

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 5947

CSAH NO. 33

OVER THE

MISSISSIPPI RIVER

DISTRICT 3 - BENTON COUNTY



PREPARED FOR THE
MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 5221 (CEI 15A)

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 5947, Piers 2 and 3, were found to be in good to satisfactory condition below water. Pier 3 exhibited undermining at the southeast corner due to an area of fractured bedrock. The channel bottom consisted of large rock and bedrock which appeared stable around the substructure units, aside for the above mentioned undermining, with no appreciable changes since the previous inspection.

INSPECTION FINDINGS:

- (A) A 6-foot-long area of undermining was observed at the southeast corner of Pier 3 with a height of 1.3 feet and with 3 feet of maximum horizontal penetration. The undermining was due to the fractured bedrock channel bottom, which has shifted from under the footing.

- (B) The masonry of Piers 2 and 3 was in good condition with no defects of structural significance observed. However, there were random areas of deteriorated joint mortar with penetrations of up to 2 inches deep (deepest losses concentrated around the upstream nose).

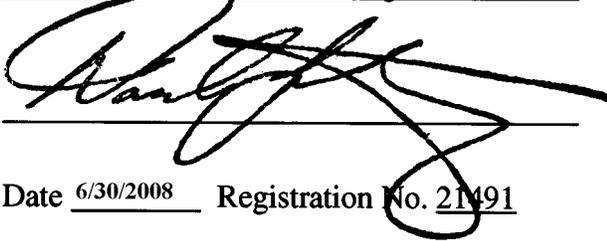
RECOMMENDATIONS:

- (A) Repair the undermining at the southeast corner of Pier 3 by placing grout bags and/or pumped grout within the undermined area to restore the full bearing capacity of the pier.

- (B) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

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



A large, stylized handwritten signature in black ink, appearing to read 'Daniel G. Stromberg', is written over a horizontal line. Below the signature, the date and registration number are printed.

Date 6/30/2008 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.



A large, stylized handwritten signature in black ink, appearing to read 'Daniel G. Stromberg', is written over a horizontal line.

Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 5947

Feature Crossed: Mississippi River

Feature Carried: CSAH No. 33

Location: District 3 - Benton County

Bridge Description: The superstructure consisted of a continuous steel truss bridge supporting a reinforced concrete deck. The superstructure is supported by three masonry piers and two masonry abutments. The piers are numbered 1 through 3 starting from the west and are founded on bedrock.

2. INSPECTION DATA

Professional Engineer/Team Leader: Bradley A. Syler, P.E., S.E.

Dive Team: John J. Loftus, Valerie Rouston

Date: August 15, 2007

Weather Conditions: Partly Cloudy, 69° F

Underwater Visibility: 3.0 Feet

Waterway Velocity: 2.5 f.p.s.

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 2 and 3.

General Shape: Rectangular piers with pointed upstream noses founded on bedrock.

Maximum Water Depth at Substructure Inspected: Approximately 7.0 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the cap at the north end of Pier 3.

Water Surface: The waterline was approximately 11.6 feet below reference.

Waterline Elevation = 981.6.

