

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 7065

CSAH NO. 18

OVER

GARDEN LAKE

DISTRICT 1 - LAKE COUNTY



PREPARED FOR THE
MINNESOTA DEPARTMENT OF TRANSPORTATION

BY
COLLINS ENGINEERS, INC.

JOB NO. 5221 (CEI 14)

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 7065, the East and West Abutments and Piers 1 and 2, were found to be generally in good condition. The few defects and areas of soft concrete that were observed are not structurally significant at this time. A minor scour depression, 5 feet in radius with 1 foot of depth, was observed at the upstream nose of Pier 1. Overall, the channel bottom at the bridge appeared stable with no significant changes since the last inspection.

INSPECTION FINDINGS:

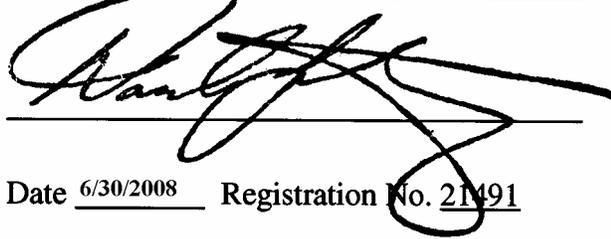
- (A) An area of minor section loss, 12 inches high by 6 inches wide with 2 inches of penetration, was located on the upstream nose of the north (downstream) shaft of Pier 1 with no exposed reinforcing steel.
- (B) The concrete surfaces on both piers from 6 inches above the waterline to 3 feet below the waterline exhibited up to a 1/4 inch deep scaling, and somewhat soft surface concrete with random areas of minor poor consolidation and up to 1/2 inch deep penetration.
- (C) Minor accumulations of timber debris were observed around the upstream column of Pier 1.
- (D) The top of the horizontal strut was observed at approximately 5.5 feet below the waterline at Pier 1. The channel bottom was flush with the bottom of horizontal strut on the west side of the pier, and on the east side of the pier there was a 6-inch cavity below the bottom of the horizontal strut.
- (E) A minor scour depression, 5 foot in radius by 1 foot deep, was observed at the upstream nose of Pier 1.

RECOMMENDATIONS:

- (A) 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 'Dan G. Stromberg', is written over two horizontal lines.

Date 6/30/2008 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.



A large, stylized handwritten signature in black ink, appearing to read 'Dan G. Stromberg', is written over two horizontal lines.

Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 7065

Feature Crossed: Garden Lake

Feature Carried: CSAH No. 18

Location: District 1 - Lake County

Bridge Description: The superstructure consists of a three span, multiple steel stringer bridge supporting a reinforced concrete deck. The superstructure is supported by two reinforced concrete abutments and two reinforced concrete piers. The pier and abutment footings are founded on steel H-piles. The piers are numbered 1 and 2, starting from the west end of the bridge.

2. INSPECTION DATA

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

Dive Team: John J. Loftus, Valerie Roustan

Date: August 25, 2007

Weather Conditions: Cloudy, 50° F

Underwater Visibility: 2.0 feet

Waterway Velocity: Negligible/None

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: East and West Abutments, Piers 1 and 2

General Shape: The piers consist of two elongated hexagonal shafts / columns supporting a rectangular pier cap. Each pier shaft is supported on a rectangular footing founded on steel H-piles. The pier shafts are connected by a concrete diaphragm located above the footings. The abutments consist of vertical walls with perpendicular wingwalls.

Maximum Water Depth at Substructure Inspected: Approximately 11.3 feet.

4. WATERLINE DATUM

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

Water Surface: The waterline was approximately 6.8 feet below reference.
Waterline Elevation = 1387.8.

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 8

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

Item 113: Scour Critical Bridges: Code J/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 West Abutment, Looking West.



