

2017 UNDERWATER BRIDGE INSPECTION REPORT



BRIDGE # 58525 CSAH 46 over KETTLE RIVER

DISTRICT: District 1

COUNTY: Pine

CITY/TOWNSHIP: STURGEON LAKE

STATE: Minnesota

Date of Inspection: 09/23/2016

Equipment Used:

Owner: County Highway Agency

Inspected By: Stromberg, Dan

Report Written By: Dan Stromberg

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
BRIDGE 58525 UNDERWATER INSPECTION DRAWINGS 2016	13

UNDERWATER INSPECTION

REPORT SUMMARY

The substructure units inspected at Bridge No. 58525, Piers 1 and 2, were found to be generally in good condition with no defects of structural significance below water. All of the concrete pier columns exhibited minor scaling from 1.5 feet below the waterline to 2.5 feet below the waterline. A minor scour depression has exposed the top of the footing at the upstream end of Pier 1. Minor scour depressions were also observed at each of the three downstream columns of Piers 1 and 2. The top of footing was partially exposed at Pier 2 within the localized scour pockets. Overall, the channel bottom configuration appeared to be in generally stable condition with just the relatively minor scour depressions observed and minimal change in channel bottom configuration since the last inspection. There was a moderate accumulation of timber debris at Pier 2.

INSPECTION FINDINGS

- A. The concrete columns exhibited moderate scaling from 1.5 foot below the waterline to 2.5 feet below the waterline with up to 1/2 inch penetrations.
- B. A scour depression, measuring 3 feet in radius and 1 foot deep, was observed at the upstream end of Pier 1. The scour depression has exposed the top of the footing at the upstream end of the pier. No vertical footing exposure was present.
- C. The channel bottom consisted of sandy gravel with cobbles up to 6 inches in diameter allowing minimal probe rod penetration.
- D. An area of poorly consolidated concrete was observed 3 feet above the waterline and measured 2 foot high by 1 foot wide with up to 1.5 inches of penetration at both upstream and downstream sides of the 2nd column from upstream end of Pier 2.
- E. Scour depressions, measuring up to 2 feet in radius and up to 1 foot deep, were observed at each of the three downstream columns of Pier 1 and 2. The top of footing was exposed at the upstream side of the columns; 1 to 2 feet exposed horizontally. The localized scour pockets partially exposed the top of footing at each of the columns with no vertical face exposure detected.
- F. An area of poorly consolidated concrete and section loss was observed at waterline, 9 inches in diameter with 3 inch maximum penetration, at the downstream side of second column from upstream end of Pier 2. Also at waterline, an area of poorly consolidated concrete and section loss, 1 foot high by 2.5 feet wide with 2 inch maximum penetration, was observed at the upstream side of the second column from upstream end of Pier 2. Reinforcing steel was exposed and lightly corroded in both places.
- G. A moderate accumulation of timber debris, consisting of pieces up to 1 foot in diameter, was present from the channel bottom to 6 inches above the waterline at Pier 2. Debris was observed at the upstream nose and along both sides of Pier 2 and extended up to 40 feet off the nose and up to 10 feet off the west face.
- H. A 10 foot long log, up to 9 inches in diameter, was observed at the upstream nose of Pier 1 approximately 1 foot below the waterline.

RECOMMENDATIONS

- (A) Remove timber debris accumulation at Pier 2. Removal of the timber debris will reduce excessive lateral loads on the pier, limit further debris accumulation, and reduce the likelihood of channel bottom degradation resulting from obstructed flow. Until the timber debris can be removed, monitor for any significant increases in accumulation.
- (B) 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 #: 58525
Feature Intersected: KETTLE RIVER
Facility Carried: CSAH 46
District: District 1
County: 058 - Pine

Bridge Description:

The superstructure consists of three spans of prestressed concrete beams supporting a reinforced concrete deck. The superstructure is supported by two reinforced concrete abutments and two reinforced concrete piers, all founded on steel H-pile supported footings. The piers are numbered 1 and 2 starting from the west.

