

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 09513

CSAH NO. 61

OVER

THE ST. LOUIS RIVER

CARLTON COUNTY



JULY 26, 2012

PREPARED FOR THE
MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

AND

WSB & ASSOCIATES, INC.

JOB NO. 7423

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 09513, Piers 1 through 3, were found to be in good condition. The corrosion on the steel pipe piles has increased since the 2007 inspection, but still has not compromised the structural integrity of the piles. A moderate accumulation of timber debris was encountered at Pier 3. The channel bottom appeared to be stable with no evidence of significant scour or appreciable changes.

INSPECTION FINDINGS:

- (A) The steel pipe piles exhibited coating loss affecting 10 to 25 percent of the surface area with up to ½ -inch-diameter nodular corrosion on the upper portion of the pipe piles, and 50 to 100 percent coating loss with up to 1/2-inch-diameter nodular corrosion on the lower portion of the pipe piles. The piles exhibited 1/32 inch deep pitting associated with the nodular corrosion.
- (B) An outer steel casing was observed around the second upstream pile at Pier 3 extending from the channel bottom to 8 feet below the waterline, and it exhibited 100 percent nodular corrosion with up to 1/16 inch section loss.
- (C) A moderate accumulation of 1-foot-diameter and smaller timber debris, was observed at Pier 3, extending up to 3 feet off the channel bottom.

RECOMMENDATIONS:

- (A) Monitor accumulation of timber debris, and if found to be progressing, removal operations may become warranted.

- (B) 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,

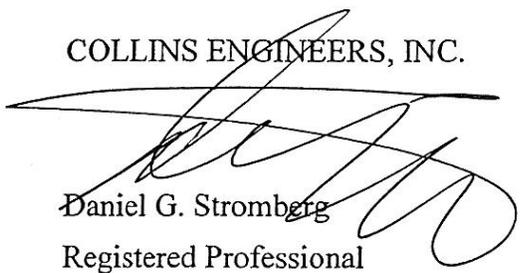
PROFESSIONAL ENGINEER

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: 09513

Feature Crossed: St. Louis River

Feature Carried: CSAH No. 61

Location: District 1 - Carlton County

Bridge Description: The superstructure consists of four spans of multiple concrete beams supporting a concrete deck. The superstructure is supported by two concrete abutments and three steel pipe pile piers, with the piers numbered from west to east.

2. INSPECTION DATA

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

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

Date: July 26, 2012

Weather Conditions: Overcast, 74°F

Underwater Visibility: 1.0 feet

Waterway Velocity: 0.5 ft/sec

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 through 3.

General Shape: Piers 1, 2, and 3 consist of a single line of six concrete filled steel pipe piles supporting a concrete cap.

Maximum Water Depth at Substructure Inspected: Approximately 17.4 feet

4. WATERLINE DATUM

Water Level Reference: The top of the cap at the South end of Pier 3.

Water Surface: The waterline was approximately 13.3 feet below reference.
Water Elevation = 1104.7

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 6

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

Item 113: Scour Critical Bridges: Code O/02

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	18	EA	18				
985	Slopes and Slope Protection	2	EA	2				



Photograph 1. View of Pier 1, Looking East.



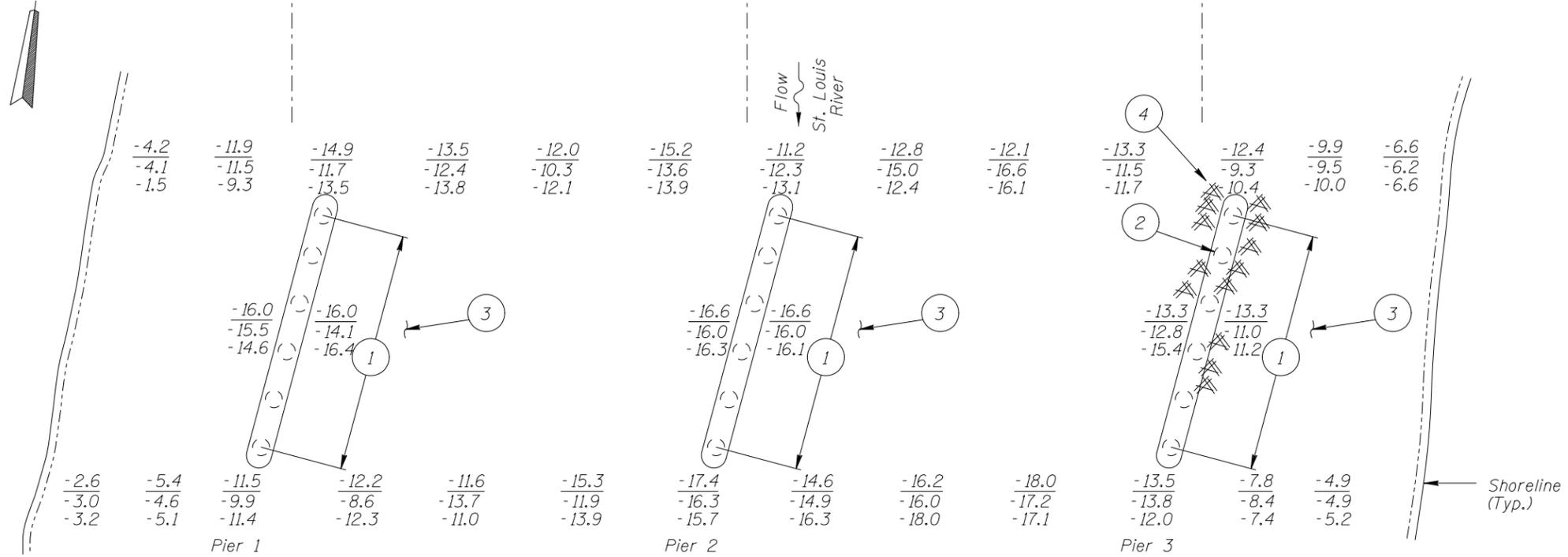
Photograph 2. View of Pier 2, Looking West.



