

UNDERWATER BRIDGE INSPECTION REPORT

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STRUCTURE NO. 66520  
TWP NO. 51 (220<sup>th</sup> STREET)  
OVER THE  
STRAIGHT RIVER  
DISTRICT 6 - RICE COUNTY

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SEPTEMBER 12, 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. 66520, Piers 1 and 2, were found to be in good to satisfactory condition with no defects of structural significance observed. The channel bottom appeared stable with no significant scour, although with a moderate accumulation of timber debris present at Pier 1. The concrete encasements along the lower portions of the columns exhibited spalling/section loss with up to 3 to 6 inches of penetration.

INSPECTION FINDINGS:

- (A) Timber debris was observed along the west face of Pier 1 that consisted of 6 inch diameter and smaller branches and extended from the channel bottom to 1 foot above the waterline.
- (B) The columns of Pier 1 were encased in up to 6 inches of additional concrete from the channel bottom to 2.3 feet above the waterline. The encasements exhibited form irregularities (embedded form boards) and spalling with up to 3 inches of penetration.
- (C) The columns of Pier 1 were encased in up to 6 inches of additional concrete from the channel bottom to 4.0 feet above the waterline. The encasements exhibited form irregularities (embedded form boards) and spalling with up to 6 inches of penetration.
- (D) The channel bottom material typically consisted of bedrock at the upstream and downstream columns with up to 2 inches of gravel and soft silt infilling along the middle columns allowing negligible probe rod penetrations.

RECOMMENDATIONS:

- (A) Monitor concrete deterioration at the concrete column encasements during future underwater inspections.
- (B) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of sixty (60) months.

**Inspection Team Leader**



**Roy A. Forsyth, PE**  
**Date 6/30/2014 License# 49270**

Respectfully submitted,

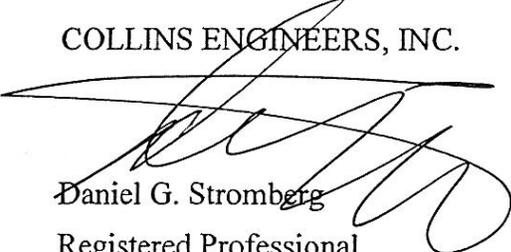
PROFESSIONAL ENGINEER

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: 66520

Feature Crossed: Straight River

Feature Carried: TWP No. 51

Location: District 6 - Rice County

Bridge Description: The bridge consists of three spans of multiple steel stringers supporting a reinforced concrete deck. The superstructure is supported by two reinforced concrete abutments and two reinforced concrete piers. The piers are labeled Piers 1 and 2 starting from the east end of the bridge.

2. INSPECTION DATA

Professional Engineer/Team Leader: Roy A. Forsyth, P.E.

Dive Team: Brandon Corr, Charles Euwema

Date: September 12, 2012

Weather Conditions: Cloudy, 65°F

Underwater Visibility: 1.0 foot

Waterway Velocity: 0.5 ft/s

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 and 2.

General Shape: The piers each consist of four round concrete columns supporting an oblong concrete pier cap.

Maximum Water Depth at Substructure Inspected: Approximately 2.2 feet.

4. WATERLINE DATUM

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

Water Surface: The waterline was approximately 12.8 feet below reference.

Assumed Waterline Elevation = 87.2

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 A/09/12

Item 113: Scour Critical Bridges: Code I

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	8	EA		8			



Photograph 1. Overall view of the Bridge, Looking Northwest.



Photograph 2. View of Pier 1, Looking Southeast.



