

2016 UNDERWATER BRIDGE INSPECTION REPORT



BRIDGE # 88621 CR 675 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. 88621, a concrete box culvert, was found to be in satisfactory condition with no defects of structural significance. The concrete surfaces typically exhibited light to moderate scaling. The concrete floor was typically free of channel bottom material or debris.

INSPECTION FINDINGS

(A) The concrete walls and floor typically exhibited moderate scaling up to 1/2 inch deep. The concrete headwalls, haunch, and ceiling typically exhibited light scaling up to 1/4 inch deep.

(B) The channel bottom at the upstream and downstream concrete aprons consisted of gravel and scattered rocks up to 6 inches in diameter.

(C) The culvert floor was exposed from 5 feet in from the upstream end to 5 feet in from the downstream end and free of any debris.

(D) A concrete corner spall was present on the downstream headwall 3 feet long, extending 4 inches on both faces with up to 2 inches of penetration with one exposed reinforcement bar with less than 10 percent section loss.

RECOMMENDATIONS

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

Contractor: Collins Engineers, Inc.

Contractor Job Number: 9687

UNDERWATER INSPECTION

1. BRIDGE DATA

Bridge #: 88621
Feature Intersected: LESTER RIVER
Facility Carried: CR 675
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: Sunny, 70°F
Underwater Visibility (feet): 2 feet
Waterway Velocity (ft/sec): None/Negligible

3. SUBSTRUCTURE INSPECTION DATA

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

Maximum Water Depth at Substructure(s) Inspected (feet): 2.7 feet

4. WATERLINE DATUM

Water Level Reference: Top of the upstream headwall.
Waterline Elevation (feet): 95.3 feet
Description: The waterline was approximately 4.7 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		1	1	
885	Scour	1	EA	1			

UNDERWATER INSPECTION

INSPECTION PROCEDURES

The routine underwater inspection of Bridge 88621 (CR 675 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 depth soundings were taken along the openings and along the length of the culvert to determine the presence, location, and area of scour.

The bridge element inspected was the precast concrete culvert. Inspection procedures followed FHWA guidance and the MnDOT Bridge and Structure Inspection Program Manual with channel bottom probing to search for foundations. The 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 BRIDGE INSPECTION REPORT

01/27/2017

BRIDGE 88621 CR 675 OVER LESTER RIVER

County: St. Louis	Location: 0.6 MI N OF JCT CSAH43	Length: 13.7 ft.
City:	Route: 07 - CNTY 675 Ref. Pt.: 000+00.630	Deck Width: 0.0 ft.
Township: 69031 - GNESEN	Control Section:	Rdwy. Area/ Pct. Unsnd: sq. ft. / %
Section: 35 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.: 63	Culvert: W125
NBI Deck: N Super: N Sub: N Chan: 7 Culv: 5		Postings:
	Open, Posted, Closed: A - Open	
	MN Scour Code: E - CULVERT	

Appraisal Ratings - Approach: 7	Waterway: 9	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	82.8

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	12/16/2016	39 LF	0	29	10	0
		Routine	07/12/2016	38 LF	0	28	10	0

Notes: [2016 U/W] Light to moderate scaling with 1 spall was present.
 [2016 Sept] Scale on wetted perimeter exposing aggregate but aggregate remains sound. Area of honeycomb on culvert top with exposed rebar having surface corrosion and little to no section loss. Exposed rebar on top of east end of culvert under headwall with rebar having minor section loss.
 [2016-2014] Water within 2" of culvert top.
 [2013] No change.
 [2012 Underwater] Scaling around the waterline along the length of the culvert with a depth of 1/16" to 1/4".
 Scouring on walls of pipe.

800	Critical Deficiencies or Safety Hazards	Underwater	12/16/2016	1 EA	1	0	0	0
		Routine	07/12/2016	1 EA	1	0	0	0

Notes: [2016-2013] No critical deficiencies or safety hazards found during this inspection.

870	Culvert End Treatment	Underwater	12/16/2016	2 EA	0	1	1	0
		Routine	07/12/2016	2 EA	0	2	0	0

Notes: [2016 U/W] Spall at downstream headwall.
 [2016 Sept] Scale along wetted perimeter exposing aggregates but aggregates remain sound.
 [2016] 1.5' spall on bottom of east headwall with exposed corroding rebar.
 [2014] Water within 2" of culvert top.
 [2013] Scaling at and below waterline.
 CURB SPALLED ON NW CORNER.

