

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 31512
CSAH NO. 18
OVER THE
MISSISSIPPI RIVER
DISTRICT 1 - ITASCA COUNTY



PREPARED FOR THE
MINNESOTA DEPARTMENT OF TRANSPORTATION
BY
COLLINS ENGINEERS, INC.
JOB NO. 3512 (CEI 30)

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected below water at Bridge No. 31512, Piers 1 and 2, were found to be generally in good condition with no structurally significant defects. The steel piles exhibited widespread coating failure and corrosion, which has progressed in extent since the last inspection, but has still not caused an appreciable loss of section or structural integrity. The channel bottom is presently stable with no significant scour; however, the heavy accumulation of organic material and vegetation at the upstream noses of Piers 1 and 2 have caused minor channel degradation around the accumulations.

INSPECTION FINDINGS:

- (A) Fairly uniform surface corrosion with frequent rust nodules was found from 1 foot above the waterline to the channel bottom, with the heaviest concentrations of deterioration found from 1 foot above the waterline to 4 feet below the waterline. None of the corrosion has caused an appreciable loss of section thus far.
- (B) Around the upstream piles of both piers, a heavy accumulation of organic material and vegetation (and an assumed beaver den at Pier 2) was present from up to 3 feet above the waterline to the channel bottom, with some light scour upstream of the piers due to the accumulations.

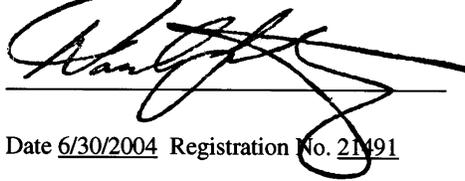
RECOMMENDATIONS:

- (A) Monitor the extent of corrosion on the piles, and if found to be progressing to the point where appreciable section loss is occurring, corrective measures to inhibit further deterioration may be warranted.
- (B) Monitor the accumulations of vegetation and organic materials at the upstream piles of the piers, so that they do not become excessive and exert large lateral loads or influence scour at the piers. If the accumulations progress in size in the future, removal may be warranted at that time.

- (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



A handwritten signature in black ink, appearing to read 'Daniel G. Stromberg', is written over two horizontal lines. The signature is stylized and cursive.

Date 6/30/2004 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.



A handwritten signature in black ink, appearing to read 'Daniel G. Stromberg', is written over two horizontal lines. The signature is stylized and cursive.

Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 31512

Feature Crossed: The Mississippi River

Feature Carried: CSAH No. 18

Location: District 1 - Itasca County

Bridge Description: The superstructure consists of three spans of prestressed concrete beams. The superstructure is supported by two reinforced concrete abutments found on steel piles and two steel pile piers. The piers are labeled Piers 1 and 2 starting from the west end of the bridge.

2. INSPECTION DATA

Professional Engineer Diver: Daniel G. Stromberg
State of Minnesota, P.E., No. 21491

Dive Team: Michelle D. Koerbel, Matthew J. Lengyel

Date: August 23, 2002

Weather Conditions: Cloudy, $\pm 65^{\circ}$ F

Underwater Visibility: ± 2.5 Feet

Waterway Velocity: ± 1.0 fps

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 and 2.

General Shape: The piers are steel shell pile bents consisting of two lines of five piles each under a concrete cap.

Maximum Water Depth at Substructure Inspected: Approximately 10.0 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap on the north side of Pier 1.

Water Surface: The waterline was approximately 7.0 feet below reference.
Waterline Elevation = 1274.7.