Photograph 3. View of Pier 3, Looking West.



131'-4" To West Abutment 132'-0" 132'-0" 131'-4" To West Abutment

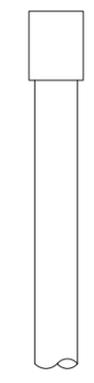


GENERAL NOTES:

- Piers 1 through 3 were inspected underwater.
- At the time of inspection on July 26, 2012, the waterline was located approximately 13.3 feet below the top of the pier cap at the downstream end of Pier 3. This corresponds with a waterline elevation of 1104.7 based on the previous report dated October 15, 2007.
- Soundings indicate the water depth at the time of inspection and are measured in feet.
- Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units.

INSPECTION NOTES

- The steel pipe piles exhibited coating loss with up to 1/2-inch-diameter nodular corrosion and up to 1/32-inch-deep section loss (pitting) over 10 to 25 percent of the surface area from the waterline to 4 feet below and on 100 percent of the surface area from 4 feet below the waterline to the channel bottom.
- An outer steel casing was observed around the second upstream pile at Pier 3. The outer casing extended from the channel bottom to 8 feet below the waterline.
- The channel bottom consisted of sand and gravel with 8 inches of probe rod penetration and occasional cobbles and riprap.
- A moderate accumulation of 1-foot-diameter and smaller timber debris, ranging from 3 feet high off the channel bottom at the upstream end of the pier to 1 foot high throughout the pier, was observed on the channel bottom.



TYPICAL END VIEW OF PIERS

Legend

- 2.0 Sounding Depth (7/26/12)
- 5.2 Sounding Depth (5/16/12)
- 5.2 Sounding Depth (10/15/07)
- () Steel Shell
- Timber Debris

Note:

All soundings based on 2012 waterline location.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION

STRUCTURE NO. 09513
CSAH NO. 610 OVER THE ST. LOUIS RIVER
CARLTON COUNTY

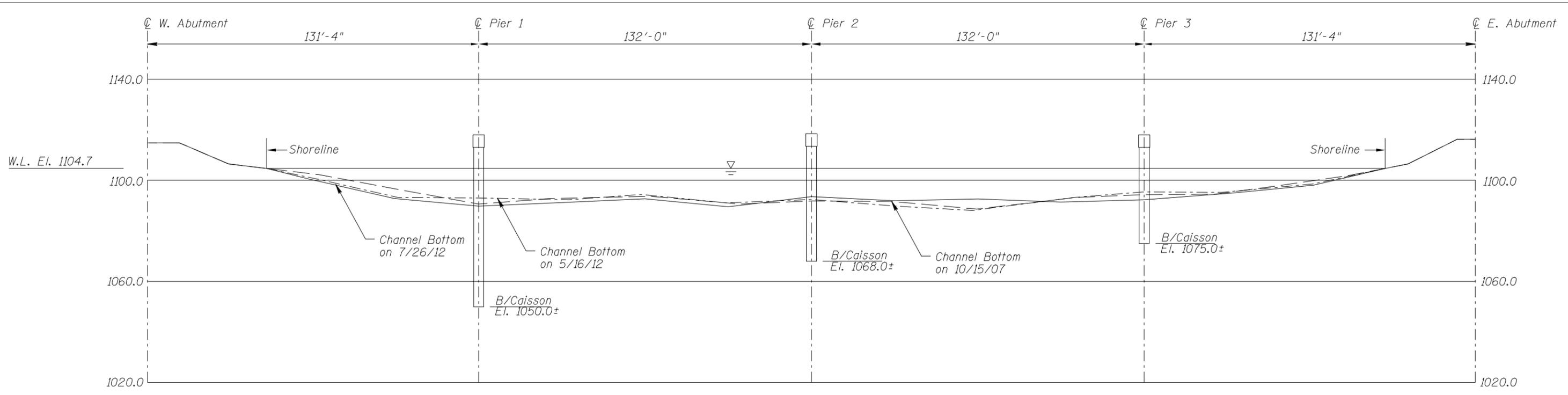
INSPECTION AND SOUNDING PLAN

Drawn By: BJR	COLLINS ENGINEERS	Date: July 2012
Checked By: BRL		Scale: NTS
Code: 742309513		Figure No.: 1

