



BRIDGE INSPECTION REPORT

Routine Inspection



BRIDGE NO.:
23C0092

STRUCTURE NAME:
PUTAH CREEK

INSPECTION DATE:
March 12, 2021

BRIDGE LOCATION INFORMATION

(9) LOCATION	SOL/YOL CO LINE	(7) FACILITY CARRIED	STEVENSON BR RD
(11) POSTMILE	0	(6) FEATURE INTERSECTED	PUTAH CREEK
(16) LATITUDE	38°32'11.31"	(5) INVENTORY RTE(ON/UNDER)	ON 14000000
(17) LONGITUDE	121°51'03.92"	(104) ON NATIONAL HIGHWAY SYSTEM	NOT ON NHS

STRUCTURAL HEALTH CONDITION SUMMARY INFORMATION

(58) DECK	5 FAIR	DECK AREA (SF)	670
(59) SUPERSTRUCTURE	5 FAIR	SUFFICIENCY RATING	48.1
(60) SUBSTRUCTURE	7 GOOD	PAINT CONDITION	SUPER N/A SUBSTR N/A
(62) CULVERT	N N/A (NBI)	STRUCTURALLY DEFICIENT (SD) STATUS	NOT SD
(67) STRUCTURE EVALUATION	5 ABOVE MIN TOLERABLE	(113) SCOUR	3 SC - UNSTABLE

PHOTOGRAPH IDENTIFICATION



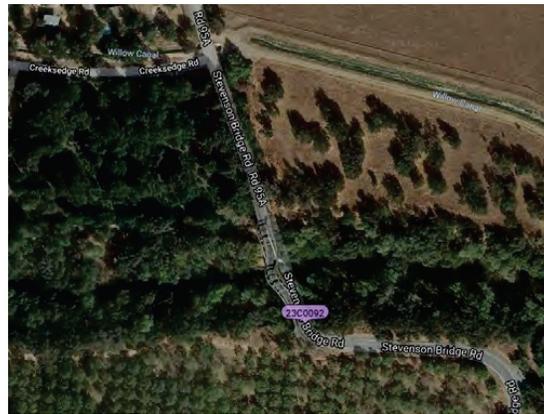
Routine-Roadway View (03/12/2021)



Routine-Elevation View (03/12/2021)



Routine-Underside View (03/12/2021)



Routine-Map View (05/23/2021)

TEAM LEADER Jacob M. Boulant
 REPORT AUTHOR Jacob M. Boulant
 INSPECTED BY JM.Boulant/CV.Udarbe

Jacob M. Boulant (Registered Civil Engineer)

6/9/2021

Date



STRUCTURE OVERVIEW

AGENCY INFORMATION

INSPECTION INFORMATION

(1) STATE NAME	CALIFORNIA	069	(90) INSPECTION DATE	03/21	(91) FREQUENCY	24	MO
(2) HIGHWAY DISTRICT		04	(92) CRITICAL FEATURE INSPECTION		(93) CFI DATE		
(3) COUNTY CODE	(23)	SOLANO	A) FRACTURE CRITICAL INSP	N-NO	MO A)		N/A
(4) PLACE CODE	(00000)	_____	B) UNDERWATER INSP	N-NO	MO B)		N/A
(21) MAINTAIN	02	COUNTY HWY AGENCY	C) OTHER SPECIAL INSP	N-NO	MO C)		N/A
(22) OWNER	02	COUNTY HWY AGENCY					
(98) BORDER BRIDGE STATE CODE	N/A	% SHARE					N/A
(99) BORDER BRIDGE STRUCTURE NUMBER							N/A

CONSTRUCTION INFORMATION

(27) YEAR BUILT	1923	(45) MAIN SPANS	2	(43a) STRUCTURE TYPE MAIN	2: CONCRETE CONT
(106) YEAR MODIFIED	N/A	(46) APPR SPANS	2	(43b) DESIGN TYPE MAIN	12: ARCH - THRU
(34) SKEW	0	(48) MAX SPAN (M)	32.9	(44a) STRUCTURE TYPE APPR	2: CONCRETE CONT
(49) LENGTH (M)	90.8	(35) STR FLARE	0-NO	(44b) DESIGN TYPE APPR	04: TEE BEAM
(112) NBIS BR LENGTH	Y	JOINTS	0	NO. OF HINGES	0

STRUCTURE DESCRIPTION

Four span bridge with a two span RC tied arch (Span 2 & 3) on RC 2-column piers with RC (5) girder approach spans (Spans 1 & 4) with RC diaphragm abutments with monolithic wingwalls (20 ft each). Abutments are founded on spread footings, pier columns are founded on timber piles.

