

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 7254

CSAH NO. 41

OVER THE

KETTLE RIVER

DISTRICT 1 – PINE COUNTY



PREPARED FOR THE
MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 5221

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 7254, Piers 1, 2, and 3, were found to be in good condition with no defects of structural significance observed. The timber piles and horizontal planks of the piers were typically firm and sound and exhibited only minor splits and checking. One of the diagonal braces was split through the upstream connection at Pier 1 and exhibited partial section loss, and the diagonal cross-bracing on the East side of Pier 2 exhibited 50 percent section loss at the upstream connection. There were moderate accumulations of timber debris observed around Piers 2 and 3. Since the last inspection, there has been some aggregation of channel bottom material at the bridge.

INSPECTION FINDINGS:

- (A) Overall, the timber piles and horizontal planks of the piers were in good and sound condition and exhibited only minor splits and checking.
- (B) The diagonal cross brace at the upstream channel end of Pier 1 was split through the connection and exhibited partial section loss along the upstream half of the pier.
- (C) The diagonal cross brace on the east side of Pier 2 exhibited partial section loss at the upstream connection.
- (D) Moderate to heavy accumulations of timber drift were observed around the piers as follows: a minor accumulation of 6-inch-diameter branchy drift along the east face of Pier 2; a 12-inch-diameter tree with branchy drift along the west side of Pier 2; and a moderate accumulation of drift at the upstream half of Pier 3 with a 1.5-foot-diameter log extending along the west face of the pier from the channel bottom to the waterline.

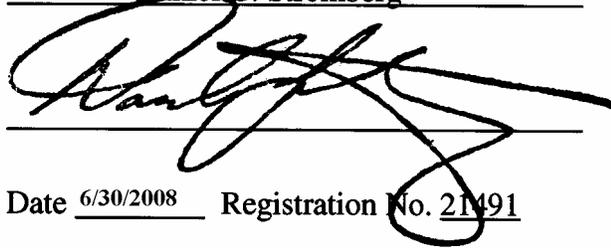
RECOMMENDATIONS:

- (A) At this point, the timber drift accumulations at the bridge are not excessive; however, they should be monitored, and if found to be progressing to an extent where excessive lateral loads may be exerted on the piers or scour may be influenced, the drift may need to be removed at that time.

- (B) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

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.

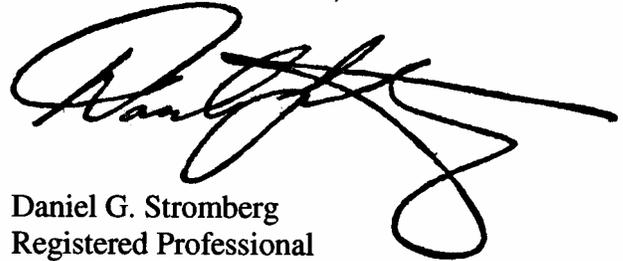
Daniel G. Stromberg



Date 6/30/2008 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.



Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 7254

Feature Crossed: Kettle River

Feature Carried: CSAH No. 41

Location: District 1 - Pine County

Bridge Description: The bridge superstructure consists of four spans of timber deck and stringers that are supported by three timber piers and two timber abutments. The piers are numbered 1 through 3 starting from the west end of the bridge. Each pier consists of a timber pier cap supported by eight timber piles.

2. INSPECTION DATA

Professional Engineer/Team Leader: Daniel G. Stromberg, P.E., S.E.

Dive Team: John J. Loftus, Valerie Rouston

Date: August 23, 2007

Weather Conditions: Cloudy, 81°F

Underwater Visibility: 3.0 feet

Waterway Velocity: 0.5 f.p.s.

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1, 2, and 3

General Shape: Each pier consists of a timber pier cap supported by a single row of eight timber piles. Timber cross-bracing and planking interconnect the piles.

Maximum Water Depth at Substructure Inspected: Approximately 5.8 feet.

4. WATERLINE DATUM

Water Level Reference: Top of the pile cap at the upstream end of Pier 2.

Water Surface: The waterline was approximately 17.5 feet below reference.
Assumed Waterline Elevation = 82.5.

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 6

Item 92B: Underwater Inspection: Code B/08/07

Item 113: Scour Critical Bridges: Code I/02

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

 Yes X No



Photograph 1. Overall View of Structure, Looking North.



