

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 69533

CSAH 5

OVER THE

WHITEFACE RIVER

ST. LOUIS COUNTY



JULY 25, 2012

PREPARED FOR THE
MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

AND

WSB & ASSOCIATES, INC.

JOB NO. 2107

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected below water at Bridge No. 69533, Piers 1 and 2, were in satisfactory condition with no defects of structural significance. The steel piles exhibited a band of surface pitting, from 1 foot above to 2 feet below the waterline. The steel piles from 1 foot above the waterline to the cap exhibited coating failure and surface corrosion on over 25 percent of the surface area. Light to moderate timber debris was found around the entire Pier 1 and at the upstream nose of Pier 2.

INSPECTION FINDINGS:

- (A) A light accumulation of timber debris consisting of branches of 3 inches in diameter and less was found around the perimeter of Pier 1, extending up to 5 feet off all faces.
- (B) A moderate accumulation of timber debris consisting of logs and branches 12 inches in diameter and less was observed at the upstream nose of Pier 2, extending from the channel bottom to 2 feet above the waterline.
- (C) The channel bottom material consisted of silty sand allowing 6 inches of probe rod penetration.
- (D) The steel piles exhibited a band of surface pitting of 1/4 inch diameter and 1/8 inch penetration from 1 foot above to 2 feet below the waterline.
- (E) The steel piles from 1 foot above the waterline to the pile cap exhibited coating failure on over 25 percent of the surface area. The areas where coating failure was occurring experienced surface corrosion with no measurable loss of section.

RECOMMENDATIONS:

- (A) Monitor the extent of surface corrosion during future underwater inspections.
- (B) Monitor the timber debris accumulation at the piers, during future inspections, and if found to be increasing to a more detrimental extent, removal operations may become warranted at that time.
- (C) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of sixty (60) months.

Inspection Team Leader:

WSB and Associates



Barritt Lovelace
Registered Professional Engineer
Bridge Safety Inspection Team Leader

Respectfully submitted,

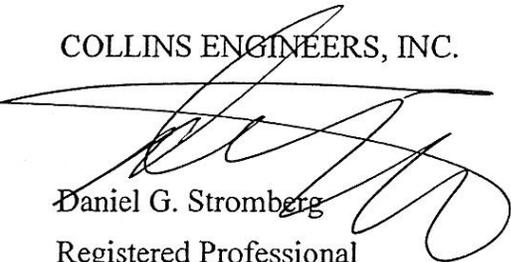
PROFESSIONAL ENGINEER

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: 69533

Feature Crossed: Whiteface River

Feature Carried: CSAH 5

Location: St. Louis County

Bridge Description: The superstructure consists of three spans of reinforced concrete deck. The bridge is supported by two reinforced concrete abutments and two pile bent piers.

2. INSPECTION DATA

Professional Engineer/Team Leader: Barritt Lovelace, P.E (WSB)

Dive Team: Kasey Yoder (WSB), John Loftus (Collins)

Date: July 25, 2012

Weather Conditions: Cloudy, 75° F

Underwater Visibility: 2.0 foot

Waterway Velocity: 0.5 ft/sec

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 and 2

General Shape: The piers consisted of a reinforced concrete pier cap supported by eight steel pipe piles. At the time of inspection, no plans were available for this structure, therefore the substructure configuration was unknown.

Maximum Water Depth at Substructure Inspected: Approximately 5.4 feet.

4. WATERLINE DATUM

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

Water Surface: The waterline was approximately 14 feet below reference.
Assumed Waterline Elevation = 86.

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/07/12

Item 113: Scour Critical Bridges: K/10

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 Piling	16	EA		16			
361	Scour	1	EA	1				
985	Slopes	1	EA	1				



