

2017 UNDERWATER BRIDGE INSPECTION REPORT



BRIDGE # 07532 CSAH 20 over WILLOW CREEK

DISTRICT: District 7 COUNTY: Blue Earth CITY/TOWNSHIP: SHELBY
STATE: Minnesota

Date of Inspection: 12/01/2016

Equipment Used:

Owner: County Highway Agency

Inspected By: Forsyth, Roy

Report Written By: Roy Forsyth

Report Reviewed By:

Final Report Date:

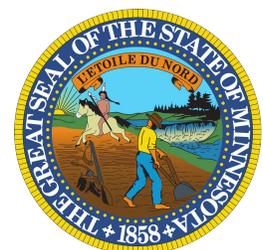


TABLE OF CONTENTS

	PAGE NUMBER
UNDERWATER SUMMARY	3
UNDERWATER INSPECTION	4
UNDERWATER INSPECTION PROCEDURES	6
STRUCTURE INVENTORY	7
ELEMENTS	8
PICTURES	11
DRAWINGS	13

UNDERWATER INSPECTION

REPORT SUMMARY

The substructure units inspected at Bridge No. 07532, North and South Abutments, were generally in satisfactory condition. The abutments were not located in the waterway at the time of inspection and were well armored with 1 to 1.5 ft diameter riprap.

INSPECTION FINDINGS

- (A) 1 to 1.5 ft diameter riprap was armoring the North and South Abutments.
- (B) The channel bottom material in the channel typically consisted of firm gravel, cobbles, and 1 ft diameter riprap with no probe rod penetration.

RECOMMENDATIONS

- (A) Recommend removing structure from underwater inspection list.

Contractor: Collins Engineers, Inc.

Contractor Job Number: 9687

UNDERWATER INSPECTION

1. BRIDGE DATA

Bridge #: 07532
Feature Intersected: WILLOW CREEK
Facility Carried: CSAH 20
District: District 7
County: 007 - Blue Earth

Bridge Description:

The superstructure consists of one span of multiple prestressed concrete beams supporting a reinforced concrete deck. The superstructure is supported by two reinforced concrete abutments.

2. INSPECTION DATA

Professional Engineer/Team Leader: Roy Forsyth
Inspection Diver: Roy Forsyth
Date of Underwater Inspection: 12/01/2016
Weather Conditions: Cloudy, 30F
Underwater Visibility (feet): 0.5
Waterway Velocity (ft/sec): 0

3. SUBSTRUCTURE INSPECTION DATA

Substructure(s) Inspected: North and South Abutments

General Shape:

The abutments consisted of reinforced concrete supported by piles.

Maximum Water Depth at Substructure(s) Inspected (feet): 0

4. WATERLINE DATUM

Water Level Reference: The bottom of concrete deck at midspan along the west fascia.
Waterline Elevation (feet): 86.5
Description: The waterline was located 13.5 ft below the reference.

5. NBIS CODING INFORMATION

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

Item 60: Substructure: Code: 6
Item 61: Channel and Channel Protection: Code: 7
Item 62: Culvert: Code:
Item 92B: Underwater Inspection: Code: N

Item 113: Scour Critical Bridge:

Code: O

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

UNDERWATER INSPECTION

INSPECTION PROCEDURES

The routine underwater inspection of Bridge 07532 (CSAH 20 over Willow Creek) was completed on December, 1, 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 2 reinforced concrete abutments. Inspection procedures followed FHWA guidance and the MnDOT Bridge and Structure Inspection Program Manual with channel bottom probing to search for bottom of 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 Structure Inventory Report

