DEPARTMENT OF TRANSPORTATION
Structure Maintenance & Investigations

**Bridge Number : 55C0130**
Facility Carried: GLASSELL STREET
Location : 0.3 MI S/O ROUTE 91 FWY
City :
Inspection Date : 07/15/2011

# Bridge Inspection Report

Inspection Type

| Routine | FC | Underwater | Special | Other |
|---|---|---|---|---|
| X | | | | |

**STRUCTURE NAME: SANTA ANA RIVER CHANNEL**

## CONSTRUCTION INFORMATION

Year Built : 1963
Year Widened: 2005
Length (m) : 293.5

Skew (degrees): 0
No. of Joints : 4
No. of Hinges : 4

Structure Description: 18 span continuous CIP RC "T" beam (8 each) supported by RC pier walls and open end RC diaphragm abutments on steel piles, except Pier 10 through Pier 18 of the east half widening which are RC column (4 each) bents on continuous RC footing and steel piles. Widen: the bridge was widened 2 CIP/RC beam (2 each) at west and east ends.

Span Configuration : (S) 12.5 m, 16 @ 16.8 m, 12.5 m (N) c/c

## LOAD CAPACITY AND RATINGS

Design Live Load: MS-18 OR HS-20
Inventory Rating: 33.5 metric tonnes Calculation Method: LOAD FACTOR
Operating Rating: 57.1 metric tonnes Calculation Method: LOAD FACTOR
Permit Rating : PPPPP
Posting Load : Type 3: Legal Type 3S2: Legal Type 3-3: Legal

## DESCRIPTION ON STRUCTURE

Deck X-Section: (W) 0.35 m br; 1.5 m sw; 9.8 m; 1.2 m cu. med.; 10.6 m; 1.5 m sw; 0.35 m br (E).

Total Width: 25.3 m Net Width: 20.4 m No. of Lanes: 4
Rail Description: (W) Type 26 (E). Rail Code : 0000
Min. Vertical Clearance: Unimpaired

## DESCRIPTION UNDER STRUCTURE

Channel Description: Natural sandy earth trapezoidal with rock slope protection through the site.

## INSPECTION COMMENTARY

CONDITION OF STRUCTURE

The compression seals are dry and teared. The compression seals were being pushed upward and there are edge spalls.

A/C has depression 40 mm at the departure between SB lanes #1 & #2 at south end.

The compression seals are dry and teared and there are edge spalls as follow:
Joint hinge #3: the compression joint seal was failed 50% at NB lanes; and the pourable joint seal was failed 100% at SB lanes.
Joint hinge #7: the compression joint seal was failed 100% at NB lanes; and the pourable joint seal was failed 100% at SB lanes.
Joint hinge #12: the compression joint seal was failed 100% at both bounds.
Joint hinge #16: the compression joint seal was partially failed.

## INSPECTION COMMENTARY

The concrete deck exhibits:
* few spalls with rebar exposed at SB lane #2 due to lack of concrete cover above PW #2; PW#3 and at span #3;
* few small spalls at the west shoulder at 2.0 m north of hinge #3; and
* at hinge #16 at SB lane #2, there is a patched spall (1000 mm X 300 mm) with A/C, it has to patch with epoxy and concrete instead of A/C.

The concrete deck exhibits (mostly at the original bridge):
* mostly transverse cracks, 2 mm wide and 150 mm spacing above the pier walls due to the negative moment; and
* transverse and map cracks, 1 mm wide and 300 mm spacing.

The soffit exhibits:
* span #1: all bays under the traffic lanes (original bridge) has several transverse cracks with heavy white efflorescence;
* span #2: all bays under the traffic lanes (original bridge) has several transverse cracks with light white efflorescence mostly at south end; and
* at spans #8 to #13 and #15 to #18: few transverse cracks with light white efflorescence; these cracks mirror the deck cracks.

The concrete girders exhibit:
* most original girders at span #2 (south end) have few minor shear cracks (2 cracks at each girder);
* 4 shear cracks at span #9 (at each end) at each original girder;
* girder 3 at span #9 has 4 spalls +/- (300 X 100 X 30) mm at west fascia;
* girder 1 at span #9 has a spall (75 X 75 X 30) mm at west fascia; and
* most original girders have few minor shear cracks at each end.