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 6

Item 61: Channel and Channel Protection: Code 6

Item 92B: Underwater Inspection: Code B/08/07

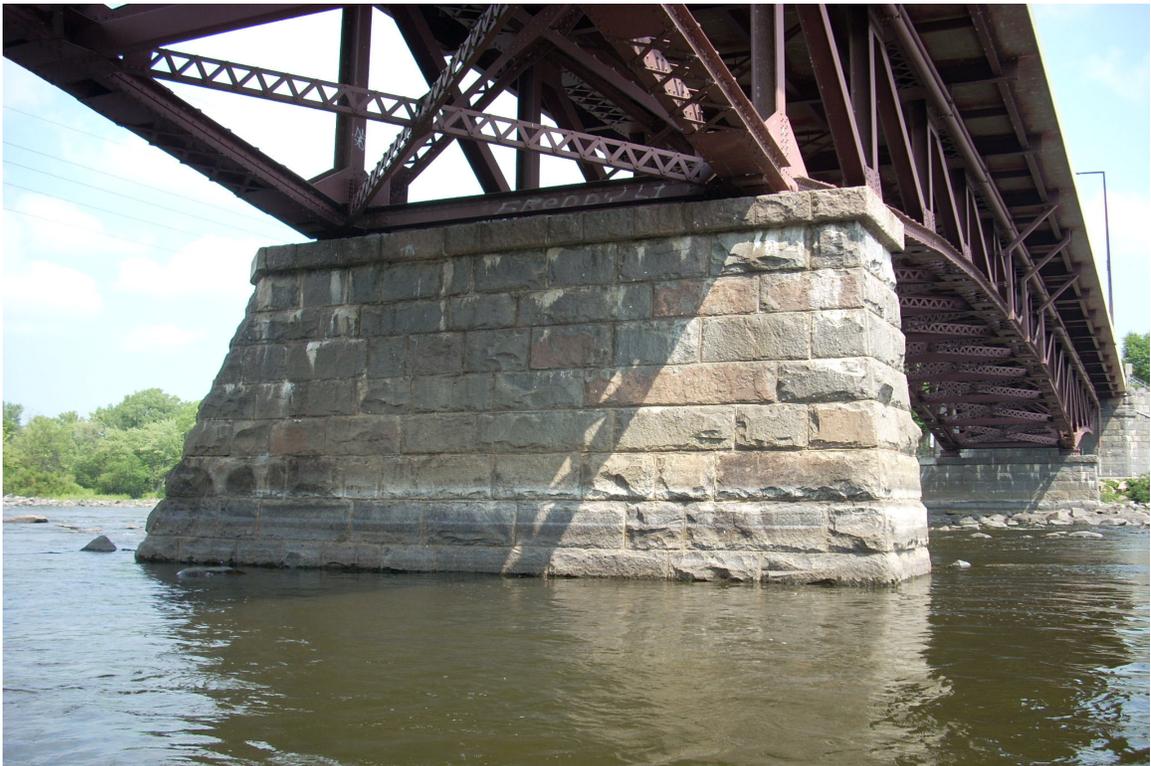
Item 113: Scour Critical Bridges: Code L/96

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

 Yes X No



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



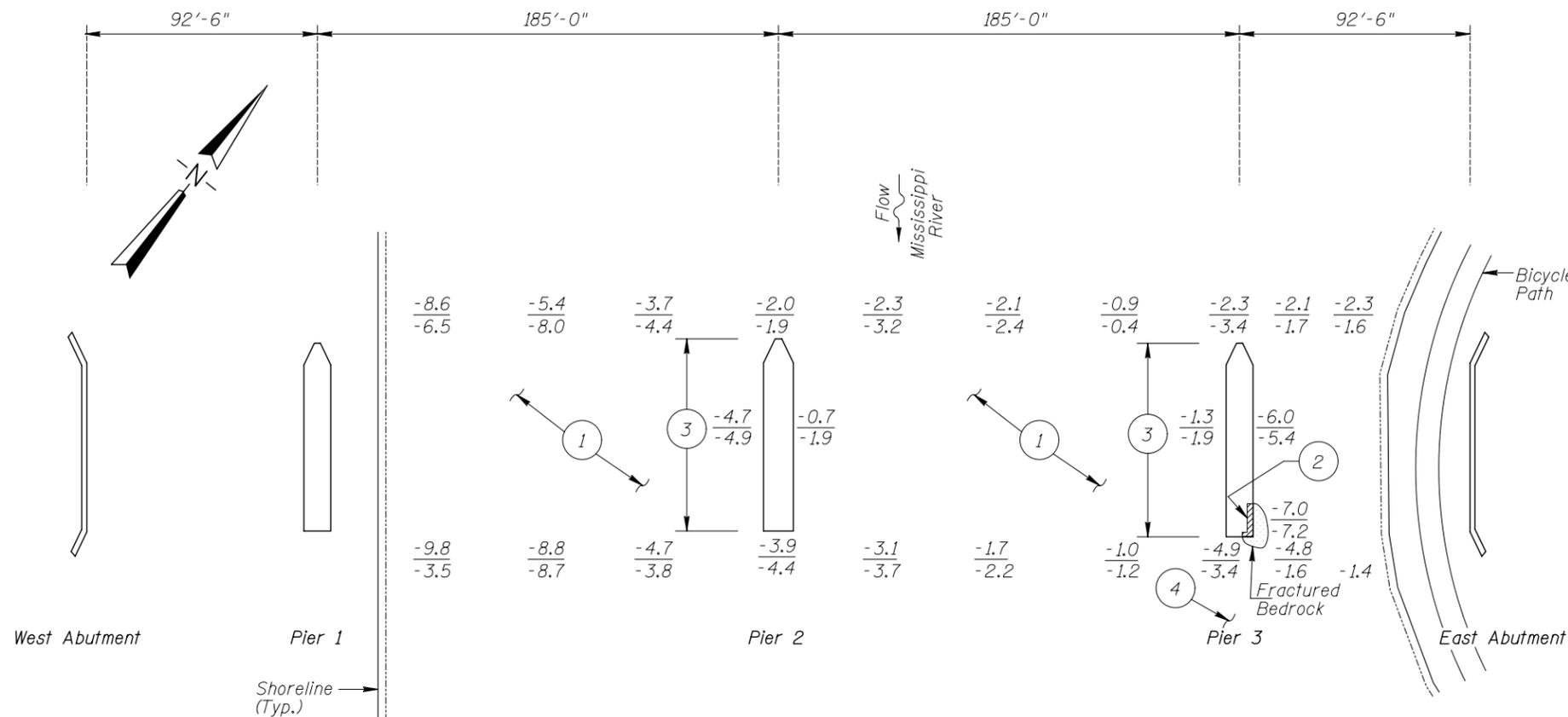
Photograph 2. View of Pier 2, Looking South.



