

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 89188
7th STREET
OVER THE
ZUMBRO RIVER
DISTRICT 6 - RICE COUNTY



PREPARED FOR THE
MINNESOTA DEPARTMENT OF TRANSPORTATION
BY
COLLINS ENGINEERS, INC.
JOB NO.5221

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected below water at Bridge No. 89188, the West Abutment and Piers 1, 2, and 3, were found to be in good to satisfactory condition. Several hairline to 1/4-inch-wide cracks were noted along the pier shafts and the abutment wall, with a very slight, 1/16-inch differential noted along the northern quarter point of Pier 1. The channel bottom appeared to be stable, and the scour protection system in-place around the substructure units was in good condition. There were light to moderate accumulations of timber debris observed at the upstream ends of Piers 1 and 2.

INSPECTION FINDINGS:

- (A) Two vertical 1/18-inch-wide cracks were observed at the upstream and downstream quarter points along the pier shaft at Piers 2 and 3 that extended from the top of the pier to the concrete scour protection at the channel bottom. All of the cracks extended through the full depth of the pier shafts.
- (B) Four vertical hairline to 1/4-inch-wide cracks were observed along the pier shaft at Pier 1 that extended from the top of the pier to the concrete scour protection at the channel bottom. All of the cracks extended through the full depth of the pier shaft.
- (C) A 1/16-inch-wide differential (in direction of pier shaft depth) was observed along one of the 1/4-inch-wide cracks at the downstream quarter point of Pier 1.
- (D) A light accumulation of 3-inch-diameter and smaller timber debris was observed at the upstream end of Pier 2.
- (E) A moderate accumulation of 3-inch-diameter and smaller timber debris was observed at the upstream end of Pier 1 that extended from the channel bottom up 2 feet.

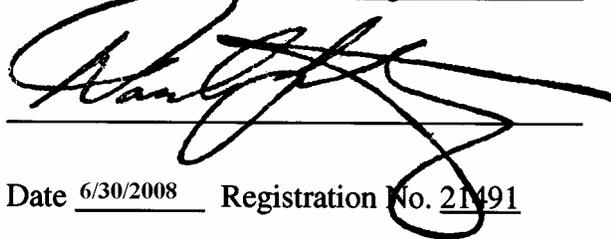
- (F) A 4-inch-diameter spall was observed at the upstream quarter point along the West Abutment with up to 2 inches of penetration and an associated hairline crack that extended to the wingwall.
- (G) A 1/16-inch-wide vertical crack was observed along the entire center joint along the West Abutment.
- (H) A hairline crack was observed at the downstream quarter point of the West Abutment that extended from the top of the abutment to the top of the concrete scour protection at the channel bottom.
- (I) A vertical hairline crack extended from the bottom of the pier cap to the channel bottom at the downstream quarter point along the west side of Pier 2.
- (J) A light accumulation of 6-inch-diameter and smaller timber debris was observed at the upstream end of Pier 1.

RECOMMENDATIONS:

- (A) Monitor the cracking along the pier shafts at Piers 1, 2 and 3 and the West Abutment, with special attention to the minor 1/16-inch-wide differential along the northern end of Pier 1 for any further progression and/or movement.
- (B) Monitor the extent of the timber debris accumulation at Piers 1 and 2, and if shown to be increasing, removal during routine maintenance may become necessary.
- (C) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

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.

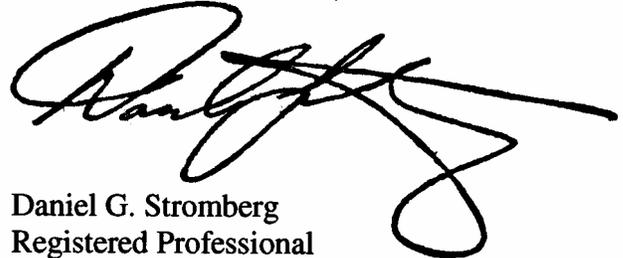
Daniel G. Stromberg



Date 6/30/2008 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.



Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 89188

Feature Crossed: Zumbro River

Feature Carried: 7th Street

Location: District 6 – Rice County

Bridge Description: The superstructure consists of three spans of multiple reinforced concrete beams supporting a reinforced concrete deck. The bridge is supported by two reinforced concrete abutments and three reinforced concrete piers, which are founded on timber piles. The piers are numbered 1 through 3 from the west to east.

2. INSPECTION DATA

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

Dive Team: Clayton G. Brookins, Valerie Roustan

Date: October 24, 2007

Weather Conditions: Sunny, 58° F

Underwater Visibility: 1.0 foot

Waterway Velocity: Negligible

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: West Abutment and Piers 1, 2, and 3.

General Shape: Oblong rectangular shafts with pointed upstream and downstream ends supported by rectangular footings that are founded on timber piles. A sloped concrete scour-protection apron surrounds each of the piers and also extends along the West Abutment.

Maximum Water Depth at Substructure Inspected: Approximately 6.3 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap at the north end of Pier 1.

Water Surface: The waterline was approximately 8.6 feet below reference.
Waterline Elevation = 974.6.

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 B/10/07

Item 113: Scour Critical Bridges: Code F/07

Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

 Yes X No



Photograph 1. Overall View of the West Abutment, Looking Northwest.



Photograph 2. View of Pier 1, Looking Southeast.



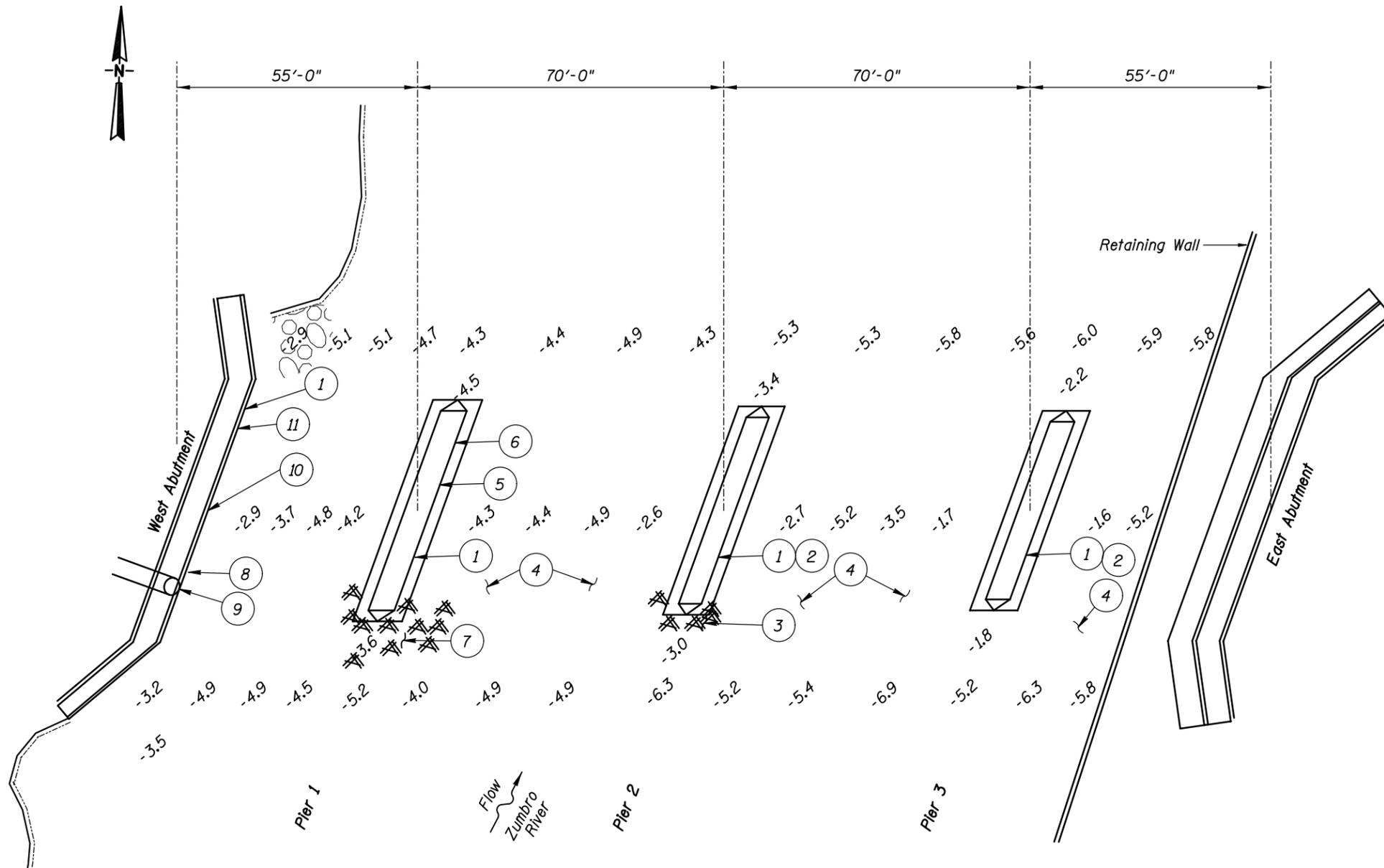
Photograph 3. View of Pier 2, Looking Southeast.



