UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 27611

PLYMOUTH AVENUE

OVER THE

MISSISSIPPI RIVER

HENNEPIN COUNTY, CITY OF MINNEAPOLIS

OCTOBER 28, 2012

PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 7423

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge 27611, Piers 1 through 3, were in overall good condition with no defects of structural significance observed. A scour depression and footing exposure was observed at the upstream end of Pier 2. A light accumulation of timber debris was observed along the east face of Pier 3. Aside from the scour, the channel bottom appeared stable with no significant changes since the previous inspection.

INSPECTION FINDINGS:

(A) The channel bottom material consisted of silty sand and gravel allowing up to 8 inches of probe rod penetration and scattered cobbles.

(B) A light accumulation of timber debris was observed along the east face of Pier 3 from channel bottom up 3 feet. The debris consisted of a 3 foot diameter log and scattered 6 to 12 inch diameter debris.

(C) A vertical hairline crack was observed from the top of the web wall to the waterline on both faces of Piers 2 and 3.

(D) A scour depression was observed around the upstream nose of Pier 2. The scour had a radius of approximately 5 feet and a maximum depth of 3 to 4 feet. The scour had partially exposed the top of the pier footing at the upstream nose with no vertical face exposure.

(E) At 2 feet above the waterline, at midpoint and both quarter points of east face of Pier 3 there was a 1 square foot area of section loss (construction related) with 2 inches of maximum penetration.

RECOMMENDATIONS:

(A) Monitor the footing exposure and scour at Pier 2, and if found to be increasing in the future, countermeasures may become warranted.

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

Respectfully submitted,

Inspection Team Leader:
WSB and Associates

Barritt Lovelace
Registered Professional Engineer
Bridge Safety Inspection Team Leader

PROFESSIONAL ENGINEER
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
Daniel G. Stromberg
Date 6/30/14 License # 21491

COLLINS ENGINEERS, INC.

Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 27611

Feature Crossed: Mississippi River

Feature Carried: Plymouth Avenue

Location: Hennepin County, City of Minneapolis

Bridge Description: The superstructure consists of five spans of two concrete box girders. The superstructure is supported by two reinforced concrete abutments and four reinforced concrete piers. The piers are numbered 1 through 4 starting from the west end of the bridge. The abutment and pier footings are supported by timber piles.

2. INSPECTION DATA

Professional Engineer/Team Leader: Barritt R. Lovelace, P.E. (WSB)

Dive Team: Marc B. Parker, Lukas Janulis, P.E.

Date: October 28, 2012

Weather Conditions: Cloudy, 40°F

Underwater Visibility: 3.0 feet

Waterway Velocity: None

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 through 3.

General Shape: The piers consist of two concrete columns each on common oblong concrete rectangular shafts with rounded ends that are supported on rectangular footings founded on piles.

Maximum Water Depth at Substructure Inspected: Approximately 18.5 feet.

4. WATERLINE DATUM

Water Level Reference: Benchmark Elevation 804.7 at Pier 1.

Water Surface: The waterline was approximately 6.0 feet below reference.
Waterline Elevation = 798.7.

