UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 31509

CSAH NO. 63

OVER THE

MISSISSIPPI RIVER

ITASCA COUNTY

OCTOBER 1, 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. 31509, Piers 1 through 5, were found to be in satisfactory condition with no defects of structural significance observed. The submerged steel of the piles at all piers exhibited 80% to 100% coating failure and nodular corrosion mostly between the waterline and the channel bottom. The overall extent of corrosion is comparable to what was present in 2007 and has minimal loss of section associated with it. The pile corrosion has random pitting with typical penetrations of 1/32 inch, and in very infrequent instances some of the pitting was 1/16 to 1/8 inch deep. At Piers 2 and 4 there were minor amounts of scattered timber drift and/or steel debris on the channel bottom in and around the piles.

INSPECTION FINDINGS:

(A) Coating failure, corrosion, rust nodules, and up to 1/8 inch deep pitting (infrequent maximum with 1/32 inch deep the far more typical pitting) were observed on approximately 80 to 100 percent of the steel pile surfaces from the waterline to the channel bottom.

(B) A light accumulation of timber drift was observed on the channel bottom around Piers 2 and 4.

RECOMMENDATIONS:

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

Respectfully submitted,

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

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: 31509

Feature Crossed: Mississippi River

Feature Carried: CSAH No. 63

Location: Itasca County

Bridge Description: The superstructure consists of six spans of prestressed concrete beams. The superstructure is supported by two abutments founded on piles and five steel shell (CIP) pile bent piers.

2. INSPECTION DATA

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

Dive Team: Clayton G. Brookins, Marc B. Parker

Date: October 1, 2012

Weather Conditions: Sunny, 50^{o}F

Underwater Visibility: 5.0 feet

Waterway Velocity: Negligible/None

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 through 5.

General Shape: Piers 1, 2, 4, and 5 are made up of a single line of eight steel shell (CIP) piles supporting a concrete cap. Pier 3 consists of two lines of five steel shell (CIP) piles each under the cap.

Maximum Water Depth at Substructure Inspected: Approximately 22.7 feet

4. WATERLINE DATUM

Water Level Reference: The top of the cap at the east end of Pier 2.

Water Surface: The waterline was approximately 10.6 feet below reference. Water Elevation = 1267.9.

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 6

Item 61: Channel and Channel Protection: Code 7

Item 92B: Underwater Inspection: Code B/10/12

Item 113: Scour Critical Bridges: Code O

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	42	EA	42				
985	Slopes & Slope Protection	1	EA	1				

Photograph 1. Overall View of the Structure, Looking North.

