

2017 UNDERWATER BRIDGE INSPECTION REPORT



BRIDGE # 69602 CR 694 over CLOQUET RIVER

DISTRICT: District 1

COUNTY: St. Louis

CITY/TOWNSHIP: INDUSTRIAL

STATE: Minnesota

Date of Inspection: 09/16/2016

Equipment Used:

Owner: County Highway Agency

Inspected By: Janulis, Lukas

Report Written By: Lukas Janulis

Report Reviewed By:

Final Report Date:



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UNDERWATER INSPECTION

REPORT SUMMARY

The substructure units inspected at Bridge No. 69602, Bents 1 and 2, were found to be in good condition, with no defects of structural significance below water. All piles at both bents exhibited coating loss on approximately 90 percent of the surface area and rust nodules on 20 percent of the pile surface area below the waterline. Overall the condition of the structure has not changed since the previous underwater inspection.

INSPECTION FINDINGS

(A) The channel bottom material consisted of 8 inch diameter and smaller stones and cobbles allowing no probe rod penetration.

(B) The piles of Bents 1 and 2 exhibited coating loss on approximately 90 percent of the surface area extending from the channel bottom to the waterline with light corrosion extending from the waterline to 1 foot below the waterline.

(C) The piles of Bent 1 exhibited rust nodules, up to 1/4 inch in diameter, covering approximately 20 percent of the pile surface area extending from the channel bottom to 1 foot below the waterline. The nodules typically had negligible pitting of the steel associated with them.

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 #: 69602
Feature Intersected: CLOQUET RIVER
Facility Carried: CR 694
District: District 1
County: 069 - St. Louis

Bridge Description:

The superstructure consists of a three span concrete deck supported by precast concrete girders. The substructure consisted of two concrete abutments and two pile bents. Each pile bent consisted of seven steel encased concrete piles. The pile bents are named Bent 1 and 2 from south to north.

2. INSPECTION DATA

Professional Engineer/Team Leader: Lukas Janulis
Inspection Diver: Lukas Janulis
Date of Underwater Inspection: 09/16/2016
Weather Conditions: Cloudy, 65F
Underwater Visibility (feet): 3.0 feet
Waterway Velocity (ft/sec): 2.0 ft/sec

3. SUBSTRUCTURE INSPECTION DATA

Substructure(s) Inspected: Bents 1 and 2.

General Shape:

Each pile bent consists of seven steel encased concrete piles supporting a reinforced concrete cap.

Maximum Water Depth at Substructure(s) Inspected (feet): 4.3 feet

4. WATERLINE DATUM

Water Level Reference: Below the top of the pile cap at the upstream end of Bent 2.
Waterline Elevation (feet): 88.8 feet
Description: The waterline was located approximately 11.2 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: 7
Item 62: Culvert: Code:
Item 92B: Underwater Inspection: Code: Y 48 09/2016

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
225	Steel or CIP Piling	14	EA		14		
885	Scour		EA	1			

UNDERWATER INSPECTION

INSPECTION PROCEDURES

The routine underwater inspection of Bridge 69602 (C.R. 694 over Cloquet River) was completed on September 16, 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. Due to waterway conditions at the time of the inspection, the inspection could be accomplished by wading/swimming 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 pile bent piers. According to the bridge inventory, Bents 1 and 2 are founded on steel encased concrete 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 BRIDGE INSPECTION REPORT

02/02/2017

BRIDGE 69602 CR 694 OVER CLOQUET RIVER

County: St. Louis	Location: 0.5 MI S OF JCT CSAH 7	Length: 231.6 ft.
City:	Route: 07 - CNTY 694 Ref. Pt.: 002+00.120	Deck Width: 35.3 ft.
Township: 69036 - INDUSTRIAL	Control Section:	Rdwy. Area/ Pct. Unsnd: 7416 sq. ft. / %
Section: 17 Township: 051N Range: 17W Maint. Area:		Paint Area/ Pct. Unsnd: sq. ft. / %
Span Type: 5 - Prestressed Concrete 2 - List: Stringer/Multi-beam or Girder	Local Agency Bridge Nbr.: 140	Culvert: N/A
NBI Deck: 7 Super: 7 Sub: 7 Chan: 7 Culv: N		Postings:
	Open, Posted, Closed: A - Open	
	MN Scour Code: N - STBL - LIM SCOUR	
Appraisal Ratings - Approach: 7 Waterway: 9		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 100.0