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 6

Item 92B: Underwater Inspection: Code B/10/12

Item 113: Scour Critical Bridges: Code N/96

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

_____ Yes X No

6. STRUCTURAL ELEMENT CONDITION RATING

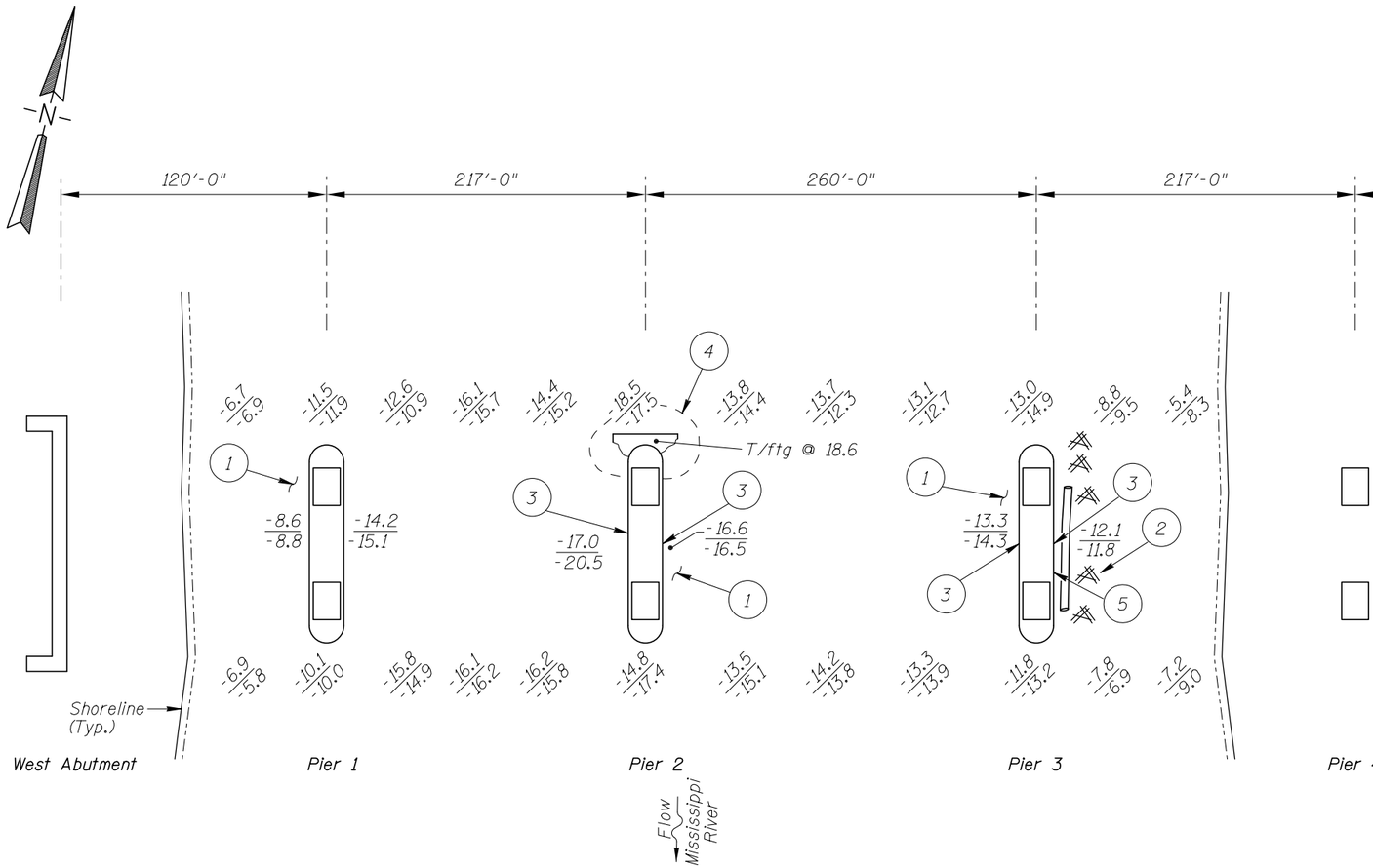
Item #	Element Description	Quantity	Unit	Conditions				
				1	2	3	4	5
210	Reinforced Concrete Pier Wall	192	LF	189	3			
361	Scour Smart Flag	1	EA	1				
985	Slopes	1	EA	1				

Photograph 1. Overall View of the Structure, Looking Northwest.

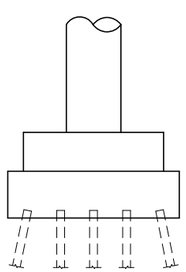
Photograph 2. View of Pier 1, Looking West.

Photograph 3. View of Pier 2, Looking West.

Photograph 4. View of Pier 3, Looking West.



