

2016 UNDERWATER BRIDGE INSPECTION REPORT



BRIDGE # 7105 CSAH 14 over DES MOINES RIVER

DISTRICT: District 7 COUNTY: Jackson CITY/TOWNSHIP: Jackson
STATE: Minnesota

Date of Inspection: 06/16/2016

Equipment Used:

Owner: County Highway Agency

Inspected By: Forsyth, Roy

Report Written By: Roy Forsyth

Report Reviewed By:

Final Report Date:



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UNDERWATER INSPECTION

REPORT SUMMARY

The substructure units inspected at Bridge No. 7105 consisted of Pier 1 and the West Abutment. The concrete components of the substructure units were found to be in good to satisfactory condition with no defects of structural significance. The downstream column of Pier 1 had minor random areas of honeycombing. A moderate accumulation of debris was observed around each column of Pier 1. The channel bottom consisted of soft silt with 12 inches of probe rod penetration.

INSPECTION FINDINGS

(A) Random areas of honeycombing were observed on the downstream column of Pier 1 measuring up to 10 inches in diameter and 1 inch deep

(B) A moderate accumulation of debris, consisting of abandoned piles and boulders, was observed around each column at Pier 1 from the streambed to 2 feet above waterline extending 4 feet away from the columns.

(C) The channel bottom consisted of soft silt with 12 inches 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 #: 7105
Feature Intersected: DES MOINES RIVER
Facility Carried: CSAH 14
District: District 7
County: 032 - Jackson
Bridge Description:

The superstructure consists of a two span steel girder bridge supported by one concrete pier and two concrete abutments. The substructure elements are identified as the West Abutment, Pier 1, and the East Abutment from west to east.

2. INSPECTION DATA

Professional Engineer/Team Leader: Roy A. Forsyth
Inspection Diver: Marc Stern
Date of Underwater Inspection: 06/16/2016
Weather Conditions: Sunny, 80°F
Underwater Visibility (feet): 1 ft
Waterway Velocity (ft/sec): 0.5 ft/s

3. SUBSTRUCTURE INSPECTION DATA

Substructure(s) Inspected: Pier 1 and West Abutment
General Shape:

Pier 1 consists of three hexagon shaped concrete columns supporting a concrete pier cap. No bridge plans were available and the foundation configuration is unknown.

Maximum Water Depth at Substructure(s) Inspected (feet): 11.3

4. WATERLINE DATUM

Water Level Reference: Top of pier cap at the downstream end of Pier 1. Assumed reference elevation = 100.0
Waterline Elevation (feet): 96.4
Description: The waterline was approximately 3.6 feet below 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: 7
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

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	3	EA	3			
215	Concrete Abutment	40	LF	40			
885	Scour	1	EA	1			

UNDERWATER INSPECTION

INSPECTION PROCEDURES

The routine underwater inspection of Bridge 7105 (CASH No. 14 over the Des Moines River) was completed on June 16, 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 1 reinforced concrete abutment and 3 reinforced concrete columns. According to the bridge inventory or design drawings, Pier 1 and the West Abutment were founded on pile footings. Inspection procedures followed FHWA guidance and the MnDOT Bridge and Structure Inspection Program Manual with channel bottom probing to search for bottom foundations. The routine underwater inspection frequency is recommended to remain at a maximum of 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: 7105