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

Item 60: Substructure: Code 7

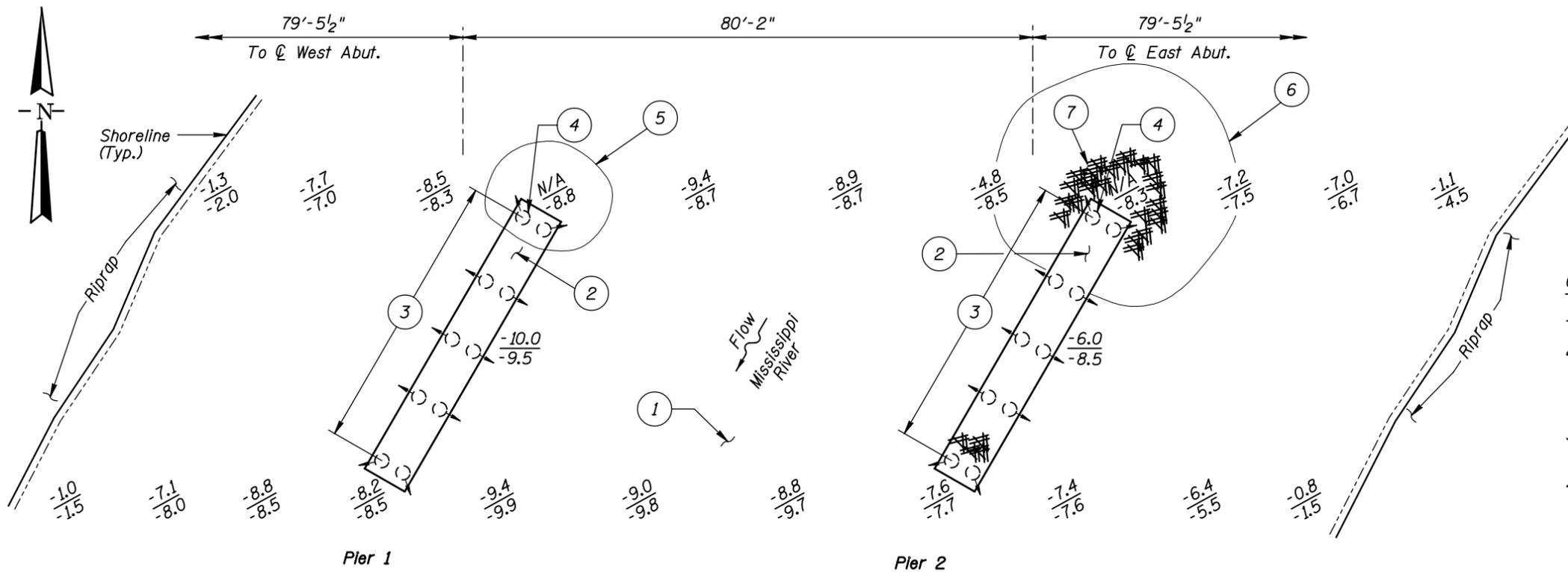
Item 61: Channel and Channel Protection: Code 5

Item 92B: Underwater Inspection: Code B/08/02

Item 113: Scour Critical Bridges: Code O/96

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

Yes No



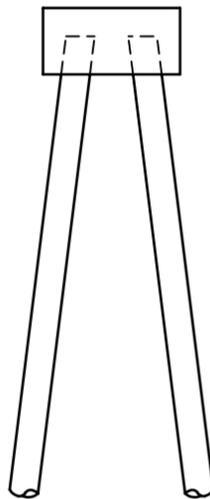
GENERAL NOTES:

1. Piers 1 and 2 were inspected underwater.
2. At the time of inspection on August 23, 2002, the waterline was located approximately 7.0 feet below the top of the cap at the upstream end of Pier 1. This corresponds to a waterline elevation of 1274.7 feet based on design drawings.
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.

SOUNDING PLAN

INSPECTION NOTES:

- 1 The channel bottom material consisted of firm sandy gravel with scattered 6 inch cobbles and a probe rod penetration of approximately 1 inch.
- 2 Soft sandy infilling present, approximately 2 to 3 feet high with a maximum probe rod penetration of 1 foot.
- 3 All piles exhibited paint coating deterioration, corrosion, and rust nodules on 50 to 100 percent of the surface area, from 1 foot above the waterline to the channel bottom. Heaviest corrosion (+/- 100 percent) was present between 1 foot above and 4 feet below the waterline. Random pitting with a maximum of 1/32 inch penetration was observed on the steel pipe piles.
- 4 There was a moderate accumulation of weeds on the upstream end of each pier extending from the waterline to the channel bottom.
- 5 A 10 foot diameter by 6 feet height pile of organic accumulation and vegetation consisting of a dense roots and organic material was observed at the mudline.
- 6 A 10 foot diameter pile of organic accumulation and vegetation consisting of dense roots and organic material was observed extended from the mudline to 3 feet above the waterline.
- 7 A heavy accumulation of timber drift consisting of 1 inch to 3 inch diameter branches. The timber drift appears to be a beaver den and extends approximately 3 feet above the waterline.

