

FISH PASSAGE ANALYSIS

San Jose Creek Bridge Replacement

In Santa Barbara County on Route 217 at San Jose Creek

SB-217-PM 1.02

05-1C3600

November 2017



EXECUTIVE SUMMARY

This project would replace the existing San Jose Creek Bridge (Br No 51-0217) that was originally constructed with reactive aggregate. The bridge is located on Route 217 near UCSB. Endangered steelhead trout are present. The creek is modified, constrained by development, and subject to flooding in high flows.

The existing bridge at Route 217 does not negatively affect fish passage conditions along San Jose Creek. The proposed bridge replacement will maintain existing fish passage characteristics. The existing and proposed conditions meet fish passage criteria as presented by permitting agencies. There are no fish passage barriers in the immediate surrounding area of this project.

INTRODUCTION

This project would replace the existing San Jose Creek Bridge (Br No 51-0217) that was originally constructed in 1963 with reactive aggregate. The bridge is located near the City of Goleta, approximately nine miles west of Santa Barbara, in Santa Barbara County on Route 217 at PM 1.02. The bridge would be replaced with a wider structure to provide standard lane and shoulder widths and a standard bike/pedestrian path on the northbound side of the highway. The proposed bridge would also be slightly longer. The existing bridge is 192.4 feet long and 94.3 feet wide. The proposed bridge is 213.7 feet long and 105 feet wide. The existing bridge is supported by six bents or sets of piers with 11 (15 inch diameter) columns per bent for a total of 66 columns. The proposed bridge would remove the existing 66 columns and replace them with one bent consisting of 8 (42 inch diameter) columns.

BACKGROUND

San Jose Creek stretches from the Santa Ynez Mountains to Route 217 near the Pacific Ocean. The longitudinal slope of the creek bed is low throughout the local study area with an average of 0.4%. A lagoon is present year round that runs from the beach to well upstream of the highway. The lagoon is affected by tidal changes and is controlled by the sandbar near the outlet to the Pacific Ocean. A peninsula and sandbar direct the creek southward along the ocean before exiting through a shallow channel across the beach. The sandbar did breach this past winter due to larger than normal storm activity. Although the water level in the lagoon did lower it did not obstruct fish passage.

METHODOLOGY

Fish flows were determined with the USGS Regional Regression method. Gage data is not available for San Jose or San Pedro Creek. The high and low flows for adult and juvenile salmonids were calculated in accordance with the NOAA Guidelines for Salmonid Passage at Stream Crossings.

Flows were analyzed with the USACOE Hydraulic Engineering Center River Analysis Software (HEC-RAS). Cross sections were generated by merging field surveys with a larger digital elevation model (DEM).

ANALYSIS

San Jose Creek crosses Route 217 at PM 1.02. The drainage basin encompasses approximately 16.4 square miles. Just upstream of Route 217 San Jose Creek merges with San Pedro Creek. Just downstream of the Hwy 217 Bridge the channel joins Atascadero Creek and flows to the Pacific Ocean. Tecolotito Creek connects with Atascadero Creek between the San Jose Creek Bridge and the ocean. San Jose Creek is in a natural condition within the vicinity of the highway but becomes channelized approximately 2000 feet upstream of Hwy 217.

A lagoon is present year round and extends upstream of the highway. The channel is relatively flat with bed material consisting mostly of silt, sand, and gravel. Figure 1 shows San Jose Creek at Route 217.



Figure 1: San Jose Creek at Route 217

The high and low flows for adult and juvenile salmonids were modeled in HEC-RAS using the Mean Higher-High Water of 5.27 feet for a tailwater elevation. This condition along with the flat longitudinal slope of the creek bed contribute to favorable fish passage conditions for both adult and juvenile salmonids. The fish flows used in the HEC-RAS modeling and the results are listed in Table 1 & 2 below.

