



NOTE: Project Study Report
Equivalent based on material
and standards in place in
September 2015

PROJECT STUDY REPORT EQUIVALENT

**San Pablo Ave Overhead
(Bridge # 28C0062)
Replacement Project
on San Pablo Avenue
just west of Hercules Ave**

APPROVED:

A handwritten signature in black ink, appearing to read 'Al Petrie', written over a horizontal line.

Al Petrie, PE
City Engineer
Public Services, Engineering Division
City of Pinole

9-30-15

DATE



Location Map



Vicinity Map

This Project Study Report Equivalent has been prepared under the direction of the following registered civil engineer. The registered civil engineer attests to the technical information contained herein and the engineering data upon which recommendations, conclusions, and decisions are based.



REGISTERED CIVIL ENGINEER

9/30/15
DATE



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1. Introduction

The City of Pinole (City) is proposing to rehabilitate/replace the existing thirteen span reinforced concrete slab structure (Bridge No. 28C0062) over the Burlington Northern Santa Fe (BNSF) Railway. The existing bridge was built in 1938 and is located on San Pablo Avenue just west of Hercules Avenue. The bridge does not have adequate width for the current and future Average Daily Traffic (ADT) along with not providing bicycle and pedestrian access. The bridge is classified as "Structurally Deficient" (SD) due to its poor deck condition and "Functionally Obsolete" (FO) due to its inadequate clear width.

See the Cost estimate for specific work items included in this project. This includes replacing the existing bridge which is discussed in depth below.

Project Limits	4-CON-CR
Applicant:	City of Pinole
Funding Source:	88.53% Federal Highway Bridge Program (HBP), 11.47% Local Match
Construction Capital Costs:	\$14,083,750
Support Costs (Including construction engineering):	\$2,583,050
Right-of-Way Costs:	\$100,000
Total Project Costs:	\$16,766,800
Number of Alternatives:	3 (Includes "No Build Alternative")
Proposed Alternative:	455' Long 7 Span, CIP/PS, Slab Bridge
Type of Facility (conventional, expressway, freeway):	Principal Arterial
Number of Structures:	One - Br No. 28C0062 over BNSF Railway
Anticipated Environmental Document	To be determined
Legal Description	The existing bridge is located on San Pablo Avenue just west of Hercules Avenue in Pinole, CA.

A project report will serve as approval of the "selected" alternative.

2. Background

The City of Pinole would like to pursue rehabilitating/replacing the existing bridge utilizing the Highway Bridge Program (HBP). The bridge has a Sufficiency Rating of 57.1 and as such, is only eligible for rehabilitation unless justification can be provided and approved by Caltrans. We believe replacement is a preferable alternative to rehabilitation for the following reasons:

- BNSF Horizontal Clearance Requirements – The existing bridge does not meet the current horizontal clearance requirements noted in the BNSF – UPRR "Guidelines for Railroad Grade Separation Projects". The existing bridge only has 8.5 feet of horizontal clearance. The current guidelines notes the absolute minimum horizontal clearance to be 18 feet, which will require special review from the railroad.
- BNSF Vertical Clearance Requirements - The existing bridge does not meet the current vertical clearance requirements noted in the Railroad Guidelines. The existing bridge

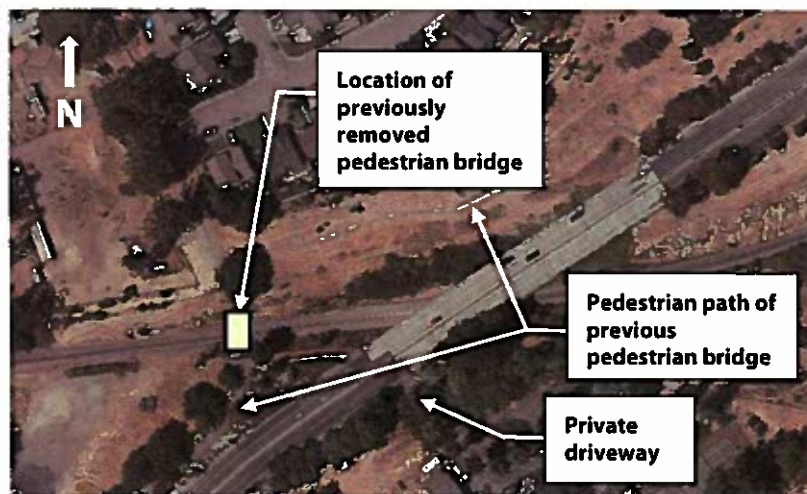
only has 20.7 feet of vertical clearance, while the guidelines require a minimum of 23.33 feet. Widening the bridge will further reduce the vertical clearance to approximately 20.3 feet due to the cross slope of the deck.

- **Current Bridge Condition** - The existing bridge is over 75 years old and is reaching the end of its useful life. The bridge is "Structurally Deficient" with numerous deficiencies. We believe a life cycle cost analysis will show a bridge replacement to be less expensive than a rehabilitation.

Due to the reasons listed above, we believe justification for a bridge replacement will be approved. An Advanced Planning Study (APS) for a rehabilitation option is included (Exhibit "A") to show the issues involved. An APS for a bridge replacement option is also included (Exhibit "B").

The site is located in a suburban area in the City of Pinole with an Average Daily Traffic (ADT) of over 10,300. A two mile detour is available around the bridge site, however due to the large ADT on this facility, it is recommended that construction be staged.

It is anticipated that any additional need for right-of-way acquisition, or temporary construction easements will be minimized by maintaining the existing roadway alignment as much as possible. The proposed alignment is just north of the existing alignment, which will maintain the existing driveway on the southwest end of the bridge as much as possible. The parcel of land north of the existing bridge contains a pedestrian path that formerly led to a pedestrian bridge that was previously removed (see below). The City had previously received approval and funding for a new pedestrian/bicycle replacement bridge. However, the City decided it was more feasible to use the funding to improve the vehicular bridge to contain pedestrian and bicycle facilities.



Aerial View of Bridge Site

It is anticipated that the new structure will be wider and be on a slightly different alignment and vertical profile. The profile is expected to be raised approximately 4 feet in order to provide adequate vertical clearance to meet railroad guidelines. The amount the profile needs to be raised can possibly be reduced, depending on communications with the BNSF Railroad. The existing bridge is approximately 62 feet wide with a clear width of approximately 54 feet (which

includes a 4' median). The existing east and west approaches are approximately 54 feet wide, which includes 4 traffic lanes and a 4' raised median.

The ADT is projected to be over 23,000 vehicles per day by 2029. The 2011 (6th Edition) AASHTO "A Policy on Geometric Design of Highways and Streets" ("Green Book") requires 12' lanes and 8' shoulders for minimum roadway widths for Principal Arterials. In order to comply with Caltrans required sidewalk widths on bridges, the sidewalks must be a minimum of 6'. The roadway approaches have one 10 foot sidewalk on the west side and the City does not want to include a sidewalk on the east side. This results in an overall bridge width of 80 feet 5 inches (see Exhibit "B").

