

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 4175
PEDESTRIAN WALKWAY (OLD 169)
OVER THE
MINNESOTA RIVER
SCOTT COUNTY



MAY 21, 2012
PREPARED FOR THE
MINNESOTA DEPARTMENT OF TRANSPORTATION
BY
COLLINS ENGINEERS, INC.
JOB NO. 7423

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 4175, Piers 3, 4, and 5, were found to be generally in satisfactory condition with minor defects of structural significance noted. The concrete of the piers exhibited random minor areas of scaling and minor areas of poor consolidation. The footing was exposed around the perimeter of Pier 4 the full vertical height exposed. The top of the seal was exposed around most of the perimeter of Pier 4, except across the downstream nose, with vertical exposure reaching a maximum of 6 inches at the upstream nose. The limits and extents of footing and seal exposure were comparable to that noted in the previous report. There was a moderate to heavy accumulation of timber debris across the upstream nose and along the north and south faces of Pier 4 extending from the channel bottom to 10 feet above waterline.

INSPECTION FINDINGS:

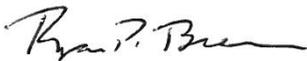
- (A) The channel bottom material consisted of sandy gravel allowing up to 3 inches of probe rod penetration.
- (B) The footing was exposed around the entire perimeter of Pier 4 with the full vertical height (2 feet) exposed. The top of the seal was exposed around most of the perimeter of the pier, except across the downstream nose, with a maximum vertical exposure of 6 inches at the upstream nose of the pier.
- (C) Moderate to heavy accumulation of timber debris, consisting of up to 18 inch diameter pieces of drift, was observed at the upstream nose and along the north and south faces of Pier 4, extending from the channel bottom to 10 feet above the waterline.
- (D) The concrete of the piers typically exhibited widespread random areas of 1/2 inch deep scaling and areas of poor consolidation with up to 1 inch deep seams of voided concrete.

- (E) Spalls measuring 6 inches in diameter were observed at the waterline on the downstream nose and the midpoint of the north face of Pier 3 with a maximum penetration of 1 inch.
- (F) A 6 inch wide spall was observed at the downstream quarter point on the south face of Pier 5. The spall extended from the waterline down 1.5 feet with a maximum penetration of 2 inches.

RECOMMENDATIONS:

- (A) Monitor footing and/or seal exposure during future inspections, and if exposure is found to be increasing to a significant extent, countermeasures may become warranted at that time.
- (B) Remove timber debris at Pier 4.
- (C) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of sixty (60) months.

Inspection Team Leader:



Ryan P. Breen, P.E.

Respectfully submitted,

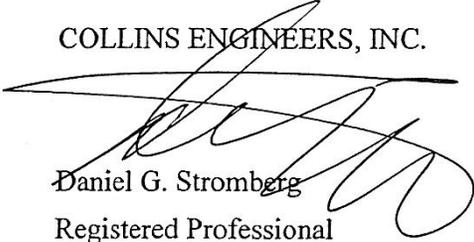
PROFESSIONAL ENGINEER

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: 4175

Feature Crossed: Minnesota River

Feature Carried: Trunk Highway No. Old 169 (currently pedestrian/bike pathway)

Location: District Metro – Scott County

Bridge Description: The superstructure consists of a reinforced concrete deck over multiple spans of steel deck truss supported by two reinforced concrete abutments and reinforced concrete piers. The piers are numbered south to north, with Pier 4 located in the waterway.

2. INSPECTION DATA

Professional Engineer/Team Leader: Ryan P. Breen, P.E.

Dive Team: Michael Banasiak, Marc Parker

Date: May 21, 2012

Weather Conditions: Sunny, 70°F

Underwater Visibility: Negligible

Waterway Velocity: 4.0 ft/s

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 3, 4, 5

General Shape: The piers consist of three multi-sided reinforced concrete columns connected by a concrete diaphragm wall supported by a rectangular reinforced concrete spread footing and seal founded on timber piles.

Maximum Water Depth at Substructure Inspected: Approximately 10.5 feet.

4. WATERLINE DATUM

Water Level Reference: Top of pier cap at the downstream end of Pier 4.

