

UNDERWATER BRIDGE INSPECTION REPORT

---

STRUCTURE NO. 60019

MSAS NO. 119

OVER THE

RED LAKE RIVER

DISTRICT 2 - POLK COUNTY, CITY OF EAST GRAND FORKS

---



AUGUST 29, 2012

PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

AYRES ASSOCIATES & COLLINS ENGINEERS, INC.

JOB NO. 7423

MINNESOTA DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 60019, Piers 6 and 7, were found to be in good condition with no defects of structural significance observed. Since the previous inspection, the footing exposure at the center column of Pier 7 has increased in extent with up to 4.5 feet of vertical exposure and undermining has developed exposing three foundation piles. At the upstream nose of Pier 7 rock has been placed extending from the streambed to 2 feet above the water surface. As a result to these countermeasures, the foundation exposure at the upstream column of the pier has reduced and footing undermining was no longer present.

INSPECTION FINDINGS:

- (A) The concrete surfaces of both piers were found to be smooth and sound with no significant structural defects observed.
- (B) The top of the footing of the upstream column at Pier 7 was exposed along the west and south sides of the column at 2.6 feet below the waterline with a maximum vertical face exposure of 2.9 feet. The footing was found to be undermined during the previous inspection, but the cavity has been filled in with sediment and rock was piled at the upstream nose.
- (C) The footing of the center column of Pier 7 was exposed for a length of 8 feet along the south face and 2 feet along the east face with up to 4.5 feet (full height) of vertical face exposure. The footing was undermined along the south face up to 1.5 feet high by 2 feet deep for a length of 6 feet with 3 piles exposed. The piles were in good condition.

RECOMMENDATIONS:

- (A) Monitor the foundation exposure and undermining at Pier 7 during future underwater inspections. Scour countermeasures (similar to what has been installed at the upstream column) should be considered at the middle column of Pier 7 in order to prevent any further undermining of the foundation.
  
- (B) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of sixty (60) months.

Inspection Team Leader

Ayres Associates, Inc.



Brian K. Schroeder  
Registered Professional Engineer  
State of Minnesota

Respectfully submitted,

**PROFESSIONAL ENGINEER**

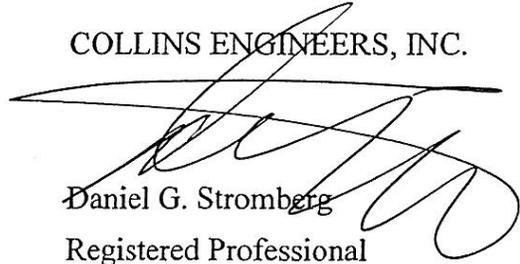
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

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: 60019

Feature Crossed: Red Lake River

Feature Carried: MSAS No. 119

Location: District 2 - Polk County, City of East Grand Forks

Bridge Description: The bridge superstructure consists of twelve spans of multiple steel girders supporting a reinforced concrete deck. The superstructure is supported by two reinforced concrete abutments, four reinforced concrete piers, and seven steel bent piers. All of the concrete substructure footings are supported by steel H-piles. The piers are numbered starting from the south end of the bridge.

2. INSPECTION DATA

Professional Engineer/Team Leader: Brian K. Schroeder, P.E.

Dive Team: Jason A. Cook, Anthony J. Coffaro

Date: August 29, 2012

Weather Conditions: Sunny, 80°F

Underwater Visibility: 0.5 feet

Waterway Velocity: Negligible/None

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 6 and 7

General Shape: The piers each consist of three cylindrical reinforced concrete columns supporting a rectangular reinforced concrete pier cap. The upper portions of the columns are connected by slender reinforced concrete diaphragms and each column is supported by a square footing founded on piles.

Maximum Water Depth at Substructure Inspected: Approximately 8.6 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap at the downstream end of Pier 7.

