

**2016 UNDERWATER
BRIDGE INSPECTION REPORT**



**BRIDGE # 01506
CSAH 1 over MISSISSIPPI RIVER**

DISTRICT: District 3

COUNTY: Aitkin

CITY/TOWNSHIP: AITKIN

STATE: Minnesota

Date of Inspection: 06/08/2016

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 at Bridge No. 01506, Piers 2 and 3, were found to be generally in satisfactory condition with no defects of structural significance observed. The steel piles exhibited light to at times moderate surface corrosion with minor section loss. There was a moderate accumulation of timber debris scattered throughout Pier 3 from channel bottom to 5 feet below the waterline. The channel bottom around the substructure units consisted of soft silt, but appeared stable with no evidence of significant scour. It should be noted that Pier 4 is normally dry and addressed as part of the above water inspection, and was only partially located in the water due to temporary elevated water levels.

INSPECTION FINDINGS

(A) The channel bottom material around Pier 2 consisted of silty sand allowing 6 to 8 inches of probe rod penetration.

(B) The channel bottom material around Pier 3 consisted of soft silt allowing up to 8 inches of probe rod penetration.

(C) The steel pipe piles exhibited 100 percent coating failure with light to moderate corrosion and minor rust nodules with up to 1/8 inch deep pitting (1/16 inch typical) over 50 percent of the surface area from the waterline to 8 feet above, and on 100% of the surface area below water.

(D) The steel pipe piles at Pier 3 exhibited 1/16 inch thick rust delaminations due to corrosion from the waterline to the channel bottom.

(E) A moderate accumulation of timber debris consisting of 1 foot diameter and smaller logs and branches was observed along the entire length of Pier 2 at the channel bottom.

(F) A moderate accumulation of timber debris consisting of 1 foot diameter and smaller logs and branches was observed extending from the channel bottom to 5 feet below the waterline at the upstream end extending to the upstream quarter points of Pier 3.

RECOMMENDATIONS

(A) Monitor timber debris accumulations around the piles at Piers 2 and 3 during future inspections, and if found to be progressing, removal may become warranted, to eliminate excessive lateral loads on piers and the potential for scour.

(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 #: 01506
Feature Intersected: MISSISSIPPI RIVER
Facility Carried: CSAH 1
District: District 3
County: 001 - Aitkin
Bridge Description:

The superstructure consists of five prestressed concrete beam simple spans. The superstructure is supported by two reinforced concrete abutments and four steel pipe pile bent piers with reinforced concrete caps. The abutments are also supported by steel pipe piles. The piers are labeled Pier 1 through 4 starting from the south end of the bridge.

2. INSPECTION DATA

Professional Engineer/Team Leader: Daniel G. Stromberg
Inspection Diver: Daniel G. Stromberg
Date of Underwater Inspection: 06/08/2016
Weather Conditions: Cloudy, 70°F
Underwater Visibility (feet): 2.0 feet
Waterway Velocity (ft/sec): 1.0 ft/sec

3. SUBSTRUCTURE INSPECTION DATA

Substructure(s) Inspected: Piers 2 and 3

General Shape:

Pier 2 consists of a single line of eight steel pipe cast-in-place piles. Pier 3 consists of two lines of five battered steel pipe cast-in-place piles each.

Maximum Water Depth at Substructure(s) Inspected (feet): 15.0 feet.

4. WATERLINE DATUM

Water Level Reference: Top of the pile cap at the downstream end of Pier 3.
Waterline Elevation (feet): 1188.8
Description: The waterline was approximately 17.5 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: 6
Item 62: Culvert: Code:
Item 92B: Underwater Inspection: Code: Y 48 06/2016

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
382	Cast in Place Piling	18	EA		18		
885	Scour	1	EA	1			

UNDERWATER INSPECTION

INSPECTION PROCEDURES

The routine underwater inspection of Bridge 01506 (CSAH 1 over Mississippi River) was completed on June 8, 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 two of the four steel pipe pile bent piers with reinforced concrete caps. The Piers are labeled Pier 1 through 4 starting from the south end of the bridge, with Piers 2 and 3 being inspected. 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: 01506

