2016 UNDERWATER
BRIDGE INSPECTION REPORT

BRIDGE # 31556
CSAH 14 over BIG FORK RIVER

DISTRICT: District 1 **COUNTY:** Itasca **CITY/TOWNSHIP:** LIBERTY

STATE: Minnesota

Date of Inspection: 06/04/2016
Equipment Used:

Owner: County Highway Agency

Inspected By: Stromberg, Dan

Report Written By: Dan Stromberg
Report Reviewed By:
Final Report Date:

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UNDERWATER INSPECTION

REPORT SUMMARY

The substructure units inspected below water at Bridge No. 31556, Piers 1 through 3, were found to be generally in good condition with no defects of structural significance at this time. The piles exhibited minor surface corrosion and rust nodules up to 1/4 inch in diameter with negligible pitting or section loss. The channel bottom around the substructure units appeared stable with no scour, and only a light accumulation of timber debris was present at the upstream piles of Piers 1 and 2.

INSPECTION FINDINGS

(A) The steel piles were typically in good condition with coating loss on up to 10% of their surface area and minor surface corrosion with rust nodules up to 1/4 inch in diameter and negligible pitting or section loss.

(B) The abutment slopes were well armored with riprap up to 24 inches in diameter.

(C) The channel bottom material at Piers 1 and 2 typically consisted of sandy gravel allowing up to 2 inches of probe rod penetration. Additionally a 12 inch diameter log was present along the north side of the upstream pile of Pier 2.

(D) A light accumulation of timber debris with logs up to 12 inch diameter was present along the upstream piles of Pier 1.

(E) The channel bottom material around Pier 3 consisted of soft silt allowing up to 1.5 feet of probe rod penetration.

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 #: 31556

Feature Intersected: BIG FORK RIVER

Facility Carried: CSAH 14

District: District 1

County: 031 - Itasca

Bridge Description:

The superstructure consists of four spans of reinforced concrete slab. The superstructure is supported by two reinforced concrete abutments and three steel pipe pile bent piers. The piers are numbered 1 through 3 starting from the south.

2. INSPECTION DATA

Professional Engineer/Team Leader: Daniel G. Stromberg

Inspection Diver: Daniel G. Stromberg

Date of Underwater Inspection: 06/04/2016

Weather Conditions: Overcast, 64°F

Underwater Visibility (feet): 1.0 feet

Waterway Velocity (ft/sec): 1.0 ft/sec

3. SUBSTRUCTURE INSPECTION DATA

Substructure(s) Inspected: Piers 1, 2, and 3

General Shape:

Piers 1 through 3 consist of a single line of 7 steel pipe piles supporting a reinforced concrete cap.

Maximum Water Depth at Substructure(s) Inspected (feet): 6.5 feet

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap at the upstream end of Pier 1.

Waterline Elevation (feet): 1318.27 feet

Description: The waterline was located approximately 6.0 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:	8
Item 62: Culvert:	Code:	
Item 92B: Underwater Inspection:	Code:	Y 48 06/2016

Item 113: Scour Critical Bridge: Code: N

Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

[ ] Yes [X] No (Mark your selection with an X)

6. STRUCTURAL ELEMENT CONDITION RATING

ELEM #	Element Description	Quantity	Unit	Conditions			
				CS1	CS2	CS3	CS4
225	Steel or CIP Piling	21	EA	21			
885	Scour	1	EA	1			

UNDERWATER INSPECTION

INSPECTION PROCEDURES

The routine underwater inspection of Bridge 31556 (CSAH 14 over Big Fork River) was completed on June 4, 2016. The underwater inspection was conducted from 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. Channel bottom 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 three piers. According to the bridge inventory, Piers 1 through 3 are founded on steel pipe piles supporting a reinforced concrete cap. 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: 31556 **CSAH 14 over BIG FORK RIVER** Date: 08/12/2016

+GENERAL+

Agency Br. No.		**Crew**	
District	01	**Maint. Area**	
County	031 - Itasca		
City			
Township	31041 - LIBERTY		
Desc. Loc.	0.5 MI S OF JCT CR 150		
Sect., Twp., Range	6 - 149N - 25W		
Latitude	47 ° 45 ' 32.97 ''		
Longitude	93 ° 54 ' 17.58 ''		
Custodian	02 - County Highway Agency		
Owner	02 - County Highway Agency		
BMU Agreement			
Year Built	2013		
MN Year Reconstructed			
FHWA Year Reconstructed			
MN Temporary Status			
Bridge Plan Location	3 - COUNTY		
Date Opened to Traffic	12/03/2013		
On - Off System	1 - ON		
Legislative District	06A		
Potential ABC	2 - N/A		

