

UNDERWATER BRIDGE INSPECTION REPORT

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STRUCTURE NO. L9222

TWP 6205

OVER THE

BREDA CREEK

ST. LOUIS COUNTY

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SEPTEMBER 25, 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 below water at Structure No. L9222, the North and South Abutments, were found to be in satisfactory to fair condition with some defects of structural significance. The timber of the block footings and grade beam was sound and had no signs of decay. The grade beam was not bearing fully on the three easterly block footings of the South Abutment.

INSPECTION FINDINGS:

- (A) The channel bottom material consisted of sand, gravel, and scattered rocks allowing a maximum probe rod penetration of 4 inches.
- (B) The timber of the grade beam and block footings was typically sound with no signs of decay or deterioration.
- (C) The grade beam at the South Abutment was not bearing fully on the east three block footings. A 1 inch gap was observed between the top of the block footing and the bottom of the north face of the grade beam at each location.

RECOMMENDATIONS:

- (A) The three easterly block footings should be shimmed to restore full bearing to the grade beam at the South Abutment.
- (B) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of sixty (60) months.
- (C) The inspection of the submerged substructure units of Structure No. L9222 can most likely be accomplished in the future without the use of a dive team. To perform the underwater inspection, a properly equipped qualified inspector will have to enter the water during a period of low flow. As channel bottom contours and depths of flow can change quickly, it is recommended that lead line soundings of water depth be taken along the upstream and downstream fascias to determine whether wading is possible prior to beginning the inspection. If conditions are unsafe for inspection by wading, then an underwater inspection with the use of a dive team will be required.

Inspection Team Leader:  
Daniel G. Stromberg, P.E.

Respectfully submitted,

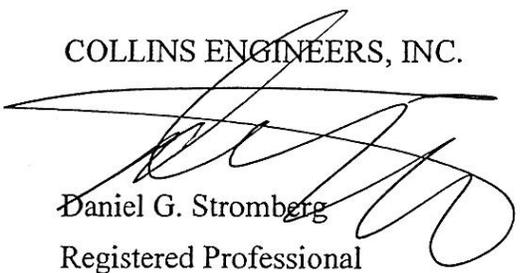
PROFESSIONAL ENGINEER

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: L9222

Feature Crossed: Breda Creek

Feature Carried: TWP 6205

Location: St. Louis County

Bridge Description: The superstructure consists of steel I-beams supported by 12 inch by 12 inch timber grade beams resting on ten 4 inch by 12 inch timber block footing boards.

2. INSPECTION DATA

Professional Engineer Diver: Daniel G. Stromberg, P.E.

Dive Team: Marc B. Parker, Clayton Brookins

Date: September 25, 2012

Weather Conditions: Cloudy, 50°F

Underwater Visibility: 2.0 feet

Waterway Velocity: None/Negligible

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: The North and South Abutments

General Shape: The superstructure consists of steel I-beam supported by 12 inch by 12 inch timber grade beams resting on ten 4 inch by 12 inch timber block footing boards.

Maximum Water Depth at Substructure Inspected: Approximately 3.0 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the timber deck at the east fascia midspan.

Water Surface: The waterline was approximately 3.1 feet below reference.  
Assumed Waterline Elevation = 96.9 feet.

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

Item 60: Substructure Condition: Code 5

Item 61: Channel and Channel Protection: Code 7

Item 92B: Underwater Inspection: Code A/09/12

Item 113: Scour Critical Bridges: Code K/12

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

Yes  No

6. STRUCTURAL ELEMENT CONDITION RATING

Item #	Element Description	Quantity	Unit	Conditions				
				1	2	3	4	5
216	Timber Abutment	36	LF	24	0	12	0	n/a
235	Timber Cap	36	LF	24	0	12	0	n/a
360	Settlement	1	EA	0	1	0	n/a	n/a
361	Scour	1	EA	1	0	0	n/a	n/a
985	Slopes and Slope Protection	1	EA	0	1	0	n/a	n/a