Pier walls exhibit:
Pier wall #2 has 2 moderate vertical cracks.
Pier wall #3 has one minor vertical crack.
Pier wall #10 has one moderate vertical crack at the west portion.
Pier wall #12 has one minor and one moderate vertical cracks at the westerly portion.
Pier wall #15 has one minor vertical crack at the westerly portion and one horizontal crack at the east portion of the pier wall.

CHANNEL/WATERWAY INVESTIGATION

The water in the channel was 0.9 m deep at spans 3 to 8; and 0.2 m deep at spans 11 to 16.
All substructure elements were inspected only at spans #1, #2, #16, #17 and #18; where pedestrian access is from any quadrants. Also all substructure elements were inspected at spans except spans #8 to 15; where pedestrian access is through a vehicular access at NE gate.

MISCELLANEOUS

Our office did not receive the As-built for that recent widen in 2005.

## ELEMENT INSPECTION RATINGS

| Elem No. | Element Description | Env | Total Qty | Units | Qty in each Condition State St. 1 | St. 2 | St. 3 | St. 4 | St. 5 |
|---|---|---|---|---|---|---|---|---|---|
| 12 | Concrete Deck - Bare | 2 | 5988 | sq.m. | 0 | 5988 | 0 | 0 | 0 |

| Elem No. | Element Description | Env | Total Qty | Units | Qty in each Condition State St. 1 | St. 2 | St. 3 | St. 4 | St. 5 |
|---|---|---|---|---|---|---|---|---|---|
| 110 | Reinforced Conc Open Girder/Beam | 2 | 3524 | m. | 3424 | 100 | 0 | 0 | |
| 182 | Other Type EQ Restrainer Cable | 2 | 4 | ea. | 4 | 0 | 0 | 0 | 0 |
| 210 | Reinforced Conc Pier Wall | 2 | 400 | m. | 396 | 4 | 0 | 0 | |
| 215 | Reinforced Conc Abutment | 2 | 36 | m. | 36 | 0 | 0 | 0 | 0 |
| 225 | Unpainted Steel Submerged Pile | 2 | 1 | ea. | 1 | 0 | 0 | 0 | 0 |
| 256 | Slope Protection | 2 | 4 | ea. | 4 | 0 | 0 | 0 | 0 |
| 301 | Pourable Joint Seal | 2 | 20 | m. | 0 | 20 | 0 | | |
| 302 | Compression Joint Seal | 2 | 81 | m. | 0 | 16 | 65 | | |
| 312 | Enclosed/Concealed Bearing | 2 | 4 | ea. | 4 | 0 | 0 | 0 | 0 |
| 331 | Reinforced Conc Bridge Railing | 2 | 591 | m. | 591 | 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 | 0 | 1 | 0 | 0 |

## WORK RECOMMENDATIONS

RecDate: 03/29/2007
Action : Deck-Methacrylate
Work By: LOCAL AGENCY
Status : PROPOSED
EstCost:
StrTarget: 2 YEARS
DistTarget:
EA:

The heavy cracking of the concrete deck (the original bridge deck) requires the cleaning and sealing with methacrylate. Before performing this work, it is recommended to check the deck (chaining) for potential delaminations below the deck surface. The chaining should be done by closing one bound of traffic alternately. The City should contact the ABME for scheduling the chaining.

RecDate: 03/29/2007
Action : Bridge-Misc
Work By: LOCAL AGENCY
Status : PROPOSED
EstCost:
StrTarget: 2 YEARS
DistTarget:
EA:

Level the 40 mm A/C depression at the departure between SB lanes #1 & #2 at south end.

RecDate: 01/29/2001
Action : Joints-Replace
Work By: LOCAL AGENCY
Status : PROPOSED
EstCost:
StrTarget: 2 YEARS
DistTarget:
EA:

The City should consider replacing the compression seals in the bridge deck joints. If the seals are replaced, modify the joint widths to allow for the proper thermal expansion of the bridge. Replace the deteriorated Type A joints seal as follows:
Joint hinge #3: Width of joint is 1.25 inches at 72 degrees Fahrenheit.
Joint hinge #7: Width of joint is 1.5 inches at 72 degrees Fahrenheit.
Joint hinge #12: Width of joint is 1.5 inches at 72 degrees Fahrenheit.
Joint hinge #16: Width of joint is 1.5 inches at 72 degrees Fahrenheit.

