UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 7819

CR 213

OVER A

STREAM

ST. LOUIS COUNTY

SEPTEMBER 27, 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 below water at Structure No. 7819, Box 1 and Box 2 of the culvert, were found to be in satisfactory to fair condition with defects of only minor structural significance. The concrete typically exhibited moderate to heavy scaling. There was a diagonal crack typically 1/8 inch wide on both center wall extensions and the northwest and southeast wingwalls. The floor of both boxes was covered in silt throughout the length of the culvert.

INSPECTION FINDINGS:

(A) The channel bottom material through the length of both boxes and upstream and downstream of the culvert consisted of silt and scattered stones allowing a maximum probe rod penetration of 1 foot.

(B) Moderate scaling was observed on the walls and ceiling of both boxes with a typical penetration of 1/4 inch and a maximum penetration of 1/2 inch.

(C) The center wall extensions at both the upstream and downstream ends of the culvert and the northwest and southeast wingwalls exhibited a diagonal crack extending from the channel bottom to the top of the wall. The cracks were typically 1/8 inch wide.

(D) An area of heavy scaling was observed at the south upper wall haunch of Box 1 near the upstream opening. The area measured 3 feet long by 6 inches high with a maximum penetration of 2 inches. No reinforcing steel was exposed.

(E) An area of heavy scaling was observed at the north wall of Box 1 near the upstream opening. The area measured 2 feet long by 8 inches high with a maximum penetration of 2 inches. No reinforcing steel was exposed.

RECOMMENDATIONS:

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

(B) At the time of inspection of the submerged substructure units of Structure No. 7819, the waterline and water flow were noticeably lower than the mean values. As a result the inspection could be safely carried out by means of wading. During future inspections of the substructure units, a higher waterline elevation and/or increased flow may result in lower overhead clearance with a possibility of a confined space entrance requirements which may require a qualified dive team to safely carry out the inspection. If future inspections determine that the waterline consistently remains at a level which an inspection can be safely performed by the means of wading, consideration may be given to removing the structure from the underwater inspection list.

Respectfully submitted,

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

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: 7819

Feature Crossed: A Stream

Feature Carried: CR 213

Location: St. Louis County

Bridge Description: The culvert consists of two reinforced concrete culvert boxes designated as Box 1 and Box 2 from south to north.

2. INSPECTION DATA

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

Dive Team: Marc B. Parker, Clayton Brookins

Date: September 27, 2012

Weather Conditions: Sunny, 55°F

Underwater Visibility: None/Negligible

Waterway Velocity: None/Negligible

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Box 1 and Box 2

General Shape: The culvert consists of two reinforced concrete box barrels measuring 10 feet wide by 4 feet high and 32 feet long.

Maximum Water Depth at Substructure Inspected: Approximately 0.8 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the culvert headwall at the upstream end near the center wall extension.

Water Surface: The waterline was approximately 4.8 feet above reference.
Assumed Waterline Elevation = 95.2 feet.