Bridge ID: 07532

CSAH 20 over WILLOW CREEK

Date: 01/12/2017

+ GENERAL +	+ ROADWAY +	+ INSPECTION +																				
Agency Br. No. 42 Crew District 07 Maint. Area County 007 - Blue Earth City Township 07020 - SHELBY Desc. Loc. 2.3 MI N OF JCT TH 30 Sect., Twp., Range 6 - 105N - 28W Latitude 43 ° 55 ' 36.14 " Longitude 94 ° 14 ' 19.76 " Custodian 02 - County Highway Agency Owner 02 - County Highway Agency BMU Agreement Year Built 1972 MN Year Reconstructed FHWA Year Reconstructed MN Temporary Status Bridge Plan Location 3 - COUNTY Date Opened to Traffic On - Off System 1 - ON Legislative District 24B Potential ABC 2 - N/A	Bridge Match ID (TIS) 0 Roadway O/U Key Route On Structure Route Sys 04 - CSAH Number 20 Roadway Name or Description CSAH 20 Level of Service 1 - MAINLINE Roadway Type 2 - 2-way traffic Control Section (TH Only) Reference Point 002+00.190 Detour Length 4.0 mi. Lanes ON 2 UNDER 0 ADT 419 YEAR 2008 HCA DT ADTT % Functional Class 07 - Rural - Major Collector	Userkey 47 Structurally Deficient N Functionally Obsolete N Sufficiency Rating 91.9 Routine Inspection Date 10/14/2015 Routine Inspection Frequency 24 Inspector Name Forsyth, Roy Status A - Open																				
		+ NBI CONDITION RATINGS +																				
		Deck 8 Unsound Deck % Superstructure 8 Substructure 6 Channel 7 Culvert N																				
		+ NBI APPRAISAL RATINGS +																				
		Structure Evaluation 6 Deck Geometry 6 Underclearances N Waterway Adequacy 7 Approach Alignment 7																				
		+ SAFETY FEATURES +																				
		Bridge Railing 0 - SUBSTANDARD 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 style="width: 60%;"></th> <th style="width: 10%; text-align: center;">Y/N</th> <th style="width: 10%; text-align: center;">Freq</th> <th style="width: 20%; 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;">12/01/2016</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	12/01/2016	Pinned Asbly.				Spec. Feat.			
	Y/N	Freq	Date																			
Frac. Critical																						
Underwater		60	12/01/2016																			
Pinned Asbly.																						
Spec. Feat.																						
		+ WATERWAY +																				
		Drainage Area (sq. mi.) Waterway Opening (sf.) 500 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 O - STBL - ACT Year 2008																				
		+ CAPACITY RATINGS +																				
		Design Load 5 - HS 20 Operating Rating 1 - H TRUCK 34.8 Inventory Rating 1 - H TRUCK 20.8 Posting VEH: SEMI: DBL: Rating Date 04/15/2015 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 5 - Prestress or Precast Main Span Design 11 - Channel Span Main Span Detail Appr. Span Type Appr. Span Design Appr. Span Detail Skew 15 LEFT Culvert Type Barrel Length Cantilever ID Number of Spans MAIN: 1 APPR: 0 TOTAL: Main Span Length 48.0 ft. Structure Length 51.5 ft. Deck Width (Out-to-Out) 36.0 ft. Deck Material 1 - Concrete Cast-in-Place Wear Surf Type 6 - Bituminous Wear Surf Install Year Wear Course/Fill Depth 0.25 ft. Deck Membrane 0 - None Deck Rebars 0 - None Deck Rebars Install Year Structure Area (Out-to-Out) 1854 sq. ft. Roadway Area (Curb-to-Curb) 1647 sq. ft. Sidewalk Width 50A. Lt 0.00 ft. 50B. Rt 0.00 ft. Curb Height Lt 0.50 ft. Rt 0.50 ft. Rail Type Lt 37 Rt 37	If Divided NB-EB SB-WB Roadway Width 32.00 ft. ft. Vertical Clearance ft. ft. Max. Vert. Clear. ft. ft. Horizontal Clear. ft. ft. Lateral Clearance ft. ft. Appr. Surface Width 42.0 ft. Bridge Roadway Width 32.0 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) 1 - CONC 3 - FTG PILE Pier Foundation (Material/Type) N - N/A 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

