

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 13503

CSAH-36

OVER THE

SUNRISE RIVER

CHISAGO COUNTY



MAY 19, 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 13503, the East and West Abutments and Piers 1 and 2, were generally in satisfactory condition below water with no defects of structural significance observed at this time. Pile B of Pier 1 had up to 3 inches of differential settlement, but has been repaired. The repair to Pile B shows no signs of further settlement or defects. The timber piles generally exhibited checking, typically 1/8 inch wide and up to 1/4 inch wide maximum with the timber typically allowing awl penetrations of 1/8 inch. The channel bottom around the substructure units appeared stable with no evidence of significant scour.

INSPECTION FINDINGS:

- (A) The channel bottom material at the East and West Abutments consisted of silty sand and cobbles up to 4 inches in diameter allowing up to 6 inches of probe rod penetration.
- (B) The channel bottom material at Piers 1 and 2 consisted of silty clay allowing up to 2 feet of probe rod penetration.
- (C) The timber piles and cross bracing were generally sound with checking typically 1/8 inch wide and up to 1/4 inch wide maximum. Awl penetration into the timber was typically 1/8 inch.
- (D) On the west face of Pile A at the East Abutment there was a 1/2 inch wide split extending from the top of the pile down 4 feet.
- (E) On the north face of Pile D at Pier 2, there was a 1/2 inch wide by 3 inch deep split extending from the top of the pile down 2 feet.

- (F) The steel channel horizontal bracing on the east and west faces of Pier 1 that extended from Piles A to D exhibited light corrosion.
- (G) Up to 3 inches of differential settlement was observed at Pile B of Pier 1. There has been a repair implemented for the pile cap to arrest further settlement. The upper horizontal steel bracing along the Pier 1 cap had a maximum deflection of 3 inches at Pile B. The lower horizontal brace showed no signs of deflection and was used by the repair to provide support to the upper brace/cap. The timber deck boards supporting the roadway were flush with the upper steel brace along the length of the pier cap.
- (H) Piles A and B at the West Abutment exhibited light deterioration on their north face with up to 1 inch of penetration extending from the top of the piles to the waterline.

RECOMMENDATIONS:

- (A) Monitor the settlement at Pile B of Pier 1.

- (B) 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,

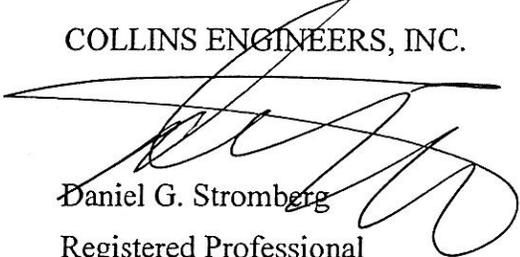
PROFESSIONAL ENGINEER

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: 13503

Feature Crossed: Sunrise River

Feature Carried: CSAH-36

Location: Chisago County, Township of Lent

Bridge Description: The superstructure consists of a timber deck supported by two timber piers and two timber abutments with 12 by 12 inch timber caps. The piers consist of seven 12 inch diameter timber piles and the abutments consist of eight 12 inch diameter timber piles. The substructure units are designated as the West Abutment, Piers 1 and 2, and the East Abutment. Piles are designated A through H from south to north.

2. INSPECTION DATA

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

Dive Team: Marc B. Parker, Michael J. Banasiak

Date: May 19, 2012

Weather Conditions: Sunny, 80 °F

Underwater Visibility: 1 ft.

Waterway Velocity: 2 ft/s

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: The East and West Abutments and Piers 1 and 2.

General Shape: Piers 1 and 2 consist of seven 12 inch diameter timber piles. The East and West Abutments consist of eight 12 inch diameter timber piles with timber lagging. The piles of each abutment and pier support a 12 inch by 12 inch timber cap, and the piers have timber cross bracing.

Maximum Water Depth at Substructure Inspected: Approximately 7.5 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap at the upstream end of Pier 2.

