

2017 UNDERWATER BRIDGE INSPECTION REPORT



BRIDGE # 88699 CR 877 over LESTER RIVER

DISTRICT: District 1

COUNTY: St. Louis

CITY/TOWNSHIP: GNESEN

STATE: Minnesota

Date of Inspection: 09/15/2016

Equipment Used:

Owner: County Highway Agency

Inspected By: Parker, Marc

Report Written By: Marc Parker

Report Reviewed By:

Final Report Date:



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UNDERWATER INSPECTION

REPORT SUMMARY

The substructure inspected at Structure No. 88699, a concrete box culvert, was found to be in good condition with no defects of structural significance below water. A band of light scaling was observed around the waterline along the length of the culvert. The apron was exposed at both the downstream and upstream openings with a maximum vertical toe exposure of 0.3 feet.

INSPECTION FINDINGS

- (A) The upstream channel bottom material consisted of 6 inch diameter cobblestones and smaller gravel.
- (B) The downstream channel bottom material consisted of soft silt with up to 2 feet of probe rod penetration.
- (C) A band of light scaling was observed around the waterline along the length of the culvert walls and floor with a typical penetration of 1/16 inch and a maximum penetration of 1/8 inch. Random areas of poor consolidation accounting for less than 5 percent of the surface area were present along the haunches and the ceiling.
- (D) The concrete apron at the upstream opening of the culvert was partially exposed for the culvert width with maximum vertical exposure of 0.3 feet.
- (E) The concrete apron at the downstream opening of the culvert was partially exposed for the west half of the barrel with maximum vertical exposure of 0.3 feet.

RECOMMENDATIONS

- (A) Reinspect the submerged substructure units at the normal maximum (NBIS) interval of sixty (60) months.

Contractor: Collins Engineers, Inc.

Contractor Job Number: 9687

UNDERWATER INSPECTION

1. BRIDGE DATA

Bridge #: 88699
Feature Intersected: LESTER RIVER
Facility Carried: CR 877
District: District 1
County: 069 - St. Louis
Bridge Description:

The structure consists of a precast concrete box culvert (12 foot wide opening).

2. INSPECTION DATA

Professional Engineer/Team Leader: Marc Parker
Inspection Diver: Marc Parker
Date of Underwater Inspection: 09/15/2016
Weather Conditions: Overcast, 60°F
Underwater Visibility (feet): 2.0 feet
Waterway Velocity (ft/sec): Negligible

3. SUBSTRUCTURE INSPECTION DATA

Substructure(s) Inspected: Culvert.
General Shape:
12 foot wide precast concrete box culvert.

Maximum Water Depth at Substructure(s) Inspected (feet): 3.9 feet

4. WATERLINE DATUM

Water Level Reference: The top of the upstream headwall.
Waterline Elevation (feet): 96.7 feet
Description: The waterline was located approximately 3.3 feet below the reference.

5. NBIS CODING INFORMATION

(Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code:
Item 61: Channel and Channel Protection: Code: 7
Item 62: Culvert: Code: 6
Item 92B: Underwater Inspection: Code: Y 48 09/2016

Item 113: Scour Critical Bridge:

Code: E

Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

Yes

No

(Mark your selection with an X)

6. STRUCTURAL ELEMENT CONDITION RATING

ELEM #	Element Description	Quantity	Unit	Conditions			
				CS1	CS2	CS3	CS4
241	Concrete Culvert	39	LF		39		
870	Culvert End Treatment	2	EA		2		
885	Scour	1	EA	1			

UNDERWATER INSPECTION

INSPECTION PROCEDURES

The routine underwater inspection of Bridge 88699 (C.R. 877 over Lester River) was completed on September 15, 2016. The underwater inspection was conducted from shore. The inspection was conducted by a team consisting of a Professional Engineer Diver with a valid MnDOT Team Leader certification, a backup diver and dive tender. Due to waterway conditions at the time of the inspection, the inspection could be accomplished by wading in accordance with OSHA regulations. Channel bottom profiles were taken along the upstream and downstream openings to determine the presence, location and area of scour.

