

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 93448

CR 453

OVER A

STREAM

ST. LOUIS COUNTY



SEPTEMBER 28, 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 at Bridge No. 93448, Bent 1 (inspected underwater) and the North and South Abutments (dry at the time of inspection due to low water levels), were found to be in good condition with no defects of structural significance. The timber of the piles, supplemental piles, backwall, and wingwalls was generally sound, with random splits or checks up to 1/16 inch wide and allowing a timber awl penetration of up to 1/8 inch. The timber backwall and wingwalls were sound and tight with no observed loss of backfill. The backwall and wingwall boards exhibited splitting or checking similar to the piles. The channel bottom appeared to be stable with no evidence of significant scour.

INSPECTION FINDINGS:

- (A) The channel bottom material in the upstream half of the channel typically consisted of soft silt allowing a maximum probe rod penetration of 2 feet.
- (B) The channel bottom material in the downstream half of the channel typically consisted of sand allowing a maximum probe rod penetration of 2 inches.
- (C) The timber of the piles, supplemental piles, backwall and wingwalls was generally sound with no indications of decay or other significant deterioration. Random splits or checks were typically present at all piles. The splitting or checking was up to 1/16 inch wide. The timber allowed a typical awl penetration of up to 1/8 inch.

RECOMMENDATIONS:

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

Inspection Team Leader:
Daniel G. Stromberg, P.E.

Respectfully submitted,

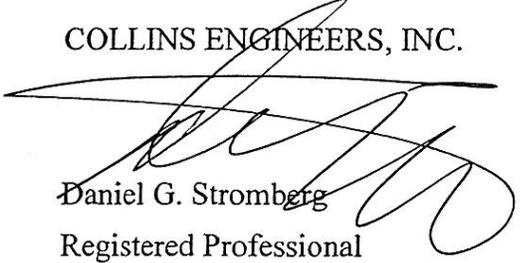
PROFESSIONAL ENGINEER

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: 93448

Feature Crossed: A Stream

Feature Carried: CR 453

Location: St. Louis County

Bridge Description: The superstructure consists of a timber deck supported by steel I-beams. The superstructure is supported by two abutments and one pile bent, each consisting of eight 12 inch diameter timber piles and a 12 inch by 12 inch timber pile cap. At each abutment there are 4 inch by 4 inch timber supplemental piles at each primary pile. The timber backwalls and wingwalls are comprised of 3 inch by 12 inch boards.

2. INSPECTION DATA

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

Dive Team: Marc B. Parker, Clay G. Brookins

Date: September 28, 2012

Weather Conditions: Sunny, 50° F

Underwater Visibility: 3 feet

Waterway Velocity: None / Negligible

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Bent 1 (inspected underwater) and the North and South Abutments (dry at the time of inspection due to low water levels)

General Shape: The superstructure consists of a timber deck supported by steel I-beams. The superstructure is supported by two abutments and one pile bent, each consisting of eight 12 inch diameter timber piles and a 12 inch by 12 inch timber pile cap. At each abutment there are 4 inch by 4 inch timber supplemental piles at each primary pile. The timber backwalls and wingwalls are comprised of 3 inch by 12 inch boards.

Maximum Water Depth at Substructure Inspected: Approximately 4.0 feet.

4. WATERLINE DATUM

Water Level Reference: Top of the pile cap at the downstream end of Bent 1.

Water Surface: The waterline was approximately 3.4 feet below the reference.
Assumed Waterline Elevation 96.6.