Creek	Flow Type	High Flow (cfs)	Low Flow (cfs)
San Jose	Adult	120	3
	Juvenile	25	1

Table 1: San Jose Creek Fish Passage Flows at Route 217

Creek	Flow Type	High Flow Vel. (fps)	Max. Allow. Vel. (fps)	Low Flow Depth (ft)	Min. Allow. Depth (ft)	Chan. Width (ft)	Bank Type	Bed Type
San Jose	Adult	0.24	6.0	5.27	1.0	125	Natural	Natural
	Juvenile	0.05	1.0	5.27	0.5			

Table 2: San Jose Creek Depths and Velocities at Route 217

CONCLUSION

The existing and proposed bridges at Route 217 provide favorable fish passage conditions.

ATTACHMENT

1. San Jose Creek Bridge Plan

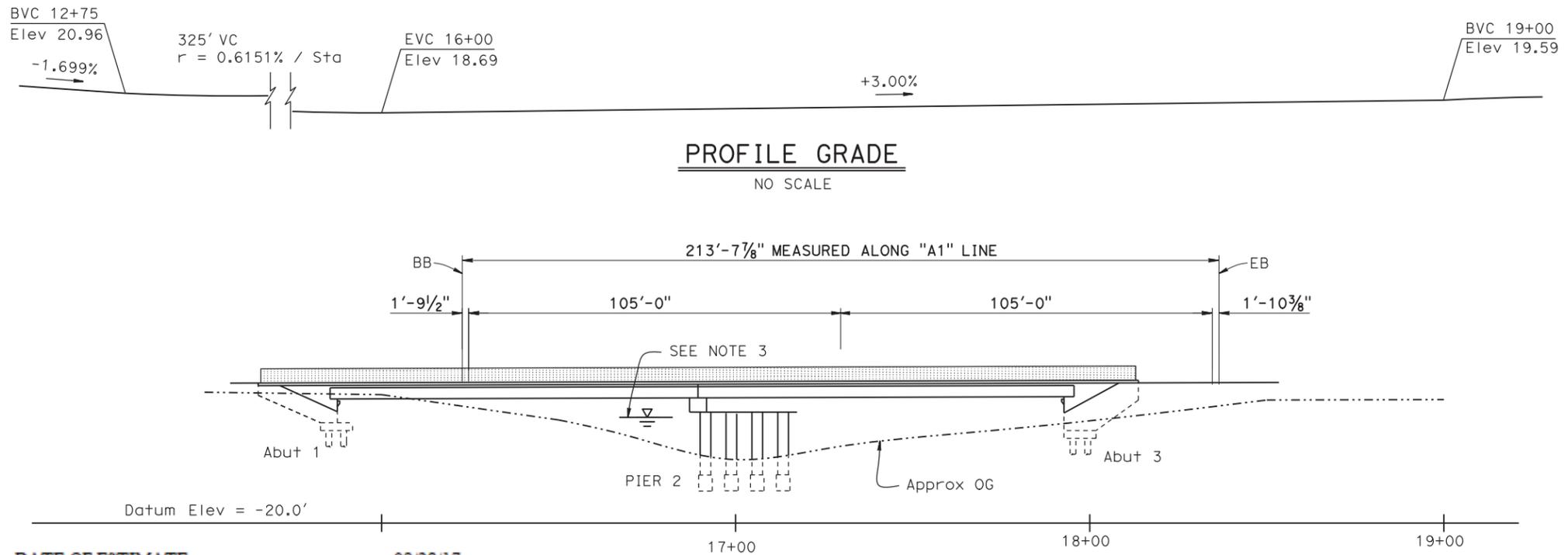
PREPARED BY:



Benedict Erchul, PE
Caltrans District 5 Hydraulics

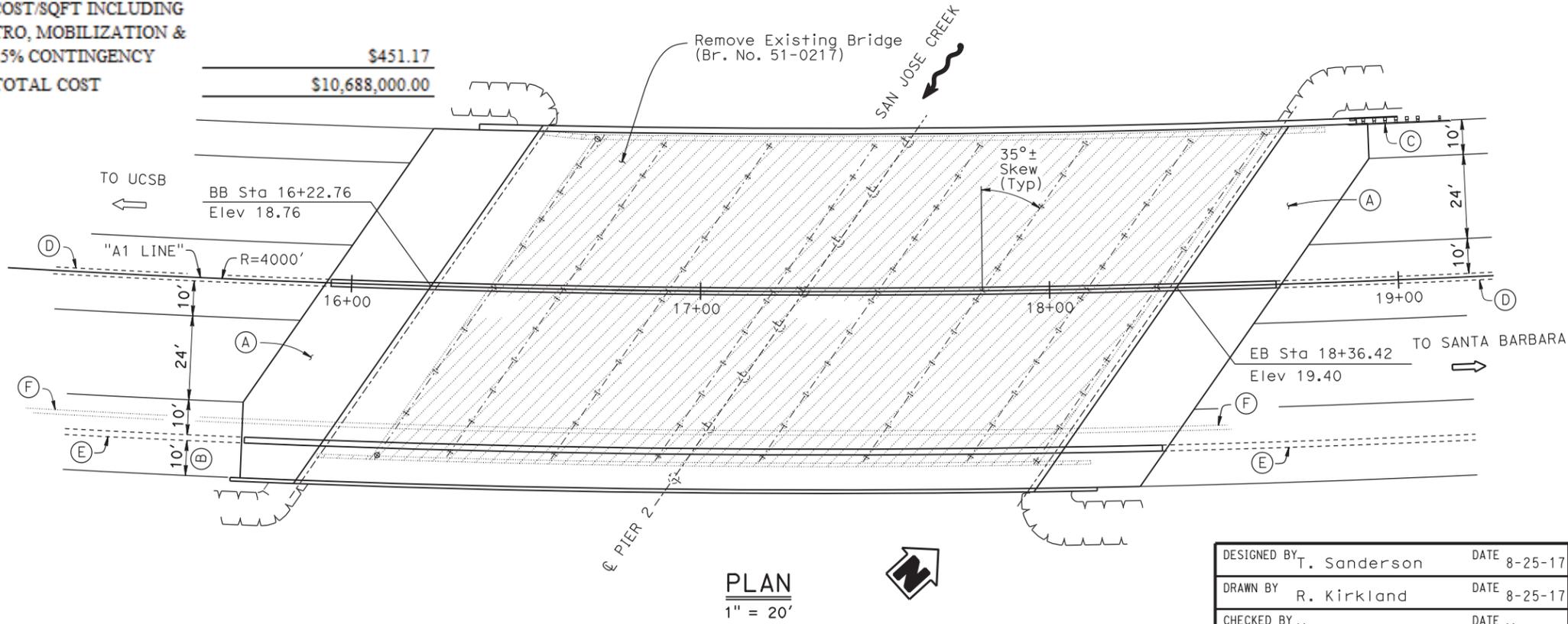
11-13-17
Date

DIST	COUNTY	ROUTE	POST MILE
05	SB	217	1.02

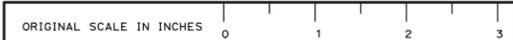


DATE OF ESTIMATE	09/28/17
BRIDGE REMOVAL	\$635,200.00
STRUCTURE DEPTH	4.75
LENGTH	214
WIDTH	105
AREA	22,434
COST/SQFT INCLUDING TRO, MOBILIZATION & 25% CONTINGENCY	\$451.17
TOTAL COST	\$10,688,000.00

ELEVATION
1" = 20'



PLAN
1" = 20'



Risks/Assumptions:

1. Stage construction will be required. Vehicular and pedestrian traffic will pass through construction site.
2. Final bridge layout to be determined during the design stage given detailed survey information.
3. Access to the creek, which is assumed limited to a 6-month window, will be required for existing bridge removal and new bridge construction operations. Trestle construction is required. Two season construction is assumed.
4. High potential for liquefaction is assumed. Assume 66"Ø CIDH foundation at Pier; 24"Ø CIDH at Abutments.
5. Project is located within a marine environment. Bridge substructure elements will be in direct contact with corrosive water. All bridge elements are within splash zone. Corrosion resistant concrete and prefabricated epoxy coated reinforcement is required in all elements. Extra concrete cover required for corrosion protection.
6. Bridge deck drainage will be required. Drainage to be routed to Drainage Inlet at location outside of Bridge Limits.
7. Existing bridge is assumed adequate for current hydraulic conditions. New profile shall not reduce the current freeboard.
8. California ST-70 bridge barriers and decorative steel pedestrian/bicycle railings with galvanized finish are assumed. No additional architectural enhancements are assumed necessary.
9. Project is located within a tsunami inundation zone. Final bridge design to account for tsunami hazards as necessary per Bridge Memos to Designers 20-13.
10. Project will require a coastal development permit.
11. Design contains items to be used for future raising of structure approximately 33" to accommodate Sea Level Rise. See notes on sheet 2 of 2.
12. Elevation based on NAVD 88.

NOTES:

1. For "TYPICAL SECTION" and "STAGE CONSTRUCTION" see sheet 2.
2. As-built alignment, stationing and datum shown.
3. HW elevation = 6.20' based on Q100 = 5500 cfs.
- (A) Structure Approach Type N(30S)
- (B) Pedestrian Walkway
- (C) Bridge approach guard railing, see "Roadway Plans"
- (D) Concrete Barrier Type 60, see "Roadway Plans"
- (E) At-grade barrier, see "Roadway Plans"
- (F) Existing at-grade barrier and chain link fence removal, see "Roadway Plans"

Legend:

- Indicates New Construction
- - - Indicates Existing Structure
- ▨ Indicates Existing Bridge Removal

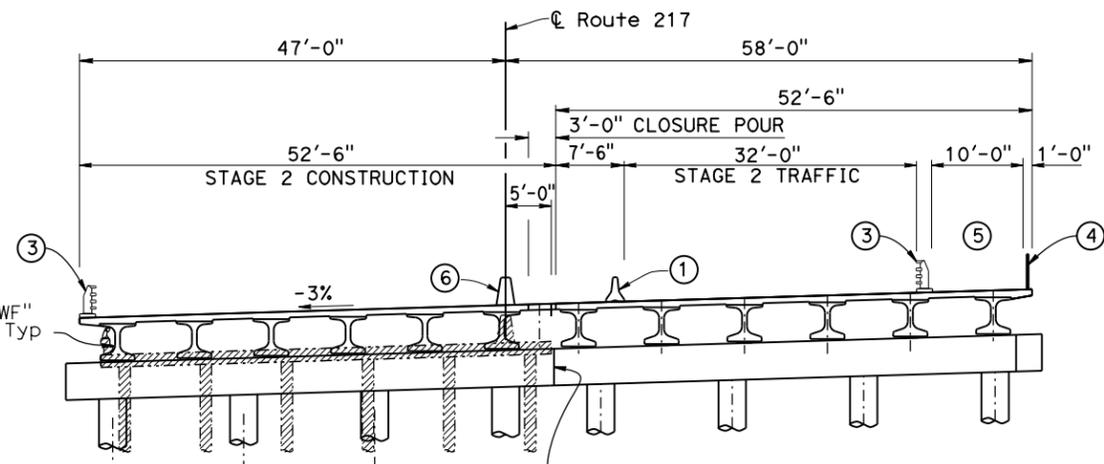
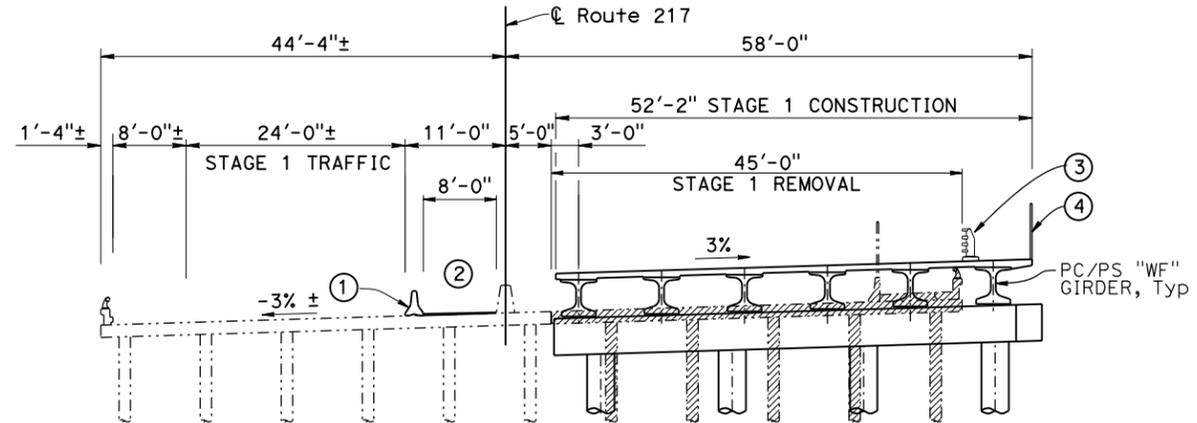
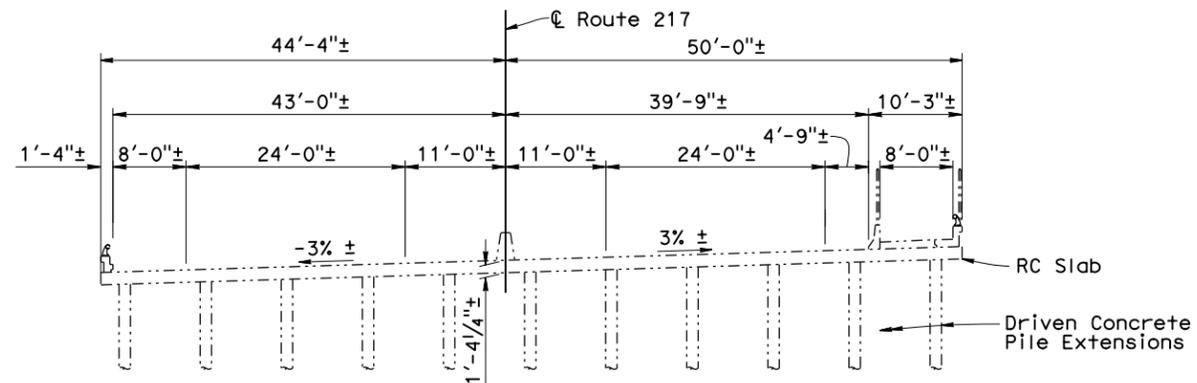
ALTERNATIVE 3
Sheet 1 of 2