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



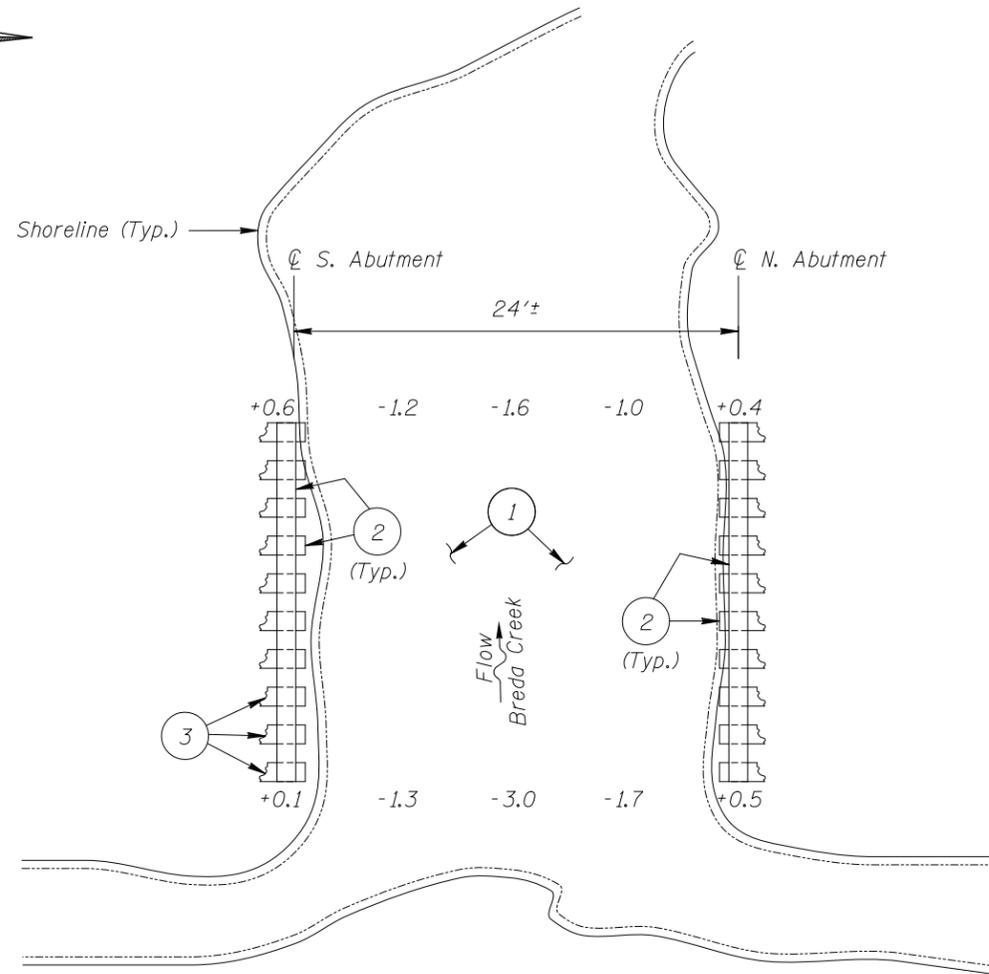
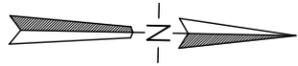
Photograph 2. View of the North Abutment, Looking Northeast.



Photograph 3. View of the South Abutment, Looking Southeast.



Photograph 4. View of the Typical Timber Condition at the Waterline of the Timber Block Footing Boards, Looking East.



