

UNDERWATER BRIDGE INSPECTION REPORT

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STRUCTURE NO. 14511

MSAS NO. 115

OVER THE

RED RIVER OF THE NORTH

DISTRICT 4 - CLAY COUNTY, CITY OF MOORHEAD

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PREPARED FOR THE  
MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 3512 (CEI 45)

MINNESOTA DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 14511, Piers 3 and 4, were in good condition with no defects of structural significance observed. The channel bottom appears to be stable with no evidence of significant scour or appreciable changes since the previous inspection.

INSPECTION FINDINGS:

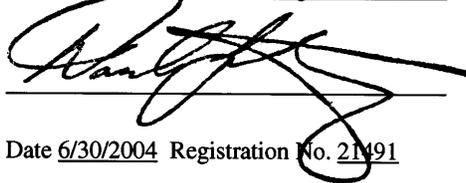
- (A) Random hairline to 1/16 inch wide vertical cracks were observed along the diaphragm of both piers, extending from the top of the diaphragm to the channel bottom.
- (B) A minor accumulation of timber debris was observed along the west side of Pier 4, extending from 0.5 feet below the waterline to the channel bottom.
- (C) The Pier 3 diaphragm was partially undermined along the east side of the pier, with up to 6 inches of vertical exposure and a maximum of 1.5 feet of horizontal penetration.

RECOMMENDATIONS:

- (A) Monitor the timber debris, and if found to be increasing in the future, removal operations may become warranted.
  
- (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

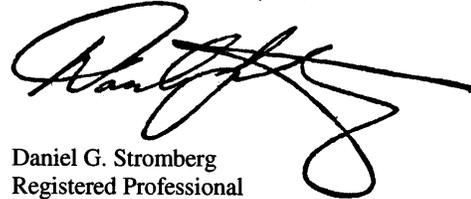


A large, stylized handwritten signature in black ink, appearing to read 'Dan G. Stromberg', is written over two horizontal lines.

Date 6/30/2004 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: 14511

Feature Crossed: The Red River of the North

Feature Carried: MSAS No. 115

Location: District 4 - Clay County, City of Moorhead

Bridge Description: The bridge is a seven span structure consisting of a multiple steel beam superstructure supporting a reinforced concrete deck. The superstructure is supported by two reinforced concrete abutments and six reinforced concrete piers. The piers are numbered 1 through 6 starting from the west end of the bridge. The abutment and pier footings are supported by steel H-piles.

2. INSPECTION DATA

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

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

Date: October 28, 2002

Weather Conditions: Cloudy, " 35E F

Underwater Visibility: Negligible/None.

Waterway Velocity: " 0.5 f.p.s.

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 3 and 4.

General Shape: The piers consist of two interior oblong rectangular shafts with rounded ends and two circular fascia columns supporting a rectangular cap. The pier shafts and columns are connected with a continuous deep concrete diaphragm, and are supported on footings founded on steel H-piles.

Maximum Water Depth at Substructure Inspected: Approximately 3.7 Feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap on the north end of Pier 4.

Water Surface: The waterline was approximately 30.8 feet below reference.  
Waterline Elevation = 872.7.

