

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 36514

CSAH NO. 18

OVER THE

RAPID RIVER

DISTRICT 1 - KOOCHICHING COUNTY



AUGUST 15, 2012

PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

AYRES ASSOCIATES & COLLINS ENGINEERS, INC.

JOB NO. 7423

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 36514, Piers 1 and 2, were generally in good condition with no defects of structural significance observed. Light to moderate accumulations of timber debris were observed at the upstream noses of Piers 1 and 2. The channel bottom appeared to be in stable condition with no evidence of significant scour. However, a partial footing exposure was observed at the upstream end of Pier 2.

INSPECTION FINDINGS:

- (A) The concrete of Piers 1 and 2 was smooth and sound with no significant deterioration.
- (B) Light scaling was observed from 3 feet above the waterline to 2 feet below the waterline with maximum penetrations of ¼ inch on Piers 1 and 2.
- (C) The footing was partially exposed at the upstream end of Pier 2 on the channel side for a length of 4 feet with a maximum vertical face exposure of 6 inches.
- (D) A minor accumulation of timber debris was observed at Pier 1 consisting of a few branches measuring up to 2 inches in diameter. A moderate accumulation of debris measuring up to 1 foot in diameter was observed across the upstream nose of Pier 2 and extending towards the easterly shoreline.

RECOMMENDATIONS:

- (A) Monitor the accumulations of timber debris at the upstream nose of Piers 1 and 2, and if found to be increasing, removal may be warranted as part of future maintenance to alleviate scour influence at the pier and any further accumulation.
- (B) Monitor footing exposure at Pier 2 during future underwater inspections.
- (C) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of sixty (60) months.

Inspection Team Leader

Ayres Associates, Inc.



Brian K. Schroeder
Registered Professional Engineer
State of Minnesota

Respectfully submitted,

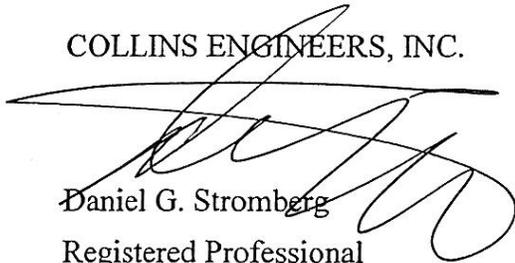
PROFESSIONAL ENGINEER

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 6/30/14 License # 21491

COLLINS ENGINEERS, INC.



Daniel G. Stromberg

Registered Professional
Engineer, State of Minnesota

UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 36514

Feature Crossed: Rapid River

Feature Carried: CSAH No. 18

Location: District 1 - Koochiching County

Bridge Description: The superstructure consists of precast concrete beams supporting a reinforced concrete deck. The substructure consists of two reinforced concrete abutments and two reinforced concrete piers founded on steel H-piles. The piers are labeled Piers 1 and 2 from west to east.

2. INSPECTION DATA

Professional Engineer Diver: Brian K. Schroeder, P.E.

Dive Team: Jason A. Cook, James A. Hitchman

Date: August 15, 2012

Weather Conditions: Cloudy, 75°F

Underwater Visibility: 1.5 feet

Waterway Velocity: Negligible/None

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 and 2

General Shape: The piers each consist of an oblong rectangular shaft with rounded noses, which rests upon a rectangular footing founded on piles.

Maximum Water Depth at Substructure Inspected: Approximately 5.9 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap on the north end of Pier 2.

Water Surface: The waterline was approximately 17.1 feet below reference.
Assumed Waterline Elevation = 1067.1.