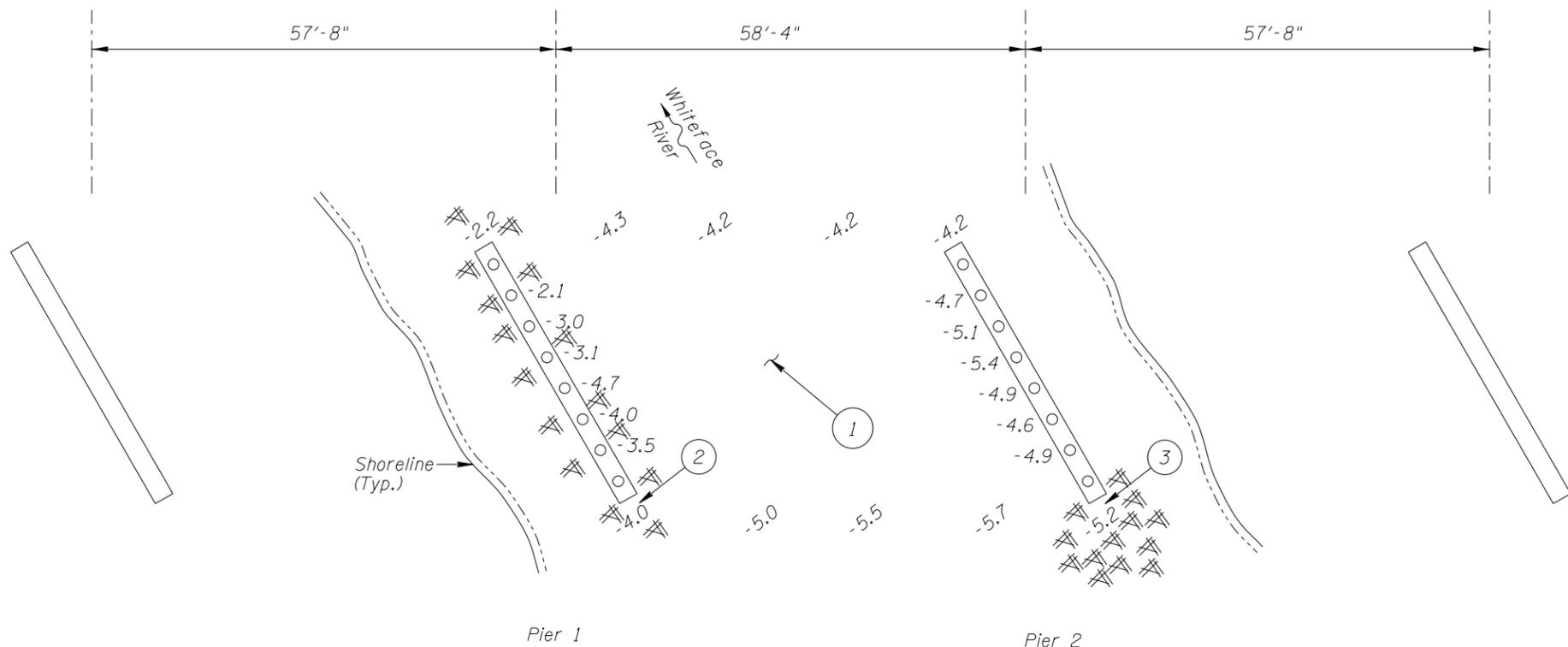
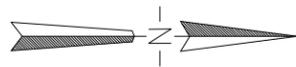
Photograph 1. View of Pier 1, Looking East.



Photograph 2. View of Pier 2, Looking North.



Photograph 3. View of typical Steel Pitting at Pier 1, Looking Southeast.



SOUNDING PLAN

Legend
 -1.2 Sounding Depth from Waterline (7/25/12)
 Timber Debris

Note:
 All soundings are based on 2012 waterline location.

GENERAL NOTES:

1. Piers 1 and 2 were inspected underwater.
2. At the time of inspection on July 25, 2012, the waterline was located approximately 14.0 feet below the top of the pier cap at the downstream end of Pier 1. Since insufficient bridge elevation information was available a reference elevation of 100.0 was assumed. Based on the assumed reference the waterline elevation was 86.0.
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 sandy silt allowing up to 6 inches of probe rod penetration.
- ② A light accumulation of timber debris, consisting of branches 3" inch dia. and smaller, was observed around the perimeter of Pier 1 extending 5 feet off all faces and from the channel bottom to the waterline.
- ③ A moderate accumulation of timber debris, consisting of logs and branches 12" inch dia. and smaller, was observed around the upstream nose of Pier 2 extending from the channel bottom to 2 feet above the waterline.
- ④ The steel piles typically exhibited pitting 1/4 inch dia. with up to 1/8 inch penetration observed from 1 foot above to 2 feet below the waterline.
- ⑤ The steel piles from 1 foot above the waterline to the cap exhibited coating failure on approximately 25% of the surface area. Surface corrosion was present with no appreciable loss of section.

