STATE OF CALIFORNIA - CALIFORNIA STATE TRANSPORTATION AGENCY

DEPARTMENT OF TRANSPORTATION
DIVISION OF MAINTENANCE
STRUCTURE MAINTENANCE & INVESTIGATIONS
100 South Main Street, 3rd Floor
LOS ANGELES, CA 90012
PHONE (213) 897-2004
FAX (213) 897-2033

Making Conservation a California Way of Life.

ICB
cc: Regina
c: Wanda 2 pgs

March 23, 2020

Mr. Shane Silsby
Director of Public Works
County of Orange
P O Box 4048
Santa Ana, CA 92702-4048

Dear Mr. Silsby:

In accordance with Title 23 of the Code of Federal Regulations (Federal Highway Act) and the National Bridge Inspection Standards (NBIS), Caltrans Structure Maintenance and Investigations performed an inspection of 4 bridges under your jurisdiction. The type of inspection is indicated on the bridge report transmittal sheet. The bridges have been rated to indicate their deficiencies, structural adequacy, safe load carrying capacity and overall general condition.

Enclosed are copies of the Bridge Inspection Reports for the structures noted on the attached transmittal sheet. These reports contain descriptions of physical changes to the structures since the last inspection, recommendations for work to be done, and additional information not recorded in the previous Bridge Reports.

Your attention is directed to the requirements of Title 23, Part 650 of the Code of Federal Regulations, where newly completed structures or any modification of existing structures shall be entered in the inventory within 90 days. Please notify this office of any newly constructed bridge or culvert within your jurisdiction, more than 20 feet measured along the center of the roadway and carrying public vehicular traffic or over a public roadway, in order that it may be entered in the inventory of bridge structures in compliance with Federal requirements.

Should you have any questions regarding the enclosed Bridge Inspection Reports, please contact Bing Wu @ (213) 897-0874.

Sincerely,

CHING CHAO
Office Chief
Structure Maintenance & Investigations -
(Investigations-South)

Enclosures

STATE OF CALIFORNIA - CALIFORNIA STATE TRANSPORTATION AGENCY

GAVIN NEWSOM, Governor

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Bridge Report Transmittal Sheet

Batch 57987

County of Orange

Bridge #	Bridge Name	Location	Inspection Date	Inspection Type	Outstanding Work	Outstanding Cost
55C0205	SANTA ANA DELHI CHANNEL	0.1 MI S/O BRISTOL STREET	02/06/2020	Routine	Y	$
55C0572	SANTA ANA DELHI CHANNEL	0.4 MI SW/O BRISTOL ST.	02/06/2020	Routine	Y	$
55C0573	REDHILL CHANNEL	0.1 MI. NW/O BROWNING AVE	02/06/2020	Routine	N	$
55C0574	REDHILL CHANNEL	0.1 MI. NW/O BROWNING AVE	02/06/2020	Routine	Y	$

4 Bridge(s) in this Transmittal

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WEB SITES:

The National Bridge Inspection Standards (NBIS) Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges, Element Level Inspection, Structure Maintenance and Investigations Manuals, Local Assistance Program Guidelines and other related information are posted on Division of Maintenance, Structure Maintenance and Investigations; Division of Local Assistance, Local Highway Bridge Program (HBP) and FHWA websites.
The websites can be accessed at:

1. "Caltrans Structure Maintenance and Investigations" http://www.dot.ca.gov/hq/structur/strmaint/
2. "Caltrans Division of Local Assistance"
http/www.dot.ca.gov/hq/LocalPrograms/hbrr99/hbrr99a.htm
3. "FHWA" http/www.fhwa.dot.gov/BRIDGE/mtguide.pdf

Inspection Type Definitions

Routine Inspection:

Routine Inspections consist of both the initial Inventory Inspection (the first inspection of the bridge that places it in the bridge inventory or when there has been a change in the configuration of the structure) and subsequent regularly scheduled inspections. The initial inspection provides all the Structural Inventory & Appraisal (SI&A) data required by federal and state regulations, determines the baseline structural conditions, lists any existing problems, and establishes the load capacity of the structure. Subsequent inspections consist of observations, measurements needed to determine the physical and functional condition of the bridge, to identify any changes from the previously recorded conditions, and verification of its load capacity. These inspections are generally conducted from the deck, ground and/or water level, and from permanent work platforms and walkways, if present. Inspection of underwater portions of the substructure is limited to observations during low-flow periods and/or probing for signs of undermining. Special equipment should be utilized in circumstances where its use provides the only practical access to areas of the structure.

Fracture Critical, Special Feature & Underwater Inspections:

Fracture Critical, Special Feature, and Underwater Inspections are up close, hands-on inspections of one or more members above or below the water level to identify any deficiencies not readily detectable using Routine Inspection procedures. These inspections generally require special equipment such as under-bridge inspection equipment, manlifts, boats, traffic control, and railroad flagging. Personnel with special skills such as divers or structural steel inspectors trained in non-destructive testing techniques may be required.

Other Inspections:

Other Inspections are conducted on damaged structures, structures that have developed specific problems, or structures suspected of developing problems. The scope of these investigations should be sufficient to determine the need for emergency load restrictions or closure of the structure, monitor a changing condition, and to assess the level of effort necessary to effect a repair.

DEPARTMENT OF TRANSPORTATION
Structure Maintenance & Investigations

Bridge Number : 55C0572
Facility Carried: IRVINE AVENUE
Location : 0.4 MI SW/O BRISTOL ST.
City :
Inspection Date : 02/06/2020
Inspection Type
Routine [X] FC [ ] Underwater [ ] Special [ ] Other [ ]

Bridge Inspection Report

STRUCTURE NAME: SANTA ANA DELHI CHANNEL

CONSTRUCTION INFORMATION

Year Built : 1988
Year Modified: N/A
Length (m) : 22.4
Skew (degrees): 38
No. of Joints : 0
No. of Hinges : 0

Structure Description: Triple 18 ft x 15 ft x 150 ft long RC box culvert under about 5 ft of fill and AC surfacing.

Span Configuration : (W) 3 @ 18.00 ft (E) clear, normal

SAFE LOAD CAPACITY AND RATINGS

Design Live Load: UNKNOWN
Inventory Rating: RF=1.00 =>32.4 metric tons Calculation Method: FIELD EVAL/ENG JUDGMENT
Operating Rating: RF=1.67 =>54.1 metric tons Calculation Method: FIELD EVAL/ENG JUDGMENT
Permit Rating : PPPPP
Posting Load : Type 3: Legal Type 3S2: Legal Type 3-3: Legal

DESCRIPTION ON STRUCTURE

Deck X-Section: (S) 1.00 ft br, 9.00 ft sw, 38.00 ft, 12 ft med curb, 38.00 ft, 9.00 ft sw, 1.00 ft br (N)

Total Width: 33.0 m Net Width: 30.3 m No. of Lanes: 6 Speed: 50 mph
Min. Vertical Clearance: Unimpaired Overlay Thickness: 0.0 inches
Rail Code: 0000

DESCRIPTION UNDER STRUCTURE

Channel Description: RC rectangular.

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

A routine inspection was performed by Y. Chen and P. Piratheepan. The conditions of AC pavement surface and rails on the top of the bridge were inspected by walking along the sidewalks. The conditions of culvert cells were inspected by walking through each cell. At the time of inspection, the water in the channel was about 5 inch through a small ditch 6 ft wide in the middle of the channel. Access to the channel was from the ramp at northeastern corner of the bridge, hip waders were used to wade through the water.

CULVERT

INSPECTION COMMENTARY

There are a couple of noticeable concrete spalls near and related to the culvert at the following locations:
a concrete nose wall spall at the northern end of Wall 3, 12 inch x 12 inch x 4 inch (Photo Number 11),
a wing wall patch failure near the southeastern corner of the culvert, 8 ft x 2 ft x 1 inch (Photo Number 12).

