

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 69602

CR 694

OVER THE

CLOQUET RIVER

ST. LOUIS COUNTY



SEPTEMBER 26, 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. 69602, Bents 1 and 2, were found to be in satisfactory condition, with no defects of structural significance. The steel shell piles exhibited coating loss on approximately 90 percent of the pile surface area with associated areas of light corrosion and rust nodules. A light accumulation of timber debris was observed at the upstream end of Bent 1.

INSPECTION FINDINGS:

- (A) The channel bottom material typically consisted of 8 inch diameter and smaller stones and cobbles with no probe rod penetration.
- (B) The piles of Bents 1 and 2 exhibited coating loss on approximately 90 percent of their surface area extending from the channel bottom to 2 feet above the waterline with light corrosion extending from the waterline to 1 foot above the waterline.
- (C) The piles of Bent 1 exhibited rust nodules, up to 1/4 inch in diameter, covering approximately 20 percent of the pile surface area extending from the channel bottom to 1 foot below the waterline.
- (D) A light accumulation of 2 inch diameter and smaller timber debris was observed around the upstream three piles of Bent 2.

RECOMMENDATIONS:

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

Respectfully submitted,

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

COLLINS ENGINEERS, INC.

Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 69602

Feature Crossed: Cloquet River

Feature Carried: CR 694

Location: St. Louis County

Bridge Description: The superstructure consisted of a concrete deck supported by precast concrete girders. The substructure consisted of two concrete abutments and two pile bents. Each pile bent consisted of seven steel encased concrete piles. The pile bents are named Bent 1 and 2 from south to north.

2. INSPECTION DATA

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

Dive Team: Marc B. Parker, Clay G. Brookins

Date: September 26, 2012

Weather Conditions: Sunny, 55° F

Underwater Visibility: 3 feet

Waterway Velocity: 1 ft/sec

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Bents 1 and 2

General Shape: The superstructure consisted of a concrete deck supported by precast concrete girders. The substructure consisted of two concrete abutments and two pile bents. Each pile bent consisted of seven steel encased concrete piles. The pile bents are named Bent 1 and 2 from south to north.

Maximum Water Depth at Substructure Inspected: Approximately 3.0 feet.

4. WATERLINE DATUM

Water Level Reference: Top of the pile cap at the upstream end of Bent 2.

Water Surface: The waterline was approximately 12.3 feet below the reference.
Waterline Elevation 87.7.

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

Item 60: Substructure: Code 6

Item 61: Channel and Channel Protection: Code 7

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

Item 113: Scour Critical Bridges: Code N/12

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
382	Cast-In-Place Piles	14	EA	7	7	0	0	n/a
985	Slopes and Slope Protection	1	EA	1	0	0	n/a	n/a



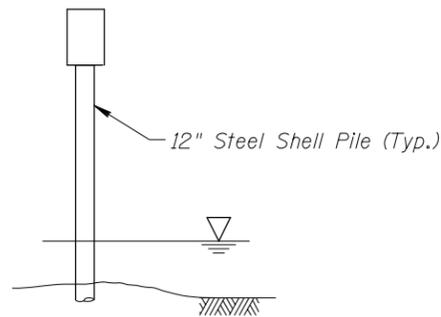
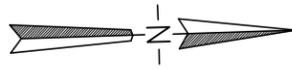
Photograph 1. Overall View of Structure, Looking Northeast



