

UNDERWATER BRIDGE INSPECTION REPORT

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STRUCTURE NO. 66505

5<sup>th</sup> STREET

OVER THE

CANNON RIVER

CITY OF NORTHFIELD

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MAY 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 below water at Bridge No. 66505, Piers 1 and 2, were found to be in good condition with no defects of structural significance observed. The channel bottom exhibited minor degradation since the 2007 underwater inspection. Refer to Figure No. 2 for the upstream and downstream fascia profiles.

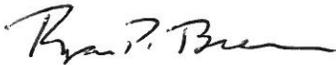
INSPECTION FINDINGS:

- (A) A light accumulation of 6-inch-diameter and smaller timber debris was observed on the channel bottom along the center column of Pier 1 extending to the upstream column.
- (B) The concrete pier surfaces were typically smooth and sound.
- (C) A moderate to heavy accumulation of 1-foot-diameter and smaller timber debris was observed on the east face of Pier 2 and extended from the waterline down 8 feet. A 2-foot-diameter tree extended from the downstream nose to the upstream nose.

RECOMMENDATIONS:

- (A) Ideally, the timber debris accumulation at Pier 2 should be removed to reduce excessive lateral loads on the pier, limit further debris accumulation, and reduce the likelihood of channel bottom degradation resulting from obstructed flow. Until drift removal can be accomplished, the timber debris at Pier 2, as well as Pier 1, should be monitored during future inspections.
  
- (B) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of sixty (60) months.

Inspection Team Leader:



Ryan P. Breen, P.E.

Respectfully submitted,

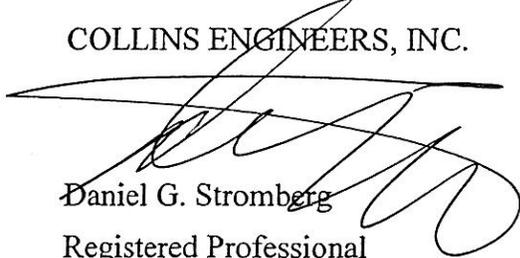
PROFESSIONAL ENGINEER

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: 66505

Feature Crossed: Cannon River

Feature Carried: 5<sup>th</sup> Street

Location: District 6 – Rice County

Bridge Description: The superstructure consists of three spans of steel girders supporting a reinforced concrete deck. The bridge is supported by two reinforced concrete abutments and two reinforced concrete piers. The piers are numbered 1 and 2 from the west to east.

2. INSPECTION DATA

Professional Engineer Diver: Ryan P. Breen, P.E.

Dive Team: Marc B. Parker, Michael J. Banasiak

Date: May 23, 2012

Weather Conditions: Cloudy, 70° F

Underwater Visibility: 0.5 feet

Waterway Velocity: 0.5 ft/s.

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 and 2.

General Shape: The piers each consist of a rectangular pile cap supported by three hexagon-shaped concrete columns that are founded on a rectangular spread footing.

Maximum Water Depth at Substructure Inspected: Approximately 11.8 feet.

4. WATERLINE DATUM

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

Water Surface: The waterline was approximately 6.4 feet below reference.  
Waterline Elevation = 93.6.

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 5

Item 92B: Underwater Inspection: Code B/05/12

Item 113: Scour Critical Bridges: Code F/07

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 CONSITION RATING:

| Item # | Element Description        | Quantity | Unit | Conditions |   |   |   |   |
|--------|----------------------------|----------|------|------------|---|---|---|---|
|        |                            |          |      | 1          | 2 | 3 | 4 | 5 |
| 205    | Reinforced Concrete Column | 6        | EA   | 6          |   |   |   |   |