CSAH 1 over MISSISSIPPI RIVER

Date: 08/05/2016

+ GENERAL +	+ ROADWAY +	+ INSPECTION +																				
Agency Br. No. Crew District 03 Maint. Area County 001 - Aitkin City Township 01001 - AITKIN Desc. Loc. 0.5 MI N OF JCT TH 210 Sect., Twp., Range 24 - 047N - 27W Latitude 46 ° 32 ' 25.66 " Longitude 93 ° 42 ' 26.93 " Custodian 02 - County Highway Agency Owner 02 - County Highway Agency BMU Agreement Year Built 1970 MN Year Reconstructed FHWA Year Reconstructed MN Temporary Status - Bridge Plan Location 3 - COUNTY Date Opened to Traffic 1/1/1901 On - Off System 1 - ON Legislative District 03B Potential ABC 2 - N/A	Bridge Match ID (TIS) 0 Roadway O/U Key Route On Structure Route Sys 04 - CSAH Number 1 Roadway Name or Description CSAH 1 (410TH AVE) Level of Service 1 - MAINLINE Roadway Type 2 - 2-way traffic Control Section (TH Only) Reference Point 000+00.490 Detour Length 19.9 mi. Lanes ON 2 UNDER 0 ADT 3750 YEAR 2008 HCA DT ADTT % Functional Class 07 - Rural - Major Collector	Userkey 41 Structurally Deficient N Functionally Obsolete N Sufficiency Rating 87.8 Routine Inspection Date 10/21/2014 Routine Inspection Frequency 24 Inspector Name Stromberg, Dan Status A - Open																				
		+ NBI CONDITION RATINGS +																				
		Deck 6 Unsound Deck % Superstructure 6 Substructure 6 Channel 6 Culvert N																				
		+ NBI APPRAISAL RATINGS +																				
		Structure Evaluation 6 Deck Geometry 5 Underclearances N Waterway Adequacy 8 Approach Alignment 8																				
		+ SAFETY FEATURES +																				
		Bridge Railing 1 - MEETS STANDARDS GR Transition 0 - SUBSTANDARD 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: 15%; text-align: center;">Freq</th> <th style="width: 15%; 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;">06/08/2016</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	06/08/2016	Pinned Asbly.				Spec. Feat.			
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Underwater		60	06/08/2016																			
Pinned Asbly.																						
Spec. Feat.																						
		+ WATERWAY +																				
		Drainage Area (sq. mi.) 6140.1 Waterway Opening (sf.) 4295 Navigation Control 0 - No nav. control on Pier Protection <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Nav. Clr. (ft.)</td> <td style="width: 30%; text-align: center;">Vert. 0.0</td> <td style="width: 40%; text-align: center;">Horiz. 0.0</td> </tr> </table> Nav. Vert. Lift Bridge Clear. (ft.) MN Scour Code I - LOW RISK Year 1990	Nav. Clr. (ft.)	Vert. 0.0	Horiz. 0.0																	
Nav. Clr. (ft.)	Vert. 0.0	Horiz. 0.0																				
		+ CAPACITY RATINGS +																				
		Design Load 4 - H 20 Operating Rating 2 - HS TRUCK 26.8 Inventory Rating 2 - HS TRUCK 16.0 Posting VEH: SEMI: DBL: Rating Date 04/07/2015 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 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: 5 APPR: 0 TOTAL: Main Span Length 72.2 ft. Structure Length 364.2 ft. Deck Width (Out-to-Out) 39.4 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) 14605 sq. ft. Roadway Area (Curb-to-Curb) 13078 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 03 Rt 03	If Divided NB-EB SB-WB Roadway Width 36.09 ft. ft. Vertical Clearance ft. ft. Max. Vert. Clear. ft. ft. Horizontal Clear. ft. ft. Lateral Clearance ft. ft. Appr. Surface Width 36.1 ft. Bridge Roadway Width 36.1 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) 8 - CIP 4 - PILE BENT Historic Status 5 - Not eligible																					
	+ PAINT +																					
	Year Painted 1970 Unsound Paint % Painted Area sq. ft. Primer Type 1 - Lead - non 3309 Finish Type F - - Phenolic Resin Alum																					
	+ BRIDGE SIGNS +																					
	Posted Load 0 - Not Required Traffic 0 - Not Required Horizontal 1 - Object Markers Vertical N - Not Applicable																					