SPAN CONFIGURATION

40 ft, 2 @ 108 ft, 40 ft

OPERATIONAL INFORMATION

LOAD CAPACITY

(31) DESIGN LOAD	0 UNKNOWN	(65) CALC METHOD	1 LF LOAD FACTOR
(66) INVENTORY RATING	RF=0.75 =>24.3 metric tons	(63) CALC METHOD	1 LF LOAD FACTOR
(64) OPERATING RATING	RF=1.26 =>40.8 metric tons	(70) BRIDGE POSTING	5 AT/ABOVE LEGAL LOADS
(41) STRUCTURE STATUS	A-OPEN, NO RESTRICTION	PERMIT RATING	PPPPP
OVERLAY THICKNESS	0 inches		

POSTING LOADS

	Safe Loads	Existing Ordinance/Order	Posting Signs	
Type 3	<u>Legal</u>	_____	_____	U.S. Tons
Type 3S2	<u>Legal</u>	_____	_____	U.S. Tons
Type 3-3	<u>Legal</u>	_____	_____	U.S. Tons
Speed	<u>55</u>	_____	_____	MPH

Additional Ordinance/Order Requirements

NONE

Additional Signs

Narrow Bridge
Vertical clearance "13 ft 6 in"

Posting Order Date _____
 Load Rating Summary Date 02/11/10
 Load Rating Type Calculated
 Load Rating Tool - Date Hand Calculations - 07/21/78

MINIMUM VERTICAL CLEARANCE

MINIMUM LATERAL UNDERCLEARANCE

(53) MIN VERT CLEAR OVER BRIDGE RDWY	4.31 M	(55) MIN LAT UNDERCLEAR RT REF	N-NOT H/RR	0.0 M
(54) MIN VERT UNDERCLEAR REF	N-NOT H/RR	0.00 M	(56) MIN LAT UNDERCLEAR LT	0.0 M

OPERATIONAL SIGN PHOTOGRAPHS



Photo 5

NARROW BRIDGE and 15 MPH signs at the approach to Abutment 1.



Photo 6

NARROW BRIDGE sign at the approach to Abutment 5.



Photo 7

Vertical clearance 13 FT 6 IN and 15 MPH signs at the approach to Abutment 5.

CONDITION INFORMATION

INSPECTION COMMENTARY

SCOPE AND ACCESS

Water, 12 to 18 inches deep flowed through a channel in Span 2 on the day of this inspection. None of the bridge elements were submerged. The substructure, superstructure and soffit were inspected by walking the channel banks below the bridge. The deck and arch were inspected by walking the bridge deck. All elements received a complete inspection.

MISCELLANEOUS

Routine photographs were taken during this inspection and are included with this report. Refer to Photos 1 through 4.

OPERATIONAL SIGNS

NARROW BRIDGE and 15 MPH signs are present at both approaches to the bridge. See Photos 5, 6 and 7.

ROADWAY CLEARANCE

There are vertical clearance signs indicating a vertical clearance of 13 FT 6 IN at both approaches to the bridge. Refer to Photo 7 from this report and Photo 3 from the 03/27/2017 report.

WATERWAY

CONDITION INFORMATION

INSPECTION COMMENTARY

The BIR dated 5/9/2008 determined that this structure is Scour Critical (NBI Item 113 code of 3). A Scour plan of action dated 11/21/2008 is on file. The Scour Plan of Action states that the channel has remained relatively stable since 1971. However, County personnel will monitor this bridge when the flow rate exceeds 4,500 cfs or about 10 feet above the pile as well as an annual inspection to check for degradation and undermining.