SAFE LOAD CAPACITY

A revised assigned load rating has been performed on this structure by SMI Ratings Branch based on Section 5.10 of the SM&I Inspection Procedure Manual and a Load Rating Summary Sheet (LRSS) dated on 09/20/2018 is in file. While this report does not include a check of that analysis, it does verify that the structural conditions observed during this inspection are consistent with those assumed in that analysis.

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
241			Culvert-RC	2	138	m	125	13	0	0
	1080		Delamination/Spall/Patched Area	2	1		0	1	0	0
	1120		Efflorescence/Rust Staining	2	6		0	6	0	0
	1130		Cracking (RC and Other)	2	6		0	6	0	0

(241-1080)
There are a couple of concrete spalls on the south acute-angle end of Wall 2, up to 12 inch H x 4 inch W x 2 inch D each within the lower half height of the wall (Photo Number 12).

(241-1120)
White efflorescence deposits and/or brown stains were observed at a few locations in the culvert cells: at the expansion joints especially near the wall and top slab soffit conjuction locations (Photo Number 5); on the soffit near the northern edge of the east cell (Photo Number 4); on the soffit of cells surrounding thin longitudinal cracks.

(241-1130)
There are 0.02 to 0.04-inch wide vertical cracks in the walls as follows: 1 crack in Wall 1, 3 cracks in Wall 3, and 6 cracks in Wall 3 (Photo Number 6).

331			Railing-RC	2	45	m	45	0	0	0

(331)
There were no significant defects noted.

WORK RECOMMENDATIONS

RecDate: 02/07/2018
Action : Sub-Epoxy Inject
Work By: LOCAL AGENCY
Status : PROPOSED

EstCost:
StrTarget: 3 YEARS
DistTarget:
EA:

Seal the cracks on culvert walls and cell soffits by epoxy injection.

Team Leader : Young Chen

Report Author : Young Chen

Inspected By : Y.Chen/P.Piratheepan

Y.Chen 3/16/2020

Young Chen (Registered Civil Engineer) (Date)

STRUCTURE INVENTORY AND APPRAISAL REPORT

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

(1) STATE NAME- CALIFORNIA 069
(8) STRUCTURE NUMBER 55C0572
(5) INVENTORY ROUTE(ON/UNDER)- ON 140000000
(2) HIGHWAY AGENCY DISTRICT 12
(3) COUNTY CODE 059 (4) PLACE CODE 00000
(6) FEATURE INTERSECTED- SANTA ANA DELHI CHANNEL
(7) FACILITY CARRIED- IRVINE AVENUE
(9) LOCATION- 0.4 MI SW/O BRISTOL ST.
(11) MILEPOINT/KILOMETERPOINT 0
(12) BASE HIGHWAY NETWORK- NOT ON NET 0
(13) LRS INVENTORY ROUTE & SUBROUTE
(16) LATITUDE 33 DEG 39 MIN 35.05 SEC
(17) LONGITUDE 117 DEG 52 MIN 54.13 SEC
(98) BORDER BRIDGE STATE CODE % SHARE %
(99) BORDER BRIDGE STRUCTURE NUMBER

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

(43) STRUCTURE TYPE MAIN:MATERIAL- CONCRETE
TYPE- CULVERT CODE 119
(44) STRUCTURE TYPE APPR:MATERIAL- OTHER/NA
TYPE- OTHER/NA CODE 000
(45) NUMBER OF SPANS IN MAIN UNIT 3
(46) NUMBER OF APPROACH SPANS 0
(107) DECK STRUCTURE TYPE- NOT APPLICABLE CODE N
(108) WEARING SURFACE / PROTECTIVE SYSTEM:
A) TYPE OF WEARING SURFACE- NOT APPLICABLE CODE N
B) TYPE OF MEMBRANE- NOT APPLICABLE CODE N
C) TYPE OF DECK PROTECTION- NOT APPLICABLE CODE N

