

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 01506
CSAH NO. 1, (410th AVE)
OVER THE
MISSISSIPPI RIVER
DISTRICT 3 – AITKIN COUNTY



OCTOBER 23, 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 at Bridge No. 01506, Piers 2 and 3, were found to be generally in satisfactory condition with no defects of structural significance observed. The steel piles exhibited light to at times moderate surface corrosion with minor section loss. There was a moderate accumulation of timber debris scattered throughout Pier 3 from channel bottom up 10 feet. The channel bottom around the substructure units consisted of soft silt, but appeared stable with no evidence of significant scour.

INSPECTION FINDINGS:

- (A) The channel bottom material around Pier 2 consisted of silty sand allowing 6 to 8 inches of probe rod penetration.
- (B) The channel bottom material around Pier 3 consisted of soft silt allowing up to 8 inches of probe rod penetration.
- (C) The steel pipe piles exhibited 100 percent coating failure with light to moderate corrosion and minor rust nodules with up to 1/8 inch deep pitting (1/16 inch typical) over 50 percent of the surface area from 8 feet to 2 feet above the waterline, and on 100% of the surface area below water.
- (D) The steel pipe piles at Pier 3 exhibited 1/16 inch thick rust delaminations due to corrosion from the waterline to the channel bottom.
- (E) A moderate accumulation of timber debris consisting of 1 foot diameter and smaller logs and branches was observed along the entire length of Pier 2 (heaviest at upstream nose) extending from channel bottom to the waterline.
- (F) A moderate accumulation of timber debris consisting of 1 foot diameter and smaller logs and branches was observed scattered throughout Pier 3, extending from channel

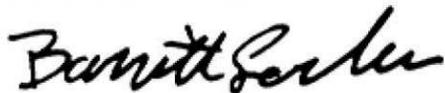
bottom up 10 feet.

RECOMMENDATIONS:

- (A) Monitor timber debris accumulations around the piles at Piers 2 and 3 during future inspections, and if found to be progressing, removal may become warranted, to eliminate excessive lateral loads on piers and the potential for scour.

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

Inspection Team Leader:
WSB and Associates



Barritt Lovelace
Registered Professional Engineer
Bridge Safety Inspection Team Leader

Respectfully submitted,

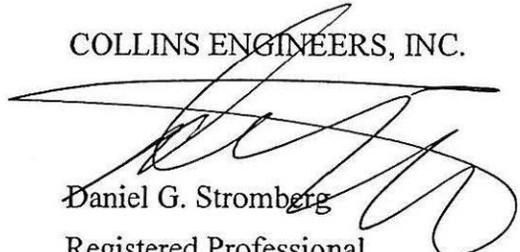
PROFESSIONAL ENGINEER

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: 01506

Feature Crossed: Mississippi River

Feature Carried: CSAH No. 1 (410th Ave)

Location: District 3 - Aitkin County

Bridge Description: The superstructure consists of five prestressed concrete beam simple spans. The superstructure is supported by two reinforced concrete abutments and four steel pipe pile bent piers with reinforced concrete caps. The abutments are also supported by steel pipe piles. The piers are labeled Pier 1 through 4 starting from the south end of the bridge.

2. INSPECTION DATA

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

Dive Team: Lukas Janulis, P.E., Marc B. Parker

Date: October 23, 2012

Weather Conditions: Cloudy, 58°F

Underwater Visibility: 2.0 feet

Waterway Velocity: 1.0 ft/sec

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 2 and 3

General Shape: Pier 2 consists of a single line of eight steel pipe cast-in-place piles. Pier 3 consists of two lines of five battered piles each.

Maximum Water Depth at Substructure Inspected: Approximately 10.6 feet.

4. WATERLINE DATUM

Water Level Reference: Top of the pile cap at the downstream end of Pier 3.

Water Surface: The waterline was approximately 21.3 feet below reference.
Waterline Elevation = 1185.0.

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/10/12

Item 113: Scour Critical Bridges: Code I/90

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	18	EA		18			
985	Slopes and Slope Protection	1	EA		1			



Photograph 1. View of Pier 2, Looking Southwest.



