

# UNDERWATER BRIDGE INSPECTION REPORT

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STRUCTURE NO. 93373

CSAH 52

OVER THE

WHITEFACE RIVER

ST. LOUIS COUNTY

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SEPTEMBER 20, 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 below water at Structure No. 93373, Bents 1 and 2, were found to be in fair condition with only minor defects of structural significance. The steel piles typically exhibited coating loss and minor corrosion extending from the channel bottom to the waterline. The cross-bracing exhibited moderate corrosion with rust delaminations up to 1/2 inch thick. An area of heavier corrosion was observed on the west cross-brace at Pile H of Bent 2 exhibiting up to 100 percent web loss of section. A light accumulation of timber debris was observed along the length of Bent 2 extending from the channel bottom to the waterline.

INSPECTION FINDINGS:

- (A) The channel bottom material consisted of rocks, up to 6 inches in diameter, and areas of silt infill with a maximum probe rod penetration of 6 inches.
- (B) The steel H-Piles of Bents 1 and 2 typically exhibited 100 percent loss of coating from 1 to 2 feet above the waterline to the channel bottom. The piles exhibited pitting, up to 1/16 inch deep, and random rust nodules, up to 1/2 inch in diameter, from the waterline to the channel bottom. Random rust delaminations, up to 1/8 inch thick, were observed above the waterline.
- (C) The steel channel cross-bracing of the bents typically exhibited rust delaminations up to 1/2 inch thick.
- (D) A light accumulation of timber debris, consisting of 6 inch diameter and smaller branches, was observed extending from the channel bottom to the waterline along the entire length of Bent 2 and extended 5 feet upstream and downstream from the bent noses.
- (E) The west cross-brace at Pile H of Bent 2 exhibited an area of heavier corrosion measuring 3 feet long with up to 100 percent web thickness loss of section.

RECOMMENDATIONS:

- (A) Repair the heavily corroded cross-brace at Pile H of Bent 2.
- (B) Monitor steel H-Pile and cross-brace corrosion and if found to be worsening, consideration may need to be given to cleaning and recoating the steel H-Piles, along with the possible need for some localized strengthening repairs.
- (C) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of sixty (60) months.

Inspection Team Leader:



Nicholas R. Triandafilou, P.E.

Respectfully submitted,

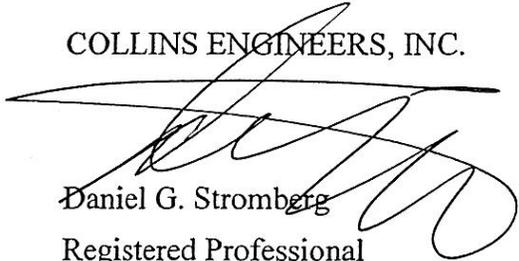
PROFESSIONAL ENGINEER

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: 93373

Feature Crossed: Whiteface River

Feature Carried: CSAH 52

Location: St. Louis County

Bridge Description: The structure consists of a timber deck on steel I-beams supported by two steel pile abutments and two steel pile bents.

2. INSPECTION DATA

Professional Engineer Diver: Nicholas R. Triandafilou, P.E.

Dive Team: Marc B. Parker, Clayton Brookins

Date: September 20, 2012

Weather Conditions: Cloudy, 45°F

Underwater Visibility: 2.0 feet

Waterway Velocity: None/Negligible

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Bents 1 and 2

General Shape: The superstructure consists of a timber deck on top of steel I-Beams. The superstructure is supported by two steel H-Pile abutments and two steel H-Pile bents. Each bent consists of eight 10 inch steel H-Piles with a steel channel cap and cross-bracing.

Maximum Water Depth at Substructure Inspected: Approximately 3.0 feet.

4. WATERLINE DATUM

Water Level Reference: The top of pile cap at the upstream nose of Bent 1.

Water Surface: The waterline was approximately 8.4 feet below reference.  
Assumed Waterline Elevation = 91.6 feet.

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

Item 60: Substructure Condition: Code 5

Item 61: Channel and Channel Protection: Code 6

Item 92B: Underwater Inspection: Code B/09/12

Item 113: Scour Critical Bridges: Code I/12

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
202	Painted Steel Piles	16	EA	0	16	0	0	n/a
234	Settlement	1	EA	1	0	0	0	n/a
363	Section Loss	1	EA	0	1	0	n/a	n/a
985	Slopes and Slope Protection	1	EA	1	0	0	n/a	n/a



Photograph 1. Overall View, Looking Southwest.