Photograph 4. View of Pier 3, Looking Southeast.

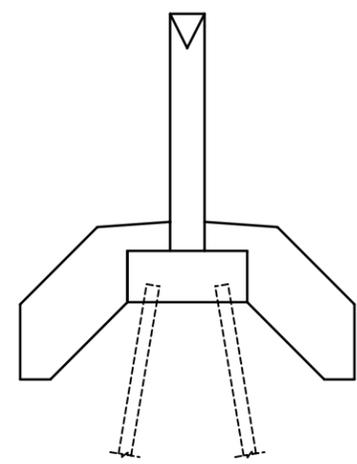


Photograph 5. View of the East Abutment, Looking North.



INSPECTION NOTES:

- 1 The concrete piers were typically in smooth and sound condition.
- 2 Two vertical 1/8-inch-wide cracks were observed at the upstream and downstream 1/4 points along the pier shaft and extended from the top of the pier to the top of the concrete scour protection. Both cracks extended through the full depth of the pier shaft.
- 3 A light accumulation of 3-inch-diameter and smaller timber debris was observed at the upstream end of Pier 2.
- 4 The channel bottom consisted of gravel and silty sand outside of the concrete scour protection around the substructure units.
- 5 Four vertical hairline to 1/4-inch-wide cracks were observed along pier shaft and extended from the top of the pier to top of the concrete scour protection. All cracks extended through the full depth of the pier shaft.
- 6 A 1/16-inch differential (east / west) was observed at the top of the pier shaft at the northern 1/4 point along the southernmost 1/4-inch wide crack.
- 7 A moderate accumulation of 3-inch-diameter and smaller timber debris was observed at the upstream end of Pier 1 and extended from the channel bottom up 2 feet.
- 8 A vertical 1/8-inch-wide crack was observed at the upstream 1/4 point along West Abutment and extended from the top of the abutment to the concrete scour protection.
- 9 A 4-inch-diameter spall was observed near the outfall at the upstream 1/4 point along the West Abutment with up to 2 inches of penetration and an associated hairline crack that extended to the wingwall.
- 10 A 1/16-inchwide vertical crack was observed at along the middle joint of the West Abutment.
- 11 A hairline crack was observed at the downstream 1/4 point of the West Abutment and extended from the top of abutment to top of concrete scour protection.



TYPICAL END VIEW OF EACH PIER SECTION

GENERAL NOTES:

1. Piers 1 through 3 and the West Abutment were inspected underwater.
2. At the time of inspection, on October 24, 2007, the waterline was located approximately 8.6 feet below the top of Pier 1 on the north end. This corresponds to a waterline elevation of 974.6.
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.

