

UNDERWATER BRIDGE INSPECTION REPORT

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STRUCTURE NO. 4237

CSAH NO. 19

OVER THE

BUFFALO RIVER

DISTRICT 4 - CLAY COUNTY

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PREPARED FOR THE  
MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 5221 (CEI 48)

MINNESOTA DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 4237, Piers 1 and 2, were found to be in good condition with no structurally significant defects observed. A moderate accumulation of timber debris was observed at the upstream end of Pier 2.

INSPECTION FINDINGS:

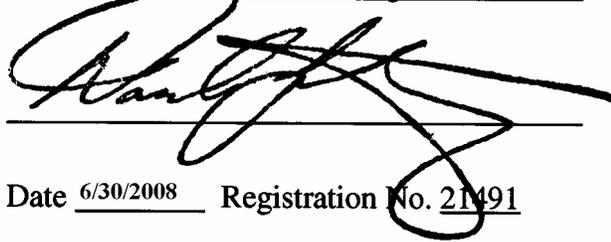
- (A) The south shoreline was protected with riprap up to 1 foot in diameter.
- (B) The timber piles, caps, and bracing of Piers 1 and 2 were lightly weathered with checks up to 1/8 inch wide. The timber allowed awl penetrations of between 1/4 and 1/2 inch. The galvanized steel connection hardware exhibited light surface corrosion with no appreciable loss of section. There were two broken and missing horizontal timbers at the upstream and downstream truss support elements of Pier 2.
- (C) A moderate accumulation of timber debris, with pieces up to 18 inches in diameter, was observed at the upstream end of Pier 2. There was also heavy timber debris accumulation on the north shoreline upstream of the bridge.

RECOMMENDATIONS:

- (A) Remove timber debris accumulated at Pier 2 and on the north shoreline upstream of bridge.
  
- (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

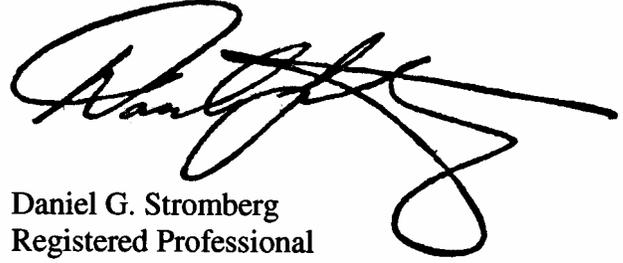


A large, stylized handwritten signature in black ink, appearing to read 'Dan G. Stromberg', is written over two horizontal lines.

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: 4237

Feature Crossed: Buffalo River

Feature Carried: CSAH No. 19

Location: District 4 - Clay County

Bridge Description: The bridge structure consists of two timber beam approach spans at each end and a main center span consisting of a steel Pratt Pony Truss. The superstructure is supported by two timber pile (with plank breast wall) abutments and four timber pile piers. The piers are numbered 1 through 4 starting from the south end of the bridge. No design drawings were provided.

2. INSPECTION DATA

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

Dive Team: John J. Loftus, Valerie Rouston

Date: August 20, 2007

Weather Conditions: Cloudy, 60 °F

Underwater Visibility: 2.5 foot

Waterway Velocity: 0.5 f.p.s.

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 and 2

General Shape: The piers consist of a single line of piles supporting a timber cap beam. There are four additional piles with horizontal timbers at each end of Piers 2 and 3 that form a rectangular box that supports the main span truss.

Maximum Water Depth at Substructure Inspected: Approximately 3.8 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the timber curb at the upstream end of Pier 2.

Water Surface: The waterline was approximately 12.6 feet below reference.  
Assumed Waterline Elevation = 87.4.

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/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. Overall View of the Structure, Looking Northwest.



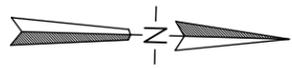
Photograph 2. View of Pier 1 and South Shoreline, Looking East.



