

UNDERWATER BRIDGE INSPECTION REPORT

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STRUCTURE NO. L7352

TWP NO. 140

OVER THE

RABBIT RIVER

DISTRICT 4 - WILKIN COUNTY

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PREPARED FOR THE  
MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 3512 (CEI 59)

MINNESOTA DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. L7352, the North and South Abutments and Pier 1, were generally in good condition with no defects of structural significance observed. Minor cracks were observed in the concrete of the pier and the abutments. Light to moderate scaling was also observed on the pier and abutments at the waterline with up to 1 inch of penetration. A 2.5-foot-diameter tree along with heavy accumulations of timber debris extended from the north embankment to Pier 1. The channel bottom around the substructure units appeared stable with no significant scour and no appreciable changes observed since the previous inspection.

INSPECTION FINDINGS:

- (A) Light to moderate scaling, with a maximum penetration of 1 inch, was observed on the concrete surfaces of the pier and the abutments and extended from 6 inches above to 6 inches below the waterline.
- (B) A 2.5-foot-diameter tree and a heavy accumulation of timber debris extended from the north embankment to Pier 1 along the upstream fascia of the bridge.
- (C) Several vertical cracks, up to 1/8 inch wide, were observed on Pier 1 and the North and South Abutments that extended from the beam seat to the channel bottom.
- (D) A construction joint, 3 inches below the waterline, exhibited random areas of section loss along both faces of Pier 1 with a maximum penetration of 2 inches.
- (E) An area of section loss, 6 inches in diameter with 1 inch of penetration, was observed on the North Abutment at the waterline.

- (F) The top of the footing was exposed along the north face of Pier 1 with up to 4 inches of vertical face detected.
- (G) The top of the footing was exposed along the North Abutment with no vertical face exposure detected.

RECOMMENDATIONS:

- (A) Remove the large tree and heavy accumulations of timber debris extending along the upstream fascia to eliminate the potential for continued accumulation and adverse affects on the bridge.
- (B) Because no information about the footings was available, monitor the extent of the local scour and footing exposure at the pier and both abutments during future inspections. If scour conditions and footing exposure increase, a scour evaluation, which has presently not been made, and/or countermeasures may be warranted.
- (C) Reinspect the 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.

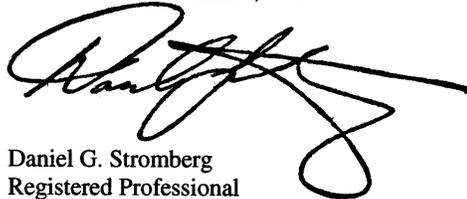
Daniel G. Stromberg



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: L7352

Feature Crossed: The Rabbit River

Feature Carried: TWP No. 140

Location: District 4 - Wilkin County

Bridge Description: The superstructure consists of two spans of multiple steel beams supporting a reinforced concrete deck. The superstructure is supported by two reinforced concrete abutments and one reinforced concrete pier. No design drawings were available with foundation information.

2. INSPECTION DATA

Professional Engineer/Team Leader: Shirley M. Walker, P.E.

Dive Team: Michelle D. Koerbel, Clayton G. Brookins.

Date: October 30, 2002

Weather Conditions: Cloudy, " 25EF

Underwater Visibility: " 2 feet

Waterway Velocity: Negligible/None

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: North and South Abutments and Pier 1.

General Shape: The abutments consist of a reinforced concrete breastwall with skewed, tapered wingwalls. The pier consists of an oblong rectangular reinforced concrete shaft which has a pointed upstream nose with a mounted steel angle for ice damage protection and a square downstream nose. No design drawings with footing details were provided.

Maximum Water Depth at Substructure Inspected: Approximately 5.2 Feet.

4. WATERLINE DATUM

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

Water Surface: The waterline was approximately 10.2 feet below reference.  
Assumed Waterline Elevation = 89.8.