Photograph 3. View of Pier 2, Looking Northeast.



Photograph 4. View of Pier 3, Looking South.



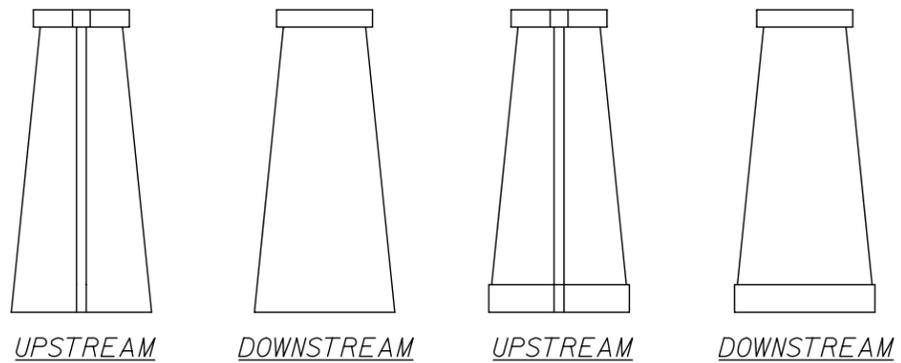
SOUNDING PLAN

GENERAL NOTES:

1. Piers 2 and 3 were inspected underwater.
2. At the time of inspection on August 15, 2007, the waterline was located approximately 11.6 feet below the top of the cap at the upstream end of Pier 3. This corresponds to a waterline elevation of 981.6 based on the previous report dated September 27, 2002.
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 around the entire perimeter of both piers consisted of large rocks and bedrock with no probe rod penetration.
- ② Undermining was observed at the southeast corner of Pier 3 due to an area of fractured bedrock. The undermining cavity was 1.3 feet high by 6 feet long with 3 feet of maximum horizontal penetration.
- ③ The masonry construction of both piers were observed to be in overall good condition, however, there were random areas of missing mortar up to 2 inches deep (heaviest at upstream nose).
- ④ 1- to 5-foot-diameter rocks scattered in the channel between Piers 2 and 3.



