

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 93153

CR107

OVER THE

MIDDLE FORK WHITEWATER RIVER

OLMSTED COUNTY



OCTOBER 2, 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 unit inspected at Bridge No. 93153, the East Abutment, was generally in fair condition, but with significant foundation undermining. The concrete footing was heavily weathered and was undermined a maximum of 3 feet vertically with 5 feet of horizontal penetration beneath the abutment foundation. The inspector observed three exposed steel H-piles under the abutment footing.

INSPECTION FINDINGS:

- (A) The East Abutment was undermined along its entire length with the undermining cavity measuring up to 3 feet vertically with 5 feet of horizontal penetration. Three steel H-piles were exposed within the cavity and appeared to be in good condition.
- (B) Approximately 2 foot diameter by 2 foot deep area of loss of fill (erosion sink hole) was observed at the northeast corner of the back side of the East Abutment.
- (C) The channel bottom material consisted of silty sand with 6 inches of probe rod penetration and random scattered 6 to 12 inch diameter stone.

RECOMMENDATIONS:

- (A) Based on the extent and severity of the undermining and evidence of loss of fill material behind the East Abutment, it is recommended that corrective action be taken to stabilize the channel bottom in the vicinity of the East Abutment and to prevent further scour/erosion.

- (B) Reinspect the submerged substructure units after corrective actions have been taken, but not greater than the normal maximum recommended (NBIS) interval of sixty (60) months.

Inspection Team Leader



Roy A. Forsyth, PE
Date 6/30/2014 License# 49270

Respectfully submitted,

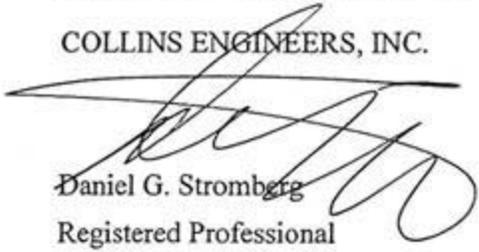
PROFESSIONAL ENGINEER

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: 93153

Feature Crossed: Middle Fork Whitewater River

Feature Carried: Trunk Highway CR107

Location: District 6 – Olmsted County

Bridge Description: The superstructure consists of a concrete deck resting on one steel multi-beam span supported by two reinforced concrete abutments. The substructure units are designated as the West Abutment and East Abutment.

2. INSPECTION DATA

Professional Engineer/Team Leader: Roy A. Forsyth, P.E.

Dive Team: Charles R. Euwema, Jordan T. Furlan, P.E.

Date: October 2, 2012

Weather Conditions: Sunny, 70° F

Underwater Visibility: 3.0 feet

Waterway Velocity: 1 ft/sec

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: East Abutment.

General Shape: Each abutment consists of a reinforced concrete wall and two skewed wingwalls, founded on a reinforced concrete footing supported by steel H-piles.

Maximum Water Depth at Substructure Inspected: Approximately 6.5 feet.

4. WATERLINE DATUM

Water Level Reference: Top of the East Abutment at the southeast corner.

Water Surface: The waterline was approximately 9.8 feet below reference.
Assumed Waterline Elevation = 90.2

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 5

Item 92B: Underwater Inspection: Code B/10/12

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
215	Reinforced Concrete Abutment	20	EA		20			
985	Slopes and Slope Protection	1	EA			1		
361	Scour Smart Flag	1	EA			1		
220	Reinforced Concrete Footing	1	EA			1		



Photograph 1. Overall View of the Bridge, Looking North.



Photograph 2. View of the West Abutment, Looking Northwest.