The channel cross section was spot checked during this inspection and compared to the channel cross section recorded on 03/25/2015. No significant changes to the channel were noted.

SPECIAL INSPECTION INFORMATION

STEEL INVESTIGATION DETAILS - NOT APPLICABLE FOR THIS BRIDGE.

UNDERWATER INVESTIGATION DETAILS - NOT APPLICABLE FOR THIS BRIDGE.

DECK AND ROADWAY

DECK CROSS SECTION

1 ft br, 0.7 ft cu, 20 ft, 0.7 ft cu, 1 ft br

DECK GEOMETRY	DECK ROADWAY/OPERATIONAL INFORMATION
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(49) LENGTH	90.8 M	(42a) TYPE OF SERVICE	1-HIGHWAY
(51) NET WIDTH	6.1 M	(12) BASE HIGHWAY NETWORK	0-NOT ON NET
(52) TOTAL WIDTH	7.1 M	(13) LRS INVENTORY RTE & SUBRTE	
(50) CURB OR SIDEWALK	LEFT 0.2 M RIGHT 0.2 M	(104) NATIONAL HIGHWAY SYSTEM	0-NOT ON NHS
(32) APPROACH RDWY WIDTH	5.8 M	(26) FUNCTIONAL CLASS 07-MAJOR COLLECTOR RURAL	
(33) BRIDGE MEDIAN	0 NO MEDIAN	(100) DEFENSE HIGHWAY	0-NOT STRAHNET

DECK STRUCTURE INFORMATION

(107) DECK STRUCTURE TYPE	1-CIP CONCRETE
(108) WEARING SURFACE / PROTECTIVE SYSTEM	
A) TYPE OF WEARING SURFACE	0-NONE
B) TYPE OF MEMBRANE	0-NONE
C) TYPE OF DECK PROTECTION	0-NONE
OVERLAY THICKNESS (inches)	0 inches
(29) AVERAGE DAILY TRAFFIC	789
(30) YEAR OF ADT 2008	(109) TRUCK ADT % 5 %
(19) BYPASS, DETOUR LENGTH	19 KM
(114) FUTURE ADT	1549
(115) YEAR OF FUTURE ADT	2041
(37) HISTORICAL SIGNIFICANCE	2: ELIGIBLE FOR NRHP

(102) DIRECTION OF TRAFFIC	2-2 WAY
(10) INVENTORY ROUTE MIN VERT CLEAR	4.31 M
(47) INVENTORY ROUTE TOTAL HORIZ CLEAR	6.1 M
(68) DECK GEOMETRY	3 INTOLERABLE - CORRECT
(72) APPR ROADWAY ALIGN	3 INTOLERABLE - CORRECT
(105) FEDERAL LANDS HWY	0-NOT APPLICABLE
(110) DESIGNATED NATIONAL NETWORK	0-NOT ON NET
(20) TOLL	3-ON FREE ROAD
(28a) LANES	2
SPEED	55
(103) TEMPORARY STRUCTURE	N/A

DECK ELEMENT INSPECTION RATINGS AND NOTES (58) DECK RATING = 5

Elem No.	Defect/Prot Defect	Element Description	Env	Total Qty	Units	Qty in each Condition State			
						CS 1	CS 2	CS 3	CS 4
12		Deck-RC	2	670	sq.m	590	0	80	0
1080		Delamination/Spall/Patched Area	2	52		0	0	52	0
1130		Cracking (RC and Other)	2	28		0	0	28	0
521		Concrete Coat.(Meth/Paint/Seal)	2	554	sq.m	554	0	0	0
(12-1080) Delamination/Spall/Patched Area									

DECK ELEMENT INSPECTION RATINGS AND NOTES

(58) DECK RATING = 5

Elem No.	Defect/Prot Defect	Element Description	Env	Total Qty	Units	Qty in each Condition State			
						CS 1	CS 2	CS 3	CS 4

(12-1080) Delamination/Spall/Patched Area

There are numerous shallow soffit spalls on the structure in all spans. The spalls are typically between one to two feet in length and approximately one foot wide with exposed corroding rebar. Spalls present randomly throughout the soffit but heaviest along the transverse cracks in Spans 1 and 4. Refer to Photos 9, 12 and 22.