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

Item 60: Substructure: Code 7

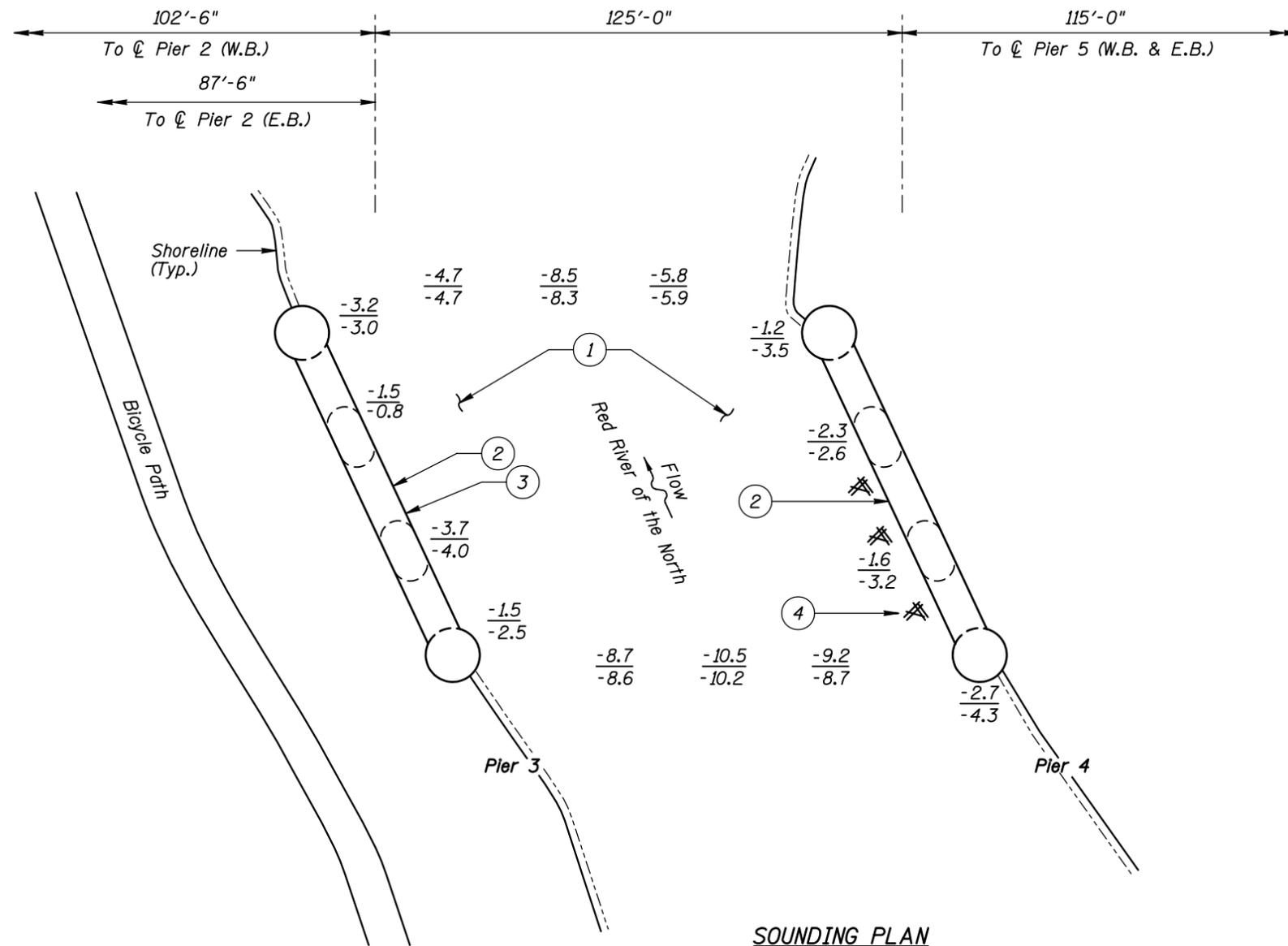
Item 61: Channel and Channel Protection: Code 6

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

Item 113: Scour Critical Bridges: Code I/92

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

\_\_\_\_\_ Yes  No

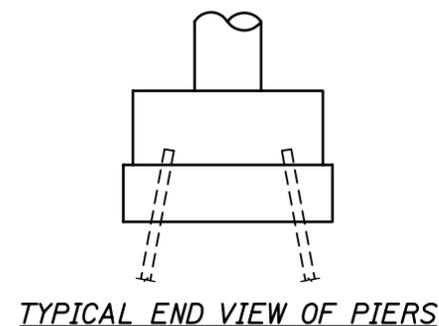


**GENERAL NOTES:**

- Piers 3 and 4 were inspected underwater.
- At the time of inspection on October 28, 2002, the waterline was located approximately 30.8 feet below the top of the pier cap at the downstream end of Pier 4. This corresponds to a waterline elevation of 872.7 based on the previous report dated September 9, 1997.
- Soundings indicate the water depth at the time of inspection and are measured in feet.
- Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units.