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 7

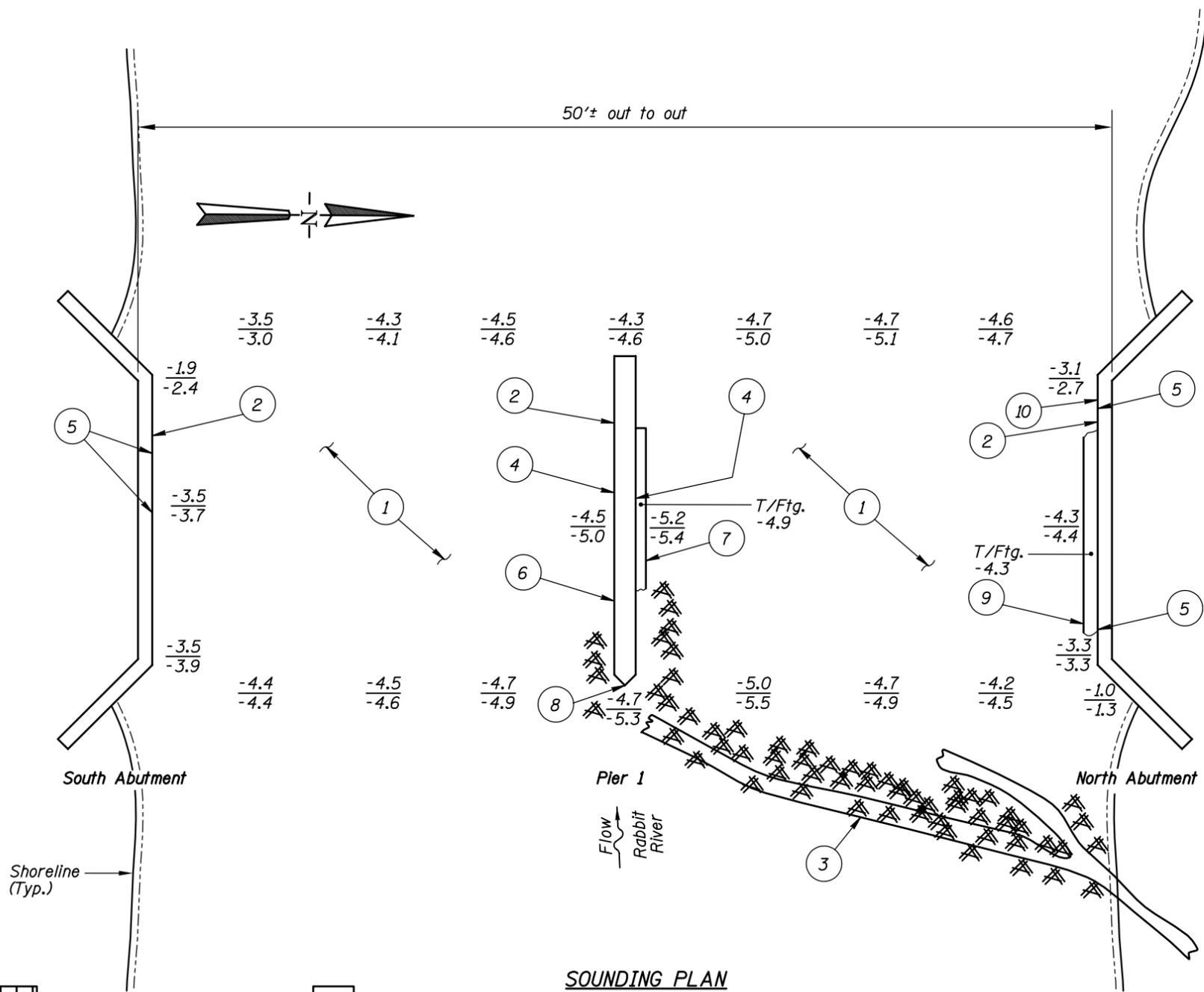
Item 61: Channel and Channel Protection: Code 6

