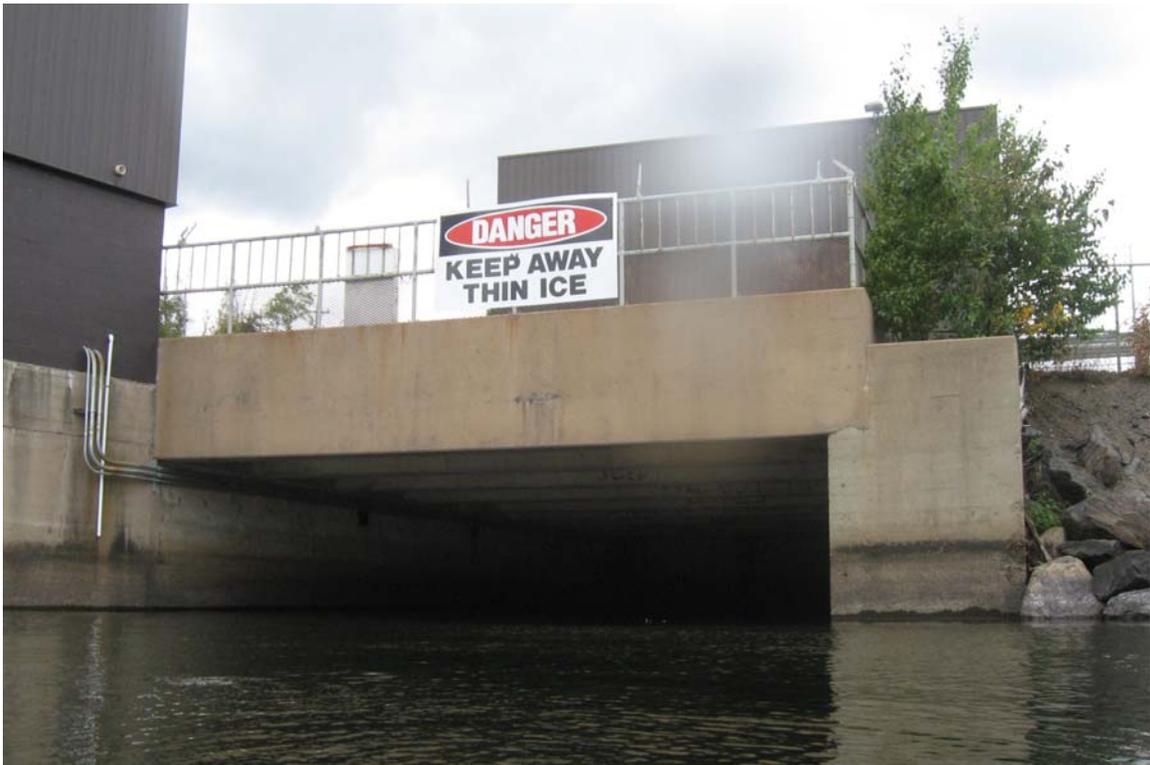


UNDERWATER BRIDGE INSPECTION REPORT

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STRUCTURE NO. 7771  
CSAH NO. 110  
OVER THE  
CHANNEL AT WHITEWATER AND COLBY LAKES  
ST. LOUIS COUNTY

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JUNE 20, 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. 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 underwater inspection in 2007, but the progress of those defects is essentially minor in extent. The channel bottom consisted of a formed concrete slab with no appreciable defects.

INSPECTION FINDINGS:

- (A) The concrete on all faces was generally smooth and sound with random small pockets of poorly consolidated concrete. On the walls there was up to 1/2 inch of section loss along various horizontal cold construction joints just below the waterline.
- (B) There was a vertical crack at the south end of the West Abutment, extending from under the fascia beam to 10 foot below the waterline with a maximum width of 1/8 inch. Associated areas of minor section loss, 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.
- (C) Random small areas of poorly consolidated concrete were observed on both abutments. There were also random, less frequent small areas of minor section loss.
- (D) Random hairline map cracking with light efflorescence was observed from the waterline to 3 feet above the waterline.
- (E) Hairline to 1/16 inch wide vertical cracks with light efflorescence were observed on both abutment walls beginning at the bottom of the bridge deck and extending below water up to 5 feet below the waterline.

- (F) Light concrete scaling with 1/8 inch to 1/4 inch penetration was observed from 1 foot above the waterline to 10 feet below the waterline on both abutment walls.
- (G) The channel bottom consisted of a formed concrete slab with a light layer of silt. Scattered riprap was observed along the south fascia of the structure.

