

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 03503

CSAH NO. 24

OVER THE

CHANNEL BETWEEN DETROIT LAKE AND DEAD SHOT BAY

DISTRICT 4 - BECKER COUNTY



JULY 12, 2012

PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

AYRES ASSOCIATES & COLLINS ENGINEERS, INC.

JOB NO. 7423

)

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 03503, Piers 1 through 3, were found to be in good condition with no defects of structural significance observed. The steel pipe piles had 100 percent coating failure and light surface corrosion around and below the waterline. The extent of steel pipe pile corrosion was comparable to what was reported in 2007. Generally light timber debris was scattered throughout the piles on the channel bottom at all piers. The channel bottom appeared to be in stable condition with no evidence of significant scour.

INSPECTION FINDINGS:

- (A) The protective coating on the cast-in-place steel pipe piles of all piers exhibited signs of initial breakdown from the top of the pile to the channel bottom.
- (B) Random rust nodules, 1/4 inch to 1 inch in diameter, were observed covering over 50 percent of the surface area of the piles from 10 feet below the waterline to the channel bottom, and between 10 to 20 percent of the surface area from the top of the pile to 10 feet below the waterline.
- (C) Timber debris was observed scattered throughout the channel bottom at all of the piers.

RECOMMENDATIONS:

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

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.

Brian K. Schroeder

Name



Signature

Date 08/11/12

Registration No. 43576

Ayres Associates, Inc.



Brian K. Schroeder
Registered Professional Engineer
State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 03503

Feature Crossed: Channel between Detroit Lake and Dead Shot Bay

Feature Carried: CSAH No. 24

Location: District 4 - Becker County

Bridge Description: The superstructure consists of a four span cast-in-place concrete slab supported by two concrete abutments on piles and three cast-in-place pipe pile bent piers, numbered 1 to 3 starting from the north end of the bridge.

2. INSPECTION DATA

Professional Engineer/Team Leader: Brian K. Schroeder, P.E. / Ricardo S. Narvaez

Dive Team: Ricardo Narvaez, Jason Cook, Adam Enderby

Date: July 12, 2012

Weather Conditions: Cloudy, 78°F

Underwater Visibility: 10.0 Feet

Waterway Velocity: None/Negligible

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 through 3.

General Shape: Each pier consists of a single line of twelve battered or vertical cast-in-place, concrete filled, steel pipe piles under a common pier cap.

Maximum Water Depth at Substructure Inspected: Approximately 21.4 feet.

4. WATERLINE DATUM

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

Water Surface: The waterline was approximately 5.6 feet below reference.
Waterline Elevation = 1333.8.

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/07/12

Item 113: Scour Critical Bridges: Code I/02

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	36	EA		36			
985	Slopes and Slope Protection	1	EA		1			



Photograph 1. View of Pier 1, Looking Northeast.



Photograph 2. View of Pier 2, Looking Northeast.



Photograph 3. View of Pier 3, Looking Southwest.



Photograph 4. Typical Conditions at Waterline.

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

INSPECTORS: Ayres Associates DATE: July 12, 2012

ON-SITE TEAM LEADER: Ricardo S. Narvaez

BRIDGE NO: 03503 WEATHER: Cloudy, 73° F

WATERWAY CROSSED: Channel between the Detroit River and Dead Shot Bay

DIVING OPERATION: _____ SCUBA SURFACE SUPPLIED AIR
_____ OTHER _____

PERSONNEL: Jason Cook, Adam Enderby

EQUIPMENT: SSA, Sounding Pole, Camera, U/W Light, Hammer

TIME IN WATER: 10:20 A.M.

TIME OUT OF WATER: 10:45 A.M.

WATERWAY DATA: VELOCITY Negligible/None

VISIBILITY 10.0 feet

DEPTH 21.4 feet maximum at Pier 2

ELEMENTS INSPECTED: Piers 1, 2 and 3

REMARKS: Overall, substructure units inspected were found to be in good condition with no defects of structural significance observed. The steel pipe piles had up to 100 percent coating failure from the top of the pile to the channel bottom. Light surface corrosion, with rust nodules typically 1/4 inch in diameter and up to 1 inch in diameter, was observed over 50 percent of the surface area of the steel pipe piles from 10 feet below the waterline to the channel bottom and over 10 to 20 percent of the surface area from the top of the pile to 10 feet below the waterline. Timber debris was observed scattered throughout the channel bottom at all piers. The channel bottom appeared to be in stable condition with no evidence of significant scour.