01/30/2017

BRIDGE 07532 CSAH 20 OVER WILLOW CREEK

County: Blue Earth	Location: 2.3 MI N OF JCT TH 30	Length: 51.5 ft.
City:	Route: 04 - CSAH 20 Ref. Pt.: 002+00.190	Deck Width: 36.0 ft.
Township: 07020 - SHELBY	Control Section:	Rdwy. Area/ Pct. Unsnd: 1647 sq. ft. / %
Section: 6 Township: 105N Range: 28W Maint. Area:		Paint Area/ Pct. Unsnd: sq. ft. / %
Span Type: 5 - Prestressed Concrete 2 - List: Stringer/Multi-beam or Girder	Local Agency Bridge Nbr.: 42	Culvert: N/A
NBI Deck: 8 Super: 8 Sub: 6 Chan: 7 Culv: N		Postings:
	Open, Posted, Closed: A - Open	
	MN Scour Code: O - STBL - ACT REQD	
Appraisal Ratings - Approach: 7 Waterway: 7		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 91.9

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
15	Prestressed Concrete Top Flange	Underwater	01/12/2017	1854 SF	1854	0	0	0
		Migrated Values		1854 SF	1854	0	0	0
	Notes: [2016] Migrator assumed CS1.							
510	- Wearing Surfaces	Underwater	01/12/2017	1647 SF	1647	0	0	0
		Migrated Values		1647 SF	1647	0	0	0
	Notes: Bituminous Overlay Notes: 2013 - New bituminou overlay. 2015 - New seal coat.							
109	Prestressed Concrete Open Girder/Beam	Underwater	01/12/2017	358 LF	358	0	0	0
		Migrated Values		358 LF	358	0	0	0
	Notes: 2014 - Fascia tees are spalling at the ends, the SE and NW corners have exposed reinforcement. (EE)							
215	Reinforced Concrete Abutment	Underwater	01/12/2017	115 LF	40	75	0	0
		Migrated Values		115 LF	40	75	0	0
	Notes: [2016] Migrator added 40 LF to abutment quantity to account for wingwalls (CS1:40 CS2:0 CS3:0 CS4:0). Heavy cracks with seepage. South abutment is undermined. 2009 - Same condition. 2013 - Riprap added to base of both abutments. 2014 - Heavy cracking with seepage and efflorescence, the concrete is spalling on the NW and SE footing. (EE)							
	Wingwall notes: 2015 - All wingwalls have cracks with latence showing.							
330	Metal Bridge Railing	Underwater	01/12/2017	102 LF	102	0	0	0
		Migrated Values		102 LF	102	0	0	0
	Notes: [2016] Migrator assumed concrete/metal combination type rail.							
515	- Steel Protective Coating	Underwater	01/12/2017	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.							
331	Reinforced Concrete Bridge Railing	Underwater	01/12/2017	102 LF	102	0	0	0
		Migrated Values		102 LF	102	0	0	0
	Notes: [2016] Migrator assumed concrete/metal combination type rail.							
800	Critical Deficiencies or Safety Hazards	Underwater	01/12/2017	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
	Notes: No critical finding observed during 2015 inspection.							

BRIDGE 07532 CSAH 20 OVER WILLOW CREEK

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
822	Bituminous Approach Roadway	Underwater	01/12/2017	2 EA	0	2	0	0
		Migrated Values		2 EA	0	2	0	0
Notes: 2007 - Settlement continues. 2010 - September 2010 wash out behind north abutment repaired by BEC. 2011 - North abutment bituminous overlay. 2013 - New bituminous overlay 2014 - Bituminous is cracked about 10' north of bridge. (EE) 2015 - New seal coat.								
885	Scour	Underwater	01/12/2017	1 EA	0	1	0	0
		Migrated Values		1 EA	0	1	0	0
Notes: O - Stable for scour. Additional action required. South abutment is undermined, 50%. 2007 - Scour is at 90% of south abutment. 2009 - could add rip rap. 2010 - September 2010 wash out behind north abutment repaired by BEC. 2011 - Riprap placed in 2010, all inplace.								
891	Other Bridge Signing	Underwater	01/12/2017	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
892	Slopes & Slope Protection	Underwater	01/12/2017	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
Notes: 50% of south abutment is exposed. 2007 - Slope steep with erosion near wing walls. Trees need to be removed. 2009 - Trees have been sprayed for removed. 2010 - October 2010 riprap added to all 4 corners. 2012 - Rating revised as per Collins Engineers, Inc inspection 9-11-2012. 2013 - Additional riprap along base of abutments and wingwalls.								
894	Deck & Approach Drainage	Underwater	01/12/2017	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
Notes: 2007 - Deck surface drains off at corners of bridge contributing to minor erosion at wing corners.								
895	Sidewalk, Curb, & Median	Underwater	01/12/2017	1 EA	0	1	0	0
		Migrated Values		1 EA	0	1	0	0
Notes: No sidewalks. 2007 - Shallow spalls. 2013 - East curb show additional spalling. See photo.								
899	Miscellaneous Items	Underwater	01/12/2017	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
Notes: 2013 - Element added for metal conduit attached to west railing.								
900	Protected Species	Underwater	01/12/2017	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: Trees U/S & D/S of bridge need to be removed.
 2007 - Trees under bridge in riprap areas needs to removed.
 2009 - Very few trees this date.
 2012 - Collins Engineers, Inc. made underwater inspection 9-11-2012. See report.
 2014 - EE inspection and load rating 12/10/14

