UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 7635

CSAH 4

OVER THE

BEAVER RIVER

ST. LOUIS COUNTY

JUNE 18, 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. 7635, Box 1 and Box 2 of the culvert, were found to be in good condition with no defects of structural significance. Light scaling was observed in both boxes of the culvert extending from 1 foot below the waterline to the culvert ceiling and along the entire ceiling with a typical penetration of 1/4 inch. The concrete floor of Box 1 was exposed along the length of the culvert with the upstream apron toe exposed vertically 6 inches. No undermining was observed at the upstream apron. The flow of the upstream waterway is directed at approximately a 45 degree angle to the culvert openings resulting in considerable sediment deposition with box 2 of the culvert, consisting of up to 2 feet thick layer of silt and light timber drift on the culvert floor.

INSPECTION FINDINGS:

(A) The concrete of the culvert was typically sound with no significant defects or loss of section.

(B) Light to moderate scaling was observed on the culvert walls extending from 1 foot below the waterline to the culvert ceiling and on the entire ceiling with a typical penetration of 1/4 inch and a maximum penetration of 1/2 inch.

(C) The concrete floor was exposed in Box 1 along the entire length of the culvert box. The culvert apron was exposed along Box 1 at the upstream opening of the culvert with up to 6 inches of apron toe vertical exposure. No undermining was observed at the upstream toe.

(D) The eastern half of the box 2 culvert floor was typically covered by a approximately 2 feet thick layer of soft silty infill accumulation with typical probe rod penetration of 1 foot. A light timber drift accumulation was scattered throughout the box consisting of 3 inch diameter and smaller branches.

(E) The channel bottom material upstream of the structure consisted of a firm mixture of sand and gravel with up to 6 inch diameter cobbles allowing no probe rod penetration.

(F) The channel bottom material downstream of the structure consisted of sandy gravel allowing up to 2 inches of probe rod penetration.

RECOMMENDATIONS:

(A) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five 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: 7635

Feature Crossed: Beaver River

Feature Carried: CSAH 4

Location: St. Louis County

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

2. INSPECTION DATA

Professional Engineer Diver: Daniel G. Stromberg

Dive Team: Clayton Brookins, Breanne Stromberg

Date: June 18, 2012

Weather Conditions: Partly Cloudy, 70°F

Underwater Visibility: 2.0 feet

Waterway Velocity: 1 ft/sec

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 5 feet high and 72 feet long.

Maximum Water Depth at Substructure Inspected: Approximately 4.5 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the upstream headwall.

Water Surface: The waterline was approximately 2.5 feet below reference.
Assumed Waterline Elevation = 97.5 feet.

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

Item 62: Culvert Condition: Code 7

Item 61: Channel and Channel Protection: Code 6

Item 92B: Underwater Inspection: Code B/06/12

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 CONDITOIN RATING

Item #	Element Description	Quantity	Unit	Conditions				
				1	2	3	4	5
241	Concrete Culvert	144	LF	144				
388	Culvert Wingwalls/Headwall	2	EA		2			

