

UNDERWATER BRIDGE INSPECTION REPORT

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STRUCTURE NO. 08520

MSAS NO. 110

OVER THE

MINNESOTA RIVER

DISTRICT 7 - BROWN COUNTY, CITY OF NEW ULM

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SEPTEMBER 12, 2012

PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

AND

WSB & ASSOCIATES, INC.

JOB NO. 2107

MINNESOTA DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The concrete surfaces of the substructure units inspected at Bridge No. 08520, Piers 1 through 3, were found to be in good condition with no defects of structural significance observed. In addition, Pier 1 exhibited footing exposure with up to 4.5 feet of vertical face exposure along the east face of the pier, and seal exposure with up to 8 inches vertical exposure. There was also up to 1.5 feet of vertical exposure for the footing at Pier 3 which was located in a scour depression on the easterly bank. Other than slightly increased foundation exposure at Pier 1, the channel bottom appeared stable with no appreciable changes since the previous inspection.

INSPECTION FINDINGS:

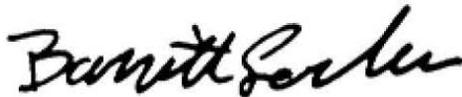
- (A) The top of the footing was exposed at Pier 1 from the upstream quarter point on the west face, around the upstream and downstream nose, and along the entire east face with up to 4.5 feet of vertical face exposure along the east face. The seal was also partially exposed with up to 8 inches of vertical exposure.
- (B) Pier 3 (located out of the waterway) exhibited footing exposure around the majority of the pier with up to 1.5 feet of vertical face exposure due to a scour depression 10 feet in radius within the easterly bank.
- (C) A scour depression 6 feet in radius, 2 feet deep was observed at the upstream noses of Piers 1 and 2.

RECOMMENDATIONS:

- (A) Because the bridge has been evaluated to be scour critical, consider countermeasures to mitigate scour at Piers 1 and 3 to prevent any further foundation exposure.
  
- (B) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of sixty (60) months unless a period of high flow creates the need for a sooner inspection.

Inspection Team Leader:

WSB and Associates



Barritt Lovelace  
Registered Professional Engineer  
Bridge Safety Inspection Team Leader

Respectfully submitted,

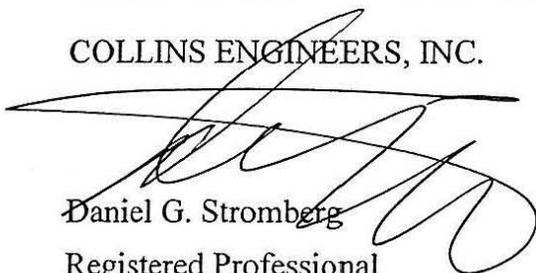
PROFESSIONAL ENGINEER

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: 08520

Feature Crossed: Minnesota River

Feature Carried: 20<sup>th</sup> Street (MSAS No. 110)

Location: District 7 - Brown County, City of New Ulm

Bridge Description: The superstructure consists of multiple steel beams over four spans. The superstructure is supported on two reinforced concrete abutments and three reinforced concrete piers. The pier and abutment footings are supported on steel piles. The piers are numbered 1 through 3 starting at the west end of the bridge.

2. INSPECTION DATA

Professional Engineer/Team Leader: Barritt Lovelace, P.E.

Dive Team: Kasey Yoder (WSB), Lukas Janulis (Collins)

Date: September 12, 2012

Weather Conditions: Cloudy, 60°F

Underwater Visibility: 1.0 foot

Waterway Velocity: 1.0 ft/s

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1, 2, and 3

General Shape: Rectangular pier shafts with rounded noses that rest on rectangular footings founded on steel piles.

Maximum Water Depth at Substructure Inspected: Approximately 9.5 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap on the south end of Pier 2.

Water Surface: The waterline was approximately 27.5 feet below reference.  
Waterline Elevation = 784.7.

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/09/12

Item 113: Scour Critical Bridges: Code R/95

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

X Yes \_\_\_\_\_ No

6. STRUCTURAL ELEMENT CONDITION RATING

Item #	Element Description	Quantity	Unit	Conditions				
				1	2	3	4	5
210	Reinforced Concrete Pier Wall	108	LF	108				
361	Scour	1	EA		1			
985	Slopes & Slope Protection	1	EA		1			