+STRUCTURE+

Service On	1 - Highway
Service Under	5 - Waterway
Main Span Type	2 - Concrete Continuous
Main Span Design	09 - Slab 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: 4 **APPR:** 0 **TOTAL:**

Main Span Length	48.0	**ft.**
Structure Length	173.6	**ft.**
Deck Width (Out-to-Out)	35.3	**ft.**
Deck Material	1 - Concrete Cast-in-Place	
Wear Surf Type	1 - Monolithic Concrete	
Wear Surf Install Year	2013	
Wear Course/Fill Depth	0.00 **ft.**	
Deck Membrane	0 - None	
Deck Rebars	1 - Epoxy Coated Reinforcing	
Deck Rebars Install Year	2013	
Structure Area (Out-to-Out)	6136	**sq. ft.**
Roadway Area (Curb-to-Curb)	5555	**sq. ft.**

Sidewalk Width **50A. Lt** 0 **ft.** **50B. Rt** 0 **ft.**

Curb Height	**Lt**	0.00 **ft.**	**Rt**	0.00	**ft.**
Rail Type	**Lt**	22	**Rt**	22	

+ROADWAY+

Bridge Match ID (TIS)	0
Roadway O/U Key	Route On Structure
Route Sys	04 - CSAH **Number** 14
Roadway Name or Description	CSAH 14
Level of Service	1 - MAINLINE
Roadway Type	2 - 2-way traffic
Control Section (TH Only)	
Reference Point	002+00.750
Detour Length	17.0 **mi.**
Lanes	**ON** 2 **UNDER** 0
	ADT 180 **YEAR** 2009
HCADT	**ADTT** **%**
Functional Class	07 - Rural - Major Collector

+RDWY DIMENSIONS+

If Divided	**NB-EB**	**SB-WB**
Roadway Width	32.0 **ft.**	**ft.**
Vertical Clearance	**ft.**	**ft.**
Max. Vert. Clear.	**ft.**	**ft.**
Horizontal Clear.	32.0 **ft.**	**ft.**
Lateral Clearance	**ft.**	**ft.**

Appr. Surface Width	32.0	**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 8 - INTEGRAL
Pier Foundation (Material/Type)	1 - CONC 4 - PILE BENT
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

+INSPECTION+

Userkey	71
Structurally Deficient	N
Functionally Obsolete	N
Sufficiency Rating	97.8
Routine Inspection Date	11/13/2014
Routine Inspection Frequency	24
Inspector Name	Stromberg, Dan
Status	A - Open

+NBI CONDITION RATINGS+

Deck	9	**Unsound Deck %**
Superstructure	9	
Substructure	7	
Channel	8	
Culvert	N	

+NBI APPRAISAL RATINGS+

Structure Evaluation	7
Deck Geometry	7
Underclearances	N
Waterway Adequacy	9
Approach Alignment	8

+SAFETY FEATURES+

Bridge Railing	1 - MEETS STANDARDS
GR Transition	0 - SUBSTANDARD
Appr. Guardrail	0 - SUBSTANDARD
GR Termini	0 - SUBSTANDARD

+IN DEPTH INSP.+

	Y/N	**Freq**	**Date**
Frac. Critical			
Underwater			06/04/2016
Pinned Asbly.			
Spec. Feat.			

+WATERWAY+

Drainage Area (sq. mi.)	536.0
Waterway Opening (sf.)	1332
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	N - STBL - LIM **Year** 2010

+CAPACITY RATINGS+

Design Load	A - HL 93	
Operating Rating	2 - HS TRUCK	42.4
Inventory Rating	2 - HS TRUCK	25.4

Posting **VEH:** **SEMI:** **DBL:**

Rating Date 11/02/2011

Overweight Permit Codes

A N - N/A **B** N - N/A **C** N - N/A

08/31/2016

Inspector: CO Bridge

BRIDGE 31556 CSAH 14 OVER BIG FORK RIVER

County: Itasca
City:
Township: 31041 - LIBERTY
Section: 6 Township: 149N Range: 25W
Span Type: 2 - Concrete Continuous 1 - Slab
List:
NBI Deck: 9 Super: 9 Sub: 7 Chan: 8

