

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. L9571

TWP 1438

OVER THE

PELICAN RIVER

ST. LOUIS COUNTY



SEPTEMBER 17, 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. L9571, the North and South Abutments, were found to be in fair condition, with only minor defects of structural significance. The H-Piles exhibited light to moderate corrosion with pitting up to 1/8 inch deep as well as some rust delaminations. The timber backwall and wingwalls were sound and tight with no observed loss of backfill or structural deficiencies. The channel bottom appeared to be stable with no evidence of significant scour.

INSPECTION FINDINGS:

- (A) The channel bottom material typically consisted of riprap, up to 2 feet in diameter, with sand infill having a maximum probe rod penetration of 1 foot.
- (B) The steel H-Piles typically exhibited light surface corrosion with pitting up to 1/32 inch deep extending from the top of the pile to 2 feet above the waterline. From 2 feet above the waterline to the channel bottom the H-Piles exhibited moderate corrosion with pitting up to 1/8 inch deep and up to 1/8 inch thick rust delaminations.
- (C) The timber backwall and wingwalls of the both abutments appeared sound and tight with no noticeable loss of backfill material or structural deficiencies.

RECOMMENDATIONS:

- (A) The inspection of the submerged substructure units of Structure No. L9571 can most likely be accomplished in the future without using a dive team. To perform the underwater inspection, a properly equipped qualified inspector will have to enter the water during a period of low flow. As channel bottom contours and depths of flow can change quickly, it is recommended that lead line soundings of water depth be taken along the upstream and downstream fascias to determine whether wading is possible prior to beginning the inspection. If conditions are unsafe for inspection by wading, then an underwater inspection with the use of a dive team will be required.
- (B) Monitor the extent of corrosion and associated section loss on the steel H-Piles.
- (C) Reinspect the submerged substructure at the normal maximum recommended (NBIS) interval of sixty (60) months.

Inspection Team Leader:

Nicholas R. Triandafilou

Nicholas R. Triandafilou, 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.

[Signature]
Daniel G. Stromberg

Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: L9571

Feature Crossed: Pelican River

Feature Carried: TWP 1438

Location: District 1 – St. Louis County

Bridge Description: The superstructure consisted of a timber deck supported by ten steel I-Beams. The superstructure was supported by two abutments consisting of five 8-inch H-Piles, two 8-inch channels as the pile cap, and a timber backwall.

2. INSPECTION DATA

Professional Engineer Diver: Nicholas R. Triandafilou, P.E.

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

Date: September 17, 2012

Weather Conditions: Cloudy, 50° F

Underwater Visibility: 2 feet

Waterway Velocity: None / Negligible

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: The North and South Abutments

General Shape: The North and South Abutments each consist of five steel 8-inch H-Piles with a cap consisting of two 8-inch steel channels bolted to the sides of the H-Piles. The backwall was comprised of 4-inch by 12-inch timber boards.

Maximum Water Depth at Substructure Inspected: Approximately 0.1 feet.

4. WATERLINE DATUM

Water Level Reference: Bottom of the east fascia girder above Pile E of the South Abutment.

Water Surface: The waterline was approximately 5.2 feet below the reference.
Waterline Elevation 94.8.

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

Item 60: Substructure: Code 5

Item 61: Channel and Channel Protection: Code 7

Item 92B: Underwater Inspection: Code A/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
202	Painted Steel Columns	18	EA	0	0	18	0	n/a
216	Timber Abutment	49	LF	0	49	0	0	n/a
386	Timber Wingwalls	4	EA	0	4	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.