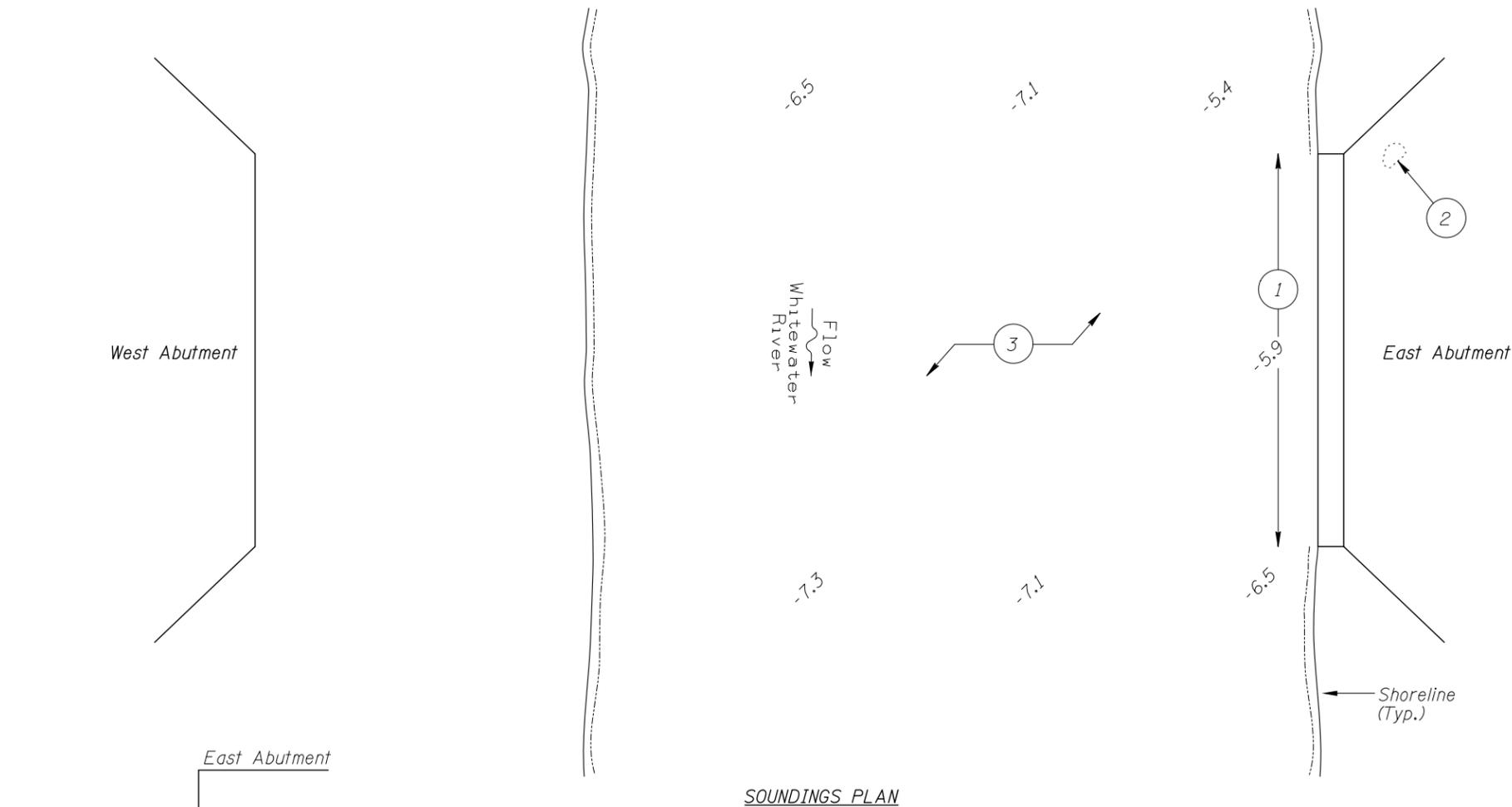
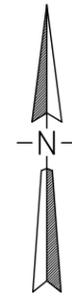
Photograph 3. View of the East Abutment, Looking East.



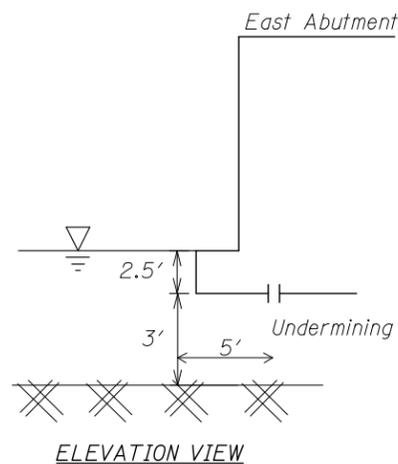
Photograph 4. View of Sink Hole at Northeast Wingwall, Looking North.

INSPECTION NOTES:

- ① The East Abutment was undermined along its entire length with the undermining cavity measuring up to 3 feet vertically with 5 feet of horizontal penetration. Three steel H-piles were exposed within the cavity and appeared to be in good condition.
- ② Approximately 2 foot diameter by 2 foot deep area of loss of fill (erosion sink hole) was observed at the northeast corner of the back side of the East Abutment.
- ③ The channel bottom material consisted of silty sand with 6 inches of probe rod penetration and random scattered 6 to 12 inch diameter stone.