Location: 0.5 MI S OF JCT CR 150
Route: 04 - CSAH 14 Ref. Pt.: 002+00.750
Control Section:
Maint. Area:
Local Agency Bridge Nbr.:
Culv: N
Open, Posted, Closed: A - Open
MN Scour Code: N - STBL - LIM SCOUR

Length: 173.6 ft.
Deck Width: 35.3 ft.
Rdwy. Area/ Pct. Unsnd: 5555 sq. ft. / %
Paint Area/ Pct. Unsnd: sq. ft. / %
Culvert: N/A
Postings:

Appraisal Ratings - Approach: 8 Waterway: 9
Required Bridge Signs - Load Posting: 0 - Not Required Traffic: 0 - Not Required
Horizntal: 1 - Object Markers Vertical: N - Not Applicable

Unofficial Structurally Deficient N
Unofficial Functionally Obsolete N
Unofficial Sufficiency Rating 97.8

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
38	Reinforced Concrete Slab	Underwater	08/12/2016	6136 SF	6136	0	0	0
		Migrated Values		6136 SF	6136	0	0	0
	Notes: [2013] Typical down centerline and a few transverse micro cracks at slab bolsters locations noticed.							
	510 - Wearing Surfaces	Underwater	08/12/2016	5555 SF	5555	0	0	0
		Migrated Values		5555 SF	5555	0	0	0
	Notes: Concrete Slab with Bituminous Overlay Notes: No Issues							
215	Reinforced Concrete Abutment	Underwater	08/12/2016	111 LF	111	0	0	0
		Migrated Values		111 LF	111	0	0	0
	Notes: [2016] Migrator added 40 LF to abutment quantity to account for wingwalls (CS1:40 CS2:0 CS3:0 CS4:0).							
225	Steel Pile	Underwater	08/12/2016	21 EA	21	0	0	0
		Migrated Values		21 EA	21	0	0	0
	515 - Steel Protective Coating	Underwater	08/12/2016	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.							
234	Reinforced Concrete Pier Cap	Underwater	08/12/2016	103 LF	103	0	0	0
		Migrated Values		103 LF	103	0	0	0
301	Pourable Joint Seal	Underwater	08/12/2016	64 LF	64	0	0	0
		Migrated Values		64 LF	64	0	0	0
	Notes: Approach to Deck Joint.							
321	Reinforced Concrete Approach Slab	Underwater	08/12/2016	1280 SF	1280	0	0	0
		Migrated Values		1280 SF	1280	0	0	0
	Notes: [2016] Migrator assumed an approach slab length of 20FT and used the inventory quantity of 32FT for the width. [2013] Transverse crack about 3 to 4 ft. out from end of deck joint.							
331	Reinforced Concrete Bridge Railing	Underwater	08/12/2016	347 LF	347	0	0	0
		Migrated Values		347 LF	347	0	0	0
	Notes: [2013] One vertical crack between each construction joint, Typical of most bridges.							

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
800	Critical Deficiencies or Safety Hazards	Underwater	08/12/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
	Notes: NO CRITICAL FINDINGS OBSERVED DURING THE LAST INSPECTION.							
810	Concrete Decks - Cracking & Sealing	Underwater	08/12/2016	0 LF	0	0	0	0
		Migrated Values		0 LF	0	0	0	0
	Notes: [2013] Transverse crack over piers							
822	Bituminous Approach Roadway	Underwater	08/12/2016	2 EA	2	0	0	0
		Migrated Values		2 EA	2	0	0	0
	Notes: [2014] New							
885	Scour	Underwater	08/12/2016	1 EA	1	0	0	0
892	Slopes & Slope Protection	Underwater	08/12/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
	Notes: Seems as built.							
893	Guardrail	Underwater	08/12/2016	4 EA	4	0	0	0
		Migrated Values		4 EA	4	0	0	0
894	Deck & Approach Drainage	Underwater	08/12/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
900	Protected Species	Underwater	08/12/2016	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: Inspected by TR, [2013-2014], Approach panels crack at 12" to thick tapered area to appr. seat.

July 2014: Bridge 31556 added to inventory by MnDOT Bridge Office.

The January 1, 2014, "dummy" inspection was created by the MnDOT Bridge Office --- THIS IS NOT AN ACTUAL FIELD INSPECTION.

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: All piles typically in good condition with only minor surface corrosion and rust nodules up to 1/4 inch.