The bridge element inspected was the precast concrete box culvert. Inspection procedures followed FHWA guidance and the MnDOT Bridge and Structure Inspection Program Manual with channel bottom probing to search for foundations. The maximum routine underwater inspection frequency is recommended to remain at 60 months based on those findings and risk factors. Also, inspection procedures should continue to follow the above approach and standard guidance with 100% Level I and 10% Level II intensity efforts.

Minnesota Structure Inventory Report

Bridge ID: 88699

CR 877 over LESTER RIVER

Date: 02/02/2017

+ GENERAL +	+ ROADWAY +	+ INSPECTION +																				
Agency Br. No. 61 Crew District 01 Maint. Area County 069 - St. Louis City Township 69031 - GNESEN Desc. Loc. 0.2 MI W OF JCT CR675 Sect., Twp., Range 27 - 052N - 14W Latitude 46 ° 57 ' 9.60 " Longitude 92 ° 5 ' 44.09 " Custodian 02 - County Highway Agency Owner 02 - County Highway Agency BMU Agreement Year Built 1938 MN Year Reconstructed FHWA Year Reconstructed MN Temporary Status Bridge Plan Location 3 - COUNTY Date Opened to Traffic On - Off System 0 - OFF Legislative District 06A Potential ABC 2 - N/A	Bridge Match ID (TIS) 0 Roadway O/U Key Route On Structure Route Sys 07 - CNTY Number 877 Roadway Name or Description CR 877 Level of Service 1 - MAINLINE Roadway Type 2 - 2-way traffic Control Section (TH Only) Reference Point 000+00.760 Detour Length 4.0 mi. Lanes ON 2 UNDER 0 ADT 145 YEAR 2003 HCA DT ADTT % Functional Class 09 - Rural - Local	Userkey 109 Structurally Deficient N Functionally Obsolete N Sufficiency Rating 86.8 Routine Inspection Date 09/27/2016 Routine Inspection Frequency 48 Inspector Name Parker, Marc Status A - Open																				
		+ NBI CONDITION RATINGS +																				
		Deck N Unsound Deck % Superstructure N Substructure N Channel 6 Culvert 6																				
		+ NBI APPRAISAL RATINGS +																				
		Structure Evaluation 6 Deck Geometry N Underclearances N Waterway Adequacy 8 Approach Alignment 8																				
		+ SAFETY FEATURES +																				
		Bridge Railing N - NOT REQUIRED GR Transition N - NOT REQUIRED Appr. Guardrail 0 - SUBSTANDARD GR Termini 0 - SUBSTANDARD																				
		+ IN DEPTH INSP. +																				
		<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;"></th> <th style="width: 10%; text-align: center;">Y/N</th> <th style="width: 15%; text-align: center;">Freq</th> <th style="width: 15%; text-align: center;">Date</th> </tr> </thead> <tbody> <tr> <td>Frac. Critical</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Underwater</td> <td></td> <td style="text-align: center;">60</td> <td style="text-align: center;">09/15/2016</td> </tr> <tr> <td>Pinned Asbly.</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Spec. Feat.</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		Y/N	Freq	Date	Frac. Critical				Underwater		60	09/15/2016	Pinned Asbly.				Spec. Feat.			
	Y/N	Freq	Date																			
Frac. Critical																						
Underwater		60	09/15/2016																			
Pinned Asbly.																						
Spec. Feat.																						
		+ WATERWAY +																				
		Drainage Area (sq. mi.) Waterway Opening (sf.) 60 Navigation Control 0 - No nav. control on Pier Protection - Nav. Clr. (ft.) Vert. 0.0 Horiz. 0.0 Nav. Vert. Lift Bridge Clear. (ft.) MN Scour Code E - CULVERT Year																				
		+ CAPACITY RATINGS +																				
		Design Load 0 - Other/Unknown Operating Rating 1 - H TRUCK 18.0 Inventory Rating 1 - H TRUCK 13.0 Posting VEH: SEMI: DBL: Rating Date 2/1/1991 Overweight Permit Codes A N - N/A B N - N/A C N - N/A																				
+ STRUCTURE +	+ RDWY DIMENSIONS +																					
Service On 1 - Highway Service Under 5 - Waterway Main Span Type 1 - Concrete Main Span Design 13 - Box Culvert Main Span Detail Appr. Span Type Appr. Span Design Appr. Span Detail Skew 0 Culvert Type W125 Barrel Length 38 Cantilever ID Number of Spans MAIN: 1 APPR: 0 TOTAL: Main Span Length 12.0 ft. Structure Length 13.8 ft. Deck Width (Out-to-Out) 0.0 ft. Deck Material N - Not Applicable Wear Surf Type 6 - Bituminous Wear Surf Install Year Wear Course/Fill Depth 4.00 ft. Deck Membrane N - Not Applicable (applies Deck Rebars N - Not Applicable (no deck) Deck Rebars Install Year Structure Area (Out-to-Out) 0 sq. ft. Roadway Area (Curb-to-Curb) sq. ft. Sidewalk Width 50A. Lt 0.00 ft. 50B. Rt 0.00 ft. Curb Height Lt 0.00 ft. Rt 0.00 ft. Rail Type Lt NN Rt NN	If Divided NB-EB SB-WB Roadway Width 28.00 ft. ft. Vertical Clearance ft. ft. Max. Vert. Clear. ft. ft. Horizontal Clear. ft. ft. Lateral Clearance ft. ft. Appr. Surface Width 26.0 ft. Bridge Roadway Width 0.0 ft. Median Width On Bridge ft.																					
		+ MISC. BRIDGE DATA +																				
		Structure Flared 0 - No flare Parallel Structure N - No parallel structure Field Conn. ID Abutment Foundation (Material/Type) N - N/A Pier Foundation (Material/Type) N - N/A Historic Status 5 - Not eligible																				
		+ PAINT +																				
		Year Painted Unsound Paint % Painted Area sq. ft. Primer Type Finish Type																				
		+ BRIDGE SIGNS +																				
		Posted Load 0 - Not Required Traffic 0 - Not Required Horizontal 1 - Object Markers Vertical N - Not Applicable																				

