UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 57521

CSAH 27 OVER THE

RED LAKE RIVER

DISTRICT 2 – PENNINGTON COUNTY

AUGUST 27, 2012

PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

AYRES ASSOCIATES & COLLINS ENGINEERS, INC.

JOB NO. 7423

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 57521, Piers 1 and 2, were found to be in good condition with no defects of structural significance. The steel pipe piles exhibited minor corrosion consisting of rust nodules up to ½ inch diameter and minimal pitting. The channel bottom around the substructure units was well established and in stable condition with no evidence of scour.

INSPECTION FINDINGS:

(A) The 16 inch diameter steel pipe pile encasements over the H-piles of both piers were coated from top of pile down 5 feet. The piles had random minor areas of coating loss on less of 1% of total surface area. In the locations of coating loss, the encasements had minor corrosion with no section loss. From 5 feet below the top of encasement to channel bottom, the encasements were coated with only a primer coat. In the areas where the encasements were not top coated, the encasements had corrosion on up to 75% of total surface area. The corrosion consisted of rust nodules up to ¼ inch in diameter and minor pitting (less than 1/32 inch deep).

(B) A minor accumulation of timber debris consisting of logs and branches up to 3-inches in diameter and a steel I-beam were observed extending from south shoreline to Pile H (eastern most pile) of Pier 1. The debris accumulation extended from the channel bottom to the waterline intermittently.

(C) The channel bottom at Piers 1 and 2 consisted of sand, gravel, cobbles up to 6 inches in diameter, and riprap up to 2 feet in diameter with up to 3 inches of probe rod penetration possible.

RECOMMENDATIONS:

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

(B) The inspection of the submerged substructure units of Structure No. 57521 can most likely be accomplished in the future without the use of a dive team. To perform the underwater inspection, a properly equipped qualified inspector will have to enter the water during a period of low flow. As channel bottom contours and depths of flow can change quickly, it is recommended that lead line soundings of water depth be taken along the upstream and downstream fascias to determine whether wading is possible prior to beginning the inspection. If conditions are unsafe for inspection by wading, then an underwater inspection with the use of a dive team will be required.

Respectfully submitted,

Inspection Team Leader

Ayres Associates, Inc.

Brian K. Schroeder
Registered Professional Engineer
State of Minnesota

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: 57521

Feature Crossed: Red Lake River

Feature Carried: CSAH 27

Location: District 2 – Pennington County

Bridge Description: The bridge superstructure consists of three spans of cast-in-place reinforced concrete structure. The superstructure is supported by two reinforced concrete abutments and two reinforced concrete piers. The piers are supported on steel piles and are numbered 1 and 2 starting from south end.

2. INSPECTION DATA

Professional Engineer Diver: Brian K. Schroeder, P.E.

Dive Team: Jason A. Cook, Anthony J. Coffaro

Date: August 27, 2012

Weather Conditions: Sunny, 72^{o} F

Underwater Visibility: 4 feet

Waterway Velocity: 1.0 ft/sec

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 and 2.

General Shape: The pier caps are concrete with an oblong rectangular shape having rounded noses, and are founded on H-piles with steel shell pile (concrete filled) encasements.

Maximum Water Depth at Substructure Inspected: Approximately 1.4 feet.

4. WATERLINE DATUM

Water Level Reference: Top of pier cap on east end of Pier 1.

Water Surface: The waterline was approximately 13.3 feet below the reference. Waterline Elevation 1153.7.