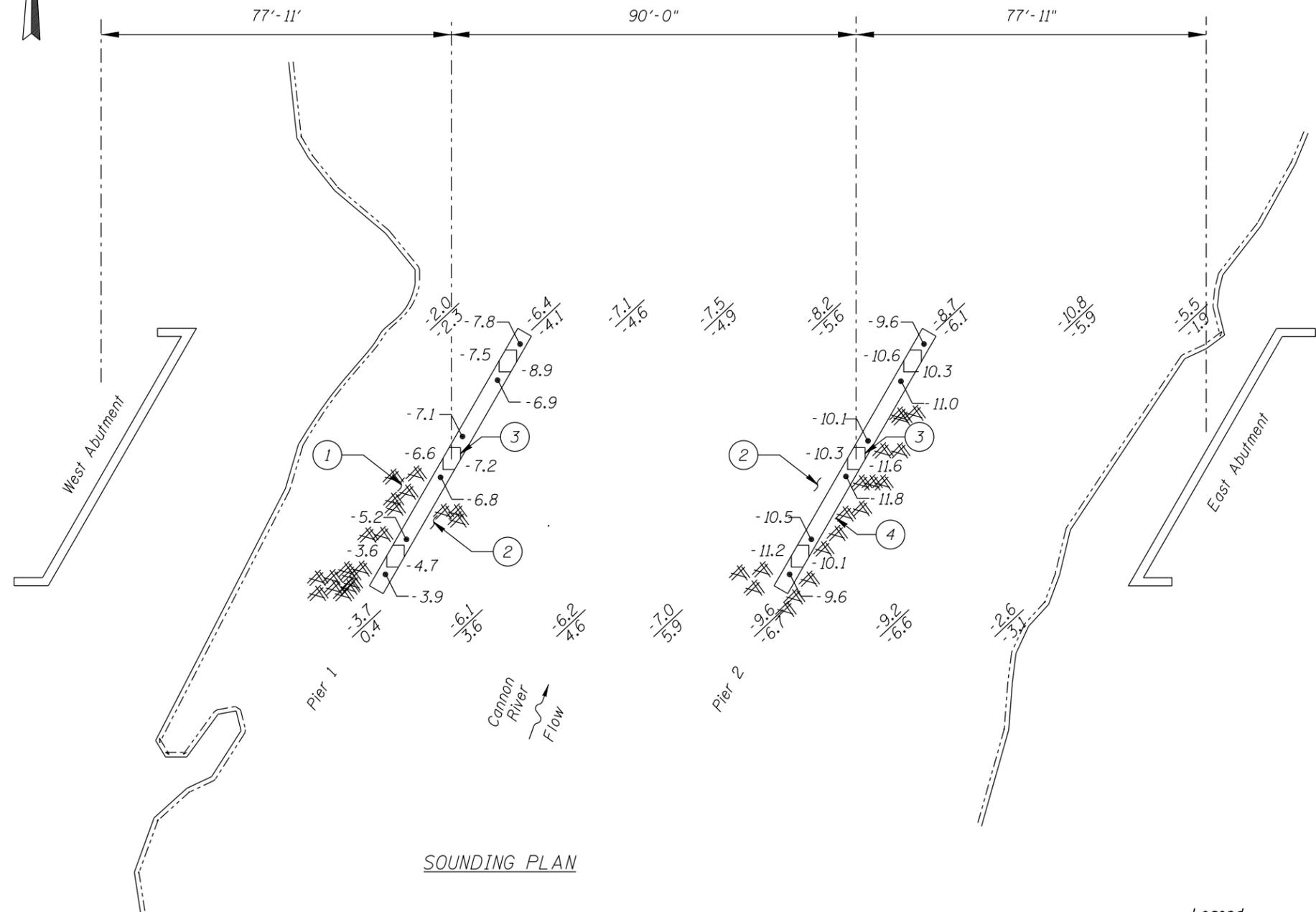
Photograph 1. Overall View of Bridge, Looking Southwest.



Photograph 2. View of Pier 1, Looking Northwest.



Photograph 3. View of Pier 2, Looking Southwest.



SOUNDING PLAN

INSPECTION NOTES:

- ① A light accumulation of 6-inch-diameter and smaller timber debris was observed on the channel bottom along the center column at Pier 1 and extended to the upstream column.
- ② The channel bottom consisted of silty clay and sand with up to 8 inches of probe rod penetration.
- ③ The concrete pier columns were typically smooth and sound.
- ④ A moderate to heavy accumulation of timber debris consisting of up to 1 foot diameter drift pieces, was observed along the east face of Pier 2 and extended from the waterline down 8 feet. A tree 2 feet in diameter extended from downstream nose to upstream nose of the pier.

