

2016 UNDERWATER BRIDGE INSPECTION REPORT



BRIDGE # 27595 103(CARTWAY RD) over ELM CREEK

DISTRICT: Metro

COUNTY: Hennepin

CITY/TOWNSHIP: Champlin

STATE: Minnesota

Date of Inspection: 05/23/2016

Equipment Used:

Owner: City or Municipal Highway Agency

Inspected By: Owens, Garrett

Report Written By: Garrett Owens

Report Reviewed By:

Final Report Date:



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UNDERWATER INSPECTION

REPORT SUMMARY

The substructure inspected at structure No. 27595, corrugated steel pipe culvert, was found to be in good condition with no defects of structural significance. A 6 foot diameter scour depression approximately 4 feet deep was found just east of the eastern end of the culvert. The southern edge at the east end was undermined at the waterline with penetration up to 1 foot.

INSPECTION FINDINGS

- (A) Corrugated steel pipe exhibited light corrosion from the waterline to the bottom of the pipe.
- (B) The culvert floor was typically covered by a layer of silty sand, stones, and riprap up to 16 inches in diameter.
- (C) Portions of the corrugated steel pipe floor were clean of any debris and/or infill.
- (D) A 6 foot diameter scour hole was found just east of the riprap at the east end.
- (E) The southern edge of the east end was undermined at the waterline with penetration up to 1 foot.

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 #: 27595
Feature Intersected: ELM CREEK
Facility Carried: 103(CARTWAY RD)
District: Metro
County: 027 - Hennepin
Bridge Description:
The structure consists of a corrugated steel pipe-arch culvert.

2. INSPECTION DATA

Professional Engineer/Team Leader: Cory R. Stuber, P.E.
Inspection Diver: Garrett R. Owens, P.E.
Date of Underwater Inspection: 05/23/2016
Weather Conditions: Sunny, 75°F
Underwater Visibility (feet): 3
Waterway Velocity (ft/sec): 1

3. SUBSTRUCTURE INSPECTION DATA

Substructure(s) Inspected: Corrugated Steel Pipe-Arch Culvert.
General Shape:
Oval Corrugated Steel Pipe

Maximum Water Depth at Substructure(s) Inspected (feet): 6.0

4. WATERLINE DATUM

Water Level Reference: Top of the culvert pipe at the center of the downstream opening.
Waterline Elevation (feet): 89.7
Description: The waterline was approximately 10.3 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: 6
Item 62: Culvert: Code: 7
Item 92B: Underwater Inspection: Code: Y 48 05/2016

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
240	Steel Culvert	135	LF		135		
885	Scour	1	EA		1		

UNDERWATER INSPECTION

INSPECTION PROCEDURES

The routine underwater inspection of Bridge 27595 (CARTWAY ROAD over ELM CREEK) was completed on MAY 23, 2016. The underwater inspection was conducted from shore. The inspection was conducted by a team consisting of a PE-Diver with a valid MnDOT Team Leader certification, a backup diver and a dive tender. The inspection utilized commercial dive equipment and techniques (SSA and/or SCUBA) in accordance with OSHA regulations. Profiles were taken along the upstream and downstream faces of the bridge and around the periphery of substructure units to determine the presence, location and area of scour.

The bridge elements inspected consisted of a single culvert barrel. According to the bridge inventory or design drawings, the culvert is a corrugated Steel Pipe-Arch 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 a maximum of 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: 27595