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 7

Item 92B: Underwater Inspection: Code A/08/12

Item 113: Scour Critical Bridges: Code N

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

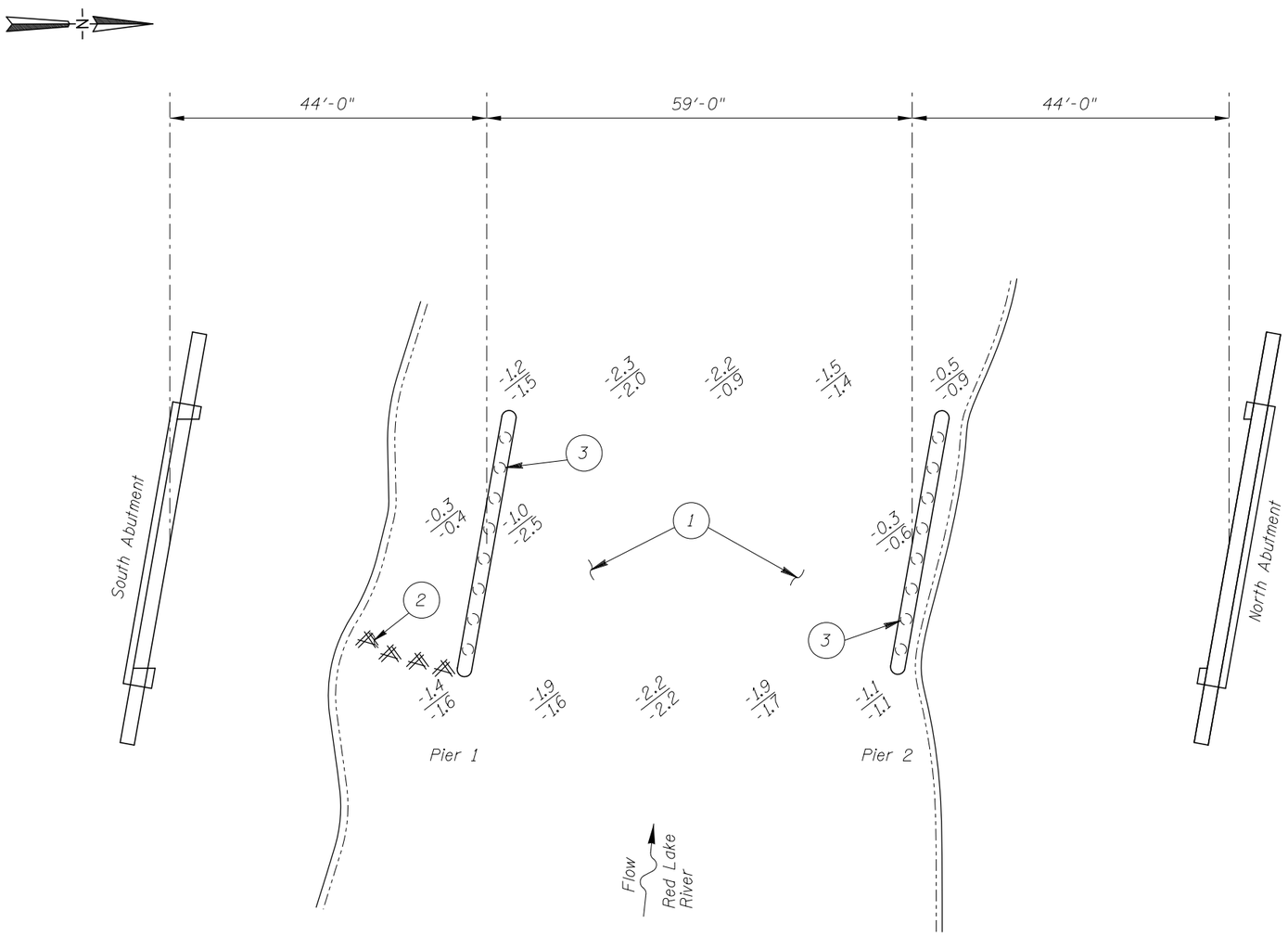
Item #	Element Description	Quantity	Unit	Conditions				
				1	2	3	4	5
382	Cast-In-Place (CIP) Concrete Piles	16	EA	16				
985	Slopes and Slope Protection	1	EA		1			

Photograph 1. View of Pier 1 and South Abutment, Looking South.

