab structure. Bents 2 and 3 and Abutments 1 and 4 are all supported on 32 ton Alternative "B" Cast-in-Place-Concrete step-taper piles with 15.5inch butt and 8inch tip. The structure was widened in 1989 in the south section and supported on 45 ton driven concrete piles. The pile tip elevations are estimated from the As-Built Plans. The estimated pile capacities are without any scour consideration. For foundation information, please refer to Table 1 below.

Table 1: Foundation data for San Jose Creek Left Bridge, Bridge No. 51-0163 L

Support Location	Pile Type [1]		Design Loading [2] (kips)		Estimated Averaged Pile Tip Elevation [3] (ft)		Estimated Pile Ultimate Axial Capacity Without Scour Consideration [4] (kips)	
	Original Bridge	Widened Bridge	Original Bridge	Widened Bridge	Original Bridge	Widened Bridge	Original Bridge	Widened Bridge
Abutment 1	Cast-In-Place Concrete Piles Alternative "B" Step Taper with 15.5 inch butt and 8 inch tip	12 inch Prestressed Concrete Piles Alternative "X"	64 kips	90 kips	22.0 ft	3.0 ft	128 kips	180 kips
Pier 2	Cast-In-Place Concrete Piles Alternative "B" Step Taper with 15.5 inch butt and 8 inch tip	12 inch Prestressed Concrete Piles Alternative "X"	64 kips	90 kips	22.0 ft	-3.0 ft	128 kips	180 kips
Pier 3	Cast-In-Place Concrete Piles Alternative "B" Step Taper with 15.5 inch butt and 8 inch tip	12 inch Prestressed Concrete Piles Alternative "X"	64 kips	90 kips	17.0 ft	-3.0ft	128 kips	180 kips
Abutment 4	Cast-In-Place Concrete Piles Alternative "B" Step Taper with 15.5 inch butt and 8 inch tip	12 inch Prestressed Concrete Piles Alternative "X"	64 kips	90 kips	11.0 ft	3.0 ft	128 kips	180 kips

Note:

1- Pile types used for the bridge are obtained from As-Built Plans.
2- Pile Design loading is obtained from the As-Built Plans, Pile detail sheets for both the original bridge and the widened section.
3- Pile tip elevations are obtained from the As-Built General Plans for the Widened section of the bridge. Pile tip elevations for the original section are estimated by back calculations using the soil profiles from LOTB stated above. Pile tip elevations are approximations where at least 2x axial capacities in compression are achieved, and may be revised if additional data becomes available.
4- Estimated axial capacities of piles are based on a combination of skin friction and end-bearing piles. Available ultimate pile capacity is obtained by calculating capacities before any scour consideration (channel contraction, degradation and local scour). Ultimate pile capacity is a 2x the design loading.

The above data are approximations for the purpose of estimating the effects of scour. Further soil investigation or additional analysis may be required, and the data may be revised accordingly, when additional information becomes available.

If you have any questions or need further information, please do not hesitate to contact me.

Muhammad Luqman
Senior Engineering Geologist (Spec.), C.E.G. 2350
Bridge Scour Critical Program

San Jose Creek
V-SB-2-Q
Br #51-163 & 51C-156

December 2, 1957

Mr. C. R. Poppe:

Foundation Data:

A foundation study was conducted at the above proposed structure site by the Engineering Geology Section during April, 1957. The study consisted of four 2½" rotary sample borings and four 2½" cone penetrometer borings. The data from these borings is shown on the "Log of Test Borings" drawing No. PR 1806-1.

GEOLOGY

The material at the proposed structure site consists entirely of Recent alluvium. With the exception of a soft six foot layer of clayey silt at elevation +39 the material consists of sand with some gravel to the maximum depth penetrated by the test borings. This sand is loose and scourable from original ground to elevation 32. Below this loose surface layer compact sand was encountered to elevation +15. Below elevation +15 the sand is gravelly and dense.

Ground water was measured at an average elevation +35 in April, 1957. The ground water surface will vary with fluctuations of San Jose Creek.

FOUNDATION RECOMMENDATIONS

Reinforced concrete 45 ton design load piles are recommended for structure support. Cast-in-drilled-hole piles should not be shown on the plans.

Abutment piles at both structures are specified to penetrate to elevation +5 and driven to full bearing below. Piles supporting the bents of both structures are estimated to penetrate to an average elevation +5.

Piles penetrating approach fills should do so through holes made through the fill to original ground. The diameter of these holes should exceed the pile butt diameter by at least six inches.

It is recommended that fill protection be included on the plans as the approach fill will be subject to lateral rosion.

Report by ORIGINAL SIGNED BY R. F. HAGER

R. F. Hager

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District V