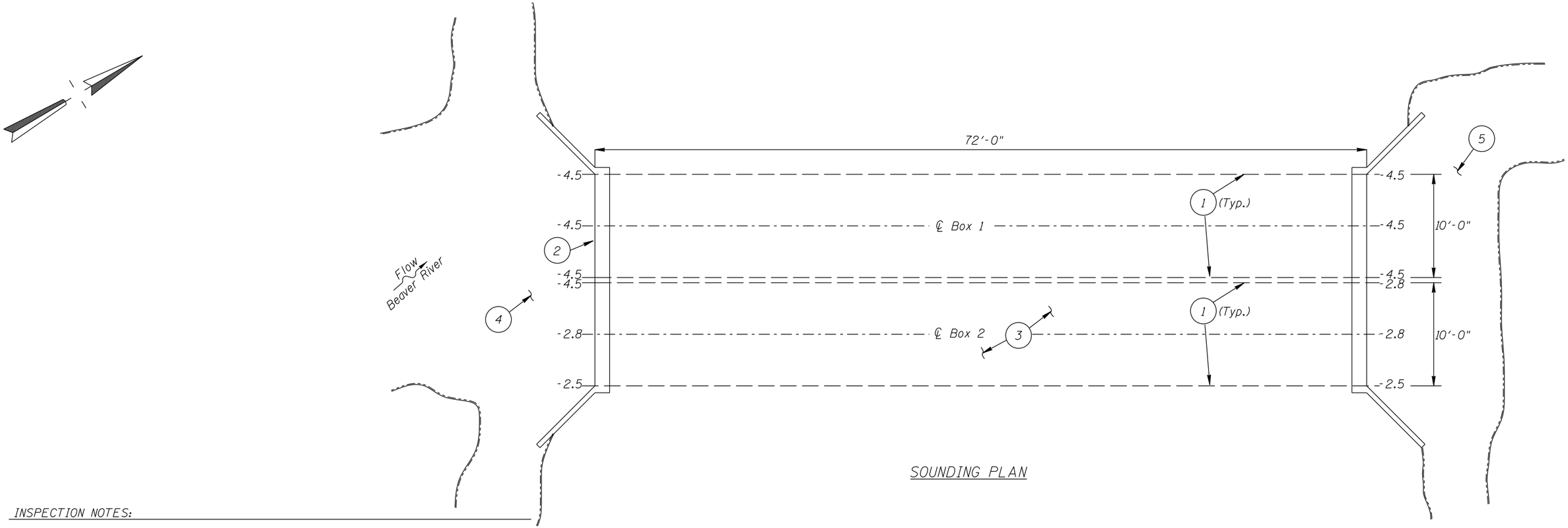
Photograph 1. View of the Upstream headwall, Looking Northeast.

Photograph 2. View of the Downstream Headwall, Looking Southeast.

Photograph 3. View of Typical Scaling at the West Wall of Box 1, Looking West.

Photograph 4. View of Upstream Channel, Looking South.

Photograph 5. View of Downstream Channel, Looking North.



SOUNDING PLAN

INSPECTION NOTES:

1. Light to moderate scaling was observed on the culvert walls extending from 1 foot below the waterline to the culvert ceiling and on the entire ceiling with a typical penetration of 1/4 inch and a maximum penetration of 1/2 inch.

2. The concrete floor was exposed in Box 1 along the entire length of the culvert box. The culvert apron was exposed along Box 1 at the upstream opening of the culvert with up to 6 inches of apron toe vertical exposure. No undermining was observed at the upstream toe.

3. The eastern half of the box 2 culvert floor was typically covered by a approximately 2 feet thick layer of soft silty infill accumulation with typical probe rod penetration of 1 foot. A light timber drift accumulation was scattered throughout the box consisting of 3 inch diameter and smaller branches.

4. The channel bottom material upstream of the structure consisted of a firm mixture of sand and gravel with up to 6 inch diameter cobbles allowing no probe rod penetration.

5. The channel bottom material downstream of the structure consisted of sandy gravel allowing up to 2 inches of probe rod penetration.

GENERAL NOTES:

1. Box 1 and Box 2 of culvert were inspected underwater.
2. At the time of inspection, on June 18, 2012, the waterline was located approximately 2.5 feet below the top of upstream headwall. Since insufficient elevation information was available, an elevation of 100.0 was assumed. This corresponds to a waterline elevation of 97.5.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.

Legend

-0.4 Sounding Depth (6/18/2012)

