

UNDERWATER BRIDGE INSPECTION REPORT

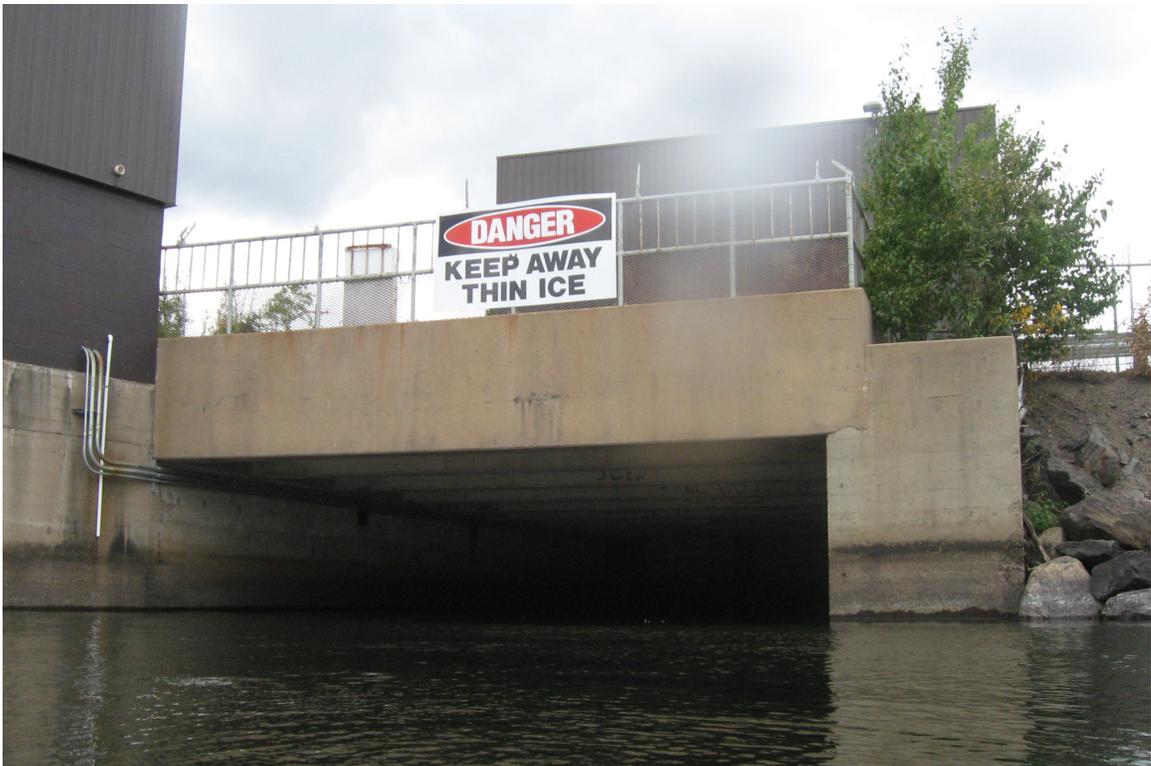
STRUCTURE NO. 7771

CSAH NO. 110

OVER THE

CHANNEL AT WHITEWATER AND COLBY LAKES

DISTRICT 1 - ST. LOUIS COUNTY



PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 5221 (CEI 7)

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected below water at Bridge No. 7771, the East and West Abutments, were found to be generally in good condition with no structurally significant defects. A few additional minor cracks and areas of section loss have developed since the previous inspection. The channel bottom consisted of a formed concrete slab and is presently stable with no appreciable changes since the previous inspection.

INSPECTION FINDINGS:

- (A) There was a vertical crack at the south end of the West Abutment, extending from under the fascia beam to 1 foot below the waterline with a maximum width of 1/8 inch. Minor section losses, up to 1 inch wide, were observed at various locations along the crack. At the bottom of the crack, a larger area of section loss with up to 1.5 inches of penetration was present.
- (B) Random small areas of poorly consolidated concrete were observed on both abutments. There were also random, less frequent small areas of minor section loss.
- (C) A hairline vertical crack with efflorescence extending from 7 feet below to 16 feet below the waterline was observed near the south end of the East Abutment.
- (D) A 1/16 inch wide vertical crack with light efflorescence was observed on both abutment walls beginning at the bottom of the bridge deck, between the center and next-to-the-north beams, and extending down both abutment walls to 1 foot below the waterline.
- (E) Light scaling with 1/8 inch to 1/4 inch penetration was observed from 2.5 feet above the waterline to 10 feet below the waterline on both abutment walls.