MINNESOTA BRIDGE INSPECTION REPORT

09/09/2016

Inspector: CO Bridge

BRIDGE 01506 CSAH 1 OVER MISSISSIPPI RIVER

County: Aitkin Location: 0.5 MI N OF JCT TH 210 Length: 364.2 ft.
 City: Route: 04 - CSAH 1 Ref. Pt.: 000+00.490 Deck Width: 39.4 ft.
 Township: 01001 - AITKIN Control Section: Rdwy. Area/ Pct. Unsnd: 13078 sq. ft. / %
 Section: 24 Township: 047N Range: 27W Maint. Area: Paint Area/ Pct. Unsnd: sq. ft. / %
 Span Type: 5 - Prestressed Concrete 2 - Local Agency Bridge Nbr.: Culvert: N/A
 List: Stringer/Multi-beam or Girder Postings:
 NBI Deck: 6 Super: 6 Sub: 6 Chan: 6 Culv: N
 Open, Posted, Closed: A - Open
 MN Scour Code: 1 - LOW RISK

Appraisal Ratings - Approach: 8 Waterway: 8 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 87.8

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	08/05/2016	14605 SF	14313	0	292	0
		Migrated Values		14605 SF	14313	0	292	0
Notes: [2012-2014] Cracks with Efflorescence: 3 in S-1 (south span), 7 in S-2, 5 in S-3, 3 in S-4, and 1 in S-5 (north span). [2010] There is a crack going full width in the south span with efflorescence. [2009] AREAS OF EFFLORESCENCE ARE APPROXIMATE AREA OF THE LARGER CRACKS IN THE TOP SIDE OF THE DECK, but not as numerous and no rust stains apparent.								
510	Wearing Surfaces	Underwater	08/05/2016	13078 SF	12816	0	262	0
		Migrated Values		13078 SF	12816	0	262	0
Notes: Top of Concrete Deck with Uncoated Rebar Notes: [2014] 2 popouts about 1' x 1.5' have now been repaired. Chain drag revealed 185 SF delaminated areas over 27 spots. 1.4% of deck is unsound (delamination). Also see Element No 358 for deck cracking. [2012] 16" x 11" x 1" deep popout near SB inside wheel track @ S poured deck joint. Popped out sometime after winter weather conditions started. [2011] Counted 48 transverse cracks in the deck and 3 longitudinal cracks near at north end. Also a 2" x 10" piece of conc broken out at the center of the north end of the north span. [2010] Chain drag revealed 22 areas of delamination mostly near the centerline in the north and south spans. Also numerous popouts 1/4 to 3/4 in deep. [2009] There are several 3 in dia. pop outs in the 2nd. span from the south. There is map cracking over much of the deck area, in addition to the 43 small transverse cracks and two 1/4 in wide transverse cracks. [2008] CHAIN DRAG RESULTS= 10 TO 15 SQ.FT. OF DELAMINATION (11 AREAS). THERE ARE NUMEROUS TRANSVERSE CRACKS. Many areas of 1/4 in delamination on deck. An area on the south expansion joint 4 in by 2 ft has lost conc.								
109	Prestressed Concrete Open Girder/Beam	Underwater	08/05/2016	1814 LF	1814	0	0	0
		Migrated Values		1814 LF	1814	0	0	0
Notes: [2014] No visible structural defects on prestressed beams. [2011] Rust is forming on the sole plate of the beam at the bearing plate area GOOD CONDITION								
215	Reinforced Concrete Abutment	Underwater	08/05/2016	129 LF	125	4	0	0
		Migrated Values		129 LF	125	4	0	0
Notes: [2016] Migrator added 40 LF to abutment quantity to account for wingwalls (CS1:40 CS2:0 CS3:0 CS4:0). [2014] N abut between beams 3 and 4 has 4" x 8" delamination in rusty area. N abut also has 1 minor crack between beams 1 and 2 and another 3 cracks between beams 4 and 5. Abutment seat and bearings were cleaned in 2014. [2012] N abut rust stain, cracking expanded since 11. [2011] Picture added of north abut. rust area. Picture of rusty crack on north abutment. [2010] There are 8 minor vertical cracks in the south abutment wall. The cracks are not in the bearing area of the beams. [2009] The north crack is about 30 in. long. [2006] THE 2 CRACKS HAVE BECOME 1 LARGE CRACK IN THE NORTH ABUTMENT. THERE IS A SMALL VERTICAL CRACK IN THE SOUTH ABUTMENT. [2007] THERE APPEARS TO BE SOME LESS LEAKING FROM THE SOUTH EXPANSION JOINT.								
Wingwall notes: [2012-2014] Appear OK.								