MINNESOTA BRIDGE INSPECTION REPORT

02/03/2017

BRIDGE 88699 CR 877 OVER LESTER RIVER

County: St. Louis	Location: 0.2 MI W OF JCT CR675	Length: 13.8 ft.
City:	Route: 07 - CNTY 877 Ref. Pt.: 000+00.760	Deck Width: 0.0 ft.
Township: 69031 - GNESEN	Control Section:	Rdwy. Area/ Pct. Unsnd: sq. ft. / %
Section: 27 Township: 052N Range: 14W Maint. Area:		Paint Area/ Pct. Unsnd: sq. ft. / %
Span Type: 1 - Concrete 19 - Culvert (includes List: frame culverts)	Local Agency Bridge Nbr.: 61	Culvert: W125
NBI Deck: N Super: N Sub: N Chan: 6 Culv: 6		Postings:
	Open, Posted, Closed: A - Open	
	MN Scour Code: E - CULVERT	

Appraisal Ratings - Approach: 8	Waterway: 8	Unofficial Structurally Deficient	N
Required Bridge Signs - Load Posting: 0 - Not Required	Traffic: 0 - Not Required	Unofficial Functionally Obsolete	N
Horizontal: 1 - Object Markers	Vertical: N - Not Applicable	Unofficial Sufficiency Rating	86.8