The proposed new bridge will replace the existing reinforced concrete slab bridge with a 7 span cast-in-place, post-tensioned concrete, slab bridge. This bridge type provides the required horizontal clearance while keeping the structure depth shallow to minimize the amount the profile needs to be raised. A 455 foot long, cast-in-place, post-tensioned concrete, voided slab bridge has been assumed for developing the bridge construction costs.

3. Purpose and Need Statement

Need:

The project need is to provide a safe crossing over BNSF Railway on San Pablo Avenue since the existing bridge is Structurally Deficient and Functionally Obsolete. The existing reinforced concrete slab bridge's deck is in poor condition and the bridge is too narrow for the current and future traffic volumes. The existing bridge is also violating current BMSF Railway horizontal and vertical clearance guidelines.

Purpose:

The primary purpose is to replace the Structurally Deficient and Functionally Obsolete structure to improve public safety since the existing bridge is deteriorating and has reached the end of its lifespan.

4. Deficiencies

The RC slab structure has been classified as Structurally Deficient and Functionally Obsolete with an overall Sufficiency Rating of 57.1. There are numerous cracks with efflorescence and spalls throughout the deck.

The roadway clear width on the bridge is inadequate to safely serve the facility's ADT. The AC approach pavement is breaking apart at both abutment paving notches. There is erosion of the approach fill at Abutment 1 caused from roadway drainage.

The roadway and sidewalk widths currently do not provide a safe method for pedestrians and bicyclists to cross the bridge. However, pedestrians and bicyclists continue to utilize the vehicular bridge to cross since there is no other method to cross the railway.

5. Corridor and System Coordination

San Pablo Avenue is functionally classified as a Principal Arterial and is considered part of the Federal Aid System. The ADT (2012) and future ADT (2029) are 10,300 and 23,203 vehicles per day, respectively, and the project is located in flat terrain. The County of Contra Costa requires 64' minimum clear width which matches AASHTO's standard to provide 64' clear width. This allows for a minimum road width of 12' lanes and 8' paved shoulders. A proposed 80'-5" wide

bridge will provide four 12' lanes, one 4' median, two 8' shoulders, one 10' sidewalk, and 2'-5" for barriers.

6. Alternatives

While we believe replacement can be justified, we have prepared Advanced Planning Studies for the following options:

Alternative 1 – Rehabilitation: Widen 425' Long 13 Span, CIP/RC, Slab Bridge

The existing 62'± wide, 13 span reinforced concrete slab bridge will be widened to 82'. Rehabilitation measures, including deck protection, crack repair and spall repair will need to be performed on the superstructure. The proposed structure depth will remain similar to the existing bridge depth of 1'-3". No major changes to the roadway profile will be made.

Advantages

- Least expensive alternative (initially)
- Will not require a profile change

Disadvantages

- Final bridge superstructure will continue to violate current horizontal clearance requirements set forth in the railroad guidelines.
- Final bridge superstructure will continue to violate current vertical clearance requirements set forth in the railroad guidelines. Due to the cross slope of the structure, the vertical clearance will be reduced from 20.7 feet to approximately 20.3 feet.
- Falsework for the superstructure widening will violate current temporary clearance requirements in the railroad guidelines.
- Structure will have shorter lifespan after rehabilitation compared to replacement alternative. A new bridge will be required in approximately 20 years.

Alternative 2 – Replacement: 455' Long 7 Span, CIP/PS, Slab Bridge

The existing 62'± wide 13 span reinforced concrete slab bridge will be replaced with an 82' wide, seven span, CIP/PS concrete slab bridge. The proposed structure depth will be 2'-6" with the longest span being 70 feet long. The roadway profile will need to be raised approximately 4' to meet railroad guideline requirements of 23'-4".

Advantages

- The replacement bridge will satisfy current BNSF Railway guidelines.
- Will provide a structure with a longer lifespan compared to a rehabilitation option.

Disadvantages

- Profile will be raised approximately four feet.
- Higher cost than rehabilitation alternative (initially)

No Build Alternative

This alternative would provide no improvements to the existing crossing. All existing deficiencies and safety issues would remain. Therefore, this alternative is not considered feasible.

7. Stage Construction

As noted above, due to the large ADT (~10,000), the bridge construction will be done utilizing stage construction. It is anticipated that traffic will be shifted towards the south side of the bridge while construction takes place on the north side. Once construction is finished on the north side, traffic will be shifted to the north side to allow for construction on the south side.

8. Funding

The California Road System (CRS) Maps, designates this portion of San Pablo Avenue as a Principal Arterial. This classifies the bridge as "On-System". The HBP contributes 88.53% of the project cost with the remaining 11.47% of the project costs to be supplied from local city funds. A preliminary cost estimate for both alternatives has been developed and is included as attachments to this report. The estimated construction cost analysis has been performed using Caltrans square foot cost data for similar structure types constructed recently. At this time, **Alternative 2 – "455' Long 7 Span, CIP/PS, Slab Bridge"** is the chosen alternative for items noted above. The recommended complete project delivery estimate for programming purposes for this replacement alternative is **\$16,766,800** which includes Preliminary Engineering, Right-of-Way, Construction, Construction Engineering, and a 25% Contingency. It is important to estimate costs at the high end of the price range to ensure adequate funding is programmed for this project. The equipment and labor costs are high relative to the square footage.

The City is cautioned that the cost estimates are based upon available square foot prices for similar structure types, and actual construction costs may vary. Several unknown factors such as hydraulic design constraints and geotechnical design data could significantly affect bridge length and costs. These issues may also affect which alternative is the most cost effective.

Alternative	Structure Construction Cost
1 – <u>Widen 425' Long 13 Span, CIP/RC, Slab Bridge</u>	\$3,230,000 (\$400/sf) (425' length)
2 – <u>455' Long 7 Span, CIP/PS, Slab Bridge</u>	\$9,147,400 (\$250/sf) (455' length)

Alternative 2 Breakdown

Construct Bridge	Bridge Removal	Slope Protection	Channel Work	Detour	Approach Roadway	Utility Relocation	Mobilization	Total Construction
\$9,147,400	\$400,000	\$20,000	\$0	\$25,000	\$600,000	\$50,000	\$1,024,240	\$11,267,000

PE Component	PE Component Cost (Est)
1 - Environmental	\$150,000
2 - Geotechnical	\$50,000
3 - Hydraulics	\$0
4 - Surveying	\$40,000
7 - Preliminary Design	\$250,000
8 - Final Design	\$400,000
9 - Indirect Costs	\$3,000
Total	\$893,000

PE	R/W	CON	CE	Cont	Total Cost
\$893,000	\$100,000	\$11,267,000	\$1,690,050	\$2,816,750	\$16,766,800

9. Schedule

Milestones	Delivery Date (Month, Day, Year)
Begin Environmental	09/01/2016
Circulate DED	09/01/2017
PA & ED	03/01/2018
Begin Right-of-Way	03/01/2018
Project PS&E	09/01/2018
Right-of-Way Certification	03/01/2019
Ready to Advertise	05/01/2019
Begin Construction	09/01/2019
End Construction	11/01/2020
End Project	01/01/2021

10. FHWA Coordination

This project will utilize Federal HBP funding. Caltrans will provide project oversight as required through Caltrans Local Assistance. All aspects of the project will meet federal and state requirements. Caltrans will approve the NEPA document under current delegation authority from FHWA.