SOUNDINGS PLAN



ELEVATION VIEW

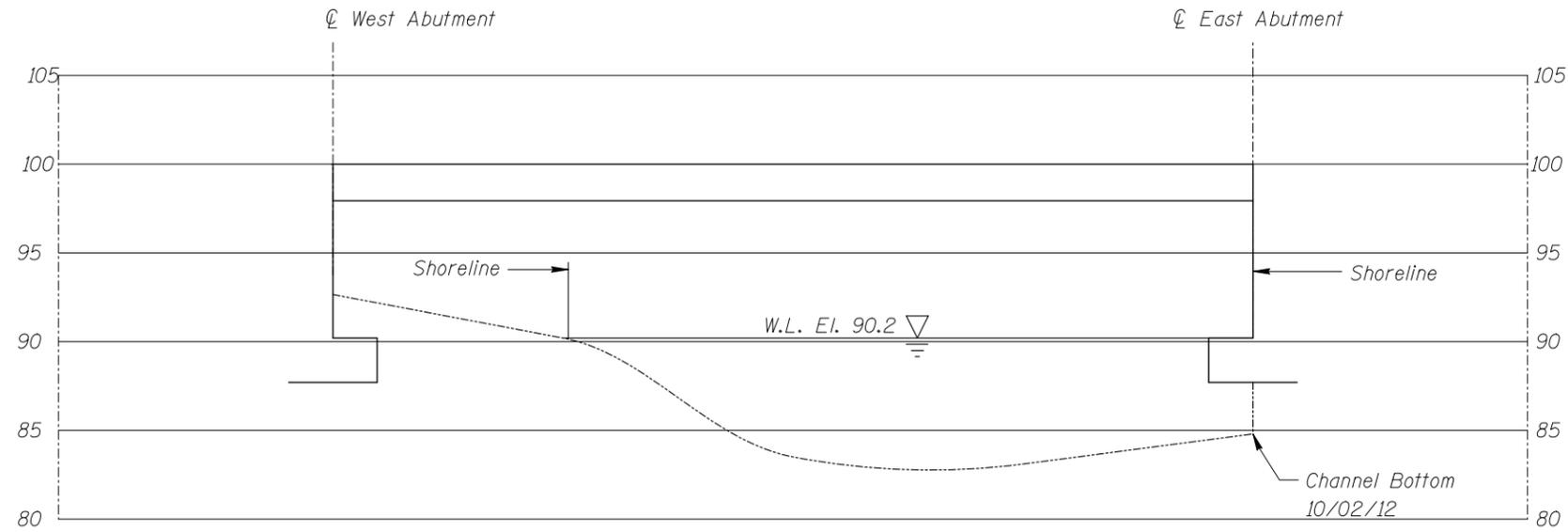
GENERAL NOTES:

1. The East Abutment and Pier 1 were inspected underwater.
2. At the time of inspection, on October 2, 2012, the waterline was located approximately 9.8 feet below the top of the East Abutment at the southeast corner. Since insufficient reference elevation information was available, an elevation of 100.0 was assumed. This corresponds to a waterline elevation of 90.2.
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 as well as around the substructure units.

