

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 92453
CSAH NO. 15
OVER THE
SOUTH BRANCH OF THE BUFFALO RIVER
DISTRICT 4 - CLAY COUNTY



PREPARED FOR THE
MINNESOTA DEPARTMENT OF TRANSPORTATION
BY
COLLINS ENGINEERS, INC.
JOB NO. 5221 (CEI 53)

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 92453, the North and South Abutments and Piers 1 and 2, were found to be in good to satisfactory condition. The timber piles exhibited some minor vertical checking up to ¼ inch wide. Piers 1 and 2 also exhibited some missing and/or broken timber bracing. The gaps between the timber planking along the abutments and wingwalls, noted in the previous inspection, have been repaired with metal strips. The channel bottom appeared stable with no evidence of significant scour or appreciable changes since the previous inspection.

INSPECTION FINDINGS:

- (A) The timber piles exhibited random vertical checking with a typical width of 1/8 inch and a maximum width of ¼ inch.
- (B) The gaps between the timber planking along the backwall and wingwalls of both abutments, noted in the previous inspection, have been repaired with metal strips to halt backfill loss.
- (C) The diagonal timber bracing at Piers 1 and 2 was completely missing.
- (D) The horizontal timber brace directly below the pier cap was broken and no longer engaged at the upstream pile at Piers 1 and 2 on the North and South sides.
- (E) A light accumulation of timber debris consisting of 4 inch diameter and smaller tree limbs and branches was observed at the upstream end of Pier 2, extending from the channel bottom to the waterline in a radius of 5 feet of the upstream pile.

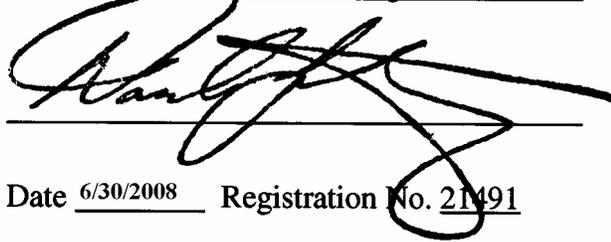
RECOMMENDATIONS:

- (A) Repair missing and/or broken timber bracing at Piers 1 and 2 to re-establish the lateral stability of the structures.

- (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

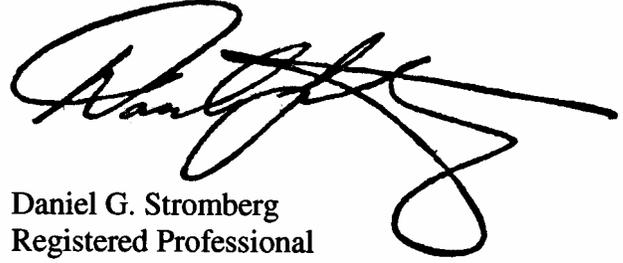


A large, stylized handwritten signature in black ink, appearing to read 'Dan G. Stromberg', is written over two horizontal lines.

Date 6/30/2008 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.



A large, stylized handwritten signature in black ink, appearing to read 'Dan G. Stromberg', is written over two horizontal lines.

Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 92453

Feature Crossed: South Branch of the Buffalo River

Feature Carried: CSAH No. 15

Location: District 4 - Clay County

Bridge Description: The superstructure consists of three spans of multiple steel beams supporting a reinforced concrete deck. The superstructure is supported by two piers and two abutments consisting of concrete caps supported by seven timber piles. The abutments also have two timber piles along each skewed wingwall. The piers are numbered 1 and 2 starting from the north end of the bridge. No design plans were available for this bridge.

2. INSPECTION DATA

Professional Engineer/Team Leader: Bradley A. Syler, P.E., S.E.

Dive Team: John J. Loftus, Valerie Rouston

Date: August 21, 2007

Weather Conditions: Cloudy, 70°F

Underwater Visibility: 1.0 foot

Waterway Velocity: 0.5 f.p.s

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 and 2, and North and South Abutments.

General Shape: Each pier and abutment consists of a concrete cap supported by seven timber piles. The piles of the piers were originally interconnected by horizontal and diagonal timber bracing. The abutments have adjacent skewed wingwalls which consist of two timber piles under a timber cap. The abutment breastwalls and wingwalls are constructed of horizontal planking behind the piles.