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

Item 62: Culvert Condition: Code 5

Item 61: Channel and Channel Protection: Code 7

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

Item 113: Scour Critical Bridges: Code E/12

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

____ Yes X No

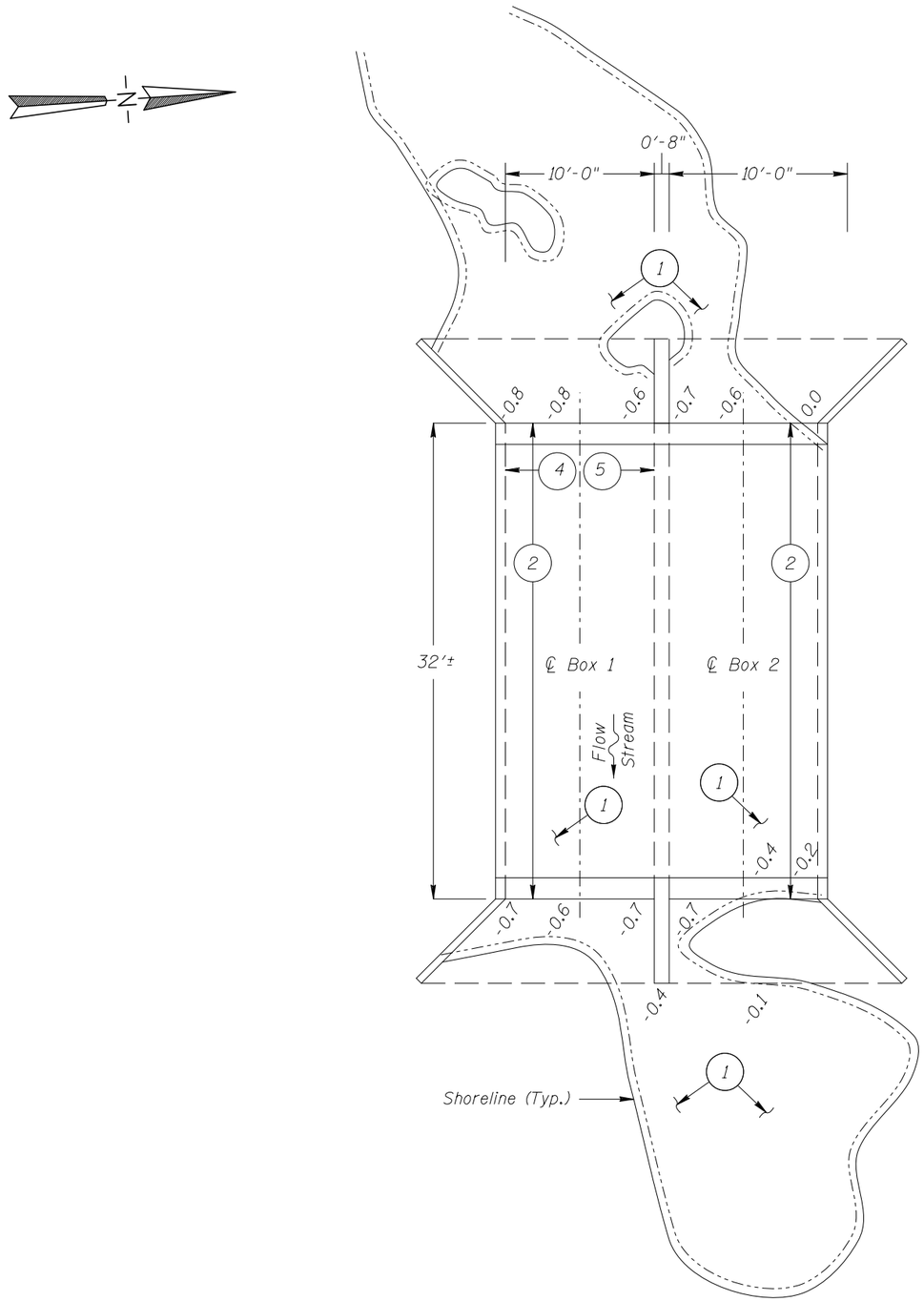
6. STRUCTURAL ELEMENT CONDITION RATING

Item #	Element Description	Quantity	Unit	Conditions				
				1	2	3	4	5
241	Concrete Culvert	66	LF	0	66	0	0	n/a
388	Culvert Headwall	2	EA	0	2	0	0	n/a
985	Slopes and Slope Protection	1	EA	1	0	0	n/a	n/a

Photograph 1. Overall View of the Culvert, Looking East.

Photograph 2. View of the Typical Scaling and Concrete Condition at the Waterline and Diagonal Crack on the Upstream Center Wall Extension, Looking Northeast.

Photograph 3. View of Heavy Scaling on the North Wall of Box 1 Near the Upstream Opening, Looking Northeast.



SOUNDING PLAN

INSPECTION NOTES:

1. The channel bottom material through the length of both boxes and upstream and downstream of the culvert consisted of silt and scattered stones allowing a maximum probe rod penetration of 1 foot.
2. Moderate scaling was observed on the walls and ceiling of both boxes with a typical penetration of $\frac{1}{4}$ inch and a maximum penetration of $\frac{1}{2}$ inch.
3. The center wall extensions at both the upstream and downstream ends of the culvert and the northwest and southeast wingwalls exhibited a diagonal crack extending from the channel bottom to the top of the wall. The cracks were typically $\frac{1}{8}$ inch wide.
4. An area of heavy scaling was observed at the south upper wall haunch of Box 1 near the upstream opening. The area measured 3 feet long by 6 inches high with a maximum penetration of 2 inches. No reinforcing steel was exposed.
5. An area of heavy scaling was observed at the north wall of Box 1 near the upstream opening. The area measured 2 feet long by 8 inches high with a maximum penetration of 2 inches. No reinforcing steel was exposed.