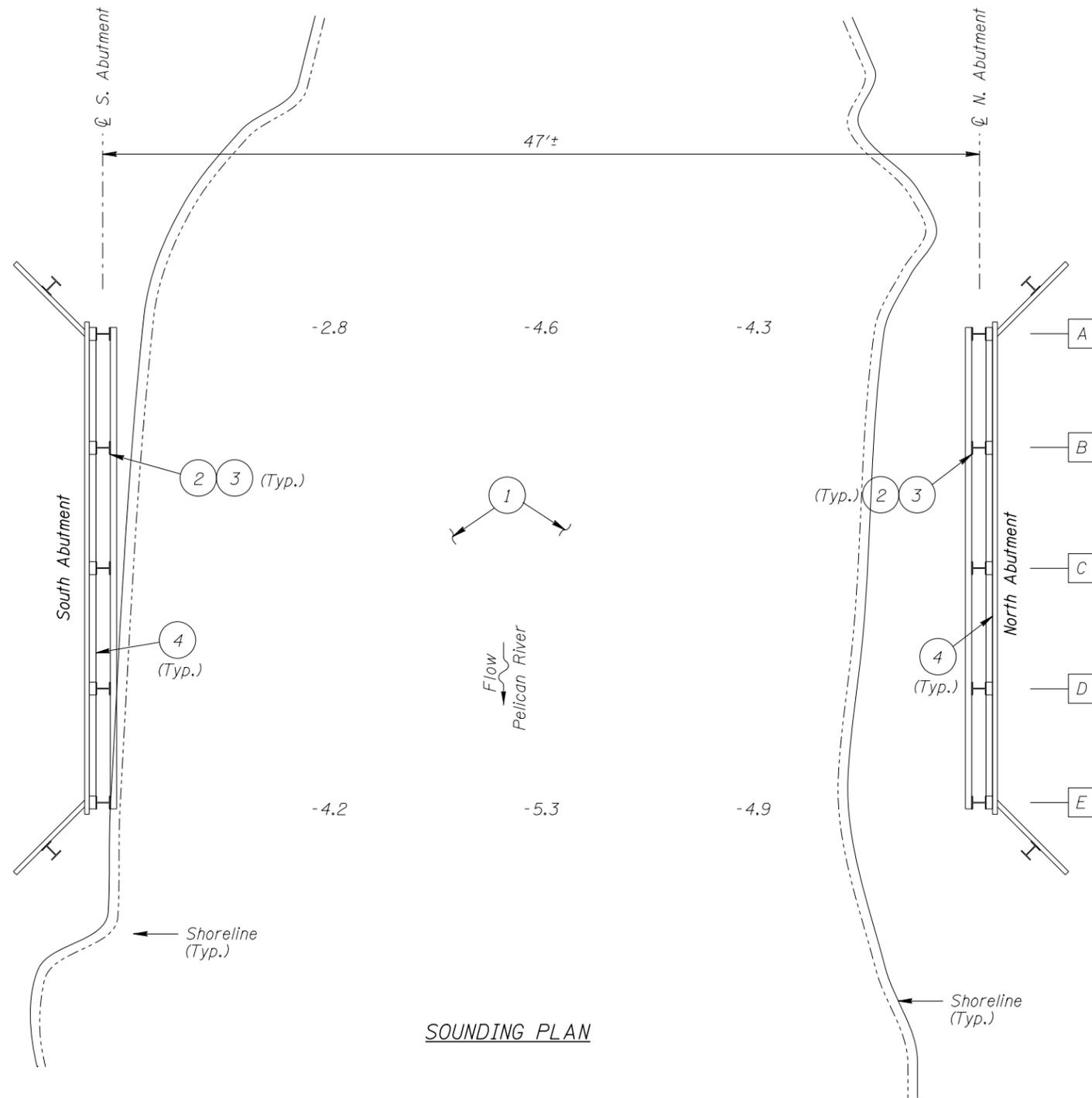
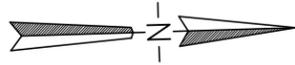
Photograph 2. View of the North Abutment, Looking Northeast.



Photograph 3. View of the South Abutment, Looking South.



Photograph 4. View of the Typical Steel Condition near the Channel Bottom, Looking Northeast.



TYPICAL END VIEW OF ABUTMENTS

INSPECTION NOTES:

- ① The channel bottom material typically consisted of riprap up to 2 feet in diameter with sand infill having a maximum probe rod penetration of 1 foot.
- ② The steel H-Piles typically exhibited light surface corrosion with pitting up to 1/32 inch deep, extending from the top of the pile to 2 feet above the waterline.
- ③ The steel H-Piles typically exhibited moderate corrosion with pitting up to 1/8 inch deep and rust delaminations up to 1/8 inch thick, extending from 2 feet above the waterline to the channel bottom.
- ④ The timber backwall was typically sound and well aligned with no noticeable loss of backfill or notable defects.

