

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 38505

CSAH NO. 16

OVER

SILVER RAPIDS

LAKE COUNTY



JUNE 19, 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. 38505, Piers 1, 2, and 3, were found to be in good condition with only light concrete scaling. The structure condition was very comparable to what was observed during the 2007 underwater inspection. The extent of footing exposure at Pier 1 has remained the same as last reported in the 2007 underwater inspection with only top of footing partially exposed and no vertical face exposure present. Light scaling with exposed aggregate was present along all faces of the piers with penetrations of up to 1/2 inch. The channel bottom appeared to be stable and well armored.

INSPECTION FINDINGS:

- (A) There were random areas of light scaling and exposed aggregate along all faces of the piers. The scaling was most prominent around the noses from 1 foot above to 3 feet below the waterline, with maximum penetrations of 1/2 inch.
- (B) The top of the Pier 1 footing was partially exposed along most of the east side of the pier. The top footing was flush with the surrounding channel bottom, with a maximum width of 2 feet exposed and no edge or vertical face exposure.
- (C) Large riprap up to 4 feet in diameter was observed along the east side of Pier 2.
- (D) The channel bottom material consisted of large riprap with firm sandy gravel and no probe penetration. Riprap sizes typically ranged from 6 inches to 2 feet in diameter.

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,

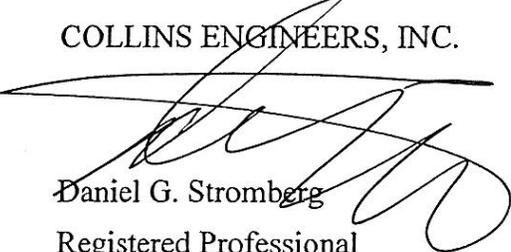
PROFESSIONAL ENGINEER

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: 38505

Feature Crossed: Silver Rapids

Feature Carried: CSAH No. 16

Location: Lake County

Bridge Description: The superstructure consists of four spans of multiple continuous steel stringers supporting a reinforced concrete deck. The superstructure is supported by two reinforced concrete abutments and three reinforced concrete piers. Design drawings provided indicate that the abutment footings are supported by steel H-piles and the pier spread footings are keyed into bedrock. The piers are numbered 1 through 3 from west to east.

2. INSPECTION DATA

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

Dive Team: Clayton Brookins, Breanne Stromberg

Date: June 19, 2012

Weather Conditions: Cloudy, 65° F

Underwater Visibility: 2.0 feet

Waterway Velocity: 3 ft/sec

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1, 2, and 3.

General Shape: The piers consist of standard single hammerhead shafts with rounded noses, founded on rectangular footings keyed into bedrock.

Maximum Water Depth at Substructure Inspected: Approximately 8.5 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 10.9 feet below reference.
Water Elevation = 1386.3.

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/06/12

Item 113: Scour Critical Bridges: Code I/95

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	75	LF	75				
220	Reinforced Concrete Footing	1	EA	1				



Photograph 1. View of Upstream Fascia, Looking Northeast.



Photograph 2. View of Downstream Fascia, Looking Southwest.



Photograph 3. View of Pier 1, Looking Northeast.



Photograph 4. View of Pier 2, Looking Northwest.



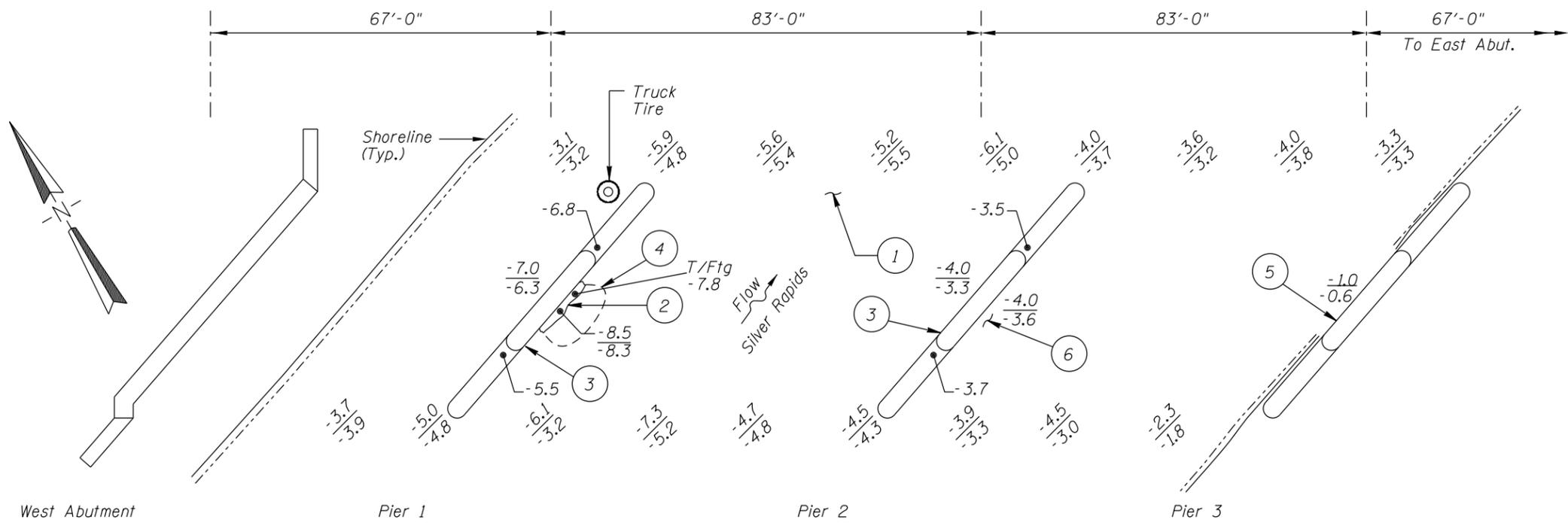
Photograph 5. View of Pier 3, Looking Southwest.