SOUNDING PLAN



TYPICAL END VIEW OF PIERS

GENERAL NOTES:

1. Piers 1 through 3 were inspected underwater.
2. At the time of inspection on October 28, 2012 the waterline was located approximately 6.0 feet below the Benchmark reference at Elevation 804.7 marked on Pier 1. Based on the reference this corresponds to a waterline elevation of 798.7.
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 and gravel allowing up to 8 inches of probe rod penetration and scattered cobbles.

(2) A light accumulation of timber debris was observed along the east face of Pier 3 from channel bottom up 3 feet. The debris consisted of a 2 foot diameter log and scattered 6 to 12 inch diameter drift pieces.

(3) A vertical hairline crack was observed from the top of the web wall to the waterline.

(4) A scour depression was observed around the upstream nose of Pier 2. The scour had a radius of about 5 feet and a maximum depth of 3 to 4 feet. The scour had partially exposed the top of the pier footing at the upstream nose with no vertical face exposure.

(5) At 2 feet above the waterline, at midpoint and both quarter points of east face of Pier 3 there was a 1 square foot area of section loss (construction related) with 2 inches of maximum penetration.

Legend

-2.0 / -5.2	Sounding Depth (10/28/12) / Sounding Depth (8/30/07)
	Scour Depression
	Timber Debris

Note:

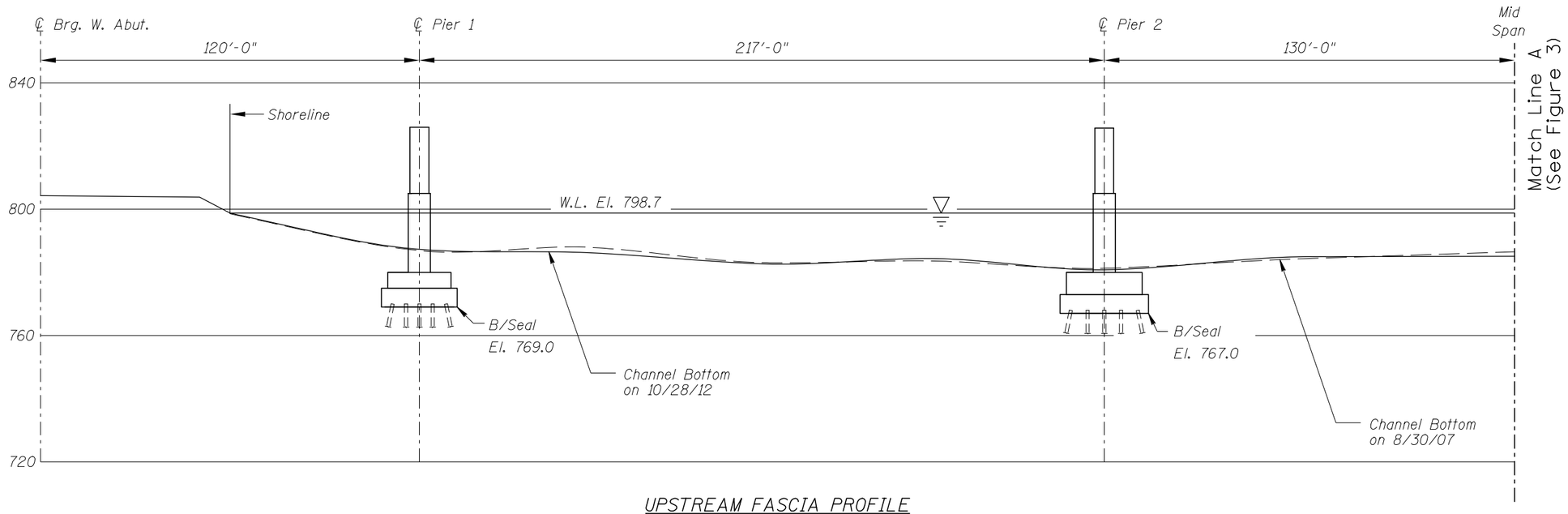
All soundings based on 2012 waterline location.

