

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 69536
TWP NO. 415
OVER THE
CHANNEL AT LAKE VERMILLION
ST. LOUIS COUNTY



JUNE 21, 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. 69536, Piers 1 and 2, were found to be in good condition with no defects of structural significance observed. The coating loss and surface corrosion on the pipe piles was comparable to the findings in the previous 2007 underwater inspection report. The corrosion consisted of rust nodules and pitting below the waterline. Areas of minor coating loss and surface corrosion were also observed above the waterline. The channel bottom appeared to be stable with no evidence of significant scour or appreciable changes since the previous inspection.

INSPECTION FINDINGS:

- (A) The steel pipe piles exhibited small random areas of coating loss above water with minor surface corrosion on the exposed steel and no appreciable section loss.
- (B) The steel pipe piles exhibited 50 to 75 percent coating loss with heavy nodular corrosion, consisting of nodules that were 1 to 1.5 inches in diameter and with typical pitting of 1/32 inch in deep and up to 1/16 inch maximum, extending from 2 feet below the waterline to the channel bottom.
- (C) The channel bottom material typically consisted of firm sand with scattered riprap up to 18 inches in diameter allowing a maximum probe rod penetration of 3 inches.

RECOMMENDATIONS:

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

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

Respectfully submitted,

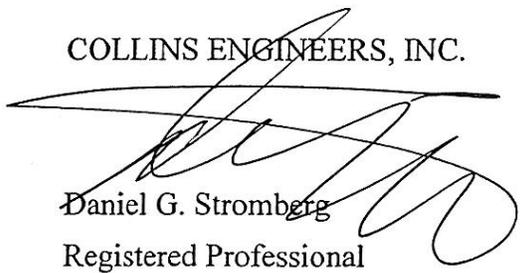
PROFESSIONAL ENGINEER

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: 69536

Feature Crossed: Channel at Lake Vermillion

Feature Carried: TWP No. 415

Location: St. Louis County

Bridge Description: The superstructure is a three span, multiple prestressed concrete girder bridge supporting a reinforced concrete deck. The superstructure is supported by two reinforced concrete abutments and two steel shell pile bent piers. The abutments are founded on spread footings keyed into bedrock. The piers are numbered 1 and 2 starting from the west end of the bridge.

2. INSPECTION DATA

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

Dive Team: Clayton Brookins, Breanne Stromberg

Date: June 21, 2012

Weather Conditions: Sunny, 75°F

Underwater Visibility: 4.0 feet

Waterway Velocity: Negligible/None

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 and 2.

General Shape: Rectangular reinforced concrete pile cap with rounded ends supported by four concrete-filled steel shell piles.

Maximum Water Depth at Substructure Inspected: Approximately 6.0 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap on the south end of Pier 1.

Water Surface: The waterline was approximately 7.1 feet below reference.
Assumed Waterline Elevation = 92.9.

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 8

Item 92B: Underwater Inspection: Code B/06/12

Item 113: Scour Critical Bridges: Code I/92

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 (CIP) Piling	8	EA		8			



Photograph 1. View of South Fascia, Looking Northeast.