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
241	Reinforced Concrete Culvert	Underwater	02/02/2017	39 LF	0	39	0	0
		Routine	09/27/2016	39 LF	0	39	0	0
Notes: [2016] 1' of freeboard in culvert. Unable to walk through culvert. [2014] Crack in each wall with leaching about 13' in from south end. Moderate scale throughout wetted perimeter. [2013] Water too high. MINOR CRACKS & LEACHING.								
800	Critical Deficiencies or Safety Hazards	Underwater	02/02/2017	1 EA	1	0	0	0
		Routine	09/27/2016	1 EA	1	0	0	0
Notes: [2016-2013] No critical deficiencies or safety hazards found during this inspection.								
870	Culvert End Treatment	Underwater	02/02/2017	2 EA	0	2	0	0
		Routine	09/27/2016	2 EA	0	2	0	0
Notes: [2016] 1' of freeboard in culvert. Unable to see most of wings. [2014] Moderate scale along wetted perimeter. [2013] No change. VERTICAL CRACKS IN CENTER.								
871	Roadway Over Culvert	Underwater	02/02/2017	1 EA	0	0	1	0
		Routine	09/27/2016	1 EA	0	0	1	0
Notes: [2016] Significant settlement along edges of culvert increasing traffic impact on bridge. Settlement is worse in east bound lane. [2014-2013] Approaches settling around barrel. Many cracks. Bituminous.								
885	Scour	Underwater	02/02/2017	1 EA	1	0	0	0
891	Other Bridge Signing	Underwater	02/02/2017	1 EA	0	1	0	0
		Routine	09/27/2016	1 EA	0	1	0	0
Notes: [2016] SW culvert marker leaning away from roadway and slightly twisted. [2014-2013] No change. 4 REFLECTORS.								
892	Slopes & Slope Protection	Underwater	02/02/2017	1 EA	0	1	0	0
		Routine	09/27/2016	1 EA	0	1	0	0
Notes: [2016-2013] Moderate erosion. Established vegetation.								

BRIDGE 88699 CR 877 OVER LESTER RIVER

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
894	Deck & Approach Drainage	Underwater	02/02/2017	1 EA	0	1	0	0
		Routine	09/27/2016	1 EA	0	1	0	0
Notes: [2016] Shoulder washing in SW. [2014-2013] No change. WASHED OUT DITCHES ALONG ROAD.								

900	Protected Species	Underwater	02/02/2017	1 EA	1	0	0	0
		Routine	09/27/2016	1 EA	1	0	0	0
Notes: [2016] No evidence of protected species present.								

General Notes: SLC District 2
Inspected by: [2016] CG : [2014] CG, BH : [2013] JRS, JDO
No Guardrail.

58. Deck NBI:

36A. Brdg Railings NBI:

36B. Transitions NBI:

36C. Appr Guardrail NBI: Culvert headwall is inside of 20' recovery (Minnesota rule 8820.9920) for ADT 50-149 and roadway inslopes steeper than 1:4 inside of recovery area.

36D. Appr Guardrail Terminal NBI: Culvert headwall is inside of 20' recovery (Minnesota rule 8820.9920) for ADT 50-149 and roadway inslopes steeper than 1:4 inside of recovery area.

59. Superstructure NBI:

60. Substructure NBI:

61. Channel NBI: [2016 U/W] Minor apron toe exposure up to 0.3 feet at both the downstream and upstream openings.
[2016] Minor bank damage due to beaver activity. Water regularly high due to frequent beaver dams in the area.

62. Culvert NBI: [2016] 1' of freeboard in culvert. Unable to walk through culvert.
[2014] Crack in each wall with leaching about 13' in from south end. Moderate scale throughout wetted perimeter.

71. Waterway Adeq NBI: [2016] Roadway to the east is lower then roadway over culvert and would over top first.
[2014] 2.5' of freeboard in culvert plus 4' of fill.