CSAH 14 over DES MOINES RIVER

Date: 07/15/2016

+ GENERAL +	+ ROADWAY +	+ INSPECTION +																				
Agency Br. No. Crew District 07 Maint. Area County 032 - Jackson City Jackson Township Desc. Loc. IN JACKSON Sect., Twp., Range 24 - 102N - 35W Latitude 43 ° 37' 15.47 " Longitude 94 ° 59' 4.16 " Custodian 02 - County Highway Agency Owner 02 - County Highway Agency BMU Agreement Year Built 1955 MN Year Reconstructed 1982 FHWA Year Reconstructed 1982 MN Temporary Status Bridge Plan Location 3 - COUNTY Date Opened to Traffic 8/1/1982 On - Off System 1 - ON Legislative District 22B Potential ABC 2 - N/A	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 026+00.800 Detour Length 1.0 mi. Lanes ON 2 UNDER 0 ADT 3450 YEAR 2008 HCA DT ADTT % Functional Class 07 - Rural - Major Collector	Userkey 72 Structurally Deficient N Functionally Obsolete N Sufficiency Rating 92.5 Routine Inspection Date 09/18/2015 Routine Inspection Frequency 24 Inspector Name Forsyth, Roy Status A - Open																				
		+ NBI CONDITION RATINGS +																				
		Deck 7 Unsound Deck % Superstructure 7 Substructure 7 Channel 7 Culvert N																				
		+ NBI APPRAISAL RATINGS +																				
		Structure Evaluation 7 Deck Geometry 4 Underclearances N Waterway Adequacy 7 Approach Alignment 7																				
		+ SAFETY FEATURES +																				
		Bridge Railing 1 - MEETS STANDARDS GR Transition N - NOT REQUIRED Appr. Guardrail N - NOT REQUIRED GR Termini N - NOT REQUIRED																				
		+ 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;">06/16/2016</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	06/16/2016	Pinned Asbly.				Spec. Feat.			
	Y/N	Freq	Date																			
Frac. Critical																						
Underwater		60	06/16/2016																			
Pinned Asbly.																						
Spec. Feat.																						
		+ WATERWAY +																				
		Drainage Area (sq. mi.) Waterway Opening (sf.) 2464 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 L - STBL - Year 1994																				
		+ CAPACITY RATINGS +																				
		Design Load 5 - HS 20 Operating Rating 2 - HS TRUCK 32.40 Inventory Rating 2 - HS TRUCK 19.40 Posting VEH: SEMI: DBL: Rating Date 07/29/2016 Overweight Permit Codes A 1 - No Restriction B 1 - No Restriction C 2 - Straddle 2 Lanes																				
+ STRUCTURE +	+ RDWY DIMENSIONS +																					
Service On 5 - Highway-pedestrian Service Under 5 - Waterway Main Span Type 3 - Steel Main Span Design 01 - Beam Span Main Span Detail Appr. Span Type 1 - Concrete Appr. Span Design 09 - Slab Span Appr. Span Detail Skew 0 Culvert Type Barrel Length Cantilever ID Number of Spans MAIN: 2 APPR: 2 TOTAL: Main Span Length 90.7 ft. Structure Length 207.6 ft. Deck Width (Out-to-Out) 39.8 ft. Deck Material 1 - Concrete Cast-in-Place Wear Surf Type 4 - Low Slump Concrete Wear Surf Install Year 1982 Wear Course/Fill Depth 0.17 ft. Deck Membrane 0 - None Deck Rebars 1 - Epoxy Coated Reinforcing Deck Rebars Install Year 1982 Structure Area (Out-to-Out) 8262 sq. ft. Roadway Area (Curb-to-Curb) 6641 sq. ft. Sidewalk Width 50A. Lt 6.00 ft. 50B. Rt 0.00 ft. Curb Height Lt 0.83 ft. Rt 0.00 ft. Rail Type Lt 17 Rt 22	If Divided NB-EB SB-WB Roadway Width 32.00 ft. ft. Vertical Clearance ft. ft. Max. Vert. Clear. ft. ft. Horizontal Clear. 31.9 ft. ft. Lateral Clearance ft. ft. Appr. Surface Width 56.0 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 3 - FTG PILE Pier Foundation (Material/Type) 1 - CONC 3 - FTG PILE Historic Status 5 - Not eligible																					
	+ PAINT +																					
	Year Painted 1982 Unsound Paint % Painted Area 12600 sq. ft. Primer Type 4 - Organic Zinc - non 3309 Finish Type H - Vinyl																					
	+ BRIDGE SIGNS +																					
	Posted Load 0 - Not Required Traffic 0 - Not Required Horizontal 1 - Object Markers Vertical N - Not Applicable																					

MINNESOTA BRIDGE INSPECTION REPORT

09/12/2016

Inspector: CO Bridge

BRIDGE 7105 CSAH 14 OVER DES MOINES RIVER

County: Jackson	Location: IN JACKSON	Length: 207.6 ft.
City: Jackson	Route: 04 - CSAH 14 Ref. Pt.: 026+00.800	Deck Width: 39.8 ft.
Township:	Control Section:	Rdwy. Area/ Pct. Unsnd: 6641 sq. ft. / %
Section: 24 Township: 102N Range: 35W Maint. Area:		Paint Area/ Pct. Unsnd: 12600 sq. ft. / %
Span Type: 3 - Steel 2 - Stringer/Multi-beam or Girder	Local Agency Bridge Nbr.:	Culvert: N/A
List:		Postings:
NBI Deck: 7 Super: 7 Sub: 7 Chan: 7 Culv: N		
	Open, Posted, Closed: A - Open	
	MN Scour Code: L - STBL - LOW RISK	