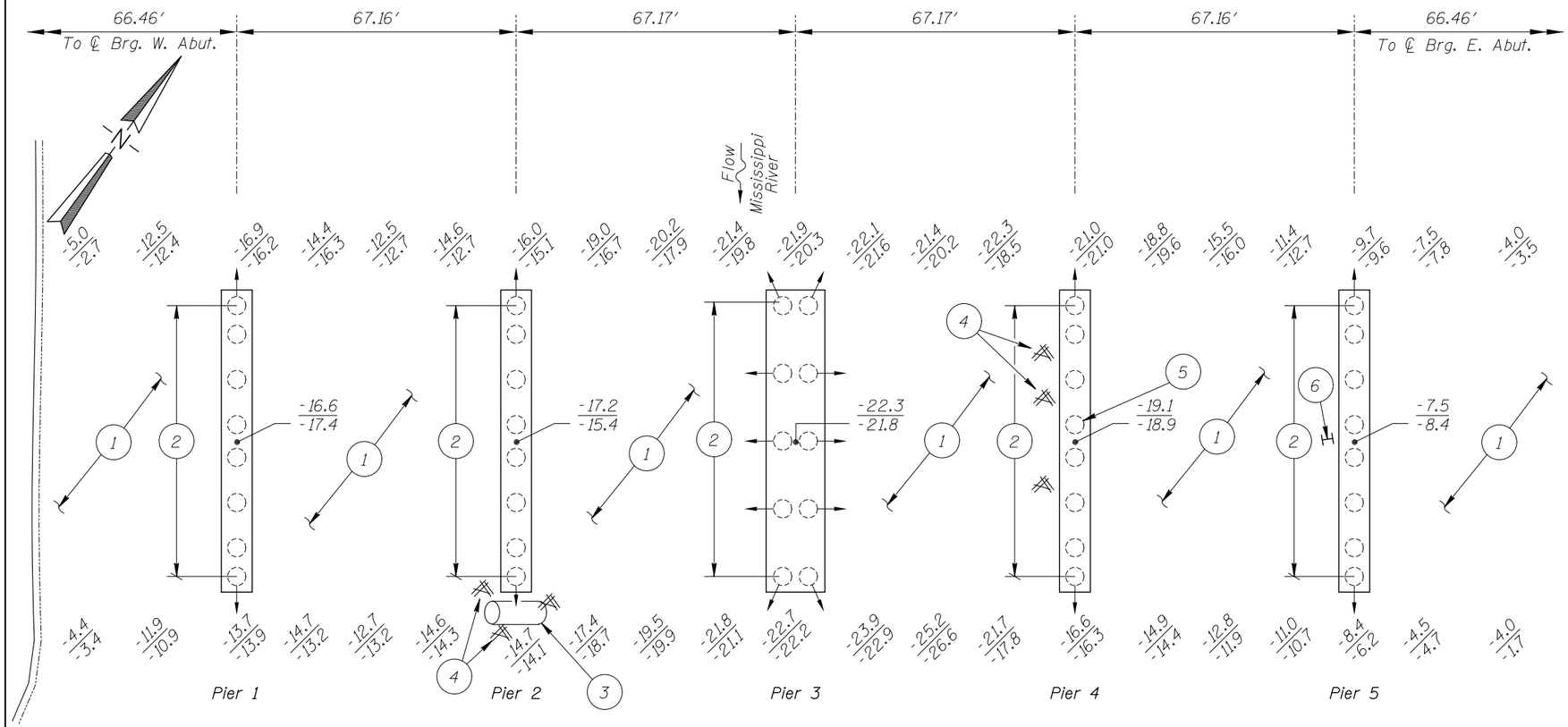
Photograph 2. View of Pier 1, Looking South.

Photograph 3. View of Pier 2, Looking South.

Photograph 4. View of Pier 3, Looking Southeast.

Photograph 5. View of Pier 4, Looking South.

Photograph 6. View of Pier 5, Looking South.



SOUNDING PLAN

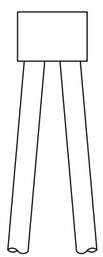
GENERAL NOTES:

1. Piers 1 through 5 were inspected underwater.
2. At the time of inspection on October 1, 2012, the waterline was located 10.6 feet below the top of cap at the downstream end of Pier 2. This corresponds to a waterline elevation of 1267.9 based on design drawings.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.
4. Soundings were taken along the bridge fascias at 1/4 point intervals between the substructure units.

INSPECTION NOTES:

1. Channel bottom consists of soft silty sand with gravel and cobbles, allowing up to 6 inches of probe rod penetration.
2. Coating failure, corrosion, and rust nodules, were observed from 6 inches above the waterline to the channel bottom on approximately 80 to 100 percent of the surface area of all piles. Typical pitting penetrations of the rust nodules were 1/32 inch, with infrequent instances of 1/16 inch and 1/8 inch penetrations observed on the steel shell piles.
3. A large steel 5 feet diameter by 10 feet long corrugated metal pipe piece of debris was observed with random 6 inch diameter timber debris and 8 inch diameter posts in and around the pipe.
4. Timber drift consisting of scattered 6 to 8 inch diameter and smaller timber debris was observed at the mudline.
5. 3/4 inch diameter steel cables were observed to be wrapped around the pile.
6. A steel H-pile was sticking 10 feet out of the channel bottom and angled toward the downstream.

TYPICAL END VIEW OF PIERS 1,2,4 & 5



TYPICAL END VIEW OF PIER 3

Note:

All soundings based on 2012 waterline location.