RECOMMENDATIONS:

- (A) Monitor the cracks in both abutment walls for any progression during future underwater inspections, which could result due to freeze and thaw action, and if found to be substantially progressing, repairs may become warranted at a later date.
- (B) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of sixty (60) months.

Inspection Team Leader:  
Daniel G. Stromberg, P.E.

Respectfully submitted,

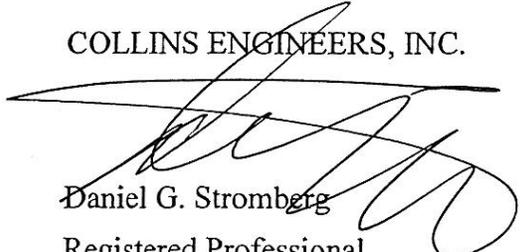
PROFESSIONAL ENGINEER

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: 7771

Feature Crossed: Channel at Whitewater and Colby Lakes

Feature Carried: CSAH No. 110

Location: 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.

Dive Team: Clayton Brookins, Breanne Stromberg

Date: June 20, 2012

Weather Conditions: Cloudy, 75° 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 39.5 Feet.

4. WATERLINE DATUM

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

Water Surface: The waterline was approximately 9.0 feet below reference.

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/06/12

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

6. STRUCTURAL ELEMENT CONDITION RATING

Item #	Element Description	Quantity	Unit	Conditions				
				1	2	3	4	5
215	Reinforced Concrete Abutment	72	LF		72			



Photograph 1. Overall View of the South Fascia, Looking Northwest.



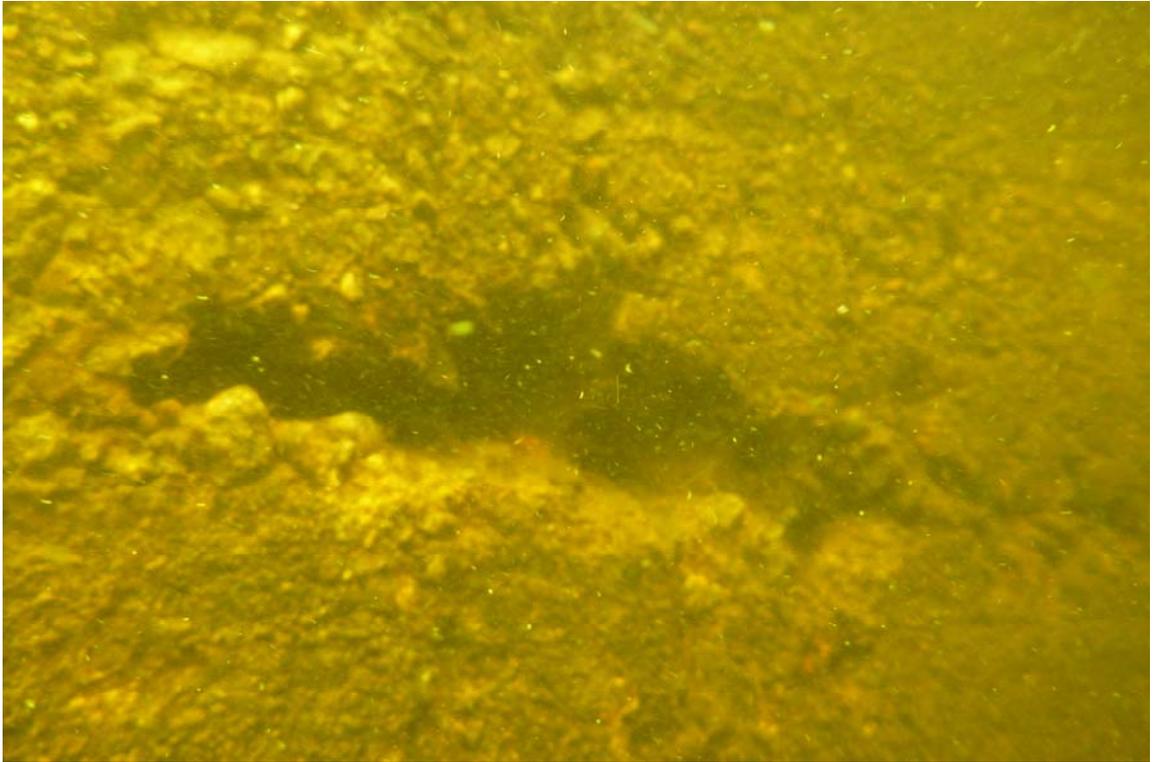
Photograph 2. Overall View of the North Fascia/Gate House, Looking West.



