

2016 UNDERWATER BRIDGE INSPECTION REPORT



BRIDGE # 93153 CR 107 over MID FK WHITEWATER RIVER

DISTRICT: District 6 COUNTY: Olmsted CITY/TOWNSHIP: QUINCY

STATE: Minnesota

Date of Inspection: 06/14/2016

Equipment Used:

Owner: County Highway Agency

Inspected By: Forsyth, Roy

Report Written By: Roy Forsyth

Report Reviewed By:

Final Report Date:



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UNDERWATER 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 2 feet vertically with 3.5 feet of horizontal penetration beneath the abutment foundation. The inspector observed three exposed steel H-piles under the abutment footing. The channel bottom material consisted of silty sand with 18 inches of probe rod penetration and random scattered 6 to 12 inch diameter stone.

INSPECTION FINDINGS

(A) The East Abutment was undermined along its entire length with the undermining cavity measuring up to 2 feet vertically with 3.5 feet of horizontal penetration. Three steel H-piles were exposed within the cavity and appeared to be in good condition.

(B) Approximately 2.5 foot diameter by 1.5 feet deep area of loss of fill (erosion sink hole) was observed at the southeast corner of the back side of the East Abutment.

(C) The channel bottom material consisted of silty sand with 18 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.

Contractor: Collins Engineers, Inc.

Contractor Job Number: 9687

UNDERWATER INSPECTION

1. BRIDGE DATA

Bridge #: 93153
Feature Intersected: MID FK WHITEWATER RIVER
Facility Carried: CR 107
District: District 6
County: 055 - Olmsted
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
Inspection Diver: Roy A. Forsyth
Date of Underwater Inspection: 06/14/2016
Weather Conditions: Sunny, 70°F
Underwater Visibility (feet): 6 in
Waterway Velocity (ft/sec): 0.5 ft/s

3. SUBSTRUCTURE INSPECTION DATA

Substructure(s) 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(s) Inspected (feet): 6.0

4. WATERLINE DATUM

Water Level Reference: Top of the Southeast Wingwall. Assumed Reference Elevation = 100.0
Waterline Elevation (feet): 91.0
Description: The waterline was approximately 9.0 feet below reference.

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 62: Culvert: Code:
Item 92B: Underwater Inspection: Code: Y 48 06/2016

Item 113: Scour Critical Bridge:

Code: I

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

Yes

No

(Mark your selection with an X)

6. STRUCTURAL ELEMENT CONDITION RATING

ELEM #	Element Description	Quantity	Unit	Conditions			
				CS1	CS2	CS3	CS4
215	Reinforced Concrete Abutment	20	LF		20		
220	Reinforced Concrete Footing	20	LF			20	
885	Scour	1	EA				1
225	Steel Piles	3	EA	3			

UNDERWATER INSPECTION

INSPECTION PROCEDURES

The routine underwater inspection of Bridge 93153 (CR107 over the Middle Fork Whitewater River) was completed on June 14, 2016. The underwater inspection was conducted from shore. The inspection was conducted by a team consisting of a PE-Diver with a valid MnDOT Team leader certification, a backup diver and a dive tender. The inspection utilized commercial dive equipment and techniques (SSA and/or SCUBA) in accordance with OSHA regulations. Profiles were taken along the upstream and downstream faces of the bridge and around the periphery of substructure units to determine the presence, location and area of scour.

The bridge element inspected consisted of one reinforced concrete abutment and one reinforced concrete footing. According to the bridge inventory or design drawings, the East Abutment was founded on a concrete pile footing and steel H-piles. Inspection procedures followed FHWA guidance and the MnDOT Bridge and Structure Inspection Program Manual with channel bottom probing to search for bottom of foundations. The routine underwater inspection frequency is recommended to remain at a maximum of 60 months based on those findings and risk factors. Also, inspection procedures should continue to follow the above approach and standard guidance with 100% Level I and 10% Level II intensity efforts.