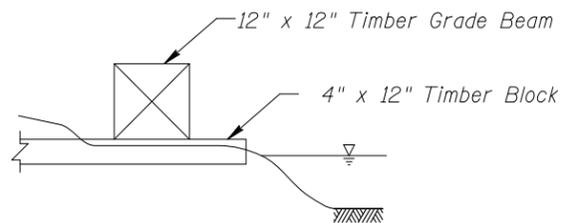
SOUNDING PLAN

INSPECTION NOTES:

- ① The channel bottom material consisted of sand, gravel, and scattered rocks allowing a maximum probe rod penetration of 4 inches.
- ② The timber of the grade beam and block footings was typically sound.
- ③ The grade beam at the South Abutment was not bearing fully on the east three block footings. A 1 inch gap was observed between the top of the block footings and the bottom of the north face of the grade beam.

GENERAL NOTES:

1. The North and South Abutments were inspected.
2. At the time of inspection, on September 25 2012, the waterline was located approximately 3.1 feet below the top of the timber deck at the east fascia midspan. Since insufficient elevation information was available, an elevation of 100.0 was assumed. This corresponds to a waterline elevation of 96.9.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.

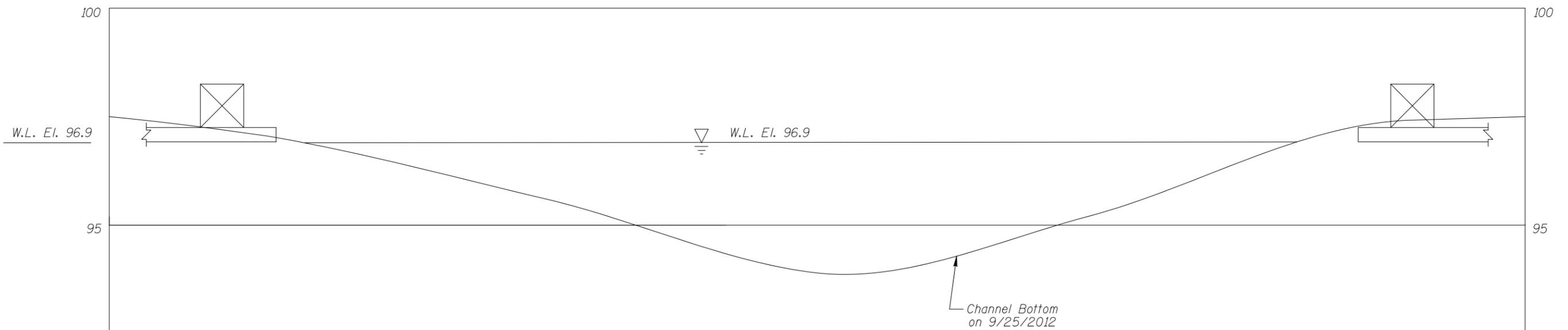
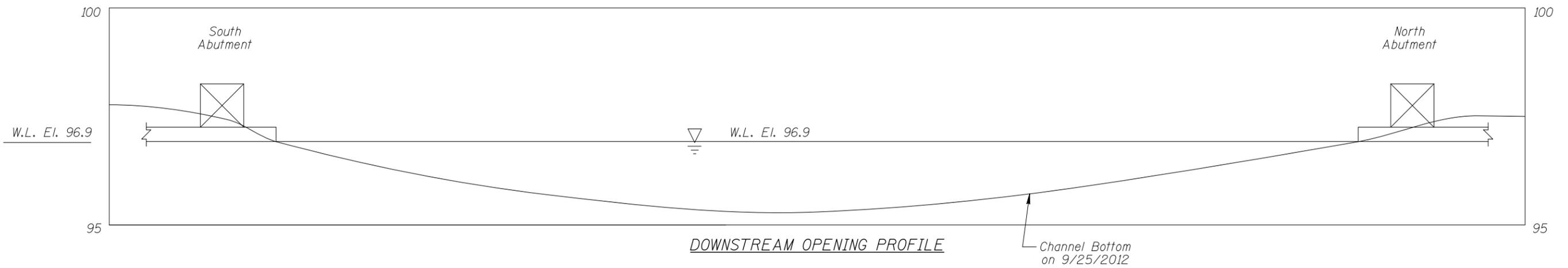


