

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 69502

CSAH 133

OVER THE

WHITEFACE RIVER

ST. LOUIS COUNTY



JULY 25, 2012

PREPARED FOR THE
MINNESOTA DEPARTMENT OF TRANSPORTATION

BY
COLLINS ENGINEERS, INC.

AND
WSB & ASSOCIATES, INC.

JOB NO. 2107

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected below water at Bridge No. 69502, Piers 1 and 2, were in good condition with no defects of structural significance. Moderate scaling was observed from 1 foot above the to 2 feet below the water line, with a maximum of 1/4 inch penetration. No footing exposure was detected around either pier. Moderate accumulation of timber debris was observed around Pier 2 consisting of logs and branches with up to 12 inch diameter. The debris extended from the channel bottom to 4 feet above the waterline. Both the East and West Abutments had undermining exposing the supporting piles.

INSPECTION FINDINGS:

- (A) A moderate accumulation of timber debris consisting of logs and branches up to 12 inches in diameter was found around the Pier 2 extending from 15 feet upstream off the upstream nose and up to 10 feet off the west face. The debris extended from the channel bottom to 4 feet above the waterline.
- (B) Moderate scaling was observed from 1 foot above to 2 feet below the water line, with a maximum of 1/4 inch penetration.
- (C) The channel bottom material consisted of sandy silt allowing 1 foot of probe rod penetration.
- (D) Both abutments exhibited undermining. The East Abutment had 5 feet of undermining measuring 4 inches vertical with 4 inches of penetration. The West Abutment had 20 feet of undermining in length measuring up to 14 inches vertical with 18 inches of penetration.

RECOMMENDATIONS:

- (A) Repair undermining and slope protection at both abutments.
- (B) Monitor timber debris accumulation at Pier 2 and if found to be increasing in the future, removal operations may be warranted
- (C) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of sixty (60) months.

WSB and Associates



Barritt Lovelace
Registered Professional Engineer
Bridge Safety Inspection Team Leader

Respectfully submitted,

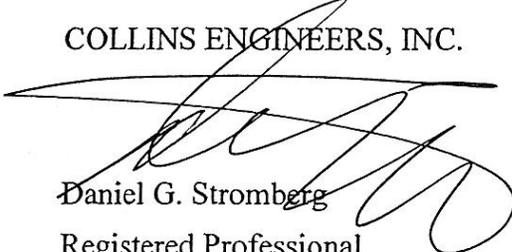
PROFESSIONAL ENGINEER

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: 69502

Feature Crossed: Whiteface River

Feature Carried: CSAH 133

Location: St. Louis County

Bridge Description: The superstructure consists of three spans of steel beams supporting a reinforced concrete deck. The bridge is supported by two reinforced concrete abutments supported by piles and two reinforced concrete wall piers.

2. INSPECTION DATA

Professional Engineer/Team Leader: Barritt Lovelace, P.E (WSB)

Dive Team: Kasey Yoder (WSB), John Loftus (Collins)

Date: July 25, 2012

Weather Conditions: Cloudy, 75° F

Underwater Visibility: 2.0 foot

Waterway Velocity: 1.0 ft/sec

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 and 2, North and South Abutments

General Shape: The piers consisted of a reinforced concrete hammerhead pier with a single reinforced concrete pier column. At the time of inspection, no plans were available for this structure, therefore the substructure configuration was unknown.

Maximum Water Depth at Substructure Inspected: Approximately 4.4 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap at the downstream end of Pier 1.

Water Surface: The waterline was approximately 14 feet below reference.
Assumed Waterline Elevation = 86.

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 4

Item 92B: Underwater Inspection: Code B/07/12

Item 113: Scour Critical Bridges: L/94

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
210	Reinforced Concrete Pier Wall	46	LF		46			
985	Slopes and Slope Protection	1	EA			1		



Photograph 1. View of Pier 1, Looking West.