Photograph 2. View of Pier 1, Looking North.

Photograph 3. View of Pier 2 and North Abutment, Looking North.

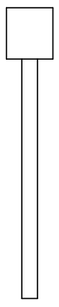
Photograph 4. View of Pier 2, Looking South.



SOUNDING PLAN

INSPECTION NOTES:

1. The channel bottom material consisted of sand, gravel, cobbles up to 6 inches in size, and riprap up to 2 feet in diameter with up to 3 inches probe rod penetration.
2. A minor accumulation of timber debris consisting of 3-inch-diameter and smaller branches and a steel I-beam were observed intermittently extending from the shoreline to the upstream pile of Pier 1 and from the channel bottom to the waterline.
3. The steel pipe pile encasements had random minor areas of coating failure from the top of the piles down 5 feet. The piles were uncoated (primer only) from 5 feet below the top of the pile to the channel bottom, with minor surface corrosion observed on over 75 % of the surface area with up to 1/4-inch-diameter rust nodules and minor pitting up to 1/32 inch deep.



TYPICAL END VIEW OF EACH PIER SECTION

GENERAL NOTES:

1. Piers 1 and 2 were inspected underwater.
2. At the time of inspection, on August 27, 2017, the waterline was located approximately 13.3 feet to top of the pier cap of Pier 1 on the east end. This corresponds to a waterline elevation of 1153.7 feet.
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 as well as around the pier structures.

Legend

-2.0	Sounding Depth (8/27/12)
-0.4	Sounding Depth (8/18/07)
	Timber Debris

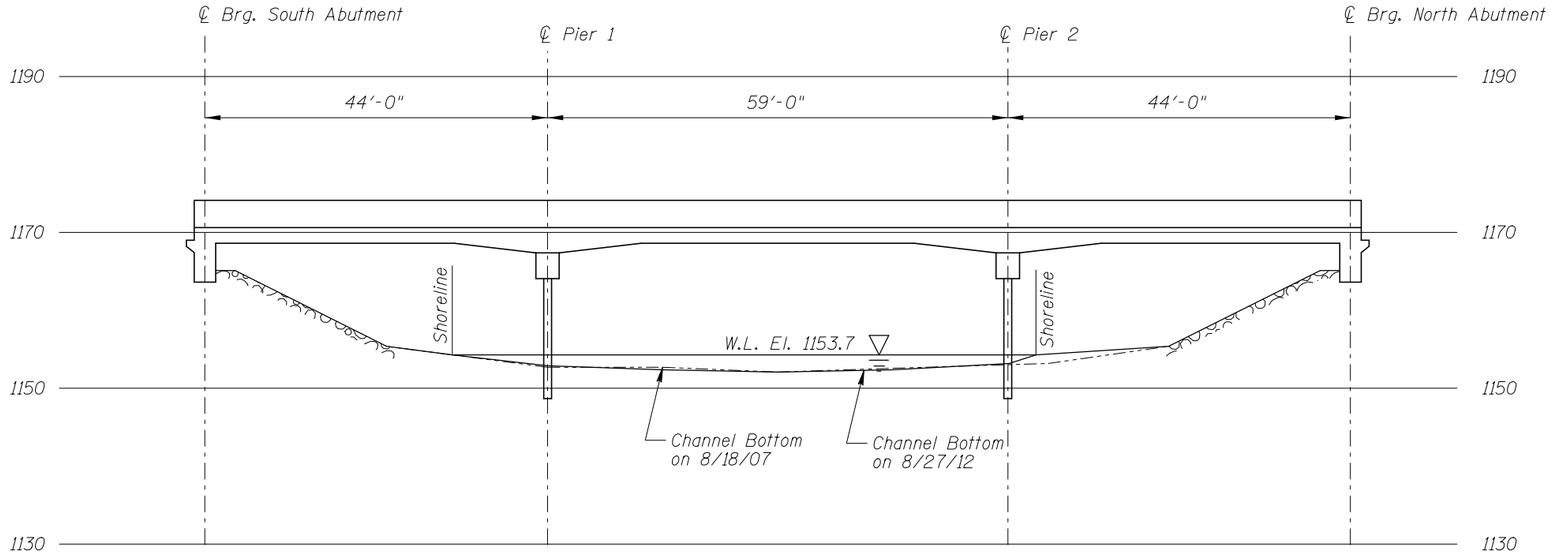
MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