Photograph 2. View Bent 1, Looking Southeast.



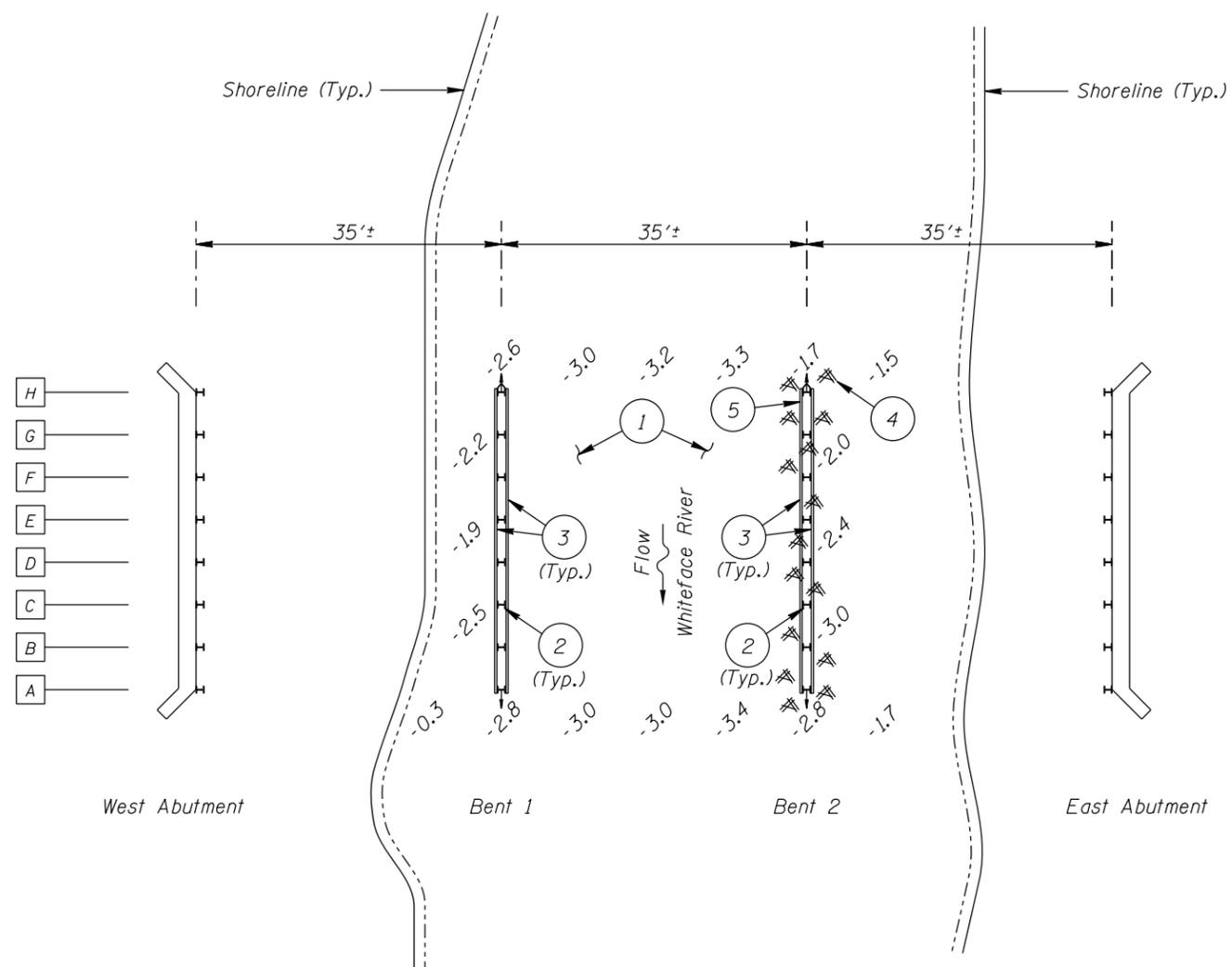
Photograph 3. View of Bent 2, Looking East.



Photograph 4. View Typical Steel Condition at the Waterline at Bent 1, Looking East.



Photograph 5. View of Heavy Corrosion and 100 Percent Section Loss of the Cross-Brace at Pile H of Bent 2, Looking Northeast.