11. Local Entity Contacts/District Contacts

Al Petrie	City Engineer, City of Pinole	(510) 724.9017
Sylvia Fung	Caltrans Local Assistance	(510) 286.5226
Alan Glen	Project Manager, Quincy Engineering, Inc.	(916) 368.9181
Lance Schrey	Project Engineer, Quincy Engineering, Inc.	(916) 368.9181

12. Attachments

- A. Site Photos
- B. Preliminary General Plans
- C. Preliminary Cost Estimates
- D. Bridge Inspection Report with Structure Inventory and Appraisal Report

Attachment A



Figure 1: Looking east on San Pablo Avenue.



Figure 2: Looking west on San Pablo Avenue



Figure 3: Northwest corner of bridge.



Figure 4: Southwest corner of bridge.



Figure 5: Northeast corner of bridge.



Figure 6: Southwest corner of bridge.



Figure 7: Looking south at bridge.

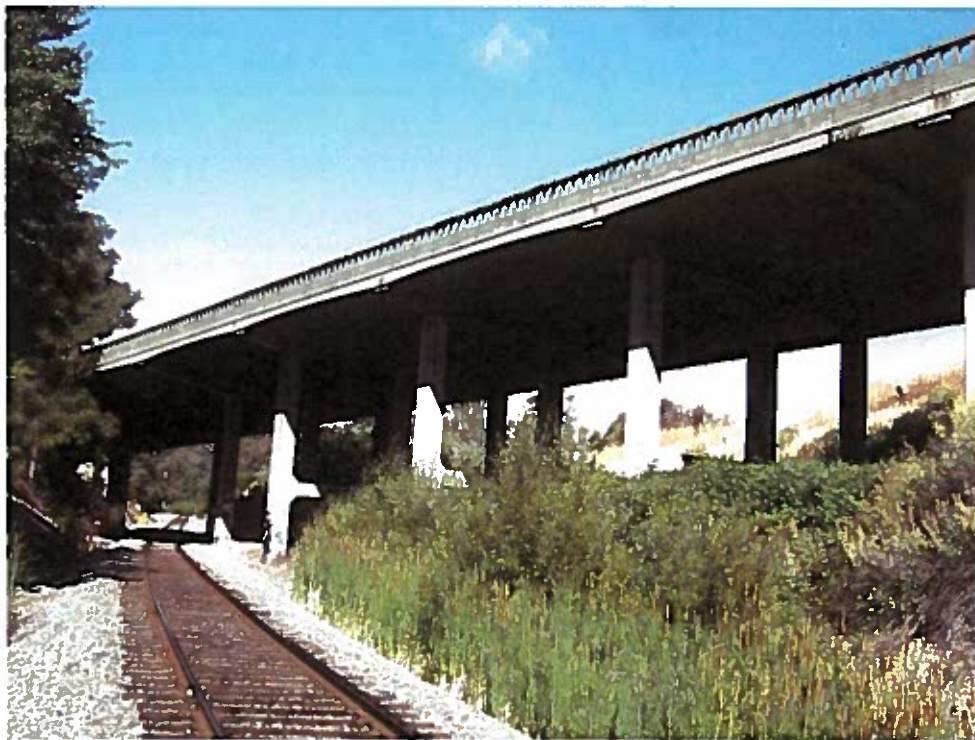


Figure 8: Looking north at bridge.

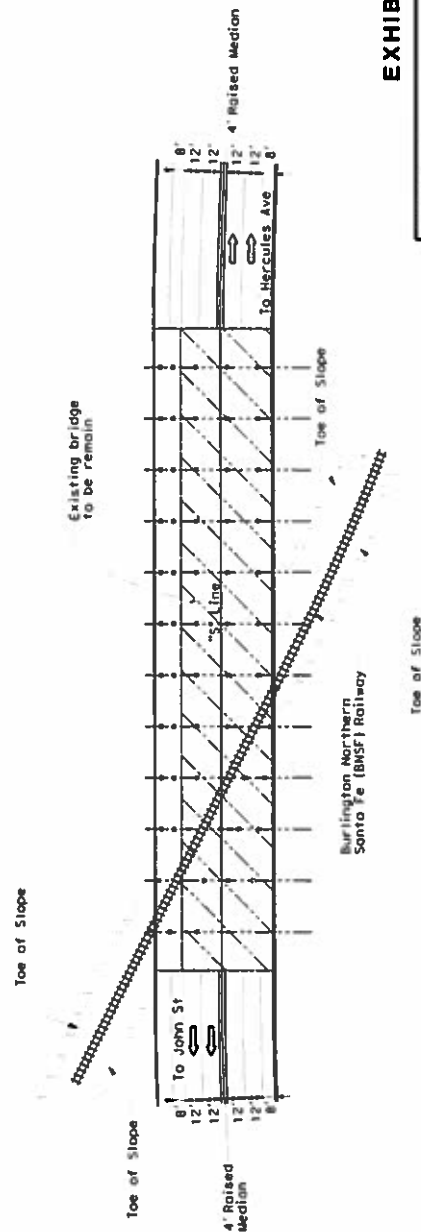
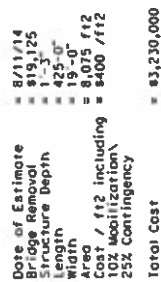


EXHIBIT "A" - REHABILITATION ALTERNATIVE

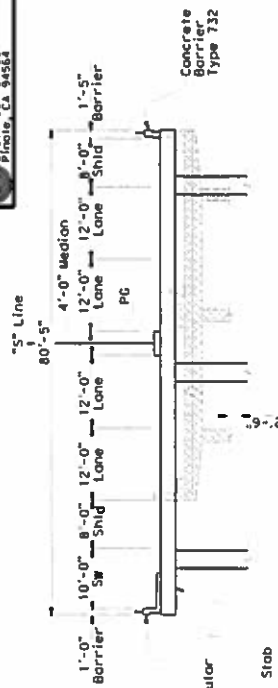
DESIGNED BY	M. Choi	DATE	8/11/2014
DRAWN BY	J. Cruz	DATE	8/11/2014
CHECKED BY	L. Schrey	DATE	8/11/2014
APPROVED			

