

2016 UNDERWATER BRIDGE INSPECTION REPORT



BRIDGE # 14510 CSAH 12 over RED RIVER OF THE NORTH

DISTRICT: District 4 COUNTY: Clay CITY/TOWNSHIP: KURTZ

STATE: Minnesota

Date of Inspection: 11/01/2016

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	12
DRAWINGS	17

UNDERWATER INSPECTION

REPORT SUMMARY

The substructure unit inspected at Bridge No. 14510, Pier 4, was in good condition with no structurally significant defects observed. The top of the concrete footing at the downstream nose of Pier 4 was exposed. The channel bottom was composed of silt with 1 foot of probe rod penetration.

INSPECTION FINDINGS

- (A) Debris accumulation was observed from the streambed to water surface extending 8 feet from Pier 4.
- (B) The streambed was composed of silt with 1 foot probe rod penetration.
- (C) The top of the concrete footing was exposed at the downstream nose of Pier 4.

RECOMMENDATIONS

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

Contractor: Ayres Associates & Collins Engineers, Inc.

Contractor Job Number: 9687

UNDERWATER INSPECTION

1. BRIDGE DATA

Bridge #: 14510
Feature Intersected: RED RIVER OF THE NORTH
Facility Carried: CSAH 12
District: District 4
County: 014 - Clay

Bridge Description:

The bridge superstructure consists of eight spans of multiple steel girders supporting a reinforced concrete deck. The superstructure is supported by two reinforced concrete abutments, three reinforced concrete piers, and four concrete bent piers.

2. INSPECTION DATA

Professional Engineer/Team Leader: Brian K. Schroeder, P.E.
Inspection Diver: Cory L. Thomson, P.E.
Date of Underwater Inspection: 11/01/2016
Weather Conditions: Cloudy, 50°F
Underwater Visibility (feet): 1.0
Waterway Velocity (ft/sec): 0.5

3. SUBSTRUCTURE INSPECTION DATA

Substructure(s) Inspected: Pier 4

General Shape:

The pier consist of two cylindrical reinforced concrete columns supporting a rectangular reinforced concrete pier cap. The columns are connected by a slender reinforced concrete diaphragm. Foundation information was unavailable.

Maximum Water Depth at Substructure(s) Inspected (feet): 11.6

4. WATERLINE DATUM

Water Level Reference: The top of pier cap at the downstream end of Pier 4
Waterline Elevation (feet): 76.2
Description: The waterline was approximately 23.8 feet below reference.

5. NBIS CODING INFORMATION

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

Item 60: Substructure: Code: 8
Item 61: Channel and Channel Protection: Code: 6
Item 62: Culvert: Code:
Item 92B: Underwater Inspection: Code: Y 48 11/2016

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	2	EA	2			
210	Reinforced Concrete Pier Wall	38	LF	38			
220	Reinforced Concrete Pile Cap/Footing	60	LF	55	5		
885	Scour	1	EA	1			

UNDERWATER INSPECTION

INSPECTION PROCEDURES

The routine underwater inspection of Bridge 14510 (CSAH 12 over the Red River of the North) was completed on November 01, 2016. The underwater inspection was conducted from a 21 ft boat. 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 one reinforced concrete pier. No design drawings were available for foundation type. 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

02/07/2017

BRIDGE 14510 CSAH 12 OVER RED RIVER OF THE NORTH

County: Clay Location: 1.4 MI W OF JCT TH 75 Length: 596.7 ft.
 City: Route: 04 - CSAH 12 Ref. Pt.: 000+00.000 Deck Width: 55.3 ft.
 Township: 14019 - KURTZ Control Section: Rdwy. Area/ Pct. Unsnd: 31032 sq. ft. / %
 Section: 6 Township: 138N Range: 48W Maint. Area: Paint Area/ Pct. Unsnd: sq. ft. / %
 Span Type: 4 - Steel Continuous 2 - Local Agency Bridge Nbr.: 12-7 Culvert: N/A
 List: Stringer/Multi-beam or Girder Postings:
 NBI Deck: 7 Super: 7 Sub: 7 Chan: 6 Culv: N
 Open, Posted, Closed: A - Open
 MN Scour Code: I - LOW RISK

