

UNDERWATER BRIDGE INSPECTION REPORT

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STRUCTURE NO. 69505  
CSAH NO. 8  
OVER THE  
ST. LOUIS RIVER  
DISTRICT 1 – ST. LOUIS COUNTY

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PREPARED FOR THE  
MINNESOTA DEPARTMENT OF TRANSPORTATION  
BY  
COLLINS ENGINEERS, INC.  
JOB NO. 3512 (CEI 2)

MINNESOTA DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge 69505, the West and East Piers, were in good condition with no defects of structural significance observed. A heavy accumulation of timber debris was observed at the upstream end of the West Pier. The channel bottom appeared to be in stable condition with no evidence of significant scour.

INSPECTION FINDINGS:

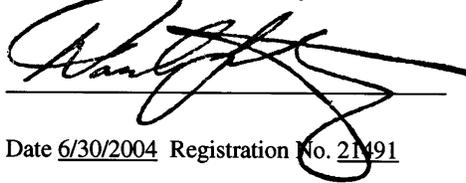
- (A) The concrete exhibited light scaling from 3 feet above the waterline to the channel bottom with exposed aggregated and typical penetrations of 1/8 inch and maximum penetrations of 1/4 inch.
- (B) A heavy accumulation of 2-foot-diameter and smaller timber debris was observed at the upstream end and along the shore side of the West Pier extending from the channel bottom to 8 feet above the waterline. The drift accumulation extended 20 feet upstream of the pier and 30 feet into the adjoining spans. A 2-foot-diameter tree was also observed along the west shoreline, and a 1-foot-diameter log was located on the channel bottom at the upstream end of the East Pier.

RECOMMENDATIONS:

- (A) Remove heavy accumulation of timber debris from around the West Pier as soon as possible to alleviate flow restriction, to eliminate potential for scour, and to limit lateral force imposed in the substructure unit.
  
- (B) 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



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Date 6/30/2004 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: 69505

Feature Crossed: The St. Louis River

Feature Carried: CSAH No. 8

Location: District 1 – St. Louis County

Bridge Description: The superstructure consists of three spans of multiple concrete beams supporting a reinforced concrete deck. The superstructure is supported by two concrete abutments and two concrete piers.

2. INSPECTION DATA

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

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

Date: August 31, 2002

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

Underwater Visibility:  $\pm 2.0$  Feet

Waterway Velocity:  $\pm 1.0$  f.p.s.

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: East and West Piers

General Shape: The piers consist of an oblong rectangular concrete shaft supporting a hammerhead pier cap on top of a rectangular footing founded on piles.

Maximum Water Depth at Substructure Inspected: Approximately 5.0 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap on the upstream end of the East Pier.

Water Surface: The waterline was approximately 16.8 feet below reference.  
Assumed Waterline Elevation = 83.2.