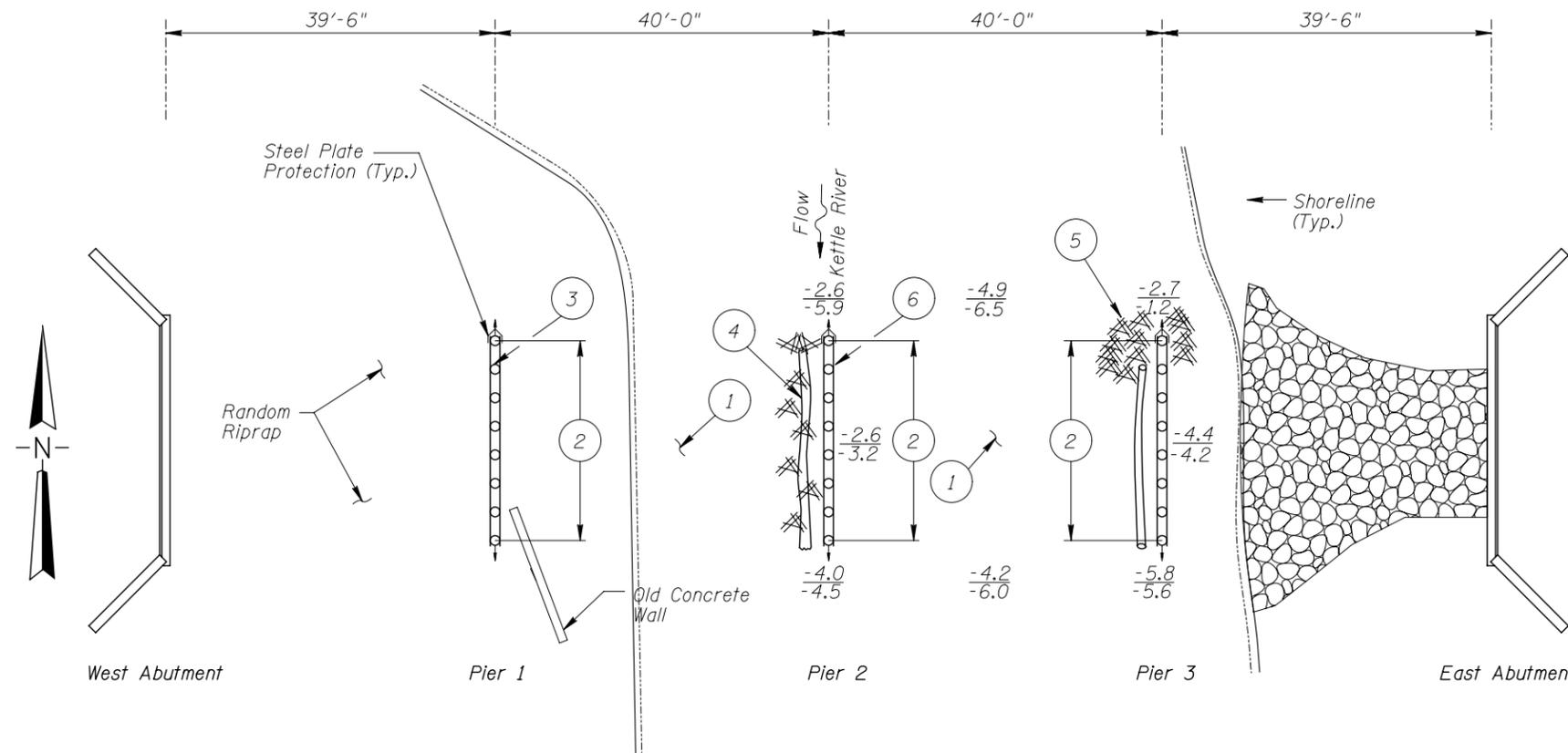
Photograph 2. View of Pier 1, Looking Southwest.



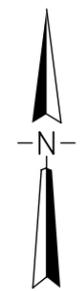
Photograph 3. View of Pier 2, Looking Southeast.



Photograph 4. View of Pier 3, Looking Southeast.



SOUNDING PLAN



Random Riprap

West Abutment

Pier 1

Pier 2

Pier 3

East Abutment

Flow
Kettle River

Shoreline
(Typ.)

Steel Plate Protection (Typ.)

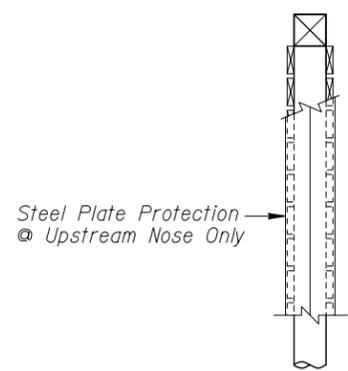
Old Concrete Wall

GENERAL NOTES:

1. Piers 1, 2, and 3 were inspected underwater.
2. At the time of inspection on August 23, 2007, the waterline was located approximately 17.5 feet below the top of the pile cap at the upstream 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 elevation was 82.5.
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 the mid points between the substructure units.