FURTHER ACTION NEEDED: _____ YES 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. 03503
 INSPECTORS Ayres Associates
 ON-SITE TEAM LEADER Ricardo S. Narvaez
 WATERWAY CROSSED Channel between Detroit Lake and Dead Shot Bay

INSPECTION DATE July 12, 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.

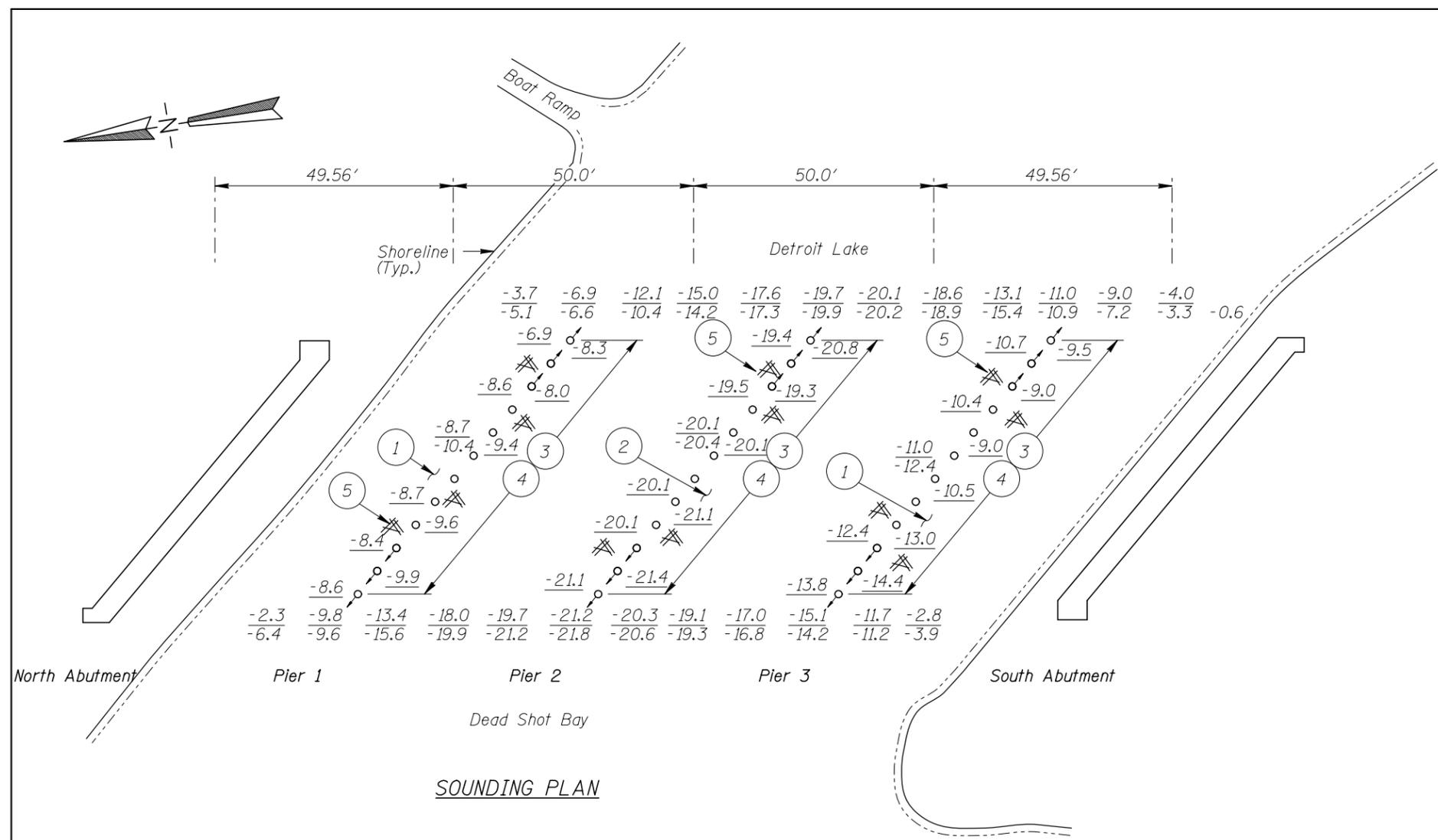
CONDITION RATING

UNIT REFERENCE NO.	UNIT DESCRIPTION	MAXIMUM DEPTH OF WATER	SUBSTRUCTURE					CHANNEL					GENERAL						
			PILING	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	9.9'	7	N	N	8	N	7	8	8	8	7	7	N	7	N	7	N	N
	Pier 2	21.4'	7	N	N	8	N	7	8	N	N	7	7	N	7	N	7	N	N
	Pier 3	15.1'	7	N	N	8	N	7	8	8	8	7	7	N	7	N	7	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, substructure units inspected were found to be in good condition with no defects of structural significance observed. The steel pipe piles had up to 100 percent coating failure from the top of the pile to the channel bottom. Light surface corrosion, with rust nodules typically 1/4 inch in diameter and up to 1 inch in diameter, was observed over 50 percent of the surface area of the steel pipe piles from 10 feet below the waterline to the channel bottom and over 10 to 20 percent of the surface area from the top of the pile to 10 feet below the waterline. Pitting, 1/32 of an inch deep, was observed on all piles. Timber debris was observed scattered throughout the channel bottom at all piers. The channel bottom appeared to be in stable condition with no evidence of significant scour.