103(CARTWAY RD) over ELM CREEK

Date: 08/26/2016

+ GENERAL +	+ ROADWAY +	+ INSPECTION +																				
Agency Br. No. Crew District 05 Maint. Area County 027 - Hennepin City Champlin Township Desc. Loc. 0.5 MI S OF JCT CSAH 12 Sect., Twp., Range 19 - 120N - 21W Latitude 45 ° 11' 3.51" Longitude 93 ° 24' 6.73" Custodian 04 - City or Municipal Highway Owner 04 - City or Municipal Highway BMU Agreement Year Built 1974 MN Year Reconstructed FHWA Year Reconstructed MN Temporary Status Bridge Plan Location 4 - MUNICIPAL Date Opened to Traffic 11/1/1974 On - Off System 0 - OFF Legislative District 47A Potential ABC 2 - N/A	Bridge Match ID (TIS) 0 Roadway O/U Key Route On Structure Route Sys 05 - MSAS Number 103 Roadway Name or Description MSAS 103 Level of Service 1 - MAINLINE Roadway Type 2 - 2-way traffic Control Section (TH Only) Reference Point 000+00.250 Detour Length 2.0 mi. Lanes ON 2 UNDER 0 ADT 9182 YEAR 2008 HCA DT ADTT % Functional Class 19 - Urban - Local	Userkey 216 Structurally Deficient N Functionally Obsolete N Sufficiency Rating 91.5 Routine Inspection Date 10/09/2015 Routine Inspection Frequency 24 Inspector Name Owens, Garrett Status A - Open																				
		+ NBI CONDITION RATINGS +																				
		Deck N Unsound Deck % Superstructure N Substructure N Channel 6 Culvert 7																				
		+ NBI APPRAISAL RATINGS +																				
		Structure Evaluation 6 Deck Geometry N Underclearances N Waterway Adequacy 7 Approach Alignment 8																				
		+ SAFETY FEATURES +																				
		Bridge Railing N - NOT REQUIRED GR Transition 0 - SUBSTANDARD Appr. Guardrail 0 - SUBSTANDARD GR Termini 0 - SUBSTANDARD																				
		+ IN DEPTH INSP. +																				
		<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th style="text-align: center;">Y/N</th> <th style="text-align: center;">Freq</th> <th style="text-align: center;">Date</th> </tr> </thead> <tbody> <tr> <td>Frac. Critical</td> <td style="text-align: center;">N</td> <td></td> <td></td> </tr> <tr> <td>Underwater</td> <td style="text-align: center;">Y</td> <td style="text-align: center;">60</td> <td style="text-align: center;">05/23/2016</td> </tr> <tr> <td>Pinned Asbly.</td> <td style="text-align: center;">N</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	N			Underwater	Y	60	05/23/2016	Pinned Asbly.	N			Spec. Feat.			
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Frac. Critical	N																					
Underwater	Y	60	05/23/2016																			
Pinned Asbly.	N																					
Spec. Feat.																						
		+ WATERWAY +																				
		Drainage Area (sq. mi.) Waterway Opening (sf.) 290 Navigation Control 0 - No nav. control on Pier Protection <table style="width: 100%; border-collapse: collapse;"> <tr> <td>Nav. Clr. (ft.)</td> <td style="text-align: center;">Vert.</td> <td style="text-align: center;">0.0</td> <td style="text-align: center;">Horiz.</td> <td style="text-align: center;">0.0</td> </tr> </table> Nav. Vert. Lift Bridge Clear. (ft.) MN Scour Code E - CULVERT Year	Nav. Clr. (ft.)	Vert.	0.0	Horiz.	0.0															
Nav. Clr. (ft.)	Vert.	0.0	Horiz.	0.0																		
		+ CAPACITY RATINGS +																				
		Design Load 0 - Other/Unknown Operating Rating 2 - HS TRUCK 24.0 Inventory Rating 2 - HS TRUCK 16.0 Posting VEH: SEMI: DBL: Rating Date 01/24/2015 Overweight Permit Codes A N - N/A B N - N/A C N - N/A																				
+ STRUCTURE +	+ RDWY DIMENSIONS +																					
Service On 5 - Highway-pedestrian Service Under 5 - Waterway Main Span Type 3 - Steel Main Span Design 16 - Long Span Main Span Detail Appr. Span Type Appr. Span Design Appr. Span Detail Skew 26 RIGHT Culvert Type 27X16"2" Barrel Length 134 Cantilever ID Number of Spans MAIN: 1 APPR: 0 TOTAL: Main Span Length 26.7 ft. Structure Length 26.7 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 2.80 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 5.00 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 33.30 ft. ft. Vertical Clearance ft. ft. Max. Vert. Clear. ft. ft. Horizontal Clear. ft. ft. Lateral Clearance ft. ft. Appr. Surface Width 32.0 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 0 - Not Required Vertical N - Not Applicable																				