INSPECTION NOTES:

- 1 The channel bottom consisted of silty sand with up to 1 foot of probe rod penetration.
- 2 The timber piles exhibited minor vertical checking and vertical splits on the outside of the timber shell. Also, the horizontal planking exhibited minor splits and some checking.
- 3 The diagonal cross bracing at the upstream end of Pier 1 was split through the connection and exhibited partial section loss along the upstream half of the pier.
- 4 A 12-inch-diameter tree trunk with branchy debris was observed along the west face of Pier 2, and a light accumulation of debris 6 inches in diameter and smaller was observed along the east face from channel bottom to waterline.
- 5 A moderate accumulation of timber debris was observed at the upstream half of Pier 3 with 1.5-foot-diameter logs that extended along the west face of the pier from channel bottom to waterline.
- 6 The diagonal cross bracing at the east side of Pier 2 exhibited 50% section loss at the upstream connection.

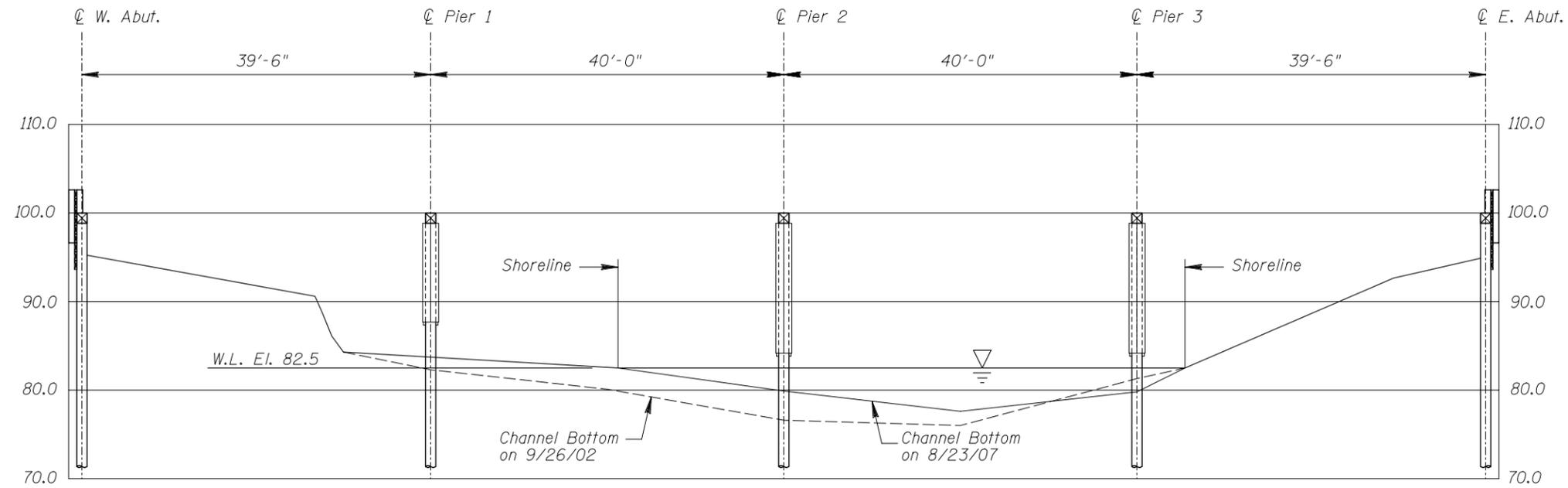


TYPICAL END VIEW OF PIERS

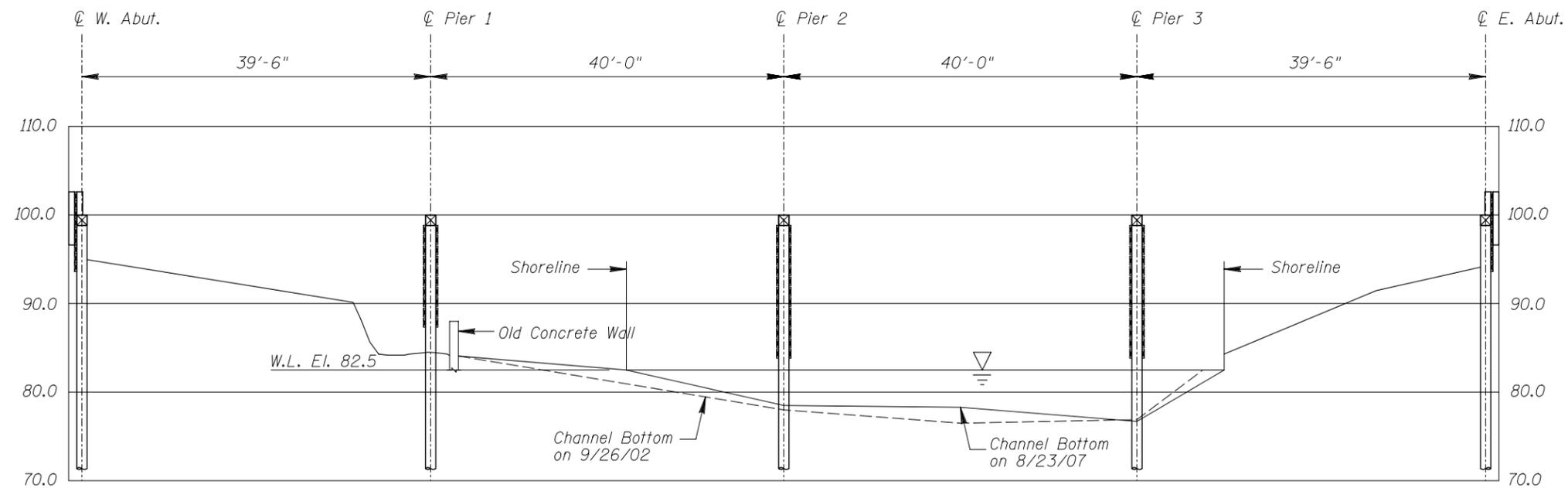
Legend

- 5.0 Sounding Depth (8/23/07)
- 5.2 Sounding Depth (9/26/02)
- o Timber Pile
- o Battered Timber Pile
- Timber Debris
- Rirrap

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 7254 OVER THE KETTLE RIVER DISTRICT 1, PINE COUNTY		
INSPECTION AND SOUNDING PLAN		
Drawn By: PRH	COLLINS ENGINEERS	Date: AUG. 2007
Checked By: MDK	<small>123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Scale: NTS
Code: 52217254		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. 7254 OVER THE KETTLE RIVER DISTRICT 1, PINE COUNTY		
UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
Drawn By: PRH	COLLINS ENGINEERS <small>123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: AUG. 2007
Checked By: MDK		Scale: 1/16"=1'
Code: 52217254		Figure No.: 2

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

INSPECTORS: Collins Engineers, Inc. DATE: August 23, 2007

ON-SITE TEAM LEADER: Daniel G. Stromberg, P.E., S.E.

BRIDGE NO: 7254 WEATHER: Cloudy, 81°F

WATERWAY CROSSED: Kettle River

DIVING OPERATION: SCUBA SURFACE SUPPLIED AIR
 OTHER _____

PERSONNEL: John J. Loftus, Valerie Roustan