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/08/12

Item 113: Scour Critical Bridges: Code N

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

 Yes X No

6. STRUCTURAL ELEMENT CONDITION RATING

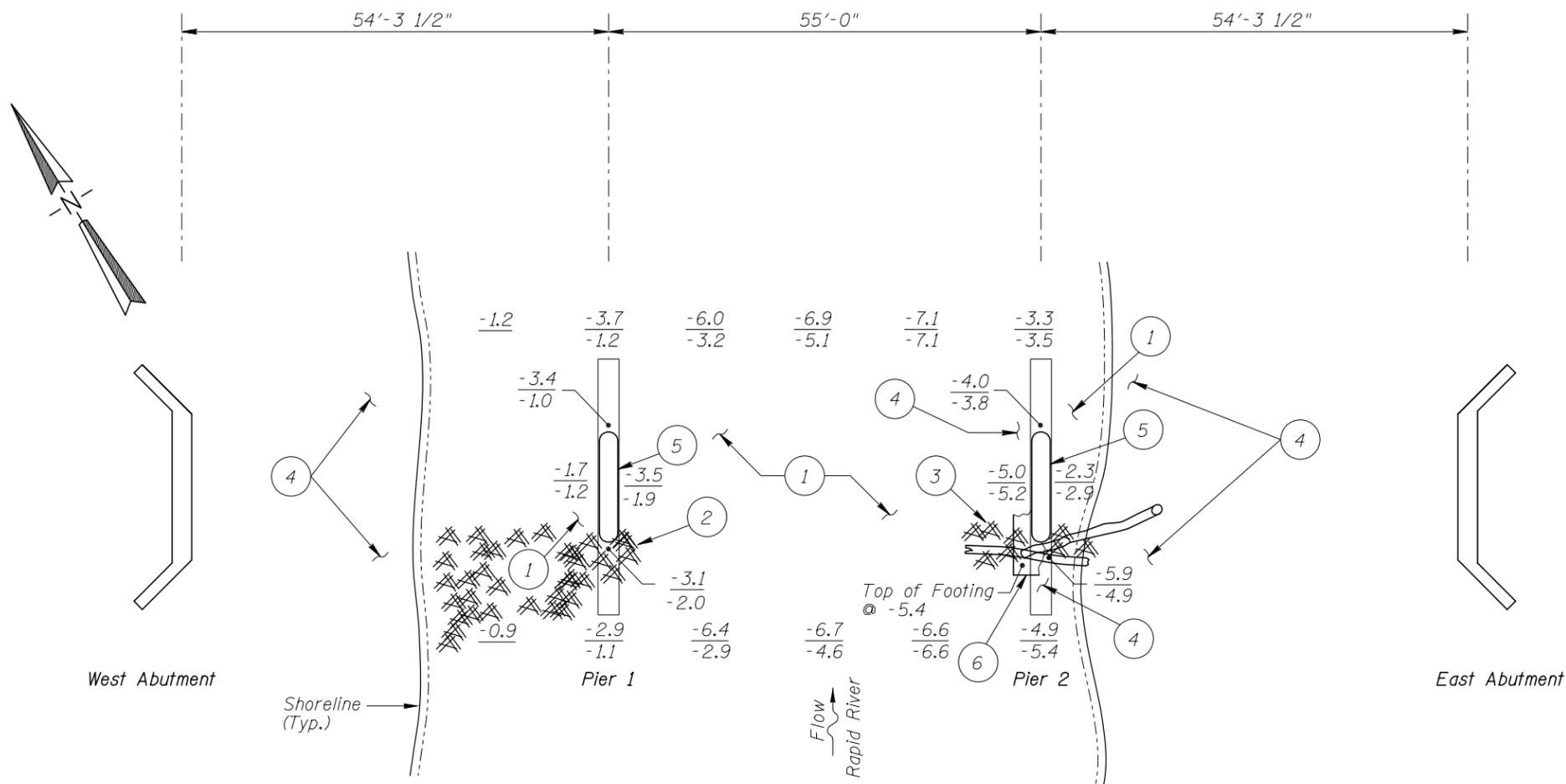
Item #	Element Description	Quantity	Unit	Conditions				
				1	2	3	4	5
205	Reinforced Concrete Column	2	EA	2				
985	Slopes	1	EA		1			



Photograph 1. View of Pier 1, Looking East.



Photograph 2. View of Pier 2, Looking West.



