

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 58520

CSAH NO. 61

OVER THE

KETTLE RIVER

DISTRICT 1 - PINE COUNTY



JULY 28, 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 substructure units inspected at Bridge No. 58520, Piers 1 and 2, were found to be generally in good to satisfactory condition with no structurally significant defects observed. The steel piles exhibited coating failure with light surface corrosion and some minor pitting. A moderate accumulation of timber debris was observed at the upstream end of Pier 1, and along the south side of Pier 2. The comparison of soundings to the pervious underwater inspection show evidence of general minor channel bottom degradation within the channel between the two piers, as the channel bottom profile appeared to be 2 to 3 feet lower. See Figure 2 for upstream and downstream fascia profiles.

INSPECTION FINDINGS:

- (A) The steel piles exhibited coating failure on 80 to 100 percent of the surface area, and light surface corrosion with rust nodules and up to 1/4 inch deep pitting on 50 percent of the surface area, from 3 feet above the waterline to the channel bottom. Deterioration was heaviest from 1 foot below the waterline to 5 feet below the waterline.
- (B) A moderate accumulation of timber debris consisting of 1 foot diameter and smaller logs and branches, including a 12-inch-diameter tree, was observed at the upstream end of Pier 1, and an 18-inch-diameter tree was observed extending along the south side of Pier 2.

RECOMMENDATIONS:

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

- (B) Monitor the drift accumulations at the piers during future inspections.

WSB and Associates



Barritt Lovelace
Registered Professional Engineer
Bridge Safety Inspection Team Leader

Respectfully submitted,

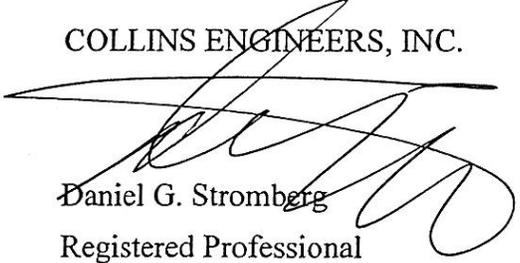
PROFESSIONAL ENGINEER

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: 58520

Feature Crossed: Kettle River

Feature Carried: CSAH No. 61

Location: District 1 - Pine County

Bridge Description: The superstructure consists of three spans of multiple concrete beams supporting a reinforced concrete deck. The superstructure is supported by two abutments and two concrete filled steel shell pile piers. The piers are numbered 1 and 2 starting from the south end of the structure.

2. INSPECTION DATA

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

Dive Team: George Bender (WSB), John Loftus (Collins)

Date: July 28, 2012

Weather Conditions: Sunny, 78° F

Underwater Visibility: 2.0 feet

Waterway Velocity: 0.5 ft/sec

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 and 2

General Shape: The piers consist of a single line of ten concrete filled steel shell piles supporting a reinforced concrete pier cap.

Maximum Water Depth at Substructure Inspected: Approximately 9.7 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap at the upstream end of Pier 1.

Water Surface: The waterline was approximately 18.5 feet below reference.
Water Elevation = 1012.3.

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/07/12

Item 113: Scour Critical Bridges: Code J/97

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
382	Cast in Place Piling	20	EA		20			
985	Slopes and Slope Protection	1	EA		1			



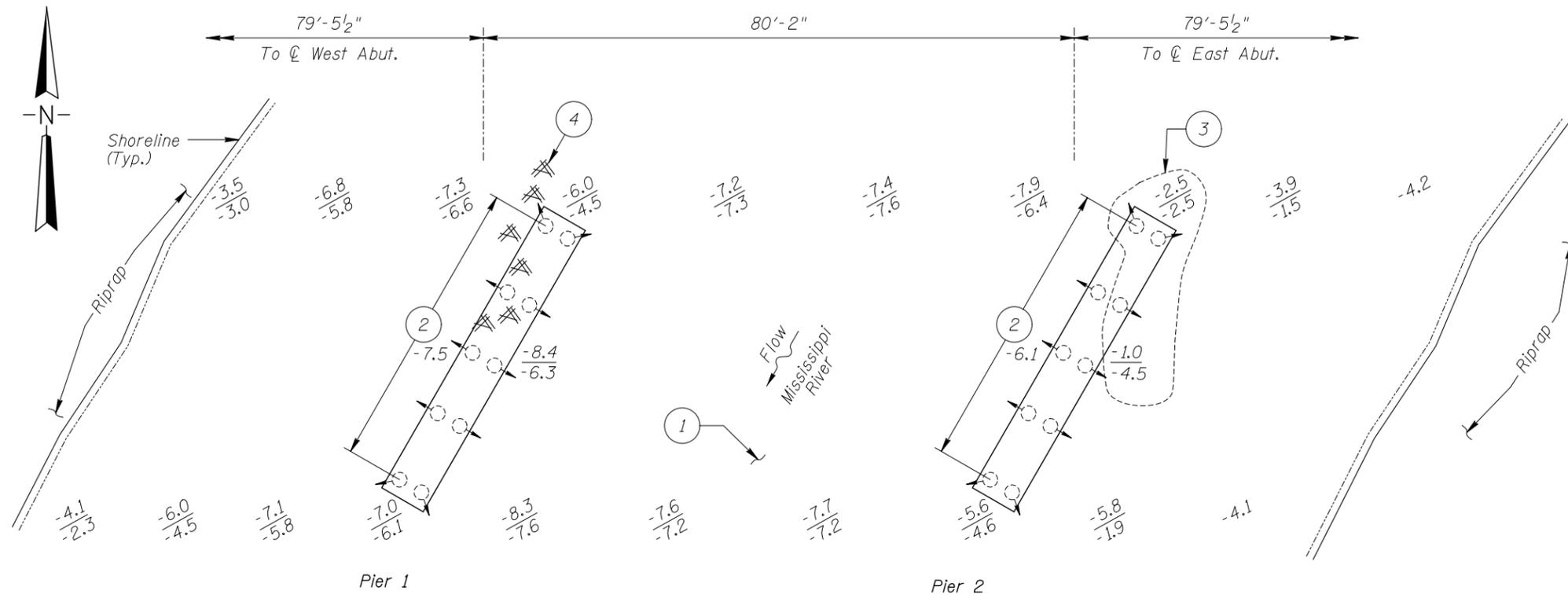
Photograph 1. Overall View of the Structure, Looking East.