61. Channel NBI:

62. Culvert NBI:

71. Waterway Adeq NBI:

72. Appr Roadway Alignment NBI:

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

Inventory Notes:

Inspector's Signature

Reviewer's Signature

Pictures

Photo 1 - Upstream Fascia, Looking Northeast

Photo 2 - Downstream Fascia, Looking Southwest

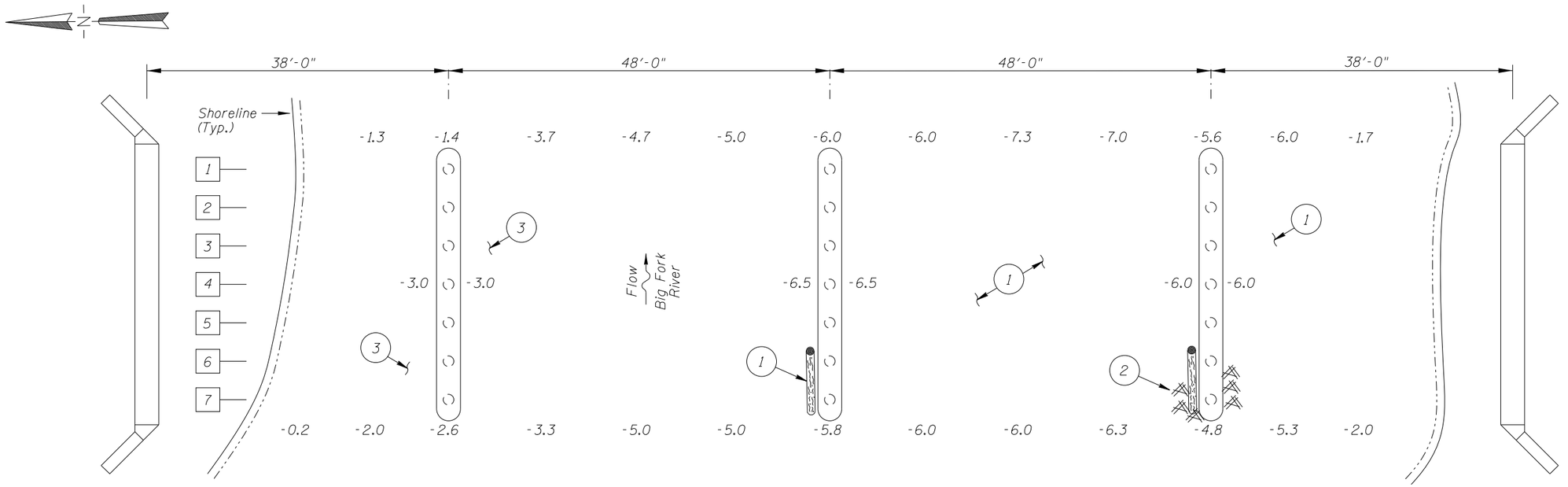
Pictures

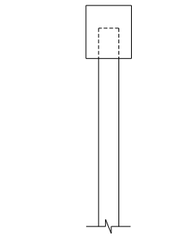
Photo 3 - Pier 1, Looking Northeast

Photo 4 - Pier 2, Looking Southwest

Pictures

Photo 5 - Pier 3, Looking Southwest





TYPICAL END VIEW OF PIERS

SOUNDING PLAN

GENERAL NOTES:

1. Piers 1, 2, and 3 were inspected underwater.
2. At the time of inspection, on June 4, 2016, the waterline was located approximately 6.0 feet below the top of the pier cap at the upstream end of Pier 1. This corresponds with a waterline elevation of 1318.27 based on the design plans.
3. The steel piles were typically in good condition with coating loss on up to 10% of their surface area and minor surface corrosion with rust nodules up to 1/4 inch in diameter and negligible pitting or section loss.
4. The abutment slopes were well armored with riprap up to 24 inch diameter.
5. Soundings indicate the water depth at the time of inspection and are measured in feet.
6. Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units.

INSPECTION NOTES:

(1) The channel bottom material at Piers 1 and 2 typically consisted of sandy gravel allowing up to 2 inches of probe rod penetration. Additionally, a 12 inch diameter log was present along the north side of the upstream pile at Pier 2.

(2) A light accumulation of timber debris with logs up to 12 inch diameter was present along the upstream piles of Pier 1.

(3) The channel bottom material around Pier 3 consisted of soft silt allowing up to 1.5 feet of probe rod penetration.