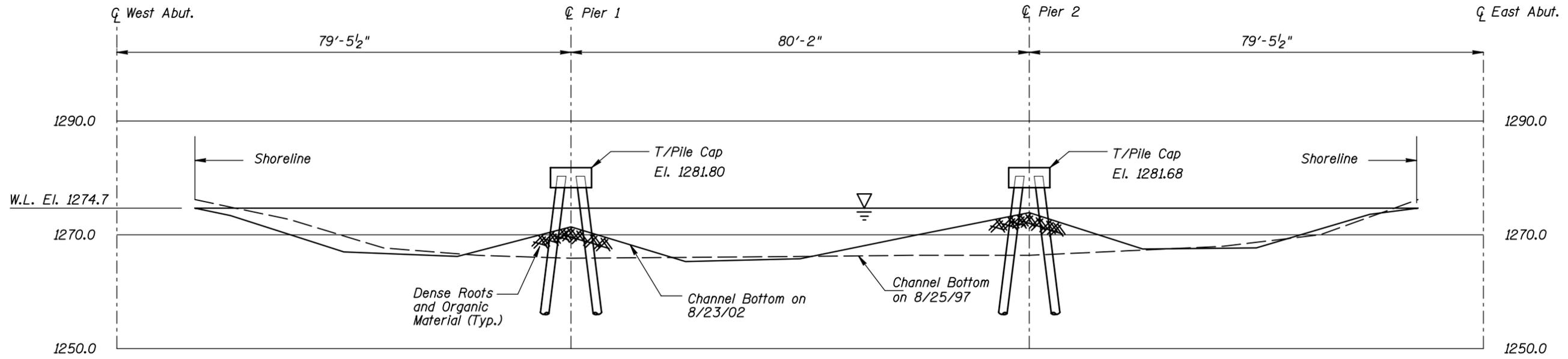


TYPICAL END VIEW OF PIERS

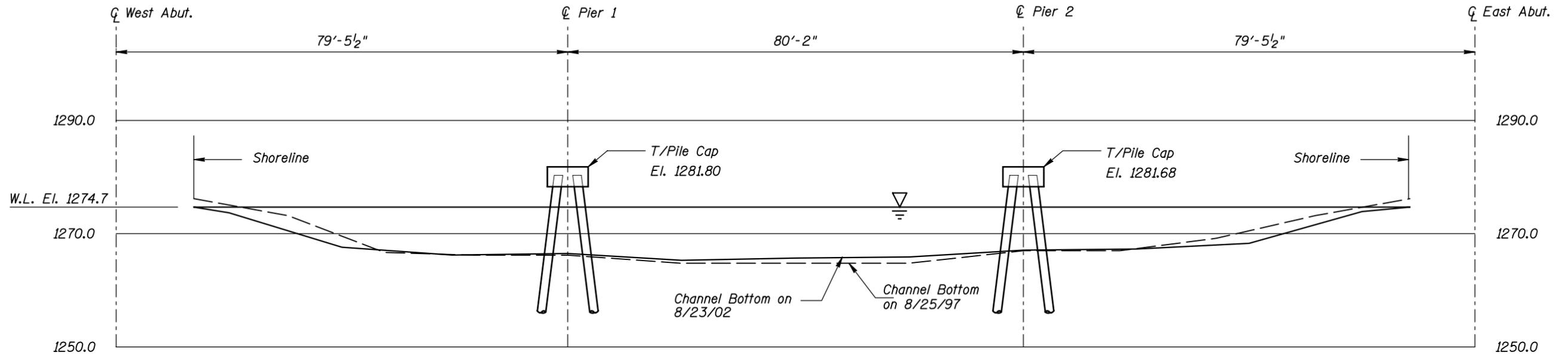
Legend

- 2.0 Sounding Depth from Waterline (8/23/02)
- 5.2 Sounding Depth from Waterline (8/25/97)
- () Steel Pile
- () Battered Steel Pile
- Timber Debris

