

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. 3512 (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 extended down both abutment walls to 1 foot below the waterline.

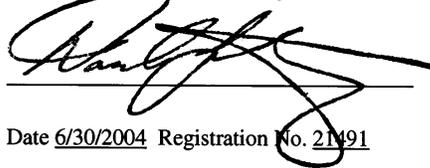
RECOMMENDATIONS:

- (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 could be 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



Date 6/30/2004 Registration No. 21491

Respectfully submitted,

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: The 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
State of Minnesota, P.E., No. 21491

Dive Team: Michelle D. Koerbel, Matthew J. Lengyel

Date: August 30, 2002

Weather Conditions: Sunny, $\pm 75^{\circ}$ F

Underwater Visibility: ± 10 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 38.3 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 10.1 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

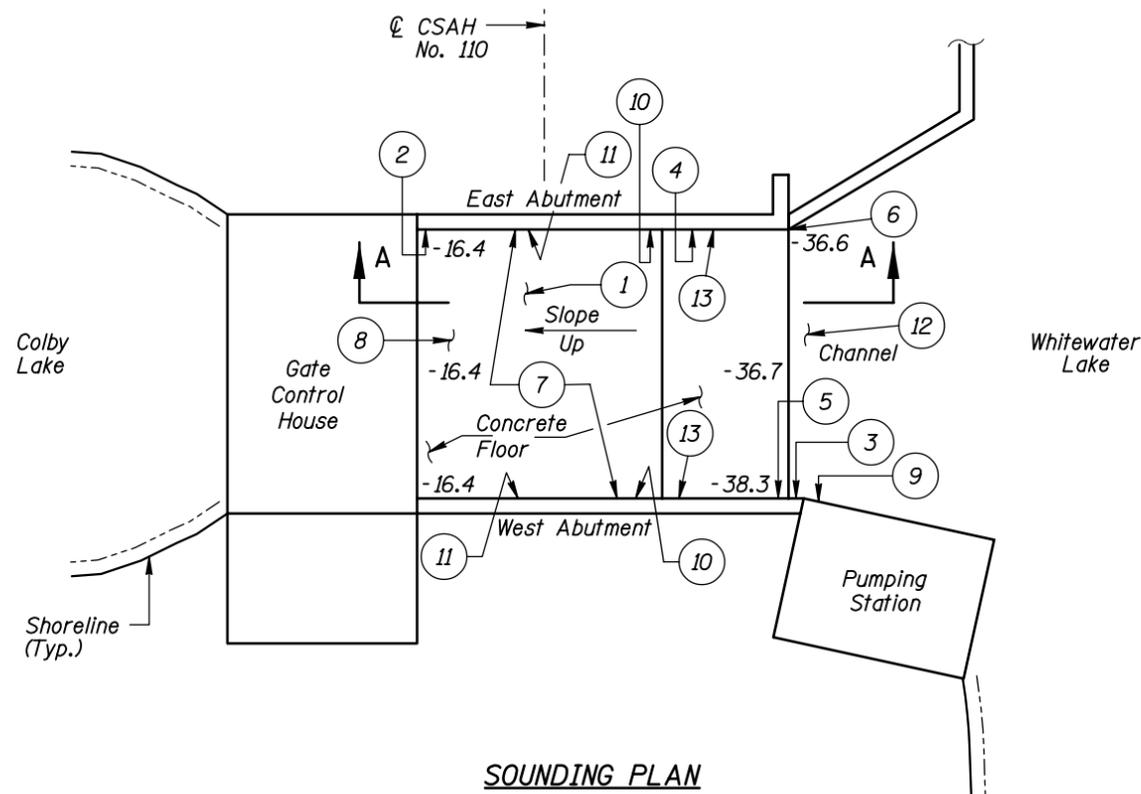
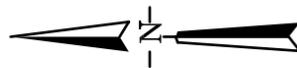
Item 61: Channel and Channel Protection: Code N/A(Concrete Floor)