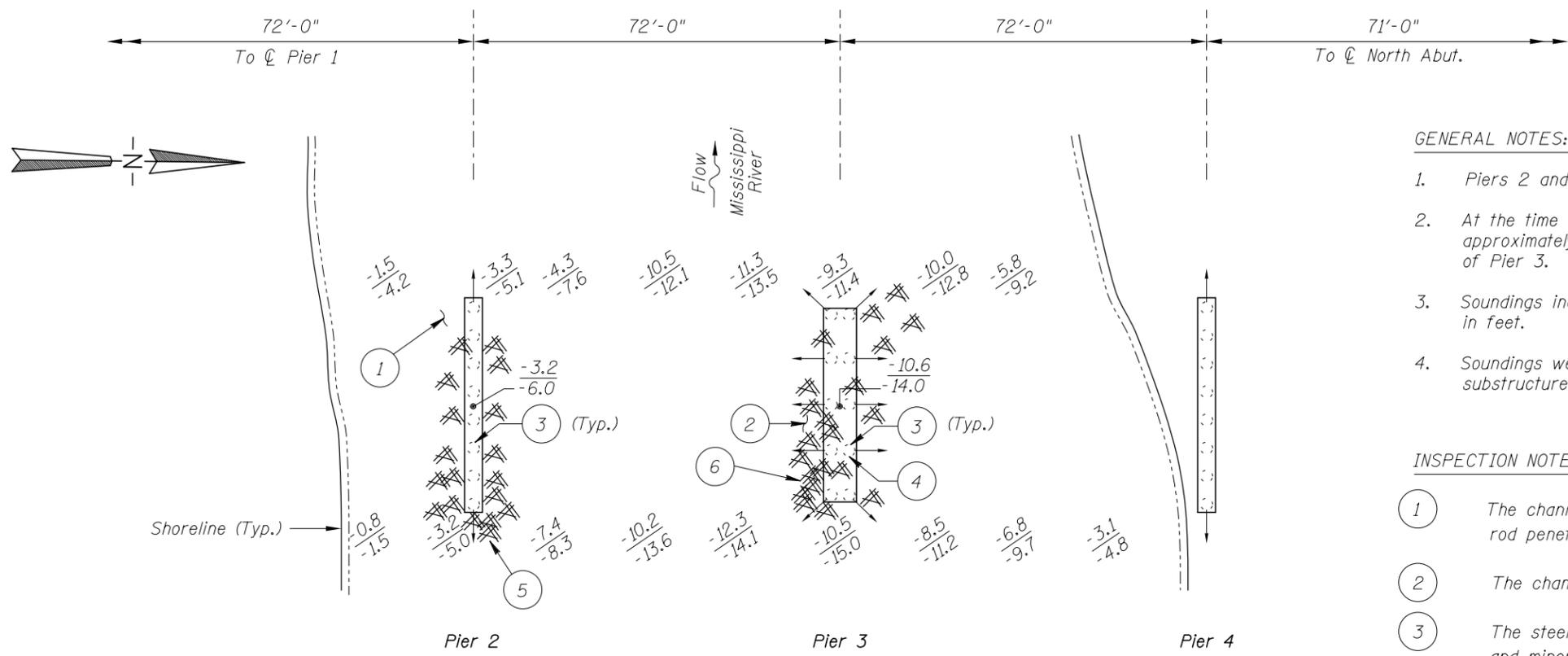
Photograph 2. View of Pier 3, Looking South.



Photograph 3. View of Upstream Channel, Looking Southeast.



Photograph 4. View of Downstream Channel, Looking Southwest.



SOUNDING PLAN

GENERAL NOTES:

1. Piers 2 and 3 were inspected underwater.
2. At the time of inspection on October 23, 2012, the waterline was located approximately 21.3 feet below the top of the pile cap at the downstream end of Pier 3. This corresponds to a waterline elevation of 1185.0.
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.

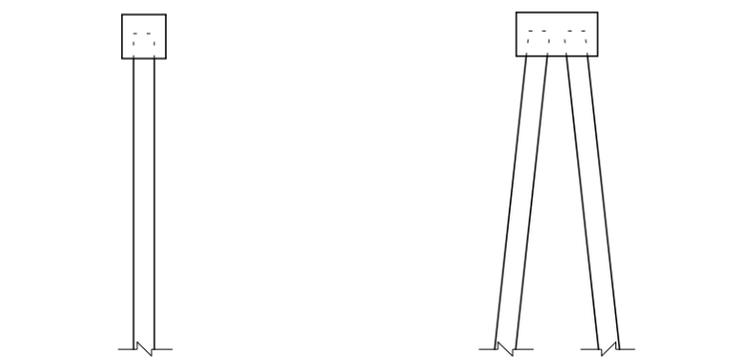
INSPECTION NOTES:

- 1 The channel bottom material consisted of silty sand with 6 to 8 inches of probe rod penetration.
- 2 The channel bottom material consisted of soft silt with up to 8 inches of probe rod penetration.
- 3 The steel pipe piles exhibited 100 percent coating failure with light to moderate corrosion and minor rust nodules with up to 1/8 inch deep pitting (1/16 inch typical) over 50 percent of the surface area from 8 feet to 2 feet above the waterline, and on 100% of the surface area below water.
- 4 The steel pipe piles at Pier 3 exhibited 1/16 inch thick rust delaminations due to corrosion from the waterline to the channel bottom.
- 5 A moderate accumulation of timber debris consisting of 1 foot diameter and smaller logs and branches was observed along the entire length of Pier 2 (heaviest at upstream nose) extending from channel bottom to the waterline.
- 6 A moderate accumulation of timber debris consisting of 1 foot diameter and smaller logs and branches was observed scattered throughout Pier 3, extending from channel bottom up 10 feet.

Legend

- 2.0 Sounding Depth (10/23/12)
- 5.2 Sounding Depth (10/15/07)
- Steel Pile
- Battered Steel Pile
- ⊘ Timber Debris

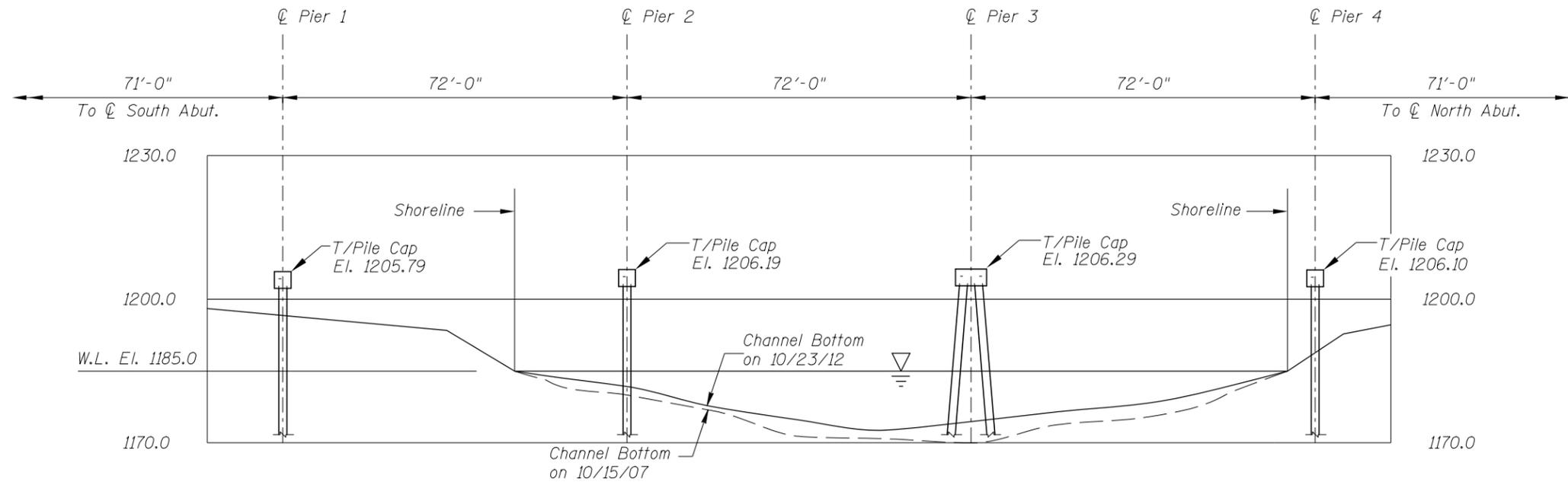
Note:
All soundings based on 2012 waterline location.