Water Surface: The waterline was approximately 32.8 feet below reference.  
Waterline Elevation = 798.3.

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 5

Item 92B: Underwater Inspection: Code B/08/12

Item 113: Scour Critical Bridges: Code I

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
205	Reinforced Concrete Column	6	EA	6				
220	Reinforced Concrete Footing	2	EA	2				
361	Scour	1	EA	1				
985	Slopes and Slope Protection	1	EA	1				



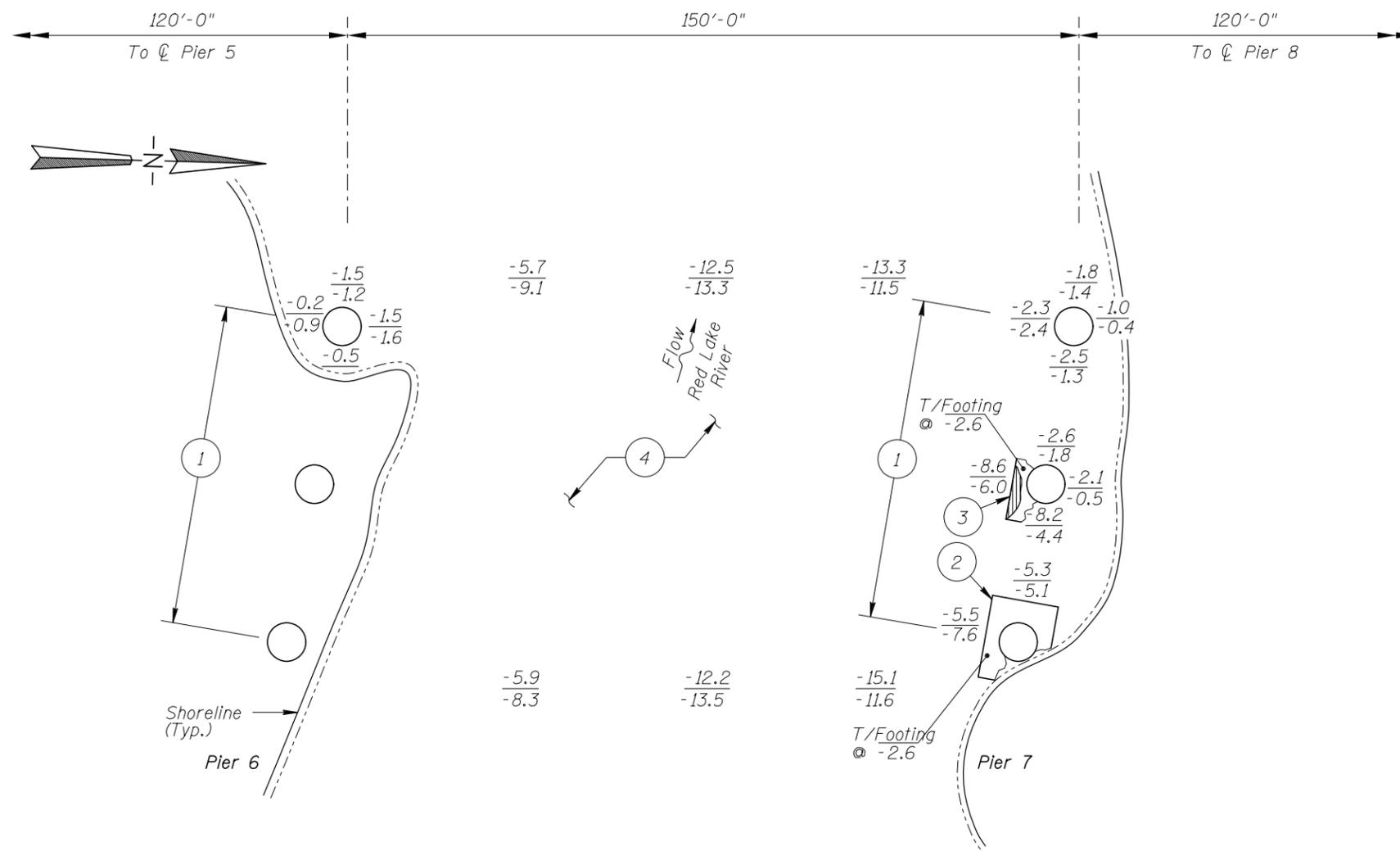
Photograph 1. View of the Structure, Looking West.