PLANNING STUDY San Pablo Ave OH BRIDGE NO. 28C0062 SCALE: AS SHOWN PROJECT NUMBER & PHASE: UNIT:	
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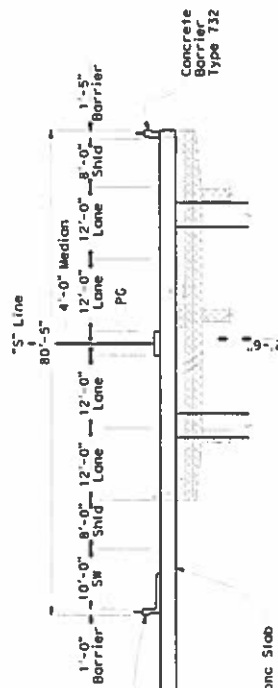
POST MILES	COUNTY	DATE	TOTAL PROJECT
4	CC		

QUINCY ENGINEERING

CITY OF PINOLE
Department of Public Works
Burlington Northern Santa Fe
Pinole, CA 94563

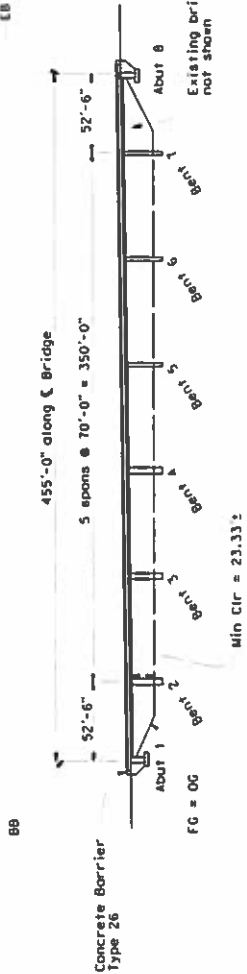


SECTION A-A
1"=10'

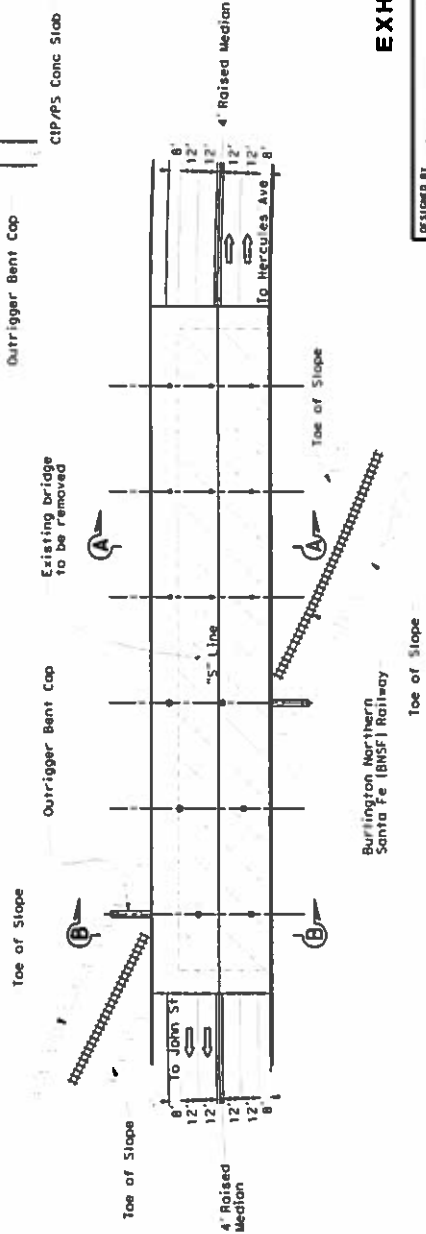


SECTION B-B
1"=10'

Date of Estimate = 8/11/14
Bridge Removal = \$400,000
Structure Depth = 2'-6"
Length = 455'-0"
Width = 80'-5"
Area = 36,400 sq ft
Cost / ft2 including 10% Mobilization = \$250 /ft2
25% Contingency = \$9,147,400
Total Cost = \$9,147,400



ELEVATION
1"=40'



PLAN
1"=40'

EXHIBIT "B" - REPLACEMENT ALTERNATIVE

PLANNING STUDY			
DESIGNED BY	DATE	8/11/2014	Lance Schrey
DRAWN BY	DATE	8/11/2014	PROJECT ENGINEER
CHECKED BY	DATE	8/11/2014	PROJECT ENGINEER
APPROVED	DATE		
PROJECT NAME & PHASE:		San Pablo Ave OH	
PROJECT NO. 28C0062		UNIT:	
SCALE: AS SHOWN		CONTRACT NO. 2	

San Pablo Ave OH (Br. No. 28C0062) at San Pablo Ave

Assuming Widening Bridge to 82' per Alt 1
 Bridge length is 425'
 Existing Structure width = 62'
 Proposed Structure width = 82'

H. Chou
 9/29/2015

					HBP Participating	Not HBP Participating
Widen Bridge	Length	Width	Area	Cost		
Multi-Span	ft	ft	sq ft	\$/sq ft		
CIP PS Slab	425	19	8075	400	\$ 3,230,000.00	\$ -
Bridge Removal	Length			Cost		
	ft	ft	sq ft	\$/sq ft		
	425	3	1275	15	\$ 19,125.00	\$ -
Slope Protection	Assuming \$10k at each abutment				\$ 20,000.00	\$ -
Canal Work	Canal repair/restoration - Assume \$0k				\$ -	\$ -
Detour - Traffic Handling - Assume \$25k					\$ 25,000.00	\$ -
Approach Roadway	Assuming 200' total approach work @ \$25/sq ft					
	Length	Ave Width	Area	Cost		
	ft	ft	sq ft	\$/sq ft		
	200	82	16400	36	\$ 600,000.00	\$ -
Utilities - Assume \$50k	(irrigation, electric, etc)				\$ 50,000.00	
Mobilization (10%)					\$ 394,412.50	\$ -
	Total				\$ 4,338,537.50	\$ -

Construction Programming Total \$ 4,339,000.00 \$ -

PE Rate 21% Assuming \$150K environmental, \$40K Surveying, \$50K Geotech, \$0K Hydro, \$650K Design/PS&E, \$3K Indirect
 CE Rate 15%
 Contingency Rate 25%

	Direct Cost	Indirect Costs	HBP Participating Costs	Target Dates
PE	\$ 893,000.00		\$ 893,000.00	9/1/2016
RW	\$ 100,000.00		\$ 100,000.00	3/1/2018
CON	\$ 4,339,000.00			
CE	\$ 650,850.00			
Cont	\$ 1,084,750.00			
Subtotal	\$ 6,074,600.00	\$ -	\$ 6,074,600.00	5/1/2019 Advertise 1/1/2021 Complete
Total Participating			\$ 7,067,600.00	
HBP %	88.53%			
Local Match %	11.47%			