TYPICAL END VIEW

Legend

- 0.4 Sounding Depth (9/25/2012)
- ⑤ Inspection Note Number
- 4" x 12" Block Footing

<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>		
STRUCTURE NO. L9222 TWP 6205 OVER THE BRED A CREEK ST. LOUIS COUNTY		
<b>INSPECTION AND SOUNDING PLAN</b>		
Drawn By: MBP	<b>COLLINS ENGINEERS</b>	Date: NOVEMBER 2012
Checked By: LJ	<small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Scale: N.T.S.
Code: 7423L9222		Figure No.: I



UPSTREAM OPENING PROFILE

Note: \_\_\_\_\_  
 Refer to Figure 1 for General Notes.

<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>		
STRUCTURE NO. L9222 TWP 6205 OVER THE BREA CREEK ST. LOUIS COUNTY		
<b>UPSTREAM AND DOWNSTREAM FASCIA PROFILES</b>		
Drawn By: MBP	<b>COLLINS ENGINEERS</b> <small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: NOVEMBER 2012
Checked By: LJ		Scale: 1"=2.5'
Code: 7423L9222		Figure No.: 2

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

INSPECTORS: Collins Engineers, Inc. DATE: September 25, 2012

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

BRIDGE NO: L9222 WEATHER: Cloudy, 50° F

WATERWAY CROSSED: Breda Creek

DIVING OPERATION: \_\_\_\_\_ SCUBA \_\_\_\_\_ SURFACE SUPPLIED AIR  
X OTHER Inspection by Wading

PERSONNEL: Clayton Brookins, Marc B. Parker

EQUIPMENT: Dry Suit, Sounding Pole, Hand Tools, Camera, Underwater Light

TIME IN WATER: 1:10 P.M.

TIME OUT OF WATER: 1:30 P.M.

WATERWAY DATA: VELOCITY None/Negligible

VISIBILITY 2 feet

DEPTH 3.0 feet maximum

ELEMENTS INSPECTED: The North and South Abutments

REMARKS: Overall, the substructure units inspected were found to be in satisfactory to fair condition with some defects of structural significance. The timber of the block footings and grade beam was sound and had no signs of decay. The grade beam was not bearing fully on the three easterly block footings of the South Abutment.

FURTHER ACTION NEEDED:      X   YES               NO

The three easterly block footings should be shimmed to restore full bearing to the grade beam at the South Abutment.

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of sixty (60) months.

The inspection of the submerged substructure units of Structure No. L9222 can most likely be accomplished in the future without using a dive team. To perform the underwater inspection, a properly equipped qualified inspector will have to enter the water during a period of low flow. As channel bottom contours and depths of flow can change quickly, it is recommended that lead line soundings of water depth be taken along the upstream and downstream fascias to determine whether wading is possible prior to beginning the inspection. If conditions are unsafe for inspection by wading, then an underwater inspection with the use of a dive team will be required.

MINNESOTA DEPARTMENT OF TRANSPORTATION  
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. L9222  
 INSPECTORS Collins Engineers, Inc.  
 ON-SITE TEAM LEADER Daniel G. Stromberg, P.E.  
 WATERWAY CROSSED Breda Creek

INSPECTION DATE September 25, 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	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER	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
	North Abutment	Dry	N	7	N	N	N	7	N	N	7	N	7	N	N	7	N	N	N
	South Abutment	Dry	N	6	N	5	N	5	N	N	7	N	7	N	N	7	N	N	N

\*UNDERWATER PORTION ONLY

REMARKS: Overall, the substructure units inspected were found to be in satisfactory to fair condition with some defects of structural significance. The timber of the block footings and grade beams was sound and had no signs of decay. The grade beam was not bearing fully on the three easterly block footings of the South Abutment.

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.