Item 92B: Underwater Inspection: Code B/10/02

Item 113: Scour Critical Bridges: Code G

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

Yes  No



**GENERAL NOTES:**

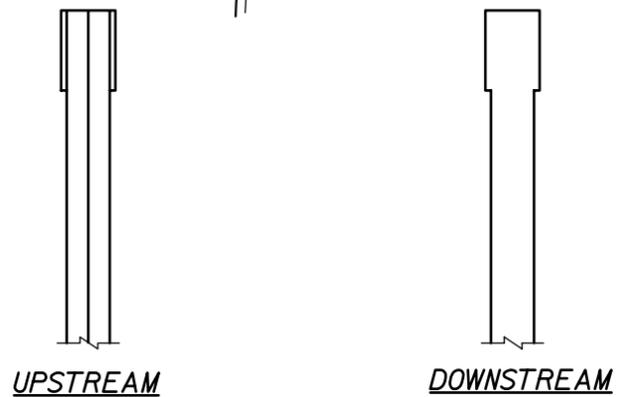
1. The North and South Abutments and Pier 1 were inspected underwater.
2. At the time of inspection on October 30, 2002 the waterline was located approximately 10.2 feet below the top of the pier cap at the upstream end of Pier 1. Since insufficient bridge elevation information was available, a reference elevation of 100.0 was assumed. Based on the assumed reference the waterline elevation was 89.8.
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.

**INSPECTION NOTES**

- ① The channel bottom material consisted of hard clay overlaid with silt and random gravel with a maximum probe rod penetration of 2 inches.
- ② Light to moderate scaling was observed around the perimeter of the pier and along the breastwalls of both abutments, with a maximum penetration of 1 inch, extending from 6 inches below to 6 inches above the waterline.
- ③ A 25-foot-diameter tree along with a heavy accumulation of timber debris extended from the north embankment to Pier 1.
- ④ Vertical crack, extending from the beam seat to the channel bottom with a maximum width of 1/8 inch, was observed on both sides of the pier.
- ⑤ Vertical crack, extending from the beam seat to the channel bottom with a maximum width of 1/16 inch, was observed on the breast wall.
- ⑥ A construction joint 3 inches below the waterline exhibited areas of section loss around the entire perimeter of the pier with a maximum penetration of 1 inch.
- ⑦ Footing exposure was detected at Pier 1 with a maximum vertical face exposure of 4 inches along the north side. Timber forms were exposed along the footing face.
- ⑧ Steel ice damage nosing protection extended from the top of the pier cap to 1 foot above the waterline.
- ⑨ Footing exposure was observed along the North Abutment with no vertical face exposure observed.
- ⑩ Area of section loss, 6 inches in diameter, was observed at the waterline with a penetration of 1 inch.

