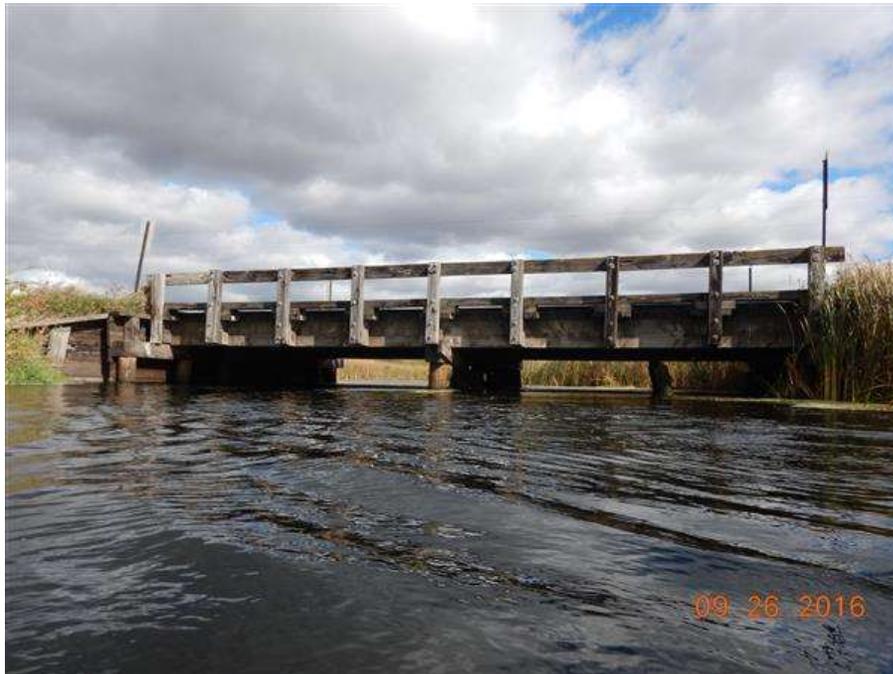


2016 UNDERWATER BRIDGE INSPECTION REPORT



BRIDGE # 89595 CSAH 42 over SAND HILL RIVER

DISTRICT: District 2

COUNTY: Norman

CITY/TOWNSHIP: BEAR PARK

STATE: Minnesota

Date of Inspection: 09/26/2016

Equipment Used:

Owner: County Highway Agency

Inspected By: Schroeder, Brian

Report Written By: Brian Schroeder

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	15

UNDERWATER INSPECTION

REPORT SUMMARY

The substructure units inspected at Bridge No. 89595, North/South Abutments and Pier 1, were found to be generally in good condition with no defects of structural significance observed. The timber piles have minor splits and checks at both the abutments and pier. The channel bottom was typically sand. No significant changes have occurred since the previous routine inspection.

INSPECTION FINDINGS

- (A) Channel Bottom was typically sand.
- (B) The timber piles have minor splits and checks at both abutments and pier.
- (C) There is minor local scour around Pier 1.

RECOMMENDATIONS

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

Contractor: Ayres Associates & Collins Engineers, Inc.

Contractor Job Number: 9687

UNDERWATER INSPECTION

1. BRIDGE DATA

Bridge #: 89595
Feature Intersected: SAND HILL RIVER
Facility Carried: CSAH 42
District: District 2
County: 054 - Norman
Bridge Description:

A timber deck is supported by a superstructure of two span timber beams supported by two timber abutments and one timber pier. The bridge is inventoried from south to north giving a South Abutment, Pier 1, and North Abutment.

2. INSPECTION DATA

Professional Engineer/Team Leader: Brian K. Schroeder, P.E.
Inspection Diver: Brian K. Schroeder, P.E.
Date of Underwater Inspection: 09/26/2016
Weather Conditions: Sunny with Wind, 60°F
Underwater Visibility (feet): 4.0
Waterway Velocity (ft/sec): Negligible/None

3. SUBSTRUCTURE INSPECTION DATA

Substructure(s) Inspected: North/South Abutment & Pier 1

General Shape:

The pier consists of a timber pier cap supported by six timber pilings. The abutments consist of a timber cap supported by seven timber pilings.