58. Deck NBI:

36A. Brdg Railings NBI:

36B. Transitions NBI:

36C. Appr Guardrail NBI:

BRIDGE 07532 CSAH 20 OVER WILLOW CREEK

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
36D.	Appr Guardrail Terminal NBI:							
59.	Superstructure NBI:							
60.	Substructure NBI:							
61.	Channel NBI:	Rating revised as per Cillins Engineers Inc. inspection 9-11-2012.						
62.	Culvert NBI:							
71.	Waterway Adeq NBI:							
72.	Appr Roadway Alignment NBI:							

Inspector's Signature

Reviewer's Signature

Pictures



Photo 1 - Overall looking west.

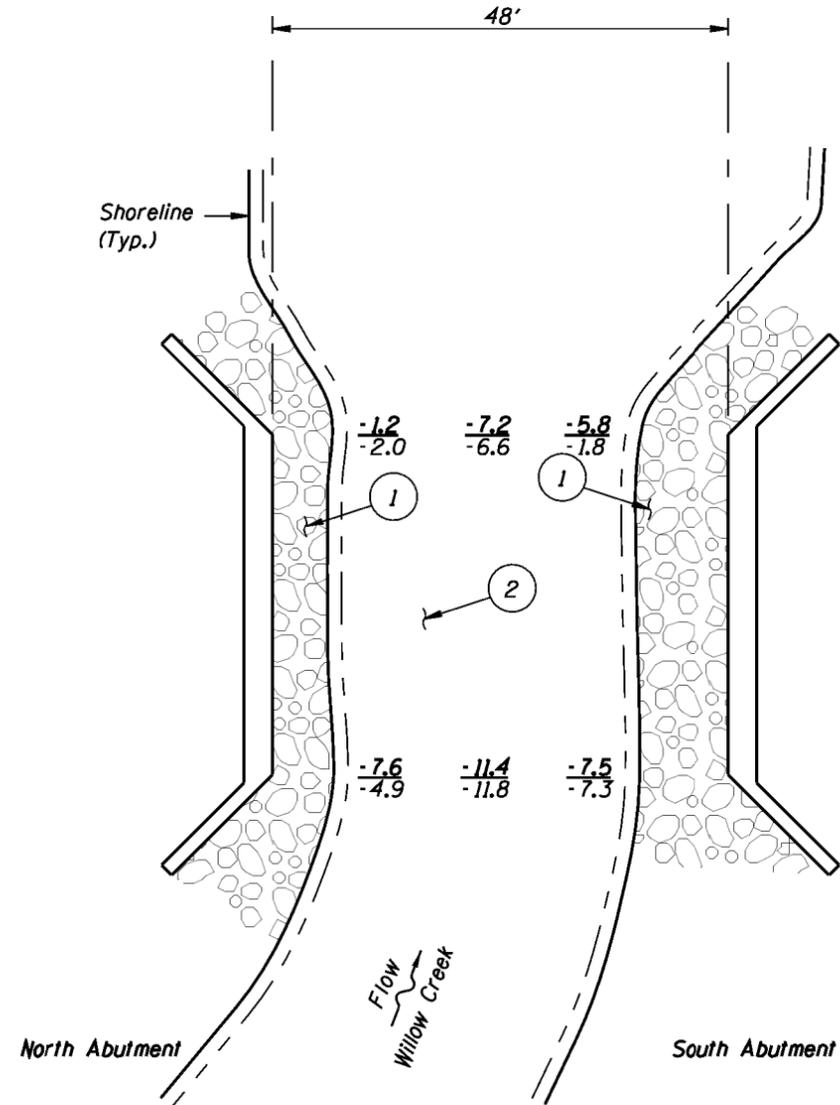
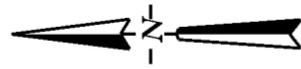


Photo 2 - South Abutment looking south.