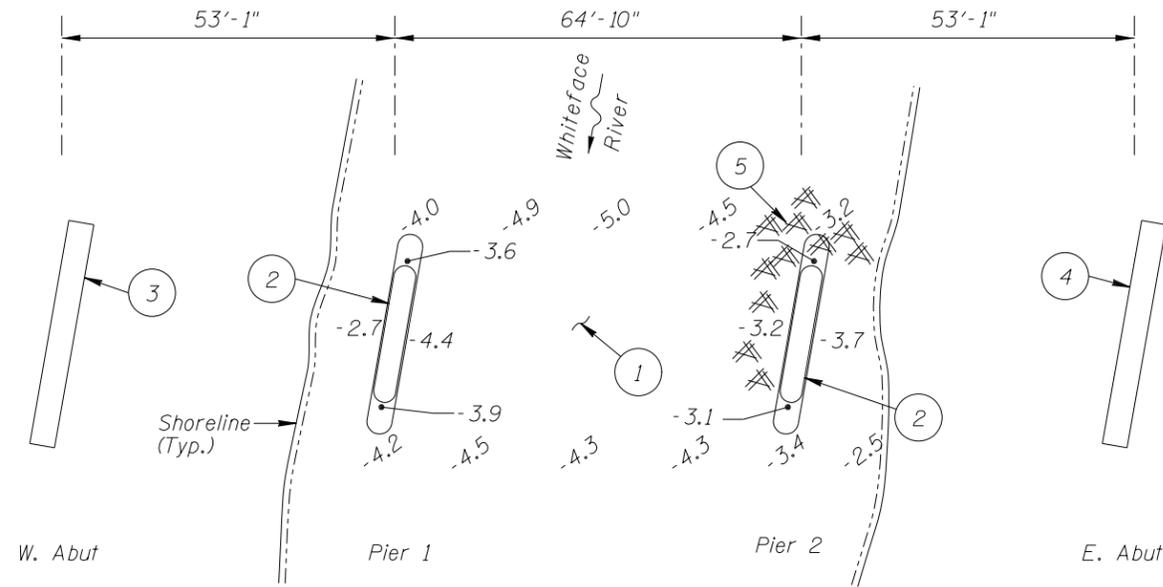
Photograph 2. View of Pier 2, Looking West.



Photograph 3. View of Undermining at the East Abutment, Looking East.



Photograph 3. View of Undermining at the East Abutment, Looking West.



SOUNDING PLAN

Legend

-1.2 Sounding Depth from Waterline (7/25/12)

Timber Debris

Note:

All soundings are based on 2012 waterline location.

GENERAL NOTES:

1. Piers 1 and 2 were inspected underwater.
2. At the time of inspection on July 25, 2012, the waterline was located approximately 14.0 feet below the top of the pier cap at the downstream 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 86.0.
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 consisted of sandy silt allowing up to 12 inches of probe rod penetration.
- ② Moderate concrete scaling from 1 foot above to 2 feet below the waterline with 1/8 inch typical penetration, and 1/4 inch maximum.
- ③ West abutment was undermining for a section 5 feet in length, with undermining cavity measuring 4 inch vertical and 4 inch of penetration.
- ④ East abutment was undermined for a section 20 feet in length, with undermining cavity measuring 14 inch vertical and 18 inch of penetration.
- ⑤ A moderate accumulation of timber debris, consisting of logs and branches 12" inch dia. and smaller, was observed around the upstream nose of Pier 2 extending 15 feet off the upstream nose to the shore, along the entire west face and up to 10 feet off the face, and from the channel bottom to 4 feet above the waterline.

**MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION**

STRUCTURE NO. 69502
OVER THE WHITEFACE RIVER
DISTRICT I, ST. LOUIS COUNTY

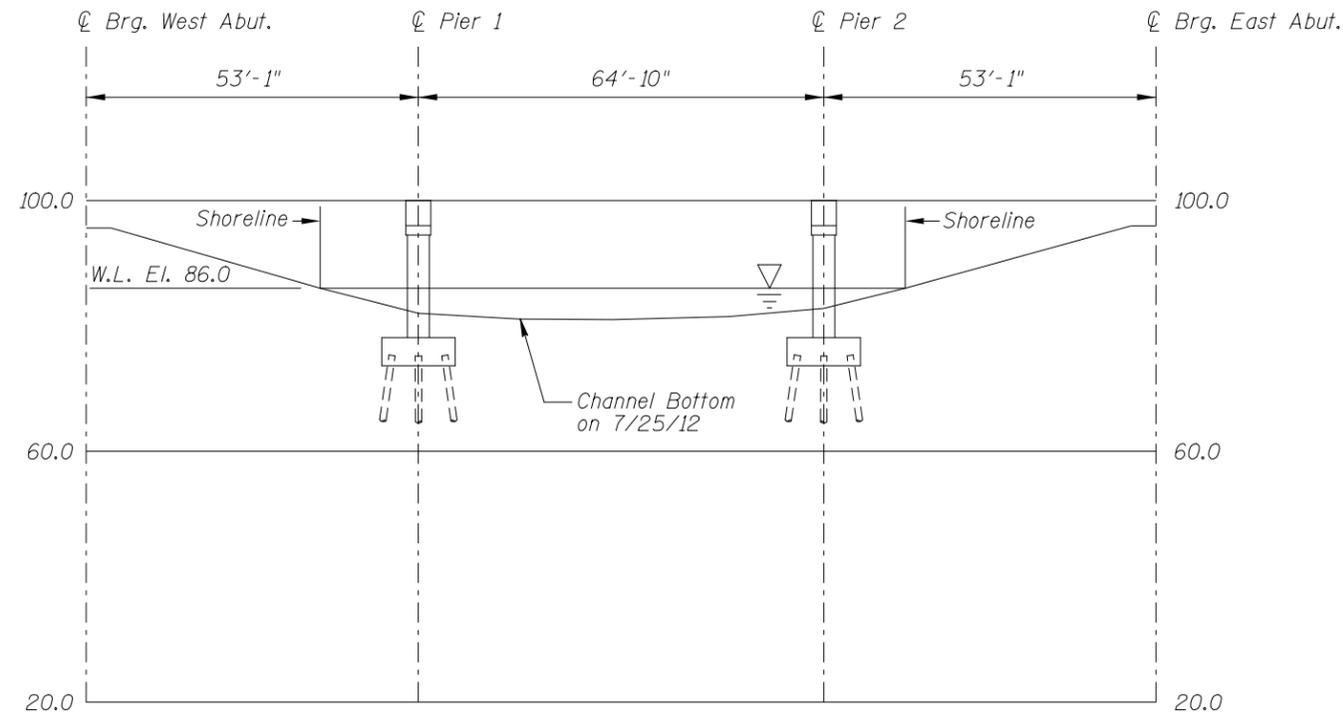
INSPECTION AND SOUNDING PLAN

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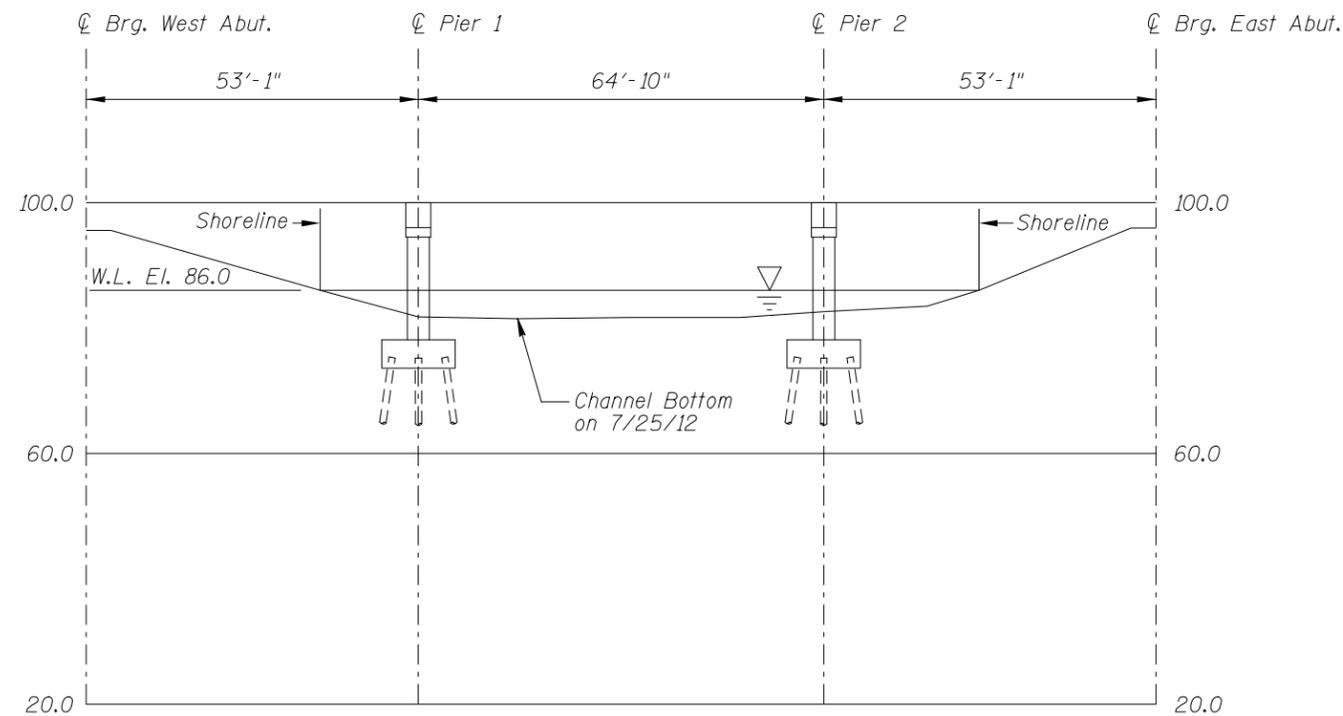
Drawn By: BJR
Checked By: BRL
Code: ---