2. INSPECTION DATA

Professional Engineer/Team Leader: Garrett R. Owens
Inspection Diver: Garrett R. Owens
Date of Underwater Inspection: 09/23/2016
Weather Conditions: Partly Cloudy, 70°F
Underwater Visibility (feet): 3.0 feet
Waterway Velocity (ft/sec): 0.5 ft/sec

3. SUBSTRUCTURE INSPECTION DATA

Substructure(s) Inspected: Piers 1 and 2

General Shape:

The piers consist of four reinforced concrete columns, which are connected by a 15 foot high concrete webwall above the waterline. The columns rest on a rectangular concrete footing that is founded on steel H-piles.

Maximum Water Depth at Substructure(s) Inspected (feet): 5.7 feet

4. WATERLINE DATUM

Water Level Reference: The top of the concrete column at the upstream end of Pier 1.
Waterline Elevation (feet): 1055.5 feet
Description: The waterline was located approximately 23.7 feet below the reference.

5. NBIS CODING INFORMATION

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

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

Item 113: Scour Critical Bridge:

Code: I

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
205	Reinforced Concrete Column	8	EA	7	1		
220	Reinforced Concrete Footing	15	LF	15			
885	Scour	1	EA		1		

UNDERWATER INSPECTION

INSPECTION PROCEDURES

The routine underwater inspection of Bridge 58525 (CSAH 46 over Kettle River) was completed on September 23, 2016. The underwater inspection was conducted from the 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. 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 consist of two reinforced concrete multi-column piers. According to design drawings, the inspected substructure units, Piers 1 and 2, each consist of four reinforced concrete columns founded on a rectangular concrete footing supported by steel H-piles. 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: 58525

CSAH 46 over KETTLE RIVER

Date: 01/06/2017

+ GENERAL +	+ ROADWAY +	+ INSPECTION +																				
Agency Br. No. S59 Crew District 01 Maint. Area County 058 - Pine City Township 58031 - STURGEON LAKE Desc. Loc. 3.2 MI W OF JCT CSAH 61 Sect., Twp., Range 16 - 045N - 20W Latitude 46 ° 23 ' 24.34 " Longitude 92 ° 52 ' 57.36 " Custodian 02 - County Highway Agency Owner 02 - County Highway Agency BMU Agreement Year Built 1985 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 08A Potential ABC 2 - N/A	Bridge Match ID (TIS) 0 Roadway O/U Key Route On Structure Route Sys 04 - CSAH Number 46 Roadway Name or Description FARM TO MARKET RD. Level of Service 1 - MAINLINE Roadway Type 2 - 2-way traffic Control Section (TH Only) Reference Point 008+00.230 Detour Length 12.0 mi. Lanes ON 2 UNDER 0 ADT 540 YEAR 2008 HCA DT ADTT % Functional Class 07 - Rural - Major Collector	Userkey 98 Structurally Deficient N Functionally Obsolete N Sufficiency Rating 94.8 Routine Inspection Date 11/04/2014 Routine Inspection Frequency 24 Inspector Name Stromberg, Dan Status A - Open																				