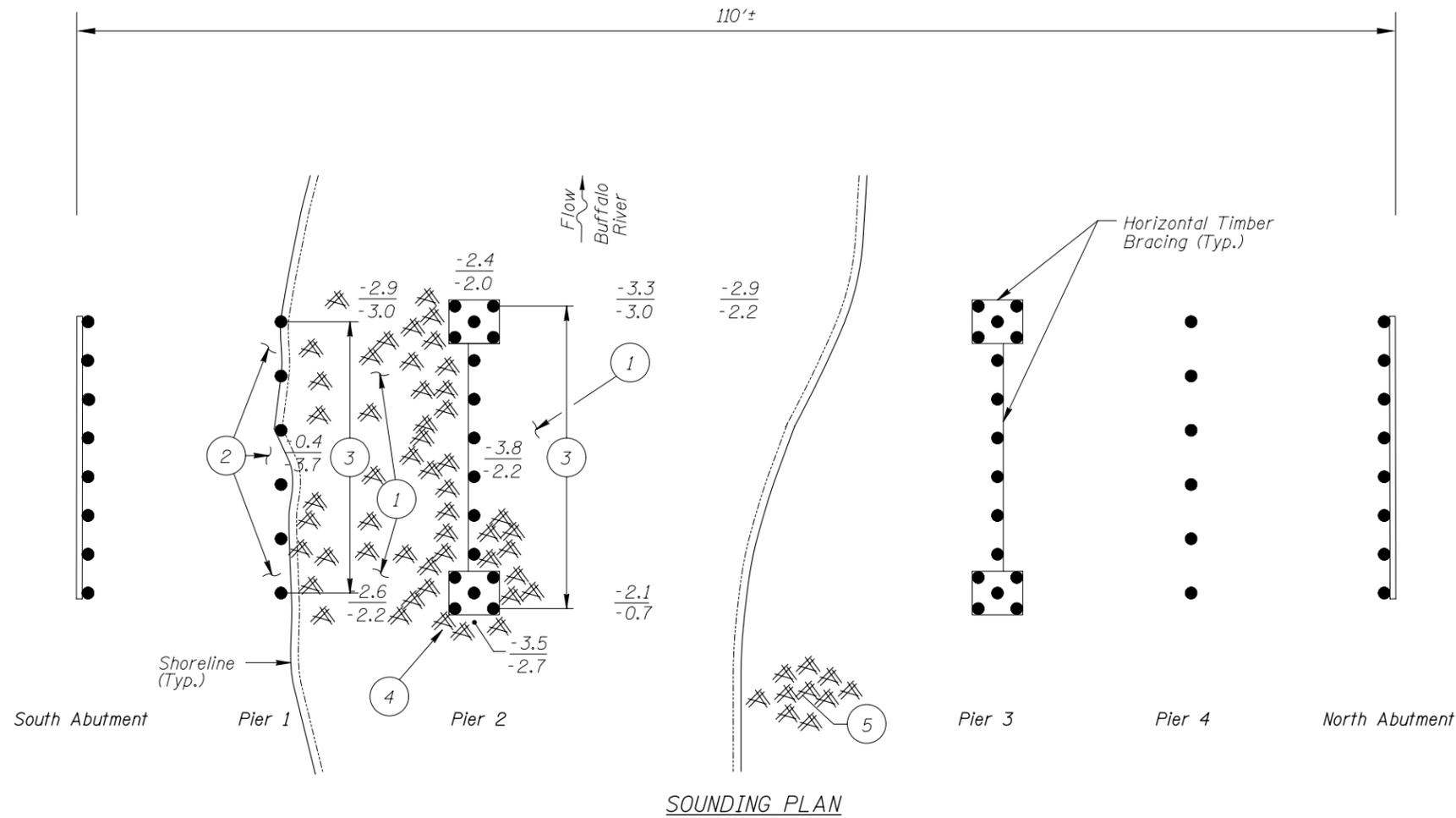
Photograph 3. View of Pier 2, Looking South.