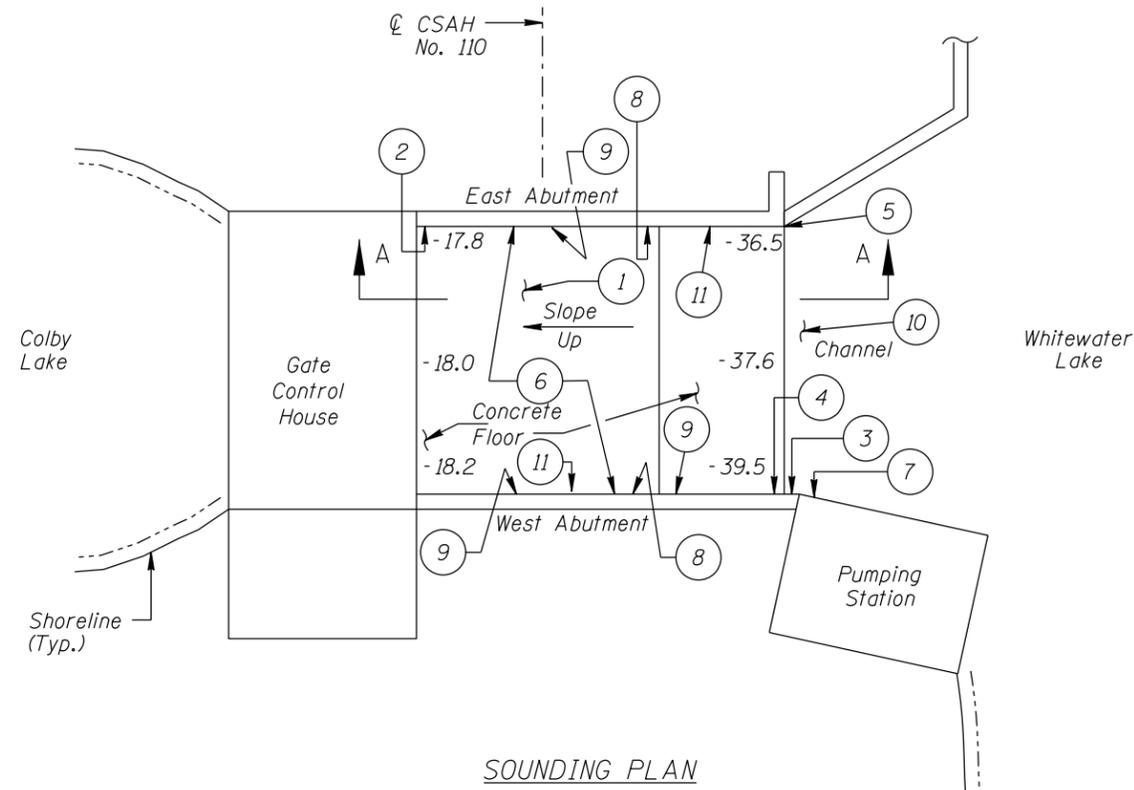
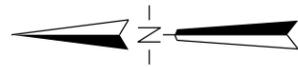
Photograph 3. View of Vertical Cracking on the West Abutment Above Water, Looking Northwest



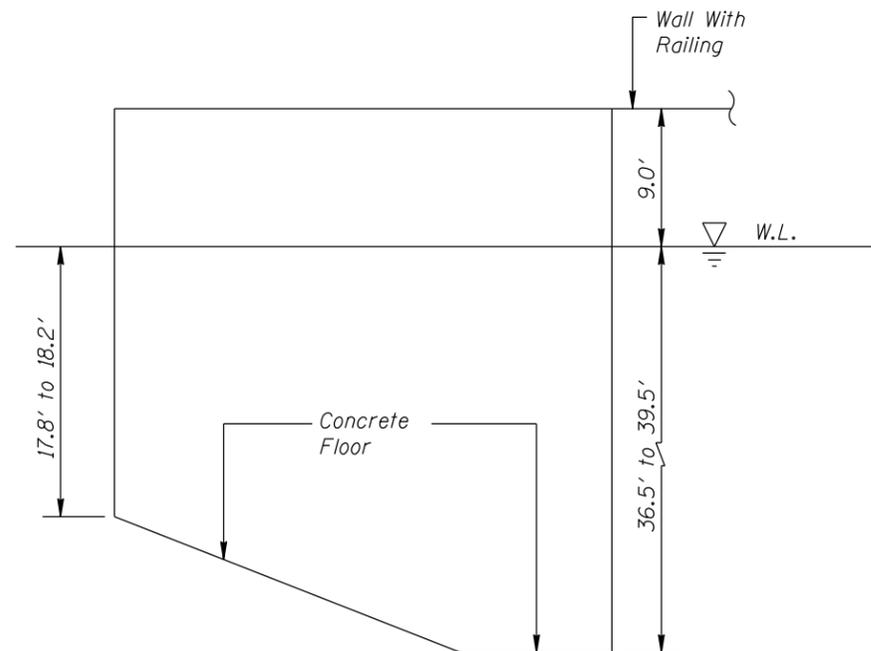
Photograph 4. View of Typical Map Cracking Above the Waterline at the East Abutment, Looking Northeast.