GENERAL NOTES:

1. Box 1 and Box 2 of culvert were inspected underwater.
2. At the time of inspection, on September 27, 2012, the waterline was located approximately 4.8 feet below the top of the culvert headwall at the upstream end at the center wall. Since insufficient elevation information was available, an elevation of 100.0 was assumed. This corresponds to a waterline elevation of 95.2.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.

Legend

-0.4	Sounding Depth (9/27/2012)
5	Inspection Note Number

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

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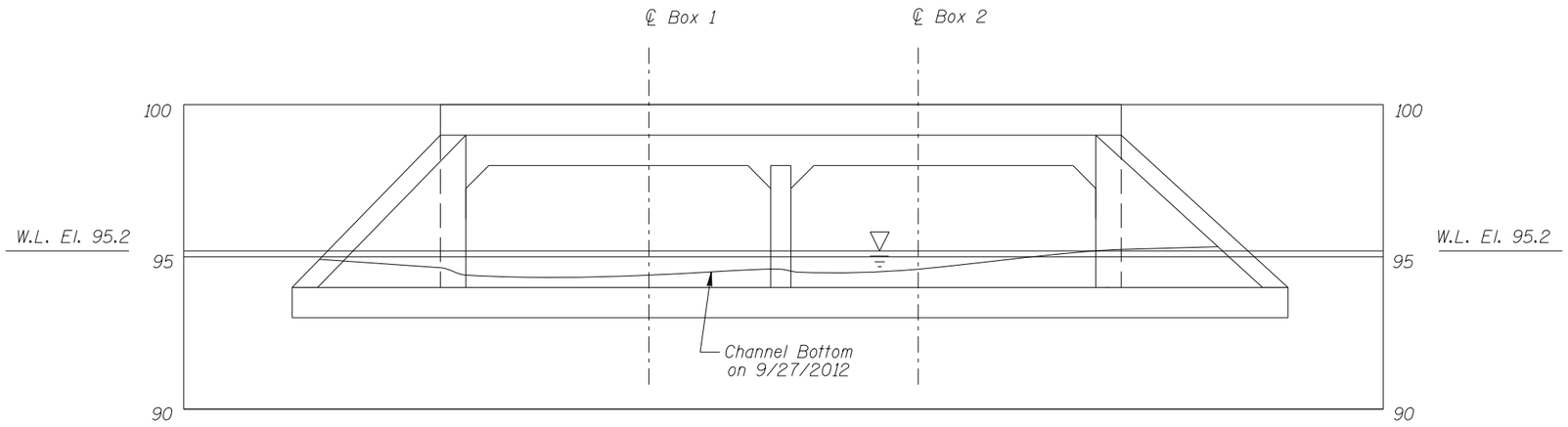
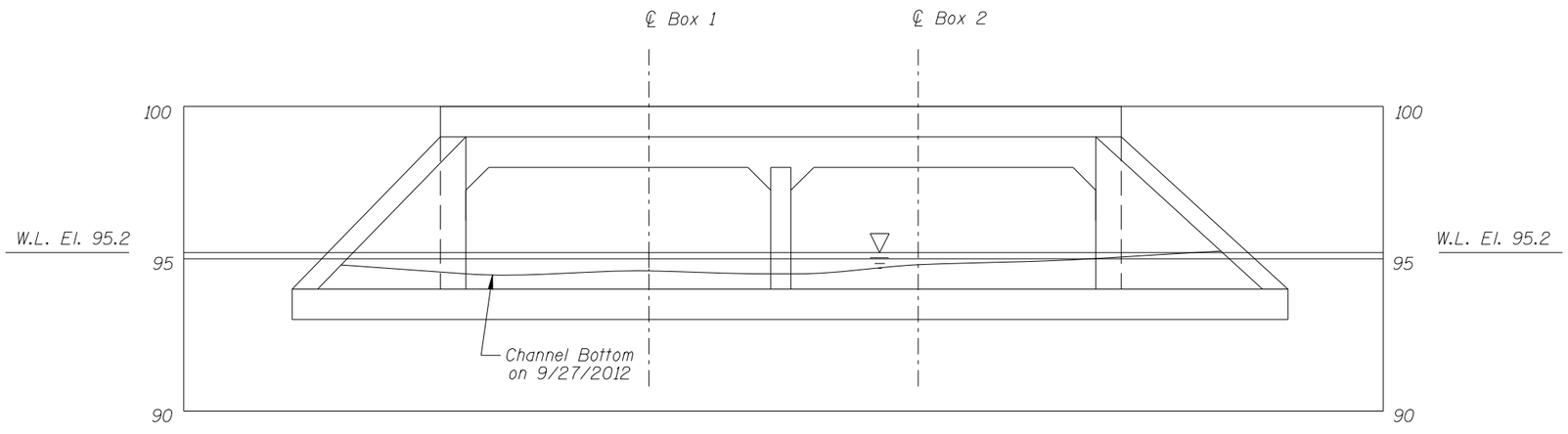
CR 213 OVER A STREAM
ST. LOUIS COUNTY