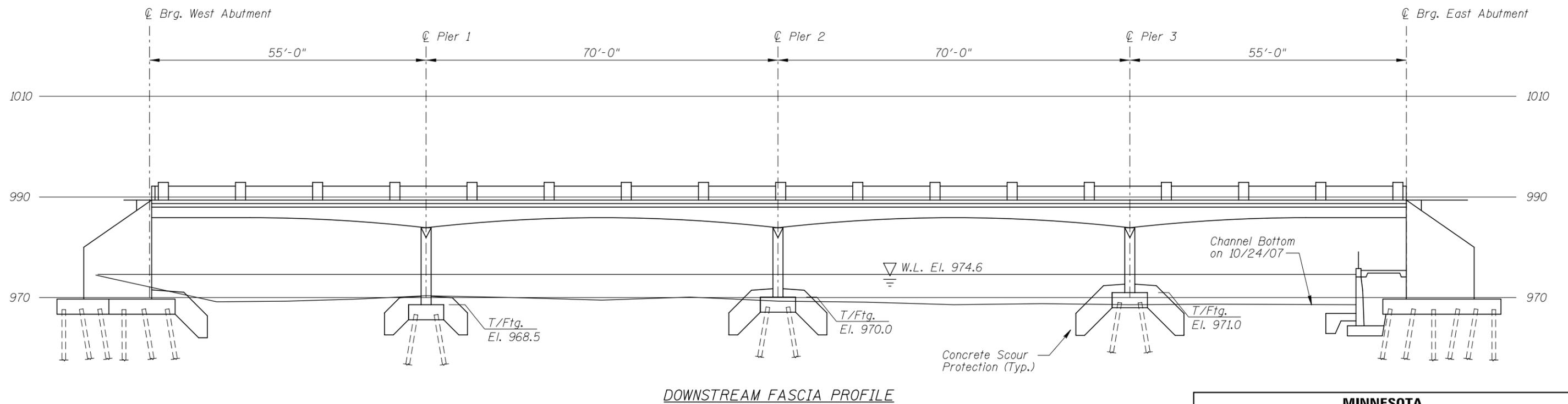
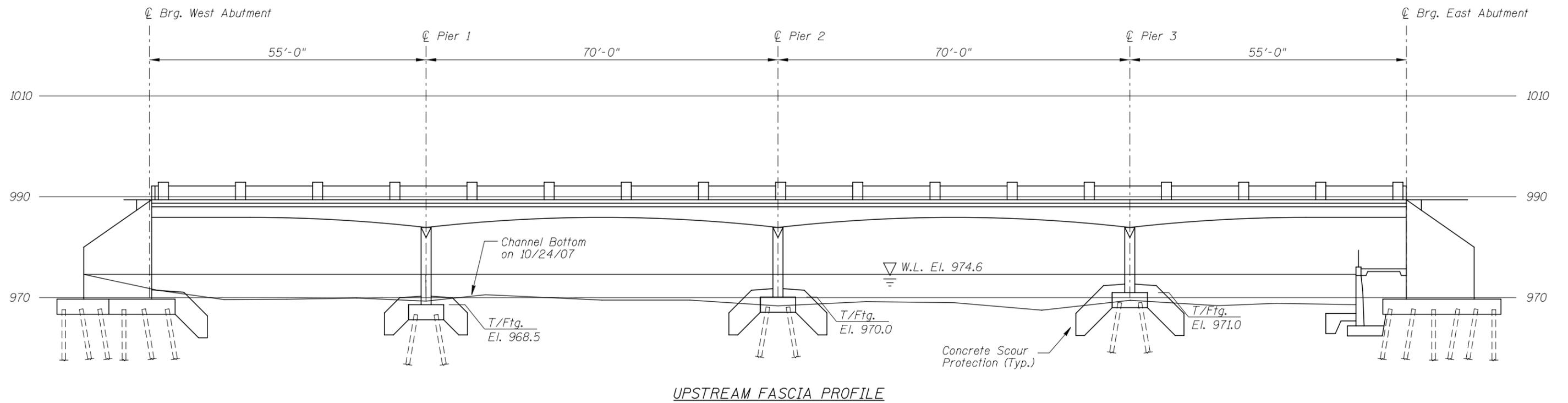
Legend