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 8

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

Item 113: Scour Critical Bridges: Code I

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
228	Timber Piles	24	EA	24	0	0	0	n/a
216	Timber Abutment	69	LF	69	0	0	0	n/a
386	Timber Wingwalls	4	EA	4	0	0	0	n/a
985	Slopes and Slope Protection	1	EA	1	0	0	n/a	n/a



Photograph 1. Overall View of Structure, Looking Southwest



Photograph 2. View of the North Abutment, Looking Northwest



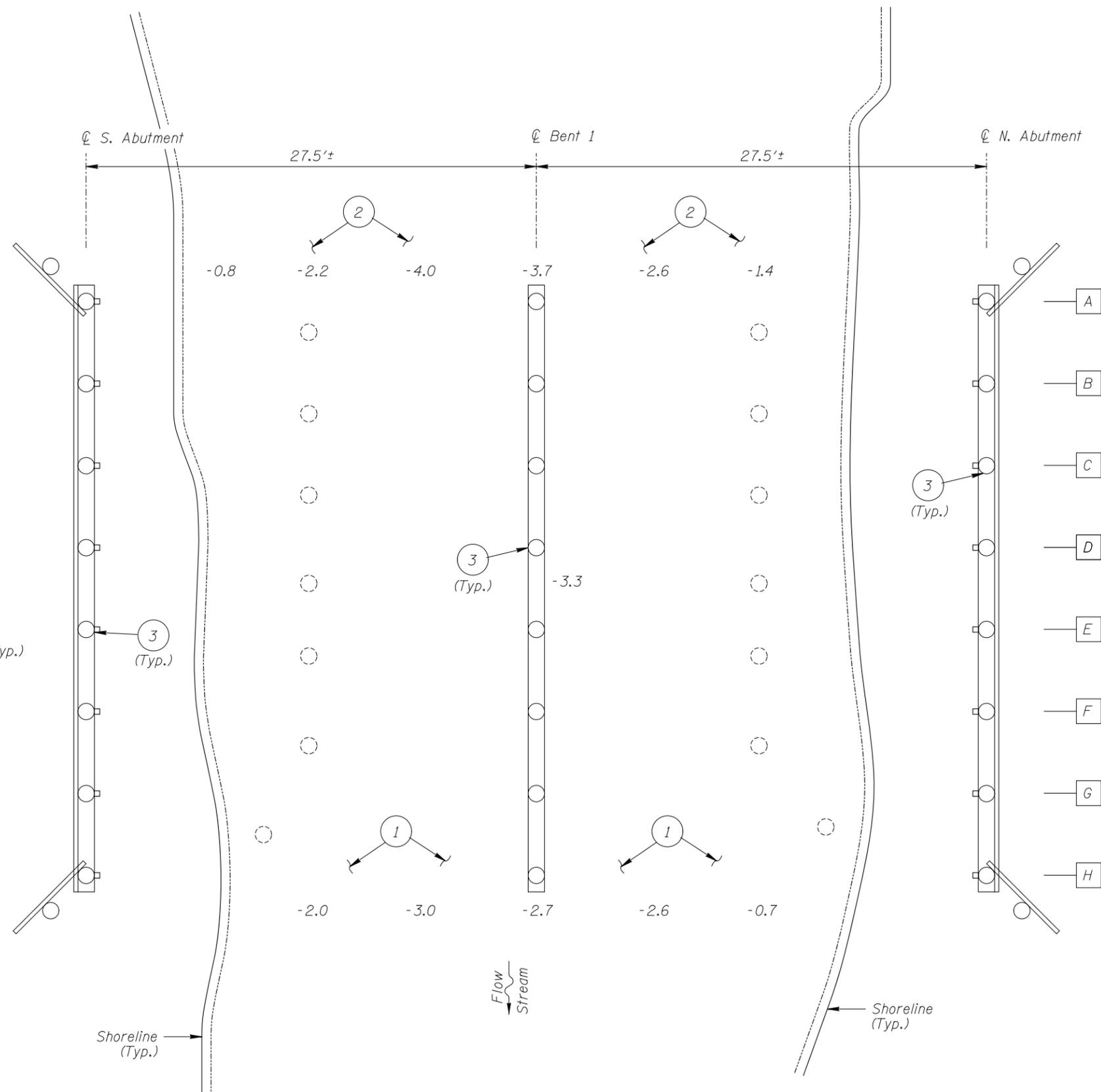
Photograph 3. View of Bent 1, Looking Southwest



Photograph 4. View of the South Abutment, Looking Southwest



Photograph 5. View of the Typical Timber Pile Condition around the Waterline, Looking Northwest



END VIEW OF BENT 1

SOUNDING PLAN

INSPECTION NOTES:

- 1 The channel bottom material typically consisted of sand allowing up to 2 inches of probe rod penetration.
- 2 The channel bottom material typically consisted of silt allowing up to 2 feet of probe rod penetration.
- 3 The timber of all piles, supplemental piles, backwalls and wingwalls was generally sound allowing a timber awl penetration of up to 1/8 inch and exhibiting random checking or splits up to 1/16 inch wide.

