

UNDERWATER BRIDGE INSPECTION REPORT

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STRUCTURE NO. 14550  
CSAH NO. 19  
OVER THE  
BUFFALO RIVER  
DISTRICT 4 - CLAY COUNTY

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SEPTEMBER 21, 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 unit inspected at Bridge No. 14450, Pier 2, was found to be in very good condition with no structurally significant defects observed. This report represents the initial underwater inspection of this structure. The steel encasements of the cast-in-place concrete piles were in good condition and exhibited no notable corrosion or protective coating failure.

INSPECTION FINDINGS:

- (A) The north and south shorelines were protected with riprap up to 1 foot in diameter.
  
- (B) The cast-in-place piles at Pier 2 were sound and in good condition.

RECOMMENDATIONS:

- (A) The inspection of the submerged substructure units of Structure No. 14550 can most likely be accomplished in the future without the use of a dive team. To perform the underwater inspection, a properly equipped qualified inspector will have to enter the water during a period of low flow. As channel bottom contours and depths of flow can change quickly, it is recommended that lead line soundings of water depth be taken along the upstream and downstream fascias to determine whether wading is possible prior to beginning the inspection. If conditions are unsafe for inspection by wading, then an underwater inspection with the use of a dive team will be required.
- (B) 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,

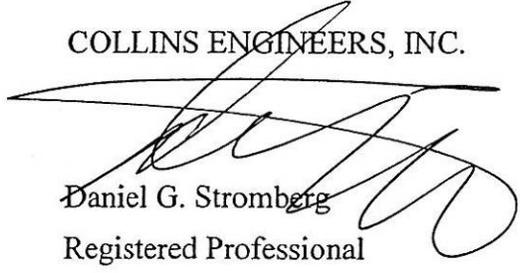
PROFESSIONAL ENGINEER

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

MINNESOTA DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 14550

Feature Crossed: Buffalo River

Feature Carried: CSAH No. 19

Location: District 4 - Clay County

Bridge Description: The bridge structure consists of five span concrete slab superstructure. The superstructure is supported by the cast-in-place concrete piles, with concrete pier caps, and concrete abutments. The piers are numbered 1 through 4 starting from the south end of the bridge. No design drawings were provided.

2. INSPECTION DATA

Professional Engineer/Team Leader: Brian K. Schroeder, P.E.

Dive Team: Jason A. Cook, Ricardo S. Narvaez

Date: September 21, 2012

Weather Conditions: Sunny, 54 °F

Underwater Visibility: 2.5 feet

Waterway Velocity: 0.5 ft/sec

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Pier 2

General Shape: The pier consists of a single line of seven cast-in-place concrete piles supporting a concrete pier cap.

Maximum Water Depth at Substructure Inspected: Approximately 1.1 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap at the downstream end of Pier 2.

Water Surface: The waterline was approximately 10.4 feet below reference.  
Assumed Waterline Elevation = 89.6.

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

Item 60: Substructure: Code 8

Item 61: Channel and Channel Protection: Code 8

Item 92B: Underwater Inspection: Code A/09/12

Item 113: Scour Critical Bridges: Code F/12

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
382	Cast-In-Place Concrete Piles	7	EA	7				
985	Slopes and Slope Protection	1	EA	1				