Appraisal Ratings - Approach: 7 Waterway: 6 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 94.4

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	11/01/2016	32998 SF	32338	0	660	0
		Migrated Values		32998 SF	32338	0	660	0
	Notes: Underside of the deck has small cracks with efflorescence. Mostly in the center spans over the river. (12)No change (14)No change (15)							
510	Wearing Surfaces	Underwater	11/01/2016	31032 SF	31032	0	0	0
		Migrated Values		31032 SF	31032	0	0	0
	Notes: Top of Concrete Deck with Epoxy Reinforcement Notes: SOME DECK CRACKING WITH EFFLORESCENCE ESPECIALLY THE CENTER 2 SPANS. (94)(95)(96)(97)(98)(99)(00)(01)(02)LOWERED THE DECK TO A 7 BASED ON SMALL CRACKING. (04)(06)Looks the same (08)(10)One small area on ND side in middle of the East bound lane has a small area of 1" deep delamination. (12)The 1" area is now about 1 foot by 1 foot and one other area about 6" around in the center of the East bound lane center span is delaminated also. (14)Cracking exists throughout the deck and are small in density yet. Cracks around the delaminated areas are medium density. 4 More areas of the East boundlane have areas that are distressed, cracked and starting to delaminate. (15)							
107	Steel Open Girder/Beam	Underwater	11/01/2016	2969 LF	2949	20	0	0
		Migrated Values		2969 LF	2949	20	0	0
	Notes: Beams look good with the exception of the cross members under the expansion gland that is tore out on the ND side. Beams and members have flaking rust with very minimal section loss. (12)No change (14)Flaking rust seen under the entire length of the leaking joint.							
515	Steel Protective Coating	Underwater	11/01/2016	999 SF	992	0	7	0
		Migrated Values		999 SF	992	0	7	0
	Notes: [2016] Migrator assumed quantity of 999 SF and estimated the condition states.							
202	Steel Column	Underwater	11/01/2016	2 EA	2	0	0	0
		Migrated Values		2 EA	2	0	0	0
	Notes: Columns have minor freckle rust on surface. (12)No changes. (14)No change (15)							
515	Steel Protective Coating	Underwater	11/01/2016	999 SF	999	0	0	0
		Migrated Values		999 SF	999	0	0	0
	Notes: [2016] Migrator assumed quantity of 999 SF and estimated the condition states.							
205	Reinforced Concrete Column	Underwater	11/01/2016	9 EA	9	0	0	0
		Migrated Values		9 EA	9	0	0	0
	Notes: Concrete columns have small hairline cracks present throughout. (12)No change in size or density this yr. (14)No change (15) [2016 UW] Good condition with no defects of structural significance.							
210	Reinforced Concrete Pier Wall	Underwater	11/01/2016	112 LF	112	0	0	0
		Migrated Values		112 LF	112	0	0	0
	Notes: Concrete pier wall concrete has minor cracks. One area of 1 Sq.Ft. of delaminatin on the face of the pier next to river on MN side right about groundline. (12)No change in size. (14)No change (15) [2016 UW] Good Condition with no defects of structural significance.							