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	01/27/2017	8182 SF	8144	38	0	0
		Routine	08/26/2016	8182 SF	8144	38	0	0
Notes: [2016-2014] 2 cracks with efflorescence. 1 on span 1 and 1 on span 3. Minor leaching under poured joint 1. [2013] No Change SOME WATER PENETRATION.								
510	- Wearing Surfaces	Underwater	01/27/2017	7411 SF	7319	92	0	0
		Routine	08/26/2016	7411 SF	7319	92	0	0
Notes: [2016] 3 areas of scale along west shoulder, largest next to SW drain. [2014] Deck crack 8' south of pier 1 and 1 crack 20' south of north abutment. 12 concrete patches along west gutterline. Areas of moderate scale along west gutterline (up to 1/2" to 3/4" in depth). Cracking and spalling along pier joint. [2013] No Change. ONE CRACK ON DECK AT EACH SAWCUT OVER PIERS.								
109	Prestressed Concrete Open Girder/Beam	Underwater	01/27/2017	924 LF	924	0	0	0
		Routine	08/26/2016	924 LF	924	0	0	0
Notes: [2016-2013] No deterioration noted.								
215	Reinforced Concrete Abutment	Underwater	01/27/2017	108 LF	104	4	0	0
		Routine	08/26/2016	108 LF	104	4	0	0
Notes: [2016] Added 36 LF to abutment quantity to account for wingwalls. Few 0.01" vertical cracks in abutments. Form tie hole patches popping out on wings. Cracking and spalling on ends of north abutment parapet wall are actually on the outer end diaphragms. Abutment is semi integral. [2014] Some minor spalling on east and west ends of north parapet wall near cracks. Movement crack on NE corner [2013] No change. Wings show no sign of movement. WATER LEAKS AT FASCIA BEAM LOCATIONS, NE SE & SW. Large movement crack NW corner. Integral abutment is showing movement, earth is pushing in (possible spring & frost). Movement with Abutment.								
225	Steel Pile	Underwater	01/27/2017	14 EA	0	14	0	0
		Routine	08/26/2016	14 EA	0	14	0	0
Notes: [2016] Surface corrosion present on bottom 2' of exposed pile. [2014-2013] Piling has minor staining at waterline. [2012 Underwater] Piles exhibit coating loss on approximately 90% of their surface area extending from the channel bottom to 2' above the waterline with light corrosion extending from the waterline to 1' above the waterline. Pier 1 piles have rust nodules up to 1/4" in diameter on approximately 20% of pile surface area extending from channel bottom to 1' below waterline.								
515	- Steel Protective Coating	Underwater	01/27/2017	645 SF	352	0	0	293
		Routine	08/26/2016	645 SF	352	0	0	293
Notes: [2016] Paint has failed with surface corrosion on bottom 2' of exposed piling. 8' of pile exposed above water. Piles are about 11' tall.								

BRIDGE 69602 CR 694 OVER CLOQUET RIVER

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
234	Reinforced Concrete Pier Cap	Underwater	01/27/2017	72 LF	72	0	0	0
		Routine	08/26/2016	72 LF	72	0	0	0
Notes: [2016-2013] No deterioration noted.								
301	Pourable Joint Seal	Underwater	01/27/2017	72 LF	0	48	24	0
		Routine	08/26/2016	72 LF	0	48	24	0
Notes: [2016] Some staining under poured joint 1 indicating joint is starting to leak where sealant is missing. [2014] Cracking along joint. Some joint sealant missing. No signs of leakage through joint. [2013] Deck spalling along joints but sealant is still intact.								
310	Elastomeric Bearing	Underwater	01/27/2017	8 EA	8	0	0	0
		Routine	08/26/2016	8 EA	8	0	0	0
Notes: [2016-2013] No deterioration noted. Located at abutments								
313	Fixed Bearing	Underwater	01/27/2017	16 EA	16	0	0	0
		Routine	08/26/2016	16 EA	16	0	0	0
Notes: [2016-2014] No notable deterioration. Located at piers.								
331	Reinforced Concrete Bridge Railing	Underwater	01/27/2017	466 LF	464	2	0	0
		Routine	08/26/2016	466 LF	464	2	0	0
Notes: [2016] Rail cracks are 0.01" in width. [2014] 2 to 4 vertical cracks per rail panel. Minor scrapes on rail face from plows. [2013] 1.5' long Spall in west rail by south deck drain. SEVERAL MINOR CRACKS IN EACH RAIL.								
800	Critical Deficiencies or Safety Hazards	Underwater	01/27/2017	1 EA	1	0	0	0
		Routine	08/26/2016	1 EA	1	0	0	0
Notes: [2016-2013] No critical deficiencies or safety hazards found during this inspection.								
823	Gravel Approach Roadway	Underwater	01/27/2017	2 EA	0	2	0	0
		Routine	08/26/2016	2 EA	0	2	0	0
Notes: [2016] Minor potholing and wash boarding on both approaches. [2014] Rutting fixed on north approach. Both approaches slightly lower the bridge deck but traffic impact not increased (possibly caused by grading instead of settlement). [2013] North approach has some rutting near bridge.								
855	Secondary Members (Superstructure)	Underwater	01/27/2017	1 EA	1	0	0	0
		Routine	08/26/2016	1 EA	1	0	0	0
Notes: [2016] Cracking and spalling on outside end diaphragms on north abutment from movement. [2014-2013] No deterioration noted. Element for 21 steel intermediate diaphragms.								
883	Concrete Shear Cracking	Underwater	01/27/2017	1 EA	1	0	0	0
		Routine	08/26/2016	1 EA	1	0	0	0
Notes: [2016] No shear cracking present.								
885	Scour	Underwater	01/27/2017	0 EA	1	0	0	0
891	Other Bridge Signing	Underwater	01/27/2017	1 EA	1	0	0	0
		Routine	08/26/2016	1 EA	1	0	0	0
Notes: [2016-2013] All signs present with no deterioration. 4 Delineators and 4 guardrail markers.								