Federal Fiscal Year (FFY)						Total		Check Total
	16/17	17/18	18/19	19/20	20/21	HBP	Local	
PE	25%	25%	25%	25%	0%			
HBP	\$ 197,643.23	\$ 197,643.23	\$ 197,643.23	\$ 197,643.23		\$ 790,572.90		
Local	\$ 25,606.78	\$ 25,606.78	\$ 25,606.78	\$ 25,606.78			\$ 102,427.10	\$ 893,000.00
	0%	0%	100%	0%	0%			
RW								
HBP	\$ -	\$ -	\$ 88,530.00	\$ -		\$ 88,530.00		
Local	\$ -	\$ -	\$ 11,470.00	\$ -			\$ 11,470.00	\$ 100,000.00
	0%	0%	0%	100%	0%			
CON, CE, CONT								
HBP	\$ -	\$ -	\$ -	\$ 5,377,843.38	\$ -	\$ 5,377,843.38		
Local	\$ -	\$ -	\$ -	\$ 696,756.62	\$ -		\$ 696,756.62	\$ 6,074,600.00
Total	\$ 223,250.00	\$ 223,250.00	\$ 323,250.00	\$ 6,297,850.00	\$ -	\$ 6,256,946.28	\$ 810,653.72	\$ 7,067,600.00
						88.53%	11.47%	

Schedule Assumptions

NEPA CE and CEQA IS/MND w/ Studies 15 year
 Final Design + RW 15 year
 Construction 1 year

San Pablo Ave OH (Br. No. 28C0062) at San Pablo Ave
 Assuming Replacement CIP/PS Slab per Alt 2
 Bridge length is 455'
 Existing Structure width = 62'
 Proposed Structure width = 80'

H. Chou
 9/29/2015

					HBP Participating	Not HBP Participating
Replace Bridge	Length	Width	Area	Cost		
Multi-Span	ft	ft	sq ft	\$/sq ft		
CIP PS Slab	455	80	417	36589.58	250	\$ 9,147,400.00
						\$ -
Bridge Removal	Length			Cost		
	ft	ft	sq ft	\$/sq ft		
	425	62	26350	15	\$ 400,000.00	\$ -
Slope Protection	Assuming \$10k at each abutment				\$ 20,000.00	\$ -
Canal Work	Canal repair/restoration - Assume \$0k				\$ -	\$ -
Detour - Traffic Handling - Assume \$25k					\$ 25,000.00	\$ -
Approach Roadway	Assuming 200' total approach work @ \$25/sq ft					
	Length	Ave Width	Area	Cost		
	ft	ft	sq ft	\$/sq ft		
	200	80	16000	36	\$ 600,000.00	\$ -
Utilities - Assume \$50k	(irrigation, electric, etc)				\$ 50,000.00	
Mobilization (10%)					\$ 1,024,240.00	\$ -
	Total				\$ 11,266,640.00	\$ -

Construction Programming Total \$ 11,267,000.00 \$ -

PE Rate 8% Assuming \$150K environmental, \$40K Surveying, \$50K Geotech, \$0K Hydro, \$650K Design/PS&E, \$3K Indirect
 CE Rate 15%
 Contingency Rate 25%

	Direct Cost	Indirect Costs	HBP Participating Costs	Target Dates
PE	\$ 893,000.00		\$ 893,000.00	9/1/2016
R/W	\$ 100,000.00		\$ 100,000.00	3/1/2018
CON	\$ 11,267,000.00			
CE	\$ 1,690,050.00			
Cont	\$ 2,816,750.00			
Subtotal	\$ 15,773,800.00	\$ -	\$ 15,773,800.00	5/1/2019 Advertise 1/1/2021 Complete
Total Participating			\$ 16,766,800.00	

HBP % 88.53%
 Local Match % 11.47%

		Federal Fiscal Year (FFY)					Total		Check Total
		16/17	17/18	18/19	19/20	20/21	HBP	Local	
PE	HBP	\$ 197,643.23	\$ 197,643.23	\$ 197,643.23	\$ 197,643.23	\$ -	\$ 790,572.90		
	Local	\$ 25,606.78	\$ 25,606.78	\$ 25,606.78	\$ 25,606.78	\$ -		\$ 102,427.10	\$ 893,000.00
RW	HBP	\$ -	\$ -	\$ 88,530.00	\$ -	\$ -	\$ 88,530.00		
	Local	\$ -	\$ -	\$ 11,470.00	\$ -	\$ -		\$ 11,470.00	\$ 100,000.00
CON, CE, CONT	HBP	\$ -	\$ -	\$ -	\$ 13,964,545.14	\$ -	\$ 13,964,545.14		
	Local	\$ -	\$ -	\$ -	\$ 1,809,254.86	\$ -		\$ 1,809,254.86	#####
Total		\$ 223,250.00	\$ 223,250.00	\$ 323,250.00	\$ 15,997,050.00	\$ -	\$ 14,843,648.04	\$ 1,923,151.96	#####
							88.53%	11.47%	

Schedule Assumptions

NEPA CE and CEQA IS/MND w/ Studies 15 year
 Final Design + RW 15 year
 Construction 1 year



DEPARTMENT OF TRANSPORTATION
Structure Maintenance & Investigations

Bridge Number : 28C0062
Facility Carried: SAN PABLO AVE
Location : JUST W/O HERCULES AVE
City : PINOLE
Inspection Date : 12/11/2012

Bridge Inspection Report

Inspection Type

Routine FC Underwater Special Other

☒

STRUCTURE NAME: SAN PABLO AVENUE OH

CONSTRUCTION INFORMATION

Year Built : 1938
Year Widened: N/A
Length (m) : 129.5

Skew (degrees): 0
No. of Joints : 2
No. of Hinges : 2

Structure Description: Thirteen continuous spans of a RC parabolic slab with hinges in Spans 4 and 10. RC abutments and 3 column RC bents at Bents 3 to 13 with Bent 2 having 1 column with support from the staggered wall of Abutment 1. Abutment 1 and all RC columns are founded on spread footings and Abutment 14 is founded on steel H-piles.

Span Configuration : 7.9 m, 11 @ 10.4 m, 7.8 m

LOAD CAPACITY AND RATINGS

Design Live Load: M-13.5 OR H-15
Inventory Rating: RF=0.69 =>22.4 metric tons
Operating Rating: RF=1.14 =>36.9 metric tons
Permit Rating : G0000
Posting Load : Type 3: Legal

Calculation Method: LOAD FACTOR
Calculation Method: LOAD FACTOR

Type 3S2: Legal

Type 3-3: Legal

DESCRIPTION ON STRUCTURE

Deck X-Section: 0.38 m br, 0.76 m sw, 7.6 m, 1.2 m med, 7.6 m, 0.76 m sw, 0.38 m br

Total Width: 18.7 m Net Width: 15.2 m No. of Lanes: 4 Speed: 25 mph
Min. Vertical Clearance: Unimpaired

Rail Code: 0000 Rail Description: Concrete baluster (aesthetic)

DESCRIPTION UNDER STRUCTURE

Channel Description: This structure is not over a waterway.