Photograph 2. View of Pier 1, Looking South.



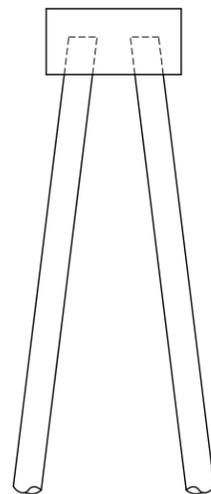
Photograph 3. View of Pier 2, Looking South.



SOUNDING PLAN

GENERAL NOTES:

1. Piers 1 and 2 were inspected underwater.
2. At the time of inspection on September 30, 2012, the waterline was located approximately 8.3 feet below the top of the cap at the upstream end of Pier 1. This corresponds to a waterline elevation of 1273.4 feet based on design drawings.
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.



TYPICAL END VIEW OF PIERS

INSPECTION NOTES:

- 1 The channel bottom material typically consisted of firm sandy gravel with scattered 6 inch cobbles and a maximum probe rod penetration of approximately 2 inches.
- 2 All piles exhibited coating failure, corrosion, and rust nodules covering 50 to 100 percent of the surface area, from 3 feet above the waterline to the channel bottom. The heaviest corrosion (+/- 100 percent) was located from 3 feet above to 2 feet below the waterline with random pitting up to 1/32 inch deep.
- 3 There was a moderate accumulation of silted in aquatics/organics and small branchy material, approximately 4 to 5 feet high allowing a maximum probe rod penetration of 1 foot, mounded up at the upstream end and upstream half of the east face of Pier 2 extending from approximately 1 to 2.5 feet below the waterline to the channel bottom.
- 4 A 6 inch diameter tree trunk with branches was observed at the upstream end of Pier 1 and extended from the channel bottom to the waterline.

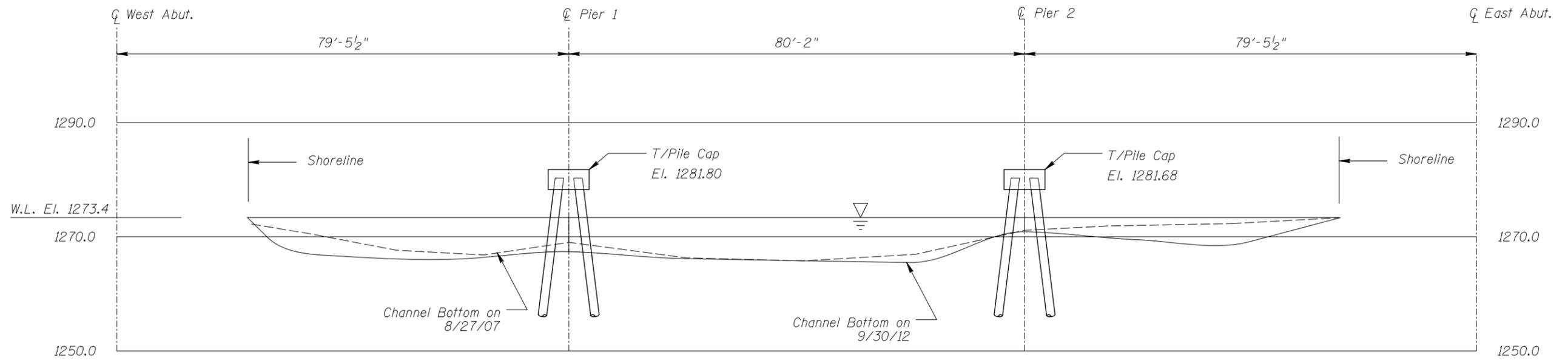
Legend

- 2.0 Sounding Depth (9/30/12)
- 5.2 Sounding Depth (8/27/07)
- Steel Pile
- with arrow Battered Steel Pile
- ▨ Timber Debris
- ⬭ Silted in Aquatics/Organics

