

UNDERWATER BRIDGE INSPECTION REPORT

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STRUCTURE NO. 5824  
CSAH NO. 1  
OVER THE  
CLEARWATER RIVER  
DISTRICT 2 - RED LAKE COUNTY

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PREPARED FOR THE  
MINNESOTA DEPARTMENT OF TRANSPORTATION  
BY  
COLLINS ENGINEERS, INC.  
JOB NO. 3512 (CEI 173)

MINNESOTA DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 5824, the East and West Abutments, were found to be in good to satisfactory condition with no defects of structural significance observed. The spalling at the West Abutment has increased and random hairline cracks have developed at both abutments. The channel bottom has remained stable with no appreciable change in configuration since the last inspection.

INSPECTION FINDINGS:

- (A) A void was observed 4 feet from the north end of the West Abutment at the waterline measuring 1.5 feet in diameter with 4 inches of penetration. Spalling and poor consolidation with up to 6 inches of maximum penetration was observed extending north of the previously mentioned void along the breastwall and for 3 feet along the wingwall exposing lightly corroded steel reinforcing at the corner.
- (B) A 1-foot-diameter void was observed 3 feet from the south end of the West Abutment at 1 foot below the waterline with 2 inches of maximum penetration.
- (C) Random hairline map cracking was observed on the breastwalls and wingwalls from the waterline to 3 feet above the waterline.

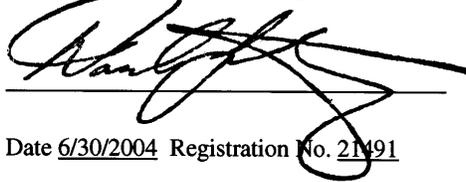
RECOMMENDATIONS:

- (A) Although the channel bottom appears to have remained stable since the last inspection, according to Item 113, the bridge is rated as scour critical, and therefore, it is recommended that the channel bottom be closely monitored after major flood events and during biennial and future underwater inspections.

- (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

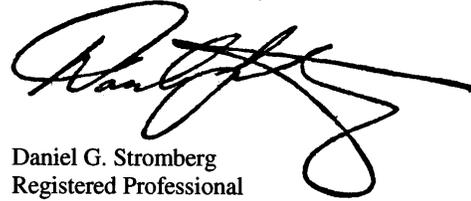


A large, stylized handwritten signature in black ink, appearing to read 'Dan G. Stromberg', is written over two horizontal lines.

Date 6/30/2004 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: 5824

Feature Crossed: The Clearwater River

Feature Carried: CSAH No. 1

Location: District 2 - Red Lake County

Bridge Description: The superstructure consists of a single span multiple steel beam structure supporting a reinforced concrete deck. The superstructure is supported by two reinforced concrete abutments founded on spread footings.

2. INSPECTION DATA

Professional Engineer Diver: Daniel G. Stromberg  
State of Minnesota, P.E., No. 21491

Dive Team: Michelle D. Koerbel, Matt J. Lengyel

Date: August 27, 2002

Weather Conditions: Sunny, 80EF

Underwater Visibility: " 2 Feet

Waterway Velocity: " 0.5 f.p.s.

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: The East and West Abutments.

General Shape: The abutments each consist of a vertical reinforced concrete breastwall with two adjacent skewed wingwalls. The abutments are founded on spread footings.

Maximum Water Depth at Substructure Inspected: Approximately 5.6 Feet.

4. WATERLINE DATUM

Water Level Reference: The top of bridge seat on the south end of the West Abutment.

Water Surface: The waterline was approximately 9.9 feet below reference.

Waterline Elevation = 1097.9.