BRIDGE 14510 CSAH 12 OVER RED RIVER OF THE NORTH

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
215	Reinforced Concrete Abutment	Underwater	11/01/2016	152 LF	152	0	0	0
		Migrated Values		152 LF	152	0	0	0
<p>Notes: [2016] Migrator added 40 LF to abutment quantity to account for wingwalls (CS1:40 CS2:0 CS3:0 CS4:0). Conc. abutments are in good shape with no signs of cracking. (12)Some small hairline cracks present. (14)No change (15)</p> <p>Wingwall notes: Wing concrete have minor cracks and minimal deterioration. (12)No change (14)No change (15)</p>								
220	Reinforced Concrete Pile Cap/Footing	Underwater	11/01/2016	60 LF	55	5	0	0
<p>Notes: [2016 UW] The top of Pier 4 footing is exposed at the downstream nose.</p>								
234	Reinforced Concrete Pier Cap	Underwater	11/01/2016	180 LF	180	0	0	0
		Migrated Values		180 LF	180	0	0	0
<p>Notes: Pier caps have minor cracks with some rust staining. (12)No change (14)No change (15)</p>								
300	Strip Seal Expansion Joint	Underwater	11/01/2016	210 LF	155	0	0	55
		Migrated Values		210 LF	155	0	0	55
<p>Notes: 2ND EXPANSION GLAND FROM THE WEST IS TORE COMPLETELY UP, NEEDS TO BE REPLACED. (93)(94)(95)(96)(97)(98)(99)(00)(01)(02)THIS IS CAUSING WATER TO RUN ON BEAMS UNDERNEATH AND RUST THEM. (04)(06)(08)(10)Rest of the glands need cleaning. (12)No change in strip seals. (14)No change (15)</p>								
311	Movable Bearing	Underwater	11/01/2016	20 EA	20	0	0	0
		Migrated Values		20 EA	20	0	0	0
<p>Notes: Expansion bearings are in alignment with minor freckle rust. (12)No change (14)Rockers on the first hinged bent on MN side are tilted some. (15)</p>								
313	Fixed Bearing	Underwater	11/01/2016	10 EA	10	0	0	0
		Migrated Values		10 EA	10	0	0	0
<p>Notes: Fixed bearings at the abutments has some minor flaking rust and minimal section loss. (12)No change (14)Esp. at the abutments on outside that exposed to moisutere. (15)</p>								
321	Reinforced Concrete Approach Slab	Underwater	11/01/2016	720 SF	720	0	0	0
		Migrated Values		720 SF	720	0	0	0
<p>Notes: [2016] Migrator assumed an approach slab length of 20FT and used the inventory quantity of 36FT for the width. New concrete approach panel installed in 2011 on MN side. Looks good. (12)No change (14)MN approach panel has a crack down the centerline area. (15)</p>								
330	Metal Bridge Railing	Underwater	11/01/2016	1191 LF	1012	179	0	0
		Migrated Values		1191 LF	1012	179	0	0
<p>Notes: [2016] Migrator assumed concrete/metal combination type rail. SOME SLIGHT CRACKING IN THE JERSEY BARRIER.(92)(93)(94)(95)(96)(97)(98)(99) ALSO SOME STAINING AND MINOR POPOUTS. (00)(01)(02)(04)(06)(08)(10)Faces of the railing has areas of minor deterioration and delamination. (12)No change (14)No change (15)</p>								
	515 - Steel Protective Coating	Underwater	11/01/2016	999 SF	999	0	0	0
		Migrated Values		999 SF	999	0	0	0
<p>Notes: [2016] Migrator assumed CS1 and a quantity of 999 SF.</p>								
331	Reinforced Concrete Bridge Railing	Underwater	11/01/2016	1191 LF	1012	179	0	0
		Migrated Values		1191 LF	1012	179	0	0
<p>Notes: [2016] Migrator assumed concrete/metal combination type rail. SOME SLIGHT CRACKING IN THE JERSEY BARRIER.(92)(93)(94)(95)(96)(97)(98)(99) ALSO SOME STAINING AND MINOR POPOUTS. (00)(01)(02)(04)(06)(08)(10)Faces of the railing has areas of minor deterioration and delamination. (12)No change (14)No change (15)</p>								
800	Critical Deficiencies or Safety Hazards	Underwater	11/01/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
<p>Notes: NO CRITICAL FINDINGS OBSERVED DURING THE LAST INSPECTION.</p>								

