Orange County Bridge Review Summary

Dokken Engineering performed a field review of the Orange County bridge listed below in April 2017 to identify maintenance activities eligible for Caltrans' Bridge Preventive Maintenance Program (BPMP), dated December 2015, funding. Additional maintenance activities, if present, not eligible for BPMP funding were also noted. Maintenance recommendations, if noted in the most recent Caltrans Bridge Inspection Report (BIR), were confirmed.

Bridge Number: 55C0606

Bridge Name: Arroyo Trabuco **Year Built:** 1991

Facility Carried: Oso Parkway

The Arroyo Trabuco Bridge at Oso Parkway is a continuous five span cast-in-place concrete box girder with reinforced concrete open-end seat abutments supported on concrete piles.

Caltrans BIR recommendations:

- The County investigate the dripping water through bridge soffit openings, cells, and vent holes.
- BIR notes nearly 60,000 ft^2 of deck should be considered for deck treatment. However, all treatment is listed under condition state 1 and is therefore ineligible for BPMP funding.

Field Inspection Observations

- Efflorescence near each wetted area indicating water is seeping through soffit slab. Water dripping in span 1, this appears to be from a utility line in the bridge. Recommend contacting utility and have utility owner correct problem before significant damage, such as corrosion, occurs to soffit. Note, if the leaking utility is sewer water then much more corrosive. Soffit opening cover appears to be corroding (Photo 4). Note this work is not eligible for BPMP funds.
- Joint seal detached at north end. (photo 5)
- Significant bank erosion. It is unclear if the water is from weep hole drainage system or detached joint seal. Since there does not appear to be water coming from the seat, it is assumed it is from the weep holes system. Investigate source of water and repair leak before condition worsens. Note this is not eligible for BPMP funds. (Photo 6 & 7)
- Minor deck cracking, not a priority to address.

Maintenance Needs Assessment

BPMP Assessment

- Repair joint seals.
- Identify water source causing bank erosion and repair problem.

General Maintenance – Non-BPMP

- Clean out down drains.
- Deck cracks are condition state 1, so are not considered significant and are not eligible for BPMP funding.
- Have utility owner stop leaks.

Proposed BPMP Construction Costs

- Joint Seal = 104 ft * $150/LF ≈ $16,000
- Traffic Control ≈ $15,000
- Bank erosion ≈ $20,000. Difficult to estimate until water source identified
- Estimated Total Construction Cost (with engineering, mobilization and contingency) ≈ $65,000

Construction Items Not Funded by BPMP

- Bridge deck treatment (low priority due to relatively minor cracking) ≈ $200,000 (includes engineering, mobilization and contingency)
- Clean deck drains ≈ $10,000, includes traffic control and assumes pipes clogged
- Utility repair should be covered by utility owner

APPENDIX A

Photos and BIR

Photo 1:

Photo 2:

Photo 3:

Photo 4: Bridge Soffit showing efflorescence and corroded cover plate

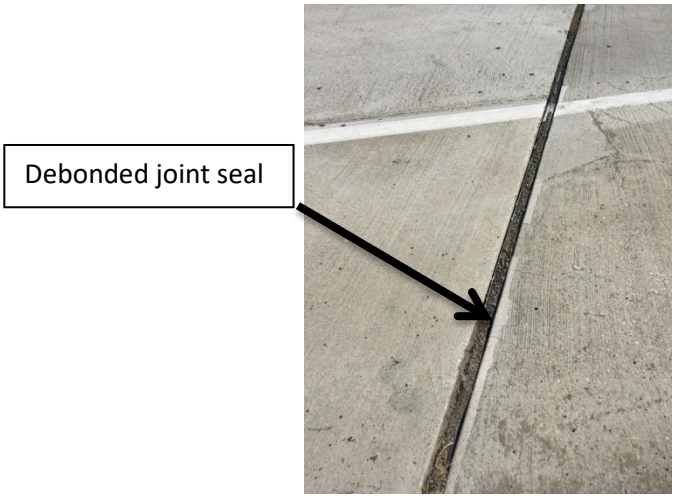

Photo 5: Detached joint seal at north end of bridge

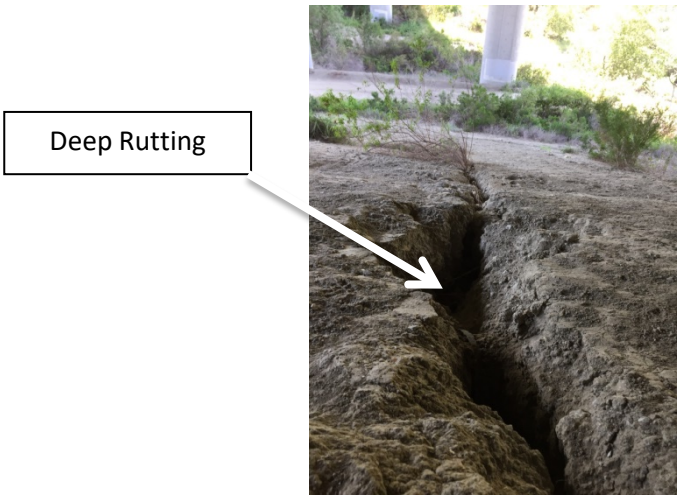

Photo 6: Rutting at abutment

Photo 7: Erosion at abutment weep hole drainage system

DEPARTMENT OF TRANSPORTATION
Structure Maintenance & Investigations

Bridge Number : 55C0606
Facility Carried: OSO PARKWAY
Location : 0.6 MI E/O FELIPE ROAD
City :
Inspection Date : 01/29/2015