Pictures



Photo 3 - North Abutment looking north.



SOUNDING PLAN

Legend

- 5.5 Sounding Depth from Waterline (12/1/16)
- 5.5 Sounding Depth from Waterline (9/11/12)

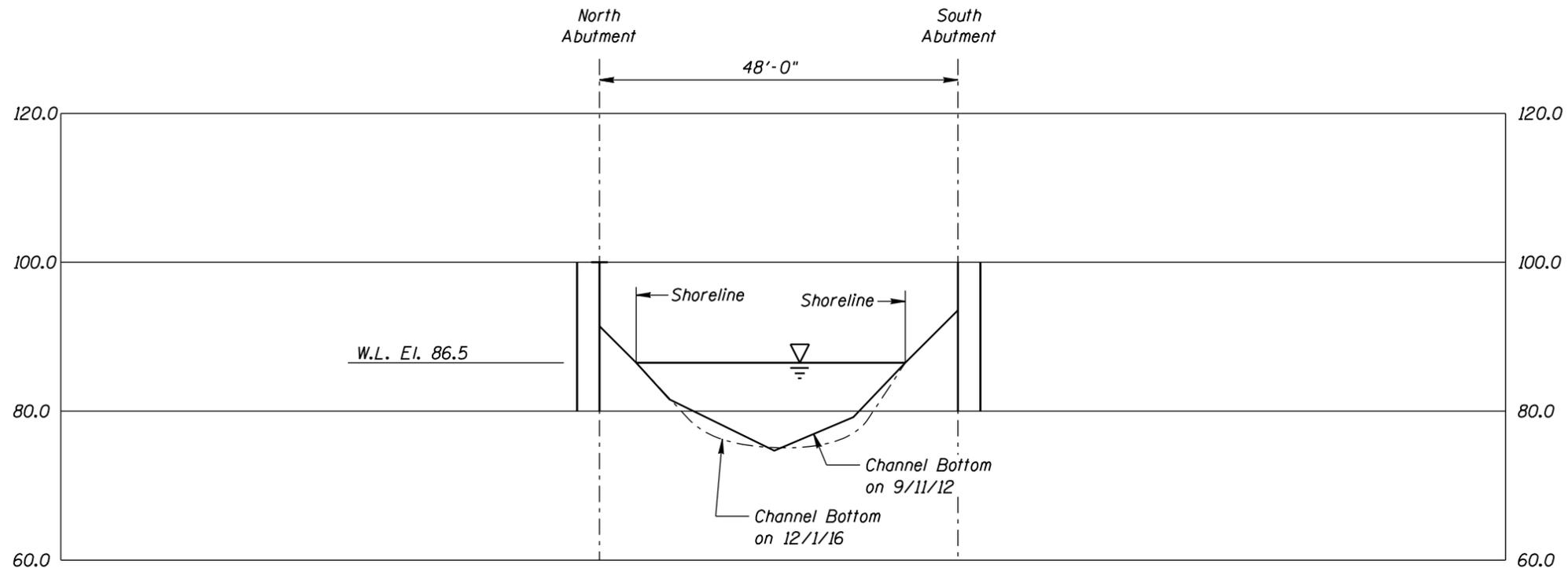
GENERAL NOTES:

1. At the time of inspection on December 1, 2016, the waterline was located approximately 13.5 feet below the bottom of the concrete girder at the midspan along the west facia. Design plans were not available, therefore a reference of 100.0 was assumed. Based on the assumed reference the waterline elevation was 86.5
2. Soundings indicate the water depth at the time of inspection and are measured in feet. All soundings based on 2016 waterline location.
3. Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units.