Water Surface: The waterline was approximately 26.5 feet below reference.
Waterline Elevation = 693.2

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

Item 60: Substructure: Code 6

Item 61: Channel and Channel Protection: Code 6

Item 92B: Underwater Inspection: Code B/05/12

Item 113: Scour Critical Bridges: Code R/04

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

X Yes _____ No

6. STRUCTURAL ELEMENT CONDITION RATING:

Item #	Element Description	Quantity	Unit	Conditions				
				1	2	3	4	5
210	Reinforced Concrete Pier Wall	120	LF	80	40			
985	Slopes & Slope Protection	2	EA		2			



Photograph 1. View of Pier 3 and the South Embankment, Looking Southwest.



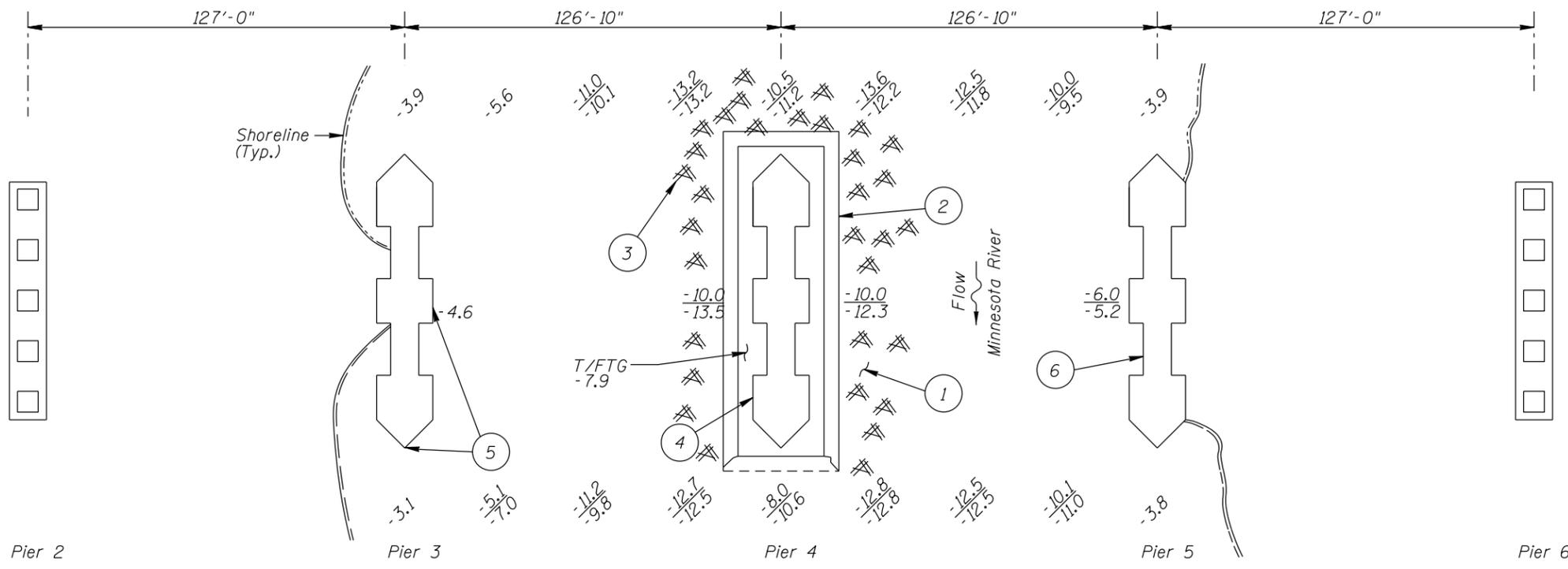
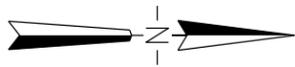
Photograph 2. View of Pier 4, Looking Northwest.



Photograph 3. View of Pier 5 and the North Embankment, Looking Northwest.



Photograph 4. View of Timber Debris Accumulation along the North Face of Pier 4, Looking Southwest.



INSPECTION NOTES:

- 1 Channel bottom around the pier was primarily sandy gravel with up to 3 inches of probe rod penetration.
- 2 The footing was exposed around the entire perimeter of the pier with full height (2 feet) of vertical exposure. The second footing step (seal) was exposed around most of the perimeter of the pier except at the downstream nose, with maximum vertical exposure of 6 inches at the upstream nose.
- 3 A moderate to heavy accumulation of timber debris, consisting of up to 18 inches diameter pieces of drift, was observed at the upstream nose and along the south and north faces of the pier extending from channel bottom to 10 feet above waterline.
- 4 The concrete exhibited widespread random areas of scaling, up to 1/2 inch deep, and random minor areas of poor consolidation with up to 1 inch deep voided concrete.
- 5 Spalls were observed at the waterline on the downstream nose and midpoint of the north face of Pier 3. The spalls were 6 inches in diameter with a maximum penetration of 1 inch.
- 6 A spall was observed on the downstream quarter-point of the south face of Pier 5 extending from the waterline down 1.5 feet. The spall was 6 inches wide with a maximum penetration of 2 inches.