Maximum Water Depth at Substructure Inspected: Approximately 3.7 Feet.

4. WATERLINE DATUM

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

Water Surface: The waterline was approximately 7.7 feet below reference.
Assumed Waterline Elevation = 92.3.

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 5

Item 61: Channel and Channel Protection: Code 6

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

Item 113: Scour Critical Bridges: Code I/95

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. View of North Abutment, Looking Northwest.



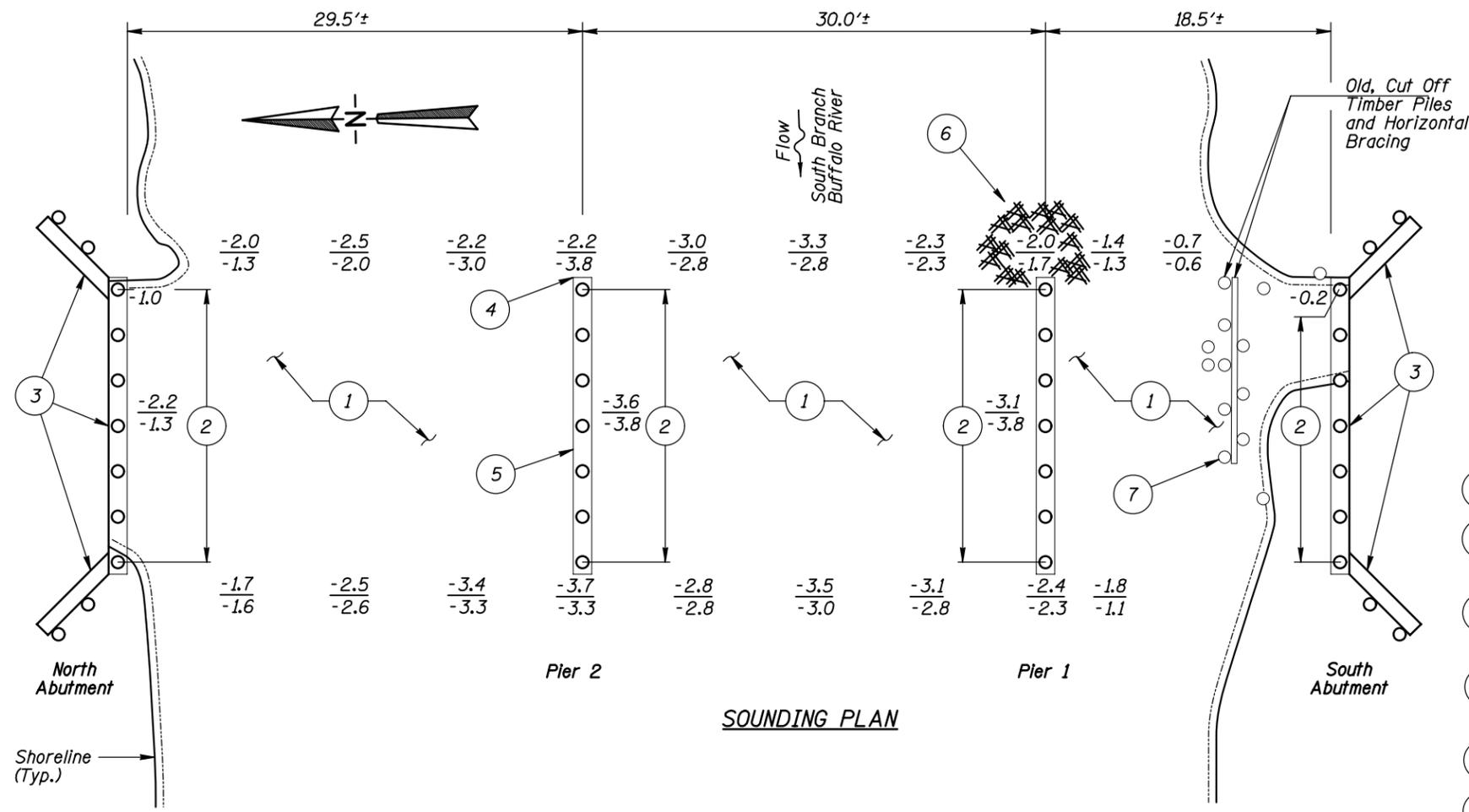
Photograph 2. View of Pier 1, Looking Northwest.