Photograph 6. View of the Footing Exposure on the East side of Pier 1, Looking Down.



Photograph 7. View of Typical Concrete Condition at the Waterline at the Upstream Nose of Pier 1, Looking North.



SOUNDING PLAN

GENERAL NOTES:

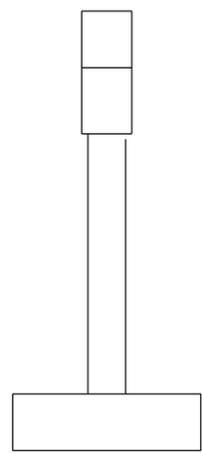
1. Piers 1, 2, and 3 were inspected underwater.
2. At the time of inspection on June 19, 2012, the waterline was located approximately 10.9 feet below the top of the cap at the downstream end of Pier 1. This corresponds to a waterline elevation of 1386.3 based on the previous report dated August 25, 2007.
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 consisted of large riprap with firm sandy gravel and no appreciable probe rod penetration. Riprap sizes typically ranged from approximately 6 inches to 2 feet in diameter.
- ② The top of the Pier 1 footing was exposed along most of the easterly side of the pier. The top footing was level with the channel bottom, with a maximum width of 2 feet exposed and no footing edge or vertical face exposure present.
- ③ A band of scaling was observed around Piers 1 and 2, extending from 1.5 feet above to 3 feet below the waterline, with typical penetrations of 1/8 to 1/4 inch and maximum penetrations of 1/2 inch at the upstream ends of the piers.
- ④ A minor scour depression with a width of 4 feet and a depth of 6 inches was observed along the easterly side of Pier 1.
- ⑤ Random light scaling and exposed aggregate was observed at Pier 3 near the waterline.
- ⑥ Larger riprap up to 4 feet in diameter was present along the easterly side of Pier 2.

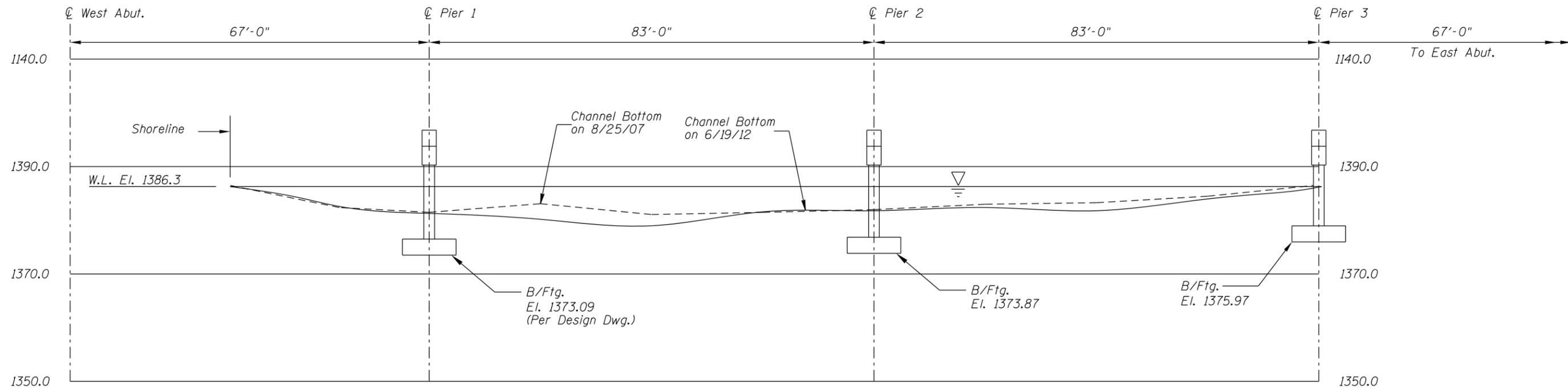
Legend

- 6.0 Sounding Depth from Waterline (6/19/12)
- 6.1 Sounding Depth from Waterline (8/25/07)
- (---) Scour Depression