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
225	Steel Pile	Underwater	08/05/2016	34 EA	0	34	0	0
		Migrated Values		34 EA	0	34	0	0
<p>Notes: [2014] No new defects. [2012] Underwater Inspection: The steel pipes exhibited 100 percent coating failure with light to moderate corrosion and rust nodules with up to 1/8" deep pitting (1/16" typical) over 50 percent of the surface area from 8' to 2' above the water line and 100 percent of the surface area below water. The steel pipe piles at pier 3 exhibited 1/16" thick rust delaminations due to corrosion from the waterline to the channel bottom. LOSS OF PAINT AT GROUND/WATER LINE SOME SCALING ABOVE GROUND/WATER LINE. SOME DEEP PITTING ON PIER PILE BELOW NORMAL WATER LINE.</p>								
515 -	Steel Protective Coating	Underwater	08/05/2016	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>								
234	Reinforced Concrete Pier Cap	Underwater	08/05/2016	167 LF	167	0	0	0
		Migrated Values		167 LF	167	0	0	0
<p>Notes: [2010-2014] Moss growing on the end of caps with some minor cracking on the bottom of the caps.</p>								
301	Pourable Joint Seal	Underwater	08/05/2016	79 LF	64	15	0	0
		Migrated Values		79 LF	64	15	0	0
<p>Notes: [2014] Adhesion failure in 9 LF in N deck joint, 6 LF in S deck joint. 15 LF total in CS 2 for loss of adhesion. [2012] Adhesion failure in 10 LF.</p>								
305	Assembly Joint without Seal	Underwater	08/05/2016	79 LF	0	70	0	9
		Migrated Values		79 LF	0	70	0	9
<p>Notes: [2012-2014] S joint leaks at CL, SB lane. 9LF to cond 3 for severe deterioration. [2011] Picture of expansion joints. All assembly deck joint areas in CS 2 or lower for deterioration of concrete adjacent to joint, loss of steel or loose connections that have been welded. [2010] The expansion plates have been welded in place and sealed in rubber stuff. [2008-2009] NORTH APPROACH WEST SIDE IS LOOSE. SOUTH STILL HAS THE BROKEN PIECE. [2007] THE PLATE WAS WELDED IN THE MISSING BOLT HOLES, BUT SOME HAVE BROKEN LOOSE ALREADY. THERE ARE ONLY 2 BOLTS HOLDING THE NORTH PLATE ON. THE WEST SIDE 7 BOLTS ARE BROKEN OFF. THE SOUTH PLATE HAS LOST 3 BOLTS. ALSO A 2 FT. PIECE OF THE BACKING PLATE HAS BEEN BROKEN OFF ON THE EAST SIDE.</p>								
311	Movable Bearing	Underwater	08/05/2016	10 EA	0	10	0	0
		Migrated Values		10 EA	0	10	0	0
<p>Notes: [2014] Bearings and seats cleaned in 2014. No new defects. [2012] Expansion bearings show no signs of movement, but deck joint has visible scrape about 1" wide today (16 deg today), so bridge superstructure is likely able to move. Moved add'l 5 bearings to cond 2. Pack rust flaking. Crayon marks in NE and SW corners at deck plates placed to monitor expansion. [2010] Rust is flaking off some of the bearings. [2008] THEY APPEAR TO BE WORKING. THE BEARINGS ON THE SOUTH ARE MORE RUSTY THAN THOSE ON THE NORTH.</p>								
313	Fixed Bearing	Underwater	08/05/2016	40 EA	40	0	0	0
		Migrated Values		40 EA	40	0	0	0
<p>Notes: [2012-2014] No apparent distress at fixed bearings at piers.</p>								
331	Reinforced Concrete Bridge Railing	Underwater	08/05/2016	728 LF	728	0	0	0
		Migrated Values		728 LF	728	0	0	0
<p>Notes: [2010-2012] Some orange and green stain on railing. SE corner end block has exposed rebars in a pop-out. [2008] THERE ARE MINOR CRACKS AT THE BOTTOM OF THE RAIL POSTS.</p>								
800	Critical Deficiencies or Safety Hazards	Underwater	08/05/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
<p>Notes: No critical structural deficiencies or serious safety hazards are present on this structure.</p>								