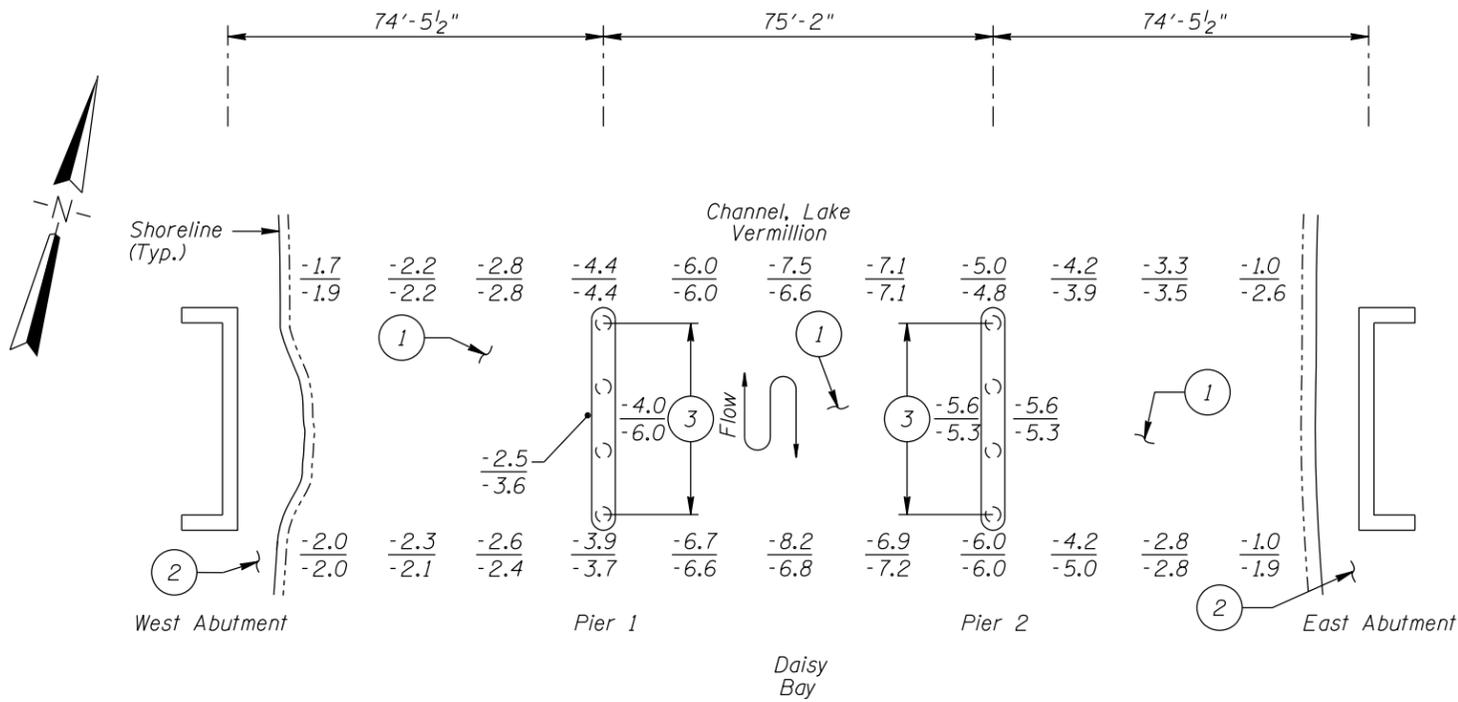
Photograph 2. View of North Fascia, Looking Southwest.



Photograph 3. View of Pier 1, Looking Northeast.



Photograph 4. View of Pier 2, Looking Northeast.



GENERAL NOTES:

1. Piers 1 and 2 were inspected underwater.
2. At the time of inspection on June 21, 2012, the waterline was located approximately 7.1 feet below the top of the cap at the south end of Pier 1. Since insufficient bridge elevation information was available a reference elevation of 100.0 was assumed. Based on the assumed reference the waterline elevation was 92.9.
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 typically consisted of firm sand with scattered riprap up to 18 inches in diameter allowing a maximum probe rod penetration of 1 to 3 inches.
- ② Both shorelines were well protected with 12 inch to 3 foot diameter riprap material along the banks.
- ③ The steel pipe piles exhibited 50 to 75 percent coating loss from 2 feet below the waterline to the channel bottom with heavy nodular corrosion (50 percent coverage), ranging in size from 1 to 1.5 inches in diameter. Rust nodules exhibited typical pitting of 1/32 inch deep and a maximum of 1/16 inch deep.
- ④ Above water there were random small areas of coating failure with surface corrosion on the exposed steel. These areas had no measurable loss of section.