MINNESOTA BRIDGE INSPECTION REPORT

09/02/2016

Inspector: CO Bridge

BRIDGE 27595 103(CARTWAY RD) OVER ELM CREEK

County: Hennepin	Location: 0.5 MI S OF JCT CSAH 12	Length: 26.7 ft.
City: Champlin	Route: 05 - MSAS 103 Ref. Pt.: 000+00.250	Deck Width: 0.0 ft.
Township:	Control Section:	Rdwy. Area/ Pct. Unsnd: sq. ft. / %
Section: 19 Township: 120N Range: 21W Maint. Area:		Paint Area/ Pct. Unsnd: sq. ft. / %
Span Type: 3 - Steel 19 - Culvert (includes frame List: culverts)	Local Agency Bridge Nbr.:	Culvert: 27'X16'2"
NBI Deck: N Super: N Sub: N Chan: 6 Culv: 7		Postings:
	Open, Posted, Closed: A - Open	
	MN Scour Code: E - CULVERT	

Appraisal Ratings - Approach: 8	Waterway: 7	Unofficial Structurally Deficient	N
Required Bridge Signs - Load Posting: 0 - Not Required	Traffic: 0 - Not Required	Unofficial Functionally Obsolete	N
Horizontal: 0 - Not Required	Vertical: N - Not Applicable	Unofficial Sufficiency Rating	91.5

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
240	Steel Culvert	Underwater	05/23/2016	106 LF	0	106	0	0
		Migrated Values		106 LF	0	106	0	0
Notes:								
[2002] Overhead arch and corner shapes are normal and all joints are intact and sound.								
[2009] Minor efflorescence at steel plate connections.								
[2013] Moderate rust has formed in the steel plates at low and normal waterline elevations. No appreciable section loss.								
[10/09/15] Corrosion throughout length of culvert above/below waterline. Bolts in very good alignment, no dips/distortion noted.								
[10/09/15] Culvert field measured at 106 LF between headwalls, adjust qtys. Entire culvert remains in CS-2.								
515	Steel Protective Coating	Underwater	05/23/2016	999 SF	999	0	0	0
		Migrated Values		999 SF	999	0	0	0
Notes: [2016] Migrator assumed CS1 and a quantity of 999 SF.								
800	Critical Deficiencies or Safety Hazards	Underwater	05/23/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
Notes: NO CRITICAL FINDINGS OBSERVED DURING THE LAST INSPECTION.								
[10/09/15] No changes noted.								
870	Culvert End Treatment	Underwater	05/23/2016	2 EA	2	0	0	0
		Migrated Values		2 EA	2	0	0	0
Notes: No Deficiencies.								
[2009 - 2013] Headwalls are exposed at peak of culvert.								
[10/09/15] No changes noted.								
871	Roadway Over Culvert	Underwater	05/23/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
Notes: 3-line cable guardrail on west side. Top cable is detached at post over culvert.								
[2009] Top cable is still detached.								
[2011 - 2013] Cable guardrail needs repair.								
[10/09/15] Roadway is free of dips/distortion/pavement cracks.								
885	Scour	Underwater	05/23/2016	1 EA	0	1	0	0
Notes: [2016] A 6 foot diameter scour hole was found at east end near barrel opening during underwater inspection.								
891	Other Bridge Signing	Underwater	05/23/2016	1 EA	0	0	1	0
		Migrated Values		1 EA	0	0	1	0
Notes: [2013] No signs present.								
[10/09/15] "NO SWIMMING OR DIVING" sign present. No other signs present.								