871	Roadway Over Culvert	Underwater	12/16/2016	1 EA	1	0	0	0
		Routine	07/12/2016	1 EA	1	0	0	0

Notes: [2016 Sept] Roadway was reclaimed and repaved between July and September. No signs of settlement or undermining.
 [2016] Many patches, cracks, and some settlement in roadway.
 [2014-2013] Cracked and slight settlement.
 Bituminous.

885	Scour	Underwater	12/16/2016	1 EA	1	0	0	0
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891	Other Bridge Signing	Underwater	12/16/2016	1 EA	1	0	0	0
		Routine	07/12/2016	1 EA	1	0	0	0

Notes: [2016 Sept-2016] All signs present with no notable deterioration.
 [2014-2013] No change.
 4 Culvert markers (Type 2 object markers).

BRIDGE 88621 CR 675 OVER LESTER RIVER

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
892	Slopes & Slope Protection	Underwater	12/16/2016	1 EA	1	0	0	0
		Routine	07/12/2016	1 EA	1	0	0	0
Notes: [2016 Sept-2013] No notable erosion present. Established vegetation.								
894	Deck & Approach Drainage	Underwater	12/16/2016	1 EA	1	0	0	0
		Routine	07/12/2016	1 EA	1	0	0	0
Notes: [2016 Sept] Shoulders were replaced during repaving. No drainage-related slope erosion. [2016-2013] No change MINOR EROSION SE.								
900	Protected Species	Underwater	12/16/2016	1 EA	1	0	0	0
		Routine	07/12/2016	1 EA	1	0	0	0
Notes: [2016 Sept-2016] No evidence of protected species present.								

General Notes: SLC District 2
 Inspected by: [2016 Sept] CG : [2016] CG, JD : [2014] CG, BH [2013] JRS, JDO.
 [2016 Sept] Return inspection in September due to water level going down, road reclaimed, and overlaid since July inspection.
 [2014] Possible beaver dam downstream due to water not moving and high water level.
 TREES ACROSS STREAM DOWNSTREAM FROM BRIDGE.
 No Guardrail.

58. Deck NBI:

36A. Brdg Railings NBI:

36B. Transitions NBI:

36C. Appr Guardrail NBI: Culvert headwall is inside of roadway clear zone with no guardrail present. Roadway does not meet minimum requirements for Minnesota rule 8820.9920 for ADT 50 - 149.

36D. Appr Guardrail Terminal NBI: Culvert headwall is inside of roadway clear zone with no guardrail present. Roadway does not meet minimum requirements for Minnesota rule 8820.9920 for ADT 50 - 149.

59. Superstructure NBI:

60. Substructure NBI:

61. Channel NBI: [2016 Sept-2016] Minor debris in channel.

62. Culvert NBI: [2016 U/W] Moderate scaling and 1 minor spall present.
 [2016 Sept] Scale on wetted perimeter exposing aggregate but aggregate remains sound. Area of honeycomb on culvert top with exposed rebar having surface corrosion and little to no section loss. Exposed rebar on top of east end of culvert under headwall with rebar having minor section loss.
 [2016-2014] Water within 2" of culvert top.
 [2013] No change.
 [2012 Underwater] Scaling around the waterline along the length of the culvert with a depth of 1/16" to 1/4".
 Scouring on walls of pipe.

71. Waterway Adeq NBI: [2016 Sept-2016] Roadway did not over top during flooding of 2012, which was greater than 500 year event. Remote chance of over topping.
 [2014] 2" of freeboard in culvert plus 1' of fill. Approaches are lower than road over culvert.