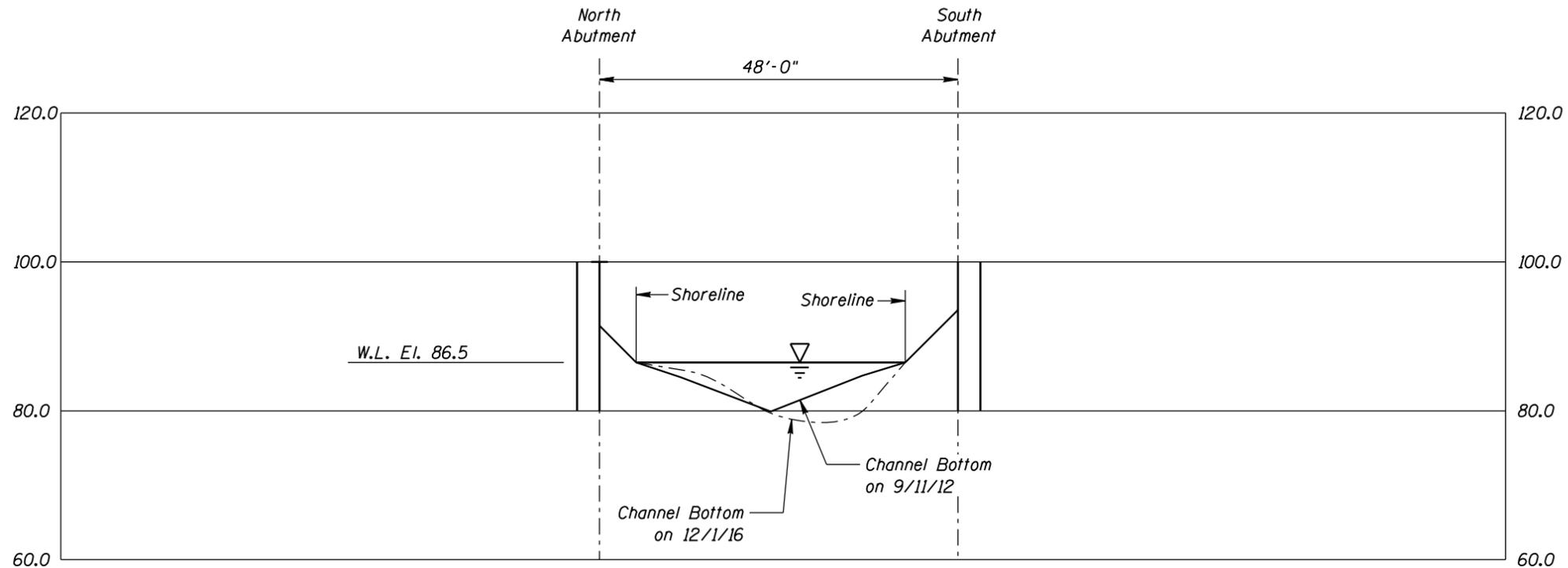
INSPECTION NOTES:

- 1 1 to 1.5 foot diameter riprap was armoring the North and South Abutments.
- 2 The channel bottom material typical consisted of firm gravel, cobbles and 1 foot diameter riprap allowing no appreciable probe rod penetration.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 07532 OVER THE WILLOW CREEK DISTRICT 7, BLUE EARTH COUNTY		
INSPECTION AND SOUNDING PLAN		
Drawn By: MJS	COLLINS ENGINEERS	Date: 12/1/2016
Checked By: RAF	<small>1599 Selby Ave. Suite 206 St. Paul, MN, 55104 (651) 646-8502 www.collinsengr.com</small>	Scale: 1"=20'
Project: 9687		Figure No.: 1



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Legend
 ——— Channel Bottom per 2012 Inspection
 - - - - - Channel Bottom per 2016 Inspection

Note:
 Refer to Figure 1 for General Notes.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. G7532 OVER THE WILLOW CREEK DISTRICT 7, BLUE EARTH COUNTY		
UPSTREAM AND DOWNSTREAM		
Drawn By: MJS	COLLINS ENGINEERS <small>1599 Selby Ave. Suite 206 St. Paul, MN, 55104 (651) 646-8502 www.collinsengr.com</small>	Date: 12/1/2016
Checked By: RAF		Scale: 1"=20'
Project: 9687		Figure No.: 2