A work recommendation to remove loose concrete around the spalls, clean the exposed rebar and apply a corrosion inhibitor to the exposed rebar was created.

(12-1130) Cracking (RC and Other)

There are two transverse deck cracks in Span 1 near Bent 2 and 2 transverse deck cracks in Span 4 near Bent 4. These cracks penetrate the full depth of the deck, are reflective in the soffit and have associated spalling. Refer to Photos 8 and 9.

The cracks have been treated with methacrylate as shown in Photo 10. Prior to being treated, the were noted to be 0.4 to 0.6 inch wide and will therefore remain in Condition State 3.

(12-521) Concrete Coat.(Meth/Paint/Seal)

The large transverse deck cracks in Spans 1 & 4 along with the entire deck were treated with methacrylate. Refer to Photos 1 and 2 from the 03/25/2015 report.

DECK PHOTOGRAPHS



Photo 8

Transverse crack with spalling in the soffit of Span 1.



Photo 9

Transverse crack with spalling in the soffit of Span 4.



Photo 10

Sealed transverse deck crack in Span 1.



Photo 22

Spalls with exposed rebar in the soffit.

JOINT - APPROACH - RAIL

RAIL INFORMATION

(36a) Rail Code 0 (36b) Transition 0 (36c) Appr Guardrail 0 (36d) Appr Guardrail End 0 Roadway Speed 55 MPH

JOINT/APPROACH/RAIL ELEMENT INSPECTION RATINGS AND NOTES

Elem No.	Defect/Prot Defect	Element Description	Env	Total Qty	Units	Qty in each Condition State			
						CS 1	CS 2	CS 3	CS 4
331		Railing-RC	2	183	m	93	45	45	0
1080		Delamination/Spall/Patched Area	2	30		0	0	30	0
1130		Cracking (RC and Other)	2	60		0	45	15	0
7000		Damage	2	4		0	0	4	0

(331-1080) Delamination/Spall/Patched Area

There are numerous random spalls and incipient spall on both bridge rails. Many of the spalls have been patched; however, the patches are beginning to fail. Refer to Photo 11.

Eleven rail posts along a section of the left rail in Span 1 have been hit by traffic or have severely deteriorated. The spalls are typically up to 6 inch X 12 inch X 2 inch deep.

(331-1130) Cracking (RC and Other)

There are numerous random cracks on both bridge rails. The most severe is a three inch wide crack/spall on the left rail over Bent 3 at the connection to the northern arch. Refer to Photos 1 and 2 from the 03/25/2013 report.

(331-7000) Damage

Spalls in the left rail posts in Span 1 are the result of vehicular impact.

JOINT/RAIL PHOTOGRAPHS



Photo 11
Failed patches in the left bridge rail.

SUPERSTRUCTURE

SUPERSTRUCTURE ELEMENT INSPECTION RATINGS AND NOTES

(59) SUPERSTRUCTURE RATING = 5

Elem No.	Defect/Prot Defect	Element Description	Env	Total Qty	Units	Qty in each Condition State			
						CS 1	CS 2	CS 3	CS 4
110		Girder/Beam-RC	2	122	m	72	37	13	0
1080		Delamination/Spall/Patched Area	2	25		7	13	5	0
1130		Cracking (RC and Other)	2	32		0	24	8	0

(110-1080) Delamination/Spall/Patched Area

There are spalls with exposed rebar randomly throughout both girders. The spalls are typically 1 to 2 square feet in area. Approximately 15% of the girders have spalls or delaminations, less than 5% are Condition State 3 spalls. Refer to Photo 12.

(110-1130) Cracking (RC and Other)

SUPERSTRUCTURE

SUPERSTRUCTURE ELEMENT INSPECTION RATINGS AND NOTES

(59) SUPERSTRUCTURE RATING = 5

Elem No.	Defect/Prot	Defect	Element Description	Env	Total Qty	Units	Qty in each Condition State			
							CS 1	CS 2	CS 3	CS 4

(110-1130) Cracking (RC and Other)

There are vertical cracks in all four girders in Spans 1 and 4. These cracks are greater than 0.05 inch wide, extent 3/4 the depth of the girders and open to the top of the girder. The cracks are up to 0.5 inch wide where they surface in the deck. Refer to Photos 13 through 16.