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



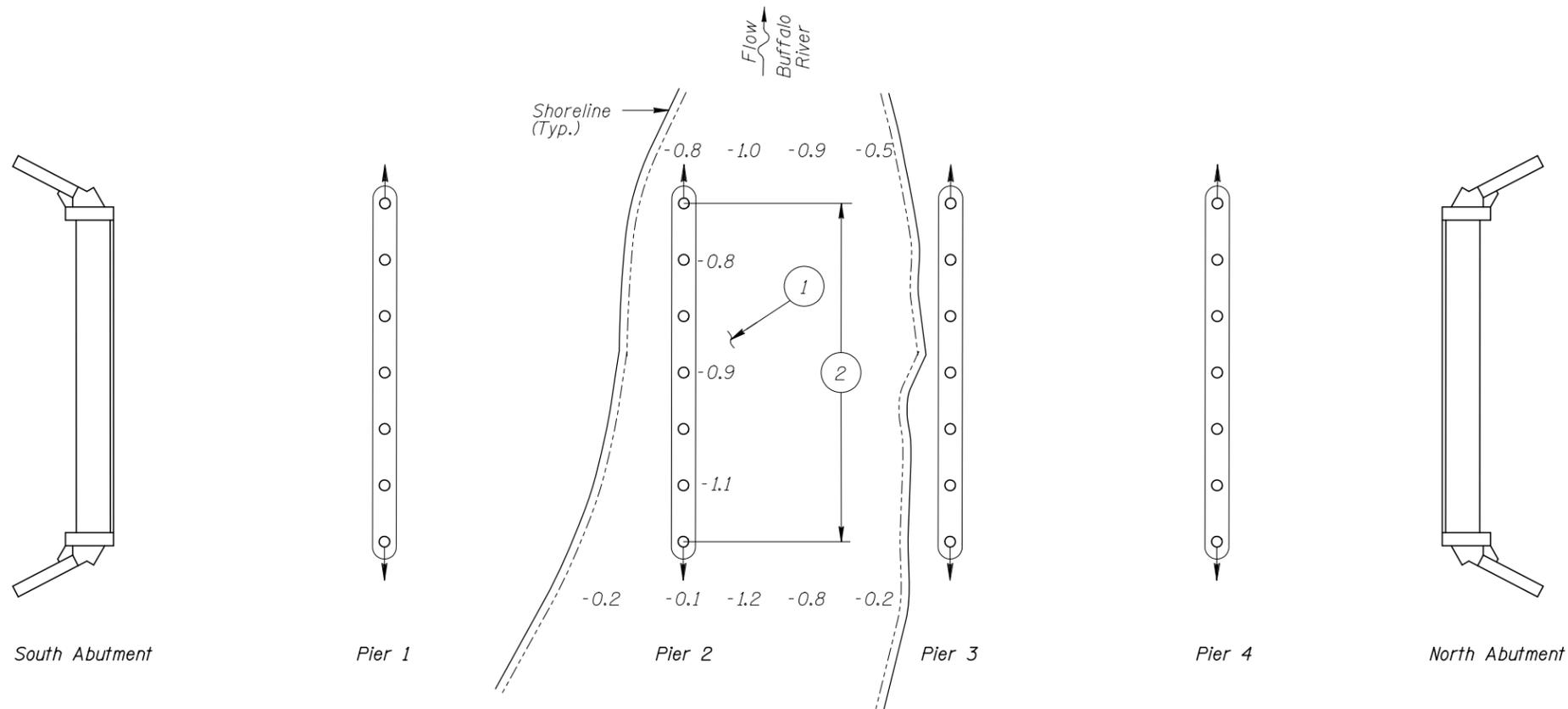
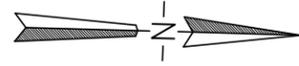
Photograph 2. View of Pier 1, Looking South.



Photograph 3. View of Pier 2, Looking South.



Photograph 4. Pier 3, Looking Southwest.



**SOUNDING PLAN**

**GENERAL NOTES:**

1. Pier 2 was inspected underwater.
2. At the time of inspection on September 21, 2012, the waterline was located approximately 10.4 feet below the top of the pier cap at the downstream end of Pier 2. Since insufficient bridge elevation information was available a reference elevation of 100.0 was assumed. Based on the assumed reference the waterline was 89.6.
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 silt with a maximum probe rod penetration of 1.5 feet.
- ② The cast-in-place concrete piles were sound and in good condition.