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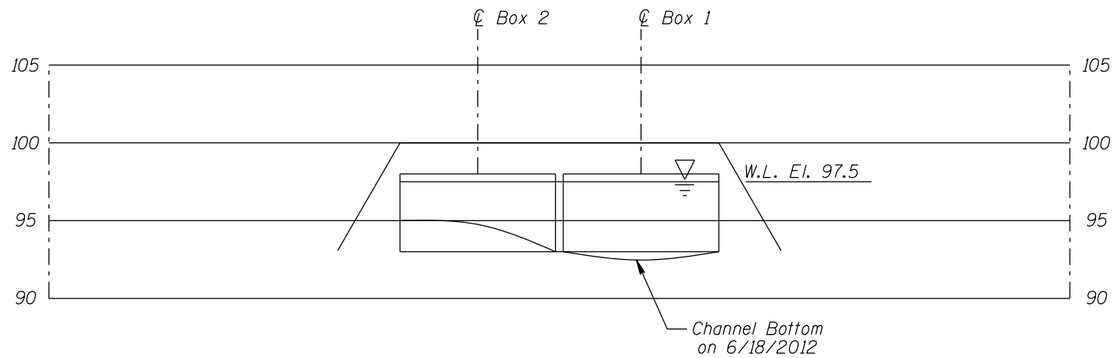
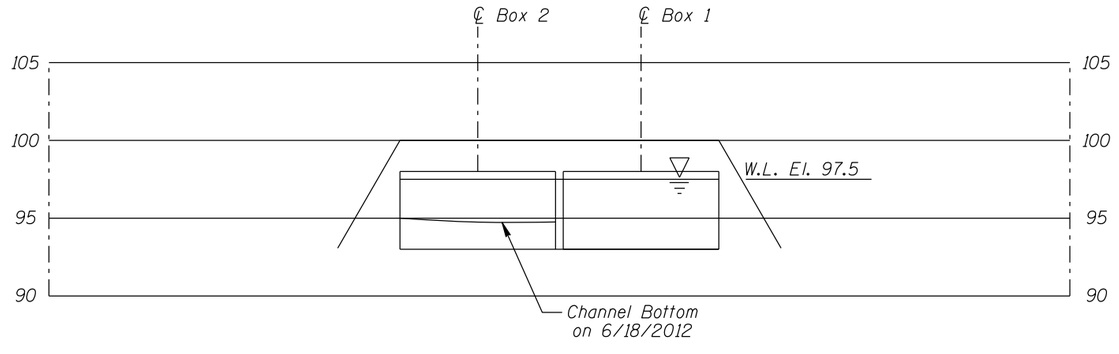
ST LOUIS COUNTY

INSPECTION AND SOUNDING PLAN

Drawn By: BMS	COLLINS ENGINEERS	Date: JULY 2012
Checked By: LJ		Scale: NTS
Code: 74237635		Figure No.: 1



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:

Refer to Figure 1 for General Notes.

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UPSTREAM AND DOWNSTREAM
FASCIA PROFILES

Drawn By: BMS	COLLINS ENGINEERS	Date: JULY 2012
Checked By: LJ		Scale: NTS
Code: 74237635		Figure No.: 2

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

INSPECTORS: Collins Engineers, Inc. DATE: June 18, 2012

ON-SITE TEAM LEADER: Daniel G. Stromberg

BRIDGE NO: 7635 WEATHER: Partly Cloudy, 70° F

WATERWAY CROSSED: Beaver River

DIVING OPERATION: X SCUBA _____ SURFACE SUPPLIED AIR

_____ OTHER _____

PERSONNEL: Clayton Brookins, Breanne Stromberg

EQUIPMENT: Commercial Scuba, Sounding Pole, Hand Tools, Camera, Underwater Light

TIME IN WATER: 12:45 p.m.

TIME OUT OF WATER: 1:45 p.m.

WATERWAY DATA: VELOCITY 1 ft/sec

VISIBILITY 2.0 feet

DEPTH 4.6 feet maximum

ELEMENTS INSPECTED: Box 1 and Box 2

REMARKS: Overall, the substructure units inspected were found to be in good condition with no defects of structural significance. Light scaling was observed on the walls of both boxes of the culvert extending from 1 foot below the waterline to the culvert ceiling and along the entire ceiling with a typical penetration of 1/4 inch. The concrete floor of Box 1 was exposed along the length of the culvert. The culvert apron was also exposed along the upstream end of Box 1 with up to 6 inches of vertical apron toe exposure. No undermining was observed at the upstream apron. The culvert floor within Box 2 was mostly covered by a layer of silt infill and light timber drift up to 2 feet thick.

FURTHER ACTION NEEDED: _____ YES X NO

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

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 7635
INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER Daniel G. Stromberg
WATERWAY CROSSED Beaver River

INSPECTION DATE June 18, 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 (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
1	Concrete Culvert Box 1	4.5’	N	7	N	8	7	7	8	6	N	N	6	7	N	N	8	N	N
2	Concrete Culvert Box 2	2.75’	N	7	N	8	7	7	8	6	N	6	6	7	N	N	8	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the substructure units inspected were found to be in good condition with no defects of structural significance. Light scaling was observed on the walls of both boxes of the culvert extending from 1 foot below the waterline to the culvert ceiling and along the entire ceiling with a typical penetration of 1/4 inch. The concrete floor of Box 1 was exposed along the length of the culvert. The culvert apron was also exposed along the upstream end of Box 1 with up to 6 inches of vertical apron toe exposure. No undermining was observed at the upstream apron. The culvert floor within Box 2 was mostly covered by a layer of silt infill and light timber drift up to 2 feet thick.

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.