MINNESOTA BRIDGE INSPECTION REPORT

09/12/2016

Inspector: CO Bridge

BRIDGE 93153 CR 107 OVER MID FK WHITEWATER RIVER

County: Olmsted	Location: 0.1 MI S OF JCT CR 152	Length: 53.0 ft.
City:	Route: 07 - CNTY 107 Ref. Pt.: 012+00.920	Deck Width: 20.0 ft.
Township: 55014 - QUINCY	Control Section:	Rdwy. Area/ Pct. Unsnd: 1055 sq. ft. / %
Section: 26 Township: 107N Range: 11W Maint. Area:		Paint Area/ Pct. Unsnd: sq. ft. / %
Span Type: 5 - Prestressed Concrete 1 - Slab	Local Agency Bridge Nbr.:	Culvert: N/A
List:		Postings:
NBI Deck: 7 Super: 7 Sub: 5 Chan: 5 Culv: N		
	Open, Posted, Closed: A - Open	
	MN Scour Code: I - LOW RISK	

Appraisal Ratings - Approach: 4	Waterway: 4	Unofficial Structurally Deficient	N
Required Bridge Signs - Load Posting: 0 - Not Required	Traffic: 0 - Not Required	Unofficial Functionally Obsolete	N
Horizontal: 1 - Object Markers	Vertical: N - Not Applicable	Unofficial Sufficiency Rating	79.0

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
38	Reinforced Concrete Slab	Underwater	07/28/2016	1060 SF	1060	0	0	0
		Update	07/14/2016	1060 SF	1060	0	0	0
	Notes: Concrete Slab with Uncoated Rebar Notes: [2016] Migrator assumed CS1.							
	510 - Wearing Surfaces	Underwater	07/28/2016	1055 SF	1055	0	0	0
		Update	07/14/2016	1055 SF	1055	0	0	0
	Notes: Concrete Slab with Uncoated Rebar Notes: [2011-15] Concrete. Top of girders.							
105	Reinforced Concrete Closed Web/Box Girder	Underwater	07/28/2016	266 LF	258	8	0	0
		Update	07/14/2016	266 LF	258	8	0	0
	Notes: [2011-15] Some water seepage between girders. Several small spall areas on bottom of girders.							
215	Reinforced Concrete Abutment	Underwater	07/28/2016	79 LF	59	20	0	0
		Update	07/14/2016	79 LF	59	20	0	0
	Notes: [2016] Migrator added 40 LF to abutment quantity to account for wingwalls (CS1:40 CS2:0 CS3:0 CS4:0). [2011-15] Few 0.010" cracks. East abutment is undermined along its entire length with the undermining cavity measured up to 3' vertically with 5' of horizontal penetration. Three H-piles are exposed within the scour cavity but, appeared to be in good condition [2016] Underwater Inspection - East Abutment was undermined along full length a maximum of 2 feet vertically with 3.5 feet of penetration. Approximately 2.5 foot diameter by 1.5 feet deep area of loss of fill (erosion sink hole) was observed at the southeast corner of the back side of the East Abutment.							
220	Reinforced Concrete Pile Cap/Footing	Underwater	07/28/2016	20 LF	0	20	0	0
	Notes: [2016] Underwater Inspection - The exposed footing on the East Abutment was 2.5 feet thick at the north end and 4.0 feet thick at the south end.							
225	Steel Pile	Underwater	07/28/2016	3 EA	3	0	0	0
	Notes: [2016] Underwater Inspection - Three steel H-piles were exposed below the East Abutment and were in good condition.							
330	Metal Bridge Railing	Underwater	07/28/2016	182 LF	0	182	0	0
		Update	07/14/2016	182 LF	0	182	0	0
	Notes: [2011-15] Flex beam. Paint on rail post failing and post anchor rusting.							
	515 - Steel Protective Coating	Underwater	07/28/2016	350 SF	350	0	0	0
		Update	07/14/2016	350 SF	350	0	0	0