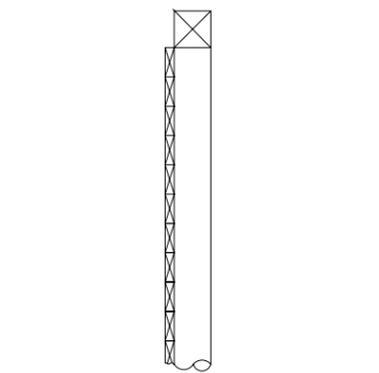
Photograph 4. View of Heavy Timber Debris at North Shoreline upstream of Pier 3, Looking Northwest.



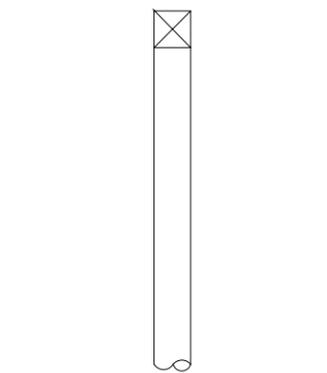
110'±



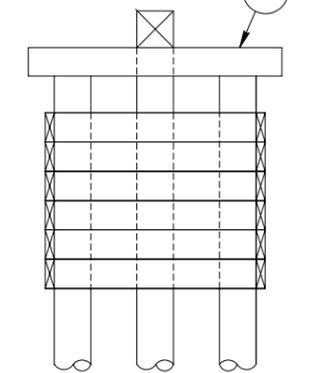
SOUNDING PLAN



TYPICAL SECTION THROUGH SOUTH ABUTMENT



TYPICAL END VIEW OF PIERS 1 & 4



TYPICAL END VIEW OF PIERS 2 & 3

GENERAL NOTES:

1. Piers 1 and 2 were inspected underwater.
2. At the time of inspection on August 20, 2007, the waterline was located approximately 12.6 feet below the top of the timber curb 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 was 87.4.
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 silt with a maximum probe rod penetration of 1.5 feet.
- 2 The south shoreline was protected with riprap up to 1 foot in diameter.
- 3 The timber piles, caps and bracing of Piers 1 and 2 were lightly weathered with checks up to 1/8 inch wide. Awl penetrations into the timber were between 1/4 and 1/2 inch. The galvanized steel connection hardware exhibited light surface corrosion with no appreciable loss of section. There were two broken and one missing horizontal timbers at the upstream and two broke and two missing horizontal timbers at the downstream truss support elements of Pier 2.
- 4 A moderate accumulation of timber debris, consisting of logs up to 18 inches in diameter, was observed along the entire south face, around the upstream nose, and along the north face to the upstream 1/4 point of Pier 2. The debris extended from the channel bottom to 2 feet above the waterline, and extended up to 3 feet from the upstream nose, up to 4 feet from the north face, and from the south face to Pier 1.
- 5 A heavy accumulation of timber debris was on the north shoreline upstream of the bridge.