BRIDGE 27595 103(CARTWAY RD) OVER ELM CREEK

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	05/23/2016	2 EA	2	0	0	0
		Migrated Values		2 EA	2	0	0	0
Notes: All grouted riprap at the inlet and outlet has been repaired and is in good condition. Minor amount of deadfalls in channel upstream. 185. Grouted riprap slope protection repairs needed near culvert outlet. [2009] Minor amount of debris in channel upstream. [10/09/15] Stream debris in channel upstream of culvert, primarily on channel banks, not in the water.								

894	Deck & Approach Drainage	Underwater	05/23/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
Notes: Use this element to rate the condition, function, and adequacy of the drainage system.								

900	Protected Species	Underwater	05/23/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
Notes: Use this element to track the presence of protected species living on this structure.								

General Notes: [2013] Maintenance needs: Repair cable guardrail at west side of culvert.
 [10/09/15] Inspection performed by WSB and Associates, Inc.

- 58. Deck NBI: [10/09/15] No changes noted.
 - 36A. Brdg Railings NBI: [10/09/15] No changes noted.
 - 36B. Transitions NBI: [10/09/15] No changes noted.
 - 36C. Appr Guardrail NBI: [10/09/15] No changes noted.
 - 36D. Appr Guardrail Terminal NBI: [10/09/15] No changes noted.
 - 59. Superstructure NBI: [10/09/15] No changes noted.
 - 60. Substructure NBI: [10/09/15] No changes noted.
 - 61. Channel NBI: [10/09/15] No changes noted. 4'+ water depth inside culvert.
 - 62. Culvert NBI: [10/09/15] Corrosion throughout length of culvert above/below waterline.
 - 71. Waterway Adeq NBI: [10/09/15] High water marks indicate water is nowhere near the roof of the culvert.
 - 72. Appr Roadway Alignment NBI: [10/09/15] No changes noted.
- Inventory Notes: [10/09/15] Culvert length changed to field measured 106 LF. See MnDOT BSIPM D.7.2.28.