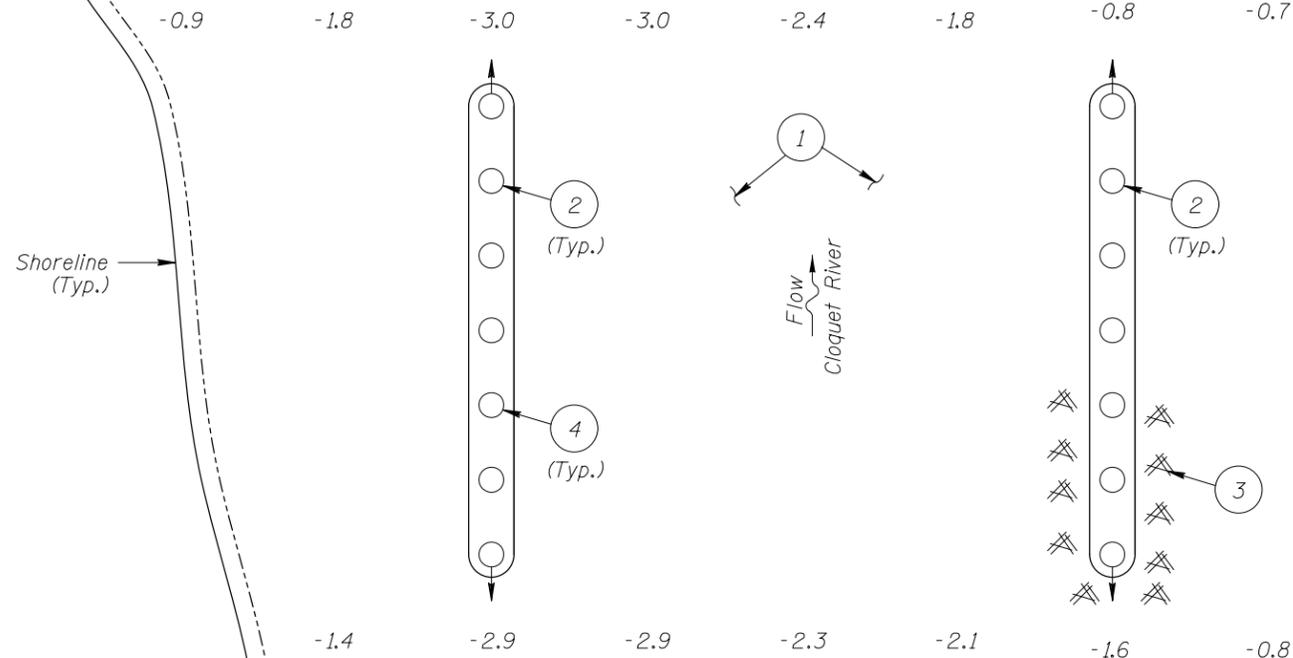
Photograph 2. View of the Bent 1, Looking Northwest.



Photograph 3. View of Bent 2, Looking Southwest.



TYPICAL END VIEW OF BENT



SOUNDING PLAN

Legend

- 17.0 Sounding Depth from Waterline (9/26/2012)
- 12-inch Diameter Steel Shell Pile
- Battered 12-inch Diameter Steel Shell Pile
- ⌘ Timber Debris
- ① Inspection Note Number

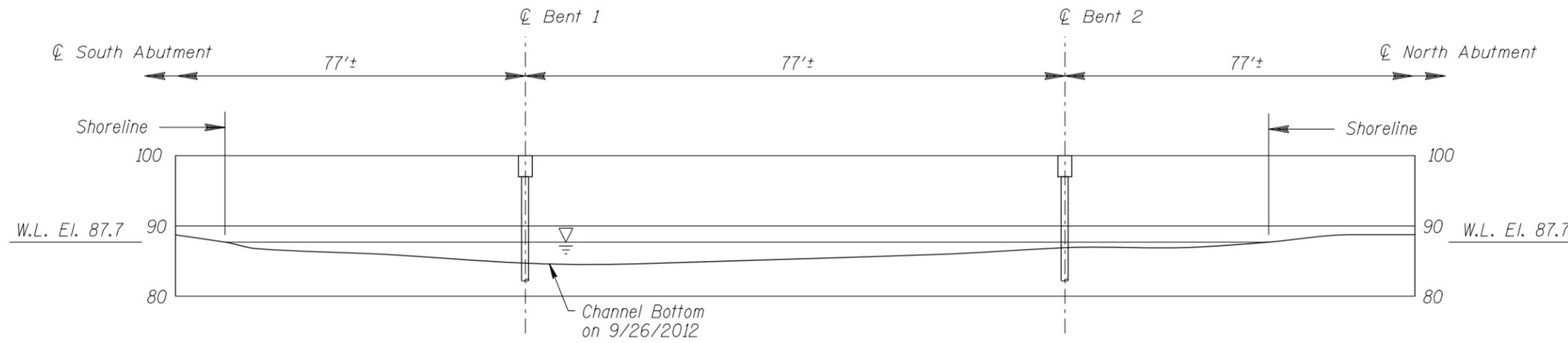
INSPECTION NOTES:

- ① The channel bottom material typically consisted of 8 inch diameter and smaller stones and cobbles allowing no probe rod penetration.
- ② The piles of Bents 1 and 2 exhibited coating loss on approximately 90 percent of their surface area extending from the channel bottom to 2 feet above the waterline with light corrosion extending from the waterline to 1 foot above the waterline.
- ③ The piles of Bent 1 exhibited rust nodules, up to 1/4 inch in diameter, covering approximately 20 percent of the pile surface area extending from the channel bottom to 1 foot below the waterline. The nodules typically have negligible pitting of the steel associated with them.
- ④ A light accumulation of 2 inch diameter and smaller timber debris was observed around the upstream three piles of Bent 2.