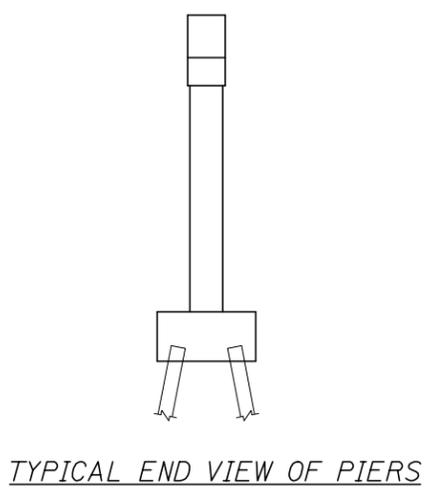
SOUNDING PLAN

GENERAL NOTES:

1. Piers 1 and 2 were inspected underwater at this bridge.
2. At the time of inspection on August 26, 2007, the waterline was located approximately 17.1 feet below the top of pier cap at north fascia of Pier 2. This corresponds with a waterline elevation of 1067.1 feet 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 points between the substructure units.

INSPECTION NOTES:

- ① The channel material consisted of sand and gravel with some silt and up to 6 inches of probe rod penetration.
- ② A moderate accumulation of timber debris was observed at Pier 1, consisting of branches, each measuring up to 2 inches in diameter. The debris extended 1 foot up from channel bottom.
- ③ A moderate accumulation of timber debris was observed, consisting of numerous logs and tree trunks measuring up to 1 foot in diameter lying across the upstream nose and extending to the easterly shoreline. Debris extended from channel bottom to waterline at Pier 2.
- ④ The shoreline consisted of up to 2 feet diameter riprap, which was also present around the upstream and downstream noses of Pier 2.
- ⑤ Light scaling from 3 feet above the waterline to 2 feet below water level with 1/8 inch typical to 1/4 inch maximum penetrations was observed along the entire perimeter of Pier 1 and Pier 2.
- ⑥ The footing was partially exposed at the upstream end of Pier 2 on the channel side for a length of 4 feet with a maximum vertical face exposure of 6 inches.



TYPICAL END VIEW OF PIERS

Legend

- 3.1 Sounding Depth (8/15/12)
- 3.1 Sounding Depth (8/26/07)
- Timber Debris

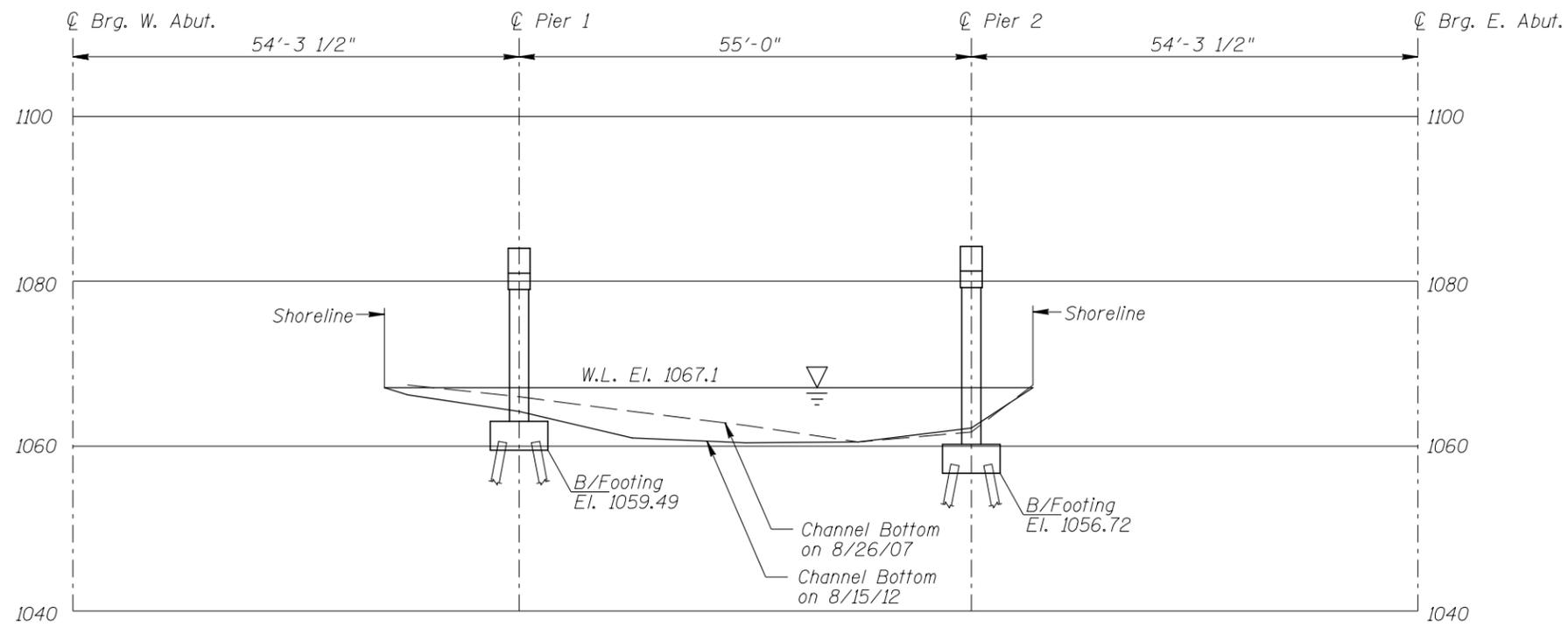
Note:

All soundings based on 2012 waterline location.

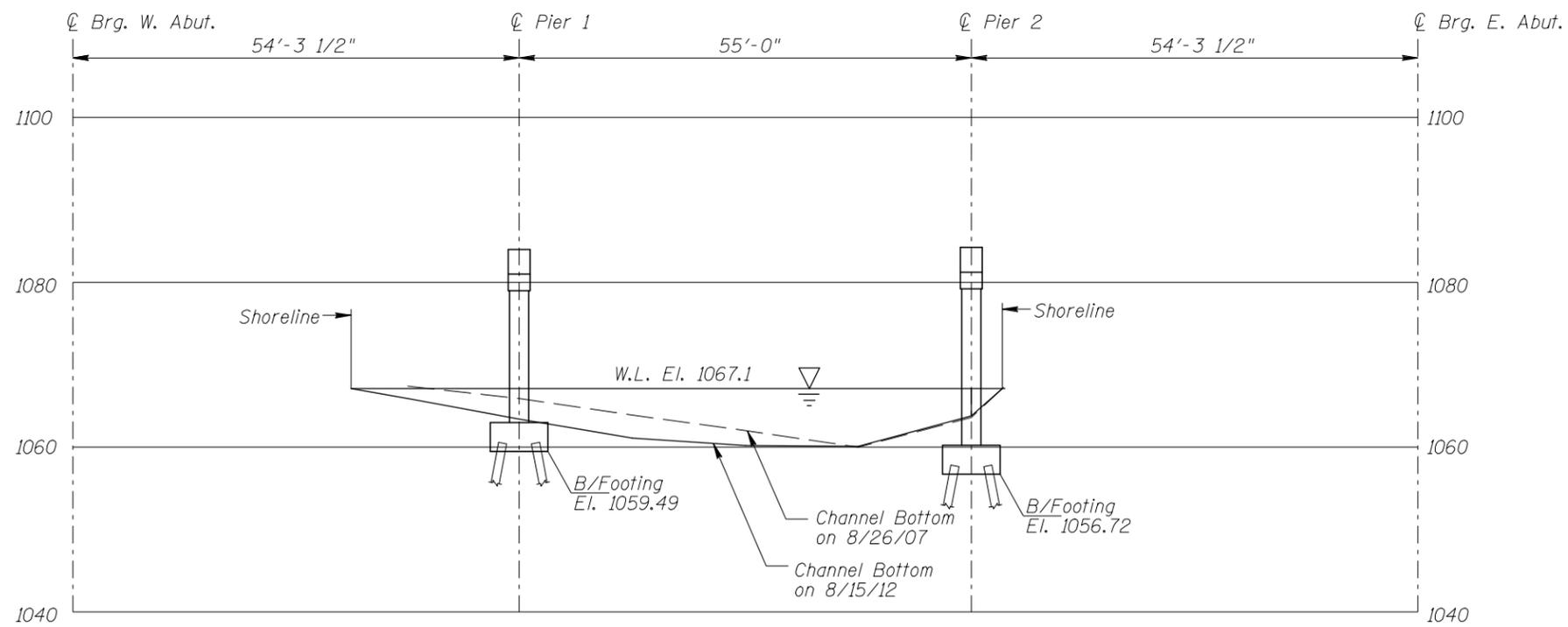
MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION	
STRUCTURE NO. 36514 OVER THE RAPID RIVER DISTRICT 1, KOOCHICHING COUNTY	
INSPECTION AND SOUNDING PLAN	
Drawn By: JAC	Date: AUG. 2012
Checked By: BKS	Scale: NTS
Code: 2255002I	Figure No.: I