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

Item 60: Substructure: Code 7

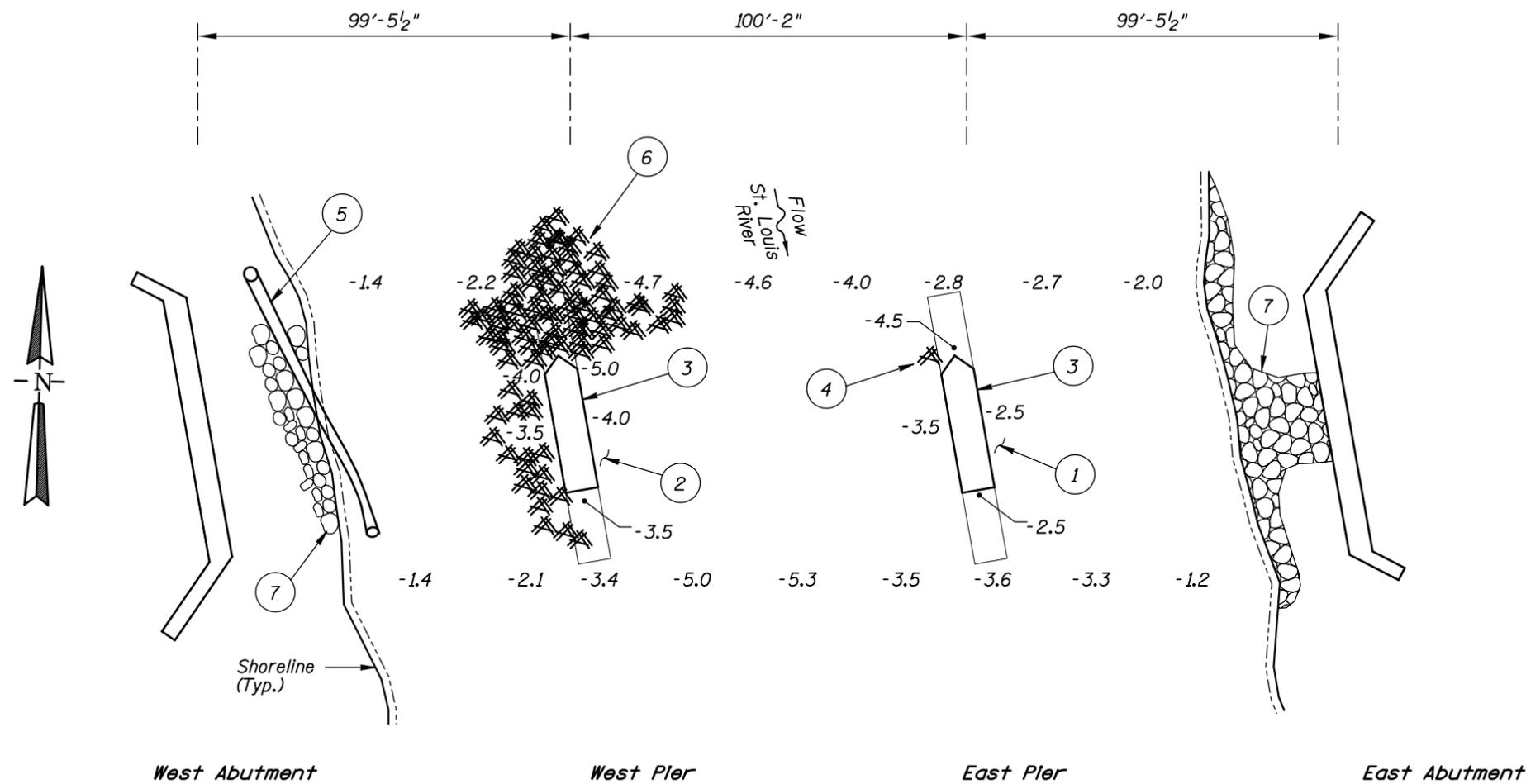
Item 61: Channel and Channel Protection: Code 4

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

Item 113: Scour Critical Bridges: Code N/02

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

\_\_\_\_\_ Yes  X  No



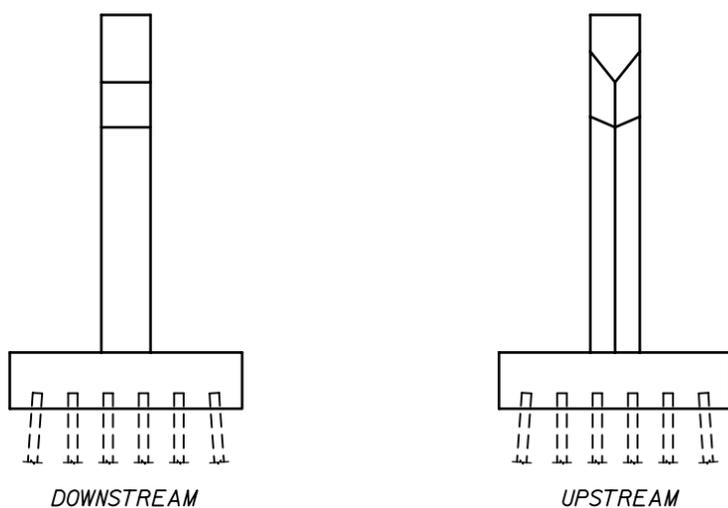
**SOUNDING PLAN**

**GENERAL NOTES:**

1. The West Pier and East Pier were inspected underwater.
2. At the time of inspection on August 31, 2002, the waterline was located approximately 16.8 feet below the top of the cap at the upstream end of East Pier. Since insufficient bridge elevation information was available a reference elevation of 100.0 was assumed. Based on the assumed reference the waterline elevation was 83.2.
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.