Appraisal Ratings - Approach: 7 Waterway: 7		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 92.5

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	07/15/2016	8262 SF	8262	0	0	0
		Migrated Values		8262 SF	8262	0	0	0
	510 - Wearing Surfaces	Underwater	07/15/2016	6641 SF	6641	0	0	0
		Migrated Values		6641 SF	6641	0	0	0
Notes: Low Slump Overlay with Epoxy Rebar Notes:								
107	Steel Open Girder/Beam	Underwater	07/15/2016	1033 LF	1033	0	0	0
		Migrated Values		1033 LF	1033	0	0	0
	515 - Steel Protective Coating	Underwater	07/15/2016	12600 SF	12600	0	0	0
		Migrated Values		12600 SF	12600	0	0	0
Notes: [2016] Migrator used inventory quantity of 12,600 SF and estimated the condition states.								
205	Reinforced Concrete Column	Underwater	07/15/2016	3 EA	2	1	0	0
		Migrated Values		1 EA	0	1	0	0
Notes: SPALL ON SE CORNER 1' X 1' X 3". 2009								
215	Reinforced Concrete Abutment	Underwater	07/15/2016	80 LF	80	0	0	0
		Migrated Values		119 LF	119	0	0	0
Notes: [2016] Migrator added 40 LF to abutment quantity to account for wingwalls (CS1:40 CS2:0 CS3:0 CS4:0). WEST ABUTMENT - 2 SPALLS ON NORTH END OF DIAPHRAGM, 1 1/2"x9" AND 3"x9" WITH REBAR EXPOSED. EAST ABUTMENT - MINOR DELAMINATION STARTING TO OCCUR AT SOUTH END OF DIAPHRAGM. 2006 WITH REBAR EXPOSED. 2011								
234	Reinforced Concrete Pier Cap	Underwater	07/15/2016	36 LF	0	36	0	0
		Migrated Values		36 LF	0	36	0	0
Notes: MINOR SCALING AT WATERLINE. 2007								
300	Strip Seal Expansion Joint	Underwater	07/15/2016	115 LF	115	0	0	0
		Migrated Values		115 LF	115	0	0	0
Notes: glands need cleaning								
311	Movable Bearing	Underwater	07/15/2016	10 EA	10	0	0	0
		Migrated Values		10 EA	10	0	0	0

BRIDGE 7105 CSAH 14 OVER DES MOINES RIVER

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
313	Fixed Bearing	Underwater	07/15/2016	10 EA	9	1	0	0
		Migrated Values		10 EA	9	1	0	0
Notes: NORTH BEARING OF PIER IS RUSTING.2006								
321	Reinforced Concrete Approach Slab	Underwater	07/15/2016	2240 SF	2240	0	0	0
		Migrated Values		2240 SF	2240	0	0	0
Notes: [2016] Migrator assumed an approach slab length of 20FT and used the inventory quantity of 56FT for the width.								
330	Metal Bridge Railing	Underwater	07/15/2016	207 LF	207	0	0	0
		Migrated Values		207 LF	207	0	0	0
Notes: [2016] Migrator assumed concrete/metal combination type rail. HAIRLINE CRACKS								
515 - Steel Protective Coating		Underwater	07/15/2016	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.								
331	Reinforced Concrete Bridge Railing	Underwater	07/15/2016	620 LF	620	0	0	0
		Migrated Values		620 LF	620	0	0	0
Notes: [2016] Migrator assumed concrete/metal combination type rail. HAIRLINE CRACKS								
800	Critical Deficiencies or Safety Hazards	Underwater	07/15/2016	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	07/15/2016	0 LF	0	0	0	0
		Migrated Values		0 LF	0	0	0	0
883	Concrete Shear Cracking	Underwater	07/15/2016	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.								
885	Scour	Underwater	07/15/2016	1 EA	1	0	0	0
891	Other Bridge Signing	Underwater	07/15/2016	1 EA	0	0	1	0
		Migrated Values		1 EA	0	0	1	0
Notes: Signs Required: Horizontal Clearance NO BRIDGE MARKERS. 2007								
892	Slopes & Slope Protection	Underwater	07/15/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
Notes: Use this element to rate the condition of slopes and slope protection.								
894	Deck & Approach Drainage	Underwater	07/15/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
895	Sidewalk, Curb, & Median	Underwater	07/15/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0

BRIDGE 7105 CSAH 14 OVER DES MOINES RIVER

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
900	Protected Species	Underwater	07/15/2016	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:

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:

62. Culvert NBI:

71. Waterway Adeq NBI:

72. Appr Roadway
Alignment NBI:

Inventory Notes:

Inspector's Signature

Reviewer's Signature

Pictures



Photo 2 - View of East Abutment, looking southeast.