These cracks are located approximately 8 to 10 feet from the bents and coincide with transverse cracks in the deck. The cracks do not indicate stress in the tension area, but more likely settlement at the abutments.

These cracks have been previously noted and no significant progress was noted when compared to Photos 4, 5, 11 and 12 from the 10/23/2009 report.

144			Arch-RC	2	132	m	99	20	13	0
	1080		Delamination/Spall/Patched Area	2	33		0	20	13	0

(144-1080) Delamination/Spall/Patched Area

Spalls with exposed rebar are present through the arch. Refer to Photos 17 through 19. The largest spall is located at the base of the left arch at Bent 2 and is approximately 22 inches by 6 inches by 3 inches deep with an exposed square main reinforcing bar. See Photo 17. The majority of the spalls appear to have been previously patched, however the patches have completely failed. No indication of section loss was noted in the exposed bars. Approximately 25% of the arch has spalls or delaminations and approximately 10% are Condition State 3.

There is an existing work recommendation to remove loose concrete in the spall, clean and apply a corrosion inhibitor to all exposed rebar.

155			Floor Beam-RC	2	180	m	179	0	1	0
	1080		Delamination/Spall/Patched Area	2	1		0	0	1	0

(155-1080) Delamination/Spall/Patched Area

There is a shallow spall with exposed rebar on the right side of Floor beam 14 in Span 3. The spall is approximately 1 foot square. Refer to Photo 15 from the 10/25/2009 inspection.

SUPERSTRUCTURE PHOTOGRAPHS



Photo 12
Spalls with exposed rebar in the bottom of the girders.



Photo 13
Vertical cracks in the girders in Span 1.



Photo 14
Vertical cracks in the girders in Span 4.



Photo 15
Vertical cracks in the girders in Span 1.



Photo 16
Vertical crack in Girder 4 in Span 1 opening to the top.



Photo 17
Spall in the left arch rib at Bent 2.

SUPERSTRUCTURE PHOTOGRAPHS



Photo 18
Spall in the left arch rib.



Photo 19
Spall in the first arch strut.

SUBSTRUCTURE

DESCRIPTION UNDER STRUCTURE

(42b) TYPE OF SERVICE UNDER	5-WATERWAY	(38) NAVIGATION CONTROL	N: NOT APPLICABLE
(69) UNDERCLEARANCES V - H	N NOT APPLICABLE (NBI)	(111) PIER PROTECTION	N/A
(71) WATER ADEQUACY	7 ABOVE MINIMUM	(39) NAVIGATION VERTICAL CLEARANCE	0.0 M
(61) CHANNEL PROTECTION	6 BANK SLUMPING	(116) VERT-LIFT BRIDGE NAV MIN VERTICAL CLEAR	M
(113) SCOUR	3 SC - UNSTABLE	(40) NAVIGATION HORIZONTAL CLEARANCE	0.0 M
SCOUR POA DATE	11/21/2008		

CHANNEL DESCRIPTION

Clayey sandy silt with some gravel.

SUBSTRUCTURE ELEMENT INSPECTION RATINGS AND NOTES

(60) SUBSTRUCTURE RATING = 7

Elem No.	Defect/Prot	Defect	Element Description	Env	Total Qty	Units	Qty in each Condition State			
							CS 1	CS 2	CS 3	CS 4
205			Column-RC	2	6	each	6	0	0	0
(205) Column-RC										
There were no significant defects noted.										
215			Abutment-RC	2	40	m	40	0	0	0
(215) Abutment-RC										
There were no significant defects noted.										
220			Pile Cap/Footing-RC	2	13	m	0	13	0	0
6000			Scour	2	13		0	13	0	0
(220-6000) Scour										
The pile caps at Bents 2 and 4 are exposed. The pile cap at Pier 2 is exposed up to 11 inches vertically for approximately 10 feet on the Span 2 side. The pile cap at Pier 3 is exposed full length on both sides, up to 60 inches vertically on the Span 2 side and 52 inches vertically on the Span 3 side of the cap. No undermining was noted at either location. Refer to Photos 20 and 21.										
228			Pile-Timber	2	1	ea.	1	0	0	0
(228) Pile-Timber										
The pile element is included to indicate the presence of piles on this structure. The piles were not exposed for visual inspection. No indication of pile distress was noted in any substructure element.										