**INSPECTION NOTES:**

- 1 The channel bottom consisted of 1- to 2-foot-diameter riprap and cobbles.
- 2 The channel bottom consisted of 1 to 2 inches of soft silt over a firm mix of 1-to 2-foot-diameter riprap and cobbles.
- 3 The concrete exhibited light scaling 3 feet above the waterline to the channel bottom with exposed aggregate and typical penetrations of 1/8 inch and maximum penetrations of 1/4 inch.
- 4 A 1-foot-diameter log was observed on the channel bottom.
- 5 A 2-foot-diameter tree trunk was observed on the West shoreline.
- 6 A heavy accumulation of 2-foot-diameter and smaller timber debris was observed at the upstream end and along the shore side of the West Pier extending from the channel bottom to 8 feet above the waterline. The drift extended 20 feet upstream of the pier and 30 feet into the adjoining spans.
- 7 1- to 2-foot-diameter riprap and cobbles were observed at the embankments.

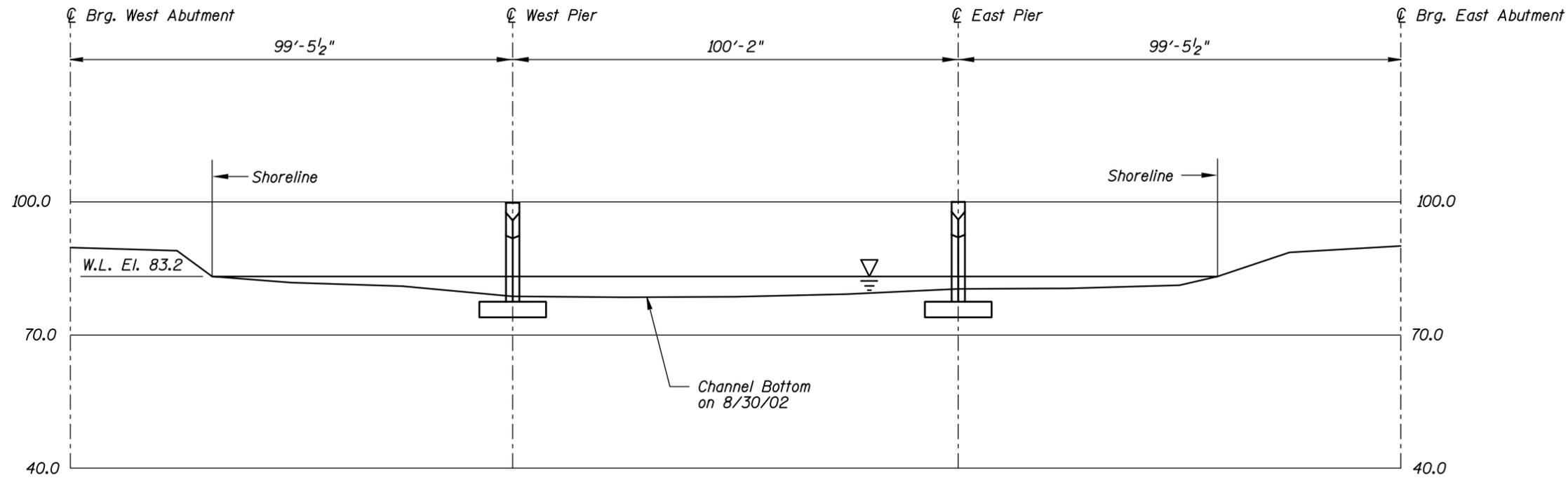


**TYPICAL END VIEW OF PIERS**

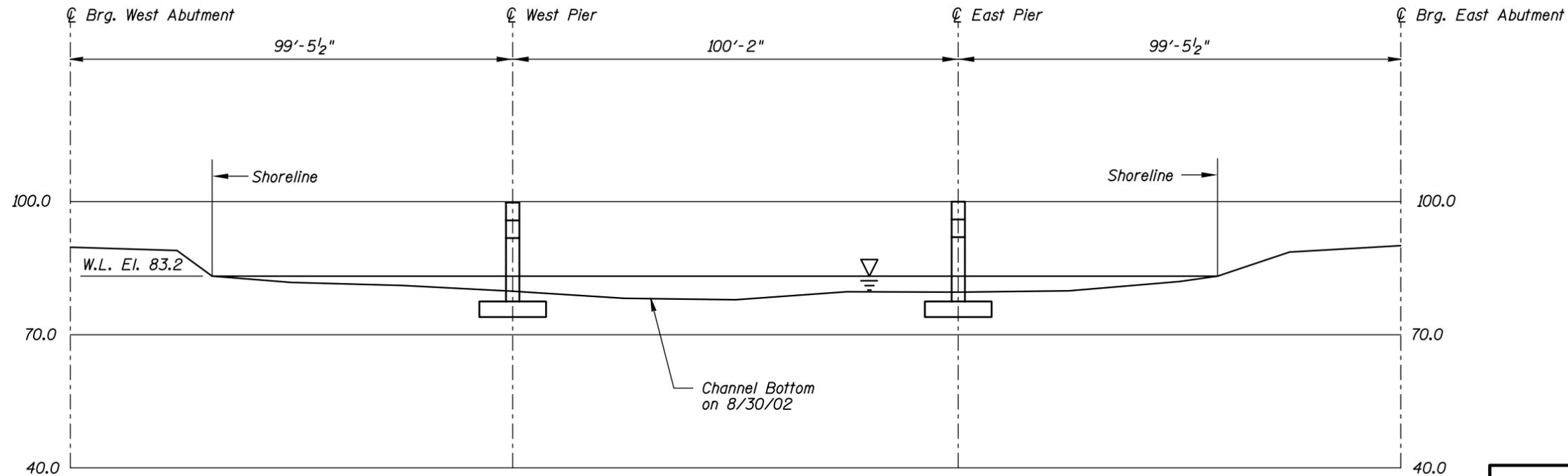
**Legend**

- 8.0 Sounding Depth from Waterline (8/30/02)
- Timber Debris
- Riprap

<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>		
STRUCTURE NO. 69505 OVER THE ST. LOUIS RIVER DISTRICT I, ST. LOUIS COUNTY		
<b>INSPECTION AND SOUNDING PLAN</b>		
Drawn By: PRH	<b>COLLINS ENGINEERS, INC.</b>	Date: AUG. 2002
Checked By: MDK	300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Scale: NTS
Code: 35120002		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. 69505 OVER THE ST. LOUIS RIVER DISTRICT I, ST. LOUIS COUNTY		
<b>UPSTREAM AND DOWNSTREAM FASCIA PROFILES</b>		
Drawn By: PRH	<b>COLLINS ENGINEERS, INC.</b>	Date: AUG. 2002
Checked By: MDK	300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Scale: 1"=30'
Code: 35I20002		Figure No.: 2



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



Photograph 2. View of East Pier, Looking Southwest.



Photograph 3. View of West Pier, Looking Northwest.



Photograph 4. View of Heavy Accumulation of Timber Debris at West Pier, Looking West.

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