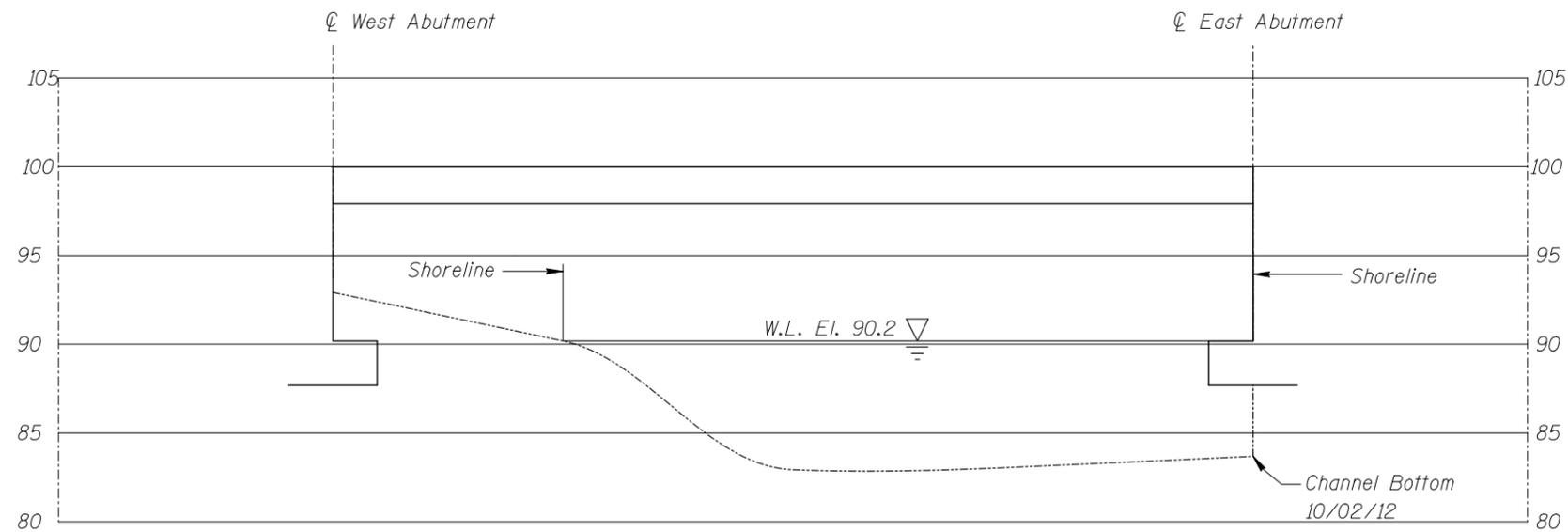
Legend

-0.4 Sounding Depth (10/2/12)

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 93153 OVER THE MIDDLE FORK WHITEWATER RIVER OLMSTED COUNTY		
INSPECTION AND SOUNDING PLAN		
Drawn By: CRE	COLLINS ENGINEERS <small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: OCT. 2012
Checked By: RAF		Scale: NTS
Code: 742393153		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. 93153 OVER THE MIDDLE FORK WHITEWATER RIVER OLMSTED COUNTY		
UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
Drawn By: CRE	COLLINS ENGINEERS <small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: OCT. 2012
Checked By: RAF		Scale: NTS
Code: 742393153		Figure No.: 2

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

INSPECTORS: Collins Engineers, Inc. DATE: October 2, 2012

ON-SITE TEAM LEADER: Roy A. Forsyth, P.E.

BRIDGE NO: 93153 WEATHER: Sunny, 70° F

WATERWAY CROSSED: Middle Fork Whitewater River

DIVING OPERATION: SCUBA SURFACE SUPPLIED AIR
 OTHER _____

PERSONNEL: Charles R. Euwema, Jordan T. Furlan, P.E.

EQUIPMENT: Commercial Scuba, Camera, Sounding Pole, Lead Line, Scraper

TIME IN WATER: 1:20 P.M.

TIME OUT OF WATER: 1:50 P.M.

WATERWAY DATA: VELOCITY 1 ft/s

VISIBILITY 3.0 feet

DEPTH 6.5 feet at East Abutment

ELEMENTS INSPECTED: East Abutment

REMARKS: Overall, the East Abutment was generally in fair condition, but with significant foundation undermining. The concrete footing was heavily weathered and was undermined with the cavity measuring up to 3 feet vertically with 5 feet of maximum horizontal penetration beneath the abutment foundation. The inspector observed three exposed steel H-piles under the abutment footing.

FURTHER ACTION NEEDED: YES NO

Based on the extent and severity of the undermining and evidence of loss of fill material behind the East Abutment, it is recommended that corrective action be taken to stabilize the channel bottom in the vicinity of the East Abutment and to prevent further scour/erosion.

Reinspect the submerged substructure units after corrective actions have been taken, but not greater than 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. 93153
 INSPECTORS Collins Engineers, Inc.
 ON-SITE TEAM LEADER. Roy A. Forsyth, P.E.
 WATERWAY CROSSED Middle Fork Whitewater River

INSPECTION DATE October 2, 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	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
	East Abutment	6.5'	7	6	5	8	N	5	4	6	6	N	4	6	7	N	7	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the East Abutment was generally in fair condition, but with significant foundation undermining. The concrete footing was heavily weathered and was undermined a maximum of 3 feet vertically with 5 feet of horizontal penetration beneath the abutment foundation. The inspector observed three exposed steel H-piles under the abutment footing.

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.