Maximum Water Depth at Substructure(s) Inspected (feet): 6.1

4. WATERLINE DATUM

Water Level Reference: Top of pier cap at west side of Pier 1
Waterline Elevation (feet): 97.2
Description: The waterline was approximately 2.8 feet below 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: Y 48 09/2016

Item 113: Scour Critical Bridge:

Code: L

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
228	Timber Pile	20	EA		20		
216	Timber Abutment	86	LF		86		
885	Scour	1	EA		1		

UNDERWATER INSPECTION

INSPECTION PROCEDURES

The routine underwater inspection of Bridge 89595 (CSAH 42 over the Sand Hill River) was completed on September, 26, 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 two timber abutments and a timber pier. According to the bridge inventory or design drawings, the abutments and pier were founded on timber piles. 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 Structure Inventory Report

Bridge ID: 89595

CSAH 42 over SAND HILL RIVER

Date: 01/10/2017

+ GENERAL +	+ ROADWAY +	+ INSPECTION +																				
Agency Br. No. Crew District 02 Maint. Area County 054 - Norman City Township 54002 - BEAR PARK Desc. Loc. 1.9 MI N OF JCT CSAH 9 Sect., Twp., Range 13 - 146N - 43w Latitude 47 ° 28 ' 5.22 " Longitude 96 ° 4 ' 2.69 " Custodian 02 - County Highway Agency Owner 02 - County Highway Agency BMU Agreement Year Built 1959 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 02A Potential ABC 2 - N/A	Bridge Match ID (TIS) 0 Roadway O/U Key Route On Structure Route Sys 04 - CSAH Number 42 Roadway Name or Description CSAH 42 Level of Service 1 - MAINLINE Roadway Type 2 - 2-way traffic Control Section (TH Only) Reference Point 005+00.582 Detour Length 2.0 mi. Lanes ON 2 UNDER 0 ADT 115 YEAR 2008 HCA DT ADTT % Functional Class 09 - Rural - Local	Userkey 94 Structurally Deficient N Functionally Obsolete N Sufficiency Rating 65.2 Routine Inspection Date 10/08/2015 Routine Inspection Frequency 24 Inspector Name Schroeder, Brian Status P - Posted for Load																				
		+ NBI CONDITION RATINGS +																				
		Deck 5 Unsound Deck % Superstructure 6 Substructure 6 Channel 7 Culvert N																				
	+ RDWY DIMENSIONS +	+ NBI APPRAISAL RATINGS +																				
	If Divided NB-EB SB-WB Roadway Width 24.00 ft. ft. Vertical Clearance ft. ft. Max. Vert. Clear. ft. ft. Horizontal Clear. ft. ft. Lateral Clearance ft. ft. Appr. Surface Width 28.0 ft. Bridge Roadway Width 24.0 ft. Median Width On Bridge ft.	Structure Evaluation 5 Deck Geometry 5 Underclearances N Waterway Adequacy 8 Approach Alignment 8																				
+ STRUCTURE +	+ MISC. BRIDGE DATA +	+ SAFETY FEATURES +																				
Service On 1 - Highway Service Under 5 - Waterway Main Span Type 7 - Timber Main Span Design 01 - Beam Span Main Span Detail Appr. Span Type Appr. Span Design Appr. Span Detail Skew 0 Culvert Type Barrel Length Cantilever ID Number of Spans MAIN: 2 APPR: 0 TOTAL: Main Span Length 20.4 ft. Structure Length 43.3 ft. Deck Width (Out-to-Out) 25.9 ft. Deck Material 8 - Wood or Timber Wear Surf Type 6 - Bituminous Wear Surf Install Year Wear Course/Fill Depth 0.67 ft. Deck Membrane 0 - None Deck Rebars N - Not Applicable (no deck) Deck Rebars Install Year Structure Area (Out-to-Out) 1121 sq. ft. Roadway Area (Curb-to-Curb) 1044 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 38 Rt 38	Structure Flared 0 - No flare Parallel Structure N - No parallel structure Field Conn. ID Abutment Foundation (Material/Type) 2 - TIMBER 3 - FTG PILE Pier Foundation (Material/Type) 2 - TIMBER 4 - PILE BENT Historic Status 5 - Not eligible	Bridge Railing 0 - SUBSTANDARD GR Transition 0 - SUBSTANDARD Appr. Guardrail 0 - SUBSTANDARD GR Termini 0 - SUBSTANDARD																				
	+ PAINT +	+ IN DEPTH INSP. +																				
	Year Painted Unsound Paint % Painted Area sq. ft. Primer Type Finish Type	<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></td> <td></td> <td></td> </tr> <tr> <td>Underwater</td> <td></td> <td style="text-align: center;">60</td> <td style="text-align: center;">09/26/2016</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	09/26/2016	Pinned Asbly.				Spec. Feat.			
	Y/N	Freq	Date																			
Frac. Critical																						
Underwater		60	09/26/2016																			
Pinned Asbly.																						
Spec. Feat.																						
	+ BRIDGE SIGNS +	+ WATERWAY +																				
	Posted Load 2 - Vehicle & Semi (Type R12-5) Traffic 0 - Not Required Horizontal 1 - Object Markers Vertical N - Not Applicable	Drainage Area (sq. mi.) Waterway Opening (sf.) 298 Navigation Control 0 - No nav. control on Pier Protection 1 - Not required Nav. Clr. (ft.) Vert. 0.0 Horiz. 0.0 Nav. Vert. Lift Bridge Clear. (ft.) MN Scour Code L - STBL - Year 1993																				
		+ CAPACITY RATINGS +																				
		Design Load 0 - Other/Unknown Operating Rating 2 - HS TRUCK 14.2 Inventory Rating 2 - HS TRUCK 10.6 Posting VEH: 24 SEMI: 40 DBL: 40 Rating Date 7/26/2006 Overweight Permit Codes A N - N/A B N - N/A C N - N/A																				