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

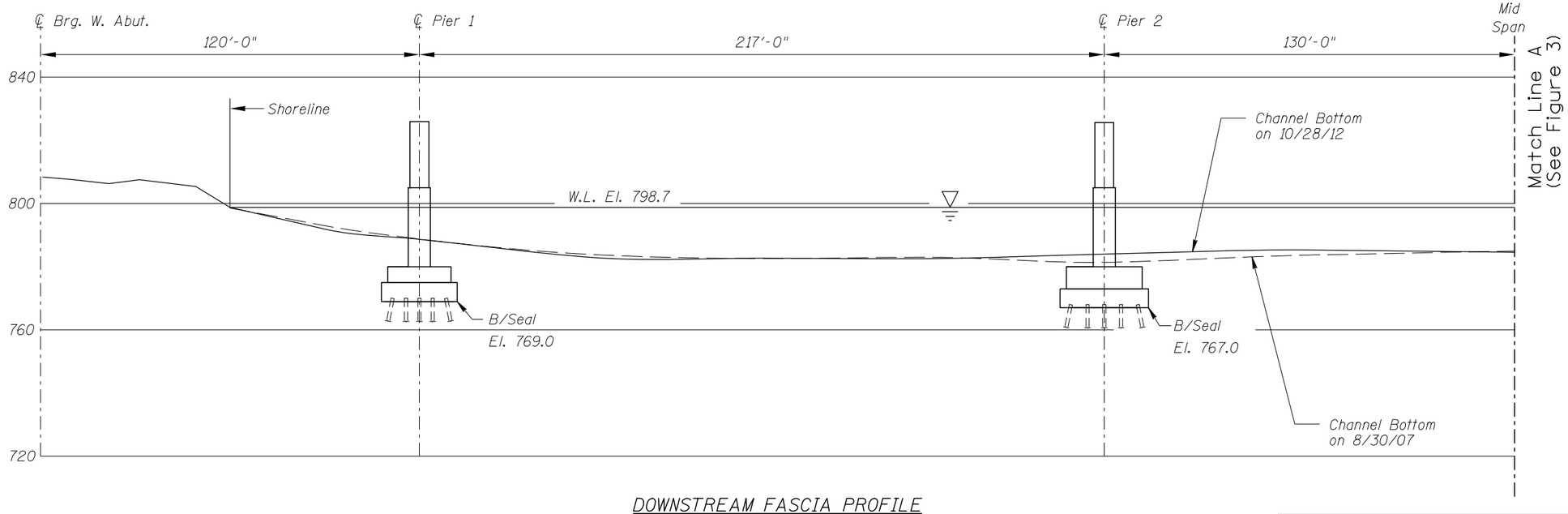
STRUCTURE NO. 27611
OVER THE MISSISSIPPI RIVER
HENNEPIN COUNTY, CITY OF MINNEAPOLIS

INSPECTION AND SOUNDING PLAN

Drawn By: CRE	COLLINS ENGINEERS 123 North Wacker Drive Suite 900 Chicago, Il. 60606 (312) 704-9300 www.collinsengr.com	Date: OCT., 2012
Checked By: LJ		Scale: NTS
Code: 74232761l		Figure No.: 1



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:

Refer to Figure 1 for General Notes.

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DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

