

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 1506
CSAH NO. 1
OVER THE
MISSISSIPPI RIVER
DISTRICT 3 - AITKIN COUNTY



PREPARED FOR THE
MINNESOTA DEPARTMENT OF TRANSPORTATION
BY
COLLINS ENGINEERS, INC.
JOB NO. 5221 (CEI 68)

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 1506, Piers 2 and 3, were found to be generally in good to satisfactory condition with no defects of structural significance observed. The steel piles exhibited light surface corrosion with minor section loss. There was a moderate accumulation of timber debris at the upstream nose and throughout both piers. The channel bottom around the substructure units was well established and appeared stable with no evidence of significant scour and no appreciable changes since the previous inspection.

INSPECTION FINDINGS:

- (A) The steel pipe piles of both piers 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 penetration typical) over 50 percent of the surface area from 6 feet above the waterline to waterline, and on over 75 percent of the pile surface areas below water.
- (B) The steel pipe piles at Pier 3 exhibited 1/16 inch thick rust delaminations due to corrosion from 3 feet below the waterline to the channel bottom.
- (C) A moderate accumulation of timber debris, consisting of 1 foot diameter and smaller logs and branches, was observed at the upstream end and scattered throughout the piles of both piers, extending from the channel bottom up 4 feet at Pier 2 and from the channel bottom up 10 feet at Pier 3.

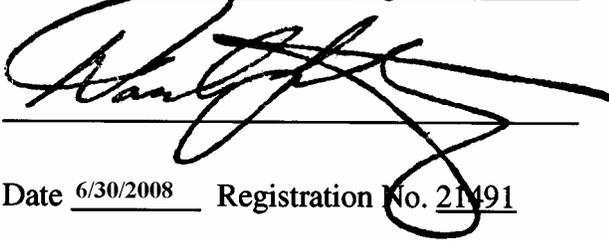
RECOMMENDATIONS:

- (A) 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.

- (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

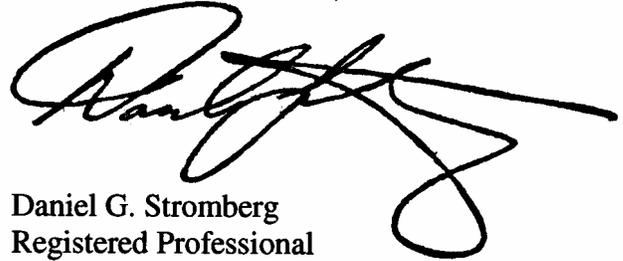


A large, stylized handwritten signature in black ink, appearing to read 'Dan G. Stromberg', is written over two horizontal lines.

Date 6/30/2008 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.



A large, stylized handwritten signature in black ink, appearing to read 'Dan G. Stromberg', is written over two horizontal lines.

Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 1506

Feature Crossed: Mississippi River

Feature Carried: CSAH No. 1

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: Daniel G. Stromberg, P.E., S.E.

Dive Team: Clayton G. Brookins, Valerie Roustan

Date: October 15, 2007

Weather Conditions: Partly Cloudy, 48°F

Underwater Visibility: 2.0 feet

Waterway Velocity: 1.5 f.p.s.

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 2 and 3

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

Maximum Water Depth at Substructure Inspected: Approximately 17.0 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 19.3 Feet below reference.
Waterline Elevation = 1187.0.

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 7

Item 92B: Underwater Inspection: Code B/10/07

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.