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

(27) YEAR BUILT 1988
(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 18290
(30) YEAR OF ADT 2010 (109) TRUCK ADT 1 %
(19) BYPASS, DETOUR LENGTH 2 KM

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

(48) LENGTH OF MAXIMUM SPAN 7.4 M
(49) STRUCTURE LENGTH 22.4 M
(50) CURB OR SIDEWALK: LEFT 2.7 M RIGHT 2.7 M
(51) BRIDGE ROADWAY WIDTH CURB TO CURB 30.3 M
(52) DECK WIDTH OUT TO OUT 33.0 M
(32) APPROACH ROADWAY WIDTH (W/SHOULDERS) 30.3 M
(33) BRIDGE MEDIAN- CLOSED (NO BARRIER) 2
(34) SKEW 38 DEG (35) STRUCTURE FLARED NO
(10) INVENTORY ROUTE MIN VERT CLEAR 99.99 M
(47) INVENTORY ROUTE TOTAL HORIZ CLEAR 30.3 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 = 95.3

PAINT CONDITION INDEX = N/A

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

(112) NBIS BRIDGE LENGTH- YES Y
(104) HIGHWAY SYSTEM- NOT ON NHS 0
(26) FUNCTIONAL CLASS- MINOR ARTERIAL URBAN 16
(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 N
(59) SUPERSTRUCTURE N
(60) SUBSTRUCTURE N
(61) CHANNEL & CHANNEL PROTECTION 9
(62) CULVERTS 7

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

(31) DESIGN LOAD- UNKNOWN 0
(63) OPERATING RATING METHOD- FIELD EVAL/ENG JUD 0
(64) OPERATING RATING- 54.1
(65) INVENTORY RATING METHOD- FIELD EVAL/ENG JUD 0
(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 9
(69) UNDERCLEARANCES, VERTICAL & HORIZONTAL N
(71) WATER ADEQUACY 9
(72) APPROACH ROADWAY ALIGNMENT 7
(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 27543
(115) YEAR OF FUTURE ADT 2042

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

(90) INSPECTION DATE 02/20 (91) FREQUENCY 48 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)

SANTA ANA DELHI CHANNEL

0.4 MI SW/O BRISTOL ST.

02/06/2020 [AAAI]