Legend

-1.7 Sounding Depth (10/1/12)
-4.4 Sounding Depth (8/28/07)

Steel Pile (under cap)

Steel Batter Pile (cap under)

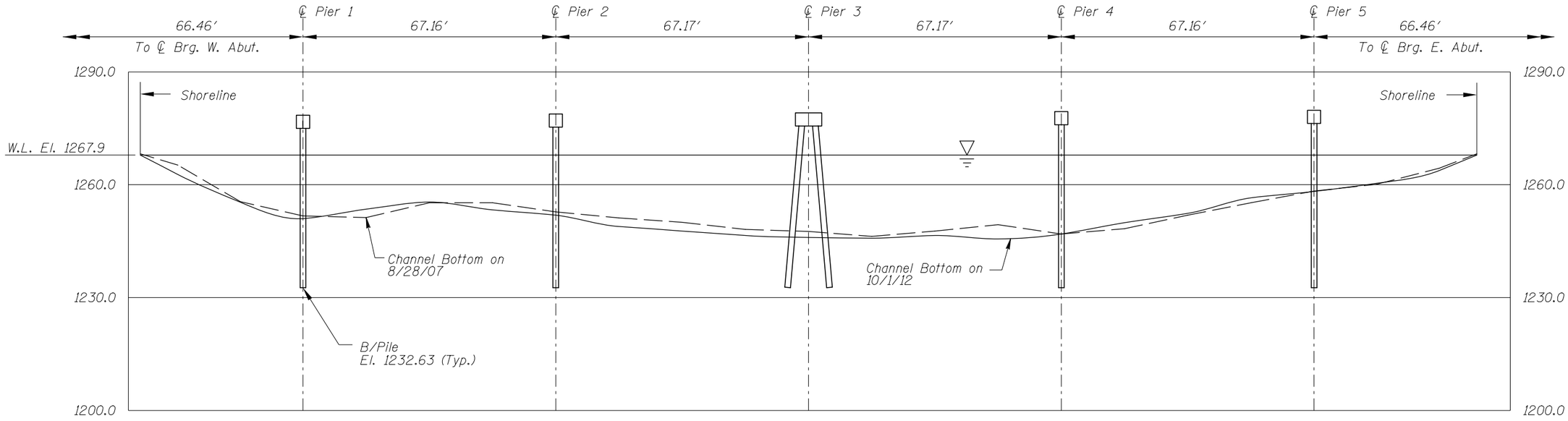
Timber Debris

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

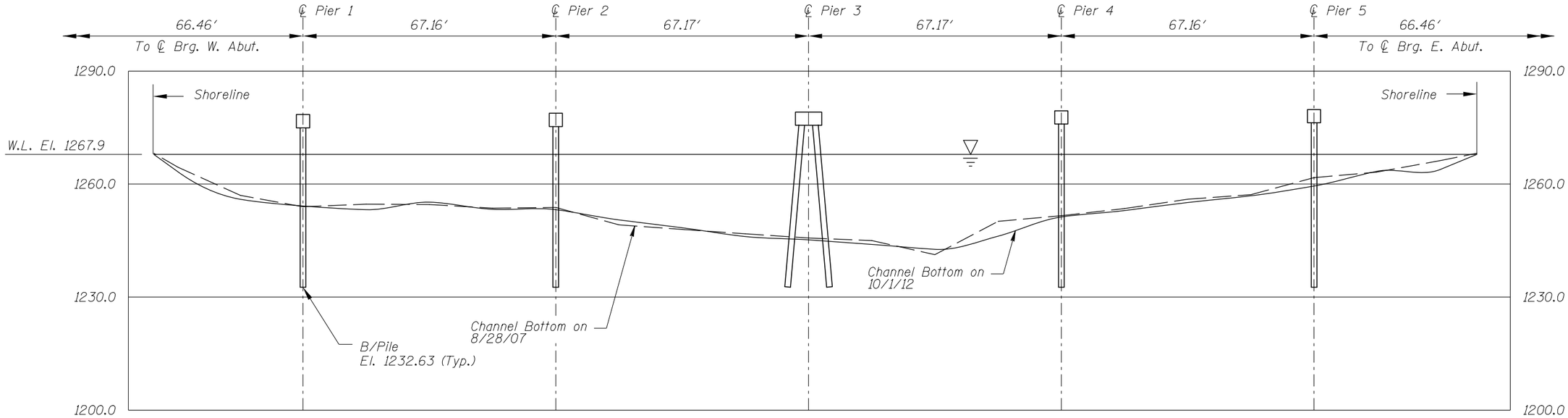
STRUCTURE NO. 31509
CSAH 63 OVER THE MISSISSIPPI RIVER
ITASCA COUNTY

INSPECTION AND SOUNDING PLAN

Drawn By: MBP	COLLINS ENGINEERS INC 123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Date: JAN., 2012
Checked By: LJ		Scale: NTS
Code: 742331509		Figure No.: 1



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:

Refer to Figure 1 for General Notes.

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

STRUCTURE NO. 31509
CSAH 3 OVER THE MISSISSIPPI RIVER
ITASCA COUNTY

UPSTREAM AND DOWNSTREAM FASCIA PROFILES

Drawn By: MBP	COLLINS ENGINEERS, INC. 123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Date: JAN., 2012
Checked By: LJ		Scale: 1"=30′
Code: 7 2331509		Figure No.: 2

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

INSPECTORS: Collins Engineers, Inc. DATE: October 1, 2012

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

BRIDGE NO: 31509 WEATHER: Sunny, 50° F

WATERWAY CROSSED: Mississippi River

DIVING OPERATION: X SCUBA _____ SURFACE SUPPLIED AIR

_____ OTHER _____

PERSONNEL: Clayton G. Brookins, Marc B. Parker

EQUIPMENT: Commercial Scuba, Scraper, Lead Line, Probe Rod, Camera

TIME IN WATER: 10:00 A.M.

TIME OUT OF WATER: 11:00 A.M.

WATERWAY DATA: VELOCITY Negligible/None

VISIBILITY 5.0 feet

DEPTH 22.7 feet maximum at Pier 3

ELEMENTS INSPECTED: Piers 1 through 5