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.



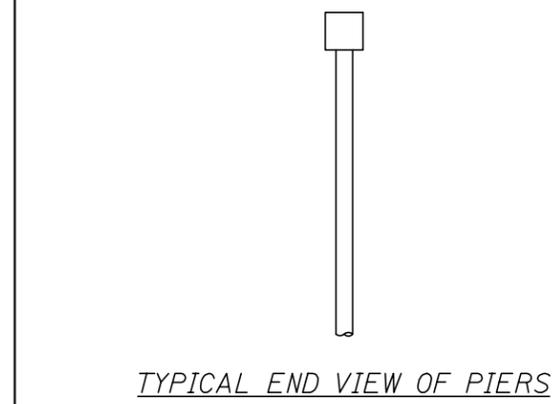
SOUNDING PLAN

GENERAL NOTES:

1. Piers 1, 2, and 3 inspected underwater.
2. At the time of inspection on July 12, 2012 the waterline was located approximately 5.6 feet below the top of the pier cap at the east end of Pier 2. This corresponds with a waterline elevation of 1333.8 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.

INSPECTION NOTES:

- 1 The channel bottom consisted of 6 inch diameter cobbles and sandy silt with up to 1 foot of probe rod penetration.
- 2 The channel bottom consisted of sand with up to 6 inches of probe rod penetration.
- 3 The steel pipe piles had coating failure with light surface corrosion from top of pile to the channel bottom.
- 4 The steel pipe piles had rust nodules, typically 1/4 inch in diameter and up to 1 inch in diameter, over 50 percent of the surface area from 10 feet below the waterline to the channel bottom and over 10 to 20 percent from the top pile to 10 feet below the waterline.
- 5 Timber debris was scattered throughout the piles of all the piers.



Legend

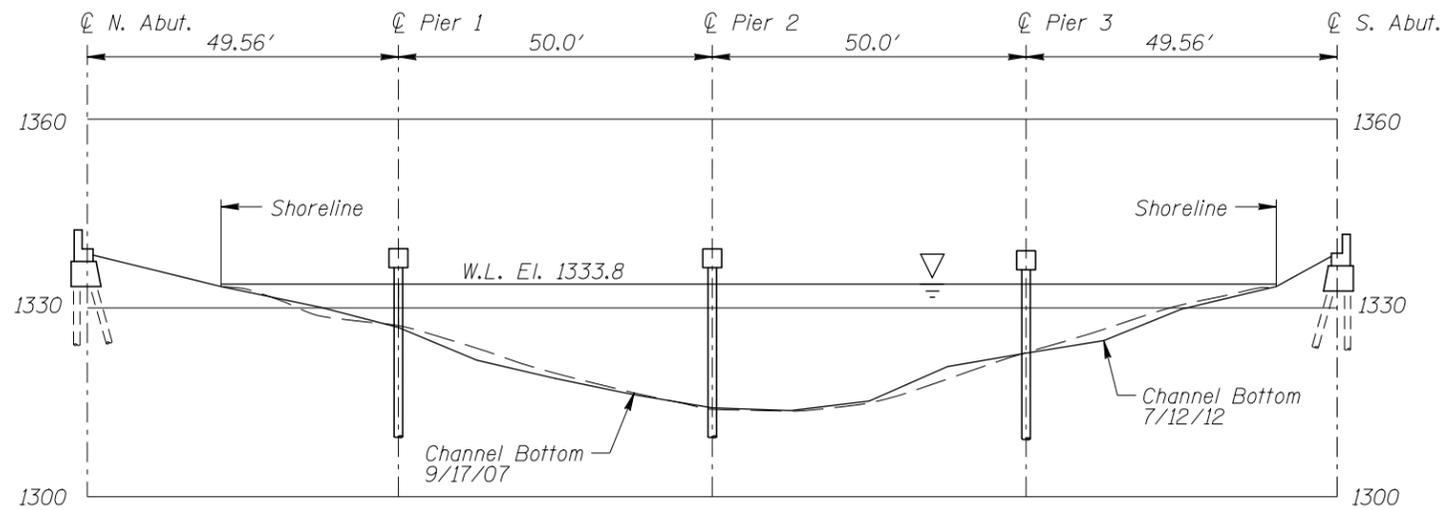
- 2.0 Sounding Depth (7/12/12)
- 5.2 Sounding Depth (9/17/07)
- 16" Diameter Steel Pipe, Cast-in-place Concrete Pile
- ⊕ Battered 16" Diameter Steel Pipe, Cast-in-place Concrete Pile