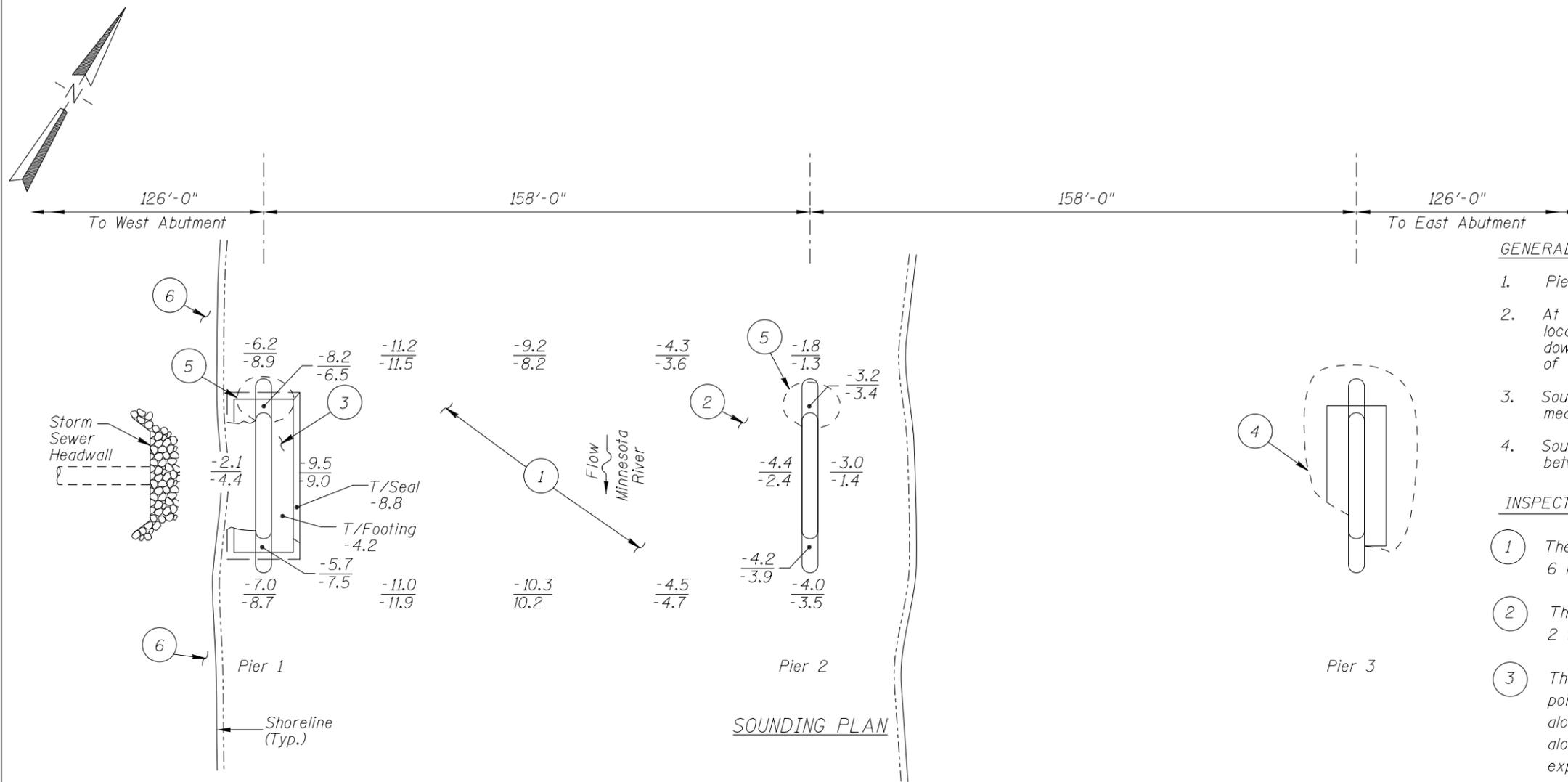
Photograph 1. View of Pier 3, Looking Southwest.



Photograph 2. View of Pier 2, Looking Southwest.



Photograph 3. View of Pier 1, Looking Southwest.



**GENERAL NOTES:**

1. Piers 1 and 2 were inspected underwater.
2. At the time of inspection on September 12, 2012, the waterline was located approximately 27.5 feet below the top of the pier cap at the downstream end of Pier 2. This corresponds with a waterline elevation of 784.7.
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 consisted of firm gravel and riprap, typically 6 inches in diameter, with up to 2 inches of probe rod penetration.
- ② The channel bottom around Pier 2 consisted of soft silt with up to 2 feet of probe rod penetration.
- ③ The top of the footing was exposed at Pier 1 from the upstream quarter point on the west face, around the upstream and downstream nose, and along the entire east face with up to 4.5 feet of vertical face exposure along the east face. The seal was also exposed up to 8 inch of vertical exposure.
- ④ The top of the footing was exposed at Pier 3 around the majority of the pier with up to 1.5 feet of vertical face exposure due to a scour depression measuring 10 feet in radius. Pier 3 was located out of the waterway at the time of inspection.
- ⑤ A scour depression 6 feet in radius, 2 feet deep was observed at the upstream noses of Piers 1 and 2.
- ⑥ Vertical bank erosion was observed upstream and downstream of the structure along the west embankment.

