

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 27537
CSAH NO. 52, 1ST AVENUE
OVER THE
EAST CHANNEL OF THE MISSISSIPPI RIVER
HENNEPIN COUNTY



OCTOBER 28, 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. 27537, Piers 2 and 3, were found to be in good condition with no defects of structural significance observed. Vertical cracking 1/16 inch maximum width was observed on both faces of Pier 2 and on the west face of Pier 3. There was minor footing exposure along the west side of Pier 2. Light accumulations of timber debris were observed along the upstream nose of Pier 3. The channel bottom appeared stable with no evidence of significant scour and with no significant changes since the previous inspection.

INSPECTION FINDINGS:

- (A) The channel bottom consisted of silty sand and scattered cobbles with up to 1 foot of probe rod penetration.
- (B) The concrete piers exhibited light scaling from 1.5 foot above to 1 foot below the waterline.
- (C) A light accumulation of timber debris consisting of 1 foot diameter logs and branches was observed at the upstream end of Pier 3.
- (D) Both embankments were well armored with grouted riprap.
- (E) Vertical cracks 1/16 inch wide were observed along the west face of Pier 3, extending from channel bottom to top of pier shaft.
- (F) Unless otherwise noted, the concrete was typically smooth and sound.
- (G) Footing exposure (top at 6.3 feet below waterline) was observed along the west face of Pier 3. The footing's surface was rough with some irregularities. Steel sheet piling

was observed along the footing from the midpoint to the downstream nose with a maximum vertical exposure of 1.5 feet (footing and sheeting.)

- (H) Vertical cracks (1/16 inch maximum width) were observed along east face (5 cracks) and west face (3 cracks) of Pier 2, extending from channel bottom to top of pier shaft.

RECOMMENDATIONS:

- (A) Monitor vertical cracking in pier concrete during future underwater inspections.
- (B) 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,

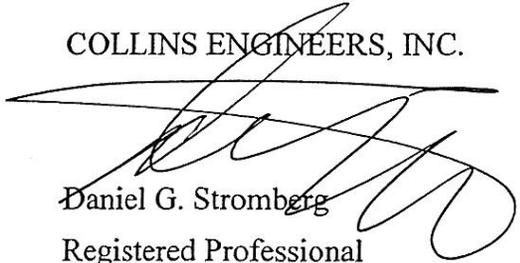
PROFESSIONAL ENGINEER

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: 27537

Feature Crossed: East Channel of the Mississippi River

Feature Carried: CSAH NO. 52, 1ST Avenue

Location: Hennepin County

Bridge Description: The bridge superstructure consists of four spans of multiple steel beams. The superstructure is supported by two reinforced concrete abutments and three reinforced concrete piers. The piers have spread footings that are keyed into rock, and the abutments are supported by timber piles. The piers are numbered 1 through 3 starting from the south end of the bridge.

2. INSPECTION DATA

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

Dive Team: Marc B. Parker, Lukas Janulis, P.E.

Date: October 28, 2012

Weather Conditions: Cloudy, 45°

Underwater Visibility: 0.5 foot

Waterway Velocity: 0.5 ft/sec

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 2 and 3

General Shape: Piers 2 and 3 each consist of two square columns which are supported by a rectangular shaft with rounded noses. The pier footings are rectangular and are keyed into rock.

Maximum Water Depth at Substructure Inspected: Approximately 9.5 feet.

4. WATERLINE DATUM

Water Level Reference: The benchmark reference at Elevation 802.05 located on Pier 3.

Water Surface: The waterline was approximately 3.3 feet below reference.