TYPICAL END VIEW OF PIER 2

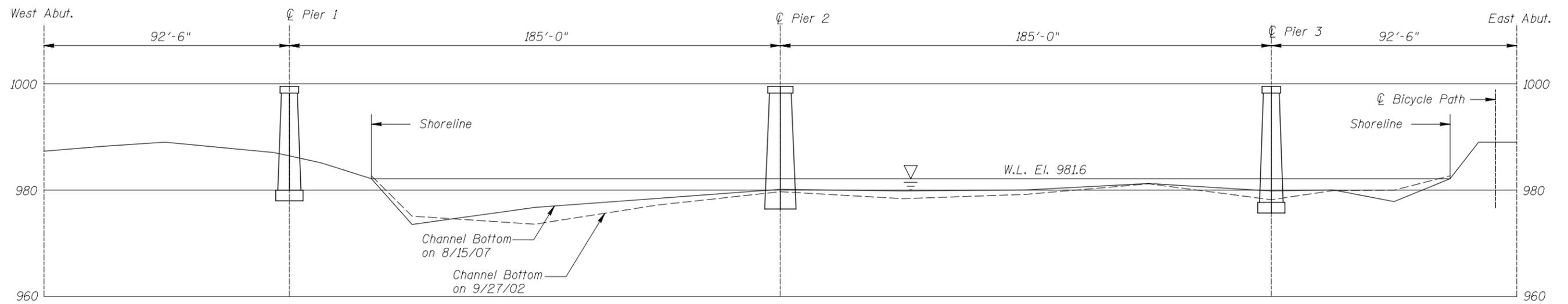
TYPICAL END VIEW OF PIER 3

Legend

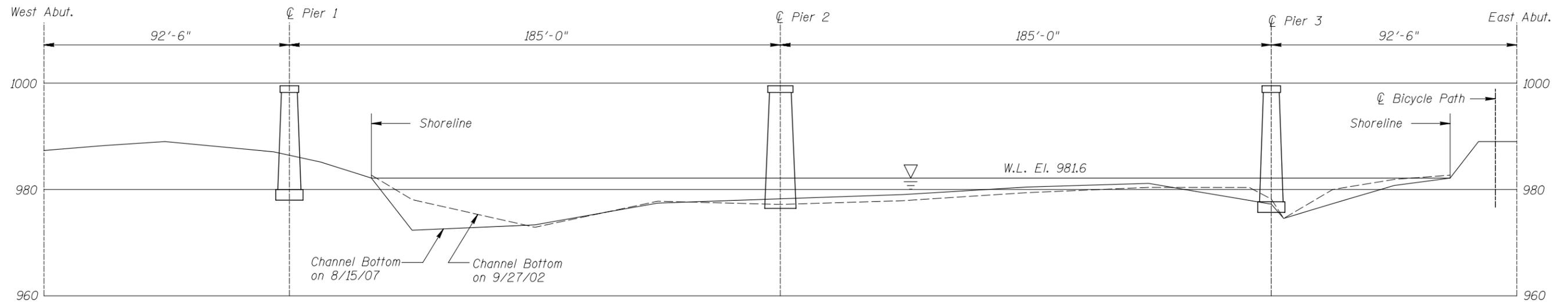
-2.0	Sounding Depth (8/25/07)
-5.2	Sounding Depth (9/27/02)

Note:
All soundings based on 2007 waterline location.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 5947 OVER THE MISSISSIPPI RIVER DISTRICT 3, BENTON COUNTY		
INSPECTION AND SOUNDING PLAN		
Drawn By: PRH	COLLINS ENGINEERS <small>133 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: AUGUST, 2007
Checked By: MDK		Scale: NTS
Code: 5221015A		Figure No.: 1



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Notes:

Refer to Figure 1 for General Notes.

**MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION**

STRUCTURE NO. 5947
OVER THE MISSISSIPPI RIVER
DISTRICT 3, BENTON COUNTY
UPSTREAM AND DOWNSTREAM
FASCIA PROFILES

Drawn By: PRH	COLLINS ENGINEERS <small>123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: AUGUST, 2007
Checked By: MDK		Scale: H:1"=40' V:1"=20'
Code: 5221015A		Figure No.: 2

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

INSPECTORS: Collins Engineers, Inc. DATE: August 15, 2007

ON-SITE TEAM LEADER: Bradley A. Syler, P.E., S.E.

BRIDGE NO: 5947 WEATHER: Partly Cloudy, 69° F

WATERWAY CROSSED: Mississippi River

DIVING OPERATION: SCUBA SURFACE SUPPLIED AIR
 OTHER

PERSONNEL: John J. Loftus, Valerie Roustan

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

TIME IN WATER: 1:10 P.M.

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

WATERWAY DATA: VELOCITY 2.5 f.p.s.

VISIBILITY 3.0 feet

DEPTH 7.0 feet maximum at Pier 3.

ELEMENTS INSPECTED: Piers 2 and 3

REMARKS: Overall, the masonry construction of Piers 2 and 3 was observed to be in good to satisfactory condition. However, there were random areas of deteriorated joint mortar with penetrations of up to 2 inches. A 6-foot-long, 1.3-foot-high area of undermining was observed at the southeast corner of Pier 3 with up to 3 feet of horizontal penetration. The undermining is due to fractured bedrock that has shifted from under the footing. The channel bottom, which consisted of large rock and bedrock, appeared stable with no appreciable changes around the substructure units since the previous inspection.

FURTHER ACTION NEEDED: YES NO

Repair the undermining at the southeast corner of Pier 3 by placing grout bags and/or pumped grout within the undermined area to restore the full bearing capacity of the pier.

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 5947

INSPECTION DATE August 15, 2007

INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER Bradley A. Syler, P.E., S.E.
WATERWAY CROSSED Mississippi River

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	SUBSTRUCTURE										CHANNEL					GENERAL				
		MAXIMUM DEPTH OF WATER	PIILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER (UNDERMINING)	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 (MASONRY)		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18		
	Pier 2	4.7'	N	7	N	9	N	7	7	8	8	N	7	N	N	N	N	N	8		
	Pier 3	7.0'	N	7	N	9	5	5	6	8	8	N	6	N	N	N	N	N	8		

REMARKS: Overall, the masonry construction of Piers 2 and 3 was observed to be in good to satisfactory condition. However, there were random areas of deteriorated joint mortar with penetrations of up to 2 inches. A 6-foot-long, 1.3-foot-high area of undermining was observed at the southeast corner of Pier 3 with up to 3 feet of horizontal penetration. The undermining is due to fractured bedrock that has shifted from under the footing. The channel bottom, which consisted of large rock and bedrock, appeared stable with no appreciable changes around the substructure units since the previous 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.