**MINNESOTA
 DEPARTMENT OF TRANSPORTATION
 UNDERWATER BRIDGE INSPECTION**

STRUCTURE NO. 69533
 OVER THE WHITEFACE RIVER
 DISTRICT I, ST. LOUIS COUNTY

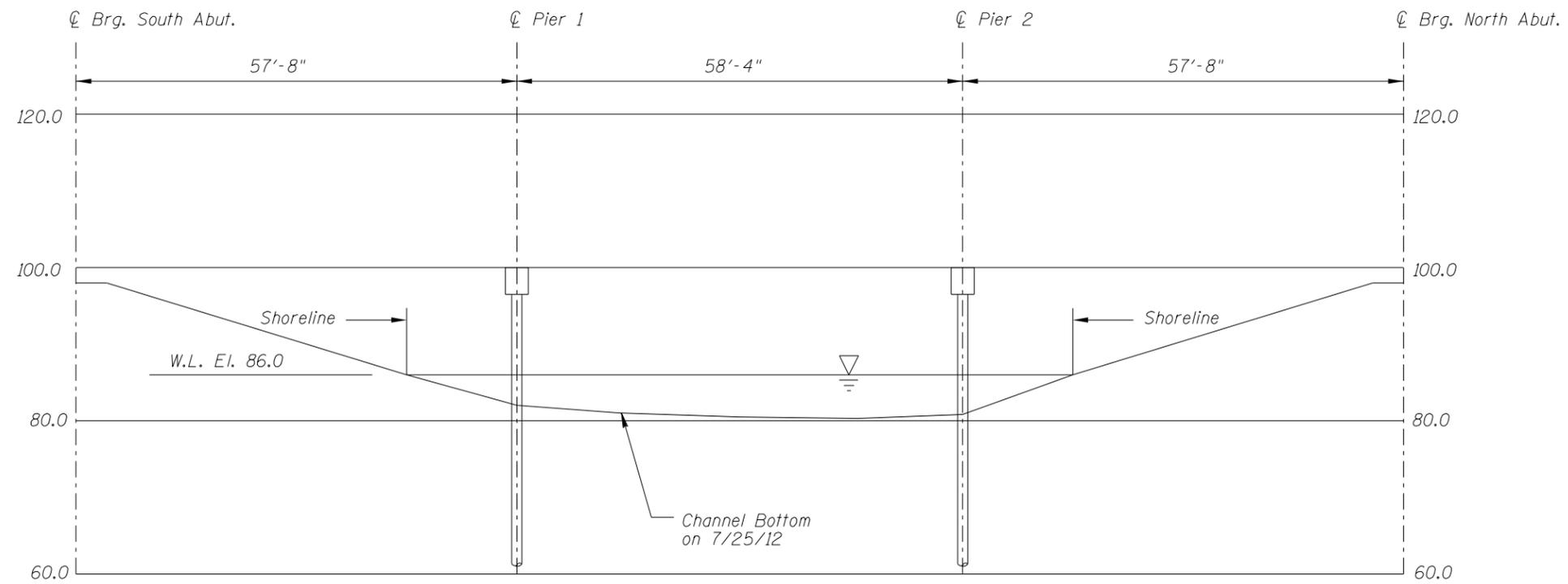
INSPECTION AND SOUNDING PLAN

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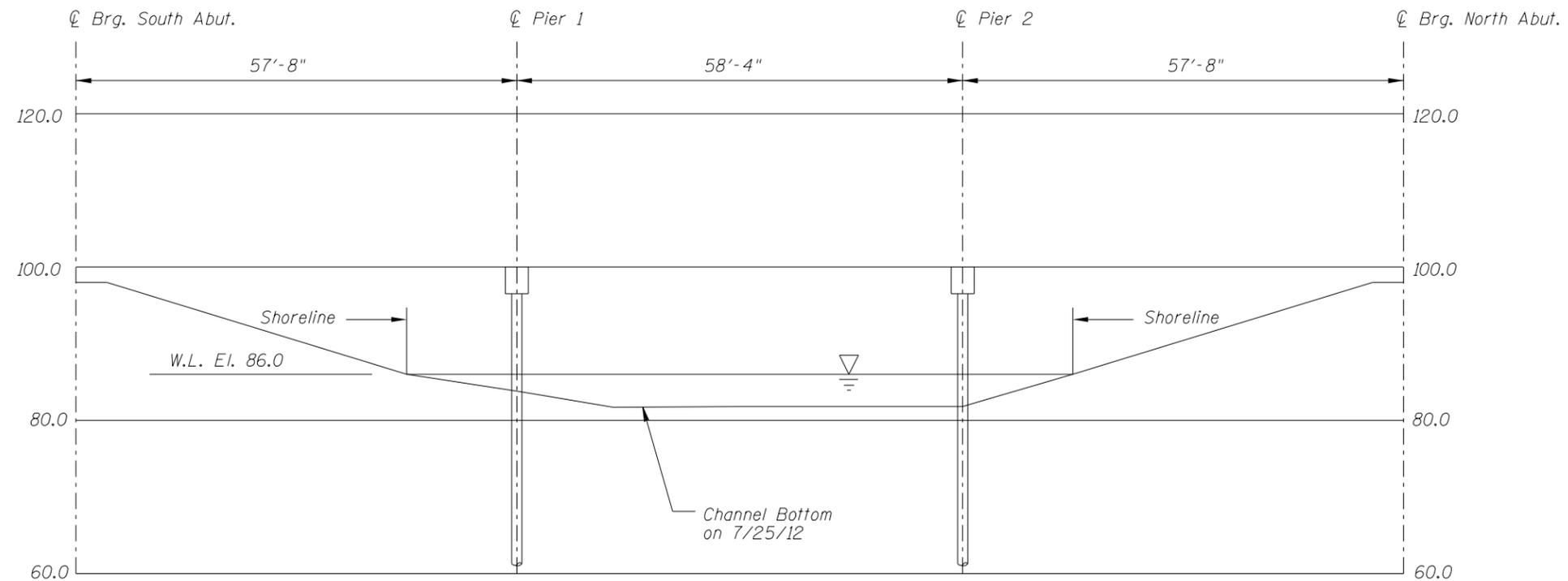
Drawn By: BJR
 Checked By: BRL
 Code: ---