72. Appr Roadway Alignment NBI: [2016 Sept-2014] Hill to south affecting sight distance. No speed reduction required.

Inspector's Signature

Reviewer's Signature

Pictures



Photo 1 - Upstream Opening, Looking Southeast



Photo 2 - Downstream Opening, Looking West

Pictures



Photo 3 - Through Barrel, Looking West

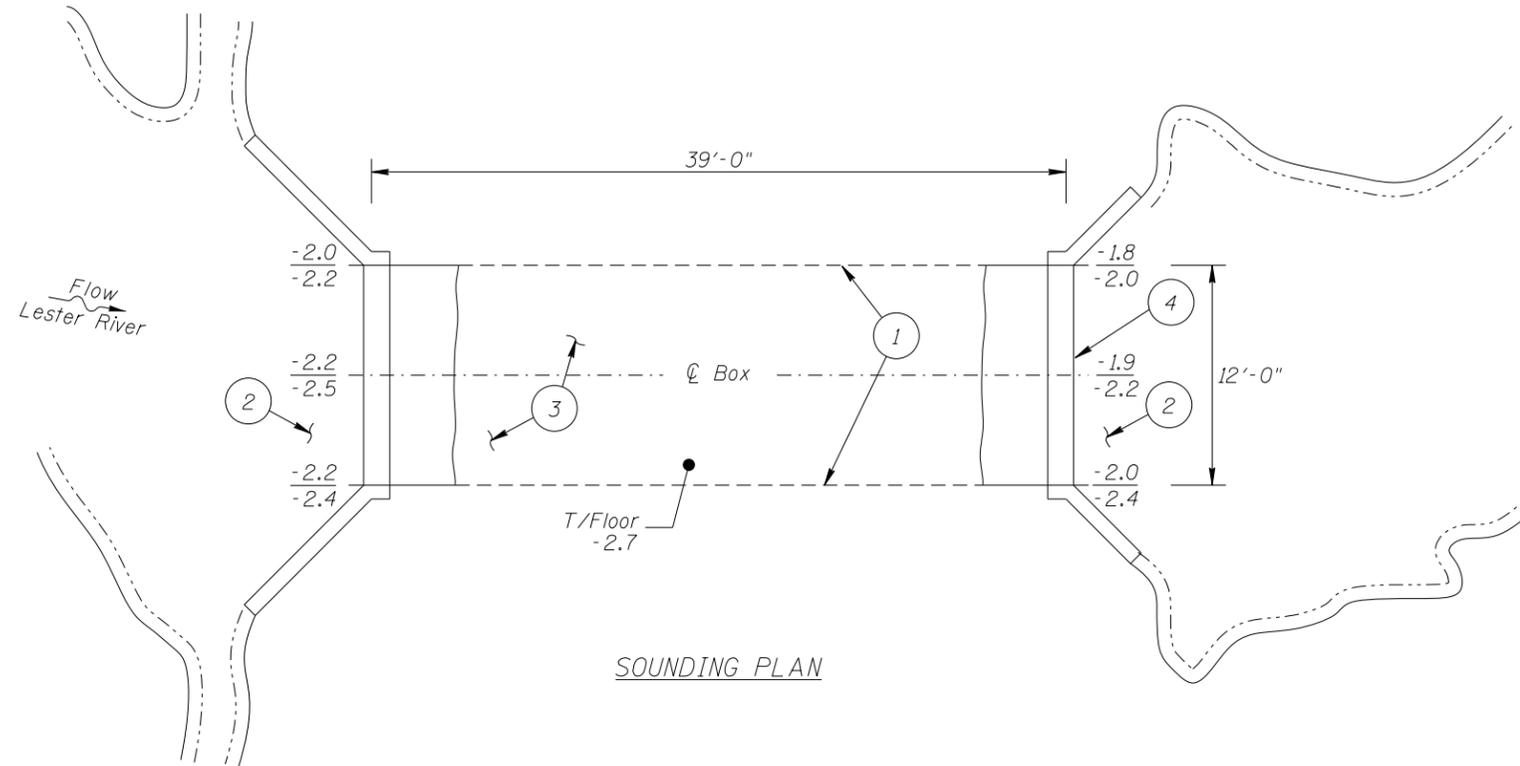
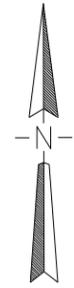


