

UNDERWATER BRIDGE INSPECTION REPORT

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STRUCTURE NO. R0278

UT NO. 11

OVER

STREAM

DISTRICT 1 - KOOCHICHING COUNTY

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AUGUST 13, 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 No. R0278, North and South Abutments, were found to generally be in satisfactory condition with no structurally significant defects at this time. The channel bottom around the substructure units appeared stable with no evidence of significant scour.

INSPECTION FINDINGS:

- (A) All wingwalls and planking were displaced with evidence of fill material spilling out.
- (B) The plank on the west wingwall of the North Abutment as well as both wingwalls on the south abutment (first two from the top) have failed at the joint backwall area, exposing some backfill.
- (C) Vegetation was growing from the beam cap between wingwalls and abutment faces.
- (D) Backwall plank at the downstream end of the North Abutment was heavily deteriorated.
- (E) There was a 6 inch wide by 3 feet long by 6 inches deep gap along the backwall by the second pile from the downstream end of the north abutment.
- (F) There was a 3 inch wide by 3 feet long by 6 inches deep gap along the backwall by the fourth pile from the downstream end of the North Abutment.
- (G) The outer shell of the downstream pile of the North Abutment and upstream pile of the South Abutment was split and delaminated all around the circumference with a 2 inch depth. This condition extends from the top of the pile to 2 feet below the waterline.
- (H) The second and third piles from the downstream end of the North Abutment

exhibited surface cracking and delaminating on portions of the perimeter with 0.5 to 1 inch of maximum penetration in outer shell from the top of pile to 2 feet below the waterline.

- (I) The first pile on the downstream end of the South Abutment was split and delaminated with a 2 inch penetration. This condition extends from the top of pile to 1 foot below the waterline.
- (J) There was a 3 inch wide by 6 inch penetration gap (reduced bearing area) between the pile caps and all piles on South Abutment.
- (K) The channel bottom consisted of silty sand with a maximum probe rod penetration of 3 inches.
- (L) The backwall between the first and second pile from downstream end of South Abutment exhibited a gap 5 feet long by 6 inches wide by 6 inches deep between pile cap and backwall.
- (M) The two middle piles on the South Abutment exhibited a 1/2 inch wide split.
- (N) The southwest pile on the South Abutment exhibited a 1/2 inch and 1 inch wide split from the top of the pile to 2 feet above the channel bottom.
- (O) Accumulation of timber debris consisting of 3 inch diameter and smaller branches extending from the channel bottom to 3 feet above the waterline

.RECOMMENDATIONS:

- (A) Remove vegetation from the beam cap to prevent accelerated deterioration.
- (B) Monitor gaps and loss of backfill at all wingwalls, and if found to be affecting the roadway embankment, repair may be necessary.
- (C) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of sixty (60) months.

**Inspection Team Leader**



**Roy A. Forsyth, PE**  
**Date 6/30/2014 License# 49270**

Respectfully submitted,

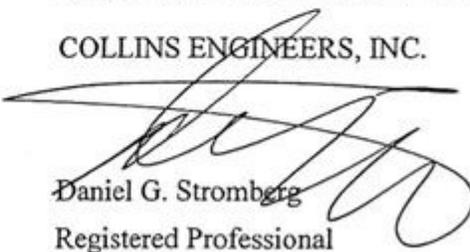
**PROFESSIONAL ENGINEER**

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: R0278

Feature Crossed: Stream

Feature Carried: UT 11

Location: District 1 - Koochiching County

Bridge Description: The bridge superstructure consists of a single span timber deck stringer structure supported by two timber pile abutments.

2. INSPECTION DATA

Professional Engineer/Team Leader: Roy A. Forsyth, P.E.

Dive Team: Jordan Furlan, P.E., Charles Euwema

Date: August 13, 2012

Weather Conditions: Sunny, 80°F

Underwater Visibility: None / Negligible

Waterway Velocity: Negligible

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: North and South Abutments.

General Shape: Abutments consist of timber caps and backwall planking supported by timber piles. Skewed wingwalls at each end of each abutment are similarly constructed.

Maximum Water Depth at Substructure Inspected: Approximately 6.5 feet.

4. WATERLINE DATUM

Water Level Reference: The bottom of the seat at the upstream corner of North Abutment.

Water Surface: The waterline was approximately 0.5 feet below reference.  
Waterline Elevation = 99.5.

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 8

Item 92B: Underwater Inspection: Code B/08/12

Item 113: Scour Critical Bridges: Code G/07

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 ELEMENT CONDITION RATING

Item #	Element Description	Quantity	Unit	Conditions				
				1	2	3	4	5
216	Timber Abutment	33	LF		20	13		
228	Timber Piling	14	EA	10	3	1		
386	Timber Wingwall	4	EA			4		



Photograph 1. View of North Abutment, Looking Northeast.