Garrett Owens
 Inspector's Signature

 Reviewer's Signature

Pictures

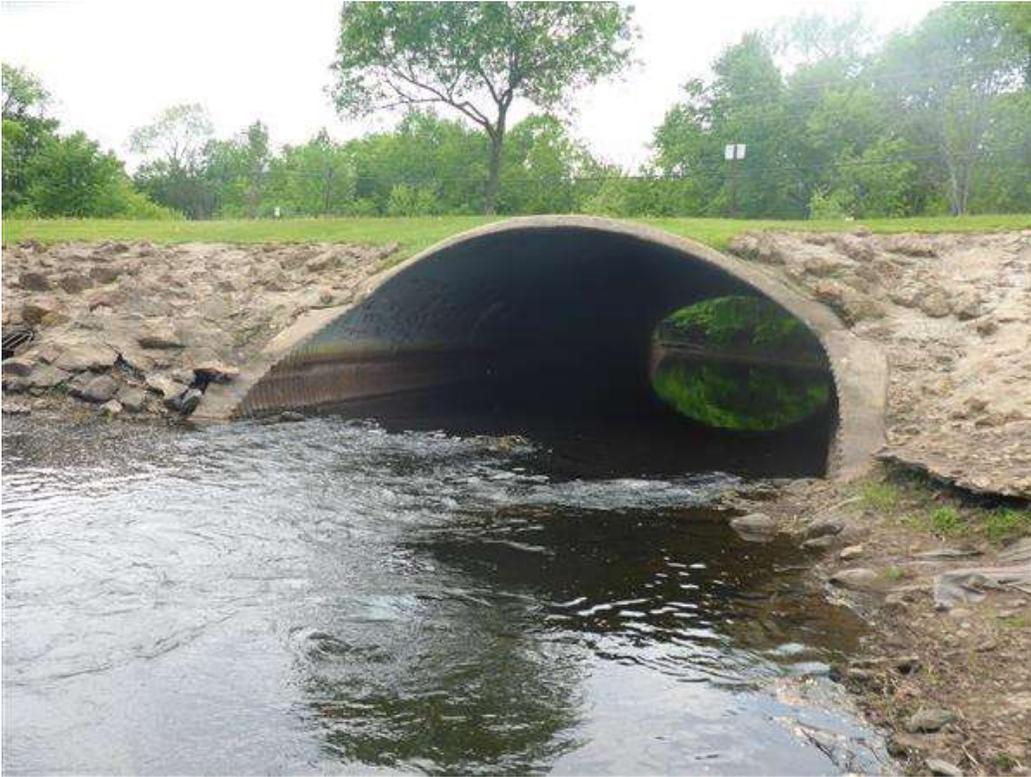


Photo 1 - Downstream Opening Looking West

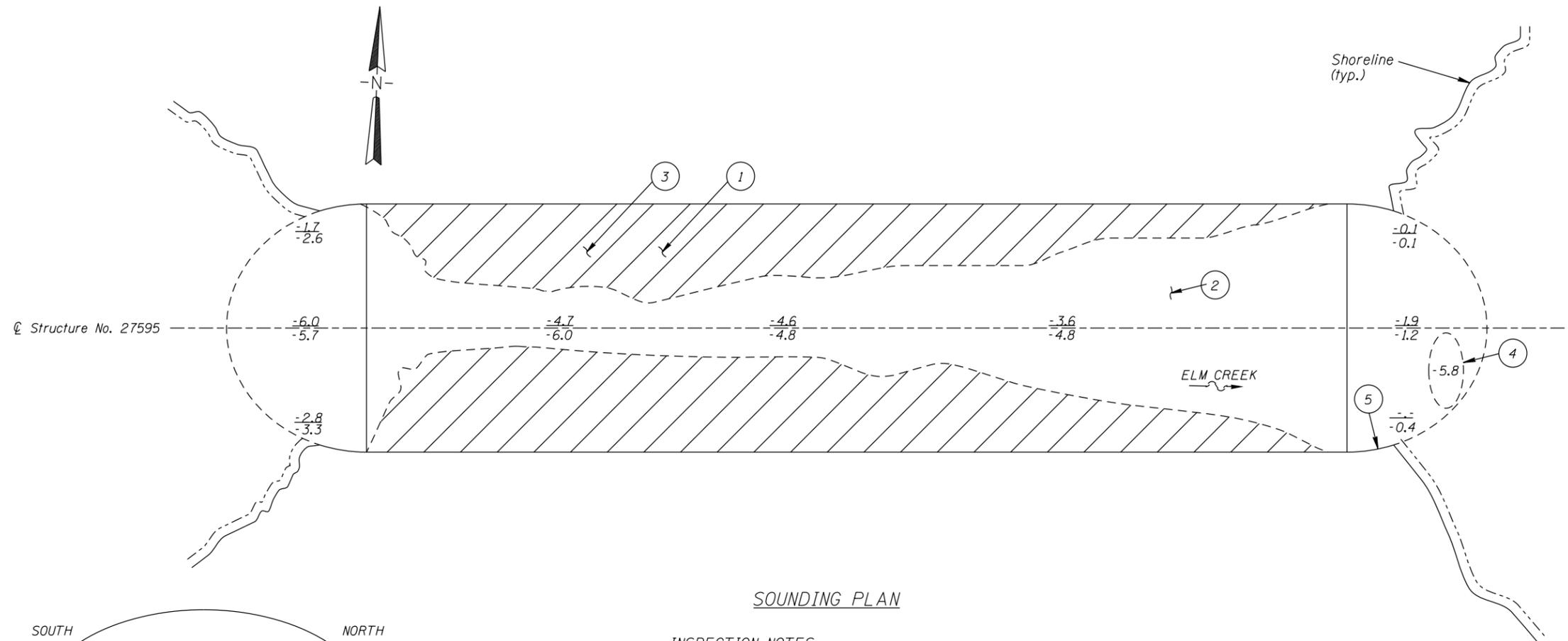


Photo 2 - Upstream Opening Looking East

Pictures



Photo 3 - Typical Condition of Culvert Barrel at Waterline



SOUNDING PLAN

INSPECTION NOTES:

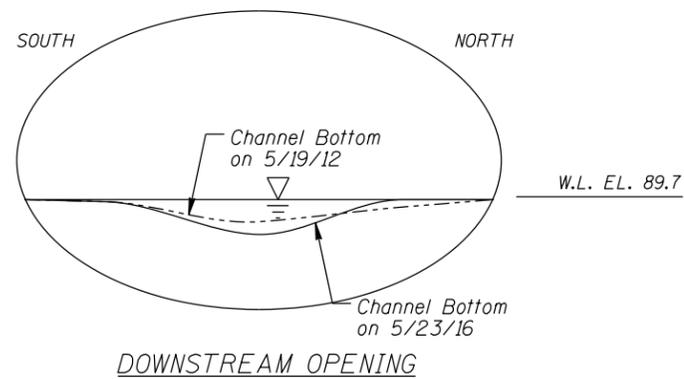
- 1 Corrugated steel pipe exhibited light corrosion from the waterline to the bottom of the pipe.
- 2 The culvert floor was covered by a layer of silty sand, stones, and riprap up to 16 inches in diameter.
- 3 The corrugated steel pipe floor was clean of any debris and/or infill.
- 4 A 6 foot diameter scour hole was located just East of the riprap at the East end.
- 5 The southern edge of the East end was undermined at the waterline with penetration up to 1 foot.

GENERAL NOTES:

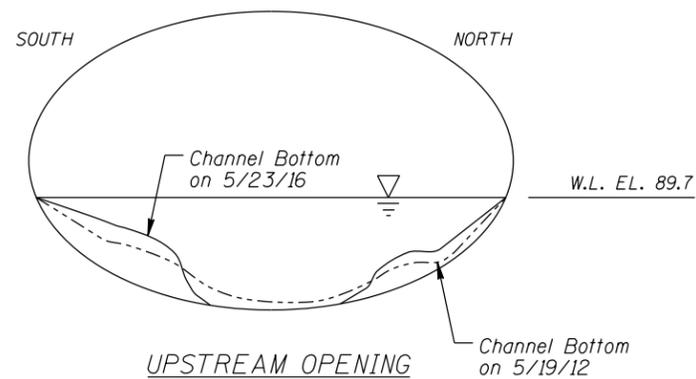
- 1. The entire length of the corrugated steep pipe culvert was inspected underwater.
- 2. At the time of inspection, on May 23, 2016, the waterline was located approximately 10.3 feet below the top of the corrugated steel pipe culvert at the center of the downstream opening. Since insufficient elevation information was available, a waterline reference of 100.0 was assumed. This corresponds to a waterline elevation of 89.7.
- 3. Soundings indicate the water depth at the time of inspection and are measured in feet.
- 4. Soundings were taken at approximately midpoints on the upstream and downstream openings and at quarter points along the pipe centerline.

Legend

- 0.4 Sounding Depth (5/23/16)
- 0.4 Sounding Depth (5/19/12)
- Exposed Corrugated Steel Pipe
- .- Sounding Depth Unavailable



DOWNSTREAM OPENING



UPSTREAM OPENING

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 27595 CARTWAY ROAD OVER ELM CREEK DAKOTA COUNTY, CITY OF CHAMPLIN		
INSPECTION AND SOUNDING PLAN		
Drawn By: BGDO	COLLINS ENGINEERS	Date: June, 2016
Checked By: BRL		Scale: NTS
Project: 63-9687		Figure No.: 1