DESIGNED BY	T. Sanderson	DATE	8-25-17
DRAWN BY	R. Kirkland	DATE	8-25-17
CHECKED BY	X	DATE	X
APPROVED	X	DATE	X

STRUCTURE DESIGN BRANCH
10

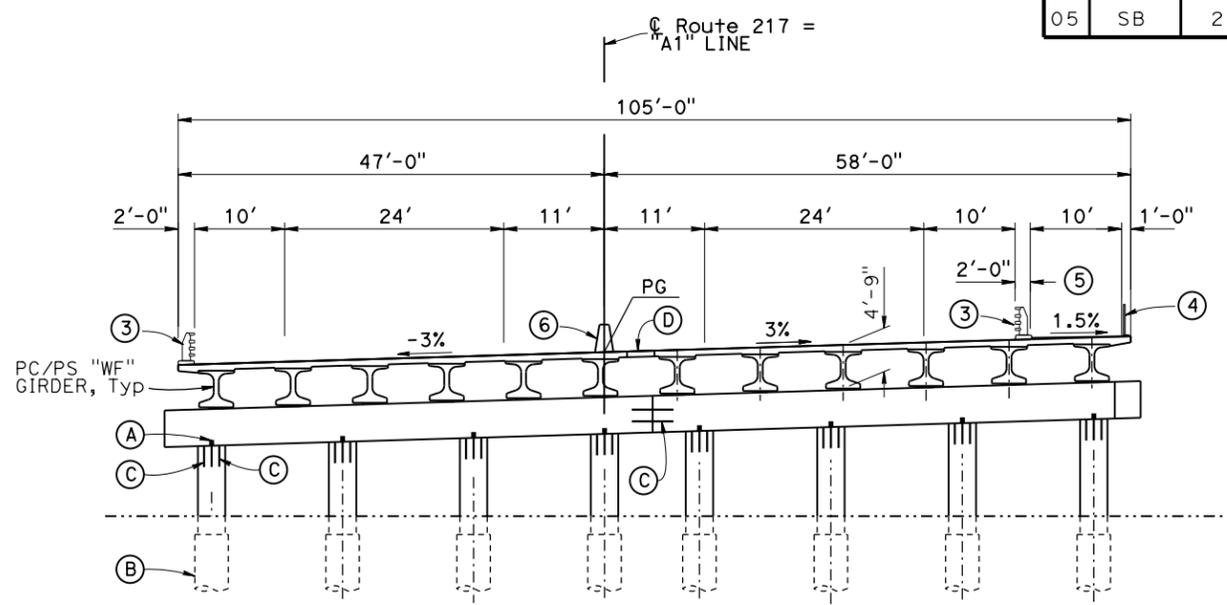
PLANNING STUDY	
SAN JOSE CREEK BRIDGE (REPLACE)	
UNIT: 3589	BRIDGE No. 51-0217
SCALE: AS NOTED	PROJECT No. & PHASE: 0512000134