		+ NBI CONDITION RATINGS +																				
		Deck 7 Unsound Deck % Superstructure 8 Substructure 7 Channel 6 Culvert N																				
		+ NBI APPRAISAL RATINGS +																				
		Structure Evaluation 6 Deck Geometry 7 Underclearances N Waterway Adequacy 9 Approach Alignment 9																				
		+ SAFETY FEATURES +																				
		Bridge Railing 1 - MEETS STANDARDS GR Transition 1 - MEETS STANDARDS Appr. Guardrail 1 - MEETS STANDARDS GR Termini 1 - MEETS STANDARDS																				
		+ 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;">09/23/2016</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	09/23/2016	Pinned Asbly.				Spec. Feat.			
	Y/N	Freq	Date																			
Frac. Critical																						
Underwater		60	09/23/2016																			
Pinned Asbly.																						
Spec. Feat.																						
		+ WATERWAY +																				
		Drainage Area (sq. mi.) 295.0 Waterway Opening (sf.) 2577 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 1 - LOW RISK Year 1997																				
		+ CAPACITY RATINGS +																				
		Design Load 5 - HS 20 Operating Rating 2 - HS TRUCK 27.0 Inventory Rating 2 - HS TRUCK 16.2 Posting VEH: SEMI: DBL: Rating Date 01/25/2016 Overweight Permit Codes A 1 - No B 2 - Straddle C 2 - Straddle Restriction 2 Lanes 2 Lanes																				
+ STRUCTURE +	+ RDWY DIMENSIONS +																					
Service On 1 - Highway Service Under 5 - Waterway Main Span Type 5 - Prestress or Precast 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: 3 APPR: 0 TOTAL: Main Span Length 75.2 ft. Structure Length 230.6 ft. Deck Width (Out-to-Out) 39.3 ft. Deck Material 1 - Concrete Cast-in-Place Wear Surf Type 1 - Monolithic Concrete Wear Surf Install Year Wear Course/Fill Depth 0.00 ft. Deck Membrane 0 - None Deck Rebars 0 - None Deck Rebars Install Year Structure Area (Out-to-Out) 9063 sq. ft. Roadway Area (Curb-to-Curb) 8299 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 22 Rt 22	If Divided NB-EB SB-WB Roadway Width 36.00 ft. ft. Vertical Clearance ft. ft. Max. Vert. Clear. ft. ft. Horizontal Clear. ft. ft. Lateral Clearance ft. ft. Appr. Surface Width 36.0 ft. Bridge Roadway Width 36.0 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) 3 - FTG PILE Pier Foundation (Material/Type) 3 - FTG PILE 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

