

UNDERWATER BRIDGE INSPECTION REPORT

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STRUCTURE NO. 31512

CSAH NO. 18

OVER THE

MISSISSIPPI RIVER

ITASCA COUNTY

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SEPTEMBER 30, 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 underwater at Bridge No. 31512, 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 or changes since the previous underwater inspection. Most of the timber debris and organic material previously (2007) reported at the upstream nose of Pier 1, was no longer present. The accumulation of organic material was still present at the upstream nose of Pier 2 and was comparable in size and extent.

INSPECTION FINDINGS:

- (A) Fairly uniform surface corrosion with frequent rust nodules was found from 3 feet above the waterline to the channel bottom on all of the piles, with the heaviest concentrations of deterioration between 3 feet above the waterline and 2 feet below the waterline. The corrosion has not caused any appreciable loss of section thus far.
- (B) Around the upstream piles of Pier 2, a light accumulation of silted-in aquatics/organics and small branchy material was observed extending from 1 to 2.5 feet below the waterline to the channel bottom.

RECOMMENDATIONS:

- (A) Monitor the extent of corrosion on the piles, and if found to be progressing to the point where appreciable section loss is occurring, corrective measures to inhibit further deterioration may be warranted.
- (B) Monitor the accumulation of vegetation and timber debris around the upstream piles of Pier 2, to ensure it does not become excessive and exert large lateral loads or influence scour at the pier. If the accumulation progresses in size in the future, removal may be warranted at that time.
- (C) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of sixty (60) months.

Inspection Team Leader:  
Daniel G. Stromberg, P.E.

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: 31512

Feature Crossed: The Mississippi River

Feature Carried: CSAH No. 18

Location: Itasca County

Bridge Description: The superstructure consists of three spans of prestressed concrete beams. The superstructure is supported by two reinforced concrete abutments founded on steel piles and two steel pipe pile piers. The piers are labeled Piers 1 and 2 starting from the west end of the bridge.

2. INSPECTION DATA

Professional Engineer Diver: Daniel G. Stromberg, P.E.

Dive Team: Clayton G. Brookins, Marc B. Parker

Date: September 30, 2012

Weather Conditions: Sunny, 60° F

Underwater Visibility: 5 feet

Waterway Velocity: None/Negligible

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 and 2.

General Shape: The piers are steel shell pile bents consisting of two lines of five piles each under a concrete cap.

Maximum Water Depth at Substructure Inspected: Approximately 8.4 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap on the north side of Pier 1.

Water Surface: The waterline was approximately 8.3 feet below reference.  
Waterline Elevation = 1273.4.

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 O

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 (CIP) Piling	20	EA	20				
985	Slopes & Slope Protection	1	EA	1				