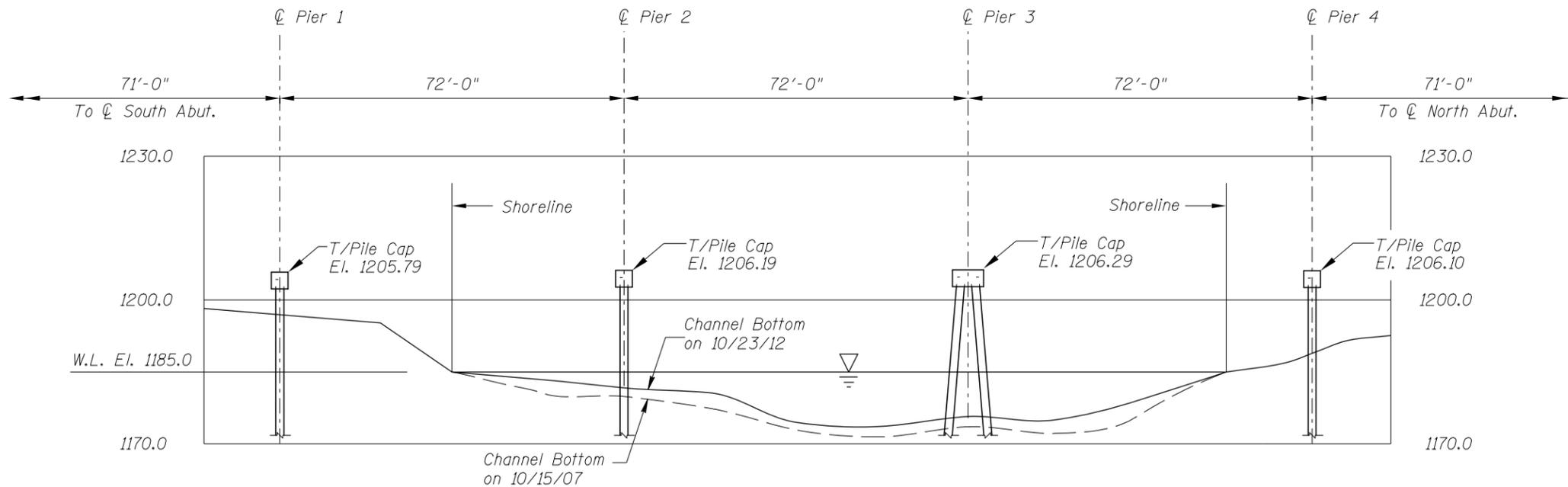
TYPICAL END VIEW OF PIERS 1, 2 & 3

END VIEW OF PIER 3

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 01506 OVER THE MISSISSIPPI RIVER DISTRICT 3, AITKIN COUNTY		
INSPECTION AND SOUNDING PLAN		
Drawn By: CRE	COLLINS ENGINEERS	Date: OCT., 2012
Checked By: LJ	<small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Scale: NTS
Code: 742301506		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. 01506 OVER THE MISSISSIPPI RIVER DISTRICT 3, AITKIN COUNTY		
UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
Drawn By: CRE	COLLINS ENGINEERS <small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: OCT., 2012
Checked By: LJ		Scale: 1"=30'
Code: 742301506		Figure No.: 2

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

INSPECTORS: Collins Engineers, Inc. DATE: October 23, 2012

ON-SITE TEAM LEADER: Barritt R. Lovelace, P.E. (WSB)

BRIDGE NO: 01506 WEATHER: Cloudy, 58°F

WATERWAY CROSSED: Mississippi River

DIVING OPERATION: SCUBA SURFACE SUPPLIED AIR
OTHER

PERSONNEL: Lukas Janulis, P.E., Marc B. Parker

EQUIPMENT: Commercial Scuba, U/W Light, Scraper, Lead Line, Sounding Pole, Probe Rod, Camera, 21 foot Boat with Motor.

TIME IN WATER: 11:15 a.m.

TIME OUT OF WATER: 11:45 a.m.

WATERWAY DATA: VELOCITY 1.0 ft/sec.

VISIBILITY 2.0 feet

DEPTH 10.6 feet maximum at Pier 3

ELEMENTS INSPECTED: Piers 2 and 3

REMARKS: Overall, Piers 2 and 3 were found to be generally in satisfactory condition with no defects of structural significance observed. The steel piles exhibited light to at times moderate surface corrosion with minor section loss. There was a moderate accumulation of timber debris scattered throughout Pier 3 from channel bottom up 10 feet. The channel bottom around the substructure units consisted of soft silt, but appeared stable with no evidence of significant scour.

FURTHER ACTION NEEDED: YES NO

Monitor timber debris around the piles at Piers 2 and 3 during future inspections, and if found to be progressing, removal may become warranted, to eliminate excessive lateral loads on piers and the potential for scour.

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. 01506
 INSPECTORS Collins Engineers, Inc.
 ON-SITE TEAM LEADER Barritt R. Lovelace, P.E. (WSB).
 WATERWAY CROSSED Mississippi River

INSPECTION DATE October 23, 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 2	3.3'	6	N	N	8	N	6	N	N	N	7	7	N	6	N	7	N	N
	Pier 3	10.6'	6	N	N	8	N	6	N	N	N	6	6	N	6	N	6	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, Piers 2 and 3 were found to be generally in satisfactory condition with no defects of structural significance observed. The steel piles exhibited light to at times moderate surface corrosion with minor section loss. There was a moderate accumulation of timber debris scattered throughout Pier 3 from channel bottom up 10 feet. The channel bottom around the substructure units consisted of soft silt, but appeared stable with no evidence of significant scour.

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.