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	08/05/2016	0 LF	0	0	0	0
		Migrated Values		0 LF	0	0	0	0
	Notes: [2014] 63 transverse cracks about 1/8" wide typ. spaced 1' to 6' apart with occasional 20' spacing. 10-12 longitudinal cracks about 1/8" wide of significance. Numerous hairline transverse and longitudinal cracks. Cracks increase in density over piers. [2010-2012] Changed to moderate cracking and density. 2010 cond 3. MINOR CRACKS WITH EFFLORESCE SHOWING ON THE UNDERSIDE.							
822	Bituminous Approach Roadway	Underwater	08/05/2016	2 EA	2	0	0	0
		Migrated Values		2 EA	2	0	0	0
	Notes: [2014] Fair condition. [2009] The N approach is newly graded and paved. [2008] THERE IS SOME SETTLEMENT IN THE NORTH APPROACH. GOOD APPROACHES. BITUMINOUS MAT AND CONC. CURB AND GUTTER ON SOUTH APPROACH							
855	Secondary Members (Superstructure)	Underwater	08/05/2016	1 EA	0	1	0	0
		Migrated Values		1 EA	0	1	0	0
	Notes: [2014] N abut diaphragm between beams 2 and 3, 2.5" of concrete on the bottom has broken off. Exposed rebar with flaking rust. Looks like #6 rebar with 25% section loss in trans reinforcement. Stirrups (vert reinf.) have 5-10% sect loss. Diaphragm between beams 3 and 4 has cracks 1/8" wide full width 2-3" from bottom. Pics. [2012] Add'l loss of section in N and S abut diaphragms. N pier diaphragm cracking in W, 2nd from W, and E bays. Moved to cond 2. [2011] South pier east of center diaphragm top of north side has a chip and potential loss of conc. on west side of center diaphragm. pic of North abutment diaphragm [2010] North abutment diaphragm west of center has a 1/2 in. crack in the bottom. NORTH ABUTMENT DIAPHRAGM EAST OF CENTER HAS A CRACK AND POTENTIAL LOSS OF CONC. ON THE INSIDE BOTTOM CORNER 3 IN, X 3 IN. FULL LENGTH							
883	Concrete Shear Cracking	Underwater	08/05/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
	Notes: [2012-2014] No visible shear cracking present.							
885	Scour	Underwater	08/05/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
	Notes: [2012] Underwater inspection: There was a moderate accumulation of timber debris scattered throughout pier 3 from channel bottom up 10'. The channel bottom around the substructure units consisted of soft silt, but appeared stable with no evidence of significant scour. USCE was on the ice checking the scour and flow rate.							
891	Other Bridge Signing	Underwater	08/05/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
	Notes: [2007-2014] NEW SIGNS							
892	Slopes & Slope Protection	Underwater	08/05/2016	1 EA	0	1	0	0
		Migrated Values		1 EA	0	1	0	0
	Notes: [2014] CS 2 for exposure of abut footing at S abut and settlement of slope protection elsewhere. [2011] Trees and brush have been cut. [2010] NE & NW corners have washing from the pavement to the wing walls. Trees and brush are growing on the NE & SE corners. [2007] SETTLEMENT ON THE SOUTH HAS EXPOSED THE ABUTMENT FOOTING. RIP-RAP IS GONE ON THE SOUTH SIDE. ALSO SOME WATER IS RUNNING FROM THE LEAKS IN THE EXP. JOINT DOWN THE ABUTMENT AND ON TO THE SLOPE AREA WITH POTENTIAL FOR WASHING. MOST OF THE SMALLER ROCKS ARE GONE FROM THE NORTH SLOPE.							
893	Guardrail	Underwater	08/05/2016	2 EA	2	0	0	0
		Migrated Values		2 EA	2	0	0	0
	Notes: [2009-2014] No guardrail on S side; N guardrail is new in 2009.							
894	Deck & Approach Drainage	Underwater	08/05/2016	1 EA	0	1	0	0
		Migrated Values		1 EA	0	1	0	0
	Notes: [2014] Cleaned deck, railing and beam seats/bearings. [2012] No new deficiencies. New approach grading to the north. SOME WATER SITS ON THE DECK EDGE. WATER COMING OFF THE DECK IN THE NORTHEAST CORNER HAS WASHED A LARGE AREA BEHIND THE WINGWALL.							