GENERAL NOTES:

1. Bent 1 was inspected during the underwater inspection. The North and South Abutments (dry due to low water levels at the time of inspection) were also inspected up to the high water mark.
2. At the time of inspection on September 28, 2012, the waterline was located approximately 3.4 feet below the top of the pile cap at the downstream end of Bent 1. Since elevation information was not available a reference elevation of 100.0 was assumed. Based on the assumed reference the waterline elevation was 96.6.
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.

Legend

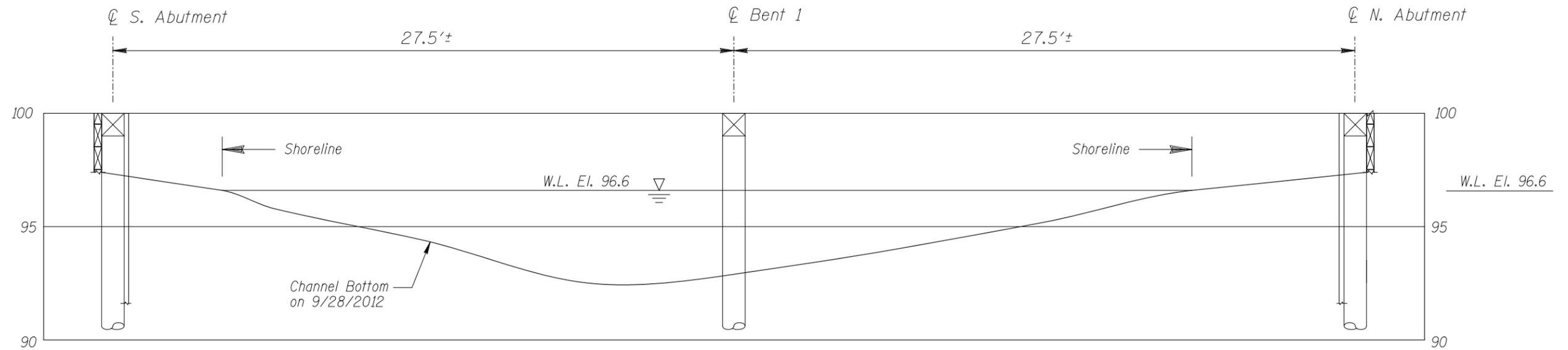
- 17.0 Sounding Depth from Waterline (9/28/2012)
- A Pile Identification Designation
- 12-inch Diameter Timber Pile
- 12-inch Diameter Abandoned Timber Pile
- 4 inch by 4 inch Supplemental Pile
- 1 Inspection Note Number