Bridge Inspection Report

Inspection Type

Routine	FC	Underwater	Special	Other
X				

STRUCTURE NAME: ARROYO TRABUCO

CONSTRUCTION INFORMATION

Year Built : 1991
Year Widened: N/A
Length (m) : 202.7

Skew (degrees): 99
No. of Joints : 3
No. of Hinges : 1

Structure Description: Continuous 5 span CIP/PS concrete box girder (11 cells) with RC 2-column bents and RC open end seat abutments, all supported upon concrete piles (Abutment 1 has steel piles).

Span Configuration : (W) 45.7 m, 3 @ 36.6 m, 45.7 m (E) c/c

SAFE LOAD CAPACITY AND RATINGS

Design Live Load: MS-18+MOD OR HS-20+MOD
Inventory Rating: RF=1.00 =>32.4 metric tons Calculation Method: ASSIGNED (LFD)
Operating Rating: RF=1.67 =>54.1 metric tons Calculation Method: ASSIGNED (LFD)
Permit Rating : PPPPP
Posting Load : Type 3: Legal Type 3S2: Legal Type 3-3: Legal

DESCRIPTION ON STRUCTURE

Deck X-Section: (S) 0.3 m br, 1.5 m sw, 13.4 m, 1.2 m cu med, 13.4 m, 1.5 m sw, 0.3 m br (N)

Total Width: 31.7 m Net Width: 26.8 m No. of Lanes: 6 Speed: 55 mph
Min. Vertical Clearance: Unimpaired AC Thickness: 0.0 Inches

Rail Code: 0110

Rail Type	Location	Length (ft)	Rail Modifications
Type 26	Right/Left	1410	

DESCRIPTION UNDER STRUCTURE

Channel Description: Natural earth open wash with a cobbled streambed.

NOTICE

The bridge inspection condition assessment used for this inspection is based on the American Association of State Highway and Transportation Officials (AASHTO) Bridge Element Inspection Manual 2013 as defined in Moving Ahead for Progress in the 21st Century (MAP-21) federal law. The new element inspection methodology may result in changes to related condition and appraisal ratings on the bridge without significant physical changes at the bridge.

The element condition information contained in this report represents the current condition of the bridge based on the most recent routine and special inspections. Some of the notes presented below may be from an inspection that occurred prior to the date noted in this report. Refer to the Scope and Access section of this inspection report for a description of which portions of the bridge were inspected on this date.

INSPECTION COMMENTARY

SCOPE AND ACCESS
There is 4" deep water in span 4, all elements have been visually inspected.

There is water dripping from the soffit vent hole in south side of span # 1.

SAFE LOAD CAPACITY

INSPECTION COMMENTARY

A Load Rating Summary Sheet dated 05/27/2014 is on file for this structure. The current rating has been assigned in accordance with SM&I procedures.

ELEMENT INSPECTION RATINGS AND COMMENTARY

Elem No.	Defect /Prot	Defect	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4
16			Top Flange-RC	2	6425	sq.m	6425	0	0	0
	521		Concrete Coat.(Meth/Paint/Seal)	2	5420	sq.m	5420	0	0	0
(16) There were no significant defects noted.										
(16-521) There were no significant defects noted.										
104			Box Girder-PS Conc.	2	203	m	195	8	0	0
	1120		Efflorescence/Rust Staining	2	8		0	8	0	0
(104-1120) There are cracks with water stain in the soffit of the box girder, 2 craks in every spans.										
205			Column-RC	2	8	each	8	0	0	0
(205) There were no significant defects noted.										
215			Abutment-RC	2	88	m	88	0	0	0
(215) There were no significant defects noted.										
225			Pile-Steel	2	1	ea.	1	0	0	0
(225) 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.										
227			Pile-RC	2	1	ea.	1	0	0	0
(227) 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.										
300			Joint-Strip Seal Exp	2	80	m	80	0	0	0
(300) There were no significant defects noted.										
302			Joint-Compression Seal	2	40	m	40	0	0	0
(302) There were no significant defects noted.										
312			Bearing-Enclosed	2	2	each	2	0	0	0
(312) There were no significant defects noted.										
321			Approach Slab-RC	2	264	sq.m	264	0	0	0
(321)										

ELEMENT INSPECTION RATINGS AND COMMENTARY

Elem No.	Defect /Prot	Defect	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4
There were no significant defects noted.										
331			Railing-RC	2	404	m	404	0	0	0

(331)
There were no significant defects noted.

WORK RECOMMENDATIONS

RecDate: 02/22/2011
Action : Drainage Issue
Work By: LOCAL AGENCY
Status : PROPOSED

EstCost:
StrTarget: 2 YEARS
DistTarget:
EA:

The city should investigate the dripping water through the bridge cell.