DIST	COUNTY	ROUTE	POST MILE
05	SB	217	1.02



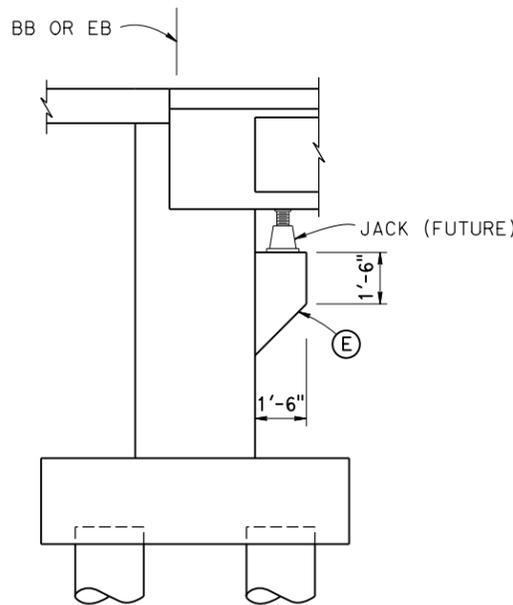
STAGE CONSTRUCTION

1" = 10'



TYPICAL SECTION

1" = 10'



ABUTMENT SECTION

3/8" = 1'-0"

LEGEND:

- ① Temporary Railing (Type K), see "Roadway Plans"
- ② Temporary Pedestrian Walkway w/AC overlay (2% max cross slope)
- ③ California ST-70 Bridge Barrier
- ④ Pedestrian Steel Railing (42" Min)
- ⑤ Pedestrian Walkway
- ⑥ Concrete Barrier Type 60A

The following items are included in order to accommodate raising of bridge approx. 33" to accommodate Sea Level Rise (future).

- (A) Pipe Pin with Cover at top of column, Typ
- (B) Type II CIDH shaft
- (C) Ultimate splice Couplers in bent cap and main reinforcement
- (D) Service couplers at closure pour
- (E) CIP/RC Corbel (1'-6" x 2'-0" w) under each girder for future jacking.

- Indicates New Construction
- - - - - Indicates Existing Structure
- ▨ Indicates Existing Bridge Removal

ALTERNATIVE 3
Sheet 2 of 2

DESIGNED BY	T. Sanderson	DATE	8-25-17
DRAWN BY	R. Kirkland	DATE	8-25-17
CHECKED BY	X	DATE	
APPROVED	X	DATE	

STRUCTURE DESIGN BRANCH
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PLANNING STUDY	
SAN JOSE CREEK BRIDGE (REPLACE)	
UNIT: 3589	BRIDGE No. 51-0217
SCALE: AS SHOWN	PROJECT No. & PHASE: 0512000134