SOUNDING PLAN

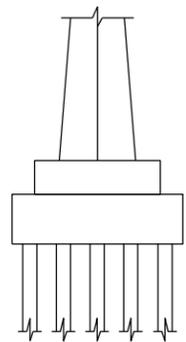
GENERAL NOTES:

1. Piers 3, 4, and 5 were inspected underwater.
2. At the time of inspection on May 21, 2012, the waterline was located approximately 26.5 feet below the top pier cap at downstream end of Pier 4. This corresponds with a waterline elevation of 693.2 feet based on design plans dated April 5, 1927.
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.

Legend

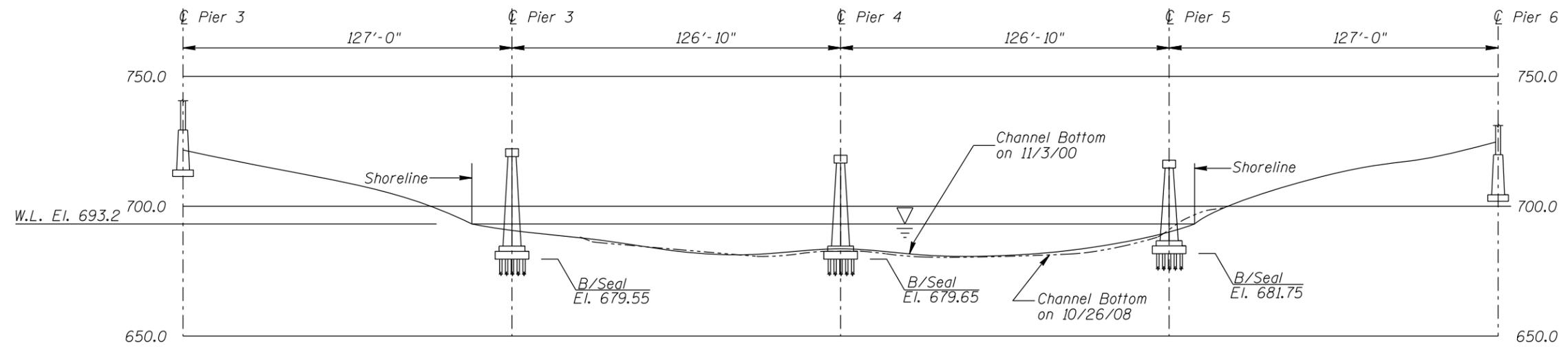
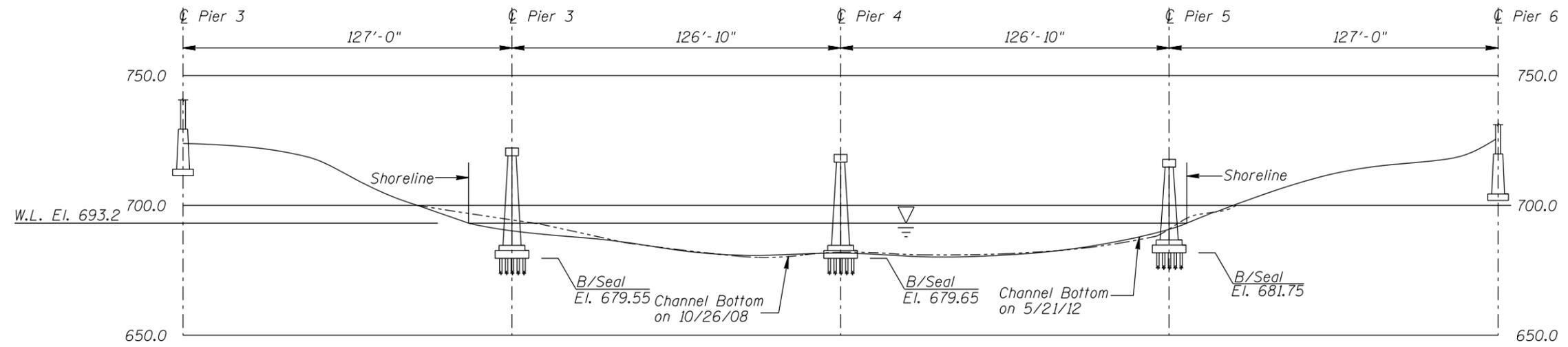
- 6.5 Sounding Depth from Waterline (5/21/12)
- 3.7 Sounding Depth from Waterline (10/26/08)
- Timber Debris

Note:
All soundings based on 2012 waterline location.