## CHANNEL X-SECTION

Side : Upstream
Measured From : Top conc rail H = 0.72 m (E)
X-Section Date: 07/15/2011

| Location | Horiz(m) | Vert(m) | Comments |
|---|---|---|---|
| Abut 1 | 0.00 | 2.90 | face of abut wall |

## CHANNEL X-SECTION

Side : Upstream

X-Section Date: 07/15/2011

Measured From : Top conc rail H = 0.72 m (E)

| Location | Horiz(m) | Vert(m) | Comments |
|---|---|---|---|
| | 3.20 | 3.43 | toe of slope south side of wall |
| | 4.00 | 3.09 | top pf wall |
| | 4.10 | 5.90 | edge of bike path |
| | 10.40 | 6.00 | edge of bike bath |
| | 12.30 | 5.55 | top of slope |
| | 12.40 | 2.15 | top of wall |
| | 12.75 | 3.40 | top of cutter north of wall |
| | 16.30 | 3.35 | top of river concrete slope |
| | 18.00 | 3.95 | top of rip rap |
| | 26.10 | 7.40 | toe of rip rap |
| | 29.50 | 7.65 | S side of pier wall 3 |
| | 29.80 | 8.25 | N side of pier wall 3 (water level 7.7m) |
| | 39.20 | 8.50 | |
| | 46.20 | 8.65 | S side of pier wall 4 |
| | 46.50 | 8.65 | N side of pier wall 4 |
| | 54.30 | 8.65 | |
| | 63.00 | 8.50 | S side of pier wall 5 |
| | 63.30 | 8.30 | N side of pier wall 5 |
| | 70.10 | 8.20 | |
| | 79.70 | 8.35 | S side of pier wall 6 |
| | 80.00 | 8.60 | N side of pier wall 6 |
| | 89.90 | 8.55 | |
| | 96.50 | 8.30 | S side of pier wall 7 |
| | 96.80 | 8.70 | N side of pier wall 7 |
| | 105.00 | 8.60 | |
| | 113.40 | 8.60 | S side of pier wall 8 |
| | 113.70 | 8.75 | N side of pier wall 8 |
| | 121.00 | 7.75 | edge of water |
| | 130.20 | 5.20 | S side of pier wall 9/ top of rip rap |
| | 130.50 | 4.75 | N side of pier wall 9/ toe of conc slope |
| | 135.00 | 3.20 | top of conc slope |
| | 140.20 | 3.65 | dirt path |
| | 147.00 | 5.75 | S side of pier wall 10 |
| | 147.30 | 5.80 | N side of pier wall 10 |
| | 149.10 | 6.15 | S edge of bike path |
| | 152.40 | 6.15 | N edge of bike path |
| | 161.60 | 7.10 | top of slope |
| | 163.70 | 8.15 | S side of pier wall 11 |
| | 164.00 | 8.20 | N side of pier wall 11 |
| | 171.60 | 8.70 | edge of water |
| | 180.40 | 8.65 | S side of pier wall 12 |

## CHANNEL X-SECTION

Side : Upstream

X-Section Date: 07/15/2011

Measured From : Top conc rail H = 0.72 m (E)

| Location | Horiz(m) | Vert(m) | Comments |
|---|---|---|---|
| | 180.70 | 8.65 | N side of pier wall 12 |
| | 191.00 | 8.75 | wet land |
| | 197.30 | 8.75 | S side of pier wall 13 |
| | 197.60 | 8.75 | N side of pier wall 13 |
| | 206.00 | 8.85 | |
| | 214.00 | 8.90 | S side of pier wall 14 |
| | 214.30 | 8.90 | N side of pier wall 14 |
| | 224.00 | 8.70 | |
| | 230.80 | 8.70 | S side of pier wall 15 |
| | 231.10 | 8.65 | N side of pier wall 15 |
| | 238.00 | 8.65 | |
| | 247.00 | 8.65 | S side of pier wall 16 |
| | 247.30 | 8.65 | N side of pier wall 16 |
| | 259.00 | 7.80 | toe of slope |
| | 264.40 | 6.65 | S side of pier wall 17 |
| | 264.70 | 6.15 | N side of pier wall 17 |
| | 271.00 | 6.30 | S edge of dirt path |
| | 277.20 | 6.15 | N edge of dirt path |
| | 281.00 | 6.85 | S side of pier wall 18 |
| | 281.30 | 6.75 | N side of pier wall 18 |
| | 285.70 | 5.30 | |
| Abut 19 | 0.00 | 2.90 | face of abut wall. |