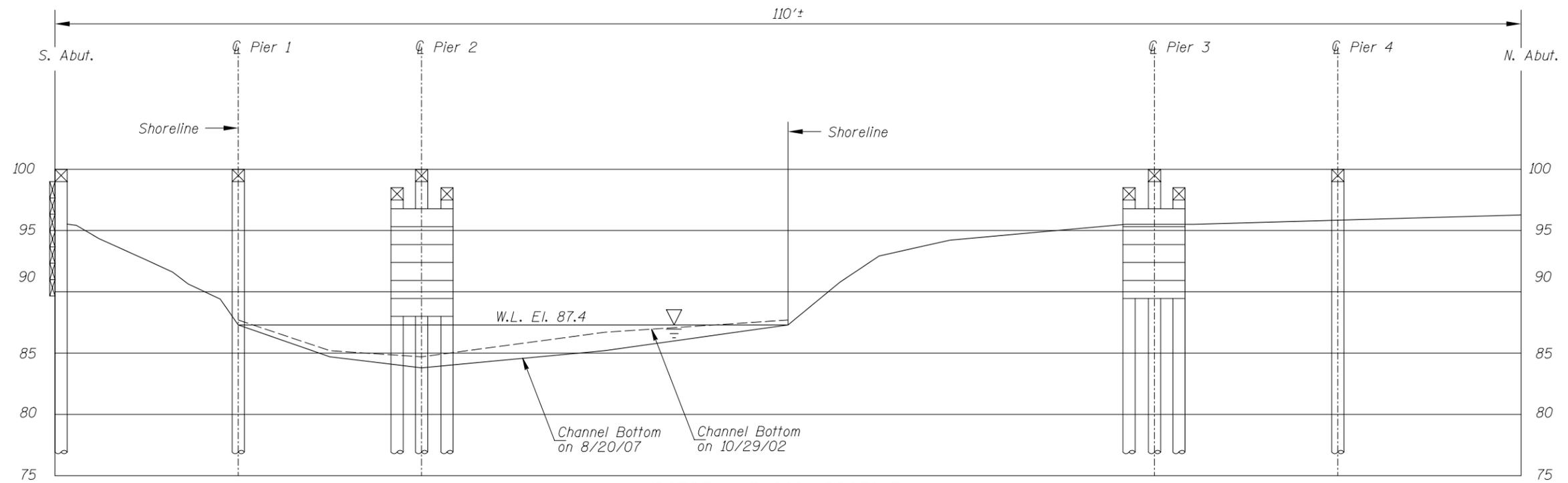
Legend

- 2.0 Sounding Depth (8/20/07)
- 5.2 Sounding Depth (10/29/02)
- Timber Pile
- ⌘ Timber Debris

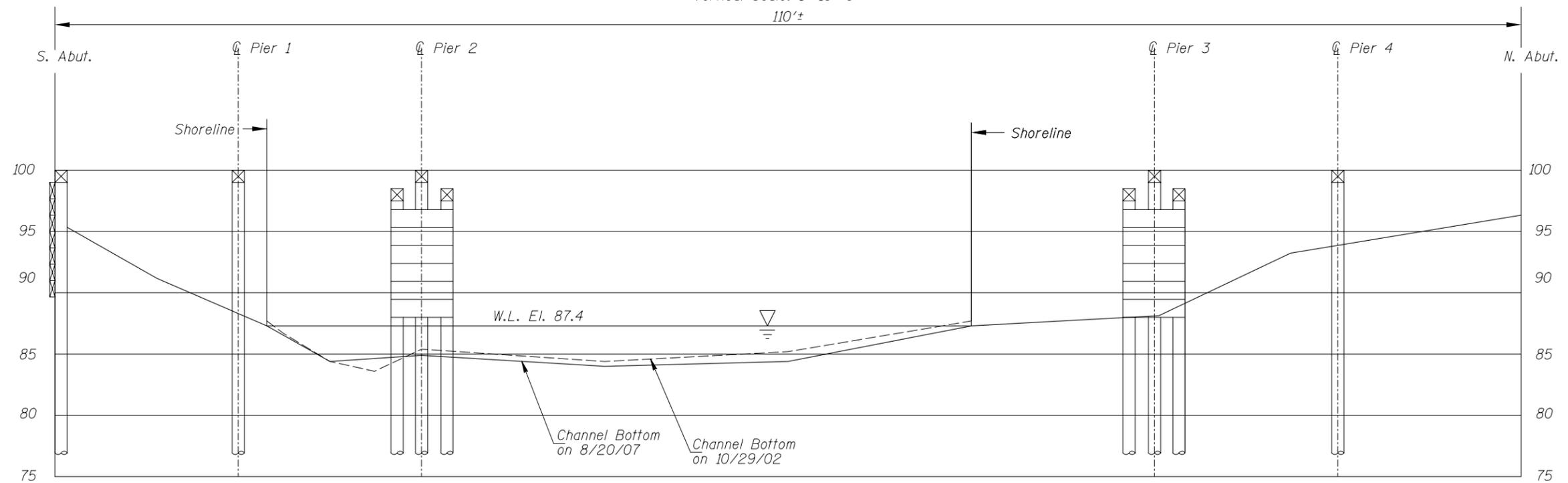
Note:

All soundings based on 2007 waterline location.