Photograph 2. View of South Abutment, Looking Southeast.



Photograph 3. View of Northeast Wingwall, Looking Northwest.



Photograph 4. View of Northwest Wingwall, Looking Northeast.

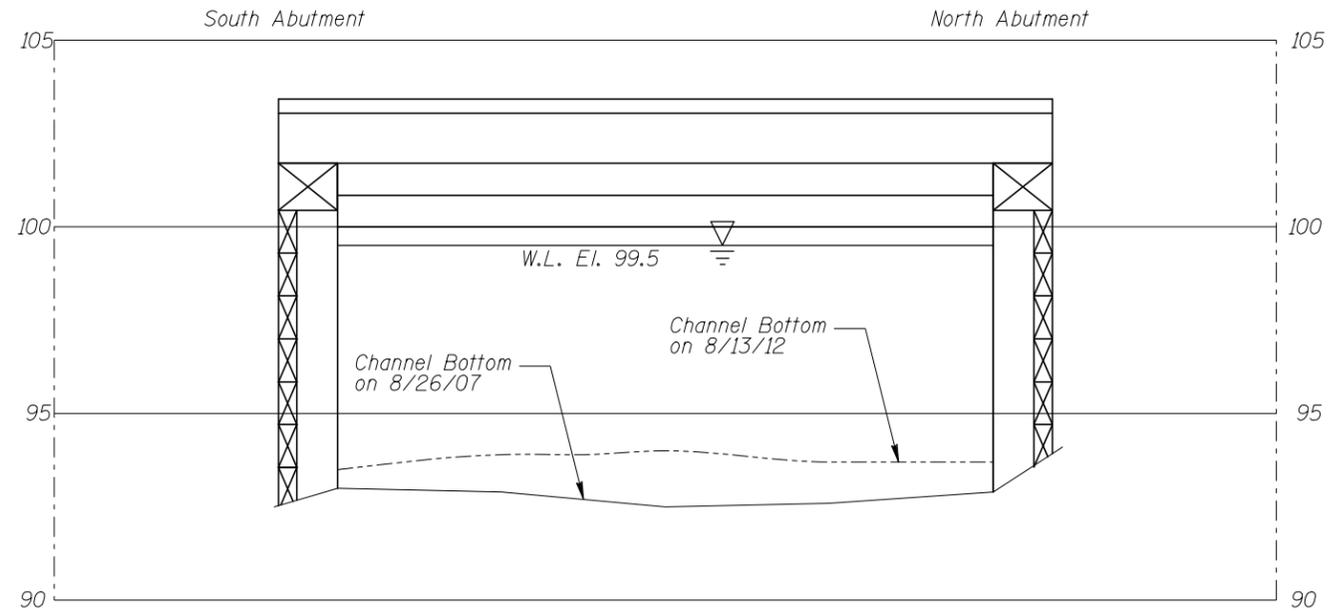


Photograph 5. View of Southeast Wingwall, Looking Southwest.