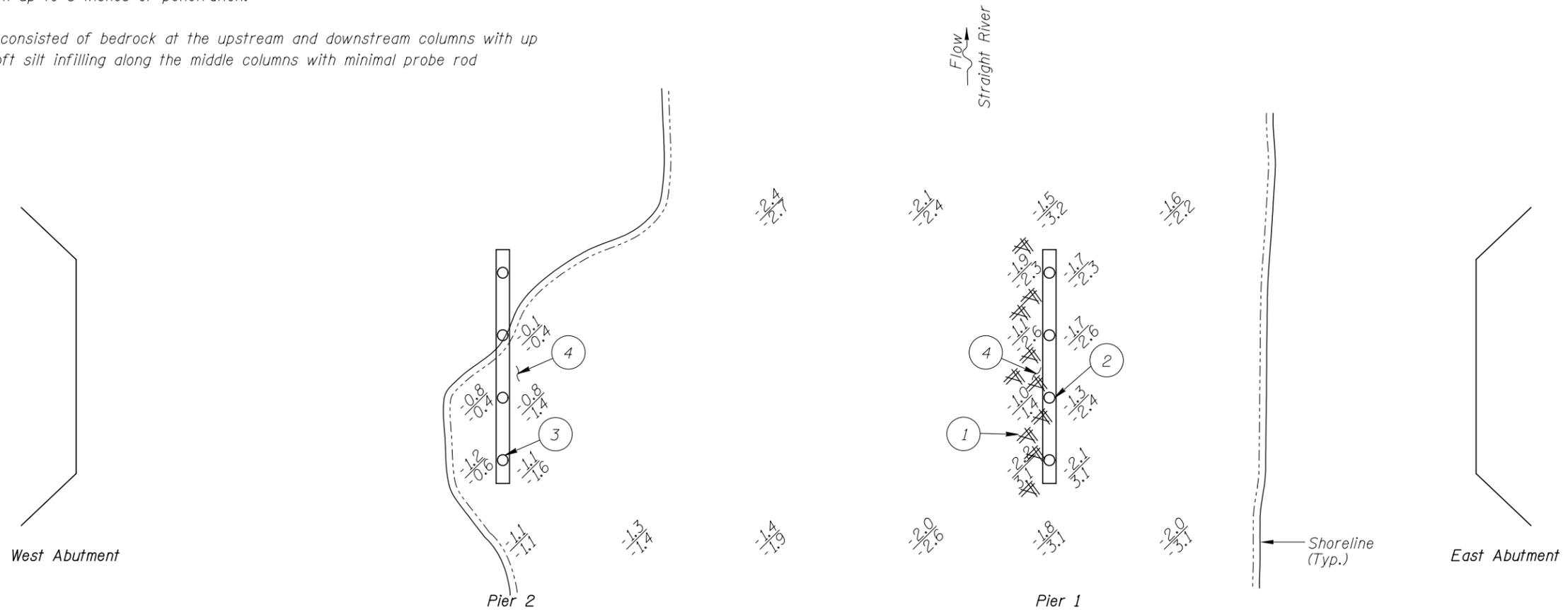
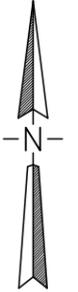
Photograph 3. View of Pier 2, Looking East.



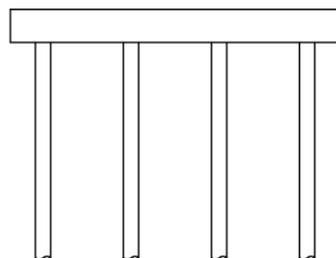
Photograph 4. View of the Irregular Concrete Encasement at the Upstream Column of Pier 2, Looking East.

INSPECTION NOTES:

- 1 Timber debris was observed along the west face of Pier 1 that consisted of 6 inch diameter and smaller branches and extended from the channel bottom to 1 foot above the waterline.
- 2 The columns of Pier 1 were encased in up to 6 inches of additional concrete from the channel bottom to 2.3 feet above the waterline. The encasements exhibited form irregularities (embedded form boards) and spalling with up to 3 inches of penetration.
- 3 The columns of Pier 1 were encased in up to 6 inches of additional concrete from the channel bottom to 4.0 feet above the waterline. The encasements exhibited form irregularities (embedded form boards) and spalling with up to 6 inches of penetration.
- 4 The channel bottom material consisted of bedrock at the upstream and downstream columns with up to 2 inches of gravel and soft silt infilling along the middle columns with minimal probe rod penetrations.



SOUNDING PLAN



TYPICAL PIER ELEVATION

GENERAL NOTES:

1. Piers 1 and 2 were inspected underwater.
2. At the time of inspection, on September 12, 2012, the waterline was located approximately 12.8 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 87.2.
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 as well as around the pier structures.

Legend

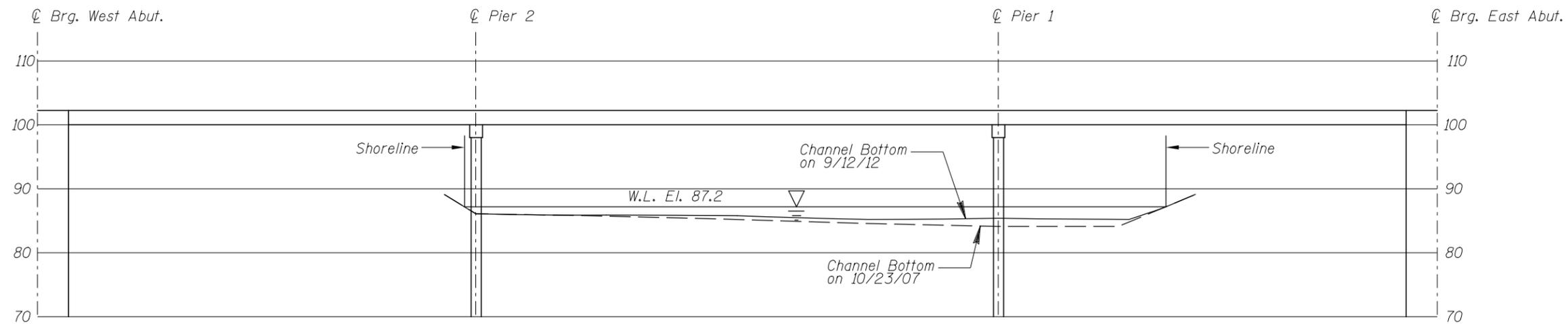
- 0.4 Sounding Depth (9/12/12)
- 0.4 Sounding Depth (10/23/07)