**COLLINS
ENGINEERS**
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Date: JULY 2012
Scale: NTS
Figure No.: 1



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:
Refer to Figure 1 for General Notes.

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MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

STRUCTURE NO. 69502
OVER THE WHITEFACE RIVER
DISTRICT 1, ST. LOUIS COUNTY

UPSTREAM AND DOWNSTREAM
FASCIA PROFILES

Drawn By: BJR	COLLINS ENGINEERS 123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Date: JULY 2012
Checked By: BRL		Scale: 1"=20'
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MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES
DAILY DIVING REPORT

INSPECTORS: WSB & Associates and Collins DATE: July 25, 2012

ON-SITE TEAM LEADER: Barritt Lovelace, P.E.

BRIDGE NO: 69502 WEATHER: Cloudy, 75° F

WATERWAY CROSSED: Whiteface River

DIVING OPERATION: SCUBA SURFACE SUPPLIED AIR
 OTHER

PERSONNEL: Kasey Yoder (WSB), John Loftus (Collins)

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

TIME IN WATER: 14:10

TIME OUT OF WATER: 14:30

WATERWAY DATA: VELOCITY 1.0 ft/sec.

VISIBILITY 2 feet

DEPTH 4.4 feet maximum at Pier 1

ELEMENTS INSPECTED: Pier 1 and Pier 2, North and South Abutments

REMARKS: Overall, Pier 1 and Pier 2 were in good condition with no defects of structural significance. There was no notable concrete deterioration, apart from moderate scaling of the pier walls from 1 foot above to 2 feet below the waterline with a maximum of 1/4 inch penetration. Both abutments had undermining which exposed the supporting piles. Moderate timber debris was observed around Pier 2 extending from the channel bottom to 4 feet above the waterline.

FURTHER ACTION NEEDED: YES NO

Repair the undermining and slope protection at the East and West abutments.

Monitor timber debris during future underwater inspections.

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. 69502
 INSPECTORS WSB & Associates, Inc. and Collins Engineers, Inc.
 ON-SITE TEAM LEADER Barritt Lovelace, P.E.
 WATERWAY CROSSED Whiteface River

INSPECTION DATE July, 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 (BRACING)	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
	Pier 1	4.4'	N	7	N	8	N	7	7	N	N	N	7	7	N	N	N	N	N
	Pier 2	3.7'	N	7	N	8	N	7	7	N	N	6	6	7	N	N	N	N	N
	East Abutment	N	7	7	N	8	N	7	5	5	4	N	4	7	7	N	N	N	N
	West Abutment	N	7	7	N	8	N	7	5	5	4	N	4	7	7	N	N	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, Pier 1 and Pier 2 were in good condition with no defects of structural significance. There was no notable concrete deterioration, apart from moderate scaling of the pier walls from 1 foot above to 2 feet below the waterline with a maximum of 1/4 inch penetration. Both abutments had undermining which exposed the supporting piles. Moderate timber debris was observed around Pier 2 extending from the channel bottom to 4 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.