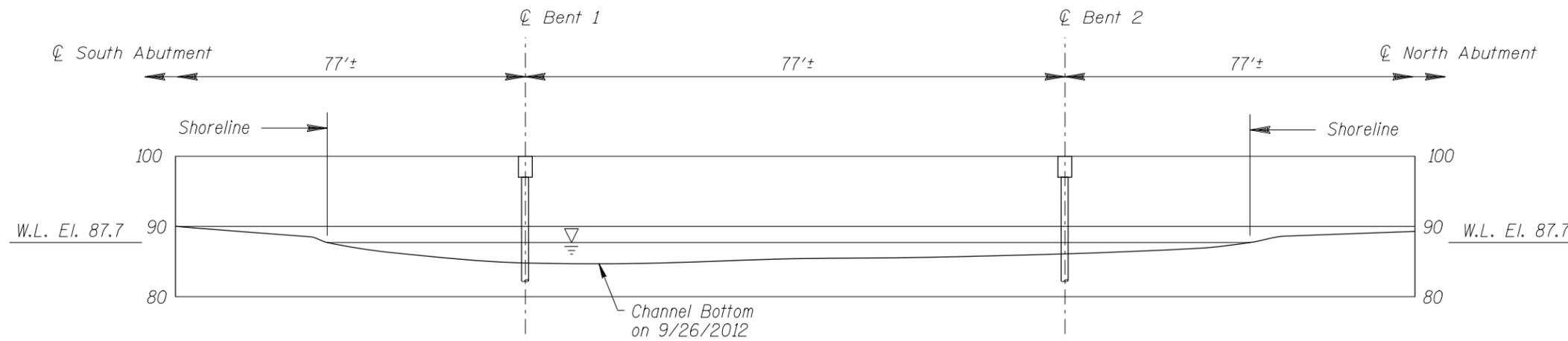
GENERAL NOTES:

1. Bents 1 and 2 were inspected during the underwater inspection.
2. At the time of inspection on September 26, 2012, the waterline was located approximately 12.3 feet below the top of the pile cap at the upstream end of Bent 2. Since elevation information was not available a reference elevation of 100.0 was assumed. Based on the assumed reference the waterline elevation was 87.7.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 69602 CR 694 OVER THE CLOQUET RIVER ST. LOUIS COUNTY		
INSPECTION AND SOUNDING PLAN		
Drawn By: MBP	COLLINS ENGINEERS	Date: NOVEMBER, 2012
Checked By: LJ	<small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Scale: NTS
Code: 742369602		Figure No.: 1



DOWNSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note: _____
 Refer to Figure 1 for General Notes.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 69602 CR 694 OVER THE CLOQUET RIVER ST. LOUIS COUNTY		
UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
Drawn By: MBP Checked By: LJ Code: 742369602	COLLINS ENGINEERS	123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com
Date: NOVEMBER, 2012		Scale: 1"=20' Figure No.: 2

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

INSPECTORS: Collins Engineers, Inc. DATE: September 26, 2012

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

BRIDGE NO: 69602 WEATHER: Sunny, 55° F

WATERWAY CROSSED: Cloquet River

DIVING OPERATION: SCUBA SURFACE SUPPLIED AIR
 OTHER

PERSONNEL: Marc B. Parker, Clayton G. Brookins

EQUIPMENT: Commercial Scuba, Probe Rod, Camera, Hand Tools

TIME IN WATER: 5:55 P.M.

TIME OUT OF WATER: 6:20 P.M.

WATERWAY DATA: VELOCITY 1 ft/sec

VISIBILITY 3 feet

DEPTH 3.0 feet maximum

ELEMENTS INSPECTED: Bents 1 and 2

REMARKS: Overall, the substructure units inspected underwater were found to be in satisfactory condition, with no defects of structural significance. The steel shell piles exhibited coating loss on approximately 90 percent of the pile surface area with associated areas of light corrosion and rust nodules. A light accumulation of timber debris was observed at the upstream end of Bent 1.

FURTHER ACTION NEEDED: YES NO

Reinspect the submerged substructure 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. 69602
 INSPECTORS Collins Engineers, Inc.
 ON-SITE TEAM LEADER Daniel G. Stromberg, P.E.
 WATERWAY CROSSED Cloquet River

INSPECTION DATE September 26, 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 (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
	Bent 1	3.0'	N	6	N	N	N	6	N	N	8	N	8	N	6	N	N	N	N
	Bent 2	1.6'	N	7	N	N	N	7	N	N	8	7	7	N	7	N	N	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the substructure units inspected underwater were found to be in good to satisfactory condition, with no defects of structural significance. The steel shell piles exhibited coating loss on approximately 90 percent of the pile surface area with associated areas of light corrosion and rust nodules. A light accumulation of timber debris was observed at the upstream end of Bent 1.

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.