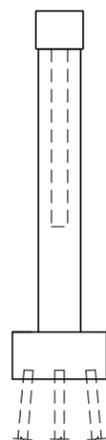
Photograph 2. Overall View of Pier 6, Looking South.



Photograph 3. Overall View of Pier 7, Looking South.



SOUNDING PLAN



TYPICAL END VIEW OF PIERS

Legend

- 2.0 Sounding Depth (8/27/12)
- 5.2 Sounding Depth (8/19/07)

Timber Debris

Indicates Area of Undermining

Note:

All soundings based on 2012 waterline location.

GENERAL NOTES:

1. Piers 6 and 7 were inspected underwater.
2. At the time of inspection on August 29, 2012, the waterline was located approximately 32.8 feet below the top of the pier cap at the downstream end of Pier 7. This corresponds to a waterline elevation of 798.3.
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.

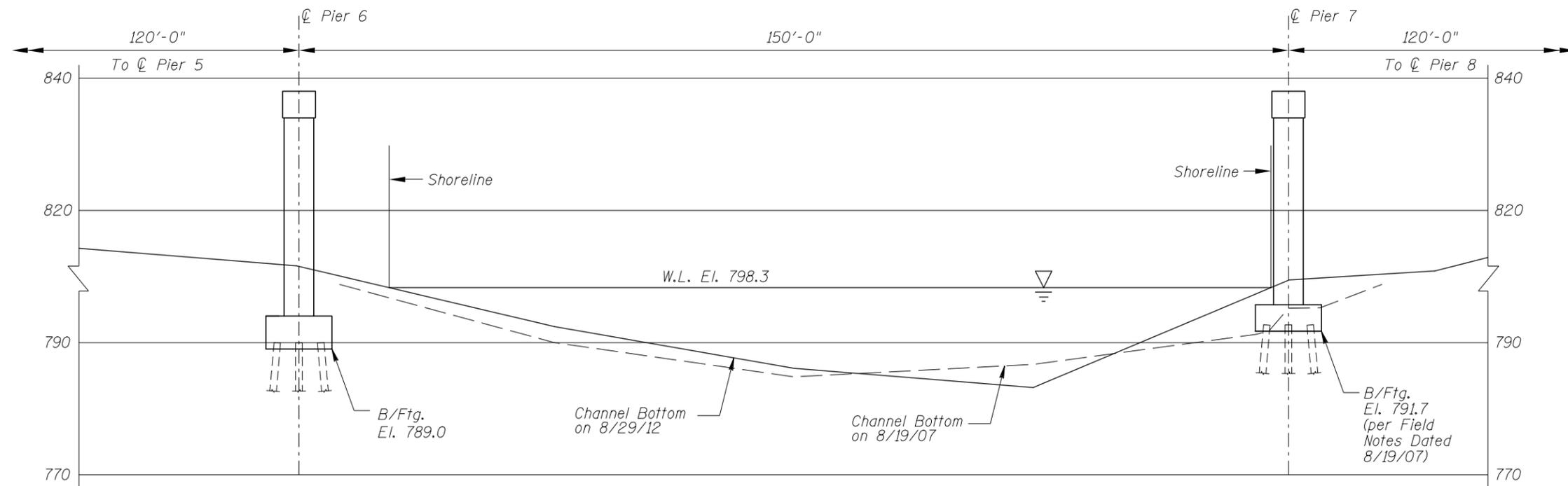
INSPECTION NOTES:

- 1 Overall, the concrete of the piers was found to be smooth and sound with no significant deterioration.
- 2 The top of the footing of the upstream column of Pier 7 was exposed along the south and west sides of the column at 2.6 feet below the waterline with a maximum vertical face exposure of 2.9 feet.
- 3 The footing of the center column of Pier 7 was partially exposed along the south face for 8 feet and east face for 2 feet with up to 4.5 feet of vertical exposure. The footing was undermined along the south face up to 1.5 feet high by 2 feet deep for a length of 6 feet with 3 piles exposed. The piles appeared to be in good condition.
- 4 The channel bottom material consisted of clay with up to 2 feet of probe rod penetration around both piers.

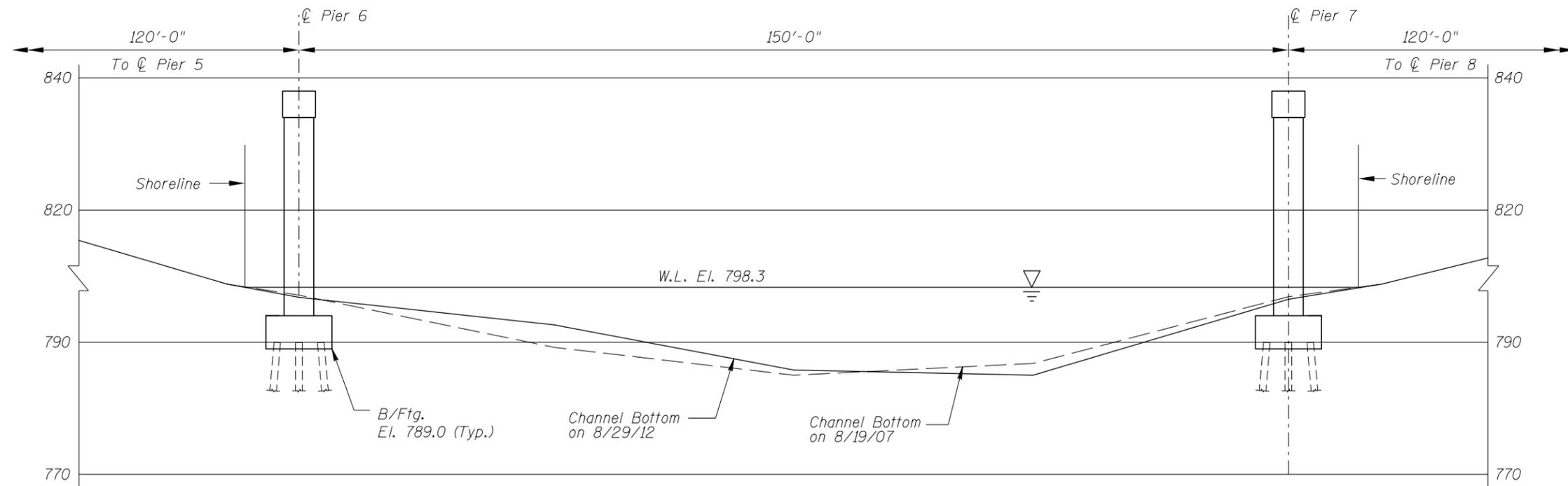
**COLLINS ENGINEERS**  
 123 North Wacker Drive  
 Suite 300  
 Chicago, IL 60606  
 (312) 704-9300  
 www.collinsengr.com

<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>	
STRUCTURE NO. 60019 OVER THE RED LAKE RIVER DISTRICT 2, POLK COUNTY, CITY OF EAST GRAND FORKS	
<b>INSPECTION AND SOUNDING PLAN</b>	
Drawn By: JAC	Date: SEPT, 2012
Checked By: BKS	Scale: NTS
Code: 52210039	Figure No.: 1