INSPECTION COMMENTARY

REVISIONS

Upgraded 71 m of ELI Element 339 (Concrete Railing) from Condition State 3 & 4 to 2 to reflect the patched spalls of shallow RC coverage in the bridge rails.

INSPECTION ACCESS

This bridge is not over water. All elements were inspected during this inspection.

DECK, JOINTS AND RAILS

The AC approach in the eastbound lanes adjacent to Abutment 14 has a pothole of 1' X 6" X 2" (see attached photo No. 1). The AC approach in the westbound lanes adjacent to Abutment 14 has severe density cracks that are forming potholes (see attached photo No. 2).

There is a 12/15/2008 outstanding work recommendation to resurface this area of the AC approach pavement.

The AC approach pavement adjacent to Abutment 1 appears to be in good condition.

There is a spall in the top of the left RC rail (see attached photo No. 3).

INSPECTION COMMENTARY

The bare concrete deck has 1/64 in. to 1/32 in. wide pattern cracks with edge spalls throughout the entire surface that are spaced as close as 6 inches on center. There are also patched spalls and some rock pockets within the deck at various locations. The largest spall is approximately 6 inches in diameter with no steel reinforcing exposed and is located in eastbound Lane 1 approximately 23 feet west of the Span 10 hinge. These distressed areas of the deck account for less than 2% of the total deck area. There is a 2/7/2000 outstanding work recommendation to treat the deck with methacrylate, which includes chipping out and patching any unsound areas of the deck prior to the placement of methacrylate.

The steel sliding plate joint assemblies located at the hinges appear to be in good condition.

In addition to light efflorescence and some minor scaling on the soffit along the longitudinal construction joint near the centerline of the bridge, the following locations have cracks on the slab soffit:

SPAN	CONDITION
3	Longitudinal cracks with light efflorescence mainly on left half of span that are short to 2.4 meters (8 feet) long, spaced as close as 2 feet on center.
6	Longitudinal cracks with light efflorescence near Bent 7 that are short to 1 meter (3 feet) long and light in density.
8	Longitudinal crack with light efflorescence located 0.3 meters (1 foot) right of the centerline and 0.3 meters (1 foot) long.
9	Transverse cracks with light efflorescence that are up to 1 meter (3 feet) long and light in density seen near the centerline and the 3/4 span point.
11	Longitudinal cracks with light efflorescence that are short to 1 meter (3 feet) and light in density located near midspan.
13	Longitudinal cracks with light efflorescence that are moderate in density with a spacing as close as 1.2 meters (4 feet) on center.

The condition of the soffit does not appear to have significantly changed since the last routine inspection on 12/8/2010.

SUPERSTRUCTURE

No defects were noted during this inspection.

SUBSTRUCTURE

At the west abutment, Abutment 1, there is erosion of the approach fill on the left side. It appears that this may be caused by poor roadway drainage. The left side of the Abutment 1 footing is exposed up to 2.5 feet vertically, but is not undermined (see archived photo in BIRIS). At this time the roadway and structure are not affected, but may be affected with future erosion considering it is founded on a spread footing.

Minor spalls were observed on the Span 5 side of Bent 6 Column 3 and the Span 8 side of Bent 8 Column 3. These spalls are up to 1 foot high, 4 inches wide and 1 inch deep with no exposed reinforcement. There is no repair work required.

A portion of Abutment 14 is undermined up to 4 inches vertically and up to 4 feet horizontally below the footing for a 6 foot length along the face of the abutment. This undermining is due to erosion of the embankment which appears to have been caused by poor roadway drainage. The erosion extends for approximately one-third the length of the abutment from the right side (see attached photo No. 5).

SAFE LOAD CAPACITY

The load rating for this structure is being reviewed by SMI Ratings Branch. An updated Load Rating Summary will be archived when this review is complete.

INSPECTION COMMENTARY

The current rating is based on BDS computer output dated 12/4/1978.

ELEMENT INSPECTION RATINGS

Elem No.	Element Description	Env	Total		Qty in each Condition State				
			Qty	Units	St. 1	St. 2	St. 3	St. 4	St. 5
38	Concrete Slab - Bare	2	2422	sq.m.	0	2422	0	0	0
205	Reinforced Conc Column or Pile Extension	2	34	ea.	33	1	0	0	
215	Reinforced Conc Abutment	2	37	m.	37	0	0	0	0
225	Unpainted Steel Submerged Pile	2	1	ea.	1	0	0	0	0
339	Concrete Railing (aesthetic/masonry)	2	284	m.	213	71	0	0	
349	Sliding Steel Plates	2	37	m.	37	0	0	0	0
358	Deck Cracking	2	1	ea.	0	0	0	1	
359	Soffit of Concrete Deck or Slab	2	1	ea.	0	1	0	0	0

WORK RECOMMENDATIONS

RecDate: 12/15/2008	EstCost:	
Action : Appr. Roadway-Repair	StrTarget: 2 YEARS	Resurface the AC approach pavement in the westbound lanes adjacent to Abutment 1.
Work By: LOCAL AGENCY	DistTarget:	
Status : PROPOSED	EA:	
 RecDate: 02/07/2000	 EstCost:	 Treat the deck with methacrylate or equivalent. Chip out and patch any unsound areas of the deck surface prior to the placement of the methacrylate. (Revised 12/15/2008 CAT)
Action : Deck-Methacrylate	StrTarget: 2 YEARS	
Work By: LOCAL AGENCY	DistTarget:	
Status : PROPOSED	EA:	
 RecDate: 02/07/2000	 EstCost:	 Backfill the undermined area under the north abutment. Install a drainage system to prevent future erosion.
Action : Bridge-Misc	StrTarget: 2 YEARS	
Work By: LOCAL AGENCY	DistTarget:	
Status : PROPOSED	EA:	
 RecDate: 02/07/2000	 EstCost:	 Replace the approach fill at the south abutment and install a drainage system to prevent future erosion.
Action : Bridge-Misc	StrTarget: 2 YEARS	
Work By: LOCAL AGENCY	DistTarget:	
Status : PROPOSED	EA:	

Team Leader : Zhigang Zhang
Report Author : Zhigang Zhang
Inspected By : Z. Zhang/J. Hu

[Signature] 1/29/13
Zhigang Zhang (Registered Civil Engineer)