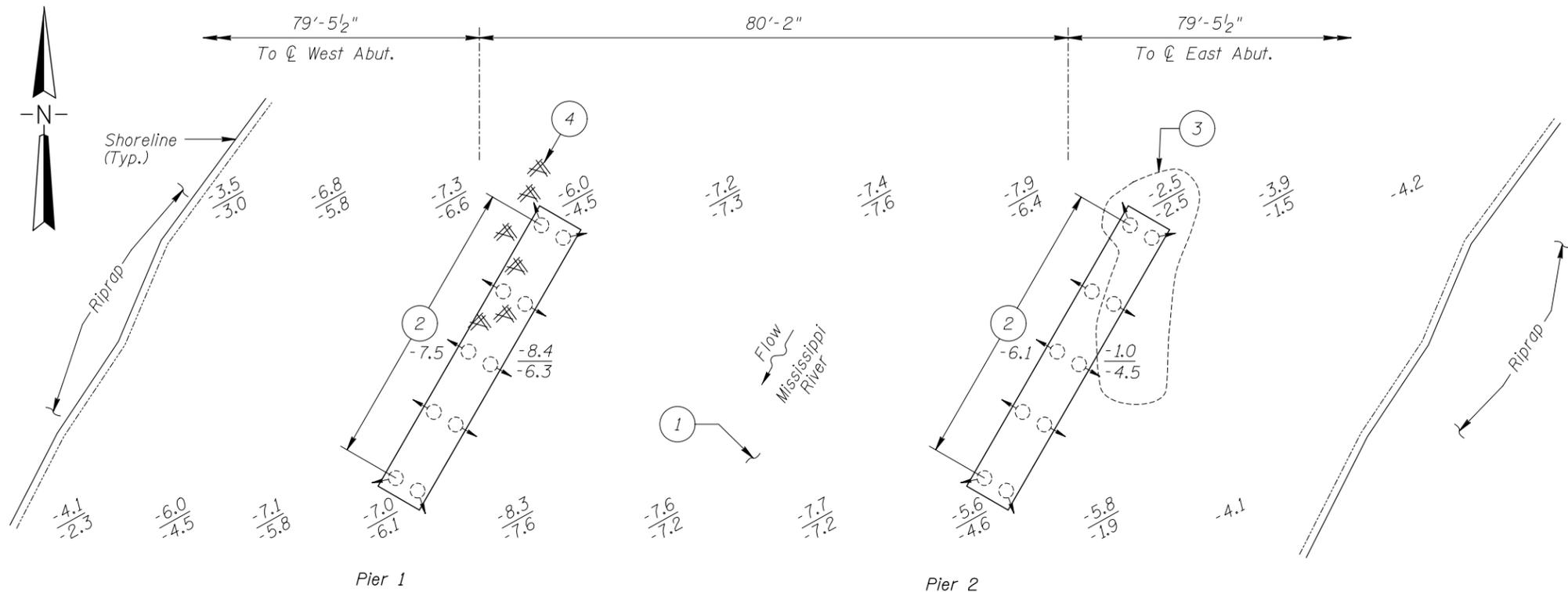
Photograph 1. Overall View of Bridge, Looking Southwest.



Photograph 2. View of Pier 1, Looking Northeast.



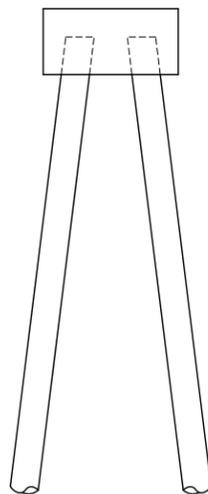
Photograph 3. View of Pier 2, Looking Northeast.



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.