**AVRES ASSOCIATES**  
 3433 Oakwood Hills Parkway  
 Eau Claire, WI 54701  
 www.AyresAssociates.com



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. 60019 OVER THE RED LAKE RIVER DISTRICT 2, POLK COUNTY, CITY OF EAST GRAND FORKS	
<b>UPSTREAM AND DOWNSTREAM FASCIA PROFILES</b>	
Drawn By: JAC	Date: SEPT, 2012
Checked By: BKS	Scale: 1"=20'
Code: 52210039	Figure No.: 2

**COLLINS ENGINEERS**  
123 North Wacker Drive  
Suite 300  
Chicago, IL 60606  
(312) 704-9300  
www.collinsengr.com

**AVRES ASSOCIATES**  
3433 Oakwood Hills Parkway  
Eau Claire, WI 54701  
www.AyresAssociates.com

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

INSPECTORS: Ayres Associates DATE: August 29, 2012

ON-SITE TEAM LEADER: Brian K. Schroeder, P.E.

BRIDGE NO: 60019 WEATHER: Sunny, 80°F

WATERWAY CROSSED: Red Lake River

DIVING OPERATION:  SCUBA  SURFACE SUPPLIED AIR  
 OTHER

PERSONNEL: Jason A. Cook, Anthony J. Coffaro

EQUIPMENT: Commercial Scuba, Probe Rod, Lead Line, Sounding Pole, U/W Light,  
Hammer, Camera

TIME IN WATER: 12:50 P.M.

TIME OUT OF WATER: 1:30 P.M.

WATERWAY DATA: VELOCITY Negligible/None

VISIBILITY 0.5 feet

DEPTH 8.6 feet maximum at Pier 7

ELEMENTS INSPECTED: Piers 6 and 7

REMARKS: Overall, the concrete surfaces of both piers were found to be smooth and sound with no significant structural defects observed. The top of the footing of the upstream column at Pier 7 was exposed around the west and south sides of the column at 2.6 feet below the waterline with a maximum vertical face exposure of 2.9 feet. The footing was found to be undermined during the previous inspection, but has been filled in with sediment and rock was piled at the upstream nose. The footing of the center column of Pier 7 was exposed for a length of 8 feet along the south face and 2 feet along the east face with up to 4.5 feet (full height) of vertical face exposure. The footing was undermined along the south face up to 1.5 feet high by 2 feet deep for a length of 6 feet with 3 piles exposed. The piles appeared to be in good condition. No debris was observed at Piers 6 and 7.

FURTHER ACTION NEEDED: \_\_\_\_\_ YES  X  NO

Monitor the undermining present at Pier 7 during future underwater inspections.

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. 60019  
 INSPECTORS Ayres Associates  
 ON-SITE TEAM LEADER Brian K. Schroeder, P.E.  
 WATERWAY CROSSED Red Lake River

INSPECTION DATE August 29, 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 (BRACING)	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 6	1.5'	N	7	N	9	N	7	7	7	7	7	7	8	N	N	N	N	N
	Pier 7	8.6'	N	7	7	9	N	7	5	7	7	7	6	8	N	N	N	N	N

\*UNDERWATER PORTION ONLY

REMARKS: Overall, the concrete surfaces of both piers were found to be smooth and sound with no significant structural defects observed. The top of the footing of the upstream column at Pier 7 was exposed around the west and south sides of the column at 2.6 feet below the waterline with a maximum vertical face exposure of 2.9 feet. The footing was found to be undermined during the previous inspection, but has been filled in with sediment and rock was piled at the upstream nose. The footing of the center column of Pier 7 was exposed for a length of 8 feet along the south face and 2 feet along the east face with up to 4.5 feet (full height) of vertical face exposure. The footing was undermined along the south face up to 1.5 feet high by 2 feet deep for a length of 6 feet with 3 piles exposed. The piles appeared to be in good condition. No debris was observed at Piers 6 and 7.

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.