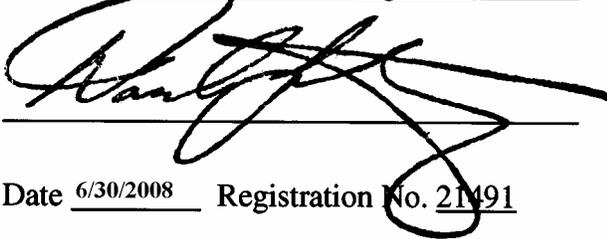
RECOMMENDATIONS:

- (A) Monitor the cracks in both abutment walls for any progression, which could result due to freeze and thaw action, and if found to be worsening, repairs may become warranted at a later date.

- (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

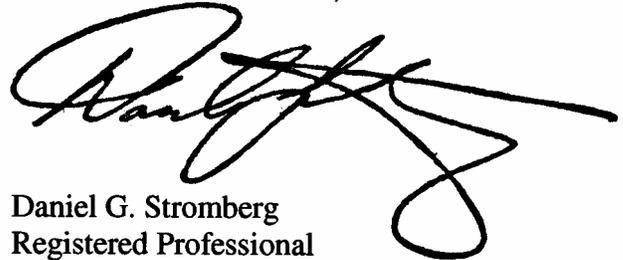


A large, stylized handwritten signature in black ink, appearing to read 'Daniel G. Stromberg', is written over a horizontal line. Below this line is another horizontal line, and below that, the date and registration number are printed.

Date 6/30/2008 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.



A large, stylized handwritten signature in black ink, appearing to read 'Daniel G. Stromberg', is written over a horizontal line. Below this line is another horizontal line, and below that, the name and title are printed.

Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 7771

Feature Crossed: Channel at Whitewater and Colby Lakes

Feature Carried: CSAH No. 110

Location: District 1 - St. Louis County

Bridge Description: The bridge superstructure consists of a single span of multiple concrete beams. The superstructure is supported by two vertical wall abutments designated as the East and West Abutments. The channel bottom between the abutments consists of a sloped concrete floor. The bridge is located adjacent to a gate control house and pumping station. No original design plans were available.

2. INSPECTION DATA

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

Dive Team: John J. Loftus, Valerie Roustan

Date: August 24, 2007

Weather Conditions: Sunny, 55° F

Underwater Visibility: 10.0 feet

Waterway Velocity: Negligible/None

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: East and West Abutments.

General Shape: Vertical concrete walls (abutments) with a monolithic sloped concrete floor extending between them.

Maximum Water Depth at Substructure Inspected: Approximately 37.6 Feet.

4. WATERLINE DATUM

Water Level Reference: The top of wall with railing at south side of East Abutment.

Water Surface: The waterline was approximately 11.1 feet below reference.
Assumed Waterline Elevation = 0.0.

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 N/A(Concrete Floor)