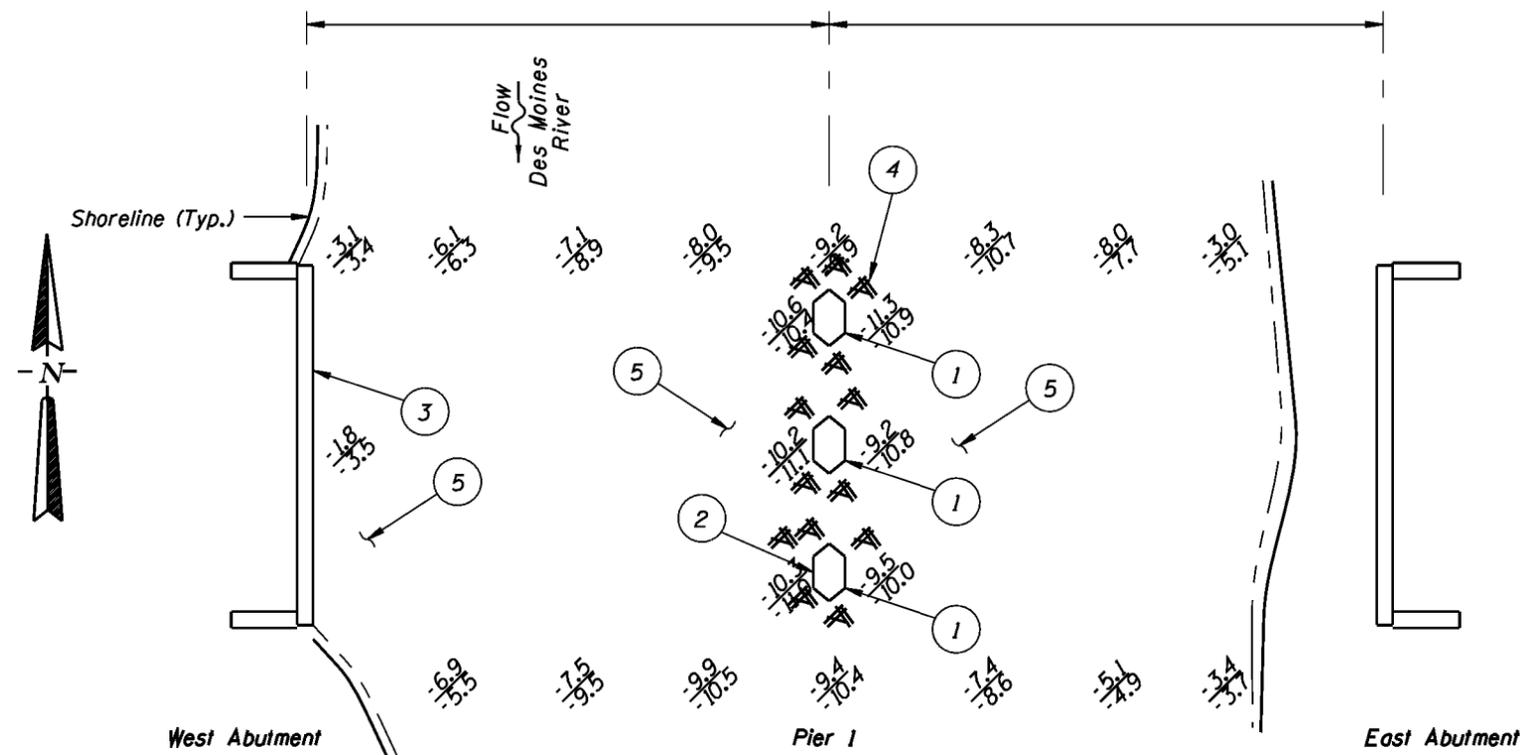


Photo 3 - View of West Abutment, looking northwest.

Pictures



Photo 4 - View of Pier 1, looking east.