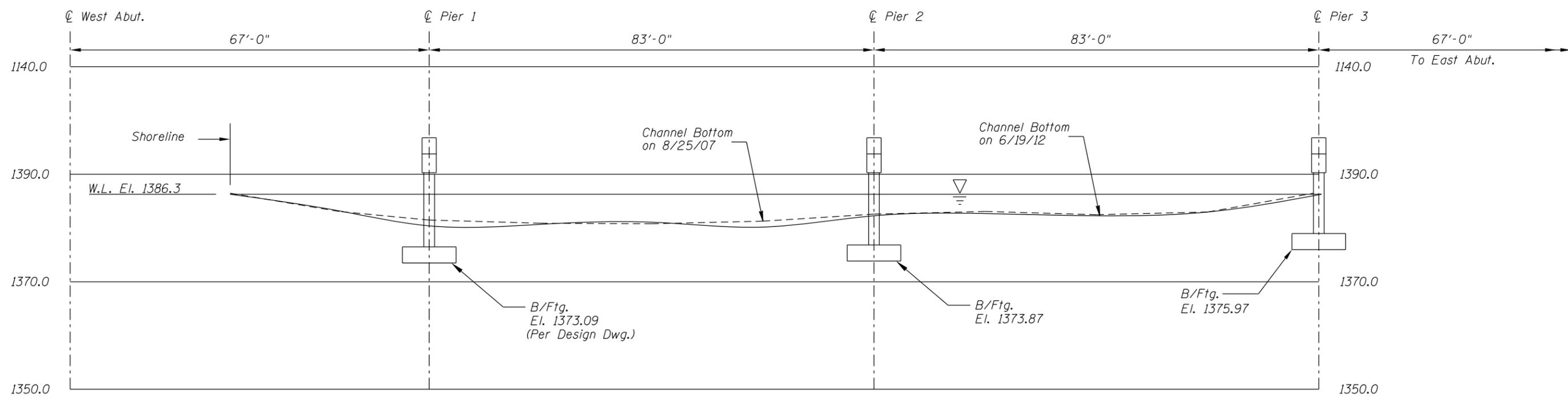


TYPICAL END VIEW OF PIERS

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 38505 OVER SILVER RAPIDS DISTRICT I, LAKE COUNTY		
INSPECTION AND SOUNDING PLAN		
Drawn By: BMS	COLLINS ENGINEERS	Date: JUNE 2012
Checked By: LJ	123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Scale: NTS
Code: 742338505		Figure No.: I



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 38505 OVER SILVER RAPIDS DISTRICT I, LAKE COUNTY		
UPSTREAM AND DOWNSTREAM 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"=20'
Code: 742338505		Figure No.: 2

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

INSPECTORS: Collins Engineers, Inc. DATE: June 19, 2012

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

BRIDGE NO: 38505 WEATHER: Cloudy, 65° F

WATERWAY CROSSED: Silver Rapids

DIVING OPERATION: SCUBA SURFACE SUPPLIED AIR
 OTHER

PERSONNEL: Clayton Brookins, Breanne Stromberg

EQUIPMENT: SCUBA, Scraper, Lead Line, Sounding Pole, Probe Rod, Camera

TIME IN WATER: 10:10 A.M.

TIME OUT OF WATER: 11:40 A.M.

WATERWAY DATA: VELOCITY 3 ft/sec

VISIBILITY 2.0 feet

DEPTH 8.5 feet maximum at Pier 1

ELEMENTS INSPECTED: Piers 1, 2, and 3

REMARKS: Overall, Piers 1, 2, and 3, were found to be in good condition with only light concrete scaling. The structure condition was very comparable to what was observed during the 2007 underwater inspection. The extent of footing exposure at Pier 1 has remained the same as last reported in the 2007 underwater inspection with only top of footing partially exposed and no vertical face exposure present. Light scaling with exposed aggregate was present along all faces of the piers with penetrations of up to 1/2 inch. The channel bottom appeared to be stable and well armored.

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. 38505
 INSPECTORS Collins Engineers, Inc.
 ON-SITE TEAM LEADER Daniel G. Stromberg, P.E.
 WATERWAY CROSSED Silver Rapids

INSPECTION DATE June 19, 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	8.5'	N	7	7	8	N	7	6	8	8	N	6	7	N	N	N	N	N
	Pier 2	4.5'	N	7	N	8	N	7	8	N	N	N	8	7	N	N	N	N	N
	Pier 3	0.8'	N	7	N	8	N	7	8	8	8	N	8	7	N	N	N	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.