Legend

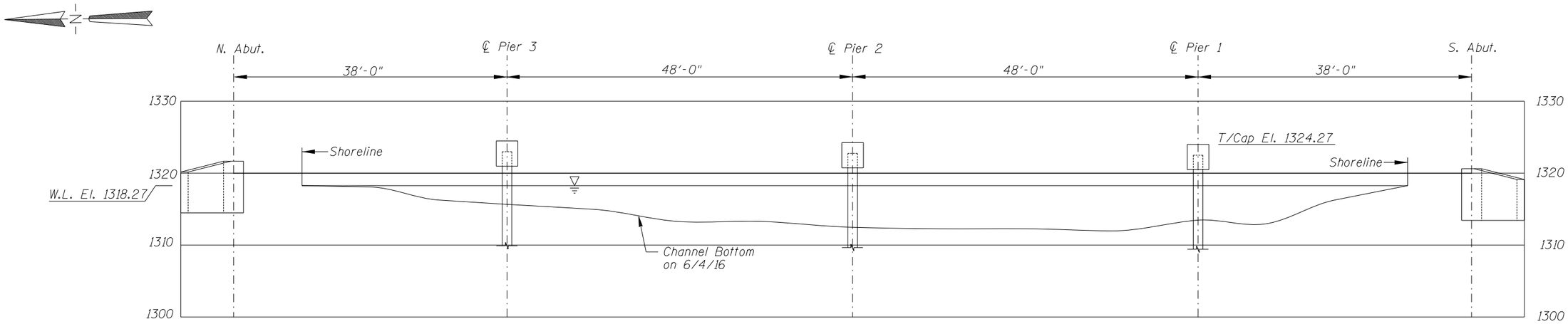
-4.8	Sounding Depth (6/4/16)
( )	Steel Pile
5	Pile Number Designation
	Timber Debris
	Timber (Log) Debris

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

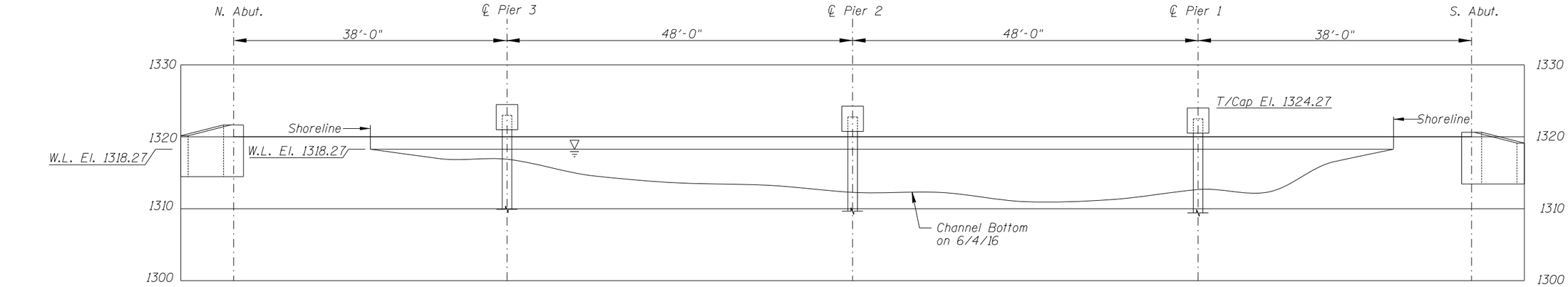
STRUCTURE NO. 31556
OVER BIG FORK RIVER
DISTRICT 1, ITASCA COUNTY

INSPECTION AND SOUNDING PLAN

DRAWN BY: ELN	COLLINS ENGINEERS 123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	DATE: JUNE 4, 2016
CHECKED BY: DGS		SCALE: NTS
CODE: 968731556		FIGURE NO.: 1



UPSTREAM FASCIA PROFILE
Vertical Scale: 1"=15'-0"



DOWNSTREAM FASCIA PROFILE
Vertical Scale: 1"=15'-0"

Note:

Refer to Figure 1 for General Notes.

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

STRUCTURE NO. 31556
OVER BIG FORK RIVER
DISTRICT 1, ITASCA COUNTY

UPSTREAM AND DOWNSTREAM
FASCIA PROFILES

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CHECKED BY: DGS		SCALE: NTS (U.O.N.)
CODE: 968731556		FIGURE NO.: 2