INSPECTORS: Collins Engineers, Inc.

DATE: August 31, 2002

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

BRIDGE NO: 69505

WEATHER: Cloudy, ± 65° F

WATERWAY CROSSED: The St. Louis River

DIVING OPERATION: X SCUBA SURFACE SUPPLIED AIR  
OTHER

PERSONNEL: Michelle D. Koerbel, Matthew J. Lengyel

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

TIME IN WATER: 8:10 A.M.

TIME OUT OF WATER: 8:30A.M.

WATERWAY DATA: VELOCITY ± 1.0 f.p.s.

VISIBILITY ± 2.0 feet

DEPTH 5.0 Feet maximum the West Pier

ELEMENTS INSPECTED: East and West Piers

REMARKS: Overall, the concrete was in good, sound condition with light scaling from 3 feet above the waterline to the channel bottom with exposed aggregate and typical penetrations of 1/8 inch and maximum penetrations of 1/4 inch. A very heavy accumulation of timber debris was observed extending 30 feet upstream, 30 feet into the spans and 8 feet above the waterline at the upstream end of the West Pier.

FURTHER ACTION NEEDED:  X  YES \_\_\_\_\_ NO

Remove heavy accumulation of timber debris from around the West Pier as soon as possible to alleviate flow restriction, to eliminate scour potential and to limit lateral force imposed in the substructure unit.

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. 69505  
INSPECTORS Collins Engineers, Inc.  
ON-SITE TEAM LEADER Daniel G. Stromberg, P.E. 21491  
WATERWAY CROSSED The St. Louis River

INSPECTION DATE August 31, 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	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 Pier	5.0'	N	7	N	9	N	7	7	N	7	4	4	7	N	N	N	N	N
	East Pier	4.5'	N	7	N	9	N	7	7	N	8	7	7	7	N	N	N	N	N

\*UNDERWATER PORTION ONLY

REMARKS: Overall, the concrete was in good, sound condition with light scaling from 3 feet above the waterline to the channel bottom with exposed aggregate and typical penetrations of 1/8 inch and maximum penetrations of 1/4 inch. A very heavy accumulation of timber debris was observed extending 30 feet upstream, 30 feet into the spans and 8 feet above the waterline at the upstream end of the West Pier.

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.