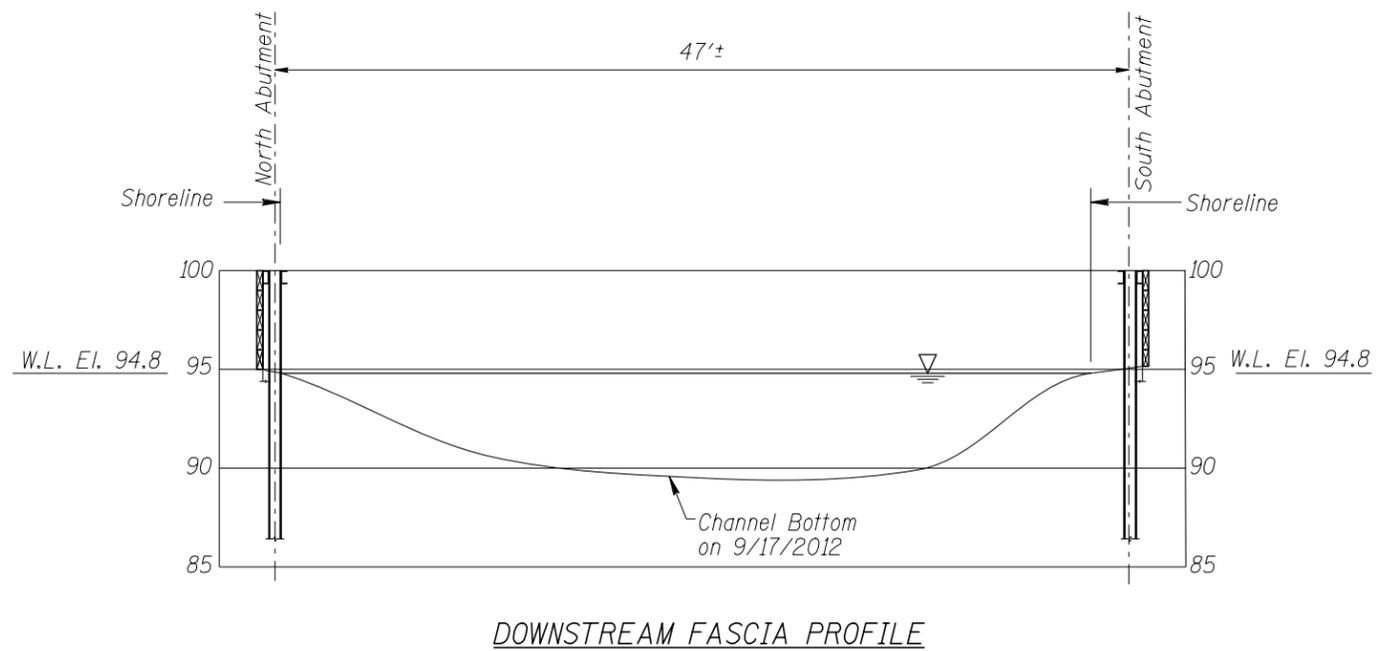
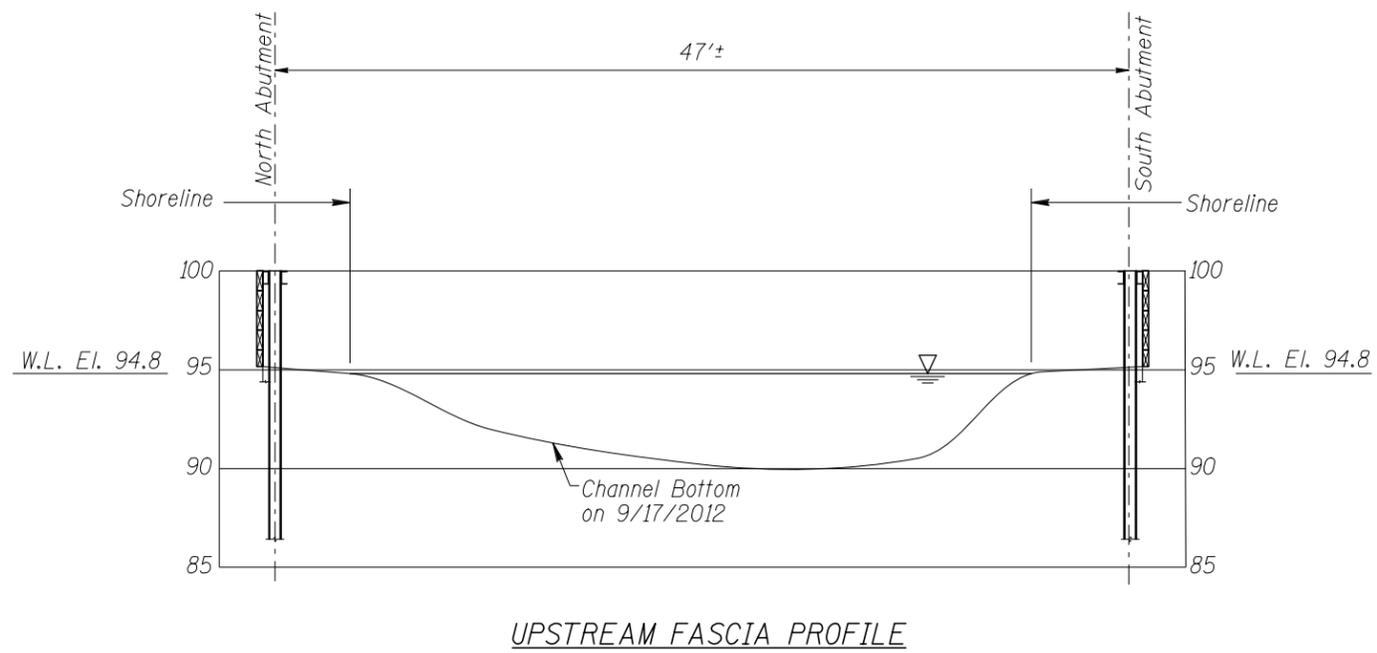
GENERAL NOTES:

1. The North and South Abutments were inspected during the underwater inspection.
2. At the time of inspection on September 17, 2012, the waterline was located approximately 5.2 feet below the bottom of the east fascia girder near the South Abutment. Since elevation information was not available a reference elevation of 100.0 was assumed. Based on the assumed reference the waterline elevation was 94.8.
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 (9/17/2012)
- A Pile Identification Designation
- H HP-8 Steel Piles
- ① Inspection Note Number

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. L957I TWP 1438 OVER THE PELICAN RIVER ST. LOUIS COUNTY		
INSPECTION AND SOUNDING PLAN		
Drawn By: MBP	COLLINS ENGINEERS	Date: OCTOBER, 2012
Checked By: LJ	<small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Scale: NTS
Code: 7423L957I		Figure No.: I



Note:
Refer to Figure 1 for General Notes.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. L9571 TWP 1438 OVER THE THE PELICAN RIVER ST. LOUIS COUNTY		
UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
Drawn By: MBP	COLLINS ENGINEERS	Date: OCTOBER, 2012
Checked By: LJ	<small>Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Scale: 1"=10'
Code: 7423L9571		Figure No.: 2

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

INSPECTORS: Collins Engineers, Inc. DATE: September 17, 2012
ON-SITE TEAM LEADER: Nicholas R. Triandafilou, P.E.
BRIDGE NO: L9571 WEATHER: Cloudy, 50° F
WATERWAY CROSSED: Pelican River
DIVING OPERATION: _____ SCUBA _____ SURFACE SUPPLIED AIR
X _____ OTHER Inspection by Wadding
PERSONNEL: Marc B. Parker, Clayton G. Brookins
EQUIPMENT: Commercial Scuba, Probe Rod, Camera, Hand Tools
TIME IN WATER: 11:15 A.M.
TIME OUT OF WATER: 11:35 A.M.
WATERWAY DATA: VELOCITY None / Negligible
VISIBILITY 2 feet
DEPTH 0.1 feet maximum at the South Abutment; 5.3 feet in
the channel
ELEMENTS INSPECTED: The North and South Abutments
REMARKS: Overall, the North and South Abutments, were found to be in fair
condition, with only minor defects of structural significance. The H-Piles exhibited light
to moderate corrosion with pitting up to 1/8 inch deep. The timber backwall and
wingwalls were sound and tight with no observed loss of backfill or structural
deficiencies. The channel bottom appeared to be stable with no evidence of significant
scour.

FURTHER ACTION NEEDED: _____ YES ___ X ___ NO

The inspection of the submerged substructure units of Structure No. L9571 can most likely be accomplished in the future without using a dive team. To perform the underwater inspection, a properly equipped qualified inspector will have to enter the water during a period of low flow. As channel bottom contours and depths of flow can change quickly, it is recommended that lead line soundings of water depth be taken along the upstream and downstream fascias to determine whether wading is possible prior to beginning the inspection. If conditions are unsafe for inspection by wading, then an underwater inspection with the use of a dive team will be required.

Monitor the extent of corrosion and associated section loss on the steel H-Piles.

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. L9571
 INSPECTORS Collins Engineers, Inc.
 ON-SITE TEAM LEADER Nicholas R. Triandafilou, P.E.
 WATERWAY CROSSED Pelican River

INSPECTION DATE September 17, 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 (TIMBER 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	N	5	N	N	7	5	N	7	N	N	7	N	5	7	N	N	N
	South Abutment	0.1'	N	5	N	N	7	5	N	7	N	N	7	N	5	7	N	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the North and South Abutments, were found to be in fair condition, with only minor defects of structural significance. The H-Piles exhibited light to moderate corrosion with pitting up to 1/8 inch deep. The timber backwall and wingwalls were sound and tight with no observed loss of backfill or structural deficiencies. 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.