UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 66546

MSAS 123 (2ND AVE. SW)

OVER THE

CANNON RIVER

CITY OF FARIBAULT, RICE COUNTY

SEPTEMBER 13, 2012

PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 7423
REPORT SUMMARY:

The substructure unit inspected at Bridge No. 66546, Pier 1, was found to be generally in satisfactory to fair condition with no defects of structural significance observed. The concrete was typically soft and easily erodible with up to 3 inches of penetration over 50 percent of the pier face from channel bottom to 1 foot above the waterline. Random locations exhibited exposed coated reinforcing steel with no surface corrosion present. The north and south embankment slopes were lined with an articulated concrete mat and the channel bottom material at the pier consisted of randomly displaced paving stones with sand infill.

INSPECTION FINDINGS:

(A) The north and south embankment slopes were lined with articulated concrete mat from top of slope to 1 foot below the waterline.

(B) Approximately 50 percent of the total pier wall surface typically exhibited soft and easily erodible concrete with up to 3 inches of penetration from the channel bottom to 1 foot above the waterline with exposed coated reinforcing steel present.

(C) The channel bottom material consisted of random displaced paving stones with sand infill.
RECOMMENDATIONS:

(A) Monitor concrete deterioration at Pier 1 and if the deficiencies continue to progress and the exposed reinforcing steel starts to corrode, repairs may become warranted at that time.

(B) The inspection of the submerged substructure units of Structure No. 66546 can most likely be accomplished in the future without the use of a dive team. To perform the underwater inspection, a properly equipped qualified inspector will have to enter the water during a period of low flow. As channel bottom contours and depths of flow can change quickly, it is recommended that lead line soundings of water depth be taken along the upstream and downstream fascias to determine whether wading is possible prior to beginning the inspection. If conditions are unsafe for inspection by wading, then an underwater inspection with the use of a dive team will be required.

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

Respectfully submitted,

Roy A. Forsyth, PE
Date 6/30/2014 License# 49270

Daniel G. Stromberg
Registered Professional Engineer, State of Minnesota
MINNESOTA DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION

1. **BRIDGE DATA**

Bridge Number: 66546

Feature Crossed: Cannon River

Feature Carried: MSAS 123 (2ND AVE. SW)

Location: City of Faribault, Rice County

Bridge Description: The superstructure consists of a two span haunched slab bridge supporting a reinforced concrete deck. The bridge is supported by two reinforced concrete abutments and one reinforced concrete pier wall with steel H-Piles extending from the bottom of the wall up 7 feet.

2. **INSPECTION DATA**

Professional Engineer/Team Leader:  Roy A. Forsyth, P.E.

Dive Team:  Charles R. Euwema, Brandon Corr

Date:  September 13, 2012

Weather Conditions:  Sunny, 80°F

Underwater Visibility:  1.0 foot

Waterway Velocity:  Negligible
3. **SUBSTRUCTURE INSPECTION DATA**

Substructure Inspected: Pier 1

General Shape: The pier consists of an oblong reinforced concrete pier wall with rounded noses. The pier wall encases 18 steel H-Piles which extend into the pier wall from the bottom of the pier wall up 7 feet.

Maximum Water Depth at Substructure Inspected: Approximately 2.5 feet.

4. **WATERLINE DATUM**

Water Level Reference: The bottom of architectural cap at downstream nose of Pier 1.

Water Surface: The waterline was approximately 8.1 feet below reference.

Waterline Elevation = 954.8

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 _8_

Item 92B: Underwater Inspection: Code _A/9/12_

Item 113: Scour Critical Bridges: Code _L_

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

<table>
<thead>
<tr>
<th>Item #</th>
<th>Element Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>210</td>
<td>Reinforced Concrete Pier Wall</td>
<td>81</td>
<td>LF</td>
<td>40  41</td>
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<td>985</td>
<td>Slopes and Slope Protection</td>
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Photograph 1. Overall View of the Structure, Looking Southeast.

Photograph 2. View of South Abutment, Looking Southwest.
Photograph 3. View of Pier 1, Looking Southwest.

Photograph 5. View of Typical Spalled Concrete along the South Face of Pier 1, Looking North.
The north and south slope embankments were lined with articulated concrete mat from the top of abutment to 1 foot below waterline and from 15 feet upstream to 50 feet downstream of the bridge face.

Approximately 50 percent of the concrete surface of the pier wall exhibited soft and spallable concrete with up to 3 inches of penetration from channel bottom to 1 foot above waterline and exposed coated reinforcing steel was present.

The channel bottom consisted of randomly displaced paving stones with sandy infill.