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

Item 60: Substructure: Code 7

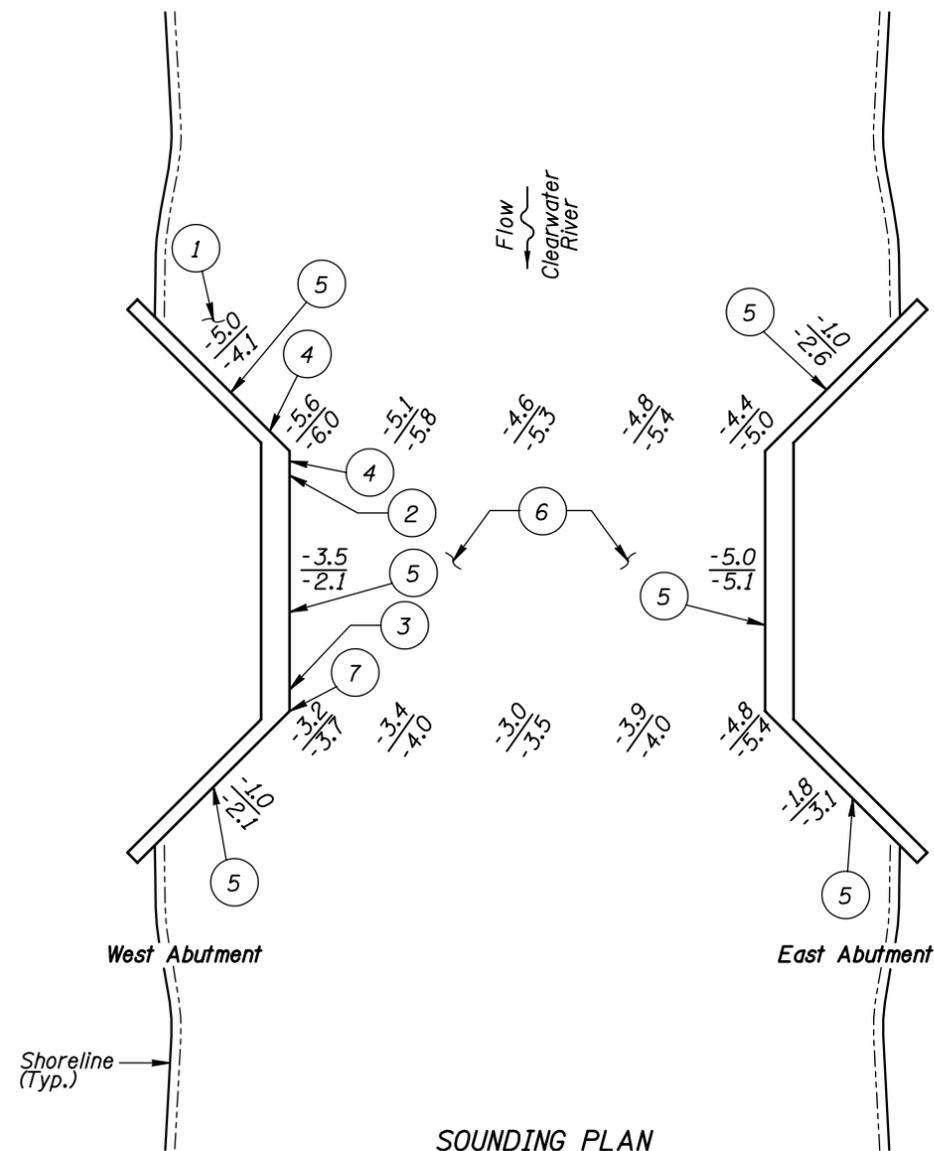
Item 61: Channel and Channel Protection: Code 7

Item 92B: Underwater Inspection: Code B/08/02

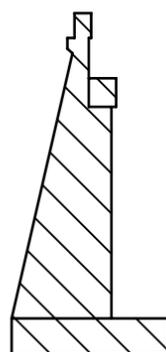
Item 113: Scour Critical Bridges: Code U/96

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

Yes  No



**SOUNDING PLAN**



**SECTION THRU W. ABUTMENT**  
(E. Abut. Opposite Hand)

**GENERAL NOTES:**

1. The East and West Abutments were inspected at this bridge.
2. At the time of inspection on August 27, 2002, the waterline was located approximately 9.9 feet below the top of bridge seat at the downstream end of the West Abutment. This corresponds to a waterline elevation of 1097.9 based on previous report dated September 8, 1997.
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.