BRIDGE 14510 CSAH 12 OVER RED RIVER OF THE NORTH

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
810	Concrete Decks - Cracking & Sealing	Underwater	11/01/2016	0 LF	0	0	0	0
		Migrated Values		0 LF	0	0	0	0
Notes: Deck surface has small hairline cracks throughout. (12)2 areas of delamination referenced in deck notes. (14)5 more areas are distressed with cracking and small popouts in East bound lane. (15)								
822	Bituminous Approach Roadway	Underwater	11/01/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
Notes: WEST APPROACH TO THE BRIDGE IS VERY ROUGH, NEEDS PATCH. (92) THIS HAS BEEN PATCHED. (93)(94) A LITTLE ROUGH. (95)(96)(97)(98)(99)CASS CO. HAS OVERLAYED THE ND SIDE WHICH NOW HAS A SMOOTH TRANSITION. CLAY CO. SIDE A LITTLE ROUGH. (00)(01)(02)(04)(06)(08)Needs patching on MN side. (10)Mn side now has a concrete approach panel which was installed last year. Smooth and in good condition. (12)No change (14)No change. (15)								
883	Concrete Shear Cracking	Underwater	11/01/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
Notes: Use this element to monitor the presence of shear cracking on concrete elements. Pay particular attention to the concrete pier caps.								
884	Substructure Settlement & Movement	Underwater	11/01/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
Notes: Rockers on the MN side very east pier are rotated some. (12)No change (14)No change. (15)								
885	Scour	Underwater	11/01/2016	1 EA	1	0	0	0
891	Other Bridge Signing	Underwater	11/01/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
Notes: Missing the NW bridge end marker. Also the SE marker is twisted some. (12)Signing is up and looks good. (14)No change (15)								
892	Slopes & Slope Protection	Underwater	11/01/2016	1 EA	0	1	0	0
		Migrated Values		1 EA	0	1	0	0
Notes: NEEDS MORE RIPRAP UNDER SOME OF THE DRAINS AND IN THE S.E. CORNER OF THE BRIDGE. (92)(93) EAST END UNDER DRAINS AND AROUND ABUTMENT FOOTING WASHING A LOT. NEEDS FILL AND RIPRAP. (94)(95)(96)(97)(98)(99)(00)(01)(02)(04)(06)Still (08)(10)Not any worse this year. (12)West slope around the footings is eroded some around the center footing exposing the piling. (14)Drains are causing erosion of the slopes under the bridge on both sides but more prevelant on MN side. ND slope is washing out on first pier on ND side. (15)								
894	Deck & Approach Drainage	Underwater	11/01/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
Notes: Drainage on deck is good. (12)No change (14)No change (15)								
899	Miscellaneous Items	Underwater	11/01/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
Notes: DRAINS NEED PAINTING. (92)(93)(94)(95)(96)(97)(98)(99)(00)(01)(02)(04)(06)(08)(10)(12)CUT BRUSH, TREES AROUND AND UNDER BRIDGE. (92)(93)(94)(95)(96)(97)Maintenance cut trees and brush during the winter of '98. Good now. (98)(99)(00)(01)(02)MN SIDE GOOD BUT ND SIDE NEEDS SOME TREES CUT ALONG BRIDGE. GROWING UP ALONG RAILINGS. (04)(06)Co. has cut brush and trees around the bridge on mn side. ND could use some work also. (08)Needs trees cut next to bridge still on ND side. (10)(12)No change (14)Also there is a deadhead in the river on the MN side about 20' out from bank north side of the bridge that should be removed. (15)								
900	Protected Species	Underwater	11/01/2016	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: PONTIS inspection comments -*BUILT IN 1978 U.S.G.S. BENCH MARK ON S.E. COR. OF BR. ELEV. 909.75

58. Deck NBI:

36A. Brdg Railings NBI:

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
	36B. Transitions NBI:							
	36C. Appr Guardrail NBI:							
	36D. Appr Guardrail Terminal NBI:							
	59. Superstructure NBI:	Lowered CS to 7 based on minor rusting of beams. Also the secondary members at the hinged joints are rusty with some minor section loss due to Gland tore and leaking moisture onto members underneath. (15)						
	60. Substructure NBI:							
	61. Channel NBI:							
	62. Culvert NBI:							
	71. Waterway Adeq NBI:							
	72. Appr Roadway Alignment NBI:							