Photograph 5. View of Typical Section Loss Underwater at the West Abutment, Looking West.



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 17.5 feet below the water surface (at floor), the edge of the abutment wall along the vertical joint exhibited a 6-inch-high by 3-inch-wide area of section loss with a penetration of 2 inches.
- 3 Vertical crack, extending from under the fascia beam to 10 feet 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 Area of horizontal section loss at 5 feet below the waterline, measuring 2.5 feet long by 3 inches high with a maximum penetration of 2 inches.
- 5 Section loss on corner at waterline to 3 feet below waterline, measuring 9 inches wide by 2 feet high with 2 inches of penetration.
- 6 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.
- 7 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 at 10 feet below the waterline.
- 8 Random hairline map cracking with light efflorescence was observed from around the waterline to 3 feet above the waterline.
- 9 Hairline to 1/16 inch wide vertical cracks with light efflorescence were observed on both abutment walls typically beginning at the bottom of the bridge deck and extending below water up to 5 feet below the waterline. Crack locations where as follows; at the west abutment, north and south of 3rd beam from the south, at the west abutment, between 3rd and 4th beams from the north and at the east abutment, north and south of the 5th beam from north.
- 10 Scattered riprap was observed along the south fascia.
- 11 Light scaling of concrete surfaces with from 1/8 inch to 1/4 inch penetration was observed from 1 foot above the waterline to approximately 10 feet below the waterline on both abutment walls.

Legend

- 35.0 Sounding Depth (6/20/12)

GENERAL NOTES:

1. The East and West Abutments were inspected underwater.
2. At the time of inspection on June 20, 2012, the waterline was located approximately 9.0 feet below the top of wall with railing at south side of East Abutment.
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.

<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>		
STRUCTURE NO. 7771 OVER THE CHANNEL AT WHITEWATER AND COLBY LAKES DISTRICT I, ST. LOUIS COUNTY		
INSPECTION AND SOUNDING PLAN		
Drawn By: BMS	<b>COLLINS ENGINEERS</b> <small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: JUNE 2012
Checked By: LJ		Scale: NTS
Code: 52210007		Figure No.: I

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

INSPECTORS: Collins Engineers, Inc. DATE: June 20, 2012

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

BRIDGE NO: 7771 WEATHER: Cloud, 75° F

WATERWAY CROSSED: Channel Between Whitewater and Colby Lakes

DIVING OPERATION:  SCUBA  SURFACE SUPPLIED AIR  
 OTHER

PERSONNEL: Clayton Brookins, Breanne Stromberg

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

TIME IN WATER: 1:45 P.M.

TIME OUT OF WATER: 2:45 A.M.

WATERWAY DATA: VELOCITY Negligible/None

VISIBILITY 10.0 feet

DEPTH 39.5 feet maximum at the West Abutment

ELEMENTS INSPECTED: East and West Abutments

REMARKS: Overall, 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 underwater inspection in 2007. The channel bottom consisted of a formed concrete slab with no appreciable deficiencies.

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 substantially progressing, repairs may become warranted at a later date.

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

INSPECTION DATE June 20, 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 (CONCRETE FLOOR)	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	36.5	N	7	N	8	7	7	N	N	N	N	N	7	N	N	7	N	N
	West Abutment	39.5	N	7	N	8	7	7	N	N	N	N	N	7	N	N	7	N	N

\*UNDERWATER PORTION ONLY

REMARKS: Overall, 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 underwater inspection in 2007. The channel bottom consisted of a formed concrete slab with no appreciable deficiencies.

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.