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ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
892	Slopes & Slope Protection	Underwater	01/27/2017	1 EA	1	0	0	0
		Routine	08/26/2016	1 EA	1	0	0	0
Notes: [2016-2013] No notable erosion present. Slopes are protected with riprap and vegetation.								
893	Guardrail	Underwater	01/27/2017	1 EA	1	0	0	0
		Routine	08/26/2016	1 EA	1	0	0	0
Notes: [2016] Minor scraping along guardrail. [2014-2013] No notable impact damage or deterioration present. W-beam w/ 2-wraps & 2-ELT ends.								
894	Deck & Approach Drainage	Underwater	01/27/2017	1 EA	0	1	0	0
		Routine	08/26/2016	1 EA	0	1	0	0
Notes: [2016] Some gravel along gutterline. Areas of heavy scale holding water. [2014] Gutterlines have been cleaned. No notable ponding or drainage-related slope erosion. [2013] No Deterioration noted.								
895	Sidewalk, Curb, & Median	Underwater	01/27/2017	1 EA	1	0	0	0
		Routine	08/26/2016	1 EA	1	0	0	0
Notes: [2016-2013] No change ALL 4 CURB TRANSITIONS ARE SETTLING AND MOVING OUTWARDS.								
900	Protected Species	Underwater	01/27/2017	2 EA	0	1	1	0
		Routine	08/26/2016	2 EA	0	1	1	0
Notes: [2016] Cliff swallow nest present on span 2. Bat droppings present on beams, abutments, and riprap.								
<p>General Notes: SLC District 5 Inspected by: [2016] CG : [2014] CG, BH. [2013] DNR has a wire weight gage attached to west rail and a bubble stream gaging station located behind SW wing with an air tube running down to the stream.</p> <p>58. Deck NBI: [2016] Deck cracks are 0.01" in width. [2014] Deck crack 8' south of pier 1 and 1 crack 20' south of north abutment. 12 concrete patches along west gutterline. Areas of moderate scale along west gutterline (up to 1/2" to 3/4" in depth). Cracking and spalling along pier joint. 2 noticeable cracks on underside with efflorescence. [2013] Deck is in good condition very little deterioration. Some spalls around poured deck joints over piers.</p> <p>36A. Brdg Railings NBI: Concrete barrier type J</p> <p>36B. Transitions NBI: Guardrail transitions meet minimum requirements. Traffic barrier designs special.</p> <p>36C. Appr Guardrail NBI: W-beam with timber posts. Traffic barrier B8307.</p> <p>36D. Appr Guardrail Terminal NBI: 2 ELT ends and 2 wraps with flared ends.</p> <p>59. Superstructure NBI: [2016] Cracking and spalling on outside end diaphragms on north abutment from movement. [2014-2013] Superstructure is in very good condition.</p> <p>60. Substructure NBI: [2016] Few 0.01" vertical cracks in abutments. Form tie hole patches popping out on wings. [2014] Movement cracks and minor spalling on east and west end of north abutment. [2013] Substructure is in very good condition.</p> <p>61. Channel NBI: [2016] Very minor debris caught on west end of pier 1. [2014-7/10/2012] Channel is in good condition</p> <p>62. Culvert NBI:</p> <p>71. Waterway Adeq NBI: [2016] High water mark 30" below middle of pier cap top.</p> <p>72. Appr Roadway Alignment NBI: [2016-2014] Curve to north affecting sight distance. [2013] No speed reduction required.</p>								