- 0.4 Sounding Depth (10/24/07)
- Timber Debris

Note:

All soundings based on 2007 waterline location.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 89188 42ND AVE. OVER THE ZUMBRO RIVER DISTRICT 6, RICE COUNTY		
INSPECTION AND SOUNDING PLAN		
Drawn By: RR	COLLINS ENGINEERS	Date: OCT. 2007
Checked By: MDK	<small>133 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Scale: NTS
Code: 52219188		Figure No.: 1



Note:
Refer to Figure 1 for General Notes.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 89188 OVER THE ZUMBRO RIVER DISTRICT 6, RICE COUNTY		
UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
Drawn By: RR	COLLINS ENGINEERS <small>133 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: OCT. 2007
Checked By: MDK		Scale: 1"=20'
Code: 52219188		Figure No.: 2

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

INSPECTORS: Collins Engineers, Inc. DATE: October 24, 2007

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

BRIDGE NO: 89188 WEATHER: Sunny, 58° F

WATERWAY CROSSED: Zumbro River

DIVING OPERATION: SCUBA SURFACE SUPPLIED AIR
 OTHER

PERSONNEL: Clayton G. Brookins, Valerie Roustan

EQUIPMENT: U/W Light, Scraper, Lead Line, Sounding Pole, Probe Rod, Camera

TIME IN WATER: 2:10 P.M.

TIME OUT OF WATER: 2:40 P.M.

WATERWAY DATA: VELOCITY Negligible

VISIBILITY 1.0 foot

DEPTH 6.3 feet maximum at Pier 2.

ELEMENTS INSPECTED: West Abutment and Piers 1, 2, and 3

REMARKS: The concrete was typically in smooth and sound condition with several hairline to 1/4-inch-wide cracks noted in the pier shafts that typically extended from the top of the piers to the top of the concrete scour protection at the channel bottom and that also extended through the full depth of the piers. A slight 1/16-inch-wide differential along one of the 1/4-inch-wide cracks at the downstream quarter point of Pier 1 was also noted. Light to moderate accumulations of timber debris were observed at the upstream ends of both Piers 1 and 2.

FURTHER ACTION NEEDED: YES NO

Monitor the cracking along the pier shafts at Piers 1, 2 and 3 and the West Abutment, with special attention to the minor 1/16-inch-wide differential along the northern end of Pier 1 for any further progression and/or movement.

Monitor the extent of the timber debris accumulation at both piers, and if shown to be increasing, removal during routine maintenance may become necessary.

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 89188
 INSPECTORS Collins Engineers, Inc.
 ON-SITE TEAM LEADER Daniel G. Stromberg, P.E. 21491
 WATERWAY CROSSED Zumbro River

INSPECTION DATE October 24, 2007
 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
	West Abutment	3.2'	N	7	N	9	N	7	8	N	N	N	8	7	N	N	N	N	N
	Pier 1	5.2'	N	6	N	8	N	6	8	N	N	7	8	7	N	N	N	N	N
	Pier 2	6.3'	N	7	N	9	N	7	8	N	N	7	8	7	N	N	N	N	N
	Pier 3	6.0'	N	7	N	9	N	7	8	N	N	N	8	7	N	N	N	N	N

*UNDERWATER PORTION ONLY

REMARKS: The concrete was typically in smooth and sound condition with several hairline to 1/4-inch-wide cracks noted in the pier shafts that typically extended from the top of the piers to the top of the concrete scour protection at the channel bottom and that also extended through the full depth of the piers. A slight 1/16-inch-wide differential along one of the 1/4-inch-wide cracks at the downstream quarter point of Pier 1 was also noted. Light to moderate accumulations of timber debris were observed at the upstream ends of both Piers 1 and 2.

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.