55C0572

100 - PHOTO> Routine-Roadway View

Photo No. 1

ROADWAY VIEW LOOKING EAST

101 - PHOTO> Routine-Elevation View

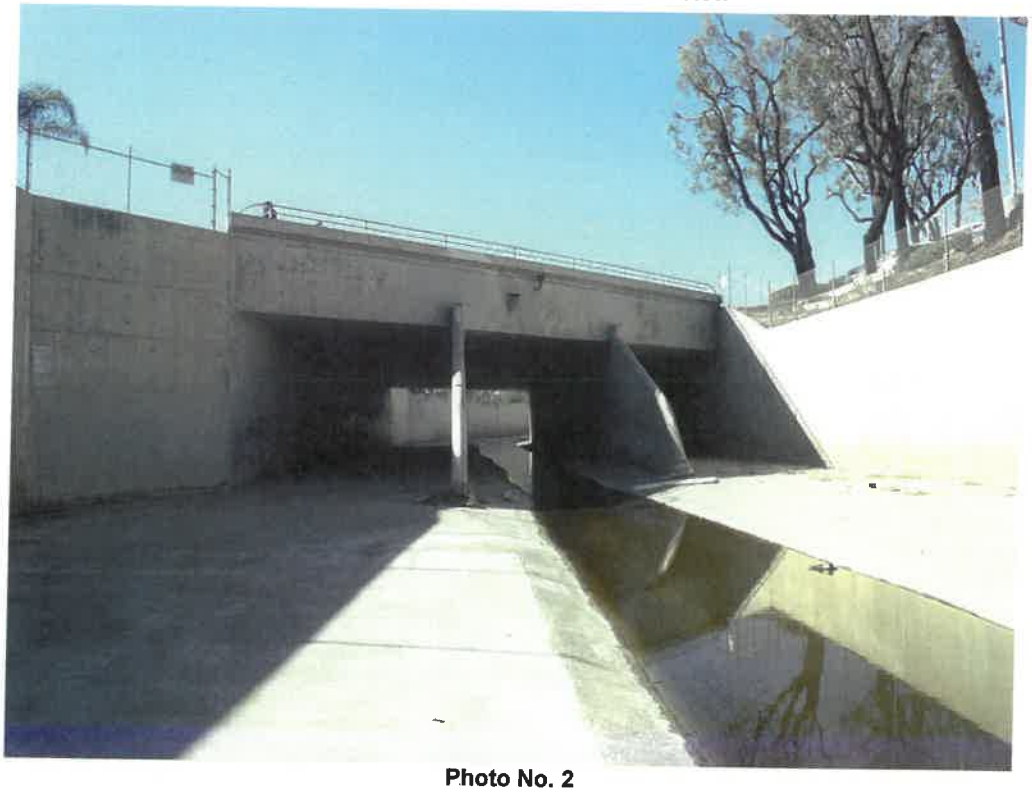

Photo No. 2

SIDE VIEW LOOKING SOUTHWEST

SANTA ANA DELHI CHANNEL

0.4 MI SW/O BRISTOL ST. 02/06/2020 [AAAI] 55C0572

135 - PHOTO> Routine-Underside View

Photo No. 3

UNDER VIEW IN THE EAST CELL, LOOKING SOUTHWEST

110 - PHOTO> Super-Misc

Photo No. 4

MINOR EFFLORESCENCE DEPOSITS ON THE TOP SLAB SOFFIT IN THE NORTHERN SIDE OF EAST CELL

SANTA ANA DELHI CHANNEL

0.4 MI SW/O BRISTOL ST. 02/06/2020 [AAAI] 55C0572