STRUCTURE NO. 27611
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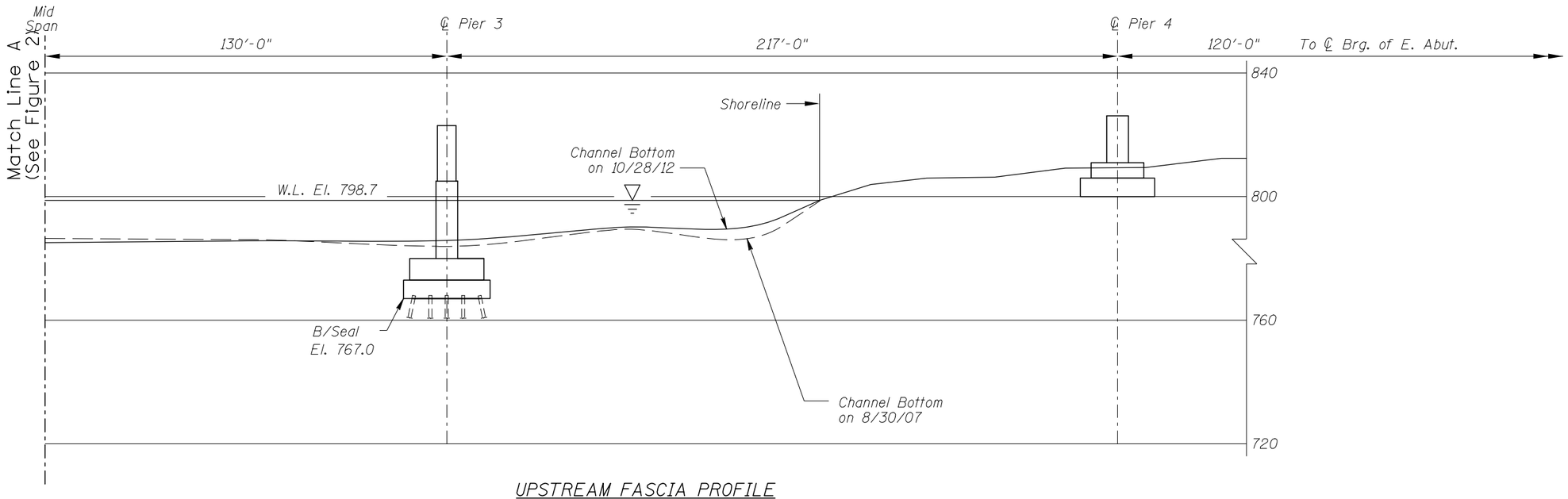
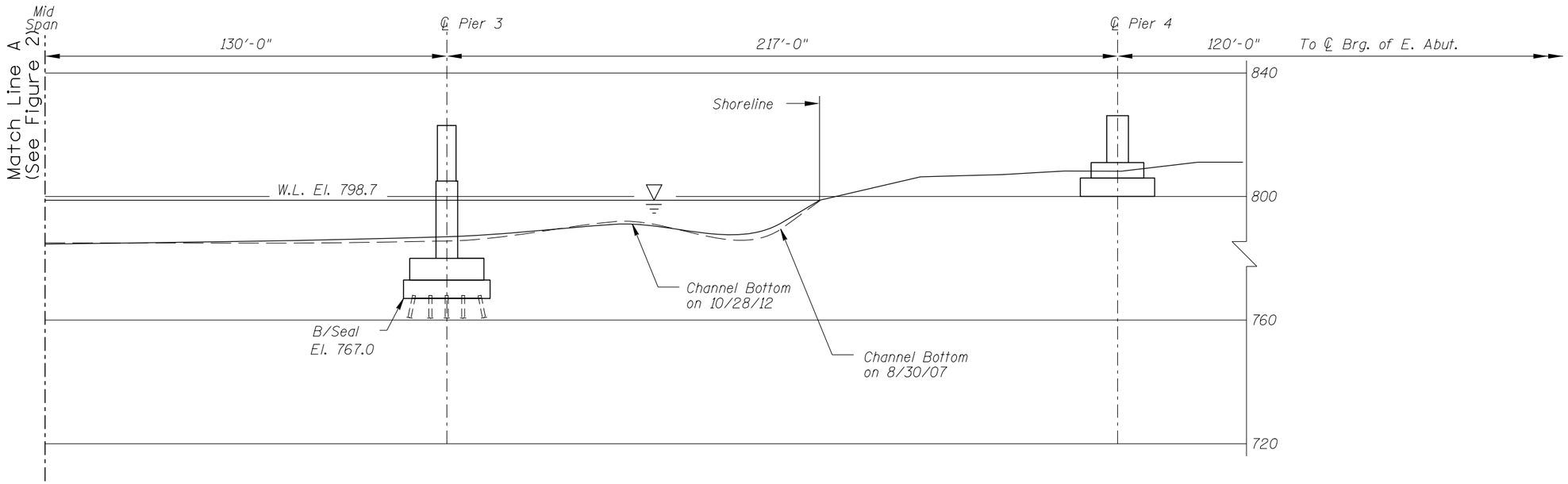
UPSTREAM AND DOWNSTREAM FASCIA PROFILES

Drawn By: CRE	COLLINS ENGINEERS, INC. 123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Date: OCT., 2012
Checked By: LJ		Scale: 1"=40'
Code: 7423276II		Figure No.: 2



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:

Refer to Figure 1 for General Notes.