Item 92B: Underwater Inspection: Code B/08/07

Item 113: Scour Critical Bridges: Code I/95

Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

 Yes X No



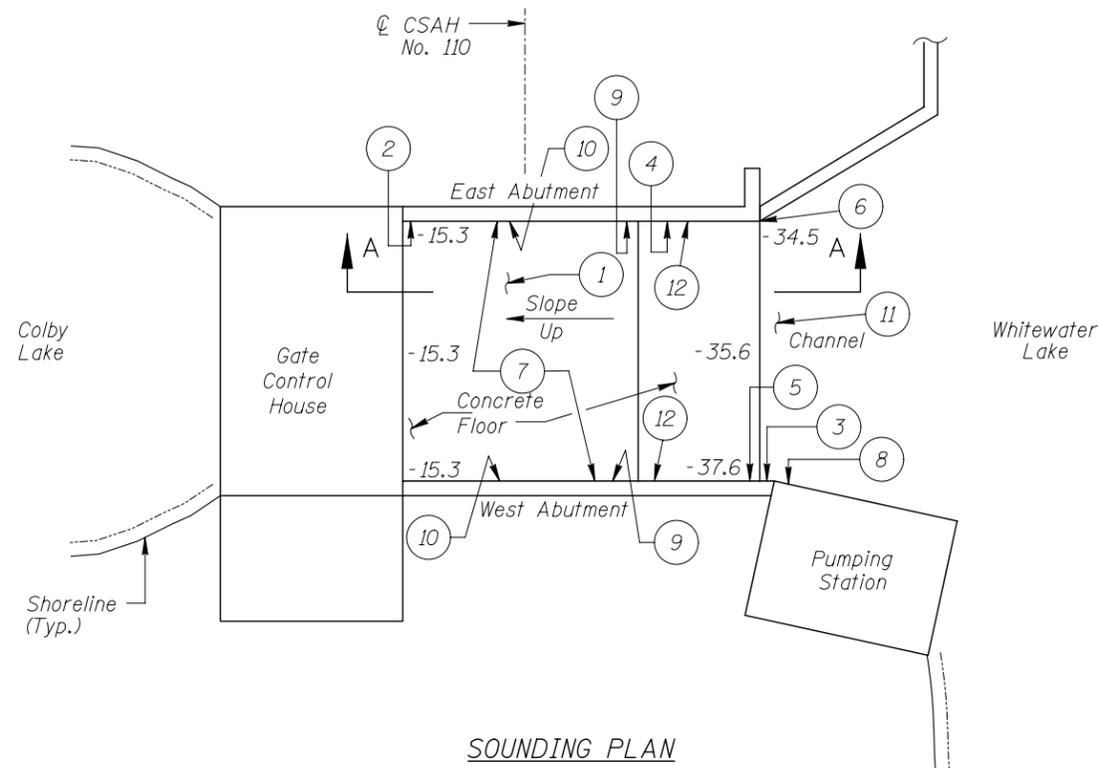
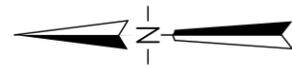
Photograph 1. View of the West Abutment and South Bridge Fascia, Looking Northwest.



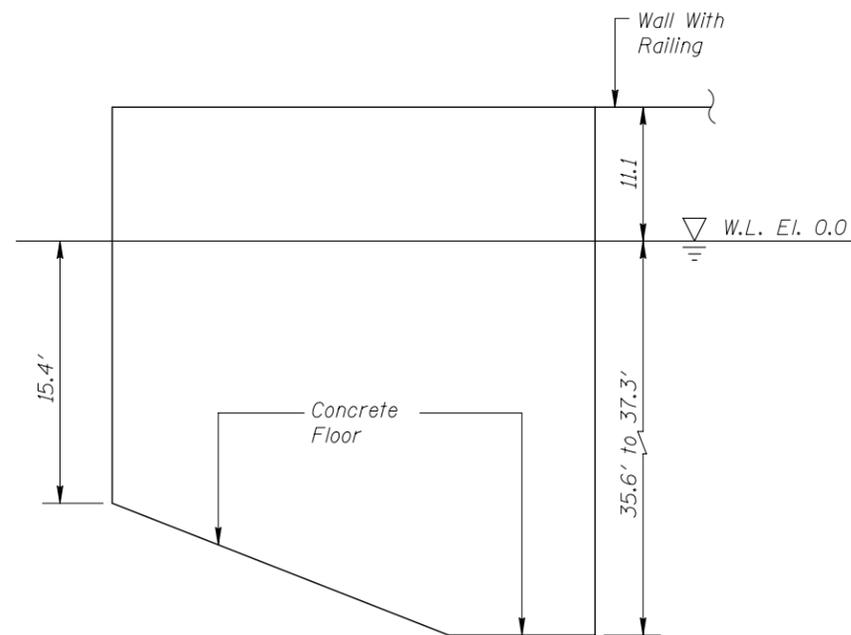
Photograph 2. View of East Abutment, Looking Northeast.



Photograph 3. View of West Abutment, Looking Northwest.



SOUNDING PLAN



SECTION A-A

INSPECTION NOTES:

- 1 The channel bottom consisted of a formed concrete slab with a light layer of silt.
- 2 At 9 feet below the water level, the bottom of the vertical joint exhibited a 6-inch-high by 3-inch-wide area of section loss with a penetration of 1 inch.
- 3 Vertical crack, extending from under the fascia beam to 1 foot below the waterline with a maximum width of 1/8 inch and minor loss of section with surface openings of up to 1 inch wide along crack.
- 4 Vertical hairline crack with efflorescence from 7 feet below the waterline to 16 feet below the waterline.
- 5 Area of horizontal section loss at 3 foot below the waterline, measuring 2.5 feet long by 3 inches high with a maximum penetration of 1.5 inches.
- 6 Section loss on corner at 2 feet above the waterline, measuring 9 inches wide by 2 feet high with 2 inches of penetration.
- 7 The concrete on all faces was generally smooth and sound with random small pockets of poorly consolidated concrete. On walls, up to 1/2 inch section loss along various horizontal cold construction joints below water.
- 8 An area of horizontal section loss, 3 feet long by 2 inches high, with 3 inches of penetration, was observed on the pump station wall.
- 9 Random hairline map cracking with light efflorescence was observed from the waterline to 3 feet above the waterline.
- 10 A 1/16 inch wide vertical crack with light efflorescence was observed on both abutment walls beginning at the bottom of the bridge deck, between the center and next to the north beams, and extended to 1 foot below the waterline.
- 11 Scattered riprap was observed along the south fascia.
- 12 Light scaling with from 1/8 inch to 1/4 inch penetration was observed from 2.5 feet above the waterline to 10 feet below the waterline on both abutment walls.