Inspected By : MT.Zaarour/A.Shenouda

Mikhael T. Zaarour (Registered Civil Engineer)

CC: City of Orange
City of Anaheim

REGISTERED PROFESSIONAL ENGINEER
Mikhael T. Zaarour
No. 68212
09/30/2013
CIVIL
STATE OF CALIFORNIA

# STRUCTURE INVENTORY AND APPRAISAL REPORT

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

(1) STATE NAME- CALIFORNIA 069
(8) STRUCTURE NUMBER **55C0130**
(5) INVENTORY ROUTE(ON/UNDER)- ON 1500M0070
(2) HIGHWAY AGENCY DISTRICT 12
(3) COUNTY CODE 059 (4) PLACE CODE 00000
(6) FEATURE INTERSECTED- SANTA ANA RIVER CHANNEL
(7) FACILITY CARRIED- GLASSELL STREET
(9) LOCATION- 0.3 MI S/O ROUTE 91 FWY
(11) MILEPOINT/KILOMETERPOINT 0
(12) BASE HIGHWAY NETWORK- PART OF NET 1
(13) LRS INVENTORY ROUTE & SUBROUTE 000000M00700
(16) LATITUDE 33 DEG 50 MIN 38.14 SEC
(17) LONGITUDE 117 DEG 51 MIN 10.93 SEC
(98) BORDER BRIDGE STATE CODE % SHARE %
(99) BORDER BRIDGE STRUCTURE NUMBER

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

(43) STRUCTURE TYPE MAIN:MATERIAL- CONCRETE CONT
TYPE- TEE BEAM CODE 204
(44) STRUCTURE TYPE APPR:MATERIAL- OTHER/NA
TYPE- OTHER/NA CODE 000
(45) NUMBER OF SPANS IN MAIN UNIT 18
(46) NUMBER OF APPROACH SPANS 0
(107) DECK STRUCTURE TYPE- CIP CONCRETE CODE 1
(108) WEARING SURFACE / PROTECTIVE SYSTEM:
A) TYPE OF WEARING SURFACE- CONCRETE CODE 1
B) TYPE OF MEMBRANE- NONE CODE 0
C) TYPE OF DECK PROTECTION- NONE CODE 0

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

(27) YEAR BUILT 1963
(106) YEAR RECONSTRUCTED 2005
(42) TYPE OF SERVICE: ON- HIGHWAY 1
UNDER- WATERWAY 5
(28) LANES:ON STRUCTURE 04 UNDER STRUCTURE 00
(29) AVERAGE DAILY TRAFFIC 22000
(30) YEAR OF ADT 2003 (109) TRUCK ADT 1 %
(19) BYPASS, DETOUR LENGTH 5 KM

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

(48) LENGTH OF MAXIMUM SPAN 16.8 M
(49) STRUCTURE LENGTH 293.5 M
(50) CURB OR SIDEWALK: LEFT 0.0 M RIGHT 0.0 M
(51) BRIDGE ROADWAY WIDTH CURB TO CURB 20.4 M
(52) DECK WIDTH OUT TO OUT 25.3 M
(32) APPROACH ROADWAY WIDTH (W/SHOULDERS) 20.4 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 10.6 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 = 86.5
STATUS STRUCTURALLY DEFICIENT
HEALTH INDEX 94.9
PAINT CONDITION INDEX = N/A

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

(112) NBIS BRIDGE LENGTH- YES Y
(104) HIGHWAY SYSTEM- NOT ON NHS 0
(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
(60) SUBSTRUCTURE 7
(61) CHANNEL & CHANNEL PROTECTION 8
(62) CULVERTS N

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

(31) DESIGN LOAD- MS-18 OR HS-20 5
(63) OPERATING RATING METHOD- LOAD FACTOR 1
(64) OPERATING RATING- 57.1
(65) INVENTORY RATING METHOD- LOAD FACTOR 1
(66) INVENTORY RATING- 33.5
(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 6
(68) DECK GEOMETRY 9
(69) UNDERCLEARANCES, VERTICAL & HORIZONTAL N
(71) WATER ADEQUACY 9
(72) APPROACH ROADWAY ALIGNMENT 8
(36) TRAFFIC SAFETY FEATURES 0000
(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 44887
(115) YEAR OF FUTURE ADT 2029

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

(90) INSPECTION DATE 07/11 (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)