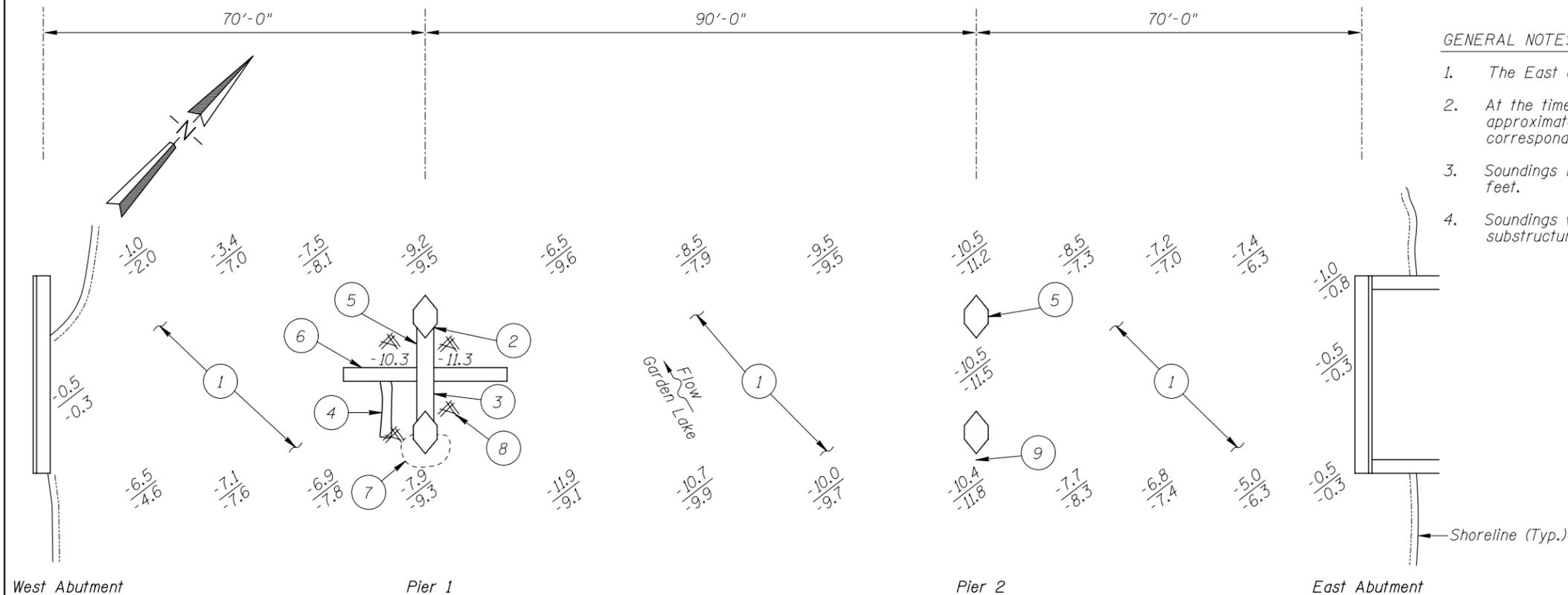
Photograph 2. View of Pier 1, Looking Southeast.



Photograph 3. Overall of Pier 1, Looking North.



Photograph 4. View of East Abutment, Looking East.



GENERAL NOTES:

1. The East and West Abutments, and Piers 1 and 2 were inspected underwater.
2. At the time of inspection on August 25, 2007, the waterline was located approximately 6.8 feet below the top of the cap at the south end of Pier 1. This corresponds to a waterline elevation of 1387.8 based on design drawings.
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.

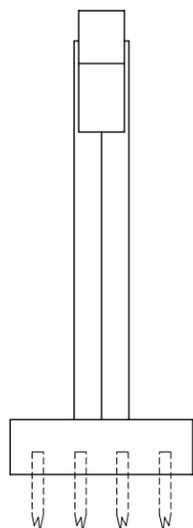
SOUNDING PLAN

INSPECTION NOTES:

- | | |
|--|--|
| <p>① The channel bottom material consisted of sandy gravel with 2 inches of probe rod penetration and scattered 1- to 3-foot-diameter riprap and 6-inch-diameter cobbles.</p> <p>② Section loss, approximately 12 inches high by 6 inches wide, with 2 inches maximum penetration was observed at the upstream nose of the downstream shaft of Pier 1. No exposed reinforcing steel.</p> <p>③ The top of a horizontal strut was observed approximately 5.5 feet below the waterline. The channel bottom was flush with the bottom of horizontal strut on the west side of the pier, and on the east side of the pier there was a 6 inch cavity below the bottom of the horizontal strut.</p> <p>④ 1-foot-diameter log was observed on the channel bottom extending along the upstream half of the pier.</p> <p>⑤ The concrete surfaces on both piers from 6 inches above the waterline to 3 feet below the waterline exhibited up to a 1/4 inch deep scaling, and somewhat soft surface concrete with random minor areas of poor consolidation. Up to 1/2 inch deep total penetration</p> <p>⑥ At approximately 8.0 feet below the waterline at the center of the horizontal strut of Pier 1 a steel I-beam was observed extending out 5 feet on each side of the strut.</p> | <p>⑦ A minor scour depression, 5 feet in radius by 1 foot deep, was observed at the upstream nose of Pier 1.</p> <p>⑧ A minor accumulation of timber debris consisting of 6-inch-diameter and smaller logs and branches was observed scattered around the upstream column of Pier 1.</p> <p>⑨ Heavy concentration of riprap was observed at the upstream nose of Pier 2.</p> |
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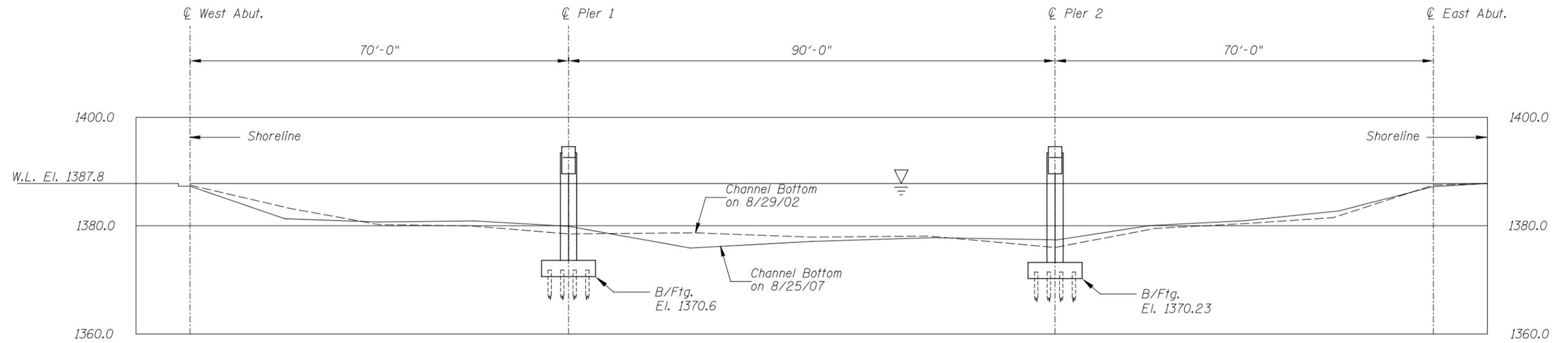
Legend

- 6.5 Sounding Depth (8/25/07)
- 5.5 Sounding Depth (8/29/02)
- Timber Debris
- Scour Depression