SOUNDING PLAN

INSPECTION NOTES:

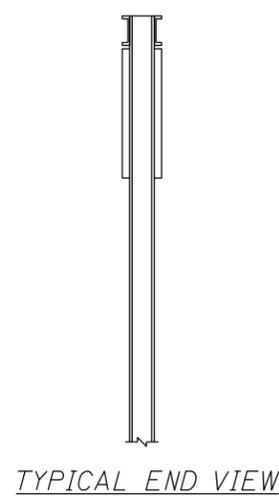
- ① The channel bottom material consisted of rocks, up to 6 inches in diameter, and areas of silt infill with a maximum probe rod penetration of 6 inches.
- ② The steel H-Piles of Bents 1 and 2 typically exhibited 100 percent loss of coating from 1 to 2 feet above the waterline to the channel bottom. The piles exhibited pitting, up to 1/16 inch deep, and random rust nodules, up to 1/2 inch in diameter, from the waterline to the channel bottom. Random rust delaminations, up to 1/8 inch thick, were observed above the waterline.
- ③ The steel channel cross-bracing of the bents typically exhibited rust delaminations up to 1/2 inch thick.
- ④ A light accumulation of timber debris, consisting of 6 inch diameter and smaller branches, was observed extending from the channel bottom to the waterline along the entire length of Bent 2 and extended 5 feet upstream and downstream from the bent noses.
- ⑤ The west cross-brace at Pile H of Bent 2 exhibited an area of heavier corrosion measuring 3 feet long with up to 100 percent web thickness loss of section.

GENERAL NOTES:

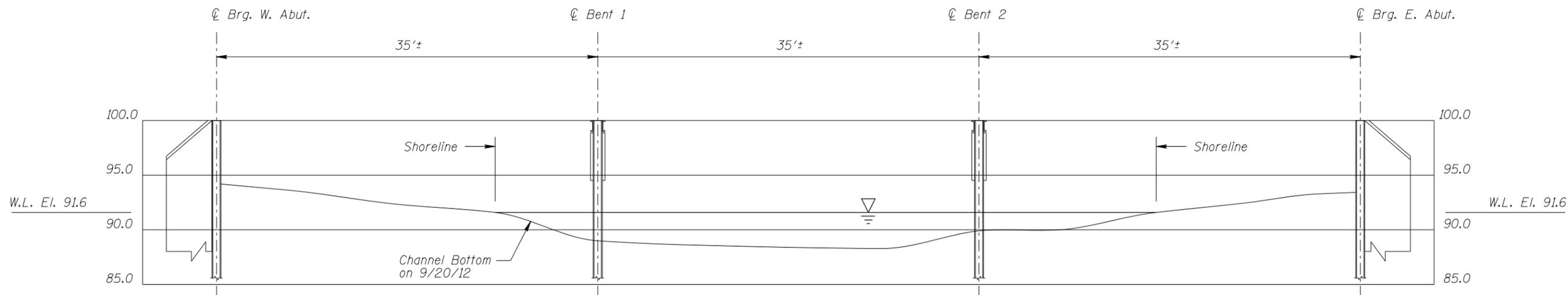
1. Bents 1 and 2 were inspected underwater.
2. At the time of inspection on September 20, 2012, the waterline was located approximately 8.4 feet below the top of the bent cap at the upstream end of Bent 1. Since insufficient elevation information was available, an elevation of 100 was assumed. This corresponds to a waterline elevation of 91.6.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.

Legend

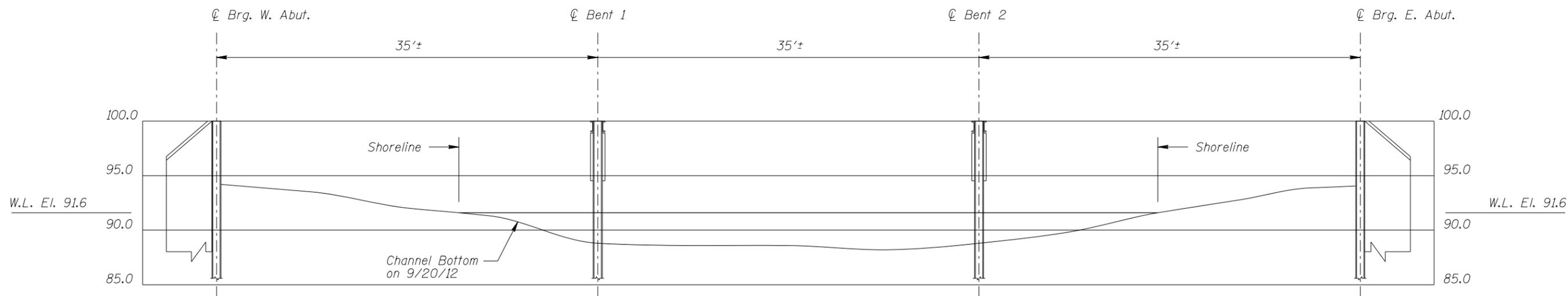
- 2.5 Sounding Depth from Waterline (9/17/12)
- H 10" Steel H-Piles
- H Battered 10" Steel H-Piles
- ⌘ Timber Debris
- A Pile Identification Designation