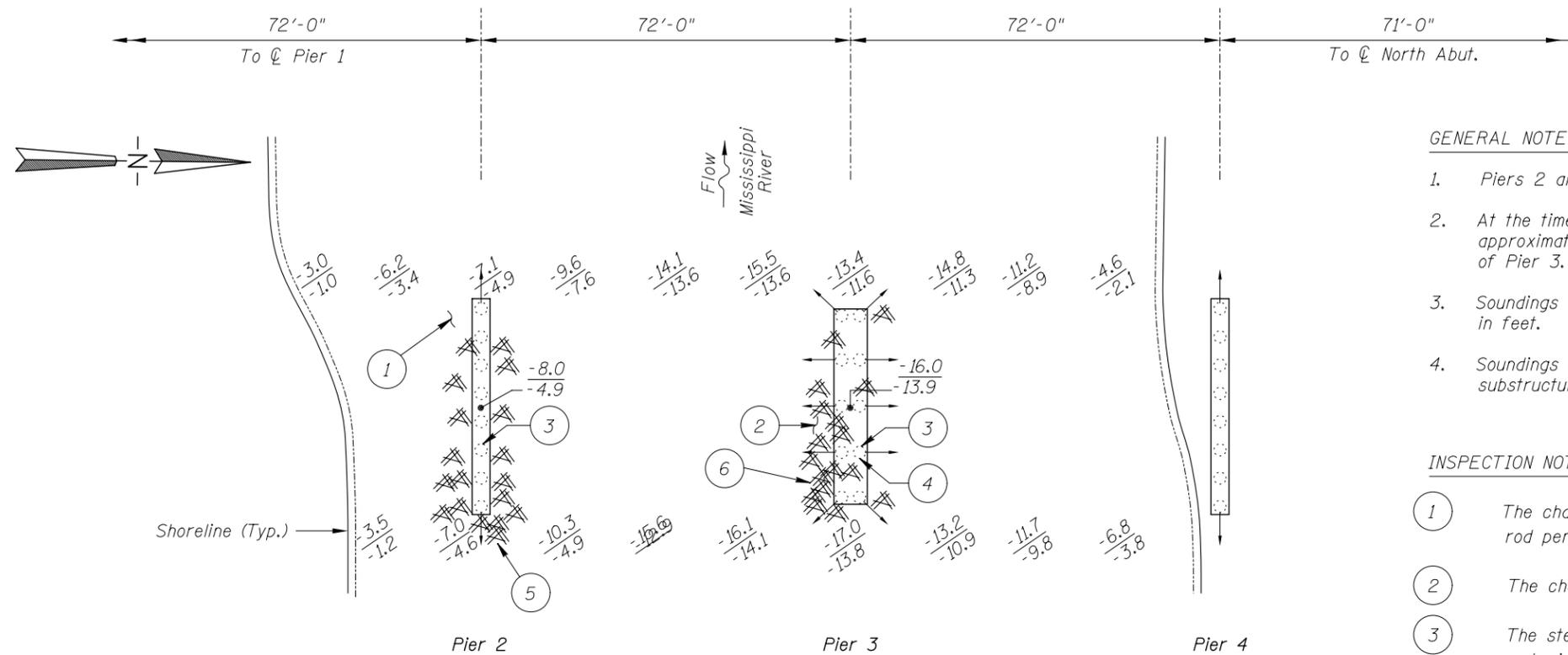
 Yes X No



Photograph 1. View of Pier 2, Looking Southwest.



Photograph 2. View of Pier 3, Looking Southwest.



GENERAL NOTES:

1. Piers 2 and 3 were inspected underwater.
2. At the time of inspection on October 15, 2007, the waterline was located approximately 19.3 feet below the top of the pile cap at the downstream end of Pier 3. This corresponds to a waterline elevation of 1187.0.
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 consisted of silty sand with 6 to 8 inches of probe rod penetration.
2. The channel bottom consisted of gravelly sand with up to 4 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 6 feet above the waterline to the channel bottom, and on over 75% 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 3 below 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 up 4 feet.
6. A moderate accumulation of timber debris consisting of 1 foot diameter and smaller logs and branches was observed on the three upstream piles on the south side of piles, extending from channel bottom up 10 feet. Scattered debris was observed along the entire length of Pier 3.

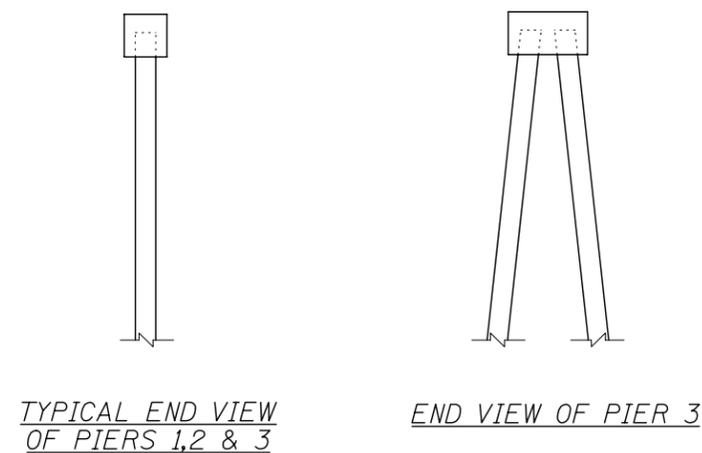
Legend

- 2.0 Sounding Depth (10/15/07)
- 5.2 Sounding Depth (9/26/02)