**SOUNDING PLAN**

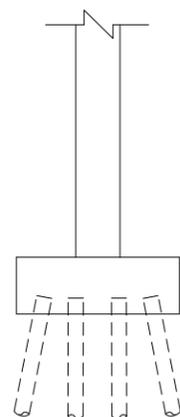
**Note:**

All soundings based on 2012 waterline location.

**Legend**

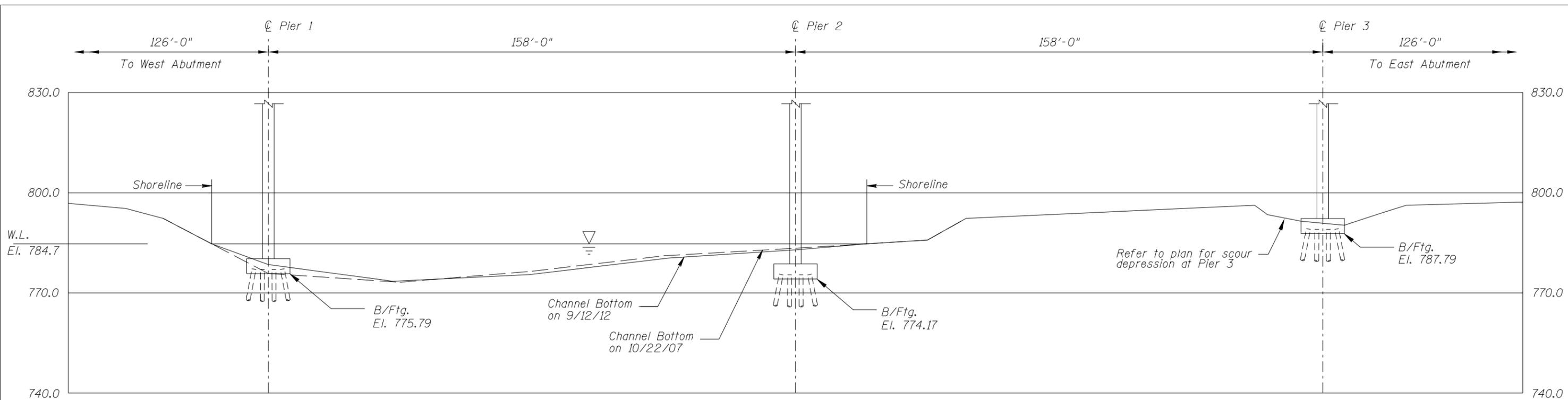
- 2.0 Sounding Depth (9/12/12)
- 5.2 Sounding Depth (10/22/07)
- Riprap
- Dry Scour Depression
- Timber Debris