110 - PHOTO> Super-Misc

Photo No. 5

TYPICAL EFFLORESCENC DEPOSITS AT AN EXPANSION JOINT

113 - PHOTO> Sub-Damage/Deterioration

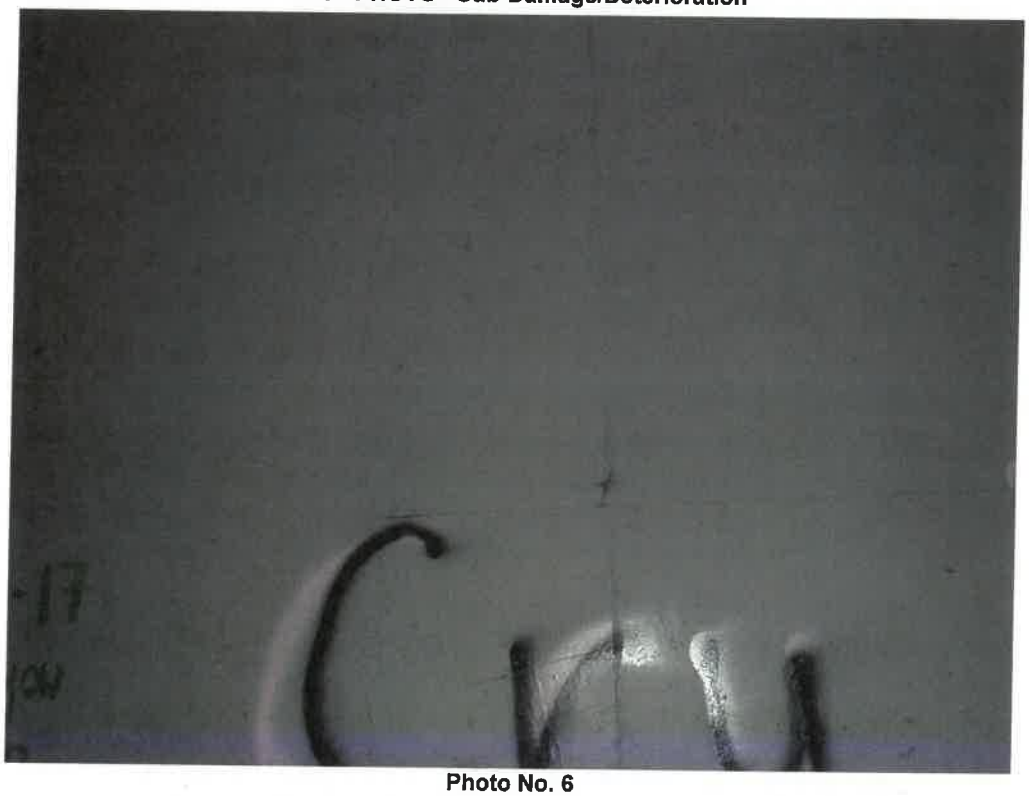

Photo No. 6

TYPICAL VERTICAL CRACKS ON THE MIDDLE PARTITION WALLS

SANTA ANA DELHI CHANNEL

0.4 MI SW/O BRISTOL ST. 02/06/2020 [AAAI] 55C0572

135 - PHOTO> Routine-Underside View

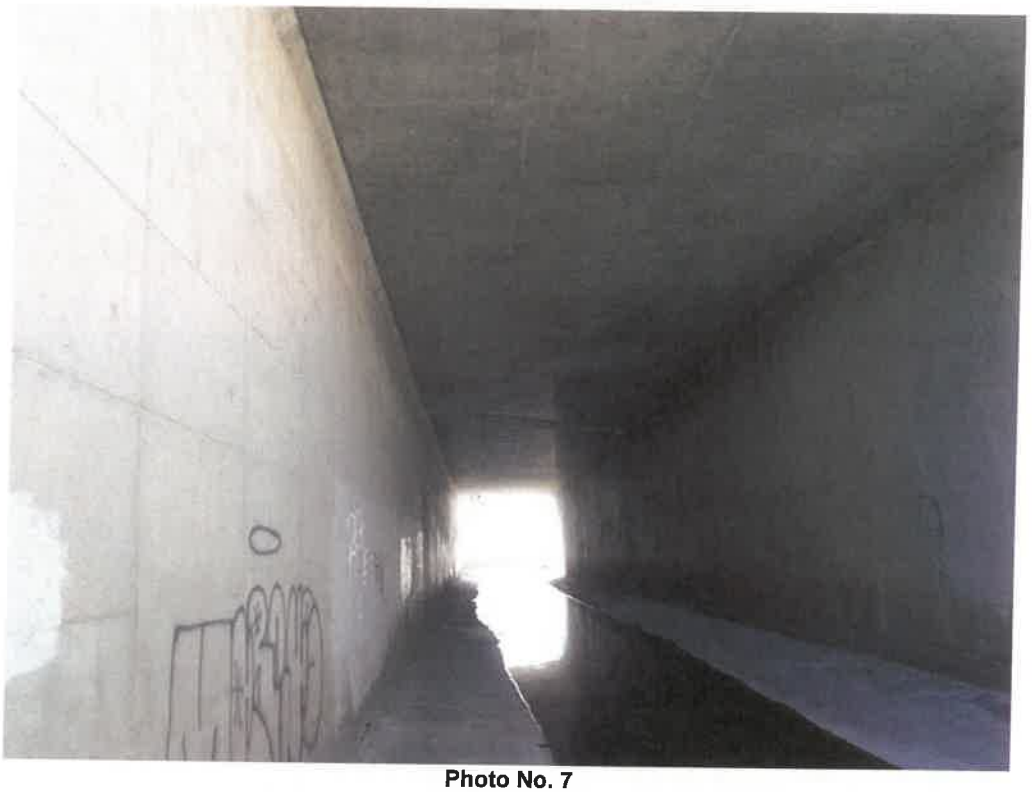

Photo No. 7

UNDER VIEW IN THE MIDDLE CELL, LOOKING SOUTHWEST

135 - PHOTO> Routine-Underside View

Photo No. 8

UNDER VIEW IN THE WEST CELL, LOOKING SOUTHWEST

SANTA ANA DELHI CHANNEL