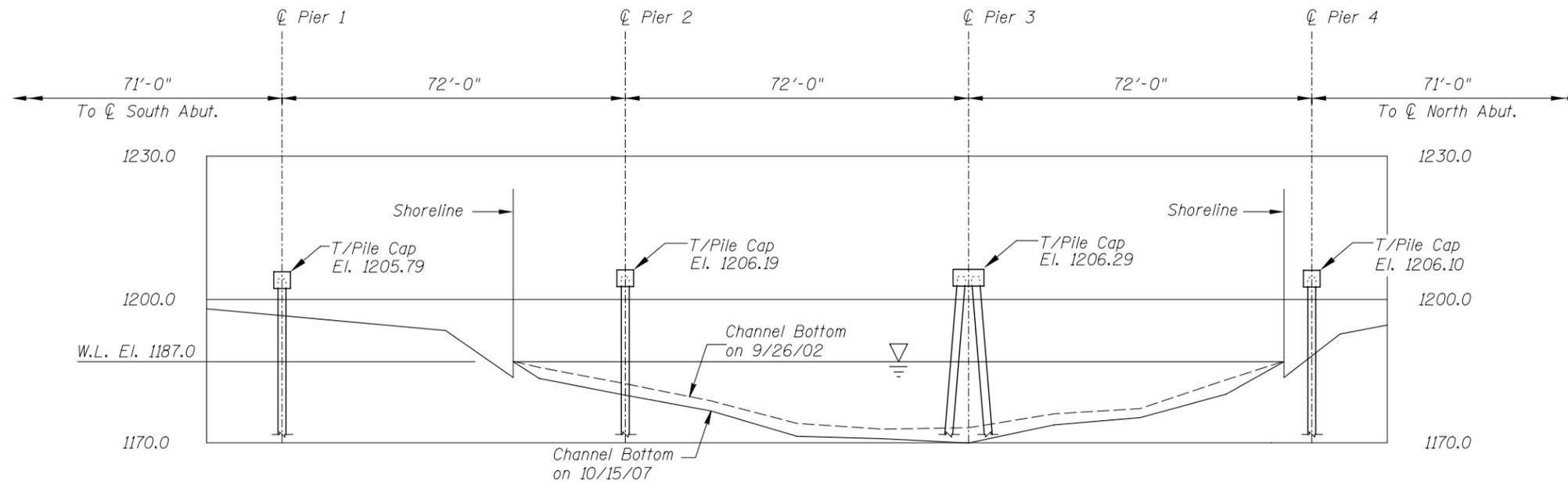
- Steel Pile
- Battered Steel Pile
- ⊗ Timber Debris

Note:

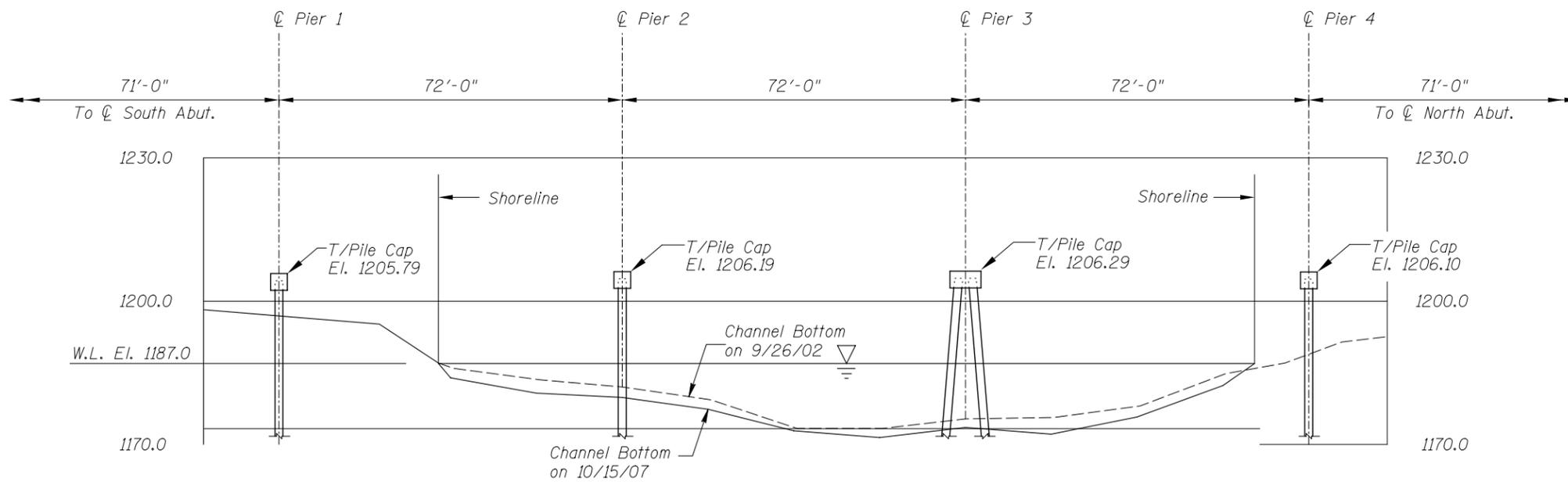
All soundings based on 2007 waterline location.