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

TIME IN WATER: 5:00 p.m.

TIME OUT OF WATER: 5:20 p.m.

WATERWAY DATA: VELOCITY 0.5 f.p.s.

VISIBILITY 3.0 feet

DEPTH 5.8 feet maximum at Pier 2

ELEMENTS INSPECTED: Piers 1, 2, and 3

REMARKS: Overall, the timber piles and horizontal planks of the piers were in good, sound condition with only minor cracking and checking observed. One of the diagonal braces was split through the connection at the upstream end of Pier 1 with partial section loss, however, at the time of the inspection, the brace was still engaged at the fastener. The diagonal cross-bracing on the east side of Pier 2 exhibited 50 percent section loss at the upstream connection. Piers 2 and 3 exhibited moderate to heavy accumulations of debris that extended along each face of the piers.

FURTHER ACTION NEEDED: YES NO

At this point, the timber drift accumulations at the bridge are not excessive; however, they should be monitored, and if found to be progressing to an extent where excessive lateral loads may be exerted on the pier or scour is influenced, the drift may need to be removed at that time.

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 7254
 INSPECTORS Collins Engineers, Inc.
 ON-SITE TEAM LEADER Daniel G. Stromberg, P.E., S.E.
 WATERWAY CROSSED Kettle River

INSPECTION DATE August 23, 2007
 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	0.0'	7	N	N	9	7	7	8	6	6	N	6	N	N	7	N	N	N
	Pier 2	4.0'	7	N	N	9	7	7	8	N	N	6	6	N	N	7	N	N	N
	Pier 3	5.8'	7	N	N	9	7	7	8	7	7	6	6	N	N	7	N	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the timber piles and horizontal planks of the piers were in good, sound condition with only minor cracking and checking observed. One of the diagonal braces was split through the connection at the upstream end of Pier 1 with partial section loss, however, at the time of the inspection, the brace was still engaged at the fastener. The diagonal cross-bracing on the east side of Pier 2 exhibited 50 percent section loss at the upstream connection. Piers 2 and 3 exhibited moderate to heavy accumulations of debris that extended along each face of the piers.

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.