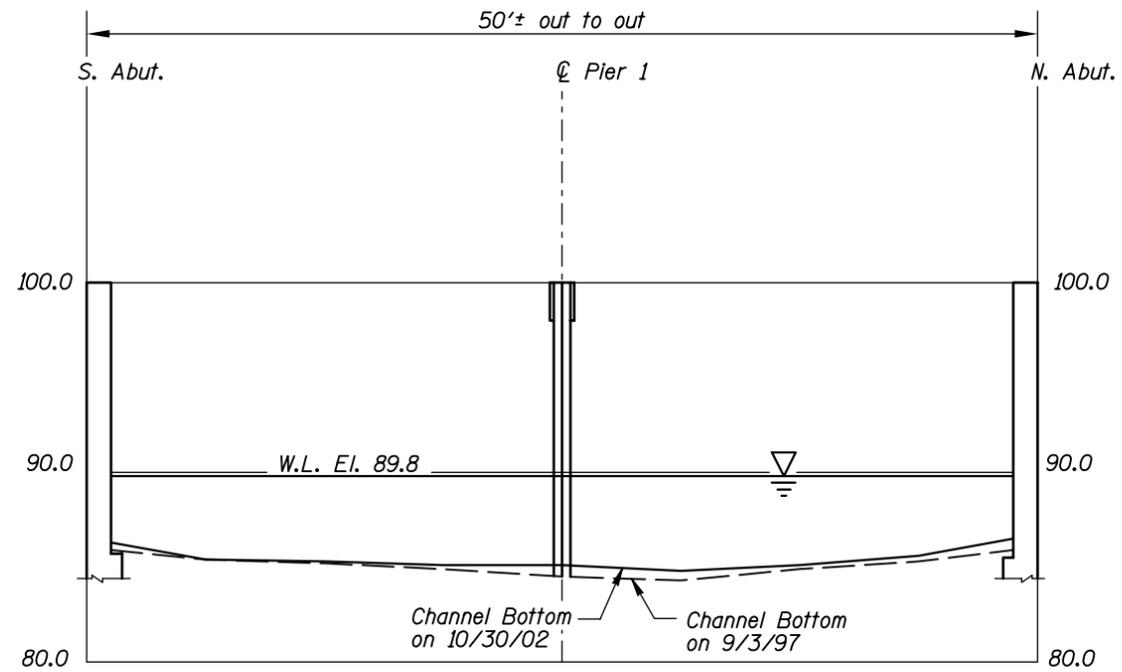
**SOUNDING PLAN**

**Legend**  
 -2.0 Sounding Depth from Waterline (10/30/02)  
 -5.2 Sounding Depth from Waterline (9/3/97)  
 Timber Debris

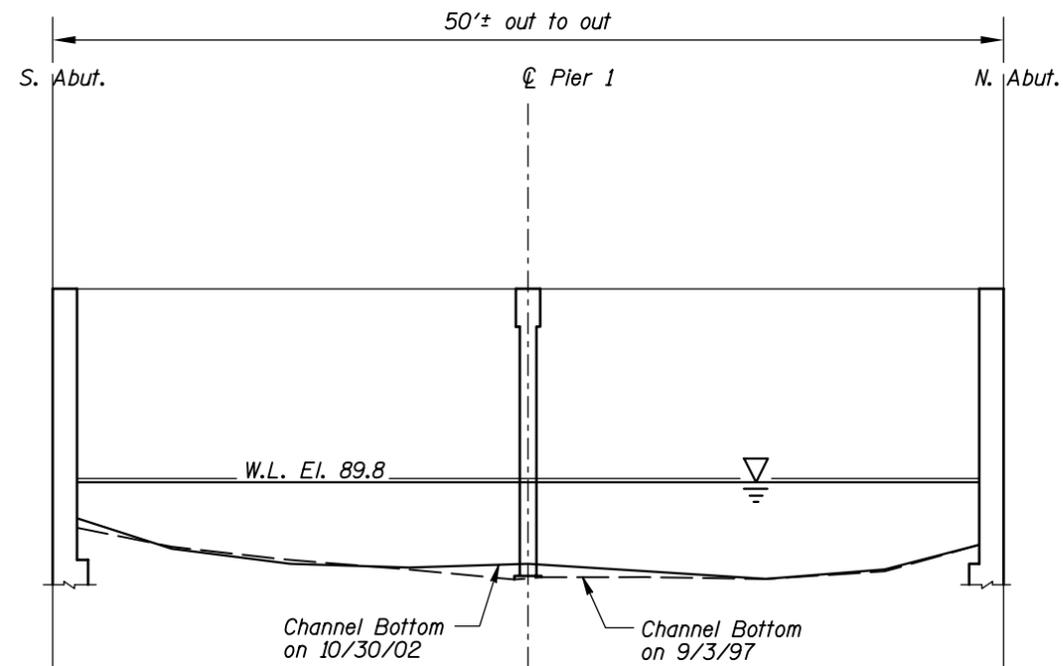


**TYPICAL END VIEW OF PIER 1**

<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>		
STRUCTURE NO. L7352 OVER THE RABBIT RIVER DISTRICT 4, WILKIN COUNTY		
<b>INSPECTION AND SOUNDING PLAN</b>		
Drawn By: PRH	<b>COLLINS ENGINEERS, INC.</b>	Date: OCT. 2002
Checked By: MDK	300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Scale: NTS
Code: 35120059		Figure No.: 1



**UPSTREAM FASCIA PROFILE**  
Vertical Scale: 1"=10'-0"



**DOWNSTREAM FASCIA PROFILE**  
Vertical Scale: 1"=10'-0"

Note:  
Refer to Figure 1 for General Notes.