SUBSTRUCTURE PHOTOGRAPHS

SUBSTRUCTURE

SUBSTRUCTURE PHOTOGRAPHS



Photo 20
Exposed pile cap at Bent 2.



Photo 21
Exposed pile cap at Bent 3.

OTHER PHOTOGRAPHS



Photo 1
Facing north.



Photo 2
Facing southwest.



Photo 3
Facing south.

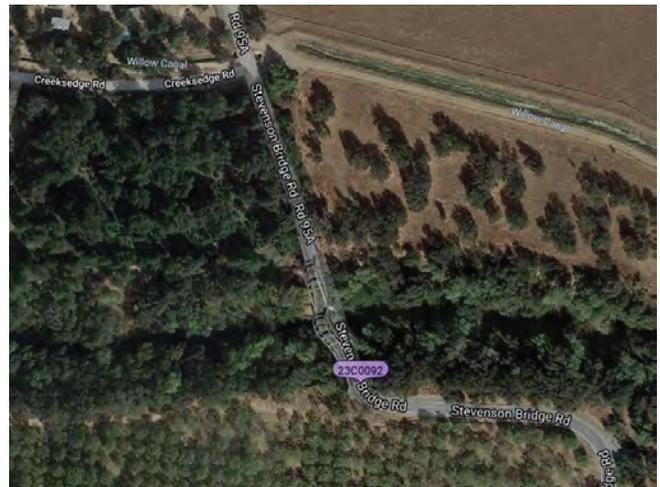


Photo 4
Overhead view.

WORK RECOMMENDATIONS

DECK WORK RECOMMENDATIONS

Rec Date	03/12/2021	Work By	LOCAL AGENCY	Est Cost		Dist Target
Status	PROPOSED	Action	Deck-Patch spalls	Str Target	1 YEAR	EA

WORK RECOMMENDATIONS

DECK WORK RECOMMENDATIONS

Remove loose concrete, clean the exposed rebar and apply a corrosion inhibitor to all spalls throughout the soffit of the deck.

JOINT/APPR/RAIL WORK RECOMMENDATIONS - NONE

SUPERSTRUCTURE WORK RECOMMENDATIONS

Rec Date	10/23/2009	Work By	LOCAL AGENCY	Est Cost		Dist Target
Status	PROPOSED	Action	Super-Patch spalls	Str Target	2 YEARS	EA

Remove loose concrete, clean the exposed rebar and apply a corrosion inhibitor to all spalls throughout the concrete arch.

SUBSTRUCTURE WORK RECOMMENDATIONS - NONE

OTHER WORK RECOMMENDATIONS - NONE



Photo #1
Facing north.



Photo #2
Facing southwest.



Photo #3
Facing south.