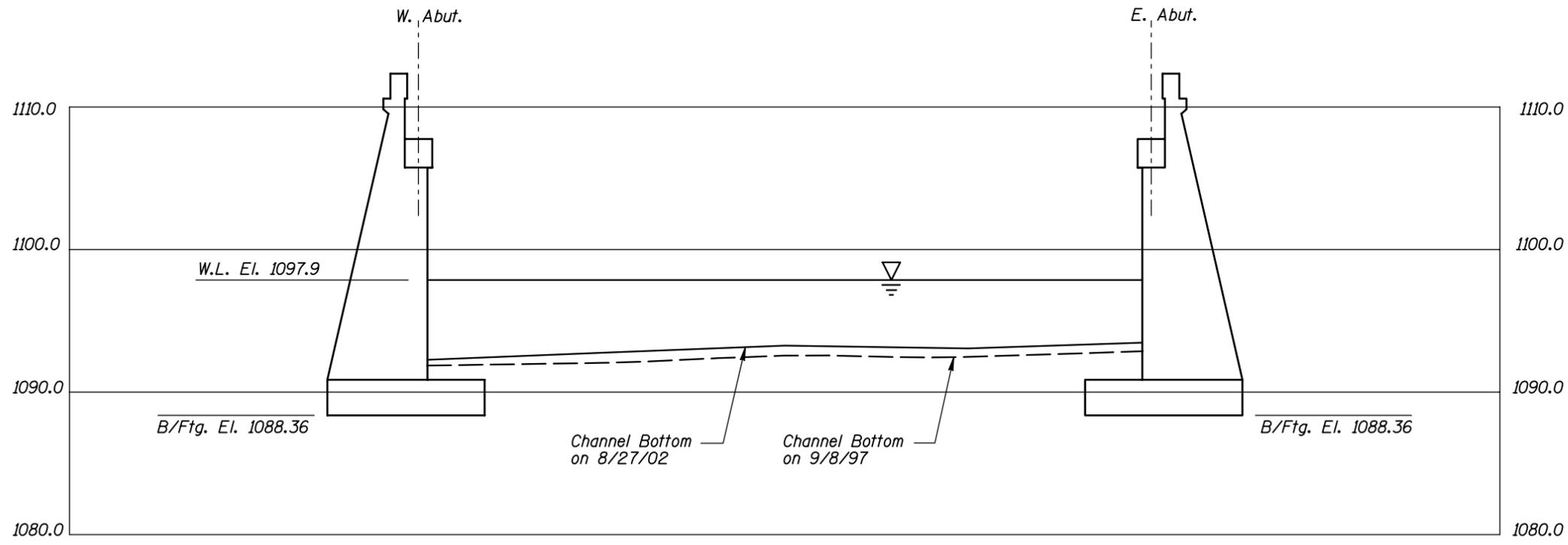
**INSPECTION NOTES:**

- 1 The channel bottom material consisted of silty sand with up to 1 foot of probe rod penetration.
- 2 1.5-foot-diameter void located at the waterline with 4 inches of penetration and no exposed reinforcing steel.
- 3 1-foot-diameter void located 1 foot below the waterline with 2 inches of maximum penetration.
- 4 3 feet along the wingwall and 4 feet along the breastwall, spalling and poor consolidation was observed from 0.5 feet above the waterline to 3 feet below the waterline with 6 inches of maximum penetration and lightly corroded exposed steel reinforcing at the corner of abutment and wingwall.
- 5 Random hairline map cracking was observed on the breastwalls and wingwalls from the waterline to 3 feet above the waterline.
- 6 The channel bottom material consisted of up to 1-foot-diameter riprap.
- 7 4-inch-diameter void and area of poor consolidation located at the waterline with 2 inches of penetration.