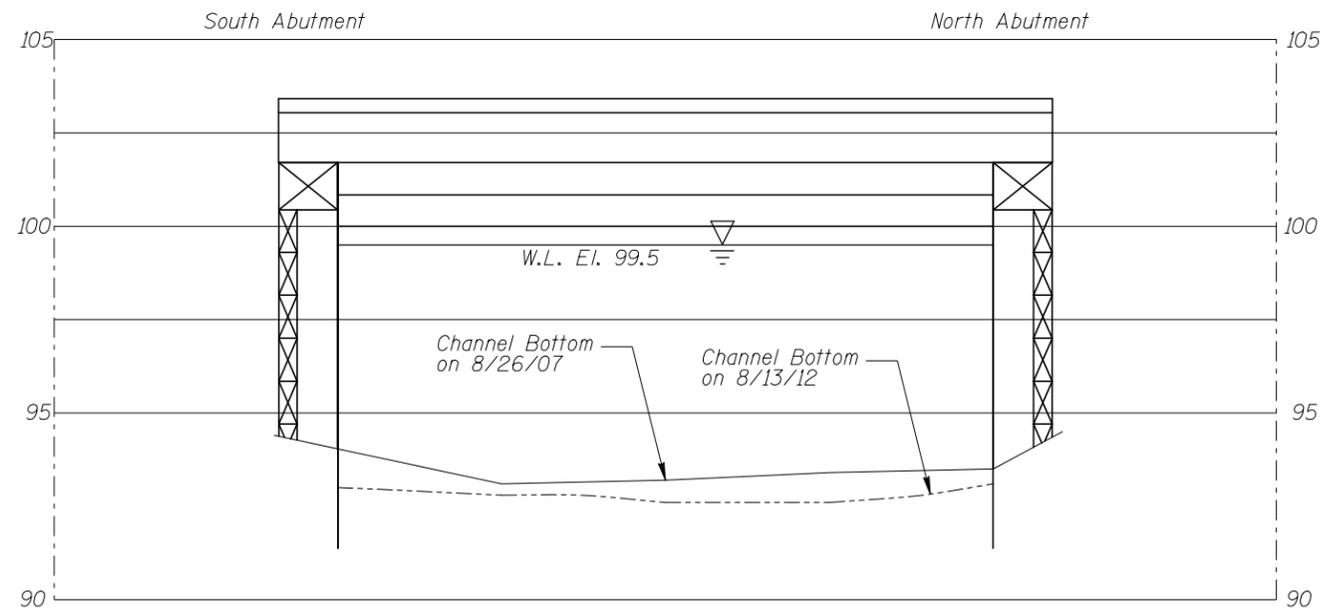


Photograph 6. View of Southwest Wingwall, Looking Southeast.





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. R0278 OVER A STREAM DISTRICT I, KOOCHICING COUNTY <b>UPSTREAM AND DOWNSTREAM FASCIA PROFILES</b>		
Drawn By: JTF	<b>COLLINS ENGINEERS</b> <small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: AUGUST 2012
Checked By: MDK		Scale: N.T.S.
Code: 522R0278		Figure No.: 2

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

INSPECTORS: Collins Engineers, Inc. DATE: August 13, 2012  
ON-SITE TEAM LEADER: Roy A Forsyth, P.E.  
BRIDGE NO: R0278 WEATHER: Sunny, 80°F  
WATERWAY CROSSED: Stream  
DIVING OPERATION:  SCUBA  SURFACE SUPPLIED AIR  
 OTHER  
PERSONNEL: Jordan Furlan, P.E., Charles Euwema  
EQUIPMENT: Scuba, Probe Rod, Lead Line, Sounding Pole, U/W Light, Scraper, Camera  
TIME IN WATER: 10:45 a.m.  
TIME OUT OF WATER: 11:15 a.m.  
WATERWAY DATA: VELOCITY 0 ft/s  
VISIBILITY None/Negligible  
DEPTH 6.5 feet maximum at South Abutment

ELEMENTS INSPECTED: North and South Abutments  
REMARKS: Overall, the structure was in satisfactory condition with no structurally significant defects at this time. The wingwalls and/or their planking of both abutments were displaced with evidence of fill material spilling out. The planks on the west wingwall of the North Abutment and both wingwalls of South Abutment have failed at the joint with the backwall area exposing some backfill. There was also a moderate amount of vegetation growing between the planking. A backwall plank at the downstream end of the North Abutment was heavily deteriorated. All the piles at the South Abutment were split and delaminated as was the downstream pile at the North Abutment with penetrations of up to 2 inches. There was up to 3 inch gap with up to 6 inches of penetration (reduced bearing area) between the pile cap and all piles at the South Abutment. There was a timber debris accumulation all along the northeast wingwall that consisted of 3 inch diameter and smaller branches extending from the channel bottom to 3 feet above the waterline.

FURTHER ACTION NEEDED:      X   YES               NO

Remove vegetation from the beam cap to prevent accelerated deterioration.

Monitor gaps and loss of backfill at all wingwalls, and if found to be affecting the roadway embankment, repair may be necessary.

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. R0278  
INSPECTORS Collins Engineers, Inc.  
ON-SITE TEAM LEADER Roy A. Forsyth, P.E.  
WATERWAY CROSSED Stream

INSPECTION DATE August 13, 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 (WINGWALL)	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
	North Abutment	6.4'	6	7	N	8	5	5	8	8	N	N	8	N	N	6	N	N	N
	South Abutment	6.5'	6	7	N	8	5	5	8	8	N	N	8	N	N	6	N	N	N

\*UNDERWATER PORTION ONLY

REMARKS: Overall, the structure was in satisfactory condition with no structurally significant defects at this time. The wingwalls and/or their planking of both abutments were displaced with evidence of fill material spilling out. The planks on the west wingwall of the North Abutment and both wingwalls of South Abutment have failed at the joint with the backwall area exposing some backfill. There was also a moderate amount of vegetation growing between the planking. A backwall plank at the downstream end of the North Abutment was heavily deteriorated. All the piles at the South Abutment were split and delaminated as was the downstream pile at the North Abutment with penetrations of up to 2 inches. There was up to 3 inch gap with up to 6 inches of penetration (reduced bearing area) between the pile cap and all piles at the South Abutment. There was a timber debris accumulation all along the northeast wingwall that consisted of 3 inch diameter and smaller branches extending from the channel bottom to 3 feet above the waterline.

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.