Timber Debris

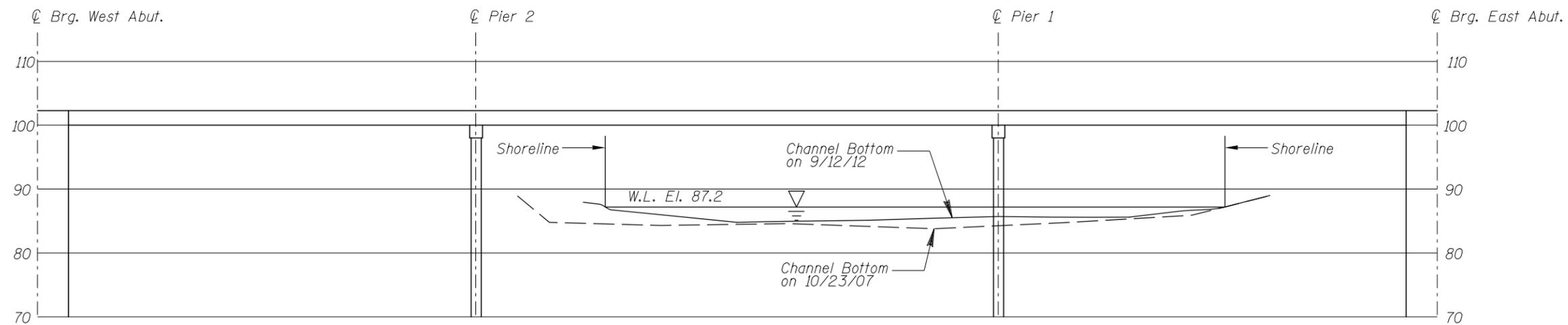
Note:

All soundings based on 2012 waterline location.

<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>		
STRUCTURE NO. 66520 OVER THE STRAIGHT RIVER DISTRICT 6, RICE COUNTY		
<b>INSPECTION AND SOUNDING PLAN</b>		
Drawn By: JTF	<b>COLLINS ENGINEERS</b>	Date: Sept. 2012
Checked By: DGS	123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Scale: NTS
Code: 52216520		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. 66520 OVER THE STRAIGHT RIVER DISTRICT 6, RICE COUNTY		
<b>UPSTREAM AND DOWNSTREAM FASCIA PROFILES</b>		
Drawn By: JTF	<b>COLLINS ENGINEERS</b>	Date: Sept. 2012
Checked By: DGS		Scale: 1"=20'
Code: 52216520		Figure No.: 2

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www.collinsengr.com

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

INSPECTORS: Collins Engineers, Inc. DATE: September 12, 2012

ON-SITE TEAM LEADER: Roy A. Forsyth, P.E.

BRIDGE NO: 66520 WEATHER: Cloudy, 65°F

WATERWAY CROSSED: Straight River

DIVING OPERATION: \_\_\_\_\_ SCUBA \_\_\_\_\_ SURFACE SUPPLIED AIR  
 OTHER Inspection by Wading

PERSONNEL: Brandon Corr, Charles Euwema

EQUIPMENT: Dry Suit, Sounding Pole, Lead Line, Probe Rod, Camera, Scraper

TIME IN WATER: 11:40 a.m.

TIME OUT OF WATER: 12:12 p.m.

WATERWAY DATA: VELOCITY 0.5 ft/s

VISIBILITY 1.0 foot

DEPTH 2.2 feet maximum at Pier 1

ELEMENTS INSPECTED: Piers 1 and 2

REMARKS: A moderate accumulation of timber debris was observed at Pier 1 (west face) that consisted of 6-inch-diameter and smaller branches and extended from the channel bottom to 1 foot above the waterline. The concrete encasements surrounding the base of the columns at Piers 1 and 2 varied in thickness from 1 to 6 inches with respect to the face of the columns due to improperly centered formwork during construction. In addition, the encasements exhibited irregularities (form boards left embedded in concrete) and scaling in the concrete surfaces with up to 6 inches of penetration.

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

Monitor concrete deterioration at the concrete column encasements 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. 66520  
 INSPECTORS Collins Engineers, Inc.  
 ON-SITE TEAM LEADER Roy A. Forsyth, P.E.  
 WATERWAY CROSSED Straight River

INSPECTION DATE September 12, 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 (ENCASEMENTS)	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	1.2'	N	7	N	8	6	6	N	8	8	6	6	6	N	N	N	N	N
	Pier 2	2.2'	N	7	N	8	6	6	N	8	8	N	8	6	N	N	N	N	N

\*UNDERWATER PORTION ONLY

REMARKS: A moderate accumulation of timber debris was observed at Pier 1 (west face) that consisted of 6-inch-diameter and smaller branches and extended from the channel bottom to 1 foot above the waterline. The concrete encasements surrounding the base of the columns at Piers 1 and 2 varied in thickness from 1 to 6 inches with respect to the face of the columns due to improperly centered formwork during construction. In addition, the encasements exhibited irregularities (form boards left embedded in concrete) and scaling in the concrete surfaces with up to 6 inches of penetration.

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.