MINNESOTA BRIDGE INSPECTION REPORT

02/02/2017

BRIDGE 89595 CSAH 42 OVER SAND HILL RIVER

County: Norman Location: 1.9 MI N OF JCT CSAH 9 Length: 43.3 ft.
 City: Route: 04 - CSAH 42 Ref. Pt.: 005+00.582 Deck Width: 25.9 ft.
 Township: 54002 - BEAR PARK Control Section: Rdwy. Area/ Pct. Unsnd: 1044 sq. ft. / %
 Section: 13 Township: 146N Range: 43w Maint. Area: Paint Area/ Pct. Unsnd: sq. ft. / %
 Span Type: 7 - Wood or Timber 2 - Local Agency Bridge Nbr.: Culvert: N/A
 List: Stringer/Multi-beam or Girder Postings: 24 40 40
 NBI Deck: 5 Super: 6 Sub: 6 Chan: 7 Culv: N
 Open, Posted, Closed: P - Posted for Load
 MN Scour Code: L - STBL - LOW RISK
 Appraisal Ratings - Approach: 8 Waterway: 8 Unofficial Structurally Deficient N
 Required Bridge Signs - Load Posting: 2 - Vehicle & Semi (Type Traffic: 0 - Not Required Unofficial Functionally Obsolete N
 R12-5)
 Horizontal: 1 - Object Markers Vertical: N - Not Applicable Unofficial Sufficiency Rating 65.2

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
54	Timber Slab	Underwater	09/26/2016	1121 SF	1121	0	0	0
		Update	11/07/2016	1121 SF	1121	0	0	0
Notes: [2015] TIMBER SHOWS WEAR.								
510	- Wearing Surfaces	Underwater	09/26/2016	1044 SF	1023	0	21	0
		Update	11/07/2016	1044 SF	1023	0	21	0
Notes: [2013-2015] CRACKING & PATCHED POT HOLES THROUGHOUT TOP OF DECK. DECK HAS SHIFTED NORTH APPROX. 1". [2015] TO MUCH DEAD WEIGHT ON DECK, APPROX. 7 1/2" OF BITUMINOUS.								
111	Timber Open Girder/Beam	Underwater	09/26/2016	128 LF	0	128	0	0
		Update	11/07/2016	128 LF	0	128	0	0
Notes: [2013-2015] SHOWS WEAR THROUGHOUT ALL.								
117	Timber Stringer	Underwater	09/26/2016	98 LF	0	98	0	0
		Update	11/07/2016	98 LF	0	98	0	0
Notes: [2013-2015] SHOWS WEAR THROUGHOUT ALL.								
156	Timber Floor Beam	Underwater	09/26/2016	26 LF	26	0	0	0
		Update	11/07/2016	26 LF	26	0	0	0
Notes: [2016] Migrator assumed the presence of one timber floorbeam in CS1.								
216	Timber Abutment	Underwater	09/26/2016	86 LF	0	86	0	0
		Update	11/07/2016	86 LF	0	86	0	0
Notes: [2016] Migrator added 40 LF to abutment quantity to account for wingwalls (CS1:0 CS2:40 CS3:0 CS4:0). [2013-2015] MOVEMENT IN NORTHWEST CORNER ABUTMENT. [2015] SHOWS WEAR.								
Wingwall notes: [2013-2015] DECAY AND EROSION ON ALL.								
228	Timber Pile	Underwater	09/26/2016	20 EA	0	20	0	0
		Update	11/07/2016	20 EA	0	20	0	0
Notes: [2013-2015] MOVEMENT OF 2 COLUMNS IN NORTHWEST CORNER ABUTMENT AND MINOR CRACKING IN ALL COLUMNS. [2015] SHOWS WEAR.								
235	Timber Pier Cap	Underwater	09/26/2016	79 LF	0	79	0	0
		Update	11/07/2016	79 LF	0	79	0	0
Notes: [2013-2015] CROSS BRACE ON PIER AS LARGE SPLIT. [2015] SHOWS WEAR.								