BRIDGE 93153 CR 107 OVER MID FK WHITEWATER RIVER

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
800	Critical Deficiencies or Safety Hazards	Underwater	07/28/2016	1 EA	1	0	0	0
		Update	07/14/2016	1 EA	1	0	0	0
Notes: [2011-15] No critical findings observed.								
822	Bituminous Approach Roadway	Underwater	07/28/2016	2 EA	2	0	0	0
		Update	07/14/2016	2 EA	2	0	0	0
Notes: [2011-15] Bituminous. [2015] East approach patched 2015.								
885	Scour	Underwater	07/28/2016	1 EA	0	0	0	1
Notes: [2016] Underwater Inspection - The East Abutment was undermined along its entire length with the undermining cavity measuring up to 2 feet vertically with 3.5 feet of horizontal penetration. Three steel H-piles were exposed within the cavity and appeared to be in good condition.								
891	Other Bridge Signing	Underwater	07/28/2016	1 EA	1	0	0	0
		Update	07/14/2016	1 EA	1	0	0	0
Notes: [2011-15] Delineators.								
892	Slopes & Slope Protection	Underwater	07/28/2016	1 EA	0	0	0	1
		Update	07/14/2016	1 EA	0	0	0	1
Notes: [2012-15] No slope protection at the East abutment. East abutment has major undermining with exposed H-pile.								
894	Deck & Approach Drainage	Underwater	07/28/2016	1 EA	1	0	0	0
		Update	07/14/2016	1 EA	1	0	0	0
Notes: [2013-15] Hole behind the abutment has been filled and patched, but has settled and needs more bituminous patching. [2012-15] A 2' diameter by 2' deep sink hole at the NE corner at the back side of the abutment.								
895	Sidewalk, Curb, & Median	Underwater	07/28/2016	1 EA	0	1	0	0
		Update	07/14/2016	1 EA	0	1	0	0
Notes: [2011-15] Wood. south side beginning to rot, needs to be replaced.								
899	Miscellaneous Items	Underwater	07/28/2016	1 EA	1	0	0	0
		Update	07/14/2016	1 EA	1	0	0	0
Notes: [2011-15] Has 4.5" galvanized conduit (telephone) on down stream side of rail.								
900	Protected Species	Underwater	07/28/2016	1 EA	0	1	0	0
		Update	07/14/2016	1 EA	0	1	0	0
Notes: [2016] Migrator determined the presence of swallows on this structure based on data in the inventory or comments in the general/miscellaneous notes.								

General Notes: DNR water monitoring equipment at the SE and NE corners.

Underwater inspection by MNDot completed on 10/2/12
Flood related pictures are in bridge file.

Highwater 1.5' above top of SE. wing, 2007.

West approach washed out and was repaired 8-19-2007 due to flood.

58. Deck NBI:

36A. Brdg Railings NBI:

36B. Transitions NBI:

36C. Appr Guardrail NBI:

36D. Appr Guardrail
Terminal NBI:

59. Superstructure NBI:

BRIDGE 93153 CR 107 OVER MID FK WHITEWATER RIVER

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
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60. Substructure NBI: [2012-15] Three H-piles are exposed within the scour cavity but, appeared to be in good condition.

61. Channel NBI: [2012-15] East abutment is undermined along its entire length with the undermining cavity measured up to 3' vertically with 5' of horizontal penetration.

62. Culvert NBI:

71. Waterway Adeq NBI:

72. Appr Roadway
Alignment NBI:

Inventory Notes:

Inspector's Signature

Reviewer's Signature

Pictures



Photo 2 - View of East Abutment, looking east.