Photograph 3. View of Pier 2, Looking Southeast.



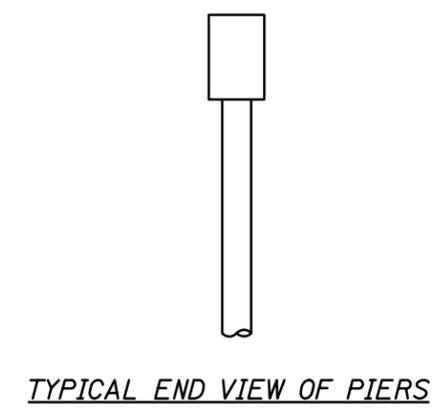
Photograph 4. View of South Abutment, Looking Southeast



- GENERAL NOTES:**
1. The North Abutment, and Piers 1 and 2 were inspected underwater.
 2. At the time of inspection on August 21, 2007, the waterline was located approximately 7.7 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 92.3.
 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 clay with up to 12 inches of probe rod penetration.
 - 2 The timber piles exhibited vertical checking with a typical width of 1/8 and a maximum width of 1/4 inch.
 - 3 The gaps between the timber planking along the backwall and wingwalls have been repaired with metal strips to halt backfill loss.
 - 4 The horizontal timber brace directly below the pier cap was broken and no longer engaged at the upstream pile at Piers 1 and 2 on both north and south sides.
 - 5 The diagonal timber bracing at Piers 1 and 2 was completely missing.
 - 6 A light accumulation of timber debris consisting of 4 inch diameter and smaller limbs and branches of Pier 1 extending from channel bottom to waterline with a radius of 5 feet off the upstream pile.
 - 7 Cut off timber piles were observed at 8 feet North of the South Abutment from channel bottom to 3 feet above the waterline and 2 feet North of Pier 1 from channel bottom to 1 foot below the waterline.