STRUCTURE INVENTORY AND APPRAISAL REPORT

***** IDENTIFICATION *****

(1) STATE NAME- CALIFORNIA 069
 (8) STRUCTURE NUMBER 28C0062
 (5) INVENTORY ROUTE (ON/UNDER) - ON 1500A0380
 (2) HIGHWAY AGENCY DISTRICT 04
 (3) COUNTY CODE 013 (4) PLACE CODE 57288
 (6) FEATURE INTERSECTED- BNSF RY
 (7) FACILITY CARRIED- SAN PABLO AVE
 (9) LOCATION- JUST W/O HERCULES AVE
 (11) MILEPOINT/KILOMETERPOINT 0
 (12) BASE HIGHWAY NETWORK- PART OF NET 1
 (13) LRS INVENTORY ROUTE & SUBROUTE 000000A03800
 (16) LATITUDE 38 DEG 00 MIN 33 SEC
 (17) LONGITUDE 122 DEG 17 MIN 13 SEC
 (98) BORDER BRIDGE STATE CODE % SHARE %
 (99) BORDER BRIDGE STRUCTURE NUMBER

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

(43) STRUCTURE TYPE MAIN:MATERIAL- CONCRETE CONT
 TYPE- SLAB CODE 201
 (44) STRUCTURE TYPE APPR:MATERIAL- OTHER/NA
 TYPE- OTHER/NA CODE 000
 (45) NUMBER OF SPANS IN MAIN UNIT 13
 (46) NUMBER OF APPROACH SPANS 0
 (107) DECK STRUCTURE TYPE- CIP CONCRETE CODE 1
 (108) WEARING SURFACE / PROTECTIVE SYSTEM:
 A) TYPE OF WEARING SURFACE- NONE CODE 0
 B) TYPE OF MEMBRANE- NONE CODE 0
 C) TYPE OF DECK PROTECTION- NONE CODE 0

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

(27) YEAR BUILT 1938
 (106) YEAR RECONSTRUCTED 0000
 (42) TYPE OF SERVICE: ON- HIGHWAY 1
 UNDER- RAILROAD 2
 (28) LANES:ON STRUCTURE 04 UNDER STRUCTURE 00
 (29) AVERAGE DAILY TRAFFIC 10300
 (30) YEAR OF ADT 2012 (109) TRUCK ADT 6 %
 (19) BYPASS, DETOUR LENGTH 3 KM

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

(48) LENGTH OF MAXIMUM SPAN 10.4 M
 (49) STRUCTURE LENGTH 129.5 M
 (50) CURB OR SIDEWALK: LEFT 0.8 M RIGHT 0.8 M
 (51) BRIDGE ROADWAY WIDTH CURB TO CURB 15.2 M
 (52) DECK WIDTH OUT TO OUT 18.7 M
 (32) APPROACH ROADWAY WIDTH (W/SHOULDERS) 16.5 M
 (33) BRIDGE MEDIAN- CLOSED (NO BARRIER) 2
 (34) SKEW 0 DEG (35) STRUCTURE FLARED NO
 (10) INVENTORY ROUTE MIN VERT CLEAR 99.99 M
 (47) INVENTORY ROUTE TOTAL HORIZ CLEAR 15.2 M
 (53) MIN VERT CLEAR OVER BRIDGE RDWY 99.99 M
 (54) MIN VERT UNDERCLEAR REF- RAILROAD 6.32 M
 (55) MIN LAT UNDERCLEAR RT REF- RAILROAD 2.6 M
 (56) MIN LAT UNDERCLEAR LT 0.0 M

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

(38) NAVIGATION CONTROL- NOT APPLICABLE CODE N
 (111) PIER PROTECTION- CODE
 (39) NAVIGATION VERTICAL CLEARANCE 0.0 M
 (116) VERT-LIFT BRIDGE NAV MIN VERT CLEAR M
 (40) NAVIGATION HORIZONTAL CLEARANCE 0.0 M

***** SUFFICIENCY RATING *****

SUFFICIENCY RATING - 57.1
 STATUS STRUCTURALLY DEFICIENT
 HEALTH INDEX 84.0
 PAINT CONDITION INDEX - N/A

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

(112) NBIS BRIDGE LENGTH- YES Y
 (104) HIGHWAY SYSTEM- ROUTE ON NHS 1
 (26) FUNCTIONAL CLASS- OTHER PRIN ART URBAN 14
 (100) DEFENSE HIGHWAY- NOT STRAHNET 0
 (101) PARALLEL STRUCTURE- NONE EXISTS N
 (102) DIRECTION OF TRAFFIC- 2 WAY 2
 (103) TEMPORARY STRUCTURE-
 (105) FED.LANDS HWY- NOT APPLICABLE 0
 (110) DESIGNATED NATIONAL NETWORK - NOT ON NET 0
 (20) TOLL- ON FREE ROAD 3
 (21) MAINTAIN- CITY OR MUNICIPAL HIGHWAY AGENCY 04
 (22) OWNER- CITY OR MUNICIPAL HIGHWAY AGENCY 04
 (37) HISTORICAL SIGNIFICANCE- NOT ELIGIBLE 5

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

(58) DECK 3
 (59) SUPERSTRUCTURE 6
 (50) SUBSTRUCTURE 7
 (61) CHANNEL & CHANNEL PROTECTION N
 (62) CULVERTS N

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

(31) DESIGN LOAD- M-13.5 OR H-15 2
 (63) OPERATING RATING METHOD- LOAD FACTOR 1
 (64) OPERATING RATING- 36.9
 (55) INVENTORY RATING METHOD- LOAD FACTOR 1
 (66) INVENTORY RATING- 22.4
 (70) BRIDGE POSTING- EQUAL TO OR ABOVE LEGAL LOADS 5
 (41) STRUCTURE OPEN, POSTED OR CLOSED- A
 DESCRIPTION- OPEN, NO RESTRICTION

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

(67) STRUCTURAL EVALUATION 5
 (58) DECK GEOMETRY 3
 (69) UNDERCLEARANCES, VERTICAL & HORIZONTAL 4
 (71) WATER ADEQUACY N
 (72) APPROACH ROADWAY ALIGNMENT 6
 (36) TRAFFIC SAFETY FEATURES 0000
 (113) SCOUR CRITICAL BRIDGES N

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

(75) TYPE OF WORK- MISC STRUCTURAL WORK CODE 38
 (76) LENGTH OF STRUCTURE IMPROVEMENT 129.5 M
 (94) BRIDGE IMPROVEMENT COST \$2,422,000
 (95) ROADWAY IMPROVEMENT COST \$484,400
 (96) TOTAL PROJECT COST \$4,068,960
 (97) YEAR OF IMPROVEMENT COST ESTIMATE 2010
 (114) FUTURE ADT 23203
 (115) YEAR OF FUTURE ADT 2029

***** INSPECTIONS *****

(90) INSPECTION DATE 12/12 (91) FREQUENCY 24 MO
 (92) CRITICAL FEATURE INSPECTION: (93) CFI DATE
 A) FRACTURE CRIT DETAIL- NO MO A)
 B) UNDERWATER INSP- NO MO B)
 C) OTHER SPECIAL INSP- NO MO C)

SAN PABLO AVENUE OH

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12/11/2012 [AAAH]

28C0062

124 - PHOTO-Joint-Damage/Deterioration



Photo No. 1

1' X 6" X 2" AC approach pothole in the east bound lane at A 1.