Note:

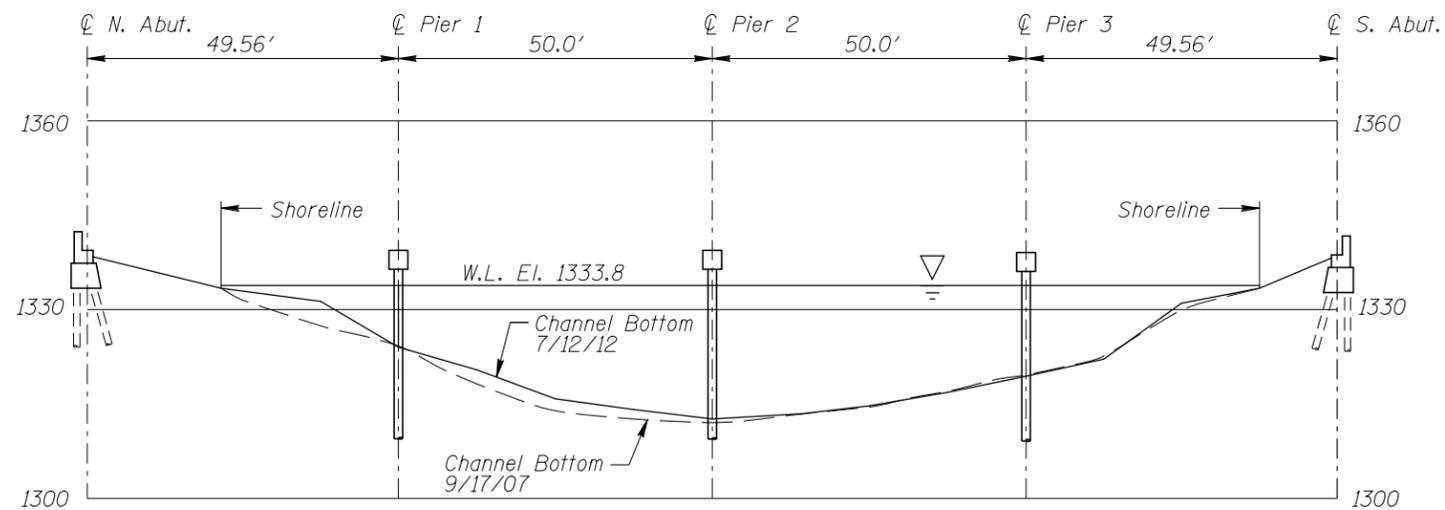
All soundings based on 2012 waterline location.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION	
STRUCTURE NO. 03503 OVER DETROIT LAKE AND DEAD SHOT BAY DISTRICT 4, BECKER COUNTY	
INSPECTION AND SOUNDING PLAN	
Drawn By: JAC Checked By: BKS Code: 522103503	<div style="text-align: center;">AYRES ASSOCIATES</div> Date: JULY 2012 Scale: NTS Figure No.: 1

COLLINS ENGINEERS
 123 North Wacker Drive
 Suite 300
 Chicago, IL 60606
 (312) 704-9300
 www.collinsengr.com



EAST FASCIA PROFILE



WEST FASCIA PROFILE

Note:
Refer to Figure 1 for General Notes.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION	
STRUCTURE NO. 03503 OVER DETROIT LAKE AND DEAD SHOT BAY DISTRICT 4, BECKER COUNTY	
EAST AND WEST FASCIA PROFILES	
COLLINS ENGINEERS <small>123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Drawn By: JAC Checked By: BKS Code: 522103503
AYRES ASSOCIATES	Date: JULY 2012 Scale: 1"=30' Figure No.: 2