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

Reviewer's Signature

Pictures



Photo 1 - Upstream Fascia, Looking Northwest



Photo 2 - Downstream Fascia, Looking Southeast

Pictures



Photo 3 - Bent 1, Looking Southwest



Photo 4 - Bent 2, Looking Northwest

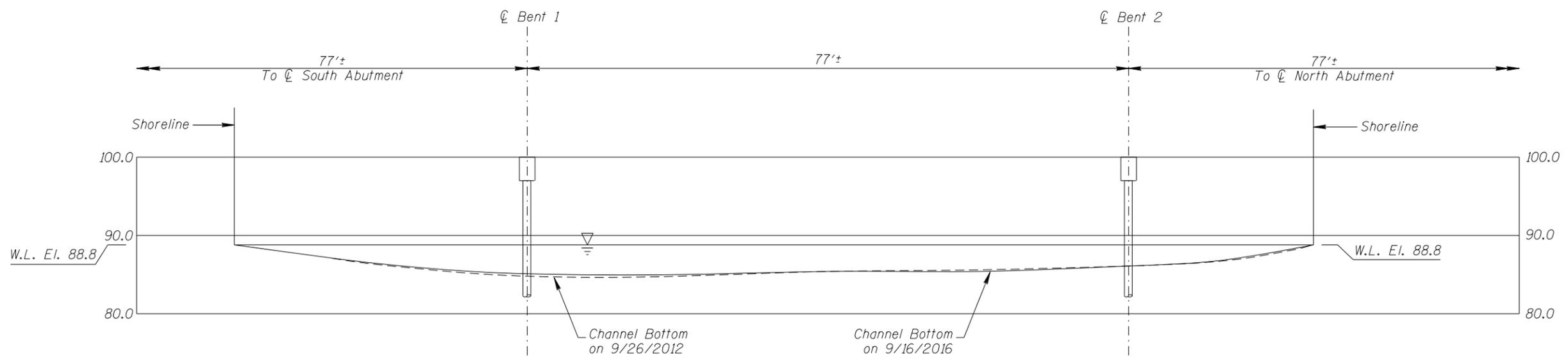
Pictures



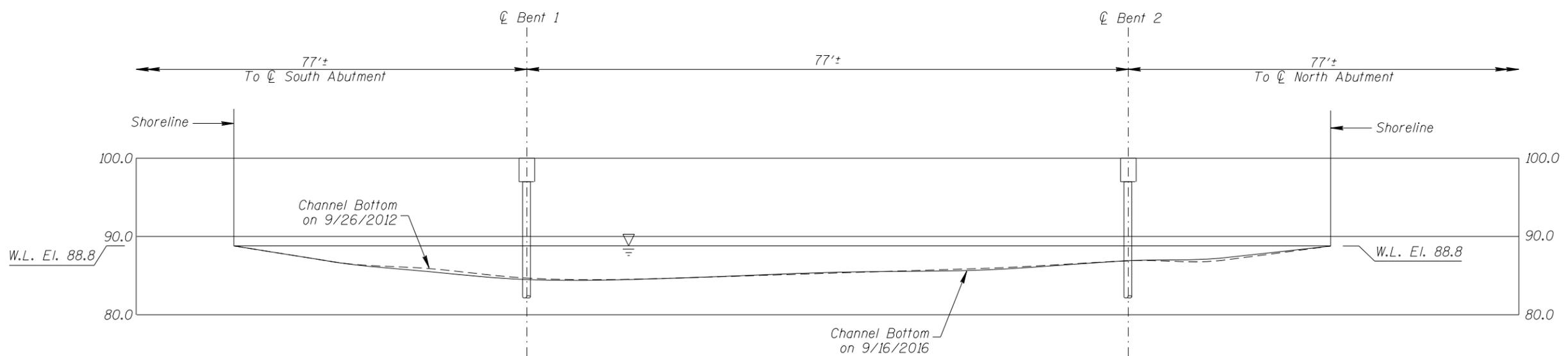
Photo 5 - Typical Steel Condition at the Waterline (Bent 1 Shown), Looking West



Photo 6 - Typical Steel Condition Below Water (Bent 1 Shown), Looking West



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:
Refer to Figure 1 for General Notes.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 69602 CR 694 OVER THE CLOQUET RIVER DISTRICT I, ST. LOUIS COUNTY UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
DRAWN BY: MBP	COLLINS ENGINEERS <small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	DATE: SEPT 16, 2016
CHECKED BY: LJ		SCALE: NTS (U.O.N.)
CODE: 968769602		FIGURE NO.: 2