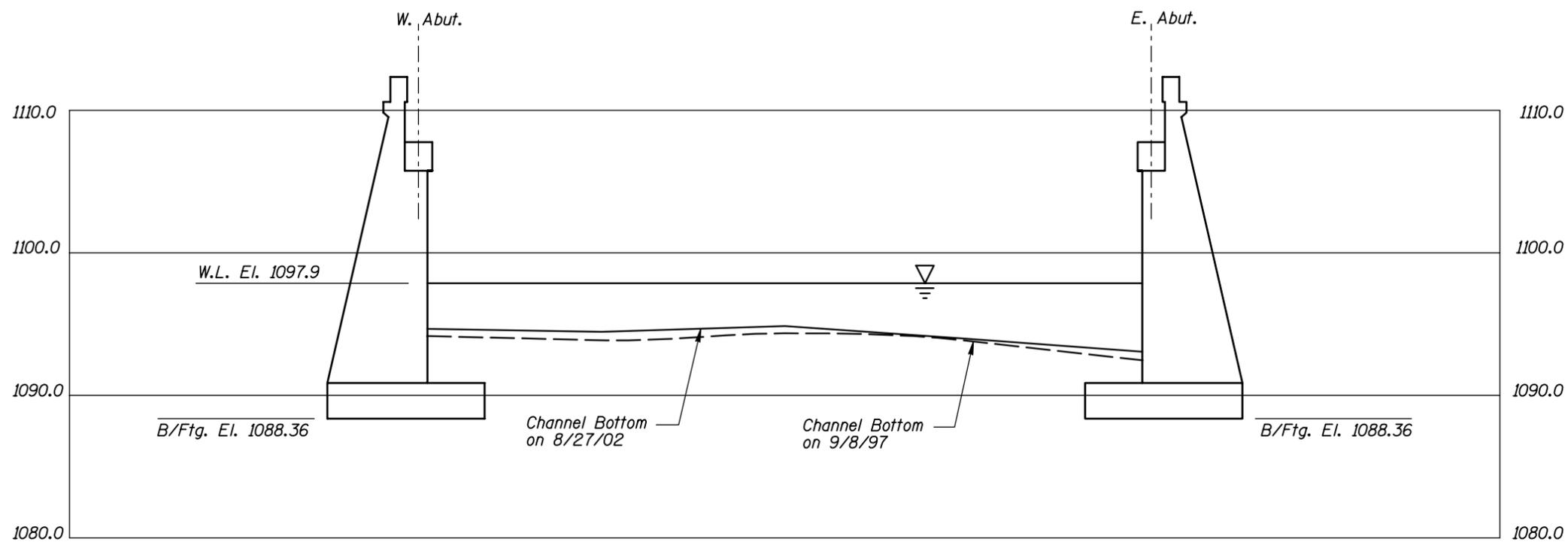
**Legend**

- 2.0 Sounding Depth from Waterline (8/27/02)
- 5.2 Sounding Depth from Waterline (9/8/97)

<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>		
STRUCTURE NO. 5824 OVER CLEARWATER RIVER DISTRICT 2, RED LAKE COUNTY		
<b>INSPECTION AND SOUNDING PLAN</b>		
Drawn By: PRH	<b>COLLINS ENGINEERS, INC.</b>	Date: AUG. 2002
Checked By: MDK	300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Scale: NTS
Code: 35120173		Figure No.: 1



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:  
Refer to Figure 1 for General Notes.

<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>		
STRUCTURE NO. 5824 OVER CLEARWATER RIVER DISTRICT 2, RED LAKE COUNTY		
<b>UPSTREAM AND DOWNSTREAM FASCIA PROFILES</b>		
Drawn By: PRH	 <b>COLLINS ENGINEERS, INC.</b> 300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Date: AUG. 2002
Checked By: MDK		Scale: 1"=10'
Code: 35I20I73		Figure No.: 2



Photograph 1. Overall View of the Structure, Looking Northwest.



Photograph 2. View of West Abutment, Looking Northwest.



Photograph 3. View of the Upstream End of the West Abutment.  
Note Spalling and Section Loss at Waterline.



Photograph 4. Overall View of the Structure, Looking Southeast.



MINNESOTA DEPARTMENT OF TRANSPORTATION  
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 5824  
INSPECTORS Collins Engineers, Inc.  
ON-SITE TEAM LEADER Daniel G. Stromberg, P.E. 21491  
WATERWAY CROSSED The Clearwater River

INSPECTION DATE August 27, 2002  
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
	East Abutment	5.0'	N	7	N	9	N	7	7	8	8	8	7	7	N	N	7	N	
	West Abutment	5.6'	N	6	N	9	N	6	7	8	8	8	7	6	N	N	6	N	

\*UNDERWATER PORTION ONLY

REMARKS: Overall, the abutments below water were found to be in good to satisfactory condition with no defects of structural significance observed. The West Abutment exhibited three areas of section loss and poor consolidation at or below the waterline. The areas of section loss typically had penetrations ranging between 3 and 6 inches, and the area at the upstream corner of the breastwall now has a small section of exposed and corroded reinforcing steel. The channel bottom has remained stable with no 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.