Team Leader : Mikhael T. Zaarour

Report Author : Mikhael T. Zaarour

Inspected By : MT.Zaarour/KD.Henderson

Mikhael T. Zaarour (Registered Civil Engineer) 3/30/15 (Date)

STRUCTURE INVENTORY AND APPRAISAL REPORT

********** IDENTIFICATION **********

(1) STATE NAME- CALIFORNIA 069
(8) STRUCTURE NUMBER **55C0606**
(5) INVENTORY ROUTE(ON/UNDER)- ON 140000000
(2) HIGHWAY AGENCY DISTRICT 12
(3) COUNTY CODE 059 (4) PLACE CODE 00000
(6) FEATURE INTERSECTED- ARROYO TRABUCO
(7) FACILITY CARRIED- OSO PARKWAY
(9) LOCATION- 0.6 MI E/O FELIPE ROAD
(11) MILEPOINT/KILOMETERPOINT 0
(12) BASE HIGHWAY NETWORK- PART OF NET 1
(13) LRS INVENTORY ROUTE & SUBROUTE 000000000000
(16) LATITUDE 33 DEG 35 MIN 04.43 SEC
(17) LONGITUDE 117 DEG 38 MIN 04.21 SEC
(98) BORDER BRIDGE STATE CODE % SHARE %
(99) BORDER BRIDGE STRUCTURE NUMBER

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

(43) STRUCTURE TYPE MAIN:MATERIAL- PRSTR CONC CONT
TYPE- BOX BEAM OR GIRDER - MULTI CODE 605
(44) STRUCTURE TYPE APPR:MATERIAL- OTHER/NA
TYPE- OTHER/NA CODE 000
(45) NUMBER OF SPANS IN MAIN UNIT 5
(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 1991
(106) YEAR RECONSTRUCTED 0000
(42) TYPE OF SERVICE: ON- HIGHWAY-PEDESTRIAN 5
UNDER- WATERWAY 5
(28) LANES:ON STRUCTURE 06 UNDER STRUCTURE 00
(29) AVERAGE DAILY TRAFFIC 27000
(30) YEAR OF ADT 2013 (109) TRUCK ADT 1 %
(19) BYPASS, DETOUR LENGTH 11 KM

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

(48) LENGTH OF MAXIMUM SPAN 45.7 M
(49) STRUCTURE LENGTH 202.7 M
(50) CURB OR SIDEWALK: LEFT 1.5 M RIGHT 1.5 M
(51) BRIDGE ROADWAY WIDTH CURB TO CURB 26.8 M
(52) DECK WIDTH OUT TO OUT 31.7 M
(32) APPROACH ROADWAY WIDTH (W/SHOULDERS) 26.8 M
(33) BRIDGE MEDIAN- CLOSED NON-MOUNTABLE 3
(34) SKEW 99 DEG (35) STRUCTURE FLARED NO
(10) INVENTORY ROUTE MIN VERT CLEAR 99.99 M
(47) INVENTORY ROUTE TOTAL HORIZ CLEAR 13.4 M
(53) MIN VERT CLEAR OVER BRIDGE RDWY 99.99 M
(54) MIN VERT UNDERCLEAR REF- NOT H/RR 0.00 M
(55) MIN LAT UNDERCLEAR RT REF- NOT H/RR 0.0 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 = 85.1
STATUS
HEALTH INDEX 99.9
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- COUNTY HIGHWAY AGENCY 02
(22) OWNER- COUNTY HIGHWAY AGENCY 02
(37) HISTORICAL SIGNIFICANCE- NOT ELIGIBLE 5

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

(58) DECK 8
(59) SUPERSTRUCTURE 7
(60) SUBSTRUCTURE 8
(61) CHANNEL & CHANNEL PROTECTION 9
(62) CULVERTS N

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

(31) DESIGN LOAD- MS-18+MOD OR HS-20+MOD 6
(63) OPERATING RATING METHOD- ASSIGNED (LFD) A
(64) OPERATING RATING- 54.1
(65) INVENTORY RATING METHOD- ASSIGNED (LFD) A
(66) INVENTORY RATING- 32.4
(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 7
(68) DECK GEOMETRY 7
(69) UNDERCLEARANCES, VERTICAL & HORIZONTAL N
(71) WATER ADEQUACY 9
(72) APPROACH ROADWAY ALIGNMENT 8
(36) TRAFFIC SAFETY FEATURES 0110
(113) SCOUR CRITICAL BRIDGES 8

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

(75) TYPE OF WORK- CODE
(76) LENGTH OF STRUCTURE IMPROVEMENT M
(94) BRIDGE IMPROVEMENT COST
(95) ROADWAY IMPROVEMENT COST
(96) TOTAL PROJECT COST
(97) YEAR OF IMPROVEMENT COST ESTIMATE
(114) FUTURE ADT 56200
(115) YEAR OF FUTURE ADT 2035

********** INSPECTIONS **********

(90) INSPECTION DATE 01/15 (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)