Water Surface: The waterline was approximately 4.1 feet below reference.

Assumed waterline elevation: 95.9 feet

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 7

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

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 MEMBER CONDITION RATING:

Item #	Element Description	Quantity	Unit	Conditions				
				1	2	3	4	5
228	Timber Piling	30	EA	26	4			



Photograph 1. View of East Abutment, Looking Northeast.



Photograph 2. View of West Abutment, Looking Southwest.



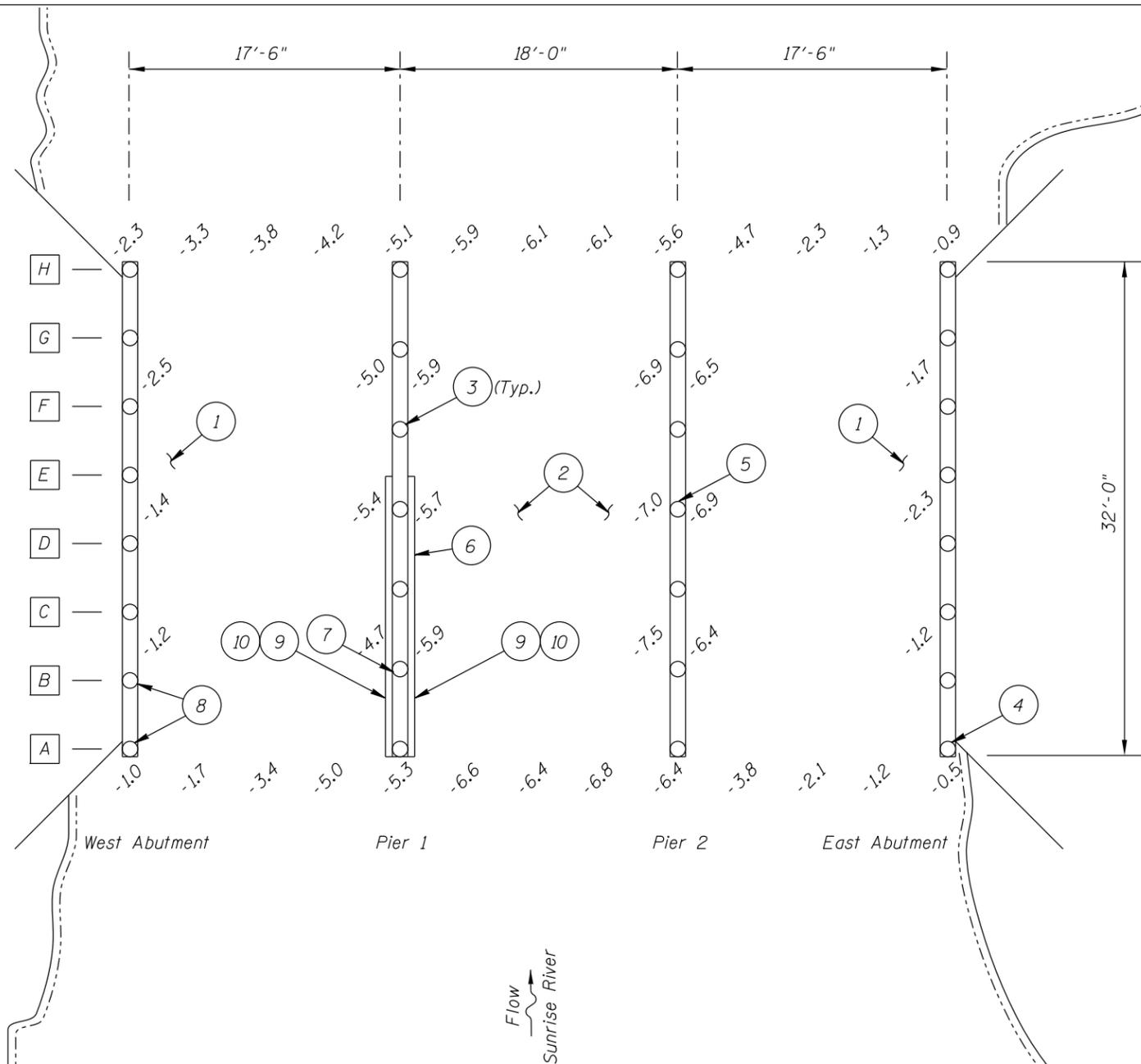
Photograph 3. View of Pier 1, Looking Northeast.