Inspector's Signature

Reviewer's Signature

Pictures



Photo 1 - North Profile



Photo 2 - South Profile

Pictures



Photo 3 - West Face of Pier



Photo 4 - East Face of Pier

Pictures



Photo 5 - Typical at Waterline



Photo 6 - West Bank

Pictures



Photo 7 - East Bank

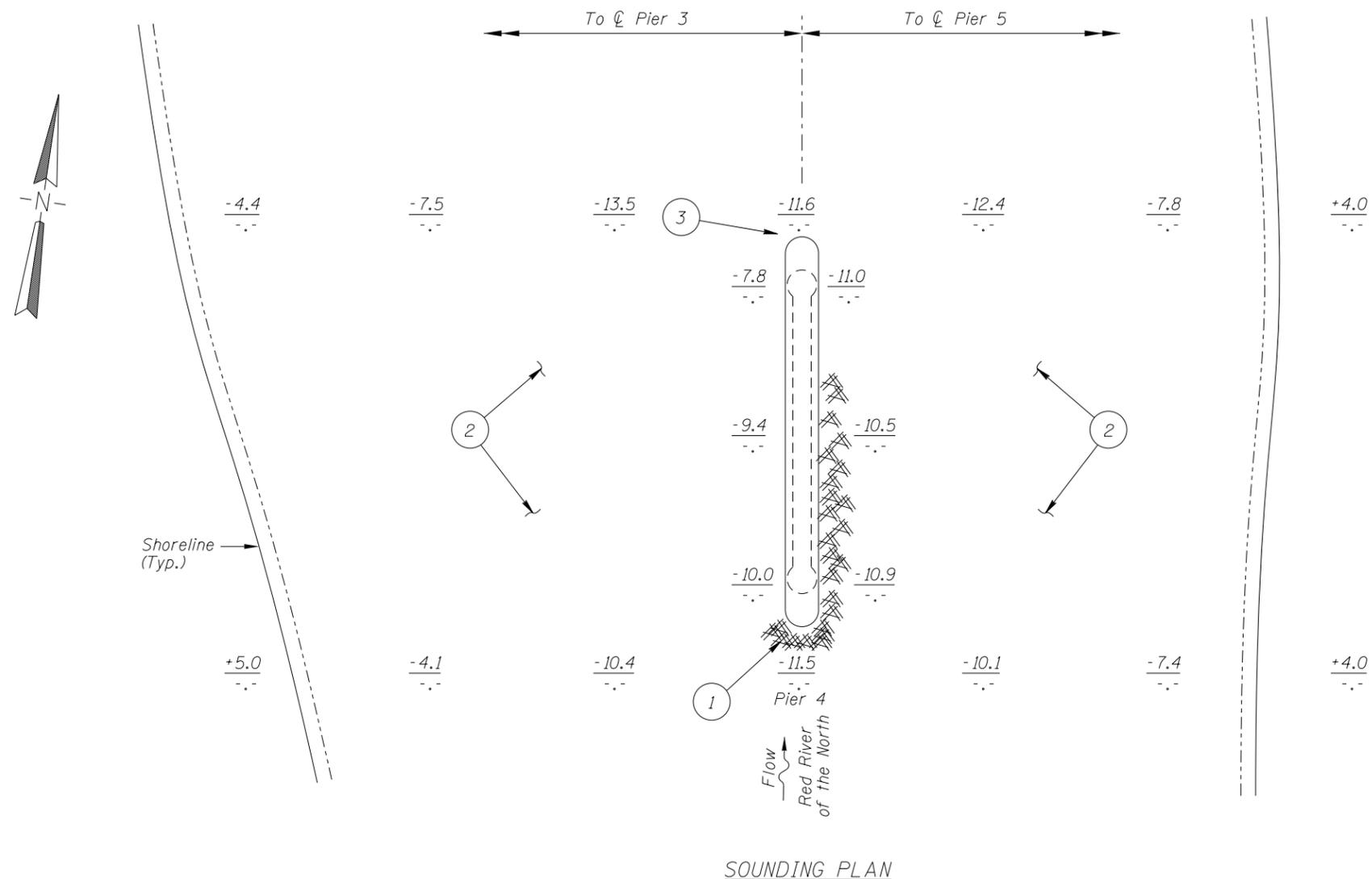


Photo 8 - Upstream Channel

Pictures



Photo 9 - Downstream Channel



SOUNDING PLAN

GENERAL NOTES:

1. Pier 4 was inspected underwater.
2. At the time of inspection on November 01, 2016, the waterline was located approximately 23.8 feet below the top of the pier cap at the downstream end of Pier 4. Since insufficient bridge elevation information was available, a reference elevation of 100.0 was assumed. Based on the assumed reference, the waterline elevation was 76.2.
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 A moderate accumulation of timber debris was observed at the upstream end and along the east face of Pier 4. The debris extended from the channel bottom to the water surface extending 8 feet from the pier.
- ② The channel bottom material consisted of silt with 1 foot of probe rod penetration.
- ③ The top of the Pier 4 footing is exposed at the downstream nose.

Legend

- 2.0 Sounding Depth (11/01/16)
- .- Sounding Depth Not Previously Taken
- Timber Debris

Note:

All soundings based on 2016 waterline location.

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

STRUCTURE NO. 14510
OVER THE RED RIVER OF THE NORTH
DISTRICT 4, CLAY COUNTY

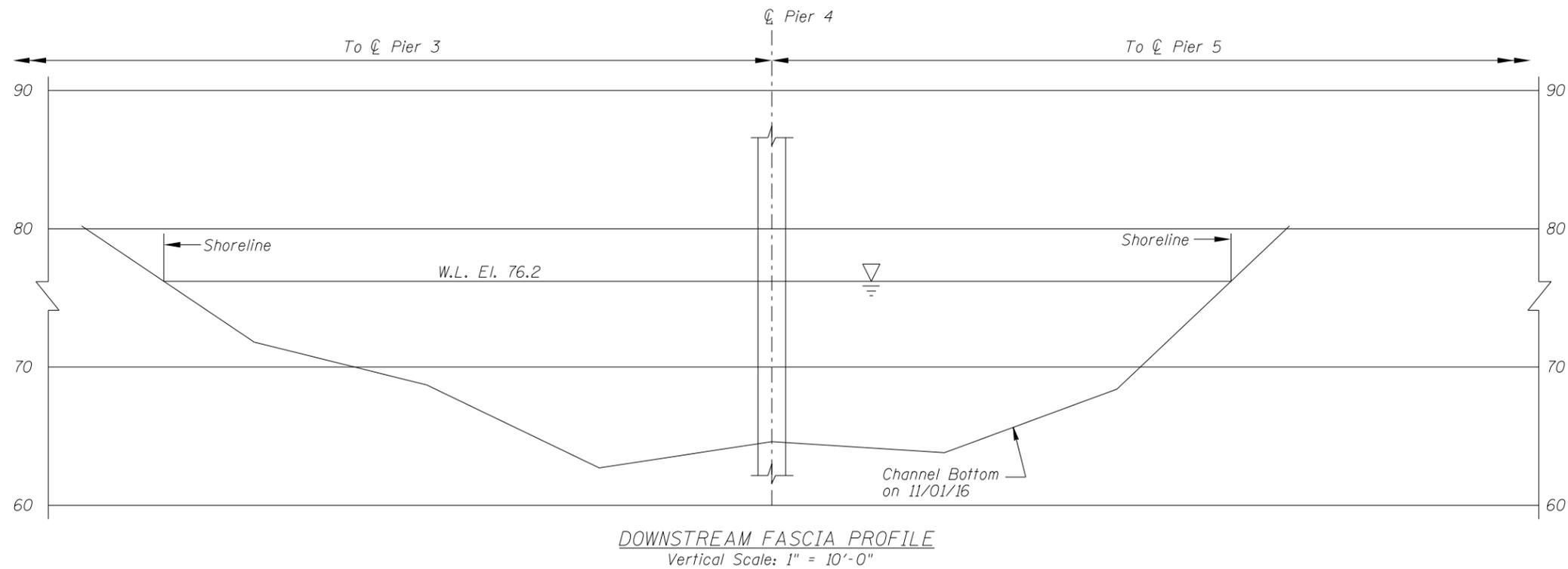
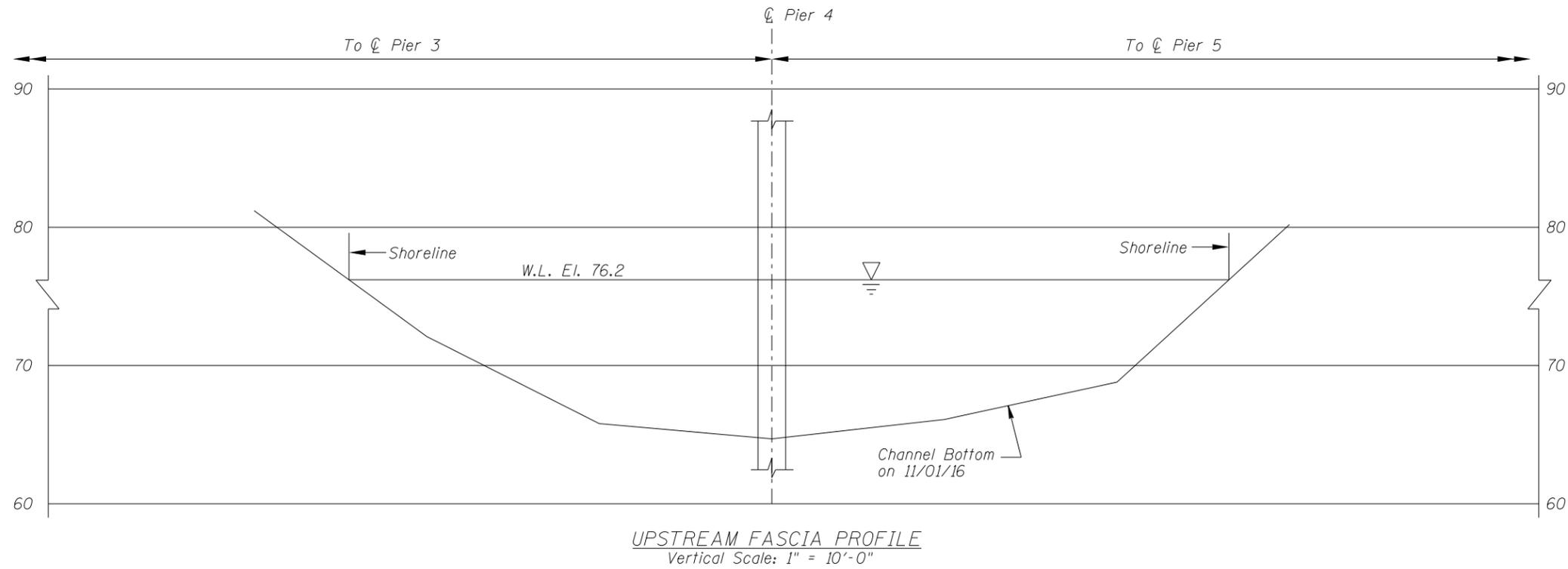
INSPECTION AND SOUNDING PLAN

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

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

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

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



Note:
Refer to Figure 1 for General Notes.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION	
STRUCTURE NO. 14-510 OVER THE RED RIVER OF THE NORTH DISTRICT 4, CLAY COUNTY	
UPSTREAM AND DOWNSTREAM FASCIA PROFILES	
Drawn By: JCK	Date: NOV., 2016
Checked By: BKS	Scale: As Noted
Project: 63-9687	Figure No.: 2

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

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