01/12/2017

Inspector: CO Bridge

BRIDGE 58525 CSAH 46 OVER KETTLE RIVER

County: Pine Location: 3.2 MI W OF JCT CSAH 61 Length: 230.6 ft.
 City: Route: 04 - CSAH 46 Ref. Pt.: 008+00.230 Deck Width: 39.3 ft.
 Township: 58031 - STURGEON LAKE Control Section: Rdwy. Area/ Pct. Unsd: 8299 sq. ft. / %
 Section: 16 Township: 045N Range: 20W Maint. Area: Paint Area/ Pct. Unsd: sq. ft. / %
 Span Type: 5 - Prestressed Concrete 2 - Local Agency Bridge Nbr.: S59 Culvert: N/A
 List: Stringer/Multi-beam or Girder Postings:
 NBI Deck: 7 Super: 8 Sub: 7 Chan: 6 Culv: N
 Open, Posted, Closed: A - Open
 MN Scour Code: I - LOW RISK

Appraisal Ratings - Approach: 9 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 94.8

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
12	Reinforced Concrete Deck	Underwater	01/06/2017	9063 SF	9063	0	0	0
		Migrated Values		9063 SF	9063	0	0	0
	Notes: 2014 VISIBLE CRACKS UNDER DECK WITH EFFLORESCENCE AT CRACKS AND POURABLE JOINT SEAL.							
510	Wearing Surfaces	Underwater	01/06/2017	8299 SF	8133	0	166	0
		Migrated Values		8299 SF	8133	0	166	0
	Notes: Top of Concrete Deck with Epoxy Reinforcement Notes: CRACKS IN DECK, CAUSING SOME LEACHING. 2008 APPROX. 10 LIN. ft. OF SPALLS AT THE WEST POURABLE JOINT AT PROTECTION ANGLE. 2010 THESE HAVE BEEN FILLED WITH RUBBERIZED BITUMINOUS CRACK SEALER, THIS APPEARS TO BE A GOOD SEAL. SAME IN 2012.							
	2014 RUBBERIZED CRACK FILLER APPEARS TO BE HOLDING IN MOST SPALL AREAS.							
109	Prestressed Concrete Open Girder/Beam	Underwater	01/06/2017	899 LF	899	0	0	0
		Migrated Values		899 LF	899	0	0	0
	Notes: PRESTRESS ENDS ON GIRDER UNDER TORN EXPANSION JOINT ARE SHOWING MODERATE RUSTING. 2014 SAME CONDITION							
205	Reinforced Concrete Column	Underwater	01/06/2017	8 EA	7	1	0	0
		Migrated Values		8 EA	7	1	0	0
	Notes: MINOR SCOURING ON CONCRETE AT WATERLINE. HONEYCOMB AREA EAST PIER, SECOND COLUMN FROM NORTH. IN 2006 REBAR IS EXPOSED IN TWO LOCATION OF THIS SPALL. 2014 SAME CONDITION							
215	Reinforced Concrete Abutment	Underwater	01/06/2017	119 LF	110	0	9	0
		Migrated Values		119 LF	110	0	9	0
	Notes: [2016] Migrator added 40 LF to abutment quantity to account for wingwalls (CS1:40 CS2:0 CS3:0 CS4:0). 2014 BITUMINOUS FELT IS BEGINNING TO CREAP OUT IN AREAS AT JOINT BETWEEN DECK AND EAST PARAPER WALL WITH LEACHING BETWEEN DECK AND PARAPET WALL CAUSING WALL STAINING. 5 RUST STAINS AND POPOUTS ON WEST ABUTMENT BELOW BEAM SEATS, 6 in. x 8 in. x 1-1/4 in. HOLE HAS FORMED ON TOP OF ABUTMENT SEAT AT LOCATION OF TORN SEAL. ALSO 2 VERTICAL CRACKS IN WEST ABUTMENT. EAST ABUTMENT HAS 5 VERTICAL CRACKS.							
	Wingwall notes: 2014 NO DEFICIECNIES NOTED							
234	Reinforced Concrete Pier Cap	Underwater	01/06/2017	79 LF	79	0	0	0
		Migrated Values		79 LF	79	0	0	0
	Notes: 2014 NO DEFICIECNIES NOTED							
300	Strip Seal Expansion Joint	Underwater	01/06/2017	39 LF	0	37	0	2
		Migrated Values		39 LF	0	37	0	2
	Notes: 3' TEAR IN RUBBER SEAL AT WEST DECK JOINT WAS REPAIRED IN JUNE 2013. 2014 SEAL HAS 2' TEAR IN REPAIR AREA ALLOWING WATER THROUGH JOINT. REMAINDER OF JOINT HAS SAND IN IT AND SHOULD BE CLEANED.							