124 - PHOTO-Joint-Damage/Deterioration



Photo No. 2

3" X 1' area of AC approach is cracking and potholing in the west bound lane at A 1.

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12/11/2012 [AAAH]

28C0062

119 - PHOTO-Rail-Damage/Deterioration

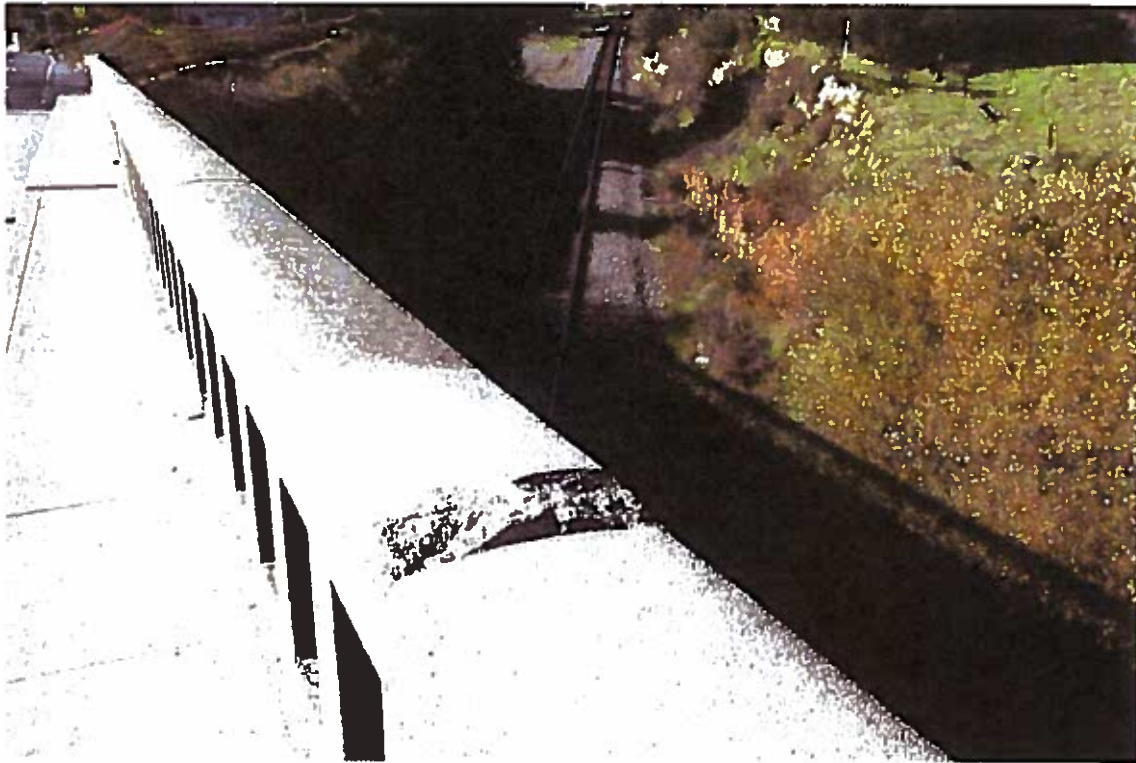


Photo No. 3

Spall in the top of the right RC bridge rail.

133 - PHOTO-Unclassified

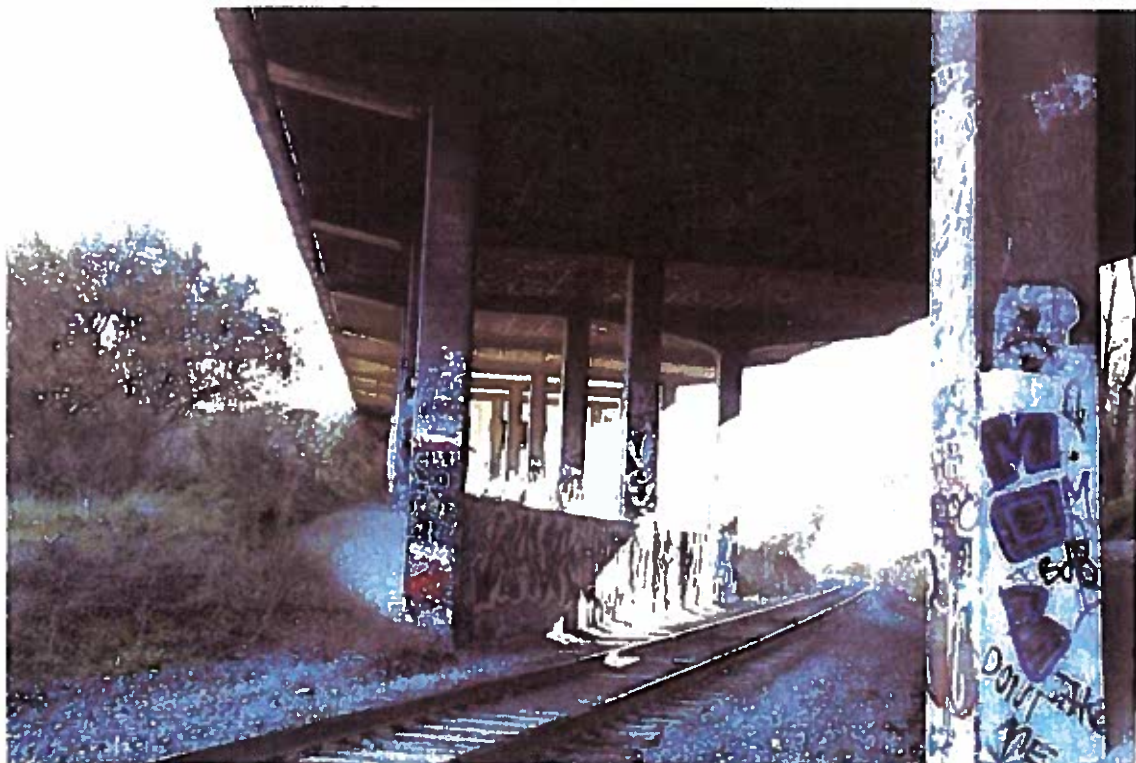


Photo No. 4

Soffit details, looking towards A 1.

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28C0062

129 - PHOTO-Hydraulic-Details



Photo No. 5

Undermined Abutment 14 (right half) due to roadway run-offs.