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
332	Timber Bridge Railing	Underwater	09/26/2016	85 LF	0	85	0	0
		Update	11/07/2016	85 LF	0	85	0	0
Notes: [2013-2015] CHECKING & SPLITS IN RAILS AND POSTS.								
800	Critical Deficiencies or Safety Hazards	Underwater	09/26/2016	1 EA	1	0	0	0
		Update	11/07/2016	1 EA	1	0	0	0
Notes: NO CRITICAL FINDINGS OBSERVED DURING THE LAST INSPECTION.								
822	Bituminous Approach Roadway	Underwater	09/26/2016	1 EA	0	1	0	0
		Update	11/07/2016	1 EA	0	1	0	0
Notes: [2013-2015] SETTLEMENT IN ROADWAY AT BOTH ENDS OF BRIDGE.								
885	Scour	Underwater	09/26/2016	1 EA	0	1	0	0
		Update	11/07/2016	1 EA	0	1	0	0
Notes: [2016] There is minor local scour around Pier 1.								
890	Load Posting or Vertical Clearance Signing	Underwater	09/26/2016	1 EA	1	0	0	0
		Update	11/07/2016	1 EA	1	0	0	0
Notes: [2016] Structure requires a vertical clearance sign or load posting sign.								
891	Other Bridge Signing	Underwater	09/26/2016	1 EA	0	1	0	0
		Update	11/07/2016	1 EA	0	1	0	0
Notes: [2013-2015] ALL DELIN. HAVE BEEN SHOT. [2015] ALL DELIN. ARE MARKED UP.								
892	Slopes & Slope Protection	Underwater	09/26/2016	1 EA	0	0	0	1
		Update	11/07/2016	1 EA	0	0	0	1
Notes: [2013-2015] NE CORNER OF BRIDGE NEEDS FILL. ABUTMENT SLOPES NEED RIPRAP.								
894	Deck & Approach Drainage	Underwater	09/26/2016	1 EA	0	1	0	0
		Update	11/07/2016	1 EA	0	1	0	0
Notes: [2013-2015] NEEDS RIPRAP AT BOTH ABUTMENTS AND ALL 4 CORNERS OF BRIDGE.								
900	Protected Species	Underwater	09/26/2016	1 EA	1	0	0	0
		Update	11/07/2016	1 EA	1	0	0	0
Notes: Use this element to track the presence of protected species living on this structure.								
General Notes: INSPECTED BY D.H. & G.J. ON 10-8-15. [2013-2015] HIGH WATER IN CHANNEL CAUSING JUST VISUAL UNDERNEATH INSPECTION FROM EDGES OF CHANNEL.								
58. Deck NBI: [2015] TIMBER SHOWS WEAR. [2013-2015] CRACKING & PATCHED POT HOLES THROUGHOUT TOP OF DECK. DECK HAS SHIFTED NORTH APPROX. 1". [2015] TO MUCH DEAD WEIGHT ON DECK, APPROX. 7 1/2" OF BITUMINOUS.								
36A. Brdg Railings NBI:								
36B. Transitions NBI:								
36C. Appr Guardrail NBI:								
36D. Appr Guardrail Terminal NBI:								
59. Superstructure NBI:								
60. Substructure NBI:								
61. Channel NBI:								