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
301	Pourable Joint Seal	Underwater	01/06/2017	72 LF	62	10	0	0
		Migrated Values		72 LF	62	10	0	0
Notes: 4 SPALLS IN A 10 ft. LENGTH ADJACENT TO THE WEST JOINT AT PROTECTION ANGLE. APPROX. 2 in. DEEP. 2010 THIS JOINT WAS FILLED WITH RUBBERIZED BITUMINOUS CRACK SEALER AND APPEARS IN GOOD CONDITION. 2014 RUBBERIZED CRACK FILLER APPEARS TO BE HOLDING								
311	Movable Bearing	Underwater	01/06/2017	16 EA	16	0	0	0
		Migrated Values		16 EA	16	0	0	0
Notes: BEARING PLATE, CURVED PLATE AND PINTLES ON ELASTOMERIC BEARING PADS. 2014 NO DEFICIECNIES NOTED								
313	Fixed Bearing	Underwater	01/06/2017	8 EA	8	0	0	0
		Migrated Values		8 EA	8	0	0	0
Notes: BEARING PLATE, CURVED PLATE AND PINTLES ON ELASTOMERIC BEARING PADS WITH ANCHOR RODS. 2014 NO DEFICIECNIES NOTED								
331	Reinforced Concrete Bridge Railing	Underwater	01/06/2017	459 LF	0	459	0	0
		Migrated Values		459 LF	0	459	0	0
Notes: CRACKING. SURFACE SPALLS\POPOUTS. 2014 MINOR HITS								
800	Critical Deficiencies or Safety Hazards	Underwater	01/06/2017	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
Notes: No critical structural deficiencies or serious safety hazards are present on this structure.								
810	Concrete Decks - Cracking & Sealing	Underwater	01/06/2017	0 LF	0	0	0	0
		Migrated Values		0 LF	0	0	0	0
Notes: 2014 NO MAJOR DEFICIECNIES NOTED, SEE DECK NOTE								
822	Bituminous Approach Roadway	Underwater	01/06/2017	2 EA	0	2	0	0
		Migrated Values		2 EA	0	2	0	0
Notes: 2014 CONCRETE BREAK\SPALL AT WEST END OF DECK, PROTECTION ANGLE HIT AND GONE FOR 8" BOTH APPROACHES SETTLED AND PREVIOUSLY PATCHED\SEALED.								
855	Secondary Members (Superstructure)	Underwater	01/06/2017	27 EA	27	0	0	0
		Migrated Values		27 EA	27	0	0	0
Notes: INCLUDES 6 CONCRETE DIAPHRAGMS AND 21 STEEL DIAPHRAGMS. 2014 STEEL RUSTING AND STAINING THE BEAMS.								
883	Concrete Shear Cracking	Underwater	01/06/2017	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
Notes: QUANTITY BASED ON NUMBER OF BEAMS. 2014 NO DEFICIECNIES NOTED								
891	Other Bridge Signing	Underwater	01/06/2017	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
Notes: 2014 BRIDGE DELINEATORS AND GUARD RAIL DELINEATORS ARE INPLACE.								
892	Slopes & Slope Protection	Underwater	01/06/2017	1 EA	0	1	0	0
		Migrated Values		1 EA	0	1	0	0
Notes: MINOR WASHING ALONG SOUTHEAST SIDE OF CONCRETE BLANKET. WASHOUT HAS GOTTEN WORSE IN 1993, 3 ft. IN DEPTH AND 5 ft. IN WIDTH. SHOULD BE FILLED WITH RIPRAP. BITUMINOUS WATER SEAL HAS TEARS OR IS PULLED LOOSE FROM ABUTMENTS, 100% PULLED LOOSE AT EAST ABUTMENT AND 25% AT WEST ABUTMENT. NE AND NW CORNERS OF GROUTED BLANKET HAVE BROKEN OFF. 2014 SOUTHEAST SIDE WASHOUT IS VEGETATED AND STABLE. EAST ABUTMENT GROUTED BLANKET PULLED AWAY FROM STRUCTURE 4".								

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
893	Guardrail	Underwater	01/06/2017	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
Notes: 2014 NO DEFICIECNIES NOTED								
894	Deck & Approach Drainage	Underwater	01/06/2017	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
Notes: 2014 NO DEFICIECNIES NOTED								
900	Protected Species	Underwater	01/06/2017	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: THERE IS AN UNDERWATER INSPECTION REPORT FOR 2002, 2007 & 2012 ON FILE.
INSPECTOR - TODD LINDSTROM

- 58. Deck NBI:
- 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: AS PER UNDER WATER INSPECTION 7-28-2012
- 62. Culvert NBI:
- 71. Waterway Adeq NBI:
- 72. Appr Roadway Alignment NBI:
- Inventory Notes:

Inspector's Signature

Reviewer's Signature

Pictures



Photo 1 - Overall View of Upstream Fascia, Looking Southwest



Photo 2 - Overall View of Downstream Fascia, Looking Northwest

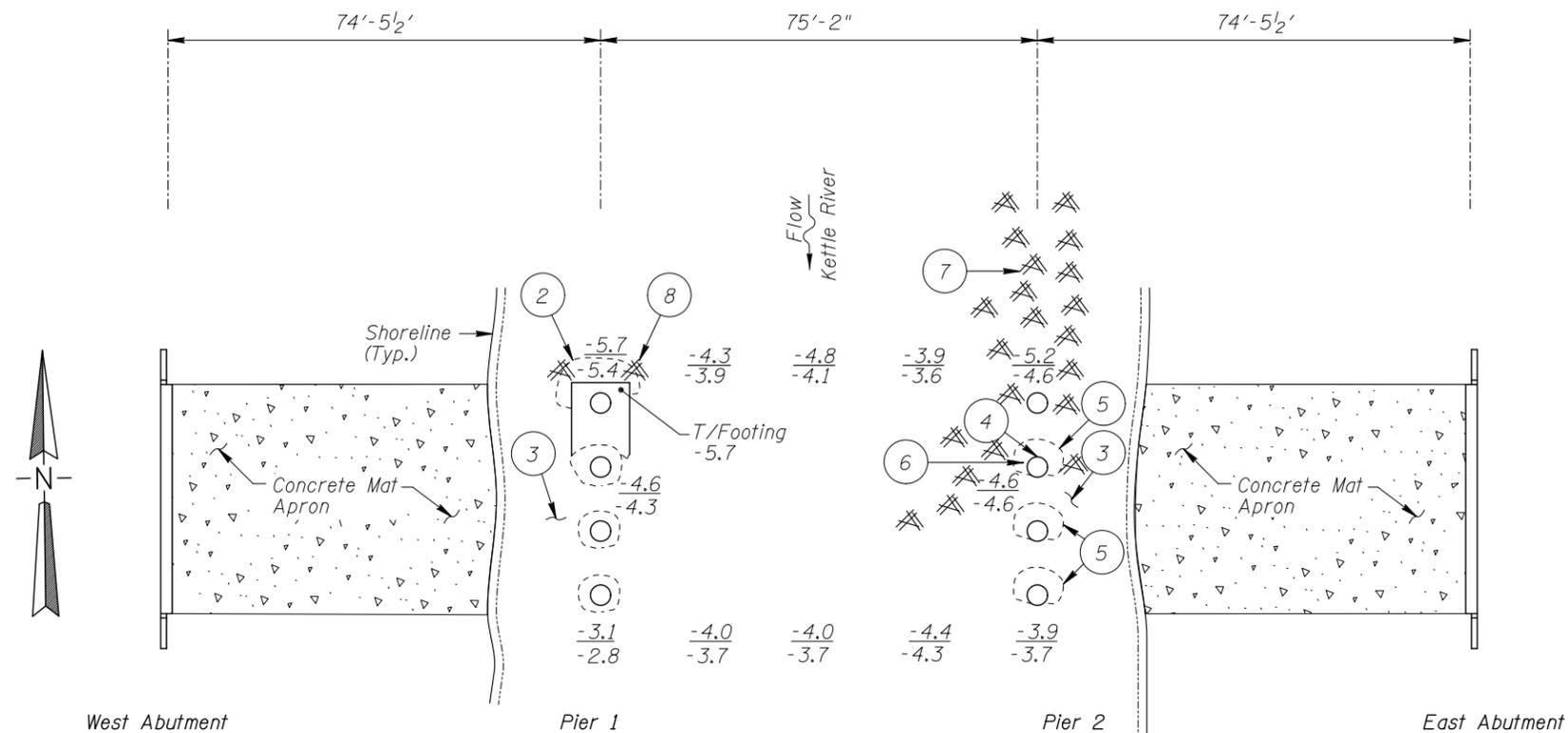
Pictures



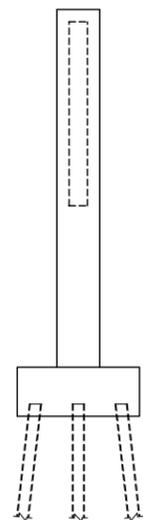
Photo 3 - View of Pier 1, Looking Northeast



Photo 4 - View of Pier 2, Looking Southwest



SOUNDING PLAN



TYPICAL END VIEW OF PIERS

GENERAL NOTES:

1. Piers 1 and 2 were inspected underwater.
2. At the time of inspection on September 23, 2016, the waterline was located approximately 23.7 feet below the top of the concrete column at the upstream end of Pier 1. This corresponds with a waterline elevation of 1055.5 based on design drawings.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.
4. Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units.