STRUCTURE NO. 57521
OVER THE RED LAKE RIVER
DISTRICT 2, PENNINGTON COUNTY

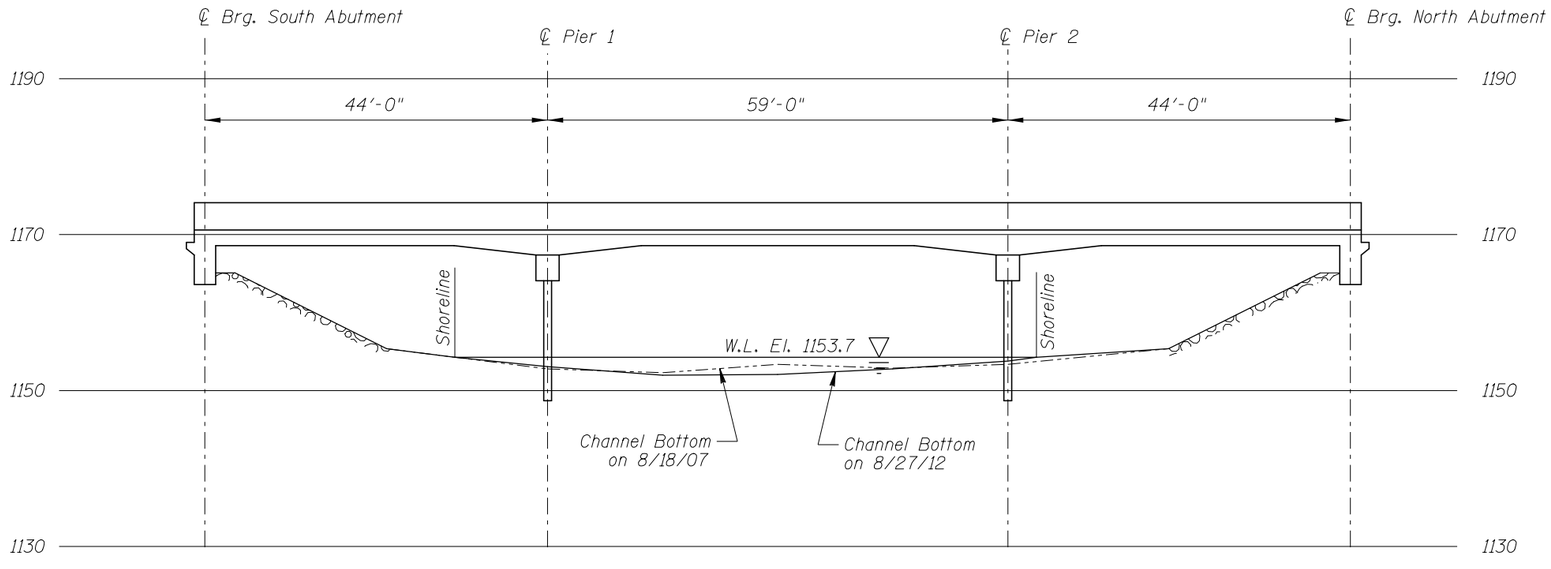
INSPECTION AND SOUNDING PLAN

COLLINS ENGINEERS, Inc. 123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com
AYRES ASSOCIATES 3433 Oakwood Hills Parkway Eau Claire, WI 54701 www.AyresAssociates.com

Drawn By: JAC	Date: SEPT, 2012
Checked By: BKS	Scale: NTS
Code: 52210034	Figure No.: 1



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:

Refer to Figure 1 for General Notes.