SOUNDING PLAN

INSPECTION NOTES:

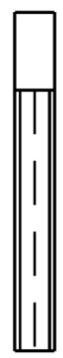
- ① The concrete columns of Pier 1 were sound and in good condition with no structurally significant defects.
- ② Random areas of honeycombing were observed at the downstream column of Pier 1 up to 10 inches in diameter and 1 inch deep.
- ③ The concrete at the West Abutment was sound and in good condition with no structurally significant defects.
- ④ Moderate debris, consisting of abandoned piles and boulders, was observed around each column from the streambed to 2 feet above waterline and extending 4 feet away from the columns.
- ⑤ The channel bottom consisted of soft silt with 12 inches of penetration.

GENERAL NOTES:

- 1. Pier 1 and the West Abutment were inspected underwater.
- 2. At the time of inspection on June 16, 2016, the waterline was located approximately 3.6 feet below the top of the pier cap at the downstream end of Pier 1. Since no design plans were available the reference elevation was assumed to be 100.0 feet. This corresponds with an assumed waterline elevation of 96.4 feet.
- 3. Soundings indicate the water depth at the time of inspection and are measured in feet. All soundings based on 2016 waterline location.
- 4. Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units.

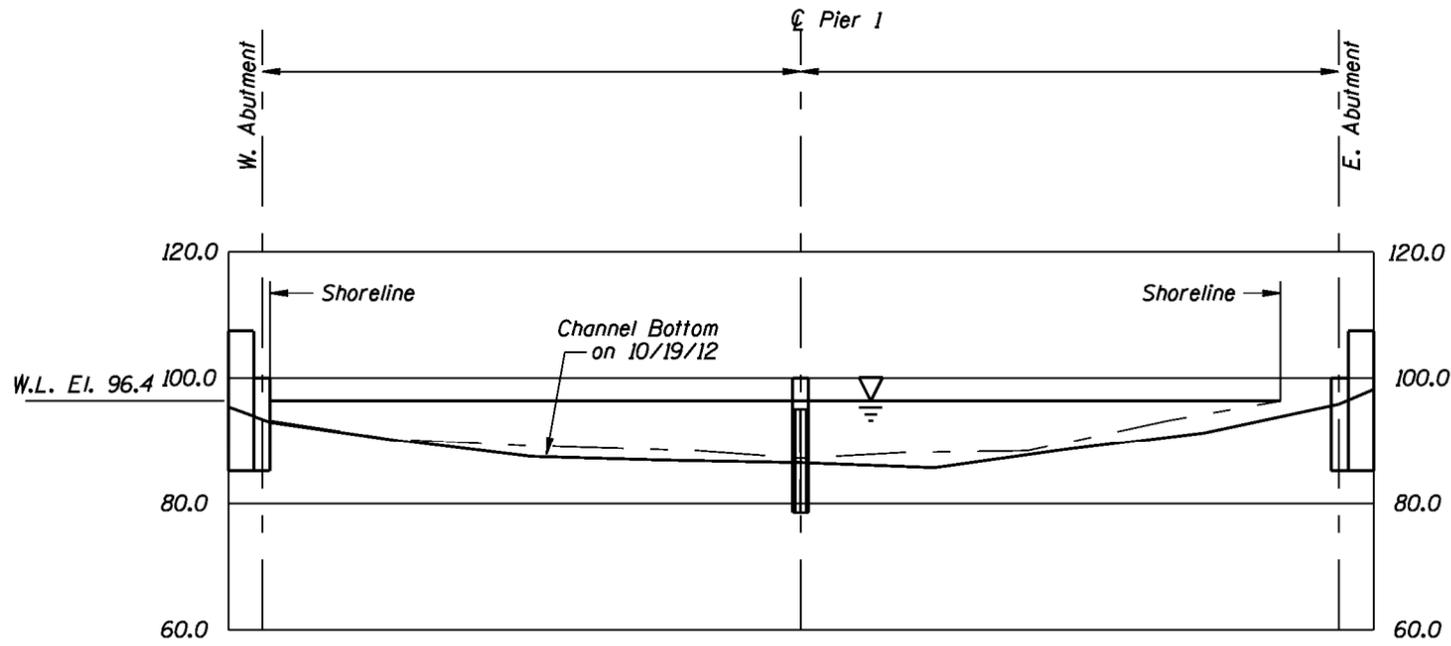
Legend

- 7.5 Sounding Depth from Waterline (6/16/16)
- 7.5 Sounding Depth from Waterline (10/19/12)
- Debris