GENERAL NOTES:

- 1 Piers 1 and 2 were inspected underwater.
- 2. At the time of inspection, on May 23, 2012, the waterline was located approximately 6.4 feet below the top of cap at Pier 1 on the upstream end. Since no bridge elevation information was available, a reference point elevation of 100.0 was assumed. Based on the assumed reference, the waterline elevation was 93.6.
- 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 as well as around the pier structures.

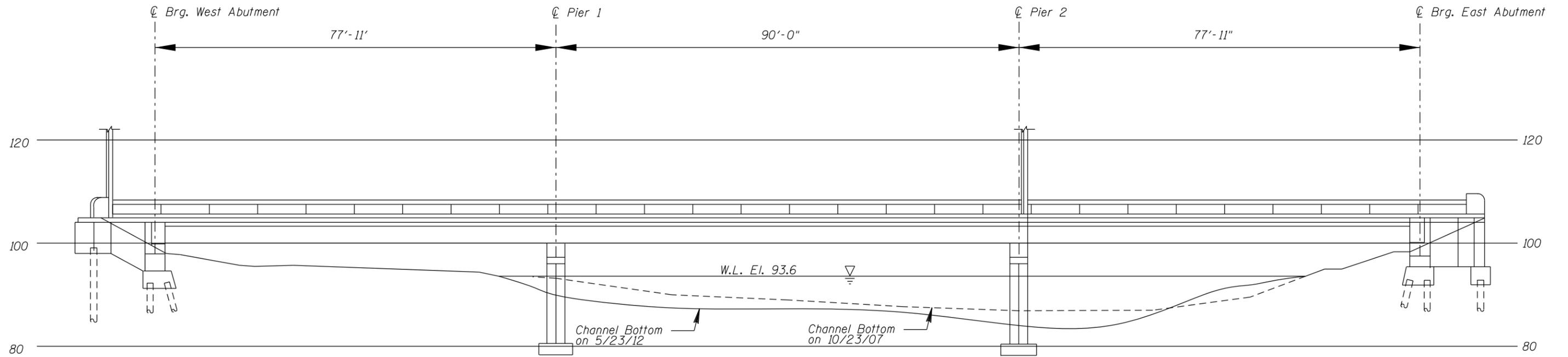
Legend

- 0.4 Sounding Depth (5/23/12)
- 0.4 Sounding Depth (10/23/07)
- Timber Debris

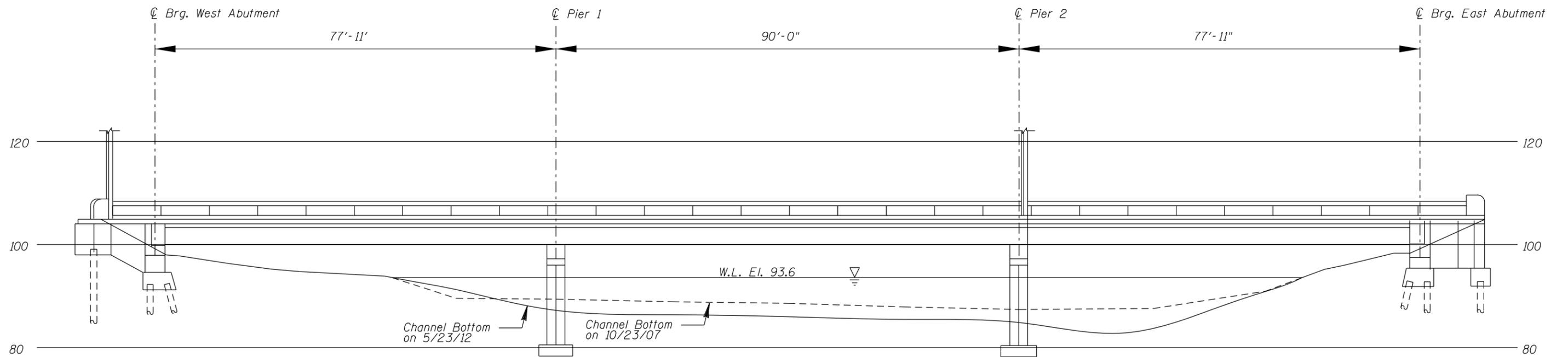
Note:

All soundings based on 2012 waterline location.