INSPECTION NOTES:

- 1 The concrete columns exhibited moderate scaling from 1.5 foot below the waterline to 2.5 feet below the waterline with up to 1/2 inch penetrations.
- 2 A scour depression, measuring 3 feet in radius and 1 foot deep, was observed at the upstream end of Pier 1. The scour depression has exposed the top of the footing at the upstream end of the pier. No vertical footing exposure present.
- 3 The channel bottom consisted of sandy gravel with cobbles up to 6 inches in diameter allowing minimal probe rod penetration.
- 4 An area of poorly consolidated concrete was observed 3 feet above the waterline and measured 2 foot high by 1 foot wide with up to 1.5 inches of penetration at both upstream and downstream sides of the 2nd column from upstream end of Pier 2.
- 5 Scour depressions, measuring up to 2 feet in radius and up to 1 foot deep, were observed at each of the three downstream columns of Pier 1 and 2. The top of footing was exposed at the upstream side of the columns; 1 to 2 feet exposed horizontally. The localized scour pockets partially exposed the top of footing at each of the columns with no vertical face exposure detected.
- 6 An area of poorly consolidated concrete and section loss was observed at waterline, 9 inches in diameter with 3 inches maximum penetration, at the downstream side of second column from upstream end of Pier 2. Also at waterline, an area of poorly consolidated concrete and section loss, 1 foot high by 2.5 feet wide with 2 inch maximum penetration was observed at the upstream side of the second column from upstream end of Pier 2. Reinforcing steel was exposed and lightly corroded in both places.
- 7 A moderate accumulation of timber debris, consisting of pieces up to 1 foot in diameter, was present from the channel bottom to 6 inches above the waterline at Pier 2. Debris was observed at the upstream nose and along both sides of Pier 2 and extended up to 40 feet off the nose and up to 10 feet off the west face.
- 8 A 10 foot long log, up to 9 inches in diameter, was observed at the upstream nose of Pier 1 approximately 1 foot below the waterline.

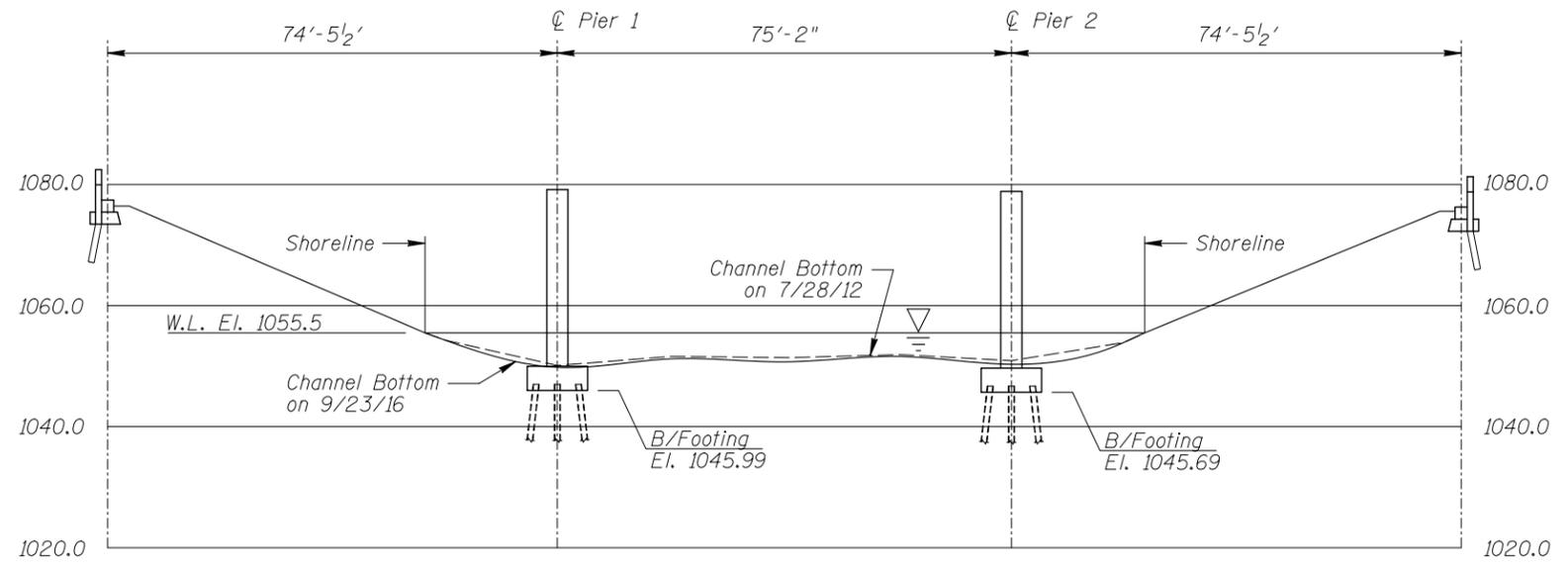
Legend

- 5.0 Sounding Depth (9/23/16)
- 5.2 Sounding Depth (7/28/12)
- Scour Depression
- Timber Debris