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
895	Sidewalk, Curb, & Median	Underwater	08/05/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
Notes: [2012-2014] OK. Not technically a sidewalk. Curb is part of the railing.								
900	Protected Species	Underwater	08/05/2016	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: [2012] Underwater inspection found the substructure units to be in generally satisfactory condition with no defects of structural significance.
 [2011] The 'AITKIN' sign on the east railing the straps holding the sign on are broken
 [2009] 112 A CHAIN DRAG REVEALED 3 AREAS OF DELAMINATION ALONG THE NORTH EXPANSION JOINT THERE ARE SEVERAL SMALL AREAS OF CONCRETE LOSS ON THE DECK.
 5 SMALL AREAS OF DELAMINATION FOUND IN 98 CHECK
 3 ON THE NORTH EXPANSION JOINT (THESE HAVE POPPED OUT IN 2002)
 1 ON THE SOUTH EXPANSION JOINT
 1 ON CENTERLINE ABOUT 100' FROM SOUTH APPROACH

58. Deck NBI: [2014] Two popout areas have been repaired. 1.4% delamination on wearing surface.
 [2012] Deck has moderate cracking visible on topside and underside with minor delaminations on less than 1%.

36A. Brdg Railings NBI:

36B. Transitions NBI: No guardrail on S approach. 30 MPH zone. Guardrail on N approach installed 2009. End post does not meet current standards.

36C. Appr Guardrail NBI: No guardrail on S approach. 30 MPH zone. Guardrail on N approach installed 2009.

36D. Appr Guardrail Terminal NBI: No guardrail on S approach. 30 MPH zone. Guardrail on N approach installed 2009.

59. Superstructure NBI: [2012:] Moved to a 6 due to rust, section loss in bearings and deck condition. Pre-stressed beams look fine. See comments on item No. 012, 303, 359, 380.

60. Substructure NBI: [2012] Underwater inspection warranted condition 6 due to moderate surface corrosion with minor section loss on the CIP piling.

61. Channel NBI: [2012] Underwater inspection warranted condition 6 due to a moderate accumulation of timber debris scattered throughout pier 3. Soundings also indicated minor sediment in the channel.

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 Structure, Looking Southeast.



Photo 2 - Overall View of Structure, Looking Southwest.

