

UNDERWATER BRIDGE INSPECTION REPORT

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STRUCTURE NO. 84505  
CSAH NO. 14  
OVER THE  
THE OTTER TAIL RIVER  
DISTRICT 4 - WILKIN COUNTY

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PREPARED FOR THE  
MINNESOTA DEPARTMENT OF TRANSPORTATION  
BY  
COLLINS ENGINEERS, INC.  
JOB NO. 3512 (CEI 58)

MINNESOTA DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 84505, Piers 1 and 2, were found to be in good condition with no structurally significant defects observed. Minor accumulations of branchy timber debris were observed around both piers with a moderate accumulation of drift also at the downstream end of Pier 2. An area of section loss was observed on Pier 1 where some timber formwork was embedded into the face of the concrete pier cap. The channel bottom appeared stable with no appreciable changes since the previous inspection.

INSPECTION FINDINGS:

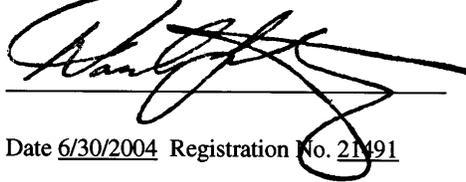
- (A) A minor accumulation of branchy timber debris, with pieces up to 3 inches in diameter, along with some minor steel debris was observed on the channel bottom at the upstream end of Pier 1 and extending along the north side of the pier.
- (B) Minor accumulations of branchy timber debris were observed all around Pier 2 with a moderate accumulation of larger timber debris, with pieces up to 8 inches in diameter, observed at the downstream end of the pier as well.
- (C) The concrete pier cap exhibited timber formwork embedded into the south face of Pier 1 with an area of concrete section loss observed along the formwork which was 2.5 feet long, 1 foot wide, and 4 inches deep.

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



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: 84505

Feature Crossed: The Otter Tail River

Feature Carried: CSAH No. 14

Location: District 4 - Wilkin County

Bridge Description: The superstructure consists of a three span multiple steel beam structure supporting a reinforced concrete deck. The superstructure is supported by two reinforced concrete abutments and two concrete-filled, steel shell pile piers. The abutment footings are supported on piles. The piers are labeled 1 and 2 starting from the west end of the bridge.

2. INSPECTION DATA

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

Dive Team: Michelle D. Koerbel, Clayton Brookins

Date: October 30, 2002

Weather Conditions: Cloudy, " 25EF

Underwater Visibility: " 3 foot

Waterway Velocity: " 2 fps

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 and 2

General Shape: Piers 1 and 2 consist of a deep, rectangular reinforced concrete cap connecting a single row of nine concrete-filled steel shell piles.

Maximum Water Depth at Substructure Inspected: Approximately 4.5 Feet.

4. WATERLINE DATUM

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

Water Surface: The waterline was approximately 7.8 feet below reference.  
Waterline Elevation = 965.0.

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

Item 60: Substructure: Code 7

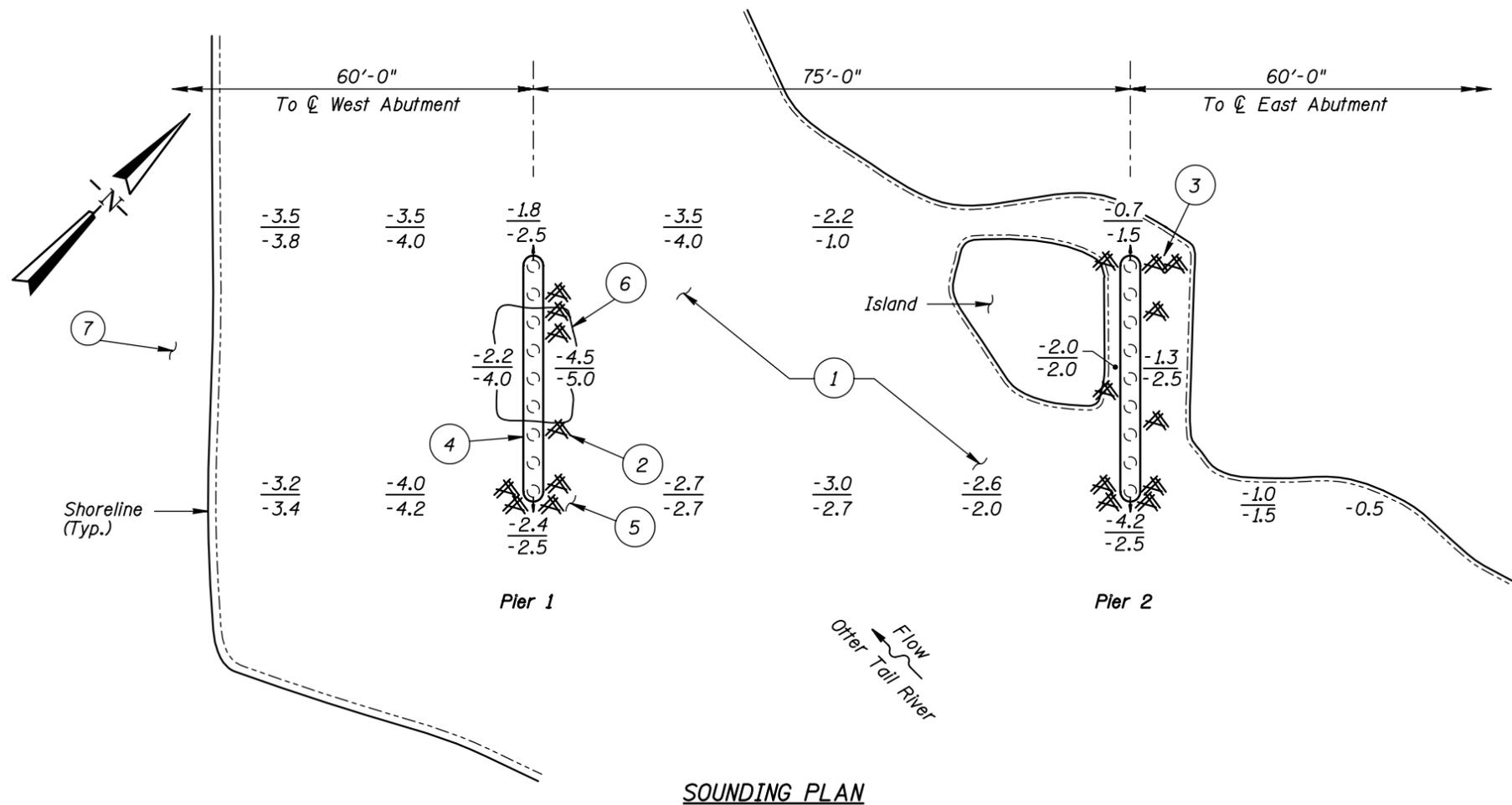
Item 61: Channel and Channel Protection: Code 7