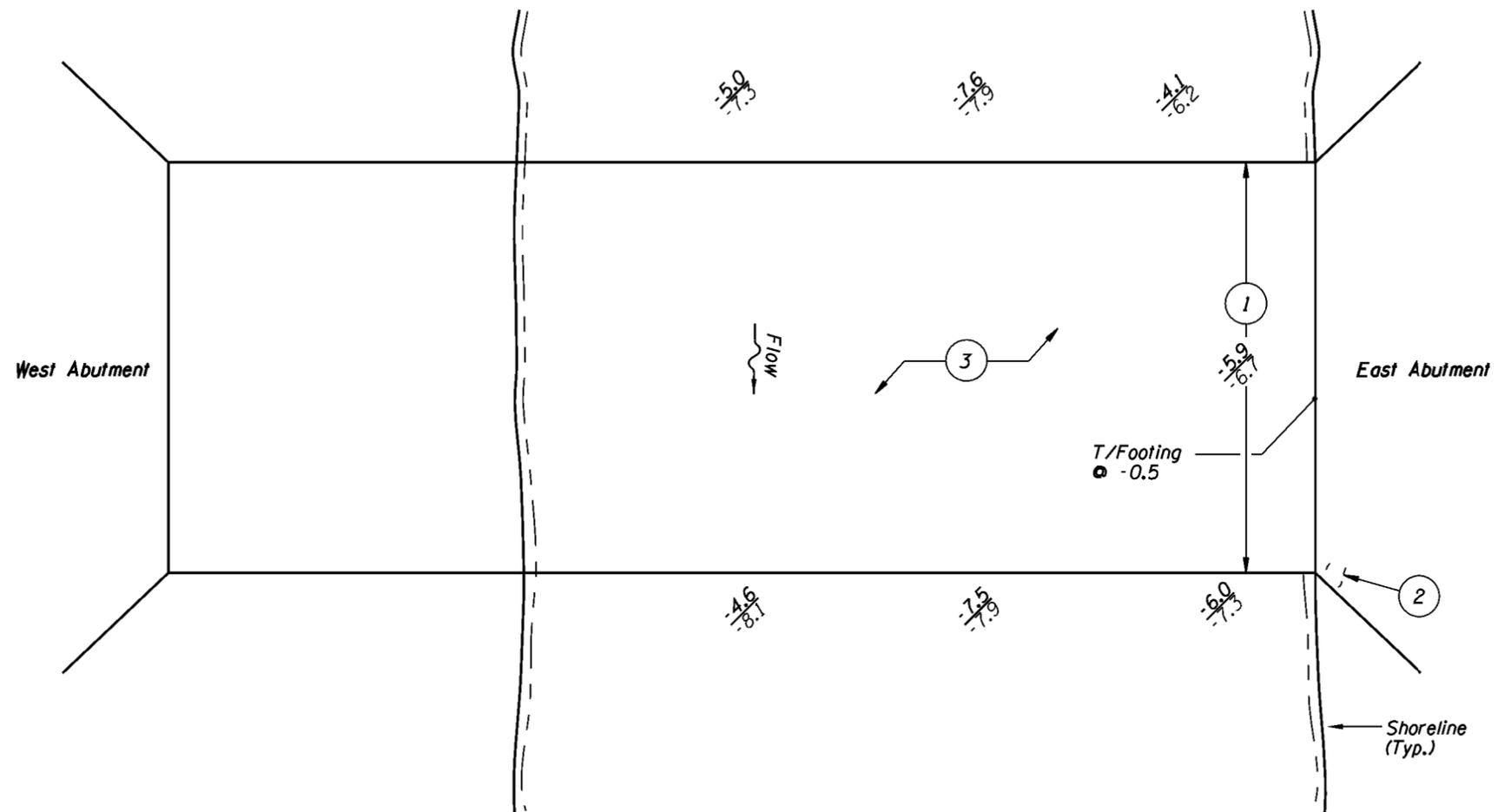
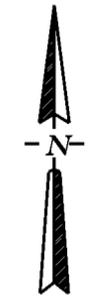


Photo 3 - View of West Abutment, looking west.