<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>		
STRUCTURE NO. 4237 OVER THE BUFFALO RIVER DISTRICT 4, CLAY COUNTY		
INSPECTION AND SOUNDING PLAN		
Drawn By: PRH	<b>COLLINS ENGINEERS</b>	Date: AUGUST, 2007
Checked By: MDK	123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Scale: NTS
Code: 52210048		Figure No.: 1



**UPSTREAM FASCIA PROFILE**  
Vertical Scale: 1"=10'-0"



**DOWNSTREAM FASCIA PROFILE**  
Vertical Scale: 1"=10'-0"

*Note:*  
Refer to Figure 1 for General Notes.

<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>		
STRUCTURE NO. 4237 OVER THE BUFFALO RIVER DISTRICT 4, CLAY COUNTY		
<b>UPSTREAM AND DOWNSTREAM FASCIA PROFILES</b>		
Drawn By: PRH	<b>COLLINS ENGINEERS</b> <small>123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: AUGUST, 2007
Checked By: MDK		Scale: NTS (U.O.N.)
Code: 52210048		Figure No.: 2

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

INSPECTORS: Collins Engineers, Inc. DATE: August 20, 2007

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

BRIDGE NO: 4237 WEATHER: Cloudy, 60 °F

WATERWAY CROSSED: Buffalo River

DIVING OPERATION:  SCUBA  SURFACE SUPPLIED AIR  
 OTHER

PERSONNEL: John J. Loftus, Valerie Roustan

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

TIME IN WATER: 4:15 p.m.

TIME OUT OF WATER: 5:00 p.m.

WATERWAY DATA: VELOCITY 0.5 f.p.s.

VISIBILITY 2.5 feet

DEPTH 3.8 feet maximum at Pier 1

ELEMENTS INSPECTED: Piers 1 and 2

REMARKS: Overall, the timber piles of Piers 1 and 2 were in good condition with no structurally significant defects observed. The timber piles, caps and bracing of Piers 1 and 2 were lightly weathered with checks up to 1/8 inch wide, and the galvanized steel connection hardware exhibited light surface corrosion with no appreciable loss of section. There were broken and missing horizontal timbers at the upstream and downstream truss support elements of Pier 2. A moderate accumulation of timber debris, with pieces up to 18 inches in diameter, was observed at the upstream end of Pier 2. There was also heavy timber debris on north shoreline upstream of bridge.

FURTHER ACTION NEEDED:  YES  NO

Remove the timber debris accumulated at Pier 2 and on the north shoreline upstream of the bridge.

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. 4237  
 INSPECTORS Collins Engineers, Inc.  
 ON-SITE TEAM LEADER Bradley A. Syler, P.E., S.E.  
 WATERWAY CROSSED Buffalo River

INSPECTION DATE August 20, 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 (TIMBER PLANKING)	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	0.4'	7	N	N	8	N	7	8	7	7	6	7	N	N	7	N	N	N
	Pier 2	3.8'	7	N	N	8	6	7	8	6	6	5	6	N	N	7	N	N	N

\*UNDERWATER PORTION ONLY

REMARKS: Overall, the timber piles of Piers 1 and 2 were in good condition with no structurally significant defects observed. The timber piles, caps and bracing of Piers 1 and 2 were lightly weathered with checks up to 1/8 inch wide, and the galvanized steel connection hardware exhibited light surface corrosion with no appreciable loss of section. There were broken and missing horizontal timbers at the upstream and downstream truss support elements of Pier 2. A moderate accumulation of timber debris, with pieces up to 18 inches in diameter, was observed at the upstream end of Pier 2. There was also heavy timber debris on north shoreline upstream of bridge.

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.