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DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

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UPSTREAM AND DOWNSTREAM FASCIA PROFILES

Drawn By: CRE	COLLINS ENGINEERS, INC. 123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Date: OCT., 2012
Checked By: LJ		Scale: 1"=40'
Code: 7423276II		Figure No.: 3

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: October 28, 2012

ON-SITE TEAM LEADER: Barritt R. Lovelace, P.E. (WSB)

BRIDGE NO: 27611 WEATHER: Cloudy, 40°F

WATERWAY CROSSED: Mississippi River

DIVING OPERATION: X SCUBA _____ SURFACE SUPPLIED AIR

_____ OTHER _____

PERSONNEL: Marc B. Parker, Lukas Janulis, P.E.

EQUIPMENT: Commercial Scuba, U/W Light, Scraper, Sounding Pole, Lead Line, Probe Rod, Camera, 14 foot Boat with Motor.

TIME IN WATER: 12:15 p.m.

TIME OUT OF WATER: 12:45 p.m.

WATERWAY DATA: VELOCITY None

VISIBILITY 3.0 feet

DEPTH 18.0 feet maximum at Pier 2

ELEMENTS INSPECTED: Piers 1 through 3

REMARKS: The concrete of the piers was overall in good condition with no defects of structural significance observed. A scour depression with partial top of footing exposure was observed at Pier 2. A light accumulation of timber debris was observed along the east face of Pier 3. Aside from the scour, the channel bottom appeared stable with no significant changes since the last inspection.

FURTHER ACTION NEEDED: _____ YES X NO

Monitor the footing exposure and scour at Pier 2, and if found to be increasing in the future, countermeasures may become warranted.

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

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 27611
INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER Barritt Lovelace, P.E. (WSB)
WATERWAY CROSSED Mississippi River

INSPECTION DATE October 28, 2012

NOTE: USE ALL APPLICABLE CONDITION DEFINITIONS AS DEFINED IN THE MINNESOTA RECORDING AND CODING GUIDE INCLUDING GENERAL, SUBSTRUCTURE, CHANNEL AND PROTECTION, AND CULVERTS AND WALL DEFINITIONS TO COMPLETE THIS FORM.

CONDITION RATING

			SUBSTRUCTURE						CHANNEL					GENERAL					
UNIT REFERENCE NO.		MAXIMUM DEPTH OF WATER	PILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (DRIFT/DEBRIS)	OVERALL CHANNEL & PROTECTION CONDITION	CONCRETE	STEEL	TIMBER	LOSS OF SECTION	PREVIOUS REPAIR OR MAINTENANCE	OTHER
	UNIT DESCRIPTION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Pier 1	14.2’	N	7	N	8	N	7	N	N	8	N	8	7	N	N	N	N	N
	Pier 2	18.0’	N	7	N	8	N	7	6	N	N	N	6	7	N	N	N	N	N
	Pier 3	13.3’	N	7	N	8	N	7	N	N	8	7	7	7	N	N	N	N	N

*UNDERWATER PORTION ONLY

REMARKS: The concrete of the piers was overall in good condition with no defects of structural significance observed. A scour depression with partial top of footing exposure was observed at Pier 2. A light accumulation of timber debris was observed along the east face of Pier 3. Aside from the scour, the channel bottom appeared stable with no significant changes since the last inspection.

NOTES: ATTACH SKETCHES AS NEEDED, IDENTIFY REMARK BY REFERRING TO UNIT REFERENCE NO. AND REMARK NO.
USE GENERAL SECTION TO IDENTIFY OVERALL PRESENCE OF SPALLS, CRACKS, CORROSION, ETC.