**INSPECTION NOTES:**

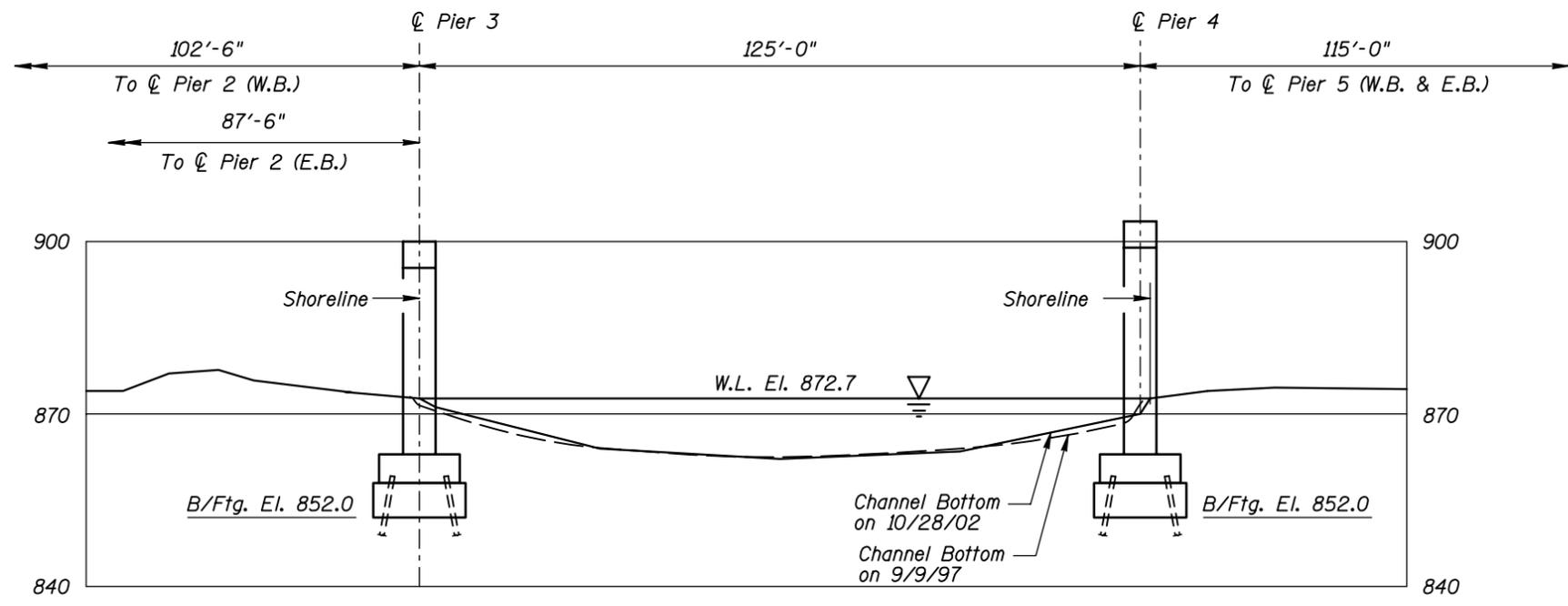
- The channel bottom material consisted of soft clay, gravel, and scattered branches with up to 1.5 feet of probe rod penetration.
- Random hairline to 1/16 inch wide vertical cracks were observed on the diaphragm wall of both piers, extending from the top of the diaphragm to the channel bottom.
- A 4 foot wide section of undermining was observed along the east side of the Pier 3 diaphragm exhibiting up to 6 inches of vertical exposure and 1.5 feet of maximum horizontal penetration at 3.2 feet below the waterline.
- A minor accumulation of timber debris, consisting of 6 inch diameter and smaller branches, was observed along the west side of Pier 4, extending from 0.5 feet below the waterline to the channel bottom.