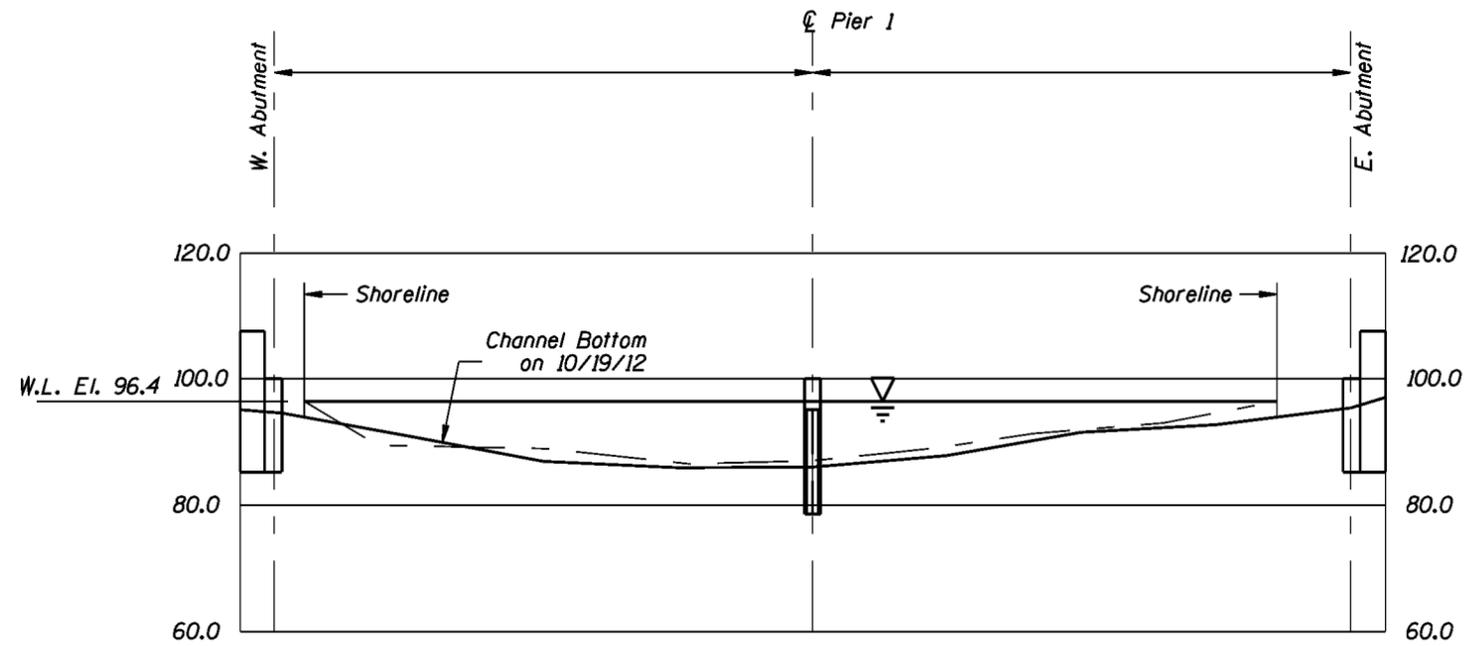


TYPICAL END VIEW OF PIERS

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 7105 OVER THE DES MOINES RIVER DISTRICT 8, JACKSON COUNTY		
INSPECTION AND SOUNDING PLAN		
Drawn By: RAF	COLLINS ENGINEERS	Date: June 16, 2016
Checked By: MJS	<small>1599 Selby Ave. Suite 206 St. Paul, MN, 55104 (651) 646-8502 www.collinsengr.com</small>	Scale: NTS
Project: 63-9687		Figure No.: 1



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Legend

- Channel Bottom per 2012 Inspection
- Channel Bottom per 2016 Inspection

Note:

Refer to Figure 1 for General Notes.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 7105 OVER THE DES MOINES RIVER DISTRICT 8, JACKSON COUNTY		
UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
Drawn By: RAF	COLLINS ENGINEERS	Date: June 16, 2016
Checked By: MJS	<small>1599 Selby Ave. Suite 206 St. Paul, MN, 55104 (651) 646-8502 www.collinsengr.com</small>	Scale: NTS
Project: 63-9687		Figure No.: 2