Pictures

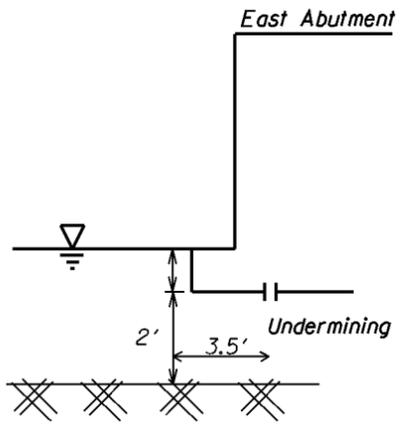


Photo 4 - View of sinkhole at the southeast corner of the backside of the East Abutment, looking down.



SOUNDINGS PLAN

- INSPECTION NOTES:**
- 1 The East Abutment was undermined along its entire length a maximum of 2 feet vertically with 3.5 feet of penetration. Three steel H-piles were exposed and were in good condition. The footing was 2.5 feet thick on the north end and 4.0 feet thick on the south end.
 - 2 A sinkhole measuring 2.5 feet diameter by 1.5 feet deep was observed at the southeast corner of the back side of the East Abutment.
 - 3 The channel bottom consisted of silty sand and random scattered 6 to 12 inch diameter stone with 18 inch penetration .



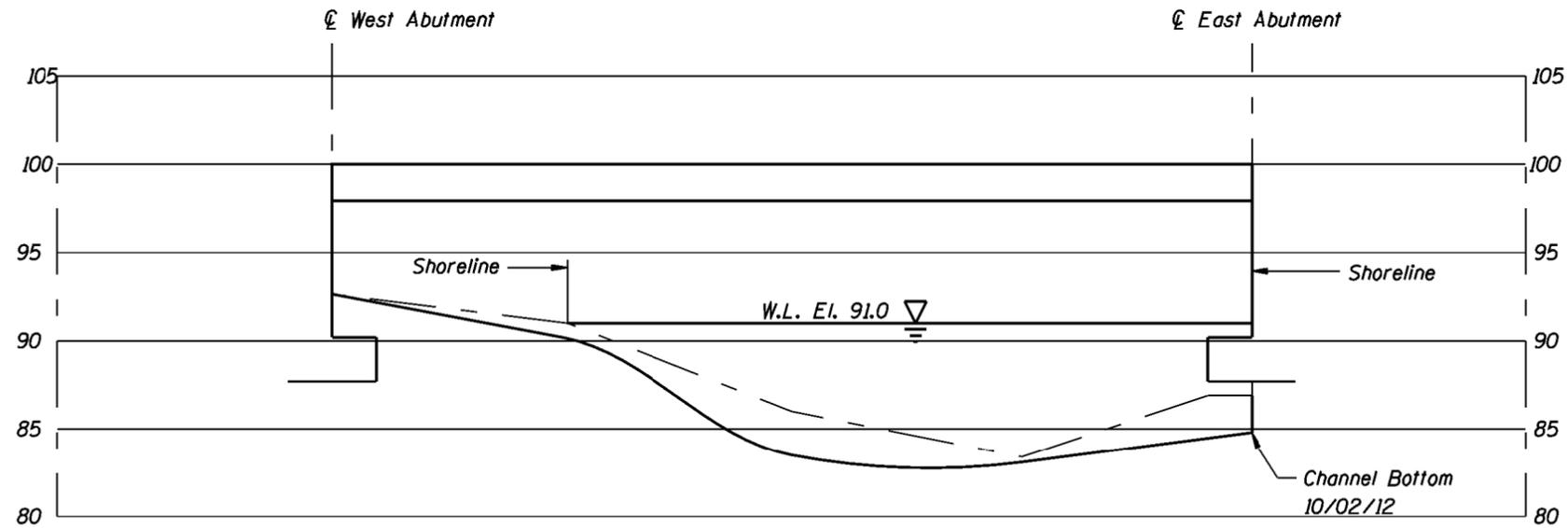
ELEVATION VIEW

- GENERAL NOTES:**
1. The East Abutment was inspected underwater.
 2. At the time of inspection, on June 14, 2016, the waterline was located approximately 9.0 feet below the top of the southeast wingwall next to southeast corner of abutment. Since insufficient reference elevation information was available, an elevation of 100.0 was assumed. This corresponds to a waterline elevation of 91.0.
 3. Soundings indicate the water depth at the time of inspection and are measured in feet. All soundings based on 2016 waterline location.
 4. Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units as well as around the substructure units.