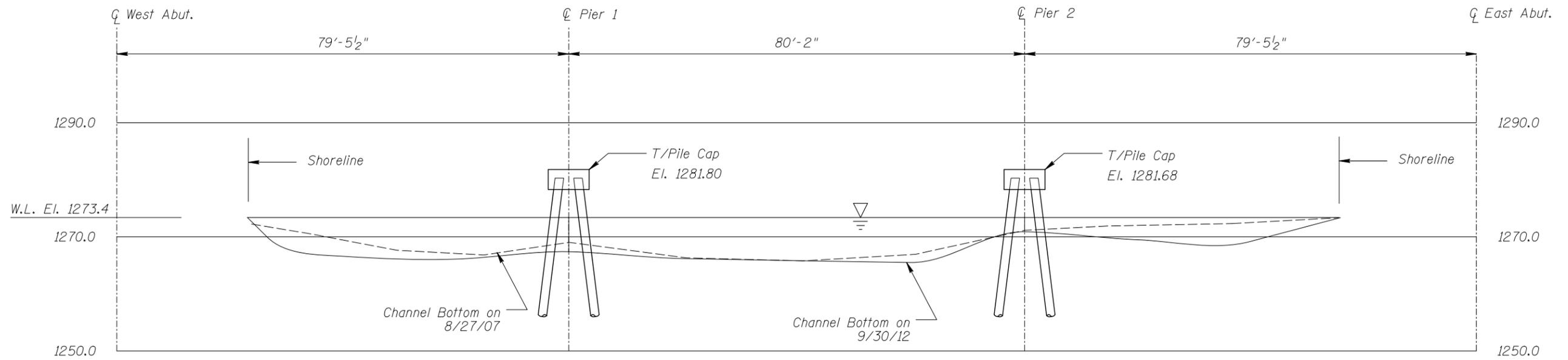
Legend

- 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

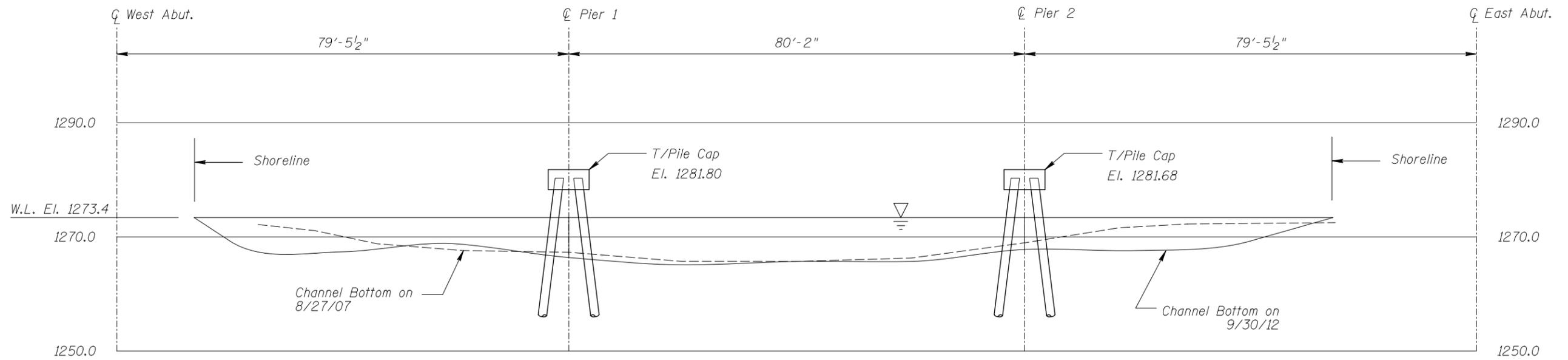
Note:

All soundings based on 2012 waterline location.

<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>		
STRUCTURE NO. 31512 CSAH 18 OVER THE MISSISSIPPI RIVER ITASCA COUNTY		
<b>INSPECTION AND SOUNDING PLAN</b>		
Drawn By: MBP	<b>COLLINS ENGINEERS</b> <small>Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: JAN., 2013
Checked By: LJ		Scale: NTS
Code: 742331512		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. 31512 CSAH 18 OVER THE MISSISSIPPI RIVER ITASCA COUNTY		
UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
Drawn By: MBP	<b>COLLINS ENGINEERS</b> <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: Collins Engineers, Inc. DATE: September 30, 2012  
ON-SITE TEAM LEADER: Daniel G. Stromberg, P.E.  
BRIDGE NO: 31512 WEATHER: Sunny, 60° F  
WATERWAY CROSSED: The Mississippi River  
DIVING OPERATION:  SCUBA  SURFACE SUPPLIED AIR  
 OTHER  
PERSONNEL: Clayton G. Brookins, Marc B. Parker  
EQUIPMENT: Commercial Scuba, Sounding Pole, Probe Rod, Camera, Hand Tools  
TIME IN WATER: 11:30 A.M.  
TIME OUT OF WATER: 12:00 P.M.  
WATERWAY DATA: VELOCITY None/Negligible  
VISIBILITY 5 feet  
DEPTH 8.4 feet maximum at Pier 1

ELEMENTS INSPECTED: Piers 1 and 2  
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 or changes since the previous underwater inspection. Most of the timber debris and organic material previously (2007) reported at the upstream nose of Pier 1, was no longer present. The accumulation of organic material was still present at the upstream nose of Pier 2 and was comparable in size and extent.

FURTHER ACTION NEEDED:  YES  NO

Monitor the extent of corrosion on the piles, and if found to be progressing to the point where appreciable section loss is occurring, corrective measures to inhibit further deterioration may be warranted.

Monitor the accumulation of vegetation and timber debris around the upstream piles of Pier 2, to ensure it does not become excessive and exert large lateral loads or influence scour at the pier. If the accumulation progresses in size in the future, removal may be warranted at that time.

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.