72. Appr Roadway Alignment NBI: [2016-2014] No sight distance issues or speed reduction required.

Inspector's Signature

Reviewer's Signature

Pictures



Photo 1 - Upstream Opening, Looking South

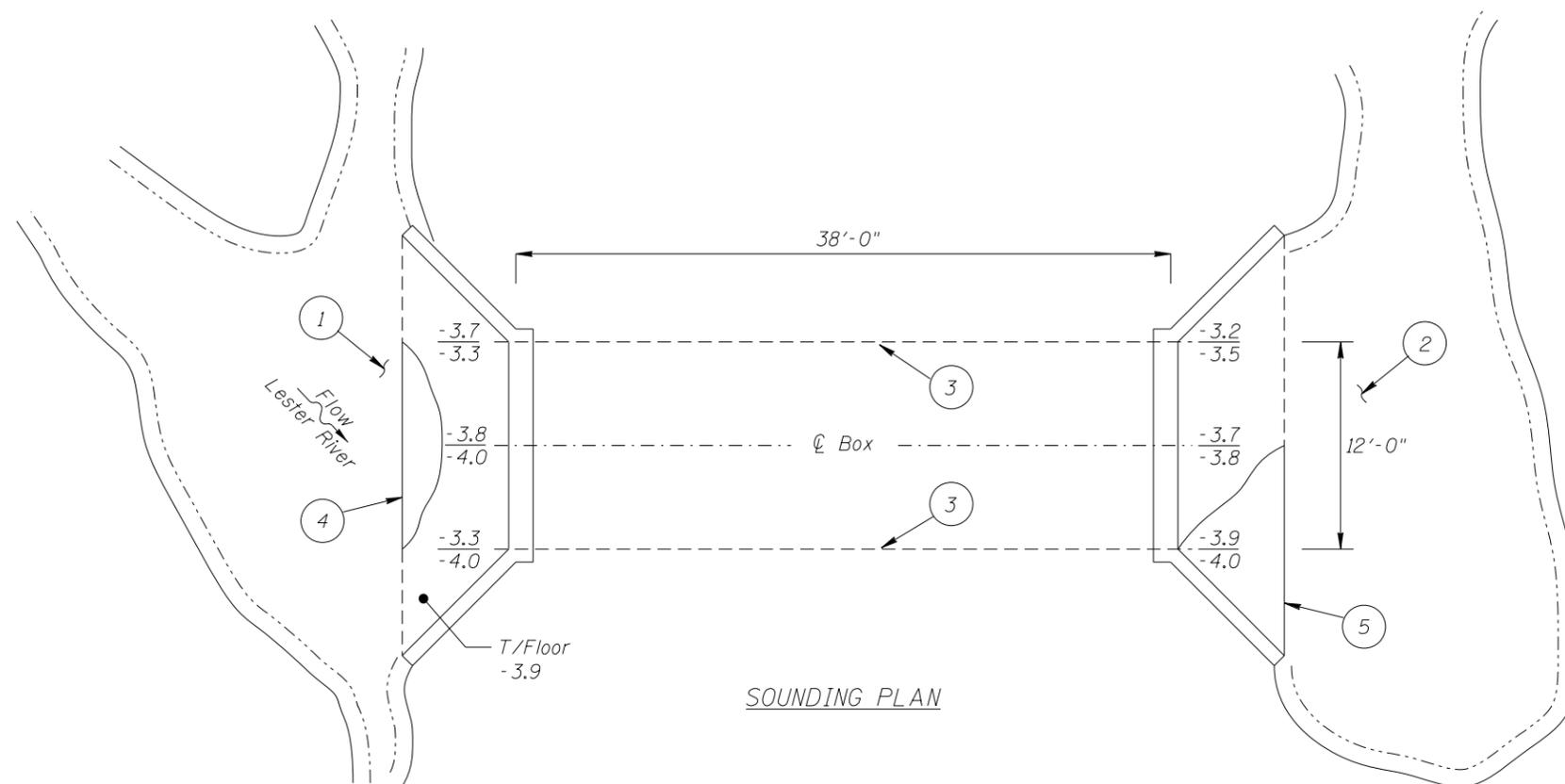


Photo 2 - Downstream Opening, Looking Northwest

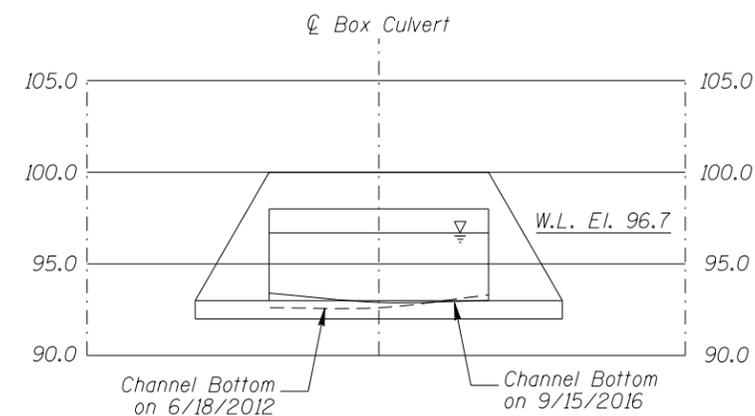
Pictures



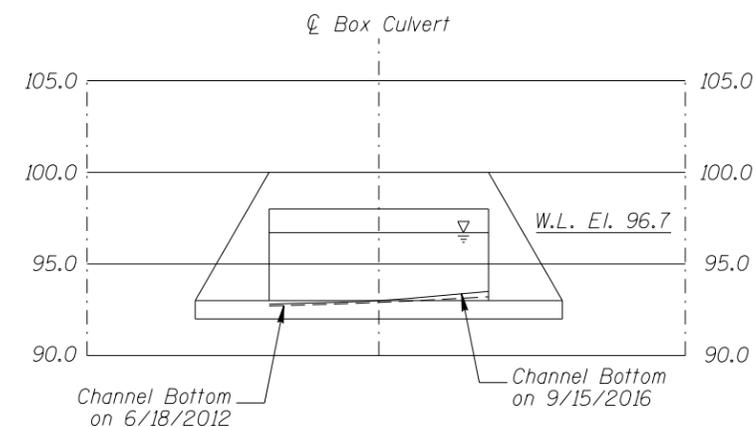
Photo 3 - Typical Concrete Condition at Waterline, Looking West



SOUNDING PLAN



UPSTREAM OPENING PROFILE



DOWNSTREAM OPENING PROFILE

GENERAL NOTES:

1. Concrete Box Culvert was inspected underwater.
2. At the time of inspection, on September 15, 2016, the waterline was located approximately 3.3 feet below the top of upstream headwall. Since insufficient elevation information was available, a reference elevation of 100.0 was assumed. This corresponds to a waterline elevation of 96.7.
3. The concrete throughout the culvert ceiling was sound with no significant structural defects.
4. Soundings indicate the water depth at the time of inspection and are measured in feet.

INSPECTION NOTES:

1. The upstream channel bottom material consisted of 6 inch diameter cobblestones and smaller gravel.
2. The downstream channel bottom material consisted of soft silt with up to 2 feet of probe rod penetration
3. A band of light scaling was observed around the waterline along the length of the culvert walls and floor with a typical penetration of 1/16 inch and a maximum penetration of 1/8 inch. Random areas of poor consolidation accounting for less than 5% of the surface area were present along the haunches and the ceiling.
4. The concrete apron at the upstream opening of the culvert was partially exposed for the culvert width with maximum vertical exposure of 0.3 feet.
5. The concrete apron at the downstream opening of the culvert was partially exposed for the west half of the barrel with maximum vertical exposure of 0.3 feet.

Legend

- 3.4 Sounding Depth (9/15/2016)
- 3.4 Sounding Depth (6/18/2012)

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 88699 CSAH 877 OVER LESTER RIVER DISTRICT I, ST LOUIS COUNTY INSPECTION, SOUNDING PLAN AND FASCIA PROFILES		
DRAWN BY: RT	COLLINS ENGINEERS	133 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com
CHECKED BY: MBP		DATE: SEPT 15, 2016
CODE: 968788699		SCALE: NTS FIGURE NO.: 1