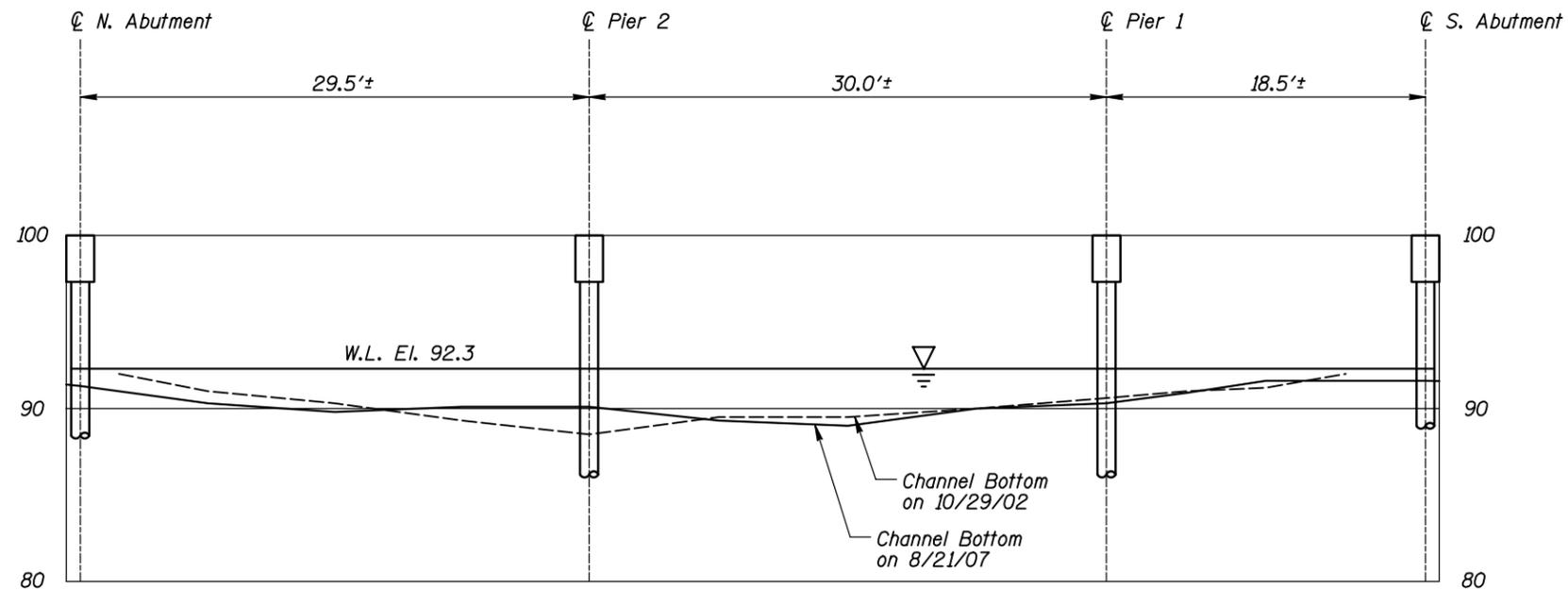
SOUNDING PLAN



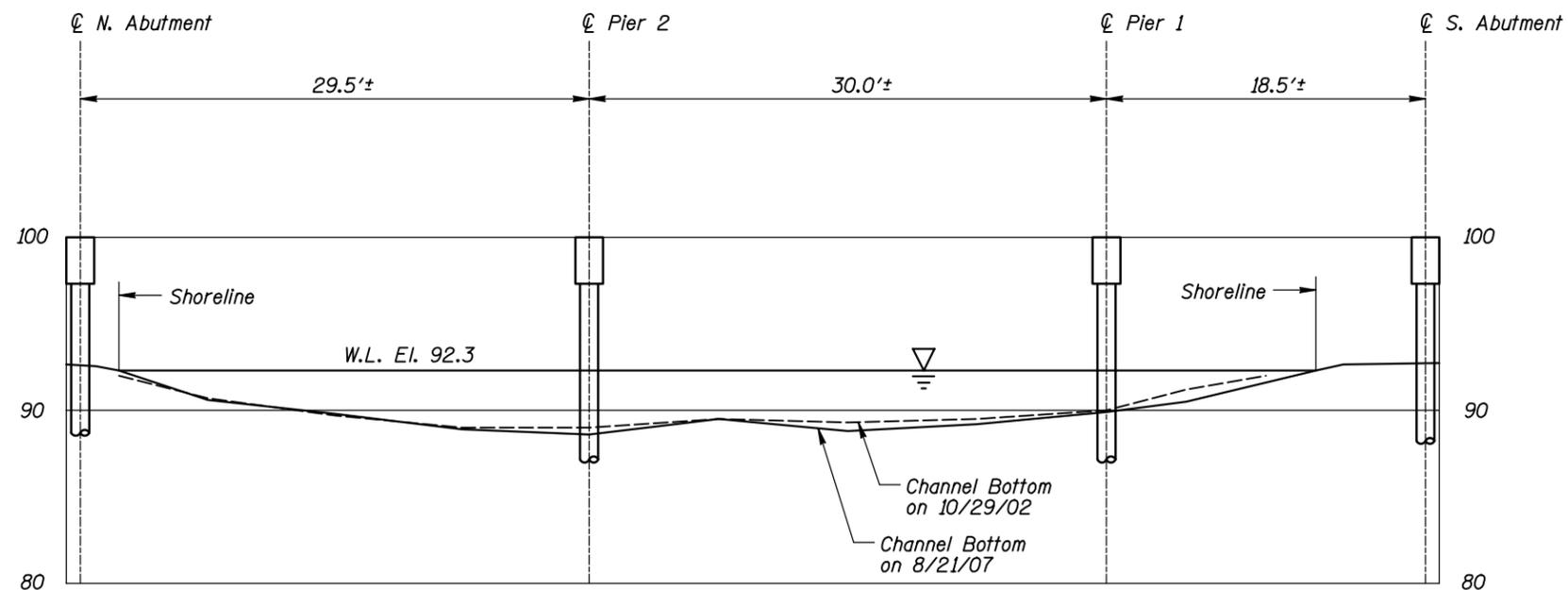
- Legend**
- 2.0 Sounding Depth (8/21/07)
 - 5.2 Sounding Depth (10/29/02)
 - Timber Pile
 - Old, Cut Off Timber Pile
 - ⌘ Timber Debris
- Note:**