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UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 36514 OVER THE RAPID RIVER DISTRICT I, KOOCHICING COUNTY		
UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
Drawn By: JAC	AVRES ASSOCIATES	Date: AUG. 2012
Checked By: BKS	<small>3433 Oakwood Hills Parkway Eau Claire, WI 54701 www.AyresAssociates.com</small>	Scale: 1"=20'
Code: 22550021		Figure No.: 2

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

INSPECTORS: Ayres Associates DATE: August 15, 2012

ON-SITE TEAM LEADER: Brian K. Schroeder, P.E.

BRIDGE NO: 36514 WEATHER: Cloudy, 75° F

WATERWAY CROSSED: Rapid River

DIVING OPERATION: SCUBA SURFACE SUPPLIED AIR
 OTHER

PERSONNEL: Jason A. Cook, James A. Hitchman

EQUIPMENT: Commercial Scuba, U/W Light, Hammer, Sounding Pole, Probe Rod, Camera,
Underwater Camera

TIME IN WATER: 1:50 p.m.

TIME OUT OF WATER: 2:15 p.m.

WATERWAY DATA: VELOCITY Negligible/None

VISIBILITY 1.5 feet

DEPTH 5.9 feet maximum at Pier 2

ELEMENTS INSPECTED: Piers 1 and 2

REMARKS: Overall, the concrete was smooth and sound. Light scaling was observed from 3 feet above the waterline to 2 feet below the waterline with maximum penetrations of ¼ inch on Piers 1 and 2. A minor accumulation of timber debris was observed at Pier 1 consisting of a few branches measuring up to 2 inches in diameter. A moderate accumulation of timber debris measuring up to 1 foot in diameter was observed across the upstream nose of Pier 2 and extending towards the easterly shoreline. The footing was exposed at the upstream end of Pier 2 on the channel side for a length of 4 feet with a maximum height of 6 inches

FURTHER ACTION NEEDED: _____ YES NO

Monitor the accumulations of timber debris at the upstream nose of Piers 1 and 2, and if found to be increasing, removal may be warranted as part of future maintenance to alleviate scour influence at the pier and any further accumulation.

Monitor Footing exposure at Pier 2.

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of sixty (60) months.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 36514
 INSPECTORS Ayres Associates
 ON-SITE TEAM LEADER. Brian K. Schroeder, P.E.
 WATERWAY CROSSED Rapid River

INSPECTION DATE August 15, 2012
 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	4.2'	N	7	N	8	N	7	8	7	7	6	6	7	N	N	N	N	N
	Pier 2	5.9'	N	7	N	8	N	7	7	7	7	6	6	7	N	N	N	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the concrete was smooth and sound. Light scaling was observed from 3 feet above the waterline to 2 feet below the waterline with maximum penetrations of ¼ inch on Piers 1 and 2. A minor accumulation of timber debris was observed at Pier 1 consisting of a few branches measuring up to 2 inches in diameter. A moderate accumulation of timber debris measuring up to 1 foot in diameter was observed across the upstream nose of Pier 2 and extending towards the easterly shoreline. The footing was exposed at the upstream end of Pier 2 on the channel side for a length of 4 feet with a maximum height of 6 inches.

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.