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|--|--|----------------|
| <b>MINNESOTA<br/>DEPARTMENT OF TRANSPORTATION<br/>UNDERWATER BRIDGE INSPECTION</b> |  |                |
| STRUCTURE NO. 66505<br>5th STREET OVER THE CANNON RIVER<br>CITY OF NORTHFIELD      |  |                |
| <b>INSPECTION AND SOUNDING PLAN</b>  |  |                |
| Drawn By: BMS  | <b>COLLINS ENGINEERS</b>   | Date: MAY 2012 |
| Checked By: RPB  | <small>123 North Wacker Drive<br/>Suite 900<br/>Chicago, IL 60606<br/>(312) 704-9300<br/>www.collinsengr.com</small> | Scale: NTS     |
| Code: 742366505  |  | Figure No.: 1  |



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:  
Refer to Figure 1 for General Notes.

|  |  |                |
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| <b>MINNESOTA<br/>DEPARTMENT OF TRANSPORTATION<br/>UNDERWATER BRIDGE INSPECTION</b> |  |                |
| STRUCTURE NO. 66505<br>5th STREET OVER THE CANNON RIVER<br>CITY OF NORTHFIELD      |  |                |
| <b>UPSTREAM AND DOWNSTREAM<br/>FASCIA PROFILES</b>                                 |  |                |
| Drawn By: BMS  | <b>COLLINS ENGINEERS</b><br><small>123 North Wacker Drive<br/>Suite 900<br/>Chicago, IL 60606<br/>(312) 704-9300<br/>www.collinsengr.com</small> | Date: MAY 2012 |
| Checked By: RPB  |  | Scale: 1"=20'  |
| Code: 742366505  |  | Figure No.: 2  |

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

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

ON-SITE TEAM LEADER: Ryan P. Breen, P.E.

BRIDGE NO: 66505 WEATHER: Cloudy, 70° F

WATERWAY CROSSED: Cannon River

DIVING OPERATION:  SCUBA  SURFACE SUPPLIED AIR  
 OTHER

PERSONNEL: Marc B. Parker, Michael J. Banasiak

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

TIME IN WATER: 11:10 A.M.

TIME OUT OF WATER: 11:45 A.M.

WATERWAY DATA: VELOCITY 0.5 f.ps.

VISIBILITY 0.5 feet

DEPTH 11.8 feet maximum at Pier 2.

ELEMENTS INSPECTED: Piers 1 and 2

REMARKS: The concrete was typically smooth and sound. A light accumulation of 6-inch-diameter and smaller timber debris was observed on the channel bottom near the center column of Pier 1 and moderate to heavy accumulation of 2-foot-diameter and smaller timber debris was observed along the east face of Pier 2.

FURTHER ACTION NEEDED:  YES  NO

Ideally, the timber debris accumulation at Pier 2 should be removed to reduce excessive lateral loads on the pier, limit further debris accumulation, and reduce the likelihood of channel bottom degradation resulting from obstructed flow. Until drift removal can be accomplished, the timber debris at Pier 2, as well as Pier 1, should be monitored 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. 66505  
 INSPECTORS Collins Engineers, Inc.  
 ON-SITE TEAM LEADER Ryan P. Breen, P.E.  
 WATERWAY CROSSED Cannon River

INSPECTION DATE May 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 1           | 8.9'                   | N            | 7                          | N        | 8            | N     | 7                                    | N       | N                  | 8                     | 6                    | 6                                      | 7        | N     | N      | N               | N                              | N     |
|                    | Pier 2           | 11.8'                  | N            | 7                          | N        | 8            | N     | 7                                    | N       | N                  | 8                     | 5                    | 5                                      | 7        | N     | N      | N               | N                              | N     |
|                    |                  |                        |              |                            |          |              |       |                                      |         |                    |                       |                      |  |          |       |        |                 |                                |       |
|                    |                  |                        |              |                            |          |              |       |                                      |         |                    |                       |                      |  |          |       |        |                 |                                |       |

\*UNDERWATER PORTION ONLY

REMARKS: The concrete was typically smooth and sound. A light accumulation of 6-inch-diameter and smaller timber debris was observed on the channel bottom near the center column of Pier 1 and moderate to heavy accumulation of 2-foot-diameter and smaller timber debris was observed along the east face of Pier 2.

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.