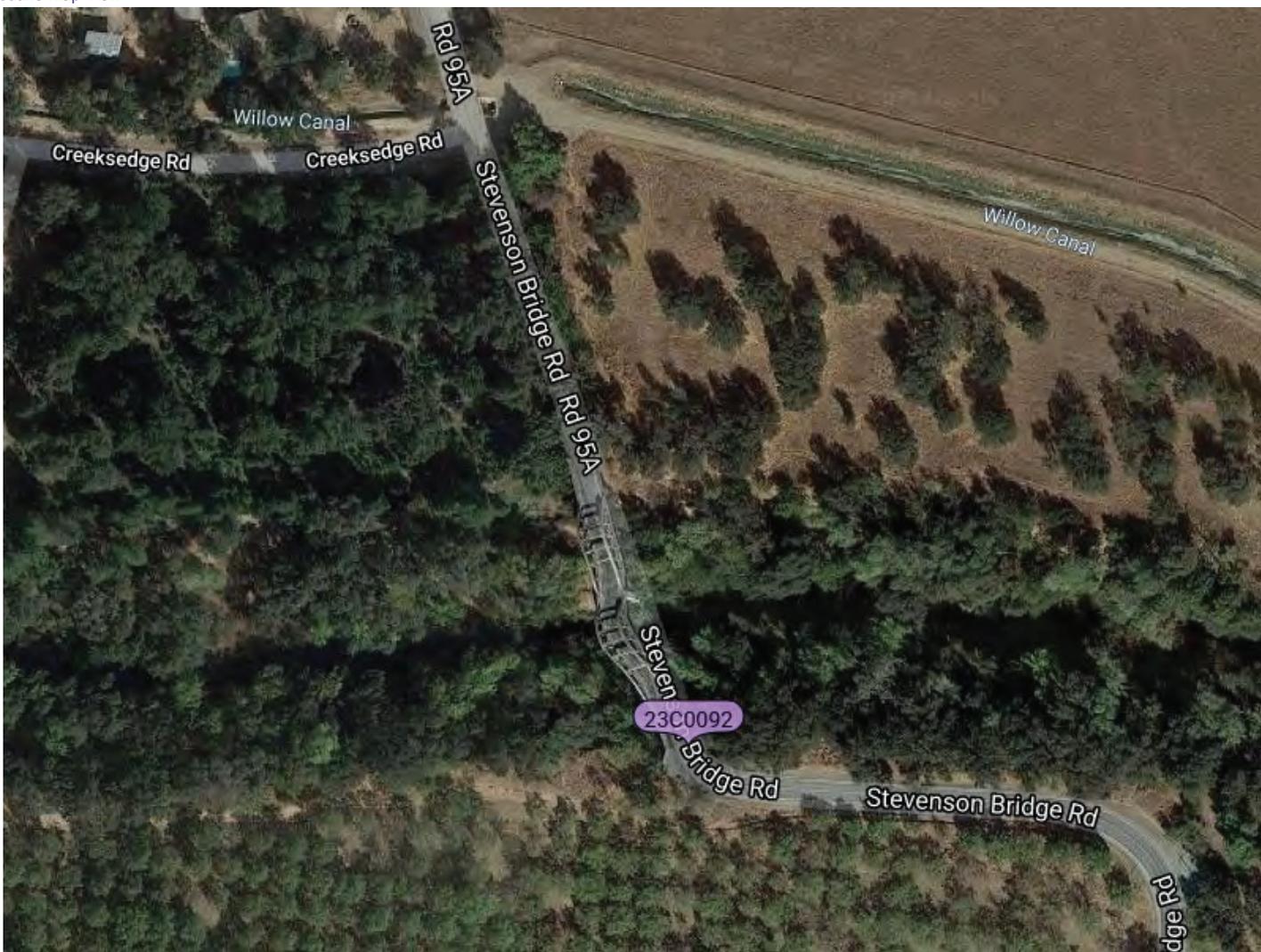


Photo #4
Overhead view.



Photo #5
NARROW BRIDGE and 15 MPH signs at the approach to Abutment 1.



Photo #6
NARROW BRIDGE sign at the approach to Abutment 5.



Photo #7
Vertical clearance 13 FT 6 IN and 15 MPH signs at the approach to Abutment 5.



Photo #8
Transverse crack with spalling in the soffit of Span 1.



Photo #9
Transverse crack with spalling in the soffit of Span 4.



Photo #10
Sealed transverse deck crack in Span 1.



Photo #11
Failed patches in the left bridge rail.



Photo #12
Spalls with exposed rebar in the bottom of the girders.



Photo #13
Vertical cracks in the girders in Span 1.



Photo #14
Vertical cracks in the girders in Span 4.



Photo #15
Vertical cracks in the girders in Span 1.