The concrete pier was inspected during the underwater inspection.

At the time of inspection on September 13, 2012, the waterline was located approximately 8.1 feet below bottom of arch concrete pier cap at downstream nose of the pier. This corresponds with a waterline elevation of 954.8 feet.

Sounding indicates the water depth at the time of inspection and are measured in feet.
UPSTREAM FASCIA PROFILE

DOWNSTREAM FASCIA PROFILE

Notes:
Refer to Figure 1 for General Notes.

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION
STRUCTURE NO. 65544
OVER THE CANNON RIVER
CITY OF FARIBOULLY, HEE COUNTY
UPSTREAM AND DOWNSTREAM FASCIA PROFILES

[Diagram showing underwater bridge profiles with annotations and dimensions]
INSPECTORS: Collins Engineers, Inc. _____________ DATE: September 13, 2012
ON-SITE TEAM LEADER: Roy A. Forsyth, P.E. ____________________________
BRIDGE NO: 66546 _____________ WEATHER: Sunny, 80° F
WATERWAY CROSSED: Cannon River ________________________________
DIVING OPERATION: SCUBA _______ SURFACE SUPPLIED AIR
_________________ X ___ OTHER Inspection by Wading ______________
PERSONNEL: Charles R. Euwema, Brandon Corr _____________________________
EQUIPMENT: Dry Suit, Camera, Sounding Pole, Probe Rod __________________
TIME IN WATER: 1:00 P.M. __________________
TIME OUT OF WATER: 2:00 P.M. __________________
WATERWAY DATA: VELOCITY ______ negligible ______
________________ VISIBILITY ______ 1.0 foot ______
_________________ DEPTH ______ 2.5 feet at Pier 1 ______________
ELEMENTS INSPECTED: Pier 1 ____________________________
REMARKS: Overall, Pier 1 was found to be generally in satisfactory condition with no
defects of structural significance observed. The concrete was typically soft and easily
erodible with up to 3 inches of penetration over 50 percent of the pier wall surface from
the channel bottom to 1 foot above the waterline. Random locations exhibited exposed
coated reinforcing steel with no surface corrosion. The north and south embankment
slopes were lined with an articulated concrete mat. The channel bottom material
consisted of random displaced paving stones with sand infill. ____________________
FURTHER ACTION NEEDED:  _______ YES  ____X____ NO

Monitor concrete deterioration at Pier 1 and if the deficiencies continue to progress and the exposed reinforcing steel starts to corrode, repairs may become warranted at that time.

The inspection of the submerged substructure units of Structure No. 66546 can most likely be accomplished in the future without the use of a dive team. To perform the underwater inspection, a properly equipped qualified inspector will have to enter the water during a period of low flow. As channel bottom contours and depths of flow can change quickly, it is recommended that lead line soundings of water depth be taken along the upstream and downstream fascias to determine whether wading is possible prior to beginning the inspection. If conditions are unsafe for inspection by wading, then an underwater inspection with the use of a dive team will be required.

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. 66546  
INSPECTORS Collins Engineers, Inc.  
INSPECTION DATE September 13, 2012  
ON-SITE TEAM LEADER Roy A. Forsyth P.E.  
WATERWAY CROSSED Cannon River  

CONDITION RATING  

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<th>UNIT REFERENCE NO.</th>
<th>MAXIMUM DEPTH OF WATER</th>
<th>PILING</th>
<th>COLUMNS, SHAFTS, OR FACES*</th>
<th>FOOTINGS</th>
<th>DISPLACEMENT</th>
<th>OTHER</th>
<th>OVERALL SUBSTRUCTURE CONDITION CODE</th>
<th>SCOUR</th>
<th>EMBANKMENT EROSION</th>
<th>EMBANKMENT PROTECTION</th>
<th>OTHER (DRIFT/DEBRIS)</th>
<th>OVERALL CHANNEL &amp; PROTECTION CONDITION</th>
<th>CONCRETE</th>
<th>STEEL</th>
<th>TIMBER</th>
<th>LOSS OF SECTION</th>
<th>PREVIOUS REPAIR OR MAINTENANCE</th>
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*UNDERWATER PORTION ONLY

REMARKS: Overall, Pier 1 was found to be generally in satisfactory condition with no defects of structural significance observed. The concrete was typically soft and easily erodible with up to 3 inches of penetration over 50 percent of the pier wall surface from the channel bottom to 1 foot above the waterline. Random locations exhibited exposed coated reinforcing steel with no surface corrosion. The north and south embankment slopes were lined with an articulated concrete mat. The channel bottom material consisted of random displaced paving stones with sand infill.

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.