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
-------------	--------------	-------------	------------	----------	-------------	-------------	-------------	-------------

62. Culvert NBI:

71. Waterway Adeq NBI:

72. Appr Roadway
Alignment NBI:

Inspector's Signature

Reviewer's Signature

Pictures

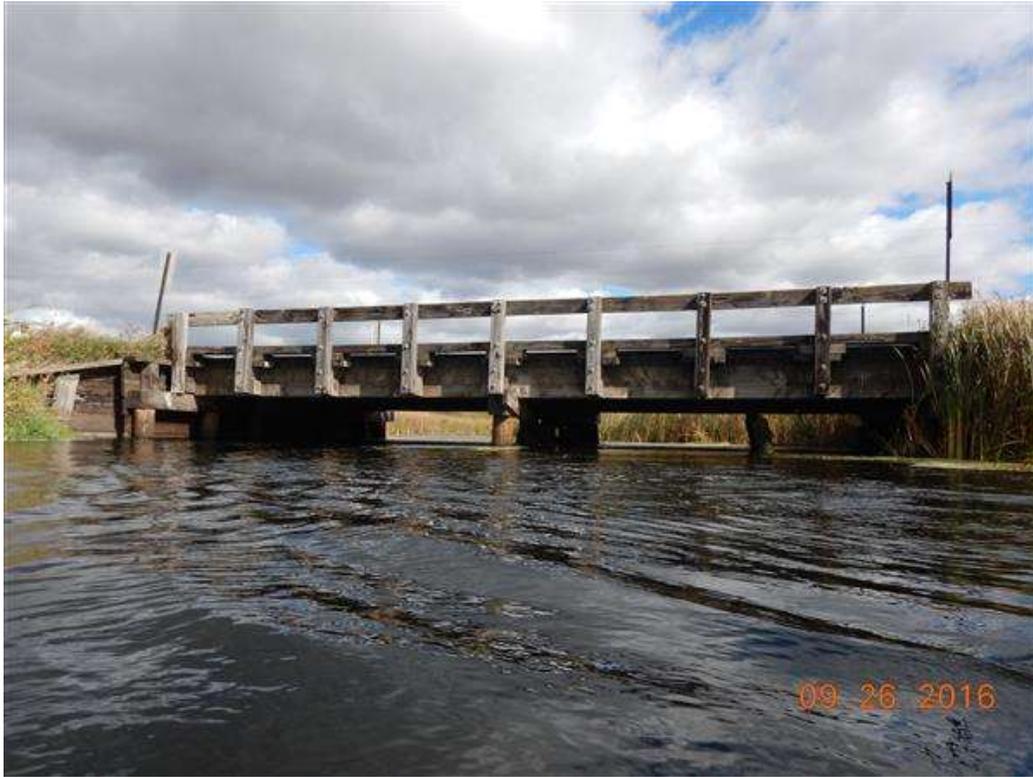


Photo 1 - West Profile



Photo 2 - East Profile

Pictures



Photo 3 - Pier 1 North Side



Photo 4 - Pier 1 South Side

Pictures



Photo 5 - North Abutment



Photo 6 - South Abutment

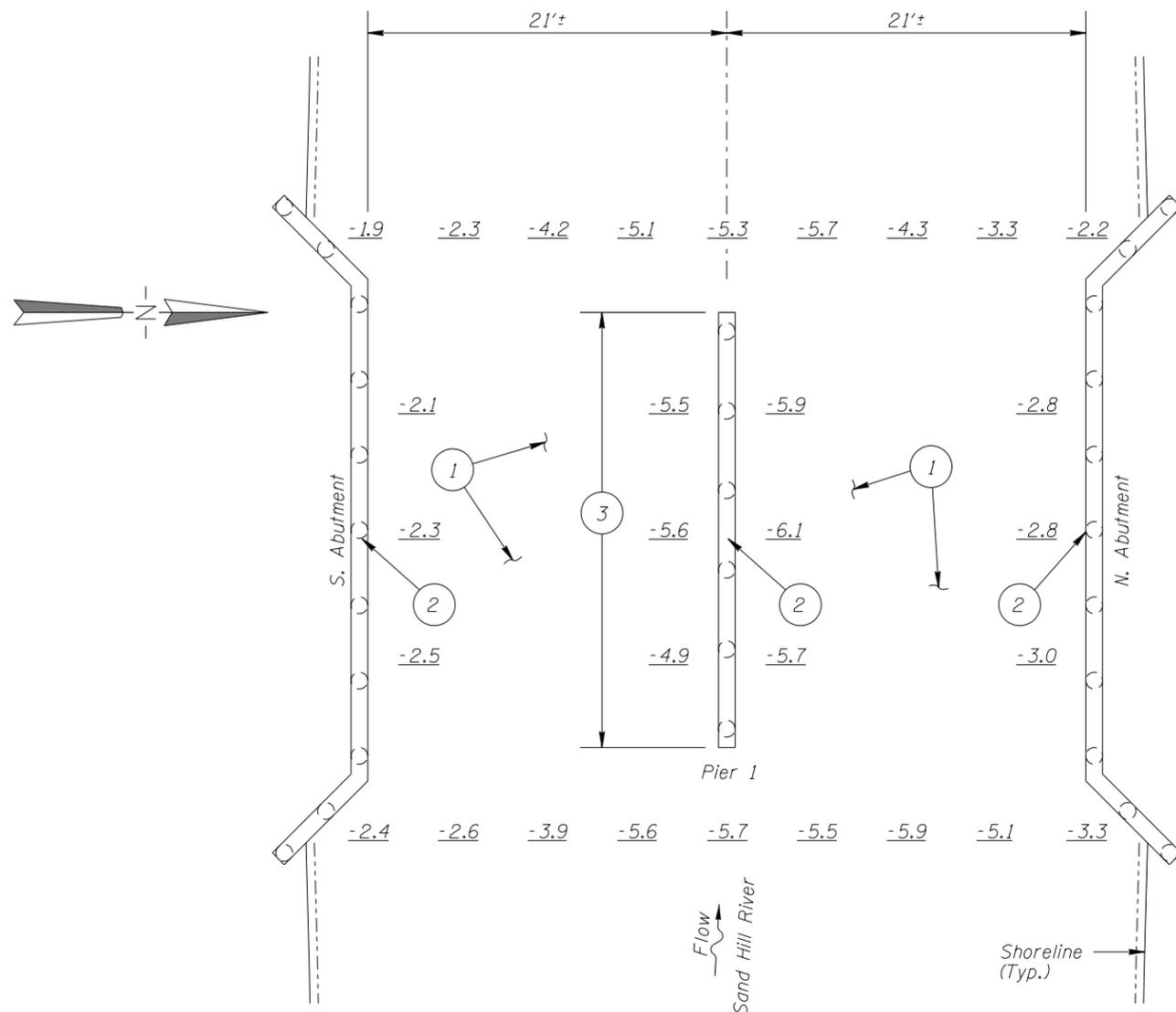
Pictures



Photo 7 - Upstream Channel



Photo 8 - Downstream Channel



INSPECTION NOTES:

- 1 The channel bottom typically consisted of sand.
- 2 The timber piles have minor splits and checks throughout.
- 3 There is minor local scour around Pier 1 extending away from the pier 4 feet at the downstream half of the south side and the entire length of the north side up to 1.2 feet deep.

GENERAL NOTES:

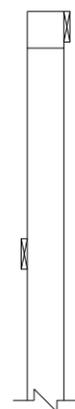
- 1. At the time of inspection on September 26, 2016, the waterline was located approximately 2.8 feet below the west end of the pier at the top of the pier cap. Structure plans are not available. An elevation of 100.0 feet was assumed. This corresponds to a waterline elevation of 97.2 feet.
- 2. Soundings indicate the water depth at the time of inspection and are measured in feet.
- 3. Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units.

Legend

-2.5 Sounding Depth from Waterline (09/26/16)

Note:

All soundings based on 2016 waterline location.