Legend

-35.0 Sounding Depth (8/24/07)

GENERAL NOTES:

1. The East and West Abutments were inspected underwater.
2. At the time of inspection on August 24, 2007, the waterline was located approximately 11.1 feet below the top of wall with railing at south side of East Abutment. The waterline elevation was assumed to be 0.0.
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 each corner of the abutments and at midspan.

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| MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION | | |
| STRUCTURE NO. 7771 OVER THE CHANNEL AT WHITEWATER AND COLBY LAKES DISTRICT 1, ST. LOUIS COUNTY | | |
| INSPECTION AND SOUNDING PLAN | | |
| Drawn By: PRH | COLLINS ENGINEERS <small>123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small> | Date: AUGUST, 2007 |
| Checked By: MDK | | Scale: NTS |
| Code: 52210007 | | Figure No.: 1 |

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

INSPECTORS: Collins Engineers, Inc. DATE: August 24, 2007

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

BRIDGE NO: 7771 WEATHER: Sunny, 55° F

WATERWAY CROSSED: Channel Between Whitewater and Colby Lakes

DIVING OPERATION: SCUBA SURFACE SUPPLIED AIR
 OTHER

PERSONNEL: John J. Loftus, Valerie Roustan

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

TIME IN WATER: 3:30 a.m.

TIME OUT OF WATER: 4:00 a.m.

WATERWAY DATA: VELOCITY Negligible/None

VISIBILITY 10.0 feet

DEPTH 37.6 feet maximum at the West Abutment

ELEMENTS INSPECTED: East and West Abutments

REMARKS: Overall, the concrete of the abutment walls and floor slab was smooth and sound with no significant deficiencies. A 1/8 inch wide vertical crack was observed at south end of West Abutment extending downward under the fascia beam. Two 1/16 inch wide vertical cracks were also observed on the face of each abutment extending downward between the center beam and the next-to-the-north beam. Otherwise, some minor section loss, random hairline map cracking, small areas of minor section loss with exposed aggregate, and random small pockets of poor consolidation were observed.

FURTHER ACTION NEEDED: YES NO

Monitor the cracks in both abutment walls for any progression, which could result due to freeze/thaw action, and if found to be worsening, repairs may become warranted at a later date.

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. 7771
 INSPECTORS Collins Engineers, Inc.
 ON-SITE TEAM LEADER Daniel G. Stromberg, P.E., S.E.
 WATERWAY CROSSED Channel between Whitewater and Colby Lakes

INSPECTION DATE August 24, 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 | SUBSTRUCTURE | | | | | | | CHANNEL | | | | | GENERAL | | | | | |
|--------------------|------------------|------------------------|--------|----------------------------|----------|--------------|-----------------|--------------------------------------|---------|--------------------|-----------------------|----------------------|--|----------|-------|--------|-----------------|--------------------------------|-------|
| | | MAXIMUM DEPTH OF WATER | 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 |
| | East Abutment | 36.6 | N | 7 | N | 9 | 7 | 7 | N | N | N | N | N | 7 | N | N | N | N | N |
| | West Abutment | 38.3 | N | 7 | N | 9 | 7 | 7 | N | N | N | N | N | 7 | N | N | N | N | N |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |

*UNDERWATER PORTION ONLY

REMARKS: Overall, the concrete of the abutment walls and floor slab was smooth and sound with no significant deficiencies. A 1/8 inch wide vertical crack was observed at south end of West Abutment extending downward under the fascia beam. Two 1/16 inch wide vertical cracks were also observed on the face of each abutment extending downward between the center beam and the next-to-the-north beam. Otherwise, some minor section loss, random hairline map cracking, small areas of minor section loss with exposed aggregate, and random small pockets of poor consolidation were observed.

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.