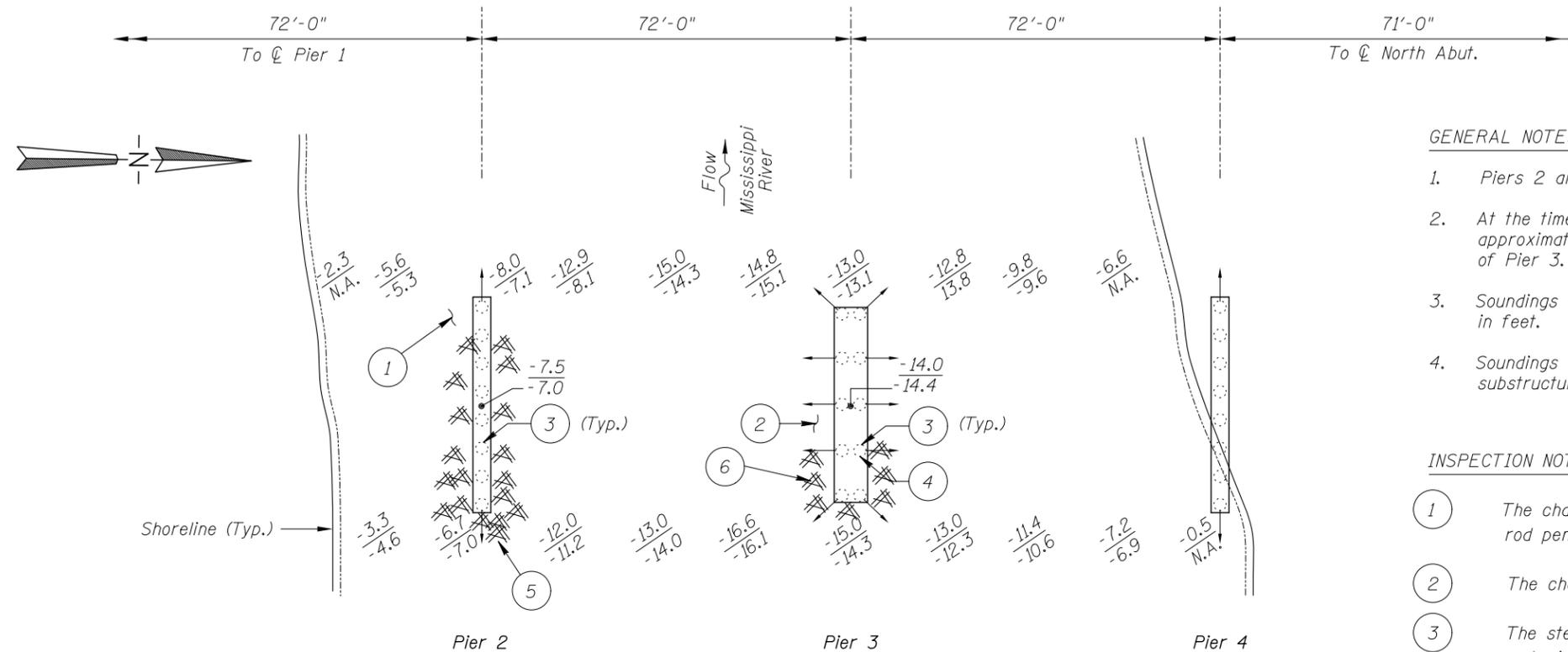
Pictures



Photo 3 - Overall View of Pier 2, Looking Northeast.



Photo 4 - Overall View of Pier 3, Looking Southeast.



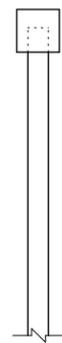
SOUNDING PLAN

GENERAL NOTES:

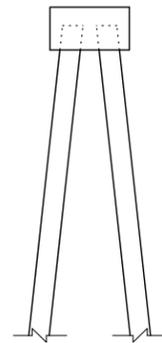
1. Piers 2 and 3 were inspected underwater.
2. At the time of inspection on June 8, 2016, the waterline was located approximately 17.5 feet below the top of the pile cap at the downstream end of Pier 3. This corresponds to a waterline elevation of 1188.8.
3. Soundings indicate the water depth at the 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 channel bottom material consisted of silty sand with 6 to 8 inches of probe rod penetration.
- 2 The channel bottom material consisted of soft silt with up to 8 inches of probe rod penetration.
- 3 The steel pipe piles exhibited 100 percent coating failure with light to moderate corrosion and minor rust nodules with up to 1/8 inch deep pitting (1/16 inch typical) over 50 percent of the surface area from waterline to 8 feet above waterline, and on 100 percent of the surface area below water.
- 4 The steel pipe piles at Pier 3 exhibited 1/16 inch thick rust delaminations due to corrosion from the waterline to the channel bottom.
- 5 A moderate accumulation of timber debris consisting of 1 foot diameter and smaller logs and branches was observed along the entire length of Pier 2 at the channel bottom.
- 6 A moderate accumulation of timber debris consisting of 1 foot diameter and smaller logs and branches was observed extending from the channel bottom to 5 feet below the waterline at the upstream end extending to the upstream quarter points of Pier 3.