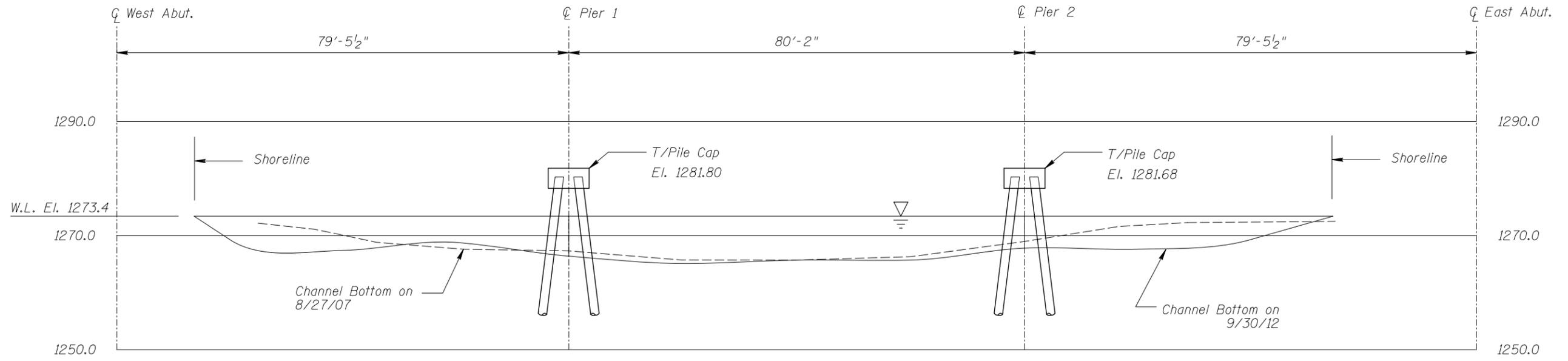
Note:

All soundings based on 2012 waterline location.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 31512 CSAH 18 OVER THE MISSISSIPPI RIVER ITASCA COUNTY		
INSPECTION AND SOUNDING PLAN		
Drawn By: MBP	COLLINS ENGINEERS	Date: JAN., 2013
Checked By: LJ	<small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Scale: NTS
Code: 742331512		Figure No.: 1



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:
Refer to Figure 1 for General Notes.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 31512 CSAH 18 OVER THE MISSISSIPPI RIVER ITASCA 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: JAN., 2013
Checked By: LJ		Scale: 1"=20'
Code: 742331512		Figure No.: 2

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

INSPECTORS: WSB & Associates and Collins DATE: July 28, 2012

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

BRIDGE NO: 58520 WEATHER: Sunny, 78° F

WATERWAY CROSSED: Kettle River

DIVING OPERATION: SCUBA SURFACE SUPPLIED AIR
 OTHER

PERSONNEL: George Bender (WSB), John Loftus (Collins)

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

TIME IN WATER: 11:50 a.m.

TIME OUT OF WATER: 12:25 a.m.

WATERWAY DATA: VELOCITY 0.5 ft/sec

VISIBILITY 2.0 feet

DEPTH 9.7 feet maximum at Piers 1 and 2

ELEMENTS INSPECTED: Piers 1 and 2

REMARKS: Overall, the steel piles were generally in satisfactory condition with no structurally significant defects observed. The steel piles exhibited coating failure on 80 to 100 percent of the pile surfaces and rust nodules with up to 1/4 inch deep pitting on up to 50 percent of the surface area from 3 feet above the waterline to the channel bottom. A moderate accumulation of timber debris was observed at the upstream end of Pier 1, and along the south side of Pier 2. The channel bottom appeared stable with no evidence of significant scour.

FURTHER ACTION NEEDED: YES NO

Monitor the debris accumulations at the piers during future 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. 31512
 INSPECTORS Collins Engineers, Inc.
 ON-SITE TEAM LEADER Daniel G. Stromberg, P.E.
 WATERWAY CROSSED The Mississippi River

INSPECTION DATE September 30, 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 1	8.4'	7	N	N	9	N	7	8	8	8	7	7	N	7	N	7	N	N
	Pier 2	6.1'	7	N	N	9	N	7	8	7	7	6	6	N	7	N	7	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, Piers 1 and 2, were found to be generally in good condition with no structurally significant defects. The steel piles exhibited widespread coating loss and minor corrosion, which has not progressed in extent since the last inspection. The channel bottom appeared presently stable with no significant scour. All the timber debris and organic material, except one tree with branches, that was noted at the upstream nose of Pier 1 during the last inspection was no longer present. The accumulation of organic material at the upstream nose of Pier 2 that was noted during the previous inspection was still present and comparable in size and extent.

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.