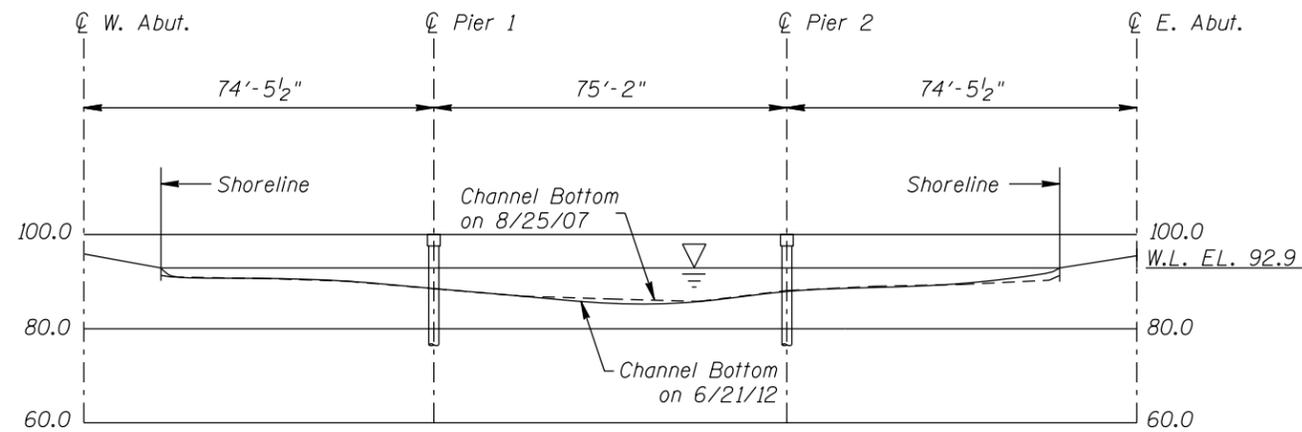


TYPICAL END VIEW OF PIERS

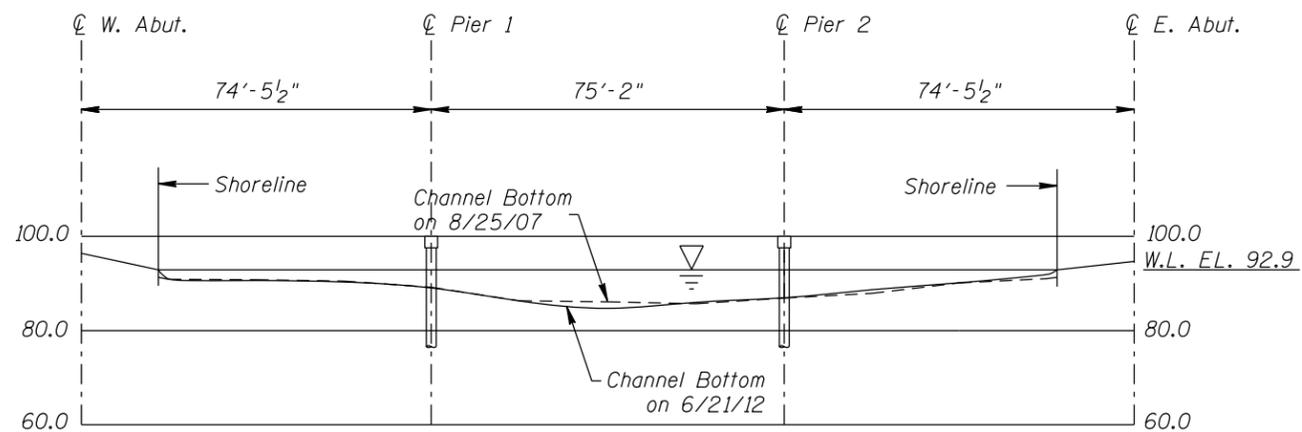
Legend

- 4.0 Sounding Depth (6/21/12)
- 3.5 Sounding Depth (8/25/07)
- ⊍ Concrete Filled Steel Pipe Pile

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 69536 TWP 415 OVER THE CHANNEL, LAKE VERMILLION ST. LOUIS COUNTY		
INSPECTION AND SOUNDING PLAN		
Drawn By: BMS	COLLINS ENGINEERS	Date: JUNE 2012
Checked By: LJ	<small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Scale: NTS
Code: 742369536		Figure No.: 1



NORTH FASCIA PROFILE



SOUTH FASCIA PROFILE

Note:
Refer to Figure 1 for General Notes.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 69536 TWP 415 OVER THE CHANNEL, LAKE VERMILLION ST. LOUIS COUNTY		
NORTH AND SOUTH FASCIA PROFILES		
Drawn By: BMS	COLLINS ENGINEERS <small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: JUNE 2012
Checked By: LJ		Scale: 1"=40'
Code: 742369536		Figure No.: 2

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

INSPECTORS: Collins Engineers, Inc. DATE: June 21, 2012

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

BRIDGE NO: 69536 WEATHER: Sunny, 75° F

WATERWAY CROSSED: Channel at Lake Vermillion

DIVING OPERATION: SCUBA SURFACE SUPPLIED AIR
 OTHER

PERSONNEL: Clayton Brookins, Breanne Stromberg

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

TIME IN WATER: 2:15 P.M.

TIME OUT OF WATER: 2:45 P.M.

WATERWAY DATA: VELOCITY Negligible/None

VISIBILITY 4.0 feet

DEPTH 6.0 feet maximum at Pier 2

ELEMENTS INSPECTED: Piers 1 and 2

REMARKS: Overall, Piers 1 and 2 were found to be in good condition with no defects of structural significance observed. The coating loss and surface corrosion on the pipe piles is similar to the findings in the previous 2007 underwater inspection, exhibiting coating loss, minor rust nodules, and pitting below the waterline. Above the waterline partial coating loss and minor corrosion was observed on the piles. The channel bottom appeared to be stable with no evidence of significant scour or appreciable changes since the previous inspection.

FURTHER ACTION NEEDED: YES NO

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. 69536
 INSPECTORS Collins Engineers, Inc.
 ON-SITE TEAM LEADER Daniel G. Stromberg, P.E., S.E.
 WATERWAY CROSSED Channel, Lake Vermillion

INSPECTION DATE June 21, 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 (DRIFT/DEBRIS)	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	N	9	10	11	12	13	14	15	16	17	18
	Pier 1	4.4'	7	N	N	8	N	7	N	8	8	N	8	N	7	N	7	N	N
	Pier 2	6.0'	7	N	N	8	N	7	N	8	8	N	8	N	7	N	7	N	N

*UNDERWATER PORTION ONLY

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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.