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

Item 113: Scour Critical Bridges: Code U/96

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

Yes  No



**SOUNDING PLAN**

**TYPICAL END VIEW OF PIERS**

**GENERAL NOTES:**

1. Piers 1 and 2 were inspected underwater.
2. At the time of inspection on October 30, 2002, the waterline was located approximately 7.8 feet below the top of the pile cap at the downstream end of Pier 1. This corresponds with a waterline elevation of 965.0 based on the previous report dated September 3, 1997.
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.

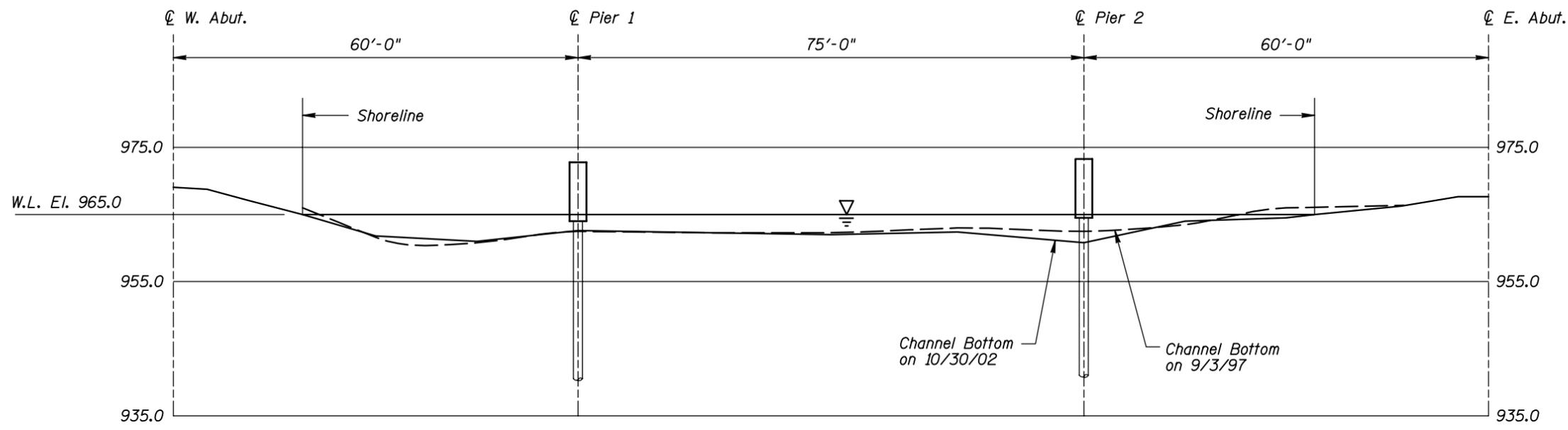
**INSPECTION NOTES:**

1. The channel bottom consisted of sand with up to 12 inches of probe rod penetration.
2. A minor accumulation of branchy timber debris, with pieces up to 3 inches in diameter, along with some minor steel debris was observed on the channel bottom at the upstream end of Pier 1 and extending along the north side of the pier.
3. Minor accumulations of branchy timber debris were observed all around Pier 2 with a moderate accumulation of larger timber debris, with pieces up to 8 inches in diameter, observed at the downstream end of the pier.
4. The concrete pier cap exhibited timber formwork embedded into the south face of Pier 1 with an area of concrete section loss observed along the formwork which was 2.5 feet long, 1 foot wide, and 4 inches deep.
5. The channel bottom consisted of riprap up to 3 feet in diameter at the upstream nose of Pier 1.
6. A large area of slop concrete was observed on the channel bottom along the center portion of Pier 1.
7. The west embankment was well armored with riprap up to 3 feet in diameter.