TYPICAL END VIEW OF PIERS 1, 2 & 4



END VIEW OF PIER 3

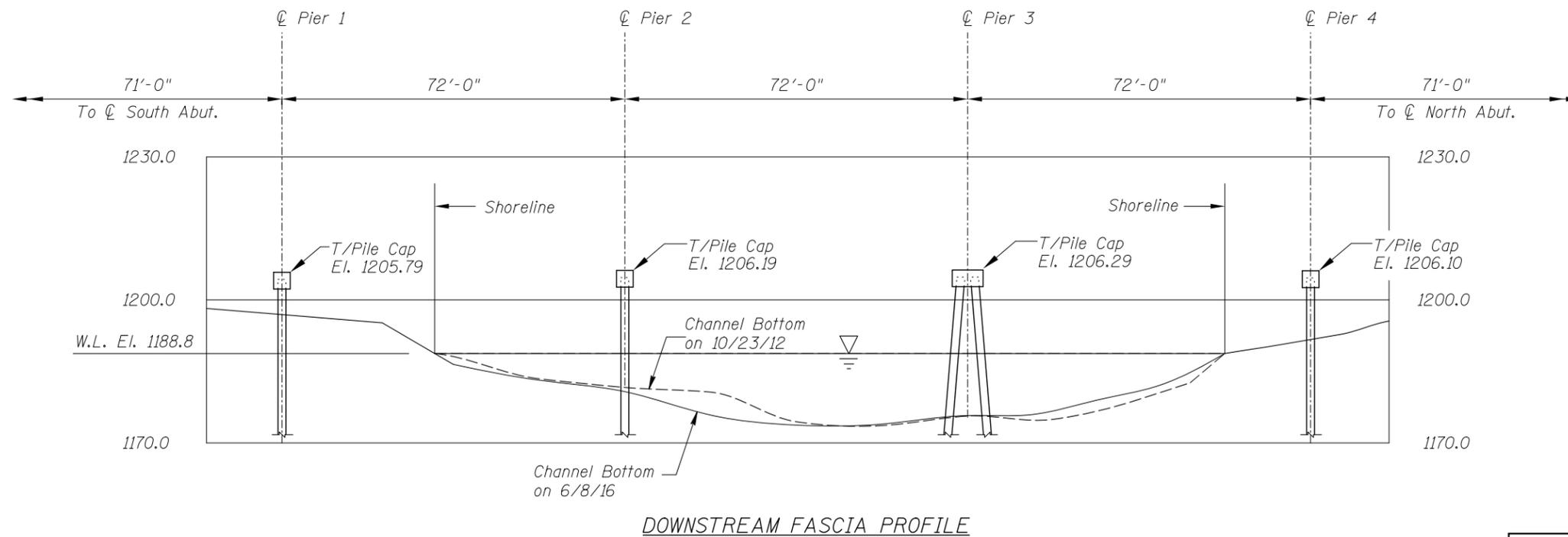
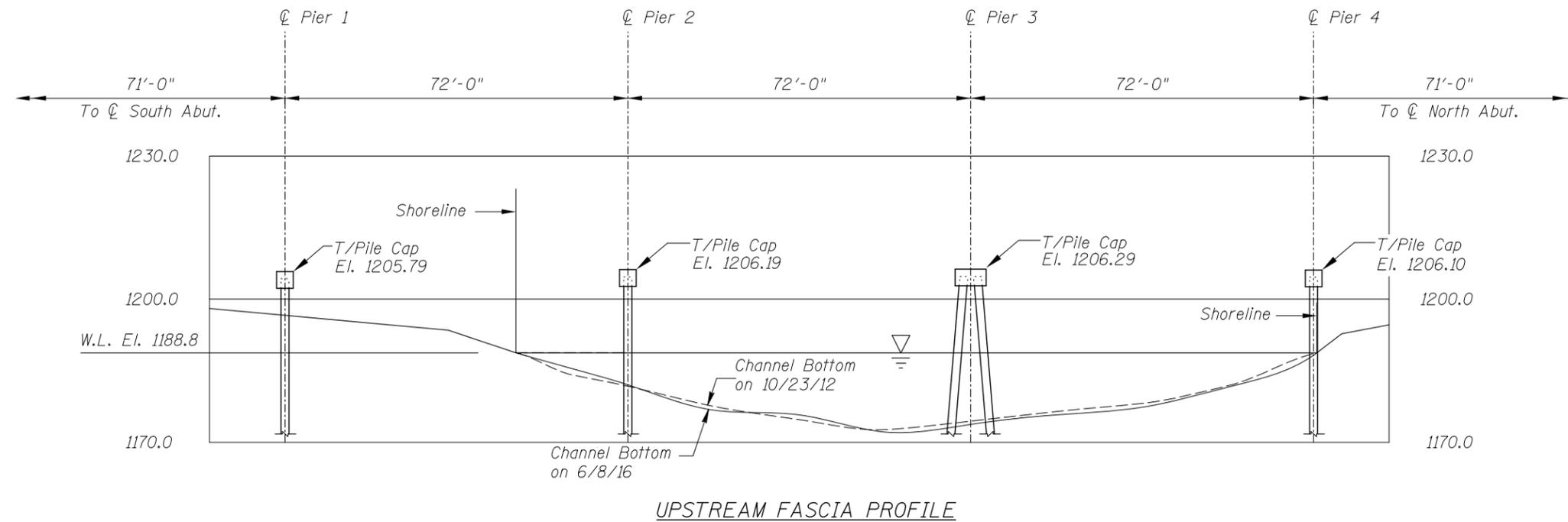
Legend

- 2.0 Sounding Depth (6/8/16)
- 5.2 Sounding Depth (10/23/12)
- Steel Pile
- Battered Steel Pile
- ⊗ Timber Debris

Note:

All soundings based on 2016 waterline location.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 01506 OVER THE MISSISSIPPI RIVER DISTRICT 3, AITKIN COUNTY		
INSPECTION AND SOUNDING PLAN		
Drawn By: BMS	COLLINS ENGINEERS	Date: JUNE 2016
Checked By: DGS	<small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Scale: NTS
Code: 968701506		Figure No.: 1



Note:
Refer to Figure 1 for General Notes.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 01506 OVER THE MISSISSIPPI RIVER DISTRICT 3, AITKIN 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: JUNE 2016
Checked By: DCS		Scale: 1"=30'
Code: 968701506		Figure No.: 2