All soundings based on 2007 waterline location.

| | | |
|--|--|--------------------|
| MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION | | |
| STRUCTURE NO. 92453 OVER SOUTH BRANCH OF THE BUFFALO RIVER DISTRICT 4, CLAY COUNTY | | |
| INSPECTION AND SOUNDING PLAN | | |
| Drawn By: PRH | COLLINS ENGINEERS <small>133 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small> | Date: AUGUST, 2007 |
| Checked By: MDK | | Scale: NTS |
| Code: 35120053 | | 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. 92453 OVER SOUTH BRANCH OF THE BUFFALO RIVER DISTRICT 4, CLAY COUNTY | | |
| UPSTREAM AND DOWNSTREAM FASCIA PROFILES | | |
| Drawn By: PRH Checked By: MDK Code: 52210053 | COLLINS ENGINEERS | 123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com |
| | | Date: AUGUST, 2007 Scale: 1"=10' Figure No.: 2 |

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

INSPECTORS: Collins Engineers, Inc. DATE: August 21, 2007

ON-SITE TEAM LEADER: Bradley A. Syler, P.E., S.E.

BRIDGE NO: 92453 WEATHER: Cloudy, 70°F

WATERWAY CROSSED: South Branch of the Buffalo River

DIVING OPERATION: SCUBA SURFACE SUPPLIED AIR
 OTHER

PERSONNEL: John J. Loftus, Valerie Roustan

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

TIME IN WATER: 12:55 p.m.

TIME OUT OF WATER: 1:20 p.m.

WATERWAY DATA: VELOCITY 0.5 f.p.s

VISIBILITY 1.0 foot

DEPTH 3.7 feet maximum at Piers 1 and 2

ELEMENTS INSPECTED: North and South Abutments and Piers 1 and 2

REMARKS: The timber piers and abutments were in good to satisfactory condition. The timber piles exhibited some random minor vertical checking up to 1/4 inch wide. The diagonal timber bracing at Piers 1 and 2 was completely missing. The horizontal timber brace directly below the pier cap was broken and no longer engaged at the upstream pile at Piers 1 and 2 on both North and South sides. The gaps between the timber planking along the abutments and wingwalls, noted in the previous inspection, have been repaired with metal strips to halt backfill loss. A light accumulation of timber debris consisting of 4 inch diameter and smaller limbs and branches was observed at the upstream end of Pier 2. The channel bottom appeared stable with no evidence of significant scour or appreciable changes since the previous inspection.

FURTHER ACTION NEEDED: YES NO

Repair missing and/or broken timber bracing at Piers 1 and 2 to re-establish the lateral stability of the structures.

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. 92453
 INSPECTORS Collins Engineers, Inc.
 ON-SITE TEAM LEADER Bradley A. Syler, P.E., S.E.
 WATERWAY CROSSED South Branch of the Buffalo River

INSPECTION DATE August 21, 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 |
| | South Abutment | 0.2' | 7 | 7 | N | 9 | N | 7 | 8 | 7 | N | N | 7 | N | N | 7 | N | N | N |
| | Pier 1 | 3.1' | 7 | N | N | 9 | 5 | 5 | 8 | N | N | 7 | 7 | N | N | 7 | N | N | N |
| | Pier 2 | 3.7' | 7 | N | N | 9 | 5 | 5 | 8 | N | N | N | 8 | N | N | 7 | N | N | N |
| | North Abutment | 2.2' | 7 | 7 | N | 9 | N | 7 | 8 | 6 | N | N | 6 | N | N | 7 | N | N | N |

*UNDERWATER PORTION ONLY

REMARKS: The timber piers and abutments were in good to satisfactory condition. The timber piles exhibited some random minor vertical checking up to 1/4 inch wide. The diagonal timber bracing at Piers 1 and 2 was completely missing. The horizontal timber brace directly below the pier cap was broken and no longer engaged at the upstream pile at Piers 1 and 2 on both North and South sides. The gaps between the timber planking along the abutments and wingwalls, noted in the previous inspection, have been repaired with metal strips to halt backfill loss. A light accumulation of timber debris consisting of 4 inch diameter and smaller limbs and branches was observed at the upstream end of Pier 2. The channel bottom appeared stable with no evidence of significant scour or appreciable 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.