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| MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION | | |
| STRUCTURE NO. 01506 OVER THE MISSISSIPPI RIVER DISTRICT 3, AITKIN COUNTY | | |
| INSPECTION AND SOUNDING PLAN | | |
| Drawn By: LJ | COLLINS ENGINEERS <small>123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small> | Date: SEPT. 2007 |
| Checked By: VR | | Scale: NTS |
| Code: 52210068 | | Figure No.: 1 |



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:
Refer to Figure 1 for General Notes.

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| 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: LJ | COLLINS ENGINEERS | Date: SEPT. 2007 |
| Checked By: VR | | Scale: 1" = 30' |
| Code: 52210068 | | Figure No.: 2 |

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

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

ON-SITE TEAM LEADER: Daniel G. Stromberg, P.E., S.E.

BRIDGE NO: 1506 WEATHER: Partly Cloudy, 48°F

WATERWAY CROSSED: Mississippi River

DIVING OPERATION: SCUBA SURFACE SUPPLIED AIR
OTHER

PERSONNEL: Clayton G. Brookings, Valerie Roustan

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

TIME IN WATER: 12:10 p.m.

TIME OUT OF WATER: 12:40 p.m.

WATERWAY DATA: VELOCITY 1.5 f.p.s.

VISIBILIEY 2.0 feet

DEPTH 17.0 feet maximum at Pier 3

ELEMENTS INSPECTED: Piers 2 and 3

REMARKS: Overall, the steel pipe piles were in good to satisfactory condition with 100 percent coating failure with light to moderate corrosion. Minor rust nodules and up to 1/8 inch deep pitting (1/16 inch typical) were observed on over 50 percent of the surface area from 6 feet above the waterline to the waterline, and over 75 percent below water. From 3 feet below the waterline to the channel bottom the corrosion on the steel piles at Pier 3 included 1/16 inch thick rust delaminations. A moderate accumulation of timber debris, consisting of 1 foot diameter and smaller logs and branches, was observed at the upstream end and throughout the piles of both piers, extending from the channel bottom up 4 feet on Pier 2 and from the channel bottom up 10 feet on Pier 3.

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 five (5) years.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 1506
 INSPECTORS Collins Engineers, Inc.
 ON-SITE TEAM LEADER Daniel G. Stromberg, P.E., S.E.
 WATERWAY CROSSED Mississippi River

INSPECTION DATE October 15, 2007

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 | 8.0 | 6 | N | N | 9 | N | 6 | 8 | N | N | 7 | 7 | N | 7 | N | 7 | N | N |
| | Pier 3 | 17.0 | 6 | N | N | 9 | N | 6 | 8 | N | N | 7 | 7 | N | 6 | N | 6 | N | N |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |

*UNDERWATER PORTION ONLY

REMARKS: Overall, the steel pipe piles were in good to satisfactory condition with 100 percent coating failure with light to moderate corrosion. Minor rust nodules and up to 1/8 inch deep pitting (1/16 inch typical) were observed on over 50 percent of the surface area from 6 feet above the waterline to the waterline, and over 75 percent below water. From 3 feet below the waterline to the channel bottom the corrosion on the steel piles at Pier 3 included 1/16 inch thick rust delaminations. A moderate accumulation of timber debris, consisting of 1 foot diameter and smaller logs and branches, was observed at the upstream end and throughout the piles of both piers, extending from the channel bottom up 4 feet on Pier 2 and from the channel bottom up 10 feet on Pier 3.

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.