INSPECTION AND SOUNDING PLAN

Drawn By: MBP	COLLINS ENGINEERS INC 123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Date: DEC. 2012
Checked By: LJ		Scale: N.T.S.
Code: 74237819		Figure No.: 1



UPSTREAM OPENING PROFILE



DOWNSTREAM OPENING PROFILE

Note:

Refer to Figure 1 for General Notes.

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UPSTREAM AND DOWNSTREAM FASCIA PROFILES

Drawn By: MBP	COLLINS ENGINEERS INC 123 North Wacker Drive Suite 900 Chicago, Il. 60606 (312) 704-9300 www.collinsengr.com	Date: DEC. 2012
Checked By: LJ		Scale: 1"=5'
Code: 74237819		Figure No.: 2

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

INSPECTORS: Collins Engineers, Inc. DATE: September 27, 2012

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

BRIDGE NO: 7819 WEATHER: Sunny, 55° F

WATERWAY CROSSED: A Stream

DIVING OPERATION: _____ SCUBA _____ SURFACE SUPPLIED AIR

X OTHER Inspection by Wading

PERSONNEL: Clayton Brookins, Marc B. Parker

EQUIPMENT: Dry Suit, Sounding Pole, Hand Tools, Camera

TIME IN WATER: 3:30 P.M.

TIME OUT OF WATER: 3:55 P.M.

WATERWAY DATA: VELOCITY None/Negligible

VISIBILITY None/Negligible

DEPTH 0.8 feet maximum at the upstream opening

ELEMENTS INSPECTED: Box 1 and Box 2

REMARKS: Overall, the substructure units inspected were found to be in satisfactory to fair condition with only minor defects of structural significance. The concrete typically exhibited moderate to heavy scaling. There was a diagonal crack typically 1/8 inch wide on both center wall extensions and the northwest and southeast wingwalls. The floor of both boxes was covered in silt throughout the length of the culvert.

FURTHER ACTION NEEDED: _____ YES ___X____ NO

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

At the time of inspection of the submerged substructure units of Structure No. 7819, the waterline and water flow were noticeably lower than the mean values. As a result the inspection could be safely carried out by means of wading. During future inspections of the substructure units, a higher waterline elevation and/or increased flow may result in lower overhead clearance with a possibility of a confined space entrance requirements which may require a qualified dive team to safely carry out the inspection. If future inspections determine that the waterline consistently remains at a level which an inspection can be safely performed by the means of wading, consideration may be given to removing the structure from the underwater inspection list.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 7819
INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER Daniel G. Stromberg, P.E.
WATERWAY CROSSED A Stream

INSPECTION DATE September 27, 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

			SUBSTRUCTURE						CHANNEL					GENERAL					
UNIT REFERENCE NO.	UNIT DESCRIPTION	MAXIMUM DEPTH OF WATER	PILING	REINFORCED CONCRETE BOX CULVERT	FOOTINGS	DISPLACEMENT	OTHER (HEADWALL/WINGWALL)	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (SIL & DEBRIS BUILDUP)	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
1	Concrete Culvert Box 1	0.7’	N	6	N	N	6	6	N	8	N	7	7	6	N	N	N	N	N
2	Concrete Culvert Box 2	0.8’	N	5	N	N	6	5	N	8	N	7	7	5	N	N	5	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the substructure units inspected were found to be in fair condition with only minor defects of structural significance. The concrete typically exhibited moderate to heavy scaling. There was a diagonal crack typically 1/8 inch wide on both center wall extensions and the northwest and southeast wingwalls. The floor of both boxes was covered in silt throughout the length of the culvert.

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.