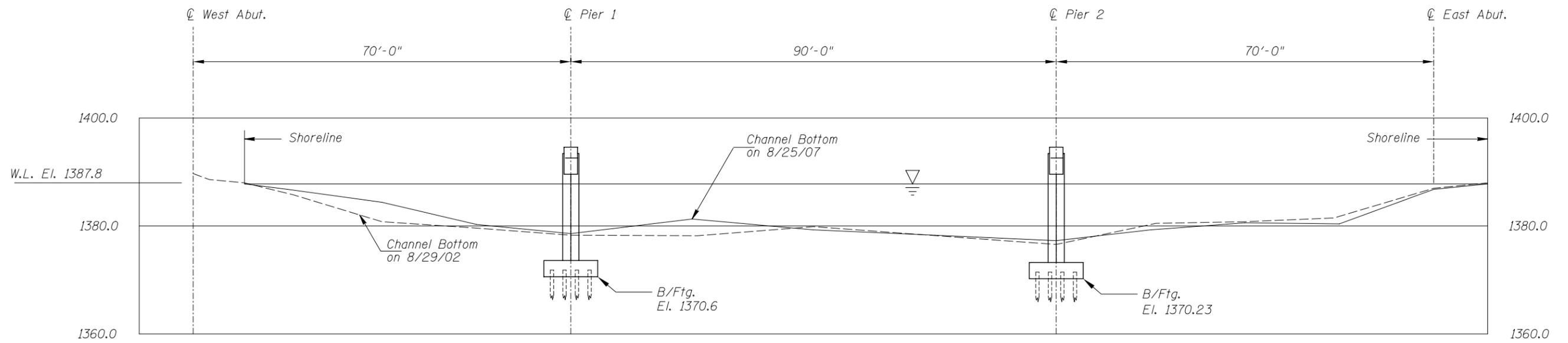


TYPICAL END VIEW OF PIERS

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 7065 OVER GARDEN LAKE DISTRICT 1, LAKE COUNTY		
INSPECTION AND SOUNDING PLAN		
Drawn By: PRH	COLLINS ENGINEERS	Date: AUG. 2007
Checked By: MDK	<small>123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Scale: NTS
Code: 52210014		Figure No.: 1



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:
Refer to Figure 1 for General Notes.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 7065 OVER GARDEN LAKE DISTRICT 1, LAKE COUNTY		
UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
Drawn By: PRH	COLLINS ENGINEERS	Date: AUG. 2007
Checked By: MDK		Scale: 1"=20'
Code: 52210014		Figure No.: 2

123 North Wacker Drive
Suite 300
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(312) 704-9300
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MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: August 25, 2007

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

BRIDGE NO: 7065 WEATHER: Cloudy, 50° F

WATERWAY CROSSED: Garden Lake

DIVING OPERATION: SCUBA SURFACE SUPPLIED AIR
 OTHER

PERSONNEL: John J. Loftus, Valerie Roustan

EQUIPMENT: Scuba, Scraper, Lead Line, Sounding Pole, Probe Rod, Camera

TIME IN WATER: 11:15 a.m.

TIME OUT OF WATER: 11:45 a.m.

WATERWAY DATA: VELOCITY Negligible / None

VISIBILITY 2.0 feet

DEPTH 11.3 feet maximum at Pier 1

ELEMENTS INSPECTED: East and West Abutments, and Piers 1 and 2

REMARKS: Overall, the below water concrete was sound and in good condition. Scaling and soft concrete with typical penetrations of 1/2 inch were observed around both piers from 6 inches above the waterline to 3 feet below the waterline. A minor scour depression, 5-foot-radius by 1-foot-deep, was observed at the upstream nose of Pier 1. The strut running between the upstream and downstream shafts of Pier 1 was exposed to its bottom on the shore side and exhibited a 6-inch cavity below the bottom of the strut on the channel side. An area of section loss, 12 inches high by 6 inches wide with 2 inches of penetration, was observed at the upstream nose of the downstream shaft of Pier 1.

FURTHER ACTION NEEDED: YES NO

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. 7065
 INSPECTORS Collins Engineers, Inc.
 ON-SITE TEAM LEADER Daniel G. Stromberg, P.E., S.E.
 WATERWAY CROSSED Garden Lake

INSPECTION DATE August 25, 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	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	0.5'	N	7	N	9	N	7	8	9	8	N	8	7	N	N	N	N	N
	Pier 1	11.3'	N	7	N	9	N	7	8	N	N	7	7	7	N	N	N	N	N
	Pier 2	10.5'	N	7	N	9	N	7	8	N	N	N	8	7	N	N	N	N	N
	West Abutment	1.0'	N	7	N	9	N	7	8	9	8	N	8	7	N	N	N	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the below water concrete was sound and in good condition. Scaling and soft concrete with typical penetrations of 1/2 inch were observed around both piers from 6 inches above the waterline to 3 feet below the waterline. A minor scour depression, 5-foot-radius by 1-foot-deep, was observed at the upstream nose of Pier 1. The strut running between the upstream and downstream shafts of Pier 1 was exposed to its bottom on the shore side and exhibited a 6-inch cavity below the bottom of the strut on the channel side. An area of section loss, 12 inches high by 6 inches wide with 2 inches of penetration, was observed at the upstream nose of the downstream shaft of Pier 1.

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.