Photograph 4. View of Pier 2, Looking Northwest.



Photograph 5. View of settlement and repair at Pile B of Pier 1, Looking East.



SOUNDING PLAN

INSPECTION NOTES:

- 1 Channel bottom material at the East and West abutments consisted of cobbles up to 4 inches in diameter and silty sand with 6 inches of probe rod penetration.
- 2 Channel bottom material at Piers 1 and 2 consisted of silty clay with up to 2 feet of probe rod penetration.
- 3 Timber piles were generally sound with checking up to 1/4 inch wide and up to 1/8 inch of awl penetration.
- 4 Pile A on the East Abutment exhibited a 1/2 inch wide split from the top of the pile down 4 feet on the west face.
- 5 Pile D on Pier 2 exhibited a 1/2 inch wide split 3 inches deep from the top of the pile down 2 feet on the north face.
- 6 Steel channel horizontal bracing (repair measures) located on the east and west faces of Pier 1, from Piles A through D, exhibited light corrosion.
- 7 Pile B of Pier 1 exhibited up to 3 inches of differential settlement.
- 8 Piles A and B on the West Abutment exhibited light deterioration on the north side, from the top of the pier to the waterline, with up to 1 inch of penetration.
- 9 Upper horizontal steel bracing repair along the Pier 1 cap exhibited a maximum deflection of 3 inches at Pile B. Lower horizontal steel bracing showed no signs of deflection.
- 10 Timber deck boards were flush with the upper horizontal steel bracing along the length of the brace.

GENERAL NOTES:

1. The East and West Abutments and Piers 1 and 2 were inspected underwater.
2. At the time of inspection on May 19, 2012, the waterline was located approximately 4.1 feet below the top of pier cap at upstream end of Pier 2. Since elevation information was not available a reference elevation of 100.0 was assumed. Based on the assumed reference the waterline elevation was 95.9.
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

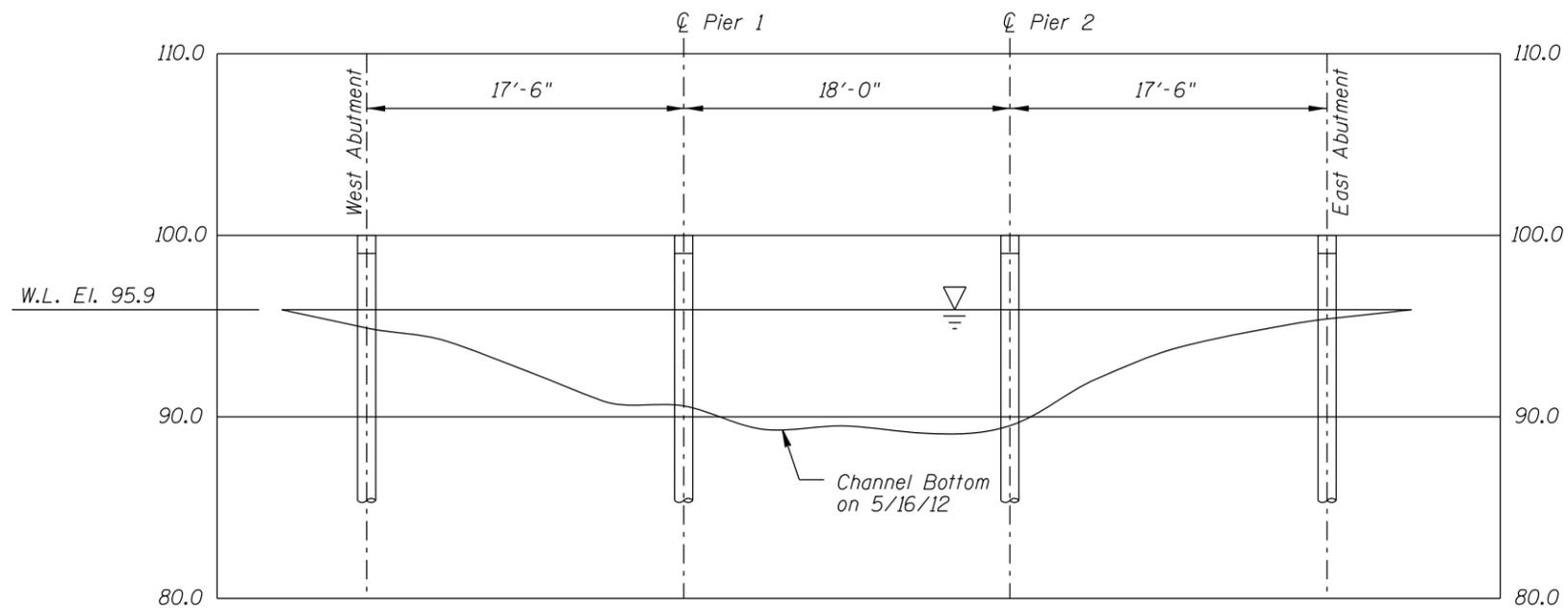
- 3.0 Sounding Depth from Waterline (5/19/12)