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 31512 OVER THE MISSISSIPPI RIVER DISTRICT I, ITASCA COUNTY		
INSPECTION AND SOUNDING PLAN		
Drawn By: PRH	COLLINS ENGINEERS, INC.	Date: AUG. 2002
Checked By: MDK	300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Scale: NTS
Code: 35120030		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. 31512 OVER THE MISSISSIPPI RIVER DISTRICT I, ITASCA COUNTY		
UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
Drawn By: PRH	COLLINS ENGINEERS, INC. 300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Date: AUG. 2002
Checked By: MDK		Scale: 1"=20'
Code: 35I20030		Figure No.: 2



Photograph 1. Overall View, Looking Southeast.



Photograph 2. View of Pier 1, Looking East.



Photograph 3. View of Pier 2, Looking West.



Photograph 4. View of Timber Drift at the Upstream Nose of Pier 2, Looking East.



Photograph 5. View of Timber Drift at the Upstream Nose of Pier 2, Looking Northwest.



Photograph 6. View of Timber Drift at the Upstream Nose of Pier 2, Looking Southwest.

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

INSPECTORS: Collins Engineers, Inc. DATE: August 23, 2002
ON-SITE TEAM LEADER: Daniel G. Stromberg, P.E.
BRIDGE NO: 31512 WEATHER: Cloudy, " 65° F
WATERWAY CROSSED: The Mississippi River
DIVING OPERATION: X SCUBA SURFACE SUPPLIED AIR
 OTHER

PERSONNEL: Michelle D. Koerbel, Matthew J. Lengyel
EQUIPMENT: Scuba, U/W Light, Scraper, Lead Line, Sounding Pole, Probe Rod,
Camera

TIME IN WATER: 12:41 P.M.

TIME OUT OF WATER: 1:10 P.M.

WATERWAY DATA: VELOCITY " 1.0 fps

VISIBILITY 2 - 3 feet

DEPTH 10 feet maximum at Pier 1

ELEMENTS INSPECTED: Piers 1 and 2

REMARKS: Overall, the submerged steel of the piles at Piers 1 and 2 were generally in good condition with complete coating failure and nodular corrosion between 1 foot above the waterline and the mudline. Thus far, the corrosion, which was the heaviest in the upper 3 to 5 feet of water depth, has resulted in minimal section loss with only the early stages of pitting having depths of no more than 1/32 inch. At both piers there was a moderate (Pier 1) to heavy (Pier 2) accumulation of dense organic material buildup around the upstream two piles. At Pier 2, the organic material mound has an accumulation of branchy drift on it, which appears to be a beaver den. These accumulations are influencing scour around the upstream side of the piers.

FURTHER ACTION NEEDED: _____ YES X NO

The combination of the organic material build-up and beaver den (timber drift accumulation) at Pier 2 is becoming excessive and could continue to progress and influence scour, restrict flow, and exert lateral load on the pier. Therefore, it is recommended that the accumulation of organic and drift at Pier 2 be closely monitored during future inspections and if found to be increasing in extant, removal may be warranted at that time. (Similar measures could be accomplished at Pier 1 to prevent the same concerns).

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. 31512
 INSPECTORS Collins Engineers, Inc.
 ON-SITE TEAM LEADER Daniel G. Stromberg, P.E. 21491
 WATERWAY CROSSED The Mississippi River

INSPECTION DATE August 23, 2002
 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	+10.0'	7	7	N	9	N	7	7	N	N	6	6	N	7	N	8	N	N
	Pier 2	+7.6'	7	7	N	9	N	7	7	N	N	5	5	N	7	N	8	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the submerged steel of the piles at Piers 1 and 2 were generally in good condition with complete coating failure and nodular corrosion between 1 foot above the waterline and the mudline. Thus far, the corrosion, which was the heaviest in the upper 3 to 5 feet of water depth, has resulted in minimal section loss with only the early stages of pitting having depths of no more than 1/32 inch. At both piers there was a moderate (Pier 1) to heavy (Pier 2) accumulation of dense organic material buildup around the upstream two piles. At Pier 2, the organic material mound has an accumulation of branchy drift on it, which appears to be a beaver den. These accumulations are influencing scour around the upstream side of the piers.

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.