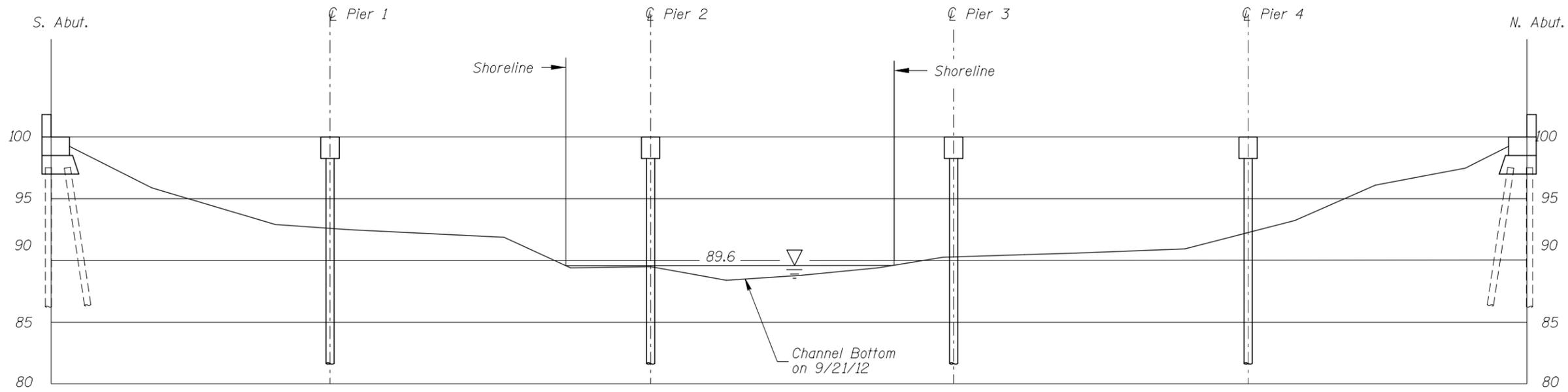
**TYPICAL END VIEW OF PIERS**

**Legend**

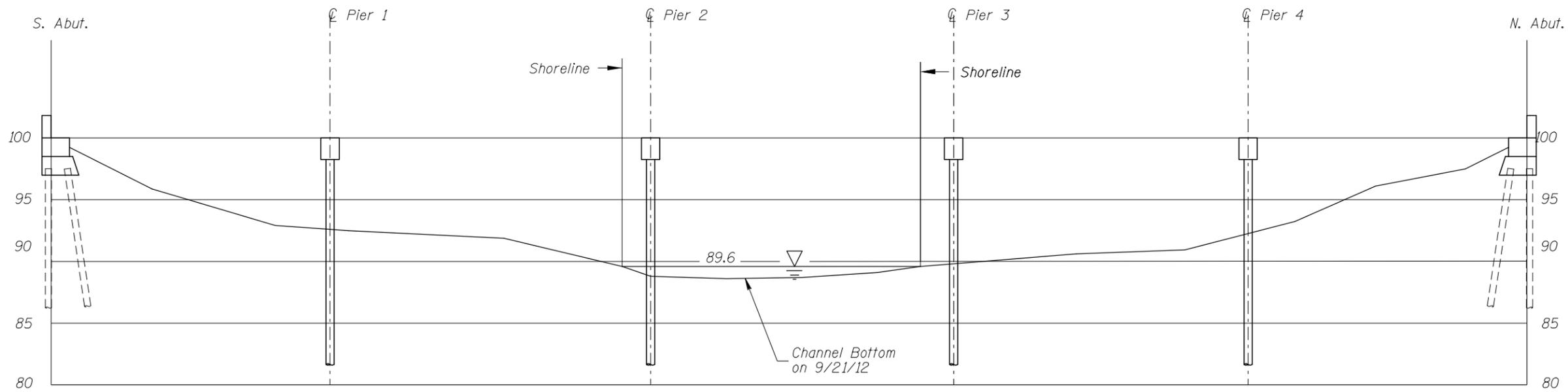
- 5.2 Sounding Depth (9/21/12)
- 16" Diameter Steel Encased Concrete Pile
- ➔ Battered 16" Diameter Steel Encased Concrete Pile

<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>		
STRUCTURE NO. 14550 OVER THE BUFFALO RIVER DISTRICT 4, CLAY COUNTY		
<b>INSPECTION AND SOUNDING PLAN</b>		
Drawn By: JAC	<b>AVRES ASSOCIATES</b>	Date: NOV. 2012
Checked By: BKS	<small>3433 Oakwood Hills Parkway Eau Claire, WI 54701 www.AyresAssociates.com</small>	Scale: NTS
Code: 52210048		Figure No.: 1

**COLLINS ENGINEERS**  
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**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. 14550 OVER THE BUFFALO RIVER DISTRICT 4, CLAY COUNTY		
<b>UPSTREAM AND DOWNSTREAM FASCIA PROFILES</b>		
Drawn By: JAC	<b>AVRES ASSOCIATES</b>	Date: NOV. 2012
Checked By: BKS	3433 Oakwood Hills Parkway Eau Claire, WI 54701 www.AyresAssociates.com	Scale: NTS (U.O.N.)
Code: 52210048		Figure No.: 2

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

INSPECTORS: Ayres Associates DATE: September 21, 2012

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

BRIDGE NO: 14550 WEATHER: Sunny, 54 °F

WATERWAY CROSSED: Buffalo River

DIVING OPERATION: \_\_\_\_\_ SCUBA \_\_\_\_\_ SURFACE SUPPLIED AIR  
X OTHER Wade

PERSONNEL: Jason A. Cook, Ricardo S. Narvaez

EQUIPMENT: Waders, Probe Rod, Sounding Pole, Hammer, Camera

TIME IN WATER: 11:25 PM

TIME OUT OF WATER: 11:35 PM

WATERWAY DATA: VELOCITY 0.5 ft/sec

VISIBILITY 2.5 feet

DEPTH 1.1 feet maximum at Pier 2

ELEMENTS INSPECTED: Pier 2

REMARKS: Overall, the cast-in-place concrete piles of Pier 2 were in very good condition with no structurally significant defects observed.

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

The inspection of the submerged substructure units of Structure No. 14550 can most likely be accomplished in the future without the use of a dive team. To perform the underwater inspection, a properly equipped qualified inspector will have to enter the water during a period of low flow. As channel bottom contours and depths of flow can change quickly, it is recommended that lead line soundings of water depth be taken along the upstream and downstream fascias to determine whether wading is possible prior to beginning the inspection. If conditions are unsafe for inspection by wading, then an underwater inspection with the use of a dive team will be required.

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. 14550  
 INSPECTORS Ayres Associates  
 ON-SITE TEAM LEADER Brian K. Schroeder, P.E.  
 WATERWAY CROSSED Buffalo River

INSPECTION DATE September 21, 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 2	1.1'	8	N	N	N	N	8	N	8	8	N	8	N	8	N	N	N	N

\*UNDERWATER PORTION ONLY

REMARKS: Overall, the cast-in-place concrete piles of Pier 2 were in good condition with no structurally significant defects 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.