<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>		
STRUCTURE NO. 93373 CSAH 52 OVER THE WHITEFACE RIVER ST. LOUIS COUNTY		
<b>INSPECTION AND SOUNDING PLAN</b>		
Drawn By: MBP	<b>COLLINS ENGINEERS</b>	Date: NOVEMBER 2012
Checked By: LJ	<small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Scale: NTS
Code: 742393373		Figure No.: 1



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:  
Refer to Figure 1 for General Notes.

<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>		
STRUCTURE NO. 93373 CSAH 52 OVER THE WHITEFACE RIVER ST. LOUIS COUNTY		
UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
Drawn By: MBP	<b>COLLINS ENGINEERS</b> <small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: NOVEMBER 2012
Checked By: LJ		Scale: 1"=10'
Code: 742393373		Figure No.: 2

MINNESOTA DEPARTMENT OF TRANSPORTATION  
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 93373  
 INSPECTORS Collins Engineers, Inc.  
 ON-SITE TEAM LEADER Nicholas R. Triandafilou, P.E.  
 WATERWAY CROSSED Whiteface River

INSPECTION DATE September 20, 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	REINFORCED CONCRETE BOX CULVERT	FOOTINGS	DISPLACEMENT	OTHER (CROSS-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
1	Bent 1	2.8'	5	N	N	N	5	5	N	N	7	7	7	N	5	N	6	N	N
2	Bent 2	3.0'	5	N	N	N	5	5	N	N	7	6	6	N	5	N	5	N	N

\*UNDERWATER PORTION ONLY

REMARKS: Overall, Bents 1 and 2, were found to be in fair condition with only minor defects of structural significance. The steel piles typically exhibited coating loss and minor corrosion extending from the channel bottom to the waterline. The cross-bracing exhibited moderate corrosion with rust delaminations up to 1/2 inch thick. An area of heavier corrosion was observed on the west cross-brace at Pile H of Bent 2 exhibiting up to 100 percent web loss of section. A light accumulation of timber debris was observed along the length of Bent 2 extending from the channel bottom to 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.

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

INSPECTORS: Collins Engineers, Inc. DATE: September 20, 2012

ON-SITE TEAM LEADER: Nicholas R. Triandafilou, P.E.

BRIDGE NO: 93373 WEATHER: Cloudy, 45° F

WATERWAY CROSSED: Whiteface River

DIVING OPERATION:  SCUBA  SURFACE SUPPLIED AIR  
 OTHER

PERSONNEL: Clayton Brookins, Marc B. Parker

EQUIPMENT: Commercial Scuba, Sounding Pole, Hand Tools, Camera, Underwater Light

TIME IN WATER: 11:45 A.M.

TIME OUT OF WATER: 12:15 P.M.

WATERWAY DATA: VELOCITY None/Negligible

VISIBILITY 2.0 feet

DEPTH 3.0 feet maximum at Bent 2

ELEMENTS INSPECTED: Bents 1 and 2

REMARKS: Overall, Bents 1 and 2, were found to be in fair condition with only minor defects of structural significance. The steel piles typically exhibited coating loss and minor corrosion extending from the channel bottom to the waterline. The cross-bracing exhibited moderate corrosion with rust delaminations up to 1/2 inch thick. An area of heavier corrosion was observed on the west cross-brace at Pile H of Bent 2 exhibiting up to 100 percent web loss of section. A light accumulation of timber debris was observed along the length of Bent 2 extending from the channel bottom to the waterline.

FURTHER ACTION NEEDED:      X   YES               NO

Repair the heavily corroded cross-brace at Pile H of Bent 2.

Monitor steel H-Pile and cross-brace corrosion and if found to be worsening, consideration may need to be given to cleaning and recoating the steel H-Piles, along with the possible need for some localized strengthening repairs.

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