Waterline Elevation = 798.8

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 7

Item 92B: Underwater Inspection: Code B/10/12

Item 113: Scour Critical Bridges: Code R/02

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	110	LF		110			
220	Reinforced Concrete Footing	1	EA	1				
361	Scour Smart Flag	1	EA	1				
985	Slopes and Slope Protection	1	EA	1				



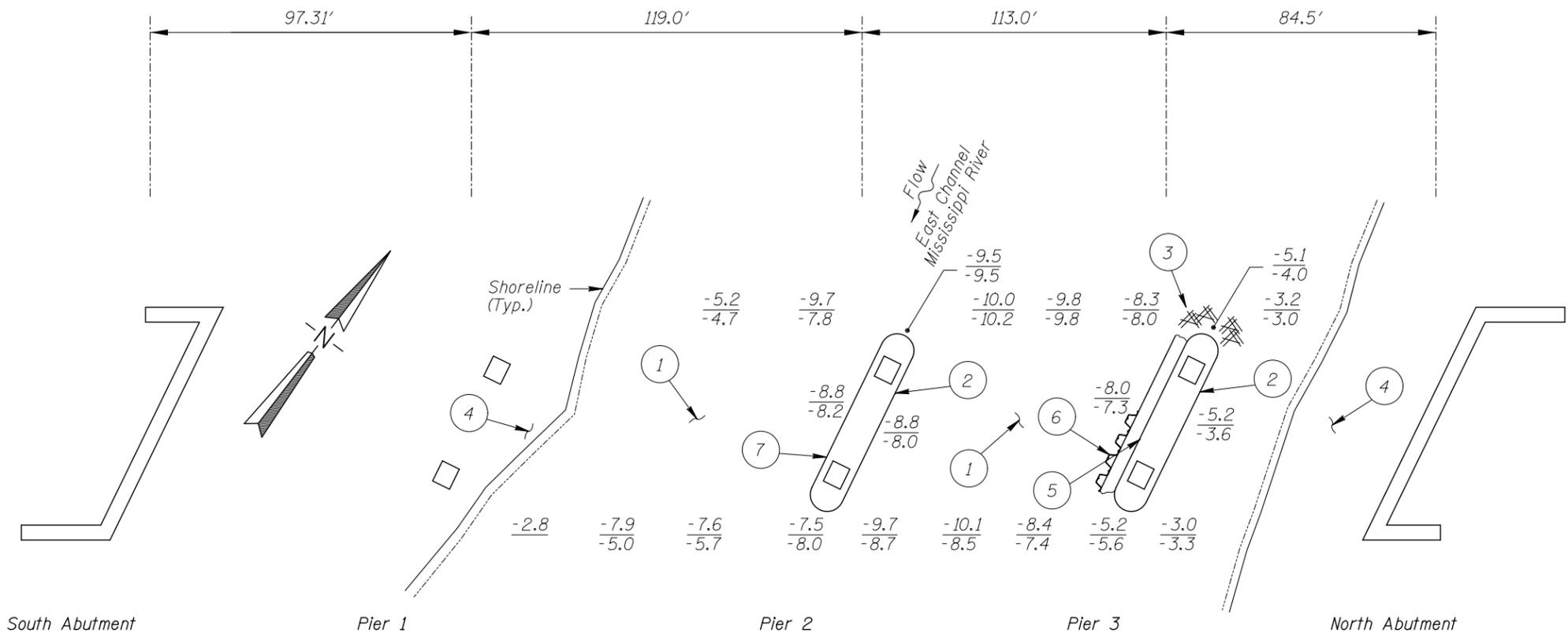
Photograph 1. View of Pier 2, Looking Southwest.



Photograph 2. View of Pier 3, Looking Southeast.



Photograph 3. Overall View of Structure, Looking South.



SOUNDING PLAN

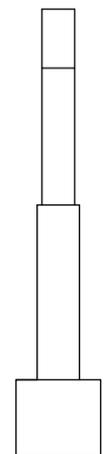
South Abutment Pier 1 Pier 2 Pier 3 North Abutment

GENERAL NOTES:

1. Piers 2 and 3 were inspected underwater.
2. At the time of inspection on October 28, 2012 the waterline was located approximately 3.3 feet below the benchmark reference at Elevation 802.05 on Pier 3. Based on the reference this corresponds with a waterline elevation of 798.8.
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 consisted of silty sand and scattered cobbles with up to 1 foot of probe rod penetration.
- 2 The concrete piers exhibited light scaling from 1.5 foot above to 1 foot below the waterline.
- 3 A light accumulation of timber debris, consisting of 1 foot-diameter logs and branches, was observed at the upstream end of Pier 3.
- 4 Both embankments were well armored with grouted riprap.
- 5 Vertical cracks 1/16 inch wide were observed along the west face of Pier 3, extending from channel bottom to top of pier shaft.
- 6 Footing exposure (top at 6.3 feet below waterline) was observed along the west face of Pier 3. The footing's surface was rough with some irregularities. Steel sheet piling was observed along footing from the midpoint to the downstream nose with a maximum vertical exposure of 1.5 feet (footing and sheeting).
- 7 Vertical cracks (1/16 inch maximum width) were observed along east face (5 cracks) and west face (3 cracks) of Pier 2, extending from channel bottom to top of pier shaft.



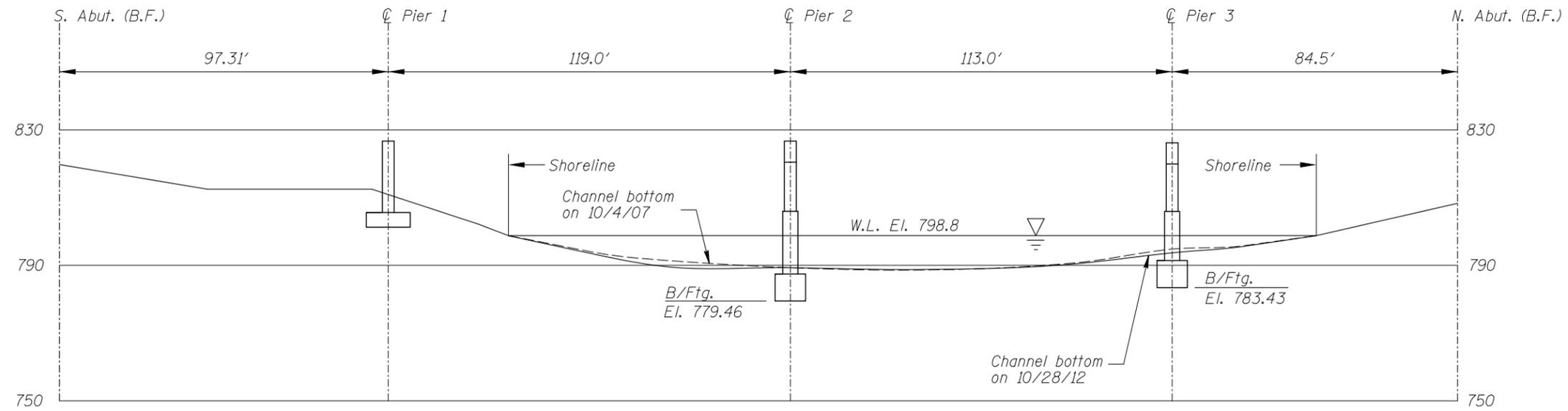
TYPICAL END VIEW OF PIERS

Legend

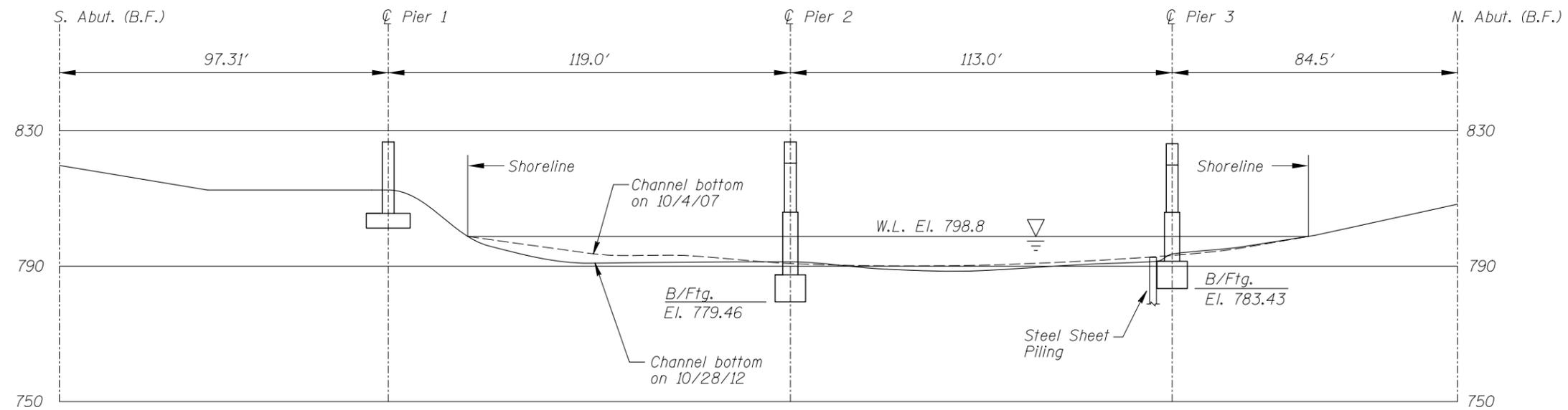
-3.0	Sounding Depth (10/28/12)
-2.2	Sounding Depth (10/1/07)
	Timber Debris

Note:
All soundings based on 2012 waterline location.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 27537 OVER THE EAST CHANNEL OF THE MISSISSIPPI RIVER HENNEPIN COUNTY		
INSPECTION AND SOUNDING PLAN		
Drawn By: CRE	COLLINS ENGINEERS <small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: OCT., 2012
Checked By: LJ		Scale: NTS
Code: 742327537		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. 27537 OVER THE EAST CHANNEL OF THE MISSISSIPPI RIVER HENNEPIN COUNTY		
UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
Drawn By: CRE	COLLINS ENGINEERS <small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: OCT., 2012
Checked By: LJ		Scale: 1"=40'