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

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UPSTREAM AND DOWNSTREAM FASCIA PROFILES

COLLINS ENGINEERS INC 123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com

AYRES ASSOCIATES 3433 Oakwood Hills Parkway Eau Claire, WI 54701 www.AyresAssociates.com

Drawn By: JAC	Date: SEPT, 2012
Checked By: BKS	Scale: 1"=20'
Code: 52210034	Figure No.: 2

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

INSPECTORS: Ayres Associates DATE: August 27, 2012
ON-SITE TEAM LEADER: Brian K. Schroeder, P.E.
BRIDGE NO: 57521 WEATHER: Sunny, 72^{o} F
WATERWAY CROSSED: Red Lake River
DIVING OPERATION: _____ SCUBA _____ SURFACE SUPPLIED AIR
X OTHER Wade
PERSONNEL: Jason A. Cook, Anthony J. Coffaro
EQUIPMENT: Waders, U/W Light, Hammer, Probe Rod, Camera
TIME IN WATER: 11:05 A.M.
TIME OUT OF WATER: 11:20 A.M.
WATERWAY DATA: VELOCITY 1.0 ft/sec
VISIBILITY 4.0 feet
DEPTH 1.4 feet maximum at Pier 1
ELEMENTS INSPECTED: Piers 1 and 2
REMARKS: Overall, the 16 inch diameter steel pipe pile encasements over the H-piles of both piers were coated from top of pile down 5 feet. From 5 feet below the top of encasement to channel bottom, the encasements were not top coated and there was only a primer coating on the encasements. In the areas where the encasements were not top coated, the encasements had corrosion on up to 75% of total surface area. The corrosion consisted of rust nodules up to ¼ inch in diameter and minor pitting (less than 1/32 inch deep). A minor accumulation of debris consisting of logs and branches up to 3 inches in diameter and a steel I-beam was observed extending from south shoreline to the eastern most pile of Pier 1.

FURTHER ACTION NEEDED: _____ YES X NO

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

The inspection of the submerged substructure units of Structure No. 57521 can most likely be accomplished in the future without the use of a dive team. To perform the underwater inspection, a properly equipped qualified inspector will have to enter the water during a period of low flow. As channel bottom contours and depths of flow can change quickly, it is recommended that lead line soundings of water depth be taken along the upstream and downstream fascias to determine whether wading is possible prior to beginning the inspection. If conditions are unsafe for inspection by wading, then an underwater inspection with the use of a dive team will be required.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 57521
INSPECTORS Ayres Associates
ON-SITE TEAM LEADER Brian K. Schroeder, P.E.
WATERWAY CROSSED Red Lake River

INSPECTION DATE August 27, 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

			SUBSTRUCTURE						CHANNEL					GENERAL					
UNIT REFERENCE NO.		MAXIMUM DEPTH OF WATER	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
	UNIT DESCRIPTION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Pier 1	1.4’	7	N	N	9	N	7	8	7	7	7	7	N	7	N	8	N	N
	Pier 2	1.1’	7	N	N	9	N	7	8	7	7	N	7	N	7	N	8	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the 16 inch diameter steel pipe pile encasements over the H-piles of both piers were coated from top of pile down 5 feet. From 5 feet below the top of encasement to channel bottom, the encasements were not top coated and there was only a primer coating on the encasements. In the areas where the encasements were not top coated, the encasements had corrosion on up to 75% of total surface area. The corrosion consisted of rust nodules up to ¼ inch in diameter and minor pitting (less than 1/32 inch deep). A minor accumulation of debris consisting of logs and branches up to 3 inches in diameter and a steel I-beam was observed extending from south shoreline to the eastern most pile of Pier 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.