**TYPICAL END VIEW OF PIERS**

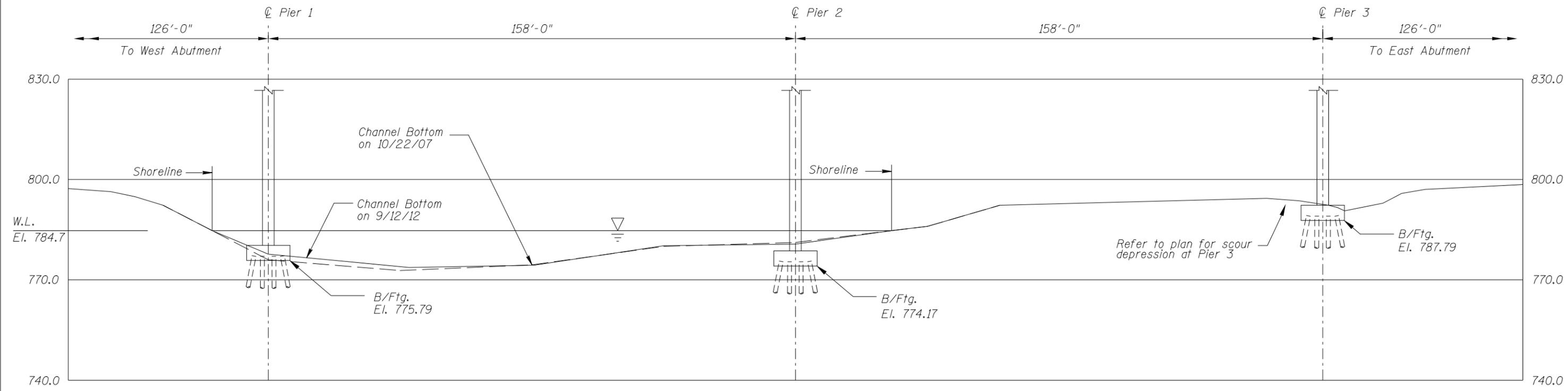


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<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>		
STRUCTURE NO. 08520 OVER THE MINNESOTA RIVER DISTRICT 7, BROWN COUNTY, CITY OF NEW ULM		
<b>INSPECTION AND SOUNDING PLAN</b>		
Drawn By: BJR	<b>COLLINS ENGINEERS</b>	Date: SEP. 2012
Checked By: BRL	123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Scale: NTS
Code: 52210129		Figure No.: 1



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:  
Refer to Figure 1 for General Notes.

<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>		
STRUCTURE NO. 08520 OVER THE MINNESOTA RIVER DISTRICT 7, BROWN COUNTY, CITY OF NEW ULM		
UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
Drawn By: BJR	<b>COLLINS ENGINEERS</b>	Date: SEP. 2012
Checked By: BRL		Scale: 1"=30'
Code: 5221029		Figure No.: 2

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

INSPECTORS: WSB & Associates and Collins Engineers DATE: September 12, 2012

ON-SITE TEAM LEADER: Barritt Lovelace, P.E.

BRIDGE NO: 08520 WEATHER: Cloudy, 60°F

WATERWAY CROSSED: Minnesota River

DIVING OPERATION:  SCUBA  SURFACE SUPPLIED AIR  
 OTHER

PERSONNEL: Kasey Yoder (WSB), Lukas Janulis (Collins)

EQUIPMENT: Commercial Scuba, Sounding Pole, Lead Line, Probe Rod, Camera

TIME IN WATER: 11:00 a.m.

TIME OUT OF WATER: 12:00 p.m.

WATERWAY DATA: VELOCITY 1.0 ft/s

VISIBILITY 1.0 foot

DEPTH 9.5 feet maximum at Pier 1

ELEMENTS INSPECTED: Piers 1, 2, and 3

REMARKS: Overall, the concrete of the pier shafts was in good condition with no structurally significant defects observed. The footing at Pier 1 was exposed from the upstream quarter point along the west face, around the upstream and downstream nose, and along the entire east face with up to 4.5 feet of vertical face exposed along the east face and with 8 inches of vertical exposure of the seal. A scour depression 6 feet in radius, 2 feet deep was observed at the upstream nose of Piers 1 and 2. The top of the footing was exposed at Pier 3 around the majority of the pier with up to 1.5 feet of vertical exposure due to a scour depression 10 feet in radius within the easterly bank of the waterway.

FURTHER ACTION NEEDED:  YES  NO

Because the bridge has been evaluated to be scour critical, consider countermeasures to mitigate scour at Piers 1 and 3.

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of sixty (60) months unless a period of high flow creates the need for a sooner inspection.

MINNESOTA DEPARTMENT OF TRANSPORTATION  
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 08520  
 INSPECTORS WSB & Associates and Collins Engineers, Inc.  
 ON-SITE TEAM LEADER. Barritt Lovelace, P.E.  
 WATERWAY CROSSED Minnesota River

INSPECTION DATE September 12, 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

UNIT REFERENCE NO.	UNIT DESCRIPTION	MAXIMUM DEPTH OF WATER	SUBSTRUCTURE						CHANNEL					GENERAL					
			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
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Pier 1	9.5'	N	7	7	9	N	7	6	6	6	N	6	7	N	N	N	N	N
	Pier 2	4.4'	N	7	N	9	N	7	7	N	N	N	7	7	N	N	N	N	N
	Pier 3	N	N	7	7	9	N	7	6	7	7	N	6	7	N	N	N	N	N

\*UNDERWATER PORTION ONLY

REMARKS: Overall, the concrete of the pier shafts was in good condition with no structurally significant defects observed. The footing at Pier 1 was exposed from the upstream quarter point along the west face, around the upstream and downstream nose, and along the entire east face with up to 4.5 feet of vertical face exposed along the east face and with 8 inches of vertical exposure of the seal. A scour depression 6 feet in radius, 2 feet deep was observed at the upstream nose of Piers 1 and 2. The top of the footing was exposed at Pier 3 around the majority of the pier with up to 1.5 feet of vertical exposure due to a scour depression 10 feet in radius within the easterly bank of the waterway.

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.