<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>		
STRUCTURE NO. L7352 OVER THE RABBIT RIVER DISTRICT 4, WILKIN COUNTY		
<b>UPSTREAM AND DOWNSTREAM FASCIA PROFILES</b>		
Drawn By: PRH	<b>COLLINS ENGINEERS, INC.</b> 300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Date: OCT. 2002
Checked By: MDK		Scale: NTS (U.O.N.)
Code: 35I20059		Figure No.: 2



Photograph 1. Overall View of Structure, Looking Northwest.



Photograph 2. View of Pier 1, Looking Northwest.



Photograph 3. View of South Abutment, Looking Southwest.



Photograph 4. View of North Abutment, Looking North.

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

INSPECTORS: Collins Engineers, Inc.                      DATE: October 30, 2002  
ON-SITE TEAM LEADER: Shirley M. Walker, P.E.  
BRIDGE NO: L7352                                              WEATHER: Cloudy, " 25EF  
WATERWAY CROSSED: The Rabbit River  
DIVING OPERATION:    X                      SCUBA                      SURFACE SUPPLIED AIR  
                                                                                                                         OTHER

PERSONNEL: Michelle D. Koerbel, Clayton G. Brookins  
EQUIPMENT: Scuba, U/W Light, Scraper, Lead Line, Sounding Pole, Probe Rod, Camera  
TIME IN WATER: 11:30 a.m.

TIME OUT OF WATER: 11:50 a.m.

WATERWAY DATA: VELOCITY Negligible/None

VISIBILITY " 2 feet

DEPTH 5.2 feet maximum at Pier 1

ELEMENTS INSPECTED: North and South Abutments and Pier 1

REMARKS: Overall, the pier and both abutments were in good condition with only minor vertical cracks and areas of section loss detected. Light to moderate scaling was also observed at the waterline on the pier and both of the abutments with up to 1 inch of penetration. A 2.5-foot-diameter tree with heavy accumulations of timber debris extended from the north embankment to Pier 1 along the upstream fascia. The top of the footing was exposed along the north face of Pier 1 and along the North Abutment with up to 4 inches of vertical face exposure detected at the pier.

FURTHER ACTION NEEDED:      X   YES               NO

Remove the large tree and heavy accumulations of timber debris extending along the upstream fascia to eliminate the potential for continued accumulation and adverse affects on the bridge.

## FURTHER ACTION NEEDED (CONTINUED)

Monitor the extent of the local scour and footing exposure at the pier and both abutments during future inspections. If scour conditions and footing exposure increase, a scour evaluation, which has presently not been made, and/or countermeasures may be warranted.

Reinspect the 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. L7352  
INSPECTORS Collins Engineers, Inc.  
ON-SITE TEAM LEADER Shirley M. Walker, P.E.  
WATERWAY CROSSED The Rabbit River

INSPECTION DATE October 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	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
	North Abutment	4.3'	N	6	7	9	N	7	6	8	8	5	6	6	N	N	N	N	N
	Pier 1	5.2'	N	6	7	9	N	7	6	N	N	5	6	6	N	N	N	N	N
	South Abutment	3.5'	N	7	N	9	N	7	7	8	8	N	7	7	N	N	N	N	N

\*UNDERWATER PORTION ONLY

REMARKS: Overall, the pier and both abutments were in good condition with only minor vertical cracks and areas of section loss detected. Light to moderate scaling was also observed at the waterline on the pier and both of the abutments with up to 1 inch of penetration. A 2.5-foot-diameter tree with heavy accumulations of timber debris extended from the north embankment to Pier 1 along the upstream fascia. The top of the footing was exposed along the north face of Pier 1 and along the North Abutment with up to 4 inches of vertical face exposure detected at the pier.

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.