Code: 742327537		Figure No.: 2

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

INSPECTORS: Collins Engineers, Inc. DATE: October 28, 2012

ON-SITE TEAM LEADER: Barritt R. Lovelace, P.E. (WSB)

BRIDGE NO: 27537 WEATHER: Cloudy, 45°F

WATERWAY CROSSED: East Channel of the Mississippi River

DIVING OPERATION: SCUBA SURFACE SUPPLIED AIR
 OTHER

PERSONNEL: Marc B. Parker, Lukas Janulis, P.E.

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

TIME IN WATER: 14:40

TIME OUT OF WATER: 14:55

WATERWAY DATA: VELOCITY 0.5 ft/sec

VISIBILITY 0.5 foot

DEPTH 9.5 feet maximum at Pier 2

ELEMENTS INSPECTED: Piers 2 and 3

REMARKS: Overall, the concrete piers were found to be in good condition with no defects of structural significance observed. Vertical cracking 1/16 inch maximum width was observed on both faces of Pier 2 and on the west face of Pier 3. There was minor footing exposure along the west side of Pier 2. Light accumulations of timber debris were observed along the upstream nose of Pier 3. The channel bottom appeared stable with no evidence of significant scour and with no significant changes since the previous inspection.

FURTHER ACTION NEEDED: YES NO

Monitor vertical cracking in pier 2 and 3 concrete 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. 27537
INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER Barritt Lovelace, P.E.
WATERWAY CROSSED East Channel of the Mississippi River

INSPECTION DATE October 28, 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	9.5'	N	7	N	N	N	7	7	8	8	7	7	7	N	N	N	N	N
	Pier 3	8.0'	N	7	7	N	N	7	7	8	8	7	7	7	N	N	N	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the concrete piers were found to be in good condition with no defects of structural significance observed. Vertical cracking 1/16 inch maximum width was observed on both faces of Pier 2 and on the west face of Pier 3. There was minor footing exposure along the west side of Pier 2. Light accumulations of timber debris were observed along the upstream nose of Pier 3. The channel bottom appeared stable with no evidence of significant scour and with no significant changes since the previous inspection.

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.