TYPICAL END VIEW OF PIERS

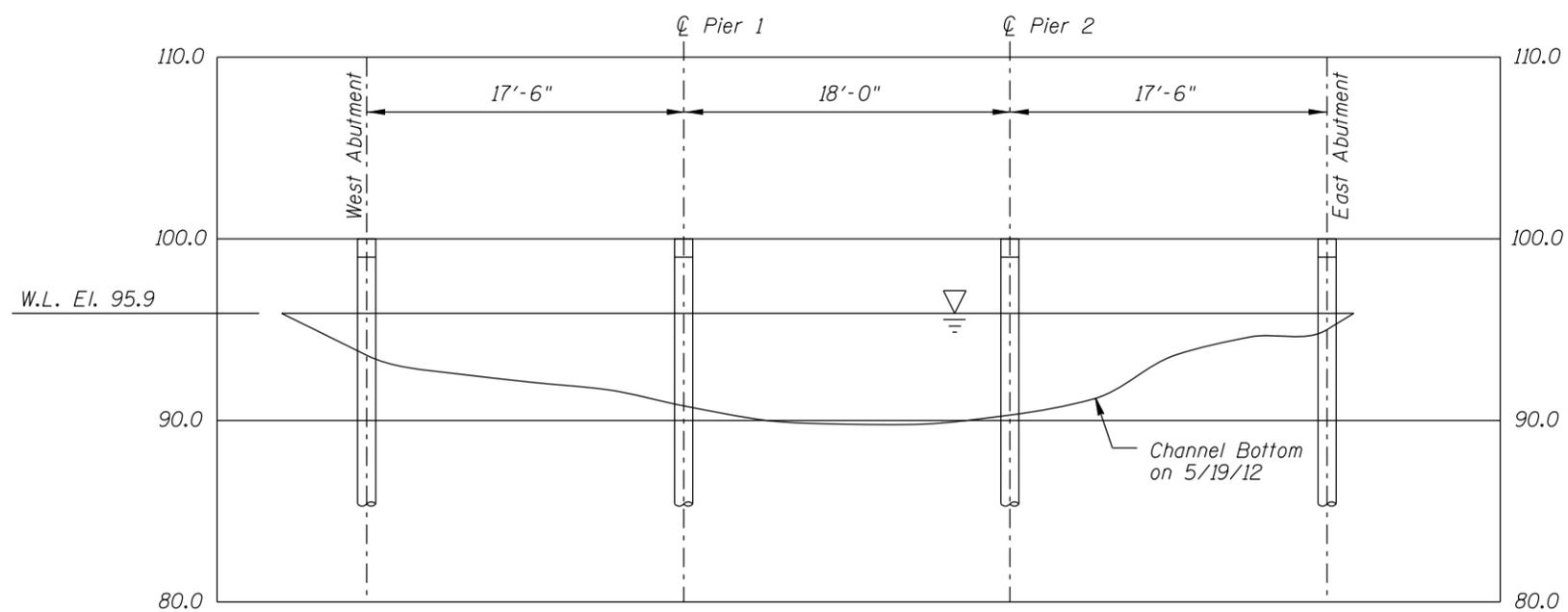


MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 13503 COUNTY ROAD 36 OVER SUNRISE RIVER CHISAGO COUNTY		
INSPECTION AND SOUNDING PLAN		
Drawn By: BLV	COLLINS ENGINEERS	Date: MAY, 2012
Checked By: RPB		Scale: 1"=10'
Code: 742313505		Figure No.: 1

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UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:
Refer to Figure 1 for General Notes.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 13503 COUNTY ROAD 36 OVER SUNRISE RIVER CHISAGO COUNTY		
UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
Drawn By: BLV	COLLINS ENGINEERS <small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: MAY, 2012
Checked By: RPB		Scale: 1"=10'
Code: 742313505		Figure No.: 2

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: May 19, 2012

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

BRIDGE NO: 13503 WEATHER: Sunny, 80°F

WATERWAY CROSSED: Sunrise River

DIVING OPERATION: SCUBA SURFACE SUPPLIED AIR
 OTHER

PERSONNEL: Marc B. Parker, Michael J. Banasiak

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

TIME IN WATER: 11:45 A.M.

TIME OUT OF WATER: 12:30 A.M.

WATERWAY DATA: VELOCITY 2 fps

VISIBILITY 1 ft

DEPTH 7.5 feet maximum at Pier 2

ELEMENTS INSPECTED: East and West Abutments and Piers 1 and 2

REMARKS: Overall, the East and West Abutments and Piers 1 and 2, were generally in satisfactory condition below water with no defects of structural significance observed at this time. Pile B of Pier 1 had up to 3 inches of differential settlement, but the repair to Pile B shows no signs of further settlement or defects. The timber piles