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

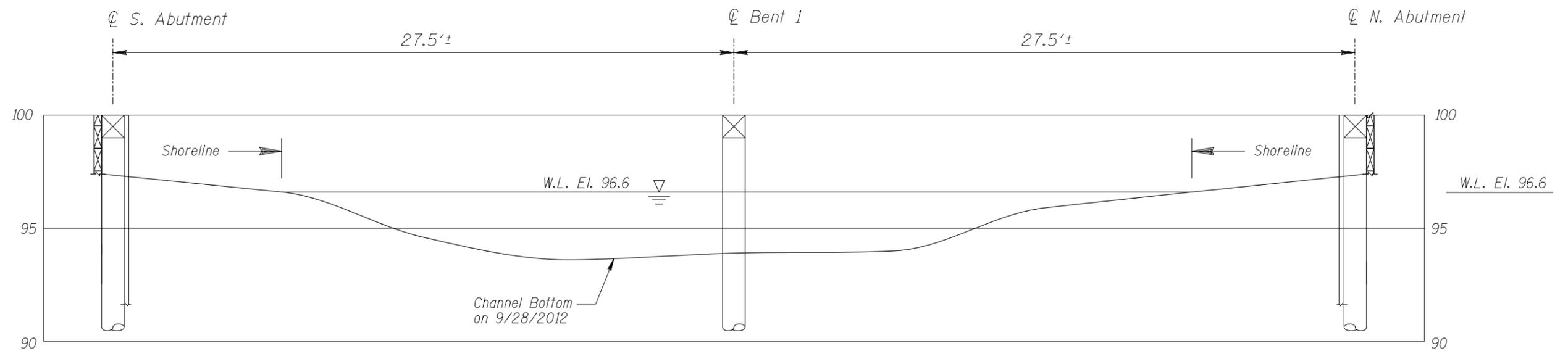
STRUCTURE NO. 93448
CR 453 OVER A STREAM
ST. LOUIS COUNTY

INSPECTION AND SOUNDING PLAN

Drawn By: MBP	COLLINS ENGINEERS 123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Date: DEC., 2012
Checked By: LJ		Scale: NTS
Code: 742393448		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. 93448 CR 453 OVER A TREAM ST. LOUIS COUNTY		
UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
Drawn By: MBP	COLLINS ENGINEERS <small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: DEC., 2012
Checked By: LJ		Scale: 1"=5'
Code: 742393448		Figure No.: 2

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

INSPECTORS: Collins Engineers, Inc. DATE: September 28, 2012

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

BRIDGE NO: 93448 WEATHER: Sunny, 50° F

WATERWAY CROSSED: A Stream

DIVING OPERATION: SCUBA SURFACE SUPPLIED AIR
 OTHER

PERSONNEL: Marc B. Parker, Clayton G. Brookins

EQUIPMENT: Commercial Scuba, Probe Rod, Camera, Hand Tools

TIME IN WATER: 7:30 A.M.

TIME OUT OF WATER: 8:00 A.M.

WATERWAY DATA: VELOCITY None / Negligible

VISIBILITY 3 feet

DEPTH 4.0 feet maximum in the channel

ELEMENTS INSPECTED: The North and South Abutments and Bent 1

REMARKS: The substructure units inspected at Bridge No. 93448, Bent 1 (inspected underwater) and the North and South Abutments (dry at the time of inspection due to low water levels), were found to be in good condition with no defects of structural significance. The timber of the piles, supplemental piles, backwall, and wingwalls was generally sound, with random splits or checks up to 1/16 inch wide and allowing a timber awl penetration of up to 1/8 inch. The timber backwall and wingwalls were sound and tight with no observed loss of backfill. The backwall and wingwall boards exhibited splitting or checking similar to the piles. The channel bottom appeared to be stable 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. 93448
 INSPECTORS Collins Engineers, Inc.
 ON-SITE TEAM LEADER Daniel G. Stromberg, P.E.
 WATERWAY CROSSED A Stream

INSPECTION DATE September 28, 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 (BACKWALL)	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
	North Abutment	Dry	7	N	N	N	7	7	N	8	N	N	8	N	N	7	N	N	N
	Bent 1	3.7'	7	N	N	N	7	7	N	8	N	N	8	N	N	7	N	N	N
	South Abutment	Dry	7	N	N	N	7	7	N	8	N	N	8	N	N	7	N	N	N

*UNDERWATER PORTION ONLY

REMARKS: The substructure units inspected at Bridge No. 93448, Bent 1 (inspected underwater) and the North and South Abutments (dry at the time of inspection due to low water levels), were found to be in good condition with no defects of structural significance. The timber of the piles, supplemental piles, backwall, and wingwalls was generally sound, with random splits or checks up to 1/16 inch wide and allowing a timber awl penetration of up to 1/8 inch. The timber backwall and wingwalls were sound and tight with no observed loss of backfill. The backwall and wingwall boards exhibited splitting or checking similar to the piles. The channel bottom appeared to be stable 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.