TYPICAL END VIEW OF PIERS

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 4175 PEDESTRIAN WALKWAY OVER THE MINNESOTA RIVER SCOTT COUNTY		
INSPECTION AND SOUNDING PLAN		
Drawn By: MJB	COLLINS ENGINEERS	Date: MAY 2012
Checked By: LJ	<small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Scale: NTS
Code: 74234175		Figure No.: I



Note:
Refer to Figure 1 for General Notes.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
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INSPECTION AND SOUNDING PLAN		
Drawn By: MJB	COLLINS ENGINEERS <small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: MAY 2012
Checked By: LJ		Scale: Scale 1"=50'
Code: 74234175		Figure No.: 2

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

INSPECTORS: Collins Engineers, Inc. DATE: May 21, 2012

ON-SITE TEAM LEADER: Ryan P. Breen, P.E.

BRIDGE NO: 4175 WEATHER: Sunny, 70° F

WATERWAY CROSSED: Minnesota River

DIVING OPERATION: SCUBA SURFACE SUPPLIED AIR
 OTHER

PERSONNEL: Nickolas R. Triandafilou, Lukas Janulis

EQUIPMENT: Commercial Scuba, Camera, Sounding Rod, 14 foot Boat w/motor, Hand
Tools

TIME IN WATER: 11:55 A.M.

TIME OUT OF WATER: 12:15 P.M.

WATERWAY DATA: VELOCITY 4.0 ft/s

VISIBILITY Negligible

DEPTH 10.5 feet maximum at Pier 4

ELEMENTS INSPECTED: Piers 3, 4, and 5

REMARKS: Overall, Piers 3, 4, and 5 were found to be generally in satisfactory condition with minor defects of structural significance noted. The concrete of the piers exhibited random minor areas of scaling and minor areas of poor consolidation. The footing was exposed around the perimeter of Pier 4 with the full vertical height exposed. The top of the seal was exposed around most of the perimeter of Pier 4, except across the downstream nose, with vertical exposure reaching a maximum of 6 inches at the upstream nose. The limits and extents of footing and seal exposure were comparable to that noted in the previous report. There was a moderate to heavy accumulation of timber debris across the upstream nose and along the north and south faces of Pier 4 extending from the channel bottom to 10 feet above waterline. Debris consisted of pieces of drift up to 18 inches in diameter.

FURTHER ACTION NEEDED: X YES NO

Monitor footing and/or seal exposure during future inspections, and if exposure is found to be increasing to significant extent, countermeasures may become warranted at that time.

Remove timber debris at Pier 4.

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. 4175
 INSPECTORS Collins Engineers, Inc.
 ON-SITE TEAM LEADER. Ryan P. Breen, P.E.
 WATERWAY CROSSED Minnesota River

INSPECTION DATE May 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 3	4.6'	N	6	N	8	N	6	N	N	7	7	7	6	N	N	7	N	N
	Pier 4	10.5'	N	6	7	8	N	6	6	N	N	5	5	6	N	N	7	N	N
	Pier 5	6.0'	N	6	N	8	N	6	N	N	7	7	7	6	N	N	7	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, Piers 3, 4, and 5 were found to be generally in satisfactory condition with minor defects of structural significance noted. The concrete of the piers exhibited random minor areas of scaling and minor areas of poor consolidation. The footing was exposed around the perimeter of Pier 4 with the full vertical height exposed. The top of the seal was exposed around most of the perimeter of Pier 4, except across the downstream nose, with vertical exposure reaching a maximum of 6 inches at the upstream nose. The limits and extents of footing and seal exposure were comparable to that noted in the previous report. There was a moderate to heavy accumulation of timber debris across the upstream nose and along the north and south faces of Pier 4 extending from the channel bottom to 10 feet above waterline. Debris consisted of pieces of drift up to 18 inches in diameter.

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.