Photo 4 - Typical Concrete Condition at Waterline, Looking South

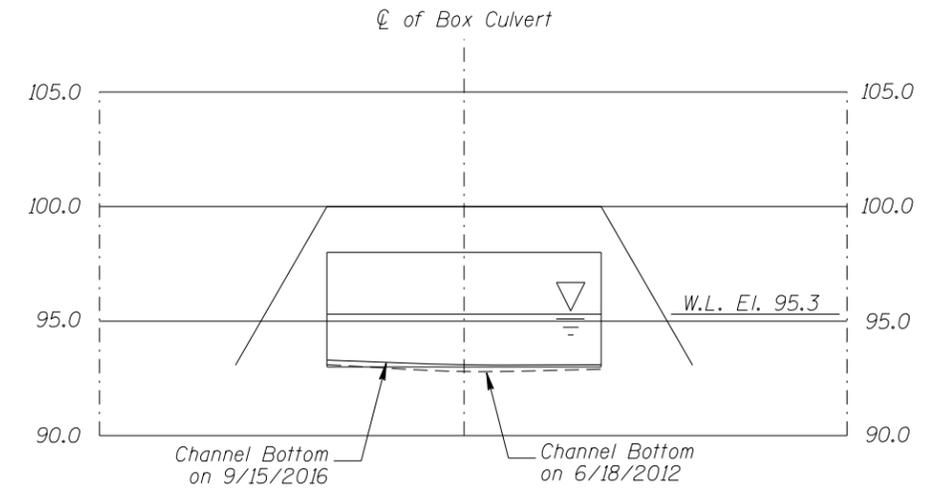
Pictures



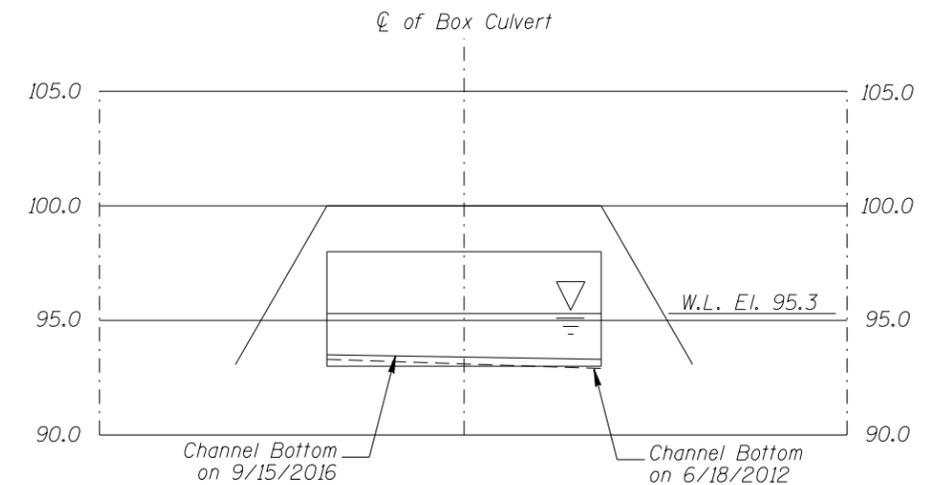
Photo 5 - Spall at Downstream Headwall, Looking West



SOUNDING PLAN



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

GENERAL NOTES:

1. Concrete Box Girder was inspected underwater.
2. At the time of inspection, on September 15, 2016, the waterline was located approximately 4.7 feet below the top of upstream headwall. Since insufficient elevation information was available, an elevation of 100.0 was assumed. This corresponds to a waterline elevation of 95.3.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.

Legend

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

INSPECTION NOTES:

- 1 The concrete walls and floor typically exhibited moderate scaling up to 1/2 inch deep. The concrete headwalls, haunch, and ceiling typically exhibited light scaling up to 1/4 inch deep.
- 2 The channel bottom at the upstream and downstream concrete aprons consisted of gravel and scattered rocks up to 6 inches in diameter.
- 3 The culvert floor was exposed from 5 feet in from the upstream end to 5 feet in from the downstream end and free of any debris.
- 4 Concrete corner spall on downstream headwall 3 feet long, extending 4 inches on both faces with up to 2 inches of penetration with one exposed reinforcement bar with less than 10% section loss.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 88621 CSAH 675 OVER LESTER RIVER DISTRICT I, ST. LOUIS COUNTY INSPECTION, SOUNDING PLAN, AND FASCIA PROFILES		
DRAWN BY: RT	COLLINS ENGINEERS	DATE: SEPT 15, 2016
CHECKED BY: LJ	<small>133 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	SCALE: NTS
CODE: 968788621		FIGURE NO.: 1