Item 92B: Underwater Inspection: Code B/08/02

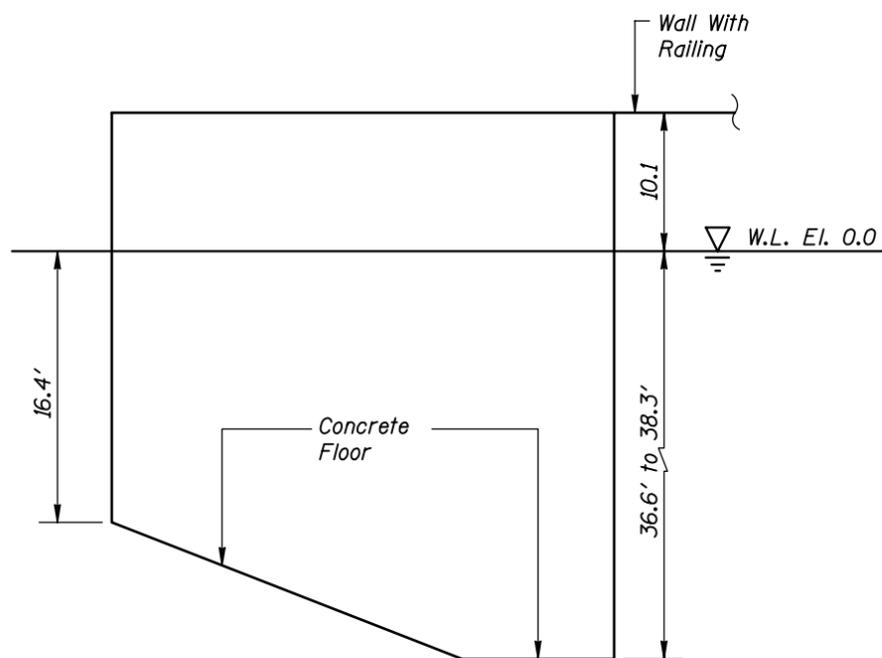
Item 113: Scour Critical Bridges: Code I/95

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

Yes No



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 in good condition 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 Three discarded bicycles were observed on the concrete floor slab.
- 9 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.
- 10 Random hairline map cracking with light efflorescence was observed from the waterline to 3 feet above the waterline.
- 11 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.
- 12 Scattered riprap was observed along the south fascia.
- 13 Light scaling with from 1/8 inch to 1/4 inch penetration was observed from 1.5 feet above the waterline to 10 feet below the waterline on both abutment walls.

Legend

-35.0 Sounding Depth from Waterline

GENERAL NOTES:

1. The East and West Abutments were inspected underwater.
2. At the time of inspection on August 30, 2002, the waterline was located approximately 10.1 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.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 7771 OVER THE CHANNEL AT WHITEWATER AND COLBY LAKES DISTRICT I, ST. LOUIS COUNTY		
INSPECTION AND SOUNDING PLAN		
Drawn By: PRH	COLLINS ENGINEERS, INC.	Date: AUG. 2002
Checked By: MDK	300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Scale: NTS
Code: 31250007		Figure No.: 1



Photograph 1. View of the West Abutment, Looking Southwest.



Photograph 2. View of Crack in the West Abutment, Looking West.



Photograph 3. View of the Section Loss on South Corner of the East Abutment, Looking North.

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

INSPECTORS: Collins Engineers, Inc. DATE: August 30, 2002
ON-SITE TEAM LEADER: Daniel G. Stromberg, P.E.
BRIDGE NO: 7771 WEATHER: Sunny, " 75° F
WATERWAY CROSSED: The Channel Between Whitewater and Colby Lakes
DIVING OPERATION: X SCUBA SURFACE SUPPLIED AIR
OTHER

PERSONNEL: Michelle D. Koerbel, Matthew J. Lengyel
EQUIPMENT: Scuba, U/W Light, Scraper, Lead Line, Sounding Pole, Probe Rod, Camera
TIME IN WATER: 11:00 A.M.
TIME OUT OF WATER: 11:30 A.M.
WATERWAY DATA: VELOCITY Negligible/None
VISIBILITY " 10 feet
DEPTH 38.3 feet maximum at the West Abutment

ELEMENTS INSPECTED: East and West Abutments

REMARKS: Overall, the concrete of the abutment walls and floor slab was in good and sound condition 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, minor small areas of section loss with exposed aggregate, and random small pockets of poor consolidation were observed.

FURTHER ACTION NEEDED: _____ YES _____ X _____ 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 could be 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. 21491
 WATERWAY CROSSED The Channel between Whitewater and Colby Lakes

INSPECTION DATE August 30, 2002
 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 (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	7	N	N
	West Abutment	38.3	N	7	N	9	7	7	N	N	N	N	N	7	N	N	7	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the concrete of the abutment walls and floor slab was in good and sound condition 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, minor small areas of 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.