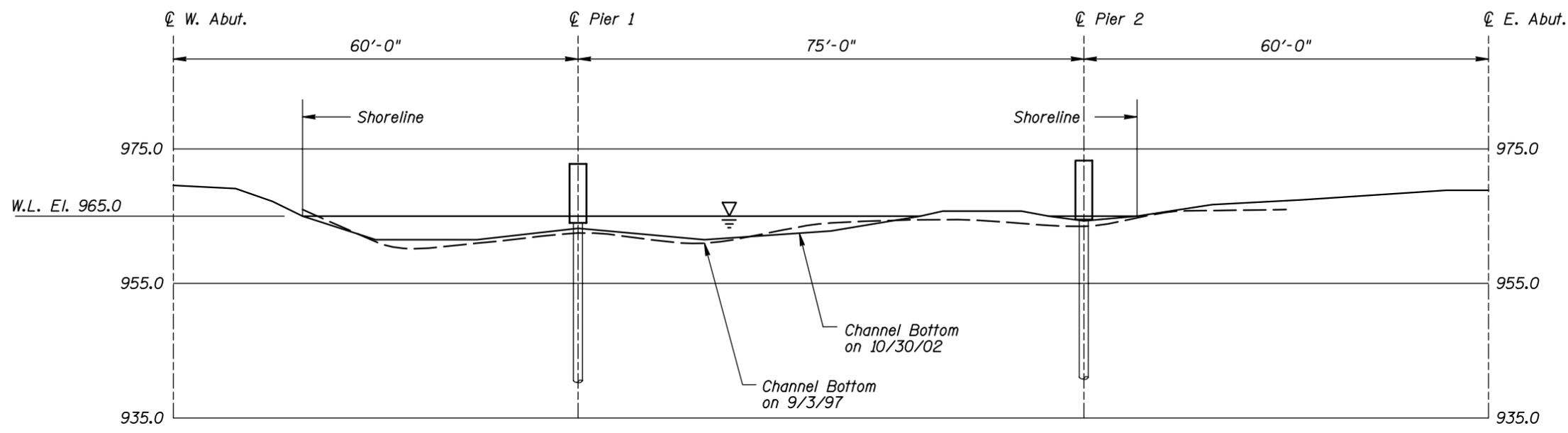
**Legend**

- 2.0 Sounding Depth from Waterline (10/30/02)
- 5.2 Sounding Depth from Waterline (9/3/97)
- Concrete-Filled Steel Shell Pile (under cap)
- Battered Concrete-Filled Steel Shell Pile (under cap)
- ▲▲▲ Timber Debris

<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>		
STRUCTURE NO. 84505 OVER OTTER TAIL 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: 35I20058		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. 84505 OVER OTTER TAIL 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: 1"=20'
Code: 35I20058		Figure No.: 2



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



Photograph 2. View of Pier 1, Looking East.



Photograph 3. View of Pier 2, Looking South.



Photograph 4. View of Downstream Nose of Pier 2, Looking West.

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: 84505 WEATHER: Cloudy, " 25EF  
WATERWAY CROSSED: The Otter Tail 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: 10:40 a.m.  
TIME OUT OF WATER: 11:00 a.m.  
WATERWAY DATA: VELOCITY " 2 f.p.s.  
VISIBILITY " 3 foot  
DEPTH 4.5 feet maximum at Pier 1

ELEMENTS INSPECTED: Piers 1 and 2

REMARKS: Overall, the concrete and steel surfaces of the piers were found to be in good condition with no structurally significant defects observed. Minor accumulations of branchy timber debris were observed around both piers with a moderate accumulation at the downstream end of Pier 2. An area of section loss was observed on Pier 1 where timber formwork was embedded into the face of the concrete pier cap. The channel bottom appeared stable with no appreciable changes since the previous inspection.

FURTHER ACTION NEEDED: \_\_\_\_\_ YES  X  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. 84505  
INSPECTORS Collins Engineers, Inc.  
ON-SITE TEAM LEADER Shirley M. Walker, P.E.  
WATERWAY CROSSED The Otter Tail 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
	Pier 1	4.5'	8	7	N	9	N	7	7	N	N	7	7	7	8	N	8	N	N
	Pier 2	4.2'	8	8	N	9	N	8	7	N	N	7	7	8	8	N	N	N	N

\*UNDERWATER PORTION ONLY

REMARKS: Overall, the concrete and steel surfaces of the piers were found to be in good condition with no structurally significant defects observed. Minor accumulations of branchy timber debris were observed around both piers with a moderate accumulation at the downstream end of Pier 2. An area of section loss was observed on Pier 1 where timber formwork was embedded into the face of the concrete pier cap. The channel bottom appeared stable with no appreciable changes since the previous inspection.

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.