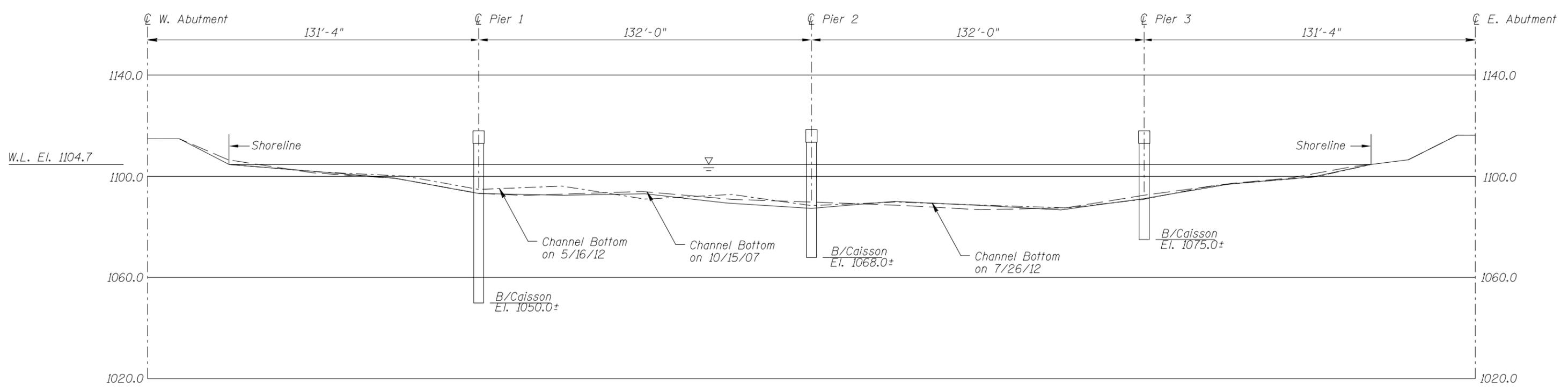
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UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:
Refer to Figure 1 for General Notes.

**MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION**

STRUCTURE NO. 09513
CSAH NO. 61 OVER THE ST. LOUIS RIVER
CARLTON COUNTY

UPSTREAM AND DOWNSTREAM
FASCIA PROFILES

Drawn By: BJR	COLLINS ENGINEERS	Date: July 2012
Checked By: BRL	123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Scale: 1"=40'
Code: 742309513		Figure No.: 2

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

INSPECTORS: WSB & Associates and Collins DATE: July 26, 2012

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

BRIDGE NO: 09513 WEATHER: Overcast, 74°F

WATERWAY CROSSED: St. Louis River

DIVING OPERATION: SCUBA SURFACE SUPPLIED AIR
OTHER

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

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

TIME IN WATER: 3:00 p.m.

TIME OUT OF WATER: 4:00 p.m.

WATERWAY DATA: VELOCITY 0.5 ft/s.

VISIBILITY 1.0 feet

DEPTH 17.4 feet maximum at Pier 2.

ELEMENTS INSPECTED: Piers 1 through 3

REMARKS: Overall, the steel pipe piles were in good condition with coating loss over 10 to 25 percent of the surface area with up to 1/2-inch-diameter nodular corrosion on the upper portion of the pipe piles and over 50 to 100 percent of the surface area coating loss with up to 1/2-inch-diameter nodular corrosion on the lower portion of the pipe piles. The nodular corrosion had minimal section loss associated with it. There was a moderate accumulation of timber debris at Pier 3.

FURTHER ACTION NEEDED: YES NO

Monitor the accumulation of timber debris, and if found to be progressing, removal operations may be warranted.

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. 09513
 INSPECTORS WSB & Associates, Inc. and Collins Engineers, Inc.
 ON-SITE TEAM LEADER. Barritt Lovelace, P.E.
 WATERWAY CROSSED St. Louis River

INSPECTION DATE July 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
	Pier 1	16.0	7	N	N	8	N	7	7	6	5	6	6	N	6	N	7	N	N
	Pier 2	17.4	7	N	N	8	N	7	7	N	N	7	6	N	7	N	7	N	N
	Pier 3	13.5	7	N	N	8	N	7	7	6	5	6	6	N	7	N	7	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the steel pipe piles were in good condition with coating loss over 10 to 25 percent of the surface area with up to 1/2-inch-diameter nodular corrosion on the upper portion of the pipe piles and over 50 to 100 percent of the surface area coating loss with up to 1/2-inch-diameter nodular corrosion on the lower portion of the pipe piles. The nodular corrosion had minimal section loss associated with it. There was a moderate accumulation of timber debris at Pier 3.

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.