UPSTREAM END VIEW OF PIER

**MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION**

STRUCTURE NO. 89595
OVER THE SAND HILL RIVER
DISTRICT 2, NORMAN COUNTY

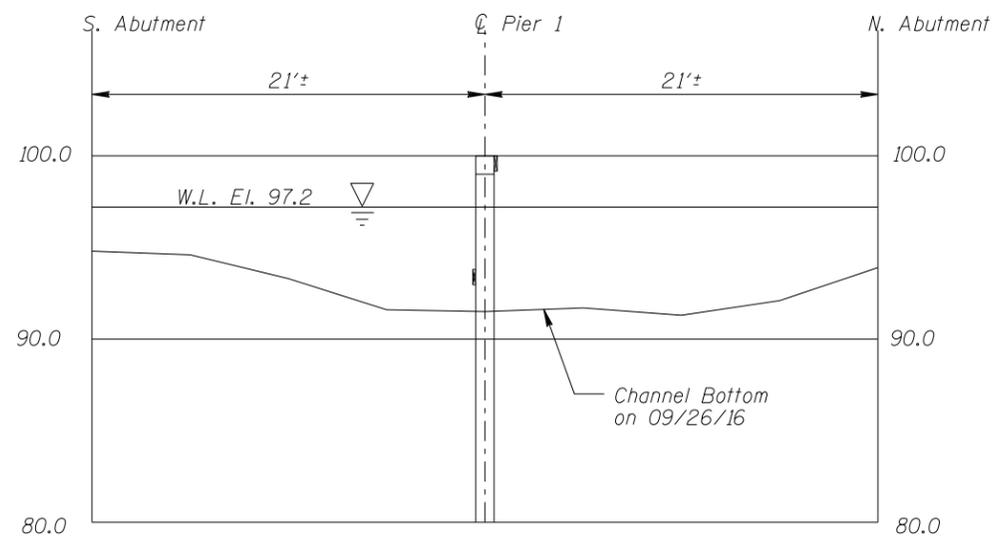
INSPECTION AND SOUNDING PLAN

Drawn By: JCK
Checked By: BKS
Project: 63-9687

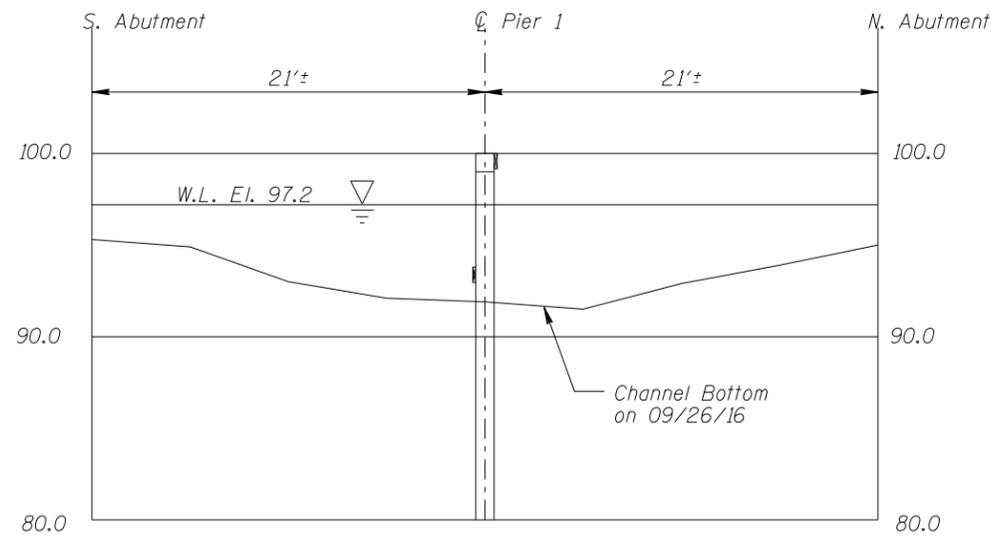
AYRES ASSOCIATES
3433 Oakwood Hills Parkway
Eau Claire, WI 54701
www.AyresAssociates.com

Date: SEPT., 2016
Scale: NTS
Figure No.: 1

COLLINS ENGINEERS
1599 Selby Avenue
Suite 206
St. Paul, MN 55104
(651) 646-8502
www.collinsengr.com



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:
Refer to Figure 1 for General Notes.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 89595 OVER THE SAND HILL RIVER DISTRICT 2, NORMAN COUNTY		
UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
Drawn By: JCK	AYRES ASSOCIATES <small>3433 Oakwood Hills Parkway Eau Claire, WI 54701 www.AyresAssociates.com</small>	Date: SEPT., 2016
Checked By: BKS		Scale: NTS
Project: 63-9687		Figure No.: 2

COLLINS ENGINEERS
1599 Selby Avenue
Suite 206
St. Paul, MN 55104
(651) 646-8502
www.collinsengr.com