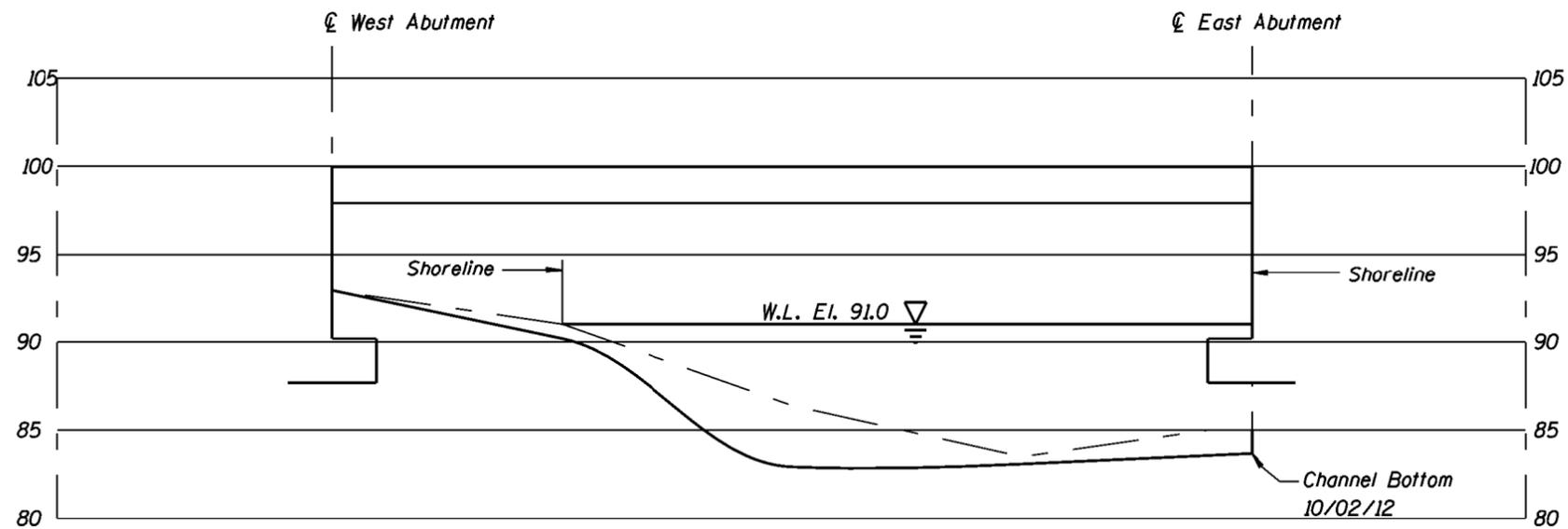
Legend

-0.4	Sounding Depth (6/14/16)
-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: MJS	COLLINS ENGINEERS <small>1599 Selby Ave. Suite 206 St. Paul, MN, 55104 (651) 646-8502 www.collinsengr.com</small>	Date: 6/14/2016
Checked By: RAF		Scale: NTS
Project: 63-9687		Figure No.: 1



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:
Refer to Figure 1 for General Notes.

Legend
 — Channel Bottom per 2012 Inspection
 — Channel Bottom per 2016 Inspection

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 93153 OVER THE MIDDLE FORK WHITEWATER RIVER OLMTED COUNTY		
UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
Drawn By: MJS Checked By: RAF Project: 63-9687	COLLINS ENGINEERS	1599 Selby Ave. Suite 206 St. Paul, MN, 55104 651.646.8302 www.collinsengr.com
		Date: 6/14/2016 Scale: NTS Figure No.: 2