0.4 MI SW/O BRISTOL ST. 02/06/2020 [AAAI] 55C0572

101 - PHOTO> Routine-Elevation View

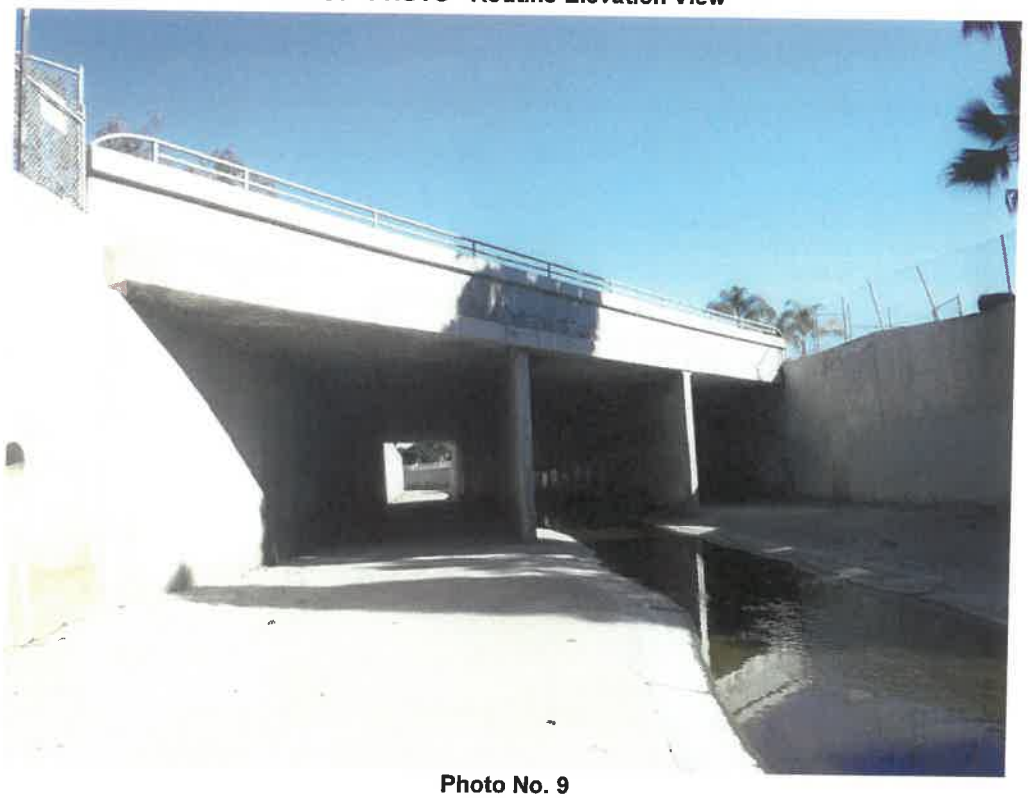

Photo No. 9
SIDE VIEW LOOKING NORTHEAST

133 - PHOTO> Unclassified

Photo No. 10
A SPALL DUE TO PATCH FAILURE ON THE NORTH CHANNEL WALL NEAR THE EAST SIDE OF THE CULVERT

SANTA ANA DELHI CHANNEL

0.4 MI SW/O BRISTOL ST. 02/06/2020 [AAAI] 55C0572

133 - PHOTO> Unclassified

Photo No. 11

A NOSE WALL BOTTOM SPALL AT WALL 3 BETWEEN THE MIDDLE AND EAST CELLS

113 - PHOTO> Sub-Damage/Deterioration

Photo No. 12

THE LOWER PORTION WALL 2 SOUTH END SPALL