generally exhibited checking typically 1/8 inch wide and up to 1/4 inch wide maximum with typical awl penetration into the timber of 1/8 inch. Areas of light deterioration including splits up to 1/2 inch wide were observed on several piles. The channel bottom around the substructure units appeared stable with no evidence of significant scour.

FURTHER ACTION NEEDED: YES NO

Monitor the settlement at Pile B of Pier 1.

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. 13503
 INSPECTORS Collins Engineers, Inc.
 ON-SITE TEAM LEADER Ryan P. Breen, P.E.
 WATERWAY CROSSED Sunrise River

INSPECTION DATE May 19, 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 (CROSS 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
	West Abutment	2.5'	6	N	N	7	N	6	N	7	N	7	7	N	N	6	N	N	N
	Pier 1	5.9'	6	N	N	6	7	6	N	N	N	7	7	N	6	6	N	N	N
	Pier 2	7.5'	6	N	N	7	7	6	N	N	N	7	7	N	N	6	N	N	N
	East Abutment	2.3'	6	N	N	7	N	6	N	7	N	7	7	N	N	6	N	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the East and West Abutments and Piers 1 and 2, were generally in satisfactory condition below water with no defects of structural significance observed at this time. Pile B of Pier 1 had up to 3 inches of differential settlement, but the repair to Pile B shows no signs of further settlement or defects. The timber piles generally exhibited checking typically 1/8 inch wide and up to 1/4 inch wide maximum with typical awl penetration into the timber of 1/8 inch. Areas of light deterioration including splits up to 1/2 inch wide were observed on several piles. The channel bottom around the substructure units appeared stable with no evidence of significant scour.

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.