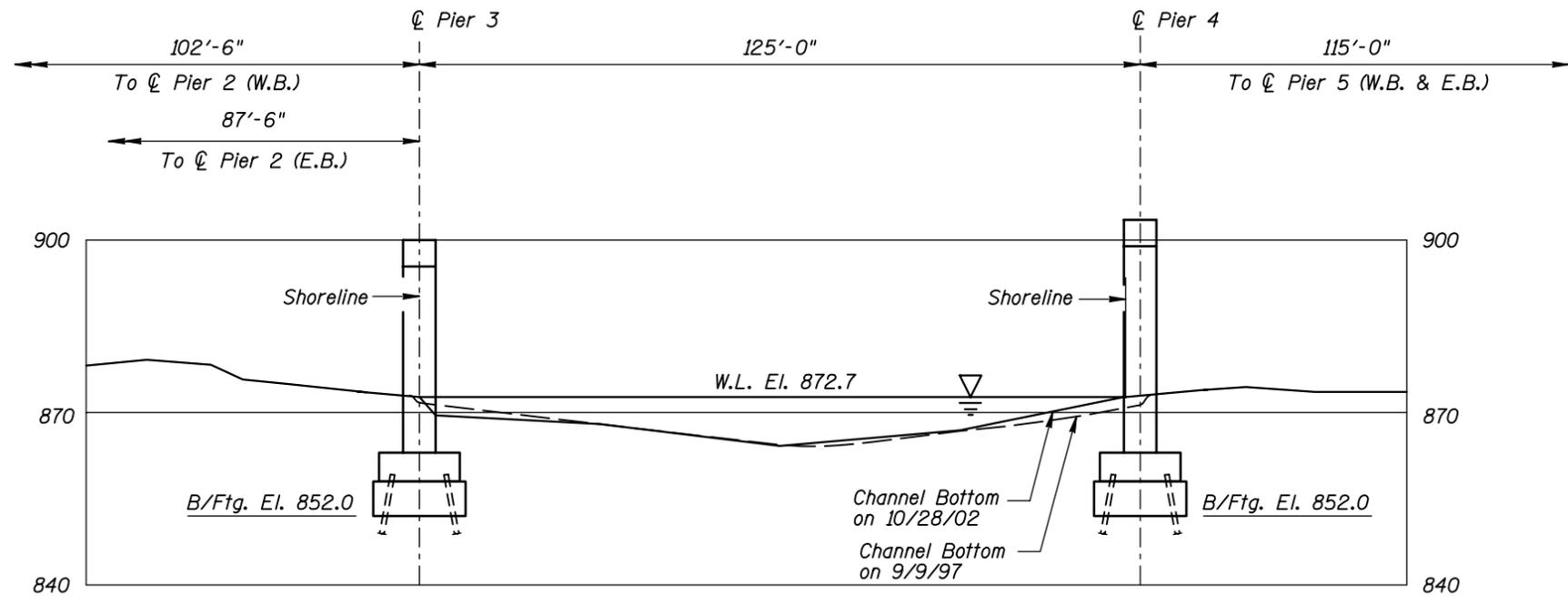
**Legend**

- 2.0 Sounding Depth from Waterline (10/28/02)
- 5.2 Sounding Depth from Waterline (9/9/97)

<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>		
STRUCTURE NO. 14511 OVER RED RIVER OF THE NORTH DISTRICT 4, CLAY COUNTY, CITY OF MOORHEAD		
<b>INSPECTION AND SOUNDING PLAN</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
Code: 35I20045		Figure No.: 1



**UPSTREAM FASCIA PROFILE**



**DOWNSTREAM FASCIA PROFILE**

Note:  
Refer to Figure 1 for General Notes.

<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>		
STRUCTURE NO. 14511 OVER RED RIVER OF THE NORTH DISTRICT 4, CLAY COUNTY, CITY OF MOORHEAD		
<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: 1"=30'
Code: 35I20045		Figure No.: 2



Photograph 1. Overall View of the Structure, Looking North.



Photograph 2. View of Pier 3, Looking Northwest.



Photograph 3. View of Pier 4, Looking Southeast.

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

INSPECTORS: Collins Engineers, Inc. DATE: October 28, 2002  
ON-SITE TEAM LEADER: Shirley M. Walker, P.E.  
BRIDGE NO: 14511 WEATHER: Cloudy, " 35E F  
WATERWAY CROSSED: The Red River of the North  
DIVING OPERATION: X SCUBA SURFACE SUPPLIED AIR  
OTHER

PERSONNEL: Michelle D. Koerbel, Clayton G. Brookins  
EQUIPMENT: Scuba, U/W Light, Scraper, Sounding Pole, Lead Line, Probe Rod, Camera  
TIME IN WATER: 3:25 p.m.  
TIME OUT OF WATER: 3:45 p.m.  
WATERWAY DATA: VELOCITY: " 0.5 f.p.s.  
VISIBILITY Negligible/None  
DEPTH 3.7 feet maximum at Pier 3.

ELEMENTS INSPECTED: Piers 3 and 4

REMARKS: The concrete surfaces below water are in good condition. Several random hairline to 1/16 inch wide vertical cracks are present in the diaphragm wall at Pier 3 and Pier 4, typically extending from the top of the diaphragm to the channel bottom. A minor accumulation of timber debris consisting of medium sized branches was present at Pier 4. The channel bottom material was soft clay with some gravel and appeared stable, however, minor undermining of the Pier 3 diaphragm was observed.

FURTHER ACTION NEEDED: \_\_\_\_\_ YES  X  NO

Monitor the timber debris, and if found to be increasing in the future, removal operations may become warranted.

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. 14511  
INSPECTORS Collins Engineers, Inc.  
ON-SITE TEAM LEADER Shirley M. Walker, P.E.  
WATERWAY CROSSED The Red River of the North

INSPECTION DATE October 28, 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
	Pier 3	3.7'	N	7	N	9	N	7	6	6	6	7	6	7	N	N	9	N	N
	Pier 4	2.7'	N	7	N	9	N	7	8	8	7	7	7	7	N	N	9	N	N

\*UNDERWATER PORTION ONLY

REMARKS: The concrete surfaces below water are in good condition. Several random hairline to 1/16 inch wide vertical cracks are present in the diaphragm wall at Pier 3 and Pier 4, typically extending from the top of the diaphragm to the channel bottom. A minor accumulation of timber debris consisting of medium sized branches was present at Pier 4. The channel bottom material was soft clay with some gravel and appeared stable, however, minor undermining of the Pier 3 diaphragm was 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.