REMARKS: Overall, the submerged steel of the piles at all piers was in good to satisfactory condition with 80% to 100% coating failure and nodular corrosion mostly between the waterline and the channel bottom. The overall extent of corrosion is comparable to what was present in 2007 and has minimal loss of section associated with it. The pile corrosion has random pitting with typical penetrations of 1/32 inch, and in very infrequent instances some of the pitting was 1/16 to 1/8 inch deep. At Piers 2 and 4 there were minor amounts of scattered timber drift and/or steel debris on the channel bottom in and around the piles.

FURTHER ACTION NEEDED: _____ YES X 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. 31509
INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER Daniel G. Stromberg, P.E.
WATERWAY CROSSED Mississippi River

INSPECTION DATE October 1, 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.	UNIT DESCRIPTION	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
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Pier 1	16.9’	6	N	N	9	N	6	8	8	8	N	8	N	6	N	6	N	N
	Pier 2	17.2’	6	N	N	9	N	6	8	N	N	7	7	N	6	N	6	N	N
	Pier 3	22.7’	6	N	N	9	N	6	8	N	N	N	8	N	6	N	6	N	N
	Pier 4	21.0’	6	N	N	9	N	6	8	N	N	7	7	N	6	N	6	N	N
	Pier 5	9.7’	6	N	N	9	N	6	8	8	8	8	8	N	6	N	6	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the submerged steel of the piles at all piers exhibited 80% to 100% coating failure and nodular corrosion mostly between the waterline and the channel bottom. The overall extent of corrosion is comparable to what was present in 2007 and has minimal loss of section associated with it. The pile corrosion has random pitting with typical penetrations of 1/32 inch, and in very infrequent instances some of the pitting was 1/16 to 1/8 inch deep. At Piers 2 and 4 there were minor amounts of scattered timber drift and/or steel debris on the channel bottom in and around the piles.

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.