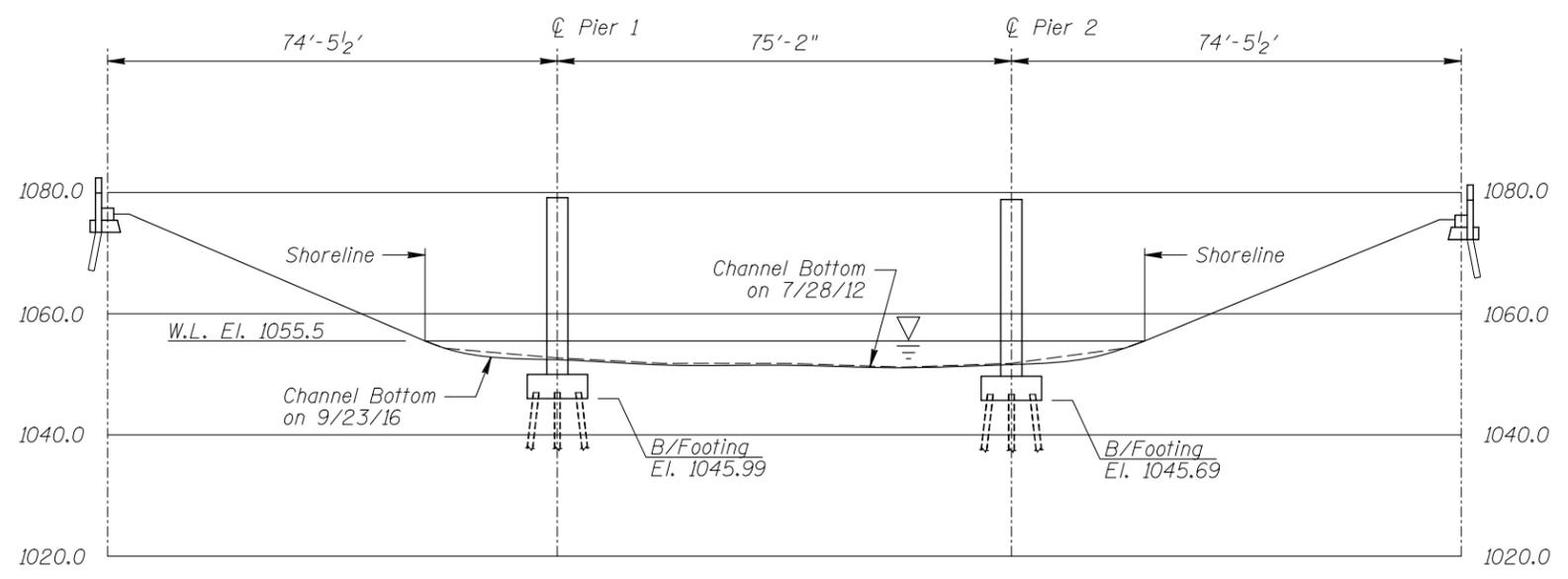
Note:

All soundings based on 2016 waterline location.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 58525 OVER THE KETTLE RIVER DISTRICT 1, PINE COUNTY		
INSPECTION AND SOUNDING PLAN		
Drawn By: BMS	COLLINS ENGINEERS <small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: JAN., 2017
Checked By: DGS		Scale: NTS
Code: 968758525		Figure No.: 1



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:
Refer to Figure 1 for General Notes.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 58525 OVER THE KETTLE RIVER DISTRICT I, PINE COUNTY		
UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
Drawn By: BMS	COLLINS ENGINEERS <small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: JAN., 2017
Checked By: DGS		Scale: 1"=30'
Code: 968758525		Figure No.: 2