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 www.collinsengr.com

Date: JULY 2012
 Scale: NTS
 Figure No.: 1



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:
Refer to Figure 1 for General Notes.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 69533 OVER THE WHITEFACE RIVER DISTRICT I, ST. LOUIS COUNTY		
UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
Drawn By: BJR	COLLINS ENGINEERS	Date: JULY 2012
Checked By: BRL		Scale: 1"=20'
<small> WSB & Associates, Inc. 701 Xenia Avenue South, Suite 300 Minneapolis, MN 55416 www.wsbeng.com 763.541.4800 • Fax 763.541.4700 INFRASTRUCTURE • ENGINEERING • PLANNING • CONSTRUCTION </small>		<small> 123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com </small>
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MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES
DAILY DIVING REPORT

INSPECTORS: WSB & Associates and Collins DATE: July 25, 2012

ON-SITE TEAM LEADER: Barritt Lovelace, P.E.

BRIDGE NO: 69533 WEATHER: Cloudy, 75° F

WATERWAY CROSSED: Whiteface River

DIVING OPERATION: SCUBA SURFACE SUPPLIED AIR
 OTHER

PERSONNEL: Kasey Yoder (WSB), John Loftus (Collins)

EQUIPMENT: Commercial Scuba, U/W Light, Scraper, Lead Line, Sounding Pole,
Probe Rod, Camera

TIME IN WATER: 15:00

TIME OUT OF WATER: 15:30

WATERWAY DATA: VELOCITY 0.5 ft/sec.

VISIBILITY 2 feet

DEPTH 5.4 feet maximum at Pier 1

ELEMENTS INSPECTED: Pier 1 and Pier 2

REMARKS: Overall, Pier 1 and Pier 2 were in satisfactory condition with no defects of structural significance. The steel piles exhibited a band of surface pitting with up to 1/8 inch penetration from 1 foot above to 2 feet below the waterline. The steel from 1 foot above the waterline to the cap exhibited coating failure and surface corrosion on over 25 percent of the surface area. Light to moderate timber debris was found around Pier 1 and at the upstream nose of Pier 2.

FURTHER ACTION NEEDED: YES NO

Monitor steel deterioration and timber accumulation during future underwater inspections.

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. 69533
 INSPECTORS WSB & Associates, Inc. and Collins Engineers, Inc.
 ON-SITE TEAM LEADER Barritt Lovelace, P.E.
 WATERWAY CROSSED Whiteface River

INSPECTION DATE July, 25, 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 (BRACING)	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	4.7'	6	6	N	8	N	6	7	6	7	6	6	N	6	N	N	N	N
	Pier 2	5.4'	6	6	N	8	N	6	7	6	7	6	6	N	6	N	N	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, Pier 1 and Pier 2 were in satisfactory condition with no defects of structural significance. The steel piles exhibited a band of surface pitting with up to 1/8 inch penetration from 1 foot above to 2 feet below the waterline. The steel from 1 foot above the waterline to the cap exhibited coating failure and surface corrosion on over 25 percent of the surface area. Light to moderate timber debris was found around Pier 1 and at the upstream nose of Pier 2.

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.