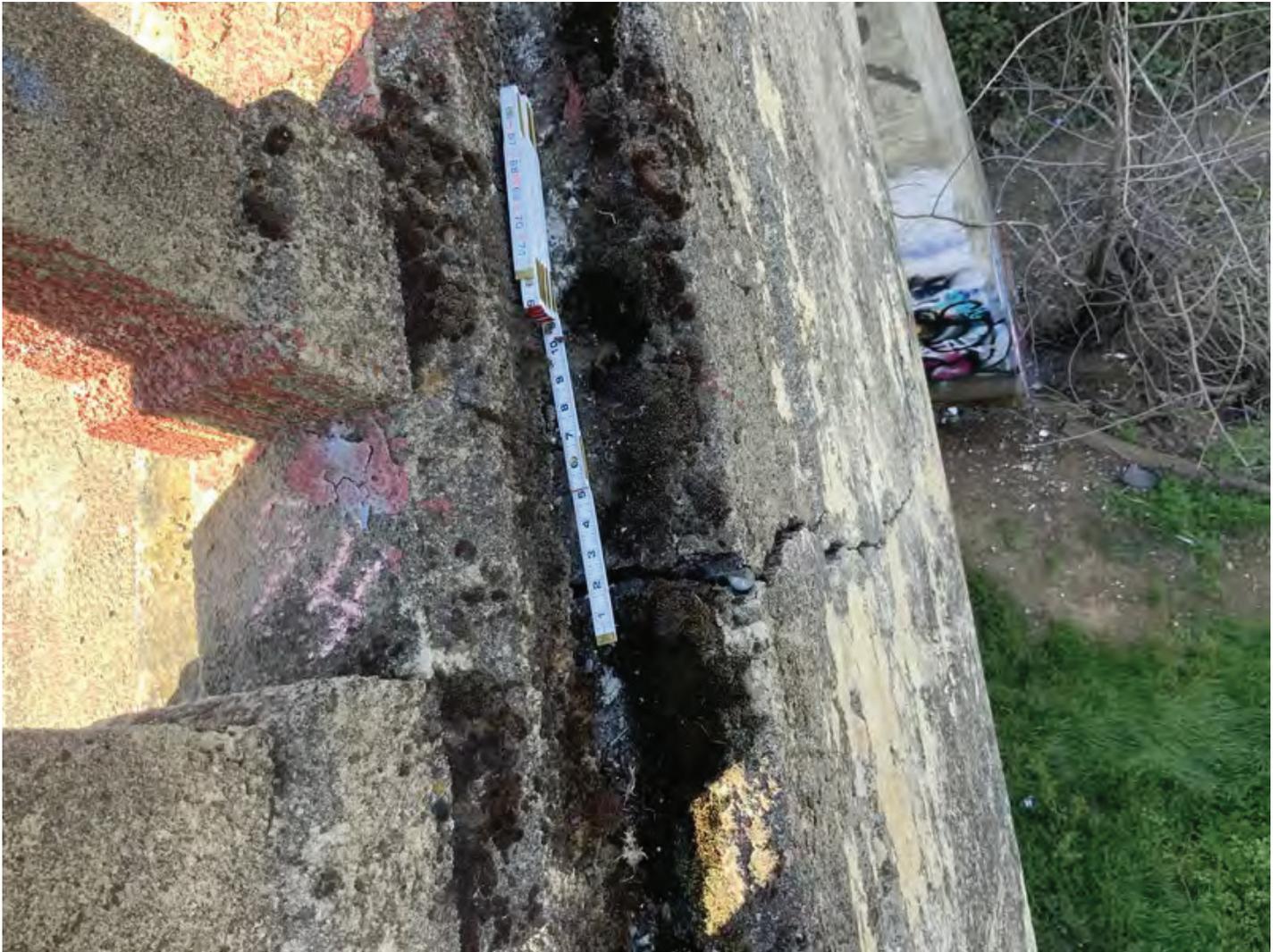


Photo #16
Vertical crack in Girder 4 in Span 1 opening to the top.



Photo #17
Spall in the left arch rib at Bent 2.



Photo #18
Spall in the left arch rib.



Photo #19
Spall in the first arch strut.



Photo #20
Exposed pile cap at Bent 2.



Photo #21
Exposed pile cap at Bent 3.



Photo #22
Spalls with exposed rebar in the soffit.